

Aphids on the World's Herbaceous Plants and Shrubs

11. HEMIPTERA.

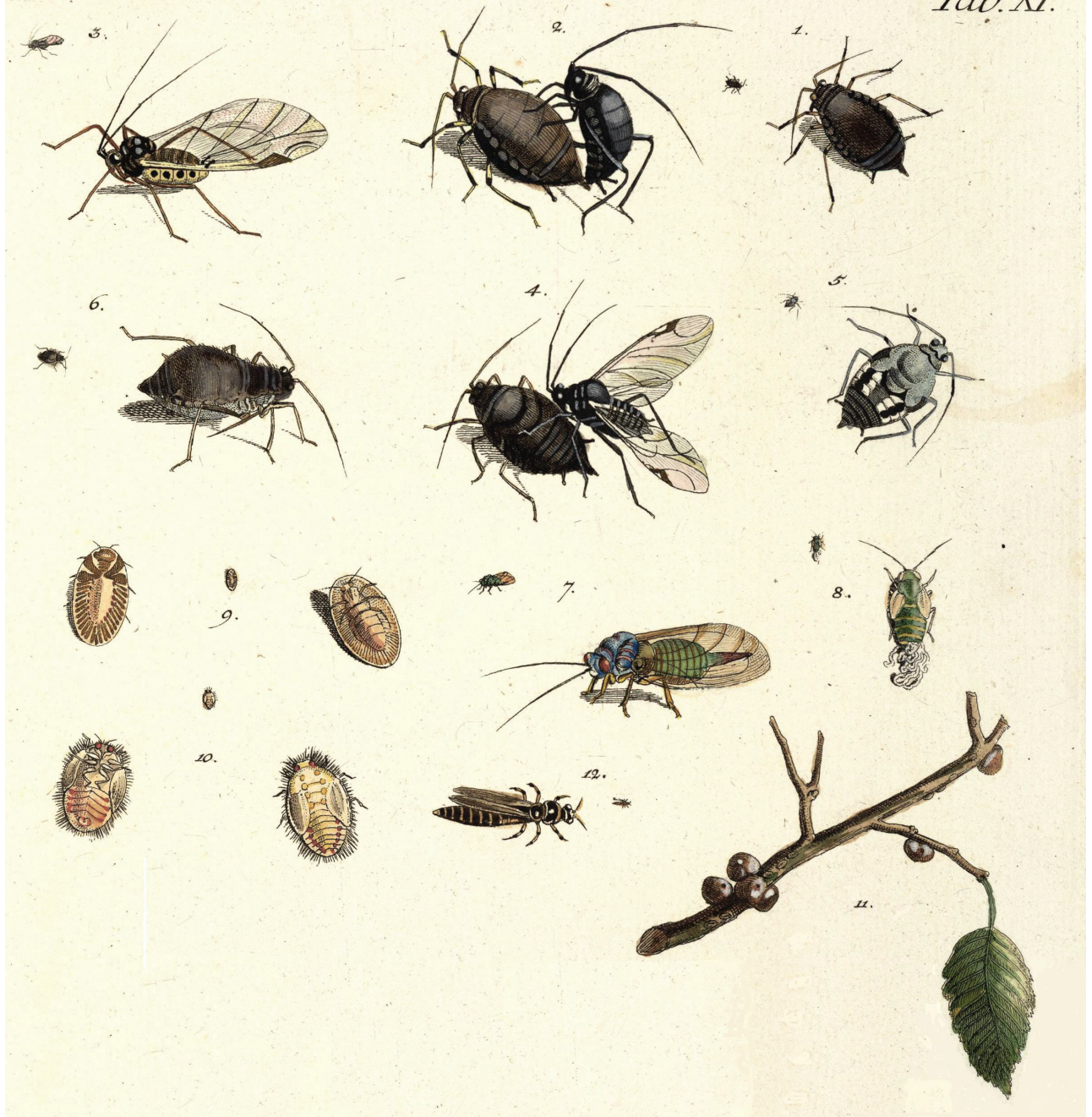
Aphis. 1–6.

Chermes. 7, 8.

Coccus. 9–11.

Thrips. 12.

Tab. XI.



Some superb early illustrations of aphids and other small insects from Sulzer (1776), *Abgekürzte Geschichte der Insecten nach dem Linnæischen System*. 1. "(Aphis) Opuli. Die Schneeballenlaus." (*Aphis viburni* Scopoli); 2. "Opuli. Die Schneeballenlaus, in copulation"; 3. "(Aphis) Persicae. Die Pfersichlaus." (Original illustration of alata of *Myzus persicae* (Sulzer)); 4. "(Aphis) Polianth. tuberos." (*Aphis fabae* Scopoli, ovipara and male); 5. Ditto, immature male; 6. "(Aphis) Salicis." (*Pterocomma salicis* (L.)); 7 and 8. "(Chermes) Buxi." (*Psylla buxi* (L.)); 9. "(Coccus) Persicorum." (*Parthenolecanium persicae* (Fabricius)); 10. "(Coccus) Fol. Quercus." (*Kermes quercus* (L.)); 11. "(Coccus) Fagi." (a nomen dubium); 12. "(Thrips) Fuscus." (*Melanthrips fuscus* (Sulzer)).

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VOLUME 1 Host Lists and Keys

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VOLUME 2 The Aphids

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Cover shows a Stereoscan photograph of an apterous vivipara of *Myzus persicae* (Sulzer) feeding from mid-rib of a Pe-Tsai (*Brassica pekinensis*) leaf. Reproduced by kind permission of Cho-kai Chan. Inset is a colony of *Liosomaphis berberidis* (Kaltenbach) feeding on the underside of a *Berberis* leaf.

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Preface

The events leading to this book started a quarter of a century ago, and since then it has very much been a story of one thing leading to another. It was in about 1980 that we first conceived the idea of a crop-oriented identification and information guide to the world's aphids. We were motivated in that project by two thoughts. First, it seemed evident to us that it would be very useful to adopt a world scale for the book, because the same main crops are grown on all continents, and pest aphids are rather good at eventually finding them wherever they are grown. Second, relatively few aphid species are pests, and those that occur on any one crop tend not to be closely related, so that it is possible to compile relatively simple keys for their identification. Thus, *Aphids on the World's Crops* came into being (1984), and was well-enough received to be followed by a CD-ROM (1998) and a second edition (2000).

These publications included aphid pests of fruit trees, but they did not include aphids on trees grown commercially for their timber, even though the Aphidoidea include some of the most important pests of temperate softwoods and hardwoods. We had good reason to exclude tree-dwelling aphids, as we knew that compiling keys to these was a very different task, needing to distinguish between many closely-related species and to compile accounts that were essentially, if rather superficially, world revisions of major aphid genera. Eventually, however, we produced *Aphids on the World's Trees* (1994), with aphids listed and keyed according to tree genera. The subject matter – the trees as well as the aphids feeding on them – forced us to adopt a far more comprehensive approach, as we could find no justification for including some species – both of trees and of tree-dwelling aphids – and omitting others. There was also no good reason to exclude such tree genera as *Prunus* and *Malus*, so there was some overlap with the crops book, compounded by the fact that many pests of field crops exhibit host alternation and migrate to trees for their sexual phase.

About 40 per cent of the world's aphid fauna (1760 species in 355 genera) live wholly or partly on trees. So, having completed this task, we started to contemplate whether the other 55 per cent living on herbaceous plants and shrubs could be treated similarly (the host plants of the remaining 5 per cent are unknown). The utility of a complete host plant-oriented treatment of the world's aphids – something as yet unavailable for any major group of plant-feeding insects – seemed undeniable, and this provided motivation as well as lending a certain inevitability to the project, but we had no illusions about the task ahead. The number of species involved was in reality about 70 per cent of the total world aphid fauna rather than 55 per cent, because of those that host-alternate between trees and herbaceous plants, and a significant proportion were little-known species requiring consultation of original literature. After the first year, we had not even completed keys to aphids on plant genera beginning with 'A', stuck on *Artemisia*, which is amazingly host to 260-plus aphid species, and seriously wondering whether the task could ever be finished. However, one of us kept compiling host lists and the other writing keys, and gradually through many more years the project progressed towards a conclusion.

One factor spurring us on was the knowledge that we were in a uniquely advantageous position to do such work. To hand was a collection of about 600 000 microscope slides of aphids, which is probably the largest, certainly the most representative, and perhaps also – we like to think – the best-curated collection of this group of insects in the world. Sitting on top of the long double-decker row of cabinets containing these slides is a double row of box files containing reprints or copies of about 95 per cent of the taxonomic papers about aphids ever

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written, some dating back more than 100 years, and sharing the same building is the world's largest library of books and journals relating specifically to insect taxonomy. With such a unique resource at our fingertips, should we not do our best to find a way make all this information more readily available?

Museum collections and libraries are essential resources, but they do not of course in themselves ensure good taxonomy. Taxonomy strives to name and classify organisms in such a way as to truly reflect their phylogenetic relationships – a fundamental requirement if we are to understand how organisms have evolved to live and interact with each other. As in many branches of biology, it is mainly a matter of correctly interpreting variation. In practice this inevitably means *morphological* variation, because the idea that adequate molecular data will ever be available to construct molecular phylogenies and define meaningful boundaries for all the thousands of taxa *at the species level* is still a pipe-dream.

Of course, morphological variation has the big disadvantage of being greatly influenced by the environment in which an organism develops. Different environmental factors, e.g. host plant, stress, humidity and temperature, affect morphology in different ways, and in aphids their environmentally conditioned polymorphism (polyphenism) adds a further complication, because under certain conditions forms intermediate between two morphs may be produced. Such is the variation within aphid species that its correct interpretation requires a collection large enough to contain many specimens of each species, including both apterous and alate morphs, and many samples from different localities and seasons.

The correct interpretation of variation also requires lots of acquired knowledge and experience, because the various ways in which morphological features interact with the environment not only have to be recognised, but also viewed and made sense of in the context of the probable biology of the species – life cycle, host plant relationships, polymorphism – based on knowledge of the genus or species group to which it belongs. Species in some groups, e.g., Hormaphidinae and Pemphiginae, and some of the host-alternating Aphidinae, have completely different morphology on primary and secondary hosts, such that different morphs of one species have often been described in different genera. Some characters such as the relative lengths of antennal segments vary according to temperature, others such as the shapes and lengths of hairs vary more according to humidity, and some characters can differ greatly between alatae and apterae, so that intermediates exhibit a wide range of variation. All these different aspects of aphid variation provide traps for the unwary.

Between us we have nearly 100 years' experience of working with aphids, which has perhaps made us more aware of the potential pitfalls, and of ways to avoid them. We hope therefore that we have produced a work that will be a helpful and reliable tool for both the newcomer to the world of aphids and to the more practised researcher. However, such experience also makes us very aware of our own fallibility, and we will publish this work with near certainty that, like its predecessors, it will contain some glaring errors. We can only hope that there are not too many of them. We would be grateful for notification of errors, omissions and difficulties with the keys, especially if supported with slide mounted specimens.

This work would not have been possible without the BMNH aphid collection, and the many people who have helped make it what it is today. A list of all those who have donated slides or assisted with curation would be a very long one, and we can only here mention major contributors over the years. The largely but by no means exclusively European collections of F. Walker, G.B. Buckton, F.V. Theobald, J.P. Doncaster and H.L.G. Stroyan, and the European and African collections of W.J. Hall, were massively enhanced by the D. Hille Ris Lambers bequest in 1984 which added much type material. That North American aphids are so well represented is mainly due to specimens and slides donated by others who are no longer with us; E.O. Essig, G.F. Knowlton, H.G. Walker, J.O. Pepper, C.F. Smith and A.G. Robinson. Many other aphid taxonomists have donated or lent specimens, sent copies of their publications, and been always ready to provide assistance, advice and unpublished data. Specifically we would like to mention S. Barbagallo, S. Chakrabarti, C.-k. Chan, S.K. David, A.K. Ghosh, S.E. Halbert, S.H. Hodjat, J. Holman, R. Kh. Kadyrbekov, M. Miyazaki, J.M. Nieto Nafria, W.H. Paik, N.F. Pashtshenko, G.-x. Qiao, F.W. Quednau, G. Remaudière, M. Sorin, A.V. Stekol'shchikov, M.B. Stoetzel, H.L.G. Stroyan, D. J.Voegtlin and G.-x. Zhang. On the BMNH staff, J.H. Martin's collecting trips have added valuable new specimens to the collection from four continents, and P.A. Brown has rescued much type and other unique material that would otherwise have been lost, by skilfull remounting and restoration of slides.

The last two years' work was facilitated by an Emeritus Research Fellowship to R.L.B. from the Leverhulme Trust.

R.L. Blackman and V.F. Eastop

VOLUME 1

Host Lists and Keys?

Introduction

This work is based on the same rationale as our previous ones (Blackman and Eastop, 1984, 1994, 2000), and has a similar format. It is specifically intended to complement the 1994 book *Aphids on the World's Trees*, and thus complete a comprehensive account of the world's aphids in relation to their host plants. The host–aphid lists and keys in this volume demonstrate, and in fact owe their feasibility to, the fact that most aphids are relatively host specific, and that this specificity is most evident at the level of the host genus. The number of aphid species recorded from any one plant genus varies greatly, from one to more than 260 (on *Artemisia*), and the proportion of these that are monophagous, oligophagous or polyphagous also shows considerable variation. The reasons for these differences are presumably part physiological and part phylogeographic. We hope that the lists will serve the supplementary purpose of providing a useful database for anyone studying the origins and evolution of the present-day associations between aphids and their host plants.

The host plant–aphid lists

Aphid/host plant records are extracted from a wide variety of literature sources and will inevitably include a percentage of misidentifications, both of aphid and host plant. As the aim is to list only true host plants we have omitted any records that are clearly spurious, e.g., tree-dwelling aphids such as *Drepanosiphum platanoides* and *Eucallipterus tiliae* that will often be found on vegetation below their respective host trees, and other aphids that were obviously vagrant individuals. When an aphid–host plant association is unusual or doubtful, the aphid species is placed in square brackets. We have used square brackets in all cases where an aphid is listed but not included in the key, not only for records that we consider doubtful, but also for unseen and little-known species where the description does not provide sufficient information to discriminate it from other related ones occurring on the same plant genus. Further information on most of these species can be found in Volume 2 (referring to the index if necessary), or in Blackman and Eastop (1994) if a tree is the normal host plant. In general we have tended to adopt a liberal approach, including species in a key even when we think that their normal hosts are in other genera.

For generic names of plants we have followed Brummit (1992) and Mabberley (1997). Authorities for plant species names are omitted except where there is ambiguity. We have made considerable use of *Index Kewensis* and the Missouri Botanic Garden database (<http://mobot.mobot.org/W3T/Search/vast.html>) in searching for and verifying plant names. Plant names that were misspelt in the original records have been corrected where we could be reasonably certain of the intended species. Names that could not be identified by reference to any available database of plant names have been included but are followed by '(?)'.

The keys

A key is provided to the aphid species on each plant genus in all cases except where only one species is recorded from that genus, or where all the species are polyphagous. Sometimes the aphids on related plant genera are combined in a single key. In particular, we found it most convenient to key all grass-feeding aphids (even although some are monophagous or genus-specific) together under *Digitaria*, and a similar procedure was adopted for aphids on ferns (under *Polypodium*), mosses (under *Polytrichum*) and orchids (under *Cymbidium*). There are cross-references to these keys under the host lists of all the relevant plant genera. In two instances – for aphids feeding on *Artemisia* and for grass-feeding aphids – a single key would have been too cumbersome, so there is a master key leading to a series of subsidiary keys.

As in our previous identification guides, the keys are intended specifically for aphids found feeding on or colonising a named plant species, and are based almost exclusively on the apterous viviparous morphs (apt.) found in mid to late spring and summer. The stem mother or fundatrix (fund.) developing from the overwintering egg usually has a distinctive morphology, so samples collected early in the season (particularly when consisting of adult apt. with a few progeny) must be treated warily. There are a few inevitable exceptions where there is no apt. to key, either because the viviparous females are all alate (al.) or, in the case of some heteroecious aphids on their primary host plants, because all the progeny of the fund. are al. spring migrants. In all such cases the morph(s) to which the key can be applied are, we think, clearly indicated.

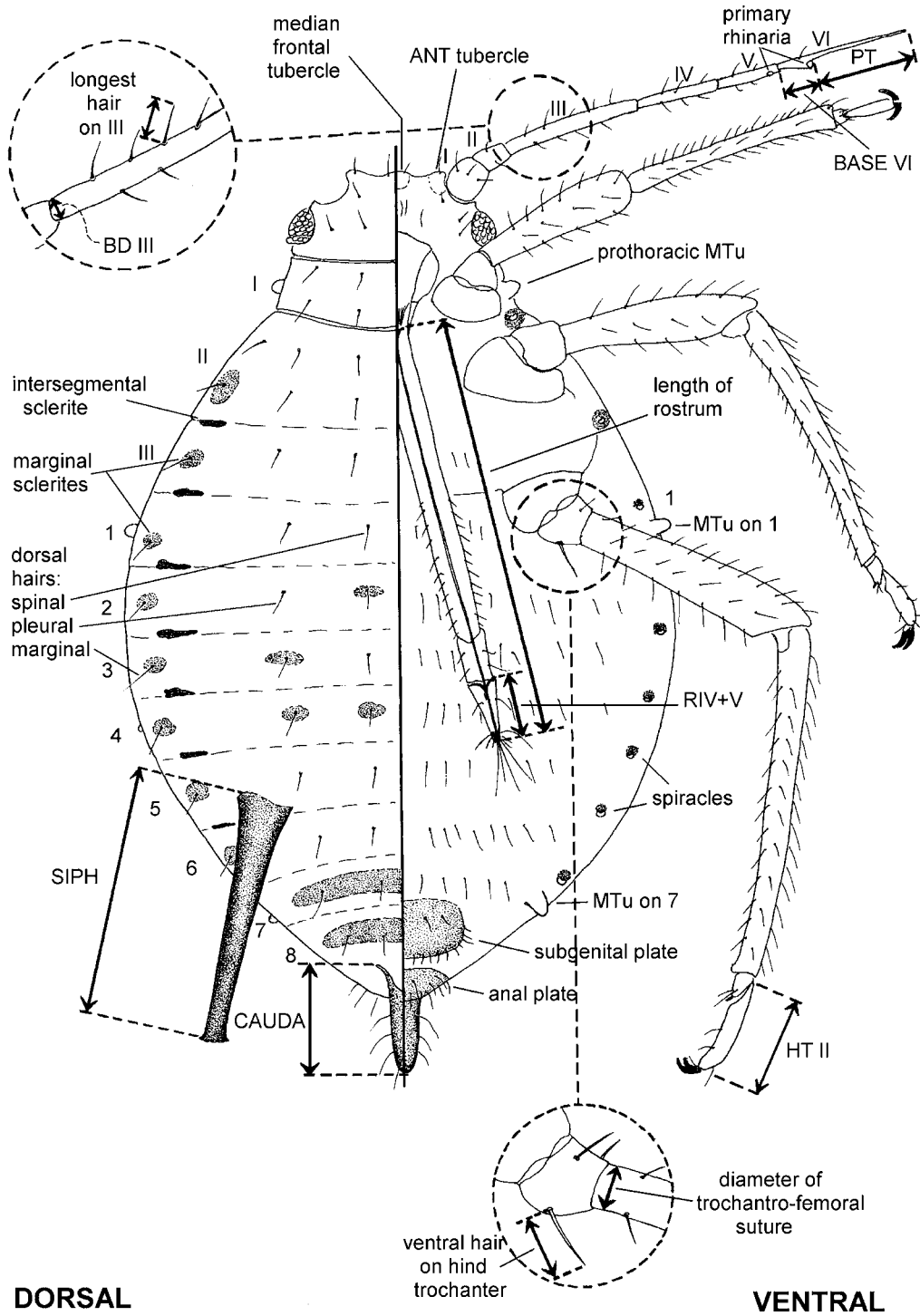
Polyphagous aphids occur on most common plant genera, and to avoid a great deal of repetition most keys at some point lead the user to the key to the 35 most polyphagous aphids, or to some part of it. Most of these polyphagous aphid species are in any case likely to be found on any plant along with aphids with more specific tastes, so it makes sense to transfer the user to the polyphagous aphids key at an appropriate point, even when only rather few polyphagous species have actually been recorded from the plant genus in question. In fact, the first question for anyone setting out to identify an aphid from any plant should be 'Is it one of the common polyphagous species?' (See also the introductory comments to the polyphagous aphids key on p. 1020.)

Whereas the keys in *Aphids on the World's Crops* are relatively simple and can be used for unmounted specimens viewed under a binocular microscope, the user of the keys in this book will need to make microscope slide whole mounts of the aphids to be identified. We recommend that Canada balsam mounts are prepared as these are of proven permanence, and can withstand a range of temperatures and humidities. A simple procedure for preparing balsam mounts is that of Martin (1983); for details of this and other advice on mounting, labelling and storage of aphid specimens see Blackman and Eastop (2000: 363–5). An important additional point to emphasise is that the exposure to and removal of potassium hydroxide need to be carefully carried out, as over-potashing will cause bleaching, and the extent and distribution of cuticular pigmentation is often used as a key character.

Figures 1–4 illustrate the characters and morphometric parameters in common use in the keys, and the abbreviations. For more detailed information on aphid morphology consult Miyazaki (1987), or Blackman

Figure 1 Diagrammatic illustration of an apterous vivipara of a member of the tribe Aphidini showing dorsal (L) and ventral (R) morphological features used in the keys in this book, the abbreviations used, and ways to measure certain morphometric parameters. Antennal (ANT) and thoracic segments are numbered I–VI and I–III respectively, ANT III onwards being the ANT flagellum, and ANT VI comprising BASE and processus terminalis (PT). The ratio of ANT VI BASE to PT ('ANT PT/BASE') is a frequently used discriminant. Abdominal segments are numbered 1–8. Insets show measurements of ANT and trochantral hairs, basal diameter of ANT III (BD III) and diameter of trochantro-femoral suture. The last two segments of the rostrum usually form a combined structure (R IV+V), the length of which is often compared with that of the 2nd segment of the hind tarsus (HT II). Members of the tribe Aphidini typically have marginal tubercles (MTu) on the prothorax and abdominal tergites (ABD TERG) 1 and 7, but some have them also on other segments.

THE PLANTS AND THEIR APHIDS



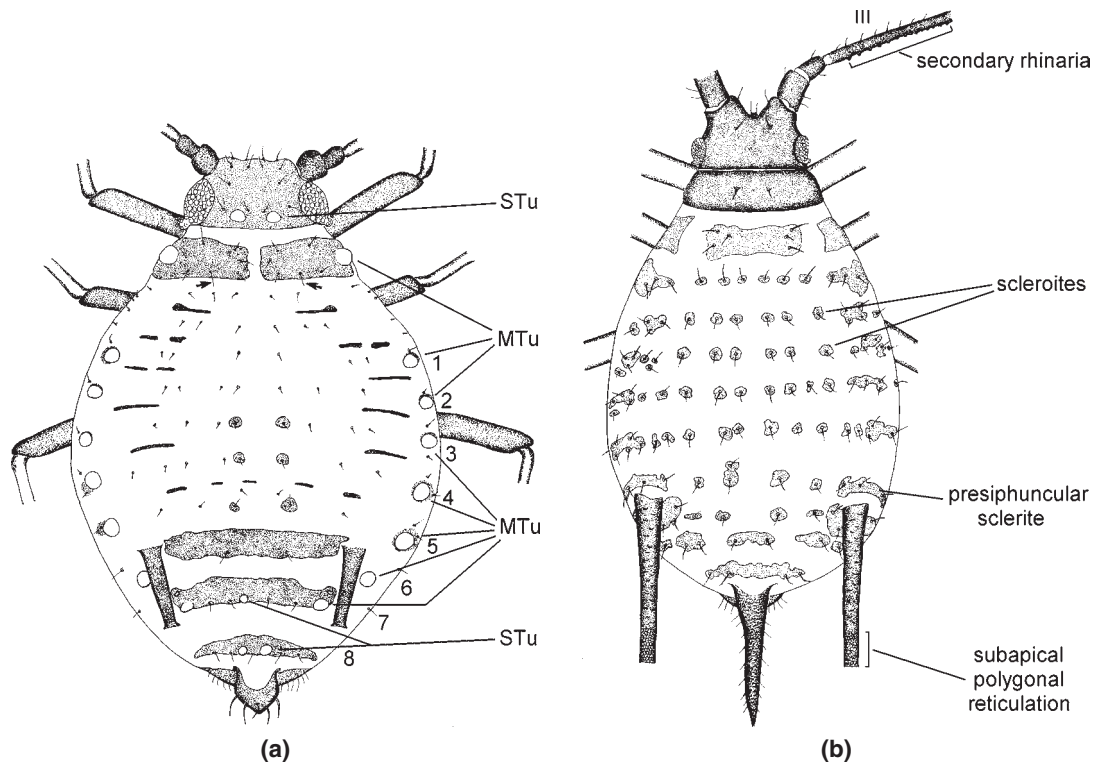


Figure 2 Dorsal facies of apterous viviparae representative of two large genera of Macrosiphini, to show additional morphological features referred to in the keys. (a) A *Dysaphis* species (*D. radicola*), showing a typical distribution of marginal and spinal tubercles (MTu and STu). Arrows indicate a pair of pleural hairs on the posterior margin of the pronotum that are characteristic of the *devectora* species group. (b) A member of *Uroleucon* (subgenus *Uromelan*), showing features typical of this and related genera.

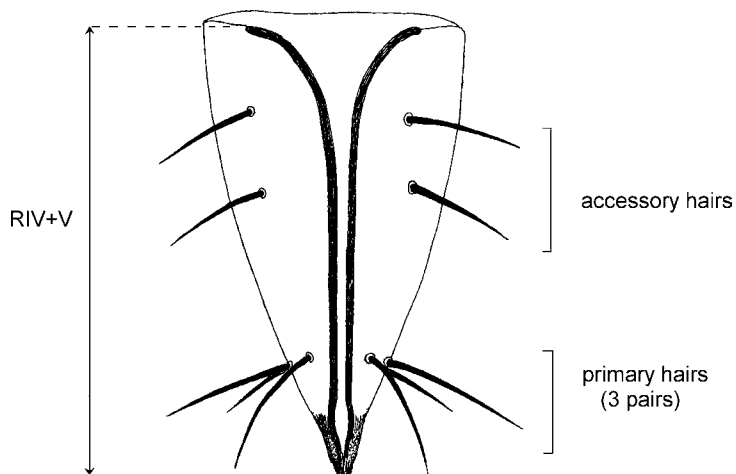


Figure 3 Combined rostral segments IV+V (R IV+V) showing length measurement and arrangement of hairs; the number of accessory hairs is a variable commonly used in the keys in this book.

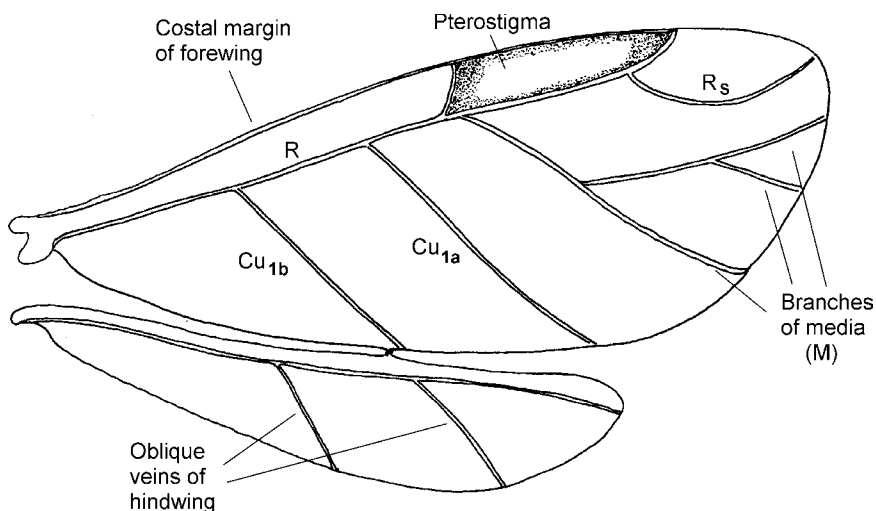


Figure 4 Typical wing venation of an alate viviparous aphid.

and Eastop (2000). Many of the discriminants used in the keys are morphometric, and require measurement of parts of the aphid, such as antennal segments (ANT) and siphunculi (SIPH) with a micrometer eyepiece or a digital measuring system. Correct and accurate calibration of the measuring device is obviously extremely important. The parameters measured are as in Ilharco and van Harten (1987), except that body length (BL) is always measured to the posterior end of the anal plate and does not include any projecting cauda.

Key couplets may offer a choice between two ranges of measurements or ratios. Sometimes when species are particularly difficult to separate these ranges are contiguous, or even overlap. For reliable identifications one should therefore ideally examine a series of 10 or more apterous adult aphids, so that if necessary the range of variation in the sample can be assessed and compared with the range given in the key.

The degree of confidence one can have in any identification made with a key in this book will depend on a range of factors. We have tried to make the keys as comprehensive as possible. This meant including species that we have not been able to examine ourselves on the basis of their published descriptions. Unseen species are indicated by an asterisk (*). Also included are little-known species of which only a few specimens have been described or examined (in some cases only a single specimen), and which potentially have a much greater range of character variation. Where there are discriminants between two nominal species we have used them, even when we suspect that further work may prove them to be unreliable. If we suspect that two species are synonymous then this is indicated in the text for one or other of them in Volume 2.

So as a general rule, specimens that run in a key to a common species are more likely to be reliably identified than those that run to an asterisked name, or to a species that transpires to be little-known or locally distributed when the name is looked up in Volume 2. You need to proceed with caution, for example, if the name that you arrive at is that of a species new to your region, and be extremely skeptical if, for example, you are in Patagonia and you have identified your aphid as a species that is only known from a single sample collected many years ago in Mongolia! If in doubt, always consult an experienced aphid taxonomist.

We have also included in the lists and keys a rather large number of undescribed species from the BMNH collection, providing details of their host, country of origin and collector. The formal naming of new species is, of course, fundamentally important, but describing species properly is very time consuming. Descriptions

HOST LISTS AND KEYS

should normally include both apterous and alate morphs, and if at all possible they should be based on several samples collected at different times of year and in more than one locality. Most of the undescribed material in the BMNH collection does not fulfill these criteria. Also, descriptions of new species are best included in revisions of the groups concerned, so that they can be adequately compared to existing species. Nevertheless, we believe that by including undescribed species in the host lists and keys we can at least make known their existence, so that this material can be borrowed and included in future taxonomic studies.

Host lists and identification keys (in alphabetical order of plant genera)

Aaronsohnia

A. factorovskyi

Myzus persicae

Compositae

Abatia

A. brasiliensis

Aphis gossypii

Flacourtiaceae

Abelia

A. bifora

A. grandiflora (incl. var. *prostrata*)

A. spathulata

A. triflora

Abelia spp.

Prociphilus xylostei

Aulacorthum solani; *Myzus ornatus*, *persicae*

Neotoxoptera abeliae

Neotoxoptera abeliae

Macrosiphum euphorbiae

Caprifoliaceae

Key to aphids on *Abelia*:-

1. ANT PT/BASE less than 0.5. Wax gland plates present on head, thorax and abdomen. Eyes 3-faceted. SIPH absent. (Apt. fundatrix, all progeny of which are al. having unbranched media in forewing and ANT with narrow, transversely elongate secondary rhinaria) *Prociphilus xylostei*
– ANT PT/BASE more than 0.5. No wax gland plates. Eyes multifaceted. SIPH present, tubular. (Al. have forewing with 1- or 2-branched media and ANT with round or oval secondary rhinaria) **2**
2. SIPH slightly to moderately clavate, without any subapical polygonal reticulation, **and** HT II 0.65–0.8× R IV+V. Al. with wing veins broadly bordered with fuscous *Neotoxoptera abeliae*
– SIPH clavate, cylindrical or tapering, with or without subapical reticulation. HT II 0.8–1.4× R IV+V. Al. without fuscous-bordered wing veins . . . go to key to polyphagous aphids, p. 1020

Abelmoschus

A. angulosus

A. esculentus see *Hibiscus esculentus*

A. moschatus

Aphis gossypii

Aphis gossypii, *Myzus persicae*

Malvaceae

Use key to polyphagous aphids, p. 1020.

Abroma (including *Ambroma*)

A. angusta

Aphis gossypii

Sterculiaceae

Abrus

A. precatorius

[*Aphis* sp. (Leonard, 1968: 269)]; *Aulacorthum solani*

Leguminosae

Abutilon*A. americanum**A. arboreum**A. avicennae**A. darwini**A. hybridum**A. indicum**A. mauritanium**A. megapotamicum**A. ramosum**A. theophrasti**A. umbellatum**A. vitifolium**Abutilon* spp.**Malvaceae***Aphis craccivora**Myzus persicae**Aphis gossypii**Aulacorthum solani*; *Macrosiphum euphorbiae**Aulacorthum solani*; *Macrosiphum euphorbiae*;*Myzus ornatus*, *persicae**Aphis gossypii*, *umbrella*; *Brachyunguis calotropicus*;*Macrosiphum euphorbiae*; *Myzus persicae**Aphis craccivora*, *gossypii**Myzus persicae**Aphis gossypii**Aphis fabae*, *gossypii*; *Myzus persicae**Aphis craccivora*, *spiraecola**Macrosiphum euphorbiae**Brachycaudus helichrysi*Key to aphids on *Abutilon*:-

1. ANT PT/BASE a little less than 1. SIPH only 0.33–0.40× cauda *Brachyunguis calotropicus*
- ANT PT/BASE much more than 1. SIPH as long as or longer than cauda **2**
2. ANT tubercles poorly developed, SIPH pale or only slightly dusky towards apices, R IV+V clearly longer than (1.2–1.33×) HT II, and marginal tubercles (MTu) often present on ABD TERG 2–6 as well as 1 and 7 *Aphis umbrella*
- **Either** ANT tubercles well developed **or** SIPH dark, R IV+V usually less than 1.2× HT II, and MTu only sporadically on ABD TERG 2–6 go to key to polyphagous aphids, p. 1020

Acacia*Acacia* spp.**Leguminosae***Aphis craccivora*, *fabae*, *gossypii*, *nasturtii*, *spiraecola*;*Aulacorthum solani*; *Macrosiphum euphorbiae*;*Myzus cymbalariae*, *persicae*

(One or more of the above polyphagous aphid species have been recorded from each of the following *Acacia* spp.; *alata*, *albida*, *arabica*, *ataxantha*, *farnesiana*, *jonesii*, *karroo*, *longifolia*, *murrayana*, *pennata*, *plumosa*, *rotundifolia*, *scorpioides*, *visite*.)

Use key to polyphagous aphids, p. 1020.

Acaena*A. glabra**A. macropoda**A. macrostemon**A. magellanica**A. microphylla**A. myriophylla**A. novae-zealandiae* (incl. *anserinifolia*)*A. ovina***Rosaceae***Macrosiphum euphorbiae**Macrosiphum euphorbiae**Acyrtosiphon malvae* group; *Macrosiphum euphorbiae**Aulacorthum solani*; *Macrosiphum euphorbiae*;*Myzus ascalonicus**Acyrtosiphon malvae* group; *Macrosiphum euphorbiae**Acyrtosiphon malvae* group*Acyrtosiphon malvae* group; *Brachycaudus helichrysi*;*Macrosiphum euphorbiae**Aphis acaenovinae*

HOST LISTS AND KEYS

A. sanguisorbae

A. splendens

Macrosiphum euphorbiae

Aphis acaenaevora;

[*Cryptomyzus michaelsoni* (Schouteden, 1904)];

Pentamyzus acaenae

Key to aphids on *Acaena*:–

1. ANT tubercles weakly developed, not projecting beyond middle of front of head in dorsal view. ANT length much less than BL, with PT shorter than head width across (and including) eyes **2**
 - ANT tubercles well developed. ANT length at least 0.9× BL, with PT as long as or longer than head width across eyes go to key to polyphagous aphids, p. 1020
2. SIPH and cauda pale. ABD TERG 1 and 7 without marginal tubercles (MTu) **3**
 - SIPH and cauda dark. ABD TERG 1 and 7 with well-developed MTu **4**
3. ANT 6-segmented. SIPH short, conical. Cauda helmet-shaped, not longer than its basal width *Brachycaudus helichrysi*
 - ANT 5-segmented. SIPH clavate. Cauda tongue-shaped, longer than its basal width *Pentamyzus acaenae*
4. SIPH 0.20–0.25× BL and 1.7–2.0× cauda. ABD TERG 2–4 more usually without MTu *Aphis acaenovinae*
 - SIPH 0.11–0.16× BL and 1.0–1.3× cauda. ABD TERG 2–4, and often also 5 and 6, with MTu *Aphis acaenaevora*

Acalypha

Acalypha spp.

Euphorbiaceae

Aphis craccivora, *gossypii*, *spiraecola*;

Myzus ornatus, *persicae*; *Neomyzus circumflexus*;

Prociphilus erigeronensis; *Toxoptera aurantii*

[One or more of the above polyphagous aphid species have been recorded from each of the following *Acalypha* spp.; *alopecuroides*, *australis*, *boehmeroides*, *capillipes*, *ciliata*, *godseffiana*, *havanensis*, *hispidula*, *ornata*, *segetalis*, *villicaulis*, *virginica*, *wilkesiana*.]

Use the key to polyphagous aphids, p. 1020.

Acantholimon

A. pamiricum

Plumbaginaceae

Chaetosiphella stipae (as *pamirica*)

Acanthopanax see *Eleutherococcus*

Acanthophyllum

Acanthophyllum sp.

Caryophyllaceae

Aphidura acanthophylli

Acanthospermum

A. australe

A. hispidum

A. humile

Acanthospermum sp.

Compositae

Uroleucon ambrosiae

Aphis craccivora, *gossypii*;

Uroleucon ambrosiae, *compositae*

Uroleucon ambrosiae

Acyrtosiphon bidenticola

Key to aphids on *Acanthospermum*:-

1. ANT tubercles poorly developed. ABD TERG 1 and 7 with marginal tubercles (MTu) 2
- ANT tubercles well developed, with inner faces divergent. ABD TERG 1 and 7 without MTu 3
2. Dorsal abdomen with a solid black patch. Cauda black *Aphis craccivora*
- Dorsal abdomen unpigmented. Cauda pale or dusky *Aphis gossypii*
3. SIPH pale basally, slender, 20–35× longer than diameter at midlength, and with any polygonal reticulation extending for less than 0.1 of length *Acyrtosiphon bidenticola*
- SIPH uniformly dark, thicker, 6–12× diameter at midlength, with a distal zone of reticulation consisting of numerous polygonal cells on 0.25–0.35 of length 4
4. Coxae and cauda black *Uroleucon compositae*
- Coxae and cauda pale *Uroleucon ambrosiae*

Acanthus

A. ilicifolius
A. lusitanicus
A. mollis

A. pubescens
Acanthus sp.

Acanthaceae

Aphis gossypii
Myzus ornatus, *persicae*; *Neomyzus circumflexus*;
Aulacorthum solani; *Macrosiphum euphorbiae*;
Myzus ornatus, *persicae*; *Neomyzus circumflexus*;
Aphis gossypii; *Myzus ornatus*
Aphis fabae; *Uroleucon compositae*

Use key to polyphagous aphids, p. 1020.

Acca

A. sellowiana

Myrtaceae

Aphis gossypii

Acerates

A. angustifolia
A. floridana
A. longifolia

Asclepiadaceae

Aphis asclepiadis, *middletoni*
Aphis asclepiadis
Aphis asclepiadis

Use key to aphids on *Asclepias*.

Aceriphyllum see Mukdenia**Achillea**

A. acuminata
A. ageratifolia
A. ageratum
A. alpinum

A. asiatica
A. atrata
A. aurea

A. californica
A. carpatica
A. cartilaginea

Yarrow

Macrosiphoniella tanacetaria
Myzus ornatus
Macrosiphoniella millefolii; *Pemphigus* [*brevicornis*]
Brachycaudus helichrysi;
Macrosiphoniella millefolii, *millefolii* ssp. *orientalis*
Macrosiphoniella tanacetaria
Metopeurum capillatum (?)
Aulacorthum solani; *Myzus ascalonicus*;
Uroleucon achilleae
Macrosiphoniella cinerescens
Brachycaudus helichrysi
Aulacorthum solani; *Uroleucon achilleae*, *ptarmicae*

Compositae

HOST LISTS AND KEYS

- A. clavennae*
A. coarctata
A. collina
- A. crithmifolia*
A. distans (incl. *tanacetifolia*)
- A. filipendulina*
A. gerberi
A. grandiflora
A. kitaibeliana see *pectinata*
A. lanulosa
A. ligustica
- A. lingulata*
A. macrocephala
A. macrophylla
- A. magna*
- A. micrantha*
A. millefolium (incl. *rubra*)
- A. moschata*
A. neilreichii
A. nobilis
- Brachycaudus helichrysi*
Aphis fabae
Brachycaudus cardui;
Macrosiphoniella millefolii, usquertensis;
Pleotrichophorus duponti
Macrosiphoniella millefolii, tapuskae; *Uroleucon achilleae*
Acyrtosiphon malvae; *Aphis fabae*; *Aulacorthum solani*;
Brachycaudus helichrysi; *Macrosiphoniella millefolii*;
Uroleucon achilleae
Brachycaudus cardui; *Macrosiphum euphorbiae*
Macrosiphoniella tapuskae; *Metopeurum achilleae*
Macrosiphoniella millefolii
- Macrosiphoniella millefolii*; *Pleotrichophorus hottesi*
Aphis ligusticae, oligommata, spiraecola;
Aulacorthum solani; *Brachycaudus helichrysi*;
Coloradoa achilleae;
Macrosiphoniella millefolii, silvestrii, tanacetaria, tapuskae
Brachycaudus helichrysi
Macrosiphoniella tanacetaria
Aulacorthum solani; *Brachycaudus helichrysi*;
Uroleucon achilleae
Brachycaudus helichrysi; *Myzus ornatus*;
Uroleucon achilleae
Aphis pseudocardui; *Macrosiphoniella tapuskae*
Abstrusomyzus phloxae; [*Acaudinum longisetosum*];
Aphis fabae, gossypii, knowltoni, middletonii, [obiensis],
oligommata, vandergooti; *Aulacorthum solani*;
Brachycaudus cardui, helichrysi; *Coloradoa achilleae*;
Macrosiphoniella abrotani, [frigidicola], millefolii,
millefolii ssp. orientalis, [oblonga], pennsylvanica,
ptarmicae, sejuncta, sudhakarisi, tanacetaria,
tapuskae, usquertensis; *Macrosiphum euphorbiae*;
Metopeurum fuscoviride, millefolii;
Microsiphum heptapotamicum, millefolii, nudum,
[ptarmicae ssp. minus];
Myzus ascalonicus, cymbalariae, ornatus, persicae;
Neomyzus circumflexus; *Pemphigus [betae], [brevicornis]*;
Pleotrichophorus duponti, hottesi, patonkus,
patonkusellus, pseudopatonkus;
Trama [eastopi], [pubescens], troglodytes;
Uroleucon achilleae, ambrosiae, [erigeronensis],
[sonchi], stoetzelae
Metopeurum capillatum (?)
Coloradoa achilleae; *Uroleucon achilleae*
Aphis vandergooti; *Brachycaudus helichrysi*;
Macrosiphoniella millefolii, tapuskae;
Microsiphum millefolii, nudum; *Myzus persicae*

<i>A. ochroleuca</i>	<i>Aphis gossypii</i>
<i>A. odorata</i>	<i>Brachycaudus helichrysi</i>
<i>A. pannonica</i>	<i>Brachycaudus helichrysi</i> ; <i>Coloradoa achilleae</i> ; <i>Macrosiphoniella millefolii</i> , <i>usquertensis</i> ; <i>Pleotrichophorus duponti</i> ; <i>Uroleucon achilleae</i>
<i>A. pectinata</i> (incl. <i>kitaibeliana</i>)	<i>Aphis fabae</i> ; <i>Pleotrichophorus achilleae</i>
<i>A. ptarmica</i>	<i>Aphis fabae</i> , <i>nasturtii</i> , <i>vandergooti</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus cardui</i> , <i>helichrysi</i> ; <i>Macrosiphoniella millefolii</i> , <i>ptarmicae</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Microsiphum ptarmicae</i> ; <i>Aphis achilleae</i> <i>radicis</i>
<i>A. ptarmicifolia</i>	
<i>A. rupestris</i>	<i>Neomyzus circumflexus</i> ; <i>Uroleucon achilleae</i>
<i>A. santolina</i>	<i>Brachycaudus helichrysi</i> ; <i>Coloradoa santolinae</i> ; <i>Macrosiphoniella tapuskae</i>
<i>A. serbica</i>	<i>Brachycaudus helichrysi</i> ; <i>Myzus cymbalariae</i>
<i>A. setacea</i>	<i>Brachycaudus cardui</i> , <i>helichrysi</i> ; <i>Coloradoa achilleae</i> ; <i>Microsiphum nudum</i>
<i>A. sibirica</i>	[<i>Anuraphis spiranthi</i> Shinji (nomen dubium)]; <i>Brachycaudus helichrysi</i> ; <i>Uroleucon achilleae</i> <i>Macrosiphoniella millefolii</i>
<i>A. stricta</i>	
<i>A. tanacetifolia</i> see <i>distans</i>	
<i>A. taygetea</i>	<i>Brachycaudus helichrysi</i>
<i>A. tomentosa</i>	<i>Aphis gossypii</i>
<i>A. trichophylla</i>	[<i>Aphis elatior</i>]
<i>Achillea</i> spp.	[<i>Macrosiphoniella aktashica hirsuta</i>] [<i>Miraphoides achilleae</i> Rusanova, 1943] [<i>Triocula distorta</i> Rusanova, 1943] <i>Uroleucon alaskense</i> , [<i>kamtshaticum</i>]

For an account of aphids of the genera *Macrosiphoniella* and *Uroleucon* on *A. millefolium* in Germany see Sobhani (1970).

Key to aphids on *Achillea*:-

1. PT much shorter than base of last ANT segment 2
- PT clearly longer than base of last ANT segment 3
2. HT II very elongate, more than 0.5 of length of hind tibia. Body and appendages densely hairy 2
Trama troglodytes group (incl. *eastopi*, *pubescens*)
- HT II of normal length. Body and appendages sparsely hairy 3
Pemphigus sp(p).
3. Marginal tubercles (MTu) absent or present, but if present they are usually only on ABD TERG 2–4 (–5) and only rarely on ABD TERG 1 or 7 4
- MTu always present at least on ABD TERG 1 and 7 38
4. ANT tubercles absent or weakly developed, so that front of head has convex outline in dorsal view, with middle part projecting furthest forward 5
- ANT tubercles variably developed, but if low they are broadly divergent, so that the front of the head is concave in dorsal view 8

HOST LISTS AND KEYS

5. Cauda tongue- or finger-shaped, longer than its basal width. Eye with ocular tubercle indistinct and displaced ventrally, so inconspicuous in dorsal view (Figure 5a) **6**
 – Cauda helmet-shaped, distinctly constricted at base and as long as broad. Eye with protruberant ocular tubercle, positioned at posterior margin **7**
6. Dorsal body hairs short, inconspicuous. ANT PT only 1.1–1.4× BASE VI. SIPH 1.3–1.8× cauda
Coloradoa achilleae
 – Dorsal body hairs long, with fan-shaped apices (Figure 5b). ANT PT at least 2× BASE VI. SIPH shorter than cauda
Coloradoa santolinae
7. Dorsal abdomen with an extensive solid black shield. ANT III 0.31–0.47 mm, 2.4–3.4× HT II. R IV+V 0.17–0.24 mm. SIPH dark, imbricated, 1.7–3.4× cauda
Brachycaudus cardui
 – Dorsal abdomen without a black shield. ANT III 0.07–0.25 mm, 0.9–2.2× HT II. R IV+V 0.10–0.15 mm. SIPH pale, smooth, 0.8–2.0× cauda
Brachycaudus helichrysi
8. Dorsal hairs numerous and long, with fan-shaped or clearly expanded apices (Figure 5c) **9**
 – Dorsal hairs short or long, but if long then with blunt or pointed apices **14**
9. SIPH 0.31–1.0× cauda **10**
 – SIPH more than 1.5× cauda **12**
10. Dorsal fan-shaped hairs very numerous, e.g., usually more than 25 on ABD TERG 6 between SIPH, and 28–45 on dorsal surface of head (not including those projecting forward between ANT bases). SIPH 0.61–1.0× cauda. ANT III with 1–2 secondary rhinaria. *Pleotrichophorus patonkusellus*
 – Dorsal fan-shaped hairs less numerous, e.g., less than 20 on ABD TERG 6 between SIPH, and 14–25 on dorsal surface of head (Figure 5c). SIPH 0.31–0.75× cauda. ANT III with 1–8 secondary rhinaria **11**
11. R IV+V 0.12–0.13 mm long, 0.86–1.09× HT II. SIPH 0.14–0.21 mm long, 0.62–0.75× cauda
Pleotrichophorus patonkus
 – R IV+V 0.09–0.12 mm long, 0.71–0.92× HT II. SIPH 0.08–0.18 mm long, 0.31–0.67× cauda
Pleotrichophorus pseudopatonkus
12. ANT 0.87–1.17× BL, with PT 3.1–4.1× BASE VI *Pleotrichophorus duponti*
 – ANT 1.24–1.57× BL, with PT 4.3–6.2× BASE VI **13**
13. SIPH 0.25–0.29× BL and 2.3–2.9× cauda *Pleotrichophorus achilleae*
 – SIPH 0.15–0.21× BL and 1.6–2.0× cauda *Pleotrichophorus hottesi*
14. SIPH tiny, no longer than wide, much less than 0.5 of length of the short triangular cauda, and less than 0.3× HT II (eg. Figure 5d, e) **15**
 – SIPH very evident, only shorter than cauda when the latter is long, dark and finger-like, and always clearly longer than HT II **18**
15. Hairs on front of head, cauda and ANT III all less than 0.5× diameter of BD III *Microsiphum nudum*
 – Hairs on front of head and cauda longer than ANT BD III. Hairs on ANT III maximally more than 0.5× BD III **16**
16. ANT PT/BASE 6–8. R IV+V with 4 accessory hairs. SIPH 1.4–1.5× longer than their basal widths. Cauda with 9–10 hairs
*Microsiphum ptarmicae**
 – ANT PT/BASE 3.7–5.7. R IV+V with 5–8 accessory hairs. SIPH 0.85–1.0× as long as their basal widths. Cauda with 12–20 hairs **17**
17. ANT PT 1.7–2.2× ANT III. ANT PT/BASE 5.0–5.7 *Microsiphum heptapotamicum**
 – ANT PT 1.2–1.6× ANT III. ANT PT/BASE 3.7–5.2 *Microsiphum millefolii*

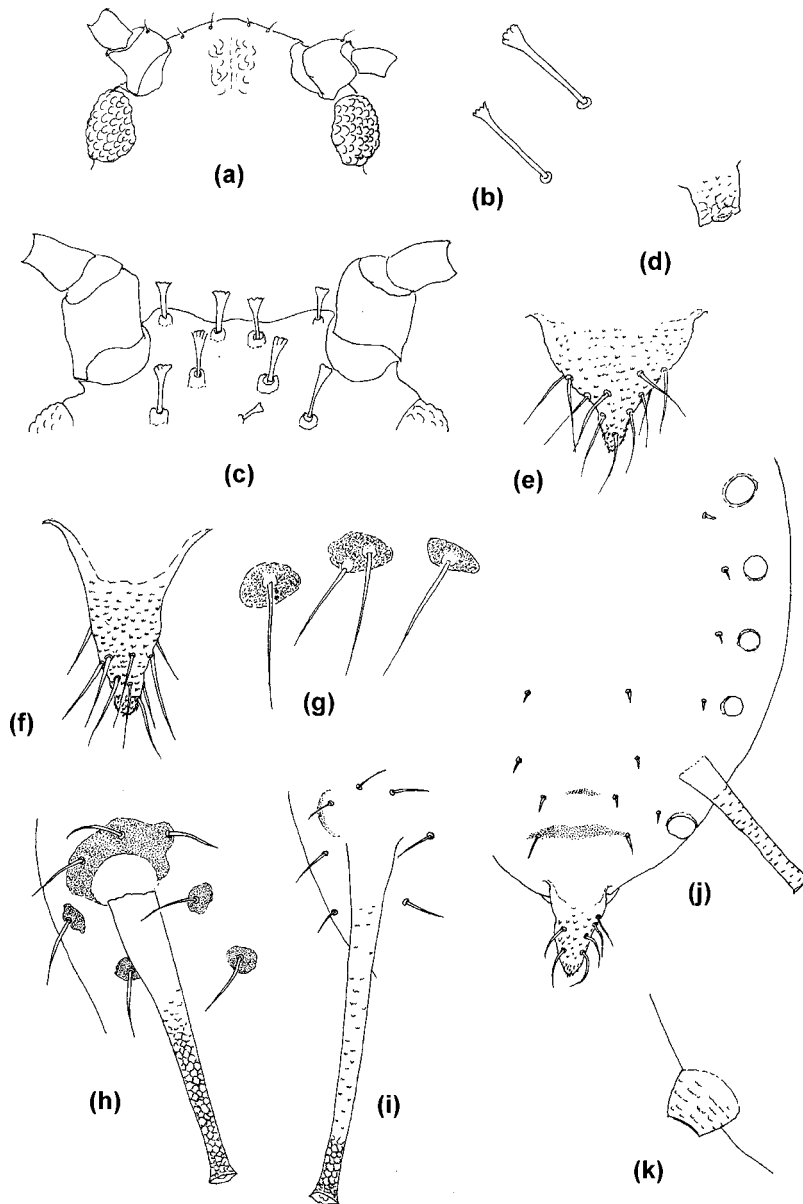


Figure 5 Apteræ on *Achillea*; (a) Front of head of *Coloradoa achilleae*, (b) dorsal body hairs of *Coloradoa santolinae*, (c) front of head of *Pleotrichophorus patonkus*, (d) SIPH of *Microsiphum millefolii*, (e) cauda of *Microsiphum millefolii*, (f) cauda of *Metopeurum fuscoviride*, (g) scleroites of *Macrosiphoniella millefolii*, (h) SIPH of *Macrosiphoniella sejuncta*, (i) SIPH of *Macrosiphoniella tapuskae*, (j) abdomen of *Aphis vandergooti* showing MTu, SIPH and cauda, (k) SIPH of *Aphis oligommata*.

HOST LISTS AND KEYS

18. SIPH pale at least over most of length, sometimes dusky or dark apically, and if with subapical polygonal reticulation then this is confined to distal 0.2 or less of length
 go to key to polyphagous aphids, starting at couplet 4 (p. 1020)
- SIPH dusky or dark over at least half of length, with polygonal reticulation usually extending over more than distal 0.2 (if rather pale then reticulated over distal 0.5 or more) **19**
19. Cauda tapering, triangular, less than 1.5 times longer than its basal width (e.g., Figure 5f). ANT tubercles very weakly developed, so that front of head is very shallowly concave in dorsal view **20**
- Cauda finger-like, more than 2 times its basal width. ANT tubercles variably developed **23**
20. Dorsal abdominal hairs very short and blunt **21**
- Dorsal abdominal hairs long, like ventral abdominal hairs **22**
21. Longest hairs on ANT III $0.5\text{--}0.6\times$ BD III. cauda with 11–20 hairs *Metopeurum fuscoviride*
- Longest hairs on ANT III about as long as BD III. cauda with c.8 hairs *Metopeurum millefolii**
22. ANT III with 5–8 rhinaria *Metopeurum achilleae*
- ANT III with 28–32 rhinaria *Metopeurum capillatum**
23. SIPH $0.6\text{--}1.0\times$ cauda **24**
- SIPH $1.1\text{--}2.9\times$ cauda **29**
24. Tibiae entirely dark brown to black **25**
- Tibiae with middle section paler **27**
25. BL only 1.3–1.6 mm. Cauda with 10–12 hairs *Macrosiphoniella sudhakarisi*
- BL 2.1–4.1 mm. Cauda with 20–32 hairs **26**
26. All dorsal abdominal hairs arising from conspicuous dark scleroites (Figure 5g). PT $3.3\text{--}4.3\times$ BASE VI. R IV+V $0.9\text{--}1.2\times$ HT II *Macrosiphoniella millefolii*
- Dorsal abdominal hairs not arising from dark scleroites. PT $2.9\text{--}3.5\times$ BASE VI. RIV+V $0.7\text{--}0.9\times$ HT II *Macrosiphoniella tanacetaria*
27. ANT III dark except at base, and bearing 8–32 rhinaria *Macrosiphoniella ptarmicae*
- ANT III only dark towards apex, and bearing 3–13 rhinaria **28**
28. SIPH mainly pale/dusky, only dark towards apices, and reticulated over distal 0.5–0.67 of length. R IV+V $0.6\text{--}0.8\times$ HT II *Macrosiphoniella abrotani*
- SIPH black and reticulated over distal 0.34–0.45 of length. R IV+V $0.8\text{--}0.9\times$ HT II *Macrosiphoniella usquertensis*
29. First tarsal segments with 3 hairs (a sense peg and a pair of lateral hairs); rarely with one additional lateral hair. SIPH often paler basally, and reticulated over distal 0.15–0.7 **30**
- First tarsal segments with 5 hairs (sense peg plus 2 lateral pairs); rarely with only 4 hairs. SIPH wholly dark, reticulated over distal 0.17–0.33 **35**
30. SIPH wholly dark, $1.1\text{--}1.3\times$ cauda and $0.16\text{--}0.24\times$ BL. Dorsal abdomen with paired dark spinal sclerites, each bearing 2–3 hairs *Macrosiphoniella silvestrii*
- SIPH often pale basally, $1.25\text{--}2.3\times$ cauda and $0.2\text{--}0.3\times$ BL. Dorsal abdomen without paired spinal sclerites; if with small dark scleroites then these are not fused between hair-bases **31**
31. SIPH $1.7\text{--}2.3\times$ cauda **32**
- SIPH $1.25\text{--}1.5\times$ cauda **33**
32. SIPH reticulated over distal 0.48–0.69. Dark crescent-shaped presiphuncular sclerites usually present, and dorsal abdominal hairs arising from dusky or dark scleroites (Figure 5h) *Macrosiphoniella sejuncta*

- SIPH reticulated over distal 0.15–0.25. Presiphuncular sclerite usually not evident, and dorsal abdominal hairs not arising from dark or dusky scleroites (Figure 5i) *Macrosiphoniella tapuskae*
- 33.** ANT III and middle part of hind tibia pale. (ANT III with 10–13 rhinaria, cauda with 14–18 hairs) *Macrosiphoniella cinerascens*
- ANT III and hind tibia mainly dark **34**
- 34.** ANT III with 30–44 rhinaria. R IV+V 0.75–0.95× HT II. Cauda with 11–18 hairs *Macrosiphoniella pennsylvanica*
- ANT III with 5–21 rhinaria. R IV+V 1.05–1.5× HT II. Cauda with 8–10 hairs *Uroleucon stoetzela*
- 35.** SIPH 1.7–2.9× cauda **36**
- SIPH 1.0–1.5× cauda **37**
- 36.** Cauda less than 0.35 mm long and less than twice its basal width. ANT III with 7–24 rhinaria *Uroleucon achilleae*
- Cauda more than 0.4 mm long and more than twice its basal width. ANT III with 30–36 rhinaria *Uroleucon ptarmicae**
- 37.** Marginal tubercles (MTu) well developed and evident on at least ABD TERG 2–5. SIPH 1.0–1.2× cauda and 0.21–0.26× BL *Uroleucon alaskense*
- MTu usually absent. SIPH 1.2–1.5× cauda and 0.25–0.30× BL *Uroleucon ambrosiae*
- 38.** Large transparent marginal tubercles (MTu) present on all of at least ABD TERG 1–4 and 7 (e.g. Figure 5j) **39**
- MTu only always present on ABD TERG 1 and 7 **41**
- 39.** SIPH 0.8–1.2× cauda, which is rounded at apex *Aphis ligusticae*
- SIPH 1.9–2.6× cauda, which tapers to a pointed apex **40**
- 40.** SIPH about 0.16× BL. Cauda about as long as its basal width, and about 0.07× BL. Subgenital plate with 3–5 hairs on anterior part *Aphis achilleaeradicis*
- SIPH 0.18–0.26× BL. Cauda longer than its basal width, 0.08–0.10× BL. Subgenital plate with (2–) 7–16 hairs on anterior part *Aphis vandergooti*
- 41.** ANT always 5-segmented. SIPH very short and flangeless (Figure 5k), 0.5–1.0× cauda .
- ANT 6-segmented, except in small summer ‘dwarfs’. SIPH with a flange, 0.8–2.1× cauda *Aphis oligommata* **42**
- 42.** ABD TERG 7 and 8 with dark transverse bands **43**
- ABD TERG 7 and 8 without dark transverse bands **46**
- 43.** Cauda tongue-shaped, much longer than R IV+V. ANT III without rhinaria *Aphis fabae*
- Cauda short, bluntly triangular, as short as or shorter than R IV+V. ANT III often with a few rhinaria on distal part **44**
- 44.** ANT PT/BASE 0.9–1.3 *Aphis pseudocardui*
- ANT PT/BASE 1.4–2.1 **45**
- 45.** Hairs on ANT III all shorter than BD III. SIPH usually longer than cauda *Aphis middletonii*
- Longest hairs on ANT III 1.0–1.5× BD III. SIPH usually shorter than cauda *Aphis knowltoni*
- 46.** SIPH pale except at apices *Aphis nasturtii*
- SIPH dark **47**

HOST LISTS AND KEYS

47. SIPH clearly darker than cauda, which has no constriction and bears 4–8 hairs *Aphis gossypii*
 – SIPH and cauda both very dark. Cauda usually has an evident constriction between basal and distal part, and bears 7–15 hairs *Aphis spiraeicola*

Achimenes

A. longiflora

Gesneriaceae

Neomyzus circumflexus

Achlys

A. triphylla

Berberidaceae

Macrosiphum tuberculaceps

Achnatherum see *Stipa*

Achras see *Manilkara*

Achyranthes

A. aspera

A. aureum

A. bidentata

A. indica

A. japonica

A. valissiae

A. verschafeltii see *Irisine herbsii*

Achyranthes sp.

Amaranthaceae

Aphis achyranthi, *craccivora*, *gossypii*, *nasturtii*;
Aulacorthum solani; *Myzus ornatus*; *Neomyzus circumflexus*

Myzus ornatus

Aphis glycines

Aphis craccivora

Aphis glycines, *gossypii*

Myzus ornatus

Myzus persicae

Key to aphids on *Achyranthes*:-

1. ANT tubercles well developed, with inner faces spiculose or scabrous. No marginal tubercles (MTu) on ABD TERG 1 and 7 go to key to polyphagous aphids, p. 1020, starting at couplet 5
 – ANT tubercles weakly developed, not exceeding height of medial part of front of head in dorsal view. ABD TERG 1 and 7 with MTu 2
2. SIPH pale or dark, cauda pale or dusky 3
 – SIPH and cauda both very dark 5
3. SIPH usually rather pale, only darker at apices *Aphis nasturtii*
 – SIPH uniformly dark 4
4. Cauda 0.08–0.125× BL (only more than 0.12× BL in very small specimens with BL less than 1 mm); pale to dusky, without a constriction, less than 3× longer than its width at midlength, and bearing 2–7 (usually 5–6) hairs *Aphis gossypii*
 – Cauda 0.125–0.16× BL, very pale, usually with a slight mid-way constriction, more than 3× longer than its narrowest width at midlength, and bearing 6–9 (usually 8) hairs *Aphis glycines*
5. Dorsum with an extensive dark sclerotic patch. ABD TERG 8 with 2 hairs. SIPH more than 3× their basal widths. Longest hairs on ANT III shorter than BD III. (Al. with sec. rhin. distributed ANT III 3–8 only) *Aphis craccivora*
 – Dorsum without an extensive dark sclerotic patch. ABD TERG 8 with 5–6 hairs. SIPH less than 3× their basal widths. Longest hairs of ANT III longer than BD III. (Al. with sec. rhin. distributed ANT III 16–20, IV 6–12, V 3–7) *Aphis achyranthi*

Acicarpa*A. tribuloides***Calyceraceae***Aulacorthum solani***Acinos***A. alpinus**A. arvensis***Labiatae***Eucarazzia elegans**Aphis calaminthae, clinopodii, craccivora, fabae;**Ovatomyzus chamaedrys*Use key to apterae on *Clinopodium*.**Aciphylla***A. aurea**A. colensoi**A. squarrosa***Umbelliferae***Schizaphis (Euschizaphis) sp.* (New Zealand, BMNH colln)*Cavariella aegopodii; Macrosiphum euphorbiae;**Rhopalosiphoninus staphyleae**Aphis sambuci; Brachycaudus helichrysi;**Dysaphis foeniculus; Smynthuroides betae*Key to aphids on *Aciphylla*:-

1. ANT PT/BASE less than 0.5. Body with numerous fine hairs *Smynthuroides betae*
- ANT PT/BASE more than 0.5, often more than 1. Body not densely hairy **2**
2. ABD TERG 8 with a posteriorly directed process above cauda. ANT PT/BASE 0.6–1.3 *Cavariella aegopodii*
- No supracaudal process. ANT PT/BASE more than 2 **3**
3. ANT tubercles well developed, ANT 0.9–1.4× BL. ANT III with (0–) 1–10 rhinaria on basal half. ANT PT/BASE 4–7 **4**
- ANT tubercles undeveloped or weakly developed. ANT 0.25–0.75× BL. ANT III without rhinaria. ANT PT/BASE 1.7–3.8 **5**
4. SIPH cylindrical or tapering with polygonal reticulation of distal 0.12–0.25 of length. SIPH 1.7–2.2× cauda which bears 8–13 hairs *Macrosiphum euphorbiae*
- SIPH markedly swollen and without polygonal reticulation. SIPH 2.1–3.0× cauda which bears 4–6 hairs
... *Rhopalosiphoninus staphyleae*
5. ABD TERG 1–4 (–5) and 7 with large flat marginal tubercles (MTu). SIPH dark **6**
- ABD TERG 1 and 7 and usually also 2–5 without MTu **7**
6. SIPH 1.3–1.7× the helmet-shaped (pentagonal) cauda which bears 4–6 hairs. Head and ABD TERG 7 and 8 with spinal tubercles (STu) *Dysaphis foeniculus*
- SIPH 1.7–2.6× the rounded cauda which bears 8–14 hairs. Head and ABD TERG 7 and 8 without STu *Aphis sambuci*
7. Cauda helmet-shaped, not longer than its basal width in dorsal view, and bearing 5–7 hairs. SIPH 0.05–0.1× BL and 0.5–1.2× R IV + V *Brachycaudus helichrysi*
- Cauda tongue-shaped, longer than its basal width and bearing 8–9 hairs. SIPH 0.11–0.14× BL and 1.7–2.1× R IV + V
... *Schizaphis (Euschizaphis) sp.* (New Zealand, BMNH colln)

Acmella*A. caulorrhiza***Compositae***Aphis gossypii*

HOST LISTS AND KEYS

Acnida see *Amaranthus*

Acnistus

A. arborescens

Myzus persicae

Solanaceae

Aconitum

A. alboviolaceum

A. arcuatum

A. arendsii

A. barbatum

A. callibotryon

A.× cammarum

A. carmichaeli

A. chinense

A. columbianum

A. excelsum

A. ferox

A. firmum

A. fischeri

A. gracile

A. jaluense

A. kirilovii

A. kitadakense

A. kusnezoffi

A. lasianthum

A. leucostomum

A. lycoctonum

A. moldavicum

A. monticola

A. napellus

A. nemorosum

A. orientale

A. paniculatum

A. pulcherrimum

A. ranunculifolium

A. rotundifolium

A. sachalinense

A. septentrionale

A. storkianum

A. superbum

A. tauricum

A. toxicum

A. triphyllum

A. variegatum

A. vulparia

Monkshood, Wolfsbane

Delphinium hanla

Delphinium hanla

Delphinium junackianum

Brachycaudus aconiti; [*Delphinium bogdoui*]

Delphinium junackianum ssp. *sylvanae*

Brachycaudus aconiti, *napelli*; *Delphinium junackianum*

Delphinium junackianum

Delphinium yezoense

Nasonovia wahinkae

Brachycaudus aconiti; *Delphinium junackianum*;

Nasonovia salebrosus

Delphinium junackianum

Delphinium junackianum

Brachycaudus aconiti

Delphinium carpaticae

Delphinium hanla

Delphinium junackianum

Delphinium yezoense

Delphinium aconitifoliae, *yezoense*

Delphinium junackianum ssp. *sylvanae*

Nasonovia alataavica

Brachycaudus napelli;

Delphinium junackianum, *lycoctoni*

Delphinium junackianum ssp. *sylvanae*

Brachycaudus aconiti; *Nasonovia alataavica*

Brachycaudus aconiti, *napelli*;

Delphinium junackianum (incl. ssp. *sylvanae*)

Delphinium junackianum

Delphinium junackianum

Delphinium junackianum

Delphinium hanla

Delphinium junackianum

Nasonovia alataavica

Delphinium yezoense

Brachycaudus aconiti

Brachycaudus napelli, *Delphinium junackianum*

Brachycaudus napelli; *Macrosiphum euphorbiae*

Delphinium junackianum ssp. *sylvanae*

Delphinium junackianum

Delphinium hanla

Brachycaudus aconiti; *Delphinium junackianum*

Delphinium lycoctoni

Ranunculaceae

A. yezoense
Aconitum sp.

Delphiniobium yezoense
Delphiniobium gyamdaense; *Myzus persicae*

Key to aphids on *Aconitum*:-

1. Dorsum usually with an extensive dark sclerotic shield (e.g., Figure 6c). Cauda helmet-shaped, shorter than its basal width **2**
– Dorsum without a dark shield. Cauda tongue-shaped, longer than its basal width **3**
2. SIPH $0.31\text{--}0.55\times$ ANT III. ANT VI BASE $0.5\text{--}0.7\times$ HT II. R IV+V $0.9\text{--}1.2\times$ HT II *Brachycaudus napelli*
– SIPH $0.57\text{--}1.0\times$ ANT III. ANT VI BASE $0.8\text{--}1.1\times$ HT II. R IV+V $1.2\text{--}1.6\times$ HT II *Brachycaudus aconiti*
3. Head spiculose with inner faces of ANT tubercles scabrous and apically convergent. SIPH pale and slightly clavate *Myzus persicae*
– Head smooth with inner faces of ANT tubercles divergent. SIPH pale and tapering or cylindrical or, if swollen, then dark at least on distal part and with polygonal reticulation **4**
4. Dorsal abdomen with raised dusky/dark hair-bearing sclerites or scleroites. SIPH $0.07\text{--}0.10\times$ BL, pale, without any subapical polygonal reticulation. Cauda pale or dusky **5**
– Dorsal abdomen without dusky/dark sclerites/scleroites. SIPH $0.15\text{--}0.35\times$ BL, dark or pale, with a subapical zone of polygonal reticulation. Cauda pale or dark **7**
5. Abdominal spinal scleroites each bearing a single hair (rarely 2), which is longer than the diameter of the scleroite (Figure 6f) *Nasonovia wahinkae*
– Abdominal spinal sclerites/scleroites mostly bearing 2 hairs, which are shorter than the maximum diameter of the sclerite (Figure 6g) **6**
6. SIPH usually a little shorter than cauda which bears 8–12 hairs. R IV+V about equal in length to HT II *Nasonovia salebrosa**
– SIPH $1.1\text{--}1.3\times$ cauda which bears 6–8 hairs. R IV+V $1.08\text{--}1.22\times$ HT II *Nasonovia alatafica*
7. SIPH pale, tapering or cylindrical, $0.25\text{--}0.35\times$ BL. cauda pale. Thoracic spiracles of normal size, like those on abdomen *Macrosiphum euphorbiae*
– SIPH usually dark at least distally, often with a swollen section at about midlength, $0.15\text{--}0.20\times$ BL. cauda dark. Thoracic spiracles much larger than abdominal ones (Figure 6h) **8**
8. SIPH $1.1\text{--}1.3\times$ cauda and $0.15\text{--}0.19\times$ BL, and mainly dark except at their bases. Cauda with 6–18 hairs (Figure 6i) *Delphiniobium junackianum*
– SIPH $1.3\text{--}2.0\times$ cauda and $0.19\text{--}0.26\times$ BL, and dark on distal half or less. Cauda with 6–10 hairs **9**
9. SIPH $1.6\text{--}2.0\times$ cauda which is $0.33\text{--}0.43$ mm long, bears 7–10 hairs (usually 8–9), and has distal part clearly thicker than hind femur, from where it tapers rather abruptly to a rounded apex (Figure 6j) *Delphiniobium carpaticae* or *lycoctoni*
– SIPH $1.3\text{--}1.55\times$ cauda which is $0.44\text{--}0.53$ mm long, bears 6–8 hairs (usually 6), and has distal part maximally about as thick as or thinner than hind femur, from where it tapers gradually almost to a point (Figure 6k) **10**
10. SIPH tapering from base to flange *Delphiniobium aconitifoliae**
– SIPH with slightly or distinctly swollen middle section **11**
11. ANT III with 44–57 rhinaria extending over basal 0.75 *Delphiniobium gyamdaense**
– ANT III with 10–33 rhinaria restricted to basal 0.5 **12**

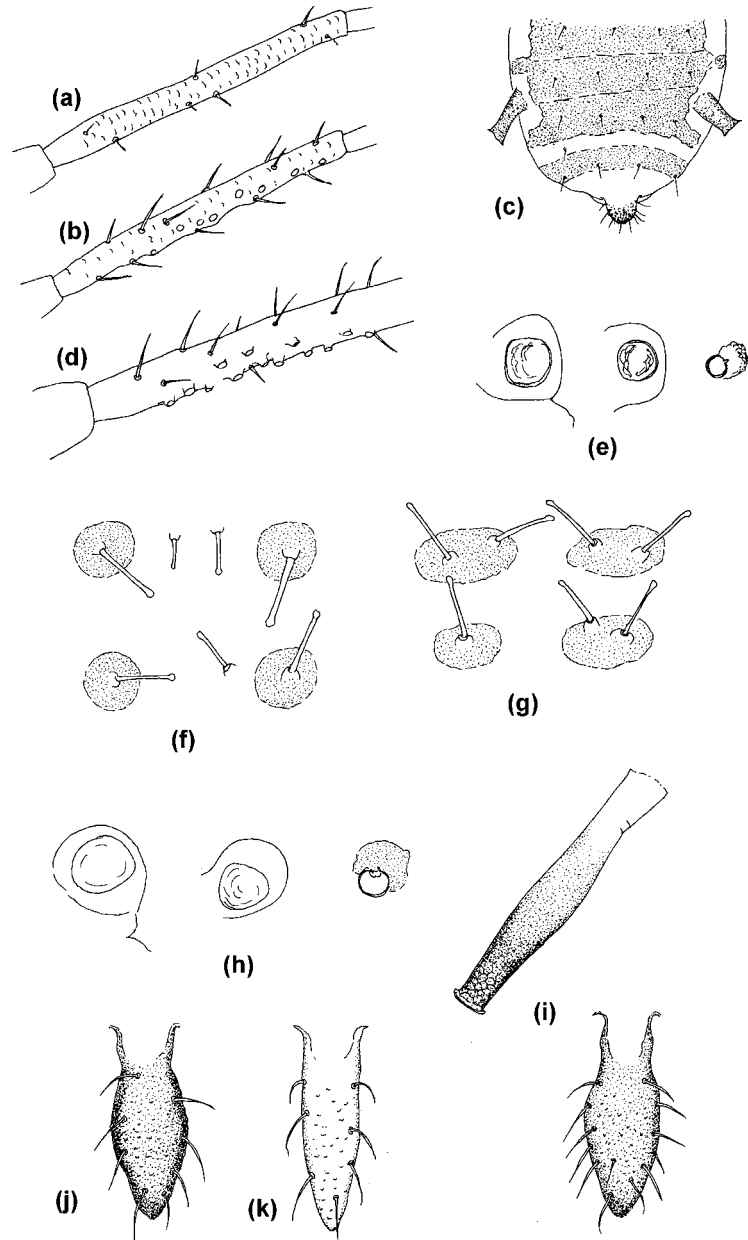


Figure 6 Apterae on *Aconitum* and *Delphinium*; (a) ANT III of *Brachycaudus rociadae*, (b) ANT III of *Brachycaudus napelli*, (c) end of abdomen of *B. napelli*, (d) basal part of ANT III of *Nasonovia wahinkae*, (e) thoracic and abdominal spiracles of *N. wahinkae* (L to R on prothorax, metathorax, 1st abdominal segment), (f) dorsal abdominal scleroites and hairs of *N. wahinkae*, (g) same for *N. alativica*, (h) thoracic v abdominal spiracles of *Delphiniobium junackianum* (L to R on prothorax, metathorax, 1st abdominal segment), (i) SIPH and cauda of *D. junackianum*, (j) cauda of *D. lycoctoni*, (k) cauda of *D. hanla*.

12. SIPH mainly pale, only dark on reticulated distal section. Femora pale or only dark at apices
Delphiniobium yezoense
 – SIPH dusky or dark on distal 0.65–0.75 of length. Femora dark on distal 0.35–0.45 of length
Delphiniobium hanla

Aconogonon

- A. ajanense*
A. phytolaccaefolium

Polygonaceae

- Macchiatella itadori*
Capitophorus essigi, hippophaes

Use key to apterae on *Polygonum*.

Acorus

- A. calamus*

A. gramineus (incl. var. *variegata*)

Araceae

- Aphis craccivora; Cerataphis brasiliensis;*
Rhopalosiphum nymphaeae, padi, rufulum;
Schizaphis acori, rotundiventris, scirpi;
Toxoptera aurantii
Myzus ornatus; Rhopalosiphum padi

Key to aphids on *Acorus*:-

1. Body dorsoventrally flattened, subcircular, wholly sclerotic with a distinct crenulate margin due to a continuous row of wax glands. SIPH in form of pores. Head with a pair of forwardly directed frontal horns
Cerataphis brasiliensis
 – Body of 'normal' aphid form. SIPH tubular. No frontal horns **2**
2. ANT tubercles well developed, with inner faces scabrous and convergent in dorsal view. SIPH and cauda pale. (Dorsum with a pattern of dark intersegmental markings.)
Myzus ornatus
 – ANT tubercles low; if at all developed then with inner faces broadly divergent, and median frontal tubercle also developed. SIPH and cauda dark **3**
3. Stridulatory apparatus present. Cauda with 10–26 hairs
Toxoptera aurantii
 – No stridulatory apparatus. Cauda with 4–10 hairs **4**
4. SIPH tapering, without any evident distal swelling and without a subapical constriction proximal to the flange, which is small. Dorsal cuticle not ornamented with nodules arranged in polygons **5**
 – SIPH slightly or moderately swollen on distal part, and then abruptly narrowing to a smooth constriction proximal to the flange, which is well developed. Dorsal cuticle with a pattern of bead-like nodules arranged in polygons, each polygon enclosing one or more additional nodules **8**
5. Dorsal abdomen with an extensive black shield
Aphis craccivora
 – Dorsal abdomen without a black shield **6**
6. Hairs on dorsal body, legs and ANT long and fine; longest hairs on ANT III 1.3–3.5× longer than BD III. Femora dark **7**
 – Hairs much shorter; longest hairs on ANT III shorter than BD III. Femora mainly pale
Schizaphis rotundiventris
7. ANT III 7–12× longer than the longest hair (30–69µm) borne upon it. ABD TERG 8 with 5–7 hairs
Schizaphis acori
 – ANT III 4.4–7.1× longer than the longest hair (53–108µm) borne upon it. ABD TERG 8 with 6–16 hairs
Schizaphis scirpi

HOST LISTS AND KEYS

8. Longest hairs on ANT III much longer than (1.8–2.25×) BD III. SIPH 0.10–0.12× BL
Rhopalosiphum rufulum
- Longest hairs on ANT III shorter than BD III. SIPH 0.12–0.22× BL **9**
9. SIPH 0.12–0.14× BL, almost cylindrical with slight distal swelling
Rhopalosiphum padi
- SIPH 0.18–0.22× BL, with distinct swelling on distal half
Rhopalosiphum nymphaeae

Acroceras

A. macrum

Gramineae

Hysteroneura setariae

Acrocladium

A. cuspidatum

Amblystegiaceae

[*Jacksonia papillata*];
Muscaphis cuspidata, *escherichi*, *musci*;
Pseudacaudella rubida

Use key to apterae of moss-feeding aphids under *Polytrichum*.

Acroclinium see *Helipterum*

Acronychia

A. laurifolia

Rutaceae

[*Sinomegoura* sp. (N. India, as *symplocois*; AK Ghosh and Raychaudhuri, 1970)]

A. pedunculata

Sinomegoura citricola, *Sinomegoura* sp. (Hong Kong, BMNH colln, leg. J.H. Martin); *Toxoptera aurantii*

Key to aphids on *Acronychia*:-

1. ANT tubercles weakly developed. SIPH entirely dark. Stridulatory apparatus present
Toxoptera aurantii
- ANT tubercles well developed. SIPH pale at bases, darker towards apices. No stridulatory apparatus **2**
2. SIPH dark over distal 0.5 or more, 0.75–1.0× the dark cauda. (ANT IV of al. 0 (–1) rhinaria)
Sinomegoura citricola
- SIPH dark only at apices, 1.2–1.45× the pale cauda. (ANT IV of al. with (0–) 3–13 rhinaria)
Sinomegoura sp. (Hong Kong, BMNH colln, leg. J.H. Martin)

Acroptilon

A. australe

A. repens

Compositae

Aphis anuraphoides, *iliensis*; *Uroleucon acroptilidis*

Dysaphis acroptilidis; *Uroleucon compositae*

Key to apterae on *Acroptilon*:-

1. Cauda finger-like, much longer than its basal width. SIPH long with polygonal reticulation on distal 0.25–0.33 of length **2**
- Cauda helmet-shaped or conical, not longer than its basal width. SIPH short and without polygonal reticulation **3**
2. ANT PT/BASE 3.8–4.7. R IV+V 1.0–1.1× HT II *Uroleucon acroptilidis*
- ANT PT/BASE 5.1–7.3. R IV+V 1.1–1.4× HT II *Uroleucon compositae*
3. ANT PT/BASE 1.5–1.8. Cauda with 5 hairs *Dysaphis acroptilidis*
- ANT PT/BASE 0.55–1.1. Cauda with 16–20 hairs **4**

4. ANT PT/BASE 0.85–1.1. ANT III 1.8–2.5× PT
 – ANT PT/BASE 0.55–0.75. ANT III 2.7–3.8× PT

Aphis anuraphoides
Aphis iliensis

Acrosynanthus = Remijia

Acrostichum

A. reticulatum

Pteridaceae

Idiopterus nephrepidis

Actaea

A. spicata

Actaea spp.

Ranunculaceae

Aphis fabae

Aphis cimicifugae

Couplet for separating these two species:–

- R IV+V 1.1–1.3× HT II. Marginal tubercles (MTu) usually present on ABD TERG 2–6 as well as 1 and 7. No dark dorsal markings anterior to SIPH *Aphis cimicifugae*
 – R IV+V 0.9–1.1× HT II. MTu only sporadically present on ABD TERG 2–6. Dorsal abdomen usually with some dark markings anterior to SIPH *Aphis fabae*

Actinidia

A. arguta

A. callosa

A. chinensis

Actinidiaceae

Aphis gossypii

[*Trichaitophorus recurvispinus*]

Aphis gossypii; [*Rhopalosiphum nymphaeae*];

Toxoptera aurantii

Use key to polyphagous aphids, p. 1020.

Actinodaphne see Blackman and Eastop (1994)

Actinomeris see *Verbesina*

Actinophloeus, Actinostrobis, Adansonia see Blackman and Eastop (1994)

Adenium

A. multiflorum

Apocynaceae

Aphis gossypii

Adenocarpus

A. complicatus

A. foliolosus

A. viscosus

Leguminosae

Acyrtosiphon pisum; *Aphis craccivora*, *cytisorum*;

Macrosiphum euphorbiae

Aphis cytisorum

Aphis cytisorum

Key to aphids on *Adenocarpus*:–

1. Spindle-shaped aphid, pale or mainly pale, without a dark dorsal abdominal shield 2
 – Oval aphid with an extensive dark dorsal abdominal shield 3

HOST LISTS AND KEYS

2. SIPH with a subapical zone of polygonal reticulation. Hairs on ANT III conspicuous, about as long as BD III
Macrosiphum euphorbiae
- SIPH without polygonal reticulation, attenuate distally. Hairs on ANT III very short and inconspicuous
Acyrtosiphon pisum
3. R IV+V 0.88–1.16× HT II (mostly 0.9–1.05×). Anterior half of genital plate with 2 (–3) hairs
Aphis craccivora
- R IV+V 0.97–1.3× HT II (mostly 1.06–1.2×). Anterior half of genital plate with 2–8 hairs (mode 4, mean 5.2)
Aphis cytisorum

Adenocaulon

- A. adhaerescens*
A. bicolor
A. conandron (?)
A. himalaicum

Compositae

- Rhopalosiphoninus tiliae*
Nasonovia rostrata; *Uroleucon adenocaulonae*
Aleurodaphis blumeae
Aleurodaphis blumeae; *Rhopalosiphoninus tiliae*

Key to aphids on *Adenocaulon*:-

1. Body dorsoventrally flattened, elongate oval with dorsum wholly sclerotic, with a crenulate margin due to a continuous ring of wax glands. Eyes 3-faceted, SIPH poriform, cauda knobbed and anal plate bilobed
Aleurodaphis blumeae
- Dorsum not wholly sclerotic, no marginal wax glands. Eyes compound, SIPH tubular, cauda tongue-shaped, anal plate entire **2**
2. SIPH black, swollen into a spindle shape on distal two-thirds. Cauda triangular
Rhopalosiphoninus tiliae
- SIPH pale or dark, not swollen. Cauda tongue- or finger-shaped **3**
3. BL more than 3 mm. SIPH wholly dark with polygonal reticulation extending over distal 0.3–0.4
Uroleucon adenocaulonae
- BL less than 2.5 mm. SIPH pale at bases, darker towards apices, without any polygonal reticulation
Nasonovia rostrata

Adenodolichos

- A. punctatus*

Leguminosae

- Aphis craccivora*

Adenophora

- A. coronopifolia*
A. curvidens
A. gmelinii
A. marsupiflora

A. peresküifolia
A. stenathina
A. thunbergiana
A. triphylla (incl. ssp. *japonica*)
A. verticillata

Campanulaceae

- Tshernovaia adenophorae*; *Uroleucon triphyllae*
[*Uroleucon cephalonopli*, *gobonis*]
Uroleucon tryphyllae
Tshernovaia adenophorae;
Uroleucon adenophorae, *triphyllae*
Uroleucon kikioense, *triphyllae*
Tshernovaia adenophorae
Uroleucon triphyllae
Uroleucon triphyllae
Uroleucon adenophorae

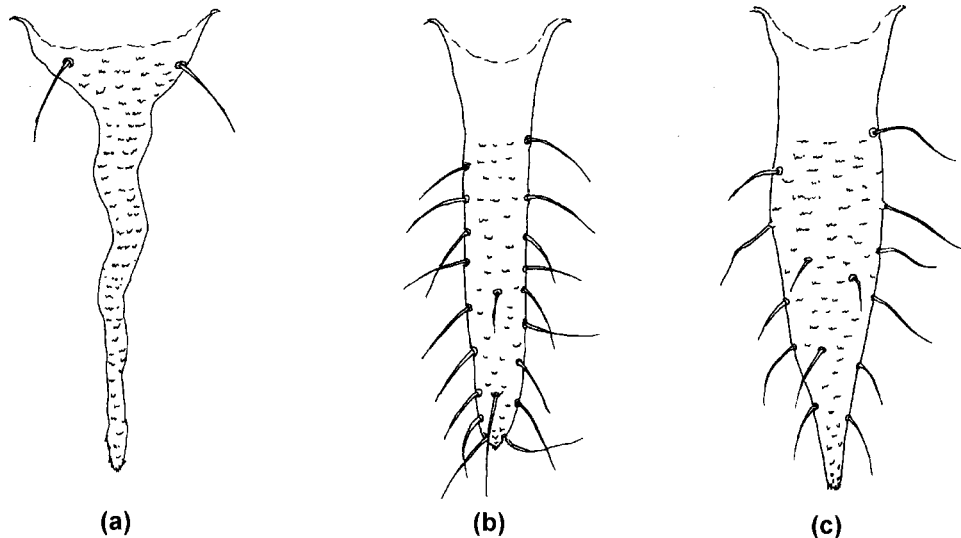


Figure 7 Apteræ on *Adenophora*; (a) cauda of *Tshernovaia adenophorae*, (b) cauda of *Uroleucon triphyllae*, (c) cauda of *U. adenophorae*.

Key to aphids on *Adenophora*:-

N.B. All these aphids have numerous rhinaria on ANT III of apteræ, dorsal hairs arising from small dark scleroites, and dark SIPH with distal polygonal reticulation.

1. Cauda with a remarkable bipartite structure, the base being broadly conical, with an abrupt transition to a very thin, somewhat twisted, hairless distal section (Figure 7a). Anal plate with a cauda-like posterior projection *Tshernovaia adenophorae*
 - Cauda finger-like, cylindrical or tapering gradually from base to apex **2**
2. Cauda pale. R IV+V c.0.7× HT II, and with only 2 accessory hairs *Uroleucon kikioense**
 - Cauda dark. R IV+V 1.0–1.3× HT II, with 7 or more accessory hairs **3**
3. SIPH 1.0–1.2× cauda, which has most of distal half almost parallel-sided or slightly swollen, and a rather abruptly pointed or rounded apex (Figure 7b). ANT PT/BASE 2.8–5.1. BL 2.5–3.2 mm *Uroleucon triphyllae*
 - SIPH 1.5–2.0× cauda, which has distal half tapering and a narrow, acuminate apex (Figure 7c). ANT PT/BASE 5.0–5.5. BL 3.7–4.3 mm *Uroleucon adenophorae*

Adenostemma

A. perrottetii
A. viscosum

Compositae

Aphis gossypii
Aphis fabae

Use key to polyphagous aphids, p. 1020.

HOST LISTS AND KEYS

Adenostyles (= *Cacalia* Kunze nec. L.)

A. albida (incl. *albifrons*, *hirsuta*)

A. alliariae

A. alpina (incl. *glabra*)

A. glabra see *alpina*

A. platyphylloides

A. viridis

Compositae

Anuraphis farfarae;

Aphis cacaliasteris, [*Aphis* sp. near *viburni*];

Brachycaudus helichrysi; [*Ovatus inulae*]

Aphis solanella; *Brachycaudus cardui*, *helichrysi*

Anuraphis farfarae; *Aphis cacaliasteris*;

Brachycaudus helichrysi

Brachycaudus helichrysi, *virgatus*

Aphis cacaliasteris; *Brachycaudus helichrysi*

Key to aphids on *Adenostyles*:-

1. Dorsal hairs long with capitate apices, and arising from tuberculate bases. SIPH 3.7–5.0× cauda
Capitophorus similis
- Dorsal hairs short, or long with pointed apices, without tuberculate bases. SIPH much shorter **2**
2. Cauda black, tongue-shaped, as long as its basal width or longer **3**
- Cauda pale or dark, helmet-shaped, shorter than its basal width **4**
3. ANT (of apt.) usually with rhinaria on III and IV, those on ANT III being mostly on distal half of segment. Tibiae dark
Aphis cacaliasteris
- ANT (of apt.) without rhinaria on III and IV. Tibiae mainly pale
Aphis fabae group (incl. *solanella*)
4. SIPH dark, with close-set rows of small spinules. ANT (of apt.) with 6–19 rhinaria clustered on swollen basal half of ANT III
Anuraphis farfarae
- SIPH pale or dusky, without rows of small spinules. ANT (of apt.) without rhinaria on ANT III and IV **5**
5. SIPH pale or slightly dusky, less than 1.5× cauda. R IV+V 1.2–1.3× HT II. Dorsal abdomen without dark sclerotisation
Brachycaudus helichrysi
- SIPH dusky or dark, more than 1.8× cauda. R IV+V 1.3–2.0× HT II. Dorsal abdomen with variably developed dark sclerotisation **6**
6. Dorsal abdomen with a solid black shield extending over the whole of ABD TERG 1–6. Genital plate with 25–42 hairs, of which 8–17 are on the anterior half. ANT IV usually longer than (0.9–1.5×) R IV +V. Never with spinal tubercles (STu)
Brachycaudus cardui
- Dorsal abdomen usually with less extensive dark sclerotisation, if extensive then genital plate only has 12–32 hairs, of which only 2–5 are on anterior half, ANT IV is usually shorter than (0.4–1.1×) R IV +V, and STu frequently present on ABD TERG 7
Brachycaudus virgatus

Adesmia

A. viscida

Adesmia sp.

Leguminosae

Aphis sp. (Chile, BMNH colln)

Aphis craccivora

Key to apterae on *Adesmia*:-

- Dorsum with an extensive dark patch. ANT PT/BASE 1.7–2.5. Cauda with 4–9 hairs
Aphis craccivora
- Dorsum with segmentally divided dark bands, often fragmented. ANT PT/BASE 1.4–1.9. Cauda with 8–14 hairs
Aphis sp. (Chile, BMNH colln)

Adhatoda see *Justicia*

Adiantum

A. capillus-veneris
A. caudatum
A. cordatum
A. cristatum
A. cuncinulium (?)
A. pedatum
A. poiretii
A. raddianum
A. subcordatum
A. tenerum
A. thalictroides
A. tinctum
A. trapeziforme
Adiantum spp.

Maidenhair Ferns

Idiopterus nephrolepidis
Micromyzodium dasi
Myzus persicae
Aphis spiraeicola
Micromyzodium filicium
Papulaphis sleesmani; *Macrosiphum adianti*
Idiopterus nephrolepidis
Aphis nerii; *Idiopterus nephrolepidis*; *Macrosiphum walkeri*
Micromyzus niger
Aphis nerii; *Idiopterus nephrolepidis*
Idiopterus nephrolepidis
Micromyzodium filicium
Idiopterus nephrolepidis; *Neomyzus circumflexus*
Aulacorthum solani; *Macrosiphum rebecca*;
Micromyzella sleonensis

Adiantaceae

Use key to apterae of fern-feeding aphids under *Polypodium*.

Adina

A. microcephala
Adina sp.

Rubiaceae

Aphis gossypii
Aphis spiraeicola

Use key to polyphagous aphids, p. 1020.

Adonis

A. aestivalis
A. vernalis
Adonis sp.

Ranunculaceae

Aphis fabae
Aphis (Debilisiphon) sp. (Bozhko 1976a, p. 99)
Aphis gossypii

Key to aphids on *Adonis*:-

1. SIPH shorter than cauda. ANT III (of apt.) with about 6 rhinaria, and IV with 1–2
Aphis (Debilisiphon) sp.
- SIPH usually longer than cauda. ANT III and IV (of apt.) without rhinaria
go to key to polyphagous aphids, p. 1020

Aechmea

A. nudicaulis

Bromeliaceae

Sitobion luteum

Aegilops

A. cylindrica

A. longissima
A. ovata
A. peregrina

Gramineae

Diuraphis noxia; *Rhopalosiphum padi*;
Schizaphis phlei, *rufula*; *Sipha aegilopis*
Sipha maydis
Aphis gossypii
Forda formicaria; *Sipha maydis*

HOST LISTS AND KEYS

A. triuncialis
Aegilops spp.

Sitobion avenae
Metopolophium dirhodum; *Schizaphis graminum*;
Sipha elegans; *Sitobion avenae*

Use key to apterae of grass-feeding aphids under *Digitaria*.

Aegle

A. marmelos

Rutaceae

Toxoptera aurantii

Aegopodium

A. alpestre
A. podagraria

Goutweed, Bishop's Weed

Cavariella aegopodii; *Dysaphis foeniculus*, *siberica*
Anuraphis subterranea
Aphis fabae, *fabae* ssp. *cirsiiacanthoidis*, *grosmannae*,
podagrariae, *sambuci*, *subnitida*;
Aulacorthum aegopodii, *solani*;
Cavariella aegopodii, [*archangelicae*], *theobaldi*;
Dysaphis crataegi, *newskyi* ssp. *mamontovae*;
Hyadaphis foeniculi; *Myzus ornatus*; *Pemphigus* sp.;
Semiaphis anthrisci, *dauci*, *pimpinellae*;
Pemphigus passeki; *Dysaphis crataegi* ssp. *aethusae*

Umbelliferae

Aegopodium spp.

Key to aphids on *Aegopodium*:-

1. ANT PT/BASE much less than 0.5 *Pemphigus* sp(p)
– ANT PT/BASE more than 0.5 **2**
2. ABD TERG 8 with a medial process projecting backward above the cauda **3**
– No supracaudal process **4**
3. SIPH clavate. ANT PT/BASE less than 1.5 *Cavariella aegopodii*
– SIPH tapering from base to flange. ANT PT/BASE more than 2 *Cavariella theobaldi*
4. SIPH very small and flangeless, only about 0.5× cauda, with aperture slanted towards mid-line of body **5**
– SIPH more than 0.75× cauda **7**
5. ABD TERG 1–4 usually with a total of at least 2–4 (range 0–7, mean 3.2) marginal tubercles (MTu), in addition to those consistently present on ABD TERG 5. Genital plate with a total of 13–21 (mostly 16–19) hairs. (Al. with ANT PT/BASE 4.0–5.0) *Semiaphis anthrisci*
– ABD TERG 1–4 usually with a total of only 0–1 MTu (range 0–7, means 0.3–0.9), in addition to those consistently present on ABD TERG 5. Genital plate with a total of 9–17 (–20) hairs. (Al. with ANT PT/BASE 2.4–4.4, but rarely more than 3.9) **6**
6. Longest hair on ABD TERG 8 is 8–25 µm (mostly 12–20 µm). Genital plate with 13–20 (mostly 14–17) hairs. ANT PT/BASE 1.7–2.5. (Al. with ANT PT/BASE 2.4–3.4 and sec. rhin. distributed III 16–23, IV 1–5, V 0–1) *Semiaphis dauci*
– Longest hair on ABD TERG 8 is 15–47 µm (mostly 18–30 µm). Genital plate with 9–20 (but mostly 11–13) hairs. ANT PT/BASE (1.8–) 2.2–3.2. (Al. with ANT PT/BASE 3.1–3.9 (–4.4) and sec. rhin. distributed III 16–59, IV 2–12 V 0–4) *Semiaphis pimpinellae*
7. Cauda short and broad, rounded or helmet-shaped, shorter than its basal width in dorsal view ... **8**
– Cauda tongue-shaped, at least as long as its basal width in dorsal view **11**

AEOLLANTHUS

8. SIPH with 30–40 densely packed rows of small nodules. Cauda with 9–13 hairs
Anuraphis subterranea 9
– SIPH with normal imbrication. Cauda with 5–7 hairs
9. ANT III and IV (of aptera) with rhinaria *Dysaphis newskyi* ssp. *mamontovae* 10
– ANT III and IV without rhinaria
10. Longest hairs on ANT III not exceeding BD III *Dysaphis crataegi* group
– Longest hairs on ANT III much longer than BD III *Dysaphis sibirica*
11. SIPH clavate, 0.8–1.4× cauda and 0.1–0.2× BL. R IV+V 0.7–1.05× HT II *Hyadaphis foeniculi* 12
– SIPH cylindrical or tapering on distal half, more than 1.4× cauda or, if shorter, then much less than 0.1× BL and R IV+V 0.95–1.5× HT II
12. ANT tubercles well developed, their inner faces parallel or convergent in dorsal view. SIPH and cauda mainly pale. ABD TERG 1 and 7 without marginal tubercles (Mtu) 13
– ANT tubercles weakly developed. SIPH and cauda black. ABD TERG 1 and 7 always with Mtu 14
13. Dorsal abdomen with a pattern of dark intersegmental ornamentation. ANT tubercles with inner faces convergent in dorsal view. SIPH with a slight ‘S’-curve *Myzus ornatus*
– Dorsal abdomen without any dark markings. ANT tubercles with inner faces parallel in dorsal view. SIPH straight *Aulacorthum solani* or *A. aegopodii*
14. ABD TERG 2–4 with large flat marginal tubercles (MTu), 33–50µm in longitudinal diameter. SIPH 2–3× cauda *Aphis sambuci*
– ABD TERG 2–4 with Mtu if present papilliform and with longitudinal diameter 15–35µm. SIPH often less than 2× cauda 15
15. Dorsal body and appendages with short hairs; those on ANT III 7–15µm long, much shorter than BD III. ABD TERG 2–4 often with Mtu 16
– Dorsal body and appendages bearing longer hairs; those on ANT III 24–75µm long, usually as long as or longer than BD III. ABD TERG 2–4 only sporadically with Mtu 17
16. ANT III (of apt.) 1.6–2.0× SIPH, and bearing rhinaria *Aphis subnitida*
– ANT III (of apt.) 1.0–1.4× SIPH, and without rhinaria *Aphis grosmanae*
17. ABD TERG 2–4 without spinal hairs (i.e., only 2 dorsal hairs per segment, as normal for genus), so that the (pleural) pair on ABD TERG 4 are about twice as far apart as the spinal pair on ABD TERG 5–7. ABD TERG 8 with 2–5 hairs *Aphis fabae* group
– ABD TERG 2–4 with both spinal and pleural hairs (i.e., 4 dorsal hairs per segment), so that the (spinal) pair on ABD TERG 4 are 1.5 or less times the distance apart of the spinal pair on ABD TERG 5–7. ABD TERG 8 with 3–11 hairs, usually 5 or more *Aphis podagrariae*

Aellenia see *Halothamnus*

Aenida see *Amaranthus*

Aeollanthus

A. myrianthus (?)

Labiatae

Sitobion coleii

HOST LISTS AND KEYS

Aeonium

A. arboreum
A. glutinosum
A. holochrysum
A. manriqueorum

Crassulaceae

Aphis sedi
Nasonovia dasyphylli
Aphis gossypii
Aphis gossypii

Use key to aphids on *Sedum*.

Aerides

A. fieldingi

Orchidaceae

Cerataphis orchidearum

Aerva

A. tomentosa

Amaranthaceae

Aphis fabae

Aeschynanthus

A. radicans

Gesneraceae

Aulacorthum solani;
Myzus duriatae; *Neomyzus circumflexus*;
Toxoptera aurantii

Key to apterae on *Aeschynanthus*:-

- Abdomen with an oval dark patch extending over ABD TERG 1-4. Head spiculose, dark, with well-developed ANT tubercles. ANT I-II, SIPH and cauda all dark *Myzus duriatae*
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Aeschynomene

A. americana
A. aspera
A. cristata
A. dimidiata
A. indica

Leguminosae

Aphis craccivora
Aphis craccivora
Sitobion africanum
Neoantalus aeschynomenis; [*Sitobion* sp.]
Aphis craccivora, *gossypii*

Key to aphids on *Aeschynomene*:-

1. SIPH as very short cones, much shorter than cauda, which has a constriction and a very elongate triangular knob. ANT VI BASE with several spaced-out rhinaria. R IV+V very short and blunt, about 0.5× HT II *Neoantalus aeschynomenis*
- SIPH tubular, tapering, as long as or longer than cauda, which has no constriction. R IV+V similar in length to HT II **2**
2. SIPH as long as or longer than the distance between their bases, with a subapical zone of polygonal reticulation. Dorsal abdomen often with a broken pattern of dark pigmentation, never with an unbroken black shield *Sitobion africanum*
- SIPH shorter than the distance between their bases, and without any subapical polygonal reticulation. Dorsal abdomen either without dark markings or with an extensive black shield **3**
3. Dorsal abdomen with an extensive black shield. Cauda as black as SIPH *Aphis craccivora*
- Dorsal abdomen without any dark markings. Cauda paler than SIPH *Aphis gossypii*

Aetheorhiza

A. bulbosa

Compositae

Uroleucon sonchi

Aethionema* (incl. *Eunomia*)A. oppositifolium**A. schistosum**Smynthuroides betae**Myzus persicae***Cruciferae**

Use key to polyphagous aphids, p. 1020.

Aethusa*A. cynapium***Umbelliferae***Aphis fabae*; [*Cavariella* sp.];*Dysaphis crataegi* ssp. *aethusae*; *Hyadaphis foeniculi*;*Macrosiphum euphorbiae*, *gei*; *Myzus ornatus*;*Pemphigus gairi*Key to aphids on *Aethusa*:-

1. ANT PT/BASE less than 0.5. ABD TERG 3–7 usually with spinal and pleural wax pore plates
Pemphigus gairi
- ANT PT/BASE more than 1.5. No wax pore plates **2**
2. Cauda helmet-shaped, not longer than its basal width in dorsal view. Dome-shaped marginal tubercles (MTu) present on most ABD TERG
Dysaphis crataegi ssp. *aethusae*
- Cauda tongue-shaped, longer than its basal width. MTu usually very small or absent, or only consistently present on ABD TERG 1 and 7 **3**
3. SIPH with a subapical zone of polygonal reticulation **4**
- SIPH without any polygonal reticulation **5**
4. Longest hairs on ABD TERG 3 and 8 are 43–84 µm and 66–106 µm respectively. Femora usually with a dusky-dark apical or subapical patch
Macrosiphum gei
- Longest hairs on ABD TERG 3 and 8 are 21–37 µm and 38–63 µm respectively. Apices of femora pale or only slightly dusky
Macrosiphum euphorbiae
5. ANT tubercles well developed, with inner faces scabrous and convergent. SIPH pale. Dorsal abdomen with a pattern of dark intersegmental ornamentation
Myzus ornatus
- ANT tubercles poorly developed or absent. SIPH dusky or dark. Dorsal abdomen with or without dark markings **6**
6. SIPH tapering. MTu always present on ABD TERG 1 and 7
Aphis fabae
- SIPH clavate. MTu never present on ABD TERG 1 and 7
Hyadaphis foeniculi

Aframomum*A. angustifolium**A. luteoalbum**A. stipulatum***Zingiberaceae***Aphis gossypii*; *Pentalonia nigronervosa**Rhopalosiphum maidis**Aphis gossypii*Key to aphids on *Aframomum*:-

1. ANT longer than body. Femora with basal 0.6 or more of length pale, contrasting with black distal section. SIPH pale basally and dark distally. (Al. with broad-banded wing-veins, and radius fused with media to form a closed cell below the pterostigma)
Pentalonia nigronervosa
- ANT shorter than body. Femora mainly dark or mainly pale. SIPH uniformly dark. (Al. with normal pale wing veins) **2**

HOST LISTS AND KEYS

2. ANT less than $0.5 \times$ BL. Legs mainly dark. SIPH less than $0.1 \times$ BL and usually slightly swollen proximal to flange *Rhopalosiphum maidis*
– ANT more than $0.5 \times$ BL. Legs mainly pale. SIPH more than $0.1 \times$ BL and tapering from base to flange, with no trace of swelling *Aphis gossypii*

Afrocarum

A. imbricatum

Umbelliferae

Hyadaphis coriandri, foeniculi

Couplet to separate these two aphids:–

- SIPH a little shorter than cauda, slightly swollen before flange *Hyadaphis coriandri*
– SIPH clavate, about equal in length to cauda or a little longer *Hyadaphis foeniculi*

Afroligusticum

A. elliotii

Umbelliferae

Aulacorthum solani

Agalinis (incl. *Gerardia*)

A. pedicularis

A. tenuifolia

Scrophulariaceae

Aphis fabae, gerardiae

Aphis gerardiae

Couplet for separating these two species:–

- Hind tibiae uniformly dark, or only a little paler in middle. Cauda with 7–11 hairs *Aphis gerardiae*
– Hind tibiae mostly pale, dark only at ends. Cauda with 11–24 hairs *Aphis fabae*

Agalma = *Schlefflera*

Aganope (incl. *Ostryoderris*)

A. lucida

Leguminosae

Aphis craccivora

Agapanthus

A. umbellatus

Agapanthus sp.

Alliaceae

[*Myzus hemerocallis*]; [*Sitobion graminis*]

Aphis fabae

Agapetes

A. serpens

Ericaceae

Indiaphis setosa

Agarista

A. salicifolia

Ericaceae

Toxoptera aurantii

Agastache

A. foeniculum

A. urticifolia

Labiatae

Aphis neomonardae

A. agastachyos

Couplet for separating these two species:–

(Both species have ANT tubercles undeveloped, ABD TERG 1 and 7 with large lateral tubercles, pale SIPH, and R IV+V with 4–8 accessory hairs.)

- SIPH 0.11 – $0.15 \times$ BL and 1.1 – $1.6 \times$ cauda *Aphis agastachyos*
– SIPH 0.06 – $0.08 \times$ BL and 0.7 – $1.0 \times$ cauda *Aphis neomonardae*

Agathis see Blackman and Eastop (1994)

Agauria see *Agarista*

Agave

A. americana
A. legrelliana
Agave spp.

Amaryllidaceae

Aphis gossypii
Aphis craccivora
Aphis helianthi; *Brachycaudus helichrysi*;
Cerataphis brasiliensis

Key to apterae on *Agave*:-

- Body dorsoventrally flattened, subcircular, wholly sclerotic, with a distinct crenulate margin due to a continuous circle of wax glands. Underside of head with at least one pair of thick, dagger-shaped hairs situated lateroventrally to bases of a pair frontal horns. SIPH pore-like . . . *Cerataphis brasiliensis*
- Body of normal aphid shape, not wholly sclerotic; head without frontal horns. SIPH conical or tubular, tapering . . . go to key to polyphagous aphids, p. 1020

Ageratum

A. conyzoides

A. houstonianum (incl. *mexicanum*)

A. maritimum

A. mexicanum see *A. houstonianum*

Ageratum spp.

Compositae

Aphis craccivora, *fabae*, *gossypii*, *spiraecola*;
Aulacorthum solani; *Brachycaudus helichrysi*;
[*Capitophorus hippophaes* ssp. *javanicus*];
Macrosiphum euphorbiae; *Myzus ornatus*, *persicae*;
Indomasonaphis anaphalidis;
Uroleucon ambrosiae (*lizerianum*), *compositae*,
sonchi ssp. *afghanicum*
Aphis fabae, *gossypii*, *spiraecola*; *Brachycaudus helichrysi*;
Macrosiphum euphorbiae; *Myzus ornatus*, *persicae*;
Neomyzus circumflexus;
Uroleucon ambrosiae ssp. *lizerianum*
Aphis gossypii, *middletonii*
[*Hyperomyzus carduellinus*]; [*Vesiculaphis picridis*]

Key to apterae on *Ageratum*:-

1. Large aphid, BL more than 4mm. SIPH strongly clavate, with maximum width 3–4× diameter of tibia at midpoint. Cauda with 25–32 hairs *Indomasonaphis anaphalidis*
- BL less than 4mm. SIPH not strongly clavate and/or cauda with less than 20 hairs **2**
2. SIPH dark with subapical polygonal reticulation. Dorsal hairs without basal scleroites. Coxae dark, cauda pale *Uroleucon sonchi* ssp. *afghanicum*
- Without this combination of characters (i.e., if SIPH are dark and have polygonal reticulation, then at least some of dorsal hairs have small dusky or dark basal scleroites, and either coxae are pale or cauda is dark) go to key to polyphagous aphids, p. 1020

Aglaia

A. odorata
Aglaia spp.

Meliaceae

Toxoptera aurantii, *citricidus*
Cervaphis schouteniae

HOST LISTS AND KEYS

Couplet for aphids on *Aglaia*:-

- Body with long branched hair-bearing processes. SIPH with a subapical ring of small hairs
Cervaphis schouteniae
- Body without long hair-bearing processes. SIPH without hairs
go to key to polyphagous aphids, p. 1020

Agonis

A. flexuosa
A. luehmannii

Myrtaceae

Anomalaphis comperei; *Aphis gossypii*
Myzus persicae

Couplet for aphids on *Agonis*:-

- ANT 5-segmented, with ANT PT/BASE less than 1. ABD TERG 7 and 8 each with a pair of long hair-bearing processes. SIPH with a subapical ring of 3–5 hairs
Anomalaphis comperei
- ANT usually 6-segmented, and ANT PT/BASE more than 2. ABD TERG 7 and 8 without long processes, SIPH without hairs
go to key to polyphagous aphids, p. 1020

Agoseris

A. glauca
Agoseris spp.

Compositae

Aphis sp. (Manitoba, BMNH colln)
Abstrusomyzus phloxae; *Pleotrichophorus triangulatus*

Key couplet for aphids on *Agoseris*:-

1. Dorsal body with numerous short fan-shaped hairs. SIPH less than 0.5× cauda
Pleotrichophorus triangulatus
- Dorsal body hairs not fan-shaped. SIPH longer than cauda **2**
2. SIPH black, tapering, 1.2–1.4× cauda. ANT PT/BASE 1.4–1.7 *Aphis* sp. (Manitoba, BMNH colln)
- SIPH pale, slightly swollen subapically, about 2× cauda. ANT PT/BASE 3.4–4.3
Abstrusomyzus phloxae

Agrimonia

A. eupatoria

A. gryposepala
A. japonica
A. odorata
A. pilosa

A. striata
Agrimonia sp(p).

Rosaceae

Acyrthosiphon malvae ssp. *agrimoniae*;
Aphis agrimoniae ssp. *ucrainica*, *proffti*;
Macrosiphum agrimoniellum, *rosae*; *Sitobion fragariae*
Macrosiphum agrimoniellum, *euphorbiae*
Aphis agrimoniae
Acyrthosiphon malvae ssp. *agrimoniae*; *Aphis proffti*
Aphis agrimoniae; [*Epipemphigus niisimae*];
Eriosoma japonicum; [*Pemphigus dorocola*];
[*Tetraneura nigriabdominalis*, *yezoensis*]
Macrosiphum pallidum
[*Acyrthosiphon malvae* ssp. *potha*];
Metopolophium dirhodum

Key to aphids on *Agrimonia*:-

1. ANT PT/BASE less than 0.5. Eyes of 3 facets. SIPH as raised pores with a surrounding ring of hairs, cauda semi-circular. Each segment of thorax and abdomen with a pair of marginal wax pore plates
Eriosoma japonicum

- ANT PT/BASE much greater than 1. Eyes compound. SIPH tubular, cauda tongue-shaped. No wax pore plates 2
- 2. ANT tubercles weakly developed. SIPH only about 0.5× distance between their bases, and less than 1.5× cauda. Marginal tubercles (MTu) present on ABD TERG 1 and 7 3
- ANT tubercles well developed, or at least protruding further than medial part of front of head in dorsal view. SIPH at least as long as the distance between their bases, and 1.4 or more× cauda. ABD TERG 1 and 7 without MTu 4
- 3. ANT/PT BASE 2.6–3.2 *Aphis proffii*
- ANT/PT BASE 1.8–2.3 *Aphis agrimoniae*
- 4. SIPH mainly pale, sometimes dusky at apices 5
- SIPH entirely or mainly dark 8
- 5. SIPH without any polygonal reticulation. Hairs on ANT III inconspicuous, the longest rarely more than 0.5× BD III 6
- SIPH with a subapical zone of polygonal reticulation. Hairs on ANT III evident, the longest more than 0.5× BD III 7
- 6. SIPH 1.8–2.2× cauda. ANT PT/BASE 4.8–5.8. R IV+V 1.1–1.3× HT II *Acyrtosiphon malvae agrimoniae*
- SIPH 1.4–1.8 (–2.0)× cauda. ANT PT/BASE 2.8–4.4. R IV+V 0.6–0.75× HT II *Metopolophium dirhodum*
- 7. R IV+V 1.1–1.3× HT II. ANT III with 15–20 rhinaria extending over more than 0.7 of its length *Macrosiphum agrimoniellum*
- R IV+V 0.8–1.0× HT II. ANT III with 1–10 rhinaria confined to basal half *Macrosiphum euphorbiae*
- 8. Hairs on ANT III all less than 0.5× BD III. R IV+V only 1.0–1.2× its basal width, shorter than HT II. Tibiae pale *Sitobion fragariae*
- Hairs on ANT III conspicuous, the longest of them more than 0.5× BD III. R IV+V more than 1.5× its basal width, similar in length to or longer than HT II. Tibiae mainly dark ... 9
- 9. Head pale or dusky. SIPH often paler at extreme bases *Macrosiphum pallidum*
- Head very dark or black, like SIPH, which are wholly dark *Macrosiphum rosae*

Agriophyllum*A. pungens***Chenopodiaceae***Aphis craccivora*; *Brachyunguis harmalae*Key to apterae on *Agriophyllum*:-

- SIPH 0.6–0.7× cauda. ANT PT/BASE 0.5–0.8 *Brachyunguis harmalae*
- SIPH and ANT PT relatively longer go to key to polyphagous aphids, p. 1020

Agriophyllum* see *Berkheya***Agrocharis****A. incognita***Umbelliferae**

Aphis gossypii, *spiraecola*; *Aulacorthum solani*;
Hyadaphis foeniculi; *Myzus ornatus*;
Uroleucon compositae

HOST LISTS AND KEYS

Couplet for aphids on *Agrocharis*:-

- SIPH dark, clavate, similar in length to or only a little longer than the equally dark cauda
Hyadaphis foeniculi
- Without this combination of characters go to key to polyphagous aphids, p. 1020

Agropyron

A. caninum see *Elymus*

A. ciliare see *Elymus*

A. cristatum (incl. ssp. *imbricatum*)

A. elongatum see *Elymus*

A. glaucum see *Elymus glaucus*

A. imbricatum see *cristatum*

A. intermedium see *Elymus hispidus*

A. junceiforme see *Elymus junceiformis*

A. junceum see *Elymus farctus*

A. littorale see *Elymus hispidus* ssp. *graecus*

A. occidentale see *Elymus smithii*

A. pectinatum (incl. *pectiniforme*)

A. pungens see *Elymus*

A. repens see *Elymus*

A. semicostatum see *Elymus*

A. smithii see *Elymus*

A. spicatum

A. tenerum see *Elymus trachycaulus*

A. trachycaulum see *Elymus*

A. trichophorum see *Elymus hispidus* ssp. *barbatus*

A. tsukushiense see *Elymus*

Agropyron spp.

Gramineae

Diuraphis agropyronophaga, bromicola, frequens, holci, noxia;

Forda marginata; Hyalopterus amygdali;

Laingia psammae; Metopolophium dirhodum;

Rhopalosiphum insertum, maidis, padi;

[*Sappaphis dipirivora*]; *Schizaphis graminum;*

Sipha elegans, maydis; Sitobion avenae;

Tetraneura capitata ssp. *agropyricena*

Diuraphis frequens; Sipha maydis; Sitobion avenae

Forda marginata

Forda hirsuta; Sipha uvarovi; Sitobion fragariae; [Slavum lentisoides (=Aploneura ampelina?)]

Use key to apterae of grass-feeding aphids under *Digitaria*.

Agrostemma

A. coeli-rosea

A. githago

Caryophyllaceae

Macrosiphum centranthi

[*Brachycaudus persicae*];

[*Nasonovia ribisnigri* (as *Macrosiphum agrostemmium*)];

[*Uroleucon picridis*]

Agrostis

- A. alba* see *stolonifera*
A. alpina
A. canina
A. capillaris (incl. *tenuis*)
- A. castellana*
A. clavata
A. curtisii
- A. gigantea*
A. perennans
A. plumosa see *Tricholaena teneriffae*
A. rupestris
- A. scabra*
A. stolizans see *stolonifera*
A. stolonifera
 (incl. *alba* auct nec. L.; *stolizans*)
- A. tenuis* see *capillaris*
Agrostis spp.

Gramineae

- Pemphigus similis*
Metopolophium dirhodum; *Rhopalosiphum padi*
Anoecia corni, zirnitsi; [*Aphis* sp., Leonard, 1968: 269];
Aploneura lentisci; *Baizongia pistaciae*;
Diuraphis agrostidis; *Forda formicaria, marginata*;
Geoica setulosa, utricularia; *Metopolophium festucae*;
Paracletus cimiciformis;
Pemphigus sp.(?groenlandicus – Zwölfer, 1958);
Rhopalosiphum padi; *Schizaphis agrostis*; *Sipha glyceriae*;
Sitobion avenae; *Tetraneura ulmi*
Hysteroneura setariae
Tetraneura fusiformis
Atheroides serrulatus; *Metopolophium festucae cerealium*;
Schizaphis graminum
Rhopalosiphum insertum; *Schizaphis rufula*; *Sitobion avenae*
Geoica utricularia; *Prociphilus erigeronensis*
- [*Acyrtosiphon loti* (as *Metopolophium gracilipes*);
Pemphigus similis
Sitobion avenae
- Anoecia corni*; *Atheroides serrulatus*; *Diuraphis agrostidis*;
Geoica setulosa; *Metopolophium festucae*; *Pemphigus* sp.;
Rhopalomyzus poae; *Rhopalosiphum insertum, maidis, padi*;
Schizaphis dubia, graminum;
Sipha elegans, glyceriae, maydis;
Sitobion akebiae, avenae, fragariae
- Anoecia krizusi*; *Aploneura lentisci*; *Forda formicaria*;
Paracletus cimiciformis; [*Prociphilus caryae*];
Sitobion beiquei, miscanthi

Use key to apterae of grass-feeding aphids under *Digitaria*.

Aichryson

- A. dichotomum*

Crassulaceae

- Nasonovia dasyphylli*

Ailanthus see Blackman and Eastop (1994)

Ainsworthia

- A. trachycarpa*

Umbelliferae

- Aphis fabae, Cavariella aegopodii*

Couplet for separating these two species:–

- SIPH black, tapering, 0.8–1.5× black cauda, which bears 11–24 hairs. ANT PT/BASE 2.4–3.4

Aphis fabae

HOST LISTS AND KEYS

- SIPH pale, clavate, 1.8–2.4× pale cauda, which bears 5 hairs. ANT PT/BASE 1.0–1.55
Cavariella aegopodii

Aira

- A. caespitosa* see *Deschampsia*
- A. capillaris*
- A. caryophyllea*
- A. flexuosa* see *Deschampsia*
- Aira* sp.

Gramineae

- Metopolophium dirhodum*; *Rhopalosiphum padi*;
- Sitobion fragariae*
- Chaetosiphella berlesei*
- Sipha glyceriae*

Use key to apterae of grass-feeding aphids under *Digitaria*.

Ajania

- A. fastigiata*

Compositae

- Macrosiphoniella ajaniae*

Ajuga

- A. cractionia*
- A. genevensis*
- A. genevensis* × *pyramidalis*
- A. macrosperma*
- A. orientalis*
- A. reptans*
- Ajuga* spp.

Labiatae

- Aphis gossypii*
- Myzus ajugae*, [*Myzus* sp. (Bozhko, 1976a: 113)]
- Ovatomyzus chamaedryst*
- Sitobion aulacorthoides*
- Myzus ajugae*
- [*Brachycaudus cardui*]; *Myzus ajugae*, *ornatus*, *persicae*
- Neomyzus circumflexus*; [*Sinomegoura rhododendri*]

Key to aphids on *Ajuga*:-

1. ANT tubercles weakly developed, not projecting beyond middle part of frons in dorsal view
Aphis gossypii
- ANT tubercles well developed, their inner faces divergent or convergent **2**
2. Inner faces of ANT tubercles clearly divergent. SIPH dark except for pale basal c.0.3, with a subapical zone of polygonal reticulation and a large flange
Sitobion aulacorthoides
- Inner faces of ANT tubercles parallel or convergent. SIPH pale or dusky, without any subapical polygonal reticulation **3**
3. Dorsal abdomen with a large dark, approximately horseshoe-shaped dark patch, and paired dark patches also on thoracic tergites
Neomyzus circumflexus
- No extensive dark dorsal patches **4**
4. PT 1.45–2.3× ANT III. Cuticle of front of head and ANT tubercles is smooth
Ovatomyzus chamaedryst
- PT 0.6–1.4× ANT III, and cuticle of front of head and ANT tubercles is spiculate or rugose **5**
5. SIPH not at all swollen, tapering with a slight 'S' curve. ANT PT/BASE 1.7–2.8. Dorsal abdomen with an intersegmental pattern of dark ornamentation
Myzus ornatus
- SIPH slightly clavate. ANT PT/BASE rarely less than 2.8. Dorsal abdomen without dark markings **6**
- R IV+V 1.05–1.30× HT II
Myzus ajugae
- R IV+V 0.9–1.0× HT II
Myzus persicae

Akebia*A. quinata**A. trifoliata**Akebia* spp.**Lardizabalaceae**

Aphis fabae; *Aulacorthum solani*, *pterinigrum*;
 [*Ericaphis* sp. (B.C., Canada)]; *Macrosiphum euphorbiae*;
Myzus ornatus; *Neomyzus circumflexus*; *Sitobion akebiae*
Sitobion akebiae
 [*Amphicercidus lanigera*]; [*Myzus varians*]

Key to aphids on *Akebia*:-

1. SIPH dark, with a subapical zone of polygonal reticulation. Cauda pale. ANT dark, with hairs on III short and blunt, the longest less than 0.5× BD III 2
 - Without this combination of characters . . . go to key to polyphagous aphids, p. 1020
2. Abdomen with black marginal sclerites, fused between segments to form broad black marginal stripes. R IV+V longer than HT II. Head with minute spicules on ventral side 2
 - Abdomen without broad black marginal stripes. R IV+V shorter than HT II. Head without spicules 2
 - Aulacorthum pterinigrum*
 - Sitobion akebiae*

Alangium (incl. Marlea)*A. platanifolium* (var. *macrophyllum*) *Cavariella angelicae***Alangiaceae***Albizia* see Blackman and Eastop (1994)**Alcea***A. pallida**A. rosea***Hollyhocks**

Aphis davletshinae
Acyrtosiphon malvae;
Aphis davletshinae, *fabae*, *fabae solanella*, *gossypii*,
nasturtii, *spiraecola*, *umbrella*;
Aulacorthum solani; *Macrosiphum euphorbiae*;
Myzus ornatus, *persicae*; *Uroleucon eoessigi*

MalvaceaeKey to aphids on *Alcea* (also *Althea* and *Lavatera*):-

1. Cauda helmet-shaped, not longer than its basal width in dorsal view. SIPH pale, smooth, short, with an annular incision proximal to the flange. Spiracular apertures large and rounded 2
 - Cauda tongue- or finger-shaped, longer than its basal width. SIPH pale or dark, imbricated, without any distinct subapical annular incision. Spiracular apertures reniform 2
 - Brachycaudus helichrysi*
2. ANT tubercles weakly developed, not projecting beyond middle of frons in dorsal view. Marginal tubercles (MTu) always present at least on ABD TERG 1 and 7 3
 - ANT tubercles well developed. MTu absent or present, but if present they are usually only on ABD TERG 2–4 (–5) and only rarely on ABD TERG 1 or 7 6
3. SIPH wholly dark 4
 - SIPH pale or dusky, or only dark towards apices 4
 - go to key to polyphagous aphids, p. 1020, starting at couplet 24
4. ANT 5-segmented. R IV+V very long, narrow and pointed, 4–5× its basal width and 1.6–2.1× HT II. Hairs on ABD TERG 2–4 mostly longer than ANT BD III. Marginal tubercles (MTu) absent from ABD TERG 2–5 4
 - Aphis davletshinae*

HOST LISTS AND KEYS

- ANT 5- or 6-segmented. R IV+V less than 2.5× its basal width and 1.0–1.45× HT II. Hairs on ABD TERG 2–4 shorter than ANT BD III. MTu often present on ABD TERG 2–5 as well as 1 and 7 5
- 5. Large MTu usually present (except in summer dwarfs) on ABD TERG 2–5 in addition to those on 1 and 7, those on 7 being greater in diameter than base of ANT III. SIPH 1.35–2.5× cauda. R IV+V 1.1–1.45× HT II. ANT VI BASE 1.0–1.35× HT II *Aphis umbrellae*
- MTu only sporadically present on ABD TERG 2–5, and diameter of tubercle on ABD TERG 7 is less than that of base of ANT III. SIPH 0.8–1.5× cauda. R IV+V 0.95–1.2× HT II. ANT VI BASE 0.85–1.1× HT II *Aphis nasturtii*
- 6. ANT, head, legs (except bases of femora), SIPH and cauda all dark. SIPH with a distal zone of polygonal reticulation. Dorsal abdominal hairs all arising from small dark scleroites *Uroleucon eoessigi*
- ANT, head, legs, SIPH and cauda mainly pale. Dorsal abdominal hairs not arising from scleroites go to key polyphagous aphids, p. 1020, starting at couplet 4

Alchemilla

A. acutiloba
A. alpina
A. arvensis
A. conjuncta
A. glaberrima
A. glaucescens
A. hoppeana
A. jaiilae
A. mollis

A. pyrenaica
A. subcrenatiformis
A. vulgaris

Alchemilla sp.

Rosaceae

Macrosiphum euphorbiae
Acyrtosiphon malvae ssp. *potha*; [*Ericaphis wakibae*]
Brachycaudus helichrysi; *Myzus persicae*
Aphis alchemillae
Aphis alchemillae
Aulacorthum solani
Macrosiphum euphorbiae
Brachycaudus helichrysi
Acyrtosiphon malvae ssp. *potha*; *Aulacorthum solani*;
Brachycaudus helichrysi; *Myzus ascalonicus*
Acyrtosiphon malvae ssp. *potha*
Acyrtosiphon malvae ssp. *potha*; *Macrosiphum euphorbiae*
Acyrtosiphon malvae ssp. *potha*; *Amphorophora gei*;
Aphis alchemillae, *craccivora*; *Aulacorthum solani*;
Brachycaudus helichrysi; *Metopolophium dirhodum*;
Myzus ornatus, *persicae*; *Neomyzus circumflexus*
Aphis fabae; [*Cavariella aquatica*]

Key to aphids on *Alchemilla*:–

1. ANT tubercles well developed, with inner faces smooth and divergent. SIPH long and pale, but without any subapical polygonal reticulation 2
 - Without the above combination of characters 4
2. SIPH markedly clavate. R IV+V 1.2–1.4× HT II *Amphorophora gei*
 - SIPH cylindrical. R IV+V 0.55–1.2× HT II 3
3. R IV+V 0.55–0.75× HT II. ANT PT/BASE 2.7–4.5. ANT VI BASE 1.25–1.75× R IV+V. SIPH 9–11× midlength diameter *Metopolophium dirhodum*
 - R IV+V 1.0–1.2× HT II. ANT PT/BASE 4.8–5.8. ANT VI BASE 0.7–1.0× R IV+V. SIPH 12–16× midlength diameter *Acyrtosiphon malvae* ssp. *potha*

4. ANT tubercles weakly developed, not projecting beyond middle of head in dorsal view. SIPH dark, tapering, short; similar in length to the tongue-shaped cauda which is dusky-dark and bears 8–10 hairs. Dorsum pale *Aphis alchemillae*
 – Without the above combination of characters go to key to polyphagous aphids, p. 1020

Alchornea*A. cordifolia***Euphorbiaceae***Aphis craccivora****Alectorolophus* see *Rhinanthus******Aleurites* see Blackman and Eastop (1994)*****Alhagi****A. camelorum* see *maurorum**A. kirghisorum**A. maurorum* (incl. *camelorum*,
pseudalhagi)*A. persarum* (?)*A. pseudalhagi* see *maurorum**A. sparsifolia***Leguminosae***Aphis alhagii*; *Smynthuodes betae**Acyrthosiphon gossypii*, *pisum*;*Aphis alhagii*, *craccivora*, [*medicaginis*];*Smynthuodes betae*; *Therioaphis ononidis**Therioaphis ononidis**Acyrthosiphon gossypii*; *Aphis craccivora*;*Weibanaphis alhagis***Key to aphids on *Alhagi*:-**

1. ANT PT/BASE 0.08–0.3. Body and appendages densely hairy *Smynthuodes betae*
 – ANT PT/BASE 0.8–4.3. Body and appendages sparsely hairy **2**
2. Cauda knobbed, anal plate bilobed. Dorsal hairs long with expanded apices, and arising from tuberculate bases *Therioaphis ononidis*
 – Cauda triangular, tongue- or finger-shaped, anal plate entire. Dorsal hairs with blunt or pointed apices, without tuberculate bases **3**
3. ANT PT/BASE about 0.8–1.0. SIPH very short, shorter than the broad triangular cauda, which is shorter than its basal width and bears c.16–18 hairs *Aphis alhagii**
 – ANT PT/BASE more than 1. SIPH longer than cauda, which is conical, tongue- or finger-shaped and bears 4–c.16 hairs **4**
4. ANT PT/BASE c.1.2. Cauda conical, c.1.2× its basal width, with c.16 hairs. SIPH very broad-based, tapering gradually to narrow apex *Weibanaphis alhagis**
 – ANT PT/BASE 1.3–5. Cauda tongue- or finger-shaped, 1.5 or more times its basal width, with 4–14 hairs. SIPH almost cylindrical on distal part **5**
5. ANT tubercles weakly developed. Dorsal abdomen with an extensive black shield. SIPH and cauda black *Aphis craccivora*
 – ANT tubercles well developed, divergent in dorsal view. Dorsal abdomen, SIPH and cauda all pale **6**
6. Siphunculi less than 2 times length of cauda *Acyrthosiphon pisum*
 – Siphunculi 2.5–3.3 times length of cauda *Acyrthosiphon gossypii*

HOST LISTS AND KEYS

Alisma

A. lanceolatum
A. orientale
A. plantago
A. plantago-aquatica

Alisma spp.

Alismaceae

Rhopalosiphum nymphaeae
 [Acyrtosiphon pisum]
Aphis nasturtii; *Rhopalosiphum nymphaeae*
Aphis nasturtii; *Aulacorthum solani*;
Rhopalosiphum nymphaeae, [padi]
Neomyzus circumflexus; *Rhopalosiphum nigrum*

Key to aphids on *Alisma*:-

1. Dorsal cuticle with a pattern of bead-like nodules arranged in polygons, each polygon enclosing 1 or more additional nodules. SIPH cylindrical or clavate with a smooth constricted region proximal to the flange 2
 - Dorsal cuticle without a pattern of nodules arranged in polygons. SIPH tapering/cylindrical, not smooth and constricted subapically go to key to polyphagous aphids, p. 1020
2. SIPH clavate, more than 2× cauda *Rhopalosiphum nymphaeae*
 - SIPH cylindrical or only slightly swollen proximal to the subapical constriction, less than 2× cauda *Rhopalosiphum nigrum*

Alkanna

A. strigosa

Boraginaceae

Brachycaudus helichrysi

Allagopappus

Allagopappus sp.

Compositae

Capitophorus inulae

Allamanda

A. blanchettii
A. cathartica
A. violacea

Apocynaceae

Aphis spiraecola
Aphis nerii; *Toxoptera aurantii*, *citricidus*
Aphis spiraecola

Key to aphids on *Allamanda*:-

(All species have weakly developed ANT tubercles, and dark SIPH and cauda.)

1. ANT PT/BASE less than 3.0. Cauda with 7–15 hairs *Aphis spiraecola*
 ANT PT/BASE more than 3.4. Cauda with 9–28 hairs 2
2. Cauda with usually more than 20 hairs. Hairs on ANT III longer than diameter of this segment at its base. Thoracic segments often partly sclerotised *Toxoptera citricidus*
 - Cauda with usually less than 20 hairs. Hairs on ANT III often shorter than diameter of this segment at its base. Thoracic tergites usually unsclerotised 3
3. SIPH less than 1.5× cauda. Stridulatory apparatus present *Toxoptera aurantii*
 SIPH more than 1.5× cauda. No stridulatory apparatus *Aphis nerii*

Allenrolfea* see *Chenopodium

Alliaria

A. petiolata (= *A. officinalis*)

Cruciferae

Brevicoryne brassicae; *Lipaphis alliariae*, *erysimi*;
Myzus persicae; [*Nasonovia ribisnigri*]

Key to aphids on *Alliaria*:-

1. ANT tubercles well developed, with inner faces convergent. SIPH pale, slightly clavate, as long as or longer than the distance between their bases and 1.9–2.5× cauda *Myzus persicae*
- ANT tubercles not developed. SIPH dusky or dark, much shorter than the distance between their bases and 0.8–1.6× cauda **2**
2. ANT III 2.5–3.7× SIPH. SIPH 0.8–1.0× cauda, which is broadly triangular and bears 6–9 hairs. ABD TERG 8 with 8–18 hairs. Dorsal abdomen with paired dark markings *Brevicoryne brassicae*
- ANT III 1.0–1.8× SIPH. SIPH 1.1–1.6× cauda which is elongate triangular or tongue-shaped and bears 4–7 hairs. ABD TERG 8 with 2–7 hairs. Dorsal abdomen with or without dark markings **3**
3. ANT PT 1.2–1.35× SIPH *Lipaphis alliariae*
- ANT PT 0.8–1.15(–1.25)× SIPH *Lipaphis erysimi*

Allionia

- A. linearis*
- A. nyctaginea*

- Aphis helianthi*
- Aphis helianthi*

Nyctaginaceae

Allium

- A. ampeloprasum*
- A. ascalonicum*

- A. caeruleum*
- A. cepa*

- A. fistulosum*
- A. grayi*
- A. neopolitanum*
- A. odorum*
- A. porrum*

- A. sativum*
- A. schoenoprasum*

- A. scorodoprasum*
- A. thunbergii*
- A. triquetrum*
- A. tuberosum*
- A. victorialis*
- Allium* spp.

Amaryllidaceae

- Neotoxoptera formosana*
- Myzus ascalonicus, cymbalariae;*
- Neotoxoptera formosana, oliveri*
- Neotoxoptera formosana*
- Aphis fabae, gossypii, [rumicis];*
- Myzus ascalonicus, persicae;*
- Neotoxoptera formosana, oliveri; Rhopalosiphum padi*
- Neotoxoptera formosana; [Metopolophium dirhodum]*
- Neotoxoptera formosana*
- Neotoxoptera formosana*
- Neotoxoptera formosana*
- Aphis fabae, gossypii; Neotoxoptera formosana;*
- Sitobion avenae*
- Myzus ascalonicus; Neotoxoptera formosana*
- Myzus ascalonicus, cymbalariae;*
- Neotoxoptera formosana, oliveri*
- Neotoxoptera formosana, oliveri*
- Neotoxoptera formosana*
- Neotoxoptera formosana*
- Myzus persicae; Neotoxoptera formosana*
- Neotoxoptera formosana*
- Dysaphis allii*

Key to aphids on *Allium*:-

1. SIPH dark with a subapical zone of polygonal reticulation. ANT wholly dark *Sitobion avenae*
- SIPH pale or dark, without subapical polygonal reticulation. ANT not wholly dark, at least paler on basal part of III **2**
2. Head smooth, with ANT tubercles undeveloped or weakly developed **3**
- Head spiculate, with well-developed, steep-sided ANT tubercles **6**

HOST LISTS AND KEYS

3. Cauda helmet-shaped, no longer than its basal width in dorsal view. ABD TERG 1–6 with a complete series of marginal tubercles (MTu) *Dysaphis allii**
 – Cauda tongue-shaped, clearly longer than its basal width. MTu absent or only regularly present on ABD TERG 1 and 7 **4**
4. SIPH cylindrical for most of length, with slight distal swelling and a smooth, constricted region just proximal to flange. Dorsal cuticle with a pattern of spicules arranged in polygons, each polygon enclosing 1–3 central spicules *Rhopalosiphum padi*
 – SIPH tapering with no trace of swelling and no subapical constriction. Dorsal cuticle without a pattern of spicules arranged in polygons **5**
5. Dorsum with dark markings, especially dark bands on ABD TERG 7 and 8. SIPH and cauda both black, cauda with 11–19 hairs *Aphis fabae*
 – Dorsal abdomen without any clearly defined dark markings. SIPH dark, cauda paler with 4–8 hairs *Aphis gossypii*
6. SIPH longer than ANT III *Myzus persicae*
 – SIPH shorter than ANT III **7**
7. Inner faces of ANT tubercles approximately parallel in dorsal view, or only slightly converging apically **8**
 – Inner faces of ANT tubercles clearly convergent in dorsal view **9**
8. ANT I and II and distal parts of femora pale. ‘Stem’ of SIPH narrow, its minimum diameter slightly less than diameter of hind tibia at its midpoint. (Al. with wing veins not black-bordered) *Myzus ascalonicus*
 – ANT I and II and distal parts of femora black. Minimum diameter of ‘stem’ of SIPH greater than diameter of hind tibia at its midpoint. (Al. with black-bordered wing veins) *Neotoxoptera formosana*
9. SIPH with swollen part only lightly imbricated and with apical flange well developed. (Al. with dark-bordered wing veins, and with a black central dorsal abdominal patch) *Neotoxoptera oliveri*
 – SIPH with swollen part scabrous (coarsely imbricated), and with apical flange only weakly developed. (Al. with wing veins not black-bordered, and with separate transverse bars on abdominal tergites) *Myzus cymbalariae*

Alocasia

A. indica
A. macrorrhiza
Alocasia sp.

Araceae

Aphis gossypii
Aphis craccivora; *Pentalonia nigronervosa*
Macrosiphum euphorbiae

Key to aphids on *Alocasia*:-

- ANT longer than body, with PT/BASE 5.5–7.7. Femora with basal 0.6 or more of length pale, contrasting with black distal section. SIPH pale basally and dark distally, and 2.3–3.3× cauda. (Al. with broad-banded wing-veins, and radius fused with media to form a closed cell below the pterostigma) *Pentalonia nigronervosa*
- Without this combination of characters go to key to polyphagous aphids, p. 1020

Aloe

A. africana

Aloaceae

Aloephagus myersi;
 [*Aphis* sp. (California; Leonard, 1972a)]

<i>A. arborescens</i>	<i>Aloephagus myersi</i>
<i>A. aristata</i>	<i>Aloephagus myersi</i>
<i>A. barbadensis</i> see <i>vera</i>	
<i>A. brevifolia</i>	[<i>Aphis</i> sp. (California; Leonard, 1972a)]
<i>A. castanea</i>	<i>Aloephagus myersi</i> ; [<i>Aphis</i> sp. (California; Leonard, 1972a)]
<i>A. chabaudii</i>	<i>Aloephagus myersi</i>
<i>A. cooperi</i>	<i>Aloephagus myersi</i>
<i>A. eru</i>	<i>Aloephagus myersi</i>
<i>A. falcata</i>	[<i>Aphis</i> sp. (California; Leonard, 1972a)]
<i>A. glauca</i>	<i>Aloephagus myersi</i> ; <i>Aphis nerii</i>
<i>A. graminicola</i>	<i>Aphis gossypii</i>
<i>A. mawii</i>	<i>Aloephagus myersi</i>
<i>A. munchii</i>	<i>Aloephagus myersi</i>
<i>A. pearsonii</i>	<i>Aloephagus myersi</i>
<i>A. percassa</i>	<i>Aloephagus myersi</i> ; <i>Aphis gossypii</i>
<i>A. rivae</i>	[<i>Aphis</i> sp. (California; Leonard, 1972a)]
<i>A. secundiflora</i>	<i>Aloephagus myersi</i>
<i>A. striata</i>	<i>Aloephagus myersi</i> ; [<i>Aphis</i> sp. (California; Leonard, 1972a)]
<i>A. tidmarshi</i>	<i>Aphis fabae</i>
<i>A. variegata</i>	<i>Aloephagus myersi</i>
<i>A. vera</i>	<i>Aphis gossypii</i> ; <i>Aulacorthum solani</i>
<i>Aloe</i> spp.	<i>Dysaphis tulipae</i> ; <i>Macrosiphum euphorbiae</i>

Key to aphids on *Aloe*:-

1. SIPH absent. ANT PT/BASE less than 0.4 *Aloephagus myersi*
 – SIPH present, tubular. ANT PT/BASE 2–7 **2**
2. Cauda helmet-shaped, not longer than its basal width in dorsal view. ABD TERG 1–4(-5) with well-developed marginal tubercles (MTu). Some hairs on ABD TERG 1–5 arising from dark scleroites *Dysaphis tulipae*
 – Cauda tongue-shaped, much longer than its basal width. Either ABD TERG 1 and 7 only with MTu, or MTu absent. None of hairs on ABD TERG 1–5 arise from dark scleroites
 go to key to polyphagous aphids, p. 1020

*Alopecurus**A. aequalis**A. agrestis**A. geniculatus**A. japonicus**A. magellanicus**A. myosuroides***Gramineae***Anoecia fulviabdominalis*;*Rhopalosiphum padi*, *rufiabdominale*; *Sipha glyceriae*;*Sitobion alopecuri*, *avenae*, *miscanthi*;*Tetraneura nigriabdominalis* (or *fusiformis*?)*Myzus persicae**Anoecia furcata*, *nemoralis*; *Atheroides serrulatus*;*Forda marginata*; *Metopolophium festucae cerealium*;*Rhopalosiphum padi*;*Schizaphis longicaudata*, *phlei*, *rufula*;*Sitobion alopecuri*, *avenae**Tetraneura nigriabdominalis* (or *fusiformis*?)*Pentamyzus fueginus*, *tenuis*[*Anoecia* sp., Zwölfer, 1958]; *Tetraneura ulmi*

HOST LISTS AND KEYS

A. pratensis

Geoica setulosa, utricularia;
Metopolophium dirhodum, festucae;
Rhopalosiphum insertum, maidis, padi;
Schizaphis phlei, graminum, nigerrima, rufula;
Sipha elegans, maydis; Sitobion avenae, fragariae;
Tetraneura caerulescens, ulmi
Aphis craccivora

Alopecurus spp.

Use key to apterae of grass-feeding aphids under *Digitaria*.

Aloysia

A. citriodora see *Lippia*

A. triphylla

Aloysia spp.

Use key to polyphagous aphids, p. 1020.

Alpinia (incl. *Catimbium*)

A. allughas

A. bracteata

A. japonica

A. kasumadei

A. malaccensis

A. purpurata

A. rafflesiana

A. sanderae

A. schumanniana

A. speciosa

Alpinia sp.

Use key to apterae on *Hedychium*.

Alsine see *Stellaria*

Alsophila see *Cyathea*

Alstonia

A. scholaris

A. venenata

Alstonia spp.

Use key to polyphagous aphids, p. 1020.

Alstroemeria

A. aurantiaca

A. chilensis

Alstroemeria spp.

Verbenaceae

Aulacorthum solani; Myzus ornatus, persicae
Macrosiphum euphorbiae; Neomyzus circumflexus

Zingiberaceae

Pentalonia nigronervosa
Pseudoregma sundanica
Pentalonia nigronervosa
Pentalonia nigronervosa
Pseudoregma sundanica
Pentalonia nigronervosa
Pentalonia nigronervosa
Pentalonia nigronervosa
Pentalonia nigronervosa
Pseudoregma sundanica
Pentalonia nigronervosa
Astegopteryx styracophila

Apocynaceae

Aphis craccivora, gossypii
Myzus persicae
Aphis gossypii

Alstroemeriaceae

Aulacorthum solani; Myzus ornatus
Aulacorthum solani
Aphis alstroemeriae; Macrosiphum euphorbiae;
[Metopolophium dirhodum]; Myzus persicae;
[Rhopalosiphum rufiabdominale]

Key to aphids on *Alstroemeria*:-

- ANT III 1.4–1.7× SIPH, and ANT PT/BASE 1.9–2.2. SIPH and cauda both black, with SIPH 1.00–1.32× cauda. Dorsal abdomen with variably developed, irregularly shaped dark markings, which tend to follow the polygonal pattern of cuticular sculpturing *Aphis alstroemeriae*
- Without this combination of characters . . . go to key to polyphagous aphids, p. 1020.

Alternanthera

- A. circuliflora*
- A. nodiflora*
- A. philoxeroides*

- A. polygonoides*
- A. pungens*
- A. sessilis*

Use key to polyphagous aphids, p. 1020.

Althaea

- A. narbonnensis*
- A. nudiflora*
- A. officinalis*

- A. rosea* see *Alcea rosea*
- A. vacca*
- Althaea* spp.

Use key to aphids on *Alcea*.

Alyogyne

- A. hakefolia*
- A. huegelii*

Use key to polyphagous aphids, p. 1020.

Alysicarpus

- A. ovalifolius*
- A. rugosus*
- A. vaginalis*

Alyssum

- A. argenteum*
- A. canescens*
- A. desertorum*
- A. montanum*
- A. murale*
- A. petraeum*
- A. saxatile*

Madwort

- Myzus ornatus*
- Smiela mongolica*
- Aphis craccivora*
- Aphis fabae*; *Myzus ascalonicus*
- Myzus ornatus*
- [*Aphis* sp. (Serbia; O. Petrović)]
- Brevicoryne brassicae*; *Myzus ornatus*; *Spatulophorus alyssi*

Amaranthaceae

- Macrosiphum euphorbiae*; *Myzus persicae*
- Aphis gossypii*
- Aphis gossypii*, *fabae*; [*Greenidea ficicola*];
- Myzus ornatus*, *persicae*; *Neomyzus circumflexus*
- Aphis craccivora*
- Aphis craccivora*
- Aphis craccivora*

Malvaceae

- Aphis ?spiraecola*
- Aphis davletshinae*, *gossypii*, *spiraecola*, *umbrella*
- Aphis davletshinae*, *fabae*, *gossypii*, *nasturtii*, *spiraecola*,
umbrella;
- [*Macrosiphum artemisiae* of Ferrari, 1872]

- Aphis gossypii*, *spiraecola*
- Acyrtosiphon malvae* group; *Aphis frangulae* group;
- Ureoleucon eoessigi*

Malvaceae

- Aphis gossypii*; *Macrosiphum euphorbiae*; *Myzus persicae*
- Myzus persicae*

Leguminosae

- Aphis gossypii*
- Aphis gossypii*
- Aphis gossypii*

Cruciferae

HOST LISTS AND KEYS

A. tortuosum

Alyssum sp.

Smiela schneideri ssp. *alysii*

Aphis craccivora

Key to aphids on *Alyssum*:-

1. SIPH as very broad, dark, volcano-shaped cones, shorter than their basal widths. ANT III with 1–11 rhinaria on distal part, and 0–3 on IV. Cauda very short, helmet-shaped or triangular with rounded apex, much shorter than its basal width **2**
 - SIPH tubular, pale or dark. ANT III–IV without rhinaria (or with rhinaria only near base of III). Cauda triangular or tongue-shaped, as long as or longer than its basal width **3**
2. ANT PT/BASE c.2.1–2.2. R IV+V c.1.2× HT II *Smiela schneideri alyssii*
 - ANT PT/BASE 0.75–1.25. R IV+V 1.35–1.55× HT II *Smiela mongolica*
3. Dorsal hairs long and with spatulate apices. Dorsal cuticle of head, pronotum and ABD TERG 7–8 very rugose. R IV+V long and pointed, 1.4–1.6× HT II. SIPH coarsely imbricated and slightly swollen near apices *Spatulophorus alyssi*
 - Dorsal hairs not spatulate, and other characters not in this combination **3**
3. Cauda broadly triangular, about as long as its basal width. SIPH dark, elongate barrel-shaped, or cylindrical for most of length and constricted apically. Dorsal abdomen with variably-developed paired dark sclerites or cross-bands *Brevicoryne brassicae*
 - Cauda tongue-shaped, much longer than its basal width, and other characters also do not apply go to key to polyphagous aphids, p. 1020

Amaranthus

A. albus

A. blitoides

A. caudatus (incl. *paniculatus*)

A. crassipes

A. cruentus

A. cuspidatus

A. deflexus

A. dubius

A. gangeticus

A. graecizans

A. hybridus

A. inamoenus

A. paniculatus = *caudatus*

A. quitensis

A. retroflexus

Amaranthaceae

Aphis craccivora; *Myzus persicae*

Aphis craccivora

Aphis craccivora, *fabae*; *Macrosiphum euphorbiae*;

Myzus persicae; *Toxoptera aurantii*

Aphis craccivora

Aphis spiraecola

Aphis amaranthi

Aphis amaranthi, *craccivora*

Aphis fabae, *gossypii*; *Macrosiphum euphorbiae*;

Myzus persicae; [*Rhopalosiphum maidis*, *padi*]

Aphis craccivora

Aphis craccivora, *fabae*, *gossypii*; *Macrosiphum euphorbiae*;

Myzus persicae; *Smynthuroides betae*

Aphis craccivora, *fabae*, *gossypii*, *middletonii*;

Aulacorthum solani; *Macrosiphum euphorbiae*;

Myzus persicae

Aphis craccivora

Aphis amaranthi; *Myzus persicae*

Aphis craccivora, *fabae*, *gossypii*, *helianthi*, *middletonii*,

nasturtii; *Aulacorthum solani*; *Brachycaudus helichrysi*;

[*Hayhurstia atriplicis*]; [*Hyperomyzus lactucae*];

Macrosiphum euphorbiae; *Myzus persicae*;

Smynthuroides betae

<i>A. spinosus</i>	<i>Aphis amaranthi, craccivora, gossypii, middletonii, spiraeicola</i> ; [<i>Hyadaphis coriandri</i>]; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i> ; <i>Neomyzus circumflexus</i>
<i>A. tricolor</i>	<i>Aphis fabae, gossypii; Macrosiphum euphorbiae</i>
<i>A. viridis</i>	<i>Aphis craccivora, gossypii, spiraeicola</i> ; <i>Myzus cymbalariae, persicae</i> ;
<i>Amaranthus</i> spp.	<i>Aphis frangulae, triglochinis</i> ; [<i>Myzakkia verbasci</i>]; [<i>Parathoracaphis manipurensis</i>]

Key to aphids on *Amaranthus*:-

1. ABD TERG 1 and 7 with marginal tubercles (MTu). ANT tubercles weakly developed, not projecting beyond middle of frons in dorsal view 2
 - ABD TERG 1 and 7 without MTu. **Either** ANT tubercles well developed, **or** SIPH absent
go to key to polyphagous aphids, p. 1020
2. SIPH pale or dusky, darker at apices, only about 0.1× BL and 0.7–1.3× cauda. ANT PT/BASE 1.1–1.8
Aphis triglochinis
 - SIPH usually entirely dark, 0.11–0.26× BL and 0.8–2.6× cauda. ANT PT/BASE 1.5–3.2 3
3. **All the following characters apply:** SIPH and cauda both dark. Dorsal abdomen without dark markings. Hairs on dorsal side of hind femur shorter than ANT BD III. ANT III without rhinaria. Cauda with 8–11 hairs. Diameter of lateral tubercle on abdominal segment 7 is greater than ANT BD III. ANT PT/BASE 2.2–3.2. R IV+V 1.25–1.35× HT II *Aphis amaranthi*
 - Without this combination of characters
go to key to polyphagous aphids, p. 1020, starting at couplet 24

Amberboa (incl. *Volutaria*)

Compositae

<i>A. lippii</i>	<i>Aphis fabae; Brachycaudus helichrysi;</i> <i>Macrosiphum euphorbiae; Myzus persicae</i>
<i>A. moschata</i>	<i>Aphis fabae; Uroleucon compositae</i>
<i>A. muricata</i>	<i>Uroleucon jaceae</i> (oviparae, UK; BMNH colln.)

Key to apterae on *Amberboa*:-

1. Head dark with well-developed, divergent ANT tubercles. ANT III with 15–86 rhinaria. SIPH and cauda both dark, SIPH having a distal zone of polygonal reticulation. First tarsal segments all with 5 hairs 2
 - Without this combination of characters
go to key to polyphagous aphids, p. 1020
2. ANT III with 42–86 rhinaria extending over 0.68–0.95 of length. Middle part of hind tibia pale; the pale section occupying at least 0.7 of total length. SIPH with reticulation over distal 0.25–0.32. ANT PT/BASE 5.2–7.3, mostly 5.5–7.0. ANT III 1.4–1.9× ANT V *Uroleucon compositae*
 - ANT III with 15–54 rhinaria extending over 0.45–0.68 of length. Middle part of hind tibia dusky to dark, or if rather pale then the pale section is less than 0.6 of total length. SIPH with reticulation over distal 0.16–0.27. ANT PT/BASE 4.3–5.5. ANT III 1.8–2.5× ANT V *Uroleucon jaceae*

Amblystegium

Amblystegiaceae

<i>A. serpens</i>	<i>Muscaphis musci</i>
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(or use key to apterae of moss-feeding aphids under *Polytrichum*)

Ambroma see *Abroma*

***Ambrosia* (incl. *Franseria*, *Gaertneria*)**

Compositae

<i>A. ambrosoides</i>	<i>Uroleucon ambrosiae</i>
<i>A. artemisifolia</i>	<i>Aphis fabae</i> , <i>gossypii</i> , <i>helianthi</i> , <i>maidiradicis</i> , <i>nasturtii</i> , <i>spiraecola</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; <i>Capitophorus jopepperi</i> ; <i>Macrosiphoniella tanacetaria</i> ssp. <i>divia</i> , [<i>yomogifoliae</i>]; <i>Macrosiphum euphorbiae</i> ; <i>Myzus ornatus</i> , <i>persicae</i> ; <i>Pleotrichophorus ambrosiae</i> ; <i>Prociphilus erigeronensis</i> ; <i>Uroleucon ambrosiae</i> , <i>tuataiae</i>
<i>A. confertiflora</i>	<i>Uroleucon ambrosiae</i> , <i>ambrosiae</i> ssp. <i>lizerianum</i>
<i>A. deltoidea</i>	<i>Uroleucon ambrosiae</i>
<i>A. discolor</i>	<i>Pleotrichophorus ambrosiae</i>
<i>A. elatior</i>	<i>Aphis gossypii</i>
<i>A. maritima</i>	<i>Aphis gossypii</i>
<i>A. paniculata</i> (incl. ssp. <i>peruviana</i>)	<i>Acyrtosiphon bidenticola</i> ; <i>Aphis gossypii</i> ; <i>Pleotrichophorus ambrosiae</i> ; <i>Uroleucon ambrosiae</i> , <i>tuataiae</i>
<i>A. polystachia</i>	<i>Uroleucon ambrosiae</i>
<i>A. psilostachya</i>	<i>Brachycaudus helichrysi</i> ; <i>Capitophorus shepherdiae</i> ; <i>Myzus persicae</i> ; <i>Uroleucon ambrosiae</i> , [<i>rudbeckiae</i>]
<i>A. tomentosa</i>	[<i>Pleotrichophorus wasatchii</i>]
<i>A. trifida</i>	<i>Aphis helianthi</i> , <i>maidiradicis</i> , <i>middletonii</i> ; [<i>Macrosiphum pallens</i>]; <i>Prociphilus erigeronensis</i> ; <i>Uroleucon ambrosiae</i> , <i>erigeronensis</i> , <i>ivae</i> , [<i>rudbeckiae</i>]
<i>Ambrosia</i> spp.	[<i>Pleotrichophorus glandulosus</i>]

Key to aphids on *Ambrosia*:-

1. Dorsal hairs greatly expanded distally; fan-, funnel- or mushroom-shaped, arising from tuberculate bases (Figure 8). Diameter of SIPH and hind tibiae at mid length similar 2
 - Dorsal body hairs with pointed, blunt or only very slightly expanded apices 4
2. Antennae longer than body. SIPH without any subapical swelling (Figure 8a), and 1.25–1.75× cauda. ANT III with 1–8 rhinaria near base *Pleotrichophorus ambrosiae*
 - Antennae shorter than body. SIPH smooth and slightly swollen subapically (Figure 8b,c), and 3.1–4.3× cauda. ANT III without any rhinaria 3
3. Dorsal cuticle smooth between hair bases (Figure 8b). Dorsal body hairs consisting of spinal, pleural and marginal rows (submarginals absent). ANT PT/BASE 3.9–5.2 *Capitophorus jopepperi*
 - Dorsal cuticle conspicuously sculptured (Figure 8c). Dorsal body hairs including a row of submarginals on each side between pleural and marginal rows. ANT PT/BASE 2.0–2.9 *Capitophorus shepherdiae*
4. SIPH either wholly dark or dark distally, at midlength about twice as wide as hind tibiae, with subapical polygonal reticulation extending over at least distal 0.25 5
 - SIPH (if present) pale or dark, without subapical polygonal reticulation or with reticulation on less than distal 0.2 9

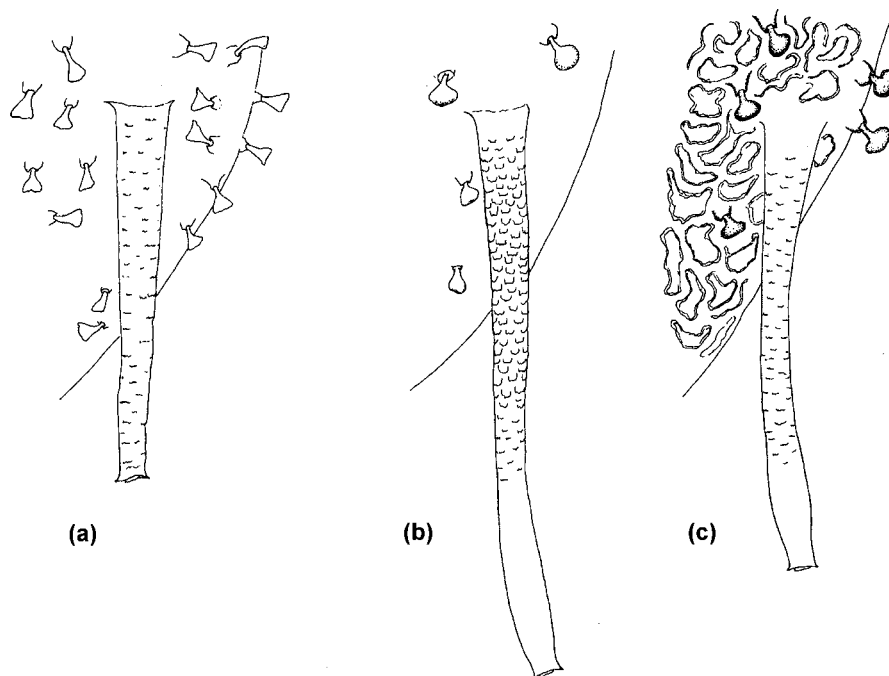


Figure 8 Apteræ on *Ambrosia*. (a) Dorsal hairs and SIPH of *Pleotrichophorus ambrosiae*, (b) same for *Capitophorus jopepperi*, (c) same for *C. shepherdiae*.

5. SIPH only dark distally. Some of distal caudal hairs usually short, and blunt or slightly capitate
Uroleucon erigeronensis
- SIPH wholly dark. Distal caudal hairs not different from those more proximal **6**
6. ANT PT/BASE 2.4–3.5. SIPH 0.6–1.1× cauda and with reticulation over distal 0.4–0.63
Macrosiphoniella tanacetaria ssp. *divia* (= *M. artemisiae*?)
- ANT PT/BASE 5.3–7.0. SIPH 1.1–1.7× cauda and with reticulation over distal 0.2–0.35 **7**
7. Cauda dark. Tibiae wholly blackish *Uroleucon tuataiae*
- Cauda pale. Tibiae usually with paler basal sections **8**
8. Hind tibiae as pale as cauda for more than 0.7 of length. ABD TERG 2–4 sometimes with small marginal tubercles (MTu). (Hind tibiae of al. with pale or dusky basal section) *Uroleucon ivae*
- Hind tibiae usually with a pale or dusky basal section, but this is not as pale as cauda for more 0.5 of length. ABD TERG 2–4 without MTu. (Hind tibia of al. entirely dark) *Uroleucon ambrosiae*
9. ANT tubercles well developed with smooth, divergent inner faces. ANT dark except at base, with ANT PT/BASE 5.9–7.5. SIPH dark except for basal 0.2–0.3 of length, tapering/cylindrical on distal half, with subapical polygonal reticulation extending for much less than 0.1 of length
Acyrtosiphon bidenticola
- Without that combination of characters go to key to polyphagous aphids, p. 1020

HOST LISTS AND KEYS

Amelanchier see Blackman and Eastop (1994)

Ammannia

A. baccifera

Ammannia spp.

Lythraceae

Aphis gossypii

Myzus persicae; *Rhopalosiphum nymphaeae*

Key to aphids on *Ammannia*:-

- SIPH and cauda both dusky to dark, with SIPH much shorter than the distance between their bases and swollen on distal half. ANT BASE VI only 0.55–0.8× R IV+V *Rhopalosiphum nymphaeae*
- Without this combination of characters go to key to polyphagous aphids, p. 1020

Ammi

A. crinitum

A. majus

A. visnaga

Umbelliferae

Aphis fabae

Aphis fabae, *spiraecola*; *Dysaphis apiifolia*, *crataegi*;

Hyadaphis foeniculus; *Myzus ornatus*, *persicae*

Aphis fabae, *spiraecola*; *Dysaphis crataegi*

Key to aphids on *Ammi*:-

1. Cauda helmet-shaped, shorter than its basal width. Large, rather flat marginal tubercles (MTu) present on most abdominal segments, and some spinal tubercles (STu) present on posterior tergites **2**
 - Without this combination of characters **3**
2. Posterior hair on hind trochanter 0.24–0.56× diameter of trochantro-femoral suture. Longest spinal hair on ABD TERG 8 is 11–36µm long. MTu usually present on abdominal segment 7 *Dysaphis apiifolia*
 - Posterior hair on hind trochanter 0.42–1.0× diameter of trochantrofemoral suture. Longest spinal hair on ABD TERG 8 is 25–80µm. MTu usually absent from abdominal segment 7 *Dysaphis crataegi*
3. SIPH swollen on distal half and about equal in length to cauda *Hyadaphis foeniculi*
 - If SIPH swollen then they are much longer than cauda go to key to polyphagous aphids, p. 1020

Ammobium

A. alatum

Compositae

Brachycaudus helichrysi

Ammodendron

A. argenteum

Leguminosae

Acyrthosiphon gossypii; *Aphis craccivora*

Key to apterae on *Ammodendron*:-

- Dorsum pale. SIPH pale, slender, 0.4–0.5× BL and 2.8–3.4× longer than pale cauda *Acyrthosiphon gossypii*
- Dorsum with an extensive dark sclerite. SIPH black, 0.06–0.12× BL and 1.1–2.1× black cauda *Aphis craccivora*

Ammophila (incl. *Psamma*)

A. arenaria

Gramineae

Atheroides serrulatus; *Chaetosiphella ?stipae*;

Forda marginata; *Geoica harpazi*, *utricularia* group;

Laingia psammae; *Schizaphis rufula*; *Sipha elegans*;

Sitobion sylvesteri; *Tetraneura ulmi*

Use key to apterae on grasses under *Digitaria*.

Ammophila* (as *Psamma*) × *Calamagrostis*Laingia psammae****Amomum****A. coccineum**A. gracile**A. subulatum***Zingiberaceae***Astegopteryx styracophila**Pseudoregma sundanica**Pentalonia kalimpongensis, nigronervosa*Use key to apterae on *Hedychium*.***Amoora* see *Aglaiia******Amorpha****A. fruticosa* (incl. *angustifolia*)**Leguminosae***Aphis craccivora, fabae; Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Amorphophallus*A. konjac**A. titanum**Amorphophallus* sp.**Araceae***Aphis gossypii; Rhopalosiphoninus latysiphon**Aphis gossypii**Neomyzus circumflexus*

Use key to polyphagous aphids, p. 1020.

Ampelocissus*A. africana**A. robinsonii***Vitaceae***Aphis gossypii**Aphis illinoisensis; Neomyzus circumflexus*Key for aphids on *Ampelocissus*:-

- Hind legs black except at bases of femora. Fore- and mid-legs also mainly dark, except for fore femora which are contrastingly pale *Aphis illinoisensis*
- Legs mainly pale or with different pigmentation go to key to polyphagous aphids, p. 1020

Ampelodesmos*A. tenax***Gramineae***Sitobion avenae****Ampelopsis****A. arborea**A. brevipedunculata**A. quinquefolia***Vitaceae***Aphis illinoisensis; Macrosiphum euphorbiae**Aphis gossypii**Aphis spiraecola; [Hysteroneura setariae]*Use key couplet provided above for *Ampelocissus*.***Ampelovitis* see *Vitis******Amphicarpaea* (incl. *Falcata*)***A. japonica**A. edgeworthii* var. *trisperma**A. monoica***Leguminosae***Aphis glycines**[Indomegoura indica]; Megoura crassicauda**Microparsus variabilis*

HOST LISTS AND KEYS

Key to apterae on *Amphicarpaea*:-

1. Large (BL more than 3 mm) spindle-shaped aphid with black head, prothorax, tibiae, SIPH and cauda. SIPH somewhat swollen, with ante- and post-siphuncular sclerites at their bases. ANT III with 15–50 rhinaria *Megoura crassicauda*
– BL not more than 2 mm and other characters not as above **2**
2. ANT tubercles weakly developed. Cauda tongue-shaped, with sides almost parallel in dorsal view before tapering to a rounded apex. (Alata with wing veins all pale, media 2-branched and hindwing with two oblique veins) *Aphis glycines*
– ANT tubercles well developed. Cauda swollen at base, then tapering to a point. (Forewing of alata with dark cubital veins and media often 1-branched, and hindwings without any oblique veins) *Microparsus variabilis*

Amphilophis

A. pertusa see *Bothriochloa*

Gramineae

Amsinckia

A. intermedia
A. psilostachya
A. spectabilis
Amsinckia sp.

Boraginaceae

Brachycaudus helichrysi; *Pleotrichophorus amsinckii*
Brachycaudus helichrysi
Brachycaudus helichrysi; *Myzus persicae*
[*Nearctaphis bakeri*]

Key to aphids on *Amsinckia*:-

- Dorsal body (including front of head and ANT I–II) bearing numerous hairs with fan-shaped or capitate apices, and arising from tuberculate bases. R IV+V extremely long, thin and tapering, 1.75–2.0× HT II *Pleotrichophorus amsinckii*
- Dorsal body hairs not fan-shaped or capitate, R IV+V not very long and thin
go to key to polyphagous aphids, p. 1020

Amsonia

A. tabernaemontana

Apocynaceae

Aphis fabae, *nasturtii*

Use key to polyphagous aphids, p. 1020.

Anabasis

A. aphylla

Chenopodiaceae

Brachyunguis salsolacearum

Anacampteros

A. telephiastrum

Portulacaceae

Aphis sp. (Leonard, 1972a: 98)

Anacardium

A. occidentale

Anacardium sp.

Anacardiaceae

Aphis gossypii, *spiraecola*;
Toxoptera aurantii, *odinae*;
Brachyunguis harmalae

Key to aphids on *Anacardium*:-

1. SIPH as long as or longer than cauda go to key to polyphagous aphids, p. 1020
- SIPH much shorter than cauda **2**

2. SIPH pale. Cauda with 6–9 hairs. ANT PT/BASE 0.45–0.75
 – SIPH black. Cauda with 13–27 hairs. ANT PT/BASE 2.4–3.6

Brachyunguis harmalae
Toxoptera odinae

Anacheilium see *Epidendrum*

Anacyclus

A. clavatus
A. radiatus

Compositae

Aphis terricola
Macrosiphoniella tapuskae

Anagallis

A. arvensis

A. collina
A. linifolia
A. monelli
A. tenella
Anagallis sp.

Pimpernels

Aphis craccivora, *fabae*, *gossypii*, *nasturtii*, *nerii*;
Myzus ascalonicus, *persicae*
Aphis fabae
Aphis nerii
Aulacorthum solani; *Rhopalosiphoninus staphyleae*
Aphis nerii
 [*Anuraphis subterranea*? (Theobald, 1927; possible
 confusion of ‘Pimpernel’ and *Pimpinella*?)]

Primulaceae

Use key to polyphagous aphids, p. 1020.

Anagyris

A. foetida

Leguminosae

Aphis craccivora

Anaphalis

A. araneosa
A. cinnomomea
A. contorta
A. luteoalbum
A. margaritacea

A. subalpina
A. subumbellata
A. triplinervis

A. wiseida
A. yedoensis
Anaphalis spp.

Compositae

Brachycaudus helichrysi
Brachycaudus helichrysi
Aphis gossypii, *spiraecola*; *Brachycaudus helichrysi*
Brachycaudus helichrysi
Aphis fabae, [*Aphis* sp. (Leonard, 1964: 95)];
Brachycaudus helichrysi;
Illinoia richardsi, *richardsi* ssp. *pacifica*;
Macrosiphum euphorbiae; *Myzus ornatus*;
Uroleucon idahoense, *russellae*
Uroleucon idahoense
Oedisiphum soureni
Aphis gossypii; *Brachycaudus helichrysi*;
Indomasonaphis anaphalidis; *Oedisiphum soureni*
Brachycaudus helichrysi
Brachycaudus cardui
Aphis fabae; *Uroleucon budhium*

Key to aphids on *Anaphalis*:–

1. Dorsum with a solid brown or black shield extending over ABD TERG 1–6. R IV + V 0.17–0.24 mm long, 0.65–2.0× SIPH and 1.4–2.6× cauda. Cauda helmet-shaped, shorter than its maximum width **2**
 – Dorsum without a solid black shield, tergum mainly membranous. R IV + V relatively and often actually shorter. Cauda variable **3**

HOST LISTS AND KEYS

2. SIPH $0.10\text{--}0.15\times$ BL and $0.9\text{--}1.5\times$ R IV+V. ANT PT $1.4\text{--}2.2\times$ R IV+V. Spiracular apertures rounded
Brachycaudus cardui
- SIPH $0.07\text{--}0.10\times$ BL and $0.5\text{--}0.7\times$ R IV+V. ANT PT $0.9\text{--}1.1\times$ R IV+V. Spiracular apertures reniform
Oedisiphum soureni
3. ANT tubercles undeveloped. SIPH cylindrical or tapering, only $0.05\text{--}0.25\times$ BL
go to key to polyphagous aphids, p. 1020, starting at couplet 15
- ANT tubercles well developed. SIPH $0.20\text{--}0.45\times$ BL ($0.25\text{--}0.45$ if dark and cylindrical or tapering) **4**
4. SIPH clearly clavate, with greatest diameter on distal half more than twice the least diameter of the ‘stem’ (see Figure 34a). Cauda about $0.12\times$ BL and bearing 25–32 hairs
Indomasonaphis anaphalidis
- SIPH cylindrical or tapering, if slightly swollen then maximum diameter at swelling less than $1.5\times$ that of the ‘stem’. Cauda often longer, but if only about $0.12\times$ BL then with only 5–13 hairs; otherwise $0.15\text{--}0.25\times$ BL and bearing 7–23 hairs **5**
5. ANT III without rhinaria (apt). ANT PT/BASE $1.7\text{--}2.5$. SIPH tapering, with a slight ‘S’ curve, without any distal polygonal reticulation. Dorsal abdomen with an intersegmental pattern of dark ornamentation
Myzus ornatus
- ANT III (of apt) bearing 1–56 rhinaria. ANT PT/BASE $4.9\text{--}7.0$. SIPH tapering or slightly curved, and with a subapical zone of polygonal reticulation. Dorsum either pale or with small dark spots (scleroites) at bases of dorsal hairs **6**
6. Dorsum pale. SIPH pale at base or entirely brown, reticulated over distal $0.06\text{--}0.35$. Cauda bearing 7–14 hairs. R IV+V $0.8\text{--}1.7\times$ HT II **7**
- Dorsal abdomen with at least some hairs arising from dark scleroites. SIPH black and reticulated over distal $0.15\text{--}0.37$. Cauda bearing 12–23 hairs. R IV+V $1.8\text{--}2.3\times$ HT II **9**
7. SIPH swollen on apical half and reticulated over distal $0.05\text{--}0.07$. Cauda bearing 7 hairs
Illinoia richardsi
- SIPH cylindrical or tapering and reticulated over distal $0.12\text{--}0.35$. Cauda bearing 8–14 hairs **8**
8. ANT III with 1–7 rhinaria on basal 0.33 . SIPH reticulated over distal $0.12\text{--}0.25$
Macrosiphum euphorbiae
- ANT III with 33–39 rhinaria extending over 0.67 of length. SIPH reticulated over about distal 0.33
Uroleucon idahoense
9. SIPH $1.8\text{--}2.3\times$ cauda and reticulated over distal $0.15\text{--}0.21$. Cauda $2.5\text{--}3.5\times$ HT II
Uroleucon budhium
- SIPH $1.5\text{--}1.8\times$ cauda and reticulated over distal $0.23\text{--}0.37$. Cauda $3.5\text{--}4.5\times$ HT II
Uroleucon russellae

Ancathia

A. igniaria

Compositae

Aphis ancathiae

Anchusa

A. arvensis

A. azurea

Boraginaceae

Aphis fabae

Aphis fabae, symphyti; Brachycaudus helichrysi, iranicus; Geocia anchusae

<i>A. capensis</i>	<i>Aulacorthum solani</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus ornatus</i> , <i>persicae</i> ; <i>Ovatomyzus boraginacearum</i>
<i>A. gmelini</i>	<i>Brachycaudus virgatus</i>
<i>A. italica</i>	<i>Brachycaudus iranicus</i> , <i>virgatus</i>
<i>A. myosotidiflora</i>	<i>Aphis gossypii</i> ; <i>Neomyzus circumflexus</i>
<i>A. officinalis</i>	<i>Aphis fabae</i> , <i>gossypii</i> , <i>symphyti</i> , [<i>Aphis</i> sp. (Davletshina, 1964: 124)]; [<i>Uroleucon jaceae</i>]; <i>Brachycaudus bicolor</i> , <i>mordvilkoii</i>
<i>A. pseudochroleuca</i>	<i>Brachycaudus virgatus</i>
<i>A. sempervirens</i>	<i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; <i>Ovatomyzus boraginacearum</i>
<i>A. strigosa</i>	<i>Brachycaudus iranicus</i> ; <i>Myzus persicae</i>
<i>A. undulata</i>	<i>Brachycaudus bicolor</i>
<i>Anchusa</i> spp.	<i>Brachycaudus cardui</i> ; [<i>Macrosiphum ?funestum</i> , Iran]

Key to aphids on *Anchusa* and *Symphytum*:-

1. ANT PT/BASE much less than 1. Dorsal hairs with expanded, usually spatulate apices. SIPH absent
Geoica anchusae 2
- ANT PT/BASE much more than 1. Dorsal hairs not spatulate. SIPH present 2
2. ANT tubercles undeveloped or weakly developed, not projecting beyond middle of frons in dorsal view 3
- ANT tubercles well developed 12
3. Cauda helmet-shaped, shorter than its basal width in dorsal view. Spiracles large and rounded 4
- Cauda tongue-shaped, longer than its basal width in dorsal view. Spiracles reniform (i.e., apertures partially covered by sclerites) 9
4. SIPH pale or slightly dusky, less than 1.5× cauda. R IV+V 1.2–1.3× HT II. Dorsal abdomen without dark sclerotisation *Brachycaudus helichrysi*
- SIPH pale, dusky or dark, more than 1.8× cauda. R IV+V 1.3–2.0× HT II. Dorsal abdomen with variably developed dark sclerotisation 5
5. Dorsal abdomen with a solid black shield extending over the whole of ABD TERG 1–6 (Plate 10a). ANT IV usually longer than (0.9–1.5×) R IV+V. Never with spinal tubercles (STu) 6
- Dorsal abdomen with less extensive dark sclerotisation, or **if** there is an extensive solid black shield **then** ANT IV is usually shorter than (0.4–1.1×) R IV+V, and STu are usually present on ABD TERG 7 7
6. Longest hairs on ABD TERG 8 are 60–110µm long. Genital plate with 25–42 hairs, of which 8–17 are on the anterior half. ANT III usually without rhinaria. (Al. with 21–35 rhinaria on ANT III and usually without, rarely with 1–2, on IV) *Brachycaudus cardui*
- Longest hairs on ABD TERG 8 are 10–16µm long. Genital plate with 16–23 hairs of which 2–5 are on anterior half. ANT III usually with 1–12 rhinaria. (Al. with 12–16 rhinaria on ANT III, and 2–3 on IV) *Brachycaudus mordvilkoii*
7. Dorsal abdomen with a subrectangular or suboval black patch with irregular lateral borders, centred on ABD TERG 2–4 (Figure 9a). ANT PT/BASE 3.9–5.0. Longest hairs on ANT III more than 0.8× BD III. Without STu *Brachycaudus iranicus*
- Dorsal abdomen with transverse sclerotic bars or paired patches, rarely fused between tergites or, **if** more extensively sclerotised (*bicolor*) **then** ABD TERG 7 usually has STu (Figure 9b). ANT PT/BASE 2.5–4.5. Longest hairs on ANT III less than 0.4× BD III 8

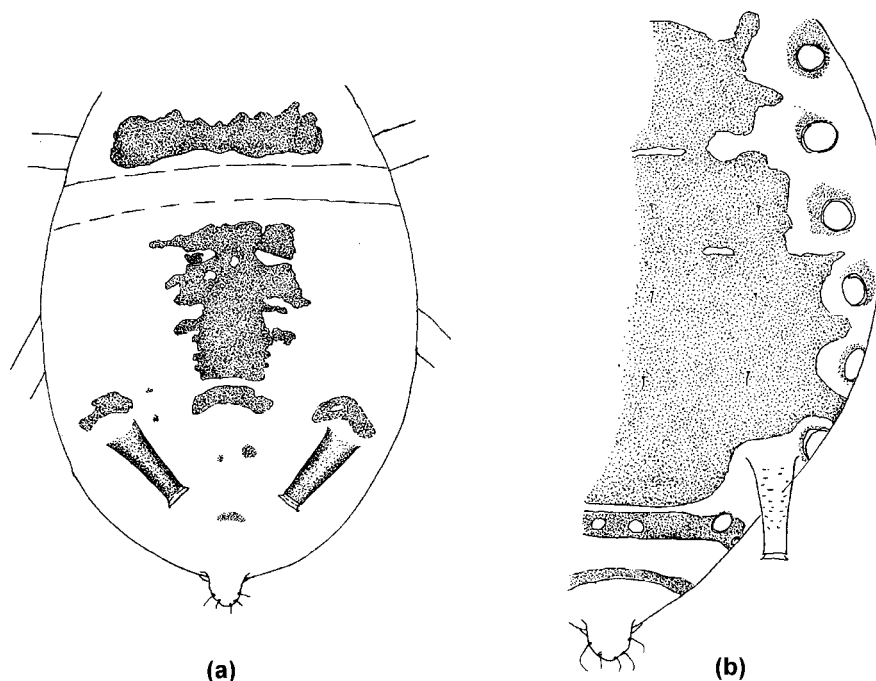


Figure 9 Apterae on *Anchusa* and *Symphytum*. (a) Dorsal sclerotisation of *Brachycaudus iranicus*, (b) dorsal sclerotisation and MTu of *B. bicolor*.

8. Broad, flat marginal tubercles (MTu) present on ABD TERG 1–7 or 1–6, the more anterior ones much larger than the spiracles and occupying almost the whole of the sclerites on which they are placed (Figure 9b). ABD TERG 7 often, and 6–8 sometimes, with STu. ANT III 1.7–2.3× ANT IV
Brachycaudus bicolor
 – MTu irregularly present on ABD TERG 2–4, sometimes also on 1 and/or 5, but never on 6 and 7, and generally smaller than the spiracles. No STu. ANT III 1.2–1.7× ANT IV *Brachycaudus virgatus*
9. SIPH and cauda both black, the latter bearing 11–24 hairs. Dorsal abdomen usually with at least some dark markings anterior to SIPH, and always with well-developed dark cross bands on ABD TERG 7 and 8
Aphis fabae
 – Cauda usually paler than SIPH (sometimes black in spring), and bearing 4–8 hairs. Dorsal abdomen without dark markings anterior to SIPH (except in alatifem specimens), and with or without cross bands on ABD TERG 7 and 8 **10**
10. Cauda black and bearing 5–7 hairs *Aphis* sp. (2nd generation *symphyti*?)
 – Cauda paler than SIPH **11**
11. R IV+V 0.12–0.16mm (more than 0.135 mm in large specimens with SIPH 0.33–0.38 mm)
Aphis symphyti
 – R IV+V 0.075–0.135 mm, but only more than 0.12 mm in large specimens (SIPH 0.33–0.44 mm)
Aphis gossypii
12. SIPH slightly swollen subapically, narrowing to a slight constriction before flange. PT 1.45–2.3× ANT III. Cuticle of front of head and ANT tubercles is smooth *Ovatomyzus boraginacearum*

- SIPH variable, but if slightly swollen subapically then PT 0.8–1.4× ANT III, and cuticle of front of head and ANT tubercles is spiculate or rugose
go to key to polyphagous aphids, p. 1020, starting at couplet 4

Andira*A. inermis* (incl. *jamaicensis*)**Leguminosae***Aphis craccivora***Andromeda***A. calyculata**A. glaucophylla**A. polifolia**Andromeda* sp.**Bog-Rosemary***Macrosiphum nasonovi**Aphis vaccinii*; *Illinoia andromedae**Aphis vaccinii*; *Ericaphis scammelli*; *Illinoia azaleae*;*Macrosiphum nasonovi*[*Aphis* sp. (Leonard, 1964: 95)]**Ericaceae**Key to aphids on *Andromeda*:–

1. Body oval, with ANT tubercles weakly developed. SIPH black, about as long as the equally dark cauda. Dorsum with a variably developed pattern of dark sclerites. ABD TERG 1 and 7 with marginal tubercles (MTu) *Aphis vaccinii*
- Body spindle-shaped, with moderately to well-developed, divergent ANT tubercles. SIPH pale or dusky, 1.5 or more times longer than the pale cauda. Dorsum without dark markings. ABD TERG 1 and 7 without MTu **2**
2. SIPH 1.4–1.75× cauda, with some subapical reticulation but never more than 2–3 rows of closed cells. ANT PT/BASE 2.4–3.1. Median frontal tubercle developed almost to same extent as ANT tubercles, the inner faces of which are rugose. ANT III without rhinaria *Ericaphis scammelli*
- SIPH more than 2× cauda, with at least 4–5 rows of subapical polygonal reticulation. ANT PT/BASE 4–6. ANT tubercles well-developed, with inner faces smooth; median frontal tubercle low or undeveloped. Rhinaria present on ANT III **3**
3. SIPH cylindrical on distal part, with reticulated subapical region not narrower. R IV+V shorter than HT II and bearing 5–7 accessory hairs. Hairs on ANT III mostly longer than 0.5× BD III *Macrosiphum nasonovi*
- SIPH swollen on distal part, narrowing to reticulated subapical region. R IV+V longer than HT II, and bearing 10–12 accessory hairs. Hairs on ANT III all or mostly shorter than 0.5× BD III **4**
4. Posterior dorsal cephalic hairs 22–30µm long. Longest hairs on ANT III are 0.33–0.75× BD III *Illinoia andromedae*
- Posterior dorsal cephalic hairs 6–19µm long. Longest hairs on ANT III are 0.2–0.25× BD III *Illinoia azaleae*

Andropogon*A. abyssinicus**A. aciculatus* see *Chrysopogon**A. annulatus**A. bicolor**A. bicornis**A. caricosus**A. cernuus**A. durus***Gramineae***Schizaphis graminum*; *Sitobion graminis**Sipha flava*; *Tetraneura fusiformis**Hysteroneura setariae*; *Rhopalosiphum maidis**Hysteroneura setariae**Hysteroneura setariae*; *Sipha flava*; *Tetraneura fusiformis**Schizaphis graminum**Rhopalosiphum maidis*

HOST LISTS AND KEYS

<i>A. effusum</i>	<i>Schizaphis graminum</i> ; <i>Sipha maydis</i>
<i>A. elongatum</i>	<i>Diuraphis noxia</i>
<i>A. gyanus</i>	<i>Aphis gossypii</i>
<i>A. gerardii</i>	<i>Sitobion avenae</i>
<i>A. glomeratus</i> (incl. var. <i>reinoldi</i>)	<i>Hysteroneura setariae</i> ; <i>Tetraneura fusiformis</i>
<i>A. gracilis</i>	<i>Tetraneura fusiformis</i>
<i>A. halli</i>	<i>Tetraneura fusiformis</i>
<i>A. hirtus</i>	<i>Schizaphis graminum</i>
<i>A. intermedius</i>	<i>Metopolophium dirhodum</i> ; <i>Rhopalosiphum padi</i>
<i>A. ischaemum</i>	<i>Tetraneura ulmi</i>
<i>A. lividus</i>	<i>Sitobion graminis</i>
<i>A. nardus</i>	[<i>Pemphigus andropogiae</i> Shinji, 1924]
<i>A. pertusus</i> see <i>Bothriochloa pertusa</i>	
<i>A. scoparius</i>	<i>Anoecia cornicola</i>
<i>A. reynoldii</i>	<i>Hysteroneura setariae</i> ; <i>Tetraneura fusiformis</i>
<i>A. tectorum</i>	<i>Tetraneura fusiformis</i>
<i>Andropogon</i> spp.	<i>Atheroides hirtellus</i> ; <i>Forda orientalis</i> ; <i>Geoica</i> sp.; <i>Pseudoregma panicola</i> ; <i>Sitobion miscanthi</i> , <i>yakini</i>

Use key to apterae of grass-feeding aphids under *Digitaria*.

Androsace

A. alpina
A. sarmentosa
A. sempervivoides

Rock-Jasmine

Nasonovia brevipes
Aulacorthum solani
Thecabius ?auriculae

Primulaceae

Key to apterae on *Androsace*:–

- | | |
|---|-----------------------------|
| 1. ANT PT/BASE less than 0.3. SIPH absent | <i>Thecabius ?auriculae</i> |
| – ANT PT/BASE 2.4–5.7. SIPH present, tubular | 2 |
| 2. ANT III with 22–26, IV with 7–9 rhinaria. SIPH c.3× HT II | <i>Nasonovia brevipes</i> |
| – ANT III with (0–) 1–2 (–4) rhinaria, IV with 0. SIPH 4.3–5.7× HT II | <i>Aulacorthum solani</i> |

Andryala

A. integrifolia

A. pinnatifida

A. ragusina

A. sinuata

A. varia

Compositae

Aphis fabae, *gossypii*, sp. near *pernilleae*;
Aulacorthum solani; *Nasonovia ribisnigri*;
Uroleucon mierae, [*picridis*]
Brachycaudus helichrysi; *Macrosiphum euphorbiae*;
Nasonovia ribisnigri; *Uroleucon mierae*
Aphis fabae, sp. near *pernilleae*, [*terricola*];
Brachycaudus helichrysi;
Nasonovia ribisnigri; *Uroleucon mierae*
[*Aphis* (*Protaphis*) sp. (Mier Durante, 1978: 93)],
Aphis sp. near *pernilleae*; *Uroleucon mierae*
Nasonovia ribisnigri; [*Uroleucon picridis*]

Key to aphids on *Andryala*:–

- | | |
|---|--------------------------------|
| 1. Cauda helmet-shaped, shorter than its basal width in dorsal view. SIPH pale or dusky, smooth-surfaced, with a subapical constriction, less than 1.5× cauda | <i>Brachycaudus helichrysi</i> |
|---|--------------------------------|

- Cauda tongue- or finger-like, longer than its basal width. SIPH pale or dark, but if pale then always more than 1.5× cauda 2
- 2. ANT tubercles weakly developed, not projecting beyond middle of frons in dorsal view. Marginal tubercles (MTu) always present on ABD TERG 1 and 7 3
- ANT tubercles well developed, their inner faces parallel or divergent in dorsal view. If MTu are present these are not on ABD TERG 1 and 7 5
- 3. Cauda as black as SIPH, and bearing 11–27 hairs *Aphis fabae*
- Cauda somewhat paler than SIPH, and bearing 4–8 hairs 4
- 4. Antennae always 5-segmented. Longest hair on ANT III less than 0.5× BD III. R IV+V more than 1.5× HT II *Aphis* sp. near *pernilleae* (q.v.)
- Antennae usually 6-segmented, sometimes 5-segmented in small specimens. Longest hair on ANT III more than 0.5× BD III. R IV+V less than 1.5× HT II *Aphis gossypii*
- 5. ANT and SIPH black, and legs brown–black on distal parts of femora and tibiae. Dorsal hairs all arising from dark scleroites, and pre- and post-siphuncular sclerites present *Uroleucon mieraе*
- ANT and SIPH not wholly black, and legs mainly pale. Dorsal hairs not arising from scleroites, and pre- and post-siphuncular sclerites absent 6
- 6. ANT PT/BASE 7.0–11.4. Dorsal abdomen with a pattern of intersegmental dark markings *Nasonovia ribisnigri*
- ANT PT/BASE 3.4–6.2. Dorsal abdomen without a pattern of intersegmental dark markings 7
- 7. Inner faces of ANT tubercles parallel in dorsal view. SIPH less than 0.25× BL and without any polygonal reticulation *Aulacorthum solani*
- Inner faces of ANT tubercles divergent. SIPH more than 0.25× BL and with a subapical zone of polygonal reticulation *Macrosiphum euphorbiae*

Aneimia*A. adianthifolia***Schizaeaceae***Idiopterus nephrolepidis*; *Neomyzus circumflexus*Key to aphids on *Aneimia*:-

- Dorsal abdomen without a dark patch. SIPH with basal 0.3 black, contrasting with distal 0.7. Cauda black. Dorsal hairs with fan-shaped apices, and arising from tuberculate bases *Idiopterus nephrolepidis*
- Dorsal abdomen with a large, roughly U-shaped dark patch. SIPH and cauda pale. Dorsal hairs very short and inconspicuous *Neomyzus circumflexus*

Anemone*A. canadensis**A. chinensis**A. coronaria* see *Pulsatilla**A. cylindrica**A. halleri**A. hupehensis* (incl. var. *japonica*)*A. narcissiflora**A. pulsatilla* see *Pulsatilla vulgaris**A. rivularis***Ranunculaceae***Macrosiphum euphorbiae**Rhopalosiphoninus staphyleae**Neomyzus circumflexus**Aulacorthum solani*; *Myzus ascalonicus*[*Longicaudus trirhodus*]; [*Thecabius anemoni*]*Myzus ornatus**Acyrtosiphon malvae* group; *Aphis spiraeicola*;[*Ericolophium takahashii*];[*Capitophorus carduinus, elaeagni*]

HOST LISTS AND KEYS

A. silvestris
A. virginiana
Anemone spp.

Aphis montanicola
Aulacorthum solani
Aphis fabae; [*Amphorophora japonica*];
Himalayaphis anemones; [*Illinoia davidsoni*];

Combined key to aphids on *Anemone* and *Pulsatilla*:-

1. ANT tubercles weakly developed, not projecting beyond middle of frons in dorsal view. Marginal tubercles (MTu) always present on ABD TERG 1 and 7 2
 - ANT tubercles well developed. MTu absent from ABD TERG 1 and 7 8
2. SIPH pale or dusky, darker at apices, only about 0.1× BL and 0.7–1.3× cauda. ANT PT/BASE 1.1–1.8 8

Aphis triglochinis

 - SIPH wholly dark, 0.12–0.26× BL and 0.9–2.6× cauda. ANT PT/BASE 1.5–3.2 3
3. Longest hair on ANT III 0.2–0.6× BD III. Marginal hair on ABD TERG 1 is 0.2–0.9× diameter of adjacent marginal tubercle (MTu). ANT PT/BASE 1.5–2.25 4
 - Longest hair on ANT III 0.5–2.2× BD III. Marginal hair on ABD TERG 1 is 0.7–2.8× diameter of adjacent MTu. ANT PT/BASE 1.9–3.2 6
4. MTu usually present on ABD TERG 2–4 as well as 1 and 7. Antennae 5-segmented 8

Aphis pulsatillaephaga

 - MTu only sporadically present on ABD TERG 2–4. Antennae 6-segmented 5
5. R IV+V 1.1–1.3× HT II. SIPH 1.3–1.9× cauda 8

Aphis montanicola

 - R IV+V 1.4–1.7× HT II. SIPH 1.75–2.25× cauda 8

Aphis pulsatillicola
6. SIPH darker than cauda which bears 4–8 hairs. Femoral hairs mostly short 7

Aphis gossypii

 - SIPH and cauda both black, the latter bearing 6–(usually at least 9)–24 hairs. Femora bearing many long, fine hairs 7
7. ANT III 0.9–1.2× cauda, which usually has a distinct midlength constriction and bears 6–15 (usually 9–11) hairs. Dorsal abdomen without any dark markings 8

Aphis spiraecola

 - ANT III 1.2–1.9× cauda which is usually without any constriction and bears 11–24 hairs. Dorsal abdomen usually with scattered dark markings anterior to SIPH and dark cross-bands on ABD TERG 7 and 8 8

Aphis fabae
8. Dorsal body hairs capitate, and arising from tuberculate bases. SIPH markedly inflated on distal half. BL more than 4mm 8

Himalayaphis anemones

 - Dorsal body hairs blunt or pointed, not arising from tuberculate bases. If SIPH are markedly inflated then BL is less than 2.5mm 8

go to key to polyphagous aphids, p. 1020

Anethum

A. foeniculum
A. graveolens

Anethum spp.

Umbelliferae

Cavariella aegopodii
Aphis fabae, *gossypii*; *Cavariella aegopodii*, *konoii*;
Dysaphis foeniculus; *Hyadaphis coriandri*, *foeniculi*;
Myzus ornatus, *persicae*; *Semiaphis heraclei*
Dysaphis apiifolia

Key to aphids on *Anethum*:-

1. ABD TERG 8 with a posteriorly projecting process above cauda 2
 - No supracaudal process 3

2. ANT PT/BASE about 1. R IV+V 0.08–0.13 mm (and usually without accessory hairs) *Cavariella aegopodii*
 – ANT PT/BASE 1.5 or more. R IV+V 0.12–0.18 mm (with 2 accessory hairs) *Cavariella konoi*
3. Cauda dark, helmet-shaped, shorter than its basal width in dorsal view **4**
 – Cauda pale or dusky, clearly longer than its basal width **5**
4. SIPH 2.5–3.5 times longer than their basal width, and 15–25 times as long as the very short, blunt and inconspicuous hairs on front of head *Dysaphis apiifolia*
 – SIPH short and broad-based, rarely more than twice as long as their basal widths, and 2.5–5.0 times as long as the long and fine hairs on front of head *Dysaphis foeniculus*
5. SIPH dark, tapering from base to flange . . . **6**
 – SIPH pale or dusky, clavate or tapering **7**
6. Dorsal abdomen with some dark markings. Cauda black, with 11–24 hairs. Femora with many long fine hairs *Aphis fabae*
 – Dorsal abdomen without any dark markings. Cauda pale or dusky, with 4–8 hairs. Femoral hairs mostly short *Aphis gossypii*
7. SIPH very small and flangeless, only about 0.5× cauda, with aperture slanted towards mid-line *Semiaphis heraclei*
 – SIPH 0.64–2.7× cauda **8**
8. SIPH 0.64–1.4× cauda. Head smooth, with ANT tubercles not developed **9**
 – SIPH 1.7–2.7× cauda. Head spiculate, with ANT tubercles well developed, their inner faces apically convergent **10**
9. SIPH 0.88–1.4× cauda, 1.7–3.1× R IV+V and 3–5× longer than their minimum diameter on basal half *Hyadaphis foeniculi*
 – SIPH 0.64–0.82× cauda, 0.9–1.6× R IV+V and 1.6–2.7× longer than their minimum diameter on basal half *Hyadaphis coriandri*
9. SIPH slightly clavate. ANT PT/BASE 3.0–4.5. Dorsal abdomen unmarked *Myzus persicae*
 – SIPH tapering, with a slight ‘S’-shape. ANT PT/BASE 1.7–2.8. Dorsal abdomen with an intersegmental pattern of dark ornamentation *Myzus ornatus*

Aneurolepidium see *Leymus**Angelica*

A. acutiloba
A. anomala
A. archangelica

A. atropurpurea
A. cincta

A. dahurica

A. decurrens

Umbelliferae

Cavariella japonica; *Semiaphis heraclei*
Cavariella konoi
Aphis fabae, [*folsomii*], *solanella*;
Cavariella aegopodii, *archangelicae*, *konoi*, *theobaldi*;
Dysaphis newskyi ssp. *ossiannilssoni*; *Hyadaphis foeniculi*
Cavariella aegopodii; *Hyadaphis foeniculi*
Aphis fabae;
Cavariella heraclei, *japonica*, *nipponica*, *oenanthi*;
Myzus persicae; *Toxoptera odinae*
Aphis fabae; *Cavariella heraclei*, *japonica*, *oenanthi*,
sapporoensis; *Semiaphis heraclei*
Dysaphis tschildarensis ssp. *tuberculata*

HOST LISTS AND KEYS

<i>A. decursiva</i>	<i>Aphis angelicae</i> ; <i>Cavariella angelicae, japonica, oenanthi, sapporoensis</i> ; <i>Paramyzus heraclei</i> ; <i>Semiaphis heraclei</i>
<i>A. genuiflexa</i>	<i>Cavariella aegopodii, konoii</i> ; <i>Semiaphis heraclei</i>
<i>A. gigas</i>	<i>Cavariella japonica, konoii</i> ; <i>Semiaphis heraclei</i>
<i>A. gmelinii</i>	<i>Aphis fabae</i> ; <i>Cavariella nipponica</i> ; <i>Semiaphis heraclei</i>
<i>A. hendersonii</i>	<i>Aphis helianthi</i>
<i>A. japonica</i>	<i>Semiaphis heraclei</i>
<i>A. littoralis</i>	<i>Cavariella theobaldi</i>
<i>A. lucida</i>	<i>Aphis helianthi</i>
<i>A. maximowiczii</i>	<i>Cavariella salicicola</i>
<i>A. polymorpha</i>	[<i>Aphis rumicis</i>]; <i>Cavariella [aquatica], japonica</i>
<i>A. pubescens</i>	<i>Cavariella angelicae</i> ; <i>Paramyzus heraclei</i>
<i>A. pyrenaica</i>	<i>Cavariella aegopodii</i>
<i>A. rosifolia</i>	<i>Hyadaphis passerinii</i>
<i>A. sachalinensis</i>	<i>Cavariella oenanthi</i> ; <i>Paramyzus heraclei</i> ; <i>Semiaphis heraclei</i>
<i>A. sinensis</i>	<i>Cavariella largispiracula</i> ; [<i>Dysaphis angelicophaga</i>]; [<i>Sappaphis angelicograstis</i>]
<i>A. sylvestris</i>	<i>Aphis fabae, gossypii, spiraecola</i> ; <i>Cavariella archangelicae, konoii, pastinacae</i> ; [<i>Coloradoa angelicae</i>]; <i>Dysaphis angelicae, foeniculus, ossiannilssoni</i> ; <i>Hyadaphis foeniculi, passerinii</i> ; [<i>Semiaphis sp.</i>]
<i>A. tomentosa</i>	<i>Aphis [cari], helianthi, sambuci</i>
<i>A. ursina</i>	<i>Cavariella angelicae, [kamtschatica], oenanthi</i>
<i>Angelica spp.</i>	[<i>Aphis thaspis</i>] <i>Cavariella pastinacae, salicis, theobaldi</i> ; <i>Dysaphis nevskyi ssp. ossiannilssoni</i> ; <i>Semiaphis sphondylii</i> ; <i>Toxoptera aurantii</i>

Key to aphids on *Angelica*:-

1. ABD TERG 8 with a posteriorly projecting process above cauda; in some species this is reduced to a small, warty, knob in the centre of ABD TERG 8, with 2 associated hairs (Figure 10f-i) 2
 - No supracaudal process, nor are there 2 hairs on ABD TERG 8 close together and associated with a warty knob 15
2. SIPH clavate; swollen on distal half to at least 1.2× narrowest part of basal half (Figure 10a-d) 3
 - SIPH tapering or cylindrical, or with slight subapical swelling (e.g. Figure 10e) 9
3. ANT PT/BASE 0.6-1.33 4
 - ANT PT/BASE 1.35-4.0 7
4. R IV+V 1.3-1.5× HT II *Cavariella nipponica*
 - R IV+V 0.7-1.2× HT II 5
5. R IV+V 1.05-1.2× HT II. SIPH short and stout, narrowing only near base (Figure 10a) *Cavariella salicicola*
 - R IV+V 0.75-1.04× HT II. SIPH with narrower basal stem extending over 0.3-0.5 of length (Figure 10 b-d) 6

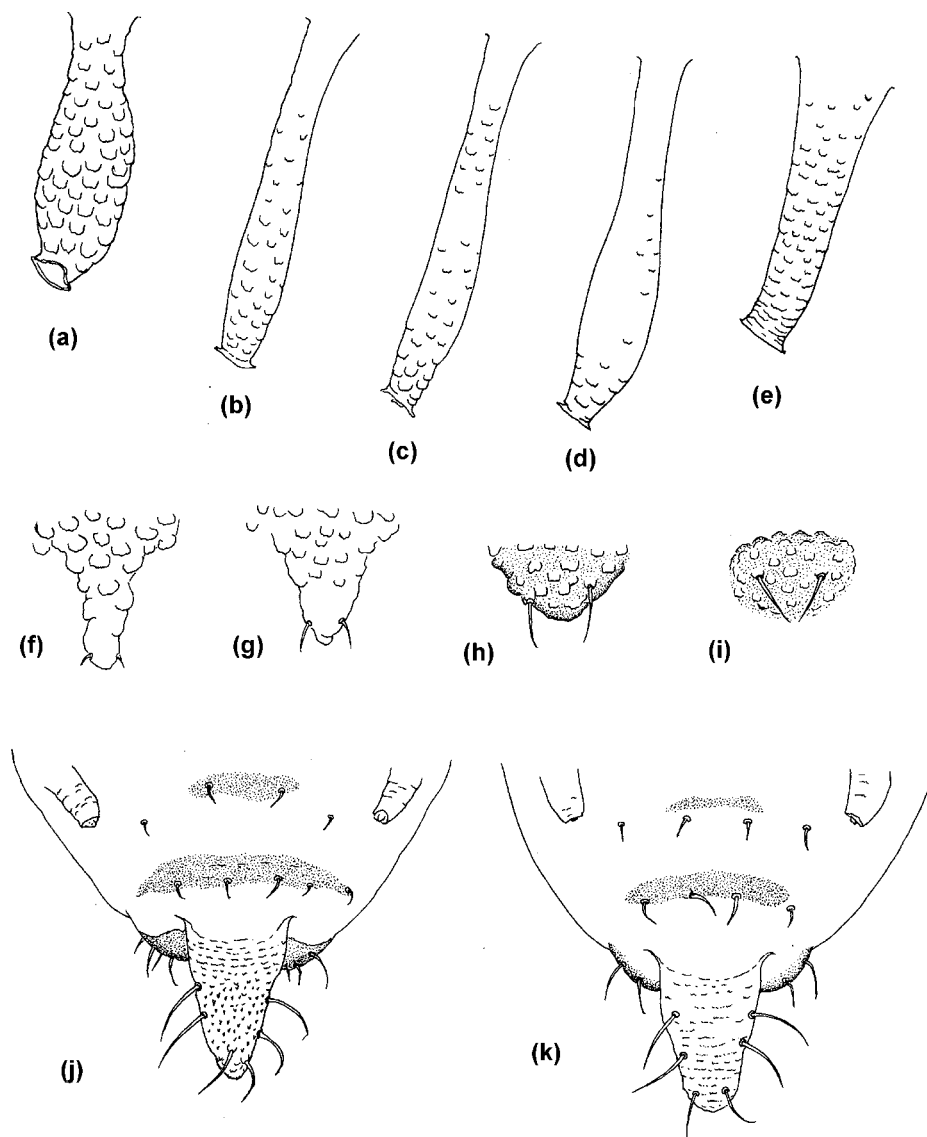


Figure 10 Apterae on *Angelica*; (a) SIPH of *Cavariella salicicola*, (b) SIPH of *C. aegopodii*, (c) SIPH of *C. archangelicae*, (d) SIPH of *C. konoii*, (e) SIPH of *C. angelicae*, (f) process on ABD TERG 8 of *C. archangelicae*, (g) same for *C. konoii*, (h) same for *C. japonica*, (i) same for *C. oenanthi*, (j) end of abdomen of *Semiaphis sphondylii*, (k) same for *S. heraclei*.

6. SIPH coarsely imbricated, and markedly swollen on distal part, with maximum diameter of swollen part about twice minimum diameter near base, and $0.64-0.73 \times R\ IV+V$ (based on apt. from *Salix*)
Cavariella salicis
- SIPH moderately imbricated, less swollen, maximum diameter of swollen part less than $0.64 \times R\ IV+V$ (Figure 10b)
Cavariella aegopodii

HOST LISTS AND KEYS

7. ANT PT/BASE 2.6–4.0 *Cavariella pastinacae*
 – ANT PT/BASE 1.4–2.0 **8**
8. SIPH 0.98–1.1× head width across (and including) eyes, and 6.7–8.7× maximum width of swollen part (Figure 10c). Length of supracaudal process at least 1.6× maximum width of swollen part of SIPH (Figure 10f). (Al. with a complete black band on ABD TERG 6) *Cavariella archangelicae*
 – SIPH 0.8–1.01 (–1.07)× head width across eyes, and 5.0–7.3× maximum width of swollen part (Figure 10d). Length of supracaudal process less than 1.5× maximum width of swollen part of SIPH. (Figure 10g) (Al. with a pair of roundish dark marks on ABD TERG 6) *Cavariella konoii*
9. Supracaudal process reduced, distinctly shorter than ANT II (e.g. Figure 10h,i) **10**
 – Supracaudal process at least as long as ANT II **14**
10. Femoral hairs numerous, long and fine, longer than 0.5× width of hind femur **11**
 – Femoral hairs sparse, short and rigid, shorter than 0.5× width of hind femur **12**
11. Head and cauda dark, tergum with variably developed dark markings. Secondary rhinaria sometimes present on ANT III–V or IV–V (of aptera) *Cavariella oenanthi*
 – Head and cauda pale, tergum without dark markings. Antennae (of aptera) without secondary rhinaria *Cavariella sapporoensis*
12. BL 1.5–2.4 mm. Tergum pigmented, and with nodulose ornamentation. SIPH 2.7–3.0× cauda, which bears 6–8 hairs. R IV+V 1.4–1.6× HT II *Cavariella japonica*
 – BL 2.6–3.1 mm. Tergum pale, smooth. SIPH more than 3× cauda, which bears 9–16 hairs. R IV+V either 1.2–1.3× or 1.6–2.0× HT II. **13**
13. R IV+V 1.2–1.3× HT II *Cavariella largispiracula*
 – R IV+V 1.6–2.0× HT II *Cavariella heraclei*
14. Antennae 5-segmented *Cavariella angelicae*
 – Antennae 6-segmented *Cavariella theobaldi*
15. SIPH very small, much shorter and thinner than cauda (Figure 10j, k) **16**
 – SIPH as thick and/or as long as, or longer than, cauda **17**
16. Cauda triangular in dorsal view. SIPH about twice (1.8–2.2) times as long as their diameter at midlength (Figure 10j) *Semiaphis sphondylii*
 – Cauda tongue shaped, with rounded apex. SIPH 1.0–1.8× their diameter at midlength (Figure 10k) *Semiaphis heraclei*
17. Cauda helmet-shaped, not longer than its basal width in dorsal view **18**
 – Cauda tongue-shaped, at least 1.2× longer than its basal width in dorsal view **22**
18. Cauda with 9–13 hairs *Dysaphis angelicophaga**
 – Cauda with 4–6 hairs **19**
19. Dorsal abdominal hairs very short and blunt, 0.25–0.45× ANT BD III and not arising from pigmented scleroites. ANT III, and usually IV also, with secondary rhinaria (in apt.) *Dysaphis newskyi* ssp. *ossiannilssoni*
 – Dorsal abdominal hairs mostly longer than ANT BD III and many of them arising from pigmented scleroites. ANT of apt. without secondary rhinaria (but these may be present in alatiform apt. with strongly sclerotised thorax) **20**

20. STu present on head and all ABD TERG, except sometimes 3 and 4. MTu on ABD TERG 7 as well as 1–5. SIPH coarsely imbricated *Dysaphis tschildarensis* ssp. *tuberculata**
 – STu at most present on head and ABD TERG 7–8 or 8. MTu on ABD TERG 1–5 only. SIPH only moderately imbricated **21**
21. SIPH more than 2× their basal widths, 1.0–1.4× R IV+V and 0.083–0.12× BL *Dysaphis angelicae*
 – SIPH less than 2× their basal widths, 0.75–1.1× R IV+V and 0.06–0.077× BL *Dysaphis foeniculus*
22. SIPH tapering or cylindrical. Prothorax and ABD TERG 1 (and usually also ABD TERG 7) with MTu **23**
 – SIPH slightly to moderately clavate. Prothorax and ABD TERG 1 and 7 without MTu **24**
23. ANT 5-segmented, with PT/BASE c.1.3. Prothorax and ABD TERG 1–5 (but not 7?) with well-developed lateral tubercles. Rostrum very long, reaching back beyond bases of SIPH, which are long, thin, and rather pale. Cauda short and rounded. R IV+V with c.6 accessory hairs *Aphis angelicae**
 – ANT usually 6-segmented, with PT/BASE more than 1.4. MTu always on prothorax and ABD 1 and 7, in most species not consistently on 2–5. Rostrum much shorter, SIPH dark, cauda tongue-shaped. R IV+V with 2 accessory hairs . . . go to key to polyphagous aphids, p. 1020, starting at couplet 24
24. SIPH dark and 0.9–1.4× cauda. ANT tubercles undeveloped. ANT PT/BASE 1.2–3.2 **25**
 – SIPH pale and 2.5–3.0× cauda. ANT tubercles well developed. ANT PT/BASE 2.8–5.7 **26**
25. Prosternal sclerite 1.36–2.6× wider than long, often convex posteriorly. SIPH 1.05–1.4× cauda. (Al. often with sec. rhinaria on ANT V) *Hyadaphis foeniculi*
 – Prosternal sclerite 2.2–3.6× wider than long, with posterior margin often straight. SIPH 0.85–1.2× cauda. (Al. rarely with sec. rhinaria on ANT V) *Hyadaphis passerinii*
26. ANT III with 4–15 rhinaria on basal half. ANT PT/BASE 5.0–5.7 *Paramyzus heraclei*
 – ANT III without rhinaria. ANT PT/BASE 2.8–4.5 *Myzus persicae*

Angianthus*A. tomentosus***Compositae***Aphis gossypii***Angraecum***Angraecum* sp.**Orchidaceae***Cerataphis orchidearum***Anigozanthos***A. flavida**A. humilis**Anigozanthos* sp.**Haemodoraceae***Myzus persicae*; *Rhopalosiphum padi**Rhopalosiphum padi**Macrosiphum euphorbiae*

Use key to polyphagous aphids, p. 1020.

Anisantha see Bromus**Aniseia***A. martinicensis***Convolvulaceae***Aphis gossypii*

HOST LISTS AND KEYS

Anisopappus

A. africana

Compositae

Aphis gossypii, *spiraecola*; *Aulacorthum solani*;
Macrosiphum euphorbiae; *Micromyzella anisopappi*;
Myzus ornatus; *Sitobion hirsutirostris*;
Uroleucon compositae

Key to aphids on *Anisopappus*:-

1. SIPH black and much longer than the distance between their bases; cauda long, thin and pale. (Additional diagnostic characters: ANT III–VI wholly dark, R IV+V with 9–12 accessory hairs, subapical polygonal reticulation of SIPH consisting of just 3–5 rows of cells, extending less than 0.1 of SIPH)
Sitobion hirsutirostris
– SIPH pale or dark, but if wholly dark and longer than the distance between their bases then cauda is also black **2**
2. SIPH pale with black tips, cauda dusky to black. (Additional diagnostic characters: head, ANT I–III and femora densely ornamented with nodulose imbrication, ANT PT/BASE 5.0–5.9, and almost all hairs on both dorsal and ventral surfaces of body and appendages very short and blunt)
Micromyzella anisopappi
– SIPH pale or dark, but if pale with black tips then cauda is also pale
go to key to polyphagous aphids, p. 1020

Anisotome

Anisotome sp.

Umbelliferae

Dysaphis foeniculus

Annona

A. cherimola
A. chrysophylla
A. glabra
A. muricata

A. reticulata

A. senegalensis
A. squamosa

Custard Apples

Aphis fabae, *gossypii*, *spiraecola*; *Macrosiphum euphorbiae*
Aphis gossypii
Aphis spiraecola
Aphis gossypii, *spiraecola*; *Greenidea anonae*;
Sinomegoura citricola; *Toxoptera aurantii*
Aphis gossypii, [*sassceri* Wilson, 1911]; *Greenidea anonae*;
Toxoptera aurantii
Aphis gossypii
Aphis craccivora, *gossypii*, *spiraecola*;
Taiwanaphis kalipadi; *Toxoptera aurantii*

Annonaceae

Key to apterae on *Annona* (or use illustrated key in Blackman and Eastop (2000)):-

1. SIPH with numerous long hairs *Greenidea anonae*
– SIPH without or with only a few small hairs **2**
2. SIPH in form of broad-based cones. Cauda knobbed, anal plate bilobed. Posterior abdomen with backwardly-directed processes *Taiwanaphis kalipadi*
– SIPH tubular. Cauda tongue- or finger-shaped, anal plate entire. No posterior abdominal processes
go to key to polyphagous aphids, p. 1020

Anoda

A. acerifolia
A. cristata

Malvaceae

Aphis gossypii
Aphis spiraecola

Use key to polyphagous aphids, p. 1020.

Anogeissus
A. schimperi

Combretaceae

Aphis gossypii

Ansellia
A. africana
A. gigantea
A. nilotica

Orchidaceae

Sitobion anselliae
Sitobion anselliae
Cerataphis orchidearum

Use key to apterae on orchids under *Cymbidium*.

Antennaria
A. dioica
A. neodioica
A. plantaginifolia

Compositae

Brachycaudus helichrysi
Uroleucon [rudbeckiae], russellae
Uroleucon pseudambrosiae;
Pleotrichophorus antennarius
Brachycaudus helichrysi

A. umbrinella

Key to aphids on *Antennaria*:-

1. Cauda helmet-shaped, no longer than its basal width in dorsal view. ANT tubercles undeveloped, spiracular apertures large and rounded *Brachycaudus helichrysi*
– Cauda longer than its basal width in dorsal view. ANT tubercles well developed, spiracles reniform **2**
2. Dorsal hairs with broadly expanded apices, funnel-shaped. R IV+V stiletto-shaped, with concave sides, SIPH pale, 2.2–2.5× cauda, without distal polygonal reticulation *Pleotrichophorus antennarius*
– Dorsal hairs with blunt or pointed apices. R IV+V with straight or slightly convex sides. SIPH dark, less than 2× cauda, and with polygonal reticulation over distal 0.23–0.37% **3**
3. R IV+V more than 1.5× HT II *Uroleucon russellae*
– R IV+V 0.9–1.1× HT II *Uroleucon pseudambrosiae*

***Anthemis* (including *Maruta*)**

A. arvensis

A. austriaca
A. blancheana
A. casablanca
A. chrysantha
A. cotula

Compositae

Aphis fabae, [*terricola*]; *Aulacorthum solani*;
Brachycaudus helichrysi; *Macrosiphoniella tapuskae*;
Macrosiphum euphorbiae;
Myzus persicae; *Pleotrichophorus glandulosus*
Aphis fabae; *Brachycaudus helichrysi*; *Myzus persicae*
Macrosiphoniella tapuskae
Brachycaudus helichrysi
Brachycaudus helichrysi
Aphis middletonii, *nasturtii*, *spiraecola*, *vandergooti*;
Brachycaudus helichrysi, *lateralis*;
Macrosiphoniella abrotani, *millefolii*, *tanacetaria*
ssp. *bonariensis*, *tapuskae*;
Macrosiphum euphorbiae; *Myzus ornatus*, *persicae*;
Pemphigus bursarius
Brachycaudus helichrysi
Aulacorthum solani; *Myzus persicae*

A. italica
A. kotschyana

HOST LISTS AND KEYS

<i>A. maritima</i>	<i>Brachycaudus cardui, helichrysi</i>
<i>A. melampodina</i>	<i>Aphis craccivora; Myzus persicae</i>
<i>A. mixta</i> see <i>Chamaemelum</i>	
<i>A. moczygia</i>	<i>Aphis fabae</i>
<i>A. nobilis</i> see <i>Chamaemelum</i>	
<i>A. ruthenica</i>	<i>Brachycaudus helichrysi; Macrosiphoniella tapuskae</i>
<i>A. sancti-johannis</i>	<i>Aphis fabae</i>
<i>A. tenuifolia</i>	<i>Aphis fabae</i>
<i>A. tinctoria</i>	<i>Aphis anthemidis, fabae, gossypii, oligommata;</i> <i>Aulacorthum solani;</i> <i>Brachycaudus cardui, helichrysi, lateralis;</i> <i>Macrosiphoniella millefolii, tanacetaria, tapuskae;</i> <i>Trama troglodytes; Uroleucon jaceae, siculum</i> <i>Aphis anthemiae; Smynthuroides betae</i>
<i>Anthemis</i> sp.	

Key to aphids on *Anthemis* and *Chamaemelum*:-

1. ANT PT/BASE less than 0.5 2
- ANT PT/BASE more than 0.7 4
2. HT II very elongate, more than 0.5 of length of hind tibia *Trama troglodytes*
- HT II of normal length 3
3. Body and appendages sparsely hairy. Wax pore plates present on ABD TERG 3–7. ANT II much shorter than ANT III or IV. R IV+V 0.45–0.7× HT II *Pemphigus bursarius*
- Body and appendages with numerous fine hairs. Wax pore plates absent. ANT II longer than IV, as long as or longer than III, R IV+V 0.9–1.2× HT II *Smynthuroides betae*
4. Marginal tubercles (MTu) absent or present, but if present they are usually only on ABD TERG 2–4 (–5) and only rarely on ABD TERG 1 or 7 5
- MTu always present at least on ABD TERG 1 and 7 16
5. Cauda helmet-shaped, constricted at base and not longer than its basal width. SIPH with a subapical annular incision. Spiracular apertures large and rounded 6
- Cauda tongue- or finger-shaped, not constricted at base, longer than its basal width. SIPH without a subapical annular incision. Spiracular apertures reniform 8
6. Dorsum without dark markings. Mesosternum without mammariform processes. R IV+V 0.10–0.15 mm, 1.1–1.5× HT II. SIPH pale, smooth, 0.8–2.0× cauda *Brachycaudus helichrysi*
- Dorsum with an extensive black shield. Mesosternum with a pair of dark mammariform processes. R IV+V 0.17–0.24 mm, 1.4–2.0× HT II. SIPH dark, imbricated, 1.7–3.4× cauda 7
7. Hairs on ABD TERG 8 are 30–61 µm long. Longest hairs on hind femur 10–25 µm long *Brachycaudus lateralis*
- Hairs on ABD TERG 8 are at least 70 µm long. Longest hairs on hind femur more than 25 µm long *Brachycaudus cardui*
8. Dorsal hairs numerous and long, arising from tuberculate bases, and with bulbous or fan-shaped apices *Pleotrichophorus glandulosus*
- Dorsal hairs short or long, but if long then with pointed apices 9
9. SIPH pale at least over most of length, sometimes dusky or dark apically, and if with subapical polygonal reticulation then this is confined to distal 0.2 or less of length

go to key to polyphagous aphids, p. 1020

- SIPH dusky or dark over at least half of length, with polygonal reticulation always present and often extending over more than distal 0.2 **10**
- 10.** SIPH shorter than or as short as (0.6–1.0×) cauda **11**
- SIPH longer than (1.1–2.9×) cauda **14**
- 11.** R IV+V 1.0–1.2× HT II **12**
- R IV+V 0.7–0.9× HT II **13**
- 12.** All dorsal abdominal hairs arising from conspicuous large dark scleroites. ANT PT/BASE 3.7–4.3. SIPH with reticulation over distal 0.50–0.63 of length. Cauda with 24–30 hairs
- Macrosiphoniella millefolii*
- Dorsal abdominal hairs mostly arising from small scleroites, only large on ABD TERG 6–8. ANT PT/BASE 4.6–5.7. SIPH with reticulation over 0.63–0.81 of length. Cauda with 12–20 hairs
- Macrosiphoniella sanborni*
- 13.** Antennae, tibiae and SIPH almost completely black. ANT III with 12–28 rhinaria. ANT PT/BASE 2.9–3.5 *Macrosiphoniella tanacetaria*
- Basal half of ANT III pale, tibiae pale in middle, and SIPH dusky. ANT III with 3–12 rhinaria. ANT PT/BASE 3.1–4.0 *Macrosiphoniella abrotani*
- 14.** Cauda pale. SIPH often pale basally. Antennae and tibiae also pale except at apices. First tarsal segments with 3 hairs (a sense peg and a pair of lateral hairs); rarely with one additional lateral hair *Macrosiphoniella tapuskae*
- Cauda, SIPH and antennae black, and tibiae mainly dark. First tarsal segments with 5 hairs (sense peg plus 2 lateral pairs); rarely with only 4 hairs **15**
- 15.** SIPH 0.29–0.36× BL. Cauda with 13–19 hairs. ANT III with 11–25 secondary rhinaria *Uroleucon siculum*
- SIPH 0.24–0.30× BL. Cauda with 19–28 hairs. ANT III with 16–54 secondary rhinaria *Uroleucon jaceae*
- 16.** ANT 5-segmented. SIPH very short, pale or dusky and flangeless, 0.5–1.0× cauda *Aphis oligommata*
- ANT 6-segmented, except in small summer ‘dwarfs’. SIPH dark, with an evident flange, 0.6–2.1× cauda **17**
- 17.** ANT PT/BASE 0.8–1.5. SIPH shorter than R IV+V **18**
- ANT PT/BASE 1.6–5.1. SIPH longer than R IV+V **19**
- 18.** ANT PT/BASE 0.8–1.0 *Aphis anthemiae*
- ANT PT/BASE 1.3–1.5 *Aphis anthemidis*
- 19.** ANT PT/BASE 3.9–6.0. SIPH 1.9–2.6× cauda, which is black, rather pointed, and bears c.10 adpressed hairs that are difficult to count. ABD TERG 1–4 and 7 regularly with large MTu *Aphis vanderhooti*
- ANT PT/BASE 1.8–3.7. Cauda rounded apically **or** a little shorter than SIPH, with outstanding hairs. ABD TERG 2–4 only sporadically with MTu **20**
- 20.** Cauda pale or dusky, and bearing 4–11 hairs. ABD TERG 7 and 8 without dark transverse bands **21**
- Cauda dark like SIPH and bearing 11–24 hairs. ABD TERG 7 and 8 with dark transverse bands **22**
- 21.** SIPH uniformly dark. Hairs on hind femur all shorter than diameter of femur at its base *Aphis gossypii*
- SIPH usually rather pale, darker at apex. Hairs on hind femur mainly longer, some of them about as long as, or longer than, diameter of femur at its base *Aphis nasturtii*

HOST LISTS AND KEYS

22. Cauda short, not clearly longer than its basal width, and shorter than R IV+V. ANT III often with a few rhinaria on distal part. ANT PT/BASE 1.6–2.2 *Aphis middletonii*
– Cauda much longer than its basal width, and longer than R IV+V. ANT III without rhinaria. ANT PT/BASE 2.4–4.0 *Aphis fabae*

Anthericum

A. liliago

A. ramosum

Anthericaceae

Aphis antherici, fabae; Aulacorthum speyeri;

Myzus persicae

Aphis fabae; Aulacorthum speyeri; Myzus ascalonicus;

Rhopalosiphoninus staphyleae

Key couplet for aphids on *Anthericum*:-

1. ANT tubercles weakly developed, not projecting beyond middle part of front of head in dorsal view. ABD TERG 1 and 7 always with marginal tubercles (MTu) **2**
– ANT tubercles well developed, with inner faces approximately parallel. No MTu on ABD TERG 1 and 7 **3**
2. All dorsal hairs very short and blunt, even those on front of head and ABD TERG 8 being less than 0.5× ANT BD III *Aphis antherici*
– Dorsal hairs longer; those on head and ABD TERG 8 are 1–5× longer than ANT BD III *Aphis fabae*
3. SIPH not clavate. Dorsum with a distinctive pattern of dark markings, including a large sclerite extending across ABD TERG 2–4, often broken in the midline but joined laterally to the marginal sclerites *Aulacorthum speyeri*
– SIPH clavate. Dorsal abdomen with or without dark markings; if present and maximally developed these consist of segmentally discrete patches or transverse bars not united with marginal sclerites **4**
4. Dorsal abdomen with dark markings. SIPH thick and markedly clavate, with swollen part more than twice the minimum diameter of the basal part, which is thicker than hind tibia at midlength. ANT III usually with 1–3 rhinaria near base *Rhopalosiphoninus staphyleae*
– Dorsal abdomen without any dark markings. SIPH thinner, with minimum diameter of basal part similar to diameter of hind tibia at midlength. ANT III without rhinaria **5**
5. SIPH distinctly shorter than ANT III. SIPH very thin on basal half, at narrowest point a little thinner than hind tibia at midlength *Myzus ascalonicus*
– SIPH as long as or longer than ANT III. Minimum width of basal part of SIPH a little more than width of hind tibia at midlength *Myzus persicae*

Anthistria see *Themeda*

Anthocephalus see *Breonia*

Antholyza

A. retracta

Iridaceae

Neomyzus circumflexus

Anthoxanthum

A. aristatum

Gramineae

Israelaphis alistana

A. odoratum

Aploneura lentisci; *Rhopalosiphum padi*;
Schizaphis graminum;
Sitobion avenae, *fragariae*, [*indicum*], *miscanthi*;
[*Trama troglodytes*]

Use key to apterae of grass-feeding aphids under *Digitaria*.

Anthriscus

A. aemula

A. caucalis

A. cerefolium

A. keniensis

A. nemorosa

A. nitidus

A. sylvestris

A. vulgaris see *caucalis*

Anthriscus sp.

Umbelliferae

[*Dysaphis ussuriensis*]

Dysaphis hirsutissima; *Macrosiphum euphorbiae*, *gei*

Aphis fabae; *Cavariella aegopodii*;

Hyadaphis foeniculi; *Macrosiphum gei*, [*stellariae*];

Myzus [*certus*], *persicae*; *Neomyzus circumflexus*

Aulacorthum solani

Dysaphis anthrisci ssp. *majkopica*

Cavariella aegopodii; *Hyadaphis foeniculi*

Aphis brohmeri, *fabae*; *Aulacorthum solani*;

Cavariella aegopodii, *japonica*, *pastinacae*, [*rutila*];

Dysaphis anthrisci, *crataegi*, *hirsutissima*,

tschildarensis ssp. *tuberculata*;

Eriosoma auratum; *Hyadaphis foeniculi*;

Macrosiphum euphorbiae, *gei*; *Pemphigus* sp.;

Semiaphis anthrisci

Myzus ornatus

Key to aphids on *Anthriscus*:-

- | | | |
|----|--|------------------------------|
| 1. | ANT PT/BASE less than 0.5. Wax glands present on abdomen | 2 |
| - | ANT PT/BASE more than 0.6 (usually much more than 1). No evident wax glands | 3 |
| 2. | SIPH present as pores ringed by hairs | <i>Eriosoma auratum</i> |
| - | SIPH absent | <i>Pemphigus</i> sp. |
| 3. | ABD TERG 8 with a wart-like or finger-like medial process, bearing 2 hairs | 4 |
| - | ABD TERG 8 without a medial hair-bearing process | 6 |
| 4. | SIPH tapering and coarsely imbricated. Process on ABD TERG 8 wart-like, shorter than ANT II | <i>Cavariella japonica</i> |
| - | SIPH clavate, smooth or with normal imbrication. Process on ABD TERG 8 quadrate or finger-like, longer than ANT II | 5 |
| 5. | ANT PT/BASE 2.6-4.0 | <i>Cavariella pastinacae</i> |
| - | ANT PT/BASE 0.6-1.3 | <i>Cavariella aegopodii</i> |
| 6. | SIPH very small and thin, about 0.5× cauda | <i>Semiaphis anthrisci</i> |
| - | SIPH at least 0.8× cauda | 7 |
| 7. | ANT tubercles undeveloped or weakly developed, not projecting beyond middle of frons in dorsal view. SIPH and cauda dark | 8 |
| - | ANT tubercles well developed. SIPH and cauda mainly or entirely pale | 15 |

HOST LISTS AND KEYS

8. SIPH swollen on distal half and 0.9–1.4× the tongue-shaped cauda, which bears 6–10 (usually 7) hairs
Hyadaphis foeniculi **9**
– SIPH tapering from base to flange, 0.8–2.4× cauda
9. Cauda helmet-shaped, not longer than its basal width in dorsal view, and with 5–9 hairs **10**
– Cauda tongue-shaped, clearly longer than its basal width in dorsal view, and with 11–31 hairs **14**
10. Dorsal hairs long and fine; longest hairs on ANT III 2.5–3.7× BD III. SIPH 1.1–1.75× cauda
Dysaphis hirsutissima
– Dorsal hairs blunt or more abruptly pointed; longest hairs on ANT III 0.7–2.2× BD III. SIPH 1.7–3.0× cauda **11**
11. Spinal tubercles (STu) present on head and ABD TERG 1–2 as well as 7–8, and sometimes also on pronotum and ABD TERG 3 and 4. Longest hairs on ANT III 16–42 µm, 0.7–1.6 (–2.0)× BD III. ABD TERG 8 with 4–6 hairs . . . *Dysaphis tschildarensis* ssp. *tuberculata**
– STu present on head and ABD TERG 7–8, never on 2–3, rarely on pronotum and ABD TERG 6. Longest hairs on ANT III 31–62 µm, 1.5–2.2× BD III. ABD TERG 8 with 4–10 hairs **12**
12. Longest hairs on ANT III and ABD TERG 3 are 7–18 µm. Pronotum without pleural hairs at posterior margin. Genital plate with 14–22 hairs
Dysaphis crataegi
– Longest hairs on ANT III and ABD TERG 3 are 31–62 µm. Pronotum with a pair of pleural hairs at posterior margin. Genital plate with 23–40 hairs **13**
13. SIPH 0.20–0.28 mm, 3.2–4.8× their width at midlength and 1.7–2.4× cauda. Degree of sclerotisation of dorsal abdomen variable, but usually not extensive on ABD TERG 1–4, with transverse bars only on more posterior tergites
Dysaphis anthrisci
– SIPH 0.21–0.37 mm, 4.5–6.2× their width at midlength and 2.6–3.0× cauda. Dorsal sclerotisation of abdomen variable, but usually with sclerites coalesced into incomplete transverse bars, or a perforated shield, on ABD TERG (3–) 4–5
Dysaphis anthrisci majkopica
14. Cauda with 11–24 hairs. ABD TERG 8 with 2–5 (–7) hairs. ABD TERG 2–6 bearing a total of 0–3 small MTu
Aphis fabae
– Cauda with 20–31 hairs. ABD TERG 8 with 5–12 hairs. ABD TERG 2–6 bearing a total of 5–9 often rather large MTu
Aphis brohmeri
15. Dorsum with a pattern of dark intersegmental ornamentation. ANT PT/BASE 1.7–2.8
Myzus ornatus
– Dorsum without any dark ornamentation. ANT PT/BASE 3.0–7.6 **16**
16. SIPH weakly clavate. Inner faces of ANT tubercles convergent. No rhinaria on ANT III
Myzus persicae
– SIPH cylindrical or tapering. Inner faces of ANT tubercles parallel or divergent. ANT III with 1–14 rhinaria on basal half **17**
17. Cuticle of head densely spiculose. ANT tubercles steep-sided, parallel or apically convergent. ANT III with (0–) 1–2 (–4) rhinaria near base. SIPH 0.20–0.25× BL, without any subapical reticulation **18**
– Cuticle of head without or with only sparse, minute spicules. Inner faces of ANT tubercles divergent. ANT III with 1–14 rhinaria near base. SIPH 0.25–0.37× BL, with a subapical zone of reticulation **19**
18. Dorsum with a large U-shaped black patch, and broad dark cross-bars on thorax. SIPH 0.7–1.1× head width across (and including) eyes. (Immatures with spiculose hind tibiae)
Neomyzus circumflexus

- Dorsum pale or without any well-defined dark markings. SIPH 1.0–1.35× head width across eyes. (Immatures with smooth hind tibiae) *Aulacorthum solani*
- 19. Longest hair on ABD TERG 8 is 38–63 μm, 0.6–1.4× basal diameter of ANT III. Anterior half of subgenital plate usually (77%) with only 2 hairs (18% with 3, 5% with 4–6 hairs) *Macrosiphum euphorbiae*
- Longest hair on ABD TERG 8 is 66–106 μm, 1.4–2.0× basal diameter of ANT III. Anterior half of subgenital plate with 2–11 hairs, usually (77%) with 4–8 hairs *Macrosiphum gei*

Anthurium*A. × froebellii**A. scherzerianum*(= *scheuchzerianum*?)*Anthurium* sp.*Aphis fabae**Aphis gossypii*; *Aulacorthum solani*; *Myzus persicae*;*Sitobion luteum**Neomyzus circumflexus***Araceae**Key to aphids on *Anthurium*:–

1. Dorsal abdomen with an oval dark patch. SIPH black with a subapical zone of polygonal reticulation *Sitobion luteum*
- Dorsal abdomen without a dark patch. SIPH if black then without any polygonal reticulation go to key to polyphagous aphids, p. 1020

Anthyllis*A. cytisoides**A. hermanniae**A. lotoides**A. macrocephala**A. vulneraria**Anthyllis* sp.**Leguminosae***Aphis* [*brunnea*], *loti*; *Therioaphis litoralis**Acyrtosiphon caraganae*, *parvum**Aphis craccivora**Acyrtosiphon loti**Acyrtosiphon loti*; *Aphis craccivora*, *klimeschi*, *loti**Acyrtosiphon pisum*Key to aphids on *Anthyllis*:–

1. Cauda knobbed, anal plate bilobed. SIPH short, pale, truncate. ANT III with 5–11 transversely elongate oval rhinaria. Abdomen with paired spinal and marginal conical hair-bearing processes *Therioaphis litoralis*
- Cauda tongue- or finger-shaped, anal plate entire. SIPH not truncate. ANT III with any rhinaria subcircular. Abdomen without conical hair-bearing processes 2
2. Broadly oval, heavily pigmented aphids. ANT tubercles poorly developed. ABD TERG 1 and 7 with marginal tubercles (MTu) 3
- Spindle-shaped, pale aphids. ANT tubercles well developed. ABD TERG 1 and 7 without MTu 5
3. R IV+V 1.17–1.44× HT II. Dorsal abdomen with broad dark segmental bands partly fused across segments, but not forming a solid shield. ABD TERG 2–4 often with MTu *Aphis klimeschi*
- R IV+V 0.82–1.18× HT II. Dorsal abdomen with a solid black shield extending over tergites 1–6. ABD TERG 2–4 rarely with MTu 4
4. Cauda finger-like, parallel-sided for much of length, nearly 2× longer than its basal width, 0.13–0.18× BL, and bearing 6–11 hairs. SIPH 0.78–1.53× cauda. (Al. with 0–2 rhinaria on ANT IV) *Aphis loti*
- Cauda with distal part tapering, about 1.5× longer than its basal width, 0.09–0.13× BL, and bearing 4–9 hairs. SIPH 1.17–2.18× cauda. (Al. never with rhinaria on ANT IV) *Aphis craccivora*

HOST LISTS AND KEYS

5. SIPH with distal part attenuate, narrower than hind tibia at midlength. Cauda with 7–23 hairs. ANT I with 9–23 hairs *Acyrtosiphon pisum*
 – SIPH tapering from base to flange, at middle as wide as or wider than hind tibia at midlength. Cauda with 6–10 hairs. ANT I with 5–11 hairs **6**
6. R IV+V 0.95–1.1× HT II *Acyrtosiphon parvus*
 – R IV+V 0.75–0.86× HT II **7**
7. ANT PT/BASE 2.8–4.3. ANT III 3.9–5.5× R IV+V *Acyrtosiphon loti*
 – ANT PT/BASE 4.3–6.0. ANT III 5.6–7.4× R IV+V *Acyrtosiphon caraganae*

Antidesma

- A. bunius*
Antidesma sp.

Euphorbiaceae

- Sinomegoura citricola*
Greenidea anonae

Key to apterae on *Antidesma*:-

- SIPH with numerous long hairs *Greenidea anonae*
 – SIPH without hairs go to key to polyphagous aphids, p. 1020

Antigonon

- A. leptopus*

Polygonaceae

- Aphis craccivora*, *gossypii*, *spiraecola*;
Myzus persicae; *Toxoptera aurantii*

Use key to polyphagous aphids, p. 1020.

Antirhea

- A. lucida*

Rubiaceae

- Aphis gossypii*

Antirrhinum

- A. majus*

Snapdragons

Scrophulariaceae

- A. orontium*
Antirrhinum spp.

- Aphis fabae*, *gossypii*; *Aulacorthum solani*;
Brachycaudus helichrysi; *Dysaphis gallica*;
Macrosiphum euphorbiae;
Myzus antirrhinii, *ornatus*, *persicae*
Myzus antirrhinii
 [*Myzus lythri*]; [*Nasononia hottesi*];
Neomyzus circumflexus

Key to aphids on *Antirrhinum*:-

1. Cauda helmet-shaped or triangular, not longer than its basal width in dorsal view, 0.5–0.9× R IV+V **2**
 – Cauda tongue-shaped, clearly longer than its basal width and longer than R IV+V
 go to key to polyphagous aphids, p. 1020; but specimens coming to *Myzus persicae* could be *M. antirrhinii*
2. SIPH pale, smooth, 0.8–2.0× cauda. Spiracular apertures rounded *Brachycaudus helichrysi*
 – SIPH imbricated, dark towards apices, 2.4–3.3× cauda. Spiracular apertures reniform *Dysaphis gallica*

Antirrhoea
A. lucida

Rubiaceae*Aphis gossypii*

Antizoma
A. capensis

Menispermaceae*Aphis gossypii*

Antrophyum
A. parvulum

Vittariaceae*Micromyzella filicis*; *Micromyzus niger*

Use key to apterae on ferns under *Polypodium*.

Apargidium* see *Microseris

Apera
A. spica-venti

Gramineae*Forda formicaria*, *marginata*;
Schizaphis phlei, *rufula*, *longicaudata*; *Tetraneura ulmi*

Use key to apterae on grasses under *Digitaria*.

***Aphananthe* see Blackman and Eastop (1994)**

Aphelandra
A. pectinata
A. squarrosa

Acanthaceae*Aphis gossypii*
Macrosiphum euphorbiae

Use key to polyphagous aphids, p. 1020.

Aphloa
A. theiformis

Flacourtiaceae*Toxoptera aurantii*

Aphyllon* see *Orobranche

Apium
A. graveolens

Umbelliferae*Aphis fabae*, *gossypii*, *helianthi*, *middletonii*, *sambuci*,
spiraecola;
Aulacorthum solani; *Brachycaudus helichrysi*;
Brachysiphoniella apiaca;
Cavariella aegopodii, *archangelicae*, *konoii*,
pastinacae, *salicicola*, *theobaldi*;
Dysaphis apiifolia, *foeniculus*, [*tulipae*];
Hyadaphis coriandri, *foeniculi*;
Macrosiphum euphorbiae, [*stellariae*], [*tenuicauda*];
Myzus ornatus, *persicae*; *Neomyzus circumflexus*;
Rhopalosiphoninus latysiphon;
Rhopalosiphum rufiabdominale; *Semiaphis heraclei*
Aphis craccivora, *spiraecola*; *Dysaphis apiifolia*;
Myzus persicae; *Semiaphis heraclei*
Pemphigus protospirae
*Semiaphis heraclei**A. leptophyllum**A. nodiflorum**A. tenuifolium*

HOST LISTS AND KEYS

Key to apterae on *Apium*:-

1. ANT PT/BASE less than 0.5. SIPH absent *Pemphigus protospirae*
- ANT PT/BASE more than 0.6. SIPH present **2**
2. ABD TERG 8 with a posteriorly projecting process above cauda **3**
- No supracaudal process **8**
3. ANT PT/BASE 0.64–1.3 **4**
- ANT PT/BASE 1.4–4.0 **5**
4. R IV+V 1.05–1.2× HT II. SIPH thick, with maximum width of swollen part more than 0.2 of length (Figure 10a) *Cavariella salicicola*
- R IV+V 0.7–0.95× HT II. SIPH with maximum width of swollen part less than 0.2 of length (Figure 10b) *Cavariella aegopodii*
5. SIPH tapering, with no trace of swelling *Cavariella theobaldi*
- SIPH swollen on distal half **6**
6. ANT PT/BASE 3.0–4.0 *Cavariella pastinacae*
- ANT PT/BASE 1.4–2.0 **7**
7. SIPH 0.98–1.1× head width across (and including) eyes, and 6.7–8.7× maximum width of swollen part (Figure 10c). Length of supracaudal process at least 1.6× maximum width of swollen part of SIPH (Figure 10f). (Al. with a complete black band on ABD TERG 6) *Cavariella archangelicae*
- SIPH 0.8–1.01 (–1.07)× head width across eyes, and 5.0–7.3× maximum width of swollen part (Figure 10d). Length of supracaudal process less than 1.5× maximum width of swollen part of SIPH. (Figure 10g) (Al. with a pair of roundish dark marks on ABD TERG 6) *Cavariella konoi*
8. Cauda short and broad, not clearly longer than its basal width in dorsal view **9**
- Cauda clearly longer than its basal width **14**
9. ANT 5-segmented, with very long hairs; the longest on ANT III are more than 3× BD III. Dorsum ornamented with a pattern of bead-like spicules *Rhopalosiphum rufiabdominale*
- ANT 6-segmented, rarely 5-segmented, with shorter hairs. Dorsal cuticle without a pattern of bead-like spicules **10**
10. Cauda broadly tongue-shaped in dorsal view, not constricted at base, with more than 10 hairs **11**
- Cauda helmet-shaped or pentagonal, constricted at base and bearing 4–6 hairs **12**
11. SIPH more than 3.5× their basal width. Large flat marginal tubercles (MTu) present on ABD TERG 2–5 as well as 1 and 7 *Aphis sambuci*
- SIPH less than 3.5× their basal width. MTu usually only on ABD TERG 1 and 7 *Aphis middletonii*
12. SIPH pale, smooth, conical, with an annular incision proximal to the flange. Spinal tubercles (STu) absent. Spiracular apertures rounded *Brachycaudus helichrysi*
- SIPH dark, imbricated, with no annular subapical incision. STu present on head and ABD TERG 8 or 7–8. Spirtacular apertures reniform **13**
13. SIPH 2.5–3.5 times longer than their basal width, and 15–25 times as long as the very short, blunt and inconspicuous hairs on front of head *Dysaphis apiifolia*
- SIPH short and broad-based, rarely more than twice as long as their basal widths, and 2.5–5.0 times as long as the long and fine hairs on front of head *Dysaphis foeniculus*
14. SIPH less than 0.55× cauda **15**
- SIPH at least 0.6× cauda **16**

15. SIPH very small and flangeless, with aperture slanted towards midline. Cauda tongue-shaped, with 5–7 hairs
Semiaphis heraclei
– SIPH as short black truncate cones. Cauda long, black and finger-like, with a midway constriction, and bearing 14–15 hairs
*Brachysiphoniella apiaca**
16. SIPH black, tapering from base to flange **17**
– SIPH pale or dusky and tapering or clavate, or black and clavate **20**
17. ANT III 0.25–0.63 mm long, 1.0–2.0× PT and 2.0–5.0× R IV+V. ABD TERG 8 with 2–11 hairs, HT I with 3 hairs. (ANT III of al. with 15–40 rhinaria) *Aphis helianthi*
– ANT III 0.12–0.36 mm long, usually 0.65–1.0× PT, but up to 1.3× in small specimens (i.e., those with PT less than 0.27 mm long), and 1.3–3.0× R IV+V (1.3–2.6× R IV+V except in large specimens). ABD TERG 8 with 2–7 hairs, HT I with only 2 hairs. (ANT III of al. with 3–23, but rarely more than 15, rhinaria) **18**
18. ANT III 0.9–1.2× cauda, which is black, slightly constricted about its midlength, and bears 6–15 (usually 9–11) hairs. Dorsal abdomen without any dark markings *Aphis spiraeicola*
– ANT III 1.2–1.9× cauda, which is pale or dark and usually has less than 9 or more than 11 hairs. Dorsal abdomen with or without dark markings **19**
19. Dorsal abdomen with dark markings. Cauda black and bearing 11–24 hairs. Femora with many long hairs *Aphis fabae*
– Dorsal abdomen without dark markings. Cauda pale or dusky, bearing 4–7 hairs. Femoral hairs mostly short *Aphis gossypii*
20. SIPH 0.6–1.4× cauda, cylindrical over most of length and slightly swollen distally, with a constriction proximal to the flange **21**
– SIPH tapering, cylindrical or clavate; if swollen distally then more than 1.5× cauda
go to key to polyphagous aphids, p. 1020
21. SIPH 0.88–1.4× cauda, 1.7–3.1× R IV+V and 3.1–5.1× longer than their minimum diameter on basal half *Hyadaphis foeniculi*
– SIPH 0.6–0.82× cauda, 0.9–1.6× R IV+V and 1.6–2.7× their minimum diameter on basal half
Hyadaphis coriandri

Apluda*A. mutica***Gramineae**

Ceratovacuna nekoashi, *perglandulosa*;
Hysteroneura setariae; *Myzus obtusirostris*;
[*Sitobion rosaeformis*]; *Tetraneura utpali*

Key to aphids on *Apluda*:-

1. Eyes 3-faceted. SIPH as pores or small cones with sclerotic rims **2**
– Eyes multifaceted. SIPH tubular **4**
2. No frontal horns. Head and prothorax not fused. SIPH as small cones. Body hairs numerous
Tetraneura utpali
– Head with a pair of frontal horns projecting forward between the antennae. Head and prothorax fused. SIPH as raised pores with sclerotised rims. Body hairs sparse **3**
3. Dorsal abdomen with large paired groups of spinal as well as marginal wax glands. Frontal horns shorter than ANT I
Ceratovacuna perglandulosa
– Dorsal abdomen with only marginal wax gland groups. Frontal horns longer than ANT I
Ceratovacuna nekoashi

HOST LISTS AND KEYS

4. Dorsum with a dark shield extending over the whole of ABD TERG 1–7. Femora pale, cauda brownish *Myzus obtusirostris*
 – Dorsum unpigmented. Femora dark, cauda very pale *Hysteroneura setariae*

(If this key does not provide a satisfactory answer, try the general key to apterae of grass-feeding aphids under *Digitaria*.)

Apocynum

A. androsaemifolium

A. cannabinum (incl. *pubescens*)

A. lancifolium

A. scabrum

A. sibiricum

A. venetum

Apocynum sp.

Apocynaceae

Abstrusomyzus phloxae;

Aphis asclepiadis, fabae, helianthi, middletonii, nerii, spiraecola;

Aulacorthum solani; *Macrosiphum euphorbiae*;

Myzus ornatus, persicae;

Rhopalosiphoninus staphyleae

Aphis asclepiadis, fabae, nerii, spiraecola;

Macrosiphum euphorbiae; *Myzus persicae*

Aphis apocynicola

Aphis apocynicola

Aphis asclepiadis

Aphis apocynicola, poacyni, sywangi

Paulianaphis madagascariensis; *Toxoptera aurantii*

Key to aphids on *Apocynum*:-

1. ABD TERG 7 with four long, pointed, pigmented hair-bearing processes. ANT PT/BASE 0.66–0.81 *Paulianaphis madagascariensis*
 – No long, pointed, pigmented abdominal processes. ANT PT/BASE more than 1 **2**
2. ANT tubercles well developed. ABD TERG 1 and 7 without marginal tubercles (MTu). SIPH mainly pale or dusky go to key to polyphagous aphids, p. 1020, starting at couplet 1020
 – ANT tubercles weakly developed, not or hardly projecting forward beyond middle of head in dorsal view. ABD TERG 1 and 7 with MTu. SIPH entirely dark **3**
3. Stridulatory apparatus present (sclerotic ridges on ABD sternites 5 and 6 and a row of short, peg-like hairs on each hind tibia) *Toxoptera aurantii*
 – No stridulatory apparatus **4**
4. ANT III with 1–6 and IV with 0–2 rhinaria. SIPH 0.7–0.9× R IV+V. ANT PT/BASE 1.3–1.7 *Aphis middletonii* group
 – ANT III and IV normally without rhinaria. SIPH 1.0–3.9× R IV+V. ANT PT/BASE 1.35–4.7 **5**
5. Hind tibia mainly pale, with length of longest hairs on middle part only about 0.7 of width of tibia at midlength **6**
 – Hind tibia pale or dark, with length of longest hairs on middle part equal to or greater than its width at midlength or, if a little shorter, then hind tibia is mainly dark **8**
6. R IV+V 1.2–1.5× HT II. Cauda with 16–22 hairs. ABD TERG 8 with c.6 hairs *Aphis sywangi*
 – R IV+V 0.8–1.1× HT II. Cauda with 6–13 hairs. ABD TERG 8 with 2 (–4) hairs **7**
7. Cauda with 8–13 hairs. R IV+V 0.83–0.95× HT II *Aphis apocynicola*
 – Cauda with 5–6 hairs. R IV+V 0.9–1.1× HT II *Aphis poacyni*

8. Hind tibiae mainly dark. ANT PT/BASE 3.4–4.7. R IV+V 1.25–1.6× HT II. SIPH 1.7–2.7× cauda
Aphis nerii
- Hind tibiae pale for more than half of length. ANT PT/BASE 1.4–3.5. R IV+V 0.85–1.24× HT II. SIPH 0.7–1.8× cauda **9**
9. ABD TERG 8 with 2 hairs (rarely with 3). ANT III 0.65–1.0× SIPH. Dorsal abdomen without any dark markings. Cauda with a slight constriction
Aphis spiraecola
- ABD TERG 8 with 2–11 hairs (usually 4–6). ANT III 0.95–1.9× SIPH. Dorsal abdomen with or without dark markings. Cauda without any constriction **10**
10. ANT III 0.65–1.01× PT, 1.1–1.6× cauda and 0.95–1.35× SIPH. Dorsal abdomen usually with some dark markings anterior to SIPH (in addition to dark intersegmental muscle sclerites) *Aphis fabae*
- ANT III 1.05–1.95× PT, 1.55–2.2× cauda and 1.25–1.9× SIPH. Dorsal abdomen usually without any dark markings anterior to SIPH (except for dark intersegmental muscle sclerites) **11**
11. Hairs on ANT III and anterior abdominal tergites finely pointed like those on outside of hind tibia and on ABD TERG 6–8. Longest hair on ANT III is 36–56µm, 1.6–2.2× BD III. Longest hair on ABD TERG 3 is 44–70µm, 1.8–2.8× ANT BD III
Aphis asclepiadis
- Hairs on ANT III and anterior abdominal tergites shorter and more abruptly pointed than those on hind tibia and ABD TERG 6–8. Longest hair on ANT III is 11–35µm, 0.5–1.5× BD III. Longest hair on ABD TERG 3 is 15–51µm, 0.6–2.1× ANT BD III
Aphis helianthi

Aponogeton

- A. distachys*
A. monocharia

Aponogetonaceae

- Rhopalosiphum nymphaeae*
Rhopalosiphum nymphaeae

Aporosa

- A. dioica*
A. frutescens

Euphorbiaceae

- Greenidea (Trichosiphum)* sp. (Hong Kong; BMNH colln, leg. J.H. Martin)
Toxoptera aurantii

Key to apterae on *Aporosa*:-

- SIPH widest near middle and bearing many spine-like hairs. No stridulatory apparatus
Greenidea (Trichosiphum) sp. (Hong Kong; BMNH colln, leg. J.H. Martin)
- SIPH tapering from base to apex and without hairs. Stridulatory apparatus present
Toxoptera aurantii

Aquilegia

- A. alpina*
A. caerulea
- A. canadensis*
- A. chrysantha*
A. coerulea
A. dichroa
A. flabellata (incl. var. *nana*)

Columbine

- Nasonovia aquilegiae*, *werderi*
Aualcorthum solani; *Nasonovia aquilegiae*;
Rhopalosiphoninus staphyleae
Aphis spiraecola; *Aualcorthum solani*;
Longicaudus trirhodus; *Myzus persicae*;
Nasonovia aquilegiae; *Neomyzus circumflexus*
Nasonovia aquilegiae
Longicaudus trirhodus
Longicaudus trirhodus
Longicaudus trirhodus

Ranunculaceae

HOST LISTS AND KEYS

A. flavescens
A. formosa (incl. var. *truncata*)

A. glandulosa
A. karelini
A. longissima
A. micrantha (incl. *rubicunda*)
A. olympica
A. pubiflora
A. rubicunda see *micrantha*.
A. viridiflora
A. vulgaris (incl. var. *alba*)

Neomyzus circumflexus
Illinoia corylina; *Megourina lagacei*;
Nasonovia aquilegiae
Nasonovia heiei
Nasonovia heiei
Longicaudus trirhodus; *Myzus persicae*
Nasonovia aquilegiae
Myzus ornatus
Longicaudus naumanni
Nasonovia aquilegiae
Longicaudus trirhodus
Aphis fabae, *gossypii*; *Aulacorthum solani*;
Longicaudus trirhodus; *Macrosiphum euphorbiae*;
Myzus ascalonicus, *persicae*; *Neomyzus circumflexus*
[*Nasonovia purpurascens*]

Aquilegia sp.

Key to aphids on *Aquilegia*:-

1. SIPH entirely black and moderately clavate; swollen to about 1.4–1.5× their minimum width. Abdominal marginal sclerites domed, each bearing 2–4 hairs 35–50µm long with slightly capitate apices (Figure 11a) *Megourina lagacei*
- SIPH if entirely black then not swollen to about 1.4–1.5× their minimum width. Abdominal marginal sclerites not domed, and not bearing capitate hairs **2**
2. SIPH slightly swollen on distal half, but with a narrower, reticulated subapical section (a few large closed polygonal cells). R IV+V 1.3–1.5× HT II and bearing 14–16 accessory hairs. First tarsal segments with 5 hairs *Illinoia corylina*

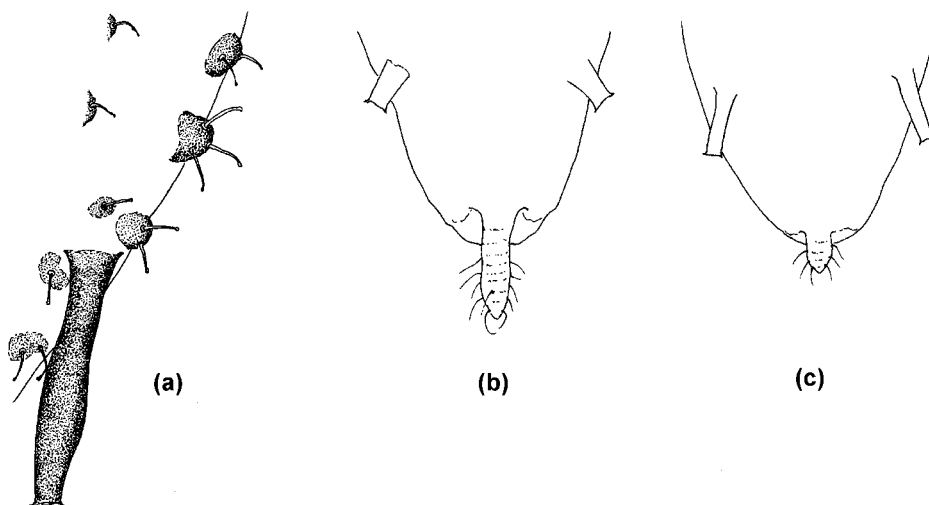


Figure 11 Apteræ on *Aquilegia*. (a) marginal sclerites on ABD TERG 3–5 and SIPH of *Megourina lagacei*, (b) end of abdomen of *Longicaudus trirhodus*, (c) same for *L. naumanni*.

- SIPH with or without swelling on distal half, but **if** with subapical reticulation **then** R IV+V is relatively much shorter and bears fewer hairs, and first tarsal segments have 3 hairs 3
- 3. ANT III distinctly longer than ANT IV+V together. First tarsal segments with 5–6 hairs (1–2 median sense pegs and 2 pairs of longer, lateral hairs). ANT PT/BASE 1.0–2.3 4
- ANT III shorter than ANT IV+V together. First tarsal segments with 2–4 hairs (usually 0–1 median sense pegs and 1 pair of laterals). ANT PT/BASE 1.8–6.5 5
- 4. SIPH very short, conical, 0.25–0.3× cauda which is very long and finger-like and bears 14–20 hairs (Figure 11b). ANT PT/BASE 1.0–1.3 *Longicaudus trirhodus*
- SIPH cylindrical, 1.24–1.71× cauda which is tongue-shaped with a pointed apex and bears 6–13 hairs (Figure 11c). ANT PT/BASE 1.7–2.3 *Longicaudus naumanni*
- 5. ANT III with 6–37 rhinaria, and SIPH without any subapical polygonal reticulation. R IV with 13–23 accessory hairs 6
- ANT III usually with 0–4 rhinaria near base; if with up to 10 rhinaria then SIPH have subapical polygonal reticulation. R IV with 4–10 accessory hairs go to key to polyphagous aphids, p. 1020
- 6. R IV+V 0.9–1.0× HT II. SIPH 2.5–3.4× cauda. Dorsal body surface almost wholly sclerotised *Nasonovia heiei*
- R IV+V 1.2–2.2× HT II. SIPH 1.1–2.1× cauda. Dorsal body with variable dark sclerotisation, sometimes extensive on dorsal abdomen, but not on head and thorax (except in alatifform apterae) 7
- 7. SIPH 0.19–0.22× BL. Dorsal sclerotic pattern consisting of pairs of pale brown spinal, pleural and marginal spots on each segment. Antennae and femora mainly dark brown *Nasonovia werderi*
- SIPH 0.11–0.17× BL. Dorsal sclerotisation very variable but never as separate paired spots; sometimes consisting of a black shield covering ABD TERG 2–5 (or 2–6). Antennae and femora mainly pale *Nasonovia aquilegiae*

Arabidopsis=*Arabis*

Arabis (incl. *Arabidopsis*, *Cardaminopsis* and *Turritis*) Cruciferae

<i>A. alba</i>	<i>[Dysaphis pyri]</i> ; <i>Lipamyzodes matthiolae</i> ; <i>Macrosiphum euphorbiae</i>
<i>A. alpina</i>	<i>Pseudobrevicoryne leclanti</i>
<i>A. arcuata</i>	[aphid gall: Wahlgren, 1956a, p.33]
<i>A. arenosa</i>	<i>Lipaphis erysimi</i> ; <i>Myzus ascalonicus</i>
<i>A. blepharophylla</i>	<i>Pemphigus populitransversus</i>
<i>A. canadensis</i>	[<i>Aphis arabismollis</i> Rafinesque, 1818 invalid name]
<i>A. carduachorum</i>	<i>Myzus ascalonicus</i> , <i>ornatus</i>
<i>A. caucasica</i>	<i>Lipamyzodes matthiolae</i> ; <i>Myzus ascalonicus</i> , <i>ornatus</i> ; <i>Tauricaphis arabisi</i>
<i>A. ciliata</i>	[aphid gall: Wahlgren 1956a, p.33]
<i>A. drummondii</i>	<i>Aphis gossypii</i>
<i>A. glabra</i>	<i>Brevicoryne brassicae</i> ; <i>Lipaphis turritella</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Pemphigus populitransversus</i>
<i>A. halleri</i>	<i>Aphis solanella</i>
<i>A. hirsuta</i>	[<i>Aphis spiraephaga</i>]; <i>Lipaphis rossi</i> ; [aphid gall: Wahlgren 1956a, p.33]; <i>Myzus persicae</i>
<i>A. hypogaea</i>	<i>Neomyzus circumflexus</i>

HOST LISTS AND KEYS

<i>A. laevigata</i>	<i>Pemphigus populitransversus</i>
<i>A. mollis</i>	[<i>Aphis arabismollis</i> Rafinesque, 1818 invalid name]
<i>A. ovirensis</i>	[aphid gall: Wahlgren, 1956a, p.33]
<i>A. pendula</i>	<i>Aphis fabae</i>
<i>A. sagittata</i>	<i>Aphis fabae</i> ; [aphid gall: Wahlgren 1956a, p.33]
<i>A. subcrenata</i>	<i>Macrosiphum euphorbiae</i>
<i>A. thaliana</i>	<i>Aphis gossypii</i> ; <i>Brevicoryne brassicae</i> ;
	<i>Lipaphis erysimi</i> , <i>rossi</i> ; <i>Myzus ornatus</i> , <i>persicae</i>
<i>A. verna</i>	<i>Myzus ascalonicus</i>
<i>Arabis</i> spp.	<i>Myzus cymbalariae</i> , <i>persicae</i> ; <i>Neomyzus circumflexus</i>

Key to aphids on *Arabis*:-

1. ANT PT/BASE less than 0.5. SIPH absent. Abdomen with wax glands on ABD TERG 3–7 (usually 4 glands on each of ABD TERG 3–6 and 2 on 7) *Pemphigus populitransversus*
- ANT PT/BASE more than 0.5. SIPH present, tubular. Abdomen without wax glands **2**
2. Dorsal hairs with fan-shaped apices, and mostly arising from tubercular bases *Tauricaphis arabisi*
- Dorsal hairs with pointed, blunt or slightly expanded apices, without tubercular bases **3**
3. R IV+V 1.5–2.2× SIPH. SIPH 0.035–0.057× BL and 0.6–0.8× cauda. R IV+V 1.1–1.5× HT II *Pseudobrevicoryne leclanti*
- R IV+V 0.15–1.2× SIPH. SIPH 0.052–0.4× BL and 0.7–2.4× cauda (if less than 1.0× cauda then R IV+V 0.55–0.75× HT II) **4**
4. ANT III 2.1–3.7× the short and somewhat barrel-shaped SIPH. Cauda broadly triangular, not longer than its basal width. ANT tubercles undeveloped. Dorsal abdomen with dark markings *Brevicoryne brassicae*
- ANT III 0.8–2.0× SIPH, which are not barrel-shaped. Cauda tongue-shaped or triangular, longer than its basal width. ANT tubercles variably developed, and dorsal abdomen with or without dark markings **5**
5. Ventral surfaces of femora scabrous or heavily imbricated. ANT tubercles variably developed, with inner faces divergent; if well developed then the median frontal tubercle is also well developed **6**
- Ventral surfaces of femora smooth or weakly imbricated or, if scabrous or heavily imbricated, then the ANT tubercles are well developed and converge apically, and the median frontal tubercle is undeveloped go to key to polyphagous aphids, p. 1020
6. ANT tubercles and median frontal tubercle weakly developed. Dorsum with broad dark bands on all tergites. SIPH and cauda very dark **7**
- ANT tubercles and median frontal tubercle moderately to well developed. Dorsum without dark bands or with dark bars only on ABD TERG VII and VIII. SIPH pale or dusky with dark apices, cauda pale or dark **8**
7. R IV+V 0.10–0.13 mm long *Lipaphis rossi*
- R IV+V 0.135–0.16 mm long *Lipaphis turritella*
8. ANT uniformly dusky or dark except for basal part of ANT III. ANT PT/BASE 1.8–2.7. R IV+V 0.6–0.9× HT II. Dorsal cuticle roughened. Cauda dusky or dark, 0.6–0.9× SIPH and 1.2–1.9× R IV+V *Lipaphis erysimi*
- ANT pale except for much darker apex of ANT V and whole of VI. ANT PT/BASE 2.7–3.5. R IV+V 1.1–1.4× HT II. Dorsal cuticle smooth. Cauda pale, 0.4–0.6× SIPH and 0.6–1.3× R IV+V *Lipamyzodes matthiolae*

Arachis*A. hypogea***Leguminosae***Acyrtosiphon ilka*; *Aphis craccivora*, *gossypii*, *nasturtii*;
Myzus persicae; *Prociphilus erigeronensis*Key to apterae on *Arachis*:-

- ANT tubercles well-developed, with inner faces smooth and divergent. SIPH long, thin and pale, without any subapical polygonal reticulation *Acyrtosiphon ilka*
- Without this combination of characters; if ANT tubercles are well developed and have smooth, divergent inner faces then SIPH have subapical polygonal reticulation for 0.1–0.2 of length
go to key to polyphagous aphids, p. 1020

Aralia

A. chinensis
A. continentalis
A. cordata

A. elata

A. hispida

A. nudicaulis
A. racemosa
A. sieboldii
A. spinosa
A. thomsonii
Aralia spp.

Sarsaparillas

Cavariella araliae
Cavariella araliae
Aphis acanthopanaci, fabae; *Cavariella araliae*;
Myzus ornatus
Aphis fabae; *Aulacorthum solani*; *Cavariella araliae*;
Myzus persicae; *Rhopalosiphoninus staphyleae*;
Toxoptera odinae
Aphis [*araliahispida* Rafinesque, 1818 invalid name],
fabae; *Aulacorthum solani*
Aphis araliaeradictis
Aphis spiraeicola
Neomyzus circumflexus
Cavariella araliae
[*Capitophorus similis*]; *Cavariella araliae*
Aphis gossypii, hederiae; *Toxoptera aurantii*

AraliaceaeKey to aphids on *Aralia*:-

1. ABD TERG 8 with a long backwardly-directed process, broad at base but with a narrow apex that extends beyond cauda *Cavariella araliae*
 - No supracaudal process **2**
2. ANT tubercles well developed. Either head spiculate or SIPH with subapical polygonal reticulation. ABD TERG 1 and 7 without marginal tubercles (MTu)
 - go to key to polyphagous aphids, p. 1020, starting at couplet 5)
 - ANT tubercles weakly developed, not projecting beyond middle part of head in dorsal view. Head without spicules. SIPH without polygonal reticulation. MTu present on ABD TERG 1 and 7 **3**
3. Stridulatory apparatus present (cuticular ridges ventrolaterally on abdominal segments 5–6, and a row of peg-like hairs on hind tibia) **4**
 - No stridulatory apparatus **5**
4. SIPH much shorter than (0.4–0.6×) cauda. ANT PT/BASE 2.5–3.0 *Toxoptera odinae*
 - SIPH 0.9–1.5× cauda. ANT PT/BASE 3.5–5.0 *Toxoptera aurantii*
5. Antennae 5-segmented, with ANT PT/BASE more than 4. ANT III with 0–5 small secondary rhinaria on distal part. (Alata with radial sector often missing from forewing?) *Aphis araliaeradictis*
 - Antennae 6-segmented, with ANT PT/BASE less than 4. ANT III without secondary rhinaria except in alatform individuals. (Alata with radial sector present in forewing.) **6**

HOST LISTS AND KEYS

6. Cauda pale or dusky, clearly paler than SIPH. Hairs on hind femur all shorter than diameter of femur at its base *Aphis gossypii*
 – Cauda as black as SIPH. At least some of hairs on hind femur longer than diameter of femur at its base 7
7. ABD TERG 7 and 8 with dark transverse bars, and sometimes there are scattered dark markings also on more anterior tergites 8
 – No dark dorsal abdominal markings 9
8. R IV+V 1.3–1.6× HT II. Apteræ often alatiform, with 0–19 rhinaria on ANT III. Marginal tubercles (MTu) frequently present on ABD TERG 2–4 *Aphis hederæ*
 – R IV+V 0.9–1.1× HT II. Apteræ without rhinaria on ANT III. MTu infrequent on ABD TERG 2–4 *Aphis fabæ*
9. R IV+V 1.3–1.4× HT II. SIPH 1.7–2.0× cauda. MTu frequently present on ABD TERG 2–4 *Aphis acanthopanaci*
 – R IV+V 1.0–1.25× HT II. SIPH 0.9–1.7× cauda. MTu rare on ABD TERG 2–4 *Aphis spiræcola*

Araujia (incl. *Physianthus*)

A. albens
A. hortorum
A. sericifera

Aphis nerii
Aphis gossypii
Aphis gossypii, nerii; Myzus persicae

Asclepiadaceae

Use key to polyphagous aphids, p. 1020.

Arbutus see Blackman and Eastop (1994)

Archangelica see *Angelica*

Arctium

A. lappa

A. leiospermum

A. majus

A. minus

A. officinale

A. tomentosum

Burdocks

Aphis fabae, gossypii, middletonii, solanella;
Aulacorthum cirsiicola, solani;
Brachycaudus cardui, helichrysi; Capitophorus elaeagni;
Dysaphis lappae, narzikulovi;
Macrosiphoniella grandicauda;
Macrosiphum euphorbiae; Myzus ornatus, persicae;
Protrama radialis; Trama troglodytes;
Uroleucon gobonis, [sonchi]
Dysaphis lappae, narzikulovi
Aphis fabae ssp. mordvilkoii, gossypii;
Capitophorus elaeagni;
Dysaphis cousiniae, [cousiniae ssp. minor]; Myzus persicae
Aphis fabae, fabae ssp. mordvilkoii, nasturtii, solanella;
Aulacorthum solani; Brachycaudus cardui, helichrysi;
Dysaphis lappae; Uroleucon cirsiicola
Aphis fabae
Aphis arctiumi, fabae, fabae ssp. mordvilkoii,
shaposhnikovii, tomentosi;
Brachycaudus cardui; Dysaphis lappae;
Protrama radialis; Uroleucon gobonis

Compositae

Arctium spp.

Brachycaudus lateralis;
 [*Nasonovia compositellae* ssp. *nigra*];
Smynthuroides betae

Key to aphids on *Arctium*:-

1. ANT/PT BASE less than 0.5. Body and appendages densely hairy 2
 – ANT PT/BASE more than 1. Body and appendages not densely hairy 4
2. Hind tarsi of normal length. Antennae 5-segmented, with ANT II much longer than ANT I, similar in length to ANT III *Smynthuroides betae*
 – Hind tarsi very elongate, more than 0.5× hind tibiae. Antennae 6-segmented, with ANT II about as long as ANT I, much shorter than ANT III 3
3. SIPH completely absent *Trama troglodytes*
 – SIPH present as pores on small, pigmented cones *Protrama radialis*
4. ANT tubercles absent or weakly developed, not projecting forward beyond middle of head in dorsal view 5
 – ANT tubercles well developed, projecting forward beyond middle of head, with inner faces convergent, divergent or parallel in dorsal view 20
5. Cauda helmet-shaped, shorter than its basal width in dorsal view. If ABD TERG 1 and 7 have marginal tubercles (MTu) then these are flat and similar to those also present on ABD TERG 2–5. Spinal (STu) sometimes also present 6
 – Cauda finger-shaped or bluntly conical, as long as or longer than its basal width. ABD TERG 1 and 7 with dome-shaped or papilliform MTu, usually larger than any that may be present on ABD TERG 2–5. No STu 11
6. ABD TERG 1–5 (–7) with large MTu, and paired STu usually also present, at least on ABD TERG 7 and 8. Spiracular apertures reniform 7
 – MTu and STu infrequently present. Spiracular apertures rounded 9
7. Longest hairs on ANT III 0.3–0.6× BD III. Dorsal cephalic and dorsal abdominal hairs similarly short *Dysaphis lappae*
 – Longest hairs on ANT III at least 0.8× BD III, and dorsal body hairs mostly longer than this diameter 8
8. Paired lateral, spinal, and often also pleural, tubercles present on most tergites. Marginal tubercles (MTu) very large and sometimes subdivided. R IV+V longer than ANT III *Dysaphis narzikulovi*
 – Spinal tubercles (STu) usually on head and ABD TERG 7 and 8, rarely on other segments. MTu variable in size, never subdivided. R IV+V much shorter than ANT III *Dysaphis cousiniae*
9. SIPH pale, 0.9–1.5× cauda. Dorsal abdomen pale. Mesosternum without mammariform processes *Brachycaudus helichrysi*
 – SIPH dark, 2.1–3.4× cauda. Dorsal abdomen with an extensive dark sclerotic shield. Mesosternum with a pair of dark mammariform processes 10
10. Hairs on ABD TERG 8 are 30–61 µm long. Longest hairs on hind femur 10–25 µm long *Brachycaudus lateralis*
 – Hairs on ABD TERG 8 are at least 70 µm long. Longest hairs on hind femur more than 25 µm long *Brachycaudus cardui*

HOST LISTS AND KEYS

11. Cauda bluntly conical, about as long as its basal width and shorter than R IV+V **12**
 – Cauda conical or finger-shaped, longer than its basal width and longer than R V+V **14**
12. SIPH cylindrical, narrow-based, about 2× cauda. ANT PT/BASE about 2. Large MTu present on ABD TERG 2–5 as well as 1 and 7 *Aphis arctiumi*
 – SIPH short, tapering and broad based, similar in length to cauda. ANT PT/BASE 0.8–2.4. MTu absent or only sporadically present on ABD TERG 2–5 **13**
13. ANT PT/BASE 1.5–2.4. Cauda as dark as SIPH *Aphis middletonii*
 – ANT PT/BASE 0.8–1.1. Cauda paler than SIPH *Aphis anuraphoides*
14. SIPH pale with dark apices, or uniformly dusky, but never dark. Cauda with 4–11 hairs *Aphis nasturtii*
 – SIPH uniformly blackish. Cauda with 4–27 hairs **15**
15. Cauda pale or dusky, clearly paler than SIPH, and bearing 4–8 hairs *Aphis gossypii*
 – Cauda dark like SIPH, and bearing 11–27 hairs **16**
16. ANT PT/BASE 1.7–3.5, but rarely less than 2.0. MTu absent or sporadically present on ABD TERG 2–4, rarely well-developed **17**
 – ANT PT/BASE 1.5–2.0. MTu present and well-developed on ABD TERG 2–4 (–5) as well as 1 and 7 **19**
17. Longest hair on ANT III 15–25µm, longest hair on hind femur 45–70µm. SIPH 1.3–1.8× cauda and 0.14–0.20× BL. ANT PT/BASE 2.9–3.4 *Aphis solanella*
 – Longest hair on ANT III 35–50µm, longest hair on hind femur 60–85µm. SIPH 0.8–1.6× cauda and 0.09–0.17× BL. ANT PT/BASE 2.4–3.4 **18**
18. Length of rostrum (from base of protractor apodeme) 0.69–0.79mm. R IV+V (0.9–)1.0–1.4× HT II *Aphis fabae* ssp. *mordvilkoii*
 – Length of rostrum 0.44–0.62mm. R IV+V 0.85–1.05× HT II *Aphis fabae* s.str.
19. R IV+V 1.55–1.7× HT II *Aphis shaposhnikovii*
 – R IV+V shorter than (about 0.85×) HT II *Aphis tomenthosi*
20. Dorsal hairs thick and distinctly capitate, arising from tuberculate bases. SIPH long, pale and slender, 2.6–3.2× cauda. ANT PT/BASE 6.0–9.2. ANT III without rhinaria *Capitophorus elaeagni*
 – Dorsal hairs pointed, blunt or if slightly capitate then thin and not arising from tuberculate bases. SIPH pale or dark, 1.5–2.7× cauda. **If** ANT III without rhinaria **then** ANT/PT BASE 1.75–4.5 **21**
21. Inner faces of ANT tubercles convergent in dorsal view. ANT III without rhinaria **22**
 – Inner faces of ANT tubercles parallel or divergent in dorsal view. ANT III with at least 1 rhinarium near base of ANT III, and sometimes many more **23**
22. SIPH slightly clavate. ANT PT/BASE 3.0–4.5. Dorsal abdomen without dark intersegmental markings. Immatures with smooth hind tibiae *Myzus persicae*
 – SIPH tapering with a slight ‘S’-curve. ANT PT/BASE 1.75–2.8. Dorsal abdomen with a pattern of dark intersegmental markings. Immatures with spinulose hind tibiae *Myzus ornatus*
23. Inner faces of ANT tubercles parallel or almost parallel in dorsal view. ANT hairs very short and blunt, the longest hair on ANT III less than 0.5× BD III. SIPH without any subapical polygonal reticulation **24**
 – Inner faces of ANT tubercles clearly divergent in dorsal view. Longest hair on ANT III more than 0.5× BDIII. SIPH with a distal zone of polygonal reticulation **25**

24. BL 1.5–3.0mm. Dorsal cuticle of head spinulose. ANT III with 1–2 rhinaria near base
Aulacorthum solani
- BL 3.0–3.8mm. Dorsal cuticle of head smooth. ANT III with 4–8 rhinaria on basal half
Aulacorthum cirsicola
25. SIPH mainly or wholly pale with polygonal reticulation on distal 0.13–0.20
Macrosiphum euphorbiae
- SIPH mainly or wholly dark with polygonal reticulation extending over distal 0.2–0.5 **26**
26. SIPH thinnest in middle and flared apically, with reticulation extending over about distal 0.5; altogether much thinner than cauda. ANT III with 2–5 rhinaria near base. R IV+V 0.7–0.9× HT II, stiletto-shaped (concave-sided) with very long accessory hairs
Macrosiphoniella grandicauda
- SIPH tapering or cylindrical on distal half and reticulated over distal 0.2–0.3; about as thick as cauda. ANT III with 18–48 rhinaria extending over most of segment. R IV+V 1.0–1.8× HT II **27**
27. Cauda paler than SIPH and bearing 30–45 hairs
Uroleucon cirsicola
- Cauda dark and bearing 11–18 hairs
Uroleucon gobonis

Arctostaphylos

- A. alpina*
A. arguta
A. cabescens
A. columbiana

A. densiflora
A. glauca
A. manzanita
A. mariposa
A. nevadensis
A. patula
A. pumila
A. stanfordiana
A. tomentosa
A. uva-ursi Bearberry

- A. viscida*
Arctostaphylos spp.

Ericaceae

- Wahlgreniella vaccinii*
Aphis gossypii
Tamalia coweni
Tamalia sp. (USA, BMNH colln, leg. D. Hille Ris Lambers);
Wahlgreniella nervata
Wahlgreniella nervata
Tamalia coweni, inquilinus
Tamalia coweni; Wahlgreniella nervata
Tamalia coweni, inquilinus
Macrosiphum euphorbiae; Tamalia coweni
Tamalia coweni, inquilinus; Wahlgreniella nervata
Tamalia coweni; Wahlgreniella nervata
Wahlgreniella nervata
Tamalia coweni
Aphis fabae, uvaeursi, vaccinii; Aulacorthum solani;
Brachycaudus helichrysi; Ericaphis fimbriata, [scammelli];
Myzus ascalonicus, ornatus; Neomyzus circumflexus;
Rhopalosiphoninus staphyleae; Tamalia coweni;
Wahlgreniella nervata, ossiannilssoni, vaccinii
Tamalia coweni, inquilinus
Tamalia dicksoni, keltoni

Key to aphids on *Arctostaphylos*:-

1. ANT 4- to 6-segmented with PT/BASE much less than 1. Eyes 3-faceted. SIPH absent or as pores on small cones. (In leaf galls) **2**
- ANT 6-segmented with PT/BASE more than 2. Eyes multifaceted. SIPH tubular **6**
2. R IV+V 0.16–0.20mm long, 1.8–2.1× HT II, and bearing 18–39 accessory hairs **3**
- R IV+V 0.063–0.10mm long, 0.9–1.5× HT II, and bearing 4–13 accessory hairs **4**

HOST LISTS AND KEYS

3. First tarsal segments with 4 hairs. Dorsal spicules large, 10–19 µm long. Tergum rather uniformly dark sclerotic *Tamalia dicksoni*
 – First tarsal segments with 2 hairs. Dorsal spicules small, 2–5 µm long. Tergum with dark cross-bands
Tamalia sp. on *A. columbiana* (Oregon, USA; BMNH, coll. Gutierrez & Lagace, leg. D. Hille Ris Lambers)
4. ANT 5-segmented. Tergum entirely sclerotic, dusky-dark. Hairs on ABD TERG 3 are 4.1–6.3× ANT BD III *Tamalia inquilinus**
 – ANT usually 4-segmented. Tergum unsclerotised or with dark cross-bands. Hairs on ABD TERG 3 are 2.6–4.0× ANT BD III **5**
5. Dorsal abdomen usually with dark cross-bands, sometimes fragmented. Antennae and dorsal body surface ornamented with numerous small spicules *Tamalia coweni*
 – Dorsal abdomen without dark markings, and spiculose ornamentation restricted to posterior part of head and posterior margins of thoracic and abdominal tergites *Tamalia keltoni**
6. Cauda helmet-shaped, not longer than basal width in dorsal view. SIPH tapering strongly, with a marked subapical annular incision. Spiracular apertures wide open, rounded *Brachycaudus helichrysi*
 – Cauda tongue- or finger-like, or triangular, longer than its basal width. SIPH tapering weakly or swollen on distal half, without a marked subapical annular incision. Spiracular apertures partially occluded, reniform **7**
7. ANT tubercles weakly developed, not projecting forward beyond middle of head in dorsal view. ABD TERG 1 and 7 always with marginal tubercles (MTu). SIPH black, tapering or cylindrical on distal half **8**
 – ANT tubercles well developed. MTu rarely on ABD TERG 1 and 7. SIPH pale and/or swollen on distal half **11**
8. Cauda pale or dusky, evidently paler than SIPH, and bearing 4–7(–8) hairs *Aphis gossypii*
 – Cauda black like SIPH, and bearing 8–25 hairs **9**
9. Dorsal abdomen with an extensive dark shield covering most of ABD TERG 1–6. ANT III with 0–14 rhinaria, and VI with 0–2 rhinaria. Longest hairs on ANT III 0.5–0.8× BD III *Aphis uvaeursi*
 – Dorsal abdomen with variable dark markings, and sometimes with transverse bars, but never with an almost entire shield. ANT III and IV without rhinaria (except in alatiform specimens). Longest hairs on ANT III 0.8–2.4× BD III **10**
10. BL 1.6–2.0 mm. ANT III 9–18× longest hair (18–27 µm) upon it, which is never longer than ANT BD III. Lateral hairs on ABD TERG 2–4 are 19–37 µm long, about as long as the distance between their bases *Aphis vaccinii*
 – BL usually more than 2 mm, if less than ANT III is only 5–9× longest hair (30–65 µm) upon it, which is usually longer than BD III. Lateral hairs on ABD TERG 2–4 are 40–85 µm long, longer than the distance between their bases *Aphis fabae*
11. SIPH tapering or cylindrical on distal half, with a subapical zone of polygonal reticulation. Longest hairs on ANT III 0.6–1.0× BD III *Macrosiphum euphorbiae*
 – SIPH without subapical polygonal reticulation, cylindrical or swollen on distal half. Hairs on ANT III all very short and blunt, less than 0.4× BD III **12**
12. SIPH cylindrical. ANT PT/BASE 2.4–3.1 *Ericaphis scammelli*
 – SIPH swollen on distal half. ANT PT/BASE 3.3–6.5 **13**

13. Dorsal abdomen usually with paired dark sclerites sometimes fused into cross bars, sometimes very small. Dorsal cuticle of head densely spiculate. SIPH strongly swollen. Cauda triangular
Rhopalosiphoninus staphyleae
- Dorsal abdomen without dark markings. Cuticle of head smooth or with sparse spicules. SIPH moderately swollen. Cauda finger-like **14**
14. ANT III usually with 1–4 rhinaria on a swollen part near base. Femora with dark apices, and SIPH dark in middle and near apices
Wahlgreniella ossiannilssoni
- ANT III without rhinaria (except in alatiform specimens). Femoral apices only slightly dusky, and SIPH entirely pale/dusky or only dark at apices **15**
15. ANT tubercles with a markedly scabrous region protruding ventrally. HT II only sparsely imbricated
Wahlgreniella vaccinii
- ANT tubercles smooth or with a few spinules ventrally. HT II distinctly and evenly imbricated
Wahlgreniella nervata

Arctotheca (incl. Cryptostemma)*A. calendula**A. calendulaceum**A. nivea**A. populifolia***Compositae***Aphis craccivora, fabae, gossypii, pseudocardui;**Myzus ornatus, persicae; Uroleucon compositae, sonchi**Capitophorus elaeagni; Myzus persicae**Uroleucon compositae**Uroleucon compositae*Key to aphids on *Arctotheca*–

1. ANT PT about equal to BASE, shorter than R IV+V. SIPH very short, shorter than the bluntly triangular cauda which is a little shorter than its basal width in dorsal view
Aphis pseudocardui
- ANT PT much longer than BASE and much longer than R IV+V. SIPH much longer than cauda and much longer than basal width **2**
2. SIPH pale. ANT III without (or with 1–10) rhinaria **3**
- SIPH thick and dark with a distal zone of polygonal reticulation. ANT III with numerous rhinaria **4**
3. Dorsal hairs thick and distinctly capitate, arising from tuberculate bases. SIPH long, pale and slender, 2.6–3.2× cauda. ANT PT/BASE 6.0–9.2. ANT III without rhinaria
Capitophorus elaeagni
- Dorsal hairs pointed, blunt or if slightly capitate then thin and not arising from tuberculate bases. SIPH pale or dark, 1.5–2.7× cauda. **If** ANT III without rhinaria **then** ANT/PT BASE 1.75–4.5
go to key to polyphagous aphids, p. 1020
4. Cauda pale. R IV+V 0.7–0.9× HT II
Uroleucon sonchi
- Cauda dark. R IV+V 1.1–1.4× HT II
Uroleucon compositae

Arctotis*A. acaulis**A. breviscapa**A. calendulacea**A. decurrens**A. fastuosa**A. floribundum**A. grandiflora***African Daisies***Myzus ornatus, persicae**Uroleucon ambrosiae* group*Aphis craccivora, fabae; Myzus persicae**Brachycaudus helichrysi; Myzus persicae**Brachycaudus helichrysi; Macrosiphum euphorbiae;**Myzus persicae; Uroleucon compositae**Brachycaudus cardui**Uroleucon compositae***Compositae**

HOST LISTS AND KEYS

A. stoechadifolia (incl. var. *grandis*) *Myzus persicae*; *Uroleucon vernoniae*
Arctotis spp. *Aphis gossypii*

Key to aphids on *Arctotis*:-

1. Cauda helmet shaped, shorter than its basal width. Dorsal abdomen with an extensive solid black sclerotic shield. (Mesosternum with a pair of pigmented mammariform processes) *Brachycaudus cardui*
 – **Either** the cauda is clearly longer than its basal width **or** the dorsal abdomen has no dark shield (and there are no mesosternal mammariform processes) **2**
2. SIPH dark with an extensive distal zone of polygonal reticulation, and cauda also dark. ANT III with numerous rhinaria **3**
 – Without that combination of characters; if SIPH dark with extensive polygonal reticulation then cauda is pale go to key to polyphagous aphids, p. 1020
3. R IV+V 1.5–1.85× HT II. ANT III with 23–57 rhinaria. ANT III 1.55–1.95× ANT V (less than 1.8 in specimens with ANT III 1 mm or more long) *Uroleucon vernoniae*
 – R IV+V 1.1–1.4× HT II. ANT III with 46–82 rhinaria. ANT III 1.8–2.6× ANT V (only less than 2.0 in specimens with ANT III 1 mm or more long) *Uroleucon compositae*

Ardisia

A. sieboldii
Ardisia spp.

Myrsinaceae

Toxoptera aurantii
Aphis spiraeicola; *Myzus ornatus*;
Sinomegoura citricola, [*pyri*];
 [*Tinocalloides montanus*]

Use key to polyphagous aphids, p. 1020.

Arecastrum see *Syagrus*

Arenaria

A. peploides see *Honckenya*
A. serpyllifolia
A. trinerva

Sandworts

Myzus certus
Macrosiphum euphorbiae; *Myzus persicae*

Caryophyllaceae

Use key to aphids on *Cerastium*.

Argania

A. spicata

Sapotaceae

Aphis spiraeicola

Argemone

A. mexicana

Prickly-poppies

Aphis gossypii

Papaveraceae

Argentina see *Potentilla*

Argyranthemum

A. adaucum
A. broussonetii
A. foeniculaceum

Compositae

Macrosiphoniella tapuskae
Brachycaudus helichrysi
Acyrtosiphon ilka; *Brachycaudus helichrysi*;
Macrosiphum euphorbiae

A. frutescens

Aphis gossypii; *Brachycaudus helichrysi*;
Macrosiphoniella sanborni, oblonga, tapuskae;
Macrosiphum euphorbiae; *Myzus persicae*;
Smynthuroides betae; *Uroleucon ?compositae*

Argyranthemum sp.

Aphis fabae

Key to aphids on *Argyranthemum*:-

1. SIPH with a subapical zone of polygonal reticulation 2
 – SIPH without any subapical polygonal reticulation (or absent) 6
2. SIPH 0.65–1.45× cauda and with polygonal reticulation extending over distal 0.4 or more of length 3
 – SIPH 1.55–2.3× cauda and with polygonal reticulation only on distal 0.3 or less 4
3. BL 1.0–2.3 mm. ANT III with 8–28 rhinaria extending over its entire length. SIPH only 0.65–0.9× cauda, with reticulation on distal 0.6–0.8. ANT VI BASE 0.6–1.0× R IV+V, which is 1.0–1.3× HT II. Cauda black with 10–17 hairs 5
Macrosiphoniella sanborni
 – BL 3.0–5.1. ANT III with 3–10 rhinaria on basal half. SIPH 0.9–1.45× cauda, with reticulation on distal 0.4–0.6. ANT VI BASE 1.8–2.4× R IV+V, which is 0.65–0.8× HT II. Cauda pale with 22–33 hairs 5
Macrosiphoniella oblonga
4. SIPH wholly dark and rather thick, less than 10× their diameter at midlength, with polygonal reticulation on distal 0.25–0.30. ANT III with more than 60 rhinaria extending over most of length of segment 5
Uroleucon compositae
 – SIPH at least basally pale, and more than 10× their diameter at midlength, with polygonal reticulation on distal 0.10–0.25. ANT III with 1–27 rhinaria on basal half 5
5. SIPH darker than body for most of length and strongly flared at apices (Figure 5i). Cauda darker than basal part of SIPH. ANT III with 6–27 rhinaria 5
Macrosiphoniella tapuskae
 – SIPH paler than body for most of length and cylindrical on reticulated part, only widening at flange. Cauda as pale as basal part of SIPH. ANT III with 1–10 rhinaria 5
Macrosiphum euphorbiae
6. Head smooth, with well-developed divergent ANT tubercles. SIPH long, pale and thin, 0.25–0.34× BL 5
Acyrtosiphon ilka
 – ANT tubercles absent or weakly developed or, if well developed their inner faces are parallel or convergent, and the dorsal cuticle of the head is spiculate or scabrous. SIPH pale or dark, less than 0.25× BL 5
 go to key to polyphagous aphids, p. 1020

Argyreia

A. nervosa
A. scandens

Convolvulaceae

Aphis gossypii
Brachyunguis letsoniae

Couplet for distinguishing these two species:-

- ANT PT/BASE less than 1. SIPH shorter than cauda *Brachyunguis letsoniae*
- ANT PT/BASE more than 2. SIPH longer than cauda *Aphis gossypii*

Argyroxiphium

Argyroxiphium sp.

Compositae

Macrosiphum sp. (Raychaudhuri, 1984: 96)

Arisaema

A. amurense (var. *serratum*)

Araceae

Cavariella sapporensis

HOST LISTS AND KEYS

<i>A. atrorubens</i> (incl. <i>triphyllum</i>)	[<i>Aphis</i> sp. (Leonard, 1973: 12)]; [<i>Macrosiphum</i> sp. (Leonard, 1968: 308)]
<i>A. serratum</i>	<i>Aphis gossypii</i>
<i>A. trifolia</i>	<i>Patchiella reaumuri</i>
<i>Arisaema</i> sp.	<i>Carolinaia (Juncomyzus)</i> sp. (Vietnam, BMNH colln)

Key to apterae on *Arisaema*:-

- ANT PT/BASE much less than 1. Eyes 3-faceted. SIPH absent *Patchiella reaumuri*
– ANT PT/BASE much more than 1. Eyes multifaceted. SIPH evident, tubular **2**
- Head spiculose dorsally and ventrally, with well-developed, steep-sided ANT tubercles. ANT III with 1–2 small rhinaria near base. SIPH almost smooth, and swollen on distal 0.7
Carolinaia (Juncomyzus) sp. (Vietnam, BMNH colln)
– Without that combination of characters **3**
- Front of head convex in dorsal view, with scabrous/warty cuticle. ABD TERG 8 with a small scabrous spinal process bearing two hairs. Thorax and ABD TERG 1–3 or 1–4 with well-developed lateral tubercles. SIPH long and scabrous, c.4× cauda *Cavariella sapporoensis*
– Without that combination of characters go to key to polyphagous aphids, p. 1020

Arisarum

A. vulgare

Araceae

Aphis gossypii, *spiraecola*; *Aulacorthum solani*;
Myzus persicae

Use key to polyphagous aphids, p. 1020.

Aristida

A. adoënsis
A. adscensionis
A. congesta
A. dichotoma
A. eggertii
Aristida sp.

Gramineae

Sitobion africanum
Hysteroneura setariae; *Melanaphis sacchari*
[*Acyrtosiphon kondoi*]
Pemphigus sp.
Tetraneura fusiformis
Sitobion miscanthi

Use key to apterae of grass-feeding aphids under *Digitaria*.

Aristolochia

A. clematidis
A. durens
A. elegans
A. indica
A. punjabensis

Birth worts

Aphis fabae
Aphis fabae
Myzus persicae
Aphis gossypii; *Aulacorthum solani*
Micromyzodium filicium

Aristolochiaceae

Key to aphids on *Aristolochia*:-

- Dorsal body hairs long and thick, almost spine-like, 3–4× longer than BDIII; 4–6 per segment in paired spinal, marginal and pleural rows; contrasting with minute hairs on ANT III–VI
Micromyzodium filicium
- Dorsal body hairs not of this size and arrangement, and not contrasting in size to hairs on ANT III–VI
go to key to polyphagous aphids, p. 1020

Aristotelia*A. maqui***Elaeocarpaceae***Aulacorthum solani***Armeria***Armeria* sp. (?*maritima*)**Plumbaginaceae***Neosappaphis franzi***Armoracia***A. rusticana* (= *lapathifolia*)**Cruciferae***Aphis gossypii*, *middletonii* group (*armoraciae*);*Brevicoryne brassicae*, *jiayuguanensis*;*Macrosiphum euphorbiae*; *Myzus persicae*;*Pemphigus* sp. (as *lactucae*);*Rhopalosiphoninus latysiphon*Key to apterae on *Armoracia*:-

1. ABD TERG 8 bearing 8–19 stout hairs. SIPH 0.04–0.08× BL, and flask or barrel-shaped 2
– ABD TERG 8 with 2–9 hairs. SIPH (if present) 0.06–0.40× BL, if less than 0.1× BL then ABD TERG 8 has only 2 hairs go to key to polyphagous aphids, p. 1020
- 2 SIPH dark, broadest on basal half. ANT PT/BASE 1.8–3.6. Dorsum with dark patches *Brevicoryne brassicae*
– SIPH pale, barrel-shaped. ANT PT/BASE 0.7–1.1. Dorsum without dark patches *Brevicoryne jiayuguanensis*

Arnebia*A. grandiflora***Boraginaceae***Aphis gossypii*, [*Aphis* sp. (Davletshina, 1964: 124)]**Arnica***A. amplexicaulis**A. chamissonis**A. cordifolia**A. latifolia**A. longifolia**A. mollis**A. montana**A. sachalinensis***Compositae***Illinoia davidsoni**Myzus ornatus**Illinoia davidsoni**Myzus ascalonicus**Illinoia davidsoni**Illinoia davidsoni**Aphis fabae*; *Brachycaudus helichrysi**Aphis fabae*Key to apterae on *Arnica*:-

- Large aphid, BL c.3 mm. Head smooth with inner faces of ANT tubercles diverging. SIPH 0.7–1.0 mm, brown, swollen on distal half and with 2–3 rows of subapical polygonal reticulation. ANT PT/BASE 5.4–7.0. RIV+V c. 0.25 mm long, with c.24 accessory hairs *Illinoia davidsoni*
- Without this combination of characters go to key to polyphagous aphids, p. 1020

Arnosseris*A. minima* (incl. *pusilla*)**Compositae***Nasonovia ribisnigri***Aronia see Photinia****Arracacia***A. ×anthorhiza***Umbelliferae***Aphis spiraeicola*; *Dysaphis apiifolia*, *foeniculus*;*Myzus persicae*; *Smynthuroides betae*

HOST LISTS AND KEYS

Key to apterae on *Arracacia*:-

1. Cauda helmet-shaped or pentagonal, not longer than its basal width. Spinal tubercles (STu) present on head and ABD TERG 8 or 7-8 2
 - Cauda if evident at all then tongue or finger-shaped, longer than its basal width. STu absent from head, and usually not on ABD TERG 7-8 go to key to polyphagous aphids, p. 1020
2. SIPH 2.5-3.5 times longer than their basal width, and 15-25 times as long as the very short, blunt and inconspicuous hairs on front of head *Dysaphis apiifolia*
 - SIPH short and broad-based, rarely more than twice as long as their basal widths, and 2.5-5.0 times as long as the long and fine hairs on front of head *Dysaphis foeniculus*

Arrhenatherum

A. elatius

Arrhenatherum sp.

Gramineae

Anoecia nemoralis, *vagans*; *Forda formicaria*;
Geoica utricularia;
Metopolophium albidum, *dirhodum*;
Pemphigus sp.(?*groenlandicus* - Zwölfer, 1958);
Rhopalosiphum padi;
Schizaphis phlei; *Sipha elegans*, *glyceriae*, *maydis*;
Sitobion avenae, *fragariae*, *graminearum*; *Tetraneura ulmi*
Forda formicaria

Use key to apterae of grass-feeding aphids under *Digitaria*.

Artabotrys

A. odoratissimus

Artabotrys sp.

Annonaceae

Toxoptera aurantii

Greenidea anonae

Couplet for these two species:-

- SIPH with numerous long hairs. Stridulatory mechanism absent *Greenidea anonae*
- SIPH without hairs. Stridulatory mechanism present *Toxoptera aurantii*

Artemisia

A. abrotanum

A. absinthium

Compositae

Brachycaudus helichrysi; *Coloradoa abrotani*;
Macrosiphoniella abrotani, *absinthii*, *artemisiae*, *atra*,
frigidicola, *oblonga*, *paucisetosa*, *pulvera*;
Macrosiphum euphorbiae; *Pleotrichophorus glandulosus*;
Xerobion cinae, *pannonica*;
Aphis elatior, *fabae*, *miranda*, [*plantaginis*];
Aulacorthum solani;
Coloradoa abrotani, *absinthii*, *angelicae*, *artemisiae*,
rufomaculata; *Cryptosiphum artemisiae*, *brevipilosum*;
Macrosiphoniella absinthii, *artemisiae*, *nigropilosa*,
oblonga, *pseudoartemisiae*, *pulvera*, *tanacetaria*;
Macrosiphum euphorbiae; *Microsiphum jazykovi*;
Myzus ascalonicus; *Pleotrichophorus glandulosus*;
Protrama longitarsus;
Titanosiphon neoartemisiae, *dracunculi*; *Xerobion cinae*

- A. adamsii*
A. afra
A. alba (incl. *camphorata*)
A. alba ssp. *saxatilis*
A. annua
A. apiacea
A. arborescens
A. arctica
A. arenaria
A. argyi
A. aromatica = *racunculoides*
A. asiatica
A. astrachanica see *Seriphidium*
lercheanum
A. austriaca (incl. var. *orientalis*)
A. balchanora see *Seriphidium*
- Macrosiphoniella atra* ssp. *latysiphon*, *pulvera*
Macrosiphoniella abrotani
Coloradoa heinzei, *palmerae*; *Macrosiphoniella atra*;
Metopeurum fuscoviride; *Pleotrichophorus glandulosus*
Macrosiphoniella szalaymarszoi
Xerobion cinae; *Aphis elatior*, *elongata*;
Brachycaudus helichrysi;
Coloradoa campestrella, *nodulosa*, *viridis*;
[Kaltenbachiella pallida];
Macrosiphoniella abrotani ssp. *chosoni*, *antennata*,
kuwayamai, *nigropilosa*, *pseudoartemisiae*,
pulvera, *tapuskae*, *[yomenae]*;
Protrama flavescens; *Tshernovaia adenophorae*
Aphis kurosawai; *Coloradoa viridis*;
Macrosiphoniella ?annulata, *antennata* group, *atra*
group, *yomogifoliae*, *Macrosiphoniella* sp.;
Pleotrichophorus glandulosus group
Brachycaudus helichrysi; *Coloradoa angelicae*;
Macrosiphoniella absinthii, *artemisiae*, *artemisiae*
ssp. *meridionalis*
Macrosiphoniella arctica, *borealis*
Aphis elatior; *Coloradoa taurica*;
Elatobium chomoense;
Macrosiphoniella arenariae, *kaufmanni*, *pulvera*, *scopariae*;
Titanosiphon artemisiae, *minkiewski*, *neoartemisiae*,
[zaisanicum];
[Xerobion sp. (Kadyrbekov, 2003c)]
Aphis kurosawai; *Aulacorthum solani*;
Capitophorus formosartemisiae;
Coloradoa campestrella, *rufomaculata*;
Cryptosiphum artemisiae;
Macrosiphoniella kuwayamai, *oblonga*, *pseudoartemisiae*,
yomogifoliae;
Pleotrichophorus glandulosus, *[pseudoglandulosus]*;
Protrama flavescens;
Sappaphis [angelicograstis], *[dipirivora]*, *piri*, *[sinipiricola]*;
Tenuilongiaphis stata;
Tuberocephalus lazikouensis, *liaoningensis*
Macrosiphoniella kuwayamai, *yomogifoliae*
[Coloradoa sp. (Holman and Pintera, 1981)];
Macropodaphis rechingeri;
Macrosiphoniella atra, *austriacae*, *pulvera*, *szalaymarszoi*;
Microsiphum woronieckae; *Obtusicauda moldavica*;
Xerobion cinae

HOST LISTS AND KEYS

A. baldshuanica see *Seriphidium*

A. borealis

A. brevifolia see *Seriphidium*

A. californica

A. campestris (incl. ssp. *glutinosa*)

A. camphorata see *alba*

A. cana see *Seriphidium*

A. canadensis

A. canariensis

A. capillaris

A. capillata (?)

A. carnifolia

A. caspica

A. caucasica see *lanulosa*

A. caudata

A. chamaemelifolia

A. cina see *Seriphidium*

A. commutata

A. dentata

A. desertorum

A. douglasiana

A. dracunculoides (incl. *aromatica*)

Obtusicauda frigidae

Aphis hiltoni; *Brachycaudus helichrysi*;

Epameibaphis atricornis; *Obtusicauda coweni*, *frigidae*;

Pleotrichophorus decampus, *obscuratus*, *quadritrichus*

Aphis elongata, *miranda*, [*plantaginis*];

Coloradoa artemisiae, *campestris*, *campestris*;

Cryptosiphum artemisiae, *brevipilosum*;

Macrosiphoniella arenariae, *artemisiae*, *dimidiata*,

[*dubia* Ferrari (nomem dubium)], *nidensis*,

subaequalis, *tapuskae*, *teriolana*, *usquertensis*;

Macrosiphum euphorbiae; *Myzus ornatus*;

Pleotrichophorus persimilis;

Protrama longitarsus, [*ranunculi*];

Titanosiphon artemisiae, *minkiewski*;

Trama troglodytes; [*Uroleucon picridis*];

Xerobion artemisiae, *georgii*, *judenkoi*

Microsiphoniella canadensis

Myzus persicae

Coloradoa rufomaculata, *submissa*;

[*Cryptosiphum artemisiae* ssp. *linanense*];

Macrosiphoniella annulata, *chaetosiphon*,

formosartemisiae, *nigropilosa*, *sanborni*,

yomogifoliae;

MicrAPHIS artemisiae; *Myzus cerasi* ssp. *umefoliae*;

[*Obtusicauda nilkaensis*]; [*Sappaphis sinipiricola*];

Titanosiphon neoartemisiae; *Tuberocephalus sasakii*;

Uroleucon omeishanense; *Xerobion cinae*

Macrosiphoniella atra ssp. *latysiphon*

Aphis kurosawai, *spiraecola*;

Macrosiphoniella kikungshana, *spinipes*, *yomogifoliae*;

Tuberocephalus sasakii

Xerobion caspicae

Misturaphis shiloensis

Macrosiphoniella abrotani, *chamaemelifoliae*, *oblonga*

Macrosiphoniella abrotani ssp. *chosoni*, [*lena*]

Capitophorus formosartemisiae

Xerobion amurensis

Pleotrichophorus gnaphalodes, *pseudoglandulosa*

Aphis middletonii;

Macrosiphoniella artemisiae, *glabra*;

Microsiphoniella artemisiae; *Neomyzus circumflexus*;

Pleotrichophorus diutius, *parilis*, [*wasatchii*]

- A. dracunculus* (incl. *glauca*)
Cryptosiphum artemisiae, dracunculum;
Macrosiphoniella alatavica, artemisiae, dracunculi, ludoviciana, nigropilosa, nitida, nitida ssp. *soongarica, oblonga, sibirica, xinjiangica*;
Microsiphum giganteum, jazykovi;
Obtusicauda dolychosiphon;
Pleotrichophorus diutius, narzikulovi, [wasatchii], [sp. near *ambrosiae*];
Titanosiphon dracunculi, neoartemisiae
- A. feddei*
Macrosiphoniella hokkaidensis, kuwayamai;
Tuberocephalus sasakii
- A. ferganensis* see *Seriphidium*
- A. filifolia*
Aphis canae, filifoliae, hermistonii, minutissima;
Myzus ornatus; *Obtusicauda filifoliae*;
Pleotrichophorus filifoliae, zoomontanus
- A. frigida*
Aphis [terricola], middletonii; Coloradoa heinzei;
Cryptosiphum innokentyi; Epameibaphis frigidae;
Macropodaphis paradoxa;
Macrosiphoniella altaica, frigidae, frigidicola, frigidivora, longirostrata;
Obtusicauda frigidae, mongolica;
Pleotrichophorus intermedius, pseudoglandulosus;
Pseudoepameibaphis glauca;
Titanosiphon dracunculi; Xerobion terraealbae
- A. gallica*
Coloradoa submissa; Macrosiphoniella abrotani
- A. genipi*
Macrosiphoniella mutellinae
- A. gigantea*
Macrosiphoniella oblonga, yomogifoliae
- A. gilvescens*
Macrosiphoniella chaetosiphon
- A. glanduligera* see *Seriphidium*
- A. glauca* see *dracunculus*
- A. gmelinii* (incl. *laxiflora, sacrorum*)
Aphis globosa
Macrosiphoniella antennata ssp. *takahashii, atra* ssp. *latysiphon, gmelinicola, himalayana, hokkaidensis, nigropilosa, oblonga, [yomenae]*;
Protrama sp.; *Uroleucon dubium*
- A. gnaphaloides* see *ludoviciana*
 var. *gnaphaloides*
- A. halophila* see *Seriphidium*
- A. hanseniana*
Xerobion cinae;
 [*Cryptosiphum milsteppensis* Rusanova, 1942 (nomen nudum)];
Macrosiphoniella pulvera; Titanosiphon dracunculi
- A. herba-alba* see *Seriphidium*
- A. heterophylla* see *douglasiana*
- A. indica* see *vulgaris* var. *indica*
- A. integrifolia*
Macrosiphoniella kuwayamai
- A. iwayomogi*
Coloradoa rufomaculata;
Macrosiphoniella atra ssp. *latysiphon*

HOST LISTS AND KEYS

- A. jacutica*
A. japonica
- A. judaica*
A. karatavica see *Seriphidium*
A. keiskeana
- A. lactucifolia*
A. lanulosa (incl. *caucasica*)
A. latifolia
A. lavandulaefolia
A. lobelli
A. longifolia
- A. ludoviciana* (incl. var. *gnaphalodes*)
- A. macrocephala*
A. manshurica
- A. maritima* see *Seriphidium*
A. maritima var. *monogyna*
 see *Seriphidium santonicum*
A. maritima var. *vallesiaca*
 see *Seriphidium vallesiaca*
A. marschalliana
- A. maximovicziana*
- A. messerschmidtiana* (incl. vars
discolor, *viridis*)
- A. mexicana*
A. mongolica
- A. monogyna*
 see *Seriphidium santonicum*
A. monosperma
- Coloradoa heinzei*
Cryptosiphum artemisiae, [*artemisiae* ssp. *linanense*];
Macrosiphoniella atra ssp. *latysiphon*,
formosartemisiae, *gaoloushana*, *grandicauda*,
kuwayamai, *oronensis*, *similioblonga*, *yomogicola*;
Pleotrichophorus glandulosa
Macrosiphoniella oblonga
- Macrosiphoniella formosartemisiae*, *kikangshana*,
kuwayamai
Pleotrichophorus glandulosus
Coloradoa taurica; *Myzus ascalonicus*
Macrosiphoniella alata
Aphis kurosawai; *Macrosiphoniella kuwayamai*
Macrosiphoniella atra
Aphis artemisicola, *canae*; *Epameibaphis atricornis*;
Pleotrichophorus brevinectarius, *longinectarius*, *pullus*
Aphis oregonensis
Artemisaphis artemisicola; *Coloradoa rufomaculata*;
Macrosiphoniella artemisiae, *ludoviciana*;
Microsiphoniella artemisiae, *canadensis*;
Obtusicauda frigida;
Pleotrichophorus glandulosus, *pseudoglandulosus*,
gnaphalodes
Macrosiphoniella artemisiae ssp. *sainshandi*
Aphis neoartemisiphila;
Macrosiphoniella formosartemisiae
- Aphis elatior*, *elongata*;
Macrosiphoniella arenariae, *austriacae*, *moldavica*
Cryptosiphum artemisiae;
Macrosiphoniella gmelincola
Macrosiphoniella abrotani ssp. *choseni*, *antennata*
 ssp. *takahashii*, *atra* ssp. *latysiphon*, *gmelinicola*,
jaroslavi, *yomogifoliae*, *zeya*
Pleotrichophorus gnaphalodes, *pseudoglandulosus*
Aphis kurosawai; *Coloradoa campestrella*;
Cryptosiphum artemisiae
Macrosiphoniella kuwayamai, *pulvera* ssp. *khinganica*,
yomogifoliae
- Coloradoa santolinae*, *Macrosiphoniella absinthii*

- A. montana* *Aulacorthum solani*; *Capitophorus formosartemisiae*;
Coloradoa artemisiae, *campestrella*;
Cryptosiphum artemisiae;
Macrosiphoniella grandicauda, *hidaensis*, *hikosanensis*,
hokkaidensis, *oblonga*, *yomogicola*, *yomogifoliae*;
Sappaphis piri; *Tuberocephalus artemisiae*, *sakurae*
- A. mutellina* [*Coloradoa palmerae* – in error: Szelegiewicz (1996: 188)];
Macrosiphoniella mutellinae
- A. nepalensis* *Brachycaudus helichrysi*;
Capitophorus formosartemisiae
- A. nutans* see *Seriphidium*
- A. opulenta* *Capitophorus formosartemisiae*;
Uroleucon ambiguum
- A. pauciflora* see *Seriphidium*
- A. pedemontana* *Macrosiphoniella frigidicola*
- A. persica* *Macrosiphoniella himalayana*, *nigropilosa*;
Obtusicauda dolichosiphon, *moldavica* ssp. *crassitubia*
- A. pontica* *Aphis miranda*; *Coloradoa palmerae*, *ponticae*;
Cryptosiphum artemisiae;
Macrosiphoniella [sp. nr. *cinerascens*: Leonard, 1973, 12],
kaufmanni
- A. porrecta* see *Seriphidium*
- A. princeps* (incl. var. *orientalis*) [*Anuraphis farfarae*];
Aphis kurosawai, [*serissae*], *spiraecola*, [*yomogii* Shinji,
1922]; *Capitophorus formosartemisiae*;
Coloradoa campestrella, *rufomaculata*;
Cryptosiphum artemisiae;
Macrosiphoniella chaetosiphon, *formosartemisiae*,
grandicauda, *hikosanensis*, *kuwayamai*, *oblonga*,
pseudoartemisiae, *sanborni*, *taesongsanensis*,
yomogicola, *yomogifoliae*;
Macrotrichaphis yatsugatakensis;
[*Myzus yomogi* Shinji (nomen dubium)];
Pleotrichophorus [*chrysanthemi*], *glandulosus*;
Sappaphis piri; [*Shinjia orientalis*];
Tuberocephalus artemisiae, [*momonis*], *sakurae*, *sasakii*;
[*Uroleucon lactucicola*]
- A. procera* *Coloradoa* [*brevisiphon*], [*procerae*];
Macrosiphoniella nigropilosa, *procerae*;
Microsiphum procerae, *subalpica*
- A. rhodantha* see *Seriphidium*
- A. rigida* see *Seriphidium*
- A. roxburghiana* *Capitophorus formosartemisiae*
- A. rubripes* *Aphis kurosawai*; *Cryptosiphum artemisiae*;
Macrosiphoniella formosartemisiae, *grandicauda*,
hidaensis, *hikosanensis*, *kuwayamai*, *oblonga*,
pseudoartemisiae, [*yomenae*], *yomogifoliae*

HOST LISTS AND KEYS

- A. rupestris*
A. rutifolia
A. sacrorum see *gmelinii*
A. saitoana
A. santolina see *Seriphidium*
A. santolinifolia
- A. saxatilis* ssp. of *alba*
A. schmidtiana (incl. *nana*)
A. schrenkiana see *Seriphidium*
A. scopaeiformis see *Seriphidium*
A. scoparia
- A. selengensis*
- A. sibirica*
A. sieversiana
- A. stelleriana*
- A. stenophylla*
A. stolonifera
- A. sublessingiana* see *Seriphidium*
A. subulata
A. suksdorfii
- A. sylvatica*
- A. tanacetifolia*
- Macrosiphoniella subequalis*
Macrosiphoniella sojaki
- Macrosiphoniella kuwayamai*
- Aphis miranda*;
Macrosiphoniella nigropilosa, oblonga, santolinifoliae
- Macrosiphoniella absinthii, yomogicola, yomogifoliae*
- Xerobion cinae; Aphis elongata*;
Coloradoa campestris, campestris, [procerae], scopariae;
Cryptosiphum brevipilosum;
Macrosiphoniella absinthii, [achlys], arenariae,
formosartemisiae, [hofuchui], [huochengensis],
lambersi, pseudoartemisiae, scopariae, [tsizhong];
[Myzus cerasi]; Pemphigus bursarius;
Pleotrichophorus glandulosus, persimilis;
Protrama flavescens; [Sappaphis albinae, sinipiricola];
Titanosiphon neoartemisiae
Cryptosiphum artemisiae, [artemisiae ssp. linanense];
Macrosiphoniella grandicauda, hidaensis, hokkaidensis,
kuwayamai, oblonga, yomogifoliae;
Pleotrichophorus glandulosus
Coloradoa indica
Aphis [terricola], fabae; [Coloradoa brevipilosa];
Cryptosiphum sieversianae;
Macrosiphoniella abrotani ssp. sainshandi, artemisiae,
atra ssp. latysiphon, hokkaidensis, kuwayamai, pulvera,
sieversianae
Capitophorus formosartemisiae; Cryptosiphum artemisiae;
Macrosiphoniella [albiartemisiae], hidaensis, kuwayamai,
longirostrata, oblonga, pseudoartemisiae, sachalinensis,
sanborni, yomogicola, yomogifoliae
Pleotrichophorus gnaphalodes
[Uroleucon gobonis]
Macrosiphoniella elenae, hikosanensis, kikumshana,
kuwayamai, sikhotealinensis, yomogifoliae;
Tuberocephalus artemisiae, sasakii
- Macrosiphoniella kuwayamai*
Brachycaudus helichrysi;
Macrosiphoniella ludoviciana
[Coloradoa kashmirica Rishi & Lone (nomen nudum)];
Delphiniobium ussuriense;
Macrosiphoniella kuwayamai
Macrosiphoniella atra ssp. latysiphon, borealis

A. taurica see *Seriphidium*
A. tenuisecta see *Seriphidium*
A. terrae-alba see *Seriphidium*
A. tomentella

A. tournefortiana
A. tridentata see *Seriphidium*
A. tridentata var. *trifida*
 see *Seriphidium tripartita*
A. tripartita see *Seriphidium*
A. turanica see *Seriphidium*
A. turcomanica
 see *Seriphidium turanica*
A. umbrosa

A. valida see *Seriphidium*
A. vallesiaca see *Seriphidium*
A. variabilis
A. verlotiorum

A. vestita

A. vulgaris

Aphis miranda; *Coloradoa taurica*;
Cryptosiphum brevipilosum;
Macrosiphoniella scopariae, [*Macrosiphoniella* sp.
 (Kadyrbekov, 2003c)];
Pleotrichophorus persimilis;
Titanosiphon minkiewski, neoartemisiae;
 [*Xerobion* sp. (Kadyrbekov, 2003c)]
Macrosiphoniella nigropilosa

Cryptosiphum artemisiae;
Macrosiphoniella kuwayamai, yomogifoliae

Macrosiphoniella artemisiae, atra, subaequalis
Coloradoa artemisiae;
Macrosiphoniella artemisiae, oblonga;
Pleotrichophorus glandulosus group
 [*Aphis* sp. – Chowdhuri *et al.*, 1969b: 335];
Brachycaudus helichrysi, [*Brachycaudus (Mordvilkomemor)*
 sp. – Chowdhuri *et al.*, 1969a: 90]
Macrosiphoniella yomogifoliae
Aphis artemisiphaga, fabae, gossypii, kurosawai,
middletonii, nevskyi, [plantaginis], spiraecola, [Aphis
(Protaphis) sp. (Holman and Pintera, 1981)];
Aulacorthum [perillae], solani;
Brachycaudus cardui, helichrysi;
Capitophorus formosartemisiae;
 [*Chaetosiphon gracilicorne*];
Coloradoa artemisiae, campestrella, rufomaculata;
Cryptosiphum artemisiae; [Dysaphis hirsutissima];
[Geoica lucifuga]; [Lachnus inflatus Shinji (1922)];
Macrosiphoniella absinthii, artemisiae, atra, chaetosiphon,
grandicauda, hidaensis, hikosanensis, hokkaidensis,
insignata, kalimpongense, kikungshana, kuwayamai,
lijiangensis, ludoviciana, nigropilosa, oblonga,
paraoblonga, pseudoartemisiae, pulvera, sanborni,
sibirica, spinipes, tanacetaria, umarovi, yomogicola,
yomogifoliae; [Metopeurum sp.]; [Sitobion gravelii];
Microsiphoniella artemisiae;

Microsiphum woronieckae;
Myzus cerasi ssp. *umefoliae*, [*dycei*], *ornatus*, *persicae*;
Obtusicauda dolichosiphon, *filifoliae*;
Pleotrichophorus brevinectarius, *glandulosus*,
pseudoglandulosus, *quadritrichus* ssp. *vulgaris*,
zoomontanus;
Prociphilus erigeronensis; *Protrama flavescens*;
Sappaphis piri; *Smynthurodes betae*;
Szelegiewicziella chamaerhodi;
Titanosiphon artemisiae, *dracunculi*;
Toxoptera aurantii; *Trama longitarsus*, *troglodytes*;
Tuberocephalus sasakii

A. vulgaris* var. *heterophylla

see *A. douglasiana*

A. vulgaris* var. *indica

Aphis kurosawai;
Cryptosiphum [*artemisiae* ssp. *linanense*];
Dysaphis microsiphon;
Macrosiphoniella kikungshana, *kuwayamai*, *yomogicola*,
yomogifoliae; *Neotoxoptera yasumatsui* ssp. *artemisiae*;
Pleotrichophorus glandulosus;
Tuberocephalus artemisiae, *higansakurae* ssp. *hainnevilleae*,
liaoningensis, *sakurae*, *sasakii*, *uwamizusakarae*
Macrosiphoniella similiblonga
Aphis artemisiphila, *artemisivora*, *craccivora*, *gossypii*,
lharsartemisiae;
Aulacorthum dasi; *Brachycaudus cardui*;
[*Chaetosiphon alpestre*]; *Colorado paradoxa*;
[*Cryptomyzus taoi*];
Cryptosiphum [*atriplicivorum*], *mordvilkoii*;
[*Geoica utricularia*]; [*Hyalomyzus raoi*];
[*Iziphya maculata*];
[*Kaltenbachiella pallida*];
[*Lipaphis erysimi*]; *Longisiphoniella subterranea*;
Macrosiphoniella antennata, *atrata*, *brevisiphona*,
cegmidi, *huaidensis*, *kirgistica*, *lidiae*, *lopatini*,
[*quinifontana*], *sikkimartemisiae*, *umarovi*;
Microsiphoniella oregonensis;
[*Myzackaia verbasci*];
[*Myzus kalimpongensis*, *ninae*, *siegesbeckicola*]
[*Nasonovia ribisnigri*];
[*Indomasonaphis anaphalidis*];
[*Paracletus cimiciformis*]; [*Phorodon cannabidis*];
Protrama longitarsus ssp. *sclerodensis*;
[*Saltusaphis scirpus*]; [*Sipha elegans*];
[*Sitobion* sp. nr *fragariae* (as *Uroleucon qinghaiense*)];
Tshernovaia spirocaudicula;
Uroleucon [*pseudotanaceti*], [*sonchi*];
Xerobion alakuli, *hirsuta*

A. vulgaris* var. *vulgatissima
***Artemisia* spp.**

The above list, taken together with the list of aphids on the similar genus *Seriphidium*, contains more than 260 species. This is by far the largest aphid fauna of any plant genus. We have split the key into three parts to make it easier to use.

Master key to aphids on *Artemisia* and *Seriphidium*:-

1. ANT tubercles undeveloped or weakly developed, and front of head convex in dorsal view; sometimes ANT tubercles are developed so that they project forward as far as the middle of the head, but then ANT III is without any secondary rhinaria (except in alatiform specimens) **KEY A**
- ANT tubercles developed or with developed processes, so that they project forward further than middle part of head, which is often concave in dorsal view. If the ANT tubercles are low (*Microsiphoniella*, *Artemisiphis* and some *Obtusicauda*), then ANT III bears at least one rhinarium **2**
2. SIPH tubular, clearly longer than their basal widths, with a subapical zone of polygonal reticulation, consisting of at least a few closed cells **KEY B**
- SIPH either very small or well-developed, but if well-developed then they lack polygonal reticulation **KEY C**

KEY A

[Note: the following species could not be included in the key because specimens were not available or could not be discriminated on the basis of the published descriptions. The number in brackets after the species indicates the couplet they should run to in the key: – *Aphis lhasartemisiae* (81), *Aphis reticulata* (78), *Coloradoa brevisiphon* (20), *C. brevipilosa* (27), *C. procerae* (26), *C. tadzhica* (20), *Sappaphis albinae* (42), *S. angelicograstis* (43), *S. dipirivora* (43), *S. sinipiricola* (43), *Xerobion alakuli* (54), *X. caspicae* (54), *X. terraealbae* (54).]

1. Antennae very densely hairy; e.g., base of last antennal segment with more than 20 hairs **2**
- Base of last antennal segment with less than 10 hairs **6**
2. Hind tarsi elongate, more than 0.5 of length of hind tibiae. Antennae 6-segmented **3**
- Hind tarsi of normal length, much less than 0.5 of length of hind tibiae. Antennae 5-segmented **5**
3. SIPH absent. ANT PT/BASE less than 0.25. Antennae without secondary rhinaria and eyes with only 3 facets (except in rare alatiform apterae) *Trama troglodytes*
- SIPH present as pores on slightly elevated, pigmented cones. ANT PT/BASE more than 0.25. Apterae typically alatiform, with secondary rhinaria on antennae and multifaceted eyes **4**
4. Hind tibia 2.2–2.6× ANT III. HT II 0.59–0.70× hind tibia. R IV with 6–8 (usually 7) accessory hairs on dorsal side *Protrama flavescens*
- Hind tibia 2.7–3.2× ANT III. HT II 0.53–0.63× hind tibia. R IV with 6–10 (usually 9) accessory hairs on dorsal side *Protrama longitarsus*
5. ANT V BASE and R IV+V both very long, respectively about 1.7 and 2.5× width of head between antennal bases. ANT II similar in length to ANT I, much shorter than III *Rectinasus buxtoni*
- ANT V BASE and R IV+V of normal length, both about 0.5× width of head between antennal bases. ANT II about twice as long as ANT I, similar in length to III *Smynthuroides betae*
6. SIPH absent. ANT PT/BASE less than 0.5 **7**
- SIPH present. ANT PT/BASE more than 0.5 **8**
7. R IV+V 0.08–0.12 mm long, and without accessory hairs. Hairs at apices of tibiae and on first tarsal segments short and thick. Cauda and anal plate not projecting posteriorly *Pemphigus bursarius*
- R IV+V 0.13–0.175 mm long, with 4–8 accessory hairs. Hairs at apices of tibiae and on first tarsal segments long and fine. Cauda and anal plate forming a dark posterior projection of the abdomen *Prociphilus erigeronensis*

HOST LISTS AND KEYS

8. Fore femora greatly enlarged, about twice as thick as mid femora, and fore tibiae with strengthened bases (Figure 12a). Dorsum adorned with numerous tubercular processes, most of which bear hairs and wax glands. Cauda knobbed **9**
 – Fore femora not enlarged. Dorsum with or without tubercular processes. Cauda variable **10**
9. Dorsal tubercles mammariform or quadrate, in a single row across each tergite, each bearing 1–3 hairs; the tubercles vary in size but all bear hairs of similar length (Figure 12b) *Macropodaphis rechingeri*
 – Dorsal tubercles mammariform, conical and digitiform, in a double transverse row on each tergite, each bearing a single hair; both tubercles and hairs vary greatly in size, the hairs on the digitiform tubercles being minute (Figure 12c) *Macropodaphis paradoxa*
10. Compound eyes well developed, with ocular tubercles (triommatidia) reduced or displaced ventrally, so that they do not form distinct projections in dorsal view. Dorsal hairs usually with expanded, and often fan-shaped, apices (e.g. Figure 12d, h–l) **11**
 – Compound eyes sometimes reduced, if well-developed then with ocular tubercles forming distinct projections. Dorsal hairs variable but never fan-shaped, and usually thinner at apex than at base **37**
11. SIPH reduced to raised pores (e.g. Figure 12d) **12**
 – SIPH tubular, longer than basal width **13**
12. Femora dark. ANT PT/BASE more than 2 *Flabellomicrosiphum knowltoni*
 – Femora pale. ANT PT/BASE less than 2 *Flabellomicrosiphum tridentatae*
13. SIPH with flange swollen, so that the apex is knob-like (Figure 12e, f) **14**
 – SIPH with normal, thin-walled flange **16**
14. Dorsum pigmented. SIPH and legs black *Epameibaphis atricornis*
 – Dorsum pale. SIPH and legs pale (except tarsi) **15**
15. ANT III with 1–4 secondary rhinaria. R IV+V 1.4–1.8× HT II. Flange of SIPH not thickly swollen (Figure 12e) *Epameibaphis frigidae*
 – ANT III without rhinaria. R IV+V 1.0–1.4× HT II. Flange of SIPH thickly swollen (Figure 12f) *Epameibaphis utahensis*
16. SIPH thinner on basal half than middle of hind tibia, swollen distally on inner side, with flange set obliquely (e.g., Figure 12g) **17**
 – SIPH on basal half as thick as or thicker than middle of hind tibia; if swollen distally then the swelling is more symmetrical and flange less oblique (Figure 12m–p) **20**
17. ANT PT/BASE 2.5–4.0 **18**
 – ANT PT/BASE 1.5–2.3 **19**
18. ANT PT 1.5–2.0× SIPH *Pseudoepameibaphis glauca*
 – ANT PT 1.0–1.3× SIPH *Pseudoepameibaphis tridentatae*
19. ANT PT 0.9–1.4× SIPH *Pseudoepameibaphis essigi*
 – ANT PT 0.3–0.7× SIPH *Pseudoepameibaphis xenotrichis*
20. SIPH short, less than 0.1× BL and less than 1.2× cauda **21**
 – SIPH longer, more than 0.1× BL and more than 1.3× cauda **27**
21. ABD TERG 8 bearing 13–19 hairs. ANT 5-segmented, and dorsal hairs all very short and fan-shaped, broadening abruptly from base (fundatrices), or ANT 6-segmented and dorsal hairs longer, broadening gradually from bases (later generations) *Coloradoa paradoxa*

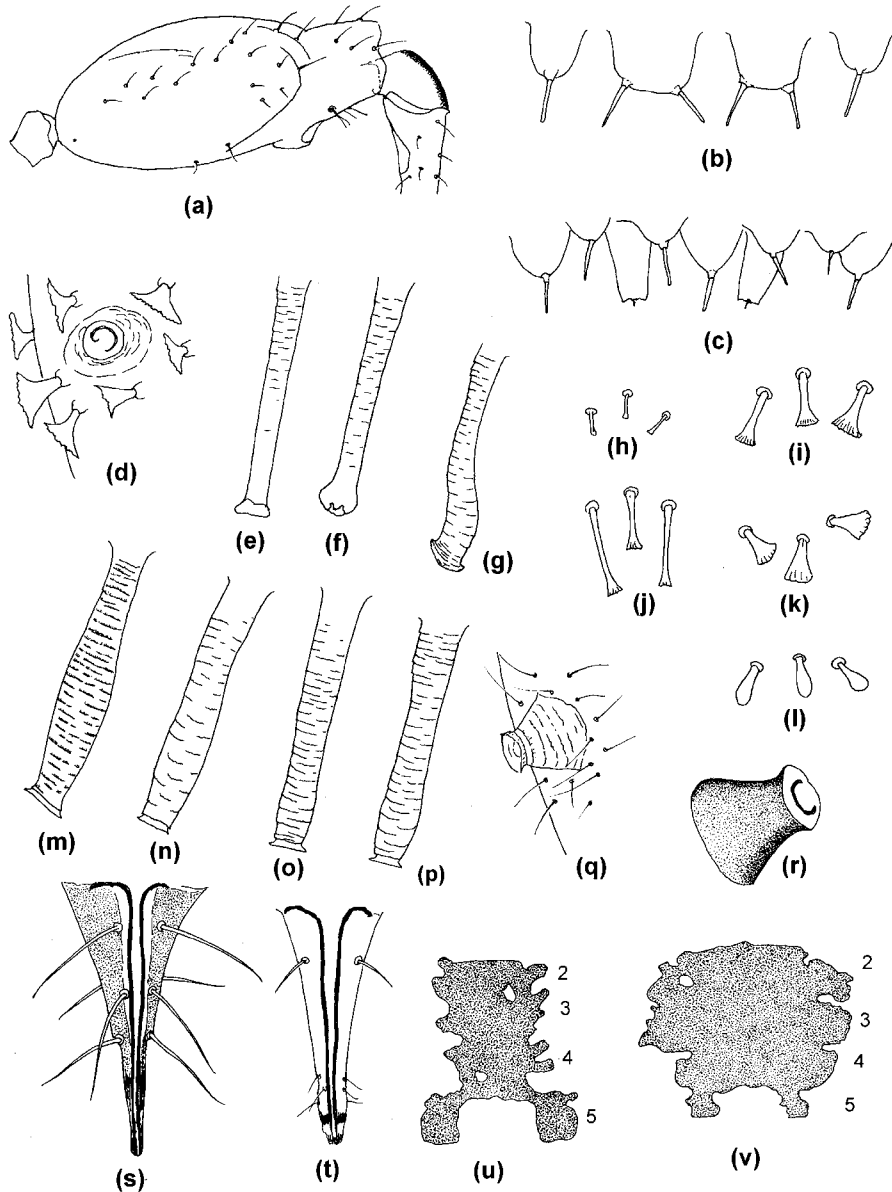


Figure 12 Apterae on *Artemisia*, Key A. (a) Fore femur of *Macropodaphis rechingeri*, (b) dorsal tubercles on ABD TERG 3 of *M. rechingeri*, (c) same for *M. paradoxa*, (d) SIPH and dorsal hairs of *Flabelomicrosiphum tridentatae*, (e) SIPH of *Epameibaphis frigidae*, (f) SIPH of *E. utahensis*, (g) SIPH of *Pseudoepameibaphis tridentatae*, (h) dorsal hairs of *Coloradoa abrotani*, (i) same for *C. campestris*, (j) same for *C. submissa*, (k) same for *C. ponticae*, (l) same for *C. viridis*, (m) SIPH of *Coloradoa absinthii*, (n) SIPH of *C. angelicae*, (o) SIPH of *C. rufomaculata*, (p) SIPH of *C. artemisiae*, (q) SIPH of *Sappaphis piri*, (r) SIPH of *Xerobion cinae*, (s) R IV + V of *Aphis filifoliae*, (t) R IV + V of *Aphis kurosawai*, (u) dorsal sclerotisation of ABD TERG 2-5 in *A. hermistonii*, (v) same for *A. canae*.

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- ABD TERG 8 bearing 6–8 hairs. ANT 6-segmented. Dorsal hairs broadening gradually from base or expanded only near their apices 22
- 22. R IV+V is 1.2–1.5× HT II, and 0.75–1.0× cauda *Coloradoa heinzei*
- R IV+V is 0.8–1.1× HT II, and 0.5–0.7× cauda 23
- 23. Dorsal abdominal hairs small, thin and rod-like (Figure 12h), only slightly expanded at apices; longest hairs on ABD TERG 3 shorter than BDIII. SIPH pale *Coloradoa abrotani*
- Dorsal abdominal hairs thicker and with fan-shaped apices; longest hairs on ABD TERG 3 longer than BDIII. SIPH uniformly dark 24
- 24. Dorsal abdominal hairs narrowest at base, cylindrical or gradually thickening proximal to the fan-shaped apex (Figure 12i) *Coloradoa campestris*
- Dorsal abdominal hairs tapering or cylindrical from base, thinnest on distal half, then widening abruptly into fan-shaped apex (e.g., Figure 12j) 25
- 25. Coxae pale, and at least basal parts of femora and SIPH pale, although sometimes darker distally *Coloradoa santolinae*
- Coxae, femora and SIPH all dark 26
- 26. Antennae dark except for ANT II and basal part of ANT III. Dorsal hairs pale, 50–60µm long, with longest hairs on ABD TERG 3 at least 3× BDIII *Coloradoa taurica*
- Antennae with ANT III and IV pale except at apices, and V pale basally. Dorsal hairs pigmented, 40–50µm long, with longest hairs on ABD TERG 3 less than 3× BDIII *Coloradoa submissa*
- 27. Antennae 5-segmented 28
- Antennae 6-segmented 29
- 28. Dorsal cuticle smooth. Dorsal hairs broadly fan-shaped (Figure 12k). ANT PT/BASE 1.1–1.4. SIPH 0.75–0.95× ANT III *Coloradoa ponticae*
- Dorsal cuticle with reticulate sculpturing. Dorsal hairs broadly capitate (i.e., with rounded apices; Figure 12l). ANT PT/BASE 1.4–2.0. SIPH 1.05–1.25× ANT III *Coloradoa viridis*
- 29. R IV+V 0.8–1.1× HT II. SIPH distinctly clavate (Figure 12m) 30
- R IV+V 1.1–1.5× HT II. SIPH variable 32
- 30. ANT PT more than 1.5× ANT III *Coloradoa absinthii*
- ANT PT less than 1.3× ANT III 31
- 31. ABD TERG 8 with the cuticle at the base of the cauda thickened and raised as a shallow, irregularly shaped process, bearing 1–2 small spinal tubercles. ANT PT/BASE 1.3–1.8 *Coloradoa palmerae*
- ABD TERG 8 with small single or paired spinal tubercles but these are not placed on a raised, thickened area of cuticle. ANT PT/BASE 1.75–2.4 *Coloradoa huculaki*
- 32. Dorsal abdominal hairs broadly fan-shaped and very numerous, not in rows. SIPH distinctly clavate *Coloradoa indica*
- Dorsal abdominal hairs sparse, rod-shaped, fan-shaped or spatulate, roughly in a single row across each segment. SIPH with or without distal swelling 33
- 33. SIPH swollen on distal half to at least 1.2 of minimum width on basal half (Figure 12n) *Coloradoa angelicae*
- SIPH cylindrical or if slightly swollen near apex, maximum width does not exceed 1.15 of minimum width (e.g. Figure 12o, p) 34

34. R IV+V 0.75–1.11× ANT PT *Colorodoa scopariae*
 – R IV+V 0.53–0.74× ANT PT **35**
35. ANT 0.4–0.5× BL, with PT/BASE 1.4–1.7. (Al. with sec. rhin. III 6–10, IV 4–8, V 0–2)
Coloradoa campestrella
 – ANT 0.5–0.7× BL, with PT/BASE 1.3–2.0 **36**
36. SIPH almost smooth on basal part, in comparison with more coarsely imbricated distal part. (Al. with sec. rhin. III 9–19, IV 3–10, V 0–4)
Coloradoa rufomaculata
 – SIPH with coarse imbrication near base similar to that near apex. (Al. with sec. rhin. III 14–22, IV 11–14, V 2–9)
Coloradoa artemisiae
37. Dorsum with numerous barrel-like or stump-like processes. Dorsal hairs extremely thick and long (80–160µm), broad-based and tapering, arising from tubercular bases *Tenuilongiaphis stata*
 – Dorsum without barrel-like or stump-like processes. Dorsal hairs short, or fine if long **38**
38. ABD TERG 1 and 7 both without marginal tubercles (MTu) **39**
 – MTu always present at least on ABD TERG 1 (or 1–5), and usually on 7 **50**
39. SIPH evident, tubular or conical, as long as their basal widths or longer **40**
 – SIPH small, pore-like or on shallow cones, not longer than their basal width; sometimes almost invisible **43**
40. Cauda longer than its basal width **41**
 – Cauda as short as or shorter than its basal width **42**
41. SIPH shorter than cauda, which has a midway constriction and a rounded apex. ANT 5-segmented, with ANT PT/BASE more than 3.5 *Misturaphis shiloensis*
 – SIPH longer than cauda, which is conical, without a constriction. ANT 5- or 6-segmented, with ANT PT/BASE 1.0–1.2 *Micraphis artemisiae*
42. ANT 0.7–0.9× BL, with PT/BASE 4.6–6.1. SIPH long and dark, 0.23–0.29× BL and 6.0–7.8× cauda. Spiracles reniform *Longisiphoniella subterranea**
 – ANT 0.4–0.7× BL, with PT/BASE 2.4–3.2. SIPH truncate, pale, 0.07–0.1× BL and 1.1–1.3× cauda. Spiracles large and circular *Brachycaudus helichrysi*
43. Dorsum clothed with dense, fine hairs, arising from junctions of cuticular reticulations. SIPH short, conical, with surrounding hairs (Figure 12q) *Sappaphis piri*
 – Dorsum sparsely hairy. SIPH pore-like or on very small cones or cylinders without surrounding hairs, or not discernible **44**
44. ANT PT/BASE more than 1.1 **45**
 – ANT PT/BASE less than 1.1 **46**
45. Body broadly spindle-shaped. SIPH as short cylinders, length about half of width. First tarsal segments with 2–2–2 hairs *Cryptosiphum mordvilkoii**
 – Body broadly oval. SIPH as pores. First tarsal segments with 3–3–2 hairs *Cryptosiphum sieversianae**
46. R IV+V 0.95–1.1× HT II. Posterior margin of subgenital plate with 6–9 hairs *Cryptosiphum dracunculum**
 – R IV+V 1.2–1.7× HT II. Posterior margin of subgenital plate with 7–19 hairs **47**

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47. Cauda semicircular, almost as long as wide. Tubercular bases of dorsal hairs mostly longer than their basal widths. Prothoracic MTu evident *Cryptosiphum astrachanicae**
 – Cauda semilunar, much broader than long. Tubercular bases of dorsal hairs not longer than their basal widths. Prothoracic MTu not evident **48**
48. Stigmal plates of the spiracles on the first two abdominal segments united. First tarsal segments with 3–3–3 hairs *Cryptosiphum innokentyi**
 – Stigmal plates of the spiracles on the first two abdominal segments separated. First tarsal segments with 3(2)–3(2)–2 hairs **49**
49. ANT III 1.0–1.6 (–2.2)× PT. Subgenital plate usually with 2 (sometimes up to 4) hairs on anterior half and 6–11 on posterior margin. (Al. with secondary rhinaria distributed ANT III 9–13, IV 0) *Cryptosiphum brevipilosum*
 – ANT III 1.6–2.8× PT. Subgenital plate with 5–10 hairs on anterior half and 12–19 on posterior margin. (Al. with secondary rhinaria distributed ANT III 21–28, IV 2–5) *Cryptosiphum artemisiae*
50. ANT PT/BASE 3.7–5.4 **51**
 – ANT PT/BASE less than 3.5 **52**
51. Antennae 4-segmented. Dorsum with a continuous sclerotic shield covering metanotum and most of ABD TERG 1–6. No stridulatory apparatus *Szelegiewiczziella chamaerhodi*
 – Antennae 6-segmented. No sclerotic dorsal shield. Stridulatory apparatus present, comprising cuticular ridges on abdominal sternites 5 and 6 and a row of short, peg-like hairs on each hind tibia *Toxoptera aurantii*
52. R IV+V more than 2 times HT II and bearing 8 or more long fine accessory hairs. (ANT PT/BASE about 1.1–1.2. SIPH very short, pale and cylindrical. Cauda semicircular) *Nevadaphis sampsoni*
 – R IV+V less than 2× HT II and bearing 2–6 accessory hairs **53**
53. SIPH as short, dark sclerotic truncate cones with broad bases (volcano-shaped; Figure 12r), shorter than their basal widths; smooth or, if weakly imbricated, then without spicules on the imbrications. Cauda conical, very short and broad, much shorter than its basal width. ANT PT/BASE always less than 1 **54**
 – SIPH tapering or cylindrical, with spiculose imbrication; if tapering from a broad base then longer than their basal widths. Cauda rounded, conical, tongue- or helmet-shaped; shorter or longer than its basal width. ANT PT/BASE more or less than 1 **63**
54. Dorsal body hairs dense, erect and fan-like, about 50µm long *Xerobion hirsuta**
 – Dorsal body hairs with pointed, blunt or only slightly expanded apices **55**
55. Cauda with 7–8 hairs. ANT III–V without secondary rhinaria *Xerobion artemisiae**
 – Cauda with 11–29 hairs. ANT with or without secondary rhinaria **56**
56. Posterior hair on hind trochanter 0.5–1.0× length of trochantrofemoral suture **57**
 – Posterior hair on hind trochanter 0.2–0.5× length of trochantrofemoral suture **60**
57. Legs and antennae wholly black *Xerobion blascoi**
 – At least middle parts of tibiae and antennae pale **58**
58. ANT III and IV without secondary rhinaria *Xerobion amurensis*
 – ANT III with 1–4 secondary rhinaria, and IV with 0–2 **59**
59. MTu on ABD TERG 1 and 7 very large, much broader than high, much larger than the adjacent stigmal plates. Dorsal hairs rather fine with pointed apices *Xerobion judenkoi*

- MTu on ABD TERG 1 and 7 papilliform, similar in size to, or smaller than, adjacent stigmal plates. Dorsal hairs rather thick and spine-like with abruptly pointed or blunt apices *Xerobion cinae*
- 60. R IV+V 1.3–1.4× HT II. ANT III-V usually without secondary rhinaria *Xerobion pannonica**
- R IV+V 0.95–1.25× HT II. ANT III-V usually with at least some secondary rhinaria **61**
- 61. Small MTu present on at least some of ABD TERG 2–5 as well as 1 and 7 *Xerobion hortobagyi*
- No MTu on ABD TERG 2–5 **62**
- 62. Posterior hair on hind trochanter 0.2–0.3× length of trochantrofemoral suture *Xerobion georgii**
- Posterior hair on hind trochanter 0.3.0.5× length of trochantrofemoral suture *Xerobion brutii*
- 63. R IV+V stiletto-shaped, with RV extended as a needle-like tip, and RIV with a pair of very long finely pointed accessory hairs, as long as or longer than the ‘apical’ hairs, which are displaced so that two pairs occupy a midway position (Figure 12s; *Aphis* subgenus *Zyxaphis*) **64**
- R IV+V variable in shape but RV is not extended as a needle-like tip, and the accessory hairs are often shorter than the longest of the apical pairs (e.g. Figure 12t) **70**
- 64. R IV+V 0.24–0.29 mm long, about 2× HT II *Aphis infrequens*
- R IV+V 0.10–0.15 mm long, 1.3–1.6× HT II **65**
- 65. SIPH very short, only about as long as their basal widths. ANT PT/BASE 0.6–0.9 **66**
- SIPH longer than their basal widths. ANT PT/BASE 0.6–2.0 **67**
- 66. Cauda broadly rounded, not longer than its basal width. RV less than half as long as RIV. [Only alatae are known, but these characters are probably applicable also to apterae.] *Aphis utahensis*
- Cauda clearly longer than its basal width. RV attenuate, almost as long as RIV *Aphis minutissima*
- 67. SIPH about equal in length to cauda and ANT BASE VI *Aphis filifoliae*
- SIPH clearly longer than both cauda and ANT BASE VI **68**
- 68. SIPH rather thick and broad-based, slightly broader at base than middle of hind femur. Abdominal pigmentation when fully developed consists of a central patch on ABD TERG 2–4 joined to widely separate paired patches on ABD TERG 5, that extend laterally towards the siphunculi (Figure 12u). ABD TERG 7 with MTu well developed; only in small specimens are they much smaller than those on ABD TERG 1 *Aphis hermistonii*
- SIPH slightly narrower at base than middle of hind femur. Abdominal pigmentation variable, but if there are any paired patches on ABD TERG 5 then these do not extend further laterally than the central patch on ABD TERG 2–4, and are not widely separated (e.g. Figure 12v). ABD TERG 7 with MTu often much smaller than those on ABD TERG 1, and in very small specimens they are little larger than hair bases, or even absent **69**
- 69. ANT PT/BASE 0.8–1.5. SIPH 0.09–0.19× BL. Abdominal pigmentation when fully developed consisting of a large broad irregular quadrate central patch over most of ABD TERG 2–4 or 2–5, typically with a central notch in the posterior margin on ABD TERG 5 (Figure 12v). Hairs on ANT III 14–31 µm long, not usually exceeding BD III *Aphis canae*
- ANT PT/BASE 1.4–2.0. SIPH 0.19–0.26× BL. Abdominal pigmentation when fully developed consisting of an oval central patch on ABD TERG 2–4, longer than wide and not extending onto ABD TERG 5. Hairs on ANT III 30–50 µm long, longer than BD III *Aphis oregonensis*
- 70. ANT III with 1 or more secondary rhinaria (in normal apterae) **71**
- ANT III without secondary rhinaria (except in clearly alatiform apterae) **74**

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71. ANT 5-segmented. R IV+V 1.5–1.7× HT II. Cauda with 5–6 short hairs *Aphis globosa**
 – ANT 6-segmented. R IV+V 1.2–1.5× HT II. Cauda with 7–20 short or long hairs 72
72. ANT PT/BASE 1.0–1.1. Cauda with 16–20 hairs *Aphis elatior*
 – ANT PT/BASE 1.3–2.4. Cauda with 7–15 hairs 73
73. ANT PT/BASE 1.3–1.7. Cauda with 7–12 short hairs, which are maximally 1.5× BDIII *Aphis artemisivora**
 – ANT PT/BASE 1.5–2.4 (rarely less than 1.7). Cauda with 10–15 long hairs, which are more than 2× BDIII *Aphis middletonii*
74. ANT PT/BASE 1.3 or less 75
 – ANT PT/BASE 1.36 or more 80
75. SIPH much longer than cauda *Aphis hiltoni**
 – SIPH 0.5–1.0× cauda 76
76. Cauda c.0.2mm long, at least twice its basal width *Aphis nevskyi**
 – Cauda 0.08–0.13mm long, similar in length to basal width or only a little longer 77
77. Cauda with 6–8 hairs. SIPH pale *Brachyunguis tausaghyz**
 – Cauda with 14–20 hairs. SIPH dark 78
78. Longest hairs on ANT III 1.1–1.2× BD III. MTu usually absent from ABD TERG 6 *Aphis elongata*
 – Longest hairs on ANT III 0.3–0.5× BD III. MTu present or absent on ABD TERG 6 79
79. MTu consistently present on ABD TERG 6 as well as 1 and 7 *Aphis miranda*
 – MTu usually absent from ABD TERG 6 *Aphis elatior*
80. MTu present on ABD TERG 1–5 but not on 7. SIPH 0.4–0.8 (–1.2)× cauda which is helmet-shaped, distinctly shorter than its basal width. (Dorsal body and appendages with numerous long hairs) *Dysaphis microsiphon*
 – MTu always on ABD TERG 1 and 7, sometimes also on 2–4 or 2–5. SIPH 0.8–2.0× cauda which is tongue-shaped, tapering or triangular 81
81. MTu normally present on most of ABD TERG 2–4 (or 5) as well as 1 and 7 82
 – MTu absent from or only rarely present on tergites other than 1 and 7 84
82. SIPH 0.8–1.25× cauda. ANT III with hairs on anterior side short, but usually with one or more long, fine hairs on posterior side which are 2–3× BD III *Aphis artemisiphaga**
 – SIPH 1.4–2.0× cauda. Hairs on ANT III all short, the longest 0.2–0.8× BD III 83
83. ANT PT/BASE 2.8–3.3. R IV+V 1.25–1.4× HT II. Cauda triangular, about as long as its basal width, with about 16 hairs *Aphis artemisiphila**
 – ANT PT/BASE 2.5–2.7. R IV+V 1.1–1.2× HT II. Cauda about twice as long as its basal width, with 6–7 long hairs *Aphis neoartemisiphila**
84. R IV+V 1.36–1.91× HT II, tapering almost to a point, and often with concave sides. ANT PT/BASE 1.4–2.0 *Aphis kurosawai*
 – R IV+V 0.9–1.5× HT II, ending bluntly and with straight or convex sides. ANT PT/BASE 1.7–3.5 (rarely less than 2.0)

. . . polyphagous *Aphis* spp. (*fabae*, *gossypii* and *spiraecola*);
 for separation see key to polyphagous aphids, p. 1020.

KEY B

[Note: the following species could not be included in the key because specimens could not be discriminated on the basis of available material or published descriptions. The number in brackets after the species indicates the couplet they should run to in the key: – *Macrosiphoniella achlys* (67), *M. arenariae* (65), *M. alativica* (34), *M. altaica* (65), *M. austriacae* (67), *M. brevisiphona* (65), *M. dracunculi* (69), *M. frigidae* (67), *M. hofuchui* (44), *M. lena* (65), *M. lidiae* (29), *M. lopatini* (29), *M. procerae* (29), *M. pulvera* ssp. *khinganica* (41), *M. santolinifoliae* (66), *M. scopariae* (51), *M. sibirica* (85), *M. tszhongi*. (44)]

1. SIPH (Figure 13a) bearing many fine hairs, and long (9–10× longer than their midlength diameter and more than 2× the pale triangular cauda which is about 2× its basal width). First tarsal segments with (4–) 5 hairs *Macrotrichaphis yatsugatakensis*
- SIPH with few or no hairs (or if with many hairs then short (Figure 13e); c.3× midlength diameter and similar in length to dark tongue-shaped cauda, and first tarsal segments with 3 hairs) 2
2. Cauda short, less than 1.5× its basal width, more-or-less triangular, sometimes with a narrower distal part (e.g. Figure 13b) 3
- Cauda finger-like, longer than 1.5× its basal width, tapering or rounded at apex 6
3. SIPH with reticulation confined to a few transverse striae and closed cells at apex (Figure 13c). Abdominal spiracles with broadly open, rounded apertures *Artemisaphis artemisicola*
- SIPH with polygonal reticulation extending over distal 0.25–0.7 of length. Abdominal spiracles with small reniform apertures, partly occluded by the stigmal plates 4
4. SIPH thin, 1.3–2.0× cauda, 6–11× their least diameter near midlength. ANT III with 4–32 tuberculate secondary rhinaria, and IV with 0–12 *Metopeurum fuscoviride*
- SIPH thick and short, 1.0–1.3× cauda, 2.2–4.5× their midlength diameter. ANT III with 5–18 rhinaria, and IV with or without 1–2 rhinaria 5
5. ANT III with 5–13 rhinaria confined to basal half, none on IV *Macrosiphoniella elenae*
- ANT III with 14–18 rhinaria distributed over most of length, and 0–2 on IV *Macrosiphoniella insignata**
6. Thoracic spiracles very large, with round apertures, conspicuously larger than abdominal ones, although these also have broad open, oval apertures. Dorsal abdomen without any dark sclerotisation *Delphiniobium ussuriense**
- Thoracic spiracles similar in size and form to abdominal ones. Dorsal abdomen with or without dark sclerotisation 7
7. Abdominal spiracles with broadly open, oval apertures. Dorsal abdomen with dark intersegmental muscle plates. SIPH with subapical polygonal reticulation extending over 0.05–0.25 of length, and often bearing a few hairs 8
- Abdominal spiracles with small reniform apertures, partly occluded by the stigmal plates. Dorsal abdomen with unpigmented intersegmental muscle plates. SIPH with polygonal reticulation extending over 0.12–0.75 of length, and usually without hairs 15
8. ANT III (of apt.) with 12–26 secondary rhinaria (rarely less than 18), extending over full length of segment, and ANT IV with 0–6 (rarely 0). (Al. with 23–30 on III and 1–12 on IV) *Obtusicauda frigidae*
- ANT III with 0–13 secondary rhinaria, and ANT IV without any. (Al. with 4–28 on III and 0–2 on IV) 9
9. SIPH 1.0–1.7× ANT PT 10
- SIPH 0.4–0.95× ANT PT 12

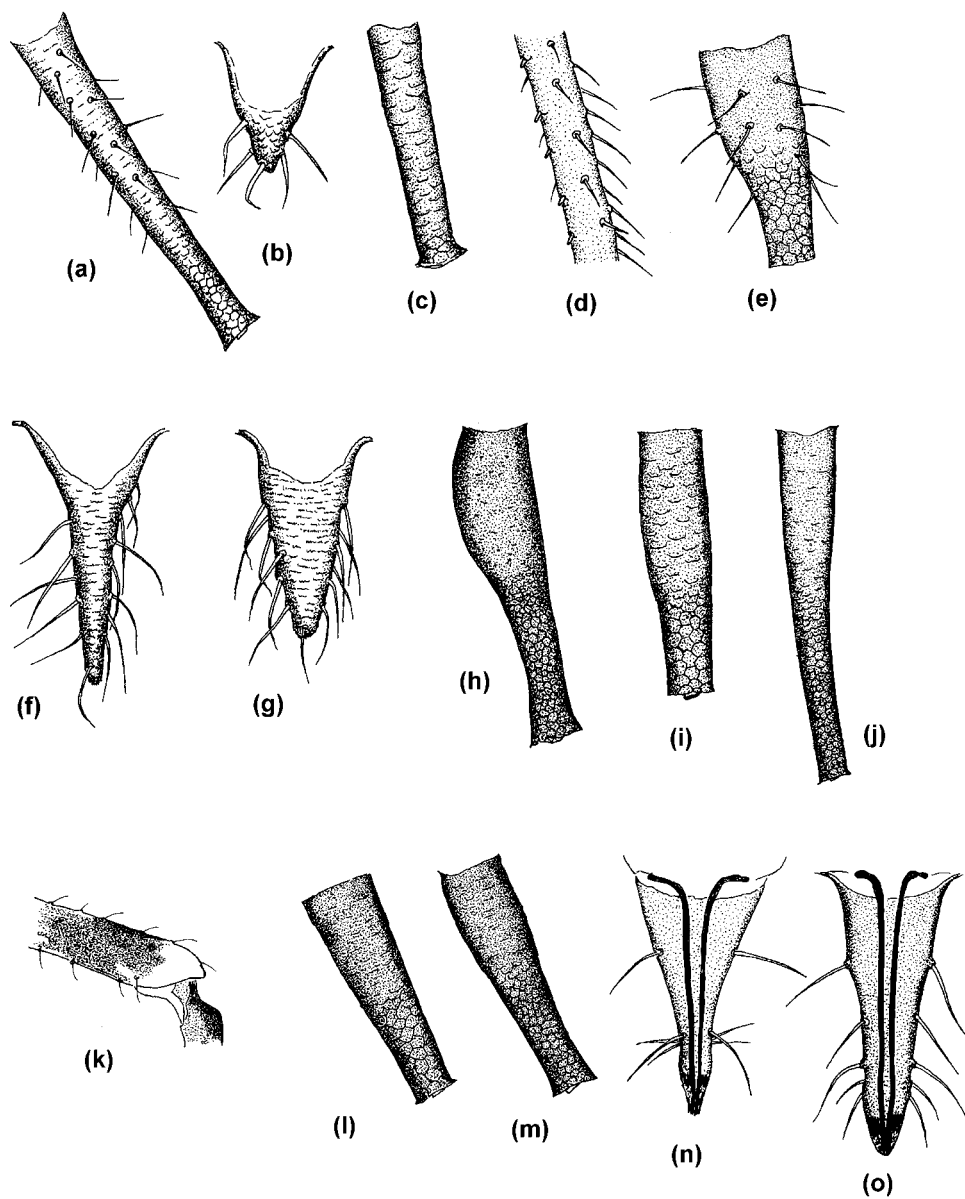


Figure 13 Apteræ on *Artemisia*, Key B. (a) SIPH of *Macrotrichaphis yatsugatakensis*, (b) cauda of *Artemisaphis artemisicola*, (c) SIPH of *A. artemisicola*, (d) part of mid-section of hind tibia of *Macrosiphoniella spinipes*, (e) SIPH of *M. chaetosiphon*, (f) cauda of *M. kuwayamai*, (g) cauda of *M. hikosanensis*, (h) SIPH of *M. antennata*, (i) SIPH of *M. teriolana*, (j) SIPH of *M. dimidiata*, (k) apex of hind femur of *M. umarovi*, (l) SIPH of *M. frigidivora*, (m) SIPH of *M. artemisiae*, (n) R IV + V of *M. kaufmanni*, (o) R IV + V of *M. chamaemelifolii*.

10. SIPH thick, 4.0–5.5× longer than their middle diameters. Coxae dusky or dark
Obtusicauda dolychosiphon
 – SIPH 5.5–10.5× longer than their middle diameters. Coxae pale or dark **11**
11. SIPH 1.4–1.7× cauda. Coxae dark *Obtusicauda anomella**
 – SIPH 1.7–2.3× cauda. Coxae pale *Obtusicauda filifoliae*
12. SIPH 0.4–0.6× ANT PT, and 0.8–1.0× cauda *Obtusicauda mongolica**
 – SIPH 0.65–0.95× ANT PT, and 1.1–2.0× cauda **13**
13. Coxae pale. ANT III (of apt.) with 0–2 secondary rhinaria. (Al. with 4–9)
Obtusicauda artemisiphila
 – Coxae dusky or dark. ANT III (of apt.) with 0–12 secondary rhinaria. (Al. with 12–24) **14**
14. ANT PT/BASE 3.3–5.1. SIPH 1.1–1.5× cauda, and 0.17–0.22× BL *Obtusicauda moldavica* group
 – ANT PT/BASE 4.9–6.5. SIPH 1.0–2.0× cauda and 0.19–0.37× BL *Obtusicauda coweni* group
15. First tarsal segments with 4–5 hairs, 3 subapical and 1–2 lateral **16**
 – First tarsal segments with 3 subapical hairs only, without lateral hairs **18**
16. Cauda dark. Tibiae wholly dark. SIPH about 1.6–1.7× cauda *Uroleucon omeishanense**
 – Cauda pale. Tibiae with paler middle section. SIPH 1.0–1.6× cauda **17**
17. ANT PT/BASE 5.5–6.5. SIPH 1.0–1.35× cauda. R IV+V 1.1–1.4× HT II. Cauda with 12–27 hairs
Uroleucon ambrosiae
 – ANT PT/BASE 3.8–4.8. SIPH 1.3–1.6× cauda. R IV+V 0.9–1.2× HT II. Cauda with 10–16 hairs
Uroleucon ambiguum
18. SIPH pale at least basally, 1.7–2.3× cauda, with reticulation over distal 0.12–0.20 (–0.25) of length. ANT PT/BASE 4.2–7.0. R IV+V with convex or straight sides and with hairs on basal half similar in length to subapical (primary) hairs **19**
 – SIPH pale or dark, 0.6–2.0× cauda, with reticulation over distal 0.25–0.75 of length. ANT PT/BASE often less than 4.2. R IV+V variable but often more-or-less stiletto-shaped, with concave sides and a pointed apex. Hairs on basal half of R IV+V often long and fine, longer than the subapical primary hairs **20**
19. ANT III with 1–10 rhinaria. SIPH pale or only dusky towards apex, which is not flared and has a distinct flange *Macrosiphum euphorbiae*
 – ANT III with 6–26 rhinaria. SIPH pale at base but darker distally, flared at apex, without any distinct flange (Figure 5i) *Macrosiphoniella tapuskae*
20. Cauda with a remarkable bipartite structure, comprising a broad base and a long thin twisted distal part **21**
 – Cauda finger-like or gradually tapering, not twisted **22**
21. Thin twisted distal part of cauda bearing c.10 hairs. ANT III with c.7–10 rhinaria. R IV+V with acutely pointed apex and 6 accessory hairs *Tshernovaia spirocaudicula**
 – Thin twisted distal part of cauda without hairs. ANT III with 20–40 rhinaria. R IV+V with blunt apex and 8–12 accessory hairs *Tshernovaia adenophorae*
22. Hind tibia with a ventral row of short thick peg-like hairs, distinct from the normal ones (Figure 13d) **23**
 – Hind tibia without a ventral row of short thick peg-like hairs **25**

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23. R IV+V 0.8–1.0× HT II. SIPH with reticulation over at least distal 0.5. Genital plate with 2–5 hairs on anterior part *Macrosiphoniella jaroslavi**
- R IV+V 1.2–1.6× HT II. SIPH with reticulation on distal 0.16–0.4. Genital plate with 9–14 hairs on anterior half **24**
24. SIPH long and stout, 0.22–0.28× BL, with reticulation over distal 0.25–0.30. R IV+V 1.4–1.6× HT II *Macrosiphoniella spinipes*
- SIPH 0.18–0.21× BL with reticulation over distal 0.16–0.25. R IV+V 1.2–1.4× HT II *Macrosiphoniella myohyangsani**
25. ABD TERG 2–4 each with at least 50 long, fine hairs arranged irregularly, not in transverse rows. Head with at least 12 dorsal hairs in addition to the frontal ones *(Macrosiphoniella subgenus Sinosiphoniella)*
- 26**
- ABD TERG 2–4 each with 8–35 hairs arranged in 1–2 transverse rows. Head with only 8–10 dorsal hairs in addition to frontal ones **29**
26. SIPH bearing long fine hairs (Figure 13e) *Macrosiphoniella chaetosiphon*
- SIPH without hairs **27**
27. Dorsal abdomen with dark transverse bars (sometimes broken into segmental groups of sclerites). Tibiae uniformly dark *Macrosiphoniella yomogicola*
- Dorsal abdomen without dark markings, or with small scleroites at bases of hairs. Tibiae usually with paler middle section, sometimes uniformly dark **28**
28. SIPH 1.1–1.6× cauda which tapers sharply from base and has long thin distal part (Figure 13f). R IV+V more than 3× its basal width, similar in length to HT II. Dorsal abdominal hairs without scleroites at their bases *Macrosiphoniella kuwayamai*
- SIPH 0.8–1.0× cauda which tapers gradually from base to apex (Figure 13g). R IV+V about 2× its basal width, clearly shorter than HT II. Dorsal abdominal hairs often arising from scleroites *Macrosiphoniella hikosanensis*
29. SIPH pale, dusky or dark, if mainly dark then with basal section distinctly paler over at least 0.1 of length **30**
- SIPH entirely or almost entirely dark, sometimes somewhat less dark at extreme base **51**
30. SIPH as long as or longer than head width across (and including) eyes **31**
- SIPH shorter than head width across eyes **40**
31. ANT III with 24–56 secondary rhinaria. R IV+V 1.2–1.5× HT II. SIPH thick, tapering from base to flange, not at all flared apically *Uroleucon dubius*
- ANT III with 1–16 secondary rhinaria. R IV+V 0.65–1.1× HT II. SIPH narrowing on distal reticulated section and often somewhat flared apically **32**
32. Hind tibia pale over most of length **33**
- Hind tibia dusky to dark **37**
33. R IV+V stiletto-shaped, more than twice as long as its basal width **34**
- R IV+V short, less than twice as long as its basal width **39**
34. Cauda with 8–10 hairs *Macrosiphoniella tadshikana** (or *alativica?*)
- Cauda with 12–19 hairs **35**
35. ANT III 1.9–2.2× ANT IV. SIPH 1.38–1.62× cauda *Macrosiphoniella xinjiangica*
- ANT III 1.05–1.3× ANT IV. SIPH 1.0–1.5× cauda **36**

36. SIPH 1.0–1.2× cauda *Macrosiphoniella terraalbae*
 – SIPH 1.2–1.5× cauda *Macrosiphoniella seriphidii*
37. Cauda with 7–15(-18) hairs. ABD TERG 8 with 3–6 hairs. Primary rhinaria with naked rims *Macrosiphoniella grandicauda*
 – Cauda with 18–33 hairs. ABD TERG 8 with 4–12 (mostly 8–11) hairs. Primary rhinaria with ciliate rims **38**
38. R IV+V 0.68–0.80× HT II. ABD TERG 8 with 6–12 hairs *Macrosiphoniella oblonga* group (incl. *hidaensis*)
 – R IV+V 0.59–0.61× HT II. ABD TERG 8 with 4 hairs *Macrosiphoniella similioblonga**
39. Femora entirely pale contrasting with wholly dark tibiae. Cauda with 6–9 hairs *Macrosiphoniella paucisetosa*
 – Femora with apical regions as dark as tibiae. Cauda with 18–26 hairs *Macrosiphoniella ludoviciana*e
40. ANT III with 23–73 secondary rhinaria *Macrosiphoniella borealis**
 – ANT III with 1–16 secondary rhinaria **41**
41. R IV+V 0.7–1.0× HT II **42**
 – R IV+V (1.0–) 1.05–1.5× HT II **45**
42. SIPH usually a little longer than cauda, which bears 8–13 hairs *Macrosiphoniella frigidicola*
 – SIPH usually a little shorter than (0.7–1.01×) cauda, which bears 10–28 hairs (if only 10–11 then SIPH 0.7–0.8× cauda) **43**
43. Longest hairs on ANT III 0.6–1.0× BD III *Macrosiphoniella pulvera*
 – Longest hairs on ANT III 1.1–1.8× BD III **44**
44. ABD TERG 3 with 10–14 hairs. R IV+V 0.6–0.8× HT II *Macrosiphoniella abrotani*
 – ABD TERG 3 with 21–32 hairs. R IV+V 0.85–0.95× HT II *Macrosiphoniella sieversianae**
45. Cauda with 18–22 hairs *Macrosiphoniella lijiangensis*
 – Cauda with 8–15 hairs **46**
46. Cauda with 10–17 hairs. ANT III with 2–16 secondary rhinaria. SIPH with polygonal reticulation extending over distal 0.50–0.65 *Macrosiphoniella szalaymarszoi* (part)
 – Cauda with 8–12 hairs. ANT III with 1–6 secondary rhinaria. SIPH with polygonal reticulation on distal 0.35–0.56 **47**
47. ANT PT/BASE 2.0–2.4. Hairs on ABD TERG 3 are 1.2–1.8× BD III *Macrosiphoniella sachalinensis**
 – ANT PT/BASE 2.5–4.0. Hairs on ABD TERG 3 are 2.0–3.4× BD III **48**
48. ANT PT/BASE 3.2–4.0. ANT III 1.3–1.7× cauda **49**
 – ANT PT/BASE 2.5–3.1. ANT III either 1.0–1.25 or 1.6–2.25× cauda **50**
49. R IV+V 1.30–1.45× HT II *Macrosiphoniella longirostrata**
 – R IV+V 1.0–1.1× HT II *Macrosiphoniella nitida* ssp. *soongarica*
50. SIPH 1.05–1.4× cauda. ANT III 1.6–2.25× cauda and 1.35–1.95× ANT IV. Hairs on ABD TERG 3 are 2.0–2.5× BD III *Macrosiphoniella cegmidi**
 – SIPH 0.8–0.9× cauda. ANT III 1.0–1.25× cauda and 0.95–1.2× ANT IV. Hairs on ABD TERG 3 are 2.7–3.4× BD III *Macrosiphoniella taesongsanensis**

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51. SIPH 0.90–1.45× cauda and flask-shaped; constricted at base, strongly swollen on basal half, narrowing on reticulated distal section to less than half the maximum width of the swollen part, and flared at apex (Figure 13h). R IV+V 0.7–0.9× HT II **52**
 – SIPH of various shapes, including flask- (or bottle-) shaped, but if strongly swollen on basal half then either less than 0.9× cauda, or R IV+V is longer than HT II (or both) **53**
52. Body spindle-shaped. ANT 1.3–1.75× BL, with ANT IV 0.8–1.2× ANT III
Macrosiphoniella antennata group
 – Body oval. ANT 1.0–1.1× BL, with ANT IV 0.5–0.6× ANT III *Macrosiphoniella gmelinicola*
53. Tibiae with at least middle part pale, contrasting with dark apex and not clearly darker than body **54**
 – Tibiae wholly dusky or dark, sometimes with middle section slightly less dark, but always clearly darker than body **65**
54. Hairs on ANT III 2.3–4.0× BD III *Macrosiphoniella kikungshana*
 – Hairs on ANT III 0.5–2.2× BD III **55**
55. SIPH with distal polygonal reticulation extending over 0.6 or more of length **56**
 – SIPH with distal polygonal reticulation over 0.3–0.55 of length **58**
56. ANT III with 8–32 secondary rhinaria (rarely less than 10, and usually extending whole length of segment) *Macrosiphoniella sanborni*
 – ANT III with 2–9 secondary rhinaria, not extending beyond basal 0.6 **57**
57. Hairs on dorsal body and antennae with pointed apices, and mostly arising from pigmented scleroites; longest hairs on ANT III 1.4–2.0× BD III, and on ABD TERG 3 more than 2.5× BD III. R IV+V 0.8–1.0× HT II *Macrosiphoniella himalayana*
 – Hairs on dorsal body and antennae with blunt or slightly capitate apices, and not arising from pigmented scleroites; longest hairs on antennae III 0.9–1.35× BD III, and on ABD TERG 3 less than 2.5× BD III. R IV+V 0.95–1.25× HT II *Macrosiphoniella pseudoartemisiae*
58. R IV+V 0.7–0.9× HT II **59**
 – R IV+V 1.0–1.5× HT II **62**
59. ANT PT/BASE 4.3–5.0. Dorsal abdominal hairs mostly arising from brown scleroites
*Macrosiphoniella oronensis**
 – ANT PT/BASE 3.2–4.25. Scleroites at bases of dorsal abdominal hairs unpigmented or lightly pigmented **60**
60. Anterior abdominal tergites with distinct tubercles each bearing 1–2 hairs *Macrosiphoniella arctica**
 – Abdominal tergites without tubercles **61**
61. SIPH 1.04–1.2× cauda, which bears 11–13 hairs *Macrosiphoniella subaequalis*
 – SIPH 0.8–1.0× cauda, which bears 14–20 hairs *Macrosiphoniella usquertensis*
62. R IV+V 1.3–1.5× HT II *Macrosiphoniella* sp. on *A. apiacea*, China
 – R IV+V 1.0–1.25× HT II **63**
63. ANT III with 4–5 secondary rhinaria and longest hairs 1.6–2.1× BD III. Cauda with about 10 hairs
*Macrosiphoniella sikkimartemisiae**
 – ANT III with 2–18 secondary rhinaria and longest hairs less than 1.3× BD III **64**
64. Cauda with 23–29 hairs *Macrosiphoniella kalimpongense**
 – Cauda with 9–17 hairs *Macrosiphoniella szalaymarzoi* (part)

65. Dorsal abdomen with a pattern of dark sclerotisation anterior to SIPH, usually involving at least some dark marginal and/or spinal sclerites that extend between hair bases **66**
 – Dorsal abdomen without a pattern of dark sclerotisation anterior to siphunculi (presiphuncular sclerites excepted), although often there are separate or lightly pigmented scleroites at bases of some of the hairs **69**
66. ANT III with 14–55 small secondary rhinaria (inner diameters about $0.25 \times \text{BD III}$). R IV+V $0.9\text{--}1.1 \times \text{HT II}$. SIPH $0.8\text{--}1.1 \times \text{cauda}$. (Alatae with 95–153 rhinaria on ANT III) *Macrosiphoniella absinthii*
 – ANT III with 2–13 secondary rhinaria of various sizes, the largest with inner diameter $0.33\text{--}0.5 \times \text{BD III}$. **If** SIPH less than $1.1 \times \text{cauda}$ **then** R IV+V $0.75\text{--}0.85 \times \text{HT II}$. (Alatae with 8–32 rhinaria on ANT III) **67**
67. SIPH $0.6\text{--}1.1 \times \text{cauda}$ *Macrosiphoniella atra* group (incl. *atrata*, *nigropilosa*)
 – SIPH $1.2\text{--}2.2 \times \text{cauda}$ **68**
68. Dorsal abdominal and femoral hairs with fine-pointed apices, $2.0\text{--}2.5 \times \text{BD III}$. SIPH almost cylindrical, only slightly narrower at flange than at base (Figure 13i) *Macrosiphoniella teriolana*
 – Dorsal abdominal and femoral hairs with blunt or slightly capitate apices, and maximally $1.5\text{--}1.8 \times \text{BD III}$. SIPH tapering, slightly swollen at base and with diameter at flange only about half that at base (Figure 13j) *Macrosiphoniella dimidiata* (or *kirgistica**)
69. Femora pale over at least half of length, only dark or dusky on apical 0.4 or less **70**
 – Femora mainly dusky or dark **73**
70. SIPH $0.9\text{--}1.25 \times \text{cauda}$ **71**
 – SIPH $1.4\text{--}1.7 \times \text{cauda}$ **72**
71. ANT PT/BASE $3.2\text{--}4.8$ *Macrosiphoniella nitida* group
 – ANT PT/BASE $2.1\text{--}2.6$ *Macrosiphoniella huaidensis*
72. R IV+V longer than HT II. ANT about $1.1 \times \text{BL}$, with ANT PT/BASE about 3.9
Macrosiphoniella lambersi (? – see text)
 – R IV+V shorter than HT II. ANT about $1.4\text{--}1.5 \times \text{BL}$, with ANT/PT BASE about $3.0\text{--}3.1$
Macrosiphoniella glabra
73. Dorsal abdominal hairs mostly arising from papilliform tubercles
*Macrosiphoniella tuberculatumartemiscicola**
 – Dorsal abdominal hairs sometimes arising from sclerotic and slightly raised cuticular areas, but not from distinct tubercles **74**
74. Femora each with pale spot at apex (Figure 13k). SIPH with reticulation only on distal $0.25\text{--}0.3$ of length
Macrosiphoniella umarovi
 – Femora without pale spot at apex. SIPH with reticulation on distal $0.3\text{--}0.7$ **75**
75. Dorsal abdominal hairs on ABD TERG 1–5 mostly arising from small dark scleroites. SIPH swollen on basal part **76**
 – Dorsal abdominal hairs on ABD TERG 1–5 not arising from scleroites (presiphuncular sclerites excepted), or if cuticle around hair bases is sclerotic then it is only faintly pigmented. SIPH not swollen on basal part **78**
76. R IV+V $1.2\text{--}1.4 \times \text{HT II}$. SIPH $1.0\text{--}1.5 \times \text{cauda}$ *Macrosiphoniella formosartemisiae*
 – R IV+V $0.9\text{--}1.0 \times \text{HT II}$. SIPH $0.7\text{--}0.9 \times \text{cauda}$ **77**
77. ANT III with 3–5 rhinaria. Cauda with 13–16 hairs *Macrosiphoniella gaoloushana*
 – ANT III with 8–14 rhinaria. Cauda with 8–10 hairs *Macrosiphoniella santolinifoliae*

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78. ANT III with 16–25 secondary rhinaria extending over most of segment III 79
 – ANT III with 1–32 secondary rhinaria, but if more than 15 then they are limited to basal half of segment 80
79. SIPH shorter than (0.7–0.8×) cauda *Macrosiphoniella mutellinae*
 – SIPH longer than (1.3–1.5×) cauda *Macrosiphoniella zeya*
80. BL 3.2–4.1 mm. ANT PT 4.8–6.8× R IV+V. Cauda with 27–44 hairs 81
 – BL 1.6–3.6 mm. ANT PT 2.4–5.0× R IV+V. Cauda with 10–36 hairs 82
81. R IV+V 0.7–0.9× HT II. ANT almost entirely jet black in mounted specimens, with only PT sometimes a little paler *Macrosiphoniella tanacetaria*
 – R IV+V 1.0–1.3× HT II. ANT mainly dark brown in mounted specimens, with base of ANT III and PT sometimes paler *Macrosiphoniella sikhotealinensis**
82. ANT I–VI uniformly dusky-dark, concolorous with head in cleared specimens. ANT PT 2.4–2.9× R IV+V. SIPH short and thick, about as thick as the constricted part of cauda at midlength. Cauda with 14–25 hairs *Macrosiphoniella hokkaidensis*
 – ANT mainly dusky-dark, but with paler basal section of ANT III, and sometimes ANT I and II also paler. ANT PT 2.4–5.0× R IV+V. SIPH narrower than cauda at midlength. Cauda with 10–36 hairs 83
83. SIPH 1.0–1.23× cauda. ANT III with 1–8 (usually 2–4) secondary rhinaria *Macrosiphoniella vallesiaca*
 – SIPH 0.6–1.05× cauda, but if more than 0.95× cauda then ANT III has 4–15 secondary rhinaria (usually 6–8) 84
84. R IV+V 0.7–0.85× HT II. (but **if** more than 0.83× HT II **then** ANT 1.25–1.65× BL) 85
 – R IV+V 0.8–1.3× HT II (**if** less than 0.9× HT II **then** ANT 0.9–1.2× BL) 87
85. ABD TERG 8 with 8–11 hairs *Macrosiphoniella sojaki*
 – ABD TERG 8 with 4–7 hairs 86
86. R IV+V with very acute apex (Figure 13n); width at level of most distal primary hairs is much less than BD III *Macrosiphoniella kaufmanni*
 – R IV+V blunter at apex and thicker subapically (Figure 13o); width at level of most distal primary hairs is similar to or only a little less than BD III *Macrosiphoniella chamaemelifoliae*
87. BL 1.6–2.2 mm. SIPH broadest at base (Figure 13l). Cauda with 12–18 hairs *Macrosiphoniella frigidivora*
 – BL 2.3–3.6 mm. SIPH usually slightly swollen on inner side near base so that there is an evident basal constriction (e.g., Figure 13m). Cauda with 17–36 hairs 88
88. ANT PT 2.4–3.5× R IV+V. R IV+V 1.0–1.2× ANT BASE VI and 1.0–1.3× HT II. Subgenital plate with 2–8 (usually 4–6) hairs on anterior half *Macrosiphoniella yomogifoliae*
 – ANT PT 3.6–5.0× R IV+V. R IV+V 0.67–1.0× ANT BASE VI and 0.8–1.1× HT II. Subgenital plate with 2–3 hairs on anterior half *Macrosiphoniella artemisiae*

KEY C

[N.B. This key cannot be applied to fundatrices, likely to be found in early spring populations.]

1. SIPH very small, no longer than their basal widths. Cauda triangular or helmet-shaped, not longer than its basal width in dorsal view 2

- SIPH tubular, much longer than their basal widths. Cauda tongue- or finger- shaped, usually longer than its basal width in dorsal view 9
- 2. Hairs on anterior ABD TERG as long as or longer than BD III. Tibiae with pale middle section 3
- Hairs on anterior ABD TERG very small, much less than 0.5× BD III. Tibiae uniformly dark 6
- 3. Tergum pale. Femora only dark apically *Microsiphoniella canadensis**
- Tergum dark, sclerotic. Femora mainly dark, only pale at bases 4
- 4. Dorsal abdominal hairs thick, 2–3× longer than BD III, with expanded or fan-shaped apices *Microsiphoniella oregonensis*
- Dorsal abdominal hairs fine-pointed or blunt, spine-like, not more than 2× longer than BD III 5
- 5. ANT PT/BASE 4.7–6.3 (except fundatrices). R IV+V 0.14–0.17 mm long, more than 2× its basal width *Microsiphoniella artemisiae*
- ANT PT/BASE 3.1–4.5. R IV+V 0.12–0.14 mm long, not more than 2× basal width *Microsiphoniella acophorum*
- 6. Cauda with 18–30 hairs 7
- Cauda with 8–14 hairs 8
- 7. ANT III with 10–34 secondary rhinaria, and ANT IV with 0–7. Hairs on ANT III usually all short and rather spine-like, maximally about 0.5× BD III. (Al. with 30–48 rhinaria on ANT III, and IV with 6–18) *Microsiphum jazykovi*
- ANT III with 6–18 secondary rhinaria, ANT IV with 0. Hairs on ANT III of variable length, many of those on basal half being long and fine-pointed, about equal to or a little longer than BD III. (Al. with 15–18 rhinaria on ANT III, and none on IV) *Microsiphum woronieckae*
- 8. Hairs on ANT III mostly fine-pointed, the longest of them about equal to BD III *Microsiphum giganteum*
- Hairs on ANT III bristle- or spine-like, up to 0.75× BD III *Microsiphum procerae*
- 9. Dorsal hairs either thick with fan- or funnel-shaped apices, or long and mostly with expanded, or slightly to moderately capitate, apices 10
- Dorsal hairs (or at least those on anterior abdominal segments) all short and blunt, or if rather long then with pointed apices 32
- 10. ANT III (of apt.) without any secondary rhinaria. Accessory hairs on R IV+V not particularly large. SIPH 3.3–5.2× cauda *Capitophorus formosartemisiae*
- ANT III (of apt.) almost always with at least one secondary rhinarium near base. R IV+V usually with a pair of particularly long and rather thick accessory hairs. SIPH 0.28–4.2× cauda 11
- 11. SIPH 0.28–0.72× cauda 12
- SIPH 0.74–4.2× cauda 15
- 12. ANT PT/BASE 5.6–7.6. Cauda 0.20–0.35 mm long and bearing 5–10 hairs (usually 6 or more) *Pleotrichophorus brevinectarius*
- ANT PT/BASE 3.1–5.4. Cauda 0.16–0.28 mm long and bearing 5–7 (usually 5) hairs 13
- 13. R IV+V tapering from base to apex, without needle-like tip. Antennae clearly longer than BL, with ANT PT/BASE 4.2–5.4 *Pleotrichophorus filifoliae**
- R IV+V with the distal part of RV extended as a needle-like, cylindrical tip (most evident in dorsoventral aspect; Figure 14a). Antennae a little shorter than BL, with ANT PT/BASE 3.1–4.5 14
- 14. SIPH, cauda and subgenital plate pale. Hairs on ABD TERG 1–5 short, fan-shaped, often without a cylindrical stem *Pleotrichophorus infrequenus*

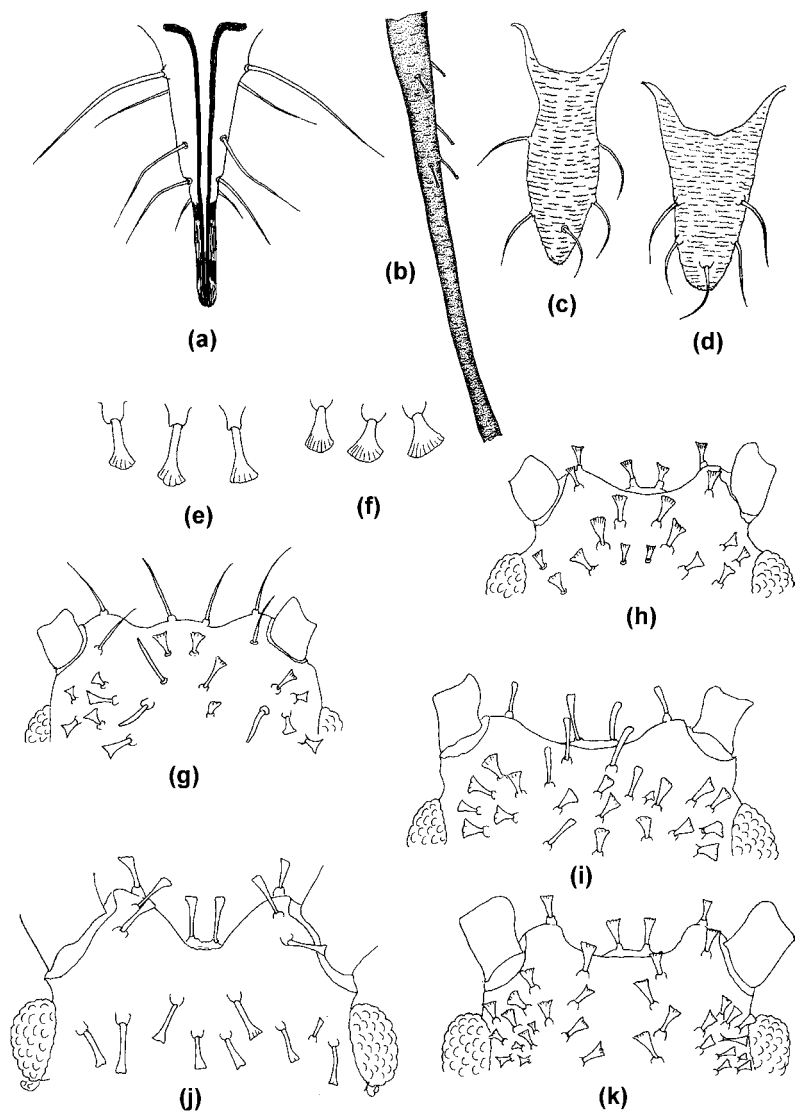


Figure 14 Apteræ on *Artemisia*, Key C. (a) R IV + V of *Pleotrichophorus infrequens*, (b) SIPH of *P. longipes*, (c) cauda of *P. quadritrichus*; (d) cauda of *P. pullus*, (e) three typical hairs on ABD TERG 3 of *P. glandulosus*, (f) same for *P. gnaphalodes*, (g) front of head of *P. heterohirsuta*, (h) same for *P. gnaphalodes*, (i) same for *P. quadritrichus*, (j) same for *P. pseudoglandulosus*, (k) same for *P. decampus*.

- SIPH, cauda and subgenital plate usually dusky or dark. Hairs on ABD TERG 1–5 longer, fan-shaped distally but with cylindrical basal half *Pleotrichophorus obscuratus*
- 15. SIPH mainly or entirely dark 16
- SIPH pale or dusky, sometimes darker on distal half 19

16. BL 2.4–3.0 mm. SIPH 3.0–3.75× cauda and bearing 2–12 long slightly capitate hairs on basal half (Figure 14b). Dorsal body hairs rather sparse and all long and only slightly capitate
Pleotrichophorus longipes
- BL 1.3–2.0 mm. SIPH 0.77–3.3× cauda and without hairs. Dorsal body hairs dense, with fan-shaped or distinctly capitate apices 17
17. SIPH 3.0–3.3× cauda, which is unpigmented *Pleotrichophorus artemisicola**
- SIPH 0.77–2.2× cauda which is dusky or dark 18
18. SIPH 0.77–1.57× cauda, which is 0.22–0.33 mm long and has a distinct constriction at about one third from base (Figure 14c) *Pleotrichophorus quadritrichus*
- SIPH 1.17–2.50× cauda, which is 0.14–0.23 mm long and tapering, without any constriction (Figure 14d) *Pleotrichophorus pullus*
19. Hairs on ABD TERG 1–5 all or mostly with distinct, more-or-less cylindrical rod-like stems, broadening distally into fan-shaped or capitate apices (Figure 14e) 20
- Hairs on ABD TERG 1–5 mostly cone- or fan-shaped, broadening from base (Figure 14f) 22
20. SIPH 1.5–2.5× cauda *Pleotrichophorus glandulosus* group
- SIPH 2.6–4.2× cauda 21
21. SIPH 0.9–1.1 mm long, 3.6–4.2× cauda *Pleotrichophorus narzikulovi**
- SIPH 0.6–0.8 mm long, 2.6–3.3× cauda *Pleotrichophorus persimilis*
22. SIPH 0.74–2.0× cauda 23
- SIPH 2.05–4.0× cauda 28
23. Hairs on antennae with pointed apices, the longest ones on ANT III being as long as or longer than BD III. Hairs on front of head varying greatly, from long and pointed to short and cone-shaped (Figure 14g) . . . *Pleotrichophorus heterohirsutus*
- Hairs on antennae very short, less than 0.5× BD III, with blunt or expanded apices. Hairs on front of head all cone-shaped or with expanded apices (Figure 14h–k) 24
24. R IV+V with the distal part of RV extended as a needle-like, cylindrical tip (most evident in dorsoventral aspect; as in Figure 14a) 25
- R IV+V tapering from base to apex 27
25. SIPH 0.74–1.0× cauda which bears 5–8 hairs (usually 2–4 dorsal). R IV+V short, broad-based, 0.11–0.12 mm long, 0.83–1.05× HT II *Pleotrichophorus spatulavillus*
- SIPH 0.8–1.6× cauda which bears 5 hairs (1 dorsal). R IV+V 0.12–0.16 mm long, 1.0–1.45× HT II 26
26. Anterior hairs on dorsal surface of head mostly with broadly expanded apices, like those more posterior (Figure 14h). Head and appendages very pale *Pleotrichophorus gnaphalodes*
- Anterior hairs on dorsal surface of head longer and with narrower apices than those more posterior (Figure 14i). Head, ANT I-II, SIPH and basal leg segments dusky or faintly sclerotic *Pleotrichophorus quadritrichus* ssp. *pallidus**
27. SIPH 0.18–0.33 mm long, 0.8–1.2× cauda *Pleotrichophorus parilis*
- SIPH 0.41–0.52 mm long, 1.5–2.0× cauda *Pleotrichophorus diutius*
28. ANT PT/BASE 3.6–4.2. R IV+V 0.85–0.95× HT II *Pleotrichophorus* sp. on *Seriphidium tridentata*, Oregon, BMNH colln
- ANT PT/BASE 4.7–7.5. R IV+V usually either less than 0.85 or more than 0.95× HT II 29

HOST LISTS AND KEYS

29. R IV+V 0.56–0.82× HT II *Pleotrichophorus zoomontanus*
 – R IV+V 0.9–1.5× HT II **30**
30. SIPH 0.66–1.02 mm long (aphids with BL 2.0–2.4 mm). Dorsal surface of head with 54–81 cone-shaped hairs (not including those projecting forward on front of head). Compound eyes conspicuously protruding *Pleotrichophorus longinectarius**
 – SIPH 0.32–0.64 mm long (aphids with BL 1.2–2.0 mm). Dorsal surface of head with 16–55 cone-shaped hairs. Compound eyes not conspicuously protruding **31**
31. Dorsal surface of head with 16–29 cone-shaped hairs, mostly with distinct stems (Figure 14j). R IV+V 0.125–0.16 mm long *Pleotrichophorus pseudoglandulosus*
 – Dorsal surface of head with 29–55 cone-shaped hairs, including many smaller and shorter stemless ones that fan out from base (Figure 14k). R IV+V 0.10–0.13 mm long *Pleotrichophorus decampus*
32. SIPH more than 0.8 mm long, 0.3–0.6× BL. Cuticle of head smooth, with broadly divergent ANT tubercles **33**
 – SIPH less than 0.75 mm long, less than 0.3× BL. Cuticle of head spiculose, with convergent, parallel or somewhat divergent ANT tubercles **37**
33. ANT III without rhinaria. ANT PT/BASE 2.1–2.7. Cauda with 5–8 hairs *Elatobium chomoense*
 – ANT III with 2–25 rhinaria. ANT PT/BASE 2.7–5.3. Cauda with 13–26 hairs **34**
34. Coxae pale. ANT III with 2–10 (–14) rhinaria, usually more-or-less in a row, with the rhinariated part not or only slightly swollen. SIPH smooth or only very weakly imbricated, 0.45–0.73× BL *Titanosiphon neoartemisiae*
 – Coxae dark. ANT III with 4–25 rhinaria which are not in a row and occupy a swollen part of the segment. SIPH smooth or imbricated, 0.3–0.6× BL **35**
35. SIPH 0.3–0.45× BL and with conspicuous imbrication. Cauda tapering to a point. ANT III with 7–12 rhinaria *Titanosiphon dracunculi*
 – SIPH 0.45–0.6× BL, smooth-surfaced. Cauda finger-shaped with a rather rounded apex. ANT III with 4–25 rhinaria **36**
36. R IV+V 1.00–1.22× HT II. ABD TERG 8 with 6–9 hairs. (Al. with 24–33 rhinaria on ANT III and none on IV) *Titanosiphon artemisiae*
 – R IV+V 0.80–1.04× HT II. ABD TERG 8 with 4–6 hairs. (Al. with 26–50 rhinaria on III and 0–7 on IV) *Titanosiphon minkiewiczii*
37. Dorsal body with distinctive black markings, including transverse bands or paired patches on thorax and a large roughly horseshoe-shaped patch on the abdomen *Neomyzus circumflexus*
 – Dorsal body pale or dark, without such markings **38**
38. ANT III with at least one secondary rhinarium near base (rarely none on one side). ANT tubercles with inner faces parallel or divergent, spinulose but not scabrous. SIPH rather long, straight and tapering from a broad base, with moderate imbrication **39**
 – ANT III without any secondary rhinaria. ANT tubercles with inner faces parallel or convergent, or with distinct processes, and/or scabrous. SIPH variable, often curved, cylindrical over most of length or swollen on distal half, moderately to heavily imbricated or scabrous **40**
39. Head pale. ANT tubercles with inner faces approximately parallel. ANT III with a (0–) 1–2 (–4) rhinaria near base. SIPH pale except at apices. Cauda pale *Aulacorthum solani*
 – Head dark. ANT tubercles with inner faces distinctly divergent. ANT III with 3–4 rhinaria. SIPH dark at least on basal half. Cauda dark *Aulacorthum dasi**

40. SIPH dark brown or black **41**
 – SIPH pale or dusky, or dark only at apices **46**
41. ANT PT c.4.25× R IV+V and c.1.35× SIPH, which are clavate, with swollen part c.1.33× minimum diameter of stem *Neotoxoptera yasumatsui* ssp. *artemisiae*
 – ANT PT 0.7–2.3× R IV+V and 0.25–0.9× SIPH which have little or no swelling of apical part **42**
42. ANT PT 1.7–2.3× R IV+V. SIPH without hairs. ANT III, IV and tibiae pale **43**
 – ANT PT 0.7–1.4× R IV+V. SIPH with or without hairs. ANT and legs mainly brown **44**
43. Dorsum almost wholly dark. R IV+V 1.1–1.2× HT II *Myzus cerasi* ssp. *umefoliae*
 – Dorsum pale. R IV+V 1.5–1.7× HT II *Tuberocephalus lazikouensis*
44. SIPH without hairs. ANT 5-segmented, with PT/BASE 1.0–1.6. SIPH 2.3–3.8× PT. Dorsum dark *Tuberocephalus uwamizusakurae**
 – SIPH with some hairs. ANT 5- or 6-segmented, with PT/BASE 1.4–2.4. SIPH 1.7–2.4× PT. Dorsum pale or dark **45**
45. (Apt. with 6-segmented antennae) ANT III 0.21–0.25 mm long. SIPH 1.4–1.5× ANT III *Tuberocephalus sakurae*
 – (Apt. with 6-segmented antennae) ANT III 0.14–0.16 mm long. SIPH 1.6–2.0× ANT III *Tuberocephalus higansakurae* ssp. *hainnevilleae*
46. SIPH bearing several (about 5–8) hairs *Tuberocephalus liaoningensis*
 – SIPH without hairs **47**
47. ANT tubercles with forwardly pointing finger- or thumb-like projections, and often the inner sides of ANT I similarly extended. Hairs on ANT tubercles conspicuous, erect, slightly capitate, 0.7–1.2× BD III. (Al. with secondary rhinaria on both ANT III and IV) **48**
 – ANT tubercles gibbous, their inner faces convergent or parallel, without projections. Hairs on ANT tubercles short and blunt, less than 0.6× BD III. (Al. with secondary rhinaria only on ANT III) **49**
48. ANT 5- or 6-segmented, 0.6–0.75× BL, with PT/BASE 2.0–2.7. Dorsal cuticle wrinkled or smooth, not nodulose. Frontal projections thumb-like, 0.04–0.06 mm long, less than twice their diameter *Tuberocephalus sasakii*
 – ANT 4, 5 or 6-segmented, 0.3–0.4× BL, with PT/BASE 1.3–1.8. Dorsal abdominal cuticle markedly nodulose. Frontal projections finger-like, 0.08–0.1 mm long, 3 or more times longer than their diameter *Tuberocephalus artemisiae*
49. Dorsal abdomen with an intersegmental pattern of dark ornamentation. ANT PT/BASE less than 2.5. SIPH tapering, with a slight S-curve, and coarsely imbricated *Myzus ornatus*
 – Dorsal abdomen without any clear dark intersegmental markings. ANT PT/BASE more than 2.5. SIPH slightly to moderately clavate **50**
50. SIPH as long as or longer than ANT III. Inner faces of ANT tubercles convergent in dorsal view *Myzus persicae*
 – SIPH clearly shorter than ANT III. Inner faces of ANT tubercles approximately parallel in dorsal view *Myzus ascalonicus*

Arthraxon*A. ciliaris**A. hispidus***Gramineae***Ceratovacuna nekoashi*; *Hysteronura setariae*;*Kaochiaoja arthraxonis*; *Melanaphis saccharii**Ceratovacuna nekoashi*; *Melanaphis arthraxonophaga*

HOST LISTS AND KEYS

A. lancifolius

Sitobion microspinulosum

A. langsdorffianus

Rhopalosiphum padi

Key to aphids on *Arthraxon*:-

1. Head with a pair of forwardly-projecting horns. Antennae very short, less than 0.2× BL. SIPH as slightly raised pores with sclerotic rims. Sides of body with large groups of wax pore-plates
Ceratovacuna nekoashi
 - Head without horns. Antennae more than 0.6× BL. SIPH tubular. No evident wax glands 2
2. Dorsum with extensive dark pigmentation. Head weakly or markedly spiculose 3
 - Dorsum without pigmentation, or with only small dark patches. Head without spicules 4
3. SIPH only a little longer than cauda, with a subapical zone of polygonal reticulation, and ornamented proximal to this with numerous small nodules. Dorsal abdomen with close-set, irregular rows of minute spicules *Sitobion microspinulosum*
 - SIPH more than 2× cauda, without subapical polygonal reticulation, and with normal imbrication. Dorsal abdomen without spicules, but with variolate sculpturing of the sclerotic areas
Kaochiaoja arthraxonis
4. SIPH clearly shorter than cauda 5
 - SIPH longer than cauda 6
5. Cauda with 16–20 hairs. Longest hairs on hind tibia almost as long as its middle diameter *Melanaphis arthraxonophaga**
 - Cauda with 8–17 (mostly 10–14) hairs. Longest hairs on hind tibia usually shorter than its middle diameter *Melanaphis sacchari*
6. Cauda long and pale, contrasting with black calf-shaped SIPH *Hysteronera setariae*
 - Cauda short and with similar pigmentation to SIPH, which are slightly swollen distally
Rhopalosiphum padi

(or, if none of these fits, try general keys to apterae of grass-feeding aphids under *Digitaria*)

Arthrophytum

A. ammodendron

Chenopodiaceae

Brachyunguis saxaulica

Arthropteris

A. orientalis

Oleandraceae

Micromyzella [davalliae], pterisoides

See key to fern-feeding aphids under *Polypodium*.

Artocarpus see Blackman and Eastop (1994)

Arum

A. canariensis

A. dioscoridis

A. italicum

A. korolkowii

A. maculatum

Araceae

Myzus persicae

Myzus cymbalariae

Dysaphis tulipae; Patchiella reaumuri;

Rhopalosiphum nymphaeae

Rhopalosiphoninus staphyleae

Melanaphis sacchari; Patchiella reaumuri;

Pentalonia nigronervosa

*A. orientale**Arum spp.*[*Aploneura ampelina*]*Aphis gossypii*; *Aulacorthum solani*;*Macrosiphum euphorbiae*; *Neomyzus circumflexus*Key to aphids on *Arum*:-

1. ANT PT/BASE much less than 1. Eyes 3-facetted. SIPH absent *Patchiella reaumuri*
 - ANT PT/BASE much more than 1. Eyes multifacetted. SIPH present **2**
2. Cuticle of head densely spiculose **3**
 - Cuticle of head without spicules **4**
3. SIPH and femora covered with irregular, transverse rows of spicules. ANT PT/BASE 5.8–8.1. (Al. with dark-bordered wing veins, with radius and costa fused for part of lengths to form a closed cell behind the pterostigma) *Pentalonia nigronervosa*
 - SIPH and femora smooth or imbricated, not markedly spiculose. ANT PT/BASE 1.4–5.8. (Al. with normal wing venation, veins not dark-bordered)
 - go to key to polyphagous aphids, p. 1020, starting at couplet 5
4. ANT tubercles very well developed with inner faces smooth and divergent. SIPH pale with a subapical zone of polygonal reticulation *Macrosiphum euphorbiae*
 - ANT tubercles weakly developed. SIPH without subapical polygonal reticulation, and usually dusky or dark. **5**
5. SIPH clavate. Dorsal cuticle with a pattern of spicules arranged in polygons, each polygon with 1 or more central spicules *Rhopalosiphum nymphaeae*
 - SIPH cylindrical/tapering. Dorsal cuticle without spicules arranged in polygons **6**
6. Cauda helmet-shaped, about as long as its basal width. Head and ABD TERG 7 and 8 with spinal tubercles (STu) *Dysaphis tulipae*
 - Cauda tongue-shaped, much longer than its basal width. STu absent **7**
7. SIPH shorter than the similarly dark cauda, which bears 9–17 hairs *Melanaphis sacchari*
 - SIPH longer than cauda, which is pale or dusky and bears 4–8 hairs *Aphis gossypii*

Aruncus*A. dioicus* (incl. *sylvestris*)*Aruncus sp.***Rosaceae***Acyrtosiphon pseudodirhodum*;*Macrosiphum cholodkovskyi**Aphis ulmariae*

1. Head dark with ANT tubercles not developed. ANT shorter than BL. Large marginal tubercles (MTu) on ABD TERG 1 and 7. Cauda short and rounded at apex *Aphis ulmariae*
 - Head pale with well-developed, divergent ANT tubercles. ANT longer than BL. No MTu on ABD TERG 1 and 7. Cauda long and pointed at apex **2**
2. SIPH 0.75–1.15× cauda and without any subapical polygonal reticulation *Acyrtosiphon pseudodirhodum*
 - SIPH 1.7–2.4× cauda, with polygonal reticulation on distal 0.11–0.17 of length *Macrosiphum cholodkovskyi*

[N.B. Other Rosaceae-feeding *Aphis*, *Acyrtosiphon* or *Macrosiphum* spp. might occur on this genus; or try the key to polyphagous aphids, p. 1020)]

HOST LISTS AND KEYS

Arundinaria (incl. Pleioblastus)

A. alpina
A. auceps
A. chino
A. gigantea var. *tecta*
A. japonica
A. niitakayamensis
Arundinaria spp.

Gramineae

Hyalopterus pruni; *Pseudoregma panicola*;
Sitobion papillatum ssp. *subnudum*
Takecallis taiwanus
Ceratovacuna japonica; *Takecallis arundicolens*
Paracolopha morrisoni; *Rhopalosiphum arundinariae*;
Takecallis taiwanus
Melanaphis bambusae;
Takecallis arundicolens, *arundinariae*
Cranaphis formosanus
Cerataphis longifila; *Chaitogeoica tattakana*;
Cranaphis indica; *Forda marginata*;
Glyphinaphis bambusae;
Melanaphis arundinariae, *meghalayensis* ssp. *bengalensis*
Neocranaphis arundinariae

[See Blackman and Eastop (1994) for keys to aphids on *Arundinaria* and *Bambusa*, and for accounts of bamboo-feeding aphids.]

Arundo

A. donax

A. mauritanica
A. variegata

Gramineae

Hyalopterus amygdali, *pruni*; *Hysteroneura setariae*;
Macrosiphum euphorbiae; *Melanaphis donacis*;
Metoplophium dirhodum; *Myzus ornatus*, *persicae*
Rhopalosiphum maidis, *padi*, *rufiabdominale*;
Schizaphis graminum, [*rosazevedoi*]
Sipha maydis; [*Takecallis arundicolens*]
Rhopalosiphum padi; *Sitobion fragariae*
Melanaphis donacis

Key to aphids on *Arundo*:-

- 1 Dorsal body hairs long and spine-like. SIPH as short, truncated cones. Cauda broadly rounded
Sipha maydis
- Dorsal body hairs if long then fine and pointed (but more often short and inconspicuous). SIPH tubular.
 Cauda longer than its basal width **2**
2. SIPH as long as or longer than cauda . . . go to key to apterae on grasses under *Digitaria*
- SIPH much shorter than cauda **3**
3. SIPH dark, stump-shaped, broadest at base. ANT PT/BASE 0.95-1.95. Cauda with 12-22 hairs
Melanaphis donacis
- SIPH pale or dusky, thin, cylindrical, narrow-based. ANT PT/BASE 2.5 or more. Cauda with 4-6 hairs
Hyalopterus pruni (or *amygdali*)

Asarum

A. canadense
A. europaeum
A. kooyanum
Asarum sp.

Aristolochiaceae

[*Aphis* sp. - Leonard, 1973: 3]; *Myzus persicae*
Brachycaudus cardui; *Rhopalosiphoninus staphyleae*
Myzus persicae
Aulacorthum solani

Key to aphids on *Asarum*:-

- Dorsum with an extensive solid black patch. Cauda helmet-shaped, not longer than its basal width in dorsal view *Brachycaudus cardui*
- Without this combination of characters go to key to polyphagous aphids, p. 1020

Asclepias*A. cornuti* see *A. syriaca**A. curassavica**A. exaltata**A. floridana**A. fruticosa**A. galioides**A. glaucescens**A. grandiflora**A. incarnata* (incl. *pulchra*)*A. lanuginosa**A. lineolata**A. longifolia**A. lunata**A. mellodora**A. mexicana**A. nivea**A. physocarpa**A. purpurascens**A. speciosa**A. stenophylla**A. syriaca* (incl. *alba*, *cornuti*)*A. tomentosa**A. tuberosa**A. verticellata**A. vestita**Asclepias* spp.**Asclepiadaceae***Aphis asclepiadis*, *fabae*, *gossypii*, *nerii*, *spiraecola*;
Brachycaudus helichrysi; [*Macrosiphoniella kikungshana*];
*Myzus persicae**Aphis nerii**Aphis asclepiadis**Aphis gossypii*, *nerii*; *Myzus persicae**Aphis nerii**Aphis spiraecola**Aphis nerii**Aphis asclepiadis*, *nerii**Brachycaudus helichrysi* (as *Anuraphis padi*)*Aphis nerii**Aphis asclepiadis**Aphis nerii**Aphis nerii**Aphis nerii**Aphis nerii**Aphis gossypii*, *nerii**Aphis nerii*; [*Myzocallis asclepiadis* (Monell in Riley and Monell, 1879)]*Aphis asclepiadis*, *fabae*, *gossypii*, *nerii*;*Brachycaudus helichrysi*; *Macrosiphum euphorbiae*;*Myzus persicae**Aphis middletonii* group*Aphis asclepiadis*, *fabae*, *gossypii*, *helianthi*, *nerii*, *spiraecola*;*Aulacorthum solani*; *Macrosiphum euphorbiae*;[*Myzocallis asclepiadis* (Monell in Riley and Monell, 1879)];*Myzus persicae**Aphis spiraecola**Aphis asclepiadis*, *nerii*; *Aulacorthum solani*;[*Macrosiphum gaurae* – Leonard, 1973: 8];[*Myzocallis asclepiadis* (Monell in Riley and Monell, 1879)]*Aphis gossypii**Aphis gossypii*, *nerii**Aphis helianthi*; [*Hyperomyzus lactucae*]; *Toxoptera aurantii*Key to aphids on *Asclepias* (also *Cryptostegia*):-

1. Cauda helmet-shaped, not longer than its basal width. Abdominal spiracles widely open, large and rounded *Brachycaudus helichrysi*
- Cauda tongue of finger-shaped, clearly longer than its basal width 2

HOST LISTS AND KEYS

2. ANT tubercles well developed. SIPH mainly pale. ABD TERG 1 and 7 without marginal tubercles (MTu) go to key to polyphagous aphids, p. 1020, starting at couplet 4
 - ANT tubercles weakly developed, not or hardly projecting forward beyond middle of head in dorsal view. SIPH dark. ABD TERG 1 and 7 with MTu 3
3. Stridulatory apparatus present, consisting of cuticular ridges on abdominal sternites 5 and 6 and a row of peg-like hairs on each hind tibia *Toxoptera aurantii*
 - No stridulatory apparatus 4
4. ANT III (in normal apt.) with 1–14 rhinaria. SIPH 0.7–1.2× R IV+V. Dorsal abdomen with variable, often rather extensive, dark patches *Aphis middletonii*
 - ANT III without rhinaria (except in alatiform apt). SIPH more than 1.5× R IV+V. Dorsal abdomen without or with a few scattered markings anterior to SIPH, or with a solid black shield 5
5. Dorsal abdomen with a solid black shield *Aphis craccivora*
 - Dorsal abdomen without a solid black shield 6
6. Hind tibiae mainly dark. ANT PT/BASE 3.4–4.7. R IV+V 1.25–1.6× HT II. SIPH 1.7–2.7× cauda. *Aphis nerii*
 - Hind tibiae pale for more than half of length. ANT PT/BASE 1.4–3.5. R IV+V 0.85–1.24× HT II. SIPH 0.7–2.5× cauda 7
7. ABD TERG 8 with 2 hairs (rarely with 3). Dorsal abdomen without any dark markings 8
 - ABD TERG 8 with 2–11 hairs (usually 4–6). Dorsal abdomen with or without dark markings 9
8. Cauda paler than SIPH, without any constriction, and bearing 4–7(–8) hairs. Femoral hairs shorter than trochantrofemoral suture *Aphis gossypii*
 - Cauda black like SIPH, usually with a midway constriction, and bearing (6–) 8–15 hairs. Femoral hairs long and fine, the longest longer than trochantrofemoral suture *Aphis spiraeicola*
9. ANT III 0.65–1.01× PT. Dorsal abdomen usually with some dark markings anterior to SIPH (in addition to dark intersegmental muscle sclerites) *Aphis fabae*
 - ANT III 1.05–1.95× PT. Dorsal abdomen usually without any dark markings anterior to SIPH (except for dark intersegmental muscle sclerites) 10
10. Hairs on ANT III and anterior abdominal tergites finely pointed like those on outside of hind tibia and on ABD TERG 6–8. Longest hair on ANT III is 36–56µm, 1.6–2.2× BD III. Longest hair on ABD TERG 3 is 44–70µm, 1.8–2.8× BD III *Aphis asclepiadis*
 - Hairs on ANT III and anterior abdominal tergites shorter and more abruptly pointed than those on hind tibia and ABD TERG 6–8. Longest hair on ANT III is 11–35µm, 0.5–1.5× BD III. Longest hair on ABD TERG 3 is 15–51µm, 0.6–2.1× BD III *Aphis helianthi*

Ascocentrum

A. ampullaceum

Orchidaceae

Ceraphis orchidearum

Ascyrum see *Hypericum*

Asparagus (incl. *Protasparagus*)

A. cochinchinensis

A. densiflorus see *sprengeri*

A. myriocladus

Liliaceae

Myzus persicae

Aphis craccivora; *Neomyzus circumflexus*

<i>A. officinalis</i>	[<i>Acyrtosiphon pisum</i>]; <i>Aphis craccivora, fabae, gossypii, helianthi</i> , [<i>salsolae</i>], <i>spiraecola; Brachycorynella asparagi</i> ; <i>Macrosiphum euphorbiae, pallidum, stellariae</i> ; <i>Myzus ascalonicus, ornatus, persicae</i> ; <i>Sitobion africanum, avenae</i> , [<i>chanikiwiti</i>]
<i>A. palaestinus</i>	[<i>Miraphis asparagi</i> Börner in Bodenheimer, 1930 (probably <i>Brachycorynella asparagi</i>)]
<i>A. plumosus</i>	<i>Aphis craccivora; Brachycorynella asparagi</i> ; <i>Macrosiphum euphorbiae; Myzus persicae</i> ; <i>Neomyzus circumflexus</i>
<i>A. retrofractus</i>	<i>Aphis gossypii; Aulacorthum solani; Myzus persicae</i>
<i>A. schoberioides</i>	<i>Aphis fabae</i>
<i>A. setaceus</i>	<i>Aulacorthum solani</i>
<i>A. sprengeri</i> (incl. <i>densiflorus</i>)	<i>Aphis fabae, gossypii, nasturtii; Aulacorthum solani</i> ; <i>Brachycorynella asparagi; Macrosiphum euphorbiae</i> ; <i>Myzus ascalonicus, ornatus, persicae</i> ; <i>Neomyzus circumflexus; Sitobion africanum</i> ; <i>Toxoptera aurantii</i>
<i>A. stipularis</i>	<i>Aphis craccivora</i>
<i>A. tenuifolius</i>	<i>Brachycorynella asparagi</i>
<i>Asparagus</i> spp.	<i>Myzus cymbalariae; Smynthurodes betae</i>

Key to apterae on *Asparagus*:-

1. SIPH as very small truncated cones, much shorter than cauda *Brachycorynella asparagi*
– SIPH much longer than cauda (or absent) 2
2. SIPH (if present) without polygonal reticulation. If ANT tubercles are well developed then head is spiculose go to key to polyphagous aphids, p. 1020
– SIPH with a subapical zone of polygonal reticulation (at least 4–5 rows of closed cells). Head always without spicules 3
3. Longest hairs on ANT III 0.6–1.0× BD III. SIPH pale, or if dark then usually pale at base. ANT tubercles well developed 4
– Longest hairs on ANT III 0.2–0.4× BD III. SIPH wholly dark. ANT tubercles rather weakly developed 6
4. SIPH wholly or mostly dark, pale only at base. Tibiae wholly dark *Macrosiphum pallidum*
– SIPH wholly pale, or dark only distally. Tibiae mainly pale 5
5. Femora usually with a dark spot or patch near apices. Dorsal hairs on head and ABD TERG 3 mostly longer than BD III *Macrosiphum stellariae*
– Femora pale or honey brown near apex. Dorsal hairs on head and ABD TERG 3 not longer than ANT BD III *Macrosiphum euphorbiae*
6. SIPH 1.1–1.4× cauda. HT II 1.2–1.6× R IV+V *Sitobion avenae*
– SIPH 1.5–1.9× cauda. HT II 1.0–1.3× R IV+V *Sitobion africanum*

HOST LISTS AND KEYS

Asperella see *Hystrix*

Asperugo

A. procumbens

Use key to polyphagous aphids, p. 1020.

Asperula

A. aristata

A. arvensis

A. cynanchica

A. glauca

A. humifusa

A. longifolia

A. neilreichii

A. odorata

A. setulosa

A. tinctoria

Asperula sp.

Boraginaceae

Brachycaudus helichrysi; *Macrosiphum euphorbiae*

Woodruff

Staegeriella asperulae; *Uhlmannia singularis*
Aphis gossypii, [*Aphis* sp. (Davletshina, 1964: 124)]
Aphis galiiscabri, *nonveilleri*; *Dysaphis pyri*;
[*Hydaphias* sp. (Bozhko, 1976a)]; *Myzus cerasi*;
Staegeriella asperulae; *Uhlmannia singularis*
Aphis galiiscabri; *Hydaphias helvetica*;
Staegeriella necopinata
Myzus sp. (*cerasi* group; Crimea, leg. J. Holman)
Uhlmannia singularis
Uhlmannia singularis
[*Aphis* sp. on roots; Schouteden, 1902];
[*Hydaphias monsana*]; *Liniosiphon asperulophagum*;
Myzus cerasi
Macrosiphum euphorbiae
Aulacorthum solani
Myzus sp. (Crimea; BMNH, leg. J. Holman)

Rubiaceae

Use key to aphids on *Galium*, on which most of the listed (unbracketed) species also occur.

Asphodeline

A. liburnica

Asphodelaceae

Myzus ornatus

Aspidistra

Aspidistra sp.

Convallariaceae

Myzus persicae

Aspidium see *Tectaria*

(See also *Dryopteris*, *Polypodium*, *Polystichum* and *Thelypteris* for fern species previously placed in *Aspidium*.)

'*Aspidium*' sp.

Myzus sp. (Pakistan, BMNH colln, leg. M.A. Ghani)

See *Polypodium* for a key to fern-feeding aphids.

Aspilia

Aspilia spp.

Compositae

Aphis craccivora, *gossypii*, *spiraecola*;
Uroleucon compositae

One or more of the above polyphagous aphid species is recorded from each of the following *Aspilia* spp.:
africana, *helianthoides*, *kotschysi*, *latifolia*, *multiflora*, *rudis*.

Use key to polyphagous aphids, p. 1020.

Asplenium

- A. adiantum-nigum*
A. aethiopicum
A. bulbiferum
A. ceterach
A. curicularium
A. dalhousiae
A. esculentum
- A. hemionitis*
A. nidus
A. ruta-muraria
A. scolopendrium
A. septentrionale
A. tenerum
A. trichomanes
- A. unilobium*
A. viride
Asplenium spp.

Aspleniaceae

- Idiopterus nephrolepidis*; *Macromyzus woodwardiae*
Micromyzella kathleena, *pterisoides*, *sophiae*
Macrosiphum walkeri
Idiopterus nephrolepidis
Macromyzus woodwardiae
Taiwanomyzus himalayensis
Macromyzella polypodicola;
Macromyzus maculatus, *woodwardiae*
Idiopterus nephrolepidis
Micromyzella filicis
Taiwanomyzus alpicola
Idiopterus nephrolepidis
Taiwanomyzus alpicola
Micromyzella filicis
Idiopterus nephrolepidis; *Micromyzodium filicium*;
Taiwanomyzus alpicola
Aphis spiraeicola
Taiwanomyzus alpicola
Amphorophora ampullata, *ampullata* ssp. *bengalensis*,
ampullata ssp. *laingi*;
Micromyzella judenkoi; [*Myzackaia verbasci*];
Neomyzus circumflexus

See *Polypodium* for a key to fern-feeding aphids.

Aster (incl. Doellingeria, Galatella)

- A. adustus*
A. ageratoides (incl. vars *amplexi*
folius, *ovatus*, *semiamplexicaulis*)
A. alpinus
A. amellus
A. bakeranus
A. biflora
A. bracei
A. canescens var. *viscosus*
A. chromopappus
A. cordifolius
A. dahuricus
A. divaricatus
A. dracunculoides
A. drummondii
A. dumosus
- A. emellus*
A. ericoides (incl. *multiflorus*)

Compositae

- Macrosiphoniella yomenae*
Macrosiphoniella yomenae;
Uroleucon fuchuense, *monticola*, *vera*
Brachycaudus helichrysi; *Illinoia subviride*
[*Brachycaudus salicinae*]; *Uroleucon pachysiphon*
Aphis gossypii
Macrosiphoniella galatellae
Aphis spiraeicola
[*Acyrtosiphon malvae*]; *Uroleucon zymoizionense*
Macrosiphoniella galatellae, *soosi*
Uroleucon [*ambrosiae*], *crepusisiphon*, [*luteolum*]
Macrosiphoniella elegans, *yomenae*
Aphis sp. (Leonard, 1968: 4); *Uroleucon crepusisiphon*
Macrosiphoniella galatellae, *yomenae*
[*Uroleucon rudbeckiae*]
Aphis middletonii group; *Neomyzus circumflexus*;
Prociphilus erigeronensis; *Uroleucon olivei*, *pseudambrosiae*
Myzus persicae
Acuticauda asterensis; [*Anoecia cornicola*];
Aphis middletonii; *Aulacorthum solani*; [*Geoica squamosa*];
Neomyzus circumflexus; *Pemphigus bursarius*;

HOST LISTS AND KEYS

A. exilis
A. fastigiatus
A. filifolius
A. foliaceus
A. fruticosus
A. geyeri
A. grimmii
A. hayatae
A. himalaicus
A. hispidus
A. incisus see *Kalimeris*
A. indicus see *Kalimeris*
A. koraiensis
A. laevis

A. laevis var. *geyeri* see *geyeri*
A. lateriflorus

A. lautureana see *Kalimeris*
A. leucanthemifolius
A. linosyris
A. maackii

A. macrophyllus
A. modestus
A. multiflorus = *ericoides*
A. novaeangliae (incl. *roseus*)

A. novi-belgii (incl. *elodes*)

A. paniculatus

A. patens
A. pilosus
A. pinnatifidus
A. prenanthoides
A. punctatus see *sedifolius*
A. puniceus

A. pygmaeus

Prociphilus erigeronensis; *Smynthuroides betae*;
Uroleucon paucosensoriatum
Acyrtosiphon bidenticola; *Aphis gossypii*
Macrosiphoniella yomenae
Aphis gossypii
Aulacorthum solani
Myzus persicae
Uroleucon breviscriptum
Uroleucon asterophagum
Macrosiphoniella yomenae
Uroleucon asterophagum
Macrosiphoniella davazhamci

Uroleucon asteriae
Aphis coreopsidis; *Prociphilus erigeronensis*;
Uroleucon breviscriptum, *crepusisiphon*, *katonkae*,
paucosensoriatum, *tenuitarsum*

Aphis middletonii group; *Prociphilus erigeronensis*;
Uroleucon gravicorne, *paucosensoriatum*, [*sonchi*]

Atarsos grindeliae
Macrosiphoniella linariae; [*Uroleucon sonchi*]
Uroleucon amamanum, *cichorii*, [*gobonis*], *lactucicola*,
monticola, *picridis*
Macrosiphum olmstedi; *Uroleucon astronomus*
Uroleucon sp. nr *bradburyi*

Aphis middletonii group, *spiraecola*; *Illinoia goldamaryae*;
Myzus persicae; *Pemphigus bursarius*;
Prociphilus erigeronensis;
Uroleucon anomalae, *astronomus*, *paucosensoriatum*
Acuticauda asterensis; *Aphis middletonii* group;
Aulacorthum solani; *Macrosiphum euphorbiae*;
Myzus persicae; *Prociphilus erigeronensis*;
Uroleucon breviscriptum, *paucosensoriatum*
Aphis middletonii group; *Neomyzus circumflexus*;
Prociphilus erigeronensis
Aphis middletonii group; *Prociphilus erigeronensis*
Uroleucon crepusisiphon, *olivei*, *paucosensoriatum*
Uroleucon amamanum
Uroleucon pseudambrosiae

Aphis middletonii group;
Uroleucon crepusisiphon, *macgillivrayae*, *olivei*,
paucosensoriatum
Aleurodaphis asteris

<i>A. sagittifolius</i>	<i>Uroleucon crepusisiphon, olivei</i>
<i>A. savatieri</i>	<i>Aleurodaphis asteris</i>
<i>A. scaber</i>	<i>Chitinosiphum doellingeriae</i> ; <i>Uroleucon asteriae, doellingeriae, [formosana], fuchuense</i>
<i>A. sedifolius</i> (incl. <i>punctatus</i>)	<i>Macrosiphoniella asteris, galatellae, soosi</i> ; <i>Uroleucon sileneobium</i>
<i>A. simplex</i>	<i>Aphis middletonii, [oreaster Rafinesque (invalid name);</i> see Hottes, 1931: 66]; <i>Illinoia goldamaryae</i> ; <i>Myzus ornatus, persicae; Prociphilus erigeronensis</i> ; <i>Uroleucon [ambrosiae], olivei, [luteolum]</i>
<i>A. simplex</i> var. <i>ramosissimus</i>	<i>Aphis middletonii</i>
<i>A. sinensis</i>	<i>Brachycaudus helichrysi</i>
<i>A. spathulifolius</i>	<i>Myzus asteriae, Myzus</i> sp. (Korea, BMNH colln)
<i>A. squamatus</i>	<i>Aphis gossypii; Myzus persicae</i>
<i>A. subutatus</i>	<i>Aphis middletonii</i>
<i>A. tanacetifolius</i>	[<i>Uroleucon</i> sp. – Leonard, 1968: 292 (as <i>Dactynotus</i>)
<i>A. tataricus</i> (incl. var. <i>hortensis</i>)	<i>Aphis spiraeicola; [Capitophorus cirsiiiphagus];</i> <i>Macrosiphoniella quinifontana, yomenae</i> ; [<i>Metopolophium dirhodum</i>]; <i>Myzus persicae</i> ; <i>Uroleucon asteromyzon</i>
<i>A. tradescanti</i>	<i>Aphis craccivora; Myzus persicae; Uroleucon erigeronense</i>
<i>A. trinervius</i>	<i>Aphis gossypii; Myzus persicae</i>
<i>A. tripolium</i>	<i>Aphis fabae, [triglochinis], tripolii; Brachycaudus helichrysi;</i> <i>Macrosiphoniella asteris; Myzus persicae</i> ; <i>Pemphigus trehernei; [Staticobium loochooense]</i>
<i>A. umbellatus</i>	<i>Uroleucon olivei, paucosensoriatum</i>
<i>A. undulatus</i>	<i>Uroleucon olivei, paucosensoriatum</i>
<i>A. yomena</i> see <i>Kalimeris</i>	
<i>Aster</i> spp.	<i>Aphis astericola; Aulacorthum asteris;</i> [<i>Brachycaudus</i> sp. on <i>Galatella</i> sp. (Kadyrbekov, 2002d)]; [<i>Hyalomyzus mitchellensis</i>]; [<i>Illinoia grindeliae</i>]; <i>Macrosiphoniella [aktaschica], [sanborni], [yangi]</i> ; <i>Macrosiphum pallidum; Myzus siegesbeckicola;</i> <i>Pemphigus [asteris Lichtenstein; nomen nudum], [betae];</i> <i>Pleotrichophorus asterifoliae; Sitobion africanum;</i> <i>Toxoptera aurantii; Uroleucon atripes, bradburyi, floricola,</i> <i>kamtshaticum, ambrosiae</i> ssp. <i>lizerianum, manitobense,</i> <i>nodulum, tenuitarsum</i>

Key to aphids on *Aster* and *Kalimeris*:-

1. Eyes composed of only 3 facets. ANT less than 0.3× BL, with PT/BASE less than 1 2
- Eyes with many facets. ANT more than 0.3× BL, with PT/BASE more than 1 6

2. Body elongate oval, small (BL less than 1.3 mm), sclerotic dorsally, with a crenulate margin due to a continuous fringe of wax glands. SIPH as pores with raised rims. Cauda knobbed, anal plate bilobed 3
- Body broadly oval to almost globular, BL more than 1.5 mm, cuticle membranous, wax glands not in a continuous marginal row. SIPH absent. Cauda rounded, anal plate entire 4

HOST LISTS AND KEYS

3. R IV+V elongate, 0.137–0.194 mm long, more than 3× its basal width. First tarsal segments with 3 hairs *Aleurodaphis blumeae*
 – R IV+V 0.074–0.104 mm long, less than 3× its basal width. First tarsal segments with 2 hairs *Aleurodaphis asteris*
4. R IV+V 0.08–0.12 mm long, shorter than last antennal segment (BASE+PT), and without any accessory hairs. Hairs at apices of tibiae and first tarsal segments short and thick. Wax glands present on ABD TERG 3–7 *Pemphigus* sp.
 – R IV+V 0.13–0.175 mm long, as long as or longer than last antennal segment (BASE+PT), and bearing 4–12 accessory hairs. Hairs at apices of hind tibiae and first tarsal segments long and fine. Wax glands present on head, thorax and abdomen, or absent 5
5. ANT II similar in length to ANT III, which bears numerous hairs. Primary rhinaria with sclerotized rims, without fimbriae. Wax glands absent. Anus in dorsal position, abdomen without a posterior projection *Smynthurodes betae*
 – ANT II much shorter than ANT III, which bears few hairs, mainly on distal part. Primary rhinaria each with a fringe of fimbriae. Wax glands present on head, thorax and abdomen. Anus borne on posterior projection of the abdomen *Prociphilus erigeronensis*
6. SIPH with a subapical zone of polygonal reticulation, forming at least 10 closed cells, and with a number of incomplete cells at its proximal boundary, which is therefore not clearly demarcated 7
 – SIPH without such a subapical zone of polygonal reticulation; sometimes with transverse striae that have some tendency to form a reticulation, but this has less than 10 closed cells, or in one case (*Acuticauda*) with reticulation in a short membranous section that is clearly demarcated by an annular constriction 55
7. Conspicuous dark, crescent-shaped antesiphuncular sclerites present, but no large postsiphuncular sclerites (e.g. Figure 15a) 8
 – Antesiphuncular sclerites faint or absent; postsiphuncular sclerites present or absent 15
8. ANT III with 20–64 rhinaria distributed over more than half its length 9
 – ANT III with 4–20 rhinaria confined to basal half 11
9. SIPH 0.13–0.14× BL, 0.46–0.55× ANT III and 0.7–0.9× cauda. ANT VI BASE 1.6–1.9× R IV+V *Macrosiphoniella elegans**
 – SIPH 0.15–0.21× BL, 0.6–0.9× ANT III and 0.8–1.2× cauda. ANT VI BASE 1.1–1.55× R IV+V 10
10. ABD TERG 1–4 with spinal hairs rarely duplicated (Figure 15b) *Macrosiphoniella linariae*
 – ABD TERG 1–4 with spinal hairs (and their basal scleroites) almost always duplicated (Figure 15c) *Macrosiphoniella yomenae*
11. R IV+V about 1.4–1.5× HT II *Macrosiphoniella bozhkoae*
 – R IV+V 0.65–1.0× HT II 12
12. Tibiae mainly pale, dark apically and at extreme bases. Cauda paler than SIPH *Macrosiphoniella asteris*
 – Tibiae entirely dark. Cauda as dark as SIPH 13
13. Coxae, trochanters and basal halves of femora pale. ABD TERG 2–5 without marginal tubercles (MTu) *Macrosiphoniella soosi*
 – Coxae and trochanters dark, and femora dark except at their bases. ABD TERG 2–5 often with MTu 14
14. Small MTu often present on some or all of ABD TERG 2–5 *Macrosiphoniella galatellae*
 – ABD TERG 2–5 without MTu *Macrosiphoniella quinifontana*

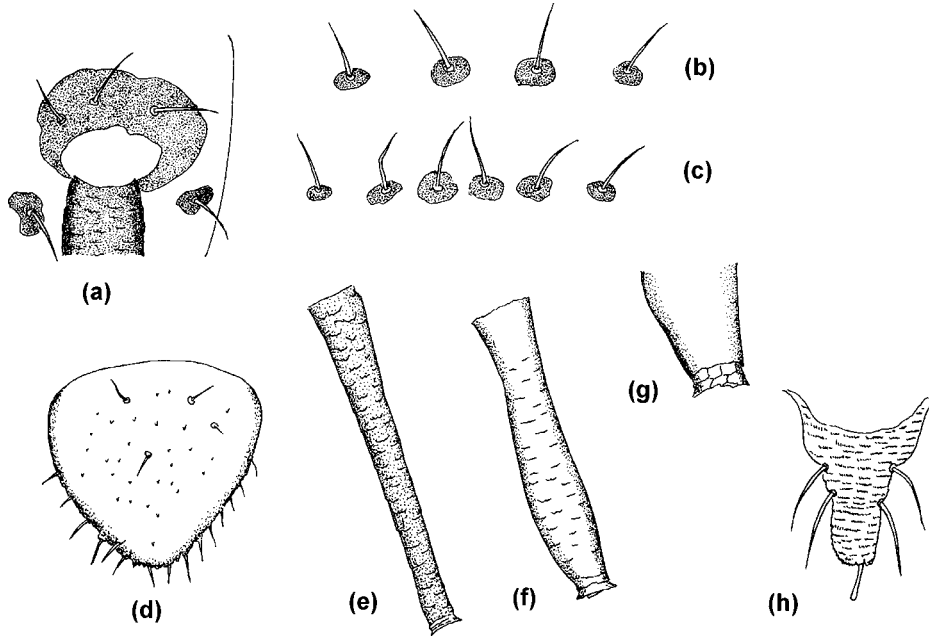


Figure 15 Apterae on *Aster* and *Kalimeris*. (a) Presiphuncular sclerite and base of SIPH of *Macrosiphoniella linariae*, (b) spinal and pleural hairs on ABD TERG 3 of *M. linariae*, (c) same for *M. yomenae*, (d) subgenital plate of *Myzus siegesbeckicola*, (e) SIPH of *M. siegesbeckicola*, (f) SIPH of *M. asteriae*, (g) SIPH of *Acuticauda asterensis*, (h) cauda of *A. asterensis*.

- 15. ANT tubercles very poorly developed so that front of head is almost straight in dorsal view. SIPH 0.15–0.2× BL, with reticulation extending over 0.4–0.55 of length. ANT PT/BASE 2.6–4.0. (Al. with sec. rhin. distributed III 22–31, IV 8–11, V 0–1) *Macrosiphoniella davazhamci*
- ANT tubercles well developed, their inner faces divergent in dorsal view. SIPH 0.15–0.55× BL, with reticulation over distal 0.03–0.5 of length. ANT PT/BASE 2.6–7.4. (Al. where known with sec. rhin. only on ANT III) 16
- 16. SIPH with zone of polygonal reticulation extending over distal 0.15–0.5 of length, and comprising many small cells of maximum diameter less than 0.25 of width of SIPH at that point. Flange often weakly developed 17
- SIPH with zone of polygonal reticulation extending over 0.03–0.2 of length, and comprising large cells, of maximum diameter more than 0.25 of width of SIPH at that point. Flange well developed 50
- 17. Cauda much paler than distal part of SIPH 18
- Cauda almost as dark as distal part of SIPH 45
- 18. Coxae dark, clearly darker than trochanters and basal halves of femora 19
- Coxae pale like trochanters and basal halves of femora 21
- 19. Dorsal hairs on ABD TERG 1–5 mostly not placed on dark scleroites. R IV+V 0.73–0.88× HT II *Uroleucon sonchi*
- Dorsal hairs on ABD TERG 1–5 all or mostly placed on dark scleroites. R IV+V 1.1–1.6× HT II 20

HOST LISTS AND KEYS

20. R IV+V 1.25–1.67× ANT VI BASE and 1.17–1.33× HT II. Cauda with 18–28 hairs
Uroleucon cichorii
- R IV+V 1.1–1.2× ANT VI BASE and 1.5–1.6× HT II. Cauda with 30–37 hairs
*Uroleucon doellingeriae**
21. SIPH dusky with darker apices, and 0.18–0.22× BL
*Uroleucon bradburyi**
- SIPH either entirely dark or mainly dark with a pale basal section; 0.16–0.55× BL **22**
22. SIPH mainly dark but with a pale basal section **23**
- SIPH uniformly pigmented **34**
23. ABD TERG 8 with a pair of spinal tubercles (STu), and ABD TERG 6 and 7 sometimes also with 1–2 STu. SIPH about 0.16–0.18× BL, about equal in length to cauda
*Uroleucon nodulum**
- ABD TERG 6–8 without STu. SIPH 0.21–0.55× BL and 0.9–2.5× cauda **24**
24. SIPH 0.21–0.24× BL, with pale section at base of SIPH less than 0.13 of total length **25**
- SIPH 0.22–0.55× BL, with pale basal section often more than 0.16 of total length **26**
25. R IV+V 1.2–1.4× HT II
Uroleucon crepusisiphon
- R IV+V 0.65–0.80× HT II
Uroleucon manitobense
26. R IV+V 1.4–1.85× HT II, and bearing more than 14 accessory hairs **27**
- R IV+V 0.6–1.34× HT II, and bearing 6–12 accessory hairs **28**
27. ANT III with 8–25 rhinaria. SIPH 1.5–2× cauda
Uroleucon zymoziense
- ANT III with 28–46 rhinaria. SIPH 1.1–1.4× cauda
Uroleucon anomalae
28. SIPH (1.9–) 2.1–2.8× cauda **29**
- SIPH 0.9–2.0× cauda **30**
29. Cauda with one or more hairs near apex that are short and blunt or capitate. Tibiae mainly pale or dusky with dark apices. (R IV+V 0.9–1.1× HT II)
Uroleucon erigeronense
- Cauda with all hairs pointed. Tibiae dark
Uroleucon katonkae
30. R IV+V 1.15–1.4× HT II **31**
- R IV+V 0.6–1.0× HT II **32**
31. ANT dark beyond base of III. SIPH pale on basal 0.2–0.3. (HT II without ventral hairs on proximal 0.5–0.7 of length, or these hairs very small or vestigial)
Uroleucon gravicorne
- ANT entirely or at least distally pale. SIPH c.0.33× BL and pale only on basal c.0.08. (HT II with normal chaetotaxy?)
*Uroleucon vera**
32. R IV+V 0.6–0.75× HT II which is 0.19–0.22 mm long
Uroleucon tenuitarsus
- R IV+V 0.8–1.0× HT II which is 0.14–0.17 mm long **33**
33. SIPH 1.4–2.0× cauda which bears 7–12 hairs
Uroleucon breviscriptum
- SIPH 0.9–1.4× cauda which bears 10–19 hairs
Uroleucon macgillivrayae
34. SIPH 1.7–2.2× cauda. Dorsal abdominal hairs long, pointed and rather numerous; ABD TERG 8 with 6–8 hairs
Uroleucon monticola
- SIPH 1.1–1.8× cauda. Dorsal abdominal hairs pointed or blunt; ABD TERG 8 with 2–7 hairs **35**
35. R IV+V 1.6–1.9× HT II, and bearing 17–24 accessory hairs. (ANT III with 10–30 rhinaria)
Uroleucon astronomus
- R IV+V 0.9–1.75× HT II, and bearing 6–16 accessory hairs **36**

36. R IV+V 1.4–1.75× HT II, and bearing 6–10 accessory hairs. ANT III with 25–63 rhinaria **37**
 – R IV+V 0.9–1.4× HT II, and bearing 6–16 accessory hairs. ANT III with 4–47 rhinaria **38**
37. ANT III black and longer than SIPH *Uroleucon picridis*
 – ANT III pale and shorter than (less than 0.9×) SIPH *Uroleucon asteriae**
38. SIPH with polygonal reticulation on distal 0.35–0.4 of length. Tibiae entirely dark. ANT III with 13–47 rhinaria (usually more than 20) *Uroleucon atripes*
 – SIPH with polygonal reticulation on distal 0.23–0.33 of length. Tibiae variably pigmented, but if entirely dark then ANT III has less than 20 rhinaria **39**
39. Hind tibia with a ventral row of short peg-like hairs. Dorsal abdominal hairs long and fine-pointed (longest more than 90µm) *Uroleucon fuchuense*
 – Hind tibia without a row of short peg-like hairs. Dorsal abdominal hairs pointed or blunt, maximally c.70µm long **40**
40. R IV+V 0.9–1.1× HT II **41**
 – R IV+V 1.15–1.4× HT II **43**
41. SIPH c.1.8× cauda. ANT III with 36–42 rhinaria *Uroleucon asteromyzon*
 – SIPH 1.4–1.6× cauda. ANT III with 16–39(–46)rhinaria **42**
42. Cauda with 15–29 hairs. ABD TERG 8 with 2–4 hairs. Longest hairs on ANT III 0.5–0.6× BD III *Uroleucon pseudambrosiae*
 – Cauda with c.37 hairs. ABD TERG 8 with 4–6 hairs. Longest hairs on ANT III 0.7–1.2× BD III *Uroleucon kamtshaticum**
43. Tibiae entirely dark. ANT III with 4–16 rhinaria *Uroleucon paucosensoriatum*
 – Tibiae with paler section on basal half. ANT III with 7–35 rhinaria **44**
44. SIPH usually longer than (0.95–1.25×) ANT III, and 0.29–0.35× BL. Cauda with 21–36 hairs. ANT III with 7–17 rhinaria *Uroleucon olivei*
 – SIPH usually shorter than (0.7–1.05×) ANT III, and 0.21–0.29× BL. Cauda with 12–27 hairs. ANT III with 8–35 rhinaria *Uroleucon ambrosiae lizerianum*
45. Coxae pale, and femora only dark over distal 0.25 or less *Uroleucon floricola*
 – Coxae dusky or dark, and femora dark over at least distal 0.3 **46**
46. Tibiae wholly dark. SIPH very thick, with apical diameter more than 0.5 of basal diameter *Uroleucon pachysiphon*
 – Tibiae mainly pale, dark only at ends. SIPH tapering apically to less than 0.5 of basal diameter **47**
47. SIPH 1.1–1.3× cauda, with reticulation extending over distal 0.33–0.4. ANT III with 17–32 rhinaria *Uroleucon amamianum*
 – SIPH 1.35–2.0× cauda, with reticulation on distal 0.2–0.33. ANT III with 11–19 or 48–c.70 rhinaria **48**
48. ANT III with 11–19 rhinaria confined to basal half of segment. (Al. with 32–54 rhinaria on ANT III) *Uroleucon lactucicola*
 – ANT III with 47–c.70 rhinaria extending over 0.69–0.75 of its length. (Al. with more than 73 rhinaria on ANT III) **49**
49. SIPH 1.88–1.98× cauda. ANT III with c.60–70 rhinaria *Uroleucon sileneobium**
 – SIPH 1.35–1.65× cauda. ANT III with 47–65 rhinaria *Uroleucon asterophagum*

HOST LISTS AND KEYS

50. SIPH entirely dark, or only pale at base **51**
 – SIPH pale or dusky, somewhat darker on reticulated subapical part **52**
51. Dorsal abdomen somewhat sclerotic, often with dark markings. Longest hairs on ANT III less than $0.5 \times$ BD III. tibiae mainly pale *Sitobion africanum*
 – Dorsal abdomen membranous, pale. Longest hairs on ANT III more than $0.5 \times$ BD III. Tibiae mainly dark *Macrosiphum pallidum*
52. R IV+V $1.4-2.1 \times$ HT II, with 14–45 accessory hairs **53**
 – R IV+V $0.8-1.2 \times$ HT II, with 7–10 accessory hairs **54**
53. R IV+V not more than $2 \times$ its basal width, with 34–45 accessory hairs. First tarsal segments with 3 hairs. ANT BASE VI $2.7-3.3 \times$ HT II *Macrosiphum olmsteadi*
 – R IV+V more than $2 \times$ its basal width, with 14–28 accessory hairs. First tarsal segments with 5 hairs. ANT BASE VI $1.4-1.7 \times$ HT II *Illinoia subviride*
54. Hairs on ANT III very short and inconspicuous, the longest about $0.33 \times$ BD III. SIPH clearly somewhat swollen proximal to reticulated subapical zone, which is only $0.03-0.05$ of total length of SIPH *Illinoia goldamaryae*
 – Hairs on ANT III conspicuous, the longest $0.5 \times$ BD III or longer. SIPH cylindrical or very slightly swollen proximal to reticulated subapical zone, which is $0.13-0.2$ of its total length *Macrosiphum euphorbiae*
55. ANT tubercles moderately to well developed, with inner faces convergent, parallel or divergent, projecting considerably beyond middle part of front of head in dorsal view **56**
 – Front of head sinuous, straight or convex in dorsal view, with ANT tubercles absent or, if at all developed, then broadly divergent and not or hardly projecting beyond middle of head in dorsal view **68**
56. Head and inner face of ANT I spiculose/scabrous, and ANT tubercles rather low with inner faces broadly divergent. ANT III with 4–11 rhinaria on basal part. R IV+V $1.4-1.8 \times$ HT II. SIPH $2.5-3.2 \times$ cauda. Tergum extensively sclerotised **57**
 – If head and ANT I are both spiculose or scabrous **then** inner faces of ANT tubercles are steep-sided or apically convergent, ANT III has 0–2 rhinaria, and other characters not in above combination **58**
57. ANT PT/BASE $6.3-6.9$. R IV+V $1.4-1.5 \times$ HT II. SIPH $2.5-2.8 \times$ cauda *Chitinosiphum kalimeris**
 – ANT PT/BASE $7.0-8.6$. R IV+V $1.5-1.8 \times$ HT II. SIPH $2.7-3.2 \times$ cauda *Chitinosiphum doellingeriae**
58. Cuticle of head almost smooth or with spicules only ventrally. Inner face of ANT I almost smooth **59**
 – Cuticle of head densely spiculose, nodulose or scabrous, dorsally as well as ventrally. Inner face of ANT I nodulose or scabrous **61**
59. ANT III with 17–29 rhinaria distributed along most of its length *Aulacorthum asteris*
 – ANT III with 0–5 rhinaria on basal half **60**
60. Dorsal hairs with expanded apices. SIPH pale. Cauda conical, with 5 hairs. R IV+V shorter than HT II *Pleotrichophorus asterifoliae*
 – Dorsal hairs with blunt apices. SIPH dark except at base, with some ill-defined subapical reticulation. Cauda long and finger-like, with 6–7 hairs. R IV+V longer than HT II *Acyrtosiphon bidenticola*
61. Dorsal abdomen with a large, roughly horseshoe-shaped dark patch, and broad dark bars on dorsal thorax *Neomyzus circumflexus*
 – Dorsal abdomen without a large dark patch (in apt) **62**

62. Subgenital plate strongly produced posteriorly, broadly conical (Figure 15d). SIPH tapering from a broad base, narrow on distal half (Figure 15e) *Myzus siegesbeckicola*
 – Subgenital plate normal. SIPH not tapering from a broad base, cylindrical or slightly to moderately swollen on distal half 63
63. Dorsal abdomen with a pattern of dark intersegmental markings *Myzus ornatus*
 – Dorsal abdomen without intersegmental markings 64
64. SIPH tapering/cylindrical. 65
 – SIPH swollen on distal half 66
65. R IV+V 1.1–1.4× HT II with 5–7 (usually 6) accessory hairs. ANT III with (0–) 1–2 (–3) small rhinaria near base. ANT longer than body with ANT PT/BASE 4.0–5.5 *Aulacorthum solani*
 – R IV+V c. 2.5× HT II and bearing c.20 accessory hairs. ANT III without rhinaria. ANT shorter than body with ANT PT/BASE c.2.7–3.0 *Myzus* sp. (Korea, BMNH colln)
66. Head and ANT I dusky to dark. R IV+V 1.7–2.1× HT II. (Al. with broad dark bands along the wing veins) *Neotoxoptera yasumatsui*
 – Head and ANT I pale. R IV+V 0.9–1.2× HT II. (Al. with unbordered wing veins) 67
67. SIPH 4–9 times longer than their minimum width, clearly shorter than head width across eyes (Figure 15f). ANT PT/BASE 2.5–3.0 *Myzus asteriae*
 – SIPH 9–15 times longer than their minimum width, as long as or longer than head width across eyes. ANT/PT BASE 2.8–5.1 *Myzus persicae*
68. Tarsi completely absent from all legs *Atarsos grindeliae*
 – Tarsi present 69
69. SIPH smooth, conical, less than twice as long as their basal width, with an annular incision proximal to the flange (e.g. Figure 15g). ANT tubercles completely undeveloped, so that front of head is convex in dorsal view. ABD TERG 1 and 7 without marginal tubercles (MTu) 70
 – SIPH imbricated and more than twice their basal width, with no subapical annular incision. ANT tubercles weakly developed, so that front of head has sinuous outline in dorsal view. MTu always present on ABD TERG 1 and 7 71
70. Cauda helmet-shaped, with all hairs long and fine-pointed *Brachycaudus helichrysi*
 – Cauda broad at base, narrower on distal part, with an apical hair that is usually hooked or blunt (Figure 15h) *Acuticauda asterensis*
71. Stridulatory apparatus present, consisting of a row of very short peg-like hairs on hind tibiae and a pattern of cuticular ridges on abdominal sternites 5–6 *Toxoptera aurantii*
 – No stridulatory apparatus 72
72. Dorsal abdomen with an extensive solid black patch *Aphis craccivora*
 – Dorsal abdomen without an extensive solid black patch; with or without segmentally divided or scattered black markings 73
73. ANT III (in normal apt.) with 1–14 rhinaria. SIPH 0.7–1.2× R IV+V. Dorsal abdomen with variable, often rather extensive, dark patches *Aphis middletonii*
 – ANT III without rhinaria (except in alatiform apt). SIPH more than 1.5× R IV+V. Dorsal abdomen without or with a few scattered markings anterior to SIPH 74
74. SIPH 0.24–0.40× BL, about twice as long as the much paler cauda. Head, ANT I, II and basal part of III very pale, contrasting with dark rest of ANT *Aphis coreopsidis*
 – SIPH only up to 0.2× BL. Cauda pale or dark. Head and antennal segments differently pigmented 75

HOST LISTS AND KEYS

75. Cauda dark with 4–6 hairs. Hind tibiae entirely dark *Aphis astericola**
 – Cauda either pale/dusky with 4–9 hairs, or dusky/dark with 7–27 hairs. Hind tibiae with at least middle section pale/dusky 76
76. ABD TERG 2–5 mostly bearing MTu. SIPH and cauda both dusky. ANT PT/BASE 1.4–2.9. Cauda with 5–9 hairs. (Al. with 1–6 rhinaria on ANT IV, and 0–2 on V) *Aphis tripolii*
 – ABD TERG 2–5 usually without MTu, sometimes with small ones on some segments. SIPH dark, cauda dark, dusky or pale. ANT PT/BASE 1.7–3.5. Cauda with 4–27 hairs. (Al. with 0–2 rhinaria on ANT IV, 0 on V) for separation of the remaining polyphagous *Aphis* spp. (*fabae*, *gossypii*, *helianthi*, *spiraecola*), use relevant couplets in polyphagous aphids key, p. 1020.

Asteriscus (including *Pallenis*)

A. aquaticus
A. graveolens
A. spinosus

A. maritimus
Asteriscus sp.

Compositae

Capitophorus inulae
Brachyunguis harmalae; *Myzus persicae*
Acyrtosiphon gossypii; *Aphis gossypii*;
Brachycaudus helichrysi; *Brachyunguis harmalae*
 [*Aphis terricola*]
 [*Macrosiphum rosae*]

Key for apterae on *Asteriscus*:-

1. Rather elongate spindle-shaped aphid with very long thin curved SIPH 2
 – Oval-bodied aphid. SIPH not very long, thin and curved 3
2. Dorsal hairs thick and capitate. BL 1.2–1.8 mm. ANT PT/BASE 5.5–9.5 *Capitophorus inulae*
 – Dorsal hairs inconspicuous. BL 2.5–3.5 mm. ANT PT/BASE 3–4 *Acyrtosiphon gossypii*
3. ANT PT/BASE 0.4–0.75. SIPH pale, 0.4–0.7× cauda *Brachyunguis harmalae*
 – ANT PT/BASE 1.7–5.3. SIPH 0.8–2.0× cauda go to key to polyphagous aphids, p. 1020

Astilbe

A. chinensis

A. davidii
A. longicarpa
A. microphylla
A. philippinensis
A. rivularis
A. thunbergii (incl. *congesta*)

Astilbe spp. (and cultivars)

Saxifragaceae

Aulacorthum solani;
 [*Aphis astilbes* Matsumura, 1917 (nomen nudum)];
 [*Macrosiphum sorbi*]
Aulacorthum solani
Taiwanomyzus montanus
Rhopalosiphoninus staphyleae; *Taiwanomyzus montanus*
Taiwanomyzus montanus
Taiwanomyzus [*darjeelingensis*], *montanus*
 [*Eriosoma astilbensis* (Shinji, 1939)];
Taiwanomyzus montanus
Aphis fabae, [*Aphis* sp. – Leonard, 1973: 3];
Macrosiphum euphorbiae

Key to aphids on *Astilbe*:-

1. Dorsum with extensive dark sclerotisation. SIPH slightly to strongly swollen on distal half. Cauda with 5 hairs 2
 – Without this combination of characters go to key to polyphagous aphids, p. 1020

2. ANT III with 3–26 rhinaria. SIPH black, dorsum with an extensive solid dark shield. SIPH widest at c.0.8–0.85 of length, where diameter is c.1.5× that of narrowest part of stem. SIPH c.0.33× BL
Taiwanomyzus montanus
- ANT III with 1–3 rhinaria. SIPH dusky, dorsum with segmentally divided dark sclerites. SIPH widest at c. 0.6–0.7 of length, where diameter is c.2× that of narrowest part of stem. SIPH c. 0.25× BL
Rhopalosiphoninus staphyleae

Astragalus

A. adscendens
A. albifrons
A. alopecias
A. alpinus
A. arenarius
A. asterias
A. bisulcatus
A. brachypus
A. canadensis
A. canescens
A. caucasicus
A. chinensis
A. cicer
A. danicus
A. falcatus
A. forskahlei
A. frigidus
A. fruticosus
A. glauciphyllus
A. globiceps
A. glycopyllus
A. gossypinus

A. hamosus
A. hyreanus
A. leucopsis
A. melilotoides
A. membranaceus
A. monspessulanus
A. onobrychus
A. parrowianus
A. paucijugus
A. pectinatus
A. pomonensis
A. pseudosquarrosus
A. schlelichowii
A. sempervirens
A. sinicus
A. spinosus
A. sprunneri

Leguminosae

Brachyunguis skafi; *Therioaphis arnaultae*, *pteromaculata*
Aphis fabae
Aphis craccivora
Acyrthosiphon loti, *pisum*; *Aphis astragali*, [*loti*], *masoni*
Aphis tacita
Aphis craccivora
Aphis craccivora
Acyrthosiphon gossypii; *Aphis craccivora*
Acyrthosiphon pisum
Acyrthosiphon kondoi
Therioaphis astragali
Aphis craccivora
Acyrthosiphon pisum; *Aphis ciceri*; *Therioaphis trifolii*
Aphis craccivora
Acyrthosiphon pisum
Aphis craccivora
Acyrthosiphon pisum
Aphis craccivora
Aphis fabae
Aphis craccivora
Aphis craccivora
Brachyunguis skafi;
Therioaphis arnaultae, *astragalensis*, *rostrata*
Aphis craccivora
Aphis craccivora
Aphis craccivora
Aphis craccivora
Acyrthosiphon kondoi
Therioaphis trifolii
Therioaphis trifolii ssp. *ventromaculata*
Brachyunguis skafi; *Therioaphis arnaultae*
Aphis craccivora
Aphis astragalina, *gallowayi*
Acyrthosiphon kondoi
Therioaphis kermanica
Acyrthosiphon pisum; *Aphis cracciae*
Aphis craccivora; *Therioaphis trifolii*
Aphis craccivora; *Therioaphis trifolii*
Acyrthosiphon gossypii; *Brachyunguis harmalae*
Acyrthosiphon pisum

HOST LISTS AND KEYS

<i>A. sulcatus</i>	<i>Acyrtosiphon pisum</i>
<i>A. thurtschaninovi</i>	<i>Aphis craccivora</i>
<i>A. uliginosus</i>	<i>Aphis craccae</i>
<i>A. vesicarius</i>	<i>Acyrtosiphon pisum</i> ; <i>Aphis craccivora</i> ; <i>Aulacorthum solani</i>
<i>A. virgatus</i>	<i>Acyrtosiphon pisum</i>
<i>A.× iphidium</i>	<i>Therioaphis astragalensis</i>
<i>Astragalus</i> spp.	<i>Acyrtosiphon astragali</i> , <i>umarovi</i> ; <i>Aphis astragalicola</i> ; <i>Brachyunguis</i> [<i>astragali</i> Narzikulov and Umarov, 1972 (nomen nudum)]; <i>Microparsus tephrosiae</i> ; <i>Myzus persicae</i> ; <i>Therioaphis azerbaidjanica</i> , <i>denaensis</i> , <i>farsiana</i> , <i>khayami</i> , <i>laurestanica</i> ,

Key to aphids on *Astragalus*:–

(Couplets 1–13 are applicable to both apt. and al.)

1. Fore coxae greatly enlarged. SIPH in form of truncate cones. Cauda knobbed, anal plate bilobed. Dorsal hairs usually with expanded apices, and/or often arising from tuberculate bases (Figure 15a–c) **2**
– Fore coxae normal. Form of SIPH various. Cauda tongue- or finger-shaped, anal plate entire. Dorsal hairs with blunt or pointed apices, and never arising from tuberculate bases **14**
2. Knob of cauda surmounted by a conical or finger-like process (e.g. Figure 16d, e) **3**
– Knob of cauda without a conical or finger-like process (Figure 16f–g) **7**
3. SIPH black. Head and thorax with a black longitudinal spinal band, having a narrow unpigmented median suture. ABD TERG 1 with black pleural and marginal sclerites, and ABD TERG 2 with black marginal sclerites. ANT III of apt. with 2–4 secondary rhinaria *Therioaphis denaensis*
– SIPH pale. Dorsum without such conspicuous black markings. ANT III of apt. without any rhinaria **4**
4. Rostrum 0.31–0.40× BL, with R IV+V 1.65–1.97× HT II, and bearing 7–9 accessory hairs *Therioaphis rostrata*
– Rostrum 0.17–0.31× BL, with R IV+V 0.74–1.42× HT II and bearing 4–6 accessory hairs **5**
5. Front of head with median projection weakly developed and hairs not arising from clearly tuberculate bases (Figure 16a). R IV+V 1.23–1.42× HT II *Therioaphis astragalensis*
– Front of head with a well developed median projection bearing hairs arising from tuberculate bases (Figure 16b, c). R IV+V 0.51–0.93× HT II **6**
6. Caudal knob bearing a conical or finger-like process 60–80µm long (Figure 16d). Median frontal projection quadrate, bearing hairs arising from low tuberculate bases (Figure 16b). Dorsal cuticle generally pale, with abdominal hairs arising from pale tuberculate bases. SIPH 1.8–2.4 times longer than their basal widths *Therioaphis farsiana*
– Caudal knob with a small conical process 22–38µm long (Figure 16e). Median frontal projection bearing hairs arising from large conical to cylindrical bases, longer than their basal widths (Figure 16c). Dorsal cuticle of head and thorax lightly pigmented, with a narrow unpigmented spinal suture, and dark rings of pigment around the bases of the dorsal abdominal hairs. SIPH 1.2–1.5 times longer than their basal widths *Therioaphis laurestanica*
7. ABD TERG 1–5 each with 4–5 hairs, which are only 5–11µm long *Therioaphis arnaultae*
– ABD TERG 1–5 each with 4–15 hairs which are 19–85µm long **8**

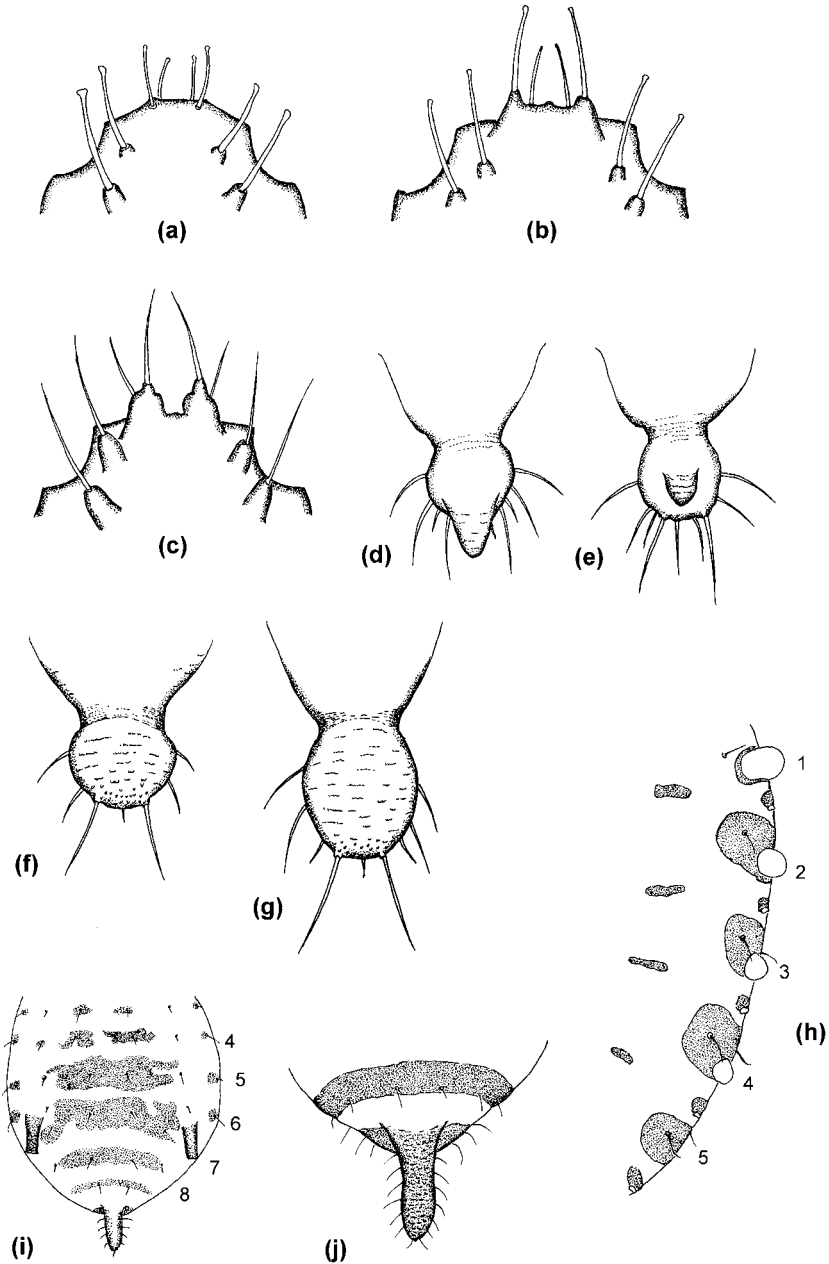


Figure 16 Apterae on *Astragalus*. (a) Dorsal view of front of head of *Therioaphis astragalensis*, (b) same for *Th. farsiana*, (c) same for *Th. laurestanica*, (d) cauda of *Th. farsiana*, (e) cauda of *Th. laurestanica*, (f) cauda of *Th. khayami*, (g) cauda of *Th. trifolii*, (h) MTu on ABD TERG 1-4 of *Aphis ciceri*, (i) dorsal abdominal sclerotisation of *A. astragali*, (j) ABD TERG 8 and cauda of *A. astragalina*.

HOST LISTS AND KEYS

8. ABD TERG 1–5 (of al.) each with only 4 hairs (one spinal pair and one marginal pair) **9**
 – ABD TERG 1–5 (apt. and al.) each with at least 6 hairs **10**
9. (Al.) Forewing with pterostigma more than twice as long as broad and mainly pale with thick black border. R IV+V $0.75\text{--}1.0\times$ HT II. ABD TERG 1–5 with hairs $40\text{--}60\mu\text{m}$ long *Therioaphis astragali*
 – (Al.) Forewing with pterostigma $1.8\text{--}2.0\times$ longer than broad and mainly black with small pale centre. R IV+V $0.57\text{--}0.68\times$ HT II. ABD TERG 1–5 with hairs $19\text{--}40\mu\text{m}$ long *Therioaphis pteromaculata*
10. ABD TERG 8 with 2 hairs, or rarely, 3. ABD TERG 1–5 each usually with 6 hairs. Tibiae without any spiculose ornamentation. ANT PT/BASE $0.46\text{--}0.69$ *Therioaphis kermanica*
 – ABD TERG 8 with 4–9 hairs. ABD TERG 1–5 mostly with more than 6 hairs. Tibiae ornamented with spicules at least distally. ANT/PT BASE $0.77\text{--}1.4$ **11**
11. ANT PT $0.90\text{--}1.31\times$ R IV+V, which bears 8–10 accessory hairs. R IV+V $1.03\text{--}1.14\times$ HT II *Therioaphis azerbaijanica*
 – ANT PT more than $1.8\times$ R IV+V, which bears 3–6 accessory hairs. R IV+V $0.67\text{--}0.92\times$ HT II **12**
12. Cauda less than $150\mu\text{m}$ long, only $1.40\text{--}1.77\times$ R IV+V and $1.20\text{--}1.46\times$ HT II, with a subspherical apical knob that is about as long as wide and bears 7–9 hairs (Figure 16f). Dorsal hairs rather fine and not distinctly expanded apically. ANT III of apt. with 0–5 rhinaria *Therioaphis khayami*
 – Cauda $190\text{--}230\mu\text{m}$ long, $2.26\text{--}2.45\times$ R IV+V and $1.56\text{--}1.78\times$ HT II, with a knob that is longer than wide and bears 11–16 hairs (Figure 16g). Dorsal hairs rather thick with distinctly expanded apices. ANT III of apt. with 4–10 rhinaria **13**
13. Ventral abdomen with large black submarginal sclerites, each encompassing the bases of 5–6 ventral hairs *Therioaphis trifolii* ssp. *ventromaculata*
 – Ventral abdomen usually without any submarginal sclerites, sometimes with small or fragmented dusky-dark sclerites, each encompassing bases of 1–4 hairs *Therioaphis trifolii*
14. Front of head with well-developed ANT tubercles, their inner faces parallel or divergent. ABD TERG 1 and 7 without marginal tubercles (MTu). SIPH and cauda pale or dusky, and dorsal abdomen without dark markings **15**
 – Front of head with sinuate outline, with ANT tubercles not projecting beyond the middle in dorsal view. ABD TERG 1 and 7 with MTu. SIPH usually and cauda often black, and dorsal abdomen often with dark markings **21**
15. SIPH distinctly clavate, $1.0\text{--}1.1\times$ cauda *Microparsus tephrosiae*
 – SIPH tapering, or cylindrical on distal part, $1.2\text{--}3.3\times$ cauda **16**
16. ANT BASE VI $1.8\text{--}3.0\times$ R IV+V. SIPH very attenuate distally **17**
 – ANT BASE VI $1.1\text{--}1.7\times$ R IV+V. SIPH gradually tapering, not attenuate distally **18**
17. SIPH $2.2\text{--}3.3\times$ cauda *Acyrtosiphon gossypii* (incl. *umarovi*)
 – SIPH $1.2\text{--}1.9\times$ cauda *Acyrtosiphon pisum*
18. Head spinulose. ANT tubercles with inner faces approximately parallel. R IV+V $1.1\text{--}1.4\times$ HT II *Aulacorthum solani*
 – Head smooth. ANT tubercles with inner faces divergent. R IV+V $0.75\text{--}0.92\times$ HT II **19**
19. Longest hairs on ABD TERG 8 are $38\text{--}48\mu\text{m}$ long, about equal to BD III. SIPH $2.0\text{--}2.6\times$ cauda *Acyrtosiphon astragali*
 – Longest hairs on ABD TERG 8 are $15\text{--}36\mu\text{m}$ long, $0.5\text{--}0.6\times$ BD III. SIPH $1.2\text{--}2.1\times$ cauda **20**

ASTRANTIA

20. SIPH 1.6–2.1× cauda. ANT PT/BASE 4.1–6.0 *Acyrtosiphon kondoi*
 – SIPH 1.2–1.6× cauda. ANT PT/BASE 2.7–4.2 *Acyrtosiphon loti*
21. ANT PT/BASE less than 1. SIPH pale and 0.57–0.91× cauda *Brachyunguis skafi*
 – ANT PT/BASE more than 1. SIPH dark, 0.5–2.5× cauda **22**
22. Well-developed, dome-like MTu present on all of ABD TERG 2–4 or 2–5, as well as 1 and 7 (Figure 16h) **23**
 – MTu absent from, or only sporadically present, and usually small, on ABD TERG 2–5 **24**
23. ANT PT/BASE 1.6–2.2. SIPH 1.6–2.1× cauda. Hairs on ANT III short and blunt, shorter than BD III *Aphis astragalicola*
 – ANT PT/BASE 2.5–3.1. SIPH 1.1–1.6× cauda. Hairs on ANT III finely pointed, longer than BD III *Aphis ciceri*
24. SIPH much darker than cauda. Dorsal abdomen without any dark markings. Cauda with 4–8 hairs *Aphis gossypii*
 – SIPH and cauda similarly dark. Dorsal abdomen with dark markings at least posteriorly. Cauda with 4–25 hairs **25**
25. Hairs on ANT III 0.3–0.75× BD III. Dorsal abdomen usually with a solid black shield extending over all of ABD TERG 1–6. Cauda with 4–9 hairs *Aphis craccivora*
 – Hairs on ANT III 0.8–2.2× BD. Dorsal abdomen with scattered or segmentally-divided black markings, or with a variably developed or fragmented black shield that does not usually extend laterally to unite with marginal sclerites on ABD TERG 1–3. Cauda with 7–25 hairs **26**
26. SIPH almost always shorter than (0.5–1.1×) cauda, which bears 8–16 hairs **27**
 – SIPH usually longer than (0.8–1.9×) cauda, which bears 7–25 hairs **29**
27. Dorsal abdomen with solid black shield on middle parts of ABD TERG 1–3 or 1–4 and extending completely across ABD TERG 4–6 or 5–6. ANT PT/BASE (1.7–)1.9–2.4 *Aphis craccae*
 – Dorsal abdomen with black pleuro-spinal bars on ABD TERG 4–6 or 5–6, but ABD TERG 1–2 (–3) only ever with scattered small sclerites (Figure 16i). ANT PT/BASE 1.3–1.9 (–2.0) **28**
28. SIPH (0.65–) 0.70–1.1× cauda *Aphis astragali*
 – SIPH 0.50–0.65 (–0.67)× cauda *Aphis masoni*
29. ABD TERG 8 with a dark transverse band of even width that extends lateroventrally, encircling the segment almost to the subgenital plate (Figure 16j) **30**
 – ABD TERG 8 with a short dark transverse bar that is not extended lateroventrally **31**
30. ANT III with 0–13 rhinaria in apt. R IV+V a little longer than HT II. Cauda with 8–15 hairs *Aphis gallowayi*
 – ANT III without rhinaria in apt. R IV+V a little shorter than HT II. Cauda with 17–22 hairs *Aphis astragalina*
31. Cauda with 7–13 hairs (usually 7–9). Hairs on ABD TERG 3 very short, 7–17µm long *Aphis tacita*
 – Cauda with 11–25 hairs. Hairs on ABD TERG 3 usually more than 18µm long *Aphis fabae*

Astrantia

A. major
A. pontica

Umbelliferae

Aphis fabae
Myzus ornatus

Use key to polyphagous aphids, p. 1020.

HOST LISTS AND KEYS

Astrocodon see *Campanula*

Astydamia

A. latifolia

Asyneuma

A. canescens

Asystasia

A. coromandeliana

A. gangetica

A. schimperii

Use key to polyphagous aphids, p. 1020.

Athanasia

A. trifurcata

Use key to polyphagous aphids, p. 1020.

Athyrium

A. alpestre

A. distentifolium

A. filix-femina

A. macrocarpus

A. pycnosorum

A. rubripes

A. yokoscense

Athyrium spp.

For a key to fern-feeding aphids see under *Polypodium*.

Atractylis

A. flava

Atractylodes

A. japonica

A. ovata

Use key to polyphagous aphids, p. 1020; *U. gobonis* will come out as *U. compositae*.

Atragene see *Clematis*

Atraphaxis

A. buxifolia

A. frutescens

Umbelliferae

Hyadaphis coriandri

Campanulaceae

Uroleucon phyteumae

Acanthaceae

Aphis gossypii

Aphis gossypii

Aphis gossypii; *Macrosiphum euphorbiae*; *Myzus persicae*

Compositae

Aphis fabae, *gossypii*; *Myzus persicae*

Dryopteridaceae

Macrosiphum lapponicum

Macrosiphum [*adiantii*], *dryopteridis*, *lapponicum*, *walkeri*

Amphorophora ampullata;

Macrosiphum [*adiantii*], *dryopteridis*, *lambi*, [*ptericolens*],

walkeri; *Taiwanomyzus alpicola*

Macromyzus woodwardiae; *Shinjia orientalis*

Amphorophora ampullata; *Micromyzus nikkoensis*

Amphorophora ampullata

Amphorophora ampullata; *Taiwanomyzus filicis*

Amphorophora ampullata ssp. *bengalensis*;

Macromyzus maculatus; *Micromyzella judenkoi*

Compositae

Aphis (*Protaphis*) *carthami*(?)

Compositae

Aphis gossypii; *Uroleucon gobonis*

Uroleucon gobonis

Polygonaceae

Acaudella puchovi

Aphis fabae, *nasturtii*;

Brachyunguis atraphaxidis, *monstratus*;

Macrosiphum euphorbiae

<i>A. pyrifolia</i>	[<i>Brachycaudus shaposhnikovi</i>]; <i>Brachyunguis atraphaxidis</i>
<i>A. replicata</i>	<i>Brachyunguis atraphaxidis</i> , [<i>Brachyunguis (Thuleaphis)</i> sp. (Kadyrbekov, 2003c)]
<i>A. spinosa</i>	<i>Acaudella puchovi</i> ; <i>Brachyunguis atraphaxidis</i>
<i>A. virgata</i>	<i>Brachyunguis monstratus</i>

Key to aphids on *Atraphaxis*:-

1. ANT PT/BASE more than 1.5 2
- ANT PT/BASE less than 1.2 3

2. Cauda hardly evident, very broadly rounded, much less than 0.5× longer than its basal width. Dorsum with black sclerotisation. Small marginal tubercles present on ABD TERG 2–4, and spinal tubercles on ABD TERG 7 and 8 *Brachycaudus shaposhnikovi**
- Cauda helmet-, tongue- or finger-shaped, much more than 0.5× longer than its basal width, and other characters not in that combination go to key to polyphagous aphids, p. 1020

3. Cauda absent. SIPH smooth and of characteristic shape; swollen in middle and strongly constricted subapically, with a large flange. ANT 5-segmented *Acaudella puchovi**
- Cauda conical. SIPH shorter than cauda, barrel-shaped, with imbrication. ANT 6-segmented 4

4. SIPH 0.055–0.065× BL and 0.7–0.9× cauda *Brachyunguis atraphaxidis**
- SIPH 0.04–0.05× BL and 0.45–0.5× cauda *Brachyunguis monstratus**

Atrichum see *Catharinaea*

Atriplex

Chenopodiaceae

<i>A. angustifolia</i> see <i>patula</i>	
<i>A. arenaria</i>	<i>Aphis fabae</i>
<i>A. babingtonii</i>	<i>Hayhurstia atriplicis</i>
<i>A. belangeri</i>	<i>Hayhurstia atriplicis</i>
<i>A. breweri</i>	<i>Brachyunguis tetrapteralis</i> ; <i>Myzus ornatus</i>
<i>A. calotheca</i>	<i>Hayhurstia atriplicis</i>
<i>A. cana</i>	<i>Xerobion juchnevitchi</i>
<i>A. canescens</i> (incl. <i>tetraptera</i>)	<i>Brachyunguis bonnevillensis</i> , <i>tetrapteralis</i> ; <i>Myzus ornatus</i>
<i>A. flabellum</i>	<i>Aphis craccivora</i> , [<i>Aphis</i> sp. (Davletshina, 1964)]; <i>Brachyunguis harmalae</i>
<i>A. halimus</i>	<i>Aphis craccivora</i> , <i>fabae</i> ; <i>Hayhurstia atriplicis</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i>
<i>A. hastata</i>	<i>Aphis fabae</i> ; <i>Hayhurstia atriplicis</i> ; <i>Macrosiphum euphorbiae</i>
<i>A. heterosperma</i>	<i>Acyrtosiphon gossypii</i> ; <i>Hayhurstia atriplicis</i>
<i>A. hortensis</i>	<i>Aphis fabae</i> ; <i>Hayhurstia atriplicis</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i>
<i>A. incisa</i>	<i>Hayhurstia atriplicis</i>
<i>A. lampa</i>	<i>Brachyunguis bahamondesi</i>
<i>A. latifolia</i>	<i>Aulacorthum solani</i> ; <i>Hayhurstia atriplicis</i>
<i>A. lentiformis</i>	<i>Brachyunguis tetrapteralis</i>
<i>A. littoralis</i>	<i>Hayhurstia atriplicis</i>
<i>A. marina</i>	<i>Hayhurstia atriplicis</i>
<i>A. nitens</i>	<i>Aphis fabae</i> , [<i>Aphis</i> sp. (Davletshina, 1964)]; <i>Hayhurstia atriplicis</i>

HOST LISTS AND KEYS

<i>A. nummularia</i>	<i>Aphis fabae</i>
<i>A. oppositifolium</i>	<i>Hayhurstia atriplicis</i>
<i>A. patula</i>	<i>Aphis craccivora, fabae, gossypii; Hayhurstia atriplicis;</i> [<i>Hyalopterus pruni</i>]; <i>Myzus persicae</i>
<i>A. portulacoides</i>	<i>Hayhurstia atriplicis</i>
<i>A. prostrata</i>	<i>Hayhurstia atriplicis</i>
<i>A. semibaccata</i>	<i>Brachyunguis tetrapteralis; Hayhurstia atriplicis</i>
<i>A. tatarica</i>	<i>Aphis craccivora, fabae; Hayhurstia atriplicis</i>
<i>A. vesicaria</i>	<i>Macrosiphum euphorbiae; Myzus persicae</i>
<i>Atriplex</i> spp.	<i>Metopeuraphis atriplicis; Smynthuroides betae</i>

Key to aphids on *Atriplex*:-

1. SIPH very long and thin, 2.5–3.5× cauda and 0.33–0.5× BL *Acyrtosiphon gossypii*
– SIPH (if present) not more than 2.5× cauda or 0.33× BL **2**
2. ANT PT/BASE 0.5–1.4 **3**
– ANT PT/BASE either less than 0.3 or more than 1.4 **7**
3. SIPH dark **4**
– SIPH pale **5**
4. ANT PT/BASE 1.0–1.4. SIPH cylindrical *Brachyunguis bahamondesi*
– ANT PT/BASE 0.5–1.0. SIPH volcano-shaped *Xerobion juchnevitchi**
5. Hairs on ABD TERG 3 are 16–20µm long, 0.8–1.0× BD; hairs on ABD TERG 8 are 28–36µm long, 1.4–1.8× BD III *Brachyunguis harmalae*
– Hairs on ABD TERG 3 are 10–16µm long, 0.5–0.7× BD III; hairs on ABD TERG 8 are 15–30µm long, 0.7–1.2× BD III **6**
6. R IV+V 1.3–1.8× ANT PT. ANT PT/BASE 0.5–0.73. SIPH 0.05–0.095 mm long *Brachyunguis tetrapteralis*
– R IV+V 0.9–1.2× ANT PT. ANT PT/BASE 0.70–1.0. SIPH 0.07–0.16 mm long *Brachyunguis bonnevillensis*
7. SIPH cylindrical or slightly swollen, only 0.5–0.7× cauda, which bears 5–7 hairs *Hayhurstia atriplicis*
– SIPH (if present) more than 0.7× cauda **8**
8. SIPH with polygonal reticulation extending over distal 0.3–0.4 of length, and much shorter than the distance between their bases *Metopeuraphis atriplicis*
– SIPH (if present) without polygonal reticulation, or **if** such reticulation is present **then** it extends over less than distal 0.3 of length, and SIPH are as long as or longer than the distance between their bases
go to key to polyphagous aphids, p. 1020

Atropa

- A. acuminata*
A. belladonna

Solanaceae

- Myzus persicae*
Aulacorthum solani; Brachycaudus helichrysi;
[*Brevicoryne brassicae*]; *Macrosiphum euphorbiae;*
Myzus persicae; Neomyzus circumflexus

Use key to polyphagous aphids, p. 1020.

Atropis see *Puccinellia*

Aubrietia

A. deltoidea

Use key to polyphagous aphids, p. 1020.

Aucuba

A. japonica

Use key to polyphagous aphids, p. 1020.

Auricula see *Primula auricula*

Avena

A. barbata

A. brevis

A. chinensis

A. desertorum

A. fatua

A. ludoviciana

A. nuda

A. sativa

A. sterilis

A. strigosa

A. wiestii

Use key to apterae of grass-feeding aphids under *Digitaria*.

Cruciferae

Myzus ascalonicus, *cymbalariae*, *ornatus*, *persicae*

Aucubaceae

Aulacorthum [*linderae*], *magnoliae*, *solani*;

Myzus ascalonicus

Gramineae

Diuraphis noxia; *Myzus persicae*; *Schizaphis dubia*, *rufula*;

Sipha maydis; *Sitobion fragariae*

Metopolophium dirhodum

Metopolophium dirhodum

Metopolophium dirhodum; *Sitobion fragariae*

[*Acyrtosiphon gossypii*]; *Aphis fabae*; *Diuraphis noxia*;

Forda orientalis; *Macrosiphum euphorbiae*;

Metopolophium dirhodum; *Myzus persicae*;

Rhopalosiphum padi;

Schizaphis graminum, *longicaudata*, *rufula*; *Sipha maydis*;

Sitobion avenae, *fragariae*, *miscanthi*

Sitobion avenae

Schizaphis graminum; *Sitobion miscanthi*

Anoecia corni, *fulviabdominalis*; *Carolinaia rhois*;

Forda formicaria, *marginata*; *Geoica utricularia*;

Israelaphis lambersi;

Metopolophium dirhodum, *festucae* ssp. *cerealium*;

Pemphigus sp. (?*groenlandicus* – Zwölfer, 1958);

Rhopalosiphum maidis, *padi*; *Schizaphis graminum*;

Sipha flava, *maydis*; *Sitobion avenae*, *fragariae*, *miscanthi*;

Tetraneura ulmi

Baizongia pistaciae; *Forda formicaria*, *rotunda*;

Israelaphis carmini, *ilharcoi*, *lambersi*;

Metopolophium dirhodum;

Rhopalosiphum maidis; *Sipha maydis*;

Sitobion avenae, *fragariae*

Metopolophium dirhodum; *Sitobion avenae*

Schizaphis graminum

HOST LISTS AND KEYS

Avenastrum see *Helictotrichon*

Averrhoa

A. bilimbi
A. carambola

Aphis gossypii
Toxoptera aurantii

Oxalidaceae

Use key to polyphagous aphids, p. 1020.

Axonopus

A. compressus (incl. var. *affinis*)
A. scoparius

Hysteroneura setariae; *Sitobion miscanthi*;
Tetraneura fusiformis
Rhopalosiphum maidis

Gramineae

Use key to apterae of grass-feeding aphids under *Digitaria*.

Axyris

A. amaranthoides
A. lanata see *Krascheninnikovia lanata*

Aphis axyriphaga, *axyriradicis*

Chenopodiaceae

Key to apterae on *Axyris*:–

- Marginal tubercles (MTu) present on ABD TERG 2–4 (–6) as well as 1 and 7. Marginal hair on ABD TERG 1 is 0.3–0.5× height of adjacent tubercle. Cauda with 7–9 hairs *Aphis axyriradicis*
- MTu absent from ABD TERG 2–6. Marginal hair on ABD TERG 1 is about 0.9× height of adjacent tubercle. Cauda with only 3–5 hairs *Aphis axyriphaga*

Azadirachta

A. indica

Aphis gossypii, *spiraecola*

Meliaceae

Use key to polyphagous aphids, p. 1020.

Azalea see *Rhododendron*

Azanza

A. garckeana

Aphis craccivora, *gossypii*

Malvaceae

Use key to polyphagous aphids, p. 1020.

Azolla

A. caroliniana
A. filiculoides

Rhopalosiphum nymphaeae
Rhopalosiphum nymphaeae

Salviniaceae

Azorella

A. selago

Myzus ascalonicus

Umbelliferae

Babiana

B. angustifolia

Myzus cymbalariae

Iridaceae

Baccaurea

Baccaurea sp.

Greenidea anonae

Euphorbiaceae

Baccharis (incl. Baccharidastrum)

B. capraiaefolia
B. coridifolia
B. dracunculifolia
B. halimifolia

B. linearis
B. megalanica
B. oxiodonta
B. patagonica
B. pilularis

B. platensis
B. polifolia
B. punctulata (= *melastomaefolia*)
B. salicifolia
B. salicina
B. schultzii
B. triplinervis
B. viminea
Baccharis spp.

Compositae

Brachycaudus helichrysi
Aphis coridifoliae; *Uroleucon tucumani*
Aphis gossypii, *spiraecola*
Aphis coreopsidis, *fabae*, [*oenotherae*];
Brachycaudus [*cardui*], *helichrysi*;
Myzus persicae; *Prociphilus erigeronensis*;
Uroleucon ambrosiae, *erigeronense*
Aphis sp. (Chile, BMNH colln); *Uroleucon erigeronense*
Aulacorthum solani; *Myzus ascalonicus*
Aphis gossypii
Uroleucon brevisiphon
Aphis baccharicola, *coreopsidis*, *gossypii*;
Brachycaudus helichrysi; *Uroleucon erigeronense*
Aphis gossypii
Uroleucon macolai
Uroleucon ambrosiae ssp. *lizerianum*, *bereticum*, [*littorale*]
Uroleucon macolai
Aphis gossypii
Aphis gossypii
Aphis spiraecola
Uroleucon [*rudbeckiae* (= *ambrosiae* ssp. *lizerianum*?)]
Aphis solitaria, *Aphis* sp. (Chile, BMNH colln);
Toxoptera aurantii;
Uroleucon [*baccharidis* (Clarke, 1903; *nomen nudum*)],
chilense, *essigi*, *pseudomuermosum*

Key to aphids on *Baccharis*:–

1. ANT about 0.25× BL, with ANT PT/BASE less than 0.5. SIPH absent. Cauda and anal plate protruding backward, dark *Prociphilus erigeronensis*
- ANT more than 0.4× BL, with ANT PT/BASE more than 1. SIPH present. Cauda and anal plate normal, pale or dark **2**
2. SIPH with a distal zone of polygonal reticulation **3**
- SIPH without any polygonal reticulation **11**
3. Cauda with some apical hairs usually short and blunt. SIPH pale at base, dark distally. Dorsal cephalic hairs 18–35µm long *Uroleucon erigeronense*
- Cauda with apical hairs finely pointed like the more proximal hairs. SIPH variously pigmented. Dorsal cephalic hairs 32–75µm long **4**
4. SIPH usually more than 1.6× cauda, which is 0.24–0.34mm long and bears 7–12 hairs **5**
- SIPH usually less than 1.6× cauda, which is 0.33–0.85mm long and bears 9–31 hairs **6**
5. First tarsal segments with 3 hairs. ANT PT/BASE 3.7–4.2. ANT III with 3–6 rhinaria, on basal half. R IV+V shorter than HT II. SIPH pale at base and lacking imbrication on basal half *Uroleucon essigi*
- First tarsal segments with 4–5 hairs. ANT PT/BASE 4.1–5.3. ANT III with 5–14 rhinaria extending onto distal half. R IV+V longer than HT II. SIPH dark and imbricated to base *Uroleucon tucumani*

HOST LISTS AND KEYS

6. SIPH 0.36–0.54 mm long, 0.9–1.1× cauda, which is 0.36–0.51 mm long. R IV+V shorter than HT II
Uroleucon brevisiphon
- SIPH 0.47–1.00 mm long, 1.1–1.6× cauda which is 0.33–0.85 mm long. R IV+V longer or shorter than HT II **7**
7. Cauda pale, contrasting with dark brown–black SIPH and distal part of hind femur. SIPH 1.1–1.5× Cauda, which is 0.46–0.85 mm long. R IV+V longer than both ANT VI BASE and HT II
Uroleucon ambrosiae ssp. *lizerianum*
- cauda somewhat pigmented, not contrastingly pale in comparison with SIPH or, if SIPH are rather dark, then pale in comparison with distal part of hind femur. SIPH 1.3–1.6× cauda, which is 0.33–0.64 mm long. R IV+V longer or shorter than ANT VI BASE and HT II **8**
8. R IV+V 0.163–0.193 mm long, 1.1–1.3× HT II **9**
- R IV+V 0.123–0.173 mm long, 0.8–1.1× HT II **10**
9. Dorsal abdomen with dark post-siphuncular sclerites and sclerites at bases of dorsal hairs. ANT PT/BASE 4.3–5.4. ANT III with 18–29 rhinaria (al. with 24–39)
Uroleucon pseudomuermosum
- Dorsal abdominal sclerites pale and inconspicuous. ANT PT/BASE more than 6. ANT III with 7–19 rhinaria (al. with 14–22)
Uroleucon chilense
10. ANT I dark compared with II and basal part of III, and dorsal abdomen with dark post-siphuncular sclerites and sclerites around bases of dorsal hairs. ANT III with 7–15 rhinaria restricted to basal half of segment (al. with 11–24)
Uroleucon macolai
- ANT I, II and basal part of III similarly pale to dusky, and dorsal abdominal sclerites pale. ANT III with 15–32 rhinaria distributed over most of segment (al. with 21–35)
Uroleucon bereticum
11. ANT tubercles well developed, with inner faces convergent and scabrous. SIPH pale and slightly to moderately clavate
Myzus persicae
- ANT tubercles absent or weakly developed, divergent and smooth. SIPH pale or dark, tapering **12**
12. Cauda helmet-shaped, not longer than its basal width. SIPH short, truncate, smooth and pale. Spiracular pores large and rounded. Marginal tubercles (MTu) absent
Brachycaudus helichrysi
- Cauda tongue-shaped, much longer than its basal width. SIPH pale or dark, tapering, with imbrication. Spiracular pores reniform. MTu present on prothorax and ABD TERG 1 and 7 **13**
13. SIPH pale. R IV+V with 3–6 accessory hairs. ANT III usually with 1–15 rhinaria on distal part, and IV with 0–4
Aphis solitaria
- SIPH dark. R IV+V with 2 accessory hairs. ANT III and IV usually without rhinaria **14**
14. Cauda paler than SIPH **15**
- Cauda as dark as SIPH **16**
15. SIPH 0.14–0.20× BL. Cauda pale or dusky. ANT PT/BASE 2.0–3.5
Aphis gossypii
- SIPH 0.25–0.40× BL. Cauda very pale. ANT PT/BASE 3.25–4.0
Aphis coreopsidis
16. ABD TERG 1–8 with broad transverse dark bands fused to form a black shield. ANT PT/BASE 1.2–1.5. ABD TERG 2–4 and 6 rarely with MTu
Aphis sp. on *B. linearis*, Chile
- ABD TERG 1–6 without fused dark bands. ANT PT/BASE 1.8–5.1, or if 1.1–1.5 then ABD TERG 2–4 and 6 often have MTu **17**
17. ANT PT/BASE 1.1–1.5. ABD TERG 2–4 and 6 frequently with MTu
Aphis coridifoliae
- ANT PT/BASE 1.7–3.5. ABD TERG 2–4 and 6 without, or only sporadically with, MTu **18**

18. Stridulatory apparatus present (a row of short peg-like hairs on hind tibia and cuticular ridges on abdominal sternites 5 and 6). ANT PT/BASE 3.7–5.1 *Toxoptera aurantii*
 – Stridulatory apparatus absent. ANT PT/BASE 1.8–3.7 **19**
19. Dorsal abdomen without any dark markings. Cauda usually with a midway constriction and thickening of distal half *Aphis spiraeicola*
 – Dorsal abdomen with dark transverse bars on ABD TERG 7–8, and often with dark postsiphuncular sclerites. Cauda without a midway constriction or tapering on distal half **20**
20. ANT PT/BASE 1.8–2.7. SIPH often bearing 1–3 hairs; 1.6–2.5× cauda, which bears 7–12 hairs *Aphis baccharicola*
 – ANT PT/BASE 2.8–3.7. SIPH always without hairs; 0.7–1.9× cauda which bears 11–24 hairs **21**
21. SIPH 0.10–0.16× BL *Aphis fabae*
 – SIPH 0.065–0.07× BL *Aphis* sp. (Chile, BMNH colln, leg. H Zuniga)

Baeckia

B. virgata

Aphis gossypii; *Myzus persicae*

Myrtaceae

Use key to polyphagous aphids, p. 1020.

Bahia

B. ambrosoides

Aphis spiraeicola

Compositae

Balanites

B. aegyptiaca

Aphis gossypii

Balanitaceae

Ballota

B. foetida

B. nigra

Aphis balloticola

Aphis balloticola, [*nasturtii*]; *Aulacorthum solani*;

Brachycaudus ballotae; *Cryptomyzus alboapicalis*, *ballotae*;

Ovatomyzus sp. (*chamaedrys*?)

Labiatae

Key to aphids on *Ballota*:-

1. Most dorsal hairs long, thick and capitate **2**
 – Dorsal hairs not long, thick and capitate **3**
2. ANT PT 1.4–1.8× SIPH. ANT PT/BASE 5.9–8.8. Cauda 0.6–0.8× R IV+V, which bears 9–14 accessory hairs. R IV+V 1.4–1.7× HT II. SIPH 3.7–4.3× cauda. ANT III and IV normally articulated *Cryptomyzus ballotae*
 – ANT PT 4.4–6.5× SIPH. ANT PT/BASE 7.8–10.5. Cauda 1.2–1.5× R IV+V, which bears 3–4 accessory hairs. R IV+V 1.1–1.3× HT II. SIPH 1.0–1.5× cauda. ANT III and IV often fused *Cryptomyzus alboapicalis*
3. Cauda helmet-shaped, shorter than its basal width in dorsal view. Dorsal abdomen dark, or with dark cross-bands. Spiracles large and rounded *Brachycaudus ballotae*
 – Cauda tongue-shaped, longer than its basal width in dorsal view. Dorsum pale. Spiracles reniform (i.e., partially covered by sclerites) **4**
4. SIPH dark. ANT tubercles weakly developed, front of head sinuous in outline in dorsal view. Marginal tubercles (MTu) always present on ABD TERG 1 and 7 *Aphis balloticola*

HOST LISTS AND KEYS

- SIPH pale. ANT tubercles well developed, projecting well beyond middle of front of head in dorsal view. MTu never present on ABD TERG 1 and 7 5
- 5. SIPH tapering or cylindrical on distal half, with a large flange. Cauda not constricted at base. Head spiculose. ANT III with 1–2 rhinaria near base *Aulacorthum solani*
- SIPH usually slightly swollen distally, with a small flange. Cauda constricted at base. Head smooth. ANT III without rhinaria *Ovatomyzus* sp.

Balsamita

B. major

B. suaveolens

Compositae

Aphis fabae; *Brachycaudus cardui*, *helichysi*;
Macrosiphoniella tanacetaria; *Myzus ascalonicus*
Brachycaudus helichrysi; [*Macrosiphoniella artemisiae*];
Macrosiphum euphorbiae; *Myzus persicae*

Use key to aphids on *Tanacetum*.

Balsamorhiza

B. sagittata

Compositae

Macrosiphum euphorbiae

Bambusa see Blackman and Eastop (1994).

[One additional species has been recorded from *Bambusa* spp.: *Sitobion fragariae*.]

Bamia see ***Hibiscus***

Banisteriopsis

Banisteriopsis sp.

Malpighiaceae

Aphis gossypii

Banksia

B. integrifolia

Proteaceae

Aphis fabae

Barbarea

B. arcuata

B. orthoceras

B. stricta

B. verna

B. vulgaris (incl. var. *stricta*)

Cruciferae

Pseudobrevicoryne buhri
Aphis [*neopolygona* (= *nasturtii*?)];
Lipaphis pseudobrassicae; *Myzus ornatus*
Aphis triglochinis
Myzus ornatus
Aphis mizutakarashi, [*neopolygona* (= *nasturtii*?)],
triglochinis;
Aulacorthum solani;
Brevicoryne barbareae, *brassicae*, *crambe*, *Brevicoryne* sp.;
Lipaphis pseudobrassicae.; *Macrosiphum euphorbiae*;
Myzus ascalonicus, *ornatus*, *persicae*;
Pemphigus populitransversus; *Pseudobrevicoryne buhri*;
[*Rhopalosiphum padi*]
[*Rhopalosiphum nymphaeae*]

***Barbarea* sp.**

Key to aphids on *Barbarea*:-

1. ANT PT/BASE less than 0.5. SIPH absent. Wax pore-plates on posterior abdomen *Pemphigus populitransversus*
- ANT PT/BASE more than 1.0. SIPH present (sometimes very small). No wax pore-plates 2

2. ANT tubercles well developed, projecting forward much further than middle of front of head in dorsal view
 – ANT tubercles less well developed or absent, so that outline of front of head is sinuate, straight or convex in dorsal view 3
 go to key to polyphagous aphids, p. 1020, starting at couplet 4
3. SIPH as very short, pigmented cones, less than 0.5× the short, triangular cauda. Apt. with secondary rhinaria on distal part of ANT III, and also usually on IV and V *Pseudobrevicoryne buhri*
 – SIPH tubular, at least 0.6× cauda. ANT of apt. without secondary rhinaria 4
4. SIPH tapering, usually rather pale. Marginal tubercles (MTu) always present at least on ABD TERG 1 and 7 5
 – SIPH usually somewhat swollen, dusky or dark at least at apices. MTu never present on ABD TERG 1 and 7 6
5. ANT PT/BASE 1.1–1.8. (Al. with 25–60 secondary rhinaria on ANT III, 9–25 on IV and 7–17 on V) *Aphis triglochinis*
 – ANT PT/BASE 2.2–3.0. (Al. with 8–18 secondary rhinaria on ANT III, 2–5 on IV and 0–2 on V) *Aphis mizutakarashi**
6. ANT III 1.2–1.7× SIPH. ABD TERG 2–4 usually without dark markings (except intersegmental ones) in mounted preparations. Cauda tongue-shaped to elongate triangular *Lipaphis pseudobrassicae*
 – ANT III 1.8–3.7× SIPH. ABD TERG 2–4 usually with dark spots or cross-bands; if not then cauda is bluntly triangular 7
7. Dorsal body hairs mostly short with expanded, fan-shaped apices *Brevicoryne crambe*
 – Dorsal body hairs with blunt or pointed apices 8
8. Tibiae pale except at apices. Dorsal abdomen without dark sclerites. SIPH a little longer than the bluntly triangular cauda *Brevicoryne barbareae*
 – Tibiae entirely dark. Dorsal abdomen with dark sclerites. SIPH 0.7–1.0× cauda 9
9. SIPH 0.6–0.8× cauda which is tongue-shaped or elongate triangular, more than 1.5× its basal width. ABD TERG all with large paired dark sclerites which may be joined medially to form broad cross-bands *Brevicoryne* sp. (*barbareae* of David and Hameed, 1975, *nec* Nevsky)
 – SIPH 0.8–1.0× cauda which is broadly triangular, not longer than its basal width. ABD TERG 1–5 with paired sclerites but these are usually small, and never form cross-bands *Brevicoryne brassicae*

Barbula*Barbula* sp.*Muscaphis musci***Pottiaceae**(or use the key to apterae of moss-feeding aphids under *Polytrichum*)**Barkhausia see Crepis****Barleria***B. cristata**B. prionitis**Aphis spiraeicola*; *Toxoptera citricidus**Myzus persicae***Acanthaceae**

Use key to polyphagous aphids, p. 1020.

Barnadesia*B. odorata**Myzus persicae***Compositae**

HOST LISTS AND KEYS

Barringtonia see Blackman and Eastop (1994)

Bartsia

B. trixago

B. viscosa

Scrophulariaceae

Brachycaudus persicae

Brachycaudus helichrysi

Couplet for separating these two species (both of which have a short, rounded cauda and large circular spiracular pores):–

- Dorsal abdomen with an extensive black shield. SIPH black, 0.105–0.125× BL. Anterior part of mesosternum with a pair of mammariform processes *Brachycaudus persicae*
- Dorsal abdomen without dark markings. SIPH pale, 0.05–0.09× BL. Mesosternum without mammariform processes *Brachycaudus helichrysi*

Basella

B. alba

B. rubra

Basellaceae

[*Lipaphis pseudobrassicae*]

Myzus persicae

Basilicum

B. polystachion

Labiatae

Aphis gossypii

Bassia

B. prostata see *Kochia*

B. sedoides

Bassia sp.

Chenopodiaceae

Chaitaphis kazakhstanica, [*tenuicauda*];

Macchiatiella rhamni (? – Ivanoskaya, 1977)

Brachyunguis tetrapteralis

Key to apterae on *Bassia*:–

1. ANT PT/BASE 0.5–0.73 *Brachyunguis tetrapteralis*
- ANT PT/BASE 1.8–8.2 **2**
2. Cauda very short and broadly rounded, hardly discernible. Dorsal hairs with blunt or pointed apices, short on anterior abdominal segments. ANT PT/BASE 6.5–8.2 *Macchiatiella rhamni* (?)
- Cauda long and thin, longer than SIPH. Dorsal hairs long and with expanded apices. ANT PT/BASE 1.5–2.0 *Chaitaphis kazakhstanica**

Batrachium see *Ranunculus*

Bauera

B. rubioides

Cunoniaceae

Aphis spiraeicola

Bauhinia (incl. *Piliostigma*)

B. blakeana

B. corniculata

B. divaricata

B. petersiana

B. purpurea

B. tomentosa

B. variegata

Leguminosae

Aphis gossypii

Aphis gossypii

Aphis craccivora, *gossypii*

Aphis craccivora, *gossypii*; *Myzus persicae*

Aphis gossypii; *Toxoptera aurantii*

Aphis craccivora; *Myzus persicae*

Aphis gossypii; *Myzus persicae*; *Sinomegoura citricola*

Use key to polyphagous aphids, p. 1020.

Becium*B. obovatum**Aphis gossypii***Labiatae****Beckmannia***B. syzigachne**Rhopalosiphum maidis; Sitobion avenae***Gramineae**Use key to apterae of grass-feeding aphids under *Digitaria*.**Bedfordia***B. salicina**Brachycaudus helichrysi***Compositae****Begonia***B. cucullata**B. fimbriatipula**B. heracleifolia**B. × hortensis**B. lomensis**B. semperflorens**B. × sempervirens**Begonia* spp.*Aphis gossypii; Myzus ornatus**Brachycaudus helichrysi**Neomyzus circumflexus**Neomyzus circumflexus**Aphis gossypii**Aphis gossypii; Aulacorthum solani; Myzus persicae**Aphis gossypii; Myzus persicae**Aphis frangulae* group; [*Rhodobium porosum*]**Begoniaceae**

Use key to polyphagous aphids, p. 1020.

Behen see Silene**Belamcanda***B. chinensis**Dysaphis tulipae; Myzus ornatus***Iridaceae**

Couplet to separate these two species:–

- Cauda helmet-shaped, not longer than its basal width in dorsal view. SIPH dark, tapering, straight. ANT tubercles weakly developed *Dysaphis tulipae*
- Cauda tongue-shaped, longer than its basal width. SIPH pale except at apices, tapering but with a slight S-curve. ANT tubercles well developed, with inner faces convergent *Myzus ornatus* (or try key to polyphagous aphids, p. 1020)

Bellardia see Bartsia**Bellevalia***B. trifoliata**Myzus persicae***Hyacinthaceae****Bellidiastrum see Aster****Bellis***B. perennis**Aphis gossypii*, [*plantaginis*];*Aulacorthum solani; Brachycaudus helichrysi;**Macrosiphum euphorbiae;**Myzus ascalonicus, ornatus, persicae;**Neomyzus circumflexus**B. sylvestris**Myzus persicae***Compositae**

Use key to polyphagous aphids, p. 1020.

HOST LISTS AND KEYS

Bencomia

- B. caudata*
- B. moquiniana*

Rosaceae

- Aphis gossypii*; *Aulacorthum* sp.; *Macrosiphum rosae*
- Macrosiphum euphorbiae*, *rosae*; *Myzus persicae*

Key to aphids on *Bencomia*:-

- Head dark with well-developed, divergent ANT tubercles, SIPH black *Macrosiphum rosae*
- Head and SIPH pale (or if dark then ANT tubercles are weakly developed)
go to key to polyphagous aphids, p. 1020

Benincasa

- B. cerifera*
- B. hispida*

Cucurbitaceae

- Aphis fabae*
- Aphis craccivora*, *fabae*, *gossypii*, [umbrella]

Use key to polyphagous aphids, p. 1020.

Berberidopsis

- B. corallina*

Flacourtiaceae

- Neomyzus circumflexus*

Berberis

- B. amurensis* (incl. var. *japonica*)
- B. aristata*
- B. asiatica*
- B. bromtonensis*
- B. buxifolia*
- B. crataegifolia*
- B. crataegina*
- B. darwinii*
- B. empetrifolia*
- B. heteropoda*
- B. hybrido-gagnepainii*
- B. ilicifolia*
- B. integerrima*

- B. juliana*
- B. koreana*
- B. lycium*
- B. neubertii*
- B. nummularia*
- B. oblonga*
- B. regeliana*
- B. sargentiana*
- B. sieboldii*
- B. sphaerocarpa*
- B. stenophylla*
- B. thunbergii*

- B. umbellata*

Berberidaceae

- Aphis spiraeicola*; *Liosomaphis ornata*
- Liosomaphis atra*, *himalayensis*
- Liosomaphis atra*, *himalayensis*
- Liosomaphis berberidis*
- Aphis patagonica*; *Liosomaphis berberidis*
- Liosomaphis berberidis*
- Liosomaphis berberidis*
- Aphis berberidorum*, *patagonica*
- Aphis berberidorum*
- Berberidaphis lydiae*; *Liosomaphis berberidis*
- Liosomaphis berberidis*
- Aphis patagonica*
- Amegosiphon platicaudum*; *Berberidaphis lydiae*;
- Liosomaphis berberidis*
- Liosomaphis berberidis*
- [*Hydaphias hofmanni*]
- Liosomaphis atra*, *berberidis*; *Myzus persicae*
- Liosomaphis berberidis*
- Liosomaphis ornata*
- Berberidaphis lydiae*; *Liosomaphis berberidis*
- Liosomaphis berberidis*
- Liosomaphis berberidis*
- Liosomaphis berberidis*
- Berberidaphis lydiae*; *Liosomaphis berberidis*
- Liosomaphis berberidis*
- Aphis nasturtii*; *Liosomaphis atra*, *berberidis*, *ornata*;
- [*Metopolophium berberinutritum*]
- Liosomaphis berberidis*, *himalayensis*;
- [*Tricaudatus polygoni*]

<i>B. verruculosa</i>	<i>Liosomaphis berberidis</i>
<i>B. vulgaris</i>	<i>Amegosiphon platycaudum</i> ; <i>Aulacorthum solani</i> ; <i>Liosomaphis berberidis</i> , <i>ornata</i>
<i>B. wallichiana</i>	<i>Liosomaphis himalayensis</i>
<i>Berberis</i> spp.	<i>Macrosiphum euphorbiae</i> , [<i>pachysiphum</i>]; [<i>Prociphilus erigeronensis</i>]; [<i>Rhopalosiphum rufiabdominale</i>]; <i>Toxoptera aurantii</i> , <i>citricidus</i> , <i>odinae</i> ; [<i>Xenosiphonaphis conandri</i>]

Key to aphids on *Berberis*:-

1. SIPH swollen, with maximum width of swollen part broader than base. Head smooth, with ANT tubercles either weakly developed or with inner faces broadly divergent 2
 - SIPH tapering or, **if** slightly clavate, **then** maximum width of swollen part is narrower than base, and head is nodulose with well-developed, convergent ANT tubercles 7
2. SIPH slightly and uniformly swollen over most of length, narrowing at base and apex, with regularly-spaced, close-set spinulose imbrication (Figure 17a). Cauda tongue-shaped with 20–30 rather short hairs (Figure 17d). ANT tubercles well-developed, broadly divergent *Amegosiphon platycaudum*
 - SIPH markedly clavate (Figure 17b, c), and lacking imbrication except near apex. Cauda with less than 20 hairs (Figure 17e, f). ANT tubercles variously developed 3
3. Cauda shorter than its basal width, with 12–18 hairs (Figure 17e). ANT PT/BASE 2.0–2.75 *Berberidaphis lydiae*
 - Cauda much longer than its basal width, with 5–8 hairs (Figure 17f). ANT PT/BASE 0.9–1.9 4
4. Dorsum sclerotic, with variably developed dark pigmentation or a complete dark shield 5
 - Dorsal abdomen pale 6
5. ANT PT/BASE 1.6–1.9. Dorsal pigmentation variable. SIPH as long as or longer than head width across (and including) eyes *Liosomaphis ornata*
 - ANT PT/BASE 1.2–1.6. Dorsum usually with a complete shield. SIPH shorter than head width across eyes *Liosomaphis atra*
6. ANT 0.52–0.73× BL, with ANT PT/BASE 1.6–2.1 *Liosomaphis himalayensis*
 - ANT 0.4–0.5× BL, with ANT PT/BASE 0.8–1.4 *Liosomaphis berberidis*
7. ANT tubercles well developed, so that there is a deep frontal sinus. ABD TERG 1 and 7 without marginal tubercles (MTu) go to key to polyphagous aphids, p. 1020, starting at couplet 5
 - ANT tubercles weakly developed, not or hardly projecting beyond middle part of front of head in dorsal view. ABD TERG 1 and 7 always with MTu 8
8. Stridulatory apparatus present, consisting of a conspicuous pattern of ridges on ventrolateral areas of abdominal sternites 5 and 6, and a row of short, peg-like hairs on the hind tibia go to key to polyphagous aphids, p. 1020, starting at couplet 26
 - Stridulatory apparatus not present 9
9. R IV+V 1.0–1.24× HT II (with R IV+V always less than 0.12 mm) 10
 - R IV+V 0.7–1.0× HT II (if more than 0.9× HT II then R IV+V is more than 0.12 mm) 11
10. SIPH and cauda black *Aphis spiraeicola*
 - SIPH and cauda mainly pale, only darker distally *Aphis nasturtii*

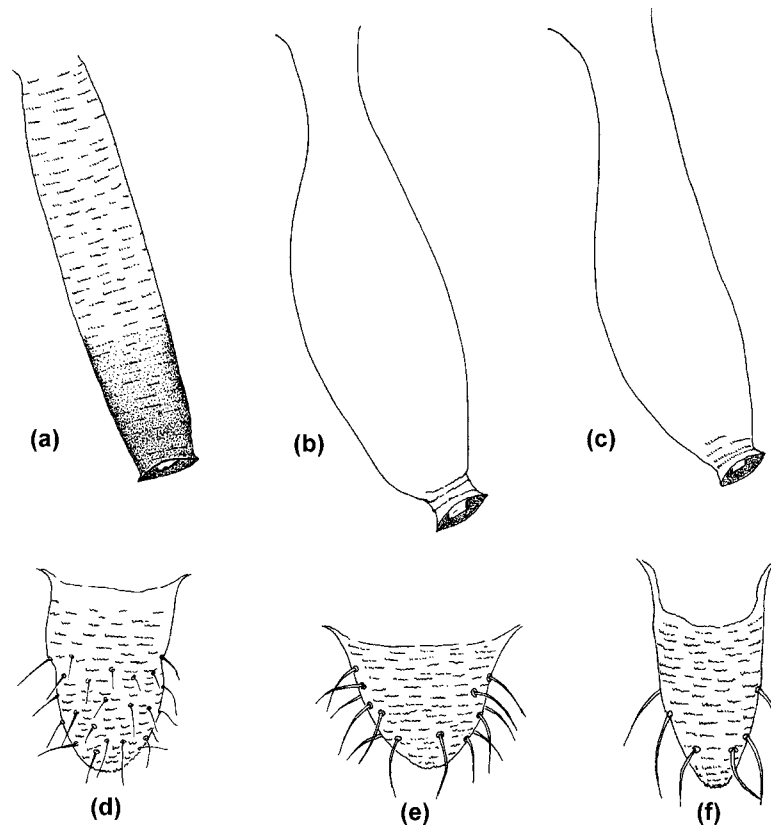


Figure 17 Apteræ on *Berberis*. (a) SIPH of *Amegosiphon platycaudum*, (b) SIPH of *Berberidaphis lydiae*, (c) SIPH of *Liosomaphis berberidis*, (d) cauda of *A. platycaudum*, (e) cauda of *B. lydiae*, (f) cauda of *L. berberidis*.

11. R IV+V 0.09–0.12mm, 0.35–0.46× cauda. Cauda 0.12–0.15× BL. Dorsal abdomen without sclerotisation anterior to SIPH *Aphis patagonica*
 – R IV+V 0.12–0.15mm, 0.55–0.77× cauda. Cauda 0.10–0.12× BL. Dorsal abdomen with variably developed sclerotisation anterior to SIPH *Aphis berberidorum*

Berchemia

- B. lineata*
B. racemosa

Rhamnaceae

- Macrosiphum berchemiae*
Macrosiphum berkemiae; *Aphis gossypii*

Key to aphids on *Berchemia*:-

1. SIPH black and having distal 0.25–0.45 with polygonal reticulation. Cauda pale **2**
 – If SIPH are black then they are without polygonal reticulation. Cauda pale or dark
 go to key to polyphagous aphids, p. 1020
2. SIPH with reticulation on distal 0.25–0.33. R IV with about 8 accessory hairs *Macrosiphum berchemiae*
 – SIPH with reticulation on distal 0.32–0.44. R IV with 4–6 accessory hairs *Macrosiphum berkemiae*

Bergenia*B. crassifolia***Saxifragaceae***Myzus persicae***Berkheya (incl. Agriphyllum)***B. arenarium**B. decurrens**B. rigida**B. robusta**B. zeyheri***Compositae***Brachyunguis agriphylli**Brachycaudus helichrysi**Brachycaudus helichrysi**Aphis pseudocardui**Aphis gossypii*; *Uroleucon compositae*Key to aphids on *Berkheya*:-

1. ANT PT/BASE either less than 0.5 or more than 1.5 go to key to polyphagous aphids, p. 1020
 - ANT PT/BASE 0.5–1.2 2
 2. ANT PT/BASE about 0.5–0.6. SIPH about 0.6× cauda. R IV+V a little shorter than HT II
 - ANT PT/BASE 0.9–1.2. SIPH similar in length to the short triangular cauda. R IV+V longer than HT II
- Brachyunguis agriphylli*
Aphis pseudocardui

Bersama see Blackman and Eastop (1994)**Berschoreria***B. yuccoides***Agavaceae***Myzus persicae***Berteroa***B. incana***Cruciferae***Aphis beteroae*, *craccivora*, *fabae*,*Aphis* sp. (Czech Republic, BMNH colln);*Lipaphis erysimi*, *ruderalis* (as *berteroaella* Mamontova);*Myzus persicae*; *Smiela fusca*; *Spatulophorus incanae**Berteroa* sp.[*Aphis triglochinis*]Key to aphids on *Berteroa*:-

1. SIPH black and volcano-shaped, with a large perisiphuncular sclerite, and sclerites at the bases of dorsal hairs. Cauda shorter than its basal width, triangular with rounded apex. ANT III with 5–16 rhinaria and IV with 0–5
 - SIPH tubular. Dorsal hairs not on dark sclerites. Cauda much longer than its basal width. ANT III and IV (of apt.) without rhinaria
- Smiela fusca*
2. Dorsal hairs with fan-shaped apices. Dorsal cuticle of head, prothorax and ABD TERG 7–8 very rugose
 - Dorsal hairs with blunt or pointed apices. Dorsal cuticle rugose or not rugose
- Spatulophorus incanae*
3. ANT III as long as or longer than ANT IV+V together. Cuticle of front of head rugose. SIPH with slight subapical swelling
 - ANT III shorter than ANT IV+V together. Cuticle of front of head smooth, spiculose or nodulose. SIPH tapering, cylindrical or clavate
- 2
3
4
5

HOST LISTS AND KEYS

4. ANT tubercles developed, projecting about as far as median tubercle, so that front of head is sinuate in outline in dorsal view. ANT more than $0.5 \times$ BL, with ANT PT/BASE 1.8–2.7. ABD TERG 8 without a rugose conical process *Lipaphis erysimi*
 – ANT tubercles undeveloped, front of head convex in dorsal view. ANT less than $0.5 \times$ BL, with ANT PT/BASE 1.6–2.0. ABD TERG 8 with a rugose conical process *Lipaphis ruderalis*
5. ABD TERG 1–4 and 7 with marginal tubercles (MTu). SIPH dusky to dark, tapering, $0.13\text{--}0.17 \times$ BL and $1.1\text{--}1.4 \times$ the similarly pigmented slender cauda, which bears 5 or 6 hairs *Aphis* sp. (BMNH colln, Czech Republic)
 – MTu either absent or usually only on ABD TERG 1 and 7; rarely on 2–4, in which case other characters are not in the same combination **6**
6. MTu on ABD TERG 1 and 7 very large; diameter of MTu on ABD TERG 1 is at least $3 \times$ length of adjacent marginal hair (which is $c.10\mu\text{m}$). SIPH without a distinct flange, $1.85\text{--}2.27 \times$ cauda which bears 8–11 hairs *Aphis berteroae*
 – Diameter of MTu (if present) on ABD TERG 1 is $0.2\text{--}1.4 \times$ length of adjacent marginal hair (which is $10\text{--}40\mu\text{m}$). SIPH with a distinct flange, $0.8\text{--}2.5 \times$ cauda which bears 4–25 hairs
 go to key to polyphagous aphids, p. 1020

Berula

B. erecta

Berula sp.

Umbelliferae

Cavariella aegopodii; *Hyadaphis foeniculi*;
Pemphigus protospirae; *Rhopalosiphum nymphaeae*
Cavariella cicutae

Key to aphids on *Berula*:-

1. ANT PT/BASE less than 0.5. SIPH absent *Pemphigus protospirae*
 – ANT PT/BASE more than 0.6. SIPH present (with distal part swollen) **2**
2. ABD TERG 8 with a supracaudal process. ANT PT/BASE 0.6–1.3 **3**
 – No supracaudal process. ANT PT/BASE 2.3–3.9 **4**
3. BL $4.4\text{--}5.7 \times$ SIPH. SIPH $5.9\text{--}8.6 \times$ maximum diameter of swollen part and $8.3\text{--}11.5 \times$ least diameter of stem, which is about equal to the diameter of the hind tibiae at midlength *Cavariella aegopodii*
 – BL $5.6\text{--}6.4 \times$ SIPH. SIPH $3.5\text{--}4.6 \times$ maximum diameter of swollen part and $4.1\text{--}5.5 \times$ least diameter of stem, which is about $1.5 \times$ diameter of hind tibiae at midlength *Cavariella cicutae*
4. SIPH $0.9\text{--}1.4 \times$ cauda. R IV+V $0.65\text{--}1.0 \times$ HT II *Hyadaphis foeniculi*
 – SIPH more than $2 \times$ cauda. R IV+V $1.0\text{--}1.4 \times$ HT II *Rhopalosiphum nymphaeae*

Beta

B. bengalensis

B. maritima

B. vulgaris (incl. vars *cicia*,
macrorrhiza, *rapa*, *saccharifera*)

Chenopodiaceae

Myzus persicae
Aphis fabae; *Myzus antirrhinii*
Aphis fabae, *craccivora*, *gossypii*, *nasturtii*, *solanella*;
Aulacorthum solani; *Brachyunguis harmalae*;
Brevicoryne brassicae; *Hayhurstia atriplicis*;
[*Lipaphis pseudobrassicae*];
Macrosiphum euphorbiae, *stellariae*;
Myzus ascalonicus, *persicae*;
Pemphigus betae, [*bursarius*], *fuscicornis*,
[*populitransversus*], *populivenae*;

Prociphilus erigeronensis;
Rhopalosiphoninus latysiphon, *staphyleae* ssp. *tulipaellus*;
Smynthuroides betae; [*Uroleucon sonchi*]

Key to aphids on *Beta*:-

1. SIPH present and only 0.6–0.8× cauda 2
 – SIPH present or absent, but if present then more than 0.8× cauda 3
2. ANT PT/BASE less than 0.7. SIPH short and broad, less than 1.5× basal width. ABD TERG 1 and 7 always with lateral tubercles (MTu) *Brachyunguis harmalae*
 – ANT PT/BASE 1.4–2.5. SIPH 3–4 times longer than their basal width, and slightly swollen over distal 0.7. ABD TERG 1 and 7 never with MTu *Hayhurstia atriplicis*
3. SIPH dark, slightly swollen and only 0.25–0.5× ANT III and 0.8–1.0× cauda, which is broadly triangular and about as long as its basal width *Brevicoryne brassicae*
 – SIPH present or absent, but if present then pale or dark, 0.5–1.5× ANT III and 0.8–2.5× cauda, which is tongue- or finger-shaped or triangular, longer than its basal width 4
4. SIPH pale with subapical polygonal reticulation (at least 4–5 rows of closed cells). ANT tubercles with inner faces smooth and divergent. ANT III with 1–10 rhinaria, and with longest hairs 0.6–1.2× BD III 5
 – SIPH (if present) pale or dark, without polygonal reticulation. ANT tubercles absent or weakly developed or, if well-developed, then with inner faces spiculate and steep-sided (parallel or apically convergent). ANT III with 0–4 rhinaria (if with 1–4 then longest hairs less than 0.5× BD III)
go to key to polyphagous aphids, p. 1020
5. Femora usually with a dark spot or patch near apices. Dorsal hairs on head and ABD TERG 3 mostly longer than ANT BD III *Macrosiphum stellariae*
 – Femora pale or honey brown near apex. Dorsal hairs on head and ABD TERG 3 not longer than ANT BD III *Macrosiphum euphorbiae*

Betonica see *Stachys*

Bidens

- B. aristosa*
B. bipinnata (incl. *cynapiifolia*)

B. biternata
B. cernua

B. chrysanthemoides
B. comosa
B. connata
B. coronata
B. frondosa

B. grantii

Compositae

- Aphis coreopsidis*
Aphis coreopsidis, *gossypii*, *spiraecola*;
Pemphigus sp. (as *lactucae*); *Prociphilus erigeronensis*
Aphis craccivora, *gossypii*, *spiraecola*; *Myzus ornatus*
Aphis fabae, *mimuli*; *Brachycaudus helichrysi*;
[*Macrosiphum rosae*]; *Myzus persicae*;
Pemphigus borealis, *Pemphigus* sp.;
[*Rhopalosiphum nymphaeae*]; *Uroleucon chrysanthemi*
Uroleucon chrysanthemi, [*rudbeckiae*]
Aphis coreopsidis; *Uroleucon chrysanthemi*
Aphis coreopsidis; *Uroleucon chrysanthemi*
Uroleucon chrysanthemi
Aphis coreopsidis, *gossypii*, *nasturtii*; *Aulacorthum solani*;
Brachycaudus helichrysi; [*Rhodobium porosum*];
[*Rhopalosiphum nymphaeae*]; *Uroleucon chrysanthemi*
Myzus ornatus

HOST LISTS AND KEYS

<i>B. laevis</i>	<i>Aphis gossypii</i> ; <i>Uroleucon chrysanthemi</i> , [<i>rudbeckiae</i>]
<i>B. leucantha</i>	<i>Aphis spiraeicola</i>
<i>B. megapotamica</i>	<i>Aphis coreopsidis</i>
<i>B. odorata</i>	<i>Geopemphigus torsus</i>
<i>B. orellana</i>	<i>Neomyzus circumflexus</i>
<i>B. pilosa</i>	<i>Acyrtosiphon bidenticola</i> , <i>ilka</i> ; <i>Aphis coreopsidis</i> , <i>craccivora</i> , <i>fabae</i> , <i>gossypii</i> , [<i>illinoisensis</i>], <i>solanella</i> , <i>spiraecola</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; [<i>Hysteroneura setariae</i>]; <i>Macrosiphum euphorbiae</i> ; <i>Myzus ornatus</i> , <i>persicae</i> ; <i>Neomyzus circumflexus</i> [<i>Rhopalosiphum padi</i> , <i>rufiabdominale</i>]; <i>Toxoptera aurantii</i> , <i>citricidus</i> ; [<i>Tricaudatus polygoni</i>]; <i>Uroleucon ambrosiae</i> , <i>compositae</i>
<i>B. reptans</i>	<i>Aphis coreopsidis</i> , <i>gossypii</i> , <i>spiraecola</i> ; <i>Uroleucon pseudambrosiae</i>
<i>B. subalternans</i>	<i>Aphis coreopsidis</i> , <i>spiraecola</i>
<i>B. tripartita</i>	<i>Aphis fabae</i> , <i>nasturtii</i> , [<i>taukogi</i>], [<i>Aphis</i> sp. Davletshina, 1964: 124]; <i>Brachycaudus helichrysi</i> ; [<i>Epipemphigus niisimae</i>]; <i>Macrosiphoniella tanacetaria</i> ; <i>Pemphigus borealis</i> , [<i>fuscicornis</i>] <i>Uroleucon chrysanthemi</i> , <i>tripartitum</i> <i>Uroleucon ambrosiae</i>
<i>B. urbanii</i>	<i>Uroleucon ambrosiae</i>
<i>B. vulgatus</i>	<i>Aphis coreopsidis</i> , <i>fabae</i> ; <i>Myzus persicae</i> ; <i>Pemphigus</i> sp. [as <i>betae</i>]; <i>Prociphilus erigeronensis</i> ; <i>Uroleucon chrysanthemi</i>
<i>B. wallichii</i>	<i>Aphis spiraeicola</i> ; <i>Macrosiphoniella yomogifoliae</i>
<i>Bidens</i> spp.	[<i>Aphis frangulae</i> group], <i>solitaria</i> , <i>triglochinis</i> ; <i>Capitophorus litanensis</i> ; <i>Pemphigus tartareus</i> ; <i>Smynthuroides betae</i>

Key to aphids on *Bidens*:-

- | | |
|---|----------------------------|
| 1. ANT PT/BASE less than 0.5. SIPH absent (on roots) | 2 |
| – ANT PT/BASE more than 1.0. SIPH present (on aerial parts) | 10 |
| 2. Only alatae (sexuparae) or alatiform nymphs present | 3 |
| – Apteræ present | 7 |
| 3. (Al.) ABD TERG (1–) 3–8 each bearing transverse dark bands. Oblique veins of hind wing parallel and widely spaced | 4 |
| – (Al.) ABD TERG pale. Oblique veins of hind wing divergent, with bases adjacent | 5 |
| 4. (Al.) Body and appendages bearing numerous long fine hairs. ABD TERG 8 with 25–50 hairs. ANT II 0.4–0.5× ANT III and bearing 20–30 hairs. ANT BASE VI 4.5–12× PT. Rhinaria on ANT III with plain rims | <i>Smynthuroides betae</i> |
| – (Al.) Body and appendages with hairs rather sparse and short. ABD TERG 8 with only 2–3 hairs. ANT II about 0.25× ANT III and bearing 5–8 hairs. ANT BASE VI 2.8–4.5× PT. Rhinaria on ANT III with strongly fimbriate rims | <i>Geopemphigus torsus</i> |

5. (Al.) Secondary rhinaria distributed ANT III 12–27, IV 6–14, V 5–15, BASE VI 3–10. ANT VI BASE with 12–18 hairs. ANT BASE VI 2.5–4.0× PT. R IV + V with 4–6 accessory hairs. Cauda with 15–20 hairs
Prociphilus erigeronensis
- (Al.) Secondary rhinaria distributed ANT III 5–10, IV 1–4, V and BASE VI 0. ANT VI BASE with only 2 hairs. ANT BASE VI 4.0–6.0× PT. R IV + V without accessory hairs. Cauda with 2–5 hairs **6**
6. (Al.) ANT III longer than ANT IV + V together. Secondary rhinaria on III 8–10, and on IV 2–3
Pemphigus borealis
- (Al.) ANT III a little shorter than ANT IV + V together. Secondary rhinaria on III 5–7, on IV 2–3
Pemphigus tartareus
7. Dorsal body and antennae clothed in numerous fine hairs. Primary rhinaria with thick sclerotised rims. Wax pore plates absent
Smynthuroides betae
- Dorsal body and antennae with sparse hairs. Primary rhinaria with ciliate rims. Wax pore plates present at least on posterior abdomen **8**
8. Head without wax pore plates. R IV + V usually without accessory hairs
Pemphigus sp.
- Head with wax pore plates. R IV + V with 2 or more accessory hairs **9**
9. Abdomen with a dark posterior extension of cauda and anal plate, which is strongly convex. R IV + V 0.95–1.2× HT II and bearing 4–10 accessory hairs
Prociphilus erigeronensis
- Cauda and anal plate not on a dark posterior extension of the abdomen. (Cauda very small, and anal plate divided into dorsal and posteroventral parts by a marked concavity.) R IV + V 0.74–0.86× HT II, with 2 accessory hairs
Geopemphigus torsus
10. ANT tubercles weakly developed, not extending forward beyond middle of front of head in dorsal view. ABD TERG 1 and 7 with or without marginal tubercles (MTu) **11**
- ANT tubercles moderately to well developed, extending clearly beyond middle of front of head in dorsal view. ABD TERG 1 and 7 without MTu **17**
11. Cauda helmet-shaped, not longer than its basal width in dorsal view, with a basal constriction. SIPH pale, smooth, with a subapical annular incision. Spiracular apertures large and rounded. ABD TERG 1 and 7 without MTu
Brachycaudus helichrysi
- Cauda tongue- or finger-shaped, longer than its basal width, without a basal constriction. SIPH pale or dark, without a subapical annular incision. Spiracular apertures small and reniform. ABD TERG 1 and 7 with MTu **12**
12. SIPH 0.24–0.40× BL, about twice as long as the much paler cauda. Head, ANT I, II and basal part of III very pale, contrasting with dark rest of ANT
Aphis coreopsidis
- SIPH only up to 0.2× BL. Cauda pale or dark. Head and antennal segments differently pigmented **13**
13. SIPH entirely dark go to key to polyphagous aphids, p. 1020, starting at couplet 24
- SIPH pale, sometimes with dark tips **14**
14. ANT PT/BASE 1.8–3.0. Longest hairs on ANT III 0.4–0.7× BD III
Aphis nasturtii
- ANT PT/BASE 1.1–1.8. Longest hairs on ANT III 0.7–1.2× BD III **15**
15. R IV + V 1.4–1.6× HT II, with 3–6 accessory hairs. ANT III usually with 1–15 rhinaria on distal part, often of bursiform type (sunk in pits), and IV with 0–4
Aphis solitaria
- R IV + V 1.0–1.3× HT II, with 2 (–3) accessory hairs. ANT III and IV usually without rhinaria (except in alatiform specimens) **16**

HOST LISTS AND KEYS

16. SIPH 1.5–2.0× longer than their basal width, shorter than ANT PT, and also shorter than cauda.
(Sec. rhin. in al. III 9–20, IV 4–6, V 0) *Aphis mimuli*
- SIPH 2.0–3.5× longer than their basal width, longer than ANT PT and often longer than cauda.
(Sec. rhin. in al. III 25–60, IV 9–25, V 7–17) *Aphis triglochis*
17. SIPH wholly dark, with a distal zone of polygonal reticulation **18**
- SIPH pale or dark, but if wholly dark then without any subapical reticulation **24**
18. Cauda dark like SIPH **19**
- Cauda much paler than SIPH **22**
19. Tibia with paler middle section. Femora pale on basal 0.3–0.5. R IV+V not stiletto-shaped, with short accessory hairs. First tarsal segments with 5 hairs **20**
- Tibiae wholly black. Femora almost wholly dark, with only about basal 0.1 pale. R IV + V stiletto-shaped, with very long accessory hairs on basal half of R IV. First tarsal segments with 3 hairs **21**
20. BL c. 5.0 mm. ANT III with 30–32 rhinaria on basal half *Uroleucon tripartitum**
- BL 1.9–4.1 mm. ANT III with 41–78 rhinaria on 0.8–0.9 of length *Uroleucon compositae*
21. ANT PT 4.8–6.8× R IV + V. R IV + V 0.7–0.9× HT II *Macrosiphoniella tanacetaria*
- ANT PT 2.4–3.5× R IV + V. R IV + V 1.0–1.3× HT II *Macrosiphoniella yomogifoliae*
22. HT II rather long and thin, 6 or more× longer than its maximum thickness and 0.9–1.1× R IV+V *Uroleucon pseudambrosiae*
- HT II less than 5× its maximum thickness and 0.7–1.1× R IV+V **23**
23. R IV + V 0.15–0.16 mm, 0.9–1.0× HT II *Uroleucon chrysanthemi*
- R IV + V 0.16–0.22 mm, 1.1–1.33× HT II *Uroleucon ambrosiae*
24. Inner faces of ANT tubercles smooth and divergent. SIPH pale at least basally, and if with subapical polygonal reticulation this extends for much less than 0.1 of length **25**
- Inner faces of ANT tubercles convergent, parallel or divergent; if smooth and divergent then SIPH are dark or have subapical polygonal reticulation over more than 0.1 of length
go to key to polyphagous aphids, p. 1020, starting at couplet 4
25. Dorsal hairs long and capitate, the spinal and marginal ones c.3× ANT BD III *Capitophorus litanensis*
- Dorsal hairs very short and blunt, much shorter than ANT BD III **26**
26. ANT PT/BASE 5.9–7.5. ANT dark except at base, and SIPH dark except for basal 0.2–0.3 of length *Acyrtosiphon bidenticola*
- ANT PT/BASE 3.0–3.75. ANT and SIPH mainly pale/dusky *Acyrtosiphon ilka*

Bifrenaria

B. aureofulva (= *secunda*)

Orchidaceae

Cerataphis orchidearum

Bignonia

B. capensis see *Tecoma capensis*

B. radicans see *Campsis radicans*

B. rex

B. stans

Bignoniaceae

Myzus ornatus

Aphis gossypii

B. unguis-cati
Bignonia sp.

Toxoptera aurantii
[*Macrosiphum rosae*]

Use key to polyphagous aphids, p. 1020.

Bilderdykia see *Fallopia*

Billardiera (incl. *Marianthus*)
B. lineata

Pittosporaceae

Macrosiphum euphorbiae

Billbergia
Billbergia sp.

Bromeliaceae

Myzus persicae

Bischofia
B. javanica
B. trifoliata

Euphorbiaceae

Toxoptera odinae
[*Aphis* sp. (Leonard, 1972a: 98)]; *Toxoptera aurantii*

Use key to polyphagous aphids, p. 1020, starting at couplet 25.

Biscutella
B. laevigata

Cruciferae

Myzus persicae

Biserrula
B. pelecinus

Leguminosae

Aphis craccivora

Bixa see Blackman and Eastop (1994)

Blackstonia
B. perfoliata

Gentianaceae

Aphis ?gentianae (BMNH colln)

Blainvillea
B. gayana
B. rhomboidea

Compositae

Aphis gossypii
Uroleucon ambrosiae group

Use key to polyphagous aphids, p. 1020.

Blechnum
B. browni (incl. *pyramidatum*)
B. occidentale
B. orientale
B. spicant

Blechnaceae

Aphis gossypii
Idiopterus nephrolepidis
Micromyzus filicis
Macrosiphum dryopteridis; *Taiwanomyzus alpicola*

Use key to fern-feeding aphids under *Polypodium*.

Blechnum
B. pyramidatum

Acanthaceae

Aphis gossypii

Blepharis
B. boerhaviaefolia

Acanthaceae

Aphis gossypii

HOST LISTS AND KEYS

Blephilia

B. hirsuta

Labiatae

Aphis coreopsidis

Bletia

Bletia spp.

Orchidaceae

Myzus ascalonicus, persicae

Use key to polyphagous aphids, p. 1020, or key to orchid-feeding aphids under *Cymbidium*.

Bletilla

B. striata

Orchidaceae

Aphis gossypii; Aulacorthum magnoliae

Use key to polyphagous aphids, p. 1020.

Blitum

B. virgatum

Chenopodiaceae

Aphis fabae

Blotiella

B. natalensis

Dennstaedtiaceae

Idiopterus nephrolepidis

Blumea

B. aurita

B. balsamifera

B. chinensis

B. lacera

B. laciniata

B. solidaginoides

B. wightiana

Blumea spp.

Compositae

Aphis gossypii

Aphis formosana, gossypii; Uroleucon [gobonis], orientale

Aleurodaphis blumeae

Aphis gossypii, spiraecola; Brachycaudus helichrysi;

Myzus ornatus, persicae

Aphis gossypii

Aphis gossypii

Aphis gossypii

Uroleucon budhium, compositae

Key to aphids on *Blumea*:-

1. Body flattened and dorsum sclerotic, with fused head and pronotum, fused ABD TERG 1-7, and a crenulate rim due to a continuous marginal row of wax glands. Cauda knobbed, anal plate bilobed 2
Aleurodaphis blumeae
- Body not flattened, segments not fused, no crenulate margin of wax glands. Cauda not knobbed, anal plate entire 2
2. ANT PT/BASE about 1. SIPH a little shorter than cauda, which is broadly triangular with a rounded apex 3
Aphis formosana
- ANT PT/BASE more than 1.5 (or less than 0.5). SIPH longer than cauda, which is helmet-shaped or tongue-shaped 3
3. SIPH wholly dark with a subapical zone of polygonal reticulation 4
- SIPH pale or dark, but if wholly dark then without any subapical polygonal reticulation 4
go to key to polyphagous aphids, p. 1020
4. R IV + V 1.1-1.4× HT II. Cauda dark 5
Uroleucon compositae
- R IV + V long and thin, 1.7-2.0× HT II. Cauda pale, dusky or dark 5
5. SIPH with polygonal reticulation on distal 0.12-0.17 of length 5
Uroleucon budhium
- SIPH with polygonal reticulation on distal 0.21-0.30 of length 5
Uroleucon orientale

Bocconia*B. frutescens***Bocconia sp.****Papaveraceae**

Acyrtosiphon bidenticola; *Aulacorthum solani*;
Brachycaudus helichrysi; *Macrosiphum euphorbiae*;
Myzus persicae; *Neomyzus circumflexus*
 [*Sitobion avenae*]

Key to apterae on *Bocconia*:-

- ANT tubercles well developed with smooth divergent inner faces. ANT dark except at base, with ANT PT/BASE 5.9–7.5. SIPH dark except for pale basal 0.2–0.3 of length, with any subapical polygonal reticulation restricted to much less than 0.1 of length *Acyrtosiphon bidenticola*
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Boehmeria*B. candidissima**B. cylindrica**B. japonica**B. longispica**B. nipononivea**B. nivea* (incl. *candicens*, *tenacissima*)*B. platanifolia**B. platyphylla**B. polystachya**B. sidaefolia**B. spicata***Boehmeria sp.****Urticaceae***Myzus ornatus**Aphis gossypii*; [*Uroleucon ambrosiae*]*Myzus moriokae*, *boehmeriae**Myzus persicae**Myzus boehmeriae*, *moriokae**Aphis craccivora*, *gossypii*; *Aulacorthum solani*;*Myzus boehmeriae*, *moriokae*, *ornatus*, *persicae**Myzus boehmeriae*; *Neomyzus circumflexus**Myzus persicae*[*Schoutedenia ralumensis*][*Matsumuraja* sp.]; *Neomyzus circumflexus**Myzus boehmeriae*[*Capitophorus indicus*]; *Myzus fatounae*, *indicus*;[*Toxoptera citricidus*]Key to aphids on *Boehmeria*:-

1. ANT tubercles well developed, with inner faces parallel or convergent and strongly nodulose or spiculose 2
 - ANT tubercles weakly developed (or if well developed then smooth and divergent) 2
go to key to polyphagous aphids, p. 1020
2. Dorsal hairs and those on ANT III longer than BD III ‘Myzus’ moriokae*
 - Dorsal hairs and hairs on ANT III mostly very short and inconspicuous, less than 0.5× BD III (except those on head and ABD TERG 7 and 8) 3
3. ANT PT/BASE 1.7–2.5. SIPH strongly imbricated or scabrous, and curved or with asymmetrical swelling of inner side 4
 - ANT PT/BASE 2.8–4.5. SIPH variously imbricated, straight, tapering or slightly clavate 6
4. ANT 5-segmented. Dorsal cuticle sclerotic, wrinkled and/or nodulose. ABD TERG 7 extended posteriorly, cowl-like *Myzus fatounae*
 - ANT 6-segmented. Dorsum membranous or sclerotic. ABD TERG 7 not extended posteriorly 5
5. Dorsal abdomen with a pattern of dark intersegmental ornamentation. ANT V shorter than ANT IV *Myzus ornatus*
 - Dorsal abdomen without dark intersegmental ornamentation. ANT V longer than IV (?) *Myzus indicus**

HOST LISTS AND KEYS

6. Dorsum with distinctive black markings; a large roughly horseshoe-shaped abdominal patch, and paired patches on thoracic tergites *Neomyzus circumflexus*
– Dorsum without dark markings 7
7. SIPH tapering or cylindrical on distal half. R IV+V 1.3–1.5× HT II. (Immatures with spinules on hind tibiae) *Myzus boehmeriae*
– SIPH slightly clavate. R IV+V 0.9–1.1× HT II. (Immatures without spinules on hind tibiae) *Myzus persicae*

Boerhavia

B. coccinea
B. diffusa
B. erecta
B. hispida
B. repens
B. viscosa

Nyctaginaceae

Aphis gossypii
Aphis craccivora, *gossypii*, *spiraecola*; *Myzus persicae*
Aphis [*coreopsidis*], *craccivora*, *gossypii*, *spiraecola*
Aphis gossypii, *spiraecola*
Aphis gossypii
Aphis gossypii

Use key to polyphagous aphids, p. 1020.

Boltonia

B. indica

B. lautureana

Compositae

Macrosiphoniella yomenae; *Myzus asteriae*;
[*Uroleucon rudbeckiae*]
Neotoxoptera yasumatsui

Use key to aphids on *Aster*.

Bomarea

B. caldasiana

Alstroemeriaceae

Brachycaudus helichrysi

Bombax see Blackman and Eastop (1994)

Bonjeania see *Lotus*

Bontia

B. daphnoides

Myoporaceae

Aphis gossypii; *Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Borago

B. officinalis

B. orientalis
Borago spp.

Boraginaceae

Aphis fabae, *gossypii*, *symphyti*, [*triglochinis*, *varians*];
Brachycaudus cardui, *helichrysi*; *Myzus ornatus*
Myzus ornatus
Aulacorthum solani; *Brachycaudus cardui* ssp. *turanica*;
Myzus persicae

Key to apterae on *Borago*:-

1. Cauda helmet-shaped, not longer than its basal width, with a basal constriction. Spiracular apertures rounded. SIPH with a subapical annular incision. 2

- Cauda tongue- or finger-shaped, longer than its basal width. Spiracular apertures reniform. SIPH without a subapical annular incision
go to key to polyphagous aphids, p. 1020, noting that specimens running to *Aphis gossypii* may be *A. symphyti* (see text for this species)
- 2. SIPH pale or slightly dusky, less than 1.5× cauda. R IV + V 1.2–1.3× HT II. Dorsal abdomen without dark sclerotisation *Brachycaudus helichrysi*
- SIPH dusky or dark, more than 1.8× cauda. R IV + V 1.3–2.0× HT II. Dorsal abdomen with variably developed dark sclerotisation *Brachycaudus cardui* (incl. ssp. *turanica*)

Boronia

- B. denticulata*
- B. megastigma*

Use key to polyphagous aphids, p. 1020.

Borreria see Spermacoce**Bossekia see Rubus****Bothriochloa**

- B. caucasica*
- B. glabra*
- B. insculpta*

- B. pertusa*

Gramineae

- Sitobion avenae*
- Hysteroneura setariae*
- Forda orientalis*; *Hysteroneura setariae*;
- Sitobion africanum*, *miscanthi*
- Forda riccobonii*; *Hysteroneura setariae*;
- Sitobion lambersi*, *miscanthi*

Use key to apterae of grass-feeding aphids under *Digitaria*.

Bothriocline

- B. laxa*

Compositae

- Aphis gossypii*

Bothriospermum

- B. chinense*
- B. tenellum*

Boraginaceae

- Myzus persicae*
- Brachycaudus helichrysi*; *Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Bougainvillea

- B. brasiliensis*
- B. buttiana*
- B. glabra*

- B. sanderiana*
- B. spectabilis*

Nyctaginaceae

- Aphis fabae*
- Myzus persicae*
- Aphis craccivora*, *spiraecola*; *Myzus persicae*;
- Toxoptera aurantii*
- Macrosiphum euphorbiae*; *Myzus persicae*
- Aphis* [*bougainvilleae* Börner in Bodenheimer and Swirski, 1957 (nomen nudum)], *craccivora*, *fabae*, *gossypii*, *spiraecola*; *Brachycaudus helichrysi*;
- Myzus antirrhinii*, *ornatus*, *persicae*;
- Neomyzus circumflexus*; *Toxoptera aurantii*, *citricidus*

HOST LISTS AND KEYS

***Bougainvillea* spp.**

Lizerius cermeli; [*Schoutedenia ralumensis*];
Sinomegoura citricola

Key to aphids on *Bougainvillea*:-

- Fore femora much thicker than mid and hind femora. Anal plate bilobed. Cauda with a constriction and an elongate knob. SIPH as short dark truncate cones. Apt. with long, pointed marginal processes. Forewing of al. with pterostigma extended to tip and heavily infuscated cubital veins
Lizerius cermeli
- Fore femora similar in thickness to mid and hind femora. Anal plate entire. Other characters not as above
go to key to polyphagous aphids, p. 1020

Bouteloua

B. americana
B. gracilis

Sipha flava
Sitobion graminis

Gramineae

Use key to apterae of grass-feeding aphids under *Digitaria*.

Bouvardia

Bouvardia spp.

Aphis gossypii, *spiraecola*; *Macrosiphum euphorbiae*;
Myzus ornatus, *persicae*

Rubiaceae

Use key to polyphagous aphids, p. 1020.

Bowkeria

B. gerrardiana

Myzus ornatus, *persicae*

Scrophulariaceae

Use key to polyphagous aphids, p. 1020.

Boykinia

B. elata

Nasonovia stroyani

Saxifragaceae

Brachanthemum

B. fruticosum

Myzus ornatus

Compositae

Brachiaria

B. brizantha
B. comata
B. deflexa
B. humidicola
B. kotschyana
B. lachnantha
B. lata
B. mutica

B. paspaloides
B. ramosa
B. reptans
B. subquadrifaria
Brachiaria sp.(?)

Sitobion africanum, *graminis*, *leelamaniae*
Aphis gossypii
Hysteroneura setariae
Sitobion africanum
Hysteroneura setariae
Sitobion graminis
Aphis gossypii
Hysteroneura setariae; *Rhopalosiphum maidis*;
Schizaphis graminum, *hypersiphonata*; *Sitobion miscanthi*
Hysteroneura setariae
Tetraneura fusiformis, *radicola* group
Schizaphis graminum
Hysteroneura setariae; *Rhopalosiphum padi*
Pentalonia gavarri (as *Micromyzus brachiariae*)

Gramineae

Use key to apterae of grass-feeding aphids under *Digitaria*.

Brachychiton see Blackman and Eastop (1994)

Brachycome see *Brachyscome*

Brachylaena

- B. dentata*
- B. discolor*
- B. ramifloram*

Compositae

- Aphis gossypii*
- Toxoptera aurantii*
- Uroleucon compositae*

Use key to polyphagous aphids, p. 1020.

***Brachypodium* (incl. *Brevipodium*)**

- B. phoenicoides*
- B. pinnatum*

- B. retusum*
- B. silvaticum*

Gramineae

- Sipha elegans*
- Anoecia corni*; *Forda rotunda*;
- Paracletus cimiciformis*;
- Sipha maydis*; *Tetraneura longisetosa*, *ulmi*
- Atheroides serrulatus*; *Sipha elegans*
- Anoecia corni*, *major*, *zirnitsi*; *Forda rotunda*;
- Melanaphis pyraeius*; *Sitobion miscanthi*;
- Tetraneura longisetosa*

Use key to apterae of grass-feeding aphids under *Digitaria*.

***Brachyscome* (including *Brachycome*)**

- B. iberidifolia*
- B. multifida*

Compositae

- Uroleucon compositae*
- Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Brachystegia see Blackman and Eastop (1994)

Brachythecium

- B. rutabulum*
- B. salebrosum*
- B. velutinum*

Brachytheciaceae

- Muscaphis musci*
- Muscaphis escherichi*
- Muscaphis musci*

Use key to moss-feeding aphids under *Polytrichum*.

Brasilettia see *Peltophorum*

Brasenia

- B. screberi*

Cabombaceae

- Rhopalosiphum maidis*

Brassaia see *Schefflera* in Blackman and Eastop (1994)

Brassica

- B. alba* see *Sinapis alba*
- B. arvensis*

Cruciferae

- Aphis nasturtii*; *Brachunguis harmalae*;
- Brevicoryne brassicae*; *Myzus* [*cerasi*], *persicae*

HOST LISTS AND KEYS

- B. campestris** (incl. var. *komatsuna*) *Aphis middletonii*; *Brevicoryne brassicae*; [*Dysaphis tulipae*]; *Lipaphis pseudobrassicae*; *Macrosiphum euphorbiae*; *Myzus antirrhinii*, *persicae*; *Pseudobrevicoryne buhri*; *Smynthuodes betae*
- B. caulorapa** see *oleracea*
- B. cernua** *Brevicoryne brassicae*; *Lipaphis pseudobrassicae*; *Myzus persicae*
- B. chinensis** *Brevicoryne brassicae*; *Lipaphis pseudobrassicae*; *Myzus persicae*
- B. elongata** *Aphis nasturtii*, *triglochinis*
- B. fimbriata** *Brevicoryne brassicae*
- B. hirta** *Lipaphis pseudobrassicae*; *Macrosiphum euphorbiae*; *Myzus persicae*; *Neomyzus circumflexus*
- B. integrifolia** *Aulacorthum solani*; *Brevicoryne brassicae*; *Lipaphis pseudobrassicae*; *Macrosiphum euphorbiae*; *Myzus persicae*; [*Utamphorophora commelinensis*]
- B. juncea** (incl. var. *crispifolia*) *Aphis gossypii*; *Brachycaudus helichrysi*; *Brevicoryne brassicae*; [*Liosomaphis himalayensis*]; *Lipaphis pseudobrassicae*; *Myzus ornatus*, *persicae*; *Rhopalosiphoninus staphyleae*; [*Sitobion avenae*, *miscanthi*]
- B. kaber** see *Sinapis arvensis*
- B. lawrenciana** *Myzus ornatus*
- B. napobrassica** *Brevicoryne brassicae*; *Lipaphis pseudobrassicae*; *Myzus persicae*
- B. napus** (incl. vars *esculenta*, *rapifera*) *Aphis fabae*; *Brevicoryne brassicae*; *Lipaphis pseudobrassicae*; *Myzus persicae*; *Pemphigus populitransversus*; *Smynthuodes betae*
- B. nigra** *Aphis middletonii*; *Brevicoryne brassicae*; *Lipaphis erysimi*, *pseudobrassicae*; *Macrosiphum euphorbiae*; *Myzus ornatus*, *persicae*; *Pemphigus populitransversus*
- B. oleracea** (incl. vars *acephala*, *botrytis*, *capitata*, *caulorapa*, *gongyloides*, *ramosa*) *Aphis craccivora*, *gossypii*, *fabae*, *middletonii*, *nasturtii*, *spiraecola*; *Aulacorthum* [*prasinum*], *solani*; *Brachycaudus helichrysi*; *Brevicoryne brassicae*; [*Dysaphis montemartini* *ghanii*]; [*Hyalopterus pruni*]; *Lipaphis pseudobrassicae*; *Macrosiphum euphorbiae*; *Myzus antirrhinii*, *ascalonicus*, *ornatus*, *persicae*; *Pemphigus populitransversus*; [*Sitobion miscanthi*]; *Smynthuodes betae*
- B. pekinensis** *Brevicoryne brassicae*; *Lipaphis* [*lepidii*], *pseudobrassicae*; *Myzus persicae*; *Rhopalosiphoninus staphyleae*
- B. petsai**=*B. pekinensis*
- B. rapa** (incl. var. *dichotoma*) *Brevicoryne brassicae*; [*Liosomaphis himalayensis*]; *Lipaphis erysimi*, *pseudobrassicae*; *Macrosiphum euphorbiae*; *Myzus persicae*; *Pemphigus populitransversus*; *Smynthuodes betae*

<i>B. rapa</i> ssp. <i>campestris</i>	see <i>B. campestris</i>
<i>B. rapa</i> ssp. <i>chinensis</i>	see <i>B. chinensis</i>
<i>B. rapa</i> ssp. <i>pekinensis</i>	see <i>B. pekinensis</i>
<i>B. rugosa</i>	<i>Lipaphis pseudobrassicae</i>
<i>B. sinapistrum</i>	<i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i>
<i>B. sinensis</i> (? <i>chinensis</i>)	<i>Lipaphis pseudobrassicae</i>
<i>B. tournefortii</i>	<i>Brevicoryne brassicae</i>
<i>Brassica</i> spp.	<i>Brevicoryne nigrisiphunculata</i> ; <i>Lipaphis unguibrevis</i> ; [<i>Myzus certus</i>]; <i>Rhopalosiphoninus latysiphon</i>

Key to aphids on *Brassica*:-(See Blackman and Eastop (2000) for keys to aphids on cultivated *Brassica* spp.)

1. SIPH present and only 0.6–0.8× cauda. ANT PT/BASE less than 0.8 *Brachyunguis harmalae*
– SIPH present or absent, but if present then ANT PT/BASE is always more than 1 2
2. SIPH as very short, flangeless, pigmented cones, less than 0.5× cauda. Apt. with secondary rhinaria on distal part of ANT III, and also usually on IV and V *Pseudobrevicoryne buhri*
– SIPH either absent or tubular and at least 0.6× cauda. ANT of apt. with or without secondary rhinaria, but these are always restricted to ANT III 3
3. SIPH slightly swollen, but not clavate (without narrow section on basal half). ANT tubercles absent, or if developed then not projecting forward beyond middle part of head, so that front of head is convex, straight or sinuate in dorsal view. ABD TERG 1 and 7 without marginal tubercles (MTu) 4
– Without this combination of characters; i.e., if SIPH are present then they are tapering, cylindrical or clavate (with narrow section on basal half), and either ANT tubercles are very well-developed or ABD TERG 1 and 7 have MTu go to polyphagous aphids key, p. 1020
4. ANT III 2.5–3.7× SIPH, which are 0.65–1.0× cauda 5
– ANT III 1.2–1.7× SIPH, which are 1.2–1.6× cauda 6
5. SIPH 0.8–1.0× cauda, which is as dark as SIPH and broadly triangular. R IV+V 0.6–0.7× HT II. ANT PT/BASE 2.3–3.8. (Al. with secondary rhinaria on ANT III 40–78, IV 0–5, V 0) *Brevicoryne brassicae*
– SIPH 0.65–0.8× cauda, which is tongue-shaped and pale, contrasting with jet black SIPH. R IV+V 0.85–0.95× HT II. ANT PT/BASE 1.3–2.2. (Al. with secondary rhinaria on ANT III 36–38, IV 0, V 0) *Brevicoryne nigrisiphunculata*
6. ANT PT/BASE about 1.2. SIPH more than 2× ANT PT. (Al. with secondary rhinaria on ANT III 5–8, IV 0–2, V 0) *Lipaphis unguibrevis*
– ANT PT/BASE 1.8–2.7. SIPH about as long as ANT PT. (Al. with secondary rhinaria on ANT III 9–32, IV 2–13, V 0–3) 7
7. ANT III+PT together 1.95–2.5× SIPH (90% of specimens less than 2.4×) *Lipaphis erysimi*
– ANT III+PT together 2.1–3.2× SIPH (90% of specimens more than 2.4×) *Lipaphis pseudobrassicae*

Breea see *Cirsium**Breonia* (incl. *Anthrocephalus*, *Anthrocephalus*)

Rubiaceae

*B. cadamba**Sinomegoura citricola*

HOST LISTS AND KEYS

Brevipodium sse *Brachypodium*

***Breynia* (incl. *Melanthesa*)**

B. cernua
B. formosana
B. fruticosa
B. microphylla
B. nivosa
B. officinalis
B. patens
B. racemosa
B. rhamnoides

Euphorbiaceae

Aphis eugeniae; *Schoutedenia ralumensis*
Sitobion phyllanthi
Schoutedenia ralumensis
Sitobion breyniae
Schoutedenia ralumensis
Aphis gossypii
Aphis spiraeicola
Schoutedenia ralumensis
Schoutedenia ralumensis

Key to aphids on *Breynia*:-

1. ABD TERG 7 with a pair of long, pointed backwardly-directed processes. SIPH as short cones. ANT 5-segmented, with ANT PT/BASE less than 1 *Schoutedenia ralumensis*
 – ABD TERG 7 without processes. SIPH tubular, much longer than wide. ANT usually 6-segmented, with ANT PT/BASE more than 2 **2**
2. SIPH with subapical polygonal reticulation (if with only a few indistinct polygonal cells then SIPH are constricted at apex and have a very small flange). ABD TERG 1 and 7 without marginal tubercles (MTu) **3**
 – SIPH without subapical reticulation. ABD TERG 1 and 7 with MTu **4**
3. Dorsum with transverse segmental bands or rows of sclerites, and large marginal sclerites which usually bear small tubercles (MTu) on ABD TERG 2-4 (-6). ANT PT/BASE 3.0-4.2. R IV+V 0.6-0.8× HT II. SIPH long and thin, constricted at apex, with slight subapical swelling and often rather indistinct subapical polygonal reticulation *Sitobion phyllanthi*
 – Dorsum without sclerotic markings. MTu usually absent. ANT PT/BASE 5.2-6.5. R IV+V 0.85-0.94× HT II. SIPH with polygonal reticulation over about distal 0.3 of length *Sitobion breyniae*
4. Cauda black with 8-16 hairs. Hind tibia with a row of short spine-like hairs on ventral side of basal half. HT I with 3 hairs. ANT PT/BASE 2.5-3.5 *Aphis eugeniae*
 – Without that combination of characters go to key to polyphagous aphids, p. 1020, starting at couplet 24

***Brickellia* (incl. *Kuhnia*)**

B. grandiflora
B. hebecarpa
B. leptophylla
B. microphylla
Brickellia sp.

Compositae

Aphis coreopsidis
Brachycaudus helichrysi
Uroleucon atripes
Uroleucon nevadense
Uroleucon erigeronense

Key to aphids on *Brickellia*:-

1. SIPH with a distal zone of polygonal reticulation extending over 0.3 or more of length. ANT tubercles rather well developed, their inner faces broadly divergent **2**
 – SIPH without any polygonal reticulation. ANT tubercles weakly developed or absent **4**
2. R IV+V 1.5-1.7× HT II. SIPH 4-6× cauda. Small aphid, BL 1.1-1.25 mm, with black tibiae *Uroleucon nevadense*
 – R IV+V 1.0-1.3× HT II. SIPH 1.8-2.35× cauda **3**

3. SIPH pale at base, 1.8–2.35× cauda, which has 6–10 hairs, the most distal 3–4 of which are shorter than the more proximal (lateral) hairs, and often blunt. Tibiae pale or dusky on basal half
Uroleucon erigeronense
- SIPH wholly dark, 1.3–1.7× cauda which has 18–31 hairs, all pointed and of similar length. Tibiae black
Uroleucon atripes
4. Cauda helmet-shaped, not longer than its basal width. SIPH short, conical, pale and smooth
Brachycaudus helichrysi
- Cauda tongue-shaped, more than twice its basal width. SIPH long and thin, dark and imbricated
Aphis coreopsidis

Bridelia see Blackman and Eastop (1994)

Brillantaisia

B. cicatricosa

B. niteus

Myzus ornatus

Aphis gossypii

Acanthaceae

Use key to polyphagous aphids, p. 1020.

Briobotrya

Briobotrya sp.

Aphis gossypii

Compositae

Briza

B. maxima

B. media

B. minor

Sitobion fragariae

Forda formicaria, *marginata*; *Rhopalosiphum padi*

Rhopalosiphum padi; *Sipha maydis*

Gramineae

Use key to apterae of grass-feeding aphids under *Digitaria*.

Bromopsis see **Bromus**

Bromus (incl. Ceratochloa)

B. arvensis

B. carinatus

B. catharticus

B. ciliatus

B. commutatus

B. erectus

B. gussonei

B. hordeaceus

Gramineae
Forda marginata; *Schizaphis dubia*, *longicaudata*, *rufila*
Diuraphis mexicana, *noxia*; *Metopolophium dirhodum*;
Rhopalosiphum padi; *Utamphorophora bromicola*
Aploneura lentisci; *Diuraphis mexicana*, *noxia*;
Metopolophium dirhodum; *Rhopalosiphum maidis*, *padi*;
Schizaphis graminum; *Sitobion graminis*
Forda marginata; *Sitobion fragariae*
Schizaphis graminum
Anoecia furcata, *nemoralis*;
Forda formicaria, *marginata*, *pawlowae*;
Metopolophium dirhodum; *Schizaphis graminum*
Israelaphis ilharcoi
Anoecia corni; *Aploneura lentisci*; *Diuraphis noxia*
Metopolophium dirhodum;
Rhopalosiphum padi; *Sitobion avenae*

HOST LISTS AND KEYS

- B. inermis*** *Anoecia haupti*; [*Ceratovacuna korotnevi*];
Cryptaphis bromi; *Diuraphis bromicola*; *Forda marginata*;
Metopolophium dirhodum; *Rhopalosiphum maidis, padi*;
Schizaphis graminum; *Sipha elegans, maydis*;
Sitobion avenae, [*Sitobion* sp. (Raychaudhuri, 1984)]
Schizaphis graminum; *Sitobion akebiae, avenae, fragariae*
Sitobion fragariae
- B. japonicus***
B. lanceolatus
B. madritensis *Diuraphis noxia*; *Metopolophium dirhodum*;
Rhopalosiphum padi; *Sitobion avenae, fragariae*
Diuraphis mexicana; *Forda marginata*
- B. marginatus***
B. maximus see *rigidus*
B. mollis *Anoecia furcata, haupti*; *Aploneura lentisci*;
Forda marginata, pawlowae; *Schizaphis graminum*;
Sitobion avenae, fragariae, miscanthi; *Tetraneura ulmi*
Schizaphis graminum
Diuraphis mexicana, noxia
Metopolophium dirhodum, festucae cerealium;
Myzus persicae; *Rhopalosiphum padi*;
Sitobion avenae, fragariae
Forda formicaria, marginata
Melanaphis pyraeius; *Sipha maydis*
Diuraphis noxia; *Forda formicaria*;
Geoica utricularia; *Israelaphis carmini, ilharcoi*;
Melanaphis pyraea; *Myzus persicae*;
Rhopalosiphum padi;
Schizaphis graminum; *Sipha maydis*;
Sitobion avenae, fragariae;
Rhopalosiphum padi; *Schizaphis graminum*;
Sitobion avenae
Rhopalosiphum padi
Anoecia corni; *Aploneura lentisci*; *Atheroides serrulatus*;
Forda formicaria, marginata; *Geoica utricularia*
Hyalopteroides humilis; *Israelaphis ilharcoi*;
Metopolophium dirhodum; *Rhopalosiphum padi*;
Sitobion fragariae
Forda marginata; *Rhopalosiphum padi*;
Schizaphis graminum
- B. porteri***
B. proximus var. *genuinus*
B. racemosus
- B. ramosus***
B. rigens
B. rigidus (incl. *maximus*)
- B. secalinus***
B. squarrosus
B. sterilis
- B. tectorum***
B. unioides *Anoecia corni, vagans*; *Diuraphis noxia*; *Geoica lucifuga*;
Metopolophium chandrani, dirhodum;
Rhopalosiphum maidis, padi, rufiabdominale;
Schizaphis graminum;
Sitobion africanum, avenae, fragariae, miscanthi;
Tetraneura ulmi
- B. villosus*** *Diuraphis noxia*; *Forda formicaria*; *Geoica utricularia*;
Myzus persicae; *Rhopalosiphum padi*;
Schizaphis graminum; *Sipha maydis*;
Sitobion avenae, fragariae
Sipha maydis
- B. willdenowii***

Bromus spp. *Anoecia haupti*; [*Aploneura ampelina*];
Baizongia pistaciae;
Tetraneura ulmi

Use key to apterae of grass-feeding aphids under *Digitaria*.

Brosimum **Moraceae**
B. gaudichaudii *Toxoptera aurantii*

Broussonettia **Moraceae**
B. kazinoki *Cavariella araliae*

Browallia **Solanaceae**
B. viscosa *Aphis fabae*
***Browallia* sp.** *Aphis spiraeicola*

Use key to polyphagous aphids, p. 1020.

Brunella* see *Prunella

Brunellia **Brunelliaceae**
B. comocladifolia *Neomyzus circumflexus*

Brunfelsia **Solanaceae**
B. americana *Toxoptera aurantii*
B. uniflora [*Ceratopemphigus zehntneri*]

Brya **Leguminosae**
B. ebenus *Aphis craccivora*

Bryonia **Cucurbitaceae**
B. alba *Aphis fabae*
B. dioica *Macrosiphum euphorbiae*
B. rhamnoides *Aphis gossypii*

Use key to polyphagous aphids, p. 1020.

Bryophyllum* see *Kalanchoe

Bryum **Bryaceae**
Bryum sp. *Muscaphis musci*

(or try key to moss-feeding aphids under *Polytrichum*)

Buchenavia **Combretaceae**
Buchenavia sp. *Toxoptera aurantii*

Buchnera **Scrophulariaceae**
B. hispida *Aphis gossypii*

HOST LISTS AND KEYS

Buddleja

B. asiatica
B. brasiliensis
B. coriacea
B. curviflora
B. cystisoides
B. davidii (incl. *nanhoensis*)

B. macrostachya
B. madagascariensis

B. officinalis
B. paniculata
B. variabilis
B. venenifera
Buddleja spp.

Buddlejaceae

[*Aiceona retipennis*]; *Aphis gossypii*
Myzus persicae
Myzus persicae
Myzus persicae
Aphis gossypii
Aphis craccivora, *fabae*, *verbasci*;
Myzus antirrhinii, *ornatus*, *persicae*
Aphis gossypii
Aphis gossypii, *spiraecola*, *verbasci*; *Myzus persicae*;
 [Hyalopterus pruni]
Aphis gossypii
Aphis raji, *verbasci*
Aphis fabae
Aphis spiraecola
Aulacorthum solani; *Brachycaudus helichrysi*;
Myzus ornatus

Key to apterae on *Buddleja*:-

1. R IV+V 1.3–1.9× cauda and 0.7–1.5× ANT PT 2
 – R IV+V shorter than cauda and 0.2–0.6× ANT PT
 go to key to polyphagous aphids, p. 1020; specimens from
 B. davidii running to *Myzus persicae* are likely to be *M. antirrhinii*
2. SIPH 6–17× longest lateral abdominal hair (which is 23–51 µm). SIPH (1.8–)2.0–2.6× cauda, and 1.1–1.75× R IV+V. ANT PT 5.9–15× longest lateral abdominal hair. ANT PT/BASE 1.85–2.75, only less than 21.0 in large specimens with BASE VI at least 0.125. ABD TERG 1 and 7 consistently with marginal tubercles (MTu). (Al. with 12–32 secondary rhinaria on ANT III and 1–10 on IV)
 Aphis verbasci
 – SIPH 1.8–2.7× longest lateral abdominal hair (which is 78–103 µm). SIPH 1.2–2.0(–2.4)× cauda, and 0.6–1.15× R IV+V. ANT PT 1.5–2.4× longest lateral abdominal hair. ANT PT/BASE 1.1–2.0. ABD TERG 1 with MTu, but ABD TERG 7 often without. (Al. with 4–9 secondary rhinaria on ANT III, and 0 on IV)
 Aphis raji

Buglossoides

B. purpureocaerulea

Boraginaceae

Aulacorthum solani; *Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Bulbine

B. alooides
Bulbine spp.

Liliaceae

Macrosiphum euphorbiae
Aphis gossypii

Use key to polyphagous aphids, p. 1020.

Bulbophyllum

Bulbophyllum sp.

Orchidaceae

Cerataphis orchidearum

Bulbostylis

B. hispidula

Cyperaceae

Aphis gossypii

Bunchosia*B. lanceolata***Malpighiaceae***Myzus persicae***Bunias***B. erucago***Cruciferae***Brevicoryne brassicae***Bunium***B. persicum**Bunium* sp.**Umbelliferae***Cavariella bunii**Dysaphis bunii*

Couplet to separate these two species:–

- ABD TERG 8 with a backwardly-pointing supracaudal process. SIPH pale, clavate. Cauda tongue-shaped. ANT PT/BASE about 1.1 *Cavariella bunii**
- No supracaudal process. SIPH dark, tapering. Cauda helmet-shaped. ANT PT/BASE about 3 or more *Dysaphis bunii**

Bupthalmum*B. salicifolium**Bupthalmum* sp.**Compositae***Brachycaudus helichrysi**Aulacorthum solani*

Use key to polyphagous aphids, p. 1020.

Bupleurum*B. aureum**B. baldense**B. euphorbioides**B. falcatum**B. fruticosum**B. linearifolium**B. longifolium**B. praealtum**B. rigidum**B. rossicum**B. scorzoneraefolium**B. stellatum**Bupleurum* sp.**Umbelliferae***Aphis bupleuri*; *Hyadaphis bupleuri*;*Macrosiphum bupleuri*, *gei**Aphis bupleuri**Semiaphis heraclei**Aphis bupleuri*; *Hyadaphis bupleuri**Aphis caroliboernerii**Hyadaphis agabiformis**Aphis funitecta*, *talgarica*;*Macrosiphum bupleuri*, *cholodkovskyi*;[*Semiaphis* sp. (Kadyrbekov, 2002d)]*Aphis bupleuri**Aphis bupleuri**Aphis bupleuri*; *Hyadaphis bupleuri**Hyadaphis mongolica**Semiaphis* sp. (Switzerland, BMNH, leg. Stäger)*Hyadaphis* sp. (Turkey, BMNH, leg. B. Koranei);*Semiaphis* sp. (France, BMNH, leg. G. Remaudière)

Key to aphids on *Bupleurum*:–

1. ANT tubercles well developed, divergent. SIPH very long with a subapical zone of polygonal reticulation 2
- ANT tubercles absent or weakly developed. SIPH without subapical reticulation 4
2. R IV+V 0.70–0.79× HT II *Macrosiphum bupleuri*
- R IV+V 0.8–1.2× HT II 3

HOST LISTS AND KEYS

3. ANT IV 1.0–1.4× ANT V. ANT III 4.9–6.9× BASE VI and 0.85–1.25× PT. Anterior part ('disk') of subgenital plate bearing 2–7 hairs (usually 2–3) *Macrosiphum cholodkovskyi*
- ANT IV 0.9–1.1× ANT V. ANT III 4.0–5.2× BASE VI and 0.70–1.1× PT. Anterior part of subgenital plate with 2–12 (usually 5–6) hairs *Macrosiphum gei*
4. SIPH not swollen. If marginal tubercles (MTu) are present at all then they occur on ABD TERG 1 and 7 **5**
- SIPH with distinct swelling. If MTu are present then they are on ABD TERG 2–4 (–6) never on ABD TERG 1 and 7 **8**
5. ANT (of apt.) usually without secondary rhinaria **6**
- ANT III–IV (–V) (of apt.) with secondary rhinaria **7**
6. ANT PT/BASE 2.0–2.2. SIPH 0.56–0.77× cauda, which bears 5–8 hairs. (Al. with secondary rhinaria distributed ANT III 7–16, IV 1–5, V 0–3) *Aphis caroliboerneri*
- ANT PT/BASE 1.35–1.45. SIPH 0.47–0.53× cauda, which bears c.11–12 hairs. (Al. undescribed) *Aphis talgarica*
7. SIPH very short, 0.6–0.7× HT II. MTu on ABD TERG 1 and 7 very small, or absent. (Al. with rhinaria distributed ANT III 54–67, IV 32–40, V 14–18) *Aphis funitecta*
- SIPH 0.8–1.1× HT II. Large MTu present on ABD TERG 1 and 7. (Al. with secondary rhinaria distributed ANT III 28–41, IV 13–15, V 0–10) *Aphis bupleuri*
8. SIPH very small and flangeless, only c.0.5× cauda or less, with apex curved towards midline. ANT PT/BASE more than 1.5 *Semiaphis* sp(p).
- SIPH at least 0.6× cauda, if shorter than cauda then ANT PT/BASE less than 1 **9**
9. SIPH clearly shorter than (about 0.75×) cauda. ANT PT/BASE less than 1 *Hyadaphis agabiformis*
- SIPH 0.9–1.25× cauda. ANT PT/BASE more than 1 **10**
10. Dorsum sclerotic, with strongly impressed reticulate sculpturing *Hyadaphis mongolica*
- Dorsum membranous or only lightly sclerotised, variably reticulated, not strongly impressed **11**
11. SIPH and cauda dark (dusky in hot weather dwarfs). SIPH 0.95–1.25× cauda. ANT PT/BASE 0.8–2.4. R IV+V 0.45–0.6× HT II *Hyadaphis bupleuri*
- SIPH and cauda pale. SIPH 1.4–1.8× cauda. ANT PT/BASE 2.8–3.4. R IV+V 0.75–0.9× HT II *Hyadaphis* sp. (Turkey, BMNH)

Bursaria

B. spinosa (incl. *incana*, *inermis*)

Use key to polyphagous aphids, p. 1020.

Bursera

B. simaruba

Use key to polyphagous aphids, p. 1020.

Butea

B. frondosa

B. minor

Use key to polyphagous aphids on p. 1020.

Pittosporaceae

Aphis gossypii; *Brachycaudus helichrysi*

Burseraceae

Aphis craccivora, *gossypii*, *spiraecola*;
Toxoptera aurantii

Leguminosae

Aphis craccivora, *gossypii*; *Toxoptera aurantii*
Brachycaudus helichrysi

Butomus*B. umbellatus***Alismaceae***Aphis nasturtii*; *Macrosiphum euphorbiae*;
*Rhopalosiphum nymphaeae*Key to apterae on *Butomus*:-

1. ANT tubercles well developed, with inner faces divergent. SIPH mainly pale, 0.25–0.35× BL, cylindrical on distal half and with a subapical zone of polygonal reticulation *Macrosiphum euphorbiae*
- ANT tubercles weakly developed. SIPH about 0.2× BL, without polygonal reticulation **2**
2. SIPH pale or only dark at apices, cylindrical or tapering. Dorsum without bead-like spinules *Aphis nasturtii*
- SIPH dusky or dark, swollen on distal half. Dorsal cuticle with a reticulate pattern of bead-like spinules *Rhopalosiphum nymphaeae*

(or try key to polyphagous aphids, p. 1020)

Buxus*B. harlandi*
B. liukiensis
*B. sempervirens**B. scutifolia*
B. wallichiana
Buxus spp.**Buxaceae***Myzus persicae*
Sinomegoura citricola
Aphis fabae, *middletonii*, *spiraecola*; *Myzus persicae*;
Toxoptera aurantii
Toxoptera aurantii
[*Amphicercidus tuberculatus*]
[*Taiwanaphis decaspermi*]; [*Macrosiphum rosae*]

Use key to polyphagous aphids, p. 1020.

Byttneria*B. biloba***Sterculiaceae***Toxoptera aurantii***Cabomba***C. caroliniana***Cabombaceae***Rhopalosiphum nymphaeae***Cacalia****Compositae**[NB: The European spp. formerly placed in *Cacalia* are now in *Adenostyles*, the African spp in *Crassocephalum*, the eastern asiatic spp. in *Parasenecio*, the central American spp. in *Psacalium*, and the North American spp. mostly in *Arnoglossum* and *Hasteola*.]*C. auriculata* see *Parasenecio*
C. delphiniifolia see *Koyamacalia*
C. hastata see *Parasenecio*
C. hirsuta see *Adenostyles albida*
C. sonchifolia see *Emilia sonchifolia*
C. suaveolens see *Hasteola*
C. tuberosa see *Senecio***Cachrys (incl. Hippomarathrum)***C. crispum*
*C. libanotis***Umbelliferae***Anuraphis pyrilaseri*; *Aphis umbelliferarum*
Anuraphis cachryos

HOST LISTS AND KEYS

C. pabularia

Dysaphis papillata

C. sicula

Anuraphis cachryos

Key to aphids on *Cachrys*:-

(NB all 4 species in the key have a short cauda, and marginal tubercles on most abdominal segments.)

1. SIPH rudimentary, hardly thicker than ANT III, about 0.5× the triangular cauda, which bears 6–7 short hairs near the apex *Aphis umbelliferarum*
 – SIPH 1.5–2.2× cauda which is rounded at apex and bears 5–12 long hairs **2**
2. Hairs on ANT and dorsal body at least as long as BD III. ANT III (apt) without rhinaria. SIPH cylindrical, not broad-based, with normal imbrication. Cauda usually with 5 hairs *Dysaphis papillata*
 – Hairs on ANT and dorsal body very short and inconspicuous, less than 0.5× BD III. ANT III swollen near base and bearing 2–25 rhinaria. SIPH conical, broad-based, bearing close-set rows of minute spinules. Cauda with 7–12 hairs **3**
3. SIPH 0.14–0.18 mm long, 1.4–1.9× cauda, with 18–30 rows of spinules *Anuraphis cachryos*
 – SIPH 0.18–0.26 mm long, 1.8–2.5× cauda, with 30–35 rows of spinules *Anuraphis pyrilariseri*

‘*Cactus*’ see *Mamillaria*, *Melocactus*, *Opuntia*

Cactaceae

‘*Cactus*’ spp.

Aphis gossypii; *Myzus persicae*; *Smynturodes betae*

Use key to polyphagous aphids, p. 1020.

Caesalpinia (see Blackman and Eastop, 1994)

Leguminosae

C. pulcherrima see *Ponciana pulcherrima*

Cajanus (see also *Atylosia*)

Leguminosae

C. cajan (incl. *indicus*)

[*Acyrtosiphon caraganae*];
Aphis craccivora, *glycines*, *gossypii*, *spiraecola*;
Brachycaudus [*cardui*], *helichrysi*;
Cervaphis rappardi ssp. *indica*;
[*Uroleucon compositae* (as *Macrosiphum neavei*
Theobald, a nomen dubium)];
Megoura lespedezae; *Myzus persicae*;
Sitobion nigrinectarium

Key to aphids on *Cajanus*:-

(This is a revised version of the key to aphids on pigeon pea in Blackman and Eastop (2000), incorporating two more species.)

1. Body with large, branched marginal hair-bearing processes *Cervaphis rappardi*
 – Body without large branched marginal processes **2**
2. Cauda helmet-shaped, a little shorter than its basal width. Spiracular apertures rounded *Brachycaudus helichrysi*
 – Cauda tongue-shaped, clearly longer than its basal width. Spiracular apertures reniform **3**
3. SIPH pale, slightly clavate, about 2× cauda. ANT tubercles well developed with inner faces convergent, scabrous *Myzus persicae*
 – SIPH dark. ANT tubercles weakly developed, or with smooth, divergent inner faces **4**

4. Cauda as dark as SIPH 5
 – Cauda paler than SIPH 6
5. Dorsal abdomen with an extensive solid black shield *Aphis craccivora*
 – Dorsal abdomen without dark markings *Aphis spiraeicola*
6. ANT tubercles weakly developed, not projecting beyond middle part of head in dorsal view. ABD TERG 1 and 7 with marginal tubercles (MTu) 7
 – ANT tubercles projecting beyond middle part of front of head in dorsal view. ABD TERG 1 and 7 without MTu 8
7. Cauda 0.08–0.125× BL (only more than 0.12× BL in very small specimens with BL less than 1 mm); pale to dusky, without a constriction, less than 3× longer than its width at midlength, and bearing 2–7 (usually 5–6) hairs *Aphis gossypii*
 – Cauda 0.125–0.16× BL, very pale, usually with a slight mid-way constriction, more than 3× longer than its narrowest width at midlength, and bearing 6–9 (usually 8) hairs *Aphis glycines*
8. SIPH tapering, more than 1.5× cauda, with polygonal reticulation on distal 0.12–0.25 of length *Sitobion nigrinectarium*
 – SIPH slightly swollen, less than 1.5× cauda, without any polygonal reticulation *Megoura lespezeae*

Cakile

C. edentula (var. *islandica*)
C. maritima

Cruciferae

Acyrtosiphon auctum
Acyrtosiphon auctum; *Aphis fabae*;
Brevicoryne brassicae; *Lipaphis erysimi*;
 [*Cavariella theobaldi*]; [*Hyadaphis foeniculi*];
Myzus persicae, [*varians*]

Key to aphids on *Cakile*:-

1. ANT III 2.5–3.7× SIPH. Cauda short, broad-based, triangular *Brevicoryne brassicae*
 – ANT III less than 2× SIPH. Cauda tongue-shaped 2
2. SIPH cylindrical or slightly tapering, 0.85–1.33× cauda. SIPH and cauda both pale, concolorous with body. ANT III with 1–3 small rhinaria near base *Acyrtosiphon auctum*
 – SIPH tapering or slightly swollen on distal half; if less than 1.33× cauda then both SIPH and cauda are dusky or dark. ANT III without any rhinaria 3
3. SIPH black and tapering from base to flange. Marginal tubercles (MTu) present on ABD TERG 1 and 7 *Aphis fabae* group
 – SIPH dusky/dark or pale with slight to moderate swelling. No MTu on ABD TERG 1 and 7 4
4. ANT tubercles well developed, scabrous, with convergent inner faces. SIPH pale, 1.9–2.5× cauda *Myzus persicae*
 – ANT tubercles weakly developed. SIPH usually dusky or dark, 1.3–1.6× cauda *Lipaphis erysimi*

Caladium

C. bicolor

Caladium spp.

Araceae

Aphis gossypii; *Melanaphis sacchari*;
Pentalonia nigronervosa
Toxoptera aurantii

HOST LISTS AND KEYS

Key to aphids on *Caladium*:-

1. ANT tubercles well developed, spiculose, pointed. Femora with basal 0.6 or more pale, contrasting with black distal section. SIPH pale basally and dark distally, and slightly swollen subapically. (Al. with broad-banded wing veins, and radius fused with media to form a closed cell below pterostigma) *Pentalonia nigronervosa* (incl. f. *caladii*)
- ANT tubercles weakly developed, without spicules. Femora either mainly dark or mainly pale. SIPH dark, tapering, without any subapical swelling. Al. with normal, pale wing venation **2**
2. Cauda pale or dusky with 4–8 hairs. ANT PT/BASE 2.1–3.2 *Aphis gossypii*
- Cauda dark with 9–26 hairs. ANT PT/BASE 3.2–5.0 **3**
3. R IV+V 1.3–1.6. SIPH 0.9–1.5× cauda. Stridulatory apparatus present *Toxoptera aurantii*
- R IV+V 0.9–1.1× HT II. SIPH 0.7–0.95× cauda. No stridulatory apparatus *Melanaphis sacchari*

Calalia see *Cacalia*

Calamagrostis

C. arenarias
C. arundinacea

C. canescens

C. epigeios

C. lanceolata

C. langsdorfii

C. littorea

C. neglecta

C. pilosa

C. purpurea

C. villosa

Calamagrostis spp.

Gramineae

Hyalopterus pruni

Anoecia major; *Forda marginata*; *Laingia psammae*;
[*Pemphigus gramineus* Shinji]; *Schizaphis jaroslavi*;
Sitobion avenae, *fragariae*; [*Watabura nishiyae*]

Diuraphis calamagrostis; *Forda formicaria*;

Rhopalosiphum padi; *Schizaphis dubia*; *Sitobion fragariae*

Anoecia corni, *major*; *Hyalopterus pruni*;

Laingia psammae;

Metopolophium dirhodum; *Rhopalosiphum padi*;

Schizaphis jaroslavi, *graminum*; *Sipha maydis*;

Sitobion africanum, *avenae*; *Tetraneura africana*, *ulmi*

Diuraphis calamagrostis; *Rhopalosiphum padi*;

Sitobion fragariae

Sitobion avenae

Hyalopterus pruni

Diuraphis calamagrostis; *Sitobion avenae*

Tetraneura indica

Diuraphis calamagrostis; *Schizaphis thunebergi*

Laingia psammae; *Sitobion avenae*

Atheroides serrulatus; *Geoica utricularia*;

Paracletus bykovi; *Rhopalosiphum padi*; *Schizaphis cuprea*;

Sipha glyceriae; *Sitobion beiquei*

Use key to apterae of grass-feeding aphids under *Digitaria*.

Calamintha

C. acinos see *Acinos arvensis*

C. alpina

C. clinopodium

see *Clinopodium vulgare*

Labiatae

Myzus ornatus

<i>C. grandiflora</i>	[<i>Aphis</i> sp. near <i>clinepetae</i> – Crimea, BMNH colln]
<i>C. hejera</i>	<i>Aphis gossypii</i>
<i>C. nepeta</i>	<i>Aphis origani</i>
<i>C. officinalis</i>	<i>Aphis calaminthae</i>
<i>C. sylvatica</i>	<i>Aphis clinopodii</i>
<i>C. umbrosa</i> see <i>Clinopodium umbrosum</i>	
<i>Calamintha</i> spp.	[<i>Aphis nepetae</i>]; <i>Eucarazzia elegans</i> ; <i>Ovatomyzus chamaedrys</i>

See key under *Clinopodium*.

Calamus

C. quinquesetinervius
C. rotang
C. unifarius

Palmae

Cerataphis jamuritsu
Cerataphis brasiliensis, lataniae
Astegopteryx nipae

Key to apt. on *Calamus*:–

(All three species have head with a pair of frontal horns and SIPH present as shallow cones or pores. See Blackman and Eastop (2000) for an illustrated key to aphids on palms.)

- Body dorsoventrally flattened, almost circular, wholly sclerotic with a distinct crenulate margin due to a continuous ring of wax glands **2**
– Body elongate oval, not dorsoventrally flattened, not wholly sclerotic and without a continuous crenulate margin, but with well-developed marginal elongate oval wax glands, arranged in groups segmentally with long axes parallel *Astegopteryx nipae*
- Frontal horns clearly longer than ANT III *Cerataphis jamuritsu**
– Frontal horns shorter than ANT III **3**
- Underside of head with at least one pair of thick, dagger-like hairs situated lateroventral to bases of frontal horns. Cauda with 5–7 mainly long hairs *Cerataphis brasiliensis*
– Underside of head with only fine hairs. Cauda with 10–16 hairs of various sizes *Cerataphis lataniae*

Calandrinia (incl. *Cosmia*)

C. parviflora
Calandrinia sp.

Portulacaceae

Aphis spiraeicola
Aphis fabae, gossypii

Use key to polyphagous aphids, p. 1020.

Calanthe

C. corymbosa
C. discolor
C. masuca
C. sylvatica
C. volkensis
Calanthe sp.

Orchidaceae

Myzus persicae
Hydranaphis calanthes
Sitobion indicum
Cerataphis orchidearum
Cerataphis orchidearum
Aphis gossypii; Sitobion luteum

HOST LISTS AND KEYS

Key to aphids on *Calanthe*:-

- Dorsal body hairs long, 2.5–3.7× BD III, arising from tuberculate bases. Longest hairs on ANT III about 1.9× BD III. Cauda pale, helmet-shaped, a little shorter than its basal width
Hydonaphis calanthes
- Dorsal hairs and those on ANT III all shorter than BD III. Cauda tongue-shaped (or knobbed)
use key to other aphids on orchids under *Cymbidium*

Calathea

C. crotalifera

Marantaceae

Pentalonia nigronervosa

Calceolaria

C. chelidonioides

C. corymbosa

C. crenatiflora

C. esculenta

C. europaeum

C. mexicana

C.× speciosa

Calceolaria spp.

Scrophulariaceae

Aphis spiraecola; *Brachycaudus helichrysi*

Neomyzus circumflexus

Myzus persicae

Aphis gossypii

Myzus persicae; *Neomyzus circumflexus*

Aphis gossypii

Aulacorthum solani

Acyrtosiphon malvae group;

Macrosiphum euphorbiae; *Myzus ornatus*

Use key to polyphagous aphids, p. 1020.

Calendula

C. aegyptiaca

C. arvensis

C. micrantha

C. officinalis

C. sicula

Calendula sp.

Compositae

Aphis fabae

Aphis craccivora, *fabae*, *gossypii*, *solanella*, *spiraecola*,
[*terricola*];

Aulacorthum solani; *Brachycaudus helichrysi*;

Macrosiphum euphorbiae; *Myzus persicae*;

Uroleucon calendulae, [*nigrotuberculatum*]

Aphis gossypii; *Myzus persicae*; *Uroleucon chrysanthemi*

[*Dysaphis tulipae*]; *Macrosiphum euphorbiae*;

Myzus persicae; *Neomyzus circumflexus*;

Neotoxoptera oliveri; *Rhopalosiphum rufiabdominale*;

Uroleucon ambrosiae, *compositae*, *Uroleucon* sp.

(California, Mexico; BMNH colln)

Brachycaudus helichrysi

Capitophorus archangelskii; [*Lipaphis erysimi*];

[*Uroleucon kashmiricum*]

Key to aphids on *Calendula*:-

1. Dorsal hairs long and capitate, arising from tuberculate bases; those on front of head more than 3× BD III. SIPH long and thin, often very slightly swollen at apices, more than 3× cauda
Capitophorus archangelskii
- Dorsal body hairs not capitate, without tuberculate bases. SIPH less than 3× cauda **2**
2. SIPH with a subapical zone of polygonal reticulation **3**
- SIPH without polygonal reticulation go to polyphagous aphids key, p. 1020.

3. Cauda and SIPH both dark. ANT III with 25–86 rhinaria *Uroleucon compositae*
 – Cauda pale or dusky, SIPH pale or dark. ANT III with 1–35 rhinaria 4
4. SIPH pale with polygonal reticulation on distal 0.12–0.17 of length. ANT III with 1–10 rhinaria *Macrosiphum euphorbiae*
 – SIPH dusky or dark with polygonal reticulation on distal 0.3 or more of length. ANT III with 7–35 rhinaria 5
5. ANT III with about 10 rhinaria forming a single row over entire length. SIPH about 2× cauda *Uroleucon calendulae**
 – ANT III with 7–35 rhinaria, not arranged in a row, usually restricted to basal part of segment. SIPH 1.0–1.5× cauda 6
6. R IV+V 0.15–0.16 mm, 0.9–1.0× HT II *Uroleucon chrysanthemi*
 – R IV+V 0.16–0.24 mm, 1.1–1.85× HT II 7
7. R IV+V 0.16–0.22 mm, 1.1–1.33× HT II and bearing less than 10 accessory hairs *Uroleucon ambrosiae*
 – R IV+V 0.22–0.24 mm, 1.5–1.85× HT II, and bearing more than 20 accessory hairs *Uroleucon* sp., California and Mexico (BMNH colln)

Calicotome (incl. Calycotome)*C. calliprinus**C. spinosa**C. villosa***Leguminosae***Ctenocallis israelicus**Ctenocallis israelicus**Aphis craccivora, cytisorum, spiraeicola;**Ctenocallis israelicus***Key to apterae on Calicotome:–**

1. Body with long finger-like marginal processes. Cauda knobbed, anal plate bilobed. Dorsum with extensive, paired dark sclerites leaving a clear spinal stripe *Ctenocallis israelicus*
 – Body without long marginal processes. Cauda not knobbed, anal plate entire. Dorsum either with a solid dark shield or without any dark markings 2
2. Dorsum pale. Femora with fine hairs about as long as trochantrofemoral suture. Cauda with a midway constriction, rounded at apex, and bearing 6–12 hairs *Aphis spiraeicola*
 – Dorsum with a dark shield (fragmented at high temperatures). Femoral hairs about 0.5× length of trochantrofemoral suture. Cauda not constricted and with rather pointed apex, and bearing 4–9 hairs 3
3. R IV+V 0.88–1.16× HT II (mostly 0.9–1.05×). Anterior half of genital plate with 2 (–3) hairs *Aphis craccivora*
 – R IV+V 0.97–1.3× HT II (mostly 1.06–1.2×). Anterior half of genital plate with 2–8 hairs (mode 4, mean 5.2) *Aphis cytisorum*

Calla*C. palustris**Calla* sp.**Araceae***Aphis nasturtii; Rhopalosiphum nymphaeae**Aulacorthum solani; Neomyzus circumflexus***Key to aphids on Calla:–**

- SIPH clavate. ANT tubercles weakly developed, not projecting beyond middle of front of head in dorsal view. Dorsal cuticle with reticulate ornamentation formed by minute spinules arranged in polygons *Rhopalosiphum nymphaeae*
 – Without this combination of characters go to key to polyphagous aphids, p. 1020.

HOST LISTS AND KEYS

Calliandra

C. eriophylla
C. guildingii
C. haematocephala
C. inaequilatera

C. surianamensis
C. tweedii

Leguminosae

Aphis sp. (Leonard, 1972a: 98)
Toxoptera aurantii
Aphis gossypii; *Toxoptera aurantii*
Aphis gossypii, *Aphis* sp. (Leonard, 1972a: 98);
Myzus persicae
Aphis craccivora
Myzus persicae

Use key to polyphagous aphids, p. 1020

Callicarpa

C. bodinieri
C. formosana
C. japonica
C. longifolia
C. macrophylla
C. mollis
C. purpurea

Verbenaceae

Aphis fabae
Aphis gossypii
Aphis gossypii
Myzus persicae
Aphis gossypii, *raji*; *Subvatomyzus leucosceptri*
Aphis gossypii
Aphis gossypii

Key to aphids on *Callicarpa*:-

1. SIPH smooth-surfaced, clavate, about 3× cauda. Hairs on ANT III short with capitate apices; the longest of them less than 0.5× BD III. R IV+V 1.8–2.1× HT II *Subvatomyzus leucosceptri*
 – Without this combination of characters **2**
2. R IV+V 0.19–0.23 mm, 2.0–2.2× HT II. Marginal abdominal hairs 78–103 μm long, 3–4× ANT BD III. Marginal tubercles (MTu) present on ABD TERG 1 but often absent from ABD TERG 7 *Aphis raji*
 – Without this combination of characters go to key to polyphagous aphids, p. 1020

Calligonum

C. aphyllum
C. arborescens
C. caput-medusea
C. comosum
C. eriopodium
C. leucocladum
C. mongolicum
C. setosum

Polygonaceae

Brachyunguis harmalae
Brachyunguis harmalae
Brachyunguis harmalae
Aphis sp. (Israel, BMNH colln.); *Brachyunguis harmalae*
Aphis craccivora; *Brachyunguis calligoni*, *harmalae*
Brachyunguis harmalae
Brachyunguis harmalae
Brachyunguis calligoni, *harmalae*

Key to apterae on *Calligonum*:-

1. ANT PT/BASE less than 1. SIPH about as long as their basal widths, 0.2–0.6× cauda **2**
 – ANT PT/BASE more than 1. SIPH much longer than their basal widths, and longer than cauda **3**
2. SIPH very small, c.0.03 mm long and 0.03 mm wide at base, and only c.0.20–0.25× cauda *Brachyunguis calligoni*
 – SIPH 0.06–0.08 mm long and 0.06–0.08 mm wide at base, 0.4–0.7× cauda *Brachyunguis harmalae*
3. Dorsum with a dark shield (often fragmented in hot climates). Cauda and SIPH both black *Aphis craccivora*
 – Dorsum without dark markings. Cauda paler than SIPH *Aphis* sp. (Israel, BMNH colln)

Callisia

- C. fragrans*
C. monandra

See key to apterae on *Commelina*.

Callistegia see *Convolvulus***Callistemon**

- C. brachyandrus*
C. citrinus
C. lanceolatus
C. pachyphyllus (incl. *viridus*)
C. pallidus
C. phoeniceus
C. pinifolius
C. salignus
C. speciosus

Key to aphids on *Callistemon*:-

- SIPH dark at least distally, with polygonal reticulation on subapical 0.1–0.2 of length. ANT dark at least distally, with hairs on ANT III less than 0.25× BD III, and ANT PT/BASE 5.0–6.8
Sitobion halli
- Without this combination of characters go to key to polyphagous aphids, p. 1020

Callistephus

- C. chinensis*

C. hortensis = *chinensis*

Callistephus sp.

Use key to polyphagous aphids, p. 1020.

Callitriche

- C. hermaphroditica* (incl. *autumnalis*)
C. stagnalis
C. verna

Water Starwort

- Rhopalosiphum nymphaeae*
Myzodium knowltoni; *Rhopalosiphum nymphaeae*
Rhopalosiphum nymphaeae

Callitrichaceae

Couplet for separating these two species:-

- Head coarsely nodulose. SIPH tapering from base to a well-developed flange *Myzodium knowltoni*
- Head smooth. SIPH somewhat swollen on distal half, narrower basad and distad of swelling
Rhopalosiphum nymphaeae

Callitris see Blackman and Eastop (1994)

Callopsis

- C. tinctoria*

Araceae

Uroleucon compositae (? – recorded as *jaceae*)

Commelinaceae

[*Rhopalosiphum maidis*]; *Uroleucon ambrosiae*
Utamphorophora commelinensis

Myrtaceae

- Myzus persicae*
Aphis gossypii; *Sitobion halli*; *Toxoptera aurantii*
Toxoptera aurantii
Aphis gossypii; *Aulacorthum solani*; *Myzus persicae*
Aulacorthum solani
Aphis gossypii
Myzus persicae
Myzus persicae
Toxoptera aurantii

HOST LISTS AND KEYS

Calluna

C. vulgaris

Ericaceae

Aphis callunae; *Ericaphis ericae*, *latifrons*;
[*Rhopalosiphum maidis*]

Key to opterae on *Calluna*:-

1. SIPH and cauda dark, with SIPH 0.6–0.8× cauda. Dorsal cuticle with a strong pattern of reticulation
Aphis callunae
- SIPH and cauda pale, with SIPH 1.4–2.0× cauda. Dorsal cuticle wrinkled or almost smooth, without reticulation **2**
2. R IV+V 1.3–1.7× HT II. First tarsal segments with 5–5–5 hairs
Ericaphis ericae
- R IV+V 0.8–1.2× HT II. First tarsal segments with 3–3–3 hairs
Ericaphis latifrons

Calodendrum see Blackman and Eastop (1994)

Calonyctium see *Ipomoea*

Calophyllum see Blackman and Eastop (1994)

Calopogonium

C. caeruleum

Leguminosae

Aphis gossypii

Calothamnus

C. chrysanthereus

C. quadrifidus

C. validus

Myrtaceae

Myzus persicae

Myzus persicae

Myzus persicae

Calotropis see Blackman and Eastop (1994)

Caltha

C. palustris

C. polypetala

C. silvestris

Ranunculaceae

Aphis nasturtii; *Macrosiphum euphorbiae*;

Myzus ascalonicus, *persicae*;

Rhopalosiphoninus calthae, *nymphaeae*

Rhopalosiphoninus calthae

Aphis rukavishnikovi

Key to aphids on *Caltha*:-

1. SIPH strongly swollen, black, 3.5–4.6× cauda. Dorsum with an almost complete black sclerotic shield
Rhopalosiphoninus calthae
- SIPH not strongly swollen, pale or dusky, less than 3× cauda. Dorsum without a sclerotic shield **2**
2. SIPH weakly swollen and dark, as is cauda. Dorsal cuticle with a pattern of spicules arranged in polygons
Rhopalosiphum nymphaeae
- SIPH tapering, cylindrical or swollen, but if swollen then SIPH and cauda both pale **3**
3. BL 3.5–4.0 mm, ANT tubercles weakly developed, ABD TERG 1–5 and 7 with well-developed, dome-shaped marginal tubercles (MTu). SIPH and cauda dark, cauda with 14–15 hairs
*Aphis rukavishnikovi**
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Calycanthus

- C. fertilis*
C. floridus
C. fragrans see *Chimonanthus*
C. occidentalis

Calycanthaceae

- Aphis fabae, spiraeicola*
Aphis fabae
Myzus persicae

Use key to polyphagous aphids, p. 1020.

Calycophyllum

- C. candidissimum*

Rubiaceae

- Toxoptera aurantii*

Calycotome* see *Calicotome***Calypttranthe* see *Hydrangea******Calyptranthes***

- C. chytraculia*

Myrtaceae

- Toxoptera aurantii*

Calystegia

- C. japonica*
C. sepium

Convolvulaceae

- Aphis nerii, Aulacorthum magnoliae, Myzus persicae*
Aphis fabae, gossypii, nerii, Aulacorthum solani,
Myzus persicae
Myzus persicae

- C. soldanella*

Use key to polyphagous aphids, p. 1020.

***Calytrix* (incl. *Llotskaya*)**

- C. cricoides*

Myrtaceae

- Aphis gossypii*

***Camassia* (incl. *Quamasia*)**

- C. scilloides* (incl. *hyacinthina*)

Hyacinthaceae

- Macrosiphum kiowanepus*

Camelina

- C. alyssum*
C. sativa
Camelina sp.

Cruciferae

- Aphis fabae*
Aphis fabae
Brachycaudus helichrysi, Brevicoryne brassicae

Key to apterae on *Camelina*:-

1. Cauda tongue-shaped, much longer than its basal width, with 11–24 hairs. SIPH black, tapering/cylindrical. ABD TERG 1 and 7 with marginal tubercles (MTu) *Aphis fabae*
- Cauda helmet-shaped or triangular, about as long as its basal width. SIPH short and conical. ABD TERG 1 and 7 without MTu **2**
2. Head and legs dark, and some dark dorsal abdominal markings, at least on posterior segments. SIPH dark, slightly swollen in middle, narrowing just before flange. Cauda dark, bluntly triangular. R IV+V 0.65–0.8× HT II *Brevicoryne brassicae*
- Head and legs mainly pale, dorsal abdomen without dark markings. SIPH pale, tapering, conical, with no trace of swelling. Cauda pale, rounded, helmet-shaped. R IV+V 1.1–1.6× HT II *Brachycaudus helichrysi*

(or try key to polyphagous aphids, p. 1020)

HOST LISTS AND KEYS

Camellia

C. chinensis
C. japonica

C. sinensis
C. × williamsi
Camellia spp.

Key to apterae on *Camellia*:-

- SIPH with numerous long hairs
- SIPH without hairs

Theaceae

Toxoptera aurantii
[*Myzus inuzakurae* Shinji (nomen dubium)];
Sinomegoura citricola; *Toxoptera aurantii*, *citricidus*
Aphis gossypii; *Toxoptera aurantii*
Toxoptera aurantii
[*Aphis camelicola* del Guercio (nomen dubium)];
Greenidea camelliae; *Macrosiphum euphorbiae*

Greenidea camelliae
go to key to polyphagous aphids, p. 1020

Campanula

C. altaica
C. benthamii
C. carpatica
C. cashmieriana
C. cochlearifolia
C. colorata
C. divergens
C. erinus
C. glomerata
C. grosseki
C. incanescens
C. latifolia

C. lyrata
C. medium

C. patula
C. peregrina
C. persicifolia

C. portenschlagina
C. punctata
C. pusilla
C. pyramidalis

C. rapunculoides

C. rapunculus
C. rhomboidalis
C. rotundifolia

Harebells, Bluebells

Uroleucon nigrocampanulae
Jacksonia campanulata
Myzus ascalonicus; *Uroleucon campanulae*
Uroleucon kashmiricum
Uroleucon campanulae
Jacksonia campanula; *Uroleucon kashmiricum*
Uroleucon nigrocampanulae
Uroleucon campanulae
Uroleucon campanulae, *nigrocampanulae*
Aphis fabae
Uroleucon kashmiricum
Aphis sp.; *Uroleucon nigrocampanulae*;
[*Hyperomyzus rhinanthi*]
[*Aphis* sp. (Turkey, Toros *et al.*, 2002: 31)]
Aphis fabae; *Aulacorthum solani*; *Macrosiphum euphorbiae*;
Myzus persicae; *Uroleucon nigrocampanulae*
Dysaphis sorbi; *Uroleucon rapunculoidis*
Uroleucon sp. (Lebanon, BMNH colln)
Dysaphis sorbi; *Myzus ascalonicus*, *ornatus*;
Neomyzus circumflexus;
Uroleucon campanulae, *nigrocampanulae*
Myzus ascalonicus
Uroleucon neocampanulae
Aulacorthum solani; *Uroleucon campanulae* ssp. *longius*
Myzus ascalonicus;
Uroleucon minosmartelli, *nigrocampanulae*
Aphis fabae; *Aulacorthum solani*;
Myzus ascalonicus, *persicae*
Uroleucon campanulae, *nigrocampanulae*, *rapunculoidis*
Uroleucon campanulae, *nigrocampanulae*
Uroleucon nigrocampanulae, *rapunculoidis*
Aphis psammophila, [*campanula-riparia* Rafinesque];
Dysaphis brevirostris, *sorbi*; *Myzus ascalonicus*;
Rhopalosiphoninus staphyleae; *Uroleucon campanulae*

Campanulaceae

<i>C. sartorii</i>	<i>Rhopalosiphoninus staphyleae</i>
<i>C. scheuchzeri</i>	<i>Uroleucon campanulae</i>
<i>C. sibirica</i>	<i>Uroleucon nigrocampanulae</i>
<i>C. trachelium</i>	<i>Aphis fabae</i> , <i>Aphis</i> sp. (Germany, BMNH colln); <i>Uroleucon campanulae</i> , <i>nigrocampanulae</i>
<i>C. versicolor</i>	<i>Uroleucon minosmartelli</i>
<i>C. vidalii</i>	<i>Aphis</i> sp. (Azores, BMNH colln)
<i>Campanula</i> spp.	<i>Aphis bimacula</i> , [<i>grossulariae</i>]; <i>Myzus ornatus</i> ; <i>Uroleucon</i> [<i>cichorii</i>], <i>gredinae</i> , <i>kikioense</i>

Key to aphids on *Campanula*:-

1. SIPH dark with a distal zone of polygonal reticulation extending for at least 0.2 of length 2
SIPH pale or dark, but if dark then without polygonal reticulation 10
2. Cauda pale or dusky 3
– Cauda dark like SIPH 5
3. R IV+V shorter than (about 0.7×) HT II, and bearing only 2 accessory hairs *Uroleucon kikioense* 4
– R IV+V 1.1–1.3× HT II, with 5–8 accessory hairs 4
4. First tarsal segments with 5 hairs. Tibiae wholly dark. ANT III with 50–66 rhinaria. Antesiphuncular sclerites present *Uroleucon gredinae**
– First tarsal segments with 3 (–4) hairs. Tibiae pale on basal 0.7. ANT III with 10–30 rhinaria. Antesi-phuncular sclerites absent *Uroleucon kashmiricum*
5. SIPH 0.85–1.25× cauda. R IV+V 0.8–1.05× HT II *Uroleucon campanulae*
– SIPH 1.5–2.35× cauda. R IV+V 1.0–2.0× HT II 6
6. ANT III 2.8–4.4× R IV+V 7
– ANT III 5.0–6.6× R IV+V 8
7. Body oval. R IV+V 1.0–1.33× HT II. SIPH 2.9–4.2× HT II *Uroleucon minosmartelli*
– Body spindle-shaped. R IV+V 1.7–2.0× HT II. SIPH 5.4–6.4× HT II
Uroleucon sp. on *C. peregrina*, Lebanon (BMNH colln)
8. Longest hairs on outer side of hind tibia 1.5–2× diameter of tibia at midlength. Longest hairs on ANT III 1.2–1.5× BD III *Uroleucon neocampanulae*
– Longest hairs on outer side of hind tibia 0.9–1.2× its diameter at midlength. Longest hairs on ANT III 0.8–1.1× BD III 9
9. ANT III with 19–58 rhinaria at a density of 20–58 per mm, extending over 0.42–0.94 of segment. (Al. with 43–78 rhinaria on ANT III and none on IV) *Uroleucon rapunculoidis*
– ANT III with 52–122 rhinaria at a density of 45–84 per mm, extending over 0.77–0.97 of segment. (Al. with 97–137 rhinaria on ANT III, and usually without but sometimes with 1–7 on IV) *Uroleucon nigrocampanulae*
10. SIPH narrow at middle and flared distally, without an apical flange *Jacksonia campanulata**
– SIPH tapering or cylindrical or swollen on distal half, with a distinct apical flange 11
11. Marginal tubercles (MTu) always present on ABD TERG 1 and 7 12
– No MTu on ABD TERG 1 and 7 15
12. ANT PT/BASE about 0.7. SIPH short, dark, conical, about 0.8× the short triangular cauda. Dorsal abdomen with a pair of large dark spots anterior to SIPH *Aphis bimacula*

HOST LISTS AND KEYS

- ANT PT/BASE 1.8–3.8. SIPH 0.6–2.4× cauda. Dorsal abdomen with or without scattered dark markings, without a pair of large dark spots anterior to SIPH 13
- 13.** SIPH black, 0.6–0.8× black cauda which bears 7–9 hairs
Aphis sp(p). (Azores, Germany, BMNH colln)
- SIPH pale or dark, 0.8–2.4× cauda which bears 6–25 hairs 14
- 14.** Cauda pale or dusky. SIPH dark or pale with dark apices. Dorsal abdomen without any dark markings. Very short-haired; e.g. hairs on ANT III 0.2–0.6× BD III. ABD TERG 8 with 2 short hairs. Cauda with 6–10 hairs
Aphis psammophila
- Cauda and SIPH dark. Dorsal abdomen with dark markings at least on ABD TERG 7 and 8. ABD TERG 8 with 2–7 long hairs. Cauda with 11–25 hairs
Aphis fabae group
- 15.** Cauda tongue-shaped, at least 1.5× its basal width, with 4–12 hairs. SIPH swollen, cylindrical or tapering on distal half. ANT tubercles well developed go to key to polyphagous aphids, p. 1020
- Cauda triangular or helmet-shaped, about as long as its basal width, with 4–6 hairs. SIPH usually slightly swollen on distal half. ANT tubercles low 16
- 16.** R IV+V 1.23–1.38× HT II. Longest hairs on ABD TERG 8 15–22µm. (Al. with 45–76 rhinaria on ANT III)
Dysaphis sorbi
- R IV+V 1.04–1.19× HT II. Longest hairs on ABD TERG 8 10–15µm. (Al. with 30–40 rhinaria on ANT III)
Dysaphis brevirostris

Campanumoea see *Codonopsis*

Camphorosma

- C. annua*
- C. lessingii*
- C. monspeliacum*

Chenopodiaceae

- Chaitaphis camphorosmae*
- Chaitaphis camphorosmae*; *Xerobion camphorosmae*
- Chaitaphis camphorosmae*; *Xerobion camphorosmae*

Couplet to separate these two species:–

(NB Both species have long dorsal hairs and ANT PT/BASE less than 1.5.)

- Cauda finger-like, more than 1.5× its basal width, with 5–7 hairs. SIPH tubular, cylindrical or slightly swollen, narrowing just before flange. R IV+V similar in length to HT II. Dorsal abdominal hairs thick, rod-shaped, with flattened or furcate apices
Chaitaphis camphorosmae
- Cauda bluntly conical to helmet-shaped, shorter than its basal width, with 13–18 hairs. SIPH are dark broad-based cones. R IV+V about 2× HT II. Dorsal abdominal hairs pointed
Xerobion camphorosmae

Campsis

- C. chinensis*
- C. radicans*
-
- C.× tagliabuana*

Bignoniaceae

- Aulacorthum magnoliae*
- Aphis fabae*, *gossypii*, *thecomae*, [*Aphis* sp. (Davletshina, 1964: 124)];
- Macrosiphum euphorbiae*; *Myzus persicae*;
- Toxoptera aurantii*
- Aulacorthum solani*; *Macrosiphum euphorbiae*;
- Myzus ornatus*

Key to apterae on *Campsis*:-

- SIPH and cauda both black, with SIPH 1.8–2.2× cauda, which bears only 4 hairs *Aphis thecomae**
- Without that combination of characters; if SIPH and cauda are both black then cauda is relatively longer or bears more hairs go to key to polyphagous aphids, p. 1020

Cananga*C. odorata***Annonaceae***Aphis craccivora*; *Toxoptera aurantii*

Use key to polyphagous aphids, p. 1020.

Canarium see Blackman and Eastop (1994)

Canavalia*C. cubensis**C. ensiformis**C. gladiata**C. maritima***Leguminosae***Aphis craccivora**Aphis craccivora*, *craccivora* ssp. *canavaliae*, *gossypii**Aphis craccivora*, *gossypii**Aphis craccivora*

Use key to polyphagous aphids, p. 1020 starting at couplet 24.

Canna*C. coccinea**C. indica**C. orientalis**Canna* spp.**Cannaceae***Neomyzus circumflexus*; *Rhopalosiphum padi**Aphis fabae*; *Aulacorthum solani*;*Macrosiphum euphorbiae*; *Myzus persicae*; *Rhopalosiphum padi*, [*nymphaeae*]; [*Sitobion* sp.][*Hyalopterus pruni*]; *Myzus ornatus*, *persicae*;*Neomyzus circumflexus**Aphis gossypii*, *spiraecola*; *Brachycaudus helichrysi*;[*Pentalonia kalimpongensis*]; *Sitobion neusi*

Key to apterae on *Canna*:-

1. SIPH dark with a distal zone of polygonal reticulation. Dorsal abdomen with a dark irregular central sclerite. ANT dark beyond base of III, with PT/BASE more than 6.5 *Sitobion neusi*
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Cannabis*C. gigantea**C. sativa***Cannabidaceae***Phorodon cannabis**Aphis fabae*, *gossypii*, [*sativae* Williams (see Davis, 1911:271)], *Aphis* sp. (Davletshina, 1964:124);*Aulacorthum solani*; *Myzus persicae*; *Phorodon cannabis*

Key to aphids on *Cannabis*:-

- ANT tubercles bearing finger-like processes. Dorsal hairs with capitate apices *Phorodon cannabis*
- ANT tubercles without finger-like processes. Dorsal hairs not capitate go to key to polyphagous aphids, p. 1020

HOST LISTS AND KEYS

Capillipedium

C. assimilis
C. parviflorum

Capillipedium spp.

Gramineae

Pseudoregma panicola
Chaetogeica graminiphaga; *Sitobion miscanthi*;
Tetraneura multisetosa, fusiformis
Chaetogeica polychaeta;
Tetraneura basui, javensis, radicola / yezoensis group

Use key to apterae of grass-feeding aphids under *Digitaria*.

Capnoides

C. brandegeei (?)
Capnoides sp.

Papaveraceae

Pseudocercidis tutigulus
Macrosiphum sp. (Colorado, USA; BMNH colln, leg.
F.C. Hottes and D. Hille Ris Lambers)

Key to apterae on *Capnoides*:-

- SIPH 0.11–0.14× BL and 1.3–1.5× cauda, with spiculose imbrication on distal part. R IV+V
0.45–0.55× HT II *Pseudocercidis tutigulus*
- SIPH c.0.30–0.33× BL and c.2× cauda, with polygonal reticulation on distal c.0.15 of length. R IV+
V c.0.8–0.9× HT II *Macrosiphum* sp. (Colorado)

Capparis

C. flexuosa
C. spinosa

Capparidaceae

Aphis craccivora
Anuraphis capparidis

Couplet for separating these two species:-

- Dorsal abdomen with an extensive black shield. Cauda pointed, clearly longer than its basal width
Aphis craccivora
- Dorsal abdomen unpigmented. Cauda short and rounded, not longer than its basal width
*Anuraphis capparidis** (possibly an immature *Aphis*?)

(Or try key to polyphagous aphids, p. 1020)

Capraria

C. biflora

Scrophulariaceae

Aphis gossypii

Capriola see Cynodon

Capsella

C. bursa-pastoris

Cruciferae

Abstrusomyzus phloxae; *Acyrtosiphon pisum*;
Aphis capsellae, craccivora, fabae, gossypii, [loti ssp.
gollmicki], middletonii, nasturtii, [plantaginis], sambuci,
[scabiosae], solanella, spiraeicola, [symphyti];
Aulacorthum solani, [speyeri];
Brachycaudus cardui, helichrysi, lateralis;
Brachyunguis harmalae; Brevicoryne brassicae;
Dysaphis capsellae, rara, [Dysaphis sp.
(Shaposhnikov, 1987b)];
[Ericaphis fimbriata, wakibae]; Forda formicaria;

Geoica utricularia; *Lipaphis erysimi*, *pseudobrassicae*;
Macrosiphum euphorbiae, [*pyrifoliae*, *stellariae*,
tenuicauda];
Myzus antirrhinii, *ascalonicus*, *cerasi*, [*certus*],
ornatus, *persicae*;
[*Nasonovia ribisnigri*]; *Nearctaphis bakeri*;
Neomyzus circumflexus; *Pemphigus* sp.;
Prociphilus erigeronensis;
Rhopalosiphoninus staphyleae;
Rhopalosiphum [*maidis*], *padi*, [*nymphaeae*];
Sitobion akebiae, *avenae*; *Smynthuroides betae*

Key to aphids on *Capsella*:-

(*C. bursa-pastoris* ('Shepherd's Purse') is a popular 'reserve host' throughout a large part of the world for numerous species of aphids, including many which are otherwise specific to other plant genera or families. It seems to be a plant that aphids – particularly grass and legume feeders – can utilise, and even form flourishing colonies on, usually at times of year when their normal hosts are scarce or unavailable. The key below attempts to discriminate the species most likely to be found on *Capsella*, but neither the list above or the key can be regarded as at all comprehensive.)

1. ANT PT/BASE less than 1. SIPH absent or, if present, then only about 0.5× cauda 2
 – ANT PT/BASE more than 1. SIPH present and more than 0.5× cauda 7
2. ANT PT/BASE more than 0.5. Eyes multifaceted. SIPH present, about 0.5× the finger-like cauda
Brachyunguis harmalae
 – ANT PT/BASE less than 0.5. Eyes with 3 facets. SIPH absent. Cauda rounded, not developed 3
3. ANT with primary rhinaria having fimbriate rims 4
 – ANT with primary rhinaria having naked rims 6
4. Anal plate displaced dorsally. Hairs on dorsal body and appendages often spatulate. Wax gland plates absent
Geoica utricularia
 – Anal plate not displaced dorsally. Hairs on body and appendages pointed. Wax gland plates present, at least on posterior abdominal segments 5
5. Cauda and anal plate extended posteriorly, dark, and bearing numerous long hairs. R IV with 6–10 accessory hairs
Prociphilus erigeronensis
 – Cauda and anal plate not extended posteriorly, with few short hairs. R IV without accessory hairs
Pemphigus sp.
6. Primary rhinaria with thick, sclerotic rims. ANT III 0.8–1.7× the elongate ANT II. R IV+V 1.0–1.8× ANT II
Smynthuroides betae
 – Primary rhinaria with thin rims. ANT III 3.3–4.6× ANT II. R IV+V 2.1–2.9× ANT II.
Forda formicaria
7. ANT tubercles absent or, if developed then small, and with median tubercle on front of head also developed; front of head therefore either convex, straight or sinuate in dorsal view. SIPH without polygonal reticulation 8
 – ANT tubercles moderately to well developed, with inner faces convergent, parallel or divergent in dorsal view; **if** rather low and divergent **then** SIPH have distal polygonal reticulation 19

HOST LISTS AND KEYS

8. SIPH almost cylindrical on basal half and slightly swollen on distal part, narrowing just before flange **9**
 – SIPH tapering gradually from base to flange, with no trace of swelling on distal part **12**
9. Cauda broadly triangular, about as long as its basal width in dorsal view. ANT III 2.5–3.7× SIPH. Dorsal abdomen with dark segmental markings *Brevicoryne brassicae*
 – Cauda tongue- or finger-shaped, longer than its basal width. ANT III 1.2–1.7× SIPH. Dorsal abdomen without dark markings (except on ABD TERG 7–8) **10**
10. ANT PT/BASE 3.0–4.0. SIPH smooth on narrowest part just proximal to flange. ABD TERG 1 and 7 always with small marginal tubercles (MTu) *Rhopalosiphum padi*
 – ANT PT/BASE 1.8–2.7. SIPH with transverse striae on narrowest part just proximal to flange. ABD TERG 1 and 7 without MTu **11**
11. ANT III+PT together 1.95–2.5× SIPH (90% of specimens less than 2.4×) *Lipaphis erysimi*
 – ANT III+PT together 2.1–3.2× SIPH (90% of specimens more than 2.4×) *Lipaphis pseudobrassicae*
12. ABD TERG 1 and 7 always with MTu. Spinal tubercles (STu) absent. Cauda tongue-shaped or bluntly conical, not constricted at base **13**
 – ABD TERG 1 and 7 either without MTu, or if MTu are present then they are always in association with STu on ABD TERG 7 and/or 8. Cauda helmet-shaped or bluntly conical, somewhat constricted at base **14**
13. ABD TERG 2–4(–5) regularly with well-developed marginal tubercles (MTu), of basal diameter about equal to distal diameter of SIPH *Aphis sambuci*
 – ABD TERG 2–4 without or only sporadically with small MTu polyphagous *Aphis* spp.
- (Go to key to polyphagous aphids, p. 1020, starting at couplet 24, but note that specimens running to *gossypii* / *frangulae* group may be *capsellae*, and specimens running to *craccivora* may be *loti* ssp. *gollmicki*.)
14. Abdomen with a extensive dark dorsal shield **15**
 – Abdomen without extensive dark markings anterior to SIPH **16**
15. Longest hairs on hind femur 10–25 μm *Brachycaudus lateralis*
 – Longest hairs on hind femur more than 25 μm long *Brachycaudus cardui*
16. SIPH dark, with normal imbrication, more than 1.5× cauda. MTU always present, at least on ABD TERG 1–4 **17**
 – SIPH pale, smooth or spiculose, less than 1.5× cauda. MTU rarely present **18**
17. Longest hairs on ANT III 29–42 μm, 1.3–1.8× BD III, and hairs on ABD TERG 8 58–82 μm. R IV+V 1.12–1.24× HT II *Dysaphis capsellae**
 – Longest hairs on ANT III 9–13 μm, 0.4–0.6× BD III, and hairs on ABD TERG 8 29–39 μm. R IV+V 1.21–1.31 (–1.58)× HT II *Dysaphis rara* (?)*
18. SIPH smooth. Spiracular apertures large and rounded *Brachycaudus helichrysi*
 – SIPH ornamented with rows of minute spicules. Spiracular apertures reniform *Nearctaphis bakeri*
19. BL 2.5–5.5 mm. SIPH pale, without any subapical reticulation, very long and attenuate distally (thinner than middle part of hind tibia), but less than 2× cauda *Acyrtosiphon pisum*
 – If BL is more than 2.5 mm, and SIPH are pale and less than 2× cauda, then SIPH have subapical polygonal reticulation **20**

20. SIPH black, 1.1–1.9× cauda, with polygonal reticulation on distal 0.15–0.40 of length. R IV+V very short and blunt, 0.6–0.8× HT II 21
 – Without this combination of characters 22
21. SIPH 1.4–1.9× cauda *Sitobion akebiae/miscanthi*
 – SIPH 1.1–1.4× cauda *Sitobion avenae*
22. SIPH black, tapering, coarsely imbricated. Dorsal cuticle extensively sclerotised, often wholly dark, and wrinkled with a jigsaw puzzle-like pattern. Large, dark, densely spiculate postsiphuncular sclerites are present *Myzus cerasi*
 – Without this combination of characters go to key to polyphagous aphids, p. 1020

Capsicum***C. annuum***(incl. *baccatum*, *frutescens*)***C. dulce******Capsicum* sp.**

Use key to polyphagous aphids, p. 1020.

Solanaceae[*Acyrtosiphon gossypii*, *pisum*];*Aphis fabae*, *gossypii*, *middletonii*, *nasturtii*, *spiraecola*;*Aulacorthum solani*, [*Brevicoryne brassicae*];[*Hayhurstia atriplicis*]; *Macrosiphum euphorbiae*;*Myzus ascalonicus*, *ornatus*, *persicae*;*Neomyzus circumflexus*; *Rhopalosiphum rufiabdominale*;[*Sipha flava*]; [*Tinocalloides montanus*]*Aphis gossypii*; *Macrosiphum euphorbiae*; *Myzus persicae**Rhopalosiphoninus latysiphon***Caragana*****C. arborescens******C. auriantiacae******C. caragana******C. chaniaga******C. changduensis******C. frutex******C. fruticosa******C. microphylla******C. pygmaea******C. sinica******C. spinosa******C. turkestanica******Caragana* sp.****Leguminosae***Acyrtosiphon caraganae*, *occidentale*, *pisum*;*Aphis craccivora*, *cytisorum*;*Therioaphis aizenbergi*, *kundurensis*, *tenera**Aphis craccivora**Therioaphis tenera**Acyrtosiphon caraganae*; *Aphis craccivora**Aphis craccivora**Acyrtosiphon caraganae*; *Myzus persicae*;*Therioaphis beijingensis*, *tenera*, *tenera* ssp. *frutex**Therioaphis kundurensis**Acyrtosiphon caraganae*; *Aphis fabae*; *Myzus persicae**Acyrtosiphon caraganae*; *Aphis craccivora**Aphis craccivora**Acyrtosiphon caraganae**Acyrtosiphon caraganae**Acyrtosiphon kondoi*; [*Titanosiphon dracunculi*]Key to aphids on *Caragana*:-

1. Cauda knobbed, anal plate bilobed. SIPH as short, truncate cones. ANT PT/BASE less than 1.7 (applies to both apt. and al.) 2
 – Cauda tongue- or finger-shaped, anal plate entire. SIPH tubular. ANT PT/BASE more than 2.0 (applies to both apt. and al.) 6

HOST LISTS AND KEYS

2. ABD TERG 1–5 each with 5 or 6 long, capitate spinopleural hairs arising from pigmented sclerites (applies to both apt. and al.) *Therioaphis aizenbergi*
 – ABD TERG 1–5 each with only two slightly capitate spinal hairs, with basal sclerites pale or dark (applies to both apt. and al.) **3**
3. SIPH dark. Spinal hairs arising from dark sclerites, those on ABD TERG 3 being displaced laterally (all vivip. are al.) *Therioaphis beijingensis**
 – SIPH pale. Spinal hairs arising from pale/dusky sclerites or tuberculate bases, those on ABD TERG 3 not laterally displaced **4**
4. Apt. vivip. present. Both apt. and al. with spinal hairs arising from tuberculate bases (less well developed in al., which have 12–20 sec. rhin. on ANT III) *Therioaphis kundurensis**
 – All vivip. are al., with spinal hairs on flat or weakly convex sclerites, which may be fused medially on some tergites. ANT III with 7–15 sec. rhin. **5**
5. (Al.) Dorsal body hairs 11–25 µm long, and flabellate. Forewing veins heavily bordered with fuscous *Therioaphis tenera* ssp. *frutex*
 – (Al.) Dorsal body hairs 19–41 µm long, with blunt or capitate apices. Forewing veins weakly bordered *Therioaphis tenera* s. str.
6. SIPH gradually tapering or cylindrical on distal half, 4.75–8.5× R IV+V, without any subapical polygonal reticulation **7**
 – SIPH less than 4.5× R IV+V, or if more then with subapical polygonal reticulation **9**
7. ANT I longer than wide and bearing 9–23 hairs. SIPH attenuate distally, thinner than hind tibia at midlength. ANT VI BASE 1.9–2.9× R IV+V *Acyrtosiphon pisum*
 – ANT I not longer than wide, bearing 7–10 hairs. SIPH not so attenuate distally, as thick as or thicker than (0.95–1.7×) diameter of hind tibia at midlength. ANT VI BASE 1.1–1.7× R IV+V **8**
8. SIPH 1.75–2.05× cauda. Diameter of SIPH at midlength 0.95–1.45× diameter of hind tibia at midlength *Acyrtosiphon kondoi*
 – SIPH 1.45–1.9× cauda (only more than 1.8× in large specimens with SIPH at least 0.9 mm). Diameter of SIPH at midlength 1.25–1.7× diameter of hind tibia at midlength *Acyrtosiphon caraganae*
9. Dorsum with an extensive black shield **10**
 – Dorsum without an extensive black shield go to key to polyphagous aphids, p. 1020
10. R IV+V 0.88–1.16× HT II (mostly 0.9–1.05×). Anterior half of genital plate with 2 (–3) hairs *Aphis craccivora*
 – R IV+V 0.97–1.3× HT II (mostly 1.06–1.2×). Anterior half of genital plate with 2–8 hairs (mode 4, mean 5.2) *Aphis cytisorum*

Caraxylon see *Iresine*

Cardamine

C. africana

C. amara

C. chenopodifolia

Cruciferae

Aulacorthum solani; *Lipaphis erysimi*; *Myzus ornatus*

Aphis fabae, *nasturtii*, *triglochinis*;

Macrosiphum euphorbiae; *Myzus cerasi*; [*Sitobion avenae*]

Brevicoryne brassicae

<i>C. flexuosa</i> (incl. var. <i>sylvatica</i>)	<i>Aphis fabae</i> , <i>nasturtii</i> , <i>triglochinis</i> ; <i>Brevicoryne brassicae</i> ; <i>Lipaphis erysimi</i> , <i>pseudobrassicae</i> ; <i>Myzotoxoptera wimshurstae</i> ; <i>Myzus ascalonicus</i> , <i>cerasi</i>
<i>C. heterophylla</i>	<i>Aulacorthum solani</i> ; <i>Myzus cerasi</i> , <i>ornatus</i>
<i>C. hirsuta</i>	<i>Aulacorthum solani</i> ; <i>Brevicoryne brassicae</i> ; <i>Lipaphis erysimi</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzotoxoptera wimshurstae</i> ; <i>Myzus ornatus</i> , <i>persicae</i>
<i>C. impatiens</i>	<i>Aphis</i> [<i>cardamine</i> Shinji, 1922 – nomen nudum], <i>nasturtii</i> , <i>triglochinis</i> ; <i>Brevicoryne brassicae</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzotoxoptera wimshurstae</i> ; <i>Myzus persicae</i>
<i>C. lyrata</i>	<i>Aphis mizutakarashi</i> ; [<i>Cavariella salicicola</i>]
<i>C. oligosperma</i>	<i>Myzus ascalonicus</i>
<i>C. pratensis</i>	<i>Myzotoxoptera wimshurstae</i> ; <i>Pemphigus populitransversus</i>
<i>C. sylvatica</i> see <i>flexuosa</i>	
Cardamine spp.	<i>Aphis craccivora</i> ; <i>Rhopalosiphoninus staphyleae</i>

Key to aphids on *Cardamine*:-

1. ANT PT/BASE less than 0.5. Eyes 3-faceted. SIPH absent. Abdomen with wax glands on ABD TERG 3–7 (usually 4 glands on each of ABD TERG 3–6 and 2 on ABD TERG 7) 2
Pemphigus populitransversus
- ANT PT/BASE more than 0.5. Eyes multifaceted. SIPH present, tubular. Abdomen without evident wax glands 2
2. ANT tubercles absent or weakly developed, with middle part of front of head also developed so that front of head is either convex, straight or sinuate in dorsal view 3
- ANT tubercles moderately to well developed, with inner faces convergent, parallel or divergent, and median tubercle on front of head undeveloped or only weakly developed, so that there is a frontal sinus 10
3. ABD TERG 1 and 7 without marginal tubercles (MTu). SIPH almost cylindrical on basal half and slightly swollen on distal part, narrowing just before flange 4
- ABD TERG 1 and 7 with MTu. SIPH tapering gradually from base to flange, with no trace of swelling on distal part 6
4. Cauda broadly conical, about as long as its basal width in dorsal view. ANT III 2.5–3.7× SIPH. Dorsal abdomen with dark segmental markings 5
Brevicoryne brassicae
- Cauda tongue-shaped, longer than its basal width. ANT III 1.2–1.7× SIPH. Dorsal abdomen without dark markings on segments anterior to SIPH 5
5. ANT III+PT together 1.95–2.5× SIPH (90% of specimens less than 2.4×) 7
Lipaphis erysimi
- ANT III+PT together 2.1–3.2× SIPH (90% of specimens more than 2.4×) 7
Lipaphis pseudobrassicae
6. Dorsum with an extensive black shield 7
Aphis craccivora
- Dorsum without extensive pigmentation 7
7. ANT PT/BASE 1.1–1.75. Cauda with 5–11 hairs. (Al. with 25–60 rhinaria on ANT III, 9–25 on IV and 7–17 on V) 8
Aphis triglochinis
- ANT PT/BASE 1.8–3.0. Cauda with 4–24 hairs. (Al. with 7–33 rhinaria on ANT III, 0–10 on IV and 0–2 on V) 8

HOST LISTS AND KEYS

8. SIPH pale/dusky with darker apices, cauda pale and bearing 4–11 hairs *Aphis nasturtii*
 – SIPH and cauda dark, cauda bearing 8–24 hairs **9**
9. Dorsal abdomen without dark markings. Cauda with 8–14 hairs. (Al. with 2–6 rhinaria on ANT IV) *Aphis mizutakarashi**
 – Dorsal abdomen with dark cross-bands on ABD TERG 7 and 8, and usually with small dark spots anterior to SIPH. Cauda with 11–24 hairs. (Al. usually without rhinaria on ANT IV) *Aphis fabae*
10. SIPH 3.6–5.0× cauda, which is helmet-shaped, shorter than its basal width. Head spinulose, and ANT III with 1–4 rhinaria on basal half *Myzotoxoptera wimshurstae*
 – SIPH less than 3× cauda and other characters not in that combination **11**
11. SIPH dark, cylindrical, coarsely imbricated, 2.3–2.9× cauda. Dorsal cuticle sclerotic, strongly wrinkled, with large dark marginal sclerites *Myzus cerasi*
 – Without that combination of characters go to key to polyphagous aphids, p. 1020

Cardaminopsis see *Arabis*

Cardaria see *Lepidium*

Cardiocrinum

C. giganteum

Liliaceae

Rhopalosiphoninus staphyleae

Cardiospermum

C. halicacabum

Sapindaceae

Aphis gossypii

Carduus

C. acanthoides (incl. ssp. *multiflorus*)
 (= *crispus* auct. nec. L.)

Aphis acanthoidis, *fabae*, *solanella*, [symphyti];
Brachycaudus cardui; *Capitophorus carduinus*;
Macropodaphis tubituberculata; *Uroleucon aeneum*, *cichorii*

C. albidus

Brachycaudus cardui; *Protrama radialis*

C. americanus

Aphis fabae; *Brachycaudus cardui*

C. arabicus

Aphis [*euonymi*], *fabae*, *solanella*;

Uroleucon [*jaceae*], [*picridis* (misident. *cichorii*?)]

C. argenteus

Aphis fabae, *gossypii*

C. armatus

Uroleucon aeneum

C. arvensis see *Cirsium arvense*

C. australis (incl. *marmoratus*)

Uroleucon aeneum

C. candicans

Aphis fabae

C. carduelis

Aphis fabae

C. carpetanus

Aphis fabae

C. clavatus

Aphis fabae; *Brachycaudus cardui*

C. colchicus

Brachycaudus cardui

C. crispus L. (*C. crispus* auct. nec. L. = *acanthoides*)

Aphis fabae; *Brachycaudus helichrysi*;
Capitophorus carduinus; *Chitinosiphum cardui*;
Uroleucon aeneum, [*jaceae* ssp. *henrichi*]

C. defloratus (incl. ssp. *glauca*)

Aphis fabae, *wartenbergi*; *Aulacorthum solani*;

Brachycaudus cardui; *Uroleucon aeneum*, *macrosiphon*

C. edelbergii

Capitophorus elaeagni

<i>C. flodmanii</i>	<i>Neomyzus circumflexus</i>
<i>C. glaucus</i> see <i>defloratus</i>	
<i>C. kernerii</i>	<i>Brachycaudus cardui</i>
<i>C. lanceolatus</i> see <i>Cirsium vulgare</i>	
<i>C. leiophyllus</i>	<i>Uroleucon aeneum</i>
<i>C. leptacanthus</i>	<i>Capitophorus elaeagni</i> ; <i>Myzus ornatus</i> ; <i>Uroleucon compositae</i>
<i>C. marianus</i>	<i>Protrama radices</i>
<i>C. marmoratus</i> see <i>australis</i>	
<i>C. nitens</i>	<i>Aphis fabae</i>
<i>C. niveus</i>	<i>Aphis fabae</i>
<i>C. nutans</i>	<i>Aphis anuraphoides</i> , <i>carthami</i> , <i>fabae</i> ssp. <i>acanthoidis</i> , [<i>symphyti</i>], [<i>terricola</i>], [<i>verbasci</i>]; <i>Brachycaudus cardui</i> , <i>helichrysi</i> ; <i>Capitophorus carduinus</i> , <i>elaeagni</i> ; <i>Myzus persicae</i> ; <i>Uroleucon aeneum</i> , <i>cichorii</i>
<i>C. nyassanus</i>	<i>Aphis fabae</i> , <i>spiraecola</i> ; <i>Capitophorus elaeagni</i> ; <i>Uroleucon compositae</i>
<i>C. ochrocentrus</i> see <i>Cirsium</i>	
<i>C. palustris</i> see <i>Cirsium palustre</i>	
<i>C. personata</i>	<i>Aphis fabae</i> ; <i>Brachycaudus cardui</i> ; <i>Capitophorus carduinus</i> ; <i>Uroleucon aeneum</i> , [<i>jaceae</i> group; not <i>aeneum</i> (?)]
<i>C. pratensis</i>	<i>Aphis fabae</i>
<i>C. pycnocephalus</i>	<i>Aphis fabae</i> , <i>pseudocardui</i> ; <i>Brachycaudus cardui</i> , <i>helichrysi</i> ; <i>Capitophorus elaeagni</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus ascalonicus</i> ; [<i>Trama caudata</i>]; <i>Uroleucon</i> [<i>sonchi</i> (possibly misidentified <i>cichorii</i> group?)], <i>aeneum</i>
<i>C. seminudus</i>	<i>Brachycaudus cardui</i>
<i>C. tenuiflorus</i>	<i>Aphis fabae</i> ; <i>Brachycaudus cardui</i> ; <i>Capitophorus elaeagni</i>
<i>C. thoermeri</i>	<i>Aphis fabae</i> ; <i>Uroleucon jaceae</i> group (<i>aeneum</i> ?)
<i>C. tridentinus</i>	<i>Uroleucon aeneum</i>
<i>Carduus</i> spp.	[<i>Anoecia corni</i>]; <i>Aphis anuraphoides</i> , <i>carduella</i> , [<i>castanea</i> Koch, 1857]; <i>Brachycaudus lateralis</i> , [<i>persicae</i>]; [<i>Hyperomyzus carduellinus</i>]; <i>Macrosiphoniella riedeli</i> , <i>tuberculata</i> ; <i>Pemphigus bursarius</i> ; <i>Trama baronii</i> , <i>troglydytes</i> ; <i>Uroleucon</i> [<i>erigeronensis</i>], <i>mongolicum</i> ssp. <i>cardui</i>

Key to aphids on *Carduus*:-

1. ANT PT/BASE less than 0.7. SIPH as pores placed on flat cones, or absent 2
- ANT PT/BASE more than 0.8. SIPH conical or tubular 5
2. Body and appendages sparsely hairy. Hind tarsus normal, less than 0.25× hind tibia. Dorsal abdomen with wax gland plates on posterior segments *Pemphigus bursarius*
- Body and appendages densely hairy. Hind tarsus elongate, more than 0.5× hind tibia. No wax gland plates 3

HOST LISTS AND KEYS

3. SIPH completely absent. Head and appendages pale/dusky. ANT PT/BASE 0.16–0.24 *Trama troglodytes*
- SIPH present as pores placed on flat, usually pigmented, cones. Head and appendages dark. ANT PT/BASE 0.33–0.69 **4**
4. Hind tarsus 0.65–0.70× hind tibia, and bearing two distinct types of hair, one type much longer and straighter than the other, exceeding 2× width of tarsus at midlength *Trama baronii*
- Hind tarsus 0.72–0.87× hind tibia, with only one type of hair (curved, and less than 1.5× width of tarsus) *Protrama radialis*
5. Dorsal hairs arising from prominent tubercles, some of which are taller than their basal widths. SIPH as short, truncate cones. Cauda knobbed. *Macropodaphis tuberculata**
- Dorsal hairs with or without tuberculate bases, but these are not as tall as their basal widths. SIPH tubular. Cauda not distinctly knobbed **6**
6. Long, capitate dorsal hairs present, at least on head and posterior abdomen, the longest of them 1.5–3.0× diameter at midlength of the pale slender SIPH, which are 2.4–3.5× cauda and do not have distal reticulation. ANT III without rhinaria **7**
- Dorsal hairs not distinctly capitate, less than 1.5× midlength diameter of the pale or dark SIPH, which are usually less than 2.4× cauda. ANT III with or without rhinaria **8**
7. Cauda 1.1–1.5× R IV+V, and bearing 5–8 hairs. ANT PT 3.1–4.4× R IV+V, and ANT PT/BASE 4.6–6.3. SIPH without dark apices *Capitophorus carduinus*
- Cauda 1.4–2.3× R IV+V, and bearing 7–13 hairs. ANT PT 4.5–6.3× R IV+V, and ANT PT/BASE 6.0–9.2. SIPH with dark apices *Capitophorus elaeagni*
8. SIPH dark, wholly or in distal part, with polygonal reticulation on more than distal 0.2 of length **9**
- SIPH pale or dark, but if dark then without any polygonal reticulation, and if pale then any reticulation extends maximally up to distal 0.2 of length **15**
9. Dorsal abdominal hairs all arising from pale tubercles **10**
- Dorsal abdominal hairs all or mostly arising from dark scleroites **11**
10. R IV+V narrow-based and very acute, 1.2–1.4× HT II. SIPH distally dark and basally pale. Cauda pale. Tibiae mainly pale. ANT III pale except at apex, with 13–25 rhinaria extending maximally over basal 0.7 of length *Macrosiphoniella tuberculata*
- R IV+V 0.9–1.0× HT II. SIPH and cauda uniformly dark. Tibiae mainly dark. ANT III dark except at base, with 34–51 rhinaria extending over almost the entire length *Macrosiphoniella riedeli*
11. Cauda pale. Anterior sclerites present or absent **12**
- Cauda dark. Anterior sclerites absent **13**
12. Crescent-shaped anterior sclerites present *Uroleucon cichorii*
- Anterior sclerites absent *Uroleucon mongolicum ssp. cardui*
13. ANT III with 48–86 rhinaria extending over 0.85–0.92 of length of segment. Cauda with 10–22 hairs. ABD TERG 2–4 without marginal tubercles (MTu) *Uroleucon compositae*
- ANT III with 20–45 rhinaria on basal 0.35–0.52 of length. Cauda with 23–30 hairs. ABD TERG 2–4 with or without MTu **14**
14. R IV+V about equal in length to, or slightly shorter than, HT II, which is usually more than 0.21 mm long. ABD TERG 2–4 without MTU, or sporadically with small MTU no larger than hair bases *Uroleucon macrosiphon*
- R IV+V 1.2–1.4× HT II, which is usually less than 0.21 mm long. ABD TERG 2–4 regularly with MTU (90% with 5 or more), often larger than hair bases *Uroleucon aeneum*

15. Cauda helmet-shaped, with basal constriction, a little shorter than its basal width, and bearing 4–8 hairs. Spiracular apertures large and rounded **16**
 – Cauda (if developed) tongue- or finger-shaped, or bluntly conical, without any basal constriction, usually longer than its basal width, if shorter then bearing more than 10 hairs. Spiracular apertures small, reniform (partly covered by opercula) **18**
16. Abdomen without extensive dark markings. SIPH pale, smooth, 0.9–1.5× cauda. Mesosternum without mammariform processes *Brachycaudus helichrysi*
 – Abdomen with a extensive dark dorsal shield. SIPH dark, imbricated, 2.1–3.4× cauda. Mesosternum with a pair of dark mammariform processes **17**
17. Longest hairs on hind femur 10–25 µm *Brachycaudus lateralis*
 – Longest hairs on hind femur more than 25 µm long *Brachycaudus cardui*
18. Marginal tubercles (MTu) always present on ABD TERG 1 and 7. ANT tubercles undeveloped or weakly developed, head not spiculose or spinulose **19**
 – No MTu on ABD TERG 1 and 7. ANT tubercles well developed, or if weakly developed then head spinulose **26**
19. R IV+V longer than ANT PT. ANT PT/BASE 0.8–1.4. SIPH 0.65–1.2× cauda which is helmet-shaped or bluntly conical, 0.7–1.2× its basal width **20**
 – R IV+V shorter than ANT PT. ANT PT/BASE more than 1.4. SIPH 0.8–2.2× cauda which is tongue- or finger-like and more than 1.3× its basal width **22**
20. SIPH 0.50–0.68× R IV+V, and 0.65–0.86× cauda. Longest hairs on ABD TERG 3 are 1.2–1.8× ANT BD III *Aphis carthami*
 – SIPH 0.7–0.9× R IV+V and 0.88–1.2× cauda. Longest hairs on ABD TERG 3 are 0.7–1.3× ANT BD III **21**
21. ANT III usually without sec. rhinaria (rarely with 1–3). R IV+V 1.28–1.36× HT II. Longest hairs on ABD TERG 3 are 0.7–1.1× ANT BD III *Aphis pseudocardui*
 – ANT III usually with (1–10) sec. rhinaria. R IV+V 1.45–1.65× HT II. Longest hairs on ABD TERG 3 are 1.2–1.3× ANT BD III *Aphis anuraphoides*
22. Dorsal body hairs and those on antennae all very short; hairs on ANT III up to 0.5× BD III, and those on ABD TERG 8 shorter than BD III. MTu almost always present on ABD TERG 2–4 **23**
 – Hairs longer; those on ANT III 0.6–3.4× BD III, those on ABD TERG 8 are 1–5× BD III. MTu occur only sporadically on ABD TERG 2–4 **24**
23. SIPH 1.6–2.2× cauda *Aphis acanthoidis*
 – SIPH 1.3–1.5× cauda *Aphis wartenbergi*
24. HT I with a sense peg between the pair of fine hairs. Cauda gradually tapering from base to apex, and bearing 5–12 hairs *Aphis carduella*
 – HT I without a sense peg, with only the 2 fine hairs. Cauda parallel-sided for much of length, and bearing 11–27 hairs **25**
25. Longest hair on ANT III 35–50 µm, longest hair on hind femur 60–85 µm. R IV+V 0.85–1.05× HT II. SIPH 0.9–1.6× cauda and 0.10–0.17× BL. ANT PT/BASE 2.4–3.4 *Aphis fabae*
 – Longest hair on ANT III 15–25 µm, longest hair on hind femur 45–70 µm. R IV+V 1.05–1.30× HT II. SIPH 1.3–1.8× cauda and 0.14–0.20× BL. ANT PT/BASE 2.9–3.4 *Aphis solanella*
26. Head spinulose with low divergent ANT tubercles. Tergum extensively sclerotised. ANT mainly dark with 1–6 rhinaria on basal part of III. SIPH dark, c.2.5× the short dark tongue-shaped cauda *Chitinosiphum cardui**

HOST LISTS AND KEYS

- If head is spinulose or spiculose then ANT tubercles are well developed with inner faces steep-sided, almost parallel or apically convergent. Other characters not in that combination
go to key to polyphagous aphids, p. 1020

Carex

(Due to differing applications of older names it is not always clear as to which sedge species a published host record applies.)

C. acuta (incl. *gracilis*)

C. acutiformis (incl. *paludosa*)

C. amplifolia

C. ampullacea see *rostrata*

C. appropinquata (incl. *paradoxa* auct.)

C. aquatilis

C. arenaria

C. atrata

C. baccans

C. bigelowii

C. breviculmis (incl. *royleana*)

C. brizoides

C. brunnea

C. caespitosa see *nigra*

C. canescens auct. nec L. see *curta*

C. capitata

C. caryophyllea

C. comosa

C. concinnoides

C. contigua see *spicata*

C. crawfordii

C. cryptocarpa

C. curta

C. curvula

C. dahurica

C. densa

C. diandra

C. digitata

C. dioica

Sedges

Atheroides serrulatus; *Caricosipha paniculatae*;

Rhopalosiphum padi; *Schizaphis pilipes*;

Subsaltusaphis lambersi, *pallida*, *picta*;

Thripsaphis cyperi, *producta*, *verrucosa*

Colopha compressa; *Rhopalosiphum padi*;

[*Laingia psammae*]; *Schizaphis scirpi*;

Subsaltusaphis ornata, *pallida*, *picta*; *Thripsaphis producta*

Thripsaphis californica

Schizaphis scirpi; *Thripsaphis ossiannilssoni*

Schizaphis mali; *Sitobion avenae*; *Subsaltusaphis aquatilis*;

Thripsaphis cyperi

Iziphya bufo; [*Juncobia leegei*, in error (Börner, 1952: 65)];

Sminthuraphis ulrichi

Subsaltusaphis picta; *Thripsaphis producta*

Carolinaia scirpi

Iziphya vittata

[*Aphis gossypii*]; *Paracolopha takahashii*

Caricosipha paniculatae; *Iziphya memorialis*;

Rhopalosiphum padi; *Vesiculaphis theobaldi*

Colopha graminis

Carolinaia schlingeri; *Sitobion fragariae*

Iziphya memorialis; *Nevskyella fungifera*

Thripsaphis californica

Rhopalosiphum padi

Iziphya vittata

Subsaltusaphis picta

Iziphya austriaca, *ingegardae*; *Metopolophium dirhodum*;

Rhopalosiphum padi; *Schizaphis caricis*; *Sitobion avenae*;

Subsaltusaphis picta; *Thripsaphis producta*

Aploneura werthi; [*Pemphigus* sp.]

Sitobion fragariae

Abstrusomyzus phloxae

Ceruraphis eriophori; *Metopolophium* sp.;

Vesiculaphis theobaldi

Ceruraphis eriophori

Baizongia pistaciae

Cyperaceae

<i>C. distans</i>	<i>Atheroides brevicornis</i> ; <i>Caricosipha paniculatae</i> ; <i>Neobacillaphis striata</i> ; <i>Thripsaphis cyperi</i>
<i>C. disticha</i>	<i>Atheroides serrulatus</i> ; <i>Caricosipha paniculatae</i>
<i>C. divisa</i>	<i>Saltusaphis scirpus</i>
<i>C. divulsa</i>	<i>Caricosipha paniculatae</i> ; <i>Ceruraphis eriophori</i> ; [<i>Rhopalomyzus poae</i>]; <i>Schizaphis pyri</i> , [<i>Schizaphis</i> sp. (Holman, 1991c)]; <i>Sitobion fragariae</i> ; <i>Vesiculaphis theobaldi</i>
<i>C. douglasii</i>	[<i>Iziphya</i> sp. (BMNH colln, Oregon, USA)]
<i>C. duriuscula</i>	[<i>Macropodaphis paradoxa</i>]
<i>C. echinata</i> (incl. <i>stellulata</i>)	<i>Iziphya bufo</i> , <i>ingegardae</i> , <i>memorialis</i> ; <i>Schizaphis scirpi</i> ; <i>Subsaltusaphis pallida</i> ; <i>Thripsaphis verrucosa</i>
<i>C. elata</i>	<i>Subsaltusaphis rossneri</i> ; <i>Thripsaphis brevicornis</i> , <i>ossiannilssoni</i> , <i>producta</i>
<i>C. elongata</i>	<i>Caricosipha paniculatae</i> ; <i>Rhopalosiphum padi</i> ; <i>Vesiculaphis theobaldi</i>
<i>C. ferruginea</i>	<i>Forda formicaria</i>
<i>C. filicina</i>	<i>Acutosiphon obliquoris</i> ; [<i>Pseudaphis abyssinica</i>]
<i>C. filicosa</i>	<i>Acutosiphon obliquoris</i> ; <i>Carolinaia sikkimensis</i>
<i>C. filiformis</i> (also see <i>lasiocarpa</i>)	<i>Subsaltusaphis flava</i> , <i>ornata</i> , <i>pallida</i> , <i>picta</i> ; <i>Thripsaphis hottesi</i> , <i>producta</i>
<i>C. flacca</i> (incl. <i>glauca</i>)	<i>Anoecia pskovica</i> ; <i>Ceruraphis eriophori</i> ; <i>Sitobion fragariae</i> ; <i>Subsaltusaphis ornata</i> , <i>paniceae</i>
<i>C. flava</i>	<i>Ceruraphis eriophori</i> ; [<i>Diuraphis calamagrostis</i>]; <i>Rhopalosiphum padi</i> ; <i>Sipha glyceriae</i> ; <i>Sitobion avenae</i> , <i>fragariae</i> ; <i>Subsaltusaphis flava</i>
<i>C. fusca</i> = <i>nigra</i>	
<i>C. gaudichaudiana</i>	<i>Thripsaphis producta</i>
<i>C. geyeri</i>	<i>Ceruraphis eriophori</i>
<i>C. glareosa</i>	<i>Ceruraphis eriophori</i> ; <i>Thripsaphis verrucosa</i>
<i>C. glauca</i> see <i>flacca</i>	
<i>C. goodenovii</i> see <i>nigra</i>	
<i>C. gracilis</i> see <i>acuta</i>	
<i>C. grisea</i>	<i>Rhopalosiphum padi</i> ; <i>Sitobion fragariae</i>
<i>C. hallerana</i>	<i>Nevskyella meridionalis</i>
<i>C. hindsii</i>	<i>Ceruraphis eriophori</i>
<i>C. hirta</i>	<i>Atheroides serrulatus</i> ; <i>Anoecia pskovica</i> ; <i>Colopha compressa</i> ; <i>Rhopalosiphum padi</i> ; <i>Saltusaphis scirpus</i> ; <i>Schizaphis caricis</i> ; <i>Subsaltusaphis flava</i> , <i>intermedia</i> ; <i>Thripsaphis producta</i> , <i>verrucosa</i>
<i>C. hordeistichos</i>	<i>Ceruraphis eriophori</i> ; <i>Rhopalosiphum padi</i> ; <i>Sitobion avenae</i>
<i>C. hosteana</i>	<i>Subsaltusaphis paniceae</i>
<i>C. humilis</i>	<i>Ceruraphis eriophori</i> ; [<i>Iziphya</i> sp. (BMNH colln, France)]
<i>C. hyalinolepis</i>	<i>Thripsaphis ballii</i>
<i>C. hystriana</i>	<i>Iziphya vittata</i>
<i>C. inflata</i> see <i>rostrata</i>	

HOST LISTS AND KEYS

- C. juncella* *Iziphya bufo*; *Schizaphis variegata*;
Thripsaphis cyperi, producta, verrucosa
- C. lachenalii* (incl. *leporina* auct.) *Caricosipha paniculatae*; *Ceruraphis eriophori*;
Iziphya bufo, ingegardae; *Metopolophium festucae*;
Thripsaphis leporinae, producta, verrucosa;
Vesiculaphis theobaldi
- C. lachryma* *Rhopalosiphum rufiabdominale*
- C. laevigata* *Ceruraphis eriophori*; *Rhopalosiphum padi*
- C. lamprophysa* *Caricosipha paniculatae*
- C. lasiocarpa* (incl. *filiformis* Good) *Saltusaphis ibericae, lasiocarpae*; *Schizaphis pilipes, scirpi*;
Thripsaphis brevicornis, ossiannilssoni, verrucosa
- C. laxiflora* *Ceruraphis eriophori*; *Schizaphis nigra*
- C. leiorhyncha* *Schizaphis pyri*
- C. lepidocarpa* *Iziphya americana*
- C. lepidocarpa* × *hostiana* *Myzus ascalonicus*
- C. leporina* see *lachenalii* and *ovalis*
- C. ligerica* *Caricosipha paniculatae*;
Iziphya austriaca, bufo, [*Iziphya* sp. near *maculata*];
Sminthuraphis ulrichi
- C. limosa* *Carolinaia schlingeri*; *Ceruraphis eriophori*;
Sitobion avenae; *Thripsaphis producta*
- C. lyngbyei* *Subsaltusaphis picta*
- C. maackii* *Sitobion akebiae*
- C. manni* [*Takecallis arundinariae*]
- C. maritima* *Schizaphis gracilis*
- C. mertensii* *Gharsia polunini*
- C. meyeriana* *Thripsaphis caricicola*
- C. montana* [*Iziphya austriaca*]
- C. morrowii* *Colopha kansugei*
- C. muricata* *Ceruraphis eriophori*; *Rhopalosiphum padi*;
[*Schizaphis* sp. (Holman, 1991c)]; *Vesiculaphis theobaldi*
- C. nebrascensis* *Schizaphis viridirubra*;
Thripsaphis ballii, producta, verrucosa
- C. nemorosa* (incl. *otrubae*) *Caricosipha paniculatae*
- C. nigra* (incl. *goodenovi, caespitosa*) *Atheroides serrulatus*; *Ceruraphis eriophori*;
[*Iziphya austriaca*]; *Rhopalosiphum padi*;
Saltusaphis scirpus;
Schizaphis pilipes, [*Schizaphis* sp. (Holman, 1991c)];
Sitobion fragariae; *Subsaltusaphis flava, paniceae, picta*;
Thripsaphis caespitosae, caricis, cyperi, ossiannilssoni,
producta, verrucosa
- C. otrubae* see *nemorosa*
- C. ovalis* (incl. *leporina* auct. nec L.) *Colopha compressa*
- C. pairei* *Rhopalosiphum padi*
- C. paleacea* *Subsaltusaphis picta*
- C. pallescens* (incl. var. *neogaea*) *Ceruraphis eriophori*, [*viburnicola* (in cult.)];
Forda formicaria; *Sitobion fragariae*
- C. paludosa* see *acutiformis*

- C. panicea* *Anoecia pskovica*; *Sipha glyceriae*; *Subsaltusaphis paniceae*;
Thripsaphis caricis, *verrucosa*; *Vesiculaphis theobaldi*
- C. paniculata* (incl. *lusitanica*) *Caricosipha paniculatae*; *Ceruraphis eriophori*;
Schizaphis caricis; *Thripsaphis producta*;
Vesiculaphis theobaldi
[*Cerataphis jamuritsu*]
- C. papuana*
- C. paradoxa* see *appropinquata*
- C. pendula*
- C. pilulifera*
- C. praecox* *Sitobion fragariae*
Iziphyha austriaca, *flabella*; *Vesiculaphis theobaldi*
Iziphyha austriaca, *memorialis*; *Sipha praecocis*;
Sminthuraphis ulrichi
- C. pseudocyperus* *Schizaphis caricis*; *Sipha glyceriae*;
Thripsaphis cyperi, *producta*
- C. pseudo-foetida* *Rhopalosiphum padi*
- C. reinii* ? *Subsaltusaphis kamiensis*
- C. remota* *Ceruraphis eriophori*; *Vesiculaphis theobaldi*
- C. rhynchophysa* *Carolinaia floris*; *Schizaphis longisetosa*
- C. rigida* *Thripsaphis cyperi*
- C. riparia* [*Byrsocryptoides zelkova* (? see Blackman and Eastop, 1994,
p. 588)]; *Caricosipha paniculatae*; *Ceruraphis eriophori*;
Colopha compressa; *Schizaphis scirpi*;
Subsaltusaphis lambersi, *ornata*, *picta*
Rhopalosiphum padi; *Sitobion avenae*;
Subsaltusaphis ornatus
- C. rosea*
- C. rossii* [*Iziphyha* sp. (BMNH colln, Oregon USA)]
- C. rostrata* (incl. *ampullacea*) *Ceruraphis eriophori*; [*Diuraphis calamagrostis*];
Forda formicaria; *Schizaphis caricis*; *Sipha glyceriae*;
Sitobion avenae; *Subsaltusaphis picta*, *rossneri*;
Thripsaphis caricicola, *cyperi*, *verrucosa*
Thripsaphis producta (as *caricis*)
- C. salina* *Rhopalosiphum padi*
- C. scoparia* *Metopolophium dirhodum*
- C. secta* *Ceruraphis eriophori*
- C. segetalis* *Caricosipha paniculatae*
- C. sempervirens* *Vesiculaphis rotunda*
- C. siderosticta* *Ceruraphis eriophori*; *Thripsaphis cyperi*
- C. sitchensis* *Schizaphis caricis*; *Thripsaphis osstianilssoni*
- C. sordida* *Caricosipha paniculatae*
- C. spicata* (incl. *contigua*)
- C. stellata* see *echinata*
- C. stellulata* see *echinata*
- C. straminea* *Caricosipha paniculatae*
- C. stricta* *Saltusaphis elongatus*
- C. sylvatica* *Rhopalosiphum padi*; *Sitobion avenae*;
Vesiculaphis theobaldi
- C. taxiflora* *Ceruraphis eriophori*
- C. temaria* *Thripsaphis foxtonensis*, *producta*
- C. tribuloides* *Ceruraphis eriophori*; *Iziphyha americana*;
Rhopalosiphum padi

HOST LISTS AND KEYS

<i>C. trichocarpa</i>	<i>Ceruraphis eriophori</i> ; <i>Thripsaphis daviaulti</i>
<i>C. trifida</i>	<i>Ceruraphis eriophori</i>
<i>C. verna</i> see <i>caryophylla</i>	
<i>C. vesicaria</i>	<i>Ceruraphis eriophori</i> ; <i>Neobacillaphis intermedia</i> , <i>szelegiewiczzi</i> ; <i>Rhopalosiphum padi</i> ; <i>Schizaphis scirpi</i> , <i>wahlgreni</i> ; <i>Sitobion fragariae</i> ; <i>Subsaltusaphis gracilis</i> , <i>intermedius</i> , <i>picta</i> , <i>rossneri</i> ; <i>Thripsaphis caricicola</i> , <i>cyperi</i> , <i>producta</i>
<i>C. vulpina</i>	<i>Caricosipha paniculatae</i> ; <i>Ceruraphis eriophori</i> ; <i>Schizaphis caricis</i> ; <i>Sitobion avenae</i> ; <i>Subsaltusaphis ornata</i> ; <i>Thripsaphis brevicornis</i> , <i>caricis</i> , <i>verrucosa</i> ; <i>Vesiculaphis theobaldi</i>
<i>C. vulpinoidea</i>	<i>Schizaphis nigra</i>
<i>Carex</i> spp.	<i>Anoecia caricis</i> ; <i>Aphis fabae</i> , [<i>typhae</i>]; <i>Asiphonaphis japonica</i> ; <i>Carolinaia caricis</i> , <i>tissoti</i> ; <i>Geoica lucifuga</i> ; <i>Iziphya albipes</i> , <i>mackaueri</i> , <i>maculata</i> , [<i>oettingenii</i>], <i>spenceri</i> , <i>variabilis</i> ; <i>Pemphigus</i> sp.; <i>Prociphilus corrugatans</i> ; <i>Rhopalosiphum cerasifoliae</i> , <i>insertum</i> , <i>parvae</i> , <i>rufiabdominale</i> ; <i>Saltusaphis kienshuensis</i> , <i>scirpus</i> ; <i>Schizaphis brachytarsus</i> , <i>graminum</i> , <i>pashtshenkoae</i> , <i>piricola</i> , <i>scirpicola</i> ; <i>Sipha flava</i> , <i>maydis</i> ; [<i>Sitobion beiquei</i> , <i>caricis</i>]; <i>Subsaltusaphis canadensis</i> , <i>saracola</i> , <i>taoi</i> , <i>virginicus</i> ; <i>Thripsaphis ballii</i> , [<i>sensoriata</i>], <i>vibei</i> , <i>vibei</i> ssp. <i>arctica</i> ; [<i>Utamphorophora humboldti</i>]; <i>Vesiculaphis angusticeps</i> , <i>caerulea</i> , <i>caricis</i> , <i>cephalata</i> , <i>nubilimaculata</i> ; <i>Zelkovaphis caucasica</i>
'Sedge'	[<i>Mamontova vera</i>]; <i>Neosaltusaphis bodenheimeri</i> ; [<i>Smynthurodes betae</i>]; <i>Tetraneura africana</i>

Keys to aphids on *Carex*:-

About 110 aphid species live on *Carex*. In particular, one whole tribe (Saltusaphidini) is almost exclusively confined to this plant genus. A single key would be rather cumbersome, so we have split it into two, A and B.

- SIPH tubular; tapering, cylindrical or swollen, clearly longer than their basal widths **KEY A**
- SIPH in form of short truncate cones not clearly longer than their basal widths, or present merely as pores, or completely absent **KEY B**

Carex aphids – KEY A

1. SIPH tapering to a point, with aperture placed laterally (Figure 18a). ANT 5-segmented, with PT/BASE less than 1 *Acutosiphon obliquoris*
- SIPH cylindrical or swollen, with terminal aperture. ANT 5- or 6-segmented, with PT/BASE more or less than 1 **2**
2. Head flattened and produced anteriorly, and sometimes also laterally, over antennal bases, to form either a projecting ledge (e.g., Figure 18b), or three large laterofrontal processes (the middle one

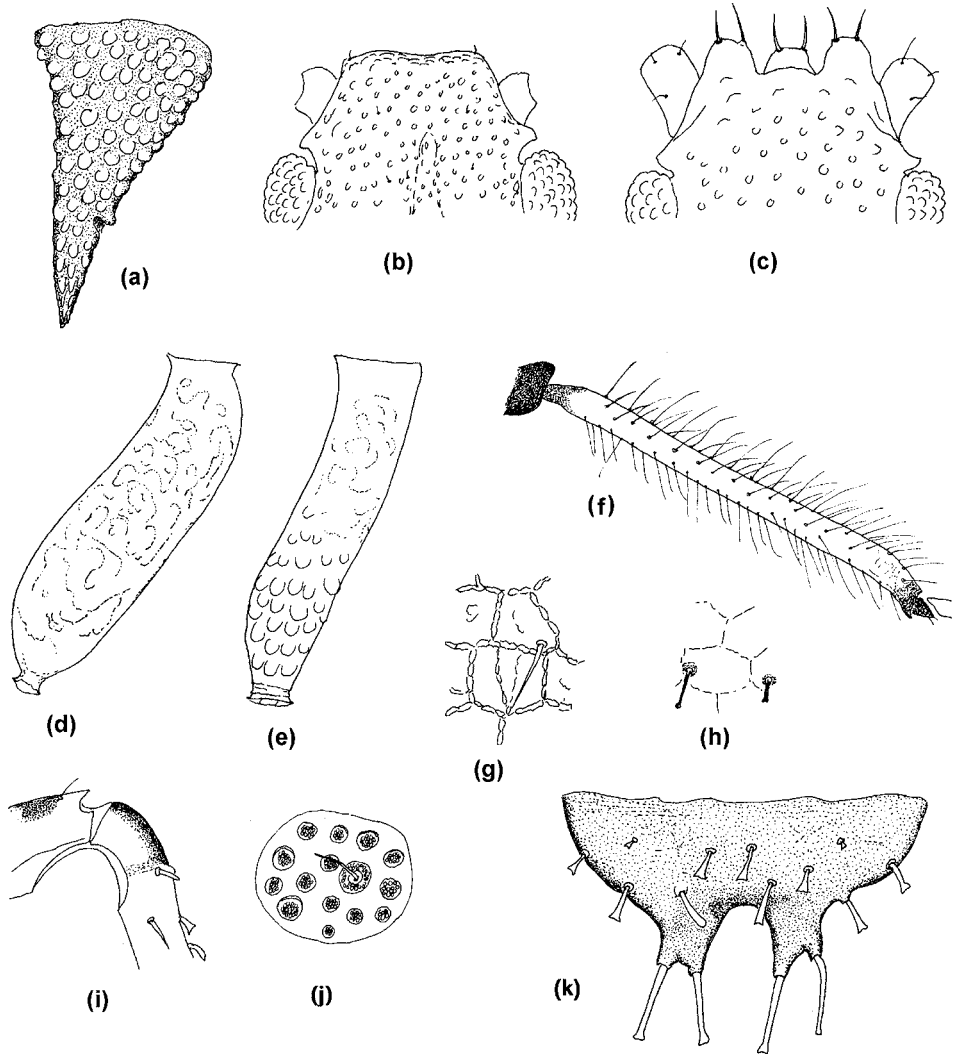


Figure 18 Apterae on *Carex* I; (a) SIPH of *Acutosiphon obliquoris*, (b) front of head of *Vesiculaphis caricis*, (c) front of head of *Vesiculaphis theobaldi*, (d) SIPH of *V. caricis*, (e) SIPH of *Carolinaia caricis*, (f) hind tibia of *Schizaphis caricis*, (g) part of spinal cuticle of ABD TERG 3 of *Schizaphis pilipes*, (h) same for *Schizaphis wahlgreni*, (i) base of tibia ('patella') of *Saltusaphis scirpus*, (j) dorsal wax gland of *Sminthuraphis ulrichi*, (k) ABD TERG 8 of *Saltusaphis scirpus*.

- displaced somewhat ventrally; Figure 18c)). SIPH very scabrous ventrally, swollen over most of length and narrowing just before flange, and curved inward at base and outward at apex into a shallow 'S' curve 3
- Head not flattened nor extended forward *over* antennal bases (although ANT tubercles may be present). SIPH scabrous, imbricated or smooth, and tapering, cylindrical or swollen 9
3. Front of head produced into a ledge, with median tubercle as a low swelling beneath it. Frontal hairs short and inconspicuous. Body oval 4

HOST LISTS AND KEYS

- Front of head produced into three large separate processes, each bearing spine-like hairs. Body elongate oval 6
- 4. SIPH stout and very strongly constricted at apex (Figure 18d); width in middle $60\text{--}95\ \mu\text{m}$, $0.22\text{--}0.26\times$ length and $3.4\text{--}5.4\times$ width of subapical constriction *Vesiculaphis caricis*
- SIPH less stout, and less strongly constricted at apex; width in middle $45\text{--}60\ \mu\text{m}$, $0.15\text{--}0.22\times$ length and $2.0\text{--}2.9\times$ width at subapical constriction 5
- 5. Dorsum pale. ANT PT/BASE $1.5\text{--}2.2$. Anterior part of frontal ledge without spinules ventrally *Vesiculaphis caerulea*
- Dorsum dark. ANT PT/BASE $1.25\text{--}1.5$. Anterior part of frontal ledge with spinules ventrally *Vesiculaphis rotunda*
- 6. Ventral side of head without rows of spinules. R IV+V $0.81\text{--}1.03\times$ HT II *Vesiculaphis cephalata*
- Ventral side of head with rows of spinules. R IV+V $1.09\text{--}1.42\times$ HT II 7
- 7. Median frontal process low, at most projecting only half as far as the laterofrontal processes. Abdomen with intersegmental areolations blurred with brown pigment and not clearly demarcated *Vesiculaphis nubilimaculata**
- Median frontal process developed to a similar extent to laterofrontal processes. Abdomen with intersegmental areolations clearly demarcated 8
- 8. Head narrow; width between (*not* including) eyes does not exceed maximum length (including frontal processes). R IV+V $1.24\text{--}1.42\times$ HT II. ANT PT/BASE $1.05\text{--}1.34$ *Vesiculaphis angusticeps*
- Head broader, wider than its maximum length. R IV+V $1.09\text{--}1.21\times$ HT II. ANT PT/BASE $1.37\text{--}1.8$ *Vesiculaphis theobaldi*
- 9. Head with inner sides of ANT tubercles developed as rounded, scabrous or spiculate processes 10
- Head with ANT tubercles absent, or weakly developed, or smooth and divergent 14
- 10. ANT III with 1–3 rhinaria in a swelling near base. SIPH dusky or dark 11
- ANT III without any rhinaria. SIPH pale 13
- 11. ANT PT/BASE $1.5\text{--}2.0$. Hairs on ANT III minute, maximally less than $0.2\times$ BD III. R IV+V with 2 accessory hairs *Carolinaia floris*
- ANT PT/BASE $2.4\text{--}c.3.2$. Hairs on ANT III maximally $0.4\text{--}0.6\times$ BD III. R IV+V with 4–5 accessory hairs 12
- 12. ANT PT/BASE $2.4\text{--}2.6$. R IV+V $1.0\text{--}1.15\times$ HT II *Carolinaia sikkimensis*
- ANT PT/BASE $c.3.2$. R IV+V $1.2\text{--}1.3\times$ HT II *Carolinaia scirpi*
- 13. SIPH clavate, thinnest on basal half. Processes on inner faces of antennal tubercles not converging apically *Myzus ascalonicus*
- SIPH not thinnest on basal half; cylindrical on distal half with just slight swelling near apex. Processes on inner faces of antennal tubercles converging apical *Abstrusomyzus phloxae*
- 14. ANT 5-segmented, bearing long hairs up to $4\text{--}5\times$ BD III. ANT PT/BASE $4.5\text{--}5.9$, with PT usually curved *Rhopalosiphum rufiabdominale*
- ANT 5- or 6-segmented, but if 5-segmented then hairs are much shorter and/or ANT PT/BASE is less than 3.6 15
- 15. ANT less than $0.5\times$ BL 16
- ANT more than $0.5\times$ BL 18

16. SIPH pale/dusky, not darker than body, very rugose, cylindrical on basal half, swollen distally and narrowing just before flange (Figure 18e). Dorsum sclerotic, strongly wrinkled. ANT usually 5-segmented, with ANT PT/BASE 1.0–1.5 *Carolinaia caricis* (or *tissoti*)
- SIPH black, or at least darker than body, moderately to heavily imbricated, tapering or with slight swelling. ANT usually 6-segmented, with ANT PT/BASE 1.7–3.6 17
17. Dorsum with extensive dark sclerotisation. Dorsal hairs long; those on ANT III about $2\times$ BD III. ANT III with 2–10 rhinaria near base. ANT PT/BASE 2.7–3.6 *Ceruraphis eriophori*
- Dorsum pale, not sclerotic. Hairs on ANT III less than $2\times$ BD III. ANT PT/BASE 1.7–2.8 *Rhopalosiphum maidis*
18. SIPH dark with a subapical zone of polygonal reticulation 19
- SIPH pale or dark, without polygonal reticulation 21
19. SIPH 1.75–2.25 \times cauda, which has a rounded apex *Sitobion fragariae*
- SIPH 1.1–1.9 \times cauda, which has a pointed apex 20
20. SIPH 1.4–1.9 \times cauda. R IV+V 0.77–0.97 \times HT II *Sitobion akebiae/miscanthi*
- SIPH 1.1–1.4 (-1.5) \times cauda. R IV+V 0.65–0.82 \times HT II *Sitobion avenae*
21. ANT III with 1–4 small rhinaria near base (rarely one side has none). ANT tubercles well developed, extending forward much further than middle of head in dorsal view. SIPH pale 22
- ANT III without rhinaria. ANT tubercles small or only moderately developed, not extending forward much further than middle of head in dorsal view. SIPH dark or pale with dark apices 23
22. ANT with each segment pale at base and dusky/dark at apex (base of VI paler than apex of V). R IV+V 0.55–0.71 \times HT II. (Al. without dorsal abdominal pigmentation) *Metopolophium dirhodum*
- ANT progressively darker from base to apex. R IV+V 0.71–0.90 \times HT II. (Al. with dark dorsal abdominal bars) *Metopolophium festucae*
23. ABD TERG 8 with 5–18 hairs. Hind tibia with numerous long, fine hairs, exceeding $2\times$ its diameter at midlength, along whole length (Figure 18f). Longest hairs on ANT III usually longer than BD III. Papilliform marginal tubercles usually present on all of ABD TERG 1–7 24
- ABD TERG 8 with 2–4 hairs. Hind tibia with shorter hairs, or if with hairs about $2\times$ its middle diameter then these do not extend to basal part. Longest hairs on ANT III rarely exceeding BD III. Marginal tubercles present or absent from ABD TERG 2–6 30
24. Most dorsal hairs with rather blunt apices; those on ABD TERG 3 maximally about 50 μ m long, up to $2.5\times$ ANT BD III. Longest hairs on ANT III are about $1.5\times$ BD III *Schizaphis (Paraschizaphis) sp. (nigra* auctt. nec Baker – see under *nigra*)
- Most dorsal hairs with fine-pointed apices; longest hairs on ABD TERG 3 are 29–130 μ m long, 2–4 \times BD III. Longest hairs on ANT III more than $1.5\times$ BD III 25
25. SIPH with 4–10 hairs. ANT III with 19–31 hairs, 94–112 μ m long 26
- SIPH without hairs. ANT III with 4–16 hairs, 18–108 μ m long 27
26. SIPH 1.43–1.61 \times cauda. R IV+V 1.13–1.17 \times HT II, and bearing 2 accessory hairs. ABD TERG 8 with 16–18 hairs *Schizaphis pashtshenkoae*
- SIPH 2.29–2.40 \times cauda. R IV+V 1.2–1.3 \times HT II and bearing 2–6 accessory hairs. ABD TERG 8 with 7–11 hairs *Schizaphis longisetosa*
27. ANT III with 15–16 hairs. SIPH 2.57–2.83 \times cauda *Schizaphis brachytarsus*
- ANT III with 6–13 hairs. SIPH 1.50–2.78 \times cauda 28

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28. Subgenital plate usually with 2–6 hairs on anterior half (rarely up to 10). Dorsal body and ANT hairs variable in length; often some of those on both ANT III and ABD TERG 3 have blunt apices and are less than 50 μm long (range 28–87 μm and 29–100 μm respectively). R IV+V 1.02–1.25 (–1.38) \times HT II. (Al. with (0–)2–5 rhinaria on ANT V) *Schizaphis caricis*
- Subgenital plate with (3–)5–14 hairs on anterior half. Dorsal body hairs all more than 65 μm long with pointed apices; hairs on ANT III and ABD TERG 3 are in range (30–) 50–108 μm and 81–132 μm respectively. R IV+V either 0.89–1.14 or 1.25–1.43 \times HT II. Al with 0–1 rhinaria on ANT V **29**
29. R IV+V 0.89–1.14 \times HT II. Hairs on ANT III 53–108 μm long *Schizaphis scirpi*
- R IV+V 1.25–1.43 \times HT II. hairs on ANT III (30–) 50–83 μm long *Schizaphis scirpicola*
30. SIPH black, calf-shaped, contrasting with long pale cauda *Hysteroneura setariae*
- SIPH pale with dark apices or dark, but if dark then cauda is similarly pigmented **31**
31. ANT PT/BASE less than 2.3 and SIPH shorter than cauda (apt. unknown; estimated from al., which has ANT PT/BASE 1.7–2.0, and SIPH about 0.75 \times cauda) *Schizaphis gracilis*
- ANT PT/BASE more than 2.3 and SIPH 1.0–3.0 \times cauda **32**
32. SIPH 0.07–0.11 \times BL (–0.13 \times in very small specimens with BL c.1.3 mm), and 1.0–1.4 \times cauda (ANT often 5-segmented) **33**
- SIPH 0.12–0.25 \times BL, and 1.25–3.0 \times cauda (ANT rarely 5-segmented) **34**
33. ANT PT/BASE 3.2–3.6 *Rhopalosiphum parvae*
- ANT PT/BASE 4.0–5.7 *Rhopalosiphum insertum*
34. SIPH pale (often with dark apices), 1.25–1.5 \times cauda. R IV+V 0.7–0.8 \times HT II *Schizaphis graminum*
- SIPH pale or dark, 1.6–3.0 \times cauda. R IV+V 0.8–1.3 \times HT II **35**
35. ABD TERG 1 and 7 without marginal tubercles (sometimes a very small tubercle on one side of ABD TERG 7 only). R IV+V 0.8–0.9 \times HT II. ANT PT/BASE 3.1–3.4 *Schizaphis variegata*
- ABD TERG 1 and 7 always with marginal tubercles (although these are sometimes not much larger than hair bases). R IV+V 0.9–1.3 \times HT II. ANT PT/BASE 3.1–6.75 **36**
36. ABD TERG 6 with well-developed marginal tubercles, similar to those on 7, wider at base than the spiracular apertures *Schizaphis nigra*
- ABD TERG 6 either without tubercles, or with small tubercles that are not larger than spiracular apertures **37**
37. Longest marginal hairs on ABD TERG 1–3 shorter than ANT BD III **38**
- Longest marginal hairs on ABD TERG 1–3 longer than BD III **40**
38. SIPH dusky/dark, almost cylindrical for most of length or with slight swelling on distal half, with a marked subapical constriction and large flange. Hairs on ABD TERG 7 and 8 short like those on more anterior tergites *Rhopalosiphum padi*
- SIPH black, tapering from base to flange with no marked subapical constriction. Hairs on ABD TERG 7 and 8 much longer than hairs on more anterior tergites **39**
39. SIPH 1.6–2.4 \times cauda. Longest hairs on hind femur as long as or longer than trochantro-femoral suture. (Al. with sec. rhin. III 15–22, IV 7–11, V 0–4) *Schizaphis piricola* (part)
- SIPH 2.2–3.3 \times cauda. Longest hairs on hind femur shorter than trochantrofemoral suture. (Al. with sec. rhin. III 6–12, IV 2–6, V 0–2) *Schizaphis rotundiventris*
40. Dorsal abdomen with a very marked reticulate microsculpture (Figure 18g). Spinal hairs on ABD TERG 1–3 with fine-pointed apices, and mostly about 1–2 \times longer than ANT BD III. R IV+V 0.9–1.05 \times HT II *Schizaphis pilipes*

- Dorsal abdomen with weakly defined microsculpture (Figure 18h). Spinal hairs on ABD TERG 1–3 tend to be blunt and not longer than ANT BD III. R IV+V 1.07–1.6× HT II 41
- 41. Cauda pale/dusky. ANT I, II and base of III pale 42
- Cauda dark like SIPH. ANT I and II dark like most of ANT flagellum, only base of ANT III sometimes paler 43
- 42. ANT PT/BASE 4.3–4.5. Spinal hairs on ABD TERG 1–3 (Figure 18h) much shorter than marginal hairs *Schizaphis wahlgreni*
- ANT PT/BASE 4.75–6.0. Spinal hairs on ABD TERG 1–3 not markedly shorter than marginal hairs *Schizaphis piricola* (part)
- 43. Marginal tubercles regularly present on ABD TERG 6, and often also on 2–5 (as well as 1 and 7) *Schizaphis pyri*
- Marginal tubercles not usually present on ABD TERG 6, and only sporadically on ABD TERG 2–5 *Schizaphis mali**

Carex aphids – KEY B

- 1. Eyes multifaceted 2
- Eyes with only three facets 59
- 2. SIPH completely absent. Cauda finger-shaped. ABD TERG 1–7 with marginal tubercles (MTu) *Asiphonaphis japonica*
- SIPH present as slightly-raised pores or as shallow cones. Cauda undeveloped, broadly rounded or knobbed. MTu present or absent 3
- 3. Distal part of cauda developed into a knob 4
- Cauda either undeveloped or broadly rounded (semicircular) 56
- 4. Dorsal hairs mostly short with pointed apices or fan- or mushroom-shaped, or if long then rod-shaped or with expanded apices. Eyes protruding, and without an ocular tubercle (triommatidium). Anal plate bilobed, with a deep cleft between the two lobes 5
- Dorsal hairs mostly or partly long, and spine-like. Eyes sessile or stalked, with an ocular tubercle. Anal plate either entire or with a shallow cleft (emarginate) 54
- 5. Fore and mid tibiae thickened at base, forming a smooth sclerotic ‘patella’ (clearly different from base of hind tibia; Figure 18i). SIPH stump-shaped, conical or raised pores 6
- Fore and mid tibiae constricted at base like hind tibiae. SIPH as slightly raised pores 23
- 6. All dorsal hairs pointed, each arising from a round wax gland, and surrounded by numerous other round wax glands (Figure 18j). Body broadly oval. ANT PT/BASE 0.6–0.75. SIPH as smooth, raised pores *Sminthuraphis ulrichi*
- Dorsal hairs mostly fan-shaped, mushroom-shaped, or rod-shaped with expanded apices, not arising from nor surrounded by wax glands. Body narrower; pear-shaped or elongate oval. ANT PT 0.7–2.1. SIPH stump-shaped or conical, sclerotic and densely spiculose 7
- 7. SIPH situated on ABD TERG 6, with anterior edge of cone behind the border between ABD TERG 5 and 6. ABD TERG 8 with a pair of large processes each bearing 2 long rod-shaped or slightly capitate hairs (Figure 18k) 8
- SIPH situated on border between ABD TERG 5 and 6. ABD TERG 8 with or without hair-bearing processes 9

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8. Body very elongate, more than 3 times longer than its greatest width. Front of head extended anteriorly between ANT bases as a rounded, dome-like protruberance (Figure 19a). Dorsum pale (except for intersegmental muscle sclerites) *Saltusaphis elongatus*
- Body 2.2–2.6 times longer than its greatest width. Front of head angular, with a very distinct median suture (Figure 19b). Dorsum with dark markings *Saltusaphis scirpus* group
9. ABD TERG 8 rounded and bearing about 50 short fan-shaped hairs *Subiziphya clauseni**
- ABD TERG 8 not rounded; angular or with projections, and bearing fewer, often longer hairs arising from tuberculate bases **10**
10. Tibiae with hairs on dorsal side near base all small and pointed. ‘Patellae’ of front and mid tibiae pale. ABD TERG 8 with a pair of dark hair-bearing processes. All dorsal abdominal hairs (except on ABD TERG 8) short and mushroom-shaped **11**
- Tibiae with one or more hairs on dorsal side near base rod-shaped, fan-shaped, strap-like or slightly expanded apically, like some of marginal abdominal hairs. ‘Patellae’ dark. ABD TERG 8 with or without processes. Dorsal hairs if short are fan-shaped **12**
11. Dorsal cuticle ornamented with numerous small blunt spicules, tending to form rows. Processes on ABD TERG 8 conical, shorter than their basal widths and with inner sides broadly divergent *Nevskyella fungifera*
- Dorsal cuticle ornamented with nodules, not arranged in rows. Processes on ABD TERG 8 rounded, as long as their basal widths and with inner sides parallel or narrowly divergent *Nevskyella meridionalis*
12. Dorsal abdominal hairs all rather long and rod-shaped or tapering, with expanded apices **13**
- Many or most of dorsal abdominal hairs short and fan-shaped, although longer rod- or strap-shaped hairs may also occur, especially marginally and/or on posterior tergites **15**
13. Femora pale except at apices. Dorsal abdomen mainly pale except for intersegmental muscle sclerites and dark spots at hair bases *Iziphya mackaueri*
- Femora dark. Dorsal abdomen with extensive dusky/dark markings **14**
14. Dorsal abdomen with an irregular dark band forming an arc across ABD TERG 5 between SIPH, fused at least partially across midline (Figure 19c). Coxae dusky/dark *Iziphya ingegardiae*
- Dorsal abdomen with a pair of large dusky/dark patches anterior to SIPH, not fused across midline (Figure 19d). Coxae pale/dusky *Iziphya americana*
15. ANT PT/BASE 0.9–1.1 (note that transition point between PT and BASE is defined by the distal end of the *primary* (largest) rhinarium, so measure from this, ignoring the accessory rhinarium that is situated distal to this, at start of narrower part of PT). Head with a pale medial zone *Iziphya variabilis*
- ANT PT/BASE 1.2–2.3 (less in early spring generations). Head either wholly dark or with pale medial zone **16**
16. Tarsi completely unpigmented, like distal parts of hind tibiae. (ABD TERG 7 almost completely dark, like 8 and most of 6) *Iziphya albipes*
- Tarsi with at least distal part fuscous, darker than distal parts of hind tibiae **17**
17. Dorsal abdomen with pigmentation anterior to SIPH very variable; either mainly comprising dark spots around hair bases, or with more extensive paired dark patches on ABD TERG 3–5 or 4–5, but these are not fused, or only tenuously fused, across midline, leaving a clear spinal stripe **18**
- Dorsal abdomen usually with extensive areas of dark pigmentation anterior to SIPH, variable but most often consisting of a continuous arc of pigment between SIPH, fused at least partially across midline on border between ABD TERG 4 and 5 (and sometimes also between 3 and 4), and never leaving a clear spinal stripe **19**

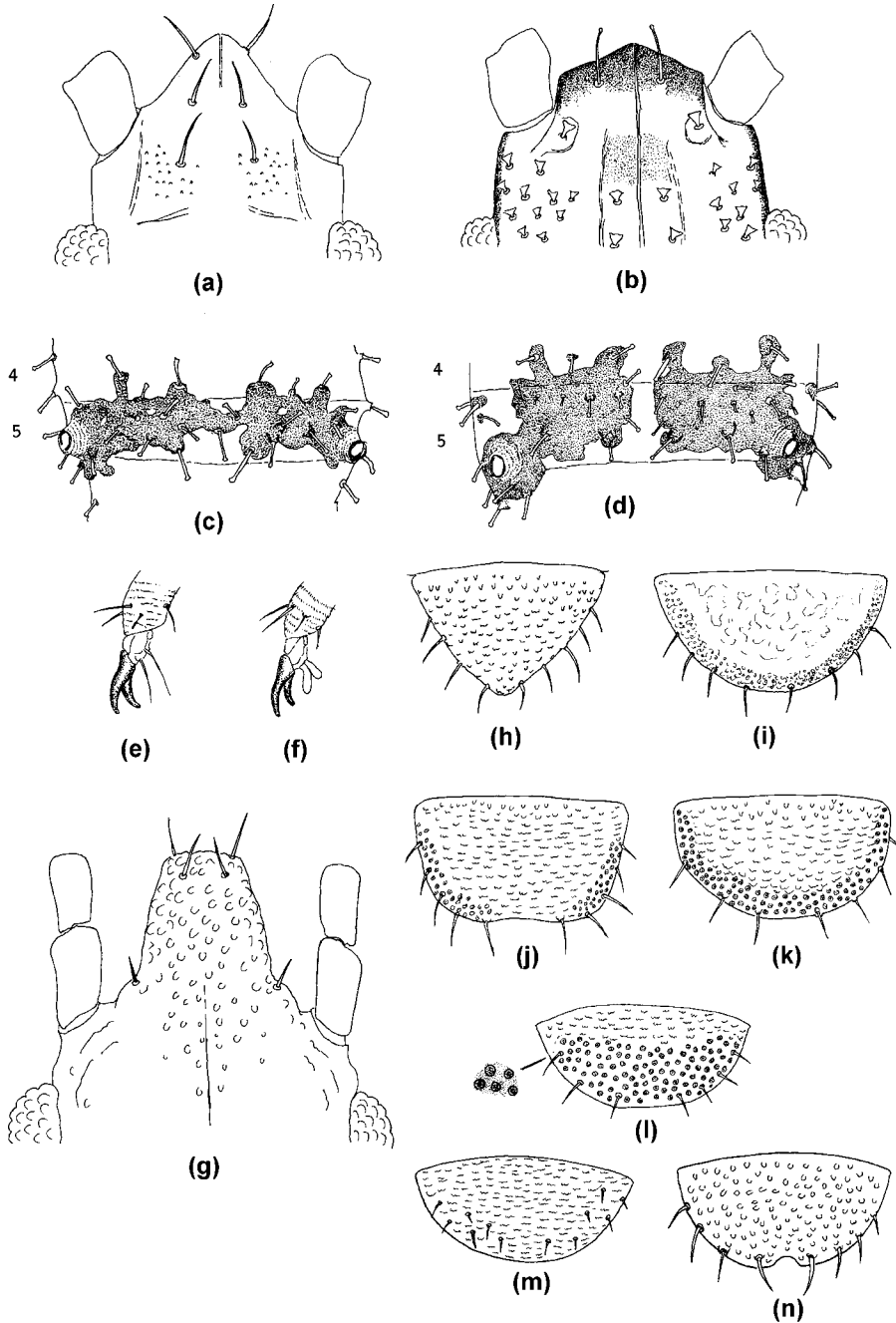


Figure 19 Apterae on *Carex* II. (a) Front of head of *Saltusaphis elongatus*, (b) front of head of *Saltusaphis scirpus*, (c) sclerotisation of ABD TERG 4 and 5 of *Iziphya ingegardae*; (d) same for *Iziphya americana*, (e) empodial hairs of *Thripsaphis producta*, (f) empodial hairs of *Th. ballii*, (g) front of head of *Th. daviaulti*; (h–n) ABD TERG 8 of (h) *Th. producta*, (i) *Th. ossiannilssoni*, (j) *Th. californica*, (k) *Th. utahensis*, (l) *Th. vibei*, (m) *Th. scabra*, (n) *Th. verrucosa*.

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18. ANT III dark on distal 0.3–0.6 of length, contrasting with basal part of segment and as dark as or darker than fore femora. Dorsal abdomen anterior to SIPH usually mainly pale, with pigmentation concentrated around hair bases; sometimes there is more extensive pigmentation, but this is ill-defined, and has numerous lacunae. Posterior marginal hairs on ABD TERG 7 usually long and rod-shaped, but sometimes fan-shaped *Iziphya vittata*
- ANT III dusky on distal 0.1–0.3 of length, which part is paler than fore femora. Dorsal abdominal pigmentation variable but if well-developed then usually in the form of clearly defined paired rather solid dark patches extending forward and mesad from the very dark SIPH bases (always leaving a clear spinal stripe). Posterior marginal hairs on ABD TERG 7 almost always fan-shaped *Iziphya flabella*
19. Head with a broad pale median zone extending to front **20**
- Head dark, at least anteriorly **21**
20. ANT 0.9–1.1× BL. Marginal hairs on ABD TERG 3–8, and spinal hairs on ABD TERG 5–8, mostly rod-shaped (that is, at least with basal half cylindrical), with expanded apices. Modified basal dorsal hairs on tibiae also usually rod-shaped *Iziphya mordvilkoii*
- ANT 0.7–0.8× BL. Dorsal abdominal hairs all fan-shaped (that is, expanded from base). Modified basal dorsal hairs on tibiae also fan-shaped *Iziphya spenceri*
21. Tibiae with modified basal dorsal hairs fan-shaped (that is, expanded from base). Marginal hairs on ABD TERG 6 and 7 also fan-shaped (including the posterior marginal hair on ABD TERG 7) *Iziphya maculata*
- Tibiae with modified basal dorsal hairs usually rod-shaped (that is, with at least basal half cylindrical), as also are marginal hairs on ABD TERG 6 and 7 (posterior marginal hair on ABD TERG 7 almost invariably rod-shaped) **22**
22. Marginal hairs on ABD TERG 3–5 mostly rod-shaped *Iziphya memorialis*
- Marginal hairs on ABD TERG 3–5 mostly fan-shaped *Iziphya bufo* (or *austriaca*)
23. Empodial hairs with fine-pointed apices (Figure 19e) **24**
- Empodial hairs spatulate (Figure 19f) **34**
24. Front of head with a very large trapezoid medial process, projecting forward to level of ANT II apices (Figure 19g). ANT short, spiculose (including ANT II) *Thripsaphis daviaulti*
- Front of head not projecting forward as far as ANT II apices. ANT spiculose or imbricate on ANT III–VI, smooth on ANT II **25**
25. ABD TERG 8 with its posterior margin bluntly triangular, with a pair of hairs close together one on each side of the apex (Figure 19h). ANT III with 1–5 rhinaria on distal half **26**
- ABD TERG 8 with posterior margin rounded, straight or emarginate (Figs 19i–n), with the two most medial hairs well separated. ANT III either without rhinaria or with 1–5 rhinaria in the middle of the segment or distally **27**
26. ANT less than 0.55× BL *Thripsaphis producta*
- ANT more than 0.55× BL *Thripsaphis foxtonensis*
27. Dorsal cuticle with numerous small stippled wax pores, especially on margins of posterior tergites and often around bases of spinal, pleural and marginal hairs. ANT III 0.35–1.25× head width across (and including) eyes. ANT PT/BASE 0.7–1.0 **28**
- Wax pores not apparent (except sometimes a few on posterior margin of ABD TERG 8). ANT III 0.9–1.2× head width across eyes. ANT PT/BASE 0.94–1.4 **33**
28. Distance between the two most medial hairs on posterior margin of ABD TERG 8 about the same as (0.9–1.25×) their distance from their nearest neighbors on each side (Figure 19i). Posterior margin of ABD TERG 8 very evenly rounded (semicircular). ANT III without rhinaria **29**

- Distance between the two most medial hairs on posterior margin of ABD TERG 8 more than 1.3× their distance from their nearest neighbors on each side (Figs 19j–l). ABD TERG 8 not evenly rounded; often with an obtuse corner between sides and broadly rounded apex, or with a straight or concave section between the most medial hairs on the posterior margin. ANT III without or with 1–5 rhinaria **30**
- 29.** ANT III 8–10× its maximum width, and 0.6–0.7× head width across (and including) eyes **30**
Thripsaphis hybrida
- ANT III 3.5–6.5× its maximum width, and 0.35–0.5× head width across eyes **31**
Thripsaphis ossiannilssoni
- 30.** Posterior margin of ABD TERG 8 with its two most medial hairs very widely separated, 2.5–3.25× further apart than the distance from their nearest neighbors on each side. Wax pores on ABD TERG 8 confined to marginal areas (Figure 19j) **31**
Thripsaphis californica
- Posterior margin of ABD TERG 8 with the distance between the two most medial hairs less than 2× the distance from their nearest neighbors on each side. Wax pores in a band extending across posterior part of ABD TERG 8 (Figure 19k, l) **31**
- 31.** Dorsal surface mainly rather pale, devoid of wax pores except for ABD TERG 8 and small fields with 1–6 pores around hair bases; with well-developed spiculose/nodulose ornamentation. Posterior hairs on ABD TERG 8 on or near posterior margin (Figure 19k) **32**
Thripsaphis utahensis
- Dorsal surface with numerous wax pores on all ABD TERG, and often also on tibiae and distal segments of ANT; with or without spicules or nodules. Hairs on ABD TERG 8 placed inward from posterior margin (Figure 19l) **32**
- 32.** Dorsal cuticle rather smooth. ANT 1.4–2.0× maximum width of body (except in specimens excessively flattened during mounting). ANT III 0.95–1.25× head width across eyes **32**
Thripsaphis cyperi
- Dorsal cuticle with spiculose/nodulose ornamentation. ANT 1.0–1.3× maximum width of body. ANT III 0.6–0.85× head width across eyes **32**
Thripsaphis vabei
- 33.** ABD TERG 8 with 10–16 thin, curved hairs 15–30µm long, and with posterior margin not indented in middle (Figure 19m). Dorsal ornamentation of ABD TERG 2–4 mostly consisting of rows of spinules **33**
Thripsaphis scabra
- ABD TERG 8 with 6–10 (usually 8) stout hairs, the middle ones 50–85µm long, and with posterior margin somewhat indented in middle (Figure 19n). Dorsal ornamentation of ABD TERG 2–4 mostly consisting of rather densely packed nodules **33**
Thripsaphis verrucosa
- 34.** ANT 5-segmented, and less than 0.25× BL **35**
Thripsaphis brevicornis
- ANT 6-segmented, more than 0.33× BL **35**
- 35.** ANT mainly dark, with a pattern of pale reticulate imbrication that is mostly devoid of spicules (except sometimes a few minute ones on the imbrication of ANT V–VI). ANT PT/BASE 0.50–0.71 **36**
- ANT pale or dark, with spiculose imbrication (especially marked on distal segments). ANT PT/BASE 0.38–1.47 **38**
- 36.** Dorsum with numerous stippled wax pores, on broad dark bands across all tergites. Dorsal hairs small and thin. ANT III 0.8–1.0× head width across eyes **37**
Thripsaphis caricicola
- Dorsum without any evident wax pores anterior to SIPH, although a few may sometimes be visible on ABD TERG 7–8. Dorsal hairs spine-like. ANT III 0.5–0.65× head width across eyes **37**
- 37.** BL less than 2.6× maximum body width. Metanotum and ABD TERG 1–5 with paired pleural dusky-dark patches, leaving an almost unpigmented spinal stripe (in cleared preparations) **37**
Thripsaphis unciniae

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- BL more than 2.6× maximum body width. Metanotum and ABD TERG 1–5 with dark cross bars, often fragmented in the spinal region but not leaving a clear spinal stripe *Thripsaphis ballii* group
- 38. ANT PT/BASE 0.38–0.68 39
- ANT PT/BASE 0.70–1.47 40
- 39. ANT PT/BASE about 0.38 *Neobacillaphis striata**
- ANT PT/BASE 0.55–0.68 *Neobacillaphis szelegiewiczzi*
- 40. All dorsal body hairs long (30–120µm) with pointed or furcate apices *Peltaphis hottesi*
- Dorsal body hairs 4–20µm long (except on head and posterior abdomen); spine-like, lanceolate, furcate, dentate or mushroom-shaped 41
- 41. Lateral margin of ABD TERG 7 (and also ABD TERG 8) with large, backwardly-projecting hair-bearing processes (Figure 20a). Dorsal cuticle pale, strongly wrinkled or alveolate
- Neosaltusaphis bodenheimeri*
- ABD TERG 7 without large backwardly-projecting hair-bearing processes. Dorsal cuticle ornamented with numerous small spicules or nodules 42
- 42. ANT VI with accessory rhinaria placed proximal and distal to, and at some distance from, primary rhinarium. ANT PT/BASE 1.3–1.47 (measure from distal end of primary rhinarium). Head with some (mushroom-shaped) hairs on lateral margins between eye and ANT socket 43
- ANT VI with accessory rhinaria close to primary rhinarium. ANT PT/BASE 0.7–1.1. Head without any hairs on lateral margins between eye and ANT socket 44

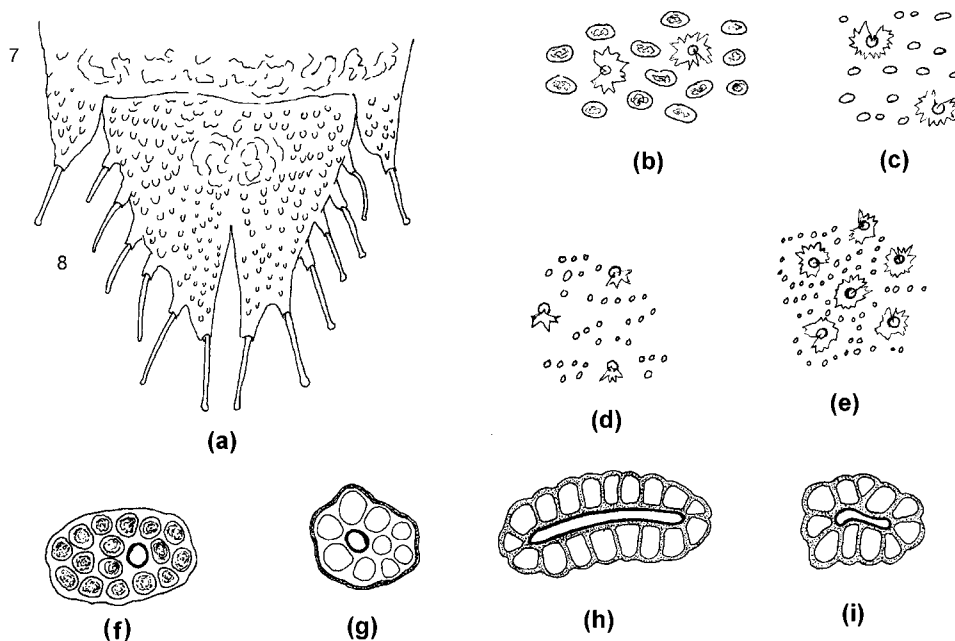


Figure 20 Apterae on *Carex* III. (a) Processes on ABD TERG 7 and 8 of *Neosaltusaphis bodenheimeri*, (b) part of ABD TERG 3 of *Subsaltusaphis pallida* in pleural region, (c) same for *S. flava*, (d) same for *S. rossneri*, (e) same for *S. ornata*, (f) marginal wax gland on ABD TERG 3 of *Zelkovaphis caucasica*, (g) same for *Colopha kansugei*, (h) same for *Paracolopha takahashii* (after Akimoto), (i) same for *Colopha compressa*.

43. R IV+V with 2 pairs of accessory hairs (based on al.; apt. unknown) *Subsaltusaphis primoriensis*
 – R IV+V with one pair of accessory hairs (as usual for genus) *Subsaltusaphis pulchra*
44. ABD TERG 1–5 with some short, spine-like hairs (and sometimes with longer marginal ones) in addition to the very short ‘mushroom-shaped’ hairs (which are stellate in dorsal view) **45**
 – ABD TERG 1–5 with exclusively mushroom-shaped/stellate hairs (or occasionally with a few very short spine-like hairs, but not more than 1–2 per segment) **46**
45. ABD TERG 2–5 or 3–5 each with a long marginal hair on each side, much longer than the spine-like hairs in the spinal region. Pleural regions of ABD TERG 2–6 with exclusively mushroom-shaped hairs *Subsaltusaphis aquatilis*
 – ABD TERG 2–6 with short spine-like marginal hairs; a few such hairs present on pleural regions of these segments as well as in spinal region *Subsaltusaphis intermedia*
46. ANT more than 0.75× BL **47**
 – ANT less than 0.75× BL **48**
47. Body usually with dark marginal and pleural longitudinal stripes *Subsaltusaphis lambersi*
 – Body without dark longitudinal markings *Subsaltusaphis canadensis** or *kamijiensis**
48. Dorsal ornamentation consisting of rather large flat transversely oval nodules, much larger than the hair bases (Figure 20b). Posterior margin of ABD TERG 8 deeply incised, to a greater degree than anal plate *Subsaltusaphis pallida*
 – Dorsal ornamentation consisting of small nodules, or blunt or pointed spinules/spicules, not much larger than hair bases (Figure 20c–e). Posterior margin of ABD TERG 8 not usually so deeply incised **49**
49. ABD TERG 8 with 16–20 long stout marginal hairs. Dorsum without dark or dusky longitudinal markings; very densely clothed in mushroom-shaped/stellate hairs. Spinopleural regions of ABD TERG 1–3 ornamented with numerous evenly distributed small pale nodules, not arranged in rows (Figure 20c) *Subsaltusaphis flava*
 – ABD TERG 8 with 6–16 long stout marginal hairs. Dorsum usually with at least traces of differential pigmentation in form of longitudinal stripes, or paired dusky patches on each tergite. Spinopleural ornamentation of ABD TERG 1–3 consisting of very small pale or dark nodules or spicules, arranged in irregular rows (Figure 20d, e) **50**
50. Dorsal cuticle including submarginal regions of tergites rather evenly and densely ornamented with fairly coarse blunt nodules. Mushroom-shaped hairs relatively sparse (less than 50 on each of ABD TERG 1–3 in spinopleural regions between muscle plates), and with ‘caps’ mostly very incomplete and asymmetrical, forming less than 180° of a complete circle, with only a few rather jagged points of different sizes (Figure 20d) *Subsaltusaphis rossneri*
 – Dorsal cuticle ornamented with nodules that become finer and often more spicule-like and less dense towards marginal, and sometimes also spinal, regions of each tergite. Mushroom-shaped hairs very numerous (more than 50 on each of ABD TERG 1–3 in spino-pleural regions between muscle plates), and with fairly symmetrical ‘caps’ completing more than 180° of a circle, and more evenly stellate in dorsal view (Figure 20e) **51**
51. Dorsum usually with well-marked and clearly-defined pleural longitudinal dark stripes that run almost the full length of the body (with small breaks between segments); these stripes are almost as dark as the intersegmental muscle plates, and are either side of a very pale spinal region that carries no trace of a darker spinal stripe (wholly dark forms also sometimes occur) *Subsaltusaphis ornata*
 – Dorsum either almost unpigmented (except for muscle plates), or with ill-defined dark pleural longitudinal stripes or rows of paired patches that are paler than intersegmental muscle plates. When pleural

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- bands are well-developed then there is also between them at least a trace of a dark spinal stripe (wholly dark forms are not known to occur) **52**
- 52.** ANT III 1.2–1.5× ANT VI (BASE + PT together). BL 2.4–3.0 mm *Subsaltiesaphis picta*
 – ANT III 0.90–1.32× ANT VI (BASE + PT together), but rarely more than 1.2, and then only when BL is less than 2.4 mm **53**
- 53.** BL 1.3–2.3 mm. Basal half of ANT IV as pale as ANT I and II *Subsaltiesaphis paniceae*
 – BL 1.9–2.9 mm. Basal half of ANT IV darker than ANT I and II *Subsaltiesaphis virginica*
- 54.** Eyes stalked. Dorsum mainly or wholly dark, with many very long black spiny hairs (300 µm or longer), especially marginally and on front of head *Caricosipha paniculatae*
 – Eyes sessile. Dorsal cuticle pale or dusky, with thick pale spiny hairs, all less than 200 µm long **55**
- 55.** Dorsal cuticle uniformly sclerotic, and adorned with small denticles or spinules between the hairs; intersegmental muscle sclerites not evident *Sipha glyceriae*
 – Dorsal cuticle not markedly sclerotic nor adorned with denticles; often showing dark intersegmental muscle sclerites *Sipha flava*
- 56.** Body elongate, almost parallel-sided. ANT 4- or 5-segmented. Dorsal hairs short, spatulate or rod-shaped, often with ragged apices. SIPH as small pores **57**
 – Body oval. ANT 5- or 6-segmented. Dorsal hairs thick and spine-like, or long with expanded apices. SIPH as pores raised on shallow cones **58**
- 57.** ANT always 5-segmented, 0.20–0.25× BL. ANT PT/BASE 0.8–1.2. ABD TERG 1–5 each usually with just 2 pairs of spinal hairs and one pair of pleural hairs *Atheroides serrulatus*
 – ANT 4- or 5-segmented, 0.14–0.17× BL. ANT PT/BASE about 0.5. ABD TERG 1–5 each with numerous hairs arranged in 2–3 very irregular rows *Atheroides brevicornis*
- 58.** ANT 5-segmented. Dorsal hairs spine-like. ANT with sparse, rather short hairs. ANT PT/BASE about 1.6. SIPH cones without surrounding hairs *Sipha praecocis**
 – ANT 6-segmented. Dorsal and antennal hairs numerous, long with expanded apices. ANT PT/BASE about 0.4. SIPH cones surrounded by hairs *Anoecia caricis**
- 59.** Abdomen with discrete, faceted wax glands. R IV+V 0.04–0.23 mm (if more than 0.17 mm then tarsal segments fused) **60**
 – Abdomen without discrete wax glands. R IV+V 0.20–0.36 mm. Tarsal segments clearly articulated **69**
- 60.** Tarsi 1-segmented (sometimes showing a clear line of fusion of two segments, but with the articulation clearly non-functional). Wax glands consisting either of groups of large cells surrounded by smaller ones, or rings of cells around clear central areas, which may be small and rounded, or elongate **61**
 – Tarsi 2-segmented. Abdominal wax glands each consisting of a group of similar-sized cells, and without any clear central area **66**
- 61.** Abdominal wax glands each consisting of a group of large cells surrounded by smaller ones. SIPH present as pores on small dark cones. R IV+V 0.17–0.23 mm *Tetraneura africana*
 – Abdominal wax glands each consisting of a ring of cells around a clear, round or elongate central area. SIPH either absent or present as pores not placed on dark cones. R IV+V 0.04–0.16 mm **62**
- 62.** Abdominal wax glands always with rather small, rounded, darkly bordered central areas (sometimes subdivided into two) **63**
 – At least the larger (marginal) wax glands have narrow elongate central areas **64**

63. Marginal wax glands comprising 10–20 cells (largest glands on posterior segments; Figure 20f). (Al. with sec. rhin. distributed III 10–12, IV 2–3, V 2–3, BASE VI 0) *Zelkovaphis caucasica*
 – Marginal wax glands comprising 4–12 cells (largest glands on posterior segments; Figure 20g). (Al. with sec. rhin. distributed III 9–20, IV 2–5, V 2–5, BASE VI 0–3) *Colopha kansugei*
64. All dorsal abdominal wax glands are oval to elongate oval with slit-like central areas (Figure 20h). SIPH always present as slightly raised pores with dark, semicircular partial rims. R IV+V about 0.145 mm *Paracolopha takahashii*
 – Only larger (marginal) wax glands have narrow elongate central areas (Figure 20i). SIPH absent or (rarely) present as very small pores. R IV+V 0.06–0.10 mm **65**
65. R IV+V 1.0–1.35× HT (I+II) *Colopha graminis*
 – R IV+V 1.8–2.8× HT (I+II) *Colopha compressa*
66. Primary rhinaria with sclerotic rims. R IV+V 0.67–0.83× HT II *Ghariesia polunini*
 – Primary rhinaria with fimbriate rims. R IV+V 0.9–1.4× HT II **67**
67. Body almost globular. Anal plate enlarged and extended or displaced dorsally, surrounded on three sides by the U-shaped ABD TERG 8 to form a trophobiotic organ (to retain honeydew for collection by ants) *Baizongia pistaciae*
 – Body ovoid or spindle-shaped. Anal plate and anus in normal posteroventral position **68**
68. Body broadly spindle-shaped, with extremely short ANT and legs (ANT and tibiae both less than 0.2× BL) *Aploneura werthi*
 – Body broadly ovoid. ANT and tibiae both more than 0.2× BL *Pemphigus* sp.
69. SIPH present as shallow cones surrounded by hairs. ANT 6-segmented. Large flat transparent marginal tubercles present on prothorax and ABD TERG 1–7. Body and appendages with numerous long fine hairs (75–150 μm long) *Anoecia pskovicica*
 – SIPH absent. ANT 5- or 6-segmented. No marginal tubercles. Body and appendages with sparser and shorter hairs (12–90 μm long) **70**
70. BL 2.9–3.8 mm. ANT 5- or 6-segmented; primary rhinarium on last segment not enlarged, less than half width of segment. Cauda broadly conical. Hairs very short (c.12 μm long) *Prociphilus corrugatus*
 – BL 1.9–3.3 mm. ANT 5-segmented. Primary rhinarium on ANT V enlarged, almost occupying whole width of segment. Cauda semicircular. Hairs long and fine (50–90 μm long) *Forda formicaria*

Carica*C. papaya***Caricaceae***Aphis fabae*, *craccivora*, *gossypii*, *spiraecola*;
Macrosiphum euphorbiae; *Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Carissa*C. carandas*
C. edulis
C. grandiflora
C. macrocarpa
C. spinarum
Carissa sp.**Apocynaceae***Toxoptera aurantii*
Aphis gossypii; [*Sitobion* sp.]; *Toxoptera aurantii*
Aphis spiraecola; *Toxoptera aurantii*
Aphis gossypii; *Myzus persicae*
Myzodium lutescens
Aphis craccivora

HOST LISTS AND KEYS

Key to apterae on *Carlisa*:-

- Head and SIPH densely ornamented with small round nodules. Cauda helmet-shaped, with a transparent apical papilla *Myzodium lutescens*
- Head and SIPH not so ornamented, and cauda without an apical papilla
go to key to polyphagous aphids, p. 1020

Carlina

C. acaulis
C. biebersteini
C. caulescens
C. corymbosa

C. graeca
C. lanata
C. vulgaris
Carlina sp.

Compositae

Aphis carlinae, vandergooti
Uroleucon carlinae
Aphis carlinae; Uroleucon carlinae
Aphis craccivora, solanella, terricola;
Uroleucon helenae, jaceae
Uroleucon jaceae
Aulacorthum solani; Uroleucon carlinae, helenae, jaceae
Aphis carlinae, terricola; Uroleucon helenae, macrosiphon
[Aphis ignatii]; [Uroleucon sonchi]

Key to aphids on *Carlina*:-

1. SIPH with a subapical zone of polygonal reticulation. ANT III with more than 20 small rhinaria. SIPH and cauda both dark; head smooth, dark, ANT tubercles well-developed with inner faces divergent 2
 - Without that combination of characters 5
2. R IV+V a little shorter than the long, thin HT II. Large aphid, BL c.3.9–4.0mm, with very long SIPH and cauda; SIPH longer than ANT III *Uroleucon macrosiphon*
 - R IV+V 1.3–1.7× HT II. BL 1.7–3.0mm. SIPH shorter than ANT III 3
3. SIPH 1.4–1.6× cauda which bears 15–28 hairs. ANT III with 16–54 rhinaria extending over basal 0.40–0.75 (mostly 0.45–0.60) of segment. ABD TERG 2–4 often with small marginal tubercles (MTu) about the size of hair bases. Hind tibiae more-or-less uniformly dark *Uroleucon jaceae* group
 - SIPH 1.75–3.1× cauda which bears 7–20 hairs. ANT III with 22–55 rhinaria extending over 0.63–0.98 (mostly 0.70–0.96) of segment. MTu absent. Tibiae dark basally and on the apical half, with a pale area in between 4
4. SIPH 1.75–2.3× cauda which bears 7–12 hairs. R IV+V 1.7–1.8× ANT BASE VI *Uroleucon helenae*
 - SIPH 2.4–3.1× cauda, which bears 16–20 hairs. R IV+V 1.2–1.5× ANT BASE VI *Uroleucon carlinae*
5. ANT PT/BASE 0.80–1.36. ANT III with 0–10 rhinaria, and ANT IV with 0–4 (but often both have 0). SIPH and cauda very short, the cauda pale and bluntly triangular, shorter than its basal width, with about 20 hairs 6
 - Without that combination of characters 7
6. ANT PT/BASE 1.04–1.36. ANT III and IV usually without rhinaria, and bearing very short hairs less than 0.3× BD III *Aphis carlinae*
 - ANT PT/BASE 0.80–0.95. ANT III and IV usually with rhinaria, and with longest hairs 0.4–0.7× BD III *Aphis terricola*
7. ABD TERG 1–4 and 7 regularly with well-developed marginal tubercles (MTu) (Figure 5j). ANT PT/BASE 3.8–5.1 *Aphis vandergooti*

- ABD TERG 2–4 only irregularly with small MTu, and if ABD TERG 1 and 7 have MTu then ANT PT/BASE is 1.5–3.4 go to key to polyphagous aphids, p. 1020

Carludovica*Carludovica* sp.**Cyclanthaceae***Cerataphis brasiliensis****Carmichaelia****C. australis**C. subulata***Leguminosae***?Megoura* sp. (New Zealand, BMNH colln, leg. M. Stufkens)*Aphis healyi*

Key to separate these two species:–

(Note: both have al. with only 1–2 rhinaria on ANT III.)

- SIPH black, tapering towards apex. Cauda black. ANT tubercles smooth and similarly developed to median frontal prominence *Aphis healyi*
- SIPH pale, swollen on distal half. Cauda pale. ANT tubercles scabrous and well-developed, median frontal tubercle undeveloped *?Megoura* sp.

Carmona*C. retusa***Boraginaceae***Toxoptera aurantii, odinae*

Use key to polyphagous aphids, p. 1020.

Caroxylon* see *Salsola***Carpesium****C. abrotanoides**C. cernuum**C. triste***Compositae***Aleurodaphis [asteris], blumeae**Acyrtosiphon malvae**Aulacorthum solani*

Key to aphids on *Carpesium*:–

- Body flattened and dorsum sclerotic, with fused head and pronotum, fused ABD TERG 1–7, and a crenulate rim due to a continuous marginal row of wax glands. Cauda knobbed, anal plate bilobed *Aleurodaphis blumeae*
- Body not flattened, segments not fused, no crenulate margin of wax glands. Cauda not knobbed, anal plate entire go to key to polyphagous aphids, p. 1020

Carpinus* see Blackman and Eastop (1994)**Carpobrotus****C. chilensis**C. edulis***Aizoaceae***Myzus persicae**Aphis fabae*

Use key to polyphagous aphids, p. 1020.

Carthamus*C. dentatus**C. flavescens***Compositae***Uroleucon carthami**Uroleucon* sp. near *jaceae* (Lebanon, BMNH colln)

HOST LISTS AND KEYS

<i>C. glaucus</i>	<i>Uroleucon carthami</i>
<i>C. lanatus</i>	<i>Aphis carthami, fabae, pseudocardui</i> , [terricola]; <i>Uroleucon aeneum, carthami, jaceae</i>
<i>C. moluccanus</i>	[<i>Uroleucon</i> sp.]
<i>C. oxyacanthas</i>	<i>Aphis anuraphoides</i>
<i>C. oxycarpus</i>	<i>Aphis carthami</i>
<i>C. racines</i>	<i>Aphis carthami</i>
<i>C. tenuus</i>	<i>Aphis carthami, craccivora; Uroleucon carthami, jaceae</i>
<i>C. tinctorius</i>	<i>Acyrtosiphon ilka</i> ; <i>Aphis anuraphoides, carthami, craccivora</i> , [echinopsis], <i>fabae, gossypii, pseudocardui</i> ; <i>Aulacorthum solani; Capitophorus elaeagni</i> ; <i>Macrosiphum euphorbiae; Myzus persicae</i> ; <i>Protrama flavescens</i> ; [Sitobion akebiae]; <i>Uroleucon carthami, compositae, gobonis</i>
<i>Carthamus</i> spp.	<i>Aphis anuraphoides</i> , [viridescens Bozhko, 1976a]; <i>Brachycaudus cardui, helichrysi; Trama caudata</i>

Key to aphids on *Carthamus*:-

1. Hind tarsus elongate, more than 0.5× hind tibia. Body and appendages densely clothed in fine hairs. SIPH as pores on small cones 2
 - Hind tarsus of normal length. Not densely hairy. SIPH tubular 3
2. Apt. alatifform, with dark dorsal cross bands and dark SIPH cones. ANT with secondary rhinaria distributed III 1–24, IV 2–6, V 3–6, VI BASE 2–4 *Protrama flavescens*
 - APT. not usually alatifform, without dark dorsal markings. ANT with secondary rhinaria distributed III 0, IV 0–2, V 1–3, VI BASE 0 *Trama caudata*
3. SIPH dark, wholly or in distal part, with polygonal reticulation usually on more than distal 0.2 of length 4
 - SIPH pale or dark; if dark then without any polygonal reticulation, and if pale then reticulation extends maximally over distal 0.2 of length 7
4. ANT III 1.8–2.5× ANT V, with 42–86 rhinaria extending over 0.68–0.95 of length. Middle part of hind tibia pale; the pale section occupying at least 0.7 of total length. SIPH with reticulation over distal 0.25–0.32. ANT PT/BASE 5.2–7.3, mostly 5.5–7.0. ABD TERG 2–4 without marginal tubercles (MTu) *Uroleucon compositae* (or *gobonis*?)
 - ANT III 1.4–1.9× ANT V, with 15–54 rhinaria extending over 0.45–0.68 of length. Middle part of hind tibia dusky to dark, or if rather pale then the pale section is less than 0.6 of total length. SIPH with reticulation over distal 0.16–0.27. ANT PT/BASE 4.3–6.6, mostly 4.5–5.5; if more than 5.5 then ABD TERG 2–4 with MTu 5
5. ABD TERG 2–4 with MTu that are mostly larger than adjacent hair bases. Cauda 3.5–4.5× ANT BASE VI, and bearing 20–34 hairs. R IV+V 1.2–1.6× ANT BASE VI. ANT PT/BASE 5.0–6.6 *Uroleucon aeneum*
 - ABD TERG 2–4 with or without MTu that are mostly smaller than adjacent hair bases. Cauda 2.6–4.0× ANT BASE VI, and bearing 13–29 hairs. R IV+V 1.0–1.3× ANT BASE VI. ANT PT/BASE 4.3–5.5 6
6. R IV+V 0.95–1.15× ANT BASE VI. ANT III with 23–45 rhinaria, few of which exceed 10µm in diameter *Uroleucon jaceae* group
 - R IV+V 1.05–1.4× ANT BASE VI. ANT III with 15–34 rhinaria, many of which exceed 10µm in diameter *Uroleucon carthami*

7. ANT PT/BASE 0.8–1.2. R IV+V longer than ANT PT. SIPH short, 0.65–1.2× cauda, which is helmet-shaped or bluntly triangular **8**
 – ANT PT/BASE more than 1.5. R IV+V much shorter than ANT PT. SIPH usually longer than cauda, which is helmet-, tongue- or finger-shaped **10**
8. SIPH 0.50–0.68× R IV+V, and 0.65–0.86× cauda. Longest hairs on ABD TERG 3 are 1.2–1.8× ANT BD III *Aphis carthami*
 – SIPH 0.7–0.9× R IV+V and 0.88–1.2× cauda. Longest hairs on ABD TERG 3 are 0.7–1.3× ANT BD III **9**
9. ANT III usually without sec. rhinaria (rarely with 1–3). R IV+V 1.28–1.36× HT II. Longest hairs on ABD TERG 3 are 0.7–1.1× ANT BD III *Aphis pseudocardui*
 – ANT III usually with (1–10) sec. rhinaria. R IV+V 1.45–1.65× HT II. Longest hairs on ABD TERG 3 are 1.2–1.3× ANT BD III *Aphis anuraphoides*
10. Cauda helmet-shaped, with basal constriction, a little shorter than its basal width in dorsal view, and bearing 4–8 hairs. Spiracular apertures large and rounded **11**
 – Cauda tongue- or finger-shaped, longer than its basal width. Spiracular apertures reniform **12**
11. Dorsum with an extensive black shield. SIPH dark, imbricated, 1.7–3.4× cauda. ANT III 0.31–0.47 mm, 2.4–3.4× HT II. R IV+V 0.17–0.24 mm *Brachycaudus cardui*
 – Dorsum without dark markings. SIPH pale, smooth-surfaced, 0.8–1.5× cauda. ANT III 0.07–0.25 mm, 0.9–2.2× HT II. R IV+V 0.10–0.15 mm *Brachycaudus helichrysi*
12. ANT tubercles well-developed, with inner faces smooth and divergent. SIPH long and thin, without any subapical polygonal reticulation **13**
 – Without this combination of characters; if ANT tubercles have smooth, divergent inner faces then SIPH have subapical polygonal reticulation for 0.1–0.2 of length
 go to key to polyphagous aphids, p. 1020
13. Long capitate dorsal hairs present on head and posterior abdomen. SIPH 1.5–1.8× ANT III which is without rhinaria *Capitophorus elaeagni*
 – Dorsal hairs short and inconspicuous. SIPH 0.8–1.3× ANT III, which bears 1–4 rhinaria near its base *Acyrtosiphon ilka*

Carum*C. carvi**C. copticum**C. kelloggii**C. petroselinum**C. rigidulum**Carum* sp.**Umbelliferae***Aphis brohmeri, fabae, spiraephaga;**Cavariella aegopodii, theobaldi;**Hyadaphis foeniculi, polonica; Myzus ornatus;**Pemphigus passeki; Semiaphis heraclei**Hyadaphis coriandri**Aphis cari; Cavariella aegopodii**Cavariella aegopodii**Cavariella aegopodii**Cavariella pastinacae***Key to aphids on Carum:–**

1. ANT PT/BASE less than 0.5. SIPH absent *Pemphigus passeki*
 – ANT PT/BASE more than 0.5, usually more than 1.0. SIPH present **2**
2. ABD TERG 8 with a backwardly directed process **3**
 – No supracaudal process **5**

HOST LISTS AND KEYS

3. ANT PT/BASE 0.65–1.25. R IV+V without accessory hairs *Cavariella aegopodii*
 – ANT PT/BASE 2.1–4.0. R IV+V with 2 accessory hairs **4**
4. SIPH slightly tapering, not clavate, 2.0–2.4× cauda *Cavariella theobaldi*
 – SIPH slightly clavate, 2.3–3.0× cauda *Cavariella pastinacae*
5. SIPH very small and flangeless, only about 0.5 of length of cauda or less, with aperture slanted towards midline *Semiaphis heraclei*
 – SIPH at least 0.6 of length of cauda, and with a distinct flange **6**
6. ANT tubercles well developed, with inner faces scabrous and converging apically. SIPH tapering, strongly imbricated, usually with a slight ‘S’ curve *Myzus ornatus*
 – ANT tubercles absent or weakly developed, so that front of head is flat, convex or has a sinuate outline in dorsal view. SIPH tapering or swollen, not curved **7**
7. SIPH tapering gradually from base to flange, 0.7–2.0× cauda. ABD TERG 1 and 7 with evident marginal tubercles (MTu) **8**
 – SIPH clavate, or at least swollen to some degree and then narrowing more abruptly before flange; 0.6–1.4× cauda. ABD TERG 1 and 7 without MTu **11**
8. SIPH 0.7–1.1× cauda. Longest hair on ANT III 0.5–0.9× BD III. R IV+V 0.65–0.9× HT II *Aphis spiraephaga*
 – SIPH 0.7–2.0× cauda, but if less than 1.1× cauda then longest hairs on ANT III are longer than BD III. R IV+V 0.9–1.4× HT II. **9**
9. ANT III longer than PT. Cauda with c.10 hairs. (Al. with 15–50 rhinaria on ANT III) *Aphis cari**
 – ANT III shorter than PT. Cauda with 11–31 hairs. (Al. with 10–25 rhinaria on ANT III) **10**
10. Large MTu present on ABD TERG 2–4, and sometimes also on 5 and/or 6, in addition to those on 1 and 7. Cauda with 20–31 hairs *Aphis brohmeri*
 – Small MTu irregularly present on some of ABD TERG 2–4. Cauda with 11–24 hairs *Aphis fabae*
11. SIPH 0.13–0.21× BL and 0.88–1.4× cauda. Prosternum with a sclerotised, and sometimes pigmented, short transverse patch *Hyadaphis foeniculi*
 – SIPH 0.09–0.11× BL and 0.6–0.82× cauda. Prosternum without a sclerotised patch **12**
12. SIPH broadest at base *Hyadaphis coriandri*
 – SIPH broadest on swollen part *Hyadaphis polonica*

Caryophyllus see *Dianthus*

Caryopteris

C. mongholica

Aphis caryopteridis

Verbenaceae

Casearia see Blackman and Eastop (1994)

Cassia (incl. *Herpetica*, *Senna*)

C. abbreviata

Myzus persicae

C. alata

Aphis craccivora, *spiraecola*

C. aphylla

Aphis gossypii

C. australis

Aphis gossypii; *Aulacorthum solani*; *Myzus persicae*

C. bicapsularis

Myzus persicae

Leguminosae

<i>C. benitoensis</i>	<i>Aphis gossypii</i>
<i>C. corymbosa</i>	<i>Aphis craccivora, fabae; Myzus persicae</i>
<i>C. didymobotrya</i>	<i>Aphis gossypii; Aulacorthum solani;</i> <i>Myzus antirrhinii, persicae</i>
<i>C. floribunda</i>	<i>Aphis craccivora, fabae, gossypii</i>
<i>C. glauca</i>	<i>Toxoptera aurantii</i>
<i>C. goratensis</i>	<i>Aphis gossypii</i>
<i>C. hoffmansegi</i>	<i>Aphis gossypii</i>
<i>C. leiophylla</i>	<i>Aphis gossypii; Myzus persicae</i>
<i>C. leptocarpa</i>	<i>Aphis spiraecola</i>
<i>C. mimosoides</i>	<i>Aphis craccivora, gossypii</i>
<i>C. obtusifolia</i>	<i>Aphis gossypii</i>
<i>C. occidentalis</i>	<i>Aphis craccivora, gossypii, spiraecola</i>
<i>C. siamea</i>	<i>Aphis craccivora; [Kurisakia yunnanensis]</i>
<i>C. sophera</i>	<i>Aphis gossypii</i>
<i>C. sturtii</i>	<i>Myzus persicae</i>
<i>C. surattensis</i>	<i>Myzus persicae</i>
<i>C. tomentosa</i>	<i>Aphis gossypii</i>
<i>C. tora</i>	<i>Aphis craccivora, gossypii; Brachycaudus helichrysi;</i> <i>Macrosiphum euphorbiae</i>
<i>Cassia</i> sp. (African)	<i>Sitobion burundiense</i>

Key to apterae on *Cassia*:-

- SIPH black with polygonal reticulation on distal 0.17–0.25 of length. ANT PT/BASE 5.1–6.6. First tarsal segments all with 4 hairs *Sitobion burundiense*
- SIPH if black then without distal reticulation, and other characters do not apply
go to key to polyphagous aphids, p. 1020
(specimens running to *Myzus persicae* may be *M. antirrhinii*)

Cassinia

Cassinia sp.

Compositae

Macrosiphum euphorbiae

Castalia see Nymphaea

Castilleja

C. coccinia
C. foliolosa
C. linariaefolia
C. miniata
C. neglecta
C. occidentalis
C. pruinosa
C. raupii
C. wightii
Castilleja spp.

Scrophulariaceae

Nasonovia castelleiae
Brachycaudus helichrysi
Nearctaphis hottesi
Nasonovia castelleiae
Nasonovia castelleiae
Nasonovia sampsoni
Nasonovia sampsoni
Nasonovia castelleiae
Nasonovia sampsoni; Macrosiphum euphorbiae
Aphis sp. (Montana, USA; BMNH colln, leg. D Hille Ris
Lambers); *Cedoaphis incognita* (as *Aphis chipetae* Hottes);
[*Macrosiphum* sp.]; *Nearctaphis bakeri, kachena*

HOST LISTS AND KEYS

Key to aphids on *Castilleja*:-

1. ANT (of apt.) with secondary rhinaria 2
 – ANT without secondary rhinaria 5
2. Head spiculose. SIPH 3–4× cauda, which is shorter than its basal width and bears more than 20 hairs *Cedoaphis incognita*
 – Head not spiculose. SIPH 0.8–2.2× cauda which is much longer than its basal width and bears 5–12 hairs 3
3. SIPH 0.25–0.35× BL, with a subapical zone of polygonal reticulation *Macrosiphum euphorbiae*
 – SIPH 0.06–0.22× BL, without any polygonal reticulation 4
4. R IV+V 1.7–2.5× HT II, with 20–25 accessory hairs. SIPH only weakly imbricated, 1.5–2.1× cauda *Nasonovia sampsoni*
 – R IV+V 1.0–1.5× HT II, with 6–8 accessory hairs. SIPH strongly imbricated, with rows of spinules on the imbrications; 0.8–1.3× cauda *Nasonovia castelleiae*
5. SIPH smooth, head smooth, cauda helmet-shaped *Brachycaudus helichrysi*
 – SIPH imbricated or with rows of spinules. If head smooth then cauda tongue-shaped 6
6. SIPH imbricated and at least 0.1× BL. Head smooth. ABD TERG 1 and 7 with marginal tubercles (MTu), which are absent from or only sporadically present on 2–5 *Aphis* sp. (Montana, USA; BMNH colln, leg. D Hille Ris Lambers)
 – SIPH spinulose and less than 0.09× BL. Head spiculose. ABD TERG 2–5 with MTu, 1 and 7 without MTu 7
7. Second tarsal segments smooth or almost smooth *Nearctaphis kachena*
 – Second tarsal segments with distinct imbrication 8
8. Dorsal abdominal hairs arising from dark scleroites, and ABD TERG 7 and 8 with dark cross-bands. R IV+V usually shorter than ANT V *Nearctaphis bakeri*
 – Dorsal abdomen without dark markings. R IV+V usually longer than ANT V *Nearctaphis hottesi*

Casuarina see Blackman and Eastop (1994)

Catabrosa

C. aquatica

Gramineae

Cavariella aquatica; *Rhopalosiphum padi*

Use key to apterae of grass-feeding aphids under *Digitaria*.

Catamixis

C. baccariodes

Compositae

Acyrtosiphon rubi

Catharanthus

C. roseus

Apocynaceae

Aphis fabae, *gossypii*, *spiraecola*;
Macrosiphum euphorbiae, [*stellariae*];
Myzus [*certus*], *ornatus*, *persicae*; [*Nasonovia ribisnigri*];
Rhopalosiphoninus staphyleae;
[*Rhopalosiphum nymphaeae*]

Use key to polyphagous aphids, p. 1020.

Catharinaea (incl. *Atrichum*)*C. undulata***Polytrichaceae***Decorosiphon corynothrix*; *Muscaphis musci*;
*Myzodium modestum*Use key to apterae of moss-feeding aphids under *Polytrichum*.***Catimbium* see *Alpinia******Cattleya****C. harrisoniae**C. lueddemanniana**C. speciosissima* see *lueddemanniana****Cattleya* spp.****Orchidaceae***Cerataphis orchidearum**Toxoptera aurantii**Sitobion anselliae*, *luteum*Use key to apterae of orchid-feeding aphids under *Cymbidium*.***Caucalis****C. anthriscus**C. incognita**C. lappula* (incl. *daucoides*)*C. latifolia* (= *Turgenia latifolia*)***Caucalis* sp.****Umbelliferae***Cavariella aegopodii*; *Dysaphis crataegi* ssp. *aethusae**Aulacorthum solani**Aphis fabae**Brachycaudus crassitibiae**Aphis* spp. (England, BMNH colln; Turkey, BMNH colln)Key to aphids on *Caucalis* (and *Turgenia*):-

1. ABD TERG 8 with a supracaudal process. SIPH clavate. ANT PT/BASE 0.7–1.25
Cavariella aegopodii
- No supracaudal process. SIPH tapering. ANT PT/BASE 1.8–5.5 **2**
2. Cauda not longer than its basal width **3**
- Cauda much longer than its basal width **4**
3. SIPH dark. ANT III more than 2× ANT V *Dysaphis crataegi aethusae*
- SIPH pale/dusky. ANT III about 1.1× ANT V *Brachycaudus crassitibiae**
4. SIPH and cauda mainly pale (SIPH often dark-tipped). Head spiculate, with ANT tubercles well developed, their inner faces approximately parallel *Aulacorthum solani*
- SIPH and cauda dark. Head not spiculate, ANT tubercles weakly developed **5**
5. ANT PT/BASE 1.6–2.2. ABD TERG 2–4 without MTu. Dorsal pigmentation when extensive fused between segments to form a shield. ABD TERG 8 with only 2 hairs about equal in length to or shorter than ANT BD III. Longest hairs on hind femur shorter than trochantrofemoral suture *Aphis* sp. (Turkey, BMNH colln)
- ANT PT/BASE 2.1–4.1 (if less than 2.4 then ABD TERG 2–4 with MTu). Dorsal pigmentation consisting of segmentally arranged cross-bands, not fused between segments. ABD TERG 8 with 2–7 hairs much longer than ANT BD III. Longest hairs on hind femur much longer than trochantrofemoral suture **6**
6. ABD TERG 2–4 regularly with large papillate MTu. R IV+V 0.17–0.18 mm, 1.2–1.5× HT II. ANT PT 1.7–1.9× R IV+V *Aphis* sp. (England, BMNH colln)
- ABD TERG 2-4 irregularly with small MTu. R IV+V 0.12–0.165 mm, 0.9–1.1× HT II. ANT PT 2.0–2.8× R IV+V *Aphis fabae*

HOST LISTS AND KEYS

Cayaponia

Cayaponia sp.

Cucurbitaceae

Wahlgreniella australis

Cayratia

C. ibuensis

C. japonica

Vitaceae

Aphis gossypii

Aphis gossypii; *Macrosiphoniella cayratiae*

Couplet for separating these two species:–

- SIPH with a distal zone of polygonal reticulation extending for about half their lengths. ANT tubercles prominent *Macrosiphoniella cayratiae**
- SIPH without polygonal reticulation. ANT tubercles weakly developed *Aphis gossypii*

Ceanothus

C. cuneatus

C. hirsutus

C. inegerrimus

C. sanguineus

C. thyrsiflorus

C. velutinus

Ceanothus spp.

Rhamnaceae

Aphis ceanothi

Aphis ceanothi

Aphis ceanothi

Aphis ceanothi

Aphis ceanothi

Aphis ceanothi

Illinoia ceanothi; *Macrosiphum euphorbiae*;

Neomyzus circumflexus

Key to aphids on *Ceanothus*:–

1. Head, SIPH and cauda black. Dorsal abdomen with large black presiphuncular sclerites, often linked by a transverse sclerite on ABD TERG 6, and always with transverse bands on ABD TERG 7 and 8. ANT PT/BASE 2.0–2.5 *Aphis ceanothi*
- Head, SIPH and cauda pale or dusky. Dorsal abdomen pale, or with any dark markings most evident on segments anterior to SIPH. ANT PT/BASE longer **2**
2. SIPH very long and thin, 2.2–3.1× cauda; narrow in middle, with distal part dusky and somewhat swollen, narrowing again before apex, with usually some subapical reticulation *Illinoia ceanothi*
- SIPH less than 2.5× cauda go to key to polyphagous aphids, p. 1020

Cecropia see Blackman and Eastop (1994)

Celastrus

C. articulatus

C. flagellaris

C. orbiculatus

C. scandens

C. strigillosus

Celastraceae

Aphis [celastrii], *gossypii*; *Aulacorthum magnoliae*

[*Aphis celastrii*], *gossypii*; *Toxoptera odinae*

Aphis [celastrii], *fabae*, *gossypii*

[*Acyrtosiphon pisum*];

Aphis craccivora, *fabae*, *gossypii*, *spiraecola*;

Aulacorthum solani; *Macrosiphum euphorbiae*

Aphis spiraecola

Use key to polyphagous aphids, p. 1020.

Celmisia

C. glandulosa

Compositae

Aulacorthum solani; *Brachycaudus helichrysi*

Use key to polyphagous aphids, p. 1020.

HOST LISTS AND KEYS

- C. diffusa* *Aphis middletonii* group; *Macrosiphoniella papillata*;
Uroleucon jaceae
- C. hyalolepis* *Aphis craccivora*; *Brachycaudus helichrysi*
- C. iberica* *Aphis alexandrae*, *fabae*, *magnopilosa*, *solanella*, *terricola*;
Uroleucon jaceae
- C. indurata* *Uroleucon jaceae*
- C. jacea* (incl. *banatica*) *Acaudinum centaureae*, *longisetosum*; *Dysaphis centaureae*;
Paczoskia obtecta; *Trama troglodytes*;
Uroleucon jaceae, *jaceicola*
- C. kotschyana* *Uroleucon jaceae*
- C. lanulata* *Myzus persicae*
- C. macrophala* *Myzus persicae*
- C. maculosa* see *rhenana*
- C. majorovii* *Uroleucon jaceicola*
- C. melitensis* *Acaudinum centaureae*; *Brachycaudus helichrysi*;
Uroleucon jaceae
- C. micranthos* *Uroleucon jaceae*
- C. moabitica* *Macrosiphoniella riedeli*
- C. monanthos* *Uroleucon mongolicum*
- C. montana* *Aphis fabae*; *Uroleucon montanivorum*
- C. moschata* *Aphis fabae*; *Myzus persicae*; *Uroleucon compositae*
- C. napifolia* *Uroleucon jaceae*
- C. nigra* *Brachycaudus helichrysi*;
Uroleucon jaceae group, *jaceicola*
- C. orientalis* *Uroleucon jaceae*
- C. pallescens* *Aphis craccivora*; *Myzus persicae*; *Uroleucon jaceae*
- C. paniculata* see *aristata*
- C. pannonica* *Uroleucon jaceae*
- C. perrottetti* *Aphis gossypii*
- C. phrygia* *Dysaphis centaureae*; *Uroleucon jaceae*;
[*Volutaphis centaureae*]
- C. picris* *Uroleucon jaceae*
- C. procurrens* *Brachycaudus helichrysi*; *Paczoskia obtecta*;
Uroleucon jaceae
- C. pseudophrygia* *Uroleucon jaceae*
- C. pulchella* *Aphis hyaleae*; *Xerobion zoiiae*
- C. rhenana* (incl. *maculosa*, *stoebe*) *Acaudinum longisetosum*, *roumanicum*;
Aphis hartigi, *terricola*, *Aphis (Protaphis)* sp. (BMNH colln, Czech Republic and Switzerland);
Dysaphis centaureae; *Macrosiphoniella staegeri*;
Trama centaureae; *Uroleucon jaceae*, *jaceicola*
- C. ruthenica* *Acaudinum centaureae*; *Aphis alexandrae*;
Macrosiphoniella staegeri; *Uroleucon jaceae*
- C. scabiosa* (incl. *tenuifolia*) *Acaudinum centaureae*, *longisetosum*;
Aphis fabae, *hartigi*, *terricola*, *Aphis* spp. (BMNH colln, Italy and Sweden); *Paczoskia obtecta*; *Protrama radiceis*;
Trama centaureae, *troglodytes*;
Uroleucon jaceae, *jaceae* ssp. *henrichi*

<i>C. solstitialis</i>	<i>Acaudinum bulgaricum</i> ; <i>Aphis alexandrae</i> , <i>terricola</i> ; <i>Macrosiphoniella papillata</i> ; <i>Uroleucon jaceae</i> group
<i>C. sphaerocephala</i>	<i>Acaudinum centaureae</i>
<i>C. squarrosa</i>	<i>Aphis alexandrae</i> , <i>magnopilosa</i> ; <i>Macrosiphoniella papillata</i> , <i>staegeri</i>
<i>C. stenolepis</i>	<i>Uroleucon jaceae</i>
<i>C. stoebe</i> see <i>rhenana</i>	
<i>C. triumphetti</i> (incl. <i>aligera</i>)	<i>Aphis fabae</i> ; <i>Paczoskia obtecta</i> ; <i>Uroleucon jaceae</i> , <i>jaceicola</i>
<i>C. vallesiaca</i> (?)	<i>Macrosiphoniella staegeri</i>
<i>C. virgata</i>	<i>Macrosiphoniella papillata</i>
<i>C. vochinensis</i>	<i>Aphis middletonii</i> group, <i>Myzus persicae</i>
<i>Centaurea</i> spp.	<i>Abstrusomyzus phloxae</i> ; <i>Brachycaudus cardui</i> , [sp. nr. <i>pruniavium</i> ; Bodenheimer and Swirski, 1957: 338]; <i>Myzus ornatus</i> ; <i>Neomyzus circumflexus</i> ; <i>Rectinasus buxtoni</i> ; <i>Smynthuodes betae</i> ; [<i>Titanosiphon dracunculi</i>]; [<i>Trama rara</i>]; [<i>Uroleucon picridis</i>]

Key to apt. on *Centaurea*:-

1. Antennae densely hairy; e.g., base of last antennal segment with more than 20 hairs 2
– Antennae less hairy; base of last antennal segment with less than 10 hairs 6
2. HT II greatly elongated, more than 0.5× hind tibia 3
– HT II of normal length 5
3. SIPH present as large pores on low pigmented cones. Most apt. alatiform, with dark dorsal markings. ANT PT/BASE 0.4–0.6 *Protrama radialis*
– SIPH absent. Apt. without dark dorsal markings. ANT PT/BASE 0.14–0.3 4
4. HT II 0.85–0.92× length of hind tibia. Eyes with many facets *Trama centaureae*
– HT II 0.60–0.73× length of hind tibia. Eyes with only 3 facets *Trama troglodytes*
5. ANT V BASE and R IV+V both very long, respectively about 1.7 and 2.5× width of head between antennal bases. ANT II similar in length to ANT I, much shorter than III *Rectinasus buxtoni*
– ANT V BASE and R IV+V of normal length, both about 0.5× width of head between antennal bases. ANT II about twice as long as ANT I, similar in length to III *Smynthuodes betae*
6. SIPH dark with a distal zone of polygonal reticulation. ANT III with 2–86 rhinaria 7
– SIPH pale or dark, if dark then without any polygonal reticulation. ANT III with 0–10 rhinaria 17
7. ANT III with only 2–8 rhinaria on basal half. SIPH 0.9–1.3× cauda. Crescent-shaped antesiphuncular sclerites present *Macrosiphoniella staegeri*
– ANT III with 8–86 rhinaria. SIPH 1.05–2.8× cauda. Antesiphuncular sclerites present or absent 8
8. Dorsal abdominal hairs all arising from pale tubercles 9
– Dorsal abdominal hairs all or mostly arising from dark scleroites 11
9. Hind tibiae with extensive pale middle regions. Hind femora dappled pale and dark, with a pale distal spot *Macrosiphoniella (Papillomyzus)* sp. (Iran, BMNH colln)
– Hind tibiae wholly black. Hind femora black over distal 0.5 or more of length 10
10. Femora pale over basal 0.3–0.5 of length *Macrosiphoniella riedeli*
– Femora pale over only basal 0.1–0.2 of length *Macrosiphoniella papillata*

HOST LISTS AND KEYS

11. Bases of SIPH almost ringed by large semicircular presiphuncular, and less extensive postsiphuncular, sclerites *Paczoskia obtecta*
 – Presiphuncular sclerites absent or fragmented **12**
12. Coxae and cauda pale. SIPH 1.2–1.6× cauda, which bears 23–39 hairs *Uroleucon pepperi*
 – Coxae dark. Cauda pale or dark, but if pale then cauda bears 7–18 hairs **13**
13. ANT I bearing 10–15 hairs. SIPH pale in summer and dark in early spring, 2.0–3.0× the pale cauda which bears 9–18 hairs *Uroleucon jaceicola*
 – ANT I bearing 6–8 hairs. SIPH dark, 1.4–2.6× cauda which is pale or dark, but if pale bears 7–11 hairs **14**
14. SIPH 1.8–2.6× the pale cauda which bears 7–11 hairs *Uroleucon mongolicum*
 – SIPH 1.4–2.2× the dark cauda which bears 12–30 hairs **15**
15. Tibiae wholly dark. Hind femora with basal half pale and distal half dark, with a rather sharp transition between. ANT III with 16–54 rhinaria often confined to basal half (but up to 81 rhinaria extending over 0.85 of ANT III in alatiform specimens with rudimentary ocelli occurring when alatae are being produced in early summer). SIPH 1.4–1.8× cauda *Uroleucon jaceae*
 – Tibiae with paler middle section. Hind femora pale over either much more or much less than half of length. ANT III with 40–86 rhinaria extending over more than half of length. SIPH 1.7–2.2× cauda **16**
16. R IV+V 1.1–1.4× HT II. Femora mainly dark, only pale on basal 0.2–0.3 of length *Uroleucon compositae*
 – R IV+V 1.6–1.9× HT II. Femora pale over basal 0.67–0.75 of length *Uroleucon montanivorum*
17. Cauda very broadly rounded, crescent-shaped, with length much less than half of its basal width **18**
 – Cauda helmet-shaped, triangular or tongue-shaped, with length more than half of its basal width **22**
18. SIPH 2.3–4.0× HT II, with minimum width not greater than width of hind tibia at midlength. Subgenital plate with 10–24 hairs on its anterior half **19**
 – SIPH usually 1.6–2.5× HT II, with minimum width clearly greater than width of hind tibia at midlength. Subgenital plate with 2–4 hairs on anterior half **21**
19. Femoral and trochantral hairs, and those on anterior abdominal sternites, short and blunt, maximally 0.4× trochantrofemoral suture *Acaudinum centaureae*
 – Femoral, trochantral and ventral body hairs long, with finely pointed apices; not much shorter than trochantrofemoral suture **20**
20. HT II 0.136–0.177 mm, and SIPH 0.49–0.75 mm, the product of the two lengths (HT II× SIPH) being 0.080–0.115 *Acaudinum longisetosum*
 – HT II 0.125–0.150 mm, and SIPH 0.34–0.53 mm, HT II× SIPH being 0.042–0.077 *Acaudinum roumanicum*
21. Femoral and trochantral hairs long and finely-pointed, maximally 0.7–1.05× trochantrofemoral suture. SIPH 0.50–0.58× ANT PT. (Al. without secondary rhinaria on ANT IV) *Acaudinum beheni*
 – Femoral and trochantral hairs short, mostly blunt, maximally 0.4× trochantrofemoral suture. SIPH 0.39–0.49× ANT PT. (Al. with 2–6 secondary rhinaria on ANT IV) *Acaudinum bulgaricum*
22. Cauda helmet-shaped or triangular, 0.7–1.35× its basal width **23**
 – Cauda tongue- or finger-shaped, more than 1.4× its basal width **28**
23. ABD TERG 1 and 7 always with marginal tubercles (MTu), larger than any MTu that may be present on other abdominal segments. Spinal tubercles (STu) absent. Cauda bluntly triangular, without any basal constriction **24**

- ABD TERG 1 and 7 either without MTu, or MTu are present in association with similar large flat MTu on most other abdominal segments, and commonly also with STu on head and ABD TERG 7–8. Cauda helmet-shaped or pentagonal, often somewhat constricted at base 26
- 24. SIPH as short cones, clearly shorter than their basal widths and also clearly shorter than (about 0.6×) cauda. MTu on ABD TERG 1 and 7 thin and tapering *Xerobion zoijae**
- SIPH as short tubes, cylindrical or slightly tapering, about as long as or longer than their basal widths and at least 0.7× cauda. MTu on ABD TERG 1 and 7 quite large and broad-based 25
- 25. ANT PT/BASE 0.7–1.2. Dorsal abdominal pigmentation variable but never with dark cross-bands on all tergites *Aphis terricola* group (incl. *alexandrae*, *centaurea*, *hartigi*, *hyaleae* and an undescribed species on *Centaurea rhenana* in C. Europe)
- ANT PT/BASE 1.7–2.3. Dorsal abdominal pigmentation variable but often comprising complete or fragmented dark cross-bands on all tergites *Aphis middletonii* group
- 26. Large, flat MTu present on most segments, their diameters very much greater than that of spiracular apertures, which are broadly reniform and contiguous on ABD TERG 1 and 2. STu often present on head and ABD TERG 7–8 *Dysaphis centaureae*
- MTu and STu only intermittently or rarely present and much smaller than spiracular apertures, which are large and rounded and not contiguous on ABD TERG 1 and 2 27
- 27. Dorsum with an extensive black shield. SIPH dark, imbricated, 1.7–3.4× cauda. ANT III 0.31–0.47 mm, 2.4–3.4× HT II *Brachycaudus cardui*
- Dorsum without dark markings. SIPH pale, smooth-surfaced, 0.8–1.5× cauda. ANT III 0.07–0.25 mm, 0.9–2.2× HT II *Brachycaudus helichrysi*
- 28. Well-developed rounded marginal tubercles (MTu) present on ABD TERG 2–5, as well as very large ones on 1 and 7. R IV+V about equal in length to ANT III *Aphis* sp. (Italy, BMNH colln)
- Papilliform MTu sporadically present or absent on ABD TERG 2–4, in addition to those on ABD TERG 1 and 7. R IV+V much shorter than ANT III 29
- 29. SIPH 1.9–2.2× the similarly dark cauda. Papilliform MTu usually present on at least some of ABD TERG 2–4 *Aphis* sp. (Sweden, BMNH colln)
- SIPH 0.7–2.5× cauda, but if more than 1.8× then either SIPH and cauda are both pale or cauda is distinctly paler than dark SIPH, and MTu are rarely present on ABD TERG 2–4 30
- 30. Cauda black with 6–8 hairs, and dorsum pale with only a dusky band on ABD TERG 8. ANT PT/BASE 1.5–1.95. R IV+V 1.2–1.3× HT II *Aphis* sp. (Italy, BMNH colln)
- Cauda pale or dark, if black and with 6–8 hairs then dorsum has extensive black sclerotisation, R IV+V is 0.8–1.0× HT II and ANT PT/BASE 1.9–3.6 go to key to polyphagous aphids, p. 1020 (specimens running to *Aphis fabae* could be *A. magnopilosa* Nevsky)

***Centaurium* (incl. *Erythraea*)**

C. tenuiflorum
C. umbellatum
C. vulgare

Gentianaceae

[*Brachyunguis harmalae*]
Aphis gentianae
Myzus [cerasi], erythraeae

Key to apterae on *Centaurium*:-

- Head smooth, ANT tubercles weakly developed, front of head straight or sinuous in dorsal view. Large, domed marginal tubercles (MTu) present on ABD TERG 1–5 and 7 *Aphis gentianae*
- Head scabrous/spinulose, ANT tubercles well-developed, scabrous, their inner faces convergent. Small MTu irregularly present on ABD TERG 1–4, never on 7 *Myzus erythraeae* (= *cerasi*?)

HOST LISTS AND KEYS

Centotheca

C. lappacea

C. latifolia

Centranthus

C. angustifolius

C. calcitrapa

C. coccineus

C. ruber

Gramineae

Pentalonia gavarri (as *nigronevosa*?)

Pentalonia gavarri

Valerianaceae

Aphis fabae, *Aphis* sp. (France, BMNH colln);

Macrosiphum euphorbiae, *rosae*

Aphis fabae; *Macrosiphum rosae*, *euphorbiae*; *Myzus ornatus*

Aphis fabae

Aphis fabae, *fabae solanella*, *gossypii*, *spiraecola*, *Aphis* sp.
(France, BMNH colln);

Macrosiphum centranthi, *euphorbiae*, *rosae*;

Myzus ascalonicus, *persicae*

Key to apterae on *Centranthus*:-

1. SIPH with a subapical zone of polygonal reticulation 2
- SIPH without polygonal reticulation 4
2. Head and ANT I–II dark. SIPH wholly dark *Macrosiphum rosae*
- Head and ANT I–II pale. SIPH pale at least at their bases 3
3. Apices of femora and SIPH dark. ANT 1.3–1.7× BL. Longest hairs on ABD TERG 3 are 33–50µm long. Cauda with 11–19 hairs *Macrosiphum centranthi*
- Apices of femora and SIPH pale/dusky. ANT 0.9–1.4× BL. Longest hairs on ABD TERG 3 are 20–37µm long. Cauda with 8–12 hairs *Macrosiphum euphorbiae*
4. SIPH and cauda both black, SIPH being 0.7–1.05× cauda. Dorsal abdomen usually with thin dark cross bands on ABD TERG 7 and 8, but without any small dark sclerites anterior to SIPH (except intersegmental muscle plates) *Aphis* sp. (France, BMNH colln)
- SIPH and cauda pale or dark, with SIPH (0.8-)1.2–2.5× cauda (if less than 1.1× cauda then dorsal abdomen usually has some small dark sclerites anterior to SIPH, or ABD TERG 7 and 8 are without dark cross bands) go to key to polyphagous aphids, p. 1020

Centrosema

C. arenarium

C. pubescens

Leguminosae

Aphis gossypii; *Microparsus brasiliensis*

Aphis craccivora

Key for apterae on *Centrosema*:-

1. ANT tubercles well-developed. SIPH with basal half pale, distal half dark and slightly clavate. (Al. with black-bordered wing veins) *Microparsus brasiliensis*
- ANT tubercles weakly developed. SIPH tapering, wholly dark 2
2. Dorsal abdomen with an extensive dark sclerite. Cauda dark *Aphis craccivora*
- Dorsal abdomen without dark markings. Cauda paler than SIPH *Aphis gossypii*

Cephalanthera

C. damasomium

C. longifolia

Cephalanthera sp.

Orchidaceae

Aphis fabae, *solanella*

Aulacorthum solani

Aphis fabae

Use key to polyphagous aphids, p. 1020.

Cephalanthus*C. occidentalis***Rubiaceae***Aphis cephalanthi***Cephalaria***C. corniculata**C. gigantea**C. joppica**C. leucantha**C. uralensis***Dipsacaceae***Macrosiphum rosae**Dysaphis cephalarioides**Brachycaudus helichrysi**Dysaphis cephalarioides**Dysaphis cephalarioides*Key to apterae on *Cephalaria*:-

1. ANT tubercle well developed, ANT about equal to BL. SIPH long and black, 0.3–0.45× BL, with a subapical zone of polygonal reticulation *Macrosiphum rosae*
- ANT tubercles little developed, ANT 0.3–0.7× BL. SIPH pale or dark, 0.05–0.15× BL and without subapical polygonal reticulation **2**
2. Large flat marginal tubercles (MTu) present on ABD TERG 1–5 and 7 (and sometimes on 6), and similar spinal tubercles (STu) on ABD TERG 1, 7 and 8. Spiracular apertures reniform. Dorsal abdomen with dark sclerites. SIPH imbricated, gradually tapering, about 2× cauda *Dysaphis cephalarioides*
- MTu rare, if present then smaller than the large, rounded spiracular apertures. STu absent. Dorsal abdomen without dark sclerites. SIPH smooth, conical, only a little longer than cauda *Brachycaudus helichrysi*

Cephalonoplos see *Cirsium***Cerastium***C. alpinum**C. arvense**C. biebersteinii**C. caespitosum* (incl. *holosteoides*)*C. edmonstonii**C. fontanum**C. glomeratum**C. holosteoides* see *caespitosum**C. macranthum**C. pumilum**C. semidecandrum**C. soleirolii**C. tianshanicum**C. tomentosum**C. triviale**C. uniflorum***Caryophyllaceae***Myzus certus, icelandicus, polaris**Aphis cerastii; Aulacorthum solani; Brachycolus cerastii;**Myzus ascalonicus, certus, cymbalariae;**Smynthuroides betae**Myzus cymbalariae**Brachycolus cerastii; Myzus certus, persicae**Acyrtosiphon auctum**Aulacorthum solani; Myzus ascalonicus, polaris**Aulacorthum solani; Macrosiphum euphorbiae;**Myzus ascalonicus, persicae**Myzus cymbalariae**Myzus ascalonicus, certus, persicae**Myzus certus, persicae**Aphidura* sp. (Corsica: BMNH, leg. J.H. Martin)*Acyrtosiphon ilka; Aulacorthum solani**Aulacorthum solani;**Myzus ascalonicus, certus, cymbalariae**Brachycolus stellariae; Myzus certus**Thecabius cerastii*

HOST LISTS AND KEYS

C. vulgatum

Abstrusomyzus phloxae; *Aphis fabae*; *Aulacorthum solani*;
Brachycaudus helichrysi; *Brachycolus cerastii*;
Myzus ascalonicus, *persicae*

Cerastium spp.

Aphis sambuci; [*Nasonovia brevipipes*]

Key to apterae on *Cerastium*:–

1. ANT PT/BASE less than 0.5. SIPH absent 2
– ANT PT/BASE more than 1.5. SIPH present, tubular (sometimes small) 3
2. Primary rhinaria ringed with short hairs. Dorsal abdomen with wax pore plates *Thecabius cerastii*
– Primary rhinaria with sclerotic, hairless rims. Dorsal abdomen without wax pore plates
Smynthurodes betae
3. Head smooth or slightly wrinkled, or with a few spicules on ventral side only 4
– Head densely spiculose or nodulose 13
4. SIPH very small, flangeless, conical or barrel-shaped, less than 0.3× cauda 5
– SIPH more than 0.7× cauda 6
5. ABD TERG 8 with a small rounded median process bearing two hairs. R IV+V at least 0.9× HT II, longer than ANT IV *Brachycolus cerastii*
– ABD TERG 8 without a median process. R IV+V 0.55–0.72× HT II, shorter than ANT IV
Brachycolus stellariae
6. ABD TERG 1 and 7 (at least) with marginal tubercles (MTu) 7
– ABD TERG 1 and 7 without MTu 9
7. MTU absent from ABD TERG 2–4, or only intermittently present and small on these segments
Aphis fabae
– Large MTu present on ABD TERG 2–4 as well as 1 and 7 8
8. SIPH uniformly dark, 2.1–3.5× cauda. ANT PT/BASE 2.1–2.9 *Aphis sambuci*
– SIPH paler at bases, less than 2× cauda (?). ANT PT/BASE 3.2–3.6 *Aphis cerastii**
9. Cauda short, helmet-shaped, not longer than its basal width. SIPH with a subapical annular incision. Spiracular apertures large and rounded *Brachycaudus helichrysi*
– Cauda tongue-shaped, longer than its basal width. Spiracular apertures reniform 10
10. SIPH with polygonal reticulation on subapical 0.12–0.20 of length *Macrosiphum euphorbiae*
– SIPH without any distinct zone of polygonal reticulation 11
11. Dorsal abdominal hairs arising from dark rounded scleroites. ANT shorter than BL, and ANT III without rhinaria. SIPH dusky/dark, especially towards apices, and slightly swollen on distal half
Aphidura sp. (Corsica)
– Dorsal abdominal hairs not arising from dark scleroites. ANT longer than BL. ANT III usually with 1–3 rhinaria near base. SIPH pale, tapering/cylindrical 12
12. SIPH 0.25–0.33× BL, and 1.5–2.4× cauda *Acyrtosiphon ilka*
– SIPH 0.11–0.17× BL, and 0.85–1.33× cauda *Acyrtosiphon auctum*
13. SIPH tapering gradually from base to flange. ANT III usually with 1–2 small rhinaria near base
Aulacorthum solani
– SIPH slightly to moderately swollen distally. ANT III without rhinaria 14
14. SIPH 0.54–0.81× ANT III 15
– SIPH 0.82–1.34× ANT III 16

15. Inner faces of ANT tubercles approximately parallel in dorsal view. SIPH almost smooth or weakly imbricated, with narrowest part of basal 'stem' not wider than hind tibia at midlength. Dorsal cuticle smooth or slightly wrinkled *Myzus ascalonicus*
- Inner faces of ANT tubercles with convergent apices. SIPH heavily imbricated or scabrous, with narrowest part of stem a little wider than hind tibia at midlength. Dorsal cuticle scaly *Myzus cymbalariae*
16. ANT tubercles not apically convergent. SIPH rather short and thick, dark, with width of narrowest part of stem more than 0.13 of length. ANT 5- or 6-segmented, with ANT PT/BASE 1.1–2.8 *Myzus polaris*
- ANT tubercles apically convergent, or with apically convergent processes. SIPH pale or dusky with narrowest part of stem less than 0.13 of length. ANT always 6-segmented, with ANT PT/BASE 2.6–5.1 17
17. ANT tubercles themselves rather low, but with scabrous processes extending forward from ANT bases. SIPH weakly swollen subapically (over about distal 0.25). Dorsum with an evident reticulate pattern *Abstrusomyzus phloxae*
- ANT tubercles broadly rounded, without forwardly directed processes. SIPH slightly to moderately swollen over about distal 0.5. Dorsum without a reticulate pattern 18
18. R IV+V in most specimens with only one pair of lateral accessory hairs (plus 0–3 ventral accessory hairs). Value of function cauda/(ANT III× PT) in range 0.80–1.52, but rarely more than 1.25 except in small specimens (those with ANT III less than 0.32 mm) *Myzus persicae*
- R IV+V in most specimens with two pairs of lateral accessory hairs. Value of function cauda/(ANT III× PT) in range 1.2–2.7 (rarely less than 1.25) 19
19. R IV+V shorter than or about as long as (0.85–1.1×) ANT BASE VI *Myzus certus*
- R IV+V usually longer than (1.0–1.2×) ANT BASE VI *Myzus icelandicus*

Ceratoides* see *Krascheninnikovia

C. papposus see *Krascheninnikovia ceratoides*

Ceratocephalus

C. falcatus

Ranunculaceae

Dysaphis pulverina

Ceratochloa* see *Bromus

***Ceratonia* see Blackman and Eastop (1994)**

Ceratophyllum

C. submersus

Ceratophyllum sp.

Ceratophyllaceae

Sipha glyceriae

Rhopalosiphum nymphaeae

Use key to apt. on *Sagittaria*.

Ceratostigma

C. willmottianum

Plumbaginaceae

Myzus ornatus, persicae

Use key to polyphagous aphids, p. 1020.

Ceratotheca

C. sesamoides

Pedaliaceae

Aphis gossypii

***Cercidiphyllum*, *Cercis* see Blackman and Eastop (1994)**

Cercocarpus

C. montanus

Rosaceae

Acyrtosiphon sp. nr *pseudodirhodum*;

Aphis cercocarpi; *Illinoia gracilicornis*

C. parvifolius see *montanus*

Key to apterae on *Cercocarpus*:-

1. ANT shorter than BL. ANT PT/BASE 1.6–2.3. SIPH dark, tapering, 0.10–0.15× BL and 1.1–1.6× cauda, which is also dark. Black cross-bands often present on posterior abdomen. Marginal tubercles (MTu) constantly on ABD TERG 1 and 7, and sporadically on 2–6 *Aphis cercocarpi*
- ANT much longer than BL. ANT PT/BASE 3.6–6.0. SIPH, cauda and abdomen pale. MTu always absent from ABD TERG 1 and 7, sporadically on 2–5 **2**
2. SIPH c. 0.30–0.35× BL and 2.7–2.9× cauda; slightly swollen on distal third, with polygonal reticulation distal to swollen part. R IV+V 1.3–1.4× HT II *Illinoia gracilicornis*
- SIPH 0.12–0.15× BL and about equal in length to cauda, not swollen distally and without any polygonal reticulation. R IV+V 0.9–1.1× HT II *Acyrtosiphon* sp. nr *pseudodirhodum*

Cerdana* see *Cordia

Cereus

C. triangularis

Cereus sp.

Cactaceae

Toxoptera aurantii

Aphis gossypii

Use key to polyphagous aphids, p. 1020.

Cerinthe

C. major

C. minor

Boraginaceae

Brachycaudus bicolor

Brachycaudus bicolor, *cerinthis*;

Macrosiphum cerinthiacum

Key to apterae on *Cerinthe*:-

1. Dorsum pale. ANT tubercles well developed, smooth, with inner faces divergent. ANT III with 8–20 rhinaria. Legs with dark spots near femoral apices. SIPH long, pale, with a darker subapical zone of polygonal reticulation; about 2× the long finger-like cauda. Spiracular apertures small, reniform *Macrosiphum cerinthiacum*
- Dorsum with broad dark transverse bands, separate or partially fused between tergites. ANT tubercles undeveloped. ANT III without rhinaria. Legs variously pigmented. SIPH dark, without polygonal reticulation. Cauda semicircular or helmet-shaped, shorter than its basal width. Spiracular apertures large, rounded **2**
2. Large, flat marginal tubercles (MTu), usually larger than spiracles, present on all thoracic segments and ABD TERG 1–7. SIPH about 2× cauda, with a large flange *Brachycaudus bicolor*
- MTu only irregularly present and always smaller than spiracles. SIPH very short, conical, similar in length to or shorter than cauda, with an undeveloped or small flange *Brachycaudus cerinthis*

Ceropegia

- C. linearis* (incl. *woodii*)
- C. radicans*
- C. stapeliaeformis*

Asclepiadaceae

- Neomyzus circumflexus*
- Aphis nerii*
- Aphis nerii*

Use key to polyphagous aphids, p. 1020.

Ceropteris

- C. calomelanos*

Polyodiaceae

- Idiopterus nephrolepidis*

(or try key to fern-feeding aphids under *Polypodium*)

Cestrum

- C. aurantiacum*
- C. diurnum* (incl. *macrophyllum*)
- C. fasciculatum*
- C. laevigatum*
- C. laurifolium*
- C. macrophyllum* see *diurnum*
- C. newelli*
- C. nocturnum*

Solanaceae

- Aphis spiraeicola*; *Aulacorthum solani*; *Myzus persicae*
- Aphis gossypii*, *spiraecola*; *Aulacorthum solani*;
- Myzus persicae*; *Toxoptera aurantii*
- Aphis fabae*, *spiraecola*; *Brachycaudus helichrysi*;
- [*Greenideoida lutea*]; *Myzus ornatus*, *persicae*;
- Neomyzus circumflexus*; *Toxoptera aurantii*
- Aphis spiraeicola*
- Aphis spiraeicola*
- Myzus persicae*; *Neomyzus circumflexus*
- Aphis craccivora*, *fabae*, *gossypii*, *spiraecola*;
- Aulacorthum solani*; [*Eriosoma lanigerum*];
- Myzus persicae*; *Toxoptera aurantii*
- Aphis fabae*; *Myzus persicae*; *Toxoptera aurantii*
- Aphis solanella*; *Myzus persicae*
- Aphis fabae*, *spiraecola*; *Myzus persicae*
- Aphis nasturtii*, *Aphis* sp. (India, BMNH colln);
- Aulacorthum magnoliae*; [*Sitobion rosaeformis*]

Key to apterae on *Cestrum*:-

- SIPH and cauda both black, SIPH 0.8–0.9× cauda which bears 6–8 hairs. ANT PT/BASE 1.6–1.95. R IV+V 1.1–1.3× HT II *Aphis* sp. (India, BMNH colln)
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Ceterach* see *Asplenium

- C. officinarum* see *Asplenium ceterach*

Chaenactis

- Ch. douglasii*

Compositae

- Uroleucon* (*Lambersius*) sp. (western USA, BMNH colln)

Chaenomeles

- Ch. japonica* (incl. *maulei*)

Rosaceae

- Aphis fabae*, *gossypii*, *pomi*, *spiraecola*, *spiraephaga*;
- Aulacorthum solani*; *Brachycaudus helichrysi*;
- Illinoia macgillivrayae*; *Macrosiphum euphorbiae*;
- Myzus persicae*; *Ovatus insitus*, *malisuctus*;
- Rhopalosiphum insertum*, [*nymphaeae*, *padi*]

HOST LISTS AND KEYS

<i>Ch. lagenaria</i>	<i>Aphis gossypii</i> , <i>pomi</i> , <i>spiraecola</i> ; <i>Brachycaudus helichrysi</i> ; <i>Dysaphis</i> sp. (Japan; Stroyan, 1985 and BMNH colln); <i>Myzus persicae</i> ; [<i>Sitobion</i> sp. (Millar, 1994)]
<i>Ch. maulei</i> see <i>japonica</i>	
<i>Ch. sinensis</i>	<i>Aulacorthum magnoliae</i> ; <i>Myzus persicae</i> ; <i>Ovatus insitus</i> , <i>Ovatus</i> sp. (? <i>malicolens</i> ; Korea, BMNH colln); <i>Prociphilus chaenomelis</i> ; [<i>Sappaphis piri</i>]
<i>Ch. speciosa</i>	<i>Aphis gossypii</i> , <i>pomi</i> ; <i>Aulacorthum solani</i> ; <i>Myzus ornatus</i> , <i>persicae</i> ; <i>Ovatus malisuctus</i> ; <i>Schizaphis chaenometiola</i> ; [<i>Sitobion</i> sp. (Millar, 1994)]

Key to apterae on *Chaenomeles* (except first couplet, also applicable to al.):—

1. ANT PT/BASE less than 0.3. SIPH absent or as very small pores. Wax gland plates on head, thorax and abdomen *Prociphilus chaenomelis*
- ANT PT/BASE more than 1.5. SIPH present, tubular. No wax gland plates **2**
2. Head with well-developed ANT tubercles, their inner faces scabrous or at least somewhat spiculose, and steep-sided or apically convergent **3**
- Head with ANT tubercles either absent or weakly developed, or very well developed and smooth and divergent **8**
3. Genital plate enlarged and produced posteriorly. SIPH dark, very coarsely imbricated *Ovatus malisuctus*
- Genital plate normal. SIPH pale, weakly to moderately imbricated **4**
4. ANT III usually with 1–2 small rhinaria near base. Inner faces of antennal tubercles spiculose, approximately parallel **5**
- ANT III without rhinaria. Inner faces of ANT tubercles scabrous, convergent apically **6**
5. Dorsal side of head almost devoid of spicules. SIPH slightly clavate. Femora dark except at bases *Aulacorthum magnoliae*
- Head densely spiculose dorsally as well as ventrally. SIPH tapering/cylindrical with no trace of swelling. Femora dark only at apices *Aulacorthum solani*
6. SIPH slightly clavate. R IV+V 1.0–1.2× HT II. ANT PT/BASE 3.1–4.6 *Myzus persicae*
- SIPH gradually tapering. R IV+V 1.25–1.5× HT II. ANT PT/BASE 4.2–6.1 **7**
7. ANT PT/BASE 4.9–6.1 (Al. emigrant with sec. rhin. distributed ANT III 60–83, IV 36–42, V 13–22) *Ovatus insitus*
- ANT PT/BASE 4.2–5.3. (Al. emigrant with sec. rhin. distributed ANT III 48–60, IV 26–38, V 10–15) *Ovatus* sp. (?*malicolens*) Korea, BMNH colln
8. SIPH with a subapical zone of polygonal reticulation. ANT tubercles very well developed. ANT III with 1–10 rhinaria. Body spindle-shaped **9**
- SIPH without polygonal reticulation. ANT tubercles weakly developed or absent. ANT III without rhinaria. Body ovate **10**
9. SIPH swollen on distal half, proximal to reticulated part. Hairs on ANT III all less than 0.4× BD III *Illinoia macgillivrayae*
- SIPH cylindrical on distal half (sometimes with some constriction of reticulated part). Hairs on ANT III 0.6–1.0× BD III *Macrosiphum euphorbiae*

10. Cauda tongue- or finger-shaped, clearly longer than its basal width. (Al. without a black dorsal abdominal patch) **11**
 – Cauda short, helmet-shaped or triangular, not longer than its basal width in dorsal view. (Al. with an extensive black dorsal abdominal patch) **18**
11. Abdomen without any marginal tubercles (MTu). SIPH thin and cylindrical with a small flange, 1.1–1.3× the very thick cauda which bears 6–7 hairs *Schizaphis chaenometiola*
 – Abdomen with MTu at least on ABD TERG 1 and 7. SIPH and cauda not as above **12**
12. SIPH slightly swollen subapically and constricted before the well-developed flange. MTu on ABD TERG 7 placed posteriodorsally to spiracle, and no larger than the spiracular aperture *Rhopalosiphum insertum*
 – SIPH tapering from base to flange, which is only moderately developed. MTu on ABD TERG 7 placed posteroventrally to spiracle, and usually larger than the spiracular aperture **13**
13. Stridulatory apparatus present. ANT PT/BASE 3.5–5.0 *Toxoptera aurantii*
 – No stridulatory apparatus. ANT PT/BASE less than 3.5 **14**
14. Femoral hairs mostly much shorter than trochantrofemoral suture **15**
 – Femoral hairs long and fine, many exceeding length of trochantrofemoral suture **16**
15. SIPH 1.3–2.5× the pale or dusky cauda, which bears 4–8 hairs. R IV+V 1.1–1.4× HT II. Dorsal abdomen without dark markings *Aphis gossypii*
 – SIPH and cauda both similarly dark, SIPH being 0.7–1.1× cauda, which bears 7–17 hairs. R IV+V 0.7–0.9× HT II. Dorsal abdomen usually with dark markings *Aphis spiraeaphaga*
16. ABD TERG 7 and 8 with dark transverse bands, and at least some dark spinopleural markings on abdomen anterior to SIPH *Aphis fabae*
 – No dark dorsal abdominal markings **17**
17. MTu usually present on ABD TERG 2–4. Cauda with 10–19 hairs. R IV+V more than 120 µm *Aphis pomi*
 – MTu usually absent from ABD TERG 2–4. Cauda with 7–15 hairs (rarely more than 12). R IV+V less than 120 µm *Aphis spiraeicola*
18. Spiracles large and rounded. Abdomen with MTu irregularly present, always smaller than spiracular apertures. (Al. with 13–46 rhinaria on ANT III and 0–15 on IV) *Brachycaudus helichrysi*
 – Spiracles reniform, not large. Abdomen with MTu on most segments, larger than spiracular apertures. (Al. with ANT III and basal part of IV swollen with numerous large rhinaria; 40–60 on III and 18–30 on IV) *Dysaphis* sp. (Japan; Stroyan, 1985 and BMNH colln)

Chaerophyllum*Ch. aromaticum**Ch. aureum**Ch. bulbosum**Ch. hirsutum***Umbelliferae***Aphis fabae*; *Cavariella aegopodii*; *Dysaphis chaerophylli*;
Macrosiphum gei; *Myzus persicae**Aulacorthum solani*; *Cavariella aegopodii, theobaldi*;*Dysaphis caucasica*; *Hyadaphis foeniculi*; *Macrosiphum gei**Aphis fabae*; *Cavariella pastinacae*;*Dysaphis brachycyclica, chaerophylli, flava*;*Macrosiphum gei**Aphis fabae*; *Cavariella aegopodii, pastinacae*;*Dysaphis brachycyclica, chaerophylli*; *Hyadaphis foeniculi*;*Macrosiphum gei*; *Myzus persicae*

HOST LISTS AND KEYS

<i>Ch. maculatum</i>	<i>Dysaphis chaerophyllina</i>
<i>Ch. roseum</i>	<i>Myzus persicae</i>
<i>Ch. sylvestre</i>	<i>Cavariella aegopodii</i> ; <i>Macrosiphum euphorbiae</i> , <i>gei</i>
<i>Ch. temulum</i>	<i>Aphis fabae</i> ; <i>Cavariella aegopodii</i> , <i>pastinacae</i> ; <i>Dysaphis brachycyclica</i> , <i>chaerophylli</i> ; <i>Macrosiphum gei</i> ; <i>Semiaphis anthrisci</i>
<i>Chaerophyllum</i> sp.	<i>Aphis solanella</i>

Key to apterae on *Chaerophyllum*:-

1. ABD TERG 8 with a backwardly directed process above cauda 2
– No supracaudal process 4
2. SIPH tapering, not at all clavate *Cavariella theobaldi*
– SIPH clavate 3
3. ANT PT/BASE 0.9–1.4 *Cavariella aegopodii*
– ANT PT/BASE 2.6–4.0 *Cavariella pastinacae*
4. ANT tubercles low or absent 5
– ANT tubercles well developed, greatly exceeding height of middle of front of head in dorsal view 11
5. SIPH very short, only 0.4–0.6× cauda, and flangeless *Semiaphis anthrisci*
– SIPH more than 0.8× cauda, with a distinct flange 6
6. Cauda helmet-shaped, not longer than its basal width in dorsal view 7
– Cauda tongue-shaped, much longer than its basal width 10
7. ANT III with short blunt hairs maximally 12–13µm long, 0.6–0.7× BD III. R IV+V 1.5–1.6× HT II *Dysaphis caucasica**
– ANT III with pointed hairs maximally 26–74µm long, 1.2–3.1× BD III. R IV+V 1.1–1.35× HT II 8
8. ABD TERG 8 with 4–6 hairs (very rarely 7), and cauda with 4–5 hairs (rarely 6). Marginal tubercles (MTu) usually absent from ABD TERG 6 *Dysaphis chaerophyllina**
– ABD TERG 8 with 5–16 hairs; if less than 8 then MTu are usually present on ABD TERG 6. Cauda with 4–13 hairs 9
9. Hairs on ANT III are maximally 47–67µm long, 2.1–3.1× BD III *Dysaphis chaerophylli*
– Hairs on ANT III are maximally 22–42µm long, 1.1–1.9× BD III *Dysaphis flava* or *brachycyclica*
10. SIPH clavate, 0.9–1.3× cauda, which bears 5–7 hairs *Hyadaphis foeniculi*
– SIPH gradually tapering, 0.8–1.8× cauda, which bears 11–24 hairs *Aphis fabae*
11. SIPH with a subapical zone of polygonal reticulation. ANT tubercles smooth, divergent, bearing pointed hairs 12
– SIPH without polygonal reticulation. ANT tubercles spiculose or scabrous, steep-sided or apically convergent, bearing blunt hairs 13
12. Longest hair on ABD TERG 8 is 38–63µm, 0.6–1.4× ANT BD III. Anterior half of subgenital plate usually (77%) with only 2 hairs (18% with 3, 5% with 4–6 hairs) *Macrosiphum euphorbiae*
– Longest hair on ABD TERG 8 is 66–106µm, 1.4–2.0× ANT BD III. Anterior half of subgenital plate with 2–11 hairs, usually (77%) with 4–8 hairs *Macrosiphum gei*

13. SIPH slightly clavate. ANT III without rhinaria. Inner faces of ANT tubercles scabrous, convergent apically *Myzus persicae*
 – SIPH gradually tapering. ANT III usually with 1–2 rhinaria. Inner faces of ANT tubercles spiculate, approximately parallel *Aulacorthum solani*

Chaetochloa see *Setaria*

Chaetotropis see *Polypogon*

Chalcas see *Murraya*

Chamaebataria

Ch. millefolium

Rosaceae

Acyrtosiphon sp. near *pseudodirhodum* (BMNH colln);
Illinoia sp. (BMNH colln)

(Both USA, California, White Mts., Cotton Wood Basin, 9600 ft (3000 m), leg. P Rude)

Couplet for separating apterae of these two spp.:-

(Both spp. have smooth head with divergent ANT tubercles, and pale SIPH and cauda.)

- SIPH tapering/cylindrical, without any subapical polygonal reticulation, c.1.1× cauda which bears c.14 hairs. ANT PT/BASE c.6, PT 2.8–3.0× SIPH. R IV+V 0.9–1.0× HT II
Acyrtosiphon sp. near *pseudodirhodum*
 – SIPH slightly swollen on distal half with polygonal reticulation on subapical 0.04–0.1 of length, 2.3–2.8× cauda which bears 8–10 hairs. ANT PT/BASE 3.3–3.9, PT 0.45–0.6× SIPH. R IV+V 1.6–2.0× HT II
Illinoia sp.

Chamaebatia

Ch. foliosa

Rosaceae

Ericaphis sp. near *wakibae* (California; BMNH colln, leg. D Hille Ris Lambers)

Chamaecypris see Blackman and Eastop (1994)

Chamaecytisus

Ch. albus

Ch. austriacus

Ch. candicans

Ch. heuffelii

Ch. palmensis

Ch. proliferus

Ch. ratisbonensis

Ch. ruthenicum

Ch. scrobiszewskii

Ch. spinosus

Ch. supinus (incl. *capitatus*)

Leguminosae

Acyrtosiphon parvum

Acyrtosiphon parvum; *Aphis pseudocytisorum*

Acyrtosiphon parvum

Ctenocallis dobrovljanskyi

Aphis cytisorum

Aphis cytisorum; *Brachycaudus helichrysi*

Acyrtosiphon parvum

Aphis cytisorum

Aphis cytisorum

Acyrtosiphon parvum

Acyrtosiphon parvum; *Aphis zweigelti*;

Ctenocallis dobrovljanskyi

Use key to apterae on *Cytisus*.

HOST LISTS AND KEYS

Chamaedaphne

Ch. calyculata

Ericaceae

Macrosiphum nasonovi

***Chamaemelum* (incl. *Ormenis*)**

Ch. mixtum

Ch. nobile

Compositae

Aphis spiraecola;
[*Aphis* (*Protaphis*) sp. – Mier Durante, 1978: 93]
Aphis fabae; *Brachycaudus cardui*, *helichrysi*;
Macrosiphoniella sanborni, *tanacetaria*

See key to apterae on *Anthemis*.

Chamaenerion* see *Epilobium

Chamaerhodos

Ch. erecta

Rosaceae

Szelegiewicziella chamaerhodi

Chamaerops

Ch. humilis

Arecaceae

Cerataphis brasiliensis

Chamaespartium* see *Genista

Chamaesyce* see *Euphorbia

Chamelaucium

Ch. uncinatum

Myrtaceae

Aphis gossypii, *spiraecola*; *Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Chamissoa

Ch. altissima

Amaranthaceae

Aphis craccivora, *gossypii*; *Macrosiphum euphorbiae*

Use key to polyphagous aphids, p. 1020.

Chamomilla* see *Matricaria

Changium

Ch. smyrnoides

Umbelliferae

Semiaphis heraclei

Chaptalia

Ch. comptonioides

Ch. montana

Ch. nutans

Chaptalia sp.

Compositae

Aphis gossypii, *spiraecola*; *Toxoptera aurantii*
Aphis gossypii; *Toxoptera aurantii*; *Uroleucon ambrosiae*
Aphis gossypii
Brachycaudus helichrysi

Use key to polyphagous aphids, p. 1020.

***Chasmanthe* (incl. spp. ex *Antholyza*)**

Ch. refracta

Iridaceae

Neomyzus circumflexus

Cheilanthes

Ch. albomarginatus
Ch. argentea
Ch. compositor
Ch. varies
Cheilanthes sp.

Pteridaceae

Micromyzodium filicium
Micromyzus judenkoi
Micromyzus judenkoi
Macromyzus manoji, woodwardiae; [*Macrosiphum rosae*]
Amphorophora ampullata ssp. *bengalensis*;
Micromyzodium dasi

Use key to fern-feeding aphids under *Polypodium*.

Cheiranthus see *Erysimum***Chelidonium**

Ch. majus

Ch. simense (?)

Papaveraceae

Acyrtosiphon chelidonii; *Aphis fabae*;
Aulacorthum solani;
Macrosiphum euphorbiae; *Myzus persicae*;
Rhopalosiphoninus latysiphon
Acyrtosiphon chelidonii

Key to apterae on *Chelidonium*:-

- Head smooth, pale, with rather low, divergent ANT tubercles. ANT III never with rhinaria. SIPH pale with darker apices, without polygonal reticulation, 1.7–2.3× cauda which bears 7–14 hairs. R IV+V 0.8–0.9× HT II, and ANT PT/BASE 2.7–3.3 *Acyrtosiphon chelidonii*
- Without this combination of characters go to key to polyphagous aphids, p. 1020

Chelone

Ch. glabra

Scrophulariaceae

Pseudosiphonaphis corni

Chenopodium (incl. *Allenrolfea*)

Ch. acuminatum
Ch. album (incl. var. *centrorubrum*)

Ch. amaranticolor

Ch. ambrosioides
 (incl. *antheiniticum*)

Ch. botrys

Ch. capitatum

Ch. ficifolium

Ch. foliosum

Ch. fremonti

Ch. giganteum

Chenopodiaceae

Aphis craccivora
Aphis craccivora, fabae, gossypii, helianthi, middletonii, nasturtii, spiraeicola;
Aulacorthum solani; [*Cryptosiphum atriplicivorum*];
Hayhurstia atriplicis[†]; *Landisaphis davisi*;
Macrosiphum [cholodkovskyi], euphorbiae;
Myzus antirrhinii, ornatus, persicae;
Pemphigus betae, fuscicornis, populivenae
Myzus persicae
Aphis craccivora, fabae, gossypii, spiraeicola;
Macrosiphum euphorbiae; Myzus persicae;
Toxoptera citricidus
Aphis fabae; Myzus persicae
Aphis fabae; Macrosiphum euphorbiae
Hayhurstia atriplicis
Aphis fabae, gossypii
Pemphigus betae
Myzus persicae

[†]Records of *Lipaphis* and *Hyalopterus*, and of *Hyadaphis coriandri*, on *Ch. album* in India and Africa respectively, are assumed to be all referable to *Hayhurstia atriplicis*.

HOST LISTS AND KEYS

<i>Ch. glaucum</i>	<i>Aphis fabae, fabae solanella; Hayhurstia atriplicis</i>
<i>Ch. hybridum</i>	<i>Aphis fabae; Hayhurstia atriplicis</i>
<i>Ch. murale</i>	<i>Aphis fabae; Hayhurstia atriplicis;</i> <i>Macrosiphum [creelii], euphorbiae; Myzus persicae</i>
<i>Ch. opulifolium</i>	<i>Aphis fabae, gossypii; Hayhurstia atriplicis;</i> <i>Macrosiphum euphorbiae; Myzus persicae;</i> <i>Smynthuroides betae</i>
<i>Ch. polyspermum</i>	<i>Aphis fabae; Hayhurstia atriplicis; Macrosiphum euphorbiae</i>
<i>Ch. pumilio</i>	<i>Aphis fabae</i>
<i>Ch. quinoa</i>	<i>Aphis fabae; Hayhurstia atriplicis;</i> <i>Macrosiphum euphorbiae</i>
<i>Ch. rafaelse</i>	<i>Aphis craccivora, fabae</i>
<i>Ch. soolanum</i>	<i>Brachyunguis bahamondesi</i>
<i>Ch. suecicum</i>	<i>Hayhurstia atriplicis; Brachyunguis bahamondesi</i>
<i>Ch. urbicum</i>	<i>Hayhurstia atriplicis</i>
<i>Ch. vaginata</i>	<i>Brachyunguis blanchardi</i>
<i>Ch. viride</i>	<i>Myzus persicae</i>
<i>Ch. vulvaria</i>	<i>Hayhurstia atriplicis</i>
<i>Chenopodium</i> spp.	<i>Aphis</i> sp. (Eritrea, BMNH colln); <i>Brachycaudus helichrysi;</i> [<i>Hyalomyzus raoi</i>]; <i>Neomyzus circumflexus;</i> <i>Rhopalosiphoninus staphyleae</i> ssp. <i>tulipaellus;</i> [<i>Semiaphis dauci</i>]; [<i>Thecabius affinis</i>]

Key to apterae on *Chenopodium*:-

1. SIPH as short as or shorter than (0.55–1.04×) cauda, and 2.7–4.2× longer than their diameter at midlength. Cauda with 5–8 hairs 2
 - SIPH (if present) either longer than cauda or, if shorter, then they are less than 2.5× their diameter at midlength and/or cauda bears more than 10 hairs 4
2. ANT PT/BASE 1.4–2.5. SIPH slightly swollen on distal half, 0.6–0.8× cauda. Clypeus not abnormally swollen *Hayhurstia atriplicis*
 - ANT PT/BASE 0.97–1.36. SIPH tapering or cylindrical, 0.7–1.04× cauda. Clypeus swollen 3
3. R IV+V 0.8–0.9× HT II. Cauda finger-shaped with a slight midway constriction. Clypeus greatly swollen, filling the space between the antennal bases *Brachyunguis blanchardi*
 - R IV+V 1.1–1.25× HT II. Cauda triangular, tapering without a constriction. Clypeus not so swollen, occupying about 0.75–0.8 of space between antennal bases *Brachyunguis bahamondesi*
4. Dorsal abdominal hairs spatulate and/or flabellate (expanded and flattened from bases). SIPH pale or dusky and distinctly clavate *Landisaphis davisi*
 - Dorsal abdominal hairs pointed, blunt or slightly expanded at apices. SIPH clavate, cylindrical, tapering or absent 5
5. SIPH thick, black, tapering, only 2.6–3.1× their diameter at midlength and c. 1.5× the black cauda which bears 6–7 hairs. ANT PT/BASE 1.95–2.35. R IV+V 1.05–1.25× HT II *Aphis* sp. (Eritrea, BMNH colln)
 - Without that combination of characters go to key to polyphagous aphids, p. 1020

Chilopsis

Ch. linearis

Bignoneae

Aphis chilopsidi

Chimonanthus

Ch. fragrans

Calycanthaceae

Macrosiphum euphorbiae

Chiococca

Ch. alba

Rubiaceae

Aphis spiraecola; Toxoptera aurantii

Use key to polyphagous aphids, p. 1020.

Chionachne

Ch. semiteres

Gramineae

Tetraneura fusiformis

Use key to apterae of grass-feeding aphids under *Digitaria*.

Chionochloa

Ch. conspicua

Gramineae

Sitobion miscanthi

Use key to apterae of grass-feeding aphids under *Digitaria*.

Chionodoxa

Chionodoxa sp.

Hyacintheae

Dysaphis tulipae

Chloraea

Ch. grandiflora

Orchidaceae

Aphis ?solanella (Chile, BMNH colln)

Chloris

Ch. barbata

Ch. gayana

Gramineae

Hysteroneura setariae; Sitobion graminis, lambersi, miscanthi

Hysteroneura setariae; Rhopalosiphum maidis;

Schizaphis hypersiphonata; Sitobion graminis;

Tetraneura fusiformis

Ch. inflata

Hysteroneura setariae;

Sitobion graminis, lambersi, miscanthi

Ch. petraea

Hysteroneura setariae; Tetraneura fusiformis

Ch. pilosa

Aphis gossypii; Hysteroneura setariae

Ch. pycnothrix

Sitobion lambersi

Ch. radiata

Hysteroneura setariae

Ch. virgata

Hysteroneura setariae; Paraclotus cimiciformis

Chloris spp.

Geoica lucifuga; Tetraneura nigriabdominalis

Use key to apterae of grass-feeding aphids under *Digitaria*.

Chlorocodon see *Mondia*

Chlorophytum

Ch. blepharophyllum

Ch. comosum

Chlorophytum spp.

Anthericaceae

Aphis craccivora

Myzus persicae; Neomyzus circumflexus

Aulacorthum solani; Myzus ascalonicus

Use key to polyphagous aphids, p. 1020.

HOST LISTS AND KEYS

Chondrilla

- Ch. brevirostris*
Ch. canescens
Ch. japonica see *Crepis japonica*
Ch. juncea

Ch. latifolia
Chondrilla spp.

Compositae

- [*Brachyunguis* sp. (Kadyrbekov, 2003c)]
Uroleucon chondrillae

Aphis fabae; *Chondrillobium blattnyi*; *Myzus persicae*;
Rectinasus buxtoni; *Uroleucon chondrillae*, *sonchi*
Uroleucon chondrillae
Aphis chondrillae;
[*Chomaphis chondrillae* Mordvilko 1932 – nomen nudum];
Titanosiphon chondrillae

Key to apterae on *Chondrilla*:–

1. ANT 5-segmented, with ANT V BASE very long and PT very short, peg-like. R IV+V extremely long, similar in length to hind femur, and bearing numerous hairs. Body and appendages densely clothed in fine hairs *Rectinasus buxtoni*
 - ANT 6-segmented, with PT not peg-like. R IV+V much shorter and less hairy. Body and appendages not densely hairy **2**
2. ANT PT/BASE 0.75–0.80. SIPH dark, short and thick, only c. 0.5× cauda, which is bluntly triangular *Aphis chondrillae**
 - ANT PT/BASE more than 1. SIPH if very short then thin and pale, otherwise more than 0.7× cauda **3**
3. SIPH pale, thin and very short, only 0.4–0.5× cauda. R IV+V only about as long as basal width *Chondrillobium blattnyi*
 - SIPH pale or dark, more than 0.7× cauda. R IV+V clearly longer than its basal width **4**
4. SIPH dark, with polygonal reticulation on distal 0.16–0.28 of length. Cauda long, pale, finger-like. ANT III with 9–74 rhinaria **5**
 - SIPH pale or dark, if dark then without polygonal reticulation, and cauda also dark. ANT III without, or with fewer, rhinaria **6**
5. ANT III with 40–74 rhinaria. Crescent-shaped antesiphuncular sclerites usually present. Cauda with 11–21 hairs *Uroleucon chondrillae*
 - ANT III with 9–35 rhinaria. Antesiphuncular sclerites vestigial or absent. Cauda with 23–30 hairs *Uroleucon sonchi*
6. SIPH very long, 3.1–3.5× cauda and 0.4–0.5× BL *Titanosiphon chondrillae*
 - SIPH much shorter **7**
7. SIPH and cauda black, the latter with 11–24 hairs. Head dark, smooth, with ANT tubercles weakly developed. ABD TERG 7 and 8 with dark cross-bands *Aphis fabae* group
 - SIPH pale and slightly clavate, cauda pale with 5–8 hairs. Head pale, scabrous, with ANT tubercles well developed, their inner faces apically convergent *Myzus persicae*

(Or try key to polyphagous aphids, p. 1020)

Chromolaena

- Ch. heteroclinia*
Ch. laevigata

Compositae

- Aphis gossypii*
Aphis fabae

Ch. odorata

Aphis craccivora, eugeniae, fabae, gossypii, nasturtii, spiraecola; Brachycaudus helichrysi; [Macrosiphoniella kikungshana]; Micromyzodium levipes; Myzus ornatus, persicae, siegesbeckicola; Neomyzus circumflexus; [Pentalonia nigronervosa]; Toxoptera aurantii, [citricidus]; Uroleucon ambrosiae

Use key to apterae on *Eupatorium*.

Chrysalidocarpus

Palmae

Ch. lutescens (incl. *madagascariensis*) *Aphis gossypii; Cerataphis brasiliensis*

Key to apterae on *Chrysalidocarpus*:-

- Body dorsoventrally flattened, almost circular, wholly sclerotic with a distinct crenulate margin due to a continuous ring of wax glands. Head with a pair of frontal horns. SIPH present as shallow cones or pores. (Underside of head with one pair of thick, dagger-like hairs situated lateroventral to bases of frontal horns) *Cerataphis brasiliensis*
- Body oval, without marginal wax glands. Head without frontal horns. SIPH tubular, dark. (cauda much paler than SIPH, and ABD TERG 1 and 7 with MTu) *Aphis gossypii*

Chrysanthellum

Compositae

Ch. americanum (incl. *procumbens*) *Aphis gossypii*

Chrysanthemoides

Compositae

Ch. monilifera *Aphis gossypii*

Chrysanthemum

Compositae

[Note: many species formerly placed in *Chrysanthemum* are now assigned to other genera, e.g., *Argyranthemum, Coleostephus, Dendranthema, Leucanthemopsis, Tanacetum*.]

Ch. anethifolium *Uroleucon ambrosiae*

Ch. annuum see *Tanacetum*

Ch. arcticum see *Dendranthema*

Ch. argenteum see *Tanacetum*

Ch. balsamita see *Tanacetum*

Ch. boreale see *Dendranthema*

Ch. ×burbankii see *Leucanthemum*

Ch. carinatum see *Ismelia versicolor*

Ch. caucasicum *Aphis fabae*

Ch. cinerariaefolium see *Tanacetum*

Ch. coccineum see *Tanacetum*

Ch. coronarium (incl. *spatiosum*) *Aphis fabae, gossypii, spiraecola; Aulacorthum solani; Brachycaudus cardui, helichrysi; Coloradoa rufomaculata; [Lipaphis pseudobrassicae]; Macrosiphoniella pseudoartemisiae, sanborni, taspukae; Macrosiphum euphorbiae; Myzus persicae; Uroleucon gobonis, [nigrotuberculatum]*

HOST LISTS AND KEYS

- Ch. corymbosum* see *Tanacetum*
Ch. flaveolum see *Leucanthemopsis*
Ch. frutescens see *Argyranthemum*
Ch. fruticosum see *Brachanthemum*
Ch. hortorum
 see *Dendranthema indica*
Ch. indicum see *Dendranthema*
Ch. japonense see *Dendranthema*
Ch. lacustre *Aphis fabae*; *Brachycaudus cardui*;
Macrosiphoniella subterranea
- Ch. lavandulaefolium* see
Dendranthema
Ch. leucanthemum
 see *Leucanthemum vulgare*
Ch. lineare *Uroleucon erigeronense*
Ch. maximum see *Leucanthemum*
Ch. morifolium see *Dendranthema*
Ch. multifidum
 see *Tanacetum vulgare* var.
Ch. myconis see *Coleostephus*
Ch. nipponicum
 see *Nipponanthemum*
Ch. ornatum see *Dendranthema*
Ch. parthenifolium see *Tanacetum*
Ch. parthenium see *Tanacetum*
Ch. procumbens *Aphis gossypii*
Ch. roseum see *Tanacetum* (Note:
 Persian insect powder=
Pyrethrum roseum)
Ch. rotundifolium *Aphis fabae*; *Brachycaudus helichrysi*
Brachycaudus helichrysi
Aphis fabae, nasturtii, [terricola];
Brachycaudus helichrysi, lateralis;
Macrosiphoniella sanborni; *Macrosiphum euphorbiae*;
Myzus ornatus, persicae; *Uroleucon sonchi*
- Ch. sinense* see *Dendranthema*
morifolium
Ch. sylvaticum *Aphis gossypii*;
Brachycaudus cardui, helichrysi, lateralis
Brachycaudus cardui
- Ch. ulginosum*
Ch. vulgare see *Tanacetum*
Ch. yedoense (or *yezoense*) see
Dendranthema
Ch. zawadskii see *Dendranthema*
 ‘*Chrysanthemum*’ spp. *Aphis craccivora, [kurosawai], [malvae], [solitaria]*;
Aulacorthum solani;
 [*Capitophorus formosanus* (= *Pleotrichophorus*
chrysanthemi?)];

Coloradoa tanacetina;
Macrosiphoniella absinthii, [kikungshana], *oblonga*,
tanacetaria, *yomogifoliae*;
Macrosiphum centranthi, *pachysiphon*, *rosae*;
[*Metopeurum capillatum*]; *Myzus ascalonicus*, *ornatus*;
Neomyzus circumflexus; *Pleotrichophorus chrysanthemi*;
Sinomegoura citricola; [*Tetraneura basui*, *nigriabdominalis*];
Uroleucon compositae, *formosanum* ssp. *crepidis*,
pseudotanaceti, [*rudbeckiae*], *tanaceti*

Key to apterae on *Chrysanthemum* and *Dendranthema*:-

(For an illustrated key to the aphids most commonly found on florist's chrysanthemums see Blackman and Eastop, 2000.)

1. ANT PT/BASE much less than 1. Body and appendages very hairy 2
 – ANT PT/BASE much more than 1. Body and appendages not usually very hairy 3
2. HT II very elongate, more than 0.5× length of hind tibia. SIPH present as pores on pigmented shallow cones *Protrama flavescens*
 – HT of normal length, much less than 0.5× hind tibia. SIPH absent *Smynthuroides betae*
3. Cauda very short, helmet-shaped, not longer than its basal width in dorsal view. Spiracular apertures large and rounded 4
 – Cauda tongue- or finger-shaped, longer than its basal width. Spiracular apertures reniform 6
4. Dorsum without dark markings. Mesosternum without mammariform processes. R IV+V 1.2–1.3× HT II. SIPH pale, smooth, 0.8–2.0× cauda *Brachycaudus helichrysi*
 – Dorsum with an extensive black shield. Mesosternum with a pair of dark mammariform processes. R IV+V 1.4–2.0× HT II. SIPH dark, imbricated, 1.7–3.4× cauda 5
5. Hairs on ABD TERG 8 are 30–61 µm long. Longest hairs on hind femur 10–25 µm long *Brachycaudus lateralis*
 – Hairs on ABD TERG 8 are at least 70 µm long. Longest hairs on hind femur more than 25 µm long *Brachycaudus cardui*
6. SIPH with a distal zone of polygonal reticulation, occupying 0.08–0.8 of length 7
 – SIPH without any polygonal reticulation 24
7. SIPH with at least basal part pale, although often darker distally 8
 – SIPH wholly dark, or dark at base as well as apex 12
8. SIPH 1.0–1.3× cauda, with polygonal reticulation on distal 0.45–0.6 of length *Macrosiphoniella oblonga*
 – SIPH more than 1.5× cauda, with polygonal reticulation on distal 0.12–0.25 of length 9
9. SIPH mainly dark, pale only on basal c.0.25, with polygonal reticulation over distal 0.3–0.4 of length. Cauda tapering from base, almost to a point *Macrosiphoniella erigeronense*
 – SIPH mainly pale, only dark towards apices, with reticulation of distal 0.12–0.25 of length. Cauda finger-like, almost parallel-sided for part of length 10
10. SIPH flared at apex and completely lacking any flange, the zone of polygonal reticulation ending abruptly at apex (Figure 5i). Dorsal hairs long (e.g. those on ABD TERG 3 more than 50 µm long). ANT III with 6–26 rhinaria *Macrosiphoniella tapuskae*

HOST LISTS AND KEYS

- SIPH with zone of polygonal reticulation ending in some transversely elongate cells and a small but distinct flange. Dorsal body hairs shorter (those on ABD TERG 3 not more than 50µm long). ANT III with 1–10 rhinaria **11**
- 11.** Apices of femora and SIPH dark. ANT 1.3–1.6× BL. Longest hairs on ABD TERG 3 are 33–50µm long. Cauda with 11–19 hairs *Macrosiphum centranthi*
- Apices of femora and SIPH pale/dusky. ANT 0.9–1.4× BL. Longest hairs on ABD TERG 3 are 20–37 µm long. Cauda with 8–12 hairs *Macrosiphum euphorbiae*
- 12.** SIPH 1.7–3.2× longer than the short, pale cauda, which bears 5–10 hairs **13**
- SIPH 0.6–2.3× cauda, but if more than 1.7× then cauda is long and finger-like and bears more than 10 hairs **14**
- 13.** SIPH with polygonal reticulation on distal 0.17–0.25 of length, and usually with a paler middle section. R IV+V 1.0–1.2× HT II *Uroleucon tanacetii*
- SIPH wholly dark, with polygonal reticulation on distal 0.25–0.38 of length. R IV+V 1.2–1.4× HT II *Uroleucon pseudotanacetii*
- 14.** SIPH 0.6–1.2× cauda, which is dark. First tarsal segments with 3 hairs **15**
- SIPH 1.1–2.3× cauda, but if less than 1.2× then cauda is pale. First tarsal segments with 5 hairs **21**
- 15.** ANT III with 29–55 secondary rhinaria. R IV+V 1.0–1.2× HT II *Macrosiphoniella absinthii*
- ANT III with 4–32 secondary rhinaria, but if with more than 25 then R IV+V is 0.7–0.9× HT II **16**
- 16.** SIPH 0.95–1.2× cauda, with reticulation on distal 0.26–0.4 of length *Macrosiphoniella subterranea*
- SIPH 0.6–0.95× cauda, with reticulation on distal 0.4–0.8 of length **17**
- 17.** ANT III with secondary rhinaria usually distributed over almost its entire length. SIPH with reticulation on distal 0.6–0.8 of length *Macrosiphoniella sanborni*
- ANT III with secondary rhinaria restricted to basal 0.6 or less. SIPH with reticulation over distal 0.4–0.7 of length **18**
- 18.** ANT III mainly pale, with 2–9 secondary rhinaria. Tibiae with an extensive paler middle section. Cauda with 10–14 hairs *Macrosiphoniella pseudoartemisiae*
- ANT III mainly or wholly dark, with 1–32 secondary rhinaria. Tibiae wholly dark. Cauda with 16–44 hairs **19**
- 19.** Dorsal body hairs long, fine and numerous, not in rows, the spinal and pleural hairs usually placed on dark transverse sclerotic cross-bands (sometimes these are reduced). Hairs on ANT III long and fine *Macrosiphoniella yomogicola*
- Dorsal body hairs much fewer and arranged in single somewhat irregular rows across each tergite. Abdomen without dark dorsal cross-bands. hairs on ANT III not long and fine **20**
- 20.** R IV+V 0.7–0.9× HT II. ANT PT/BASE 2.9–3.5. SIPH with polygonal reticulation on distal 0.4–0.55 *Macrosiphoniella tanacetaria*
- R IV+V 1.0–1.4× HT II. ANT PT/BASE 2.3–2.9. SIPH with polygonal reticulation on distal 0.48–0.7 *Macrosiphoniella yomogifoliae*
- 21.** Cauda dark, like SIPH *Uroleucon compositae* (or *gobonis*)
- Cauda pale, or much paler than SIPH **22**
- 22.** ANT III very long, 1.5–2.1× ANT IV+V together, and bearing very numerous (96–135) strongly protruberant secondary rhinaria distributed over its entire length *Uroleucon formosanum*
- ANT III shorter than or about equal in length to ANT IV+V together, and with 8–38 rhinaria extending over 0.35–0.65 of length **23**

23. Coxae black. SIPH 1.4–1.9× cauda. Dorsal hairs mostly without dark basal sclerites *Uroleucon sonchi*
 – Coxae pale. SIPH 1.1–1.5× cauda. Many of dorsal hairs arising from dark scleroites *Uroleucon ambrosiae*
24. Dorsal hairs long, with knobbed or funnel-shaped apices *Pleotrichophorus chrysanthemi*
 – Dorsal hairs short and blunt, or club- or fan-shaped, or if long then pointed 25
25. Triommatidium merged with compound eye, so that there is no distinct ocular tubercle. Dorsal hairs small, fan- or club-shaped, or at least with somewhat expanded apices. Front of head weakly convex in dorsal view, ANT tubercles undeveloped. ANT PT/BASE 1.4–2.0. SIPH cylindrical for most of length, slightly swollen subapically. R IV+V with slightly concave sides. Cauda less than 1.5× its basal width, with 4–5 hairs 26
 – Triommatidium forming a distinct ocular tubercle at posterior margin of eye, dorsal hairs with blunt or pointed apices, and other characters not in above combination 27
26. Dorsal hairs fan-shaped (Figure 52c). RIV+V more than 1.1× HT II. SIPH 0.17–0.2× BL, with basal part almost smooth (Figure 12o) *Coloradoa rufomaculata*
 – Dorsal hairs very small and weakly club-shaped, or with only slightly expanded apices (Figure 52d). R IV+V less than 1.1× HT II. SIPH 0.13–0.18× BL, with basal part coarsely imbricated like distal part (Figure 52e) *Coloradoa tanacetina*
27. ANT 5- or 6-segmented, with penultimate segment less than 1.2× length of base of last segment. SIPH short and tapering, scabrous or coarsely imbricated, ending in a large flange. Head spiculose *Tuberocephalus misakurae*
 – ANT 6-segmented, rarely 5-segmented, with penultimate segment more than 1.2× length of base of last segment. SIPH various, and head smooth or spiculose go to key to polyphagous aphids, p. 1020

Chrysobalanus

Ch. oblongifolius

Aphis gossypii

Chrysobalanaceae

Chrysobotrya see Ribes

Chrysophyllum

Ch. oliviforme

Toxoptera aurantii

Sapotaceae

Chrysopogon (incl. Pollinia)

Ch. aciculatus

Hysteroneura setariae; *Tetraneura fusiformis*

Ch. aucheri

Sitobion graminis

Ch. ciliatus

Asiphonella dactylonii

Ch. gryllus

Sipha maydis

Ch. zeylanicus

Sitobion graminis, *miscanthi*

Chrysopogon sp.

Kaochiaoja arthraxonis (? as *Macrosiphum pollinae* Shinji)

Gramineae

Use key to apterae of grass-feeding aphids under Digitaria.

Chrysopsis

Ch. graminifolia

Uroleucon chrysopsidicola

Ch. mariana

Uroleucon chrysopsidicola

Ch. villosa

Pleotrichophorus villosae; *Uroleucon carberriense*

Compositae

HOST LISTS AND KEYS

Key to apterae on *Chrysopsis*:-

1. Dorsal body densely clothed in fan-shaped hairs. SIPH pale, about as long as cauda, without any polygonal reticulation *Pleotrichophorus villosae*
 – Dorsal body hairs not fan-shaped. SIPH dark, or pale with dark apices, longer than cauda, with a sub-apical zone of polygonal reticulation **2**
2. SIPH black, less than 1.5× cauda *Uroleucon chrysopsidicola*
 – SIPH pale basally, dark apically, and more than 2× cauda *Uroleucon carberriense*

Chrysosplenium

Ch. flagelliferum

Saxifragaceae

Taiwanomyzus chrysosplenii

Chrysothamnus

Ch. frigidus

Ch. graveolens see *nauseosus*

Ch. greenei

Ch. lanceolatus

Ch. nauseosus (incl. *graveolens*,
latisquameus)

Ch. parryi

Ch. plattensis

Ch. viscidiflorus

Chrysothamnus spp.

Compositae

Pleotrichophorus elongatus, packi, wasatchii

Pleotrichophorus oestlundii

Aphis chrysothamni

Aphis chrysothamni, chrysothamnicola, crypta, gregalis, ornata;

Pleotrichophorus elongatus, gregarius, neosporadicus, oestlundii, packi, packi ssp. *brevis, palmerae, sporadicus, stroudi, utensis, wasatchii, xerozoous;*

Uroleucon aaroni, [ambrosiae], escalantii

Aphis gregalis, infrequens, zonassa; [Fordia marginata];

Pleotrichophorus elongatus, oestlundii, palmerae, packi, xerozoous

Pleotrichophorus 'nauseosus' (lapsus for elongatus?), oestlundii

Aphis gregalis; Durocapillata utahensis;

[*Macrosiphoniella glabra*];

Pleotrichophorus elongatus, gregarius, magnautensus, oestlundii, palmerae, pycnorhysus, utensis

Aphis middletonii group;

[*Artemisaphis artemisicola*];

[*Aspidaphis adjuvans*]

Key to apterae on *Chrysothamnus* (and *Gutierrezia*):-

1. Many or all dorsal hairs expanded from base, fan- or funnel-shaped, or with fan- or funnel-shaped apices, or (in one species) minute with club-shaped apices. SIPH thin, at midlength less than half thickness of cauda, without any polygonal reticulation **2**
 – Dorsal hairs never fan- or funnel-shaped; tapering from base, with pointed, blunt or capitate apices. SIPH either thicker or with subapical polygonal reticulation **12**
2. R IV+V short and blunt, with slightly convex sides, and the pair of lateral accessory hairs on basal half shorter than or similar in length to the longest pair of primary (subapical) hairs (e.g., Figure 21a) **3**
 – R IV+V acutely pointed or with extended, tubular apex, with sides straight or concave and the pair of lateral accessory hairs on the basal half usually longer than the longest subapical pair (e.g. Figure 21b) **5**

CHRYSOTHAMNUS

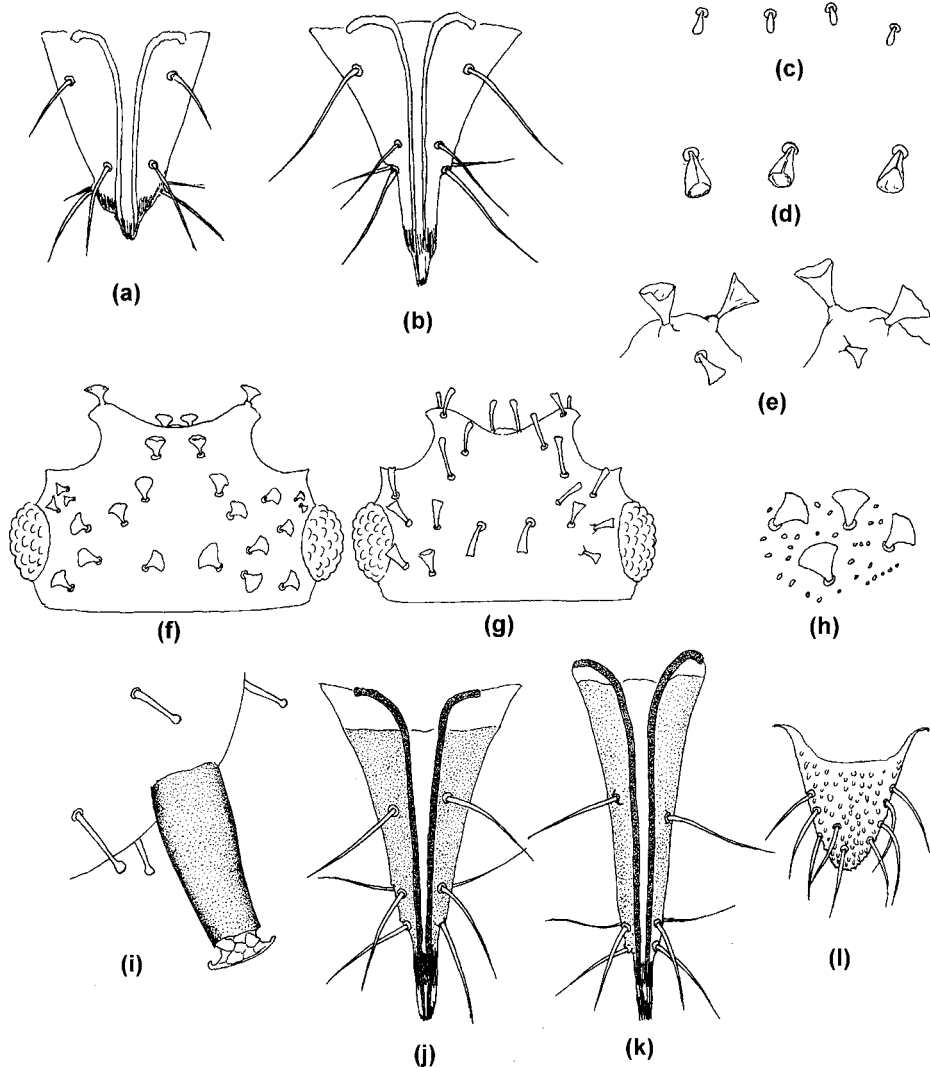


Figure 21 Apterae on *Chrysothamnus*. (a) R IV + V of *Pleotrichophorus pycnorhynchus*, (b) R IV + V of *P. gregarius*, (c) dorsal abdominal hairs of *P. magnautensis*, (d) same for *P. utensis*, (e) spinal abdominal tubercles and hairs of *P. gregarius*, (f) dorsal cephalic hairs of *P. elongatus*, (g) same for *P. packi*, (h) dorsal abdominal hairs and spicules of *P. oestlundii*, (i) SIPH and dorsal abdominal hairs of *Durocapillata utahensis*, (j) R IV + V of *Aphis chrysothamni*, (k) R IV + V of *Aphis chrysothamnicola*, (l) cauda of *Aphis ornata*.

- | | |
|--|--|
| <p>3. SIPH 1.80–3.13× cauda, and mainly pale, only darker distally
– SIPH 0.78–1.63× cauda, and mainly dark</p> | <p><i>Pleotrichophorus pycnorhynchus</i>
4</p> |
| <p>4. Dorsal body hairs minute (less than 10µm long), club-shaped (Figure 21c). Ventral side of ANT I with 15 or more hairs. SIPH 0.78–1.03× cauda</p> | <p><i>Pleotrichophorus magnautensis</i></p> |

HOST LISTS AND KEYS

- Dorsal body hairs larger, fan- or funnel-shaped (Figure 21d). Ventral side of ANT I with less than 10 hairs. SIPH 1.06–1.63× cauda *Pleotrichophorus utensis*
- 5. Dorsal abdomen with cuticle raised into paired longitudinal rows of spinal (and often also smaller, pleural) tubercles, largest on ABD TERG 5–7, bearing groups of spinal and pleural fan- and funnel-shaped hairs (e.g., Figure 21e) **6**
- Dorsal abdomen without tubercles **7**
- 6. R IV+V 0.6–0.7× HT II. SIPH mainly pale, only dark towards apices. Cauda usually with 3 pairs of lateral hairs plus 0–3 dorsal ones *Pleotrichophorus xerozoous*
- R IV+V 0.7–1.0× HT II. SIPH dark at least on distal half of length. Cauda with usually 4 pairs of lateral hairs plus 0–6 dorsal ones *Pleotrichophorus gregarius*
- 7. SIPH long and thin, 0.22–0.39× BL **8**
- SIPH 0.11–0.21× BL **11**
- 8. SIPH pale, sometimes dusky towards apices. Cauda with 5–6 hairs (only 2 lateral pairs). Dorsal cephalic hairs all short and fan- or funnel-shaped (Figure 21f) *Pleotrichophorus elongatus*
- SIPH dark over at least distal half of length. Cauda with 5–21 hairs (usually 3–5 lateral pairs). Dorsal cephalic hairs varying in form; all fan- or funnel-shaped, or with some longer hairs with flattened, blunt or pointed apices **9**
- 9. All dorsal cephalic hairs expanded from base; fan- or funnel-shaped, or with flattened, fan- or funnel-shaped apices. Accessory hairs on R IV+V hardly longer than longest subapical hairs *Pleotrichophorus stroudi**
- Frontal dorsal cephalic hairs long, with blunt, slightly expanded or pointed apices (e.g., Figure 21g). Accessory hairs on R IV+V distinctly longer than longest of subapical hairs **10**
- 10. SIPH 0.32–0.39× BL and 2.04–3.02× cauda; dark except for pale basal 0.15–0.2 of length. Posterior dorsal cephalic hairs expanded from base, with spatulate apices (Figure 21g). Cauda tapering, with 5–13 hairs (usually 3–5 lateral pairs). *Pleotrichophorus packi*
- SIPH 0.27–0.33× BL and 1.58–2.11× cauda, with pale basal part 0.35–0.6 of length. Posterior dorsal cephalic hairs variable, sometimes with flattened or spatulate apices, or with blunt or pointed apices, but not expanded from base. Cauda rather thick, with 10–21 hairs (usually 5–8 lateral pairs) *Pleotrichophorus sporadicus* complex (*sporadicus*, *neosporadicus*, *packi* ssp. *brevis*)
- 11. Dorsal cuticle rather sclerotic with blunt spicules irregularly distributed among the fan-shaped hairs (Figure 21h). Cauda with 3 pairs of lateral hairs and 4–10 dorsal hairs that are usually spatulate or have funnel-shaped apices *Pleotrichophorus oestlundi*
- Dorsal cuticle without any generally distributed large spicules. Cauda with 2 pairs of lateral hairs and a single dorsal hair which has a blunt or pointed apex *Pleotrichophorus wasatchii*
- 12. SIPH with subapical polygonal reticulation. ANT tubercles well developed, their inner faces smooth and divergent. Cauda long and finger-like **13**
- SIPH without any polygonal reticulation. ANT tubercles absent or weakly developed. Cauda short, triangular or helmet-shaped **15**
- 13. SIPH wholly dark, 1.0–1.5× cauda, which bears 12–27 hairs, all pointed and of similar lengths *Uroleucon ambrosiae* group (incl. *U. aaroni*)
- SIPH paler at base, 1.7–2.5× cauda, which bears 5–10 hairs (2 lateral pairs and 1–6 more distal, shorter hairs, some of which usually have blunt or bent apices) **14**
- 14. ANT IV of al. with 9–12 rhinaria, and ANT IV of apt. sometimes with 1–3 rhinaria *Uroleucon zerogutierrezis*

- ANT IV of al. usually without rhinaria, rarely with 1–4, and ANT IV of apt always without rhinaria
Uroleucon erigeronense group (incl. *U. escalantii*)
- 15. Most hairs on dorsum and ANT III with distinctly capitate apices. SIPH thick and tapering, almost smooth, with a very marked subapical incision and a large flange (Figure 21i)
Durocapillata utahensis
- Hairs on dorsum and ANT III blunt or pointed. SIPH imbricated, without a subapical incision and with a moderately developed flange **16**
- 16. R IV+V stiletto-shaped, with R V extended as a needle-like tip, and R IV with a pair of very finely pointed accessory hairs, as long as or longer than the subapical (primary) hairs (Figure 21j, k) **17**
- R IV+V varying in shape but R V is not extended as a needle-like tip, and the accessory hairs are usually shorter than the longest of the subapical pairs **19**
- 17. R IV+V (Figure 21j) 0.11–0.175 mm long, 1.1–1.4× HT II. Dorsal abdomen usually with a dark central sclerite of irregular shape on tergites 1–3 or 1–4
Aphis chrysothamni
- R IV+V 0.21–0.29 mm long, 1.75–2.4× HT II. Dorsal abdomen without dark markings anterior to SIPH, or with small sclerites not fused between tergites **18**
- 18. R IV+V (Figure 21k) 0.21–0.24 mm long, 1.75–2.0× HT II. ANT III without secondary rhinaria
Aphis chrysothamnicola
- R IV+V 0.24–0.29 mm long, 2.0–2.4× HT II. ANT III with 0–4 secondary rhinaria
Aphis infrequens
- 19. SIPH 1.6–1.8× cauda and 1.7–1.9× R IV+V. Secondary rhinaria distributed ANT III 0–1, IV 4–8, V 0–1
*Aphis zonassa**
- SIPH 0.7–1.5× cauda and 0.6–1.3× R IV+V. Secondary rhinaria distributed ANT III 0–10, IV 0–3, V 0–2 **20**
- 20. Cauda rounded at apex, with 10–16 hairs. Hairs on ANT III short, recumbent, with rather blunt apices, the longest of them 0.5–0.8× BD III
Aphis middletonii group (incl. *A. crypta*, *A. gutierrezis*)
- Cauda triangular, bluntly pointed at apex, with 8–12 hairs (e.g., Figure 21l). Longest hairs on ANT III are 1–3× BD III, with fine-pointed apices **21**
- 21. ANT PT/BASE 1.3–2.0
Aphis ornata
- ANT PT/BASE 1.1–1.5
Aphis gregalis

Chusquea*Ch. abietifolia***Gramineae***Hysteroneura setariae***Cicer***C. arietinum***Leguminosae***Acyrtosiphon gossypii*, *pisum*;*Aphis craccivora*; *Macrosiphum euphorbiae**C. songaricum*[*Acyrtosiphon hissaricum*]

Use key to apterae on *Pisum* (*Acyrtosiphon hissaricum* could not be keyed on the basis of the available information).

Cicerbita*C. alpina***Compositae**[*Amphorophora gei*]; *Aphis fabae*; *Aulacothum solani*;*Macrosiphum polanense*; *Nasonovia ribisnigri*;*Uroleucon sonchi*

HOST LISTS AND KEYS

<i>C. azurea</i>	<i>Acyrtosiphon ilka</i>
<i>C. cacaliaefolia</i>	<i>Uroleucon cicerbitae</i>
<i>C. reticulata</i>	<i>Aphis craccivora</i>

Key to apterae on *Cicerbita*:-

1. SIPH with polygonal reticulation on distal 0.1–0.3 of length. Cauda bearing 17–34 hairs. ANT III with 10 or more rhinaria 2
 – SIPH without distal polygonal reticulation (or if with then other characters do not apply) 4
2. SIPH pale, tapering, with a rather constricted subapical zone of polygonal reticulation occupying less than 0.2 of total length. Dorsal hairs not arising from scleroites, and postsiphuncular sclerites absent. Cauda with 17–21 hairs *Macrosiphum polanense*
 – SIPH dark, cylindrical, with polygonal reticulation on distal 0.15–0.30 of length, the reticulated section not at all constricted. Dorsal hairs arising from small dark scleroites, and large postsiphuncular sclerites also present. Cauda with 18–34 hairs 3
3. R IV+V 1.05–1.15× HT II. SIPH reticulated over distal 0.25–0.30 of length. Hind coxae pale like trochanters *Uroleucon cicerbitae*
 – R IV+V 0.7–0.9× HT II. SIPH reticulated over distal 0.15–0.25 of length. Hind coxae much darker than trochanters *Uroleucon sonchi*
4. ANT PT/BASE 8–11. ANT III with 7–28 rhinaria extending over 0.4–0.7 of length. Spiracular apertures on pro- and metathorax much larger than those on abdomen *Nasonovia ribisnigri*
 – ANT PT/BASE 1.7–7.5. ANT III with 0–3 rhinaria near base. Thoracic spiracular apertures reniform, similar in size and form to abdominal ones 5
5. SIPH dark (or if pale then either clavate or with subapical polygonal reticulation)
 go to key to polyphagous aphids, p. 1020
 – SIPH pale or only dark at apices, tapering/cylindrical, without subapical polygonal reticulation 6
6. Head spinulose, ANT tubercles with inner faces steep-sided, almost parallel. R IV+V 1.05–1.50× HT II. ANT BASE VI 1.2–2.0× HT II *Aulacorthum solani*
 – Head smooth, ANT tubercles with inner faces divergent. R IV+V 0.75–0.93× HT II. ANT BASE VI 0.9–1.11× HT II *Acyrtosiphon ilka*

Cichorium

C. divaricatum
C. endiva

C. intybus

Compositae

Aphis intybi
Aphis fabae, intybi, pseudocardui, Hyperomyzus lactucae, Macrosiphum euphorbiae, Myzus ornatus, persicae, Nasonovia ribisnigri, Pemphigus bursarius, Prociphilus erigeronensis, Trama troglodytes, Uroleucon ambrosiae, cichorii, picridis, sonchi
Acyrtosiphon ilka;
Aphis albella, anuraphoides, fabae, gossypii, intybi, middletonii, [terricola], [Aphis (Protaphis) sp.
 (Mier Durante, 1978; Holman and Pintera, 1981)];
Aulacorthum solani, Brachycaudus helichrysi;
Hyperomyzus lactucae, picridis, Macrosiphum euphorbiae; Myzus ornatus, persicae; Nasonovia ribisnigri; Pemphigus bursarius; Prociphilus erigeronensis;

C. pumillum
***Cichorium* spp.**

Protrama flavescens;
Trama caudata, maritima, [*narzykulovi*], *pamirica*,
trogodytes;
Uroleucon mulgedii (as *altaicum*), *cichorii*, [*cirsii*],
 [jaceae], *picridis, pseudambrosiae, sonchi*
Aphis craccivora, intybi
 [*Protrama radialis*]; [*Trama rara*]

Key to apterae on *Cichorium*:-

[For keys to common aphids on *C. endiva* and *C. intybus* see Blackman and Eastop (2000).]

1. Hind tarsus II elongate, much longer than other tarsi 2
 – Hind tarsus II of normal length 5
2. SIPH completely absent. Eyes of 3 facets *Trama troglodytes*
 – SIPH present as slightly raised pores. Eyes usually with more than 12 facets 3
3. ANT VI similar in length to ANT V or a little longer, with PT at least one third as long as BASE VI. Many apterae alatiform with dark transverse bands on dorsal abdomen *Protrama flavescens*
 – ANT VI a little shorter than ANT V, with PT very short. No dorsal abdominal pigmentation 4
4. ANT III 2.3–2.9× ANT IV. HT II 3.3–4.2× ANT VI (incl. PT) *Trama maritima* (or *pamirica*?)
 – ANT III 1.6–2.25× ANT IV. HT II 2.6–3.5× ANT VI (incl. PT) *Trama caudata*
5. ANT PT/BASE less than 0.3. SIPH absent. Eyes with only 3 facets 6
 – ANT PT/BASE more than 0.5. SIPH present. Eyes multifaceted 7
6. R IV+V 0.08–0.12 mm long, a little shorter than last ANT segment (incl. PT), and without any accessory hairs. Hairs at apices of tibiae and first tarsal segments short and thick *Pemphigus bursarius*
 – R IV+V 0.13–0.175 mm long, as long as or longer than last ANT segment and bearing 4–8 accessory hairs. Hairs at apices of hind tibiae and first tarsal segments long and fine *Prociphilus erigeronensis*
7. ANT tubercles absent or weakly developed 8
 – ANT tubercles well developed 17
8. Cauda short, helmet-shaped or bluntly triangular, not longer than its basal width in dorsal view 9
 – Cauda tongue-shaped, clearly longer than its basal width 13
9. ANT PT/BASE c.0.58 *Xerobion intybi*
 – ANT PT/BASE 0.8–3.2 10
10. SIPH pale, smooth-surfaced, with an annular incision below the well-developed flange. ABD TERG 1 and 7 without marginal tubercles (MTu). ANT PT/BASE 2.4–3.2 *Brachycaudus helichrysi*
 – SIPH dark, without a subapical annular incision, and flange small. ABD TERG 1 and 7 with large MTu. ANT PT/BASE 0.8–2.3 11
11. ANT PT/BASE 1.5–2.4. Cauda as dark as SIPH *Aphis middletonii*
 – ANT PT/BASE 0.8–1.4. Cauda paler than SIPH 12
12. ANT III usually without sec. rhinaria (rarely with 1–3). R IV+V 1.28–1.36× HT II. Longest hairs on ABD TERG 3 are 0.7–1.1× ANT BD III *Aphis pseudocardui*
 – ANT III usually with (1–10) sec. rhinaria. R IV+V 1.45–1.65× HT II. Longest hairs on ABD TERG 3 are 1.2–1.3× ANT BD III *Aphis anuraphoides*

HOST LISTS AND KEYS

13. Cauda black like SIPH. Dark dorsal markings present, at least on head, thorax and ABD TERG 7 and 8, and often more extensive **14**
 – Cauda pale or, if dusky to dark, then paler than SIPH. No dark dorsal markings **16**
14. Dorsal abdominal dark markings not fused between segments. hairs on ANT III 0.8–3.4× BD III. Cauda with 11–27 hairs *Aphis fabae*
 – Dorsal abdomen with dark markings usually fused between segments to form a central patch or shield. Hairs on ANT III 0.25–0.75× BD III. Cauda with 4–9 hairs **15**
15. ANT PT/BASE 2.4–3.8. R IV+V 1.25–1.75× ANT BASE VI (only less than 1.3× in large specimens (BL 2 mm or more) *Aphis intybi*
 – ANT PT/BASE 1.7–2.7. R IV+V usually 0.85–1.2× ANT BASE VI (1.2–1.4× in hot-weather dwarfs) *Aphis craccivora*
16. SIPH dark *Aphis gossypii*
 – SIPH pale *Aphis albella*
17. Head spiculose, with inner faces of ANT tubercles spiculose or scabrous, and almost parallel or apically convergent **18**
 – Head smooth, with inner faces of ANT tubercles divergent **20**
18. Dorsal abdomen with a pattern of dark intersegmental markings. ANT PT/BASE 1.7–2.8. SIPH coarsely imbricated, tapering and with a slight S-curve *Myzus ornatus*
 – Dorsal abdomen without any dark markings. ANT PT/BASE 2.8–5.5. SIPH moderately imbricated, cylindrical and almost straight, or slightly clavate **19**
19. SIPH slightly clavate. ANT III never with rhinaria *Myzus persicae*
 – SIPH cylindrical. ANT III usually with 1–2 small rhinaria near base *Aulacorthum solani*
20. SIPH strongly clavate **21**
 – SIPH tapering or cylindrical **22**
21. Dorsum pale. R IV+V 0.88–1.0× HT II *Hyperomyzus lactucae*
 – ABD TERG 1–6 with dark pleural flecks. R IV+V 1.45–1.8× HT II *Hyperomyzus picridis*
22. SIPH with a subapical zone of polygonal reticulation occupying 0.12–0.43 of total length **23**
 – SIPH without any subapical polygonal reticulation, or with striae containing a few closed cells but occupying less than 0.1 of total length **29**
23. SIPH pale at least basally, sometimes darker towards apices, with reticulation on distal 0.12–0.20 of length. First tarsal segments with 3 hairs. ANT III with 1–11 rhinaria **24**
 – SIPH black, with reticulation of numerous rather small polygonal cells on distal 0.16–0.43 of length. First tarsal segments with 5 hairs. ANT III with 8–97 rhinaria **25**
24. ANT PT/BASE 4.3–6.1. HT II 0.13–0.18 mm. Dorsal hairs never on scleroites, and no postsiphuncular sclerites *Macrosiphum euphorbiae*
 – ANT PT/BASE 2.9–3.6. HT II 0.175–0.21 mm. At least some of dorsal hairs usually arising from small pigmented scleroites, and large (but sometimes weakly pigmented) postsiphuncular sclerites present *Uroleucon mulgedii*
25. Dorsal hairs on ABD TERG 1–5 mostly not placed on dark scleroites. R IV+V 0.73–0.88× HT II *Uroleucon sonchi*
 – Dorsal hairs on ABD TERG 1–5 all or mostly placed on dark scleroites. R IV+V 0.9–1.84× HT II **26**

26. Crescent-shaped black antesiphuncular sclerites present. ANT III with 25–97 secondary rhinaria occupying at least 0.8 of segment **27**
 – Antesiphuncular sclerites absent or indistinct. ANT III with 8–46 secondary rhinaria on basal 0.5–0.7 of segment **28**
27. R IV+V 1.45–1.84× HT II *Uroleucon picridis*
 – R IV+V 1.17–1.33× HT II *Uroleucon cichorii*
28. HT II rather long and thin, about 6× its maximum thickness, and 0.9–1.1× R IV+V *Uroleucon pseudambrosiae*
 – HT II shorter, less than 5× its maximum thickness and 0.7–0.95× R IV+V *Uroleucon ambrosiae*
29. Dorsal abdomen with paired dark intersegmental markings, closer together on ABD TERG 4 and 5 than on more anterior segments. Spiracular apertures on pro-and metathorax much larger than those on abdomen. SIPH 0.18–0.26× BL *Nasonovia ribisnigri*
 – Dorsal abdomen without dark markings. Spiracular apertures on thorax of similar size to those on abdomen. SIPH 0.26–0.34× BL *Acyrtosiphon ilka*

Ciclospermum* see *Cyclospermum***Cicuta***

- C. bulbifera*
C. californica see *virosa*
C. douglasii
C. maculata
- C. occidentalis*
C. virosa (incl. *californica*)

Cicuta* spp.*Umbelliferae**

- Cavariella konoi*
Aphis gossypii
Aphis helianthi, *saniculae*, *spiraecola*, *thaspii*;
Cavariella aegopodii, [*hendersoni*], *konoii*, *pastinacae*,
theobaldi;
Hyadaphis foeniculi; [*Pemphigus* sp. (as *lactucae*)]
Aphis helianthi; *Rhopalosiphum nymphaeae*
Aphis fabae, *grosmannae*, *nasturtii*;
Cavariella aegopodii, *cicutae*, *konoii*, *pastinacae*, *Cavariella*
(*Cavariellinepicauda*) sp.(BMNH colln, China);
Macrosiphum gei; *Rhopalosiphum nymphaeae*;
[*Wahlgreniella nervata* (as *Amphorophora cicutae* Shinji)]
Dysaphis apiifolia

Key to apterae on *Cicuta*:-

1. ABD TERG 8 with a posteriorly projecting process above cauda; sometimes reduced to a small, warty knob in the centre of ABD TERG 8, with 2 associated hairs **2**
 – No supracaudal process, nor are there 2 hairs on ABD TERG 8 close together and associated with a warty knob **7**
2. ABD TERG 8 with a warty knob. SIPH tapering/cylindrical. R IV+V c 0.22 mm, longer than ANT PT *Cavariella (Cavariellinepicauda)* sp.(BMNH colln, China, leg. G.-x. Qiao)
 – ABD TERG 8 with an evident backwardly-pointing process. SIPH clavate. R IV+V 0.08–0.19 mm, usually shorter than ANT PT (except in *cicutae*) **3**
3. SIPH tapering, with no trace of swelling *Cavariella theobaldi*
 – SIPH clavate **4**

HOST LISTS AND KEYS

4. ANT PT/BASE 0.6–1.3. R IV+V with 0–2 accessory hairs **5**
 – ANT PT/BASE 1.4–4.0. R IV+V always with 2 accessory hairs **6**
5. Supracaudal process large, broad-based, projecting beyond and usually covering cauda. SIPH thick, less than 5× longer than their maximum width *Cavariella cicutae*
 – Supracaudal process smaller, finger-like, not projecting beyond tip of cauda. SIPH more than 5× longer than their maximum width *Cavariella aegopodii*
6. ANT PT/BASE 1.4–2.0 *Cavariella konoii*
 – ANT PT/BASE 2.6–4.0 *Cavariella pastinacae*
7. ANT tubercles well developed. SIPH cylindrical with a distal zone of polygonal reticulation. Longest hairs on dorsal abdomen 66–106 µm. Anterior half of subgenital plate with 2–11 (usually 4–8) hairs *Macrosiphum gei*
 – ANT tubercles weakly developed or absent. SIPH without polygonal reticulation. Dorsal abdominal hairs shorter and/or fewer hairs on anterior part of subgenital plate **8**
8. SIPH clavate **9**
 – SIPH tapering or cylindrical **10**
9. SIPH more than 2× cauda. Dorsal cuticle with a reticulate pattern of small round bead-like spinules arranged in polygons. R IV+V 1.0–1.5× HT II *Rhopalosiphum nymphaeae*
 – SIPH 0.9–1.4× cauda. Dorsal cuticle without spinules arranged in polygons. R IV+V 0.7–0.8× HT II *Hyadaphis foeniculi*
10. Cauda helmet-shaped, not longer than its basal width, with 5 hairs. Spinal tubercles (STu) present on head and ABD TERG 7 and 8 *Dysaphis apitifolia*
 – Cauda tongue-shaped, longer than its basal width, with more than 6 hairs. STu absent **11**
11. ABD TERG 1–7 or 1–5 and 7 with well-developed marginal tubercles (MTu) *Aphis grosmaniae*
 – MTu only regularly present on ABD TERG 1 and 7, with occasionally small ones on other segments **12**
12. Hind femora with many long fine hairs, most of them as long as or longer than width of trochantro-femoral suture. Cauda 1.6–2.5× ANT BASE VI **13**
 – Hind femora with most or all hairs shorter than width of trochantrofemoral suture. Cauda 1.2–1.9× ANT BASE VI **14**
13. SIPH 0.75–1.1× ANT III and 1.8–2.7× ANT BASE VI. Cauda hardly constricted near midlength and bearing 11–24 hairs. ABD TERG 7 and 8 with dark bands and dark dorsal markings also anterior to SIPH. (Al. with 10–23 rhinaria on ANT III) *Aphis fabae*
 – SIPH 1.1–1.45× ANT III and 2.8–3.4× ANT BASE VI. Cauda usually clearly constricted near midlength and bearing 6–15 (usually 9–11) hairs. Abdomen without any dark markings. (Al. with 4–12 rhinaria on ANT III) *Aphis spiraeicola*
14. ANT III–V (of apt.) usually with sec. rhin. (III 0–14, IV 0–12, V 0–8) *Aphis saniculae*
 – ANT III–V (of apt.) without sec. rhin. (except in alatiform specimens) **15**
15. SIPH mainly pale or dusky, only dark towards apices *Aphis nasturtii*
 – SIPH uniformly dark **16**
16. SIPH much darker than cauda, which bears 4–7 (–8) hairs *Aphis gossypii*
 – SIPH and cauda similarly pigmented. Cauda with 8–12 hairs **17**
17. HT I with 3 hairs. Longest hairs on ANT III 16–35 µm, 0.6–1.2× BD III. (Al. with sec. rhin. III 15–40, IV 0–2, V 0) *Aphis helianthi*
 – HT I with 2 hairs. Longest hairs on ANT III 10–15 µm, 0.3–0.5× BD III. (Al. with sec. rhin. III 28–56, IV 5–11, V 0–6) *Aphis thaspis*

Cienfuegosia*C. gossypoides***Malvaceae***Myzus persicae***Cimicifuga***C. dahurica**C. foetida**C. heracleifolia**Cimicifuga* sp.**Ranunculaceae***Aphis cimicifugae**Macrosiphum vereshshagini**Aphis spiraeicola**Aphis fabae*; *Aulacorthum solani*Key to apterae on *Cimicifuga*:-

1. SIPH with a subapical zone of polygonal reticulation, and HT II 0.57–0.75× ANT VI BASE
Macrosiphum vershtshagini
- SIPH **either** without subapical polygonal reticulation **or** HT II 0.8–1.0× ANT VI BASE **2**
2. Front of head with ANT tubercles absent or weakly developed. Marginal tubercles (MTu) present on most or all of ABD TERG 2–4 (–5), as well as on 1 and 7. HT II with dorsal hairs, including dorsoapical pair, very short and inconspicuous. R IV+V 1.1–1.3× HT II. Cauda finger-shaped, constricted in middle, with 13–19 hairs
Aphis cimicifugae
- Without this combination of characters go to key to polyphagous aphids, p. 1020

Cinchona see Blackman and Eastop (1994)**Cineraria***C. cruenta**C. hybrida* see *cruenta**C. renifolia**C. saxifraga**C. stella**Cineraria* spp.**Compositae***Aphis gossypii*; *Aulacorthum solani*;*Brachycaudus cardui*, *helichrysi*, *lateralis*;*Eriosoma patchiae*; *Macrosiphum euphorbiae*;*Myzus ascalonicus*, *ornatus*, *persicae*;*Neomyzus circumflexus**Myzus persicae*; *Neomyzus circumflexus**Aphis gossypii*; *Macrosiphum euphorbiae*;*Myzus persicae**Aulacorthum solani*; *Brachycaudus cardui**Aphis craccivora*, [*umbrella*]; *Myzus ascalonicus*;*Sitobion miscanthi*Key to apterae on *Cineraria*:-

1. SIPH as large pores with partially sclerotised rims, ringed with hairs. ANT PT/BASE less than 0.8. Dorsal body with wax glands on all segments, each normally comprising a ring of facets around a central pore
Eriosoma patchiae
- SIPH conical or tubular. ANT PT/BASE more than 1. No discrete wax glands **2**
2. Cauda tongue-shaped, clearly longer than its basal width. Spiracular apertures reniform
go to key to polyphagous aphids, p. 1020
- Cauda helmet-shaped, short, not longer than its basal width in dorsal view. Spiracular apertures large and rounded **3**
3. Dorsum without dark markings. Mesosternum without mammariform processes. R IV+V 0.10–0.15 mm, 1.2–1.3× HT II. SIPH pale, smooth, 0.8–2.0× cauda
Brachycaudus helichrysi

HOST LISTS AND KEYS

- Dorsum with an extensive black shield. Mesosternum with a pair of dark mammariform processes. R IV+V 0.17–0.24mm, 1.4–2.0× HT II. SIPH dark, imbricated, 1.7–3.4× cauda 4
- 4. Hairs on ABD TERG 8 are 30–61 µm long. Longest hairs on hind femur 10–25 µm long
Brachycaudus lateralis
- Hairs on ABD TERG 8 are at least 70 µm long. Longest hairs on hind femur more than 25 µm long
Brachycaudus cardui

Cinna

C. latifolia

Gramineae

Rhopalosiphum padi; *Sitobion fragariae*

Use key to apterae of grass-feeding aphids under *Digitaria*.

Cinnamomum see Blackman and Eastop (1994)

Circaea

Circaea sp.

Onagraceae

Aphis fabae

Cirsium (incl. Breea, Cephalonoplos)

C. achantarense (?)

Aulacorthum cirsicola

C. acaule

Trama troglodytes

C. afrum see *Ptilostemon afer*

C. akarna

[*Rhopalosiphum rufiabdominale*]

C. alatum see *elodes*

C. altissimum

Aphis helianthi

C. americanum see *foliosum*

C. aomorense

Capitophorus cirsiiaphagus, *elaeagni*

C. argyracanthus see *veratum*

C. arvense (incl. *incanum*, *setosum*)

Aphis anuraphoides, [eponyms of Bozhko (1976a)=
solanella?], [*fabae*], *fabae* ssp. *cirsiiacanthoidis*,
gossypii, *janischi*, *nasturtii*, *solanella*, *terricola*, [*Aphis*
(*Protaphis*) sp. – Holman and Pintera, 1981)];
Brachycaudus cardui, *helichrysi*;
Capitophorus carduinus, *elaeagni*, *horni* ssp. *gynoxantha*
Dysaphis atina, *radicivorans*; *Hyperomyzus lactucae*;
Macrosiphum euphorbiae; *Myzus persicae*;
[*Nasonovia ribisnigri*];
Protrama [*flavescens*], *radicis*;
Chitinosiphum cirsorhizum;
Trama [*caudata*], [*mordvilkoii* Börner 1940], *troglodytes*;
Uroleucon aeneum, *cephalonopli*, *cirsii*, *gobonis*, [*jaceae*
ssp. *henrichi*], [*nigrotuberculatum*], *pepperi*,
[*rudbeckiae*], [*sonchi*]
Capitophorus elaeagni; *Uroleucon cirsii*
Aphis fabae
Aphis cirsiioleracei, *fabae*; *Brachycaudus cardui*;
Uroleucon cirsii
Brachycaudus cardui

C. brevistylum

C. candelabrum

C. canum

C. caput-medusae

<i>C. centaurea</i>	<i>Aphis fabae</i>
<i>C. coryletorum</i>	<i>Aphis cirsiophila</i> ; <i>Uroleucon cephalonopli</i>
<i>C. costaricense</i>	<i>Capitophorus elaeagni</i>
<i>C. creticum</i> (incl. <i>siculum</i>)	<i>Capitophorus bulgaricus</i> ; <i>Uroleucon aeneum</i> , <i>cirsii</i>
<i>C. desertorum</i>	<i>Aphis fabae</i>
<i>C. dipsacolepis</i>	[<i>Aphis horii</i> ? doubtful record – see Takahashi, 1966]
<i>C. discolor</i>	<i>Aphis fabae</i> ; <i>Brachycaudus cardui</i> ; <i>Capitophorus elaeagni</i>
<i>C. edule</i>	<i>Brachycaudus cardui</i> ; <i>Capitophorus elaeagni</i>
<i>C. elodes</i> (or <i>alatum</i> ?)	<i>Aphis anuraphoides</i> , [<i>viridescens</i> Bozhko (= <i>cirsioleracei</i> ?)]
<i>C. eriophorum</i>	<i>Brachycaudus cardui</i>
<i>C. erisithales</i>	<i>Aphis fabae</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus cardui</i> ; <i>Nasonovia ribisnigri</i> ; <i>Uroleucon macrosiphon</i>
<i>C. falconeri</i>	<i>Capitophorus horni</i> ssp. <i>gynoxantha</i>
<i>C. filipendulum</i>	<i>Uroleucon longirostre</i>
<i>C. foliosum</i>	<i>Aphis fabae</i>
<i>C. furiens</i>	<i>Capitophorus bulgaricus</i>
<i>C. glabrum</i>	<i>Aphis solanella</i>
<i>C. helenioides</i>	<i>Aphis fabae</i> ; <i>Capitophorus carduinus</i> , <i>horni</i> ssp. <i>gynoxantha</i> ; [<i>Dysaphis lappae</i>]; <i>Uroleucon cirsii</i> , <i>jaceae</i> , [<i>sonchi</i>]
<i>C. heterophyllum</i> see <i>helenioides</i>	
<i>C. horridulum</i>	<i>Capitophorus elaeagni</i>
<i>C. incanum</i> see <i>arvense</i>	
<i>C. japonicum</i>	<i>Aulacorthum cirsicola</i> , <i>vandenboschi</i> ; <i>Capitophorus cirsiiphagus</i> , <i>elaeagni</i> , <i>montanus</i> ; [<i>Macrosiphum naazamii</i> Shinji]; <i>Uroleucon cephalonopli</i> , [<i>formosanum</i>], <i>giganteum</i> , <i>gobonis</i> , [<i>rudbeckiae</i>]
<i>C. kamtschaticum</i>	<i>Aulacorthum cirsicola</i> ; <i>Capitophorus elaeagni</i> ; <i>Uroleucon cephalonopli</i> , <i>giganteum</i> <i>Uroleucon gobonis</i>
<i>C. kawakamii</i>	
<i>C. lanceolatum</i> see <i>vulgare</i>	
<i>C. laniflorum</i>	<i>Uroleucon cirsicola</i>
<i>C. leucanthum</i> (?)	<i>Uroleucon cephalonopli</i>
<i>C. maackii</i>	<i>Aphis fabae</i> ; <i>Capitophorus cirsiiphagus</i> , <i>elaeagni</i> , <i>montanus</i> ; <i>Chitinosiphum cirsii</i> <i>Uroleucon cephalonopli</i> , <i>giganteum</i> , <i>gobonis</i> , [<i>lactucicola</i>]
<i>C. mexicanum</i>	<i>Aphis gossypii</i> , <i>spiraecola</i> ; <i>Capitophorus carduinus</i> , <i>elaeagni</i> ; <i>Myzus persicae</i> ; <i>Uroleucon ambrosiae</i>
<i>C. montanum</i>	<i>Brachycaudus cardui</i>
<i>C. morisianum</i>	<i>Brachycaudus helichrysi</i> ; <i>Capitophorus bulgaricus</i>
<i>C. muticum</i>	<i>Aphis fabae</i> ; <i>Brachycaudus cardui</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Uroleucon pepperi</i> , <i>jaceae</i>
<i>C. nuttallii</i>	<i>Capitophorus elaeagni</i>
<i>C. occidentalis</i>	<i>Aphis helianthi</i> ; <i>Capitophorus elaeagni</i>
<i>C. ochro-centrum</i>	<i>Bipersona ochrocentri</i>

HOST LISTS AND KEYS

- C. oleraceum* *Aphis cirsioleracei, fabae* ssp. *cirsiacanthoidis, janischi*;
Brachycaudus cardui; *Capitophorus horni*;
Pemphigus bursarius; *Protrama radialis*;
Uroleucon cirsi, *jaceae*, [*sonchi*]
- C. palustre* *Aphis cirsioleracei, fabae*; *Brachycaudus cardui*;
Capitophorus carduinus; *Protrama radialis*;
Trama troglodytes; *Uroleucon aeneum, cirsi*
Aphis cirsioleracei, fabae; *Uroleucon cirsi*
- C. pannonicum*
C. pauciflorum see *waldsteini*
C. pendulum *Aphis fabae, Aulacorthum cirsicola*;
Chitinosiphum cirsi;
Uroleucon cephalonopli
Capitophorus cirsiiphagus
- C. purpuratum*
C. rivulare *Aphis fabae, fabae* ssp. *cirsiacanthiodis*;
Brachycaudus cardui
Capitophorus cirsiiphagus;
Uroleucon cephalonopli
- C. schantarensis* *Aphis gossypii*; *Capitophorus elaeagni, [evelaeagni]*;
[*Hyperomyzus sinilactucae*];
Uroleucon cephalonopli
- C. segetum* *Uroleucon cephalonopli*
Dysaphis radicivorans
- C. setidens*
C. setigerum
C. setosum see *arvensis*
C. siculum see *creticum*
C. sieversii
C. smallii
C. spicatum
C. spinosissimum
C. syriacum
C. tanakae
C. undulatum
C. veratum (incl. *argyracanthus*)
C. vlassovianum
C. vulgare (incl. *lanceolatum*)
- Aphis turanica*
Capitophorus elaeagni
Aulacorthum cirsicola
Brachycaudus cardui; [*Uroleucon sonchi*]
[*Dysaphis lappae* ssp. *cynarae*]
Capitophorus cirsiiphagus
Brachycaudus cardui
Hyperomyzus lactucae; *Uroleucon kumaoni*
Uroleucon cephalonopli
Aphis fabae, gossypii, helianthi, solanella, terricola;
Artemisaphis artemisicola; *Bipersona ochrocentri*;
Brachycaudus cardui, helichrysi;
Capitophorus carduinus, elaeagni, horni ssp. *gynoxantha*;
Uroleucon cichorii, cirsicola, cirsi, compositae, jaceae
Brachycaudus cardui; *Hyperomyzus lactucae*
- C. waldsteinii* (incl. *pauciflorum*)
C. wallichii
C. weyrichii *Aphis craccivora*
Aphis fabae group;
Uroleucon cephalonopli, giganteum
- Cirsium* spp. *Aphis pilosicauda*, [*Aphis (Protaphis)* sp. (Mier Durante,
1978)]; *Brachycaudus cardui* ssp. *turanica, lateralis*;
[*Capitophorus similis*]; [*Cavariella salicicola*];
Eotrana moerickei;
[*Macrosiphum* sp. (Leonard, 1964: 96)];
[*Uroleucon sonchi* spp. *stepposa*]

Key to apterae on *Cirsium* (also *Cnicus*):-

1. ANT PT/BASE 0.1–0.7. SIPH absent or as pores on flat cones. Cauda broadly rounded, not evident 2
 - ANT PT/BASE 0.8 or more. SIPH conical or tubular, usually longer than basal width. Cauda various, usually evident 5
2. HT II very elongate, at least 0.5× length of hind tibia, and fused to HT I 3
 - HT II much less than 0.5× length of hind tibia and separate from HT I 4
3. SIPH completely absent. Head and appendages pale or dusky. ANT PT/BASE 0.16–0.24 6
 - SIPH present as pores on flat, pigmented cones. Head and appendages dark. ANT PT/BASE 0.33–0.69 7
 - Trama troglodytes*
 - Protrama radialis*
4. Body and appendages with sparse, short hairs. SIPH absent. ANT PT/BASE 0.12–0.32. Dorsal abdomen with wax pore plates 6
 - Body and appendages densely hairy. SIPH present as pores. ANT PT/BASE 0.44–0.57. No wax pore plates 12
 - Pemphigus bursarius*
 - Eotrana moerickei*
5. Long, thick capitate dorsal hairs present at least on head and posterior abdomen. SIPH slender, about as thick as hind tibiae at midlength 6
 - Dorsal hairs not thick and distinctly capitate; if conspicuous, long and slightly expanded apically then SIPH are much thicker than hind tibiae at midlength 12
6. Spinal hairs duplicated (e.g., Figure 22a), so that on each of ABD TERG 1–5 there are 4 spinal hairs, 2–4 pleural hairs and 4–6 marginal hairs (the longest similar in length to those on ABD TERG 6–8) 7

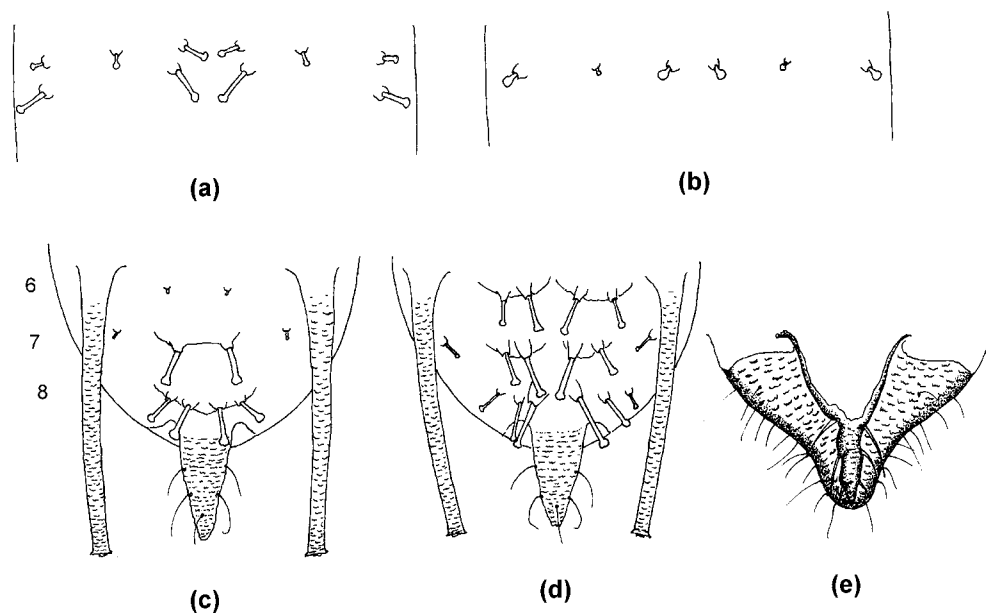


Figure 22 Apterae on *Cirsium*. (a) Hairs on ABD TERG 3 of *Capitophorus horni*, (b) same for *C. carduinus*, (c) end of abdomen *C. montanus* showing hairs on ABD TERG 6–8, (d) same for *C. cirsiiphagus*, (e) cauda and anal plate of *Bipersona ochrocentri*.

HOST LISTS AND KEYS

- Spinal hairs not duplicated (e.g., Figure 22b), so that on each of ABD TERG 1–5 there are at most 2 spinal hairs, 2 pleural hairs and 2–4 marginal hairs (sometimes much shorter than those on ABD TERG 6–8) **9**
- 7.** R IV+V 1.7–2.3× HT II. Pleural hairs on ABD TERG 1–3 often duplicated *Capitophorus bulgaricus*
- R IV+V 1.1–1.5× HT II. Pleural hairs on ABD TERG 1–3 not duplicated, except in some large individuals **8**
- 8.** R IV+V 1.1–1.4× HT II (many 1.1–1.25×), and 0.8–1.2× ANT BASE VI. SIPH 1.4–1.9× ANT III
Capitophorus horni s.str.
- R IV+V 1.2–1.5× HT II (mostly 1.2–1.4×), and 1.0–1.45× ANT BASE VI (mostly 1.2–1.4×). SIPH 1.6–2.2× ANT III *Capitophorus horni* ssp. *gynoxantha*
- 9.** R IV+V 1.15–1.7× ANT BASE VI **10**
- R IV+V 0.7–1.1× ANT BASE VI **11**
- 10.** Cauda 1.1–1.5× R IV+V, and bearing 5–8 hairs. ANT PT 3.1–4.4× R IV+V, and ANT PT/BASE 4.6–6.3. SIPH without dark apices *Capitophorus carduinus*
- Cauda 1.4–2.3× R IV+V, and bearing 7–13 hairs. ANT PT 4.5–6.3× R IV+V, and ANT PT/BASE 6.0–9.2. SIPH with dark apices *Capitophorus elaeagni*
- 11.** ANT PT/BASE less than 6. ABD TERG 6 with 1 pair of minute spinal hairs, and ABD TERG 7 with 1 pair of thick capitate spinal hairs (and 0–2 much smaller pleural ones) (Figure 22.c) *Capitophorus montanus*
- ANT PT/BASE more than 6.5. ABD TERG 6 with 1–2 pairs of thick capitate hairs, and ABD TERG 7 with 2 pairs of thick capitate spinal hairs (Figure 22d) *Capitophorus cirsiiphagus*
- 12.** SIPH with a zone of polygonal reticulation occupying subapical 0.15–0.4 of length **13**
- SIPH without subapical polygonal reticulation, sometimes with 1–3 rows of closed cells occupying less than 0.1 of length **27**
- 13.** Cauda dark **14**
- Cauda pale or dusky **20**
- 14.** Cauda broad at base, tapering to a very thin distal section that has a twisted appearance. Anal plate extended below cauda, and ending in a rounded protruberance (Figure 22e) *Bipersona ochrocentri*
- Cauda tongue- or finger-shaped. Anal plate not extended **15**
- 15.** R IV+V 0.22–0.30mm long. Cauda with 16–55 hairs (usually more than 20) **16**
- R IV+V 0.17–0.22mm long. Cauda with 10–26 hairs (usually less than 20) **18**
- 16.** Tibiae wholly dark. Cauda with more than 40 hairs *Uroleucon giganteum*
- Tibiae with paler middle section. Cauda with 16–34 hairs **17**
- 17.** ANT III with rhinaria extending over 0.5–0.8 of length. Hind femur dark on distal 0.65–0.75 of length. SIPH with polygonal reticulation on distal 0.25–0.33. R IV+V 1.4–1.62× HT II *Uroleucon cephalonopli*
- ANT III with rhinaria extending over 0.37–0.52 of length. Hind femur dark on distal 0.4–0.5. SIPH with polygonal reticulation on distal 0.15–0.20. R IV+V 1.20–1.35× HT II *Uroleucon aeneum*
- 18.** ANT III with rhinaria extending over 0.7–0.9 of length. Hind femur dark on distal 0.6–0.75 of length *Uroleucon gobonis*
- ANT III with rhinaria extending over 0.45–0.7 of length. Hind femur dark on distal 0.4–0.55 of length **19**

19. R IV+V 0.9–1.1× HT II, which is more than 0.20 mm long *Uroleucon macrosiphon*
 – R IV+V 1.2–1.35× HT II, which is less than 0.19 mm long *Uroleucon jaceae*
20. Hairs on cauda all pointed and of similar length **21**
 – Distal hairs on cauda clearly shorter (and often blunter) than more proximal hairs **25**
21. SIPH 1.1–1.5× cauda, with polygonal reticulation on distal 0.25–0.45 of length **22**
 – SIPH 1.6–2.2× cauda, with polygonal reticulation on less than distal 0.25 of length **23**
22. R IV+V less than 0.19 mm long. Cauda with 12–27 hairs. SIPH with polygonal reticulation on distal 0.25–0.36 of length *Uroleucon ambrosiae*
 – R IV+V more than 0.20 mm long. Cauda with 23–39 hairs. SIPH with polygonal reticulation on distal 0.36–0.45 of length *Uroleucon pepperi*
23. SIPH pale. Cauda with 8–12 hairs *Macrosiphum euphorbiae*
 – SIPH dark. Cauda with more than 20 hairs **24**
24. Crescent-shaped antesiphuncular sclerites present. SIPH 0.25–0.34× BL. Cauda with 20–33 hairs *Uroleucon cirsii*
 – No antesiphuncular sclerites. SIPH 0.32–0.42× BL. Cauda with 30–45 hairs *Uroleucon cirsicola*
25. SIPH wholly dark. Dorsal hairs with basal dark scleroites. ANT III with 39–49 rhinaria *Uroleucon kumaoni**
 – SIPH pale at least basally. Dorsal hairs not arising from dark scleroites. ANT III with 5–24 rhinaria **26**
26. R IV+V c.2× HT II *Uroleucon longirostre*
 – R IV+V 0.9–1.1× HT II *Uroleucon erigeronense*
27. Head spiculose **28**
 – Head without spicules **32**
28. ANT tubercles rather low with inner faces divergent. SIPH 2.7–3.6× cauda *Chitinosiphum cirsorhizum*
 – ANT tubercles well developed with steep-sided, almost parallel or apically convergent inner faces. SIPH less than 2.6× cauda **29**
29. SIPH somewhat clavate. ANT tubercles with inner faces apically convergent. ANT not longer than BL *Myzus persicae*
 – SIPH cylindrical/tapering. ANT tubercles with inner faces approximately parallel. ANT longer than BL **30**
30. ANT, SIPH and femora mainly black *Aulacorthum vandenboschi*
 – ANT segments, SIPH and femora mainly pale, darker at apices **31**
31. Head uniformly spiculose both dorsally and ventrally. Hind tibiae 0.6–0.8× BL. SIPH 2.0–2.6× cauda. ANT III with (0–)1–3(–4) rhinaria near base. BL 1.8–3.0 mm *Aulacorthum solani*
 – Head smooth dorsally and with spiculose areas between ANT tubercles and clypeus ventrally. Hind tibiae 0.9–1.5× BL. SIPH 1.5–2.0× cauda. ANT III with 3–12 rhinaria on basal half. BL 3.0–4.1 mm *Aulacorthum cirsicola*
32. ANT tubercles well developed, with divergent inner faces. ANT III with 3–36 rhinaria **33**
 – ANT tubercles absent or weakly developed. ANT III usually without rhinaria **34**
33. SIPH distinctly clavate. Dorsum pale. ANT PT/BASE 4.6–8. R IV+V 0.9–1× HT II *Hyperomyzus lactucae*

HOST LISTS AND KEYS

- SIPH tapering/cylindrical. Dorsum usually with dark intersegmental markings. ANT PT/BASE 8–11. R IV+V 1.2–1.6× HT II *Nasonovia ribisnigri*
- 34.** Cauda shorter than its basal width, rounded or helmet-shaped, with 5–8 hairs. Marginal tubercles (MTu) absent from ABD TERG 1 and 7, or only present if there are spinal tubercles (STu) and MTu on other segments **35**
- Cauda tongue-shaped or bluntly triangular, shorter or longer than its basal width, but if shorter then it bears more than 10 hairs. MTu always present on ABD TERG 1 and 7, and sometimes on other segments, but STu never present **41**
- 35.** Paired STu present, at least on head, and often on ABD TERG 8 or 7–8. Spiracular apertures reniform **36**
- STu absent from head, and rarely on ABD TERG 8. Spiracular apertures large and rounded **39**
- 36.** SIPH shorter than cauda. Paired STu only present on head *Dysaphis microsiphon*
- SIPH longer than cauda. Paired STu present at least on head and ABD TERG 8 **37**
- 37.** STu usually only on head and ABD TERG 8, with occasionally 1 on ABD TERG 7. MTu on ABD TERG 1–5 rather small, not much larger than spiracular apertures on those segments. Longest hairs on ANT III 1.0–1.2× BD III *Dysaphis atina*
- Paired STu consistently present on head and ABD TERG 7 and 8, and also on several other segments. Large MTu present on ABD TERG 1–5 or 1–7. Longest hairs on ANT III shorter than BD III **38**
- 38.** Longest hairs on head about equal in length to ANT BD III, and dorsal abdominal hairs 0.5–0.6× BD III. Cauda with 4 hairs *Dysaphis radicivorans**
- Longest hairs on head and dorsal abdomen shorter than 0.5× ANT BD III. Cauda with 5–7 hairs *Dysaphis lappae* spp. *circsii*
- 39.** Dorsum without dark markings. SIPH pale, smooth-surfaced, 0.8–1.5× cauda. ANT III 0.07–0.25 mm, 0.9–2.2× HT II *Brachycaudus helichrysi*
- Dorsum with an extensive black shield. SIPH dark, imbricated, 1.7–3.4× cauda. ANT III 0.31–0.47 mm, 2.4–3.4× HT II **40**
- 40.** Hairs on ABD TERG 8 are 30–61 µm long. Longest hairs on hind femur 10–25 µm long *Brachycaudus lateralis*
- Hairs on ABD TERG 8 are at least 70 µm long. Longest hairs on hind femur more than 25 µm long *Brachycaudus cardui*
- 41.** ANT PT/BASE 0.8–1.2. SIPH short, 0.7–1.2× the short blunt triangular cauda **42**
- ANT PT/BASE 1.8–4.0. SIPH 0.8–2.5× cauda, if 0.8–1.2× then cauda is tongue-shaped, clearly longer than its basal width **43**
- 42.** Longest hairs on ABD TERG 3 are 1.2–1.3× ANT BD III. SIPH 0.9–1.2× cauda, and with a distinct flange. R IV+V 1.45–1.65× HT II *Aphis anuraphoides*
- Longest hairs on ABD TERG 3 are 0.5–0.9× ANT BD III. SIPH 0.67–0.92× cauda, with a weak flange. R IV+V 1.2–1.4(–1.5)× HT II *Aphis terricola* (or *turanica*?)
- 43.** Cauda with 4–9 hairs (usually 5–7) **44**
- Cauda with 7–27 hairs (usually 8–24) **47**
- 44.** Dorsal abdomen with an extensive solid black patch *Aphis craccivora*
- Dorsal abdomen without extensive dark markings **45**
- 45.** Semiglobular MTu consistently present on all or most of ABD TERG 2–6 as well as 1 and 7 *Aphis circsiphila*
- MTu absent from ABD TERG 2–6, or irregularly present, and then conical or papilliform **46**

46. ANT 5-segmented (in both apt. and al.). SIPH and cauda both black. ABD TERG 2–4 with sporadic MTu (mean 1.7) *Aphis cirsioleracei*
 – ANT 6-segmented (except in summer dwarf apt.). SIPH distinctly darker than cauda. ABD TERG 2–4 very rarely with any MTu *Aphis gossypii*
47. Longest hairs on ANT III less than 0.5× BD III. Cauda short, only about as long as its basal width, with 16–20 long curved hairs *Aphis pilosicauda*
 – Longest hairs on ANT III more than 0.5× BD III. Cauda much longer than its basal width, with 7–27 hairs **48**
48. ABD TERG 8 with 6–11 hairs (fewer in hot-weather dwarfs). ANT III (1.6–)2.0–4.0(–5.0)× R IV+V. HT I with 3 hairs (sense peg present). Cauda with 7–12 hairs. (Al. with 15–40 rhinaria on ANT III) *Aphis helianthi*
 – ABD TERG 8 with 2–7 hairs. ANT III 1.3–2.6 (–3.0)× R IV+V. HT I with 2 hairs (no sense peg). Cauda with 7–27 hairs. (Al. with 4–23 rhinaria on ANT III) **49**
49. Dorsal abdomen without any dark markings. Cauda bearing 7–15 (usually 9–11) hairs, and usually with a distinct midway constriction *Aphis spiraeicola*
 – Dorsal abdomen with dark cross-bands on ABD TERG 7 and 8, and some small dark markings anterior to SIPH. Cauda bearing 11–24 hairs, and without a constriction **50**
50. SIPH more than 6.5× longer than marginal hairs on ABD TERG 3, which are 12–49 μm long. Longest hairs on ANT III 0.6–1.5× BD III *Aphis solanella*
 – SIPH less than 6.5× longer than marginal hairs on ABD TERG 3, which are 50–85 μm long. Longest hairs on ANT III 1.3–3.5× BD III *Aphis fabae* group (incl. *A. fabae* ssp. *cirsiacanthoidis*, *A. janischi*)

Cissampelos

- C. capensis*
C. mucronata
C. pareira

Menispermaceae

- Aphis gossypii*
Aphis gossypii
Aphis gossypii; [*Myzus formosanus*]; *Toxoptera aurantii*

Use key to polyphagous aphids, p. 1020

Cissus

- C. ampelopsis*
C. arborea
C. grisebachii
C. japonica
C. sicyoides

C. welwitschii
Cissus spp.

Vitaceae

- Aphis illinoisensis*
Macrosiphum euphorbiae
Aphis illinoisensis
Aphis gossypii
Aphis illinoisensis, *spiraeicola*; *Macrosiphum cuscutae*;
Toxoptera aurantii
Aulacorthum solani; *Myzus ornatus*
Aulacorthum solani; *Sitobion cissi*

Key to apterae on *Cissus*:–

1. Hind tibiae entirely black **2**
 – Hind tibiae pale, or at least with pale middle section **3**
2. SIPH with a subapical zone of polygonal reticulation. ANT tubercles well-developed, divergent. ANT 1.4–1.7× BL, with PT/BASE 5.5–6.8 *Macrosiphum cuscutae*
 – SIPH without any polygonal reticulation. ANT tubercles weakly developed. ANT 0.7–0.9× BL, with PT/BASE 3.1–4.0 *Aphis illinoisensis*

HOST LISTS AND KEYS

3. SIPH dark with subapical polygonal reticulation, cauda pale. ANT III with 1–6 rhinaria near base, and with hairs all very short, less than 0.5× BD III *Sitobion cissi*
 – Without this combination of characters go to key to polyphagous aphids, p. 1020

Cistus

C. albidus
C. algarvensis
C. corbariensis
C. creticus
C. crispus

C. germanicus
C. heterophyllus
C. hirsutus

C. incanus (incl. *corsicus*)
C. ladanifer

C. laurifolius
C. monspeliensis
C. nehrodense
C. populifolius
C. salviaefolius
C. vaginatus
C. villosus

Cistus spp.

Rock-Roses

[*Aphis* sp. – Leonard, 1972a: 99]
Neomyzus circumflexus
Myzus ornatus
 [*Brachycaudus cardui*]; *Myzus persicae*
Aphis [*cisti* Lichtenstein of del Guercio, 1911 (nomen nudum)], *cisticola*
Brachycaudus helichrysi
Myzus persicae
 [*Aphis cisti* Lichtenstein of del Guercio, 1911 (nomen nudum)]; *Myzus persicae*
Aphis cisticola, lupoi
Aphis cisticola, lichtensteini, lupoi;
Myzus ornatus, persicae
Aphis cisticola, fabae; Myzus persicae
Aphis cisticola, lichtensteini
Brachycaudus helichrysi
Aphis lichtensteini, lupoi
Aphis cisticola, lichtensteini; Myzus persicae
Myzus persicae
 [*Aphis* sp. – Leonard, 1972a: 99]; *Brachycaudus helichrysi*;
Myzus persicae
Macrosiphum euphorbiae;
 [*Myzus targionii* Del Guercio, 1894 – nomen dubium]

Cistaceae

Key to apterae on *Cistus*:-

1. Body spindle-shaped. SIPH pale, with a subapical zone of polygonal reticulation *Macrosiphum euphorbiae*
 – Body oval. SIPH dark or pale, without any polygonal reticulation **2**
2. ANT tubercles well-developed, with inner faces scabrous and converging apically **3**
 – ANT tubercles undeveloped or weakly developed, not projecting beyond middle of front of head in dorsal view **5**
3. SIPH slightly clavate. Dorsal abdomen without any dark markings *Myzus persicae*
 – SIPH tapering. Dorsal abdomen with dark markings **4**
4. Dorsal abdomen with a large, roughly horseshoe-shaped patch. ANT PT/BASE 3.5–5.0 *Neomyzus circumflexus*
 – Dorsal abdomen with a pattern of paired intersegmental markings. ANT PT/BASE 1.7–2.5 *Myzus ornatus*
5. SIPH pale, conical, almost smooth, with an annular incision below the flange. Cauda helmet-shaped, not longer than its basal width. Spiracular apertures large and rounded *Brachycaudus helichrysi*
 – SIPH dark, tapering, imbricated, without an annular incision below the flange. Cauda tongue-shaped, longer than its basal width. Spiracular apertures reniform **6**

6. R IV+V less than $1.3\times$ HT II. Hairs on ANT and legs mostly fine-pointed and often long; those on ANT III usually longer than BD III. Cauda with 11–27 hairs *Aphis fabae*
 – R IV+V more than $1.3\times$ HT II. Hairs on ANT and legs blunt or abruptly pointed; those on ANT III not longer than BD III. Cauda with 4–14 hairs 7
7. R IV+V $1.75\text{--}2.50\times$ HT II and bearing 6–10 accessory hairs. HT II very short, $0.65\text{--}0.83\times$ ANT BASE VI. Marginal tubercles (MTu) small and often absent from ABD TERG 1 and 7 *Aphis lichtensteini*
 – R IV+V $1.34\text{--}2.05\times$ HT II and bearing 2–6 accessory hairs. HT II $0.72\text{--}1.00\times$ ANT BASE VI. MTu always present and well developed on ABD TERG 1 and 7 8
8. SIPH rather short and thick, $0.13\text{--}0.18\times$ BL, and less than $2.8\times$ their basal widths. R IV+V with 2–6 accessory hairs (85% with 3 or more) *Aphis lupoi*
 – SIPH $0.18\text{--}0.24\times$ BL and more than $2.9\times$ longer than their basal widths. R IV+V with 2–3 accessory hairs (94% with 2) *Aphis cisticola*

Citharexylum

- C. fruticosum*
C. myrianthum
C. spinosum

- Aphis spiraeicola*
Myzus persicae
Aphis gossypii

Verbenaceae

Use key to polyphagous aphids, p. 1020.

Citrullus (incl. Colocynthis)

- C. colocynthis*

C. lanatus
C. vulgaris

- Aphis fabae*, *gossypii*; *Macrosiphum euphorbiae*;
Myzus persicae
Aphis craccivora, *fabae*, *gossypii*; *Aulacorthum solani*
Aphis fabae, *gossypii*; *Myzus persicae*

Cucurbitaceae

Use key to polyphagous aphids, p. 1020.

Citrus see Blackman and Eastop (2000) for a list and key to aphids on *Citrus*.

Cladrastis

- C. lutea*

- Aphis craccivora*

Leguminosae**Clarkia (including Godetia)**

- C. amoena*

C. elegans
C. pulchella
Clarkia spp. (as *Godetia* spp.)

- Onagraceae**
Aphis frangulae (as *epilobiina* – Börner, 1952);
Macrosiphum euphorbiae; [*Myzus godetiae*]
Aphis frangulae (as *epilobiina* – Börner, 1952)
Myzus ornatus
Aphis grossulariae, *oenotherae*, *triglochinis*; *Myzus persicae*

Key to apterae on *Clarkia*:-

1. ANT tubercles well developed. Marginal tubercles (MTu) absent from ABD TERG 1 and 7
 go to key to polyphagous aphids, p. 1020
 – ANT tubercles weakly developed. MTu always present on ABD TERG 1 and 7 2
2. R IV+V $1.0\text{--}1.3\times$ HT II, and with 2(–3) accessory hairs 3
 – R IV+V $1.3\text{--}1.7\times$ HT II, with 6–11 accessory hairs 4

HOST LISTS AND KEYS

3. SIPH entirely dark, more than 0.1× BL and 1.5× cauda. ANT PT/BASE 2.0–3.6 *Aphis frangulae*
 – SIPH mainly pale, less than 0.1× BL and 0.7–1.3× cauda. ANT PT/BASE 1.1–1.8 *Aphis triglochinis*
4. MTu present on at least some of ABD TERG 2–5, as well as 1 and 7 *Aphis grossulariae*
 – MTu absent from ABD TERG 2–5 *Aphis oenotherae*

Clausena

C. anisata

Toxoptera aurantii

Rutaceae

Claytonia

C. perfoliata

Myzus persicae

Portulacaceae

C. sibirica see *Montia*

Clematis (incl. *Atragene*)

C. aethusiaefolia

Aphis clematiphaga

C. alpina

Macrosiphum atragenae; *Myzus varians*

C. apiifolia

[*Brachycaudus klugkisti*]; *Colophina clematis*;

Macrosiphum clematifoliae; *Myzus persicae*, *variens*

C. armandii

Myzus varians

C. brachiata

Myzus varians

C. brevicaudata

Aphis clematiphaga; *Colophina arctica*

C. chrysocarpa

[*Sitobion* sp. – S Africa (Millar, 1994)]

C. cirrhosa

Aphis clematidis; *Aulacorthum solani*

C. connata

Tubaphis clematophila

C. crispa

Macrosiphum euphorbiae

C. dioica

Toxoptera aurantii

C. douglasii

Aphis clematidis

C. flammula

Aphis clematidis, *vitalbae*; *Myzus varians*

C. floribunda

Colophina monstifica

C. florida

Macrosiphum clematifoliae, *clematophagum*

C. fusca

Aphis clematicola

C. glauca

Macrosiphum atragenae

C. gouriana

Colophina clematis

Macrosiphum clematifoliae

C. grata

Aphis longituba

C. hexapetala

Aphis clematidis, *clematiphaga*

C. integrifolia

Aphis clematidis

C. ×jackmanii

Myzus varians

C. japonica

Colophina clematis; *Macrosiphum clematifoliae*;

Myzus varians

C. lawsoniana

Toxoptera aurantii

C. ligusticifolia

Illinoia brevitarsis;

Macrosiphum sp. (Oregon: BMNH colln); *Myzus varians*

C. mandshurica

Myzus varians

C. ochotensis

Myzus varians

C. orientalis

Aphis brachysiphon, *clematidis*, [*Aphis* sp. (Davletshina, 1964: 125)]; *Myzus ascalonicus*, *ornatus*

<i>C. paniculata</i>	[<i>Acyrtosiphon pisum</i>]; <i>Aphis clematidis</i> ; <i>Aulacorthum solani</i>
<i>C. recta</i>	<i>Aphis clematidis</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus varians</i>
<i>C. stans</i>	<i>Colophina arma</i>
<i>C. terniflora</i> (incl. <i>robusta</i>)	<i>Colophina clematicola</i> ; <i>Myzus varians</i>
<i>C. trichotoma</i>	<i>Colophina clematis</i> ; <i>Macrosiphum clematifoliae</i>
<i>C. vitalba</i>	<i>Aphis clematidis</i> , [<i>nasturtii</i>], <i>vitalbae</i> ; <i>Aulacorthum solani</i> ; <i>Myzus varians</i>
<i>C. viticella</i>	<i>Aphis clematidis</i> , <i>fabae</i>
<i>C. vitiifoliae</i> (?)	<i>Macrosiphum clematifoliae</i>
<i>Clematis</i> spp.	<i>Aphis nerii</i> ; <i>Sitobion africanum</i>

Key to apterae on *Clematis*:-

1. ANT PT/BASE more than 1. SIPH tubular. Cauda longer than its basal width. Dorsum without multifaceted wax glands 2
 - ANT PT/BASE much less than 0.5. SIPH as pores, or absent. Cauda broadly rounded, not evident. Dorsum with numerous multifaceted wax glands 23
2. SIPH with a subapical reticulated zone comprising at least 2-3 rows of closed polygonal cells 3
 - SIPH without subapical polygonal reticulation 9
3. SIPH wholly black, or black with pale bases 4
 - SIPH pale or slightly dusky, or dark only at apices 5
4. SIPH more than 0.33× BL, black with contrastingly pale basal part. ANT tubercles very well developed. Dorsum pale *Macrosiphum clematifoliae*
 - SIPH less than 0.33× BL, wholly black. ANT tubercles rather weakly developed. Dorsum sometimes pale, sometimes with dark cross-bands *Sitobion africanum*
5. Hairs on ANT III 0.7-1.0× BD III. SIPH 1.7-2.2× cauda *Macrosiphum euphorbiae*
 - Hairs on ANT III 0.2-0.4× BD III. SIPH 2.3-3.2× cauda 6
6. ANT PT/BASE 6.5-7.8. SIPH somewhat swollen distally, tapering gradually through the subapical reticulated region, with a small flange *Illinoia brevitarsis*
 - ANT PT/BASE 4.0-6.1. SIPH cylindrical on distal half, or if appearing slightly swollen then the swelling does not include the subapical reticulated region, and there is a well-developed flange 7
7. ANT BASE VI wholly dark like apex of ANT V, and 1.05-1.25× R IV+V. ANT III with 1-6 rhinaria *Macrosiphum* sp. (BMNH colln, Oregon, USA, leg. D. Hille Ris Lambers)
 - ANT BASE VI paler than apex of V except in region of primary rhinarium, and 1.7-2.1× R IV+V. ANT III with 6-12 rhinaria 8
8. R IV+V 0.9-1.05× HT II. SIPH 2.8-3.0× cauda, which is rather short and thick, almost parallel-sided on basal half. *Macrosiphum atragenae*
 - R IV+V c.1.1× HT II. SIPH c.2.3-2.4× cauda, which tapers from base to apex *Macrosiphum clematophagum*
9. Head spiculose, with well-developed, steep-sided or apically convergent ANT tubercles. ABD TERG 1 and 7 without marginal tubercles (MTu) 10
 - Head not spiculose, ANT tubercles undeveloped or weakly developed. ABD TERG 1 and 7 with MTu 15

HOST LISTS AND KEYS

10. SIPH with contrastingly black distal sections *Myzus varians*
 – SIPH pale, or dusky only at apices **11**
11. Dorsal abdomen with an intersegmental pattern of dark ornamentation. SIPH tapering, with a slight S-curve, coarsely imbricated, 0.75–0.95× head width across eyes. ANT PT/BASE 1.9–2.4 *Myzus ornatus*
 – Dorsal abdomen without intersegmental dark markings. SIPH clavate, or tapering and straight, 1.0–1.3× head width across eyes. ANT PT/BASE 2.2–5.5 **12**
12. SIPH with coarse, scabrous imbrication, tapering or cylindrical on distal half, constricted near apex and with a small flange, the diameter at the flange not exceeding the diameter at midlength (Figure 23a). ANT PT/BASE 2.2–3.5. Cauda distinctly constricted at base, with 4–5 hairs (Figure 23b) *Tubaphis clematophila*
 – SIPH with moderate imbrication, tapering or slightly clavate, with diameter of flange greater than diameter at midlength. ANT PT/BASE 2.8–5.5. Cauda not constricted at base, with 4–8 (usually 6–7) hairs **13**
13. SIPH clavate. ANT III without rhinaria **14**
 – SIPH tapering. ANT III usually with 1–2 small rhinaria near base *Aulacorthum solani*
14. SIPH slightly clavate, with maximum width of swollen part 1.05–1.4× minimum width of stem; normally imbricated, as long as or longer than ANT III *Myzus persicae*
 – SIPH evidently clavate, with maximum width of swelling 1.3–1.8× minimum width of stem; weakly imbricated with swollen part almost smooth, 0.5–0.75× ANT III *Myzus ascalonicus*
15. Cauda black like SIPH, and with 9–27 hairs **16**
 – Cauda pale or dusky, with 4–14 hairs **18**

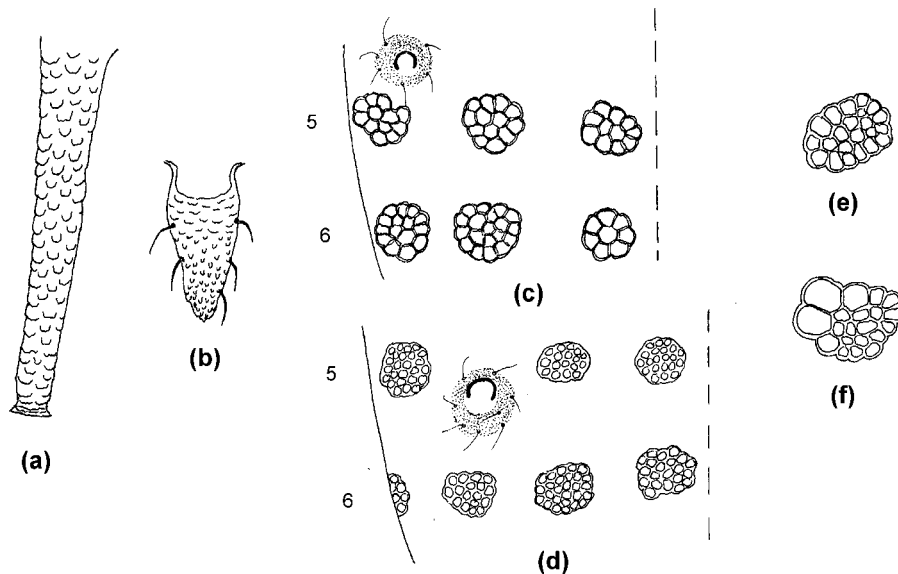


Figure 23 Apteræ on *Clematis*. (a) SIPH of *Tubaphis clematophilus*, (b) cauda of *T. clematophilus*, (c) left side of ABD TERG 5 of *Colophina clematis* showing SIPH and dorsal wax glands, (d) same for *C. arctica*, (e) wax gland on ABD TERG 7 of *C. arma*, (f) same for *C. monstifica* (after Aoki, 1983).

16. Stridulatory apparatus present, consisting of cuticular ridges on abdominal sternites 5 and 6 and a row of short peg-like hairs on each hind tibia *Toxoptera aurantii*
 – No stridulatory apparatus 17
17. ABD TERG 7 and 8 with dark transverse bars, and often with dark markings on more anterior segments. ANT PT/BASE 1.7–3.5. SIPH 0.7–1.8× cauda *Aphis fabae*
 – Dorsal abdomen without any dark markings. ANT PT/BASE 3.4–4.1. SIPH 1.7–2.7× cauda *Aphis nerii*
18. ANT III with pointed hairs, the longest of them 2.0–2.8× BD III *Aphis clematiphaga**
 – ANT III with pointed or blunt hairs, maximally 0.4–1.5× BD III 19
19. ANT PT/BASE 0.8–1.1. SIPH about equal in length to cauda *Aphis brachysiphon*
 – ANT PT/BASE 1.7–3.5. SIPH more than 1.1× cauda 20
20. R IV+V 1.1–1.7× HT II 21
 – R IV+V 0.75–1.0× HT II 22
21. SIPH (1.67–)2.0–3.3× cauda, which is 0.10–0.16 mm long and bears 5–8 hairs *Aphis longituba*
 – SIPH 1.3–2.1(–2.5)× cauda, which is 0.17–0.21 mm long and bears 7–14 hairs *Aphis vitalbae*
22. Hairs on ANT III short and blunt, 0.5–0.7× BD III *Aphis clematicola**
 – Hairs on ANT III pointed, 0.8–1.5× BD III *Aphis clematidis*
23. BL 0.8–1.3 mm. ANT 4-segmented. Tarsi 1-segmented (2 segments fused). SIPH absent *Colophina clematicola*
 – BL more than 2 mm. ANT 6-segmented. Tarsi 2-segmented. Poriform SIPH present 24
24. ABD TERG 4 with 10–16 wax glands (2 spinal, 2 pleural, 6–12 marginal) 25
 – ABD TERG 4 with 17–24 wax glands (e.g., 4–6 spinal, 4–8 pleural, 8–12 marginal) 26
25. SIPH located just anterior to the row of wax glands on ABD TERG 5. Spinal wax glands on ABD TERG 6 with facets of diameter more than 20 μm (Figure 23c) *Colophina clematis*
 – SIPH located between rows of wax glands on ABD TERG 5 and 6. Spinal wax glands on ABD TERG 6 with facets of diameter less than 20 μm (Figure 23d) *Colophina arctica*
26. BL 2.4–3.3 mm. Wax plates composed of cells of more-or-less uniform size, even on ABD TERG 7 (Figure 23e) *Colophina arma*
 – BL 3.6–5.4 mm. Some wax glands on ABD TERG 7 composed of cells differing greatly in size (Figure 23f) *Colophina monstifrica**

Cleome (incl. Gynandropsis)

C. amblyocarpa
C. chelidonii
C. coeruleo-rosea
C. gynandra
C. monophylla
C. pentaphylla

C. rutidosperma
C. serrulata
C. speciosa
C. spinosa

Capparidaceae

Myzus persicae
Aphis craccivora, *gossypii*
Aphis gossypii
Aphis gossypii; *Lipaphis pseudobrassicae*; *Myzus persicae*
Aphis gossypii; *Myzus persicae*
Aphis craccivora, *gossypii*; *Brachycaudus helichrysi*;
Lipaphis pseudobrassicae
Lipaphis pseudobrassicae; *Myzus persicae*
Aphis craccivora
Lipaphis pseudobrassicae
Myzus persicae; [*Sitobion pauliani*]

HOST LISTS AND KEYS

C. viscosa
Cleome sp.

Aphis gossypii
Macrosiphum euphorbiae

Key to apterae on *Cleome*:–

1. ANT tubercles low, divergent and scabrous. Median frontal tubercle similarly developed, and scabrous, as also are ANT I and II. SIPH cylindrical for most of length or slightly thicker distally with a constriction before the flange *Lipaphis pseudobrassicae*
- ANT tubercles either undeveloped or low and rather smooth, or, if scabrous then well developed and steep-sided or apically convergent. SIPH tapering, cylindrical or moderately clavate, with or without a subapical constriction go to key to polyphagous aphids, p. 1020

Clerodendrum

Verbenaceae

(Some of the E. Asian records of *Aphis gossypii* may refer to *A. clerodendri*.)

<i>C. bingei</i> (= <i>foetidum</i>)	<i>Aphis gossypii</i>
<i>C. chinense</i>	<i>Aphis clerodendri</i>
<i>C. floribundum</i>	<i>Aphis clerodendri</i>
<i>C. fragrans</i> see <i>phillipinum</i>	
<i>C. indicum</i>	<i>Aphis gossypii</i>
<i>C. inerme</i>	<i>Aphis gossypii</i>
<i>C. infortunatum</i>	<i>Aphis gossypii</i> , <i>nasturtii</i> , <i>spiraecola</i> ; <i>Nasonovia rostrata</i>
<i>C. japonicum</i>	<i>Aphis gossypii</i> ; <i>Myzus persicae</i>
<i>C. johnstonii</i>	<i>Aphis spiraecola</i> ; <i>Myzus ornatus</i>
<i>C. longiflorum</i>	<i>Aphis clerodendri</i>
<i>C. myricoides</i>	<i>Aphis gossypii</i> ; <i>Myzus ornatus</i> , <i>persicae</i>
<i>C. paniculatum</i>	<i>Aphis gossypii</i>
<i>C. phillipinum</i> (incl. <i>fragrans</i>)	<i>Aphis gossypii</i> ; <i>Myzus persicae</i>
<i>C. quadriculare</i>	<i>Aphis clerodendri</i>
<i>C. serratum</i>	<i>Aphis gossypii</i> ; [<i>Mollitrichosiphum nandii</i>]
<i>C. speciosissimum</i>	<i>Aphis gossypii</i> ; <i>Myzus persicae</i>
<i>C. splendens</i>	<i>Aphis gossypii</i> , <i>spiraecola</i> , <i>Aphis</i> sp. (India, BMNH colln)
<i>C. thompsoniae</i>	<i>Aphis gossypii</i>
<i>C. tomentosum</i>	<i>Aphis clerodendri</i>
<i>C. tracyanum</i>	<i>Aphis clerodendri</i>
<i>C. trichotomum</i>	<i>Aphis clerodendri</i> , <i>gossypii</i> ; <i>Aulacorthum magnoliae</i> ; <i>Prociphilus clerodendri</i>
<i>C. yakusimense</i>	<i>Aphis clerodendri</i> ssp. <i>amamiana</i>
<i>Clerodendrum</i> spp.	<i>Brachycaudus helichrysi</i> ; <i>Sinomegoura citricola</i>

Key of apterae on *Clerodendrum*:–

1. Wax glands present. SIPH absent. ANT PT/BASE less than 0.5 *Prociphilus clerodendri**
- Wax glands absent. SIPH present, tubular. ANT PT/BASE more than 1 2
2. Spiracular pores on thorax very large and rounded, more than 4× larger than those on abdomen. R IV +V 0.21–0.33 mm long, about 2× HT II, and bearing 22–30 accessory hairs. Dorsal body hairs long with blunt or slightly expanded apices *Nasonovia rostrata*
- Spiracular pores on thorax not distinctly larger than those on abdomen. R IV +V shorter, with fewer accessory hairs. Dorsal body hairs if long then pointed 3

3. ANT tubercles absent or weakly developed and ABD TERG 1 and 7 with marginal tubercles (MTu).
Cauda paler than at least distal part of SIPH, which are either wholly dark or have dark apices 4
– Either ANT tubercles are well developed or, if they are absent or weakly developed, then either ABD
TERG 1 and 7 are without MTu or both cauda and SIPH are entirely dark 6
4. SIPH pale basally, darker towards apices *Aphis nasturtii*
– SIPH uniformly dark 5
5. ANT V 2.5–4× longer than hairs on ABD TERG 8, which are finely pointed. Cauda with 6–9 (usually
7–8) hairs *Aphis clerodendri*
– ANT V 4–9× longer than hairs on ABD TERG 8, which are usually blunt. Cauda with 4–8 (usually
5–6) hairs *Aphis gossypii*
6. SIPH black, 2.2–3.1× cauda, which is also black and about as long as its basal width in dorsal view.
ABD TERG 1 and 7 with Mtu *Aphis* sp. (India, BMNH colln)
– SIPH pale or dark, but if dark they are less than 2× cauda, and cauda is longer than its basal width.
ABD TERG 1 and 7 with or without MTu go to key to polyphagous aphids, p. 1020

Clethra

C. barbinervis
C. cubensis
C. monostachya

Clethraceae

Matsumuraja rubifoliae; *Myzus persicae*
Aphis spiraeicola; *Toxoptera aurantii*
Myzus persicae

Couplet to distinguish these species:–

- Head, thorax and abdomen with long paired finger-like tubercles, the tubercles near SIPH being about
equal in length to SIPH and 2× ANT III (fundatrix). (Al. second generation with secondary rhinaria
distributed III 22–31, IV 9.18, V 3–10. Immatures with distal half of hind tibiae strongly spinulose.)
Matsumuraja rubifoliae
– Without long finger-like tubercles go to key to polyphagous aphids, p. 1020

Cleyera

C. japonica
Cleyera sp.

Theaceae

Aphis gossypii
Toxoptera aurantii

Use key to polyphagous aphids, p. 1020.

Clianthus

C. dampieri
C. formosus
C. puniceus

Leguminosae

Acyrthosiphon pisum
Aphis gossypii; *Aulacorthum solani*
Acyrthosiphon pisum; *Aphis craccivora*

Key to apterae on *Clianthus*:–

- ANT VI BASE 0.25–0.4 mm, 1.8–2.3× R IV+V. SIPH very attenuate distally, with minimum diame-
ter less than 0.25× width of cauda at midlength in dorsal view *Acyrthosiphon pisum*
– ANT VI BASE less than 0.2 mm, less than 1.5× R IV+V. SIPH clavate, cylindrical or tapering but not
attenuate and of diameter more than 0.3× width of cauda at midlength
go to key to polyphagous aphids, p. 1020

HOST LISTS AND KEYS

Clibadium

C. erosum
C. surinamense
C. terebinthinaceum

Compositae

Aphis coreopsidis, *gossypii*; *Aulacorthum solani*
Aphis eugeniae, *spiraecola*
Aphis spiraecola; *Toxoptera aurantii*; *Uroleucon ambrosiae*

Use key to apterae on *Eupatorium*, which includes all these species.

Clidemia

C. hirta

Melastomataceae

Aphis gossypii

Cliffortia

C. strobilifera

Rosaceae

Aphis gossypii

Climacium

C. dendroides

Climaciaceae

Pseudacaudella rubida

(or try key to moss-feeding aphids under *Polytrichum*)

Climacoptera

Climacoptera sp.

Chenopodiaceae

Aphis craccivora

Clinopodium

C. acinos=*Acinos arvensis*
C. chinense
C. gracile
C. micranthum
C. multicaule
C. umbrosum
C. vulgare

Calamints

Aphis clinepetae
Aphis clinopodii, *gossypii*; *Eumyzus clinopodii*
Aphis gossypii
[*Hyperomyzus carduellinus*]
Aphis gossypii; *Myzus ornatus*
Aphis clinopodii, *origani*; *Chaetosiphon hirticorne*;
Cryptomyzus heinzei; *Dysaphis microsiphon*;
Myzus ornatus; *Ovatomyzus chamaedrys*

Labiatae

Key to aphids on *Clinopodium*, *Acinos* and *Calamintha*:-

1. SIPH strongly swollen, with maximum diameter of swollen part more than 2× minimum diameter of stem (Figure 48a). SIPH 5.4–8.2× cauda *Eucarazzia elegans*
 – SIPH not swollen or less swollen, and less than 4× cauda **2**
2. Dorsal cuticle of head nodulose or spiculose **3**
 – Dorsal cuticle of head more-or-less smooth, without nodules or spicules (although their may be some spicules ventrally) **5**
3. Antennal hairs very long, 2–3× BD III, arising from tuberculate bases. SIPH long, thin, cylindrical and straight *Chaetosiphon hirticorne*
 – Antennal hairs short, 0.25–0.8× BD III. SIPH thick, tapering, and usually somewhat curved **4**
4. Dorsal body hairs very long, 2–3× BD III. Dorsal cuticle smooth, and without any distinct dark inter-segmental markings. ANT tubercles low. SIPH shorter than ANT III *Eumyzus clinopodii*
 – Dorsal body hairs very short, less than 0.3× BD III. Dorsal cuticle wrinkled, with a pattern of dark intersegmental markings. ANT tubercles well developed, with their inner faces apically convergent. SIPH longer than ANT III *Myzus ornatus*

5. Dorsal body hairs long and rather thick, 2–3× ANT BD III, with knobbed apices and mostly arising from distinctly tuberculate bases. ANT III with 2–10 rhinaria on basal part. ANT PT/BASE 7.8–9.5. SIPH clavate, 3–4× cauda *Cryptomyzus heinzei*
- Dorsal body hairs shorter or with pointed apices, without tuberculate bases. ANT III without rhinaria. ANT PT/BASE less than 8. SIPH tapering, cylindrical or clavate, usually less than 3× cauda **6**
6. ANT 1.1–1.6× BL, with PT/BASE 5.6–7.7. ANT tubercles distinctly developed. SIPH pale, cylindrical or slightly clavate (Figure 50e), 2.2–3.1× cauda, which has a distinctly constricted base *Ovatomyzus chamaedryz*
- ANT 0.43–0.75× BL, with PT/BASE 1.4–3.5. ANT tubercles undeveloped or weakly developed. SIPH dusky or dark, tapering, 0.4–2.5× cauda which is not constricted at base **7**
7. SIPH 0.4–0.8 (–1.2)× cauda which is helmet-shaped, shorter than its basal width *Dysaphis microsiphon*
- SIPH 0.8–2.5× cauda which is tongue-shaped or tapering, longer than its basal width **8**
8. Dorsal abdomen with an extensive black patch *Aphis craccivora*
- Dorsal abdomen membranous of with scattered dark markings or cross-bands **9**
9. Hairs on legs very short; posterior hair on hind trochanter only about 0.33× width of trochantrofemoral suture *Aphis ?calaminthae*
- Hairs on legs longer; posterior hair on hind trochanter 0.5–2.0× width of trochantrofemoral suture **10**
10. R IV+V 1.5–1.9× HT II. ANT PT/BASE 1.4–2.1. Longest hair on ANT III 0.6–0.9× BD III. (Al. with 2–6 secondary rhinaria on ANT IV) *Aphis clinepetae**
- R IV+V 0.9–1.4 (rarely up to 1.5)× HT II. ANT PT/BASE 1.7–4.0. Longest hair on ANT III 0.3–3.4× BD III. (Al. usually without, rarely with 1–2, secondary rhinaria on ANT IV) **11**
11. SIPH 0.87–1.1× cauda, which bears 4 – (more rarely) 5 hairs. ABD TERG 8 usually with a pale, dusky or dark sclerotic transverse band, and small spots at bases of SIPH *Aphis clinopodii*
- SIPH 0.8–2.5× cauda, which bears 4–19 hairs (more than 5 hairs if SIPH are less than 1.1× cauda). Dorsal abdomen with or without dark markings **12**
12. Cauda black and bearing 11–19 hairs. Longest hairs on ANT III 0.8–2.2× BD III *Aphis fabae*
- Cauda pale or dark, bearing 4–8 hairs. Longest hairs on ANT III 0.4–0.8× BD III **13**
13. SIPH 1.07–1.43× cauda. ABD TERG 8 often with a pale, dusky or dark sclerotic transverse band, and small spots at bases of SIPH *Aphis origani*
- SIPH 1.3–2.5× cauda. Dorsal abdomen usually without any dark markings (except in alatifform specimens) *Aphis gossypii*

Clintonia

Clintonia borealis

Convallariaceae

Illinoia [borealis], pallida

Clitoria

C. ternatea

Clitoria sp.

Leguminosae

Aphis gossypii

Brachycaudus helichrysi

Use key to polyphagous aphids, p. 1020.

Clusia

C. gundlachi

C. rosea

Guttiferae

Toxoptera aurantii

Toxoptera aurantii

HOST LISTS AND KEYS

Clutia

C. abyssinica

Clutia sp.

Use key to polyphagous aphids, p. 1020.

Euphorbiaceae

Aphis spiraecola; *Toxoptera citricidus*

Aphis fabae

Cnicus

Cn. argyracanthus see *Cirsium veratum*

Cn. arvensis see *Cirsium arvense*

Cn. benedictus

Cn. edelbergii see *Carduus*

Cn. wallichii

'*Cnicus*' spp.

Use key to aphids on *Cirsium*.

Compositae

Brachycaudus cardui; *Myzus persicae*; *Uroleucon aeneum*

Dysaphis atina, *microsiphon*

Aphis spiraecola; *Bipersona ochrocentri*;

Brachycaudus helichrysi; *Capitophorus carduinus*, *elaeagni*;

Myzus ornatus; *Neomyzus circumflexus*

Cnidium

Cn. ajanense

Cn. dahuricum

Cn. monnieri

Cn. officinale

Cn. silaifolium

Umbelliferae

Dysaphis cnidii

Aphis fabae

Dysaphis sp. near *mordvilkoii* (China, BMNH colln)

Aulacorthum solani; *Cavariella salicicola*;

Semiaphis heraclei

Cavariella aegopodii

Key to apterae on *Cnidium*:-

1. ABD TERG 8 with a posteriorly projecting process above cauda. ANT PT/BASE 0.6–1.4. SIPH clavate 2
 - No supracaudal process. ANT PT/BASE 2.4–5.3. SIPH clavate, cylindrical or tapering 3
2. SIPH moderately imbricated, with a narrow basal stem. R IV without accessory hairs 4
 - SIPH thick, short and coarsely imbricated, narrowing only near base. R IV with a pair of accessory hairs 3
 - Cavariella aegopodii*
 - Cavariella salicicola*
3. SIPH very small and flangeless, only about 0.5 of length of cauda or less, with aperture slanted towards midline 4
 - SIPH at least 0.6 of length of cauda, and with a distinct flange 4
 - Semiaphis heraclei*
4. Cauda helmet-shaped or pentagonal, not longer than its basal width. Spinal tubercles (STu) present on head, and usually on ABD TERG 8, or 7 and 8. Longest hairs on ANT III 2.1–3.6× BDIII 5
 - Cauda tongue-shaped, clearly longer than its basal width. STu absent from head and not usually present on ABD TERG 7 and 8. Longest hairs on ANT III 0.3–2.1× BD III 5
 - go to key to polyphagous aphids, p. 1020
5. R IV+V 1.54–1.81× HT II. ABD TERG 8 with 7–9 hairs 5
 - R IV+V 1.05–1.15(–1.33)× HT II. ABD TERG 8 with 4–7 hairs 5
 - Dysaphis cnidii*
 - Dysaphis* sp. near *mordvilkoii* (China, BMNH colln)

Cobaea*C. scandens*

Use key to polyphagous aphids, p. 1020.

Coccinea*C. adoensis**C. cordifolia* see *indica**C. indica* (incl. *cordifolia*)

Use key to polyphagous aphids, p. 1020.

Coccocypselum*C. herbaceum**C. lanceolatum***Coccoloba***C. borinquensis**C. diversifolia**C. flendona**C. laurifolia**C. obtusifolia**C. pyrifolia**C. retusa**C. uvifera**C. wrightii*

Use key to polyphagous aphids, p. 1020.

Cocculus*C. triloba***Cochlearia***C. armoracia* see *Armoracia rusticana**C. officinalis*Key to apterae on *Cochlearia*:–

- Head dark, rough but not spinulose, with low ANT tubercles, and median tubercle developed to a similar extent, so that outline of front of head is w-shaped in dorsal view. SIPH cylindrical or slightly swollen, with basal part distinctly thicker than hind tibia at midlength *Lipaphis cochleariae*
- Head pale/dusky, spinulose, with well-developed steep-sided ANT tubercles. Median tubercle not developed. SIPH clavate, with minimum diameter of basal part similar to thickness of hind tibia at midlength *Myzus ascalonicus*

(or try key to polyphagous aphids, p. 1020)

Codonopsis*C. clematidea**C. javanica* (incl. *japonicus*)**Cobaeaceae***Aphis fabae*; *Myzus persicae***Cucurbitaceae***Aphis gossypii**Aphis craccivora*, *gossypii*, *nasturtii*, [umbrella]**Rubiaceae***Aphis gossypii**Aphis gossypii***Polygonaceae***Toxoptera aurantii**Aphis gossypii*, *nasturtii**Aphis gossypii**Aphis gossypii**Aphis craccivora**Toxoptera aurantii**Aphis craccivora*, *spiraecola**Aphis craccivora*, *gossypii*; *Toxoptera aurantii**Toxoptera aurantii***Menispermaceae***Schizaphis jaroslavi***Scurvy-Grasses****Cruciferae***Lipaphis cochleariae*; *Myzus ascalonicus***Campanulaceae***Rhopalomyzus codonopsidis**Neomyzus taiwanus*

HOST LISTS AND KEYS

<i>C. lanceolata</i>	<i>Codonopsimyza sasammi</i> ; <i>Meguroleucon codonopsidicola</i> ; <i>Neomyzus codonopsis</i>
<i>C. ovata</i>	<i>Aphis fabae</i>
<i>C. pilosula</i>	<i>Meguroleucon codonopsicola</i>

Key to apterae on *Codonopsis*:-

1. SIPH black and without any distal polygonal reticulation. Cauda black with 11–25 hairs. ABD TERG 1 and 7 with marginal tubercles (MTu) *Aphis fabae*
 - SIPH pale or dark, if dark then with polygonal reticulation. Cauda pale/dusky, with 5–14 hairs. ABD TERG 1 and 7 without MTu **2**
2. Head, ANT and SIPH entirely dark. Distal 0.2–0.3 of SIPH with polygonal reticulation *Meguroleucon codonopsidicola*
 - Head pale, ANT and SIPH mainly pale, sometimes darker at apices. SIPH without polygonal reticulation, or with only a few closed cells near apices **3**
3. Dorsum without dark markings. Head smooth ventrally as well as dorsally. Cauda with 9–14 hairs **4**
 - Dorsum with a conspicuous pattern of black markings. Head with spicules at least ventrally. Cauda with 5(–6) hairs **5**
4. SIPH markedly inflated over about distal 0.7 of length, the maximum width of the swelling being more than twice the minimum width of the basal part. ANT III without rhinaria. ANT tubercles low and bearing slightly capitate hairs longer than BD III *Rhopalomyzus codonopsidis*
 - SIPH cylindrical or only slightly swollen on distal half. ANT III with 1–13 rhinaria distributed in a row over length of segment. ANT tubercles well developed and bearing blunt or capitate hairs less than 0.5× BD III *Codonopsimyza sasammi**
5. Dorsum with dark transverse bands across pronotum, metanotum and ABD TERG 8, as well as broader bands across mesonotum and ABD TERG 2/3. Head with spicules dorsally as well as ventrally *Neomyzus taiwanus*
 - Dorsum with broad dark bands across mesonotum and anterior abdomen, but pronotum and metanotum with paired dark patches, and ABD TERG 8 without any dark markings. Head without spicules dorsally *Neomyzus codonopsis*

<i>Coelia</i>	Orchidaceae
<i>Coelia</i> spp.	<i>Cerataphis orchidearum</i>

<i>Coeloglossum</i>	Orchidaceae
<i>C. viride</i>	<i>Aphis fabae</i>

<i>Coelogyne</i>	Orchidaceae
<i>C. cristata</i>	<i>Cerataphis orchidearum</i>
<i>C. miniata</i>	<i>Sitobion luteum</i> , <i>orchidacearum</i>

Use key to aphids on orchids under *Cymbidium*.

<i>Coffea</i>	Rubiaceae
<i>C. canephora</i>	<i>Aphis gossypii</i>
<i>Coffea</i> spp./hybrids	<i>Aphis gossypii</i> , <i>spiraecola</i> ; <i>Brachycaudus helichrysi</i> ; <i>Sinomegoura coffeae</i> ; <i>Toxoptera aurantii</i> , <i>citricidus</i>

Key to apterae on *Coffea*:-

- Head with well-developed ANT tubercles, their inner faces smooth and divergent. Tibiae wholly black, and ANT black beyond basal part of ANT III. SIPH tapering from a broad base, mainly pale becoming gradually darker towards apices; 1.4–1.6× cauda, which is pale or dusky *Sinomegoura coffeae*
- Without this combination of characters go to key to polyphagous aphids, p. 1020

Coix*C. lacrymi-jobi***Gramineae**

Rhopalosiphum maidis, padi;
Sitobion [indicum], [rosaeiformis]

Use key to apterae of grass-feeding aphids under *Digitaria*.**Coldenia***C. procumbens***Boraginaceae***Aphis gossypii***Colebrookea***C. oppositifolia***Labiatae***Aphis raji*; *Subovatomyzus leucosceptri*

Couplet to separate these two species:-

- SIPH dark, tapering, 0.12–0.22 mm, shorter than or about equal to R IV+V (0.19–0.23 mm). ANT PT/BASE 1.5–2.0 *Aphis raji*
- SIPH pale, weakly clavate. 0.33–0.48 mm, more than 2× R IV+V (0.14–0.18 mm). ANT PT/BASE 5.8–7.9 *Subovatomyzus leucosceptri*

Coleonema*C. album***Rutaceae***Aphis* sp. – Leonard, 1972a: 99**Coleostephus***C. myconis***Compositae***Aphis craccivora, fabae*; *Brachycaudus helichrysi*

Use key to polyphagous aphids, p. 1020.

Coleus see *Plectranthus***Colletia**

C. cruciata
Colletia sp.

Rhamnaceae

[*Aphis* sp. – Leonard, 1972a: 99]; *Toxoptera aurantii*
Aphis sp. (Chile, BMNH colln)

Collinsonia

C. canadensis
C. grandiflora
C. serotina

Labiatae

Hyalomyzus collinsoniae
Myzus ornatus, persicae
Hyalomyzus orphnophlebos

Key to apterae on *Collinsonia*:-

1. Head posteroventrally with a pair of scabrous tubercles placed on either side of clypeus. SIPH dusky to dark, evidently clavate. (Al. with dark-bordered forewing veins and sec. rhin. distributed ANT III 37–65, IV 10–40, V 0–9) 2

HOST LISTS AND KEYS

- Head without posteroventral tubercles. SIPH tapering and dusky, or clavate and pale, (Al. with forewing veins not dark-bordered and sec. rhin. distributed ANT III 6–19, IV and V 0) 3
- 2. R IV+V 0.10–0.13 mm long, 1.3–1.5× HT II, and usually bearing only 2 accessory hairs
Hyalomyzus collinsoniae
- R IV+V 0.13–0.15 mm long, 1.8–1.9× HT II, and bearing 6 or more accessory hairs
Hyalomyzus orphnophlebos
- 3. SIPH slightly clavate. ANT PT/BASE (2.8–)3.1–4.5. Dorsal abdomen without dark intersegmental markings
Myzus persicae
- SIPH tapering with a slight ‘S’-curve. ANT PT/BASE 1.75–2.8. Dorsal abdomen with a pattern of dark intersegmental markings
Myzus ornatus

Collomia

C. linearis

Collomia sp.

Polemoniaceae

Nasonovia colloniae

Macrosiphum sp. (Oregon, USA; BMNH colln)

Couplet for separating these two species:–

- ANT III narrowed at base, bearing slightly capitate hairs which are maximally 1.0–1.5× BD III, and 2–30 rhinaria on basal half. R IV+V 1.8–2.0× HT II, with c.20 accessory hairs. First tarsal segments with 4–4–4 hairs. SIPH without subapical reticulation, 1.1–1.5× cauda, which bears 5 hairs
Nasonovia collomiae
- ANT III not narrowed at base, bearing blunt or pointed hairs maximally 0.8–0.95× BD III, and about 3 rhinaria near base. R IV+V c.1.2× HT II, with c.9 accessory hairs. first tarsal segments with 3–3–3 hairs. SIPH with subapical reticulation, c.2× cauda which bears c.11 hairs
Macrosiphum sp. (Oregon, USA; BMNH colln)

Colocasia

C. antiquorum see *esculenta*

C. esculenta (incl. var. *antiquorum*)

C. kotoensis

Colocasia spp.

Araceae

Aphis craccivora, *gossypii*, *nasturtii*, *spiraecola*;
Hysteroneura setariae; *Neomyzus circumflexus*;
Patchiella reaumuri; *Pentalonia nigronervosa*;
Rhopalosiphum nymphaeae, *padi*; *Schizaphis scirpi*;
Toxoptera aurantii
Aphis gossypii
Aphis fabae, [*punicae*], [*umbrella*]
Aulacorthum magnoliae; *Brachycaudus helichrysi*;
Hydronephus colocasiae

Key to apterae on *Colocasia*:–

1. ANT PT/BASE less than 0.5. Eyes of only 3 facets. SIPH absent. Dorsal wax pore plates present on all segments
Patchiella reaumuri
- ANT PT/BASE more than 1. Eyes multifaceted. SIPH present. No dorsal wax pore plates 2
2. SIPH pale on basal half and dark on distal half, and usually slightly swollen subapically. SIPH and femora covered with irregular, transverse rows of spicules. (Alata with dark-bordered wing veins, with radius and costa fused for part of lengths to form a closed cell behind the pterostigma)
Pentalonia nigronervosa
- SIPH either mainly pale or mainly dark; tapering, cylindrical, clavate, or flared apically. SIPH and femora smooth or imbricated, not markedly spiculose. (Alata with normal wing venation, veins not dark-bordered) 3

3. Head spiculose with low, scabrous, divergent ANT tubercles. R IV+V 1.5–1.9× HT II. SIPH 3.2–3.7× cauda, strongly imbricated, cylindrical with somewhat flared apices. Dorsal cuticle with spiculose reticulation *Hydranaphis colocasiae**
 – Without that combination of characters 4
4. SIPH black, 1.6–2.3× cauda which bears 5–9 hairs. ANT PT/BASE 3.2–5.7. ABD TERG 8 with (5–)6–16 hairs that are 88–150µm long *Schizaphis scirpi*
 – Without that combination of characters go to key to polyphagous aphids, p. 1020

Colocynthis* see *Citrullus***Cologania****C. ovalifolia***Leguminosae***Picturaphis vignaphilus****Columnnea****C. percrassa***Gesneriaceae***Aulacorthum solani*; *Myzus persicae*

Use key to polyphagous aphids on p. 1020.

Colutea*C. arborescens***Leguminosae***Acyrtosiphon caraganae, pisum*;
Aphis craccivora, cytisorum; *Myzus ascalonicus*;
Pemphigus vesicarius (as *coluteae*)*C. istria**Aphis craccivora**C. media**Acyrtosiphon caraganae**C. melanocalyx**Acyrtosiphon caraganae, pisum*;[*Aphis* sp. – Leonard, 1972a: 99]*C. orientale**Acyrtosiphon caraganae**C. persica**Acyrtosiphon pisum*; *Aphis craccivora**Colutea* sp.*Acyrtosiphon caraganae* ssp. *occidentale*Key to apterae on *Colutea*:–

1. ANT PT/BASE less than 0.5. SIPH absent. Dorsal abdomen with wax pore plates *Pemphigus vesicarius*
 – ANT PT/BASE more than 1. SIPH present. No wax pore plates 2
2. Body oval, with extensive dark dorsal sclerotisation. SIPH black, less than 4× R IV+V. Cauda black 3
 – Body spindle-shaped, without dark sclerotisation. SIPH pale, 4.75–8.5× R IV+V. Cauda pale 4
3. R IV+V 0.88–1.16× HT II (mostly 0.9–1.05×). Anterior half of genital plate with 2(–3) hairs. Cauda with 4–7(–9) hairs *Aphis craccivora*
 – R IV+V 0.97–1.3× HT II (mostly 1.06–1.2×). Anterior half of genital plate with 2–8 hairs (mode 4, mean 5.2). Cauda with (6–)7–13 hairs *Aphis cytisorum*
4. ANT I longer than wide and bearing 9–23 hairs. SIPH attenuate distally, thinner than hind tibia at midlength *Acyrtosiphon pisum*
 – ANT I not longer than wide, bearing 7–10 hairs. SIPH not attenuate distally, thicker than hind tibia at midlength *Acyrtosiphon caraganae*

HOST LISTS AND KEYS

Colvillea

C. racemosa

Comandra

C. pallida

Comanthosphace

Comanthosphace sp.

Comarum see *Potentilla*

Combretum see Blackman and Eastop, 1994

Commelina

C. africana

C. benghalensis

C. coelestis

C. communis

C. diffusa see *longicaulis*

C. elegans

C. forskalaei

C. longicaulis (incl. *diffusa*)

C. nigritana

C. nudiflora

C. subulata

Commelina sp.

Leguminosae

Myzus persicae

Santalaceae

Sitobion (Metobion) sp. (BMNH colln, Alberta)

Labiatae

Aulacorthum phytolaccae

Commelinaceae

Aphis gossypii

Aphis gossypii; *Aulacorthum solani*;

Macrosiphum euphorbiae; *Myzus ornatus*, *persicae*;

Neomyzus circumflexus; [*Rhopalosiphum maidis*]

Neomyzus circumflexus; *Utamphorophora commelinensis*

Aphis gossypii

Aphis craccivora, *gossypii*; *Myzus persicae*;

Utamphorophora commelinensis

Aphis gossypii

Aphis gossypii, *spiraecola*; *Neomyzus circumflexus*;

Utamphorophora commelinensis

Aphis gossypii

Aphis gossypii

Aphis gossypii

[*Sitobion aulacorthoides*]

Key to apterae on *Commelina*:-

- SIPH markedly clavate, with maximum width of swollen part about twice minimum width of basal part. ANT PT/BASE 5.4–6.5 m *Utamphorophora commelinensis*
- SIPH not markedly clavate (if somewhat clavate then ANT PT/BASE is less than 5)
go to key to polyphagous aphids, p. 1020

Commiphora see Blackman and Eastop, 1994

Comptonia see *Myrica*

C. peregrina see *Myrica aspleniifolia*

Myricaceae

Conandron

C. ramondioides

Gesneraceae

Xenosiphonaphis conandri

Conioselinum

C. chinense

Umbelliferae

Hyadaphis foeniculi

Conium*C. chaerophylloides**C. maculatum***Conium sp.****Umbelliferae***Dysaphis apiifolia**Anuraphis subterranea; Aphis fabae, helianthi;**Aulacorthum solani;**Cavariella aegopodii, pastinacae, theobaldi;**Dysaphis apiifolia, apiifolia ssp. petroselini, crataegi,**lauberti; Hyadaphis foeniculi, passerinii;**Macrosiphum euphorbiae, gei; Myzus ornatus**Semiaphis coniumi**Aulacorthum solani*Key to apterae on *Conium*:-

1. ABD TERG 8 with a backwardly directed process above cauda 2
 - No supracaudal process 4
2. SIPH tapering, not at all clavate *Cavariella theobaldi*
 - SIPH clavate 3
3. ANT PT/BASE 0.9–1.4 *Cavariella aegopodii*
 - ANT PT/BASE 2.6–4.0 *Cavariella pastinacae*
4. ANT tubercles low or absent 5
 - ANT tubercles well developed, greatly exceeding height of middle of front of head in dorsal view 13
5. SIPH very short, only about 0.5× cauda, and flangeless *Semiaphis coniumi**
 - SIPH more than 0.8× cauda, with a distinct flange 6
6. Cauda helmet-shaped, not longer than its basal width in dorsal view. Spinal tubercles (STu) present on head and ABD TERG 8, and sometimes on other segments 7
 - Cauda tongue-shaped, much longer than its basal width. STu rare, and never on head 10
7. SIPH ornamented with close-set rows of spinules; about 1.5× cauda, which bears 11–16 hairs. STu on all or most of ABD TERG 1–8. R IV+V 0.25–0.37mm, 1.55–2.2× HT II *Anuraphis subterranea*
 - SIPH imbricated, without spinules, about 2× cauda which bears 4–7 hairs. STu not usually present on ABD TERG 1–5, and often not on 6 or 7. R IV+V 0.14–0.19mm, 1.05–1.5× HT II 8
8. Most dorsal hairs with pointed apices; those on head longer than diameter of STu on head between eyes *Dysaphis lauberti*
 - Most dorsal hairs short with blunt apices; those on head shorter than diameter of STu 9
9. Ventral hair on hind trochanter 0.24–0.56× (rarely more than 0.5×) width of trochantrofemoral suture (see Figure 1). Longest spinal hair on ABD TERG 8 is 11–38µm long (rarely more than 30µm). ABD TERG 7 frequently with marginal tubercles (MTu) *Dysaphis apiifolia*
 - Ventral hair on hind trochanter 0.42–1.00× (rarely less than 0.5×) width of trochantrofemoral suture. Longest spinal hair on ABD TERG 8 is 25–80µm long (rarely shorter than 30µm). ABD TERG 7 rarely with MTu *Dysaphis crataegi*
10. SIPH clavate, 0.9–1.4× cauda, which bears 5–8 hairs. Prosternum with a dark, approximately trapezoid sclerite 11
 - SIPH gradually tapering, 0.8–1.9× cauda, which bears (7–)9–24 hairs. Prosternum without a dark trapezoid sclerite 12

HOST LISTS AND KEYS

11. Prosternal sclerite 1.36–2.6× wider than long, often convex posteriorly. SIPH 1.05–1.4× cauda. (Al. often with sec. rhin. on ANT V) *Hyadaphis foeniculi*
– Prosternal sclerite 2.2–3.6× wider than long, with straight posterior margin. SIPH 0.85–1.2× cauda. (Al. rarely with sec. rhin. on ANT V) *Hyadaphis passerinii*
12. ANT I dark, but ANT II pale or dusky, concolorous with basal half of III. Dorsal abdomen usually without any dark markings anterior to SIPH (except for dark intersegmental muscle sclerites). ANT III 1.05–1.95× PT, (1.6–)2.0–4.0(–5.0)× R IV+V, and 1.5–2.5(–2.8)× cauda. SIPH 1.5–2.5(–2.8)× cauda. HT I with 3 hairs (sense peg present). ABD TERG 8 with 2–11 hairs. (Al. with 15–40 rhinaria on ANT III) *Aphis helianthi*
– ANT I and II both dark, contrasting with III. Dorsal abdomen usually with some small dark markings anterior to SIPH (in addition to dark intersegmental muscle sclerites). ANT III 0.65–1.3× PT, 1.2–2.6(–3.0)× R IV+V and 1.2–1.6(–1.9)× cauda. SIPH 0.7–1.6× cauda. HT I with 2 hairs (no sense peg). ABD TERG 8 with 2–5(–7) hairs. (Al. with 10–23 rhinaria on ANT III) *Aphis fabae*
13. SIPH with a subapical zone of polygonal reticulation. ANT tubercles smooth, divergent, bearing pointed hairs **14**
– SIPH without polygonal reticulation. ANT tubercles spiculose or scabrous, steep-sided or apically convergent, bearing blunt hairs **15**
14. Longest hair on ABD TERG 8 is 38–63 μm, 0.6–1.4× ANT BD III. Anterior half of subgenital plate usually (77%) with only 2 hairs (18% with 3, 5% with 4–6 hairs) *Macrosiphum euphorbiae*
– Longest hair on ABD TERG 8 is 66–106 μm, 1.4–2.0× ANT BD III. Anterior half of subgenital plate with 2–11 hairs, usually (77%) with 4–8 hairs *Macrosiphum gei*
15. Dorsal abdomen with an intersegmental pattern of dark markings. ANT 0.5–0.6× BL, with PT/BASE 1.7–2.8. ANT III without rhinaria. Inner faces of ANT tubercles scabrous, convergent apically. SIPH usually with a slight S-curve *Myzus ornatus*
– Dorsal abdomen without dark intersegmental markings. ANT 1.1–1.3× BL, with PT/BASE 4.0–5.5. ANT III usually with 1–2 rhinaria. Inner faces of ANT tubercles spiculose, approximately parallel. SIPH straight *Aulacorthum solani*

Conopharyngia see *Tabernaemontana*

Conopholis

C. americana

Orobanchaceae

Prociophilus longianus

Conopodium

C. denudatum

C. majus

Umbelliferae

Cavariella aegopodii; *Myzus ornatus*, *persicae*

Aphis lambersi

Use key to apterae on *Daucus*.

Conringia

C. orientalis

Cruciferae

Lipaphis rossi ssp. *conringiae*; *Myzus persicae*

Couplet for separating apterae of these two species:–

- Dorsum without dark sclerotisation. ANT tubercles well developed, with their inner faces apically convergent. SIPH weakly clavate, 0.75–1.0× ANT III *Myzus persicae*
– Dorsum with broad dark segmentally separated cross-bands and marginal sclerites. ANT tubercles weakly developed, their inner faces divergent. SIPH short and very broad-based, not clavate, c.0.5–0.6× ANT III *Lipaphis rossi* ssp. *conringiae*

Consolida

C. ambigua

Ranunculaceae

Nasonovia jammuensis

Convallaria

C. keiskei

C. majalis

Convallariaceae

Aulacorthum watanabei

Aphis gossypii; *Aulacorthum solani*, *speyeri*;

Illinoia wahnaga; *Macrosiphum euphorbiae*, *pechumani*;

Metopolophium dirhodum; *Myzus ascalonicus*, *persicae*

Key to apterae on *Convallaria*:-

1. ANT tubercles weakly developed. ABD TERG 1 and 7 with marginal tubercles (MTu). SIPH dark, cauda pale or dusky, rarely dark *Aphis gossypii*
- ANT tubercles well developed. ABD TERG 1 and 7 without MTu. SIPH and cauda variously pigmented, pale or dark **2**
2. Head almost smooth, without any spinules, with inner faces of ANT tubercles divergent **3**
- Head spiculate, with inner faces of ANT tubercles parallel or convergent **6**
3. SIPH without polygonal reticulation. Median frontal tubercle developed, so that front of head has W-shaped outline in dorsal view *Metopolophium dirhodum*
- SIPH with a subapical zone of polygonal reticulation (several rows of closed cells). Median frontal tubercle not developed, so that head has U- or V-shaped frontal sinus in dorsal view **4**
4. Head, antennae, legs, SIPH and cauda all dark *Macrosiphum pechumani*
- Head and all appendages pale, or dusky only at apices **5**
5. SIPH swollen proximal to reticulated zone, to 1.2–1.4 minimal diameter of basal half. Hairs on ANT III less than 0.5× BD III. First tarsal segments each with 5 hairs *Illinoia wahnaga*
- SIPH not swollen. Hairs on ANT III 0.6–1.0× BD III. First tarsal segments with 3 hairs *Macrosiphum euphorbiae*
6. Dorsal thorax and abdomen with a distinctive and extensive pattern of dark markings. SIPH wholly dark, or dark at bases and apices **7**
- Dorsum without extensive dark markings. SIPH pale except at apices **8**
7. SIPH wholly dark, cauda pale. Dorsal abdomen with paired dark patches, sometimes partially fused across midline, but not extending laterally to join marginal sclerites *Aulacorthum watanabei*
- SIPH dark at bases and apices, but middle section pale; cauda dusky or dark. Dorsal abdomen with extensive dark sclerotisation across ABD TERG 2–4, fused with marginal sclerites *Aulacorthum speyeri*
8. SIPH tapering gradually from base to flange. ANT III usually with 1–2 small rhinaria near base *Aulacorthum solani*
- SIPH slightly to moderately clavate. ANT III never with rhinaria **9**
9. SIPH clearly shorter than ANT III, with a narrow stem that is a little thinner at its narrowest point than hind tibia at midlength. Inner faces of ANT tubercles approximately parallel in dorsal view *Myzus ascalonicus*
- SIPH as long as or longer than ANT III, with basal half at its narrowest point thicker than hind tibia at midlength. Inner faces of ANT tubercles apically convergent in dorsal view *Myzus persicae*

HOST LISTS AND KEYS

Convolvulus

C. althaeoides

C. arvensis

C. betonicifolius

C. cneorum

C. derelicta see *soldanella*

C. floridus

C. major

C. minor

C. pseudocantabricus

C. sepium see *Calystegia sepium*

C. soldanella (incl. *derelicta*)

Convolvulus spp.

Convolvulaceae

Aphis [*convolvulicola* (= *gossypii*?)];

Aulacorthum solani; *Macrosiphum euphorbiae*;

Rhopalosiphoninus staphyleae

Aphis [*convolvulicola* (= *gossypii*?)], *fabae*, *gossypii*, *nerii*,
spiraecola;

Aulacorthum solani; [*Brachycaudus amygdalinus*];

Brachyunguis convolulisucta; *Macrosiphum euphorbiae*;

Myzus persicae; *Rhopalosiphoninus latysiphon*

Myzus persicae

Myzus persicae; *Neomyzus circumflexus*

Myzus persicae

Aulacorthum solani; *Myzus persicae*;

Neomyzus circumflexus;

Aulacorthum solani

Uroleucon uyguricum

Myzus persicae

Aphis davletshinae, *eugeniae*;

[*Macrosiphum ludoviciana*]; *Toxoptera aurantii*

Key to apterae on *Convolvulus*:-

1. Antennae 5-segmented. R IV+V very long (0.19–0.22 mm), narrow and pointed, 4–5× its basal width and 1.6–2.1× HT II *Aphis davletshinae*
– Without that combination of characters **2**
2. SIPH c.0.3× BL, dark, with polygonal reticulation on distal 0.13–0.16 of length. ANT III with 15–21 rhinaria extending over 0.70–0.75 of length *Uroleucon uyguricum*
– SIPH pale or dark, if dark then without polygonal reticulation. ANT III without or with fewer rhinaria **3**
3. ANT PT/BASE c.0.5. SIPH similar in length to cauda *Brachyunguis convolulisucta**
– ANT PT/BASE more than 1. SIPH longer than cauda **4**
4. Hind tibiae with a row of short, peg-like or spine-like hairs on basal 0.7, clearly differentiated from other tibial hairs, which are usually long and pointed. SIPH cylindrical/tapering and black, cauda black. ABD TERG 1 and 7 with marginal tubercles (MTu) **5**
– Hind tibiae without a row of peg-like ‘comb’ hairs. SIPH and cauda pale or dark, ABD TERG 1 and 7 with or without MTu go to key to polyphagous aphids, p. 1020
5. SIPH 1.0–1.8× ANT III. ANT PT/BASE 2.3–3.5. HT I with 3 hairs. No sclerotic ridges on abdominal sternites 5 and 6 *Aphis eugeniae*
– SIPH 0.5–0.9× ANT III. ANT PT/BASE 3.5–5.3. HT I with 2 hairs. ABD sternites 5 and 6 with sclerotic (stridulatory) ridges *Toxoptera aurantii*

Conyza

C. aegyptiaca

C. angustifolia

Compositae

Uroleucon erigeronense

Aphis spiraecola; *Brachycaudus helichrysi*

<i>C. bonariensis</i>	<i>Aphis gossypii</i> , <i>spiraecola</i> ; <i>Brachycaudus helichrysi</i> ; <i>Illinoia goldamaryae</i> ;
<i>C. canadensis</i> (incl. var. <i>pusilla</i>)	<i>Uroleucon ambrosiae</i> , <i>bereticum</i> , <i>compositae</i> , <i>gravicorne</i> <i>Aphis craccivora</i> , [<i>euphorbiae</i>], [<i>exsors</i>], <i>fabae</i> , <i>gossypii</i> , <i>lugentis</i> , [<i>meijigusae</i> Shinji, 1922], <i>middletonii</i> , [<i>plantaginis</i>], <i>spiraecola</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; <i>Illinoia goldamaryae</i> ; [<i>Longicaudus trirhodus</i>]; [<i>Macrosiphum</i> sp. – Leonard, 1972b: 192]; <i>Myzus persicae</i> ; <i>Neomyzus circumflexus</i> ; <i>Prociphilus erigeronensis</i> , <i>Protrama longitarsus</i> ssp. <i>sclerodensus</i> ; <i>Uroleucon ambrosiae</i> , [<i>cichorii</i>], <i>erigeronense</i> , <i>gravicorne</i> , <i>macgillivrayae</i> , <i>pseudambrosiae</i> , <i>simile</i> , [<i>sonchi</i>], <i>Uroleucon</i> sp. (Michigan, BMNH colln)
<i>C. floribunda</i>	<i>Uroleucon compositae</i>
<i>C. gouani</i>	<i>Aphis gossypii</i> ; <i>Aulacorthum solani</i> ; <i>Myzus ornatus</i>
<i>C. hochstetterii</i>	<i>Aulacorthum solani</i>
<i>C. ivaefolia</i>	[<i>Aphis</i> sp. nr <i>gossypii</i> (Portugal, BMNH colln)]
<i>C. japonica</i>	<i>Aphis gossypii</i> ; <i>Macrosiphoniella formosartemisiae</i> ; <i>Myzus ornatus</i>
<i>C. lyrata</i>	<i>Uroleucon ambrosiae</i>
<i>C. notobellidiastrum</i>	<i>Myzus ornatus</i>
<i>C. scabrida</i>	<i>Aphis gossypii</i>
<i>C. steudelii</i>	<i>Uroleucon compositae</i>
<i>C. stricta</i>	<i>Aphis gossypii</i> ; <i>Brachycaudus helichrysi</i> ; <i>Nasonovia rostrata</i> ; [<i>Sitobion</i> sp.]
<i>C. sumatrensis</i>	<i>Aphis gossypii</i> , <i>spiraecola</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus ornatus</i> ; <i>Sitobion autriquei</i> ; <i>Uroleucon compositae</i>
<i>C. transvaalensis</i>	<i>Brachycaudus helichrysi</i>
<i>C. volkensis</i>	<i>Myzus ornatus</i>

Key to apterae on *Conyza*:-

- | | | |
|----|---|--|
| 1. | ANT PT/BASE less than 1. SIPH absent, or present as pores on low hairy cones | 2 |
| – | ANT PT/BASE more than 1. SIPH tubular | 3 |
| 2. | Hind tarsi very elongate, more than 0.5× hind tibiae. SIPH present as pores on hairy cones. Dorsum with pattern of dark sclerotisation. Cauda and anal plate not protrusive | |
| – | Hind tarsus of normal length. SIPH absent. Dorsum without dark sclerotisation. Cauda and anal plate forming a protrusion at end of abdomen | <i>Protrama</i> sp. (<i>longitarsus</i> ssp. <i>sclerodensus</i> ?)
<i>Prociphilus erigeronensis</i> |
| 3. | SIPH with subapical reticulation (at least 2–3 rows of closed polygonal cells) | 4 |
| – | SIPH without polygonal reticulation | 15 |
| 4. | SIPH entirely dark | 5 |
| – | SIPH pale or with a pale basal section | 10 |

HOST LISTS AND KEYS

5. Dorsum with an extensive dark shield, continuous over ABD TERG 1–6. ANT III with 1–7 rhinaria. SIPH with polygonal reticulation on distal 0.12–0.19 of length. First tarsal segments with 3–3–3 hairs *Sitobion autriquei*
- Dorsum without extensive dark sclerotisation, at most with scleroites at base of hairs. ANT III with 8–97 rhinaria. SIPH with polygonal reticulation extending over distal 0.19–0.4 of length. First tarsal segments with 5–5–5 hairs **6**
6. Cauda and coxae dark **7**
- Cauda and coxae pale, or somewhat dusky **8**
7. SIPH 1.3–1.6× cauda, with distal 0.19–0.23 reticulated. Cauda with 11–14 (–17) hairs *Uroleucon simile*
- SIPH 1.7–2.3× cauda, with distal 0.20–0.35 (mostly at least 0.25) reticulated. Cauda with 13–20 hairs *Uroleucon compositae*
8. Cauda 0.35–0.47 mm long, and somewhat dusky, not contrastingly pale in comparison with SIPH and distal parts of hind femora. Scleroites at bases of dorsal hairs very pale and inconspicuous *Uroleucon bereticum*
- Cauda 0.46–0.85 mm long, and contrastingly pale compared with SIPH and distal parts of hind femora. Dorsal hairs mostly arising from small dusky or dark scleroites **9**
9. HT II rather long and thin, about 6× its maximum thickness, and 0.9–1.1× R IV+V *Uroleucon pseudambrosiae*
- HT II shorter, less than 5× its maximum thickness and 0.7–0.85× R IV+V *Uroleucon ambrosiae*
10. SIPH dark distally, with pale basal section, and polygonal reticulation on 0.21–0.45 of length. ANT III with 5–37 rhinaria. Cauda tapering to a very thin apex, with subapical hairs usually shorter and often blunter than lateral hairs **11**
- SIPH entirely pale, or dusky only towards apices, and reticulation on distal 0.03–0.20. ANT III with 1–10 rhinaria. Cauda tapering or finger-like, not very thin at apex, with any subapical hairs similar to lateral hairs **14**
11. SIPH 1.9–2.5× cauda. MTu absent *Uroleucon erigeronense*
- SIPH 1.1–1.7× cauda. MTu usually present on some of ABD TERG 1–5 **12**
12. Second tarsal segments with proximal ventral hairs atrophied. R IV+V 1.1–1.4× HT II *Uroleucon gravicorne*
- Second tarsal segments with proximal ventral hairs fully developed. R IV+V 0.8–1.0× HT II **13**
13. SIPH 1.9–2.1× cauda and reticulated over distal 0.28–0.32, the length of the reticulated section being 1.7–1.9× HT II. Diameter of secondary rhinaria about half diameter of ANT III, and thin-walled, with a lumen more than half their outer diameter *Uroleucon* sp., (Michigan, USA, BMNH colln)
- SIPH 1.1–1.6× cauda and reticulated over distal 0.15–0.35, the length of the reticulated section being 0.65–1.2× HT II. Secondary rhinaria smaller, 0.25–0.4× diameter of ANT III, and thick-walled, with a lumen about half their outer diameter *Uroleucon maccillivrayae*
14. Hairs on ANT III very short and inconspicuous, the longest about 0.33× BD III. SIPH clearly somewhat swollen proximal to reticulated subapical zone, which is only 0.03–0.05 of total length of SIPH *Illinoia goldamaryae*
- Hairs on ANT III conspicuous, the longest 0.5× BD III or longer. SIPH cylindrical or very slightly swollen proximal to reticulated subapical zone, which is 0.13–0.2 of its total length *Macrosiphum euphorbiae*

15. Spiracular pores on thorax very large and rounded, more than 4× larger than those on abdomen. R IV + V 0.21–0.33 mm long, about 2× HT II, and bearing 22–30 accessory hairs. Dorsal body hairs long with blunt or slightly expanded apices *Nasonovia rostrata*
- Spiracular pores on thorax not distinctly larger than those on abdomen. R IV + V relatively shorter, with fewer accessory hairs. Dorsal body hairs if long then pointed **16**
16. ANT tubercles weakly developed, not projecting beyond middle of front of head in dorsal view. ABD TERG 1 and 7 with marginal tubercles (MTu) **17**
- ANT tubercles well developed. ABD TERG 1 and 7 without MTu
go to key to polyphagous aphids, p. 1020, starting at couplet 4
17. Dorsal abdomen with an extensive solid black sclerite centered on ABD TERG 4–5. Cauda black like SIPH, tongue-shaped, rather pointed and bearing 4–7 hairs *Aphis craccivora*
- Dorsal abdomen with or without dark markings, but without an extensive solid black sclerite. Cauda pale or dark, but if black then usually with more than 7 hairs **18**
18. Cauda bearing 4–7 hairs and much paler than SIPH *Aphis gossypii*
- Cauda bearing 7–25 hairs, and black like SIPH **19**
19. Tibiae wholly dark. ANT III and IV usually with rhinaria. ABD TERG 8 with 5–10 hairs. ANT PT/BASE 1.3–1.9 *Aphis lugentis*
- Tibiae mainly pale, darker at apices. ANT III and IV with or without rhinaria. ABD TERG 8 with 2–7 hairs. ANT PT/BASE 1.6–3.7 **20**
20. ANT III and IV often with rhinaria. ABD TERG 8 with 2(–3) hairs. Cauda bluntly triangular, about as long as its basal width, shorter than R IV + V *Aphis middletonii*
- ANT III and IV without rhinaria. ABD TERG 8 bearing 2–7 hairs. Cauda tongue-shaped, longer than its basal width, 1.5–2.5× R IV + V **21**
21. ANT III 0.9–1.2× cauda, which usually has a distinct midlength constriction and bears 6–15 (usually 9–11) hairs. Dorsal abdomen without any dark markings *Aphis spiraeicola*
- ANT III 1.2–1.9× cauda which is usually without any constriction and bears 11–24 hairs. Dorsal abdomen usually with scattered dark markings anterior to SIPH and dark cross-bands on ABD TERG 7 and 8 *Aphis fabae*

Coprosma

C. crassifolia
C. grandifolia
C. repens
C. rigida
Coprosma sp.

Rubiaceae

Aphis coprosmae
Aulacorthum solani
Myzus persicae
Aphis coprosmae
 ?*Staegeriella* sp. (Tasmania: BMNH colln and
 Tasmania Dept. Agric.)

Key to apterae on *Coprosma*:-

1. Head smooth, with ANT tubercles undeveloped. ANT PT only 0.9–1.1× ANT V, and PT/BASE 1.3–1.5. (Al. with 0–1 rhinaria on ANT III) *Aphis coprosmae*
- Without that combination of characters **2**
2. Head smooth, with ANT tubercles weakly developed. SIPH dark, clavate, c.1.0–1.2× the long, dark, finger-like cauda. SIPH c.0.15× BL, and c.0.4× ANT PT. PT/BASE c.3.6
?Staegeriella sp. (Tasmania, BMNH colln, leg. M Williams)
- Without that combination of characters go to key to polyphagous aphids, p. 1020.

HOST LISTS AND KEYS

Corallorhiza

- C. maculata* (incl. *multiflora*)
C. striata

Orchidaceae

- Macrosiphum corallorhizae*
Macrosiphum corallorhizae

Corchorus, *Cordia* see Blackman and Eastop (1994)

Cordyline

- C. australis*
C. fruticosa
C. indivisa
C. terminalis

Cordyline spp.

Agavaceae

- Rhopalosiphum padi*
Aphis craccivora, *gossypii*
Rhopalosiphum padi
Aphis craccivora, *gossypii*, *spiraecola*;
Neomyzus circumflexus; *Toxoptera aurantii*
Myzus persicae; *Rhopalosiphum rufiabdominale*

Use key to polyphagous aphids, p. 1020.

Coreopsis (incl. *Leptosyne*)

- C. aristosa* see *Bidens*
C. auriculata
C. crassifolia
C. lanceolata
C. major
C. tinctoria
C. tripteris
Coreopsis spp.

Compositae

- Uroleucon ambrosiae*
Aphis coreopsidis
Aphis coreopsidis
Uroleucon reynoldense
Aphis fabae
Uroleucon ambrosiae, *reynoldense*
 [*Aphis andreinii* del Guercio – nomen dubium];
 [*Cavariella capreae*];
Geopemphigus sp. (N Carolina, USA; BMNH colln,
 leg. R. Chalfont);
Macrosiphum euphorbiae; *Myzus ornatus*;
 [*Pemphigus indicus* Kieffer (Wilson and Vickery, 1918)];
Uroleucon compositae

Key to apterae on *Coreopsis*:-

- | | | |
|----|---|-------------------------------|
| 1. | ANT PT/BASE less than 0.5. SIPH absent. Eyes of only 3 facets | 2 |
| – | ANT PT/BASE more than 1. SIPH present, tubular. Eyes multifaceted | 3 |
| 2. | R IV without accessory hairs. HT II with only 4 accessory hairs. Hind tibiae and HT I with short thick distal hairs c.0.3× diameter of tibia and much shorter than HT I | <i>Pemphigus</i> sp. |
| – | R IV with 2 accessory hairs. HT II with 8–15 accessory hairs. Hind tibiae and HT I with fine distal hairs more than 0.5× diameter of tibia and as long as or longer than HT I | <i>Geopemphigus</i> sp. |
| 3. | SIPH with a subapical zone of polygonal reticulation. ANT tubercles well developed, smooth, divergent. ANT III with rhinaria | 4 |
| – | SIPH without subapical reticulation. ANT tubercles weakly developed, or if well developed then head spiculose. ANT III without rhinaria | 7 |
| 4. | SIPH pale, with reticulation on distal 0.1–0.2 of length. ANT III with 1–10 rhinaria | <i>Macrosiphum euphorbiae</i> |
| – | SIPH black, with reticulation on more than 0.2 of length. ANT III with 8–37 rhinaria | 5 |

5. SIPH 1.7–2.3× cauda, which is dark *Uroleucon compositae*
 – SIPH maximally 1.5× cauda, which is pale or dusky **6**
6. Tibiae uniformly black *Uroleucon reynoldense*
 – Tibiae with paler section on basal half *Uroleucon ambrosiae*
7. Head spiculose with well-developed, apically convergent ANT tubercles. Dorsal cuticle very rugose. SIPH pale with dark apices, coarsely imbricated, with a slight S-curve. ABD TERG 1 and 7 without marginal tubercles (MTu) *Myzus ornatus*
 – Head without spicules, ANT tubercles weakly developed. Dorsal cuticle not rugose. SIPH dark, normally imbricated, straight or curved. ABD TERG 1 and 7 with MTu **8**
8. SIPH 0.24–0.40× BL, about twice as long as the much paler cauda. Head, ANT I, II and basal part of III very pale, contrasting with dark rest of ANT. Longest hair on ANT III less than 0.4× BD III *Aphis coreopsidis*
 – SIPH less than 0.2× BL. Cauda black. Head dusky and ANT I–II dark, ANT III–V mainly pale, VI darker. Longest hair on ANT III 0.8–3.4× BD III *Aphis fabae*

Coriandrum*C. sativum***Umbelliferae**

Aphis fabae, gossypii, spiraeicola;
Brachycaudus helichrysi;
Hyadaphis coriandri, foeniculi; Macrosiphum gei;
Myzus ornatus, persicae; Neomyzus circumflexus;
Semiaphis heraclei

Key to apterae on *Coriandrum*:-

1. SIPH very small and flangeless, only about 0.5 of length of cauda or less, with aperture slanted towards midline *Semiaphis heraclei*
 – SIPH at least 0.6 of length of cauda, and with a distinct flange **2**
2. SIPH cylindrical and with polygonal reticulation over distal 0.09–0.17 of length. Cauda with 11–21 hairs. Subgenital plate with 2–11 (usually 4–7) hairs on anterior half *Macrosiphum gei*
 – SIPH without distal polygonal reticulation and/or cauda and anterior half of subgenital plate with fewer hairs **3**
3. SIPH 0.6–1.4× cauda, slightly swollen distally, with a constriction proximal to the flange **4**
 – SIPH tapering, cylindrical or clavate; if swollen distally then more than 1.5× cauda and without a constriction proximal to flange go to key to polyphagous aphids, p. 1020.
4. SIPH 0.88–1.4× cauda, 1.7–3.1× R IV+V and 3.1–5.1× longer than their minimum diameter on basal half *Hyadaphis foeniculi*
 – SIPH 0.6–0.82× cauda, 0.9–1.6× R IV+V and 1.6–2.7× their minimum diameter on basal half *Hyadaphis coriandri*

Coriaria*C. arborea**C. japonica***Coriariaceae**

Brachycaudus helichrysi
Aphis gossypii;
 [*Macrosiphum coriariae* Shinji, 1922 – nomen dubium]

Use key to polyphagous aphids, p. 1020.

HOST LISTS AND KEYS

Coridothymus

C. capitatus

Labiatae

Aphis serpylli

***Corispermum* (incl. *Coryspermum*)**

C. marschallii

Chenopodiaceae

Aphis craccivora, *vladimirovi*; *Semiaphis coryspermi*

Key to apterae on *Corispermum*:-

1. SIPH c. 0.5× cauda. Marginal tubercles (MTu) absent *Semiaphis coryspermi**
 - SIPH 1.1–2.1× cauda. MTu present at least on prothorax and ABD TERG 1 and 7 **2**
2. Large conical MTu present on ABD TERG 2–5 as well as 1 and 7. R IV+V 1.5–1.62× HT II Dorsal abdomen with only sparse or broken sclerites *Aphis vladimirovi**
 - MTu only ABD TERG 1 and 7. R IV+V 0.85–1.2× HT II. Dorsal abdomen usually with a solid black shield *Aphis craccivora*

Cornus see Blackman and Eastop (1994)

Coronaria* see *Lychnis

Coronilla

C. emerus

C. glauca

C. montana

C. pusilla

C. valentina

C. varia

Leguminosae

Acyrtosiphon caraganae; *Aphis cytisorum*;

Myzus ornatus; *Therioaphis langloisi*

[*Aphis* sp. – Leonard, 1972a: 99]; *Myzus persicae*;

Therioaphis langloisi

[*Aphis* sp. – Leonard, 1972a: 99]; *Myzus persicae*

Aphis coronillae

Acyrtosiphon caraganae; *Myzus ornatus*

Acyrtosiphon caraganae, *pisum*;

Aphis coronillae, *craccae*, *vineti*

Key to apterae on *Coronilla*:-

1. ANT PT/BASE about 0.5. Cauda knobbed, anal plate bilobed. SIPH as small pores on dark shallow cones *Therioaphis langloisi*
 - ANT PT/BASE much more than 1. Cauda tongue- or finger-shaped, anal plate entire. SIPH tubular **2**
2. Dark aphids with dorsal dark sclerotisation and weakly developed ANT tubercles **3**
 - Pale aphids without dorsal sclerotisation, with well-developed ANT tubercles **6**
3. SIPH 0.7–1.1× cauda *Aphis craccae*
 - SIPH 1.2–2.0× cauda **4**
4. ABD TERG 2–6 (as well as 1 and 7) with rather large marginal tubercles (MTu) *Aphis coronillae*
 - ABD TERG 2–6 without or rarely with small MTu **5**
5. Posterior hair on hind trochanter 0.5–1.1× width of trochantrofemoral suture *Aphis cytisorum*
 - Posterior hair on hind trochanter 0.15–0.4× width of trochantrofemoral suture *Aphis vineti*
6. Head spiculose with inner faces of ANT tubercles convergent apically. ANT III without rhinaria **7**
 - Head smooth with inner faces of ANT tubercles divergent. ANT III usually with 1 or more rhinaria near base **8**

7. SIPH slightly clavate. ANT PT/BASE (2.8–)3.1–4.5. Dorsal abdomen without dark intersegmental markings *Myzus persicae*
 – SIPH tapering with a slight ‘S’-curve. ANT PT/BASE 1.75–2.8. Dorsal abdomen with a pattern of dark intersegmental markings *Myzus ornatus*
8. ANT I longer than wide and bearing 9–23 hairs. SIPH attenuate distally, thinner than hind tibia at midlength *Acyrtosiphon pisum*
 – ANT I not longer than wide, bearing 7–10 hairs. SIPH not attenuate distally, thicker than hind tibia at midlength *Acyrtosiphon caraganae*

Coronopus (incl. Seneberiera)*C. didymus**C. pinnatifidus**C. procumbens***Coronopus spp.****Cruciferae***Lipaphis erysimi; Myzus cerasi, persicae;**Pemphigus populitransversus**Aphis gossypii; Brachycaudus helichrysi;**Myzus ascalonicus, ornatus, persicae**Myzus cerasi, ornatus, persicae**Aphis nasturtii; Lipaphis pseudobrassicae*Key to apterae on *Coronopus*:-

1. ANT PT/BASE less than 0.5. Eyes 3-faceted. RIV without accessory hairs. SIPH absent *Pemphigus populitransversus*
 – ANT PT/BASE more than 1. Eyes multifaceted. RIV with accessory hairs. SIPH present, tubular 2
2. Head with weakly developed, scabrous ANT tubercles, and median tubercle also very scabrous and developed to a similar extent. SIPH cylindrical over most of length, with slight distal swelling 3
 – Without this combination of characters; **if** ANT tubercles are scabrous then they are well developed, and median tubercle is undeveloped 4
3. ANT III+PT together 1.95–2.5× SIPH (90% of specimens less than 2.4×) *Lipaphis erysimi*
 – ANT III+PT together 2.1–3.2× SIPH (90% of specimens more than 2.4×) *Lipaphis pseudobrassicae*
4. Head dark with ANT tubercles well developed and scabrous. Dorsal abdomen with extensive dusky/dark pigmentation, and rounded dark marginal sclerites *Myzus cerasi*
 – Without this combination of characters; **if** head is dark with well developed scabrous ANT tubercles then dorsal abdomen has an intersegmental pattern of dark markings, but no dark marginal sclerites go to key to polyphagous aphids, p. 1020.

Cortaderia*C. richardii**C. selloana***Gramineae***Sitobion miscanthi**Hyalopterus pruni; Sitobion fragariae*Use key to apterae of grass-feeding aphids under *Digitaria*.**Cortusa***C. matthioli***Primulaceae***Anuraphis cortusae***Corybas (incl. Corysanthes)***C. rotundifolius***Orchidaceae***Neomyzus circumflexus*

HOST LISTS AND KEYS

Corydalis

C. aurea

C. brandegeei see *Capnoides*

C. formosa (incl. *tashiroi*)

C. heterocarpa v. *japonica*

C. incisa

C. lutea

C. ophiocarpa

C. tashiroi see *formosa*

Corydalis sp.

Fumariaceae

Acyrtosiphon malvae, *pisum*; *Aulacorthum solani*;

Neomyzus circumflexus

Longicaudinus corydalisicola

Longicaudinus corydalisicola

Aulacorthum solani

Aphis craccivora, *fabae*; *Aulacorthum solani*; *Myzus persicae*

Neomyzus circumflexus

Macrosiphum euphorbiae; [*Pseudocercidus tutigulus*]

Key to apterae on *Corydalis*:-

1. SIPH shorter than cauda *Longicaudinus corydalisicola*
 - SIPH longer than cauda **2**
2. ANT VI BASE 0.25–0.4 mm, 1.8–2.3× R IV+V. SIPH very attenuate distally, with minimum diameter less than 0.25× width of CAUDA at midlength in dorsal view *Acyrtosiphon pisum*
 - ANT VI BASE less than 0.2 mm, less than 1.5× R IV+V. SIPH clavate, cylindrical or tapering but not attenuate and of diameter more than 0.3× width of cauda at midlength
go to key to polyphagous aphids, p. 1020.

Corynephorus (incl. Weingartneria)

C. articulatus

C. canescens

C. divaricatus

Corynephorus spp.

Gramineae

Sitobion fragariae

Baizongia pistaciae; *Chaetosiphella berlesei*, *tshernavini*;

Forda formicaria., *marginata*; *Geoica utricularia*;

Schizaphis weingaertneriae; *Sitobion avenae*;

Tetraneura ulmi

Sitobion fragariae

Baizongia pistaciae; *Forda marginata*;

Geoica setulosa

Use key to apterae of grass-feeding aphids under *Digitaria*.

Corysanthes see *Corybas*

Coryspermum see *Corispermum*

Corytholoma see *Sinningia*

Cosmia see *Calandrinia*

Cosmos

C. bipinnatus

C. caudatus

C. sulphureus

Compositae

Aphis fabae, *gossypii*, *middletonii*, *spiraecola*;

Brachycaudus cardui; [*Longicaudus trirhodus*]

Aphis gossypii, *spiraecola*

Aphis gossypii

Cosmos spp.

Aphis coreopsidis, *craccivora*, *solitaria*;
Brachycaudus helichrysi; [*Capitophorus carduinus*];
Macrosiphum euphorbiae; *Myzus ornatus*, *persicae*;
Uroleucon ambrosiae, *compositae*, [*kashmiricum*]

Key to apterae on *Cosmos*:-

1. ANT tubercles weakly developed. SIPH 0.24–0.4× BL, more than 8× their midlength diameter, and about 2× the much paler cauda. Head, ANT I, II and basal part of III very pale, contrasting with dark rest of ANT. Longest hair on ANT III less than 0.4× BD III *Aphis coreopsidis*
 – Either ANT tubercles well developed, or if weakly developed then the other characters do not all apply **2**
2. ANT tubercles weakly developed. SIPH pale (sometimes dark-tipped) and more than 4× their midlength diameter, 1.1–1.5× cauda. ANT PT/BASE 1.3–1.8. ANT III with 0–15 rhinaria on distal half, and ANT IV with 0–4. RIV+V 1.4–1.6× HT II and bearing 3–6 accessory hairs *Aphis solitaria*
 – Either ANT tubercles well developed, or if weakly developed then the other characters do not all apply **3**
3. Dorsum with an extensive dark sclerotic shield. Cauda short and rounded, not longer than its basal width. Spiracular apertures large and rounded *Brachycaudus cardui*
 – Either dorsum without an extensive dark shield or other characters do not apply
 go to key to polyphagous aphids, p. 1020.

Costus

C. afer
C. malortieanus
C. mexicanus
C. speciosus

Zingiberaceae

Pentalonia nigronervosa; *Pseudoregma sundanica*
Pentalonia nigronervosa
Pentalonia nigronervosa; *Pseudoregma sundanica*
Pseudoregma nicolaiae

Use key to apterae on *Hedychium*.

Cotinus

C. coggygria

Anacardiaceae

Aphis fabae; *Carolinaia rhois*;
Semiaphis sp. (Bozhko, 1976a: 67)

Key to apterae on *Cotinus*:-

1. SIPH very small, less than 0.5× cauda *Semiaphis* sp.
 – SIPH more than 0.7× cauda **2**
2. SIPH dark, clavate, about 2× the pale cauda which bears 5 hairs *Carolinaia rhois*
 – SIPH dark, cylindrical or tapering, 0.7–1.8× the black cauda which bears 11–24 hairs *Aphis fabae*

(or if none of these three fit, try key to polyphagous aphids)

Cotoneaster

C. acutifolius see *vittosulus*
C. amoenus
C. bacillaris
C. bullatus
C. buxifolius see *prostratus*

Rosaceae

Aulacorthum solani
Dysaphis microsiphon
Aphis pomi; *Myzus persicae*

HOST LISTS AND KEYS

<i>C. cambricus</i> (incl. <i>integerrimus</i> auct., <i>vulgaris</i>)	<i>Anuromyzus cotoneasteris</i> ; <i>Aphis pomi</i> ; <i>Rhopalosiphum insertum</i>
<i>C. conspicuus</i>	<i>Aphis gossypii</i>
<i>C. denticulatus</i>	<i>Aphis gossypii</i>
<i>C. distichus</i> see <i>nitidus</i>	
<i>C. divaricatus</i>	<i>Aphis pomi</i>
<i>C. ellipticus</i> (incl. <i>insignis</i>)	<i>Dysaphis microsiphon</i>
<i>C. franchetii</i>	<i>Aphis pomi</i> , <i>spiraecola</i>
<i>C. frigidus</i>	<i>Aphis spiraecola</i>
<i>C. glaucophyllus</i>	[<i>Aphis</i> sp. (Leonard, 1972a: 100)]
<i>C. harrovianus</i>	<i>Aphis gossypii</i>
<i>C. henryanus</i>	<i>Aphis gossypii</i> , <i>pomi</i> , <i>spiraecola</i>
<i>C. horizontalis</i>	<i>Aphis pomi</i> , <i>spiraecola</i> ; <i>Eriosoma lanigerum</i>
<i>C. humifusus</i>	<i>Eriosoma lanigerum</i>
<i>C. insignis</i> see <i>ellipticus</i>	
<i>C. integrifolius</i> (incl. <i>thymifolius</i> , <i>microphyllus</i> auct., <i>ochleatus</i>)	<i>Aphis gossypii</i> , <i>pomi</i>
<i>C. integeriimus</i> see <i>cambricus</i>	
<i>C. lucidus</i>	<i>Aphis pomi</i>
<i>C. medicus</i>	<i>Aphis pomi</i>
<i>C. melanocarpus</i>	<i>Aphis pomi</i> , [<i>Aphis</i> sp. (Davletshina, 1964: 125)]; <i>Dysaphis microsiphon</i>
<i>C. microphylla</i> see <i>integrifolius</i>	
<i>C. monopyrenus</i> (incl. <i>multiflorus</i> auct.)	<i>Aphis pomi</i>
<i>C. nitens</i>	[<i>Aphis</i> sp. (Leonard, 1972a: 100)]
<i>C. nitidua</i> (incl. <i>distichus</i>)	<i>Myzus persicae</i>
<i>C. nummularia</i>	<i>Dysaphis microsiphon</i>
<i>C. obtusus</i>	<i>Aspidophorodon indica</i>
<i>C. pannosus</i>	<i>Aphis gossypii</i> , <i>spiraecola</i>
<i>C. praecox</i>	<i>Aphis fabae</i>
<i>C. prostratus</i> (incl. <i>buxifolius</i> auct., <i>vellaea</i>)	[<i>Aphis</i> sp. (Leonard, 1972a: 99)]
<i>C. racemiflorus</i>	<i>Anuromyzus cotoneasteris</i> ; [<i>Aphis</i> sp. (Leonard, 1972a: 100)]
<i>C. rhytidophyllus</i>	[<i>Aphis</i> sp. (Leonard, 1972a: 100)]
<i>C. rotundifolius</i>	<i>Myzus persicae</i>
<i>C. salicifolius</i>	<i>Aphis pomi</i> ; <i>Rhopalosiphum insertum</i>
<i>C. saxatilis</i>	<i>Anuromyzus cotoneasteris</i> ; <i>Dysaphis microsiphon</i>
<i>C. serotina</i>	<i>Aphis pomi</i>
<i>C. tauricus</i>	<i>Anuromyzus cotoneasteris</i>
<i>C. villosulus</i> (incl. <i>acutifolius</i> auct.)	<i>Aphis pomi</i> ; <i>Eriosoma lanigerum</i> ; <i>Nearctaphis yohoensis</i>
<i>C. vulgaris</i> see <i>cambricus</i>	
<i>C. wardii</i>	[<i>Aphis</i> sp. (Leonard, 1972a:100)]; <i>Myzus persicae</i>
<i>C. zabelii</i>	<i>Myzus persicae</i>
<i>Cotoneaster</i> sp.	[<i>Eriosoma phaenax</i> (sexuparae, Pakistan and India)]

Key to apterae on *Cotoneaster*:-

1. ANT PT/BASE less than 0.5. SIPH as pores with partly sclerotised rims. Wax glands present, each consisting of a ring of large facets around a central area *Eriosoma lanigerum*
- ANT PT/BASE more than 0.5. SIPH tubular or as short, truncate cones. Wax glands absent 2
2. Cauda helmet-shaped or triangular, as short as or shorter than its basal width 3
- Cauda tongue- or finger-shaped, clearly longer than its basal width 5
3. SIPH with close-set transverse rows of small spinules. SIPH less than 2× their midlength diameter. Abdomen with dark patch on ABD TERG 3–6 *Nearctaphis yohoensis*
- SIPH smooth or with normal imbrication. Either SIPH longer or dorsal abdomen pale 4
4. Dorsum pale, membranous. SIPH very short, truncate cones, less than 2× their midlength diameter. Cauda pentagonal, with 5 hairs *Dysaphis microsiphon*
- Dorsum dark, sclerotic. SIPH tubular, more than 3× their midlength diameter (Figure 24a). Cauda triangular, pointed, with 6–7 hairs (Figure 24b) *Anuromyzus cotoneasteris*
5. Front of head with a well-developed scabrous median tubercle bearing 4 thick, slightly capitate hairs (Figure 24c), and ABD TERG 8 with a similar hair-bearing process (Figure 24d). SIPH long, smooth and flangeless (Figure 24e). ANT PT/BASE less than 1.3 *Aspidophorodon indica*
- Front of head and ABD TERG 8 without scabrous processes. SIPH imbricated, with flange. ANT PT/BASE more than 1.5 6
6. Head spiculose, with well-developed ANT tubercles, their inner faces parallel or apically convergent 7
- Head almost smooth, with ANT tubercles weakly developed 8
7. SIPH slightly clavate. ANT tubercles with inner faces apically convergent. ANT III without rhinaria *Myzus persicae*
- SIPH tapering, with no trace of distal swelling. ANT tubercles with inner faces approximately parallel. ANT III usually with 1–2 small rhinaria near base *Aulacorthum solani*

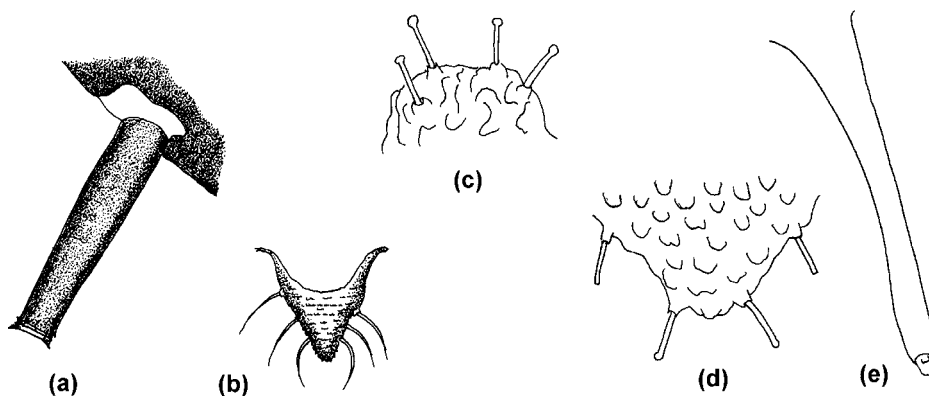


Figure 24 Apterae on *Cotoneaster*. (a) SIPH of *Anuromyzus cotoneasteris*, (b) cauda of *A. cotoneasteris*, (c) median tubercle on head of *Aspidophorodon indica*, (d) tubercle on ABD TERG 8 of *A. indica*, (e) SIPH of *A. indica*.

HOST LISTS AND KEYS

8. SIPH pale with darker apices; cylindrical over most of length, and constricted subapically, with a very well-developed flange. Dorsal cuticle ornamented with spicules, mostly arranged in polygons
Rhopalosiphum insertum
- SIPH dark, tapering to a moderate flange. Dorsal cuticle without spicules arranged in polygons **9**
9. Cauda paler than SIPH, without any midway constriction, and bearing 4–8 hairs *Aphis gossypii*
- Cauda as dark as SIPH, often slightly constricted near its midpoint, and bearing 7–19 hairs **10**
10. Dorsal abdomen usually with scattered dark markings anterior to SIPH and dark cross-bands on ABD TERG 7 and 8. ANT III 1.2–1.9× cauda which is usually without any constriction and bears 11–24 hairs
Aphis fabae
- Dorsal abdomen without any dark markings. ANT III 0.9–1.2× cauda, which usually has a distinct midlength constriction and bears 6–19 hairs **11**
11. Marginal tubercles (MTu) present on ABD TERG 2–4. Cauda with 10–19 hairs (rarely less than 13) R IV+V more than 0.13 mm
Aphis pomi
- MTu absent from ABD TERG 2–4. Cauda with 7–15 hairs (rarely more than 12). R IV+V less than 0.125 mm
Aphis spiraecola

Cotula

- C. australis*
C. coronopifolia
- C. hemispherica*
C. plumosa
Cotula spp.

Compositae

- Brachycaudus helichrysi*; *Myzus ascalonicus*
Aphis coronopifoliae, *triglochinis*;
Brachycaudus helichrysi;
Macrosiphum euphorbiae; *Myzus persicae*
Aphis spiraecola
Myzus ascalonicus
[*Acutosiphon obliquoris*]; *Aphis nasturtii*;
Myzus ornatus

Key to apterae on *Cotula*:-

1. Cauda helmet-shaped, as short as or shorter than its basal width. Spiracular apertures large and rounded. SIPH smooth, conical, with marked subapical annular incision
Brachycaudus helichrysi
- Cauda tongue-shaped, much longer than its basal width. Spiracular apertures reniform. SIPH imbricated, without a marked subapical incision **2**
2. SIPH mainly pale (often dusky-tipped). ANT tubercles weakly developed. ABD TERG 1 and 7 with marginal tubercles (MTu) **3**
- SIPH pale or dark, but if pale then ANT tubercles are well developed and ABD TERG 1 and 7 lack Mtu
go to key to polyphagous aphids, p. 1020
3. ANT PT/BASE 1.9–3.0
Aphis nasturtii
- ANT PT/BASE 1.1–1.8 **4**
4. SIPH less than 2× longer than their basal width, and less than 0.9× cauda. (Sec. rhin. in al. III 11–17, IV 2–7, V 0)
Aphis coronopifoliae
- SIPH more than 2× longer than their basal width, and more than 0.9× cauda. (Sec. rhin. in al. III 25–60, IV 9–25, V 7–17)
Aphis triglochinis

Cotyledon

- C. orbiculata*
C. umbilicus

Crassulaceae

- Aphis gossypii*
Idiopterus nephrolepidis

C. wickensii
Cotyledon sp.

Myzus persicae
Macrosiphum euphorbiae

Key to apterae on *Cotyledon*:-

- SIPH black basally and contrastingly pale distally. Dorsal hairs thick and capitate, arising from tuberculate bases *Idiopterus nephrolepidis*
- SIPH pale, dark-tipped or uniformly dark. Dorsal hairs not capitate, without tuberculate bases
 go to key to polyphagous aphids, p. 1020.

***Coursetia* (incl. *Cracca*)**

C. ambigua
C. spicata

Leguminosae

Megouroparsus tephrosiae
Megouroparsus tephrosiae

Cousinia

C. affinis
C. alata
C. calcitrata
C. chaetocephala
C. cylindracea
C. lepida
C. microcarpa
C. perovskiensis

C. piptocephala
C. platycephs
C. platylepis
C. pseudomollis
C. pulchella
C. radians
C. stocksii
C. umbrosa
Cousinia spp.

Compositae

Turanoleucon mitjaevi
Aphis cousiniae; *Turanoleucon mitjaevi*
Macrosiphoniella tuberculata
Macrosiphoniella tuberculata
Macrosiphoniella tuberculata
Macrosiphoniella tuberculata
Brachycaudus cardui
Aphis anuraphoides;
 [*Xerobion* sp. (Kadyrbekov, 2002d)]
Macrosiphoniella tuberculata
 [*Macrosiphoniella* sp. (Kadyrbekov, 2003c)]
Turanoleucon mitjaevi
Dysaphis pseudomolli
Dysaphis cousiniae
Dysaphis cousiniae, *cousiniae* ssp. *minor*
Macrosiphoniella tuberculata
Dysaphis cousiniae
Aphis craccivora, *fabae*, *solanella*;
Brachycaudus viridanus;
Uroleucon sonchi ssp. *afghanicum*

Key to apterae on *Cousinia*:-

1. Cauda short, conical or helmet-shaped, not longer than its basal width in dorsal view 2
 - Cauda clearly longer than its basal width 7
2. ANT PT/BASE 0.8–1.2. SIPH 0.65–1.2× cauda 3
 - ANT PT/BASE more than 2. SIPH 1.0–3.4× cauda 4
3. Longest hairs on ABD TERG 3 are 1.2–1.3× ANT BD III. SIPH 0.8–1.2× cauda, almost cylindrical, 1.7–2.5× their basal width, and with a distinct flange *Aphis anuraphoides* 3
 - Longest hairs on ABD TERG 3 are 0.5–0.9× ANT BD III. SIPH 0.7–1.1× cauda, tapering, 1.3–1.75× their basal width, with a small flange *Aphis terricola* or *cousiniae* 4
4. Spiracular apertures large and rounded 5
 - Spiracular apertures reniform 6

HOST LISTS AND KEYS

5. Dorsum with an extensive dark shield. BL 1.8–2.4mm. (Al. with 15–36 rhinaria on ANT III) *Brachycaudus cardui*
 – Dorsum without a dark shield. BL 1.3–1.7mm. (Al. with c.7 rhinaria on ANT III) *Brachycaudus viridanus**
6. Spinal tubercles (STu) present on head and posterior ABD TERG, and well-developed marginal tubercles (MTu) present on ABD TERG 1–5. R IV+V shorter than ANT PT *Dysaphis cousiniae*
 – STu absent, and MTu on ABD TERG 1–5 absent or inconspicuous. R IV+V longer than ANT PT *Dysaphis pseudomolli*
7. SIPH mainly or wholly dark with subapical polygonal reticulation on distal 0.16–0.43 of length **8**
 – SIPH pale or dark, but if dark then without polygonal reticulation
 go to key to polyphagous aphids, p. 1020
8. SIPH with reticulation on distal 0.16–0.27 of length. Postsiphuncular sclerites present *Uroleucon sonchi* (ssp. *afghanicum*?)
 – SIPH with reticulation on distal 0.3–0.43 of length. Postsiphuncular sclerites absent **9**
9. Dorsal abdominal hairs borne on rounded tubercles. R IV+V less than 0.25mm long, 0.7–1.3× HT II. SIPH c.1.4–1.5× cauda, which is pale *Macrosiphoniella tuberculata*
 – Dorsal abdominal hairs without tuberculate bases. R IV+V more than 0.3mm long, 1.95–2.15× HT II. SIPH 1.9–2.4× cauda, which is dark *Turanoleucon mitjaevi*.

Cracca=*Coursetia*

Crambe

- C. abyssinica*
- C. hispanica*
- C. maritima*
- C. orientalis*
- C. tatarica*

Cruciferae

- Lipaphis pseudobrassicae*; *Myzus persicae*
- Lipaphis pseudobrassicae*; *Myzus persicae*
- Brevicoryne brassicae*;
- [*Lipaphis hedickei* Börner, 1951 – nomen nudum]
- Brevicoryne nigrisiphunculata*
- Brevicoryne crambe*, *nigrisiphunculata*

Key to apterae on *Crambe*:–

1. ANT tubercles, and also ANT I and II, scabrous. ANT III 0.7–1.7× SIPH, which are 1.2–2.5× cauda **2**
 – ANT tubercles, ANT I and II fairly smooth. ANT III 2.5–3.7× SIPH, which are 0.65–1.0× cauda **3**
2. ANT tubercles low, with median tubercle developed to similar extent. SIPH 1.2–1.6× cauda. ANT PT/BASE 1.8–2.7 *Lipaphis pseudobrassicae*
 – ANT tubercles well developed, with inner faces convergent apically; median tubercle much lower. SIPH 1.9–2.5× cauda. ANT PT/BASE 2.8–4.5 *Myzus persicae*
3. Cauda as dark as SIPH and broadly triangular, hardly as long as its basal width in dorsal view. Paired spinal and pleural dark sclerites often present on ABD TERG 1–7. Dorsal hairs pointed *Brevicoryne brassicae*
 – Cauda pale or dusky and tongue-shaped or elongate triangular, clearly longer than its basal width. ABD TERG 1–7 usually without dark markings (except intersegmental muscle sclerites). Dorsal hairs short and fan-shaped, or long with blunt or slightly expanded apices **4**

4. SIPH jet black, 0.65–0.8× cauda. ANT PT/BASE 2.1–2.7. Dorsal hairs up to 2–2.5× BD III, with blunt or slightly capitate apices *Brevicoryne nigrisiphunculata*
 – SIPH dark but not jet black, 0.8–1.2× cauda. ANT PT/BASE 1.2–1.5. Dorsal hairs fan-shaped or spatulate, maximally about 1× BD III *Brevicoryne crambe*

Craspedia*C. ?chrysantha***Compositae***Aphis* sp. (Australia, BMNH colln)***Crassocephalum****C. biafrae**C. bumbense**C. crepidioides**C. guineense**C. mannii**C. montuosum**C. rubens**C. vitellinum***Compositae***Aphis gossypii**Aphis fabae, gossypii, spiraecola;**Brachycaudus helichrysi; Myzus ornatus;**Sitobion autriquei; Uroleucon compositae**Aphis gossypii, spiraecola; Brachycaudus helichrysi;**Neomyzus circumflexus**Aphis gossypii**Aphis fabae, gossypii, spiraecola;**Brachycaudus helichrysi; Macrosiphum euphorbiae;**Myzus ornatus; Uroleucon compositae**Aphis fabae, gossypii, spiraecola;**Aulacorthum solani; Brachycaudus helichrysi;**Macrosiphum euphorbiae; Myzus ornatus;**Sitobion autriquei; Uroleucon compositae**Aphis fabae, gossypii, spiraecola;**Aulacorthum solani; Macrosiphum euphorbiae;**Myzus ornatus; Myzus persicae; Uroleucon compositae**Aphis fabae, gossypii, spiraecola;**Aulacorthum solani; Macrosiphum euphorbiae;**Myzus ornatus, persicae; Uroleucon compositae*Key to apterae on *Crassocephalum*:-

- Dorsum with an extensive dark shield, continuous over ABD TERG 1–6. ANT III with 1–7 rhinaria. SIPH black with polygonal reticulation on distal 0.12–0.19 of length. First tarsal segments with 3–3–3 hairs *Sitobion autriquei*
 – Without this combination of characters go to key to polyphagous aphids, p. 1020

Crassula*C. coccinea**C. falcata**C. moschata**C. perfossa**C. portulacea**Crassula* sp.**Crassulaceae***Brachycaudus cardui; Neomyzus circumflexus**Aphis gossypii**Myzus ascalonicus**Aphis fabae**Aphis gossypii**Aphis sedi; Myzus persicae*Key to apterae on *Crassula*:-

1. SIPH pale or only dark at apices go to key to polyphagous aphids, p. 1020.
 – SIPH entirely dark 2

HOST LISTS AND KEYS

2. Dorsum with an extensive dark shield. Cauda helmet-shaped. Spiracular apertures large and rounded. SIPH with a subapical annular incision *Brachycaudus cardui*
 – Without that combination of characters **3**
3. Cauda black with 11–24 hairs. Dorsal abdomen with dark cross-bands on ABD TERG 7 and 8, and some dark markings anterior to SIPH. Femora with many fine hairs longer than trochantrofemoral suture *Aphis fabae*
 – Cauda pale or dark with 4–8 hairs. Dorsal abdomen with or without dusky cross-bands on ABD TERG 7 and 8, usually without any dark markings anterior to SIPH. Femoral hairs all much shorter than trochantrofemoral suture **4**
4. ANT PT/BASE 1.6–2.3. SIPH 0.9–1.4× cauda, which bears 4–6 hairs and is usually rather dark, only a little paler than SIPH *Aphis sedi*
 – ANT PT/BASE 2.1–3.2. SIPH 1.3–2.5× cauda, which bears 4–8 hairs and is usually pale/dusky, markedly paler than SIPH *Aphis gossypii*

Crataegus see Blackman and Eastop (1994)

Craterispermum see Blackman and Eastop (1994)

Crateva (incl. *Crataeva*)

C. religiosa

Capparidaceae

Brachycaudus helichrysi; *Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Cratoneurum

C. filicinum

Amblystegiaceae

Muscaphis utahensis; *Pemphigus hydrophilus*

Use key to apterae of moss-feeding aphids under *Polytrichum*.

Cratoxylum see Blackman and Eastop (1994)

Crepidastrum

C. lanceolatum

Compositae

Myzus lactucicola

Crepis

C. alpestris

C. aspera

C. aurea

C. biennis

Compositae

Uroleucon hypochoeridis

Uroleucon picridis

Nasonovia ribisnigri

Aphis crepidis, fabae; *Aulacorthum solani*;

Brachycaudus helichrysi; *Hyperomyzus picridis*;

Myzus ascalonicus; *Trama troglodytes*;

Uroleucon cichorii, grossum

C. capillaris (incl. *virens*)

Aphis crepidis, fabae; *Brachycaudus cardui*;

Macrosiphum euphorbiae; *Myzus ornatus*;

Nasonovia ribisnigri; *Trama maritima, troglodytes*;

Uroleucon cichorii, grossum, murale, sonchi

C. conyzifolia

Nasonovia ribisnigri; *Uroleucon cichorii*

C. endivia

Uroleucon murale

<i>C. foetida</i>	<i>Uroleucon cichorii</i>
<i>C. haenseleri</i> see <i>vesicaria</i>	
<i>C. japonica</i>	<i>Aphis spiraeicola</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; [<i>Cryptomyzus taoi</i>]; <i>Hyperomyzus lactucae</i> ; <i>Neomyzus circumflexus</i> ; [<i>Sitobion miscanthi</i>]; <i>Uroleucon ambrosiae</i> , <i>erigeronensis</i> , <i>formosanum</i> ssp. <i>crepidis</i> , <i>pseudambrosiae</i>
<i>C. leontodontoides</i>	<i>Uroleucon grossum</i>
<i>C. neglecta</i>	<i>Uroleucon picridis</i>
<i>C. nicaeensis</i>	<i>Uroleucon cichorii</i>
<i>C. palaestina</i>	<i>Nasonovia ribisnigri</i>
<i>C. paludosa</i>	<i>Nasonovia ribisnigri</i> ; <i>Uroleucon cichorii</i> , <i>riparium</i>
<i>C. parviflora</i>	[<i>Uroleucon picridis</i> (misident. <i>cichorii</i> ?)]
<i>C. praemorsa</i>	<i>Aphis fabae</i> ; <i>Myzus ornatus</i> ; <i>Nasonovia ribisnigri</i>
<i>C. pulchra</i>	<i>Uroleucon sonchi</i>
<i>C. rhoendifolia</i>	<i>Aphis</i> (<i>Protaphis</i>) sp.; <i>Uroleucon cichorii</i>
<i>C. setosa</i>	<i>Macrosiphum euphorbiae</i> ; <i>Uroleucon cichorii</i>
<i>C. sibirica</i>	[<i>Cryptomyzus ribis</i>]; <i>Uroleucon cichorii</i> , <i>picridis</i>
<i>C. taraxifolia</i> see <i>vesicaria</i>	
<i>C. tectorum</i>	<i>Aphis seneciocrepiphaga</i> ; <i>Hyperomyzus sandilandica</i> ; <i>Macrosiphoniella crepidis</i> ; <i>Nasonovia ribisnigri</i> ; <i>Uroleucon cichorii</i> , <i>grossum</i> , <i>riparium</i> , <i>sonchi</i> <i>Acyrtosiphon crepidis</i> ; <i>Macrosiphoniella crepidis</i>
<i>C. tenuifolia</i>	<i>Aphis crepidis</i> , <i>gossypii</i> , [<i>intybi</i>]; <i>Aulacorthum solani</i> ;
<i>C. vesicaria</i> (incl. <i>haenseleri</i> , <i>taraxifolia</i>)	<i>Hyperomyzus lactucae</i> ; <i>Myzus ornatus</i> , <i>persicae</i> ; <i>Nasonovia ribisnigri</i> ; <i>Uroleucon cichorii</i> , <i>grossum</i> [<i>Trama mordvilkoii</i> Börner, 1940]
<i>C. virens</i>	<i>Nasonovia ribisnigri</i>
<i>C. viscidula</i>	<i>Aphis nasturtii</i> (?); <i>Pemphigus bursarius</i> ;
<i>Crepis</i> spp.	<i>Uroleucon adenocaulonae</i>

Key to apterae on *Crepis*:-

- | | |
|--|-------------------------------|
| 1. ANT PT/BASE less than 0.5 | 2 |
| – ANT PT/BASE more than 1 | 4 |
| 2. HT II normal. Body sparsely hairy. Wax glands present on posterior abdomen | <i>Pemphigus bursarius</i> |
| – HT II very elongate. Body densely hairy. No wax glands | 3 |
| 3. Eyes with 3 facets. SIPH absent | <i>Trama troglodytes</i> |
| – Eyes with many facets. SIPH present as pores on shallow cones | <i>Trama maritima</i> |
| 4. SIPH with a distal zone of polygonal reticulation | 5 |
| – SIPH without polygonal reticulation | 16 |
| 5. SIPH pale, with reticulation consisting of large cells on distal 0.08–0.2 of length. First tarsal segments with 3–3–3 hairs | <i>Macrosiphum euphorbiae</i> |
| – SIPH wholly or mainly dark, with reticulation of numerous small cells on distal 0.16–0.55 of length. First tarsal segments with 3–3–3 or 5–5–5 hairs | 6 |

HOST LISTS AND KEYS

6. Cauda dark 7
 – Cauda pale 8
7. SIPH 0.9–1.2× cauda with reticulation on distal 0.45–0.55. R IV+V 0.6–0.7× HT II. First tarsal segments with 3–3–3 hairs *Macrosiphoniella crepidis*
 – SIPH 1.5–2.1× cauda with distal 0.16–0.23 reticulated. R IV+V 1.1–1.2× HT II. First tarsal segments with 5–5–5 hairs *Uroleucon riparium*
8. ANT III 1.8–2.0× longer than ANT IV + V together *Uroleucon formosanum* ssp. *crepidis**
 – ANT III shorter than ANT IV+V 9
9. Crescent-shaped antesiphuncular sclerites present (sometimes subdivided) 10
 – Antesiphuncular sclerites absent 12
10. R IV+V 1.45–1.85× HT II. Coxae pale like basal parts of femora *Uroleucon picridis*
 – R IV+V 0.84–1.35× HT II. Coxae dusky or dark, darker than the basal parts of femora 11
11. R IV+V 0.84–1.08× HT II (rarely more than 1). Cauda with 14–24 hairs (usually about 17) *Uroleucon hypochoeridis*
 – R IV+V 1.04–1.35× HT II. Cauda with 18–33 hairs *Uroleucon cichorii* group (incl. *grossum*)
12. Coxae dark. SIPH often paler in middle. Dorsal hairs not arising from pigmented scleroites *Uroleucon sonchi*
 – Coxae pale. SIPH wholly dark. Dorsal hairs with or without pigmented scleroites at bases 13
13. ANT III with rhinaria distributed over at least 0.9 of length. R IV+V 0.8–1.0× HT II *Uroleucon murale*
 – ANT III with rhinaria on basal 0.5–0.7. R IV+V 1.05–2.2× HT II 14
14. SIPH 1.7–2.1× cauda. R IV+V 1.9–2.2× HT II *Uroleucon adenocaulonae*
 – SIPH 1.1–1.5× cauda. R IV+V 0.9–1.45× HT II 15
15. HT II rather long and thin, 6 or more× longer than its maximum thickness and 0.9–1.1× R IV+V *Uroleucon pseudambrosiae*
 – HT II less than 5× its maximum thickness and 0.70–0.85× R IV+V *Uroleucon ambrosiae*
16. Cauda helmet-shaped, shorter than its basal width. SIPH conical or tapering, with a subapical annular incision 17
 – Cauda tongue-shaped or triangular, longer than its basal width. SIPH varying, if tapering then without a subapical annular incision 18
17. Dorsal abdomen with an extensive solid black shield. ANT III 0.31–0.47 mm, 2.4–3.4× HT II. R IV+V 0.17–0.24 mm. SIPH dark, imbricated, 1.7–3.4× cauda *Brachycaudus cardui*
 – Dorsal abdomen without a black shield. ANT III 0.07–0.25 mm, 0.9–2.2× HT II. R IV+V 0.10–0.15 mm. SIPH pale, smooth, 0.8–2.0× cauda *Brachycaudus helichrysi*
18. Head spiculose with steep-sided or apically convergent ANT tubercles
 go to key to polyphagous aphids, p. 1020, starting at couplet 5.
 – Head not spiculose, with ANT tubercles divergent or undeveloped 19
19. ANT III with 3–40 rhinaria; if a small number then they are on basal half only. ANT tubercles moderately to well developed, projecting beyond middle of front of head in dorsal view. ABD TERG 1 and 7 without marginal tubercles (MTu) 20
 – ANT III usually without rhinaria, if with 1–4 then these are distributed over its length. ANT tubercles undeveloped or weakly developed. ABD TERG 1 and 7 always with MTu 24

20. SIPH clavate, swollen to at least 1.2 of minimum diameter on basal half **21**
 – SIPH tapering, cylindrical or only slightly swollen towards apex **23**
21. SIPH pale. R IV+V 0.8–1.0× HT II. (Al. with a dark trapezoid dorsal abdominal patch) *Hyperomyzus lactucae*
 – SIPH dusky or dark at least on distal part. R IV+V 1.05–1.7× HT II. (Al. without a dark dorsal abdominal patch) **22**
22. R IV+V 1.05–1.25× HT II. SIPH lightly imbricated, 2.0–2.4× cauda, with maximum diameter of swollen part 1.3–1.5× minimum diameter on basal half *Hyperomyzus sandilandica*
 – R IV+V 1.5–1.7× HT II. SIPH smooth, 1.5–1.65× cauda, with maximum width of swollen part 1.5–2.0× minimum width on basal half *Hyperomyzus picridis*
23. Thoracic spiracular apertures large and rounded, much larger than abdominal ones. R IV+V 1.2–1.6× HT II. SIPH 1.6–2.2× cauda. Dorsal abdomen with dark intersegmental markings. Hairs on ANT III up to 0.7–1.1× BD III *Nasonovia ribisnigri*
 – Thoracic spiracular apertures not unusually large. R IV+V 0.6–0.7× HT II. SIPH 1.15–1.45× cauda. Dorsal abdomen without dark intersegmental markings. Hairs on ANT III very short, maximally c.0.25× BD III *Acyrtosiphon crepidis**
24. ANT PT/BASE c.1.0 or less *Aphis (Protaphis) sp.*
 – ANT PT/BASE 1.7–3.9 **25**
25. Tibiae entirely dark. Hairs on ANT III 1.7–3.3× BD III *Aphis seneciocrephaga**
 – Tibiae dark only distally. Hairs on ANT III 0.3–1.7× BD III **26**
26. Most or all of ABD TERG 2–5 usually with dome-shaped MTu. Posterior hair on hind trochanter blunt, 0.3–0.5× diameter of trochantrofemoral suture. Longest hair on ANT III 0.25–0.55× BD III. ANT III sometimes with up to 6 secondary rhinaria *Aphis crepidis*
 – ABD TERG 2–5 rarely with MTu. Posterior hair on hind trochanter pointed, 0.55–1.54× diameter of trochantro-femoral suture. Longest hair on ANT III 0.47–0.8× BD III. ANT III without secondary rhinaria (except in alatiform specimens)
 go to key to polyphagous aphids, p. 1020, starting at couplet 24

Crinodendron*C. patagua***Elaeocarpaceae***Myzus ornatus*; *Neomyzus circumflexus*

Use key to polyphagous aphids, p. 1020.

Crinum*C. careyanum***Amaryllidaceae***Aphis gossypii****Cristaria****C. corchorifolia***Malvaceae***Macrosiphum euphorbiae****Critesion* see *Hordeum******Crithmum****C. maritimum***Umbelliferae***Aphis fabae*; *Cavariella aegopodii*; *Dysaphis crithmi*;
Hyadaphis foeniculi;
Macrosiphum ?centranthi (Ilharco, 1984)
[*Uroleucon cichorii*]

HOST LISTS AND KEYS

Key to apterae on *Crithmum*:-

1. ANT tubercles well developed, smooth, divergent. SIPH elongate (0.3–0.45× BL), with a distal zone of polygonal reticulation *Macrosiphum ?centranthi*
- ANT tubercles absent or weakly developed. SIPH relatively shorter and without polygonal reticulation **2**
2. ABD TERG 8 with a backward-pointing process above cauda. ANT PT/BASE 0.64–1.25 *Cavariella aegopodii*
- No supracaudal process. ANT PT/BASE 1.2–4.0 **3**
3. Cauda helmet-shaped, not longer than its basal width in dorsal view, with 4–5 hairs. Head and ABD TERG 7 and 8 usually with spinal tubercles (STu) *Dysaphis crithmi*
- Cauda finger-like, much longer than its basal width., with 6–25 hairs. No STu **4**
4. SIPH cylindrical or tapering. ABD TERG 1 and 7 with marginal tubercles (MTu). Cauda with 11–25 hairs *Aphis fabae*
- SIPH clavate. MTu usually present on ABD TERG 5, but absent from 1 and 7. Cauda with 6–9 hairs *Hyadaphis foeniculi*

Critonia

C. portoricensis

Compositae

Uroleucon ambrosiae

Crocsmia

C. × crocosmiiflora

Iridaceae

Aphis fabae

Crocus

C. carduchorum

C. sativus

Crocus spp.

Iridaceae

Dysaphis tulipae

Aulacorthum solani; *Myzus ascalonicus*

Aphis gossypii; *Dysaphis tulipae*;

[*Idiopterus nephrolepidis*];

Myzus persicae; *Neomyzus circumflexus*;

Rhopalosiphoninus staphyleae

Key to apterae on *Crocus*:-

- Cauda helmet-shaped, not longer than its basal width in dorsal view. Spinal tubercles (STu) usually present, at least on head and ABD TERG 8 *Dysaphis tulipae*
- Cauda tongue-shaped, clearly longer than its basal width. STu rarely present, and never on head go to key to polyphagous aphids, p. 1020.

Cronartium

C. fusiforme

Mycetales

Cinara cronartii (in lesions of *Pinus*; see Blackman and Eastop, 1994)

Croomia

C. heterosepala

C. japonica

Stemoraceae

Aphis spiraecola

Aphis spiraecola

Crossandra*C. infundibuliformis*

Use key to polyphagous aphids, p. 1020.

Acanthaceae*Aphis gossypii*; *Myzus persicae*; *Neomyzus circumflexus***Crossopteryx** see Blackman and Eastop (1994)**Crotalaria**

C. alata
C. anagyroides
C. atrorubens
C. barkae
C. brownei
C. capensis
C. comosa
C. glauca
C. goreensis
C. hyssopifolia
C. juncea
C. laburnifolia
C. lanceolata
C. longirostrata
C. madurensis
C. mesopontica
C. mucronata
C. naragutensis
C. ochroleuca
C. reptans
C. retusa
C. rogersii
C. spectabilis
C. stipularia
C. striata

Crotalaria spp.**Leguminosae**

Aphis gossypii
Brachycaudus helichrysi
Aphis gossypii
Aphis gossypii
Aphis gossypii; *Brachycaudus helichrysi*
Acyrtosiphon pisum
Aphis gossypii
Aphis gossypii
Aphis craccivora, *gossypii*
Aphis gossypii
Aphis craccivora, *gossypii*; *Aulacorthum magnoliae*
Myzus persicae
Aphis craccivora
Aphis craccivora
Toxoptera aurantii
Aphis craccivora
Aphis craccivora
Aphis gossypii
Aphis craccivora, *gossypii*
Aphis craccivora
Aphis gossypii
Aphis craccivora
Aphis craccivora
Macrosiphum euphorbiae
Aphis craccivora, *fabae*, *gossypii*;
Brachycaudus helichrysi; [*Schizaphis rotundiventris*]
Aphis nasturtii, *spiraecola*; *Myzus ornatus*;
Sitobion nigrinectarium

Key to apterae on *Crotalaria*:-

1. SIPH black with a distal zone of polygonal reticulation *Sitobion nigrinectarium*
 - SIPH pale or dark, if dark then without polygonal reticulation **2**
 2. ANT VI BASE 0.25–0.4 mm, 1.8–2.3× R IV+V. SIPH very attenuate distally, with minimum diameter less than 0.25× width of cauda at midlength in dorsal view *Acyrtosiphon pisum*
 - ANT VI BASE less than 0.2 mm, less than 1.5× R IV+V. SIPH clavate, cylindrical or tapering but not attenuate and of diameter more than 0.3× width of cauda at midlength
- go to key to polyphagous aphids, p. 1020.

HOST LISTS AND KEYS

Croton

C. humilis

C. lobatus

Euphorbiaceae

Aphis spiraecola

Aphis craccivora, *gossypii*

Use key to polyphagous aphids, p. 1020. (for trees in this genus see Blackman and Eastop 1994).

Crupina

C. vulgaris

Crupina sp.

Compositae

Macrosiphoniella papillata

Macrosiphoniella riedeli

Couplet for separating these two species:-

(Both species have thick, dark SIPH with distal polygonal reticulation, a very long pointed cauda, R IV + V about equal to HT II, and dorsal hairs arising from tuberculate bases.)

- ANT and legs almost wholly jet black, except for base of ANT III and basal 0.1–0.2 of femora. ANT III with 20–34 rhinaria *Macrosiphoniella papillata*
- ANT and legs mainly dark, but basal parts of ANT IV and V paler as well as base of III, tibiae usually paler in middle, and femora pale on basal 0.4–0.6. ANT III with 34–51 rhinaria *Macrosiphoniella riedeli*

Cryptocoryne

C. ciliata

Araceae

Rhopalosiphum nymphaeae

Cryptogramma

C. crispa

Cryptogramma sp. (?)

Pteridaceae

Macrosiphum woodsiae

Macrosiphum clydesmithi

Use key to fern-feeding aphids under *Polypodium*.

Cryptolepis

C. transvaalensis

Asclepiadaceae

Aphis gossypii

Cryptostegia

C. grandiflora

C. madagascariensis

Asclepiadaceae

Aphis asclepiadis, *craccivora*, *gossypii*, *nerii*, *spiraecola*;
Toxoptera aurantii

Aphis craccivora, *gossypii*, *spiraecola*

Use key to aphids on *Asclepias*.

Cryptostemma* see *Arctotheca

Cryptotaenia

C. africana

C. canadensis

Umbelliferae

Aphis gossypii; *Macrosiphum euphorbiae*

Aphis gossypii;

Cavariella aegopodii, *japonica*, *oenanthi*, *salicicola*;

Hyadaphis foeniculi; *Macrosiphum euphorbiae*;

[*Pemphigus* sp.]; *Semiaphis heraclei*

C. japonica

Aphis gossypii, [*mitsubae* Shinji (= *spiraecola*?)], *spiraecola*;
Aulacorthum solani;
Cavariella japonica, *oenanthi*, *salicicola*;
Amphorophora cryptotaeniae; *Myzus persicae*;
Semiaphis heraclei

Key to apterae on *Cryptotaenia*:-

1. ABD TERG 8 with a posteriorly projecting process above cauda; in some species this is reduced to a small, warty, knob in the centre of ABD TERG 8, with 2 associated hairs 2
 - No supracaudal process, nor are there are 2 hairs on ABD TERG 8 close together and associated with a warty knob 5
2. SIPH clavate; swollen on distal half to at least 1.2× narrowest part of basal half 3
 - SIPH tapering or cylindrical, or with slight subapical swelling 4
3. Supracaudal process longer than (1.2–1.5×) cauda. SIPH coarsely imbricated and stout, less than 5× longer than the maximum width of the swollen part *Cavariella salicicola*
 - Supracaudal process almost always shorter than (0.75–1.05×) cauda. SIPH weakly imbricated and more than 5× longer than maximum width of swollen part *Cavariella aegopodii*
4. Femoral hairs numerous, long and fine, longer than 0.5× width of hind femur *Cavariella oenanthi*
 - Femoral hairs sparse, short and rigid, shorter than 0.5× width of hind femur *Cavariella japonica*
5. SIPH very small and flangeless; less than 0.5× cauda and often not much longer (1.0–1.8×) than their diameter at midlength *Semiaphis heraclei*
 - SIPH more than 0.6× cauda, and with a flange 6
6. SIPH tapering or cylindrical go to key to polyphagous aphids, p. 1020.
 - SIPH swollen or clavate 7
7. Head smooth or slightly rugose with ANT tubercles undeveloped. ANT PT/BASE 1.2–3.0. R IV+V 0.7–1.05× HT II. SIPH dark (or pale in summer dwarfs), and 0.9–1.4× cauda *Hyadaphis foeniculi*
 - Head spiculose with ANT tubercles well developed. ANT PT/BASE 2.8–5.1. R IV+V 0.9–1.7× HT II. SIPH pale and 1.7–3.0× cauda 8
8. SIPH strongly clavate, with swollen part maximally 1.8–2.1× minimum width on basal part, and with a subapical constriction bearing 2–3 rows of transverse striae below the well-developed flange. R IV+V 1.5–1.7× HT II. Apex of ANT PT pointed *Amphorophora cryptotaeniae*
 - SIPH slightly clavate, with swollen part less than 1.5× minimum width of basal part, and without a distinct subapical constriction. R IV+V 0.9–1.2× HT II. Apex of ANT PT not fine-pointed *Myzus persicae*

*Cucubalus**C. baccifer***Caryophyllaceae**

Aphis fabae; *Brachycaudus lychnidis*

Couplet for separating apterae of these two species:-

- Dorsum with solid black shield extending over ABD TERG 1–7. Cauda rounded or helmet-shaped, not longer than its basal width in dorsal view, 0.5–0.65× R IV+V. Spiracular apertures rounded, with diameter larger than ANT BD III. ANT/PT BASE 4.4–5.4 *Brachycaudus lychnidis*
- Dorsum with only segmentally isolated scleritisation. Cauda tongue-shaped, longer than its basal width, 1.1–2.0× R IV+V. Spiracular apertures reniform, smaller than ANT BD III. ANT PT/BASE 2.3–4.1 *Aphis fabae*

HOST LISTS AND KEYS

Cucumis

C. anguria
C. dipsaceus
C. ficifolius
C. figarei
C. hirsutus
C. melo (incl. var. *mumarlica*)

C. myriocarpus
C. sativus

Cucumis spp.

Use key to apterae on *Cucurbita*.

Cucurbitaceae

Aphis gossypii
Aphis middletonii
Aphis gossypii
Aphis gossypii
Aphis gossypii
 [Acyrtosiphon *cyparissiae*]; *Aphis craccivora*, *gossypii*;
 [Brevicoryne *brassicae*]; [Cavariella *salicicola*];
 [Lipaphis *erysimi*]; [Macrosiphoniella *sanborni*];
Macrosiphum euphorbiae; *Myzus persicae*
Aphis gossypii
 [Acyrtosiphon *cyparissiae*];
Aphis craccivora, *fabae*, *gossypii*, *middletonii*, *spiraecola*;
Aulacorthum magnoliae, *solani*, *spinacaudatum*;
Brachycaudus helichrysi; *Macrosiphum euphorbiae*;
Myzus persicae; *Sinomegoura citricola*
Rhopalosiphoninus latysiphon

Cucurbita

C. ficifolia
C. maximus

C. moschata

C. pepo

Cucurbita spp.

Cucurbitaceae

Aphis craccivora, *gossypii*
Aphis gossypii, *spiraecola*;
Aulacorthum magnoliae; *Brachycaudus helichrysi*;
Dysaphis crataegi ssp. *kunzei*; *Macrosiphum euphorbiae*;
Myzus persicae; *Neomyzus circumflexus*
Aphis gossypii, *nerii*, [ruborum ssp. *longisetosus*];
Aulacorthum magnoliae,
 [linderiae Shinji (Agarwala *et al.*, 1982)]; *Myzus persicae*
 [Acyrtosiphon *pisum*, *vasiljevi*];
Aphis craccivora, *fabae*, *gossypii*;
Aulacorthum magnoliae, *solani*, *spinacaudatum*;
Brachycaudus helichrysi; *Macrosiphum euphorbiae*;
Myzus persicae; *Smynturodes betae*
 [Rhopalosiphum *nymphaeae*]

Key to apterae on *Cucurbita* (and *Cucumis*):-

For keys to the common aphids on cultivated Cucurbitaceae see Blackman and Eastop (2000).

- | | | |
|----|---|---|
| 1. | ANT PT/BASE less than 0.5. SIPH absent | <i>Smynturodes betae</i> |
| - | ANT PT/BASE more than 1. SIPH present | 2 |
| 2. | Cauda helmet-shaped, not longer than its basal width in dorsal view | 3 |
| - | Cauda tongue- or finger-like, clearly longer than its basal width | 4 |
| 3. | Head and ABD TERG 8 with paired spinal tubercles (STu). SIPH dark and imbricated, 1.7–2.4× cauda. Spiracular apertures reniform | <i>Dysaphis crataegi</i> ssp. <i>kunzei</i> |
| - | Head and ABD TERG without STu. SIPH pale, smooth-surfaced, 1.0–1.3× cauda. Spiracular apertures rounded | <i>Brachycaudus helichrysi</i> |

4. Head dark and SIPH mainly pale but contrastingly dark at apices **5**
 – Head pale or dark, but if dark then SIPH are also wholly dark go to key to polyphagous aphids, p. 1020
5. SIPH slightly to moderately clavate. Hind tibia dark except for basal 0.1–0.2 of length
Aulacorthum magnoliae
 – SIPH tapering, sometimes with slight swelling of distal half, but no constriction on basal half. Hind tibia dark on about distal half of length
Aulacorthum spinicaudatum

Cuminum

C. cyminum
C. sativum

Umbelliferae

Aphis gossypii; *Myzus persicae*
Hyadaphis coriandri

Key to aphids on *Cuminum*:-

1. Head spiculose, with well-developed scabrous ANT tubercles, their inner faces converging apically. SIPH slightly to moderately clavate, about 2× cauda *Myzus persicae*
 – Head not spiculose, ANT tubercles undeveloped or weakly developed. SIPH swollen and shorter than cauda, or tapering and longer than cauda **2**
2. SIPH pale or dusky-tipped, swollen and a little shorter than cauda *Hyadaphis coriandri*
 – SIPH dark, tapering and longer than cauda *Aphis gossypii*

Cuphea

C. aequipetala
C. ignea
C. micropetala
C. platycentra
C. procumbens
C. purpurea
Cuphea spp.

Lythraceae

Impatiens americanum
Aphis gossypii; *Myzus ornatus*
Aphis gossypii
Aphis gossypii; *Myzus persicae*
Aphis gossypii; *Aulacorthum solani*; *Myzus ornatus*
Myzus persicae
Acyrtosiphon malvae group;
Blanchardaphis sp. (BMNH colln, Brazil);
Smynthuodes betae

Key to apterae on *Cuphea*:-

1. SIPH black, with 2–3 rows of transverse striae, or a few closed polygonal cells, subapically. Head with moderately developed ANT tubercles, with divergent inner faces, and a well-developed (but lower) median tubercle. R IV+V bearing 14–20 accessory hairs **2**
 – SIPH pale, dark or absent; if dark then there are either no subapical transverse striae or there is more extensive polygonal reticulation, and the other characters also do not apply
 go to key to polyphagous aphids, p. 1020
2. Dorsal abdomen with an extensive solid dark shield. Tibiae and ANT III-VI pale except at segment apices. SIPH with 2–3 subapical rows of transverse striae, rarely including any closed polygonal cells. Hairs on ANT III 0.3–0.5× BD III *Impatiens americanum*
 – Dorsal abdomen membranous. Tibiae and ANT III-VI dark. SIPH with subapical 2–3 rows of large polygonal cells. Hairs on ANT III 0.8–0.9× BD III *Blanchardaphis* sp.

Curculigo

Curculigo capitulata

Hypoxidaceae

Pseudoregma sundanica

HOST LISTS AND KEYS

Curcuma

C. domestica see *longa*

C. longa

Use key to aphids on *Hedychium*.

Zingiberaceae

Aphis gossypii; *Pentalonia kalimpongensis*, *nigronevosa*;
[*Rhopalosiphum nymphaeae*]

Cuscuta

C. epithimum

C. europaea

C. japonica

C. lehmanniana

C. monogyna

C. reflexa

C. subinclusa

C. umbellata

Cuscuta sp.

Aphis cuscutae

Aphis hederæ

Aphis gossypii

Brachyunguis cuscutae

Aphis hederæ; *Brachyunguis cuscutae*

Aphis gossypii, [*Aphis* sp. – Remaudière and Etienne, 1989];

Myzus persicae

Aphis fabae

Macrosiphum cuscutae

Aphis craccivora

Convolvulaceae

Key to apterae on *Cuscuta*:-

1. ANT tubercles undeveloped or weakly developed. ABD TERG 1 and 7 with marginal tubercles (MTu) 2
 - ANT tubercles well developed. ABD TERG 1 and 7 without MTu 7
2. ANT PT/BASE 0.9–1.0. SIPH very short, hardly longer than their basal widths, and about equal in length to the short, broadly conical cauda, which is about as long as its basal width 2
 - ANT PT/BASE 1.3–3.0. SIPH clearly longer than their basal widths, 0.9–2.8× cauda, which is tongue-shaped, longer than its basal width 3

*Brachyunguis cuscutae**
3. Dorsum with an extensive black shield *Aphis craccivora*
 - Dorsum without an extensive black shield 4
4. Cauda as dark as SIPH, with 9–18 hairs 5
 - Cauda paler than SIPH, with 4–9 hairs 6
5. R IV+V 0.9–1.3× HT II. Marginal tubercles infrequent on ABD TERG 2–4 *Aphis fabae*
 - R IV+V 1.35–1.7× HT II. Marginal tubercles frequently present on ABD TERG 2–4 *Aphis hederæ*
6. SIPH 0.9–2.5× cauda, which bears 4–8 hairs (usually 5–6). No postsiphuncular sclerite. Longest hair on ANT III 0.4–0.8× BD III *Aphis gossypii*
 - SIPH 2.5–2.9× cauda, which bears 6–9 hairs (usually 7–8). SIPH with a dark sclerotic area just posterior to the base. Longest hair on ANT III 0.8–1.0× BD III *Aphis cuscutae*
7. Head smooth with inner faces of ANT tubercles divergent. ANT III with 1–2 (–4) rhinaria. ANT III–VI, tibiae and SIPH wholly dark, contrasting with pale cauda. SIPH with polygonal reticulation on distal 0.11–0.16 of length *Macrosiphum cuscutae*
 - Head spiculose, with inner faces of ANT tubercles apically convergent. ANT III without rhinaria. ANT III–VI, tibiae and SIPH mainly pale. SIPH slightly clavate, without subapical polygonal reticulation *Myzus persicae*

Cussonia see Blackman and Eastop (1994)

Cyamopsis

C. psoraloides = *tetragonolobus*

C. tetragonolobus

Leguminosae

Acyrtosiphon gossypii; *Aphis craccivora*, *gossypii*

Key to apterae on *Cyamopsis*:-

1. Body spindle-shaped. ANT tubercles well developed. SIPH pale, very long and thin, 0.33–0.50× BL and 2.5–3.5× cauda *Acyrtosiphon gossypii*
- Body oval. ANT tubercle weakly developed. SIPH dark and much shorter **2**
2. Dorsum with an extensive black shield. Cauda black like SIPH *Aphis craccivora*
- Dorsum pale. Cauda paler than SIPH *Aphis gossypii*

Cyanotis

C. axillaris

Commelinaceae

Aphis fabae, *gossypii*

Use key to polyphagous aphids, p. 1020.

Cyathea

C. aquilina

C. araneosa

C. arborea

C. balanocarpa

Cyatheaceae

Aphis spiraecola; *Toxoptera aurantii*

Toxoptera aurantii

Aphis spiraecola; *Macrosiphum ptericolens*

Aphis spiraecola; *Macrosiphum cyatheae*

Use key to fern-feeding aphids under *Polypodium*.

Cyathula

C. prostrata

C. tomentosa

C. uncinulata

Amaranthaceae

Aphis gossypii

Aphis raji

Macrosiphum euphorbiae; *Myzus ornatus*

Key to apterae on *Cyathula*:-

- R IV+V 0.19–0.23 mm long, narrow and pointed, with R V elongated, so that most distal primary hairs are placed 0.04 mm or more from apex. ANT and legs with long, fine-pointed hairs. SIPH dark, 0.6–1.15× R IV+V, and 1.2–2.0(–2.4)× longer than the short dark triangular cauda *Aphis raji*
- Without this combination of characters go to key to polyphagous aphids, p. 1020

Cycas

C. circinalis

Cycas sp.

Cycadaceae

Cerataphis brasiliensis

Aphis gossypii

Couplet for separating these two species:-

- Body dorsoventrally flattened, almost circular, wholly sclerotized with a distinct crenulate margin. Head with a pair of anteriorly directed horns. SIPH as pores *Cerataphis brasiliensis*
- Body oval, of normal aphid form. Head without horns. SIPH tubular *Aphis gossypii*

HOST LISTS AND KEYS

Cyclamen

- C. cilicium*
C. europaeum
C. indicum

C. persicum

Cyclamen spp.

Primulaceae

- Rhopalosiphoninus staphyleae*
Aphis gossypii; *Myzus persicae*; *Neomyzus circumflexus*
Aphis gossypii; *Aulacorthum solani*; *Myzus persicae*;
Neomyzus circumflexus
Aphis gossypii; *Aulacorthum solani*; *Myzus persicae*;
Neomyzus circumflexus
Aphis fabae; *Macrosiphum euphorbiae*;
Myzus ornatus, [*langei*]; *Rhopalosiphoninus latysiphon*

Use key to polyphagous aphids, p. 1020.

Cycloloma

- C. atriplicifolium*

Chenopodiaceae

- Macrosiphum euphorbiae*

Cyclophorus see Pyrrosia

Cyclospermum

- C. leptophyllum*

Umbelliferae

- Dysaphis apiifolia*

Cydonia

- C. japonica*

C. malus (= *maliformis*?)
C. oblonga see *vulgaris*
C. sinensis see *Chaenomeles*
C. vulgaris

Quinces

Rosaceae

- Brachycaudus helichrysi*; *Myzus ornatus*;
Nearctaphis crataegifoliae
Aulacorthum solani

Anuraphis farfarae;
Aphis craccivora, *fabae*, *gossypii*, *pomi*, *spiraecola*;
[*Aploneura ampelina*]; *Aulacorthum solani*;
Brachycaudus persicae; *Dysaphis plantaginea*, *pyri*;
Eriosoma flavum, *lanigerum*, *lanuginosum*, *pyricola*;
Macrosiphum euphorbiae; *Myzus ornatus*, *persicae*;
Nearctaphis bakeri, *crataegifoliae*;
Ovatus crataegarius, *insitus*; *Phorodon humuli*;
Pterochloroides persicae; *Rhopalosiphum insertum*;
Sitobion avenae; *Toxoptera aurantii*;
‘*Watabura nishiyae*’
[*Prociphilus corrugatans*]

Key to apterae on *Cydonia*:-

[See Blackman and Eastop (2000) for a key to the more common aphids on Quince.]

- | | | |
|----|---|---------------------------------|
| 1. | ANT PT/BASE less than 1. SIPH absent, pore-like or as pigmented hairy cones | 2 |
| – | ANT PT/BASE more than 1. SIPH tubular | 7 |
| 2. | SIPH in form of large pores on large pigmented cones bearing numerous hairs. Abdomen with a double row of large dark spinal tubercles | <i>Pterochloroides persicae</i> |
| – | SIPH pore-like surrounded by a single ring of hairs, or absent. No dark spinal tubercles | 3 |

3. SIPH absent. R IV+ V shorter than HT II *Watabura nishiyae* (a *Prociphilus* sp.?)*
 – SIPH present as pores with partially sclerotised rims. R IV+V longer than HT II 4
4. Distinct dorsal abdominal wax pore plates present, consisting of groups of cells each enclosing a very small, narrow or subdivided central area (on roots, trunk or branches) *Eriosoma lanigerum*
 – Dorsal abdominal wax pore plates absent or present, if present then each consists of a ring of cells around a large central undivided area (on roots only) 5
5. BL 2.0–2.7 mm. R IV+V 0.22–0.25 mm (cauda with 2–4 hairs) *Eriosoma lanuginosum*
 – BL 1.0–1.9 mm. R IV+V 0.10–0.18 mm 6
6. BL 1.0–1.3 mm. R IV+V 0.10–0.12 mm. Cauda with 2–4 hairs *Eriosoma flavum*
 – BL 1.3–1.9 mm. R IV+V 0.12–0.18 mm. Cauda with 5 or more hairs *Eriosoma pyricola*
7. ANT tubercles undeveloped or weakly developed 8
 – ANT tubercles well-developed 20
8. SIPH short, with closely spaced rows of spinules or nodules 9
 – SIPH longer, with sparser, normal imbrication, or if short then smooth 11
9. Cauda broadly rounded, much shorter than its basal width. Most segments with paired spinal tubercles (STu). (Leaf galls containing fundatrix and emigrant alatae only) *Anuraphis farfarae*
 – Cauda 0.6–1.3 times as long as its basal width. STu absent. (Not forming leaf galls) 10
10. SIPH 0.8–1.1× cauda, which is 1.0–1.3× its basal width and bears 6–7 hairs. R IV+V 0.10–0.13 mm long, and usually with 2 accessory hairs. (Al. with a solid black dorsal abdominal patch) *Nearctaphis bakeri*
 – SIPH 1.1–1.6× cauda, which is 0.6–1.0× its basal width, and bears 8–12 hairs. R IV+V 0.14–0.18 mm long, and usually with 4 accessory hairs. (Al. without a solid black dorsal abdominal patch) *Nearctaphis crataegifoliae*
11. Cauda short and broad, helmet-shaped 12
 – Cauda tongue-shaped, clearly longer than its basal width in dorsal view 15
12. SIPH pale, smooth, truncate, less than 1.4× cauda *Brachycaudus helichrysi*
 – SIPH dark, imbricated, tapering, more than 1.5× cauda 13
13. Dorsum covered with an extensive black shield, extending to marginal sclerites. Spinal tubercles (STu) absent from head, rarely present on ABD TERG 8 only *Brachycaudus persicae*
 – Dorsum without an extensive black shield. STu usually present on head and ABD TERG 7–8 14
14. SIPH 0.14–0.20× BL. ANT PT/BASE 3.6–5.7 *Dysaphis plantaginea*
 – SIPH 0.07–0.12× BL. ANT PT/BASE 2.2–3.2 *Dysaphis pyri*
15. SIPH cylindrical over much of length, slightly swollen distally, with a constriction just proximal to flange *Rhopalosiphum insertum*
 – SIPH tapering from base to flange 16
16. Dorsal abdomen with an extensive black patch *Aphis craccivora*
 – Dorsal abdomen unpigmented or with only scattered dark markings 17
17. ANT PT/BASE more than 3.5. Stridulatory apparatus present, consisting of ventrolateral ridges on abdominal sternites 5 and 6 and a row of peg-like hairs on each hind tibia *Toxoptera aurantii*
 – ANT PT/BASE less than 3.5. No stridulatory apparatus 18

HOST LISTS AND KEYS

18. Cauda paler than SIPH, with usually 4–8 hairs (usually 5–6) *Aphis gossypii*
 – Cauda and SIPH both dark, and cauda with 7–19 hairs **19**
19. Marginal tubercles (MTu) present on ABD TERG 2–4. Cauda with 10–19 hairs (rarely less than 13). R IV+V more than 130 µm long *Aphis pomi*
 – MTu absent from ABD TERG 2–4. Cauda with 7–15 hairs (rarely more than 12). R IV+V less than 120 µm long *Aphis spiraeicola*
20. Head smooth, with inner faces of ANT tubercles divergent. SIPH with a subapical zone of polygonal reticulation **21**
 – Head spiculose, with inner faces of ANT tubercles parallel or convergent. SIPH without any polygonal reticulation **23**
21. SIPH 1.1–1.4× cauda with reticulation on distal 0.19–0.35 of length. Hairs on ANT III 0.3–0.5× BD III *Sitobion avenae*
 – SIPH 1.7–2.4× cauda with reticulation on distal 0.1–0.2 of length, hairs on ANT III 0.6–1.1× BD III **22**
22. Head and SIPH dark. ANT III with 10–35 rhinaria *Macrosiphum rosae*
 – Head and SIPH pale. ANT III with 1–10 rhinaria *Macrosiphum euphorbiae*
23. Inner faces of ANT tubercles approximately parallel in dorsal view. ANT III usually with 1–3 small rhinaria near base *Aulacorthum solani*
 – Inner faces of ANT tubercles convergent, or bearing scabrous rounded or finger-like processes. ANT III without any rhinaria **24**
24. Inner faces of ANT tubercles bearing long, finger-like processes *Phorodon humuli*
 – Inner faces of ANT tubercles without finger-like processes **25**
25. Dorsal abdomen with an intersegmental pattern of dark ornamentation. ANT PT/BASE 1.7–2.8 *Myzus ornatus*
 – Dorsal abdomen without any dark ornamentation. ANT PT/BASE 2.8–8 **26**
26. SIPH slightly clavate. ANT VI pale, with PT/BASE 2.8–4.5 *Myzus persicae*
 – SIPH tapering from base to flange. ANT VI dark, with PT/BASE 5–8 **27**
27. Al. (spring emigrant) with 60–83 rhinaria on ANT III, 36–42 on IV and 13–22 on V *Ovatus insitus*
 – Al. (spring emigrant) with 22–49 rhinaria on ANT III, 5–20 on IV and 0–10 on V *Ovatus crataegarius*

Cymbalaria see *Linaria*

Cymbaria

C. borysthénica

Scrophulariaceae

Macrosiphoniella cymbariae

Cymbidium

C. aloifolium

C. eburneum

C. elegans

C. grandiflorum

C. iridifolium

C. longifolium

Orchidaceae

Cerataphis orchidearum

Sitobion indicum, pseudoluteum

Sitobion indicum, pseudoluteum

Neomyzus circumflexus

Sitobion indicum

Sitobion indicum, pseudoluteum

<i>C. lowianum</i>	<i>Aphis fabae</i> ; <i>Cerataphis orchidearum</i> ; <i>Myzus persicae</i> ; <i>Sitobion indicum</i>
<i>C. luteum</i>	<i>Sitobion indicum</i>
<i>C. montanum</i>	<i>Sitobion indicum</i>
<i>C. munronianum</i>	<i>Sitobion indicum</i>
<i>C. tracyanum</i>	<i>Sitobion indicum</i>
<i>Cymbidium</i> sp.	<i>Aphis gossypii</i> , <i>nasturtii</i> ; <i>Aulacorthum solani</i> ; <i>Myzus ornatus</i>

Key to apterae on *Cymbidium* and most other orchid genera:–

(For a key to the common aphids on cultivated orchids see Blackman and Eastop, 2000)

1. Body dorsoventrally flattened, almost circular, wholly sclerotic, with a continuous marginal fringe of wax glands, and a pair of horns projecting forward anteriorly (Figure 25a). SIPH as large round pores raised on shallow cones. Cauda knobbed, anal plate bilobed *Cerataphis orchidearum*
 - Body oval, not wholly sclerotic, without marginal wax glands or horns. SIPH tubular, cauda helmet- or tongue-shaped, anal plate entire 2
2. SIPH wholly dark, with a subapical zone of polygonal reticulation (sometimes only a few closed polygonal cells) 3
 - SIPH pale or dark, but if dark then without any trace of subapical polygonal reticulation 8
3. Dorsal hairs long and conspicuous, those on anterior ABD TERG 1.0–1.8× ANT BD III. Longest hair on ANT III 0.5–1.0× BD III. SIPH 1.1–1.33× cauda, and only reticulated on less than 0.14 of length. ABD TERG 1–5 usually with dark sclerotisation extending to margins 4
 - Anterior dorsal abdominal and ANT hairs very short and inconspicuous, less than 0.4× BD III. SIPH 1.4–2.3× cauda, and reticulated on distal 0.2 or more of length. ABD TERG 1–5 either unsclerotised or with a central dark patch not extending to margins 5

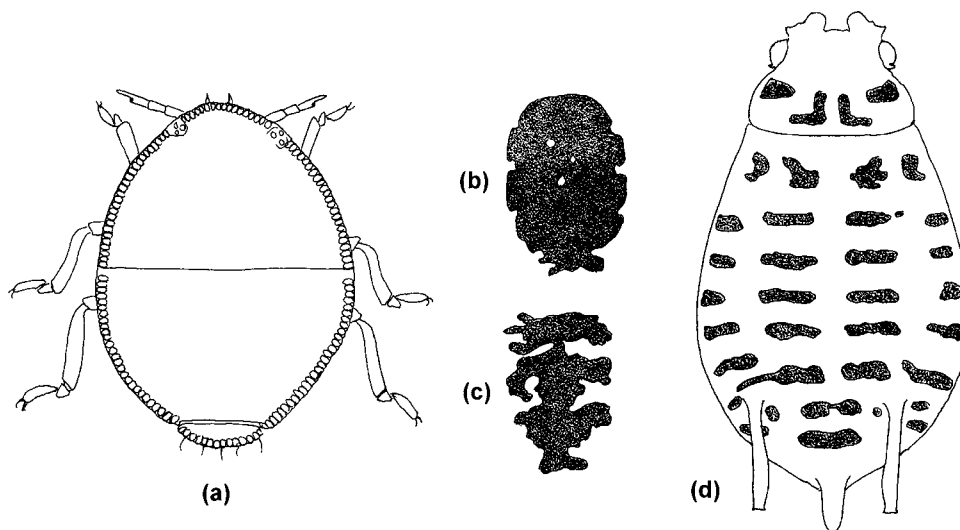


Figure 25 Apterae on *Cymbidium* and other orchid genera. (a) Dorsal body of *Cerataphis orchidearum*, (b) dorsal abdominal patch of *Sitobion luteum*, (c) dorsal abdominal patch of *S. indicum*, (d) dorsal markings of *Neomyzus dendrobii*.

HOST LISTS AND KEYS

4. First tarsal segments with 4 hairs. Longest hairs on ANT III 0.8–1.0× BD III *Sitobion pseudoluteum**
 – First tarsal segments usually with 3 hairs. Longest hairs on ANT III 0.5–0.7× BD III *Sitobion orchidacearum*
5. Abdominal tergum membranous. SIPH 1.9–2.3× cauda **6**
 – Abdominal tergum with a dark patch. SIPH 1.4–2.0× cauda **7**
6. ANT shorter than BL, and pale except for apices of segments III–V and PT. ANT PT/BASE 3.9–6.2. Cauda 0.17–0.23 mm long, 1.2–1.6× its basal width *Sitobion anselliae*
 – ANT much longer than BL, and dark except for I–II and base of III. ANT PT/BASE 6.2–8.0. Cauda 0.26–0.35 mm long, 1.6–2.0× its basal width *Sitobion eulophiae*
7. Cauda with 6–8 hairs. Dorsal abdominal patch broadly oval with only small marginal indentations (Figure 25b). ANT III slightly constricted at base in comparison to rhinarated part *Sitobion luteum*
 – Cauda with 9–13 hairs. Dorsal abdominal patch very irregular in outline with large intersegmental indentations (Figure 25c). ANT III as thick at base as at rhinarated part *Sitobion indicum*
8. Dorsum with a distinctive pattern of black markings, comprising paired pleuro-spinal and marginal sclerites on prothorax, metanotum and ABD TERG 1–7, and a medial sclerite on ABD TERG 8 (Figure 25d). SIPH asymmetrically swollen on distal half *Neomyzus dendrobii*
 – Dorsum without such a pattern; if with any dark markings then SIPH are not swollen on distal half **9**
9. Dorsal abdomen with a solid dark oval sclerite centred on ABD TERG 2–4, otherwise pale except for thin cross band on ABD TERG 8. SIPH black, cylindrical, slightly narrower at midlength. Head densely spiculate, with well-developed ANT tubercles. ANT PT/BASE 2.9–3.3
?Micromyzus sp. on *Dendrobium sulphureum*, New Guinea
 – Without that combination of characters; if dorsal abdomen has a central sclerite then it is broken in midline and ANT PT/BASE 3.5–5.0. SIPH and head various **10**
10. Cauda helmet-shaped, not longer than its basal width, with 4–5 hairs. R IV+V 1.5–1.8× HT II, similar in length to SIPH *Dysaphis neostroyani*
 – Cauda tongue-shaped, longer than its basal width, with 4–24 hairs. R IV+V 0.9–1.4× HT II, shorter than SIPH **11**
11. SIPH thick and cylindrical, c.0.8× cauda. ANT PT/BASE c.1.9. ABD TERG 1 and 7 with marginal tubercles (MTu) *Aphis orchidis**
 – Without that combination; either or both SIPH and ANT PT relatively longer. ABD TERG 1 and 7 with or without MTu **12**
12. SIPH and cauda both entirely black, the latter without any midway constriction and bearing 11–24 hairs. Thorax and ABD TERG 7 and 8 with dark cross-bands, and usually scattered small dark markings also on ABD TERG 1–6. ANT tubercles weakly developed and ABD TERG 1 and 7 with MTu. No stridulatory apparatus **13**
 – Without that combination of characters go to key to polyphagous aphids, p. 1020
13. Hairs on ANT III very fine, the longest 2.1–2.8× BD III. R IV+V 1.05–1.25× HT II. MTu often present on ABD TERG 2–6 as well as 1 and 7 *Aphis epipactis*
 – Longest hairs on ANT III 0.6–2.2× BD III. R IV+V 0.9–1.1× HT II. MTu rarely present on ABD TERG 2–6 *Aphis fabae* group (incl. *A. solanella*)

Cymbopogon

C. citratus
C. martini
C. nardus
C. tortilis
C. validus
Cymbopogon sp.

Gramineae

Sipha flava
Sitobion miscanthi; *Tetraneura fusiformis*
Sitobion miscanthi
 [Pemphigus andropogiae]; [Watabura nishiyae]
 [Sitobion sp. (Millar, 1994)]
Schizaphis hierochlorophaga

Use key to apterae of grass-feeding aphids under *Digitaria*.

Cymboseris see Crepis**Cynanchum**

C. acutum
C. atratum
C. dalhousia
C. ellipticum
C. salinarum
C. savannarum
C. sibiricum

Asclepiadaceae

Aphis fabae, *gossypii*, *nerii*; *Brachyunguis bicolor*, *cynanchi*
Aphis nerii
Aphis nerii
Aphis nerii
Aphis nerii; *Toxoptera aurantii*
Aphis nerii
Brachyunguis cynanchi

Key to apterae on Cynanchum:–

1. ANT PT/BASE more than 2. SIPH longer than cauda go to key to polyphagous aphids, p. 1020
- ANT PT/BASE less than 1. SIPH shorter than cauda **2**
2. SIPH 2–3× longer than their basal widths, 0.75–0.9× ANT VI (incl. PT), and 0.8–0.95× cauda, which bears 11–12 hairs *Brachyunguis cynanchi**
- SIPH less than 2× longer than their basal widths, about 0.6× ANT VI (incl. PT), and 0.5–0.6× cauda, which bears about 6 hairs *Brachyunguis bicolor**

Cynara

C. cardunculus

C. cynosbatella

C. scolymus

Compositae

Aphis fabae, *gossypii*, [intybi], *spiraecola*;
Brachycaudus cardui; *Capitophorus elaeagni*, *carduinus*;
Dysaphis lappae ssp. *cynarae*; *Hyperomyzus lactucae*;
Macrosiphum euphorbiae; *Myzus persicae*;
Trama troglodytes; *Uroleucon compositae*, *sonchi*
Aphis fabae ssp. ?*cirsiiacanthoides* (as *neoreticulata*
 Theobald, 1927)
Aphis craccivora, *fabae*, *gossypii*, *middletonii*, *solanella*,
terricola; *Aulacorthum solani*;
Brachycaudus cardui, *helichrysi*;
Capitophorus [*carduinus*], *elaeagni*, *horni*;
Dysaphis lappae ssp. *cynarae*; *Macrosiphum euphorbiae*;
Myzus persicae; [Pleotrichophorus *chrysanthemi*];
Protrama radiceis; *Trama troglodytes*;
Uroleucon cichorii, *compositae*, *gobonis*

HOST LISTS AND KEYS

Key to apterae on *Cynara* (and *Silybum*):–

1. ANT PT/BASE less than 0.7. HT II elongate, at least 0.5× hind tibia 2
– ANT PT/BASE more than 0.75. HT II of normal length 3
2. SIPH absent. ANT VI shorter than ANT V *Trama troglodytes*
– SIPH present as pores on small shallow cones. ANT VI longer than ANTV *Protrama radialis*
3. Cauda short, helmet-shaped or bluntly triangular, shorter than or not clearly longer than its basal width in dorsal view 4
– Cauda elongate triangular, tongue-or finger-shaped, clearly longer than its basal width in dorsal view 8
4. ANT PT/BASE 0.75–2.1. ABD TERG 1 and 7 with well-developed marginal tubercles (MTu). Cauda bluntly triangular with 10–20 hairs 5
– ANT PT/BASE 2.3–5.1. Cauda helmet-shaped, with 5–8 hairs. If ABD TERG 1 and 7 have MTu then these are also present on ABD TERG 2–5 6
5. ANT PT/BASE 0.75–1.15, and PT 0.5–0.8× R IV+V *Aphis terricola*
– ANT PT/BASE 1.4–2.1, and PT 0.8–1.2× R IV+V *Aphis middletonii*
6. Dorsal abdomen with an extensive solid black patch. SIPH 0.10–0.15× BL. Mesosternum with a pair of dark mammariform processes *Brachycaudus cardui*
– Dorsal abdomen without a solid black patch, at most with scattered dark markings. SIPH 0.05–0.10× BL. Mesosternum without mammariform processes 7
7. BL 0.9–2.0 mm. SIPH smooth, short and broad-based, 1.5–2.0× their diameter at midlength. Spinal and marginal tubercles (STu and MTu) rare or absent *Brachycaudus helichrysi*
– BL 2.1–3.0 mm. SIPH imbricated and about 3× their diameter at midlength. Numerous well-developed STu and MTu present *Dysaphis lappae* ssp. *cynarae*
8. Hairs on front of head and dorsal body mostly capitate, often quite long and arising from tuberculate bases 9
– Hairs on front of head and dorsal body not capitate 11
9. Dorsal abdomen with most spinal hairs duplicated, not arranged in two clear longitudinal rows *Capitophorus horni*
– Dorsal abdomen with one pair of spinal hairs per segment, forming a single longitudinal row on each side of mid-line 10
10. Cauda 1.4–2.3× R IV+V, and bearing 7–13 hairs. ANT PT 4.5–6.3× R IV+V, and 6.0–9.2× ANT BASE VI. SIPH with dark apices *Capitophorus elaeagni*
– Cauda 1.1–1.5× R IV+V, and bearing 5–8 hairs. ANT PT 3.1–4.4× R IV+V, and 4.6–6.3× ANT VI BASE. SIPH without dark apices *Capitophorus carduinus*
11. SIPH pale and markedly clavate, with maximum diameter of swollen part 1.4–2.0× minimum diameter on basal half. Head smooth *Hyperomyzus lactucae*
– SIPH pale or dark; tapering, cylindrical, or if clavate then head is spiculose 12
12. SIPH pale or dark, but if dark then without any subapical polygonal reticulation go to key to polyphagous aphids p. 1020
– SIPH mainly or wholly dark, and with a subapical zone of polygonal reticulation 13
13. Cauda dark like SIPH 14
– Cauda pale 15

14. ANT III with 48–86 rhinaria extending over 0.85–0.92 of length of segment. Cauda with 10–22 hairs. ABD TERG 2–4 without marginal tubercles (MTu) *Uroleucon compositae* (or *gobonis*)
 – ANT III with 20–45 rhinaria on basal 0.35–0.52 of length. Cauda with 23–30 hairs. ABD TERG 2–4 regularly with MTu *Uroleucon aeneum*
15. Dorsal hairs on ABD TERG 1–5 not placed on dark scleroites. RVI+V 0.73–0.88× HT II *Uroleucon sonchi*
 – Dorsal hairs on ABD TERG 1–5 all or mostly placed on dark scleroites. R IV+V 1.17–1.33× HT II *Uroleucon cichorii*

Cynodon*C. dactylon**C. plectostachyum***Gramineae**

Anoecia vagans; *Aploneura lentisci*;
Asiphonella cynodonti, *dactylonii*; *Ceratovacuna panici*;
Forda formicaria, *hirsuta*, *marginata*; *Geoica lucifuga*;
Hysteroneura setariae; [*Iziphyta maculata*];
Rhopalosiphum maidis, *padi*, *ruftabdominale*;
Schizaphis graminum; *Sipha flava*, *maydis*;
Sitobion africanum, *avenae*, *lambersi*, *leelamaniae*,
miscanthi; *Smynthuroides betae*;
Tetraneura africana, *caerulescens*, *fusifformis*,
nigriabdominalis, *radicicola*
Brachysiphoniella montana; [*Pterasthenia shiraensis*];
Sitobion graminis

Use key to apterae of grass-feeding aphids under *Digitaria*.

Cynoglossum

C. amabile
C. creticum
C. denticulatum
C. furcatum
C. glochidiatum
C. grande
C. hungaricum
C. lanceolatum
C. montanum
C. nebrodense
C. officinale

C. pictum
C. wallichii

Cynoglossum spp.**Boraginaceae**

Brachycaudus helichrysi
Brachycaudus bicolor, *helichrysi*
 [*Protrama longitarsus* ssp. *sclerodensis*]
Brachycaudus helichrysi
 [*Longisiphoniella subterranea*]
Brachycaudus bicolor; *Myzus persicae*
Brachycaudus cardui
Aphis gossypii; *Brachycaudus helichrysi*; *Myzus ornatus*
Brachycaudus cardui
Aphis craccivora; *Brachycaudus helichrysi*
Acyrtosiphon malvae; *Aphis symphyti*;
Brachycaudus bicolor, *cardui*, *helichrysi*, *lateralis*;
 [*Diuraphis frequens*]; *Myzus persicae*
Brachycaudus helichrysi
 [*Aleurodaphis blumeae*]; *Brachycaudus helichrysi*;
Myzus ornatus
Aphis [*cynoglossi* Lichtenstein, 1884], *fabae*, *nasturtii*,
Aphis sp. ?*tirucallis* (BMNH colln, Iran);
 [*Cerataphis lataniae*]; [*Eutrichosiphum flavum*];
Macrosiphum euphorbiae; *Neomyzus circumflexus*;
 [*Rhopalosiphum padi*]; [*Uroleucon pseudotanacetii*]

HOST LISTS AND KEYS

Key to apterae on *Cynoglossum*:-

1. Cauda helmet-shaped, not longer than its basal width in dorsal view 2
 – Cauda tongue or finger-shaped, clearly longer than its basal width 5
2. Dorsum without any dark markings. SIPH 0.05–0.10× BL *Brachycaudus helichrysi*
 – Dorsum with a dark shield or extensive dark markings. SIPH 0.09–0.15× BL 3
3. Broad, flat, pale marginal tubercles (MTu) present on ABD TERG 1–7, larger than the spiracles and occupying almost the whole of the sclerites on which they are placed. ABD TERG 7 often, and 6–8 sometimes, with spinal tubercles (STu) *Brachycaudus bicolor*
 – MTu irregularly present on ABD TERG 2–4, sometimes also on 1 and/or 5, but never on 6 and 7, and generally smaller than the spiracles. No STu 4
4. Longest hairs on hind femur 10–25 µm *Brachycaudus lateralis*
 – Longest hairs on hind femur more than 25 µm long *Brachycaudus cardui*
5. ANT tubercles weakly developed. ABD TERG 1 and 7 with marginal tubercles (MTu) 6
 – ANT tubercles well developed. ABD TERG 1 and 7 without MTu
 go to key to polyphagous aphids, p. 1020, starting at couplet 4
6. Dorsal abdomen with a (sometimes fragmented) black shield. R IV+V 0.9–1.01× HT II. Cauda with 4–8 hairs 7
 – Dorsal abdomen with dark cross-bands, or pale. R IV+V 0.88–1.57× HT II. Cauda with 4–25 hairs 8
7. ANT PT/BASE 1.4–1.6. SIPH 0.6–1.0× cauda *Aphis* sp. (?*tirucallis* – Iran, BMNH colln)
 – ANT PT/BASE 1.7–2.8. SIPH 1.1–2.1× cauda *Aphis craccivora*
8. Cauda black with 11–25 hairs. Dorsal abdomen usually with transverse dark bands on ABD TERG 7 and 8, and often with dark markings on more anterior tergites *Aphis fabae*
 – Cauda paler than SIPH, with 4–11 hairs. Dorsal abdomen without dark markings, or with only narrow bands on ABD TERG (7)–8 9
9. SIPH usually rather pale, darker at apices. R IV+V 1.0–1.2× HT II *Aphis nasturtii*
 – SIPH uniformly dark. R IV+V 1.1–1.57× HT II 10
10. Total length of rostrum (measured from base of protractor apodeme) 0.43–0.60 mm, 0.27–0.36× BL. (Al. with 1–4 rhinaria n ANT IV) *Aphis symphyti*
 – Total length of rostrum 0.34–0.49 mm, 0.22–0.28× BL. (Al. usually with 0, rarely with 1–2, rhinaria on ANT IV) *Aphis gossypii*

Cynometra see Blackman and Eastop (1994)

Cynosurus

C. cristatus

C. echinatus

C. elegans

Cynosurus spp.

Gramineae

Anoecia corni; *Atheroides serrulatus*;

Metopolophium festucae ssp. *cerealium*;

Pemphigus sp. (?*groenlandicus* – Zwölfer, 1958);

Rhopalosiphum padi

Metopolophium fasciatum; *Sitobion avenae*

Sitobion fragariae

Rhopalosiphum padi

Use key to apterae of grass-feeding aphids under *Digitaria*.

Cynura = *Gynura*

Cypella

C. herbertii

Cyperorchis = **Cymbidium**

Cyperus (incl. *Mariscus*)

C. ajax

C. alopecuroides

C. alternifolius

C. amabilis

C. australis

C. bacans

C. badius

C. compressus

C. congestus

C. cylindristachyus

C. cyperoides

C. difformis

C. distachyos

C. elatus

C. esculentus

C. exaltatus

C. fastigiatus

C. flabelliformis

C. flavus

C. flexuosus

C. haspan

C. hebeiensis

C. hermaphroditus

C. imbricatus

C. incompletus

C. iria

C. kyllingia see *Killingia*

C. laevigatus

C. longus

C. malaccensis

Iridaceae

Hysteroneura setariae

Cyperaceae

[*Sitobion* sp.]

Schizaphis rotundiventris

Rhopalosiphum padi

Schizaphis minuta

Rhopalosiphum padi

Carolinaia scirpi

Schizaphis pyri (as *fritzmuelleri*), *rotundiventris*;

Sipha glyceriae

Hysteroneura setariae

Hysteroneura setariae

Hysteroneura setariae; *Schizaphis rotundiventris*

Carolinaia scirpi

Schizaphis (Paraschizaphis) sp. nr *acori* (Japan, BMNH colln)

Aphis fabae, [*polyanthi* Passerini, 1843: Macchiati, 1884]

Schizaphis rotundiventris

Aphis gossypii; *Carolinaia cyperi*; *Hysteroneura setariae*;

Rhopalosiphum maidis, *rufiabdominale*;

Saltusaphis scirpus;

Schizaphis minuta, *rotundiventris*; *Sipha flava*;

Sitobion hillerislammersi, [*Sitobion* sp. (Millar, 1994)];

Smynthuroides betae

Schizaphis rotundiventris

Rhopalosiphum maidis

Carolinaia scirpi, *javanica*; *Sitobion miscanthi*

Carolinaia caricis, *cyperi*

Carolinaia caricis, *cyperi*

Carolinaia javanica

Thripsaphis cyperi ssp. *waligshanennis*, *ossiannilsoni* ssp. *hebeiensis*

Carolinaia cyperi

Aphis gossypii

Carolinaia corozonensis

Saltusaphis scirpus

Aphis fabae

Rhopalosiphum padi;

Schizaphis graminum, [*scirpi*], *rotundiventris*;

Sitobion avenae; *Tetraneura africana*

Vesiculaphis caricis

HOST LISTS AND KEYS

<i>C. microiria</i>	<i>Rhopalosiphum rufiabdominale</i>
<i>C. monophyllus</i>	<i>Vesiculaphis caricis</i>
<i>C. niveus</i>	<i>Schizaphis graminum</i>
<i>C. odoratus</i>	<i>Carolinaia cyperi</i>
<i>C. pagrus</i>	<i>Hysteroneura setariae</i> ; <i>Schizaphis rotundiventris</i>
<i>C. pseudoleptocladus</i>	[<i>Sitobion</i> sp. (Millar, 1994)]
<i>C. pustulatus</i>	<i>Aphis gossypii</i>
<i>C. reduncus</i>	<i>Aphis gossypii</i>
<i>C. rigidifolius</i>	<i>Rhopalosiphum maidis</i> ; <i>Saltusaphis scirpus</i> ; <i>Schizaphis rotundiventris</i>
<i>C. rotundifolius</i>	<i>Ceruraphis eriophori</i>
<i>C. rotundus</i>	<i>Aphis fabae</i> , <i>gossypii</i> ; <i>Carolinaia cyperi</i> ; <i>Geoica lucifuga</i> ; <i>Hysteroneura setariae</i> ; <i>Rhopalosiphum maidis</i> , <i>padi</i> , <i>rufiabdominale</i> ; <i>Schizaphis graminum</i> , <i>minuta</i> , <i>piricola</i> , <i>pyri</i> , <i>rotundiventris</i> ; <i>Sitobion miscanthi</i> ; <i>Tetraneura fusiformis</i> , <i>radicicola</i> ; [<i>Therioaphis trifolii</i> ssp. <i>maculata</i> , <i>ononidis</i>]; <i>Vesiculaphis caricis</i>
<i>C. serotina</i>	[<i>Schizaphis</i> sp.], [<i>Schizaphis</i> (<i>Paraschizaphis</i>) sp.]; <i>Sitobion miscanthi</i> group; <i>Vesiculaphis caricis</i>
<i>C. sumatrensis</i>	<i>Schizaphis rotundiventris</i>
<i>C. umbellatus</i>	<i>Hysteroneura setariae</i> ; <i>Schizaphis rotundiventris</i>
<i>C. usitatus</i>	<i>Saltusaphis scirpus</i>
<i>C. vegetus</i>	<i>Sitobion avenae</i>
<i>C. virens</i>	<i>Geoica utricularia</i>
<i>Cyperus</i> spp.	<i>Acutosiphon obliquoris</i> ; <i>Forda formicaria</i> , <i>hirsuta</i> ; <i>Melanaphis donacis</i> ; <i>Metopolophium dirhodum</i> , <i>festucae</i> ; [<i>Pseudaphis sijui</i>]; <i>Rhopalosiphum nymphaeae</i> ; <i>Sitobion africanum</i> , <i>graminis</i> ; [<i>Subsaltusaphis sinensis</i>]; <i>Thripsaphis cyperi</i>

Key to apterae on *Cyperus*:-

1. SIPH tubular; tapering, cylindrical or swollen, clearly longer than their basal widths 2
 - SIPH in form of short truncate cones not clearly longer than their basal widths, or present merely as pores, or completely absent 30
2. SIPH tapering to a point, with aperture placed laterally (Figure 18a). ANT 5-segmented, with PT/BASE less than 1 3
 - SIPH cylindrical or swollen, with terminal aperture. ANT 5- or 6-segmented, with PT/BASE more or less than 1 3
3. Head flattened, with frontal area produced into a ledge extending over ANT bases. SIPH stout, very scabrous, swollen over most of length and very strongly constricted before apex; width in middle 60–95 µm, 0.22–0.26× length and 3.4–5.4× width of subapical constriction 4
 - Head not flattened or extended forward over ANT bases. SIPH scabrous, imbricated or smooth, but if scabrous, swollen and subapically constricted then the swollen part is less than 2.5× width of constriction 4
4. Head with inner sides of ANT tubercles scabrous, or developed as rounded, scabrous or spiculose processes 5
 - Head with ANT tubercles absent, or weakly developed, or smooth and divergent 6

5. ANT 2.7–3.7× head width across (and including) eyes. ANT III 2.3–2.6× ANT V, and 2.9–4.0× BASE VI. R IV+V 1.2–1.3× HT II and bearing 4–5 accessory hairs *Carolinaia scirpi*
 – ANT 2.1–2.5× head width across eyes. ANT III 1.5–1.7× ANT V, and 1.9–2.2× BASE VI. R IV+V 0.9–1.0× HT II, and bearing 2 accessory hairs *Carolinaia javanica*
6. ANT 5-segmented, bearing long hairs up to 4–5× BD III. ANT PT/BASE 4.5–5.9, with PT usually curved. (When rarely 6-segmented then ANT PT 2.0–2.5× ANT III) *Rhopalosiphum rufiabdominale*
 – ANT 5- or 6-segmented, but if 5-segmented then hairs are much shorter and/or ANT PT/BASE is less than 3.6. ANT PT 0.9–2.0× ANT III 7
7. SIPH scabrous dorsally and with heavy, denticulate imbrication ventrally; swollen or thickened on distal half and constricted subapically, so that maximum diameter of swollen part is more than 1.7× diameter of subapical constriction. Dorsal cuticle sclerotic and strongly wrinkled or pitted 8
 – SIPH smooth or normally imbricated, or heavily imbricated but with maximum diameter of distal half less than 1.6× diameter of subapical constriction. Dorsal cuticle sclerotic or membranous 10
8. ANT 0.26–0.31× BL, often 5-segmented, with ANT PT/BASE 1.0–1.5 *Carolinaia caricis*
 – ANT usually 6-segmented, 0.4–0.55× BL, with ANT PT/BASE 2.0–2.6 9
9. Rostrum 0.14–0.17× BL. SIPH thick, 3.9–4.5× maximum diameter of swollen part and 3.7–4.8× minimum diameter on basal half *Carolinaia cyperi*
 – Rostrum 0.17–0.22× BL. SIPH longer and thinner; 5.0–5.8× maximum diameter of swollen part and 6.5–7.3× minimum diameter on basal half *Carolinaia corazonensis*
10. Cauda 0.8–1.2× ANT PT and bearing 12–21 hairs. ANT PT/BASE 1–2 *Melanaphis donacis*
 – Cauda 0.25–0.7× ANT PT and bearing 4–13 hairs. ANT PT/BASE 1.7–6.3 11
11. ANT less than 0.5× BL 12
 – ANT more than 0.5× BL 13
12. Dorsum with extensive dark sclerotisation. Dorsal hairs long; those on ANT III about 2× BD III. ANT III with 2–10 rhinaria near base. ANT PT/BASE 2.7–3.6 *Ceruraphis eriophori*
 – Dorsum pale, not sclerotic. Hairs on ANT III less than 2× BD III. ANT PT/BASE 1.7–2.8 *Rhopalosiphum maidis*
13. SIPH dark with a subapical zone of polygonal reticulation 14
 – SIPH pale or dark, without polygonal reticulation 18
14. Cauda black like SIPH *Sitobion graminis*
 – Cauda pale or dusky, much paler than SIPH 15
15. SIPH 2.5–3.1× cauda, which has 5–6 hairs. Dorsal abdomen with a sharply-defined almost oval black central patch *Sitobion hillerislambersi*
 – SIPH 1.1–1.9× cauda. Dorsal abdomen with or without dark markings, but without a sharply defined central black patch 16
16. SIPH 1.1–1.4× cauda. HT II 1.2–1.6× R IV+V *Sitobion avenae*
 – SIPH 1.4–1.9× cauda. HT II 1.0–1.3× R IV+V 17
17. Dorsal abdominal pigmentation often consisting of segmentally arranged and variably developed but well-defined transverse black bars. Short-haired; longest hairs on ANT III less than 20µm long *Sitobion africanum*
 – Dorsal abdominal pigmentation variably developed, ill-defined and not segmentally divided. Longer haired; longest hairs on ANT III more than 20µm long *Sitobion miscanthi*

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18. ANT III with 1–4 small rhinaria near base (rarely one side has none). ANT tubercles well developed, extending forward much further than middle of head in dorsal view. SIPH pale **19**
 – ANT III without rhinaria. ANT tubercles small or only moderately developed, not extending forward much further than middle of head in dorsal view. SIPH dark or pale with dark apices **20**
19. ANT with each segment pale at base and dusky/dark at apex (base of VI paler than apex of V). R IV + V $0.55\text{--}0.71\times$ HT II. (Al. without dorsal abdominal pigmentation) *Metopolophium dirhodum*
 – ANT progressively darker from base to apex. R IV + V $0.71\text{--}0.90\times$ HT II. (Al. with dark dorsal abdominal bars) *Metopolophium festucae*
20. SIPH clavate. Dorsal cuticle ornamented with a pattern of rounded bead-like spicules, arranged in polygons *Rhopalosiphum nymphaeae*
 – SIPH tapering or somewhat thickened distally, but not clavate. Dorsal cuticle smooth or variously sculptured **21**
21. SIPH black, swollen slightly on basal half (calf-shaped), contrasting with long (0.16–0.26 mm) pale cauda, which bears 4 hairs on middle part *Hysteroneura setariae*
 – SIPH pale with dark apices or entirely dark; cylindrical or tapering without any swelling of basal half. Cauda pale, dusky or dark, with 4–24 hairs **22**
22. SIPH pale basally, dark towards apices **23**
 – SIPH uniformly dark **24**
23. SIPH $2.8\text{--}3.7\times$ longer than their width at midlength. ANT with primary rhinaria on ANT V much smaller than that on VI, its diameter $0.3\text{--}0.4\times$ width of segment at that point. Body broadly oval. R IV + V $0.85\text{--}1.0\times$ HT II *Schizaphis minuta*
 – SIPH $4.2\text{--}9.2\times$ longer than their width at midlength. ANT with primary rhinarium on ANT V about the same size as that on VI, its diameter more than 0.5 of width of segment at that point. Body elongate oval. R IV + V $0.7\text{--}0.8\times$ HT II *Schizaphis graminum*
24. SIPH cylindrical or slightly swollen on distal half, with a smooth subapical constricted area before a well-developed flange. Dorsal cuticle with a reticulate pattern of spicules arranged in polygons, each polygon enclosing one or more additional spicules *Rhopalosiphum padi*
 – SIPH tapering from base to flange, without a subapical constriction. Dorsal cuticle with or without a reticulate pattern but not as above **25**
25. ANT III–VI dark except for basal part of III. ANT PT/BASE 4.2–6.0. SIPH $1.6\text{--}3.3\times$ cauda (Al. with media once-branched) **26**
 – ANT III and IV mainly pale, V dark towards apex, VI mainly dark. ANT PT/BASE 1.7–4.0. SIPH $0.8\text{--}2.0(\text{--}2.5)\times$ cauda. (Al. with media twice-branched) **29**
26. ABD TERG 8 with 5–7 hairs. Longest hairs on ANT III $1.6\text{--}2.2\times$ BD III *Schizaphis* sp. near *acori* (Japan, BMNH colln)
 – ABD TERG 8 with 2 hairs. Longest hairs on ANT III $0.5\text{--}0.9\times$ BD III **27**
27. SIPH $2.2\text{--}3.3\times$ cauda. Longest hairs on hind femur shorter than trochantrofemoral suture. (Al. with sec. rhin. III 6–12, IV 2–6, V 0–2) *Schizaphis rotundiventris*
 – SIPH $1.6\text{--}2.4\times$ cauda. Longest hairs on hind femur as long as or longer than trochantrofemoral suture. (Al. with sec. rhin. III 15–29, IV 7–15, V 0–5) **28**
28. ANT I and II dark like most of ANT flagellum, only base of ANT III often pale. Cauda dark *Schizaphis pyri*
 – ANT I and II pale like base of ANT III. Cauda pale/dusky *Schizaphis pircicola*

29. Cauda black with 11–27 hairs. Dorsal abdomen with black bands on ABD TERG 7 and 8. Longest hair on ANT III 0.8–3.4× BD III *Aphis fabae*
 – Cauda pale or dusky with 4–8 hairs. Dorsal abdomen without dark markings. Longest hair on ANT III 0.4–0.7× BD III *Aphis gossypii*
30. Eyes multifaceted. Distal part of cauda developed as a knob 31
 – Eyes with only three facets. Cauda broadly rounded, not developed 35
31. Dorsal hairs long and spine-like. Eyes with an ocular tubercle. Anal plate either entire or with a shallow cleft (emarginate) 32
 – Dorsal hairs mostly short with pointed apices or fan- or mushroom-shaped, or if long then rod-shaped or with expanded apices. Eyes protruding, and without an ocular tubercle (triommatidium). Anal plate bilobed, with a deep cleft between the two lobes 33
32. Dorsal cuticle uniformly sclerotic, and adorned with small denticles or spinules between the hairs; intersegmental muscle sclerites not evident *Sipha glyceriae*
 – Dorsal cuticle not markedly sclerotic nor adorned with denticles; often showing dark intersegmental muscle sclerites *Sipha flava*
33. Fore and mid tibiae thickened at base, forming a smooth sclerotic ‘patella’ (clearly different from base of hind tibia). SIPH stump-shaped, conical or raised pores. ABD TERG 8 with a pair of large processes each bearing two long rod-shaped slightly capitate hairs *Saltusaphis scirpus* group
 – Fore and mid tibiae constricted at base like hind tibiae. SIPH as slightly raised pores. ABD TERG 8 without processes 34
34. ANT III 0.35–0.5× head width across (and including) eyes. Posterior margin of ABD TERG 8 very evenly rounded (semi-circular) *Thripsaphis ossiannilssoni* group
 – ANT III 0.95–1.25× head width across eyes. Posterior margin of ABD TERG 8 not very evenly rounded *Thripsaphis cyperi* group
35. Tarsi 1-segmented. SIPH present as small pigmented cones. Faceted wax glands present 36
 – Tarsi 2-segmented. SIPH absent. Anal plate enlarged and displaced dorsally. No faceted wax glands 38
36. R IV+V less than 0.15 mm, less than 1.8× HT *Tetraneura fusiformis*
 – R IV+V more than 0.15 mm long, more than 1.8× HT 37
37. Body and ANT with numerous hairs of varying size and length *Tetraneura radicolica*
 – Body and ANT hairs all short, sparse and inconspicuous *Tetraneura africana*
38. Primary rhinarium on ANT V with plain rim 39
 – Primary rhinarium on ANT V with fimbriate rim 41
39. ANT II about twice as long as ANT I, and nearly as long as ANT III. Anal plate displaced dorsally *Smynthuodes betae*
 – ANT II only a little longer than ANT I, and much shorter than ANT III. Anal plate in normal posteroventral position 40
40. Primary rhinarium on ANT BASE V very large, transversely oblong and extending around segment, 4–5× larger than primary rhinarium on ANT IV *Forda formicaria*
 – Primary rhinarium on ANT BASE V almost circular and less than 2× larger than that on ANT IV *Forda hirsuta*
41. Anal plate with numerous short hairs *Geoica utricularia*
 – Anal plate with 2 longitudinal rows of long hairs *Geoica lucifuga*

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Cyphomandra

C. betacea

Solanaceae

Aphis craccivora, *fabae*, *gossypii*, *spiraecola*,
[*Aphis* sp. (Millar, 1994)];
Brachycaudus helichrysi; *Macrosiphum euphorbiae*;
Myzus ornatus, *persicae*

Use key to polyphagous aphids, p. 1020.

Cyphostemma

C. adenocaulis

Vitaceae

Aphis gossypii

Cypripedium

Cypripedium spp.

Orchidaceae

Aphis gossypii; *Cerataphis orchidearum*;
[*Micromyzodium filicium*]; *Rhopalosiphum nymphaeae*;
Sitobion luteum

Use key to apterae of orchid-feeding aphids under *Cymbidium*.

Cyrilla see Blackman and Eastop (1994)

Cyrtanthus

Cyrtanthus sp.

Amaryllidaceae

Myzus persicae

Cyrtococcum

C. accrescens

C. trigonum

Gramineae

Pseudoregma panicola

Pseudoregma panicola

Cyrtomium

C. falcatum

Cyrtomium sp.

Dryopteridaceae

Idiopterus nephrolepidis; *Macromyzus woodwardiae*

Neomyzus circumflexus

[*Cerataphis lataniae* – Swain, 1919: 164]

Use key to fern-feeding aphids under *Polypodium*.

Cyrtopodium

Cyrtopodium sp.

Orchidaceae

Cerataphis orchidearum

Cyrtospadix see *Caladium*

Cystopteris

C. bulbifera

C. crispa

C. fragilis

C. montana

Dryopteridaceae

Macrosiphum cystopteris; *Papulaphis sleesmanni*

Taiwanomyzus alpicola

Macrosiphum dryopteridis; *Taiwanomyzus alpicola*

Amphorophora ampullata; [*Rhopalosiphoninus staphyleae*]

Use key to fern-feeding aphids under *Polypodium*.

***Cystostemon* (incl. *Vaupelia*)**

Cystostemon sp.

Boraginaceae

Aphis craccivora

Cytisus (incl. *Lembotropis*, *Sarothamnus*, *Spartocytisus*) Leguminosae

<i>C. adami</i>	<i>Aphis cytisorum</i>
<i>C. austriacus</i>	<i>Acyrtosiphon pisum</i> ; <i>Aphis cytisorum</i>
<i>C. canariensis</i>	<i>Aphis craccivora</i> , <i>gossypii</i> ; <i>Myzus persicae</i>
<i>C. capitatus</i> = <i>Chamaecytisus supinus</i>	
<i>C. hirsutus</i>	<i>Aphis cytisorum</i>
<i>C. multiflorus</i> (incl. <i>albidus</i>)	[<i>Acyrtosiphon loti</i>]; <i>Aphis cytisorum</i> ssp. <i>sarothamni</i>
<i>C. nigricans</i>	<i>Acyrtosiphon parvum</i> , <i>pisum</i> ssp. <i>spartii</i> ; <i>Aphis cytisorum</i> , <i>pseudocytisorum</i> ; <i>Ctenocallis dobrovljanskyi</i>
<i>C. nubigenus</i>	<i>Acyrtosiphon pisum</i> ; <i>Aphis craccivora</i> , <i>cytisorum</i>
<i>C. pilosus</i>	<i>Acyrtosiphon parvum</i> ; <i>Ctenocallis dobrovljanskyi</i>
<i>C. proliferus</i>	<i>Brachycaudus helichrysi</i>
<i>C. purgans</i>	<i>Aphis cytisorum</i> ssp. <i>sarothamni</i>
<i>C. rhodopeus</i> = <i>Genista lydia</i>	
<i>C. scoparius</i>	<i>Acyrtosiphon parvum</i> , <i>pisum</i> , <i>pisum</i> ssp. <i>spartii</i> ; <i>Aphis cytisorum</i> ssp. <i>sarothamni</i> ; <i>Aulacorthum solani</i> ; <i>Ctenocallis setosus</i> ; [<i>Eriosoma sparthani</i> (Boisduval – nomen dubium); <i>Myzus persicae</i> ; [<i>Trama troglodytes</i>]
<i>C. sessilifolius</i>	<i>Aphis pseudocytisorum</i> ; <i>Acyrtosiphon pisum</i>
<i>C. striatus</i>	<i>Acyrtosiphon pisum</i> ; <i>Aphis cytisorum</i>
<i>C. supinus</i>	<i>Aphis cytisorum</i> , <i>zweigelti</i>
<i>C. supranubius</i>	[<i>Acyrtosiphon supranubium</i> (= <i>parvum</i> ?)]
<i>C. vulgare</i> see <i>scoparius</i>	<i>Aphis cytisorum</i> ssp. <i>sarothamni</i> ; <i>Acyrtosiphon pisum</i> ; <i>Myzus persicae</i>
Cytisus sp.	[<i>Acyrtosiphon caraganae</i>]; [<i>Aphis genistae</i>]

Key to apterae on *Cytisus* and *Chamaecytisus*:-

1. Body with a complete segmental series of long finger-like marginal processes. Cauda knobbed **2**
– Body without long marginal processes. Cauda not knobbed **3**
2. Dorsum with a complete series of long finger-like spinal processes, like the marginal ones
Ctenocallis setosus
– Dorsum without long finger-like spinal processes *Ctenocallis dobrovljanskyi*
3. Cauda helmet-shaped, not longer than its basal width in dorsal view. SIPH smooth, short, conical, with a subapical annular incision *Brachycaudus helichrysi*
– Cauda tongue- or finger-shaped, much longer than its basal width. SIPH imbricated, tubular, without a subapical annular incision **4**
4. ANT tubercles undeveloped or weakly developed. ABD TERG 1 and 7 with marginal tubercles (MTu). SIPH dark **5**
– ANT tubercles well developed. ABD TERG 1 and 7 without MTu. SIPH pale or dark **9**
5. Dorsal abdomen without any dark reticulated sclerites. Cauda pale or dusky, usually paler than SIPH *Aphis gossypii*
– Dorsum usually with a black sclerotic shield, which under the microscope has a distinct pale reticulation that follows the reticulate sculpturing of the cuticle; sometimes this shield is reduced or fragmented

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- (especially in small specimens developing at higher temperatures), but there are usually at least some small fragments showing a reticulate pattern. SIPH and cauda both black 6
6. R IV+V more than 3× longer than its basal width, and 1.2–1.3× HT II *Aphis zweigelti*
 – R IV+V less than 3× longer than its basal width, and 0.9–1.3× HT II 7
7. SIPH 0.9–1.2(–1.3)× cauda. R IV+V 1.0–1.15× HT II. Dorsal pigmentation often reduced to small scattered sclerites *Aphis pseudocytisorum*
 – SIPH 1.2–2.2× cauda (rarely less than 1.3). R IV+V 0.9–1.3× HT II. Dorsal abdomen usually with a dark shield, rarely with scattered small sclerites except in summer dwarfs 8
8. R IV+V 0.88–1.16× HT II (mostly 0.9–1.05×). Anterior half of genital plate with 2(–3) hairs *Aphis craccivora*
 – R IV+V 0.97–1.3× HT II (mostly 1.06–1.2×). Anterior half of genital plate with 2–8 hairs (mode 4, mean 5.2) *Aphis cytisorum* (incl. ssp. *sarothamni*)
9. Head smooth with inner faces of ANT tubercles divergent 10
 – Head spiculose with inner faces of ANT tubercles steep-sided, almost parallel or apically convergent 11
10. ANT VI BASE more than 2× R IV+V. SIPH very attenuate; thinner at midlength than hind tibia at its midlength. Cauda very thick on basal half, but tapering distally almost to a point; with 8–14 hairs *Acyrtosiphon pisum* (incl. ssp. *spartii*)
 – ANT VI BASE less than 2× R IV+V. SIPH as thick as or thicker than hind tibia at their respective midlength points. Cauda rounded at apex, with 6–9 hairs *Acyrtosiphon parvum*
11. SIPH slightly clavate. ANT tubercles with inner faces apically convergent. ANT III without rhinaria *Myzus persicae*
 – SIPH not clavate; tapering or cylindrical, with a rather large flange. ANT tubercles with inner faces roughly parallel. ANT III usually with 1–2 small rhinaria near base *Aulacorthum solani*

Daboecia

D. cantabrica (incl. *polifolia*)

Ericaceae

Aphis multiflorae; *Ericaphis ericae*; [*Illinoia lambersi*]

Use key to apterae on *Erica*.

Dactylis

D. glomerata

Gramineae

[*Acyrtosiphon ignotum*]; *Anoecia corni*, *krizusi*;
Aphis craccivora; *Aploneura lentisci*; *Atheroides serrulatus*;
Aulacorthum solani; *Baizongia pistaceae*;
Carolinaia howardii; *Diuraphis mexicana*;
Forda formicaria, *marginata*, *pawlowae*, *rotunda*;
Hyalopteroides humilis; *Jacksonia papillata*;
Laingia psammae; *Melanaphis pyraria*;
Metopolophium dirhodum; *Myzus ornatus*, *persicae*;
Paraclotus cimiciformis; *Rhopalomyzus lonicerae*, *poae*;
Rhopalosiphoninus solani;
Rhopalosiphum insertum, [*musae*], *padi*;
Schizaphis graminum; *Sipha glyceriae*, *maydis*;
Sitobion avenae, *fragariae*, *miscanthi*;
[*Takecallis arundinariae*];

Tetraneura fusiformis (or *nigriabdominalis?*), *ulmi*,
yezoensis;
Utamphorophora humboldti

Use key to apterae of grass-feeding aphids under *Digitaria*.

Dactyloctenium

D. aegyptiacum

Gramineae

Aphis gossypii; *Geoica lucifuga*; *Hysteroneura setariae*;
 [*Micromyzus niger*]; *Rhopalosiphum maidis*, *padi*;
Schizaphis hypersiphonata; *Sitobion miscanthi*;
Tetraneura fusiformis

Use key to apterae of grass-feeding aphids under *Digitaria*.

Dactylorhiza

D. sambucina

Orchidaceae

Aphis solanella; *Aulacorthum solani*

Use key to apterae on orchids under *Cymbidium*.

Daemea* see *Pergularia

Daemonorops

D. geniculatus

Palmae

Astegopteryx nipae

Dahlia

D. hybrida

D. juarezi

D. pinnata

D. rosea

D. variabilis

Dahlia spp. (cult., hybrids)

Compositae

Aphis fabae; *Brachycaudus helichrysi*

Aphis fabae

Aphis fabae, *gossypii*; *Aulacorthum magnoliae*;

Macrosiphum euphorbiae; *Myzus persicae*;

Uroleucon ambrosiae

Aphis gossypii; *Neomyzus circumflexus*

Aphis solanella

Aphis craccivora, [*exsors*], *knowltoni*, *nasturtii*, *spiraecola*;

Aulacorthum solani; *Brachycaudus helichrysi*;

Macrosiphum euphorbiae;

Myzus ascalonicus, *ornatus*, *persicae*;

Neomyzus circumflexus

Key to apterae on *Dahlia*:-

- R IV+V similar in length to the black, bluntly triangular cauda. Dorsum with extensive dark sclerotic areas. ANT III and IV, or III-V, with sec. rhinaria. Longest hairs on ANT III 1.0-1.5× BD III
Aphis knowltoni
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Dalbergia

(See also Blackman and Eastop, 1994)

D. ferruginea

D. torta

Leguminosae

Anomalosiphum philippinensis

Anomalosiphum tiomanensis

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Couplet for separating apterae of these two species:–

- Paired finger-like processes on ABD TERG 7 (not incl. hairs) c.0.9× as long as processes on ABD TERG 8. R IV+V 1.40–1.44× HT II *Anomalosiphum philippensis*
- Paired finger-like processes on ABD TERG 7 (not incl. hairs) 0.6–0.75× as long as processes on ABD TERG 8. R IV+V 1.05–1.15× HT II *Anomalosiphum tiomanensis*

Dalea

D. dominguensis

Leguminosae

Aphis craccivora

Damnacanthus

D. indicus

Rubiaceae

[*Cinara paxilla*, *subapicula* (presumed vagrants from *Pinus*)];
Toxoptera aurantii, *citricidus*

Use key to polyphagous aphids, p. 1020.

Danae

D. racemosa

Ruscaceae

Myzus persicae

Danthonia

D. carphoides

D. spicata

Danthonia spp.

Gramineae

Sitobion avenae

Geoica utricularia; *Prociphilus erigeronensis*

Geoica lucifuga; *Schizaphis graminum*

Use key to apterae of grass-feeding aphids under *Digitaria*.

Daphne

D. ×burkwoodii (incl. var. ‘Somerset’)

D. cneorum (var. *eximia*)

D. gnidium

D. indica

D. involucrata

D. laureola (incl. *laurifolia*)

D. ×mantensiana

D. mezereum

D. odora

D. striata

Daphne spp.

Thymeliaceae

Macrosiphum daphnidis

Macrosiphum daphnidis, *euphorbiae*

Acyrtosiphon daphnidis, [*Acyrtosiphon* sp.
(Lampel, 2001)];

[*Siphonophora gnidii* Lichtenstein, 1884 – nomen dubium]

Macrosiphum daphnidis, *euphorbiae*

Aphis nasturtii

Aulacorthum solani;

Macrosiphum daphnidis, *euphorbiae*

Macrosiphum daphnidis

Macrosiphum daphnidis

Acyrtosiphon argus; *Aulacorthum magnoliae*

Macrosiphum daphnidis

[*Aphis kurosawai*], [*Aphis* (*Pergandeida*) spp. (BMNH
colln; China, Kashmir)]; *Myzus persicae*

Key to apterae on *Daphne*:–

1. SIPH with polygonal reticulation on distal 0.1–0.2 of length 2
- SIPH without a distal zone of polygonal reticulation 3
2. Longest hair on ABD TERG 3 is 43–71 µm, and on vertex 61–92 µm. Cauda with 10–19 hairs 3
Macrosiphum daphnidis

- Longest hair on ABD TERG 3 is 21–37µm, and on vertex 28–48µm. Cauda with 8–13 hairs
Macrosiphum euphorbiae
- 3. ANT tubercles well developed, with smooth, divergent inner faces. ABD TERG 1 and 7 without marginal tubercles (MTu). ANT III with 1–47 rhinaria 4
- **Either** ANT tubercles well developed, but with inner faces scabrous or spiculose and parallel or apically convergent, **or** ANT tubercles weakly developed, and ABD TERG 1 and 7 with MTu. ANT III with 0–2 (–4) rhinaria
go to key to polyphagous aphids, p. 1020
(but note that specimens running to *Aphis craccivora* may be one of the undescribed *Aphis* (*Pergandeida*) species collected on *Daphne* in China and Kashmir)
- 4. ANT III with 25–47 secondary rhinaria extending over most of its length. R IV+V 0.67–0.80× HT II
Acyrtosiphon argus
- ANT III with 1–4 rhinaria near base. R IV+V 0.8–0.9× HT II
Acyrtosiphon daphnidis

Darlingtonia

D. californica

Sarraceniaceae

Macrosiphum sp. near *jeanae* (California, BMNH colln, leg. D.W. Nielsen)

Dasiophora see Potentilla

Datura

D. alba

D. arborea

D. × candida

D. fastuosa

D. ferox

D. innoxia

D. metaloides

D. metel

D. sanguinea

D. stramonium

D. suaveolens (incl. var. *knightii*)

D. tatula

D. torula

Datura spp.

Solanaceae

Myzus persicae; *Neomyzus circumflexus*

Myzus persicae

Macrosiphum euphorbiae

Aphis fabae, *gossypii*; *Brachycaudus helichrysi*; [*Hyperomyzus carduellinus*]; *Myzus ornatus*, *persicae*; *Neomyzus circumflexus*; *Rhopalosiphum rufiabdominale*; *Toxoptera odinae*

Myzus persicae

Aphis gossypii

Myzus persicae

Aphis fabae, *gossypii*; [*Brachycaudus cardui*];

Myzus persicae

Myzus persicae

Aphis craccivora, *fabae*, *gossypii*;

Aulacorthum solani; [*Brachycaudus cardui*];

Macrosiphum euphorbiae; *Myzus ornatus*, *persicae*;

[*Nasonovia ribisnigri*]; *Neomyzus circumflexus*;

Rhopalosiphoninus staphyleae;

Rhopalosiphum rufiabdominale

Aulacorthum solani; *Myzus persicae*;

Neomyzus circumflexus

Aphis gossypii, *solanella*

Macrosiphum euphorbiae; *Myzus persicae*

[*Acyrtosiphon daturae* Rusanova 1942 (nomen nudum)];

Aphis spiraeicola; [*Hyalopterus pruni*]; [*Uroleucon orientale*]

HOST LISTS AND KEYS

Key to apterae on *Datura*:-

- ANT 5-segmented, bearing long hairs up to 4–5× BD III. ANT PT/BASE 4.5–5.9, with PT usually curved
Rhopalosiphum rufiabdominale
- ANT usually 6-segmented, if 5-segmented then bearing much shorter hairs and with ANT PT/BASE less than 4
go to key to polyphagous aphids, p. 1020

Daubentonia see *Sesbania*

Daucus

D. carota

D. maximus

D. muricatus

D. pusillus

D. sativus

Daucus spp.

Umbelliferae

Aphis fabae, gossypii, helianthi, middletonii, lambersi, spiraeicola; Aulacorthum solani; Cavariella aegopodii; Dysaphis apiifolia, crataegi, foeniculus, [tulipae]; Hyadaphis coriandri, [foeniculi], passerinii; [Macrosiphum stellariae]; Myzus ornatus, persicae; Pemphigus phenax; Rhopalosiphoninus latysiphon; Semiaphis dauci, heraclei

Aphis fabae, spiraeicola; Cavariella aegopodii, aspidaphoides; Hyadaphis foeniculi; Semiaphis dauci

Semiaphis dauci

Aphis fabae; Hyadaphis foeniculi

Pemphigus phenax

Cavariella pastinacae

Key to apterae on *Daucus*:-

(For an illustrated key to common aphids on *D. carota* see Blackman and Eastop, 2000.)

1. ANT PT/BASE less than 0.5. SIPH absent *Pemphigus phenax*
 - ANT PT/BASE more than 0.6. SIPH present **2**
2. ABD TERG 8 with a posteriorly projecting process above cauda **3**
 - Supracaudal process absent **5**
3. Supracaudal process very large, cowl-like, completely covering cauda in dorsal view *Cavariella aspidaphoides*
 - Supracaudal process smaller, conical or finger-like, not covering cauda in dorsal view **4**
4. ANT PT/BASE 0.64–1.25. Supracaudal process 0.75–1.05× cauda *Cavariella aegopodii*
 - ANT PT/BASE 3.0–4.0. Supracaudal process 0.15–0.33× cauda *Cavariella pastinacae*
5. SIPH very small and flangeless, only about 0.5× cauda or less, with aperture slanted towards mid-line **6**
 - SIPH at least 0.67× cauda **7**
6. Hairs very short; posterior hair on hind trochanter rarely exceeding 20µm, less than 0.5× diameter of trochantrofemoral suture *Semiaphis dauci*
 - Posterior hair on hind femur up to 60µm long, more than 0.5× diameter of the trochantrofemoral suture *Semiaphis heraclei*
7. Head spiculose. ANT tubercles well developed, their inner faces convergent or parallel-sided in dorsal view **8**
 - Head not spiculose. ANT tubercles weakly developed **11**

8. SIPH black and very strongly clavate *Rhopalosiphoninus latysiphon*
 – SIPH tapering or slightly clavate 9
9. ANT tubercles with inner faces approximately parallel in dorsal view. ANT III usually with 1–3 rhinaria near base. Siphunculi tapering and straight *Aulacorthum solani*
 – Inner faces of ANT tubercles convergent in dorsal view. ANT III without any rhinaria. Siphunculi slightly clavate, or tapering with a slight S-curve 10
10. SIPH slightly clavate. No dorsal abdominal pigmentation. ANT PT/BASE 2.8–4.5 *Myzus persicae*
 – SIPH tapering, with a slight S-curve. Dorsal abdomen with an intersegmental pattern of dark ornamentation. ANT PT/BASE 1.7–2.8 *Myzus ornatus*
11. cauda helmet-shaped in dorsal view, a little shorter than its basal width, with an angular apex. Spinal tubercles (STu) usually present, at least on head and ABD TERG 8 12
 – cauda tongue-shaped, at least as long as its basal width in dorsal view, with rounded apex. STu absent 14
12. SIPH 1.6–2.3× longer than their basal widths. Hairs on front of head long and pointed *Dysaphis foeniculus*
 – SIPH 2.5–3.0× longer than their basal widths. Hairs on front of head short and blunt 13
13. Posterior hair on hind trochanter 0.24–0.56 (rarely more than 0.5)× length of trochantrofemoral suture. Longest hair on ABD TERG 8 is 11–38µm, rarely longer than 30µm. ABD TERG 7 frequently with a pair of marginal tubercles (MTu) *Dysaphis apiifolia*
 – Posterior hair on hind trochanter 0.42–1.00 (rarely less than 0.5)× length of trochantrofemoral suture. Longest hair on ABD TERG 8 is 25–80µm, rarely shorter than 30µm. ABD TERG 7 rarely with MTu *Dysaphis crataegi*
14. SIPH shorter than or of similar length to cauda, if a little longer then clavate 15
 – SIPH tapering, usually longer than cauda 16
15. SIPH 0.88–1.20× cauda, 1.7–3.1× R IV+V and 3.1–5.1× longer than their minimum diameter on basal half *Hyadaphis passerinii*
 – SIPH 0.6–0.82× cauda, 0.9–1.6× R IV+V and 1.6–2.7× their minimum diameter on basal half *Hyadaphis coriandri*
16. Appendages short, SIPH less than 0.1× BL, shorter than R IV+V. ANT PT 1.0–1.5× R IV+V. ANT III often with 1–12 rhinaria *Aphis middletonii*
 – Appendages longer, SIPH usually 0.1–0.25× BL and longer than R IV+V. ANT PT 1.7–3.2× R IV+V. ANT III without rhinaria (except in alatiform or parasitised specimens) 17
17. Large marginal tubercles (MTu) present on ABD TERG 2–5 as well as 1 and 7. Longest femoral hairs only about half as long as trochantrofemoral suture *Aphis lambersi*
 – MTu usually only on ABD TERG 1 and 7; if any are present on ABD TERG 2–5 then the femoral hairs are as long as the trochantrofemoral suture or longer
 polyphagous *Aphis* spp.; go to key to polyphagous aphids, p. 1020, starting at couplet 24

Davallia*D. chaerophylloides**D. solida***Davalliaceae***Burundiaphis autriquei*;*Micromyzella davalliae*, *pterisoides*;*Macrosiphum walkeri*

HOST LISTS AND KEYS

Key to apterae on *Davallia*:-

1. SIPH pale, with subapical polygonal reticulation (at least 3–4 rows of closed cells) *Macrosiphum walkeri*
 – SIPH dark, without subapical polygonal reticulation **2**
2. Head, ANT I and ANT II without nodules or spinules. ANT III a little shorter than IV, with 2–5 rhinaria on distal part. ABD TERG 1–5 membranous *Burundiaphis autriquei*
 – Head, ANT I and ANT II nodulose or spinulose. ANT III longer than IV, without any rhinaria. ABD TERG 1–5 extensively sclerotised **3**
3. ANT III much paler than II. Cauda pale or dusky *Micromyzella pterisoides*
 – ANT III as dark as II. Cauda dark *Micromyzella davalliae*

(or try key to fern-feeding aphids under *Polypodium*)

Daviesia

D. divaricata

Leguminosae

Meringosiphon paradiscus (?)

Davilla

D. rugosa

Dilleniaceae

Toxoptera aurantii

Debregeasia

D. longifolia

Debregeasia sp.

Urticaceae

Neomyzus circumflexus; *Myzus debregeasiae*

Aphis fabae

Use key to apterae on *Wendlandia*.

Decaspermum

D. fruticosum

Myrtaceae

Taiwanaphis decaspermi

Decodon

D. verticillatum

Lythraceae

Myzus lythri

Deinandra* see *Hemizonia

Delphinium

D. ajacis

D. alatum

D. ×barlowi

D. confusum

D. consolida

D. cuneatum

D. denudatum

D. dictiocarpum

D. elatum

D. maackianum

D. occidentale

Ranunculaceae

Brachycaudus napelli; *Nasonovia jammuensis*

Nasonovia heiei, *salebrosa*

Delphiniobium junackianum

Brachycaudus aconiti

Brachycaudus aconiti, *napelli*

Brachycaudus aconiti

Nasonovia jammuensis

Brachycaudus aconiti

Brachycaudus aconiti; *Delphiniobium junackianum*;

Macrosiphum euphorbiae

Aphis craccivora; *Delphiniobium hanla*

Brachycaudus rociadae;

Nasonovia wahinkae, *wahinkae* ssp. *robinsoni*

<i>D. rotundifolium</i>	<i>Brachycaudus aconiti</i>
<i>D. sapellonis</i>	<i>Brachycaudus rociadae</i>
<i>D. tricorne</i>	<i>Brachycaudus rociadae</i> ; <i>Delphiniobium junackianum</i>
<i>D. trollifolium</i>	<i>Delphiniobium junackianum</i>
<i>D. vestitum</i>	<i>Nasonovia jammuensis</i>
<i>Delphinium</i> spp.	<i>Aphis fabae</i> , <i>gossypii</i> ; <i>Macrosiphum minatii</i> ; <i>Myzus persicae</i>

Key to apterae on *Delphinium*:-

1. Cauda helmet-shaped, shorter than its basal width. Dorsum usually with an extensive dark sclerotic shield (e.g., Figure 6c) 2
 - Cauda tongue-shaped, longer than its basal width. Dorsum usually without a dark shield 4
2. ANT III usually without rhinaria, and with longest hairs shorter than BD III (Figure 6a) 3
 - ANT III usually with rhinaria, and with longest hairs as long as or longer than BD III (e.g., Figure 6b) 3
3. SIPH 0.31–0.55× ANT III. ANT VI BASE 0.5–0.7× HT II. R IV+V 0.9–1.2× HT II 8
 - SIPH 0.57–1.0× ANT III. ANT VI BASE 0.8–1.1× HT II. R IV+V 1.2–1.6× HT II 8
4. SIPH with a subapical zone of polygonal reticulation (at least 4–5 rows of complete, closed cells) 5
 - SIPH without polygonal reticulation 8
5. ANT III with 1–10 rhinaria, which are not protruberant. SIPH pale. Cauda pale 6
 - ANT III with 12–65 protruberant rhinaria. SIPH wholly dark or pale basally and dark over at least distal 0.3. Cauda pale or dark 6
6. SIPH cylindrical, wholly dark. Longest hair on ANT III 1.07–1.72× BD III, and longest hair on ABD TERG 3 about 2.4–3.0× BD III. First tarsal segments with 4–4–4 hairs 7
 - SIPH usually somewhat swollen in middle, and pale basally (e.g., Figure 6i). Longest hairs on ANT III and ABD TERG 3 about 0.9–1.0× BD III. First tarsal segment with 3–3–3 hairs 7
7. SIPH 1.1–1.3× cauda and 0.15–0.19× BL, and mainly dark except at their bases. Cauda with 6–18 hairs 8
 - SIPH 1.3–1.55× cauda and 0.20–0.25× BL, and pale on basal 0.5–0.75. Cauda with 6–8 (usually 6) hairs 8
8. ANT III without rhinaria, or if present they are not strongly protruberant. Spiracular apertures on thorax similar in size to those on abdomen 9
 - ANT III with 6 or more strongly protruberant rhinaria (e.g., Figure 6d). Spiracular apertures on thorax larger than those on abdomen (Figure 6e) 9
9. Dorsal abdomen with raised, pigmented hair-bearing sclerites. SIPH 0.8–1.25× cauda 10
 - Dorsal abdomen without raised, hair-bearing sclerites; either wholly pale or with extensive sclerotisation. SIPH 2.2–3.4× cauda 12
10. Spinal sclerites on ABD TERG 1–5 each usually with a single hair (Figure 6f). R IV+V with 8–12 accessory hairs. 12
 - *Nasonovia wahinkae*

HOST LISTS AND KEYS

- Spinal sclerites on ABD TERG 1–5 mostly with 2 hairs (as in Figure 6g). R IV+V with 13–c.20 accessory hairs 11
- 11. ANT III with 14–57 rhinaria, usually scattered over most of length of segment, and 6–10 on ANT IV *Nasonovia wahinkae* ssp. *robinsoni*
- ANT III with 6–12 rhinaria, on basal part, and 0 on IV *Nasonovia salebrosa**
- 12. Dorsum extensively sclerotised and pigmented. Longest hair on ANT III only c.0.5× BD III or less. R IV+V 0.9–1.0× HT II, with 18–20 accessory hairs. SIPH 2.5–3.4× cauda, which is helmet-shaped, hardly longer than its basal width *Nasonovia heiei**
- Dorsum membranous. Longest hair on ANT III is 0.7–1.0× BD III. R IV+V 1.05–1.15× HT II, with 8–10 accessory hairs. SIPH 2.2–2.4× cauda, which is finger-like, much longer than its basal width *Nasonovia jammuensis**

Dendranthema

- D. boreale*
- D. indicum* (incl. *grandiflora*,
morifolia)
'Florists' chrysanthemum'
- D. japonense*
- D. lavandulaefolia*
- D. ornatum*
- D. yezoense*
- D. zawadskii* (incl. *latilobum*)

Dendranthema spp.

Compositae

- Coloradoa tanacetina*
- Aphis craccivora*, *fabae*, *gossypii*, *nastutii*, *parvus*,
spiraecola;
- Aulacorthum solani*;
- Brachycaudus cardui*, *helichrysi*;
- Capitophorus formosartemisiae*;
- [*Chaitophorus chrysanthemi* Hille Ris Lambers, 1932];
- Coloradoa rufomaculata*, *tanacetina*;
- Macrosiphoniella oblonga*, *sanborni*, *tanacetaria*,
yomogicola; *Macrosiphum centranthi*, *euphorbiae*;
- Myzus ascalonicus*, *ornatus*, *persicae*;
- Neomyzus circumflexus*;
- Pleotrichophorus chrysanthemi*, [glandulosus];
- [*Sitobion miscanthi* (as *Uroleucon yiliense*)];
- Tuberocephalus misakurae*;
- Uroleucon ambrosiae* group, [giganteum], *tanaceti*
- Macrosiphoniella sanborni*
- Macrosiphoniella sanborni*
- Macrosiphoniella sanborni*
- Macrosiphoniella sanborni*
- [*Aleurodaphis blumeae*]; *Brachycaudus helichrysi*;
- Macrosiphoniella absinthii*
- Macrosiphoniella yomogifoliae*;
- [*Myzus pileae*, *siegesbeckicola* (exules of *Tuberocephalus*?)];
- Uroleucon formosanus*

See under *Chrysanthemum* for a key to apterae on both *Chrysanthemum* and *Dendranthema*.

Dendriopterium see *Sanguisorba*

Dendrobium

- D. densiflorum*
- D. gracilicaule*
- D. heterocarpum*

Orchidaceae

- Sitobion luteum*
- Cerataphis orchidearum*
- Sitobion luteum*

<i>D. kingianum</i>	<i>Cerataphis orchidearum</i> ; <i>Sitobion luteum</i>
<i>D. longicornum</i>	<i>Myzus ornatus</i> ; <i>Sitobion luteum</i>
<i>D. moschatum</i>	<i>Sitobion luteum</i>
<i>D. mutabile</i>	<i>Sitobion luteum</i> , <i>orchidacearum</i>
<i>D. phalaenopsis</i>	<i>Sitobion luteum</i>
<i>D. stratiotes</i>	<i>Myzus persicae</i>
<i>D. sulphureum</i>	? <i>Micromyzus</i> sp. (New Guinea; BMNH colln, leg. J. Keesing)
<i>Dendrobium</i> spp.	<i>Neomyzus dendrobii</i>

Use key to apterae of orchid-feeding aphids under *Cymbidium*.

Dendrocalamus see Blackman and Eastop (1994)

***Dendropanax* (incl. *Gilibertia*)**

D. pellucidopunctatus
D. trifidus

Araliaceae

Cavariella gilibertiae
[*Aphis* sp. (BMNH colln, Java)];
Cavariella gilibertiae

Dendrophthoë

D. pentandra

Loranthaceae

Aphis spiraecola; *Mesothoracaphis rappardi*;
Sinomegoura citricola; *Toxoptera aurantii*;
Tuberaphis cerina

Key to apterae on *Dendrophthoë*:-

1. Eyes multifaceted. SIPH tubular. Anal plate entire go to key to polyphagous aphids, p. 1020
– Eyes of only three facets (triommatidium). SIPH pore-like. Anal plate bilobed **2**
2. Head, thorax and abdominal segment I fused to form pill box-like prosoma. ANT greatly reduced, 3-segmented, 0.07–0.09× BL *Mesothoracaphis rappardi*
– Head fused to prothorax only. ANT 5-segmented, 0.25–0.29× BL *Tuberaphis cerina*

Dendrotrophe

D. frutescens

Santalaceae

Tuberaphis sp. (BMNH colln, Hong Kong, leg. J.H. Martin)

Dentaria see *Cardamine*

Dentella

D. repens

Rubiaceae

Aphis gossypii

Deplanchea

D. formosana

Bignoniaceae

Aulacorthum solani

Deschampsia

D. ambigua
D. antarctica

Gramineae

Colopha ulmicola (as *Tetraneura graminis*)
Rhopalosiphum padi

HOST LISTS AND KEYS

<i>D. caespitosa</i>	<i>Anoecia furcata, nemoralis;</i> <i>Atheroides doncasteri, hirtellus, serrulatus;</i> <i>Colopha graminis; Forda formicaria;</i> <i>Geoica utricularia; Laingia psammae;</i> <i>Metopolophium festucae; Rhopalosiphum padi;</i> <i>Sitobion avenae, fragariae; Tetraneura longisetosa, ulmi</i>
<i>D. flexuosa</i>	<i>Anoecia furcata, nemoralis; Atheroides serrulatus;</i> <i>Chaetosiphella berlesei; Forda formicaria, marginata;</i> <i>Jacksonia papillata; Metopolophium festucae, tenerum;</i> <i>Rhopalosiphum padi;</i> <i>Schizaphis sp. near graminum (Ossiannilsson, 1959);</i> <i>Sitobion avenae, fragariae; Tetraneura longisetosa, ulmi</i> <i>Sitobion graminearum</i>
<i>Deschampsia sp.</i>	

Use key to apterae of grass-feeding aphids under *Digitaria*.

***Descurainia* (incl. *Sophia Adams nec. L.*)**

Cruciferae

<i>D. appendiculata</i>	<i>Myzus persicae</i>
<i>D. filipiae</i>	<i>Lipaphis pseudobrassicae</i>
<i>D. pinnata</i>	<i>Macrosiphum euphorbiae</i>
<i>D. sophia</i>	<i>Aphis craccivora, fabae, solanella; Brachycaudus helichrysi;</i> <i>Brevicoryne brassicae; Landisaphis davisi;</i> <i>Lipaphis erysimi;</i> <i>Aphis gossypii, middletonii</i>
<i>Descurainia spp.</i>	

Key to apterae on *Descurainia*:–

- ABD TERG 6–8 with median rugose conical processes, each bearing a pair of short (c.20µm) club-shaped hairs. SIPH distinctly clavate, with diameter of swollen part c.1.5× that of stem
Landisaphis davisi
- ABD TERG 6 and 7 without median processes, and if ABD TERG 8 has a projection then SIPH are only very weakly if at all clavate
go to key to apterae on *Brassica*

Desmanthus

Leguminosae

<i>D. virgatus</i>	<i>Aphis craccivora</i>
--------------------	-------------------------

***Desmodium* (incl. *Meibomia*)**

Leguminosae

<i>D. adscendens</i>	<i>Microparsus olivei, venezuelensis ssp. meridensis</i>
<i>D. canadense</i>	<i>Microparsus desmodiorum, variabilis</i>
<i>D. canescens</i>	<i>Microparsus desmodiorum, variabilis</i>
<i>D. canum</i>	<i>Microparsus olivei</i>
<i>D. gangeticum</i>	<i>Aphis gossypii</i>
<i>D. gyrans</i>	<i>Aphis craccivora</i>
<i>D. heterocarpon</i>	<i>Aphis craccivora</i>
<i>D. heterophyllum</i>	<i>Aphis craccivora</i>
<i>D. intortum</i>	<i>Aphis craccivora, glycines; [Brachycaudus rumexicolens];</i> <i>Sitobion africanum; [Toxoptera citricidus]</i>
<i>D. marilandicum</i>	<i>Microparsus variabilis</i>
<i>D. paniculatum</i>	<i>Microparsus desmodiorum</i>

D. perplexum
D. scorpiurus
D. sericophyllum
D. supinum
D. triflorum
D. uncinatum
D. viridiflorum
Desmodium spp.

Microparsus desmodiorum, olivei
Micromyzus olivei
Microparsus venezuelensis ssp. *meridensis*
Microparsus olivei
Toxoptera aurantii
Microparsus venezuelensis
Microparsus desmodiorum, olivei
 [*Capitophorus hippophaes, mitegoni*];
Macrosiphum euphorbiae; [*Acyrtosiphon rubi*];
 [*Sitobion rosaeiformis*]

Key to apterae on *Desmodium*:-

- | | | |
|----|--|-------------------------------|
| 1. | SIPH with a subapical zone of polygonal reticulation | 2 |
| - | SIPH without any polygonal reticulation | 3 |
| 2. | SIPH black. Dorsal abdomen with variably developed dark markings. Hairs on ANT III all less than 0.5× BD III | <i>Sitobion africanum</i> |
| - | SIPH pale. Dorsal abdomen without dark markings. Hairs on ANT III 0.6–1.0× BD III | <i>Macrosiphum euphorbiae</i> |
| 3. | ANT tubercles well developed, divergent. ANT PT/BASE more than 5. ANT III with 1–2 (–4) rhinaria. ABD TERG 1 and 7 without marginal tubercles (MTu) | 4 |
| - | ANT tubercles weakly developed. ANT PT/BASE less than 5. ANT III without rhinaria. ABD TERG 1 and 7 with MTu | 8 |
| 4. | Head densely spiculose ventrally and over inner faces of ANT tubercles. SIPH slightly swollen on distal 0.7 of length, paler at base, about 2× the dusky/dark triangular cauda (e.g., Figure 26a, b) | 5 |

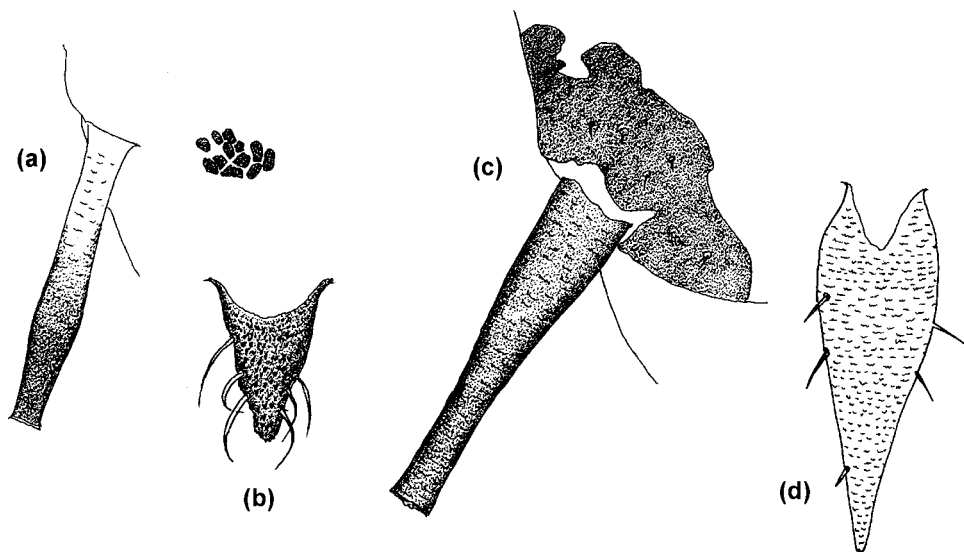


Figure 26 Apterae on *Desmodium*. (a) SIPH and adjacent intersegmental sclerite of *Microparsus venezuelensis* ssp. *meridensis*, (b) cauda of *M. venezuelensis* ssp. *meridensis*, (c) SIPH and perisiphuncular sclerite of *Microparsus olivei*, (d) cauda of *M. olivei*.

HOST LISTS AND KEYS

- Head smooth or with only a few spicules ventrally. SIPH tapering, sometimes with flared apices, usually wholly dark, similar in length to the pale cauda, which is slightly swollen on basal half and acutely pointed at apex (Figure 26d) 6
- 5. Dorsal abdomen with paired dark submarginal intersegmental sclerites (Figure 26a) *Microparsus venezuelensis* ssp. *meridensis*
- Dorsal abdomen without dark intersegmental sclerites *Microparsus venezuelensis* ssp. *venezuelensis*
- 6. Tibiae and ANT III almost wholly dark *Microparsus desmodiorum*
- Tibiae with at least middle section pale, and ANT III with paler basal section 7
- 7. Large black presiphuncular and postsiphuncular sclerites, joined to form broad rings around bases of SIPH (Figure 26c) *Microparsus olivei*
- Only small dusky presiphuncular sclerites present *Microparsus variabilis*
- 8. Stridulatory apparatus present, consisting of cuticular ridges on abdominal sternites 5 and 6 and a row of peg-like hairs on each hind tibia. Cauda with 10–28 hairs *Toxoptera aurantii*
- No stridulatory apparatus. Cauda with 2–9 hairs 9
- 9. Cauda as dark as SIPH 10
- Cauda paler than SIPH 11
- 10. Dorsal abdomen with an extensive solid black shield *Aphis craccivora*
- Dorsal abdomen without dark markings *Aphis spiraeicola*
- 11. Cauda 0.08–0.135× BL (only more than 0.12× BL in very small specimens with BL less than 1 mm), and 0.8–1.25× ANT V; pale to dusky, without a constriction, less than 3× longer than its width at midlength, and bearing 4–7 (usually 5–6) hairs *Aphis gossypii*
- Cauda 0.12–0.175× BL, and 1.05–1.7× ANT V; very pale, usually with a slight mid-way constriction, more than 3× longer than its narrowest width at midlength, and bearing 5–10 (usually 7–9) hairs *Aphis glycines*

Desmostachya

D. bipinnata

Gramineae

Hysteroneura setariae

(or use key to apterae of grass-feeding aphids under *Digitaria*)

Deutzia

D. corymbosa

D. crenata see *scabra*

D. gracilis

D. hybrida

D. kalmiaeflora

D. ×rosea

D. scabra (incl. *crenata*, *sieboldiana*)

D. vilmorinae

Deutzia spp.

Hydrangeaceae

[*Acyrtosiphon ignotum*]

Aphis craccivora, *fabae*; *Aulacorthum magnoliae*, *solani*;
Macrosiphum euphorbiae; [*Neotoxoptera abeliae*];

Rhopalosiphoninus hydrangeae

[*Aphis* spp. (Davletshina, 1964; Leonard, 1972a)]

Myzus ornatus

[*Illinoia spiraeae*]; *Macrosiphum euphorbiae*; *Myzus ornatus*

Aphis craccivora, *fabae*, *gossypii*, *spiraecola*, *utsigicola*;
[*Cryptomyzus ribis*]; [*Hyperomyzus lactucae*];

Myzus ornatus, *philadelphi*; *Nippodysaphis deutziae*;

Rhopalosiphoninus deutzifoliae

Myzus persicae

[*Aphis celastrii*]; *Rhopalosiphoninus celtifoliae*

Key to apterae on *Deutzia*:-

(Apterae of *Nippodysaphis deutziae*, *Rhopalosiphoninus celtifoliae* and *Rh. deutzifoliae* on *Deutzia* in spring are all fundatrices, all their progeny being emigrant alatae.)

1. SIPH very markedly inflated, with diameter of balloon-like swollen part 2.0–4.5× minimum diameter of basal part *Rhopalosiphoninus deutzifoliae*
- SIPH tapering, cylindrical, or moderately swollen with diameter of swollen part less than 2× minimum diameter of basal part 2
2. SIPH pale, with a subapical zone of polygonal reticulation. Head smooth, without spicules, and with well-developed ANT tubercles. ANT III with 1–10 rhinaria, and longest hairs 0.7–1.0× BD III *Macrosiphum euphorbiae*
- SIPH pale or dark, without subapical polygonal reticulation. If ANT tubercles are well developed then at least ventral side of head is spiculate. ANT III with 0–3 rhinaria; if with any rhinaria then hairs are all shorter than 0.5× BD III 3
3. Head nodulose or spiculate on at least the ventral side, and with well-developed ANT tubercles 4
- Head smooth or somewhat wrinkled, without spicules or nodules, and ANT tubercles weakly developed 9
4. R IV+V 1.4–1.6× HT II, and bearing 7–8 accessory hairs *Rhopalosiphoninus celtifoliae*
- R IV+V 0.9–1.3× HT II, and bearing 2–7 accessory hairs 5
5. SIPH strongly swollen near midlength where they are maximally c.1.5× minimum diameter nearer base, and c.3× width of flange; pale for most of length but dusky near tips (see Figure 32c). Legs mainly pale *Rhopalosiphoninus hydrangeae*
- SIPH tapering or somewhat swollen; if swollen then either legs are mainly dark, or swelling is greatest on distal 0.7, and is no more than 1.25× minimum diameter of basal part and little more than width of flange 6
6. Femora dark over at least half of length (ANT and legs usually mainly dark). SIPH somewhat swollen, pale or dark 7
- ANT and legs mainly pale. SIPH tapering or slightly swollen, pale 8
7. SIPH wholly dark. Cauda triangular, only a little longer than its basal width. ANT III without rhinaria *Myzus philadelphi*
- SIPH pale with dark apices. Cauda tongue-shaped, about 2× its basal width. ANT III with 1–3 small rhinaria near base *Aulacorthum magnoliae*
8. SIPH slightly swollen, moderately imbricated. ANT PT/BASE 2.8–4.5. Dorsal abdomen without dark intersegmental markings *Myzus persicae*
- SIPH tapering, with a slight S-curve, coarsely imbricated (squamous). ANT PT/BASE 1.7–2.8. Dorsal abdomen with paired dark intersegmental markings *Myzus ornatus*
9. Cauda triangular or helmet-shaped, shorter than its basal width. SIPH cylindrical over most of length or slightly swollen on distal part with a subapical constriction and a well-developed flange (Figure 32d). ABD TERG 1 and 7 without marginal tubercles (MTu) *Nippodysaphis deutziae*
- Cauda longer than its basal width. SIPH tapering, without a subapical constriction. ABD TERG 1 and 7 with MTu 10
10. SIPH about 2× cauda which is dark, has a midway constriction and bears c.10 hairs. Al. with secondary rhinaria distributed ANT III 8–10, IV 5–6, V 0–1 *Aphis utsigicola**
- Without this combination of characters

go to key to polyphagous aphids, p. 1020, starting at couplet 24

Dianella

D. tasmanica

Phormiaceae

Rhopalosiphum nymphaeae

Dianthus

D. alpinus

D. armeria

D. asper

D. barbatus

D. brachyanthus

D. carthusianorum

D. caryophyllus

D. chinensis

D. commutatus

D. crinitus

D. dampieri

D. deltoides

D. graniticus

D. gratianopolitanus

D. hungaricus

D. kitaibelii

D. microlepis

D. myrtinervis

D. plumarius

D. repens

D. serotinus

Dianthus spp.

Caryophyllaceae

Macrosiphum stellariae

Macrosiphum euphorbiae

Myzus certus

Aulacorthum solani;

Macrosiphum euphorbiae, [gei], *stellariae*;

Myzus certus, *persicae*

Myzus cymbalariae

Aphidura pujoli; *Aphis fabae*; *Myzus certus*

Aphidura picta, *pujoli*; *Aphis fabae*, *gossypii*;

Macrosiphum euphorbiae, *stellariae*;

Myzus [antirrhinii], *certus*, *dianthicola*, *persicae*, [polaris];

Smynthuroides betae; [Wahlgreniella *nervata*]

Aphis craccivora; [Chucallis *bambusicola*];

[Melanaphis *bambusae*]; *Myzus ascalonicus*, *certus*, *persicae*

Aphidura pujoli

Aphidura picta; *Aphis craccivora*

[Acyrtosiphon *pisum*]

Aulacorthum solani; *Macrosiphum euphorbiae*;

Myzus ascalonicus, *certus*, *ornatus*;

Rhopalosiphoninus staphyleae

Aulacorthum solani; *Myzus ascalonicus*

Myzus certus

Aulacorthum solani; *Myzus certus*

[*Volutaphis* sp. (Holman and Pintera, 1981)]

Myzus ascalonicus

Myzus cymbalariae, *persicae*

[*Anuraphis subterranea*]; *Aphis sambuci*;

Macrosiphum euphorbiae; *Myzus certus*

Aphis dianthiphaga

Macrosiphum euphorbiae; *Myzus certus*

Aphis [plantaginis], *spiraecola*; *Brachycaudus helichrysi*;

[*Cranaphis formosana*]; *Rhopalosiphum rufiabdominale*;

[*Toxoptera citricidus*]

Key to apterae on *Dianthus*:–

(See Blackman and Eastop, 2000, for an illustrated key to common aphids on pinks and carnations.)

1. ANT PT/BASE less than 1. Eyes 3-faceted. SIPH absent *Smynthuroides betae*
- ANT PT/BASE more than 1. Eyes multifaceted. Tubular SIPH present **2**
2. SIPH pale with subapical polygonal reticulation (at least 4–5 rows of closed cells). ANT tubercles with inner faces smooth and divergent. ANT III with 1–13 rhinaria, and with longest hairs 0.6–1.2× BD II **3**

- SIPH pale or dark, without polygonal reticulation. ANT tubercles if well-developed then with inner faces spiculose and steep-sided (parallel or apically convergent). ANT III with 0–3 rhinaria, if with any then longest hairs less than $0.5 \times$ BD III 4
- 3. Femora usually with a dark spot or patch near apices. ABD TERG 2–3 with longest hair 26–56 μm , usually as long as or longer than ANT BD III. Subgenital plate with 2–13 hairs in addition to those on posterior margin *Macrosiphum stellariae*
- Femora pale or only slightly dusky at apices. ABD TERG 2–3 with longest hair 21–37 μm , usually shorter than ANT BD III. Subgenital plate with 2(–4) hairs on anterior part *Macrosiphum euphorbiae*
- 4. Head not spiculose, with ANT tubercles undeveloped or weakly developed, or with median tubercle similarly developed, so that ANT tubercles do not project much beyond middle of front of head in dorsal view 5
- Head spiculose, with well-developed, steep-sided ANT tubercles 11
- 5. ANT 5-segmented, bearing long hairs up to $4–5 \times$ BD III *Rhopalosiphum rufiabdominale*
- ANT usually 6-segmented, with much shorter hairs 6
- 6. Cauda helmet-shaped. SIPH short, pale, conical, almost smooth, with a subapical annular incision below the flange. Spiracular apertures large and rounded *Brachycaudus helichrysi*
- Cauda triangular or tongue-shaped. SIPH pale or dark, imbricated, with or without some subapical transverse striae, but without a distinct subapical incision. Spiracular apertures reniform 7
- 7. SIPH slightly swollen on distal part. Mesosternum with a pair of closely-spaced rough-surfaced mammiform processes. ABD TERG 1 and 7 without MTu 8
- SIPH tapering from base to flange, with no trace of swelling. Mesosternum without mammiform processes. ABD TERG 1 and 7 with MTu 9
- 8. SIPH dark and $1.0–1.2 \times$ ANT III. R IV+V $0.94–1.25 \times$ HT II. Abdomen with a variably developed dorsal black patch, which may be fragmented or (often in small specimens) absent *Aphidura picta*
- SIPH pale and $0.65–0.95 \times$ ANT III. R IV+V $0.78–0.92 \times$ HT II. Abdomen with little or no dorsal pigmentation *Aphidura pujoli*
- 9. ABD TERG 2–4 or 2–5 as well as 1 and 7 with large flat MTu 10
- ABD TERG 2–4 without MTu, or occasionally with small papilliform Mtu
polyphagous *Aphis* spp.; go to key to polyphagous aphids, p. 1020, starting at couplet 24
- 10. SIPH $1.0–1.2 \times$ cauda, which bears 6–9 hairs *Aphis dianthiphaga**
- SIPH more than $2 \times$ cauda, which bears more than 10 hairs *Aphis sambuci*
- 11. SIPH strongly swollen on distal 0.7, with maximum diameter of swelling $1.7–2.9 \times$ minimum diameter nearer base. SIPH about as long as or longer than head width across eyes and $2.2–3.2 \times$ cauda which bears only 5 hairs. ANT III usually with 1–4 rhinaria near base *Rhopalosiphoninus staphyleae*
- SIPH tapering, cylindrical or with slight, moderate or strong swelling distally, but if strongly swollen then SIPH are relatively shorter and if at all swollen then ANT III is without rhinaria 12
- 12. SIPH tapering gradually from base to flange. ANT III usually with 1–2 small rhinaria near base *Aulacorthum solani*
- SIPH slightly to moderately swollen distally. ANT III without rhinaria 13
- 13. SIPH $0.54–0.81 \times$ ANT III 14
- SIPH $0.82–1.34 \times$ ANT III 15

HOST LISTS AND KEYS

14. Inner faces of ANT tubercles approximately parallel in dorsal view. SIPH almost smooth or weakly imbricated, with narrowest part of basal 'stem' not wider than hind tibia at midlength. Dorsal cuticle smooth or slightly wrinkled *Myzus ascalonicus*
 – Inner faces of ANT tubercles with convergent apices. SIPH heavily imbricated or scabrous, with narrowest part of stem a little wider than hind tibia at midlength. Dorsal cuticle scaly *Myzus cymbalariae*
15. R IV+V in most specimens with only one pair of lateral accessory hairs (plus 0–3 ventral accessory hairs). Value of function cauda/(ANT III×PT) in range 0.80–1.52, but rarely more than 1.25 except in small specimens (those with ANT III less than 0.32 mm) *Myzus persicae*
 – R IV+V in most specimens with two pairs of lateral accessory hairs. Value of function cauda/(ANT III×PT) in range 1.2–2.7 (rarely less than 1.25) **16**
16. ANT PT/BASE 2.1–3.7 (mostly less than 3.25). R IV+V 0.87–1.28×HT II (rarely less than 0.9×HT II), or value of function [(306×R IV+V)–(127×HT II)] is more than 17 *Myzus certus*
 – ANT PT/BASE 2.5–4.0 (mostly more than 3.25). R IV+V 0.78–0.98×HT II (rarely more than 0.9×HT II), or value of function [(306×R IV+V)–(127×HT II)] is less than 17 *Myzus dianthicola*

Diascia

D. rigescens

Scrophulariaceae

Myzus ornatus

Dicentra

D. formosa

Fumariaceae

Aulacorthum solani;

Macrosiphum euphorbiae, *Macrosiphum* sp. (BMNH colln; B.C., Oregon); *Myzus ornatus*

D. spectabilis

Aphis fabae

D. thalictrifolia

Neomyzus dicentrae

Key to apterae on *Dicentra*:-

1. SIPH and cauda dark, the latter bearing 11–24 hairs. ANT tubercles weakly developed. ABD TERG 1 and 7 with MTu *Aphis fabae*
 – SIPH and cauda pale (SIPH sometimes dark at apices); cauda with 5–12 hairs. ANT tubercles moderately to well developed. ABD TERG 1 and 7 without MTu **2**
2. Inner faces of ANT tubercles smooth and divergent. SIPH with a subapical zone of polygonal reticulation (at least 4–5 rows of closed cells). Hairs on ANT III 0.6–1.0×BD III **3**
 – Inner faces of ANT tubercles spiculate or scabrous, and steep-sided. SIPH sometimes with subapical transverse striae, but without polygonal reticulation. Hairs on ANT III less than 0.5×BD III **4**
3. R IV+V 0.6–0.8×HT II. ABD TERG 2–4 frequently bearing marginal tubercles (MTu) as large as or larger than spiracular apertures *Macrosiphum* sp. on *Dicentra* (BC, Oregon)
 – R IV+V 0.8–1.0×HT II. ABD TERG 2–4 occasionally with MTu, but these are usually very small, not much larger than hair bases *Macrosiphum euphorbiae*
4. ANT PT/BASE 1.7–2.8. SIPH coarsely imbricated, 0.17–0.22×BL *Myzus ornatus*
 – ANT PT/BASE 2.9–5.5. SIPH with normal imbrication, 0.20–0.25×BL **5**
5. Dorsum with paired dark pleural and marginal (or fused pleuromarginal) sclerites. SIPH as thick as or thicker than cauda, which bears 5 hairs. R IV+V 0.6–0.9×HT II. ANT tubercles rather low, scabrous *Neomyzus dicentrae*
 – Dorsum without dark markings. SIPH for most of length thinner than cauda which bears 7 hairs. R IV+V 1.1–1.4×HT II. ANT tubercles high and spiculate *Aulacorthum solani*

Dichaea*D. glauca***Orchidaceae***Aulacorthum solani***Dichanthium (incl. Eremopogon)***D. annulatum***Gramineae***Hysteroneura setariae*; *Myzus persicae*;
Sitobion africanum, *graminis*, *miscanthi*;
*Tetraneura fusiformis**D. bladhii**Hysteroneura setariae**D. foveolatus**Sitobion lambersi**Dichanthium* spp.*Forda hirsuta*, *riccoboni*; *Rhopalosiphum maidis*Use key to apterae of grass-feeding aphids under *Digitaria*.**Dichilus***D. villosus***Leguminosae***Aphis craccivora*, *cytisorum*

Couplet for separating these two species:–

- R IV+V 0.88–1.16× HT II, mostly 0.91–1.09. Anterior half of genital plate with 2(–3) hairs
Aphis craccivora
- R IV+V 0.97–1.3× HT II, mostly 1.05–1.2. Anterior half of genital plate with 2–8 hairs (mode 4, mean 5.2)
Aphis cytisorum

Dichondra*D. repens* var. *carolinensis***Polygonaceae***Pemphigus tartareus***Dichrocephala***D. bicolor**D. chrysanthemefolia***Compositae***Aphis gossypii*
Aphis gossypii, *nasturtii*, *spiraecola*;
Brachycaudus helichrysi; [*Hysteroneura setariae*];
Macrosiphum euphorbiae; *Myzus ornatus*, *persicae*;
Uroleucon compositae
Aulacorthum solani; *Macrosiphum euphorbiae*;
Myzus persicae
*Aphis gossypii**D. integrifolia**D. latifolia*

Use key to polyphagous aphids, p. 1020.

Dichromena see *Rhynchospora***Dichrostachys***D. cinerea***Leguminosae***Aphis gossypii***Dicksonia***Dicksonia* sp.**Dicksoniaceae***Macrosiphum walkeri***Dicliptera***D. verticillata***Acanthaceae***Aphis gossypii*

HOST LISTS AND KEYS

Dicranopteris

One aphid species, *Idiopteris nephrolepidis*, is recorded from four *Dicranopteris* spp.; *bifida*, *cordata*, *leonina* and *radicans*.

Dicranum

D. scoparium

Gleicheniaceae

Dicranaceae

[*Jacksonia papillata*]; *Muscaphis escherichi*;
Pseudacaudella rubida

Use key to apterae of moss-feeding aphids under *Polytrichum*.

Didymocarpus

D. pedicellata

Gesneriaceae

Micromyzodium filicium

Didymopanax see Schefflera

Dieffenbachia

D. amoena

D. macrophylla

D. maculata

D. magnifica

D. picta

D. rudolfi

D. seguine

Dieffenbachia spp.

Araceae

Aphis gossypii

Rhopalosiphum nymphaeae

Aphis gossypii; *Myzus ornatus*, *persicae*;

Neomyzus circumflexus

Pentalonia nigronervosa

Aphis gossypii; *Neomyzus circumflexus*

Aulacorthum solani

Pentalonia nigronervosa

Macrosiphum euphorbiae;

Rhopalosiphum rufiabdominale

Key to apterae on *Dieffenbachia*:-

1. SIPH pale on basal half and dark on distal half, and usually slightly swollen subapically. SIPH and femora covered with irregular, transverse rows of spicules. (Al. with dark-bordered wing veins, with radius and costa fused for part of lengths to form a closed cell behind the pterostigma)
Pentalonia nigronervosa
– SIPH either mainly pale or mainly dark; tapering, cylindrical, or clavate. SIPH and femora smooth or imbricated, not markedly spiculate. (Al. with normal wing venation, veins not dark-bordered) 2
2. ANT 5-segmented, with hairs up to 4–5× BD III. ANT PT/BASE 4.5–5.9, with PT usually curved
Rhopalosiphum rufiabdominale
– ANT usually 6-segmented, if 5-segmented then bearing much shorter hairs and with ANT PT/BASE less than 4 3
3. SIPH, cauda and legs all dark. SIPH somewhat swollen on distal half. R IV+V 1.2–1.8× ANT BASE VI. Dorsum with a pattern of spinules arranged in polygons, with 1 or more spinules in the center of each polygon
Rhopalosiphum nymphaeae
– cauda pale, ANT and legs at least partially pale, SIPH pale or dark. SIPH cylindrical, tapering or clavate. R IV+V 0.6–1.3× ANT BASE VI. Dorsum without a pattern of spinules arranged in polygons
go to key to polyphagous aphids, p. 1020

Diervilla

D. japonica see *Weigela japonica*

D. lonicera

Caprifoliaceae

Aphis gossypii; *Macrosiphum diervillae*

- D. lutea* [Aphis diervillalutea Rafinesque – invalid name];
[Pemphigus diani Ferrari, 1872]
D. middendoriana Rhopalosiphoninus celtifoliae

Key to apterae on *Diervilla*:-

1. ANT 1.5–1.9× BL. SIPH long and thin, more than 14× longer than their width at midlength, with a subapical zone of polygonal reticulation *Macrosiphum diervillae*
 - ANT less than 1.5× BL. SIPH shorter and thicker, less than 14× their middle width **2**
 2. R IV+V 1.4–1.6× HT II, and bearing 7–8 accessory hairs. (Al. with thick, dark clavate SIPH) *Rhopalosiphoninus celtifoliae*
 - R IV+V 1.0–1.4× HT II, with 2 accessory hairs *Aphis gossypii*
- (or try key to polyphagous aphids, p. 1020)

Digitalis

D. ambigua

Aphis armata, fabae; Aulacorthum solani;

Macrosiphum melampyri

D. grandiflora

Brachycaudus helichrysi

D. lanata

Aphis fabae, kosarovi, nerii; Brachycaudus helichrysi;

Myzus persicae

D. lutea

Aphis fabae; Aulacorthum solani; Brachycaudus helichrysi;

Myzus persicae

D. micrantha

Aphis armata

D. purpurea

Acyrtosiphon malvae; [Amphorophora rubi];

Aphis armata, fabae, kosarovi, nerii, [pilosa Walker, 1849];

Aulacorthum solani; Brachycaudus helichrysi;

Macrosiphum euphorbiae; Myzus persicae, [dycei]

Aphis gossypii; Neomyzus circumflexus

Scrophulariaceae

Digitalis spp.

Key to apterae on *Digitalis*:-

1. ANT tubercles undeveloped or weakly developed. SIPH and cauda both black, the latter bearing 9–24 hairs **2**
- ANT tubercles well developed, or if not then cauda is not black and bears 4–8 hairs **5**
2. Dorsal abdomen without any dark sclerites. ANT PT/BASE 3.4–4.1. SIPH 1.7–2.7× cauda *Aphis nerii*
- Dorsal abdomen with dark cross-bars on ABD TERG 7 and 8, and usually with other dark markings. ANT PT/BASE 1.7–3.5. SIPH 0.7–1.8× cauda **3**
3. Longest hair on ANT III 0.5–0.6× BD III. Posterior hair on hind trochanter shorter than trochantro-femoral suture *Aphis kosarovi**
- Longest hair on ANT III (0.6–)0.8–2.65× BD III. Posterior hair on hind trochanter as long as or longer than trochantrofemoral suture **4**
4. Longest hair on ANT III 1.5–2.65× BD III. R IV+V 1.04–1.25× HT II *Aphis armata*
- Longest hair on ANT III 0.6–2.2× BD III. R IV+V 0.88–1.1× HT II *Aphis fabae*
5. SIPH dark on distal part, paler towards bases, with a subapical zone of polygonal reticulation. Femora with distal 0.2 of length black. R IV+V 0.65–0.8× ANT VI BASE *Macrosiphum melampyri*
- SIPH pale or only dark at apices, with or without subapical polygonal reticulation; if with, then femora without black apices and R IV+V 0.8–1.1× ANT VI BASE go to key to polyphagous aphids, p. 1020

Digitaria (incl. *Syntherisma*, *Trichachne*)

Gramineae

<i>D. abyssinica</i>	<i>Hysteroneura setariae</i> ; <i>Kugegania ageni</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Rhopalosiphum maidis</i> , <i>padi</i> ; <i>Sitobion africanum</i> , <i>graminis</i> , <i>neusi</i>
<i>D. adscendens</i>	<i>Anoecia fulviabdominalis</i> ; <i>Geoica lucifuga</i> ; <i>Kaochiaoja arthraconis</i> ; <i>Micromyzodium spinulosum</i> ; <i>Rhopalosiphum maidis</i> , <i>padi</i> ; <i>Schizaphis graminum</i> (as <i>mehijiwae</i>), <i>hypersiphonata</i> ; <i>Sitobion akebiae</i> , <i>kamtshaticum</i> , [<i>rosaeiformis</i>]; <i>Tetraneura nigriabdominalis</i> (or <i>fusiformis</i> ?), <i>yezoensis</i>
<i>D. chinensis</i>	<i>Rhopalosiphum maidis</i>
<i>D. ciliaris</i>	<i>Aphis gossypii</i> ; <i>Schizaphis graminum</i> (as <i>mehijiwae</i>); <i>Tetraneura nigriabdominalis</i> (or <i>fusiformis</i> ?)
<i>D. corymbosa</i>	<i>Tetraneura nigriabdominalis</i> (or <i>fusiformis</i> ?)
<i>D. decumbens</i>	<i>Asiphonella dactylonii</i> ; <i>Rhopalosiphum maidis</i> ; <i>Sipha flava</i> ; <i>Tetraneura nigriabdominalis</i> (or <i>fusiformis</i> ?)
<i>D. didactyla</i>	<i>Tetraneura nigriabdominalis</i> (or <i>fusiformis</i> ?)
<i>D. ekmanii</i>	<i>Hysteroneura setariae</i>
<i>D. eriantha</i>	<i>Rhopalosiphum maidis</i>
<i>D. filiformis</i>	<i>Forda marginata</i>
<i>D. horizontalis</i> see <i>sanguinalis</i>	
<i>D. humifusa</i>	<i>Anoecia corni</i>
<i>D. insularis</i>	<i>Hysteroneura setariae</i> ; <i>Rhopalosiphum maidis</i>
<i>D. ischaemum</i>	<i>Anoecia cornicola</i> ; [<i>Tychea panici</i> Thomas – an <i>Anoecia</i> ?]
<i>D. longiflora</i>	<i>Hysteroneura setariae</i> ; <i>Toxoptera aurantii</i>
<i>D. marginata</i>	<i>Sitobion lambersi</i>
<i>D. microbachne</i>	<i>Hysteroneura setariae</i> ; <i>Rhopalosiphum maidis</i>
<i>D. paspalodes</i>	<i>Tetraneura nigriabdominalis</i>
<i>D. polybotria</i>	<i>Hysteroneura setariae</i>
<i>D. pruriens</i>	<i>Rhopalosiphum maidis</i>
<i>D. radiosa</i>	<i>Hysteroneura setariae</i>
<i>D. sanguinalis</i> (incl. <i>horizontalis</i>)	<i>Anoecia corni</i> , <i>cornicola</i> , <i>vagans</i> ; <i>Aphis craccivora</i> , <i>gossypii</i> , <i>middletonii</i> ; <i>Hysteroneura setariae</i> ; <i>Myzus ornatus</i> ; <i>Paracletus cimiciformis</i> ; <i>Rhopalosiphum maidis</i> , <i>padi</i> , <i>rufiabdominale</i> ; <i>Schizaphis graminum</i> , <i>hypersiphonata</i> ; <i>Sipha flava</i> ; <i>Sitobion africanum</i> , <i>avenae</i> , <i>graminis</i> ; <i>Tetraneura fusiformis</i> , <i>ulmi</i> , <i>yezoensis</i>
<i>D. scalarum</i>	<i>Sitobion africanum</i> , <i>neusi</i>
<i>D. smutsii</i>	<i>Rhopalosiphum maidis</i>
<i>D. timorensis</i>	<i>Sitobion lambersi</i>
<i>D. velutina</i>	<i>Hysteroneura setariae</i> ; [<i>Sitobion</i> sp. (Millar, 1994)]; <i>Tetraneura fusiformis</i>
<i>D. violascens</i>	<i>Hysteroneura setariae</i> ; <i>Sitobion akebiae</i>
<i>Digitaria</i> spp.	<i>Sitobion miscanthi</i>

Key to apterae on *Digitaria* and other genera of herbaceous Gramineae:–

More than 250 aphid species feed on grasses. Some are found only on grasses living in certain habitats, but very few are specific to a particular grass genus or species. The key is subdivided to make it less cumbersome; the main key enables direct identification of individual species and those in small genera, and also leads to a series of subsidiary keys separating species with particular morphological features. Aphids on *Miscanthus* are treated in a separate key, as there are 9 *Melanaphis* spp. that appear to be specific to that genus.

Numerous other aphid species are found on bamboos, and are treated in Blackman and Eastop (1994). For simplified, illustrated keys to the aphids most commonly found on cereal crops, and on the grasses of temperate and tropical pastures, consult Blackman and Eastop (2000).

Main key to apterae of grass-feeding aphids

1. ANT PT/BASE more than 0.4 (but if less than 0.65 then body markedly elongate) 2
 - ANT PT/BASE 0.2–0.5. Body globose, broadly oval or spindle-shaped 29
2. ABD TERG 8 with a pair of very large, densely nodulose, backwardly-directed conical processes, and with or without similar but thinner spinal and marginal processes on other tergites 3
 - ABD TERG 8 without very large paired conical processes (sometimes with a median process) 6
3. Conical processes only on ABD TERG 8. SIPH with swollen part bent towards midline, nearly at a right angle to the pedunculate basal part *Israelaphis lambersi*
 - A greater number of conical processes present, both spinal and marginal. SIPH straight 4
4. Spinal processes present on all segments from head to ABD TERG 8, and marginal processes on meso- and metathorax, ABD TERG 1–4 and 6–7 (40–42 in total) *Israelaphis ilharcoi*
 - Spinal and marginal processes usually limited to ABD TERG 5–8 or 6–8, only occasionally with small processes on more anterior tergites 5
5. ANT PT 4.6–8.2× R IV+V, which is 0.43–0.50× HT II. ANT PT/BASE 2.04–3.32 *Israelaphis carmini*
 - ANT PT 4.4–4.5× R IV+V, which is 0.50–0.53× HT II. ANT PT/BASE 2.33–2.57 *Israelaphis alistana*
6. Cauda either very broadly rounded (less than 0.5× longer than its basal width) or with a conical base and a midway constriction delimiting the apical part as a rounded knob. SIPH either stump-shaped, conical or poriform. ANT 4- or 5-segmented, often very short. Dorsal cuticle usually sclerotic, and dorsal hairs usually thick and spine-like or with expanded apices **Siphini: go to Key A**
 - Cauda triangular, helmet-shaped, lanceolate, tongue- or finger-shaped, much more than 0.5× its basal width, sometimes with a midway constriction but the apical part is not a rounded knob. SIPH tubular, flask-shaped, conical, mammariform or poriform. ANT 5- or 6-segmented, short or long. Dorsal cuticle with or without sclerotisation, dorsal hairs not thick and spine-like; blunt or pointed, or with expanded apices 7
7. SIPH mammariform, or poriform, or as very short tubes or broad-based cones, as short as or shorter than their basal widths and usually less than 0.35× cauda **go to Key B (mainly *Diuraphis* spp.)**
 - SIPH tubular; flask-shaped, conical, cylindrical or swollen, long or short but if less than 0.4× cauda, then longer than their basal widths 8
8. SIPH with a subapical zone of reticulation, comprising one or more complete rows (rings) of clearly-defined closed cells (if with only 1–3 rows then tergum sclerotic) **go to Key C (mainly *Sitobion* spp.)**
 - SIPH without any clearly-defined subapical reticulation; in some species there is some ill-defined subapical reticulation that may include 1–3 rows of almost complete cells, or interconnected transverse striae, in which cases the tergum is not sclerotic 9

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9. ANT 5-segmented with PT/BASE less than 2. SIPH slightly to distinctly clavate **10**
 – ANT 5- or 6-segmented, but if 5-segmented then PT/BASE is rarely less than 2. SIPH tapering, cylindrical or clavate **13**
10. Body markedly elongate. Front of head between ANT bases markedly convex. Dorsum with polygonal glandular facets on pigmented sclerites. ANT PT/BASE 0.6–0.8 *Pentamyzus tenuis*
 – Body oval. Front of head sinuate in dorsal view, with ANT tubercles and median frontal tubercle weakly to moderately developed. Dorsal sclerites pale and without any distinct glandular facets. ANT PT/BASE 0.7–1.9 **11**
11. ANT III 1.25–1.60× ANT IV. R IV+V 0.6–0.8× HT II, and without accessory hairs. Cauda tapering, c.2× its basal width in dorsal view *Pentamyzus graminis*
 – ANT III 1.8–2.6× ANT IV. R IV+V 0.8–1.2× HT II, and bearing (1–)2–6 accessory hairs. Cauda thick, parallel-sided basally and convex-sided distally, about 1.5× its basal width in dorsal view **12**
12. ANT PT/BASE 1.5–1.9. R IV+V less than 1.5× its basal width, 0.5–0.8× ANT PT. SIPH markedly clavate, with maximum width of swollen part c.2× width at flange *Pentamyzus falklandicus*
 – ANT PT/BASE 0.69–1.48. R IV+V 1.9–2.5× its basal width, 1.0–1.33× ANT PT. SIPH less strongly clavate, maximum width of swelling less than 1.5× width at flange *Pentamyzus fueginus*
13. Head densely spiculate or nodulose, or with rows of small spicules, either both dorsally and ventrally, or at least ventrally **go to Key D**
 – Head cuticle smooth or rugose, without spicules or nodules, or with only very few spicules on ventral surface, not forming rows **14**
14. Dorsal hairs very long with expanded apices, and arising from tuberculate bases. Tergum sclerotic and dark-pigmented **15**
 – Dorsal hairs if long then with pointed apices and without tuberculate bases. Tergum membranous or sclerotic **16**
15. Hairs on ANT III 1.6–2.1× BD III. R IV+V 1.1–1.3× HT II, and 0.85–0.95× ANT BASE VI *Cryptaphis bromi*
 – Hairs on ANT III shorter and more variable in length, 0.3–1.3× BD III. R IV+V 0.9–1.1× HT II and 0.55–0.65× ANT BASE VI *Cryptaphis poae*
16. SIPH clavate, i.e. with swollen distal part and narrower basal part **17**
 – SIPH tapering or cylindrical, or somewhat swollen proximal to a subapical constriction, but without any narrowing of basal part **25**
17. ABD TERG 8 with a bluntly conical very rugose medial process (Figure 35b). ANT PT/BASE 0.7–1.3. SIPH flangeless, rounded at apex, with a small terminal aperture (Figure 35a). Dorsal cuticle very rugose *Cavariella aquatica*
 – No medial process on ABD TERG 8. ANT PT/BASE more than 1.3. SIPH with a flange and large terminal aperture. Dorsal cuticle smooth, spiculate or rugose **18**
18. Dorsal cuticle with a pattern of spicules arranged in polygons, each polygon surrounding one or two additional spicules. R IV+V 1.0–1.5× HT II *Rhopalosiphum nymphaeae*
 – Dorsal cuticle without spicules, smooth or wrinkled. R IV+V 0.6–1.0× HT II **19**
19. SIPH smooth and swollen on distal half to 1.5–1.9× their minimum width basad. R IV+V 0.6–0.7× HT II. Head with smooth divergent ANT tubercles. (Al. with sec. rhin. distributed III 35–65, IV 16–28, V 0–5) *Rhopalomyzus loniceriae*

- SIPH swollen to 1.2–1.6× their minimum width basad (if swollen to more than 1.4× minimum width then R IV+V 0.8–1.0× HT II). ANT tubercles variably developed, smooth or somewhat scabrous. (Al. with sec. rhin. distributed III 4–29, IV 0–5, V 0) **20**
- 20.** ANT III usually with 1–3 rhinaria on slight swelling near base. Head usually with some spicules posteroventrally. ANT tubercles rather well developed, steep-sided, somewhat scabrous **21**
- ANT III without rhinaria. Head without spicules. ANT tubercles variably developed **22**
- 21.** ANT PT/BASE 3.1–3.5. R IV+V 0.67–0.70× HT II. Tergum coarsely corrugated. (Al. with sec. rhin. distributed III 4–9, V 0–1) *Utamphorophora vabei*
- ANT PT/BASE 3.5–5.5. R IV+V 0.78–0.88× HT II. Tergum not coarsely corrugated. (Al. with sec. rhin. distributed III 15–29, IV 0–5) *Utamphorophora humboldti*
- 22.** ANT tubercles rather well developed, projecting beyond middle of front of head in dorsal view. ANT PT/BASE 5.0–7.5 (Al. with 8–27 sec. rhin. on ANT III) *Utamphorophora bromicola*
- ANT tubercles very weakly developed, not projecting beyond middle of front of head in dorsal view. ANT PT/BASE 0.9–5.0 (Al. with 4–12 sec. rhin. on ANT III) **23**
- 23.** ANT 1.1–1.3× BL. SIPH 0.26–0.29× BL. ANT PT/BASE 4–5. RV+V heart-shaped *Carolinaia howardii*
- ANT shorter than BL. SIPH less than 0.25× BL. ANT PT/BASE less than 4. R IV+V not heart-shaped **24**
- 24.** Dorsal abdomen dark. Tibiae pale. SIPH 1.4–1.8× cauda. ANT PT 1.15–1.75× ANT III *Carolinaia setariae*
- Dorsal abdomen pale. Tibiae dark. SIPH 2.0–2.5× cauda. ANT PT 0.90–1.17× ANT III *Carolinaia rhois*
- 25.** Cauda helmet-shaped, somewhat constricted at base, not longer than its basal width, with 4–6 hairs. SIPH short, pale, smooth, conical, with an annular incision proximal to the well-developed flange. Spiracular apertures large and rounded. ANT tubercles undeveloped *Brachycaudus helichrysi*
- Cauda tongue- or finger-shaped or bluntly triangular, with 4–24 hairs. SIPH various, usually imbricated. Spiracular apertures not large and rounded. ANT tubercles variably developed **26**
- 26.** SIPH very small, thin and almost flangeless, 0.3–0.55× cauda (if more than 0.4× cauda then 2–3× longer than their basal widths) **27**
- SIPH 0.5–2.5× cauda (if less than 0.55× cauda then less than 2× longer than their basal widths) **28**
- 27.** ANT III with 1–7 rhinaria. SIPH and cauda pale, SIPH broad-based. Cauda with 5–12 hairs. ABD TERG 1 and 7 without marginal tubercles (MTu) *Hyalopteroides humilis*
- ANT III without rhinaria. SIPH (at least distally) and cauda dusky/dark. SIPH not broad-based. Cauda with 5–6 hairs. ABD TERG 1 and 7 always with (small) Mtu *Hyalopterus pruni* (or *amygdali*)
- 28.** ANT tubercles moderately to well developed, with inner faces divergent; sometimes low, but always better developed than (more than twice as high as) middle part of front of head or median frontal tubercle, so that there is a frontal sinus. SIPH uniformly pale or dusky or becoming darker towards apices cauda pale/dusky. ABD TERG 1 and 7 without marginal tubercles (MTu)
- go to Key E (mainly *Metopolophium* spp.)**
- ANT tubercles weakly developed or, if rather well developed then widely separated and with middle part of front of head convex, or with median frontal tubercle projecting to a similar extent. SIPH sometimes pale but more often entirely dark or with dark apices, cauda pale or dark. ABD TERG 1 and 7 almost always with MTu (in some species these are very small, and they are absent in 2 spp.)
- go to Key F (mostly *Melanaphis*, *Rhopalosiphum* and *Schizaphis* spp.)**

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29. Front of head with a pair of short conical horns between ANT bases. Head and prothorax fused **30**
 – Front of head without horns. Head and prothorax not fused **37**
30. Sclerotised areas of cuticle warty, with especially warty areas at posterior margin of prothorax. SIPH pores slightly raised on dusky or dark-pigmented cones, with a few surrounding hairs **31**
 – Sclerotised areas of cuticle smooth or wrinkled, not warty. SIPH pores not placed on raised cones and without any surrounding hairs **32**
31. Body oval. Horns broadly rounded at apices. Spinal and marginal wax glands often present on all or most tergites *Pseudoregma panicola*
 – Body elongate oval. Horns not broadly rounded at apices. Wax glands usually only present on ABD TERG 6–8 *Pseudoregma alexandrae*
32. Meso- and metathorax and ABD TERG 1–7 with paired or single groups of spinal wax glands as well as marginal ones *Ceratovacuna perglandulosa*
 – Thorax and ABD TERG 1–7 without spinal wax glands, only marginal ones **33**
33. ANT 4-segmented (but this based on only 3 specimens) with distinctly spinulose imbrication extending over whole of ANT III and IV. ABD TERG 8 with a group of c.12 wax glands *Ceratovacuna spinulosa**
 – ANT 4- or 5-segmented, with ANT III very weakly imbricated and with at most a few minute spinules on the imbrication of distal part of ANT III (if 4-segmented) or on IV (if 5-segmented). ABD TERG 8 with a group of 5–40 wax glands **34**
34. ABD TERG 1–3 each with 8–19 spinopleural hairs. ANT entirely dusky/dark *Ceratovacuna graminum*
 – ABD TERG 1–3 each with 3–8 spinopleural hairs. ANT pale, or darker only distally **35**
35. Head with longest anterior dorsal hairs 55–81 µm long, usually as long as or longer than frontal horns which are 48–68 µm long. ABD TERG 8 with a group of 5–20 wax glands. Each lobe of anal plate with 6–8(–9) hairs *Ceratovacuna panici*
 – Head with longest anterior dorsal hairs 46–71 µm long, often shorter than frontal horns which are 55–136 µm long. ABD TERG 8 with a group of 15–40 wax glands. Each lobe of anal plate with (8–)9–12 hairs **36**
36. Frontal horns symmetrical, straight-sided, 55–100 µm long, broad-based, 1.5–2.2× their basal widths *Ceratovacuna lanigera*
 – Frontal horns with apices somewhat curved distally, 96–140 µm long, slightly constricted at base and 2.5–3.5× their basal widths *Ceratovacuna nekoashi*
37. SIPH present as pores placed on shallow cones which are pigmented and/or surrounded by hairs **Key G (*Anoecia* and *Tetraneura*)**
 – SIPH either completely absent or (rarely) as very small pores, not placed on cones **Key H (*Colopha*, *Pemphigini* and *Fordini*)**

Key A – Apteræ of Siphini on grasses

1. Cauda with a conical base and a rounded, knobbed apex **2**
 – Cauda broadly rounded **5**
2. ANT PT/BASE 1.8–2.6 *Sipha flava*
 – ANT PT/BASE 0.65–1.3 **3**

3. Dorsal cuticle smooth, without denticles *Sipha agropyronensis*
 – Dorsal cuticle with a densely denticulate ornamentation 4
4. Dorsal cuticle with small pointed denticles between bases of long spine-like hairs, which on ABD TERG 3 are more than 45 µm long. Hairs on ANT III usually longer than (0.6–1.8×) BD III *Sipha glyceriae*
 – Dorsal cuticle with very dense, blunt denticles, and hairs on ABD TERG 3 less than 40 µm long. Hairs on ANT III usually shorter than (0.4–1.0×) BD III *Sipha littoralis*
5. R IV+V stiletto-shaped with attenuated R V, 0.9–2.0× HT II 6
 – R IV+V short, not stiletto-shaped, without attenuated R V, 0.6–1.0× HT II 9
6. Hind tibia 4.7–5.5× R IV+V, which is 0.9–1.1× HT II. ANT PT 0.90–1.15× R IV
Chaetosiphella sp. on *Stipa* (BMNH: France, Yugoslavia)
 – Hind tibia 1.5–3.3× R IV+V, which is 1.3–2.0× HT II. ANT PT 0.30–0.65× R IV 7
7. R IV+V 15–20× longer than hairs on ABD TERG 3, which are fan-shaped. Hind tibia 1.5–1.7× R IV+V
Chaetosiphella tshernavini
 – R IV+V 1.1–5.0× longer than hairs on ABD TERG 3, which have pointed or expanded apices. Hind tibia 2.3–3.3× R IV+V 8
8. R IV+V 1.1–1.7× longer than longest hairs on ABD TERG 3, which are all spine-like, with pointed apices
Chaetosiphella berleseii
 – R IV+V 2.5–5.0× longer than longest hairs on ABD TERG 3, which are mostly very thick with blunt, bifurcate or serrate apices
Chaetosiphella stipae
9. Body very elongate, more than 2.5× longer than its maximum width. SIPH poriform 10
 – Body elongate oval, oval or pear-shaped, less than 2.5× longer than its maximum width. SIPH as small shallow pigmented cones 15
10. SIPH as slightly raised pores with sclerotic rims, of diameter greater than hind tibia at midlength, and placed on ABD TERG 6
Laingia psammae
 – SIPH pores of diameter less than midlength diameter of hind tibia, and placed on ABD TERG 5 11
11. Dorsal hairs very short, rod- or club-shaped, less than 0.5× ANT BASE V (or IV). Longer hairs only present on front of head and ABD TERG 8 12
 – Dorsal hairs of various lengths, the longest with pointed apices and as long as or longer than ANT BASE V (or IV), the shorter hairs with pointed, blunt, furcate or serrate apices 13
12. ANT 5-segmented, 0.20–0.25× BL, with PT/BASE 0.75–1.2. Dorsal hairs mostly rod-shaped, with serrate apices
Atheroides serrulatus
 – ANT usually 4-segmented, 0.14–0.17× BL, with PT/BASE c.0.5. Dorsal hairs flabellate or club-shaped, with rounded or serrate apices
Atheroides brevicornis
13. Tergum black. All dorsal hairs, both long and short, with pointed apices. ANT 0.26–0.29× BL
Atheroides hirtellus
 – Tergum pale or dark, but not black. Some or all of shorter dorsal hairs with blunt or expanded apices. ANT 0.20–0.23× BL 14
14. ABD TERG 8 with 14–18 long, mostly pointed hairs on posterior and lateral margins, and 12–24 shorter hairs more anteriorly with pointed, bifurcate or expanded apices
Atheroides karakumi
 – ABD TERG 8 with only the 14–18 long, pointed hairs on posterior and lateral margins
Atheroides doncasteri
15. Dorsum with a solid black shield encompassing ABD TERG 2–7, and broad black cross-bands on other tergites
Sipha maydis
 – Dorsum pale or dark or with dark markings, but no solid black shield 16

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16. ANT PT/BASE 1.0–1.22. R IV+V 0.95–1.17× HT II *Sipha burakowskii*
 – ANT PT/BASE 1.25–2.30. R IV+V 0.50–0.75× HT II (?*uvarovi*) 17
17. ANT PT/BASE 1.25–1.45 18
 – ANT PT/BASE 1.48–2.30 19
18. Body less than 2× longer than its maximum width. ANT IV 0.7–0.8×ANT V BASE *Sipha uvarovi**
 – Body more than 2× longer than its maximum width. ANT IV 0.8–1.0×ANT V BASE *Sipha taurica*
19. R IV+V 0.65–0.73× HT II *Sipha arenarii*
 – R IV+V 0.50–0.62× HT II *Sipha elegans* (incl. *S. aegilopsis*; see text)

Key B – Apterae on grasses with poriform or extremely short SIPH (mainly *Diuraphis*)

1. SIPH as small pores with partly sclerotised rims, sometimes surrounded by pigmented sclerite, but hardly raised above the body surface 2
 – SIPH short, conical or mammariform, usually pigmented, often very small, but with pore distinctly raised above body surface 7
2. ABD TERG 8 with a large rugose bluntly conical process, broader based than and partly covering cauda *Aspidaphis porosiphon*
 – ABD TERG 8 without any medial process 3
3. ANT tubercles bearing long forwardly-directed finger-like processes. Cauda long, lanceolate, with 21–27 hairs *Davatchiaphis persica*
 – ANT tubercles without finger-like processes. Cauda triangular, elongate triangular or tongue-shaped and bearing 6–9 hairs 4
4. ANT 0.17–0.20× BL. Cauda about as long as its basal width, with 6–8 hairs on narrower apical part. ANT 5-segmented *Mordvilkoella skorkini**
 – ANT 0.25–0.35× BL. Cauda elongate triangular or tongue-shaped, distinctly longer than its basal width, without narrower apical part, bearing 6–9 hairs. ANT 5- or 6-segmented 5
5. ANT 5-segmented. R IV+V c.1.1× HT II *Mordvilkoella jacutensis**
 – ANT usually 6-segmented. R IV+V 0.5–0.75× HT II 6
6. ANT PT/BASE 1.2–1.7 (In al. ANT PT/BASE 1.6–1.7) *Diuraphis agrostidis*
 – ANT PT/BASE 1.0–1.2. (In al. ANT PT/BASE 1.25–1.45) *Diuraphis bromicola*
7. Tibial hairs long and finely pointed, the longest more than 1.5× width of tibia at midlength. ABD TERG 1 and 7, or 1–4 and 7, with marginal tubercles (MTu) 8
 – Tibial hairs short not longer than width of tibia at midlength. ABD TERG 1 and 7 without MTu 10
8. ABD TERG 1–5 each with 1–2 marginal hairs *Melanaphis montana* or *tateyamaensis*
 – ABD TERG 1–5 each with 3–7 marginal hairs 9
9. Head with 8–10 ventral hairs on each side. ABD TERG 7 with 4 hairs, ABD TERG 8 with 2 hairs *Melanaphis jamatonica*
 – Head with 5–7 ventral hairs on each side. ABD TERG 7 with 6–8 hairs, ABD TERG 8 with 4–6 hairs *Melanaphis japonica*
10. Cauda long, black and finger-like with a midway constriction, and bearing 12–19 hairs. SIPH as short black broad-based cones, with a distinct apical rim around a large terminal pore *Brachysiphoniella montana*

- Cauda tongue-shaped or conical, unconstricted, bearing 4–9 hairs. SIPH mammariform or conical with rim rather indistinct and a small pore 11
- 11. ABD TERG with a medial finger-like or conical process. ABD TERG 3–5 (sometimes also 2 and 6) with small marginal tubercles (MTu) 12
- ABD TERG 8 without a medial process. ABD TERG 2–6 usually without MTu (except *calamagrostis*) 14
- 12. Process on ABD TERG 8 is 0.5–0.75× cauda. ANT PT/BASE 1.5–2.6 *Diuraphis noxia*
- Process on ABD TERG 8 is 0.25–0.33× cauda. ANT PT/BASE 0.9–1.65 13
- 13. Process on ABD TERG 8 broadly triangular. ANT PT/BASE 0.9–1.25 *Diuraphis mexicana*
- Process on ABD TERG 8 finger-like; sometimes broader at base, but with distal part almost parallel-sided. ANT PT/BASE 1.2–1.65 (except down to 1.0 in summer dwarfs) *Diuraphis muehlei*
- 14. R IV+V 0.9–1.15× HT II *Diuraphis tritici*
- R IV+V 0.5–0.75× HT II 15
- 15. SIPH placed equidistantly from spiracles on abdominal segments 6 and 7. ANT PT/BASE 1.05–1.5 *Diuraphis frequens*
- SIPH placed distinctly closer to spiracle on abdominal segment 6 than to that on 7. ANT PT/BASE 1.3–1.9 16
- 16. Longest hairs on ANT III less than 10µm, 0.4–0.7× BD III. MTu usually absent *Diuraphis holci* (and *elymophila*)
- Longest hairs on ANT III more than 10µm, 0.7–1.0× BD III. Small rounded MTu usually present on some or all of ABD TERG 2–5 *Diuraphis calamagrostis*

Key C – Apteræ with reticulate SIPH on grasses (mainly *Sitobion*)

This key includes 20 *Sitobion* spp., 3 *Pseudaphis* spp., *Micromyzodium spinulosum*, *Macrosiphum euphorbiae* and *Rhopalosiphoninus indicus*, but excludes the species of *Sitobion* subgenus *Metobion*, which are included with *Metopolophium* in Key D. *S. rosaeiformis* could not be included because apt. from grasses have not been described.

- 1. SIPH flask-shaped, dark, 3.2–3.8× cauda, with the inflated part maximally 2.8–3.5× wider than the stem *Rhopalosiphoninus indicus*
- SIPH not flask-shaped, pale or dark, 0.8–3.0× cauda 2
- 2. Front of head between ANT bases convex or almost straight in dorsal view, lacking ANT tubercles. SIPH 0.80–1.24× cauda and 0.08–0.13× BL 3
- ANT tubercles at least slightly developed. SIPH 1.1–3.0× cauda, 0.12–0.35× BL 5
- 3. SIPH 1.00–1.24× cauda, and 1.55–2.23× R IV+V, which bears 5–8 accessory hairs *Pseudaphis abyssinica*
- SIPH 0.80–1.00× cauda, and 1.26–1.71× R IV+V, which bears 4–6 accessory hairs 4
- 4. BL 1.06–1.55 mm, and SIPH 0.12–0.15 mm. ABD TERG 1–4 with paired dark patches and ABD TERG 5–8 with short dark bars, usually not extending laterally to link with marginal sclerites *Pseudaphis sijui*
- BL 1.70–2.20 mm, SIPH 0.17–0.21 mm. ABD TERG 1–8 usually with broad dark cross-bands extending laterally to include marginal sclerites, often narrowly separated in midline on ABD TERG 1–4 *Pseudaphis arabica*

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5. Head densely spinulose both dorsally and ventrally. Femora also densely spinulose. R IV+V 1.5–1.9× HT II. SIPH dark, 2.5–3.0× cauda *Micromyzodium spinulosum*
 – Head smooth dorsally, smooth or spinulose ventrally. Femora at most sparsely spinulose. R IV+V 0.6–1.4× HT II. SIPH pale or dark, 1.1–2.7× cauda **6**
6. Dorsal cuticle of thorax and abdomen densely ornamented with minute spicules, and unreticulated proximal parts of SIPH ornamented with small nodules *Sitobion microspinulosum*
 – Dorsal cuticle without spicules, and proximal parts of SIPH normally imbricated (often with spinules on the imbrication) **7**
7. SIPH 0.12–0.17× BL. ANT PT/BASE 3.0–4.3. Abdomen with a rather solid dusky/dark patch extending across ABD TERG 1–6 and linked with or including marginal sclerites *Sitobion pauliani*
 – SIPH 0.18–0.35× BL. ANT PT/BASE 2.5–9.2. Abdomen with or without dark sclerotisation but this is either ill-defined or segmentally divided or not linked with marginal sclerites **8**
8. Cauda dark, almost as dark as the black SIPH *Sitobion graminis*
 – Cauda pale or dusky, SIPH pale or dark, but if black then cauda is distinctly paler **9**
9. Cauda with only 2 long lateral hairs, plus 1–4 subapical hairs that are much shorter and blunter. Longest hairs on ANT III 7–12 µm *Sitobion lambersi*
 – Cauda with at least 4 long pointed hairs. Longest hairs on ANT III 7–40 µm **10**
10. Head and ABD TERG (5–)6–8 with spinal tubercles (STu). Marginal tubercles (MTu) also consistently present on ABD TERG 1–5 (sometimes also on 7) *Sitobion papillatum*
 – Head without STu and ABD TERG 7–8 rarely with STu. MTu present or absent **11**
11. ANT PT/BASE 2.5–6.2. R IV+V 0.65–0.95× HT II **12**
 – ANT PT/BASE 6.0–9.2, but if 6.0–6.2 then R IV+V is longer than HT II **22**
12. ANT tubercles very well developed, median frontal tubercle undeveloped. Longest hairs on ANT III 0.6–1.0× BD III. ABD TERG 8 with 5–8 hairs *Macrosiphum euphorbiae*
 – ANT tubercles rather weakly developed, and median frontal tubercle often evident. Longest hairs on ANT III 0.3–0.8× BD III. ABD TERG 8 with 3–6 (usually 4) hairs **13**
13. R IV+V with 2–4, or rarely 5, accessory hairs. SIPH commonly with basal part pale **14**
 – R IV+V with 6, rarely 5 or 7, accessory hairs. SIPH mostly uniformly dark, sometimes paler basally **17**
14. BL 3.7–4.3 mm. Cauda with 10–12 rather short hairs. ANT III with 3–9 rhinaria *Sitobion himalayensis**
 – BL 1.4–3.3 mm. Cauda with 6–9 hairs with at least the more basal ones quite long. ANT III with 0–4 rhinaria **15**
15. Cauda with 4 long basal and 3 short blunt distal hairs. Hairs on ABD TERG 8 only 10–16 µm long. SIPH mainly dark, often paler towards base *Sitobion yakini*
 – Cauda with all hairs pointed, the more distal ones only a little shorter than those more basal. Hairs on ABD TERG 8 are 20–43 µm long. SIPH mainly pale, darker towards apex **16**
16. SIPH 1.75–2.0× cauda, which has a rounded apex. ABD TERG 2–5 usually without marginal tubercles (MTu) *Sitobion pseudoalupecuri*
 – SIPH 1.1–1.6× cauda, which has a rather tapered apex. ABD TERG 2–5 usually with hemispherical MTu *Sitobion alopecuri*
17. SIPH 1.0–1.4× cauda (measure several specimens if borderline) **18**
 – SIPH 1.4–2.7× cauda (measure several specimens if borderline) **19**

18. R IV+V $0.80\text{--}0.95\times$ HT II. SIPH usually paler towards base, reticulated on distal $0.15\text{--}0.17$ of length. Hairs on ABD TERG 8 are $40\text{--}55\mu\text{m}$ long. ABD TERG 1–4 with variably-developed paired dusky/dark patches
Sitobion bamendae
- R IV+V $0.65\text{--}0.82\times$ HT II. SIPH uniformly dark and reticulated on distal $0.19\text{--}0.35$ of length. Hairs on ABD TERG 8 are $25\text{--}42\mu\text{m}$ long. Dorsal abdomen pale or dusky, without paired dusky/dark patches
Sitobion avenae
19. SIPH $1.8\text{--}2.7\times$ cauda and $0.95\text{--}1.30\times$ ANT III (measure several specimens if borderline)
Sitobion fragariae
- SIPH $1.4\text{--}1.9\times$ cauda and $0.75\text{--}1.05\times$ ANT III (measure several specimens if borderline) **20**
20. SIPH reticulated over distal $0.15\text{--}0.40$ of length. Longest hairs on ANT III $0.45\text{--}0.8\times$ BD III. Dorsal abdomen sclerotic but with any pigmentation rather ill defined. ABD TERG 2–5 with 0–8 marginal tubercles (MTu) in total, but mostly (67%) with 2–6
Sitobion miscanthi/akebiae group
- SIPH reticulated over $0.10\text{--}0.18$ of length. Longest hairs on ANT III $0.25\text{--}0.6\times$ BD III. Dorsal abdomen often with variably-developed pattern of clearly delimited dark sclerites, as segmentally-divided transverse bands or an irregular central patch. MTu either absent, mostly confined to ABD TERG 5, or more numerous (totalling 5–8) **21**
21. Longest hairs on ANT III $8\text{--}20\mu\text{m}$, longest posterior dorsal cephalic hairs $8\text{--}30\mu\text{m}$, longest hairs on ABD TERG 8 $17\text{--}45\mu\text{m}$. Dorsal abdomen with variably developed dark dorsal cross-bands not fused across tergites. ABD TERG 2–5 with only 0–3 MTu in total, mostly absent, or present only on ABD TERG 5
Sitobion africanum
- Longest hairs on ANT III $16\text{--}23\mu\text{m}$, longest posterior dorsal cephalic hairs $26\text{--}32\mu\text{m}$, longest hairs on ABD TERG 8 $40\text{--}50\mu\text{m}$. Dorsal abdomen with a variably developed dark central patch not or only partially divided between tergites. ABD TERG 2–5 with 5–8 MTu in total
Sitobion matatum
22. Longest hairs on ANT III more than $0.6\times$ BD III. Primary rhinarium on ANT V large, occupying almost entire width of segment. ANT III with 5–8 rhinaria. SIPH black, and tergum usually extensively pigmented, with pigmentation often encompassing marginal sclerites
Sitobion yasumatsui
- Longest hairs on ANT III $0.2\text{--}0.5\times$ BD III. Primary rhinarium on ANT V small, occupying less than half width of segment. ANT III with 0–7 rhinaria. SIPH pale or dark, if black then tergum not so extensively pigmented **23**
23. SIPH pale except towards apices. ANT III–V mainly pale with dark articulations.
Sitobion leelamaniae (incl. *chanikiwiti*, *howlandae*)
- SIPH entirely dark, or paler only at base. ANT III–V with at least V uniformly dark **24**
24. Anterior part of head and ANT including I and II entirely dark. Distal $0.4\text{--}0.5$ of hind femora dark
Sitobion kamtshaticum
- Anterior part of head and at least ANT I and II pale/dusky. Femora pale **25**
25. Abdominal tergum with a variably developed dark central patch, sometimes fragmented or absent. ANT PT/BASE 7–8
Sitobion neusi
- Abdominal tergum pale. ANT PT/BASE $6.2\text{--}6.7$
*Sitobion raoi**

Key D – Apterae of grass-feeding aphids with spinulose heads

This key includes all the grass-feeding aphids with spinulose heads, except those with reticulate SIPH that were taken out in Key B (*Pseudaphis* spp., *Micromyzodium spinulosum* and *Rhopalosiphoninus indicus*). Among these are 5 very polyphagous species (*Aulacorthum solani*, *Myzus ascalonicus*, *M. ornatus*, *M. persicae* and *Neomyzus circumflexus*) that are occasionally found on grasses.

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1. Head extended forward between ANT bases with three large separate processes, each bearing spine-like hairs. SIPH very large, thick and warty, constricted subapically. ANT PT/BASE 1.37–1.80
Vesiculaphis theobaldi
 - Head not produced anteriorly. SIPH various, ANT PT/BASE more than 1.8 **2**
 2. Head entirely lacking ANT tubercles, almost flat between ANT bases. Cauda short and rounded, about as long as its basal width in dorsal view **3**
 - Head with ANT tubercles developed. Cauda helmet-shaped, tongue- or finger shaped, usually longer than its basal width in dorsal view **4**
 3. ANT 5-segmented. R IV+V 1.8–2.2× HT II *Hallaphis rhodesiensis*
 - ANT normally 6-segmented, sometimes 5-segmented. R IV+V 1.1–1.3× HT II *Hallaphis ilharcoi*
- (Note: Apt with 5-segmented ANT and R IV+V 1.2–1.5× HT II may be one of two other *Hallaphis* spp. only known from trapped al.)
4. Tergum with extensive dark sclerotised pleurospinal areas **5**
 - Tergum, membranous or sclerotic but unpigmented, or with only dark intersegmental and/or marginal sclerites **7**
 5. SIPH entirely black. ABD TERG 1–7 almost completely dark except for clear areas at bases of SIPH. R IV+V 0.7–0.8× HT II *Myzus obtusirostris*
 - SIPH with at least middle section pale or dusky. Tergum with at least ABD TERG 5 mostly unpigmented. R IV+V 0.85–1.7× HT II **6**
 6. R IV+V 0.85–1.1× HT II. ANT III without rhinaria. Dorsal dark sclerotisation solid on ABD TERG 1–2 or 1–3, usually with a pale median area on 4 *Kaochiaoja arthroxonis*
 - R IV+V 1.2–1.7× HT II. ANT III usually with 1–2 rhinaria near base. Dorsal abdomen with a dark roughly U-shaped patch, pale medially on ABD TERG 1–2 (–3) *Neomyzus circumflexus*
 7. SIPH flangeless, scaly, swollen at base and slightly flared distally, with a small somewhat slanted aperture *Jacksonia papillata*
 - SIPH with a distinct flange; cylindrical, tapering or clavate **8**
 8. Dorsal surface of head smooth, black, with a pair of spinal tubercles (STu). Cauda long and dark with 3–5 short curved hairs. R IV+V without accessory hairs. (Al. with forewings usually lacking radius) *Kugegania ageni*
 - Dorsal surface of head smooth or spiculate, pale or dark, without STu. Cauda pale or dark, if dark then short and triangular, with 4–11 hairs. R IV+V with 2 or more accessory hairs. (Al. with radius in forewing) **9**
 9. SIPH grossly inflated over distal 0.7, with maximum width of swollen part more than 2× minimum width of stem and c.3× width of constricted subapical part, which has a rather indistinct reticulate pattern *Rhopalosiphoninus solani*
 - SIPH tapering, cylindrical or slightly to moderately swollen, with swollen part less than 2× minimum width basad or distad **10**
 10. Femora spinulose over entire length. SIPH very slightly swollen subapically. Cauda swollen at base, with a constriction of distal half, and bearing 4 hairs. (Al. with broadly dark-banded forewing veins and media fused with radius) *Pentalonia gavarri*
 - Femora not spinulose, or with spinules only on distal half. SIPH tapering/cylindrical or swollen over greater part of length. Cauda triangular or tongue-shaped, unconstricted, with 4–8 hairs. (Al. with normal wing venation) **11**

11. SIPH tapering, with a slight S-curve, coarsely imbricated. Dorsal abdomen with a pattern of dark intersegmental markings. ANT PT/BASE 1.7–2.8 *Myzus ornatus*
 – SIPH tapering/cylindrical or swollen, not coarsely imbricated. Dorsal abdomen without dark intersegmental markings. ANT PT/BASE 2.8–5.5 12
12. Dorsal hairs with expanded apices, short or long. SIPH dusky/dark, swollen over most of length, without a narrow section on basal half. Cauda short, triangular, not longer than its basal width. ANT and legs mainly dark 13
 – Dorsal hairs very short and blunt. SIPH pale or dark, cylindrical/tapering, or swollen on distal half with a narrower section on basal half. Cauda much longer than its basal width. ANT and legs pale or at least not mainly dark 14
13. Dorsal hairs 40–65 µm long. Longest hairs on ANT III 0.6–1.0× BD III *Rhopalomyzus poae*
 – Dorsal hairs 10–28 µm long. Longest hairs on ANT III 0.4–0.5× BD III *Rhopalomyzus grabhami*
14. Head smooth dorsally and anterioventrally, with a few rows of spicules posterioventrally. R IV+V short and blunt, 0.8–0.9× HT II. ANT III usually with 1–3 rhinaria on slight swelling near base. SIPH swollen over distal 0.7 of length *Utamphorophora humboldti*
 – Head spiculose dorsally and ventrally. R IV+V 0.7–1.5× HT II. ANT III with or without rhinaria near base, if with then SIPH tapering/cylindrical 15
15. R IV+V very short and blunt 0.7–0.8× HT II, with 2 accessory hairs *Myzus maculocarpus**
 – R IV+V 0.9–1.5× HT II, with 2–15 accessory hairs 16
16. SIPH tapering/cylindrical. ANT III usually with 1–2 rhinaria near base *Aulacorthum solani*
 – SIPH swollen on distal half. ANT III without rhinaria 17
17. SIPH almost smooth, less than 0.82× ANT III. R IV+V with 7–15 accessory hairs *Myzus ascalonicus*
 – SIPH normally imbricated, more than 0.83× ANT III. R IV+V with 2–5 (–7) accessory hairs *Myzus persicae*

Key E – Apteræ of *Metopolophium* and *Sitobion* (*Metobion*) spp. on grasses

1. SIPH 0.55–0.67× cauda *Metopolophium* sp. on *Poa nemoralis* (Switzerland, BMNH colln, leg. Knoppe de Rico)
 – SIPH 0.85–2.5× cauda 2
2. SIPH 0.85–0.90× cauda, which bears 10–17 hairs *Metopolophium palmerae*
 – SIPH 1.0–2.5× cauda, which bears 4–21 hairs (if cauda has more than 8 hairs then SIPH more than 1.2× cauda) 3
3. BL 3.6–4.2 mm. R IV+V 0.5–0.7× HT II 4
 – BL 1.3–3.75 mm, but if more than 3.5 mm then R IV+V is at least 0.85× HT II 6
4. ANT PT/BASE less than 4. ANT III with 11–13 rhinaria in a row on basal half *Sitobion brevirostre*
 – ANT PT/BASE 4.2–7.0. ANT III with 2–6 rhinaria near base 5
5. Cauda with 4–8 hairs. ANT PT/BASE 6.4–7.0 *Sitobion graminearum*
 – Cauda with 12–21 hairs. ANT PT/BASE 4.3–5.5 *Sitobion beiquei*
6. ANT PT/BASE 4.6–5.4 7
 – ANT PT/BASE 1.8–4.5 9

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7. R IV+V 0.90–0.95× HT II, with 8–11 accessory hairs. SIPH 2.0–2.5× cauda, which bears 9–14 hairs
Metopolophium alpinum
– R IV+V 0.55–0.87× HT II, with 4–10 accessory hairs. SIPH 1.1–2.0× cauda, which bears 5–9 hairs **8**
8. R IV+V 0.55–0.60× HT II, with 4–6 accessory hairs. SIPH 1.1–1.3× cauda
Metopolophium longicaudatum
– R IV+V 0.67–0.87× HT II, with 5–10 accessory hairs. SIPH 1.5–2.0× cauda
Metopolophium festucae ssp. *cerealium* (part)
9. R IV+V with only 0–2 accessory hairs **10**
– R IV+V with (2–) 3–10 accessory hairs **11**
10. ANT III with 0–2 rhinaria near base. SIPH 2.1–2.7× cauda. R IV+V longer than its basal width, 0.75–0.95× HT II. Tergum sclerotic and usually dark-pigmented, at least marginally
Metopolophium friscum
– ANT III with 8–17 rhinaria distributed over 0.5–0.7 of length. SIPH 1.3–1.6× cauda. R IV+V shorter than its basal width, 0.6–0.7× HT II. Tergum pale not or hardly sclerotic *Sitobion scoticum*
11. SIPH 1.0–1.35× cauda (usually less than 1.3×). R IV+V 0.86–1.14× HT II, which is 0.092–0.126 mm long. Hind tibia less than 0.45× BL
Metopolophium sabihae
– SIPH 1.3–2.5× cauda, but **if** less than 1.4× cauda then **either** R IV+V is 0.62–0.70× HT II (which is 0.128–0.183 mm long), **or** hind tibia is more than 0.46× BL **12**
12. R IV+V 0.92–1.10× HT II. ANT PT/BASE 1.8–2.8 **13**
– R IV+V 0.60–0.98× HT II; **if** more than 0.9× HT II (some *festucae*) then ANT PT/BASE normally in range 2.9–4.0 (although individuals developing in cold conditions may have ANT PT/BASE ratios down to 2.1) **14**
13. SIPH 1.7–2.3× cauda, and without any subapical reticulation. ANT tubercles well developed
Metopolophium tenerum
– SIPH 1.4–1.6× cauda, and often with some rather indistinct subapical reticulation. ANT tubercles weakly developed *Sitobion calvulum*
14. ANT III with 2–8 rhinaria. ANT PT/BASE 2.0–3.0. R IV+V 0.6–0.7× HT II
Metopolophium chandrani
– ANT III with 0–4 rhinaria. ANT PT/BASE 2.1–5.0, but if less than 3.0 (cold temperature *festucae*) then R IV+V more than 0.7× HT II **15**
15. SIPH 0.25–0.36× hind tibia. HT II 0.128–0.183 mm (only less than 0.146 mm if BL is less than 2 mm **and** ANT PT/BASE 3–4) **16**
– SIPH 0.34–0.52× hind tibia, but if less than 0.36× then HT II is 0.096–0.146 mm long (only more than 0.128 mm if BL is more than 2 mm and/or ANT PT/BASE less than 3) **17**
16. SIPH 1.7–2.0× cauda. ANT PT 3.3–4.4× HT II. ANT V 1.2–1.7× cauda. R IV+V 0.65–0.78× HT II. If still inconclusive, the function (PT×SIPH)/(cauda×HT II) is in range 6.0–8.6
Metopolophium fasciatum
– SIPH 1.3–1.9× cauda. ANT PT 2.6–4.1× HT II. ANT V 0.9–1.4× cauda. R IV+V 0.61–0.72× HT II. If still inconclusive, the function (PT×SIPH)/(cauda×HT II) is in range 3.6–6.5
Metopolophium dirhodum
17. Hind tibia 11.3–16.7× R IV+V (only less than 12× when BL less than 2.2 mm). ANT BASE VI 1.20–1.62× HT II (only less than 1.3× when **either** BL less than 2 mm **or** ANT BASE VI is 0.36–0.42× ANT IV)
Metopolophium albidum

- Hind tibia $7.1\text{--}12.0\times$ R IV+V (only more than $11.3\times$ when BL is $2.2\text{--}2.7\text{ mm}$). ANT BASE VI $0.95\text{--}1.29\times$ HT II (only more than $1.2\times$ when BL more than 2 mm **and** ANT BASE VI is $0.43\text{--}0.53\times$ ANT IV) **18**
- 18.** SIPH $2.0\text{--}2.7\times$ cauda, which is $0.09\text{--}0.11\times$ BL *Metopolophium montanum*
- SIPH $1.3\text{--}2.0\times$ cauda, which is $0.11\text{--}0.17\times$ BL **19**
- 19.** R IV+V $0.092\text{--}0.119\text{ mm}$ long, $0.67\text{--}0.87\times$ HT II, and bearing 5–10 accessory hairs. Hind tibia $0.87\text{--}1.71\text{ mm}$ long, HT II $0.116\text{--}0.164\text{ mm}$ long. ANT PT/BASE $3.0\text{--}5.0$. If inconclusive then function $(A\times B\times C)/(D\times E\times F)$ is $6.5\text{--}12.7$, where A=length of ANT flagellum (III+IV+V+VI incl. PT), B=length of hind tibia, C=HT II, D=body length (in this case incl. Cauda), E=ANT VI BASE, and F=R IV+V *Metopolophium festucae* ssp. *cerealium*
- R IV+V $0.089\text{--}0.114\text{ mm}$ long, $0.72\text{--}1.0\times$ HT II, and bearing 3–8 accessory hairs. Hind tibia $0.75\text{--}1.22\text{ mm}$ long, HT II $0.096\text{--}0.133\text{ mm}$ long. ANT PT/BASE $2.1\text{--}4.2$. If inconclusive then function $(A\times B\times C)/(D\times E\times F)$ is $3.9\text{--}8.1$ *Metopolophium festucae* s. str.

Key F – Mostly *Melanaphis*, *Rhopalosiphum* and *Schizaphis*

This key includes apterae of the rest of the grass-feeding Aphidinae not covered by Keys B-E. To qualify for this key your aphid should have (a) 5- or 6-segmented ANT with ANT PT/BASE more than 1, (b) a non-spiculose head with low ANT tubercles, (c) SIPH tubular or conical, $0.45\text{--}2.5\times$ cauda, which is tongue- or finger-shaped, and (d) marginal tubercles on ABD TERG 1 and 7 (with 2 exceptions).

- 1.** SIPH short and usually thick or rather thick, less than (often much less than) $2.4\times$ longer than their basal width, $0.45\text{--}1.2\times$ cauda, and usually with a well-developed, rather swollen flange **2**
- SIPH tapering, cylindrical or slightly swollen, $0.6\text{--}2.5\times$ cauda, but if less than $1.2\times$ cauda then they are more than $2.4\times$ their basal width, and/or have a small flange **16**
- 2.** Hairs on ANT III very long and fine, up to $4\text{--}7\times$ longer than BD III *Melanaphis pahanensis*
- Hairs on ANT III $0.25\text{--}1.5\times$ longer than BD III **3**
- 3.** R IV+V $0.5\text{--}0.7\times$ HT II. ABD TERG 8 with 3–6 hairs **4**
- R IV+V $0.8\text{--}1.5\times$ HT II. ABD TERG 8 with 2–5 hairs **5**
- 4.** ANT PT/BASE $1.1\text{--}1.9$. Longest hairs on ANT III $19\text{--}32\mu\text{m}$, $0.6\text{--}1.1\times$ BD III *Melanaphis donacis*
- ANT PT/BASE $2.5\text{--}3.1$. Longest hairs on ANT III $35\text{--}40\mu\text{m}$, $1.2\text{--}1.5\times$ BD III *Melanaphis elizabethae*
- 5.** Cauda with only 4–6 hairs. Coxae dark *Melanaphis bambusae*
- Cauda with 7–20 hairs. Coxae pale **6**
- 6.** R IV+V $1.22\text{--}1.44\times$ HT II **7**
- R IV+V $0.80\text{--}1.16\times$ HT II **9**
- 7.** Hind tibia with scent glands on basal part *Melanaphis daisenensis*
- Hind tibia without scent glands **8**
- 8.** ABD TERG 1–5 with a large dark sclerite (often segmentally divided or interrupted in mid-line). ANT PT/BASE $2.8\text{--}3.8$. Cauda with 17–20 hairs *Melanaphis graminisucta*
- ABD TERG 1–5 without a dark sclerite. ANT PT/BASE $4.0\text{--}4.4$. Cauda with 12–15 hairs *Melanaphis miscanthi**
- 9.** ABD TERG 1–4 each with 3–8 long fine hairs on each side. ABD TERG 8 with (3–) 4 (–5) hairs *Melanaphis koreana*
- ABD TERG 1–4 each with 1–2 hairs on each side. ABD TERG 8 with 2 hairs **10**

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10. Longest hairs on ANT III c.1.0× BD III. Hind tibia with longest hairs 1.3–2.0× diameter of tibia at midlength. Marginal hairs on ABD TERG 1–4 27–47µm *Melanaphis yasumatsui*
- Longest hairs on ANT III 0.3–0.7× BD III. Hind tibia with longest hairs not more than 1.2× diameter of tibia at midlength. Marginal hairs on ABD TERG 1–4 14–30µm **11**
11. SIPH 0.46–0.68× cauda **12**
- SIPH 0.70–1.05× cauda **13**
12. SIPH pale/dusky, at least 1.5× longer than their basal widths, and 0.46–0.63× cauda, both pale or dusky. (Sec. rhin. in al. III 19–45, IV 2–21, V 0–11) *Melanaphis pyraria*
- SIPH dark, very broad-based, shorter than their basal width and 0.63–0.68× cauda. (Sec. rhin. in al. III 6–9, IV 0, V 0) *Melanaphis arthroxonophaga*
13. ANT PT 2.6–3.5× cauda. Head with both ANT and median frontal tubercles rather well developed **14**
- ANT PT 1.9–2.5× cauda. Head with ANT and median frontal tubercles weakly developed **15**
14. SIPH 1.3–1.7 (–2.0)× their basal width, and with a large flange, so that diameter at flange is 1.25–1.4× the minimum subapical diameter *Melanaphis sorini*
- SIPH 1.7–2.8× their basal width and with a small flange, so that diameter at flange is 1.03–1.14× the minimum subapical diameter *Melanaphis indosacchari*
15. Hind tibia 2.0–3.0× ANT PT (measure several specimens if borderline) *Melanaphis sorghi* (also *M. zhanhuaensis?* – see text)
- Hind tibia 1.4–2.2× ANT PT *Melanaphis sacchari*
16. Tergum of thorax and abdomen with a reticulate pattern of strings of small bead-like spicules arranged in polygons, most polygons enclosing one to many additional similar spicules. SIPH in all except one species almost cylindrical for most of length or with very slight swelling of distal part, constricted subapically and then broadened again to a well-developed flange (as if a noose had been placed around near the apex and tightened slightly). (Al. with media of forewing twice-branched) **17**
- Tergum smooth, wrinkled or spiculate, but if spiculate then the spicules are coarser and more angular and not arranged as above. SIPH cylindrical or tapering, sometimes with a slight subapical constriction but usually with a small flange. (Al. with media once- or twice-branched) **23**
17. Body rather elongate. SIPH 0.07–0.08× BL, tapering from base with only a slight subapical constriction and small flange. ANT PT/BASE 1.7–2.8 *Rhopalosiphum maidis*
- Body oval. SIPH 0.08–0.15× BL, almost cylindrical for most of length, distinctly constricted subapically and with a large flange. ANT PT/BASE 2.5–5.6 **18**
18. ANT usually 5-segmented with longest hairs on ANT III 3–5× BD III. ABD TERG 8 with 4–8 hairs *Rhopalosiphum rufiabdominale*
- ANT 5- or 6-segmented with longest hairs on ANT III 0.4–2.25× BD III. ABD TERG 8 with 2 (–3) hairs **19**
19. Longest hairs on ANT III 0.4–1.0× BD III. R IV+V 0.9–1.15× HT II **20**
- Longest hairs on ANT III 1.1–2.25× BD III. R IV+V 1.2–1.4× HT II **21**
20. Hind tibia with numerous long hairs with finely-pointed apices, the longest 64–85µm long *Rhopalosiphum nigrum*
- Hind tibia with all hairs more spine-like and maximally 24–40µm *Rhopalosiphum padi*
21. ANT PT/BASE 2.5–3.5 *Rhopalosiphum rufulum*
- ANT PT/BASE 4.2–5.3 **22**

22. ANT 5-segmented. Cauda triangular *Rhopalosiphum insertum*
 – ANT 6-segmented. Cauda tongue-shaped, often with a slight mid-way constriction *Rhopalosiphum padiformis*
23. ABD TERG 1 and 7 without marginal tubercles (MTu), or rarely only on ABD TERG 7 **24**
 – ABD TERG 1 and 7 always with (sometimes small) MTu **27**
24. Dorsal cuticle with coarsely rugose, denticulate sculpturing. SIPH short, with subapical constriction and large flange. Cauda dark *Schizaphis palustris*
 – Dorsal cuticle not coarsely rugose. SIPH without a subapical constriction and with a small flange. Cauda pale or dusky **25**
25. SIPH dark except at bases, 0.17–0.20× BL *Schizaphis aurea*
 – SIPH dusky, only dark at apices, 0.11–0.18× BL **26**
26. SIPH 0.11–0.13× BL and 1.1–1.3× cauda *Schizaphis graminum* ssp. *gigjai*
 – SIPH 0.12–0.18× BL and 1.4–2.0× cauda *Schizaphis dubia*
27. SIPH mainly pale or dusky, usually with dark apices **28**
 – SIPH uniformly dark **42**
28. R IV+V 1.0–1.33× HT II. Cauda with 6–12 hairs *Schizaphis rufula*
 – R IV+V 0.5–1.0× HT II. Cauda with 4–7 (–14) hairs **29**
29. SIPH 0.6–0.8× cauda which bears 8–14 hairs. R IV+V 0.5–0.7× HT II *Schizaphis longicaudata*
 – SIPH 0.8–2.2× cauda which bears 4–7 hairs. R IV+V 0.6–1.0× HT II **30**
30. SIPH 0.8–1.2× cauda. ANT PT/BASE 2.3–3.7 **31**
 – SIPH 1.0–2.2× cauda, but if 1.0–1.2× cauda then ANT PT/BASE is 3.6–5.2 **33**
31. Cauda with 6–7 hairs. SIPH usually shorter than (0.8–1.0×) cauda. ANT PT/BASE 3.1–3.7 *Schizaphis priori*
 – Cauda with 4–5 hairs. SIPH usually longer than (0.9–1.2×) cauda. ANT PT/BASE 2.3–3.0 (–3.5) **32**
32. Some or all of ABD TERG 2–4 and 6 usually with MTu. R IV+V 0.75–0.85× HT II. ANT PT/BASE 2.6–3.5 *Schizaphis borealis*
 – ABD TERG 2–4 and 6 without MTu. R IV+V 0.85–0.95× HT II. ANT PT/BASE 2.3–3.1 *Schizaphis weingaertneriae*
33. SIPH uniformly pale, without dark apices **34**
 – SIPH with dark apices **35**
34. R IV+V blunt, 0.6–0.8× HT II. SIPH with a small but evident flange. Cauda with a distinct midway constriction *Schizaphis thunebergi**
 – R IV+V pointed, c.0.9× HT II. SIPH flange very weakly developed. Cauda not constricted at midlength *Schizaphis muhlenbergiae*
35. Second tarsal segments mostly with a mid-dorsal hair in addition to the two subapical ones. SIPH 1.5–1.7× cauda *Schizaphis werderi**
 – Second tarsal segments without, or only very rarely with, a mid-dorsal hair. SIPH 1.0–2.25× cauda **36**
36. SIPH 3.1–3.7× HT II, 0.19–0.25× BL and 1.67–2.25× cauda *Schizaphis hypersiphonata*
 – SIPH 1.6–2.9× HT II, 0.10–0.19× BL and 1.0–1.7× cauda **37**

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37. SIPH 0.10–0.13× BL and 1.6–1.8× HT II. Longest hair on ABD TERG 8 is 21–50µm long
Schizaphis jaroslavi
 – SIPH 0.11–0.19× BL and 1.8–2.9× HT II. Longest hair on ABD TERG 8 is 15–40µm long, but if more than 20µm then SIPH are more than 0.13× BL **38**
38. SIPH 1.0–1.2× cauda. (Al. with sec. rhin. ANT III 15–16, IV c.9, V 6–7)
Schizaphis hierochlorophaga
 – SIPH 1.3–1.7× cauda. (Al. with sec. rhin. ANT III 2–10, IV 0–4, V 0)
39 (*Schizaphis graminum* group)
39. SIPH 0.11–0.16× BL. Al. with sec. rhin. ANT III 2–6 (mostly 4 or 5), IV 0–1 *Schizaphis phlei*
 – SIPH 0.14–0.19× BL. Al. with sec. rhin. ANT III 3–10 (mostly 6–8), IV 0–4 **40**
40. R IV+V 0.65–0.80× HT II. ANT PT/BASE 2.8–4.7. SIPH 1.3–1.7× cauda *Schizaphis graminum*
 – R IV+V 0.75–1.0× HT II. ANT PT/BASE 2.3–4.0. SIPH 1.25–1.5× cauda **41**
41. R IV+V 0.80–1.0× HT II. SIPH 0.14–0.15× BL and 1.25–1.4× cauda. Longest hair on ABD TERG 6–7 is 14–18µm, and on ABD TERG 8 is 30–40µm
Schizaphis holci
 – R IV+V 0.75–0.88× HT II. SIPH 0.15–0.17× BL and 1.3–1.5× cauda. Longest hair on ABD TERG 6–7 is 11–12µm, and on ABD TERG 8 is 17–25µm
Schizaphis agrostis
42. R IV+V 0.7–0.9× HT II. SIPH 0.7–1.1× cauda. (Al. with media of forewing once-branched) **43**
 – R IV+V 0.9–1.5× HT II. SIPH 0.8–2.5× cauda. (Al. with media of forewing once- or twice-branched) **44**
43. ANT PT/BASE 2.0–3.7. Hairs on ABD TERG 7 and 8 maximally 24–40µm long
Schizaphis nigerrima
 – ANT PT/BASE 4.0–4.7. Hairs on ABD TERG 7 and 8 long and fine-pointed, 45–60µm long
Schizaphis cuprea
44. Cauda long and very pale, with only 4 hairs. SIPH slightly swollen on basal half (calf-shaped). ANT PT/BASE 5.0–6.3. (Hind wing of al. with onlt one oblique vein)
Hysteroneura setariae
 – Cauda pale, dusky or dark with 4–28 hairs. SIPH cylindrical or tapering, not at all swollen on basal half. ANT PT/BASE 1.7–6.0. (Hind wing of al. with 2 oblique veins) **45**
45. SIPH 2.1–3.0× cauda. ANT entirely dark except for base of III. (Forewing of al. with once-branched media)
Schizaphis rotundiventris
 – SIPH 0.8–2.2 (–2.5)× cauda. ANT pale at least on most of III and IV. (Forewing of al. with media once- or twice-branched)
 polyphagous *Aphis* and *Toxoptera*; go to key to polyphagous aphids, p. 1020, starting at couplet 24

Key G – Apteræ of *Anoecia* and *Tetraneura* on grasses

Apt. included in this key all have very short ANT PT, SIPH as slightly elevated cones and a broadly rounded cauda. Two *Anoecia* spp. described from India on unidentified grasses, *A. himlayensis* and *A. radiciphaga*, could not be included on the basis of their published descriptions; a key to Indian *Anoecia* is provided by Chakrabarti *et al.* (1982).

1. Tarsi 2-segmented. Eyes usually multifaceted. ANT more than 0.25× BL. ANT III-V often with secondary rhinaria. Flat rounded marginal tubercles (MTu) are usually present **2**
 – Tarsi 1-segmented. Eyes usually with just a triommatidium. ANT less than 0.25× BL. ANT without sec. rhin. Wax glands comprising one to many cells usually present **13**

2. MTu usually present on all of ABD TERG 1–7; often reduced in size on ABD TERG 5 and 6, and sometimes absent from 6, or occasionally both 5 and 6 **3**
 – MTu on ABD TERG 1–4 and 7, but always absent from 5 and 6 **6**
3. Compound eyes reduced to 0–10 (–25) facets, usually smaller than triommatidia. ANT III–V without sec. rhin. Dorsal abdomen often unsclerotised. BL 1.2–2.1 mm *Anoecia zirnitsi*
 – Compound eyes with more than 25 facets. ANT III–V usually with sec. rhin. Dorsal abdomen usually with extensive dusky/dark sclerotisation. BL 1.9–3.0 mm **4**
4. ABD TERG 1–5 with short (10–15 µm) blunt or spatulate hairs, which at least on 4 and 5 are placed in single transverse rows. R IV+V with 5–6 (–8) accessory hairs *Anoecia vagans*
 – ABD TERG 1–4 (–5) each with numerous fine-pointed hairs; spatulate hairs (41–73 µm long) occur only irregularly if at all on ABD TERG 5–7, and only those on 6 and 7 are arranged in transverse rows. R IV+V with 8–14 accessory hairs **5**
5. Rostrum 0.76–0.96 mm long, reaching well past bases of hind coxae to about middle of abdomen. BL (2.2–) 2.5–3.0 mm. Hairs on ABD TERG 6 and 7 usually all fine-pointed *Anoecia major* (and *mirae*?)
 – Rostrum 0.52–0.85 mm long, reaching about to bases of hind coxae. BL 1.9–2.4 (–2.8) mm. One or more of hairs on ABD TERG 6 and 7 almost always spatulate *Anoecia corni*
6. Dorsal abdomen unsclerotised or only with dusky/dark bands on ABD TERG (5–) 6–7. Compound eyes often reduced to less than 20 facets. ANT III–V without sec. rhin. **7**
 – Dorsal abdomen extensively sclerotised on ABD TERG 3–7, with either broad dark bands or a solid or perforated dark shield. Compound eyes with more than 25 facets. ANT III–V usually each with 1 or more sec. rhin. **9**
7. ANT III only c.0.13 mm long, less than 0.09× BL. (Al. developing on grasses have a large black dorsal abdominal patch over ABD TERG 3–6) *Anoecia cornicola*
 – ANT III 0.18–0.24 mm long, at least 0.10× BL. (Al. with dusky cross-bands or a dark patch limited to ABD TERG 5–6) **8**
8. ANT hairs all or mostly spatulate. (Al. with a dark sclerite on ABD TERG 5–6) *Anoecia stipae**
 – ANT hairs finely pointed. (Al. with rather indistinct dusky dorsal abdominal cross-bands) *Anoecia setariae*
9. Dorsal abdominal hairs numerous and irregularly distributed except on ABD TERG (6–) 7–8, with either fine-pointed or markedly expanded apices **10**
 – Dorsal abdominal hairs less numerous, tending to be in rows on at least ABD TERG 3–8, and many of those on ABD TERG 1–7 with blunt or spatulate apices **12**
10. All or most of hairs on ABD TERG 1–7, and also some of those on ANT and legs, with expanded, bifurcate or multifurcate apices
Anoecia sp. on *Hordeum jubatum* (Manitoba; BMNH colln, leg. A.G. Robinson)
 – All or most hairs with fine-pointed apices **11**
11. ABD TERG 7 with 12–20 hairs between the marginal groups, not in a single row. Sec. rhin. distributed III 0–1 (–4), IV 1 (–3), V 0–2, VI 0 *Anoecia fulviabdominalis*
 – ABD TERG 7 with 4–6 hairs between the marginal groups, usually in a single row. Sec. rhin. distributed ANT III 0–6, IV 0–4, V 0–3, VI 0–2 *Anoecia haupti* or *A. krizusi**
12. ANT III 0.16–0.21 mm long, usually a little shorter than ANT IV+V, and 1.0–1.4× R IV+V. Spatulate hairs common on ANT and legs *Anoecia graminis*
 – ANT III 0.24–0.38 mm long, longer than ANT IV+V and 1.9–2.5× R IV+V. Most hairs on ANT and legs fine-pointed, with sometimes a few interspersed spatulate hairs *Anoecia furcata*

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13. R IV+V 0.10–0.13 mm long, 1.1–2.0× HT **14**
 – R IV+V 0.15–0.25 mm long, 1.8–2.7× HT **19**
14. ABD TERG 1–7 each with 2 pairs of long, stout marginal hairs with distinctly capitate apices. (Embryos inside abdomen also have capitate marginal hairs) *Tetraneura capitata*
 – Marginal hairs of adults and embryos long or short but with fine-pointed, acute or blunt apices (or sometimes dilated apically in adults, but not in embryos) **15**
15. ANT flagellum (which may consist of 1–4 segments) with less than 8 hairs between apex of II and distal rim of penultimate primary rhinarium **16**
 – ANT flagellum with more than 8 hairs between apex of II and distal rim of penultimate primary rhinarium **17**
16. Longest ANT hairs not longer than BD III. Spinal and pleural wax glands on ABD TERG 1–5 each usually comprising a ring of cells (diam. 52–65 µm) around an undivided or partially subdivided central area. ABD TERG 7 with 4–6 hairs. Embryos inside abdomen with hind tarsal claws similar to those of fore and mid tarsi *Tetraneura caerulescens*
 – Longest ANT hairs longer than BD III. Spinal and pleural wax glands on ABD TERG 1–5 small (diam. 12–25 µm), each comprising a single cell or a group of 2–3 contiguous cells. ABD TERG 7 with 8 hairs. Embryos inside abdomen with hind tarsal claws much longer than those of fore and mid tarsi *Tetraneura basui*
17. ANT II with 6–18 hairs. ABD TERG 8 with 6–15 similar-sized hairs. Wax glands each usually comprising a group of cells with one large cell 14–77 µm in diameter, of irregular shape and sometimes appearing partially subdivided, with many small cells alongside or partly surrounding it
Tetraneura javensis group (incl. *javensis*, *kalimpongensis**, *lambersi**, *multisetosa**, *utpali**)
 – ANT II with 2–5 hairs. ABD TERG 8 with 2 thick and spine-like hairs of varying length, often very long, sometimes with additional smaller marginal hairs. Wax glands each usually comprising a small group of mostly similar-sized cells 7–24 µm in diameter, with or without an adjacent cluster of very small cells **18**
18. ABD TERG 8 commonly with one or more smaller marginal hairs in addition to a pair of very large spinal hairs. Embryos in abdomen (dissect some out when mounting if possible) without spicules on hind tarsi, and with ABD TERG 1–5 each having a transverse row of 6–10 spinopleural hairs between the 2 larger marginal hairs *Tetraneura nigriabdominalis*
 – ABD TERG 8 usually only with a pair of very large spinal hairs, rarely with 1–2 additional hairs. Embryos in abdomen with minutely spinulose hind tarsi, and with ABD TERG 1–5 each usually having a transverse row of (5–) 6 spinopleural hairs *Tetraneura fusiformis*
19. ABD TERG 8 with 38–48 hairs. ANT II with 31–58 hairs. R IV+V with more than 30 hairs *Tetraneura triangula**
 – ABD TERG 8 with 2–10 hairs. ANT II with 2–26 hairs. R IV+V with 10–30 hairs **20**
20. ANT II with (8–) 12–26 hairs **21**
 – ANT II with 2–5 hairs **24**
21. ANT hairs all very short, less than 0.5× BD III *Tetraneura brachytricha**
 – ANT hairs mostly longer than BD III **22**
22. Marginal wax glands comprising groups of 10–35 cells. ABD TERG 8 with c.10 hairs *Tetraneura polychorema**
 – Marginal wax glands comprising single cells with surface appearing stippled, max. diam. 20–40 µm. ABD TERG 8 with 2–8 hairs, including at least 2 long thick spinal hairs **23**

23. Penultimate ANT segment with 18–30 hairs. Embryos inside abdomen (dissect some out before mounting if possible) with ABD TERG 1–5 each bearing 12–20 pleurospinal hairs between marginal groups of 3–8 hairs. Embryos have 16–23 hairs on penultimate ANT segment (IV) and 10–16 accessory hairs on R IV+V
Tetraneura yezoensis (incl. *sikkimensis**)
- Penultimate ANT segment with 36–60 hairs. Embryos inside abdomen with ABD TERG 1–5 each bearing 20–50 pleurospinal hairs between marginal groups of 10–15 hairs. Embryos have 30–55 hairs on penultimate ANT segment (IV) and 18–24 accessory hairs on R IV+V
Tetraneura radicolica
24. Marginal wax glands very well-developed, especially those on ABD TERG 7 which have 30–40 similar-sized cells. ANT hairs less than $0.5 \times$ BD III
Tetraneura africana
- Marginal wax glands variable, often with a ring of cells around an undivided central area. Longest ANT hairs usually more than $0.5 \times$ BD III **25**
25. ABD TERG 8 with c.8 hairs
*Tetraneura indica**
- ABD TERG 8 with 2 hairs, that are long (c. 170 μ m) and thick
Tetraneura ulmi group (incl. *chui**, *longisetosa*)

Key H – Apteræ of *Colopha*, *Fordini* and *Pemphigini* on grasses

1. Tarsi 1-segmented (sometimes with an incomplete suture). Wax glands each comprising a ring of cells around a darkly-defined round, oval or elongate central clear area **2**
- Tarsi 2-segmented. If wax glands are present then they are comprised of numerous cells (pores) without a clear central area **4**
2. Abdominal wax glands always with rather small, round or oval, darkly bordered central areas (sometimes subdivided into two). R IV+V $1.2\text{--}2.2 \times$ HT (I+II)
Colopha kansugei
- At least the larger (marginal) wax glands have narrow elongate (slit-like) central areas. R IV+V $1.0\text{--}1.35 \times$ HT (I+II) **3**
3. (Al. with media of forewing unbranched)
Colopha ulmicola
- (Al. with media of forewing once-branched)
Colopha graminis
4. Primary rhinarium on last ANT segment with a naked rim **5**
- Primary rhinarium on last ANT segment with a fimbriate or ciliate rim **18**
5. ANT II elongate, much longer than I and similar in length to III
Smynthurodes betae
- ANT II similar in length to I, much shorter than III **6**
6. ANT usually 6-segmented.. Legs thick, especially hind tibiae which are more than 0.7 of width of hind femora at their respective midpoints. Dorsal cuticle with fine reticulation **7**
- ANT 5-segmented. Hind tibiae less than 0.7 of width of hind femora at their respective midpoints. Cuticle not distinctly reticulated **8**
7. Hairs very short, those on ANT III only 4–12 μ m long (based on 4th instar)
Paracletus subnudus
- Hairs on ANT III up to 25–36 μ m long, with fine apices
Paracletus cimiciformis
8. Multifaceted eyes present in addition to triommatidia
Paracletus donisthorpei
- Eyes represented only by triommatidia **9**
9. Hind tarsi 0.22–0.38 mm long, $1.4\text{--}1.8 \times$ longer than mid-tarsi. ANT densely clothed with fine hairs **10**
- Hind tarsi less than 0.22 mm long, less than $1.4 \times$ longer than mid-tarsi. ANT not densely clothed with fine hairs **12**

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10. Head cuticle finely spinulose. Hind legs elongate, with femora and tibiae curved, and HT II narrow, 7–10× longer than their maximum width *Paracletus bykovi*
- Head cuticle smooth or finely spiculose. Hind legs thick, with femora and tibiae rather straight, and HT II 5.0–6.5× longer than their maximum width **11**
11. Head cuticle finely spiculose. ANT long, 0.65–0.69× BL, with ANT III c.3.8–4.0× HT II. R IV+V 1.37–1.46× HT II *Forda longicornis*
- Head cuticle completely smooth. ANT 0.24–0.41× BL, with ANT III 0.88–1.62× HT II. R IV+V 0.63–0.98× HT II *Forda rotunda*
12. Primary rhinarium on ANT BASE V very large, transversely oblong and extending around segment, 4–5× larger than primary rhinarium on ANT IV *Forda formicaria*
- Primary rhinarium on ANT BASE V almost circular and less than 2.5× larger than that on ANT IV **13**
13. Dorsal hairs extremely long (250–350µm), with very fine apices. R IV+V c.0.37 mm long *Forda hirsutissima**
- Dorsal hairs always less than 130µm, with pointed, blunt, furcate or expanded apices. R IV+V less than 0.30 mm long **14**
14. Head cuticle finely spiculose, with small separate rounded spicules. Marginal hairs on ABD TERG 1–5 are 35–55µm long with fine-pointed apices *Forda orientalis*
- Head cuticle rather coarsely spiculose, with angular spicules partially joined to form a reticulum. Marginal hairs on ABD TERG 1–5 are 6–28µm long with acute, blunt or expanded apices **15**
15. Tibiae each with a row of short, stout erect peg-like hairs on dorsal side. Hairs on ABD TERG 8 long (more than 50µm), and in larger specimens often thick and strap-like, with some of them having spatulate or furcate apices *Forda hirsuta*
- Tibiae without erect, peg-like hairs. Hairs on ABD TERG 8 short or long, never strap-like, with pointed or blunt, rarely bifurcate, apices **16**
16. Marginal hairs on ABD TERG 1–5 maximally 16–28µm long, and often curved. Longest hairs on ANT III 0.6–1.2× BD III *Forda riccobonii*
- Marginal hairs on ABD TERG 1–5 maximally 6–15µm long, and usually quite straight. Longest hairs on ANT III 0.2–0.8× BD III **17**
17. R IV+V more than 1.3× HT II. (Al. with sec. rhin. distributed III c.40, IV c.6, V BASE 0–2) *Forda pawlowae*
- R IV+V 1.0–1.3× HT II. (Al. with sec. rhin. distributed III 9–27, IV 2–5, V BASE 0–2) *Forda marginata*
18. Anal plate enlarged and extended or displaced dorsally, surrounded on three sides by the U-shaped ABD TERG 8 to form a trophobiotic organ (to retain honeydew for collection by ants) **19**
- Anal plate and anus in normal posteroventral position **20**
19. Small faceted wax glands present on head (3 pairs), and spinal as well as marginal pairs of small wax glands present on thorax and abdomen. All body hairs pointed *Baizongia pistaciae*
- Wax glands not usually evident, or only marginal glands present. Dorsal body hairs pointed, spatulate or fan-shaped **20**
20. Anal plate with scattered, shortish, sometimes spatulate, hairs, not arranged in two longitudinal rows **21**
- Anal plate with long and usually pointed hairs arranged in two longitudinal rows (as well as finer, shorter hairs grouped near anus) **22**

21. R IV+V with 4–14 hairs. ABD TERG 8 with 11–25 hairs, and anal plate with 15–120 hairs. Dorsal hairs as well as those on anal plate very variable, often spatulate or fan-shaped, but not with very finely-attenuated apices *Geoica utricularia*
- R IV+V with 16–30 hairs. ABD TERG 8 with 50–100 hairs, and anal plate with c.80–200 hairs. Hairs on dorsal body and anal plate rarely spatulate, often with very finely attenuated apices *Geoica harpazi*
22. Primary rhinaria transversely elongated; slit-like, or of irregular shape with narrow diverticula *Geoica setulosa*
- Primary rhinaria oval or circular **23**
23. Hairs on ABD TERG 1–3 shorter than (0.75–0.80×) ANT BD III. ANT PT c.0.05 mm long, ANT PT/BASE 0.40–0.65 *Geoica sikkimensis**
- Longest hairs on ABD TERG 1–3 (unless all spatulate) more than 1.5× ANT BD III. ANT PT 0.015–0.04 mm long, ANT PT/BASE 0.15–0.52 **24**
24. Dorsal hairs comprising 1 spinal, 1 pleural and 1–4 marginal pairs per segment. Marginal wax glands usually present on ABD TERG 1–7. R IV+V 1.64–2.10× HT II. (Al. with secondary rhinaria ciliated) *Chaetogeoica graminiphaga**
- Dorsal hairs much more numerous, in bands across segments, with marginal groups of 3–10 hairs per segment, of which 1–2 are usually much longer. R IV+V 1.2–1.7× HT II. (Al. with secondary rhinaria with or without cilia) **25**
25. Dorsal hairs variable in form, but usually most are spatulate, except for 1–2 long acute marginal ones per segment. R IV+V with 4–8 accessory hairs. ABD TERG 8 with 5–9 hairs. (Al. with secondary rhinaria not ciliated) *Geoica lucifuga*
- Dorsal hairs not spatulate. R IV+V with 2–4 accessory hairs. ABD TERG 8 with 8–18 hairs. (Al. unknown) *Chaetogeoica polychaeta**
26. ANT 6-segmented, with ANT PT/BASE c.0.5 *Asiphonella* spp.
- ANT 4- or 5-segmented, with ANT PT/BASE less than 0.33 **27**
27. Body broadly spindle-shaped, with extremely short ANT and legs (ANT and tibiae both less than 0.2× BL) *Aploneura lentisci*
- Body broadly oval, ANT and tibiae both more than 0.2× BL **28**
28. Wax pore plates present on head, thorax and abdomen, especially well developed marginally on abdomen. R IV+V 0.13–0.175 mm long, with 4–8 accessory hairs. Cauda and anal plate forming a dark, rounded posterior projection of the abdomen *Prociphilus erigeronensis*
- Wax pore plates absent from head and typically also from thorax and margins of abdomen; usually with 4 (2 spinal and 2 pleural) on each of ABD TERG 3–6 and 1 spinal pair on ABD TERG 7. R IV+V 0.08–0.12 mm long, with 0(–2) accessory hairs. Cauda and anal plate not produced posteriorly *Pemphigus* spp. (e.g. *brevicornis*, *groenlandicus*, *similis*, *vulgaris*)

Digraphis* see *Phalaris***Dilomilis* (incl. *Octadesmia*)***D. montana***Orchidaceae**

Aphis gossypii; *Aulacorthum solani*;
Cerataphis orchidearum; *Neomyzus circumflexus*;
Sitobion luteum

Use key to aphids on orchids under *Cymbidium*.

HOST LISTS AND KEYS

Dimeria

D. ornithopoda (var. *tenera*)

Dimorphotheca

D. aurantiaca

D. sinuate

Use key to polyphagous aphids, p. 1020.

Diodia (incl. Hemidiodia)

D. ocymifolia

D. teres

Use key to polyphagous aphids, p. 1020.

Dioscorea

D. alata

D. bulbifera

D. japonica

D. trifida

Dioscorea spp.

Yams

Aphis gossypii; [*Macromyzus manoji*];

Macrosiphum euphorbiae

Aphis gossypii (as *minuta*)

Aulacorthum magnoliae; *Sitobion miscanthi*

Geopemphigus floccosus

[*Rhopalosiphum maidis*]; *Toxoptera citricidus*

Dioscoreaceae

Key to apterae on *Dioscorea*:-

1. ANT PT/BASE less than 1. SIPH absent. Anal plate displaced dorsally. Dorsal wax glands present
Geopemphigus floccosus
- ANT PT/BASE more than 1. SIPH present, tubular. Anal plate in normal position. Wax glands not evident **2**
2. SIPH dark, 1.4–1.9× cauda, with a subapical zone of polygonal reticulation. Hairs on ANT III less than 0.5× BD III
Sitobion miscanthi
- Without this combination of characters go to key to polyphagous aphids, p. 1020

Diospyros see Blackman and Eastop (1994)

Dipcadi

Dipcadi sp.

Hyacinthaceae

Aphis gossypii

Dipholis see *Sideroxylon*

Diplanthera see *Deplanchea*

Diplazium

D. japonicum

D. laffanianum

Woodsiaceae

Macromyzella polypodicola

Idiopterus nephrolepidis

Use key to apterae on ferns under *Polypodium*.

Diplocaulobium

D. chrysotropis

Orchidaceae

Sitobion luteum

Diplolophium
D. buchananii

Umbelliferae

Dysaphis sp. (Remaudière and Autrique, 1985: 131)

Diplopappus see *Aster*

Diplorhynchus
D. psilopus
Diplorhynchus sp.

Apocynaceae

[*Sitobion* sp. (Millar, 1994: 83)]
Toxoptera aurantii

Diplotaxis
D. harra

Cruciferae

Acyrtosiphon gossypii; *Aphis craccivora*;
Brevicoryne brassicae; *Myzus persicae*
Brevicoryne brassicae
Brevicoryne brassicae
Myzus persicae

D. muralis
D. tenuifolia
D. viminea

Key to apterae on *Diplotaxis*:-

1. ANT III 2.5–3.7× SIPH, which are 0.8–1.0× the broadly triangular cauda. Dorsal abdomen with paired dorsal markings 2
 Brevicoryne brassicae
- ANT III less than 1.5× SIPH, which are longer than the tongue- or finger-shaped cauda. Dorsal abdomen with or without dark markings 2
2. SIPH very long and thin, 2.5–3.5× cauda and 0.33–0.5× BL 2
 Acyrtosiphon gossypii
- SIPH shorter 2
 go to key to polyphagous aphids, p. 1020

Dipodium
D. roseum

Orchidaceae

Sitobion miscanthi

Dipogon
D. lignosus

Leguminosae

Acyrtosiphon pisum

Dipsacus
D. atropurpureus
D. fullonum (incl. ssp. *sylvestris*)

Dipsacaceae

Macrosiphum rosae
Aphis confusa, [*dipsacicola* Holman (nomen nudum)],
fabae, *ochropus*, *solanella*; *Macrosiphum rosae*;
Myzus persicae; [*Uroleucon rudbeckiae*]
Aphis eugeniae
Aphis ochropus; *Macrosiphum rosae*
Aphis ochropus; *Macrosiphum rosae*
Macrosiphum rosae

D. inermis
D. laciniatus
D. pilosus
D. strigosus
D. sylvestris see *D. fullonum*

Key to apterae on *Dipsacus*:-

1. ANT tubercles weakly developed. ABD TERG 7 with marginal tubercles (MTu). Cauda pale or dark 2
- ANT tubercles well developed. ABD TERG 7 without MTu. Cauda pale 5
2. Femoral hairs all much shorter than diameter of trochantrofemoral suture. Cauda dusky to dark with 2–9 hairs 3

HOST LISTS AND KEYS

- Many of femoral hairs long and fine, exceeding diameter of trochantrofemoral suture. Cauda black with 10–24 hairs 4
- 3. SIPH 2.0–2.8× cauda. R IV+V 1.4–1.8× HT II. ANT PT/BASE 2.9–3.7 *Aphis ochropus*
 – SIPH 0.8–2.2× cauda. R IV+V 1.1–1.4× HT II. ANT PT/BASE 1.5–3.3 *Aphis confusa*
- 4. Dark cross-bands present on ABD TERG 7 and 8, and often dark markings also on more anterior tergites. Hind tibia without a row of spine-like hairs. HT 1 usually with 2 hairs (no sense peg) *Aphis fabae* group (incl. *solanella*)
 – Dorsal abdomen without dark markings. Hind tibia with a row of spine-like hairs. HT I with 3 hairs (sense peg present) *Aphis eugeniae*
- 5. SIPH black, tapering/cylindrical, with a distal zone of polygonal reticulation. head dark, smooth, with inner faces of ANT tubercles divergent. ANT III with 10–35 rhinaria *Macrosiphum rosae*
 – SIPH pale, slightly clavate. Head spiculose with inner faces of ANT tubercles scabrous and apically convergent. ANT III without rhinaria *Myzus persicae*

Dipterocarpus see Blackman and Eastop (1994)

Disa

D. caulescens

D. uniflora

Aulacorthum solani

Aulacorthum solani

Orchidaceae

Discaria

Discaria sp.

Aphis sp. (BMNH colln – Chile)

Rhamnaceae

Disocactus (incl. *Heliocereus*, *Nopalxochia*)

D. ackermannii

Aphis gossypii; *Myzus persicae*

Cactaceae

Use key to polyphagous aphids, p. 1020.

Disperis

Disperis sp.

Aulacorthum solani

Orchidaceae

Disporum

D. hookeri

D. smithii

Disporum spp.

Aulacorthum solani; *Macrosiphum wilsoni*

Macrosiphum wilsoni

Macrosiphum euphorbiae

Convallariaceae

Key to apterae on *Disporum*:-

1. SIPH without polygonal reticulation. ANT tubercles with steep-sided, approximately parallel, inner faces, and head densely spiculose at least on underside *Aulacorthum solani*
 – SIPH with a subapical zone of polygonal reticulation. ANT tubercles with divergent inner faces, and head smooth or with only sparse, minute spinules 2
2. SIPH 2.3–3.4× cauda. R IV+V 1.0–1.2× HT II, which is 0.11–0.14 mm long *Macrosiphum wilsoni*
 – SIPH 1.7–2.2× cauda. R IV+V 0.8–1.0× HT II, which is 0.13–0.19 mm long *Macrosiphum euphorbiae*

Dissotis*D. senegambiensis**D. trothae***Melastomataceae***Aphis gossypii**Aphis gossypii*, *spiraecola*; *Myzus ornatus*

Use key to polyphagous aphids, p. 1020.

Distichlis*D. spicata***Gramineae***Aphis craccivora*; *Pemphigus* sp.;*Schizaphis graminum*Use key to aphids on grasses under *Digitaria***Distictis***D. gnaphalanta***Bignoniaceae***Aphis craccivora**Distylium* see Blackman and Eastop (1994)*Ditremexa* see *Cassia**Dittrichia* see *Inula**Dizygotheca* see *Schleffera***Dodartia***D. orientalis***Scrophulariaceae***Aphis gossypii***Dodecatheon***D. ×lemoinei**D. meadia**D. paucifolium***Primulaceae***Macrosiphum euphorbiae*; *Myzus persicae**Aphis gossypii*, *spiraecola**Macrosiphum euphorbiae*

Use key to polyphagous aphids, p. 1020.

Dodonaea*D. boroniaefolia**D. viscosa***Sapindaceae***Myzus persicae**Aphis gossypii*, *spiraecola*

Use key to polyphagous aphids, p. 1020.

Doellingeria see *Aster***Dolichos***D. gululu**D. lablab***Leguminosae***Aphis craccivora**Acyrtosiphon* [*caraganae*], *gossypii*, *pisum*;*Aphis craccivora*, *fabae*, *gossypii*;*Microparsus brasiliensis*; *Myzus ornatus*, *persicae*;*Neomyzus circumflexus*; *Rhopalosiphum rufiabdominale*

HOST LISTS AND KEYS

<i>D. lupiniflorus</i>	<i>Aphis craccivora</i>
<i>D. malosanus</i>	<i>Aphis craccivora</i> , <i>gossypii</i>
<i>D. monachalis</i>	<i>Aphis craccivora</i>
<i>D. sesquipedalis</i>	<i>Aphis craccivora</i>
<i>Dolichos</i> sp.	<i>Sitobion nigrinectarium</i>

Key to apterae on *Dolichos*:–

1. SIPH with proximal half pale, distal half dark and slightly clavate. (Wing veins of al. with broad black borders) *Microparsus brasiliensis*
 - SIPH uniformly pale or dark, or dark only at apices. (Wing veins of al. not black-bordered) **2**
2. SIPH black with a subapical zone of polygonal reticulation *Sitobion nigrinectarium*
 - SIPH pale or dark, if dark then without polygonal reticulation **3**
3. SIPH pale and attenuated distally, thinner than hind tibiae at their respective midlengths **4**
 - SIPH pale or dark, not attenuated distally, not thinner than hind tibiae at their respective midlengths go to key to polyphagous aphids. p. 1020
4. SIPH 0.23–0.38× BL, 1.2–1.9× cauda *Acyrtosiphon pisum*
 - SIPH 0.42–0.50× BL, 2.5–3.5× cauda *Acyrtosiphon gossypii*

Dombeya see Blackman and Eastop (1994)

Dorema

<i>D. ammoniacum</i>	<i>Aphis fabae</i> ; <i>Swirskiaphis polychaeta</i>
<i>D. ammomum</i>	<i>Aphis fabae</i>
<i>D. ochieri</i>	<i>Aphis fabae</i>

Umbelliferae

Key to apterae on *Dorema*:–

- Dorsal body hairs numerous, long and thick, more than 0.5× as long as SIPH. SIPH only 0.065–0.09× BL, about 1× HT II. ANT PT/BASE 1.6–2.3 *Swirskiaphis polychaeta*
- Dorsal body hairs fine, less than 0.5× as long as SIPH. SIPH 0.09–0.19× BL and 1.3–2.6× HT II. ANT PT/BASE (2.1–) 2.4–3.4 *Aphis fabae*

Doronicum

<i>D. austriacum</i>	<i>Aphis cacaliasteris</i> , <i>fabae</i> , <i>solanella</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; <i>Macrosiphum doronicicola</i> , <i>euphorbiae</i> ; <i>Nasonovia ribisnigri</i> ; <i>Uroleucon doronici</i>
<i>D. carpetanum</i>	<i>Brachycaudus helichrysi</i> ; <i>Uroleucon doronici</i>
<i>D. caucasicum</i>	<i>Protrama longitarsus</i> ; <i>Trama troglodytes</i> , [voigti Börner, 1940] <i>Uroleucon doronici</i>
<i>D. columnae</i>	<i>Brachycaudus cardui</i> ; <i>Neomyzus circumflexus</i>
<i>D. cruentum</i>	<i>Aphis fabae</i> ; <i>Brachycaudus helichrysi</i>
<i>D. grandiflorum</i>	<i>Aphis fabae</i> ; <i>Uroleucon doronici</i>
<i>D. orientale</i>	<i>Aphis fabae</i> ; <i>Brachycaudus helichrysi</i> ; <i>Uroleucon doronici</i>
<i>D. pardalianches</i>	<i>Aphis fabae</i> ; <i>Brachycaudus helichrysi</i> ; <i>Uroleucon doronici</i>
<i>Doronicum</i> spp.	<i>Brachycaudus tragopogonis</i> ; [<i>Protrama radialis</i>]

Compositae

Key to apterae on *Doronicum*:-

1. HT much elongated, more than 0.5× hind tibia. ANT PT/BASE less than 1. Body and appendages densely clothed in fine hairs 2
 - HT of normal length. ANT PT/BASE more than 1.5. SIPH present. Eyes multifaceted. Body and appendages less hairy 3
2. SIPH absent. ANT PT/BASE less than 0.25. ANT without sec. rhinaria and eyes with only 3 facets (except in rare alatiform apt.) *Trama troglodytes*
 - SIPH present as pores on slightly elevated, pigmented cones. ANT PT/BASE more than 0.25. Apt. typically alatiform, with secondary rhinaria on ANT and multifaceted eyes *Protrama longitarsus*
3. SIPH with subapical reticulation (at least 4–5 rows of closed polygonal cells) 4
 - SIPH without subapical reticulation 6
4. SIPH and cauda dark. ANT III with more than 20 rhinaria *Uroleucon doronici*
 - SIPH and cauda pale. ANT III with 1–10 rhinaria 5
5. R IV+V 1.05–1.38× HT II, and bearing 12–17 accessory hairs *Macrosiphum doronicicola*
 - R IV+V 0.8–1.0× HT II, and bearing 7–10 accessory hairs *Macrosiphum euphorbiae*
6. Head spiculose with well-developed, steep-sided ANT tubercles 7
 - Head not spiculose and ANT tubercles undeveloped or moderately developed 8
7. Dorsal abdomen with a large, dark, roughly horseshoe-shaped patch. SIPH 0.7–1.0× head width across (and including) eyes. Hind tibiae of immature forms densely spinulose *Neomyzus circumflexus*
 - Dorsum without any dark markings. SIPH 1.0–1.4× head width across eyes. Hind tibiae of immature forms smooth *Aulacorthum solani*
8. ANT III with 8–42 rhinaria. ANT PT/BASE 8–11. Cauda much longer than its basal width and bearing 7(–8) hairs *Nasonovia ribisnigri*
 - ANT III without rhinaria. ANT PT/BASE 1.5–5.0. If cauda is much longer than its basal width then it bears 10–24 hairs 9
9. Cauda dark, tongue-shaped, as long as or longer than its basal width, with 10–24 hairs. ABD TERG 1 and 7 with marginal tubercles (MTu). Spiracular apertures reniform 10
 - Cauda pale or dark, helmet-shaped or semi-circular, shorter than its basal width in dorsal view, with 4–9 hairs. ABD TERG 1 and 7 without MTu. Spiracular apertures rounded 11
10. ANT (of apt.) usually with rhinaria on III and IV, those on III being mostly on distal part of segment. Tibiae dark *Aphis cacaliasteris*
 - ANT without rhinaria on III and IV. Tibiae mostly pale *Aphis fabae* (or *A. solanella*); see polyphagous aphids key, p. 1020, couplet 35)
11. R IV+V 0.7–0.9× HT II. Dorsal abdomen usually with extensive dark sclerotisation, but with sclerites showing some division between segments. First tarsal segments each with 2 sense pegs (i.e., first tarsal chaetotaxy 4–4–4) *Brachycaudus tragopogonis*
 - R IV+V 1.2–2.0× HT II. Dorsal abdomen either membranous or with a solid dark sclerotic shield, not divided segmentally. First tarsal segments each with (0–) 1 sense peg (first tarsal chaetotaxy 3–3–3 or 3–3–2) 12
12. Dorsum membranous. SIPH pale and smooth, 0.9–1.6× cauda. Mesosternum without mammariform processes *Brachycaudus helichrysi*
 - Dorsum with a solid dark shield. SIPH dark, imbricated, 1.8–3.4× cauda. Mesosternum with a pair of dark mammariform processes *Brachycaudus cardui*

HOST LISTS AND KEYS

Dorycnium see *Lotus*

Dovyalis see Blackman and Eastop (1994)

Draba

D. borealis

D. ruaxes

Myzus ascalonicus

Myzus ascalonicus

Cruciferae

Dracaena

Dracaena spp.

Dracaenaceae

Aphis spiraeicola; *Rhopalosiphum padi*;

Toxoptera aurantii; *Uroleucon compositae*

Key to apterae on *Dracaena*:-

- SIPH cylindrical over most of length, slightly swollen distally but with a smooth constricted region just proximal to the well-developed flange. Dorsal cuticle ornamented with spicules arranged in polygons
Rhopalosiphum padi
- SIPH without a smooth constricted region below flange. Dorsal cuticle without spicules arranged in polygons
go to key to polyphagous aphids, p. 1020

Dracocephalum

D. austriacum

D. foetidum

D. latifolium (? – error for
lamiifolium or *lancifolium*?)

D. nutans

D. ruyschiana

Dracocephalum sp.

Aulacorthum solani

Klimaszewska dracocephali

Aphis spiraeicola

Aphis nepetae

Aphis balloticola

[*Aphis narzikulovi* (record based on misidentified host –
see Holman, 1988: 43)]

Labiatae

Key to apterae on *Dracocephalum*:-

1. ANT III with 31–33 rhinaria distributed over most of length. R IV+V and HT II each bearing c.40 hairs. First tarsal segments with 5 hairs
Klimaszewska dracocephali
- ANT III without (or with less than 10) rhinaria. R IV+V and HT II much less hairy. First tarsal segments with 2–3 hairs
go to key to polyphagous aphids, p. 1020 (but note that specimens running to
A. gossypii could be a species of the *frangulae* group, which includes *balloticola* and *nepetae*)

Dracophyllum

D. palustre

D. recurvatum

D. subulatum

Epacridaceae

?*Schizaphis* (*Euschizaphis*) sp. (New Zealand; BMNH colln)

?*Schizaphis* (*Euschizaphis*) sp. (New Zealand; BMNH colln)

?*Schizaphis* (*Euschizaphis*) sp. (New Zealand; BMNH colln)

Dregea

D. volubilis

Aphis nerii

Asclepiadaceae

Drepanocladus

D. aduncus

Muscaphis cuspidata

Amblystegiaceae

(or try key to apterae on mosses under *Polytrichum*)

Droogmansia*D. megalantha**D. vanderysti**Droogmansia* sp.*Sitobion africanum**Sitobion africanum**Aphis craccivora***Leguminosae**

Couplet for separating these two species:–

- Dorsum with variably developed, segmentally divided sclerotisation. SIPH with a subapical zone of polygonal reticulation *Sitobion africanum*
- Dorsum with an extensive solid black patch. SIPH without polygonal reticulation *Aphis craccivora*

Drosera*D. anglica**D. capillaris**D. intermedia**D. longifolia**D. loureirii**D. peltata* (incl. *lanata*)*D. rotundifolia**Drosera* spp.**Droseraceae***Aphis triglochinis*; *Rhopalosiphum nymphaeae**Hyalomyzus jussiaeae**Aphis triglochinis**Aphis triglochinis**Aphis droserae**Aphis droserae**Aphis nasturtii*, *triglochinis*; [*Cavariella aegopodii*];*Myzus lythri**Aphis frangulae*Key to apterae on *Drosera*:–

1. Head spiculose/nodulose, with rounded ANT tubercles. ABD TERG 1 and 7 without marginal tubercles (MTu). SIPH pale, 2.3–3.8× cauda **2**
 - Head without spicules or nodules, ANT tubercles undeveloped or weakly developed, not projecting beyond middle of front of head in dorsal view. ABD TERG 1 and 7 with MTu. SIPH pale or dark, 0.7–2.1× cauda **3**
2. ANT 0.5–0.6× BL, with ANT PT/BASE 2.4–3.0. SIPH not clavate *Myzus lythri*
 - ANT 1.1–1.3× BL, with ANT PT/BASE 4.0–5. SIPH slightly clavate *Hyalomyzus jussiaeae*
3. SIPH somewhat swollen on distal half, dark like cauda, ANT and legs. R IV+V 0.135–0.195 mm long, 1.3–1.7× ANT BASE VI *Rhopalosiphum nymphaeae*
 - SIPH cylindrical or tapering, pale or dark. Cauda pale or dark, ANT and legs at least partly pale. R IV+V usually shorter **4**
4. SIPH pale, sometimes dusky-tipped **5**
 - SIPH uniformly dark **6**
5. ANT PT/BASE 1.1–1.8. (Al. with secondary rhinaria distributed ANT III 25–60, IV 9–25, V 7–17) *Aphis triglochinis*
 - ANT PT/BASE 1.8–3.0 (Al. with secondary rhinaria distributed ANT III 8–16, IV 1–6, V 0–2) *Aphis nasturtii*
6. SIPH and cauda both black. SIPH short, 0.13–0.15× BL and 0.9–1.1× cauda. ANT dark except for basal part of ANT III *Aphis droserae*
 - Cauda paler than SIPH, which are usually more than 0.15× BL (range 0.09–0.26) and usually more than 1.1× cauda (0.85–2.16). ANT III–IV, and most of V, pale *Aphis frangulae* group

HOST LISTS AND KEYS

Dryas

D. integrifolia

D. octopetala

Dryas spp.

Rosaceae

Acyrtosiphon brevicorne

Acyrtosiphon brevicorne, *malvae*; [*Ericaphis latifrons*]

Macrosiphum rosae

Key to apterae on *Dryas*:–

1. SIPH black, with a subapical zone of polygonal reticulation. ANT III with 10–35 rhinaria
Macrosiphum rosae
- SIPH pale or dark, without polygonal reticulation. ANT III with 1–24 rhinaria (usually less than 10)
2
2. ANT 5- or 6-segmented, 0.7–0.8× BL, with PT/BASE 1.6–2.4. SIPH 0.15–0.18× BL and 1.1–1.4× cauda
Acyrtosiphon brevicorne
- ANT 6-segmented, 0.9–1.5× BL, with PT/BASE 4.4–7.5. SIPH 0.20–0.29× BL, 1.5–2.5× cauda
Acyrtosiphon malvae group

Drymaria

D. cordata

D. villosa

Drymaria sp.

Caryophyllaceae

Aphis craccivora, *gossypii*; *Aulacorthum solani*;

Brachycaudus helichrysi; [*Lipaphis erysimi*];

Myzus ornatus, *persicae*;

Neomyzus circumflexus; [*Sitobion pauliani*]

Aphis craccivora; *Neomyzus circumflexus*

Rhopalosiphum rufiabdominale

Use key to polyphagous aphids, p. 1020.

Drymoglossum see *Pyrrhosia*

Drynaria

D. volkensii

Polypodiaceae

Micromyzella pterisoides

(or try key to fern-feeding aphids under *Polypodium*)

Dryopteris

D. abbrevians

D. arguta

D. arida

D. austriaca see *dilatata*

D. carthuriana

D. dentata

D. dilatata (incl. *austriaca*)

D. filix-mas

D. marginalis?

D. molle

D. monticola

Dryopteridaceae

Idiopteris nephrolepidis

Macrosiphum walkeri

Macromyzella polypodicola

Amphorophora ampullata; *Idiopteris nephrolepidis*;

Macrosiphum dryopteridis; *Taiwanomyzus alpicola*

Idiopteris nephrolepidis

Amphorophora ampullata; *Macrosiphum dryopteridis*;

Taiwanomyzus filicis

Amphorophora ampullata;

Macromyzus maculata, *woodwardiae*;

Macrosiphum dryopteridis

Macrosiphum miho

Macromyzus maculatus

Macromyzus woodwardiae

<i>D. nipponensis</i>	<i>Idiopteris nephrolepidis</i>
<i>D. oligocarpa</i>	<i>Idiopteris nephrolepidis</i>
<i>D. palacea</i>	[<i>Eutrichosiphum alnicola</i>]
<i>D. parasitica</i>	<i>Macromyzus polypodicola</i>
<i>D. patagonica</i>	<i>Idiopteris nephrolepidis</i>
<i>D. rigida</i>	<i>Idiopteris nephrolepidis</i>
<i>D. spinulosa</i>	<i>Macrosiphum dryopteridis</i>
<i>D. thelypteris</i>	<i>Macrosiphum lambi</i>
<i>D. varia</i>	<i>Macrosiphum woodwardiae</i>
<i>Dryopteris</i> sp.	[<i>Shinjia orientalis</i>]

Use general key to fern-feeding aphids under *Polypodium*.

Drypetes*D. lateriflora***Euphorbiaceae***Aphis spiraeicola*

Duabanga see Blackman and Eastop (1994)

Duboisia*D. myoporoides***Solanaceae***Myzus persicae***Duchesnea***D. indica***Rosaceae**

Acyrtosiphon malvae (ssp. *borealis*);
Aphis nasturtii; *Myzus ornatus*, *persicae*

Use key to polyphagous aphids, p. 1020.

Ducrosia*Ducrosia* sp.**Umbelliferae***Hyadaphis foeniculi*

Duggena see *Gonzalagunia*

Duranta*D. ellisia**D. erecta**D. plumieri**D. repens* (incl. var. *aurea*)*D. stenostachya***Verbenaceae***Aphis nerii**Aphis gossypii*; *Myzus ornatus*, *persicae**Aphis gossypii*, *nerii*, *punicae*, *spiraecola*;*Brachycaudus helichrysi*; *Myzus ornatus*, *persicae*;*Toxoptera odinae**Aphis gossypii*, *punicae*; *Myzus ornatus*, *persicae*;*Toxoptera odinae**Myzus persicae*

Key to apterae on *Duranta*:–

1. Head spinulose with well-developed, apically convergent ANT tubercles 2
- Head without spicules, ANT tubercles undeveloped or weakly developed, not projecting beyond middle of front of head in dorsal view 3
2. SIPH slightly clavate. Dorsum without dark intersegmental markings. ANT PT/BASE 2.8–4.5

Myzus persicae

HOST LISTS AND KEYS

- SIPH tapering, usually with a slight ‘S’-curve. Dorsum with a pattern of dark intersegmental markings. ANT PT/BASE 1.7–2.8 *Myzus ornatus*
- 3. Cauda helmet-shaped, shorter than its basal width in dorsal view. SIPH smooth, conical, with a subapical annular incision below the large flange. Spiracular apertures rounded. ABD TERG 1 and 7 without marginal tubercles (MTu) *Brachycaudus helichrysi*
- Cauda tongue-shaped, longer than its basal width. SIPH imbricated, without a subapical annular incision. Spiracular apertures reniform. ABD TERG 1 and 7 with MTu 4
- 4. SIPH and cauda both black 5
- SIPH pale or dark, cauda pale or dusky (paler than SIPH) 7
- 5. SIPH 0.4–0.6× cauda. Stridulatory apparatus present. ABD TERG 2 usually, and 3 often, with marginal tubercles (MTu) *Toxoptera odinae*
- SIPH 0.9–2.7× cauda. No stridulatory apparatus. ABD TERG 2 and 3 rarely with MTu 6
- 6. SIPH 0.9–1.7× cauda. ANT PT/BASE 1.9–2.8 *Aphis spiraeicola*
- SIPH 1.7–2.7× cauda. ANT PT/BASE 3.4–4.1 *Aphis nerii*
- 7. SIPH often paler at base, and usually less than 1.5× cauda, which bears 7–9 hairs. (Al. often with 1 or more rhinaria on ANT IV) *Aphis punicae*
- SIPH uniformly dark, usually more than 1.5× cauda, which bears 4–7 hairs. (Al. usually without rhinaria on ANT IV) *Aphis gossypii*

Dyckia

D. brevisflora

D. floribunda

D. rariflora

Bromeliaceae

Hysteroneura setariae

Aphis fabae, *gossypii*

[*Aphis* sp. – Leonard, 1972a: 100]; *Myzus persicae*

Key to apterae on *Dyckia*:-

- Cauda pale, elongate and with only 4 hairs, contrasting with black, calf-shaped SIPH. ANT PT/BASE 4.8–6.7. (Al. with only 1 oblique vein in hind-wing) *Hysteroneura setariae*
- Without that combination of characters go to key to polyphagous aphids, p. 1020.

Dyctyosperma see *Dictyosperma*

Dyschoriste

D. heudelotiana

D. ?radicans

Acanthaceae

Aphis gossypii

Aphis gossypii

Dysophylla see *Pogostemon*

Dysoxylum see Blackman and Eastop (1994)

Dyssodia

D. tagetifolia

Dyssodia sp.

Compositae

Geopempigus sp. (*blackmani*?)

Myzus persicae

Couplet for separating these species:–

- ANT PT/BASE less than 1. SIPH absent. Anal plate displaced dorsally. Dorsal wax glands present on head, thorax and abdomen. (On roots) *Geopemphigus (blackmani?)*
- ANT PT/BASE 2.8–4.5. SIPH present, tubular, slightly clavate. Anal plate in normal position. No discrete wax glands. (On aerial parts) *Myzus persicae*

(or use key to polyphagous aphids, p. 1020)

Dystaenia

D. ibukiensis
D. takeshimana

Umbelliferae

Cavariella japonica
Brachycaudus helichrysi

Couplet for separating these two species:–

- ABD TERG 8 with a small process bearing a pair of hairs. SIPH rugose, without a subapical annular incision, 2.7–3.0× cauda. Tergum pigmented, and with nodulose ornamentation. Spiracular apertures small, occluded *Cavariella japonica*
- ABD TERG 8 without a small hair-bearing process. SIPH short, smooth, with a subapical annular incision. Tergum unpigmented, smooth. Spiracular apertures large and rounded *Brachycaudus helichrysi*

Ecballium

E. elaterium

Cucurbitaceae

Aphis [ecballii], gossypii;
Aulacorthum solani; *Macrosiphum euphorbiae*;
Myzus ornatus

Use key to polyphagous aphids, p. 1020.

Eccoilopus* see *Spodiopogon

Echeveria

E. crenulata
E. gibbiflora
E. gigantea
Echeveria sp.

Crassulaceae

[*Aphis* sp. (Leonard, 1972a)]
Aphis sedi
Aphis sedi
Macrosiphum centranthi

Couplet for two species on *Echeveria*:–

- Body spindle-shaped, BL 2.0–3.6 mm. ANT 1.3–1.6× BL. SIPH pale with dark apices, 1.8–2.2× cauda, with subapical polygonal reticulation. Rostrum (total length measured from base of protractor apodeme) less than 0.25× BL *Macrosiphum centranthi*
- Body oval, BL 1.0–1.7 mm. ANT 0.5–0.8× BL. SIPH uniformly dark, 0.8–1.4× cauda, without polygonal reticulation. Rostrum total length 0.30–0.42× BL *Aphis sedi*

Echinacea

E. purpurea

Compositae

[*Macrosiphum* sp. (Ossiannilsson, 1964)];
Uroleucon leonardi

Echinocarpus see *Sloanea*

Echinochloa

E. colonum

E. crusgalli

E. pyramidalis

Gramineae

Aphis gossypii; *Geoica lucifuga*;
Hysteroneura setariae;
Rhopalosiphum maidis, rufiabdominale;
Melanaphis indosacchari, sacchari; *Smynthuroides betae*;
Tetraneura basui, caerulescens, fusiformis, javensis
Anoecia corni, fulviabdominalis, setariae;
Aphis middletonii;
Carolinaia rhois; *Diuraphis noxia*; *Forda marginata*;
Geoica utricularia; *Hysteroneura setariae*;
Melanaphis sacchari; *Paracletus cimiciformis*;
 [*Pseudoregma alexanderi*];
Rhopalosiphum maidis, padi, rufiabdominale;
Schizaphis graminum; *Sitobion avenae, miscanthi*;
Tetraneura basui, fusiformis, nigriabdominalis, triangula,
radicicola, ulmi, yezoensis
Rhopalosiphum maidis

Use key to apterae of grass-feeding aphids under *Digitaria*.

Echinocystis

E. fabacea

E. lobata

Echinocystis sp.

Cucurbitaceae

Aphis gossypii
Aphis gossypii; *Macrosiphum euphorbiae*
Macrosiphum echinocysti

Key to apterae on *Echinocystis*:-

1. Body oval. SIPH uniformly dark, shorter than distance between their bases, without polygonal reticulation. Cauda with 4–7 (–8) hairs *Aphis gossypii*
- Body spindle-shaped. SIPH pale (or dark-tipped), longer than the distance between their bases, with a subapical zone of polygonal reticulation. Cauda with 8–15 hairs **2**
2. ANT PT/BASE about 7. SIPH 0.35–0.4× BL, with polygonal reticulation on distal 0.17–0.25. SIPH 2.1–2.6× cauda which bears 12–15 hairs *Macrosiphum echinocysti*
- ANT PT/BASE 5.3–6.5. SIPH 0.25–0.35× BL, with polygonal reticulation on distal 0.13–0.20. SIPH 1.7–2.2× cauda which bears 8–12 hairs *Macrosiphum euphorbiae*

Echinodorus

E. berteroi

E. ranunculoides

Alismataceae

Rhopalosiphum nymphaeae
Rhopalosiphum nymphaeae

Echinophora

E. tenuifolia

Umbelliferae

Anuraphis cachryos

Echinops

E. albicaulis

Compositae

Aphis echinopsicola; *Paczoskia paczoskii* ssp. *turanica*;
Turanoleucon jashenkoi

<i>E. bannaticus</i>	<i>Paczoskia longipes</i>
<i>E. commutatus</i>	<i>Aphis fabae</i> ; <i>Paczoskia longipes</i>
<i>E. cornigerus</i>	<i>Uroleucon budhium</i>
<i>E. dahuricus</i>	[<i>Aphis</i> (<i>Protaphis</i>) sp. (Holman, 1991c: 48)]
<i>E. echinata</i>	<i>Myzus persicae</i> ; <i>Uroleucon echinatum</i>
<i>E. exaltatus</i>	<i>Paczoskia longipes</i>
<i>E. galalensis</i>	<i>Paczoskia meridionalis</i>
<i>E. galaticus</i>	<i>Paczoskia colchica</i>
<i>E. karatavicus</i>	<i>Paczoskia paczorskii</i> ssp. <i>turanica</i>
<i>E. longifolius</i>	<i>Aphis gossypii</i>
<i>E. maracandicus</i>	<i>Paczoskia paczorskii</i> ssp. <i>turanica</i>
<i>E. microcephalus</i>	<i>Paczoskia brevipilosa</i> , <i>major</i> ssp. <i>bulgarica</i>
<i>E. ritro</i>	<i>Aphis fabae</i> , <i>middletonii</i> ; <i>Brachycaudus helichrysi</i> ; <i>Paczoskia major</i> , <i>paczorskii</i> ; <i>Turanoleucon jashenki</i>
<i>E. ritro</i> ssp. <i>tenuifolius</i>	<i>Paczoskia brevipilosa</i>
<i>E. ruthenicum</i>	<i>Brachycaudus cardui</i> ; <i>Paczoskia paczorskii</i> , <i>paczorskii</i> ssp. <i>ruthenica</i> , [<i>Paczoskia</i> sp. (Szelegiewicz, 1964a)]
<i>E. sphaerocephalus</i>	<i>Aphis fabae</i> , <i>terricola</i> ; <i>Aulacorthum solani</i> ; <i>Paczoskia major</i>
<i>E. spinosissimus</i>	<i>Paczoskia meridionalis</i>
<i>E. spinosus</i>	<i>Aphis echinopsis</i> , [<i>pseudocardui</i>]
<i>E. tjanschanicus</i>	<i>Paczoskia paczorskii</i> ssp. <i>turanica</i>
<i>E. viscosus</i>	<i>Paczoskia meridionalis</i>
<i>Echinops</i> spp.	<i>Aphis</i> [<i>anuraphoides</i>]; <i>Brachycaudus cardui</i> ssp. <i>turanica</i> ; <i>Paczoskia wagneri</i>

Key to apterae on *Echinops*:-

Couplets 8–16 are based largely on Holman (1981).

1. Cauda short, bluntly triangular, semi-circular or helmet-shaped, shorter than or not clearly longer than (less than 1.3×) its basal width in dorsal view 2
 - Cauda tongue- or finger-shaped or acutely triangular, clearly longer than (more than 1.4×) its basal width in dorsal view 6
2. ANT PT/BASE 0.8–2.1. ABD TERG 1 and 7 with (and 2–5 without) marginal tubercles (MTu). Spiracular apertures reniform. SIPH dark. Cauda with 8–22 hairs 3
 - ANT/BASE 2.4–5.1. ABD TERG 1 and 7 without MTu. Spiracular apertures large and rounded. SIPH pale or dark. Cauda with 4–8 hairs 5
3. ANT PT/BASE 1.7–2.1. R IV+V 0.8–1.2× SIPH. Cauda with 8–16 hairs *Aphis middletonii*
 - ANT PT/BASE 0.8–1.1. R IV+V long, 1.5–2.5× SIPH. Cauda with 16–22 hairs 4
4. Hairs on ANT III 12–20µm long, 0.9–1.2× BD III. Longest hairs on hind femur 18–35µm long. R IV +V 1.8–2.6× SIPH. SIPH 4–6× longer than longest hair on ANT III *Aphis echinopsis*
 - Hairs on ANT III 5–11µm long, 0.4–0.8× BD III. Longest hairs on hind femur 12–15µm long. R IV +V 1.16–1.75× SIPH. SIPH 8–16× longer than longest hair on ANT III *Aphis terricola* or *echinopsicola*
5. Dorsal abdomen without dark markings. SIPH pale, smooth, about 1.1–1.3× cauda *Brachycaudus helichrysi*

HOST LISTS AND KEYS

- Dorsal abdomen with a solid dark shield. SIPH dark, imbricated, 2.1–3.4× cauda
Brachycaudus cardui (incl. ssp. *turanica*)
- 6. SIPH with a subapical zone of polygonal reticulation (at least 3–4 rows of closed cells) 7
- SIPH without polygonal reticulation 19
- 7. Conspicuous dark, crescent-shaped antesiphuncular sclerites present. SIPH long and thin, somewhat flared apically, with polygonal cells relatively large and few in number 8
- Antesiphuncular sclerites absent. SIPH thicker, not flared apically, with polygonal cells small and very numerous 17
- 8. Hairs on ANT III only 0.2–0.3× BD III. ANT I 0.30–0.35× width of head across (and including) eyes
Paczoskia brevopilosa
- Hairs on ANT III 0.5 or more×BD III. ANT I 0.35–0.53× head width across eyes 9
- 9. First tarsal segments always with 3 hairs. R IV+V with 6–9 (mostly 6–7) accessory hairs 10
- First tarsal segments with 4–6 hairs (exceptionally 3 hairs on one or more tarsi). R IV+V with 8–28 accessory hairs 14
- 10. R IV+V 0.35–0.39× head width, and 1.35–c.1.5× HT II 11
- R IV+V 0.41–0.51 (rarely less than 0.44)× head width, and 1.6–2.0× HT II 12
- 11. Reticulation of SIPH consisting of 20–25 transverse rows of closed cells covering distal 0.35–0.4 of its length. ANT BASE VI 0.27–0.29× head width. SIPH 1.3–1.4× cauda *Paczoskia wagneri*
- Reticulation of SIPH consisting of 3–4 transverse rows of rather indistinct cells occupying less than 0.1 of length. ANT BASE VI 0.37–0.45× head width. SIPH 1.7–1.9× cauda *Paczoskia longipes*
- 12. ANT BASE VI and ANT I are respectively 0.35–0.41 and 0.43–0.46× head width. ABD TERG 3 with 9–15 hairs. ANT with base of IV (as well as III) paler *Paczoskia paczorskii* ssp. *ruthenica*
- ANT BASE VI and ANT I are respectively 0.25–0.35 and 0.35–0.43× head width **or, if longer**, then ABD TERG 3 has 15–24 hairs, **or** ANT III–VI are uniformly dark pigmented except for base of III 13
- 13. ANT III–VI uniformly dark pigmented, except for pale/dusky base of III. ABD TERG 3 with 11–17 hairs (rarely more than 15) *Paczoskia paczorskii* s. str.
- ANT III and basal half of IV pale or dusky. clearly paler than apex of IV and V–VI. ABD TERG 3 with 15–24 hairs (rarely less than 17) *Paczoskia paczorskii* ssp. *turanica*
- 14. ANT PT/BASE 5.8–7.3. First tarsal segments mostly with 4 hairs (more rarely 3 or 5). R IV+V with 8–12 accessory hairs *Paczoskia colchica*
- ANT PT/BASE 3.9–5.6. First tarsal segments usually with 5–6 hairs (rarely one or more tarsi with 4). R IV+V with 11–28 accessory hairs 15
- 15. ANT VI BASE 0.24–0.30× head width *Paczoskia meridionalis*
- ANT VI BASE 0.31–0.44× head width 16
- 16. R IV+V 0.48–0.57× head width, with 16–22 accessory hairs. Hind femur 2.35–2.60× head width *Paczoskia major* s. str.
- R IV+V 0.39–0.49× head width, with 11–15 accessory hairs. Hind femur 1.95–2.35× head width *Paczoskia major* ssp. *bulgarica*
- 17. R IV+V 1.1–1.2× HT II *Uroleucon echinatum*
- R IV+V long and slender, 1.7–2.3× HT II 18
- 18. Cauda pale. ANT tubercles well developed, median frontal tubercle undeveloped. SIPH with reticulation on distal 0.14–0.17 of length *Uroleucon budhium*

- Cauda dark. ANT tubercles low, median tubercle developed. SIPH with reticulation on distal 0.4–0.45 of length *Turanoleucon jashenkoi*
- 19. SIPH wholly dark. Head smooth, with ANT tubercles weakly developed. ABD TERG 1 and 7 with MTu **20**
- SIPH mainly pale, often darker at apices. Head with spicules, ANT tubercles well developed, spiculate, steep-sided. ABD TERG 1 and 7 without MTu **21**
- 20. Cauda paler than SIPH and bearing 4–8 hairs. Dorsal abdomen without any dark markings. Hairs on hind femur shorter than its basal diameter *Aphis gossypii*
- Cauda as black as SIPH, with 11–24 hairs. Dorsal abdomen with dark cross-bands on ABD TERG 7 and 8, and often with scattered dark markings anteriorly. Hairs on hind femur long and fine, mostly longer than its basal diameter *Aphis fabae* group
- 21. SIPH slightly clavate. ANT III always without rhinaria *Myzus persicae*
- SIPH not clavate. ANT III usually with 1–2 small rhinaria near base *Aulacorthum solani*

Echinopsilon* see *Bassia***Echinopsis****E. chiloensis**Aphis danielae***Cactaceae*****Echinospartum****E. barnadesii* (incl. *dorsisericum*, *lusitanicum*)*Acyrtosiphum echinospartii, pisum; Aphis cytisorum***Leguminosae***E. horridum**Aphis craccivora**E. ibericum**Aphis cytisorum***Key to apterae on *Echinospartum*:-**

1. Oval aphid with ANT tubercles weakly developed, and ANT 0.5–0.8× BL. Dorsum with extensive dark sclerotisation. SIPH and cauda dark **2**
 - Broadly spindle-shaped aphid with ANT tubercles very well developed, and ANT 0.9–1.6× BL. Dorsum membranous. SIPH and cauda pale or dusky **3**
2. R IV+V 0.88–1.16× HT II (mostly 0.9–1.05×). Anterior half of genital plate with 2 (–3) hairs *Aphis craccivora*
 - R IV+V 0.97–1.3× HT II (mostly 1.06–1.2×). Anterior half of genital plate with 2–8 hairs (mode 4, mean 5.2) *Aphis cytisorum*
3. ANT I with 9–23 hairs. ANT PT/BASE 3.0–4.8. Cauda with 8–14 hairs *Acyrtosiphon pisum*
 - ANT I with 5–8 hairs. ANT PT/BASE 2.3–2.72. Cauda with 5–8 hairs (the distal ones being very short and blunt) *Acyrtosiphon echinospartii*

Echinospertum* see *Lappula***Echites****E. agglutinata**Aphis spiraeicola**E. arguta**Brachycaudus helichrysi**E. umbellata**Aphis spiraeicola***Apocynaceae**

Use key to polyphagous aphids, p. 1020.

Echium

E. angustifolium
E. decaisnei
E. giganteum
E. herreme
E. hottentotica
E. italicum
E. lycopsis
E. nervosum
E. plantagineum
E. rubrum

E. vulgare

E. wildpretii

Echium sp.

Boraginaceae

Brachycaudus helichrysi; *Myzus persicae*
Aphis gossypii
Myzus persicae
Brachycaudus cardui
Myzus persicae
Brachycaudus cardui
Brachycaudus helichrysi
Brachycaudus bicolor; *Myzus ornatus*, *persicae*
Brachycaudus helichrysi
Brachycaudus ?cardui (Bozhko, 1976a, as *B. symphyti*
 Schrank)
Aphis fabae, *solanella*, *symphyti*;
Brachycaudus cardui, *helichrysi*, *mordvilkoii*;
Myzus persicae; [*Uroleucon jaceae*]
Aphis gossypii
Nasonovia ribisnigri

Key to apterae on *Echium*:–

1. Cauda semi-circular or helmet-shaped, not longer than its basal width in dorsal view. Spiracular apertures rounded **2**
 - Cauda tongue- or finger-shaped, clearly longer than its basal width **5**
2. Dorsum without any dark markings. SIPH 0.9–1.5× cauda. Mesosternum without mammariform processes *Brachycaudus helichrysi*
 - Dorsum with a dark shield or extensive dark markings. SIPH 2.1–3.4× cauda. Mesosternum with a pair of dark mammariform processes **3**
3. Broad, flat, pale marginal tubercles (MTu) present on ABD TERG 1–7, larger than the spiracles and occupying almost the whole of the sclerites on which they are placed. ABD TERG 7 often, and 6–8 sometimes, with spinal tubercles (STu) *Brachycaudus bicolor*
 - MTu irregularly present on ABD TERG 2–4, sometimes also on 1 and/or 5, but never on 6 and 7, and generally smaller than the spiracles. No STu **4**
4. Longest hairs on ABD TERG 8 are 60–110µm long. Genital plate with 25–42 hairs, of which 8–17 are on the anterior half. ANT III usually without rhinaria. (Al. with 21–35 rhinaria on ANT III and usually without, rarely with 1–2, on IV) *Brachycaudus cardui*
 - Longest hairs on ABD TERG 8 are 10–16µm long. Genital plate with 16–23 hairs of which 2–5 are on anterior half. ANT III usually with 1–12 rhinaria. (Al. with 12–16 rhinaria on ANT III, and 2–3 on IV) *Brachycaudus mordvilkoii*
5. ANT tubercles weakly developed. SIPH uniformly dark. ABD TERG 1 and 7 with MTu **6**
 - ANT tubercles well developed. SIPH mainly pale. ABD TERG 1 and 7 without MTu **8**
6. Cauda black with 11–27 hairs. Dorsal abdomen usually with transverse dark bands on ABD TERG 7 and 8, and often with dark markings on more anterior tergites *Aphis fabae* (or *A. solanella*); see couplet 35 of polyphagous aphids key, p. 1020
 - Cauda paler than SIPH, with 4–11 hairs. Dorsal abdomen without dark markings, or with only narrow bands on ABD TERG (7)–8 **7**

7. Total length of rostrum (measured from base of protractor apodeme) 0.43–0.60 mm, 0.27–0.36× BL. (Al. with 1–4 rhinaria on ANT IV) *Aphis symphyti*
 – Total length of rostrum 0.34–0.49 mm, 0.22–0.28× BL. (Al. usually with 0, rarely with 1–2, rhinaria on ANT IV) *Aphis gossypii*
8. Head smooth, with divergent ANT tubercles. ANT III with 3–36 rhinaria on swollen basal part. ANT PT/BASE 7.0–11.4. SIPH cylindrical, almost smooth. Thoracic spiracles much larger than abdominal spiracles *Nasonovia ribisnigri*
 – Head spiculose, with ANT tubercles apically convergent. ANT III without rhinaria. ANT PT/BASE 1.75–4.5. SIPH slightly clavate, imbricated. Thoracic spiracles similar in size to abdominal ones
9. SIPH slightly clavate. ANT PT/BASE 3.0–4.5. Dorsal abdomen without dark intersegmental markings. Immatures with smooth hind tibiae *Myzus persicae*
 – SIPH tapering with a slight ‘S’-curve. ANT PT/BASE 1.75–2.8. Dorsal abdomen with a pattern of dark intersegmental markings. Immatures with spinulose hind tibiae *Myzus ornatus*

9

Eclipta

- E. alba*
E. erecta see *alba*
E. prostrata

Compositae

- Aphis fabae*, *gossypii*; *Uroleucon ambrosiae*
Aphis gossypii

Use key to polyphagous aphids, p. 1020.

Eclypta* see *Eclipta***Edgeworthia***

- E. ‘grandii’ (gardneri?)*

Thymelaeaceae

- Neomyzus circumflexus*; *Rhopalosiphum padi*

Use key to polyphagous aphids, p. 1020.

Edraianthus

- E. croaticus*
E. kitaibelii
E. yugoslavicus

Campanulaceae

- Uroleucon ?minosmartelli* (Serbia; O Petrović, pers. comm.)
Aulacorthum solani
Uroleucon ?minosmartelli (Serbia; O Petrović, pers. comm.)

Key to apterae on *Edraianthus*:-

- SIPH and cauda black, SIPH 1.5–1.8× cauda and with polygonal reticulation on distal 0.3–0.46 of length. Head smooth, and ANT III with 15 or more rhinaria extending over more than 0.5 of length *Uroleucon ?minosmartelli*
 – SIPH and cauda pale, SIPH 1.8–2.6× cauda and without polygonal reticulation. Head spiculose, and ANT III with 1–3 small rhinaria near base *Aulacorthum solani*

Egletes

- E. viscosa*

Compositae

- Uroleucon ambrosiae*

HOST LISTS AND KEYS

Ehretia see Blackman and Eastop (1994)

Ehrharta

E. calycina

Gramineae

Rhopalosiphum maidis; *Schizaphis graminum*;
Smynthuroides betae

Use key to apterae of grass-feeding aphids under Digitaria.

Eichhornia

E. crassipes

Pontederiaceae

Neomyzus circumflexus; *Rhopalosiphum nymphaeae*

Couplet for separating apterae of these two species:–

- Head smooth with weakly developed ANT tubercles. SIPH clavate, with a smooth constricted region proximal to the flange. Dorsal cuticle ornamented with spinules arranged in polygons, without dark markings *Rhopalosiphum nymphaeae*
- Head spinulose with well-developed ANT tubercles. SIPH tapering/cylindrical, without a smooth sub-apical constriction. Dorsum with dark thoracic cross-bands and a roughly horseshoe-shaped abdominal sclerite *Neomyzus circumflexus*

(or, if neither combination applies, go to key to polyphagous aphids, p. 1020)

Elaeagnus, *Elaeis*, *Elaeocarpus* see Blackman and Eastop (1994)

Elatinoides

E. elatine

Scrophulariaceae

Aphis elatinoidei

Eleocharis (incl. *Heleocharis*)

E. erythropoda

E. flavescens

E. obtusa

E. palustris

Eleocharis sp.

Cyperaceae

Rhopalosiphum cerasifoliae

Carolinaia caricis

Rhopalosiphum cerasifoliae

Sipha glyceriae

Rhopalosiphum rufiabdominale

Key to apterae on *Eleocharis*:–

1. SIPH very short, stump-like. Dorsum with spine-like hairs and many small pointed denticles *Sipha glyceriae*
– SIPH tubular, cylindrical or tapering. Dorsal hairs short or long but not spine-like **2**
2. ANT usually 5-segmented, with PT/BASE 1.0–1.5. Dorsum strongly wrinkled. SIPH rugose, with somewhat swollen distal part that is broader than base *Carolinaia caricis*
– ANT 5 or 6-segmented, with PT/BASE 3.6–4.2. Dorsum smooth or with pattern of spicules. SIPH with normal or coarse imbrication, tapering/cylindrical, not broader on distal part than at base. **3**
3. ANT 5-segmented, bearing long hairs up to 4–5× BD III. Dorsal hairs also long and conspicuous. SIPH and cauda dark *Rhopalosiphum rufiabdominale*
– ANT 6-segmented, with longest hairs 0.4–0.6× BD III. Dorsal hairs also short and blunt. SIPH pale/dusky with darker apices, cauda pale/dusky *Rhopalosiphum cerasifoliae*

Elephantopus (incl. Pseudelephantopus)**Compositae**

<i>E. carolianus</i>	<i>Uroleucon elephantopica</i>
<i>E. mollis</i>	<i>Aphis gossypii</i>
<i>E. scaber</i>	<i>Sitobion congolense</i> ; <i>Uroleucon compositae, vernoniae</i>
<i>E. spicatus</i>	<i>Aphis gossypii</i> ; <i>Uroleucon ambrosiae, vernoniae</i>
<i>Elephantopus</i> sp.	<i>Brachycaudus helichrysi</i>

Key to apterae on *Elephantopus*:–

1. SIPH with subapical polygonal reticulation 2
 - SIPH without polygonal reticulation use key to polyphagous aphids, p. 1020
2. SIPH thin, about as thick as hind tibia at their respective midlengths. reticulation of SIPH consisting of rather few, large cells on distal 0.10–0.17 of length. Hairs on ANT III very short, less than 0.3× BD III. Cauda pale *Sitobion congolense*
 - SIPH rather thick, distinctly thicker than hind tibia at midlength, with reticulation consisting of numerous small polygonal cells on more than 0.17 of length. Hairs on ANT III more than 0.5× BD III. Cauda pale or dark 3
3. Cauda black. ANT III with 23–77 rhinaria 4
 - Cauda pale. ANT III with 5–31 rhinaria 5
4. R IV+V 1.5–1.8× HT II. ANT III with 23–57 rhinaria *Uroleucon vernoniae*
 - R IV+V 1.1–1.4× HT II. ANT III with 46–82 rhinaria *Uroleucon compositae*
5. R IV+V 0.22–0.24 mm, c.2× HT II. Cauda with 5–7 hairs *Uroleucon elephantopica**
 - R IV+V 0.16–0.22 mm, 1.2–1.4× HT II. Cauda with 12–27 hairs *Uroleucon ambrosiae*

Elettaria**Zingiberaceae**

<i>E. cardamomum</i>	<i>Aphis craccivora</i> ; <i>Pentalonia kalimpongensis, nigronervosa</i> ; <i>Pseudoregma nicolaiae</i>
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Use key to apterae on *Hedychium*.

Eleusine**Gramineae**

<i>E. coracana</i>	<i>Anoecia corni</i> ; <i>Aphis gossypii, spiraecola</i> ; <i>Brachycaudus helichrysi</i> ; <i>Geoica lucifuga</i> ; <i>Hysteroneura setariae</i> ; <i>Melanaphis sorghi</i> ; <i>Rhopalosiphum maidis, padi</i> ; <i>Schizaphis graminum</i> ; <i>Sitobion avenae, leelamaniae, miscanthi</i> ; <i>Tetraneura basui, fusiformis, javensis, yezoensis</i>
<i>E. indica</i>	<i>Anoecia cornicola</i> ; <i>Aphis gossypii, middletonii, spiraecola</i> ; <i>Chaetogeica graminiphaga</i> ; <i>Geoica lucifuga, utricularia</i> ; <i>Hysteroneura setariae</i> ; <i>Metopolophium dirhodum</i> ; <i>Paraclotus cimiciformis</i> ; <i>Rhopalosiphum maidis, padi, rufiabdominale</i> ; <i>Schizaphis graminum, hypersiphonata</i> ; <i>Sipha flava</i> ; <i>Sitobion avenae, graminis, leelamaniae, miscanthi</i> , <i>pauliani, yakini</i> , [<i>Sitobion</i> sp. (Millar, 1994)]; <i>Tetraneura basui, fusiformis</i> ; <i>Toxoptera aurantii</i>

HOST LISTS AND KEYS

Eleusine sp.

[*Brachymyzus jasmini*]; *Brachysiphoniella montana*;
Sipha flava; *Tetraneura ulmi*

Use key to apterae of grass-feeding aphids under *Digitaria*.

Eleutheranthera

E. ruderalis

Compositae

Aphis gossypii; *Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Eletherococcus (incl. *Acanthopanax*)

E. aculeatus

E. divaricatus

E. senticosus

E. sessiliflorus

E. spinosus

E. trifoliatus

Eletherococcus sp.

Araliaceae

Aphis gossypii

Toxoptera odinae

Aphis ponomarenkoi; *Toxoptera odinae*

Toxoptera odinae

Toxoptera odinae

Aphis gossypii; *Toxoptera odinae*

Aphis spiraeicola

Key to apterae on *Eletherococcus*:-

1. SIPH 1.2–2.5× cauda, which bears 4–15 hairs 2
– SIPH 0.4–0.6× cauda, which bears 13–25 hairs 3
2. SIPH clearly darker than cauda, which has no constriction and bears 4–8 hairs. Femoral hairs mostly short *Aphis gossypii*
– SIPH and cauda both very dark. Cauda usually has an evident constriction between basal and distal part, and bears 7–15 hairs. Femora with long fine hairs *Aphis spiraeicola*
3. Stridulatory apparatus present, consisting of cuticular ridges on ABD sternites 5 and 6 and a row of peg-like hairs on each hind tibia *Toxoptera odinae*
– No stridulatory apparatus *Aphis ponomarenkoi**

Elodea

E. canadensis

Hydrocharitaceae

Rhopalosiphum nymphaeae

Elsholtzia

E. 'alba' (= *stauntonii* f. *albiflora*?)

E. blanda

E. ciliata

E. cristata

E. fruticosa

E. patrini

E. polystachya

E. pseudocristata

Elsholtzia sp.

Labiatae

Myzus ornatus

Myzus ornatus;

Sitobion aulacorthoides, *miscanthi*, [*rosaeiformis*]

Kaltenbachiella elsholtziae; [*Tuberocephalus momonis*]

Kaltenbachiella elsholtziae (as *japonica*)

Rhopalosiphoninus elsholtze

Kaltenbachiella elsholtziae; [*Tuberocephalus sakurae*]

Aphis gossypii

Lehrius papillicaudus

Subovatomyzus leucosceptri

Key to apterae on *Elsholtzia*:-

1. Body globose. ANT very short, 0.10–0.13× BL. Eyes 3-faceted. Tarsal segments I and II partially fused. Dorsal wax pore plates consisting of rings of rounded cells present on most segments. SIPH absent *Kaltenbachiella elsholtziae*

- Body oval or spindle-shaped. ANT usually 6-segmented, 0.5 or more × BL. Eyes multifaceted. Tarsi 2-segmented. No dorsal wax gland plates. Tubular SIPH present 2
- 2. SIPH with subapical polygonal reticulation 3
- SIPH without subapical polygonal reticulation 5
- 3. SIPH pale, mainly smooth, and markedly inflated over 0.67–0.75 of length, with maximum width of swollen part more than 2× minimum diameter of basal part. Cauda semicircular to helmet-shaped, shorter than its basal width in dorsal view *Rhopalosiphoninus elsholtze*
- SIPH wholly or mainly dark, imbricated on unreticulated part, tapering or cylindrical. Cauda long and pointed or finger-like 4
- 4. SIPH paler at base, 2.0–2.5× cauda. R IV+V with acute apex, 1.25–1.41× HT II. Head with rows of minute spinules ventrally *Sitobion aulacorthoides*
- SIPH wholly dark, 1.4–1.9× cauda. R IV+V with bulbous sides and blunt apex, 0.77–1.0× HT II. Head without spicules *Sitobion miscanthi*
- 5. Head smooth with well-developed, divergent ANT tubercles. Antennal and body hairs short, with somewhat capitate apices. SIPH pale, almost smooth, slightly but distinctly swollen on distal half, with a subapical annular incision. ANT PT/BASE 5.8–7.9 *Subovatomyzus leucosceptri*
- Without that combination of characters 6
- 6. SIPH tapering from broad base, squamous, flangeless, with small terminal aperture, c.4× cauda which is short with swollen basal part bearing 4 hairs and narrower, squamous apical part. ANT tubercles well developed, scabrous, and ANT I with projection on inner side *Lehrius papillicaudus**
- Without that combination of characters go to key to polyphagous aphids, p. 1020

***Elymus* (incl. *Elytrigia*, *Roegneria*)**

E. arenarius see *Leymus*

E. canadensis

E. caninus

E. ciliaris

E. dahuricus

E. europaeus

E. elongatus

E. excelsus

E. farctus (incl. *junceum*)

E. geniculatus

E. giganteus

E. glaucus

E. hispidus (incl. *barbulatus*,
graecus, *intermedium*, *littorale*,
trichophorum)

E. junceiformis

Gramineae

Carolinaia howardii, *rhois*; *Diuraphis noxia*;
Rhopalosiphum padi; *Schizaphis graminum*;
Sitobion avenae

Anoecia krizusi; *Diuraphis frequens*; *Rhopalosiphum padi*;
Sitobion avenae

Anoecia fulviabdominalis; *Rhopalosiphum rufiabdominale*;
Sitobion akebiae, *avenae*; *Tetraneura fusiformis*

Diuraphis elymophila; *Metopolophium dirhodum*;
Rhopalosiphum padi; *Sitobion avenae*

Forda formicaria

Diuraphis noxia

Rhopalosiphum padi; *Sitobion avenae*

Forda formicaria; *Rhopalosiphum padi*;

Schizaphis graminum; *Sitobion avenae*

Rhopalosiphum padi

Sipha taurica; *Sitobion fragariae*

Diuraphis frequens, *tritici*; *Sipha agropyronensis*

Anoecia corni, *vagans*; *Diuraphis noxia*;

Schizaphis graminum, *rufula*;

Sipha arenarii, *elegans*, *maydis*; *Sitobion avenae*, *fragariae*

Schizaphis rufula

HOST LISTS AND KEYS

E. junceus see *furcatus*

E. kamoji

E. mollis

E. pendulinus

E. pilosus

E. pungens

E. repens

E. semicostatus

E. sibiricus

E. smithii (incl. *Agropyron occidentale*)

E. spicatus

E. striatus

E. striatus (sensu Hitch nec Willd)

E. sabulosus

E. trachycaulus

(incl. *Agropyron tenerum*)

E. tsukushiensis

(incl. *Agropyron transiens*)

E. virginicus

Elymus spp.

Geoica setulosa

Sitobion alopecuri; *avenae*

Sitobion avenae

Schizaphis graminum

Sipha elegans

Anoecia corni, *nemoralis*, *vagans*; [*Aphis nasturtii*];

Aploneura lentisci; *Diuraphis frequens*, *noxia*;

Forda formicaria, *hirsuta*, *marginata*; *Geoica utricularia*;

Metopolophium dirhodum, *festucae*;

Myzus ascalonicus; *Paraclotus cimiciformis*;

Pemphigus sp.; *Rhopalosiphum padi*; *Schizaphis graminum*;

Sipha elegans, *glyceriae*, *maydis*;

Sitobion avenae, *miscanthi*;

Tetraneura ulmi; *Utamphorophora humboldti*

Sitobion miscanthi

Rhopalosiphum padi; *Sitobion avenae*

Diuraphis tritici; *Pemphigus* sp.; *Sipha agropyronensis*;

Sitobion miscanthi

Forda marginata

Schizaphis graminum

Rhopalosiphum maidis, *padi*; *Sitobion avenae*

Sipha glyceriae, *taurica*

Schizaphis graminum; *Sipha elegans*;

Sitobion avenae

Anoecia fulviabdominalis; *Geoica lucifuga*;

Rhopalosiphum padi, *rufiabdominale*; *Tetraneura fusiformis*

Rhopalosiphum padi; *Schizaphis graminum*; *Sitobion avenae*

[*Chondrillobium blattnyi*]; *Laingia psammae*;

Metopolophium palmerae

Use key to apterae of grass-feeding aphids under *Digitaria*.

Elytranthe see *Macrosolen*

E. globosa see *Macrosolen cochinchinensis*

Elytrigia see *Elymus*

Embergeria see *Sonchus*

Emblica see *Phyllanthus*

Emelista see *Cassia*

Emex

E. australis

Polygonaceae

Aphis fabae; *Brachycaudus helichrysi*;

Macrosiphum euphorbiae; *Uroleucon compositae*

E. pulcher
E. spinosa

Aphis solanella
Aphis craccivora, fabae;
Brachycaudus rumexicolens; *Dysaphis emicis*;
Macrosiphum euphorbiae; *Myzus persicae*

Key to apterae on *Emex*:-

1. Cauda very broadly rounded, hardly distinguishable from ABD TERG 8. SIPH conical, 0.03–0.04× BL. ANT PT/BASE 1.6–2.2. R IV+V 0.7–1.0× HT II. Dark cross-bands present on ABD TERG 4–8 or 5–8
Brachycaudus rumexicolens
- Cauda helmet-, tongue- or finger-shaped. SIPH more than 0.05× BL. Either or both ANT PT and R IV +V relatively longer. Dorsum with or without dark markings **2**
2. Paired spinal tubercles (STu) present on head and all or most thoracic and abdominal segments. Large marginal tubercles (MTu) present on ABD TERG 1–7. Cauda helmet-shaped, not longer than its basal width, and SIPH dark and imbricated
Dysaphis emicis
- STu rarely present, and then only on posterior abdominal segments. MTu rare or only occurring regularly on ABD TERG 1 and 7. If cauda is helmet-shaped then SIPH are pale and smooth-surfaced
 go to key to polyphagous aphids, p. 1020

Emilia

E. coccinea see *sagittata*
E. humberitii

E. javanica

E. sagittata

E. sonchifolia

Emilia sp.

Compositae

Aphis craccivora, gossypii, spiraeicola; *Aulacorthum solani*;
Brachycaudus helichrysi; *Ipuka dispersum*;
Macrosiphum euphorbiae; *Myzus ornatus, persicae*;
Uroleucon compositae
Aphis spiraeicola; *Ipuka dispersum*; *Myzus persicae*;
Neomyzus circumflexus; *Uroleucon sonchi*
Aphis craccivora, gossypii, spiraeicola; *Ipuka dispersum*;
Macrosiphum euphorbiae; *Myzus persicae*;
Neomyzus circumflexus; [*Sitobion* sp. (van Harten, 1972a)]
Aphis gossypii, [middletonii], nerii, spiraeicola;
Aulacorthum solani; *Brachycaudus helichrysi*;
Hyperomyzus carduellinus, lactucae; *Ipuka dispersum*;
[*Lipaphis erysimi*]; *Macrosiphum euphorbiae*;
Myzus persicae; *Neomyzus circumflexus*;
Toxoptera aurantii;
Uroleucon formosanum, sonchi, vernoniae
Uroleucon ambrosiae

Key to apterae on *Emilia*:-

1. ANT III bearing 4–135 secondary rhinaria (if less than 10 then SIPH are clavate, and are without polygonal reticulation). ANT IV-V may also have secondary rhinaria **2**
- ANT III bearing 0–10 secondary rhinaria (if with 4–10 then SIPH have subapical polygonal reticulation). ANT IV and V never with secondary rhinaria
 go to key to polyphagous aphids, p. 1020
2. SIPH clavate, pale except at apices, and almost smooth **3**
- SIPH tapering, cylindrical or very slightly expanded subapically; dark, with imbrication and subapical polygonal reticulation **4**

HOST LISTS AND KEYS

3. Hairs on ABD TERG 8 only 10–19 µm long, and those on ANT tubercles 6–11 µm. Secondary rhinaria distributed ANT III 11–29, IV 0–16, V 0–9. ANT PT/BASE 4.3–5.6 (mostly 4.5–5.2) *Hyperomyzus carduellinus*
- Hairs on ABD TERG 8 30–50 µm long, and those on ANT tubercles 18–30 µm. Secondary rhinaria distributed ANT III 4–20, IV 0–1, V 0. ANT PT/BASE 4.6–8.0 (mostly 5.8–6.7) *Hyperomyzus lactucae*
4. Dorsal and ANT hairs very short, only 5–10 µm long. ANT with secondary rhinaria distributed III 9–32 (on distal part), IV 20–35, V 9–20. SIPH thin, hardly thicker than hind tibia at their respective midlengths, with a few rather ill-defined subapical rows of polygonal reticulation. *Ipuka dispersum*
- Dorsal and ANT hairs long and conspicuous, 20–90 µm long. ANT III with 10–135 secondary rhinaria (if with few in number then confined to basal part), ANT IV and V with 0. SIPH much thicker than hind tibia at their respective midlengths **5**
5. ANT III 1.5–2.1× IV+V together, with 96–135 strongly protuberant rhinaria extending over more than 0.95 of length *Uroleucon formosanus*
- ANT III similar in length to IV+V together, with 10–82 only slightly protuberant rhinaria, extending over 0.34–0.90 of length **6**
6. Cauda pale. ANT III with 10–35 rhinaria. Most dorsal hairs not arising from pigmented scleroites. R IV+V 0.7–0.9× HT II *Uroleucon sonchi*
- Cauda dark. ANT III with 23–82 rhinaria. Dorsal hairs all arising from dark scleroites. R IV+V 1.1–1.8× HT II **7**
7. R IV+V 1.5–1.8× HT II. ANT III with 23–57 rhinaria *Uroleucon vernoniae*
- R IV+V 1.1–1.4× HT II. ANT III with 46–82 rhinaria *Uroleucon compositae*

Eminia

E. antennulifera

Leguminosae

Aphis craccivora

Empetrum

E. hermaphroditum

E. nigrum

Empetraceae

Wahlgreniella lampeli

Ericaphis latifrons;

Wahlgreniella empetri, nervata ssp. *arbuti*

Key to apterae on *Empetrum*:-

1. SIPH tapering, slightly curved, with an oblique aperture turned outwards, and a very large flange. ANT PT/BASE 1.9–2.2. ANT tubercles and median frontal tubercle of similar size *Ericaphis latifrons*
- SIPH clavate, with moderate flange. ANT PT/BASE 2.2–6.8. ANT tubercles much better developed than median frontal tubercle **2**
2. ANT PT/BASE 2.2–2.8. R IV+V with 2–4 accessory hairs *Wahlgreniella empetri*
- ANT PT/BASE 4.5–6.8. R IV+V with 2–17 accessory hairs **3**
3. R IV+V with 2 accessory hairs *Wahlgreniella lampeli*
- R IV+V with 10–17 accessory hairs *Wahlgreniella nervata* ssp. *arbuti*

Encelia

E. farinosa

Compositae

Uroleucon ambrosiae

Encephalartos
E. cycadifolius

Aphis gossypii

Zamiaceae

Enchylaena
E. tomentosa

Myzus persicae

Chenopodiaceae

Encyclia
E. adenocavia
E. alatha

Aphis gossypii
Aphis spiraecola

Orchidaceae

Use key to aphids on orchids under *Cymbidium*.

Englehardtia see Blackman and Eastop (1994)

Enhydra see *Enydra*

Enkianthus
E. campanulatus
E. perulatus
E. japonicus

Akkaia polygoni; *Macrosiphum euphorbiae*
Akkaia polygoni; *Aulacorthum magnoliae*
Akkaia polygoni

Ericaceae

Key to apterae on *Enkianthus*:-

- ANT 4- or 5-segmented, with ANT PT/BASE c.0.9. SIPH strongly scabrous, and tapering to a narrow apex, without polygonal reticulation. Fundatrices and immatures in spring colonies with strongly spinulose hind tibiae *Akkaia polygoni*
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Ensete
E. ventricosum

Dysaphis tulipae; *Pentalonia nigronervosa*;
Rhopalosiphum musae;
Sitobion sp. (Ethiopia, BMNH colln)

Musaceae

Use key to apterae on *Musa*.

Entada
E. abyssinica

Aphis gossypii

Leguminosae

Enteropogon
Enteropogon sp.

Sitobion miscanthi

Gramineae

(or use key to apterae of grass-feeding aphids under *Digitaria*.)

Enydra
E. sessilis

Aphis gossypii

Compositae

Epacris
E. longiflora

Aphis gossypii, *spiraecola*

Epacridaceae

Use key to polyphagous aphids, p. 1020.

HOST LISTS AND KEYS

Ephedra

E. alai
E. arvense
E. capitata
E. ciliata
E. distachya
E. equisetina
E. fedtschenkoi
E. foliata
E. intermedia
E. lomatolepis
E. monosperma
E. ramosissimum
E. regeliana
E. strobilacea
Ephedra sp.

Gnetaceae

Ephedraphis ephedrae
Ephedraphis ephedrae
Ephedraphis ephedrae
Ephedraphis ephedrae
Ephedraphis ephedrae, *ephedrae* ssp. *taurica*
Ephedraphis ephedrae
Ephedraphis ephedrae
Ephedraphis ephedrae
Ephedraphis ephedrae
Ephedraphis ephedrae
Ephedraphis gobica
Ephedraphis ephedrae
Ephedraphis ephedrae
Ephedraphis ephedrae, *ephedrae* ssp. *taurica*
[*Brachyunguis tamaricis* (Lichtenstein) (as *tamaricifoliae*);
Ephedraphis gobica ssp. *injiangica*

Couplet for separating apterae of *Ephedraphis* spp.:–

1. SIPH 1.6–4.0× cauda which is rounded or helmet-shaped, as short as or shorter than its basal width. ANT PT/BASE 1.2–2.0 *Ephedraphis ephedrae*
- SIPH c.1.25× cauda which is long and finger-like, much longer than its basal width. ANT PT/BASE 1.7–2.5 **2**
2. ANT PT/BASE c.2.5 *Ephedraphis gobica* s. str.*
- ANT PT/BASE 1.7–2.0 *Ephedraphis gobica* ssp. *injiangica**

***Epidendrum* (incl. *Anacheilium*)**

E. atropurpureum
E. campylostalix
E. cochleatum
E. crassifolium
E. crassilabium
E. difforme
E. ellipticum
E. fragrans
E. ibaguense
E. phoeniceum
E. ramosum
E. repens
E. secundum
E. teretifolium

Orchidaceae

Aphis spiraeicola
Sitobion luteum
Cerataphis orchidearum; *Sitobion luteum*
Sitobion luteum
Sitobion luteum
Sitobion luteum
Aphis fabae
Aphis spiraeicola; *Aulacorthum solani*; *Sitobion luteum*
Myzus persicae; *Sitobion anselliae*
Toxoptera aurantii
Cerataphis orchidearum
Toxoptera aurantii
Aphis gossypii; *Cerataphis orchidearum*
Cerataphis orchidearum; *Sitobion luteum*

Use key to apterae of orchid-feeding aphids under *Cymbidium*.

Epifagus

E. virginianus

Scrophulariaceae

Prociphilus erigeronensis

Epilobium***E. adenocaulon******E. adnatum******E. alpinum******E. alsinifolium******E. angustifolium******E. cephalostigma******E. ciliatum******E. collinum******E. coloratum******E. dodonaei******E. fleischeri******E. franciscanum******E. herbaceum******E. hirsutum******E. hirtigerum******E. junceum******E. lamyi******E. lanceolatum******E. lineare******E. minutiflorum******E. molle******E. montanum******E. obscurum******E. palustre******E. paniculatum******E. parviflorum******E. pubescens*****Onagraceae***Aphis grossulariae, nasturtii, oenotherae, Aphis* sp.
(USA: California, Oregon; BMNH colln)*Macrosiphum euphorbiae; Myzus lythri**Aphis epilobiaria; Myzus lythri**Aphis varians**Aphis fabae**Aphis epilobiaria, epilobii, fabae, frangulae, gossypii, grossulariae, helianthi, mirifica, oenotherae, [onographaga], praeterita, salicariae, [triglochinis], varians, Aphis* sp. (USA: Washington, BMNH colln, leg. D. Carroll);[*Cavariella aegopodii*];*Macrosiphum [cholodkovskyi], euphorbiae, fuscicornis, lisae, rosae, tinctum, valerianae;**Uroleucon epilobii, [Uroleucon* sp. (USA; Leonard, 1968: 343)]*Aphis [onographaga]**Aphis epilobii, Aphis* sp. (New Zealand; BMNH colln);*Myzus ornatus, persicae**Aphis epilobii; Macrosiphum tinctum**Aphis oenotherae, varians*[*Aphis plantaginis* of Passerini, 1863]*Aphis* sp. nr. *mirifica* (Italy; BMNH colln)*Aphis oenotherae**Aphis epilobiaria**Aphis epilobiaria, epilobii, fluvialis, grossulariae, [pollinosa (nomen dubium)], praeterita;**Macrosiphum euphorbiae, tinctum; Myzus persicae**Casimira canberrae**Casimira canberrae**Aphis grossulariae, pollinaria; Myzus lythri**Aphis epilobii**Aphis oenotherae**Aphis grossulariae; ?Eriosoma* sp.*Macrosiphum ?tinctum* (as *epilobii* Kaltenbach)*Aphis epilobii, grossulariae, pollinaria, spiraephaga;**Brachycaudus cardui; Macrosiphum euphorbiae, tinctum;**Myzus lythri**Aphis epilobii, pollinaria, salicariae, spiraephaga**Aphis epilobiaria, epilobii, grossulariae, pollinaria,**praeterita;**Macrosiphum ?tinctum* (as *epilobii* Kaltenbach)*Aphis* sp. (USA: California, Oregon; BMNH colln)*Aphis epilobii, grossulariae, pollinaria, praeterita;**Brachycaudus cardui; Macrosiphum euphorbiae;**Myzus ascalonicus**Aphis epilobii*

HOST LISTS AND KEYS

<i>E. roseum</i>	<i>Aphis epilobii</i> , <i>grossulariae</i> ; <i>Macrosiphum tinctum</i> ; <i>Myzus lythri</i>
<i>E. rotundifolium</i>	<i>Aphis</i> sp. (New Zealand; BMNH colln)
<i>E. tetragonum</i>	<i>Aphis epilobii</i> ; <i>Myzus ascalonicus</i>
<i>E. tianshanicum</i>	<i>Aphis grossulariae</i>
<i>E. watsoni</i>	<i>Aphis</i> sp. (Washington, USA; BMNH colln)
<i>E. virgatum</i>	<i>Aphis epilobii</i>
<i>Epilobium</i> spp.	<i>Aphis</i> [<i>despecta</i> (nomen dubium)], [<i>malvae</i> Walker of Buckton], <i>nelsonensis</i> , <i>nivalis</i> , [<i>Aphis</i> sp. (French Alps; Stroyan, 1984: 89)]; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; <i>Eriosoma nigrum</i>

Key to apterae on *Epilobium*:-

1. Eyes 3-faceted. SIPH consisting of shallow cones with sclerotic rims, their bases ringed by long hairs. Marginal wax glands on abdomen each consist of a ring of cells around a circular central area. Dorsum almost wholly sclerotic (on roots) *Eriosoma nigrum*
- Eyes multifaceted. SIPH tapering, cylindrical, or conical without a basal ring of hairs. No discrete wax glands. Dorsum membranous or with black sclerotic shield **2**
2. Head spiculose or nodulose. ANT tubercles well developed, SIPH without polygonal reticulation **3**
- Head without spicules or nodules. ANT tubercles variously developed, if well developed then SIPH have a subapical zone of polygonal reticulation **4**
3. ANT 0.5–0.6× BL, with PT/BASE 2.4–3.0, and ANT III without rhinaria. Dorsal cuticle wrinkled or warty, and SIPH coarsely imbricated *Myzus lythri*
- ANT 1.1–1.3× BL, with PT/BASE 4.0–5.5, and ANT III usually with 1–3 small rhinaria near base. Dorsal cuticle smooth, SIPH moderately imbricated *Aulacorthum solani*
4. ANT tubercles weakly developed or undeveloped. SIPH without polygonal reticulation **5**
- ANT tubercles well developed, with inner faces divergent. SIPH with a subapical zone of polygonal reticulation **27**
5. Cauda helmet-shaped, not longer than its basal width in dorsal view. Spiracular apertures rounded. ABD TERG 1 and 7 without marginal tubercles (MTu) **6**
- Cauda tongue-shaped or triangular, longer than its basal width. Spiracular apertures reniform. ABD TERG 1, and usually also 7, with MTu **7**
6. Dorsum with an extensive solid black shield. SIPH dark, 2.1–3.4× cauda *Brachycaudus cardui*
- Dorsum without dark markings. SIPH pale, 1.1–1.3× cauda *Brachycaudus helichrysi*
7. ABD TERG 7 without MTu. First tarsal segments with 2–2–2 hairs. ANT PT/BASE 2.95–4.0, PT 1.2–1.8× SIPH. (Al. with media of forewing once-branched) *Casimira canberrae*
- ABD TERG 7 with MTu. First tarsal segments with 3–3–2 or 3–3–3 hairs. ANT PT/BASE 1.1–3.7, PT 0.6–1.4× SIPH. (Al. with media of forewing twice-branched) **8**
8. R IV+V with 6–12 accessory hairs **9**
- R IV+V with only 2 accessory hairs **16**
9. Hairs on ANT III very long, fine and wavy, the longest of them 1.8–4× BD III. ANT PT/BASE 1.5–2.0 *Aphis varians*
- Hairs on ANT III straight or curved, not fine and wavy, maximally 1–2× BD III. ANT PT/BASE 1.8–3.4 **10**

10. ABD TERG 2–6 bearing in total 1–10 MTu (only less than 3 in some small specimens)
Aphis grossulariae
 – ABD TERG 2–6 without MTu 11
11. R IV+V 0.17–0.20 mm long. Tarsi almost completely smooth. SIPH sometimes with a few fine hairs
Aphis epilobiaria
 – R IV+V 0.10–0.17 mm long. Tarsi with some imbrication, or if smooth then R IV+V is 0.10–0.12 mm. SIPH without hairs 12
12. SIPH only 1.05–1.35× R IV+V, 0.11–0.13× BL and 0.9–1.2× cauda. R IV+V with 9–11 accessory hairs
Aphis fluvialis
 – SIPH 1.4–2.55× R IV+V, 0.11–0.21× BL and 0.9–2.1× cauda. R IV+V with 6–10 accessory hairs 13
13. SIPH 0.9–1.1× cauda. R IV+V 1.05–1.30× HT II. Cauda 1.5–2.0× R IV+V. Tarsi almost completely smooth. Head, ANT and legs dusky
Aphis sp.(USA: California, Oregon; BMNH colln)
 – SIPH 1.05–2.1× cauda. R IV+V 1.27–1.80× HT II. Cauda 1.05–1.75× R IV+V. Tarsi with some imbrication 14
14. Cauda 1.35–1.75× R IV+V and 0.95–1.30× ANT BASE VI. RIV+V 0.105–0.142 mm long, 1.18–1.55× HT II. Head, ANT and legs all rather dusky/dark
Aphis epilobii
 – Cauda 1.05–1.35× RIV+V and 1.25–1.95× ANT BASE VI. R IV+V 0.125–0.17 mm long and 1.4–1.95× HT II. Head, ANT and legs usually quite pale 15
15. ANT PT/BASE 2.55–3.70. ANT PT 1.8–2.6× R IV+V and 0.85–1.45× SIPH. R IV+V 0.125–0.145 mm long, 1.25–1.50× HT II and 1.25–1.75× ANT BASE
Aphis sp. (New Zealand; BMNH colln)
 – ANT PT/BASE 1.90–2.55. ANT PT 1.1–1.6× R IV+V and 0.60–0.95× SIPH. R IV+V 0.145–0.175 mm long, 1.45–1.80× HT II and 1.35–2.00× ANT BASE VI
Aphis oenotherae
16. ANT PT/BASE 3.3–4.7. SIPH 1.2–1.9× cauda which bears 5–8 hairs
Aphis praeterita
 – ANT PT/BASE 1.1–3.5, if more than 3.2 then cauda bears 11–24 hairs 17
17. Longest hairs on ANT III 0.3–0.9× BD III. Posterior hair on hind trochanter usually shorter than width of trochantrofemoral suture 18
 – Longest hairs on ANT III 0.9–3.6× BD III. Posterior hair on hind trochanter usually longer than width of trochantrofemoral suture 25
18. ANT 5-segmented, in both apt. and al. SIPH short and rather thin, 0.8–1.0× cauda, which has a marked constriction and bears only 3–5 hairs
Aphis nelsonensis
 – ANT usually 6-segmented (occasionally 5-segmented in small apt.). SIPH 0.7–2.5× cauda which bears 4–17 hairs 19
19. R IV+V 0.65–0.92× HT II. SIPH 0.7–1.1× cauda which bears 7–17 hairs
Aphis spiraephaga
 – R IV+V (0.89–)0.93–1.57× HT II. SIPH 0.78–2.5× cauda which bears 4–12 hairs 20
20. ANT PT/BASE 1.3–1.7. SIPH short and thick, less than 2× their basal widths, 0.78–0.95× cauda
Aphis nivalis
 – ANT PT/BASE 1.6–3.2. SIPH more than 2× their basal widths, 0.85–2.5× cauda 21
21. SIPH less than 2× ANT BASE VI (or BASE V when ANT 5-segmented). ANT PT/BASE 1.6–2.2. SIPH 0.9–1.43× cauda (Al. never with secondary rhinaria on ANT IV) 22
 – SIPH more than 2× ANT BASE VI (or BASE V). ANT PT/BASE 2.0–3.2. SIPH 0.85–2.5× cauda (Al. with 0–7 secondary rhinaria on ANT IV) 23
22. SIPH dark. R IV+V 0.93–1.25× HT II
Aphis mirifica
 – SIPH pale. R IV+V 0.9–1.0× HT II
Aphis sp. (Washington, USA, BMNH colln)

HOST LISTS AND KEYS

23. ANT III 0.25–0.63 mm long, 2.5– 4.0× R IV+V. HT I with 3 hairs (median sense peg present)
Aphis helianthi
 – ANT III 0.15–0.32 mm long, 1.3–2.6× R IV+V. HT I with 2 hairs (no sense peg) **24**
24. SIPH 0.85–2.2× cauda which bears 4–11 hairs. (Al. with (0–) 1–7 secondary rhinaria on ANT IV)
Aphis frangulae
 – SIPH 1.3–2.5× cauda which bears 4–8 hairs. (Al. never with secondary rhinaria on ANT IV)
Aphis gossypii
25. SIPH usually rather distinctly and evenly curved outwards from base to flange. ANT III 1.5–2.6× SIPH, 1.9–3.1× cauda. Longest hairs on ANT III 1.9–3.2× BD III. ABD TERG 1–4 each with 6 spinopleural hairs, and ABD TERG 8 with 5–10 hairs. Cauda with 6–11 hairs. First tarsal segments with 3–3–3 hairs
Aphis salicariae
 – SIPH not appreciably curved. ANT III 0.8–1.6× SIPH, 0.8–1.8× cauda. Longest hairs on ANT III 0.75–2.15× BD III. ABD TERG 1–4 with 2–4 spinopleural hairs, and ABD TERG 8 with 2–5 hairs. Cauda with 7–24 hairs **26**
26. SIPH 0.4–0.84× cauda, which is 2.0–2.2× R IV+V and bears 7–15 hairs. ABD TERG 8 with only 2 hairs. First tarsal segments with 3–3–3 hairs
Aphis pollinaria
 – SIPH 0.8–1.7× cauda, which is 1.35–1.95× RIV+V and bears 6–24 hairs. ABD TERG 8 with 2–5 hairs. First tarsal segments with 3–3–2 hairs
Aphis fabae group
27. ANT I and II dark **28**
 – ANT I and II pale **29**
28. ANT III with 10–36 rhinaria, not in a row *Macrosiphum rosae*
 – ANT III with 4–9 rhinaria, in a row *Macrosiphum valerianae*
29. SIPH less than 1.5× cauda; dark with about basal 0.25 pale, and with polygonal reticulation extending over distal 0.25–0.35 *Uroleucon epilobii**
 – SIPH more than 1.6× cauda, mainly pale or dusky, with polygonal reticulation extending over distal 0.08–0.2 of length **30**
30. SIPH more than 2.5× cauda *Macrosiphum fuscicornis**
 – SIPH 1.6–2.2× cauda **31**
31. Longest hairs on ANT III 0.4–0.5× BD III. R IV+V 0.4–0.5× HT II. ANT PT/BASE 3.8–4.4
Macrosiphum lisae
 – Longest hairs on ANT III 0.6–1.3× BD III. R IV+V 0.8–1.1× HT II. ANT PT/BASE 4.6–6.5 **32**
32. R IV+V 0.98–1.11× HT II. Posterior part of head (between eyes) usually with 1–2 small spinal tubercles (STu), and similar STu often also ABD TERG 8, or 7 and 8. Marginal tubercles (MTu) usually present on ABD TERG 2–4
Macrosiphum tinctum
 – R IV+V 0.8–1.02× HT II. STu and MTu absent or only irregularly present, and rarely on head
Macrosiphum euphorbiae

Epipactis

<i>E. atropurpurea</i>	<i>Aphis fabae</i>
<i>E. consimilis</i>	<i>Aphis fabae</i>
<i>E. helleborini</i> (incl. <i>latifolia</i>)	<i>Aphis epipactis, fabae</i>
<i>E. latifolia</i> see <i>helleborini</i>	
<i>E. palustris</i>	<i>Aphis epipactis, fabae</i>

Orchidaceae

Use key to aphids on orchids under *Cymbidium*.

Epiphyllum

E. ackermanii
Epiphyllum sp.

Cactaceae

Myzus persicae
Aphis craccivora, *spiraecola*; *Macrosiphum euphorbiae*;
Myzus ornatus; *Neomyzus circumflexus*

Use key to polyphagous aphids, p. 1020.

Equisetum

E. arvense

E. laevigatum

E. pratense

E. sylvaticum

Equisetaceae

Aphis equiseticola; *Macrosiphum equiseti*;
Neomyzus circumflexus; *Sitobion avenae*
Anoecia equiseti
Aphis equiseticola; *Macrosiphum equiseti*
Aphis equiseticola; *Macrosiphum equiseti*

Key to apterae on *Equisetum*:–

1. SIPH poriform. Cauda broadly rounded. ANT PT/BASE less than 0.5. Hairs on body and appendages numerous, long and fine-pointed (on roots) *Anoecia equiseti*
- SIPH tubular. Cauda tongue- or finger-like. ANT PT/BASE more than 1. Hairs shorter and sparser 2
2. SIPH without any subapical reticulation. Cauda with 4–6 hairs 3
- SIPH subapical rows of polygonal reticulation, sometimes rather ill-defined. Cauda with 7–11 hairs 4
3. SIPH shorter than cauda. ANT PT/BASE 1.3–1.5. Dorsum pale *Aphis equiseticola*
- SIPH 1.7–2.4× cauda. ANT PT/BASE 3.5–5.1. Dorsum with extensive dark sclerotisation, including a U-shaped dorsal abdominal patch *Neomyzus circumflexus*
4. Head spinulose ventrally. SIPH pale or dusky, like cauda, with reticulation over distal 0.14–0.20. Cauda 1.05–1.55× HT II. ABD TERG 8 with 5–10 hairs *Macrosiphum equiseti*
- Head smooth. SIPH black, with reticulation over distal 0.20–0.34. Cauda pale, 0.75–1.05× HT II. ABD TERG 8 with 4–5 hairs *Sitobion avenae*

Eragrostis

E. amabilis

E. arenicola

E. aspera

E. chariis

E. cilianensis

E. ciliaris

E. curvula

E. echinochloidea

E. ferruginea

E. gangetica

E. interrupta

E. macilentia

Gramineae

Tetraneura basui

Aphis gossypii

Aphis gossypii; *Tetraneura fusiformis*

Hysteroneura setariae

Aphis gossypii

Aphis gossypii; *Tetraneura fusiformis*

Hysteroneura setariae; *Metopolophium dirhodum*;

Rhopalosiphum maidis, *padi*;

Sitobion africanum, *avenae*, *graminis*, [*Sitobion* sp. (Millar, 1994)]

Hysteroneura setariae

Tetraneura fusiformis

Aphis gossypii; *Sitobion graminis*, *miscanthi*;

Tetraneura fusiformis, *radicicola*, *yezoensis*

Tetraneura fusiformis

Sitobion neusi

HOST LISTS AND KEYS

<i>E. major</i>	<i>Anoecia corni</i> ; <i>Hysteroneura setariae</i>
<i>E. megastachya</i> see <i>poaeoides</i> var. <i>megastachya</i>	
<i>E. minor</i>	<i>Anoecia haupti</i> , <i>vagans</i> ; <i>Tetraneura ulmi</i>
<i>E. multicaulis</i>	<i>Sitobion avenae</i> ; <i>Tetraneura fusiformis</i>
<i>E. namaquensis</i>	<i>Aphis gossypii</i>
<i>E. nigra</i>	<i>Anoecia radiciphaga</i> ; <i>Forda marginata</i> ; <i>Geoica lucifuga</i> ; <i>Tetraneura fusiformis</i> , <i>sikkimensis</i>
<i>E. obtusa</i>	<i>Rhopalosiphum padi</i>
<i>E. olivacea</i>	<i>Rhopalosiphum padi</i> ; <i>Sitobion graminis</i> ; <i>Tetraneura fusiformis</i>
<i>E. pectinacea</i>	<i>Anoecia corni</i>
<i>E. pilosa</i>	<i>Aphis gossypii</i> ; <i>Hysteroneura setariae</i> ; <i>Rhopalosiphum maidis</i> ; <i>Schizaphis graminum</i> ; <i>Sitobion africanum</i>
<i>E. plana</i>	<i>Hysteroneura setariae</i> ; <i>Sitobion graminis</i> , [<i>Sitobion</i> sp. (Millar, 1994)]
<i>E. poaeoides</i> (incl. var. <i>megastachya</i>)	<i>Anoecia corni</i> ; <i>Colopha ulmicola</i> ; <i>Geoica utricularia</i> ; <i>Schizaphis graminum</i> ; <i>Sitobion avenae</i> ; <i>Smynthuroides betae</i> ; <i>Tetraneura caerulea</i> , <i>ulmi</i>
<i>E. squamata</i>	<i>Hysteroneura setariae</i>
<i>E. superba</i>	<i>Sitobion miscanthi</i>
<i>E. tef</i>	<i>Hysteroneura setariae</i> ; <i>Schizaphis graminum</i> ; <i>Smynthuroides betae</i> ; <i>Tetraneura ulmi</i>
<i>E. tenella</i>	<i>Tetraneura fusiformis</i> , <i>radicicola</i> , <i>yezoensis</i>
<i>E. tenuifolia</i>	<i>Geoica lucifuga</i> ; <i>Hysteroneura setariae</i> ; <i>Sitobion africanum</i> , <i>graminis</i> , <i>neusi</i> , <i>yakini</i>
<i>E. tremula</i>	<i>Aphis gossypii</i>
<i>E. unioloides</i>	<i>Forda trivialis</i> ssp. <i>lambersi</i> (= <i>marginata</i> ?); <i>Hysteroneura setariae</i>
<i>E. vaginata</i> (incl. <i>dominii</i>)	<i>Rhopalosiphum padi</i>
<i>E. virescens</i>	<i>Hysteroneura setariae</i>
<i>Eragrostis</i> spp.	<i>Anoecia fulviabdominalis</i> ; <i>Aploneura lentisci</i> ; <i>Pseudoregma panicola</i> ; <i>Rhopalosiphum rufiabdominale</i> ; <i>Sipha flava</i> , <i>maydis</i>

Use key to apterae of grass-feeding aphids under *Digitaria*.

Eranthemum

E. nervosum

Aphis gossypii

Acanthaceae

Erechtites

E. arguta

E. hieraciifolia

Aphis sp. (California, BMNH colln)

Aphis fabae, *gossypii*, *spiraecola*;

Brachycaudus helichrysi; *Myzus ornatus*, *persicae*;

Toxoptera aurantii; *Uroleucon ambrosiae*, *pseudambrosiae*

E. prenanthoides

Aphis fabae, *lugentis*, *Aphis* sp. (California, BMNH colln);

Aulacorthum solani; *Brachycaudus cardui*, *helichrysi*

E. quadridentata
E. valerianaefolia

Brachycaudus helichrysi
Acyrtosiphon bidenticola; *Aphis gossypii*, *spiraecola*;
Hyperomyzus lactucae; *Myzus persicae*;
Neomyzus circumflexus; *Uroleucon ambrosiae*
Aphis gossypii; *Brachycaudus helichrysi*

E. verbenifolia

Key to aphids on *Erechtites*:-

1. SIPH dark with extensive subapical polygonal reticulation. Cauda long and pale **2**
- SIPH and cauda pale or dark, but if SIPH are dark then they lack polygonal reticulation **3**
2. HT II rather long and thin, about 6× its maximum thickness, and 0.9–1.1× R IV+V
Uroleucon pseudambrosiae
- HT II shorter, less than 5× its maximum thickness and 0.7–0.85× R IV+V *Uroleucon ambrosiae*
3. SIPH pale, smooth and markedly clavate. ANT III with 7–24 secondary rhinaria (88% with 11 or more).
 ANT PT/BASE 5.2–7.3 *Hyperomyzus lactucae*
- SIPH pale or dark, tapering/cylindrical or slightly clavate; if at all clavate then ANT PT/BASE less
 than 5.2. ANT III with 0–10 secondary rhinaria **4**
4. ABD TERG 1 and 7 with marginal tubercles (MTu) **5**
- ABD TERG 1 and 7 without MTu **8**
5. Ventral hair on hind trochanter 12–19 μm, 0.2–0.4× diameter of trochantrofemoral suture. Large MTu
 regularly present on ABD TERG 1–4(-5) and 7. R IV+V 0.18–0.19 mm, with (3-)4 accessory hairs;
 1.11–1.43× cauda, and 4.0–6.5× distance between the 2 hairs on anterior half of subgenital plate
Aphis sp. ex *E. prenanthoides*, USA, BMNH colln
- Ventral hair on hind trochanter more than 0.55× diameter of trochantrofemoral suture. MTu only spo-
 radically present on ABD TERG 2–5. R IV+V 0.07–0.17 mm, with 2 accessory hairs; 0.6–1.1× cauda,
 and less than 3× distance between the 2 hairs on anterior half of subgenital plate (unless many hairs
 are present) **6**
6. ANT III, IV and often V with sec. rhinaria. ANT PT/BASE 1.3–2.4. Tibiae black. HT I with 3 hairs
 (sense peg present) *Aphis lugentis*
- ANT without sec. rhinaria (except in alatiforms). ANT PT/BASE 2.1–5.3. Tibiae pale at least on basal
 half. HT I with only 2 hairs (no sense peg) **7**
7. SIPH 0.8–0.9× cauda (both being black). ABD TERG 2–4 with 1–3 MTu in total
Aphis sp. ex *E. arguti*, USA, BMNH colln
- SIPH (0.8-) 0.9–2.8× cauda, which is pale or dark. ABD TERG 2–4 only sporadically with MTu, often
 without any go to key to polyphagous aphids, p. 1020, starting at couplet 24
8. Cauda helmet-shaped, not longer than its basal width in dorsal view. Spiracular apertures large and
 rounded **9**
- Cauda tongue or finger-like, longer than its basal width in dorsal view. Spiracular apertures reniform
10
9. Dorsum with an extensive dark shield. BL 1.5–2.5 mm. SIPH dark, 0.19–0.32 mm, 2.3–3.0× their basal
 diameters *Brachycaudus cardui*
- Dorsum without any dark markings. BL 0.9–1.5 mm. SIPH pale, 0.065–0.165 mm, 0.9–2.0× their basal
 diameters *Brachycaudus helichrysi*
10. ANT PT/BASE 5.9–7.5. ANT dark except at base, and SIPH dark except for basal 0.2–0.3 of length
Acyrtosiphon bidenticola
- ANT PT/BASE less than 5.9. ANT mainly pale, SIPH uniformly dark or pale
 go to key to polyphagous aphids, p. 1020, starting at couplet 4

HOST LISTS AND KEYS

Eremocitrus

E. glauca

Use key to polyphagous aphids, p. 1020.

Eremophila

E. alternifolia

E. bignoniflora

E. gilesii

E. maculata

E. serrulata

Use key to polyphagous aphids, p. 1020.

Eremopogon* see *Dichanthium

***Eremopyrum* (or *Eremopyron*)**

E. buonapartis

E. triticeum

(or use key to apterae of grass-feeding aphids under *Digitaria*)

Eremosparton

E. aphyllum

See key to apterae on *Ammodendron*.

Eremostachys

E. labiosa

E. vacillans

Couplet for separating these two species:-

- Dorsum with an extensive black sclerotic shield. Cauda semicircular to helmet-shaped, shorter than its basal width in dorsal view. SIPH shorter than R IV+V *Brachycaudus cerasicola*
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Eremurus

E. comosus

E. lactiflorus

E. olgae

Eremurus sp.

Couplet for separating apterae of these two species:-

- Cauda helmet-shaped with 5-7 hairs, not longer than its basal width and much shorter than R IV+V *Dysaphis eremuri*
- Cauda tongue-shaped with 11-25 hairs, longer than its basal width and longer than R IV+V *Aphis fabae*

Rutaceae

Myzus persicae; *Toxoptera aurantii*

Myoporaceae

Myzus persicae

Aphis gossypii; *Myzus persicae*

Aphis gossypii

[*Aphis* sp. (Leonard, 1972a:100)]

Myzus persicae

Gramineae

Geoica lucifuga

Diuraphis noxia

Leguminosae

Acyrtosiphon gossypii; *Aphis craccivora*

Labiatae

Brachycaudus cerasicola

Aphis sp. (*frangulae* group; BMNH colln, Afghanistan)

Asphodelaceae

Dysaphis eremuri

Dysaphis eremuri

Dysaphis eremuri, *eremuri* ssp. *baisunensis*

Aphis fabae

Erianthemum*Erianthemum* sp.**Erianthus see Saccharum****Erica***E. arborea**E. australis**E. azorica**E. bauera**E. caffra**E. cinerea**E. glandulosa**E. gracilis**E. multiflora**E. regia* var. *variegata**E. scoparia**E. stricta**E. tetralix**E. umbellata**E. urceolaris**E. verticillata***Loranthaceae***Aphis gossypii***Ericaceae***Aphis arbuti, gossypii, spiraecola*, [*Aphis* sp. (Ilharco, 1984)];
*Toxoptera aurantii**Aphis gossypii**Aphis gossypii; Toxoptera aurantii**Aphis gossypii**Aulacorthum solani; Ericaphis ericae**Aphis multiflorae**Aphis gossypii; Myzus persicae**Aphis fabae, spiraephaga; Ericaphis ericae**Aphis multiflorae**Aphis spiraecola**Aphis fabae, spiraecola, spiraephaga**Myzus ornatus**Ericaphis ericae**Ericaphis latifrons**Myzus ornatus**Aphis multiflorae***Key to apterae on Erica:–**

1. SIPH uniformly dark. ABD TERG 1 and 7 with marginal tubercles (MTu) 2
– SIPH pale or dusky, sometimes dark-tipped. ABD TERG 1 and 7 without MTu 7
2. ANT PT/BASE 3.5–5.0. Stridulatory apparatus present (see p. 1020) *Toxoptera aurantii*
– ANT PT/BASE 1.4–3.6 No stridulatory apparatus 3
3. Black cauda, usually with an evident constriction at midlength, 0.9–1.2× ANT III and bearing 7–15 hairs. Hind femur with long fine hairs similar in length to trochantrofemoral suture *Aphis spiraecola*
– Cauda pale or dark with no evident constriction, 1–2× ANT III (if less than 1.2× ANT III then cauda pale with 4–7 hairs and/or hind femur with only short hairs 4
4. Longest hairs on ANT III 0.8–3.4× BD III, and longest hairs on hind femur longer than trochantrofemoral suture. Cauda with 11–27 hairs *Aphis fabae* (or *arbuti*)
– Longest hairs on ANT III 0.4–0.9× BD III, and longest hairs on hind femur shorter than trochantrofemoral suture. Cauda with 4–17 hairs 5
5. SIPH 1.3–2.5× cauda, which is paler than SIPH and bears 4–8 hairs. ANT PT/BASE 2.1–3.2 *Aphis gossypii*
– SIPH 0.7–1.1× cauda, which is as dark as SIPH and bears 4–17 hairs. ANT PT/BASE 1.4–2.3 6
6. R IV+V 1.09–1.24× HT II. Cauda with 4–7 hairs *Aphis multiflorae*
– R IV+V 0.65–0.92× HT II. Cauda with 7–17 hairs *Aphis spiraephaga*
7. ANT 1.1–1.3× BL. ANT III usually bearing 1–2 small rhinaria near base *Aulacorthum solani*
– ANT 0.5–1.0× BL. ANT III without rhinaria 8

HOST LISTS AND KEYS

8. ANT PT/BASE 2.8–4.5. SIPH slightly clavate *Myzus persicae*
 – ANT PT/BASE 1.7–2.8. SIPH tapering or cylindrical, often with an outward curve towards apex, and the aperture may be oblique **9**
- 9 ANT tubercles well-developed, nodulose, with their inner faces very steep-sided, parallel or apically convergent. Dorsal abdomen with a pattern of dark intersegmental spots *Myzus ornatus*
 – ANT tubercles rather low, spiculate or almost smooth, with inner faces divergent. Dorsal abdomen without any intersegmental spots **10**
10. R IV+V 0.8–1.2× HT II. First tarsal segments with 3 hairs *Ericaphis latifrons*
 – R IV+V 1.3–1.7× HT II. First tarsal segments with 5 hairs *Ericaphis ericae*

Ericameria

E. bloomeri

Pleotrichophorus lagacei

Compositae

(or try key to aphids on *Haplopappus*)

Erigeron (incl. *Leptilon*, *Phalacroloma*, *Stenactis*)

Compositae

E. acer (= *acre*, *acris*)

Acuticauda erigerontis; *Acyrtosiphon malvae* group;
Aphis erigerontis; *Aulacorthum solani*;
Brachycaudus helichrysi; *Macrosiphoniella erigeronis*;
Myzus ornatus; *Pleotrichophorus remaudierei*;
Uroleucon monticola, *simile*

E. alpinus

Uroleucon simile

E. annuus

Aphis craccivora, *fabae*; *Aulacorthum solani*;
Brachycaudus helichrysi; *Macrosiphoniella yomenae*;
Macrosiphum euphorbiae; *Myzus persicae*;
Uroleucon chrysopsidicola, *erigeronense*, *gravicorne*,
luteolum, *monticola*, *olivei*, *paucosensoriatum*

E. armerifolius

Myzus persicae

E. asteroides

Aphis craccivora

E. aurantiacus

Uroleucon calendulae, *simile*

E. bonariensis see *Conyza*

E. canadensis see *Conyza*

E. chinensis

Uroleucon gravicorne

E. crispus

Aphis gossypii

E. floribundus

Brachycaudus helichrysi; *Macrosiphum euphorbiae*

E. jamaicensis

Uroleucon erigeronense, *gravicorne*

E. karvinskianus

Myzus ornatus; *Uroleucon gravicorne*

E. linifolius

Aphis gossypii; *Brachycaudus helichrysi*

E. oligocephalus

Uroleucon tschuense

E. peregrinus

Brachycaudus helichrysi

E. philadelphicus

[*Anoecia cornicola*]; *Aphis middletonii* group;

[*Geoica utricularia*]; *Illinoia goldamaryae*;

Pemphigus sp.;

Pleotrichophorus ?patonkus (BMNH colln);

[*Macrosiphum erigeron-philadelphicum* (Rafinesque)

– invalid name]; *Uroleucon canadense*, *gravicorne*

Uroleucon erigeronense, *simile*

E. politus

<i>E. pulchellus</i>	<i>Uroleucon erigeronense</i> , <i>gravicorne</i> , <i>simile</i>
<i>E. pusillus</i> see <i>Conyza canadensis</i>	
<i>E. ramosus</i>	<i>Aphis middletonii</i> ; <i>Brachycaudus helichrysi</i> ; <i>Uroleucon gravicorne</i>
<i>E. simplex</i>	<i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i>
<i>E. speciosus</i>	<i>Brachycaudus helichrysi</i> ; <i>Myzus ascalonicus</i>
<i>E. speciosus</i> × <i>macranthus</i>	<i>Brachycaudus helichrysi</i> ; <i>Uroleucon simile</i>
<i>E. strigosus</i>	[<i>Aphis erigeron-strigosum</i> Rafinesque – invalid name]; [<i>Macrosiphum gibbosa</i> (Rafinesque) – invalid name]; <i>Uroleucon gravicorne</i>
<i>E. subtrinervis</i>	<i>Uroleucon erigeronense</i>
<i>E. sumatrensis</i>	<i>Aphis spiraecola</i>
<i>E. superbus</i>	<i>Uroleucon erigeronense</i>
<i>Erigeron</i> spp.	<i>Aphis lugentis</i> ; [<i>Capitophorus formosartemisiae</i>]; <i>Cedoaphis maxsoni</i> ; [<i>Eutrichosiphum pseudopasaniae</i>]; [<i>Impatientinum asiaticum</i> ssp. <i>dalhousiensis</i>]; [<i>Uroleucon asterophagum</i>]; <i>Pemphigus brevicornis</i> ; [<i>Sitobion miscanthi</i> , <i>sikkimensis</i> , <i>smilacicola</i>]; <i>Uroleucon bereticum</i> , [<i>cichorii</i>], <i>simlaense</i> , <i>Uroleucon</i> sp. (BMNH colln, California)

Key to apterae on *Erigeron*:-

1. SIPH with subapical reticulation (at least 2–3 rows of closed polygonal cells) 2
– SIPH without any distinct subapical zone of reticulation (or SIPH absent) 19
2. SIPH with zone of polygonal reticulation extending over distal 0.15–0.5 of length, and comprising many small cells of maximum diameter less than 0.25 of diameter of SIPH at that point. Flange weakly developed 3
– SIPH with zone of polygonal reticulation extending over 0.03–0.2 of length, often somewhat constricted, and comprising large cells of diameter more than 0.3 of diameter of SIPH at that point. Flange well developed 18
3. SIPH uniformly pigmented, dusky or dark 4
– SIPH mainly dark but with a pale basal section 15
4. SIPH less than 0.4 mm long, about as long as or a little shorter than cauda, with reticulation over about distal 0.5 of length. ANT III with only 1–4 rhinaria near base *Macrosiphoniella erigeronis**
– SIPH more than 0.4 mm long, longer than cauda, with reticulation on distal 0.15–0.45 of length. ANT III usually with many more rhinaria 5
5. Conspicuous dark, crescent-shaped antesiphuncular sclerites present 6
– No crescent-shaped antesiphuncular sclerites 7
6. No large post-siphuncular sclerites. ANT III with 20–40 rhinaria. Cauda black. SIPH reticulated on distal c.0.4 of length *Macrosiphoniella yomenae*
– Large postsiphuncular sclerites present. ANT III with 10–23 rhinaria. Cauda pale/dusky. SIPH reticulated over distal c.0.3 of length *Uroleucon calendulae**
7. Dorsal hairs arising from pigmented tubercles. R IV+V with more than 30 accessory hairs *Uroleucon* sp. (California, BMNH colln)
– Dorsal hairs without raised bases. R IV+V with less than 20 accessory hairs 8

HOST LISTS AND KEYS

8. Coxae with dark pigmentation. Cauda dusky or dark 9
 – Coxae and cauda both pale, or only slightly dusky 11
9. First tarsal segments with 3 hairs. Cauda dusky, paler than SIPH *Uroleucon simlaense*
 – First tarsal segments with 5 hairs. Cauda dark like SIPH 10
10. SIPH 1.70–1.83× cauda. ANT III with 38–44 rhinaria extending over 0.60–0.65 of length. *Uroleucon tschuense**
 – SIPH 1.3–1.6× cauda. ANT III with 38–62 rhinaria extending over 0.67–0.95 of length. *Uroleucon simile*
11. R IV+V 1.5–1.8× HT II, which is only 0.10–0.12 mm long *Uroleucon chrysopsidicola*
 – R IV+V 0.9–1.3× HT II, which is 0.13–0.18 mm long 12
12. SIPH 1.7–2.2× cauda. Dorsal abdominal hairs long, pointed and rather numerous; ABD TERG 8 with 6–8 hairs *Uroleucon monticola*
 – SIPH 1.1–1.8× cauda. Dorsal abdominal hairs pointed or blunt; ABD TERG 8 with 2–5 hairs 13
13. Hind tibiae wholly dark. ANT I and II dark. ANT III with 4–16 rhinaria *Uroleucon paucosensoriata*
 – Hind tibiae with paler basal section. ANT I and II pale. ANT III with 7–32 rhinaria 14
14. SIPH 0.8–1.3 mm long. ANT III with 7–17 rhinaria, restricted to darker, more swollen region on basal half *Uroleucon olivei*
 – SIPH 0.4–0.7 mm long. ANT III with 15–32 rhinaria, extending over most of its length *Uroleucon bereticum*
15. SIPH 1.9–2.5× cauda. Marginal abdominal tubercles (MTu) absent *Uroleucon erigeronense*
 – SIPH 0.9–1.6× cauda. MTu usually present on some abdominal segments 16
16. R IV+V 0.8–1.0× HT II *Uroleucon macgillivrayae*
 – R IV+V 1.1–1.4× HT II 17
17. Second tarsal segments with proximal ventral hairs atrophied or minute. ANT III more than 1.4× ANT IV. SIPH 1.3–1.6× cauda *Uroleucon gravicorne*
 – Second tarsal segments with proximal ventral hairs normally developed. ANT III less than 1.3× ANT IV. SIPH 1.1–1.3× cauda *Uroleucon luteolum*
18. Hairs on ANT III very short and inconspicuous, the longest about 0.33× BD III. SIPH clearly somewhat swollen proximal to reticulated subapical zone, which is only 0.03–0.05 of total length of SIPH *Illinoia goldamaryae*
 – Hairs on ANT III conspicuous, the longest 0.5× BD III or longer. SIPH cylindrical or very slightly swollen proximal to reticulated subapical zone, which is 0.13–0.2 of its total length *Macrosiphum euphorbiae*
19. Dorsal hairs with expanded or fan-shaped apices, and arising from tuberculate bases 20
 – Dorsal hairs with blunt or pointed apices, and without tuberculate bases 21
20. SIPH shorter than cauda, which is about twice as long as its basal width *Pleotrichophorus ?patonkus*
 – SIPH about 2 or more× cauda, which is 1.2–1.4× longer than its basal width *Pleotrichophorus remaudierei*
21. ANT shorter than BL, and with secondary rhinaria at least on ANT III and/or IV 22
 – ANT longer or shorter than BL, but if shorter then without any rhinaria on ANT III–IV (except in alate-form specimens) go to key to polyphagous aphids, p. 1020

22. ABD TERG 1 and 7 without marginal tubercles (MTu). SIPH smooth, with a very marked subapical annular incision *Acuticauda erigeronensis*
 – ABD TERG 1 and 7 with large MTu. SIPH with faint to moderate imbrication and no subapical annular incision 23
23. Secondary rhinaria distributed ANT III 13–23, IV 7–16, V 3–18, VI 1–4. SIPH 0.12–0.16 mm long *Aphis erigerontis*
 – Sec. rhin. distributed ANT III 1–12, IV 0–11, V 0–5, VI 0. SIPH 0.13–0.28 mm long 24
24. ANT with more rhinaria on III than on IV. Tibiae with pale middle section. Cauda shorter than R IV+V *Aphis middletonii*
 – ANT generally with more rhinaria on IV than on III. Tibiae entirely dark. Cauda longer than R IV+V *Aphis lugentis*

Eriobotrya see Blackman and Eastop (1994, 2000)

Eriocephalus

E. africanus

Compositae

Brachycaudus helichrysi

Eriochloa

E. polystachya (incl. *subglabra*)

E. punctata

Gramineae

Rhopalosiphum maidis

Rhopalosiphum maidis

(or use key to apterae of grass-feeding aphids under *Digitaria*.)

Eriocoma see *Oryzopsis*

Eriodendron see *Ceiba*

Eriogonum

E. alatum

E. arborescens

E. bakeri

E. compositum

E. corymbosum

E. effusum

E. fasciculatum (incl. *polifolium*)

E. flavum

E. inflatum

E. latifolium (incl. *nudum*)

E. pyrrollaeifolium

E. racemosum

E. umbellatum

Eriogonum spp.

Polygonaceae

Braggia eriogoni

Braggia eriogoni ssp. *californica*; *Myzus persicae*

Braggia eriogoni

Braggia sp. (BMNH colln, Oregon);

Macrosiphum euphorbiae

Braggia agathona, *uncompahgensis*, *urovaneta*

Braggia eriogoni

Braggia deserticola; *eriogoni* ssp. *californica*

Uroleucon coloradense

Braggia eriogoni

Braggia urovaneta ssp. *pachysiphon*

Braggia eriogoni

Braggia urovaneta

Braggia agathona, *echinata*, *eriogoni*

Aphis craccivora;

Braggia deserticola ssp. *thanatophila*, *eriogoni* ssp. *atra*;

Cedoaphis maxsoni; [*Uroleucon martini*];

[*Pleotrichophorus amsinckii*]

HOST LISTS AND KEYS

Key to apterae on *Eriogonum*:-

1. Cauda broadly conical, triangular or helmet-shaped, shorter than, or only about as long as, its basal width (e.g., Figure 27a, b) 2
 - Cauda tongue- or finger-like, much longer than its basal width 11
2. Cuticle of head densely spiculate. ABD TERG 1 and 7 without marginal tubercles (MTu). SIPH more than 4× their basal widths. ANT PT/BASE 4-5 *Cedoaphis maxsoni*
 - Cuticle of head without spicules, often reticulate. ABD TERG 1, and usually also 7, with MTu. SIPH less than 3× their basal widths. ANT PT/BASE 1-2 3
3. Dorsal hairs very thick, with basal diameters often exceeding 6µm, and arising from tuberculate bases more than 12µm high (Figure 27e, f) 4
 - Dorsal hairs thinner and without, or with only small low, tuberculate bases (Figure 27g) 5
4. Dorsal hairs rod-like, almost cylindrical, up to 50µm long, with broad rounded apices (Figure 27e) *Braggia echinata*
 - Dorsal hairs tapering, 50-100µm long, with thin blunt or rounded apices (Figure 27f) *Braggia uncomphagensis*
5. Dorsal hairs maximally about as long as ANT BD III. SIPH very short, at most about as long as their basal widths. MTu usually absent from ABD TERG 7 6
 - Dorsal hairs mostly longer than BD III or, if shorter, then SIPH much longer than their basal widths. MTu present on ABD TERG 7 7
6. Hind legs almost completely black, with only basal halves of tibiae a little paler. R IV+V 1.17-1.40× HT II, and longer than ANT VI BASE *Braggia deserticola*
 - Hind tibiae mainly pale, black only at apices. R IV+V 1.0-1.33× HT II, about equal in length to ANT VI BASE *Braggia deserticola* ssp. *thanatophila*

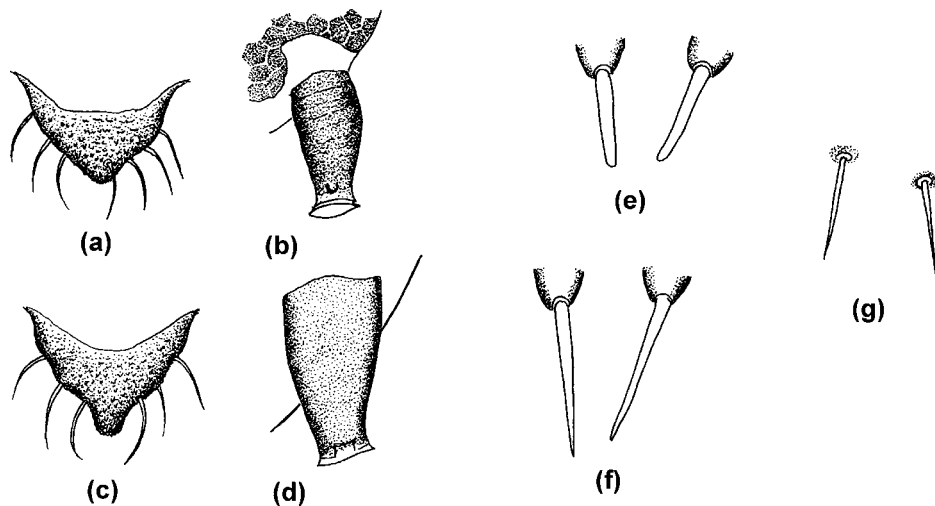


Figure 27 Apterae on *Eriogonum*. (a) cauda of *Braggia eriogoni*, (b) SIPH of *B. eriogoni*, (c) cauda of *B. urovaneta*, (d) SIPH of *B. urovaneta*, (e) dorsal hairs of *B. echinata* (paratype), (f) dorsal hairs of *B. uncomphagensis* (paratype), (g) dorsal hairs of *B. eriogoni*.

7. Cauda less than 0.75× its basal width (e.g., Figure 27a). SIPH with a large flange (e.g., Figure 27b). ANT III and IV, or III-V, usually with secondary rhinaria. Dorsal hairs mostly more than 2× BD III (e.g., Figure 27g) **8**
- Cauda more than 0.75× its basal width (Figure 27c). SIPH with a small flange (Figure 27d). ANT usually without secondary rhinaria. Dorsal hairs short, and often blunt, maximally 0.8–2.0× BD III **10**
8. Hairs on ANT III sparse, short and thin, maximally about 20µm and shorter than BD III
Braggia agathona
- Hairs on ANT III maximally 25–35µm, longer than BD III **9**
9. R IV+V 0.20–0.24 mm long, 1.75–1.95× HT II *Braggia* sp. (BMNH colln, Oregon)
- R IV+V 0.14–0.18 mm long, 1.35–1.65× HT II *Braggia eriogoni* s.lat.
10. R IV+V 0.145–0.175 mm long, 1.29–1.50× HT II and 2.33–2.67× basal width of SIPH
Braggia urovaneta
- R IV+V 0.11–0.135 mm long, 0.93–1.2× HT II and 1.2–2.0× basal width of SIPH
Braggia urovaneta ssp. *pachysiphon*
11. ANT tubercles weakly developed. Dorsum with an extensive black shield. SIPH and cauda both black
Aphis craccivora
- ANT tubercles well developed. Dorsum without a black shield. SIPH pale or dark, cauda pale **12**
12. Head spiculose, with inner faces of ANT tubercles scabrous and apically convergent. SIPH pale, and slightly clavate, without subapical reticulation. ANT III without rhinaria *Myzus persicae*
- Head smooth, with inner faces of ANT tubercles divergent. SIPH cylindrical over most of length, with polygonal reticulation over distal 0.3–0.4. ANT III with 1–40 rhinaria **13**
13. SIPH mainly pale with polygonal reticulation on distal 0.13–0.21. ANT III with 1–7 (–10) rhinaria on basal part
Macrosiphum euphorbiae
- SIPH mainly dark with paler basal part, and with polygonal reticulation over distal 0.3–0.4. ANT III with 18–40 rhinaria extending over most of segment
*Uroleucon coloradense**

Eriophorum

E. angustifolium

E. vaginatum

Eriophorum spp.

Cyperaceae

Ceruraphis eriophori; *Colopha compressa*;

Paraschizaphis scirpi ssp. *eriophori*

Ceruraphis eriophori;

Paraschizaphis scirpi ssp. *eriophori*;

Vesiculaphis theobaldi

Anoecia pskovica; *Cavariella aquatica*;

Metopolophium dirhodum

Key to apterae on *Eriophorum*:–

1. ANT PT/BASE less than 0.5. Eyes of 3 facets. SIPH as slightly raised pores, or absent **2**
- ANT PT/BASE more than 0.5. Eyes multifaceted. SIPH tubular **3**
2. ANT 4- or 5-segmented, very short, 0.10–0.12× BL. Tarsi 1-segmented. Wax pore plates, consisting of rings of 8–12 facets, present on all segments. SIPH absent or as very small pores. Body and appendages with sparse, short hairs
Colopha compressa
- ANT 6-segmented, about 0.5× BL. Tarsi 2-segmented. Wax pore plates absent. SIPH as large pores on shallow cones surrounded by hairs. Body and appendages densely hairy
Anoecia pskovica
3. SIPH dark. Hairs on ANT and dorsal body conspicuous **4**
- SIPH pale. Hairs on ANT and dorsal body inconspicuous **5**

HOST LISTS AND KEYS

4. Body elongate oval with extensive dark dorsal pigmentation. ANT III with 2–10 rhinaria near base. ANT PT/BASE 2.7–3.6 *Ceruraphis eriophori*
- Body broadly oval, without dark dorsal pigmentation. ANT III without rhinaria. ANT PT/BASE 4.1–5.3 *Schizaphis scirpi* ssp. *eriophori*
5. Front of head between ANT produced into 3 large separate rounded processes, each bearing spine-like hairs *Vesiculaphis theobaldi*
- Front of head not produced into 3 large rounded processes bearing spine-like hairs 6
6. SIPH thickened distally, with a rounded flangeless apex and small aperture. ABD TERG 8 with a backward-pointing conical process. ANT 0.3–0.4× BL, with PT/BASE 0.75–1.25 *Cavariella aquatica*
- SIPH tapering or cylindrical on distal part, with a flange and large aperture. ABD TERG 8 without a process. ANT c.0.6× BL, and PT/BASE 2.5–3.2 *Metopolophium dirhodum*

Eriophyllum

E. staechadifolium

Compositae

Pleotrichophorus longirostris

Eriosema

E. affinis

E. glomeratum

E. griseum

E. psoraleoides

Leguminosae

Aphis craccivora, *gossypii*

Aphis craccivora

Aphis gossypii

Aphis craccivora, *gossypii*; *Uroleucon compositae*

Use key to polyphagous aphids, p. 1020.

Eriosorus

E. aurita (?)

E. peruviana

Eriosorus spp.

Adiantaceae

Macromyzus maculatus

Micromyzodium filicium

Amphorophora ampullata ssp. *bengalensis*;

Micromyzus niger; *Shinjia orientalis*

Use key to apterae on ferns under *Polypodium*.

Erithalis

E. fruticosa

Rubiaceae

Aphis spiraeicola

Erlangea

E. cordifolia

E. longipes

E. rogersii

E. ugandensis

Compositae

Aphis gossypii, *spiraecola*; *Brachycaudus helichrysi*;

Myzus ornatus; *Uroleucon compositae*

Aphis gossypii; *Capitophorus elaeagni*;

Macrosiphum euphorbiae; *Myzus persicae*;

Uroleucon compositae

Myzus persicae

Aphis gossypii; *Brachycaudus helichrysi*;

Uroleucon compositae

Key to apterae on *Erlangea*:-

- Hairs on front of head and dorsal body mostly long and capitate, with tuberculate bases. ANT PT/BASE more than 6. SIPH pale with dark apices *Capitophorus elaeagni*
- Dorsal hairs not capitate, without tuberculate bases. ANT PT/BASE less than 6. SIPH dark or pale, with or without dark apices go to key to polyphagous aphids, p. 1020

Erodium

E. botrys
E. bryoniaefolium
E. cheilanthifolium =
trichomanifolium
E. chium
E. cicutarium

E. malacoides
E. moschatum

E. trichomanefolium
Erodium sp.

Geraniaceae

Myzus persicae
Aphis craccivora

Acyrthosiphon malvae
Acyrthosiphon malvae, malvae ssp. *geranii*;
 [Aphis *urticaria* Kalténbach of Rusanova, 1942];
Aulacorthum solani; *Macrosiphum euphorbiae, pallidum*;
Myzus ascalonicus, ornatus, persicae; *Nasonovia ribisnigri*
Acyrthosiphon malvae
Acyrthosiphon malvae ssp. *geranii*;
Macrosiphum euphorbiae; *Myzus persicae*
Acyrthosiphon malvae ssp. *geranii*
Aulacorthum solani; *Myzus ascalonicus*

Key to apterae on *Erodium*:-

1. Thoracic spiracles much larger than abdominal spiracles. ANT PT/BASE 7.0–11.4. ANT III with 3–36 rhinaria. Dorsum usually with a pattern of dark intersegmental pleural markings *Nasonovia ribisnigri*
- Thoracic spiracles similar in size to abdominal ones. ANT PT/BASE 1.3–7.5. ANT III with 0–24 rhinaria. Dorsum with or without dark pigmentation 2
2. SIPH dark except at bases, with a subapical zone of polygonal reticulation. ANT III, and usually also tibiae, entirely dark. ABD TERG 7 and 8 each usually with a pair of spinal tubercles (STu) *Macrosiphum pallidum*
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Eruca

E. japonica
E. vesicaria (incl. var. *sativa*)

Cruciferae

Aphis spiraecola
Aphis gossypii; *Brevicoryne brassicae*;
Lipaphis erysimi; *Pemphigus populitransversus*;
Myzus persicae

Use key to apterae on *Brassica*.

Erucago* see *Bunias***Erucaria***

E. boveana
E. hispanica
Erucaria sp.

Cruciferae

Acyrthosiphon gossypii; *Lipaphis erysimi*; *Myzus persicae*
Myzus persicae
Brevicoryne brassicae

HOST LISTS AND KEYS

Key to apterae on *Erucaria*:-

1. ANT III with 1–3 rhinaria near base. SIPH 2.5–3.5× cauda, with distal part thin and cylindrical. ANT VI BASE 2.0–2.6× R IV+V *Acyrtosiphon gossypii*
– ANT III without rhinaria. SIPH 0.65–2.5× cauda, if much longer than cauda then with distal part somewhat swollen. ANT VI BASE less than 1.5× R IV+V **2**
2. Head spiculose, with inner faces of ANT tubercles apically convergent. SIPH 1.9–2.5× cauda *Myzus persicae*
– Head smooth, with ANT tubercles little developed. SIPH 0.65–1.5× cauda **3**
3. ANT III 2.2–3.7× SIPH. SIPH 0.8–1.0× cauda, which is broadly triangular and bears 6–9 hairs. ABD TERG 8 with 8–18 hairs. Dorsal abdomen with paired dark markings *Brevicoryne brassicae*
– ANT III 1.0–1.8× SIPH. SIPH 1.1–1.6× cauda which is elongate triangular or tongue-shaped and bears 4–7 hairs. ABD TERG 8 with 2–7 hairs. Dorsal abdomen with or without dark markings *Lipaphis erysimi*

Erucastrum

E. gallicum (incl. *pollichii*)

Cruciferae

Brevicoryne brassicae

Ervatamia see *Tabernaemontana*

Ervum see *Vicia* (but *Ervum lens*=*Lens esculenta*)

Eryngium

E. alpinum
E. bourgatii
E. campestre

E. creticum
E. foetidum
E. giganteum
E. heldreichii
E. incognitum
E. maritimum

E. nasturtiifolium
E. paniculatum
E. planum

E. tricuspidatum
Eryngium sp.

Umbelliferae

Brachycaudus helichrysi
Aphis solanella
Aphis eryngiiglomerata, fabae, solanella, Aphis
(*Protaphis*) sp. (Turkey, BMNH colln);
Dysaphis sp. (Stroyan, 1985); *Helosiphon eryngii*;
Hyadaphis coriandri; *Macrosiphum euphorbiae*
Aphis spiraecola
Aphis craccivora
Aulacorthum solani
Aphis fabae; *Aulacorthum solani*; *Myzus ornatus, persicae*
Dysaphis foeniculus
Aphis eryngiiglomerata; *Aulacorthum solani*;
Cavariella aegopodii;
Dysaphis apiifolia, *Dysaphis* sp. (Stroyan, 1985);
Hyadaphis coriandri; *Myzus ascalonicus*
Aphis craccivora
Aphis fabae (as *eryngii* Blanchard)
Aphis eryngiiglomerata, fabae, [*Aphis* spp.
(Bozhko, 1976a: 71; Leonard, 1973: 15)];
Macrosiphum gei
Macrosiphum euphorbiae
[*Aphis dispar* Walker, *diversa* Walker – nomina dubia]

Key to apterae on *Eryngium*:-

1. ABD TERG 8 with a backward-pointing process above cauda. ANT PT/BASE 0.6–1.25. SIPH clavate
Cavariella aegopodii 2
– No supracaudal process. ANT PT/BASE more than 1.3. SIPH tapering, cylindrical or clavate
2. ANT PT/BASE 0.7–1.05. SIPH 0.025–0.031× BL *Aphis (Protaphis) sp.* (Turkey, BMNH colln)
– ANT PT/BASE 1.7–7.1. SIPH 0.045–0.45× BL 3
3. Cauda as short as or shorter than its basal width 4
– Cauda much longer than its basal width 8
4. Cauda with 30–40 hairs. SIPH constricted apically, with a swollen hemispherical ‘collar’ and a small aperture. Very large, flat marginal tubercles (MTu) present on ABD TERG 1–4 and 7. Spinal tubercles (STu) absent *Helosiphon eryngii*
– Cauda with 4–6 hairs. SIPH without a swollen ‘collar’ and with aperture of normal size. MTu and STu present or absent 5
5. SIPH smooth, pale, with subapical annular incision. No dark dorsal abdominal markings. MTu and STu rarely present *Brachycaudus helichrysi*
– SIPH imbricated, dark, without a subapical incision. Dark cross-bands usually present on ABD TERG 7 and 8. MTu regularly on ABD TERG 1–5, and STu usually on head and ABD TERG 8, or 7 and 8 6
6. SIPH 2.5–3.5 times longer than their basal width, 1.2–1.5× R IV+V and 15–25× as long as the very short, blunt and inconspicuous hairs on front of head *Dysaphis apiifolia*
– SIPH short and broad-based, rarely more than twice as long as their basal widths, 0.75–1.05× R IV+V and 2.5–5.0 times as long as the long and fine hairs on front of head 7
7. ABD TERG 8 usually (mean 1.6) and 7 often (mean 0.5) with STu. (Al. with 18–39 rhinaria on ANT III at a density of 44–90 per mm, and with STu on ABD TERG 7 and 8 occurring as in apt.) *Dysaphis foeniculus*
– STu absent always from ABD TERG 7 and usually (mean 0.25) from 8. (Al. with 34–50 rhinaria at a density of 92–136 per mm, and STu usually absent from ABD TERG 7 and 8) *Dysaphis sp.* (Stroyan, 1985)
8. SIPH with a subapical zone of polygonal reticulation. Head smooth, with well-developed ANT tubercles, their inner faces divergent 9
– SIPH without polygonal reticulation. If head is smooth then ANT tubercles are absent or weakly developed 10
9. Longest hair on ABD TERG 8 is 38–63 µm, 0.6–1.4× ANT BD III. Anterior half of subgenital plate usually (77%) with only 2 hairs (18% with 3, 5% with 4–6 hairs) *Macrosiphum euphorbiae*
– Longest hair on ABD TERG 8 is 66–106 µm, 1.4–2.0× ANT BD III. Anterior half of subgenital plate with 2–11 hairs, usually (77%) with 4–8 hairs *Macrosiphum gei*
10. Well-developed marginal tubercles (MTu) present on ABD TERG 2–4 as well as 1 and 7. Hairs on legs all short; e.g., those on hind femur maximally 15 µm, those on hind tibia maximally 25 µm *Aphis eryngiiglomerata*
– MTu absent from ABD TERG 2–4, or irregularly present and small. **If there are MTu on 1 and 7 then hairs on legs are much longer** 11
11. SIPH short and thick, 1.6–2.7× their minimum diameter on basal half and 0.9–1.3× HT II. Small MTu often present on ABD TERG 5 (sometimes also on 4) *Hyadaphis coriandri*
– SIPH more slender, 1.5–7.5× HT II. MTu irregularly present on ABD TERG 2–4, but very rarely on 5 go to key to polyphagous aphids, p. 1020

Erysimum (incl. *Cheiranthus*)*E. alliaria**E. annus**E. canescens**E. cheiranthoides**E. cheiri**E. collinum**E. crepidifolium**E. diffusum**E. officinale* see *Sisymbrium officinale**E. pannonicum**E. repandum**E. sessiliflorum**E. rupestre**E. vulgare**E. wilczekianum**Erysimum* sp.

Cruciferae

*Lipaphis erysimi**Anoecia corni*; *Brevicoryne brassicae**Brevicoryne brassicae*; *Smiela syreniae**Lipaphis turritella*; *Myzus cerasi*, *persicae**Aphis* sp. (*fabae* group; England, BMNH colln);*Brevicoryne brassicae*; *Lipaphis erysimi*;*Myzus ornatus*, *persicae**Lipaphis erysimi**Pseudobrevicoryne erysimi**Brevicoryne brassicae*; *Lipaphis fritzmulleri**Pseudobrevicoryne erysimi**Myzus persicae**Smiela syreniae**Lipaphis erysimi*; *Myzus ornatus*[*Cavariella aegopodii*]*Rhopalosiphoninus staphyleae**Acyrtosiphon ilka*Key to apterae on *Erysimum*:-

1. ANT PT/BASE less than 0.5. SIPH as rather large pores on shallow hairy cones. Cauda very broadly rounded. Large flat rounded marginal tubercles (MTu) present on most segments *Anoecia corni*
- ANT PT/BASE more than 0.8. SIPH barrel-shaped, tubular, or conical. Cauda tongue-shaped, helmet-shaped or triangular. MTu small or absent from most segments **2**
2. Cauda helmet-shaped or triangular, not or hardly longer than its basal width in dorsal view. ANT tubercles undeveloped, so that front of head is straight or convex in dorsal view. ANT III more than 2.4× SIPH **3**
- Cauda tongue-shaped, much longer than its basal width. ANT tubercles at least somewhat developed; if low then the medial tubercle is also developed, so that front of head U- or W-shaped in dorsal view. ANT III 0.8–2.3× SIPH **5**
3. SIPH tapering or barrel-shaped, longer than their basal widths. ANT without secondary rhinaria. Dorsum with paired dark markings *Brevicoryne brassicae*
- SIPH conical, shorter than their basal widths. ANT with secondary rhinaria on III, or III and IV. Dorsum without paired dark markings, either wholly dark or pale **4**
4. Hairs on ABD TERG 1–5 are long, 2–3× ANT BD III, and slightly capitate. ANT PT/BASE 0.9–1.5. SIPH cones large, dark, broad-based *Smiela syreniae*
- Hairs on ABD TERG 1–5 shorter than ANT BD III, with blunt or pointed apices. ANT PT/BASE 2.3–3.5. SIPH cones small and rounded apically *Pseudobrevicoryne erysimi*
5. ABD TERG 1 and 7 with marginal tubercles (MTu). SIPH and cauda black, SIPH tapering and similar in length to cauda which bears c.15 hairs *Aphis* sp. (*fabae* group, England: BMNH colln)
- ABD TERG 1 and 7 without MTu. SIPH and cauda pale or dark, cauda with 5–9 hairs **6**
6. ANT 1.05–1.4× BL. ANT tubercles well-developed, with inner faces smooth, broadly divergent. SIPH tapering/cylindrical for most of length, broad-based, 1.0–1.25× ANT III *Acyrtosiphon ilka*
- Without that combination of characters **7**

7. Cuticle of head rather rough, but without spicules. Front of head with median and ANT tubercles developed to a similar extent, with inner faces of ANT tubercles divergent **8**
 – Cuticle of head spiculate. ANT tubercles well developed, with inner faces steep-sided and apically convergent; median tubercle undeveloped **10**
8. ANT tubercles and median frontal tubercle weakly developed. Dorsum with broad dark bands on all tergites. SIPH and cauda very dark *Lipaphis turritella*
 – ANT tubercles and median frontal tubercle moderately to well developed. Dorsum without dark bands or with dark bars only on ABD TERG 7 and 8. SIPH pale or dusky with dark apices, cauda pale or dark **9**
9. SIPH 0.15–0.17 mm, 1.0–1.3× cauda *Lipaphis fritzmulleri*
 – SIPH 0.18–0.29 mm, 1.3–1.6× cauda *Lipaphis erysimi*
10. SIPH strongly clavate, with greatest diameter of swelling 1.7–2.8× minimum diameter of stem. ANT III usually with 1–7 rhinaria on basal half *Rhopalosiphoninus staphyleae*
 – SIPH tapering, cylindrical or only moderately clavate, with greatest diameter of swelling 1.1–1.45× minimum diameter of stem. ANT III without rhinaria **11**
11. SIPH slightly to moderately clavate (with a narrower basal part). Dorsum without any dark markings. ANT 0.7–1.0× BL, PT/BASE 2.8–4.5 *Myzus persicae*
 – SIPH tapering from base to flange. Dorsum with extensive pigmentation, or at least with dark pleural or marginal spots. ANT 0.5–0.7× BL, PT/BASE 1.7–3.2 **12**
12. Dorsum with extensive dusky/dark sclerotisation, and large dark marginal spots. SIPH dark, 0.22–0.27× BL *Myzus cerasi*
 – Dorsum without extensive dusky/dark sclerotisation, but with a pattern of dark intersegmental pleural spots. SIPH pale or dusky, 0.17–0.22× BL *Myzus ornatus*

Erythraea* see *Centaurium***Erythrina* see Blackman and Eastop (1994)*****Erythrococca****E. bongensis**E. microcarpa**Aphis gossypii**Aphis gossypii***Euphorbiaceae*****Erythrodes****Erythrodes* sp. (?)*Toxoptera aurantii***Orchidaceae*****Erythrodontium****E. leptophallum*[*Kaburagia rhusicola* (imm. sexuparae only)]**Entodontaceae**(or use key to moss-feeding aphids under *Polytrichum*)***Erythronium****E. dens-canis**Myzus persicae***Liliaceae*****Erythroxyllum****E. havanense**Toxoptera aurantii***Erythroxyllaceae**

HOST LISTS AND KEYS

Escallonia

E. ×langleyensis

Escallonia sp(p).

Use key to polyphagous aphids, p. 1020.

Escalloniaceae

Macrosiphum euphorbiae

Aphis fabae, *gossypii*, *spiraecola*; *Myzus persicae*

Eschscholzia

E. californica

Myzus persicae

Papaveraceae

***Etlingera* (incl. *Nicolaia*, *Phaenomia*)**

E. elatior

[*Pseudoregma elatior*?]

E. hemisphaerica

Pseudoregma sundanica

E. speciosa

Pseudoregma nicolaiae

Etlingera sp.

Pentalonia nigronervosa

Zingiberaceae

Use key to apterae on *Hedychium*.

Eucalyptus see Blackman and Eastop (1994)

Euchlaena = *Zea*

Euclea see Blackman and Eastop (1994)

Eucommia

E. ulmoides

[*Aphis* sp. – Leonard, 1972a: 101]; *Myzus persicae*

Eucommiaceae

Eucryphia

E. lucida

Aulacorthum solani

Eucryphiaceae

Eugenia see Blackman and Eastop (1994)

Eulalia

E. amaura

Hysterononeura setariae; *Schizaphis hypersiphonata*

E. villosa

Sitobion graminis

Eulalia sp.

Sipha flava

Gramineae

Use key to apterae of grass-feeding aphids under *Digitaria*.

Eulophia

E. alta

Aphis spiraecola; *Neomyzus circumflexus*; *Sitobion luteum*

E. horsfallii

Sitobion eulophiae

E. streptopetala

Aulacorthum solani; *Myzus ornatus*; *Sitobion anselliae*

Orchidaceae

Use key to aphids on orchids under *Cymbidium*.

Eunomia see *Aethionema*

***Eupatorium* (incl. *Osmia*)**

E. adenophorum

Aphis fabae, *gossypii*, *spiraecola*; *Aulacorthum solani*;

Brachycaudus helichrysi; *Myzus ornatus*, *persicae*;

Neomyzus circumflexus

Compositae

- E. africanum*
E. ageratoides see *rugosum*
E. ayapanoides
E. basifolium
E. cannabinum
- E. capillifolium*
E. chinense (incl. vars
sacchalinense, simplicifolium)
E. clementis
E. coelestinum
- E. conyzoides*
E. fistulosum
E. foeniculaceum
E. formosanum
E. fortunei
E. glandulosum
E. grandiceps
E. heteroclinium see *Chromolaena*
heteroclinia
E. hydrodes
- E. hyssopifolium*
E. incarnatum
E. inulaefolium
E. laevigatum see *Chromolaena*
E. latanifolium
E. libanoticum
- E. macrophyllum*
E. maculatum
E. odoratum see *Chromolaena*
E. pallescens
E. patens
E. paucibracteatum
E. pauciflorum
E. perfoliatum
E. pilosum
E. polyodon
E. polystictum
E. purpureum (incl. var. *maculatum*)
- E. recurvans*
E. rhexioides
E. rotundifolium
- Aphis spiraeicola*
Aphis spiraeicola
Aphis spiraeicola; *Uroleucon garnicai*
Aphis bozkhoae, eupatorii, frangulae, gossypii, spiraeicola,
Aphis spp. (BMNH colln, France and former Yugoslavia);
Brachycaudus cardui, helichrysi;
Macrosiphum euphorbiae; [*Ovatomyzus boraginacearum*]
Aphis spiraeicola; *Uroleucon ambrosiae, ciefi, erigeronense*
Aphis tsujii; Aulacorthum solani;
Brachycaudus helichrysi
Aphis spiraeicola
Aphis gossypii, spiraeicola; Myzus persicae;
Uroleucon ambrosiae
Aphis spiraeicola
Uroleucon ambrosiae
Aphis spiraeicola
Brachycaudus helichrysi
Brachycaudus helichrysi
Aphis nasturtii
Aphis spiraeicola; Toxoptera aurantii; Uroleucon ambrosiae
- Aphis gossypii, spiraeicola; Brachycaudus helichrysi;*
Neomyzus circumflexus
Uroleucon ciefi, pseudambrosiae
Uroleucon eupatorifoliae
Aphis gossypii, spiraeicola; [Tuberolachnus salignus]
- Aphis spiraeicola*
Aphis gossypii, spiraeicola; Neomyzus circumflexus;
Toxoptera aurantii
Aphis spiraeicola
Uroleucon ambrosiae
- Aphis spiraeicola*
Nietonafriella enclypteata
Aphis gossypii, spiraeicola; Toxoptera aurantii
Aphis spiraeicola
Aphis fabae, spiraeicola; Uroleucon ambrosiae
[*Uroleucon* sp. (Leonard, 1968)]
Aphis spiraeicola; Uroleucon ambrosiae
Uroleucon ambrosiae
Aphis gossypii, spiraeicola, vernoniae;
Uroleucon ambrosiae, eupatoricolens
Uroleucon ciefi
Aphis spiraeicola
[*Uroleucon* sp. (Leonard, 1968)]

HOST LISTS AND KEYS

<i>E. rugosum</i>	<i>Aphis coreopsidis</i> ; [<i>Macrosiphum eupatorii</i>]; <i>Uroleucon ambrosiae</i>
<i>E. urticaefolium</i>	<i>Aphis coreopsidis</i> ; <i>Brachycaudus helichrysi</i> ; <i>Macrosiphum euphorbiae</i> ; [<i>Uroleucon rudbeckiae</i>]
<i>E. villosum</i>	<i>Aphis spiraeicola</i> ; <i>Uroleucon ambrosiae</i>
<i>Eupatorium</i> spp.	? <i>Alphitoaphis</i> sp., BMNH colln (Washington DC, leg. A. Jensen); <i>Aphis</i> [<i>kurosawai</i>], <i>solitaria</i> ; <i>Hyperomyzus</i> (<i>Neonasonovia</i>) sp. (Costa Rica; BMNH colln) <i>Macrosiphum</i> [<i>gaurae</i>], <i>pallidum</i> ; <i>Toxoptera odinae</i>

Key to apterae on *Eupatorium* and *Chromolaena*:-

1. SIPH with a subapical zone of polygonal reticulation (at least 3–4 rows of closed polygonal cells) 2
 - SIPH without polygonal reticulation (sometimes with transverse interconnected striae) 11
2. SIPH either entirely dark, or pale on less than basal 0.2 of length 3
 - SIPH pale or dusky, or with at least basal 0.25 pale 9
3. Cauda dark. Many of hairs on ANT III exceeding BD III *Uroleucon eupatorifoliae*
 - Cauda pale or slightly dusky, much paler than SIPH. Hairs on ANT III usually not exceeding BD III 4
4. First tarsal segments with 4–5 hairs 5
 - First tarsal segments with 3 hairs 8
5. R IV+V 0.8–1.1× HT II 6
 - R IV+V 1.15–1.6× HT II 7
6. ANT III with 16–39 rhinaria. ANT PT/BASE 5.18–6.67. Cauda with 15–29 hairs. SIPH rather thick with reticulation on distal 0.31–0.36 of length *Uroleucon pseudambrosiae*
 - ANT III with 6–13 rhinaria. ANT PT/BASE 4.28–5.31. Cauda with 9–12 hairs. SIPH rather thin with reticulation on distal 0.21–0.29 of length *Uroleucon garnicai*
7. SIPH longer than ANT III *Uroleucon eupatoricolens*
 - SIPH shorter than ANT III *Uroleucon ambrosiae*
8. Dorsal hairs all arising from dark scleroites. SIPH 0.45–0.68 mm long, with distal 0.28–0.30 reticulated. Spinal and marginal tubercles (STu and MTu) absent. SIPH uniformly dark *Uroleucon ciefi*
 - Dorsal hairs not arising from dark scleroites. SIPH 0.56–1.20 mm long, with distal 0.14–0.20 reticulated. STu present on head and ABD TERG 7 and 8; MTu on prothorax, ABD TERG 2–5, and often on ABD TERG 1 and 7. SIPH dark over most of their length, but pale on basal 0.06 *Macrosiphum pallidum*
9. ANT III with 7–20 rhinaria often extending over more than basal half. SIPH with reticulation on distal 0.25–0.35. Cauda usually with one or more of subapical hairs blunt or with slightly expanded apices *Uroleucon erigeronense*
 - ANT III with 1–10 rhinaria, always restricted to basal half. SIPH with reticulation on distal 0.13–0.24 of length. Cauda with all hairs pointed 10
10. Clypeus much enlarged, almost globular. Front of head with ANT tubercles rather low and median tubercle developed. SIPH 2.0–2.9× cauda, with reticulation on distal 0.17–0.24. ANT PT/BASE 4.4–5.3 *Nietonafriella euclipteata*

- Clypeus of normal size. Front of head with ANT tubercles well developed, median tubercle undeveloped. SIPH 1.7–2.2× cauda, with reticulation on distal 0.13–0.20. ANT PT/BASE 5.3–6.2
Macrosiphum euphorbiae
- 11.** Head with well-developed ANT tubercles, their inner faces spiculate or scabrous **12**
- Head with ANT tubercles undeveloped or weakly developed, if moderately developed then with smooth inner faces **14**
- 12.** Longest hairs on ANT III and ABD TERG 3 longer than BD III. SIPH entirely dark
*Micromyzodium levipes**
- Hairs on ANT III and ABD TERG 3 short and blunt, less than 0.5× BD III. SIPH pale or only dark towards apices **13**
- 13.** Head not densely spiculate. SIPH tapering from broad base, with very coarse imbrication (Figure 15e), 3.5–4.0× cauda. Subgenital plate strongly produced posteriorly, broadly conical (Figure 15d)
Myzus siegesbeckicola
- Head densely spiculate and other characters not in that combination
go to key to polyphagous aphids, p. 1020, starting at couplet 5
- 14.** SIPH markedly clavate. Tergum with an extensive black sclerotic shield. ANT III dark except at base, with 10–17 rhinaria distributed over most of length
Hyperomyzus (Nasonovia) sp. (Cost Rica; BMNH colln, leg. J.H. Martin)
- SIPH tapering/cylindrical. Tergum with or without a dark sclerotic shield. ANT III with 0–10 rhinaria (usually 0, except in alatiform specimens) **15**
- 15.** SIPH slender, pale, and almost flangeless; 2.5–3.7× pale cauda which has a swollen basal half and slender distal half. MTu on ABD TERG 1–5, but absent from 7. ANT 5-segmented
?Alphitoaphis sp., BMNH colln (Washington DC, leg. A. Jensen)
- SIPH and cauda dark or pale, SIPH relatively shorter, with a distinct flange. MTu either absent, or present on both ABD TERG 1 and 7. ANT usually 6-segmented **16**
- 16.** Cauda helmet-shaped, as short as or shorter than its basal width in dorsal view. Spiracular apertures large and rounded. ABD TERG 1 and 7 without MTu **17**
- Cauda tongue-shaped, longer than its basal width. Spiracular apertures reniform. MTu present on ABD TERG 1 and 7 **18**
- 17.** Dorsum with an extensive black shield. SIPH dark, 0.19–0.32 mm, 2.3–3.0× their basal diameters. BL 1.5–2.5 mm
Brachycaudus cardui
- Dorsum without dark markings. SIPH pale, 0.65–0.165 mm, 0.9–2.0× their basal diameters. BL 0.9–1.5 mm
Brachycaudus helichrysi
- 18.** Cauda dark like SIPH **19**
- Cauda pale or if dusky, then paler than SIPH, which may be pale, dark or dark-tipped **26**
- 19.** Stridulatory apparatus present, consisting of sclerotic ridges on ABD sternites 5 and 6, and a row of blunt, peg-like hairs on each hind tibia. ANT PT/BASE 2.4–5.1 **20**
- Stridulatory apparatus absent. ANT PT/BASE 1.8–3.7 **21**
- 20.** SIPH 0.35–0.7× cauda *Toxoptera odinae*
- SIPH 0.9–1.5× cauda *Toxoptera aurantii*
- 21.** Secondary rhinaria present (in apt.) on ANT III (5–10), IV (8–9) and V (1–2) *Aphis bozhkoeae**
- Secondary rhinaria absent (in apt., except in alatiform specimens) **22**

HOST LISTS AND KEYS

22. Dorsal abdomen with extensive dark sclerotisation **23**
 – Dorsal abdomen mainly membranous, with or without dark segmental markings **24**
23. Hairs on ANT III shorter than BD III. Cauda with 4–9 hairs *Aphis craccivora*
 – Hairs on ANT III long and fine, mostly more than 2× BD III. Cauda with 11–25 hairs *Aphis tsujii*
24. Dorsal abdomen with dark cross-bands on ABD TERG 7 and 8 and usually with dark markings anterior to SIPH. Cauda with 11–25 hairs, without a midway constriction *Aphis fabae*
 – Dorsal abdomen without dark markings. Cauda with 7–16 hairs, and usually with a distinct midway constriction. **25**
25. HT I with 3 hairs (i.e., median sense peg present, as on fore and mid-tarsi). ANT PT/BASE 2.5–3.5. Hind tibia with a row of short, spine-like hairs *Aphis eugeniae*
 – HT I with 2 hairs (no median sense peg). ANT PT/BASE 1.9–2.8. Hind tibia with all hairs mong and fine-pointed *Aphis spiraeicola*
26. SIPH 0.24–0.40× BL, about twice as long as the much paler cauda. Head, ANT I, II and basal part of III very pale, contrasting with dark rest of ANT. ANT PT/BASE 3.7–4.9 *Aphis coreopsidis*
 – SIPH only up to 0.2× BL. Cauda pale or dark. Head and ANT segments differently pigmented. ANT PT/BASE 1.3–3.0 **27**
27. SIPH uniformly dark (sometimes dusky or paler basally in midsummer dwarfs) *Aphis eupatorii/frangulae/gossypii* group
 – SIPH pale, or pale with dark apices **28**
28. ANT III with (0–) 1–15 rhinaria on distal half, and ANT IV with (0–) 1–4; these are often bursiform (sunk in pits). RIV+V bearing 3–6 accessory hairs *Aphis solitaria*
 – ANT III without rhinaria (except in alatiform specimens). R IV+V bearing 2 accessory hairs **29**
29. SIPH 6.5–11.2× their width at midlength, constricted at base and cylindrical on distal half. ANT PT/BASE 1.5–1.9 *Aphis vernoniae*
 – SIPH 3.1–6.2× their width at midlength; tapering from a broad base, and usually with dark apices. ANT PT/BASE 1.8–3.0 **30**
30. R IV+V 0.95–1.3× HT II, and 0.9–1.3× ANT BASE (V) VI. ANT PT 1.9–2.8× HT II *Aphis nasturtii*
 – R IV+V 1.25–1.55× HT II, and 1.3–1.6× ANT BASE (V) VI. ANT PT 2.6–3.4× HT II **31**
31. Cauda with only 6 hairs. R IV+V 1.25–1.45× HT II. ANT PT 2.6–2.9× HT II. ABD TERG 2–4 without marginal tubercles (MTu) *Aphis* sp. (S France; BMNH colln)
 – Cauda with 9–13 hairs. R IV+V 1.4–1.55× HT II. ANT PT 2.8–3.4× HT II. ABD TERG 2–4 sporadically with MTu (mean 1.75) *Aphis* sp. (former Yugoslavia; BMNH colln)

Euphorbia (incl. *Chamaesyce*)

E. agraria
E. albomarginata
E. alepica
E. ×ambohipotsiensis
E. amygdaloides

E. ×andrefandrova
E. aphylla
E. arguta

Euphorbiaceae

Aphis agrariae
Aphis ?esulae (USA; BMNH colln)
Aphis hillerislamberti
Eonaphis euphorbiae
Aphis valleii, [*Aphis* sp. (Holman and Pintera, 1981);
Macrosiphum amygdaloides, *euphorbiae*
Eonaphis euphorbiae
Acyrtosiphon ilka; *Myzus persicae*
Myzus persicae

<i>E. austriaca</i>	<i>Macrosiphum meixneri</i>
<i>E. berteriana</i>	<i>Aphis craccivora</i>
<i>E. bertheloti</i>	<i>Aphis tirucallis</i>
<i>E. biglandulosa</i>	<i>Aphis euphorbiae</i>
<i>E. biumbellata</i>	<i>Aphis brotericola, hillerislammersi</i>
<i>E. bourgaeana</i>	<i>Aphis tirucallis; Myzus persicae</i>
<i>E. breoni</i>	<i>Eonaphis euphorbiae</i>
<i>E. broterii</i>	<i>Aphis brotericola</i>
<i>E. candelabrum</i>	<i>Aulacorthum solani; Myzus persicae</i>
<i>E. capuronii</i>	<i>Eonaphis euphorbiae</i>
<i>E. chamaepeplus</i>	<i>Myzus persicae</i>
<i>E. characias</i>	<i>Aphis euphorbiae, hillerislammersi, tirucallis, vallei;</i> <i>Macrosiphum amygdaloides, euphorbiae;</i> <i>[Therioaphis langloisi]</i>
<i>E. cheiradenia</i>	<i>Aphis euphorbicola</i>
<i>E. corollata</i>	<i>Aphis euphorbiae</i>
<i>E. cyparissias</i>	<i>Acyrtosiphon cyparissiae, cyparissiae ssp. propinquum;</i> <i>Aphis esulae, [sp. nr. esulae (Remaudière, 1964)],</i> <i>euphorbiae, hillerislammersi, tirucallis,</i> <i>pseudopaludicola;</i> <i>Aulacorthum solani</i>
<i>E. delphinensis</i>	<i>Eonaphis euphorbiae</i>
<i>E. denticulata</i>	<i>Aphis euphorbicola</i>
<i>E. didiereoides</i>	<i>Eonaphis pauliani</i>
<i>E. dorsiventralis</i>	<i>Aphis gossypii</i>
<i>E. epithymoides</i>	<i>Acyrtosiphum thracicum; Myzus persicae</i>
<i>E. esula</i>	<i>Acyrtosiphon cyparissiae, cyparissiae ssp. propinquum,</i> <i>euphorbiae;</i> <i>Aphis brotericola, esulae, euphorbiae, glareosae;</i> <i>Aulacorthum solani; Macrosiphum euphorbiae;</i> <i>Myzus persicae; Pemphigus immunis</i>
<i>E. exigua</i>	<i>Aphis hillerislammersi</i>
<i>E. falcata</i>	<i>Aphis hillerislammersi, tirucallis</i>
<i>E. forskalii</i>	<i>Aphis gossypii</i>
<i>E. genoudiana</i>	<i>Eonaphis euphorbiae</i>
<i>E. gerardiana</i> see <i>sequieriana</i>	
<i>E. glareosa</i> see <i>pannonica</i>	
<i>E. helioscopia</i>	<i>Acyrtosiphon cyparissiae, euphorbiae, [moltshanovi],</i> <i>[pisum];</i> <i>Aphis euphorbiae, hillerislammersi, tirucallis;</i> <i>Macrosiphum euphorbiae; Myzus persicae;</i> <i>Pemphigus immunis</i>
<i>E. heterophylla</i>	<i>Aphis craccivora, gossypii</i>
<i>E. hirta</i>	<i>Aphis craccivora, gossypii, euphorbiae, spiraecola, tirucallis;</i> <i>Brachycaudus helichrysi; Myzus persicae</i>
<i>E. horombensis</i>	<i>Eonaphis euphorbiae</i>
<i>E. hyberna</i>	<i>Macrosiphum meixneri</i>
<i>E. inaequilatera</i>	<i>Aphis craccivora; Sitobion phyllanthi</i>

HOST LISTS AND KEYS

<i>E. ingezalahiana</i>	<i>Eonaphis euphorbiae</i>
<i>E. insularis</i>	<i>Macrosiphum inexpectatum</i>
<i>E. lagascae</i>	<i>Aphis brotericola</i> , <i>tirucallis</i>
<i>E. lamprocarpa</i>	<i>Acyrtosiphon cyparissiae</i> ssp. <i>turkestanicum</i> ; <i>Trama euphorbiae</i>
<i>E. lanata</i>	<i>Aphis pseudoeuphorbiae</i>
<i>E. laro</i>	<i>Eonaphis pauliani</i>
<i>E. lathyris</i>	<i>Aphis sensoriataeuphorbii</i> , [<i>Aphis</i> sp. (Holman and Pintera, 1981)]; <i>Macrosiphum euphorbiae</i> ; <i>Smynthuodes betae</i>
<i>E. lunulata</i>	<i>Acyrtosiphon cyparissiae</i> ; [<i>Macrosiphoniella huochengensis</i>]
<i>E. macroclada</i>	<i>Aphis myrsinitidis</i>
<i>E. maculata</i>	<i>Macrosiphum euphorbiae</i>
<i>E. marginata</i>	<i>Macrosiphum euphorbiae</i>
<i>E. mauritanica</i>	<i>Myzus persicae</i>
<i>E. milii</i>	<i>Eonaphis euphorbiae</i> ; <i>Sitobion milii</i>
<i>E. missouriensis</i>	<i>Aphis euphorbiae</i>
<i>E. myrsinites</i>	<i>Aphis brotericola</i> , <i>myrsini</i> , <i>myrsinitidis</i>
<i>E. nerifolia</i>	<i>Aphis spiraecola</i>
<i>E. nicaeensis</i>	<i>Aphis brotericola</i> , <i>hillerislambersi</i> , <i>vallei</i>
<i>E. obtusifolia</i> (incl. <i>regisjubae</i>)	<i>Aphis hillerislambersi</i> , <i>tirucallis</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i>
<i>E. oxyphylla</i>	<i>Aphis brotericola</i>
<i>E. palustris</i>	<i>Acyrtosiphon euphorbiae</i> ; <i>Aphis paludicola</i>
<i>E. pannonica</i> (incl. <i>glareosa</i>)	<i>Aphis glareosae</i>
<i>E. paralias</i>	<i>Aphis hillerislambersi</i> , <i>tirucallis</i> , <i>vallei</i>
<i>E. pauliani</i>	<i>Eonaphis euphorbiae</i>
<i>E. pekinensis</i>	<i>Aulacorthum euphorbophagum</i> ; <i>Macrosiphum</i> sp. (Japan, BMNH colln, leg. M. Miyazaki)
<i>E. peplis</i>	<i>Aphis craccivora</i> , <i>euphorbiae</i>
<i>E. peplus</i>	<i>Acyrtosiphon cyparissiae</i> ; <i>Aphis euphorbiae</i> , <i>solanella</i> , <i>tirucallis</i> ; <i>Aulacorthum solani</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus cymbalariae</i> , <i>ornatus</i> , <i>persicae</i>
<i>E. petiolata</i>	<i>Aphis pseudeuphorbiae</i>
<i>E. pilulifera</i>	<i>Aphis craccivora</i> , <i>gossypii</i>
<i>E. piscatoria</i>	<i>Aphis hillerislambersi</i>
<i>E. pithyusa</i> (incl. <i>ovalifolia</i>)	<i>Acyrtosiphon euphorbiae</i> ; <i>Aphis hispanica</i>
<i>E. platyphyllos</i>	<i>Acyrtosiphon thracicum</i>
<i>E. polychroma</i>	<i>Acyrtosiphon euphorbiae</i> , <i>thracicum</i>
<i>E. portlandica</i>	<i>Aphis hillerislambersi</i>
<i>E. portulacoides</i>	<i>Aphis pseudopulchella</i>
<i>E. prostrata</i>	<i>Aphis craccivora</i> , <i>euphorbiae</i> , <i>tirucallis</i>
<i>E. pubescens</i>	<i>Aphis euphorbiae</i> , <i>tirucallis</i>
<i>E. pulcherrima</i>	<i>Aphis craccivora</i> ; <i>Aulacorthum solani</i> ; <i>Myzus persicae</i> ; <i>Toxoptera aurantii</i>
<i>E. razafinjohanii</i>	<i>Eonaphis euphorbiae</i>
<i>E. salicifolia</i>	<i>Aphis euphorbiae</i>

<i>E. schimperiana</i>	<i>Aphis hillerislammersi</i>
<i>E. segetalis</i>	<i>Aphis brotericola</i> , <i>hillerislammersi</i> , <i>tirucallis</i> ; <i>Myzus persicae</i>
<i>E. seguieriana</i> see <i>seguieriana</i>	
<i>E. semiperfoliata</i>	<i>Macrosiphum amygdaloides</i>
<i>E. sequieriana</i> (incl. <i>gerardiana</i>)	<i>Acyrtosiphon cyparissiae</i> ssp. <i>propinquum</i> ; <i>Aphis euphorbiae</i> , <i>gerardiana</i> , <i>glareosae</i> <i>Aphis</i> sp. (Hungary and Switzerland; BMNH colln) <i>Aphis hillerislammersi</i> , <i>tirucallis</i>
<i>E. serrata</i>	<i>Aphis hillerislammersi</i> , <i>tirucallis</i>
<i>E. ×soanierariensis</i>	<i>Eonaphis euphorbiae</i>
<i>E. spinosa</i>	<i>Acyrtosiphon corsicae</i> , <i>matilei</i> ; <i>Aphis brotericola</i>
<i>E. splendens</i>	<i>Aphis tirucallis</i> ; <i>Eonaphis euphorbiae</i>
<i>E. stenoclada</i>	<i>Eonaphis euphorbiae</i> ; [<i>Paulianaphis madagascariensis</i>]
<i>E. stepposa</i>	<i>Aphis glareosae</i>
<i>E. striatella</i>	<i>Aphis euphorbicola</i>
<i>E. stricta</i>	<i>Acyrtosiphon euphorbiae</i> ; <i>Pemphigus immunis</i>
<i>E. supine</i>	<i>Aphis craccivora</i>
<i>E. sylibum</i>	<i>Macrosiphum euphorbiae</i>
<i>E. terracina</i>	<i>Aphis euphorbiae</i> , <i>tirucallis</i>
<i>E. thymifolia</i>	<i>Aphis gossypii</i>
<i>E. tirucallis</i>	<i>Aphis tirucallis</i>
<i>E. viguieri</i>	<i>Eonaphis euphorbiae</i>
<i>E. villosa</i>	<i>Macrosiphum euphorbiae</i>
<i>E. virgata</i>	<i>Acyrtosiphon cyparissiae</i> ssp. <i>turkestanicum</i> ; <i>Aphis esulae</i> , <i>euphorbiae</i>
<i>E. wulfenii</i>	<i>Macrosiphum euphorbiae</i>
<i>E. ×zanaharensis</i>	<i>Eonaphis euphorbiae</i>
<i>Euphorbia</i> spp.	<i>Acyrtosiphon pareuphorbiae</i> ; <i>Aphis dlabolai</i> , <i>hispanica</i> , <i>nerii</i> , <i>nevskyi</i> , <i>propinqua</i> , <i>pseudeuphorbiae</i> , <i>pulchella</i> , <i>Aphis</i> sp. near <i>hillerislammersi</i> (Canary Is., Spain, BMNH colln); [<i>Pemphigus brevicornis</i>]; <i>Trama afghanica</i>

Key to apterae on *Euphorbia*:-

[There are numerous morphologically similar *Aphis* spp. on *Euphorbia* in S, C and E Europe, including some undescribed species. Couplets 28 onwards make an attempt to discriminate most of the taxa in this group that are represented in the BMNH collection, but a more detailed study of this group is needed.]

- | | |
|--|---------------------------|
| 1. Hind tarsi greatly elongated, more than 0.6× hind tibia | 2 |
| – Hind tarsi similar in length to other tarsi | 3 |
| 2. ANT PT/BASE less than 0.5 | <i>Trama euphorbiae</i> * |
| – ANT PT/BASE more than 0.5 | <i>Trama afghanica</i> * |
| 3. Eyes with only 3 facets | 4 |
| – Eyes multifaceted | 7 |
| 4. Body with very large spinal and marginal spine-like processes. SIPH conical, dark, broad-based, with a subapical ring of hairs. ANT PT/BASE more than 1 | 5 |
| – Body without long spine-like processes. SIPH absent. ANT PT/BASE less than 0.5 | 6 |

HOST LISTS AND KEYS

5. R IV+V 0.164–0.183 mm. Marginal processes present on ABD TERG 2 (as well as 3, 4 and 7) *Eonaphis euphorbiae*
 – R IV+V 0.120–0.142 mm. Marginal processes absent from ABD TERG 2 *Eonaphis pauliani*
6. Body and appendages clothed with dense, fine hairs. ANT II at least 2× ANT I. Anal plate enlarged, with anus in dorsal position *Smynthuroides betae*
 – Body with sparse inconspicuous hairs. ANT I and II similar in length. Anus and anal plate normal *Pemphigus immunis*
7. Head spiculose, with inner faces of ANT tubercles parallel or convergent apically **8**
 – Head without spicules. ANT tubercles either undeveloped or with divergent inner faces **10**
8. SIPH long and straight, tapering/cylindrical, with a well-developed flange. ANT III usually with 1–2 small rhinaria near base. ANT tubercles with inner faces almost parallel **9**
 – Without that combination of characters
 go to key to polyphagous aphids, p. 1020, starting at couplet 5
9. R IV+V 0.9–1.0× HT II, which is more than 0.145 mm long *Aulacorthum euphorbophagum*
 – R IV+V 1.1–1.4× HT II, which is 1.10–0.14 mm long *Aulacorthum solani*
10. ANT tubercles developed, sometimes low but projecting beyond middle of front of head in dorsal view. ANT usually at least 0.9× BL, with one or more rhinaria on basal part of ANT III. ABD TERG 1 and 7 without marginal tubercles (MTu) **11**
 – ANT tubercles absent, or if somewhat developed then hardly projecting beyond middle of front of head in dorsal view, and ABD TERG 1 and 7 then have MTu. ANT less than 0.9× BL, and usually without rhinaria on III **25**
11. SIPH with subapical polygonal reticulation, although this may only consist of a very few closed cells near apex, in which case SIPH is slightly swollen subapically, and has a slight constriction just proximal to the (small) flange **12**
 – SIPH without any subapical polygonal reticulation, the subapical region having transverse somewhat spinulose imbrication, and no trace of swelling or constriction proximal to the rather well-developed flange **18**
12. Hairs on ANT III all short and blunt, the longest much less than 0.5× BD III. SIPH with only a few closed polygonal cells near apex **13**
 – Longest hairs on ANT III more than 0.5× BD III. SIPH with at least 4–5 rows of closed polygonal cells near apex **15**
13. SIPH more than 1.5× head width across (and incl.) eyes, and with at least 4–5 rows of closed polygonal cells near apex. ANT BASE VI c.0.26 mm long, c.1.6× HT II *Macrosiphum* sp. on *E. pekinensis* (Japan, BMNH colln)
 – SIPH shorter than head width across eyes, and with only a few closed polygonal cells near apex. ANT BASE VI 0.095–0.125 mm long, 0.6–0.9× HT II **14**
14. R IV+V 0.11–0.13 mm, 1.1–1.3× ANT BASE VI and 0.83–0.89× HT II *Sitobion milii*
 – R IV+V 0.09–0.10 mm, 0.7–1.0× ANT BASE VI and 0.60–0.76× HT II *Sitobion phyllanthi*
15. Total length of rostrum (measured from base of protractor apodeme) 0.89–1.09× ANT III *Macrosiphum inexpectatum*
 – Total length of rostrum 0.57–0.80× ANT III **16**
16. R IV+V 0.45–0.62× ANT BASE VI, and 0.60–0.71× HT II. ANT III with 6–20 secondary rhinaria, often extending onto distal half *Macrosiphum meixneri*

- R IV+V $0.69-1.1 \times$ ANT BASE VI and $0.79-0.91 \times$ HT II. ANT III with 1–10 secondary rhinaria restricted to basal $0.2-0.5$ **17**
- 17.** R IV+V $0.69-0.79 \times$ ANT BASE VI and $0.79-0.91 \times$ HT II. Longest hair on ABD TERG 3 is $32-72 \mu\text{m}$. Apical parts of femora very dark *Macrosiphum amygdaloides*
- R IV+V $0.8-1.1 \times$ ANT BASE VI and $0.83-1.08 \times$ HT II. Longest hair on ABD TERG 3 is $21-37 \mu\text{m}$. Apical parts of femora pale or slightly dusky *Macrosiphum euphorbiae*
- 18.** First tarsal segments with 5–7 hairs **19**
- First tarsal segments with 3 hairs **20**
- 19.** Anterior half of head dark, strongly demarcated from pale posterior half. ANT, tibiae and SIPH wholly or mainly dark *Acyrtosiphon cyparissiae*
- Front of head pale or dusky, ANT, tibiae and SIPH mainly pale with only apices dark *Acyrtosiphon cyparissiae* ssp. *propinquum*
- 20.** Cauda $2.2-2.7 \times$ longer than its width at midlength, $1.1-1.4 \times$ HT II and $1.7-2.1 \times$ R IV+V *Acyrtosiphon corsicae*
- Cauda $2.8-4.4 \times$ longer than its width at midlength, $1.5-3.7 \times$ HT II and $2.7-7.5 \times$ R IV+V **21**
- 21.** R IV+V $0.75-0.9 \times$ HT II. ANT BASE VI $1.1-1.5 \times$ R IV+V *Acyrtosiphon ilka*
- R IV+V $0.4-0.65 \times$ HT II. ANT BASE VI $1.5-3.1 \times$ R IV+V **22**
- 22.** BL $1.7-2.5 \text{ mm}$, ANT $1.5-2.3 \text{ mm}$. ANT III $4.6-7.5 \times$ R IV+V and $2.7-4.0 \times$ HT II. Cauda with 5–10 hairs **23**
- BL $2.3-4.4 \text{ mm}$, ANT $2.5-4.3 \text{ mm}$. ANT III $7.5-12.1 \times$ R IV+V and $3.8-5.6 \times$ HT II. Cauda with 9–21 hairs **24**
- 23.** SIPH $1.4-1.8 \times$ cauda, which bears 7–19 hairs *Acyrtosiphon matilei*
- SIPH $1.9-2.0 \times$ cauda, which bears 5–7 hairs *Acyrtosiphon pareuphorbiae*
- 24.** ANT III with 3–11 rhinaria, restricted to basal half. ANT PT $0.64-1.06 \times$ ANT III and $3.4-5.1 \times$ HT II *Acyrtosiphon euphorbiae*
- ANT III with 14–26 rhinaria, distributed over most of length. ANT PT $1.03-1.18 \times$ ANT III and $4.9-5.9 \times$ HT II *Acyrtosiphon thracicum*
- 25.** ABD TERG 1 and 7 without marginal tubercles (MTu). Spiracular apertures large and rounded. SIPH smooth, pale, with a marked annular incision proximal to the flange *Brachycaudus helichrysi*
- ABD TERG 1 and 7 with MTu. Spiracular apertures reniform. SIPH imbricated, pale or dark, without a subapical annular incision **26**
- 26.** Stridulatory apparatus present. ANT PT/BASE $4.0-5.0$ *Toxoptera aurantii*
- Stridulatory apparatus absent. ANT PT/BASE $0.9-4.1$ **27**
- 27.** ANT PT/BASE $0.9-2.5$, but if more than 2.0 then SIPH are $0.7-1.0 \times$ cauda and R IV+V is $0.7-0.9 \times$ HT II **28**
- ANT PT/BASE $1.9-4.1$; if less than 2.0 then **either** SIPH are $1.1-2.2 \times$ cauda **or** R IV+V is $1.0-1.3 \times$ HT II go to key to polyphagous aphids, p. 1020, starting at couplet 24
- 28.** Cauda very short, broadly rounded, only $0.4-0.7 \times$ as long as its basal width in dorsal view, and bearing 4–7 hairs *Aphis euphorbicola*
- Cauda helmet-shaped, triangular or finger-shaped, at least $0.8 \times$ as long as its basal width, and bearing 6–34 hairs **29**

HOST LISTS AND KEYS

29. MTu present on at least some of ABD TERG 2–6 as well as 1 and 7 (but these may be reduced or occasionally absent in specimens collected in autumn) **30**
 – MTu present only on ABD TERG 1 and 7 **34**
30. Cauda with about 17 hairs *Aphis pseudopulchella** **31**
 – Cauda with 7–15 hairs **31**
31. Hairs on ANT III minute, the longest 0.3–0.4× BD III. Dorsum invariably with extensive dark sclerotisation. MTu very large; longitudinal diameter of MTu on ABD TERG 2–4 is 0.25–0.33 the distance between them *Aphis glareosae*
 – Longest hairs on ANT III more than 0.4× BD III. Dorsum with variable, sometimes extensive sclerotisation. MTu variably developed **32**
32. ANT PT/BASE 2.1–2.5. MTu well developed. ABD TERG 8 with 4–6 hairs *Aphis* sp. on *Euphorbia sequieriana*, Hungary and Switzerland
 – ANT PT/BASE 1.2–2.0. MTu variably developed. ABD TERG 8 with 2–4 hairs **33**
33. Longest hairs on ANT III 20–40µm, longer than BD III. Cauda with 9–14 hairs *Aphis myrsinitidis*
 – Longest hairs on ANT III 8–18µm, 0.4–0.8× BD III. Cauda with 4–10 hairs *Aphis brotericola*
34. Cauda helmet-shaped or triangular, 0.8–1.3× its basal width in dorsal view **35**
 – Cauda elongate triangular or finger-shaped, more than 1.3× its basal width **38**
35. ANT PT/BASE 0.9–1.2. Longest hairs on ANT III 0.8–1.0× BD III. Cauda with 9–16 hairs **36**
 – ANT PT/BASE 1.25–1.95. Longest hairs on ANT III either less than 0.8× or more than 1.0× BD III. Cauda with 7–10 hairs **37**
36. SIPH 0.85–1.31× cauda, which is about as long as its basal width. R IV+V 0.93–1.03× HT II. (Al. with 6–13 secondary rhinaria on ANT III, 0 on IV) *Aphis dlabolai**
 – SIPH 0.65–0.80× cauda, which is 1.1–1.3× its basal width. R IV+V 0.75–0.86× HT II. (Al. with 12–19 secondary rhinaria on ANT III, 0–4 on IV) *Aphis propinqua*
37. SIPH only 0.27–0.46× cauda, which is triangular. Longest hairs on ANT III less than 0.8× BD III. Dorsum membranous *Aphis hispanica*
 – SIPH 0.78–1.06× cauda, which is helmet-shaped (with convex sides). Longest hairs on ANT III longer than BD III. Dorsal abdomen with variably developed dark sclerotisation *Aphis valleii*
38. SIPH 0.25–0.69× cauda **39**
 – SIPH 0.70–1.37× cauda **43**
39. ANT with secondary rhinaria (in apt.) distributed III 5–16, IV 6–9, V 5–7. ANT PT/BASE c.1.6–1.7 *Aphis sensoriataeuphorbiae*
 – ANT without secondary rhinaria. ANT PT/BASE 0.88–1.53 **40**
40. SIPH 0.25–0.30× cauda. ANT PT/BASE c.1.0. ANT PT 0.8–0.9× HT II *Aphis* sp. near *hillerislambersi* (Canary Is. and Spain, BMNH colln)
 – SIPH 0.39–0.67× cauda. ANT PT/BASE 1.0–1.63. ANT PT 1.0–1.3× HT II **41**
41. R IV+V 0.080–0.97 mm, 0.60–0.76× HT II *Aphis gerardianae*
 – R IV+V 0.098–0.12 mm, 0.73–0.92× HT II **42**
42. ANT PT/BASE 1.0–1.63. R IV+V 0.73–0.90× HT II. Cauda with 6–12 hairs *Aphis hillerislambersi*
 – ANT PT/BASE c.1.0. R IV+V c.0.9× HT II. Cauda with 6–7 hairs *Aphis nevskiyi**

43. Hairs on ANT III finely pointed, 1.1–2.0× BD III 44
 – Longest hairs on ANT III 0.2–0.95× BD III 45
44. Cauda bearing numerous (28 or more) hairs *Aphis paludicola*
 – Cauda bearing 7–10 hairs *Aphis pseudopaludicola**
45. ANT PT/BASE c.0.9 *Aphis agrariae**
 – ANT PT/BASE 1.2–2.4 46
46. Longest hairs on ANT III 0.2–0.5× BD III. ANT PT/BASE 1.5–2.4. Dorsum membranous or with only light, pale, patchy sclerotisation 47
 – Longest hairs on ANT III 0.55–0.95× BD III. ANT PT/BASE 1.2–1.8. Dorsal sclerotisation very variable, sometimes even absent, but often dark and extensive 48
47. Cauda with 6–10 hairs *Aphis esulae*
 – Cauda with 12–17 hairs *Aphis pulchella*
48. SIPH rather robust, often with slightly convex sides, 1.5–2.3× longer than their basal widths. Cauda tapering near base, but with an almost cylindrical middle part and a rather rounded apex, and bearing 6–14 hairs *Aphis euphorbiae*
 – SIPH with tapering, often slightly concave sides, 2.1–3.6× longer than their basal widths. Cauda tapering over most of length, with a rather acute apex, and 6–9 hairs 49
49. Dorsum with little or no sclerotisation *Aphis pseudeuphorbiae*
 – Dorsum often with extensive dark sclerotisation, although this is sometimes reduced *Aphis tirucallis*

Euphoria see *Dimocarpus**Euphrasia*

- E. brevipila*
E. frigida
E. hirtella
E. lutea see *Odontites*
E. nemorosa
E. officinalis
- E. rostkoviana*
- E. stricta*
E. viscosa see *Parentucellia*
Euphrasia spp.

Scrophulariaceae

- Hyperomyzus zirnitsi*; *Myzus cerasi*
Hyperomyzus thorsteinni
Nasonovia ribisnigri
- Brachycaudus helichrysi*
Brachycaudus helichrysi, mimeuri;
Hyperomyzus zirnitsi;
Myzus cerasi; *Nasonovia ribisnigri*
Hyperomyzus zirnitsi ssp. *boerneri*;
Nasonovia ribisnigri
Brachycaudus mimeuri; *Nasonovia ribisnigri*
- Brachycaudus persicae*; *Hyperomyzus rhinanthi*;
Macrosiphum euphorbiae

Key to apterae on *Euphrasia*:-

1. Cauda helmet-shaped, shorter than its basal width in dorsal view 2
 – Cauda tongue- or finger-shaped, much longer its basal width 3
2. SIPH dark, imbricated, 1.4–2.1× cauda. Dorsum sclerotic, usually dark *Brachycaudus mimeuri* (or *persicae* – see text)
 – SIPH pale, smooth, 1.1–1.3× cauda. Dorsum pale, membranous *Brachycaudus helichrysi*

HOST LISTS AND KEYS

3. SIPH very strongly swollen distally, with diameter of swollen part 1.6 or more× minimum diameter of ‘stem’ 4
 - SIPH tapering or cylindrical 7
4. Dorsum with extensive black sclerotic markings, including a black patch on ABD TERG 2–4 (–5). SIPH black, spindle-shaped. Cauda black *Hyperomyzus rhinanthi*
 - Dorsum pale. SIPH pale, dusky, or dark-tipped, clavate. Cauda pale 5
5. ANT PT/BASE 4.0–5.9. Longest hairs on ANT III less than 0.5× BD III *Hyperomyzus thorsteinni*
 - ANT PT/BASE 6.2–7.4. Longest hairs on ANT III more than 0.5× BD III 6
6. ANT III with 35–42 rhinaria. (Al. with 75–101 rhinaria on III, and 16–34 on IV) *Hyperomyzus zirnitsi*
 - ANT III with 21–37 rhinaria. (Al. with c.45 rhinaria on III and 14 on IV) *Hyperomyzus zirnitsi* ssp. *boernerii*
7. Head densely ornamented with spicules and nodules. Dorsum with an extensive dark sclerotic shield, ornamented with wrinkles. ANT III without rhinaria. ANT PT/BASE 2.0–3.0 *Myzus cerasi*
 - Head without spicules or nodules. Dorsum without an extensive dark sclerotic shield. ANT III with 1–36 rhinaria. ANT PT/BASE 5.3–11.4 8
8. SIPH with a subapical zone of polygonal reticulation. Dorsum without any dark markings. ANT PT/BASE 5.3–6.2. ANT III with 1–10 rhinaria *Macrosiphum euphorbiae*
 - SIPH without polygonal reticulation. Dorsum usually with a pattern of dark markings. ANT PT/BASE 7.0–11.4. ANT III with 3–36 rhinaria *Nasonovia ribisnigri*

Euptelia see Blackman and Eastop (1994)

Euralia

E. viminea = *Microstegium vimineum*

Gramineae

Eurhynchium

E. confertum

E. praelongum

Muscaphis musci

Muscaphis cuspidata, *escherichi*

Brachytheciaceae

Use key to apterae of moss-feeding aphids under *Polytrichum*.

Eurotia see *Axyris*

[except *Eurotia ceratoides* = *Krascheninnikovia ceratoides*]

Eurya

E. japonica

Eurya spp.

Theaceae

Aphis [*euryae* Shinji (nomen dubium)], *gossypii*, *spiraecola*;

Ericolophium euryae;

[*Macrosiphoniella formosartemisiae*, *grandicaudata*];

[*Indomasonaphis anaphalidis*];

Sinomegoura citricola, *symplocois*;

Toxoptera aurantii, *citricidus*

Aulacorthum rhamni; *Eutrichosiphum roepkei*;

Greenidea symplocosis; *Neomyzus circumflexus*

Key to apterae on *Eurya*:-

1. SIPH bearing numerous very long hairs 2
 – SIPH without hairs 3
2. Cauda with a median process (stylus). SIPH more than $0.3 \times$ BL, with pale reticulation over most of length *Greenidea symplocosis*
 – Cauda without a median process. SIPH less than $0.3 \times$ BL, without reticulation *Eutrichosiphum roepkei**
3. Head spiculose, with inner faces of ANT tubercles steep-sided, parallel or apically convergent 4
 – Head without spicules. ANT tubercles either weakly developed or with inner faces divergent 5
4. Dorsal abdomen with a large, roughly horseshoe-shaped dark sclerite, and dark cross-bands on thorax *Neomyzus circumflexus*
 – Dorsum without dark markings *Aulacorthum rhamni**
5. ANT tubercles weakly developed, not projecting beyond middle of front of head in dorsal view. MTu present on ABD TERG 1 and 7 6
 – ANT tubercles moderately to well-developed, projecting beyond middle of front of head in dorsal view. MTu absent from ABD TERG 1 and 7 9
6. Cauda paler than SIPH and bearing 4–8 hairs *Aphis gossypii*
 – Cauda as black as SIPH and bearing 8–54 hairs 7
7. Cauda with 8–12 hairs. ANT PT/BASE 1.9–2.9. Stridulatory apparatus absent *Aphis spiraeicola*
 – Cauda with 10–54 hairs. ANT PT/BASE 3.5–5.0. Stridulatory apparatus present 8
8. Longest hairs on ANT III $0.5\text{--}1.0 \times$ BD III. Cauda with 10–26 hairs *Toxoptera aurantii*
 – Longest hairs on ANT III $1.2\text{--}2.1 \times$ BD III. Cauda with 19–54 hairs *Toxoptera citricidus*
9. BL 1.2–1.6 mm. Cauda pale. Front of head with a prominent median tubercle almost as large as ANT tubercles. Dorsum often with a dark patch. ANT III without rhinaria. SIPH $2.0\text{--}2.5 \times$ cauda *Ericolophium euryae*
 – BL 1.7–3.2 mm. Cauda dark. Median tubercle weakly developed. Dorsum pale. ANT III usually with at least one rhinarium. SIPH $0.8\text{--}1.5 \times$ cauda 10
10. Head width across (and including) eyes $0.9\text{--}1.1 \times$ cauda, which bears 10–19 hairs. SIPH $0.8\text{--}1.0 \times$ cauda *Sinomegoura citricola*
 – Head width across eyes $c.1.4 \times$ cauda, which bears 6–9 hairs. SIPH $c.1.1 \times$ cauda *Sinomegoura symplocois*

Euryops*E. chrysanthemoides**E. pectinatus**E. virgineus***Compositae***Macrosiphum euphorbiae*; *Uroleucon compositae**Aphis spiraeicola*, [*Aphis* sp. (Leonard, 1972a: 101)];*Myzus persicae**Macrosiphum euphorbiae*; *Myzus ornatus*

Use key to polyphagous aphids, p. 1020.

Euscaphis see Blackman and Eastop (1994)***Eustrephus****E. latifolius***Philesiaceae***Aulacorthum solani*

HOST LISTS AND KEYS

Euthamia

E. caroliniana

E. conyzoides

Compositae

?*Pleotrichophorus* sp. (Florida, BMNH colln, leg.

S.E. Halbert)

Aphis gossypii

Key to apterae on *Euthamia*:-

- ANT PT/BASE 6.9–7.6. ANT PT 2.5–2.8× SIPH which are thin and flangeless. Cauda with 4–5 hairs. ANT flagellum dark except at base of III, and tibiae mostly dark, contrasting with entirely pale femora ?*Pleotrichophorus* sp. (Florida, BMNH colln)
- ANT PT/BASE less than 6.5 and other characters not in above combination
go to key to polyphagous aphids, p. 1020

***Eutrema* (incl. *Wasabia*)**

E. wasabi

Cruciferae

Pemphigus populitransversus

Exochorda

E. racemosa

Rosaceae

[*Lachnus tropicalis* – Tao, 1999]

Exostema

E. caribaeum

E. longiflora

E. paniculata

Rubiaceae

Aphis spiraeicola; *Toxoptera aurantii*

Aphis spiraeicola

Toxoptera aurantii

Use key to polyphagous aphids, p. 1020.

Exotheca

E. abyssinica

Gramineae

Aphis gossypii; *Myzus persicae*; *Pseudaphis sijui*;

Rhopalosiphum maidis;

Sitobion africanum, *graminis*, [*Sitobion* sp. (Millar, 1994)];

[*Uroleucon compositae*]

Use key to apterae of grass-feeding aphids under *Digitaria*.

Fadogia

F. agrestis

Rubiaceae

Aphis gossypii

Fagara* see *Zanthozylum

Fagonia

F. arabica

F. bruguieri

F. cretica

F. glutinosa

F. mollis

Zygophyllaceae

Acyrtosiphon gossypii; *Brachyunguis harmalae*

Brachyunguis harmalae; *Myzus persicae*

Acyrtosiphon gossypii; *Aphis craccivora*;

Brachyunguis harmalae; *Myzus persicae*

Acyrtosiphon gossypii; *Aphis gossypii*

Acyrtosiphon gossypii; *Aphis craccivora*;

Brachyunguis harmalae; *Myzus persicae*

Key to apterae on *Fagonia*:-

1. ANT PT/BASE 0.40–0.75. SIPH 0.4–0.7× cauda *Brachyunguis harmalae*
- ANT PT/BASE more than 1. SIPH more than 0.7× cauda **2**
2. SIPH very long and thin, 2.5–3.5× cauda and 0.33–0.5× BL *Acyrtosiphon gossypii*
- SIPH less than 2.5× cauda and less than 0.33× BL go to key to polyphagous aphids, p. 1020

Fagopyrum*F. cymosum**F. esculentum**F. saggitatum**F. tataricum****Fagopyrum* spp.****Polygonaceae**

Anaulacorthum fagopyri; *Aphis gossypii*, *nasturtii*;
Aulacorthum solani;
Brachycaudus amygdalinus, *rumexicolens*;
[*Impatientinum asiaticum* ssp. *dalhousiensis*];
Macrosiphum fagopyri; *Uroleucon fagopyri*
Acyrtosiphon rubi;
Aphis fabae, *gossypii*, *nasturtii*, *neopolygona*, *solanella*;
Aulacorthum solani; *Macchiatella itadori*;
Macrosiphum euphorbiae; *Myzus ornatus*, *persicae*;
[*Schizaphis graminum*]; *Uroleucon compositae*
Aphis fabae
Acyrtosiphon rubi; *Aphis fabae*
Aphis solanella, *spiraecola*;
[*Aulacorthum nipponicum*];
[*Liosomaphis himalayensis*]; [*Macrosiphum rosae*];
Neomyzus circumflexus; *Toxoptera aurantii*, *odinae*

Key to apterae on *Fagopyrum*:-

1. Cauda very broadly rounded, so that it is hardly evident **2**
- Cauda evident, tongue- or finger-shaped **4**
2. SIPH tubular, imbricated. ANT III with rhinaria. Dorsal abdomen with a large black sclerite centered on ABD TERG 3–6, but with ABD TERG 7 and 8 unsclerotised *Macchiatella itadori*
- SIPH very short, conical, smooth surfaced. ANT III without rhinaria. Dorsal abdomen usually with dark sclerotic bars on ABD TERG 6–8, and sometimes with dark markings anterior to siphunculi, but without a large black central sclerite **3**
3. ANT 5- or 6-segmented, only 0.24–0.38 mm long, 0.17–0.28× BL. Spinal hairs on ABD TERG 6 and 7 are pointed, 25–44 µm long, similar to those on ABD TERG 8. If dark sclerotic bars are present then these are on ABD TERG 6–8 only *Brachycaudus amygdalinus*
- ANT usually 6-segmented, 0.49–0.95 mm long, 0.33–0.48× BL. Spinal hairs on ABD TERG 6 and 7 are only 10–15 µm long, much shorter than those on ABD TERG 8. If dark dorsal sclerotic bars are present then these are on ABD TERG 5 as well as 6–8, and often there are irregular dark sclerites on more anterior segments *Brachycaudus rumexicolens*
4. ANT tubercles well developed, projecting well beyond middle part of front of head in dorsal view. No marginal tubercles (MTu) on ABD TERG 1 and 7 **5**
- ANT tubercles weakly developed, not or hardly projecting beyond middle of front of head in dorsal view. MTu always present on ABD TERG 1 and 7 **11**
5. Head spiculose or nodulose. ANT tubercles with inner faces rough and steep-sided, parallel or apically convergent **6**

HOST LISTS AND KEYS

- Head without numerous spicules or nodules (sometimes with a few spicules ventrally). ANT tubercles with inner faces smooth and divergent 7
- 6. ANT III with 6–8 rhinaria. First tarsal segments with 4–4–4 hairs. SIPH slightly swollen, with 2–5 rows of subapical transverse striae and/or polygonal reticulation (Figure 28a) *Anaulacorthum fagopyri*
- ANT III with 0–2 (–4) rhinaria. First tarsal segments with 3–3–3 or 3–3–2 hairs. SIPH if slightly swollen then without subapical striae or reticulation polyphagous *Aulacorthum* and *Myzus* spp.
(go to key to polyphagous aphids, p. 1020, starting at couplet 5)
- 7. SIPH without any polygonal reticulation. Hairs on ANT III and ABD TERG 3 very short with very blunt or incrassate apices, maximally 6–15 µm long, 0.2–0.3× BD III. Dorsal cuticle sclerotic, wrinkled or variolate *Acyrtosiphon rubi*
- SIPH with several subapical rows of polygonal reticulation. Hairs on ANT III and ABD TERG 3 with blunt or pointed apices, the longest of them at least 0.5× BDIII. Dorsal cuticle mainly membranous 8
- 8. SIPH reticulated over at least distal 0.25 of length. Dorsal abdominal hairs arising from small dark scleroites. Postsiphuncular sclerites present. ANT III with 27–80 rhinaria distributed over most of length 9
- SIPH with reticulation over distal 0.13–0.20 of length. Dorsal abdominal hairs not arising from dark scleroites. Postsiphuncular sclerites absent. ANT III with 1–13 rhinaria, restricted to basal part 10
- 9. SIPH about 2× the similarly dark cauda. ANT III mainly dark with 60–80 rhinaria. No antesiphuncular sclerites *Uroleucon compositae*
- SIPH about 1.3–1.5× the much paler cauda. ANT III mainly pale with 23–34 rhinaria. Large, crescent-shaped antesiphuncular sclerites present (Figure 28b) *Uroleucon fagopyri*
- 10. BL more than 4 mm. SIPH dark. Cauda thick (3 or more× thicker than diameter of SIPH at their respective midpoints), with 11–16 hairs *Macrosiphum fagopyri*
- BL 2–4 mm. SIPH pale, sometimes darker distally. Cauda thinner (less than 2.5× diameter of SIPH at their respective midpoints), with 8–12 hairs *Macrosiphum euphorbiae*

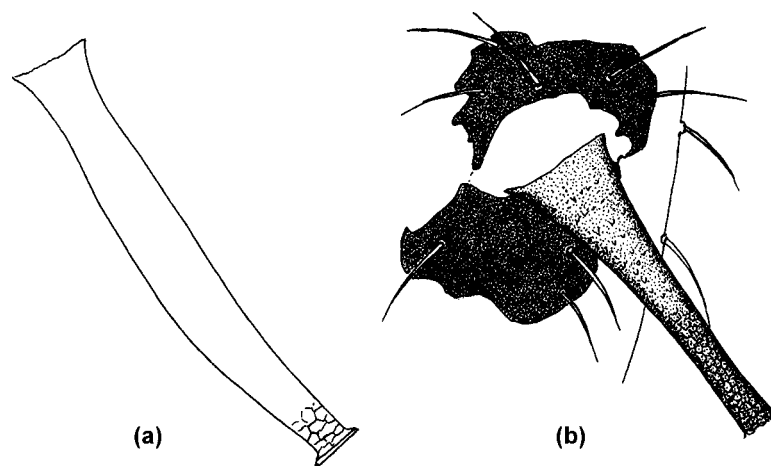


Figure 28 Apteræ on *Fagopyrum*; (a) SIPH of *Anaulacorthum fagopyri*, (b) SIPH and pre- and postsiphuncular sclerites of *Uroleucon fagopyri*.

11. ANT PT/BASE 1.5–2.0. (Al. with 28–32 secondary rhinaria on ANT III, 12–15 on IV and 2–5 on V)
*Aphis neopolygona**
- ANT PT/BASE 1.9–5.0. (Al. with 2–33 secondary rhinaria on ANT III, 0–5 on IV and 0 on V)
 polyphagous *Aphis* and *Toxoptera* spp.
 (use key to polyphagous aphids, p. 1020, starting at couplet 24)

Faidherbia*F. albida**Aphis gossypii***Leguminosae*****Falcaria****F. rivini**Ammiaphis sii*; [*Aphis chloris*]*F. vulgaris**Ammiaphis sii*; *Aphis fabae***Umbelliferae**Key to apterae on *Falcaria*:-

- Cauda pale, tapering to a point and bearing 5–7 hairs. All hairs on body and appendages very small and inconspicuous. ANT with sec. rhinaria. ABD TERG 1–5 with flat round marginal tubercles (MTu) (but not on 7), and paired spinal tubercles (STu) also often present *Ammiaphis sii*
- Cauda black, tongue-shaped and bearing 11–19 hairs. Body hairs evident. ANT without sec. rhinaria. STu absent, and MTu only constantly present on ABD TERG 1 and 7 *Aphis fabae*

Falcata* see *Amphicarpaea***Fallopia* (incl. *Bilderdykea*, *Reynoutria*)***F. aubertii*=*baldshuanica**F. baldshuanica**F. convolvulus**F. japonica* (incl. *cuspidatum*)*F. sachalinensis***Polygonaceae***Aphis fabae*; *Macrosiphum euphorbiae**Aphis* [*fabae*], *gossypii*, *nasturtii*, [*neoreticulata* Theobald, 1927], *solanella*;*Aulacorthum solani*; *Macrosiphum venafuscae*;*Myzus* [*certus*], *persicae**Aphis* [*celastrii*], *craccivora*, *fabae*, *gossypii*, *ichigo*;*Aulacorthum magnoliae*, *solani*; *Macchiatella itadori**Macrosiphum euphorbiae*; *Toxoptera odinae**Aphis fabae*, *nasturtii*, *polygonacea*, *solanella*, *spiraecola*;*Aulacorthum solani*; *Macchiatella itadori*Key to apterae on *Fallopia*:-

1. Cauda very broadly rounded, not evident. ANT III with rhinaria, and dorsal abdomen with a large black central sclerite *Macchiatella itadori*
- Cauda tongue- or finger-like. If ANT III has rhinaria then dorsal abdomen has no black central sclerite 2
2. SIPH with polygonal reticulation on subapical 0.1–0.2 of length 3
- SIPH without polygonal reticulation 4
3. SIPH mainly dark, paler at base. ANT PT/BASE 6–8. ANT BASE VI 1.4–1.6× R IV+V. Cauda with 7 hairs *Macrosiphum venafuscae*
- SIPH pale, sometimes darker towards apices. ANT PT/BASE 5.3–6.2. ANT BASE VI 0.9–1.3× R IV+V. Cauda with 8–14 hairs *Macrosiphum euphorbiae*

HOST LISTS AND KEYS

4. Head spiculose, with well-developed, steep-sided ANT tubercles. ABD TERG 1 and 7 without marginal tubercles (MTu) 5
 - Head without spicules, ANT tubercles weakly developed. ABD TERG 1 and 7 with MTu 7
5. SIPH tapering or cylindrical, 2.1–2.5× cauda *Aulacorthum solani*
 - SIPH slightly to moderately swollen on distal half, 1.6–2.2× cauda 6
6. Head and ANT I and II dark, ANT III with 1–2 rhinaria near base. Legs mostly dark *Aulacorthum magnoliae*
 - Head and ANT I–II pale, ANT III without rhinaria. Legs mainly pale *Myzus persicae*
7. SIPH and cauda both black, with SIPH at least 1.9× cauda, and no dark dorsal abdominal shield 8
 - Either SIPH and cauda are not both black, or SIPH are less than 1.8× cauda, or there is an extensive black dorsal shield go to key to polyphagous aphids, p. 1020, starting at couplet 24
8. MTu usually present on ABD TERG 2–5 as well as 1 and 7. ABD TERG 8 with 4–5 hairs on a transverse sclerotic bar. Longest hairs on ANT III 0.5–0.7× BD III *Aphis ichigo*
 - MTu absent from ABD TERG 2–5. ABD TERG 8 membranous, with 2 hairs. Longest hairs on ANT III 1–2× BD III *Aphis polygonaceae*

Faramea

F. occidentalis

Toxoptera aurantii

Rubiaceae

Farfugium

F. japonicum (see also *Senecio kaempferi*)

Aphis fukii

Compositae

Fatoua

F. pilosa

F. villosa

Fatoua sp.

[*Pemphigus fataunae*]

[*Epipemphigus niisimae*]; *Micromyzodium kuwakusae*

[*Myzus fataunae*]

Moraceae

Fatsyhedera (= *Fatsia*×*Hedera*)

F. lizei

Aphis gossypii, [*Aphis* sp. (Leonard, 1972a: 101)]

Araliaceae

Fatsia

F. japonica

Aphis fabae, [*Aphis* sp. (Leonard, 1972a: 101)];
Aulacorthum magnoliae; *Neomyzus circumflexus*;
Toxoptera odinae

Araliaceae

Use key to polyphagous aphids, p. 1020.

Feijoa see *Acca*

Felicia

F. amelloides

Myzus persicae; [*Uroleucon* sp.; Leonard, 1972a: 111]

Compositae

'Ferns'

See *Polypodium* for general key to apterae of fern-feeding aphids.

Ferula

F. akitschkensis
F. assa-foetida
F. communis

F. galbanifula
F. jaeschkeana
F. karatavica
F. kelleri
F. leiophylla
F. linkii

F. mirabilis
F. nuda

F. ovina
F. prangifolia
F. tingitana
Ferula spp.

Umbelliferae

Dysaphis tschildarensis
Dysaphis crataegi
Anuraphis cachryos, *pyrilaseri*; *Aphis fabae*, *spiraecola*;
Aulacorthum solani; *Cavariella aegopodii*;
Dysaphis apiifolia, *crataegi* ssp. *siciliensis*, *foeniculus*;
Hyadaphis foeniculi
Aphis fabae
Anuraphis ferulae; *Dysaphis tadjikistanica*, *tschildarensis*
Dysaphis ferulae, *mirabilis*
Dysaphis ferulae
Hyadaphis ferulae
Aphis solanella; *Cavariella aegopodii*;
Dysaphis foeniculus; *Hyadaphis coriandri*; *Myzus persicae*
Dysaphis mirabilis
Aphis craccivora; *Brachyunguis peucedani*;
 [*Dysaphis* sp. (Kadyrbekov, 2003c)]
Dysaphis hissarica
Dysaphis ferulae, *mirabilis*
Cavariella aegopodii
Acyrtosiphon ilka; *Aphis gossypii*;
 [*Myzus ferulaginis* (nomen nudum)];
Swirskiaphis polychaeta; *Trama kulinitiscae*;
 [*Vacuna ferulae* (nomen nudum)]

Key to apterae on *Ferula*:-

Couplets 13–16 are based partly on the key to *Dysaphis* on *Ferula* provided by Danyarova and Narzikulov (1975).

1. Hind tarsi very much elongated, more than 0.5× hind tibiae. SIPH poriform. Cauda broadly rounded, not evident *Trama kulinitiscae*
- Hind tarsi not much longer than other tarsi. SIPH tubular. Cauda helmet-shaped, triangular or tongue-like 2
2. Dorsal body hairs very long (more than 100 μm), thick and numerous *Swirskiaphis polychaeta*
- Dorsal body hairs less than 50 μm long, not thick 3
3. Cauda tongue-shaped, clearly longer than its basal width. Spinal tubercles (STu) absent or rarely present 4
- Cauda triangular or helmet-shaped, not longer than its basal width. STu usually present 11
4. ABD TERG 8 with a backwardly directed process above cauda *Cavariella aegopodii*
- No supracaudal process 5
5. Head densely spiculose, with steep-sided or apically convergent ANT tubercles
 go to key to polyphagous aphids, p. 1020, starting at couplet 5
- Head without spicules. ANT tubercles undeveloped or variously developed 6
6. ANT PT/BASE c.0.6. SIPH c.0.6× cauda. ABD TERG 1 and 7 with MTu *Brachyunguis peucedani**
- ANT PT/BASE 1.0–4.6, SIPH 0.6–3.6× cauda. ABD TERG 1 and 7 with or without MTu 7

HOST LISTS AND KEYS

7. ANT III with 1–4 rhinaria near base. ANT tubercles well developed. SIPH pale, tapering/cylindrical, without subapical polygonal reticulation, 1.7–2.3× cauda. ABD TERG 1 and 7 without MTu
Acyrtosiphon ilka
- ANT III without rhinaria (unless SIPH have subapical polygonal reticulation), and other characters not in that combination **8**
8. SIPH not at all swollen, 0.8–2.5× cauda, which bears 4–24 hairs. ABD TERG 1 and 7 with MTu (or if not then SIPH with subapical polygonal reticulation). Longest hairs on ANT III 0.4–1.5× BD III
go to key to polyphagous aphids, p. 1020, starting at couplet 16
- SIPH swollen basally, 0.6–0.8× cauda, or clavate and 0.9–1.2× cauda, which bears 6–7 hairs. ABD TERG 1 and 7 without MTu. Longest hairs on ANT III less than 0.4× BD III **9**
9. SIPH clavate, 1.7–3.2× R IV+V, 1.6–2.8× HT II and 0.9–1.2× cauda *Hyadaphis foeniculi*
- SIPH swollen basally, 0.95–1.7× R IV+V, 0.9–1.35× HT II and 0.6–0.8× cauda **10**
10. SIPH 1.25–1.35× HT II and 1.2–1.7× R IV+V *Hyadaphis ferulae**
- SIPH 0.90–1.27× HT II and 0.95–1.47× R IV+V *Hyadaphis coriandri*
11. SIPH ornamented with blunt spinules, arranged in closely-spaced transverse rows. Cauda with 9–20 hairs **12**
- SIPH with normal imbrication. Cauda with 5–8 hairs **14**
12. SIPH 0.185–0.263 mm long, 2–3× their middle widths. (Al. with 76–99 sec. rhinaria on ANT III, 21–42 on IV and 0–10 on V) *Anuraphis pyrilaseri*
- SIPH 0.105–0.180 mm long, 1.3–2.2× their middle widths. (Al. with 29–72 sec. rhinaria on ANT III, 0–13 on IV and 0–2 on V) **13**
13. Marginal tubercles (MTu) present on thorax and ABD TERG 1–5, but absent from ABD TERG 6 and 7. Spinal tubercles (STu) regularly present on ABD TERG 1–5. (Al. with 29–43 secondary rhinaria on ANT III, 0 on IV and V) *Anuraphis ferulae**
- MTu present on thorax and ABD TERG 1–7. STu small and often absent from ABD TERG 3–5. (Al. with 37–72 sec. rhinaria on ANT III, 6–13 on IV and 0–2 on V) *Anuraphis cachryos*
14. R IV+V 1.4–1.8× HT II. STu present on head and all ABD TERG, except sometimes 3 and 4. MTu on ABD TERG 7 as well as 1–5. SIPH coarsely imbricated *Dysaphis tschildarensis**
- R IV+V less than 1.4× HT II. STu at most present on head and ABD TERG 7–8 or 8. MTu on ABD TERG 1–5 only, or sometimes also on 7. SIPH only moderately imbricated **15**
15. Longest hairs on ANT III 1.0–2.1× BD III. ANT PT/BASE 2.0–3.3
Dysaphis foeniculus group (including *ferulae*, *mirabilis*, *tadzhikistanica*)
- Longest hairs on ANT III 0.4–0.9× BD III. ANT PT/BASE 2.7–4.1 **16**
16. Longest marginal hairs on ABD TERG 3–5 are 2.0–2.5× BD III *Dysaphis hissarica**
- Longest marginal hairs on ABD TERG 3–5 are 0.4–1.0× ANT BD III **17**
17. Posterior hair on hind trochanter 0.24–0.56 (rarely more than 0.5)× length of trochantrofemoral suture. Longest hair on ABD TERG 8 is 11–38µm, rarely longer than 30µm. ABD TERG 7 frequently with marginal tubercles (MTu) *Dysaphis apiifolia*
- Posterior hair on hind trochanter 0.42–1.0 (rarely less than 0.5)× length of trochantrofemoral suture. Longest hair on ABD TERG 8 is 25–80µm, rarely shorter than 30µm. ABD TERG 7 rarely with MTu *Dysaphis crataegi*

Ferulago

F. campestris

Umbelliferae

Anuraphis pyrilaseri

Festuca*F. arundinacea* (incl. *uechtritzi*)*F. brachyphylla**F. cinerea* (incl. *duriuscula*)*F. contracta**F. crinum-ursi**F. elatior**F. geniculata* see *Vulpia geniculata**F. gigantea**F. glauca**F. heterophylla**F. longifolia**F. myuros**F. ovina* (incl. var. *vulgaris*)*F. ovina-duriuscula**F. pratensis**F. pseudovina**F. rubra***Gramineae**

Forda rotunda; *Geoica utricularia*;
Metopolophium dirhodum; *Rhopalosiphum padi*;
Sitobion avenae, *graminis*; *Tetraneura ulmi*
Rhopalosiphum padi; *Sipha glyceriae*; *Sitobion fragariae*
Forda formicaria, *marginata*; *Paracletus cimiciformis*;
Schizaphis graminum; *Sitobion avenae*
Myzus ascalonicus; *Rhopalosiphum padi*
Rhopalomyzus poae
Forda marginata; *Rhopalosiphum padi*;
Schizaphis graminum

Geoica setulosa; *Sitobion avenae*, *fragariae*;
Tetraneura longisetosa, *ulmi*
Forda formicaria; *Tetraneura ulmi*
Schizaphis graminum; *Sitobion avenae*;
 [*Sminthuraphis ulrichi*]
Sitobion fragariae
Sitobion fragariae
Anoecia nemoralis, *zirnitsi*; *Aploneura lentisci*;
Atheroides karakumi, *serrulatus*; *Baizongia pistaciae*;
Chaetosiphella berleseii; *Cryptaphis poae*;
 [*Diuraphis* sp. (Holman and Pintera, 1981)];
Forda formicaria, *marginata*; *Geoica setulosa*, *utricularia*;
 [*Ziphyia maculata*]; *Jacksonia papillata*;
Metopolophium tenerum; *Myzus ascalonicus*;
Paracletus cimiciformis; *Rhopalosiphum insertum*, *padi*;
 [*Saltusaphis iberica*]; *Schizaphis graminum*;
Sipha elegans, *maydis*, *uvarovi*; *Sitobion fragariae*;
Tetraneura caerulescens, *longisetosa*, *ulmi*;
Vesiculaphis theobaldi
Anoecia corni; *Forda marginata*
Forda marginata; *Geoica utricularia*;
Metopolophium dirhodum; *Mordvilkoella jacutensis*;
Rhopalosiphum maidis, *padi*;
Schizaphis graminum, *nigerrima*;
Sipha glyceriae, *elegans*, *maydis*;
Sitobion avenae, *fragariae*, [*graminearum* Mordvilko, 1919]
 [*Ziphyia bufo*]
Anoecia corni, *nemoralis*, *zirnitsi*; *Aspidaphis porosiphon*;
Atheroides brevicornis, *serrulatus*;
Forda formicaria, *marginata*; *Geoica utricularia*;
Metopolophium dirhodum, *festucae*, *sabihiae*;
Paracletus cimiciformis; *Rhopalosiphum insertum*, *padi*;
Schizaphis graminum;
Sipha elegans, *glyceriae*, *littoralis*, *maydis*;
Sitobion akebiae, *avenae*, *fragariae*;
Smynthurodes betae; *Tetraneura ulmi*

HOST LISTS AND KEYS

<i>F. sulcata</i>	<i>Forda formicaria</i> ; <i>Geoica setulosa</i> , <i>utricularia</i> ; <i>Schizaphis graminum</i>
<i>F. tectoria</i>	<i>Sitobion avenae</i>
<i>F. trachyphylla</i>	<i>Atheroides serrulatus</i>
<i>F. vaginiata</i> (incl. <i>dominii</i>)	<i>Sitobion avenae</i>
<i>F. varia</i>	[<i>Acyrtosiphon loti</i> (as <i>Metopolophium gracilipes</i>)]; <i>Metopolophium dirhodum</i> ; <i>Rhopalomyzus poae</i> ; <i>Rhopalosiphum padi</i>
<i>Festuca</i> spp.	<i>Anoecia vagans</i> ; <i>Chaetosiphella tshernavini</i> ; <i>Forda formicaria</i> ; <i>Paracletus bykovi</i> ; <i>Utamphorophora humboldti</i>

Use key to apterae of grass-feeding aphids under *Digitaria*.

Filago

F. arvensis
F. gallica

F. germanica

F. minima
F. montana
Filago spp.

Compositae

Pemphigus populinigrae; *Pleotrichophorus filaginis*
Aphis [*filaginis* (nomen nudum)], *frangulae*;
Pemphigus populinigrae
Aphis filaginea, *frangulae*; *Brachycaudus helichrysi*;
Pemphigus populinigrae;
[*Sitobion avenae* (as *Macrosiphoniella gnaphalii*)]
Pemphigus populinigrae
Pemphigus populinigrae
Aphis craccivora;
[*Macrosiphum filaginis* (nomen nudum)]

Key to apterae on *Filago*:-

- SIPH absent. ANT about 0.2× BL, with PT/BASE 0.17–0.20. ABD TERG 3–7 with wax gland plates
– SIPH present, ANT more than 0.3× BL, with PT/BASE more than 0.5. No wax gland plates **2**
Pemphigus populinigrae
- Dorsal hairs with fan-shaped apices. SIPH long and thin. ANT PT/BASE 4.8–6.9. R IV+V short, stiletto-shaped, with a pair of very long accessory hairs near base
– Dorsal hairs blunt or pointed. SIPH not long and thin. ANT PT/BASE less than 3. R IV+V blunt-tipped, without very long accessory hairs **3**
Pleotrichophorus filaginis
- Dorsal abdomen with a solid black sclerotic shield
– Dorsal abdomen without a solid black shield **4**
Aphis craccivora
- SIPH much longer than HT II. ANT PT/BASE 2–3
– SIPH similar in length to HT II. ANT PT/BASE about equal to or less than 1 **1**
Aphis frangulae
*Aphis filaginea**

Filicium

F. decipiens

Toxoptera aurantii

Sapindaceae

Filipendula (incl. *Ulmaria*)

F. hexapetala

F. kamtschatica

Rosaceae

Aphis ulmariae, [*Aphis* sp. (Bozhko, 1976a: 63)];
Macrosiphum cholodkovskyi
Amphorophora filipendula; *Aphis ulmariae*;
Aulacorthum solani

<i>F. palmata</i>	<i>Aphis filipendulae, ulmariae</i>
<i>F. ulmaria</i>	<i>Amphorophora gei;</i> <i>Aphis gossypii, nudicauda, spiraephaga, ulmariae</i>
<i>F. vulgaris</i>	<i>Aphis nudicauda; Macrosiphum cholodkovskyi</i>

Key to apterae on *Filipendula*:-

1. Medium-sized to large, broadly spindle-shaped aphids with well-developed ANT tubercles and ANT as long as or longer than BL 2
 - Small oval aphids with weakly developed ANT tubercles and ANT shorter than BL 5
2. SIPH cylindrical on distal part 3
 - SIPH markedly clavate 4
3. SIPH with a subapical zone of polygonal reticulation (at least 4–5 rows of closed cells). Hairs on ANT III 0.8–1.2× BD III. ANT III with 2–10 rhinaria *Macrosiphum cholodkovskyi*
 - SIPH without polygonal reticulation. Hairs on ANT III less than 0.5× BD III. ANT III with 0–2 (rarely –4) rhinaria *Aulacorthum solani*
4. R IV+V 1.2–1.4× HT II, and bearing 8–10 accessory hairs. ANT tubercles each bearing 5–8 hairs, the longest of them longer than BD III *Amphorophora gei*
 - R IV+V 0.95–1.05× HT II, and bearing 4–6 accessory hairs. ANT tubercles each bearing 2–3 hairs, none of them longer than BD III *Amphorophora filipendulae*
5. Cauda with only 2–4 very short, blunt hairs *Aphis nudicauda*
 - Cauda with 4–17 long pointed hairs 6
6. SIPH 1.2–2.5× cauda 7
 - SIPH 0.7–1.1× cauda 8
7. ABD TERG 2–4 often with MTu. Longest hairs on ANT III 0.8–1.1× BD III, and on front of head 1.0–1.2× BD III. Cauda similarly pigmented to SIPH, with 4–17 hairs *Aphis ulmariae*
 - ABD TERG 2–4 without MTu. Longest hairs on ANT III and front of head 0.4–0.8× BD III. Cauda paler than SIPH, with 4–8 hairs *Aphis gossypii*
8. R IV+V 0.65–0.92× HT II. Dorsal abdomen with variably developed dark sclerotisation. Femora wholly dark *Aphis spiraephaga*
 - R IV+V c.1.3× HT II. Dorsal abdomen without any dark sclerotisation. Femora mainly pale, darker only at apices *Aphis filipendulae**

Fimbristylis

<i>F. annua</i>
<i>F. dichotoma</i>
<i>F. diphylla</i>
<i>F. miliacea</i>

Cyperaceae

<i>Carolinaia caricis, cyperi; Neomyzus circumflexus</i>
<i>Schizaphis rotundiventris</i>
<i>Schizaphis minuta, rotundiventris</i>
<i>Tetraneura fusiformis</i>

Key to apterae on *Fimbristylis*:-

- Dorsal abdomen with a large roughly horseshoe-shaped patch, and dark cross bars on thorax *Neomyzus circumflexus*
- Dorsum without any distinctive dark markings go to key to apterae on *Cyperus*

Flacourtia

Flacourtiaceae

One aphid species, *Toxoptera aurantii*, is recorded from 4 species of *Flacourtia*; *foveolata* (?), *indica*, *inermis*, *ramontchii*

HOST LISTS AND KEYS

Flaveria

F. australasica

F. trinervia

Compositae

Aphis gossypii

Aphis craccivora, *gossypii*, *spiraecola*

Use key to polyphagous aphids, p. 1020.

Flemingia

F. congesta

Leguminosae

Aphis gossypii

Fleurya see Laportea

Flueggea

F. macrosipila

F. virosa see *Securinega virosa*

Euphorbiaceae

Schoutedenia ralumensis

Foeniculum

F. vulgare (incl. *azoricum*, *dulce*,
officinale, *piperitum*)

Umbelliferae

Aphis [*albella*], *craccivora*, *fabae*, *foeniculivora*, *gossypii*,
[*saliceti*], *spiraecola*; *Brachycaudus helichrysi*;
Cavariella aegopodii, *konoii*, *pastinacae*;
Dysaphis apiifolia, *foeniculus*, *lauberti*, [*tulipae*];
[*Foeniaphis oblongisensoria* (al. vagrant, nr *Chromaphis?*)];
Hyadaphis coriandri, *foeniculi*, *passerinii*;
Myzus ascalonicus, *persicae*; *Semiaphis heraclei*;
Swirskiaphis polychaeta
Aphis ?lammersi (Italy, BMNH colln)

Foeniculum sp.

Key to apterae on *Foeniculum*:-

- | | | |
|----|---|--------------------------------|
| 1. | ABD TERG 8 with a posteriorly directed process above cauda | 2 |
| - | No supracaudal process | 4 |
| 2. | ANT PT/BASE 2.6-4 | <i>Cavariella pastinacae</i> |
| - | ANT PT/BASE 1.0-2.0 | 3 |
| 3. | Supracaudal process about as long as cauda, and about 3× longer than its width at midlength. R IV+V 0.8-1.05× HT II, and without any accessory hairs. ANT PT/BASE 1.0-1.55 (mostly 1.1-1.4) | <i>Cavariella aegopodii</i> |
| - | Supracaudal process about 0.7× cauda and about 1.3× its width at midlength. R IV+V 1.0-1.2× HT II, with 2 accessory hairs. ANT PT/BASE 1.3-2.0 (mostly 1.4-1.7) | <i>Cavariella konoii</i> |
| 4. | Body bearing numerous long thick hairs, c.130µm long, more than 0.5× SIPH | <i>Swirskiaphis polychaeta</i> |
| - | Body with much shorter, thin hairs | 5 |
| 5. | Cauda helmet-shaped, not longer than its basal width in dorsal view | 6 |
| - | Cauda tongue-shaped, much longer than its basal width | 9 |
| 6. | SIPH smooth, pale, about as long as cauda. No dorsal abdominal markings. No spinal tubercles (STu) on head or ABD TERG 8. Spiracular apertures large and rounded | <i>Brachycaudus helichrysi</i> |
| - | SIPH imbricated, dark, longer than cauda. Dark dorsal abdominal markings present. STu often present on head and ABD TERG 8, or 7 and 8. Spiracular apertures reniform | 7 |

7. Longest hairs on ANT III 0.3–0.7× BD III. MTu often present on ABD TERG 7. ANT PT/BASE 3.1–4.2
Dysaphis apiifolia
- Longest hairs on ANT III 0.8–2.3× BD III. MTu rarely present on ABD TERG 7. ANT PT/BASE 2.0–3.5 **8**
8. Longest hairs on ANT III 26–58µm long, 1.25–2.3× BD III. SIPH 0.17–0.29mm, R IV+V 0.16–0.19mm
Dysaphis lauberti
- Longest hairs on ANT III 18–25µm long, 0.8–1.2× BD III. SIPH 0.10–0.15mm, R IV+V 0.13–0.16mm
Dysaphis foeniculus
9. SIPH very small and flangeless, less than 0.5× cauda, with aperture slanted towards midline
Semiaphis heraclei
- SIPH at least 0.6× cauda, with a flange **10**
10. ANT less than 0.5× BL. SIPH 0.6–1.4× cauda, and somewhat swollen either at base or on distal half **11**
- ANT 0.5–1.2× BL. SIPH 0.8–3.3× cauda; if less than 1.9× cauda then they are not at all swollen **13**
11. SIPH 0.6–0.82× cauda, 0.9–1.6× R IV+V and 1.6–2.7× their minimum diameter on basal half
Hyadaphis coriandri
- SIPH 0.85–1.4× cauda, 1.7–3.1× R IV+V and 3.1–5.1× longer than their minimum diameter on basal half **12**
12. Prosternal sclerite 1.36–2.6× wider than long, often convex posteriorly. SIPH 1.05–1.4× cauda. (Al. often with sec. rhinaria on ANT V)
Hyadaphis foeniculi
- Prosternal sclerite 2.2–3.6× wider than long, with posterior margin often straight. SIPH 0.85–1.2× cauda. (Al. rarely with sec. rhinaria on ANT V)
Hyadaphis passerinii
13. ABD TERG 2–4 (–5,6) as well as 1 and 7 with evident dome-shaped marginal tubercles (MTu). Hairs on dorsal body and appendages only 7–20µm long
Aphis ?lamberti (Italy, BMNH colln)
- ABD TERG 2–6 only sporadically with small MTu, and if ABD TERG 1 and 7 have MTu then some hairs on dorsal body and appendages are longer than 20µm
 go to key to polyphagous aphids, p. 1020 (but note that specimens running to *Aphis gossypii* could be *A. foeniculivora*, which has ANT PT/BASE 2.9–3.5, compared with 1.8–2.8 in most populations of *A. gossypii*)

Fontanesia

F. fortunei

Forsteronia

F. corymbosa

Use key to polyphagous aphids, p. 1020.

Forsythia

F. ×intermedia

F. japonica

F. koreana

F. suspensa

Oleaceae

Aphis fabae; *Macrosiphum rosae*

Apocynaceae

Aphis craccivora; *Toxoptera aurantii*

Oleaceae

Myzus ornatus

Prociphilus oriens

Aphis craccivora, *gossypii*

Amphicercidus forsythiae; *Aphis fabae*, *spiraecola*;

Aulacorthum magnoliae; *Macrosiphum euphorbiae*;

[*Prociphilus kuwanai*]; [*Trichosiphonaphis polygonifoliae*]

HOST LISTS AND KEYS

F. viridissima

Aphis fabae, gossypii; Macrosiphum euphorbiae;
Prociphilus americanus

Key to apterae on *Forsythia* (except couplets 1–2 which can be applied to al.):–

1. Wax pore plates present. SIPH absent. ANT PT/BASE less than 0.5. (Spring colonies of fund. with all progeny large al., emerging from leaf nests in spring) 2
 - No discrete wax glands. SIPH present. ANT PT/BASE more than 1.5 3
2. Al. (progeny of fund.) with at least 4 sec. rhin. on ANT V *Prociphilus oriens*
 - Al. (progeny of fund.) with 0–2 sec. rhin. on ANT V *Prociphilus americanus*
3. SIPH more than 5× cauda which is rounded and shorter than its basal width. ANT III with 3–9 rhinaria. (Al. with more than 100 rhinaria on ANT III) *Amphicercidus forsythiae*
 - SIPH less than 3× cauda which is conical or tongue-shaped, longer than its basal width. ANT III with or without rhinaria. (Al. with much fewer rhinaria on ANT III) go to key to polyphagous aphids, p. 1020

Fortunella

F. margarita

Fortunella sp(p).

Toxoptera aurantii

Aphis gossypii

Use key to polyphagous aphids, p. 1020.

Fouquieria

F. digueti

Myzus ornatus

Fragaria

F. × ananassa

F. californica

F. chiloensis

F. chinensis var. *ananassa*

(see *F. × ananassa*)

F. deltonia (?*daltoniana*)

F. grandiflora

F. moupinensis

F. moschata

F. nilgerrensis

F. nipponica

F. nubicola

Rutaceae

Fouquieriaceae

Rosaceae

Acyrtosiphon malvae ssp. *rogersii*;

Aphis fabae, forbesi, ichigicola, ruborum;

Aulacorthum solani; Chaetosiphon fragaefolii, jacobi, minor;

Ericaphis fimbriata, wakibae; Eriosoma japonicum, yangi;

Macrosiphum euphorbiae;

Matsumuraja formosana, rubicola; Myzaphis rosarum;

[*Neomegoura doarsis*]; *Myzus ascalonicus, ornatus*;

Neomyzus circumflexus; Sitobion fragariae

Chaetosiphon jacobi

Aphis gossypii; Aulacorthum solani; Chaetosiphon minor;

Rhodobium porosum; Rhopalosiphoninus staphyleae;

Sitobion akebiae

Chaetosiphon minor

Dysaphis microsiphon

Acyrtosiphon fragariaevescae; Sitobion fragariae

Myzus ornatus

Acyrtosiphon malvae ssp. *rogersii; Sitobion fragariae*

[*Acutosiphon obliquoris*]; *Dysaphis microsiphon*;

Myzus ornatus; [*Trichosiphonaphis gerbera, polygoni*]

Aphis forbesi

Dysaphis microsiphon

<i>F. orientalis</i>	<i>Aphis ichigicola</i>
<i>F. vesca</i>	<i>Acyrtosiphon capitellum</i> ; <i>Aphis forbesi</i> ; <i>Aulacorthum solani</i> ; <i>Chaetosiphon fragaefolii</i> ; <i>Ericaphis fimbriata</i> , <i>wakibae</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus ascalonicus</i> , <i>ornatus</i> , <i>persicae</i> ; <i>Neomyzus circumflexus</i> ; <i>Rhodobium porosum</i> ; <i>Sitobion fragariae</i>
<i>F. ×vescana</i>	<i>Rhopalosiphoninus staphyleae</i>
<i>F. virginiana</i>	<i>Abstrusomyzus valuliae</i> ; <i>Aphis nasturtii</i> ; <i>Aulacorthum solani</i> ; <i>Chaetosiphon fragaefolii</i> ; <i>Ericaphis fimbriata</i> ; <i>Macrosiphum pechumani</i> ; [<i>Ovatus insitus</i>]; <i>Sitobion fragariae</i>
<i>F. ×viridis</i>	<i>Acyrtosiphon malvae</i> ssp. <i>rogersii</i> ; <i>Myzus ascalonicus</i>
<i>Fragaria</i> spp.	<i>Acyrtosiphon fragrum</i> , [<i>pisum</i>], <i>rubi</i> ; [<i>Amphorophora agathonica</i> , <i>rubi</i>]; <i>Aphis middletonii</i> , <i>nasturtii</i> ; [<i>Chaetosiphon thomasi</i>]; [<i>Dysaphis foeniculus</i>]; <i>Hyalomyzus fragaricola</i> ; [<i>Hyperomyzus rhinanthi</i>]; <i>Macrosiphum pallidum</i> , <i>rosae</i> ; <i>Myzus cymbalariae</i> , [<i>Myzus</i> sp. (Chowdhuri <i>et al.</i> 1969a)]; <i>Paramyzus longirostris</i> ; [<i>Pemphigus bursarius</i>]; <i>Rhopalosiphoninus latysiphon</i>

Key to apterae on *Fragaria*:-

(For an illustrated key to aphids on cultivated strawberry see Blackman and Eastop, 2000.)

1. ANT PT/BASE less than 0.5. Eyes with only 3 facets. Wax gland plates present on thorax and abdomen.
SIPH as raised pores with sclerotic rims and surrounding hairs *Eriosoma* sp.
- ANT PT/BASE more than 1. Eyes multifaceted. No wax gland plates. SIPH tubular 2
2. Dorsal body with at least some of hairs thick, long, with capitate apices, and arising from tuberculate bases 3
- Dorsal body hairs blunt, pointed, or if expanded apically then short and without tuberculate bases 7
3. ANT I with a long finger-like hair-bearing process on inner side, about as long as or longer than ANT II 4
- ANT I without a finger-like process 5
4. Dorsal abdomen with very long spinal and marginal hair-bearing processes, 2–7× as long as their middle widths. ANT PT/BASE 3.3–3.9 *Matsumuraja rubicola*
- Dorsal abdomen with all process shorter, not much longer than their middle widths. ANT PT/BASE 2.8–3.0 *Matsumuraja formosana**
5. Hairs on ABD TERG 1–5 usually all minute, rarely with some rather long and capitate spinal hairs, but never with long marginal ones *Chaetosiphon minor*
- At least 4 long capitate hairs (2 spinal, 2 marginal) on each of ABD TERG 1–5 6
6. Dorsal abdomen pigmented dark brown *Chaetosiphon jacobi*
- Dorsal abdomen pale *Chaetosiphon fragaefolii*
7. SIPH with a subapical zone of polygonal reticulation (at least 4–5 rows of closed cells) 8
- SIPH without polygonal reticulation 14

HOST LISTS AND KEYS

8. SIPH dark and with a greatly inflated, balloon-like middle section *Rhopalosiphoninus latysiphon*
 – SIPH not inflated **9**
9. Longest hairs on ANT III 0.3–0.55× BD III. ANT III with 1–4 very small rhinaria. ANT tubercles rather low, and median frontal tubercle distinctly developed **10**
 – Longest hairs on ANT III 0.6–1.3× BD III. ANT III with 1–35 rhinaria of various sizes. ANT tubercles well developed, median frontal tubercle undeveloped **11**
10. SIPH 1.8–2.7× cauda, which has a blunt, rounded apex. Femora pale or only dusky at apices. ANT III–VI pale except at apices of segments *Sitobion fragariae*
 – SIPH 1.4–1.9× cauda, which has a pointed apex. Femora with dark distal section. ANT III–VI entirely dark, or pale only at base of III *Sitobion akebiae*
11. Front of head pale, SIPH pale or dusky only towards apices *Macrosiphum euphorbiae*
 – Front of head dusky or dark, SIPH dark, or pale only at bases **12**
12. Cauda dark *Macrosiphum pechumani*
 – Cauda pale **13**
13. Head as dark as SIPH. Hind tibiae with paler middle sections *Macrosiphum rosae*
 – Head dusky, paler than SIPH. Hind tibiae wholly dark *Macrosiphum pallidum*
14. Median part of front of head between ANT bases forming a prominent, quadrate, very rugose projection, bearing a pair of hairs. Dorsum coarsely pitted all over. ANT PT/BASE 1.25–1.75 *Myzaphis rosarum*
 – Front of head without a quadrate projection. Dorsum smooth, wrinkled or pitted. ANT PT/BASE usually more than 1.75 **15**
15. ANT tubercles moderately to well developed, projecting beyond middle of head in dorsal view; if rather low then cuticle of head has spicules or nodules **16**
 – ANT tubercles weakly developed, cuticle of head without spicules or nodules **34**
16. SIPH clavate, i.e., slightly to considerably swollen on distal 0.5–0.7 of length **17**
 – SIPH cylindrical or tapering over most of length (although there may be slight subapical swelling) **23**
17. ANT tubercles very well developed, with inner faces divergent and almost smooth, and bearing long hairs. BL usually more than 2.5 mm *Amphorophora rubi*
 – ANT tubercles steep-sided, rounded apically, with numerous spinules and/or nodules, and usually bearing rather short blunt hairs. BL less than 2.5 **18**
18. ANT III with 1–4 secondary rhinaria near base **19**
 – ANT III without secondary rhinaria **20**
19. SIPH considerably swollen over about distal 0.7 of length, smooth-surfaced, with maximum diameter of swollen part 1.5–2.1× minimum diameter basad. R IV+V 1.1–1.3× HT II. Cauda short, triangular. *Rhopalosiphoninus staphyleae*
 – SIPH swollen over 0.5–0.6 of length, with maximum diameter less than 1.5× minimum diameter basad. R IV+V 1.5–1.8× HT II. Cauda tongue-shaped *Paramyzus longirostris*
20. Hairs on ANT tubercles much longer than those on ANT III; 0.8–1.0× BD III *Hyalomyzus fragaricola*
 – Hairs on ANT tubercles very short and blunt, similar to those on ANT III; 0.2–0.75× BD III **21**
21. SIPH 0.9–1.34× ANT III. Inner faces of ANT tubercles convergent apically *Myzus persicae*
 – SIPH 0.54–0.81× ANT III. Inner faces of ANT tubercles parallel or convergent **22**

22. Inner faces of ANT tubercles approximately parallel in dorsal view. SIPH almost smooth or weakly imbricated, with narrowest part of basal 'stem' not wider than hind tibia at midlength. Dorsal cuticle smooth or slightly wrinkled *Myzus ascalonicus*
 – Inner faces of ANT tubercles with convergent apices. SIPH heavily imbricated or scabrous, with narrowest part of stem a little wider than hind tibia at midlength. Dorsal cuticle scaly *Myzus cymbalariae*
23. ANT tubercles well developed with inner faces smooth, bearing hairs $0.6\text{--}1.1\times$ BD III **24**
 – ANT tubercles with inner faces scabrous and bearing hairs $0.2\text{--}0.8\times$ BD III **28**
24. SIPH dark on at least basal part **25**
 – SIPH pale **26**
25. ANT PT/BASE about 4.7. Dorsal hairs with capitate apices *Acyrtosiphon capitellum**
 – ANT PT/BASE about 10.7 (?). Dorsal hairs with furcate apices *Acyrtosiphon fragrum**
26. ANT PT/BASE less than 4 *Acyrtosiphon fragariaevescae**
 – ANT PT/BASE 5.0–6.5 **27**
27. R IV+V $0.87\text{--}1.13\times$ HT II. Dorsal cuticle rugose, papillate *Acyrtosiphon rubi*
 – R IV+V $1.1\text{--}1.4\times$ HT II. Dorsal cuticle smooth or slightly wrinkled *Acyrtosiphon malvae* ssp. *rogersii*
28. ANT III with 2–18 rather large rhinaria in a row, the sensoriated part being quite dark *Rhodobium porosum*
 – ANT III pale or dusky, without or with 1–4 very small rhinaria near base **29**
29. ANT III with 1–4 small rhinaria near base (rarely one ANT with 0). ANT $1.1\text{--}1.5\times$ BL, PT/BASE 4.0–5.5 **30**
 – ANT III without rhinaria. ANT $0.5\text{--}1.2\times$ BL, ANT PT/BASE 1.7–4.5 **31**
30. Dorsum with a large black U-shaped patch, and broad dark cross bars or paired patches on thorax. SIPH $0.7\text{--}1.0\times$ head width across (and including) eyes *Neomyzus circumflexus*
 – Dorsum without dark markings. SIPH $1.0\text{--}1.35\times$ head width across eyes *Aulacorthum solani*
31. Dorsum with an intersegmental pattern of dark ornamentation. ANT $0.5\text{--}0.6\times$ BL, with ANT PT/BASE 1.7–2.8 *Myzus ornatus*
 – Dorsum with or without more extensive dark sclerotisation. ANT $0.65\text{--}1.2\times$ BL, with ANT PT/BASE 2.5–4.5 **32**
32. SIPH slightly swollen subapically, and with a very small flange. Prothorax with a pair of MTu. Dorsum with extensive sclerotisation, marked with a fine dark reticulate pattern, the pigmented areas being segmentally divided. Cauda triangular, less than $1.5\times$ its basal width in dorsal view *Abstrusomyzus valuliae*
 – SIPH not swollen subapically, with a small or large flange. No MTu on prothorax. Dorsum membranous or with variably developed sclerotisation, not segmentally divided and without a dark reticulate pattern. Cauda tongue-shaped, more than $1.8\times$ its basal width **33**
33. SIPH $1.5\text{--}1.9\times$ cauda. R IV+V less than 0.12 mm, $0.8\text{--}1.1\times$ HT II. Dorsal abdomen always pale and membranous *Ericaphis fimbriata*
 – SIPH $2.0\text{--}2.7\times$ cauda. R IV+V usually more than 0.12 mm, $1.1\text{--}1.4\times$ HT II. Dorsal abdomen sclerotic, usually with an ill-defined brown mid-dorsal region of varying extent *Ericaphis wakibae*
34. Cauda helmet-shaped, not longer than its basal width in dorsal view. SIPH only 0.03–0.08 mm. Well-developed MTu usually present on ABD TERG 1–5, but not on 7 *Dysaphis microsiphon*

HOST LISTS AND KEYS

- Cauda tongue-shaped or bluntly triangular, longer or shorter than its basal width. SIPH 0.06–0.36mm. MTu variably developed on ABD TERG 2–5, but always present on 1 and 7 35
- 35. ANT 5-segmented, with PT/BASE 4.5–6.0. Dorsal abdomen with paired spinal and marginal rows of pigmented sclerites bearing long, blunt hairs that are 2–3× longer than ANT BD III. Cauda pale 36
Aphis ichigocola
- ANT 5- or 6-segmented, with PT/BASE 1.7–3.5. Dorsal abdomen with shorter hairs not arising from longitudinal rows of pigmented sclerites. Cauda pale or dark 36
- 36. Cauda pale, dusky or dark, bearing 4–9 hairs. ABD TERG 1–5 without dark markings 37
- Cauda dark with more than 10 hairs. ABD TERG 1–5 usually with some dark markings 38
- 37. R IV+V 1.6–1.9× HT II. Cauda and SIPH with similar pigmentation 37
Aphis forbesi
- R IV+V 1.1–1.5× HT II. Cauda paler than SIPH 38
Aphis gossypii
- 38. Cauda much longer than its basal width, and much longer than R IV+V, which is 0.9–1.1× HT II. ANT PT/BASE 2.1–3.3 37
Aphis fabae
- Cauda short, hardly longer than its basal width, much shorter than R IV+V which is 1.2–1.5× HT II. ANT PT/BASE 1.6–2.1 38
Aphis middletonii

Francoa

F. ramosa
F. sonchifolia

Myzus persicae
Aphis fabae

Saxifragaceae

Use key to polyphagous aphids, p. 1020.

Frangula see *Rhamnus frangula* in Blackman and Eastop (1994)

Frankenia

F. pulverulenta

Myzus persicae

Frankeniaceae

Franseria see *Ambrosia*

Frasera

F. speciosa

Aphis fraseriae; [*Uroleucon martini*]

Gentianaceae

Freesia

F. refracta
Freesia spp.

Neomyzus circumflexus
Aphis gossypii; *Dysaphis tulipae*; *Macrosiphum euphorbiae*;
Myzus ornatus, persicae; *Rhopalosiphum padi*

Iridaceae

Key to apterae on *Freesia*:-

- Cauda helmet-shaped, not longer than its basal width in dorsal view. SIPH 0.06–0.096× BL. Head and ABD TERG 8 (or 7–8) with spinal tubercles (STu) *Dysaphis tulipae*
- Cauda tongue-shaped, longer than its basal width. SIPH 0.1–0.35× BL. STu absent from head, and rarely on ABD TERG 8 go to key to polyphagous aphids, p. 1020

Freycinetia

F. funicularis
F. gaudichaudii
F. javanica

Cerataphis freycinetiae
Cerataphis freycinetiae
Astegopteryx pandani

Pandanaceae

Key to apterae on *Freycinetia*:-

(Both species have a pair of pointed horns on front of head, eyes with only 3-facets, pore-like SIPH and a transversely elongate cauda)

- Body dorsoventrally flattened, disc-like, with head fused to whole of thorax, and a continuous circumferential row of small wax glands *Cerataphis freycinetiae*
- Body pear-shaped, with head fused to prothorax. Marginal wax glands in rows of 3–6 per segment, separated between segments *Astegopteryx pandani*

Fritillaria

F. askabadensis
F. crassifolia
F. imperialis

Liliaceae

[*Sitobion fragariae*]
Aulacorthum solani; *Myzus ornatus*
Aphis fabae

Use key to polyphagous aphids, p. 1020.

Fuchsia

F. magellanica
Fuchsia sp(p). (and hybrids)

Onagraceae

Aulacothum solani; *Myzus ornatus*
[*Anoecia corni*]; *Aphis gossypii*, *grossulariae*, *oenotherae*;
Macrosiphum euphorbiae; *Myzus lythri*, *persicae*;
Neomyzus circumflexus; *Smynthuroides betae*

Key to apterae on *Fuchsia*:-

1. ANT PT/BASE less than 0.5. Eyes 3-faceted. SIPH absent *Smynthuroides betae*
- ANT PT/BASE more than 1.5. Eyes multifaceted. SIPH tubular **2**
2. ABD TERG 1 and 7 with marginal tubercles (MTu) **and** R IV+V with 6–12 accessory hairs **3**
- **Either** ABD TERG 1 and 7 are without MTu **or** R IV+V has only 2 accessory hairs **4**
3. ABD TERG 2–6 bearing in total 1–10 MTu (rarely less than 3) *Aphis grossulariae*
- ABD TERG 2–6 without MTu *Aphis oenotherae*
4. ANT 0.5–0.6× BL, with PT/BASE 1.7–3.0. Dorsal cuticle wrinkled or warty, and SIPH coarsely imbricated, cylindrical or tapering **5**
- ANT more than 0.7× BL, with PT/BASE 2.8–6.2 (if less than 3.0 then SIPH slightly clavate). Dorsal cuticle not conspicuously wrinkled or warty. SIPH moderately imbricated
go to key to polyphagous aphids, p. 1020
5. Dorsal abdomen with a pattern of dark intersegmental markings. ANT PT/BASE 1.7–2.8 *Myzus ornatus*
- Dorsal abdomen without conspicuous dark intersegmental markings. ANT PT/BASE 2.4–3.0 *Myzus lythri*

Fuirena

F. umbellata

Cyperaceae

Carolinaia caricis

Fumana

F. ericoides
F. laevipes
F. scoparia

Cistaceae

Aphis fumanae
Aphis fumanae
Aphis fumanae

HOST LISTS AND KEYS

F. vulgaris (incl. *spachii*)
Fumana sp.

Aphis fumanae; [*Therioaphis langloisi*]
Macrosiphum euphorbiae

Couplet for apterae on *Fumana*:-

- SIPH black, without subapical polygonal reticulation, 0.09–0.23× BL and 1.0–2.2× the dark cauda. R IV+V 1.25–1.7× HT II *Aphis fumanae*
- SIPH pale, with subapical polygonal reticulation, 0.25–0.35× BL and 1.7–2.2× the pale cauda. R IV+V 0.8–1.0× HT II

Macrosiphum euphorbiae (or try key to polyphagous aphids, p. 1020)

Fumaria

F. capreolata
F. densiflora
F. muralis

F. officinalis

F. parviflora
F. vaillantii

Fumaria sp.

Use key to polyphagous aphids, p. 1020.

Funastrum see *Sarcostemma*

Funkia see *Hosta*

Furcraea

F. tuberosa

Aphis spiraeicola

Agavaceae

Gaertneria see *Ambrosia*

Gaillardia

G. aristata
G. pulchella (incl. *picta*, *aristosa*)

G. uniflora
Gaillardia spp.

Uroleucon gobonis
Aphis fabae, *gossypii*; *Brachycaudus helichrysi*;
[*Macrosiphoniella* sp. (Leonard, 1968: 344)];
Myzus persicae
Aphis gossypii
Macrosiphum euphorbiae; *Myzus ornatus*;
Uroleucon ambrosiae ssp. *lizerianum*, *compositae*

Compositae

Use key to polyphagous aphids, p. 1020 (but specimens running to *Uroleucon compositae* may be *U. gobonis*).

Galactia

G. rudolphoides

Aphis craccivora

Leguminosae

Galactites*G. tomentosa***Compositae***Aphis fabae, gossypii; Brachycaudus cardui, helichrysi; Capitophorus elaeagni; Dysaphis lappae ssp. cynarae; Myzus persicae; Ovatus inulae; Uroleucon aeneum*Key to apterae on *Galactites*:-

1. Cauda short, helmet-shaped and not longer than its basal width in dorsal view 2
 - Cauda triangular, tongue- or finger-shaped, longer than its basal width in dorsal view 4
2. Dorsal abdomen with an extensive solid black patch *Brachycaudus cardui*
 - Dorsal abdomen without a solid black patch, at most with scattered dark markings 3
3. BL 0.9–2.0 mm. SIPH smooth, short and broad-based, 1.5–2.0× their diameter at midlength. Spinal and marginal tubercles rare or absent *Brachycaudus helichrysi*
 - BL 2.1–3.0 mm. SIPH imbricated and about 3× their diameter at midlength. Numerous well-developed spinal and marginal tubercles present *Dysaphis lappae ssp. cynarae*
4. Cauda (0.55–0.8 mm) about 0.2× BL, black, and bearing 22–34 hairs. SIPH 0.9–1.4 mm long, black and reticulated over about distal 0.2 of length *Uroleucon aeneum*
 - Cauda and SIPH shorter, paler and cauda less hairy 5
5. R IV+V 2.5–3.0× HT II and bearing 12–25 very short accessory hairs *Ovatus inulae*
 - R IV+V relatively much shorter and with fewer accessory hairs 6
6. Long, capitate dorsal hairs present, at least on head and posterior abdomen; the longest 1.5–3× diameter at midlength of SIPH, which are pale and slender. ANT PT/BASE 6.0–9.2 *Capitophorus elaeagni*
 - Dorsal hairs not distinctly capitate and little if any longer than diameter of SIPH at midlength. ANT PT/BASE less than 5.5 go to key to polyphagous aphids, p. 1020

Galagania*G. fragrantissima***Caprifoliaceae***Hyadaphis galaganiae***Galatella see Aster****Galega***G. officinalis***Leguminosae***Acyrtosiphon pisum; Aulacorthum solani;**Macrosiphum euphorbiae**G. orientalis**Acyrtosiphon pisum; Aphis craccivora*Key to apterae on *Galega*:-

- Body large, spindle-shaped. Head with well-developed ANT tubercles, their inner faces smooth and divergent. SIPH attenuate distally, thinner than hind tibia at their respective midlengths, and lacking polygonal reticulation *Acyrtosiphon pisum*
- Without this combination of characters go to key to polyphagous aphids, p. 1020

Galeopsis*G. angustifolia**G. bifida* see *tetrahit**G. ladanum***Labiatae***Cryptomyzus galeopsidis; Roepkea marchali**Aphis frangulae ssp. beccabungae, [symphyti];**Cryptomyzus galeopsidis, ribis; Kaltenbachiella pallida*

HOST LISTS AND KEYS

<i>G. speciosa</i>	<i>Aphis frangulae</i> ssp. <i>beccabungae</i> ; <i>Cryptomyzus galeopsidis</i> , <i>ribis</i> ; <i>Myzus padellus</i>
<i>G. tetrahit</i> (incl. <i>bifida</i>)	<i>Aphis frangulae</i> ssp. <i>beccabungae</i> , <i>gossypii</i> , <i>nasturtii</i> , <i>spiraecola</i> ; <i>Aulacorthum solani</i> ; <i>Cryptomyzus galeopsidis</i> , <i>ribis</i> , <i>stachydis</i> ; <i>Myzus persicae</i> ; [<i>Paramyzus heraclei</i>]; [<i>Pemphigus bursarius</i>]
<i>G. versicolor</i>	<i>Cryptomyzus ribis</i>

Key to apterae on *Galeopsis*:-

1. ANT 4- (rarely 5-) segmented, 0.12–0.15× BL. Dorsal wax gland plates present on all segments, each consisting of a ring of facets surrounding a usually elongate central field
Kaltenbachiella pallida
- ANT 6- (rarely 5-) segmented, at least 0.4× BL. Wax gland plates absent **2**
2. SIPH short, dark, less than 0.1× BL, ornamented with transverse rows of small spicules. Dorsum usually dark, sclerotic, with numerous small spicules. Cauda shorter than its basal width in dorsal view
Roepkea marchali
- SIPH pale or dark, more than 0.1× BL, smooth or imbricated. Dorsum without dark pigmentation. Cauda as long as or longer than its basal width **3**
3. Dorsal body hairs long, thick and capitate, arising from tuberculate bases **4**
- Dorsal body hairs pointed, blunt, or if capitate then short and without tuberculate bases **5**
4. SIPH 1.1–2.1× cauda. R IV+V 0.9–1.1× HT II, with 2–5 accessory hairs. Longest hairs on ANT III 1.0–1.3× BD III
Cryptomyzus galeopsidis
- SIPH 2.4–3.1× cauda. R IV+V 1.3–1.5× HT II, with 6–8 accessory hairs. Longest hairs on ANT III 0.4–0.9× BD III
Cryptomyzus ribis
5. SIPH 2.9–4.1× cauda and markedly swollen on distal 0.7 of length; maximum width of swollen part 1.7–2.0× minimum width of basal part. ANT III with 2–25 rhinaria dispersed along its length, and IV with 0–12. ANT PT/BASE 7.4–10
Cryptomyzus stachydis
- SIPH less than 2.8× cauda and not markedly swollen. ANT either without secondary rhinaria or with them only near base of III. ANT PT/BASE 1.5–5.5 **6**
6. SIPH thick and scaly; cylindrical or slightly swollen on basal half, tapering on distal half, and 2.0–2.5× cauda. Dorsal cuticle strongly wrinkled. ANT PT/BASE 1.5–2.5
Myzus padellus
- SIPH not thick and scaly; normally imbricated and cylindrical or tapering from base, 0.9–2.5× cauda. Dorsal cuticle not strongly wrinkled. ANT PT/BASE 2.0–5.5 **7**
7. SIPH uniformly dark, cauda pale or dusky *Aphis frangulae* group (incl. *beccabungae*, *gossypii*)
- SIPH and cauda both pale (may be dark-tipped), or both black
go to key to polyphagous aphids, p. 1020

Galinsoga

- G. ciliata*
G. parviflora

Compositae

- Aphis fabae*
Aphis fabae, *gossypii*, *spiraecola*; *Aulacorthum solani*;
Brachycaudus cardui, *helichrysi*, *lateralis*;
Macrosiphum euphorbiae; *Myzus ornatus*, *persicae*;
Pemphigus sp. (India, U.P., BMNH colln);
Smynthuroides betae; *Uroleucon compositae*

Key to apterae on *Galinsoga*:-

1. Dorsum with an extensive black shield covering ABD TERG 1–6. (Hairs on front of head minute, maximally only 0.15–0.4× BD III) 2
- Dorsum without an extensive black shield. (Longest hairs on front of head often more than 0.4× BD III) go to key to polyphagous aphids, p. 1020
2. Longest hairs on hind femur 10–25 µm *Brachycaudus lateralis*
- Longest hairs on hind femur more than 25 µm long *Brachycaudus cardui*

Galium*G. album**G. anglicum**G. aparine**G. aristatum**G. boreale**G. ceratopodum**G. circaezans**G. cruciatum**G. erectum**G. glaucum**G. intermedium**G. kinuta**G. lucidum**G. mollugo**G. murale**G. odoratum**G. palustre* (incl. *elongatum*)*G. pamirolaicum**G. pseudoaristatum***Rubiaceae***Aphis galiiscabri*; *Dysaphis pyri*; *Myzus langei**Aphis fabae**Aphis fabae*, *galiiscabri*, *solanella*; *Aulacorthum solani*;*Brachycaudus helichrysi*; *Dysaphis pyri*, *reaumuri*;*Hydaphias helvetica*, *molluginis*; *Linosiphon galiophagum*;*Macrosiphum euphorbiae*;*Myzus ascalonicus*, *cerasi*, *cymbalariae*, *ornatus*,
persicae, *veronicae*;*Neomyzus circumflexus*; *Sitobion fragariae*, *miscanthi**Staegeriella* sp. (Switzerland, BMNH colln)*Aphis fabae*, *galiiscabri*, *gossypii*; *Amphorophora annae*;*Aulacorthum solani*; *Linosiphon galiophagum*;*Myzus borealis*, *cerasi*; *Ossiannilssonina oelandica*;*Staegeriella necopinata**Staegeriella necopinata**Aphis gossypii**Aphis galiiscabri*; [*Lipamyzodes matthiolae*]; *Myzus cerasi**Aphis fabae**Aphis fabae**Aphis galiiscabri*; [*Brachycaudus prunicola*];*Hydaphias carpaticae*; *Linosiphon galii*;*Staegeriella necopinata**Aphis gossypii*[*Aphis* sp. (Serbia, O. Petrović)]; *Myzus langei**Aphis fabae*, *galiiscabri*, *molluginis*, *solanella*;*Dysaphis reaumuri*;*Hydaphias hofmanni*, *molluginis*, *mosana*;*Macrosiphum euphorbiae*;*Myzus cerasi*, *langei*, *ornatus*, *persicae*;*Neomyzus circumflexus*; *Staegeriella necopinata*;*Sitobion miscanthi**Aphis fabae*, *solanella*; *Macrosiphum euphorbiae*;*Myzus persicae**Aphis galiiscabri*; *Linosiphon asperulophagum**Aphis fabae*, *galiiscabri*; *Aulacorthum solani*; *Myzus cerasi**Aphis galiiscabri**Aphis galiiscabri*; *Dysaphis pyri*; *Linosiphon galii*;*Myzus cerasi*

HOST LISTS AND KEYS

<i>G. purpureum</i>	<i>Staegeriella necopinata</i>
<i>G. rubioides</i>	<i>Myzus borealis</i>
<i>G. saccharatum</i>	<i>Aphis galiiscabri</i>
<i>G. saxatile</i>	<i>Myzus langei</i>
<i>G. schultesii</i>	<i>Aphis galiiscabri</i> ; <i>Linosiphon galii</i>
<i>G. simense</i>	<i>Aphis fabae</i> , <i>spiraecola</i>
<i>G. spurium</i> (incl. var. <i>echinospermum</i>)	<i>Aphis galiiscabri</i> , <i>solanella</i> ; <i>Brachycaudus helichrysi</i> ; <i>Myzus persicae</i>
<i>G. sylvaticum</i>	<i>Aphis galiiscabri</i> ; <i>Linosiphon galii</i> , <i>galiophagum</i>
<i>G. tauricum</i>	<i>Dysaphis reaumuri</i>
<i>G. trachyspermum</i>	<i>Aphis craccivora</i>
<i>G. tricorutum</i>	<i>Aphis craccivora</i> , <i>fabae</i> ; <i>Macrosiphum euphorbiae</i>
<i>G. uliginosum</i>	<i>Aphis galiiscabri</i> ; <i>Myzus cerasi</i>
<i>G. verum</i>	<i>Uhlmannia singularis</i>
<i>G. verum</i> (incl. var. <i>asiaticum</i>)	<i>Aphis fabae</i> , <i>galiiscabri</i> , <i>molluginis</i> , <i>solanella</i> ; <i>Dysaphis pyri</i> ; <i>Hydaphias helvetica</i> , <i>hofmanni</i> , <i>mosana</i> ; <i>Linosiphon galiophagum</i> ; <i>Myzus cerasi</i> , <i>langei</i> , <i>ornatus</i> , <i>persicae</i> ; <i>Staegeriella necopinata</i> ; [<i>Vesiculaphis caricis</i>] <i>Abstrusomyzus phloxae</i> ; <i>Aphis</i> sp. (B.C., BMNH colln); <i>Iranaphias debhani</i> ; <i>Macrosiphum</i> [<i>funestum</i>], <i>pallidum</i> ; [<i>Metopolophium dirhodum</i>]; [<i>Rhopalosiphum nymphaeae</i>]
<i>Galium</i> spp.	

Key to aphids on *Galium* (and *Asperula*):–

1. SIPH longer than cauda, with subapical polygonal reticulation. ANT tubercles moderately to well-developed with inner faces smooth and divergent 2
 - SIPH longer or shorter than cauda, without any polygonal reticulation. ANT tubercles absent, weakly developed, or well developed with inner faces somewhat scabrous or spiculose. 8
2. ANT III with 1–10 (often small) rhinaria. R IV+V 0.65–1.15× ANT BASE VI 3
 - ANT III without any rhinaria. R IV+V 0.4–0.6× ANT BASE VI 6
3. SIPH pale at least at base. ANT III with longest hairs 0.6–1.0× BD III. 4
 - SIPH entirely dark. ANT III with longest hairs 0.4–0.5× BD III 5
4. SIPH and legs mostly pale. Marginal tubercles (MTu) only sporadically present on ABD TERG 2–5 *Macrosiphum euphorbiae*
 - SIPH dark for most of length, pale basally. Tibiae mostly dark. MTu regularly present on ABD TERG 2–5 *Macrosiphum pallidum*
5. SIPH 1.75–2.25× cauda, which has a rather rounded apex *Sitobion fragariae*
 - SIPH 1.4–1.9× cauda, which has a rather pointed apex *Sitobion miscanthi*
6. R IV+V 0.6–0.7× HT II, and 0.4–0.5× ANT BASE VI *Linosiphon galii*
 - R IV+V 0.8–1.1× HT II, and 0.5–0.6× ANT BASE VI 7
7. Dorsum almost wholly dark brown to black. SIPH dark *Linosiphon asperulophagum*
 - Dorsum pale. SIPH mainly pale, dark at apices *Linosiphon galiophagum*
8. Paired marginal tubercles (MTu) always present on ABD TERG 7. ANT tubercles weakly developed 9

- MTu absent from ABD TERG 7 (rarely present on one side only in *Dysaphis pyri*, with spinal tubercles then also present). ANT tubercles absent, weakly developed or well-developed 15
- 9. Large MTu present on ABD TERG 1–4 and 7, and sometimes also on 5 and 6, those on 1 and 7 being especially large. Dorsum pale *Aphis molluginis*
- MTu absent or only sporadically present on ABD TERG 2–4, and then only small. Dorsum pale or dark 10
- 10. Dorsal abdomen with an extensive solid black central patch *Aphis craccivora*
- Dorsal abdomen with or without black markings, but without an extensive solid black central patch (in prepared specimens) 11
- 11. Very short-haired aphid; posterior hair on hind trochanter only 0.2× diameter of trochantrofemoral suture. SIPH 0.57–1.2× (usually shorter than) cauda. R IV+V 1.02–1.43× HT II. ANT 5-segmented *Aphis nonveilleri*
- Posterior hair on hind trochanter 0.55–2.02× diameter of trochantrofemoral suture. If SIPH are shorter than cauda then R IV+V is 0.62–0.92× HT II. ANT 5- or 6-segmented 12
- 12. Cauda paler than SIPH and bearing 4–8 hairs. Dorsal abdomen without dark markings 13
- Cauda as black as SIPH and bearing 11–27 hairs. Dorsal abdomen with dark markings at least on ABD TERG 7 and 8 14
- 13. SIPH 0.8–1.0× cauda. R IV+V 0.9–1.1× HT II *Aphis* sp. (B.C., Canada, BMNH colln)
- SIPH 1.1–2.5× cauda. R IV+V 1.05–1.45× HT II *Aphis gossypii*
- 14. ANT PT/BASE 1.4–2.2. SIPH 0.5–0.95× cauda. R IV+V 0.6–0.95× HT II. Dorsal abdomen usually with a pair of large black sclerites anterior to SIPH (Figure 29a) *Aphis galiiscabrie*
- ANT PT/BASE 2.3–3.7. SIPH 0.8–1.6× cauda. R IV+V 0.9–1.2× HT II. Dorsal abdomen with only scattered smaller dark markings anterior to SIPH *Aphis fabae* group (incl. *A. solanella*)
- 15. SIPH usually longer than cauda, if 0.8–1.0× cauda then with a subapical annular incision and a distinct flange 16
- SIPH shorter than cauda, if 0.8–1.0× cauda then flangeless (Figure 29j, k) 30
- 16. Dorsal abdomen anterior to SIPH with conspicuous dark markings; either an extensive black patch, or a pattern of dark spots 17
- Dorsal abdomen without any conspicuous dark markings anterior to SIPH 21
- 17. Abdomen with large dark marginal sclerites (as well as dorsal sclerotisation) 18
- Abdomen without large dark marginal sclerites 20
- 18. ANT less than 0.5× BL, 4–6-segmented. when 6-segmented III is a little longer than R IV+V. Cauda bluntly triangular, shorter than its basal width. SIPH straight and cylindrical or slightly tapering towards apex *Myzus* sp. ex *Asperula* (Crimea, BMNH, leg. J. Holman)
- ANT more than 0.5× BL, 6-segmented with III 1.8–2.6× R IV+V. Cauda acutely triangular. SIPH either slightly clavate or strongly tapering and often somewhat curved 19
- 19. Dorsal abdomen always with a complete black sclerotic shield. SIPH and cauda dark. ANT PT/BASE 2.2–3.2, and PT 0.8–1.1× ANT III *Myzus cerasi* group (incl. *veronicae*)
- Dorsal abdomen with variable pigmentation; a complete black shield may be present, or there may be segmental pleural and marginal pairs of spots. SIPH dark or pale with dark apices, cauda pale or dusky. ANT PT/BASE 1.9–2.5, and PT 0.7–0.9× ANT III *Myzus borealis*
- 20. Dorsal abdomen with an irregular, large approximately horseshoe-shaped central dark patch, and thorax also with dark patches. ANT PT/BASE 3.6–5.0. ANT III often with 1–2 rhinaria near base *Neomyzus circumflexus*

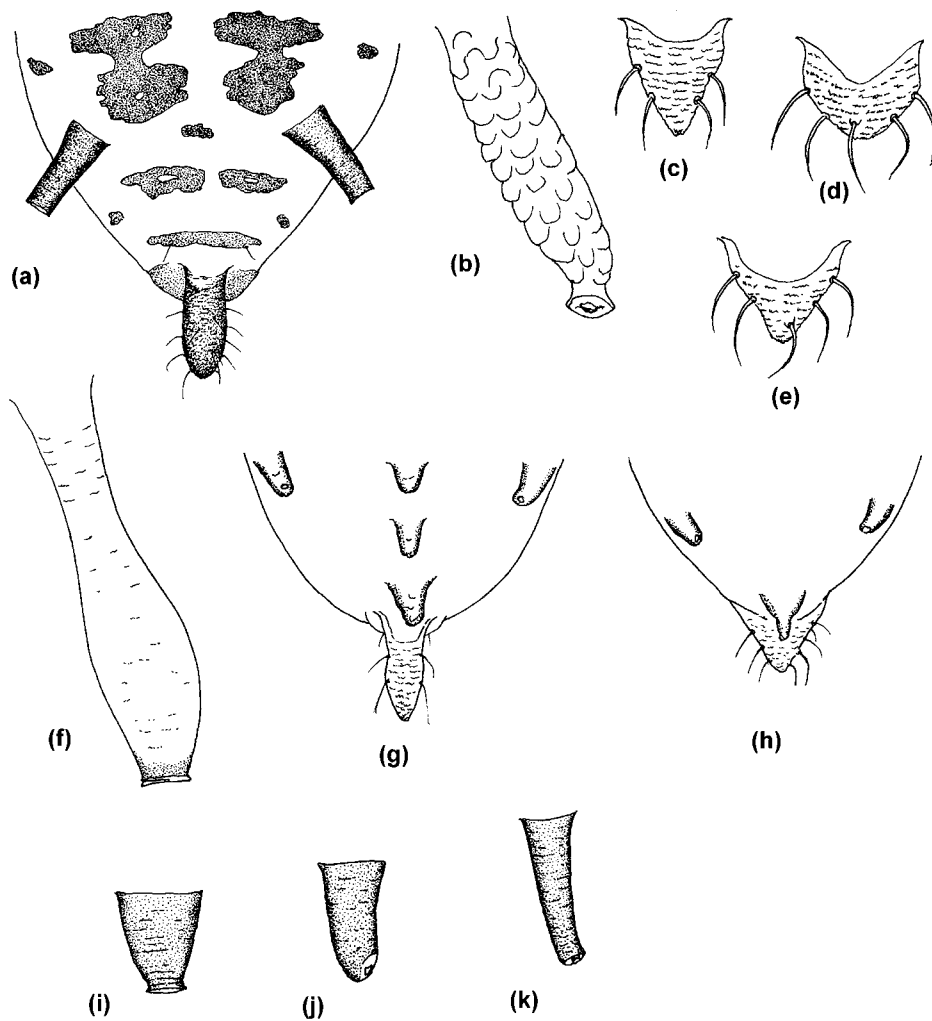


Figure 29 Apteræ on *Galium*. (a) Dorsal sclerotisation of *Aphis galiiscabri*, (b) SIPH of *Myzus langei*, (c) cauda of *M. langei*, (d) cauda of *Dysaphis pyri*, (e) cauda of *D. reaumuri*, (f) SIPH of *Amphorophora annae*; (g) end of abdomen of *Ossiannilssonina oelandica*, (h) end of abdomen of *Uhlmannia singularis*, (i) SIPH of *Staegeriella necopinata*, (j) SIPH of *Hydaphias mosana*, (k) SIPH of *H. molluginis*.

- Dorsal abdomen with a pattern of dark intersegmental pleural spots. ANT PT/BASE 1.9–2.4. ANT III never with rhinaria *Myzus ornatus*
- 21. Cauda helmet-shaped or triangular in dorsal view, shorter than its basal width or only a little longer (Figure 29c-e). ANT tubercles absent or developed to a similar extent to median frontal tubercle 22
- Cauda tongue- or finger-shaped, at least 1.2× its basal width in dorsal view. ANT tubercles well-developed with inner faces almost parallel, or convergent, and median frontal tubercle absent or weakly developed 25

22. ANT PT/BASE less than 1.5. SIPH very rugose, thickened, narrowing rather abruptly and turned outwards at apex (Figure 29b). Cauda bearing 4 hairs (Figure 29c) *Myzus langei*
- ANT PT/BASE more than 1.7. SIPH smooth and conical or moderately imbricated, tapering gradually, straight. Cauda bearing 5 (–7) hairs **23**
23. SIPH smooth, conical, with a subapical annular incision. Spiracular apertures large and rounded *Brachycaudus helichrysi*
- SIPH imbricated, tapering gradually to flange, without a subapical annular incision. Spiracular apertures reniform **24**
24. Large spinal and marginal tubercles (STu and MTu) present. Cauda helmet-shaped or pentagonal (Figure 29d). Dorsal body hairs with blunt apices. ANT tubercles weakly developed *Dysaphis pyri*
- STu and MTu usually absent. Cauda triangular (Figure 29e). Dorsal body hairs with expanded apices. ANT tubercles rather well developed, as also is the median frontal tubercle *Dysaphis reaumuri*
25. SIPH swollen on distal half to about twice their minimum diameter (Figure 29f). ANT III with 0–2 (usually 1) rhinaria near base *Amphorophora annae*
- SIPH with or without some distal swelling, but if at all swollen then ANT III has no rhinaria **26**
26. SIPH tapering/cylindrical, without any trace of swelling. ANT III usually with a single rhinarium near base *Aulacorthum solani*
- SIPH at least slightly swollen distally. ANT III without rhinaria **27**
27. SIPH with slight swelling confined to distal quarter of length, narrowest at about distal 0.7. Dorsal abdomen with polygonal reticulate sculpuring. SIPH 2.9–3.5× R IV+V. (Al. with incomplete dark cross bands on dorsal abdomen) *Abstrusomyzus phloxae*
- SIPH slightly to distinctly swollen over distal third to half of length, narrowest before or at about midlength. **If** dorsal abdomen has reticulate sculpuring **then** SIPH are 1.8–2.5× R IV+V. (Al. with a black central patch on dorsal abdomen) **28**
28. SIPH as long as or longer than ANT III. R IV+V 0.9–1.1× HT II. SIPH 3.3–4.8× R IV+V *Myzus persicae*
- SIPH clearly shorter than (less than 0.8×) ANT III. R IV+V 1.3–1.5× HT II. SIPH 1.8–2.8× R IV+V **29**
29. Inner faces of ANT tubercles approximately parallel in dorsal view. SIPH almost smooth or weakly imbricated, with narrowest part of basal ‘stem’ not wider than hind tibia at midlength. Dorsal cuticle smooth or slightly wrinkled *Myzus ascalonicus*
- Inner faces of ANT tubercles with convergent apices. SIPH heavily imbricated or scabrous, with narrowest part of stem a little wider than hind tibia at midlength. Dorsal cuticle scaly *Myzus cymbalariae*
30. Dorsal hairs numerous, long, with pointed apices. SIPH and cauda both much shorter than their basal widths *Iranaphis dehbandi*
- Dorsal hairs sparse, short and blunt-ended. SIPH and cauda variable **31**
31. Unpaired median hair-bearing processes present on ABD TERG 6–8, or on ABD TERG 8 only. SIPH much reduced, shorter than HT II **32**
- No median dorsal abdominal processes. SIPH shorter or longer than HT II **33**
32. Median dorsal processes present on ABD TERG 6–8. Cauda finger-like, much longer than its basal width (Figure 29g) *Ossiannilssonina oelandica*
- Median dorsal process on ABD TERG 8 only. Cauda broadly triangular, much shorter than its basal width (Figure 29h) *Uhlmannia singularis*

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33. SIPH 0.5–0.8× cauda, with opening at a right angle to its long axis, and with a small but distinct flange (Figure 29i). ANT III without secondary rhinaria. MTu absent
Staegeriella necopinata group
- SIPH 0.75–1.0× cauda, with a small, rather oblique opening and no flange (Figure 29j, k). ANT III with 2–24 secondary rhinaria. MTu often present **34**
34. ANT III with 17–24 secondary rhinaria. R IV+V only about 0.6× HT II *Hydaphias carpaticae**
- ANT III with 2–12 secondary rhinaria. R IV+V 0.7–1.1× HT II **35**
35. Hairs on anterior abdominal sternites often blunt-tipped, with the longest of them 0.7–1.4× ANT BD III, and 0.15–0.28× R IV+V. R IV+V 0.9–1.1× HT II *Hydaphias mosana*
- Hairs on anterior abdominal sternites mostly fine-pointed, the longest of them more than 1.5× ANT BD III, and 0.3–0.5× R IV+V. R IV+V 0.7–0.9× HT II *Hydaphias molluginis* group

Gamochaeta

G. calviceps
G. pennsylvanica

Aphis gossypii
Aphis gossypii; *Aulacorthum solani*

Use key to polyphagous aphids, p. 1020.

Gamolepis see Steirodiscus

Garcinia see Blackman and Eastop (1994)

Gardenia

G. augusta
G. jasminoides (= *florida*)

G. radicans
G. thunbergia
Gardenia spp.

Aphis spiraeicola
Aphis gossypii, *spiraeicola*; *Brachycaudus helichrysi*;
Macrosiphum euphorbiae; *Myzus ornatus*;
Neomyzus circumflexus; *Sinomegoura citricola*;
Toxoptera aurantii, *citricidus*, *odinae*
Aphis gossypii
Myzus persicae; *Toxoptera aurantii*
Sinomegoura citricola, *rhododendri*;
Smynthurodes betae

Rubiaceae

Key to apterae on *Gardenia*:–

1. Cauda black, long, finger-like and pointed, 0.18–0.25× BL, as long as or slightly longer than SIPH, which are paler basally and darker distally **2**
- Cauda pale or dark, if dark then rounded at apex, less than 0.16× BL, and SIPH are also uniformly dark (if present) go to key to polyphagous aphids, p. 1020
2. Cauda with 12–24 hairs. SIPH dark on about distal 0.7 of length *Sinomegoura citricola*
- Cauda with at most 7 hairs. SIPH dark only at apices *Sinomegoura rhododendri*

Garnotia (as Granotia?)

Garnotia sp.

Kaochiaoja arthraconis (as *Micromyzus granotiae*)

Gramineae

Garrya

G. elliptica
G. fadyeni

Myzus ornatus
Toxoptera aurantii

Garryaceae

Use key to polyphagous aphids, p. 1020.

Gaultheria (incl. Pernettya)***G. mucronata******G. procumbens******G. shallon******Gaultheria* sp.****Ericaceae***Aphis* sp. (Chile, BMNH colln); *Aulacorthum solani*;*Ericaphis scammelli*; *Macrosiphum euphorbiae*, *parvifolii*;*Myzus ornatus*; *Neomyzus circumflexus**Illinoia borealis**Aulacorthum dorsatum*, *pterinigrum*, *solani*;*Ericaphis wakibae*; *Illinoia lambersi*; *Neomyzus circumflexus**Ericolophium* sp. (Meghalaya, India; BMNH colln,

leg. AK Samanta)

Key to apterae on *Gaultheria*:-

1. ANT tubercles very weakly developed. SIPH and cauda both black. Dorsal abdomen with dark sclerites divided into polygons. R IV+V not longer than HT II *Aphis* sp. (Chile, BMNH colln)
- ANT tubercles moderately to well developed. SIPH pale or dark, cauda pale. Dorsal abdomen pale or with an extensive dark patch not divided into polygons. R IV+V longer than HT II 2
2. Dorsal abdomen with dark markings. Head with spicules, at least ventrally 3
- Dorsal abdomen without dark markings. Head with or without spicules 7
3. Dorsal abdomen with a pattern of intersegmental dark markings. ANT PT/BASE 1.7–2.8
Myzus ornatus
- Dorsal thorax and abdomen usually with extensive dark sclerotisation. ANT PT/BASE 3.2–5.2 4
4. Dorsal abdomen with a roughly U-shaped dorsal patch. Head densely spiculose/nodulose dorsally and ventrally
Neomyzus circumflexus
- Dorsal sclerotisation not U-shaped. Head with spicules mostly on ventral side surface 5
5. ANT III without rhinaria. SIPH 0.23–0.26× BL *Ericaphis wakibae*
- ANT III with 1–5 rhinaria. SIPH 0.25–0.33× BL 6
6. Dorsal cuticle very wrinkled, variably pigmented but often mostly dark, with large marginal and post-siphuncular sclerites forming a broad dark stripe on each side of body *Aulacorthum pterinigrum*
- Dorsal cuticle almost smooth, variably pigmented in spinopleural region but without dark marginal sclerites anterior to SIPH *Aulacorthum dorsatum*
7. ANT BASE VI 1.6–1.8× R IV+V, which bears only 2 accessory hairs. SIPH c.0.24× BL, 6.5–7.5× their diameter at midlength and 1.8–2.2× cauda. ANT III without rhinaria
Ericolophium sp. (Meghalaya, BMNH colln)
- ANT BASE VI 0.8–1.55× R IV+V, which bears 6–23 accessory hairs. SIPH either relatively shorter or more slender. ANT III often with 1 or more rhinaria on basal half 8
8. Inner faces of ANT tubercles rugose or spiculose. SIPH without a distinct subapical zone of polygonal reticulation (sometimes with subapical transverse striae and 1–2 rows of closed polygonal cells) 9
- Inner faces of ANT tubercles smooth. SIPH with a distinct subapical zone of polygonal reticulation (at least 4–5 rows of closed cells) 10
9. SIPH 1.5–1.75× cauda. ANT tubercles low, with inner faces divergent and median frontal tubercle well developed. ANT III without rhinaria *Ericaphis scammelli*
- SIPH 2.1–2.5× cauda. ANT tubercles well-developed, with inner faces steep-sided, and median frontal tubercle much lower or undeveloped. 1–2 small rhinaria usually present on ANT III
Aulacorthum solani

HOST LISTS AND KEYS

10. Longest hairs on ANT III 0.5–1.0× BD III. SIPH pale, or dusky only at apices; cylindrical or swollen on distal half proximal to reticulated region. **11**
 – Longest hairs on ANT III 0.2–0.4× BD III. SIPH rather dark, and swollen on distal half proximal to reticulated section **12**
11. SIPH distinctly swollen on distal half proximal to reticulated region. ANT BASE VI long and thin, 2.2–2.6× R IV+V *Macrosiphum parvifolii*
 – SIPH cylindrical on distal half, sometimes a little constricted in reticulated region. ANT BASE VI 0.9–1.3× R IV+V *Macrosiphum euphorbiae*
12. First tarsal segments with 5 hairs. RIV+V with 15–23 accessory hairs *Illinoia lambersi*
 – First tarsal segments with 3 (–4) hairs. R IV+V with 7–11 accessory hairs *Illinoia borealis*

Gaura

G. biennis
G. coccinea
G. lindheimeri
G. parviflora
Gaura sp.

Onagraceae

Macrosiphum gaurae, [*pallidum*]
Aphis craccivora
Macrosiphum gaurae
Macrosiphum gaurae
 [*Aphis oenotherae*]

Key to apterae on *Gaura*:-

- Spindle-shaped aphid, BL 2.7–3.9 mm. Dorsum pale. SIPH pale at least basally, with a subapical zone of polygonal reticulation. Cauda dusky *Macrosiphum gaurae*
 – Oval aphid, BL 1.1–2.3 mm. Dorsum with a black sclerotic shield. SIPH and cauda both entirely black, SIPH without polygonal reticulation *Aphis craccivora*

Gaylussacia

G. frondosa
Gaylussacia sp.

Ericaceae

[*Illinoia* sp. (Leonard, 1971: 80)]
Illinoia finni

Gazania

G. longiscapa
G. pectinata
G. rigens

G. uniflora
Gazania sp.

Compositae

Myzus ornatus, *persicae*
Aphis gossypii
Aphis gossypii, *terricola*; *Brachycaudus helichrysi*;
Myzus persicae; [*Uroleucon* sp. (Leonard, 1968: 344)]
 [*Uroleucon* sp. (Leonard, 1972a: 111)]
Aulacorthum solani; *Brachycaudus helichrysi*

Key to apterae on *Gazania*:-

- ANT PT/BASE 0.7–1.5. SIPH dark, shorter than the short triangular, very hairy cauda *Aphis terricola*
 – ANT PT/BASE more than 1.5. SIPH if dark then longer than cauda
 go to key to polyphagous aphids, p. 1020

Geissorhiza

G. inaequalis

Iridaceae

Macrosiphum euphorbiae; *Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Geitonoplesium*G. cymosum*

Use key to polyphagous aphids, p. 1020.

Philesiaceae*Aulacorthum solani*; *Myzus persicae***Gelsemium***G. sempervirens***Loganiaceae**[*Hyalomyzus eriobotryae*]**Genipa***G. americana***Rubiaceae***Toxoptera aurantii***Genista (incl. Chamaemelum, Teline)***G. anglica**Acyrtosiphon ericetorum*; *Aphis genistae*, *kaltenbachii**G. canariensis**Aphis craccivora**G. capitata* see *Chamecytistus supinus**G. cinerea**Acyrtosiphon pisum*;*Aphis cytisorum*, *fabae*, *gossypii**G. florida**Acyrtosiphon pisum*; *Aphis cytisorum**G. germanica**Aphis genistae**G. horrida* see*Echinopartium horrida**G. lydia* (incl. '*Cytisus rhodopeus*')*Acyrtosiphon parvum*, *pisum**G. medica**Aphis craccivora**G. monosperma**Aphis craccivora*/ *cytisorum* group (Israel, BMNH colln)*G. ovata**Aphis genistae**G. pilosa**Acyrtosiphon pisum**G. sagittalis**Acyrtosiphon pisum*; *Aphis genistae**G. scorpius**Aphis craccivora**G. sphacelata**Aphis craccivora*/ *cytisorum* group (Israel, BMNH colln)*G. sphaerocarpa**Aphis craccivora*, *fabae**G. tinctoria* (incl. var. *humifusa*)*Acyrtosiphon genistae*, *pisum*;*Aphis craccivora*, *cytisorum*, *genistae**G. tridentata**Aphis craccivora*Key to apterae on *Genista*:-

1. Body spindle-shaped, pale. ANT longer than BL. SIPH pale or dark, thin and cylindrical on distal half. Cauda elongate finger-shaped, pale 2
 - Body oval, often with dark dorsal markings. ANT shorter than BL. SIPH dark, tapering from base to apex. Cauda tongue-shaped, pale or dark 5
2. ANT VI BASE less than 2× R IV+V. SIPH tapering, not attenuated, less than 10× their width at midlength. Cauda rounded at apex, with 6–9 hairs *Acyrtosiphon parvum*
 - ANT VI BASE more than 2× R IV+V. SIPH attenuated, more than 10× longer than their width at midlength. Cauda tapering distally almost to a point; with 8–14 hairs 3
3. Cauda very thick; at midpoint at least 3× width of SIPH at midpoint. Femoral apices pale. SIPH pale, or only dusky at extreme apices *Acyrtosiphon pisum*
 - Cauda thinner; at midpoint less than 2.5× width of SIPH at midpoint. Femoral apices usually dark. SIPH dark, or darkening gradually from base to apex 4

HOST LISTS AND KEYS

- | | | | |
|----|---|--------------------------------|---|
| 4. | BL less than 2.5 mm. SIPH darkening towards apex | <i>Acyrtosiphon ericetorum</i> | |
| – | BL more than 2.5 mm. SIPH wholly dark | <i>Acyrtosiphon genistae*</i> | |
| 5. | Cauda paler than SIPH. Dorsal abdomen without any dark markings | <i>Aphis gossypii</i> | 6 |
| – | Cauda as black as SIPH. Dorsal abdomen with at least some dark markings | | 6 |
| 6. | Cauda with 11–25 hairs. Dorsal abdomen usually with a few small dark spots anterior to SIPH | <i>A. fabae</i> | 7 |
| – | Cauda with 4–13 hairs. Dorsal abdomen usually with extensive dark sclerotisation | | 7 |
| 7. | SIPH 0.2–0.8× cauda | | 8 |
| – | SIPH 1.1–2.2× cauda | | 9 |
| 8. | SIPH 0.2–0.3× cauda. Hairs on ANT III 0.3–0.4× BD III | <i>Aphis kaltenbachi</i> | |
| – | SIPH 0.5–0.8× cauda. Hairs on ANT III 0.8–1.3× BD III | <i>Aphis genistae</i> | |
| 9. | R IV+V 0.88–1.16× HT II (mostly 0.9–1.05×). Anterior half of genital plate with 2 (–3) hairs | <i>Aphis craccivora</i> | |
| – | R IV+V 0.97–1.3× HT II (mostly 1.06–1.2×). Anterior half of genital plate with 2–8 hairs (mode 4, mean 5.2) | <i>Aphis cytisorum</i> | |

Gentiana

G. asclepiadea

G. cruciata

G. lutea

G. olgae

G. panonnica

G. punctata

G. purpurea

G. scabra

G. septemifida

Gentiana sp.

Gentianaceae

Aphis fabae, gentianae; Metopeurum gentianae

Aphis gentianae

Aphis fabae, [orocantabrica], solanella,

Aphis sp. (French Alps, BMNH colln, leg G. Remaudière)

Brachycaudus gentianae

Aphis fabae

Aphis fabae

Aphis fabae

Macrosiphum euphorbiae

Macrosiphum euphorbiae

Aphis sp. (Austria, BMNH colln, leg. R.N.B. Prior)

Key to apterae on *Gentiana*:-

- | | | | |
|----|---|--|---|
| 1. | SIPH with a distal zone of polygonal reticulation | | 2 |
| – | SIPH without polygonal reticulation | | 3 |
| 2. | ANT tubercles well developed. ANT III with 1–10 rhinaria. SIPH long, more than 10× their width at midlength, with a well-developed flange and reticulation on distal 0.13–0.2 of length | <i>Macrosiphum euphorbiae</i> | |
| – | ANT tubercles not well developed. ANT III with 7–16 rhinaria. SIPH less than 6× their width at midlength, with a small flange and reticulation on at least distal 0.33 of length | <i>Metopeurum gentianae</i> | |
| 3. | Cauda helmet-shaped, shorter than its basal width, with 5 hairs | <i>Brachycaudus gentianae</i> | |
| – | Cauda tongue-like, much longer than its basal width, with 6–25 hairs | | 4 |
| 4. | Cauda with 6–8 hairs | | 5 |
| – | Cauda with 11–25 hairs | | 6 |
| 5. | ABD TERG 1–5 and 7 with large domed marginal tubercles (MTu) | <i>Aphis gentianae</i> | |
| – | Only ABD TERG 1 and 7 with MTu; small MTu irregularly present on some of ABD TERG 2–5 | <i>Aphis</i> sp., French Alps (BMNH colln) | |

6. SIPH 0.6–0.75× cauda (pale red-brown in life) *Aphis* sp., Austria (BMNH colln)
 – SIPH 0.8–1.9× cauda (black in life) 7
7. SIPH 4.9–17× longer than the longest marginal hairs on ABD TERG 2–4 *Aphis solanella*
 – SIPH 2.4–5.4× longer than the longest marginal hairs on ABD TERG 2–4 *Aphis fabae*

Geoffroea*G. decorticans**Aphis craccivora***Leguminosae*****Geraea****Geraea* sp.*Uroleucon ambrosiae***Compositae*****Geranium****G. affine**Acyrtosiphon malvae**G. collinum**Acyrtosiphon malvae*; *Maculolachnus submacula**G. columbianum**Acyrtosiphon malvae**G. dahuricum**Cryptaphis geranicola**G. dalmaticum**Acyrtosiphon malvae**G. dissectum**Acyrtosiphon malvae*; *Aulacorthum solani**G. divaricatum*[*Aphis urticata*]; *Indoidiopterus geranii*;[*Micromyzodium filicium*];*Myzus* sp. (India; BMNH colln, leg. A.N. Chowdhuri)*G. erianthum**Cryptaphis geranicola**G. fremontii**Amphorophora coloutensis**G. lucidum**Acyrtosiphon malvae*; [*Cavariella konoii*];*Macrosiphum pseudogeranii*; [*Micromyzodium filicium*]*G. macrorrhizum**Amphorophora tuberculata**G. maculatum**Acyrtosiphon malvae*; *Macrosiphum geranii**G. maderense**Acyrtosiphon malvae**G. molle**Acyrtosiphon malvae*; *Aulacorthum solani*;*Maculolachnus submacula*; *Myzus ascalonicus*, *persicae**G. nepalense**Cryptaphis geranicola**G. ocellatum**Aphis gossypii*; *Brachycaudus helichrysi*;*Indoidiopterus geranii*; *Myzus ornatus**G. phaeum**Acyrtosiphon malvae**G. potentilloides**Aulacorthum solani**G. pratense**Acyrtosiphon malvae*; *Macrosiphum ?geranii**G. pusillum**Acyrtosiphon malvae*; *Aphis fabae**G. pyrenaicum**Acyrtosiphon malvae**G. renardi**Myzus ornatus**G. richardsonii**Amphorophora coloutensis*, *geranii*; *Nasonovia crenicornia**G. robertianum**Acyrtosiphon malvae*; [*Macrosiphum funestum*];*Maculolachnus submacula*; *Myzus ornatus**G. rotundifolium**Acyrtosiphon malvae**G. sanguineum**Acyrtosiphon malvae*; *Aulacorthum solani**G. saxatile**Acyrtosiphon malvae**G. sibiricum**Cryptaphis geranicola*; *Acyrtosiphon malvae**G. sylvaticum**Aulacorthum solani*

HOST LISTS AND KEYS

<i>G. thunbergii</i>	<i>Cryptaphis geranicola</i>
<i>G. tuberosum</i>	<i>Macrosiphum euphorbiae</i>
<i>G. viscosissimum</i>	<i>Amphorophora geranii</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; <i>Macrosiphum aetheocornum</i>
<i>G. wallichianum</i>	<i>Macrosiphum pseudogeranii</i> ; <i>Indoidiopterus geranii</i>
<i>Geranium</i> spp.	[<i>Acutosiphon obliquoris</i>]; <i>Aphis craccivora</i> , [<i>geranii</i> Hereman, 1840 (nomen nudum)], <i>Aphis</i> sp. (Pakistan, BMNH colln); [<i>Capitophorus carduinus</i>]; [<i>Dysaphis microsiphon</i>]; [<i>Macrosiphoniella sanborni</i>]; [<i>Macrosiphum solutum</i> Blanchard, 1939 (= <i>Acyrtosiphon malvae</i> ?)]; <i>Macrosiphum</i> sp. (Manitoba; BMNH colln, leg. A.G. Robinson); <i>Myzus ascalonicus</i> ; <i>Rhopalosiphoninus staphyleae</i> ; [<i>Thecabius affinis</i>]

Key to apterae on *Geranium* (NB for florists' geraniums, see *Pelargonium*):–

1. SIPH as pores on broad dark hairy cones *Maculolachnus submacula*
– SIPH tubular **2**
2. SIPH with a subapical zone of polygonal reticulation (at least 4–5 rows of closed cells) **3**
– SIPH without polygonal reticulation, or with only 1–3 rather indistinct rows of cells **7**
3. Distal 0.3–0.4 of femora black. SIPH wholly black. First tarsal segments with 4 hairs (including 2 sense pegs) *Macrosiphum pseudogeraniae*
– Femora dusky or dark only at apices. SIPH pale, dusky, or pale at bases. First tarsal segments with 3 hairs (1 sense peg) **4**
4. R IV+V 0.8–1.0× HT II *Macrosiphum euphorbiae*
– R IV+V 1.2–1.7× HT II **5**
5. SIPH 1.5–1.8× cauda, mainly dark, with paler basal part. R IV+V with 9–11 accessory hairs *Macrosiphum* sp. (cult. *Geranium* sp., Manitoba: BMNH colln)
– SIPH 2.0–2.4× cauda, mainly pale, dusky or dark towards apices. R IV+V with either 5–8 or 12–16 accessory hairs **6**
6. R IV+V bearing 12–16 accessory hairs. SIPH sometimes bearing 1–4 hairs (Figure 30a; but often without any) *Macrosiphum aetheocornum*
– R IV+V bearing 5–8 accessory hairs. SIPH without hairs *Macrosiphum geranii*
7. Dorsal body hairs very long, the longest of them 3 or more× ANT BD III. Dorsal cuticle sclerotic, dark *Cryptaphis geranicola*
– Dorsal body hairs less than 2× BD III. Dorsal cuticle pale or dark **8**
8. SIPH with 5–11 blunt or capitate hairs (Figure 30b) *Nasonovia crenicornia*
– SIPH without hairs **9**
9. Cuticle of head smooth, without spicules. ANT tubercles well developed, with inner faces smooth and divergent **10**
– **Either** cuticle of head spiculose, **or** ANT tubercles weakly developed or undeveloped **13**

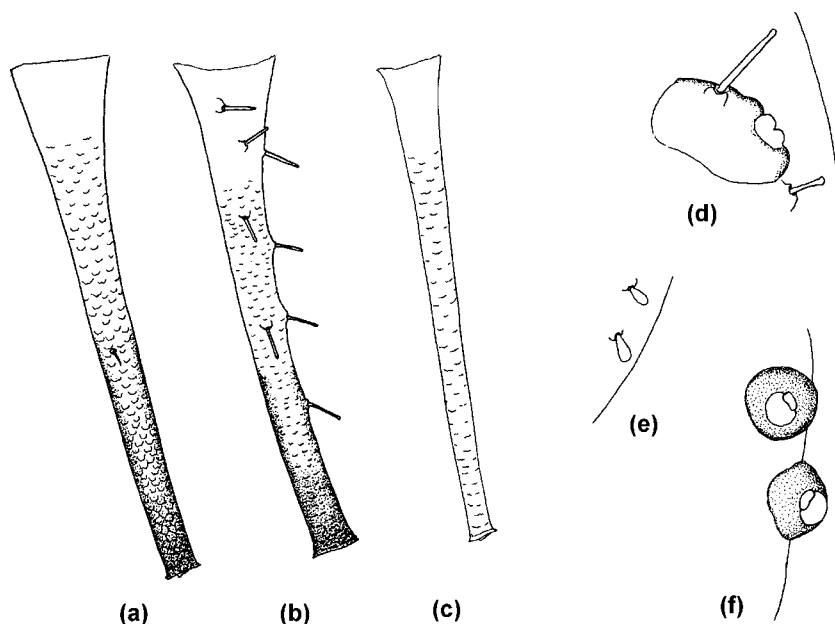


Figure 30 Apterae on *Geranium*. (a) SIPH of *Macrosiphum aetheocornum*; (b) SIPH of *Nasonovia crenicornia*, (c) SIPH of *Acyrthosiphon malvae*; (d) marginal tubercle and hairs of *Amphorophora tuberculata*, (e) dorsal abdominal hairs of *Indoidiopterus geranii*, (f) spiracular plates on abdominal segments 1 and 2 of *I. geranii* (ventral view).

10. SIPH cylindrical on distal half (Figure 30c). Longest hairs on ANT III $0.3-0.6 \times$ BD III
Acyrthosiphon malvae
- SIPH swollen on distal half. Longest hairs on ANT III $0.7-1.0 \times$ BD III **11**
11. ABD TERG 2–5 with marginal tubercles (MTu), usually well-developed, with 2 marginal hairs of very unequal length situated anteriodorsad and posteroventrad of each tubercle (Figure 30d)
Amphorophora tuberculata
- ABD TERG 2–5 usually without MTu, and marginal hairs all of similar length **12**
12. R IV+V $1.1-1.6 \times$ HT II, with 15–25 accessory hairs. ANT III with 0–2 rhinaria
Amphorophora coloutensis
- R IV+V $1.9-2.2 \times$ HT II, with 30–40 accessory hairs. ANT III with 4–8 rhinaria
Amphorophora geranii
13. Hairs on ABD TERG 1–5 very short and thick, with clubbed apices (Figure 30e). Abdominal spiracular plates raised as rounded tubercles (Figure 30f). (Head spiculose, SIPH slightly clavate. Al. with forewing veins fuscous-bordered and media fused with R_s)
Indoidiopterus geranii
- Hairs on ABD TERG 1–5 thin; long or short, blunt or pointed. Abdominal spiracular plates not raised. (Head smooth or spiculose, SIPH clavate, cylindrical or tapering) **14**
14. Head spiculose, tergum very rugose. SIPH coarsely imbricated (scaly), slightly clavate, longer than ANT III. R IV+V $1.3-1.5 \times$ HT II
Myzus sp. H.P., India (BMMH colln)
- If head spiculose then other characters are not in that combination **15**

HOST LISTS AND KEYS

15. SIPH black, 0.08–0.12× BL, about equal in length to the dark cauda. ANT PT/BASE 1.7–2.4 (only more than 2.0 in small specimens of BL c.1 mm)

Aphis sp. (nr. *spiraecola*), Pakistan (BMNH colln)

- SIPH pale or dark, if dark then relatively longer, and ANT PT/BASE also longer

go to key to polyphagous aphids, p. 1020

Gerardia see *Agalinis*

Gerbera

- G. hybrida*
G. jamesonii

- G. macrophylla*
Gerbera spp.

Compositae

Aphis gossypii
Aphis craccivora, *fabae*, *gossypii*, *solanella*, *spiraecola*;
Aulacorthum solani; *Brachycaudus cardui*, *helichrysi*;
Capitophorus elaeagni; *Macrosiphum euphorbiae*;
Myzus cymbalariae, *ornatus*, *persicae*;
Neomyzus circumflexus;
Uroleucon ambrosiae, *compositae*
Aphis gossypii; [*Trichosiphonaphis gerberae*]
Aphis spiraecola, [*Aphis* sp. (imm. only; Portugal, BMNH colln)]; *Brachycaudus helichrysi*;
Indomasonaphis anaphalidis, *rumicis*; *Myzus ascalonicus*

Key to apterae on *Gerbera*:-

- SIPH strongly swollen over about distal 0.7 of length, with greatest diameter of swelling more than twice the least diameter of the 'stem'. Cauda bearing 14–32 hairs **2**
– If SIPH are at all swollen then cauda has less than 12 hairs **3**
- Cauda with 25–32 hairs. R IV+V with 9–12 accessory hairs *Indomasonaphis anaphalidis*
– Cauda with about 14–15 hairs. R IV+V with 2 accessory hairs *Indomasonaphis rumicis**
- Cauda helmet-shaped, a little shorter than its basal width. Spiracular apertures large and rounded. SIPH with a subapical annular incision **4**
– Cauda tongue- or finger-shaped, longer than its basal width. Spiracular apertures small and reniform. SIPH without a subapical annular incision **5**
- Abdomen without extensive dark markings. SIPH pale, smooth, 0.9–1.5× cauda. Mesosternum without mammariform processes *Brachycaudus helichrysi*
– Abdomen with an extensive dark dorsal shield. SIPH dark, imbricated, 2.1–3.4× cauda. Mesosternum with a pair of dark mammariform processes *Brachycaudus cardui*
- Long, thick capitate dorsal hairs present on head and posterior abdomen, arising from tuberculate bases. SIPH slender, pale, about as thick as hind tibia at midlength. ANT PT/BASE 6.0–9.2 *Capitophorus elaeagni*
– Dorsal hairs, not long, thick and capitate, without tuberculate bases; if long and slightly expanded apically then SIPH are much thicker than hind tibiae at midlength, or clavate. ANT PT/BASE 1.7–7.3
go to key to polyphagous aphids, p. 1020

Geropogon see *Tragopogon*

Gesnouinia

- G. arborea*

Urticaceae

Aphis parietariae

Gesneria*G. cuneifolia**Myzus persicae***Geum***G. aleppicum*[*Aphis diluta*]; *Myzus ornatus*;
Eriosoma japonicum (as *Schizoneurella gei*)*G. avens**Macrosiphum gei**G. calthifolium* (incl. *nipponicum*)*Acyrtosiphon shinanonus*; *Macrosiphum euphorbiae*;
*Myzus persicae**G. canadense**Acyrtosiphon pseudodirhodum*; *Amphorophora gei, rossi*;
*Macrosiphum pallidum. rosae**G. ciliatum**Macrosiphum kiowanepum**G. coccineum**Amphorophora gei*; [*Aphis* sp. (Daveltshina, 1964)];
*Macrosiphum gei**G. japonicum**Eriosoma japonicum**G. laciniatum**Macrosiphum gei**G. macrophyllum**Amphorophora gei, rossi*; *Aulacorthum solani*;
Macrosiphum euphorbiae, gei; *Myzus ascalonicus**G. montanum*[*Hyperomyzus lactucae*]*G. parviflorum**Amphorophora gei*; *Macrosiphum gei*;
*Ovatomyzus boraginacearum**G. peruvianum**Aulacorthum solani*; *Rhopalosiphoninus staphyleae**G. pyrenaicum**Macrosiphum gei**G. rivale**Acyrtosiphon malvae* ssp. *potha*; *Amphorophora gei*;
Aulacorthum solani; *Macrosiphum gei*;
*Myzus ascalonicus, ornatus**G. rivale* × *urbanum**Myzus ornatus**G. schofieldii**Macrosiphum euphorbiae*; *Myzus ornatus**G. strictum**Macrosiphum euphorbiae**G. triflorum**Myzus ornatus**G. urbanum**Acyrtosiphon malvae*; *Amphorophora gei*;
Aulacorthum solani; *Macrosiphum euphorbiae, gei*;
Myzus ascalonicus; *Ovatomyzus boraginacearum**G. virginianum**Amphorophora rossi*; *Macrosiphum pallidum**Geum* spp.*Chaetosiphon janetscheki*;
[*Nectarophora* sp. (Cockerell, 1903: 17)];
*Sitobion fragariae*Key to apterae on *Geum*:-

1. ANT PT/BASE less than 0.5. Eyes with only 3 facets. Wax gland plates present on thorax and abdomen. SIPH as raised pores with sclerotic rims and surrounding hairs
Eriosoma japonicum
- ANT PT/BASE more than 1. Eyes multifaceted. No wax gland plates. SIPH tubular **2**
2. SIPH with a subapical zone of polygonal reticulation (at least 4–5 rows of closed cells) **3**
- SIPH without polygonal reticulation **8**
3. Longest hairs on ANT III 0.3–0.5× BD III. ANT III with 1–4 very small rhinaria. ANT tubercles rather low, and median frontal tubercle distinctly developed
Sitobion fragariae

HOST LISTS AND KEYS

- Longest hairs on ANT III 0.6–1.3× BD III. ANT III with 1–35 rhinaria of various sizes. ANT tubercles well developed, median frontal tubercle undeveloped 4
- 4. Front of head pale, SIPH pale or dark only towards apices 5
- Front of head dusky to dark. SIPH dark, or pale only at bases 6
- 5. Longest hair on ABD TERG 8 is 38–63µm, 0.6–1.4× ANT BD III. Anterior half of subgenital plate usually (77%) with only 2 hairs (18% with 3, 5% with 4–6 hairs)
 - Macrosiphum euphorbiae*
 - Longest hair on ABD TERG 8 is 66–106µm, 1.4–2.0× ANT BD III. Anterior half of subgenital plate with 2–11 hairs, usually (77%) with 4–8 hairs *Macrosiphum gei*
- 6. Head as dark as SIPH. Hind tibiae with pale middle sections *Macrosiphum rosae*
- Head dusky, paler than SIPH. Hind tibiae wholly dark 7
- 7. SIPH 0.73–0.95× ANT III *Macrosiphum pallidum*
- SIPH 1.03–1.30× ANT III *Macrosiphum kiowanepum*
- 8. Dorsal body hairs long, thick and capitate, maximally c. 3× ANT III, with prominently tuberculate bases. SIPH also with 3–4 thick capitate hairs on basal part
 - Chaetosiphon janetscheki*
 - Dorsal body hairs not thick and capitate, without tuberculate bases. SIPH without hairs 9
- 9. ANT tubercles very well developed, with divergent inner faces. Cuticle of head smooth or with a few spinules ventrally. ANT III with 0–24 rhinaria 10
- **Either** ANT tubercles weakly developed and head without spicules, **or** ANT tubercles with well-developed steep-sided inner faces and cuticle of head densely spiculate or nodulose. ANT III with 0–2 (–4) rhinaria go to key to polyphagous aphids, p. 1020
- 10. BL 0.7–1.6mm. SIPH 0.15–0.33mm, slender and usually slightly swollen on distal half. ANT III without rhinaria. (Al. with a dorsal abdominal black patch and sec. rhinaria on ANT III, IV and V)
 - Ovatomyzus boraginacearum*
 - BL 1.8–4.0mm. SIPH 0.45–1.0mm, tapering, cylindrical or evidently swollen on distal half. ANT III with 1–24 rhinaria. (Al. pale dorsally and with sec. rhinaria restricted to ANT III) 11
- 11. SIPH markedly swollen on distal half, the swollen part being smooth-surfaced. ANT III with 1–7 small rhinaria near base 12
- SIPH tapering or cylindrical, and with imbrication throughout. ANT III with 1–30 rhinaria 13
- 12. SIPH 2.2–2.8× cauda. R IV+V 1.2–1.4× HT II. ANT III with 1–3 rhinaria *Amphorophora gei*
- SIPH 1.7–2.0× cauda. R IV+V 1.4–1.6× HT II. ANT III with 1–7 rhinaria *Amphorophora rossi*
- 13. SIPH 0.8–1.2× cauda *Acyrthosiphon pseudodirhodum*
- SIPH 1.5–1.5× cauda 14
- 14. R IV+V 0.8–0.9× HT II *Acyrthosiphon shinanonum*
- R IV+V 0.92–1.4× HT II *Acyrthosiphon malvae* group

Gigantochloa see Blackman and Eastop (1994)

Gilia

G. aggregata see *Ipomopsis aggregata*

G. capitata

Polemoniaceae

[*Aphis* sp. (Leonard, 1974: 101)]

G. linearis see *Collomia linearis*

G. tricolor

Macrosiphum euphorbiae

Gilibertia* see *Dendropanax

Ginoria

G. americana

Aphis spiraeicola

Lythraceae

Girardinia

G. cuspidata

G. heterophylla

Microlophium carnosum; *Myzus dycei*

Dysaphis microsiphon

Urticaceae

Key to apterae on *Girardinia*:-

1. SIPH very small and thin, 0.03–0.08 mm long. Well-developed marginal tubercles (MTu) present on ABD TERG 1–5, and head with a large pair of spinal tubercles (STu). Cauda helmet-shaped, shorter than its basal width in dorsal view *Dysaphis microsiphon*
 - SIPH larger, and MTu, STu and cauda not as above **2**
2. Large spindle-shaped aphid, BL more than 3 mm, ANT much longer than BL. ANT tubercles smooth, with inner faces divergent. Dorsal hairs long and pointed. SIPH long, tapering and normally imbricated, with flared apices *Microlophium carnosum*
 - Small oval aphid, BL less than 2 mm, ANT much shorter than BL. ANT tubercles scabrous, with inner faces apically convergent. Dorsal hairs inconspicuous. SIPH thick and scaly for most of length, with smooth tapering distal part that is somewhat bent outwards *Myzus dycei*

Girgensohnia

G. oppositiflora

Brachyunguis salsolaceanum

Chenopodiaceae

Gladiolus

G. communis

G. gandavensis

G. gandavi

G. × hortolanus

G. watsonioides

Gladiolus ssp.

Aphis gossypii; *Macrosiphum euphorbiae*;

[*Myzaphis rosarum*]; *Myzus persicae*

Metopolophium dirhodum

Dysaphis tulipae; *Sitobion akebiae*

Aphis fabae, *spiraeicola*; *Macrosiphum euphorbiae*

Aphis gossypii

Aphis craccivora; *Aulacorthum solani*;

Myzus ascalonicus, *cymbalariae*, *ornatus*;

Neomyzus circumflexus;

Rhopalosiphoninus latysiphon, *staphyleae*;

Sitobion africanum, *akebiae*, *fragariae*, *graminis*,

[*phyllanthi*], [*wikstroemiae*]; *Smynthuroides betae*

Iridaceae

Key to apterae on *Gladiolus*:-

1. Cauda helmet-shaped ('pentagonal'), not longer than its basal width, with 4–6 hairs. Head and ABD TERG 8, or 7 and 8, with paired spinal tubercles (STu), and marginal tubercles (MTu) present on prothorax and ABD TERG 1–5, or 1–5 and 7 *Dysaphis tulipae*
 - Cauda (if at all evident) triangular or tongue-shaped, longer than its basal width, with 4–25 hairs. STu absent from head, rarely on ABD TERG 7–8. MTu absent or only regularly present on ABD TERG 1 and 7 **2**

HOST LISTS AND KEYS

2. SIPH dark, tapering, with a subapical zone of polygonal reticulation. Hairs on ANT III less than $0.6 \times$ BD III 3
 - SIPH (if present) pale or dark, but if dark then either without subapical polygonal reticulation, or strongly swollen. Hairs on ANT III more or less than $0.6 \times$ BD III 6
3. Cauda dark like SIPH *Sitobion graminis*
 - Cauda pale 4
4. R IV+V $0.65-0.75 \times$ HT II. Longest hairs on ANT III $20-30 \mu\text{m}$ *Sitobion akebiae*
 - R IV+V $0.75-0.9 \times$ HT II. Longest hairs on ANT III $12-20 \mu\text{m}$ 5
5. Cauda $0.43-0.55$ SIPH and $1.9-2.6 \times$ HT II. Dorsal abdominal sclerotisation often extensive, but not segmentally divided and with ill-defined edges *Sitobion fragariae*
 - Cauda $0.53-0.6 \times$ SIPH and $2.4-3.0 \times$ HT II. Dorsal abdominal sclerotisation very variable, but when well developed it is segmentally divided and has well-defined edges *Sitobion africanum*
6. SIPH cylindrical, pale, without subapical polygonal reticulation. R IV+V $0.55-0.75 \times$ HT II *Metopolophium dirhodum*
 - Without that combination of characters; if SIPH are pale, cylindrical (i.e., not swollen) and lack subapical reticulation then R IV+V is $0.95-1.35 \times$ HT II go to key to polyphagous aphids, p. 1020

Glaucium

G. corniculatum
G. elegans
G. fimbrilligerum
G. flavum

G. grandiflorum
G. leiocarpum
G. luteum

Glaucium spp.

Papaveraceae

Acyrthosiphon glaucii, *ilka*
Acyrthosiphon glaucii
Acyrthosiphon glaucii
Acyrthosiphon lambersi; *Aphis fabae*;
Macrosiphum euphorbiae
Acyrthosiphon lambersi
Acyrthosiphon ilka, *lambersi*
Acyrthosiphon ilka; *Aphis fabae*;
Aulacorthum solani; *Brachycaudus helichrysi*;
[Cavariella theobaldi]; *Macrosiphum euphorbiae*;
[Sitobion avenae]
[Siphonophora glaucii Lichtenstein (nomen nudum)]

Key to apterae on on *Glaucium*:-

1. SIPH pale, or only dusky towards apex, cylindrical for most of length, normally imbricated, without subapical polygonal reticulation 2
 - SIPH pale or dark, but if pale then either very short, smooth and conical, or with subapical polygonal reticulation go to key to polyphagous aphids, p. 1020
2. Head spinulose, with inner faces of ANT tubercles steep-sided, almost parallel *Aulacorthum solani*
 - Head smooth with ANT tubercles, either weakly developed or with inner faces divergent 3
3. SIPH short, less than $0.15 \times$ BL, and less than $1.5 \times$ cauda *Acyrthosiphon glaucii*
 - SIPH $0.18-0.34 \times$ BL, more than $1.7 \times$ cauda 4
4. ANT tubercles well developed. ANT PT/BASE $3.0-3.7$. SIPH without any trace of subapical swelling *Acyrthosiphon ilka*
 - ANT tubercles weakly developed. ANT PT/BASE $1.9-2.8$. SIPH with a very slight swelling immediately proximal to flange *Acyrthosiphon lambersi*

Glaux*G. maritima***Primulaceae***Thecabius ?auriculae* (on roots)**Glechoma***G. hederacea***Labiatae**

Aulacorthum glechomae, solani;
 [*Cavariella aegopodii*];
Myzus ascalonicus; *Ovatus glechomae*;
Prociphilus erigeronensis;
Rhopalosiphoninus staphyleae ssp. *tulipaellus*

Key to apterae on *Glechoma*:-

1. ANT 0.25–0.3× BL, with PT/BASE less than 1. Cauda and anal plate both extended posteriorly, together forming a dark hairy rounded protruberance. SIPN absent *Prociphilus erigeronensis*
- ANT 1.0–1.6× BL, with PT/BASE 3–5. Cauda and anal plate normal. SIPN present **2**
2. SIPH evidently swollen, with maximum diameter of swollen part 1.3–2.1× minimum diameter of basal part **3**
- SIPH tapering or cylindrical **4**
3. SIPH with minimum diameter of basal part ('stem') greater than that of hind tibia at midlength, and swollen part as wide as base of cauda. SIPH 3.1–4.3× R IV+V. ANT III with 1–3 rhinaria near base. Dorsum with dark markings *Rhopalosiphoninus staphyleae* ssp. *tulipaellus*
- SIPH with minimum diameter of 'stem' less than that of hind tibia at midlength, and swollen part about half as wide as base of cauda. SIPH 1.8–2.5× R IV+V. ANT III without rhinaria. Dorsum without dark markings *Myzus ascalonicus*
4. ANT III without rhinaria. Inner faces of ANT tubercles with convergent processes, of length about 0.5× ANT I. (Immatures with smooth hind tibiae) *Ovatus glechomae*
- ANT III usually with 1–3 small rhinaria near base. Inner faces of ANT tubercles approximately parallel, without convergent processes **5**
5. Cauda with 6–8, usually 7, hairs. R IV with 5–7 accessory hairs. (Immatures with smooth hind tibiae) *Aulacorthum solani*
- Cauda with 4–5 hairs. R IV with 2 accessory hairs. (Immatures with spinulose hind tibiae) *Aulacorthum glechomae**

Gleditsia see Blackman and Eastop (1994)**Glehnia***G. littoralis***Umbelliferae***Semiaphis heraclei***Gleichenia***Gleichenia* sp.**Gleicheniaceae***Amphorophora ampullata* ssp. *bengalensis***Glinus***G. lotoides**G. radiatus***Molluginaceae***Aphis gossypii**Aphis gossypii*

HOST LISTS AND KEYS

Gliricidia, *Glochidion* see Blackman and Eastop (1994)

Glossanthus

Glossanthus sp.

Gesneriaceae

[*Aphis verticolor* Rafinesque, 1817 (invalid name)]

Gloxinia

G. digitaliflora

Gloxinia spp.

Gesneriaceae

Myzus persicae; *Neomyzus circumflexus*

Aphis craccivora; *Aulacorthum solani*; *Myzus ornatus*

Use key to polyphagous aphids, p. 1020.

Glyceria

G. aquatica

G. fluitans

G. grandis

G. maritima see *Puccinellia*

G. maxima

G. nemoralis

G. notata

G. plicata

G. pulchella

G. stricta (incl. *nervata*)

Gramineae

Rhopalosiphum insertum, *padi*; *Sipha glyceriae*

Metopolophium dirhodum; *Rhopalomyzus lonicerae*, *poae*;

Rhopalosiphum insertum, *nymphaeae*, *padi*; *Sipha glyceriae*;

Sitobion avenae, *graminis*, *fragariae*

Sitobion avenae

Metopolophium dirhodum; *Rhopalosiphum padi*;

Sitobion fragariae

Rhopalosiphum padi; *Sitobion avenae*

Melanaphis pyrararia; *Sitobion avenae*

Rhopalosiphum padi

Sitobion fragariae

Carolinaia howardii

Use key to apterae of grass-feeding aphids under *Digitaria*.

Glycine

G. hispida see *max*

G. javanica

G. max (incl. *hispida*)

Leguminosae

Aphis craccivora; *Sitobion nigrinectarium*

Acyrtosiphon gossypii, *pisum*;

Aphis craccivora, *fabae*, *glycines*, *gossypii*;

Aulacorthum solani; [*Hyadaphis coriandri*];

Macrosiphum euphorbiae; *Myzus persicae*;

Neomyzus circumflexus

Key to apterae on *Glycine*:-

- | | | |
|----|--|--------------------------------|
| 1. | SIPH with a subapical zone of polygonal reticulation (at least 4–5 rows of closed cells) | 2 |
| – | SIPH without polygonal reticulation | 3 |
| 2. | SIPH black. R IV+V 1.1–1.2× HT II. ABD TERG 8 with 4–6 hairs | <i>Sitobion nigrinectarium</i> |
| – | SIPH pale or dusky. R IV+V 0.95–1.1× HT II. ABD TERG 8 with 6–8 hairs | <i>Macrosiphum euphorbiae</i> |
| 3. | ANT tubercles well-developed. SIPH pale or dusky. ABD TERG 1 and 7 without MTu | 4 |
| – | ANT tubercles weakly developed. SIPH dark. ABD TERG 1 and 7 with MTu | 8 |
| 4. | Head smooth, with divergent ANT tubercles. SIPH very attenuate distally. ANT BASE VI 1.8–2.9× R IV+V | 5 |

- Head spiculate or nodulose, with inner faces of ANT tubercles parallel or convergent apically. SIPH not attenuate distally. ANT BASE VI 0.8–1.6× R IV+V 6
- 5. SIPH 0.42–0.50× BL and 2.5–3.5× cauda *Acyrtosiphon gossypii*
– SIPH 0.23–0.38× BL and 1.2–1.9× cauda *Acyrtosiphon pisum*
- 6. Dorsum with a large black roughly U-shaped patch, and black cross-bands on thorax. (Immatures with spinulose hind tibiae) *Neomyzus circumflexus*
– Dorsum without dark markings. (Immatures with smooth hind tibiae) 7
- 7. SIPH tapering or cylindrical. ANT III almost always with 1–2 small rhinaria near base *Aulacorthum solani*
– SIPH slightly clavate. ANT III without rhinaria *Myzus persicae*
- 8. Dorsal abdomen with an extensive black shield. Cauda black *Aphis craccivora*
– Dorsal abdomen without dark markings. Cauda paler than SIPH 9
- 9. Cauda 0.08–0.135× BL (only more than 0.12× BL in very small specimens with BL less than 1 mm), and 0.8–1.25× ANT V; pale to dusky, without a constriction, less than 3× longer than its width at midlength, and bearing 4–7 (usually 5–6) hairs *Aphis gossypii*
– Cauda 0.12–0.175× BL, and 1.05–1.7× ANT V; very pale, usually with a slight mid-way constriction, more than 3× longer than its narrowest width at midlength, and bearing 5–10 (usually 7–9) hairs *Aphis glycines*

Glycosmis*G. arborea**G. pentaphylla**Aphis spiraeicola**Greenidea ficicola, psidii* (ssp. *heeri*)**Rutaceae**Key to apterae on *Glycosmis*:-

- 1. SIPH covered with numerous long hairs 2
– SIPH without hairs *Aphis spiraeicola* (or try key to polyphagous aphids, p. 1020)
- 2. SIPH reticulated only at base, and rather densely spinulose over most of length *Greenidea psidii* (incl. ssp. *heeri*)
– SIPH reticulated over most of length, spinulose only on distal part *Greenidea ficicola*

Glycyrrhiza*G. aspera**G. glabra**G. lepidota**G. uralensis**Glycyrrhiza* sp.**Leguminosae***Acyrtosiphon gossypii*; *Aphis craccivora**Aphis craccivora, gossypii, [medicaginis]**Aphis craccivora**Aphis craccivora**Aphis fabae*Key to apterae on *Glycyrrhiza*:-

- SIPH pale and attenuated distally, thinner than hind tibia at their respective midpoints, 0.42–0.50× BL and 2.5–3.5× cauda *Acyrtosiphon gossypii*
- SIPH pale or dark, thicker than hind tibia at their respective midpoints, less than 0.33× BL and less than 2.5× cauda go to key to polyphagous aphids, p. 1020

Gnaphalium*Gn. affine* see *multiceps**Gn. americanum**Gn. antillarum**Gn. arenarium* see *Helichrysum**Gn. argenteum**Gn. attenuatum**Gn. beneolens**Gn. bicolor**Gn. californicum**Gn. caucasicum**Gn. chiliense**Gn. declinatum**Gn. decurrens**Gn. dioicum* see *Antennaria**Gn. erectum**Gn. germanica**Gn. hypoleucum**Gn. indicum**Gn. japonicum**Gn. leontopodium* see *Leontopodium*
*alpinum**Gn. luteo-album**Gn. multiceps* (incl. *affine*)*Gn. norvegicum**Gn. obtusifolium**Gn. peregrinum**Gn. polycephalum**Gn. portoricense**Gn. purpureum**Gn. spathulatum**Gn. sylvaticum***Compositae***Acyrtosiphon bidenticola*; *Aphis gossypii*, *spiraecola*;
Aulacorthum solani; *Brachycaudus helichrysi*;
Neomyzus circumflexus; *Uroleucon ambrosiae*
Aphis gossypii; *Neomyzus circumflexus**Macrosiphum euphorbiae**Aphis spiraecola*; *Brachycaudus helichrysi**Uroleucon russellae**Illinoia richardsi*; *Uroleucon russellae**Uroleucon russellae**Brachycaudus helichrysi**Brachycaudus helichrysi**Aphis spiraecola*[*Nectarophora* sp.? – Cockerell 1903: 171]*Pemphigus populinigrae**Pemphigus populinigrae**Capitophorus gnathalifoliae**Aphis gossypii**Aphis gossypii*; *Brachycaudus helichrysi*;*Oedisiphum compositarum**Aphis gossypii*, *spiraecola*; *Aulacorthum solani*;*Brachycaudus helichrysi*;*Myzus ascalonicus*, *ornatus*, *persicae*;*Neomyzus circumflexus*;*Oedisiphum compositarum*, *soureni*;*Toxoptera aurantii*; *Uroleucon compositae*, *sonchi*[*Aphis gnaphalii* Shinji, 1927];[*Macrosiphoniella yomogifoliae*];*Uroleucon ambrosiae*, *gobonis**Brachycaudus helichrysi**Uroleucon pseudambrosiae**Myzus ornatus**Aphis gossypii*;[*Uroleucon* sp. (as *Dactynotus* – Leonard, 1968: 345)]*Uroleucon ambrosiae**Brachycaudus helichrysi*; *Aphis middletonii**Aphis gossypii*; *Myzus persicae*;[*Uroleucon rudbeckiae*]*Brachycaudus helichrysi*; *Macrosiphoniella olgae*;*Oedisiphum compositarum*; *Pemphigus populinigrae*;*Pleotrichophorus filaginis*, [?*glandulosus*];[*Uroleucon cichorii*]

<i>Gn. uliginosum</i>	<i>Aphis nasturtii</i> , [<i>Aphis</i> sp.(Davletshina, 1964)]; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; <i>Myzus ornatus</i> ;
<i>Gn. undulatum</i>	<i>Pemphigus populinigrae</i> ; <i>Uroleucon gobonis</i> <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; <i>Myzus persicae</i> ; <i>Uroleucon compositae</i>
<i>Gnaphalium</i> spp.	<i>Aphis craccivora</i> , [<i>Aphis</i> (<i>Protaphis</i>) sp.(Mier Durante, 1978: 93)]; [<i>Cavariella salicicola</i>]; [<i>Dysaphis microsiphon</i>]; <i>Hyperomyzus</i> (<i>Neonasonovia</i>) sp. (U.P., India; BMNH colln, leg. D. Bhattacharya); <i>Pemphigus</i> sp. (India, U.P., BMNH colln); <i>Rhopalosiphum rufiabdominale</i> ; <i>Tuberocephalus</i> sp. (Japan, BMNH colln)

Key to apterae on *Gnaphalium*:-

1. SIPH absent. ANT about 0.2× BL, with PT/BASE 0.17–0.20. ABD TERG 3–7 with wax gland plates **2**
– SIPH present, ANT more than 0.3× BL, with PT/BASE more than 0.5. No wax gland plates **3**
2. R IV+V 1.2–1.4× HT II *Pemphigus populinigrae*
– R IV+V 0.8–0.9× HT II *Pemphigus* sp. (?*mordwilkoji*; India, BMNH colln)
3. Dorsal hairs numerous, with fan-shaped or capitate apices, arising from tuberculate bases **4**
– Dorsal hairs without fan-shaped or capitate apices, with or without tuberculate bases **5**
4. SIPH swollen on distal part. ANT I with capitate hairs arising from tuberculate bases
*Capitophorus gnathalifoliae**
– SIPH cylindrical (slightly flared at apex). ANT I without capitate hairs *Pleotrichophorus flaginis*
5. Cauda helmet-shaped, slightly constricted near base, shorter than or not clearly longer than its basal width, and bearing 4–6 hairs **6**
– Cauda bluntly conical, tongue- or finger-shaped, either distinctly longer than its basal width or bearing more than 10 hairs **8**
6. R IV+V less than 0.15 mm long, 1.1–1.5× HT II. SIPH conical, pale, almost smooth. Spiracular apertures large and rounded. Tergum membranous *Brachycaudus helichrysi*
– R IV+V more than 0.20 mm long, more than 2× HT II. SIPH dark, cylindrical or slightly swollen, imbricated. Spiracular apertures small and reniform. Tergum with variably developed dark sclerotisation **7**
7. Longest hairs on ANT III 12–15 μm, shorter than ANT BD III, and longest hairs on ABD TERG 3 15–36 μm, less than 2× ANT BD III *Oedisiphum compositarum*
– Longest hairs on ANT III 18–21 μm, as long as or longer than ANT BD III, and longest hairs on ABD TERG 3 50–60 μm, more than 2× ANT BD III *Oedisiphum soureni*
8. ANT tubercles undeveloped or weakly developed, or if well developed then densely spiculate or scabrous and with parallel or apically convergent inner faces. SIPH without a subapical zone of polygonal reticulation **9**
– ANT tubercles well developed, with almost smooth, divergent inner faces. SIPH often with distal or subapical polygonal reticulation **10**

HOST LISTS AND KEYS

9. Eyes reduced to 10–30 facets, with no distinct ocular tubercle (triommatidium). ANT I very wide, 2 or more× thicker than ANT II *Tuberocephalus* sp. (Japan, BMNH colln)
 – Eyes with many more than 30 facets and a distinct ocular tubercle. ANT I less than 2× thicker than ANT II go to key to polyphagous aphids, p. 1020
10. SIPH pale, or dusky towards apices **11**
 – SIPH uniformly dark, or paler only in middle **13**
11. SIPH cylindrical on distal half, with reticulation on subapical 0.13–0.20 of length. R IV+V 0.9–1.1× HT II *Macrosiphum euphorbiae*
 – SIPH swollen on distal half, if with reticulation than this does not extend beyond 0.07 of length. R IV+V 1.5–2.3× HT II **12**
12. Thoracic spiracles similar in size to abdominal ones. R IV+V 1.5–1.7× HT II. SIPH 2.2–2.5× cauda, imbricated and with some subapical reticulation. ANT III with rhinaria regularly spaced in a row *Illinoia richardsi*
 – Thoracic spiracles much larger than abdominal ones. R IV+V c.2.3× HT II. SIPH 1.4–1.5× cauda, almost smooth, without subapical reticulation. ANT III with rhinaria clustered on swollen part near base *Hyperomyzus (Neonasonovia)* sp. (U.P., India; BMNH colln, leg. D. Bhattacharya)
13. SIPH more than 10× longer than their width at midlength, with at most 1–3 rows of subapical polygonal reticulation. Hairs on ABD TERG 1–5 much shorter than ANT BD III, and without pigmented basal scleroites *Acyrtosiphon bidenticola*
 – SIPH thicker, less than 10× their width at midlength, with many rows of polygonal reticulation. Hairs on ABD TERG 1–5 longer than ANT BD III and often arising from pigmented scleroites **14**
14. SIPH about 1.1–1.2× cauda, and reticulated over about half of length *Macrosiphoniella olgae**
 – SIPH 1.1–2.1× cauda, and reticulated over distal 0.23–0.37 **15**
15. Cauda dark. SIPH 1.8–2.1× cauda. ANT III with 51–77 rhinaria *Uroleucon compositae* (or *gobonis*?)
 – Cauda pale. SIPH 1.1–1.9× cauda. ANT III with 8–46 rhinaria **16**
16. Coxae dark. Dorsal hairs not arising from dark scleroites. SIPH dark at base and apex, but often paler in middle *Uroleucon sonchi*
 – Coxae pale. At least some of dorsal hairs arising from dark scleroites. SIPH wholly dark **17**
17. R IV+V 1.8–2.3× HT II. SIPH 1.5–1.8× cauda, which is dusky *Uroleucon russellae*
 – R IV+V 0.9–1.5× HT II. SIPH 1.1–1.3× cauda, which is pale **18**
18. HT II rather long and thin, about 6× its maximum thickness, and 0.9–1.1× R IV+V *Uroleucon pseudambrosiae*
 – HT II shorter, less than 5× its maximum thickness and 0.7–0.85× R IV+V *Uroleucon ambrosiae*

Gnidia

Gnidia spp.

Thymelaceae

Sitobion wikstroemiae

Gochnatia

Gochnatia sp.

Compositae

Uroleucon gochnatiae

Godetia see *Clarkia*

Goebelia see *Sophora* in Blackman and Eastop (1994)

Goldfussia see *Strobilanthes*

Gomphocarpus

Asclepiadaceae

One aphid species, *Aphis nerii*, is recorded from the following *Gomphocarpus* spp.; *cornutus*, *fruticosus*, *lanatus*, *purpurascens* and *sinaicus*.

Gomphrena

Amaranthaceae

G. celosioides

Aphis gossypii; [*Hysteroneura setariae*]

G. globosa

Aphis gossypii; *Aulacorthum solani*;

Macrosiphum euphorbiae, [*salviae*], *stellariae*;

Myzus certus, *persicae*; *Rhopalosiphoninus staphyleae*

Use key to polyphagous aphids, p. 1020, but note that specimens running to *Macrosiphum euphorbiae* could be *M. stellariae*, and those running to *Myzus persicae* could be *M. certus*; for separation of these species-pairs see the key to aphids on *Dianthus*, couplets 3 and 15 respectively.

Gonatanthus

Araceae

Gonatanthus sp.

Aphis helianthi

Gongronema

Asclepiadaceae

G. latifolium

Aphis gossypii

Goniolimon

Plumbaginaceae

G. rubellum

Staticobium latifoliae

G. speciosum

Rhopalosiphoninus staphyleae

G. tataricum

Staticobium gmelini, *insularum*

Use key to aphids on *Limonium*.

Gonolobus

Asclepiadaceae

G. laevis

Aphis nerii

Gonospermum

Compositae

G. fruticosum

[*Brevicoryne brassicae*]

***Gonzalagunia* (incl. *Duggena*)**

Rubiaceae

G. brachyantha

Toxoptera aurantii

G. spicata

Aphis gossypii; *Toxoptera aurantii*

Use key to polyphagous aphids. p. 1020.

Gordonia

Theaceae

G. obtusa

Toxoptera aurantii

HOST LISTS AND KEYS

Gossypium

G. arboreum
G. barbadense
G. herbaceum

G. hirsutum
G. indicum
G. nanking
G. sturtianum
***Gossypium* spp.**

Malvaceae

Aphis gossypii
Aphis gossypii
Acyrtosiphon gossypii;
Aphis craccivora, *fabae*, *gossypii*, *middletonii*;
Brachyunguis harmalae (as *plotnikovi*);
Macrosiphum euphorbiae; *Myzus persicae*;
Rhopalosiphum rufiabdominale; *Smynthuroides betae*
Acyrtosiphon gossypii; *Aphis gossypii*
Aphis gossypii
Aphis gossypii
Aphis gossypii
Aphis craccivora, [*poacyni*], [*umbrella*];
Rectinasus buxtoni

Key to apterae on *Gossypium*:-

1. ANT PT/BASE less than 0.3. Body and appendages densely hairy. SIPH absent 2
 – ANT PT/BASE at least 0.5. Body and appendages not densely hairy. SIPH present 3
2. ANT V BASE and R IV+V both very long, respectively about 1.7 and 2.5× width of head between antennal bases. ANT II similar in length to ANT I, much shorter than III *Rectinasus buxtoni*
 – ANT V BASE and R IV+V of normal length, both about 0.5× width of head between antennal bases. ANT II about twice as long as ANT I, similar in length to III *Smynthuroides betae*
3. SIPH pale and attenuated distally, thinner than hind tibia at their respective midpoints, and 2.5–3.5× cauda *Acyrtosiphon gossypii*
 – SIPH pale or dark, thicker than hind tibia at their respective midpoints, and less than 2.5× cauda 4
4. ANT 5-segmented, bearing long, fine hairs, many of them more than 2× BD III. SIPH cylindrical for most of length but markedly constricted just proximal to flange *Rhopalosiphum rufiabdominale*
 – ANT usually 6-segmented, with shorter hairs. SIPH without a marked subapical constriction 5
5. ANT PT/BASE less than 1. SIPH pale, 0.4–0.6× cauda *Brachyunguis harmalae*
 – ANT PT/BASE 1.4–6.2. SIPH pale or dark, 0.8–2.5× cauda go to key to polyphagous aphids, p. 1020

Gourliea* see *Geoffroea

Graffenrieda

G. rufescens

Melastomataceae

Aphis spiraeicola

Grantia* see *Iphiaona

Graptopetalum

G. paraguayense

Crassulaceae

Aphis sedi

Gratiola

G. officinalis

Scrophulariaceae

Aphis [*chloris*], *gratiolae*, *nasturtii*; *Aulacorthum solani*;
Brachycaudus helichrysi; *Macrosiphum euphorbiae*

Key to apterae on *Gratiola*:-

1. SIPH dark, about 1.2× cauda, which bears 4–5 hairs. R IV+V c.0.75× HT II *Aphis gratiolae*
 – Without this combination of characters go to key to polyphagous aphids, p. 1020

Gravesia*Gravesia* sp.**Melastomataceae***Brachycaudus helichrysi***Greigia***Greigia* sp.**Bromeliaceae***Aphis* sp. – Leonard, 1972a: 101*Grevillea*, *Grewia* see Blackman and Eastop (1994)**Greyia***G. sutherlandii***Greyiaceae***Aulacorthum solani*; *Macrosiphum euphorbiae*;
Toxoptera odinae

Use key to polyphagous aphids, p. 1020.

Grindelia*G. chiloensis**G. cuneifolii**G. integrifolia**G. nana**G. perennis**G. squarrosa**G. stricta***Compositae***Aphis melosae*; *Myzus persicae**Brachycaudus helichrysi**Aulacorthum solani*;*Uroleucon erigeronense*, *penderum**Brachycudus helichrysi*; *Uroleucon chani**Uroleucon richardsi*[*Anoecia corni*]; *Atarsos grindeliae*;*Illinoia grindeliae*, *grindeliae* ssp. *palmerae*;*Uroleucon richardsi*, *Uroleucon* sp. (Colorado, BMNH colln)[*Illinoia grindeliae*];*Uroleucon* sp. (Oregon, BMNH colln)Key to apterae on *Grindelia*:-

1. Tarsi absent. ANT III–V with secondary rhinairia (sometimes III and IV are fused). ANT PT/BASE 1.0–1.4 *Atarsos grindeliae*
 – Two-segmented tarsi present. Secondary rhinaria absent or on ANT III only. ANT PT/BASE 1.4–6.5 **2**
2. ANT tubercles weakly developed or undeveloped. SIPH without subapical reticulation **3**
 – ANT tubercles well developed. SIPH with or without subapical reticulation **4**
3. Cauda helmet-shaped, shorter than its basal width in dorsal view, with 4–7 hairs. SIPH pale, smooth, conical, with an annular subapical incision. Spiracular apertures rounded. Dorsum without dark markings or reticulate sculpturing. No marginal tubercles (MTu) *Brachycaudus helichrysi*
 – Cauda tongue-shaped, longer than its basal width, with 6–12 hairs. SIPH dark, coarsely imbricated, with no annular subapical incision. Spiracular apertures reniform. Dorsum with variably developed dark markings and reticulate sculpturing. Large MTu present on prothorax and ABD TERG 1 and 7 *Aphis melosae*

HOST LISTS AND KEYS

4. SIPH without a distinct zone of reticulation, at most with subapical transverse striae and 1–2 rows of indistinct polygonal cells **5**
 – SIPH with a distinct distal zone of reticulation extending 0.2 or more of its length and with numerous polygonal cells **7**
5. Head spiculose, with inner faces of ANT tubercles approximately parallel. SIPH tapering or cylindrical on distal half. ANT III with 0–3 (usually 1) rhinaria *Aulacorthum solani*
 – Head smooth, with inner faces of ANT tubercles divergent. SIPH slightly swollen on distal half. ANT III with 2–5 rhinaria **6**
6. ANT PT/BASE 4.0–4.3. Cauda 1.5–1.8× R IV+V, which is 1.25–1.5× HT II *Illinoia grindeliae*
 – ANT PT/BASE 4.5–4.9. Cauda 1.9–2.4× R IV+V which is 1.1–1.2× HT II
Illinoia grindeliae ssp. *palmerae*
7. SIPH entirely dark *Uroleucon chani*
 – SIPH pale, at least on basal part **8**
8. ANT III with 12–31 rhinaria extending to 0.80–0.98 from base, with the majority on distal half *Uroleucon richardsi*
 – ANT III with 5–26 rhinaria extending to 0.4–0.8 from base, with the majority on basal half **9**
9. R IV+V 0.9–1.1× HT II, with 6–9 accessory hairs. SIPH 1.85–2.5× cauda *Uroleucon erigeronense*
 – R IV+V 1.15–1.5× HT II, with 7–13 accessory hairs. SIPH 1.5–2.6× cauda **10**
10. ANT PT/BASE 3.0–3.5. ANT PT 1.0–1.1× cauda. R IV+V with 7–9 accessory hairs
Uroleucon (Lambersius) sp. (on *G. stricta*, Oregon)
 – ANT PT/BASE 3.6–5.2. ANT PT 1.5–2.0× cauda. R IV+V with 9–13 accessory hairs **11**
11. SIPH 2.2–2.6× cauda. R IV+V 1.15–1.3× HT II. Tibiae dusky/dark for most of length
Uroleucon (Lambersius) sp. (on *G. squarrosa*, Colorado)
 – SIPH 1.65–1.95× cauda. R IV+V 1.3–1.6× HT II. Tibiae pale except at apices *Uroleucon penderum*

Grossularia see *Ribes*

Guazuma, *Guettarda* see Blackman and Eastop (1994)

Guiera

G. senegalensis

Aphis gossypii

Combretaceae

Guizotia

G. abyssinica

G. aethiopica

Compositae
Aphis craccivora; [*Melanaphis* sp.];
 [*Rhopalosiphum maidis*]; *Uroleucon compositae* (as *jaceae*)
Aphis gossypii, *spiraecola*

Use key to polyphagous aphids, p. 1020.

Gundelia

G. tournefortii

Compositae
Aphis gossypii; *Myzus persicae*; *Uroleucon iranicum*

Key to apterae on *Gundelia*:-

- SIPH dark with distal polygonal reticulation extending over 0.33–0.44 of length. ANT III bearing 27–51 rhinaria extending over most of length. Cauda pale, 2.5–2.9× ANT BASE VI and bearing 8–12 hairs
Uroleucon iranicum
- Without this combination of characters go to key to polyphagous aphids, p. 1020

Gutierrezia*G. bracteata* (= *californica*)*G. longifolia**G. sarothrae**Gutierrezia* spp.**Compositae***Uroleucon erigeronense**Aphis crypta*, *gutierrezis*; *Pleotrichophorus utensus*;*Uroleucon escalantii**Pleotrichophorus utensus**Pleotrichophorus pycnorhysus*; *Uroleucon zerogutierrezis*

Use key to apterae on *Chrysothamnus*.

Guttarda see *Matthiola***Guyonia***G. ciliata***Melastomataceae***Toxoptera aurantii***Gymnadenia***G. odoratissima***Orchidaceae***Aphis fabae***Gymnaster** see *Aster***Gymnema***G. tingens***Asclepiadaceae***Aulacorthum nipponicum***Gymnocarpium***G. dryopteris***Dryopteridaceae***Idiopterus nephrolepidis*; *Macrosiphum dryopteridis*;*Taiwanomyzus alpicola**G. robertianum**Macrosiphum dryopteridis*; *Taiwanomyzus alpicola*

Use key to fern-feeding aphids under *Polypodium*.

Gymnocarpus*G. decanderum***Illecebraceae***Aphis craccivora*; *Brachyunguis harmalae*;*Myzus persicae*

Key to apterae on *Gymnocarpus*:-

- ANT PT/BASE less than 1. SIPH pale, 0.4–0.6× cauda *Brachyunguis harmalae*
- ANT PT/BASE 2.0–5.3. SIPH pale or dark, longer than cauda go to key to polyphagous aphids, p. 1020

Gymnogramma*G. totta***Thelypteridaceae***Micromyzus nikkoensis*

(or use key to fern-feeding aphids under *Polypodium*)

HOST LISTS AND KEYS

Gynandropsis see *Cleome*

Gynerium

G. sagittatum

Hysteroneura setariae

Gramineae

(or try key to apterae of grass-feeding aphids under *Digitaria*)

Gynura

G. angulosa

Aphis gossypii, *spiraecola*; *Brachycaudus helichrysi*;
Hyperomyzus carduellinus; [*Brachysiphoniella montana*];
Myzus persicae

G. aurantiaca

Brachycaudus helichrysi; *Macrosiphum euphorbiae*;
Myzus ornatus

G. crepidioides

Aphis spiraecola; *Brachycaudus helichrysi*; [*Myzus pileae*]

G. guinensis

Aphis gossypii

G. nepalensis

Aphis gossypii, *spiraecola*; *Brachycaudus helichrysi*;
Hyperomyzus carduellinus; *Myzus ornatus*, *persicae*;
Neomyzus circumflexus; *Toxoptera aurantii*

G. sarmentosa

Aphis gossypii; *Uroleucon vernoniae*

G. scandens

Aphis fabae; *Aulacorthum solani*; *Myzus ornatus*

Gynura sp.

Uroleucon sonchi (ssp. *afghanicum*?)

Compositae

Key to apterae on *Gynura*:-

1. SIPH dark, with a distal zone of polygonal reticulation, 1.4–1.9× cauda, which is long, slender and pale and bears 23–30 hairs *Uroleucon sonchi*
– Without that combination of characters; if SIPH are dark and have polygonal reticulation then cauda is also dark **2**
2. SIPH dark with polygonal reticulation, cauda also dark, R IV+V 1.5–1.8× HT II, and ANT III with 23–57 rhinaria *Uroleucon vernoniae*
– Without that combination of characters **3**
3. SIPH smooth, pale, and swollen on distal 0.7, maximum width of swollen part being 1.3–1.5× minimum width of basal part. ANT III with 5–30 rhinaria. ANT PT/BASE 4.4–6.8 *Hyperomyzus carduellinus*
– Without that combination of characters go to key to polyphagous aphids, p. 1020

Gypsophila

G. dahurica

Aphis gypsophilae

G. fastigiata

Aphis craccivora

G. paniculata

Aphidura gypsophilae; [*Aphis* sp. (Leonard, 1973: 16)]

G. perfecta

Aulacorthum solani

G. porrecta

[*Aphis* sp. (Leonard, 1973: 16)]

G. repens

Myzus ornatus

G. struthium

[*Brachyunguis harmalae*]

Gypsophila sp.

Aphis gossypii; *Myzus persicae*

Caryophyllaceae

Key to apterae on *Gypsophila*:-

1. SIPH very short and dark, only 0.35–0.4× the long dark cauda *Aphis gypsophilae*
– SIPH pale or dark, as long as or longer than cauda **2**

2. ANT tubercles low, somewhat scabrous, and median frontal tubercle (on ventral side of head) developed to a similar extent and also scabrous. SIPH straight, tapering from base to flange. Cuticle of abdomen with a reticulate pattern dorsally and with closely-spaced transverse rows of fine spinules ventrally
Aphidura gypsophilae
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Habenaria

H. dilatata
H. monorrhiza
H. tridactylites

Orchidaceae
Aulacorthum solani
Aulacorthum solani; *Neomyzus circumflexus*
Aphis fabae

Use key to polyphagous aphids, p. 1020.

Hackelia

H. patens

Boraginaceae
Macrosiphum euphorbiae

Hacquetia

H. epipactis

Umbelliferae
Aphis fabae

Hagenia see Blackman and Eastop (1994)

Hakea

H. leucoptera

H. sericea
Hakea spp.

Proteaceae
Macrosiphum euphorbiae;
[*Amphorophora* sp.; Leonard, 1972a]
Aphis gossypii; *Sitobion africanum*
Toxoptera aurantii

Key to apterae on *Hakea*:-

- SIPH dark with subapical polygonal reticulation (a few rows of large polygonal cells). Dorsum with variably developed dark cross-bands (often absent). Hairs on dorsal body and antennae very short and blunt
Sitobion africanum
- Without this combination of characters go to key to polyphagous aphids, p. 1020

Halesia

H. carolina

Styracaceae
Macrosiphum euphorbiae; *Myzus ornatus*

Use key to polyphagous aphids, p. 1020.

Halimicistus (*Halimium* × *Cistus*)

H. sahuicii

Cistaceae
Myzus ornatus

Halimium

H. alyssoides
H. halimifolium
H. ocymoides (= *occimoides*)
H. umbellatum

Cistaceae
Aphis cisticola, *lichtensteini*
Aphis cisticola
Aphis cisticola
Aphis cisticola, *lichtensteini*

Use key to apterae on *Cistus*.

HOST LISTS AND KEYS

Halimodendron

H. argenteum
H. halodendron

Use key to apterae on *Echinopartium*.

Halleria

H. lucida

Halocharis

H. hispida

Halogeton

Halogeton sp.

Haloragis

H. alata

***Halothamnus* (incl. *Aellenia*)**

H. hierochunticus

Haloxyton

H. aphyllum

Hamelia

H. erecta see *patens*
H. patens
Hamelia spp.

Use key to polyphagous aphids, p. 1020.

Hamiltonia* see *Spermadictyon

Handelia

H. trichophylla

Haplopappus

H. acradenius
H. bloomeri see *Ericameria*
H. hirtus (var. *sonchifolius*)
Haplopappus sp.

Key to apterae on *Haplopappus* and *Ericameria*:-

1. Dorsal body hairs broadly fan-shaped. SIPH long and pale with dusky apices, swollen on distal third
Pleotrichophorus lagacei
- Dorsal body hairs with blunt or pointed apices. SIPH long or short, dark over at least distal half, not swollen distally

Leguminosae

Aphis craccivora
Acyrtosiphon pisum; *Aphis craccivora*

Scrophulariaceae

[*Aphis* sp.; Leonard, 1972a: 101]; *Myzus persicae*

Chenopodiaceae

Brachyunguis salsolacearum

Chenopodiaceae

Aphis craccivora/salsolae group (Pakistan, BMNH colln)

Haloragaceae

Myzus persicae

Chenopodiaceae

Brachyunguis harmalae

Chenopodiaceae

Brachyunguis saxaulica

Rubiaceae

Aphis spiraecola; *Toxoptera aurantii, odinae*
Aphis gossypii

Compositae

Dysaphis handeliae

Compositae

Uroleucon erigeronense

Uroleucon suzannae

Aphis melosae

2. SIPH wholly dark, without polygonal reticulation, less than 1.7× the dark cauda. Dorsum with variable but often extensive dark sclerotisation, marked with a pale reticulate pattern. Large marginal tubercles (MTu) present on prothorax and ABD TERG 1–7 *Aphis melosae*
- SIPH with pale bases, dark distally and with an extensive distal zone of polygonal reticulation; more than 1.8× the long pale/dusky cauda. Dorsum without dark markings. MTu absent **3**
3. R IV+V 0.14–0.16 mm long, with 6–9 accessory hairs. Cauda with 7–10 hairs *Uroleucon erigeronense*
- R IV+V 0.24–0.25 mm long, with 34–38 accessory hairs. Cauda with 12–26 hairs *Uroleucon suzannae*

Hardenbergia

H. monophylla
H. violacea

Leguminosae

Macrosiphum euphorbiae; *Myzus persicae*
Myzus ornatus

Use key to polyphagous aphids, p. 1020.

Harphephyllum see Blackman and Eastop (1994)

Harrisonia

H. abyssinica

Simarubaceae

Uroleucon compositae

Harungana see Blackman and Eastop (1994)

Hasteda

H. suaveolens

Compositae

Uroleucon sp. (*rudbeckiae*?)

Haumaniastrum

H. cylindraceum
H. galeopsifolium

Labiatae

Macrosiphum euphorbiae
Aphis gossypii

Use key to polyphagous aphids, p. 1020.

Hauya

H. matudai

Onagraceae

Aphis sp. (California, BMNH colln and Leonard, 1972a: 102)

Haworthia

H. reinhardtii
H. rugosa

Aloeaceae

Aphis craccivora
Aloephagus myersi

Key to apterae on *Haworthia*:-

- SIPH tubular, black. Cauda black, tongue-shaped. ANT PT/BASE 1.7–2.8 *Aphis craccivora*
- SIPH absent. Cauda not evident (broadly rounded). ANT PT/BASE 0.25–0.4 *Aloephagus myersi*

Hebe

H. andersonii
H. diosmifolia

Scrophulariaceae

Macrosiphum euphorbiae; *Myzus ornatus*, *persicae*
Myzus persicae

HOST LISTS AND KEYS

H. elliptica
H. hulkeana
H. perfoliata
H. salicifolia

H. speciosa
H. stricta
Hebe sp.

Brachycaudus helichrysi; *Macrosiphum euphorbiae*
Myzus persicae
Macrosiphum euphorbiae; *Myzus persicae*
Aphis gossypii; *Brachycaudus helichrysi*;
Macrosiphum euphorbiae
Aphis gossypii; *Myzus ornatus*, *persicae*
Macrosiphum euphorbiae
Rhopalosiphoninus staphyleae

Use key to polyphagous aphids, p. 1020.

Hedera

H. helix (incl. *canariensis*)

H. japonica
H. rhombea
Hedera sp.

Araliaceae

Aphis fabae, *gossypii*, *hederae*, [*ilicis*]; *Aulacorthum solani*;
 [Cavariella *aegopodii*]; [*Dysaphis angelicae*];
Macrosiphum euphorbiae;
Myzus ascalonicus, *ornatus*, *persicae*;
Neomyzus circumflexus; [*Pemphigus populi* (as *P. hederae*)];
Rhopalosiphoninus staphyleae
Aphis hederiphaga
Aphis hederiphaga
Aphis nasturtii

Key to apterae on *Hedera*:-

1. SIPH and cauda both dark, the latter bearing 9–25 hairs. Marginal tubercles (MTu) present on ABD TERG 1 and 7, and frequently on other segments 2
 - Without this combination of characters go to key to polyphagous aphids, p. 1020
2. R IV+V 0.9–1.3× HT II. MTu infrequent on ABD TERG 2–4 *Aphis fabae*
 - R IV+V 1.35–1.7× HT II. MTu frequently present on ABD TERG 2–4 3
3. Hairs on ANT III numerous (25 or more), the longest of them 1.7–2.2× BD III. ANT III without rhinaria *Aphis hederiphaga*
 - Hairs on ANT III sparse (15 or less), the longest of them 0.6–1.7× BD III. Apt. often alatiform with 0–19 small rhinaria on ANT III *Aphis hederae*

Hedychium

H. coccineum
H. coronarium
Hedychium sp.

Zingiberaceae

Pseudoregma nicolaiae
Aphis gossypii; *Astegopteryx styracophila*;
Pentalonia kalimpongensis, *nigronevosa*
Brachycaudus helichrysi; *Myzus persicae*

Key to apterae on *Hedychium* (including also *Pseudoregma sundanica*, so that the key can be applied to aphids found on several other genera of Zingiberaceae; *Alpinia*, *Amomum*, *Costus*, *Elettaria*, *Etlingera*, *Zingiber*):-

1. Head fused with pronotum, and bearing a pair of forwardly directed horns between the antennal bases. Eyes of 3 facets. SIPH poriform, or on low cones 2
 - Head not fused to pronotum, and without horns. Eyes multifaceted. SIPH tubular 4
2. Tips of horns pointed. Dorsal cuticle pale. SIPH with pore raised on a shallow cone bearing 2–11 hairs. Wax gland plates if present only marginal, and arranged in rows *Astegopteryx styracophila*

- Tips of horns rounded. Tergites mainly brown, sclerotic, the cuticle being ornamented with numerous pustules. SIPH as simple pores. Wax gland plate if present then in groups, and often spinal as well as marginal 3
- 3. Dorsal hairs on head are 69–78 µm long, and those on ABD TERG 8 are 80–92 µm long. Wax glands always well-developed; e.g., marginal wax glands on ABD TERG 2 in groups of 7–12, and spinal wax glands on prothorax in groups of 7–17 *Pseudoregma nicolai*
- Dorsal hairs on head are 28–45 µm long, and those on ABD TERG 8 are 37–59 µm long. Wax glands less well developed, sometimes absent; e.g., marginal wax glands on ABD TERG 2 in groups of 0–6, and spinal wax glands on pronotum in groups of 0–5 *Pseudoregma sundanica*
- 4. SIPH pale on basal half and dark on distal half, and usually slightly swollen subapically. SIPH and femora covered with irregular, transverse rows of spicules. (Al. with dark-bordered wing veins) 5
- SIPH either mainly pale or mainly dark; tapering, cylindrical, or clavate. SIPH and femora smooth or imbricated, not markedly spiculate. (Al. with normal wing venation, veins not dark-bordered) go to key to polyphagous aphids, p. 1020
- 6. ANT PT/BASE 3–4. (Al. with radius of forewing strongly curved but not touching media) *Pentalonia kalimpongensis*
- ANT PT/BASE 5–8. (Al. with radius of forewing fused to media for part of length to form a closed cell below the pterostigma) *Pentalonia nigronervosa*

Hedyotis

H. corymbosus
H. scandens

Rubiaceae

Myzus persicae
Aphis gossypii; *Toxoptera aurantii*;
[*Trichosiphonaphis polygonifoliae*]

Use key to polyphagous aphids, p. 1020.

Hedypnois

H. rhagidioloides

Compositae

Aphis carthami(?)

Hedysarum

H. austrosibiricum
H. canum see *Desmodium canum*
H. mackenzii
H. onobrychis

Leguminosae

Aphis hedysari
Acyrtosiphon churchillense (?)
Acyrtosiphon pisum;
Aphis craccivora (? – as *onobrychidis*)

Key to apterae on *Hedysarum*:–

- 1. Spindle-shaped aphid. Dorsal body unsclerotised, SIPH and cauda pale 2
- Oval aphid, dorsal body extensively sclerotised, with a pale reticulate pattern. SIPH and cauda black 3
- 2. SIPH very attenuate distally, thinner than hind tibiae at their respective midlengths. Cauda very thick. ANT BASE VI 1.8–3.0× R IV+V *Acyrtosiphon pisum*
- SIPH gradually tapering, not attenuate distally, thicker than hind tibia at their respective midlengths. ANT BASE VI 1.3–1.8× R IV+V *Acyrtosiphon churchillense*
- 3. Longest hairs on ANT III 1.0–1.5× BD III. Cauda with 20–26 hairs *Aphis hedysari*
- Longest hairs on ANT III 0.4–0.8× BD III. Cauda with 4–9 hairs *Aphis craccivora*

HOST LISTS AND KEYS

Heinsia

H. crinita

Rubiaceae

Toxoptera odinae

Helenium

H. autumnale

H. hoopesii

H. tenuifolium

Compositae

Aphis gossypii, *vernoniae*; *Uroleucon tardae*

Macrosiphum euphorbiae, *kiowanepum*; *Uroleucon martini*

Aphis middletonii (as *maidiradicis*)

Key to apterae on *Helenium*:—

1. SIPH with a subapical zone of polygonal reticulation. ANT tubercles well developed 2
 – SIPH without polygonal reticulation. ANT tubercles poorly developed or undeveloped 5
2. ANT, tibiae and SIPH pale or only dark distally *Macrosiphum euphorbiae*
 – ANT, tibiae and SIPH wholly or mainly black 3
3. ANT III with 3–8 rhinaria. SIPH reticulated on distal 0.12–0.17 of length *Macrosiphum kiowanepum*
 – ANT III with 11–c. 30 rhinaria. SIPH reticulated on distal 0.27–0.37 of length 4
4. SIPH 0.42–0.60 mm long. ANT III with 11–20 rhinaria (usually less than 15). ANT PT/BASE 3.3–4.7 *Uroleucon tardae*
 – SIPH 0.81–1.33 mm long. ANT III with c. 30 rhinaria. ANT PT/BASE 5.3–6.9 *Uroleucon martini**
5. SIPH and cauda both short and black, the latter only about as long as its basal width, and bearing 10–17 hairs. ANT III often with secondary rhinaria *Aphis middletonii*
 – SIPH pale or dark, cauda pale or if dusky, then paler than SIPH and bearing 4–9 hairs. ANT III without secondary rhinaria 6
6. ANT PT/BASE 2.1–3.2. SIPH dark, tapering from broad base to flange *Aphis gossypii*
 – ANT PT/BASE 1.5–1.9. SIPH pale, constricted at base and cylindrical on distal half *Aphis vernoniae*

Heleocharis see *Eleocharis*

Helianthemum

H. alpestre

H. canum

H. chamaecistus see *nummularium*

H. cinereum

H. hirsutum (incl. *grandiflorum*)

H. hirtum

H. nummularium (incl. *chamaecistus*)

H. obovatum

H. obscurum

H. ovatum (= *vulgare*)

H. stevenii

Helianthemum sp.

Cistaceae

Aphis helianthemii; *Brachycaudus helichrysi*

Aphis helianthemii, *helianthemii* ssp. *thermophila*;

Macrosiphum euphorbiae

[*Aphis cisticola*]

Aphis helianthemii; *Myzus ascalonicus*

[*Aphis cisticola*]

Aphis cliftonensis, *helianthemii*, *helianthemii* ssp. *thermophila*, *nasturtii*; *Myzus ornatus*

Aphis helianthemii

Aphis helianthemii ssp. *obscura*

Aphis helianthemii; *Aulacorthum solani*; *Myzus ascalonicus*

Aphis helianthemii

[*Aphis terricola*]

Key to apterae on *Helianthemum*:-

1. ANT tubercles undeveloped or weakly developed. ABD TERG 1 and 7 with marginal tubercles (MTu). SIPH imbricated, cauda finger-like. Spiracles reniform 2
 - **Either** ANT tubercles are well-developed **or** other characters do not apply
go to key to polyphagous aphids, p. 1020
2. ABD TERG 2-5 as well as 1 and 7 all with flattish, subconical MTu. Longest hairs on ANT III only 4-5 µm, and posterior hair on hind trochanter less than 10 µm *Aphis cliftonensis*
 - ABD TERG 2-5 mostly without MTu. Longest hairs on ANT III 7-13 µm, and posterior hair on hind trochanter 30-50 µm 3
3. R IV+V with blunt apex, 1.0-1.2× HT II. Cauda pale, SIPH usually pale with dark apices *Aphis nasturtii*
 - R IV+V tapering to a rather acute apex, 1.2-1.6× HT II. Cauda dusky/dark, SIPH dark or dusky with darker apices *Aphis helianthemii* group

Helianthus

H. agrophyllus

H. annuus

H. atrorubens

H. debilis

H. divaricatus

H. giganteus

H. grosseserratus

H. heterophylla

H. longifolius

H. maximiliani

H. microcephalus

H. neglectus

H. nuttallii

H. occidentalis

H. paradoxus

H. petiolaris

Compositae

Aphis gossypii

Aphis craccivora, debilicornis, fabae, gossypii, [kurosawai] helianthi, middletonii, nasturtii, nerii, spiraecola;

Aulacorthum solani; [Bipersona ochrocentri];

Brachycaudus cardui, helichrysi;

[Eriosoma antennieurfum]; [Hyadaphis coriandri];

Illinoia masoni; Macrosiphum euphorbiae, helianthi;

Myzus ornatus, persicae, [siegesbeckicola];

Pemphigus sp. (Ivanoskaya, 1977, as *lichtensteini*);

Prociphilus erigeronensis; [Rhopalosiphum padi];

[Sitobion miscanthi]; Trama penecaeca, rara, troglodytes;

Uroleucon ambrosiae, budhium, compositae, illini

[rudbeckiae], [tanaceti] Uroleucon sp. (California,

BMNH colln)

Uroleucon helianthicola, parvotuberculatus

Aphis fabae, helianthi; Myzus persicae

Aphis helianthi; Uroleucon helianthicola

Aphis fabae, helianthi; Aulacorthum solani;

Prociphilus erigeronensis; Uroleucon helianthicola

Aphis debilicornis, helianthi;

[Uroleucon sp. (Rogers *et al.*, 1978)]

Uroleucon helianthicola

Uroleucon helianthicola

Uroleucon maximilianicola [Uroleucon sp. (Rogers *et al.*, 1978)]

Uroleucon helianthicola, pseudambrosiae

Aphis helianthi

Aphis debilicornis; Illinoia masoni

Uroleucon helianthicola

Illinoia masoni

Aphis helianthi; Macrosiphum euphorbiae;

Uroleucon ambrosiae, [Uroleucon sp. (Rogers *et al.*, 1978)]

HOST LISTS AND KEYS

H. pumilus
H. rigidus
H. silphioides
H. strumosus
H. tuberosus

Helianthus spp.

Aphis middletonii
Aphis helianthi
Uroleucon helianthicola
Aphis helianthi; *Uroleucon helianthicola*, *obscuricaudatum*
Aphis debilicornis, *fabae*, *helianthi*, *middletonii*, *solanella*;
 [Dysaphis radicola]; *Macrosiphum euphorbiae*;
Myzus persicae;
Trama [*helianthemii* (Westwood, 1944)], *troglydotes*
penecaeca;
Uroleucon compositae, *gobonis*, *helianthicola*, *illini*
pseudotanaceti, [*nigrotuberculatum*]
 [Kurisakia indica]; *Pleotrichophorus ohioensis*;
Uroleucon illini, [*rurale*]

Key to apterae on *Helianthus*:-

[Simplified keys to the aphids on *H. annuus* and *H. tuberosus* can be found in Blackman and Eastop (2000).]

1. ANT PT/BASE less than 0.5. SIPH absent or present only as pores on flat pigmented cones 2
 – ANT PT/BASE more than 0.8. SIPH present, tubular 6
2. HT II greatly elongated, more than 0.5× length of hind tibia. Body and appendages densely covered with fine hairs 3
 – HT II of normal length. Body and appendages not densely covered with fine hairs 5
3. SIPH present as small flat pigmented cones *Trama penecaeca*
 – SIPH completely absent 4
4. HT II 0.84–0.92× length of hind tibia. Eyes with many facets *Trama rara*
 – HT II 0.60–0.73× length of hind tibia. Eyes with only 3 facets *Trama troglodytes*
5. R IV+V 0.08–0.12 mm long, a little shorter than last ANT segment (incl. PT), and without any accessory hairs. Hairs at apices of tibiae and first tarsal segments short and thick *Pemphigus* sp(p).
 – R IV+V 0.13–0.175 mm long, as long as or longer than last ANT segment and bearing 4–8 accessory hairs. Hairs at apices of hind tibiae and first tarsal segments long and fine *Prociphilus erigeronensis*
6. ANT tubercles weakly developed or undeveloped. SIPH without polygonal reticulation. Head not spiculose 7
 – ANT tubercles well developed. SIPH with or without polygonal reticulation (if without then cuticle of head is spiculose) 10
7. Cauda helmet-shaped, shorter than its basal width, with 5–8 hairs. ABD TERG 1 and 7 without marginal tubercles (MTu) 8
 – Cauda triangular, tongue- or finger-shaped, longer than its basal width or, if about equal in length to basal width, then with more than 10 hairs. ABD TERG 1 and 7 with MTu 9
8. Dorsum with an extensive black shield. SIPH dark, imbricated, 1.7–3.4× cauda. ANT III 0.31–0.47 mm, 2.4–3.4× HT II *Brachycaudus cardui*
 – Dorsum without dark markings. SIPH pale, smooth-surfaced, 0.8–1.5× cauda. ANT III 0.07–0.25 mm, 0.9–2.2× HT II *Brachycaudus helichrysi*
9. SIPH very short, only 0.5–0.75× cauda. ANT PT/BASE 1.0–1.4. Longest hairs on ANT III more than 1.5× BD III *Aphis debilicornis*

- SIPH at least 0.8× cauda. ANT PT/BASE more than 1.4. Longest hairs on ANT III often less than 1.5× BD III
go to key to polyphagous aphids, p. 1020, starting at couplet 24
- 10.** Dorsal hairs with fan-shaped apices *Pleotrichophorus ohioensis** **11**
- Dorsal hairs blunt or pointed **11**
- 11.** SIPH with subapical polygonal reticulation (at least 3–4 rows of closed cells). Inner faces of ANT tubercles, divergent, not spiculose or scabrous **12**
- SIPH without subapical polygonal reticulation. Inner faces of antennal tubercles parallel or apically convergent, and spiculose or scabrous go to key to polyphagous aphids, p. 1020, starting at couplet 5
- 12.** SIPH slightly swollen on distal half, with subapical reticulated region extending less than 0.1 of length. Longest hairs on ANT III less than 0.3× BD III *Illinoia masoni*
- SIPH cylindrical or tapering, with reticulated region extending more than 0.1 of length. Longest hairs on ANT III more than 0.5× BD III **13**
- 13.** SIPH reticulated over about distal 0.2 of length (or less). Cauda pale with 8–18 hairs **14**
- SIPH usually reticulated over more than 0.2 of length but, if less, then cauda is dark and has 20 or more hairs **16**
- 14.** SIPH pale, sometimes darker towards apices. ANT III with 1–10 rhinaria restricted to basal part *Macrosiphum euphorbiae*
- SIPH dark. ANT III with more than 20 rhinaria extending over more than half of segment **15**
- 15.** R IV+V short, similar in length to HT II. ANT III with 20–30 small rhinaria scattered over entire length. First tarsal segments with 3 hairs *Macrosiphum helianthi**
- R IV+V elongate, 1.8–2.3× HT II. ANT III with 32–67 rather large rhinaria concentrated on basal 0.7. First tarsal segments with 5 hairs *Uroleucon budhium*
- 16.** Coxae dark *Uroleucon compositae* (or *gobonis*)
- Coxae pale **17**
- 17.** Crescent-shaped antesiphuncular sclerites present. Cauda dark **18**
- Antesiphuncular sclerites absent or fragmented. Cauda pale, dusky or dark **19**
- 18.** SIPH with reticulation extending over distal 0.2–0.25 of length. Cauda with more than 20 hairs. ANT III with 19–35 rhinaria, dark except at base *Uroleucon helianthicola*
- SIPH with reticulation extending over more than 0.3 of length. Cauda with 7–13 hairs. ANT III with 8–18 rhinaria, dark only on rhinariated part *Uroleucon illini*
- 19.** Cauda pale. ANT III with 10–46 rhinaria **20**
- Cauda dusky or dark, or darker towards apex. ANT III with 5–18 rhinaria **22**
- 20.** SIPH 2.4–3.0× cauda, which bears only 5–10 hairs *Uroleucon pseudotanacetii*
- SIPH 1.1–1.8× cauda, which bears 13–32 hairs **21**
- 21.** HT II rather long and thin, about 6× its maximum thickness, and 0.9–1.1× R IV+V *Uroleucon pseudambrosiae*
- HT II shorter, less than 5× its maximum thickness and 0.7–0.95× R IV+V *Uroleucon ambrosiae* or *U. maximilianicola*
- 22.** Cauda dusky, with 13–19 hairs. SIPH reticulated over distal 0.27–0.32 of length *Uroleucon* sp. (California, BMNH colln)
- Cauda dusky or dark, with 22–32 hairs. SIPH reticulated over distal 0.29–0.40 of length **23**

HOST LISTS AND KEYS

23. Cauda dark, almost as dark as SIPH. R IV+V 1.0–1.2× ANT BASE VI. Small, pale marginal tubercles (MTu) sporadically present on ABD TERG 2–4 *Uroleucon parvotuberculatus*
 – Cauda dusky, much paler than SIPH. R IV+V 0.75–0.95× ANT BASE VI. MTu absent *Uroleucon obscuricaudatus*

Helichrysum

H. angustifolium
H. arenarium

H. argyrosphaerum
H. armenium
H. aureum
H. bellidioides
H. bracteatum
 (incl. *H. chrysanthemum*)

H. crispum
H. cymosum
H. diosmaefolium
H. graveolens
H. italicum (incl. ssp. *picardi*)

H. maracandicum
H. mechowianum

H. melaleucum
H. microphyllum
H. odoratissimum

H. punctatum
H. serotinum
H. setosum

H. stoechas

H. suaveolens
H. virgineum
Helichrysum spp.

Compositae

[*Macrosiphoniella* sp. (as *absinthii*)]
 [*Aphis* (*Protaphis*) sp. (Kadyrbekov, 2003c)];
Aulacorthum solani; *Brachycaudus helichrysi*;
 [*Brachyunguis* sp. (Kadyrbekov, 2003c)];
Macrosiphoniella helichrysi, *hillerislammersi*, *janckei medvedevi*;
Myzus ascalonicus; *Pleotrichophorus helichrysi*;
 [*Staticobium gmelini*]; [*Thripsaphis caespitosae*]
 [*Xerobion* sp. (Kadyrbekov, 2001c)]
Macrosiphum euphorbiae; *Uroleucon compositae*
Xerobion alba
Uroleucon compositae
Aulacorthum solani; *Myzus cymbalariae*, *ornatus*
Aphis fabae, *gossypii*, *nasturtii*, *spiraecola*;
Aulacorthum solani; *Brachycaudus helichrysi*;
Myzus ornatus, *persicae*; *Ovatus inulae*
Macrosiphoniella helichrysi
Aphis gossypii, *spiraecola*; *Myzus ornatus*
Myzus persicae
Macrosiphoniella helichrysi
Brachycaudus helichrysi;
Macrosiphoniella aetnensis, *helichrysi*
Macrosiphoniella nikolajevi
Aphis gossypii, *spiraecola*; *Aulacorthum solani*;
Brachycaudus helichrysi; *Myzus ornatus*;
Sitobion autriquei; *Uroleucon compositae*
Macrosiphoniella madeirensis
Myzus persicae
Aphis fabae, *spiraecola*; *Macrosiphoniella helichrysi*;
Micromyzella eliei; *Uroleucon compositae*
 [*Macrosiphum multipilosum*]
Macrosiphoniella helichrysi
Aphis gossypii, *spiraecola*; *Aulacorthum solani*;
Brachycaudus helichrysi; *Macrosiphum euphorbiae*;
Myzus ornatus; *Sitobion autriquei*, *hirsutirostris*;
Uroleucon compositae
Aphis pseudocardui; *Brachycaudus helichrysi*;
Macrosiphoniella helichrysi; *Rectinasus buxtoni*
Macrosiphoniella paradoxa
Uroleucon russellae
Uroleucon cichorii

Key to apterae on *Helichrysum*:-

1. ANT 5-segmented, with ANT V BASE very long, more than 15× longer than the short peg-like PT (Figure 31a). R IV+V extremely long, similar in length to hind femur (Figure 31b)
 - Rectinasus buxtoni*
 - ANT 5- or 6-segmented, base of last segment and R IV+V relatively much shorter 2
2. ANT PT/BASE 0.7–1.2. SIPH very short, less than 0.07× BL, clearly shorter than the short triangular or tongue-shaped cauda 3
 - ANT PT/BASE more than 1.5. SIPH at least 0.07× BL and as long as or longer than cauda 4
3. SIPH tubular, longer than their basal width (Figure 31c). R IV+V 1.2–1.55× HT II
 - Aphis pseudocardui*
 - SIPH conical, very broad-based, much shorter than their basal width (Figure 31d). R IV+V 1.7–1.8× HT II
 - Xerobion alba*

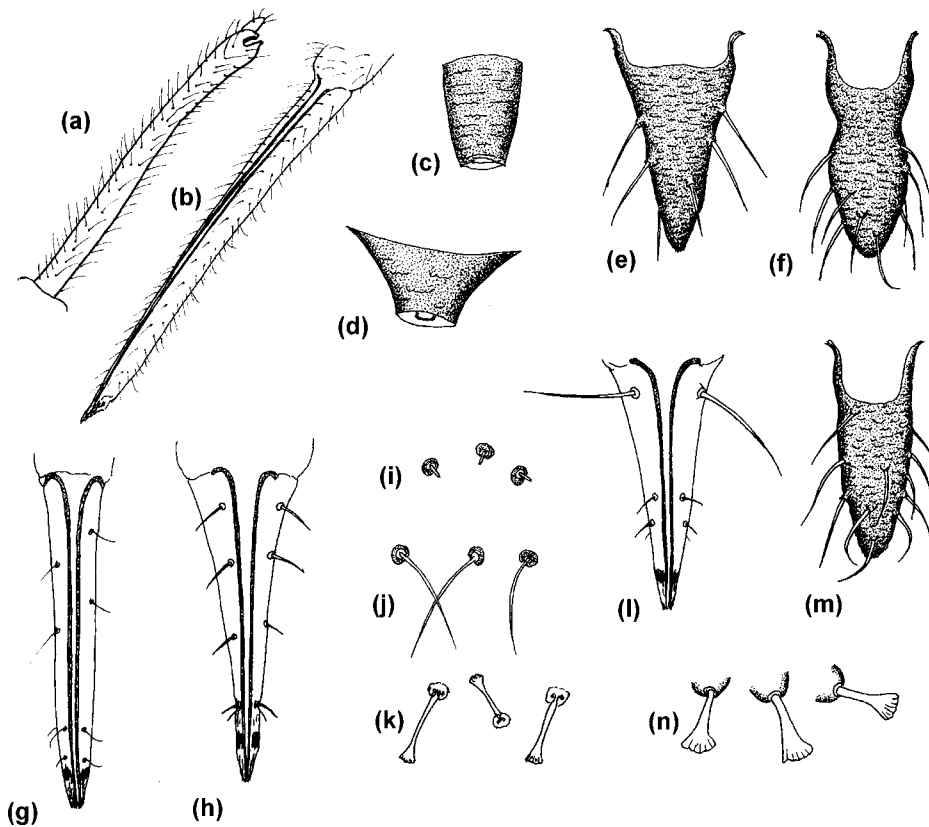


Figure 31 Apterae on *Helichrysum*. (a) ANT V of *Rectinasus buxtoni*, (b) R IV+V of *R. buxtoni*, (c) SIPH of *Aphis pseudocardui*, (d) SIPH of *Xerobion alba*, (e) cauda of *Macrosiphoniella medvedevi*, (f) cauda of *M. helichrysi*, (g) R IV+V of *M. jankei*, (h) R IV+V of *M. helichrysi*, (i) hairs on ABD TERG 3 of *M. hil-lerislambersi*, (j) same for *M. medvedevi*, (k) same for *M. jankei*, (l) R IV+V of *Pletrichophorus helichrysi*, (m) cauda of *Macrosiphoniella aetnensis*, (n) hairs on ABD TERG 3 of *P. helichrysi*.

HOST LISTS AND KEYS

4. SIPH with a distal zone of polygonal reticulation (at least 3–4 rows of closed cells) **5**
 – SIPH without distal polygonal reticulation **18**
5. SIPH reticulated over distal 0.21–0.65 of length **6**
 – SIPH reticulated over distal 0.1–0.2 of length **16**
6. First tarsal segments with 3 hairs. SIPH reticulated over distal 0.33–0.65 of length **7**
 – First tarsal segments with 5 hairs. SIPH reticulated over distal 0.21–0.30 of length **14**
7. ANT III with 45–76 rhinaria. Cauda with c.15–20 hairs *Macrosiphoniella nikolajevi**
 – ANT III with 3–46 rhinaria. Cauda with 4–14 hairs **8**
8. Cauda triangular, tapering from its base to its nearly acute apex, and bearing 4–8 hairs (e.g. Figure 31e) **9**
 – Cauda finger-like, blunt at apex, with 9–23 hairs (e.g., Figure 31f) **12**
9. Dorsal body hairs very short, only about 0.1–0.25× BD III (Figure 31i) *Macrosiphoniella hillerislambersi*
 – Dorsal body hairs more than 0.7× BD III **10**
10. All dorsal body hairs long and fine-pointed (Figure 31j). R IV+V 1.9–2.1× HT II *Macrosiphoniella medvedevi*
 – Some or all dorsal body hairs with fan-shaped or furcate apices (Figure 31k). R IV+V 1.39–1.85× HT II **11**
11. R IV+V 1.39–1.63× HT II. ANT III with 23–26 rhinaria *Macrosiphoniella paradoxa*
 – R IV+V (Figure 31g) 1.66–1.85× HT II. ANT III with 9–22 rhinaria *Macrosiphoniella janckei*
12. R IV+V 1.05–1.16× HT II. SIPH reticulated on distal 0.45–0.50, and 1.23–1.40× cauda. Scleroites at bases of dorsal abdominal hairs and antesiphuncular sclerites weakly pigmented. Cauda only weakly constricted, tapering on distal half (Figure 31m) *Macrosiphoniella aetnensis*
 – R IV+V 1.20–1.75× HT II. SIPH reticulated on distal 0.50–0.65, and 0.94–1.46× cauda. Large dark scleroites present at bases of all dorsal abdominal hairs, often fused into broad bars on anterior tergites. Cauda with a very marked constriction and somewhat swollen distal half (Figure 31f) **13**
13. SIPH 1.04–1.46× cauda. R IV+V (Figure 31h) 1.20–1.56× HT II. ANT IV 0.97–1.29× ANT V ((Al. with 32–68 rhinaria on ANT III and ANT PT/BASE 3.0–4.0) *Macrosiphoniella helichrysi*
 – SIPH 0.94–1.15× cauda. R IV+V 1.43–1.75× HT II. ANT IV 1.22–1.45× ANT V ((Al. with 60–82 rhinaria on ANT III and ANT PT/BASE 3.8–4.7) *Macrosiphoniella madeirensis**
14. R IV+V 1.8–2.3× HT II. Coxae pale *Uroleucon russellae*
 – R IV+V 1.1–1.6× HT II. Coxae dark **15**
15. SIPH 1.2–1.6× cauda, which is pale. Antesiphuncular sclerites present *Uroleucon cichorii*
 – SIPH 1.8–2.1× cauda, which is dark. Antesiphuncular sclerites absent *Uroleucon compositae*
16. SIPH pale, or only dusky towards apices, 1.7–2.2× cauda. R IV+V 0.8–1.0× HT II *Macrosiphum euphorbiae*
 – SIPH dark, 1.5–1.8× cauda. R IV+V 1.0–1.3× HT II **17**
17. Dorsum with extensive dark sclerotisation, continuous over ABD TERG 1–6. R IV+V with 5–7 accessory hairs. ANT III with 1–7 small rhinaria *Sitobion autriquei*
 – Dorsum without dark sclerotisation. R IV+V with 11–12 accessory hairs. ANT III with 5–29 rhinaria *Sitobion hirsutirostris*

18. R IV+V with a pair of very long accessory hairs near base, at least 4–5× longer than primary hairs (Figure 311). Dorsal hairs very numerous, with fan-shaped apices (Figure 31n)
Pleotrichophorus helichrysi
 – R IV+V with accessory hairs of normal length. Dorsal hairs with blunt or pointed apices **19**
19. ANT III (apt.) with 13–22 secondary rhinaria, IV with 13–22 and V with 3–11. Dorsum with a solid black shield. SIPH long, black and clavate, contrasting with pale cauda *Micromyzella eliei*
 – ANT III with 0–4 secondary rhinaria, IV and V with none. Other characters also do not apply **20**
20. R IV+V 2.3–3.0× HT II, and bearing 17–26 accessory hairs. Head smooth, except for a well-developed rather scabrous median frontal tubercle, and divergent ANT tubercles, each bearing a rounded, scabrous process *Ovatus inulae*
 – R IV+V less than 1.6× HT II, and bearing less than 15 accessory hairs. Head either smooth with ANT tubercles undeveloped or weakly developed, or spiculose with ANT tubercles well developed
 go to key to polyphagous aphids, p. 1020

Helicia*H. antennata***Proteaceae***Toxoptera aurantii***Heliconia**

One aphid species, *Pentalonia nigronervosa*, has been recorded from the following *Heliconia* spp.; *aurantiaca*, *bahai*, *caribaea*, *latispatha*, *metallica*, *stricta*

Heliconiaceae**Helicteres***H. isora**Helicteres* sp.**Sterculiaceae***Aphis gossypii*; *Toxoptera aurantii*[*Hyalomyzus raoi*]

Use key to polyphagous aphids, p. 1020.

Helictotrichon (incl. Avenastrum)*H. schellianum**Helictotrichon* sp.**Gramineae***Tetraneura nigriabdominalis* ssp. *shanxiensis**Sitobion avenae*

(or use key to apterae of grass-feeding aphids under *Digitaria*)

Heliocereus see Disocactus**Heliophila***Heliophila* sp.**Cruciferae***Brevicoryne brassicae***Heliopsis***H. helianthoides**H. laevis**Heliopsis* sp.**Compositae***Uroleucon* [*leonardi*], *obscuricaudatus**Aphis fabae**Aphis nerii*

Key to apterae on *Heliopsis*:-

- SIPH black with distal polygonal reticulation extending 0.33–0.40 of length. Cauda dusky with 22–32 hairs. ANT and tibiae wholly dark, ANT III bearing 5–14 rhinaria *Uroleucon obscuricaudatus*
 – Without this combination of characters go to key to polyphagous aphids, p. 1020

HOST LISTS AND KEYS

Heliotropium

H. angiospermum

H. arborescens

H. europaeum

H. indicum

H. laevis

H. peruvianum

H. procumbens

Heliotropium sp.

Boraginaceae

Aphis gossypii

Aphis gossypii; *Macrosiphum euphorbiae*;

Myzus persicae; *Neomyzus circumflexus*

Aphis craccivora, *gossypii*; *Aulacorthum solani*;

Neomyzus circumflexus; *Smynthurodes betae*

Aphis craccivora, *gossypii*, *spiraecola*;

Brachycaudus helichrysi

Neomyzus circumflexus

Myzus persicae; *Neomyzus circumflexus*

Macrosiphum euphorbiae

Brachycaudus cardui, *helichrysi*; *Myzus ornatus*

Key to apterae on *Heliotropium*:–

- Dorsum with an extensive solid black shield. Cauda helmet-shaped, shorter than its basal width. R IV + V 1.5–2.0× HT II *Brachycaudus cardui*
- Dorsum pale, or with a U-shaped patch, or if with an extensive solid black shield then cauda is tongue-shaped, much longer than its basal width, and R IV + V is 0.9–1.2× HT II
go to key to polyphagous aphids, p. 1020

Helipterum

H. roseum

H. strictum

Helipterum sp.

Compositae

Aphis fabae; *Brachycaudus helichrysi*;

Pemphigus mordvilkoii

Aphis fabae

Myzus antirrhinii

Use key to polyphagous aphids, p. 1020, but note that specimens running to *Myzus persicae* may be *M. antirrhinii*.

Helleborus

H. foetidus

H. kochii

H. lividus (incl. *corsicus*)

H. niger

H. odoratus

H. orientalis

H. purpurascens

H. viridis

Helleborus sp.

Ranunculaceae

Macrosiphum [*euphorbiae*], *hellebori*

Macrosiphum hellebori

Macrosiphum hellebori; *Rhopalosiphoninus staphyleae*

Macrosiphum hellebori; *Myzus persicae*;

Rhopalosiphoninus staphyleae

Macrosiphum hellebori

Rhopalosiphoninus staphyleae

Macrosiphum hellebori

Macrosiphum hellebori

[*Aphis* sp. (Leonard, 1974)]

Key to apterae on *Helleborus*:–

- SIPH 1.9–2.6× cauda, with subapical polygonal reticulation. Apices of femora and reticulated section of SIPH are dark. ANT PT/BASE 4.6–7.9 *Macrosiphum hellebori*
- SIPH without subapical polygonal reticulation and/or other characters do not all apply
go to key to polyphagous aphids, p. 1020

Helminthia see *Picris***Hemerocallis***H. alba**H. aurantiaca**H. citrina**H. dumortieri**H. flava**H. fulva**H. lilioasphodelus**H. middendorffii**Hemerocallis* sp.**Hemerocallidaceae**[*Aphis sambuci*]*Indomegoura indica*; *Myzus hemerocallis*[*Aphis* sp. (China, as *elongata*; Zhang, 1999)];*Indomegoura indica*; *Myzus hemerocallis**Indomegoura indica**Myzus hemerocallis*; *Rhopalosiphoninus staphyleae**Indomegoura indica*; *Myzus hemerocallis*;*Rhopalosiphoninus staphyleae**Indomegoura indica*; *Myzus hemerocallis**Indomegoura indica**Myzus persicae*Key to apterae on *Hemerocallis*:-(See Blackman and Eastop, 2000, Figure 40, for illustrations of SIPH of *Hemerocallis*-feeding aphids.)

1. SIPH 2.3–2.8× cauda and markedly swollen on distal 0.7, with maximum diameter of swollen part 1.5–2.0× minimum diameter of basal narrow part. Dorsal abdomen with dark spinal paired patches or interrupted cross bands on all tergites *Rhopalosiphoninus staphyleae*
- SIPH 1.6–2.5× cauda, not or only moderately swollen distally. Dorsal abdomen without dark markings **2**
2. Head, ANT, legs and SIPH all dark. SIPH thick, swollen or cylindrical over most of length, narrowing distally, with subapical polygonal reticulation *Indomegoura indica*
- Head, ANT, legs and SIPH mainly pale. SIPH thin, without polygonal reticulation **3**
3. SIPH tapering or cylindrical on distal half, more than 2.5× cauda, with coarse imbrication. (Al. without a black dorsal abdominal patch) *Myzus hemerocallis*
- SIPH slightly to moderately swollen on distal half, less than 2.5× cauda, with normal imbrication. (Al. with a black dorsal abdominal patch) *Myzus persicae*

Hemidiodia see *Diodia***Hemigraphis***H. indicus***Acanthaceae***Myzus persicae**Hemisteptia* see *Saussurea***Hemizonia***H. fasciculata***Compositae***Macrosiphum euphorbiae**Heptapleurum* see *Schefflera***Heracleum***H. austriacum**H. canescens***Umbelliferae***Aulacorthum solani*; *Dysaphis nevskyi**Hyadaphis foeniculi*

HOST LISTS AND KEYS

<i>H. dissectum</i>	<i>Anuraphis subterranea</i> ; [<i>Avicennina</i> sp.; Kadyrbekov, 2002e]; <i>Cavariella pastinacae, theobaldi</i>
<i>H. dulce</i>	<i>Cavariella konoi, sapporoensis</i>
<i>H. laciniatum</i>	<i>Aphis fabae</i> ; <i>Cavariella pastinacae, theobaldi</i> ; <i>Hyadaphis passerinii</i> ; <i>Macrosiphum gei</i>
<i>H. lanatum</i>	<i>Anuraphis subterranea</i> ; <i>Aphis decepta</i> , [<i>helianthi</i>], [<i>heraclicola</i>], <i>spiraecola</i> ; <i>Cavariella aegopodii, heraclei, nipponica, pastinacae,</i> <i>theobaldi</i> ; <i>Hyadaphis foeniculi</i> ; <i>Myzus ornatus</i> ; <i>Paramyzus heraclei</i>
<i>H. lanatum</i> ssp. <i>asiaticum</i>	<i>Cavariella kamtschatica</i> (= <i>pastinacae</i> ?)
<i>H. lehmannianum</i>	<i>Anuraphis subterranea</i> ; <i>Cavariella theobaldi</i> ; <i>Dysaphis crataegi</i> ssp. <i>heraclei</i> , sp. nr <i>lauberti</i>
<i>H. mantegazzianum</i>	<i>Anuraphis subterranea</i> ; <i>Aphis fabae</i> ; <i>Cavariella pastinacae, theobaldi</i> ; <i>Dysaphis lauberti</i>
<i>H. maximum</i>	<i>Paramyzus heraclei</i> ; <i>Semiaphis heraclei</i>
<i>H. moellendorffii</i>	<i>Aphis fabae</i> ; <i>Cavariella angelicae, heraclei, konoi, nipponica,</i> <i>sapporoensis</i> ; <i>Paramyzus heraclei</i> ; <i>Semiaphis heraclei</i>
<i>H. palmatum</i>	<i>Cavariella pastinacae, theobaldi</i>
<i>H. pastinacifolium</i>	<i>Dysaphis crataegi</i> ssp. <i>heraclei</i>
<i>H. pyrenaicum</i> see <i>sphondylium</i>	
<i>H. sibiricum</i>	<i>Anuraphis subterranea</i> ; <i>Aphis fabae</i> ; <i>Cavariella pastinacae, theobaldi</i> ; <i>Dysaphis newskyi</i> ssp. <i>aizenbergi</i> ; <i>Paramyzus heraclei</i>
<i>H. sosnowskyi</i>	<i>Cavariella aegopodii</i>
<i>H. sphondylium</i> (incl. <i>pyrenaicum</i> , <i>euspondylium</i>)	<i>Anuraphis subterranea</i> ; <i>Aphis brohmeri, fabae, helianthi</i> ; <i>Aulacorthum solani</i> ; <i>Cavariella aegopodii, archangelicae, pastinacae, theobaldi</i> ; <i>Dysaphis crataegi, lauberti, newskyi</i> ; <i>Hyadaphis foeniculi</i> ; <i>Macrosiphum euphorbiae, gei</i> ; <i>Myzus ascalonicus, ornatus, persicae</i> ; <i>Paramyzus heraclei</i> ; <i>Semiaphis heraclei, sphondylii</i>
<i>H. villosum</i>	<i>Cavariella aegopodii, theobaldi</i> ; [<i>Pilobtusaphis dsengei</i> Rusanova, 1942 (nomen nudum)]
<i>Heracleum</i> sp.	[<i>Brachycaudus umbelliferarum</i>]; <i>Macrosiphum pallidum</i>

Key to apterae on *Heracleum*:-

1. ABD TERG 8 with a posteriorly projecting process above cauda; in some species this is reduced to a small, warty, knob in the center of ABD TERG 8, with 2 associated hairs (Figure 10f-i) 2
 - No supracaudal process, nor are there 2 hairs on ABD TERG 8 close together and associated with a warty knob 10
2. SIPH clavate; swollen on distal half to at least 1.2× narrowest part of basal half 3
 - SIPH tapering or cylindrical, or with slight subapical swelling 7
3. ANT PT/BASE 0.6–1.3 4
 - ANT PT/BASE 1.4–4.2 5

HERACLEUM

4. R IV+V 1.3–1.5× HT II, usually with 2 accessory hairs *Cavariella nipponica*
 – R IV+V 0.7–1.1× HT II, without accessory hairs *Cavariella aegopodii*
5. ANT PT/BASE 2.6–4.2 *Cavariella pastinacae*
 – ANT PT/BASE 1.4–2.0 **6**
6. SIPH 0.98–1.1× head width across (and including) eyes, and 6.7–8.7× maximum width of swollen part (Figure 10c). Length of supracaudal process at least 1.6× maximum width of swollen part of SIPH (Figure 10f). (Al. with a complete black band on ABD TERG 6) *Cavariella archangelicae*
 – SIPH 0.8–1.01 (–1.07)× head width across eyes, and 5.0–7.3× maximum width of swollen part (Figure 10d). Length of supracaudal process less than 1.5× maximum width of swollen part of SIPH. (Figure 10g) (Al. with a pair of roundish dark marks on ABD TERG 6) *Cavariella konoii*
7. Supracaudal process reduced, distinctly shorter than ANT II. R IV+V with 4–10 accessory hairs **8**
 – Supracaudal process at least as long as ANT II. R IV+V with 2 (–3) accessory hairs **9**
8. Femoral hairs numerous, long and fine, longer than 0.5× width of hind femur *Cavariella sapporoensis*
 – Femoral hairs sparse, short and rigid, shorter than 0.5× width of hind femur *Cavariella heraclei*
9. Antennae 5-segmented *Cavariella angelicae*
 – Antennae 6-segmented *Cavariella theobaldi*
10. SIPH very small, much shorter and thinner than cauda **11**
 – SIPH as thick and/or as long as cauda **12**
11. Cauda triangular in dorsal view. SIPH about twice (1.8–2.2) times as long as their diameter at midlength (Figure 10j) *Semiaphis sphondylii*
 – Cauda tongue shaped, with rounded apex. SIPH 1.0–1.8× their diameter at midlength (Figure 10k) *Semiaphis heraclei*
12. Cauda helmet-shaped, not longer than its basal width in dorsal view. Head and ABD TERG 8 or 7–8 usually with spinal tubercles (STu) **13**
 – Cauda tongue- or finger-shaped, longer than its basal width. Head without, and ABD TERG 7–8 usually without, STu **17**
13. SIPH with close-set rows of fine spinules. Cauda with 11–12 hairs *Anuraphis subterranea*
 – SIPH with normal imbrication. Cauda with 4–8 hairs **14**
14. Hairs on ABD TERG 2–3 acute, fine-pointed, maximally 27–65 µm long *Dysaphis lauberti*
 – Hairs on ABD TERG 2–3 blunt, maximally 5–20 µm long **15**
15. Hairs on ANT III fine-pointed, maximally 29–56 µm long, 1.2–2.0× BD III *Dysaphis newskyi*
 – Hairs on ANT III blunt, maximally 3–18 µm long, 0.3–0.8× BD III **16**
16. Hairs on ANT III and ABD TERG 2–3 maximally only 3–10 µm long, 0.3–0.5× BD III. Well-developed marginal tubercles (MTu) present on ABD TERG 1–7. All apt. with secondary rhinaria on ANT III, and sometimes on ANT IV *Dysaphis newskyi* ssp. *aizenbergi*
 – Hairs on ANT III and ABD TERG 2–3 maximally 7–19 µm long, 0.5–0.9× BD III. MTu present on ABD TERG 1–5, usually absent from ABD TERG 7. Apt. usually without secondary rhinaria *Dysaphis crataegi* group
17. ANT tubercles undeveloped or weakly developed, not or hardly projecting beyond middle of front of head in dorsal view. SIPH and cauda uniformly dark **18**
 – ANT tubercles well-developed. SIPH at least basally pale, cauda pale **24**

HOST LISTS AND KEYS

18. SIPH swollen on distal 0.7, and 0.85–1.4× cauda. Longest hairs on ANT III 0.3–0.5× BD III. ABD TERG 1 and 7 without (but 5 usually with) marginal tubercles (MTu) **19**
 – SIPH tapering or cylindrical, 0.8–2.2× cauda. Longest hairs on ANT III more than 0.5× BD III. ABD TERG 1 and 7 always with MTu **20**
19. Prosternal sclerite 1.36–2.6× wider than long, often convex posteriorly. SIPH 1.05–1.4× cauda. (Al. often with sec. rhinaria on ANT V) *Hyadaphis foeniculi*
 – Prosternal sclerite 2.2–3.6× wider than long, with posterior margin often straight. SIPH 0.85–1.2× cauda. (Al. rarely with sec. rhinaria on ANT V) *Hyadaphis passerinii*
20. ANT III 0.9–1.23× cauda. ABD TERG 8 with 2 hairs, and usually no dark cross-band. Cauda usually with a distinct midlength constriction, and bearing 7–15 (mostly 8–12) hairs *Aphis spiraeicola*
 – ANT III 1.25–2.8× cauda. ABD TERG 8 with (2-)3–11 hairs, usually on or just posterior to a dark cross-band. Cauda usually without a constriction, and bearing 10–31 hairs **21**
21. R IV+V 1.1–1.4× HT II. MTu on ABD TERG 1 and 7 only. Anterior half of subgenital plate with 2(–3) hairs. (ANT III of al. with 35–67 rather tuberculate rhinaria) *Aphis decepta*
 – R IV+V 0.8–1.4× HT II, but if more than 1.1× HT II then there are at least some MTu on ABD TERG 2–4. Anterior half of subgenital plate with 2–14 hairs. (ANT III of al. with 7–33 rhinaria) **22**
22. HT I with 3 hairs (sense peg present). ANT I dark, but ANT II pale or dusky, concolorous with basal half of III. Dorsal abdomen usually without any dark markings anterior to SIPH (except for dark intersegmental muscle sclerites). ANT III 1.05–1.95× PT, (1.6–) 2.0–4.0 (–5.0)× R IV+V, and 1.5–2.5 (–2.8)× cauda. SIPH 1.5–2.5 (–2.8)× cauda. (Al. with 15–40 rhinaria on ANT III) *Aphis helianthi*
 – HT I with 2 hairs (no sense peg). ANT I and II both dark, contrasting with III. Dorsal abdomen usually with some dark markings anterior to SIPH (in addition to dark intersegmental muscle sclerites). ANT III 0.65–1.3× PT, 1.2–2.6 (–3.0)× R IV+V and 1.2–1.6 (–1.9)× cauda. SIPH 0.7–1.6× cauda. (Al. with 10–23 rhinaria on ANT III) **23**
23. ABD TERG 2–6 bearing a total of 0–3 small MTu. Cauda with 11–24 hairs. ABD TERG 8 with 2–5 (–7) hairs *Aphis fabae*
 – ABD TERG 2–6 bearing a total of 5–9 often rather large MTu. Cauda with 20–31 hairs. ABD TERG 8 with 5–12 hairs *Aphis brohmeri*
24. SIPH with a subapical zone of polygonal reticulation. Cuticle of head smooth **25**
 – SIPH without polygonal reticulation. Cuticle of head spinulose **27**
25. Front of head dusky to dark. SIPH dark, or pale only at bases. ABD TERG (1–) 2–4 (–6) with evident marginal tubercles (MTu) *Macrosiphum pallidum*
 – Front of head pale, SIPH pale or dark only towards apices. ABD TERG 1–6 usually without MTu, sometimes with occasional very small MTu on 2–4 **26**
26. Longest hair on ABD TERG 8 is 38–63 μm, 0.6–1.4× ANT BD III. Anterior half of subgenital plate usually (77%) with only 2 hairs (18% with 3, 5% with 4–6 hairs). SIPH pale or dusky at apices *Macrosiphum euphorbiae*
 – Longest hair on ABD TERG 8 is 66–106 μm, 1.4–2.0× ANT BD III. Anterior half of subgenital plate with 2–11 hairs, usually (77%) with 4–8 hairs. SIPH dark at apices *Macrosiphum gei*
27. SIPH coarsely imbricated, tapering, with a slight S-curve. Dorsal abdomen with an intersegmental pattern of dark spots. ANT PT/BASE 1.7–2.8 *Myzus ornatus*
 – SIPH moderately or weakly imbricated, and slightly to moderately swollen on distal half. Dorsal abdomen without any dark markings. ANT PT/BASE 2.8–6.1 **28**

28. ANT III with 4–15 rhinaria on basal half. ANT PT/BASE 5.0–6.1 *Paramyzus heraclei*
 – ANT III without rhinaria. ANT PT/BASE 2.8–4.5 **29**
29. SIPH less than 0.75× ANT III, almost smooth-surfaced, with minimum width on basal half less than midlength diameter of hind tibia. Inner faces of ANT tubercles approximately parallel-sided *Myzus ascalonicus*
 – SIPH more than 0.75× ANT III, moderately imbricated, with minimum width of basal half greater than midlength width of hind tibia. Inner faces of ANT tubercles apically convergent *Myzus persicae*

Herderia

Herderia sp.

Compositae

Sitobion sp. (van Harten, 1972a)

Hernandia see Blackman and Eastop (1994)

Herniaria

H. besseri

Illecebraceae

Aphis herniariae

Herpetica see *Cassia*

Hertia see *Othonna*

Hesperis

H. matronalis

Cruciferae

Aphis gossypii; *Dysaphis pavlovskyana*; *Lipaphis erysimi*;
Myzus ascalonicus;
Rhopalosiphoninus staphyleae (ssp. *tulipaellus*)
Brevicoryne brassicae

Hesperis sp.

Key to apterae on *Hesperis*:–

1. SIPH weakly to markedly clavate (i.e. swollen on distal half, narrower on basal half) **2**
 – SIPH not clavate (i.e., not thinner on basal half than on distal half) **4**
2. Head smooth, with ANT tubercles weakly developed, their inner faces divergent. Longest hairs on ANT III and ABD TERG 3 more than 0.6× BD III (?) *Dysaphis pavlovskyana**
 – Head spiculose, with well-developed, steep-sided ANT tubercles. Longest hairs on ANT III and ABD TERG 3 are 0.2–0.5× BD III **3**
3. Dorsum with dark markings. SIPH with basal half much thicker than hind tibia at midlength. ANT III with 0–7 small rhinaria near base *Rhopalosiphoninus staphyleae*
 – Dorsum without dark markings. SIPH with narrowest diameter not greater than diameter of hind tibia at midlength. ANT III without rhinaria *Myzus ascalonicus*
4. ANT III 2.2–3.7× SIPH. SIPH short and thick, 0.8–1.0× cauda, which is broad and triangular. Dorsal abdomen with paired dark sclerites anterior to SIPH *Brevicoryne brassicae*
 – ANT III 0.9–1.8× SIPH. SIPH 1.3–2.5× cauda, which is tongue-shaped. Dorsal abdomen without dark sclerites anterior to SIPH **5**
5. ABD TERG 1 and 7 with marginal tubercles. SIPH tapering from base to flange, without any trace of swelling distally, and darker than cauda *Aphis gossypii*
 – ABD TERG 1 and 7 without marginal tubercles. SIPH cylindrical or slightly swollen on distal half, with similar pigmentation to cauda *Lipaphis erysimi*

HOST LISTS AND KEYS

Heteranthera

H. limosa

Pontederiaceae

Rhopalosiphum nymphaeae

Heteromeles* see *Photinia arbutifolia

Heteromorpha

H. trifoliata

Umbelliferae

Aphis spiraecola; *Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Heteropanax

H. fragrans

Araliaceae

[*Aiceona titabarensis*]

(Try key to aphids on *Aralia*.)

Heteropogon

H. contortus

Gramineae

Forda hirsuta

(or use key to apterae of grass-feeding aphids under *Digitaria*)

Heteropyxis

H. natalensis

Myrtaceae

Aphis gossypii

***Heterostemma* (incl. *Symphyzicarpus*)**

H. albus

Asclepiadaceae

[*Aphis* sp. (Davletshina, 1964)]

Heterotheca

H. grandiflora

H. subaxillaris

H. villosa

Compositae

Uroleucon erigeronense

Uroleucon ambrosiae

Brachycaudus helichrysi

Key to apterae on *Heterotheca*:-

1. ANT tubercles undeveloped. SIPH pale, truncate, without polygonal reticulation. Cauda, which is helmet-shaped, not longer than its basal width, and bears 4–6 hairs *Brachycaudus helichrysi*
– ANT tubercles well developed. SIPH dark at least distally, with a distal zone of polygonal reticulation. Cauda finger-shaped with 6–27 hairs **2**
2. SIPH pale at base, more than 2× cauda which bears 6–10 hairs, the most distal of these being short, and blunt or capitate *Uroleucon erigeronense*
– SIPH wholly dark, less than 1.5× cauda which bears 12–27 hairs, all of similar length *Uroleucon ambrosiae*

Heterotrichum

Heterotrichum sp.

Melastomataceae

Aphis spiraecola; *Neomyzus circumflexus*;

Toxoptera aurantii

Use key to polyphagous aphids, p. 1020.

Heuchera

H. americana
H. glabra
H. hartwegii
H. hirsuticallis
H. hispida
H. micrantha (incl. *diversifolia*)
H. richardsoni
H. rubescens
H. sanguinea
H. villosa

Saxifragaceae

Aphis spiraeicola; *Nasonovia heucherae*, *tiarella*
Nasonovia cynosbati
Nasonovia davidsoni, *heucherae*
Nasonovia heucherae
Nasonovia heucherae
Macrosiphum euphorbiae; *Nasonovia davidsoni*, *heucherae*
Nasonovia borealis
Nasonovia cynosbati
 [Aphis sp. (Leonard, 1973: 17)]
Nasonovia smithi

Key to apterae on *Heuchera*:-(Note: apterae of *Nasonovia tiarella* are unknown.)

1. Thoracic spiracular apertures much larger than abdominal ones. ANT III with 1–44 secondary rhinaria, and secondary rhinaria also often on ANT IV, or IV and V. Hairs on ABD TERG 3 usually longer than ANT BD III, and with expanded apices. R IV+V 1.4–2.2× HT II. Cauda pale, finger- or tongue-shaped, with 4–7 (usually 5) hairs 2
 - Thoracic spiracular apertures similar in size to abdominal ones. ANT III with 0–10 secondary rhinaria, none on IV or V. Hairs on ABD TERG 3 usually shorter than ANT BD III. R IV+V usually less than 1.4× HT II. Cauda if pale and tongue- or finger-shaped then usually with more than 5 hairs
go to key to polyphagous aphids, p. 1020
2. Dorsal abdomen pale or with indistinct sclerotisation 3
 - Dorsal abdomen with dark marginal sclerites and/or dark spinopleural sclerites, or cross-bars, or a patch or shield 4
3. SIPH 1.2–2.3× cauda, and 0.14–0.20× BL. ANT PT/BASE 4.5–9.7. Secondary rhinaria distributed ANT III 1–44, IV 0–15, V 0–4 *Nasonovia cynosbati*
 - SIPH 1.0–1.2× cauda, and 0.11–0.14× BL. ANT PT/BASE 4.1–5.6. Secondary rhinaria distributed ANT III 24–54, IV 0–26, V 0–13 *Nasonovia borealis*
4. Longest hair on ANT III 0.4–0.8× BDIII. Secondary rhinaria distributed ANT III 7–21, IV 0–9, V 0–1 *Nasonovia smithi*
 - Longest hair on ANT III 0.8–1.3× BD III. Secondary rhinaria distributed ANT III 26–37, IV 10–15, V 0–7 5
5. Dorsal abdomen usually with dark marginal sclerites and spinopleural sclerites or cross-bars, seldom with a larger more solid pigmented area. R IV+V with 7–11 accessory hairs (usually 8–10). ANT PT/BASE 4.8–6.9 *Nasonovia heucherae*
 - Dorsal abdomen with a solid black shield. R IV+V with 10–13 accessory hairs. ANT PT/BASE about 6.5–7.8 *Nasonovia davidsoni*

Hexachlamys*H. edulis**Aphis gossypii***Myrtaceae****Hibbertia***H. obcuneata**Myzus ornatus**H. scandens**Myzus persicae***Dileniaceae**

Use key to polyphagous aphids, p. 1020.

HOST LISTS AND KEYS

Hibiscus (incl. Bamia)

H. abelmoschus
H. arnottianus (incl. *kauaiensis*)
H. aspera
H. boryanus
H. calyphyllus
H. cannabinus
H. coccineus
H. eetveldeanus
H. esculentus

H. furcellatus
H. hamabo
H. liliflorus
H. ludwigii
H. manihot
H. moschatus
H. mutabilis

H. palustris
H. panduriformis
H. pedunculatus
H. rosa-sinensis

H. sabdariffa

H. squamosus
H. sterculiaefolius
H. suranensis
H. syriacus

H. tiliaceus
H. trionum
Hibiscus ssp.

Malvaceae

Aphis gossypii; *Myzus persicae*
Aphis gossypii
Aphis gossypii
Aphis gossypii
Aulacorthum solani
Aphis craccivora, *gossypii*, *umbrella*
Aphis gossypii
Aphis gossypii
[Acyrtosiphon gossypii];
Aphis craccivora, *eugeniae*, *gossypii*, [*longisetosa*],
spiraecola, *umbrella*;
Aulacorthum solani; *Macrosiphum euphorbiae*;
Myzus persicae; *Smynthurodes betae*; *Toxoptera odinae*
Aphis gossypii
Aphis gossypii
Aphis gossypii
Aphis gossypii
Aphis gossypii; *Myzus persicae*
Aphis gossypii
Aphis gossypii; [*Macrosiphum* sp.; Leonard, 1972a];
Myzus ornatus, *persicae*
Aphis craccivora
Aphis gossypii
Aphis gossypii; *Aulacorthum solani*
Aphis coreopsidis, *craccivora*, *fabae*, *gossypii*, *nasturtii*,
spiraecola, *umbrella*; *Aulacorthum solani*;
[Eutrichosiphum pseudopasaniae];
Myzus ornatus, *persicae*; [*Nasonovia ribisnigri*];
Neomyzus circumflexus; *Rhopalosiphum rufiabdominale*;
[Sitobion rosaeiformis]; *Toxoptera aurantii*, *odinae*
Aphis gossypii, *spiraecola*; *Myzus persicae*;
Rhopalosiphum rufiabdominale
Aphis gossypii
Aphis gossypii
Aphis gossypii
Aphis albella, *craccivora*, *fabae*, *gossypii*, *spiraecola*,
[Aphis sp. (Davletshina, 1964)];
Aulacorthum magnoliae; *Myzus persicae*
Aphis craccivora, *gossypii*; *Toxoptera aurantii*
Aphis albella, *gossypii*
[Acyrtosiphon malvae]; *Aphis solanella*;
[Macrosiphum pechumani]

Key to apterae on *Hibiscus*:-

1. ANT tubercles weakly developed. ABD TERG 1 and 7 with marginal tubercles 2
- ANT tubercles well developed. ABD TERG 1 and 7 without marginal tubercles
go to key to polyphagous aphids, p. 1020

2. SIPH pale, or only dusky near apices 3
 – SIPH dark 4
3. ABD TERG 2–5 as well as 1 and 7 usually with rather large dome-like marginal tubercles (MTu). SIPH 1.5–2.1 (-2.5)× cauda. ANT PT/BASE 2.1–2.9 *Aphis umbrella*
 – ABD TERG 2–5 usually without MTu, sometimes with small papilliform MTu on 4 and/or 5. SIPH 2.2–2.9× cauda, ANT PT/BASE 2.6–3.6 *Aphis albella**
4. SIPH 0.24–0.40× BL, about twice as long as the much paler cauda. Head, ANT I, II and basal part of III very pale, contrasting with dark rest of ANT *Aphis coreopsidis*
 – SIPH only up to 0.2× BL. Cauda pale or dark. Head and antennal segments differently pigmented
 go to key to polyphagous aphids, p. 1020, starting at couplet 24

Hieracium (incl. Pilosella)*H. alpinum**H. argillaceum* (incl. *lachenalii*)*H. atratum**H. aurantiacum* (incl. *auricoma*)*H. bauhini**H. bifidum**H. boreale* see *sabaudum**H. bosniacum**H. brevifolium* (incl. *brachyphyllum*)*H. brunea-ocroceum**H. bupleuroides**H. caespitosum* (incl. *pratense*)*H. canadense**H. cymosum**H. dacicum**H. densiflorum**H. dubium**H. echioides**H. exotericum**H. fallax**H. flagellare**H. florentinum**H. floribundum***Compositae***Brachycaudus helichrysi*; *Nasonovia ribisnigri*;*Pemphigus bursarius**Aphis fabae*, *hieracii*; *Nasonovia pilosellae*, *ribisnigri*;*Pleotrichophorus deviatu*; *Uroleucon obscurum**Pleotrichophorus deviatu**Aphis fabae*, *pilosellae*; *Aulacorthum solani*;*Brachycaudus helichrysi*; *Macrosiphum euphorbiae*;*Nasonovia compositellae* ssp. *nigra*, *pilosellae*, *ribisnigri*;*Pleotrichophorus deviatu*;*Uroleucon cichorii*, *obscurum*, *pilosellae**Aphis curtiseta*, *mohelnensis*, *pilosellae*;*Aulacorthum solani*; *Brachycaudus helichrysi**Aphis fabae*; *Aulacorthum solani*; *Nasonovia ribisnigri*;*Uroleucon obscurum**Brachycaudus cardui*, *helichrysi**Uroleucon pseudobscurum**Nasonovia ribisnigri**Aphis pilosellae**Aphis curtiseta*, *mohelnensis*; *Nasonovia ribisnigri*;*Uroleucon obscurum*, *pilosellae**Uroleucon hieracicola**Aphis curtiseta*, *fabae*; *Nasonovia ribisnigri*;*Uroleucon pilosellae**Nasonovia ribisnigri**Uroleucon obscurum**Uroleucon cichorii**Aphis mohelnensis*, *pilosellae*; *Nasonovia compositellae*;*Uroleucon obscurum*, *pilosellae**Nasonovia compositellae* ssp. *nigra**Aphis curtiseta*; *Nasonovia ribisnigri**Nasonovia ribisnigri*[*Uroleucon* sp. (Leonard, 1968: 346)]*Aulacorthum solani*; *Nasonovia ribisnigri*;*Uroleucon obscurum*

HOST LISTS AND KEYS

<i>H. gentile</i>	<i>Nasonovia compositellae</i> ssp. <i>nigra</i> , <i>ribisnigri</i>
<i>H. glomeratum</i>	<i>Uroleucon obscurum</i>
<i>H. gronovii</i>	<i>Nasonovia ribisnigri</i> ; <i>Uroleucon pseudambrosiae</i>
<i>H. heldreichii</i>	<i>Myzus ornatus</i> ; <i>Nasonovia ribisnigri</i>
<i>H. hoppaeaeum</i>	<i>Aphis pilosellae</i>
<i>H. intybaceum</i>	<i>Nasonovia nivalis</i>
<i>H. jaculifolium</i>	<i>Nasonovia ribisnigri</i>
<i>H. junceum</i>	<i>Nasonovia ribisnigri</i>
<i>H. korshinskyi</i>	<i>Acyrtosiphon ilka</i> ; <i>Nasonovia compositellae</i> ssp. <i>nigra</i>
<i>H. lachenalii</i> see <i>argillaceum</i>	
<i>H. laevigatum</i>	<i>Aphis fabae</i> , <i>hieracii</i> ; <i>Nasonovia compositellae</i> ssp. <i>nigra</i> ; <i>Pleotrichophorus deviatu</i> s; <i>Uroleucon obscurum</i>
<i>H. lanatum</i>	<i>Aphis fabae</i> ; <i>Nasonovia ribisnigri</i> ; <i>Uroleucon obscurum</i>
<i>H. macranthum</i>	<i>Aphis pilosellae</i>
<i>H. murorum</i> (incl. <i>silvaticum</i>)	<i>Aphis fabae</i> , <i>hieracii</i> , <i>pilosellae</i> ; <i>Hyperomyzus hieracii</i> ; <i>Nasonovia compositellae</i> ssp. <i>nigra</i> , <i>pilosellae</i> , <i>ribisnigri</i> ; <i>Pleotrichophorus deviatu</i> s; <i>Uroleucon obscurum</i> , <i>sonchi</i> <i>Aulacorthum solani</i> ; <i>Nasonovia ribisnigri</i>
<i>H. pallidum</i>	<i>Nasonovia compositellae</i> ssp. <i>nigra</i> , <i>ribisnigri</i>
<i>H. peleterianum</i>	<i>Aphis pilosellae</i> ; <i>Aulacorthum solani</i> ;
<i>H. pilosella</i>	[<i>Brachycaudus mordvilko</i> i]; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i> ; <i>Nasonovia pilosellae</i> , <i>ribisnigri</i> ; <i>Pemphigus bursarius</i> ; <i>Pleotrichophorus deviatu</i> s; <i>Trama troglodytes</i> ;
	<i>Uroleucon bielawskii</i> , <i>cichorii</i> , [<i>picridis</i>], <i>pilosellae</i> , <i>obscurum</i>
<i>H. piloselloides</i>	<i>Aphis curtiset</i> a;
	<i>Nasonovia compositellae</i> ssp. <i>nigra</i> , <i>pilosellae</i> ;
	<i>Pleotrichophorus deviatu</i> s
<i>H. porrifolium</i>	<i>Acyrtosiphon porrifolii</i> ; <i>Uroleucon obscurum</i>
<i>H. praealtum</i>	<i>Uroleucon obscurum</i>
<i>H. praecox</i>	<i>Nasonovia compositellae</i> ssp. <i>nigra</i>
<i>H. pratense</i>	<i>Nasonovia ribisnigri</i> ; [<i>Uroleucon</i> sp. (Leonard, 1968: 346)]
<i>H. racemosum</i>	<i>Uroleucon obscurum</i>
<i>H. robustum</i>	<i>Uroleucon obscurum</i>
<i>H. rotundatum</i>	<i>Nasonovia ribisnigri</i>
<i>H. rubrum</i>	<i>Nasonovia ribisnigri</i> ; [<i>Uroleucon</i> sp. (Leonard, 1968: 346)]
<i>H. sabaudum</i> (incl. <i>boreale</i> , <i>silvestre</i>)	<i>Aphis fabae</i> , <i>hieracii</i> ;
	<i>Nasonovia compositellae</i> ssp. <i>nigra</i> , <i>ribisnigri</i> ;
	<i>Hyperomyzus hieracii</i> ; <i>Pleotrichophorus deviatu</i> s;
	<i>Uroleucon obscurum</i>
<i>H. saxifragum</i>	<i>Aphis hieracii</i>
<i>H. scabrum</i>	<i>Uroleucon pseudambrosiae</i>
<i>H. schmidt</i> i see <i>pallidum</i>	
<i>H. scouleri</i>	<i>Brachycaudus helichrysi</i> ; <i>Nasonovia ribisnigri</i>
<i>H. silvaticum</i> see <i>murorum</i>	
<i>H. silvestre</i> see <i>sabaudum</i>	
<i>H. spondylium</i>	[<i>Nasonovia</i> sp. (Börner, 1952: 350)]; <i>Uroleucon obscurum</i>

<i>H. umbellatum</i>	<i>Aphis heiei, hieracii; Brachycaudus cardui, helichrysi; Hyperomyzus hieracii; [Macrosiphoniella femorata]; Nasonovia compositellae ssp. nigra, ribisnigri; Uroleucon obscurum, [picridis], pseudobscurum</i>
<i>H. vavietis</i>	<i>Nasonovia compositellae ssp. nigra (? – as hieracii Kalt.)</i>
<i>H. venosum</i>	<i>[Aphis hieracium-venosum Rafinesque (invalid name)]; [Uroleucon sp. (Leonard, 1968: 346)]</i>
<i>H. villosiceps</i>	<i>Nasonovia nivalis, ribisnigri</i>
<i>H. villosum</i>	<i>Nasonovia ribisnigri</i>
<i>H. virosum</i>	<i>Aphis fabae, frangulae group, mohelnensis; Nasonovia ribisnigri; Uroleucon obscurum</i>
<i>H. vulgatum</i>	<i>Acyrtosiphon rubi; Hyperomyzus hieracii; Nasonovia compositellae, compositellae ssp. nigra, ribisnigri; Uroleucon obscurum, pseudambrosiae</i>
<i>H. zizianum</i>	<i>Uroleucon obscurum</i>
<i>Hieracium spp.</i>	<i>Aphis gossypii, scorzonerae; Hyperomyzus inflatus, [nigricornis?], picridis; [Macrosiphoniella yomenae]; Nasonovia brevipes (?), compositellae ssp. iberica; Uroleucon hieracioides</i>

Key to apterae on *Hieracium*:-

1. SIPH present. ANT PT/BASE more than 1 2
 – SIPH absent. ANT PT/BASE less than 0.5 39
2. SIPH with distal reticulated zone (at least 4–5 rows of closed polygonal cells extending for 0.13 or more of length) 3
 – SIPH without a distinct zone of polygonal reticulation (sometimes with transverse striae and 1–2 indistinct rows of transversely elongate cells) 12
3. SIPH pale, or only dusky towards apices, with reticulation on distal 0.13–0.20 of length. Femora wholly pale, or only dusky at apices *Macrosiphum euphorbiae*
 – SIPH wholly dark or only pale at base or in middle, with reticulation on distal 0.16–0.44 of length 4
4. Cauda dark *Uroleucon hieracioides**
 – Cauda much paler than SIPH 5
5. Well-developed, crescent-shaped antesiphuncular sclerites present 6
 – Antesiphuncular sclerites absent, broken or vestigial 9
6. Tibiae wholly dark. Hind tibiae 0.85–1.05× BL. Cauda with 9–18 hairs *Uroleucon pseudobscurum*
 – Tibiae with paler middle section. Hind tibiae 0.70–0.95× BL. Cauda with 10–28 hairs 7
7. SIPH reticulated on distal 0.33–0.40 of length. First tarsal segments usually with 3 hairs (rarely 4 or 5). ANT III with 15–28 rhinaria. Coxae dusky/dark *Uroleucon pilosellae*
 – SIPH reticulated on 0.21–0.30 of length. First tarsal segments with 5 hairs. ANT III with 13–97 rhinaria. Coxae pale or dusky 8
8. ANT PT/BASE 3.8–6.2. ANT III with 13–55 rhinaria *Uroleucon obscurum*
 – ANT PT/BASE 6.0–7.9. ANT III with 45–97 rhinaria *Uroleucon cichorii*
9. Coxae dark, much darker than trochanters and bases of femora. Dorsal abdominal hairs not arising from dark sclerites 10

HOST LISTS AND KEYS

- Coxae pale or dusky, similar to trochanters and bases of femora. Some or all of dorsal abdominal hairs arising from dark scleroites **11**
- 10.** SIPH pale at base. First tarsal segments with 3 (or rarely 4) hairs. Cauda bearing 26–32 hairs, $2.4\text{--}3.0\times$ R IV+V which bears 10–12 accessory hairs. ANT PT/BASE 3.0–4.2 *Uroleucon bielawskii*
- SIPH dark at base, sometimes paler in middle. First tarsal segments with (4–) 5 hairs. Cauda bearing 16–24 hairs, $2.9\text{--}4.3\times$ R IV+V which bears 7–8 accessory hairs. ANT PT/BASE 3.9–5.2 *Uroleucon sonchi*
- 11.** R IV+V $1.3\text{--}1.4\times$ HT II *Uroleucon hieracicola*
- R IV+V $0.9\text{--}1.1\times$ HT II *Uroleucon pseudambrosiae*
- 12.** ABD TERG 1 and 7 with marginal tubercles (MTu) **13**
- ABD TERG 1 and 7 without MTu **21**
- 13.** Cauda obtusely triangular, about as long as its basal width in dorsal view. SIPH very short, about equal in length to cauda. ANT PT/BASE about 1 *Aphis scorzonerae**
- Cauda tongue-shaped, longer than its basal width. SIPH usually longer than cauda. ANT PT/BASE more than 1.25 **14**
- 14.** Cauda with 11–25 hairs. Dorsal abdomen usually with scattered dark markings anterior to SIPH, and broad dark cross-bars on ABD TERG 7 and 8 *Aphis fabae*
- Cauda with 4–10 hairs. No dark dorsal markings anterior to SIPH **15**
- 15.** ANT PT $0.8\text{--}1.3\times$ R IV+V. R IV+V $1.5\text{--}2.0\times$ HT II **16**
- ANT PT $1.4\text{--}2.1\times$ R IV+V. R IV+V $0.95\text{--}1.5$ (occasionally more than 1.5 in summer dwarfish specimens) **17**
- 16.** ANT 4- or 5-segmented. Posterior hair on hind trochanter $0.2\text{--}0.4\times$ diameter of trochantrofemoral suture. Ventral abdominal hairs about equal to ANT BD III, or shorter *Aphis pilosellae*
- ANT usually 6-segmented. Posterior hair on hind trochanter $0.8\text{--}1.4\times$ diameter of trochantrofemoral suture. Ventral abdominal hairs distinctly longer than ANT BD III *Aphis mohelnensis*
- 17.** Cauda paler than SIPH **18**
- Cauda as dark as SIPH **19**
- 18.** R IV+V $1.1\text{--}1.4\times$ HT II. ANT PT/BASE 2.1–3.2 *Aphis gossypii*
- R IV+V $0.85\text{--}1.05\times$ HT II. ANT PT/BASE 1.6–2.0 *Aphis frangulae* group on *H. virosum*, Uzbekistan (see Holman, 1998)
- 19.** Posterior hair on hind trochanter $0.3\text{--}0.8\times$ diameter of trochantrofemoral suture. Hairs on ANT III maximally $0.4\times$ BD III *Aphis curtiseta*
- Posterior hair on hind trochanter $0.9\text{--}1.5\times$ diameter of trochantrofemoral suture. Longest hairs on ANT III $0.5\text{--}1.2\times$ BD III **20**
- 20.** Longest hairs on ABD TERG 3 are $25\mu\text{m}$ long, about $1.3\times$ ANT BD III. Longest dorsal and ventral hairs on hind femur are respectively $0.3\text{--}0.8$ and $0.5\text{--}1.0\times$ diameter of trochantrofemoral suture *Aphis hieracii*
- Longest hairs on ABD TERG 3 are $50\text{--}70\mu\text{m}$ long, $2.5\text{--}3.5\times$ ANT BD III. Longest dorsal and ventral hairs on hind femur are of about equal length, $1.2\text{--}1.4\times$ diameter of trochantrofemoral suture *Aphis heiei*
- 21.** Cauda helmet-shaped, a little shorter than its basal width in dorsal view **22**
- Cauda tongue- or finger-shaped, or triangular, longer than its basal width **23**

22. Dorsum with an extensive black shield. SIPH dark, imbricated, 2.1–3.4× cauda *Brachycaudus cardui*
 – Dorsum without dark markings. SIPH pale, smooth-surfaced, 0.8–1.5 (-2.0)× cauda *Brachycaudus helichrysi*
23. Cuticle of head smooth, not spiculose 24
 – Cuticle of head densely spiculose or nodulose 37
24. Dorsal hairs narrowest at base, widening gradually to a broadly fan-shaped apex *Pleotrichophorus deviatius*
 – Dorsal hairs not narrowest at base; blunt, pointed or with expanded, not fan-shaped apices 25
25. SIPH markedly clavate 26
 – SIPH not clavate 28
26. SIPH very strongly inflated, with maximum width 2.2–3.1× minimum width on basal half. ANT with 23–40 rhinaria on III, 1–7 on IV and 0–1 on V *Hyperomyzus inflatus*
 – SIPH less strongly inflated, with maximum width 1.3–2.0× minimum width on basal half. ANT with 9–23 rhinaria on III, 0–6 on IV, 0 on V 27
27. Dorsal abdomen with a large dark central patch. SIPH 1.6–2.6× cauda, with swollen part up to 1.5–2.0× width of narrowest part on basal half *Hyperomyzus hieracii*
 – Dorsal abdomen without a large dark central patch. SIPH 1.4–1.6× cauda, with swollen part 1.3–1.6× width of narrowest part on basal half *Hyperomyzus picridis*
28. Hairs on ANT III very short, 0.2–0.3× BD III. ANT III with only 0–3 small rhinaria near base. Thoracic spiracular apertures similar in size to abdominal ones 29
 – Hairs on ANT III 0.8–1.7× BD III. ANT III with 2–36 rhinaria. Thoracic spiracular apertures much larger than (more than 2× diameter of) abdominal ones 31
29. Dorsal cuticle variolate. Longest dorsal hairs on head more than 0.5× ANT BD III. ANT PT/BASE 4.7–6.5 *Acyrtosiphon rubi*
 – Dorsal cuticle wrinkled. Longest dorsal hairs on head less than 0.5× BD III. ANT PT/BASE 3.0–4.2 30
30. SIPH 1.7–2.5× cauda and 1.0–1.3× ANT III. R IV+V 0.75–0.9× HT II *Acyrtosiphon ilka*
 – SIPH 1.3–1.6× cauda and 0.7–0.8× ANT III. R IV+V 1.0–1.15× HT II *Acyrtosiphon porrifolii*
31. R IV+V about 2× HT II. ANT PT/BASE 3.1–3.8. Hind tarsus I with 3 hairs. Cauda (probably) with 5 hairs *Nasonovia brevipes**
 – R IV+V 1.1–1.7× HT II. ANT PT/BASE 3.4–11.4. Hind tarsus I with 2 or 3 hairs. Cauda with 6–9 (usually 7) hairs 32
32. Dorsum with extensive black sclerotisation, including a continuous shield extending over ABD TERG 1–5 33
 – Dorsum with paired spinopleural dark markings and sometimes less distinct cross-bars, never with a solid shield 35
33. ANT PT/BASE 3.4–5.0. ABD TERG 2–4 usually with small marginal tubercles (MTu). R IV+V 1.1–1.3× HT II *Nasonovia compositellae* ssp. *compositellae*
 – ANT PT/BASE 4.9–9.8. ABD TERG 2–4 usually without MTu. R IV+V 1.2–1.6× HT II 34
34. ANT PT/BASE 4.9–8.3. Longest hairs on ANT III 1.1–1.7× BD III. R IV+V 0.16–0.19 mm, 1.2–1.5× HT II, and bearing 8–10 accessory hairs *Nasonovia compositellae* ssp. *nigra*
 – ANT PT/BASE 8.3–9.8. Longest hairs on ANT III 1.0–1.2× BD III. R IV+V 0.21–0.24 mm, 1.3–1.6× HT II, and bearing 11–14 accessory hairs *Nasonovia compositellae* ssp. *iberica*

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35. Hind tarsus I with 3 hairs. ANT PT/BASE 7.0–11.4 *Nasonovia ribisnigri*
 – Hind tarsus I with 2 hairs. ANT PT/BASE 4.9–8.0 **36**
36. R IV+V 1.4–1.7× HT II. ANT PT/BASE 5.7–8.0 *N. pilosellae*
 – R IV+V 1.1–1.4× HT II. ANT PT/BASE 4.9–6.4 *N. nivalis*
37. Dorsal abdomen with a pattern of intersegmental dark markings. ANT PT/BASE 1.7–2.8 *Myzus ornatus*
 – Dorsal abdomen without dark markings. ANT PT/BASE 2.8–5.5 **38**
38. SIPH slightly to moderately clavate. Inner faces of ANT tubercles apically convergent. ANT III without rhinaria *Myzus persicae*
 – SIPH tapering or cylindrical on distal half. Inner faces of ANT tubercles approximately parallel. ANT III with (0–) 1–2 (–4) rhinaria *Aulacorthum solani*
39. Hind tarsus normal. Body sparsely hairy *Pemphigus bursarius*
 – Hind tarsus much elongated. Body densely hairy *Trama troglodytes*

Hierochloa

H. hookeri

H. odorata

Gramineae

Metopolophium dirhodum

Sitobion fragariae

Use key to apterae of grass-feeding aphids under *Digitaria*.

Hippocrepis

H. comosa

Hippocrepis sp.

Leguminosae

Acyrtosiphon caraganae, loti, pisum

Macrosiphum euphorbiae

Key to apterae on *Hippocrepis*:-

- SIPH with a subapical zone of polygonal reticulation. Longest hairs on ANT III 0.6–1.0× BD III *Macrosiphum euphorbiae*
 – SIPH without polygonal reticulation. Hairs on ANT III very short and blunt, the longest 0.2–0.4× BD III **2**
- ANT I longer than wide and bearing 9–23 hairs. SIPH attenuate distally, thinner than hind tibia at midlength *Acyrtosiphon pisum*
 – ANT I not longer than wide, bearing 6–10 hairs. SIPH not attenuate distally, as thick as or thicker than hind tibia at midlength **3**
- SIPH gradually tapering from base to flange, 1.5–2.1× cauda and 4.7–7.7× R IV+V (which is 0.126–0.143 mm long) *Acyrtosiphon caraganae*
 – SIPH tapering from base but almost cylindrical on distal half; 1.2–1.7× cauda and 4.3–4.9× R IV+V (which is 0.112–0.128 mm long) *Acyrtosiphon loti*

Hippomarathrum see *Cachrys*

Hippophae see Blackman and Eastop (1994)

Hippuris

H. vulgaris

Hippuridaceae

Brachycaudus helichrysi; Myzus lythri;

Rhopalosiphum nymphaeae

Key to apterae on *Hippurus*:-

1. Head densely spiculose. SIPH tapering and coarsely imbricated, 1.8–2.8× ANT PT. Immatures with spinulose hind tibiae *Myzus lythri*
- Head not spiculose. SIPH almost smooth, truncate or swollen on distal half. 0.45–0.95× ANT PT. Immatures with smooth hind tibiae **2**
2. SIPH swollen on distal half, more than 2× cauda which is much longer than its basal width. Dorsal cuticle with a reticulate pattern formed by roundish, bead-like spinules *Rhopalosiphum nymphaeae*
- SIPH truncate, 0.8–1.5 (–2.0)× cauda, which is helmet-shaped and not longer than its basal width. Dorsal cuticle without spinulose reticulation *Brachycaudus helichrysi*

***Hiptuge* (incl. *Hiptage*)**

H. madablota

Malpighiaceae

Aphis craccivora

Hirschfeldia

H. incana (incl. *adpressa*)

Cruciferae

[*Aulacorthum hirschfeldii* Rusanova, 1942 (nomen nudum)]
Brevicoryne brassicae; *Lipaphis pseudobrassicae*;
Myzus persicae

Use key to aphids on *Brassica*.

Hispidella

H. hispanica

Compositae

Macrosiphum euphorbiae; *Uroleucon mierae*

Couplet to separate these two species:-

(Both species have SIPH with subapical polygonal reticulation.)

- ANT and SIPH black, and legs brown-black on distal basal parts of femora and tibiae. Dorsal hairs all arising from dark sclerites, and pre- and postsiphuncular sclerites present *Uroleucon mierae*
- ANT, SIPH and legs mainly pale. Dorsum without any dark markings *Macrosiphum euphorbiae*

Histiopteris

H. incisa

Dennstaedtiaceae

Aphis gossypii

Hoffmannia

H. ghiesbreghtii

Rubiaceae

Aphis gossypii

Hoffmannseggia

H. falcaria

Leguminosae

Aphis craccivora

Holarrhena

H. antidysinterica

Apocynaceae

Aphis gossypii, *spiraecola*

Use key to polyphagous aphids, p. 1020.

Holboellia

H. latifolia

Lardizabalaceae

Hillerislambersia darjeelingi; *Sinonipponaphis holboelliae*

HOST LISTS AND KEYS

Couplet for separation of apterae of these two species:–

- Dorsal cuticle of head, thorax and most abdominal segments fused into a sclerotic oval carapace, covered with numerous conical spine-like pustules. ANT 4-segmented, c.0.2× BL, not visible from above. SIPH as pores on dark sclerites. Cauda knobbed, anal plate bilobed
Sinonipponaphis holboelliae
- Dorsal cuticle membranous and divided normally, bearing long, finely-pointed hairs up to 5.5× ANT BD III. ANT 6-segmented, 0.65–0.9× BL. SIPH tubular, thick, tapering, with distal polygonal reticulation. Cauda short, tongue-shaped, 1.0–1.5× its basal width, and anal plate entire
Hillerislammersia darjeelingi

Holcus

H. halepensis see *Sorghum halepense*

H. lanatus

H. mollis

H. sorghum see *Sorghum vulgare*

Holcus sp.

Gramineae

Anoecia corni; *Atheroides serrulatus*;
Cryptaphis poae; *Diuraphis holci*; *Forda formicaria*;
Geoica setulosa, utricularia; *Hyalopteroides humilis*;
Laingia psammae; *Melanaphis pyraria*;
Metopolophium dirhodum, festucae;
Rhopalosiphum nymphaeae, padi;
Schizaphis graminum ssp. *holci*;
Sitobion avenae, fragariae; *Tetraneura ulmi*
Anoecia corni; *Cryptaphis poae*; *Diuraphis holci*;
Rhopalosiphum padi; *Schizaphis holci*;
Sipha glyceriae, maydis; *Sitobion avenae*; *Tetraneura ulmi*
Sipha flava

Use key to apterae of grass-feeding aphids under *Digitaria*.

Holmskioldia

H. sanguinea

Verbenaceae

Aphis gossypii, spiraecola; *Brachycaudus helichrysi*;
Myzus ornatus

Use key to polyphagous aphids, p. 1020.

Holodiscus

H. discolor

Rosaceae

Acyrtosiphon sp. nr *pseudodirhodum* (California, BMNH colln); *Aphis craccivora, fabae, holodisci, schuhi*;
Illinoia spiraeae
Macrosiphum clydesmithi, euphorbiae, holodisci, pteridis

Key to apterae on *Holodiscus*:–

1. Body oval. ANT tubercles weakly developed. ANT shorter than BL. Dorsal abdomen with or without dark markings. SIPH dark, without subapical polygonal reticulation. ABD TERG 1 and 7 with marginal tubercles (MTu) 2
- Body spindle-shaped. ANT tubercles well developed, with divergent inner faces. ANT longer than BL. Dorsal abdomen without dark markings. SIPH pale or dusky, usually with subapical polygonal reticulation. ABD TERG 1 and 7 without MTu 5

2. SIPH very short, about as long as their basal widths and shorter than the pale/dusky cauda. Dorsal abdomen without dark markings *Aphis schuhi*
- SIPH longer than their basal widths and longer than the dark cauda. Dorsal abdomen with dark markings 3
3. Dorsal abdomen with an extensive solid dark shield. Longest hairs on ANT III 0.4–0.8× BD III. Cauda tapering to a blunt point, with 4–9 hairs *Aphis craccivora*
- Dorsal abdomen with dark spots or patches, no solid dark shield. Longest hairs on ANT III 0.8–2.2× BD III. Cauda rounded at apex, with 8–24 hairs 4
4. ANT PT/BASE 1.2–1.5. SIPH 2.0–2.2× cauda, which bears 9–12 hairs *Aphis holodisci*
- ANT PT/BASE 1.7–3.5. SIPH 0.7–1.8× cauda, which bears 11–25 hairs *Aphis fabae*
5. SIPH 0.12–0.15× BL, 2.7–3.6× diameter at midlength, c.1× cauda, and without subapical polygonal reticulation *Acyrtosiphon* sp. nr. *pseudodirhodum* (California, BMNH colln)
- SIPH 0.29–0.45× BL, 9–20× diameter at midlength, 1.5–3.5× cauda, and usually with subapical polygonal reticulation 6
6. Longest hairs on ANT III 0.6–1.0× BD III. R IV+V 0.80–1.16× HT II. Cauda with 8–19 hairs 7
- Longest hairs on ANT III 0.15–0.5× BD III. R IV+V 1.18–1.4× HT II. Cauda with 6–9, usually 7, hairs 8
7. SIPH 0.25–0.35× BL, 1.7–2.3× cauda, which bears 8–12 hairs. R IV+V 0.8–1.0× HT II *Macrosiphum euphorbiae*
- SIPH 0.4–0.45× BL, 2.5–2.8× cauda, which bears 13–19 hairs. R IV+V 0.97–1.16× HT II *Macrosiphum holodisci*
8. SIPH weakly clavate, c.15× as long as their greatest diameter on distal half *Illinoia spiraeae*
- SIPH cylindrical on distal half, c.20× as long as their greatest diameter on distal half 9
9. Hairs on ANT and dorsum mostly very short, thick and clavate; those on ANT III 0.15–0.3× BD III. R IV+V 0.13–0.17 mm, 1.3–1.4× HT II, which is 0.10–0.12 mm. SIPH often lacking polygonal reticulation, or with 1–2 ill-defined rows *Macrosiphum clydesmithi*
- Hairs on ANT and dorsum cylindrical with blunt apices; those on ANT III 0.3–0.5× BD III. R IV+V 0.16–0.18 mm, 1.18–1.32× HT II, which is 0.12–0.14 mm. SIPH with 3–5 rows of polygonal reticulation *Macrosiphum pteridis*

Holoschoenus* see *Scirpoides*H. vulgaris* see *Scirpoides holoschoenus****Holosteum****H. umbellatum***Caryophyllaceae***Myzus ascalonicus****Homalocenchrus* see *Leersia******Homogyne****H. alpina***Compositae***Brachycaudus helichrysi*; *Capitophorus similis*

Couplet for separating these two species:–

- SIPH long and thin, curved outwards distally, 0.25–0.37× BL and 3.7–5.0× cauda, which is tongue-shaped. Hairs on front of head and dorsal body capitate *Capitophorus similis*
- SIPH short, conical, 0.07–0.10× BL and 0.8–1.5 (–2.0)× cauda, which is helmet-shaped and not longer than its basal width. Hairs not capitate *Brachycaudus helichrysi*

HOST LISTS AND KEYS

Homonoia

H. ripatria

Honkenya

H. peplodes

Use key to apterae on *Cerastium*.

Hoplophyllum

H. bloomeri see *Ericameria*

H. tuberculatum

Hordeum

H. avenaceum

H. brachyantherum

H. brevisubulatum

H. bulbosum

H. caespitosum

H. comosum

H. distichon

H. hexastichon see *vulgare*

H. jubatum

H. leporinum

H. murinum

H. nodosum

H. pusillum

H. sativum see *vulgare*

H. secalinum

H. spontaneum

H. stenostachys

Euphorbiaceae

[*Cavariella aegopodii*]

Caryophyllaceae

Acyrtosiphon auctum; *Myzus ascalonicus*

Compositae

Aphis terricola

Gramineae

Rhopalosiphum padi

Sipha glyceriae; *Sitobion fragariae*

Forda riccobonii; *Sipha elegans*; *Sitobion avenae*, *miscanthi*

Diuraphis noxia; *Forda formicaria*; *Sipha elegans*, *maydis*;

Sitobion avenae, *fragariae*

Schizaphis graminum

Diuraphis noxia

Diuraphis noxia;

Metopolophium dirhodum, *festucae* ssp. *cerealium*;

Rhopalosiphum maidis, *padi*; *Sitobion avenae*, *fragariae*

Anoecia corni, *Anoecia* sp. (Manitoba, Canada; BMNH colln, leg. A.G. Robinson); [*Pemphigus betae*];

Rhopalosiphum maidis, *padi*; *Schizaphis graminum*;

Sitobion alopecuri, *avenae*, *fragariae*

Diuraphis noxia; *Israelaphis ilharcoi*;

Rhopalosiphum maidis; *Schizaphis graminum*;

Sitobion avenae, [*longisiphon* Rusanova, 1942 (nomen nudum)]

Anoecia corni, *vagans*; *Aphis craccivora*;

Aploneura lentisci; *Atheroides serrulatus*;

Baizongia pistaceae; *Diuraphis noxia*; *Geoica setulosa*;

Israelaphis carmini, *ilharcoi*;

Metopolophium dirhodum, *fasciatum*, *festucae*, *festucae* ssp. *cerealium*;

Paracletus bykovi; *Rhopalosiphum maidis*, *padi*;

Schizaphis graminum; *Sipha elegans*, *maydis*;

Sitobion avenae, *fragariae*;

Tetraneura [*reticulata* del Guercio, 1920)], *ulmi*

Schizaphis graminum

Schizaphis graminum; *Sitobion avenae*

Diuraphis noxia

Rhopalosiphum maidis

Schizaphis graminum

- H. vulgare* (incl. *hexastichon*, *sativum*) *Anoecia corni*, *vagans*; *Aploneura lentisci*;
Baizongia pistaceae; *Carolinaia rhois*;
Cavariella aquatica; *Diuraphis noxia*;
Forda formicaria, *marginata*, *rotunda*;
Geoica harpazi, *lucifuga*, *utricularia*;
Hysteroneura setariae; *Macrosiphum euphorbiae*;
Metoplophium dirhodum, *festucae* ssp. *cerealium*;
Myzus persicae; *Paracletus cimiciformis*, *subnudus*;
Rhopalosiphum maidis, *padi*, *rufiabdominale*;
Schizaphis graminum; *Sipha elegans*, *flava*, *maydis*;
Sitobion akebiae, *avenae*, *fragariae*, *graminis*, *miscanthi*,
 [rosaeiformis];
Tetraneura africana, *fusiformis*, *radicicola*, *ulmi*
Hordeum spp. *Anoecia graminis*; *Diuraphis frequens*;
Melanaphis pyrararia; *Neomyzus circumflexus*

Use key to apterae of grass-feeding aphids under *Digitaria*.

Horkelia

H. fusca

Use key to aphids on *Potentilla*

Hornstedtia

H. mollis

(or try key under *Hedychium*)

Hortensia see Hydrangea

Hoslundia

H. opposita

Hosta (incl. Funkia)

H. japonica

H. lancifolia

H. montana

H. rectifolia

H. sieboldiana

H. subcordata

H. undulata

H. ventricosa (incl. *caerulea*)

Use key to polyphagous aphids, p. 1020.

Hottonia

H. palustris

Rosaceae

Chaetosiphon ?fragaeifolii

Zingiberaceae

Astegopteryx styracophila

Labiatae

Uroleucon compositae

Hostaceae

[*Nectarosiphon obako* Shinji, 1922 (nomen dubium)]

Aphis fabae

Aulacorthum solani

Aphis fabae

Aulacorthum solani; *Macrosiphum euphorbiae*

Aphis fabae, [sambuci]

Aphis fabae

Aphis ?fabae

Primulaceae

Rhopalosiphum nymphaeae

HOST LISTS AND KEYS

Hovenia see Blackman and Eastop (1994)

Hoya

H. carnosa
H. longifolia
H. viridis

Asclepiadaceae

Aphis nerii; *Myzus persicae*
Aphis asclepiadis, *nerii*
Aphis asclepiadis (India)

Use key to apterae on *Asclepias*.

Hulthemia see *Rosa*

Humularia

H. welwitschii

Leguminosae

Neoantalus humulariae

Humulus

H. japonicus see *scandens*
H. lupulus

Cannabidaceae

Aphis fabae, *gossypii*, [*lupuli*]; *Aulacorthum solani*;
Macrosiphum euphorbiae, *hamiltoni*; *Myzus persicae*;
Phorodon cannabidis, *humuli*, *humulifoliae*;
[*Rhodobium porosum* (as *Metopolophium humulisuctum*)];
Rhopalosiphoninus staphyleae
Aphis helianthi
Aphis humuli; *Karamicrosiphum humuliosum*;
Phorodon humulifoliae, *japonensis*
Aphis spiraecola

H. lupulus × *neomexicanus*
H. scandens (incl. *japonicus*)

Humulus sp.

Key to apterae on *Humulus*:-

(See Blackman and Eastop, 2000, for an illustrated key to common aphids on hops.)

1. ANT tubercles weakly developed, not projecting beyond middle of front of head in dorsal view **2**
– ANT tubercles well developed **3**
2. ANT 5-segmented in both apt. and al. ABD TERG 1 and 7 without marginal tubercles (MTu) *Aphis humuli*
– ANT 6-segmented (rarely 5-segmented in midsummer dwarf apt.). ABD TERG 1 and 7 with MTu
go to key to polyphagous aphids, starting at couplet 24
3. ANT tubercles with finger-like forward projections, at least half as long as ANT I **4**
– ANT tubercles without finger-like projections **7**
4. Dorsal hairs capitate, including those on ANT tubercles and ANT I–III. Longest hairs on ANT III about equal to BD III *Phorodon cannabidis*
– Dorsal and ANT hairs with blunt or pointed apices. Longest hairs on ANT III less than 0.5 × BD III **5**
5. SIPH with distal part strongly curved outwards, swollen on the curve and then narrowing abruptly, the narrow section being completely smooth, the rest coarsely imbricated *Phorodon humulifoliae*
– SIPH with distal part slightly curved outwards but tapering gradually over most of length, there being no abrupt transition to a smooth narrow apical section **6**
6. Finger-like projection on ANT tubercle reaching apex of ANT I or beyond, its length greater than that of ANT II. R IV+V 1.1–1.35 × HT II *Phorodon humuli*

- Finger-like projection on ANT tubercle not reaching apex of ANT I, its length less than that of ANT II. R IV+V 1.35–1.6× HT II *Phorodon japonensis*
- 7. Cuticle of head spiculose or nodulose, with inner faces of ANT tubercles scabrous and steep-sided, parallel or apically convergent. SIPH without polygonal reticulation **8**
- Cuticle of head smooth, inner faces of ANT tubercles divergent. SIPH with a subapical zone of polygonal reticulation **10**
- 8. SIPH markedly swollen, with maximum diameter of swollen part at least 1.5× minimum diameter of basal part. Dorsal abdomen with dark markings *Rhopalosiphoninus staphyleae*
- SIPH tapering, cylindrical or slightly swollen. Dorsal abdomen without dark markings **9**
- 9. SIPH slightly clavate. ANT 0.7–1.0× BL, and PT/BASE 2.8–4.5. ANT III without rhinaria *Myzus persicae*
- SIPH tapering or cylindrical on distal half. ANT 1.1–1.3× BL, and PT/BASE 4.0–5.5. ANT III with (0–) 1–2 (–4) rhinaria near base *Aulacorthum solani*
- 10. First tarsal segments with 4 hairs. ANT PT/BASE less than 5. ANT III with 11–12 rhinaria. ANT and dorsal body hairs expanded apically *Karamicosiphum humulosum**
- First tarsal segments with 3 hairs. ANT PT/BASE more than 5. ANT III with 1–10 rhinaria. ANT and dorsal body hairs blunt or pointed **11**
- 11. SIPH slightly swollen on distal half proximal to reticulated section, which extends for less than 0.1 of SIPH length. SIPH 2.4–2.6× cauda *Macrosiphum hamiltoni*
- SIPH cylindrical on distal half, with reticulation extending 0.13–0.2 of length. SIPH 1.7–2.2× cauda *Macrosiphum euphorbiae*

Hyacinthus*H. orientalis***Hyacinthaceae***Aphis gossypii*; *Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Hyalaea* see *Centaurea***Hybanthus* (incl. *Ionidium*)***H. concolor***Violaceae***Myzus persicae****Hydrangea* (incl. *Calypttranthe*)***H. aspera***Hydrangeaceae***Aphis gossypii*; *Aulacorthum solani*;*Tuberoaphis hydrangeae**H. hortensis**Aphis nerii*; *Aulacorthum solani*;*Macrosiphum euphorbiae*; *Neomyzus circumflexus*;[*Rhodobium porosum*]*H. involucrata**Macromyzus woodwardiae**H. macrophylla**Aphis gossypii*; *Aulacorthum magnoliae*, *solani*;*Macromyzus woodwardiae*; *Macrosiphum euphorbiae*;*Myzus philadelphia*; *Neomyzus circumflexus*;*Rhopalosiphoninus hydrangeae*; *Toxoptera odinae**H. paniculata**Aphis fabae*; *Eumyzus darjeelingensis*;*Rhopalosiphoninus hydrangeae*

HOST LISTS AND KEYS

H. petiolaris

?*Myzus* sp. (BMNH colln, Japan, leg. M. Miyazaki);
Rhopalosiphoninus sp. (BMNH colln, Japan, leg. M.

Miyazaki); *Taiwanomyzus montanus*

H. robusta

Tuberoaphis hydrangeae ssp. *digitata*

H. scandens

Eumyzus hydrangi; *Rhopalosiphoninus hydrangeae*

H. strigosa

Aphis gossypii; *Aulacorthum solani*

Hydrangea ssp.

Aphis spiraecola; *Myzus ornatus*, *persicae*;

Tubicauda hydrangeae

Key to apterae on *Hydrangea*:-

1. Dorsal body hairs arising from finger-like or tapering processes that are much longer than their basal widths (e.g., Figure 32a, b) 2
 - Dorsal body hairs not arising from finger-like processes 4
2. Longest dorsal abdominal processes only about 0.05 mm long *Tuberoaphis hydrangeae**
 - Longest dorsal abdominal processes more than 0.1 mm long 3
3. BL 1.1–2.2 mm. Spinal abdominal processes 0.12–0.21 mm long (fundatrix, Figure 32a) or 0.05–0.13 mm long (2nd generation), with thick apices. Eyes without evident ocular tubercles *Tuberoaphis hydrangeae* ssp. *digitata*
 - BL c.3.1–3.2 mm. Spinal abdominal processes 0.33–0.54 mm long (fundatrix), with narrow apices (Figure 32b). Ocular tubercles evident at posterior edge of eye *Macromyzus woodwardii**
4. Cauda swollen on basal half, narrowing abruptly to a cylindrical apical section, the swollen part bearing 4 hairs. Dorsal body hairs long and finely pointed; the longest hairs on ABD TERG 3 are 80–85 µm, 3.5–4.0× ANT BD III *Tubicauda hydrangeae**
 - Cauda tapering, triangular, tongue or finger-shaped, sometimes constricted in the middle but without a much narrower cylindrical apical section, and often with more than 4 hairs. Dorsal body hairs blunt or acutely pointed, less than 60 µm, less than 3.5× ANT BD III 5

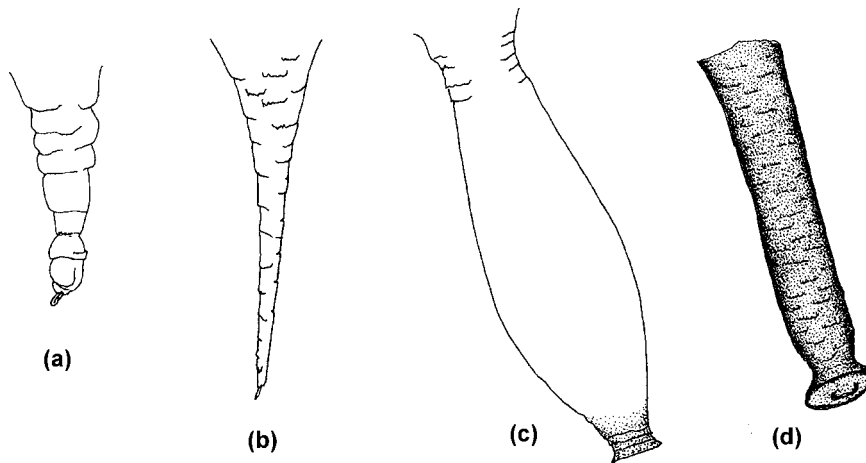


Figure 32 Apterae on *Hydrangea* (also *Deutzia*). (a) Dorsal process of *Tuberoaphis hydrangeae* ssp. *digitata* (fundatrix), (b) dorsal process of *Macromyzus woodwardii* (fundatrix; after Miyazaki, 1972), (c) SIPH of *Rh. hydrangeae*, (d) SIPH of *Nippodysaphis deutziae*.

5. SIPH 2.55–4.3× cauda, and slightly to markedly clavate. (Al. with rhinaria distributed ANT III 13–64, IV 0–22, V 0–6) **6**
 – SIPH less than 2.5× cauda, tapering, cylindrical or clavate. (Al. generally with less rhinaria) **10**
6. SIPH dark and imbricated **7**
 – SIPH pale and smooth **8**
7. ANT III with 3–26 rhinaria. Tibiae pale. Cauda tongue- or finger-shaped, rounded at apex, with 4–5 hairs *Taiwanomyzus montanus*
 – ANT III without rhinaria. Tibiae dusky/dark. Cauda triangular, with 6–7 hairs *Myzus philadelphi*
8. SIPH (Figure 32c) thick and markedly clavate, 2.55–3.2× cauda; maximum width of swollen part 1.3–1.9× minimum width of basal part, and about equal to or greater than R IV+V. ANT PT/BASE 3.8–4.9. ANT III usually with 1–3 rhinaria near base *Rhopalosiphoninus hydrangeae*
 – SIPH less clavate, 3.1–4.3× cauda; maximum width of swollen part 1.2–1.3× minimum width of basal part, and 0.4–0.6× R IV+V. ANT PT/BASE 2.0–2.7. ANT III without rhinaria. (Possibly fundatrices of species migrating in second generation to secondary host) **9**
9. ANT hairs very short and inconspicuous, less than 0.3× BD III. ANT PT/BASE 2.0–2.1. SIPH 3.1–3.3× cauda *Rhopalosiphoninus* sp., Japan (Miyazaki 2388, 2419)
 – ANT hairs evident, 0.6–0.7× BD III. ANT PT/BASE c.2.6. SIPH 4.2–4.3× cauda
 ?*Myzus* sp., Japan (Miyazaki 2417, 2434)
10. Head densely spiculose or nodulose, with ANT tubercles weakly developed and divergent. Dorsal hairs acutely pointed, with slightly tuberculate bases; 0.8–3× ANT BD III **11**
 – **Either** head is without spicules or nodules or, **if** head is spiculose or nodulose then ANT tubercles are well developed and steep-sided, with inner faces parallel or apically convergent, and dorsal hairs are very short and blunt (less than 0.5× ANT BD III) go to key to polyphagous aphids, p. 1020
11. Longest hairs on ABD TERG 2–5 about equal to ANT BD III. R IV+V 0.8–1.0× HT II *Eumyzus darjeelingensis**
 – Longest hairs on ABD TERG 2–5 more than 2× ANT BD III. R IV+V 1.0–1.2× HT II *Eumyzus hydrangi*

Hydrilla*H. verticillata***Hydrocharitaceae***Rhopalosiphum nymphaeae***Hydrocharis***H. morus-ranae**Hydrocharis* sp.**Hydrocharitaceae***Rhopalosiphum nymphaeae*[*Uroleucon obscurum* – Börner, 1952 (error?)]**Hydrochloa** see *Luziola***Hydrocleys***H. nymphoides***Limnocharitaceae***Rhopalosiphum nymphaeae***Hydrocotyle***H. bonariensis**H. sibthorpiodes**H. vulgaris***Umbelliferae***Aulacorthum solani**Aulacorthum solani*; *Neomyzus circumflexus**Aulacorthum solani*; *Hyadaphis coriandri*;*Pemphigus* sp. (?*protospirae*); *Rhopalosiphum nymphaeae**Hydrocotyle* spp.*Myzus ornatus*; *Smynthuodes betae*

HOST LISTS AND KEYS

Key to apterae on *Hydrocotyle*:-

1. SIPH very short, 0.60–0.82× cauda; thick at base and swollen distally, constricted just proximal to the well-developed flange *Hyadaphis coriandri*
– SIPH (if present) much longer than cauda; clavate, cylindrical or tapering 2
2. SIPH clavate. Dorsal cuticle with a reticulate sculpture consisting of bead-like spinules *Rhopalosiphum nymphaeae*
– SIPH (if present) not clavate **and** dorsal cuticle without bead-like spinulose reticulation
go to key to polyphagous aphids, p. 1020

Hydrophyllum

H. tenuipes

Hydrophyllaceae

Aphis sp. (Leonard, 1974: 102)

Hygrohypnum

H. luridum

Hypnaceae

Pemphigus hydrophilus (?)

Hygrophila

One polyphagous aphid species, *Aphis gossypii*, is recorded from three *Hygrophila* spp.; *auriculata*, *costata*, *difformis*.

Acanthaceae

Hylocomium

H. brevirostre

H. splendens

Hylocomiaceae

Muscaphis musci

[*Jacksonia papillata*]; *Muscaphis escherichi*;

Pseudacaudella rubida

Use key to apterae of moss-feeding aphids under *Polytrichum*.

Hylotelephium see *Sedum*

Hymenanthera see *Melicytus*

Hymenocardia see Blackman and Eastop (1994)

Hymenocephalus

H. rigidus

Compositae

Uroleucon hymenocephali

Hymenodictyon, *Hymenosporum* see Blackman and Eastop (1994)

Hyoscyamus

H. albus

H. niger

Hyoscyamus sp.

Solanaceae

Aulacorthum solani

Aphis fabae, [*hyoscyami* Kittel, 1827 – invalid name];

Aulacorthum solani; *Myzus persicae*

Macrosiphum euphorbiae

Use key to polyphagous aphids, p. 1020.

Hyoseris

H. radiata

Compositae

Aphis gossypii; *Macrosiphum euphorbiae*;

Nasonovia ribisnigri;

Uroleucon sonchi, *Uroleucon* sp. (Spain, BMNH colln)

Key to apterae on *Hyoseris*:-

1. SIPH with a subapical zone of polygonal reticulation 2
– SIPH without subapical reticulation 4
2. SIPH mainly or wholly pale, sometimes darker apically. ANT III with 1–10 rhinaria. First tarsal segments with 3 hairs *Macrosiphum euphorbiae*
– SIPH wholly dark or somewhat paler in middle. ANT III with 11–50+ rhinaria. First tarsal segments with 5 hairs 3
3. ANT III with 11–48 rhinaria. Pre-siphuncular sclerites and scleroites at bases of dorsal hairs weakly developed or absent *Uroleucon sonchi*
– ANT III with more than 50 rhinaria. Well developed pre-siphuncular sclerites and dark scleroites at bases of dorsal hairs *Uroleucon* sp. (Spain, BMNH colln)
4. ANT III with 3–36 rhinaria. ANT PT/BASE 7.0–11.4. Thoracic spiracular apertures much larger than abdominal ones. ABD TERG 1 and 7 without marginal tubercles (MTu) *Nasonovia ribisnigri*
– ANT III without rhinaria. ANT PT/BASE 2.1–3.2. Thoracic and abdominal spiracles of similar size. ABD TERG 1 and 7 with MTu *Aphis gossypii*

(or try key to polyphagous aphids, p. 1020)

Hyparrhenia

H. cymbaria
H. filipendula
H. rufa

H. variabilis

Gramineae

[*Sitobion* sp. (Millar, 1994)]
Rhopalosiphum maidis
Hysteroneura setariae;
Sitobion africanum, graminis, [*Sitobion* sp. (Millar, 1994)];
Tetraneura fusiformis
Pseudaphis sijui; [*Sitobion* sp. (Millar, 1994)]

Use key to apterae of grass-feeding aphids under *Digitaria*.

Hypecoum

H. erectum
H. procumbens

Fumariaceae

Lipaphis jungarica
Aphis fabae, gossypii

Key to apterae on *Hypecoum*:-

- SIPH pale. R IV+V c.0.75× HT II. ABD TERG 1 and 7 without marginal tubercles (MTu), which may however be present on ABD TERG 6. ABD TERG 8 with a median process *Lipaphis jungarica*
- SIPH dark. R IV+V 0.9–1.35× HT II. ABD TERG 1 and 7 with MTu. ABD TERG 8 without a median process go to key to polyphagous aphids, p. 1020, starting at couplet 32

***Hypericum* (incl. *Ascyrum*)**

H. aethiopicum
H. alpinum
H. androsaemum
H. arnoldianum
H. ascyron (incl. *gebleri*)
H. balearicum
H. calycinum

Guttiferae

Aphis chloris
Acyrtosiphon malvae; Aulacorthum solani
Aphis chloris, gossypii, Aphis sp. (Stroyan, 1984: 124)
Macrosiphum euphorbiae; Myzus persicae
Aphis hypericiphaga, hypericiradicis, spiraeicola
Aphis chloris, gossypii
Aphis gossypii, Aphis sp. (Stroyan, 1984: 124);
Myzus persicae; Neomyzus circumflexus

HOST LISTS AND KEYS

- H. canadense*
H. canariense
H. cernuum see *oblongifolium*
H. chinense see *monogynum*
H. crispum see *triquetifolium*
H. densiflorum
- H. elatum* see \times *inodorum*
H. foliosum
H. forrestii see *patulum*
H. gebleri see *ascyron*
H. gentianoides
H. hircinum
- H. hirsutum*
H. hookerianum
- H.?* *hypericoides*
H. hyssopifolium
H. \times inodorum (incl. *elatum*)
H. kalmianum
H. lanceolatum (records probably based on *revolutum*)
H. linarifolium
H. lonicera
H. mitchellianum
H. monogynum (incl. *chinense*)
H. montanum
H. oblongifolium (incl. *cernuum*)
H. olympicum (incl. *grandiflora*, *polyphyllum*)
H. patulum (incl. *forrestii*)
- H. perforatum*
- H. polyphyllum* see *olympicum*
H. prolificum
H. pulchrum
H. quadrangulum (see *tetrapterum*)
H. revolutum (see also *lanceolatum*)
- H. roeperianum*
H. scabrum
- Aphis gossypii*; *Myzus persicae*
Aphis gossypii, *spiraecola*; *Toxoptera aurantii*
- Hyalomyzus triangulatus*; *Macrosiphum euphorbiae*;
Myzus ornatus
- Aphis fabae*
- Aphis middletonii* group
Aphis chloris, [*Aphis* sp. (Leonard, 1972a)];
Aulacorthum solani; *Macrosiphum euphorbiae*;
Myzus persicae
Aphis chloris, *fabae*
 [*Aphis* sp. (Leonard, 1972a)]; *Aulacorthum solani*;
Myzus ornatus, *persicae*
Aphis spiraecola
Aphis chloris
Aphis gossypii; *Macrosiphum euphorbiae*; *Myzus persicae*
Aphis hyperici
Myzus ornatus; *Sitobion africanum*
- Aphis chloris*
Aphis spiraecola
Hyalomyzus mitchellensis
Myzus ornatus, *persicae*
Aphis fabae
Aphis gossypii; *Myzus persicae*
Aulacorthum solani; *Myzus ornatus*, *persicae*
- Aphis chloris*, *gossypii*; *Aulacorthum solani*;
Myzus ornatus, *persicae*; [*Wahlgreniella nervata*]
Aphis chloris, *craccivora*, *fabae*, *gossypii*, [*oenotherae*
 (Leonard, 1974)], *spiraecola*
Aulacorthum solani; *Macrosiphum euphorbiae*;
Myzus persicae;
 [*Pergandeida polygonata* Nevsky var. *hyperici* Rusanova,
 1942 (nomen nudum)]
- Aphis hyperici*; *Hyalomyzus triangulatus*
Aphis chloris
- Aphis gossypii*; *Aulacorthum solani*;
Macrosiphum euphorbiae; *Myzus persicae*
Aphis chloris, *gossypii*
Aphis pavlovskii

- H. tetrapterum* (incl. 'quadrangulum' cultivars) *Aphis chloris, fabae*
H. triquetrifolium (incl. *crispum*) *Aphis chloris; Macrosiphum euphorbiae*
Hypericum spp. *Metopolophium darjeelingense*

Key to apterae on *Hypericum*:-

1. Dorsal cuticle of head spiculose or strongly wrinkled, and ANT tubercles well developed with inner faces scabrous and steep-sided or apically convergent, or with rounded, convergent processes **2**
 – Dorsal cuticle of head smooth or slightly wrinkled, and ANT tubercles absent, weakly developed or, if well developed, then with inner faces smooth and divergent **4**
2. SIPH clavate; swollen on distal 0.7–0.8, constricted subapically, and with narrower basal section. ANT PT/BASE 0.8–2.1. (Al. with secondary rhinaria on ANT IV and V) **3**
 – SIPH tapering, cylindrical or clavate, but if clavate then without a subapical constriction, and with ANT PT/BASE 2.8–4.5. (Al. without secondary rhinaria on ANT IV and V)
 go to key to polyphagous aphids, p. 1020, starting at couplet 5
3. ANT PT/BASE 1.5–2.1. Dorsal cuticle of head spinulose. SIPH often dusky to dark. (Al. with secondary rhinaria distributed III 19–28, IV 13–21, V 3–8) *Hyalomyzus mitchellensis*
 – ANT PT/BASE 0.8–1.0. Dorsal cuticle of head strongly wrinkled. SIPH pale. (Al. with secondary rhinaria distributed ANT III 11–19, IV 6–10, V 3–6) *Hyalomyzus triangulatus*
4. SIPH with a subapical zone of polygonal reticulation (at least 4–5 rows of closed cells) **5**
 – SIPH without polygonal reticulation **6**
5. SIPH black. Dorsal abdomen with variably developed dark sclerotisation. Longest ANT hairs less than 0.5× BD III *Sitobion africanum*
 – SIPH pale. Dorsal abdomen without dark sclerotisation. Longest ANT hairs 0.6–1.0× BD III *Macrosiphum euphorbiae*
6. SIPH 0.3–0.7× cauda **7**
 – SIPH 0.8–2.5× cauda **8**
7. Cauda with 5–6 hairs *Aphis hyperici*
 – Cauda with 6–11 hairs *Aphis hypericiphaga**
8. ANT tubercles well developed. ANT PT/BASE 3.0–7.5. SIPH pale, 1.5–2.5× cauda. ABD TERG 1 and 7 without marginal tubercles (MTu) **9**
 – ANT tubercles absent or weakly developed. ANT PT/BASE 1.5–4.5. SIPH dark, 0.8–2.2× cauda. ABD TERG 1 and 7 with MTu **10**
9. ANT PT/BASE 4.8–7.5. Femora without spinules. First tarsal segments with 3 hairs (1 sense peg) *Acyrtosiphon malvae*
 – ANT PT/BASE 3.0–3.9. Femora with many small blunt spinules ventrally. First tarsal segments usually with 4 hairs (2 sense pegs) *Metopolophium darjeelingensis*
10. ABD TERG 2–4 or 2–6 as well as 1 and 7 with large, dome-like MTu **11**
 – MTu only consistently present on ABD TERG 1 and 7 **12**
11. ANT PT/BASE 2.2–2.8. MTu present on ABD TERG 1–4 and 7 *Aphis hypericiradicis**
 – ANT PT/BASE 1.5–1.7. MTu present on all of ABD TERG 1–7 *Aphis pavlovskii**
12. Cauda usually paler than SIPH, and bearing 4–8 hairs. Dorsum without dark markings. Longest hairs on ANT III 0.3–0.5× BD III **13**

HOST LISTS AND KEYS

- SIPH and cauda both black; cauda with 4–25 hairs, but if 8 or less then either dorsal abdomen has a solid black shield or longest hairs on ANT III are more than 0.5× BD III
go to key to polyphagous aphids, p. 1020, starting at couplet 24
- 13. Posterior hair on hind trochanter 0.37–0.53× length of trochantrofemoral suture. ANT PT/BASE 1.5–2.1 *Aphis chloris*
- Posterior hair on hind trochanter 0.55–1.54× length of trochantrofemoral suture. ANT PT/BASE 1.7–3.2 **14**
- 14. R IV+V 1.1–1.5× HT II. (Al. without rhinaria on ANT IV) *Aphis gossypii*
- R IV+V 0.8–0.95× HT II. (Al. with 2–6 rhinaria on ANT IV) *Aphis* sp. (Stroyan, 1984: 124)

Hypnum

H. cupressiforme

Hypnum sp.

Hypnaceae

Muscaphis escherichi

Melaphis rhois

Use key to apterae of moss-feeding aphids under *Polytrichum*.

Hypochoeris

H. achyrophorus

H. brasiliensis

H. glabra

H. laevigata

H. maculata

H. radicata

H. uniflora

Hypochoeris spp.

Compositae

Uroleucon hypochoeridis

Uroleucon ambrosiae ssp. *lizerianum*

Aphis hypochoeridis, *picridicola*; *Brachycaudus helichrysi*;

Uroleucon hypochoeridis

Uroleucon hypochoeridis

Aphis hypochoeridis; *Uroleucon cichorii*, *hypochoeridis*

Aphis [*evansi*], *fabae*, *gossypii*, *hypochoeridis*, *nasturtii*,
picridicola, *pseudocardui*, *spiraecola*;

Brachycaudus helichrysi; *Hyperomyzus carduellinus*;

Macrosiphum euphorbiae;

Myzus ascalonicus, *cymbalariae*, *ornatus*, *persicae*;

Nasonovia ribisnigri; *Neomyzus circumflexus*;

Trama caudata;

Uroleucon ambrosiae, *cichorii*, *hypochoeridis*, *sonchi*

Nasonovia ribisnigri; *Uroleucon cichorii*, *hypochoeridis*

Aphis pernilleae; *Aulacorthum palustre*, [*rufum*];

Trama troglodytes

Key to apterae on *Hypochoeris*:-

1. Hind tarsi greatly elongated, more than 0.6× hind tibiae. ANT PT/BASE less than 0.4. SIPH absent, or as pores **2**
- Hind tarsi normal. ANT PT/BASE more than 0.7. SIPH tubular **3**
2. SIPH absent. Eyes of only 3 facets *Trama troglodytes*
- SIPH present as pores on small cones. Eyes multifaceted *Trama caudata*
3. Cauda helmet-shaped or triangular, not longer than its basal width **4**
- Cauda tongue- or finger-shaped, much longer than its basal width **6**
4. Cauda helmet-shaped, with 4–6 hairs. SIPH smooth, pale, with a subapical annular incision. ANT PT/BASE 2.4–3.2. ANT III without rhinaria. Dorsum without dark markings. Spiracular apertures rounded. ABD TERG 1 and 7 without marginal tubercles (MTu) *Brachycaudus helichrysi*

- Cauda triangular, with 7–19 hairs. SIPH imbricated, dark, without a subapical annular incision. ANT PT/BASE 0.8–2.1. ANT III often with rhinaria. Dorsum usually with dark sclerotisation. Spiracular apertures reniform. ABD TERG 1 and 7 with MTu **5**
- 5.** ANT PT/BASE 1.5–2.1. Cauda with 6–12 hairs *Aphis picridicola*
- ANT PT/BASE (0.8–)1.0–1.2 (-1.4). Cauda with 13–19 hairs *Aphis pseudocardui*
- 6.** ANT tubercles absent or weakly developed. ABD TERG 1 and 7 with MTu **7**
- ANT tubercles well developed. ABD TERG 1 and 7 without MTu **9**
- 7.** Marginal hair on ABD TERG 1 is 0.14–0.6× height of adjacent MTu. ANT PT/BASE 1.5–2.7. R IV+V 1.2–2.0× HT II **8**
- Marginal hair on ABD TERG 1 is 0.7–1.8× height of adjacent MTu. ANT PT/BASE 1.8–3.7. R IV+V 0.9–1.5× HT II go to key to polyphagous aphids, p. 1020, starting at couplet 24
- 8.** R IV+V 1.6–2.0× HT II. Posterior hair on hind trochanter 0.2–0.3× length of trochantrofemoral suture. SIPH 2.4–4.2× their midlength diameters *Aphis pernilleae*
- R IV+V 1.2–1.6× HT II. Posterior hair on hind trochanter 0.4–1.0× length of trochantrofemoral suture. SIPH 3.5–7.1× their midlength diameters *Aphis hypochoeridis*
- 9.** Cuticle of head densely spiculate or nodulose, at least on ventral surface. ANT tubercles with inner faces scabrous or spiculate and parallel or apically convergent go to key to polyphagous aphids, p. 1020, starting at couplet 5
- Cuticle of head smooth or with only sparse spinules. ANT tubercles with inner faces smooth and divergent or almost parallel **10**
- 10.** SIPH with a subapical zone of polygonal reticulation (at least 4–5 rows of closed cells) **11**
- SIPH without a subapical zone of polygonal reticulation **15**
- 11.** SIPH mainly pale, with reticulation consisting of few, large cells and extending over distal 0.13–0.20 of length. ANT III with 1–10 rhinaria. Dorsal abdomen without scleroites at base of hairs. First tarsal segments with 3 hairs *Macrosiphum euphorbiae*
- SIPH dark, with reticulation consisting of numerous small cells and extending over distal 0.16–0.43 of length. ANT III with 8–97 rhinaria. Dorsal abdomen with dark scleroites at base of hairs. First tarsal segments with 5 hairs **12**
- 12.** Antesiphuncular sclerites absent or indistinct **13**
- Crescent-shaped antesiphuncular sclerites present **14**
- 13.** Coxae pale. SIPH 1.0–1.35× cauda. R IV+V 1.1–1.4× HT II *Uroleucon ambrosiae*
- Coxae dark. SIPH 1.4–2.2× cauda. R IV+V 0.73–0.88× HT II *Uroleucon sonchi*
- 14.** R IV+V 1.17–1.33× HT II, SIPH 1.4–1.8× cauda *Uroleucon cichorii*
- R IV+V 0.84–1.08× HT II. SIPH 1.25–1.5× cauda *Uroleucon hypochoeridis*
- 15.** SIPH slightly but distinctly swollen on distal half, 1.1–1.5× cauda which is constricted about 0.4 from base *Hyperomyzus carduellinus*
- SIPH tapering or cylindrical on distal half, 1.6–2.5× cauda, which is not constricted **16**
- 16.** ANT III with 3–36 rhinaria, and with longest hairs 0.7–1.1× BD III. ANT PT/BASE 7.0–11.4. Thoracic spiracles much larger than abdominal ones *Nasonovia ribisnigri*
- ANT III with 1–3 rhinaria, and with longest hairs less than 0.4× BD III. ANT PT/BASE 4.2–5.2. Thoracic spiracles similar in size to abdominal ones *Aulacorthum palustre*

HOST LISTS AND KEYS

Hypocyrta see *Nematanthus*

Hypoestes

H. phyllostachya

Acanthaceae

Macrosiphum euphorbiae

Hyptage see *Hiptuge*

Hyptis (incl. *Mesosphaerum*)

H. capitata

H. mutabilis

H. pectinata

H. procumbens

H. radiata

H. rhomboidea

H. spicata

H. spicigera

H. suaveolens

H. verticillata

Labiatae

Aphis gossypii; *Hyalomyzus eriobotryae*

Macrosiphum mesosphaeri

Aphis spiraecola; *Macrosiphum mesosphaeri*

Macrosiphum mesosphaeri

Macrosiphum mesosphaeri

Aphis gossypii

Macrosiphum mesosphaeri

Aphis gossypii

Macrosiphum mesosphaeri

Aphis spiraecola; *Macrosiphum mesosphaeri*

Key to apterae on *Hyptis*:-

1. Head densely spiculate with scabrous, convergent ANT tubercles. SIPH clavate, 2.5–2.7× cauda. R IV +V 1.5–1.8× HT II. (Al. with very numerous rhinaria on ANT III, IV and V)
Hyalomyzus eriobotryae
– Without that combination of characters **2**
2. SIPH dark except at bases, with subapical zone of polygonal reticulation on subapical 0.16–0.25. ANT tubercles well developed, with smooth, divergent inner faces. ANT dark, much longer than body, with ANT PT/BASE 5.4–6.9
Macrosiphum mesosphaeri
– Without that combination of characters go to key to polyphagous aphids, p. 1020

Hyssopus

H. officinalis

H. seravschanica

Labiatae

Aphis sp. nr *serpylli* (Switzerland, BMNH colln);

Aulacorthum solani; *Eucarazzia elegans*

Uroleucon hyssopii

Key to apterae on *Hyssopus*:-

1. SIPH dark, with a distal zone of polygonal reticulation. ANT III with numerous (c.60) rhinaria distributed along most of its length
*Uroleucon hyssopii**
– SIPH pale or dark, without polygonal reticulation. ANT III with 0–12 rhinaria **2**
2. SIPH dark, tapering, 0.12–0.14× BL and 1.3–1.9× cauda. ANT PT/BASE 1.7–2.0
Aphis sp. (Switzerland, BMNH colln)
– SIPH pale, tapering or swollen distally, 0.18–0.36× BL and 1.8–8.6× cauda. ANT PT/BASE 3.0–5.5 **3**
3. SIPH strongly swollen on distal half, 5.5–8.6× the triangular cauda, which bears 5 hairs. Alatiform apt. common with rhinaria distally on ANT III (-IV)
Eucarazzia elegans
– SIPH tapering/cylindrical, 1.8–2.6× the tongue-shaped cauda which bears 6–8, usually 7, hairs. ANT III usually with 1–3 small rhinaria near base
Aulacorthum solani

Hystrix*Hystrix patula* (= *Asperella hystrix*) *Metopolophium dirhodum*(or use key to apterae of grass-feeding aphids under *Digitaria*)**Gramineae*****Iberis****I. affinis**I. amara**I. umbellata**Iberis* sp.*Brevicoryne brassicae**Lipaphis erysimi*; *Myzus ornatus*, *persicae**Myzus persicae**Macrosiphum euphorbiae***Cruciferae**Use key to apterae on *Brassica*.***Iboza* see *Tetradenia******Ichnanthus****I. pallens**Pseudoregma panicola***Gramineae*****Ichnocarpus****I. frutescens**Aphis gossypii*, *spiraecola***Apocynaceae**

Use key to polyphagous aphids, p. 1020.

Ilex* see Blackman and Eastop (1994)**Illicium****I. anisatum**I. religiosum**I. verum***Illiciaceae***Polytrichaphis fragilis*; [*Semiaphis heraclei*];*Toxoptera aurantii**Toxoptera aurantii**Polytrichaphis illicius*Key to apterae on *Illicium*:–

1. Dorsal body hairs multiplied (ABD TERG 1–4 each with at least 8 spinopleural hairs and 1 marginal pair). SIPH dusky, or dark on distal half only. Cauda with 6–11 hairs. No stridulatory apparatus. **2**
– Dorsal body hairs not multiplied (ABD TERG 1–4 each with only 1 spinal and 1 marginal pair). SIPH black. Cauda with 10–26 hairs. Stridulatory apparatus present *Toxoptera aurantii*
2. Dorsal body hairs very long, fine and numerous, those on ABD TERG 3 maximally 3.5–4.5 X ANT BD III. ABD TERG 8 with 9–13 hairs. SIPH uniformly dusky *Polytrichaphis fragilis*
– Dorsal body hairs shorter and less numerous, those on ABD TERG 3 not more than 2.5 X ANT BD III. ABD TERG 8 with 4–5 hairs. SIPH dark basally and pale distally *Polytrichaphis illicius**

Impatiens*I. balsamina**I. bicornuta**Aphis gossypii*, *impatiens*, *nasturtii*, *spiraecola*;*Aulacorthum solani*;*Impatientinum asiaticum*, *asiaticum* ssp. *dalhousiensis*,
impatiens;*Macrosiphum euphorbiae*; *Myzus ornatus*, *persicae**Impatientinum impatiens***Balsaminaceae**

HOST LISTS AND KEYS

<i>I. biflora</i> see <i>capensis</i>	
<i>I. capensis</i> (incl. <i>biflora</i> , <i>fulva</i>)	<i>Aphis</i> [<i>cephalanthi</i>], <i>fabae</i> , <i>impatientis</i> , <i>nasturtii</i> , <i>Aphis</i> sp. (Ontario, BMNH colln), [<i>Aphis</i> sp. (Leonard, 1968)]; <i>Catamergus fulvae</i> <i>Macrosiphum euphorbiae</i> , <i>impatientis</i> , <i>pallidum</i> ; <i>Uroleucon impatiensicolens</i> <i>Impatientinum asiaticum</i>
<i>I. edgeworthii</i>	
<i>I. falcifer</i> (= <i>serrata</i>)	<i>Aphis spiraeicola</i> ; <i>Epipemphigus marginalis</i>
<i>I. fulva</i> see <i>capensis</i>	
<i>I. furcillata</i>	<i>Impatientinum impatiens</i>
<i>I. glandulifera</i>	<i>Aphis fabae</i> , <i>impatiphila</i> , <i>impatiradicis</i> , <i>Aphis</i> sp. (Ontario, BMNH colln); <i>Impatientinum asiaticum</i> , <i>impatiens</i> [<i>Aphis</i> sp. (Leonard, 1972a)]
<i>I. holstii</i>	<i>Macrosiphum pallidum</i> (or <i>impatientis</i> ?)
<i>I. lecakarata</i>	<i>Aleurodaphis impatiens</i> ; <i>Aphis fabae</i> ;
<i>I. nolitangere</i>	<i>Epipemphigus niisimae</i> ; <i>Eumyzus gallicola</i> , <i>impatiensae</i> ; <i>Hydronephus impatiens</i> ; <i>Impatientinum asiaticum</i> , <i>balsamines</i> , <i>impatiens</i> <i>Semiaphis moiwaensis</i> , <i>nolitangere</i>
<i>I. pallida</i>	<i>Aphis impatiens</i> ; <i>Catamergus fulvae</i> ; <i>Macrosiphum impatiens</i> , <i>pallidum</i> ; <i>Uroleucon impatiensicolens</i>
<i>I. parviflora</i>	<i>Impatientinum asiaticum</i> , [<i>balsamines</i>]
<i>I. purpurea-violacea</i>	<i>Aphis fabae</i> , <i>gossypii</i> , <i>spiraeicola</i> ; <i>Aulacorthum solani</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus ornatus</i>
<i>I. roylei</i>	<i>Aphis fabae</i> ; <i>Eumyzus indicus</i>
<i>I. scabrada</i>	<i>Eumyzus indicus</i> ; <i>Impatientinum asiaticum</i> ssp. <i>dalhousiensis</i>
<i>I. sultani</i>	<i>Aulacorthum solani</i> ; <i>Impatientinum balsamines</i>
<i>I. textori</i>	<i>Aleurodaphis impatiens</i> ; <i>Eumyzus impatiensae</i> ; <i>Hydronephus impatiens</i> ; <i>Impatientinum balsamines</i> , <i>impatiens</i>
<i>I. walleriana</i>	<i>Myzus persicae</i> ; <i>Neomyzus circumflexus</i>

Key to apterae on *Impatiens*:-

1. Body aleyrodiform; flattened, elongate oval, with a crenulate margin of wax glands. Cauda knobbed, anal plate bilobed *Aleurodaphis impatiens*.
- Body of more normal aphid form, and other characters do not apply 2
2. ANT 5-segmented, less than 0.25× BL, with ANT PT/BASE less than 0.5. Eyes 3-faceted, SIPH absent. Dorsal abdomen with paired spinal and pleural wax gland plates *Epipemphigus* sp(p).
- ANT usually 6-segmented, more than 0.45× BL, with ANT PT/BASE more than 1. Eyes multi-faceted, SIPH present. No dorsal wax gland plates 3
3. Dorsum with extensive dark sclerotisation 4
- Dorsum membranous, or with only localised sclerotisation 8
4. Head spiculose. Cauda short and dark, much less than 2× its basal width in dorsal view. SIPH tapering or slightly swollen on distal half, with a large flange 5
- Head not spiculose. Cauda pale, finger-like, at least 2× its basal width. SIPH tapering or cylindrical on distal half, usually with some subapical reticulation, and with a small flange 6

5. SIPH more than 3× cauda, and slightly swollen on distal half. ANT PT/BASE 4.7–5.5
Hydranaphis impatiens
 – SIPH tapering with no swelling, 1.6–2.3× cauda. ANT PT/BASE 2.6–3.7 *Eumyzus indicus**
6. Apices of tibiae pale, and apices of femora pale or dusky. ANT III with 8–17 secondary rhinaria, IV with 1–7 and V with 0–7. R IV+V 0.65–0.77× HT II. SIPH 0.64–0.77× head width across (and including) eyes. Height of ANT tubercles much less than 0.5× length of ANT I along inner side
Impatientinum balsamines
 – Apices of tibiae dark or black, distal parts of femora black. ANT III with 1–11 secondary rhinaria, IV and V with 0. R IV+V 0.84–1.0× HT II. SIPH at least 0.8× head width across eyes. Height of ANT tubercles about 0.5× length of ANT I along inner side 7
7. Basal part of SIPH with nodulose imbrication, and postsiphuncular sclerite spiculose (Figure 33a). SIPH 0.8–0.9× head width across eyes. Spiracular sclerites of abdominal segments 1 and 2 very close, often contiguous (Figure 33c)
Impatientinum asiaticum
 – Basal part of SIPH and postsiphuncular sclerite quite smooth (Figure 33b). SIPH 0.9–1.2× head width across eyes. Spiracular sclerites on abdominal segments 1 and 2 distinctly separated (Figure 33d) 7
Impatientinum impatiens
8. SIPH very small, 0.24–0.45× cauda, with apices curved inwards and flangeless (e.g., Figure 33e) 9
 – SIPH at least 0.6× cauda, and usually with at least a small flange 10
9. SIPH about as long as their basal widths, 0.2–0.3× cauda *Semiaphis nolitangere*
 – SIPH c.1.5× their basal widths, and 0.33–0.45× cauda *Semiaphis moiwaensis*
10. Head densely spiculose, at least ventrally 11
 – Head not spiculose 13
11. Dorsal hairs all very short and blunt, much shorter than ANT BD III, and without tuberculate bases or pigmented scleroites. SIPH smooth or variously imbricated. Cauda pale
 go to key to polyphagous aphids, p. 1020
 – Dorsal hairs much longer than ANT BD III, rather spine-like, with acute apices, and placed on lightly or heavily pigmented scleroites (e.g., Figure 33f). SIPH with close-set nodulose imbrication. Cauda dark 12

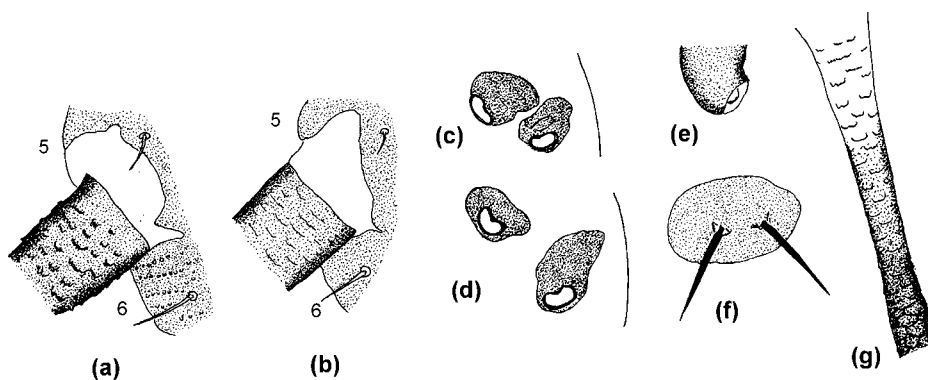


Figure 33 Apterae on *Impatiens*. (a) Base of SIPH and ABD TERG 5–6 of *Impatientinum asiaticum*, (b) same for *I. impatiens*, (c) 1st and 2nd abdominal spiracles of *I. asiaticum*, (d) same for *I. impatiens*, (e) SIPH of *Semiaphis nolitangere*, (f) dorsal hairs of *Eumyzus impatiensae*, (g) SIPH of *Catamergus fulvae*.

HOST LISTS AND KEYS

12. Dorsal hairs maximally 1.5–2.2× ANT BD III, arising from small, lightly pigmented, flat scleroites. SIPH 0.8–1.0× cauda, which is longer than its basal width *Eumyzus gallicola*
 – Dorsal hairs maximally 2.2–3.3× ANT BD III, arising from large, often heavily pigmented, somewhat domed scleroites (Figure 33f). SIPH 1.6–2.3× cauda, which is not or hardly longer than its basal width in dorsal view *Eumyzus impatiense*
13. ANT longer than BL. ANT tubercles well developed, divergent. SIPH with subapical polygonal reticulation (if rather indistinct, then SIPH are thin with pale basal half and dark distal half). ABD TERG 1 and 7 without marginal tubercles (MTu). ANT III with secondary rhinaria **14**
 – ANT shorter than BL. ANT tubercles weakly developed. SIPH without subapical polygonal reticulation. ABD TERG 1 and 7 with MTu. ANT III (or fused III+IV) without rhinaria **18**
14. SIPH rather thin, about equal in length to cauda, with pale basal half and dark distal half, and with 1–4 rather indistinct rows of polygonal cells near apex (Figure 33g) *Catamergus fulvae*
 – SIPH tapering or cylindrical, longer than cauda, with a least 4–5 subapical rows of well-defined polygonal cells; entirely pale, entirely dark, or mainly dark with pale base **15**
15. SIPH dark, 1.2–1.4× cauda, with reticulation extending over distal 0.3–0.4 of length. First tarsal segments with 5 hairs *Uroleucon impatiensicolens*
 – SIPH pale or dark, 1.4–2.2× cauda, with reticulation extending over distal 0.13–0.23 of length. First tarsal segments with 3 hairs **16**
16. SIPH pale, or only dusky towards apices *Macrosiphum euphorbiae*
 – SIPH mainly dark, sometimes paler at base **17**
17. ANT III (except at base) and tibiae black *Macrosiphum pallidum*
 – ANT III mainly pale (except for rhinariated section and apex), tibiae with pale middle section *Macrosiphum impatiens*
18. ABD TERG 2–4, as well as 1 and 7, with low, conical or hemispherical MTu **19**
 – ABD TERG 2–4 without or only very sporadically with MTu **20**
19. Longest hairs on ANT III 0.4–0.7× BD III. Posterior hair on hind trochanter 0.2–0.5× length of trochantrofemoral suture. SIPH 1.2–1.7× cauda and 1.1–1.5× ANT III *Aphis impatiphila*
 – Longest hairs on ANT III 1.2–1.7× BD III. Posterior hair on hind trochanter 1.1–1.4× length of trochantrofemoral suture. SIPH 1.0–1.1× cauda and 0.9–1.0× ANT III *Aphis impatiradicis*
20. R IV+V 0.7–0.9× HT II. Cauda dark like SIPH and bearing 4–6 (–7) hairs *Aphis impatientis*
 – R IV+V 0.9–1.4× HT II. Cauda **either** not dark like SIPH **or** bearing more than 7 hairs **21**
21. SIPH 0.67–1.0× cauda, which bears 13–18 hairs. R IV+V 1.2–1.4× HT II *Aphis* sp. (Ontario, BMNH colln)
 – SIPH (0.8–) 1.0–2.5× cauda, which bears 4–24 hairs, but if more than 12 hairs and/or siphunculi are shorter than cauda, then R IV+V 0.9–1.2× HT II
 go to key to polyphagous aphids, p. 1020, starting at couplet 24

Imperata

I. arundinacea

I. cylindrica (incl. *major*)

Gramineae

Forda marginata; *Geoica lucifuga*;

Tetraneura fusiformis, *radicola*, *yezoensis*

Aphis gossypii; *Forda orientalis*;

Melanaphis zhanhuaensis; *Sipha maydis*;

Tetraneura multisetosa, *fusiformis*, *radicola*, *triangula*,
yezoensis

Use key to apterae of grass-feeding aphids under *Digitaria*.

Indigofera

I. anil
I. arrecta
I. astragalina
I. australis
I. colutea
I. comosa
I. conjugata
I. dendroides
I. dosua
I. emarginella
I. enneaphylla
I. gerardiana

I. heterantha
I. hirsuta
I. hirta
I. melandenia
I. nigra
I. nigrimana
I. nummulariifolia
I. oblongifolia
I. pilosa
I. prieureana
I. pulchella
I. spicata
I. splendens
I. subulata
I. suffruticosa
I. teysmanni
I. tinctoria
I. trita
Indigofera spp.

Leguminosae

Aphis craccivora
Aphis craccivora
Aphis gossypii
Acyrtosiphon pisum
Aphis gossypii
Aphis craccivora
Aphis gossypii
Aphis gossypii
 [Macrosiphum sp.; Leonard, 1972a]; *Megoura dooarsis*
Aphis craccivora
Aphis craccivora
Acyrtosiphon pisum; *Cavariella himachali*;
 [Macrosiphum sp.; Leonard, 1972a]; [*Megoura* sp. (India)];
Myzus persicae
Megoura dooarsis
Aphis gossypii
Aphis craccivora, *gossypii*
Aphis craccivora
Aphis craccivora
Aphis gossypii
Aphis gossypii
Aphis craccivora
Aphis gossypii
 [Macrosiphum sp.; Leonard, 1972a]
Aphis craccivora; *Pterasthenia albata*
Acyrtosiphon pisum
Aphis gossypii; *Microparsus brasiliensis*
Aphis craccivora
Aphis craccivora; *Megoura dooarsis*, *lespedezae*
Aphis craccivora
Aphis craccivora
Anomalosiphum indigoferae; [*Aphis indigoferae*];
Nudisiphon folisacculata; *Toxoptera aurantii*

Key to apterae on *Indigofera*:-

See Blackman and Eastop (2000) for an illustrated key to apterae of common aphids on indigo.

1. SIPH as very short, broad, pigmented cones. Cauda shaped like an arrowhead in dorsal view. Anal plate bilobed *Pterasthenia albata*
 – SIPH tubular. Cauda either broad with a distinct median stylus, triangular or tongue- or finger-shaped. Anal plate entire **2**
2. SIPH with a subapical ring of hairs with expanded apices. ABD TERG 8 with hair-bearing backwardly directed processes. Cauda broad with a median stylus *Anomalosiphum indigoferae*
 – SIPH without hairs. ABD TERG 8 without processes. Cauda tongue-shaped, or triangular with a curved, horn-like apex **3**

HOST LISTS AND KEYS

3. SIPH dark, at least on distal half 4
 – SIPH pale, sometimes darker at apex 10
4. Head spiculose. SIPH clavate, dark on swollen distal part, paler on about distal 0.4. (Al. with black-bordered wing veins) *Microparsus brasiliensis*
 – Head without spicules. SIPH wholly dark, or paler only at base 5
5. ANT longer than BL. ANT tubercles well-developed, with divergent inner faces. ANT III with 1 or more rhinaria near base. SIPH slightly swollen in middle. Cauda long, pale and finger-like 6
 – ANT shorter than BL. ANT tubercles small or undeveloped. ANT III without rhinaria. SIPH cylindrical, tapering or swollen on distal part. Cauda pale or dark, tongue-shaped 7
6. Longest hairs on ANT III more than 0.5× BD III. ANT mainly black, and legs with large sections of femora and tibiae black. SIPH wholly dark *Megoura lespedezae*
 – Longest hairs on ANT III less than 0.5× BD III. ANT and legs variably pigmented but usually mainly pale. SIPH usually paler at base *Megoura dooarsis*
7. ANT PT/BASE 1.0–1.4. SIPH flangeless, clavate. ABD TERG 8 with a thumb-like process. ABD TERG 1 and 7 without marginal tubercles (MTu) *Cavariella himachali**
 – ANT PT/BASE 1.9–5.0. SIPH tapering or cylindrical, with a flange. No process on ABD TERG 8. ABD TERG 1 and 7 with MTu 8
8. ANT PT/BASE 3.5–5.0. Cauda with 10–26 hairs. Stridulatory apparatus present (see p. 1020) *Toxoptera aurantii*
 – ANT PT/BASE 1.9–3.4. Cauda with 4–9 hairs. No stridulatory apparatus 9
9. Dorsum usually with an extensive black shield. Cauda black like SIPH *Aphis craccivora*
 – Dorsum without any dark markings. Cauda paler than SIPH *Aphis gossypii*
10. SIPH tapering or cylindrical and attenuated distally. Head with well-developed, divergent ANT tubercles. ANT III with 1–5 rhinaria near base *Acyrtosiphon pisum*
 – SIPH somewhat swollen on distal part. Head either without ANT tubercles or these have steep-sided, scabrous inner faces. ANT III without rhinaria 11
11. SIPH flangeless. Head without ANT tubercles. Dorsal hairs pointed. Cauda triangular, with a curved, horn-like apex *Nudisiphon folisacculata*
 – SIPH with a flange. Head spiculose with steep-sided, apically convergent ANT tubercles. Dorsal hairs short and blunt. Cauda tongue-shaped *Myzus persicae*

Inga see Blackman and Eastop (1994)

Inula (incl. *Dittrichia*)

I. aspera

I. bifrons

I. britannica

I. cappa

Compositae

Brachycaudus salicinae; *Uroleucon inulicola*

Uroleucon bifrontis

Aphis fabae, *Aphis* (*Protaphis*) sp. (Czech Republic, BMNH colln); *Brachycaudus helichrysi*; *Ovatus inulae*;

Uroleucon inulicola, *pulicariae*

Aphis gossypii; *Brachycaudus helichrysi*;

Myzus ornatus, *persicae*;

Indomasonaphis anaphalidis, *inulae*;

[*Subovatomyzus leucosceptri*];

[*Tetraneura nigriabdominalis*]; *Toxoptera aurantii*;

Uroleucon budhium

<i>I. conyza</i>	<i>Capitophorus inulae</i> ; <i>Ovatus inulae</i> ; <i>Uroleucon inulae</i> (?)
<i>I. cuspidata</i>	<i>Aphis spiraeicola</i> ; <i>Indomasonaphis anaphalidis</i>
<i>I. dysenterica</i> see <i>Pulicaria</i>	
<i>I. ensifolia</i>	<i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; <i>Uroleucon ensifoliae</i> , <i>inulicola</i>
<i>I. germanica</i>	<i>Brachycaudus helichrysi</i>
<i>I. grandiflora</i>	<i>Brachycaudus helichrysi</i> ; <i>Capitophorus pakansus</i>
<i>I. graveolens</i>	<i>Capitophorus inulae</i> ; [<i>Macrosiphum weberi</i>]
<i>I. helenium</i>	<i>Brachycaudus cardui</i> , <i>helichrysi</i> ; <i>Capitophorus pakansus</i> ; <i>Ovatus inulae</i> ; <i>Uroleucon inulicola</i>
<i>I. hirta</i>	<i>Brachycaudus helichrysi</i> ; <i>Capitophorus inulae</i> ; <i>Uroleucon inulicola</i>
<i>I. hookeri</i>	<i>Capitophorus inulae</i>
<i>I. japonica</i>	[<i>Aphis helianthemis</i> ssp. <i>obscura</i>]
<i>I. magnifica</i>	<i>Brachycaudus cardui</i> ; <i>Capitophorus pakansus</i>
<i>I. oculus-christi</i>	<i>Brachycaudus helichrysi</i> , <i>salicinae</i>
<i>I. pilosa</i>	<i>Brachycaudus helichrysi</i>
<i>I. racemosa</i>	<i>Myzus persicae</i>
<i>I. × rigida</i>	<i>Brachycaudus helichrysi</i> ; <i>Uroleucon inulicola</i>
<i>I. royleana</i>	<i>Brachycaudus helichrysi</i> ; <i>Capitophorus pakansus</i>
<i>I. rubicaulis</i>	<i>Uroleucon fuscaudatum</i>
<i>I. salicina</i>	<i>Brachycaudus helichrysi</i> , <i>salicinae</i> ; <i>Capitophorus inulae</i> ; <i>Uroleucon inulicola</i> ssp. <i>hirticola</i>
<i>I. spiraeifolia</i>	<i>Uroleucon inulicola</i>
<i>I. squarrosa</i>	<i>Aphis</i> [<i>plantaginis</i> of Theobald (1927)], [<i>Aphis</i> (<i>Protaphis</i>) sp. (Holman and Pintera, 1981)]; <i>Capitophorus inulae</i> ; <i>Uroleucon inulae</i> (?), <i>inulicola</i>
<i>I. × stricta</i> (incl. <i>vrabelyiana</i>)	<i>Brachycaudus helichrysi</i> , <i>salicinae</i> ; <i>Uroleucon ensifoliae</i> , <i>pulicariae</i>
<i>I. telephium</i>	<i>Uroleucon inulae</i> (?)
<i>I. thapsoides</i>	<i>Uroleucon elbursicum</i>
<i>I. verbascifolia</i>	<i>Uroleucon dalmaticum</i>
<i>I. viscosa</i>	<i>Aphis fabae</i> , <i>gossypii</i> ; <i>Brachycaudus helichrysi</i> ; <i>Capitophorus inulae</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i> ; <i>Ovatus inulae</i> ; <i>Uroleucon bifrontis</i> , <i>inulae</i>
<i>I. weberi</i>	<i>Brachycaudus helichrysi</i>
<i>Inula</i> spp.	[<i>Aphis anuraphoides</i>]; [<i>Capitophorus horni</i> ssp. <i>gynoxantha</i>]

Key to apterae on *Inula*:-

1. SIPH dusky or dark over at least half of length, with a distal zone of reticulation comprising numerous (more than 100) small polygonal cells 2
- SIPH pale or dark without polygonal reticulation, or pale with distal reticulation comprising fewer, larger cells 10
2. R IV+V 1.85–3.01× HT II 3
- R IV+V 1.05–1.70× HT II 7
3. R IV+V 2.05–2.92× ANT BASE VI 4
- R IV+V 1.4–2.0× ANT BASE VI 5

HOST LISTS AND KEYS

4. SIPH dusky, basally almost concolorous with body, 0.27–0.37× BL. Scleroites at bases of dorsal hairs pale and indistinct. Cauda with 11–22 hairs *Uroleucon inulae*
 – SIPH entirely dark, much darker than body, 0.34–0.42× BL. Scleroites at bases of dorsal hairs dark. Cauda with 19–28 hairs *Uroleucon elbursicum**
5. R IV+V with about 30 accessory hairs and with the lateral pair of primary (subapical) hairs much longer than all the others *Uroleucon bifrontis**
 – R IV+V with 8–10 accessory hairs, and with all primary and accessory hairs of similar length **6**
6. ANT III with 8–31 rhinaria. SIPH reticulated on distal 0.20–0.27 of length *Uroleucon dalmaticum*
 – ANT III with 32–72 rhinaria. SIPH reticulated on distal 0.12–0.21 of length *Uroleucon budhium*
7. Cauda dark like SIPH and distal parts of femora **8**
 – Cauda much paler than SIPH and distal parts of femora **9**
8. R IV+V 1.08–1.32× HT II. First tarsal segments with 3 (occasionally 4) hairs. Cauda tapering to a rounded apex *Uroleucon ensifoliae*
 – R IV+V 1.5–1.7× HT II. First tarsal segments with 5 (occasionally 4) hairs. Cauda tapering to a narrowly acute apex *Uroleucon fuscaudatum*
9. SIPH 0.23–0.28× BL, and 1.3–1.8× cauda. R IV+V 1.14–1.36× HT II *Uroleucon pulicariae*
 – SIPH 0.32–0.4× BL, and 1.8–2.4× cauda. R IV+V 1.25–1.65× HT II *Uroleucon inulicola*
10. Dorsal hairs long (more than 50µm), with capitate or at least slightly expanded apices, and usually with tuberculate bases **11**
 – Dorsal hairs shorter with blunt or pointed apices, and without tuberculate bases **14**
11. SIPH rather strongly clavate (Figure 34a). BL 3.4–4.8mm *Indomasonaphis anaphalidis*
 – SIPH cylindrical on distal part, or very weakly clavate. BL 1.3–3.4mm **12**
12. BL 2.8–3.4mm. SIPH 0.25–0.3× BL, 1.8–2.0× cauda, which bears about 24–26 hairs. R IV+V with 16–18 accessory hairs. First tarsal segments with 5 hairs *Indomasonaphis inulae*
 – BL 1.3–2.2mm. SIPH very long and thin, 0.31–0.4× BL and 4–6× cauda, which bears 5–7 hairs. RIV+V with 2 accessory hairs. First tarsal segments with 3 hairs **13**
13. ANT III with 2–5 long capitate hairs, as long as or longer than BD III. ABD TERG 1–4 each with 16–28 capitate hairs, arranged in spinopleural and marginal groups on large tubercles, the longest hairs being 3–4× ANT BD III (Figure 34b). R IV+V 2.2–2.5× HT II *Capitophorus pakansus*
 – ANT III with very short hairs, 0.2–0.3× BD III. ABD TERG 1–4 each with 12–14 capitate hairs, the longest 2–3× ANT BD III (Figure 34c). R IV+V 1.5–1.8× HT II *Capitophorus inulae*
14. Cauda helmet-shaped or bluntly triangular, not or hardly longer than its basal width in dorsal view **15**
 – Cauda tongue-shaped, much longer than its basal width **18**
15. ANT PT/BASE 0.9–1.1. Cauda bluntly triangular with 14–20 hairs. ABD TERG 1 and 7 with marginal tubercles (MTu). Spiracular apertures reniform *Aphis (Protaphis) sp.* (Czech Republic, BMNH colln, leg. D. Hille Ris Lambers)
 – ANT PT.BASE 2.4–5.1. Cauda helmet-shaped, with 4–8 hairs. ABD TERG 1 and 7 without MTu. Spiracular apertures rounded **16**
16. SIPH and cauda pale. Dorsum without dark markings *Brachycaudus helichrysi*
 – SIPH and cauda dark. Dorsum with a solid dark shield or with variably developed dusky markings, and dark intersegmental muscle plates **17**

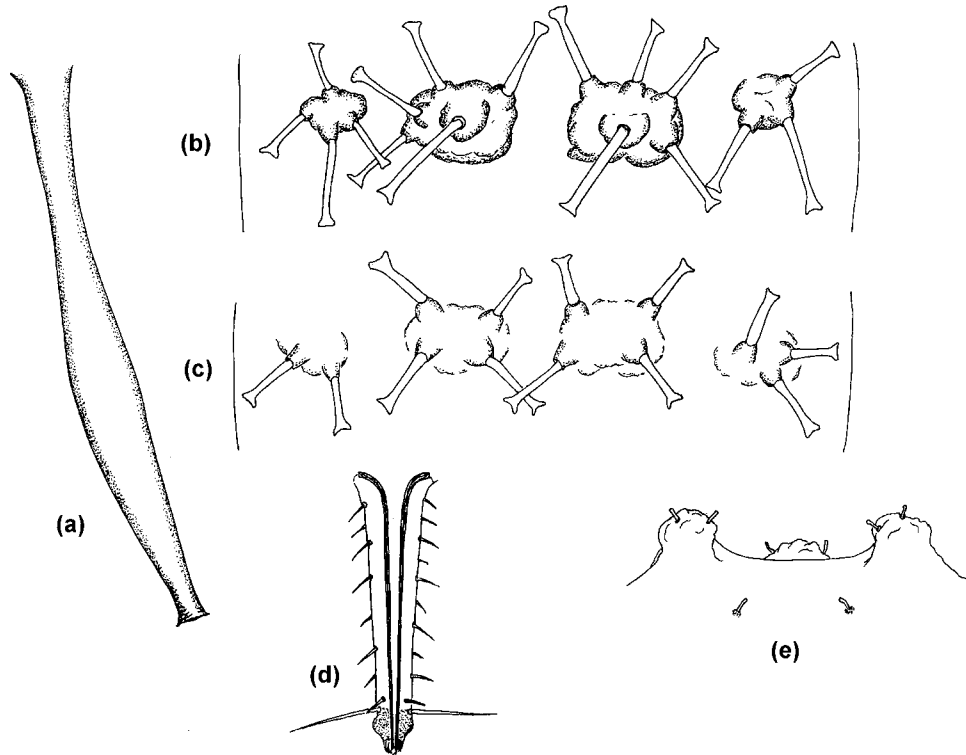


Figure 34 Apterae on *Inula*. (a) SIPH of *Indomasonaphis anaphalidis*, (b) hairs on ABD TERG 3 of *Capitophorus pakansus*, (c) same for *C. inulae*, (d) R IV+V of *Ovatus inulae*, (e) front of head of *O. inulae* in dorsal view.

17. Dorsal abdomen with an extensive solid black shield. SIPH 2.1–3.4× cauda. R IV+V 1.5–2.0× HT II. Mesosternum with a pair of dark mammariform processes *Brachycaudus cardui*
- Dorsal abdomen with variably developed dusky segmental markings, and dark intersegmental muscle plates. SIPH 1.0–1.4× cauda. R IV+V 1.2–1.4× HT II. Mesosternum without mammariform processes *Brachycaudus salicinae*
18. R IV+V 2.3–3.0× HT II, and bearing 17–26 accessory hairs (Figure 34d). Head smooth, except for a well-developed rather scabrous median frontal tubercle, and divergent ANT tubercles, each bearing a rounded, scabrous process (Figure 34e) *Ovatus inulae*
- R IV+V less than 1.6× HT II, and bearing less than 10 accessory hairs. Head smooth or spiculate, with ANT tubercles undeveloped or variably developed, without a scabrous median frontal tubercle go to key to polyphagous aphids, p. 1020

Ioichroma
I. cynaceum

Solanaceae
Macrosiphum euphorbiae

Ionidium* see *Hybanthus

Ionopsis
I. utricularioides

Orchidaceae
Aphis spiraeicola

Ipecacuanha* = *Psychotria

(N.B. a record of *Aphis nerii* from *Ipecacuanha* was probably based on 'Bastard Ipecacuanha', which is *Asclepias curassavica*.)

***Ipomoea* (incl. *Pharbitis*)**

- I. alba*
- I. aquatica*
- I. argenteaurata*
- I. asarifolia*
- I. batatas* (incl. var. *edulis*)

- I. cairica* = *palmata*
- I. cornea*
- I. crispa*
- I. dichroa*
- I. dissecta* see *Merremia dissecta*
- I. eriocarpa*
- I. fistulopa*
- I. floribunda*
- I. gultata*
- I. hederacea*

- I. litoralis*
- I. olbata*

- I. maxima*
- I. mexicana*
- I. nil* (incl. var. *japonica*)

- I. palmata* (incl. *cairica*)

- I. pandurata*
- I. purpurea*

- I. sinensis*
- I. staphylinus* (?)
- I. stipulata*
- I. stolonifera*
- I. tiliacea*
- I. tricolor*
- I. villosa*
- Ipomoea* spp.

Convolvulaceae

- Macrosiphum euphorbiae*
- Aphis gossypii*; *Myzus persicae*
- Aphis gossypii*
- Aphis gossypii*
- Aphis gossypii*, *nasturtii*, *spiraecola*;
- Aulacorthum magnoliae*, *solani*;
- Geopemphigus floccosus*; *Macrosiphum euphorbiae*;
- Myzus persicae*; *Neomyzus circumflexus*

- Aphis gossypii*
- Myzus persicae*
- Aphis gossypii*

- Aphis gossypii*
- Aphis gossypii*
- Myzus persicae*
- Myzus persicae*
- Aphis gossypii*, *nasturtii*, *spiraecola*;
- Aulacorthum magnoliae*; *Myzus ornatus*, *persicae*;
- Neomyzus circumflexus*
- Myzus persicae*
- [*Myzackaia verbasci*]; *Myzus ornatus*;
- Neomyzus circumflexus*
- Myzus persicae*; *Neomyzus circumflexus*
- Myzus persicae*
- Acyrtosiphon malvae*; *Aphis craccivora*, *gossypii*;
- Aulacorthum magnoliae*, *solani*; *Myzus persicae*
- Aulacorthum solani*; *Geopemphigus floccosus*;
- Myzus persicae*
- Aphis gossypii*
- [*Aphis* sp. (Davletshina, 1964)];
- Macrosiphum euphorbiae*; *Myzus persicae*
- Myzus persicae*
- Toxoptera citricidus*
- Geopemphigus floccosus*
- Myzus persicae*
- Aphis spiraecola*
- Toxoptera aurantii*
- Macrosiphum euphorbiae*
- Aphis fabae*; [*Capitophorus mitegoni*];
- [*Greenidea ficicola*]; *Rhopalosiphoninus latysiphon*;
- [*Sitobion indicum*]

Key to apterae on *Ipomoea*:-

- ANT PT/BASE less than 0.5. SIPH absent. Groups of wax glands present dorsally on head, thorax and abdomen
Geopemphigus floccosus
- ANT PT/BASE more than 1. SIPH tubular. No discrete groups of dorsal wax glands
go to key to polyphagous aphids, p. 1020

Ipomopsis*I. aggregata***Polemoniaceae***Macrosiphum euphorbiae*; *Nasonovia takala*Key to apterae on *Ipomopsis*:-

- RIV+V with about 25 accessory hairs, 2.5–2.7× HT II, which is very short (less than 0.07 mm). First tarsal segments with 4 hairs. ANT III with 10–41 rhinaria, mostly clustered on rather swollen basal half. Thoracic spiracular apertures much larger than abdominal ones. SIPH 1.2–1.7× cauda, without subapical polygonal reticulation
Nasonovia takala
- R IV+V with 7–10 accessory hairs, 0.8–1.0× HT II, which is more than 0.1 mm long. First tarsal segments with 3 hairs. ANT III with 1–10 small rhinaria. Thoracic and abdominal spiracular apertures of similar size. SIPH 1.7–2.2× cauda, with a subapical zone of polygonal reticulation
Macrosiphum euphorbiae

(or try key to polyphagous aphids, p. 1020)

Iresine*I. celosia**I. herbstii**I. lindeni**Iresine* spp.**Amaranthaceae***Aphis gossypii**Aphis gossypii*; *Macrosiphum euphorbiae*; *Myzus persicae**Myzus persicae**Aphis coreopsidis*Key to apterae on *Iresine*:-

- SIPH long, dark and tapering, 0.24–0.4× BL. Head, ANT I, II and base of III very pale, contrasting with dark rest of ANT
Aphis coreopsidis
- Without this combination of characters
go to key to polyphagous aphids, p. 1020

Iris*I. alberti**I. albicans**I. aphylla**I. atrofusca**I. biglumis**I. croatica**I. cypriana**I. filifolia**I. florentina**I. foetidissima**I. gatesii**I. × germanica**I. graminea**I. japonica***Iridaceae***Dysaphis tulipae**Aphis fabae*; *Dysaphis tulipae**Dysaphis tulipae**Dysaphis tulipae**Aphis newtoni**Dysaphis tulipae**Macrosiphum euphorbiae**Dysaphis tulipae**Aphis newtoni*; *Dysaphis tulipae**Aphis newtoni**Myzus persicae**Aphis gossypii*, *newtoni*; *Dysaphis tulipae*;*Macrosiphum euphorbiae*; *Myzus persicae**Aphis newtoni**Aulacorthum magnoliae*

HOST LISTS AND KEYS

<i>I. kaempferi</i>	<i>Macrosiphum euphorbiae</i>
<i>I. loczyi</i>	<i>Dysaphis tulipae</i>
<i>I. longipetala</i>	<i>Aulacorthum solani</i> ; <i>Rhopalosiphoninus staphyleae</i>
<i>I. lortetii</i>	<i>Dysaphis tulipae</i>
<i>I. ochroleuca</i> (incl. <i>gigantea</i>)	<i>Rhopalosiphum padi</i>
<i>I. oraria</i> (incl. <i>frutescens</i>)	[<i>Uroleucon ambrosiae</i>]
<i>I. pallasii</i>	<i>Aphis newtoni</i>
<i>I. pallida</i>	<i>Sitobion avenae</i>
<i>I. perrieri</i>	<i>Dysaphis tulipae</i>
<i>I. pseudacorus</i>	<i>Aphis newtoni</i> ; <i>Dysaphis tulipae</i>
<i>I. pumila</i>	<i>Dysaphis tulipae</i>
<i>I. setosa</i>	<i>Macrosiphum euphorbiae</i> ; <i>Myzus ornatus</i>
<i>I. sibirica</i>	<i>Aphis newtoni</i>
<i>I. sofarana</i>	<i>Dysaphis tulipae</i>
<i>I. songorica</i>	<i>Dysaphis tulipae</i>
<i>I. spurium</i>	<i>Dysaphis tulipae</i>
<i>I. tectorum</i>	<i>Aulacorthum solani</i>
<i>I. uniflora</i>	<i>Aphis neoneutroni</i>
<i>I. variegata</i>	<i>Dysaphis tulipae</i>
<i>Iris</i> sp.	<i>Acyrtosiphon ilka</i> ; <i>Aphis fabae</i> ; <i>Metopolophum dirhodum</i> ; <i>Myzus ascalonicus</i> ; <i>Neomyzus circumflexus</i> ; <i>Rhopalosiphum maidis</i> ; <i>Schizaphis graminum</i> , <i>scirpi</i>

Key to apterae on *Iris*:-

(See Blackman and Eastop, 2000 for an illustrated key to common aphids on cultivated irises.)

1. SIPH wholly dark 2
 - SIPH mainly pale, sometimes darker distally 7
2. Cauda helmet-shaped, not longer than its basal width in dorsal view. Spinal tubercles (STu) present on head and ABD TERG 8, or 7 and 8 Dysaphis tulipae
 - Cauda tongue-shaped, much longer than its basal width. STu absent from head, and rarely on ABD TERG 8 3
3. SIPH with a subapical zone of polygonal reticulation. Hairs on ANT III all less than 0.5× BD III Sitobion avenae
 - SIPH without polygonal reticulation. Hairs on ANT III more than 0.8× BD III 4
4. Marginal tubercles (MTu) present on ABD TERG 1 and 7, and small MTu sporadically occur on some of ABD TERG 2-4 5
 - MTu consistently present and conspicuous on at least ABD TERG 2 and 3, and often also on ABD TERG 4-5 or 4-6, as well as 1 and 7 6
5. Cauda pale with 4-7 hairs. ANT PT/BASE 5.0-5.3. Dorsal abdomen without dark sclerites Aphis neoneutroni
 - Cauda dark with 11-24 hairs. ANT PT/BASE 1.7-3.5. Dorsal abdomen with dark cross-bands on ABD TERG 7 and 8, and some dark markings anterior to SIPH Aphis fabae
6. Body densely hairy. ANT III dark, with long, fine hairs maximally 3-4× BD III. SIPH 1.4-2.1× cauda. ANT PT/BASE 4.2-5.6 Schizaphis scirpi
 - Body sparsely hairy. ANT III pale, with longest hairs 1-2× BD III. SIPH 0.8-1.35× cauda. ANT PT/BASE 2.8-4.1 Aphis newtoni

7. Head smooth or only sparsely spiculose **and** SIPH without polygonal reticulation **8**
 – Either head is densely spiculose at least on ventral side, or SIPH have subapical polygonal reticulation
 go to key to polyphagous aphids, p. 1020
8. ANT tubercles weakly developed, not projecting forward beyond middle part of head in dorsal view.
 ANT III without rhinaria. SIPH less than 0.5× as long as the distance between their bases, and distinctly dark-tipped *Schizaphis graminum*
 – ANT tubercles with divergent inner faces, projecting forward well beyond middle part of head (median frontal tubercle). ANT III with 1–3 rhinaria near base. SIPH more than 0.5× longer than the distance between their bases **9**
9. R IV+V 0.55–0.75× HT II. SIPH 8–12.5× longer than their width at midlength *Metopolophium dirhodum*
 – R IV+V 0.79–0.92× HT II. SIPH (11.1–) 12.5–22× longer than their width at midlength *Acyrtosiphon ilka*

Isatis

I. glauca
I. tinctoria
Isatis sp.

Cruciferae

Smiela schneideri
Brevicoryne brassicae; *Lipaphis erysimi*; *Myzus persicae*
Acyrtosiphon ilka

Key to apterae on *Isatis*:-

1. SIPH as very broad, dark, volcano-shaped cones, shorter than their basal widths. ANT III with 3–11 rhinaria on distal part, and 0–1 on IV. Dorsal abdominal hairs 3–5× ANT BD III. Cauda very short, helmet-shaped or triangular with rounded apex, much shorter than its basal width *Smiela schneideri*
 – SIPH tubular, pale or dark. ANT III–IV without rhinaria, or with rhinaria only near base of III. Dorsal abdominal hairs less than 1.5× ANT BD III. Cauda triangular or tongue-shaped, as long as or longer than its basal width **2**
2. ANT tubercles well developed with smooth broadly divergent inner faces. ANT III with 1–3 rhinaria near base. ANT III 0.8–1.0× SIPH which are long, pale, thin and tapering/cylindrical on distal part *Acyrtosiphon ilka*
 – Without that combination of characters **3**
3. SIPH pale, more than 1.5× cauda. Head spiculose, with well-developed ANT tubercles, their inner faces scabrous and apically convergent *Myzus persicae*
 – SIPH dusky or dark, less than 1.5× cauda. Head not spiculose, ANT tubercles weakly developed **4**
4. Cauda broadly triangular in dorsal view. ANT III 2.5–3.7× SIPH *Brevicoryne brassicae*
 – Cauda elongate triangular or tongue-shaped. ANT III 1.0–1.4× SIPH *Lipaphis erysimi*

Ischaemum

I. album
I. annulatum
I. aristatum
I. nilagiricum
I. rugosum
I. timorense
Ischaemum sp.

Gramineae

Ceratovacuna spinulosa
Forda hirsuta
Sitobion akebiae, *lambersi*
Hysteroneura setariae
Aphis gossypii; *Sitobion lambersi*, *miscanthi*
Hysteroneura setariae
Chaetogeica graminiphaga

Use key to apterae of grass-feeding aphids under *Digitaria*.

HOST LISTS AND KEYS

Iseilema

I. anthephoroides

I. laxum

Gramineae

Hysteroneura setariae; *Sitobion raoi*

Melanaphis indosacchari, *sacchari*; *Tetraneura fusiformis*

Use key to apterae of grass-feeding aphids under *Digitaria*.

Ismelia

I. versicolor (incl. *carinatum*)

Compositae

Aphis fabae; *Brachycaudus helichrysi*;

Macrosiphoniella sanborni; *Myzus persicae*

Key to apterae on *Ismelia*:-

- SIPH dark, 0.7–0.9× cauda, with polygonal reticulation extending over distal 0.6–0.8 of length. ANT III with 8–28 secondary rhinaria, usually distributed over almost its entire length
Macrosiphoniella sanborni
- Without this combination of characters go to key to polyphagous aphids, p. 1020

Isnardia

I. intermedia

Onagraceae

Hyalomyzus jussiaeae

Isochilus

I. linearis

Orchidaceae

Cerataphis orchidearum

(or try key to aphids on orchids under *Cymbidium*)

***Isodon* (incl. *Rabdosia*)**

I. coetsa see *Plectranthus*

I. excisus

I. inflexus

Labiatae

Cryptaphis menthae; *Macrosiphum perillae*

Cryptaphis menthae; *Macrosiphum perillae*;

Myzus [*plectranthi* Shinji, 1939 (nomen dubium)],
siegesbeckiae

Macrosiphum isodonis, *perillae*; *Myzus mushaensis*

Myzus isodonis

Key to apterae on *Isodon*:-

1. Hairs on ANT and dorsal body long, with expanded apices; on ANT III up to 1.4× BD III, and on ABD TERG 3 more than 2× BD III. ANT III with 4–5 rhinaria distributed along its length. SIPH less than 0.2× BL
*Cryptaphis menthae**
- ANT and dorsal hairs shorter than BD III, with blunt or pointed apices. ANT III without rhinaria or with 3–13 rhinaria on basal part. SIPH more than 0.2× BL **2**
2. Head coarsely spinulose with gibbous ANT tubercles. SIPH without polygonal reticulation. ANT III without rhinaria. Dorsal abdomen without dark markings **3**
- Head not spinulose, ANT tubercles smooth with divergent inner faces. SIPH with subapical polygonal reticulation. ANT III with 3–13 rhinaria. Dorsal abdomen with continuous broad dark marginal stripes, united by a dark band across ABD TERG 6 **5**
3. SIPH tapering to a small, flangeless terminal aperture *Myzus isodonis*
- SIPH with a distinct apical flange **4**
4. Cauda 1.0–1.6× R IV+V. SIPH 2.0–3.0× cauda *Myzus mushaensis*
- Cauda 0.9–1.0× R IV+V. SIPH 3.0–4.3× cauda *Myzus siegesbeckiae*

5. Longest hairs on ANT III less than $0.5 \times$ BD III, and longest hairs on front of head and ABD TERG 8 are about equal to BD III. R IV+V c. $1.1 \times$ HT II *Macrosiphum perillae**
 – Longest hairs on ANT III $0.8\text{--}0.9 \times$ BD III, and longest hairs on front of head and ABD TERG 8 are $1.6\text{--}2.0 \times$ BD III. R IV+V $1.4\text{--}1.6 \times$ HT II *Macrosiphum isodonis*

Itea

- I. virginica*
I. yunnanensis

- Aphis iteae*
Aphis gossypii

Escalloniaceae

Couplet for separating these two species:–

- Cauda as dark as SIPH, about as long as its basal width, with c.10 hairs. Apices of tibiae with a rounded knob-like structure *Aphis iteae*
 – Cauda paler than SIPH, with 4–8 hairs. Apices of tibiae normal *Aphis gossypii*

Iva

- I. axillaris*
I. cheiranthifolia
I. oraria (incl. *frutescens*)
I. xanthifolia

- Aphis craccivora*
Uroleucon ambrosiae
 [*Aphis* sp. (Leonard, 1975)]; *Uroleucon ambrosiae*
Aphis [aba], gossypii, helianthi;
Brachycaudus helichrysi; [*Pemphigus betae*];
Uroleucon ambrosiae, ivae;
Pemphigus [brevicornis]

Compositae

Iva sp.

Key to apterae on *Iva*:–

1. ANT PT/BASE less than 0.5. SIPH absent. Dorsal abdomen with wax glands *Pemphigus* sp.
 – ANT PT/BASE more than 1. SIPH present, tubular or conical. Dorsal abdomen without evident wax glands 2
2. SIPH dark with a distal zone of polygonal reticulation, cauda contrastingly pale. ANT III with 8–31 rhinaria. ANT tubercles well developed, with divergent inner faces 3
 – SIPH and cauda pale or dark. ANT III without rhinaria (except in alatiform specimens). ANT tubercles absent or weakly developed 4
3. Hind tibiae as pale as cauda for more than 0.7 of length. ABD TERG 2–4 sometimes with small marginal tubercles (MTu). (Hind tibiae of al. with pale or dusky basal section) *Uroleucon ivae*
 – Hind tibiae usually with a pale or dusky basal section, but this is not as pale as cauda for more than 0.5 of length. ABD TERG 2–4 without MTu. (Hind tibia of al. entirely dark) *Uroleucon ambrosiae*
4. SIPH pale, conical, smooth, with an annular incision proximal to the flange. Cauda helmet-shaped, shorter than its basal width in dorsal view. Spiracular apertures rounded. ABD TERG 1 and 7 without marginal tubercles (MTu) *Brachycaudus helchrysi*
 – SIPH dark, tapering or cylindrical, imbricated, without a subapical annular incision. Cauda tongue-shaped, much longer than its basal width. Spiracular apertures reniform. ABD TERG 1 and 7 with MTu 5
5. Dorsal abdomen with an extensive dark shield *Aphis craccivora*
 – Dorsal abdomen without any extensive dark markings 6
6. ANT III 0.15–0.32 mm long, $1.3\text{--}2.6 \times$ R IV+V. HT I with 2 hairs (no sense peg). ABD TERG 8 with 2 hairs. SIPH $0.9\text{--}1.6 \times$ ANT III. (Al. with 3–13 rhinaria on ANT III) *Aphis gossypii*
 – ANT III 0.25–0.63 mm long, $2.5\text{--}4.0 \times$ R IV+V. HT I with 3 hairs. ABD TERG 8 with 2–11 hairs. SIPH $0.6\text{--}1.1 \times$ ANT III. (Al. with 15–40 rhinaria on ANT III) *Aphis helianthi*

HOST LISTS AND KEYS

Ixanthus

I. viscosa

Gentianaceae

Myzus ornatus

Ixeridium

I. dentatum

Compositae

[*Aphis odorikonis*]; *Aulacorthum solani*;
Hyperomyzus carduellinus;
 [Macrosiphoniella yomogicola]; *Myzus lactucicola*
Uroleucon formosanum, lactucicola, picridis, sonchi

See key under *Ixeris*.

***Ixeris* (incl. *Paraixeris*)**

I. chinensis (incl. ssp. *versicolor*)

Compositae

Aphis gossypii (? – on roots with eggs; Chu, 1949);
 [Macrosiphoniella ixeridis (Holman *et al.*, 2001, nomen nudum)]; *Uroleucon lactucicola*

I. dentata see *Ixeridium*

I. denticulata (incl. ssp. *sonchifolia*)

Aphis gossypii (? – on roots with eggs; Chu, 1949)
Uroleucon formosanum

I. laevigata = *Lactuca oldhami*

I. polycephala

Myzus lactucicola

I. sonchifolia see *denticulata*

Key to apterae on *Ixeris* and *Ixeridium*:-

1. Head densely spiculose or nodulose, or if smooth then with weakly-developed ANT tubercles. ANT III with 0–2 (–3) rhinaria 2
 – Head smooth with well-developed ANT tubercles. ANT III with more rhinaria 3
2. Abdomen usually with dark pigmentation extending evenly over ABD TERG 1–5. SIPH slightly clavate. (Al. with sec. rhin. on ANT IV–(V) as well as III) *Myzus lactucicola*
 – Dorsal abdomen unpigmented, or differently pigmented. SIPH clavate or tapering/cylindrical. (Al. with sec. rhin. usually on III only) go to key to polyphagous aphids, p. 1020, starting at couplet 5
3. SIPH pale, smooth, without a distal zone of polygonal reticulation, and swollen on distal 0.7, maximum width of swollen part being 1.3–1.5× minimum width of basal part. *Hyperomyzus carduellinus*
 – SIPH dark, imbricated, with a distal zone of polygonal reticulation, and tapering or cylindrical on distal part 4
4. ANT III 1.8–2.0× longer than ANT IV+V together *Uroleucon formosanum*
 – ANT III as short as or shorter than ANT IV+V 5
5. Cauda dark like SIPH, and bearing 12–15 hairs *Uroleucon lactucicola*
 – Cauda pale and bearing 14–30 hairs 6
6. Coxae pale like basal parts of femora. Dorsal hairs arising from dark scleroites, and crescent-shaped antesiphuncular sclerites present. R IV+V 1.45–1.85× HT II *Uroleucon picridis*
 – Coxae dark. Dorsal hairs not arising from dark scleroites, antesiphuncular sclerites absent or indistinct. R IV+V 0.8–0.9× HT II *Uroleucon sonchi*

Ixia

Ixia sp. (cultivar)

Iridaceae

Dysaphis tulipae

Ixophorus*I. unisetus**Tetraneura fusiformis***Gramineae**(or use keys to grass-feeding aphids under *Digitaria*)***Ixora****I. chinensis* (incl. *philippinensis*)*Aphis gossypii**I. coccinea**Aphis craccivora*, *gossypii*, *spiraecola*; *Toxoptera aurantii**I. lutea**Aphis spiraecola**I. macrothyrsa**Aphis spiraecola*; *Toxoptera aurantii**I. oculata**Aphis gossypii**Ixora* sp.*Sinomegoura citricola***Rubiaceae**

Use key to polyphagous aphids, p. 1020.

Jacobaea*J. salsamita*[*Aphis jacobea-balsamita* Rafinesque (1818)];[*Macrosiphum jacobea-balsamita* Rafinesque (1818)]**Compositae**

(See Hottes, 1931, pp. 61,66 concerning Rafinesque 1818)

Jacobinia* see *Justicia***Jacquemontia****J. havanensis**Aphis spiraecola**J. nipensis**Aphis spiraecola***Convolvulaceae*****Jacquiniella****J. globosa**Sitobion luteum***Orchidaceae**(Or use key to aphids on orchids under *Cymbidium*)***Jambosa****J. caryophylla**Prociphilus gambosae***Myrtaceae**(Perhaps also see list and key under *Syzygium* in Blackman and Eastop, 1994)***Jasione****J. dentata**Aphis psammophila**J. montana**Aphis berteroeae*, *gossypii*, *psammophila*;*Brachycaudus helichrysi*; *Dysaphis brevirostris*, *sorbi*;*Myzus ascalonicus*; *Uroleucon* sp. nr. *campanulae***Campanulaceae**Key to apterae on *Jasione*:-

1. ANT III black with 11–47 rhinaria. SIPH black, with a distal zone of polygonal reticulation, 0.85–1.25× the long black, pointed cauda. Dorsal hairs arising from dark scleroites
Uroleucon sp. nr. *campanulae*
- ANT III without rhinaria, and other characters not in the same combination 2
2. SIPH dark. Marginal tubercles (MTu) always present on ABD TERG 1 and 7 3
- SIPH pale or only dark at apices. MTu absent from ABD TERG 1 and 7 4

HOST LISTS AND KEYS

3. Maximum diameter of MTu on ABD TERG 1 is 0.5–1.4× length of adjacent marginal hair. Posterior hair on hind trochanter 0.8–1.5× diameter of trochantrofemoral suture *Aphis gossypii*
 - Maximum diameter of MTu on ABD TERG 1 is 2–3× length of adjacent marginal hair. Posterior hair on hind trochanter 0.2–0.3× diameter of trochantrofemoral suture *Aphis psammophila*
4. SIPH smooth, short and conical, 0.8–2.0× cauda, which is helmet-shaped. Head smooth, with ANT tubercles undeveloped. Spiracular apertures rounded. ABD TERG 8 bearing 6–12 hairs 0.5–1.3× SIPH *Brachycaudus helichrysi*
 - SIPH imbricated, usually somewhat swollen on distal part, 2.3–3.3× cauda which is triangular or tongue-shaped. Head spiculose, at least ventrally, with ANT tubercles somewhat developed. Spiracular apertures reniform. ABD TERG 8 bearing 4–7 hairs, 0.02–0.20× SIPH **5**
5. Head densely spiculose with well-developed, steep-sided ANT tubercles. SIPH with narrowest part of basal half similar in thickness to hind tibia at midlength. R IV+V with 7–15 accessory hairs. Cauda with 4–7 (usually 6) hairs *Myzus ascalonicus*
 - Head more sparsely spiculose, with weakly developed, broadly divergent ANT tubercles. SIPH with narrowest part of basal half much thicker than hind tibia at midlength. R IV+V with 2 accessory hairs. Cauda with 4–6, usually 5, hairs **6**
6. R IV+V 1.23–1.38× HT II. Longest hairs on ABD TERG 8 15–22µm. (Al. with 45–76 rhinaria on ANT III) *Dysaphis sorbi*
 - R IV+V 1.04–1.19× HT II. Longest hairs on ABD TERG 8 10–15µm. (Al. with 30–40 rhinaria on ANT III) *Dysaphis brevisrostris*

Jasminum

J. angustifolium
J. azoricum
J. humile
J. mesnyi
J. officinale
J. polyanthum
J. sambac
Jasminum sp.

Oleaceae

Aphis nerii
Aphis nerii
Aphis spiraecola; *Brachymyzus jasmini*; *Myzus ornatus*
Aphis spiraecola
Aphis craccivora, *fabae*, *gossypii*
Myzus persicae
Myzus persicae; [*Tinocallis platani*]; *Toxoptera aurantii*
[*Macrosiphum jasmini*]

Key to apterae on *Jasminum*:-

- SIPH as short, broad, pale truncate cones, not longer than their basal widths, scabrous on distal part, with indistinct flange. Head spiculose ventrally, with low, somewhat scabrous ANT tubercles. R IV+V without any accessory hairs *Brachymyzus jasmini*
- SIPH much longer than their basal widths. Head either densely spiculose with well-developed ANT tubercles, or not spiculose with ANT tubercles weakly developed. R IV+V with at least 2 accessory hairs go to key to polyphagous aphids, p. 1020

Jatropha

J. curcas

J. gossypifolia

Euphorbiaceae

Aphis craccivora, *gossypii*, *spiraecola*;
Brachycaudus helichrysi
Aphis spiraecola

Use key to polyphagous aphids, p. 1020.

Julbernardia see Blackman and Eastop (1994)

Juncus*J. ambiguus**J. articulatus**J. balticus**J. bifolius**J. compressus**J. conglomeratus**J. coriaceus**J. effusus* (incl. *decipiens*)*J. gerardii**J. inflexus* (incl. *glaucus*)*J. krameri**J. lampocarpus**J. maritimus**J. oxycarpus**J. squarrosus**J. tenageia**J. tenuis***Juncus spp.****Juncaceae***Rhopalosiphum padi*; *Schizaphis palustris*; *Sitobion avenae**Atheroides hirtellus*; *Rhopalosiphum padi*;*Schizaphis palustris*; *Sitobion avenae*, *fragariae**Rhopalosiphum cerasifoliae**Juncobia leegei*; *Rhopalosiphum padi*; *Schizaphis palustris*;*Sitobion avenae*, *fragariae**Atheroides brevicornis*; *Iziphya bufo*;*Juncobia leegei*; *Sitobion avenae*; *Thripsaphis verrucosa**Rhopalosiphum padi*; *Sipha glyceriae**Prociphilus corrugatus**Carolinaia floris*, *obscura*;*Prociphilus corrugatus*, *erigeronensis*;*Rhopalosiphum insertum*, *nymphaeae*; *Sipha glyceriae*;*Sitobion avenae**Atheroides serrulatus*; *Juncobia leegei*;*Schizaphis palustris*; *Sitobion avenae**Atheroides serrulatus*; *Saltusaphis scirpus*;*Rhopalosiphum insertum**Carolinaia obscura**Rhopalosiphum nymphaeae*; *Schizaphis palustris*;*Sipha glyceriae*; *Thripsaphis cyperi**Juncobia leegei**Hysteroneura setariae*; *Rhopalosiphum padi*;*Sitobion graminis**Juncobia leegei**Schizaphis palustris**Schizaphis graminum*, *palustris*; *Sitobion avenae**Cavariella aquatica*; *Forda formicaria*; *Geoica utricularia*;*Iziphya maculata*; [*Myzus titschaki*]; *Schizaphis scirpi*

Key to apterae on *Juncus*:-

1. SIPH tubular; tapering, cylindrical or swollen, longer than their basal widths. ANT PT/BASE 0.7–6.7 2
 - SIPH in form of short truncate cones not longer than their basal widths, or present merely as pores, or completely absent. ANT PT/BASE 0.1–1.8 15
2. ABD TERG 8 with a supracaudal process (Figure 35b). ANT PT/BASE 0.7–1.3. SIPH flangeless, with a small terminal aperture (Figure 35a) *Cavariella aquatica*
 - No supracaudal process. ANT PT/BASE 1.5–6.7. SIPH with a flange and normal aperture 3
3. SIPH dark with subapical polygonal reticulation 4
 - SIPH pale or dark, without any polygonal reticulation 6
4. Cauda dark, almost as dark as SIPH. Dorsal abdomen with clearly defined dark segmental markings *Sitobion graminis*
 - Cauda pale or dusky. Dorsal abdomen with ill-defined dark pigmentation, not segmentally divided, or unpigmented 5

HOST LISTS AND KEYS

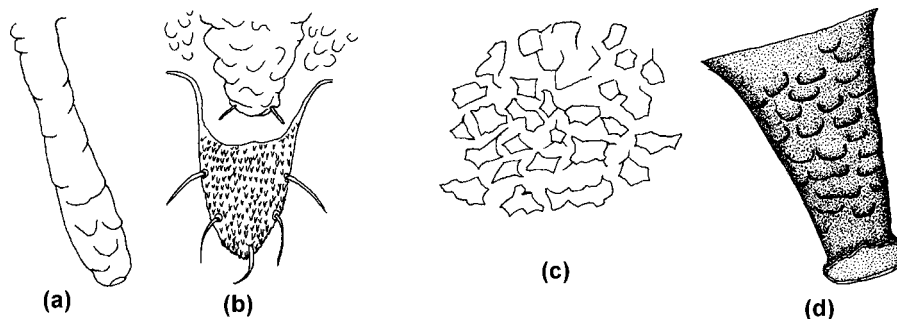


Figure 35 Apteræ on *Juncus*. (a) SIPH of *Cavariella aquatica*, (b) cauda and process on ABD TERG 8 of *C. aquatica*, (c) dorsal cuticular sculpturing of *Schizaphis palustris*, (d) SIPH of *S. palustris*.

5. SIPH 1.75–2.25× cauda, which has a rounded apex. Dorsal abdomen sometimes with ill-defined dark pigmentation, darkest in central area *Sitobion fragariae*
 – SIPH 1.1–1.4× cauda, which has a rather pointed apex. Dorsal abdomen usually pale, if with dark pigmentation then the central area is palest *Sitobion avenae*
6. ANT tubercles markedly scabrous or spiculose. ANT III with 1–5 rhinaria. **7**
 – ANT tubercles not markedly scabrous or spiculose. ANT III without rhinaria **8**
7. ANT 0.5–0.7× BL, with ANT PT/BASE 1.5–2.0. ANT tubercles well developed, rounded, scabrous, and frontal sinus narrow. Dorsal cuticle strongly wrinkled *Carolinaia floriss*
 – ANT longer than BL, with ANT PT/BASE c.4. ANT tubercles low, divergent, spiculose, and frontal sinus very broad. Dorsal cuticle with reticulate sculpturing *Carolinaia obscura*
8. Cauda pale. SIPH pale, dark-tipped or dark, if entirely dark then much darker than cauda **9**
 – Cauda and SIPH with similar dusky or dark pigmentation **11**
9. SIPH black, calf-shaped, contrasting with long pale cauda. Femora mainly dark. ANT PT/BASE 4.9–6.7 *Hysteroneura setariae*
 – SIPH pale or with dark apices, tapering from base. Femora pale. ANT PT/BASE 2.8–4.8 (–5.0) **10**
10. R IV+V 0.073–0.091 mm long, 0.38–0.56× cauda *Schizaphis graminum*
 – R IV+V 0.092–0.120 mm long, 0.6–0.8× cauda *Rhopalosiphum cerasifoliae*
11. Dorsal cuticle usually dusky/dark, sclerotic and very rough, with close-set irregular angular denticulation (Figure 35c). Marginal abdominal tubercles (MTu) absent. SIPH short, tapering (Figure 35d), 0.08–0.11× BL. ANT PT/BASE 2.6–3.1 *Schizaphis palustris*
 – Dorsal cuticle pale or dusky, ornamented with a pattern of spinules arranged in polygons. Small MTu present on ABD TERG 1 and 7. SIPH 0.11–0.21× BL, clavate or cylindrical on distal half. ANT PT/BASE 3.1–5.8 **12**
12. ABD TERG 8 with (5–) 6–16 hairs, 88–150µm long. Hairs on outer side of hind tibia very long and fine, 2–3× diameter of tibia at midlength *Schizaphis scirpi*
 – ABD TERG 8 with 2 hairs up to 60µm long. Hairs on outer side of hind tibia not much longer than its midlength diameter **13**
13. SIPH clavate (with narrow region proximal to swollen part), more than 2× cauda. ANT PT/BASE 3.1–4.0 *Rhopalosiphum nymphaeae*
 – SIPH not clavate; not more than 2× cauda. ANT PT/BASE 3.6–5.8 **14**

14. ANT 6-segmented. ANT PT 1.2–1.9× ANT III. Longest hairs on ANT III shorter than BD III
Rhopalosiphum padi
 – ANT usually 5-segmented, when 6-segmented ANT PT 1.7–2.6× ANT III. Longest hairs on ANT III longer than BD III
Rhopalosiphum insertum
15. Eyes multifaceted. SIPH present; pore-like, stump-shaped or broadly conical. ANT PT/BASE 0.5–1.8 **16**
 – Eyes with only 3 facets. SIPH absent. ANT PT/BASE 0.1–0.5 **24**
16. Distal part of cauda developed into a knob. Body oval or elongate, variably sclerotised. SIPH stump-shaped or as raised pores on shallow cones **17**
 – Cauda either undeveloped or broadly rounded, not evident. Body narrowly elongate, dorsum strongly sclerotised. SIPH as scarcely elevated pores with chitinised rims **22**
17. Dorsal hairs spine-like, with numerous small denticles or spinules between the hairs. Anal plate entire. Eyes with ocular tubercles (triommatidia) *Sipha glyceriae*
 – Dorsal hairs fan-shaped or finely pointed. Anal plate bilobed. Eyes without ocular tubercles **18**
18. Dorsal hairs fan-shaped. Fore- and mid-tibiae thickened at base, forming a smooth sclerotic ‘patella’ (clearly different from base of hind tibia). Body oval **19**
 – Dorsal hairs pointed. Fore- and mid-tibiae with bases like hind tibia. Body elongate **21**
19. SIPH situated on ABD TERG 6, with anterior edge of cone behind the border between ABD TERG 5 and 6. ABD TERG 8 with a pair of large processes each bearing 2 long rod-shaped or slightly capitate hairs (Figure 18k) *Saltusaphis scirpus*
 – SIPH situated on border between ABD TERG 5 and 6. ABD TERG 8 with or without hair-bearing processes **20**
20. Head broadly rounded, with lateral margin between ANT socket and eye sloping towards vertex. ANT PT/BASE 0.7–0.8 *Juncobia leegei*
 – Head not broadly rounded, with lateral margin between ANT socket and eye almost parallel to mid-line. ANT PT/BASE 1.4–1.8 *Iziphya* spp.
21. Front of head with a very prominent quadrate median projection, almost extending forward to apex of ANT I. Posterior margin of ABD TERG 8 slightly emarginate (Figure 19n). Dorsal cuticle rather pale, with numerous small nodules. Wax pores not apparent *Thripsaphis verrucosa*
 – Front of head with much less prominent, rounded, median projection. Posterior margin of ABD TERG 8 not emarginate. Dorsal cuticle rather dark, especially on margins and posteriorly, with numerous wax pores *Thripsaphis cyperi*
22. Dorsal body hairs numerous, long and spine-like, the longest 110–200 µm long. ANT III with 3–5 hairs 50–70 µm long *Atheroides hirtellus*
 – Dorsal body hairs maximally 30 µm long, rod-shaped or flabellate. ANT III with 0–3 hairs, maximally 15–20 µm long **23**
23. Dorsal abdominal hairs rod-shaped, ABD TERG 1–5 with only 2–4 spinal hairs and 2 pleural hairs per segment. Marginal hairs longer and more conspicuous *Atheroides serrulatus*
 – Dorsal abdominal hairs mostly flabellate, and much more numerous, in 2–3 irregular rows on each of ABD TERG 1–5. Marginal hairs on ABD TERG 1–5 not longer than spinopleural hairs *Atheroides brevicornis*
24. First tarsal segments with 2 or 3 hairs. Cauda dark, evident, semicircular or bluntly triangular **25**
 – First tarsal segments with 4 or more hairs. Cauda not evident **26**

HOST LISTS AND KEYS

25. Large wax glands present on head, thorax and abdomen. Cauda rounded, with c.16 hairs. R IV+V 0.7–1.1× HT II *Prociphilus erigeronensis*
 – Wax glands not evident. cauda bluntly triangular (conical), with c.60 hairs. R IV+V 1.4–1.8× HT II *Prociphilus corrugatus*
26. Primary rhinaria without fimbriate margins, the primary rhinarium on ANT V being much larger than that on ANT IV. Anal plate in normal ventral position *Forda formicaria*
 – Primary rhinaria with fimbriate margins, and of similar size on ANT IV and V. Anal plate enlarged and displaced dorsally *Geoica utricularia*

Juniperus see Blackman and Eastop (1994)

Jurinea

J. alata

J. cyanoides

J. ewersmannii

J. mollis

J. staechadifolia

Compositae

Aulacorthum solani

Aphis jurineae; [*Brachyunguis* sp. (Kadyrbekov, 2003c)]

Uroleucon jaceae

Aphis terricola; *Uroleucon jaceae*

Paczoskia jurineicola

Key to apterae on *Jurinea*:-

1. SIPH black, with polygonal reticulation on distal 0.16–0.35 of length. Cauda black. ANT III black, with 16–54 rhinaria. Dorsal hairs arising from dark sclerites **2**
 – SIPH and cauda pale or dark, SIPH if dark then without polygonal reticulation. ANT III with 0–10 rhinaria. Dorsal hairs not arising from dark sclerites **3**
2. Crescent-shaped antesiphuncular sclerites present. ANT I very long, almost 3× ANT II. Cauda with c.8 hairs *Paczoskia jurineicola**
 – Antesiphuncular sclerites absent. ANT I less than 2× ANT II. Cauda with 22–28 hairs *Uroleucon jaceae* group
3. ANT tubercles undeveloped, cuticle of head without spicules. ABD TERG 1 and 7 with well-developed marginal tubercles (MTu). SIPH dark **4**
 – ANT tubercles well developed, steep-sided, cuticle of head spiculate. ABD TERG 1 and 7 without MTu. SIPH pale except at apices *Aulacorthum solani*
4. R IV+V longer than ANT PT. ANT PT/BASE 0.7–1.0. SIPH shorter than cauda, which is bluntly triangular, shorter than its basal width and bears 16–20 hairs. ABD TERG 2–4 usually without MTu *Aphis terricola*
 – R IV+V much shorter than ANT PT. ANT PT/BASE 1.6–2.3. SIPH much longer than their basal widths, 1.8–2.8× cauda which is elongate triangular, longer than its basal width, and bears c.8 hairs. ABD TERG 2–4 as well as 1 and 7 with large MTu *Aphis jurineae*

(or, if none fit, try key to polyphagous aphids. p. 1020)

Jussiaea see *Ludwigia*

Justicia (incl. *Adhatoda*, *Jacobina*, *Rostellularia*)

J. alba (= *vasica*?)

J. anselliana

J. carnea

J. furcata

Acanthaceae

[*Aphis* sp. nr *salviae* (Bodenheimer and Swirski, 1957) = *craccivora*?]; *Myzus persicae*

Aphis gossypii; *Uroleucon compositae*

Myzus ornatus, *persicae*

Aulacorthum solani

<i>J. ilicifolius</i>	<i>Aphis gossypii</i>
<i>J. leucantha</i> see <i>procumbens</i>	
<i>J. matammensis</i>	<i>Aphis gossypii</i> ; <i>Uroleucon compositae</i>
<i>J. obtusa</i>	<i>Myzus ornatus</i>
<i>J. peploides</i>	<i>Myzus persicae</i> ; <i>Neomyzus circumflexus</i>
<i>J. procumbens</i> (incl. <i>leucantha</i>)	<i>Aphis</i> [<i>glycines</i>], <i>gossypii</i> ; [<i>Carolinaia justiceae</i> Shinji (nomen dubium)]
<i>J. secunda</i>	<i>Aphis gossypii</i>
<i>J. simplex</i>	<i>Myzus ornatus</i>
<i>J. vasica</i> (ex <i>Adhatoda</i>)	<i>Aphis spiraecola</i> , [<i>Aphis</i> sp. nr <i>salviae</i> (Swirski and Amitai, 2001)= <i>craccivora</i> ?]; [<i>Coloradoa artemisicola</i>]; <i>Toxoptera aurantii</i>

Use key to polyphagous aphids, p. 1020.

Kalanchoe (incl. Bryophyllum)

K. blossfeldiana
K. brachyloba
K. crenata
K. integrifolia
K. laciniata
K. longiflora
K. marmorata
K. pinnata (incl. *calycina*)

K. prolifera
K. somaliensis
K. waldheimii
Kalanchoe sp.

Crassulaceae

Aphis gossypii; *Aulacorthum solani*; *Myzus persicae*
Aphis gossypii
Aphis gossypii
Aphis fabae, *gossypii*; *Aulacorthum solani*; *Myzus persicae*
Aphis gossypii
Aphis fabae; *Macrosiphum euphorbiae*
Myzus persicae
Aphis gossypii, *sedi*, [*Aphis* sp. (Leonard, 1972a)];
Macrosiphum euphorbiae; *Myzus persicae*;
Neomyzus circumflexus
Myzus ornatus; *Neomyzus circumflexus*
Myzus persicae
Aphis gossypii; *Myzus persicae*
Aphis sedi, *solanella*, *spiraecola*

Key to apterae on *Kalanchoe*:–

1. SIPH pale and ANT tubercles well-developed, **or** SIPH and cauda both black, the latter bearing 7–24 hairs
 go to key to polyphagous aphids, p. 1020
- ANT tubercles weakly developed **and** SIPH usually darker than cauda which bears 4–7 (–8) hairs **2**
2. Rostrum (total length measured from base of protractor apodeme, see Figure 1) 0.30–0.42× BL. ANT V 1.0–1.5× ANT VI BASE. SIPH 0.8–1.5× cauda *Aphis sedi*
- Rostrum 0.22–0.30× BL (except in very small specimens with BL less than 1.1 mm). ANT V 1.4–1.9× ANT VI BASE. SIPH 1.3–2.3× cauda *Aphis gossypii*

Kalimeris

K. incisa

K. indica
K. yomena

Compositae

Aleurodaphis asteris; *Macrosiphoniella yomenae*;
Myzus asteriae; *Chitinosiphum kalimeris*
Macrosiphoniella yomenae
Aleurodaphis asteris, *blumeae*; *Aulacorthum asteris*, *solani*;
Macrosiphoniella sanborni, *yomenae*, [*yomogicola*];
Myzus asteriae, *persicae*

Use key to aphids on *Aster*.

HOST LISTS AND KEYS

Kallstroemia

K. maxima

Use key to polyphagous aphids, p. 1020.

Kalmia

K. angustifolia

K. latifolia

Zygophyllaceae

Aphis craccivora; *Myzus persicae*

Ericaceae

Neoamphorophora kalmiae

Ericaphis wakibae;

Illinoia azaleae ssp. *kalmiaflora*, *rhokalaza*

Key to apterae on *Kalmia*:-

1. SIPH pale and very strongly swollen over about distal 0.7, with maximum width of swollen part 1.9–3.0× minimum width of basal stem. Cuticle of head smooth, with rather low, rounded ANT tubercles, not projecting forward beyond medial frontal prominence in dorsal view
Neoamphorophora kalmiae
- SIPH pale or dark, cylindrical or swollen on distal half to 1.1–1.5 of minimum width of basal half. Cuticle of head smooth or spiculose, with ANT tubercles projecting forward far beyond middle of front of head in dorsal view **2**
2. SIPH pale and tapering or cylindrical, or only very slightly swollen on distal half, and with only 1–2 rows of polygonal cells (if any) at apex. ANT III without rhinaria. Head cuticle spiculose. Cauda elongate triangular/tongue-shaped
Ericaphis wakibae
- SIPH mainly dark, sometimes paler at base, distinctly clavate, with 4–8 rows of polygonal cells on constricted subapical part. ANT III with 2–9 rhinaria. Head cuticle smooth. Cauda finger-like, long and pale **3**
3. Longest hairs on ANT III 0.15–0.4× BD III. (Al. with 12–19 rhinaria on ANT III)
Illinoia azaleae ssp. *kalmiaflora*
- Longest hairs on ANT III 0.6–0.8× BD III. (Al. with 22–41 rhinaria on ANT III)
Illinoia rhokalaza

Kalopanax see Blackman and Eastop (1994)

Karelinia

K. caspia

Compositae

Aphis anuraphoides, *kareliniae*

Macrosiphoniella kareliniae

Key to apterae on *Karelinia*:-

1. SIPH 0.19–0.22× BL with polygonal reticulation on distal 0.25–0.32 of length. ANT PT/BASE 1.75–2.15. ABD TERG 1 and 7 without marginal tubercles (MTu) *Macrosiphoniella kareliniae*
- SIPH less than 0.1× BL and without polygonal reticulation. ANT PT/BASE 0.8–1.1. ABD TERG 1 and 7 (at least) with MTu **2**
2. ABD TERG 6 without MTu. ANT III and IV usually with rhinaria *Aphis anuraphoides*
- ABD TERG 6 with MTu. ANT III and IV without rhinaria *Aphis kareliniae*

Kentia see *Gronophyllum*

Kerria

K. japonica

Rosaceae

Aphis spiraecola; *Aulacorthum kerriae*, *magnoliae*, *solani*

Key to apterae on *Kerria*:-

1. ANT tubercles undeveloped. Head without spicules. SIPH and cauda dark. ABD TERG 1 and 7 with marginal tubercles (MTu). ANT III without rhinaria *Aphis spiraeicola*
- ANT tubercles well developed, steep-sided. Head with spicules at least ventrally. ANT III usually with 1–2 (–3) rhinaria on ANT III **2**
2. SIPH slightly swollen on distal half *Aulacorthum magnoliae*
- SIPH tapering or cylindrical **3**
3. Head, thorax and marginal and posterior parts of abdomen with extensive dark pigmentation. SIPH mainly dark, somewhat paler in middle *Aulacorthum kerriae*
- Dorsal body entirely pale. SIPH pale except at apices *Aulacorthum solani*

Kickxia*K. spartioides***Scrophulariaceae***Myzus persicae**Kielmeyera*, *Kigelia* see Blackman and Eastop (1994)**Kleinia (incl. Notenia, Notoniopsis)***K. fulgens**K. grandiflora**K. neriifolia**K. repens* see *Senecio repens**Myzus persicae**Brachycaudus helichrysi**Brachycaudus helichrysi*; *Macrosiphum euphorbiae*;*Myzus persicae***Compositae**

Use key to polyphagous aphids, p. 1020.

Knautia*K. arvensis**K. dinarica**K. dipsacifolia**K. drymeia**K. integrifolia**K. longifolia**K. silvatica***Dipsacaceae***Aphis confusa*, *longini*, *thomasi*;*Aulacorthum knautiae*, *sedens*, *solani*;*Macrosiphum knautiae*, *rosae*, *silvaticum*, [*weberi*];*Ovatomyzus boraginacearum**Aphis confusa**Macrosiphum knautiae*, *rosae*[*Aphis knautiae* (nomen nudum)];*Macrosiphum knautiae*, *rosae**Aphis confusa**Macrosiphum rosae**Aphis confusa*; *Macrosiphum rosae*, *silvaticum*Key to apterae on *Knautia*:-

1. ANT tubercles undeveloped. ANT III without rhinaria (except in alatifform specimens). ABD TERG 1 and 7 with marginal tubercles (MTu) **2**
- ANT tubercles well developed. ANT III with at least 1 rhinarium. ABD TERG 1 and 7 without MTu **4**
2. Cauda with 14–24 hairs. Longest hairs on hind femur as long as or longer than diameter of trochantrofemoral suture. Well-developed MTu present on ABD TERG 2–4 as well as 1 and 7. ANT PT/BASE 3–4 *Aphis longini*

HOST LISTS AND KEYS

- Cauda with 4–9 hairs. Longest hairs on hind femur 0.15–0.7 of diameter of trochantrofemoral suture. Small MTu present or absent from ABD TERG 2–4 (–5). ANT PT/BASE 1.5–3.3 3
- 3. Posterior hair on hind trochanter 0.2–0.5× diameter of trochantrofemoral suture. Hairs on anterior half of subgenital plate 0.2–0.5× ANT BD III *Aphis thomasi*
- Posterior hair on hind trochanter 0.6–1.1× diameter of trochantrofemoral suture. Hairs on anterior half of subgenital plate 1.0–2.0× ANT BD III *Aphis confusa*
- 4. Head and SIPH black. ANT III with 7–25 rhinaria. SIPH with polygonal reticulation on distal 0.1–0.2 of length (8 or more rows of closed cells) 5
- Head and SIPH pale. ANT III with 0–3 rhinaria. SIPH without polygonal reticulation or with only 1–4 rows of closed cells 7
- 5. R IV+V 0.14–0.18 mm, 0.92–1.17× HT II *Macrosiphum rosae*
- R IV+V 0.175–0.215 mm, 1.19–1.8× HT II 6
- 6. R IV+V 1.19–1.4× HT II *Macrosiphum silvaticum*
- R IV+V 1.4–1.8× HT II *Macrosiphum knautiae*
- 7. Cuticle of head smooth dorsally and ventrally. PT 1.5–2.3× ANT III, which is without rhinaria. SIPH slightly swollen subapically, narrowing to a slight constriction before flange *Ovatomyzus boraginacearum*
- Head spinulose at least on ventral surface. PT 0.8–1.6× ANT III, which usually has 1 or more small rhinaria near base. SIPH cylindrical or slightly swollen distally 8
- 8. Outer side of ANT I with 2–4 hairs on basal half. SIPH slightly swollen on distal 0.33, with at least 2–3 rows of closed polygonal cells subapically. SIPH 2.2–2.9× cauda. Head with anteriodorsal part devoid of spinules *Aulacorthum knautiae*
- Outer side of ANT I with 1–2 hairs on basal half. SIPH cylindrical on distal part, sometimes with 1–3 indistinct rows of closed polygonal cells subapically, but usually without any. SIPH 2.0–2.5× cauda. Head including anteriodorsal part with numerous spinules 9
- 9. R IV+V 1.5–1.7× HT II. ANT PT/BASE 3.4–4.7 *Aulacorthum sedens*
- R IV+V 1.1–1.4× HT II. ANT PT/BASE 4.0–5.5 *Aulacorthum solani*

Kniphofia

Kniphofia hybrida

Kniphofia spp.

Asphodelaceae

Aphis fabae

Macrosiphum euphorbiae; *Sitobion schoelli*

Key to apterae on *Kniphofia*:–

- SIPH 0.15–0.22× BL and 0.7–0.8× head width across (and including) eyes, with polygonal reticulation on distal 0.25–0.35 of length *Sitobion schoelli*
- SIPH without polygonal reticulation, or if with reticulation then this extends over only distal 0.1–0.2 of length, and SIPH are 0.3–0.4× BL and 1.3–1.9× head width across eyes go to key to polyphagous aphids, p. 1020

Kobresia

K. caricina

Kobresia sp.

Cyperaceae

Ceruraphis eriophori

Gharsesia polunini

Use key to apterae on *Carex*.

Kochia

- K. cana*
- K. childsii*
- K. hyssopifolia*
- K. indica*
- K. prostrata*

- K. scoparia*

- K. trichophylla*

Chenopodiaceae

- Chaitaphis safavii*
- Chaitaphis tenuicauda*
- Aphis craccivora*
- Aphis craccivora*
- Aphis salsolae*; *Chaitaphis tenuicauda*;
- Xerobion eriosomatinum*
- Aphis craccivora*, *gossypii*, *salsolae*, *spiraecola*;
- Clypeoaphis suaedae*
- Aphis salsolae*

Key to apterae on *Kochia*:-

1. Dorsal hairs with expanded, often furcate apices (Figure 36a, b). Cauda long and thin, 4–5× longer than its middle width (e.g., Figure 36c) 2
 - Dorsal hairs blunt or pointed. Cauda less than 4× its middle width 3
2. ANT PT/BASE 1.4–1.9. SIPH 0.8–0.95× cauda. Dorsal hairs with small pale tuberculate bases (Figure 36a) *Chaitaphis tenuicauda*
 - ANT PT/BASE 2.1–2.9. SIPH 0.6–0.75× cauda. Dorsal hairs arising from large, rather rugose, hemispherical, often pigmented, tuberculate bases (Figure 36b) *Chaitaphis safavii*

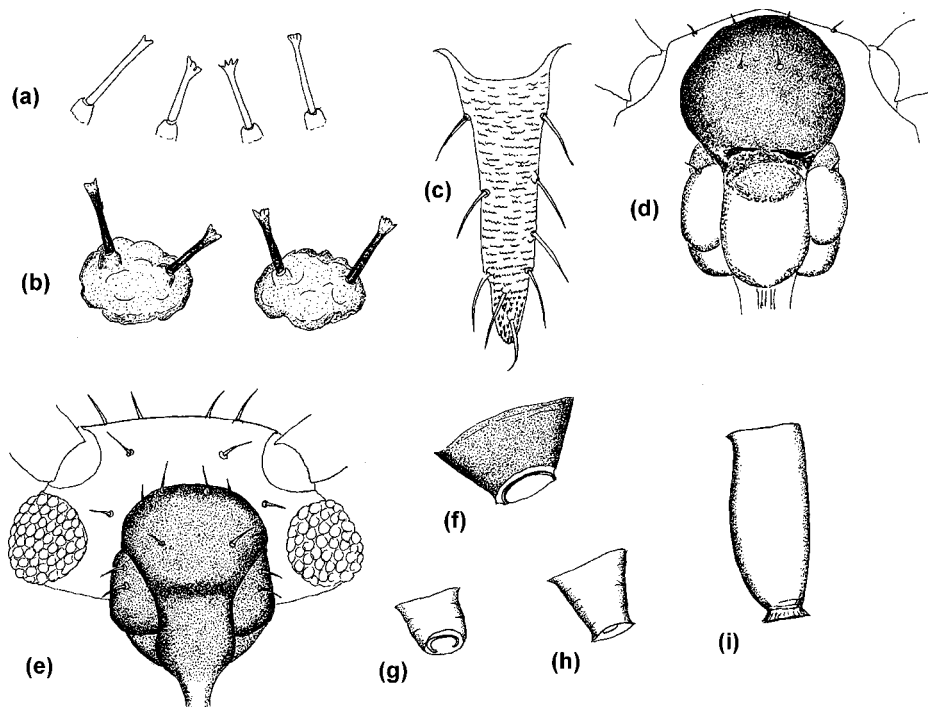


Figure 36 Apterae on *Kochia* (also *Salsola* and *Suaeda*). (a) Dorsal hairs of *Chaitaphis tenuicauda*, (b) dorsal hairs of *Ch. safavii*, (c) cauda of *Ch. tenuicauda*, (d) clypeus of *Clypeoaphis suaedae*, (e) clypeus of *Xerobion eriosomatinum*, (f) SIPH of *X. eriosomatinum*, (g) SIPH of *Brachyunguis cahuille*, (h) SIPH of *B. harmalae*, (i) SIPH of *Clypeoaphis suaedae*.

HOST LISTS AND KEYS

3. ANT PT/BASE 1.4–3.0. SIPH 1.2–2.2× cauda
 go to key to polyphagous aphids, p. 1020, starting at couplet 24,
 where specimens running to *A. craccivora* may be *A. salsolae*
- ANT PT/BASE 0.8–1.4. SIPH 0.5–0.9× cauda **4**
4. SIPH in form of dark, broad-based cones, shorter than their basal widths (Figure 36f). Cauda bluntly conical, shorter than its basal width. Clypeus dark and swollen, but not globose (Figure 36e)
Xerobion eriosomatinum
- SIPH pale or dusky, tubular, often slightly swollen, much longer than their basal widths (Figure 36i). Cauda finger-like, longer than its basal width. Clypeus globose (Figure 36d) *Clypeoaphis suedae*

***Koeleria* (incl. *Lophochloa*, *Rostraria*)**

Gramineae

K. alpicola

Rhopalomyzus poae

K. alpina

Rhopalosiphum padi

K. cristata (incl. *supina*)

Israelaphis carmini; [*Pterasthenia shiraensis*];

Rhopalosiphum padi; *Sitobion miscanthi*

K. gracilis

Aploneura lentisci; *Forda marginata*; *Paracletus cimiciformis*

K. phleiooides

Israelaphis carmini; *Rhopalosiphum maidis, padi*;

Sipha maydis; *Sitobion fragariae*

K. pyramidata

Forda formicaria

Use key to apterae of grass-feeding aphids under *Digitaria*.

Kohlreuteria see Blackman and Eastop (1994)

Kohautia

Rubiaceae

K. senegalensis

Aphis gossypii

Kolkwitzia

Caprifoliaceae

K. amamilis

Aphis helianthi; *Aulacorthum solani*;

Macrosiphum euphorbiae; *Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Kotschya

Leguminosae

K. africana

Aphis spiraecola; *Sitobion burundiense*

Key to apterae on *Kotschya*:-

- SIPH black with polygonal reticulation on distal 0.17–0.25 of length. ANT PT/BASE 5.1–6.6. First tarsal segments all with 4 hairs *Sitobion burundiense*
- SIPH if black then without distal reticulation, and other characters do not apply
 go to key to polyphagous aphids, p. 1020

Koyamacalia

Compositae

K. delphiniifolia

Brachycaudus helichrysi

Krascheninnikovia

Chenopodiaceae

K. ceratoides

Eichinaphis pamirica; *Scythaphis eurotia*

K. ewersmanniana

Eichinaphis pamirica, turanica

K. lanata

Macrosiphoniella frigidicola, ludoviciana

K. latens

Eichinaphis turanica

Key to apterae on *Krascheninnikovia*:-

1. ANT equal to or more than BL. ANT III with 3–15 rhinaria. ANT PT/BASE 3.0–4.5. SIPH 0.25–0.3× BL, with polygonal reticulation on distal 0.3–0.5. Cauda tongue-shaped, much longer than broad 2
 - ANT up to 0.6× BL. ANT III without rhinaria. ANT PT/BASE 1.3–2.0. SIPH short, conical or tubular, 0.05–0.15× BL, without polygonal reticulation. Cauda broadly rounded or conical 3
2. BL 2.8–4.2 mm. Cauda 0.42–0.55 mm, with 15–24 hairs *Macrosiphoniella ludoviciana*
 - BL 1.6–2.3 mm. Cauda 0.24–0.44 mm, with 6–13 hairs *Macrosiphoniella frigidicola*
3. ANT only about 0.25× BL. SIPH as small pores raised on small sclerotic cones. R IV+V not stiletto-shaped. Dorsal body hairs without tuberculate bases. Cauda very broadly rounded *Scythaphis eurotiae**
 - ANT more than 0.3× BL. SIPH tubular, swollen, longer than basal width. RIV+V stiletto-shaped, with long tubular RV. Dorsal body hairs mostly arising from tuberculate bases. Cauda conical *Eichinaphis pamirica* (or *turanica*? – see text)

Kraussia*K. floribunda***Rubiaceae***Aphis craccivora*, *spiraecola*

Use key to polyphagous aphids, p. 1020.

Krigia*K. montana**K. virginica***Compositae***Uroleucon brachychaeta**Aphis middletonii* group; *Uroleucon brachychaeta*Key to apterae on *Krigia*:-

- SIPH black, with a distal zone of polygonal reticulation, 1.4–1.8× the finger-like cauda. ANT III with 28–62 rhinaria. ANT PT/BASE 4.7–6.2. R IV+V very short, 0.6–0.8× HT II *Uroleucon brachychaeta*
- Without this combination of characters go to key to polyphagous aphids, p. 1020

Krugiodendron*K. ferreum***Rhamnaceae***Aphis craccivora*; *Toxoptera aurantii*

Use key to polyphagous aphids, p. 1020.

Kuhnia* see *Brickellia***Kunzea****K. ericifolia**K. pomifera**K. recurva***Myrtaceae***Aphis gossypii*[*Cinara tujafilina*]*Aphis gossypii****Kyllinga****K. brevifolia**K. bulbosa***Cyperaceae***Carolinaia caricis*; *Hysteroneura setariae*;*Vesiculaphis caricis**Aphis gossypii*

HOST LISTS AND KEYS

K. peruviana
Kyllinga spp.

Use key to apterae on *Cyperus*.

Lablab

L. purpureus

Use key to apterae on *Medicago*

Lachenalia

L. tricolor

Lachenalia sp.

Use key to polyphagous aphids, p. 1020.

Lacinaria see *Liatrix*

Lactuca

L. alpina

L. biennis

L. brevirostris see *Pterocypsela indica*

L. brunoniana

L. canadensis

L. capensis

L. chinensis

L. debilis

L. dentata

L. denticulata see *Paraixeris*

L. floridana

L. formosana see *Pterocypsela*

L. glandulifera

L. gracilis

L. graminifolia

L. hastata

L. hirsuta

L. indica

L. intybacea

L. jamaicensis

L. laciniata see *Pterocypsela*

Carolinaia caricis

Saltusaphis scirpus; *Schizaphis rotundiventris*

Leguminosae

Acyrtosiphon gossypii; *Aphis gossypii*

Hyacinthaceae

Aphis gossypii

Macrosiphum euphorbiae; *Myzus persicae*

Compositae

Aphis fabae; *Macrosiphum euphorbiae*

Uroleucon pseudambrosiae

Uroleucon longisetosum

Aphis fabae; *Aulacorthum solani*; *Macrosiphum euphorbiae*;

Nasonovia ribisnigri; *Pemphigus bursarius*;

Uroleucon pseudambrosiae, *sonchellum*, *sonchi*

Aphis gossypii, *spiraecola*; *Hyperomyzus lactucae*;

Sitobion africanum; *Uroleucon compositae*, *sonchi*

Aphis gossypii (? – on roots with eggs; Chu, 1949)

Aphis gossypii; *Hyperomyzus carduellinus*;

Uroleucon debile, *formosanum*

Hyperomyzus lactucae

Aphis nasturtii (as *floridanae* Tissot, 1937);

Aulacorthum solani; *Myzus ornatus*, *persicae*;

Neomyzus circumflexus; *Uroleucon ambrosiae*

Aphis spiraecola; *Aulacorthum solani*; *Myzus ornatus*;

Nasonovia ribisnigri; *Uroleucon compositae*

Uroleucon formosanum

Uroleucon sonchellum

Uroleucon longisetosum

Uroleucon pseudambrosiae, *sonchellum*

Aulacorthum solani; *Hyperomyzus lactucae*;

Uroleucon formosanum, *lactucicola*, *picridis*, *sonchi*

Acyrtosiphon bidenticola; *Aphis gossypii*;

Aulacorthum solani; *Neomyzus circumflexus*;

Uroleucon ambrosiae, *pseudambrosiae*

Aphis gossypii; *Uroleucon pseudambrosiae*

- L. laevigata* see *oldhami*
L. lanceolata
L. longifolia
L. ludoviciana
L. macrophylla
L. macrorhiza
L. muralis see *Mycelis*
L. oldhami (incl. *laevigata*)
L. perennis
L. pulchella
L. quercina
L. raddeana see *Pterocypsela*
L. saggitifolia
L. saligna
L. sativa
- L. scariola*=*serriola*
L. serriola (incl. *integrata*, *scariola*)
- L. sibirica* see *Mulgedium sibiricum*
L. spicata
L. squarrosa see *Pterocypsela indica*
L. tatarica see *Mulgedium tataricum*
L. thunbergii
L. triangulata see *Pterocypsella*
L. uncinata
L. viminalis
L. viminea
L. virosa
- Lactuca* spp.
- Myzus lactucicola*
Dysaphis microsiphon
Uroleucon sonchellum
Nasonovia ribisnigri
Uroleucon longisetosum
- Myzus persicae*; *Sitobion miscanthi*; *Uroleucon lactucicola*
Uroleucon ochropus, *sonchi*
Uroleucon deltense, *erigeronense*
Uroleucon murale
- Uroleucon pseudambrosiae*
Acyrthosiphon scariolae; *Pemphigus bursarius*
Acyrthosiphon lactucaae; *Aphis fabae*, *gossypii*, *terricola*;
Aulacorthum solani; *Macrosiphum euphorbiae*;
Myzus ascalonicus, *cymbalariae*, *lactucicola*, *ornatus*,
persicae; *Nasonovia ribisnigri*; *Neomyzus circumflexus*;
Pemphigus [betae], *bursarius*, [*populivenae*];
Prociphilus erigeronensis; *Trama caudata*, *troglodytes*;
Uroleucon ambrosiae, *cichorii*, *formosanum*, *picridis*,
pseudambrosiae, *sonchi*
- Acyrthosiphon [lactucaae]*, *scariolae*;
Aphis fabae, *gossypii*, *lactucicola*, *terricola*;
Aulacorthum solani; *Hyperomyzus carduellinus*, *lactucaae*;
Macrosiphum euphorbiae; *Myzus lactucicola*, *persicae*;
Nasonovia ribisnigri; *Pemphigus bursarius*;
[*Protrama radialis*]; *Trama caudata*, *troglodytes*;
Uroleucon bielawskii, *chondrillae*, *cichorii*, *erigeronense*,
formosanum, *pseudambrosiae*, [*rudbeckiae*], *sonchellum*,
sonchi
- Myzus persicae*
- Uroleucon formosanum*
- Uroleucon sonchi*
Uroleucon chondrillae
Uroleucon bicolor, *bielawskii*
Acyrthosiphon [lactucaae], *scariolae*;
Macrosiphum euphorbiae; *Pemphigus bursarius*;
Uroleucon erigeronense, [*jaceae*], *pseudambrosiae*,
sonchellum
- [*Acyrthosiphon moltshanovi*];
Aphis craccivora, [*intybi*], *pseudocardui*, *spiraecola*;
Brachycaudus helichrysi; [*Hyalomyzus collinsoniae*];

HOST LISTS AND KEYS

[*Hyperomyzus nabali?* (as *braggi?*)];
Macrosiphum pulcherinum;
Pemphigus [borealis], *populitransversus*;
Rhopalosiphoninus latysiphon;
Uroleucon fuchuense, [*gravicorne*],

Key to apterae on *Lactuca* (also *Mulgedium* and *Pterocypsela*):–

(See Blackman and Eastop, 2000, for an illustrated key to common aphids on lettuce.)

1. ANT PT/BASE less than 0.5. SIPH either absent, or present only as pores on shallow cones **2**
 – ANT PT/BASE at least 0.8. SIPH tubular **5**
2. HT II of normal length. Body hairs sparse **3**
 – HT II very elongate, more than 0.5× hind tibia. Body hairs numerous, conspicuous **4**
3. R IV+V 0.08–0.12 mm long, and without accessory hairs. Hairs at apices of tibiae and on first tarsal segments short and thick. Cauda and anal plate not projecting posteriorly *Pemphigus* spp.
 – R IV+V 0.13–0.175 mm long, with 4–8 accessory hairs. Hairs at apices of tibiae and on first tarsal segments long and fine. Cauda and anal plate forming a dark posterior projection of the abdomen
Prociphilus erigeronensis
4. SIPH present as shallow cones. Eyes usually with more than 12 facets *Trama caudata*
 – SIPH absent. Eyes with only 3 facets *Trama troglodytes*
5. SIPH with a subapical zone of polygonal reticulation (at least 4–5 rows of closed polygonal cells) **6**
 – SIPH without polygonal reticulation **32**
6. SIPH pale, sometimes dusky towards apices. First tarsal segments with 3 hairs **7**
 – SIPH wholly dark or pale only on basal part or in middle. First tarsal segments with 3–5 hairs **9**
7. SIPH reticulation consisting of numerous (<100) small polygonal cells. ANT PT/BASE 2.9–3.4
*Uroleucon mulgedii**
 – SIPH reticulation consisting of fewer larger polygonal cells. ANT PT/BASE more than 4 **8**
8. SIPH 0.25–0.35× BL, 1.7–2.2× cauda. ANT III with 1–8(–10) rhinaria on basal part
Macrosiphum euphorbiae
 – SIPH c.0.45× BL and c.2.6× cauda. ANT III with 9–15 rhinaria on middle part
*Macrosiphum pulcherinum**
9. SIPH with grossly inflated, balloon-like section proximal to reticulated subapical part. Head strongly spiculate. ANT III without rhinaria *Rhopalosiphoninus latysiphon*
 – SIPH tapering or cylindrical, or flared apically. Head without spicules. ANT III with rhinaria **10**
10. ANT III with 1–4 small rhinaria near base. SIPH with a distinct flange. Dorsal abdominal pigmentation when present diffuse or as dark bands, not concentrated at hair-bases. R IV+V 0.09–0.14 mm long, shorter than HT II and bearing 6 accessory hairs. Cauda with 7–10(–12) hairs **11**
 – ANT III with more than 5 rhinaria. SIPH with flange small or undeveloped. Dorsal abdominal pigmentation when present consisting of dark scleroites at hair bases. R IV+V 0.125–0.24 mm, often longer than HT II and bearing 8 or more accessory hairs. Cauda with 8–37 hairs **12**
11. Dorsal abdominal pigmentation usually consisting of segmentally arranged, variably developed but well-defined black bars. Longest hairs on ANT III less than 20 µm long *Sitobion africanum*
 – Dorsal abdominal pigmentation variably developed, ill-defined and not segmentally divided. Longest hairs on ANT III more than 20 µm long *Sitobion miscanthi*

12. SIPH with pale basal section **13**
 – SIPH wholly dark, or sometimes with paler middle section **14**
13. ANT III with 5–17 rhinaria. R IV+V longer than HT II. SIPH more than 2× cauda, which has 1 or more distal hairs short and blunt or capitate *Uroleucon erigeronense*
 – ANT III with 42–69 rhinaria. R IV+V shorter than HT II. SIPH thick, less than 2× cauda, which has distal hairs all fine-pointed *Uroleucon bielawskii*
14. Cauda almost as dark as SIPH **15**
 – Cauda distinctly paler than SIPH **16**
15. ANT III with 51–77 rhinaria, extending over most of its length. Primary rhinarium on ANT V flat and not clearly larger than secondary rhinaria on III *Uroleucon compositae*
 – ANT III with 11–19 rhinaria confined to basal half. Primary rhinarium on ANT V protruberant and much larger than secondary rhinaria on III *Uroleucon lactucicola*
16. ANT III 1.5–2.0× longer than ANT IV+V together **17**
 – ANT III less than 1.2× ANT IV+V together **18**
17. ANT III with 96–135 strongly protruberant rhinaria. Cauda 1.3–1.9× ANT V. ANT PT/BASE 4.8–6.3 *Uroleucon formosanum*
 – ANT III with 49–93 rhinaria, which do not protrude strongly. Cauda 0.85–1.3× ANT V. ANT PT/BASE 6.0–8.4 *Uroleucon sonchellum*
18. ANT III with 8–11 rhinaria on basal half *Uroleucon debile**
 – ANT III with 8–97 (rarely less than 12) rhinaria, often extending beyond basal half **19**
19. Crescent-shaped antesiphuncular sclerites present **20**
 – Antesiphuncular sclerites absent or indistinct **24**
20. R IV+V 0.67–0.95× HT II *Uroleucon chondrillae*
 – R IV+V 1.17–1.84× HT II **21**
21. SIPH short and thick, 0.14–0.15× BL *Uroleucon longisetosum*
 – SIPH 0.20–0.29× BL **22**
22. R IV+V 1.17–1.33× HT II *Uroleucon cichorii*
 – R IV+V 1.45–1.84× HT II **23**
23. ANT VI BASE 0.6–0.7× R IV+V, which is c.2.2× longer than its basal width. Marginal tubercles (MTu) usually present on ABD TERG 2–4. ANT III with 25–66 rhinaria extending for 0.7–0.9 of its length. Cauda with 12–25 hairs *Uroleucon picridis*
 – ANT VI BASE c.0.9× R IV+V, which is c.4.2× longer than its basal width. MTu absent. ANT III with c.26 rhinaria mostly on basal half. Cauda with c.37 hairs *Uroleucon hasanicum**
24. Coxae dusky/dark, distinctly darker than basal parts of femora **25**
 – Coxae pale, concolorous with basal parts of femora **28**
25. Cauda with 10–12 hairs. ANT III with 45–62 rhinaria. *Uroleucon ochropus*
 – Cauda with 20–35 hairs. ANT III with 9–45(–69) rhinaria. **26**
26. Dark scleroites at bases of dorsal hairs more than 2× diameter of hair bases. SIPH 0.67–0.77 mm long *Uroleucon deltense*
 – Dark scleroites at bases of dorsal hairs absent or very small, usually less than 2× diameter of hair bases. SIPH 0.8–1.3 mm long **27**

HOST LISTS AND KEYS

27. SIPH 0.25–0.4× BL and 1.4–1.9× cauda, which is pale. ANT III with rhinaria confined to basal 0.5(–0.6) of length *Uroleucon sonchi*
 – SIPH 0.20–0.25(–0.29)× BL and 1.2–1.5× cauda, which is pale or dusky. ANT III with rhinaria extending over 0.6–0.8 of length *Uroleucon brevirostre**
28. Ventral side of hind tibia with a row of short, peg-like hairs. Dorsal abdominal hairs long; those on ABD TERG 3 maximally 50–60µm, about 2× ANT BD III *Uroleucon fuchuense*
 – Hind tibia without a distinct row of peg-like hairs (although ventral hairs are often the shortest). Hairs on ABD TERG 3 maximally 20–45µm, less than 1.6× ANT BD III **29**
29. SIPH rather thick (c.8–12× longer than diameter at midlength), 1.1–1.5× cauda. R IV+V 0.9–1.45× HT II **30**
 – SIPH long and thin (c.11–17× longer than diameter at midlength), 1.5–2.0× cauda. R IV+V 0.75–0.9(–1.0)× HT II **31**
30. HT II rather long and thin, 6 or more× longer than its maximum thickness and 0.9–1.1× R IV+V *Uroleucon pseudambrosiae*
 – HT II less than 5× its maximum thickness and 0.70–0.85× R IV+V *Uroleucon ambrosiae*
31. SIPH 1.22–1.33 mm long, 0.32–0.37× BL. Cauda with 27–34 hairs *Uroleucon bicolor**
 – SIPH 0.65–0.77 mm long, 0.22–0.33× BL. Cauda with 11–19 hairs *Uroleucon murale*
32. Cauda helmet-shaped or bluntly triangular, not longer than its basal width in dorsal view **33**
 – Cauda tongue- or finger-shaped, or elongate triangular, clearly longer than its basal width **37**
33. ANT PT/BASE 2.4–3.2. Marginal tubercles (MTu) either absent or present on ABD TERG 1–5, but never on ABD TERG 7. Cauda helmet-shaped with 5–7 hairs **34**
 – ANT PT/BASE 0.75–1.4. ABD TERG 1 and 7 with well-developed MTu. Cauda bluntly triangular with 15–20 hairs **35**
34. SIPH imbricated, very small, 0.03–0.08 mm. Well-developed MTu present on ABD TERG 1–5. Spiracular apertures reniform. Dark dorsal abdominal cross-bands often present *Dysaphis microsiphon*
 – SIPH smooth, 0.08–0.14 mm. MTu absent. Spiracular apertures rounded. Never with dark dorsal markings *Brachycaudus helichrysi*
35. ANT PT 0.75–1.05× SIPH *Aphis terricola*
 – ANT PT 1.06–1.4× SIPH **36**
36. ANT PT/BASE 1.0–1.4 *Aphis pseudocardui*
 – ANT PT/BASE 0.8–1.0 *Aphis lactuicola**
37. Head smooth, and ANT tubercles well developed with smooth, broadly divergent inner faces. ANT III with rhinaria, and ABD TERG 1 and 7 usually without MTu **38**
 – Head spiculose or, if smooth, then ANT tubercles weakly developed, ANT III without rhinaria and ABD TERG 1 and 7 with MTu **42**
38. SIPH clavate **39**
 – SIPH tapering or cylindrical on distal half **40**
39. Hairs on ABD TERG 8 are 8–19µm long, and on ANT tubercles 6–11µm. Secondary rhinaria distributed ANT III 11–29, IV (0–)1–16, V 0(–9). ANT PT/BASE 4.3–5.6. ANT PT 1.6–2.3× cauda *Hyperomyzus carduellinus*
 – Hairs on ABD TERG 8 are 30–50µm long, and on ANT tubercles 18–30µm. Secondary rhinaria distributed ANT III 4–20, IV 0(–1), V 0. ANT PT/BASE 4.8–7.4. ANT PT 2.0–3.0× cauda *Hyperomyzus lactucae*

40. Thoracic spiracles enlarged, much larger than abdominal spiracles. ANT PT/BASE 7.0–11.4, usually more than 8.0. Hairs on ANT III 0.7–1.1× BD III. Dorsum usually with paired dark intersegmental markings *Nasonovia ribisnigri*
- Thoracic spiracles similar in size to abdominal ones. ANT PT/BASE less than 7.5. Hairs on ANT III less than 0.7× BD III. Dorsum without any dark markings **41**
41. ANT, tibiae and SIPH pale. R IV+V 0.6–0.7× HT II and bearing 16–25 accessory hairs *Acyrtosiphon lactucae/scariolae* group
- ANT, tibiae and SIPH mainly dark. R IV+V 1.2–1.3× HT II, with 10–12 accessory hairs *Acyrtosiphon bidenticola*
42. Head densely spiculose, SIPH slightly clavate, and dorsum with extensive uniform dusky/dark sclerotisation. R IV+V 0.7–0.9× HT II *Myzus lactucicola*
- Head smooth or spiculose; if spiculose and SIPH clavate, then dorsum is not extensively sclerotised or has a clearly defined pattern of dark markings, and R IV+V is more than 0.9× HT II
go to key to polyphagous aphids, p. 1020

Laelia*L. lobata**Laelia* sp.*Sitobion luteum**Cerataphis orchidearum***Orchidaceae**Use key to aphids on orchids under *Cymbidium*.***Laetia****L. crenata**L. thamnina**Toxoptera aurantii**Aphis gossypii***Flacourtiaceae**

Use key to polyphagous aphids, p. 1020.

Lafoensia*L. glyptocarpa**L. punicaefolia**Toxoptera aurantii**Aphis gossypii***Lythraceae**

Use key to polyphagous aphids, p. 1020.

Lagascea*Lagascea* sp.*Acyrtosiphon bidenticola***Compositae*****Lagedium* see *Mulgedium******Lagenaria****L. leucantha* (incl. *clavata*, *depressa*,
gourda)*L. siceraria* (incl. *vulgaris*)*Aphis gossypii*, *spiraecola**Aphis craccivora*, *gossypii*, *spiraecola*, [*umbrella*];
Macrosiphum euphorbiae; *Myzus persicae***Cucurbitaceae**

Use key to polyphagous aphids, p. 1020.

Lagerstroemia* see Blackman and Eastop (1994)**Laggera****L. alata**L. flava**Aphis gossypii**Brachycaudus helichrysi***Compositae**

HOST LISTS AND KEYS

L. pterodonta
L. purpurascens

Aphis gossypii; *Brachycaudus helichrysi*; [*Dysaphis* sp.]
Aphis gossypii

Use key to polyphagous aphids, p. 1020.

Lagunaria

L. patersonii

Malvaceae

Myzus persicae

Lagurus

L. ovatus

Gramineae

Sipha maydis; *Sitobion avenae*, *fragariae*

Use key to apterae of grass-feeding aphids under *Digitaria*.

Lamarckia

L. aurea

Gramineae

Geoica utricularia; *Rhopalosiphum padi*

Use key to apterae of grass-feeding aphids under *Digitaria*.

Lamium (incl. Lamiastrum)

L. album (incl. var. *barbatum*)

Labiatae

Aphis gossypii, *lamiorum*, *odorikonis*; *Aulacorthum solani*;
Brachycaudus helichrysi, *lamii*; *Cryptaphis garwhalensis*;
Cryptomyzus alboapicalis, *ballotae*, *galeopsidis*,
korschelti, *multipilosus*, *ribis*, *stachydis*, *taoi*;

L. amplexicaule

Macrosiphum euphorbiae; *Myzus ornatus*, *persicae*
Aphis fabae, *gossypii*, *lamiorum*; *Aulacorthum solani*;
Cryptomyzus galeopsidis, *korschelti*, *ribis*, *taoi*;
Macrosiphum euphorbiae; *Myzus ornatus*, *persicae*;
Pemphigus bursarius

L. galeobdolon

Aphis lamiorum; *Cryptomyzus maudamonti*

L. hybridum

Cryptomyzus galeopsidis

L. luteum

Aphis lamiorum

L. maculatum

Aphis lamiorum; *Aulacorthum solani*;

Brachycaudus helichrysi, *lamii*;

Cryptomyzus galeopsidis, *ribis*, *ulmeri*;

Myzus ornatus, *persicae*

L. purpureum

Aphis frangulae ssp. *beccabungae*, *fabae*, *lamiorum*;

Aulacorthum solani; *Brachycaudus helichrysi*, *lamii*;

Cryptomyzus galeopsidis, *ribis*;

[*Dysaphis montemartini* nomen dubium];

Macrosiphum euphorbiae; *Rhopalosiphoninus staphyleae*

[*Aphis aliena*], [*incerta* Nevsky of Rusanova, 1942],

[*pollinosa* (nomen dubium)];

[*Chaetosiphon heterotrichum*]

Key to apterae on *Lamium*:—

1. Dorsal body hairs long and thick, much longer than ANT BD III, and many or all of them with knobbed or expanded apices, and arising from tuberculate bases 2
- Dorsal body hairs mostly shorter than BD III; pointed or blunt, or if with somewhat expanded apices then without tuberculate bases 11

2. Longest hairs on ANT III shorter than or about equal to $(0.5-1.1\times)$ BD III, clearly shorter than hairs on ANT I. R IV+V at least $1.3\times$ HT II, with 6–18 accessory hairs. SIPH at least $0.2\times$ BL **3**
 – Longest hairs on ANT III longer than $(1.2-2.5\times)$ BD III, similar in length to those on ANT I. R IV+V with 2–10 accessory hairs. SIPH less than $0.2\times$ BL **6**
3. ANT PT $1.2-1.6\times$ ANT III. Longest hair on ANT III $0.9-1.1\times$ BD III *Cryptomyzus ballotae* **4**
 – ANT PT more than $1.6\times$ ANT III. Longest hair on ANT III $0.5-0.8\times$ BD III **4**
4. SIPH more-or-less cylindrical, with little trace of swelling; thinner than hind tibia for most of length. SIPH $2.2-3.1\times$ cauda *Cryptomyzus ribis*
 – SIPH with distinctly swollen section on distal part, with maximum diameter $1.2-1.6\times$ minimum diameter on proximal half, the swollen part distinctly thicker than hind tibia. SIPH $3.6-5.0\times$ cauda **5**
5. R IV+V with 11–18 accessory hairs. ABD TERG 1–4 each with a group of 2–3, rarely 4, marginal hairs on each side *Cryptomyzus korschelti*
 – R IV+V with 7–13 accessory hairs. ABD TERG 1–4 each with a group of 4–5 marginal hairs on each side *Cryptomyzus taii*
6. Hairs on ANT III all pointed, the longest of them $1.7-2.1\times$ BD III. ANT III with 7–19 rhinaria, distributed over most of its length *Cryptomyzus multipilosus**
 – Hairs on ANT III all distinctly capitate, the longest of them **either** $1.2-1.7\times$ **or** $2.2-2.5\times$ BD III. ANT III with 0–17 rhinaria on its basal half **7**
7. Longest hairs on ANT III $2.2-2.5\times$ BD III. ABD TERG 1–4 each with 30–34 hairs. R IV+V with c.10 accessory hairs *Cryptaphis garwhalensis**
 – Longest hairs on ANT III $1.2-1.7\times$ BD III. ABD TERG 1–4 each with 5–20 hairs. R IV+V with 2–7 hairs **8**
8. ABD TERG 1–4 each with 12–20 capitate hairs. SIPH $0.09-0.11\times$ BL and $1.0-1.5\times$ cauda *Cryptomyzus alboapicalis*
 – ABD TERG 1–4 each with 5–14 capitate hairs; if with 12–14 then SIPH more than $0.15\times$ BL and more than $2\times$ cauda **9**
9. SIPH $0.10-0.23$ mm. The following discriminant function is less than 49.4: $\langle 0.5\times$ number of hairs on ABD TERG 3 **plus** $698\times$ HT II **minus** $0.7\times$ number of rhinaria on ANT III **minus** $309\times$ minimum width of basal part of SIPH \rangle *Cryptomyzus ulmeri*
 – SIPH $0.17-0.38$ mm; if less than 0.23 mm, then use the above discriminant function, the value of which is greater than 49.4 **10**
10. Rostrum reaching to hind coxae. ABD TERG 1–4 each with 8–14 hairs. The following discriminant function is usually (90% of specimens) greater than 20: $[(182\times$ length of longest hair on ABD TERG 2–4) $+(113\times$ ANT BASE VI) $+(1.3\times$ number of hairs on ABD TERG 3 (not counting very small ones)) $-(328\times$ length of longest hair on ANT I)] *Cryptomyzus maudamanti*
 – Rostrum not reaching to hind coxae. ABD TERG 1–4 each with 4–11 hairs. Value of above discriminant function is less than 20 *Cryptomyzus galeopsidis*
11. Cauda helmet-shaped, shorter than its basal width in dorsal view. Spiracles large and rounded. SIPH with a distinct annular incision proximal to the flange **12**
 – Cauda either not evident, or if present then tongue- or finger-shaped, clearly longer than its basal width. Spiracles reniform. SIPH (if present) without a distinct subapical incision **13**
12. Dorsum with a dark sclerotic shield. SIPH dark, imbricated, $c.2\times$ cauda *Brachycaudus lamii*
 – Dorsum without dark markings. SIPH pale and smooth, less than $1.5\times$ cauda *Brachycaudus helichrysi*

Laplacea

- L. angustifolia*
L. ekmanii
Laplacea sp.

Theaceae

- Toxoptera aurantii*
Toxoptera aurantii
Aphis spiraeicola

Use key to polyphagous aphids, p. 1020.

Laportea (incl. Fleurya)

- L. aestuans*

L. bulbifera
L. platycarpa
Laportea sp. (as *Fleurya*)

Urticaceae

- Macrosiphum euphorbiae*; *Myzus persicae*;
Sitobion autriquei
Hydronaphis laporteeae
Aphis gossypii
Myzus dycei; *Rhopalosiphum nymphaeae*

Key to apterae on *Laportea*:-

1. Dorsal body hairs long and pointed, the longest ones on ABD TERG 3 are 1.6–2.2× ANT BD III. Dorsum with extensive dark sclerotisation. R IV+V 1.6–1.8× HT II *Hydronaphis laporteeae*
 – Dorsal hairs much shorter. If dorsum is dark and sclerotic then R IV+V is less than 1.2× HT II **2**
2. SIPH wholly dark with a subapical zone of polygonal reticulation. Head dark with well-developed, broadly divergent ANT tubercles. (Dorsum with extensive dark sclerotisation) *Sitobion autriquei*
 – SIPH pale or dark, if dark then without subapical reticulation and head with ANT tubercles weakly developed **3**
3. Head densely spiculate or nodulose, with well-developed, rounded ANT tubercles, their inner faces apically convergent. SIPH 2.8–3.5× cauda; rather thick, very rugose for most of length and usually somewhat swollen on distal part, but narrowing and smooth subapically *Myzus dycei*
 – If head densely spiculate then SIPH are less than 2.7× cauda **4**
4. Dorsal cuticle with a pattern of spinules arranged in polygons, with 1–3 spinules in the center of each polygon. Head smooth with ANT tubercles weakly developed, SIPH clavate *Rhopalosiphum nymphaeae*
 – Dorsal cuticle without spinules arranged in polygons, and other characters not in this combination
 go to key to polyphagous aphids, p. 1020

Lappa see Arctium**Lappula (incl. Echinosperrum)**

- L. lappula*

Boraginaceae

- Brachycaudus helichrysi*; [*Uroleucon jaceae*]

Lapsana (incl. Lampsana)

- L. communis* (incl. *vulgaris*)

Compositae

- Aphis fabae*; *Aulacorthum solani*;
Hyperomyzus lampanae; *Macrosiphum euphorbiae*;
Myzus ornatus; *Nasonovia ribisnigri*;
Pemphigus bursarius; *Trama rara*, *troglodytes*;
Uroleucon cichorii

Key to apterae on *Lapsana*:-

1. HT II greatly elongated, more than 0.5× hind tibia. Body densely clothed in fine hairs. SIPH absent **2**
 – HT II of normal length. Body not densely hairy, SIPH present or absent **3**

- Cauda tongue- or finger-shaped, longer than its basal width. STu usually absent, MTu sporadic or only consistently present on ABD TERG 1 and 7 7
- 5. Head densely spiculose. SIPH shorter than R IV+V, with close-set annular rows of blunt spinules. Cauda with 10–12 hairs. STu on ABD TERG 1–5 *Anuraphis pyrilareri*
- Head not spiculose. SIPH longer than R IV+V, normally imbricated. Cauda with 5 hairs. STu on head and ABD TERG 8 6
- 6. Longest hairs on ANT III 37–54 µm, 1.8–2.8× BD III *Dysaphis laserpitii*
- Longest hairs on ANT III 8–17 µm, 0.3–0.8× BD III *Dysaphis apiifolia*
- 7. SIPH dusky/dark, clavate, 0.85–1.2× the also dark cauda *Hyadaphis passerinii*
- SIPH cylindrical or tapering (or if not then pale and much longer than pale cauda) 8
- 8. Head smooth with well-developed ANT tubercles, their inner faces broadly divergent. 9
- Head either smooth with ANT tubercles undeveloped or weakly developed, or spiculose with steep-sided ANT tubercles go to key to polyphagous aphids, p. 1020
- 9. ANT, legs except basal parts of femora, SIPH and cauda all black. SIPH without any distinct subapical zone of polygonal reticulation *Acyrtosiphon nigripes*
- ANT, legs, SIPH and cauda pale, or only dark at apices. SIPH with a subapical zone of polygonal reticulation 10
- 10. R IV+V 0.95–1.14× HT II. ABD TERG 8 with 7–10 hairs *Macrosiphum gei*
- R IV+V 0.63–0.83× HT II. ABD TERG 8 with 6 hairs *Macrosiphum laseri*

Lasiacis

Gramineae

One aphid species, *Pseudoregma panicola*, is recorded from three *Lasiacis* spp.; *L. divaricata*, *L. grisebachii* and *L. sorghoidea* (or use key to apterae of grass-feeding aphids under *Digitaria*).

Lasiagrostis see Stipa

Lasianthus

Rubiaceae

L. chinensis

Toxoptera citricidus

L. cyanocarpus

Aulacorthum nipponicum

Lasianthus sp.

Sinomegoura citricola

Key to apterae on *Lasianthus*:-

- 1. ANT tubercles weakly developed. ANT III without rhinaria, and with longest hairs on it 1.5–2.0× BD III. ABD TERG 1 and 7 with marginal tubercles (MTu). Cauda with 19–54 hairs. Stridulatory apparatus present *Toxoptera citricidus*
- ANT tubercles well developed. ANT III with 1 or more rhinaria, and with longest hairs on it shorter than BD III. ABD TERG 1 and 7 without MTu. Cauda with 5–6 or 11–19 hairs. No stridulatory apparatus 2
- 2. Cauda very large, as long as or slightly longer than SIPH, and bearing 11–19 hairs. SIPH dark on distal 0.6–0.7 of length. Head smooth, with broadly divergent ANT tubercles *Sinomegoura citricola*
- Cauda less than 0.5× SIPH, with 5–6 hairs. SIPH entirely dark. Head spiculose, ANT tubercles with inner faces steep-sided *Aulacorthum nipponicum*

Lastrea see *Thelypteris*

Lathraea

L. squamaria

Lathyrus (incl. Oxypogon)

L. angulatus
L. angustifolius
L. aphaca
L. davidii
L. hirsutus
L. humilis
L. japonicus (incl. *glaber*, *maritimus*)

L. latifolius
L. littoralis
L. marmoratus
L. montanus
L. nevadensis
L. niger
L. nissola
L. nudicaulis see *palustris*
L. nutallii
L. ochrus
L. odoratus

L. pagloi
L. palustris (incl. *nudicaulis*)
L. pilosus
L. pisiformis
L. pratensis

L. roseus
L. sativus

L. sylvestris
L. tuberosus
Lathyrus sp.

Scrophulariaceae

Aphis orobanches

Leguminosae

Acyrtosiphon pisum
Acyrtosiphon pisum
Aphis craccivora
Megoura crassicauda
Acyrtosiphon pisum
Aphis craccivora
Acyrtosiphon pisum, *kondoii*; *Macrosiphum creelii*;
Megoura crassicauda, *littoralis*
Acyrtosiphon pisum; *Megoura viciae*
Macrosiphum creelii
Acyrtosiphon pisum; *Aphis craccivora*
Megoura viciae
Nearctaphis sclerosa
Aphis craccivora
Macrosiphum euphorbiae

Nearctaphis sclerosa
Acyrtosiphon pisum
Acyrtosiphon pisum;
Aphis craccivora, [*dissita* Walker (nomen nudum)], *fabae*,
gossypii; *Macrosiphum* [*centranthi*], *euphorbiae*;
Megoura viciae; *Myzus persicae*; *Nearctaphis crataegifoliae*;
Smynthuroides betae
Aphis craccivora
Megoura viciae
Acyrtosiphon pisum
Acyrtosiphon pisum
Acyrtosiphon pisum; *Aphis comosa*, *pseudocomosa*;
Aulacorthum solani; *Megoura viciae*;
Megourella purpurea; *Pemphigus populi*
Acyrtosiphon pisum
Acyrtosiphon pisum; *Macrosiphum euphorbiae*;
Megoura viciae; [*Uroleucon compositae*]
Acyrtosiphon pisum; *Aphis fabae*; *Megoura viciae*
Megoura viciae
Acyrtosiphon loti

Key to apterae on *Lathyrus*:-

1. Head with well-developed ANT tubercles, the inner faces of which are smooth and broadly divergent 2
- ANT tubercles absent or weakly developed, or if well developed then with inner faces steep-sided and scabrous or spiculose 10

2. SIPH somewhat swollen in middle, and either entirely black or dusky/dark with black apices 3
 – SIPH pale and cylindrical or tapering for most of length 6
3. Dorsal abdomen with a segmental pattern of dark spinal, pleural and marginal sclerites. Cauda pale. ANT III with 1–6 small rhinaria near base *Megourella purpurea*
 – Dorsal abdomen without a segmental pattern of dark sclerites. Cauda pale or dark. ANT III with 6–50 somewhat protruberant rhinaria extending onto distal half 4
4. Cauda pale. SIPH dusky/dark with black apices. Antesiphuncular sclerites very pale or absent *Megoura litoralis*
 – Cauda and SIPH black, and large crescent-shaped antesiphuncular sclerites present 5
5. ANT III with 5–26 (usually 10–18) rhinaria, not in a row, on basal 0.75 of segment (ANT IV of al. with 0–7 rhinaria) *Megoura viciae*
 – ANT III with (15–)21–50 rhinaria in a row extending over 0.75–0.90 of segment. (ANT IV of al. with more than 17 rhinaria) *Megoura crassicauda*
6. SIPH with a subapical zone of polygonal reticulation (at least 4–5 rows of closed cells). Hairs on ANT III more than $0.5 \times$ BD III 7
 – SIPH without polygonal reticulation. Hairs on ANT III very short and blunt, much less than $0.5 \times$ BD III 8
7. ANT VI BASE $0.8\text{--}1.3 \times$ R IV+V *Macrosiphum euphorbiae*
 – ANT VI BASE $1.4\text{--}2.0 \times$ R IV+V *Macrosiphum creelii*
8. Articulation between ANT III and IV blackish. ANT VI BASE 0.25–0.4 mm, $1.8\text{--}2.3 \times$ R IV+V. SIPH very attenuate distally, with minimum diameter less than $0.25 \times$ width of CAUDA at midlength in dorsal view *Acyrtosiphon pisum*
 – Articulation between ANT III and IV pale or dusky. ANT VI BASE 0.13–0.2 mm, $1.0\text{--}1.5 \times$ R IV+V. SIPH not attenuate distally, with minimum diameter more than $0.25 \times$ width of cauda at midlength in dorsal view 9
9. ANT PT/BASE 4.3–6.0, and PT usually $1.6\text{--}2.5 \times$ cauda. SIPH usually more than $1.7 \times$ cauda *Acyrtosiphon kondoi*
 – ANT PT/BASE 3.0–4.2, and PT usually $1.1\text{--}1.6 \times$ cauda. SIPH usually less than $1.7 \times$ cauda *Acyrtosiphon loti*
10. Head densely spiculate or nodulose, **but** ANT tubercles are undeveloped. SIPH with close-set, strongly spiculate imbrication. Cauda helmet-shaped or bluntly triangular, not longer than its basal width in dorsal view 11
 – Head smooth or, if densely spinulose or nodulose then with ANT tubercles well developed. SIPH (if present) with normal imbrication. Cauda (if developed at all) tongue- or finger-like, longer than its basal width 12
11. Dorsal abdomen without dark sclerites anterior to SIPH *Nearctaphis crataegifoliae*
 – Dorsal abdomen with extensive dark sclerotisation anterior to SIPH, including a quadrate patch over ABD TERG 3–5, and smaller sclerites on 1 and 2 *Nearctaphis sclerosa**
12. Dorsal abdomen with extensive dark sclerotisation, divided into polygons by a pale reticulation 13
 – Dorsal abdomen not extensively sclerotised go to key to polyphagous aphids, p. 1020
13. Longest hair on ANT III is $0.25\text{--}0.75$ (usually $0.5\text{--}0.6 \times$) BD III. Cauda with 4–9 hairs *Aphis craccivora*
 – Longest hair on ANT III is $0.67\text{--}1.38 \times$ BD III. Cauda with 6–19 hairs 14

HOST LISTS AND KEYS

14. SIPH 1.6–2.0× cauda, which bears 6–11 hairs (usually less than 10) *Aphis comosa*
– SIPH 1.1–1.5× cauda, which bears (8–)10–19 hairs *Aphis pseudocomosa*

Launaea

L. arborescens
L. pinnatifida
L. rotundifolia
Launaea spp.

Compositae

Brachycaudus helichrysi
[*Eutrichosiphum alnicola*]; *Myzus persicae*
Aphis spiraecola
Aphis pseudocardui; [*Metopolophium chandrani*];
Uroleucon sonchi

Key to apterae on *Launaea*:-

1. ANT PT/BASE 1.0–1.4. SIPH short, black, about as long as cauda which is bluntly triangular and bears 12–20 hairs *Aphis pseudocardui*
– ANT PT/BASE more than 1.8 and other characters not in that combination **2**
2. BL 2.9–4.5. ANT black, with III bearing 9–35 rhinaria. SIPH black with polygonal reticulation on distal 0.16–0.27 of length. Cauda long, pale, slender, with 23–30 hairs *Uroleucon sonchi*
– Aphids without that combination of characters go to key to polyphagous aphids, p. 1020

Laurus

L. nobilis
L. rotundifolia

Lauraceae

Aphis frangulae
Aphis spiraecola

Use key to polyphagous aphids, p. 1020.

Lavandula

L. angustifolia (incl. *spicu*)
L. multifida
L. officinalis
L. stoechas (incl. *pedunculata*)
Lavandula sp.

Labiatae

Aphis fabae; *Eucarazzia elegans*
Aphis salviae
Myzus persicae
Eucarazzia elegans
Myzus ornatus

Key to apterae on *Lavandula*:-

- SIPH very markedly clavate, so that maximum diameter of swollen part is more than 2× minimum diameter of stem (see Figure 48a). SIPH 5.3–8.8× cauda, which bears only 5 hairs *Eucarazzia elegans*
- SIPH tapering, cylindrical or only moderately clavate; less than 3× cauda, and if at all swollen then cauda bears 6 or more hairs
go to key to polyphagous aphids, p. 1020, but note that specimens running to *Aphis craccivora* may be *A. salviae* (see couplet 16 of key to apt. on *Salvia*)

Lavatera

L. acerifolia
L. arborea
L. assurgentiflora
L. cretica

L. olbia
L. phoenicea

Malvaceae

Aphis gossypii; *Macrosiphum euphorbiae*; *Myzus persicae*
Aphis gossypii, *umbrella*; *Myzus ornatus*, *persicae*
Myzus persicae
Aphis fabae, *umbrella*; *Macrosiphum euphorbiae*;
Myzus ornatus, *persicae*
Aphis gossypii
Aphis gossypii

<i>L. punctata</i>	<i>Aphis fabae, gossypii</i>
<i>L. thuringiaca</i>	<i>Acyrtosiphon malvae; Aphis davletshinae;</i> [<i>Brachycaudus</i> sp. (Bozhko, 1976)]; <i>Myzus persicae</i>
<i>L. trimestris</i>	<i>Aphis umbrellae; Myzus persicae</i>
<i>L. uniflora</i>	<i>Aphis gossypii</i>
<i>Lavatera</i> spp.	[<i>Aphis epilobii</i> Kittel (invalid name)]; <i>Brachycaudus helichrysi</i>

Use key to aphids on *Alcea*.

Lawsonia

L. alba

L. inermis

L. uniflora

Lythraceae

Aphis gossypii; Myzus persicae;
Tinocallis kahawaluokalani (see Blackman and Eastop 1994)
Aphis craccivora, gossypii, nasturtii
Aphis gossypii

Key to aphids on *Lawsonia*:-

- All adult viviparae alate. Cauda knobbed, anal plate bilobed. ANT PT/BASE less than 1.5. SIPH as short, pale truncate cones *Tinocallis kahawaluokalani* (see Blackman and Eastop 1994)
- Adult viviparae apterous or alate. Cauda tongue-shaped, anal plate entire. ANT PT/BASE more than 1.5. SIPH tubular, tapering or swollen on distal half go to key to polyphagous aphids, p. 1020

Lecythis

Lecythis sp.

Lecythidaceae

Aphis gossypii

Ledebouriella

L. divaricata

Umbelliferae

Cavariella japonica

Ledum see Rhododendron

Leea

Leea spp.

Leeaceae

Toxoptera aurantii, odinae

See key to polyphagous aphids, p. 1020.

Leersia (incl. Homalocenchrus)

L. hexandra

L. japonica

L. oryzoides

L. virginica

Gramineae

Brachysiphoniella montana; Kugegania ageni
[*Melanaphis siphonella*]
Colopha graminis; Rhopalosiphum nymphaeae;
Sipha glyceriae
Colopha graminis; Rhopalosiphum nymphaeae

Key to apterae on *Leersia*:-

1. SIPH long (0.14–0.31× BL), tubular, and swollen on distal part 2
- SIPH as very short cones, or absent 3
2. Head not spiculose ventrally, and without spinal tubercles (STu). ANT tubercles weakly developed. Dorsal cuticle with a regular pattern of spinules arranged in polygons. SIPH 0.14–0.21× BL *Rhopalosiphum nymphaeae*
- Head spiculose on ventral side, dorsally smooth and with a pair of STu. ANT tubercles well-developed, with inner faces scabrous. Dorsal cuticle without spicules arranged in polygons. SIPH more than 0.25× BL *Kugegania ageni*

HOST LISTS AND KEYS

3. Eyes 3-faceted. SIPH absent. ANT and legs greatly reduced, ANT less than $0.1 \times$ BL. Wax glands present on all segments, each comprising a ring of cells surrounding 1–2 smaller central cells *Colopha graminis*
- Eyes multifaceted. SIPH as very short cones. ANT and legs of normal length, e.g., ANT at least $0.2 \times$ BL. No discrete wax glands **4**
4. Dorsal body hairs thick and spine-like. Tergum sclerotic, with numerous small denticles between hair bases. Cauda short, pale, with a round knob. ANT PT/BASE less than 1.5 *Sipha glyceriae*
- Dorsal body hairs thin and fine-pointed. Tergum membranous, without denticles. Cauda long, dark, finger-like. ANT PT/BASE more than 2 *Brachysiphoniella montana*

(or use general keys to apterae of grass-feeding aphids under *Digitaria*)

Lefeburea

L. abyssinica

Umbelliferae

Sitobion africanum, [*Sitobion* sp. (Millar, 1994)]

Legousia (incl. *Specularia*)

Legousia sp.

Campanulaceae

Uroleucon sp. (as *sonchi*)

Leliocattleya

Leliocattleya (hybrid)

Orchidaceae

Aulacorthum solani

Lembotropis see *Cytisus*

Lemna

L. gibba

L. minor

L. perpusila

L. polyrhiza

L. trisulca

Lemnaceae

Rhopalosiphum nymphaeae

[*Aphis sambuci*]; *Rhopalosiphum nymphaeae*

Rhopalosiphum nymphaeae

Rhopalosiphum nymphaeae

Rhopalosiphum nymphaeae

Lens

L. culinaris (incl. *esculenta*)

L. nigricans

Leguminosae

Acyrtosiphon kondoi; *Aphis craccivora*, *fabae*;

Macrosiphum euphorbiae; *Myzus persicae*

Acyrtosiphon pisum

Use key to apterae on *Medicago*.

Leonotis

L. leonurus

L. nepetifolia

Leonotis sp.

Labiatae

Aphis gossypii

Aphis fabae, *gossypii*; *Brachycaudus helichrysi*;

Macrosiphum euphorbiae; *Uroleucon compositae*

Aulacorthum solani

Use key to polyphagous aphids, p. 1020

Leontodon (incl. *Thrinacia*)

L. alpinus

L. asper

Compositae

Aphis fabae; *Brachycaudus helichrysi*; *Myzus persicae*;

Uroleucon cichorii

Aphis leontodontis; *Uroleucon leontodontis*

<i>L. autumnalis</i>	<i>Aphis craccivora, fabae, gossypii, leontodontis, middletonii, nasturtii, spiraecola, [taraxacicola]; Aulacorthum palustre, solani; Hyperomyzus lactucae; Nasonovia ribisnigri; Uroleucon cichorii, hypochoeridis, leontodontis</i>
<i>L. crispus</i>	<i>Uroleucon leontodontis</i>
<i>L. danubicus</i>	<i>Aphis solanella; Trama troglodytes; Uroleucon cichorii</i>
<i>L. hastilis</i>	<i>Uroleucon cichorii, leontodontis</i>
<i>L. hirtus</i>	<i>Uroleucon sonchi</i>
<i>L. hispidus</i>	<i>Aphis leontodontis, picridicola; Uroleucon leontodontis, picridis</i>
<i>L. rothii</i>	<i>Acyrtosiphon ilka; Aphis ?pseudocardui (Portugal, BMNH colln); Aulacorthum solani; Myzus cymbalariae</i>
<i>L. taraxacoides</i>	<i>Aphis picridicola, [terricola]</i>
<i>L. taraxacum</i>	
see <i>Taraxacum officinale</i>	
<i>L. villarsii</i>	<i>Uroleucon leontodontis</i>
<i>Leontodon</i> spp.	<i>[Aulacorthum rufum]; Myzus ascalonicus; Trama caudata; Uroleucon pilosellae</i>

Key to apterae on *Leontodon*:-

1. Hind tarsi greatly elongated, more than 0.6× hind tibiae. ANT PT/BASE less than 0.4. SIPH absent, or as pores 2
 - Hind tarsi normal. ANT PT/BASE more than 0.7. SIPH tubular 3
2. SIPH absent. Eyes of only 3 facets *Trama troglodytes*
 - SIPH present as pores on small cones. Eyes multifaceted *Trama caudata*
3. Cauda helmet-shaped or triangular, not longer than its basal width 4
 - Cauda tongue- or finger-shaped, longer than its basal width 7
4. Cauda helmet-shaped, with 4–6 hairs. SIPH smooth, pale, with a subapical annular incision. ANT PT/BASE 2.4–3.2. ANT III without rhinaria. Dorsum without dark markings. Spiracular apertures rounded. ABD TERG 1 and 7 without marginal tubercles (MTu) *Brachycaudus helichrysi*
 - Cauda bluntly triangular, with 6–19 hairs. SIPH imbricated, dark, without a subapical annular incision. ANT PT/BASE 0.8–2.3. ANT III often with rhinaria. Dorsum usually with dark sclerotisation. Spiracular apertures reniform. ABD TERG 1 and 7 with MTu 5
5. Cauda with 6–12 hairs. MTu usually present on ABD TERG 2–4 as well as the large ones on 1 and 7 *Aphis picridicola*
 - Cauda with 11–19 hairs. MTu usually only on ABD TERG 1 and 7 6
6. ANT PT/BASE 1.4–2.3. SIPH 1.1–1.6× cauda *Aphis middletonii*
 - ANT PT/BASE (0.8–)1.0–1.2 (–1.4). SIPH 0.8–1.1× cauda *Aphis ?pseudocardui*
7. Abdomen with conspicuous, well-developed marginal tubercles (MTu) on ABD TERG 2–4 (–5) as well as on 1 and 7, diameter of MTu on 7 being 1.6–2.9× ANT BD III *Aphis leontodontis*
 - Abdomen either without MTu, or with MTu regularly present either only on ABD TERG 1 and 7 (that on 7 being less than 1.5× ANT BD III), or only on 2–4 (–5), but not both 8

HOST LISTS AND KEYS

8. SIPH dark with an extensive distal zone of polygonal reticulation. ANT mainly dark **9**
 – SIPH without polygonal reticulation, or with only a few closed cells subapically. ANT mainly pale **14**
9. Dorsal hairs on ABD TERG 1–5 not arising from dark scleroites. Antesiphuncular sclerites absent or vestigial. R IV+V 0.8–0.9× HT II *Uroleucon sonchi*
 – Dorsal hairs all or mostly arising from dark scleroites. Crescent-shaped antesiphuncular sclerites present. R IV+V 0.84–1.84× HT II **10**
10. First tarsal segments bearing only 3 hairs, all subapical. ANT III with 12–30 rhinaria. Cauda with 11–16 hairs. R IV+V 1.15–1.45× HT II *Uroleucon pilosellae*
 – First tarsal segments usually with 5 hairs, including a pair of lateral ones. ANT III with 25–97 rhinaria. Cauda with 12–36 hairs. R IV+V 0.84–1.84× HT II **11**
11. R IV+V 0.84–1.08× HT II *Uroleucon hypochoeridis*
 – R IV+V 1.17–1.84× HT II **12**
12. R IV+V 1.17–1.33× HT II. ANT PT/BASE 6.0–7.9. ANT III with 56–97 rhinaria. Cauda with (16–) 20–36 hairs *Uroleucon cichorii*
 – R IV+V 1.30–1.84× HT II. ANT PT/BASE 5.1–6.7. ANT III with 25–60 rhinaria. Cauda with 11–24 hairs **13**
13. ABD TERG 2–4 (–5) regularly with well-developed MTu, the diameter of which is usually larger than that of adjacent hair bases. Cauda with (12–) 18–24 hairs *Uroleucon picridis*
 – ABD TERG 2–4 usually lacking MTu, and if present these are rarely larger than hair bases. Cauda with 11–17 (–20) hairs *Uroleucon leontodontis*
14. Head cuticle smooth (sometimes with a few spinules ventrally). ANT tubercles well developed with inner faces divergent or almost parallel, and smooth or only slightly scabrous. ANT III with 1–36 rhinaria **15**
 – Either head is smooth and ANT tubercles are small or undeveloped, **or** head is markedly spinulose at least ventrally, and inner faces of ANT tubercles are markedly scabrous and parallel or apically convergent. ANT III with 0–3 rhinaria go to key to polyphagous aphids, p. 1020
15. SIPH markedly clavate, with maximum width of swollen part 1.3–2.0× diameter of stem *Hyperomyzus lactucae*
 – SIPH cylindrical or tapering **16**
16. Thoracic spiracles enlarged, much larger than abdominal spiracles. ANT PT/BASE 7.0–11.4, usually more than 8.0. ANT III with 14–36 rhinaria. Hairs on ANT III 0.7–1.1× BD III. Dorsum usually with paired dark intersegmental markings *Nasonovia ribisnigri*
 – Thoracic spiracles similar in size to abdominal ones. ANT PT/BASE 3.0–5.2. ANT III with 1–4 rhinaria. Hairs on ANT III less than 0.7× BD III **17**
17. SIPH 0.22–0.25× BL and 1.8–2.5× cauda, which has no distinct constriction. R IV+V 1.2–1.3× HT II *Aulacorthum palustre*
 – SIPH 0.23–0.31× BL and 1.5–1.8× cauda, which has a distinct constriction on basal part. R IV+V 0.77–0.90× HT II *Acyrtosiphon ilka*

Leontopodium

L. alpinum

L. coreanum

Compositae

Brachycaudus helichrysi; *Macrosiphoniella mutellinae*;

Myzus persicae

Uroleucon leontopodiicola

Key to apterae on *Leontopodium*:-

1. SIPH dark with an extensive zone of polygonal reticulation extending over at least 0.25 of length. ANT III with 15–67 rhinaria distributed over much of its length 2
- SIPH mostly pale, without extensive polygonal reticulation. ANT III with 0 (–10) rhinaria
go to key to polyphagous aphids, p. 1020
2. BL 2.9–3.6 mm. SIPH 0.71–0.91 mm long, 1.4–1.5× cauda and reticulated over distal c.0.25 of length
*Uroleucon leontopodiicola**
- BL 1.5–1.7 mm. SIPH 0.20–0.25 mm, 0.65–0.85× cauda and reticulated over more than 0.5 of length
Macrosiphoniella mutellinae

Leonurus*L. cardiaca**L. heterophyllus**L. macranthus**L. sibiricus**L. turkestanicus**Leonurus* sp.**Labiatae**[*Aphis* sp. (*plantaginis* of Wilson and Vickery, 1918);*Brachycaudus helichrysi*; *Cryptomyzus leonuri*, *ribis*;*Myzus ornatus**Aphis frangulae*, *gossypii**Aphis gossypii*; *Cryptomyzus ribis**Aphis gossypii*; *Cryptomyzus ribis*, *taoi*;*Macrosiphum salviae*; [*Myzus kalimpongensis*];[*Ovatus minutus*]; [*Semiaphis heraclei*]*Cryptomyzus multipilosus**Aulacorthum solani*; *Cryptomyzus ballotae*Key to apterae on *Leonurus*:-

1. Dorsal body hairs long and thick, much longer than ANT BD III, and many or all of them with knobbed or expanded apices, and arising from tuberculate bases. SIPH swollen on distal part 2
- Dorsal body hairs mostly shorter than BD III; pointed or blunt, or if with somewhat expanded apices then without tuberculate bases. SIPH swollen, tapering or cylindrical 6
2. Longest hairs on ANT III shorter than or about equal to 0.5–1.1× BD III, clearly shorter than hairs on ANT I. R IV+V 1.3–1.6× HT II, with 6–14 accessory hairs. SIPH 0.20–0.25× BL, and 3.6–5× cauda 3
- Longest hairs on ANT III longer than 1.2–2.1× BD III, similar in length to those on ANT I. R IV+V 1.0–1.2× HT II, with 2–4 accessory hairs. SIPH less than 0.2× BL, and less than 2.5× cauda 5
3. ANT PT 1.2–1.6× ANT III, and ANT PT/BASE 6.4–8.8. Longest hair on ANT III 0.9–1.1× BD III. R IV+V 1.5–1.6× HT II 4
Cryptomyzus ballotae
- ANT PT more than 1.6× ANT III and ANT PT/BASE 9.0–10.5. Longest hair on ANT III 0.5–0.8× BD III. R IV+V 1.3–1.5× HT II 4
4. ANT III with 0–3 rhinaria. SIPH more-or-less cylindrical, with little trace of swelling; thinner than hind tibia for most of length. SIPH 2.2–3.1× cauda 4
Cryptomyzus ribis
- ANT III with 5–19 rhinaria. SIPH with distinctly swollen section on distal part, with maximum diameter 1.2–1.6× minimum diameter on proximal half, the swollen part distinctly thicker than hind tibia. SIPH 3.6–5.0× cauda 4
Cryptomyzus taoi
5. Hairs on ANT III all pointed. ANT III with rhinaria distributed over almost its entire length. SIPH a little more than 2× cauda 4
Cryptomyzus multipilosus
- Hairs on ANT III markedly capitate. ANT III with rhinaria restricted to basal 0.5–0.7. SIPH usually less than 2× cauda 4
Cryptomyzus leonuri

HOST LISTS AND KEYS

6. SIPH black with polygonal reticulation on distal 0.17–0.20 of length. ANT and tibiae entirely dark. *Macrosiphum salviae*
 – SIPH pale or dark, if dark then without polygonal reticulation. ANT and tibiae not entirely dark
 go to key to polyphagous aphids, p. 1020 (but note that specimens keying to
A. gossypii might be some other member of the *A. frangulae* group specific to Labiatae)

Lepanthes

L. lindmaniana (incl. *clavata*)

Orchidaceae

Aphis spiraeicola; *Sitobion luteum*; *Toxoptera aurantii*

Use key to aphids on orchids under *Cymbidium*.

Lepidagathis

L. anobrya

Acanthaceae

Aphis gossypii

Lepidium (incl. *Cardaria*)

L. apetalum

L. campestre

L. crassifolium

L. draba (= *Cardaria draba*)

Cruciferae

Aphis middletonii group; *Lipaphis ruderalis*; *Myzus cerasi*

Lipaphis lepidii ssp. *lepidiocardariae*, *pseudobrassicae*;

Macrosiphum euphorbiae; *Pemphigus* sp.

Dysaphis vandenboschi ssp. *lepidii*

Aphis craccivora, *fabae*, *frangulae*, *nasturtii*;

Aulacorthum solani; *Brevicoryne brassicae*;

Dysaphis vandenboschi;

Lipaphis erysimi, *lepidii* ssp. *lepidiocardariae*;

Macrosiphum euphorbiae; *Myzus certus*, *persicae*

Lepidaphis deformans, *terricola*; *Lipaphis lepidii*;

Macrosiphum euphorbiae; *Smynthuroides betae*

Acyrtosiphon gossypii

Acyrtosiphon gossypii; *Brevicoryne brassicae*;

[*Dysaphis capsellae*]; *Landisaphis davisii*

[*Aphis* sp. (Davletshina, 1964)]; *Lipaphis lepidii*

Aphis craccivora, *gossypii*; *Brevicoryne brassicae*;

Lipaphis lepidii, *ruderalis*; *Myzus persicae*

Aphis fabae; *Brevicoryne brassicae*;

Lipaphis erysimi, *ruderalis*; *Myzus cerasi*, *persicae*

Aphis [*acaroides* Rafinesque (invalid name)], *craccivora*,

fabae, *gossypii*, *middletonii* group;

Lipaphis pseudobrassicae; *Macrosiphum euphorbiae*;

Myzus persicae; *Neomyzus circumflexus*;

Pemphigus populitransversus

Key to apterae on *Lepidium*:-

1. Head with ANT tubercles well-developed, and median frontal tubercle undeveloped 2
- Head with ANT tubercles low or absent, or if developed then the median frontal tubercle is also well developed, so front of head has a straight, convex or sinuate outline in dorsal view 8
2. Head cuticle smooth, ANT tubercles with inner faces divergent 3
- Head cuticle spiculate or nodulose, at least ventrally, ANT tubercles with inner faces approximately parallel or apically convergent 4
3. SIPH very long and thin, about 3× cauda, without any subapical reticulation *Acyrtosiphon gossypii*
- SIPH about 2× cauda, with subapical polygonal reticulation *Macrosiphum euphorbiae*

4. Dorsum with extensive dark pigmentation **5**
 – Dorsum pale **6**
5. SIPH black, 2.3–2.8× cauda, which is also dark. Dorsal cuticle almost entirely pigmented, and with a maze-like pattern of wrinkles. ANT 0.5–0.7× BL *Myzus cerasi*
 – SIPH pale/dusky, darker at apices, 1.8–2.3× pale/dusky cauda. Dorsal cuticle not wrinkled, with a distinctive U-shaped mark on abdomen. ANT 0.9–1.3× BL *Neomyzus circumflexus*
6. SIPH tapering or cylindrical on distal half. ANT III usually with 1–2 small rhinaria near base. ANT 1.1–1.5× BL *Aulacorthum solani*
 – SIPH slightly to moderately clavate. ANT III without rhinaria. ANT 0.6–1.0× BL **7**
7. R IV+V in most specimens with only one pair of lateral accessory hairs (plus 0–3 ventral accessory hairs). ANT PT/BASE 2.8–4.5 (rarely less than 3.25). Value of function cauda/(ANT III× PT) in range 0.80–1.52, but rarely more than 1.25 except in small specimens (those with ANT III less than 0.32 mm) *Myzus persicae*
 – R IV+V in most specimens with two pairs of lateral accessory hairs. ANT PT/BASE 2.1–3.7 (mostly less than 3.25). Value of function cauda/(ANT III× PT) in range 1.2–2.7 (rarely less than 1.25) *Myzus certus*
8. ANT 0.25–0.36× BL, with ANT PT/BASE 0.9–1.15. SIPH 0.032–0.054× BL, shorter than R IV+V. Cauda triangular, about as long as its basal width in dorsal view **9**
 – Without that combination of characters **10**
9. R IV+V 1.0–1.1× HT II. ANT 0.30–0.36× BL. ABD TERG 8 with 12–15 hairs, and posterior margin of subgenital plate with 13–17 hairs *Lepidaphis deformans**
 – R IV+V 1.20–1.27× HT II. ANT 0.25–0.28× BL. ABD TERG 8 with 16–19 hairs, and posterior margin of subgenital plate with 19–24 hairs *Lepidaphis terricola**
10. Cauda helmet-shaped (pentagonal), a little shorter than its basal width in dorsal view, with 4–5 hairs. Head almost always with a pair of spinal tubercles (STu), and STu often present on ABD TERG 7 and 8. Marginal tubercles (MTu) consistently present on ABD TERG 1–5 and often also on 7 *Dysaphis vandenboschi*
 – Cauda (if present) triangular, tongue- or finger-shaped, shorter or longer than its basal width, but if shorter then with 7 or more hairs. Head and ABD TERG 7 and 8 usually without STu. MTu absent or of sporadic occurrence, or consistently present on ABD TERG 1 and 7 only **11**
11. ABD TERG 6–8 with median rugose conical processes, each bearing a pair of short (c.20 µm) club-shaped hairs. SIPH distinctly clavate, with diameter of swollen part c.1.5× that of stem (Figure 37a) *Landisaphis davisi*
 – ABD TERG 6 and 7 without median processes, and if ABD TERG 8 has a projection then SIPH are only very weakly if at all clavate **12**
12. ANT 6-segmented with ANT III longer than IV+V measured together. SIPH somewhat swollen, either in middle or subapically **13**
 – ANT 5- or 6-segmented, if 6-segmented then ANT III shorter than IV+V measured together. SIPH (if present) cylindrical or tapering, without any trace of swelling
 go to key to polyphagous aphids, p. 1020
13. SIPH 0.8–1.0× cauda, which is short, broad-based and triangular. Dorsal abdomen with paired dark markings *Brevicoryne brassicae*
 – SIPH longer than cauda, which is elongate triangular or tongue-shaped. Dorsal abdomen without dark markings **14**

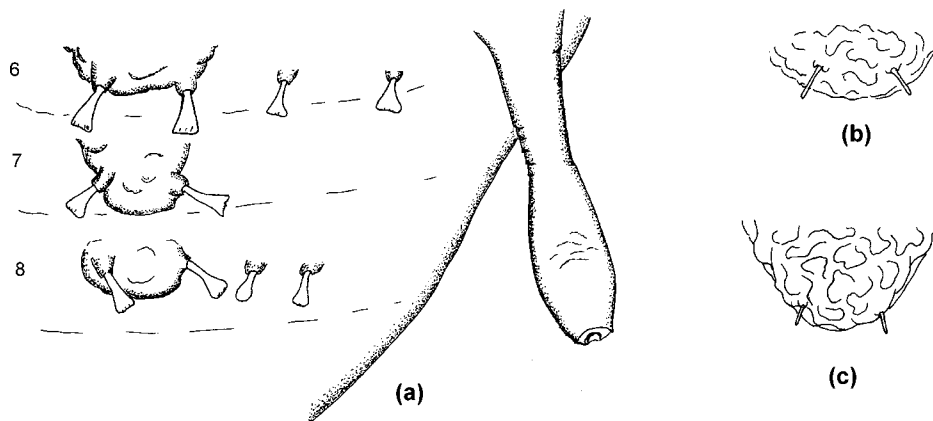


Figure 37 Apteræ on *Lepidium*. (a) SIPH and processes on ABD TERG 6–8 of *Landisaphis davisi*, (b) process on ABD TERG 8 of *Lipaphis lepidii*, (c) same for *Lipaphis ruderalis*.

14. ANT tubercles developed, projecting about as far as median tubercle, so that front of head is sinuate in outline in dorsal view. ANT more than $0.5 \times$ BL. ABD TERG 8 without a rugose swelling or conical process **15**
 – ANT tubercles undeveloped, front of head convex in dorsal view. ANT less than $0.5 \times$ BL. ABD TERG 8 with a rugose medial swelling or conical process (Figure 37b,c) **16**
15. ANT III + PT together $1.95\text{--}2.5 \times$ SIPH (90% of specimens less than $2.4 \times$) *Lipaphis erysimi*
 – ANT III + PT together $2.1\text{--}3.2 \times$ SIPH (90% of specimens more than $2.4 \times$)
Lipaphis pseudobrassicæ
16. Cauda $0.8\text{--}1.1 \times$ ANT III. R IV+V $0.6\text{--}0.7 \times$ HT II *Lipaphis ruderalis*
 – Cauda $0.65\text{--}0.75 \times$ ANT III. R IV+V $0.9\text{--}1.1 \times$ HT II **17**
17. SIPH $2.0\text{--}2.8 \times$ HT II *Lipaphis lepidii*
 – SIPH $3.0\text{--}3.5 \times$ HT II *Lipaphis lepidii* ssp. *lepidiocardariae*

Lepidotheca* see *Matricaria

Leptactina

Leptactina sp.

Aphis craccivora (?)

Rubiaceae

(Or try key to polyphagous aphids, p. 1020.)

Leptadenia

L. hastata

Aphis gossypii

L. reticulata

Aphis nerii

Asclepiadaceae

Use key to polyphagous aphids, p. 1020.

Leptilon* see *Erigeron

Leptinella

L. plumosa

Compositae
Aulacorthum solani; *Macrosiphum euphorbiae*;
Myzus ascalonicus

Leptochloa

- L. filiformis*
L. virgata

Gramineae

- Aphis middletonii* group; *Hysteroneura setariae*
Rhopalosiphum maidis

Use key to apterae of grass-feeding aphids under *Digitaria*.

Leptodermis

- L. griffithii*

Rubiaceae

- Aphis gossypii*

Leptogramma see *Gymnogramma*

Leptospermum see Blackman and Eastop (1994)

Leptosyne see *Coreopsis*

Leptotaenia see *Lamatium*

Lespedeza

- L. bicolor* (incl. var. *japonica*)

L. capitata

L. cyrtobotrya

L. cytisoides

L. hedysaroides

L. procumbens

L. repens

L. stipulacea

L. thunbergii

L. virgata

L. virginica

Lespedeza sp.

Leguminosae

- Aphis craccivora*; *Aulacorthum solani*;
Megoura brevipilosa, *lespedezae*; [*Rhodobium porosum*]

Microparsus singularis

Aphis spiraeicola; *Megoura lespedezae*

Acyrtosiphon pisum

Megoura brevipilosa

Macrosiphum euphorbiae

Microparsus singularis

Microparsus singularis

Megoura lespedezae

Aulacophoroides virgatae

Microparsus singularis

[*Therioaphis ononidis*]

Key to apterae on *Lespedeza*:-

1. SIPH entirely dark 2
– SIPH pale, sometimes dark at apices 6
2. SIPH not swollen in middle. ABD TERG 1 and 7 with marginal tubercles (MTu) 24
go to key to polyphagous aphids, p. 1020, starting at couplet 24
– SIPH swollen in middle. ABD TERG 1 and 7 without MTu 3
3. Large, dark marginal sclerites present on all thoracic and abdominal segments, much larger than the spaces between them and including very large ante- and postsiphuncular sclerites 4
Aulacophoroides virgatae
– Marginal sclerites pale or dusky and smaller than the spaces between them. Crescent-shaped antesi-phuncular sclerites usually present, postsiphuncular sclerites small or not evident 4
4. SIPH 0.4–0.5 mm long, 0.20–0.25× BL. ANT PT/BASE 4.8–6.1 5
Microparsus singularis
– SIPH 0.57–0.84 mm long, 0.27–0.34× BL. ANT PT/BASE 3.5–4.9 5
5. Head with ANT tubercles rather low, and bearing hairs more than 0.6× BD III 5
Megoura lespedezae
– Head with very well-developed ANT tubercles, bearing hairs less than 0.4× BD III 5
Megoura brevipilosa

HOST LISTS AND KEYS

6. SIPH with subapical reticulation (at least 4–5 rows of closed cells) *Macrosiphum euphorbiae*
 – SIPH without subapical reticulation 7
7. Head smooth, with inner faces of ANT tubercles divergent. SIPH attenuate distally, 1.2–1.9× cauda *Acyrtosiphon pisum*
 – Head spiculate, at least on ventral side, with inner faces of ANT tubercles steep-sided, approximately parallel. SIPH not attenuate distally, 2.1–2.5× cauda *Aulacorthum solani*

Lesquerella

L. arctica

Brevicoryne arctica

Cruciferae

Lettsonia* see *Argyreia

***Leucadendron* see Blackman and Eastop (1994)**

Leucaena

L. glauca (= *leucocephala*)

Aphis fabae

Leguminosae

Leucanthemopsis

L. flaveola

Aphis craccivora

Compositae

Leucanthemum

L. × burbankii

Aulacorthum magnoliae

L. maximum see *× superba*

L. myconis

Aphis fabae; *Brachycaudus helichrysi*, *lateralis*;
Macrosiphoniella millefolii

L. rotundifolium

Aphis fabae; *Brachycaudus cardui*, *helichrysi*

L. × superba (= *maximum* auct.
 nec Raymond)

Aphis fabae, *gossypii*;
Brachycaudus cardui, *helichrysi*, [*iranicus*], *lateralis*;
Macrosiphoniella leucanthemi, *subterranea*;
Macrosiphum euphorbiae; *Trama troglodytes*

L. uliginosum

Trama troglodytes

L. vulgare (= *Chrysanthemum*
leucanthemum)

Aphis fabae, [*hieracii*], *middletonii*, *solanella*, *vandergooti*,
 [*Aphis* sp. (Holman and Pintera, 1981)];
Aulacorthum solani; *Brachycaudus cardui*, *helichrysi*;
Coloradoa tanacetina;
Macrosiphoniella artemisiae, [*atra*], *leucanthemi*,
millefolii, *oblonga*, *subterranea*, *tanacetaria*;
 [*Macrosiphum* sp. (Leonard, 1968)];
Metopeurum fuscoviride; *Myzus ascalonicus*;
 [*Pleotrichophorus duponti*];
 [*Rhopalosiphum nymphaeae*]; *Trama troglodytes*;
Uroleucon gravicorne, *ochropus*, *siculum*, *sonchi*

Key to apterae on *Leucanthemum*:-

1. Hind tarsi greatly elongated, more than 0.6× hind tibiae. ANT PT/BASE less than 0.4. SIPH absent *Trama troglodytes*
 – Hind tarsi normal. ANT PT/BASE more than 0.7. SIPH tubular 2

2. SIPH dark, at least on distal half, with polygonal reticulation on at least distal 0.16 of length 3
 – SIPH pale or dark, but if dark then without polygonal reticulation 13
3. Cauda tapering from base to apex, triangular, less than 1.7 times longer than its basal width (Figure 5f). ANT tubercles very weakly developed, so that front of head is very shallowly concave in dorsal view *Metopeurum fuscoviride*
 – Cauda finger-like, more than 2 times its basal width. ANT tubercles variably developed 4
4. Hairs on ABD TERG 1–5 placed on conspicuous dark scleroites (e.g., Figure 5g) 5
 – Scleroites at bases of hairs on ABD TERG 1–5 pale and inconspicuous, or not evident 7
5. SIPH 0.6–1.0× cauda, with reticulation on distal 0.40–0.63 *Macrosiphoniella millefolii*
 – SIPH 1.6–1.9× cauda, with reticulation on distal 0.20–0.25 6
6. Cauda pale. ANT III with 45–62 rhinaria. R IV+V shorter than HT II *Uroleucon ochropus*
 – Cauda dark. ANT III with 11–25 rhinaria. R IV+V longer than HT II *Uroleucon siculum*
7. SIPH 0.23–0.33× BL, 1.4–2.2× cauda 8
 – SIPH 0.09–0.20× BL, 0.6–1.3× cauda 10
8. SIPH wholly dark, or paler only in middle. Large, dark postsiphuncular sclerites present *Uroleucon sonchi*
 – SIPH pale at base. Postsiphuncular sclerites absent or indistinct 9
9. SIPH 1.8–2.2× cauda, which has hairs near apex. Femora and tibiae mainly pale with contrastingly black apices *Macrosiphoniella leucanthemi*
 – SIPH 1.5–1.75× cauda, which has an attenuated apical part without hairs. Legs rather uniformly pigmented *Uroleucon gravicorne*
10. SIPH pale, at least basally, 1.0–1.3× cauda, which is pale/dusky. ANT VI BASE 1.9–2.3× R IV+V *Macrosiphoniella oblonga*
 – SIPH dark, 0.6–1.0× the similarly dark cauda. ANT VI BASE 0.7–1.8× R IV+V 11
11. Tibiae mainly pale, dark basally and apically. Anterior sclerites present, although rather pale. Cauda with 13–20 hairs *Macrosiphoniella subterranea*
 – Tibiae wholly dark. Anterior sclerites absent. Cauda with 19–32 hairs 12
12. ANT III wholly black, with 12–32 rhinaria. R IV+V 0.7–0.9× HT II. SIPH with reticulation on distal 0.35–0.51. Cauda with 26–32 hairs *Macrosiphoniella tanacetaria*
 – ANT III pale at base, with 3–14 rhinaria. R IV+V 0.85–1.11× HT II. SIPH with reticulation on distal 0.45–0.69. Cauda with 19–27 hairs *Macrosiphoniella artemisiae*
13. ABD TERG 1–4 (–5) and 7 with large, conspicuous, rather flat marginal tubercles (MTu) (Figure 5j) *Aphis vandergooti*
 – MTu present or absent on ABD TERG 1 and 7, but only sporadically present (and then small) on ABD TERG 2–4 14
14. Cauda helmet-shaped, a little shorter than its basal width in dorsal view, with 5–8 hairs. Spiracular apertures large and rounded 15
 – Cauda tongue-shaped or triangular; if as short as its basal width then with more than 10 hairs. Spiracular apertures small and reniform 17
15. Dorsum without dark markings. Mesosternum without mammariform processes. R IV+V 0.10–0.15 mm, 1.2–1.3× HT II. SIPH pale, smooth, 0.8–2.0× cauda *Brachycaudus helichrysi*
 – Dorsum with an extensive black shield. Mesosternum with a pair of dark mammariform processes. R IV+V 0.17–0.24 mm, 1.4–2.0× HT II. SIPH dark, imbricated, 1.7–3.4× cauda 16

HOST LISTS AND KEYS

16. Hairs on ABD TERG 8 are 30–61 μm long. Longest hairs on hind femur 10–25 μm long
Brachycaudus lateralis
- Hairs on ABD TERG 8 are at least 70 μm long. Longest hairs on hind femur more than 25 μm long
Brachycaudus cardui
17. Triommatidium merged with compound eye, so that there is no distinct ocular tubercle. ANT PT/BASE 1.4–1.7. Dorsal hairs small, club-shaped, or with somewhat expanded apices. SIPH cylindrical for most of length, slightly swollen subapically. R IV+V 0.9–1.0 \times HT II with slightly concave sides. Cauda less than 1.5 \times its basal width, with 4–5 hairs
Coloradoa tanacetina
- Triommatidium forming a distinct ocular tubercle at posterior margin of eye, ANT PT/BASE more than 2, and other characters not in above combination go to key to polyphagous aphids, p. 1020

Leucas

L. aspera
L. cephalotes
L. lavandulifolia
L. linifolia
L. martinicensis
L. zeylandica
Leucas spp.

Labiatae

Aphis gossypii, *spiraecola*; *Cryptomyzus taoi*
Aphis gossypii
Aphis gossypii
Aphis gossypii, *spiraecola*
Aphis gossypii
Aphis gossypii
[*Aphis umbrellae*]; [*Myzus siegesbeckicola*];
[*Sitobion indicum*]

Key to apterae on *Leucas*:-

- Dorsal body hairs long and thick, much longer than ANT BD III, and many or all of them with knobbed or expanded apices, and arising from tuberculate bases. ANT PT/BASE 9.0–10.5. SIPH swollen on distal part, more than 3.5 \times cauda
Cryptomyzus taoi
- Without the above combination of characters go to key to polyphagous aphids, p. 1020

Leucocrinum

L. montanum

Anthericaceae

Abstrusomyzus leucocrini

Leucopogon

L. parviflorus
L. richei

Epacridaceae

Ceriferella leucopogonis
Macrosiphum euphorbiae

Key to apterae on *Leucopogon*:-

- Wax plates divided into polygonal cells present dorsally on all body segments. Cauda constricted at about midlength so that distal part is an elongate, parallel-sided knob. Anal plate bilobed
Ceriferella leucopogonis
- Without the above combination of characters go to key to polyphagous aphids, p. 1020

Leucosceptrum

L. canum

Labiatae

Subovatomyzus leucosceptri

Leucosidea see Blackman and Eastop (1994)

Leucospermum

L. cordifolium

Proteaceae

Aphis evansi, *gossypii*, *pseudocardui*

Key to apterae on *Leucospermum*:-

1. SIPH shorter than R IV+V. ANT PT/BASE less than 1.5. Cauda triangular or bluntly conical, about as long as its basal width, with 13–19 hairs 2
 - SIPH longer than R IV+V. ANT PT/BASE more than 1.8. Cauda tongue-shaped, longer than its basal width, with 4–8 hairs 2
Aphis gossypii (or try key to polyphagous aphids, p. 1020)
2. ANT PT/BASE 1.0–1.4. Hairs on ABD TERG 8 are 17–19 µm long. Cauda rounded at apex 3
Aphis pseudocardui
 - ANT PT/BASE 0.7–0.9. Hairs on ABD TERG 8 are 20–25 µm long. Cauda with a rather pointed apex 3
Aphis evansi

Leucothoe*L. axillaris**L. catesbaei**L. fontanesiana**L. grayana* var. *oblongifolia***Ericaceae**[*Aphis* sp. (Leonard, 1972a)]*Illinoia azaleae*; *Macrosiphum euphorbiae**Aulacorthum solani*; *Illinoia rhokalaza**Aulacorthum vaccinii*Key to apterae on *Leucothoe*:-

(Check: all 5 species keyed usually have 1 or more rhinaria on basal part of ANT III.)

1. SIPH with a subapical zone of reticulation (at least 4–5 rows of rather large closed polygonal cells). Inner faces of ANT tubercles smooth and divergent 2
 - SIPH without subapical polygonal reticulation. Inner faces of ANT tubercles spiculate and almost parallel 4
2. ANT hairs very short and blunt, maximally only 0.20–0.25× BD III. SIPH slightly but distinctly swollen on distal half proximal to reticulated part. First tarsal segments with (4–) 5 hairs 3
Illinoia azaleae
 - Longest ANT hairs more than 0.5× BD III. SIPH with or without swelling on distal half. First tarsal segments with 3–5 hairs 3
3. SIPH wholly dark. R IV+V c.1.6× HT II, with 15–20 accessory hairs. First tarsal segments with 5 hairs 3
Illinoia rhokalaza
 - SIPH pale, sometimes darker distally. R IV 0.8–1.0× HT II, with 7–10 accessory hairs. First tarsal segments with 3 hairs 3
Macrosiphum euphorbiae
4. TERG dark, sclerotic. ANT PT/BASE 2.5–3.7. Cauda with 5 hairs 3
Aulacorthum vaccinii
 - TERG pale. ANT PT/BASE 4.0–5.5. Cauda with 7 hairs 3
Aulacorthum solani

Leutea*L. divariegata***Umbelliferae***Aphis gossypii***Leuzea***Leuzia salina***Compositae***Aphis anuraphoides***Levisticum***L. officinale***Umbelliferae***Aphis fabae*, *gossypii*, *spiraecola*; *Brachycaudus helichrysi*;
Cavariella aegopodii, [*rutila*], *salicicola*;
Dysaphis apiifolia; *Hyadaphis passerinii*;
Macrosiphum euphorbiae; *Myzus ornatus**Levisticum* sp.*Dysaphis apiifolia* ssp. *petroselini* (as *nudicaulium*)Use key to apterae on *Apium*, which includes all these species, but specimens keying to *Hyadaphis foeniculi* may be *H. passerinii*; see key to apterae on *Foeniculum* for discriminants.

HOST LISTS AND KEYS

Lewisia

- L. cantelovii*
L. × hednerii × howelli

Portulacaceae

- Macrosiphum euphorbiae*
Myzus ascalonicus

Use key to polyphagous aphids, p. 1020.

Leycesteria

- L. formosa*
L. montanum

Caprifoliaceae

- [*Forda riccobonii*]; *Hyadaphis coriandri*
Semiaphis heraclei

Key to apterae on *Leycesteria*:-

- SIPH 0.098–0.21 mm, as long as or longer than R IV+V. ANT PT 0.75–1.3× SIPH *Hyadaphis coriandri*
- SIPH 0.05–0.10 mm, shorter than R IV+V. ANT PT 1.5–4.5× SIPH *Semiaphis heraclei*

Leymus

- L. arenarius*

L. pseudagropyron
L. secalinus

Gramineae

- Laingia psammae*; *Metopolophium dirhodum*;
Rhopalosiphum padi, *rufiabdominale*;
Schizaphis priorii, *rufula*; *Sipha arenarii*; *Sitobion avenae*
Diuraphis frequens; *Sipha bukarowskii*
Sitobion avenae

Use key to aphids on grasses under *Digitaria*.

Lhotskya see Calytrix

Liabum

- L. cubense*

Compositae

- Uroleucon ambrosiae*

Liatris (incl. Lacinaria)

- L. elegans*
L. gummiferae
L. punctata
L. scariosa
L. squarrosa

Compositae

- Aphis laciniariae*
[*Cavariella aegopodii* (*capreae* of Theobald, 1927: 8)]
Aphis laciniariae; [*Pleotrichophorus wasatchii*]
Brachycaudus cardui
Aphis craccivora, *spiraecola*

Key to apterae on *Liatris*:-

1. Dorsum with extensive black sclerotisation **2**
 - Dorsum without dark markings **3**
2. Cauda helmet-shaped, a little shorter than its basal width in dorsal view. Spiracular apertures large and rounded. R IV+V 1.3–1.8× HT II. SIPH 2.1–3.4× cauda *Brachycaudus cardui*
 - Cauda tongue-shaped, tapering, longer than its basal width. Spiracular apertures small and reniform. R IV+V 0.9–1.2× HT II. SIPH 1.2–2.2× cauda *Aphis craccivora*
3. ABD TERG 1 and 7 with large, domed marginal tubercles (MTu), similar in diameter to SIPH at midlength. SIPH and cauda both pale/dusky. Posterior hair on hind trochanter only 0.2–0.3× diameter of trochantrofemoral suture *Aphis laciniariae*
 - ABD TERG 1 and 7 with or without MTu; if with MTu then these are much smaller in diameter than SIPH at midlength, SIPH and cauda are not both pale or dusky, and posterior hair on hind trochanter is 0.5 or more × diameter of trochantrofemoral suture go to key to polyphagous aphids, p. 1020

Libanotis see *Seseli***Ligularia***L. fischeri**L. glauca**L. persica**L. schmidti**L. sibirica* (incl. var. *speciosa*)*L. stenocephala**L. thomsonii***Compositae***Aleurodaphis ligulariae*; *Aphis fabae*;
Aulacorthum ligularicola; *Brachycaudus helichrysi*;
*Sorbaphis chaetosiphon**Aphis fabae**Dysaphis ligulariae**Aphis ligulariae**Aphis fabae*; *Brachycaudus helichrysi*;*Sorbaphis chaetosiphon*[*Aphis saussurearadicis*]; *Sorbaphis chaetosiphon**Dysaphis ligulariae*Key to apterae on *Ligularia*:-

1. Body elongate oval, sclerotic dorsally, with a crenulate margin due to a continuous fringe of wax glands. Eyes as triommatidia. SIPH as pores with raised rims. Cauda knobbed, anal plate bilobed
*Aleurodaphis ligulariae**
 - Body oval or spindle-shaped, without a marginal fringe of wax glands. Eyes multifaceted. SIPH tubular. Cauda helmet-, tongue- or finger-shaped, anal plate entire **2**
2. SIPH with numerous (20–30) long fine hairs on basal 0.7–0.8 of length, similar to the hairs densely clothing the body and appendages *Sorbaphis chaetosiphon*
 - SIPH without hairs **3**
3. Well-developed marginal tubercles (MTu) consistently present on ABD TERG 1–4 or 1–5 **4**
 - MTu absent or only consistently present on ABD TERG 1 and 7 **5**
4. Hairs on ANT III shorter than BD III. Paired spinal tubercles (STu) usually present on head and ABD TERG 7 and 8. Cauda helmet-shaped with 5–6 hairs *Dysaphis ligulariae**
 - Hairs on ANT III very numerous and the longest more than 2× BD III. STu absent. Cauda finger-shaped with 20–23 hairs *Aphis ligulariae**
5. ANT III with 5–17 rhinaria in a row on basal half. Head spinulose dorsally and ventrally with well-developed steep-sided ANT tubercles. ANT PT/BASE 4.9–5.6. R IV+V 1.1–1.3× HT II. SIPH dusky, cylindrical, without or with indistinct subapical reticulation, 2.9–3.3× cauda *Aulacorthum ligularicola**
 - Without that combination of characters go to key to polyphagous aphids, p. 1020

Ligusticum*L. acutilobum* see *Angelica**L. alatum**L. apiifolium**L. grayi**L. hultenii**L. lucidum* (incl. *pyreniaca*)*L. mutellina**L. porteri**L. scothicum**Ligusticum* sp.**Umbelliferae**[*Dysaphis armeniaca*]*Cavariella aegopodii**Aphis helianthi**Semiaphis heraclei**Aphis fabae**Cavariella aegopodii*; *Pemphigus* sp. (Zwölfer, 1958)*Aphis helianthi*; *Cavariella aegopodii*, [*archangelicae*]*Aphis fabae*[*Uroleucon martini*]

HOST LISTS AND KEYS

Key to apterae on *Ligusticum*:-

1. ABD TERG 8 with a backwardly pointed process above cauda. ANT PT/BASE 0.6–1.3. SIPH clavate
Cavariella aegopodii
- ABD TERG 8 without a supracaudal process. ANT PT/BASE either less than 0.5 or more than 1.4.
SIPH (if present) not clavate **2**
2. SIPH very small, less than 0.5× cauda, flangeless, and usually curved so that aperture is slanted towards
midline of body *Semiaphis heraclei*
- SIPH (if present) more than 0.8× cauda, and with a distinct flange
go to key to polyphagous aphids, p. 1020

Ligustrum see Blackman and Eastop (1994)

Lilium

L. auratum
L. canadense
L. candidum
L. formosum
L. harrisi = *longiflorum* var. *eximium*
L. henryi
L. × hollandicum
L. lancifolium
L. leichtlinii
L. longiflorum (incl. var. *eximium*)
L. mackliniae
L. martagon
L. modeoloides
L. multiflorum (?)
L. philadelphicum
L. speciosum (incl. var. *rubrum*)
L. superbum
L. szovitsianum
L. tenuifolium
L. testaceum
L. tigrinum
L. washingtonianum
Lilium sp. ('lilies')

Liliaceae

Aphis gossypii; *Aulacorthum solani*; *Indomegoura indica*;
Macrosiphum euphorbiae
Macrosiphum lili
Aphis fabae, *gossypii*; *Dysaphis tulipae*; *Ericaphis lili*;
Myzus ornatus
Ericaphis scoliopi; *Rhopalosiphoninus staphyleae*
Macrosiphum lili
Aulacorthum solani; *Myzus ascalonicus*
Aphis gossypii; *Indomegoura indica*
Aulacorthum solani; [*Ovatus menthae*]
Aphis fabae, *gossypii*, *middletonii*, *ogilviei*;
[*Carolinaia cyperi*]; *Ericaphis scoliopi*;
Macrosiphum euphorbiae; *Myzus persicae*;
Neomyzus circumflexus; [*Neotoxoptera violae*]
Aulacorthum solani
Myzus ascalonicus, *persicae*
Aphis gossypii
Metopolophium dirhodum
Aphis fabae
Aphis gossypii; *Aulacorthum magnoliae*;
Ericaphis scoliopi; *Macrosiphum lili*; *Myzus ascalonicus*
Aulacorthum solani; *Macrosiphum lili*
Aulacorthum solani
Aphis liliophaga
Aphis gossypii
Aulacorthum solani; *Macrosiphum lili*;
Neomyzus circumflexus
Neomyzus circumflexus
Abstrusomyzus phloxae

Key to apterae on *Lilium*:-

(See Blackman and Eastop, 2000, for an illustrated key to common aphids on lilies.)

1. Cauda helmet-shaped, as short as or shorter than its basal width in dorsal view, with 4–6 hairs. Head and ABD TERG 8 (or 7 and 8) usually with spinal tubercles (STu), and marginal tubercles (MTu) on ABD TERG 1–5 (rarely also on 7) *Dysaphis tulipae*
- Cauda tongue- or finger-shaped, longer than its basal width, with 4–25 hairs. STu absent from head and only rarely on ABD TERG (7–)8, and MTu only ever consistently present on ABD TERG 1 and 7 2
2. ABD TERG 1 and 7 always with paired MTu. Head with ANT tubercles weakly developed, not or hardly projecting forward beyond middle of head in dorsal view 3
- ABD TERG 1 and 7 without MTu. Head with ANT tubercles moderately or well developed, projecting far beyond middle part of head in dorsal view 6
3. Cauda as dark as SIPH, with 6–25 hairs. Dorsal abdomen with some small dark markings on ABD TERG anterior to SIPH, and dark cross-bands on ABD TERG 7 and 8 4
- Cauda paler than SIPH, with 4–9 hairs. Dorsal abdomen with or without dark markings 5
4. Cauda with 11–25 hairs. Hairs on hind femur long and fine, exceeding diameter of trochantrofemoral suture. Longest hairs on ANT III 0.7–2.1× BD III. Marginal hairs on ABD TERG 3 are 40–85µm long *Aphis fabae*
- Cauda with 6–9 hairs. Hairs on hind femur all much shorter than diameter of trochantrofemoral suture. Longest hairs on ANT III 0.3–0.5× BD III. Marginal hairs on ABD TERG 3 are c.12µm long *Aphis ogilviei*
5. ANT PT/BASE 1.78–2.17. R IV+V 1.06–1.13× HT II, which is 0.094–0.114mm long. ABD TERG 7 and 8 with narrow cross-bands *Aphis liliophaga**
- ANT PT/BASE (2.1–) 2.2–3.0. R IV+V 1.1–1.4× HT II, which is 0.078–0.110mm long. ABD TERG 7 and 8 usually without cross-bands *Aphis gossypii*
6. Head, ANT, legs, SIPH and cauda entirely black. SIPH very stout, cylindrical on basal part, abruptly narrowing to apex, with some subapical polygonal reticulation *Indomegoura indica*
- Head, ANT, legs, SIPH and cauda not all entirely black. SIPH either rather thin and tapering or cylindrical, or swollen distally with narrower basal part 7
7. Head not spinulose. ANT tubercles with inner faces smooth and divergent 8
- Head with spinules or nodules, at least on ventral side. ANT tubercles with inner faces steep-sided, almost parallel or apically convergent 10
8. SIPH pale, without polygonal reticulation. Longest hairs on ANT III 0.3–0.5× BD III. Median frontal tubercle well-developed. R IV+V 0.6–0.7× HT II *Metopolophium dirhodum*
- SIPH pale or dark, with subapical reticulation. Longest hairs on ANT III 0.6–1.0× BD III. Median frontal tubercle small or undeveloped. R IV+V 0.8–1.1× HT II 9
9. SIPH entirely black, contrasting with pale cauda. ANT III–VI dark, apical parts of femora and basal parts of tibiae black *Macrosiphum lili*
- SIPH pale like cauda, sometimes darker distally. ANT and legs mainly pale *Macrosiphum euphorbiae*
10. SIPH 2.7–3.5× cauda; rather straight-sided, tapering gradually from base to flange, weakly imbricated, usually with some subapical polygonal reticulation. Dorsum without dark markings 11
- SIPH 1.8–3.5× cauda, but if more than 2.6× cauda then SIPH are either swollen distally or coarsely imbricated and curved, and dorsum has dark markings

go to key to polyphagous aphids, p. 1020, starting at couplet 5

HOST LISTS AND KEYS

11. ANT PT/BASE 5.8–7.0. R IV+V 0.95–1.14× HT II. Longest hairs on ANT tubercles 7–10µm long,
less than 0.5× BD III *Ericaphis lilii*
– ANT PT/BASE 4.0–5.6. R IV+V 1.27–1.5× HT II. Longest hairs on ANT tubercles 19–24µm long,
0.8–1.0× BD III *Ericaphis scoliopi*

Limnanthemum see *Nymphoides*

Limnanthes
L. douglasii

Limnanthaceae

Brevicoryne brassicae

Limnocharis
L. flava

Alismataceae

Aphis gossypii

Limnophyton
Limnophyton sp.

Alismataceae

Rhopalosiphum nymphaeae

Limoniastrum
L. monopetalum

Plumbaginaceae

Staticobium sp. (Portugal; BMNH, leg. F. Ilharco)

Limonium (incl. *Statice*)

Plumbaginaceae

L. bellidifolium

Staticobium limonii

L. chrysocomum

Staticobium gmelini

L. gmelinii

Staticobium caspicum, *gmelini*, *latifoliae*, *longisetosum*,
smaillovae

L. humile

Staticobium sp. nr *staticis* (BMNH, Wales, leg. F.H. Jacob)

L. latifolium

Aulacorthum solani; *Staticobium latifoliae*, *limonii*

L. meyeri

Staticobium caspicum

L. myrianthum

Staticobium latifoliae

L. oleifolium

Staticobium sp. (BMNH, Cyprus, leg. V.F. Eastop)

L. otolepis

Staticobium otolepidis

L. perfoliatum

Staticobium otolepidis

L. platyphyllum

Aphis limonicola

L. pubescens

Staticobium sp. (BMNH, France, leg. R. van den Bosch)

L. sareptanum

Staticobium gmelini, *strongilosiphon*

L. scoparium

Staticobium gmelini

L. sinuatum

Aphis craccivora

L. suffruticosum

Staticobium suffruticosum

L. tetragonum

Staticobium loochooense

L. vulgare (= *Statice limonium*)

Macrosiphum euphorbiae;

Staticobium latifoliae, *limonii*, *staticis*

L. wrightii

Staticobium loochooense

Limonium sp.

Staticobium caucasicum, *insularum*, [*Staticobium* sp.
(Tashev, 1961)]

Key to apterae on *Limonium*:–

(Couplets 4–10 are tentative and may not provide conclusive identification; there are fundamental problems with the taxonomy of *Staticobium* spp., as discussed in the introduction to that genus.)

1. SIPH usually dark distally and pale basally, with an extensive zone of polygonal reticulation extending over distal 0.30–0.55 of length. Dorsal hairs often arising from small dark scleroites **2**
 – SIPH pale or dark, more uniformly pigmented, if with polygonal reticulation then this extends only 0.13–0.20 of length. Dorsal hairs not arising from small dark scleroites **11**
2. Dorsal body hairs very small and inconspicuous. Longest hairs on ANT III 0.2–0.3× BD III
Staticobium gmelini (incl. *insularum*, *strongilosiphon*)
 – Dorsal body hairs evident. Longest hairs on ANT III 0.5–1.5× BD III **3**
3. Cauda with 4(–5) hairs *Staticobium lochooense*
 – Cauda with 6–13 hairs **4**
4. Cauda 1.0–1.5× its basal width in dorsal view, rather rounded at apex **5**
 – Cauda 1.4–2.4× its basal width, if less than 1.7× then with a rather thin, pointed apex **6**
5. SIPH c.1.35× cauda, c.0.11× BL. ANT PT/BASE c.3.3 *Staticobium longisetosum**
 – SIPH 1.9–2.2× cauda, 0.14–0.18× BL. ANT PT/BASE c.4 *Staticobium caucasicum*
6. Dorsal hairs not arising from scleroites. R IV+V 0.73–0.9× HT II **7**
 – Dorsal hairs mostly arising from dusky/dark scleroites. R IV+V 0.9–1.3× HT II **8**
7. ANT PT/BASE 3.2–4.2. SIPH reticulated over 0.30–0.33 of length. Cauda with 6–9 hairs
Staticobium otolepidis
 – ANT PT/BASE 2.7–3.2 (–3.6). SIPH reticulated over 0.32–0.40 of length. Cauda with 9–12 hairs
*Staticobium suffruticosum**
8. ANT PT/BASE 3.1–3.7. R IV+V 1.0–1.1× HT II
Staticobium sp. (BMNH colln; France, Cyprus and former Yugoslavia)
 – ANT PT/BASE 3.5–5.5. R IV+V 0.9–1.3× HT II **9**
9. SIPH 0.29–0.37× BL, and 1.0–1.2× ANT III; reticulated over distal 0.35–0.42 of length
Staticobium limonii (s.str.)
 – SIPH 0.14–0.30× BL, and 0.58–1.15× ANT III; reticulated over distal 0.35–0.55 **10**
10. SIPH 0.14–0.23× BL, and 0.9–1.5× cauda, which bears 6–11 (usually 7–8) hairs
Staticobium staticis
 – SIPH (0.20–) 0.23–0.30× BL, and 1.25–2.0× cauda, which bears 7–14 (usually 8–11) hairs
Staticobium latifoliae (incl. *caspicum*, *?smailovae*)
11. ABD TERG 1 and 7 with large, hemispherical marginal tubercles (MTu); length of marginal hair on ABD TERG 1 is 0.3–0.4× basal diameter of adjacent tubercle *Aphis limoncola**
 – ABD TERG 1 and 7 with or without MTu; if with MTu, then they are small, usually papilliform, and marginal hair on ABD TERG 1 is at least 0.6× basal diameter of adjacent tubercle
 go to key to polyphagous aphids, p. 1020

Linaria*L. canadensis**L. cymbaria* see *vulgaris**L. dalmatica**L. genistifolia**L. melanantha**L. popovii***Scrophulariaceae***Aphis middletonii* group;[*Macrosiphum* sp. (Leonard, 1968)]*Acyrtosiphon ilka*; *Myzus linariae**Brachycaudus linariae*; *Myzus linariae**Macrosiphum euphorbiae*[*Aphis* sp. (Davletshina, 1964)]

HOST LISTS AND KEYS

L. vulgaris (incl. *Cymbalaria muralis*) [*Aphis linariae* Lichtenstein (nomen nudum)];
Brachycaudus helichrysi, *linariae*, *rinariatus*;
Dysaphis gallica; [*Macrosiphoniella linariae*];
Macrosiphum euphorbiae;
Myzus ascalonicus, *cymbalariae*, *ornatus*, *persicae*

Key to apterae of *Linaria*:-

1. Cauda short, helmet-shaped, pentagonal or bluntly triangular, not more than 1.2× its basal width in dorsal view 2
 - Cauda tongue- or finger-like, more than 1.3× its basal width in dorsal view 6
2. ANT PT/BASE less than 2. SIPH shorter than R IV+V. ABD TERG 7 with large marginal tubercles (MTu) Aphis middletonii
 - ANT PT/BASE more than 2.4. SIPH longer than R IV+V. ABD TERG 7 without MTu 3
3. ABD TERG 1–5 with extensive dark sclerotisation. Cauda with 10–15 hairs 4
 - ABD TERG 1–5 without dark sclerotisation. Cauda with 4–6 hairs 5
4. ANT III and IV with numerous rhinaria. Longest hairs on ANT III more than 0.5× BD III. SIPH much shorter than (0.6–0.75×) ANT III. ABD TERG 1–5 with a solid dark shield, fused with marginal sclerites Brachycaudus rinariatus
 - ANT III and IV without rhinaria. Hairs on ANT III minute, the longest c.0.2× BD III. SIPH slightly longer than ANT III. ABD TERG 1–5 with variably developed sclerotisation, usually with intersegmental gaps and not fused with marginal sclerites Brachycaudus linariae
5. SIPH smooth, pale 0.8–2.0× cauda. Head smooth with ANT tubercles and median frontal tubercle undeveloped. Spiracular apertures large and rounded Brachycaudus helichrysi
 - SIPH imbricated, dark at least towards apices, 2.4–3.3× cauda. Head with evident ANT tubercles and a scabrous median frontal tubercle. Spiracular apertures small and reniform Dysaphis gallica
6. Head smooth with inner faces of ANT tubercles smooth and divergent 7
 - Head spinulose or nodulose with inner faces of ANT tubercles scabrous and steep-sided 8
7. SIPH with a subapical zone of polygonal reticulation. Longest hairs on ANT III 0.6–1.0× BD III Macrosiphum euphorbiae
 - SIPH without polygonal reticulation. Longest hairs on ANT III less than 0.5× BD III Acyrtosiphon ilka
8. SIPH tapering, with a slight 'S' curve. Dorsal abdomen with a pattern of dark intersegmental markings Myzus ornatus
 - SIPH slightly to moderately clavate. Dorsal abdomen without dark markings 9
9. SIPH 0.54–0.81× ANT III 10
 - SIPH 0.82–1.34× ANT III 11
10. Inner faces of ANT tubercles approximately parallel in dorsal view. SIPH almost smooth or weakly imbricated, with narrowest part of basal 'stem' not wider than hind tibia at midlength. Dorsal cuticle smooth or slightly wrinkled Myzus ascalonicus
 - Inner faces of ANT tubercles with convergent apices. SIPH heavily imbricated or scabrous, with narrowest part of stem a little wider than hind tibia at midlength. Dorsal cuticle scaly Myzus cymbalariae
11. R IV+V 0.63–0.88× HT II. ANT PT/BASE 2.1–2.85 Myzus linariae
 - R IV+V 0.9–1.1× HT II. ANT PT/BASE 2.8–4.5 Myzus persicae

Lindelofia*L. anchusioides**L. macrostyla***Boraginaceae***Brachycaudus bicolor**Brachycaudus bicolor***Lindenbergia***L. urticaefoliae**Lindenbergia* sp.**Scrophulariaceae***Aphis fabae**Myzus ornatus*

Use key to polyphagous aphids, p. 1020.

Lindera see Blackman and Eastop (1994)**Linnaea***L. borealis* (incl. *americana*)**Caprifoliaceae***Aulacorthum solani*; *Illinoia simpsoni*;*Neomyzus circumflexus*Key to apterae on *Linnaea*:–

- SIPH swollen on distal part, but the subapical part narrower and with polygonal reticulation (4–6 rows of large polygonal cells) *Illinoia simpsoni*
- SIPH cylindrical or tapering on distal part and/or without polygonal reticulation
go to key to polyphagous aphids, p. 1020

Linosyris*L. villosa***Compositae***Macrosiphoniella bozhkoeae*, *erigeronis* ssp. *villosae*

Couplet to separate apterae of these two species:–

(Both have dark SIPH with a distal zone of polygonal reticulation)

- SIPH shorter than cauda. R IV+V c.0.12 mm *Macrosiphoniella erigeronis* ssp. *villosae**
- SIPH longer than cauda. R IV+V c.0.16 mm *Macrosiphoniella bozhkoeae**

Linum*L. austriacum* (?)*L. capitatum**L. grandiflorum**L. nervosum**L. perenne**L. usitatissimum**Linum* spp.**Linaceae***Aphis linorum*; [*Dysaphis pyri*]*Aphis lini**Acyrtosiphon ilka*; *Aphis fabae*; *Myzus persicae**Aphis lini**Aphis linorum*; *Rhopalosiphoninus staphyleae**Acyrtosiphon ilka*, *mordvilkoii*;*Aphis craccivora*, *fabae*, *gossypii*; *Linaphis lini*;*Macrosiphum euphorbiae**Brevicoryne brassicae*; *Lipaphis erysimi*;*Neomyzus circumflexus*; [*Sitobion avenae*];*Smynthuodes betae*Key to apterae on *Linum*:–

1. SIPH pale, long, tapering or cylindrical on distal half, and without subapical polygonal reticulation. ANT tubercles with smooth, broadly divergent inner faces, and median frontal tubercle evident *Acyrtosiphon ilka* group (incl. *mordvilkoii*)
- SIPH (if present) either not pale, long and tapering, or with subapical polygonal reticulation, and other characters not in above combination 2

HOST LISTS AND KEYS

2. ANT III longer than IV+V together 3
 – ANT III shorter than IV+V together 5
3. ANT III 2.2–3.7× SIPH. SIPH 0.8–1.0× cauda, which is broadly triangular and bears 6–9 hairs. Dorsal abdomen with paired dark markings *Brevicoryne brassicae*
 – ANT III 1.0–1.8× SIPH. SIPH 1.1–1.6× cauda which is elongate triangular or tongue-shaped and bears 4–7 hairs. Dorsal abdomen with or without dark markings 4
4. ANT PT/BASE 1.8–2.7. (Al. with 9–25 secondary rhinaria on ANT III, 2–8 on IV and 0–3 on V) *Lipaphis erysimi*
 – ANT PT/BASE less than 1.4. (Al. with 4–8 secondary rhinaria on ANT III only) *Linaphis lini*
5. ANT PT/BASE c.1.2–1.3. SIPH much shorter than (c.0.6–0.7×) cauda. Abdomen with variably developed paired dark markings on ABD TERG 1–4, and cross-bands on 5–8 *Aphis lini*
 – ANT PT/BASE either less than 0.5 or more than 2. SIPH (if present) 0.7–3.2× cauda. Dorsal abdomen with or without dark markings 6
6. ABD TERG 1–7 with large, rather flat marginal tubercles (MTu), occupying a large part of each marginal sclerite (sometimes small or absent on 5 and/or 6) *Aphis linorum*
 – MTu not large and flat and only ever regularly present on ABD TERG 1 and 7
 go to key to polyphagous aphids, p. 1020

Liparis

L. bowkeri
L. javanica
L. neglecta
L. nugentae
Liparis sp.

Orchidaceae

Aulacorthum solani; *Sitobion eulophiae*
Neomyzus circumflexus
Sitobion eulophiae
Sitobion luteum
Cerataphis orchidearum

Use key to apterae of orchid-feeding aphids under *Cymbidium*.

Lipocarpa

L. chinensis

Cyperaceae

Aphis gossypii

Lippia

L. citriodora

L. grandiflora
L. javanica
L. nodiflora
L. urticoides

Verbenaceae

Aphis fabae; *Macrosiphum euphorbiae*;
Myzus ornatus, *persicae*, [*targionii* (nomen dubium)]
Aphis gossypii
Aphis gossypii
Aphis gossypii
[*Aphis* sp. (Leonard, 1972a)]; *Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Liquidambar, *Liriodendron* see Blackman and Eastop (1994)

Liriope

L. muscari
L. platyphylla

Convallariaceae

Myzus ascalonicus; *Rhopalosiphum padi*
Hydronephthalis liriope

Key to apterae on *Liriopis*:-

- Head densely spinulose but with ANT tubercles weakly developed, divergent. ANT with many sec. rhin. (III 23–29, IV 0–13). Dorsal abdomen with a large irregularly-shaped dark central sclerite, large post-siphuncular sclerites and a cross-band on ABD TERG 7. SIPH dark, clavate
Hydonaphis liriopes
- Without that combination of characters go to key to polyphagous aphids, p. 1020.

Lisianthus*L. glandulosus***Gentianaceae***Aphis spiraeicola*; *Toxoptera aurantii*

Use key to polyphagous aphids, p. 1020.

Listera*L. ovata**Listera* sp.**Orchidaceae***Aphis fabae*; *Aulacorthum solani**Sinomegoura citricola*Use key to polyphagous aphids, p. 1020 (or try key to orchids under *Cymbidium*).***Lithocarpus*** see Blackman and Eastop (1994)***Lithospermum****L. arvense***Boraginaceae***Aphis craccivora*, *fabae*; *Brachycaudus cardui*;*Macrosiphoniella lithospermi*;*Uroleucon jaceae*, [*picridis* (misident. *cichorii*?)]*L. diffusum**Brachycaudus helichrysi**L. erythrorhizon**Brachycaudus cardui**L. fruticosum**Uroleucon jaceae**L. officinale**Brachycaudus cardui*; *Uroleucon jaceae**L. pilosum* see *ruderales**L. ruderales**Aphis lithospermi**L. tenuiflorum*[*Anuraphis lithospermi* Rusanova 1942 (nomen nudum)]*Lithospermum* sp.*Aulacorthum solani*; *Macrosiphum euphorbiae*Key to apterae on *Lithospermum*:-

1. Cauda helmet-shaped, not longer than its basal width in dorsal view. Spiracular apertures large and rounded. SIPH with a subapical annular incision **2**
- Cauda tapering, tongue- or finger-shaped, longer than its basal width. Spiracular apertures reniform. SIPH without a subapical annular incision **3**
2. R IV+V 0.10–0.15 mm, 1.1–1.5× HT II. SIPH pale or slightly dusky, smooth-surfaced, 0.8–2.0× cauda. Dorsal abdomen without dark sclerotisation *Brachycaudus helichrysi*
- R IV+V 0.17–0.24 mm, 1.3–1.8× HT II. SIPH dusky or dark, imbricated, 2.1–3.4× cauda. Dorsal abdomen with a dark shield *Brachycaudus cardui*
3. SIPH and cauda both black **4**
- SIPH and cauda (or at least cauda) pale go to key to polyphagous aphids, p. 1020
4. SIPH with a distal zone of polygonal reticulation. ANT III with 14 or more rhinaria. ABD TERG 1 and 7 without marginal tubercles (MTu) **5**
- SIPH without polygonal reticulation. ANT III without rhinaria. ABD TERG 1 and 7 with well-developed MTu **6**

HOST LISTS AND KEYS

5. Presiphuncular sclerites present *Macrosiphoniella lithospermi**
– Presiphuncular sclerites absent *Uroleucon jaceae*
6. ABD TERG 1–5 with black cross-bands. ANT flagellum (III–VI) dark except at base of III. SIPH about equal in length to cauda *Aphis lithospermi**
– ABD TERG 1–5 without dark cross-bands. ANT flagellum pale except for apex of V, VI, and terminal process. SIPH longer than cauda (except in very small specimens) *Aphis fabae*

Litsea, *Livistonia* see Blackman and Eastop (1994)

Lobelia

L. assurgens
L. pyramidalis
L. syphilitica
Lobelia sp.

Campanulaceae

Neomyzus circumflexus
Brachycaudus helichrysi
[*Capitophorus elaeagni*]
Aulacorthum solani

Use key to polyphagous aphids, p. 1020.

Lobularia

L. maritima

Cruciferae

Aphis gossypii; [*Brachycaudus cardui*];
Myzus persicae

Use key to polyphagous aphids, p. 1020.

Lochia

L. trichophylla

Caryophyllaceae

Aphis gossypii

Lochnera see *Catharanthus*

Lolium

L. italicum
L. multiflorum

L. perenne

L. remotum
L. rigidum

L. temulentum
Lolium sp.

Gramineae

Myzus persicae; *Rhopalosiphum padi*; *Sipha maydis*
Anoecia zirnitsi; *Rhopalosiphum padi*;
Schizaphis graminum; *Sipha maydis*; *Sitobion avenae*;
Tetraneura ulmi
Anoecia vagans; *Atheroides serrulatus*; *Diuraphis noxia*;
Metopolophium dirhodum, *festucae*; *Myzus persicae*;
Forda formicaria, *marginata*; *Geoica utricularia*;
Paraclotus cimiciformis;
Rhopalosiphum padi, *rufiabdominale*;
Schizaphis graminum; *Sipha maydis*;
Sitobion avenae, *fragariae*; *Tetraneura ulmi*
Sitobion avenae
Rhopalosiphum rufiabdominale; *Sipha maydis*;
Sitobion avenae, *fragariae*
Anoecia vagans
Anoecia corni; *Diuraphis frequens*; [*Dysaphis tulipae*];
Geoica utricularia group; *Rhopalosiphum maidis*;
[*Sitobion longisiphon* Rusanova, 1942 (nomen nudum)];
Smynthurodes betae

Use key to apterae of grass-feeding aphids under *Digitaria*.

Lomatium (incl. Leptotaenia)

L. multifida
L. nudicaule

L. triternatum
Lomatium sp.

Umbelliferae

Aphis helianthi; *Cavariella aegopodii*
Aphis fabae; *Cavariella aegopodii*;
Hyadaphis foeniculi
Aphis helianthi
Macrosiphum euphorbiae

Use key to apterae on *Apium*, which includes these species.

Lonas

L. inodora see *Tripleurospermum*

Compositae**Lonicera (incl. xylosteum)**

L. alberti see *spinosa*
L. alpigena
L. altaica
L. altmannii

L. angustifolia
L. anisotricha
L. arborea
L. bracteolaris

L. × brownii
L. caerulea (incl. *edulis*)

L. canadensis
L. caprifolium

L. chamissoi
L. chrysantha (incl. *gibbiflora*)

L. ciliosa
L. coerulea

L. confusa

L. coreana
L. dioica (incl. *glauca*,
glaucescens, *parviflora*)
L. edulis see *caerulea*

L. etrusca
L. ferdinandi
L. flava
L. fragrantissima

Caprifoliaceae

Rhopalomyzus loniceriae, *poae*; *Trichosiphonaphis corticis*
Semiaphis aizenbergi
Amphicercidus lonicericola; *Brevicoryne shaposhnikovii*;
Hyadaphis foeniculi; *Prociphilus umarovi*;
Rhopalomyzus loniceriae
[*Semiaphis* sp. (Chowdhuri *et al.*, 1969)]
Brevicoryne lonicerina
Brachycorynella lonicerina
Brevicoryne shaposhnikovii; *Rhopalomyzus narzikulovi*;
Prociphilus umarovi
Hyadaphis passerinii
Amphicercidus japonicus; *Prociphilus konoi*, *xylostei*;
Rhopalomyzus loniceriae; *Semiaphis heraclei*
Hyadaphis foeniculi
Alphitoaphis lonicericola;
Hyadaphis [*foeniculi*], *passerinii*, *tataricae*;
Prociphilus umarovi
Amphicercidus japonicus
Aphis gossypii; *Amphicercidus japonicus*;
Prociphilus konoi, *xylostei*; *Rhopalomyzus loniceriae*;
Neorhopalomyzus lonicericola
Hyadaphis passerinii
Loniceraphis paradoxa; *Prociphilus xylostei*;
Rhopalomyzus coerulescens; *Semiaphis aizenbergi*
Hyadaphis foeniculi; *Neorhopalomyzus lonicericola*;
[*Trichosiphonaphis polygoniformosana*]; *Semiaphis heraclei*
Neorhopalomyzus lonicericola
Alphitoaphis lonicericola; *Gypsoaphis oestlundii*
Hyadaphis foeniculi (? – see text)
Myzus persicae
Hyadaphis foeniculi
Macrosiphum euphorbiae

HOST LISTS AND KEYS

- L. × gibbiflora* see *chrysantha*
L. glabrata
L. glauca see *dioica*
L. gracilipes (incl. var. *glabra*)
- L. heckrotii*
L. iliensis
L. implexa
L. insularis see *morrowii*
L. involucrata
- L. involucrata* var. *ledebourii*
 see *ledebourii*
L. japonica
- L. karelini*
- L. korolkovii*
- L. lanceolata*
L. ledebourii
- L. maackii*
- L. macrantha*
- L. maculata*
L. maximowiczii
- L. microphylla*
- L. morrowii* (incl. *insularis*)
- L. muendeniensis*
L. myrtillus
L. nigra
- Amphicercidus japonicus*
Aulacorthum magnoliae; *Prociphilus konoi*, *lonicerae*;
Semiaphis heraclei
Aphis gossypii; *Hyadaphis passerinii*
Semiaphis iliensis
Hyadaphis [*foeniculi*], *passerinii*
- Amphicercidus flocculosus*; *Delphiniobium canadense*;
Hyadaphis foeniculi, *Illinoia crystleae*;
Rhopalomyzus grabhami, *lonicerae*
- Amphicercidus japonicus*, *sinilonicericola*; [*Aphis crinosa*];
Hyadaphis [*foeniculi*], *passerinii*; *Macrosiphum euphorbiae*;
Myzus persicae; *Neotoxoptera abeliae*;
Prociphilus dilonicerae, *lonicerae*, *trinus*, *xylostei*;
Semiaphis heraclei;
Trichosiphonaphis lonicerae, *polygonifoliae*,
 [*polygoniformosana*], *Trichosiphonaphis* sp. (BMNH)
 [*Avicennina* sp. (Kadyrbekov, 2002e)];
Prociphilus umarovi; *Semiaphis aizenbergi*
Loniceraphis paradoxa;
Rhopalomyzus [*codonopsidis* (ovip. and males only)],
tianschanica
Macrosiphum euphorbiae
Illinoia crystleae ssp. *bartholomewi*;
Macrosiphum raysmithi; *Rhopalomyzus grabhami*
Amphicercidus japonicus; *Aulacorthum magnoliae*;
Hyadaphis tataricae; *Macrosiphum euphorbiae*;
Neorhopalomyzus lonicericola;
Prociphilus xylostei ssp. *ussuricus*;
Rhopalomyzus lonicerae; *Semiaphis heraclei*;
Trichosiphonaphis lonicerae
Aphis spiraecola; *Myzus ornatus*;
Trichosiphonaphis lonicerae
Hyadaphis foeniculi
Amphicercidus japonicus; *Prociphilus konoi*;
Rhopalomyzus lonicerae
 [*Metopolophium mukhamedievi*]; *Rhopalomyzus alaica*;
Semiaphis aizenbergi, *longissima*
Amphicercidus japonicus; *Neorhopalomyzus lonicericola*;
Prociphilus konoi, *oriens*; *Trichosiphonaphis polygonifoliae*
Rhopalomyzus lonicerae
Brachycorynella lonicerina
Hyadaphis bicincta; *Macrosiphum oredonense*;
Prociphilus xylostei; *Semiaphis pastinacae*, *sphondylii*

- L. nitida*
L. nummularifolia (incl. *persica*)
L. obovata
L. parviflora see *dioica*
L. periclymenum
L. persica see *nummularifolia*
L. praecox
L. praeflorens
L. prolifera
L. pyrenaica
L. quinquelocularis
L. ruprechtiana
L. sempervirens
L. seravschannica
L. simulatrix
L. spinosa (incl. *alberti*)
L. stanantha
L. syringantha
L. tatarica (incl. *zabelii*)
L. × tellmanniana
L. tianshanica
L. utahensis
L. webbiana
L. xylosteum (= *xylosteum vulgare*)
- Macrosiphum euphorbiae*; *Myzus ornatus*
Amphicercidus alticola, *alticola* ssp. *tshatcalica*;
Brachycorynella lonicerina;
Hyadaphis coriandri, *foeniculi*, *passerinii*, [*Hyadaphis* sp.
(Remaudière and Talhouk, 2000)];
Rhopalomyzus coerulescens, *ferganica*, *hissarica*
Brachycorynella lonicerina
Hyadaphis [*foeniculi*], *passerinii*; *Macrosiphum euphorbiae*;
Rhopalomyzus loniceriae
[*Aulacorthum muradachi*]
Neotoxoptera abeliae; *Trichosiphonaphis loniceriae*
Hyadaphis passerinii
Hyadaphis foeniculi; *Rhopalomyzus loniceriae*
Amphicercidus loniceriae, *tuberculatus*;
Hyadaphis coriandri;
Myzus sp. (? *mumecola* – BMNH colln and Chowdhuri
et al., 1969);
Prociphilus himalayensis, *Prociphilus* sp. (BMNH, India)
Amphicercidus japonicus; *Hyadaphis foeniculi*;
Neorhopalomyzus lonicericola;
Prociphilus xylostei ssp. *ussuricus*; *Rhopalomyzus loniceriae*
Gysoaphis oestlundii; *Hyadaphis foeniculi*, *passerinii*
Avicennina sogdiana
Avicennina sogdiana; *Loniceraphis paradoxa*;
Rhopalomyzus coerulescens, *hissarica*, *tianshanica*;
Semiaphis aizenbergi; *Brachycorynella lonicerina*
[*Macrosiphum rosae*]
Rhopalomyzus tianshanica; *Semiaphis aizenbergi*;
Brachycorynella lonicerina
Hyadaphis foeniculi
Amphicercidus japonicus;
[*Avicennina* sp. (Kadyrbekov, 2002e)];
Brachycorynella lonicerina;
Hyadaphis [*coriandri*], *foeniculi*, *passerinii*, *tataricae*;
Myzus persicae; *Prociphilus umarovi*, *xylostei*;
Rhopalomyzus loniceriae, *poae*; *Semiaphis nolitangere*;
Trichosiphonaphis corticis, [*foliotus* Shaposhnikov in
Juchnevitch, 1968], *polygonifoliae*
Hyadaphis [*foeniculi*], *passerinii*
Loniceraphis paradoxa;
Rhopalomyzus tianshanica
Rhopalomyzus grabhami
[*Hyadaphis* sp. (BMNH, Pakistan, leg. MA Ghani, fund.
only)]
Aphis xylostei; [*Brachycaudus prunicola*];
Hyadaphis foeniculi, [*passerinii*]; *Prociphilus xylostei*;

HOST LISTS AND KEYS

L. × zabelii see *tatarica*

L. zeravshanica

Lonicera spp.

Rhopalomyzus loniceræ; *Semiaphis pastinacæ*;
Trichosiphonaphis alpestris, *corticis*

Avicennina sogdiana

Hillerislambersia darjeelingi;

[*Myzus komaumii* Shinji, 1943 (as *loniceræ* Shinji, 1944)];

Neorhopalomyzus lonicerisuctus

[*Neotoxoptera oliveri*]; [*Semiaphis nolitangere*]

Key to apterae (except couplets 2–7) on *Lonicera*–

1. ANT PT/BASE much less than 0.5. Wax gland plates present on head (Figure 38a), thorax and abdomen. Eyes 3-faceted. SIPH absent. (Apt. fundatrix, all progeny of which are al. having unbranched media in forewing and ANT with narrow, transversely elongate secondary rhinaria) **2**
 - ANT PT/BASE more than 0.5. No wax gland plates. Eyes multifaceted. SIPH present (sometimes very small). (Al. have forewing with 1- or 2-branched media and ANT with round or oval secondary rhinaria) **8**
 2. (Couplets 2–7 apply only to al. fundatrigeniae/emigrants produced in leaf-curls in spring.) ANT III with 42–56 sec. rhinaria (IV with 16–25, V 3–6, VI BASE 0–2) *Prociphilus diloniceræ**
 - ANT III with 9–29 sec. rhinaria (IV 4–16, V 4–10, VI BASE 0–2) **3**
 3. ANT V without sec. rhinaria (III 18–27, IV 4–9, V 0, VI BASE 0) *Prociphilus xylostei*
 - ANT V with 4–10 sec. rhinaria **4**
 4. BL 3.5–5.5 mm. ANT III with 21–29 rhinaria (IV 8–16, V 4–10, VI BASE 0) *Prociphilus oriens*
 - BL 2.0–3.6 mm, if more than 3.0 mm then ANT III with 9–16 rhinaria **5**
 5. ANT IV with c.15 sec. rhinaria (III c.25, IV c.15, V c.9, VI BASE 0) *Prociphilus loniceræ**
 - ANT IV with 4–10 sec. rhinaria (III 10–c.22, IV 4–10, V 4–8, VI BASE 0–2) **6**
 6. ANT III with 9–16 sec. rhinaria (IV 4–8, V 4–7, VI BASE 0) *Prociphilus umarovi* (incl. *himalayensis*, *trinus**)
 - ANT III with 17–c.22 sec. rhinaria (IV 8–10, V 5–8, VI BASE 0–2) **7**
 7. R IV+V 0.104–0.116 mm long, 0.41–0.49× HT II. ANT VI BASE without sec. rhinaria (III 17–22, IV 8–10, V 5–8, VI 0) *Prociphilus konoï*
 - R IV+V 0.137 mm long, 0.6× HT II. ANT VI BASE with sec. rhinaria (1 specimen; III 22 and 22, IV 8 and 9, V 5 and 8, VI BASE 2 and 2) *Prociphilus* sp. on *L. quinquelocularis* (BMNH colln, India)
 8. SIPH very short, flangeless, usually less than 0.5× cauda and never more than 0.66× cauda, or present merely as pores or shallow cones **9**
 - SIPH 0.66–c.5× cauda, and usually with a distinct flange **11**
 9. Cauda semicircular, much shorter than its basal width in dorsal view. SIPH as pores with partly sclerotised rims (Figure 38b) *Gysoaphis oestlundii*
 - Cauda tongue-shaped or triangular, longer than, or at least as long as, its basal width in dorsal view. SIPH as shallow cones or short tubes **10**
 10. SIPH as shallow cones, much shorter than wide (Figure 38c) *Brachycorynella lonicerina*
 - SIPH as short flangeless tubes, at least as long as wide, and often curved inwards distally (Figure 38d) *Semiaphis* spp.
- (Incl. *aizenbergi**, *heraclei*, *iliensis*, *longissima**, *nolitangere*, *pastinacæ*, *rabotkinae**, *sphondylii*, see text under these names; in the present state of knowledge it is not possible to provide a key to apterae of *Semiaphis* species in spring populations on *Lonicera*.)

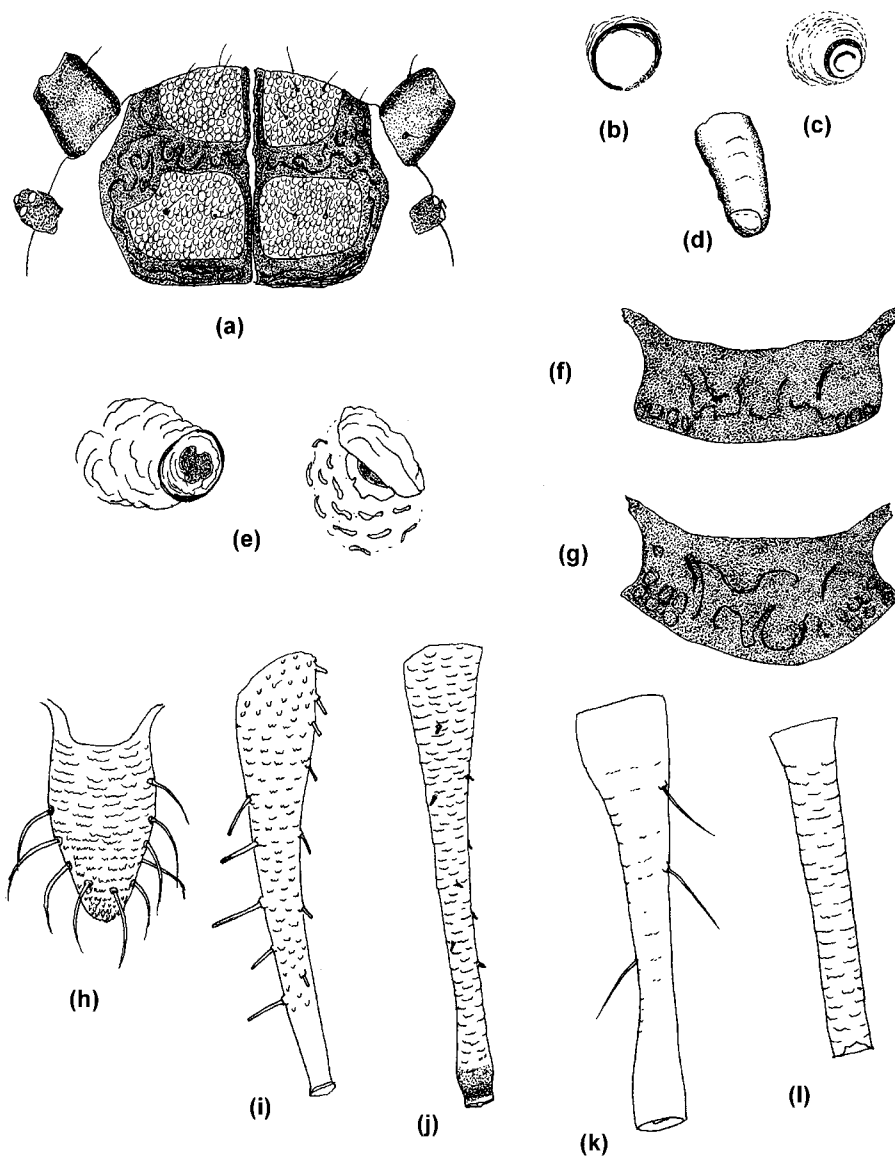


Figure 38 Apterae on *Lonicera*. (a) Dorsal view of head of fundatrix of *Prociphilus xylostei*, (b) SIPH of *Gypsoaphis oestlundii*, (c) SIPH of *Brachycorynella lonicerina*, (d) SIPH of *Semiaphis heraclei* (from *Lonicera*), (e) spiracles of (L) prothorax and (R) 3rd abdominal segment of *Delphiniobium canadense*, (f) prosternal sclerite of *Hyadaphis passerinii*, (g) same for *H. foeniculi*, (h) cauda of *Trichosiphonaphis loniceriae*, (i) SIPH of *T. loniceriae*, (j) SIPH of *T. polygonifoliae* (from *Lonicera*), (k) SIPH of *T. corticis*, (l) SIPH of *Alphitoaphis lonicericola*.

HOST LISTS AND KEYS

11. SIPH with a subapical zone of polygonal reticulation (at least 4–5 rows of closed cells) **12**
 – SIPH without subapical polygonal reticulation **18**
12. Cauda helmet-shaped, about as long as its basal width in dorsal view. SIPH very thick, tapering from base to apex, much more than 2× thicker than hind tibia at their respective midlengths. Dorsal hairs very long and fine-pointed *Hillerislammersia darjeelingi*
 – Cauda finger-like, much longer than wide. SIPH cylindrical or slightly inflated on distal part, less than 2× thickness of hind tibia at midlength. Dorsal hairs not long and fine-pointed **13**
13. Abdominal spiracular apertures covered by opercula, and the cuticle surrounding them very rugose. Thoracic spiracles much larger than abdominal ones (Figure 38e) *Delphiniobium canadense*
 – Abdominal spiracular apertures not covered by opercula, and surrounding cuticle not rugose. Thoracic spiracles similar in size to abdominal ones **14**
14. Tibiae with pale apices, contrasting with dark tarsi **15**
 – Tibiae with apices dark like tarsi **17**
15. ANT III with 0–4 very small, inconspicuous rhinaria. R IV+V short, c.0.7× HT II, with about 6 accessory hairs *Macrosiphum raysmithi*
 – ANT III with 9–40 rhinaria. R IV+V 0.9–1.1× HT II, with 13–24 accessory hairs **16**
16. First tarsal segments with 3 hairs. ANT III with 9–15 rhinaria *Illinoia crystleae* ssp. *bartholomewi*
 – First tarsal segments mostly with 4–5 hairs. ANT III with 18–40 rhinaria *Illinoia crystleae*
17. ANT PT/BASE 3.9–4.5. ANT III with 7–18 rhinaria. SIPH 2.5–3.1× cauda *Macrosiphum oredonense*
 – ANT PT/BASE 5.3–6.2. ANT III with 1–10 rhinaria. SIPH 1.7–2.2× cauda *Macrosiphum euphorbiae*
18. SIPH slightly to markedly swollen in middle or on distal part, the swollen section being at least 0.3 of the total length; never with hairs **19**
 – SIPH tapering or cylindrical, or if with slight subapical swelling then they bear some (sometimes minute) hairs **39**
19. SIPH 0.67–1.5× cauda **20**
 – SIPH 1.6–c.5× cauda **30**
20. SIPH 0.07–0.18 mm long **21**
 – SIPH 0.19–0.46 mm long **26**
21. Cauda helmet-shaped or very bluntly triangular, 0.67–1.3× its basal width in dorsal view **22**
 – Cauda tongue- or finger-shaped, or triangular with a rather pointed apex; at least 1.4× its basal width in dorsal view **23**
22. ANT III with 7–8 rhinaria on distal part. (Al. with 32–42 rhinaria on ANT III and 1–2 on IV) *Brevicoryne lonicerina**
 – ANT III without rhinaria. (Al. with 54–55 rhinaria on ANT III, 0 on IV) *Brevicoryne shaposhnikovi**
23. R IV+V 0.067–0.095 mm long **24**
 – R IV+V 0.10–0.13 mm long **25**
24. SIPH dark. Prosternum with a large dark trapezoid sclerite *Hyadaphis bicincta*
 – SIPH pale/dusky. Prosternal sclerite pale, inconspicuous *Hyadaphis tataricae*

25. (Apt. fundatrigenia) SIPH narrow-based, not much thicker at base than at flange, slightly clavate, and more than $1.3\times$ HT II. ANT PT/BASE c.1.9–2.0 *Hyadaphis polonica*
 – All apt. on *Lonicera* are fundatrices with 5-segmented ANT, ANT PT/BASE 0.8–0.9, and broad-based SIPH $0.8\text{--}1.3\times$ HT II *Hyadaphis coriandri*
26. Cauda usually dark like SIPH, finger-like, $1.6\text{--}2.0\times$ its basal width in dorsal view. Prosternum with a dark, clearly defined trapezoid sclerite 27
 – Cauda pale or dark, tongue-shaped or bluntly triangular, $0.9\text{--}1.6\times$ its basal width in dorsal view. Prosternum with central sclerite pale or not clearly defined 28
27. Prosternal sclerite $2.7\text{--}3.6\times$ wider than long (Figure 38f). SIPH $0.85\text{--}1.2\times$ cauda. R IV+V $0.083\text{--}0.122$ mm long. (Al. rarely with secondary rhinaria on ANT V) *Hyadaphis passerinii*
 – Prosternal sclerite $1.36\text{--}2.6\times$ wider than long, and often with posterior margin convex (Figure 38g). SIPH $1.05\text{--}1.4\times$ cauda. R IV+V $0.093\text{--}0.137$ mm long. (Al. often with 1–4 secondary rhinaria on ANT V) *Hyadaphis foeniculi*
28. Cauda short, about as long as its basal width in dorsal view. (All apt. in spring populations fundatrices with ANT 5-segmented, producing al. progeny) 29
 – Cauda $1.25\text{--}1.6\times$ its basal width in dorsal view. (Apt. fundatrigeniae often present in spring populations) 3 Asian *Rhopalomyzus* spp. (*coerulescens*, *ferganica**, *narzikulovi**)
29. (Fund.) SIPH $1.25\text{--}1.33\times$ cauda. (SIPH of al. strongly clavate, with maximum diameter of swollen part more than $2\times$ minimum diameter of basal part) *Rhopalomyzus alaica**
 – (Fund.) SIPH $2.33\text{--}3.33\times$ cauda. (SIPH of al. more weakly clavate) *Rhopalomyzus tianshanica**
30. SIPH more than $3\times$ longer than cauda which is short, broadly rounded or helmet-shaped, a little shorter than its basal width *Avicennina sogdiana**
 – SIPH less than $3\times$ longer than cauda which is triangular or tongue-shaped and longer than its basal width 31
31. Head smooth dorsally, smooth or with some spicules ventrally. ANT tubercles undeveloped, or weakly developed with inner faces broadly divergent (All apt. in spring populations fundatrices producing al. progeny) 32
 – Head spiculose. ANT tubercles moderately to well developed, with inner faces usually steep-sided 35
32. (Fund. only) SIPH $0.12\text{--}0.17\times$ BL, which is $1.8\text{--}2.6$ mm. R IV+V shorter than HT II (all morphs) 33
 – (Fund. only) SIPH c. $0.1\times$ BL, which is $2.8\text{--}3.5$ mm. R IV+V longer than HT II (all morphs) 34
33. (Fund.) ANT PT/BASE 1.8–2.2. (SIPH of al. fundatrigenia $1.5\text{--}1.6\times$ cauda, $0.12\text{--}0.14\times$ BL) *Rhopalomyzus loniceræ*
 – (Fund.) ANT PT/BASE 1.1–1.3. (SIPH of al. fundatrigenia $2.3\text{--}2.7\times$ cauda, $0.15\text{--}0.17\times$ BL) *Rhopalomyzus hissarica*
34. (Fund. and al.) Longest hairs on ANT III $0.3\text{--}0.6\times$ BD III *Rhopalomyzus poae*
 – (Fund. and al.) Longest hairs on ANT III $0.8\text{--}1.4\times$ BD III *Rhopalomyzus grabhami*
35. (Fund. only) ANT PT/BASE a little less than 1. (All second generation are al. with dark-bordered wing veins) *Neotoxoptera abeliae*
 – (All morphs) ANT PT/BASE more than 1. (Al. without dark-bordered wing-veins) 36
36. ANT I and II dark, and femora mainly dark. ANT III usually with a single rhinarium on a slight swelling near base *Aulacorthum magnoliae*
 – ANT I and II and femora pale. ANT III without rhinaria 37

HOST LISTS AND KEYS

37. SIPH 0.20–0.28× BL, which is 1.2–2.5 mm *Myzus persicae*
 – (Fund.) SIPH 0.14–0.17× BL, which is 2.6–3.5 mm **38**
38. R IV+V with 4 accessory hairs *Neorhopalomyzus lonicericola*
 – R IV+V with c.14 accessory hairs *Neorhopalomyzus lonicerisuctus**
39. Cuticle of head densely spiculose dorsally and ventrally. SIPH with or without hairs **40**
 – Cuticle of head smooth or with spicules only ventrally. SIPH without hairs **46**
40. SIPH without hairs. ANT PT/BASE 1.7–2.8. Cauda with 4–6 hairs **41**
 – SIPH usually with one or more hairs. ANT PT/BASE more than 3 (except fund.). Cauda with 6–13 hairs **42**
41. ANT tubercles very well developed, with inner faces apically convergent. Dorsal abdomen with a pattern of dark intersegmental markings. SIPH with coarse, non-spinulose imbrication
Myzus ornatus
 – ANT tubercles rather weakly developed, with inner faces divergent. Dorsal abdomen without dark intersegmental markings. SIPH with spiculose imbrication
Myzus sp. (?*mumecola*) (on *L. quinquelocularis*, India, BMNH colln and Chowdhuri *et al.*, 1969)
42. Cauda tongue-shaped, broadly rounded at apex, about 2× its basal width in dorsal view (Figure 38h). SIPH tapering from a broad base to a narrow apex, with a small flange, and bearing 6–20 hairs that are 14–22 µm long (Figure 38i) *Trichosiphonaphis loniceriae*
 – Cauda helmet-shaped, flask-shaped, pentagonal or triangular, less than 1.5× its basal width in dorsal view. SIPH cylindrical on distal half or swollen subapically, with or without a flange, and bearing 0–20 hairs that are 5–55 µm long **43**
43. SIPH 2.5–3.5× cauda, with well-marked spinulose imbrication at least on basal part, bearing (0–) 6–20 hairs, and with a subapical constriction and a swollen apical rim or small flange **44**
 – SIPH 3.6–5.0× cauda, almost smooth, with 0–7 hairs, and completely flangeless **45**
44. BL 1.8–2.5 mm. ANT tubercles weakly developed. SIPH 0.56–0.64 mm long, with 8–16 hairs which are maximally only 5–11 µm long (Figure 38j) *Trichosiphonaphis polygonifoliae*
 – BL 0.9–1.2 mm. ANT tubercles well developed with inner faces almost parallel. SIPH 0.26–0.36 mm long, with longest hairs 7–18 µm
Trichosiphonaphis sp. (Japan; BMNH, see text under *polygoniformosanus*)
45. Dorsal hairs very long and fine. SIPH with 0–5 very fine hairs 22–55 µm long (Figure 38k) *Trichosiphonaphis corticis*
 – Dorsal hairs very short. SIPH with 0–7 hairs (most often 0) only 5–7 µm long
Trichosiphonaphis alpestris
46. Cauda helmet-shaped or broadly rounded, shorter than, or not more than 1.2× longer than its basal width in dorsal view **47**
 – Cauda triangular with a rather pointed apex, or tongue-shaped, if tongue-shaped then more than 1.3× longer than its basal width in dorsal view **55**
47. (Fund.) Dorsal and antennal hairs short and inconspicuous. SIPH 0.08–0.09× BL, and more than 5× longer than their basal widths. ANT without sec. rhinaria. Marginal and spinal tubercles (MTu and STu) not evident. (All progeny of fund. are al.) *Loniceraphis paradoxa**
 – Dorsal and antennal hairs long and fine-pointed. SIPH 0.17–0.25× BL, thick, 3–5× longer than their basal width. ANT with sec. rhinaria. MTu and STu often present **48**
48. Hairs on ANT III all less than 1.5× BD III **49**
 – Longest hairs on ANT III more than 1.5× BD III **50**

49. ANT PT/BASE 3.2–4.2. ANT III with 8–20 rhinaria. (Al. with sec. rhinaria distributed ANT III 44–49, IV 7–16, V 0–3) *Amphicercidus flocculosus*
 – ANT PT/BASE less than 3. ANT III with 22–77 rhinaria. (Al. with 113–163 rhinaria on ANT III, 0 on IV and V) *Amphicercidus sinilonicericola**
50. ANT III with only 3–4 rhinaria (except in alatiform individuals). Cauda with 6 hairs **51**
 – ANT III with 6–49 rhinaria. Cauda with 6–19 hairs **52**
51. Rostrum total length 0.4–0.5× BL *Amphicercidus lonicericola**
 – Rostrum total length 0.25–0.3× BL *Amphicercidus alticola* s.str.*
52. ANT PT/BASE 3.7–4.0. ANT III with 25–49 rhinaria *Amphicercidus loniceriae**
 – ANT PT/BASE 1.6–3.7. ANT III with 6–28 rhinaria **53**
53. Cauda with c.6 hairs *Amphicercidus alticola* ssp. *tschatshica**
 – Cauda with 10–19 hairs **54**
54. ABD TERG 2–7 with MTu (placed pleurally on 7), and ABD TERG 7 and 8 with STu, all well developed. ANT PT/BASE 2.9–3.7. ANT III with 6–11 rhinaria *Amphicercidus tuberculatus*
 – Small MTu and Stu irregularly present on ABD TERG 2–5 and ABD TERG 7–8. ANT PT/BASE 1.6–2.8. ANT III with 8–28 rhinaria *Amphicercidus japonicus*
55. SIPH thin, cylindrical for most of length and pale, or only dusky towards apices, and almost flangeless (Figure 381). Cauda with a rather pointed apex, not more than 1.3× its basal width. ABD TERG 7 without marginal tubercles (MTu) *Alphitoaphis lonicericola*
 – SIPH tapering from base to flange, and wholly dark. Cauda with rounded apex, and more than 1.3× its basal width. ABD TERG 7 with MTu **56**
56. Hairs on ANT III long and fine, the longest more than 2× BD III *Aphis xylostei**
 – Longest hairs on ANT III 0.4–1.7× BD III **57**
57. SIPH and cauda both black. Cauda usually with a distinct constriction near its midlength, and bearing 7–15 hairs *Aphis spiraeicola*
 – SIPH much darker than cauda, which does not have a midlength constriction and bears 4–8 hairs *Aphis gossypii*

Lophanthus*L. schrenkii***Labiatae***Klimaszewska lophanthi***Lophochloa see Koeleria****Lopholaena***L. coriifolia***Compositae***Aphis gossypii***Lophospermum***L. erubescens***Scrophulariaceae**[*Myzus persicae* (1 male, as *Macrosiphum lophospermum*)]**Loranthus***L. acaciae**L. cordifolius* see *Tapinanthus**L. dregei**L. pentandrus* see *Dendrophthoë***Mistletoes***Brachyunguis harmalae**Sitobion* sp. nr *loranthi***Loranthaceae**

HOST LISTS AND KEYS

L. sutchuenensis see *Taxillus*

Loranthus spp.

Aphis gossypii; *Greenidea rappardi*; *Sitobion loranthi*;
Toxoptera aurantii, *citricidus*

Key to apterae on *Loranthus* (also *Scurrula*, *Tapianthus* and *Taxillus*):–

(Note: East Asian and African plants described in *Loranthus* are now placed in other genera, e.g., *Dendrophthoe*, *Macrosolen*, *Scurrula*, *Tapianthus*, *Taxillus*, so records of aphids from ‘*Loranthus* sp.’ or ‘mistletoe’ in those regions should more properly be referred to one or other of those genera.)

1. Head fused with prothorax. Eyes 3-faceted. ANT 5-segmented, with ANT PT/BASE less than 0.3. SIPH as pores. Anal plate bilobed 2
 - Head not fused with prothorax, and without spine-like hairs. Eyes multifaceted. ANT usually 6-segmented, with ANT PT//BASE more than 0.5. SIPH tubular. Anal plate entire 4
2. Marginal wax glands present in a longitudinal row on each segment (Figure 39a; sometimes lacking on ABD TERG 5–8). Head with a pair of mammariform or conical tubercles situated anteroventrally near ANT bases, each bearing a thick spine-like hair (Figure 39b). R IV+V rather short and blunt, 0.85–1.07× HT II. SIPH pores with 5–20 encircling hairs (Figure 39c). BL 1.5–2.1 mm 3
 - Marginal wax glands not evident. Head without a pair of antero-ventral tubercles. R IV+V acute, with RV somewhat attenuated; 1.3–1.6× HT II. SIPH with 2–4 encircling hairs *Tuberaphis takenouchii*
3. Cauda with the distal part in form of a broad knob (Figure 39d). Tergum pale. ABD TERG 5–8 often without marginal wax glands *Tuberaphis loranthi*

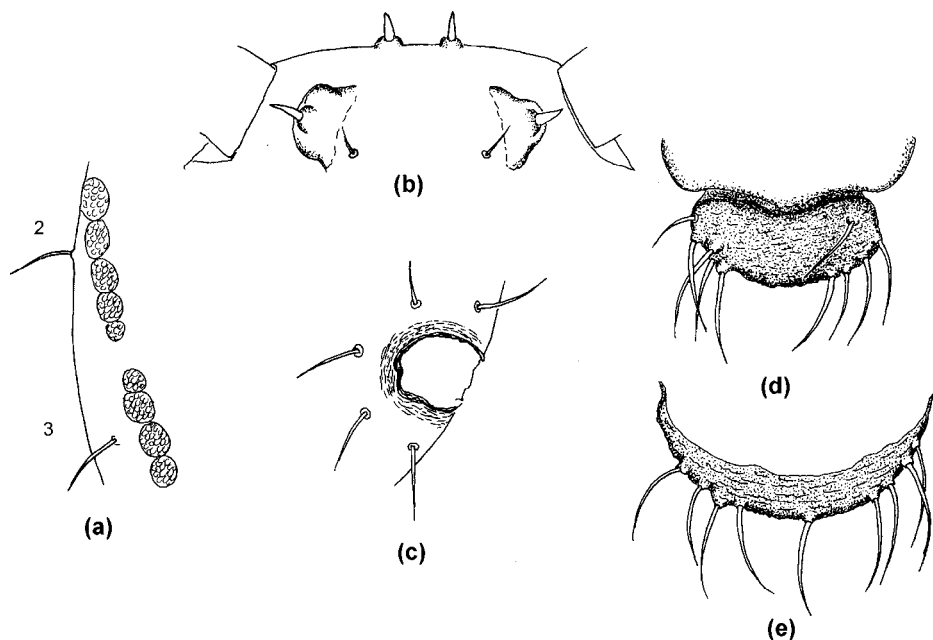


Figure 39 Apterae of *Tuberaphis* on *Loranthus* and related genera. (a) Marginal wax glands of *Tuberaphis loranthi*, (b) ventral side of front of head of *T. loranthi*, (c) SIPH of *T. loranthi*, (d) cauda of *T. loranthi*, (e) cauda of *T. scurrulae*.

- Cauda broadly rounded (Figure 39e). Tergum dark. ABD TERG 1–8 all with longitudinal rows of marginal wax glands *Tuberaphis scurrulae*
- 4. SIPH with numerous long hairs. Cauda broadly rounded, with a median stylus-like process *Greenidea rappardi*
- SIPH without hairs. Cauda tongue-or finger-shaped **5**
- 5. ANT PT/BASE 0.6–0.7. SIPH pale, shorter than their basal widths and about 0.5× cauda *Brachyunguis harmalae*
- ANT PT/BASE more than 2. SIPH dark at least distally, much longer than their basal widths, and more than 0.7× cauda **6**
- 6. SIPH pale basally, 0.8–1.0× the large black cauda *Sinomegoura citricola*
- SIPH wholly dark, longer than cauda **7**
- 7. SIPH with a subapical zone of polygonal reticulation. ANT III with 1–2 (–4) small rhinaria near base. ANT PT/BASE 5.1–9.0 **8**
- SIPH without polygonal reticulation. ANT III without rhinaria. ANT PT/BASE less than 5
go to key to polyphagous aphids, p. 1020, starting at couplet 25
- 8. SIPH 0.64–0.96 mm long, 0.34–0.38× BL and 2.3–2.7× cauda, their midlength diameter 2.0–2.5× that of hind tibia. ANT PT/BASE 7.5–9.0 *Sitobion loranthi**
- SIPH 0.39–0.48 mm long, 0.20–0.27× BL and 1.5–1.9× cauda, their midlength diameter 1.50–1.66× that of hind tibia. ANT PT/BASE 5.1–6.0 *Sitobion asirum**

Lotus (incl. *Bonjeania*, *Dorycnium*, *Tetragonolobus*) Leguminosae

<i>L. allionii</i>	<i>Therioaphis litoralis</i>
<i>L. angustifolius</i>	<i>Acyrthosiphon loti</i> ; <i>Aphis loti</i>
<i>L. angustissimus</i>	<i>Therioaphis brachytricha</i>
<i>L. corniculatus</i>	<i>Acyrthosiphon kondoi</i> , <i>loti</i> , <i>pisum</i> ; <i>Aphis craccivora</i> , <i>fabae</i> , <i>loti</i> , <i>lotiradicis</i> ; [<i>Macrosiphum</i> sp. (Leonard, 1974)]; <i>Megoura viciae</i> ; <i>Nearctaphis bakeri</i> ; [<i>Sipha glyceriae</i>]; <i>Therioaphis brachytricha</i> , <i>trifolii</i>
<i>L. cytisoides</i>	<i>Acyrthosiphon loti</i> ; <i>Aphis craccivora</i> , <i>loti</i>
<i>L. gebelia</i>	<i>Acyrthosiphon pisum</i> ; <i>Therioaphis litoralis</i> , <i>loti</i>
<i>L. germanicus</i> see <i>sericeus</i>	
<i>L. graecus</i>	<i>Therioaphis loti</i>
<i>L. herbaceum</i> see <i>pentaphyllos</i>	
<i>L. hirsutus</i>	<i>Aphis loti</i> ; <i>Therioaphis bonjeaniae</i> , <i>litoralis</i>
<i>L. hispidus</i> (incl. <i>subbiflora</i>)	<i>Acyrthosiphon loti</i> , <i>pisum</i> ; <i>Aphis craccivora</i>
<i>L. lamprocarpus</i>	<i>Aphis craccivora</i>
<i>L. lanuginosus</i>	<i>Aphis craccivora</i>
<i>L. latifolius</i>	<i>Therioaphis loti</i>
<i>L. maritimus</i>	<i>Aphis craccivora</i>
<i>L. palustris</i>	<i>Aphis craccivora</i>
<i>L. pedunculatus</i>	<i>Aphis craccivora</i> , <i>lotiradicis</i>
<i>L. pentaphyllos</i> (incl. <i>herbaceum</i>)	<i>Acyrthosiphon caraganae</i> , <i>loti</i> , <i>pisum</i> ; <i>Aphis craccivora</i> , [<i>Aphis</i> sp. (Romania; Holman and Pintera, 1981)]; <i>Therioaphis dorycnii</i> , [<i>hillerislambersi</i>], <i>litoralis</i> , <i>obscura</i>

HOST LISTS AND KEYS

<i>L. peregrinus</i>	<i>Therioaphis loti</i>
<i>L. rectus</i>	<i>Therioaphis bonjeaniae, brachytricha</i>
<i>L. scoparius</i>	<i>Acyrtosiphon kondoi</i>
<i>L. sericeus</i> (incl. <i>germanicus</i>)	<i>Aphis craccivora; Therioaphis dorycnii, litoralis</i>
<i>L. subbiflorus</i>	<i>Acyrtosiphon loti</i>
<i>L. suffruticosus</i>	<i>Therioaphis obscura</i>
<i>L. tenuifolius</i>	<i>Acyrtosiphon pisum</i>
<i>L. tenuis</i>	<i>Acyrtosiphon pisum; Aphis craccivora</i>
<i>L. uliginosus</i> (incl. <i>pedunculatus</i> auctt. nec Cav.)	<i>Acyrtosiphon loti, pisum; Aphis craccivora, lotiradicis;</i> <i>Megoura viciae; Therioaphis brachytricha</i>
<i>Lotus</i> sp.	[<i>Paracletus cimiciformis</i>]; [<i>Therioaphis subalba</i>]

Key to apterae on *Lotus* (couplets 1–3 **only** can also be applied to alatae):–

1. Fore coxae greatly enlarged. SIPH in form of small truncate cones. Cauda knobbed, anal plate bilobe **2**
– Fore coxae normal. Form of SIPH various. Cauda tongue- or finger-shaped, anal plate entire **8**
2. All viviparae are al. **3**
– Apt. commonly present **4**
3. (Al.) Knob of cauda trapezoid, longer than its greatest width (Figure 40a). ABD TERG 8 with 4–7 hairs, usually placed on dark sclerites. Head with dark ventral cross-band between eyes
Therioaphis dorycnii
– (Al.) Knob of cauda almost globular, not longer than its greatest width (Figure 40b). ABD TERG 8 with 2 hairs, placed on pale or dusky sclerites. Ventral cross-band between eyes often pale or indistinct
Therioaphis loti
4. Dorsal hairs only 7–10 µm long, much shorter than ANT BD III, with blunt apices, and arising from rough convex sclerotic plates (Figure 40c) *Therioaphis brachytricha*
– Dorsal hairs 35–90 µm long, mostly much longer than ANT BD III, thick, and with knobbed or otherwise expanded apices, and arising from tuberculate or conical bases **5**
5. ABD TERG 1–5 each with 1 pair of long spinal hairs and 1 pair of long marginal hairs (occasionally there are also 1–2 much smaller hairs) **6**
– ABD TERG 1–5 with at least some tergites having more than 4 long hairs per segment **7**
6. ABD TERG 1–7 with very large paired variably pigmented sclerotic bars, often fused across midline. Spinal hairs on ABD TERG 3 are c.70 µm long, placed on processes c.35 µm high (Figure 40d) *Therioaphis obscura*
– ABD TERG 1–7 without large sclerotic bars. Spinal hairs on ABD TERG 3 are 80–90 µm long, and placed on processes c.60 µm high (Figure 40e) *Therioaphis litoralis*
7. Dorsum usually unpigmented and unsclerotised. ANT PT/BASE less than 0.9, with PT about equal to HT II. SIPH small and inconspicuous, only about 0.02–0.04 mm long (Figure 40g) *Therioaphis bonjeaniae*
– Dorsum with hairs arising from variably pigmented sclerites (Figure 40f). ANT PT/BASE more than 1.1, PT being much longer than HT II. SIPH pigmented, distinctly visible, 0.04–0.07 mm long (Figure 40h) *Therioaphis trifolii*
8. Body broadly spindle-shaped, BL 2.0–5.5 mm. ANT tubercles very well developed, with inner faces smooth and divergent **9**
– Body oval, 1.1–2.9 mm. ANT tubercles undeveloped or weakly developed **12**

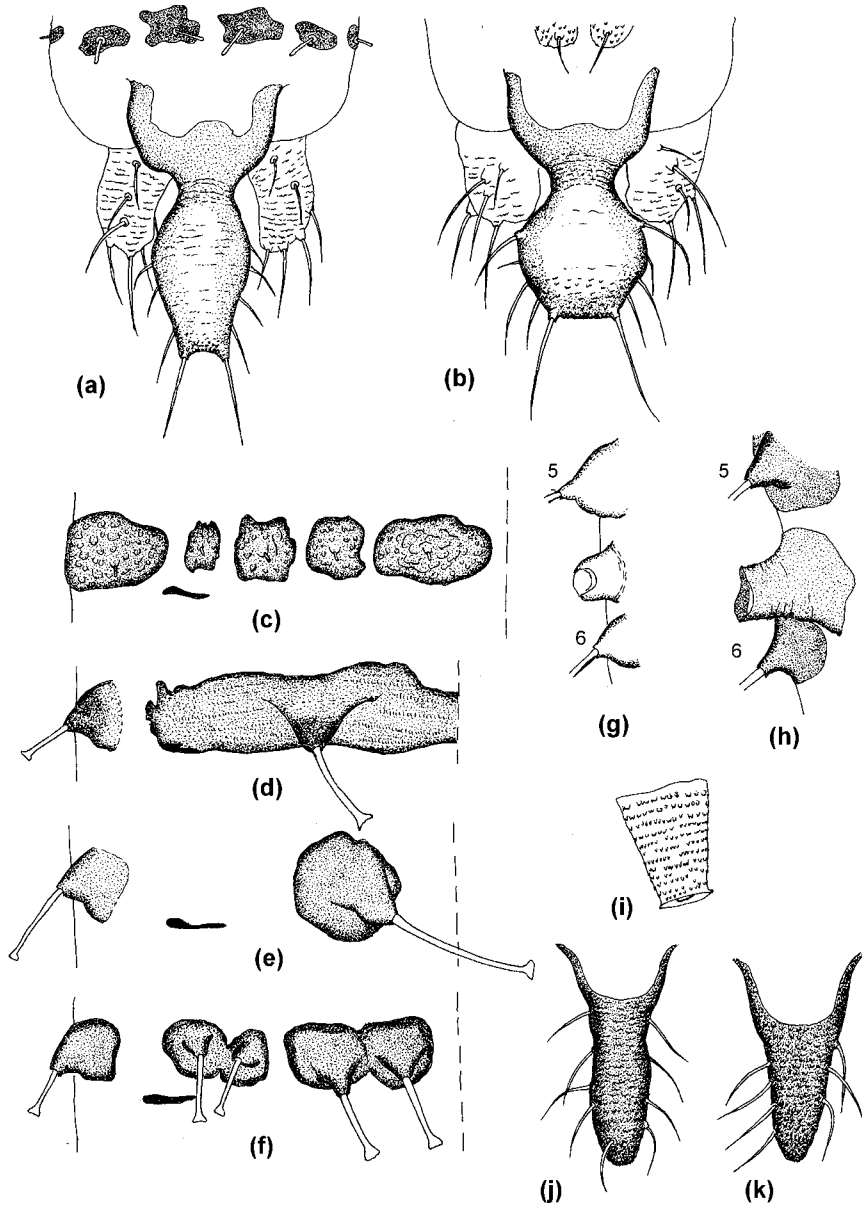


Figure 40 Aphids on *Lotus*. (a) End of abdomen (dorsal view) of al. of *Therioaphis dorycnii*, (b) same for alata of *Th. loti*, (c) ABD TERG 3 (left side) of apt. of *Th. brachytricha*, (d) same for *Th. obscura*, (e) same for *Th. litoralis*, (f) same for *Th. trifolii*, (g) SIPH and adjacent processes of apt. of *Th. bonjeaniae*, (h) same for *Th. trifolii*, (i) SIPH of apt. of *Nearctaphis bakeri*, (j) cauda of apt. of *Aphis loti*, (k) cauda of apt. of *A. craccivora*.

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9. Head, SIPH and cauda black. ANT and legs also mainly black, and black crescent-shaped antesiphuncular sclerites present. SIPH swollen in middle *Megoura viciae*
– Head and appendages mainly pale. No antesiphuncular sclerites. SIPH thin and tapering or cylindrical **10**
10. ANT I with 9–23 hairs. ANT BASE VI 0.25–0.40 mm long, 1.8–3× longer than R IV+V. SIPH attenuate distally, with diameter at midlength similar to or less than middle diameter of hind tibia *Acyrtosiphon pisum*
– ANT I with 6–10 hairs. ANT BASE VI 0.13–0.20 mm long, 1–1.5× longer than R IV+V. SIPH not attenuate distally; diameter at midlength greater than middle diameter of hind tibia **11**
11. ANT PT/BASE 3.0–4.2. R IV+V with 6 accessory hairs. SIPH 0.20–0.25× BL *Acyrtosiphon loti*
– ANT PT/BASE 4.3–6.0. R IV+V with 4 accessory hairs. SIPH 0.25–0.33× BL *Acyrtosiphon kondoi*
12. SIPH pale, short, with close-set rows of spinules (Figure 40i), 0.8–1.1× cauda which is also short, only a little longer than its basal width. ABD TERG 1 and 7 without marginal tubercles (MTu) *Nearctaphis bakeri*
– SIPH dark, with normal imbrication, 0.8–2.2× cauda which is much longer than its basal width. ABD TERG 1 and 7 with MTu **13**
13. Longest hairs on ANT III finely pointed, 0.8–2.2× BD III. Dorsal abdomen usually with well-developed black cross-bands on ABD TERG 7 and 8, but with only small, scattered sclerites on ABD TERG 1–6. Cauda with 11–25 hairs *Aphis fabae*
– Longest hairs on ANT III 0.2–0.8× BD III. Dorsal abdomen either with extensive dark sclerotisation on ABD TERG 1–6, or if mainly membranous then cross-bands on ABD TERG 7 and 8 are vestigial or absent. Cauda with 4–16 hairs **14**
14. Dorsal sclerotisation variably developed, at most with separate dark cross-bands on metanotum and ABD TERG 1–6. R IV+V 1.10–1.25× HT II. Cauda with 11–16 hairs. MTu regularly present on some of ABD TERG 2–6 (totalling 6–7) *Aphis lotiradicis*
– Dorsum usually with a solid black shield over metanotum and ABD TERG 1–6, sometimes partially fragmented, but never divided into segmental cross-bands. R IV+V 0.87–1.15× HT II. Cauda with 4–11 hairs. ABD TERG 2–6 rarely with MTu (totalling 0–4) **15**
15. Cauda finger-like, almost parallel-sided on distal part with rounded apex (Figure 40j), 0.13–0.18× BL, and bearing 6–11 hairs. SIPH 0.8–1.5× cauda. (Al. with 0–2 rhinaria on ANT IV) *Aphis loti*
– Cauda with distal part tapering, apex not rounded (Figure 40k), 0.09–0.13× BL, and bearing 4–9 hairs. SIPH 1.2–2.2× cauda. (Al. never with rhinaria on ANT IV) *Aphis craccivora*

Lostylis see Blackman and Eastop (1994)

Lubinia see *Lysimachia*

Luculia

L. gratissima
Luculia sp.

Myzus persicae
Aphis spiraecola

Rubiaceae

Use key to polyphagous aphids, p. 1020.

Ludwigia (incl. *Jussiaea*, *Jussiena*)

L. abyssinica
L. angustifolia

Aphis gossypii, *spiraecola*; *Myzus lythri*
Aphis gossypii; *Hyalomyzus jussiaeae*

Onagraceae

<i>L. bonariensis</i>	<i>Hyalomyzus jussiaeae</i>
<i>L. decurrens</i>	<i>Aphis gossypii</i> ; <i>Hyalomyzus jussiaeae</i>
<i>L. erecta</i>	<i>Aphis spiraecola</i>
<i>L. grandiflora</i>	<i>Aulacorthum solani</i>
<i>L. linifolia</i>	<i>Aphis gossypii</i> , <i>spiraecola</i> ; <i>Hyalomyzus jussiaeae</i>
<i>L. octovalvis</i>	<i>Hyalomyzus jussiaeae</i> ; <i>Myzus lythri</i>
<i>L. peruviana</i>	<i>Aphis gossypii</i> ; [<i>Sitobion indicum</i>]
<i>L. suffruticosa</i>	<i>Aphis gossypii</i> , <i>spiraecola</i> ; <i>Hyalomyzus jussiaeae</i>

Key to apterae on *Ludwigia*:-

- Head spiculose or nodulose, with well-developed ANT tubercles, their inner faces steep-sided and scabrous. SIPH pale or dark. ABD TERG 1 and 7 without MTu **2**
 – Head smooth with ANT tubercles weakly developed. SIPH dark. ABD TERG 1 and 7 with Mtu
 go to key to polyphagous aphids, p. 1020, starting at couplet 24
- ANT 0.5–0.6× BL, with ANT PT/BASE 2.4–3.0 *Myzus lythri*
 – ANT 1.1–1.3× BL, with ANT PT/BASE 4–5 **3**
- SIPH slightly clavate, 2.6–3.3× cauda which bears 4 hairs. R IV+V 1.45–1.75× HT II., with 2 accessory hairs. Tergum sclerotic, with a wrinkled, reticulate appearance. ANT III without rhinaria *Hyalomyzus jussiaeae*
 – SIPH tapering/cylindrical, 2.0–2.5× cauda which bears 7 hairs. R IV+V 1.1–1.4× HT II., with 5–7 accessory hairs. Tergum membranous, smooth. ANT III usually with 1–3 small rhinaria near base
Aulacorthum solani

Luffa*L. acutangula**L. aegyptiaca* (= *cylindrica*)*Luffa* sp.**Cucurbitaceae***Aphis gossypii*, [*umbrella*];*Aulacorthum magnoliae**Aphis craccivora*, *fabae*, *gossypii**Aphis solanella*, *spiraecola*

Use key to polyphagous aphids, p. 1020.

Lunania*L. cubensis***Flacourtiaceae***Toxoptera aurantii****Lunaria****L. biennis* (incl. *annua*)*L. rediviva***Cruciferae***Aphis fabae*; *Brevicoryne brassicae*; *Myzus persicae**Aphis fabae*Key to apterae on *Lunaria*:-

- ANT III 2.5–3.7× SIPH, which are somewhat swollen in middle (barrel-shaped) and 0.8–1.0× the broadly triangular cauda. Dorsum with paired dark markings *Brevicoryne brassicae*
- Without the above combination of characters
 go to key to polyphagous aphids, p. 1020 (or try key to apterae on *Brassica*)

Lupinus*L. affinis**L. albiflorus***Leguminosae***Macrosiphum albifrons**Macrosiphum albifrons*

HOST LISTS AND KEYS

<i>L. albifrons</i>	<i>Macrosiphum albifrons</i>
<i>L. albus</i>	<i>Aphis craccivora</i>
<i>L. angustifolius</i>	<i>Acyrtosiphon kondoi, pisum;</i> <i>Aphis craccivora, fabae, frangulae;</i> <i>Macrosiphum euphorbiae; Myzus persicae</i>
<i>L. arboreus</i>	<i>Macrosiphum albifrons</i>
<i>L. arcticus</i>	<i>Macrosiphum albifrons</i>
<i>L. argenteus</i> (incl. <i>decumbens</i>)	<i>Aphis lupini; Macrosiphum albifrons</i>
<i>L. densiflorus</i>	<i>Aphis</i> sp. (? <i>craccivora</i>)
<i>L. latifolius</i>	<i>Macrosiphum albifrons</i>
<i>L. luteus</i>	<i>Acyrtosiphon kondoi, pisum;</i> <i>Aphis craccivora, fabae, gossypii; Brachycaudus helichrysi</i>
<i>L. mutabilis</i>	<i>Macrosiphum albifrons</i>
<i>L. nootkatensis</i>	<i>Brachycaudus helichrysi; Macrosiphum albifrons;</i> [<i>Pseudocercidus rosae</i>]
<i>L. polyphyllus</i>	<i>Macrosiphum albifrons</i>
<i>L. pubescens</i>	<i>Macrosiphum albifrons</i>
<i>L. rivularis</i>	<i>Macrosiphum albifrons</i>
<i>L. sericeus</i>	<i>Macrosiphum albifrons</i>
<i>L. subcarnosus</i>	<i>Macrosiphum albifrons</i>
<i>L. termis</i>	<i>Myzus persicae</i>
<i>Lupinus</i> spp.	<i>Aphis lupinehansoni; Macrosiphum timpanogos, zionense;</i> <i>Myzus ornatus</i>

Key to apterae on *Lupinus*:-

(See Blackman and Eastop, 2000, for an illustrated key to aphids on cultivated lupins.)

1. Cuticle of head smooth and ANT tubercles well-developed, their inner faces smooth and divergent 2
 - Head either smooth with ANT tubercles absent or weakly developed, or spiculose with well-developed ANT tubercles, their inner faces scabrous and parallel or apically convergent 7
2. SIPH with a subapical zone of polygonal reticulation. Hairs on ANT III more than 0.5× BD III 3
 - SIPH without subapical polygonal reticulation. Hairs on ANT III less than 0.5× BD III 6
3. SIPH, ANT, distal parts of femora, tibiae and tarsi black *Macrosiphum zionense*
 - SIPH, ANT and legs mainly pale 4
4. ANT III with 1–10 rhinaria. BL 1.7–3.6 mm *Macrosiphum euphorbiae*
 - ANT III with 11–40 rhinaria. BL 3.2–5.1 mm 5
5. Cauda slightly constricted at about 0.3 from base. ANT III with 11–22 rhinaria. ANT V 1.03–1.09 mm long, 0.9–1.1× ANT IV and 0.8–0.9× ANT III *Macrosiphum timpanogos**
 - Cauda without any constriction. ANT III with 17–40 rhinaria. ANT V 0.57–0.79 mm long, 0.7–0.8× ANT IV and 0.5–0.7× ANT III *Macrosiphum albifrons*
6. ANT I with 9–23 hairs. Articulation between ANT III and IV blackish pigmented. ANT BASE VI 0.25–0.40 mm long, 1.8–3× longer than R IV+V. SIPH attenuate distally, with diameter at midlength less than middle diameter of hind tibia *Acyrtosiphon pisum*
 - ANT I with 6–10 hairs. Articulation between ANT III and IV not blackish pigmented. ANT BASE VI 0.13–0.20 mm long, 1–1.5× longer than R IV+V. SIPH not attenuate distally; diameter at midlength greater than middle diameter of hind tibia *Acyrtosiphon kondoi*

7. ANT I-VI rather uniformly dark. Cauda with 12–20 hairs **8**
 – ANT with at least III-V mainly pale. Cauda with 4–25 hairs **9**
8. R IV+V acute, 1.2–1.4× HT II. ANT PT/BASE less than 2. Cauda tapering almost to a point. (Al. with 3–6 rhinaria on ANT III and 0 on IV) *Aphis lupini*
 – R IV+V blunter, about 1× HT II. ANT PT/BASE more than 2. Cauda broader with more rounded apex. (Al. with 12–18 rhinaria on ANT III and 1–2 on IV) *Aphis lupinehansoni*
9. Dorsum with an extensive dark shield, with a pale reticulation (sometimes fragmented in small specimens) **10**
 – Dorsum without an extensive dark shield **11**
10. R IV+V 0.88–1.16× HT II (mostly 0.9–1.05×). Anterior half of genital plate with 2 (–3) hairs *Aphis craccivora*
 – R IV+V 0.97–1.3× HT II (mostly 1.06–1.2×). Anterior half of genital plate with 2–8 hairs (mode 4, mean 5.2) *Aphis cytisorum*
11. Head smooth with ANT tubercles weakly developed, ABD TERG 1 and 7 with marginal tubercles (MTu), no dark markings on dorsal abdomen anterior to SIPH, **and** hairs on hind femur all distinctly shorter than diameter of femur at its base **12**
 – Without the above combination of characters go to key to polyphagous aphids, p. 1020
12. ANT PT/BASE 2.6–3.8. ABD TERG 8 with a dark cross-band. (Al. with 1–2 rhinaria on ANT IV) *Aphis frangulae*
 – ANT PT/BASE 1.9–3.2. ABD TERG 8 usually without a cross-band. (Al. without rhinaria on ANT IV) *Aphis gossypii*

Lupsia see *Galactites*

Lupulina (-us) see *Medicago*

Luziola (incl. *Hydrochloa*)

Luziola sp.

Gramineae

Schizaphis longicaudata; *Sipha glyceriae*

Use key to apterae of grass-feeding aphids under *Digitaria*.

Luzula

L. albida

L. arctica

L. banksiana

L. campestris

L. forsteri

L. lutea

L. luzuloides (= *nemorosa*)

L. multiflora

L. nemorosa see *luzuloides*

L. nivea

L. pilosa

L. spadicea

L. spicata

Juncaceae

Ceruraphis eriophori

Carolinaia sp.(*schlingeri*?)

Rhopalosiphoninus staphyleae

Melanaphis luzulella; *Sitobion avenae*

Rhopalosiphum padi

Melanaphis luzulella

Melanaphis luzulella; *Paraclotus bykovi*;

Rhopalosiphum padi; *Sitobion avenae*

Melanaphis luzulella; *Sitobion avenae*, *fragariae*

Carolinaia sp.(*schlingeri* ?); *Sitobion avenae*

Melanaphis luzulella; *Paraclotus bykovi*

Melanaphis luzulella

Melanaphis luzulella

HOST LISTS AND KEYS

L. sudetia
L. sylvatica
Luzula sp.

Sitobion avenae
Forda formicaria; *Melanaphis luzulella*
Sipha maydis

Key to apterae on *Luzula*:-

1. SIPH absent. Eyes of 3 facets only. ANT 5-segmented, with ANT PT/BASE less than 0.3 2
 – SIPH present as tubes or pores. Eyes multifaceted. ANT 5- or 6-segmented, with ANT PT/BASE more than 1 3
2. Hind legs elongate, with femora and tibiae curved, and hind tarsi 0.22–0.38 mm long, 1.4–1.8× longer than mid-tarsi. ANT densely clothed with fine hairs. Primary rhinarium on ANT V not much larger than that on ANT IV *Paracletus bykovi*
 – Hind legs not elongate, with hind tarsi less than 0.22 mm long, less than 1.4× longer than mid-tarsi. ANT not densely clothed with fine hairs, and primary rhinarium on ANT V very large, transversely oblong and extending around segment *Forda formicaria*
3. SIPH as pores on shallow cones. Dorsal hairs very thick, long and spine-like. Cauda broadly rounded *Sipha maydis*
 – SIPH tubular. Dorsal hairs not very thick and spine-like. Cauda triangular, tongue- or finger-shaped 4
4. ANT III bearing 2–10 rhinaria, and with longest hairs at least 2× BD III. Dorsum with extensive dark sclerotisation. SIPH black and very rugose *Ceruraphis eriophori*
 – ANT III without rhinaria or with 1–4 very small rhinaria, and with longest hairs less than 1.5× BD III. Dorsum with or without sclerotisation, SIPH pale or dark 5
5. SIPH clavate; i.e., distinctly swollen on distal part, with a narrower section basad. Dorsal abdomen with extensive dark sclerotisation 6
 – SIPH cylindrical or tapering. Dorsal abdomen without extensive dark sclerotisation 7
6. ANT tubercles very well developed, their inner faces approximately parallel in dorsal view. ANT PT/BASE 4.7–5.3. Dorsal abdomen with segmentally divided sclerotisation *Rhopalosiphoninus staphyleae*
 – ANT tubercles low, rounded. ANT PT/BASE 1.9–2.5. Dorsal abdomen with an almost complete shield over metanotum and ABD TERG 1–6 *Carolinaia* sp. (*schlingeri*?)
7. SIPH with a subapical zone of polygonal reticulation. ANT III with 0–4 small rhinaria near base. Cauda with 6–9 (–13) hairs 8
 – SIPH without polygonal reticulation. ANT III without rhinaria. Cauda with 4–7 hairs 9
8. SIPH 1.75–2.25× cauda, which has a rounded apex *Sitobion fragariae*
 – SIPH 1.1–1.4× cauda, which has a more pointed apex *Sitobion avenae*
9. ANT usually 5-segmented, with PT/BASE 1.8–3.6. SIPH tapering gradually from base to flange *Melanaphis luzullela*
 – ANT usually 6-segmented, with ANT PT/BASE 3.1–5.2. SIPH cylindrical for most of length, slightly swollen distally with a smooth, constricted region proximal to flange *Rhopalosiphum padi*

Luzuriaga
L. radicans

Philesiaceae
Aphis sp. (Chile, BMNH colln, leg. D. Hille Ris Lambers)

***Lychnis* (incl. *Coronaria*)**

- L. alba* see *Silene*
L. alba × *dioica* see *Silene*
L. coriacea
L. coronaria
L. dioica see *Silene*
L. diurna
L. divaricata
L. flos-cuculi

L. githago
L. pratensis
L. vespertina
L. viscaria (incl. ssp. *atropurpurea*)
L. viscosa
Lychnis spp.

Caryophyllaceae

- Brachycaudus lychnidis*
Brachycaudus lychnidis

Brachycaudus lychnidis
Brachycaudus lychnidis
Brachycaudus lychnicola; *Myzus ascalonicus*;
[*Volutaphis* sp. (Börner, 1952: 116)]
Aphis nasturtii
Brachycaudus lychnidis
Brachycaudus lychnidis
Brachycaudus lychnidis; *Volutaphis centaureae*
Brachycaudus lychnidis
Aphis sambuci; *Aulacorthum solani*;
Macrosiphum euphorbiae

Use key to apterae on *Silene*.

Lycium

- L. barbarum*
L. chilense (incl. var. *minutifolium*)
L. chinense

L. dasystemum
L. europaeum
L. ferocissimum
L. gillesianum (incl. *ruiz-leali*)
L. halimifolium
L. nodosum
L. parviflorum
L. ruthenicum
L. shawii
L. stenophyllum
L. turcomanicum
Lycium sp.

Solanaceae

- Myzus persicae*
Aphis danielae; *Myzus persicae*
[*Aphis schinifoliae*]; *Aulacorthum magnoliae*, *solani*;
Myzus antirrhinii, *persicae*; *Neomyzus circumflexus*
Brachyunguis lycii
Brachyunguis lycii; *Myzus persicae*
Myzus persicae
Aphis danielae
Macrosiphum euphorbiae; *Myzus persicae*
Aphis danielae
? *Brachyunguis tetrapteralis* (as *Aphis piutapa*)
Brachyunguis lycii
Aphis craccivora; [*Brachyunguis* sp.]; *Myzus persicae*
Aphis danielae
Brachyunguis lycii, *zawadovskii*
Aphis spiraeicola

Key to apterae on *Lycium*:-

1. ANT PT/BASE 0.5–1.45 2
- ANT PT/BASE more than 1.5 (or less than 0.5) go to key to polyphagous aphids, p. 1020
2. SIPH pale, 0.5–0.9 × cauda (which is triangular and 1.1–1.5 × its basal width) 3
- SIPH pale or dark, 1.07–1.41 × cauda 4
3. SIPH 0.3–0.5 × cauda, shorter than ANT PT ? *Brachyunguis tetrapteralis*
- SIPH 0.5–0.9 × cauda, longer than ANT PT *Brachyunguis lycii*

HOST LISTS AND KEYS

4. ANT PT/BASE 1.05–1.45. Dorsum with extensive dark sclerotisation. SIPH more than 0.2 mm long. Cauda finger-like, with a constriction, much longer than its basal width. ABD TERG 2–6 without marginal tubercles (MTu) *Aphis danielae*
- ANT PT/BASE 0.6–0.7. Dorsum without extensive dark sclerotisation. SIPH only c.0.1 mm long. Cauda broadly conical/helmet-shaped, shorter than its basal width. ABD TERG 2–6 as well as 1 and 7 with MTu *Brachyunguis zawadovskii*

Lycopersicon

L. esculentum

Solanaceae

[*Acyrtosiphon pisum*];
Aphis craccivora, *fabae*, *gossypii*, *spiraecola*;
Aulacorthum solani; *Brachycaudus helichrysi*;
[*Brachyunguis harmalae*]; *Macrosiphum euphorbiae*;
[*Maculolachnus submacula*];
Myzus antirrhinii, *ascalonicus*, *ornatus*, *persicae*;
Prociphilus erigeronensis;
Rhopalosiphoninus latysiphon, *solani*, *staphyleae* ssp.
tulipaellus;
Rhopalosiphum [*nymphaeae*], *padi*, *rufiabdominale*;
Smynthuroides betae; *Toxoptera aurantii*, *citricidus*

Key to apterae on *Lycopersicon*:-

1. SIPH thick and markedly clavate, so that maximum width of swollen part is more than 1.5× minimum width of basal part **2**
- SIPH (if present) tapering, cylindrical or only moderately clavate
go to key to polyphagous aphids, p. 1020
2. SIPH with swollen part 3.7–4.8× thicker than the narrow cylindrical basal part, and a narrowly constricted subapical region with polygonal reticulation. ANT III without rhinaria
Rhopalosiphoninus latysiphon
- SIPH with swollen part not more than 3.2× the minimum width of the rather thick basal part, and subapical region not narrowly constricted, with a few rows of transverse striae proximal to flange. ANT III usually with 1–4 rhinaria on a thickened part near base **3**
3. Longest hairs on ANT III 6–10 μm, 0.2–0.4× BD III *Rhopalosiphoninus staphyleae* ssp. *tulipaellus*
- Longest hairs on ANT III 20–24 μm, 0.8–1.0× BD III *Rhopalosiphoninus solani*

Lycopus

L. americanus
L. europaeus
L. lucidus
L. maackianus
L. ramosissimus
L. virginicus

Labiatae

Hyalomyzus sensoriatus
Ovatus insitus, [*lycopi*]
Aphis lycopicola
Aphis lycopicola
Aphis lycopicola
Hyalomyzus eriobotryae; *Kaltenbachiella ulmifusa*;
Tiliphagus lycoposugus

Key to apterae on *Lycopus*:-

1. SIPH absent. ANT PT/BASE less than 0.5. Wax gland plates present. (On roots) **2**
- SIPH present, tubular. ANT PT/BASE more than 1. No discrete wax glands **3**

2. Wax glands each comprising a ring of cells around a clear central area. BL less than 2 mm
Kaltenbachiella ulmifusa
- Wax glands not in form of rings; circular, subdivided into small cells without a clear central area. BL more than 2.5 mm
Tiliphagus lycoposugus
3. SIPH clavate 4
- SIPH tapering/cylindrical 5
4. ANT PT/BASE less than 3 (apt. undescribed; estimated from al.) *Hyalomyzus sensoriatus*
- ANT PT/BASE more than 3.5 *Hyalomyzus eriobotryae*
5. Head densely spiculose. ANT tubercles well-developed, with inwardly directed scabrous processes bearing short hairs with blunt or slightly expanded apices. ANT 6-segmented, ANT PT/BASE 4.4–6.1 *Ovatus insitus*
- Head smooth with ANT tubercles weakly developed. ANT 5-segmented, with ANT PT/BASE c. 3
*Aphis lycopicola**

Lycoris*L. sanguinea***Amaryllidaceae***Neotoxoptera formosana***Lygos see Genista****Lynosyris see Bigelovia****Lyonia (incl. *× olisma*)***L. calycosa**L. mariana**L. ovalifolia**L. rubiginosa***Ericaceae***Toxoptera aurantii**Aphis spiraeicola**Acutosiphon obliquoris*; *Aphis gossypii*, *nerii*, *spiraeicola*;*Dysaphis microsiphon*; *Ericolophium ovalifolii*;[*Schizaphis rotundiventris*]; *Sinomegoura citricola*;[*Thoracaphis* sp.]; *Toxoptera aurantii*; *Vesiculaphis pieridis**Toxoptera aurantii*; [*Uroleucon ambrosiae*]Key to apterae on *Lyonia*:–

1. SIPH very small and thin, 0.03–0.08 mm long. Well-developed marginal tubercles (MTu) present on ABD TERG 1–5, and head with a large pair of spinal tubercles (STu). Cauda helmet-shaped, shorter than its basal width in dorsal view *Dysaphis microsiphon*
- SIPH larger, and MTu, STu and cauda not as above 2
2. SIPH tapering from broad base to point apex, with pore subapical. ANT PT/BASE 0.45–0.7
Acutosiphon obliquoris
- SIPH not tapering to point, and with terminal aperture. ANT PT/BASE 0.7–6.0 3
3. ANT PT/BASE 0.7–0.9. Tergum sclerotic and very coarsely corrugated. SIPH thick, strongly scabrous and warty, cylindrical for most of length and narrowing just proximal to flange
Vesiculaphis pieridis
- ANT PT/BASE more than 1.5, tergum not very coarsely corrugated, and SIPH not as above 4
4. SIPH pale, cylindrical, curved outward distally, c.1.5× ANT III and more than 2.5× cauda. ANT tubercles well developed, with inner faces divergent. ANT PT/BASE c.2 *Ericolophium ovalifolii*
- SIPH dark and/or other characters not in this combination go to key to polyphagous aphids, p. 1020

HOST LISTS AND KEYS

Lysichiton

L. americanum
L. camtschaticense

Araceae

Macrosiphum oregonense
Aulacorthum solani

Key to apterae on *Lysichiton*:-

- SIPH with a subapical zone of polygonal reticulation, and with part just proximal to this reticulation slightly swollen. SIPH 1.13–1.45× ANT III, which bears hairs maximally 0.6–1.2× BD III
Macrosiphum oregonense
- SIPH without subapical reticulation, and with no trace of swelling. SIPH shorter than ANT III, which has hairs maximally 0.2–0.4× BD III
Aulacorthum solani

Lysimachia (incl. Lubinia, Naumbergia, Steironema)

Primulaceae

L. barystachys *Aphis gossypii*
L. ciliata *Aphis fabae*; *Aulacorthum solani*
L. clethroides *Aphis gossypii*
L. davurica *Aphis pashtshenkoae*
L. lanceolata *Neomyzus circumflexus*
L. mauritiana *Aphis fabae*, *gossypii*
L. nemorum *Aulacorthum solani*; [*Jacksonia papillata*]; *Myzus persicae*
L. nummularia *Aulacorthum solani*; *Mordwilkoja vagabunda*;
Thecabius lysimachiae

L. punctata *Aphis fabae*; *Aulacorthum solani*
L. quadrifolia [*Cavariella* sp. (Leonard, 1968)];
[*Thecabius* sp. (Leonard, 1968)]

L. stricta *Aphis gossypii*
L. terrestris *Aulacorthum solani*; *Mordwilkoja vagabunda*
L. thyrsoiflora *Aphis fabae*, *frangulae*; *Aulacorthum solani*
L. vulgaris *Aphis* [*brohmeri*], *fabae*, *frangulae*, *lysimachiae*;
Aulacorthum solani; *Macrosiphum euphorbiae*;
Mordvilkoja vagabunda

Lysimachia spp. *Myzus ornatus*; [*Paracletus cimiciformis*]

Key to apterae on *Lysimachia*:-

1. SIPH absent. Eyes with only 3 facets. ANT PT/BASE less than 0.5. ABD TERG 3–6 each with 4, and ABD TERG 7 with 2, large wax gland plates **2**
- SIPH present, tubular. Eyes multifaceted. ANT PT/BASE more than 1. No discrete wax glands **3**
2. BL 1.3–1.8 mm. ANT 5- or 6-segmented, if 6-segmented then ANT III distinctly shorter than ANT IV + V together *Thecabius lysimachiae*
- BL 1.9–2.9 mm. ANT 6-segmented, with ANT III as long as or longer than IV + V together *Mordvilkoja vagabunda*
3. ANT tubercles undeveloped or weakly developed. ABD TERG 1 and 7 with marginal tubercles (MTu) **4**
- ANT tubercles well developed. ABD TERG 1 and 7 without Mtu
go to key to polyphagous aphids, p. 1020, starting at couplet 4
4. SIPH 0.5–0.7× cauda. ANT PT/BASE 1.5–2.0 *Aphis pashtshenkoae**
- SIPH 0.8–2.3× cauda. ANT PT/BASE (1.7–) 2.0–4.0 **5**

5. SIPH c.2.25× the equally dark cauda *Aphis lysimachiae**
 – SIPH 0.8–2.3× cauda, but if more than 2× then cauda is paler than SIPH 6
6. SIPH darker than cauda which bears 4–8 hairs. Femoral hairs mostly short *Aphis frangulae* group (incl. *gossypii*)
 – SIPH and cauda both black, with cauda bearing 11–24 hairs. Femoral hairs long and fine *Aphis fabae*

Lythrum

L. alatum
L. graefferi
L. hyssopifolium
L. linifolium
L. salicariae

L. virgatum
L. vulneria

Myzus lythri
Myzus lythri
Myzus lythri
Aulacorthum solani
Aphis fabae, gossypii, grossulariae, [salicariae];
Myzus lythri
Aphis fabae; Myzus lythri
Myzus lythri

Lythraceae

Key to apterae on *Lythrum*:-

1. Head densely spiculose. ANT 0.5–0.6× BL, with ANT PT/BASE 2.4–3.0. ANT III without rhinaria. SIPH pale, cylindrical/tapering, coarsely imbricated., 2.3–2.8× cauda *Myzus lythri*
 – Head smooth, or if spiculose then ANT are longer and/or other characters do not apply 2
2. Head smooth with ANT tubercles undeveloped. SIPH pale. R IV+V 1.4–1.7× HT II, which bears 6–11 accessory hairs *Aphis grossulariae*
 – Either ANT tubercles are well developed, or SIPH are dark and R IV+V is 0.9–1.4× HT II with only 2 accessory hairs go to key to polyphagous aphids, p. 1020

Maackia, Macadamia, Macaranga see Blackman and Eastop (1994)

Machaeranthera

M. viscosa

Atarsos grindeliae

Compositae**Macleania**

M. punctata

Toxoptera aurantii

Ericaceae**Macleaya**

M. cordata

Aulacorthum solani

Papaveraceae

Maclura see Blackman and Eastop (1994)

‘*Macrophyllum*’ = *Lactuca macrophylla*?

‘*Macrophyllum* sp.’

Uroleucon sonchi

Macroptilium

M. lathyroides

Aphis craccivora

Leguminosae**Macrosolen**

M. cochinchinensis (incl. *Elytrantha globosa*)

Toxoptera aurantii; Tuberaphis macrosoleni

Loranthaceae

HOST LISTS AND KEYS

Key to apterae on *Macrosolen*:-

- Eyes of 3 facets. Head fused to prothorax, and bearing short, spine-like hairs. SIPH as pores surrounded by hairs. Cauda shorter than its basal width. ANT PT/BASE less than 0.3 *Tuberaphis macrosoleni*
- Eyes multifaceted. Head not fused to prothorax, hairs not spine-like. SIPH tubular. Cauda long than its basal width. ANT PT/BASE more than 1.5 go to key to polyphagous aphids, p. 1020

Macrotyloma

M. stenophyllum

Leguminosae

Aphis gossypii

Madia

M. sativa

Compositae

Uroleucon madia, *eumadia*, [*rudbeckiae*]

Key to apterae on *Madia*:-

(Both species have siphunculi with distal polygonal reticulation, a long thin hairy R IV, and first tarsal segments with 5 hairs.)

- ANT PT/BASE 2.65–4.0. SIPH 1.28–1.56× cauda *Uroleucon eumadiae*
- ANT PT/BASE 4.5–6.1. SIPH 1.80–2.25× cauda *Uroleucon madia*

Magnolia see Blackman and Eastop (1994)

Magydaris

M. pastinacea

Umbelliferae

Anuraphis shaposhnikovi

Mahonia

M. aquifolia

M. japonica

M. morrisonensis

M. repens

Berberidaceae

Liosomaphis berberidis; *Macrosiphum euphorbiae*

[*Prociphilus osmanthae*]

Wahlgreniella viburni

Liosomaphis berberidis

Key to apterae on *Mahonia*:-

1. SIPH tapering/cylindrical, with a subapical zone of polygonal reticulation *Macrosiphum euphorbiae*
 - SIPH strongly swollen on distal 0.7 of length, and without subapical polygonal reticulation **2**
2. ANT 0.4–0.5× BL, ANT PT/BASE 0.8–1.4. ANT tubercles weakly developed, not projecting forward beyond middle of head in dorsal view *Liosomaphis berberidis*
 - ANT c. 0.8× BL, ANT PT/BASE 1.6–1.9. ANT tubercles moderately developed, projecting forward beyond middle of head in dorsal view *Wahlgreniella viburni*

(or try key to apt. on *Berberis*)

***Maianthemum* (incl. *Smilacina*)**

M. bifolium

M. dilatatum

M. kamtschaticum

M. racemosum

M. stellatum

Maianthemum sp.

Convallariaceae

Aulacorthum majanthemi; *Rhopalosiphoninus maianthemi*

Macrosiphum badium

Macrosiphum euphorbiae

Macrosiphum badium, *pechumani*

Macrosiphum badium, *insularis*

Illinoia wahnaga

Key to apterae on *Maianthemum*:-

(All species have well-developed ANT tubercles, and ANT at least 0.9× BL.)

1. SIPH without any subapical polygonal reticulation; distal part of SIPH very smooth, with a subapical annular incision close to flange *Aulacorthum majanthemum*
- SIPH with a subapical zone of polygonal reticulation (at least 2–3 rows of closed cells) **2**
2. SIPH swollen on distal c.0.7 of length, **and** cauda triangular in dorsal view, shorter than (c.0.8×) R IV +V. Hairs on ANT III long and pointed, the longest 1.7–2.1× BD III. Dorsum with extensive dark sclerotisation. Head densely spinulose both dorsally and ventrally *Rhopalosiphoninus maianthemum*
- SIPH tapering/cylindrical, or if swollen then cauda tongue or finger-shaped and at least 2× R IV+V. ANT III with blunt hairs maximally 0.4–1.0× BD III. Dorsum without extensive dark sclerotisation. Head smooth or not densely spinulose. Cauda tongue- or finger-shaped **3**
3. SIPH swollen proximal to reticulated zone, to 1.2–1.4 minimal diameter of basal half. Hairs on ANT III less than 0.5× BD III. First tarsal segments each with 5 hairs *Illinoia wahnaga*
- SIPH cylindrical or less swollen. Hairs on ANT III 0.6–1.0× BD III. First tarsal segments with 3 hairs **4**
4. R IV+V 0.75–1.0× HT II. SIPH usually pale on at least basal half, sometimes becoming darker distally **5**
- R IV+V 1.15–1.48× HT II. SIPH dusky/dark, sometimes paler at base **6**
5. ANT BASE VI 0.25–0.30mm, at least 2× R IV+V and similar in length to cauda *Macrosiphum insularis*
- ANT BASE VI 0.13–0.20mm, 0.9–1.3× R IV+V and 0.3–0.5× cauda *Macrosiphum euphorbiae*
6. ANT III with 11–25 rhinaria in a row over most of length. Head, ANT, legs, SIPH and cauda all very dark. Head smooth *Macrosiphum pechumani*
- ANT III with 1–5 rhinaria near base. Head, ANT, legs and SIPH mainly dusky or dark, cauda pale/dusky. Head with spinules dorsally, and sometimes also ventrally *Macrosiphum badium**

Majorana see Origanum**Malabaila***M. aurea***Umbelliferae***Cavariella theobaldi***Malachium see Myosoton****Malachra***M. capitata***Malvaceae***Aphis gossypii***Malcolmia***Malcolmia* sp.**Cruciferae***Acyrthosiphon ilka***Mallotus** see Blackman and Eastop (1994)**Malope***M. trifida***Malvaceae***Macrosiphum euphorbiae; Myzus persicae*

Use key to polyphagous aphids, p. 1020.

HOST LISTS AND KEYS

Malpighia see Blackman and Eastop (1994)

Malva

M. alcea
M. borealis
M. crispa
M. denticulata
M. maluca
M. moschata
M. neglecta (incl. *rotundifolia*)

M. nicaeensis
M. nudiflora
M. parviflora

M. plebeja
M. pusilla

M. sinensis
M. sylvestris (incl. var. *mauritiana*)

M. verticillata
Malva spp.

Malvaceae

Aphis gossypii
Aphis umbrella
Aphis gossypii
Aphis fabae
Aphis umbrella
Aphis fabae; *Myzus persicae*
Acyrtosiphon gossypii, *malvae*;
Aphis davletshinae, *fabae*, *gossypii*, *spiraecola*, *umbrella*;
Aulacorthum solani; *Brachycaudus helichrysi*;
Macrosiphum euphorbiae, [*malvicola* (nomen dubium)];
Myzus persicae; *Rhopalosiphum rufiabdominale*;
Aphis spiraecola
Aphis umbrella
Aphis craccivora, *gossypii*, *umbrella*;
Macrosiphum euphorbiae; *Myzus ornatus*, *persicae*;
[*Uroleucon compositae*]
Brachycaudus malvae
Aphis davletshinae, *fabae*, *umbrella*; *Aulacorthum solani*;
Myzus ascalonicus, *persicae*
Aphis rostella, *umbrella*
Acyrtosiphon malvae; *Aphis fabae*, *gossypii*, *umbrella*;
Brachycaudus malvae; *Aulacorthum solani*;
Macrosiphum euphorbiae; *Myzus persicae*;
[*Uroleucon* sp. (Leonard, 1964: 98)]
Aphis gossypii; *Macrosiphum euphorbiae*
Aphis [*eupatorii*], *nasturtii*, *solanella*;
Aulacorthum magnoliae; [*Cryptomyzus alboapicalis*]

Key to apterae on *Malva*:-

1. Cauda helmet-shaped, not longer than its basal width in dorsal view. SIPH with an annular incision proximal to the flange. Spiracular apertures large and rounded 2
 - Cauda tongue- or finger-shaped, longer than its basal width. SIPH without any distinct subapical annular incision. Spiracular apertures reniform 3
2. Dorsum with an extensive solid black sclerotic shield. Hairs on ANT III very short, only 0.2–0.25× BD III *Brachycaudus malvae*
 - Dorsum without a dark sclerotic shield. Hairs on ANT III longer, 0.5–0.7× BD III *Brachycaudus helichrysi*
3. SIPH pale, very long and attenuated distally, thinner than hind tibiae at their respective midlengths, 0.33–0.45× BL and 2.5–3.5× cauda *Acyrtosiphon gossypii*
 - SIPH pale or dark, thicker and relatively shorter 4
4. SIPH pale or dusky, or only dark towards apex, ANT tubercles weakly developed, and marginal tubercles (MTu) always present on ABD TERG 1 and 7 5

- Without the above combination of characters; i.e., **either** SIPH are wholly dark **or** ANT tubercles are well developed and MTu are absent from ABD TERG 1 and 7
go to key to polyphagous aphids, p. 1020
- 5. ANT 5-segmented. R IV+V very long, narrow and pointed, 4–5× its basal width and 1.6–2.1× HT II. Hairs on ABD TERG 2–4 mostly longer than ANT BD III. MTu absent from ABD TERG 2–5
Aphis davletshinae
- ANT 5- or 6-segmented. R IV+V less than 3× its basal width and 0.95–1.6× HT II. Hairs on ABD TERG 2–4 shorter than ANT BD III. MTu often present on ABD TERG 2–5 as well as 1 and 7 **6**
- 6. MTu only sporadically present on ABD TERG 2–5, and diameter of tubercle on ABD TERG 7 is less than that of base of ANT III. SIPH 0.8–1.5× cauda. R IV+V 0.95–1.2× HT II. ANT VI BASE 0.85–1.1× HT II
Aphis nasturtii
- Large MTu usually present (except in summer dwarfs) on ABD TERG 2–5 in addition to those on 1 and 7, those on 7 being greater in diameter than base of ANT III. SIPH 1.35–2.5× cauda. R IV+V 1.1–1.6× HT II. ANT VI BASE 1.0–1.35× HT II **7**
- 7. R IV+V 1.0–1.33× HT II and less than 2.5× its basal width *Aphis umbrella*
- R IV+V 1.35–1.6× HT II, more than 2.5× its basal width *Aphis rostella*

Malvastrum

- M. coccineum*
- M. corchorifolium*
- M. coromandelianum*
- M. tricuspidatum*

Malvaceae

- Myzus persicae*; *Neomyzus circumflexus*
- Aphis gossypii*
- Aphis gossypii*
- Aphis gossypii*, *umbrella*

Use key to apterae on *Malva*.

Malvaviscus

- M. arboreus* (incl. *drummondii*,
penduliflorus)
- M. conzattii*
- M. grandiflorus*

Malvaceae

- Aphis gossypii*; *Myzus persicae*; *Toxoptera aurantii*
- Aphis gossypii*; *Myzus ornatus*, *persicae*;
Neomyzus circumflexus
- Aulacorthum solani*; *Neomyzus circumflexus*;
Toxoptera aurantii

Use key to polyphagous aphids, p. 1020.

Mammea see Blackman and Eastop (1994)

Mandevilla

- M. laxa* (incl. *suaveolens*)
- Mandevilla* sp.

Apocynaceae

- Aphis craccivora*, *gossypii*; *Myzus persicae*;
Toxoptera aurantii
- [*Sitobion pseudoluteum*]

Use key to polyphagous aphids, p. 1020.

Manihot

- M. utilissima*

Euphorbiaceae

- Aphis craccivora*

HOST LISTS AND KEYS

***Manilkara* (incl. *Achras*)**

M. zapota (incl. *zapotilla*)

Use key to polyphagous aphids, p. 1020.

Mapouria* see *Psychotria

Maranta

M. arundinacea

Maranta sp.

Use key to polyphagous aphids, p. 1020.

Marcgravia

M. rectiflora

Margaretta see Blackman and Eastop (1994)

Margaritaria

M. discoidea (ssp. *nitida*)

Marianthus* see *Billardiera

Mariscus* see *Cyperus

Markhamia see Blackman and Eastop (1994)

Marrubium

M. incisum

M. peregrinum

M. supinum

M. vulgare

Key to apterae on *Marrubium*:-

1. Dorsal body hairs long and thick, much longer than ANT BD III, and many or all of them with knobbed or expanded apices, and arising from tuberculate bases. ANT PT/BASE 6.4–10.5 2
 - Dorsal body hairs mostly shorter than BD III; pointed or blunt, or if with somewhat expanded apices then without tuberculate bases. ANT PT/BASE 1.9–5.5 3
2. ANT PT/BASE 9.0–10.5. R IV+V 1.3–1.5× HT II, with 7–9 accessory hairs *Cryptomyzus taoi*
 - ANT PT/BASE 6.4–8.8. R IV+V 1.5–1.6× HT II, with 8–14 accessory hairs *Cryptomyzus ballota*
3. ANT tubercles well developed, with inner faces steep-sided and spiculate. ANT III usually with 1–2 small rhinaria near base. SIPH pale, tapering/cylindrical, with a well-developed flange. ABD TERG 1 and 7 without marginal tubercles (MTu) *Aulacorthum solani*
 - ANT tubercles weakly developed. ANT III without rhinaria. SIPH wholly dark. ABD TERG 1 and 7 with MTu *Aphis balloticola* or *Aphis gossypii*

Sapotaceae

Aphis gossypii; *Toxoptera aurantii*, *odinae*

Marantaceae

Aphis gossypii

Myzus persicae

Marcgravaceae

Toxoptera aurantii

Euphorbiaceae

Schoutedenia ralumensis

Labiatae

Aphis gossypii (? – on roots with eggs; Chu, 1949: 100)

[*Aphis frangulae* (or *balloticola*? – Holman and Pintera, 1981)]

Aphis balloticola, *gossypii*; *Cryptomyzus taoi*

Aphis balloticola, *gossypii*; *Aulacorthum solani*;

Cryptomyzus ballota

Marsilea*M. quadrifolia**M. strigosa**M. vestita***Marsileaceae***Idiopterus nephrolepidis; Myzus persicae;**Rhopalosiphum nymphaeae**Rhopalosiphum nymphaeae**Myzus persicae*Key to apterae on *Marsilea*:–

1. Head almost smooth with ANT tubercles weakly developed. SIPH uniformly dusky/dark, clavate. Dorsal cuticle with spicules arranged in polygons *Rhopalosiphum nymphaeae*
- Head spiculose with well-developed ANT tubercles. SIPH at least partly pale, cylindrical or clavate. Dorsal cuticle smooth or wrinkled and tuberculate, without spicules **2**
2. SIPH pale, sometimes dark at apices, slightly clavate. Dorsal hairs short and blunt, without tuberculate bases. Head and ANT I–II pale *Myzus persicae*
- SIPH black on basal part, contrastingly pale distally. Dorsal hairs thick and expanded apically, arising from tuberculate bases. Head and ANT I–II black *Idiopterus nephrolepidis*

Marsypianthes*M. chamaedrya***Labiatae***Aphis gossypii; Myzus ornatus*

Use key to polyphagous aphids, p. 1020.

Martynia*M. chamomilla**M. louisiana**M. lutea***Martyniaceae***Aphis gossypii**Aphis gossypii; Macrosiphum euphorbiae;**Myzus persicae**Nasonovia ribisnigri*Key to apterae on *Martynia*:–

- Thoracic spiracles greatly enlarged, rounded, much larger than abdominal spiracles. ANT PT/BASE 7.0–11.4, usually more than 8.0. ANT III with 14–36 rhinaria *Nasonovia ribisnigri*
- Thoracic spiracles similar in size to abdominal ones. ANT PT/BASE less than 6. ANT III with 0–10 rhinaria go to key to polyphagous aphids, p. 1020

Maruta see *Anthemis***Masdevallia***Masdevallia* sp.**Orchidaceae***Sitobion pseudoluteum**Mastichodendron* see *Sideroxylon***Matayba***M. oppositifolia***Sapindaceae***Toxoptera aurantii***Matricaria (incl. Chamomilla, Lepidotheca)***M. ambigua**M. chamomilla***Compositae***Brachycaudus helichrysi**Aphis craccivora, dudichi, fabae, gossypii, spiraeicola, vandergooti; Brachycaudus cardui, helichrysi;**Macrosiphoniella tapuskae; Macrosiphum euphorbiae;**Metopeurum matricariae; Myzus ornatus, persicae*

HOST LISTS AND KEYS

<i>M. disciformis</i>	<i>Aphis fabae</i>
<i>M. discoidea</i>	<i>Aphis solanella</i> ; <i>Brachycaudus cardui</i> , <i>lateralis</i> ; <i>Coloradoa inodorella</i>
<i>M. inodora</i> see <i>Tripleurospermum</i> <i>inodorum</i>	
<i>M. maritima</i> see <i>Tripleurospermum</i> <i>maritimum</i>	
<i>M. matricarioides</i> (incl. <i>suaveolens</i>)	<i>Aphis fabae</i> , <i>gossypii</i> , <i>nasturtii</i> , <i>solanella</i> , <i>spiraecola</i> , <i>vandergooti</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus cardui</i> , <i>helichrysi</i> ; <i>Macrosiphoniella abrotani</i> , <i>tapuskae</i> <i>Brachycaudus helichrysi</i>
<i>M. parthenoides</i>	
<i>M. perforata</i> see <i>Tripleurospermum</i> <i>perforatum</i>	
<i>M. recutita</i>	<i>Aphis fabae</i> , [<i>terricola</i>], <i>vandergooti</i> ; <i>Brachycaudus cardui</i> ; <i>Macrosiphoniella tapuskae</i>
<i>M. suaveolens</i> see <i>matricarioides</i>	
<i>M. tenuifolia</i>	<i>Aphis fabae</i>
<i>M. tetragonasperma</i>	<i>Aphis fabae</i>
<i>Matricaria</i> spp.	<i>Aphis</i> (<i>Pergandeida</i>) sp. (Turkey; BMNH colln, leg. G. Remaudière); <i>Macrosiphoniella silvestrii</i> ; <i>Myzus ascalonicus</i> , <i>cymbalariae</i> ; <i>Trama troglodytes</i>

Key to apterae on *Matricaria* and *Tripleurospermum*:-

1. ANT PT/BASE less than 0.5. Eyes composed of only 3 facets. SIPH absent 2
– ANT PT/BASE more than 0.7. Eyes multi-faceted. SIPH present 3
2. Hind tarsi greatly elongated, more than 0.6× hind tibiae. Body and appendages densely covered in fine hairs. No discrete wax glands *Trama troglodytes*
– Hind tarsi normal. Body with rather sparse, short hairs. Posterior part of abdomen with paired wax glands *Pemphigus* sp(p)
3. Cauda helmet-shaped or triangular, shorter than or not more than 1.25× longer than its basal width in dorsal view 4
– Cauda tongue- or finger-shaped, more than 1.5× longer than its basal width 8
4. Cauda helmet-shaped, constricted at base and rounded at apex. Spiracular apertures large and rounded. SIPH with a subapical annular incision 5
– Cauda triangular, tapering, without any basal constriction. Spiracular apertures small, oval or reniform. SIPH without any distinct subapical annular incision 7
5. Dorsum without dark markings. Mesosternum without mammariform processes. R IV+V 0.10–0.15 mm, 1.2–1.3× HT II. SIPH pale, smooth, 0.8–2.0× cauda *Brachycaudus helichrysi*
– Dorsum with an extensive black shield. Mesosternum with a pair of dark mammariform processes. R IV+V 0.17–0.24 mm, 1.4–2.0× HT II. SIPH dark, imbricated, 1.7–3.4× cauda 6
6. Hairs on ABD TERG 8 are 30–61 µm long. Longest hairs on hind femur 10–25 µm long *Brachycaudus lateralis*
– Hairs on ABD TERG 8 are at least 70 µm long. Longest hairs on hind femur more than 25 µm long *Brachycaudus cardui*
7. SIPH very short, black, cylindrical, much shorter than R IV+V. ANT PT/BASE 0.8–1.3. ABD TERG 1 and 7 with large marginal tubercles (MTu) *Aphis dudichi*

- SIPH pale or dark, narrow at base, somewhat swollen on distal half, longer than R IV+V. ANT PT/BASE 1.3–1.9. ABD TERG 1 and 7 without MTu *Coloradoa inodorella*
- 8.** SIPH with a distal zone of polygonal reticulation **9**
- SIPH without any polygonal reticulation **16**
- 9.** SIPH 0.6–1.3× cauda, and reticulated on distal 0.40–0.67 of length **10**
- SIPH 1.6–2.3× cauda, and reticulated on distal 0.12–0.33 **14**
- 10.** ANT, legs mostly pale, or pale on at least basal part of ANT III, bases of femora and middle sections of tibiae. SIPH pale at least basally. Cauda pale or dusky **11**
- ANT, legs, SIPH and cauda all wholly dark **12**
- 11.** SIPH more than 0.9× head width across (and including) eyes, and at least as long as cauda, which bears 18–33 hairs *Macrosiphoniella oblonga*
- SIPH less than 0.9× head width across eyes and usually shorter than cauda, which bears 12–28 hairs *Macrosiphoniella abrotani*
- 12.** SIPH thicker than and 1.1–1.3× cauda. Dorsal abdomen with paired dark spinal sclerites, each bearing 2–3 hairs *Macrosiphoniella silvestrii*
- SIPH thinner than and 0.6–1.0× cauda. Dorsum with or without dark sclerites **13**
- 13.** All dorsal abdominal hairs arising from conspicuous dark scleroites (Figure 5g). PT 3.3–4.3× BASE VI. R IV+V 0.9–1.2× HT II *Macrosiphoniella millefolii*
- Dorsal abdominal hairs not arising from dark scleroites. PT 2.9–3.5× BASE VI. RIV+V 0.7–0.9× HT II *Macrosiphoniella tanacetaria*
- 14.** ANT III with 1–7 (–10) rhinaria. SIPH not flared distally (often with the reticulated part somewhat constricted), but with a distinct flange *Macrosiphum euphorbiae*
- ANT III with 6–26 rhinaria. SIPH flared distally, but with flange undeveloped **15**
- 15.** SIPH mainly pale, broad-based (Figure 5i), 0.25–0.30× BL and 1.8–2.3× cauda, which is tongue-shaped. ANT tubercles well developed *Macrosiphoniella tapuskae*
- SIPH wholly dusky/dark, narrow-based, c.0.2× BL and c.1.6–1.8× cauda, which is elongate triangular. ANT tubercles rather weakly developed *Metopeurum matricariae*
- 16.** ABD TERG 1–4 (–5) and 7 or 1–7 with conical or domed marginal tubercles (MTu) **17**
- MTu either absent or only regularly present on (prothorax and) ABD TERG 1 and 7 **18**
- 17.** SIPH 0.8–1.1× cauda. Longest hairs on ANT III 1.0–3.2× BD III *Aphis lindae*
- SIPH 1.9–2.6× cauda. Longest hairs on ANT III 0.4–0.6× BD III *Aphis vanderhooti*
- 18.** SIPH dark 0.7–0.8× cauda, which is similarly pigmented and bears 6–10 hairs. Dorsal abdomen with variable dorsal dark markings anterior to SIPH. ANT PT/BASE 1.7–2.0 *Aphis (Pergandeida) sp.* (Turkey; BMNH colln)
- SIPH longer than 0.8× cauda and other characters not in that combination
go to key to polyphagous aphids, p. 1020

Matteucia (incl. Pteretis)

M. struthiopteris

Dryopteridaceae

Amphorophora ampullata, *ampullata* ssp. *laingi*;
Macrosiphum adianti, *walkeri*; *Neomyzus circumflexus*

Use key to fern-feeding aphids under *Polypodium*.

HOST LISTS AND KEYS

Matthiola

M. annua see *incana*
M. incana (incl. *annua*)
M. livida
M. odoratissima
Matthiola sp.

Cruciferae

Aphis fabae, gossypii, nasturtii; Brevicoryne brassicae; Lipamyzodes matthiolae; Lipaphis erysimi; Myzus persicae Acyrthosiphon gossypii; Lipaphis erysimi; Myzus persicae Brevicoryne brassicae Aulacorthum solani

Key to apterae on *Matthiola*:-

1. ANT III 2.1–3.7× the short and somewhat barrel-shaped SIPH. Cauda broadly triangular, not longer than its basal width. ANT tubercles undeveloped. Dorsal abdomen with dark markings
Brevicoryne brassicae
 - ANT III 0.8–2.0× SIPH, which are not barrel-shaped. Cauda tongue-shaped or triangular, longer than its basal width. ANT tubercles variably developed, and dorsal abdomen with or without dark markings **2**
2. SIPH pale, very long and attenuated distally, thinner than hind tibiae at their respective midlengths, 0.33–0.45× BL and 2.5–3.5× cauda *Acyrthosiphon gossypii*
 - SIPH pale or dark, thicker and relatively shorter **3**
3. Ventral surfaces of femora scabrous or heavily imbricated. ANT tubercles variably developed, with inner faces divergent; if well developed then the median frontal tubercle is also well developed **4**
 - Ventral surfaces of femora smooth or weakly imbricated or, if scabrous or heavily imbricated, then the ANT tubercles are well developed, with inner faces parallel or apically convergent, and the median frontal tubercle is undeveloped go to key to polyphagous aphids, p. 1020
4. ANT uniformly dusky or dark except for basal part of ANT III. ANT PT/BASE 1.8–2.7. R IV+V 0.6–0.9× HT II. Dorsal cuticle roughened. Cauda dusky or dark, 0.6–0.9× SIPH and 1.2–1.9× R IV+V *Lipaphis erysimi*
 - ANT pale except for much darker apex of ANT V and whole of VI. ANT PT/BASE 2.7–3.5. R IV+V 1.1–1.4× HT II. Dorsal cuticle smooth. Cauda pale, 0.4–0.6× SIPH and 0.6–1.3× R IV+V *Lipamyzodes matthiolae*

Maurandya

M. hendersoni

Scrophulariaceae

Myzus persicae

Mazus

M. japonicus
M. miquelii (incl. var. *stolonifer*)
M. surculosus
Mazus sp.

Scrophulariaceae

Neotoxoptera oliveri
Aleurodaphis blumeae; Schizaphis minuta
Dysaphis microsiphon
Myzus persicae

Key to apterae on *Mazus*:-

1. Eyes with only 3 facets. Body elongate oval, small (BL less than 1.3 mm), sclerotic dorsally, with a crenulate margin due to a continuous fringe of wax glands. SIPH as pores with raised rims. Cauda knobbed, anal plate bilobed *Aleurodaphis blumeae*
 - Eyes multifaceted, and all other characters above also do not apply **2**

2. SIPH dark, only 0.03–0.08 mm long, 0.4–0.8× cauda which is helmet-shaped, distinctly shorter than its basal width. Body and appendages with numerous long hairs. ABD TERG 1–5 with marginal tubercles
Dysaphis microsiphon
– Without that combination of characters 3
3. SIPH tapering/cylindrical, mainly pale with dark apices. Head smooth with ANT tubercles low, not or hardly projecting forward beyond middle part of front of head in dorsal view. ANT with primary rhinaria on ANT V much smaller than that on VI, its diameter 0.3–0.4× width of segment at that point. ABD TERG 1 and 7 with small marginal tubercles
Schizaphis minuta
– Without that combination of characters go to key to polyphagous aphids, p. 1020

Meconopsis

- M. betonicifolia*
- M. cambrica*
- M. paniculata*

Use key to polyphagous aphids, p. 1020.

Papaveraceae

- Aulacorthum solani*; *Myzus persicae*
- Aphis fabae*; *Myzus ornatus*
- Aulacorthum solani*; *Myzus persicae*

Medicago

- M. arborea*
- M. carstiensis*
- M. corniculata*
- M. coronata*
- M. denticulata*
- M. falcata*
- M. galilaea*
- M. hispida*
- M. indica* (?)
- M. laciniata*
- M. lupulina*
- M. marina*
- M. minima*
- M. perennis*
- M. polycarpa*
- M. polymorpha* (incl. var. *vulgaris*)
- M. prostrata*
- M. sativa*

Leguminosae

- Aphis craccivora*, *Aphis* (*Pergandeida*) sp. (France, BMNH colln, leg. F. Leclant); *Therioaphis trifolii*
- Acyrthosiphon pisum*
- Acyrthosiphon pisum*; *Aphis craccivora*;
- Brachycaudus helichrysi*
- Acyrthosiphon gossypii*, *pisum*
- Acyrthosiphon pisum*; *Aphis craccivora*
- Acyrthosiphon kondoi*, *pisum*;
- Aphis coronillae* ssp. *arenaria*, *craccivora*, [*loti*], *medicaginis*;
- Myzus ornatus*; *Therioaphis trifolii*
- Acyrthosiphon pisum*
- Acyrthosiphon pisum*; *Aphis craccivora*;
- Nearctaphis sensoriata*
- Therioaphis rhiemi*
- Acyrthosiphon gossypii*, *pisum*; *Aphis craccivora*
- Acyrthosiphon kondoi*, *pisum*;
- Aphis coronillae* ssp. *arenaria*, *craccivora*, *medicaginis*;
- Myzus ornatus*, *persicae*; *Pemphigus populi*;
- Therioaphis trifolii*
- Acyrthosiphon pisum*; *Aphis craccivora*
- Aphis craccivora*
- Macrosiphum albifrons*
- Therioaphis trifolii*
- Acyrthosiphon pisum*; *Aphis craccivora*, *fabae*;
- Myzus persicae*; *Therioaphis trifolii*
- Acyrthosiphon pisum*
- Acyrthosiphon kondoi*, *loti*, *pisum*;
- [*Anuriella dorsolineata* del Guercio (nomen dubium)];
- Aphis craccivora*, *fabae*, *gossypii*, [*loti*], *medicaginis*,
yangbajaingana; *Brachycaudus helichrysi*;

HOST LISTS AND KEYS

	[<i>Cavariella llhasana</i>]; [<i>Macrosiphoniella maculata</i>]; <i>Macrosiphum creelii</i> , <i>euphorbiae</i> ; <i>Myzus ornatus</i> , <i>persicae</i> ; <i>Nearctaphis bakeri</i> ; [<i>Pemphigus</i> sp. (Zwölfer, 1958)] <i>Therioaphis</i> [<i>cana</i>], <i>riehmi</i> , [<i>luteola</i>], <i>subalba</i> , <i>trifolii</i> , <i>trifolii</i> ssp. <i>maculata</i> , <i>trifolii</i> ssp. <i>ventromaculata</i>
<i>M. trunculata</i>	<i>Acyrtosiphon kondoi</i> , <i>pisum</i> ; <i>Therioaphis trifolii</i> ssp. <i>maculata</i>
<i>M. varia</i>	<i>Acyrtosiphon pisum</i> ; <i>Aphis craccivora</i> ; <i>Aulacorthum solani</i> ; <i>Myzus ascalonicus</i> , <i>ornatus</i> , <i>persicae</i>

Key to apterae on *Medicago*:-

(Couplet 1–3 only can be applied to both apt. and al. For an illustrated, simplified key to common alfalfa aphids see Blackman and Eastop, 2000.)

1. Cauda with a constriction and a knob-like apex. Anal plate bilobed. Dorsal hairs arising from pigmented bases (if apt. then these hairs are mostly long and capitate). Fore coxae greatly enlarged. ANT PT/BASE about 1 2
 - Cauda tongue-shaped, rounded or triangular in dorsal view, or not evident. Anal plate entire. Body hairs blunt or pointed, with or without pigmented bases. Fore coxae normal. ANT PT/BASE either much more or much less than 1 5
2. (All viviparae are al.) ABD TERG 1–5 each with 4 hairs (1 pair spinal, 1 pair marginal) 3
 - (Apt. present and common.) ABD TERG 1–5 each usually with 6 or more hairs 3

Therioaphis riehmii
3. ABD TERG 1–5 each with only 4 long hairs (1 pair spinal, 1 pair marginal), although often with additional much smaller hairs in pleural region 4
 - ABD TERG 1–5 each with 8 or more hairs (2 pairs spinal, 2 marginal) 4

Therioaphis subalba
4. Ventral abdomen with large black submarginal sclerites, each encompassing the bases of 5–6 ventral hairs 5
 - Ventral abdomen without any submarginal sclerites, or with small or fragmented dusky-dark sclerites, each encompassing bases of 1–4 hairs. 5

. . . *Therioaphis trifolii* (incl. ssp. *maculata*)
5. Head with well-developed ANT tubercles, the inner faces of which are smooth and divergent 6
 - ANT tubercles absent or weakly developed, or if well developed then with inner faces steep-sided and scabrous or spiculose 12
6. SIPH with a subapical zone of polygonal reticulation (at least 4–5 rows of closed cells). Hairs on ANT III more than 0.5× BD III 7
 - SIPH without polygonal reticulation. Hairs on ANT III very short and blunt, much less than 0.5× BD III 9
7. ANT III with 17–40 rhinaria. BL 3.2–5.1 mm 8
 - ANT III with 1–10 rhinaria. BL 1.7–4.0 mm 8

Macrosiphum albifrons
8. ANT VI BASE 0.8–1.3× R IV+V 9
 - ANT VI BASE 1.4–2.0× R IV+V 9

Macrosiphum euphorbiae
Macrosiphum creelii
9. SIPH attenuated distally, as thin as or thinner than hind tibiae at their respective midlengths 10
 - SIPH not attenuated distally, thicker than hind tibiae at their respective midlengths 11

MELAMPODIUM

10. SIPH 2.2–3.3× cauda and 0.33–0.45× BL *Acyrtosiphon gossypii*
 – SIPH 1.2–1.9× cauda and 0.22–0.37× BL *Acyrtosiphon pisum*
11. ANT PT/BASE 4.3–6.0, and PT usually 1.6–2.5× cauda. SIPH usually more than 1.7× cauda *Acyrtosiphon kondoi*
 – ANT PT/BASE 3.0–4.2, and PT usually 1.1–1.6× cauda. SIPH usually less than 1.7× cauda *Acyrtosiphon loti*
12. Head densely spiculose or nodulose, **but** ANT tubercles are undeveloped. SIPH with close-set, strongly spiculose imbrication. Cauda helmet-shaped or bluntly triangular, not longer than or only a little longer than its basal width in dorsal view **13**
 – Head smooth or, if densely spinulose or nodulose then with ANT tubercles well developed. SIPH (if present) with normal imbrication. Cauda (if developed at all) tongue- or finger-like, much longer than its basal width **14**
13. Hind tibiae with numerous rounded scent glands. Dorsal abdomen with a black sclerotic shield *Nearctaphis sensoriata*
 – Hind tibiae without scent glands. Dorsal abdomen with small pale to dark hair-bearing sclerites, sometimes fused into larger patches or bars on posterior tergites *Nearctaphis bakeri*
14. Dorsal abdomen with extensive dark sclerotisation, divided into polygons **15**
 – Dorsal abdomen not extensively sclerotised go to key to polyphagous aphids, p. 1020
15. SIPH 0.075–0.08× BL, and 0.65–0.85× cauda. ANT PT/BASE 1.6–2.0 *Aphis (Pergandeida) sp. on Medicago arborea, France*
 – SIPH 0.11–0.25× BL and 1.1–2.1× cauda. ANT PT/BASE 1.7–3.3 **16**
16. ABD TERG 2–6 usually without marginal tubercles (MTu) (range 0–3) *Aphis craccivora*
 – ABD TERG 2–4 (–6) regularly bearing dome-shaped MTu (range 4–10) **17**
17. Cauda with most hairs short, blunt, and often rather straight or adpressed. Dorsal sclerotisation often fragmented intersegmentally. Longest hairs on ANT III 5–8µm, 0.15–0.33× BD III *Aphis medicaginis*
 – Cauda with long, curved, finely-pointed hairs. Dorsal sclerotisation forming a solid patch. Longest hairs on ANT III 8–16µm, 0.36–0.7× BD III **18**
18. SIPH 0.49–0.97× head width across eyes, and 1.0–1.6× ANT III. ANT PT/BASE 2.1–3.0 *Aphis coronillae (incl. ssp. arenaria)*
 – SIPH 0.4–0.5× head width across eyes, and 0.7–0.8× ANT III. ANT PT/BASE 1.9–2.4 *A. yangbajaingana*

Megarrhiza see *Merah*

Meibomia see *Desmodium*

Meineckia (incl. *Peltandra*)

M. virginica

Euphorbiaceae

Rhopalosiphum nymphaeae

Melaleuca see Blackman and Eastop (1994)

Melampodium

Melampodium sp.

Compositae

Uroleucon ambrosiae

Melampyrum

M. latifolium
M. nemorosum
M. pratense

M. roseum
M. sylvaticum
Melampyrum spp.

Scrophulariaceae

[*Aphis melampyrum-latifolium* Rafinesque (invalid)]
Aphis coffeata; *Macrosiphum melampyri*
 [*Aphis melampyrum-latifolium* Rafinesque (invalid)];
Brachycaudus persicae; *Macrosiphum melampyri*;
 [*Uroleucon cichorii*]
 [*Acyrtosiphon kondoi*]
Macrosiphum melampyri
Macrosiphum sp. (Pennsylvania, USA; BMNH colln)

Key to apterae on *Melampyrum*:–

1. Dorsum with an extensive solid black shield covering almost all of metanotum and ABD TERG 1–6. Cauda short and rounded, not longer than its basal width *Brachycaudus persicae*
- Dorsum without an extensive black shield. Cauda tongue- or finger-shaped, longer than its basal width **2**
2. Body oval. ANT much shorter than BL. ANT tubercles very low. Hairs on ANT long and fine, 2–2.5× BD III. SIPH much shorter than distance between their bases, c.1.25× cauda, and without polygonal reticulation *Aphis coffeata**
- Body spindle-shaped. ANT longer than BL. ANT tubercles very well developed. Hairs on ANT 0.7–1.2× BD III. SIPH much longer than the distance between their bases, c.2× cauda, and with sub-apical polygonal reticulation **3**
3. Head dark. SIPH wholly black, and a dark, crescent-shaped antesiphuncular sclerite present. Cauda with 8–9 hairs (4 lateral pairs) *Macrosiphum* sp. (Pennsylvania, BMNH colln)
- Head pale/dusky. SIPH pale on basal part, black towards apices. No dark antesiphuncular sclerite. Cauda with 10–17 hairs (5 lateral pairs) *Macrosiphum melampyri*

Melandrium see *Silene*

Melanoselinum

M. decipiens

Umbelliferae

Cavariella aegopodii; *Dysaphis foeniculus*

Key to apterae on *Melanoselinum*:–

- ABD TERG 8 with a backwardly-directed process above cauda. ANT PT/BASE 0.64–1.25. Cauda tongue-shaped, clearly longer than its basal width. Spinal tubercles (STu) absent. Longest hairs on ANT III 0.3–0.4× BD III *Cavariella aegopodii*
- No supracaudal process. ANT PT/BASE 2.0–3.3. Cauda helmet-shaped, not longer than its basal width. STu present. Longest hairs on ANT III 1.0–2.1× BD III *Dysaphis foeniculus*

Melanthera

M. brownei
M. confusa see *hastata*
M. deltoidea
M. hastata
Melanthera spp.

Compositae

Aphis gossypii; *Uroleucon compositae*
Aphis gossypii, *spiraecola*
Aphis spiraecola; *Uroleucon ambrosiae*
Ipuka melantherae (as *Aulacorthum* sp.n.; van Harten, 1972a);
Myzus ornatus

Key to apterae on *Melanthera*:-

- Secondary rhinaria present on ANT III-IV or III-V, distributed III 7-17, IV 1-14, V 0-2, with those on III more numerous on distal half, and none on basal 0.2. ANT PT/BASE 6.7-8.5. ANT black beyond base of III. SIPH black, 2.2-2.6× cauda *Ipuka melantherae*
- Secondary rhinaria absent, or if present then on ANT III only, and more numerous on basal half. Other characters not in above combination go to key to polyphagous aphids, p. 1020

Melanthesa* see *Breynia***Melastoma***

M. affine
M. candidum
M. indica
M. malabathricum
Melastoma sp.

Aphis gossypii
Aphis gossypii
Aphis nasturtii, spiraeicola
Aphis gossypii
Aulacorthum solani

Melastomaceae

Use key to polyphagous aphids, p. 1020.

Melia* see Blackman and Eastop (1994)**Melianthemum* (incl. *Smilacina*)**

M. racemosa
Melianthemum sp.

Macrosiphum pechumani
Illinoia wahnaga

ConvallariaceaeUse key to apterae on *Maianthemum*.***Melianthus***

M. major
M. minor

Myzus persicae
Myzus persicae

Melianthaceae***Melica***

M. altissima
M. bauhinii
M. bulbosa
M. penicillaris
Melica sp.

Sitobion fragariae
Rhopalosiphum padi
Forda formicaria
Rhopalosiphum padi
Sitobion avenae

GramineaeUse key to apterae of grass-feeding aphids under *Digitaria*.***Melicoccus***

M. bijuga

Aphis craccivora

Sapindaceae***Melicytus* (incl. *Hymenanchera*)**

M. dentata

Myzus persicae

Violaceae***Melilotus***

M. alba

Leguminosae
Acyrtosiphon churchillense, kondoi, pisum;
Aphis comosa, craccivora, fabae, gossypii, [loti], middletonii;
Macrosiphum euphorbiae;
Nearctaphis bakeri, californica, crataegifolii ssp.
occidentalis, nigrescens; Therioaphis riehmii, trifolii

HOST LISTS AND KEYS

<i>M. altissima</i>	<i>Aphis craccivora</i> ; <i>Pemphigus populi</i>
<i>M. arenaria</i>	<i>Aphis craccivora</i> ; <i>Therioaphis riehmii</i>
<i>M. arvensis</i> see <i>officinalis</i>	
<i>M. dentata</i>	<i>Aphis craccivora</i>
<i>M. indica</i>	<i>Acyrtosiphon pisum</i> ; <i>Aphis craccivora</i> , <i>gossypii</i> ; <i>Therioaphis riehmii</i>
<i>M. italica</i>	<i>Aphis craccivora</i>
<i>M. macrorrhiza</i>	[<i>Pemphigus</i> sp. – <i>populi</i> ?]
<i>M. officinalis</i> (= <i>arvensis</i>)	<i>Acyrtosiphon kondoi</i> , <i>ononis</i> , <i>pisum</i> ; <i>Aphis craccivora</i> , <i>fabae</i> , <i>medicaginis</i> ; <i>Therioaphis riehmii</i>
<i>M. parviflora</i>	<i>Aphis craccivora</i>
<i>M. segetalis</i>	<i>Acyrtosiphon pisum</i> ; <i>Aphis craccivora</i> ; <i>Therioaphis riehmii</i>
<i>M. suaveolens</i>	<i>Aphis craccivora</i> ; <i>Therioaphis riehmii</i> , <i>subalba</i> , <i>trifolii</i>
<i>M. sulcata</i>	<i>Aphis craccivora</i>
<i>Melilotus</i> spp.	<i>Acyrtosiphon gossypii</i> ; <i>Aphis</i> (<i>Pergandeida</i>) sp. (Iran, BMNH colln, leg. SH Hodjat); <i>Aulacorthum solani</i> ; <i>Myzus persicae</i>

Key to apterae on *Melilotus*:–

(Couplet 1–2 only can be applied to both apt. and al.)

1. Cauda with a constriction and a knob-like apex. Anal plate bilobed. Dorsal hairs arising from pigmented bases (if apt. then these hairs are mostly long and capitate). Fore coxae greatly enlarged. ANT PT/BASE about 1 2
 - Cauda tongue-shaped, rounded or triangular in dorsal view, or not evident. Anal plate entire. Body hairs blunt or pointed, with or without pigmented bases. Fore coxae normal. ANT PT/BASE either much more or much less than 1 4
2. (All viviparae are al.) ABD TERG 1–7 each with 4 hairs 16–26µm long (1 pair spinal, 1 pair marginal) Therioaphis riehmii
 - (Apt. present and common.) ABD TERG 1–7 each usually with more than 4 hairs, the longest of which are more than 26µm long 3
3. ABD TERG 1–5 each with only 4 long hairs (2 spinal, 2 marginal), although often with additional much smaller hairs in pleural region Therioaphis subalba
 - ABD TERG 1–5 each with 8 or more hairs (2 pairs spinal, 2 pairs marginal) Therioaphis trifolii
4. Head with well-developed ANT tubercles, the inner faces of which are smooth and divergent 5
 - ANT tubercles absent or weakly developed, or if well developed then with inner faces steep-sided and scabrous or spiculose 10
5. SIPH with a subapical zone of polygonal reticulation (at least 4–5 rows of closed cells). Hairs on ANT III more than 0.5× BD III Macrosiphum euphorbiae
 - SIPH without polygonal reticulation. Hairs on ANT III very short and blunt, much less than 0.5× BD III 6
6. SIPH gradually tapering, not attenuate distally, thicker than hind tibia at their respective midlengths. ANT BASE VI.1.1–1.8× R IV+V 7
 - SIPH very attenuate distally, thinner than hind tibiae at their respective midlengths. ANT BASE VI 1.5–3.0× R IV+V 8

7. ANT III with (2–) 4–11 rhinaria in a row on basal half. SIPH 1.2–1.6× cauda
Acyrtosiphon churchillense
 – ANT III with 1 (–3) rhinaria near base. SIPH 1.6–2.1× cauda
Acyrtosiphon kondoi
8. SIPH 2.2–3.3× cauda
Acyrtosiphon gossypii
 – SIPH 1.2–1.9× cauda **9**
9. Cauda with 7–13 (–14) hairs. ANT BASE VI 1.8–3.0× R IV+V, which is 0.6–0.85× HT II and bears 3–7 (–8) accessory hairs
Acyrtosiphon pisum
 – Cauda with 11–23 hairs. ANT BASE VI 1.5–2.3× R IV+V, which is 0.75–0.95× HT II and bears (6–) 8–12 accessory hairs
Acyrtosiphon ononis
10. Head spiculose or nodulose, **but** ANT tubercles are undeveloped. SIPH with close-set, strongly spiculose imbrication **11**
 – Head smooth or, if spiculose or nodulose then with ANT tubercles well developed. SIPH (if present) with normal imbrication **14**
11. Dorsal abdomen with extensive sclerotisation, variably developed but at least with complete broad dark cross-bands covering most of ABD TERG 5–8. ANT III (1.0–) 1.1–1.5× PT **12**
 – Dorsal abdomen with at most with dark bars on ABD TERG 5–8, more anterior segments having small dark or pale brown sclerites at bases of hairs. ANT III 0.7–1.1 (–1.2)× PT **13**
12. ABD TERG 3–5 or 3–6 covered by an almost solid dark shield. First tarsal segments with 4 hairs
Nearctaphis nigrescens
 – At most ABD TERG 4–5 with solidly fused cross-bands, those on 3 and 6 being free. First tarsal segments with (2)–3 hairs
Nearctaphis californica
13. SIPH pale. R IV+V 0.09–0.13 mm long, 1.0–1.1× HTII, with 2–3 accessory hairs
Nearctaphis bakeri
 – SIPH dark. R IV+V 0.14–0.18 mm long, 1.2–1.5× HT II., and usually with 4 accessory hairs
Nearctaphis crataegifolii ssp. *occidentalis*
14. Dorsal abdomen with variably developed dark sclerotisation, divided by thin lines into a polygonal reticulation; this may form a solid shield, or be reduced and fragmented into patches. Cauda dark, much longer than its basal width, with 4–11 hairs **15**
 – Dorsal abdomen either membranous, or not extensively sclerotised anterior to SIPH, or if with dark segmentally divided cross-bars and marginal sclerites then cauda is bluntly triangular and bears 12–17 hairs
 go to key to polyphagous aphids, p. 1020
15. ABD TERG 2–4 (–6) regularly bearing dome-shaped marginal tubercles (range 4–10) like those on 1 and 7. Longest hairs on ANT III 5–8 µm, 0.15–0.33× BD III. Cauda with most hairs short, blunt, and often rather straight or adpressed
Aphis medicaginis
 – ABD TERG 2–6 with or without MTu (range 0–8), but when present these are smaller than those on ABD TERG 1 and 7, and often papilliform. Longest hairs on ANT III 8–49 µm, 0.25–1.4× BD III. Cauda with long, curved, finely pointed hairs **16**
16. Longest hair on ANT III 18–48 µm, 0.67–1.38× BD III. MTu usually present on at least some of ABD TERG 2–6. Cauda with 6–11 hairs
Aphis comosa
 – Longest hair on ANT III 8–18 µm, 0.25–0.75 (usually 0.5–0.6)× BD III. MTu rarely present on ABD TERG 2–6. Cauda with 4–9 hairs **17**
17. ANT PT/BASE 1.6–1.8. (Ovip. with ANT PT/BASE 1.3–1.7)
Aphis (Pergandeida) sp. (Iran, BMNH colln, leg. S.H. Hodjat)
 – ANT PT/BASE (1.7–) 1.8–2.5. (Ovip. with ANT PT/BASE 1.8–2.5)
Aphis craccivora

HOST LISTS AND KEYS

***Melinis* (incl. *Rhynchelytron*)**

M. minutiflora

M. repens see *Tricholaena rosea*

Melinis sp.

Sitobion graminis

Sipha flava

Gramineae

Use key to apterae of grass-feeding aphids under *Digitaria*.

Meliosma see Blackman and Eastop (1994)

Melissa

M. officinalis

Melissa spp.

Labiatae

Eucarazzia elegans; *Macrosiphum euphorbiae*;

Ovatus crataegarius

Aphis gossypii; *Aulacorthum solani*; *Myzus ornatus*

Use key to apterae on *Mentha*.

Melissitus see *Trigonella*

Melittis

Melittis melissophyllum

Labiatae

Cryptomyzus ballotae

Melocanna

M. bambusoides

Gramineae

Astegopteryx singaporensis (see Blackman and Eastop, 1994)

(use key to apt. on *Bambusa* in Blackman and Eastop, 1994).

***Melochia* (incl. *Riedelea* Vent nec Oliv.)**

M. corchorifolia

M. melissaeifolia

M. nodiflora

M. parviflora

Aphis gossypii

Aphis gossypii

Aphis gossypii

Aphis craccivora

Sterculiaceae

Use key to polyphagous aphids, p. 1020.

Melospermum lapsus for *Molopospermum*? (q.v.)

Melothria

M. guadelupensis

M. japonica

M. maderaspatana

Aphis gossypii

Aphis nerii

Aphis gossypii

Cucurbitaceae

Use key to polyphagous aphids, p. 1020.

Memecylon see Blackman and Eastop (1994)

Mentha

M. aquatica

Labiatae

Aphis affinis, *fabae*; *Aulacorthum solani*;

Kaltenbachiella pallida; *Ovatus crataegarius*, *mentharius*

<i>M. arvensis</i> (incl. <i>piperascens</i> , <i>vulgaris</i>)	<i>Aphis affinis</i> , <i>craccivora</i> , <i>gossypii</i> , <i>middletonii</i> , <i>origani</i> ; <i>Aulacorthum solani</i> ; [<i>Capitophorus elaeagni</i>]; [<i>Cinara pinihabitans</i>]; <i>Kaltenbachiella pallida</i> ; <i>Macrosiphum perillae</i> ; <i>Ovatus crataegarius</i> , <i>mentharius</i>
<i>M. asiatica</i>	<i>Aphis affinis</i> ; <i>Dysaphis microsiphon</i> ; <i>Ovatus crataegarius</i>
<i>M. canadensis</i> (= <i>arvensis</i> var. <i>villosa</i>)	<i>Aphis middletonii</i> ; <i>Ovatus crataegarius</i> , <i>nipponicus</i>
<i>M. citrata</i>	<i>Macrosiphum euphorbiae</i> ; <i>Ovatus crataegarius</i>
<i>M. crispa</i>	<i>Ovatus crataegarius</i>
<i>M. gentilis</i>	<i>Ovatus crataegarius</i>
<i>M. haplocalyx</i>	[<i>Kaltenbachiella pallida</i> ssp. <i>dongtaiensis</i>]
<i>M. hirsuta</i>	[<i>Aphis tentans</i> Walker (nomen dubium)]; <i>Myzus persicae</i> ; <i>Ovatus crataegarius</i>
<i>M. japonica</i>	<i>Ovatus crataegarius</i>
<i>M. longifolia</i>	<i>Aphis affinis</i> , <i>fabae</i> ; <i>Eucarazzia elegans</i> ; [<i>Hyadaphis coriandri</i>]; <i>Kaltenbachiella pallida</i> ; <i>Ovatomyzus chamaedrys</i> ; <i>Ovatus crataegarius</i> , <i>mentharius</i> ; [<i>Rhopalosiphum maidis</i>]
<i>M. ×piperita</i>	<i>Aphis affinis</i> , <i>gossypii</i> , <i>nasturtii</i> , <i>pulegii</i> ; <i>Kaltenbachiella pallida</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Ovatus crataegarius</i> , <i>mentharius</i>
<i>M. pulegium</i>	<i>Aphis pulegii</i> ; <i>Aulacorthum solani</i> ; <i>Myzus cymbalariae</i> ; <i>Ovatus crataegarius</i>
<i>M. rotundifolia</i>	<i>Aphis affinis</i> , <i>gossypii</i> ; <i>Eucarazzia elegans</i> ; <i>Myzus ornatus</i> ; <i>Ovatus crataegarius</i>
<i>M. spicata</i> see <i>viridis</i>	
<i>M. suaveolens</i>	<i>Aphis affinis</i> , <i>fabae</i> , <i>gossypii</i> ; <i>Eucarazzia elegans</i> ; <i>Kaltenbachiella pallida</i> ; <i>Myzus ornatus</i> ; <i>Ovatus crataegarius</i>
<i>M. sylvestris</i>	<i>Aphis affinis</i> , [<i>capsellae</i>], [<i>clinopodii</i>], <i>gossypii</i> , <i>origani</i> ; <i>Brachycaudus helichrysi</i> (? – as <i>Acaudus menthaecola</i> Nevsky); <i>Dysaphis microsiphon</i> ; <i>Ovatus crataegarius</i> , <i>mentharius</i>
<i>M. viridis</i> (= <i>spicata</i>)	<i>Aphis affinis</i> , <i>gossypii</i> ; <i>Aulacorthum solani</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus ascalonicus</i> , <i>ornatus</i> ; <i>Ovatus crataegarius</i> , <i>mentharius</i>
<i>Mentha</i> spp.	<i>Aphis brevitarsis</i> , <i>spiraecola</i> ; <i>Cryptaphis menthae</i> ; [<i>Myzus</i> sp. nr <i>amygdalinus</i> (Börner, 1952: 130)]; <i>Ovatus</i> sp. (England, BMNH colln, leg. H.L.G. Stroyan); [<i>Pemphigus mordvilkoii</i>]; [<i>Rhopalosiphoninus solani</i>]

Key to apterae on *Mentha*:-

(See Blackman and Eastop, 2000, for an illustrated key to aphids on cultivated mint.)

1. ANT usually 4-segmented, 0.12–0.15× BL, with PT/BASE less than 0.5. Eyes 3-faceted. SIPH absent. Legs very short, with fore- and mid-tarsi usually 1-segmented. Dorsal wax glands present on head, thorax and ABD TERG 1–8, comprising facets surrounding an elongate central area
Kaltenbachiella pallida
- ANT 5- or 6-segmented, more than 0.5× BL, with PT/BASE more than 1. Eyes multifaceted, SIPH present, tarsi 2-segmented and wax glands not evident

HOST LISTS AND KEYS

2. SIPH strongly swollen, with maximum diameter of swollen part more than 2× minimum diameter of stem, smooth except for a little subapical polygonal reticulation (see Figure 48a). SIPH 5.4–8.2× cauda *Eucarazzia elegans*
 - SIPH not swollen or much less swollen, and less than 3.5× cauda **3**
3. Head spiculose, at least on ventral surface **4**
 - Head without spicules **13**
4. Dorsal abdomen wholly blackish sclerotic except around bases of SIPH. Dorsal hairs long, the longest more than 2× ANT BD III, with somewhat expanded apices. ANT III with 4–5 small rhinaria distributed over most of its length *Cryptaphis menthae**
 - Dorsal abdomen not wholly blackish sclerotic. Dorsal hairs short and blunt, not more than 0.5× ANT BD III. ANT III without rhinaria or with 1–2 rhinaria near base **5**
5. SIPH slightly but distinctly swollen on distal half **6**
 - SIPH tapering or cylindrical, without any trace of swelling on distal half **8**
6. SIPH 0.82–1.34× ANT III *Myzus persicae*
 - SIPH 0.54–0.81× ANT III **7**
7. Inner faces of ANT tubercles approximately parallel in dorsal view. SIPH almost smooth or weakly imbricated, with narrowest part of basal ‘stem’ not wider than hind tibia at midlength. Dorsal cuticle smooth or slightly wrinkled *Myzus ascalonicus*
 - Inner faces of ANT tubercles with convergent apices. SIPH heavily imbricated or scabrous, with narrowest part of stem a little wider than hind tibia at midlength. Dorsal cuticle scaly *Myzus cymbalariae*
8. Dorsal abdomen with a conspicuous pattern of dark intersegmental markings. ANT PT/BASE 1.7–2.8, and PT 0.7–0.9× ANT III *Myzus ornatus*
 - Dorsal abdomen without a conspicuous pattern of dark intersegmental markings. ANT PT/BASE (2.2–) 3.2–6.0, and PT (0.8–) 1.0–1.9× ANT III. **9**
9. ANT III usually with 1–2 small rhinaria near base. ANT tubercles approximately parallel-sided in dorsal view, without forwardly-directed processes *Aulacorthum solani*
 - ANT III without rhinaria. ANT tubercles bearing forwardly directed processes **10**
10. Inner side of ANT I and ANT tubercles each with a forwardly directed process, that on the ANT tubercle being longer than its basal width in dorsal view. SIPH attenuated and cylindrical on its distal half, about as thick as hind tibia at their respective midlengths *Ovatus mentharius*
 - Inner side of ANT I without a forwardly directed process, and that on the ANT tubercle shorter than its basal width in dorsal view. SIPH not attenuated, thicker than hind tibiae at their respective midlengths **11**
11. SIPH dusky/dark, usually somewhat curved, 6–7× longer than their width at midlength *Ovatus nipponicus*
 - SIPH pale, sometimes darker at apices; rather straight, 8–12× their width at midlength **12**
12. R IV+V c.0.6–0.7× ANT VI BASE, and about equal in length to HT II. ANT PT/BASE c.2.2–2.3 *Ovatus* sp. (England, BMNH colln)
 - R IV+V 1.1–1.4× ANT VI BASE, and 1.3–1.7× HT II. ANT PT/BASE 4.0–6.0 *Ovatus crataegarius*
13. ANT tubercles well developed **14**
 - ANT tubercles absent or weakly developed, not projecting beyond middle of head in dorsal view **16**

14. SIPH without subapical polygonal reticulation, with slight subapical swelling (see Figure 50e), 2.3–2.8× cauda, which is tongue-shaped with a basal constriction *Ovatomyzus chamaedryis*
 – SIPH with a subapical zone of polygonal reticulation, 1.7–2.5× cauda, which is finger-like, without a basal constriction **15**
15. SIPH dark. Abdomen with continuous broad dark marginal stripes, united by a dark band across ABD TERG 6. Hairs on ANT III less than 0.5× BD III *Macrosiphum perillae**
 – SIPH pale or dusky. Abdomen without any dark markings. Hairs on ANT III more than 0.5× BD III *Macrosiphum euphorbiae*
16. Cauda helmet-shaped, shorter than its basal width, with 4–6 hairs. Marginal tubercles (MTu) either absent or present on ABD TERG 1–5, but never on ABD TERG 7 **17**
 – Cauda tongue-shaped or bluntly triangular, if short then with 15–20 hairs. ABD TERG 1 and 7 with well-developed MTu **18**
17. SIPH imbricated, very small, 0.03–0.08 mm. Well-developed MTu present on ABD TERG 1–5. Spiracular apertures reniform. Dark dorsal abdominal cross-bands often present *Dysaphis microsiphon*
 – SIPH smooth, 0.08–0.14 mm. MTu absent. Spiracular apertures rounded. Never with dark dorsal markings *Brachycaudus helichrysi*
18. Dorsal abdomen with an extensive solid black sclerite centred on ABD TERG 4–5. Cauda black like SIPH, tongue-shaped, rather pointed and bearing 4–7 hairs *Aphis craccivora*
 – Dorsal abdomen with or without dark markings, but without an extensive solid black sclerite. Cauda pale or dark, but if black then with more than 10 hairs **19**
19. Cauda black with 11–25 hairs **20**
 – Cauda pale or dark with 4–11 hairs **21**
20. Cauda bluntly triangular, about as long as its basal width or only a little longer. ANT PT 1–1.5× R IV+V. ANT III usually with 1–12 rhinaria on distal half *Aphis middletonii*
 – Cauda tongue-shaped, much longer than its basal width. ANT PT 1.7–3.2× R IV+V. ANT III without rhinaria except in alatiform specimens) *Aphis fabae*
21. ANT 5-segmented. BL 0.6–1.0 mm hot weather forms of subsequent spp. (not separately identifiable) **22**
 – ANT 6-segmented. BL usually more than 1 mm
22. SIPH pale with dark apices *Aphis nasturtii*
 – SIPH uniformly dusky/dark **23**
23. R IV+V 3.3–4.1× HT II, which is greatly reduced, only 0.035–0.04 mm long. ANT PT/BASE 1.3–1.8. SIPH 0.8–1.1× cauda *Aphis brevitaris*
 – R IV+V 1.0–1.6× HT II. ANT PT/BASE 1.8–3.0. SIPH 0.9–2.1× cauda **24**
24. Cauda pale, dusky or dark, but usually distinctly paler than SIPH **25**
 – Cauda dusky or dark, with similar pigmentation to SIPH **26**
25. ABD TERG 7 and 8 without dark transverse bands, and intersegmental muscle sclerites are unpigmented. MTu on ABD TERG 7 small, with diameter less than 0.5× that of SIPH at midlength. ANT PT/BASE 2.1–3.2 *Aphis gossypii*
 – ABD TERG 8, or 7 and 8, usually with thin dusky/dark transverse band(s), and intersegmental muscle sclerites are often dark. MTu on ABD TERG 7 large, with diameter more than 0.5× diameter of SIPH at midlength. ANT PT/BASE 1.8–2.6 *Aphis origani*

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26. Hairs on ABD TERG 7 finely pointed to blunt, maximally 22–46 µm long, and on ABD TERG 8 finely pointed, maximally 26–66 µm. SIPH 0.15–0.30 mm long, 1.15–2.33× cauda. ANT III 0.17–0.40 mm, 0.83–1.67× PT. ANT III with 0–6 rhinaria (ANT IV of al. usually without rhinaria; mean 0.1)

Aphis affinis

- Hairs on ABD TERG 7 blunt, maximally 12–22 µm long, and on ABD TERG 8 also blunt, maximally 18–44 µm. SIPH 0.13–0.21 mm long, 0.9–1.7× cauda. ANT III 0.13–0.20 mm, 0.68–1.11× PT. ANT III without rhinaria. (ANT IV of al. with 0–5 rhinaria; mean 1.8)

Aphis pulegii

Mentzelia

M. albicaulis

M. dispersa

M. lindleyi

Loasaceae

Macrosiphum euphorbiae, mentzeliae

[aphid (Leonard, 1974: 105)]

Aphis fabae

Key to apterae on *Mentzelia*:-

1. ANT tubercles weakly developed. SIPH black, without polygonal reticulation. Cauda black, with 11–19 hairs *Aphis fabae*
- ANT tubercles well developed, with inner faces smooth and divergent. SIPH pale/dusky or dark only distally, with a subapical zone of polygonal reticulation. Cauda pale with 8–12 hairs **2**
2. R IV+V 0.8–1.0× HT II. SIPH 0.7–1.1× ANT III *Macrosiphum euphorbiae*
- R IV+V 1.2–1.4× HT II. SIPH 1.0–1.4× ANT III *Macrosiphum mentzeliae*

Menyanthes

M. trifoliata

Menyanthes sp.

Menyanthaceae

[*Macrosiphum nasonovi*]; *Rhopalosiphum nymphaeae*

Aphis triglochis

Key to apterae on *Menyanthes*:-

- SIPH swollen on distal half, more than 2× cauda. Dorsal cuticle with spiculose reticulation. ANT PT/BASE 2.3–3.9 *Rhopalosiphum nymphaeae*
- SIPH not swollen, tapering from base to flange, 0.7–1.3× cauda. Dorsal cuticle without spicules. ANT PT/BASE 1.1–2.1 *Aphis triglochis*

Menziesia

M. ferruginea

Ericaceae

Ericaphis wakibae; Illinoia menziesiae

Key to apterae on *Menziesia*:-

- ANT III with 1–5 rhinaria. R IV+V 0.83–0.97× HT II. Tarsi with spinulose imbrication. First tarsal segments usually with 5 hairs. ANT tubercles not spiculose. Tergum membranous, pale. Cauda with 7 (–8) hairs *Illinoia menziesiae*
- ANT III without rhinaria. R IV+V 1.14–1.36× HT II. Tarsi with smooth imbrication. First tarsal segments with 3 hairs. ANT tubercles spiculose. Tergum sclerotic, often dark. Cauda with 5 (–7) hairs *Ericaphis wakibae*

Merah (incl. Megarrhiza)

M. oregana

Cucurbitaceae

Macrosiphum sp. (Leonard, 1974)

Mercurialis*M. annua**Mercurialis* sp.

Use key to polyphagous aphids. p. 1020.

Meriandra*M. benghalensis***Merremia**

One polyphagous aphid species, *Myzus persicae*, is recorded from three *Merremia* spp.; *M. dissecta*, *M. gemella* and *M. tuberosa*.

Mertensia*M. maritima**M. paniculata* (= *sibirica*)*M. sibirica* see *paniculata**Mertensia* sp.**Euphorbiaceae**

Aphis fabae, *gossypii*, *nasturtii*; *Aulacorthum solani*
[*Hayhurstia atriplicis*]
Myzus persicae

Labiatae*Aphis gossypii***Convolvulaceae****Boraginaceae**

Brachycaudus helichrysi;
Macrosiphum sp. (Manitoba, BMNH colln)
Brachycaudus helichrysi; *Macrosiphum niwanistum*
Macrosiphum euphorbiae, *mertensiae*

Key to apterae on *Mertensia*:-

1. Body oval, BL 1.2–2.0mm. Cauda helmet-shaped, not longer than its basal width. SIPH smooth, short and conical, with a subapical annular incision. Spiracular apertures large and rounded
Brachycaudus helichrysi
- Body spindle-shaped, 2.0–4.0mm. Cauda tongue- or finger-shaped. SIPH long, tapering/cylindrical, without a subapical annular incision (usually with polygonal reticulation). Spiracular apertures small and reniform **2**
2. SIPH cylindrical, only a little wider at base than at apex, with indistinct subapical reticulation over less than 0.1 of total length. R IV+V 0.5–0.6× HT II *Macrosiphum niwanistum*
- SIPH tapering from base, c.2× wider at base than at apex, with at least 4–5 rows of polygonal reticulation over more than 0.1 of length. R IV+V 0.75–1.0× HT II **3**
3. SIPH 1.3–1.4mm long, 17–20× longer than their diameter at midlength, and more than 0.36× BL *Macrosiphum* sp. (Manitoba, BMNH colln)
- SIPH 0.6–1.0mm long, 12–16× longer than their diameter at midlength, and less than 0.35× BL **4**
4. ANT III with 7–11 rhinaria extending over more than 0.5 of length. R IV with 6 accessory hairs *Macrosiphum mertensiae*
- ANT III with 1–10 (usually 2–6) rhinaria extending over less than 0.5 of length. R IV with 7–10 accessory hairs *Macrosiphum euphorbiae*

Meryta*M. sinclairii***Mesembryanthemum***M. acinaciforme**M. crystallinum***Araliaceae***Aphis gossypii***Aizoaceae**

Aphis fabae
Aphis fabae; *Dysaphis apiifolia*, *emicis*;
Macrosiphum euphorbiae

HOST LISTS AND KEYS

<i>M. edule</i>	<i>Aphis fabae</i>
<i>M. forskahlei</i>	<i>Aphis craccivora</i>
<i>M. nodiflorum</i>	<i>Aphis fabae</i> ; <i>Dysaphis emicis</i>
<i>M. spectabile</i>	<i>Myzus persicae</i>
<i>Mesembryanthemum</i> spp.	<i>Aphis frangulae</i> , <i>gossypii</i> , <i>nasturtii</i>

Key to apterae on *Mesembryanthemum*:–

1. Cauda helmet-shaped, not longer than its basal width. Paired spinal tubercles (STu) present on head and at least ABD TERG 8. Large marginal tubercles (MTu) present on all or most segments **2**
 - Cauda tongue- or finger-shaped, much longer than its basal width. STu rarely present, and only ever on ABD TERG 7 and 8. MTu absent or only regularly present on prothorax and ABD TERG 1 and 7 go to key to polyphagous aphids, p. 1020
2. Paired STu present on all or most segments. SIPH 0.7–1.1× R IV+V. ANT PT/BASE 1.8–2.8
 - STu present on head and ABD TERG (6–7) –8. SIPH 1.1–1.6× R IV+V. ANT PT/BASE 2.8–4.0
Dysaphis emicis
Dysaphis apiifolia

Mesona

<i>M. procumbens</i>	[<i>Myzus varians</i>]
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Labiatae

Mesosphaerum see *Hyptus*

Mesua see Blackman and Eastop (1994)

Metaplexis

<i>M. japonica</i>	<i>Aphis nerii</i>
<i>M. stauntoni</i>	[<i>Aphis</i> sp. (Davletshina, 1964)]

Asclepiadaceae

Metastelma

<i>M. anegadense</i>	<i>Aphis nerii</i>
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Asclepiadaceae

Metroxylon see Blackman and Eastop (1994)

Meum

<i>M. athamanticum</i>	<i>Cavariella aegopodii</i>
<i>Meum</i> sp.	<i>Aphis fabae</i>

Umbelliferae

Key to apterae on *Meum*:–

- ABD TERG 8 with a backwardly-directed finger-like process above cauda. SIPH and cauda pale, SIPH swollen on distal part. ANT PT/BASE 0.64–1.25 *Cavariella aegopodii*
- No supracaudal process. SIPH and cauda dark. ANT PT/BASE 1.8–3.7 *Aphis fabae*

Michelia see Blackman and Eastop (1994)

Microcitrus

<i>M. australis</i>	<i>Aphis gossypii</i> ; <i>Myzus persicae</i>
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Rutaceae

Use key to polyphagous aphids, p. 1020.

Microcos see Blackman and Eastop (1994)

Microglossa

M. pyrifolia

Compositae

Aphis gossypii; *Aulacorthum solani*

Use key to polyphagous aphids, p. 1020.

Microlaena

M. stipoides

Gramineae

Sitobion miscanthi

Microlepia

M. pyramidata

Dennstaedtiaceae

Idiopterus nephrolepidis

Micromeria (incl. Satureja)

M. graeca

M. varia

Labiatae

Aphis serpylli

Aphis brunellae (?)

Key to apterae on *Micromeria*:-

[Both species are small aphids (BL 1.0–1.6 mm) of the taxonomically difficult *A. frangulae* group normally associated with species in other genera of Labiatae. It is possible that the records from *Micromeria* are of (an)other undescribed species.]

– Cauda pale. Total rostrum length (from base of protractor apodeme) 0.32–0.41 mm. ANT PT/BASE 2.0–3.2. SIPH 0.9–1.9× cauda *Aphis brunellae*

– Cauda dark. Total rostrum length 0.24–0.33 mm. ANT PT/BASE 1.4–2.5. SIPH 0.5–1.3× cauda *Aphis serpylli*

Micropsis

M. discolor (?)

Compositae

Sinomegoura citricola (Raychaudhuri, 1984: 103)

Microseris (incl. Apargidium)

M. autumnalis

Compositae

Uroleucon picridis

Microsorium

Microsorium sp.

Polyodiaceae

Micromyzus katoi

Microstegium (incl. Psilopogon)

M. ciliatum

M. crispulum

M. nudum

M. vimineum

Gramineae

Ceratovacuna panici

Rhopalosiphum rufiabdominale

[*Ceratovacuna* sp. B of Takahashi (1958) (= *lanigerum*?)]

Brachysiphoniella montana; *Ceratovacuna nekoashi*;

Kaochiaoja arthraxonis; *Sitobion kamshaticum*

Use keys to apterae of grass-feeding aphids under *Digitaria*.

Mikania

M. alba

M. cordata

M. cordifolia

Compositae

Aphis spiraeicola; *Toxoptera aurantii*

Aphis spiraeicola

Aphis gossypii, *spiraeicola*; *Neomyzus circumflexus*;

Toxoptera aurantii

HOST LISTS AND KEYS

<i>M. hastata</i>	<i>Myzus persicae</i>
<i>M. micrantha</i>	<i>Aphis coreopsidis</i> , <i>craccivora</i> , <i>gossypii</i> , <i>spiraecola</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Neomyzus circumflexus</i> ; <i>Rhopalosiphum padi</i> ; <i>Toxoptera aurantii</i> ; <i>Uroleucon ambrosiae</i>
<i>M. ranunculifolia</i>	<i>Aulacorthum solani</i> ; <i>Neomyzus circumflexus</i> ; <i>Toxoptera aurantii</i> ; <i>Uroleucon ambrosiae</i>
<i>M. scandens</i>	<i>Aleurodaphis mikaniae</i> ; <i>Aphis gossypii</i> , <i>spiraecola</i> ; <i>Brachycaudus helichrysi</i> ; <i>Myzus persicae</i>

Key to apterae on *Mikania*:-

1. Body elongate oval, sclerotic dorsally, with a crenulate margin due to a continuous fringe of wax glands. SIPH as pores with raised rims. Cauda knobbed, anal plate bilobed *Aleurodaphis mikaniae*
- Body oval or spindle-shaped, BL usually more than 1.5 mm, without a marginal fringe of wax glands. SIPH tubular. Cauda tongue- or finger-shaped, anal plate entire **2**
2. SIPH dark, 0.24–0.40× BL, about twice as long as the much paler cauda. Head, ANT I, II and basal part of III very pale, contrasting with dark rest of ANT *Aphis coreopsidis*
- SIPH pale or dark, but if dark then only up to 0.2× BL. Cauda pale or dark. Head and antennal segments differently pigmented go to key to polyphagous aphids, p. 1020

Milium

M. effusum (incl. *aurea*)

Gramineae

Fortda formicaria; *Metopolophium dirhodum*;
Rhopalosiphum padi

Use key to apterae of grass-feeding aphids under *Digitaria*.

Millettia

M. reticulata

Millettia sp. (vine)

Leguminosae

Aulacophoroides formosana

Aulacophoroides sp. (Hong Kong; BMNH colln, leg. J.H. Martin)

(See Blackman and Eastop (1994) for a key to apterae on *Millettia*.)

Miltonidium

Miltonidium hybrid

Leguminosae

Aulacorthum solani

Mimosa

M. pudica

Leguminosae

Aphis craccivora; *Sitobion mimosae*

Key to apterae on *Mimosa*:-

- Dorsal abdomen without a solid black shield. SIPH with reticulation on distal c.0.2 of length. Cauda pale. ANT PT/BASE 4.0–5.75 *Sitobion mimosae**
- Dorsal abdomen with a solid black shield. SIPH without polygonal reticulation. Cauda black like SIPH. ANT PT/BASE 1.9–2.8 *Aphis craccivora*

Mimulus

M. aurantiacus

M. calycinus (?)

Scrophulariaceae

Aphis costalis

Aphis costalis

<i>M. cardinalis</i>	<i>Macrosiphum euphorbiae</i> ; <i>Nasonovia alpina</i>
<i>M. floribundus</i>	<i>Rhopalosiphum nymphaeae</i>
<i>M. geyri</i> (= <i>jamesii</i>)	<i>Aphis mimuli</i>
<i>M. guttatus</i>	<i>Aphis costalis</i> , [<i>Aphis</i> sp. (Leonard, 1974)]; [<i>Cavariella aegopodii</i>]; <i>Myzodium mimulicola</i>
<i>M. jamesii</i> see <i>geyri</i>	
<i>M. lewisii</i>	<i>Nasonovia</i> sp. (California; BMNH colln, leg. E.O. Essig)
<i>M. luteus</i>	<i>Aulacorthum solani</i>
<i>M. ringens</i>	<i>Aphis mimuli</i>
<i>Mimulus</i> spp.	<i>Macrosiphum euphorbiae</i> ; <i>Neomyzus circumflexus</i>

Key to apterae on *Mimulus*:-

1. SIPH slightly swollen on distal part. ANT, legs, SIPH and cauda all mainly or entirely dark. Dorsal cuticle with a pattern of spicules arranged in polygons *Rhopalosiphum nymphaeae*
- SIPH not swollen distally and/or other characters do not apply 2
2. Head nodulose with both median frontal tubercle and ANT tubercles well developed, so that front of head is W-shaped in dorsal view. Cauda with broad basal part and distinctly narrower distal part *Myzodium mimulicola*
- Head smooth or spiculose. ANT tubercles and median frontal tubercle not both well developed. Cauda not as above 3
3. ANT tubercles weakly developed. ABD TERG 1 and 7 with marginal tubercles (MTu) 4
- ANT tubercles well developed. ABD TERG 1 and 7 without MTu 5
4. R IV+V with 5–9 accessory hairs. SIPH 1.4–1.9× cauda. ANT PT/BASE 1.8–2.3 *Aphis costalis*
- R IV+V with 2 accessory hairs. SIPH 0.7–0.9× cauda. ANT PT/BASE 1.3–1.7 *Aphis mimuli*
5. Spiracular apertures on pro- and metathorax much larger than those on abdomen (which are partially covered by cowl-like opercula). R IV+V 1.6–3.5× HT II and bearing 12–30 accessory hairs. Longest hairs on ANT III 1.1–1.5× BD III. ANT III with 6–26 rhinaria on thickened basal part 6
- Thoracic spiracular apertures not much larger than abdominal ones, R IV+V shorter and less hairy, and ANT III with shorter hairs and fewer or no rhinaria go to key to polyphagous aphids, p. 1020
6. R IV+V 1.8–2.2× HT II. ANT PT/BASE 5.8–6.8 *Nasonovia alpina*
- R IV+V 3.2–3.5× HT II. ANT PT/BASE 3.9–5.5 *Nasonovia* sp., BMNH colln, California

Mimusops see Blackman and Eastop (1994)

Minuartia*M. peploides***Caryophyllaceae***Acyrtosiphon auctum*; *Myzus persicae*Key to apterae on *Minuartia*:-

- Head smooth, with inner faces of ANT tubercles broadly divergent. SIPH cylindrical, 0.85–1.33× cauda. ANT PT/BASE 1.6–2.7 *Acyrtosiphon auctum*
- Head densely spiculose, with inner faces of ANT tubercles steep-sided and apically convergent. SIPH slightly clavate, 1.9–2.5× cauda. ANT PT/BASE 2.8–4.5 *Myzus persicae*

HOST LISTS AND KEYS

Mirabilis

M. jalapa

Nyctaginaceae

Aphis craccivora, *fabae*, *gossypii*, [*oenotherae*], *spiraecola*;
[*Capitophorus hippophaes* ssp. *javanicus*];
Macrosiphum euphorbiae; *Myzus ornatus*, *persicae*;
Neomyzus circumflexus

Use keys to polyphagous aphids, p. 1020.

Miscanthus

M. japonicus

M. purpurascens see *sinensis*

M. sinensis (incl. *purpurascens*)

M. violaceus

Miscanthus spp.

Gramineae

Ceratovacuna lanigera;

Melanaphis sorini (? – as *sacchari*)

Brachysiphoniella montana; [*Cavariella gilbertiae*];

Ceratovacuna lanigera; *Hyalopterus pruni*;

Melanaphis jamatonica, *japonica*, *koreana*, *montana*,
yasumatsui; *Rhopalosiphum maidis*

Hysteroneura setariae; *Pseudaphis sijui*; *Sitobion graminis*

Melanaphis daisenensis, *miscanthi*, *tateyamaensis*;

Pseudoregma alexanderi;

Sitobion avenae, *miscanthi*, [*smilacifoliae*];

Tetraneura fusiformis, *radicicola*

Use key to apterae of grass-feeding aphids under *Digitaria*.

Mitella

M. caulescens

Saxifragaceae

Macrosiphum tolmiea;

Nasonovia (Kakimia) sp. (*stroyani*? – Jensen, 2000: 451)

Use key to apterae on *Tellima*.

Mitracarpus

M. villosus

Rubiaceae

Aphis gossypii

Mnesithea

Mn. granularis

Gramineae

Aphis gossypii

Mnium

Mn. cuspidatum

Mn. hornum

Mn. maximoviczii

Mn. rostratum

Mn. undulatum

Mn. vesicatum

Mniaceae

[*Schlechtendalia chinensis* (imm. sexuparae only)]

Muscaphis escherichi(?); *Pseudacaudella rubida*

[*Schlechtendalia chinensis* (imm. sexuparae only)]

Muscaphis escherichi

Jacksonia papillata; *Muscaphis escherichi*, *musci*

[*Schlechtendalia chinensis* (imm. sexuparae only)]

Use key to apterae of moss-feeding aphids under *Polytrichum*.

Modiola

M. caroliniana

Malvaceae

Myzus persicae

Moehringia*M. trinervia*Use key to apterae on *Stellaria*.**Caryophyllaceae***Aphis sambuci*; *Brachycolus stellariae*;
Macrosiphum stellariae; *Myzus certus***Mohria***M. lepigera***Schizaeaceae***Micromyzus* sp. (2 ovip.)**Molineria***M. capitulata***Hypoxidaceae***Pseudoregma sundanica***Molinia***M. caerulea***Gramineae***Anoecia corni*; *Forda formicaria*;
Hyalopterus amygdali, pruni;
Metopolophium dirhodum;
*Sitobion avenae, fragariae*Use key to apterae of grass-feeding aphids under *Digitaria*.**Molopospermum***M. peloponesiacum***Umbelliferae***Aulacorthum solani*; *Cavariella aegopodii*Key to apterae on *Molopospermum*:-

- ABD TERG 8 with a backwardly-directed finger-like process above cauda. SIPH swollen on distal part.
ANT PT/BASE 0.64–1.25 *Cavariella aegopodii*
- No supracaudal process. SIPH without swelling. ANT PT/BASE 4.0–5.5 *Aulacorthum solani*

Mollugo*M. nudicaulis**M. pentaphylla**M. verticillata***Molluginaceae***Aphis gossypii**Aphis craccivora**Aphis spiraecola*

Use key to polyphagous aphids, p. 1020.

Molucella*M. laevis**M. spinosa***Labiatae***Aphis gossypii*; *Aulacorthum solani*; [*Brevicoryne brassicae*]
Macrosiphum euphorbiae

Use key to polyphagous aphids, p. 1020.

Momordica*M. charantia**M. cochinchinensis**M. femea***Cucurbitaceae***Aphis fabae, gossypii, nasturtii, spiraecola*, [umbrella];
Myzus persicae; *Toxoptera aurantii, odinae*
Aphis gossypii; *Toxoptera aurantii*
Toxoptera aurantii

Use key to polyphagous aphids, p. 1020.

HOST LISTS AND KEYS

Monarda

M. didyma
M. fistulosa (incl. vars
alba, menthifolia)
M. punctata
Monarda sp.

Labiatae

Aphis gossypii; *Macrosiphum euphorbiae*
Aphis fabae, *gossypii*, *neomonardae*; *Aulacorthum solani*;
Hyalomyzus monardae; *Myzus ornatus*; *Ovatus crataegarius*
Aphis gossypii
Aphis middletonii, *nasturtii*;
[*Utamphorophora humboldti*]

Key to apterae on *Monarda*:–

1. ANT PT/BASE less than 1.8. Head with ANT tubercles undeveloped, ABD TERG 1 and 7 with large marginal tubercles (MTu); SIPH pale, R IV+V with 4–7 accessory hairs. *Aphis neomonardae*
- ANT PT/BASE more than 1.8. **If** ANT tubercles are undeveloped and ABD TERG 1 and 7 have MTu **then** SIPH are dark and R IV+V with 2 accessory hairs **2**
2. ANT tubercles well developed with inner faces apically convergent, or bearing apically convergent processes. R IV+V 1.3–1.7× HT II. ANT PT/BASE 3.0–6.0. ANT III without rhinaria. (Al. with secondary rhinaria on ANT IV) **3**
- Without that combination of characters, i.e., **if** ANT tubercles are well developed and apically convergent **then** R IV+V is less than 1.3× HT II and other characters do not all apply
go to key to polyphagous aphids, p. 1020
3. SIPH dark and swollen on distal 0.7. ANT and tibiae dark distally. ANT PT/BASE 3.0–3.5 *Hyalomyzus monardae*
- SIPH pale, tapering/cylindrical. ANT and tibiae pale/dusky. ANT PT/BASE 4.0–6.0 *Ovatus craegarius*

Mondia (incl. *Chlorocodon*)

Mondia sp.

Asclepiadaceae

Aphis nerii

Moneses

M. uniflora

Ericaceae

Aulacorthum pirolacearum (= *rufum*?)

Monnina (= *Monina*)

Monina sp.

Polygalaceae

[*Uroleucon erigeronense*]

Monochoria

M. hastaefolia
M. vaginalis

Pontederiaceae

Rhopalosiphum nymphaeae
Rhopalosiphum nymphaeae

Monotes see Blackman and Eastop (1994)

Montanoa

M. bipinnatifida

Compositae

Aphis gossypii, *nasturtii*, *spiraecola*; *Aulacorthum solani*;
[*Macrosiphoniella sanborni*];
Myzus ornatus, *persicae*, [*siegesbeckicola*];
[*Myzackaia verbasci*]; *Sinomegoura citricola*;
[*Uroleucon* sp. (California, Leonard, 1972a: 111)]

*M. grandiflora**Neomyzus circumflexus*;
Uroleucon ambrosiae ssp. *lizerianum**M. rosei**Myzus persicae**Montanoa* sp.*Aleurodaphis blumeae*See key to apterae on *Carpesium*.**Montbretia see Tritonia****Montezuma***M. speciosissima***Malvaceae***Aphis gossypii***Montia***M. sibirica***Portulacaceae***Aulacorthum solani*;
Macrosiphum claytoniae, *euphorbiae*;
Myzus ascalonicus, *persicae*; *Neomyzus circumflexus*Key to apterae on *Montia*:-

1. Head densely spiculose or nodulose, ANT tubercles with inner faces steep-sided, parallel or apically convergent. SIPH tapering, cylindrical or slightly clavate, without polygonal reticulation
go to key to polyphagous aphids, p. 1020, starting at couplet **5**
- Head smooth or only sparsely spiculose, ANT tubercles with inner faces divergent. SIPH tapering or cylindrical, with a subapical zone of polygonal reticulation **2**
2. Dorsal cuticle sclerotic, wrinkled, pigmented. Longest hair on ANT III 0.4–0.75× BD III. SIPH 2.3–2.7× cauda
Macrosiphum claytoniae
- Dorsal cuticle membranous and pale. Longest hair on ANT III 0.7–1.0× BD III. SIPH 1.7–2.2× cauda
Macrosiphum euphorbiae

Moraea*M. papilionacea**M. robinsoniana***Iridaceae***Macrosiphum euphorbiae*
*Dysaphis tulipae*Use key to apterae on *Iris*.**Moricandia***M. nitens***Cruciferae***Myzus persicae***Morina***M. coulteriana***Morinaceae***Aulacorthum solani*; *Rhopalosiphum staphyleae*

Use key to polyphagous aphids, p. 1020.

Morinda, Moringa see Blackman and Eastop (1994)**Morrenia***M. odorata***Asclepiadaceae***Aphis gossypii*; *Myzus persicae*

Use key to polyphagous aphids, p. 1020.

HOST LISTS AND KEYS

Morus see Blackman and Eastop (1994)

Mosla

One polyphagous aphid species, *Aphis gossypii*, is recorded from three *Mosla* spp.: *M. formosana*, *M. japonica* and *M. punctulata*.

'Mosses'

See under *Polytrichum* for a general key to apterae on mosses.

Mozartia see *Myrcia*

Mucuna (incl. *Stizolobium*)

M. deeringianum

M. pruriens

Use key to polyphagous aphids, p. 1020.

Muehlenbeckia

M. australis

M. complexa

Muehlenbeckia spp.

Labiatae

Leguminosae

Myzus persicae

Aphis craccivora, *fabae*; *Myzus persicae*

Polygonaceae

Aphis cottieri

Aphis cottieri

Aphis gossypii, *spiraecola*; *Aulacorthum solani*;

Brachycaudus rumexicolens; *Myzus persicae*;

Neomyzus circumflexus; *Toxoptera aurantii*

Key to apterae on *Muehlenbeckia*:-

1. Cauda very broadly rounded, not evident. SIPH short and conical, 0.03–0.04× BL. Abdomen with dark cross-bands on ABD TERG (4–) 5–8 *Brachycaudus rumexicolens*
– Cauda tongue- or finger-shaped. SIPH longer, more than 0.1× BL. Abdomen without or with different dark markings **2**
2. Head with median frontal process well-developed, scabrous, rounded. Femora black except at bases. SIPH and cauda both black, cauda bearing 8–11 hairs. R IV+V 0.8–1.0× HT II *Aphis cottieri*
– Without that combination of characters go to key to polyphagous aphids, p. 1020

Muhlenbergia

M. mexicana

M. racemosa

M. schreberi

Muhlenbergia sp.

Gramineae

Anoecia cornicola; *Geoica utricularia*;

Rhopalosiphum maidis

Anoecia corni

Hyalopteroides humilis; *Prociphilus erigeronensis*

Schizaphis muhlenbergiae

Use key to apterae of grass-feeding aphids under *Digitaria*.

Mukia

M. maderaspatana

Cucurbitaceae

Aphis gossypii

Mukdenia

M. rossii

Saxifragaceae

Aulacorthum glechomae

Mulgedium (incl. Lagedium)*M. alpinum* see *Cicerbita alpina**M. macrophyllum**M. plumieri**M. roseum**M. sibiricum**M. tataricum**Mulgedium* sp.**Compositae***Uroleucon sonchi**Uroleucon ochropus**Uroleucon chondrillae**Uroleucon brevirostre, formosanum**Aphis solanella; Hyperomyzus lactucae;**Macrosiphum euphorbiae; Uroleucon mulgedii**Uroleucon ambrosiae*Use key to apterae on *Lactuca*.**Mulinum***M. spinosum***Umbelliferae***Aphis martinezi, mulini, mulinicola, paravanoi, roberti,**Aphis* sp. (Argentina; BMNH colln);*Hyadaphis coriandri*Key to apterae on *Mulinum*:–

1. Cauda pale/dusky, SIPH pale or dark. Dorsal abdomen without dark sclerotisation anterior to SIPH 2
 - Cauda and SIPH both dark. Dorsal abdomen usually with some dark sclerotisation anterior to SIPH 3
2. SIPH 0.6–0.82× cauda, dark and slightly swollen distally, with a constriction proximal to the well-developed flange. ABD TERG 1 and 7 without marginal tubercles (MTu). Genital plate with 6–13 hairs on posterior part *Hyadaphis coriandri*
 - SIPH 1.0–1.2× cauda, mainly pale, tapering, with no subapical constriction and a small flange. ABD TERG 1 and 7 with large MTu. Genital plate often without any hairs on posterior part *Aphis paravanoi*
3. ABD TERG 1–4 (but not 7) with large dome-like MTu. SIPH c.0.5× cauda *Aphis* sp. (Argentina, BMNH colln)
 - MTu always on ABD TERG 1 and 7, rarely with small papilliform tubercles on 2–4. SIPH 0.5–1.5× cauda 4
4. Longest hairs on ANT III and ABD TERG 3 only 4–11 µm long. Dorsal abdomen without or with only small sclerotic areas. Cauda triangular *Aphis martinezi*
 - Longest hairs on ANT III 10–35 µm, and on ABD TERG 3 13–40 µm long. Dorsal abdomen with variably developed, often extensive sclerotisation. Cauda finger-like 5
5. Longest hairs on ANT III 10–14 µm, much shorter than BD III, on ABD TERG 3 13–28 µm, and on ABD TERG 8 20–45 µm long. Cauda rather thin, with 4–10 hairs *Aphis roberti*
 - Longest hairs on ANT III and ABD TERG 3 30–35 µm, as long as or longer than BD III, and on ABD TERG 8 50–60 µm long. Cauda with 8–14 hairs 6
6. ANT PT/BASE 1.5–1.8. SIPH more than 4× longer than their width at midlength, and 1.3–1.5× cauda. Cauda 0.27–0.32 mm long, with 10–14 hairs *Aphis mulini*
 - ANT PT/BASE 0.9–1.1. SIPH and cauda both rather short and thick; SIPH less than 3× longer than their width at midlength, and 0.8–1.0× cauda. Cauda 0.17–0.20 mm long, with 8–10 hairs *Aphis mulinicola*

HOST LISTS AND KEYS

Mundulea see Blackman and Eastop (1994)

Muntingia

M. calabura

Aphis gossypii, *spiraecola*

Use key to polyphagous aphids, p. 1020.

Tiliaceae

Muretia (=Galagania)

M. fragrantissima

Hyadaphis galaganiae

Umbelliferae

Murraya see Blackman and Eastop (1994)

Musa

M. basjoo

M. cavendishii

M. ensete see *Ensete ventricosum*

M. formosana

M. nana

M. paradisiaca

M. rosacea

M. ×sapientum

M. superba

M. textilis

Musa spp.

Musaceae

Rhopalosiphum nymphaeae; *Sinomegoura citricola*

Aphis fabae; *Pentalonia nigronervosa*

Pentalonia nigronervosa

Pentalonia nigronervosa

[*Acyrtosiphon pisum*]; *Aphis gossypii*;

Cerataphis brasiliensis; *Metopolophium dirhodum*;

Myzus persicae; *Pentalonia nigronervosa*;

[*Schoutedenia ralumensis*]; [*Tetraneura nigriabdominalis*]

Pentalonia nigronervosa

Aphis spiraecola; *Astegopteryx* [*nipae*], *styracophila*;

Cerataphis brasiliensis; *Pentalonia nigronervosa*;

Rhopalosiphum enigmae, *musae*, *rufiabdominale*;

Toxoptera aurantii, *odinae*

Pentalonia nigronervosa

Pentalonia nigronervosa

Aphis fabae; *Brachycaudus helichrysi*; *Dysaphis tulipae*;

[*Pseudoregma nicolaiae*]; *Rhopalosiphum maidis*

Key to apterae on *Musa* (and *Ensete*):-

1. Head with a pair of forwardly-directed horns between ANT bases. Eyes 3-faceted. Marginal wax glands evident. SIPH as pores 2
 - No frontal horns. Eyes multifaceted. No evident wax glands. SIPH tubular 3
2. Body dorsoventrally flattened, almost circular, wholly sclerotic with a continuous crenulate margin of wax glands. Head fused with 3 thoracic tergites, and ABD TERG 1-7 fused 3
 - Body not dorso-ventrally flattened, pear-shaped, not sclerotic, with marginal wax glands divided into segmental groups. Head fused with prothorax, other tergites free 4
 - Cerataphis brasiliensis*
 - Astegopteryx styracophila*
3. SIPH and femora covered with irregular, transverse rows of spicules. ANT PT/BASE 5.8-8.1. (Alata with dark-bordered wing veins, with radius and costa fused for part of lengths to form a closed cell behind the pterostigma) 4
 - SIPH and femora smooth or imbricated, not markedly spiculose. ANT PT/BASE 1.4-5.8. (Alata with normal wing venation, veins not dark-bordered) 4
 - Pentalonia nigronervosa*

4. Cauda helmet-shaped, a little shorter than its basal width **5**
 – Cauda tongue-shaped, longer than its basal width in dorsal view **6**
5. SIPH pale, smooth, with a marked subapical annular incision. Spiracular apertures large and rounded. Spinal tubercles (STu) absent *Brachycaudus helichrysi*
 – SIPH dark, imbricated, without a subapical incision. Spiracular apertures reniform. Spinal tubercles (STu) present on head and ABD TERG 8, or 7 and 8 *Dysaphis tulipae*
6. Dorsal cuticle with a reticulate pattern of spicules. SIPH cylindrical on basal part, slightly swollen on distal part, with a smooth constricted subapical region **7**
 – Dorsal cuticle without spicules, or with spiculosity localised. SIPH tapering on basal part, and tapering, cylindrical or swollen on distal part, without a smooth constricted subapical region **10**
7. ANT PT/BASE less than 3. Body rather elongate *Rhopalosiphum maidis*
 – ANT PT/BASE more than 3. Body oval **8**
8. ANT usually 5-segmented, with long hairs. ANT PT usually distinctly curved, and longer than ANT III (or III+IV together if ANT is 6-segmented) *Rhopalosiphum rufiabdominale*
 – ANT 5- or 6-segmented, with short hairs. ANT PT usually straight and shorter than ANT III+IV (or III alone if ANT 5-segmented) **9**
9. ANT PT/BASE 3.0–3.9. SIPH less than 3× longer than width at midlength, 1.1–1.6× cauda *Rhopalosiphum musae*
 – ANT PT/BASE 4.3–5.0. SIPH more than 3× longer than width at midlength, 1.8–2.4× cauda *Rhopalosiphum enigmae*
10. SIPH black with a distal zone of polygonal reticulation, 2.0–2.2× cauda. Dorsal abdomen with a dark irregular central sclerite. ANT III–VI entirely dark *Sitobion* sp. on *Ensete ventricosum* (Ethiopia, BMNH colln, leg. T. Abate)
 – Without that combination of characters **11**
11. SIPH pale, tapering/cylindrical, without swelling or subapical polygonal reticulation. ANT III with 1–3 rhinaria near base. Head cuticle smooth with ANT tubercles divergent, and median frontal tubercle evident *Metopolophium dirhodum*
 – Without that combination of characters go to key to polyphagous aphids, p. 1020

Muscari

M. comosum
Muscari spp.

- Cauda helmet-shaped, a little shorter than its basal width in dorsal view. Spinal tubercles (STu) present on head and ABD TERG 8, or 7 and 8 *Dysaphis tulipae*
 – Cauda tongue-shaped, much longer than its basal width. STu absent from head, and rarely on ABD TERG 8 go to key to polyphagous aphids. p. 1020

Hyacinthaceae

Macrosiphum euphorbiae
Aphis gossypii; *Dysaphis tulipae*

Musineon (=Musenium)

M. tenuifolium

Aphis helianthi

Umbelliferae

Mussaenda

M. arcuata
M. frondosa

Aphis gossypii
Aphis gossypii; *Toxoptera aurantii*, *odinae*

Rubiaceae

HOST LISTS AND KEYS

M. philippica
Mussaenda spp.

Use key to polyphagous aphids, p. 1020.

Myagrurum

Myagrurum sp.

Mycelis

M. muralis

Use key to apterae on *Lactuca*.

Myoporurum

M. acuminatum

M. insulare

M. laetum

M. 'pictum'

M. sandwicense

M. tenuifolium

M. viscosum

Use key to polyphagous aphids, p. 1020.

Myosotis

M. alpestris

M. alpina

M. arvensis

M. caespitosa

M. collina

M. nemorosa

M. palustris=*scorpioides*

M. scorpioides

M. silvatica

M. suaveolens

M. welwitschii

Myosotis sp.

Key to apterae on *Myosotis*:-

1. Cauda helmet-shaped, a little shorter than its basal width in dorsal view
- Cauda tongue- or finger-shaped, much longer than its basal width

Toxoptera odinae

Aphis spiraecola; *Myzus persicae*

Cruciferae

Brevicoryne brassicae

Compositae

Pemphigus bursarius; *Uroleucon murale*, [*rudbeckiae*]

Myoporaceae

Aphis gossypii; *Myzus persicae*

Myzus persicae

Aphis gossypii

Aphis gossypii, [*myopori*]

[*Aphis* sp. (Hawaii, BMNH colln; specimens in poor condition)]

Aphis gossypii; *Macrosiphum euphorbiae*; *Myzus persicae*

Myzus persicae

Boraginaceae

Brachycaudus jacobi

Aulacorthum solani

Aphis fabae; *Aulacorthum solani*;

Brachycaudus cardui, *helichrysi*, *jacobi*;

Macrosiphum euphorbiae;

Myzus ascalonicus, *ornatus*, *persicae*

Brachycaudus helichrysi

Brachycaudus helichrysi

Brachycaudus helichrysi

Aphis fabae, *gossypii*, *nasturtii*, *triglochinis*;

Aulacorthum solani; *Brachycaudus helichrysi*;

Macrosiphum euphorbiae, *gei*;

Myzus myosotidis, *ornatus*, *persicae*

Brachycaudus helichrysi, *jacobi*; *Myzus ornatus*, *persicae*;

Neomyzus circumflexus

Brachycaudus helichrysi

Brachycaudus helichrysi

[*Aulacorthum solani* ssp. *orientale*]

2. Dorsum pale, membranous. SIPH pale, smooth, 0.8–2.0× cauda *Brachycaudus helichrysi*
 – Dorsum with an extensive black sclerotic shield. SIPH dark, imbricated, 1.7–3.6× cauda **3**
3. ANT III with 4–11 rhinaria. R IV+V 0.135–0.175 mm. Dorsal shield with a distinct pattern of spinulose imbrications *Brachycaudus jacobi*
 – ANT III without rhinaria (except in alatiform specimens). R IV+V (0.175–) 0.18–0.24 mm. Dorsal shield almost smooth or with indistinct imbrications *Brachycaudus cardui*
4. SIPH with a subapical zone of polygonal reticulation (at least 4–5 rows of closed cells). ANT tubercles well developed, with inner faces smooth and divergent **5**
 – SIPH without subapical polygonal reticulation. ANT tubercles if well developed then with inner faces steep-sided, and scabrous or spiculose **6**
5. Longest hair on ABD TERG 8 is 38–63 µm, 0.6–1.4× ANT BD III. Anterior half of subgenital plate usually (77%) with only 2 hairs (18% with 3, 5% with 4–6 hairs) *Macrosiphum euphorbiae*
 – Longest hair on ABD TERG 8 is 66–106 µm, 1.4–2.0× ANT BD III. Anterior half of subgenital plate with 2–11 hairs, usually (77%) with 4–8 hairs *Macrosiphum gei*
6. SIPH pale or dark, tapering or cylindrical, or if swollen on distal part then less than 0.82× ANT III **7**
 – SIPH slightly swollen on distal part **and** more than 0.83× ANT III **8**
7. ANT PT/BASE 1.1–1.8. SIPH 0.7–1.3× cauda *Aphis triglochinis*
 – Without that combination of characters; if ANT PT/BASE less than 1.9 then SIPH more than 1.3× cauda go to key to polyphagous aphids, p. 1020
8. Hairs on inner sides of ANT tubercles mostly pointed, the longest 0.75–1.0× ANT BD III. SIPH 0.84–1.09× ANT III, and 0.17–0.20× BL. (Al. with (0–) 2–5 sec. rhinaria on ANT IV and 0–2 on V) *Myzus myosotidis*
 – Hairs on inner sides of ANT tubercles all short and blunt, the longest 0.3–0.6× BD III. SIPH 1.0–1.6× ANT III, and 0.20–0.28× BL. (Al. without sec. rhinaria on ANT IV or V) *Myzus persicae*

Myosoton (incl. Malachium)*M. aquaticum***Caryophyllaceae***Aphis nasturtii*; *Aulacorthum solani*

Use key to polyphagous aphids, p. 1020.

Myosurus*M. minimus***Ranunculaceae***Myzus ornatus***Myrcia (incl. Mozartia)***M. albescens**M. jaboticaba* see *Myrciaria cauliflora**M. splendens**Toxoptera aurantii**Toxoptera aurantii***Myrtaceae****Myrciaria***M. cauliflora* (= *jaboticaba*)*Myrciaria* sp.*Toxoptera aurantii**Aphis gossypii***Myrtaceae**

Use key to polyphagous aphids, p. 1020.

Myriactis*M. nepalensis**M. wallichii***Compositae***Aphis gossypii*; *Protrama longitarsus* ssp. *sclerodensis**Aphis spiraeicola*; *Protrama longitarsus* ssp. *sclerodensis*

HOST LISTS AND KEYS

Key to apterae on *Myriactis*:-

- Hind tarsi elongate, more than 0.5× hind tibiae. ANT PT/BASE less than 1
Protrama longitarsus ssp. *sclerodensis*
- Hind tarsi of normal length, not clearly longer than fore or mid tarsi. ANT PT/BASE more than 1
go to key to polyphagous aphids, p. 1020

Myrica

M. aspleniifolia

M. californica

M. cerifera

M. gale

M. rubra

Myricaceae

Cepigillettea myricae; *Illinoia azaleae*, *borealis*

Aphis fabae

[*Longistigma caryae*]

Cepigillettea myricae; *Illinoia canadensis*;

Macrosiphum euphorbiae; *Myzocallis myricae*

Aulacorthum solani; *Greenidea myricae*;

[*Parathoracaphis cheni*]

Key to apterae on *Myrica* (couplets 1–3 can also be applied to alatae):-

1. SIPH tubular, with numerous long hairs. *Greenidea myricae*
- SIPH tubular or conical, without hairs **2**
2. SIPH in form of short truncated cones. Cauda with a constriction, and anal plate bilobed **3**
- SIPH tubular, tapering, cylindrical or swollen on distal half. Cauda finger-like, without a constriction, and anal pale entire **4**
3. (All vivip. are al.) ANT shorter than body, with ANT PT/BASE less than 2. Head and thorax with longitudinal black stripes, and abdomen with paired dark segmental patches. Tibiae with similar pigmentation to distal parts of femora *Myzocallis myricae*
- (Apt. or al.) ANT longer than body, with ANT PT/BASE more than 2. Dorsum without a pattern of dark markings. Tibiae black, contrasting with paler femora *Cepigillettea myricae*
4. SIPH tapering or cylindrical on distal half (or, if distinctly swollen, then without subapical reticulation) go to key to polyphagous aphids, p. 1020
- SIPH distinctly swollen on distal half, with polygonal reticulation distal to swelling **5**
5. First tarsal segments with 5 hairs *Illinoia azaleae*
- First tarsal segments with 3 hairs (occasionally with 4, but never 5) **6**
6. SIPH dark over most or whole of length, with a small flange. HT II only 0.07–0.10 mm long *Illinoia borealis*
- SIPH pale or dusky, or only dark at apices, with a well-developed flange. HT II 0.10–0.14 mm long *Illinoia canadensis*

Myricaria

M. alopecuroides

M. bracteata

M. germanica

Tamaricaceae

Eotrampa bazarovi

Aphis ishkovi; *Brachyunguis harmalae*; *Mariaella lambersi*

Aphis fabae; *Mariaella lambersi*

Key to apterae on *Myricaria*:-

1. BL 5.0–5.5 mm. HT II elongated, c. 0.4× length of hind tibia *Eotrampa bazarovi*
- BL less than 3 mm. HT II of normal length, less than 0.25× hind tibia **2**

2. ANT usually 5-segmented, 0.3–0.4× BL, with ANT PT/BASE 0.9–1.6. SIPH as small, short cones, with an annular subapical constriction and a large flange. Cauda rounded, about half as long as its basal width
Mariaella lambersi
- Without the above combination of characters 3
3. ANT PT/BASE less than 1. SIPH about as long as their basal widths, 0.2–0.6× cauda
Brachyunguis harmalae
- ANT PT/BASE more than 1. SIPH much longer than their basal widths, and longer than cauda 4
4. ABD TERG 2–5 as well as 1 and 7 regularly with marginal tubercles (MTu). SIPH thick basally and curved outwards towards the much narrower apex
*Aphis ishkovi**
- MTu only constantly on ABD TERG 1 and 7, sporadically on 2–4. SIPH rather straight and not much thicker at base than apex
Aphis fabae

Myriocephalus*Myriocephalus* sp.**Compositae***Uroleucon* sp. (Israel, BMNH colln)***Myriophyllum****M. aquaticum**M. spicatum**M. verticillatum***Haloragidaceae***Aulacorthum solani*; *Rhopalosiphum nymphaeae**Rhopalosiphum nymphaeae**Rhopalosiphum nymphaeae*Key to apterae on *Myriophyllum*:-

- Dorsal cuticle with a pattern of spinules arranged in polygons, with 1–3 spicules in the centre of each polygon. Head smooth with ANT tubercles weakly developed, SIPH clavate
Rhopalosiphum nymphaeae
- Dorsal cuticle without spinules arranged in polygons, and other characters not in this combination
go to key to polyphagous aphids, p. 1020

Myriopteron*M. extensum***Asclepiadaceae***Aulacorthum myriopteroni****Myrrhis****M. odorata***Umbelliferae***Aphis fabae*; *Aulacorthum solani*;*Cavariella aegopodii*, *archangelicae*, *konoii*;*Macrosiphum gei*; *Myzus ornatus*Key to apterae on *Myrrhis*:-

1. ABD TERG 8 with a posteriorly projecting process above cauda. SIPH clavate 2
- No supracaudal process. SIPH tapering/cylindrical 4
2. ANT PT/BASE 0.6–1.3. R IV+V usually without accessory hairs *Cavariella aegopodii*
- ANT PT/BASE 1.4–2.0. R IV+V with 2 accessory hairs 3
3. Length of supracaudal process at least 1.6× maximum width of swollen part of SIPH. SIPH 0.98–1.10× longer than head width across (and including) eyes, and 6.7–9× their maximum width on swollen part. (Al. with a complete black band on ABD TERG 6) *Cavariella archangelicae*
- Length of supracaudal process less than 1.5× maximum width of swollen part of SIPH. SIPH 0.8–1.0 (–1.07) head width across eyes, and 5–7× their maximum width on swollen part. (Al. with a pair of roundish dark marks on ABD TERG 6) *Cavariella konoii*

HOST LISTS AND KEYS

4. Head dark with ANT tubercles weakly developed. SIPH and cauda black. ABD TERG 1 and 7 always with marginal tubercles (MTu) *Aphis fabae*
– Head pale with ANT tubercles well developed. SIPH and cauda mainly pale. ABD TERG 1 and 7 without MTu **5**
5. Dorsal abdomen with a pattern of dark intersegmental markings. ANT PT/BASE 1.7–2.8. SIPH coarsely imbricated, with a slight ‘S’ curve *Myzus ornatus*
– Dorsal abdomen without a pattern of dark intersegmental markings. ANT PT/BASE 2.8–6.2. SIPH not coarsely imbricated go to key to apterae on *Chaerophyllum*, starting at couplet 11

***Myrrhoides* (incl. *Physocaulis*)**

M. nodosa

Umbelliferae

Dysaphis physocaulis

Myrsine

M. africana

M. avenis

M. semiserrata

Myrsinaceae

[*Aphis* sp. (Leonard, 1972a:102)]; *Aulacorthum solani*;

Toxoptera aurantii

Toxoptera aurantii

Toxoptera aurantii

Use key to polyphagous aphids, p. 1020.

Myrtus see Blackman and Eastop (1994)

Nabalus

N. albus see *Prenanthes*

N. trifoliata

Compositae

Uroleucon ambrosiae

Najas

N. microdon (incl. *flexilis*)

Hydrocharitaceae

Rhopalosiphum nymphaeae

Nama

N. jamaicensis

Hydrophyllaceae

Aphis gossypii, *middletonii*; *Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Nandina

N. domestica

Berberidaceae

Myzus persicae

Narcissus

Narcissus spp.

Amaryllidaceae

Aulacorthum solani; *Macrosiphum euphorbiae*;

Myzus persicae

Use keys to polyphagous aphids, p. 1020.

Nardus

N. stricta

Nardus sp.

Gramineae

Forda formicaria; *Geocica utricularia*;

Metopolophium dirhodum, *festucae* ssp. *cerealium*;

Paracletus cimiciformis; *Pemphigus similis*; *Tetraneura ulmi*

Atheroides serrulatus

Use key to apterae of grass-feeding aphids under *Digitaria*.

Nasturtium see *Rorippa*

Nauclea see Blackman and Eastop (1994)

Naumbergia see *Lysimachia*

Nectandra see Blackman and Eastop (1994)

Neea

N. shaferei

Aphis spiraecola

Nyctaginaceae

Neillia

N. opulifolia see *Physocarpus*

Neillia sp.

Brachymyzus jasmini (oviparae)

Rosaceae

Nelsonia

N. canescens

Aphis gossypii

Acanthaceae

Nelumbo (incl. *Nelumbium*)

N. lutea (incl. *pentapetala*)

N. nucifera = *speciosa*

N. speciosa

Rhopalosiphum nymphaeae

Rhopalosiphum nymphaeae

Nelumbonaceae

Nematanthus (incl. *Hypocyrtia*)

N. wettsteinii

Aulacorthum solani

Gesneraceae

Nemesia

N. strumosa

Aphis gossypii; *Myzus persicae*

Scrophulariaceae

Use key to polyphagous aphids, p. 1020.

Nemophila

N. menziesii

Nemophila sp.

Myzus persicae

Aulacorthum solani

Hydrophyllaceae

Use key to polyphagous aphids, p. 1020.

Neourbania

N. adendrobium

Cerataphis orchidearum

Orchidaceae

Nepeta

N. cabulica (?)

N. cataria

N. formosa

N. glechoma

Genus and sp. nr *Hyperomyzus* (*Neonasonovia*)
(Afghanistan, BMNH colln)

Aphis coreopsidis, *fabae*, *frangulae*, *gossypii*, *nasturtii*,
nepetae; *Aulacorthum solani*; *Eucarazzia elegans*;

Myzus ornatus; *Ovatus crataegarius*

Eucarazzia elegans

Aphis [*glechomae* (nomen dubium)], *gossypii*;

[*Dysaphis tulipae*]

Labiatae

HOST LISTS AND KEYS

<i>N. grandiflora</i>	<i>Aulacorthum solani</i> ; <i>Ovatus crataegarius</i>
<i>N. hederacea</i>	<i>Aphis gossypii</i>
<i>N. manchuriensis</i>	<i>Aphis clinpetae</i>
<i>N. mussinii</i>	<i>Aphis gossypii</i>
<i>N. nepetella</i>	<i>Aphis frangulae</i> , <i>nepetae</i> ; <i>Eucarazzia elegans</i>
<i>N. nuda</i>	<i>Aphis nasturtii</i> , <i>nepetae</i> , <i>Aphis</i> sp. (Lebanon, BMNH colln)
<i>N. pannonica</i>	<i>Aphis nepetae</i>
<i>N. subsessilis</i> (incl. <i>yezoensis</i>)	<i>Aulacorthum nepetifolii</i>
<i>Nepeta</i> spp.	[<i>Aphis umbrella</i>]; <i>Aulacorthum sclerodorsi</i> (?); <i>Myzus persicae</i>

Key to apterae on *Nepeta*:-

1. Head densely spiculate or nodulose, at least on the ventral surface 2
 - Head without spicules or nodules 7
2. Dorsum almost entirely dark sclerotic. SIPH entirely dark. longest hairs on ANT III 1.0–1.4× BD III. ANT III with 4–14 rhinaria, usually extending onto distal half *Aulacorthum nepetifolii*
 - Dorsum with or without dark markings, but not entirely dark sclerotic. SIPH pale, or only dark towards apices. ANT III with 0–5 rhinaria, if present they are only on basal part. Longest hairs on ANT III 0.2–0.8× BD III 3
3. SIPH smooth, cylindrical over most of length with distal c.0.2 narrower; dark subapically, with 1–3 rows of polygonal reticulation. Dorsum with variably developed dark sclerotic markings on thorax and ABD TERG 3–4, and dark postsiphuncular sclerites. ANT VI entirely dark *Aulacorthum sclerodorsi*
 - SIPH imbricated, tapering, cylindrical or slightly clavate, without any clearly defined subapical reticulation. Dorsum pale or with only intersegmental dark markings. ANT VI pale 4
4. Dorsum with a pattern of dark intersegmental markings. SIPH coarsely imbricated, with a slight ‘S’ curve. ANT PT/BASE 1.7–2.8 *Myzus ornatus*
 - Dorsum without dark markings. SIPH moderately imbricated. ANT PT/BASE 2.8–7.6 5
5. SIPH slightly clavate. R IV+V 0.9–1.0× HT II. ANT 0.7–1.0× BL *Myzus persicae*
 - SIPH tapering/cylindrical, with no trace of swelling. R IV+V 1.1–1.6× HT II. ANT 1.1–1.5× BL 6
6. ANT tubercles bearing rounded processes that converge apically. ANT PT/BASE 5.2–7.6. ANT III without rhinaria *Ovatus crataegarius*
 - ANT tubercles with inner faces almost parallel, without rounded processes. ANT PT/BASE 4.0–5.5. ANT III almost always with 1–2 rhinaria near base *Aulacorthum solani*
7. SIPH markedly clavate. Sec. rhinaria usually present on ANT III–IV (–V). ABD TERG 1 and 7 without marginal tubercles (MTu) 8
 - SIPH tapering. Cauda longer than its basal width. Sec. rhinaria absent (except in alatifform specimens). ABD TERG 1 and 7 with MTu 9
8. Cauda not longer than its basal width. Rhinaria mainly on distal part of ANT III and on IV. Dorsal abdominal hairs not arising from projections *Eucarazzia elegans*
 - Cauda c.2× its basal width. Rhinaria evenly distributed over ANT III, IV and V. Dorsal abdominal hairs arising from projections
genus and sp. nr *Hyperomyzus* (*Neonasonovia*) (Afghanistan, BMNH colln)
9. SIPH pale, or only dark towards apices *Aphis nasturtii*
 - SIPH entirely dark 10

10. SIPH 0.24–0.40× BL. ANT III except base and ANT IV–VI dark, contrasting with very pale head, ANT I, II and base of III *Aphis coreopsidis*
- SIPH less than 0.24× BL. ANT III (–V) mainly pale, paler than ANT I–II **11**
11. Cauda dark with 11–24 hairs. Dorsal abdomen usually with dark cross-bands on ABD TERG 7 and 8 and some dark markings anterior to SIPH. Longest hairs on ANT III 0.8–3.4× BD III *Aphis fabae*
- Cauda pale or dark with 4–8 hairs. Dorsal abdomen usually without dark markings, sometimes with a cross-band on ABD TERG 8 only. Longest hair on ANT III 0.4–1.0× BD III **12**
12. R IV+V 1.5–1.9× HT II. ANT PT/BASE 1.6–2.0 *Aphis clinepetae**
- R IV+V 1.1–1.4 (–1.5)× HT II. ANT PT/BASE 2.0–3.0 **13**
13. (Al. with sec. rhinaria on ANT IV and V; distributed III 11–30, IV 3–12, V 0–6) **14**
- (Al. usually with sec. rhinaria distributed III 3–13, IV 0 (–3), V 0) **15**
14. ANT PT 2.1–2.6× R IV+V. (Al. with rhinaria distributed III 11–14, IV 3–7, V 0–4) *Aphis frangulae* (sensu.lat. – see text)
- ANT PT 1.4–1.7 (–2.0)× R IV+V. (Al. with rhinaria distributed III 22–30, IV 6–12, V 2–6) *Aphis* sp. (Lebanon, BMNH colln, leg. D. Hille Ris Lambers)
15. (Al with rhinaria distributed III 3–13, IV 0–3, V 0) *Aphis gossypii*
- (Al. with rhinaria distributed III 4–7, IV 0, V 0) *Aphis nepetae*

Nephrolepis

N. cordifolia
N. biserrata
N. davalioides
N. exaltata

N. pectinata
N. ?undulata
Nephrolepis sp.

Oleandraceae

Macrosiphum walkeri
Idiopterus nephrolepidis
Idiopterus nephrolepidis
Aulacorthum solani; *Idiopterus nephrolepidis*;
Macrosiphum walkeri
Idiopterus nephrolepidis
Micromyzella pterisoides
Micromyzodium filicium

Use key to fern-feeding aphids under *Polypodium*.

Nerium

N. indicum
N. odoratum
N. odorum
N. oleander

Apocynaceae

Aphis nerii; *Myzus persicae*
Aphis nerii
Aphis fabae, *gossypii*, *nerii*; *Myzus persicae*
Aphis asclepiadis, *fabae*, *gossypii*, *nerii*, *spiraecola*;
Aulacorthum solani; *Macrosiphum euphorbiae*;
Myzus persicae; *Toxoptera aurantii*

Use key to apterae on *Asclepias*, which includes all these species.

Neurolaena

N. lobata

Compositae

Aphis spiraecola; *Uroleucon ambrosiae*

Use key to polyphagous aphids, p. 1020.

Neyraudia

N. arundinaria

Gramineae

Tetraneura javensis

(or use key to apterae of grass-feeding aphids under *Digitaria*)

HOST LISTS AND KEYS

Nicandra

N. physalodes

Solanaceae

Aulacorthum solani; *Macrosiphum euphorbiae*;
Myzus persicae

Use keys to polyphagous aphids, p. 1020.

Nicolaia see *Etlingera*

Nicotiana

N. alata

N. glauca

N. glutinosa

N. plumbaginifolia

N. quadrivalvis

N. rustica

N. x sanderae

N. tabacum

Solanaceae

Myzus persicae; *Toxoptera aurantii*

Aulacorthum solani; *Macrosiphum euphorbiae*

Myzus persicae

Myzus persicae

Myzus persicae

Macrosiphum euphorbiae

Myzus persicae

Macrosiphum euphorbiae; *Myzus persicae*

Aphis fabae, *gossypii*, *nasturtii*, *spiraecola*;

Aulacorthum solani; *Macrosiphum euphorbiae*;

Myzus antirrhinii, *persicae*, *persicae* ssp. *nicotianae*;

Nasonovia ribisnigri; [*Pentalonia nigronervosa*];

Rhopalosiphum rufiabdominale; *Smynthuroides betae*

Key to apterae on *Nicotiana*:—

1. Thoracic spiracular apertures much larger than abdominal ones. ANT PT/BASE 6.5–10. Dorsal abdomen with paired, dark intersegmental markings, far apart between ABD TERG 1–4 but nearer midline between ABD TERG 4–5 and 5–6 *Nasonovia ribisnigri*
- Thoracic spiracular apertures similar in size to abdominal ones, ANT PT/BASE less than 6.5 and dorsal abdomen without intersegmental markings spaced in that way
go to key to polyphagous aphids, p. 1020 (specimens from field tobacco running to *Myzus persicae* are likely to be *M. persicae* ssp. *nicotianae*)

Nidorella

N. resedifolia

Compositae

Aphis gossypii

Nigella

N. arvensis

Ranunculaceae

Aphis spiraecola

Nipa see *Nypa*

Nipponanthemum

N. nipponicum

Compositae

Macrosiphoniella yomogifoliae

Nitraria

N. retusa

Zygophyllaceae

Brachyunguis harmalae

Noltea

N. africana

Rhamnaceae

Aphis ceanothi

Nonea

N. ventricosa

Boraginaceae

Myzus persicae

Nonnea see *Nonea*

Nopalxochia see *Disocactus*

Notobasis

N. syriaca

Compositae

Aphis fabae, *gossypii*; *Brachycaudus helichrysi*;
Capitophorus elaeagni

Key to apterae on *Notobasis*:-

- Hairs on front of head and dorsal body thick and capitate, mostly long and thick, and arising from tuberculate bases. ANT PT/BASE 6.0–9.2 *Capitophorus elaeagni*
- Dorsal hairs not thick and distinctly capitate, without tuberculate bases. ANT PT/BASE less than 6 go to key to polyphagous aphids, p. 1020

Notonia see *Kleinia*

Notoniopsis see *Kleinia*

Nuphar

N. advena

N. japonicum

N. lutea (incl. *polysepala*)

Nymphaceae

Rhopalosiphum nymphaeae

Rhopalosiphum nymphaeae

Macrosiphum audeni, *euphorbiae*;

Rhopalosiphum nymphaeae

Use key to apterae on *Nymphaea*.

Nuxia

Nuxia sp.

Buddlejaceae

Aphis gossypii

Nymphaea

N. alba

N. amazonum

N. coerulea

N. elegans

N. japono-koreana

N. lotus

N. lutea see *Nuphar*

N. odorata

N. polysepala see *Nuphar lutea*

N. pubescens

N. stellata

N. tetragona

Nymphaea sp.

Nymphaceae

Rhopalosiphum nymphaeae

Rhopalosiphum nymphaeae

Rhopalosiphum nymphaeae

Rhopalosiphum nymphaeae

Rhopalosiphum nymphaeae

Rhopalosiphum nymphaeae

Aphis gossypii; *Rhopalosiphum nymphaeae*

Rhopalosiphum nymphaeae

Rhopalosiphum nymphaeae

Rhopalosiphum nymphaeae

[*Brachycaudus rumexicolens*]

HOST LISTS AND KEYS

Key to apterae on *Nymphaea* (and *Nuphar*):–

1. Dorsal cuticle with a pattern of spinules arranged in polygons, with 1–3 spinules in the centre of each polygon. SIPH clavate *Rhopalosiphum nymphaeae*
- Dorsal cuticle without spinules arranged in polygons. SIPH not clavate 2
2. SIPH with subapical reticulation (at least 4–5 rows of closed polygonal cells). ANT tubercles well-developed, smooth, with inner faces divergent 3
- SIPH without subapical polygonal reticulation. ANT tubercles not as above
go to key to polyphagous aphids, p. 1020
3. R IV+V 0.8–1.0× HT II. ANT PT/BASE 4.5–6.2 *Macrosiphum euphorbiae*
- R IV+V 1.0–1.1× HT II. ANT PT/BASE 5.9–7.2 *Macrosiphum audeni*

Nymphoides (incl. *Limnanthemum*)

N. geminata

N. indicum

N. peltatum

Menyanthaceae

Aulacorthum solani

Rhopalosiphum nymphaeae

Rhopalosiphum nymphaeae

Use key to apterae on *Nymphaea*

Nypa (incl. *Nipa*)

N. fruticans

Palmae

Astegopteryx nipae; *Cerataphis brasiliensis*

See key to apterae on *Calamus*.

Oberna see *Silene*

Obione see *Atriplex*

Ochna

A single aphid species, *Sitobion ochnearum*, is recorded from 4 spp. of *Ochna*; *O. afzelii*, *O. leptoclada*, *O. pretoriensis*, *O. pulchra*.

Ochnaceae

Ochradenus

O. baccatus

Myzus persicae

Resedaceae

Ochroma see Blackman and Eastop (1994)

Ochthodium

O. aegyptiorum

Cruciferae

Brevicoryne brassicae

Ocimum

O. basilicum

O. canum

O. gratissimum

O. minimum

O. sanctum

O. urticifolium

Ocimum sp.

Labiatae

Aphis gossypii; *Myzus ornatus*, *persicae*;

Macrosiphum mesosphaeri; *Sitobion coleii*

Aphis gossypii

Aphis gossypii; *Macrosiphum mesosphaeri*, *salviae*

Myzus ornatus

Aphis gossypii; *Macrosiphum mesosphaeri*; *Myzus ornatus*

Aulacorthum solani; *Myzus ornatus*

Aphis spiraeicola; [*Sitobion indicum*]

Key to apterae on *Ocimum*:-

1. SIPH mainly or wholly dark, with a subapical zone of reticulation (at least 4–5 rows of closed polygonal cells) 2
 - SIPH pale or dark, without subapical polygonal reticulation
go to key to polyphagous aphids, p. 1020
2. ANT and tibiae mainly pale. Dorsum with an extensive solid dark shield across ABD TERG 1–5, fused with marginal and antesiphuncular sclerites. Longest hairs on ANT III less than 0.5× BD III 3
 - ANT and tibiae mainly dark. Dorsum without a complete dark shield, with or without a less extensive dark patch. Longest hairs on ANT III more than 0.5× BD III 3
Sitobion colei
3. Dorsal abdomen with a central dark patch. Head as dark as ANT. SIPH wholly dark. Process at base of prothoracic furca is tubercular, about as long as its basal width 3 *Macrosiphum salviae*
 - Dorsal abdomen without a dark central patch. Head paler than ANT. SIPH usually with paler basal section. Process at base of prothoracic furca is broadly conical, much shorter than its basal width 3
Macrosiphum mesosphaeri

Ocotea see Blackman and Eastop (1994)

Octadesmia see *Dilomilis*

Octomeron

O. montanum

Labiatae

Aphis fabae, gossypii; Macrosiphum euphorbiae; Myzus ornatus

Use key to polyphagous aphids, p. 1020.

Ocimum see *Ocimum*

Odontioda

Odontioda sp. (hybrid)

Orchidaceae

Aphis spiraeicola

Odontites (incl. *Ortantha*)

O. lutea

O. serotina

O. verna (incl. *sicula*)

O. vulgaris

Scrophulariaceae

Brachycaudus mimeuri, persicae

Aphis frangulae

Brachycaudus mimeuri

Brachycaudus persicae

Key to apterae on *Odontites*:-

1. Dorsum with an extensive solid black shield covering almost all of metanotum and ABD TERG 1–6. Cauda short and rounded, not longer than its basal width 3 *Brachycaudus mimeuri* (or *persicae*: see text)
- Dorsum without an extensive black shield. Cauda much longer than its basal width 3 *Aphis frangulae*

Odontoglossum

Odontoglossum sp.

Orchidaceae

Sitobion luteum

Odontonema

O. strictum

Acanthaceae

Myzus persicae

Odontospermum see *Asteriscus*

***Oemleria* (incl. *Osmaronia*)**

O. cerasiformis

Rosaceae

Macrosiphum [*euphorbiae*], *occidentale*, *osmaroniae*

Key to apterae on *Oemleria*:-

- R IV+V short and blunt, about as long as its basal width, 0.7–0.8× HT II. ANT BASE VI 1.5–2.3× R IV+V. Cauda with 8–14 hairs *Macrosiphum occidentale*
- R IV+V much longer than its basal width, 0.9–1.1× HT II. ANT BASE VI 1.0–1.5× R IV+V. Cauda with 5–8 hairs *Macrosiphum osmaroniae*

Oenanthe

Oe. aquatica

Oe. crocata

Oe. javanica (incl. *stolonifera*)

Oe. pimpinelloides

Oe. sarmentosa

Oe. silaifolia

Oe. stolonifera see *javanica*

Oenanthe spp.

Umbelliferae

Anuraphis subterranea; *Aulacorthum solani*;

Pemphigus protospirae

Cavariella aegopodii, *theobaldi*; *Hyadaphis passerinii*;

Macrosiphum euphorbiae; *Myzus persicae*

Amphorophora cryptotaeniae;

Aphis craccivora, *gossypii*, *spiraecola*;

Brachycaudus helichrysi; *Cavariella oenanthis*, *salicicola*;

[*Hyalopterus pruni*]; *Myzus persicae*; *Semiaphis heraclei*

Aphis fabae

Cavariella aegopodii, *konoii*; *Hyadaphis passerinii*;

Pemphigus populicaulis

Cavariella aegopodii; *Macrosiphum euphorbiae*

[*Aphis oenanthis* Lichtenstein (nomen nudum)];

Cavariella salicis

Key to apterae on *Oenanthe*:-

1. ABD TERG 8 with a posteriorly projecting process above cauda; in one species (*Cavariella oenanthis*) this is reduced to a small, warty, knob in the centre of ABD TERG 8, with 2 associated hairs 2
- No supracaudal process, nor are there 2 hairs on ABD TERG 8 close together and associated with a warty knob 7
2. SIPH clavate; swollen on distal half to at least 1.2× narrowest part of basal half. ANT PT/BASE 0.6–2.0 3
- SIPH tapering or cylindrical, or with slight subapical swelling. ANT PT/BASE 1.3–3.5 6
3. Supracaudal process conical or finger-like, not projecting to tip of cauda 4
- Supracaudal process large, conical, extending beyond and usually covering cauda 5
4. ANT PT/BASE 0.6–1.3. R IV+V 0.7–0.95× HT II, and without accessory hairs *Cavariella aegopodii*
- ANT PT/BASE 1.35–2.0. R IV+V 1.0–1.2× HT II, with 2 accessory hairs *Cavariella konoii*
5. R IV+V 1.05–1.2× HT II. SIPH short and stout, narrowing only at base *Cavariella salicicola*
- R IV+V 0.85–1.04× HT II. SIPH with narrower basal stem extending over about 0.3 of length *Cavariella salicis*

6. Supracaudal process reduced to a warty knob, distinctly shorter than ANT II. Head and cauda dark, tergum with variably developed dark markings. Secondary rhinaria sometimes present on ANT III–V or IV–V (of aptera). ANT PT/BASE 1.3–1.8. Femoral hairs numerous, long and fine, longer than 0.5× width of hind femur *Cavariella oenanthi*
- Supracaudal process at least as long as ANT II. Head and cauda pale, tergum without dark markings. Antennae (of aptera) without secondary rhinaria. ANT PT/BASE 2.1–3.5. Femoral hairs sparse and shorter than 0.5× width of hind femur *Cavariella theobaldi*
7. SIPH very small and flangeless; less than 0.5× cauda and often not much longer (1.0–1.8×) than their diameter at midlength *Semiaphis heraclei*
- SIPH (if present at all) more than 0.6× cauda, and with a flange **8**
8. Head and most thoracic and abdominal segments with large, flat, dark-rimmed spinal tubercles (STu). SIPH short and dark with close-set rows of spinules. Cauda helmet-shaped, shorter than its basal width, with c.10–12 hairs *Anuraphis subterranea*
- STu absent or only on ABD TERG 7 or 7–8. SIPH (if present) smooth or with normal imbrication. Cauda (if at all evident) tongue- or finger-shaped, or if helmet-shaped then with 4–6 hairs **9**
9. SIPH and cauda both dark, with SIPH swollen on distal 0.7, and 0.9–1.4× cauda *Hyadaphis passerinii*
- Without that combination of characters **10**
10. SIPH strongly clavate, with swollen part maximally 1.8–2.1× minimum width on basal part, and with a subapical constriction bearing 2–3 rows of transverse striae below the well-developed flange. R IV+V 1.5–1.7× HT II. Apex of ANT PT pointed *Amphorophora cryptotaeniae*
11. Without that combination of characters go to key to polyphagous aphids, p. 1020

Oenothera*Oe. amoena* see *Clarkia amoena**Oe. berteriana**Oe. biennis**Oe. caespitosa**Oe. erythrosepala**Oe. grandiflora**Oe. muricata**Oe. oakesiana**Oe. odorata**Oe. parviflora**Oe. picensis**Oe. pilosella**Oe. rosea**Oe. sarmentosa**Oe. serrulata***Onagraceae***Aphis oenotherae**Anoecia [cornicola], oenotherae, [setariae];**Aphis gossypii, nasturtii, oenotherae, oestlundii;**Aulacorthum solani;**Macrosiphum euphorbiae, gaurae, [pallidum];**Myzus [biennis], oenotherae, persicae;**[Pemphigus oenotherae (nomen nudum)];**[Uroleucon ambrosiae]**Aphis oenotherae**Myzus ornatus; [Uroleucon nigrotuberculatum]**Aphis oenotherae**Brachycaudus cardui**Aphis oenotherae**Aphis gossypii, spiraeicola; Rhopalosiphoninus staphyleae**Aphis oenotherae**Aphis spiraeicola**Rhopalosiphoninus staphyleae**Rhopalosiphoninus staphyleae**[Cavariella aegopodii]**Aphis oenotherae*

HOST LISTS AND KEYS

Oe. subulifera
Oe. versicolor
Oenothera sp.

[*Myzus oenotherae*]
Brachycaudus helichrysi
Aphis [*epilobiarum*], [*epilobii*], [*grossulariae*], [*praeterita*],
sambuci

Key to apterae on *Oenothera*:-

1. ANT PT/BASE less than 0.5, with numerous long hairs. SIPH as large pores with surrounding hairs on shallow pigmented cones *Anoecia oenotherae*
- ANT PT/BASE more than 1.5, with few hairs. SIPH tubular **2**
2. ANT tubercles undeveloped or weakly developed, so that front of head is convex, straight or sinuous in dorsal view **3**
- ANT tubercles well developed, so there is deep frontal sinus in dorsal view **10**
3. Cauda helmet-shaped, not longer than its basal width, with 4–8 hairs. SIPH with a distinct annular subapical incision. Spiracular apertures large and rounded. ABD TERG 1 and 7 without marginal tubercles (MTu) **4**
- Cauda tongue-shaped, longer than its basal width, with 4–21 hairs. SIPH without a subapical annular incision. Spiracular apertures reniform. ABD TERG 1 and 7 with MTu **5**
4. Dorsal abdomen with an extensive solid black shield. ANT III 0.31–0.47 mm, 2.4–3.4× HT II. R IV+V 0.17–0.24 mm. SIPH dark, imbricated, 1.7–3.4× cauda *Brachycaudus cardui*
- Dorsal abdomen without a black shield. ANT III 0.07–0.25 mm, 0.9–2.2× HT II. R IV+V 0.10–0.15 mm. SIPH pale, smooth, 0.8–2.0× cauda *Brachycaudus helichrysi*
5. SIPH 2.2–4.5× cauda, which is black and bears 9–20 hairs. ABD TERG 2–4 (–6) as well as 1 and 7 with well-developed MTu *Aphis sambuci*
- SIPH 0.8–2.5× cauda, if more than 2.1× then cauda is pale or dusky and bears fewer hairs. ABD TERG 2–4 only sporadically with small MTu **6**
6. SIPH pale. R IV+V 0.155–0.17 mm long, with 6–9 accessory hairs. Cauda with 10–15 hairs *Aphis oenotherae*
- SIPH pale, dark, or dark-tipped. R IV+V 0.075–0.145 mm long, with 2 accessory hairs. Cauda with 4–15 hairs **7**
7. ANT PT/BASE 1.2–1.9. R IV+V 1.35–1.7× HT II. Anterior half of subgenital plate with 4–6 hairs *Aphis oestlundii*
- ANT PT/BASE 1.9–3.1. R IV+V 1.0–1.4× HT II. Anterior half of subgenital plate with 2 hairs **8**
8. SIPH pale except at apices *Aphis nasturtii*
- SIPH dark **9**
9. SIPH clearly darker than cauda, which has no constriction and bears 4–8 hairs *Aphis gossypii*
- SIPH and cauda both very dark. Cauda usually has an evident constriction between basal and distal part, and bears 7–15 hairs *Aphis spiraeicola*
10. SIPH with subapical reticulation (at least 4–5 rows of closed polygonal cells). Head smooth, with inner faces of ANT tubercles divergent **11**
- SIPH without subapical polygonal reticulation. Head spiculose, with inner faces of ANT tubercles parallel or apically convergent **12**
11. SIPH variably pigmented, often dark distally. ANT VI BASE 0.65–0.95× R IV+V, which is 1.1–1.3× HT II *Macrosiphum gaurae*
- SIPH usually pale, or only dusky at apices. ANT VI BASE 0.9–1.3× R IV+V, which is 0.85–1.1× HT II *Macrosiphum euphorbiae*

12. Longest hairs on ANT III more than $0.5 \times$ BD III (?). ANT dark beyond basal half of ANT V. SIPH $1.4\text{--}1.9 \times$ cauda (?) *Myzus biennis* (or *oenotherae*? – see text)*
 – Longest hairs on ANT III less than $0.5 \times$ BD III. ANT pale except for segmental apices. SIPH $1.9\text{--}2.5 \times$ cauda **13**
13. ANT III with (0–) 1–2 (–3) small rhinaria near base. Inner faces of ANT tubercles approximately parallel-sided. SIPH tapering/cylindrical on distal half *Aulacorthum solani*
 – ANT III without rhinaria. Inner faces of ANT tubercles apically convergent. SIPH slightly swollen on distal half *Myzus persicae*

Oldenlandia

O. corymbosa
O. herbacea
O. sclerophylla
Oldenlandia spp.

Rubiaceae

Aphis gossypii
Aphis gossypii
Aphis gossypii
 [*Acyrtosiphon pisum*]; *Aulacorthum solani*;
 [*Lipaphis pseudobrassicae*]; *Myzus cymbalariae*;
Uroleucon compositae

Use key to polyphagous aphids, p. 1020.

Olea see Blackman and Eastop (1994)

Olearia

O. gunniana
O. lyrata
O. passerinoides
O. pimeleoides
O. viscidula

Compositae

Aphis gossypii; [*Uroleucon* sp. (Leonard, 1972a)]
 [*Uroleucon* sp. (Leonard, 1972a)]
Myzus persicae; [*Uroleucon* sp. (Leonard, 1972a)]
 [*Uroleucon* sp. (Leonard, 1972a)]
Myzus persicae; [*Uroleucon* sp. (Leonard, 1972a)]

Use key to polyphagous aphids, p. 1020. (Note: the *Uroleucon* is a large, red, reportedly undescribed species.)

Omalotheca

O. caucasica

Compositae

Brachycaudus helichrysi

Oncidium

O. altissimum
O. cebolleta
O. sphacelatum

Orchidaceae

Cerataphis orchidearum; *Myzus persicae*; *Sitobion luteum*
Aphis spiraeicola
Toxoptera aurantii

Use key to apterae on orchids under *Cymbidium*.

Oncoba

O. brasiliensis see *Abetia*
O. crenata see *Laetia*
O. spinosa

Flacourtiaceae

Schoutedenia ralumensis; *Toxoptera aurantii*

Key to apterae on *Oncoba*:–

- ABD TERG 7 with a pair of long, pointed backwardly-directed processes. SIPH as short broad cones. ANT 5-segmented. ANT PT/BASE less than 1 *Schoutedenia ralumensis*
 – ABD TERG 7 without long processes. SIPH tubular, dark, much longer than wide. ANT 6-segmented, with ANT PT/BASE 3.5–5.0 *Toxoptera aurantii*

HOST LISTS AND KEYS

Onobrychis

O. gracilis
O. pulchella
O. sativa

O. sibirica
O. viciifolia

Leguminosae

Acyrtosiphon pisum
 [*Aphis* 'laburni' (=cytisorum?)]
Acyrtosiphon loti, *pisum*; *Aphis craccivora*, *pseudocomosa*;
Therioaphis trifolii
Aphis craccivora
Acyrtosiphon pisum; *Aphis craccivora*, *pseudocomosa*;
 [*Brachycaudus persicae*]

Key to apterae on *Onobrychis*:-

1. Fore coxae greatly enlarged. SIPH in form of truncate cones. Cauda knobbed, anal plate bilobed. Dorsal hairs with expanded apices, and arising from pigmented, tuberculate bases *Therioaphis trifolii*
- Fore coxae normal. SIPH tubular. Cauda tongue- or finger-shaped, anal plate entire. Dorsal hairs with blunt or pointed apices, not arising from tuberculate bases **2**
2. Body pale, spindle-shaped; BL 2.0–4.4 mm. ANT tubercles well developed with inner faces divergent. SIPH and cauda pale **3**
- Body oval, with an extensive dark dorsal shield; BL 1.4–2.2 mm. ANT tubercles weakly developed. SIPH and cauda both dark **4**
3. ANT I longer than wide and bearing 9–23 hairs. SIPH attenuate distally, thinner than hind tibia at midlength *Acyrtosiphon pisum*
- ANT I not longer than wide, bearing 6–10 hairs. SIPH not attenuate distally, as thick as or thicker than hind tibia at midlength *Acyrtosiphon loti*
4. Longest ANT hairs 0.67–1.4× ANT BD III. Femoral hairs about as long as trochantrofemoral suture. Cauda with 8–19 hairs (rarely less than 10) *Aphis pseudocomosa*
- Longest ANT hairs 0.37–0.75× ANT BD III. Femoral hairs shorter. Cauda with 4–9 hairs *Aphis craccivora*

Onoclea

O. sensibilis

O. struthiopteris

Dryopteridaceae

Amphorophora ampullata ssp. *laingi*;
Aulacorthum solani; *Neomyzus circumflexus*
Amphorophora ampullata, *ampullata* ssp. *laingi*

Use key to fern-feeding aphids under *Polypodium*.

Ononis

O. antiquorum
O. arvensis see *hircina*
O. diffusa
O. fruticosa
O. hircina (incl. *arvensis*)

O. leiosperma
O. minutissima
O. natrix (incl. *ramosissima*,
stenophylla)

Leguminosae

Aphis craccivora

Therioaphis ononidis
Acyrtosiphon ononis
Acyrtosiphon ononis, *pisum*;
Aphis brunnea, *craccivora*, *cytisorum*;
 [*Myzus* sp. (Bozhko, 1976a)]; *Therioaphis ononidis*
Aphis craccivora; *Therioaphis natricis*, *ononidis*, *trifolii*
Therioaphis alatina
Acyrtosiphon pisum; *Aphis brunnea*, *craccivora*;
Therioaphis alatina, *natricis*, *trifolii*

<i>O. pseudohircina</i>	<i>Acyrthosiphon ononis</i> ; <i>Aphis craccivora</i> ; <i>Therioaphis ononidis</i>
<i>O. pubescens</i>	<i>Aphis brunnea</i>
<i>O. repens</i> (incl. <i>mitis</i> , <i>procurrens</i>)	<i>Acyrthosiphon ononis</i> , <i>pisum</i> ; <i>Aphis kaltenbachi</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Therioaphis ononidis</i>
<i>O. serrata</i>	<i>Therioaphis ononidis</i>
<i>O. spinosa</i> (incl. var. <i>albiflora</i>)	<i>Acyrthosiphon ononis</i> , <i>pisum</i> ; <i>Aphis craccivora</i> , <i>kaltenbachi</i> , <i>?medicaginis</i> ; <i>Brachycaudus helichrysi</i> ; <i>Therioaphis alatina</i> , <i>hungarica</i> , <i>obscura</i> , <i>ononidis</i> , <i>trifolii</i>
<i>Ononis</i> sp.	<i>Aphis fabae</i>

Key to apterae on *Ononis*:-

(Couplets 1–3 can be applied to alatae as well as apterae.)

1. Fore coxae greatly enlarged. SIPH in form of truncate cones. Cauda knobbed, anal plate bilobed. Dorsal hairs with expanded apices, and arising from tuberculate bases that are often pigmented **2**
– Fore coxae normal. SIPH tubular. Cauda tongue- or finger-shaped, anal plate entire. Dorsal hairs with blunt or pointed apices, not arising from tuberculate bases **7**
2. ABD TERG 1–4 each with 6 or more long hairs *Therioaphis trifolii*
– ABD TERG 1–4 each with 4 long hairs (1 spinal pair and 1 marginal pair; occasionally there are also 1–2 much smaller hairs) **3**
3. R IV+V distinctly longer than HT II, and bearing 8–27 accessory hairs **4**
– R IV+V 0.7–0.95× HT II, and bearing 2–8 (–9) accessory hairs **6**
4. All adult viviparae alate. ABD TERG 8 with 2 (–3) hairs. (R IV+V with 17–25 accessory hairs) *Therioaphis alatina*
– Predominant morph apterous. ABD TERG 8 with 4–6 hairs **5**
5. R IV+V with 14–27 accessory hairs *Therioaphis natricis*
– R IV+V with 8–12 accessory hairs *Therioaphis ononidis*
6. ABD TERG 1–7 with very large paired variably pigmented sclerotic cross-bars, often fused across midline. R IV+V with 2–4 accessory hairs *Therioaphis obscura*
– ABD TERG 1–7 with hairs arising from separate sclerotic plates that are rarely fused across midline. R IV+V with 6–9 accessory hairs *Therioaphis hungarica*
7. Body spindle-shaped. ANT tubercles well developed, with inner faces smooth and divergent. ANT usually longer than BL **8**
– Body oval. ANT tubercles undeveloped or weakly developed, ANT shorter than BL **10**
8. SIPH with subapical polygonal reticulation, thicker than hind tibia at their respective midlengths. ANT VI BASE similar in length to R IV+V *Macrosiphum euphorbiae*
– SIPH without subapical polygonal reticulation, as thin as or thinner than hind tibia at their respective midlengths. ANT VI BASE 1.5–2.5× R IV+V **9**
9. ANT VI BASE 1.5–2.0× R IV+V, which bears (6–) 8–12 accessory hairs. R IV+V 0.75–0.95× HT II. Cauda with 11–23 hairs *Acyrthosiphon ononis*
– ANT VI BASE 2.0–2.5× R IV+V which bears 3–7 (–8) accessory hairs. R IV+V 0.67–0.85× HT II. Cauda with 8–14 hairs *Acyrthosiphon pisum*

HOST LISTS AND KEYS

10. Cauda helmet-shaped, not longer than its basal width. SIPH pale, smooth, with a subapical annular incision. Spiracular apertures large and rounded. ABD TERG 1 and 7 without marginal tubercles (MTu). Dorsal abdomen without dark markings *Brachycaudus helichrysi*
- Cauda tongue- or finger-shaped, longer than its basal width. SIPH dark, imbricated, without a subapical annular incision. Spiracular apertures reniform. ABD TERG 1 and 7 always with MTu. Dorsal abdomen usually with dark markings **11**
11. SIPH very short, flangeless, 0.2–0.3× cauda. Dorsum usually with a solid dark shield from metanotum to ABD TERG VI *Aphis kaltenbachi*
- SIPH with a distinct flange, and at least 0.8× cauda. Dorsum with or without a solid dark shield **12**
12. Very short haired; hairs on ABD TERG 8 are 11–16 µm, and on ABD TERG 3 marginally 11–12 µm. Posterior hair on hind trochanter 16–24 µm, 0.29–0.52× length of trochantrofemoral suture *Aphis ?medicaginis* (see text)
- Longer haired; hairs on ABD TERG 8 are 18–85 µm, and on ABD TERG 3 marginally 12–85 µm. Posterior hair on hind trochanter (0.34–) 0.5–2.0× length of trochantrofemoral suture **13**
13. ABD TERG 1–4 and 7, and sometimes also 5 and 6, with MTu. R IV+V 1.1–1.45× HT II and bearing 2–6 (usually 4–5) accessory hairs *Aphis brunnea*
- MTu only sporadically present on ABD TERG 2–4. R IV+V 0.9–1.2× HT II, with 2 accessory hairs **14**
14. Cauda with 11–25 hairs. Dorsal abdomen usually with a few small dark spots anterior to SIPH *Aphis fabae*
- Cauda with 4–13 hairs. Dorsal abdomen usually with extensive dark sclerotisation **15**
15. R IV+V 0.88–1.16× HT II (mostly 0.9–1.05×). Anterior half of genital plate with 2 (–3) hairs *Aphis craccivora*
- R IV+V 0.97–1.3× HT II (mostly 1.06–1.2×). Anterior half of genital plate with 2–8 hairs (mode 4, mean 5.2) *Aphis cytisorum*

Onopordon

O. acanthium

O. anisacanthum

O. illyricum

O. sibthopianum

Onopordon sp.

Compositae

Aphis craccivora, *fabae*, *solanella*, [symphyti], *terricola*,
[*Aphis* (*Protaphis*) sp. (Mier Durante, 1978)];
Brachycaudus cardui, *helichrysi*; *Capitophorus elaeagni*;
Dysaphis lappae ssp. *cynarae*; *Myzus persicae*;
Trama troglodytes; *Uroleucon aeneum*, [sonchi]
Myzus persicae
Brachycaudus cardui; [*Uroleucon sonchi*]
Aphis terricola
Uroleucon bicolor (?)

Key to apterae on *Onopordon*:-

1. HT II elongate, at least 0.5× hind tibia. SIPH absent. Eyes with only 3 facets *Trama troglodytes*
- HT II of normal length. SIPH present. Eyes multifaceted **2**
2. Cauda short, helmet-shaped or bluntly triangular, shorter than or not clearly longer than its basal width in dorsal view **3**
- Cauda elongate triangular, tongue- or finger-shaped, clearly longer than its basal width in dorsal view **6**

3. ANT PT/BASE 0.75–1.15. Cauda bluntly triangular with 10–20 hairs. ABD TERG 1 and 7 with well-developed marginal tubercles (MTu) *Aphis terricola*
- ANT PT/BASE 2.3–5.1. Cauda helmet-shaped, with 5–8 hairs. If ABD TERG 1 and 7 have MTu then these are also present on ABD TERG 2–5 4
4. Dorsal abdomen with an extensive solid black patch. SIPH 0.10–0.15× BL. Mesosternum with a pair of dark mammariform processes *Brachycaudus cardui*
- Dorsal abdomen without a solid black patch, at most with scattered dark markings. SIPH 0.05–0.10× BL. Mesosternum without mammariform processes 5
5. BL 0.9–2.0 mm. SIPH smooth, short and broad-based, 1.5–2.0× their diameter at midlength. Spinal and marginal tubercles (STu and MTu) rare or absent *Brachycaudus helichrysi*
- BL 2.1–3.0 mm. SIPH imbricated and about 3× their diameter at midlength. Numerous well-developed STu and MTu present *Dysaphis lappae* ssp. *cynarae*
6. Hairs on front of head and dorsal body mostly long and capitate, arising from tuberculate bases *Capitophorus eleagni*
- Hairs on front of head and dorsal body not capitate 7
7. BL 3.5–5.0 mm. ANT III with 17–45 rhinaria. SIPH dark, with reticulation on distal 0.15–0.25 of length 8
- BL less than 3.5, and other characters not in that combination go to key to polyphagous aphids, p. 1020
8. Cauda black. ABD TERG 2–4 consistently with well-developed MTu. R IV+V 1.2–1.3× HT II *Uroleucon aeneum*
- Cauda pale. ABD TERG 2–3 irregularly with very small MTu. R IV+V 0.79–0.84× HT II *Uroleucon bicolor* (? – see text)

Onosma*O. stellulatum***Boraginaceae***Brachycaudus cardui****Onosmodium****O. occidentale***Boraginaceae***Brachycaudus helichrysi****Onychium****O. japonicum***Adiantaceae***Idiopterus nephrolepidis****Ophiorhiza****Ophiorhiza* sp.**Rubiaceae***Aphis spiraeicola****Ophrys****O. apifera**O. fusca**O. sphegodes* (incl. *arenifera*)*O. todereana* (?*tenoreana*)**Orchidaceae***Aphis fabae**Dysaphis neostroyani**Aphis fabae**Aphis fabae*Use key to apterae of orchid-feeding aphids under *Cymbidium*.***Oplismenus****O. burmannii***Gramineae***Tetraneura fusiformis*

HOST LISTS AND KEYS

<i>O. compositus</i>	<i>Asiphonella dactylonii</i> ; <i>Ceratovacuna nekoashi</i> ; [<i>Hyalomyzus raoi</i>]; <i>Hysteronera setariae</i> ; <i>Micromyzodium spinulosum</i> ; <i>Pentalonia gavarri</i> ; <i>Pseudoregma panicola</i>
<i>O. hirtellus</i>	<i>Pseudoregma panicola</i>
<i>O. setarius</i>	<i>Pseudoregma panicola</i>
<i>O. undulatifolius</i>	<i>Ceratovacuna nekoashi</i> ; <i>Pseudoregma panicola</i> ; <i>Sitobion akebiae</i>
<i>Oplismenus</i> spp.	<i>Baizongia pistaciae</i> ; <i>Ceratovacuna lanigera</i> ; <i>Sitobion miscanthi</i>

Use key to apterae of grass-feeding aphids under *Digitaria*.

Oplopanax

O. horridum

Aphis helianthi

Araliaceae

Opopanax

O. chironium

Anuraphis shaposhnikovii; *Aphis fabae*

Umbelliferae

Key to apterae on *Opopanax*:-

(Both spp. have undeveloped or weakly-developed ANT tubercles, dark SIPH, cauda with more than 10 hairs, dark cross-bands on ABD TERG 7–8, and usually some scattered dark markings on ABD TERG 1–6.)

- Cauda shorter than its basal width in dorsal view. SIPH less than 2.5× longer than their basal diameters, with close-set transverse rows of small spinules. ABD TERG 1–7 all with marginal tubercles (MTu) and often with spinal tubercles (STu). R IV+V 1.25–1.6× HT II *Anuraphis shaposhnikovii*
- Cauda longer than its basal width. SIPH more than 2.5× their basal diameters, with normal imbrication. STu absent and only ABD 1 and 7 regularly with MTu. R IV+V 0.9–1.2 *Aphis fabae*

Opulaster see *Physocarpus*

Opuntia

O. aurantiaca

Aphis middletonii

O. dillenii

Aphis gossypii

O. ficus-indica

Aphis craccivora, *fabae*, *middletonii*; *Myzus persicae*

O. inermis

Aphis middletonii; *Pentalonia nigronervosa*

O. vulgaris

Aphis fabae

Opuntia sp.

Aphis gossypii

Cactaceae

Key to apterae on *Opuntia*:-

- ANT longer than BL, with ANT PT/BASE 5–8. Femora with basal 0.6 or more of length pale, rest contrastingly black. SIPH pale basally and dark distally. (Al. with broad-banded wing-veins, and radius fused with media to form a closed cell below pterostigma) *Pentalonia nigronervosa*
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Orchis

O. coriophora

Aphis fabae

O. purpureum

Aphis orchidis

Orchidaceae

Orchis spp. *Aulacorthum solani*; *Dysaphis neostroyani*;
Neomyzus circumflexus

Use key to apterae of orchid-feeding aphids under *Cymbidium*.

Oreocnide (incl. Villebrunea)

O. integrifolia *Greenidea bucktonis*

Urticaceae

Oreopanax

O. guatemalense *Myzus persicae*

Araliaceae

Origanum (incl. Majorana)

O. majorana (= *Majorana hortensis*) *Myzus ornatus*; *Neomyzus circumflexus*

O. paniculatum *Aphis origani*

O. syriaca *Eucarazzia elegans*

O. tyttanthum *Aphis origani*

O. virens *Aphis origani*; *Myzus ornatus*

O. vulgare *Aphis fabae*, *gossypii*, *nasturtii*, *origani*;
Aulacorthum solani; *Kaltenbachiella pallida*;
Myzus ornatus, *persicae*; *Ovatus crataegarius*

Labiatae

Key to apterae on *Origanum*:–

1. ANT usually 4-segmented, 0.12–0.15× BL, with PT/BASE less than 0.5. Eyes 3-faceted. SIPH absent. Legs very short, with fore- and midtarsi usually 1-segmented. Dorsal wax glands present on head, thorax and ABD TERG 1–8, comprising facets surrounding an elongate central area
Kaltenbachiella pallida
- ANT 5- or 6-segmented, more than 0.5× BL, with PT/BASE more than 1. Eyes multifaceted, SIPH present, tarsi 2-segmented and wax glands not evident **2**
2. SIPH strongly swollen, with maximum diameter of swollen part more than 2× minimum diameter of stem, smooth except for a little subapical polygonal reticulation, and 5.4–8.2× cauda
Eucarazzia elegans
- SIPH not swollen or much less swollen, and less than 3.5× cauda **3**
3. Head smooth with ANT tubercles weakly developed. Marginal tubercles (MTu) present on ABD TERG 1 and 7 **4**
- Head spiculose with well-developed ANT tubercles, their inner faces spiculose or scabrous and steep-sided. MTu absent from ABD TERG 1 and 7 **7**
4. SIPH pale with dark apices *Aphis nasturtii*
- SIPH wholly dark **5**
5. Cauda with 11–24 hairs. Hairs on ANT III 0.8–3.4× BD III *Aphis fabae*
- Cauda with 4–8 hairs. Hairs on ANT III 0.3–0.7× BD III **6**
6. SIPH 0.10–0.12× BL, 1.05–1.45× cauda. ABD TERG 7 and 8 usually with narrow dusky or dark cross-bands *Aphis origani*
- SIPH 0.12–0.26× BL, 1.3–2.5× cauda. ABD TERG 7 and 8 rarely with dark cross-bands *Aphis gossypii*
7. Dorsal abdomen without any dark markings **8**
- Dorsal abdomen with dark markings **10**

HOST LISTS AND KEYS

8. SIPH slightly but distinctly swollen on distal half. ANT 0.7–1.0× BL *Myzus persicae*
– SIPH tapering/cylindrical on distal half. ANT 1.1–1.5× BL **9**
9. Inner faces of ANT tubercles with convergent, rounded, scabrous processes. ANT III without rhinaria. ANT PT/BASE 5.2–7.6. R IV+V 1.3–1.6× HT II, with 2–4 accessory hairs *Ovatus crataegarius*
– Inner faces of ANT tubercles without processes, approximately parallel. ANT III usually with 1–2 small rhinaria near base. ANT PT/BASE 4.0–5.4. R IV+V 1.1–1.4× HT II, with 5–7 accessory hairs *Aulacorthum solani*
10. Dorsal abdomen with a large, roughly U-shaped black patch. ANT PT/BASE 4.3–5.2 *Neomyzus circumflexus*
– Dorsal abdomen with a pattern of dark intersegmental markings. ANT PT/BASE 1.7–2.8 *Myzus ornatus*

Orixa

O. japonica

Rutaceae

Aulacorthum magnoliae, ?*solani* (as *Myzus kusaki* Shinji)

Use key to polyphagous aphids, p. 1020.

Orlaya

O. grandiflora

Umbelliferae

Aphis solanella; *Cavariella theobaldi*; *Dysaphis crataegi*

Key to apterae on *Orlaya*:-

(All three species have weakly-developed ANT tubercles and tapering/cylindrical SIPH.)

1. ABD TERG 8 with a backwardly-pointed process bearing 2 hairs *Cavariella theobaldi*
– No process on ABD TERG 8 **2**
2. Cauda helmet-shaped, not longer than its basal width, usually with 5 hairs. Spinal tubercles (STu) present on head and ABD TERG 8 or, 7 and 8, and marginal tubercles (MTu) on ABD TERG 1–5, but not usually on 7 *Dysaphis crataegi*
– Cauda tongue-shaped, longer than its basal width, with 11–23 hairs. STu absent, and MTu only regularly present on ABD TERG 1 and 7 *Aphis fabae* group (incl. *solanella*)

Ormenis see *Chamaemelum*

Ornithogalum

O. dubium

Ornithogalum spp.

Hyacinthaceae

Aphis gossypii

Myzus persicae; *Rhopalosiphum nymphaeae*, *padi*

Key to apterae on *Ornithogalum*:-

- Dorsal cuticle with a pattern of spinules arranged in polygons, with 1–3 spicules in the centre of each polygon. SIPH clavate *Rhopalosiphum nymphaeae*
– Without the above combination of characters; if dorsal cuticle has a pattern of spinules arranged in polygons **then** SIPH not clavate go to key to polyphagous aphids, p. 1020

Ornithopus

O. perpusillus

Leguminosae

Acyrtosiphon pisum; *Aphis craccivora*

Key to apterae on *Ornithopus*:-

- Body oval, with an extensive black sclerotic dorsal shield, BL 1.4–2.2 mm. SIPH and cauda black
Aphis craccivora
- Body spindle-shaped, pale, BL 2.5–4.4 mm. SIPH and cauda pale. (Additional check – ANT VI BASE 0.25–0.4 mm, 1.8–2.3× R IV+V – otherwise go to key to polyphagous aphids)
Acyrtosiphon pisum

Orobanche (incl. *Aphyllon*)

O. aegyptiaca

O. hederæ

O. lortala

O. lutea

O. muteli

O. ramosa

Orobanche sp.

Orobanchaceae

Aphis gossypii, [*Aphis* sp. (Davletshina, 1964)];

Rectinasus buxtoni

Macrosiphum euphorbiae

Nasonovia ribisnigri

[*Aphis orobanches*]

[*Aphis orobanches*]

[*Aphis orobanches*]; [*Dysaphis candicans*];

[*Brachycaudus cardui* (? – as *Aphis phelipaeae* Passerini)]

[*Anuraphis subterranea*]; *Aphis middletonii*;

[*Siphonophora orobanches* Lichtenstein (nomen nudum)];

Myzus persicae; *Rhopalosiphum rufiabdominale*;

Smynthuodes betae

Key to apterae on *Orobanche*:-

[Only the original descriptions of *Aphis orobanches* and *Dysaphis candicans* are available (Passerini, 1879), and are insufficient to include these species in the key; see text under these names for further information.]

1. ANT 5-segmented, with ANT V BASE very long, more than 15× longer than the short peg-like PT. R IV+V extremely long, similar in length to hind femur
Rectinasus buxtoni
- ANT 5- or 6-segmented, base of last segment and R IV+V relatively much shorter **2**
2. Thoracic spiracles greatly enlarged, rounded, much larger than abdominal spiracles. ANT PT/BASE 7.0–11.4, usually more than 8.0. ANT III with 14–36 rhinaria
Nasonovia ribisnigri
- Thoracic spiracles similar in size to abdominal ones. ANT PT/BASE less than 6. ANT III with 0–10 rhinaria
go to key to polyphagous aphids, p. 1020

Ortantha see *Odontites*

Orthillia (incl. *Ramischia*)

O. secunda

Ericaceae

Aulacorthum pirolacearum (= *rufum*?)

Orthocarpus

O. luteus

O. purpurascens

Scrophulariaceae

Nasonovia alpina

Macrosiphum orthocarpus

Key to apterae on *Orthocarpus*:-

- BL 1.9–2.5 mm. ANT III-V dark only at apices, and SIPH pale or uniformly pigmented, without sub-apical polygonal reticulation. (Also check: thoracic spiracular apertures much larger than abdominal ones, which are almost covered by cowl-like opercula. R IV+V 1.6–2.1× HT II, with 12–18 accessory hairs)
Nasonovia alpina

HOST LISTS AND KEYS

- BL more than 3 mm. ANT black beyond basal part of III. SIPH black on distal c.0.7 (and with sub-apical reticulation?) *Macrosiphum orthocarpus**

Orthostemon=*Acca*

Oryza

O. sativa

Gramineae

Anoecia corni, fulviabdominalis; Aphis gossypii; Brachysiphoniella montana; Chaetogeica polychaeta; Diuraphis noxia; Forda orientalis; Geoica lucifuga, setulosa, utricularia; Hyalopterus amygdali; Hysteroneura setariae; Melanaphis sacchari; Metopolophium dirhodum; Paraclotus cimiciformis; [Prociphilus sp.]; Rhopalosiphum maidis, nymphaeae, padi, rufiabdominale, rufulum; Schizaphis graminum; Siphia flava, glyceriae; Sitobion akebiae, avenae, graminis, miscanthi; Tetraneura basui, fusiformis, javensis, nigriabdominalis, radicolica, ulmi

Use key to apterae of grass-feeding aphids under *Digitaria*.

Oryzopsis (incl. *Eriocoma, Piptantherum*)

O. cuspidata

O. lateralis

O. milacea

Gramineae

Forda marginata
Sitobion himalayensis
Melanaphis sacchari; Myzus persicae; Sitobion avenae

Use key to apterae of grass-feeding aphids under *Digitaria*.

Osbeckia

O. capitata

O. chinensis

O. crinata

Melastomataceae

Aphis gossypii, nasturtii; [Capitophorus carduinus]; Myzus ornatus, persicae
Aphis nasturtii; Brachycaudus helichrysi; [Rhopalosiphum rufiabdominale]
Aphis gossypii; [Capitophorus sp.]; Myzus persicae; Toxoptera aurantii

Use key to polyphagous aphids, p. 1020.

Osmanthus see Blackman and Eastop (1994)

Osmaronia see *Oemleria*

Osmia see *Eupatorium*

Osmorhiza

O. aristata

O. chilensis

Umbelliferae

Semiaphis heraclei
Macrosiphum euphorbiae; Myzus ascalonicus; [Rhopalosiphoninus staphyleae]

O. claytoni
O. longistylis

Aphis fabae; *Cavariella aegopodii*, *theobaldi*
Aphis fabae

Use key to apterae on *Apium*.

Osmunda

O. asiatica
O. cinnamomea
O. claytoniana
O. japonica
O. regalis

Osmundaceae

Micromyzus osmundae
Amphorophora ampullata ssp. *laingi*
Micromyzus osmundae
Amphorophora ampullata; *Taiwanomyzus babai*, *filicis*
Aulacorthum solani; *Macrosiphum walkeri*;
Micromyzella pterisoides; *Neomyzus circumflexus*
Macrosiphum euphorbiae

Osmunda sp.

Use key to apterae on ferns under *Polypodium*.

Osmundastrum* see *Osmunda

Osteomeles

O. schwerinae
O. subrotunda

Rosaceae

Myzus persicae
Aphis gossypii

Use key to polyphagous aphids, p. 1020.

Osteospermum

O. ecklonis
O. moniliferum
O. spinescens
O. vaillantii

Compositae

Macrosiphum euphorbiae; *Uroleucon compositae*
Aulacorthum solani; *Myzus persicae*
Aphis craccivora
Myzus persicae

Use key to polyphagous aphids, p. 1020.

Ostryoderris* see *Aganope

***Othonna* (incl. *Hertia*, *Othonnopsis*)**

O. cheirifolia

Compositae

Macrosiphum euphorbiae

Othonnopsis* see *Othonna

Otites* see *Silene

Otochilus

O. porreta

Orchidaceae

Sitobion indicum, *luteum*

Use key to apterae on orchids under *Cymbidium*.

Ottelia

O. alismoidis

Hydrocharitaceae

Rhopalosiphum nymphaeae

Ourisia

O. macrophylla

Scrophulariaceae

Neomyzus circumflexus

Ourouparia see *Uncaria*

Oxalis

O. acetosella

O. cernua

O. corniculata

O. deppei

O. enneaphylla

O. latifolia

O. martiana

O. oregana

O. pes-caprae

O. rosea

O. semilobo

O. stricta

O. triflora

O. variabilis

O. versicolor

Oxalis sp.

Oxalidaceae

Aphis nasturtii; [*Hyperomyzus lactucae*];

Myzus persicae

Myzus persicae; *Rhopalosiphoninus staphyleae*

Aphis craccivora, *gossypii*, *nasturtii*, *spiraecola*;

Aulacorthum solani; *Brachycaudus helichrysi*;

Macrosiphum euphorbiae;

Myzus cymbalariae, *ornatus*, *persicae*;

Indomasonaphis anaphalidis; *Neomyzus circumflexus*;

Neotoxoptera oliveri;

Rhopalosiphoninus latysiphon, *staphyleae*;

Toxoptera aurantii

Aphis fabae; *Neomyzus circumflexus*

Myzus ascalonicus

Aphis gossypii; *Macrosiphum euphorbiae*;

[*Micromyzodium filicium*]; *Myzus persicae*

Myzus persicae

Macrosiphum sp. (Oregon, USA; BMNH, leg. D. Hille Ris

Lambers); *Rhopalosiphoninus staphyleae*

Aphis gossypii, *spiraecola*; *Macrosiphum euphorbiae*;

Myzus persicae

Myzus persicae

Aphis gossypii; *Myzus persicae*

Abstrusomyzus reticulatus; *Aphis middletonii*

Myzus ornatus, *persicae*

Myzus persicae

Aphis fabae

[*Rhopalosiphum maidis*]

Key to apterae on *Oxalis*:-

1. BL 3.8–4.7 mm. SIPH pale, smooth and markedly swollen on distal 0.7 (Figure 34a). Dorsal hairs long, thick, and blunt or slightly expanded apically *Indomasonaphis anaphalidis*
 – Without that combination of characters **2**
2. Dorsum with an extensive solid dark sclerotic shield, with very conspicuous dark non-spinulose reticulation. SIPH slightly swollen near apex *Abstrusomyzus reticulatus*
 – Dorsum with or without dark markings; **if** with a solid dark sclerotic dorsal shield then this either lacks reticulation, or the reticulation is either pale or finely spinulose, **and** SIPH are either markedly inflated over more than half of length or completely lack any trace of swelling **3**
3. SIPH cylindrical/tapering, with polygonal reticulation on distal 0.12–0.26 of length **4**
 – SIPH if cylindrical/tapering then without polygonal reticulation go to key to polyphagous aphids, p. 1020
4. ABD TERG 7 and 8 mostly with spinal tubercles (STu), and ABD TERG 2–5 mostly with marginal tubercles (MTu) *Macrosiphum* sp. (Oregon, BMNH colln)
 – Stu and MTu only sporadically present *Macrosiphum euphorbiae*

Oxybaphus*O. angustifolius* = *Allionia linearis**O. nyctagineus**Oxybaphus* sp.**Nyctagineae***Aphis fabae*; *Macrosiphum euphorbiae**Aphis helianthi*

Use key to polyphagous aphids, p. 1020.

Oxylobium*O. callistachys***Leguminosae***Aphis gossypii***Oxylobus***Oxylobus* sp.**Compositae***Aphis solitaria***Oxypetalum***Oxypetalum* spp.**Asclepiadaceae***Aphis gossypii*, *nerii*

Use key to polyphagous aphids, p. 1020.

Oxypogon see Lathyrus**Oxyria***O. digyna***Polygonaceae***Aphis fabae*; *Indomasonaphis rumicis*Key to apterae on *Oxyria*:–

- BL more than 3.5 mm. SIPH pale and strongly swollen on distal part *Indomasonaphis rumicis**
- BL less than 3 mm. SIPH dark, and tapering or cylindrical on distal part *Aphis fabae*

Oxytropis**Leguminosae***O. campestris**Acyrtosiphon churchillense*; *Aphis astragali**O. deflexa* var. *sericea**Acyrtosiphon churchillense**O. hudsonica**Acyrtosiphon churchillense*; *Aphis masoni**O. lamberti**Aphis ?craccivora* (as *medicaginis*)*O. microphylla**Aphis craccivora**O. oxyphylla**Aphis cracciae*, *oxytropis**O. sordida**Nearctaphis vera**Oxytropis* spp.*Acyrtosiphon kondoi*; *Aphis oxytropiradicis*Key to apterae on *Oxytropis*:–

1. (Only al. known, but the following should also apply to apt.) Cauda as short as or shorter than its basal width in dorsal view. SIPH with transverse rows of spinules. Longest hairs on ANT III 60–70 μ m, c.2.5 \times BD III *Nearctaphis vera**
- Cauda tongue- or finger-shaped, longer than its basal width. SIPH with normal imbrication. Longest hairs on ANT III 0.3–2.2 \times BD III **2**
2. ANT tubercles well developed, with divergent inner faces. ABD TERG 1 and 7 without marginal tubercles (MTu). (SIPH without subapical reticulation, and ANT VI BASE 1.0–1.8 \times R IV+V) **3**
- ANT tubercles undeveloped or weakly developed. ABD TERG 1 and 7 with MTu **4**
3. ANT III with (2–) 4–11 rhinaria in a row on basal half. SIPH 1.2–1.6 \times cauda *Acyrtosiphon churchillense*
- ANT III with 1 (–3) rhinaria near base. SIPH 1.6–2.1 \times cauda *Acyrtosiphon kondoi*

HOST LISTS AND KEYS

4. Dorsal abdomen without any sclerotisation. Large MTu consistently present on ABD TERG 2–4 as well as 1 and 7. R IV+V c.1.5× HT II *Aphis oxytropiradicis**
 – Dorsal abdomen with at least some sclerotisation. MTu absent from ABD TERG 2–4 or only sporadically present, and small. R IV+V less than 1.4× HT II **5**
5. Hairs on ANT III 0.3–0.75× BD III. Dorsal abdomen usually with a solid black shield extending over all of ABD TERG 1–6. SIPH 1.2–2.2× cauda, which bears 4–9 hairs *Aphis craccivora*
 – Hairs on ANT III 0.8–2.2× BD III. Dorsal abdomen with scattered or segmentally-divided black markings, or with a variably developed or fragmented black shield that does not usually extend laterally to unite with marginal sclerites on ABD TERG 1–3. SIPH 0.5–1.1× cauda, which bears 6–16 hairs **6**
6. R IV+V markedly narrowed subapically, with acute apex; 1.2–1.3× HT II *Aphis oxytropis**
 – R IV+V tapering gradually to blunt apex; 0.8–1.1× HT II **7**
7. ANT PT/BASE (1.7–) 1.9–2.4. Dorsal abdomen often with black spinopleural bars or patches on ABD TERG 4–6 or 5–6, but ABD TERG 1–2 (–3) only with scattered small sclerites *Aphis craccae*
 – ANT PT/BASE 1.3–1.9 (–2.0). Dorsal abdomen with solid black shield on middle parts of ABD TERG 1–3 or 1–4 and extending completely across ABD TERG 4–6 or 5–6 **8**
8. SIPH (0.65–) 0.70–1.1× cauda *Aphis astragali*
 – SIPH 0.50–0.65 (–0.67)× cauda *Aphis masoni*

Ozoroa see Blackman and Eastop (1994)

Ozothamnus

O. leptophyllus

Compositae

Aphidini gen. and sp. indet. (New Zealand, BMNH colln, leg M. Stufkens)

Pachira

Pachira spp.

Bombaceae

Aphis craccivora, *gossypii*, *middletonii*

Use key to polyphagous aphids, p. 1020.

Pachycarpus

P. schinzianus

Asclepiadaceae

Aphis nerii

Pachypleurum

P. alpinum

Umbelliferae

Cavariella nipponica

Pachystachys

P. lutea

Acanthaceae

Aphis gossypii; *Toxoptera aurantii*

Use key to polyphagous aphids, p. 1020.

Paederia

P. foetida

P. scandens (incl. vars *mairei*,
maritima)

P. tomentosa

Rubiaceae

Aphis gossypii, *spiraecola*; *Aulacorthum nipponicum*
Aulacorthum esakii, *nipponicum*

Aulacorthum esakii, *nipponicum*

Key to apterae on *Paederia*:-

1. Head dark and densely spiculate at least on ventral surface, with well-developed, steep-sided ANT tubercles 2
 – Without that combination of characters go to key to polyphagous aphids, p. 1020
2. Tergum wholly dark sclerotic. SIPH cylindrical/tapering on distal half, mainly pale/dusky, sometimes darker at base and apex. Longest hairs on ANT III more than $0.5 \times$ BD III *Aulacorthum esakii*
 – Tergum not wholly sclerotic, often with variably developed dark sclerites on ABD TERG 1–6. SIPH somewhat swollen on distal half, and wholly dark. Longest hairs on ANT III less than $0.5 \times$ BD III *Aulacorthum nipponicum*

Paeonia

P. lactiflora
P. suffruticosa

Myzus persicae
Aphis spiraeicola

Paeoniaceae

Use key to polyphagous aphids, p. 1020.

Palicourea

P. alpina

Aulacorthum solani; *Toxoptera aurantii*

Rubiaceae

Use key to polyphagous aphids, p. 1020.

Palisota

P. hirsuta
P. thyrsoiflora

Pentalonia nigronervosa
Pentalonia nigronervosa

Commelinaceae***Paliurus***

P. spina-cristi
Paliurus sp.

Aphis [*paliuri* Lichtenstein (nomen nudum)], *nasturtii*
 [*Aphis exploratus*]

Rhamnaceae

Pallenis see *Asteriscus*

Palura

P. chinensis

Rhopalosiphum nymphaeae

Symplocaceae

Panax, *Pandanus* see Blackman and Eastop (1994)

Pandiaka

P. involucrata

Aphis gossypii

Amaranthaceae***Pandorea***

P. ricasoliana

Aphis gossypii

Bignoniaceae

Panicularia see *Glyceria*

Panicum

P. adenophorum
P. afzelii

Sitobion neusi, [*Sitobion* sp. (Millar, 1994)]
Aphis gossypii

Gramineae

HOST LISTS AND KEYS

<i>P. antidotale</i>	<i>Anoecia nemoralis</i> ; <i>Hysteroneura setariae</i> ; <i>Rhopalosiphum maidis</i>
<i>P. barbinode</i> (incl. <i>purpurascens</i>)	<i>Hysteroneura setariae</i> ; <i>Rhopalosiphum maidis</i>
<i>P. boliviense</i>	<i>Hysteroneura setariae</i>
<i>P. capillare</i>	<i>Anoecia corni</i> , <i>cornicola</i> ; <i>Aphis middletonii</i> ; <i>Hysteroneura setariae</i> ; <i>Rhopalosiphum maidis</i>
<i>P. clandestinum</i>	<i>Hysteroneura setariae</i>
<i>P. colonum</i> see <i>Echinochloa</i>	
<i>P. coloratum</i>	<i>Rhopalosiphum maidis</i> ; [<i>Sitobion</i> sp. (Millar, 1994)]
<i>P. colore</i>	<i>Rhopalosiphum maidis</i>
<i>P. conjugatum</i>	<i>Rhopalosiphum maidis</i>
<i>P. crus-corvi</i>	<i>Hysteroneura setariae</i>
<i>P. crusgalli</i> see <i>Echinochloa</i>	
<i>P. deustum</i>	<i>Rhopalosiphum maidis</i>
<i>P. dichotomiflorum</i>	<i>Anoecia corni</i> ; <i>Rhopalosiphum maidis</i>
<i>P. fasciculatum</i>	<i>Tetraneura fusiformis</i>
<i>P. fimbriatum</i>	<i>Rhopalosiphum maidis</i>
<i>P. flavidum</i>	<i>Hysteroneura setariae</i>
<i>P. glabrum</i> = <i>Digitaria ischaemum</i>	
<i>P. glanduliferum</i>	<i>Sitobion neusi</i>
<i>P. glutinosum</i>	<i>Hysteroneura setariae</i> ; <i>Rhopalosiphum padi</i>
<i>P. hemitomum</i>	<i>Rhopalosiphum maidis</i>
<i>P. hirticaule</i>	<i>Tetraneura fusiformis</i>
<i>P. infestum</i>	<i>Rhopalosiphum maidis</i>
<i>P. javanicum</i>	<i>Rhopalosiphum maidis</i> ; <i>Tetraneura javensis</i>
<i>P. laevifolium</i>	<i>Sitobion ?africanum</i>
<i>P. laxum</i>	<i>Hysteroneura setariae</i>
<i>P. maximum</i>	<i>Hysteroneura setariae</i> ; <i>Rhopalosiphum maidis</i> ; <i>Sipha flava</i> ; <i>Sitobion africanum</i> , <i>lambersi</i> , [<i>Sitobion</i> sp. (Millar, 1994)]; <i>Tetraneura fusiformis</i>
<i>P. miliaceum</i>	<i>Anoecia vagans</i> ; <i>Geoica utricularia</i> ; <i>Melanaphis sorghi</i> ; <i>Myzus persicae</i> ; <i>Paraclotus cimiciformis</i> ssp. <i>panicumi</i> ; [<i>Prociphilus bumeliae</i>]; <i>Rhopalosiphum maidis</i> , <i>padi</i> ; <i>Schizaphis graminum</i> ; <i>Sitobion avenae</i> ; <i>Tetraneura javensis</i> , <i>fusiformis</i> , <i>ulmi</i> , <i>yezoensis</i>
<i>P. montanum</i>	<i>Hysteroneura setariae</i>
<i>P. muticum</i>	<i>Hysteroneura setariae</i>
<i>P. novemnerve</i>	<i>Tetraneura fusiformis</i>
<i>P. paludosum</i>	<i>Brachysiphoniella montana</i>
<i>P. patens</i>	<i>Pseudoregma panicola</i>
<i>P. pilosum</i>	<i>Tetraneura fusiformis</i>
<i>P. plicatum</i>	<i>Hysteroneura setariae</i>
<i>P. polycaulon</i>	<i>Hysteroneura setariae</i> ; <i>Tetraneura fusiformis</i>
<i>P. proliferum</i>	<i>Anoecia corni</i> ; [<i>Colopha ulmicola</i> ? (as <i>Rhizobius spicatus</i>)]; <i>Hysteroneura setariae</i>
<i>P. prostratum</i>	<i>Hysteroneura setariae</i>
<i>P. purpurascens</i> see <i>barbinode</i>	

<i>P. repens</i>	<i>Brachysiphoniella montana</i> ; <i>Hysteroneura setariae</i> ; <i>Schizaphis hypersiphonata</i>
<i>P. reptans</i>	<i>Pseudoregma panicola</i> ; <i>Tetraneura fusiformis</i>
<i>P. sanguinale</i> see <i>Digitaria sanguinalis</i>	
<i>P. scoparium</i>	<i>Hysteroneura setariae</i> ; <i>Tetraneura fusiformis</i>
<i>P. sellowii</i>	<i>Tetraneura fusiformis</i>
<i>P. teneriffae</i> see <i>Tricholaena</i>	
<i>P. trichoides</i>	<i>Pseudoregma panicola</i>
<i>P. trigonum</i> see <i>Cyrtococcum</i>	
<i>P. turgidum</i>	<i>Forda ?riccobonii</i>
<i>P. virgatum</i>	<i>Anoecia cornicola</i> ; <i>Rhopalosiphum maidis</i>
Panicum spp.	<i>Anoecia fulviabdominalis</i> ; <i>Ceratovacuna graminum, panici</i> ; <i>Colopha ulmicola</i> ; <i>Diuraphis noxia</i> ; <i>Geoica utricularia</i> ; [<i>Kaltenbachiella nirecola</i>]; <i>Prociphilus erigeronensis</i> ; <i>Sipha elegans</i> ; <i>Sitobion miscanthi</i> ; <i>Tetraneura ulmi</i> ; <i>Toxoptera aurantii</i>

Use key to apterae of grass-feeding aphids under *Digitaria*.

Panzeria see **Panzerina**

Panzerina (incl. **Panzeria**)

P. lanata

Labiatae

Aphis panzeriae

Papaver

P. alpinum
P. croceum
P. decaisnei
P. dubium
P. hybridum
P. laestadianum
P. nudicaule

P. orientale

P. pilosum
P. rhoeas
P. somniferum

P. subpiriforme
Papaver spp.

Papaveraceae

Aulacorthum solani; *Rhopalosiphoninus staphyleae*
Acyrtosiphon ilka
Acyrtosiphon ilka
Aphis fabae; *Brachycaudus helichrysi*; *Myzus persicae*
Aphis fabae, solanella
Aphis fabae
Acyrtosiphon ilka; *Macrosiphum euphorbiae*;
Myzus persicae; *Neomyzus circumflexus*
Aulacorthum solani; *Brachycaudus helichrysi*;
Neomyzus circumflexus
Aphis fabae; *Brachycaudus cardui*
Aphis fabae; *Macrosiphum euphorbiae*; *Myzus persicae*
[*Acyrtosiphon papaverinum*], *papaverisuctum*, [titovi
Mordvilko (nomen nudum)];
Aphis fabae, gossypii, [idaei], nasturtii, solanella;
Brachycaudus helichrysi; [*Lipaphis pseudobrassicae*];
Macrosiphum euphorbiae, [stellariae];
Myzus ascalonicus, persicae, Rectinasus buxtoni
Rhopalosiphum padi, Smynthurodes betae
Macrosiphum euphorbiae
[*Macrosiphum stellariae*]; *Rhopalosiphum rufiabdominale*

HOST LISTS AND KEYS

Key to apterae on *Papaver*:-

1. ANT PT/BASE less than 0.3. Body and appendages densely hairy. SIPH absent 2
 – ANT PT/BASE at least 0.5. Body and appendages not densely hairy. SIPH present 3
2. ANT V BASE and R IV+V both very long, respectively about 1.7 and 2.5× width of head between antennal bases. ANT II similar in length to ANT I, much shorter than III *Rectinasus buxtoni*
 – ANT V BASE and R IV+V of normal length, both about 0.5× width of head between antennal bases. ANT II about twice as long as ANT I, similar in length to III *Smynthurodes betae*
3. SIPH pale, long, tapering or cylindrical on distal half, and without subapical polygonal reticulation. ANT tubercles with smooth, broadly divergent inner faces, and median frontal tubercle evident 4
 – SIPH either not pale, long and tapering, or with subapical polygonal reticulation, and other characters not in above combination 5
4. SIPH 1.67–2.2× cauda. R IV+V 0.75–0.95× HT II *Acyrtosiphon ilka*
 – SIPH 1.4–1.5× cauda. R IV+V 0.69–0.77× HT II *Acyrtosiphon papaverisuctum*
5. Cauda helmet-shaped, somewhat constricted at base, not longer than its basal width in dorsal view. SIPH with a subapical annular incision. Spiracular apertures large and rounded 6
 – Cauda not helmet-shaped. SIPH without a subapical annular incision. Spiracular apertures small, usually reniform go to key to polyphagous aphids, p. 1020
 (but note that specimens running to *Macrosiphum euphorbiae* could be *M. stellariae*)
6. Dorsal abdomen with an extensive solid black shield. ANT III 0.31–0.47 mm, 2.4–3.4× HT II. R IV+V 0.17–0.24 mm. SIPH dark, imbricated, 1.7–3.4× cauda *Brachycaudus cardui*
 – Dorsal abdomen without a black shield. ANT III 0.07–0.25 mm, 0.9–2.2× HT II. R IV+V 0.10–0.15 mm. SIPH pale, smooth, 0.8–2.0× cauda *Brachycaudus helichrysi*

Paphiopedilum

P. insigna

P. venustum

Paphiopedilum spp.

Orchidaceae

Neomyzus circumflexus;

Sitobion luteum/indicum group

Aulacorthum solani

Cerataphis orchidearum; [*Pentalonia nigronervosa*]

Use key to aphids on orchids under *Cymbidium*.

Pappea see Blackman and Eastop (1994)

Parabenzoin see *Lindera*

Parahebe

P. catarractae

Scrophulariaceae

Myzus ornatus

Paraixeris

P. denticulata

Compositae

Uroleucon formosanum

Paraseneo

P. hastata (incl. *orientalis*)

Compositae

Aphis fabae, [*grossmanniae*]; *Aulacorthum solani*;

Brachycaudus helichrysi; *Uroleucon fuchuense*

P. auriculata

Aphis fabae; *Uroleucon gobonis*

Key to apterae on *Paraseneo* :-

- SIPH dark with polygonal reticulation on distal 0.23–0.33 of length. Cauda pale. Hind tibia with a ventral row of short peg-like hairs. Dorsal abdominal hairs long and fine-pointed (longest more than 90 µm) *Uroleucon fuchuense*
- Without that combination of characters
go to key to polyphagous aphids, p. 1020, but specimens running to
Uroleucon compositae may be *U. gobonis*.

Paratropia* see *Schefflera***Pardanthopsis****P. dichotoma**Aphis fabae***Iridaceae*****Parentucellia****P. latifolia**Brachycaudus mimeuri* (?)**Scrophulariaceae***P. viscosa**Brachycaudus helichrysi, persicae*Key to apterae on *Parentucellia*:-

(All three species have a short, helmet-shaped cauda, somewhat constricted at base.)

- Dorsal abdomen usually with an extensive solid black shield. Femora dark except basally. SIPH dark, 2.2–3.4× cauda *Brachycaudus persicae* (or *mimeuri*?)
- Dorsal abdomen without a black shield. Femora mainly pale. SIPH pale, 0.8–2.0× cauda
Brachycaudus helichrysi

Parietaria*P. arborea**Aphis parietariae**P. diffusa**Aphis parietariae**P. floridana**Aphis gossypii**P. judaica* (incl. *officinalis*)*Aphis craccivora, fabae, parietariae**P. officinalis* see *judaica**P. punctata**Aphis parietariae**P. ramiflora**Aphis parietariae***Urticaceae**Key to apterae on *Parietaria*:-

(All species have dark SIPH and marginal tubercles on ABD TERG 1 and 7.)

1. Cauda with 11–24 hairs. Longest hairs on ANT III 0.8–2.2× BD III *Aphis fabae*
- Cauda with 4–10 hairs. Longest hairs on ANT III 0.3–0.8× BD III **2**
2. Dorsal abdomen with an extensive black sclerotic shield *Aphis craccivora*
- Dorsal abdomen without dark markings **3**
3. SIPH 1.0–1.5× cauda, which bears 6–10 hairs. R IV+V 1.36–1.63× HT II *Aphis parietariae*
- SIPH 1.3–2.5× cauda, which bears 4–8 hairs. R IV+V 1.1–1.4 (–1.5)× HT II *Aphis gossypii*

Parinaria* see Blackman and Eastop (1994)**Parkia****P. roxburghii**Toxoptera odinae***Leguminosae**

HOST LISTS AND KEYS

Parmentiera

P. edulis

Solanaceae

Toxoptera aurantii

Parodichloa see Poa

Parrotia

P. persica

Hamamelidaceae

Aphis gossypii

Parthenium

P. argentatum

P. hysterophorus

P. quinquefolia

Compositae

Rhopalosiphum rufiabdominale;
Uroleucon ambrosiae ssp. *lizerianum*
Acyrtosiphon bidenticola;
Aphis coreopsidis, *gossypii*, *spiraecola*;
Brachycaudus helichrysi;
Geopemphigus sp. (Mexico, BMNH colln);
Uroleucon ambrosiae, *ambrosiae* ssp. *lizerianum*,
pseudambrosiae
Aulacorthum solani; *Rhopalosiphoninus staphyleae*

Key to apterae on *Parthenium*:–

1. ANT PT/BASE less than 0.5. ANT V and VI with spinulose imbrication/reticulation. Eyes of 3 facets. SIPH absent. Paired spinal and marginal wax glands present *Geopemphigus* sp.
- ANT PT/BASE more than 1.5. ANT V and VI not spinulose. Eyes multifaceted. SIPH present. No discrete wax glands **2**
2. ANT tubercles weakly developed, not extending forward beyond middle of front of head in dorsal view. ABD TERG 1 and 7 with or without marginal tubercles (MTu) **3**
- ANT tubercles well developed. ABD TERG 1 and 7 without MTu **5**
3. Cauda helmet-shaped, not longer than its basal width in dorsal view, with a basal constriction. SIPH pale, smooth, with a subapical annular incision. Spiracular apertures large and rounded. ABD TERG 1 and 7 without MTu *Brachycaudus helichrysi*
- Cauda tongue- or finger-shaped, longer than its basal width, without a basal constriction. SIPH dark, without a subapical annular incision. Spiracular apertures small and reniform. ABD TERG 1 and 7 with MTu **4**
4. SIPH 0.24–0.40× BL, about twice as long as the much paler cauda. Head, ANT I, II and basal part of III very pale, contrasting with dark rest of ANT *Aphis coreopsidis*
- SIPH only up to 0.2× BL. Cauda pale or dark. Head and antennal segments differently pigmented go to key to polyphagous aphids, p. 1020, starting at couplet 22
5. ANT tubercles with smooth, divergent inner faces. SIPH dark except for basal 0.2–0.3 of length, tapering/cylindrical on distal half, with subapical polygonal reticulation extending for much less than 0.1 of length *Acyrtosiphon bidenticola*
- Without that combination of characters; if SIPH are mainly dark then they are either swollen distally or have polygonal reticulation on much more than 0.1 of length **6**
6. SIPH wholly dark with polygonal reticulation on distal 0.25–0.4 of length, and 1.0–1.4× the long pale cauda. At least some of dorsal hairs arising from small scleroites **7**
- Without that combination of characters go to key to polyphagous aphids, p. 1020, starting at couplet 4

7. HT II rather long and thin, 6 or more= longer than its maximum thickness and $0.9-1.1 \times R\ IV+V$ *Uroleucon pseudambrosiae*
 – HT II less than $5 \times$ its maximum thickness and $0.70-0.85 \times R\ IV+V$ *Uroleucon ambrosiae*

Parthenocissus

P. quinquefolia
P. semicordata
P. tricuspidata
P. vitacea

Vitaceae

Aphis fabae, folsomii, illinoisensis
Greenidea parthenocissi; Neothelaxes parthenocissi, viticola
Aphis folsomii; Neomyzus parthenocissi
Aphis folsomii

Key to apterae on *Parthenocissus* (except couplet 2, where only data for alatae are available):–

1. ANT 5-segmented, with ANT PT/BASE less than 1. SIPH as pores. Cauda with a midway constriction delimiting the distal part as a knob 2
 – ANT 6-segmented, with ANT PT/BASE more than 1.5. SIPH tubular. Cauda not knobbed 3
2. (Al.) ANT III with oval rhinaria arranged in a row. HT II tapering, with longest ventral hairs $c.1.5 \times$ maximum diameter of segment. ABD TERG 1–7 each with one pair of spinal hairs, and ABD TERG 8 with 4 (–5) hairs *Neothelaxes viticola**
 – (Al.) ANT III with oval to annular rhinaria scattered over whole surface. HT II parallel-sided, with longest ventral hairs $c.4 \times$ maximum diameter of segment. ABD TERG 1–7 each with 3–6 spinal hairs, and ABD TERG 8 with 6 or more hairs *Neothelaxes parthenocissi**
3. SIPH $0.48-0.67 \times$ BL and bearing numerous very long hairs. Longest hairs on ANT III more than $200\ \mu\text{m}$ long, $5.5-7.6 \times$ BD III *Greenidea parthenocissi*
 – SIPH less than $0.3 \times$ BL, without hairs. Longest hairs on ANT III less than $100\ \mu\text{m}$ long, less than $3.5 \times$ BD III 4
4. Head spiculose, with well-developed, rounded, scabrous ANT tubercles. Dorsal abdomen with a large dark central sclerite on ABD TERG 2–4, large dark postsiphuncular sclerites present, and ABD TERG 7 and 8 also heavily sclerotised and with coarse, spinulose imbrication. ABD TERG 1 and 7 without marginal tubercles (MTu) *Neomyzus parthenocissi*
 – Head smooth, ANT tubercles weakly developed. Dorsal abdomen membranous or with different sclerotisation. ABD TERG 1 and 7 always with MTu 5
5. R IV+V with 8–10 accessory hairs. Cauda short and broad, about as long as its basal width, with more than 20 hairs *Aphis folsomii*
 – R IV+V with 2 accessory hairs. Cauda much longer than its basal width, and with 7–19 (–24) hairs 6
6. Hind tibiae wholly black. Longest hairs on ANT III $0.33-0.5 \times$ BD III *Aphis illinoisensis*
 – Hind tibiae mainly pale, with black apices. Longest hairs on ANT III $0.8-3.4 \times$ BD III *Aphis fabae*

Paspalum

P. alaini
P. auriculatum
P. blodgettii
P. boscianum
P. caespitosum
P. commersonii

Gramineae

Tetraneura fusiformis
Tetraneura fusiformis
Tetraneura fusiformis
Rhopalosiphum maidis
Tetraneura fusiformis
Geoica lucifuga; Hysteroneura setariae;
Tetraneura basui, fusiformis

HOST LISTS AND KEYS

<i>P. commutatum</i>	<i>Geoica lucifuga</i>
<i>P. conjugatum</i>	<i>Geoica lucifuga</i> ; <i>Hysteroneura setariae</i> ; <i>Ceratovacuna panici</i> ; <i>Rhopalosiphum padi</i> , <i>rufiabdominale</i> ; <i>Schizaphis hypersiphonata</i> (? – as <i>graminum</i>); <i>Sitobion lambersi</i> , <i>miscanthi</i> ; <i>Tetraneura basui</i> , <i>fusiformis</i>
<i>P. dilatatum</i>	<i>Hysteroneura setariae</i> ; <i>Rhopalosiphum maidis</i> ; <i>Schizaphis hypersiphonata</i> (? – as <i>graminum</i>); <i>Sitobion avenae</i> , <i>fragariae</i> , <i>graminis</i> , <i>miscanthi</i> , [<i>Sitobion</i> sp. (Millar, 1994)]; <i>Tetraneura fusiformis</i>
<i>P. distichum</i> (incl. <i>paspaloides</i>)	<i>Rhopalosiphum maidis</i> ; <i>Sipha glyceriae</i>
<i>P. fimbriatum</i>	<i>Hysteroneura setariae</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Rhopalosiphum maidis</i> ; <i>Tetraneura fusiformis</i>
<i>P. laxum</i>	<i>Hysteroneura setariae</i>
<i>P. longifolium</i>	<i>Hysteroneura setariae</i>
<i>P. melanospermum</i>	<i>Sipha flava</i>
<i>P. notatum</i>	<i>Hysteroneura setariae</i>
<i>P. paniculatum</i>	<i>Hysteroneura setariae</i> ; <i>Sipha flava</i>
<i>P. paspaloides</i> see <i>distichum</i>	
<i>P. regubium</i>	<i>Hysteroneura setariae</i>
<i>P. scrobiculatum</i>	<i>Aphis gossypii</i> ; <i>Hysteroneura setariae</i> ; <i>Rhopalosiphum maidis</i> ; <i>Sitobion graminis</i>
<i>P. secans</i>	<i>Hysteroneura setariae</i> ; <i>Tetraneura fusiformis</i>
<i>P. thunbergii</i>	<i>Sitobion akebiae</i>
<i>P. urvillei</i>	<i>Hysteroneura setariae</i>
<i>P. virgatum</i>	<i>Rhopalosiphum maidis</i>
<i>Paspalum</i> sp.	<i>Forda marginata</i> ; <i>Myzus obtusirostris</i>

Use key to apterae of grass-feeding aphids under Digitaria.

Passiflora

P. caerulea
P. edulis

P. foetida
P. ligularis
Passiflora spp.

Passifloraceae

Macrosiphum euphorbiae
Aphis gossypii; *Aulacorthum solani*;
Brachycaudus helichrysi; *Macrosiphum euphorbiae*;
Myzus persicae; *Toxoptera aurantii*
Brachycaudus helichrysi; *Myzus ornatus*; *Toxoptera citricidus*
Macrosiphum euphorbiae
Aphis spiraecola; *Aulacorthum magnoliae*;
[*Myzackaia verbasci*]; *Neomyzus circumflexus*

Use key to polyphagous aphids, p. 1020.

Pastinaca

P. hirsuta
P. sativa (incl. spp. *sylvestris*)

Umbelliferae

Aphis fabae
Anuraphis subterranea;
Aphis brohmeri, *decepta*, *fabae*, *fabae* spp. *mordwilkoi*,
gossypii, *helianthi*, *middletonii*, *spiraecola*;
Cavariella aegopodii, *japonica*, *konoii*, *pastinacae*,
salicicola, *theobaldi*;

Dysaphis bononii, *crataegi* ssp. *kunzei*, *lauberti*;
Hyadaphis foeniculi, *passerinii*; *Macrosiphum euphorbiae*;
Myzus ornatus, *persicae*; *Semiaphis pastinacae*

Key to apterae on *Pastinaca*:-

1. ANT tubercles undeveloped or only weakly developed, not projecting forward beyond middle of head in dorsal view 2
 - ANT tubercles well developed, projecting forward far beyond middle of head, so there is deep frontal sinus 22
2. ABD TERG 8 with a posteriorly projecting process above cauda 3
 - No supracaudal process 9
3. SIPH cylindrical /tapering, not clavate, or with only slight subapical or basal swelling 4
 - SIPH clavate, or at least somewhat swollen on distal part 6
4. ANT PT/BASE less than 2. Supracaudal process usually shorter than ANT II. (Figure 10h) 5
 - ANT PT/BASE more than 2. Supracaudal process usually longer than ANT II 5
5. ANT 6-segmented Cavariella theobaldi
 - ANT 5-segmented Cavariella angelicae
6. SIPH short and thick, less than 5× their maximum width (Figure 10a) Cavariella salicicola
 - SIPH clavate (with narrow region on basal half), more than 5× their maximum width (e.g., Figure 10b) 7
7. ANT PT/BASE 0.6–1.3. R IV+V 0.7–0.9 (–1.1)× HT II, without accessory hairs Cavariella aegopodii
 - ANT PT/BASE 1.4–4.0. R IV+V 1.0–1.2× HT II, with 2 accessory hairs 8
8. ANT PT/BASE 2.6–4.0. SIPH smooth on basal part. Cauda with 6–8 hairs Cavariella pastinacae
 - ANT PT/BASE 1.4–2.0. SIPH imbricated throughout. Cauda with 4–6 hairs Cavariella konoii
9. SIPH very small, thin and flangeless, about 0.5× cauda, with aperture slanted towards midline Semiaphis pastinacae
 - SIPH more than 0.75× cauda, with a distinct flange 10
10. Cauda helmet-shaped, a little shorter than its basal width in dorsal view. Head and ABD TERG 8 or 7–8 usually with spinal tubercles (STu) 11
 - Cauda tongue- or finger-shaped, or triangular but longer than or as long as its basal width. Head without, and ABD TERG 7–8 usually without, STu 14
11. SIPH less than 2× their basal diameters, with close-set rows of fine spinules. Cauda with 9–16 hairs. R IV+V 0.24–0.37 mm, 1.3–1.8× SIPH Anuraphis subterranea
 - SIPH more than 2× longer than their basal diameters, with normal imbrication. Cauda with 4–8 hairs. R IV+V 0.13–0.19 mm, 0.5–1.0× SIPH 12
12. Longest hairs on ANT III fine-pointed, 30–63 μm, 1.2–1.7× BD III Dysaphis lauberti
 - Longest hairs on ANT III 6–23 μm, 0.4–1.0× BD III 13
13. SIPH less than 3.5× longer than their basal diameters. Dorsal abdominal pigmentation never in form of complete cross-bands on ABD TERG 1–5 Dysaphis crataegi ssp. *kunzei*
 - SIPH 4 or more × longer than their basal diameters. Dorsal abdomen often with complete dark cross-bands on many or all of ABD TERG 1–8 Dysaphis bononii

HOST LISTS AND KEYS

14. SIPH clavate. ABD TERG 1 and 7 without marginal tubercles (MTu) **15**
 – SIPH tapering/cylindrical. ABD TERG 1 and 7 with MTu **16**
15. Prothorax with ventral sclerite 1.3–2.6× wider than long, with posterior margin often convex. SIPH 1.05–1.4× cauda. (Al. often with sec. rhinaria on ANT V) *Hyadaphis foeniculi*
 – Prothorax with ventral sclerite 2.2–3.6× wider than long, with straight posterior margin. SIPH 0.85–1.2× cauda (Al. rarely with sec. rhinaria on ANT V) *Hyadaphis passerinii*
16. Cauda bluntly triangular, hardly longer than its basal width. SIPH less than 0.1× BL, shorter than or as short as R IV+V. ANT III and IV often with sec. rhinaria. ANT PT/BASE less than 2 *Aphis middletonii*
 – Cauda tongue- or finger-shaped, clearly longer than its basal width. SIPH 0.1–0.25× BL, longer than R IV+V. No sec. rhinaria (except when alatiform). ANT PT/BASE usually more than 2 **17**
17. Cauda pale or dusky, distinctly paler than SIPH, and bearing 4–8 hairs *Aphis gossypii*
 – Cauda dark, as dark or nearly as dark as SIPH, and bearing 7–31 hairs **18**
18. ANT III 0.9–1.23× cauda. ABD TERG 8 with 2 hairs, and usually no dark cross-band. Cauda usually with a distinct midlength constriction, and bearing 7–15 (mostly 8–12) hairs *Aphis spiraeicola*
 – ANT III 1.25–2.8× cauda. ABD TERG 8 with (2–) 3–11 hairs, usually on or just posterior to a dark cross-band. Cauda usually without a constriction, and bearing 10–31 hairs **19**
19. R IV+V 1.1–1.4× HT II. MTu on ABD TERG 1 and 7 only. Anterior half of subgenital plate with 2 (–3) hairs. (ANT III of al. with 35–67 rather tuberculate rhinaria) *Aphis decepta*
 – R IV+V 0.8–1.4× HT II, but if more than 1.1× HT II then there are at least some MTu on ABD TERG 2–4. Anterior half of subgenital plate with 2–14 hairs. (ANT III of al. with 7–33 rhinaria) **20**
20. HT I with 3 hairs (sense peg present). ANT I dark, but ANT II pale or dusky, concolorous with basal half of III. Dorsal abdomen usually without any dark markings anterior to SIPH (except for dark intersegmental muscle sclerites). ANT III 1.05–1.95× PT, (1.6–) 2.0–4.0 (–5.0)× R IV+V, and 1.5–2.5 (–2.8)× cauda. SIPH 1.5–2.5 (–2.8)× cauda. (Al. with 15–40 rhinaria on ANT III) *Aphis helianthi*
 – HT I with 2 hairs (no sense peg). ANT I and II both dark, contrasting with III. Dorsal abdomen usually with some dark markings anterior to SIPH (in addition to dark intersegmental muscle sclerites). ANT III 0.65–1.3× PT, 1.2–2.6 (–3.0)× R IV+V and 1.2–1.6 (–1.9)× cauda. SIPH 0.7–1.6× cauda. ABD TERG 8 with 2–5 (–7) hairs. (Al. with 10–23 rhinaria on ANT III) **21**
21. ABD TERG 2–6 bearing a total of 0–3 small MTu. Cauda with 11–24 hairs. ABD TERG 8 with 2–5 (–7) hairs *Aphis fabae*
 – ABD TERG 2–6 bearing a total of 5–9 often rather large MTu. Cauda with 20–31 hairs. ABD TERG 8 with 5–12 hairs *Aphis brohmeri*
22. SIPH with a subapical zone of polygonal reticulation. Cuticle of head smooth, with inner faces of ANT tubercles divergent. ANT III with 1–7 rhinaria on basal half *Macrosiphum euphorbiae*
 – Head without subapical reticulation. Head spiculose, with inner faces of ANT tubercles scabrous and apically convergent. ANT III without rhinaria **23**
23. SIPH slightly clavate. ANT PT/BASE (2.8–) 3.1–4.5. Dorsal abdomen without dark intersegmental markings *Myzus persicae*
 – SIPH tapering with a slight ‘S’-curve. ANT PT/BASE 1.75–2.8. Dorsal abdomen with a pattern of dark intersegmental markings *Myzus ornatus*

Patrinia

P. rupestris
P. scabiosaefolia

P. siberica
P. villosa

Compositae

Aphis patriniae, *patriniphila*
Aphis patriniae, *patrinicola*, *patvaliphaga*, *spiraecola*;
[Uroleucon amamianum]
Aphis patvaliphaga
Aphis patriniae

Key to apterae on *Patrinia*:-

1. Marginal tubercles (MTu) only constantly present on prothorax and ABD TERG 1 and 7. R IV+V 0.6–1.24× HT II 2
– Large dome-like MTu present on ABD TERG 2–4 (–5), as well as on prothorax and ABD TERG 1 and 7. R IV+V 1.38–1.68× HT II 4
2. SIPH and cauda mainly pale. R IV+V 0.6–0.7× HT II. Cauda with 3–6 hairs. Longest hairs on ANT III 0.3–0.6× BD III 3
*Aphis patvaliphaga**
– SIPH and cauda dark. R IV+V 0.95–1.24× HT II. Cauda with 7–15 hairs. Longest hairs on ANT III 0.5–1.7× BD III 3
3. R IV+V 0.95–1.1× HT II. SIPH usually shorter than (0.66–1.02×) cauda 3
*Aphis patriniphila**
– R IV+V 1.01–1.24× HT II. SIPH usually longer than (0.86–1.71×) cauda 3
Aphis spiraecola
4. Longest hairs on ANT III 12–18µm long, 0.7–1.0× BD III. Femoral hairs long and fine, up to c.50µm long, 2.5–3× BD III and longer than basal diameter of hind femur. Cauda with 6–10 hairs 3
Aphis patriniae
– Longest hairs on ANT III and on femora 6–8µm long, 0.3–0.5× BD III and much shorter than basal diameter of hind femur. Cauda with 4–6 hairs 3
*Aphis patrinicola**

Paullinia

P. pinnata
Paullinia sp.

Sapindaceae

Aphis spiraecola
Aphis gossypii

Use key to polyphagous aphids, p. 1020.

Paulownia see Blackman and Eastop (1994)

Pavetta

Pavetta sp.

Rubiaceae

Sitobion africanum

Pavonia

P. fruticosa
P. grandiflora
P. hastata
P. spicata

Malvaceae

Aphis craccivora
Myzus persicae
Myzus persicae
Macrosiphum cuscutae

Key to apterae on *Pavonia*:-

1. Dorsum with an extensive black shield. ANT tubercles weakly developed. ABD TERG 1 and 7 with marginal tubercles (MTu) 2
Aphis craccivora
– Dorsum pale. ANT tubercles well developed. ABD TERG 1 and 7 without MTu 2

HOST LISTS AND KEYS

2. Head smooth with inner faces of ANT tubercles divergent. ANT III with 1–2 (–4) rhinaria. ANT III–VI, tibiae and SIPH wholly dark, contrasting with pale cauda. SIPH with polygonal reticulation on distal 0.11–0.16 of length *Macrosiphum cuscutae*
- Head spiculose, with inner faces of ANT tubercles apically convergent. ANT III without rhinaria. ANT III–VI, tibiae and SIPH mainly pale. SIPH slightly clavate, without subapical polygonal reticulation *Myzus persicae*

Paxistima

P. myrsinites

Celastraceae

Wahlgreniella arbuti

Pectis

P. floribunda

Compositae

Macrosiphum euphorbiae

Pedicularis

P. brachyodonta

P. bracteosa

P. canadensis

P. densiflorus

P. gracilis

P. hirsuta

P. olgae

P. palustris

P. pycnantha

P. resupinata

P. sceptrum-carolinum

P. sudetica

P. verticillata

Pedicularis spp.

Scrophulariaceae

Brachycaudus helichrysi

Macrosiphum euphorbiae; *Nasonovia alpina*

Ericaphis wakibae

?*Myzus* sp. (California; BMNH colln, leg. D. Hille Ris Lambers)

Brachycaudus helichrysi; *Dysaphis microsiphon*

Sitobion calvulum

Dysaphis emicis

Aphis nasturtii; *Ericaphis wakibae*

Brachycaudus cerasicola

Aphis frangulae, *pediculariphaga*, *septentrionalis*;
Myzus padellus (as *Cyrtomyzus pedicularis*)

Myzus cerasi

Metopolophium pedicularis

Hyperomyzus rhinanthi; *Myzus padellus*

Hyperomyzus zirmitisi; *Macrosiphum constrictum*;

Nearctaphis yohoensis

Key to apterae on *Pedicularis*:-

1. Cauda short and broad, bluntly triangular or helmet-shaped, shorter than or hardly longer than its basal width in dorsal view **2**
- Cauda tongue-shaped and longer than its basal width or, if short and triangular, then tapering to apex and often with a slight midlength constriction **8**
2. Dorsal cuticle of head densely spiculose. SIPH pale with rows of spicules *Nearctaphis yohoensis*
- Dorsal cuticle of head without spicules. SIPH pale or dark, smooth or with normal imbrication **3**
3. SIPH smooth, with a subapical annular incision. Spiracular apertures large and rounded. Spinal and marginal tubercles (STu and MTu) not usually present **4**
- SIPH imbricated, without a subapical annular incision. Spiracular apertures small and reniform. Some STu and/or MTu always present **5**
4. Dorsum with an extensive black shield. Longest hairs on ANT III 1.0–1.33× BD III *Brachycaudus cerasicola*
- Dorsum pale. Longest hairs on ANT III 0.5–0.7× BD III *Brachycaudus helichrysi*

5. Head with a pair of large STu. Well-developed MTu present on ABD TERG 1–5, or 1–7 **6**
 – Head without STu. MTu present on ABD TERG 1–4 and 7, or 1 and 7 **7**
6. STu present on head only. SIPH less than 1.3× cauda, and less than half width of cauda at base
Dysaphis microsiphon
 – STu on all or most segments. SIPH more than 1.5× cauda, and more than half width of cauda at base
Dysaphis emicis
7. Longest hairs on ANT III 0.4–0.5× BD III. ABD TERG 8 with 5–7 hairs, cauda with 7–11 hairs. MTu present on ABD TERG 2–4 (–5) as well as 1 and 7
*Aphis pediculariphaga**
 – Longest hairs on ANT III 0.8–1.0× BD III. ABD TERG 8 with 2–3 hairs, cauda with 4–8 hairs. MTu usually only present on ABD TERG 1 and 7
*Aphis septentrionalis**
8. Head spiculose, with scabrous, rounded ANT tubercles **9**
 – Head smooth or with a few spicules ventrally. ANT tubercles either weakly developed or smooth and divergent **12**
9. ANT longer than BL, with ANT PT/BASE 3.0–4.1. R IV with 8–12 accessory hairs. TERG with variable dusky/dark sclerotisation
Ericaphis wakibae
 – ANT 0.6–0.95× BL, with ANT PT/BASE 1.8–3.2 (–3.5). R IV with 2–4 accessory hairs. Tergum either pale or with an extensive dark sclerotic patch **10**
10. SIPH pale, 8–11× longer than their diameter at midlength, 0.65–0.85× ANT III, normally imbricated, and slightly swollen on distal half. ANT 0.8–0.95× BL, with PT/BASE 2.7–3.5. (Imm. with smooth hind tibiae)
Myzus sp. on *P. densiflorus*, California
 – SIPH dusky or dark, 3–9× longer than their midlength diameters, 1–2× ANT III, coarsely imbricated, and not at all swollen distally. ANT 0.6–0.8× BL with PT/BASE 1.8–3.3. (Imm. with outer apices of hind tibiae spinulose) **11**
11. Tergum pale. SIPH slightly swollen on basal part, 2.2–2.7× cauda, and less than 5× longer than their width at midlength
Myzus padellus
 – Tergum with an extensive dark sclerotic patch. SIPH cylindrical, 2.7–3.3× cauda, more than 6× longer than their width at midlength
Myzus cerasi
12. ANT III without rhinaria. ABD TERG 1 and 7 with marginal tubercles (MTu) **13**
 – ANT III usually with 1 or more rhinaria. ABD TERG 1 and 7 without MTu **14**
13. SIPH uniformly dark. Hairs on hind femur all shorter than diameter of femur at its base
Aphis frangulae group (incl. *A. gossypii*)
 – SIPH usually rather pale, darker at apex. Hairs on hind femur mainly longer, some of them about as long as, or longer than, diameter of femur at its base
Aphis nasturtii
14. SIPH smooth and markedly inflated over distal c.0.75, with maximum width of swollen part 1.6 or more× minimum width of basal part **15**
 – SIPH imbricated and tapering/cylindrical **16**
15. Dorsal abdomen with a large black central patch. SIPH black
Hyperomyzus rhinanthi
 – Dorsal abdomen without a black patch. SIPH pale with dark apices
Hyperomyzus zirnitsi
16. ANT BASE VI 0.20–0.22 mm long. Distal 0.06 of SIPH with a band of polygonal reticulation
*Macrosiphum constrictum**
 – ANT BASE VI 0.11–0.18 mm. SIPH without polygonal reticulation **17**
17. R IV+V 1.6–2.1× HT II, with 12–18 accessory hairs. Longest hairs on ANT III 1.1–1.5× BD III. ANT PT/BASE 5.8–6.8
Nasonovia alpina

HOST LISTS AND KEYS

- R IV+V 0.67–1.10× HT II, with 4–9 accessory hairs. Longest hairs on ANT III 0.3–0.6× BD III. ANT PT/BASE 2.2–3.9 18
- 18. ANT III with 0–1 rhinaria near base. ANT and dorsal hairs with pointed apices. R IV+V 0.10–0.11× HT II. ANT PT/BASE 2.2–2.9 *Sitobion calvulum*
- ANT III with 5–15 rhinaria extending onto distal half of segment. ANT and dorsal hairs with blunt apices. R IV+V 0.67–0.8× HT II. ANT PT/BASE 3.5–3.8 *Metopolophium pedicularis*

Pedilanthus

P. tithymaloides

Euphorbiaceae

Aphis gossypii

Peganum

P. harmala

Zygophyllaceae

Acyrtosiphon gossypii, [*pisum*];
Aphis craccivora, *gossypii*, [*umbrella*];
Brachyunguis harmalae; *Myzus persicae*

Key to apterae on *Peganum*:-

1. SIPH pale, very long and attenuated distally, thinner than hind tibiae at their respective midlengths, 0.33–0.45× BL and 2.5–3.5× cauda *Acyrtosiphon gossypii*
 - SIPH pale or dark, thicker and relatively shorter 2
2. ANT PT/BASE less than 1. SIPH pale, much shorter than cauda *Brachyunguis harmalae*
 - ANT PT/BASE more than 1. SIPH pale or dark, longer than cauda
go to key to polyphagous aphids, p. 1020

Peiranisa

P. benitoensis

Leguminosae

see *Cassia benitoensis*

Peireskia see *Pereskia*

Pelargonium

P. crithmifolium
P. denticulatum
P. × domesticum
P. grandiflorum
P. graveolens
P. hederæfolium
P. hortorum
P. inquinans
P. odoratissimum
P. peltatum

P. quercifolium
P. radula
P. violareum
P. zonale

Geraniaceae

Macrosiphum euphorbiae
Aulacorthum solani; *Brachycaudus helichrysi*
Acyrtosiphon malvae
Acyrtosiphon malvae; *Aulacorthum solani*
Acyrtosiphon malvae; *Macrosiphum euphorbiae*
Myzus persicae
Aphis gossypii; *Neomyzus circumflexus*
[*Cryptomyzus ribis*]
Acyrtosiphon malvae; *Aphis fabae*
Acyrtosiphon malvae; *Aulacorthum solani*;
Brachycaudus helichrysi
Acyrtosiphon malvae
Acyrtosiphon malvae
Acyrtosiphon malvae
Acyrtosiphon malvae; *Aphis fabae*, *gossypii*;
Aulacorthum solani; *Myzus persicae*

***Pelargonium* spp.**

Aphis [*extranea* Walker (nomen dubium)], *spiraecola*;
Myzus ornatus, [*targionii* del Guercio (nomen dubium)];
 [*Pentalonia nigronervosa*]; *Toxoptera aurantii*

Use key to polyphagous aphids, p. 1020.

Pellaea

P. calomelanos

P. glabella

Pellaea sp.

Adiantaceae

Micromyzella sleonensis

Macrosiphum adianti, *walkeri*; *Neomyzus circumflexus*

Macrosiphum woodsiae

Use key to apterae of fern-feeding aphids under *Polypodium*.

Peltandra* see *Meineckia***Peltophorum* see Blackman and Eastop (1994)*****Pennisetum***

P. alopecuroides

P. cenchoides

P. ciliare

P. clandestinum

P. flaccidum

P. giganticum

P. glaucum see *Setaria glauca*

P. macrourum

P. me;ianum

P. orientale

P. pedicillare

P. pedicellatum

P. polystachion (incl. *atrichum*)

P. pseudotrichoides

P. purpureum

P. setaceum

P. setosum

P. trachyphyllum

P. typhoides

Gramineae

Brachysiphoniella montana;

Rhopalosiphum padi, *rufiabdominale*;

Schiazaphis aurea; *Tetraneura fusiformis*

Tetraneura fusiformis

Hysteroneura setariae; *Rhopalosiphum maidis*; *Sipha flava*

Hysteroneura setariae; *Kugegania ageni*;

Rhopalosiphum maidis; *Schizaphis rotundiventris*;

Sitobion pauliani, [*Sitobion* sp. (Millar, 1994)];

Tetraneura fusiformis, *yezoensis*

Sitobion miscanthi

Rhopalosiphum maidis

Rhopalosiphum maidis

Rhopalosiphum maidis

Sitobion avenae

Rhopalosiphum padi

Aphis gossypii

Aphis gossypii; *Hysteroneura setariae*;

Sitobion africanum, *indicum*, *pauliani*

Sitobion africanum

Aphis gossypii; *Hysteroneura setariae*;

Melanaphis sacchari; *Pseudaphis sijui*;

Rhopalosiphum maidis; *Sipha flava*;

Sitobion bamendae, *leelamaniae*, *papillatum*, *pauliani*,

yakini, [*Sitobion* spp. (Essig, 1958; van Harten, 1972a)]

Tetraneura fusiformis

Pseudaphis arabica; *Sitobion fragariae*

Sitobion pauliani

Hysteroneura setariae; *Pseudaphis sijui*; *Sitobion yakini*

Forda orientalis; *Melanaphis sorghi*;

Rhopalosiphum maidis, *rufiabdominale*;

Sitobion leelamaniae, *miscanthi*

HOST LISTS AND KEYS

P. typhoideum

Forda hirsuta, *orientalis*; *Melanaphis sacchari*;
Rhopalosiphum maidis;
Sitobion leelamaniae, *miscanthi*
Tetraneura kalimpongensis

Pennisetum sp.

Use key to apterae of grass-feeding aphids under *Digitaria*.

Penstemon

P. biflorus

P. cordifolius

P. diffusus

P. fruticosus (incl. var. *scauleri*)

P. gloxinoides

P. glaber

P. laevigatus

P. newberryi

P. spectabilis

P. trifoliatus

P. virens

Penstemon spp.

Scrophulariaceae

Aphis fabae

Aphis fabae; *Macrosiphum euphorbiae*; *Myzus ornatus*

[*Aphis ramona*]

Aphis sierra

Aulacorthum solani; *Macrosiphum euphorbiae*;

Myzus persicae

Aphis helianthi

Aphis fabae; *Macrosiphum euphorbiae*

Aphis sierra

Myzus persicae; *Neomyzus circumflexus*

Aphis fabae

Aphis penstemonicola

[*Aphis solitaria*]; *Brachycaudus helichrysi*;

[*Hyadaphis foeniculi*]; [*Macrosiphum kiowanepum*];

Rhopalosiphoninus staphyleae

Key to apterae on *Penstemon*:-

1. ANT tubercles weakly developed. ABD TERG 1 and 7 with well developed marginal tubercles (MTu). Cauda bluntly triangular, shorter than or hardly longer than its basal width in dorsal view, with 4–6 hairs. Often with large dark postsiphuncular sclerites and dark cross bands on ABD TERG 6, 7 and 8 (broadest on 6) 2
 - Without that combination of characters; i.e., **if** ANT tubercles are weakly developed **and** ABD TERG 1 and 7 have well-developed MTu **then** cauda is either tongue-shaped and clearly longer than its basal width, or bears more 10 hairs go to key to polyphagous aphids, p. 1020
2. ANT III-V usually with numerous sec. rhinaria. (Al. with sec. rhinaria distributed ANT III 20–43, IV 12–20, V 5–9) *Aphis penstemonicola*
 - ANT usually without sec. rhinaria. (Al. with sec. rhinaria distributed ANT III 11–18, IV 0–2, V 0) *Aphis sierra*

Pentaglottis

P. sempervirens

Pentaglottis sp.

Boraginaceae

Ovatomyzus boraginacearum

[*Ovatomyzus chamaedrys*]

Pentalinon (incl. *Urechtites*)

P. luteum

Apocynaceae

Aphis craccivora, *gossypii*; *Toxoptera aurantii*

Use key to polyphagous aphids, p. 1020.

Pentanema (incl. *Vicoa*)

P. leptoclada

Compositae

Aphis gossypii

Pentaphylloides see *Potentilla*

Pentapterygium see *Agapetes*

Pentarrhinum

P. insipidum

Aphis nerii

Asclepiadaceae

Pentas

P. lanceolata

Pentas sp.

Aphis gossypii

Aphis spiraecola

Rubiaceae

Use key to polyphagous aphids, p. 1020.

Pentascnistis

P. minor

[*Pterasthenia shiraensis*]

Gramineae

Pentzia

P. incana

P. pilulifera

Coloradoa rufomaculata

Aphis craccivora

Compositae

Key to apterae on *Pentzia*:-

- Dorsal hairs spatulate or club-shaped (widening from base to rounded apex). R IV+V with a pointed apex and concave lateral margins. SIPH cylindrical for most of length, slightly swollen subapically. ANT PT/BASE 1.5–2.0 *Coloradoa rufomaculata*
- Dorsal hairs with pointed, blunt or slightly expanded apices. R IV+V with straight or convex lateral margins, and other characters not in that combination go to key to polyphagous aphids, p. 1020

Peperomia

P. pellucida

P. tenella

Aphis gossypii

Aphis gossypii

Piperaceae

Pepo see *Cucurbita*

***Pereskia* (incl. *Peireskia*)**

P. aculeata

Aphis craccivora, *nerii*, *spiraecola*;

Myzus ornatus, *persicae*; *Toxoptera aurantii*

Cactaceae

Use key to polyphagous aphids, p. 1020.

Perezia

P. multiflora

Aphis fabae

Compositae

***Pergularia* (incl. *Daemia*)**

P. cordata

P. daemia

P. extensa

P. tomentosa

P. variabilis

Aphis nerii

Aphis gossypii, *nerii*

Aphis [*asclepiadis*], *nerii*; *Toxoptera aurantii*

Aphis nerii

Myzus persicae

Asclepiadaceae

Use key to polyphagous aphids, p. 1020.

HOST LISTS AND KEYS

Perideridia
P. parishii

Umbelliferae

Hyadaphis foeniculi

Perilepta see Strobilanthes

Perilla

P. frutescens (incl. vars *argua*, *crispa*,
japonica)

P. nankinensis

P. ocymoides

Perilla spp.

Labiatae

Aphis egomae, *gossypii*; *Aulacorthum perillae*, [*siniperillae*];

Micromyzodium nipponicum

Aulacorthum perillae

Aphis gossypii; *Aulacorthum perillae*;

Macrosiphum perillae

[*Myzus siegesbeckicola*];

Sitobion aulacorthoides, *plectranthi*

Key to apterae on *Perilla*:–

1. ANT tubercles weakly developed, ABD TERG 1 and 7 with marginal tubercles (MTu), SIPH dark, cauda pale or dusky 2
– Without that combination of characters 3
2. ANT 5-segmented *Aphis egomae**
– ANT 6-segmented (except in hot-weather dwarfs) *Aphis gossypii*
3. SIPH with a subapical zone of reticulation (at least 4–5 rows of closed polygonal cells). Head smooth, or with minute spinules only on ventral surface. Abdomen with or without dark markings, but these not forming an extensive dorsal sclerotic shield 4
– SIPH without a distinct subapical zone of polygonal reticulation. Head usually spiculate both dorsally and ventrally. Dorsal abdomen with an extensive dusky/dark sclerotic shield 6
4. Abdomen with continuous broad dark marginal stripes, united by a dark band across ABD TERG 6 6
– Abdomen without extensive dark markings *Macrosiphum perillae* 5
5. ANT III with 1–7 rhinaria on basal half, ANT IV with 0. ANT PT/BASE 5.5–6.4 *Sitobion aulacorthoides*
– ANT III with 4–15 rhinaria distributed over whole length, and ANT IV with 0–4. ANT PT/BASE 4.8–5.5 *Sitobion plectranthi*
6. ANT shorter than BL. ANT III without rhinaria *Micromyzodium nipponicum*
– ANT longer than BL. ANT III with rhinaria near base *Aulacorthum perillae*

Periploca

P. glabra

P. graeca

P. linearifolia

P. sepium

Asclepiadaceae

[*Aphis* sp. (Bozhko, 1976a: 72)]

Aphis fabae, *gossypii*, *nasturtii*; *Myzus persicae*

Toxoptera aurantii

[*Aphis periplocophila*]

Use key to polyphagous aphids, p. 1020, but note that there are *Aphis* spp. on *Periploca*, recorded from Ukraine and China, that could not be included in a key on the basis of available information (*Aphis periplocophila* would probably key to *Aphis gossypii*).

Pernettya* see *Gaultheria***Perotis****P. vaginata***Gramineae***Hysteroneura setariae*;
Sitobion graminis, [*Sitobion* sp. (Millar, 1994)]Use key to apterae of grass-feeding aphids under *Digitaria*.***Perovskia****P. abratanoides**P. atriplicifolia**P. scrophulariaefolia***Labiatae***Brachycaudus cerasicola**Aphis solanella**Aphis craccivora*Key to apterae on *Perovskia*:–

- Cauda semicircular to helmet-shaped, shorter than its basal width in dorsal view. Spiracular apertures large and rounded. SIPH shorter than R IV+V. ABD TERG 1 and 7 without marginal tubercles (MTu). Dorsal abdomen with an extensive black sclerotic shield *Brachycaudus cerasicola*
- Cauda not helmet-shaped, spiracular apertures reniform and other characters not in that combination go to key to polyphagous aphids, p. 1020

Persea* see Blackman and Eastop (1994)**Persicaria****P. alpina**P. amphibia**P. amplexicaule**P. attenuata**P. bistorta**P. blumea**P. capitata**P. hydropiper***Polygonaceae***Brachycaudus brevirostratus*;*Capitophorus essigi*, *hippohaes**Aphis fabae*, *nasturtii*; *Aulacorthum solani*;*Capitophorus hippophaes*; *Rhopalosiphum nymphaeae**Toxoptera odinae*; *Tricaudatus polygoni**Capitophorus hippophaes**Acyrtosiphon bistorti*;*Aphis fabae*, *fabae* ssp. *cirsiiacanthoidis* (?), *solanella*;*Aulacorthum solani**Capitophorus* [*elaeagni*], *hippohaes* ssp. *javanicus*, *mitegoni**Aphis gossypii*; *Myzus brevisiphon*; *Sitobion miscanthi*[*Anoecia cornicola*]; *Aphis middletonii*, *nasturtii*, *spiraecola*;*Aulacorthum solani*;*Capitophorus* [*elaeagni*], *hippohaes*, *hippohaes* ssp.*javanicus*, *mitegoni*; [*Cryptomyzus galeopsidis*, *ribis*];*Kaltenbachiella nirecola*;*Macrosiphum euphorbiae*; *Myzus persicae*; *Pemphigus* sp.;*Prociphilus erigeronensis*; *Sitobion miscanthi**Trichosiphonaphis polygoni*, *polygonifoliae*,*polygoniformosana**P. lapathifolia* (incl. *nodosa*, *pallida*)*Aphis middletonii*, *nasturtii*, *spiraecola*; *Aulacorthum solani*;*Capitophorus hippophaes*, *hippohaes* ssp. *javanicus*;[*Cryptomyzus galeopsidis*, *ribis*];*Trichosiphonaphis polygonifoliae*

HOST LISTS AND KEYS

<i>P. maculosa</i>	<i>Aphis fabae</i> , <i>middletonii</i> , <i>nasturtii</i> , <i>polygonata</i> ; <i>Aspidaphis adjuvans</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus amygdalinus</i> , <i>rumexicolens</i> ; <i>Capitophorus hippophaes</i> , <i>hippophaes</i> ssp. <i>dubius</i> , <i>javanicus</i> ; [<i>Cryptomyzus ribis</i>]; [<i>Hyperomyzus nigricornis</i>]; <i>Macrosiphum euphorbiae</i> ; <i>Myzus</i> [<i>certus</i>], <i>persicae</i>
<i>P. minor</i>	<i>Aphis nasturtii</i> ; <i>Capitophorus hippophaes</i> , <i>mitegoni</i>
<i>P. mollis</i>	<i>Akkaia bengalensis</i> , <i>neopolygona</i> ; <i>Capitophorus hippophaes</i> ssp. <i>javanicus</i> , <i>mitegoni</i> ; <i>Tricaudatus polygona</i> ; <i>Trichosiphonaphis polygona</i>
<i>P. nepalensis</i>	<i>Akkaia polygona</i> ; <i>Aphis gossypii</i> ; <i>Aulacorthum solani</i> ; <i>Capitophorus hippophaes</i> ssp. <i>javanicus</i> , <i>mitegoni</i> ; <i>Myzus persicae</i>
<i>P. pennsylvannica</i>	<i>Aphis middletonii</i> ; <i>Capitophorus hippophaes</i> ; <i>Pemphigus</i> sp.
<i>P. senticosa</i>	<i>Capitophorus hippophaes</i> ssp. <i>javanicus</i>
<i>P. tinctoria</i>	<i>Capitophorus hippophaes</i> ssp. <i>javanicus</i>
<i>P. vivipara</i>	<i>Brachycaudus acaudatus</i> ; <i>Tricaudatus polygona</i>
<i>P. weyrichii</i>	<i>Capitophorus eniwanus</i> ; <i>Tricaudatus polygona</i>
<i>Persicaria</i> sp.	[<i>Aphis rumicis</i>]

Use key to apterae on *Polygonum*, in which all *Persicaria*-feeding aphids have been included.

Persimmon see *Diospyros*

Petasites

<i>P. albus</i>
<i>P. amplus</i>
<i>P. fragrans</i>
<i>P. georgicus</i>
<i>P. hybridus</i>
<i>P. japonicus</i> (incl. var. <i>giganteus</i>)
<i>P. niveus</i>
<i>P. offinalis</i>
<i>P. palmatus</i> see <i>tatewakianus</i>
<i>P. spurius</i>
<i>P. tatewakianus</i> (= <i>palmatus</i>)
<i>P. tomentosus</i>
<i>P. tricholobus</i>
<i>P. vulgaris</i>
<i>Petasites</i> spp.

Compositae

<i>Anuraphis farfarae</i> ; <i>Aphis nasturtii</i> ; <i>Aulacorthum solani</i> ; <i>Capitophorus similis</i> ; <i>Dysaphis lappae</i>
<i>Aphis fukii</i>
<i>Aulacorthum solani</i> ; <i>Myzus ornatus</i>
<i>Anuraphis farfarae</i>
<i>Aphis torquens</i> ; <i>Brachycaudus cardui</i> , <i>helichrysi</i> ; <i>Capitophorus similis</i> ; <i>Uroleucon tussilaginis</i>
<i>Aphis fukii</i> , <i>gossypii</i> ; <i>Capitophorus similis</i> ; <i>Aulacorthum solani</i> ; <i>Macrosiphoniella grandicauda</i> ; [<i>Macrosiphum petasitis</i> Matusumura (nomen dubium)]; <i>Myzus persicae</i> , [<i>varians</i>]; <i>Toxoptera odinae</i>
<i>Brachycaudus helichrysi</i>
<i>Anuraphis farfarae</i> ; <i>Brachycaudus cardui</i> , <i>helichrysi</i> ; <i>Capitophorus similis</i>
<i>Anuraphis farfarae</i> ; <i>Brachycaudus helichrysi</i> ; <i>Capitophorus similis</i>
<i>Aphis torquens</i> ; <i>Aulacorthum solani</i>
<i>Chomaphis mira</i>
<i>Aphis fukii</i> ; <i>Aulacorthum cirsicola</i> ; <i>Capitophorus takahashii</i> ; <i>Myzus persicae</i>
<i>Brachycaudus helichrysi</i>
<i>Aulacorthum kerriae</i> ; <i>Myzus ascalonicus</i>

Key to apterae on *Petasites*:-

1. Dorsal hairs long and thick with knobbed apices 2
 – Dorsal hairs not thick, if long then with fine apices 3
2. ANT III with 2–3 thick capitate hairs, c.0.7–0.8× BD III *Capitophorus similis*
 – ANT III with c. 6 thick capitate hairs, longer than BD III *Capitophorus takahashii**
3. ANT tubercles undeveloped or weakly developed, not extending forward further than middle part of front of head in dorsal view 4
 – ANT tubercles well developed, so that there is a deep frontal sinus 13
4. Cauda semicircular or helmet-shaped, shorter than its basal width in dorsal view 5
 – Cauda tongue- or finger-like, longer than its basal width in dorsal view 9
5. Prothorax with a pair of very large marginal tubercles (MTu), up to twice the diameter of the compound eye, and ABD TERG 1–5 also with very large MTu. SIPH long and flangeless, more than 7× cauda, and bearing some small pointed hairs *Chomaphis mira*
 – Prothorax if with MTu then these are smaller than compound eyes. ABD TERG 1–5 with or without MTu. SIPH less than 4× cauda, and without hairs 6
6. Spinal tubercles (STu) present on head, prothorax and some of ABD TERG 1–8. Well-developed MTu present on prothorax and ABD TERG 1–5 7
 – STu and MTu absent, or rarely present on 1–2 segments 8
7. ANT III with 6–19 rhinaria clustered near base. ABD TERG 8 without STu. SIPH with very close-set rows of fine spinules. SIPH 2.0–2.4× cauda, which bears c.15 hairs *Anuraphis farfarae*
 – ANT III without rhinaria. ABD TERG 7 and 8 both usually with STu. SIPH with normal imbrication. SIPH 1.5–2.0× cauda, which bears 5–7 hairs *Dysaphis lappae*
8. Dorsal abdomen with an extensive solid black shield. ANT III 0.31–0.47 mm, 2.4–3.4× HT II. R IV+V 0.17–0.24 mm. SIPH dark, imbricated, 1.7–3.4× cauda *Brachycaudus cardui*
 – Dorsal abdomen without a black shield. ANT III 0.07–0.25 mm, 0.9–2.2× HT II. R IV+V 0.10–0.15 mm. SIPH pale, smooth, 0.8–2.0× cauda *Brachycaudus helichrysi*
9. SIPH much shorter than (0.4–0.6×) cauda *Toxoptera odinae*
 – SIPH at least 0.8× cauda, and usually much longer 10
10. Cauda pale or dusky. Longest hairs on ANT III 0.4–0.8× BD III 11
 – Cauda dark. Hairs on ANT III long and fine, the longest 1.6–2.7× BD III 12
11. SIPH uniformly dark. Hairs on hind femur all shorter than diameter of femur at its base *Aphis gossypii*
 – SIPH usually rather pale, darker at apex. Hairs on hind femur mainly longer, some of them about as long as, or longer than, diameter of femur at its base *Aphis nasturtii*
12. SIPH 0.8–1.4× cauda, which bears 16–21 hairs. Well-developed conical or hemispherical MTu present on ABD TERG 2–4 (–5) as well as 1 and 7. (Al. with 7–20 sec. rhinaria on ANT III, 0–4 on IV, 0 on V) *Aphis torquens*
 – SIPH 1.7–2.1× cauda, which bears 10–13 hairs. MTu only consistently present on ABD TERG 1 and 7. (Al. with 20–32 sec. rhinaria on ANT III, 5–11 on IV and 0–7 on V) *Aphis fukii*
13. Cuticle of head smooth. SIPH with polygonal reticulation on distal 0.11–0.55 of length 14
 – Cuticle of head spiculose, at least ventrally. SIPH without polygonal reticulation 15

HOST LISTS AND KEYS

14. SIPH 1.5–1.8× cauda, with reticulation on distal 0.5–0.6 of length. R IV+V acutely pointed 0.7–0.9× HT II, and bearing very long accessory hairs, much longer than the 3 subapical pairs
Macrosiphoniella grandicauda
- SIPH 2.1–2.6× cauda, with reticulation on distal 0.11–0.15 of length. R IV+V blunt at apex, 1.3–1.5× HT II, with accessory hairs of normal length
Uroleucon tussilaginis
15. Dorsum mainly dark and sclerotic, leaving only a large pale central abdominal region and small pale areas anterior to bases of SIPH. Cauda dark
Aulacorthum kerriae
- Dorsum pale or with less extensive dark markings. Cauda pale **16**
16. ANT 1.6–1.7× BL, which is 2.7–4.1 mm. Hind tibiae very long, 0.9–1.5× BL. ANT III with 3–12 rhinaria in a row on basal half
Aulacorthum cirsicola
- ANT 0.5–1.5× BL, which is 1.0–3.0 mm. Hind tibia 0.4–0.8× BL. ANT III without rhinaria or with 1–3 rhinaria near base
 go to key to polyphagous aphids, p. 1020, starting at couplet 5

Petiveria

P. alliacea

Phytolaccaceae

[*Microparsus olivei*]; *Toxoptera citricidus*

Petrea

P. volubilis

Verbenaceae

Aphis gossypii; *Toxoptera aurantii*

Use key to polyphagous aphids, p. 1020.

Petrorhagia

P. saxifraga

Caryophyllaceae

Aphis ?craccivora; *Aulacorthum solani*;
Brachycaudus helichrysi; *Myzus ascalonicus*;
Neomyzus circumflexus

Use key to polyphagous aphids, p. 1020.

Petroselinum

P. crispum (incl. *sativum*)

Umbelliferae

Aphis fabae, *gossypii*, *solanella*; *Aulacorthum solani*;
Cavariella aegopodii, *archangelicae*;
Dysaphis apiifolia, *apiifolia* ssp. *petroselini*;
Hyadaphis foeniculi; *Myzus ornatus*, *persicae*;
Rhopalosiphoninus latysiphon;
Rhopalosiphum rufiabdominale; *Uroleucon compositae*
Aphis craccivora; *Cavariella aegopodii*;
Dysaphis apiifolia, [*tulipae*]
Semiaphis sp. (Turkey; BMNH colln, leg. N. Tuatay)

P. hortense

Petroselinum sp.

Key to apterae on *Petroselinum*:-

1. ABD TERG 8 with a backward-pointing process above the cauda. **2**
 – No supracaudal process **3**
2. ANT PT/BASE 0.6–1.4 (–1.55). R IV+V 0.7–1.05× HT II and without accessory hairs
Cavariella aegopodii
 – ANT PT/BASE 1.5–2.0. R IV+V 1.0–1.2× HT II, with 2 accessory hairs *Cavariella archangelicae*
3. SIPH very short, dark, slightly swollen and flangeless; 0.35–0.55× cauda, 0.65–0.75× R IV+V. ANT PT/BASE 1.8–2.2
Semiaphis sp. (Turkey, BMNH colln)
 – SIPH pale or dark, 0.8–3.4× cauda, longer than R IV+V. ANT PT/BASE 1.7–5.1 **4**

4. Cauda helmet-shaped, not longer than its basal width in dorsal view, with 5 hairs. Head and ABD TERG 7 and 8 usually with paired spinal tubercles (STu) *Dysaphis apiifolia* (incl. ssp. *petroselini*)
 – Cauda tongue- or finger-shaped, with 4–24 hairs. Head and ABD TERG 7–8 usually without STu 5
5. ANT less than 0.5× BL. SIPH clavate and 0.88–1.4× cauda *Hyadaphis foeniculi*
 – ANT 0.5–1.2× BL. SIPH 0.8–3.4× cauda, but if less than 1.6× cauda then not clavate
 go to key to polyphagous aphids, p. 1020

Petrosimonia

P. brachiata
P. brachyptera

Chenopodiaceae

Brachyunguis salsolacearum
Aphis craccivora

Key to apterae on *Petrosimonia*:-

- ANT PT/BASE 0.5–0.7. SIPH very short, 0.5–0.7× the short conical cauda. Clypeus globose
*Brachyunguis salsolacearum**
- ANT PT/BASE more than 1.8. SIPH more than 0.8× cauda. Clypeus normal
 go to key to polyphagous aphids, p. 1020

Petteria

P. ramentacea

Aphis cytisorum

Leguminosae**Petunia**

P. alba

Aphis craccivora; [*Lipaphis pseudobrassicae*];
Myzus persicae; *Rhopalosiphum rufiabdominale*

P. axillaris (incl. *hybrida*)

Aphis fabae; *Macrosiphum euphorbiae*; *Myzus persicae*;
Rhopalosiphum rufiabdominale

P. integrifolia

Aphis gossypii

P. violacea

[*Anoecia corni*, *himalayensis*]; *Aphis craccivora*;
Brachycaudus helichrysi; [*Brevicoryne brassicae*];

Petunia spp.

[*Eutrichosiphum khasyanum*]; *Myzus persicae*
Brachycaudus helichrysi; *Nasonovia ribisnigri*;
 [*Paracletus cimiciformis*]; [*Rhopalosiphum maidis*]

(The sticky hairs of *Petunia* may act a trap for many aphids, resulting in spurious host records.)

Key to apterae on *Petunia*:-

- Thoracic spiracles enlarged, much larger than abdominal spiracles. ANT PT/BASE 7.0–11.4, usually more than 8.0. Hairs on ANT III 0.7–1.1× BD III. Dorsum usually with paired dark intersegmental markings
Nasonovia ribisnigri
- Without that combination of characters
 go to key to polyphagous aphids, p. 1020

Peucedanum

P. aculeolatum
P. alsaticum

Myzus ornatus
Aphis fabae, *umbelliferarum*; *Cavariella aegopodii*;
Dysaphis uralensis, [*Dysaphis* sp. (Stroyan, 1985: 363)]
Cavariella aegopodii

P. arenarium

Aphis fabae; *Aulacorthum solani*; *Cavariella aegopodii*

P. austriacum

Aphis fabae

P. baicalense

P. carvifolium

Aphis peucedanicarvifoliae

P. cervaria

Aphis schilderi; *Semiaphis cervariae*, *horvathi*, *sphondylii*

Umbelliferae

HOST LISTS AND KEYS

<i>P. deltoideum</i>	<i>Dysaphis deltoidei</i>
<i>P. fraxinifolium</i>	<i>Hyadaphis coriandri</i>
<i>P. graveolens</i> see <i>Anethum graveolens</i>	
<i>P. kerstenii</i>	<i>Myzus ornatus</i>
<i>P. japonicum</i>	<i>Aphis gossypii</i> ; <i>Aulacorthum solani</i>
<i>P. officinale</i>	<i>Acyrtosiphon nigripes</i> ssp. <i>peucedani</i> ; <i>Aphis fabae</i> , <i>peucedani</i> , <i>schilderi</i> ; <i>Aulacorthum solani</i> ; <i>Cavariella aegopodii</i> ; <i>Defractosiphon franzi</i> ; <i>Semiaphis horvathi</i>
<i>P. oreoselinum</i>	<i>Aphis grossmannae</i> , <i>schilderi</i> ; <i>Dysaphis oreoselini</i> , <i>peucedani</i> ; <i>Hyadaphis passerinii</i> ; <i>Semiaphis cervariae</i>
<i>P. ostruthium</i>	<i>Aphis fabae</i> , [<i>Aphis</i> sp., Sweden (Ossiannilsson, 1964a)]; <i>Cavariella aegopodii</i> ; <i>Semiaphis sphondylii</i>
<i>P. palustre</i>	<i>Aphis fabae</i> ; <i>Semiaphis anthrisci</i>
<i>P. pseudoreoselinum</i>	<i>Brachyunguis peucedani</i>
<i>P. ruthenicum</i>	<i>Acyrtosiphon nigripes</i> ssp. <i>peucedani</i> ; <i>Aphis umbelliferarum</i> ; <i>Defractosiphon franzi</i> ; [<i>Semiaphis pastinacae</i>]
<i>P. sativum</i> see <i>Pastinaca sativum</i>	
<i>P. tenuifolium</i>	<i>Acyrtosiphon moltshanovi</i> (?); [<i>Dysaphis</i> sp. (Chakrabarti, 1972)]; [<i>Hyalomyzus</i> sp. (L.K. Ghosh, 1977)]
<i>P. terebinthaceum</i>	<i>Cavariella japonica</i> , <i>konoii</i>
<i>P. typherr</i>	<i>Aphis fabae</i>
<i>Peucedanum</i> sp.	<i>Cavariella archangelicae</i> ; [<i>Dysaphis taisetsusana</i> (?)]; [<i>Semiaphis coryspermi</i>], [<i>Semiaphis</i> sp. (Bozhko, 1976: 70)]

Key to apterae on *Peucedanum*:-

- | | |
|---|-------------------------------------|
| 1. SIPH less than 0.9× cauda | 2 |
| – SIPH at least 0.9× cauda | 10 |
| 2. ANT PT/BASE c. 0.6, PT being similar in length to SIPH | <i>Brachyunguis peucedani</i> * |
| – ANT PT/BASE more than 1.5, and PT much longer than SIPH | 3 |
| 3. Cauda broadly conical or triangular, not longer than its basal width in dorsal view, with 4–6 hairs | 4 |
| – Cauda tapering, tongue- or finger-like, distinctly longer than its basal width, and often with more than 6 hairs | 5 |
| 4. Flat dome-shaped marginal tubercles (MTu) consistently present on ABD TERG 1–5 and 7 | <i>Aphis umbelliferarum</i> |
| – MTu absent or inconspicuous, or not consistently present on any ABD TERG | <i>Aphis peucedanicarvifoliae</i> * |
| 5. SIPH more than 0.6× cauda, with or without a flange | 6 |
| – SIPH less than 0.6× cauda, flangeless, and usually curved towards midline | 7 |
| 6. SIPH tapering almost to a point, with a narrow, rounded, flangeless apex (Figure 41a). ANT III with 0–6 rhinaria on distal part, and IV with 1–7 (1–11 on III+IV if fused) | <i>Defractosiphon franzi</i> |
| – SIPH slightly swollen, with an apical flange (Figure 41b). ANT III and IV without rhinaria | <i>Hyadaphis coriandri</i> |

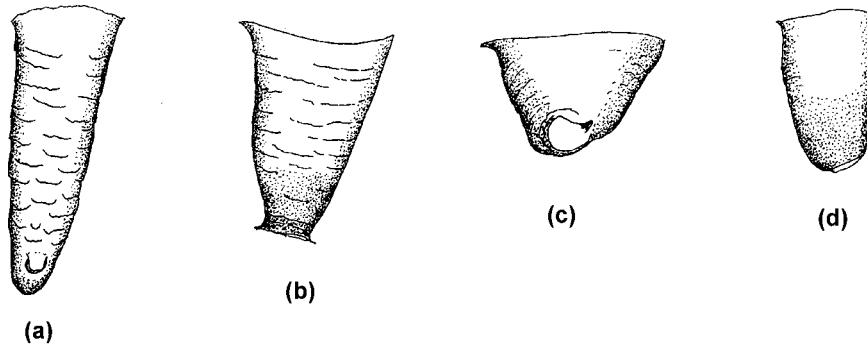


Figure 41 Apterae on *Peucedanum*. (a) SIPH of *Defractosiphon franzi*, (b) SIPH of *Hyadaphis coriandri*, (c) SIPH of *Semiaphis cervariae*, (d) SIPH of *S. horvathi*.

7. SIPH very short and broad-based, $0.4\text{--}0.6\times$ as long as their basal widths (Figure 41c). R IV+V only
 $c.0.5\times$ HT II *Semiaphis cervariae*
 – SIPH more than $0.8\times$ as long as their basal widths (e.g., Figure 41d). R IV+V $0.7\text{--}1.0\times$ HT II **8**
8. ANT PT/BASE $1.6\text{--}2.5$. Well-developed flat marginal tubercles (MTu) usually present on prothorax and ABD TERG 1–5, mostly much larger than spiracular apertures, and spinal tubercles (STu) usually present on ABD TERG 5–7 *Semiaphis horvathi*
 – ANT PT/BASE $2.5\text{--}3.5$. MTu and STu irregularly present, MTu rarely larger than spiracular apertures except on ABD TERG 5 **9**
9. Longest hairs on ANT III $15\text{--}20\mu\text{m}$, $0.6\text{--}0.8\times$ BD III. Hairs on ABD TERG 8 are $30\text{--}50\mu\text{m}$, $1.0\text{--}1.7\times$ BD III *Semiaphis sphondylii*
 – Longest hairs on ANT III $10\text{--}13\mu\text{m}$, $0.4\text{--}0.5\times$ BD III. Hairs on ABD TERG 8 are $12\text{--}30\mu\text{m}$, $0.5\text{--}1.2\times$ BD III *Semiaphis anthrisci*
10. ABD TERG 8 with a backwardly-projecting process, sometimes reduced but always bearing a pair of hairs **11**
 – No supracaudal process. SIPH cylindrical or tapering **14**
11. SIPH not clavate, thick, scabrous throughout length. Process on ABD TERG 8 reduced to a small knob *Cavariella japonica*
 – SIPH clavate, with normal imbrication, or scabrous only on distal part. Process on ABD TERG 8 conical or finger-like **12**
12. ANT PT/BASE $0.9\text{--}1.3$ (rarely up to 1.4). R IV+V without accessory hairs *Cavariella aegopodii*
 – ANT PT/BASE $1.4\text{--}2.0$. R IV+V with 2 accessory hairs **13**
13. SIPH $0.98\text{--}1.1\times$ head width across (and including) eyes, and $6.7\text{--}8.7\times$ maximum width of swollen part. Length of supracaudal process at least $1.6\times$ maximum width of swollen part of SIPH. (Al. with a complete black band on ABD TERG 6) *Cavariella archangelicae*
 – SIPH $0.8\text{--}1.01$ (~ 1.07) \times head width across eyes, and $5.0\text{--}7.3\times$ maximum width of swollen part. Length of supracaudal process less than $1.5\times$ maximum width of swollen part of SIPH. (Al. with a pair of roundish dark marks on ABD TERG 6) *Cavariella konoii*
14. Cauda helmet-shaped, not longer than its basal width in dorsal view, and usually bearing 5 hairs. Head and often also ABD TERG 8, or 7 and 8, with spinal tubercles (STu) **15**

HOST LISTS AND KEYS

- Cauda tongue- or finger-shaped, much longer than its basal width. STu absent from head and rarely present on ABD TERG **18**
- 15.** Longest hair on ANT III 40–50 µm long, 2.3–2.7× BD III. Pronotum with a pair of pleural hairs (lateral to the spinal pair) *Dysaphis deltoidei*
- Longest hair on ANT III 4–8 µm long, 0.2–0.4× BD III. Pronotum without pleural hairs **16**
- 16.** SIPH 0.25–0.34 mm, 2.2–3.2× cauda *Dysaphis peucedani**
- SIPH 0.15–0.19 mm, 1.6–2.1× cauda **17**
- 17.** All apt. to some extent alatiform with ANT III–IV (–V) swollen and bearing numerous sec. rhinaria. Arms of mesothoracic furca separate *Dysaphis uralensis*
- Apt. without sec. rhinaria. Arms of mesothoracic furca united at bases *Dysaphis oreoselini*
- 18.** Head, ANT, tibiae, SIPH and cauda all entirely black. (Large, spindle-shaped aphid) *Acyrtosiphon nigripes* ssp. *peucedani*
- At least ANT and tibiae have pale sections **19**
- 19.** Head smooth with broadly divergent ANT tubercles. SIPH thin, tapering, pale, without subapical reticulation, 1.0–1.3× the thick, pale cauda. R IV+V 0.6–0.7× HT II *Acyrtosiphon ?moltshanovi*
- Without that combination of characters **20**
- 20.** ANT tubercles weakly developed, head without spicules. SIPH dark **21**
- ANT tubercles well developed, head with or without spicules. SIPH pale or dusky
go to key to polyphagous aphids, p. 1020, starting at couplet 5
- 21.** ABD TERG 1 and 7 without marginal tubercles (MTu). SIPH clavate, 0.9–1.4× cauda *Hyadaphis passerinii* (or *foeniculi*)
- ABD TERG 1 and 7 always with MTu. SIPH cylindrical/tapering, 1–3× cauda **22**
- 22.** Cauda with 11–19 hairs **23**
- Cauda with 4–8 hairs **24**
- 23.** ABD TERG 2–4, as well as 1 and 7, with well-developed MTu. Longest hair on ANT III 0.4–0.6× BD III. Cauda with 12–15 hairs *Aphis grossmannae*
- ABD TERG 2–4 only irregularly with small MTu. Longest hair on ANT III 0.80–2.2× BD III. Cauda with 11–19 hairs *Aphis fabae*
- 24.** Cauda paler than SIPH, with 4–8 hairs. Longest hair on ANT III 0.4–0.8× BD III. MTu on ABD TERG 1 and 7 small, less than half diameter of SIPH at midlength *Aphis gossypii*
- Cauda as dark as SIPH. Longest hair on ANT III 0.2–0.5× BD III. MTu large, more than 0.5× diameter of SIPH at midlength **25**
- 25.** ABD TERG 2–4 as well as 1 and 7 regularly with MTu. SIPH 1.7–3.0× cauda *Aphis peucedani*
- ABD TERG 2–4 without or only irregularly with MTu. SIPH 1.0–1.7× cauda *Aphis schilderi*

Phaca see *Astragalus*

Phacelia

Ph. campanularia

Ph. circinata

Ph. heterophylla

Ph. nemoralis

Ph. sericea

Hydrophyllaceae

[*Aphis* sp.]

[‘*Nectarophora*’ sp. (Cockerell, 1903:17)]

Myzus ascalonicus

Abstrusomyzus phloxae

Brachycaudus helichrysi

*Ph. tanacetifolia**Aphis fabae**Phacelia* spp.*Aphis phaceliae*; *Illinoia phacelia*Key to apterae on *Phacelia*:-

1. Spindle-shaped aphid with ANT much longer than BL, and ANT PT/BASE more than 7. SIPH pale, c.2.5× cauda, cylindrical or slightly swollen on distal part, with some indistinct subapical reticulation. R IV+V 1.6–1.8× HT II and bearing 23–32 accessory hairs *Illinoia phacelia*
- Without that combination of characters **2**
2. ANT tubercles weakly developed, and ABD TERG 1 and 7 with marginal tubercles (MTu). R IV+V 1.5–1.6× HT II, longer than cauda and bearing 4–5 hairs *Aphis phaceliae*
- Without that combination of characters; i.e., **if** ANT tubercles are weakly developed and ABD TERG 1 and 7 have MTu **then** R IV+V is relatively shorter and bears only 2 accessory hairs
go to key to polyphagous aphids, p. 1020

Phaeomeria see *Etlingera**Phagnalon***Compositae***Ph. rupestre**Macrosiphum euphorbiae*; *Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Phaius (or *Phajus*)**Orchidaceae***Ph. grandifolius**Aphis fabae* group (Brazil)*Phalacroloma* see *Erigeron**Phalanopsis***Orchidaceae***Phalanopsis* sp.*Cerataphis orchidearum**Phalaris* (incl. *Phalaroides*)**Gramineae***Ph. aquatica**Metopolophium dirhodum**Ph. arundinacea* (incl. var. *picta*)*Anoecia major*; *Atheroides serrulatus*; *Geoica lucifuga*;*Forda formicaria*; [*Hyalopterus pruni*];*Metopolophium dirhodum*; *Myzus persicae*;*Rhopalomyzus lonicerae*, *poae*;*Rhopalosiphum insertum*, *maidis*, *padi*;*Schizaphis jaroslavi*, *longicaudata*, *graminum*;*Sipha glyceriae*, *maidis*; *Sitobion avenae*, *fragariae**Ph. brachystachys**Israelaphis lambersi*; *Metopolophium dirhodum*;*Ph. canariensis**Rhopalosiphum padi*; *Sitobion avenae*, *fragariae**Diuraphis noxia*; *Israelaphis lambersi*;*Rhopalomyzus lonicerae*; *Rhopalosiphum maidis*;*Schizaphis graminum**Ph. coerulescens**Metopolophium dirhodum*; *Rhopalosiphum padi**Ph. minor**Hysteroneura setariae**Ph. nodosa**Diuraphis noxia*; *Rhopalosiphum maidis*, *padi*;*Sitobion fragariae**Ph. paradoxa**Israelaphis lambersi*

HOST LISTS AND KEYS

Ph. tuberosa (incl. *stenoptera*)

Diuraphis noxia; *Metopolophium dirhodum*;
Rhopalosiphum maidis, *padi*; *Schizaphis hypersiphonata*;
Sitobion fragariae

Phalaris sp.

Aphis craccivora

Use key to apterae of grass-feeding aphids under *Digitaria*.

Phania

Ph. matricarioides

Aphis gossypii

Compositae

Pharbitis see *Ipomoea*

Phaseolus

Ph. adenanthus

Ph. angularis

Ph. atropurpureus

Ph. aureus

Ph. coccineus

Ph. limensis

Ph. lunatus

Ph. multiflorus

Ph. mungo

Ph. nanus

Ph. nipponensis

Ph. radiatus

Ph. sublobatus

Ph. subtrilobata

Ph. trilobus

Ph. vulgaris

Leguminosae

Microparsus puertoricensis

Aphis gossypii; *Aulacorthum solani*

Acyrtosiphon pisum; *Aphis craccivora*;

Macrosiphum euphorbiae

Aphis craccivora, *gossypii*

Aphis craccivora, *fabae*; *Myzus ornatus*, *persicae*;

Smynthuodes betae

Aphis fabae

Aphis craccivora, *fabae*, *gossypii*;

Microparsus brasiliensis; *Smynthuodes betae*

Aphis craccivora, *gossypii*;

[*Amphorophora ampullata* of Zirnits, 1927];

Smynthuodes betae

Acyrtosiphon gossypii; *Aphis craccivora*

Aphis gossypii

Aphis nerii

Aphis craccivora; *Aulacorthum solani*; *Smynthuodes betae*

Aphis craccivora

[*Macrocaudus phaseoli* Shinji (nomen dubium)]

Aphis craccivora

Acyrtosiphon pisum;

Aphis craccivora, *fabae*, *gossypii*, *lhasaensis*, *middletonii*,
nasturtii; *Aulacorthum solani*; [*Capitophorus elaeagni*];

[*Hyalopterus pruni*]; *Macrosiphum creelii*, *euphorbiae*;

[*Megoura viciae*]; *Microparsus brasiliensis*, *vignaphilus*;

Myzus ornatus, *persicae*; *Smynthuodes betae*;

[*Toxoptera citricidus*]

Phaseolus spp.

Acyrtosiphon phaseoli; *Aphis glycines*;

Rhopalosiphoninus latysiphon; [*Semiaphis heraclei*]

Key to apterae on *Phaseolus*:–

(See Blackman and Eastop, 2000, for an illustrated key to common aphids on cultivated *Phaseolus*.)

1. ANT PT/BASE less than 0.5. SIPH absent. Body and appendages densely clothed in fine hairs

Smynthuodes betae

– ANT PT/BASE more than 1.5. Body and appendages not so hairy

2

2. ANT tubercles weakly developed. ABD TERG 1 and 7 with marginal tubercles (MTu) **3**
 – ANT tubercles well developed. ABD TERG 1 and 7 without MTu **7**
3. Dorsal abdomen with an extensive solid black shield. Cauda with 4–9 hairs **4**
 – Dorsal abdomen without an extensive solid black shield, and if with any dark markings then cauda has 10 or more hairs **5**
4. ABD TERG 2–4 usually without MTu *Aphis craccivora*
 – Well-developed MTu consistently present on ABD TERG 2–4 as well as 1 and 7 *Aphis lhasaensis*
5. Hind femur with all hairs shorter than basal diameter of femur. SIPH uniformly dark or slightly paler near bases, and darker than cauda which bears 4–10 hairs **6**
 – Hind femur with at least some long fine hairs longer than its basal diameter. SIPH pale or dark, but if dark then cauda is similarly dark and may have more than 10 hairs
 go to key to polyphagous aphids, p. 1020, starting at couplet 25
6. Cauda 0.08–0.135× BL (only more than 0.12× BL in very small specimens with BL less than 1 mm), and 0.8–1.25× ANT V; pale to dusky, without a constriction, less than 3× longer than its width at midlength, and bearing 4–7 (usually 5–6) hairs *Aphis gossypii*
 – Cauda 0.12–0.175× BL, and 1.05–1.7× ANT V; very pale, usually with a slight mid-way constriction, more than 3× longer than its narrowest width at midlength, and bearing 5–10 (usually 7–9) hairs *Aphis glycines*
7. ANT I and II black, contrasting with base of III. SIPH with pale basal part and dark distal part (and often slightly clavate). (Al. with forewing veins, especially the anal vein Cu_{1b} , conspicuously black-bordered) **8**
 – ANT I and II pale. SIPH entirely pale or darker only at apices; tapering, cylindrical or clavate. (Al. with forewing veins not conspicuously dark-bordered) **10**
8. SIPH 1.1–1.5× cauda *Microparsus brasiliensis*
 – SIPH 1.7–2.0× cauda **9**
10. SIPH pale on basal 0.33–0.67 of length. HT I with medial hair (sense peg) 0.4–0.6× length of the 2 lateral hairs. BL 1.9–2.4 mm *Microparsus vignaphilus*
 – SIPH pale on basal 0.2–0.4 of length. HT I with medial hair 0.6–1.0× length of the 2 lateral hairs. BL 1.1–1.9 mm *Microparsus puertoricensis*
10. Head densely spiculose, at least ventrally, with scabrous, steep-sided ANT tubercles. ANT III with 0–2 (–3) rhinaria go to key to polyphagous aphids, p. 1020, starting at couplet 5
 – Head smooth or with sparse minute spicules, ANT tubercles smooth and broadly divergent ANT III with (0–) 1–10 rhinaria **11**
11. SIPH with subapical reticulation (at least 4–5 rows of closed polygonal cells) **12**
 – SIPH without polygonal reticulation **13**
12. ANT BASE VI 0.8–1.3× R IV+V *Macrosiphum euphorbiae*
 – ANT BASE VI 1.4–2.0× R IV+V *Macrosiphum creelii*
13. SIPH long and attenuate distally, 0.42–0.50× BL and 2.5–3.5× cauda *Acyrtosiphon gossypii*
 – SIPH 0.23–0.38× BL, and 1.2–2.3× cauda **14**
14. SIPH tapering gradually from base to flange, 2.0–2.3× cauda. R IV+V about equal in length to HT II or a little longer *Acyrtosiphon phaseoli**
 – SIPH thin and cylindrical distally, 1.2–1.9× cauda. R IV+V 0.6–0.95× HT II *Acyrtosiphon pisum*

HOST LISTS AND KEYS

Phaulopsis (incl. Phaylopsis)

Ph. poggei

Acanthaceae

Aphis gossypii

Phellodendron see Blackman and Eastop (1994)

Philadelphus

Ph. caucasicus

P. coronarius (incl. *pallidus*)

Ph. gardenianus=*lewisii*

Ph. grandiflora=*inodorus*

Ph. inodorus (incl. *grandiflora*)

Ph. lewisii (incl. *gardenianus*)

Ph. mexicanus

Ph. multiflorus

Ph. pekinensis

Ph. satsumanus

Ph. satsumi

Ph. shrenkii

Ph. tenuifolius

Ph. viminalis

Ph. ×virginalis

Philadelphus spp.

Hydrangeaceae

Aphis fabae; *Myzus persicae*

Aphis fabae, *fabae* ssp. *mordvilkoii*, *nasturtii*, *spiraecola*;

Brachycaudus helichrysi; [*Macrosiphum rosae*];

Myzus persicae

Aphis fabae, *spiraecola*; *Macrosiphum euphorbiae*;

Myzus persicae

[*Anoecia corni*]; *Aphis fabae*; *Aulacorthum solani*;

Brachycaudus helichrysi; *Glendenningia philadelphi*;

[*Illinoia spiraeae*]; *Macrosiphum euphorbiae*;

Myzus ornatus, *persicae*

Myzus persicae

Aphis fabae; *Myzus persicae*

Myzus persicae

Myzus persicae

Aulacorthum solani; *Myzus philadelphi*

Aphis philadelphicola

Aphis philadelphicola; *Rhopalosiphoninus deutzifoliae*

Aphis fabae

Aphis fabae; *Brachycaudus helichrysi*;

Macrosiphum euphorbiae; *Myzus ornatus*, *persicae*

Aphis gossypii, [*philadelphi*], [*viburni* of Börner 1923];

[*Prociophilus americanus* (as *Pemphigus venafuscus*)]

Key to apterae on *Philadelphus*:-

(Couplets 1–2 can be applied to al. as well as apt.)

1. SIPH very markedly inflated, with diameter of swollen part 2.0–4.5× minimum diameter of basal part. (Apt. fundatrix, all progeny being al.) *Rhopalosiphoninus deutzifoliae*
– SIPH tapering or cylindrical, or clavate but with diameter of swollen part less than 2× minimum diameter of basal part 2
2. Cauda broad-based with a drawn-out conical papilliform tip, bearing 1–2 hairs on the tip and 6 hairs on the swollen basal part. SIPH clavate. (Al. with numerous sec. rhinaria scattered over entire surfaces of ANT III–V; 47–61 on III, 17–28 on IV and 3–11 on V) *Glendenningia philadelphi*
– Cauda helmet-, tongue- or finger-shaped, tapering from base to apex, or with rounded apex. SIPH cylindrical, tapering or slightly clavate. (Al. with sec. rhinaria much less numerous) 3
3. ANT, SIPH and legs (even basal parts of femora) entirely dark. Head spiculose, SIPH slightly swollen on distal part, cauda triangular *Myzus philadelphi*
– SIPH pale or dark, ANT and legs with at least some parts pale. Other characters not in that combination 4

4. Well-developed marginal tubercles (MTu) present on ABD TERG 1–5 (–6) and 7. SIPH 0.67–0.87× cauda, much shorter than R IV+V which is 1.54–1.65× HT II *Aphis philadelphicola**
- MTu only ever regularly on ABD TERG 1 and 7, and other characters not in that combination go to key to polyphagous aphids, p. 1020, (but note that specimens running to *Aphis fabae* are likely to be ssp. *mordvilkoii*).

Phillyrea*Ph. media***Oleaceae***Prociphilus oleae***Philodendron***Ph. hastatum**Philodendron* sp.**Araceae***Myzus ornatus**Pentalonia nigronervosa*; *Toxoptera aurantii*Key to apterae on *Philodendron*:–

- SIPH with pale basal and dark distal sections. Femora with basal 0.6 or more of length pale, contrasting with black distal section. SIPH and femora covered with irregular, transverse rows of spicules. ANT PT/BASE 5.8–8.1. (Alata with dark-bordered wing veins, with radius and costa fused for part of lengths to form a closed cell behind the pterostigma) *Pentalonia nigronervosa*
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Philotria see *Elodea***Phyllitis** see *Asplenium***Phleum***Ph. alpinum**Ph. echinatum**Ph. phleoides**Ph. pratense**Phleum* spp.**Gramineae***Forda formicaria*, *marginata*; *Rhopalosiphum padi*;*Schizaphis jaroslavi*; *Sipha maydis*; *Sitobion avenae**Israelaphis ilharcoi**Anoecia corni**Anoecia corni*, *querci*; *Carolinaia rhois*;*Diuraphis muehlei*, *tritici*; *Geoica utricularia*;*Israelaphis lambersi*; *Metopolophium dirhodum*, *tenerum*;*Rhopalomyzus lonicerarum*; *Rhopalosiphum maidis*, *padi*;*Schizaphis borealis*, *graminum*, *phlei*; *Sipha flava*;*Sitobion akebiae*, *avenae*; *Tetraneura fusiformis*, *yezoense**Geoica utricularia*; *Sipha glyceriae*Use key to apterae of grass-feeding aphids under *Digitaria*.**Phlogacanthus***Ph. thyrsofolius* (?)**Acanthaceae***Toxoptera aurantii***Phlojodicarpus***Ph. sibiricus**Ph. villosus***Umbelliferae***Aphis phlojodicarpi**Aphis phlojodicarpi***Phlomis***Ph. bracteosa**Ph. canescens**Ph. fruticosa***Labiatae***Cryptomyzus taoi**Cryptomyzus tadjikistanica**Myzus persicae*

HOST LISTS AND KEYS

<i>Ph. macrophylla</i>	<i>Macrosiphum euphorbiae</i>
<i>Ph. nepetaefolia</i> see <i>Leonotis</i>	
<i>Ph. olivieri</i>	<i>Cryptomyzus behboudii</i>
<i>Ph. tuberosa</i>	<i>Aphis origani</i> ; <i>Aulacorthum solani</i> ; <i>Macrosiphum euphorbiae</i>
<i>Ph. viscosa</i>	<i>Cryptomyzus ribis</i>
<i>Phlomis</i> sp.	<i>Brachycaudus cerasicola</i> ; <i>Roepkea marchali</i>

Key to apterae on *Phlomis*:-

1. Dorsal hairs long and thick with knobbed apices 2
 – Dorsal hairs long or short without knobbed apices 4
2. R IV+V very long and narrow, as long as or longer than SIPH *Cryptomyzus behboudii*
 – R IV+V very much shorter than (c.0.33×) SIPH 3
3. SIPH more-or-less cylindrical, with little trace of swelling; thinner than hind tibia for most of length. SIPH 2.2–3.1× cauda *Cryptomyzus ribis*
 – SIPH with distinctly swollen section on distal part, with maximum diameter 1.2–1.6× minimum diameter on proximal half, the swollen part distinctly thicker than hind tibia. SIPH 3.6–5.0× cauda *Cryptomyzus taoi*
4. Hairs on ANT and dorsal side of tibiae long, stiff, erect, maximally 100–110µm, more than 2× BD III. ANT PT/BASE more than 7. SIPH clavate, c.2× cauda *Cryptomyzus tadzhikistanica**
 – Hairs shorter or not stiff and erect, ANT PT/BASE less than 7. SIPH various 5
5. Cauda semicircular to helmet-shaped, shorter than its basal width in dorsal view. Dorsum often with an extensive black sclerotic shield 6
 – Cauda finger-like, much longer than its basal width. Dorsum without an extensive black sclerotic shield 7
6. SIPH shorter than R IV+V, lightly imbricated, without spicules. Dorsal cuticle not spiculose *Brachycaudus cerasicola*
 – SIPH longer than R IV+V, with transverse rows of spicules. Dorsal cuticle spiculose *Roepkea marchali*
7. **ALL the following apply:** ANT tubercles weakly developed. SIPH wholly dusky/dark, but cauda paler. ABD TERG 1 and 7 with well-developed marginal tubercles (MTu), those on 7 having basal diameter more than 0.5× thickness of SIPH at midlength. ABD TERG 8 (or 7 and 8) with thin dusky or dark cross-bands, and abdomen usually with dark intersegmental muscle plates. ANT PT/BASE 1.8–2.6 *Aphis origani*
 – Without that combination of characters go to key to polyphagous aphids, p. 1020

Phlox

<i>Ph. douglasii</i>	<i>Myzus ascalonicus</i>
<i>Ph. drummondii</i>	<i>Aphis gossypii</i> ; <i>Aulacorthum solani</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i>
<i>Ph. paniculata</i>	<i>Aphis fabae</i> ; <i>Myzus ascalonicus</i> , <i>persicae</i>
<i>Ph. subulata</i>	<i>Abstrusomyzus phloxae</i> ; <i>Myzus ascalonicus</i>
<i>Phlox</i> sp.	<i>Aphis triglochinis</i>

Polemoniaceae

Key to apterae on *Phlox*:-

- ANT PT/BASE 1.1–1.73. SIPH pale and 0.7–1.3× cauda *Aphis triglochinis*
- ANT PT/BASE more than 1.8. SIPH pale or dark, if pale then more than 1.5× cauda go to key to polyphagous aphids, p. 1020

Phoebe see Blackman and Eastop (1994)

Phormium

Ph. tenax

Phormiaceae

Aulacorthum solani

Photinia (incl. Aronia, Stranvaesia)

Ph. arbutifolia

Ph. davidiana

Ph. × fraseri

Ph. glabra

Ph. melanocarpa

Ph. niitakayamensis

Ph. notoniana

Ph. × prunifolia

Ph. villosa

Rosaceae

Aphis pomi

Illinoia spiraeae

Brachycaudus helichrysi; *Ericaphis gentneri*;

Macrosiphum euphorbiae

Hyalomyzus eriobotryae; *Sinomegoura citricola*, *photiniae*;

Toxoptera aurantii

Aphis pomi

Aphis stranvaesiae

Prociphilus sp. 'A' (A.K. Ghosh *et al.*, 1970b)

Aphis pomi

Aphis gossypii, *spiraecola*; [*Eriosoma lanigerum*];

Melanaphis bambusae; [*Ovatus malisuctus*];

Prociphilus ushikoroshi

Key to apterae on *Photinia* (shrubs – for trees see Blackman and Eastop, 1994):-

1. ANT PT/BASE less than 0.5. SIPH indistinct or absent. Wax glands evident. (Al. with narrow, transversely elongate sec. rhin.) 2
 - ANT PT/BASE more than 1.5. SIPH present, tubular or conical. Wax glands not evident. (Al. with circular or oval sec. rhin.) 3
2. Al. with sec. rhin. distributed ANT III 10–14, IV 4–7, V 1–4, VI 0–1 *Prociphilus ushikoroshi*
 - Al. with sec. rhin. distributed ANT III 35–36, IV 9–10, V 10–11, VI 0–2 *Prociphilus* sp. 'A' of A.K. Ghosh *et al.*, 1970
3. SIPH short, less than 2× their basal width 4
 - SIPH more than 2× their basal width 5
4. Cauda helmet-shaped, not longer than its basal width in dorsal view. SIPH pale, smooth, conical, with a subapical annular incision *Brachycaudus helichrysi*
 - Cauda digitiform, clearly longer than its basal width. SIPH as short dark tubes, imbricated, with no subapical annular incision *Melanaphis bambusae*
5. ABD TERG 1 and 7 with marginal tubercles (MTu) 6
 - ABD TERG 1 and 7 without MTu 9
6. Hind tibiae entirely dark *Aphis stranvaesiae*
 - Hind tibiae with at least middle section paler 7
7. Dorsal abdomen without any dark markings. SIPH and cauda both black, cauda usually having a distinct midlength constriction and bearing 6–19 hairs 8
 - Without that combination of characters 8

go to key to polyphagous aphids, p. 1020, starting at couplet 24
8. Marginal tubercles (MTu) present on ABD TERG 2–4. Cauda with 10–19 hairs (rarely less than 13) *Aphis pomi*
 - R IV+V more than 0.13 mm

HOST LISTS AND KEYS

- MTu absent from ABD TERG 2–4. Cauda with 7–15 hairs (rarely more than 12). R IV+V less than 0.125 mm *Aphis spiraeicola*
- 9.** SIPH dark, almost smooth, less than 1.5× cauda, which bears 10–24 hairs **10**
- SIPH pale, or dusky only at apices, imbricated, more than 1.5× cauda, which bears 4–12 hairs **11**
- 10.** SIPH 1.0–1.3× cauda which is pale, with thin pointed apex, and bears 10–18 hairs. Head spiculose over entire ventral surface *Sinomegoura photiniae*
- SIPH 0.8–1.0× cauda which is dark with blunt apex and bears 17–24 hairs. Head spiculose only on ventral side of ANT tubercles *Sinomegoura citricola*
- 11.** Head densely spiculose with scabrous, convergent ANT tubercles. SIPH clavate, 2.5–2.7× cauda. R IV +V 1.5–1.8× HT II. (Al. with very numerous rhinaria on ANT III, IV and V) *Hyalomyzus eriobotryae*
- Without that combination of characters **12**
- 12.** SIPH swollen on distal half to a maximum of 1.2–1.4× minimum width basad, with a few rows of subapical polygonal reticulation. Longest hairs on ANT III 0.3–0.4× BD III. ANT PT 1.4–1.8× BL *Illinoia spiraeae*
- Without that combination of characters **13**
- 13.** SIPH with polygonal reticulation on subapical 0.13–0.2 of length. Cauda with 8–12 hairs *Macrosiphum euphorbiae*
- SIPH without subapical reticulation (sometimes with a few transverse interconnected striae near apex). Cauda with 5–9 hairs *Ericaphis gentneri*

Phragmanthera

Ph. regularis

Loranthaceae

Aphis gossypii; *Sitobion asirum*

Key to apterae on *Phragmanthera*:-

- SIPH entirely dark, without subapical polygonal reticulation. ABD TERG 1 and 7 with marginal tubercles (MTu) *Aphis gossypii*
- SIPH pale or dusky, darker towards apices, with subapical polygonal reticulation. ABD TERG 1 and 7 without MTu *Sitobion asirum*

Phragmites

Ph. australis (incl. *communis*,
stenophylla)

Gramineae

Brachysiphoniella montana; *Davatchiaphis persica*;
Hyadaphis amygdali, pruni;
Melanaphis bambusae, elizabethae, donacis;
Mordvilkoella skorkini;
Rhopalosiphum maidis, padi, rufiabdominale;
Schizaphis graminum, hypersiphonata;
Sitobion avenae, miscanthi;
Tetraneura brachytricha, triangula
Hyalopterus amygdali, pruni; *Melanaphis bambusae*
Brachysiphoniella montana; *Hyalopterus pruni*
Hyalopterus pruni; *Rhopalosiphum maidis, padi*
Sipha maydis

Ph. karka

Ph. longivalvis

Ph. mauritanica

Phragmites sp.

Use key to apterae of grass-feeding aphids under *Digitaria*.

Phryma
Ph. leptostachya

Phrymaceae
Cavariella salicicola

Phuopsis
Ph. stylosa

Rubiaceae
Rhopalosiphoninus staphyleae

Phygelius
Ph. aequalis

Scrophulariaceae
[*Cavariella aegopodii*]

Phyla
Ph. nodiflora

Verbenaceae
Aphis craccivora

Phyllanthus
Ph. floribundus
Ph. maderaspatensis
Ph. myrtifolius
Ph. reticulatus
Ph. urinaria
Phyllanthus sp.

Euphorbiaceae
Aphis gossypii; *Schoutedenia ralumensis*
Aphis gossypii; *Sitobion ?mimosae*, *phyllanthi*
Aphis eugeniae
Schoutedenia ralumensis
Sitobion ?mimosae
[*Anomalosiphum indigoferae*]

See Blackman and Eastop (1994) for a key to apterae on *Phyllanthus*.

Phyllocactus
Ph. ackermanii

Cactaceae
Aphis gossypii

Phyllostachys see Blackman and Eastop (1994)

Physalis
Ph. alkekengi (incl. *fracheti* form
bunyardii)

Solanaceae
Aphis fabae, *gossypii*;
[*Macrosiphoniella physaliae* Shinji (nomen dubium)];

Ph. angulata

Macrosiphum euphorbiae; *Myzus persicae*

Ph. floridana

Aphis gossypii; *Macrosiphum euphorbiae*

Ph. micrantha

Macrosiphum euphorbiae

Ph. peruviana

Aphis gossypii

Ph. pruinosa

Aphis gossypii; *Aulacorthum solani*;

Ph. pubescens

Macrosiphum euphorbiae; *Myzus persicae*

Ph. subglabrata

Macrosiphum euphorbiae

Ph. turbinata

Aulacorthum solani; *Macrosiphum euphorbiae*;

Ph. virginiana

Myzus persicae; *Neomyzus circumflexus*

Ph. viscosa

Macrosiphum euphorbiae

Physalis sp.

Macrosiphum euphorbiae

[*Uroleucon illini*]

Use key to polyphagous aphids, p. 1020.

HOST LISTS AND KEYS

Physianthus see *Araujia*

Physocarpus (incl. *Opulaster*)

Ph. capitatus

Ph. malvaceus

Ph. opulifolius

Ph. rameleyi

Rosaceae

Aphis neilliae; *Illinoia corylina*; *Utamphorophora humboldti*

Utamphorophora humboldti

Aphis neilliae, *spiraecola*; *Rhopalosiphum padi*;

Utamphorophora humboldti

Aphis neilliae

Key to apterae on *Physocarpus*:-

1. ANT tubercles well developed. SIPH mainly pale, slightly clavate. Cauda pale 2
– ANT tubercles weakly developed. SIPH and cauda uniformly dark 3
2. SIPH with subapical polygonal reticulation, distal to swollen part. ANT tubercles with smooth, divergent inner faces. R IV+V 1.3–1.5× HT II, and bearing c.14–16 accessory hairs. First tarsal segments with 5 hairs *Illinoia corylina*
– SIPH without polygonal reticulation. ANT tubercles steep-sided, somewhat scabrous. R IV+V 0.7–0.9× HT II, with 2–3 accessory hairs. First tarsal segments with 3 hairs *Utamphorophora humboldti*
3. ANT hairs long and fine, the longest on ANT III 2.3–3.5× BD III. ABD TERG 8 with a dark cross-band bearing 6–8 hairs. Cauda short, tapering from a broad base to a rounded apex *Aphis neilliae*
– Without that combination of characters go to key to polyphagous aphids, p. 1020, starting at couplet 22

Physocaulis see *Myrrhoides*

Physostegia

Physostegia spp.

Labiatae

Aulacorthum solani; *Macrosiphum euphorbiae*

Use key to polyphagous aphids, p. 1020.

Phyteuma

Phyteuma sp.

Campanulaceae

Aphis fabae

Phytolacca

Ph. americana (= *dodecandra*)

Ph. decandra

Ph. dioica

Ph. dodecandra see *americana*

Ph. esculenta

Phytolaccaceae

Aphis fabae, *gossypii*; *Aulacorthum solani*;

Macrosiphum euphorbiae

Aphis spiraecola; *Macrosiphum euphorbiae*

Toxoptera aurantii

Aulacorthum phytolaccae

Key to apterae on *Phytolacca*:-

- Dorsum wholly dark sclerotic. Head spiculose. ANT III with 9–13 rhinaria. Longest hairs on ANT III 1.2–1.6× BD III. R IV+V 1.3–1.4× HT II *Aulacorthum phytolaccae*
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Picnomon

P. acarna

Compositae

Macrosiphoniella tuberculata;

Rhopalosiphum rufiabdominale

Key to apterae on *Picnomon*:-

- Dorsal abdominal hairs borne on rounded tubercles. SIPH with polygonal reticulation on distal 0.30–0.43 of length. Cauda very long with a narrow, pointed apex *Macrosiphoniella tuberculata*
- Dorsal abdominal hairs not arising from rounded tubercles, and other characters not in that combination go to key to polyphagous aphids, p. 1020

Picramnia*P. pentandra***Simaroubaceae***Toxoptera aurantii****Picridium* see *Reichardia******Picris* (incl. *Helminthia*)***P. echioides**P. hieracioides* (incl. *glabrescens*,
japonica)*P. japonica**P. kamtshatica**P. koreana**P. pauciflora**P. spinifera**P. spinulosa**P. sprengeriana**Picris* spp.**Compositae***Acyrtosiphon ilka*; *Aphis stroyani*, *terricola*;
Hyperomyzus lactucae, *picridis*; *Myzus ornatus*, *persicae*;
Nasonovia ribisnigri; *Trama caudata*, *maritima*;
*Uroleucon picridis**Aphis fabae*, *nasturtii*, *picridicola*, *stroyani*, *terricola*;
Aulacorthum palustre; *Hyperomyzus picridis*;
Nasonovia ribisnigri;*Uroleucon amamanum*, *cichorii*, [*cichorii* ssp. *grossum*],
picridiphagum, *picridis*, *sonchi*[*Sitobion akebiae*]; *Uroleucon picridis**Uroleucon kamtshaticum**Uroleucon picridis**Uroleucon sonchi**Aphis stroyari**Hyperomyzus picridis**Hyperomyzus picridis**Aphis gossypii*; [*Aulacorthum rufum*];[*Hyperomyzus nigricornis*?]Key to apterae on *Picris*:-

1. HT II greatly elongated, more than 0.75 of length of hind tibia. ANT PT/BASE less than 0.5. SIPH small and conical. Body and appendages densely clothed in fine hairs **2**
- HT II of normal length. ANT PT/BASE more than 0.7. SIPH tubular. Body not densely hairy **3**
2. ANT III 1.80–2.35× (usually 2.0–2.2×) ANT IV, and 0.90–1.35× (usually 1.0–1.25×) ANT V **Trama caudata**
- ANT III 2.1–2.8× (usually 2.4–2.7×) ANT IV, and 1.35–1.80× (usually 1.5–1.7×) ANT V **Trama maritima**
3. ANT tubercles weakly developed. ABD TERG 1 and 7 with marginal tubercles (MTu). ANT PT/BASE 0.8–3.7 **4**
- ANT tubercles well developed. ABD TERG 1 and 7 without MTu. ANT PT/BASE 2.8–11.4 **7**
4. Cauda bluntly triangular, shorter than R IV + V. Distal part of ANT III usually, and ANT IV often, with sec. rhinaria. ANT PT/BASE 0.8–2.1 **5**
- Cauda tongue-shaped, longer than R IV + V. ANT III and IV without rhinaria (except in alatiform specimens). ANT PT/BASE usually more than 2.1 (1.7–3.7) **6**

HOST LISTS AND KEYS

5. ANT PT/BASE 0.8–1.3. SIPH 0.7–0.9× cauda. Dorsum with scattered dark sclerites *Aphis terricola*
 – ANT PT/BASE 1.5–2.1. SIPH 0.9–1.3× cauda. Dorsum with more extensive dark sclerotisation, especially on ABD TERG 4–6 *Aphis picridicola*
6. Rostrum reaching back beyond hind coxae; length (from base of protractor apodeme) 0.35–0.38× BL *Aphis stroyani*
 – Rostrum not reaching back beyond hind coxae, its length 0.2–0.33× BL
 go to key to polyphagous aphids, p. 1020, starting at couplet 24
7. SIPH smooth and swollen markedly over distal 0.7 of length to a maximum of 1.3–2.0× their minimum width basad. Head smooth. ANT III with 5–30 rhinaria **8**
 – SIPH imbricated, tapering/cylindrical, or if somewhat clavate **then** head spiculose and ANT III without rhinaria **9**
8. R IV+V 1.5–1.7× HT II, with 8–12 accessory hairs *Hyperomyzus picridis*
 – R IV+V 0.9–1.0× HT II, with 6–9 accessory hairs *Hyperomyzus lactucae*
9. SIPH wholly or mainly dark, with polygonal reticulation comprising numerous small cells on distal 0.16–0.43 of length. ANT mainly dark **10**
 – SIPH pale or dusky, without polygonal reticulation, or with only a few rows of large polygonal cells on less than 0.2 of length. ANT mainly pale **15**
10. Dorsal hairs on ABD TERG 1–3 not placed on dark scleroites. R IV+V 0.8–0.95× HT II **11**
 – Dorsal hairs on ABD TERG 1–3 all or mostly placed on dark scleroites. R IV+V 1.0–1.84× HT II **12**
11. Cauda with 14–17 hairs. R IV+V c.0.18 mm long *Uroleucon picridiphagum*
 – Cauda with 20–30 hairs. R IV+V 0.143–0.175 mm long. *Uroleucon sonchi*
12. Ante-siphuncular sclerites absent or indistinct **13**
 – Crescent-shaped antesiphuncular sclerites present **14**
13. Cauda pale. R IV+V 1.0–1.1× HT II. SIPH 1.4–1.7× cauda, with reticulation on distal 0.26–0.30 of length *Uroleucon kamtshaticum**
 – Cauda dark. R IV+V 1.3–1.6× HT II. SIPH less than 1.3× cauda, with reticulation on distal 0.33–0.4 of length *Uroleucon amamianum*
14. R IV+V 1.45–1.84× HT II. ANT PT 2.9–3.9× R IV+V. ANT PT/BASE 4.3–5.3 (–5.8) *Uroleucon picridis*
 – R IV+V 1.17–1.33× HT II. ANT PT 4.1–5.4× R IV+V. ANT PT/BASE (5.1–) 5.6–7.2 *Uroleucon cichorii*
15. Dorsal abdomen with paired dark intersegmental markings, closer together on ABD TERG 4 and 5 than on more anterior segments. Spiracular apertures on pro-and metathorax much larger than those on abdomen. ANT PT/BASE 7.0–11.4. ANT III with 9–42 rhinaria *Nasonovia ribisnigri*
 – Dorsal abdomen without dark markings. Spiracular apertures on thorax of similar size to those on abdomen. ANT PT/BASE 2.8–6.3. ANT III with 0–3 (–10) rhinaria **16**
16. Head spiculose or nodulose both dorsally and ventrally (or SIPH with at least 4–5 rows of large polygonal cells on distal 0.13–0.20 of length)
 go to key to polyphagous aphids, p. 1020, starting at couplet 4
 – Head without spicules at least on dorsal surface. SIPH with or without 1–3 rows of subapical polygonal reticulation on less than 0.1 of length **17**
17. ANT PT/BASE 4.2–5.2. R IV+V 1.2–1.3× HT II. Head with some spicules on ventral surface *Aulacorthum palustre*
 – ANT PT/BASE 2.8–3.7. R IV+V 0.75–1.0× HT II. Head without spicules *Acyrtosiphon ilka*

Pieris*P. japonica**P. ovalifolia* see *Lyonia ovalifolia***Pieris sp.****Ericaceae***Aphis spiraeicola*; *Akkaia polygoni*;
Aulacorthum pterinigrum, *solani*; *Illinoia azaleae*;
Macrosiphum euphorbiae, *Macrosiphum* sp. (B.C.; BMNH
colln); *Sinomegoura citricola*; *Wahlgreniella nervata**Aulacorthum magnoliae*; *Illinoia lambersi*Key to apterae on *Pieris*:–

1. ANT 4- or 5-segmented, with ANT PT/BASE c.0.9. SIPH strongly scabrous, and tapering to a narrow apex. Fundatrices and immatures in spring colonies with strongly spinulose hind tibiae
Akkaia polygoni
- ANT usually 6-segmented, ANT PT/BASE more than 2. SIPH smooth or normally imbricated **2**
2. SIPH with subapical reticulation (at least 4–5 rows of closed polygonal cells) **3**
- SIPH without subapical polygonal reticulation **7**
3. Head with minute spicules on ventral side. Abdomen with black marginal sclerites, fused between segments to form broad black marginal stripes
Aulacorthum pterinigrum
- Head without spicules. Abdomen without broad black marginal stripes **4**
4. R IV+V 1.1–1.9× HT II. First tarsal segments with (4–) 5 hairs **5**
- R IV+V 0.73–1.0× HT II. First tarsal segments with 3 hairs **6**
5. R IV+V less than 0.14 mm long, 1.1–1.45× HT II, and bearing 8–12 accessory hairs. Second tarsal segments without spinules on the imbrications. HT II more than 1.5× longer than max. diam. of swollen part of SIPH
Illinoia azaleae
- R IV+V more than 0.14 mm long, 1.4–1.9× HT II, and bearing 15–23 accessory hairs. Second tarsal segments with spinules on the imbrications. HT II less than 1.5× longer than max. diam. of swollen part of SIPH
Illinoia lambersi
6. Longest hairs on ANT III 10–24 μm, 0.3–0.5× BD III. SIPH swollen proximal to reticulated part. Cauda with rounded apex, and bearing 7–9 hairs. (Al. with paired pleural dark patches and large marginal and post-siphuncular sclerites)
Macrosiphum sp. (B.C., Canada; BMNH colln, leg. C.-k. Chan – see text under *M. parvifolii*)
- Longest hairs on ANT III 28–40 μm, 0.6–1.0× BD III. SIPH not swollen. Cauda with a rather pointed apex, and bearing 8–12 hairs. (Al. without dark dorsal abdominal sclerites)
Macrosiphum euphorbiae
7. SIPH swollen on distal part. Head smooth with well-developed ANT tubercles, their inner faces divergent
Wahlgreniella nervata
- Without that combination of characters; if SIPH swollen **then** head is spinulose and ANT tubercles have inner faces parallel or convergent
go to key to polyphagous aphids, p. 1020

Pilea*P. cadierei**P. hamaoi**P. macrocarpa**P. microphylla**P. notata**P. pubescens***Urticaceae**[*Macrosiphum* sp. (Leonard, 1972a)]; *Myzus persicae**Myzus pileae*, *fataunae*;[*Brachymyzus jasmini*]*Aphis gossypii**Kaochiaoja pileophaga**Neomyzus circumflexus*

HOST LISTS AND KEYS

P. pumila
Pilea sp. (?)

Pseudasiphonaphis corni
[*Matsumuraja nuditerga*]

Key to apterae on *Pilea*:-

1. Head smooth with weakly developed ANT tubercles 2
– Head spiculose with well-developed ANT tubercles 3
2. SIPH as very small, rimless cones, shorter than their basal widths. ABD TERG 1–7 all with well-developed marginal tubercles (MTu), longer than SIPH. ANT hairs long and fine, 2–3× BD III Pseudasiphonaphis corni
– SIPH tubular, cylindrical/tapering, much longer than their basal widths. Only ABD TERG 1 and 7 regularly with MTu. ANT hairs 0.4–0.8× BD III Aphis gossypii
3. Dorsal hairs long and thick. R IV+V c.1.7× HT II. Dorsal abdomen with a large dark sclerotic patch Kaochiaoja pileophaga*
– Dorsal hairs very short. R IV+V 0.9–1.4× HT II. Dorsal abdomen with or without sclerotisation 4
4. Dorsal cuticle not sclerotic. ABD TERG 7 not extended posteriorly. SIPH normally imbricated, slightly clavate (with narrow section on basal half), 1.9–2.5× cauda, which is not constricted basally. ANT PT/BASE 2.8–4.5 Myzus persicae
– Dorsal cuticle sclerotic, with wrinkles or corrugations. ABD TERG 7 extended posteriorly, its posterior margin bluntly conical or rounded. SIPH stout, with coarse denticulate imbrication, 2.2–5× cauda, which has a basal constriction. ANT PT/BASE 1.6–2.5 5
5. ANT 5-segmented. SIPH 3.3–4.5× cauda, which is only a little longer than its basal width Myzus fataunae
– ANT 6-segmented. SIPH 2.2–2.8× cauda which is about 2× longer than its basal width Myzus pileae

Piliostigma see Blackman and Eastop (1994)

Pilosella see *Hieracium*

P. officinarum=*Hieracium pilosella*

Pilularia

P. globulifera

Marsileaceae

Neomyzus circumflexus

Pimelea

Pimelea spp.

Thymelaeaceae

[*Semiaphis anthrisci*]; *Myzus persicae*

Pimenta

P. dioica (incl. *officinalis*)

Myrtaceae

Myzus persicae

Pimpinella

P. anisoidis

P. anisum

Umbelliferae

Dysaphis anisoidis

Aphis fabae; *Cavariella aegopodii*, *archangelicae*;

Dysaphis apiifolia; *Hyadaphis coriandri*, *foeniculi*;

Macrosiphum euphorbiae

P. aromatica

P. diversifolia

Aphis fabae; *Cavariella aegopodii*; *Dysaphis pimpinellae*

Cavariella aegopodii, ?*konoii*

<i>P. hallaisanensis</i>	<i>Aphis gossypii</i> ; <i>Hyadaphis coriandri</i> , <i>foeniculi</i> ; [<i>Sitobion</i> sp.]
<i>P. magna</i>	<i>Anuraphis catonii</i> ; <i>Aphis fabae</i> ; <i>Cavariella pastinacae</i> ; <i>Semiaphis anthrisci</i> , <i>pimpinellae</i>
<i>P. major</i>	<i>Anuraphis catonii</i> ; <i>Aphis subnitida</i> ; <i>Cavariella aegopodii</i>
<i>P. monoica</i>	<i>Aphis gossypii</i>
<i>P. nigra</i>	<i>Anuraphis catonii</i>
<i>P. peregrina</i>	<i>Anuraphis catonii</i>
<i>P. saxifraga</i>	<i>Anuraphis catonii</i> ; <i>Aphis</i> [<i>jacetana</i>], <i>subnitida</i> ; <i>Cavariella aegopodii</i> , <i>pastinacae</i> , <i>theobaldi</i> ; <i>Hyadaphis foeniculi</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Semiaphis anthrisci</i> , <i>pimpinellae</i>
<i>P. thellungiana</i>	<i>Cavariella aegopodii</i>
<i>P. tortuosus</i>	<i>Hyadaphis coriandri</i>
<i>P. tragium</i>	<i>Dysaphis anisoidis</i>
<i>P. tripartita</i>	<i>Dysaphis anisoidis</i> ssp. <i>nairi</i>
<i>P. umbellata</i>	<i>Cavariella</i> ? <i>kono</i> i
<i>P. villosa</i>	<i>Aphis subnitida</i>

Key to apterae on *Pimpinella*:-

1. ANT tubercles well developed, with smooth divergent inner faces. ANT 0.9–1.4× BL. SIPH long, unswollen, with a subapical zone of polygonal reticulation *Macrosiphum euphorbiae*
- ANT tubercles absent or weakly developed. ANT less than 0.9× BL. SIPH without subapical polygonal reticulation 2
2. ABD TERG 8 with a posteriorly-projecting process above cauda 3
- No supracaudal process 7
3. SIPH tapering/cylindrical *Cavariella theobaldi*
- SIPH clavate 4
4. ANT PT/BASE 0.6–1.3. R IV usually without accessory hairs *Cavariella aegopodii*
- ANT PT/BASE 1.4–4.0. R IV usually with 2 accessory hairs 5
5. ANT PT/BASE 2.6–4.0 *Cavariella pastinacae*
- ANT PT/BASE 1.4–2.0 6
6. SIPH longer than head width across (and including) eyes. Length of supracaudal process at least 1.6× maximum width of swollen part of SIPH. (Alata with a complete black band on ABD TERG 6) *Cavariella archangelicae*
- SIPH equal to or shorter than head width across eyes. Length of supracaudal process less than 1.5× maximum width of swollen part of SIPH. (Alata with a pair of roundish dark marks on ABD TERG 6) *Cavariella kono*i
7. SIPH very short and flangeless, curved towards midline, 0.3–0.5× cauda *Semiaphis* spp. (*pimpinellae*, *anthrisci*, *dauci*; see text, and use key to apterae on *Aegopodium*, couplets 5–6, for separation of these 3 spp.)
- SIPH more than 0.6× cauda, and with a flange 8
8. Marginal tubercles (MTu) present on thorax and most or all of ABD TERG 1–5 (–7) 9
- MTu absent or only regularly present on prothorax and ABD TERG 1 and 7 14
9. SIPH with close-set rows of separate blunt spinules/denticles. Cauda helmet-shaped, shorter than its basal width, with 11–13 hairs *Anuraphis catonii*

HOST LISTS AND KEYS

- SIPH with normal imbrication. Cauda helmet-shaped, triangular or tongue-shaped; if shorter than its basal width then with 4–6 hairs **10**
- 10.** Cauda tongue-shaped/elongate triangular, longer than its basal width, with 6–12 hairs. Spinal tubercles (STu) absent *Aphis subnitida*
- Cauda helmet-shaped or triangular, not longer than its basal width, with 4–6 hairs. STu present on head and ABD TERG 7–8, or on ABD TERG 8 only **11**
- 11.** Cauda helmet-shaped/pentagonal. Arms of mesothoracic furca separated **12**
- Cauda conical/triangular. Arms of mesothoracic furca connected **13**
- 12.** ABD TERG 1–7 with large dark sclerites, forming broad cross-bands on most segments. R IV+V 1.0–1.1× HT II *Dysaphis pimpinellae*
- Dark cross-bands only present on ABD TERG 5–8. R IV+V 1.2–1.5× HT II *Dysaphis apiifolia*
- 13.** Longest hair on ANT III 8–15 µm long, 0.35–0.7× BD III. R IV+V 0.09–0.11 mm long *D. anisoidis* s. str.
- Longest hair on ANT III 16–35 µm long, 1–2× BD III. R IV+V 0.11–0.13 mm long *Dysaphis anisoidis* ssp. *nairi*
- 14.** SIPH swollen, 0.6–1.4× cauda; if more than 0.9× cauda then clavate. ABD TERG 1 and 7 without MTu **15**
- SIPH cylindrical/tapering, 0.9–2.5× cauda. ABD TERG 1 and 7 with MTu **16**
- 15.** SIPH 0.88–1.4× cauda, 1.7–3.1× R IV+V and 3.1–5.1× longer than their minimum diameter on basal half *Hyadaphis foeniculi*
- SIPH 0.6–0.82× cauda, 0.9–1.6× R IV+V and 1.6–2.7× their minimum diameter on basal half *Hyadaphis coriandri*
- 16.** SIPH darker than cauda which bears 4–8 hairs. Femoral hairs mostly short. Dorsal abdomen without any dark markings anterior to SIPH *Aphis gossypii*
- SIPH and cauda black, latter with 11–24 hairs. Femoral hairs long and fine. Dorsal abdomen with scattered dark markings anterior to SIPH *Aphis fabae*

Piper

P. aduncum

P. betle

P. futokadsura

P. guineense

P. hispidum

P. kadzura

P. longum

P. nigrum

P. peltatum

P. umbellatum

Piper sp.

Piperaceae

Aphis gossypii, *spiraecola*; *Aulacorthum solani*;

Neomyzus circumflexus; *Sinomegoura citricola*;

Toxoptera aurantii

Aphis gossypii

Neomyzus circumflexus

Toxoptera aurantii

Aphis gossypii

Aulacorthum magnoliae

Sinomegoura citricola

Aphis gossypii, *spiraecola*; *Myzus persicae*;

Toxoptera aurantii

Aphis gossypii

Aphis gossypii

[*Aphis piperis* (invalid name)]

Use key to polyphagous aphids, p. 1020.

Piptantherum* see *Oryzopsis***Piptanthus****P. tomentosus***Leguminosae***Aphis cytisorum* ssp. *sarothamni*, *fabae*Key to apterae on *Piptanthus*:–

1. Dorsum with an extensive black shield (fragmented in small individuals). Longest hairs on ANT III 0.5–0.7× BD III. Cauda with 7–11 hairs *Aphis cytisorum* ssp. *sarothamni*
- Dorsum with only scattered small sclerites anterior to SIPH. Longest hairs on ANT III 0.8–2.2× BD III. Cauda with 11–24 hairs *Aphis fabae*

Piptocarpha*P. rotundifolia***Compositae***Aphis gossypii****Piqueria****P. trinervia***Compositae***Myzus persicae****Pirola* see *Pyrola******Piscidia****P. piscipula***Leguminosae***Aphis craccivora****Pisonia****P. aculeata***Nyctaginaceae***Aphis craccivora*, *spiraecola*

Use key to polyphagous aphids, p. 1020.

Pistacia* see Blackman and Eastop (1994)**Pistia****P. stratiotes***Araceae***Rhopalosiphum nymphaeae*, *rufiabdominale*

Key to separate apterae of these two species:–

(Both have weakly developed ANT tubercles and tergum with a reticulate pattern of spicules.)

- SIPH clavate. ANT and body hairs short. ANT 6-segmented *Rhopalosiphum nymphaeae*
- SIPH cylindrical. ANT and body hairs long. ANT 5-segmented *Rhopalosiphum rufiabdominale*

Pisum*P. arvense**P. sativum***Leguminosae***Acyrtosiphon pisum*; *Aphis fabae*; *Myzus persicae**Acyrtosiphon gossypii*, *pisivorum*, *pisum*;*Aphis craccivora*, *fabae*; *Aulacorthum solani*;*Macrosiphum creelii*, *euphorbiae*; *Megoura crassicauda*;*Myzus persicae*; *Sitobion nigrinectarium*; *Smynthuroides betae**Megoura viciae*; *Neomyzus circumflexus**Pisum* spp.

HOST LISTS AND KEYS

Key to apterae on *Pisum*:-

(See Blackman and Eastop, 2000, for an illustrated key to common aphids on *Pisum sativum*.)

1. ANT tubercles well developed with smooth, divergent inner faces 2
 - ANT tubercles absent or weakly developed, or if well developed then with steep-sided, spiculate or scabrous inner faces go to key to polyphagous aphids, p. 1020
2. SIPH black 3
 - SIPH mainly pale, sometimes darker distally 5
3. SIPH tapering/cylindrical, with subapical polygonal reticulation, at least 1.5× cauda which is contrastingly pale *Sitobion nigrinectarium*
 - SIPH cigar-shaped, without polygonal reticulation, similar in length to cauda, which is black 4
4. ANT III with 5–26 (usually 10–18) rhinaria, not in a row, on basal 0.75 of segment (ANT IV of al. with 0–7 rhinaria) *Megoura viciae*
 - ANT III with (15–) 21–50 rhinaria in a row extending over 0.75–0.90 of segment. (ANT IV of al. with more than 17 rhinaria) *Megoura crassicauda*
5. SIPH with a subapical zone of polygonal reticulation 6
 - SIPH without subapical reticulation 7
6. ANT VI BASE 0.8–1.3× R IV+V *Macrosiphum euphorbiae*
 - ANT VI BASE 1.4–2.0× R IV+V *Macrosiphum creeli*
7. SIPH long and attenuate distally, 0.42–0.50× BL and 2.5–3.5× cauda *Acyrtosiphon gossypii*
 - SIPH 0.22–0.38× BL, and 1.2–2.3× cauda 8
8. SIPH tapering gradually from base to flange, c.2× cauda. ANT VI BASE less than 0.2mm long, c.1.2–1.3× R IV+V *Acyrtosiphon pisivorum**
 - SIPH thin and cylindrical distally, 1.2–1.9× cauda. ANT VI BASE 0.25–0.4mm long, 1.8–2.3× R IV+V *Acyrtosiphon pisum*

Pitcairnia

P. hybrida

Bromeliaceae

Aphis gossypii; *Toxoptera aurantii*, *odinae*

Use key to polyphagous aphids, p. 1020.

Pithecellobium, *Pittosporum* see Blackman and Eastop (1994)

Pituranthos

P. chloranthus

P. tortuosus

Pituranthos sp.

Umbelliferae

Hyadaphis coriandri

Hyadaphis coriandri

Brachyunguis harmalae

Key to apterae on *Pituranthos*:-

(Both species have SIPH shorter than cauda.)

- ANT PT/BASE less than 1. SIPH very short, not swollen (Figure 36h), cauda triangular. ABD TERG 1 and 7 with marginal tubercles (MTu) *Brachyunguis harmalae*
- ANT PT/BASE at least 1.5. SIPH slightly swollen (Figure 41b), cauda finger-like. No MTu on ABD TERG 1 and 7 *Hyadaphis coriandri*

Pityrogramma

P. calomelanos
P. chrysophylla
P. tatarea

P. triangularis

Adiantaceae

Idipterus nephrolepidis; *Micromyzus niger*
Micromyzodium filicium
Aulacorthum solani; *Idiopterus nephrolepidis*;
Micromyzella filicis
Neomyzus circumflexus

Use key to fern-feeding aphids under *Polypodium*.

Plagianthus see Blackman and Eastop (1994)

Plagiochloa see *Tribolium*

Plagiomnium see *Mnium*

Plagiothecium

P. laetum

Plagiotheciaceae

Muscaphis escherichi ssp. *irae*

Planera see Blackman and Eastop (1994)

Plantago

P. aristata
P. asiatica

P. camtschatica
P. coronopus
P. depressa
P. lagopus

P. lanceolata

P. major

P. maritima
P. media

Plantaginaceae

Aphis middletonii; *Brachycaudus helichrysi*
 [Eriosoma harunire]; *Dysaphis plantagifoliae*;
 [Pemphigus dorocola]
 [Nectarosiphon obako Shinji (nomen dubium)]
Aphis longirostrata; *Dysaphis maritima*, *plantaginea*
Aphis fabae, *plantaginis*; *Brachycaudus plantaginis*
Aulacorthum solani; *Brachycaudus helichrysi*;
Myzus ornatus, *persicae*
Aphis fabae, *gossypii*, [montanicola], *nasturtii*, *plantaginis*,
 [Aphis sp. (Sweden; Ossiannilsson, 1964a)];
Aulacorthum solani; *Brachycaudus helichrysi*, *lucifugus*;
Dysaphis aucupariae, *plantaginea*, [sorbi];
Macrosiphum euphorbiae;
Myzus ascalonicus, *ornatus*, *persicae*
Abstrusomyzus phloxae;
Aphis fabae, *frangulae*, *gossypii*, *middletonii*, *nasturtii*,
plantaginis, *spiraecola*; *Aulacorthum solani*;
Brachycaudus helichrysi, *plantaginis*;
Dysaphis aucupariae, *plantaginea*, *plantaginis*, *pulverina*;
 [Hyalomyzus eriobotryae]; *Macrosiphum euphorbiae*;
Myzus ascalonicus, [cerasi], *cymbalariae*, *ornatus*, *persicae*;
Neomyzus circumflexus; [Rhopalosiphum maidis, nymphaeae]
Aphis longirostrata; *Dysaphis maritima*
Aphis fabae, *langirostrata*, *plantaginis*;
Brachycaudus helichrysi;
Dysaphis aucupariae, *plantaginea*, *plantaginis*, *pulverina*;
Myzus ascalonicus, *ornatus*

HOST LISTS AND KEYS

<i>P. ovata</i>	<i>Aphis craccivora</i>
<i>P. palmata</i>	<i>Aulacorthum solani</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus ornatus</i> ; <i>Neomyzus circumflexus</i>
<i>P. psyllium</i>	<i>Dysaphis plantaginea</i> ; <i>Myzus ascalonicus</i>
<i>P. rubrifolia</i>	<i>Aulacorthum solani</i>
<i>P. rugelii</i>	<i>Aphis middletonii</i> ; <i>Dysaphis plantaginea</i>
<i>P. stauries</i>	<i>Aphis sambuci</i>
<i>P. virginica</i>	<i>Aphis gossypii</i>
<i>Plantago</i> spp.	<i>Dysaphis pavlovskyana</i> , <i>shaposhnikovi</i> ; [<i>Sitobion akebiae</i>]; <i>Smynthuroides betae</i>

Key to apterae on *Plantago*:-

1. ABD TERG 1–5 (–6) and 7 all with well-developed marginal tubercles (MTu), those on ABD TERG 7 being as large as or larger than the adjacent spiracular plates 2
 - MTu either absent or present, but not as above; in particular, **if** there are large MTu on ABD TERG 7 then they are similarly large on ABD TERG 1 only, and not consistently present on any intervening segments 4
2. ANT and legs dark except for femoral bases. SIPH 2.2–3.5× cauda which is black and bears 10–20 hairs *Aphis sambuci*
 - ANT and legs mainly pale, darker distally. SIPH 0.9–2.4× cauda which is paler than SIPH and bears 6–9 (–12) hairs 3
3. R IV+V 1.24–1.41× HT II. SIPH 1.62–2.4× cauda *Aphis plantaginis*
 - R IV+V (1.29–) 1.45–1.63× HT II (only below 1.45× in specimens with BL less than 1.2 mm). SIPH 0.94–1.64× cauda *Aphis longirostrata*
4. Cauda helmet-shaped, pentagonal or triangular in dorsal view, not longer than 1.2× its basal width, and bearing 4–6 (usually 5) hairs 5
 - Cauda (if at all evident) tongue-shaped, finger-shaped or bluntly triangular, but **if** less than 1.2× its basal width **then** with more than 8 hairs
go to key to polyphagous aphids, p. 1020, but note that grass-feeding aphids may sometimes also occur on *Plantago*
5. Dorsum with an extensive dark sclerotic shield, sometimes incomplete but usually extending from metanotum to ABD TERG 6 6
 - Dorsum with or without scattered or segmentally divided dark sclerites 7
6. ANT hairs short, longest on ANT III only c.0.2× BD III. ANT PT/BASE 5.3–7.5. ANT III without rhinaria *Brachycaudus lucifugus*
 - ANT hairs long, those on ANT III 2–2.5× BD III. ANT PT/BASE 2.2–2.5. ANT III with 6–16 rhinaria *Brachycaudus plantaginis**
7. SIPH 0.8–2.0× cauda 8
 - SIPH 2.6–c.5× cauda 9
8. SIPH pale and smooth, with a subapical annular incision. Dorsal abdomen without any dark markings. MTu frequently absent *Brachycaudus helichrysi*
 - SIPH dusky to dark, imbricated. Dorsal abdomen with small dark sclerites at bases of hairs on ABD TERG 1–6, and dark cross-bands on 7 and 8. Well-developed MTu regularly present, on prothorax and ABD TERG 1–5 *Dysaphis pulverina*

9. ANT PT/BASE 2.0–3.1 10
 – ANT PT/BASE 3.2–c.5 12
10. SIPH somewhat swollen *Dysaphis pavlovskyana*
 – SIPH tapering/cylindrical 11
11. Dorsal cuticle rather pale and not distinctly reticulate. Spinal and marginal tubercles (STu and MTu) if present not much larger than adjacent hair-bases *Dysaphis aucupariae*
 – Dorsal cuticle usually smoky and distinctly reticulate. STu and MTu when present up to 2× diameter of adjacent hair-bases, MTu often appearing smoky *Dysaphis maritima*
12. ANT PT/BASE 3.2–4.0. STu usually present on head and ABD TERG 7 and 8, and MTu usually on prothorax and ABD TERG 1–4 (–5) *Dysaphis shaposhnikovi**
 – ANT PT/BASE 4.0–c.5. STu on ABD TERG 8 only or absent; MTu usually absent 13
13. SIPH 3.0–3.4× cauda, which is longer than its basal width. ANT PT/BASE 4.0–4.5 *Dysaphis plantaginea* (or *plantagifoliae* – see text)
 – SIPH c.5× cauda, which is not longer than its basal width. ANT PT/BASE c.5 *Dysaphis plantaginis**

Platanthera

P. bifolia

Platanthera sp.

[*Aphis hederiae*]

Aphis fabae

Orchidaceae

Platostoma

P. africanum

Aphis gossypii

Labiatae

Platycelyphium

P. voensis

Aphis craccivora

Leguminosae

Platycerium

Platycerium sp.

Micromyzus katoi

Polypodiaceae

Platycodon

P. glandiflorum

Campanulaceae

Megouroleucon codonopsicola;

Rhopalosiphoninus staphyleae;

Uroleucon kikioense, *neocampanulae*, [*rudbeckiae*]

Aphis gossypii; [*Sitobion akebiae*]

P. glaucus

Key to apterae on *Platycodon*:-

1. SIPH pale or dark, if dark then without polygonal reticulation. Head smooth or spiculose, if smooth then ANT tubercles not well developed go to key to polyphagous aphids, p. 1020
 – SIPH dark with a distal zone of polygonal reticulation. Head smooth, ANT tubercles well developed with smooth divergent inner faces 2
2. Dorsal abdomen with large marginal and pre- and postsiphuncular sclerites but without scleroites at bases of spinal and pleural hairs. Dorsal hairs all shorter than ANT BD III. First tarsal segments with 4 hairs (2 sense pegs, 2 laterals) *Megouroleucon codonopsicola*
 – Dorsal abdomen with small marginal sclerites and scleroites at bases of spinal and pleural hairs. Dorsal hairs all much longer than ANT BD III. First tarsal segments with 5 hairs (1 medial sense peg, 4 laterals) 3

HOST LISTS AND KEYS

3. Cauda pale. R IV+V c.0.7× HT II
 – Cauda dark. R IV+V c.1.4–1.5× HT II

*Uroleucon kikioense**
Uroleucon neocampanulae

Platylobium

P. formosum

Aphis platylobii

Leguminosae

Plectranthus (incl. Coleus)

P. albus

P. aromaticus

P. barbatus

P. blumei

P. coetsa

P. inflexus see *Isodon*

P. japonicus see *Isodon*

P. longitubus

P. rugosus

P. scutellariodes

P. shirensis

P. striatus

P. trichocarpus

P. verschaffeltii

Plectranthus sp.

Sitobion autriquei

Ovatus minutus

Sitobion colei

Aphis gossypii; *Macrosiphum mesosphaeri*;

Myzus ornatus, *persicae*; *Sitobion colei*

Aphis gossypii; [*Cinara hottensis*];

Myzus ascalonicus, *siegesbeckiae*;

Sitobion aulacorthoides, *plectranthi*

Labiatae

[*Anuraphis floris* Monzen, 1934]; *Cryptaphis menthae*

Myzus ornatus; *Cryptaphis rostrata*

Myzus ornatus

Myzus ornatus

Aphis gossypii

Myzus siegesbeckiae

Eucarazzia elegans; *Myzus ornatus*; *Neomyzus circumflexus*

[*Myzus plectranthi* Shinji (nomen dubium)];

[*Sitobion* sp. (Millar, 1994)]

Key to apterae on *Plectranthus*:-

1. SIPH strongly swollen, with maximum diameter of swollen part more than 2× minimum diameter of stem, smooth except for a little subapical polygonal reticulation (see Figure 48a). SIPH 5.4–8.2× cauda 2
 – SIPH not swollen or much less swollen, and less than 3.5× cauda *Eucarazzia elegans*
2. Dorsal hairs long, 2–4× longer than ANT BD III, with expanded apices 3
 – Dorsal hairs all or mostly shorter than ANT BD III, with blunt or pointed apices 4
3. R IV+V 1.3–1.4× HT II, with c.8 accessory hairs. SIPH c.2.5× cauda. ANT PT/BASE 4.5–5.0 5
 – R IV+V 1.6–1.8× HT II, with 2–4 accessory hairs. SIPH 1.2–1.6× cauda. ANT PT/BASE 3.1–3.6 9
*Cryptaphis menthae**
Cryptaphis rostrata
4. SIPH partly or wholly dark, with a subapical zone of polygonal reticulation 5
 – SIPH pale or dark, without subapical reticulation 9
5. Dorsal abdomen with extensive black sclerotisation 6
 – Dorsal abdomen mainly pale 7
6. Longest hairs on ANT III 14–20µm long, 0.5–0.6× BD III, and those on ABD TERG 8 are 30–42µm long, 1.0–1.6× BD III 8
 – Longest hairs on ANT III 8–12µm long, 0.3–0.45× BD III, and those on ABD TERG 8 are 12–28µm long, 0.4–0.9× BD III 9
Sitobion autriquei
Sitobion colei

PLEUROSPERMUM

7. ANT III–VI dark except at base of III. Head without spicules *Macrosiphum mesosphaeri*
 – ANT III–V pale with dark apices. Ventral side of head minutely spiculose 8
8. ANT III with 1–7 rhinaria on basal half, ANT IV with 0. ANT PT/BASE 5.5–6.4
Sitobion aulacorthoides
 – ANT III with 4–15 rhinaria distributed over whole length, ANT IV with 0–4. ANT PT/BASE 4.8–5.5
Sitobion plectranthi
9. Head smooth with ANT tubercles weakly developed. SIPH dark, cauda paler. ABD TERG 1 and 7 with marginal tubercles (MTu) *Aphis gossypii*
 – Head densely spiculose with well-developed steep-sided or apically convergent ANT tubercles. SIPH pale/dusky, cauda pale. ABD TERG 1 and 7 without MTu 10
10. ANT PT/BASE 1.7–2.8. ANT 6-segmented 11
 – ANT PT/BASE 2.6–5.2, but if less than 2.8 then ANT III and IV usually fused to give 5-segmented ANT 12
11. Dorsal body with a distinctive pattern of dark intersegmental markings *Myzus ornatus*
 – Dorsal body without any distinctive pattern of dark intersegmental markings (?) *Ovatus minutus**
12. Dorsum with extensive dark markings, including a large roughly horseshoe-shaped abdominal patch
Neomyzus circumflexus
 – Dorsum pale 13
13. SIPH tapering/cylindrical, very coarsely imbricated (see Figure 48e), 3–4× cauda. R IV+V 1.3–1.6× HT II. Dorsal abdomen roughly corrugated *Myzus siegesbeckiae*
 – SIPH slightly clavate (with narrower section on basal half), normally imbricated, 1.8–2.5× cauda. R IV + V 0.9–1.2× HT II. Dorsal abdomen almost smooth *Myzus persicae*

Pleioblastus see *Arundinaria* in Blackman and Eastop (1994)

Pleione

P. formosana

Pleione spp.

Aulacorthum solani

Myzus ascalonicus, persicae

Orchidaceae

Use key to polyphagous aphids, p. 1020.

Pleodendron

P. fallax

Myzus ornatus

Canellaceae

Pleopeltis

P. excavata

Micromyzella pterisoides

Polypodiaceae

(or use key to fern-feeding aphids under *Polypodium*)

Pleuropterus

P. multiflorus

Aphis nerii

Polygonaceae

Pleurospermum

P. uralense

Aphis fabae, pleurospermi

Umbelliferae

HOST LISTS AND KEYS

Key to apterae on *Pleurospermum*:-

- R IV+V 1.4–1.5× HT II and bearing 11–12 accessory hairs. Large marginal tubercles (MTu) present on ABD TERG 1–4 (–5) and 7. ANT and tibiae mainly dark. Dorsal abdomen without any dark sclerotisation anterior to SIPH
Aphis pleurospermi
- R IV+V 0.9–1.1× HT II and bearing 2 accessory hairs. MTu only regularly present on ABD TERG 1 and 7. ANT and tibiae with extensive pale regions. Dorsal abdomen usually with some dark markings anterior to SIPH
Aphis fabae

Pleurothallis

P. corniculata
P. cubensis
P. ruscifoliae
P. velaticaulis

Orchidaceae

Certaphis orchidearum
Cerataphis orchidearum; *Sitobion luteum*
Sitobion luteum
Sitobion luteum; *Toxoptera aurantii*

Use key to apterae on orchids under *Cymbidium*.

Pleurozium

P. schreberi

Hylocomiaceae

[*Jacksonia papillata*]; *Muscaphis escherichi*;
Pseudacaudella rubida

Use key to apterae of fern-feeding aphids under *Polypodium*.

Pluchea

P. absinthoides
P. adnata
P. carolinensis (= *odorata*)
P. dioscoridis
P. indica
P. odorata see *carolinensis*
P. pupurascens
P. rosea

Compositae

Macrosiphum euphorbiae; *Uroleucon tessariae*
Uroleucon ambrosiae
Aphis gossypii, *spiraecola*; *Uroleucon ambrosiae*
Aphis delottoi, *pseudocardui*
Aphis gossypii
Aphis spiraecola; *Uroleucon ambrosiae*
Aphis spiraecola; *Uroleucon ambrosiae*

Key to apterae on *Pluchea*:-

1. ANT tubercles absent or weakly developed. SIPH without polygonal reticulation **2**
 - ANT tubercles moderately or well developed, with smooth divergent inner faces. SIPH with distal zone of polygonal reticulation **5**
2. ANT PT/BASE 0.75–1.1. SIPH and cauda both shorter than R IV+V. Cauda bluntly triangular with 13–20 hairs. ANT III often with rhinaria on distal part. Dorsal abdomen with dark markings **3**
 - ANT PT/BASE 1.9–3.2. SIPH and cauda both longer than R IV+V. Cauda tongue- or finger-shaped with 4–12 (–15) hairs. ANT III without rhinaria. Dorsal abdomen without dark markings **4**
3. Hairs on ABD TERG 8 are 30–38 µm, 1.5–2.0× ANT BD III. ANT PT/BASE 0.75–0.93
Aphis delottoi
 - Hairs on ABD TERG 8 are 12–25 µm, 0.6–1.2× BD III. ANT PT/BASE (0.8–) 1.0–1.2 (–1.4)
Aphis pseudocardui
4. SIPH clearly darker than cauda, which has no constriction and bears 4–8 hairs. Femoral hairs all short
Aphis gossypii

- SIPH and cauda both very dark. Cauda usually has an evident constriction between basal and distal part, and bears 7–15 hairs. Femora with some long fine hairs *Aphis spiraeicola*
- 5. SIPH 1.1–1.35× cauda, with reticulation on distal 0.30–0.35 of length *Uroleucon ambrosiae*
- SIPH 1.7–2.2× cauda, with reticulation on distal 0.13–0.28 of length **6**
- 6. SIPH reticulated over distal 0.22–0.28 of length. ANT III with 9–15 rhinaria. Cauda with pointed apex *Uroleucon tessariae*
- SIPH reticulated over subapical 0.13–0.20 of length. ANT III with 1–8 (–10) rhinaria. Cauda with rounded apex *Macrosiphum euphorbiae*

Plumbago*P. capensis**P. ceylonica**A. pulchella**P. scandens**P. zeylandica***Plumbaginaceae***Aphis craccivora, fabae, gossypii, [punicae], spiraeicola;**Toxoptera aurantii**Myzus persicae**Aphis spiraeicola**Aphis craccivora, spiraeicola; Myzus persicae**Aphis craccivora; [Hysteroneura setariae];**Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Plumeria*P. rubra**P. tricolor***Apocynaceae***Aphis gossypii**Aphis fabae, gossypii*

Use key to polyphagous aphids, p. 1020.

Poa*P. acroleuca**P. alopecurus**P. alpina**P. ampla**P. angustifolia**P. annua**P. aquatica***Gramineae***Sitobion akebiae**Pentamyzus tenuis**[Acyrtosiphon loti]; Metopolophium alpinum, montanum; Schizaphis werderi; Sitobion avenae; [Nasonovia brevipes]**Forda marginata**Atheroides serrulatus**Anoecia corni, haupti, nemoralis, vagans; [Aphis sambuci];**Aploneura lentisci; Baizongia pistaciae;**[Brachycaudus helichrysi]; [Colopha compressa];**Forda formicaria, marginata;**Geoica harpazi, lucifuga, utricularia; Hyalopterus pruni;**[Matsumuraja capitophoroides]; Melanaphis pyrarica;**Metopolophium chandrani, dirhodum; Myzus ascalonicus;**Rhopalomyzus grabhami, poae;**Rhopalosiphum insertum, maidis, padi;**Schizaphis agrostis, graminum, [holci], palustris;**Sipha glyceriae, maydis;**Sitobion akebiae, alopecuri, avenae, fragariae, miscanthi;**Tetraneura fusiformis, fusiformis ssp. bispina, [poae**(nomen dubium)], ulmi; Utamphorophora humboldti**Sipha glyceriae; Sitobion avenae*

HOST LISTS AND KEYS

<i>P. arctica</i>	<i>Sitobion calvulum</i>
<i>P. bulbosa</i>	<i>Forda marginata</i> ; <i>Rhopalosiphum padi</i> ; <i>Schizaphis graminum</i> ; <i>Sitobion avenae</i> , <i>fragariae</i>
<i>P. chaixi</i>	<i>Anoecia nemoralis</i>
<i>P. compressa</i>	<i>Atheroides serrulata</i> ; <i>Forda marginata</i> ; <i>Rhopalosiphum padi</i> ; <i>Schizaphis graminum</i> ; <i>Sitobion avenae</i> , <i>fragariae</i>
<i>P. cookii</i>	<i>Rhopalosiphum padi</i>
<i>P. exilis</i>	<i>Sitobion fragariae</i>
<i>P. flabella</i>	<i>Pentamyzus falklandicus</i>
<i>P. glauca</i>	<i>Rhopalosiphum padi</i> ; <i>Sipha glyceriae</i> ; <i>Sitobion avenae</i> , <i>fragariae</i> ; <i>Utamphorophora humboldti</i>
<i>P. infirma</i>	<i>Sitobion fragariae</i>
<i>P. laxa</i>	[<i>Acyrtosiphon loti</i>]; <i>Pemphigus similis</i>
<i>P. maritima</i> see <i>Puccinellia</i>	
<i>P. nemoralis</i>	<i>Anoecia corni</i> , <i>nemoralis</i> ; <i>Diuraphis holci</i> ; <i>Forda formicaria</i> , <i>marginata</i> ; <i>Metopolophium dirhodum</i> , <i>Metopolophium</i> sp. (Switzerland; BMNH, leg. K. de Rico); <i>Rhopalosiphum padi</i> ; <i>Sitobion akebiae</i> , <i>avenae</i>
<i>P. novae-zelandiae</i>	<i>Sitobion miscanthi</i>
<i>P. palustris</i>	<i>Rhopalosiphum padi</i> ; <i>Sipha glyceriae</i>
<i>P. pratensis</i>	<i>Anoecia corni</i> , <i>cornicola</i> , <i>nemoralis</i> ; <i>Aploneura lentisci</i> ; <i>Atheroides serrulatus</i> ; <i>Baizongia pistaciae</i> ; <i>Forda formicaria</i> , <i>marginata</i> , <i>rotunda</i> ; <i>Geoica utricularia</i> ; <i>Jacksonia papillata</i> ; <i>Paracletus cimiciformis</i> ; <i>Rhopalomyzus poae</i> ; <i>Rhopalosiphum insertum</i> , <i>maidis</i> , <i>padi</i> , <i>padiformis</i> ; <i>Schizaphis graminum</i> , <i>muhlenbergiae</i> ; <i>Sipha maydis</i> ; <i>Sitobion akebiae</i> , <i>avenae</i> , <i>fragariae</i> , <i>miscanthi</i> ; <i>Tetraneura ulmi</i> , <i>yezoensis</i>
<i>P. sachalinensis</i>	<i>Rhopalosiphum padi</i>
<i>P. schimperana</i>	<i>Hysteroneura setariae</i> ; <i>Myzus ornatus</i> ; <i>Rhopalosiphum padi</i> ; <i>Sitobion graminis</i> , <i>yakini</i>
<i>P. sphondylodes</i>	<i>Sitobion akebiae</i>
<i>P. trivialis</i>	<i>Anoecia nemoralis</i> ; <i>Aploneura lentisci</i> ; [<i>Colopha compressa</i>]; <i>Cryptaphis poae</i> ; <i>Forda marginata</i> ; <i>Metopolophium dirhodum</i> , <i>festucae</i> , <i>festucae</i> ssp. <i>cerealium</i> , <i>friscum</i> ; <i>Rhopalomyzus poae</i> ; <i>Rhopalosiphum insertum</i> , [<i>nigrum</i>], <i>padi</i> , <i>rufiabdominale</i> ; <i>Sipha elegans</i> ; <i>Sitobion avenae</i> , <i>fragariae</i> , <i>scoticum</i> ; <i>Tetraneura ulmi</i> ; <i>Utamphorophora humboldti</i>
<i>Poa</i> spp.	<i>Aphis craccivora</i> ; [<i>Cerataphis lataniae</i>]; <i>Forda bykovi</i> ; <i>Geoica setulosa</i> ; <i>Glabromyzus howardii</i> ; [<i>Pemphigus bursarius</i>]; <i>Sipha flava</i> ; <i>Sitobion graminearum</i> , [<i>Sitobion</i> sp. (Chowdhuri <i>et al.</i> , 1969b)]; [<i>Subiziphya clauseni</i> Quednau 1990]

Use key to apterae of grass-feeding aphids under *Digitaria*.

Podospermum* see *Scorzonera***Podranea***

P. brycei
P. ricasoliana

Bignoniaceae

Aphis gossypii
Aphis gossypii, *spiraecola*

Use key to polyphagous aphids, p. 1020.

Pogonarthria

P. squarrosa

Gramineae

[*Sitobion* sp. (van Harten, 1972a)]

Pogonatherum

P. paniceum
P. sarcharum
P. saccharoideum

Gramineae

Tetraneura basui, *fusiformis*, *radicola/yezoensis* group
Tetraneura basui
Tetraneura fusiformis

Use key to apterae of grass-feeding aphids under *Digitaria*.

Pogonatum

P. urnigerum

Polytrichaceae

Myzodium modestum

***Pogostemon* (incl. *Dysophylla*)**

P. amaranthoides
P. elstozia (?*elsholtzioides*)
Pogostemon sp.

Labiatae

Aphis gossypii
Subovatomyzus leucosceptri
Aphis nasturtii; *Brachycaudus helichrysi*;
Myzus persicae

Key to apterae on *Pogostemon*:-

- Head smooth with well-developed, divergent ANT tubercles. Antennal and body hairs short, with somewhat capitate apices. SIPH pale, almost smooth, slightly but distinctly swollen on distal half, with a subapical annular incision. ANT PT/BASE 5.8-7.9 *Subovatomyzus leucosceptri*
- Without this combination of characters go to key to polyphagous aphids, p. 1020

Pohlia

P. gracilis
Pohlia sp.

Bryaceae

Muscaphis escherichi; [*Rhopalomyzus poae*]
Myzodium modestum

Use key to apterae of moss-feeding aphids under *Polytrichum*.

Poikilospermum

Poikilospermum sp.

Cecropiaceae

Cerataphis freycinetiae(?)

Poinciana

P. pulcherrima (in error as
Poincianella pulcherrima?)

Leguminosae

Aphis craccivora, *gossypii*

Polanisia

P. graveolens

Capparidaceae

[*Aphis polanisiae* (nomen dubium), *polanisagraveolens* (invalid)]; *Myzus persicae*

HOST LISTS AND KEYS

Polemonium

P. boreale
P. caeruleum
P. carneum
P. caucasicum
P. foliosissimum
P. himalayanum
P. mellitum
P. racemosum
P. speciosum
Polemonium sp.

Polemoniaceae

Aulacorthum solani
Macrosiphum euphorbiae; *Rhopalosiphoninus staphyleae*
Macrosiphum euphorbiae
Nasonovia dzhetisuensis
Nasonovia muesbecki ssp. *montana*, *polemonii*
Aulacorthum solani
Macrosiphum euphorbiae; *Myzus persicae*
Aphis polemoniradicis
Nasonovia polemonii
Nasonovia hottesi

Key to apterae on *Polemonium*:-

(Only al. of *Nasonovia hottesi* are known; some characters of apt. of this species are inferred from al.).

1. ANT tubercles undeveloped. Large hemispherical or flattened marginal tubercles (MTu) present on prothorax and ABD TERG 1–4 (–5) and 7. SIPH short and dark, 1.2–1.5× cauda, which is about as long as its basal width and bears 10–16 hairs *Aphis polemoniradicis*
 – Without that combination of characters **2**
2. Thoracic spiracles much larger than abdominal ones. ANT III with numerous rhinaria. First tarsal segments with 4 hairs. (Sec. rhin. in al. III 40–86, IV 0–22, V 0–3) **3**
 – Thoracic spiracles similar in size to abdominal ones. ANT III with 0–10 rhinaria. First tarsal segments with (2–) 3 hairs. (Sec. rhin. in al. III less than 30, IV 0–5)
go to key to polyphagous aphids, p. 1020
3. R IV+V 2.4–3.0× HT II, and bearing more than 20 accessory hairs **4**
 – R IV+V 1.4–2.3× HT II, with 10–15 accessory hairs **5**
4. SIPH 1.3–1.44× cauda *Nasonovia muesbecki* ssp. *montana**
 – SIPH more than 3× cauda *Nasonovia polemonii*
5. SIPH 0.85–0.95× cauda. R IV+V 2.0–2.3× HT II, with 13–15 accessory hairs *Nasonovia dzhetisuensis**
 – SIPH longer than cauda (1.2–1.5× longer in al.). R IV+V c.1.4× HT II, with c.10–11 accessory hairs (data for al.) *Nasonovia hottesi**

Polianthes

P. tuberosa
Polianthes sp.

Agavaceae

Aphis fabae, [*polyanthis* (nomen dubium)]; *Myzus persicae*
Aulacorthum solani

Use key to polyphagous aphids, p. 1020.

Poliomintha

P. incana

Labiatae

[*Pleotrichophorus stroudi*]

Pollia

P. japonica

Commelinaceae

Aulacorthum takahashii

Pollinia* see *Chrysopogon***Polyalthia***

P. longifolia
Polyalthia sp.

Use key to apterae on *Annona*.

Annonaceae

Aphis gossypii, *spiraecola*
Greenidea anonae; *Toxoptera aurantii*

Polyanthes* see *Polianthes***Polycarpaea***

P. carnosae
P. repens

Use key to polyphagous aphids, p. 1020.

Caryophyllaceae

Aphis gossypii
Myzus persicae

Polycarpon

P. prostratum

Polygala

P. arenaria
P. butyracea
P. senega
P. virgata
Polygala sp.

Key to apterae on *Polygala*:-

- Thoracic spiracles greatly enlarged, rounded, much larger than abdominal spiracles. ANT PT/BASE 7.0–11.4, usually more than 8.0. ANT III with 14–36 rhinaria *Nasonovia ribisnigri*
- Thoracic spiracles similar in size to abdominal ones. ANT PT/BASE less than 6. ANT III with 0–10 rhinaria go to key to polyphagous aphids, p. 1020

Caryophyllaceae

Aphis gossypii

Polygalaceae

Aphis gossypii
Aphis craccivora
[*Aphis polygalasenegae* (invalid)]
Aphis craccivora
Brachycaudus helichrysi; *Myzus ornatus*;
Nasonovia ribisnigri

Polygonatum

P. biflorum (incl. *commutatum*)
P. caniculatum
P. commutatum see *biflora*
P. falcatum
P. multiflorum

P. officinale
P. pubescens
Polygonatum sp.

Key to apterae on *Polygonatum*:-

1. Head smooth, ANT tubercles well-developed with their inner faces divergent 2
- Head densely spiculose, at least ventrally, and ANT tubercles with inner faces steep-sided or apically convergent 5

Convallariaceae

Macrosiphum insularis
Catamergus kickapoo

Aulacorthum magnoliae, *solani*
Aulacorthum speyeri; *Metopolophium dirhodum*;
Myzus ascalonicus
Aulacorthum speyeri
Catamergus kickapoo
Macrosiphum euphorbiae

HOST LISTS AND KEYS

2. SIPH without polygonal reticulation. Median frontal tubercle developed, so that front of head has W-shaped outline in dorsal view *Metopolophium dirhodum*
- SIPH with a subapical zone of polygonal reticulation (several rows of closed cells). Median frontal tubercle not developed, so that head has U- or V-shaped frontal sinus in dorsal view **3**
3. SIPH 0.28–0.32 mm long, 0.13–0.19× BL and 1.9–2.6× HT II *Catamergus kickapoo*
- SIPH 0.55–1.15 mm long, 0.21–0.35× BL and 3.0–6.5× HT II **4**
4. ANT BASE VI 1.9–2.3× R IV+V. ANT PT/BASE 2.9–4.9. Cauda thick, c.2× longer than its midpoint width in dorsal view *Macrosiphum insularis*
- ANT BASE VI 0.9–1.3× R IV+V. ANT PT/BASE 5.3–6.2. Cauda c.3× longer than its midpoint width in dorsal view *Macrosiphum euphorbiae*
5. Dorsal abdomen with extensive dark sclerotisation across ABD TERG 2–4, fused with marginal sclerites. SIPH dark basally and apically, cauda dark *Aulacorthum speyeri*
- Dorsal abdomen without extensive dark sclerotisation. SIPH pale, or dark only apically, cauda pale/dusky go to key to polyphagous aphids, p. 1020, starting at couplet 5

Polygonum

P. alatum

P. alpinum see *Persicaria*

P. amphibium see *Persicaria*

P. amplexicaule see *Persicaria*

P. angustifolium

P. arenarium

P. arenastrum

P. argyrocoleon

P. aviculare

P. barbatum

P. bistorta see *Persicaria*

P. blumei see *longisetum*

P. bucharicum

P. caespitosum

P. capitatum see *Persicaria*

Polygonaceae

Akkaia bengalensis; *Aphis gossypii*, *spiraecola*, [*verbasci*];

Aulacorthum solani;

Capitophorus hippophaes ssp. *javanicus*, *mitegoni*;

Epipemphigus imaicus; [*Melanaphis arundinariae*];

Myzakkia polygonicola, *verbasci*;

Myzus brevisiphon, *ornatus*, *persicae*;

Trichosiphonaphis polygoni

Aphis elegantula; *Brachycaudus brevirostratus*;

Capitophorus hippophaes ssp. *javanicus*;

Macchiatiella rhamni (ssp. *tarani*?)

Aphis polygonata

Aphis polygonata

Aphis polygonata; *Aspidaphis adjuvans*

Aphis gossypii, *nasturtii*, *polygonata*; *Aspidaphis adjuvans*;

Brachycaudus amygdalinus, *rumexicolens*;

Capitophorus hippophaes; *Macrosiphum euphorbiae*;

Myzus certus, *persicae*; *Pemphigus* sp.; *Sitobion avenae*;

Trichosiphonaphis polygoniformosana

Akkaia bengalensis; *Aphis gossypii*, *spiraecola*;

Capitophorus hippophaes ssp. *javanicus*, *mitegoni*;

Brachycaudus helichrysi; *Myzus formosanus*;

Toxoptera aurantii; *Trichosiphonaphis polygoni*

Tricaudatus polygoni

Trichosiphonaphis polygoni

- P. chinense*** *Aphis spiraeicola*; *Brachycaudus helichrysi*;
Capitophorus hippophaes ssp. *javanicus*, *mitegoni*;
[*Greenidea bucktonis*]; *Myzus formosanus*, *ornatus*;
Sitobion miscanthi; *Tricaudatus polygona*;
Trichosiphonaphis polygona
Capitophorus hippophaes ssp. *javanicus*
- P. conspicuum***
- P. convolvulus*** see *Fallopia*
- P. coriarium***
- P. cristatum***
- P. cuspidatum*** see *Fallopia japonica*
- P. divaricatum*** *Brachycaudus brevirostratus*; *Macchiatella itadori*;
Capitophorus hippophaes ssp. *javanicus*
Capitophorus hippophaes ssp. *javanicus*
- P. diversifolium*** *Aphis polygonata*
- P. equisetifolium*** *Acaudella* sp. (Israel, Cyprus; BMNH, leg. V.F. Eastop);
Aphis craccivora; *Aspidaphis adjuvans*;
Brachycaudus amygdalinus, *sedi*
[*Anoecia cornicola*]
- P. erectum***
- P. fagopyron*** see *Fagopyron esculentum*
- P. flaccidum*** *Aphis gossypii*; *Capitophorus hippophaes* ssp. *javanicus*
- P. glabrum*** *Akkaia bengalensis*;
Capitophorus hippophaes ssp. *javanicus*, *mitegoni*;
Neomyzus circumflexus
- P. hydropiper*** see *Persicaria*
- P. hydropiperoides*** *Aphis middletonii*
- P. incarnatum*** *Aphis middletonii*
- P. jurii*** *Capitophorus hippophaes* ssp. *javanicus*
- P. lapathifolium*** see *Persicaria*
- P. laxiflorum*** *Capitophorus hippophaes*
- P. longisetum*** *Capitophorus hippophaes* ssp. *javanicus*;
Trichosiphonaphis polygona, *polygonifoliae*
- P. minus*** see *Persicaria*
- P. molle*** see *Persicaria*
- P. muhlenbergii*** *Aphis middletonii*; *Macrosiphum euphorbiae*
- P. multiflorum*** *Brachycaudus helichrysi*; *Myzus persicae*;
Toxoptera odinae
- P. nepalense*** see *Persicaria*
- P. nitens*** *Brachycaudus amygdalinus*; *Sitobion avenae*
- P. nodosum*** see *Persicaria lapathifolia*
- P. orientale*** *Aphis fabae*, *gossypii*;
Capitophorus hippophaes ssp. *javanicus*, *mitegoni*;
Kaltenbachiella nirecola; *Pemphigus* sp.
- P. paronychia*** *Abstrusomyzus phloxae*
- P. patulum*** *Capitophorus hippophaes*
- P. pennsylvanicum*** see *Persicaria*

HOST LISTS AND KEYS

- P. perfoliatum* *Akkaia bengalensis*; *Aphis nasturtii*; [*Aulacorthum* sp.];
Capitophorus hippophaes ssp. *javanicus*, *mitegoni*;
Trichosiphonaphis gerberae, *polygoni*, *polygoniformosana*
- P. persicaria* see *Persicaria*
maculosa
- P. plebeium* *Myzus formosanus*
- P. polymorphum* *Macchiatiella rhamni* ssp. *tarani*
- P. portoricense* *Capitophorus hippophaes*
- P. proliferum* *Macrosiphum euphorbiae*
- P. pulchrum* *Aphis spiraecola*; *Aulacorthum solani*;
Capitophorus hippophaes; *Myzus ornatus*
- P. punctatum* *Capitophorus hippophaes*;
Rhopalosiphum nymphaeae
- P. reynoutria* see *Fallopia japonica*
- P. riparium* *Brachycaudus brevirostratus*; *Capitophorus eniwanus*
- P. roseoviride* *Capitophorus hippophaes* ssp. *javanicus*
- P. runcinatum* *Akkaia bengalensis*; *Aphis gossypii*, *nasturtii*;
Myzackaia polygonicola, *verbasci*; *Myzus formosanus*;
[*Rhopalosiphum maidis*]
- P. sachalinense* see *Fallopia*
- P. sagittata* see *Persicaria*
- P. scabrum* *Trichosiphonaphis polygonifoliae*
- P. scandens* *Aphis fabae*
- P. senegalense* (incl. var. *albotometosum*) *Aphis gossypii*; *Capitophorus hippophaes*, *mitegoni*
- P. senticosum* *Capitophorus hippophaes* ssp. *javanicus*;
Trichosiphonaphis polygonifoliae
- P. serrulatum* *Akkaia neopolygoni*; *Aphis gossypii*, *spiraecola*;
Capitophorus hippophaes ssp. *javanicus*;
[*Matsumuraja capitophoroides*]; *Myzackaia verbasci*;
Myzus ornatus; *Tricaudatus polygoni*;
Trichosiphonaphis gerberae, *polygoni*
- P. setaceum* *Capitophorus hippophaes*
- P. sieboldii* *Trichosiphonaphis polygoni*, *polygoniformosana*
- P. sinensis* *Capitophorus mitegoni*
- P. sphaerocephalum* *Akkaia bengalensis*
- P. tenuicaule* *Aphis nasturtii*; *Capitophorus hippophaes*;
Neomyzus circumflexus
- P. thunbergii* *Akkaia odaiensis*, *polygoni*, *taiwana*; *Aphis polygonacea*;
Myzus kawatabiensis;
Trichosiphonaphis cornuta, *lijiangensis*, *loniceriae*, *polygoni*,
polygonifoliae, *polygoniformosana*, *tade*
- P. tinctorium* *Capitophorus hippophaes* ssp. *javanicus*
- P. tomentosum* *Aphis fabae*; *Capitophorus hippophaes*
- P. triptocarpum* *Brachycaudus brevirostratus*
- P. viscosum* [*Capitophorus elaeagni*];
[*Myzus polygonyonai* Shinji (nomen dubium)]
- P. viviparum* see *Persicaria*

*P. vulgare**Aphis gossypii**P. weyrichii* see *Persicaria**P. zuccarinii**Aphis nasturtii**Polygonum* spp.

[*Aphis longisetosa*, *rumicis*]; [*Aulacorthum nipponicum*];
Capitophorus [*formosartemisiae*], *himachali*;
 [*Cavariella aegopodii*]; *Dysaphis microsiphon*;
 [*Idiopterus nephrolepidis*]; [*Liosomaphis atra*];
 [*Macrosiphum pseudogeranii*];
Margituberculatus longituberculatus; [*Micromyzodium* sp.];
Myzackaia nitakaensis; *Myzosiphum ryukyense*;
Myzus ascalonicus, [*cerasi*], [*dycei*];
Pemphigus [*brevicornis*], *tibetapolygoni*;
Prociphilus erigeronensis; *Rhopalosiphum padi*;
Sinomegoura citricola; *Smynthuodes betae*;
 [*Sorbaphis chaetosiphon*]

Key to apterae on *Polygonum* and *Persicaria*:-

1. ANT PT/BASE less than 0.5. SIPH absent 2
 – ANT PT/BASE more than 0.7. SIPH present 7
2. Body and appendages densely clothed with fine hairs. ANT II elongate, longer than IV. Anus and anal plate displaced dorsally. No wax pore plates *Smynthuodes betae*
 – Body and appendages sparsely hairy. ANT II much shorter than IV. Anus not displaced dorsally. Wax pore plates present 3
3. Wax pore plates comprising rings of bead-like facets surrounding clear central areas, the marginal ones being transversely elongate *Kaltenbachiella nirecola*
 – Wax pore plates comprising numerous small pores without a clear central area, each gland bearing a single hair near its centre 4
4. Wax pore plates present on head, thorax and abdomen, especially well developed marginally on abdomen. R IV+V 0.13–0.175 mm long, with 4–8 accessory hairs. Cauda and anal plate forming a dark, rounded posterior projection of the abdomen *Prociphilus erigeronensis*
 – Wax pore plates absent from head and margins of abdomen, spinal and pleural plates present on thorax and abdomen, or on ABD TERG 3–7 only. R IV+V 0.08–0.12 mm long, with 0–2 accessory hairs. Cauda and anal plate not produced posteriorly 5
5. Wax pore plates present on thorax and ABD TERG 1–7. ANT PT/BASE c.0.35. R IV+V with a pair of accessory hairs *Pemphigus tibetapolygoni**
 – Wax pore plates only on ABD TERG 3–7 (or 4–7). ANT PT/BASE less than 0.3. R IV+V without accessory hairs 6
6. R IV+V 0.55–0.66× HT II *Epipemphigus imaicus**
 – R IV+V 0.70–0.83× HT II *Pemphigus* sp(p).
7. Head cuticle with extensive spiculosity, at least on ventral side 8
 – Head cuticle mostly either smooth, wrinkled, corrugated or papillated; without spicules, or with spicules only either anteroventrally or posteriorly 29
8. SIPH with subapical reticulation (c.4 rows of closed polygonal cells) *Myzosiphum ryukyense**
 – SIPH without subapical polygonal reticulation, at most with 1–2 rows of transversely elongate cells 9

HOST LISTS AND KEYS

9. ABD TERG 1–4 with long thin marginal processes bearing small apical hairs (Figure 42a; only al. known, but these are assumed to be also present in apt.) *Margituberculatus longituberculatus*
 – ABD TERG 1–4 without long thin marginal processes **10**
10. Tergum almost entirely very dark brown to black, sclerotic and very rugose. SIPH black, scabrous, with a well-developed flange (e.g., Figure 42b). Cauda with 4–6 hairs, and distal part somewhat constricted (e.g., Figure 42c) **11**
 – Tergum membranous or sclerotic, smooth or rugose, pale or dark; if entirely dark then smooth, finely spiculate, wrinkled or reticulate. SIPH various. Cauda with 4–15 hairs, and distal part not usually constricted **13**
11. Cauda with (5–) 6 hairs *Myzackaia nitakaensis*
 – Cauda with 4 hairs **12**
12. Longest hairs on ANT tubercles 15–25 µm long, and hair on outer side of ANT I 20–25 µm long *Myzackaia polygonicola*
 – Hairs on ANT tubercles and ANT I all very short and blunt, maximally 10 µm long *Myzackaia verbasci*
13. SIPH flangeless (Figure 42d, g, h; although sometimes with a swollen apical rim, as in Figure 42g) **14**
 – SIPH with a distinct apical reflexed flange (e.g., Figure 42i) **18**
14. SIPH tapering, cylindrical or only very slightly swollen towards apex, with apical diameter less than 0.35× basal diameter (e.g., Figure 42d) **15**
 – SIPH expanded on distal part, and with apical diameter more than 0.35× basal diameter (e.g., Figure 42g,h) **16**
15. ANT I with a finger-like projection at inner apex (Figure 42e). R IV+V 1.3–1.4× HT II *Trichosiphonaphis cornuta**
 – ANT I with a rounded scabrous boss at inner apex (Figure 42f). R IV+V 1.0–1.2× HT II *Trichosiphonaphis polygoni*
16. ANT PT/BASE 0.75–0.9. Cauda with 4 hairs *Trichosiphonaphis lijiangensis*
 – ANT PT/BASE 5.0–6.2. Cauda with 5–14 hairs **17**
17. Cauda with 7–14 hairs. SIPH with a slight subapical constriction (Figure 42g). Ventral hairs on head short and blunt, similar to dorsal hairs. BL usually more than 2 mm *Trichosiphonaphis polygonifoliae*
 – Cauda with 5–7 hairs. SIPH without any subapical constriction (Figure 42h). Ventral hairs on head pointed and much longer than dorsal ones. BL usually less than 2 mm *Trichosiphonaphis tade*
18. SIPH bearing 5–30 hairs **19**
 – SIPH without hairs **21**
19. SIPH with 15–30 hairs, the longest of them exceeding width of flange (Figure 42i). Cauda with 4–7 hairs *Trichosiphonaphis polygoniformosana*
 – SIPH with 5–20 hairs which are all shorter than, or at most equal to, width of flange. Cauda with 7–15 hairs **20**
20. R IV+V 1.0–1.15× HT II. Cauda with 7–8 hairs *Trichosiphonaphis gerberae**
 – R IV+V 1.3–1.35× HT II. Cauda with 9–15 hairs *Trichosiphonaphis loniceriae**

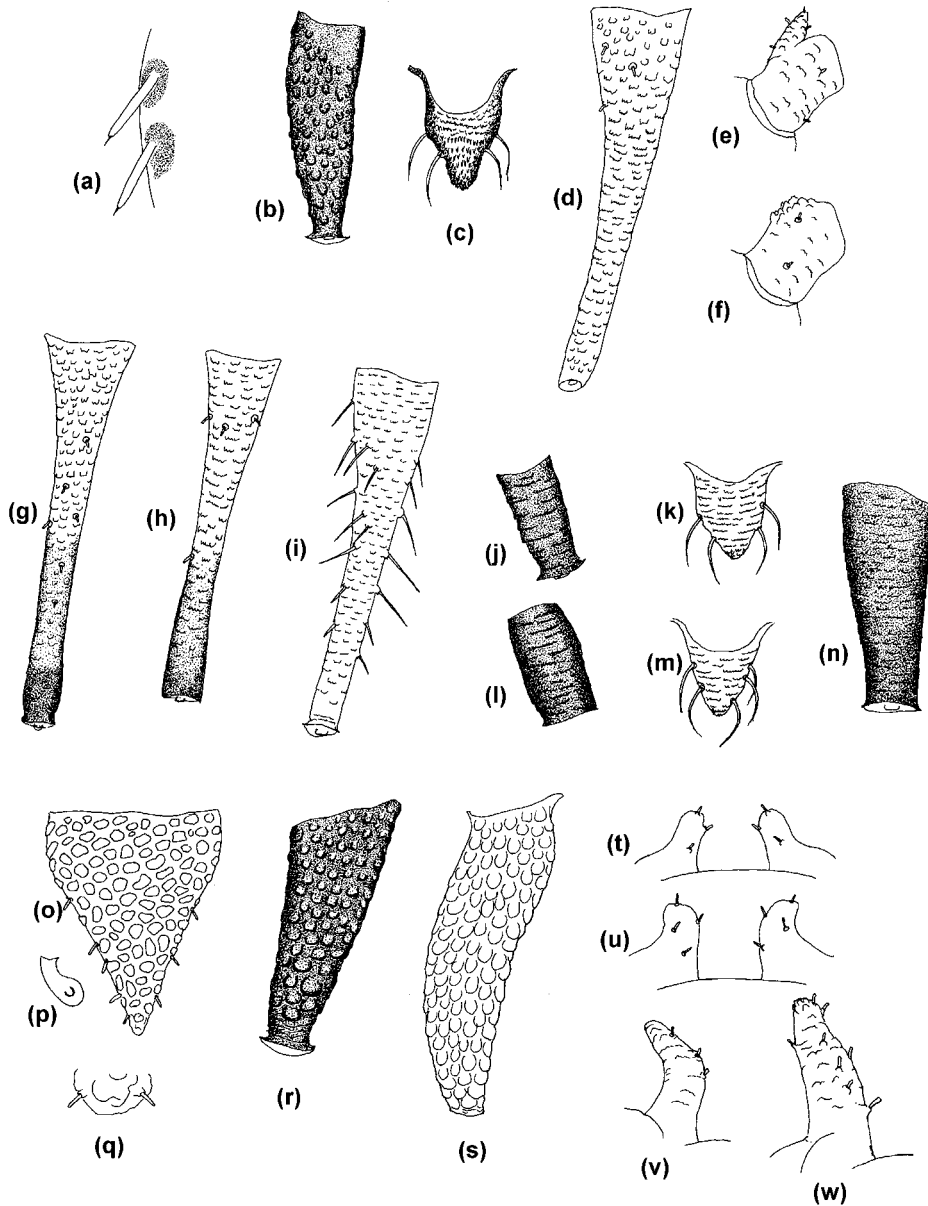


Figure 42 Aphids on *Polygonum*. (a) Lateral processes on ABD TERG 3–4 of *Margituberculatus longituberculatus* (al.), (b) SIPH of *Myzackaia polygonicola*, (c) cauda of *M. polygonicola*, (d) SIPH of *Trichosiphonaphis polygoni*, (e) ANT I of *T. cornuta* (dorsal view), (f) same for *T. polygoni*, (g) SIPH of *T. polygonifoliae* (from *Polygonum*), (h) SIPH of *T. tade*, (i) SIPH of *T. polygoniformosanus*, (j) SIPH of *Myzus kawatabiensis*, (k) cauda of *M. kawatabiensis*, (l) SIPH of *M. brevisiphon*, (m) cauda of *M. brevisiphon*, (n) SIPH of *M. formosanus*, (o) ABD TERG 8 of *Aspidaphis adjuvans*, (p) SIPH of *A. adjuvans*, (q) Process on ABD TERG 8 of *Tricaudatus polygoni*, (r) SIPH of *Akkaia taiwana*, (s) SIPH of *A. polygoni*, (t) projections on ANT tubercles of *A. taiwana*, (u) same for *A. bengalensis*, (v) projection on left ANT tubercle of *A. polygoni*, (w) same for *A. neopolygoni*.

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21. SIPH 0.85–1.25× cauda, which is triangular or pentagonal and only about as long as its basal width in dorsal view **22**
 – SIPH 1.5–2.5× cauda, which is elongate triangular or tongue-shaped, and clearly longer than its basal width **23**
22. ANT PT/BASE 2.5–3.0. R IV+V 1.1–1.3× HT II. TERG smooth and mainly pale and membranous. SIPH with a large flange (Figure 42j). Cauda pentagonal, with 2–4 hairs (Figure 42k)
Myzus kawatabiensis
 – ANT PT/BASE 3.2–4.0. R IV+V 1.0–1.06× HT II. TERG uniformly pigmented, sclerotic and finely wrinkled. SIPH with a small flange (Figure 42l). Cauda triangular with (4–) 5 hairs (Figure 42m)
Myzus brevisiphon
23. Dorsal hairs 30–45µm long, 1.5–2.2× ANT BD III. TERG uniformly pigmented, sclerotic, densely ornamented with minute rounded spicules. SIPH dark, thick, tapering, c.0.09–0.11× BL and only about 3× longer than their width at midlength (Figure 42n)
Myzus formosanus
 – Dorsal hairs short and blunt, mostly shorter than ANT BD III. TERG usually pale, smooth or wrinkled, not finely spiculose. SIPH pale/dusky, tapering, cylindrical or swollen distally, more than 0.15× BL **24**
24. SIPH tapering, coarsely imbricated, with a slight S-curve. Dorsal abdomen with a pattern of dark inter-segmental markings. ANT PT/BASE 1.8–2.5
Myzus ornatus
 – SIPH tapering, cylindrical or swollen distally, not curved, not coarsely imbricated. Dorsal abdomen without dark ornamentation. ANT PT/BASE 2.6–5.3 **25**
25. SIPH tapering/cylindrical on distal half. ANT III usually with 1–2 small rhinaria near base
Aulacorthum solani
 – SIPH at least slightly swollen on distal part. ANT III without rhinaria **26**
26. SIPH 0.54–0.81× ANT III. Inner faces of ANT tubercles approximately parallel in dorsal view. SIPH almost smooth or weakly imbricated, with narrowest part of basal half not wider than hind tibia at midlength
Myzus ascalonicus
 – SIPH 0.82–1.34× ANT III. ANT tubercles apically convergent. SIPH moderately imbricated, with narrowest part of basal half wider than tibia at midlength **27**
27. ANT tubercles themselves rather low, but with scabrous processes extending forward from ANT bases. SIPH weakly swollen subapically (over about distal 0.25). Dorsum with an evident reticulate pattern
Abstrusomyzus phloxae
 – ANT tubercles broadly rounded, without forwardly-directed processes. SIPH slightly to moderately swollen over about distal 0.5. Dorsum without a reticulate pattern **28**
28. R IV+V in most specimens with only one pair of lateral accessory hairs (plus 0–3 ventral accessory hairs). Value of function cauda/(ANT III× PT) in range 0.80–1.52, but rarely more than 1.25 except in small specimens (those with ANT III less than 0.32 mm)
Myzus persicae
 – R IV+V in most specimens with two pairs of lateral accessory hairs. Value of function cauda/(ANT III× PT) in range 1.2–2.7 (rarely less than 1.25)
Myzus certus
29. Dorsal hairs, or at least those on head and ABD TERG 8, long, thick and capitate, and arising from tuberculate bases. R IV+V rostrate; i.e., RV extended into a short beak-like process. SIPH more than 1.8× cauda, and slightly to moderately swollen on distal part **30**
 – Dorsal hairs not long, thick and capitate. R IV+V not rostrate. SIPH (if present) tapering, cylindrical, swollen, flask-shaped, or as short truncate cones **35**

30. R IV+V 1.2–1.7× HT II 31
 – R IV+V 0.9–1.1× HT II 32
31. SIPH 2.2–2.5× cauda, and only moderately swollen on distal part. Hairs on ABD TERG 3 maximally 30–60µm long, and on ABD TERG 8 maximally 35–70µm long *Capitophorus eniwanus*
 – SIPH 2.6–3.1× cauda, and markedly swollen on distal part. Hairs on ABD TERG 3 maximally 58–69µm long, and on ABD TERG 8 maximally 65–72µm long *Capitophorus himachali**
32. ANT 5- or 6-segmented, 0.4–0.6× BL, with ANT PT/BASE 2.8–3.8. ABD TERG 7 with marginal hairs longer than the minute spinal hairs *Capitophorus essigi*
 – ANT 6-segmented, 0.8–1.2× BL, with ANT PT/BASE 5.75–8.75. ABD TERG 7 with spinal hairs much longer and thicker than marginal hairs 33
33. ANT I with very short inconspicuous hairs (maximally 8–15µm) at inner apex. ABD TERG 6 with short thin inconspicuous hairs *Capitophorus hippophaes* ssp. *javanicus*
 – ANT I with conspicuous, thick capitate hairs (maximally 20–35µm) at inner apex. ABD TERG 6 with thick, capitate spinal hairs 34
34. Spinal hairs on ABD TERG 1–5 all very small, so that those on ABD TERG 6 are much longer and thicker than those on ABD TERG 5 *Capitophorus hippophaes* s.str.
 – Spinal hairs on ABD TERG 1–6 gradually increasing in size from anterior to posterior *Capitophorus mitegoni*
35. Cauda very broadly rounded, hardly developed, less than half as long as its basal width in dorsal view. SIPH present, ANT PT/BASE more than 1 36
 – Cauda various, but **if** less than half its basal width **then** SIPH absent and ANT PT/BASE less than 0.5 41
36. SIPH cylindrical or flask-shaped, more than 2.7× longer than their basal width. ANT PT/BASE 3.5–10. ANT III with or without sec. rhinaria 37
 – SIPH as short truncate cones. ANT PT/BASE 1.2–2.2. ANT III without sec. rhinaria 39
37. SIPH flask-shaped with ‘neck’ much narrower than flange. ANT 5-segmented, without sec. rhinaria. ANT PT/BASE 3.5–5.5. R IV+V 0.6–0.8× HT II *Acaudella* sp. on *P. equisetiforme*, Israel and Cyprus
 – SIPH cylindrical. ANT 6-segmented, III with sec. rhinaria. ANT PT/BASE 6.5–10. R IV+V 1.0–1.4× HT II 38
38. SIPH pale. Dorsum with variably-developed dark markings, if with a dark central patch then it is on ABD TERG 4–5 only, wider than long, and incomplete in spinal region *Macchiatella rhamni* (incl. ssp. *tarani*)
 – SIPH dark. Dorsum usually with a large solid dark patch extending over much of ABD TERG 2–5 or 3–5, as long as or longer than wide *Macchiatella itadori*
39. First tarsal segments all with 2 hairs. Paired spinal tubercles (STu) regularly present on ABD TERG 7 and 8, and flat marginal tubercles (MTu) on marginal sclerites of ABD TERG 2–5. ANT PT/BASE 1.2–1.5 *Brachycaudus acaudatus*
 – First segments of fore and mid tarsi usually with 3 hairs. STu usually absent, and MTu only sporadically present. ANT PT/BASE 1.6–2.2 40
40. ANT 5- or 6-segmented, only 0.24–0.38mm long, 0.17–0.28× BL. Spinal hairs on ABD TERG 6 and 7 are pointed, 25–44µm long, similar to those on ABD TERG 8. If dark sclerotic bars are present then these are on ABD TERG 6–8 only *Brachycaudus amygdalinus*

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- ANT usually 6-segmented, 0.49–0.95 mm long, 0.33–0.48× BL. Spinal hairs on ABD TERG 6 and 7 are only 10–15 μm long, much shorter than those on ABD TERG 8. If dark dorsal sclerotic bars are present then these are on ABD TERG 5 as well as 6–8, and often there are irregular dark sclerites on more anterior segments
Brachycaudus rumexicolens (or *brevirostratus*?)
- 41. ABD TERG 8 extended into a very large cowl-like supracaudal process with reticulate sculpturing, completely covering cauda in dorsal view (Figure 42o). SIPH as small thin tubes, less than 0.7× cauda, swollen distally and with subapical aperture and no flange (Figure 42p). ANT 5-segmented
Aspidaphis adjuvans
- ABD TERG 8 not so extended, and other characters not in that combination **42**
- 42. SIPH moderately to markedly clavate, and smooth-surfaced **43**
- SIPH (if present) not clavate; tapering/cylindrical with imbrication, or thick and scabrous **44**
- 43. Appendages mainly dark. Dorsal cuticle with a pattern of spinules arranged in polygons. ABD TERG 7 and 8 without median tubercular processes. SIPH with smooth constricted subapical region
Rhopalosiphum nymphaeae
- Appendages pale. Dorsal cuticle not spinulose. ABD TERG 8, or 7 and 8, with a median tubercular process bearing a pair of short blunt hairs (Figure 42q). SIPH with transverse striae on subapical region
Tricaudatus polygoni
- 44. ANT tubercles with longer-than-wide forward-pointing projections. SIPH very rugose, scaly or warty, thick and tapering from a broad base, or swollen for most of length and tapering distally to a small or very small terminal flange and aperture. Cauda constricted on basal part and swollen on distal part **45**
- ANT tubercles either undeveloped or without forward-pointing projections. SIPH (if present) and cauda not as above **49**
- 45. SIPH dark, with diameter at flange 0.4–0.5× diameter at base, and more than width of hind tibia at midlength (e.g., Figure 42r). ANT 5-segmented, with ANT PT/BASE 1.7–2.4 **46**
- SIPH pale or only dark distally, and narrowing apically to a usually small oblique flange of diameter only 0.16–0.33× diameter at base, and less than midlength width of hind tibia (e.g., Figure 42s). ANT 5- or 6-segmented, with ANT PT/BASE 0.9–1.3 **47**
- 46. Projections on ANT tubercles rather straight, c. 0.75× length of ANT I measured along its *outer* side (Figure 42t). BL usually less than 2.1 mm
Akkaia taiwana
- Projections on ANT tubercles bent outward distally (Figure 42u), and at least as long as ANT I measured along its outer side. BL usually more than 2.1 mm
Akkaia bengalensis
- 47. ANT 6-segmented. Projections on ANT tubercles c. 3× their basal widths, nearly straight (Figure 42w), longer than ANT I+II together
Akkaia neopolygoni
- ANT 5-segmented. Projections on ANT tubercles c. 2× their basal widths, strongly curved (e.g., Figure 42v), not or hardly longer than ANT I **48**
- 48. Dorsal cuticle of head papillated, except on anterior part. Inner apex of ANT I with a rounded scabrous projection
Akkaia polygoni
- Dorsal cuticle of head mostly smooth. Inner apex of ANT I not projecting anteriorly
*Akkaia odaiensis**
- 49. ANT tubercles moderately to well developed, with smooth divergent inner faces. ANT III with 1 or more rhinaria on basal part. Body spindle-shaped, with pale elongate finger-like cauda. SIPH usually with subapical polygonal reticulation **50**
- ANT tubercles undeveloped or weakly developed. ANT III usually without any rhinaria, or with rhinaria on distal part. Body oval. SIPH (if present) without polygonal reticulation **54**

50. Longest hairs on ANT III 0.6–1.2× BD III **51**
 – Longest hairs on ANT III less than 0.5× BD III **52**
51. SIPH mainly dark, paler at base. ANT PT/BASE 6–8. ANT BASE VI 1.4–1.6× R IV+V. Cauda with 7 hairs *Macrosiphum venaefuscae*
 – SIPH pale, sometimes darker towards apices. ANT PT/BASE 5.3–6.2. ANT BASE VI 0.9–1.3× R IV+V. Cauda with 8–14 hairs *Macrosiphum euphorbiae*
52. SIPH pale, rather long and thin, without subapical reticulation or with only a few closed cells. R IV+V with acute apex and c.10 accessory hairs. Cauda with 5–6 hairs *Acyrtosiphon bistorti**
 – SIPH dark, rather thick, with subapical reticulation on distal 0.19–0.35 of length. R IV+V short and blunt, with 4–6 accessory hairs. Cauda with (6–) 7–13 hairs **53**
53. SIPH 1.1–1.4× cauda. HT II 1.25–1.6× R IV+V *Sitobion avenae*
 – SIPH 1.4–1.9× cauda. HT II 1.0–1.3× R IV+V *Sitobion miscanthi*
54. Cauda helmet-shaped, shorter than its basal width, with 4–6 hairs **55**
 – Cauda tongue-shaped, bluntly triangular or broadly rounded (not evident), if about equal to its basal width then with more than 10 hairs **56**
55. SIPH imbricated, very small, 0.03–0.08 mm. Well-developed MTu present on ABD TERG 1–5. Spiracular apertures reniform. Dark dorsal abdominal cross-bands often present *Dysaphis microsiphon*
 – SIPH smooth, 0.08–0.14 mm. MTu absent. Spiracular apertures rounded. Never with dark dorsal markings *Brachycaudus helichrysi*
56. SIPH pale and 0.63–0.85× cauda *Aphis polygonata*
 – SIPH (if present) pale or dark, 0.8–2.5× cauda, but if pale then more than 0.9× cauda **57**
57. ANT PT/BASE 1.18–1.45. Abdomen with paired dark spinopleural sclerites on ABD TERG 1–4, and short cross-bands on ABD TERG 5–8. SIPH 1.2–1.6× cauda, which is bluntly triangular and bears 5–9 hairs *Aphis elegantula*
 – ANT PT/BASE either less than 0.5 or more than 1.5, and other characters not in above combination **58**
58. SIPH black, 0.25–0.48 mm long, 1.9–2.3× cauda which is also black, usually has a distinct midway constriction, and bears 7–11 hairs. Dorsal abdomen without any dark markings *Aphis polygonacea*
 – Without the above combination of characters; if black SIPH present and more than 1.8× cauda then either cauda is not black, or it has more than 11 hairs, or dorsal abdomen has extensive black sclerotisation go to key to polyphagous aphids, p. 1020, starting at couplet 25

Polymnia*P. canadensis**Polymnia* sp.**Compositae***Neomyzus circumflexus*; *Uroleucon zinzalae*[*Capitophorus hippophaes*];*Macrosiphum euphorbiae*Key to apterae on *Polymnia*:–

- SIPH dark, with polygonal reticulation on distal 0.28–0.35 of length. R IV+V more than 2× HT II and bearing 20–30 accessory hairs. ANT III dark with 30–40 rhinaria distributed over more than half of length *Uroleucon zinzalae*
- Without the above combination of characters go to key to polyphagous aphids, p. 1020

Polypodium

P. ellipticum
P. glycyrrhiza (?)
P. hesperium
P. loriceum
P. mettenianum (?)
P. munitum
P. orientale (?)
P. pectinatum
P. phyllitidis
P. punctatum
P. scolopendria
P. virginicum (?)
P. vulgare
***Polypodium* spp.**

Polypodiaceae

Micromyzus kato
Aulacorthum solani; *Macrosiphum adianti*, *walkeri*
Macrosiphum rhamnii
Idiopterus nephrolepidis
Micromyzella filicis
Macrosiphum walkeri
Micromyzella filicis
Idiopterus nephrolepidis
Idiopterus nephrolepidis
Micromyzella filicis
Micromyzella filicis
Macrosiphum miho
Macrosiphum dryopteridis; *Taiwanomyzus alpicola*
Amphorophora ampullata ssp. *bengalensis*;
Macromyzella polypodicola; *Macromyzus woodwardiae*;
Micromyzodium filicium, *polypodii*;
Micromyzus mawphlangensis; *Myzus cymbalariae*;
Shinjia orientalis; *Taiwanomyzus himalayensis*

Key to apterae on *Polypodium* and other fern genera:–

1. Tarsi vestigial, without claws, reduced to a very small thumb- or finger-like process (e.g., Figure 43a) 2
 - Tarsi normally developed, with 2 claws 3
2. Head spiculose. ANT 5-segmented (in both apt. and al.) *Mastopoda pteridis*
 - Head without spicules. ANT 6-segmented *Shinjia orientalis*
3. ANT III bearing many (10–37) small papillate rhinaria on distal half (Figure 43b). SIPH 0.5–1.1× head width *Papulaphis sleesmani*
 - ANT III without rhinaria, or with fewer rhinaria that are either on basal half or extend along segment; if on distal half then SIPH 1.4–1.9× head width 4
4. SIPH cylindrical/tapering, rather thick, 1.5–2.1× width of hind tibia at their respective midlengths, **and** with a distinct subapical zone of reticulation (several rows of closed polygonal cells; e.g., Figure 43c). Head with numerous spicules 5
 - Without the above combination; if SIPH have a distinct zone of polygonal reticulation then they are not more than 1.5× thicker than hind tibia at midlength, and head is without spicules, or with spicules confined to ventrolateral areas 8
5. Dorsal abdomen without dark sclerites. Longest hairs on ANT III only 0.2–0.3× BD III. SIPH entirely dark *Macromyzella polypodicola*
 - Dorsal abdomen with raised dark sclerites at bases of dorsal hairs (e.g., Figure 43c). Longest hairs on ANT III 0.4–1.3× BD III. SIPH pale or dark 6
6. ANT III and IV with rhinaria *Macromyzus maculatus*
 - ANT III and IV without rhinaria 7
7. Longest hairs on ANT III 0.45–0.6× BD III. SIPH pale distally and with a small flange *Macromyzus manoji**
 - Longest hairs on ANT III 1.0–1.3× BD III. SIPH entirely dark, with flange well-developed (Figure 43c) *Macromyzus woodwardiae*

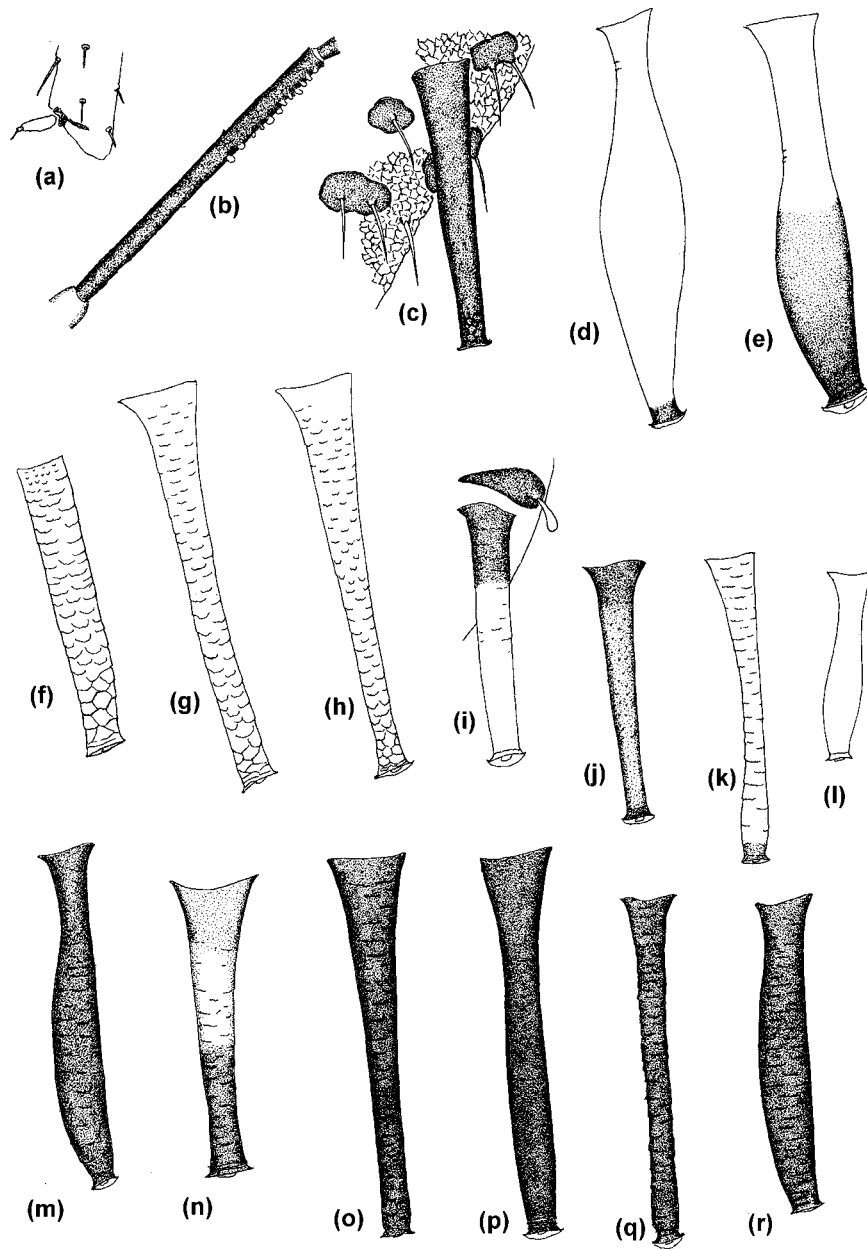


Figure 43 Apterae on *Polypodium* and other ferns. (a) End of hind tibia and tarsus of *Shinjia pteridifoliae*, (b) ANT III of *Papulaphis sleesmani*, (c) SIPH and surrounding cuticle of *Macromyzus woodwardiae*, (d) SIPH of *Amphorophora scabripes*, (e) SIPH of *A. ampullata*, (f) SIPH of *Macrosiphum adianti*, (g) SIPH of *M. clydesmithi*, (h) SIPH of *M. pteridis*, (i) SIPH, presiphuncular sclerite and a dorsal hair of *Idiopterus nephrolepidis*, (j) SIPH of *Micromyzodium polypodii*, (k) *Micromyzus niger*, (l) SIPH of *Taiwanomyzus filicis*, (m) SIPH of *T. alpicola*, (n) SIPH of *Myzus filicis*, (o) SIPH of *Micromyzella sleonensis*, (p) SIPH of *M. pterisoides*, (q) SIPH of *M. kathleenae*, (r) SIPH of *Micromyzus katoii*.

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8. SIPH pale or dusky, or black on basal 0.25–0.33 and pale distally, or dark only at apex **9**
 – SIPH mostly dark, sometimes paler towards base **46**
9. Head smooth, or spiculate only ventrally **10**
 – Head with numerous spicules or nodules on both dorsal and ventral surfaces **31**
10. SIPH clavate, almost smooth, without subapical reticulation (Figure 43d,e) **11**
 – SIPH tapering or cylindrical, with normal imbrication, and often with some subapical polygonal reticulation **14**
11. SIPH rather strongly swollen over 0.7 of length, with maximum width of swollen part c.3× narrowest width just proximal to flange (Figure 43d). ANT III with 19–27 rhinaria. Femora scabrous over distal 0.5–0.7 of length *Amphorophora scabripes*
 – SIPH swollen on distal part with maximum width c.2× narrowest width just proximal to flange (Figure 43e). ANT III with 1–38 rhinaria. Femora scabrous over distal c.0.3 **12**
12. ANT III with 1–6 rhinaria near base. R IV+V 1.15–1.4× HT II. ANT VI BASE 1.3–1.6× R IV+V *Amphorophora ampullata* ssp. *bengalensis*
 – ANT III with 5–23 rhinaria. R IV+V 0.85–1.15× HT II. ANT VI BASE 1.5–2.0× R IV+V **13**
13. ANT PT/BASE 3.5–5.2 (–5.6). SIPH 1.9–2.7× cauda *Amphorophora ampullata* s. str.
 – ANT PT/BASE 5.0–6.6. SIPH 1.5–2.1× cauda *Amphorophora ampullata* s.sp. *laingi*
14. ANT less than 0.7× BL, with ANT tubercles weakly developed. ABD TERG 1 and 7 with marginal tubercles (MTu). SIPH dark at apices, without polygonal reticulation *Aphis nasturtii*
 – ANT more than 0.9× BL, with ANT tubercles moderately to well developed. ABD TERG 1 and 7 without MTu. SIPH usually with some subapical polygonal reticulation **15**
15. Entire tergum anterior to SIPH dark-pigmented *Macrosiphum cystopteris*
 – Tergum usually pale or if pigmented it is darkest posteriorly **16**
16. R IV+V with 13–35 accessory hairs **17**
 – R IV+V with 4–12 accessory hairs **18**
17. R IV+V 0.18–0.21 mm, 1.6–1.95× HT II. Tergum unpigmented *Macrosiphum longirostratum*
 – R IV+V 0.12–0.15 mm, 1.38–1.61× HT II. Tergum of abdomen sometimes pigmented posteriorly *Macrosiphum woodsiae*
18. ANT III–VI and tibiae almost entirely dark. SIPH without any discernible polygonal reticulation *Macrosiphum cyatheae*
 – ANT III–VI and tibiae pale or dusky, or only dark towards apices. SIPH usually with at least a few subapical polygonal cells **19**
19. Longest hairs on ANT III 0.5–c.1.0× BD III **20**
 – Longest hairs on ANT III 0.2–0.45× BD III **22**
20. ANT III with 1–7 (–10) rhinaria. SIPH 1.7–2.2× cauda *Macrosiphum euphorbiae*
 – ANT III with (4–) 7–46 rhinaria. SIPH 2.2–2.8× cauda **21**
21. ANT not more than 1.2× BL. Longest hairs on ANT III c.1.0× BD III. SIPH 2.2–2.3× cauda which bears 12–13 hairs *Macrosiphum lapponicum**
 – ANT more than 1.3× BL. Longest hairs on ANT III 0.5–0.7× BD III. SIPH 2.5–2.8× cauda which bears 8–10 hairs *Macrosiphum lambi*
22. SIPH without a broad base (Figure 43f), less than 0.2× BL and 1.8–2.1× cauda. R IV+V 0.7–0.9× HT II *Macrosiphum adianti*
 – SIPH broad-based (Figure 43g, h), 0.21–0.33× BL and 2.2–2.9× cauda. R IV+V 0.8–2.1× HT II **23**

23. R IV+V almost always less than 0.14 mm (except in large specimens of *walkeri*) **24**
 – R IV+V usually more than 0.14 mm (except in small specimens of *clydesmithi*) **27**
24. ANT III usually without rhinaria, sometimes with 1. Front of head dusky/dark with clusters of rather large spinules or nodules ventrally below ANT tubercles *Macrosiphum rebecca*
 – ANT III with 1–8 rhinaria. Head pale, with or without fine spinules ventrally **25**
25. R IV+V less than 0.11 mm, 0.8–1.0× HT II. ANT IV shorter than ANT V *Macrosiphum miho**
 – R IV+V usually more than 0.11 mm, 1.0–1.5× HT II. ANT IV usually as long as or longer than ANT V **26**
26. Cauda with (7–) 8–10 hairs (often 4 lateral pairs) *Macrosiphum dryopteridis*
 – Cauda with 7–9 hairs (usually 3 lateral pairs) *Macrosiphum walkeri*
27. Joints between ANT III–IV and ANT IV–V contrastingly black. ANT III usually with 1 rhinarium, sometimes 0 or 2. HT II 0.08–0.10 mm *Macrosiphum rhamni*
 – Joints of ANT III–V pale or dark but not black. ANT III with 0–36 rhinaria, rarely less than 2. HT II 0.08–0.17 mm **28**
28. Dorsal hairs short, thick and capitate; those on ANT tubercles less than 0.6× BD III. SIPH with 0–3 rows of often rather indistinct subapical reticulation (Figure 43g) *Macrosiphum clydesmithi*
 – Dorsal hairs thin with blunt or only slightly incrassate apices; longest hairs on ANT tubercles more than 0.6× BD III. SIPH with 3–10 subapical rows of distinct polygonal reticulation (e.g., Figure 43h) **29**
29. R IV+V 0.8–1.3× HT II, which is 0.13–0.17 mm long. ANT III with 14–36 rhinaria *Macrosiphum osmaroniae**
 – R IV+V 1.2–1.45× HT II, which is 0.10–0.14 mm long. ANT III with 3–35 rhinaria **30**
30. R IV+V 0.14–0.15 mm, 1.21–1.44× HT II, which is 0.10–0.12 mm. Hind tibiae usually dusky throughout *Macrosiphum ptericolens*
 – R IV+V 0.16–0.18 mm, 1.28–1.55× HT II, which is 0.12–0.14 mm. Hind tibiae with middle section pale *Macrosiphum pteridis*
31. SIPH tapering, cylindrical, or only slightly swollen subapically **32**
 – SIPH clavate; i.e. at least slightly swollen over c.0.4 or more of length distally, with narrower basal section **42**
32. SIPH black on basal 0.25–0.33, contrasting with complete lack of pigmentation distally (Figure 43i). Head black with ANT tubercles very well developed, their inner faces straight and slightly divergent. Dorsal hairs long and capitate, arising from tuberculate bases *Idiopterus nephrolepidis*
 – SIPH entirely pale or differently pigmented. Head pale or dark, and if ANT tubercles are well developed then they usually have parallel or gibbous, apically convergent inner faces. Dorsal hairs short or long, if long then not capitate **33**
33. Dorsal abdomen with a large black roughly U-shaped patch, and paired dark patches on thorax *Neomyzus circumflexus*
 – Dorsum either pale or with different pigmentation **34**
34. Dorsal hairs long, as long as or longer than ANT BD III. SIPH nearly twice as wide as hind tibia at their respective midlength points, dark on basal and distal parts with a paler section in between (e.g., Figure 43j). ANT III without rhinaria **35**
 – Dorsal hairs very short, much shorter than BD III. SIPH not more than 1.5× wider than hind tibia at their respective midlengths. ANT III with or without rhinaria **37**

HOST LISTS AND KEYS

35. Dorsum with extensive dark sclerotisation. Dorsal hairs very long, 3–4× BD III
Micromyzodium filicium
 – Dorsum pale, with hairs all less than 2× BD III **36**
36. R IV+V c.2.3–2.5× HT II. Cauda with 4 hairs
Micromyzodium polypodii
 – R IV+V less than 1.7× HT II. Cauda with 5–10 hairs
*Micromyzodium dasi**
37. Tibiae mainly pale, only dark at apices **38**
 – Tibiae entirely dark **41**
38. Abdomen with a central dark sclerite extending over ABD TERG 1–5. R IV+V 1.45–1.65× HT II
*Myzus lefroyi**
 – Dorsal abdomen without a large dark central sclerite. R IV+V 1.1–1.4× HT II **39**
39. ABD TERG 1–5 with marginal tubercles (MTu). Head and ABD TERG 7 and 8 often with spinal tubercles (STu). SIPH normally imbricated, 5–7× longer than their midlength diameter. Imm. with outer apices of hind tibiae spinulose *Myzus* sp. ('*Aspidium*', Pakistan; BMNH colln, leg. M.A. Ghani)
 – LTu and STu absent. SIPH almost smooth, 8–18× longer than their midlength diameter. Imm. with outer apices of hind tibiae not spinulose **40**
40. BL 1.8–3.0mm. ANT I–II and femora pale. SIPH tapering from base to the well-developed flange. Cauda pale
Aulacorthum solani
 – BL 0.9–1.3mm. ANT I–II dark, femora dark distally. SIPH slightly expanded subapically, with a small flange (Figure 43k). Cauda dusky/dark
Micromyzus niger
41. ANT PT/BASE 2.5–3.5. Tibiae black, contrasting with pale femora. Cauda elongate, rounded at apex, more than 2× longer than its basal width in dorsal view
Micromyzus osmundae
 – ANT PT/BASE 4–5. Tibiae dark, but not black. Cauda triangular, c.1.4× its basal width in dorsal view
Micromyzus nikkoensis
42. SIPH almost smooth or very weakly imbricated, especially on swollen part (e.g., Figure 43l). HT I with 3 hairs. ANT III with 0–12 rhinaria **43**
 – SIPH either moderately or very coarsely imbricated. HT I with 2 hairs (no sense peg). ANT III never with rhinaria **45**
43. Longest hairs on ANT III c. 0.67× BD III, and hairs on ABD TERG 7 and 8 pointed, c.1.8–1.9× BD III. ANT PT/BASE 3.3–3.8. R IV+V with 4 accessory hairs
Taiwanomyzus himalayensis
 – ANT and dorsal body hairs all minute, blunt. less than 0.5× BD III. ANT PT/BASE 2.3–2.8. R IV+V with either 2 or 6 accessory hairs **44**
44. ANT III with 0–7 rhinaria on basal part. R IV+V with 2 accessory hairs
Taiwanomyzus filicis
 – ANT III with 9–12 rhinaria over 0.5–0.67 of length. R IV+V with 6 accessory hairs
*Taiwanomyzus babai**
45. SIPH more than 0.8× ANT III, with moderate imbrication. Dorsal cuticle almost smooth
Myzus persicae
 – SIPH less than 0.8× ANT III, with coarse imbrication. Dorsal cuticle scaly
Myzus cymbalariae
46. SIPH clavate, with maximum width of swollen part 1.3–1.6× minimum width of basal part (Figure 43m). Dorsum with an extensive dark shield. ANT III with 1–2 rather large rhinaria
Taiwanomyzus alpicola
 – SIPH tapering, cylindrical or somewhat swollen in middle, but without a distinctly narrower stem. Dorsum pale or dark, ANT III with or without rhinaria **47**

47. ANT less than $0.75 \times$ BL 48
 – ANT more than $0.75 \times$ BL 51
48. ANT tubercles well developed, with inner faces apically convergent. ABD TERG 1 and 7 without marginal tubercles (MTu). SIPH often paler towards base (Figure 43n) *Myzus ilicis*
 – ANT tubercles undeveloped or weakly developed. ABD TERG 1 and 7 with MTu. SIPH uniformly dark 49
49. SIPH clearly darker than cauda, which bears 4–8 hairs *Aphis gossypii*
 – SIPH and cauda both very dark. Cauda with 7–15 hairs 50
50. Hind tibiae mainly dark. ANT PT/BASE 3.4–4.7. R IV+V $1.25\text{--}1.6 \times$ HT II. SIPH $1.7\text{--}2.7 \times$ cauda *Aphis nerii*
 – Hind tibiae pale except at base and apex. ANT PT/BASE 1.9–2.9. R IV+V $1.0\text{--}1.24 \times$ HT II. SIPH $0.9\text{--}1.7 \times$ cauda *Aphis spiraeicola*
51. SIPH $1.1\text{--}1.5 \times$ cauda, which bears 10–28 hairs. Stridulatory apparatus present *Toxoptera aurantii*
 – SIPH $1.6\text{--}3.7 \times$ cauda, which bears 3–9 hairs. No stridulatory apparatus 52
52. SIPH $2.5\text{--}3.7 \times$ cauda 53
 – SIPH $1.6\text{--}2.4 \times$ cauda 57
53. SIPH tapering/cylindrical, or slightly swollen subapically, at least $10 \times$ longer than their width at midlength (e.g., Figure 43o) 54
 – SIPH slightly swollen in middle (cigar-shaped), less than $10 \times$ longer than their width at midlength (e.g., Figure 43p) 56
54. R IV+V $1.34\text{--}1.62 \times$ HT II, and bearing 8–15 accessory hairs. Dorsum with extensive dark sclerotisation, not segmentally divided *Micromyzella davalliae*
 – R IV+V $0.85\text{--}1.05 \times$ HT II, with only 2–6 accessory hairs. Dorsum pale or with broad dusky sclerotic cross-bands 55
55. R IV+V with 2 accessory hairs. Cauda much paler than SIPH, with several or all of hairs short and blunt *Micromyzella sleonensis*
 – R IV+V with 5–6 accessory hairs. Cauda dusky/dark with all hairs fine-pointed *Micromyzus pojani*
56. R IV+V c. $1.1 \times$ HT II, with 4 accessory hairs. Dorsum mainly pale, with a fragmented spinal patch on ABD TERG 1–3 *Micromyzus mawphlangensis**
 – R IV+V $1.67\text{--}2.25 \times$ HT II, with 8–12 accessory hairs. Dorsum uniformly dark *Micromyzella pterisoides*
57. HT II 0.104–0.118 mm long. R IV+V $1.05\text{--}1.24 \times$ HT II. SIPH thin and cylindrical (Figure 43q) 58
 – HT II 0.07–0.09 mm long. R IV+V $1.25\text{--}2.3 \times$ HT II. SIPH rather thick, often somewhat cigar-shaped (e.g., Figure 43r) 59
58. First tarsal segments all with 2 hairs. Cauda dark. ANT BASE VI 0.132–0.155 mm. R IV+V $0.81\text{--}0.92 \times$ ANT BASE VI *Micromyzella kathleenae*
 – First tarsal segments all with 3 hairs. Cauda pale. ANT BASE VI 0.099–0.127 mm. R IV+V $0.91\text{--}1.13 \times$ ANT BASE VI *Micromyzella sophiae*
59. R IV+V $1.7\text{--}2.3 \times$ HT II and bearing 8–14 accessory hairs. ANT PT/BASE 4.4–6.0 *Micromyzus katoi* group
 – R IV+V $1.2\text{--}1.7 \times$ HT II and bearing 4–9 accessory hairs. ANT PT/BASE 2.5–4.6 60

HOST LISTS AND KEYS

60. SIPH 1.6–2.0× cauda. ANT III without rhinaria (?). ANT PT/BASE 2.5–3.3. First tarsal segments with 3 or 4 hairs *Micromyzus vandergooti**
- SIPH 2.0–2.3× cauda. ANT III usually with 1 or more rhinaria. ANT PT/BASE 3.0–4.6. First tarsal segments with 2 or 3 hairs *Micromyzella filicis*
(*Micromyzella judenkoi* could not be included in the key because apt. of this species have not been described; these would probably run through the key to the last couplet. Al. of *M. judenkoi* differ from those of *M. filicis* by frequently having sec. rhinaria on ANT IV and V – see text.)

Polypogon

P. elongatus

P. fugax

P. littoralis

P. monspeliensis

P. viridis

Gramineae

Metopolophium dirhodum

Chaetogeoica graminiphaga; *Geoica sikkimensis*;

Tetraneura fusiformis, *radicola/yezoensis*

Sitobion miscanthi

Metopolophium dirhodum; *Rhopalosiphum padi*;

Sipha maydis; *Sitobion avenae*, *fragariae*;

Tetraneura basui, *fusiformis*; *Utamphorophora humboldti*

Forda formicaria, *rotunda*

Use key to apterae of grass-feeding aphids under *Digitaria*.

Polyscias

P. balfouriana

P. guilfoylei

Araliaceae

Aphis spiraecola

Aphis spiraecola; *Myzus persicae*; *Toxoptera aurantii*

Use key to polyphagous aphids, p. 1020.

Polystachya

P. flavescens

P. luteola

P. minuta = *luteola*

Orchidaceae

Sitobion luteum

Cerataphis orchidearum

Use key to apterae on orchids under *Cymbidium*.

Polystichum

P. acrostichoides

P. lobatum (?)

P. lonchitis

P. munitum

P. rigens (?)

Polystichum spp.

Dryopteridaceae

Idiopterus nephrolepidis

Amphorophora ampullata

Neomyzus circumflexus

Aulacorthum solani;

Macrosiphum adianti, [*ptericolens*], *walkeri*

Idiopterus nephrolepidis

Amphorophora laingi; *Macromyzella polypodicola*;

Macromyzus woodwardiae

Use key to fern-feeding aphids under *Polypodium*.

Polytrias

P. amaura

P. diversiflora

Gramineae

Schizaphis rotundiventris; *Sipha flava*

Rhopalosiphum maidis

Use key to apterae of grass-feeding aphids under *Digitaria*.

Polytrichum*P. commune**P. formosum**P. juniperinum**P. piliferum***Polytrichaceae***Decorosiphon corynothrix*; *Muscaphis musci*;*Myzodidium modestum**Decorosiphon corynothrix*; [*Jacksonia papillata*];*Myzodidium modestum*; *Muscaphis escherichi*;*Pseudacaudella rubida**Decorosiphon corynothrix*; *Myzodidium modestum**Muscaphis musci*; *Myzodidium modestum*Key to apterae on *Polytrichum* and other mosses:–

This key includes some species collected from unidentified mosses, or extracted using Berlese funnels where the moss species could not be certainly identified. One species that is typically a grass feeder, *Jacksonia papillata*, is also included, as this aphid is regularly extracted from moss samples and is suspected to sometimes feed on mosses (Müller, 1973b). From couplet 3 onward, all species except *J. papillata* have some morphological features that are typical of moss-feeding aphids; ANT PT tapering almost to a fine point (e.g., Figure 44a), and cauda swollen basally but with a thin papillate distal part (e.g., Figure 44b).

- | | |
|---|---|
| 1. ANT PT/BASE less than 0.5. SIPH absent. Eyes 3-faceted | 2 |
| – ANT PT/BASE more than 0.5. SIPH present, tubular. Eyes multifaceted | 3 |

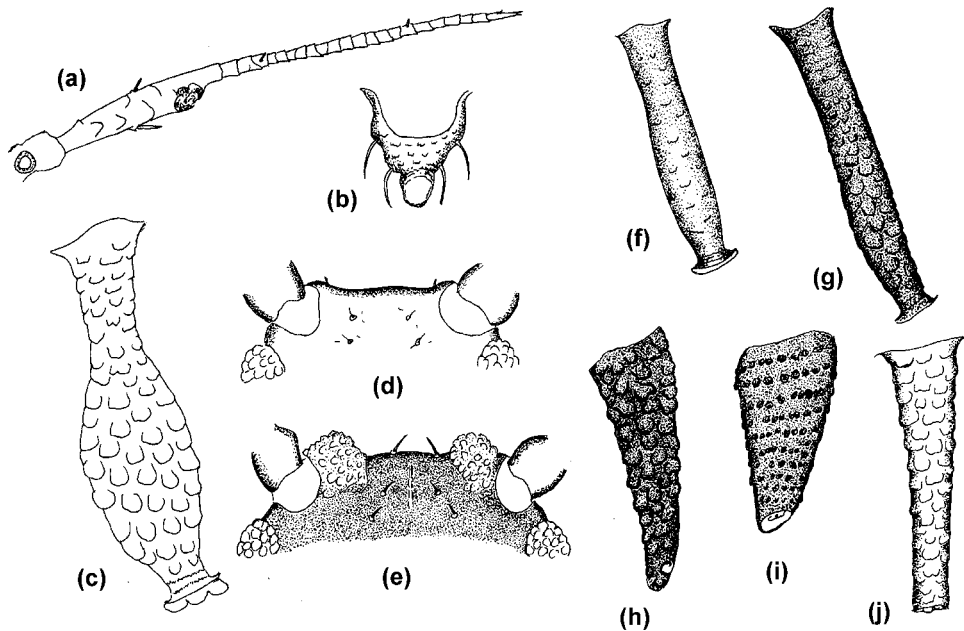


Figure 44 Apterae on *Polytrichum* and other mosses. (a) ANT VI of *Muscaphis musci*, (b) cauda of *Muscaphis musci*, (c) SIPH of *Decorosiphon corynothrix*, (d) front of head of *Pseudacaudella rubida*, (e) front of head of *Myzodidium modestum*, (f) SIPH of *Pseudacaudella rubida*, (g) SIPH of *Myzodidium modestum*, (h) SIPH of *Muscaphis escherichi*, (i) SIPH of *Muscaphis utahensis*, (j) SIPH of *Muscaphis musci*.

HOST LISTS AND KEYS

2. Tarsi 1-segmented. ANT 4- or 5-segmented *Melaphis rhois*
 [Note: species of other genera of Fordini in E Asia with mosses as sec. hosts (*Kaburagia*, *Nurudea*, *Schlechtendalia*) could not be included in the key, as no specimens are available; probably these only occur on mosses as imm. stages of al. sexuparae.]
- Tarsi 2-segmented. ANT 6-segmented *Pemphigus hydrophilus*
3. SIPH with a subapical constriction, a well-developed flange and a large apical pore (Figure 44c,f,g). ANT 6-segmented **4**
 – SIPH with no subapical constriction, flange absent or very weakly developed and a reduced apical or subapical pore (Figure 44h–j). ANT 5- or 6-segmented **7**
4. ANT and legs with numerous very long, erect, bristle-like hairs. SIPH markedly swollen on distal half, to a maximum of c.2× minimum width of stem (Figure 44c) *Decorosiphon corynothrix*
 – ANT and legs with shorter more normal hairs. SIPH tapering/cylindrical, or only slightly swollen (e.g. Figure 44f,g) **5**
5. ANT tubercles undeveloped, cuticle of head almost smooth dorsally (Figure 44d), with nodules on ventral side. Dorsal cuticle almost smooth in pleuro-spinal region, nodulose on margins *Pseudacaudella rubida*
 – ANT tubercles developed as rounded, densely nodulose bosses (Figure 44e). Dorsal cuticle rugose or with a reticulate sculpture extending to marginal areas **6**
6. Dorsal abdomen strongly sclerotised and rugose. SIPH uniformly black, darker than femora (Figure 44g) *Myzodium modestum*
 – Dorsal abdomen not strongly sclerotised, with reticulate sculpturing. SIPH not distinctly darker than hind femora *Myzodium knowltoni*
7. ANT tubercles well developed, rounded, apically convergent, nodulose. Cauda tongue-shaped, without a thin apical part *Jacksonia papillata*
 – ANT tubercles undeveloped. Cauda with swollen basal part and thin apical part **8**
8. SIPH tapering to a rounded apex, with pore placed subapically (e.g., Figure 44h). ANT PT/BASE 0.6–1.5 **9**
 – SIPH with obliquely or transversely truncate apex and terminal pore (Figure 44i, j). ANT PT/BASE 2.0–3.3 **10**
9. ANT PT/BASE 0.6–1.16. R IV+V 1.2–1.5× HT II *Muscaphis escherichi*
 – ANT PT/BASE 1.2–1.5. R IV+V 0.9–1.15× HT II *Muscaphis cuspidata*
10. SIPH stout, with ends somewhat obliquely truncate (Figure 44i). R IV+V 0.7–1.1× HT II *Muscaphis utahensis*
 – SIPH not stout, with ends transversely truncate (Figure 44j). R IV+V 1.4–1.9× HT II **11**
11. SIPH 0.09–0.13× BL, less than 3× cauda *Muscaphis musci*
 – SIPH 0.25–0.31× BL, 3.7–4.4× cauda *Muscaphis mexicana*

Poncirus

P. trifoliata

Rutaceae

Aphis gossypii, *spiraecola*; *Aulacorthum magnoliae*;
Myzus persicae; *Toxoptera aurantii*, *citricidus*

Use key to polyphagous aphids, p. 1020.

Pontederia*P. cordata***Pontederiaceae***Aphis nasturtii*; *Aulacorthum solani*;
Rhopalosiphum nymphaeae

Use key to polyphagous aphids, p. 1020.

Portulaca*P. blercea* (?)*P. clavatus* (?)*P. grandiflora**P. oleracea***Portulacaceae***Aphis gossypii**Neotoxoptera oliveri**Aphis craccivora*, *fabae*, *gossypii*; *Neotoxoptera oliveri**Aphis albella*, *craccivora*, *fabae*, *gossypii*, *middletonii*,*nasturtii*, [*portulacae* Shinji (nomen dubium)],*spiraecola*, [*varians* of Pashtshenko, 1988a)];*Aulacorthum solani*; *Brachyunguis harmalae*;*Macrosiphum euphorbiae*;*Myzus certus*, *ornatus*, *persicae*, [*portulacae* Macchiati(nomen dubium)], [*Myzus* sp. (Ossiannilsson, 1964a)];*Pemphigus* sp.; *Smynthuroides betae**Aphis gossypii**P. quadrifida*Key to apterae on *Portulaca*:–

1. ANT tubercles undeveloped or weakly developed 2
- ANT tubercles well developed 5
2. ANT PT/BASE 0.5–0.9. SIPH about as long as their basal widths, 0.2–0.6× cauda 2
Brachycaudus harmalae
- ANT PT/BASE either less than 0.5 or more than 1.5. SIPH if present at all then more than 0.8× cauda 3
3. ABD TERG 1 and 7 with marginal tubercles (MTu) **and** SIPH pale, or only dusky at apices 4
- Without that combination of characters, i.e., if ABD TERG 1 and 7 have MTu then wholly dark SIPH are present 4
go to key to polyphagous aphids, p. 1020
4. SIPH 2.2–2.9× cauda 4
*Aphis albella**
- SIPH 0.9–1.6× cauda 4
Aphis nasturtii
5. Head smooth, with inner faces of ANT tubercles divergent. SIPH with polygonal reticulation on distal 0.1–0.2 of length 5
Macrosiphum euphorbiae
- Head spiculose, with inner faces of ANT tubercles parallel or apically convergent. SIPH without polygonal reticulation 6
6. SIPH tapering/cylindrical 7
- SIPH slightly to moderately clavate 8
7. BL 1.0–1.7 mm. ANT III without rhinaria. ANT PT/BASE 1.7–2.8. Dorsal abdomen with a pattern of dark intersegmental markings. SIPH coarsely imbricated, and with a slight S-curve 7
Myzus ornatus
- BL 1.8–3.0 mm. ANT III usually with 1–2 rhinaria near base. ANT PT/BASE 4.0–5.5. Dorsal abdomen without dark markings. SIPH with normal imbrication, not curved 7
Aulacorthum solani
8. SIPH 0.12–0.17× BL. R IV+V 1.2–1.5× HT II. (Al. with dark-bordered wing veins) 8
Neotoxoptera oliveri
- SIPH 0.18–0.28× BL. R IV+V 0.9–1.2× HT II. (Al. with wing veins not dark-bordered) 9

HOST LISTS AND KEYS

9. R IV+V in most specimens with only one pair of lateral accessory hairs (plus 0–3 ventral accessory hairs). Value of function cauda/(ANT III× PT) in range 0.80–1.52, but rarely more than 1.25 except in small specimens (those with ANT III less than 0.32 mm) *Myzus persicae*
- R IV+V in most specimens with two pairs of lateral accessory hairs. Value of function cauda/(ANT III× PT) in range 1.2–2.7 (rarely less than 1.25) *Myzus certus*

Portulacaria

P. afra

Potalia

Potalia sp(p).

Use key to polyphagous aphids, p. 1020.

Potamogeton

P. crispus

P. fluitans

P. natans

P. richardi

Use key to apterae on *Nymphaea*.

Potentilla (incl. Comarum, Dasiphora)

P. acaulis

P. alpestris see *crantzii*

P. anglica

P. anserina

P. argentea

P. argyrophylla

P. arguta

P. asiatica

P. atrosanguinea

P. aurea

P. bakeri

P. bifurca

P. blaschkeana

P. canadensis

Portulacaceae

Myzus persicae

Loganiaceae

Aphis gossypii; *Myzus ornatus*, *persicae*;
[*Rhopalosiphum maidis*]; *Toxoptera odinae*

Potamogetonaceae

Rhopalosiphum nymphaeae

Rhopalosiphum nymphaeae

Aphis gossypii; *Rhopalosiphum nymphaeae*

Rhopalosiphum nymphaeae

Rosaceae

Macropodaphis paradoxa

Acyrthosiphon boreale

Acyrthosiphon boreale; *Anthracosiphon hertae*;

Aphis craccivora, *nasturtii*, *roepkei*, *subviridis*, *tomentillae*;

Aulacorthum solani;

Chaetosiphon fragaefolii, *potentillae*, *thomasi*;

Longicaudus trirhodus;

Macrosiphum euphorbiae, *potentillae*; *Myzaphis rosarum*;

Myzus persicae; *Nearctaphis argentinaeradicens*;

Pemphigus ?populi;

Rhopalosiphoninus [heikinheimoi], *latysiphon*

Acyrthosiphon malvae ssp. *potha*;

Aphis potentillae, *roepkei*, *subviridis*, *tomentillae*,

Aphis sp. (Sweden, BMNH colln); *Macrosiphum rosae*

Macrosiphum pachysiphon; *Metopolophium dirhodum*

Nasonovia williamsi

Acyrthosiphon boreale; *Chaetosiphon alpestre*

Aulacorthum solani; *Brachycaudus helichrysi*;

Macrosiphum euphorbiae

Acyrthosiphon boreale

Macrosiphum potentillicaulis

Aphis potentillae, *tianschanica*

Macrosiphum euphorbiae

Anthracosiphon crystleae; *Aulacorthum solani*;

Macrosiphum euphorbiae

<i>P. caulescens</i>	<i>Chaetosiphon alpinum</i> ; <i>Myzus ornatus</i>
<i>P. chinensis</i>	<i>Aphis mongolica</i> , <i>potentillae</i> , <i>roepkei</i> ; <i>Neotoxoptera oliveri</i> , [<i>violae</i>]
<i>P. chrysantha</i>	<i>Macropodaphis paradoxa</i>
<i>P. collina</i>	<i>Macrosiphum euphorbiae</i> ; <i>Myzus ornatus</i>
<i>P. crantzii</i> (incl. <i>alpestris</i> , <i>verna</i>)	<i>Acyrtosiphon boreale</i> , <i>malvae</i> ; <i>Aulacorthum solani</i> ; <i>Chaetosiphon alpinum</i> , <i>potentillae</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus ascalonicus</i> , <i>ornatus</i>
<i>P. crinita</i>	<i>Aulacorthum solani</i>
<i>P. dickinsii</i>	<i>Aphis potentillae</i>
<i>P. erecta</i> (incl. <i>tormentilla</i>)	<i>Aphis tormentillae</i> ; <i>Aulacorthum solani</i> ; <i>Myzus ascalonicus</i>
<i>P. favrati</i>	<i>Macrosiphum euphorbiae</i>
<i>P. fruticosa</i>	<i>Acyrtosiphon assiniboinensis</i> , [<i>ignotum</i>], <i>malvae</i> ssp. <i>rogersii</i> , <i>scalare</i> , <i>wasintae</i> ; <i>Aphis dasiphorae</i> , <i>fabae</i> , <i>spiraecola</i> ; <i>Chaetosiphon alpestre</i> ; <i>Macropodaphis dasiphorae</i> , <i>primigenius</i> ; <i>Macrosiphum euphorbiae</i> , <i>rosae</i> ; <i>Myzaphis canadensis</i> , <i>rosarum</i> ; <i>Myzus ornatus</i> ; [<i>Ossiannilsonia oelandica</i>]; <i>Sitobion fragariae</i>
<i>P. glandulosa</i>	<i>Acyrtosiphon vandenboschi</i> ; <i>Chaetosiphon hottesi</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Nasonovia williamsi</i>
<i>P. gracilis</i> (incl. <i>nutallii</i>)	<i>Acyrtosiphon malvae</i> (s.lat.); <i>Aulacorthum solani</i> ; <i>Myzus ascalonicus</i>
<i>P. hirta</i>	<i>Macrosiphum euphorbiae</i> ; <i>Myzus ornatus</i>
<i>P. hybrida</i>	<i>Sitobion fragariae</i>
<i>P. hyparctica</i>	<i>Acyrtosiphon boreale</i>
<i>P. impolita</i>	<i>Aphis roepkei</i>
<i>P. inclinata</i>	<i>Aphis subviridis</i> ; <i>Aulacorthum solani</i>
<i>P. intermedia</i>	<i>Chaetosiphon alpestre</i>
<i>P. megalantha</i>	<i>Acyrtosiphon malvae</i> (s. lat.); <i>Aulacorthum solani</i> ; <i>Chaetosiphon alpestre</i> ssp. <i>airolense</i> ; <i>Myzus ascalonicus</i> , <i>ornatus</i>
<i>P. monspeliensis</i>	<i>Chaetosiphon thomasi</i> ; <i>Macrosiphum euphorbiae</i>
<i>P. mooniana</i>	[<i>Tricaudatus polygoni</i>]; [<i>Trichosiphonaphis gerberae</i> , <i>polygoni</i>]
<i>P. nepalensis</i>	<i>Acyrtosiphon rubifoliae</i>
<i>P. neumanniana</i>	<i>Chaetosiphon potentillae</i>
<i>P. norvegica</i>	<i>Acyrtosiphon malvae</i> ssp. <i>potha</i> ; <i>Aulacorthum solani</i>
<i>P. nuttallii</i> see <i>gracilis</i>	
<i>P. ornithopodioides</i>	<i>Acyrtosiphon boreale</i> ; <i>Myzus ornatus</i>
<i>P. palustris</i> (= <i>Comarum palustre</i>)	<i>Acyrtosiphon malvae</i> ssp. <i>potha</i> ; <i>Anthracosiphon hertae</i> ; <i>Aphis comari</i> , <i>tormentillae</i> ; <i>Macrosiphum euphorbiae</i>
<i>P. parviflora</i>	<i>Macropodaphis dzhungarica</i>
<i>P. parvifolia</i>	<i>Aphis dasiphorae</i>
<i>P. patula</i>	<i>Acyrtosiphon boreale</i> ; <i>Aulacorthum solani</i> ; <i>Myzus ascalonicus</i>
<i>P. pennsylvanica</i> (incl. <i>sibirica</i>)	<i>Aulacorthum solani</i> ; <i>Chaetosiphon alpestre</i> , <i>potentillae</i> ; <i>Holmania chaetosiphon</i> ; <i>Myzus ascalonicus</i>

HOST LISTS AND KEYS

<i>P. pimpinelloides</i>	<i>Myzus ornatus</i>
<i>P. puberula</i> (incl. <i>pusilla</i>)	<i>Acyrtosiphon boreale</i> ; <i>Aphis breviseta</i> ; <i>Chaetosiphon alpestre</i> , <i>alpestre</i> ssp. <i>airolense</i> <i>Aphis tormentillae</i> ; [<i>Brachycaudus cerasicola</i>]; <i>Macrosiphum euphorbiae</i> ; <i>Myzus ornatus</i> , <i>persicae</i> <i>Aphis roepkei</i>
<i>P. recta</i> (incl. <i>macrantha</i> , <i>transcaspica</i> , <i>warrenii</i>)	<i>Acyrtosiphon boreale</i> , <i>malvae</i> ssp. <i>potha</i> ; <i>Aphis potentillae</i> , <i>roepkei</i> , <i>solanella</i> , <i>tormentillae</i> ; <i>Chaetosiphon alpestre</i> ssp. <i>airolense</i> ; [<i>Cryptomyzus galeopsidis</i>]; <i>Macrosiphum euphorbiae</i> ; <i>Myzus ascalonicus</i> , <i>ornatus</i> ; <i>Pemphigus</i> ? <i>populi</i> <i>Aulacorthum solani</i> ; <i>Myzus ascalonicus</i>
<i>P. repens</i>	<i>Aulacorthum solani</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus ascalonicus</i>
<i>P. reptans</i>	<i>Macrosiphum euphorbiae</i>
<i>P. rubricaulus</i>	<i>Aphis gossypii</i>
<i>P. rupestris</i>	<i>Chaetosiphon muelleri</i>
<i>P. russelliana</i>	<i>Acyrtosiphon malvae</i> ; <i>Chaetosiphon potentillae</i>
<i>P. sibirica</i> see <i>pennsylvanica</i>	<i>Paramyzus longirostris</i>
<i>P. silvestris</i>	<i>Aphis diluta</i> ; <i>Chaetosiphon alpestre</i> ssp. <i>orientale</i> ; [<i>Macropodaphis tsherepanovi</i>]; [<i>Macrosiphum stellariae</i>]
<i>P. speciosa</i>	<i>Aphis breviseta</i>
<i>P. sterilis</i>	<i>Aphis mongolica</i>
<i>P. stolonifera</i>	<i>Acyrtosiphon boreale</i> ; <i>Chaetosiphon alpestre</i>
<i>P. supina</i>	
<i>P. tabernaemontani</i>	<i>Aphis gossypii</i>
<i>P. tanacetifolia</i> (incl. var. <i>filipendula</i>)	<i>Acyrtosiphon pseudodirhodum</i> ; <i>Aspidophorodon indica</i> ; <i>Chaetosiphon jacobi</i> ; <i>Macropodaphis ivanovskajae</i> ; <i>Macrosiphum pallidum</i> ; [<i>Sitobion beiquei</i>]; [<i>Uroleucon martini</i>]
<i>P. tephroleuca</i>	
<i>P. tormentilla</i> see <i>erecta</i>	
<i>P. transcaspica</i> see <i>recta</i>	
<i>P. tridentata</i>	
<i>P. verna</i> see <i>crantzii</i>	
<i>Potentilla</i> spp.	

Key to apterae on *Potentilla*:-

1. Fore femora greatly enlarged, about twice as thick as mid femora, and fore tibiae with strengthened bases. Dorsum adorned with numerous tubercular processes, most of which bear hairs and wax glands. Cauda knobbed 2
 - Fore femora not enlarged. Dorsum with or without tubercular processes. Cauda variable 6
2. ABD TERG 1-5 with both mammariform and digitiform tubercles, each bearing a single hair; mammariform tubercles have a thick blunt or slightly capitate apical hair, whereas digitiform tubercles have an apical pore with a very small hair on the rim 3
 - ABD TERG 1-5 with mammariform or quadrate tubercles, each bearing 1-3 hairs; the tubercles vary in size and shape but all bear hairs of similar length 3
3. Front of head with 3 pairs of tubercles 4
 - Front of head with 2 pairs of tubercles 4

4. ANT PT/BASE 1.5–1.7 *Macropodaphis dzhungarica**
 – ANT PT/BASE 2.0–2.3 5
5. BL c. 1.6–2.0mm. SIPH and femora dark *Macropodaphis primigenius*
 – BL c. 3.8mm. SIPH and femora pale *Macropodaphis dasiphorae**
6. ANT PT/BASE less than 0.5. SIPH absent. Dorsal abdomen with wax pore plates
Pemphigus sp. (?*populi* – Zwölfer, 1958)
 – ANT PT/BASE more than 0.8. SIPH present. Dorsal abdomen without wax pore plates 7
7. Dorsal body hairs thick and markedly capitate, and arising from prominent tuberculate bases that are often higher than their basal widths. First tarsal segments all with 5 hairs 8
 – Dorsal body hairs not thick and capitate, or if with somewhat expanded apices then without prominent tubercular bases (always shorter than their basal widths). First tarsal segments with 2–6 hairs 18
8. SIPH with a distinct subapical zone of polygonal reticulation *Holmania chaetosiphon*
 – SIPH without subapical polygonal reticulation 9
9. SIPH with 1–12 thick capitate hairs on proximal part 10
 – SIPH without hairs 12
10. SIPH 0.23–0.25× BL, with 9–12 capitate hairs *Chaetosiphon alpestre* ssp. *orientale**
 – SIPH 0.14–0.20× BL, with 1–6 capitate hairs 11
11. SIPH 0.17–0.20× BL, with 4–6 capitate hairs *Chaetosiphon alpestre* s.str.
 – SIPH 0.14–0.17× BL, with 1–4 capitate hairs *Chaetosiphon alpestre* ssp. *airolense*
12. SIPH 1.2–2.0× cauda 13
 – SIPH 2.1–3.5× cauda 14
13. R IV+V very long and narrow, 2.4–2.8× HT II. Dorsal hairs very numerous (20–30 per segment), varying in length but maximally c.130µm long *Chaetosiphon muelleri*
 – R IV+V triangular, similar in length to HT II. Dorsal hairs much fewer and shorter. (Only imm. known) *Chaetosiphon alpinum*
14. Cuticle of head smooth. R IV+V with 10–15 accessory hairs *Chaetosiphon hottesi*
 – Cuticle of head spiculose. R IV+V with 3–6 accessory hairs 15
15. ANT III with 9–12 capitate hairs *Chaetosiphon potentillae*
 – ANT III with 2–7 capitate hairs 16
16. Dorsal abdomen with dark pigmentation *Chaetosiphon jacobi*
 – Dorsal abdomen pale 17
17. Rostrum not reaching hind coxae. R IV+V 0.06–0.08× BL *Chaetosiphon thomasi*
 – Rostrum reaching to or beyond hind coxae. R IV+V 0.08–0.11× BL *Chaetosiphon fragaefolii*
18. SIPH with a subapical zone of reticulation (at least 4–5 rows of closed, polygonal cells) 19
 – SIPH without polygonal reticulation (sometimes with a few interconnected subapical striae) 28
19. SIPH dark and with a greatly inflated, balloon-like middle section *Rhopalosiphoninus latysiphon*
 – SIPH pale or dark, not inflated 20
20. Dorsal abdomen with extensive dark sclerotisation. Ventral side of head ornamented with spicules 21
 – Dorsal abdomen without extensive dark sclerotisation. Head without spicules 22

HOST LISTS AND KEYS

21. Longest hairs on ANT III less than $0.5 \times$ BD III. Cauda finger-like, at least $2 \times$ longer than its basal width in dorsal view *Anthracosiphon crystleae*
 – Longest hairs on ANT III $0.6\text{--}1.4 \times$ BD III. Cauda triangular, less than $1.5 \times$ longer than its basal width in dorsal view *Anthracosiphon hertae*
22. Longest hairs on ANT III $0.3\text{--}0.5 \times$ BD III. ANT III with 1–4 very small rhinaria. ANT tubercles rather low, and median frontal tubercle distinctly developed *Sitobion fragariae*
 – Longest hairs on ANT III $0.6\text{--}1.3 \times$ BD III. ANT III with 1–35 rhinaria of various sizes. ANT tubercles well developed, median frontal tubercle undeveloped 23
23. SIPH pale or dusky only towards apices 24
 – SIPH dark, or pale only at bases 25
24. Cauda $1.8\text{--}2.0 \times$ R IV+V. SIPH $2.2\text{--}2.5 \times$ cauda. R IV+V $1.1\text{--}1.2 \times$ HT II. (Al. with 19–31 small rhinaria in a scattered row) *Macrosiphum potentillae*
 – Cauda $2.3\text{--}3.5 \times$ R IV+V. SIPH $1.6\text{--}2.3 \times$ cauda. R IV+V $0.95\text{--}1.1 \times$ HT II. (Al. with 11–20 rhinaria, some more than half diameter of ANT III, in an almost straight line) *Macrosiphum euphorbiae*
25. SIPH wholly jet black, and rather thick; $5\text{--}7 \times$ as long as their width at midlength. ANT III pale except at apex *Macrosiphum pachysiphon*
 – SIPH wholly dark, or paler at base, and more than $10 \times$ longer than their width at midlength. ANT III dark at least on sensoriated part 26
26. Head, ANT I and ANT II as dark as SIPH, which are wholly dark. ANT III with 4–25 rhinaria 77% with 11 or more. (ANT III of al. with 31–71 rhinaria) *Macrosiphum rosae*
 – Head, ANT I and ANT II much paler than distal part of SIPH, which may be paler at base. ANT III with 2–10 rhinaria. (ANT III of al. with 13–22 rhinaria) 27
27. SIPH $1.9\text{--}2.2 \times$ cauda. R IV+V $0.8\text{--}0.95 \times$ HT II *Macrosiphum potentillicaulis**
 – SIPH $1.2\text{--}1.7$ (-1.8) \times cauda. R IV+V $0.9\text{--}1.15 \times$ HT II *Macrosiphum pallidum*
28. Front of head with median tubercle very well developed as a rugose, quadrate (sometimes bilobed) process 29
 – Median frontal tubercle undeveloped or less well developed, not quadrate or bilobed 30
29. ANT tubercles evident (although lower than median tubercle), and ANT I with projection at inner apex. ANT 5-segmented, with ANT PT/BASE 1.0–1.3. SIPH flangeless, with very small aperture. Dorsal cuticle wrinkled. First tarsal segments with 3 hairs *Aspidophorodon indica*
 – ANT tubercles undeveloped, inner apex of ANT I without projection. ANT 6-segmented, with ANT PT/BASE 1.3–1.6. SIPH with flange and normal aperture. Dorsal cuticle strongly pitted. First tarsal segments with 5 hairs *Myzaphis rosarum*
30. ANT tubercles absent or weakly developed. ABD TERG 1 and 7 with or without marginal tubercles (MTu) 31
 – ANT tubercles well developed, so that there is a frontal sinus. ABD TERG 1 and 7 never with MTu 49
31. ABD TERG 7 without MTu 32
 – ABD TERG 7 with MTu 35
32. Cauda finger-like, much longer than its basal width. ANT PT/BASE $0.67\text{--}1.3$. SIPH either much shorter or much longer than cauda 33
 – Cauda helmet-shaped, as short as or shorter than its basal width. ANT PT/BASE $1.3\text{--}3.2$. SIPH similar in length to cauda 34

33. SIPH very short, c.0.3× cauda. ANT PT/BASE 1.0–1.3. First tarsal segments with 6 hairs
Longicaudus trirhodus
- SIPH long and thin, nearly 3× cauda. ANT PT/BASE 0.67–1.0. First tarsal segments with 2 hairs
*Myzaphis canadensis**
34. SIPH with close-spaced spiculose imbrication. ANT PT/BASE 1.3–1.7. ANT III (distally) and IV usually with rhinaria. ANT with long fine hairs much longer than BD III. ABD TERG 1–5 (–6) usually with MTu. Dorsal abdomen with dark spots and patches
Nearctaphis argentinaeradialis
- SIPH with smooth surface. ANT PT/BASE 2.4–3.2. ANT III without rhinaria. ANT hairs shorter than BD III. Dorsal abdomen without dark markings
Brachycaudus helichrysi
35. R IV+V 1.6–2.3× HT II, and bearing 4–16 accessory hairs **36**
- R IV+V 0.9–1.4× HT II, with 2 (–3) accessory hairs **37**
36. SIPH dark. ANT usually 5-segmented, with ANT PT/BASE 1.35–1.72. R IV+V with 12–14 accessory hairs
Aphis mongolica
- SIPH pale. ANT usually 6-segmented, with ANT PT/BASE 1.9–2.9. R IV+V with 4–8 accessory hairs
Aphis diluta
37. Hairs on ANT III pointed, the longest of them more than 0.65× longer than BD III **38**
- Hairs on ANT III blunt or pointed, the longest 0.3–0.6 (–0.7)× BD III **40**
38. ANT PT/BASE 1.25–1.65. SIPH 0.55–0.85× cauda
Aphis dasiphorae
- ANT PT/BASE 1.8–3.9. SIPH 0.8–1.8× cauda **39**
39. Cauda paler than SIPH, without a constriction, and bearing 4–11 hairs. ABD TERG 7 and 8 usually with dusky cross-bands. R IV+V 1.15–1.4× HT II
Aphis comari
- Cauda as dark as SIPH, and bearing (7–) 8–24 hairs (but **if** with 7–11 **then** it has a midway constriction and ABD TERG 7 and 8 are without cross-bands). R IV+V 0.85–1.2 (–1.3)× HT II
go to key to polyphagous aphids, p. 1020, starting at couplet 33
40. Dorsal abdomen with an extensive solid black shield centered on ABD TERG 4–5
Aphis craccivora
- Dorsum without an extensive solid black shield **41**
41. Marginal tubercles (MTu) consistently present on most or all of ABD TERG 2–4 as well as 1 and 7 **42**
- MTu only occurring irregularly or inconsistently on ABD TERG 2–4 **46**
42. SIPH entirely blackish. TERG with dark sclerotic bars on thorax and posterior abdomen **43**
- SIPH usually paler basally and darker at apex. TERG without dark sclerotisation **44**
43. R IV+V 1.6–1.8× HT II. ANT PT/BASE c.2.4–2.5
*Aphis potentillae**
- R IV+V 1.1–1.2× HT II. ANT PT/BASE c.1.9–2.0
*Aphis tianschanica**
44. SIPH 0.9–1.1× cauda, which is tongue-shaped to triangular
Aphis subviridis
- SIPH 1.3–2.2× cauda which is finger-like **45**
45. ANT PT/BASE 1.5–2.1. SIPH 1.3–1.4× cauda, which bears long curved hairs
Aphis roepkei
- ANT PT/BASE 2.5–3.1. SIPH 1.6–2.2× cauda, which bears hairs shorter than ANT BD III
Aphis breviseta
46. SIPH and cauda both similarly dark **47**
- SIPH dark or pale with dark apices, cauda pale or dusky **48**
47. SIPH 0.64–1.0× cauda, which bears 5–9 hairs
Aphis tormentillae
- SIPH 1.2–1.3× cauda, which bears 4 hairs
Aphis sp. on *P. argentea* (Sweden, BMNH colln)

HOST LISTS AND KEYS

48. SIPH uniformly dark. Hairs on hind femur all shorter than diameter of femur at its base
Aphis gossypii
 – SIPH usually rather pale, darker at apex. Hairs on hind femur mainly longer, some of them about as long as, or longer than, diameter of femur at its base
Aphis nasturtii
49. Head spiculose, with inner faces of ANT tubercles steep, almost parallel or apically convergent. ANT III with 0–4 rhinaria **50**
 – Head smooth, with inner faces of ANT tubercles divergent. ANT III with (0–) 1–56 rhinaria **55**
50. SIPH clavate, i.e. slightly to considerably swollen on distal 0.5–0.7 of length **51**
 – SIPH cylindrical or tapering, without swollen distal part **54**
51. ANT III with 1–4 secondary rhinaria on slightly swollen section of basal half. R IV+V 1.5–1.8× HT II
Paramyzus longirostris
 – ANT III without secondary rhinaria. R IV+V 0.9–1.5× HT II **52**
52. SIPH 0.9–1.34× ANT III. R IV+V 0.9–1.1 (–1.2)× HT II
Myzus persicae
 – SIPH 0.50–0.81× ANT III. R IV+V 1.2–1.5× HT II **53**
53. SIPH with narrowest part of stem as thin as or thinner than hind tibia at midlength. R IV+V with 7–15 accessory hairs. (Al. with forewing veins not black-bordered)
Myzus ascalonicus
 – SIPH with narrowest part of stem thicker than hind tibia at midlength. R IV+V with 4–7 accessory hairs. (Al. with black-bordered forewing veins)
Neotoxoptera oliveri
54. SIPH coarsely imbricated, with a slight S-curve. Dorsal abdomen with a pattern of dark intersegmental markings. ANT PT/BASE 1.8–2.5. BL 1.0–1.75 mm
Myzus ornatus
 – SIPH not curved, not coarsely imbricated. Dorsal abdomen without dark ornamentation. ANT PT/BASE 4.0–5.3. BL 1.8–3.0 mm
Aulacorthum solani
55. ANT with numerous protuberant sec. rhinaria; 23–56 on III, 0–22 on IV, 0–1 on V. ANT hairs 1–2× BD III. Thoracic spiracles large and rounded, much larger than abdominal ones. R IV+V 1.6–1.9× HT II
Nasonovia williamsi
 – ANT with 0–32 non-protuberant sec. rhinaria, confined to ANT III. ANT hairs all shorter than BD III. Thoracic spiracles not much larger than abdominal ones. R IV+V 0.6–1.6× HT II **56**
56. Longest hairs on ABD TERG 1–3 thick and with blunt or slightly expanded apices, 25–52 µm long, longer than diameter of ANT III at midlength. SIPH long and thin, 1.65–2.9× cauda **57**
 – Longest hairs on ABD TERG 1–3 are 10–20 µm long, shorter than midlength diameter of ANT III. SIPH 0.8–2.5× cauda **58**
57. Dorsal abdominal cuticle strongly sclerotised and corrugated in a jigsaw puzzle-like pattern. R IV+V 1.0–1.25× HT II and bearing 4–8 accessory hairs. Cauda with 7–12 hairs. ANT III with 1–4 (–32) rhinaria. BL less than 2.5 mm
Acyrtosiphon scalare
 – Dorsal abdominal cuticle smooth. R IV+V 1.5–1.6× HT II and bearing c.40 accessory hairs. Cauda with 16–19 hairs. ANT III without rhinaria. BL more than 3 mm
Acyrtosiphon vandenboschi
58. SIPH 0.8–1.2× cauda. ANT PT 2.25–3.25× SIPH
Acyrtosiphon pseudodirhodum
 – SIPH 1.4–2.5× cauda. ANT PT less than 2× SIPH **59**
59. R IV+V 0.6–0.8× HT II. ANT PT/BASE 2.5–4.4
Metopolophium dirhodum
 – R IV+V 0.9–1.5× HT II. ANT PT/BASE 3.5–9.0 **60**
60. SIPH 1.4–1.5× cauda. ANT PT/BASE 3.8–4.2. ANT III with 8–20 rhinaria
Acyrtosiphon assiniboensis

- SIPH 1.5–2.5× cauda. ANT PT/BASE 3.5–9.0, **but if** less than 4.3 then SIPH 1.6–1.8× cauda and ANT III with 1–5 rhinaria **61**
- 61.** ANT PT/BASE 3.5–4.3. SIPH 1.6–1.8× cauda. ANT III with 1–5 rhinaria near base *Acyrtosiphon wasintae*
- ANT PT/BASE 4.4–9.0. SIPH 1.8–2.6× cauda. ANT III with 1–24 rhinaria **62**
- 62.** ANT PT/BASE 7.1–9.0. SIPH dark except at bases *Acyrtosiphon rubifoliae*
- ANT PT/BASE 4.4–6.3. SIPH pale *Acyrtosiphon malvae* group, incl. *A. boreale*

Poterium* see *Sanguisorba***Pothomorphe****P. peltata**P. umbellata*

Use key to polyphagous aphids on p. 1020.

Piperaceae

Aphis craccivora, *gossypii*, *spiraecola*;
Neomyzus circumflexus; *Toxoptera aurantii*;
Uroleucon ambrosiae
Myzus persicae

Pothos

P. hermaphroditus
P. longifolius
P. roxburghii
P. scandens
P. seemanni

Araceae

Cerataphis freycinetiae
Cerataphis freycinetiae
Cerataphis pothophila
 [*Greenidea ficicola*]
Cerataphis ?freycinetiae (as *lataniae*)

Key to apterae on *Pothos*:–

(Both species have a flattened aleyrodiform body with an encircling fringe of wax glands, a pair of small frontal horns, 3-faceted eyes and poriform SIPH.)

- Ventral side of head with a pair of dagger-like hairs. Cauda with 6–9 hairs. ABD TERG 8 with 11–16 hairs *Cerataphis freycinetiae*
- Ventral side of head without any dagger-like hairs. Cauda with 11–14 hairs. ABD TERG 8 with 8–10 hairs *Cerataphis pothophila*

Poupartia*P. caffra***Anacardiaceae***Aphis gossypii****Pourthiaca* see *Photinia******Pouteria* see Blackman and Eastop (1994)*****Pouzolzia****P. hirta**P. indica**Pouzolzia* sp.**Urticaceae**

Aphis gossypii, *nasturtii*, *spiraecola*;
Brachycaudus helichrysi; *Toxoptera citricidus*
Aphis gossypii
 [*Subovatomyzus leucosceptri*]

Use key to polyphagous aphids, p. 1020.

HOST LISTS AND KEYS

Prangos

- P. asperula*
P. bucharica
P. pabularia see *Cachrys*

Umbelliferae

- Swirskiaphis polychaeta*
Dysaphis crataegi, *papillata*

Key to apterae on *Prangos*:-

1. Dorsal body hairs very long (more than 100µm), thick and numerous. SIPH about equal in length to cauda. Spinal tubercles (STu) absent *Swirskiaphis polychaeta*
 – Dorsal body hairs less than 50µm. SIPH about 2× cauda. Head and ABD TERG 8 (or 7 and 8) usually with paired STu **2**
2. Longest hairs on ANT III as long as or longer than BD III. ANT PT/BASE c.2.3 *Dysaphis papillata**
 – Longest hairs on ANT III 0.3–0.8× BD III. ANT PT/BASE 2.7–4.1 *Dysaphis crataegi*

Prasium

- P. majus*

Labiatae

- Cryptomyzus* sp. near *korschelti* (Israel; Swirski and Amitai, 2001: 73)

Pratia

- P. nummularia*

Campanulaceae

- Rhopalosiphoninus staphyleae*

Premna see Blackman and Eastop (1994)

Prenanthes

- P. alba*
P. autumnalis
P. brunoniana
P. purpurea
P. tanakae
P. tatarinowii
P. trifoliata see *Nabalus*

Compositae

- Hyperomyzus nabali*; *Uroleucon pseudambrosiae*
Uroleucon pseudambrosiae
Uroleucon longisetosus
Macrosiphum prenanthidis
Hyperomyzus carduellinus
Aphis fabae, *Aphis* sp. near *viburni* (Holman, 1987)

Key to apterae on *Prenanthes*:-

1. SIPH clavate **2**
 – SIPH tapering or cylindrical for most of length **3**
2. SIPH 1.1–1.5× cauda, with maximum diameter of swollen part 1.05–1.45× minimum diameter of basal part. R IV+V 0.9–1.0× HT II. ANT PT/BASE 4.4–6.0 *Hyperomyzus carduellinus*
 – SIPH 1.4–1.8× cauda, with maximum diameter of swollen part 1.8–3.1× minimum diameter of basal part. R IV+V 1.05–1.3× HT II. ANT PT/BASE 8.5–13.5 *Hyperomyzus nabali*
3. SIPH with a distal zone of polygonal reticulation. ANT tubercles well developed. ANT III with rhinaria. ABD TERG 1 and 7 without marginal tubercles (MTu) **4**
 – SIPH without polygonal reticulation. ANT tubercles weakly developed. ANT III without rhinaria. ABD TERG 1 and 7 with MTu **6**
4. SIPH 2.0–2.5× cauda and mainly pale, sometimes dark on distal reticulated part, which extends for less than 0.2 of total length *Macrosiphum prenanthidis*
 – SIPH 1.1–1.5× cauda and wholly dark, with distal reticulation extending more than 0.25 of length **5**

5. Crescent-shaped antesiphuncular sclerites present. SIPH short and thick, 0.14–0.15× BL. R IV+V 1.2–1.3× HT II *Uroleucon longisetosus*
 – No antesiphuncular sclerites. SIPH more than 0.2× BL. R IV+V 0.9–1.1× HT II *Uroleucon pseudambrosiae*
6. ABD TERG 2–6 as well as 1 and 7 usually bearing prominent MTu. R IV+V 1.23–1.53× HT II *Aphis* sp. near *viburni* (Holman, 1987)
 – ABD TERG 2–6 rarely with small MTu. R IV+V 0.9–1.4× HT II *Aphis fabae* group

Primula

P. acaulis
P. allionii
P. alpicola
P. × auricula

P. denticulata
P. elatior
P. floribunda
P. forbesii
P. glaucescens
P. japonica
P. juliae
P. kewensis (incl. var. *farinosa*)
P. macrophylla
P. malacoides
P. marginata
P. montavariensis
P. obconica
P. officinalis see *veris*
P. palinuri
P. parryi

P. pedemontana
P. polyantha
P. sieboldii
P. sinensis (incl. var. *stellata*)
P. veris (= *officinalis*, incl. ssp. *canescens*)

P. viali
P. vulgaris
Primula spp.

Primulaceae

Acyrthosiphon primulae
Thecabius auriculae
Myzus ornatus
Acyrthosiphon auriculae; *Aulacorthum solani*;
Macrosiphum euphorbiae; *Thecabius auriculae*
Aulacorthum solani
Aulacorthum solani; *Myzus ascalonicus*
Myzus ornatus; *Neomyzus circumflexus*
Myzus persicae
 [*Acyrthosiphon auriculae* (excised leaves)]
Aulacorthum solani; *Myzus ornatus*
Aulacorthum solani
Acyrthosiphon primulae; *Myzus persicae*
Cavariella aquatica
Myzus ornatus, *persicae*
 [*Acyrthosiphon auriculae* (excised leaves)]
Brachycaudus helichrysi
Myzus ornatus

[*Acyrthosiphon auriculae* (excised leaves)]
Amphorophora pawtincae; *Aulacorthum solani*;
Rhopalosiphoninus staphyleae
Thecabius auriculae
Myzus ornatus
Aphis gossypii; *Neomyzus circumflexus*
Aulacorthum solani; *Myzus ornatus*, *persicae*
Acyrthosiphon primulae; *Aulacorthum solani*;
Macrosiphum euphorbiae;
Myzus ascalonicus, *ornatus*, *persicae*
Aulacorthum solani
Aulacorthum solani; *Myzus cymbalariae*, *persicae*
 [*Eutrichosiphum pseudopasaniae*]; *Neomyzus primulus*;
 [*Rhodobium porosum*]; *Rhopalosiphoninus latysiphon*;
 [*Roepkea marchali*]; *Sitobion miscanthi*;
 [*Wahlgreniella nervata*]

Key to apterae on *Primula*:-

1. ANT PT/BASE less than 0.5. SIPH as inconspicuous pores. Cauda broadly rounded, not evident. Dorsal abdomen with wax glands (4 on each of ABD TERG 3–6, 2 on ABD TERG 7) *Thecabius auriculae*

HOST LISTS AND KEYS

- ANT PT/BASE more than 0.7. SIPH tubular. Cauda helmet-, tongue- or finger-shaped. No discrete wax glands 2
- 2. ANT 0.3–0.4× BL, with ANT PT/BASE 0.75–1.25. SIPH flangeless and with reduced aperture. ABD TERG 8 with a triangular supracaudal process *Cavariella aquatica*
- ANT more than 0.4× BL, with ANT PT/BASE more than 1.5. SIPH with flange and normal aperture. ABD TERG 8 without a supracaudal process 3
- 3. SIPH tapering or cylindrical with distal polygonal reticulation (at least 4–5 rows of closed cells) 4
- SIPH without distal polygonal reticulation (except when black with balloon-like swelling of distal part) 5
- 4. SIPH wholly dark, 1.4–1.9× cauda. ANT tubercles rather weakly developed *Sitobion miscanthi*
- SIPH mainly pale, 1.7–2.2× cauda. ANT tubercles well developed *Macrosiphum euphorbiae*
- 5. Cuticle of head smooth with ANT tubercles well developed, their inner faces smooth and divergent. ANT 0.9–1.4× BL 6
- Cuticle of head densely spiculose, or if smooth then ANT tubercles undeveloped or weakly developed and ANT less than 0.9×BL 8
- 6. SIPH clavate. ANT PT/BASE more than 6 (estimated from al.; apt. undescribed) *Amphorophora pawtincae*
- SIPH tapering/cylindrical. ANT PT/BASE less than 6 7
- 7. R IV+V 1.25–1.35× HT II and bearing 25–31 accessory hairs. Cauda with 10–13 hairs *Acyrtosiphon auriculae*
- R IV+V 1.0–1.25× HT II and bearing 8–12 accessory hairs. Cauda with 6–8 hairs *Acyrtosiphon primulae*
- 8. Cuticle of head densely spiculose, abdomen with dark dorsal markings and SIPH tapering/cylindrical 9
- Without that combination of characters go to key to polyphagous aphids, p. 1020
- 9. SIPH 1.8–2.3× cauda, 0.17–0.23× BL. R IV+V 1.2–1.7× HT II. ABD TERG 2–4 with a roughly horse-shoe-shaped patch *Neomyzus circumflexus*
- SIPH c.3× cauda, 0.23–0.25× BL. R IV+V 1.1–1.2× HT II. ABD TERG 2–4 with variably developed cross-bands or roughly quadrate patch *Neomyzus primulus**

Pringlea

P. antiscorbutica

Cruciferae

Aulacorthum solani; *Macrosiphum euphorbiae*;

Myzus ascalonicus

Use key to polyphagous aphids, p. 1020.

Prinsepia

P. sinensis

P. utilis

Rosaceae

Aphidura mordvilkoii, *prinsepiae*

[*Acyrtosiphon pisum*]; *Aphis gossypii*;

Tricaudatus polygoni

Key to apterae on *Prinsepia*:–

- Dorsum membranous. SIPH markedly swollen over distal 0.75 of length. ABD TERG 7 and 8 each with an unpaired rounded medial process *Tricaudatus polygoni*

- Dorsum extensively sclerotised. SIPH tapering. ABD TERG 7 and 8 without processes
Aphidura mordvilkoii or *prinsepieae*

(If neither combination of characters wholly applies then go to key to polyphagous aphids, p. 1020)

Priva*P. lappulacea***Verbenaceae***Aphis gossypii*; *Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Prosopis*P. glandulosa**P. stephaniana***Leguminosae***Macrosiphum ?euphorbiae**Aphis craccivora*

Use key to polyphagous aphids, p. 1020.

Prostanthera*P. nivea***Labiatae***Myzus persicae***Protasparagus see Asparagus****Prunella (incl. Brunella)***P. asiatica**P. grandiflora**P. vulgaris***Labiatae***Cryptomyzus taoi**Aphis brunellae*; *Aulacorthum solani**Aphis brunellae*, *nasturtii*; *Aulacorthum solani*;*Macrosiphum euphorbiae*; *Myzus ornatus*, *persicae*

Key to apterae on *Prunella*:-

- Dorsal body hairs long and thick, much longer than ANT BD III, and many or all of them with knobbed or expanded apices, and arising from tuberculate bases. ANT PT/BASE 9.0–10.5. SIPH swollen on distal part
Cryptomyzus taoi
 - Dorsal body hairs mostly shorter than BD III; pointed or blunt, or if with somewhat expanded apices then without tuberculate bases. ANT PT/BASE 1.7–6.2. SIPH swollen, tapering or cylindrical **2**
 - R IV+V 1.2–1.7× HT II. ANT tubercles weakly developed. ABD TERG 1 and 7 with marginal tubercles (MTu). Cauda pale
Aphis brunellae
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Prunus see Blackman and Eastop (1994)

Psamma see *Ammophila*

Psedera see *Parthenocissus*

Pseudechinolaena*Ps. polystachya***Gramineae***Ceratovacuna lanigera*; *Pseudoregma panicola*

Use key to apterae of grass-feeding aphids under *Digitaria*.

Pseudelephantopus see *Elephantopus*

Pseuderanthemum*Ps. atropurpureum***Acanthaceae***Aphis gossypii*

HOST LISTS AND KEYS

Pseudocydonia

Ps. sinensis

Rosaceae

Ovatus crataegarius

Pseudopanax

Ps. lessonii

Araliaceae

Aphis gossypii

Pseudorosularia

Ps. sempervivoides

Crassulaceae

Aphis sedi

Pseudosasa

Ps. japonica

Gramineae

Melanaphis bambusae; *Sitobion miscanthi*;
Takecallis arundinariae

A key to bamboo-feeding aphids was provided by Blackman and Eastop (1994).

Pseudoscleropodium

Ps. purum

Brachystegiaceae

[*Jacksonia papillata*]; *Muscaphis escherichi*, *musci*;
Pseudocaudella rubida

Use key to apterae of moss-feeding aphids under *Polytrichum*.

Psiadia

Ps. arabica

Ps. punctulata

Compositae

Myzus persicae

Brachycaudus helichrysi; *Macrosiphum euphorbiae*;

Myzus persicae

Use key to polyphagous aphids, p. 1020.

Psidium see Blackman and Eastop (1994)

Psilopogon see *Microstegium*

Psophocarpus

Ps. tetragonolobus

Leguminosae

Aphis craccivora

Psoralea

Ps. corylifolia

Ps. bituminosa

Ps. drupacea

Ps. macrostachya

Leguminosae

Acyrtosiphon kondoi; *Aphis craccivora*

Aphis craccivora, *cytisorum*

Aphis craccivora

Acyrtosiphon pisum

Use key to apterae on *Caragana*.

***Psychotria* (incl. *Ipecacuahna*, *Mapouria*, *Straussia*)**

Ps. alba

Ps. coronata

Ps. pubescens

Rubiaceae

[*Aphis* sp. (Leonard, 1972a:102)]

Aphis gossypii

Toxoptera aurantii

Use key to polyphagous aphids, p. 1020.

Ptarmica* see *Achillea*Pt. speciosa*=*Achillea cartilaginea**Pt. vulgaris*=*Achillea ptarmica****Ptelea****Pt. trifoliata****Pteleopsis****Pt. anisoptera****Pteranthus****Pt. dichotomus****Pteretis* see *Matteucia******Pteridium****Pt. aquilinum* (incl. var. *latiusculum*)*Pt. caudatum**Pt. latiusculum* see *aquilinum**Pteridium* sp.**Rutaceae***Aphis fabae*; [*Mesocallis pteleae*]; [*Sipha maydis*]**Combretaceae***Paoliella pteleopsidis***Illecebraceae***Aphis craccivora***Dennstaedtiaceae***Amphorophora ampullata*, *ampullata* ssp. *bengalensis*;
Aphis gossypii, *nasturtii*, [*pteridisaquilinoides* Rafinesque
(invalid)]; *Idiopterus nephrolepidis*;*Macrosiphum clydesmithi*, *osmaroniae*, *ptericolens*,
pteridis, *rhamni*; *Mastopoda pteridis*; *Shinjia orientalis*
Aphis gossypii; *Macrosiphum cyatheae*, *ptericolens*;
*Toxoptera aurantii**Aulacorthum solani*Use key to fern-feeding aphids under *Polypodium*.***Pteris****Pt. aquilina* see *Pteridium**Pt. cretica**Pt. ensiformis**Pt. ovalifolia**Pt. tremula**P. vittata**Pteris* spp.**Pteridaceae***Idiopterus nephrolepidis**Micromyzus niger**Shinjia orientalis**Idiopterus nephrolepidis**Micromyzella filicis**Amphorophora ampullata* ssp. *bengalensis*;*Macrosiphum rhamni*;[*Eriosoma longipilosum* (vagr. al. sexup.)]Use key to fern-feeding aphids under *Polypodium*.***Pterocarpus*, *Pterocarya* see Blackman and Eastop (1994)*****Pterocephalus****Pt. lasiospermus***Dipsacaceae***Macrosiphum euphorbiae****Pterocypsela****Pt. formosana**Pt. indica***Compositae***Uroleucon formosanum**Aulacorthum solani*; *Hyperomyzus carduellinus*, *lactucae*;*Uroleucon formosanum*, *hasanicum*, *lactucicola*, *picridis*,
sonchi

HOST LISTS AND KEYS

Pt. laciniata
Pt. raddeana
Pt. triangulata

[*Aphis lactucae* Shinji, 1922]
Uroleucon formosanum, fuchuense
Uroleucon formosanum

Use key to apterae on *Lactuca*.

Pterolobium

Pterolobium sp.

Aphis craccivora

Leguminosae

Pterostyrax see Blackman and Eastop (1994)

Pterotheca see *Crepis*

Ptilium

Pt. crista-castrensis

Muscaphis escherichi

Brachytheciaceae

(or use key to apterae of moss-feeding aphids under *Polytrichum*)

Ptiloria see *Stephanomeria*

Ptilostemon

Pt. afer

Pt. casabonae

Brachycaudus cardui

Aphis fabae

Compositae

Key to apterae on *Ptilostemon*:-

- Cauda helmet-shaped, not longer than its basal width in dorsal view. Dorsal abdomen with an extensive solid black shield *Brachycaudus cardui*
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Ptilotrichum see *Alyssum*

Ptychotis

Pt. saxifraga

Dysaphis apiifolia

Umbelliferae

***Puccinellia* (incl. *Atropis*)**

P. distans

P. maritima

Atheroides brevicornis; *Paracletus cimiciformis*;

Tetraneura ulmi

Atheroides brevicornis; *Forda formicaria*;

Sipha elegans, glyceriae, littoralis

Gramineae

Use key to apterae of grass-feeding aphids under *Digitaria*.

Pueraria

P. javanica

P. lobata

P. phaseoloides

Aphis glycines

Aphis craccivora

Aphis craccivora, glycines

Leguminosae

Use key to apterae on *Glycine*.

Pulicaria*P. crispa**P. dysenterica**P. odora**P. sicula**P. undulata**P. vulgaris**Pulicaria* sp.**Compositae***Aphis gossypii*; *Brachyunguis/Xerobion* sp. (N Yemen, BMNH colln); *Capitophorus inulae**Aphis fabae*, *pseudocardui*; *Aulacorthum solani*; *Brachycaudus helichrysi*; *Myzus ornatus*, *persicae*;*Ovatus inulae*; *Uroleucon pulicariae*, *siculum**Aphis (Protaphis)* sp. (Corsica, BMNH colln)*Uroleucon inulae**Hyperomyzus lactucae**Brachycaudus helichrysi*; *Uroleucon pulicariae**Pemphigus bursarius*Key to apterae on *Pulicaria*:-

1. SIPH dusky or dark over at least half of length, with a distal zone of reticulation comprising numerous (more than 100) small polygonal cells 2
 - SIPH pale or dark without polygonal reticulation, or pale with distal reticulation comprising fewer, larger cells 4
2. R IV+V 1.8–2.8× HT II. SIPH dusky with paler basal part *Uroleucon inulae*
 - R IV+V 1.1–1.4× HT II. SIPH wholly dark 3
3. Cauda black like SIPH. Tibiae mainly dark, with middle section sometimes somewhat paler *Uroleucon siculum*
 - Cauda pale. Tibiae mainly pale, dark only at base and apex *Uroleucon pulicariae*
4. Dorsal hairs long and thick, with distinctly capitate apices and tuberculate bases. ABD TERG 1–4 each with 12–14 capitate hairs, the longest 2–3× ANT BD III *Capitophorus inulae*
 - Dorsal hairs blunt, pointed or only slightly expanded apically, with or without tuberculate bases, and usually shorter. ABD TERG 1–4 each with fewer hairs 5
5. R IV+V 2.3–3.0× HT II, and bearing 17–26 accessory hairs. Head with a well-developed rather scabrous median frontal tubercle, and also with rounded scabrous forwardly directed processes on ANT tubercles *Ovatus inulae*
 - R IV+V 0.8–1.7× HT II, and bearing less than 10 accessory hairs. Head without a well-developed scabrous median frontal process 6
6. SIPH markedly clavate, and 1.4–1.7× cauda. ANT III with 5–29 rhinaria. Head smooth, ANT tubercles moderately well developed, with smooth divergent inner faces *Hyperomyzus lactucae*
 - SIPH tapering, cylindrical or clavate, but **if** clavate then more than 1.7× cauda, and other characters also do not apply 7
7. ANT PT/BASE less than 0.3 or more than 1.5. ABD TERG 1 and 7 with or without MTu, but if with then SIPH are longer than R IV+V go to key to polyphagous aphids, p. 1020
 - ANT PT/BASE 0.4–1.2. ABD TERG 1 and 7 with well-developed MTu. SIPH shorter than R IV+V 8
8. ANT PT/BASE 1.0–1.2. ANT without sec. rhinaria. R IV+V 1.4–1.6× HT II. Hairs on ABD TERG 1–3 are 10–18µm long. SIPH c.2× longer than their basal widths. Cauda about as long as its basal width in dorsal view *Aphis (Protaphis)* sp. (Corsica, BMNH colln)
 - ANT PT/BASE 0.4–0.6. ANT III or III–IV with rhinaria. R IV+V 1.15–1.25× HT II. Hairs on ABD TERG 1–3 are 35–45µm long, with tuberculate bases. SIPH only about as long as their basal widths, and cauda much shorter than its basal width in dorsal view *Brachyunguis/Xerobion* sp. (N Yemen, BMNH colln).

Pulmonaria

P. angustifolia

P. longifolia

P. mollissima

P. officinalis

P. saccharata

Pulmonaria sp.

Boraginaceae

Brachycaudus helichrysi

Amphorosiphon pulmonariae

[*Amphorophora ampullata*]; *Brachycaudus helichrysi*

Amphorosiphon pulmonariae;

Aphis fabae, *gossypii*, *nasturtii*; *Aulacorthum langei*;

Brachycaudus cardui, *helichrysi*; *Macrosiphum gei*;

Myzus ascalonicus, *persicae*; [*Uroleucon jaceae*]

Aphis symphyti; *Aulacorthum solani*;

Myzus ascalonicus, *persicae*

Brachycaudus jacobi

Key to apterae on *Pulmonaria*:-

(*Macrosiphum euphorbiae* is also included as it can probably feed on *Pulmonaria* and is likely to be confused with *M. gei*.)

1. Cauda helmet-shaped, a little shorter than its basal width in dorsal view 2
 – Cauda tongue- or finger-shaped, much longer than its basal width 4
2. Dorsum pale, membranous. SIPH pale, smooth, 0.8–2.0× cauda *Brachycaudus helichrysi*
 – Dorsum with an extensive black sclerotic shield. SIPH dark, imbricated, 1.7–3.6× cauda 3
3. ANT III with 4–11 rhinaria. R IV+V 0.135–0.175 mm. Dorsal shield with a distinct pattern of spinulose imbrications *Brachycaudus jacobi*
 – ANT III without rhinaria (except in alatiform specimens). R IV+V (0.175–) 0.18–0.24 mm. Dorsal shield almost smooth or with indistinct imbrications *Brachycaudus cardui*
4. SIPH dark and markedly clavate. Dark ante- and postsiphuncular sclerites present, the latter usually joined by a bridge across ABD TERG 7. ANT III with more than 30 rhinaria. R IV+V with more than 40 accessory hairs *Amphorosiphon pulmonariae*
 – SIPH if dark then not clavate. No ante- nor postsiphuncular sclerites. ANT III with 0–10 rhinaria. R IV+V with 2–15 accessory hairs 5
5. SIPH with a subapical zone of polygonal reticulation (at least 4–5 rows of closed cells). ANT tubercles well-developed, with inner faces smooth and divergent 6
 – SIPH without subapical polygonal reticulation. ANT tubercles if well developed then with inner faces steep-sided, and scabrous or spiculose 7
6. Longest hair on ABD TERG 8 is 38–63 μm, 0.6–1.4× ANT BD III. Anterior half of subgenital plate usually (77%) with only 2 hairs (18% with 3, 5% with 4–6 hairs) *Macrosiphum euphorbiae*
 – Longest hair on ABD TERG 8 is 66–106 μm, 1.4–2.0× ANT BD III. Anterior half of subgenital plate with 2–11 hairs, usually (77%) with 4–8 hairs *Macrosiphum gei*
7. SIPH pale, broad at base and cylindrical/tapering on distal part, 0.20–0.25× BL. ANT PT/BASE 4.0–5.5 8
 – Without that combination of characters go to key to polyphagous aphids, p. 1020
8. ANT III almost always (98%) without rhinaria. (ANT III of al. with 0–3 rhinaria). R IV+V with 8–10 accessory hairs *Aulacorthum langei*
 – ANT III almost always (98%) with 1–2 (–3) small rhinaria near base. (ANT III of al. with 5–26 rhinaria). R IV+V with 5–7(–8) accessory hairs *Aulacorthum solani*

Pulsatilla

P. cernua
P. coronaria
P. davurica
P. grandis
P. halleri (incl. var. *stiriaca*)
P. koreana
P. montana
P. multifida
P. nigricans
P. patens
P. pratensis
P. pratensis ssp. *nigricans*
 see *nigricans*
P. turczaninowii
P. vulgaris
Pulsatilla sp.

Ranunculaceae

Aphis montanicola
Aphis triglochinis; *Aulacorthum solani*
Aphis montanicola
Aulacorthum solani
Aphis montanicola
Aphis gossypii
Aphis montanicola
Aphis pulsatillicola
Aphis pulsatillicola
Aphis montanicola
Aphis montanicola

Aphis montanicola, pulsatillaephaga
Aphis montanicola; *Myzus ascalonicus*
Macrosiphum euphorbiae

See key to apterae on *Anemone* and *Pulsatilla*, under *Anemone*.

Punica

P. granatum

Lythraceae

Aphis achyranthi, craccivora, fabae, gossypii, punicae, spiraeicola;
Brachycaudus helichrysi; [*Hysteroneura setariae*];
 [*Micromyzodium filicium*]; *Myzus ornatus, persicae*;
Neomyzus circumflexus; *Toxoptera aurantii*

Key to apterae on *Punica*:-

1. ANT tubercles weakly developed **and** cauda tongue-shaped **and** ABD TERG 1 and 7 with marginal tubercles (MTu) (all these conditions must apply) 2
- **Either** ANT tubercles well-developed **or** cauda helmet-shaped and not longer than its basal width. ABD TERG 1 and 7 without MTu go to key to polyphagous aphids, p. 1020
2. Cauda pale, or dusky but paler than SIPH 3
- Cauda and SIPH both very dark 4
3. SIPH often paler at base, and usually less than 1.5× cauda, which has 7–9 hairs. (Al. often with 1 or more rhinaria on ANT IV) *Aphis punicae*
- SIPH uniformly dark, and usually more than 1.5× cauda, which has 4–7(–8) hairs. (Al. without rhinaria on ANT IV) *Aphis gossypii*
4. Many of hairs on hind femur and dorsal side of hind tibia with finely pointed apices, longer than trochantrofemoral suture. Cauda with 7–24 hairs 5
- Hairs on hind femur and dorsal side of hind tibia shorter than trochantrofemoral suture. Cauda with 4–9 hairs 7
5. Stridulatory apparatus present, consisting of a conspicuous pattern of ridges on ventrolateral areas of abdominal sternites 5 and 6, and a row of short, peg-like hairs on the hind tibia *Toxoptera aurantii*
- Stridulatory apparatus not present 6

HOST LISTS AND KEYS

6. SIPH 0.75–1.1× ANT III and 1.8–2.7× ANT BASE VI. ANT PT 0.27–0.46 mm, and ANT PT/BASE 2.1–3.8 (mostly 2.4–3.6). Cauda hardly constricted near midlength and bearing 11–24 hairs. ABD TERG 7 and 8 with dark bands and dark dorsal markings also anterior to SIPH. (Al. with 10–23 rhinaria on ANT III) *Aphis fabae*
- SIPH 1.1–1.45× ANT III and 2.8–3.4× ANT BASE VI. ANT PT 0.22–0.29 mm, and ANT PT/BASE 2.1–2.6. Cauda usually clearly constricted near midlength and bearing 6–15 (usually 9–11) hairs. Abdomen without any dark markings. (Al. with 4–12 rhinaria on ANT III) *Aphis spiraeicola*
7. Dorsum with an extensive dark sclerotic patch. ABD TERG 8 with 2 hairs. SIPH more than 3× their basal widths. Longest hairs on ANT III shorter than BD III. (Al. with sec. rhin. distributed ANT III 3–8 only) *Aphis craccivora*
- Dorsum without an extensive dark sclerotic patch. ABD TERG 8 with 5–6 hairs. SIPH less than 3× their basal widths. Longest hairs of ANT III longer than BD III. (Al. with sec. rhin. distributed ANT III 16–20, IV 6–12, V 3–7) *Aphis achyranthi*

Purshia

P. tridentata

Rosaceae

Acyrtosiphon purshiae

Pycneus

P. mundtii

Cyperaceae

Aphis gossypii

Pyracantha

P. angustifolia

P. coccinea (incl. var. *lalandi*)

P. crenulata

P. koidzumii

Pyracantha spp.

Rosaceae

Aphis spiraeicola

Aphis pomi, *spiraeicola*; *Myzus persicae*

Aphis pomi, *spiraeicola*

Aphis gossypii, *spiraeicola*; *Toxoptera citricidus*

Eriosoma crataegi, *lanigerum*; *Toxoptera aurantii*

Key to apterae on *Pyracantha*:-

1. ANT PT/BASE less than 0.5. SIPH as pores with sclerotised rims. Wax glands present, each usually consisting of a ring of large facets around an undivided or partially divided central area **2**
- ANT PT/BASE more than 1. SIPH tubular, Wax glands not evident **3**
2. Maximum diameter of SIPH pore 80–160 μm. ANT III usually more than 1.25× ANT IV+V together *Eriosoma crataegi*
- Maximum diameter of SIPH pore less than 60 μm. ANT III usually less than 1.25× ANT IV+V together *Eriosoma lanigerum*
3. SIPH and cauda both black. Cauda finger-like, usually with a midway constriction. Dorsal abdomen without dark markings, and no stridulatory apparatus present **4**
- SIPH and cauda pale or dark, but if both are black then cauda is tongue-like without a constriction, and either dorsal abdomen has dark markings, or a stridulatory apparatus is present
go to key to polyphagous aphids, p. 1020
4. Marginal tubercles (MTu) present on ABD TERG 2–4. Cauda with 10–19 hairs (rarely less than 13). R IV+V more than 130 μm long *Aphis pomi*
- MTu absent from ABD TERG 2–4. Cauda with 7–15 hairs (rarely more than 12). R IV+V less than 120 μm long *Aphis spiraeicola*

Pyrethrum*P. cinerariaefolium**P. clusii* see *Tanacetum corymbosum**P. corymbosum**P. inodorum* see *Matricaria*
*recutita**P. leptophyllum**P. macrophyllum**P. millefoliatum**Pyrethrum* sp.**Compositae***Aphis fabae*; *Brachycaudus helichrysi*;
*Myzus persicae**Brachycaudus helichrysi**Aphis craccivora**Uroleucon pyrethri**Macrosiphoniella persequens*; *Macrosiphum pyrethri**Brachycaudus cardui*;*Macrosiphoniella caucasica*, *tanacetaria* ssp. *bonariensis*Key to apterae on *Pyrethrum*:-

1. SIPH as very short truncate cones, only 0.4–0.5× cauda, which is broadly triangular in dorsal view. ANT III with c.16–17 rhinaria, and IV usually with 1–2 rhinaria *Macrosiphum pyrethri**
- SIPH conical, cylindrical, tapering or clavate, at least 0.6× cauda, which is helmet-, tongue- or finger-shaped. ANT III with or without rhinaria, ANT IV always without **2**
2. SIPH with a distal zone of polygonal reticulation **3**
- SIPH without polygonal reticulation **7**
3. SIPH with reticulation restricted to subapical 0.1–0.2 of length **4**
- SIPH reticulated on distal 0.32–0.55 of length **5**
4. SIPH 1.7–2.2× cauda which bears 8–12 hairs. Dorsal scleroites and sclerites absent. ANT III with 1–10 rhinaria *Macrosiphum euphorbiae*
- SIPH 2.5–3.0× cauda which bears 16–20 hairs. Dorsal hairs arising from dark scleroites. Large crescent-shaped antesiphuncular present, as well as smaller, postsiphuncular sclerites. ANT III with 13–31 rhinaria *Uroleucon pyrethri**
5. SIPH mainly pale, only dusky/dark at apices, reticulated on distal 0.32–0.42, and 1.5–2.0× the pale cauda. ANT and legs mainly pale *Macrosiphoniella persequens*
- SIPH and cauda both dark. SIPH reticulated on distal 0.40–0.55, and 0.6–1.1× cauda. ANT and legs mainly or entirely dark **6**
6. ANT III with 12–32 rhinaria. Dorsal body hairs not arising from dark scleroites. Cauda with 26–32 hairs *Macrosiphoniella tanacetaria* (incl. ssp. *bonariensis*)
- ANT III with 5–7 rhinaria. Dorsal hairs all arising from well-developed dark sclerites/scleroites of varying size and shape. Cauda with 8 hairs *Macrosiphoniella caucasica*
7. Cauda helmet-shaped, not longer than its basal width. SIPH tapering, with a subapical annular incision. Spiracular apertures large and rounded **8**
- Cauda tongue- or finger-shaped, much longer than its basal width. SIPH tapering or swollen distally, without a subapical annular incision. Spiracular apertures reniform
go to key to polyphagous aphids, p. 1020
8. Dorsal abdomen with an extensive solid black shield. ANT III 0.31–0.47 mm, 2.4–3.4× HT II. R IV+V 0.17–0.24 mm. SIPH dark, imbricated, 1.7–3.4× cauda *Brachycaudus cardui*
- Dorsal abdomen without a black shield. ANT III 0.07–0.25 mm, 0.9–2.2× HT II. R IV+V 0.10–0.15 mm. SIPH pale, smooth, 0.8–2.0× cauda *Brachycaudus helichrysi*

HOST LISTS AND KEYS

Pyrola

P. chlorantha

P. elliptica

Ericaceae

Aulacorthum pirolacearum (= *rufum*?)

[*Macrosiphum pechumani*]

Pyrostegia

P. ignea

Bignoniaceae

Aulacorthum solani

Pyrrhopappus

P. carolinianus

Compositae

Uroleucon pseudambrosiae

***Pyrrhosia* (incl. *Cyclophorus*, *Drymoglossum*)**

P. lanceolatus

P. nummularifolius

P. piloselloides

Pyrrhosia sp.

Polypodiaceae

Micromyzus vandergooti

Micromyzus vandergooti

Micromyzus vandergooti

Macrosiphini gen. and sp. n. (BMNH, Taiwan)

Key to separate apterae of these two species:–

(Both have SIPH swollen in middle)

- SIPH black, cauda pale. Head pale with rather low ANT tubercles. ANT III without rhinaria. Dorsal abdomen without any dark sclerotisation *Micromyzus vandergooti*
- SIPH pale, cauda dark. Head dark with very well-developed ANT tubercles. ANT III with 3–4 rhinaria in a row on basal part. Dorsal abdomen with a dark central patch, and dark marginal, pre- and postsiphuncular sclerites Macrosiphini gen. and sp. n. (BMNH, Taiwan, leg. S.E. Halbert)

(or try key to fern-feeding aphids under *Polypodium*)

Pyrus see Blackman and Eastop (1994)

Qualea

Q. multiflora

Vochysiaceae

Aphis gossypii, *spiraecola*

Use key to polyphagous aphids, p. 1020.

Quamasia see *Camassia*

Quillaja

Q. saponaria

Rosaceae

Aphis marthae

Rabdosia see *Isodon*

Radicula see *Rorippa*

(*R. armoracia* see *Armoracia lapathifolia*)

Radiola

R. linoides

Linaceae

Aphis fabae

Ramischia see *Orthilia*

Ramona see *Salvia*

Randia

- R. aculeata*
- R. dasycarpa*
- R. mitis*
- R. sinensis*
- R. spinosa*

Use key to polyphagous aphids, p. 1020.

Ranunculus (incl. *Batrachium*)

- R. acris* (*acer*) (incl. *strigulosus*, *stevanii* auct.)

R. angustifolius

R. aquatilis

R. arvensis

R. asiaticus

R. auricomus

R. biternatus

R. bulbosus (incl. ssp. *aleae*=*occidentalis*)

R. californicus

R. cortusaefolius

R. diffusus

R. flammula (incl. *ovalis*)

R. fluitans

R. glaber

R. glacialis

R. gramineus

R. hirtellus

R. japonicus

R. lanuginosus

R. lingua

Rubiaceae

- Aphis spiraecola*; *Toxoptera aurantii*
- Aphis spiraecola*
- Aphis spiraecola*; *Toxoptera aurantii*
- Toxoptera aurantii*
- Myzus persicae*; *Toxoptera aurantii*

Ranunculaceae

- Acyrtosiphon* sp. nr *malvae* (Switzerland, BMNH, leg. W. Meier);
- Aphis fabae*, *nasturtii*, *spiraecola*; [*Aploneura lentisci*];
- Aulacorthum solani*; *Dysaphis ranunculi*;
- Macrosiphum euphorbiae*;
- Myzus ascalonicus*, *ornatus*, *persicae*;
- Neomyzus circumflexus*; *Rhopalosiphum nymphaeae*;
- Thecabius affinis*; *Tubaphis ranunculina*
- Macrosiphum euphorbiae*
- Macrosiphum euphorbiae*; *Myzus ornatus*;
- Rhopalosiphum nymphaeae*
- Aphis fabae*; *Aulacorthum solani*;
- Dysaphis ranunculi*;
- Myzus persicae*; *Sitobion miscanthi*; *Thecabius affinis*
- Aphis fabae*; *Myzus persicae*
- Macrosiphum ranunculi*; *Thecabius affinis*
- Aulacorthum solani*
- Aphis fabae*; *Aulacorthum solani*; *Dysaphis ranunculi*;
- Myzus ascalonicus*, *ornatus*, *persicae*;
- Neomyzus circumflexus*; *Protrama ranunculi*;
- Rhopalosiphum padi*; *Thecabius affinis*, *populiconduplifolius*
- Thecabius affinis*
- Aphis solanella*; *Aulacorthum solani*
- Aulacorthum solani*
- Aphis nasturtii*; *Macrosiphum euphorbiae*; *Thecabius affinis*
- Rhopalosiphum nymphaeae*
- Thecabius affinis*
- [*Nasonovia brevipes*]
- Macrosiphum euphorbiae*
- Thecabius affinis*
- Cavariella japonica*, *nipponica*, *salicicola*; *Thecabius affinis*;
- Sappaphis ranunculi*; *Sitobion akebiae*
- Aulacorthum solani*
- Aphis nasturtii*, *triglochinis*

HOST LISTS AND KEYS

<i>R. lyalli</i>	<i>Aulacorthum solani</i>
<i>R. montanus</i>	<i>Thecabius affinis</i>
<i>R. multifidus</i>	<i>Aulacorthum solani</i>
<i>R. muricatus</i>	<i>Dysaphis ranunculi</i>
<i>R. occidentalis</i> see <i>bulbosus</i>	
<i>R. propinquus</i>	<i>Tubaphis ranunculina</i>
<i>R. pyrenaicus</i>	<i>Macrosiphum euphorbiae</i>
<i>R. quelpaertensis</i>	<i>Thecabius affinis</i>
<i>R. recurvatus</i>	<i>Neomyzus circumflexus</i>
<i>R. repens</i>	<i>Aphis nasturtii</i> ; <i>Aulacorthum solani</i> ; <i>Dysaphis</i> [<i>annulata</i>], <i>ranunculi</i> ; <i>Macrosiphum stellariae</i> ; <i>Myzus ascalonicus</i> ; <i>Protrama</i> [<i>radicis</i>], <i>ranuncululi</i> ; <i>Thecabius affinis</i> ; <i>Tubaphis ranunculina</i>
<i>R. scleratus</i>	<i>Aphis nasturtii</i> ; [<i>Lipaphis erysimi</i>]; <i>Macrosiphum euphorbiae</i> ; <i>Myzus ornatus</i> ; <i>Rhopalosiphum nymphaeae</i> ; <i>Thecabius affinis</i>
<i>R. serbicus</i>	<i>Aphis fabae</i>
<i>R. steveni</i>	<i>Macrosiphum euphorbiae</i>
<i>R. sundaicus</i>	<i>Neomyzus circumflexus</i>
<i>R. ternatus</i>	<i>Thecabius populiconduplifolius</i>
<i>R. trichophyllus</i>	<i>Rhopalosiphum nymphaeae</i>
<i>R. velutinus</i>	<i>Protrama ranunculi</i> ; <i>Tubaphis ranunculina</i>
<i>R. vernyi</i> (var. <i>japonicus</i>)	<i>Tubaphis ranunculina</i>
<i>Ranunculus</i> spp.	<i>Abstrusomyzus phloxae</i> ; [<i>Aleurodaphis blumeae</i>]; <i>Aphis middletonii</i> , <i>montanicola</i> ; <i>Brachycaudus helichrysi</i> ; [<i>Macrosiphum centranthi</i>]; <i>Nasonovia ranunculi</i> ; <i>Tubaphis clematophila</i>

Key to apterae on *Ranunculus*:-

1. HT II greatly elongated, 0.5–0.65× hind tibia. SIPH as pores on dark sclerites. All apt. alatifform with dark dorsal cross bands and marginal sclerites *Protrama ranunculi*
- HT II of normal length. SIPH tubular or absent. Dorsum with or without dark markings **2**
2. ANT PT/BASE less than 0.5. Eyes of only 3-facets. SIPH absent. Dorsal wax gland plates (Figure 45a) present on all segments, with 6 per segment on meso- and metanotum and ABD TERG 1–7
Thecabius affinis (incl. *Th. populiconduplifolius*)
- ANT PT/BASE more than 1.5. Eyes multifaceted. SIPH tubular. No discrete wax glands **3**
3. Cauda semicircular, pentagonal, helmet-shaped or bluntly triangular, shorter than or not more than 1.2× longer than its basal width in dorsal view **4**
- Cauda tongue- or finger-shaped, more than 1.25× its basal width **7**
4. Cauda bluntly triangular, with 10 or more hairs. ABD TERG 7 with marginal tubercles (MTu)
Aphis middletonii
- Cauda either broadly rounded, semicircular, pentagonal or helmet-shaped, with 4–7 hairs. ABD TERG 7 usually without MTu **5**
5. SIPH pale, legs mainly pale. Tergum membranous. Spiracular apertures large and rounded. Head without spinal tubercles (STu), and MTu also usually absent *Brachycaudus helichrysi*
- SIPH dark, legs mainly dark. Tergum with more-or-less extensive sclerotisation. Spiracular apertures reniform. Head with a pair of STu, and MTu present at least on ABD TERG 1–5 **6**

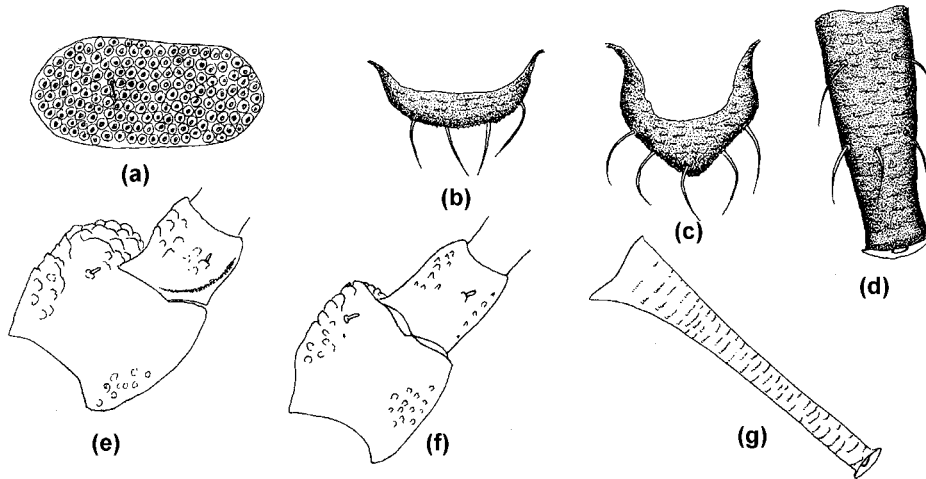


Figure 45 Apterae on *Ranunculus*. (a) Dorsal abdominal wax plate of *Thecabius affinis*, (b) cauda of *Sappaphis ranunculi*, (c) cauda of *Dysaphis ranunculi*, (d) SIPH of *Sappaphis ranunculi*, (e) ANT I and II of *Tubaphis clematophila* (dorsal side), (f) same for *Tubaphis ranunculina*, (g) SIPH of *T. ranunculina*.

6. SIPH bearing 5–8 hairs (Figure 45d). Hairs on dorsal body, ANT and legs 2.5–3.5× ANT BD III. Cauda broadly rounded, much shorter than its basal width in dorsal view (Figure 45b) *Sappaphis ranunculi*
- SIPH without hairs. Hairs on dorsal body, ANT and legs variable in length, but maximally 2× ANT BD III and often much shorter. Cauda helmet-shaped/pentagonal, about as long as its basal width (Figure 45c) *Dysaphis ranunculi*
7. SIPH with subapical polygonal reticulation (at least 4–5 rows of closed polygonal cells) **8**
- SIPH without polygonal reticulation **11**
8. SIPH wholly dark, 1.4–1.9× cauda. Hairs on ANT III less than 0.5× BD III *Sitobion akebiae* (or *miscanthi*)
- SIPH mainly pale, often darker towards apices, 1.7–2.2× cauda. Hairs on ANT III more than 0.5× BD III **9**
9. ANT PT/BASE c.3. ANT III with 7–10 rhinaria. Cauda with 12–17 hairs *Macrosiphum ranunculi**
- ANT PT/BASE more than 5. ANT III with 1–10 rhinaria (usually less than 7). Cauda with 8–15 hairs **10**
10. Femora usually with a dark spot or patch near apices. ABD TERG 2–3 with longest hair 26–56µm, usually as long as or longer than ANT BD III. Subgenital plate with 2–13 hairs in addition to those on posterior margin *Macrosiphum stellariae*
- Femora pale or only slightly dusky at apices. ABD TERG 2–3 with longest hair 21–37µm, usually shorter than ANT BD III. Subgenital plate with 2(–4) hairs on anterior part *Macrosiphum euphorbiae*
11. Cauda with a constriction near base. SIPH pale, tapering or cylindrical, rather straight, and with very coarse imbrication. Head spiculose, dorsal abdomen without dark markings **12**
- Cauda not constricted near base, and other characters not in that combination **13**
12. ANT I with a rounded, scabrous process at inner apex (Figure 45e). SIPH tapering on distal half, with diameter of flange less than diameter at midlength. Mesosternal furca sessile *Tubaphis clematophila*

HOST LISTS AND KEYS

- ANT I not extended at inner apex (Figure 45f). SIPH cylindrical on distal half or slightly flared apically, with large flange of diameter greater than diameter at midlength (Figure 45g). Mesosternal furca with a distinct broad basal stem *Tubaphis ranunculina*
- 13.** Thoracic spiracles large and rounded, much larger than abdominal ones. ANT III with c. 15–17 rhinaria in a row along its whole length. R IV+V with c.10–11 accessory hairs. SIPH 0.9–1.0× cauda, which has a midway constriction and bears 5 hairs *Nasonovia ranunculi*
- Thoracic spiracles similar in size and shape to abdominal ones, ANT III with 0–4 rhinaria, and other characters not in that combination **14**
- 14.** Dorsal abdomen with a pattern of bead-like spicules arranged in polygons. SIPH clavate *Rhopalosiphum nymphaeae*
- Dorsal abdomen without a pattern of spicules. SIPH cylindrical, tapering or clavate **15**
- 15.** ABD TERG 8 with a posteriorly projecting process above cauda; in some species reduced to a small, warty, knob in the center of ABD TERG 8, with 2 associated hairs **16**
- No supracaudal process, nor are there 2 hairs on ABD TERG 8 close together and associated with a warty knob **18**
- 16.** ANT PT/BASE 1.4–2.0. Process on ABD TERG 8 is a small knob. SIPH thick, tapering/cylindrical, or with only slight subapical swelling *Cavariella japonica*
- ANT PT/BASE 0.6–1.33. Process on ABD TERG 8 projecting back over cauda. SIPH clavate **17**
- 17.** R IV+V 1.05–1.2× HT II. SIPH short and stout, narrowing only near base *Cavariella salicicola*
- R IV+V 1.3–1.5× HT II. SIPH with narrower basal stem extending over c.0.33 of length *Cavariella nipponica*
- 18.** ANT PT/BASE 1.1–1.73. SIPH pale and 0.7–1.3× cauda *Aphis triglochis*
- Without that combination; if ANT PT/BASE less than 1.8 then SIPH are dark and/or more than 1.5× cauda **19**
- 19.** ABD TERG 1 and 7 with large marginal tubercles (MTu). Marginal hairs on ABD TERG 1 are 0.3–0.6× diameter of adjacent MTu. (SIPH dark, R IV+V 1.2–1.5× HT II, ANT PT/BASE 1.6–2.3) *Aphis montanicola*
- ABD TERG 1 and 7 with or without MTu, but if with MTu then marginal hairs on ABD TERG 1 are 0.7–2.8× diameter of MTu on that segment. (SIPH pale or dark, R IV+V 0.8–1.4× HT II, ANT PT/BASE 1.7–5.3) go to key to polyphagous aphids, p. 1020

Rapanea

Rapanea guianensis

Myrsinaceae

Toxoptera aurantii

Raphanus

R. acanthiformis see *R. sativus*

R. landroides

R. macropoda

R. raphanistrum

Cruciferae

Brevicoryne brassicae

Myzus persicae

Aphis fabae, *nasturtii*, *spiraecola*; *Brevicoryne brassicae*;
Lipaphis erysimi, *pseudobrassicae*;

Macrosiphum euphorbiae; *Myzus persicae*;

Neomyzus circumflexus; *Pemphigus populitransversus*;

Smynthuroides betae

R. sativus (incl. *acanthiformis*)

[*Akkaia bengalensis*, *sikkimensis*];
Aphis craccivora, *gossypii*, *nasturtii*, *spiraecola*;
Aulacorthum solani; *Brevicoryne brassicae*;
Lipaphis erysimi, *pseudobrassicae*;
Macrosiphum euphorbiae;
Myzus ascalonicus, [*dycei*], *ornatus*, *persicae*;
Rhopalosiphum [nymphaeae], [*padi*]; *Uroleucon compositae*
[*Myzus certus*]; [*Neotoxoptera sungkangensis*]

Raphanus spp.

Use key to apterae on *Brassica*.

Raphia see Blackman and Eastop (1994)

Raphiolepis see *Rhaphiolepis*

Rapistrum

R. rugosum

Cruciferae

Brevicoryne brassicae; *Myzus persicae*

Use key to apterae on *Alliaria*.

Ratibida

R. columnaris

Aphis ornata

R. columnifera

Myzus ornatus

Compositae

Key to apterae on *Ratibida*:-

- SIPH dark, shorter than R IV+V, 0.7–1.0× the dark broadly conical cauda, which bears 8–10 hairs. ABD TERG 1 and 7 with large marginal tubercles. Abdomen with variable dark dorsal sclerotisation, most developed on ABD TERG 4–5 *Aphis ornata*
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Rauwolfia

R. densiflora

Toxoptera aurantii

R. inebrians

Sitobion halli

R. lamarkii

Aphis spiraecola

R. nitida

Aphis craccivora

R. tetraphylla

Aphis craccivora, *gossypii*, *spiraecola*

R. vomitoria

Sitobion halli, *krahi* (?)

Rauwolfia spp.

[*Clethrobius dryobius*]

Apocynaceae

Key to apterae on *Rauwolfia*:-

1. SIPH with a subapical zone of polygonal reticulation **2**
 - SIPH without polygonal reticulation go to key to polyphagous aphids, p. 1020
2. Longest posterior dorsal cephalic hairs (between eyes) less than 18µm long. ANT III-VI mainly pale/dusky with dark segmental apices. R IV+V 0.8–1.05× HT II. SIPH dark distally, with polygonal reticulation on distal 0.2 or less *Sitobion halli*
 - Longest posterior dorsal cephalic hairs more than 18µm long. ANT III-VI black except at base of III. R IV+V 1.05–1.2× HT II. SIPH dark except at base, with polygonal reticulation on more than 0.3 of length *Sitobion krahi*

HOST LISTS AND KEYS

Ravenala **Strelitziaceae**
R. madagascariensis *Pentalonia nigronervosa*

Reaumuria **Tamaricaceae**
R. hirtella ?*Xerobion* sp. (Egypt, BMNH colln)

Reboudia **Cruciferae**
R. pinnata *Myzus persicae*

Rechsteineria see *Sinningea*

Reevesia **Sterculiaceae**
R. thyrsoidea *Myzus persicae*

Rehmannia **Scrophulariaceae**
R. glutinosa *Rhopalosiphum nymphaeae*
Rehmannia sp. *Macrosiphum euphorbiae*

Key to apterae on *Rehmannia*:-

- Dorsal cuticle with a pattern of spicules arranged in polygons, with 1–3 spicules in the center of each polygon. SIPH clavate, dusky/dark, without imbrication *Rhopalosiphum nymphaeae*
- Dorsal cuticle without spicules arranged in polygons. SIPH not clavate (or if clavate then pale and with imbrication) go to key to polyphagous aphids, p. 1020

Reichardia (incl. *Picridium*) **Compositae**
R. picroides *Uroleucon cichorii, hypochoeridis, sonchi*
R. tingitana *Hyperomyzus carduellinus, lactucae*
R. vulgare *Uroleucon sonchi*

Key to apterae on *Reichardia*:-

1. SIPH pale, markedly swollen, and without polygonal reticulation 2
- SIPH dark, not swollen, with distal zone of polygonal reticulation 3
2. Hairs on ABD TERG 8 are 8–19 µm long, and on ANT tubercles 6–11 µm. Secondary rhinaria distributed ANT III 11–29, IV (0–)1–16, V 0(–9). ANT PT/BASE 4.3–5.6. ANT PT 1.6–2.3× cauda *Hyperomyzus carduellinus*
- Hairs on ABD TERG 8 are 30–50 µm long, and on ANT tubercles 18–30 µm. Secondary rhinaria distributed ANT III 4–20, IV 0 (–1), V 0. ANT PT/BASE 4.8–7.4. ANT PT 2.0–3.0× cauda *Hyperomyzus lactucae*
3. Hairs on ABD TERG 1–5 not placed on dark scleroites. Anterior sclerites absent or vestigial. R IV+V 0.73–0.88× HT II *Uroleucon sonchi*
- Hairs on ABD TERG 1–5 placed on dark scleroites. Crescent-shaped anterior sclerites present. R IV+V 0.84–1.33× HT II 4
4. R IV+V 1.17–1.33× HT II. ANT III with 56–97 rhinaria *Uroleucon cichorii*
- R IV+V 0.84–1.08× HT II. ANT III with 20–85 rhinaria *Uroleucon hypochoeridis*

Remijia (incl. *Acrosynanthus*) **Rubiaceae**
R. laevifolia *Toxoptera aurantii*

Reseda*R. complicata**R. lutea**R. luteola**R. muricata**R. odorata**R. orientalis**Reseda* sp.**Resedaciae**[*Anoecia corni*]; *Aphis fabae*; [*Therioaphis trifolii*]*Aphis craccivora, fabae; Myzus persicae*[*Acyrtosiphon pisum*]; [*Cavariella aegopodii*];[*Uroleucon cichorii*]*Myzus persicae**Aphis fabae*, [*introducata* Walker, 1849 (nomen dubium)]*Myzus persicae**Brevicoryne brassicae*Key to apterae on *Reseda*:-

- ANT III 2.5–3.7× SIPH. SIPH short and thick, 0.8–1.0× the broadly triangular cauda, which bears 6–9 hairs. Dorsal abdomen with variable dark markings *Brevicoryne brassicae*
- ANT III less than 2× SIPH, and other characters not in that combination
go to key to polyphagous aphids, p. 1020

Retama*R. roetum**R. sphaerocarpa* see *Genista**Retama* sp.**Leguminosae***Aphis craccivora**Acyrtosiphon gossypii*Use key to apterae on *Vigna*.**Reynoutria***R. aubertii* see *Fallopia baldshuanica**R. elliptica**R. cuspidatum* see *Fallopia japonica**R. sachalinensis* see *Fallopia***Polygonaceae***Macchiatella itadori***Rhabdadenia***Rh. biflora**Aphis gossypii***Apocynaceae****Rhabdosia** error for *Rabdosia* (see *Isodon*)**Rhacomitrium***Rh. canescens**Rhacomitrium* sp.[*Nurudea meitanensis*]*Myzodium modestum***Grimmiaceae**(or use key to apterae of moss-feeding aphids under *Polytrichum*)**Rhagadiolus***Rh. stellatus**Hyperomyzus lactucae, picridis*;*Uroleucon hypochoeridis, mieraе, picridis***Compositae**Key to apterae on *Rhagadiolus*:-

1. SIPH pale, markedly swollen, and without polygonal reticulation 2
- SIPH dark, not swollen, with distal zone of polygonal reticulation 3
2. R IV+V 1.45–1.8× HT II, with 8–12 accessory hairs *Hyperomyzus picridis*
- R IV+V 0.85–1.05× HT II, with 6–9 accessory hairs *Hyperomyzus lactucae*

HOST LISTS AND KEYS

3. R IV+V 0.84–1.08× HT II *Uroleucon hypochoeridis*
 – R IV+V 1.19–1.84× HT II 4
4. R IV+V 0.24–0.32 mm long, 1.50–1.84× HT II. ABD TERG 2–5 regularly with well-developed marginal tubercles (MTu) on the marginal sclerites *Uroleucon picridis*
 – R IV+V 0.19–0.25 mm long, 1.19–1.58× HT II. ABD TERG 2–5 rather irregularly with small MTu (rarely more than 3 in total) *Uroleucon miera*

Rhamnus see Blackman and Eastop (1994)

Rhamphicarpa

Rh. fistulosa

Scrophulariaceae

Aphis gossypii

Rhaphiolepis

Rh. indica

Rosaceae

Aphis craccivora, pomi; Illinoia macgillivrayae; Myzus persicae; Nippolachnus piri; Rhopalosiphoninus staphyleae; Sinomegoura photiniae

Rh. japonica see *umbellata*

Rh. umbellata (incl. *japonica*)

Aphis gossypii; Nippolachnus piri; Sinomegoura photiniae

Rh. vinifera

[*Cerataphis brasiliensis*]

Rhaphiolepis sp.

Aphis gossypii

Key to apterae on *Rhaphiolepis*:-

(*Aphis spiraeicola* is included in the key as it is likely to occur on this plant and might be confused with *A. pomi*.)

1. ANT less than 0.25× BL, with PT/BASE 0.45–0.75. Body elongate, pale, and body and appendages densely clothed in long fine hairs. SIPH poriform *Nippolachnus piri*
 – ANT more than 0.5× BL, with PT/BASE more than 1.5. Body oval or spindle-shaped, sparsely hairy. SIPH tubular 2
2. SIPH dark, 1.2–1.3× the long, rather acutely-pointed cauda, which bears 10–18 hairs. Head markedly spiculose on ventral surface, but not dorsally, and with well-developed, broadly divergent ANT tubercles *Sinomegoura photiniae*
 – Without that combination of characters 3
3. SIPH 2.4–2.7× cauda, with swollen section on distal half, narrowing to a subapical region with 4–5 rows of polygonal reticulation. Head smooth with inner faces of ANT tubercles divergent *Illinoia macgillivrayae*
 – Without that combination of characters 4
4. SIPH and cauda both black. Cauda finger-like, usually with a midway constriction. Dorsal abdomen without dark markings 5
 – SIPH and cauda pale or dark, but if both black then cauda is tongue-shaped without a constriction, and dorsal abdomen has dark markings go to key to polyphagous aphids, p. 1020
5. Marginal tubercles (MTu) present on ABD TERG 2–4. Cauda with 10–19 hairs (rarely less than 13). R IV+V more than 130µm long *Aphis pomi*
 – MTu absent from ABD TERG 2–4. Cauda with 7–15 hairs (rarely more than 12). R IV+V less than 120µm long *Aphis spiraeicola*

Rhapis*Rh. javanica***Palmae***Astegopteryx rhapsidis***Rhaponticum see Stemmacantha****Rheum***Rh. compactum**Rh. emodi**Rh. franzenbachii**Rh. maximowiczii**Rh. moorcroftianum**Rh. nudatum* (?nutans)*Rh. officinale**Rh. palmatum**Rh. rhabarbarum**Rh. rhaponticum**Rh. tataricum**Rh. undulatum**Rheum* spp. (and cultivars)**Polygonaceae***Aphis fabae**Aphis fabae**Aphis fabae**Aphis rheicola*; *Brachyunguis rhei*; *Dysaphis emicis**Aphis fabae**Aphis fabae*, *solanella**Aphis fabae*; *Capitophorus hippophaes* ssp. *javanicus*;*Macrosiphum euphorbiae**Aphis fabae*, *rumicis*; *Myzus ornatus**Aphis fabae*; *Macrosiphum euphorbiae*, *stellariae*;*Myzus ascalonicus*, [*certus*], *ornatus*, *persicae**Aphis fabae*, *rheicola*, *rumicis*, *solanella*;*Macrosiphum euphorbiae*; *Myzus persicae**Aphis craccivora*, *fabae*;[*Brachycaudus* (*Thuleaphis*) sp. (Kadyrbekov, 2003c)];[*Dysaphis* sp. (Kadyrbekov, 2003c)]*Aphis acetosae*, *craccivora*, *fabae*, *gossypii*, *rumicis*;*Dysaphis rumecicola**Aulacorthum solani*, [*solani* ssp. *orientale*];*Dysaphis radicola***Key to apterae on Rheum:–**

1. Cauda helmet-shaped, not longer than its basal width in dorsal view. Paired spinal tubercles (STu) present on head and (at least) ABD TERG 8 2
 - Cauda tongue- or finger-shaped, more than 1.3× its basal width in dorsal view. STu absent from head, and usually from ABD TERG 8 4
2. Paired STu on head and ABD TERG 8, or 7 and 8, absent from ABD TERG 1–6. Hairs on ANT III and ABD TERG 1–5 shorter than ANT BD III. SIPH 2.0–2.5× cauda *Dysaphis radicola*
 - Single or paired STu present on most or all segments from head to ABD TERG 8. Longest hairs on ANT III and ABD TERG 1–5 much longer than ANT BD III. SIPH 1.5–2.2× cauda 3
3. Hairs on ANT III and ABD TERG 1–5 fine-pointed, those on ANT III longer than 45 µm, 2 or more× ANT BD III. R IV+V 1.55–1.70× HT II *Dysaphis rumecicola*
 - Hairs on ANT III and ABD TERG 1–5 often with blunt apices, those on ANT III being all less than 45 µm long, less than 2× BD III. R IV+V 1.3–1.6× HT II *Dysaphis emicis*
4. ANT PT/BASE c.1.0 *Brachyunguis rhei**
 - ANT PT/BASE more than 1.5 5
5. Dorsal hairs, or at least those on head and ABD TERG 8, long, thick and capitate, arising from tuberculate bases. R IV+V rostrate, i.e. with R V extended into a short, beak-like process *Capitophorus hippophaes* (ssp. *javanicus*)
 - Dorsal hairs not long, thick and capitate, not on tuberculate bases. R IV+V not rostrate 6

HOST LISTS AND KEYS

6. ANT tubercles weakly developed or undeveloped. Prothorax, ABD TERG 1 and 7 with marginal tubercles (MTu) 7
 – ANT tubercles well developed. Prothorax and ABD TERG 1 and 7 without MTu 11
7. Dorsal abdomen with an extensive solid black sclerite centered on ABD TERG 4–5. Cauda black like SIPH, tongue-shaped, rather pointed and bearing 4–7 hairs *Aphis craccivora*
 – Dorsal abdomen with or without dark markings, but without an extensive solid black sclerite. Cauda pale or dark, but if black then with more than 9 hairs 8
8. Well-developed MTu present on all or most of ABD TERG 2–4 as well as 1 and 7 *Aphis acetosae*
 – Small MTu only sporadically present on ABD TERG 2–4 9
9. Cauda paler than SIPH and bearing 4–8 hairs. Dorsal abdomen without dark markings *Aphis gossypii*
 – SIPH and cauda both dark, cauda with 10–24 hairs. Dorsal abdomen with or without dark markings 10
10. ANT III darker on distal half, and IV entirely dusky/dark. Dorsal abdomen usually with dark cross-bands including an especially broad one on ABD TERG 6 between SIPH *Aphis rumicis*
 – ANT III entirely pale, IV pale or darker distally. Dorsal abdomen with cross-bands absent or only well developed on ABD TERG 7 and 8 *Aphis fabae* group (including *solanella*, and possibly *rheicola**)
11. Head smooth, and inner faces of ANT tubercles smooth and divergent. SIPH with a subapical zone of polygonal reticulation 12
 – Head spiculose, inner faces of ANT tubercles scabrous or spiculose and parallel or apically convergent. SIPH without polygonal reticulation go to key to polyphagous aphids, p. 1020
12. Femora usually with a dark spot or patch near apices. ABD TERG 2–3 with longest hair 26–56 µm, usually as long as or longer than ANT BD III. Subgenital plate with 2–13 hairs in addition to those on posterior margin *Macrosiphum stellariae*
 – Femora pale or only slightly dusky at apices. ABD TERG 2–3 with longest hair 21–37 µm, usually shorter than ANT BD III. Subgenital plate with 2(–4) hairs on anterior part *Macrosiphum euphorbiae*

Rhigozum

Rh. obovatum

Bignoniaceae

Myzus persicae

Rhinanthus (incl. *Alectorolophus*)

Rh. alectorolophus

Scrophulariaceae

[*Acyrtosiphon pisum*]; *Aphis fabae*;
Brachycaudus helichrysi; *Myzus alectorolophi*
Hyperomyzus rhinanthi
Hyperomyzus rhinanthi
Brachycaudus helichrysi; *Hyperomyzus rhinanthi*
Aphis fabae
Hyperomyzus rhinanthi
Hyperomyzus rhinanthi
Brachycaudus helichrysi; *Hyperomyzus rhinanthi*
Myzus cerasi
Brachycaudus helichrysi;
 [*Hyperomyzella erratica* of Weis (1955) (= *Hyperomyzus rhinanthi*?)]
Aphis solanella; *Brachycaudus persicae*; [*Myzus padellus*]

Rhinanthus spp.

Key to apterae on *Rhinanthus*:-

1. SIPH black and markedly swollen over distal 0.75 of length. ANT III with 25–64 rhinaria. Dorsal abdomen with a large black quadrate central patch. *Hyperomyzus rhinanthi*
- Without that combination of characters 2
2. Head spiculose with well-developed scabrous ANT tubercles. SIPH very coarsely imbricated (scaly) 3
- Head not spiculose, ANT tubercles absent or weakly developed. SIPH smooth or with normal imbrication 4
3. Dorsum with extensive dark sclerotisation. SIPH more than 7× longer than their width at midlength. Cauda with 6–9 hairs *Myzus cerasi*
- Dorsum sclerotic but not dark in mounted preparations. SIPH less than 6× longer than width at midlength. Cauda with 4–6 hairs *Myzus alectorolophi* (or *M. padellus*)
4. Cauda tongue-shaped, longer than its basal width, with 11–24 hairs. Spiracular apertures reniform. ABD TERG 7 with marginal tubercles (MTu) *Aphis fabae* group (incl. *A. solanella*)
- Cauda helmet-shaped, not longer than its basal width, with 4–8 hairs. Spiracular apertures large and rounded. ABD TERG 7 without MTu 5
5. Dorsum with an extensive dark sclerotic shield. SIPH black, imbricated, more than 2× cauda *Brachycaudus persicae*
- Dorsum pale. SIPH pale, smooth-surfaced, less than 2× cauda *Brachycaudus helichrysi*

Rhipogonum*Rh. scandens***Rhipogonaceae***Aulacorthum solani*; *Myzus persicae*;
Neomyzus circumflexus; *Sitobion miscanthi*Key to apterae on *Rhipogonum*:-

- SIPH dark with a distal zone of polygonal reticulation. R IV+V less than 0.8× HT II *Sitobion miscanthi*
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Rhinopetalum* see *Fritillaria***Rhizophora****Rh. mangle***Rhizophoraceae***Aphis gossypii****Rhodiola****Rh. rosea***Crassulaceae***Aphis sedi*; *Brachycaudus sedi*Key to apterae on *Rhodiola*:-

- Cauda broadly rounded, much shorter than its basal width in dorsal view. SIPH stump-like *Brachycaudus sedi*
- Cauda tongue-shaped, longer than its basal width. SIPH tubular *Aphis sedi*

Rhodococcum* see *Vaccinium***Rhododendron* (inc. *Azalea*, *Ledum*)***Rh. albiflorum**Rh. albrechtii***Ericaceae**[*Macrosiphum scoliopi*]*Vesiculaphis caricis*

HOST LISTS AND KEYS

<i>Rh. arboreum</i>	<i>Aphis gossypii</i> ; <i>Brachycaudus helichrysi</i> ; <i>Chaetomyzus rhododendri</i> ; <i>Ericolophium holsti</i> , <i>rhododendri</i> ; <i>Indiaphis crassicornis</i> ; [<i>Macrosiphoniella spinipes</i>]; <i>Myzus ornatus</i> , <i>persicae</i> ; <i>Sinomegoura rhododendri</i> <i>Illinoia lambersi</i>
<i>Rh. calendulaceum</i>	
<i>Rh. californicum</i> see <i>macrophyllum</i>	
<i>Rh. campanulatum</i>	
<i>Rh. campylocarpum</i>	<i>Myzus brevisiphon</i> [<i>Aulacorthum perillae</i>]; <i>Ericolophium takahashii</i> ; <i>Myzus brevisiphon</i> , <i>persicae</i> <i>Illinoia rhokalaza</i> <i>Illinoia lambersi</i>
<i>Rh. canescens</i>	<i>Illinoia lambersi</i>
<i>Rh. catawbiense</i> × <i>metternichii</i>	<i>Illinoia lambersi</i>
<i>Rh. cunninghami</i>	<i>Illinoia lambersi</i>
<i>Rh. dauricum</i>	<i>Vesiculaphis cephalata</i> , <i>kongoensis</i>
<i>Rh. decorum</i>	<i>Illinoia lambersi</i>
<i>Rh. ferrugineum</i>	<i>Aphis remaudieri</i>
<i>Rh. flavum</i>	<i>Illinoia dzhibladgeae</i>
<i>Rh. formosanum</i>	<i>Ericolophium taiheisanum</i>
<i>Rh. groenlandicum</i>	<i>Illinoia paqueti</i> , <i>pianwae</i>
<i>Rh. indicum</i>	<i>Illinoia azaleae</i> ; <i>Vesiculaphis caricis</i>
<i>Rh. kesselringii</i>	<i>Illinoia lambersi</i>
<i>Rh. lasiostylum</i>	<i>Ericolophium itoe</i>
<i>Rh. luteum</i>	<i>Illinoia lambersi</i>
<i>Rh. macrophyllum</i>	<i>Illinoia rhododendri</i>
<i>Rh. maximum</i>	<i>Illinoia azaleae</i> , <i>rhokalaza</i>
<i>Rh. maxwellii</i>	<i>Illinoia lambersi</i>
<i>Rh. megapotanicum</i>	<i>Myzus persicae</i>
<i>Rh. molle</i>	<i>Illinoia lambersi</i> ; <i>Macrosiphum euphorbiae</i>
<i>Rh. morii</i>	<i>Ericolophium holsti</i>
<i>Rh. mucronulatum</i>	<i>Vesiculaphis caricis</i> , <i>cephalata</i> , <i>kongoensis</i>
<i>Rh. nudiflorum</i>	<i>Illinoia rhokalaza</i>
<i>Rh. oldhami</i>	<i>Sinomegoura rhododendri</i>
<i>Rh. palustre</i>	<i>Neoamphorophora ledi</i>
<i>Rh. przelwaskii</i>	<i>Ericolophium ninguidum</i>
<i>Rh. reticulatum</i>	<i>Ericolophium itoe</i> ; <i>Vesiculaphis kongoensis</i>
<i>Rh. rhodora</i>	<i>Illinoia azaleae</i> ssp. <i>rhododendronia</i>
<i>Rh. schlippenbachii</i>	<i>Vesiculaphis caricis</i>
<i>Rh. sichotense</i>	<i>Vesiculaphis cephalata</i>
<i>Rh. simsii</i>	<i>Ericolophium alpininae</i> , <i>nigripunctatum</i> , <i>rectisiphon</i> ; <i>Illinoia azaleae</i> ; <i>Liosomaphis rhododendrophila</i>
<i>Rh. sublanceolatum</i>	<i>Illinoia lambersi</i>
<i>Rh. viscosum</i>	<i>Illinoia rhokalaza</i>
<i>Rh. yedoense</i>	<i>Vesiculaphis caricis</i>
<i>Rhododendron</i> spp.	<i>Acyrthosiphon</i> [<i>rubi</i>], <i>Acyrthosiphon</i> sp. (Norway, BMNH, leg. C. Stenseth); [<i>Aiceona retipennis</i>]; <i>Aphis fabae</i> , [<i>kurosawai</i>], <i>nerii</i> , <i>spiraecola</i> ; [<i>Chaitophorus clarus</i> Tseng and Tao]; <i>Ericolophium ovalifolii</i> , <i>tianchiense</i> ;

[*Eulachnus thunbergii* (Wilson)]; [*Eutrichosiphum* sp.];
 [*Hillerislambersia darjeelingi*]; [*Hyperomyzus nabali*];
Indiaphis indica, *rostrata*, *Indiaphis* sp. (W Bengal; BMNH
 colln, leg. A.N. Basu);
Indomasonaphis anaphalidis; [*Lipaphis erysimi*];
 [*Macrosiphum rosae*];
 ?*Neoamphorophora* sp. (BMNH, Turkey, leg. N. Tuatay);
Neomasonaphis inulae; [*Rhopalosiphum rufiabdominale*];
Toxoptera odinae; [*Trichaitophorus aceris*];
 [*Uroleucon nigrotuberculatum, sonchi*];
Vesiculaphis grandis; *Wahlgreniella nervata*

Key to apterae on *Rhododendron*:-

1. SIPH with a subapical zone of reticulation (at least 3–4 rows of rather large polygonal cells, occupying distal 0.06–0.2 of total length). ANT III usually with 1 or more rhinaria on basal part. ANT tubercles well developed, their inner faces divergent 2
 - SIPH without reticulation; sometimes with interconnected transverse striae near apex, but no polygonal cells. ANT III with or without rhinaria. ANT tubercles variably developed or undeveloped 9
2. Tergum almost wholly dark sclerotic. Cauda dusky/dark. ANT III and most of IV pale 3
 - Tergum pale or if pigmented then cauda pale and ANT III and IV dusky/dark 3
Illinoia dzhibladzeae
3. ANT hairs very short and blunt, the longest on III much less than 0.5× BD III 4
 - Longest hairs on ANT III more than 0.5× BD III 5
4. R IV+V less than 0.14mm long, 1.1–1.45× HT II, and bearing 8–12 accessory hairs. Second tarsal segments without spinules on the imbrications (Figure 46a). HT II more than 1.5× longer than max.diam.of swollen part of SIPH 4
 - R IV+V more than 0.14mm long, 1.4–1.9× HT II, and bearing 15–23 accessory hairs. Second tarsal segments with spinules on the imbrications (Figure 46b). HT II less than 1.5× longer than max.diam.of swollen part of SIPH 5
Illinoia lambersi
5. SIPH entirely dark. ANT III–V rather evenly dusky/dark 5
 - SIPH pale at least on basal part, although often dark distally. ANT III–V mainly pale, darker at apices 6
Illinoia rhokalaza
6. R IV+V 0.8–1.0× HT II, with 7–10 accessory hairs. First tarsal segments with 3 hairs. Second tarsal segments without spinules on the imbrications 6
 - R IV+V 1.05–1.90× HT II, with 14–38 accessory hairs. First tarsal segments with (4–)5 hairs. Second tarsal segments with (sometimes minute) spinules on the imbrications 7
Macrosiphum euphorbiae
7. R IV+V 0.21–0.24mm long, 1.05–1.45× HT II, which has long thin spinules on the imbrications, and HT I is also spinulose (Figure 46c) 7
 - R IV+V 0.125–0.20mm long, 1.65–1.90× HT II, which has very small spinules on the imbrications, and no distinct spinules on HT I 8
Illinoia paqueti
8. ANT shorter than BL. R IV+V 0.125–0.155mm long, with 14–20 accessory hairs. SIPH rather thick, usually without a thinner section on basal half (Figure 46d) 8
 - ANT longer than BL. R IV+V 0.175–0.20mm long, with c.30 accessory hairs. SIPH long and thin with some distal swelling so that there is a thinner section on basal half (Figure 46e) 8
Illinoia pinawae

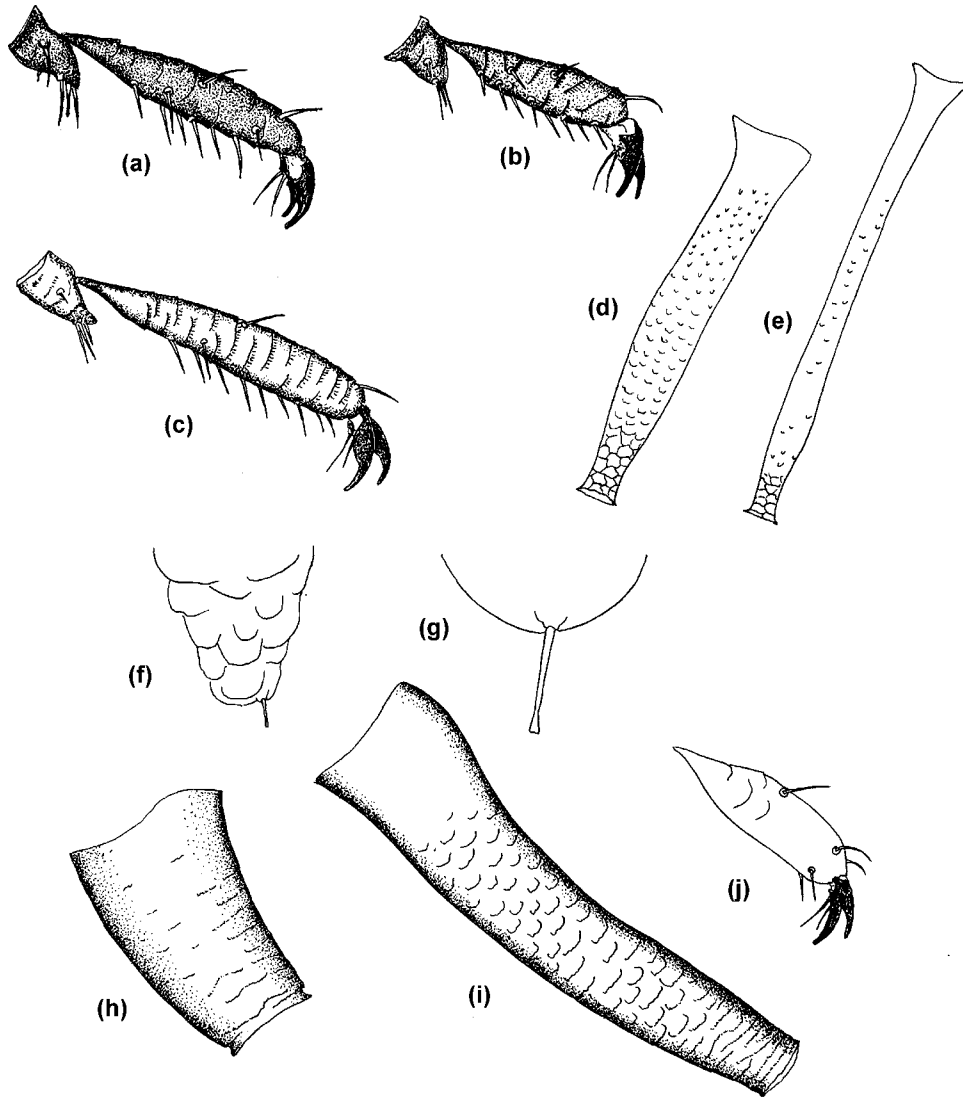


Figure 46 Apteræ on *Rhododendron*. (a) Hind tarsus of *Illinoia azaleae*, (b) hind tarsus of *I. lambersi* (*I. rhododendri* is similar), (c) hind tarsus of *I. paquetai*, (d) SIPH of *I. rhododendri*, (e) SIPH of *I. pinawae*, (f) dorsal process on ABD TERG 6 of *Chaitomyzus rhododendri*, (g) dorsal process on ABD TERG 6 of *Indomasonaphis anaphalidis*, (h) SIPH of *Indiaphis crassicornis*, (i) SIPH of *Ericolophium rhododendri*, (j) HT II of *E. rhododendri*.

9. SIPH conspicuously warty or nodulose throughout length 10
 – SIPH smooth, or with normal, spiculose or denticulate imbrication, or warty only towards apices 15

10. ANT PT/BASE 1.7–2.8. ANT tubercles well developed, with inner faces apically covergent

Myzus ornatus

- ANT PT/BASE less than 1.5. ANT tubercles not projecting forward beyond middle of front of head in dorsal view 11
- 11. SIPH clavate *Vesiculaphis rhododendri**
- SIPH not clavate, i.e., without a narrower section on basal half 12
- 12. BL more than 3.5mm. R IV+V 1.8–2.0× HT II. HT I with 3 hairs (sense peg present). (ANT III of al. with 82–85 rhinaria) *Vesiculaphis grandis*
- BL less than 2.5mm. R IV+V 1.0–1.4× HT II. HT I with 2 hairs (sense peg absent). (ANT III of al. with 19–54 rhinaria) 13
- 13. Head warty with small blunt nodules dorsally along posterior margin, and frontal part produced into 3 large lobes. (Al. with anterior dorsal cephalic hairs a little longer than ANT BD III. Cauda tongue-shaped, at least 1.5× its basal width. SIPH more than 0.75× head width across eyes) *Vesiculaphis cephalata*
- Head scabrous with many minute spicules in rows dorsally along posterior margin, and frontal part produced into a ledge, with median tubercle as a low swelling beneath it. (Al. with anterior dorsal cephalic hairs shorter than ANT BD III. Cauda triangular, less than 1.5× its basal width. SIPH less than 0.75× head width across eyes) 14
- 14. (Al.) Forewing with media once-branched. Dorsal abdomen without any dark cross-bands. ANT III smooth, with 28–54 rhinaria. R IV+V 0.6–1.2× ANT BASE VI *Vesiculaphis caricis*
- (Al.) Forewing with media twice-branched. Abdomen with dark cross-bands on ABD TERG 3–5. ANT III imbricated, with 19–23 rhinaria. R IV+V 0.4–0.5× ANT BASE VI *Vesiculaphis kongoensis*
- 15. Most dorsal hairs arising from rounded, broad-based processes 16
- Dorsal hairs not arising from broad-based processes 18
- 16. Dorsal processes scabrous, those on ABD TERG 5 and 6 being longer than their basal widths, bearing hairs much shorter than height of processes (Figure 46f). SIPH markedly clavate. Cauda with 5–6 hairs. First tarsal segments with 3 hairs *Chaetomyzus rhododendri*
- Dorsal processes smooth, hemispherical, all much shorter than their basal widths, bearing long thickish hairs, longer than heights of processes, and with expanded apices (Figure 46g). SIPH clavate or cylindrical. Cauda with 24–60 hairs. First tarsal segments with 5 hairs 17
- 17. SIPH distinctly clavate. Cauda with 35–60 hairs *Indomasonaphis anaphalidis*
- SIPH cylindrical or only very slightly swollen on distal half. Cauda with 24–34 hairs *Indomasonaphis inulae*
- 18. SIPH clavate (with narrower section on basal half) 19
- SIPH cylindrical or tapering 24
- 19. ANT PT/BASE 1.0–1.3 (estimated, only al. have been described). First tarsal segments with 5 hairs 20
- ANT PT/BASE 1.4–6.8. First tarsal segments with (2–) 3 hairs 21
- 20. (Based on al.) R IV with c.4–6 accessory hairs. Cauda with 5–6 hairs *Liosomaphis rhododendrophila**
- (Based on al.) R IV with c.16–20 accessory hairs. Cauda with c.17–18 hairs *'Ericolophium' alpigeniae**
- 21. Head densely spiculose, with inner faces of ANT tubercles apically convergent. ANT PT/BASE 2.8–4.5 *Myzus persicae*
- Head smooth, with inner faces of ANT tubercles divergent. ANT PT/BASE 1.4–2.4 or 5.2–6.8 22

HOST LISTS AND KEYS

22. ANT PT/BASE 5.2–6.8. Tergum entirely pale *Wahlgreniella nervata*
 – ANT PT/BASE 1.4–2.4. Tergum with some dark markings **23**
23. ANT III without rhinaria. Tergum mainly membranous, with only small sclerites anterior to SIPH and dark cross-bands on posterior tergites. R IV+V c.1.2× HT II, with 2–4 accessory hairs. Second tarsal segments not spinulose *Neoamphorophora ledi*
 – ANT III with 3–7 rhinaria, spaced out over distal 0.7 of length. Tergum mainly dark sclerotic. R IV+V more than 2× HT II, with c.25 accessory hairs. Second tarsal segments spinulose
?Neoamphorophora sp. (BMNH, Turkey, leg. N. Tuatay)
24. Second tarsal segments with spinules on the imbrications, at least ventrally **25**
 – Second tarsal segments without spinules on the imbrications **36**
25. R IV+V 1.5–1.7× HT II, with 16–21 accessory hairs. Cauda with 10–15 hairs *Ericolophium holsti*
 – R IV+V 0.8–1.7× HT II, with 2–6 accessory hairs. Cauda with 4–12 hairs **26**
26. First tarsal segments with 5 hairs. Cauda with 8–12 hairs. R IV+V 0.8–0.9× HT II
Ericolophium ninguidum
 – First tarsal segments with 3 hairs. Cauda with 4–8 hairs. R IV+V 0.9–1.7× HT II **27**
27. Longest hairs on ABD TERG 1–3 more than 24µm, 1–6× ANT BD III **28**
 – Longest hairs on ABD TERG 1–3 less than 20µm, shorter than ANT BD III **32**
28. Longest hairs on ABD TERG 1–3 only 25–30µm, 1.0–1.2× ANT BD III, with blunt apices. R IV+V 1.5–1.7× HT II. ANT PT/BASE 2.2–3.0 *Indiaphis indica*
 – Longest hairs on ABD TERG 1–3 more than 50µm, 1.5–6× ANT BD III, with pointed apices. Other characters not in above combination **29**
29. R IV+V 1.6–1.7× HT II. (ANT 5-segmented, with PT/BASE 1.1–1.2) *Indiaphis rostrata* (fundatrices?)
 – R IV+V 0.9–1.5× HT II **30**
30. ANT 0.9–1.5× BL, with PT/BASE c.3. SIPH more than 4× longer than their width at midlength *Ericolophium takahashii**
 – ANT only c.0.5× BL, and PT/BASE 1.0–1.9. SIPH stout, less than 3× longer than their width at midlength (e.g., Figure 46h) **31**
31. R IV+V more than 0.15mm long, longer than cauda. ANT tubercles undeveloped. ANT PT/BASE 1.5–1.9. *Indiaphis crassicornis*
 – R IV+V less than 0.12mm long, shorter than cauda. ANT tubercles low but evident. ANT PT/BASE 1.0–1.1 *Indiaphis* sp. (?fundatrix; W Bengal, BMNH colln, leg. A.N. Basu)
32. R IV+V 1.3–1.6× HT II. SIPH dark *Ericolophium itoe* (partim)
 – R IV+V 0.6–1.1× HT II. SIPH pale at least basally **33**
33. R IV+V 0.6–0.9× HT II **34**
 – R IV+V 1.0–1.1× HT II **35**
34. Tergum with a dark sclerotic patch extending from ABD TERG 3–6. Dorsal hairs pointed *Ericolophium nigripunctatum**
 – Dorsal abdomen without a dark patch. Dorsal hairs blunt *Ericolophium rectisiphon**
35. Tergum pale. SIPH c.2.5–2.6× cauda *Ericolophium ovalifolii*
 – Tergum entirely dark brown. SIPH c.1.9–2.0× cauda *Ericolophium taiheisanum**

36. ANT longer than BL. ANT III with 1–4 rhinaria near base. SIPH entirely pale or with dark apices **37**
 – ANT shorter than BL. ANT III without rhinaria, and other characters not in above combination **38**
37. SIPH strongly tapering to dark apices, 0.7–1.2× the dark cauda. R IV with 2–4 accessory hairs
Sinomegoura rhododendri
 – SIPH almost cylindrical over most of length, entirely pale, 2.0–2.1× the pale cauda. R IV with 12–16 accessory hairs
Acyrtosiphon sp. (Norway, BMNH, leg. C. Stenseth)
38. ANT tubercles moderately or well developed (if rather low then scabrous, and inner side of ANT I also scabrous). ABD TERG 1 and 7 without marginal tubercles and cauda tongue-shaped, much longer than its basal width **39**
 – ANT tubercles undeveloped, or weakly developed but not scabrous. **Either** ABD TERG 1 and 7 have MTu **or** cauda is helmet-shaped, not longer than its basal width
 go to key to polyphagous aphids, p. 1020, starting at couplet 15
 (Note: specimens running to *Aphis solanella* may be *A. remaudieri* Börner – see text)
39. SIPH stout, less than 6.5× longer than their midlength widths, and almost flangeless (Figure 46j). Second tarsal segments weakly imbricated, almost smooth on distal half (Figure 46k). Hairs on ABD TERG 1–3 maximally 55–85 µm, c.2× ANT BD III
Ericolophium rhododendri
 – SIPH more than 7× longer than their widths at midlength, with a distinct flange. Second tarsal segments normally imbricated (often with at least traces of spinules on the imbrications). Hairs on ABD TERG 1–3 maximally 20 µm, not longer than ANT BD III **40**
40. ANT PT/BASE 2.2–2.4. R IV+V c.1.4× HT II, with 2 accessory hairs. Cauda with 5–7 hairs
Ericolophium itoe (partim)
 – ANT PT/BASE 1.6–1.8. R IV+V 0.75–0.9× HT II, with 8–14 accessory hairs. Cauda with 10–11 hairs
Ericolophium tianchiense

Rhodomyrthus*Rh. tomentosa**Rhodomyrthus* sp. (?)*Greenidea psidii**Greenidea siamensis***Myrtaceae**Key to apterae on *Rhodomyrthus*:–

(Both species have SIPH with numerous long hairs.)

- BL 1.3–1.7 mm. SIPH black, darker than dorsal abdominal sclerotisation. (Al. with 7–17 rhinaria on ANT III)
Greenidea siamensis
- BL 1.8–2.6 mm. SIPH not as dark as dorsal abdominal sclerotisation. (Al. with 20–31 rhinaria on ANT III)
Greenidea formosana

Rhodotypos*Rh. kerriodes**Rh. scandens**Aphis fabae**Aphis fabae***Rosaceae****Rhoicissus***Rh. cuneifolia**Rh. tridentata**Sitobion cissi**Sitobion cissi***Vitaceae****Rhus** See also Blackman and Eastop (1994)*Rh. aromatica*=*canadensis**Rh. canadensis**Carolinaia rhois***Anacardiaceae**

HOST LISTS AND KEYS

<i>Rh. diversiloba</i>	<i>Carolinaia rhois, schlingeri</i>
<i>Rh. japonica</i>	<i>Schlechtendalia chinensis</i>
<i>Rh. radicans</i>	<i>Carolinaia caricis, carolinensis, floridensis, howardii,</i> [<i>rhois</i>], <i>rhusifoliae, tissoti; Toxoptera odinae</i>
<i>Rh. toxicodendron</i> see <i>radicans</i>	
<i>Rh. trifoliolata</i>	<i>Melaphis rhois</i>
<i>Rh. trilobata</i>	<i>Carolinaia rhois</i>
<i>Rh. typhina</i>	<i>Carolinaia rhois; Melaphis rhois</i>
<i>Rhus</i> sp.	[<i>Illinoia spiraeae</i>]

Key to aphids on herbaceous and shrubby *Rhus*:-

This key includes al. as well as apt. Couplets 3–16 are based mainly on the key by Remaudière and Muñoz-Viveros (1992).

1. ANT PT/BASE much less than 0.5, with PT short and thick. SIPH absent. (ANT of al. with strap-like, annular sec. rhinaria) 2
 - ANT PT/BASE more than 1, with PT thin and elongate. SIPH present, tubular. (ANT of al. with rounded or oval sec. rhinaria) 3
2. (Al. from gall) Pterostigma of forewing extending around wing-tip. Sec. rhinaria as broad as or broader than the spaces between them, occupying at least half of total area of ANT 3
 - Schlechtendalia chinensis*
 - (Al. from gall) Pterostigma not extending around wing-tip. Sec. rhinaria generally narrower than the spaces between them, occupying less than half of total area of ANT 4
Melaphis rhois
3. Apt. (incl. fundatrices) 4
 - Al. 13
4. SIPH 0.4–0.6× the black cauda which bears 16–27 hairs. ABD TERG 1 and 7 with marginal tubercles (MTu). Stridulatory apparatus present 5
 - Toxoptera odinae*
 - SIPH longer than the pale or dark cauda which bears 4–6 hairs. ABD TERG 1 and 7 without MTu. No stridulatory apparatus 5
5. Tergum strongly rugose 6
 - Tergum smooth or almost smooth 7
6. Tergum pale. SIPH slightly clavate with dense, conspicuous imbrication fund. of *Carolinaia caricis* 6
 - Tergum dark brown. SIPH moderately clavate, with only a little imbrication *Carolinaia schlingeri*
7. SIPH cylindrical, tapering or only weakly clavate (in which case they are c.8× longer than their max. diameter) 8
 - SIPH very distinctly clavate, less than 7× longer than their max. diameter 9
8. SIPH c.5× their midlength diameter, pale, as is cauda. ANT 5- or 6-segmented, with PT/BASE less than 2 fund. of *Carolinaia tissoti* 8
 - SIPH c.8× their midlength diameter, dark, as is cauda. ANT 6-segmented, with PT/BASE at least 4 *Carolinaia floridensis* (partim) 9
9. ANT tubercles weakly developed, so that front of head is sinuate in dorsal view. ANT shorter than BL. Tergum pale 10
 - ANT tubercles well developed, so that there is a deep frontal sinus. ANT longer than BL. Tergum dark 11

10. SIPH pale, 2.4–3.3× cauda, which bears 4 hairs fund. of *Carolinaia carolinensis*
 – SIPH dark, only c.2× longer than cauda, which bears 5 hairs *Carolinaia rhois*
11. R IV+V heart-shaped, bulbous posteriorly. Head smooth ventrally. Cauda paler than SIPH and bearing 5 hairs *Carolinaia howardii*
 – R IV+V not swollen, straight-sided. Head spiculose ventrally. Cauda as dark as SIPH and bearing 4 hairs **12**
12. SIPH markedly clavate, 5–6× longer than max. diameter of swollen part, and 2.3–2.6× longer than ANT VI BASE. R IV+V 0.12–0.13 mm long. Spinal tubercles (STu) absent *Carolinaia rhusifoliae*
 – SIPH slightly clavate, c.8× longer than max. diameter of swollen part, and 3.0–3.5× longer than ANT VI BASE. R IV+V 0.09–0.105 mm long. Spinal tubercles (STu) often present on head and sometimes on ABD TERG 8 *Carolinaia floridensis* (partim)
13. (Al.) Abdomen with a solid dark sclerotic patch across ABD TERG 3–5, 3–6 or 3–7 **14**
 – (Al.) Abdomen with or without dark sclerites, but without an extensive solid dark sclerotic patch **16**
14. (Al.) ANT III with 23–31 sec. rhinaria, IV with 9–12 and V with 5–6 *Carolinaia carolinensis*
 – (Al.) ANT III with less than 15 sec. rhinaria, IV with less than 4, V with none **15**
15. (Al.) Hind wing with 2 oblique veins. ANT tubercles weakly developed, not projecting forward beyond median frontal tubercles in dorsal view. Dorsal abdominal patch not extending beyond ABD TERG 6. Cauda pale with 5 hairs. ANT PT/BASE less than 3, R IV+V c 0.9× HT II, SIPH c. 2× cauda *Carolinaia schlingeri*
 – (Al.) Hind wing with one oblique vein. ANT tubercles extending forward much beyond middle part of head in dorsal view. Dorsal abdominal patch extending from ABD TERG 3–7. Cauda as dark as SIPH and bearing 4 hairs. ANT PT/BASE more than 4, R IV+V c.1.1× HT II, SIPH c.3× cauda *Carolinaia floridensis*
16. (Al.) Hind wing with one oblique vein. Cauda with 4 hairs. ANT PT/BASE less than 3 *Carolinaia caricis* or *Carolinaia tissoti*
 – (Al.) Hind wing with 2 oblique veins. Cauda with 5 hairs. ANT PT/BASE more than 3 **17**
17. (Al.) R IV+V heart-shaped, short (0.096–0.11 mm). HT II 0.09–0.10 mm. ANT PT/BASE 4.3–5.5 *Carolinaia howardii*
 – (Al.) R IV+V straight-sided, 0.12–0.14 mm long. HT II 0.12–0.15 mm. ANT PT/BASE 3.3–4.1 *Carolinaia rhois*

Rhynchelytron see *Melinis*

Rhynchosia

Rh. minima

Rh. nyasica

Rh. resinosa

Rhynchosia sp.

Leguminosae

Aphis craccivora, *gossypii*; *Sitobion nigrinectarium*

Aphis craccivora

Sitobion nigrinectarium

Microparsus rhynchosiae

Key to apterae on *Rhynchosia*:-

1. ANT tubercles undeveloped or weakly developed. ANT III without rhinaria. ANT PT/BASE 2.0–3.4. ABD TERG 1 and 7 with marginal tubercles (MTu) **2**
 – ANT tubercles well developed. ANT III with 1–2 small rhinaria near base. ANT PT/BASE 4.0–7.4. ABD TERG 1 and 7 without MTu **3**

HOST LISTS AND KEYS

2. Dorsal abdomen with an extensive black patch. SIPH and cauda both black *Aphis craccivora*
 – Dorsal abdomen without any dark sclerotisation. SIPH black, cauda pale or dusky *Aphis gossypii*
3. SIPH somewhat clavate, 0.16–0.21× BL, without subapical reticulation *Microparsus rhynchosiae*
 – SIPH long and thin, tapering/cylindrical, more than 0.3× BL, with a subapical zone of polygonal reticulation *Sitobion nigrinectarium*

Rhynchospora (incl. Dichromena)

<i>Rh. alba</i>	<i>Sitobion paludum</i>
<i>Rh. cyperoides</i>	<i>Carolinaia caricis</i>
<i>Rh. elongata</i>	<i>Rhopalosiphum maidis</i>
<i>Rh. mariusculus</i>	<i>Carolinaia caricis</i> ; <i>Hysteroneura setariae</i>
<i>Rh. radicans</i>	<i>Carolinaia caricis</i> ; <i>Hysteroneura setariae</i>
<i>Rh. rugosa</i>	<i>Carolinaia caricis</i>
<i>Rh. setacea</i>	<i>Carolinaia caricis</i>
<i>Rhynchospora</i> sp.	<i>Rhopalosiphum padi</i>

Cyperaceae

Key to apterae on *Rhynchospora*:-

- Dorsal abdomen with extensive dark sclerotisation extending without subdivision across all of ABD TERG 1–5, including margins. SIPH black, 1.4–1.9× cauda, with a distal zone of polygonal reticulation *Sitobion paludum*
 – Without that combination of characters go to key to apt. on *Cyperus*

Rhytidiadelphus

<i>Rh. loreus</i>	<i>Muscaphis escherichi</i>
<i>Rh. squarrosus</i>	<i>Decorosiphon corynothrix</i> ; [<i>Jacksonia papillata</i>]; <i>Muscaphis escherichi</i>

Hylocomiaceae

Use key to apterae of moss-feeding aphids under *Polytrichum*.

Rhytidophyllum

<i>Rh. villosulum</i>	<i>Aphis spiraeicola</i>
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Gesneriaceae

Ribes (incl. Chrysobotrya, Grossularia)

<i>R. acidum</i>	<i>Aphis schneideri</i>
<i>R. affine</i>	<i>Aphis solitaria</i>
<i>R. alpinum</i>	<i>Aphis grossulariae</i> , <i>schneideri</i> ; <i>Cryptomyzus</i> [<i>ballotae</i>], <i>galeopsidis</i> , <i>heinzei</i> , <i>korschelti</i> , [<i>ribis</i>]; <i>Eriosoma anncharlotteae</i> , [<i>ulmi</i>]; <i>Hyperomyzus lactucae</i> , <i>pallidus</i> , <i>picridis</i> , <i>rhinanthi</i> , <i>zirnitsi</i> ; <i>Nasonovia cynosbati</i> , <i>ribisnigri</i>
<i>R. ambiguum</i>	<i>Hyperomyzus lactucae</i>
<i>R. aureum</i>	<i>Aphis</i> [<i>cornifoliae</i> Fitch (of Gillette, 1910)], <i>fabae</i> , <i>grossulariae</i> , <i>nasturtii</i> , <i>schneideri</i> ; <i>Cryptomyzus ribis</i> ; <i>Eriosoma ulmi</i> ; <i>Hyperomyzus lactucae</i> , [<i>nigricornis</i>], <i>pallidus</i> , <i>rhinanthi</i> , <i>ribiellus</i> ; <i>Nasonovia cynosbati</i> , <i>houghtonensis</i> ssp. <i>russellae</i> , <i>ribisnigri</i>

Grossulariaceae

<i>R. bracteosum</i>	<i>Hyperomyzus lactucae</i>
<i>R. burejense</i>	<i>Cryptomyzus taoi</i> ; <i>Hyperomyzus pallidus</i>
<i>R. cereum</i>	<i>Nasonovia arizonensis</i> (?), <i>houghtonensis</i> ssp. <i>cerei</i> , <i>grossa</i>
<i>R. ciliatum</i>	<i>Aphis solitaria</i>
<i>R. cynosbati</i>	<i>Hyperomyzus pallidus</i> ; <i>Nasonovia cynosbati</i> , <i>houghtonensis</i> ssp. <i>similis</i>
<i>R. diacanthum</i>	<i>Aphis grossulariae</i> , <i>varians</i> ; <i>Hyperomyzus lactucae</i>
<i>R. distans</i>	<i>Cryptomyzus korschelti</i>
<i>R. divaricatum</i>	<i>Aphis grossulariae</i> ; <i>Nasonovia cynosbati</i> , ? <i>vannesii</i>
<i>R. fasciculatum</i>	<i>Cryptomyzus ribis</i> ; <i>Hyperomyzus lactucae</i> ; [<i>Macrosiphum suguri</i> Shinji (nomen dubium)]; [<i>Sitobion akebiae</i>]
<i>R. fasciculatum</i> var. <i>chinense</i>	<i>Cryptomyzus taoi</i>
<i>R. fragrans</i>	<i>Aphis grossulariae</i> , <i>varians</i>
<i>R. ×gordonianum</i>	<i>Aphis schneideri</i>
<i>R. glutinosum</i> = <i>sanguineum</i> var.	
<i>R. gracile</i>	<i>Hyperomyzus nabali</i> , <i>pallidus</i>
<i>R. grossularia</i> = <i>uva-crispa</i>	
<i>R. heterotrichum</i>	<i>Cryptomyzus malkovskii</i> , [<i>ribis</i>]
<i>R. hirtellum</i>	<i>Nasonovia houghtonensis</i> ssp. <i>similis</i> , <i>ribisnigri</i>
<i>R. inerme</i>	<i>Hyperomyzus pallidus</i> ; <i>Nasonovia grossa</i> , <i>houghtonensis</i> ssp. <i>occidentalis</i> , <i>houghtonensis</i> ssp. <i>russellae</i>
<i>R. irriguum</i>	<i>Hyperomyzus pallidus</i> ; <i>Nasonovia ribisnigri</i>
<i>R. janczewskii</i>	[<i>Cryptomyzus ribis</i> (really <i>korschelti</i> ?)]
<i>R. komarovii</i>	<i>Hyperomyzus lactucae</i> , <i>pallidus</i>
<i>R. lacustre</i>	<i>Aphis oenotherae</i> ; <i>Macrosiphum bisensoriatum</i> ; <i>Nasonovia cynosbati</i> , <i>ribisnigri</i>
<i>R. laxiflorum</i>	<i>Aphis oenotherae</i> ; <i>Cryptomyzus galeopsidis</i> ; <i>Hyperomyzus lactucae</i>
<i>R. leptanthum</i>	<i>Aphis oenotherae</i> ; <i>Hyperomyzus pallidus</i>
<i>R. longiflorum</i> = <i>odoratum</i>	
<i>R. macwiggi</i> (? <i>maximowiczii</i>)	<i>Cryptomyzus korschelti</i>
<i>R. magellanicum</i>	<i>Aphis varians</i> ; <i>Cryptomyzus ribis</i> ; <i>Hyperomyzus lactucae</i>
<i>R. malvaceum</i>	<i>Nasonovia ribifolii</i>
<i>R. malvifolium</i>	[<i>Cryptomyzus ribis</i> (really <i>korschelti</i> ?)]
<i>R. mandshuricum</i>	<i>Cryptomyzus korschelti</i> , <i>ribis</i> ; <i>Hyperomyzus pallidus</i>
<i>R. menziesii</i>	<i>Hyperomyzus lactucae</i> , <i>pallidus</i> , <i>picridis</i>
<i>R. meyeri</i>	<i>Aphis grossulariae</i> ; <i>Cryptomyzus ribis</i> ; <i>Hyperomyzus pallidus</i>
<i>R. montigenum</i>	<i>Nasonovia cynosbati</i>
<i>R. multiflorum</i>	<i>Hyperomyzus lactucae</i>
<i>R. nevadense</i>	[<i>Aphis</i> (<i>Bursaphis</i>) sp.]; <i>Hyperomyzus lactucae</i>
<i>R. nigrum</i>	<i>Aphis grossulariae</i> , <i>manitobensis</i> , <i>mimuli</i> , <i>oenotherae</i> , <i>schneideri</i> , <i>triglochinis</i> , <i>varians</i> ; <i>Cryptomyzus galeopsidis</i> , <i>galeopsidis</i> ssp. <i>citrinus</i> , <i>galeopsidis</i> ssp. <i>dickeri</i> , <i>ribis</i> <i>Eriosoma ulmi</i> ; <i>Hyperomyzus lactucae</i> , [<i>nigricornis</i>], <i>petiolaris</i> , <i>ribiellus</i> ;

	<i>Nasonovia cynosbati</i> , <i>houghtonensis</i> ssp. <i>similis</i> , <i>ribisnigri</i>
	<i>Rhopalosiphoninus ribesinus</i>
<i>R. niveum</i>	<i>Hyperomyzus pallidus</i>
<i>R. nondescriptum</i>	<i>Hyperomyzus pallidus</i>
<i>R. odoratum</i>	<i>Aphis mimuli</i> , <i>oenotherae</i> ; <i>Cryptomyzus ribis</i> ; <i>Hyperomyzus lactucae</i> , <i>rhinanthi</i> , <i>ribiellus</i> ; <i>Myzus persicae</i> ; <i>Nasonovia cynosbati</i>
<i>R. orientale</i>	<i>Cryptomyzus ballotae</i>
<i>R. oxyacanthoides</i>	<i>Hyperomyzus pallidus</i> ; <i>Nasonovia houghtonensis</i> ssp. <i>similis</i>
<i>R. palczewskii</i>	<i>Cryptomyzus ribis</i>
<i>R. pallidiflorum</i>	<i>Aphis grossulariae</i>
<i>R. petiolare</i>	<i>Hyperomyzus petiolaris</i>
<i>R. rotundifolium</i>	<i>Hyperomyzus pallidus</i>
<i>R. rubrum</i>	<i>Aphis grossulariae</i> , <i>schneideri</i> , <i>triglochinis</i> ; <i>Cryptomyzus galeopsidis</i> , <i>maudamanti</i> , <i>ribis</i> , <i>stachydis</i> ; <i>Eriosoma grossulariae</i> , <i>ulmi</i> ; <i>Hyperomyzus lactucae</i> , <i>rhinanthi</i> , <i>zirnitsi</i> ; <i>Nasonovia cynosbati</i> , <i>ribisnigri</i> ; <i>Rhopalosiphoninus ribesinus</i>
<i>R. rubrum</i> var. <i>subglandulosum</i>	<i>Aphis oenotherae</i>
<i>R. sachalinense</i>	<i>Cryptomyzus ribis</i>
<i>R. sanguineum</i>	<i>Aphis grossulariae</i> , <i>schneideri</i> ; <i>Eriosoma anncharlotteae</i> , <i>grossulariae</i> , <i>ulmi</i> ; <i>Nasonovia cynosbati</i> , <i>houghtonensis</i> ssp. <i>similis</i> , <i>muesebecki</i>
<i>R. sanguineum</i> var. <i>glutinosum</i>	<i>Nasonovia ribifolii</i>
<i>R. sativum</i>	<i>Cryptomyzus galeopsidis</i> , <i>ribis</i> ; [<i>Myzus ribis</i> Shinji, 1922]
<i>R. saxatile</i>	<i>Cryptomyzus malkovskii</i>
<i>R. saxosum</i>	<i>Nasonovia cynosbati</i>
<i>R. setosum</i>	<i>Cryptomyzus korschelti</i>
<i>R. sinanense</i>	<i>Hyperomyzus lactucae</i> ; [<i>Myzus ribis</i> Shinji, 1922]; [<i>Prociphilus pini</i>]
<i>R. speciosum</i>	<i>Aphis oenotherae</i> ; <i>Nasonovia cynosbati</i>
<i>R. spicatum</i>	<i>Cryptomyzus ribis</i> , <i>stachydis</i> ; <i>Hyperomyzus lactucae</i>
<i>R. triste</i>	<i>Aphis grossulariae</i> , <i>schneideri</i> , <i>varians</i> ; <i>Cryptomyzus korschelti</i>
<i>R. uva-crispa</i> (incl. <i>grossularia</i>)	<i>Aphis grossulariae</i> , <i>oenotherae</i> , <i>schneideri</i> , <i>triglochinis</i> , <i>varians</i> ; <i>Cryptomyzus galeopsidis</i> , <i>ribis</i> ; <i>Eriosoma grossulariae</i> , <i>ulmi</i> ; <i>Hyperomyzus pallidus</i> , <i>picridis</i> , <i>ribiellus</i> ; <i>Nasonovia brachycyclica</i> , <i>cynosbati</i> , <i>houghtonensis</i> , <i>ribisnigri</i>
<i>R. valdivianum</i>	<i>Hyperomyzus lactucae</i>
<i>R. vilmorianum</i>	<i>Hyperomyzus lactucae</i>
<i>R. viscossimum</i>	<i>Nasonovia houghtonensis</i> ssp. <i>cerei</i>
<i>Ribes</i> spp.	<i>Aphis</i> [<i>atromaculata</i>], <i>oenotherae</i> ssp. <i>pacifica</i> , [<i>popovi</i>], <i>spiraecola</i> , [<i>viburni</i> (= ? <i>fabae</i>)]; <i>Macrosiphum euphorbiae</i> ; <i>Nasonovia arizonensis</i> , [<i>suguri</i> Shinji (= ? <i>cynosbati</i>)], <i>vannesii</i>

Key to apterae on *Ribes*:-

Note: This key is applicable to second generation apterae of host-alternating species of *Cryptomyzus*, *Hyperomyzus* and *Nasonovia* in spring colonies on *Ribes*; it will not work for fundatrices, except where this morph is specified. It does not include *Hyperomyzus nigricornis*, of which only al. are known. Couplets 25–35 are based largely on Heie (1979).

For an illustrated key to the common aphids on commercially grown *Ribes* spp. see Blackman and Eastop (2000).

1. ANT PT/BASE less than 1. ANT V+VI about equal to or shorter than R IV+V. Dorsal wax glands present each consisting of a ring of facets around an undivided central area (most easily seen on head and margins of abdomen). SIPH as pores with sclerotic rims **2**
 - ANT PT/BASE more than 1.5. No evident wax glands. SIPH tubular **4**
2. Wax glands with a ring of 9–20 small facets, each of diameter less than 0.25 of that of central area. ANT V 0.63–0.87× ANT VI *Eriosoma grossulariae*
 - Wax glands with a ring of 5–10 facets, each of diameter more than 0.33 of that of central area. ANT V 0.86–1.26× ANT VI **3**
 - Central area of wax gland defined by a distinct fine double line. ANT VI 0.45–0.58× R IV+V, which is 1.32–1.63× HT II. Longest apical hair on ANT PT 15–20µm *Eriosoma ulmi*
 - Central area of wax gland delimited by a greyish band or single line. ANT VI 0.31–0.45× R IV+V, which is 1.6–2.0× HT II. Longest apical hair on ANT PT less than 15µm *Eriosoma anncharlotteae*
4. Dorsal body hairs with distinctly capitate apices; **either** at least some of these hairs are long and very thick, more than 2.5× longer than ANT BD III and with bases at least 2–3× thicker than those of ventral hairs, **or** they arise from transverse rows of sclerites **5**
 - Dorsal hairs with blunt or pointed apices, or if hairs are long and have somewhat expanded apices then they are not much thicker at base than ventral hairs and/or not on transverse rows of pigmented sclerites **11**
5. Dorsal abdomen with sclerites at bases of capitate hairs. SIPH tapering for most of length. Cauda pentagonal, not longer than its basal width *Cryptomyzus malkovskii**
 - Dorsal abdomen membranous. SIPH either thin and cylindrical for most of length, or swollen on distal half. Cauda tongue-shaped, usually longer than its basal width **6**
6. R IV+V 1.3–1.6× HT II, with 5–18 accessory hairs. Longest hair on ANT III shorter than or about equal to (0.5–1.1×) BD III, usually shorter than longest hair on ANT I, or if similar in length then R IV+V more than 1.4× HT II with 7–18 accessory hairs **7**
 - R IV+V 0.95–1.35× HT II, with 2–7 accessory hairs. Longest hair on ANT III longer than 1.2–2.1× BD III, similar in length to longest hair on ANT I. **10**
7. ABD TERG 1–4 each with at most 6–12 long capitate hairs (only marginal hairs are duplicated), plus some much smaller hairs amongst them. R IV+V with 11–18 accessory hairs. Cauda not longer than its basal width *Cryptomyzus korschelti*
 - ABD TERG 1–4 each with (10–) 12–18 long capitate hairs (spinal hairs often and pleural sometimes duplicated, as well as marginal hairs). R IV+V with 5–14 accessory hairs. Cauda usually a little longer than its basal width **8**
8. ANT PT/BASE 5.9–9.0. R IV+V 1.48–1.75× HT II *Cryptomyzus ballotae* (or *heinzei*?)
 - ANT PT/BASE 9.0–11.5. R IV+V 1.3–1.5× HT II **9**

HOST LISTS AND KEYS

9. SIPH cylindrical or only slightly thickened on distal half, 2.5–4× cauda, which is not constricted at base. R IV with 5–8 accessory hairs *Cryptomyzus ribis*
 – SIPH slightly but distinctly clavate, 4.3–5× cauda, which is slightly constricted at base. R IV with 9–13 accessory hairs *Cryptomyzus taoi*
10. SIPH cylindrical or only slightly swollen on distal half, 0.13–0.18× BL, and 1.5–2.4× cauda *Cryptomyzus galeopsidis*
 – SIPH distinctly clavate, 0.17–0.20× BL and 2.3–4× cauda *Cryptomyzus maudamanti*
11. SIPH slightly to markedly swollen or clavate **12**
 – SIPH tapering or cylindrical **24**
12. Head spiculose, with inner faces of ANT tubercles steep-sided or apically convergent **13**
 – Head smooth, with inner faces of ANT tubercles divergent **14**
13. SIPH black and strongly clavate. ANT III with 5–28 rhinaria. Tergum sclerotic, and often dark. SIPH 2.5–3× the triangular cauda *Rhopalosiphoninus ribesinus*
 – SIPH pale and only slightly clavate. ANT III without rhinaria. Tergum not sclerotic. SIPH 1.9–2.5× the tongue-shaped cauda *Myzus persicae*
14. SIPH ornamented with fine imbrications throughout most of length, even on swollen part **15**
 – SIPH smooth, or with some imbrication basally or apically, but not on swollen part **17**
15. SIPH only slightly swollen on distal half, with maximum width of swollen part 1.05–1.2× minimum diameter basad *Hyperomyzus ribiellus* (partim)
 – SIPH distinctly clavate, with maximum width of swollen part 1.5–2.6× minimum diameter basad **16**
16. R IV+V shorter than HT II *Hyperomyzus petiolaris*
 – R IV+V longer than HT II *Hyperomyzus nabali*
17. Dorsum with extensive black sclerotic markings, including a black patch on ABD TERG 2–4(–5). SIPH black, spindle-shaped. Cauda black *Hyperomyzus rhinanthi*
 – Dorsum pale or only with small dark intersegmental markings. SIPH pale, dusky, or dark-tipped, clavate. Cauda pale **18**
18. SIPH 2.9–4.1× cauda. ANT III with 0–2 rhinaria *Cryptomyzus stachydis*
 – SIPH 1.3–2.0× cauda. ANT III with 0–40 rhinaria **19**
19. R IV+V 0.88–1.25× HT II, and SIPH with maximum width of swollen part less than 2× minimum width basad. ANT III with 0–14 rhinaria; if present these are usually restricted to basal half **20**
 – R IV+V 1.2–1.7× HT II, but if less than 1.3× then SIPH has maximum width of swollen part more than 2× minimum width basad. ANT III with 8–40 rhinaria, often extending in an irregular row onto distal half **23**
20. ANT III without or sometimes with 1–4 rhinaria. ANT PT/BASE 2.5–4.5 (fund.) **21**
 – ANT III with (0–)4–12 rhinaria. ANT PT/BASE 4.3–7.7 **22**
21. SIPH 1.2–1.9× ANT PT. R IV+V 0.9–1.01× HT II. ANT PT/BASE 2.5–3.6(–4.1) *Hyperomyzus lactucae* (fund.)
 – SIPH 0.6–1.1× ANT PT. R IV+V 1.0–1.25× HT II. ANT PT/BASE (3.1–)3.5–4.5 *Hyperomyzus pallidus* (fund.)
22. ANT PT/BASE 4.2–5.5(–6.0). R IV+V 0.88–1.0× HT II. SIPH (1.65–)1.7–2.0× cauda. (Al. with dark dorsal patch fenestrated) *Hyperomyzus lactucae*
 – ANT PT/BASE 5.5–7.8. R IV+V 0.99–1.14× HT II. SIPH 1.45–1.7(–1.83)× cauda. (Al. with solid dark dorsal patch) *Hyperomyzus pallidus*

23. R IV+V 1.2–1.35× HT II. Maximum width of swollen part of SIPH 2.1–2.6× minimum width of stem, which is narrower than hind femur at midlength *Hyperomyzus zirnitsi*
 – RIV+V 1.5–1.7× HT II. Maximum width of swollen part of SIPH 1.3–1.6× minimum width of stem, which is thicker than hind femur at midlength *Hyperomyzus picridis*
24. Thoracic spiracular apertures much larger than abdominal ones. ANT III with 0–52 rhinaria **25**
 – Thoracic spiracular apertures similar in size to abdominal ones. ANT III with 0–10 rhinaria **38**
25. Abdominal spiracular apertures almost circular, not covered with a cowl-like operculum. Cauda usually with 7–9 hairs (1 dorsoapical and 3–4 lateral pairs) **26**
 – Abdominal spiracular apertures reniform or oval, partially covered by cowl-like opercula. Cauda usually with 5 hairs (1 dorsoapical and 2 lateral pairs), rarely with 4, 6, 7 or 8 **27**
26. SIPH imbricated throughout length, 2.4–2.7× cauda. ANT III with 7–37 rhinaria, not restricted to basal half, and longest hairs 1.0–1.3× BD III *Hyperomyzus ribiellus* (partim)
 – SIPH with little or no imbrication except near apices, 1.6–2.2× cauda. ANT III with 0–18 rhinaria on basal half, and longest hairs 0.7–1.1× BD III *Nasonovia ribisnigri*
27. Sec. rhinaria tuberculate. Tergum pale **28**
 – Sec. rhinaria sunken, flat or only very slightly protruding. Tergum pale or dark, or with dark markings **29**
28. R IV+V 2.1–2.9× HT II, with 20–24 accessory hairs. ANT PT/BASE 3.8–5.0. ANT III with 10–19 rhinaria, and longest hairs 1.2–1.8× BD III *Nasonovia muesbecki*
 – R IV+V c.1.4× HT II, with c. 9–10 accessory hairs. ANT PT/BASE c.7. ANT III with c.28–32 rhinaria, and longest hairs c1.0× BD III *Nasonovia vannesii*
29. SIPH dark, 2.6–3.0× cauda. Dorsum with an extensive black shield extending from metanotum to ABD TERG 5 or 6, but not extending laterally on abdomen to spiracles and marginal sclerites *Nasonovia grossa*
 – SIPH pale or dark, 0.9–2.4× cauda. Dorsum pale or with dark markings, or if with extensive dark pigmentation this includes marginal sclerites **30**
30. SIPH with spinulose imbrication over almost entire length **31**
 – SIPH almost smooth or wrinkled, but with spinulose imbrication only on distal part **37**
31. SIPH and cauda dark. Dorsal abdomen usually with dark sclerotisation, consisting of dark sclerites or cross-bars or a complete shield extending to marginal sclerites **32**
 – SIPH pale or dark-tipped, cauda pale. Dorsal abdomen pale or variably sclerotised, but never with an extensive dark area (*Nasonovia houghtonensis* s.lat.) **33**
32. R IV+V 0.13–0.14 mm, 1.5–1.7× HT II, with 7–12 accessory hairs. Longest hairs on ANT III 1.1–1.5×BD III. ANT PT/BASE 3.5–3.7. SIPH 0.07–0.11× BL *Nasonovia arizonensis*
 – R IV+V 0.15–0.18 mm, 2.0–2.1× HT II, with 16–18 accessory hairs. Longest hairs on ANT III 1.6–2.0× BD III. ANT PT/BASE 3.8–4.5. SIPH 0.19–0.27× BL *Nasonovia ribifolii*
33. SIPH 0.30–0.57 mm long, usually more than 1.5× cauda. R IV+V 1.8–2.7× HT II. (Al. with 30–63 rhinaria on ANT III) *Nasonovia houghtonensis* ssp. *cerei*
 – SIPH 0.17–0.33 mm long, usually less than 1.5× cauda. R IV+V 1.4–2.1× HT II. (Al. with 16–30 rhinaria on ANT III) **34**
34. R IV+V 1.4–1.7× HT II, with 10–14 accessory hairs *Nasonovia houghtonensis* ssp. *houghtonensis*
 – R IV+V 1.6–2.1× HT II, with 12–23 accessory hairs **35**

HOST LISTS AND KEYS

35. R IV+V with 12–13 accessory hairs *Nasonovia houghtonensis* ssp. *occidentalis*
 – R IV+V with 14–23 accessory hairs **36**
36. Prothorax and ABD TERG 2–5 usually with well-developed marginal tubercles (MTu). ABD TERG 3 usually with 4 marginal hairs on each side *Nasonovia houghtonensis* ssp. *russellae*
 – MTu usually absent. ABD TERG 3 usually with 2 marginal hairs on each side *Nasonovia houghtonensis* ssp. *similis*
37. ABD TERG 1–7 usually with a pattern of more-or-less fused dark sclerites or cross-bars. SIPH almost smooth, and dusky or dark, sometimes with paler middle section *Nasonovia brachycyclica*
 – Dorsal abdomen pale, rarely with rather pale indistinct sclerites. SIPH pale, usually with some imbrication, occasionally dusky or dark *Nasonovia cynosbati*
38. ANT tubercles very well developed, with divergent inner faces. SIPH with a subapical zone of polygonal reticulation. ABD TERG 1 and 7 without marginal tubercles (MTu) **39**
 – ANT tubercles undeveloped or weakly developed. SIPH without polygonal reticulation. ABD TERG 1 and 7 always with MTu **40**
39. ANT PT/BASE c.7. R IV+V 1.1–1.2× HT II *Macrosiphum bisensoriatum*
 – ANT PT/BASE 5.3–6.2. R IV+V 0.8–1.0× HT II *Macrosiphum euphorbiae*
40. R IV+V with 3–12 accessory hairs **41**
 – R IV+V with 2 accessory hairs **46**
41. Hairs on ANT III very long, fine and wavy, the longest of them 1.8–4× BD III **42**
 – Hairs on ANT III straight or curved, not fine and wavy, maximally 1–2× BD III **44**
42. SIPH 0.13–0.23 mm long, 0.08–0.10× BL, 0.8–1.0× cauda *Aphis manitobensis*
 – SIPH 0.23–0.38 mm long, 0.12–0.25× BL, and 1.0–2.2× cauda **43**
43. ABD TERG 2–5 as well as 1 and 7 with well-developed marginal tubercles (MTu) *Aphis schneideri*
 – ABD TERG 2–5 only sporadically with small MTu *Aphis varians*
44. Marginal tubercles (MTu) present at least on some of ABD TERG 2–6 *Aphis grossulariae*
 – MTu usually absent from ABD TERG 2–6 **45**
45. ANT III usually with 1–8, and IV with 0–2, rhinaria, on distal halves of segments; these are of bursiform type, i.e. sunk in pits, with small irregular-shaped openings. Longest hairs on ABD TERG 8 usually less than 55 µm long. Dorsal cuticle distinctly reticulated. HT I with 2 hairs (no sense peg) *Aphis solitaria*
 – ANT III and IV without rhinaria. Hairs on ABD TERG 8 rarely less than 55 µm long. Dorsal cuticle not reticulated. HT I with 3 hairs *Aphis oenotherae*
46. SIPH and cauda pale or dusky, SIPH sometimes dark-tipped **47**
 – SIPH and cauda black **49**
47. ANT PT/BASE 1.8–3.0. SIPH 0.9–1.6× cauda. longest hairs on ANT III 0.4–0.7× BD III *Aphis nasturtii*
 – ANT PT/BASE 1.1–1.8. SIPH 0.7–1.3× cauda. Longest hairs on ANT III 0.7–1.2× BD III **48**
48. SIPH 1.5–2.0× longer than their basal width, shorter than ANT PT, and also shorter than cauda. (Sec. rhin. in al. III 9–20, IV 4–6, V 0) *Aphis mimuli*
 – SIPH 2.0–3.5× longer than their basal width, longer than ANT PT and often longer than cauda. (Sec. rhin. in al. III 25–60, IV 9–25, V 7–17) *Aphis triglochis*

49. SIPH 0.75–1.1× ANT III and 1.8–2.7× ANT BASE VI. ANT PT 0.27–0.46 mm, and ANT PT/BASE 2.1–3.8 (mostly 2.4–3.6). Cauda not constricted near midlength and bearing 11–24 hairs. ABD TERG 7 and 8 with dark bands, and dark dorsal markings also usually present anterior to SIPH. (Al. with 10–23 rhinaria on ANT III) *Aphis fabae*
- SIPH 1.1–1.45× ANT III and 2.8–3.4× ANT BASE VI. ANT PT 0.22–0.29 mm, and ANT PT/BASE 2.1–2.6. Cauda usually clearly constricted near midlength and bearing 6–15 (usually 9–11) hairs. Abdomen without any dark markings. (Al. with 4–12 rhinaria on ANT III) *Aphis spiraeicola*

Richardia Kunth. see Zantedeschia**Richardia L.***R. pilosa***Rubiaceae***Aphis spiraeicola; Myzus ascalonicus, ornatus*

Use key to polyphagous aphids, p. 1020.

Ricinus*R. communis***Euphorbiaceae***Aphis fabae, gossypii; Myzus persicae;*
[*Chromaphis juglandicola*]

Use key to polyphagous aphids, p. 1020.

Riedlea see Melochia**Ritchiea***Ritchiea* sp.**Capparidaceae***Aphis gossypii***Robinia** see Blackman and Eastop (1994)**Rochea see Crassula****Rodriguezia***Rodriguezia* sp.**Orchidaceae***Sitobion luteum***Roegneria see Elymus****Roemeria***Roemeria* sp.**Papaveraceae***Acyrtosiphon ilka***Romneya***R. coulteri***Papaveraceae***Aulacorthum solani***Rorippa (incl. Nasturtium, Radicula)***R. amphibia***Cruciferae***Aphis fabae, nasturtii, triglochinis;*
Lipaphis erysimi; Myzus ascalonicus; Neomyzus circumflexus
Aphis frangulae, nasturtii, triglochinis
Myzus ascalonicus
Aphis triglochinis
Aphis craccivora
*Aphis roripae**R. aquatica**R. atrovirens**R. austriaca**R. heterophylla**R. hispida*

HOST LISTS AND KEYS

<i>R. humifusa</i>	<i>Lipaphis pseudobrassicae</i>
<i>R. indica</i>	<i>Aphis craccivora</i> , <i>gossypii</i> , <i>nasturtii</i> ; <i>Aulacorthum magnoliae</i> ; <i>Lipaphis pseudobrassicae</i> ; <i>Myzus ascalonicus</i> , <i>ornatus</i> , <i>persicae</i> ; <i>Neotoxoptera oliveri</i>
<i>R. islandica</i>	<i>Aphis nasturtii</i> ; <i>Lipaphis erysimi</i> , <i>pseudobrassicae</i>
<i>R. kernerii</i>	<i>Aphis nasturtii</i>
<i>R. microphylla</i>	<i>Aphis nasturtii</i>
<i>R. nasturtium</i>	<i>Aphis nasturtii</i> ; <i>Lipaphis pseudobrassicae</i> ; <i>Myzus persicae</i>
<i>R. nasturtium-aquaticum</i> = <i>officinalis</i>	
<i>R. obtusa</i>	<i>Aphis mimuli</i>
<i>R. officinalis</i>	<i>Aphis mimuli</i> , <i>nasturtii</i> , <i>triglochinis</i> ; <i>Lipaphis erysimi</i> ; <i>Myzus ascalonicus</i> , <i>cerasi</i> , <i>ornatus</i> , <i>persicae</i> ; <i>Pemphigus</i> sp.; <i>Rhopalosiphum nymphaeae</i>
<i>R. officinalis</i> × <i>microphylla</i>	<i>Myzus ascalonicus</i>
<i>R. palustris</i>	<i>Aphis gossypii</i> , <i>nasturtii</i> , <i>spiraecola</i> ; <i>Lipaphis erysimi</i>
<i>R. portoricensis</i>	<i>Aphis spiraecola</i> ; <i>Myzus persicae</i>
<i>R. sinuata</i>	<i>Pemphigus populitransversus</i>
<i>R. sylvestris</i>	[<i>Acyrtosiphon pisum</i>]; <i>Aphis nasturtii</i> , <i>triglochinis</i> ; <i>Lipaphis erysimi</i>
<i>Rorippa</i> spp.	<i>Brevicoryne</i> sp. of David and Hameed, 1975, <i>nec</i> Nevsky; <i>Macrosiphum euphorbiae</i>

Key to apterae on *Rorippa*:-

1. ANT PT/BASE less than 0.5. SIPH absent. Wax pore-plates on posterior abdomen 11
 - ANT PT/BASE more than 1.0. SIPH present. No wax pore-plates 2
2. ANT tubercles absent or weakly developed, or if rather well developed then median frontal tubercle is also similarly developed, so that front of head is convex, straight or sinuate in dorsal view. ABD TERG 1 and 7 with or without marginal tubercles (MTu) 3
 - ANT tubercles well developed, so that there is a frontal sinus. ABD TERG 1 and 7 never with MTu 11
3. SIPH slightly to distinctly swollen in middle, or on distal half 4
 - SIPH tapering or cylindrical, with no trace of swelling 7
4. SIPH clavate, i.e. with narrow section on basal half. Dorsal cuticle ornamented with spinules arranged in polygons 11
 - SIPH with narrowest part just proximal to flange. Dorsal cuticle without spinulose ornamentation 5
5. ANT III more than 2× SIPH, which are 0.6–0.8× cauda. ABD TERG all with large paired dark sclerites which may be joined medially to form broad cross-bands 11
 - ANT III 1.2–1.7× SIPH, which are 1.3–1.6× cauda. ABD TERG 2–4 usually without dark markings (except intersegmental ones) in mounted preparations 6
6. ANT III+PT together 1.95–2.5× SIPH (90% of specimens less than 2.4×) 11
 - ANT III+PT together 2.1–3.2× SIPH (90% of specimens more than 2.4×) 6

Lipaphis pseudobrassicae

7. SIPH and cauda black go to key to polyphagous aphids, p. 1020, starting at couplet 24
 – SIPH and cauda pale or dusky, SIPH sometimes dark-tipped 8
8. ANT 5-segmented, with ANT PT/BASE 3.5–4.5. ANT III usually with 1–9 rhinaria *Aphis roripae*
 – ANT usually 6-segmented. ANT PT/BASE 1.1–3.0. ANT III usually without rhinaria 9
9. ANT PT/BASE 1.8–3.0. SIPH 0.9–1.6× cauda. Longest hairs on ANT III 0.4–0.7× BD III *Aphis nasturtii*
 – ANT PT/BASE 1.1–1.8. SIPH 0.7–1.3× cauda. Longest hairs on ANT III 0.7–1.2× BD III 10
10. SIPH 1.5–2.0× longer than their basal width, shorter than ANT PT, and also shorter than cauda.
 (Sec. rhin. in al. III 9–20, IV 2–6, V 0) *Aphis mimuli*
 – SIPH 2.0–3.5× longer than their basal width, longer than ANT PT and often longer than cauda.
 (Sec. rhin. in al. III 25–60, IV 9–25, V 7–17) *Aphis triglochis*
11. SIPH and cauda entirely black. Dorsum with extensive dark pigmentation. Head densely spiculate,
 with ANT tubercles scabrous and apically convergent *Myzus cerasi*
 – Without that combination of characters go to key to polyphagous aphids, p. 1020

Rosa (incl. *Hulthemia*)*R. abyssinica**R. acicularis**R. alba**R. alberti**R. alpina**R. amblyotis**R. americana**R. andersoni**R. banksiae**R. beggeriana**R. bruniana**R. brunonii**R. californica**R. canina**R. carolina***Rosaceae***Macrosiphum euphorbiae*; *Pseudaphis abyssinica**Longicaudus trirhodus*; *Macrosiphum mordvilkoii*, *rosae*;*Maculolachnus sijpkensis*, *submacula*;*Metopolophium dirhodum*; *Myzaphis rosarum*;*Pseudocercidis rosae**Aphis gossypii*; *Macrosiphum mordvilkoii**Chaetosiphon chaetosiphon*;*Myzaphis juchnevitshae*, *tianshanica**Macrosiphum rosae*; *Metopolophium alpinum*;*Wahlgreniella ossiannilssoni**Maculolachnus submacula**Macrosiphum rosae**Macrosiphum rosae**Macrosiphum rosae*; *Sitobion ibarae**Amphorophora catharinae*; *Metopolophium dirhodum*;*Myzaphis turanica**Myzaphis turanica**Chaetosiphon glabum*, *gracilicorne*; *Myzaphis bucktoni**Macrosiphum rosae**Aphis gossypii*, *spiraecola*; *Chaetosiphon tetrarhodum*;*Longicaudus dunlopi*, *trirhodus*;*Macrosiphum rosae*; *Maculolachnus submacula*;*Metopolophium dirhodum*, [*fasciatum* (sexuales only)];*Myzaphis bucktoni*, *rosarum*; [*Pterocomma ?steinheili*];*Rhodobium porosum*; *Sitobion fragariae*, *rosaeiformis*;*Toxoptera aurantii**Chaetosiphon* [*fragaefolii*], *thomasi*;*Macrosiphum impatientis*, *rosae*;*Myzaphis rosarum*; *Rhodobium porosum*

HOST LISTS AND KEYS

- R. centifolia* (incl. var. *gallica*)
Aphis fabae; *Chaetosiphon tetrarhodum*;
Longicaudus trirhodus; *Macrosiphum rosae*;
Maculolachnus submacula; *Metopolophium dirhodum*;
Myzaphis rosarum; *Rhodobium porosum*;
Sitobion ibarae, rosaeiformis
- R. chinensis*
Longicaudus trirhodus; *Macrosiphum euphorbiae, rosae*;
Myzaphis rosarum; *Rhodobium porosum*;
[*Rhopalosiphum nymphaeae*]; *Sitobion ibarae, rosivorum*
Macrosiphum rosae; *Metopolophium dirhodum*
- R. cinnamomea*
R. coreana
R. damascena
R. damascus
R. davurica
Sitobion ibarae
Macrosiphum rosae
[*Aphis umbrella (gossypii?)*]; *Sitobion rosaeiformis*
Chaetosiphon coreanum; *Longicaudus trirhodus*;
Macrosiphum mordvilkoii, rosae; *Myzaphis rosarum*;
Myzus japonensis
- R. eglanteri*
Chaetosiphon tetrarhodum; *Macrosiphum rosae*;
Metopolophium dirhodum
- R. fedtschenkoana*
R. fendleri
Chaetosiphon chaetosiphon; *Myzaphis turanica*
Acyrtosiphon pentatrachopus;
Chaetosiphon thomasi, [sp. near *thomasi* (western USA)];
Eomacrosiphum nigromaculosum;
Maculolachnus submacula
- R. foetida* (incl. *lutea*)
R. gallica
Macrosiphum rosae
Aphis fabae; *Chaetosiphon tetrarhodum*;
Macrosiphum rosae; *Myzaphis rosarum*; *Rhodobium porosum*
- R. genuina* see *polyantha*
R. glauca
R. gymnocarpa
R. helenae
R. hugonis
R. indica (incl. *pumilaplana*)
Metopolophium dirhodum; *Myzaphis rosarum*
Macrosiphum euphorbiae
Macrosiphum rosae
Macrosiphum rosae
Chaetosiphon tetrarhodum; *Macrosiphum rosae*;
Myzaphis rosarum; *Rhodobium porosum*;
Sitobion [miscanthi], *rosaeiformis*
Raychaudhuriaphis capitata
- R. involucrata*
R. kokandica
R. laevigata
R. laxa
R. luciae
R. lutea see *foetida*
R. macrophylla
Chaetosiphon chaetosiphon
[*Macrosiphum floridae*]
Amphorophora catharinae
Myzaphis rosarum
- Chaetosiphon glabrum, gracilicorne*;
Longicaudus naumanni; *Macrosiphum rosae*;
Myzaphis avariolosa, bucktoni, rosarum;
Sitobion rosaeiformis
- R. majalis*
Chaetosiphon tetrarhodum; *Longicaudus trirhodus*;
Macrosiphum rosae; *Myzaphis rosarum*; *Rhodobium porosum*
- R. marretii*
R. maximowicziana
Longicaudus trirhodus
Aphis neospiraeae; *Longicaudus trirhodus*;
Macrosiphum mordvilkoii, rosae

<i>R. montana</i>	<i>Longicaudus trirhodus</i>
<i>R. moschata</i>	<i>Chaetosiphon gracilicorne</i>
<i>R. multiflora</i>	<i>Aphis gossypii</i> ; <i>Chaetosiphon coreanum</i> , <i>tetrarhodum</i> , <i>Chaetosiphon</i> sp. near <i>thomasi</i> (New Zealand); <i>Longicaudus trirhodus</i> ; <i>Macrosiphum impatientis</i> , <i>mordvilkoii</i> , <i>perillae</i> , <i>rosae</i> ; <i>Metopolophium dirhodum</i> ; <i>Myzaphis rosarum</i> ; <i>Rhodobium porosum</i> ; [<i>Schizoneura rosaefoliae</i> Shinji (nomen dubium)]; <i>Sitobion akebiae</i> , <i>fragariae</i> , <i>ibarae</i> , <i>kamtshaticum</i> <i>Metopolophium dirhodum</i> ; <i>Myzaphis rosarum</i>
<i>R. nanothamnus</i>	[<i>Chaetosiphon minor</i>]; <i>Macrosiphum rosae</i> ;
<i>R. nitida</i>	<i>Metopolophium dirhodum</i>
<i>R. nutkana</i>	<i>Eomacrosiphum nigromaculosum</i> ; <i>Ericaphis fimbriata</i> , <i>wakibae</i> ; <i>Macrosiphum rosae</i> ; <i>Metopolophium dirhodum</i> ;
<i>R. omeiensis</i>	[<i>Longicaudus netuba</i>]; <i>Myzaphis rosarum</i>
<i>R. palustris</i>	<i>Macrosiphum euphorbiae</i>
<i>R. pendulina</i>	<i>Macrosiphum rosae</i> ; <i>Metopolophium dirhodum</i>
<i>R. persica</i>	<i>Acyrtosiphon gossypii</i>
<i>R. pimpinellifolia</i>	<i>Myzaphis rosarum</i>
<i>R. platyacantha</i>	<i>Amphorophora catharinae</i>
<i>R. polyantha</i> (incl. <i>genuina</i>)	<i>Aphis gossypii</i> ; <i>Chaetosiphon coreanum</i> ; <i>Sitobion ibarae</i>
<i>R. pomifera</i>	<i>Metopolophium alpinum</i> , <i>dirhodum</i> ; <i>Myzaphis rosarum</i>
<i>R. rouletti</i>	<i>Chaetosiphon tetrarhodum</i> ; <i>Macrosiphum rosae</i> ; <i>Rhodobium porosum</i>
<i>R. rubiginosa</i>	[<i>Aphis rosasuaveolens</i> Rafinesque (invalid name)]; <i>Chaetosiphon tetrarhodum</i> ; <i>Longicaudus trirhodus</i> ; <i>Macrosiphum euphorbiae</i> , <i>rosae</i> ; <i>Metopolophium dirhodum</i> <i>Macrosiphum rosae</i>
<i>R. rubrifolia</i>	<i>Acyrtosiphon gossypii</i> ; [<i>Anoecia corni</i>];
<i>R. rugosa</i> (incl. vars <i>typica</i> , <i>gregeliana</i>)	<i>Chaetosiphon coreanum</i> , [<i>fragaefolii</i>], <i>tetrarhodum</i> , <i>thomasi</i> ; <i>Ericaphis wakibae</i> ; <i>Longicaudus trirhodus</i> ; <i>Macrosiphum euphorbiae</i> , <i>mordvilkoii</i> , <i>rosae</i> ; <i>Metopolophium alpinum</i> , <i>dirhodum</i> ; <i>Myzaphis rosarum</i> ; <i>Myzus japonensis</i> , <i>ornatus</i> , <i>persicae</i> ; <i>Rhodobium porosum</i> <i>Longicaudus trirhodus</i>
<i>R. sempervirens</i>	<i>Macrosiphum euphorbiae</i>
<i>R. sericea</i> (incl. var. <i>pteragantia</i>)	<i>Metopolophium dirhodum</i> ; <i>Myzaphis rosarum</i> ;
<i>R. setigera</i>	<i>Sitobion fragariae</i> <i>Chaetosiphon tetrarhodum</i>
<i>R. setipoda</i>	<i>Chaetosiphon tetrarhodum</i> ; <i>Macrosiphum rosae</i> ;
<i>R. sicula</i>	<i>Metopolophium dirhodum</i> <i>Chaetosiphon tetrarhodum</i> ; <i>Macrosiphum rosae</i> ;
<i>R. spinosissima</i>	<i>Myzaphis rosarum</i> ; <i>Rhodobium porosum</i> ; <i>Wahlgreniella ossiannilssoni</i>
<i>R. suaveolens</i>	<i>Sitobion akebiae</i> , <i>ibarae</i>
<i>R. sweginzowii</i>	<i>Metopolophium dirhodum</i>

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<i>R. tomentosa</i>	<i>Myzaphis bucktoni</i>
<i>R. villosa</i>	<i>Chaetosiphon tetrarhodum</i> ; <i>Longicaudus trirhodus</i> ; <i>Macrosiphum rosae</i> ; <i>Maculolachnus submacula</i> ; <i>Metopolophium alpinum</i> , [<i>dirhodum</i>]; <i>Myzaphis bucktoni</i>
<i>R. virginiana</i>	<i>Macrosiphum rosae</i> ; <i>Metopolophium dirhodum</i>
<i>R. webbiana</i>	<i>Chaetosiphon glabrum</i>
<i>R. wichuraiana</i>	<i>Macrosiphum rosae</i>
<i>R. woodsii</i>	<i>Ericaphis wakibae</i> ; <i>Macrosiphum rosae</i> ; <i>Pseudocercidis rosae</i>
<i>R. ×anthina</i>	<i>Ferusaphis xanthinae</i> ; <i>Myzaphis rosarum</i> ; <i>Rhodobium porosum</i>
<i>Rosa</i> spp. (incl. cult.)	<i>Acyrtosiphon malvae</i> group, <i>pseudodirhodum</i> ; <i>Amphorophora</i> [<i>ampullata</i> ssp. <i>bengalensis</i>]; <i>Aphiduromyzus rosae</i> ; <i>Aphis craccivora</i> , <i>stranvaesia</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus</i> [<i>amygdalinus</i>], <i>helichrysi</i> ; [<i>Cavariella aegopodii</i> , <i>salicicola</i>]; <i>Chaetosiphon chaetosiphon</i> ssp. <i>montanum</i> , [<i>jacobi</i>], <i>Chaetosiphon</i> sp. near <i>glabrum</i> (Kashmir; BMNH colln, leg. N. Rishi); [<i>Hyalomyzus raoi</i>]; [<i>Impatientinum asiaticum</i> ssp. <i>dalhousiensis</i>]; <i>Longicaudus himalayensis</i> of David <i>et al.</i> (1970); [<i>Macrosiphoniella leucanthemi</i>]; <i>Macrosiphum centranthi</i> , [<i>davisi</i> del Guercio ex Mason, 1921 (nomen nudum)], [<i>kiowanepus</i>], <i>pachysiphon</i> , <i>pallidum</i> ; [<i>Matsumuraja capitophoroides</i> , <i>rubifoliae</i>]; <i>Metopolophium</i> [<i>chandrani</i>], <i>montanum</i> , <i>rosaesuctum</i> ; [<i>Ovatus malisuctus</i>]; [<i>Neomasonaphis inulae</i>]; <i>Neomyzus circumflexus</i> ; [<i>Longicaudus netuba</i>]; <i>Pseudocercidis tutigulus</i> ; [<i>Rhopalosiphum nymphaeae</i>]; <i>Toxoptera odinae</i> ; <i>Wahlgreniella nervata</i>

Key to apterae on *Rosa*:-

Notes: Blackman and Eastop (2000) provided an illustrated key to aphids on cultivated roses. The present key is considerably extended to cover all *Rosa* spp. Certain *Rubus*-feeding aphids such as *Matsumuraja* spp. may sometimes be found on *Rosa* but are not included, so if this key does not provide a satisfactory answer, it might be worthwhile to try the key to apterae on *Rubus*. From couplet 8 onwards, the key cannot be applied to fundatrices.

- | | |
|--|--------------------------------|
| 1. ANT PT/BASE 0.25 or less. SIPH as pores on flat dark discs | 2 |
| – ANT PT/BASE more than 0.5. SIPH tubular, conical or absent | 3 |
| 2. Dorsal abdominal hairs arising from dark scleroites | <i>Maculolachnus submacula</i> |
| – Dorsal abdominal hairs not arising from dark scleroites | <i>Maculolachnus sijpensi</i> |
| 3. SIPH 0.17–0.55× cauda, or absent (in fund.). First tarsal segments with 6 hairs | 4 |
| – SIPH at least 0.8× cauda. First tarsal segments with 2–6 hairs | 7 |
| 4. R IV+V 0.85–1.0× HT II. (Spring populations consisting only of fund. without SIPH, and emigrant al.) | <i>Longicaudus naumanni</i> |
| – R IV+V either 0.6–0.8 or c.1.1× HT II. (Spring populations incl. 2nd generation apt. with SIPH 0.17–0.55× cauda) | 5 |

5. R IV+V c.1.1× HT II *Longicaudus himalayensis* of David *et al.*, 1970
 – R IV+V 0.6–0.8× HT II 6
6. ANT PT/BASE 0.91–1.46. SIPH 0.28–0.41× cauda *Longicaudus trirhodus*
 – ANT PT/BASE 1.6–2.1. SIPH 0.17–0.26× cauda *Longicaudus dumlopi*
7. (Spring colonies consisting only of fund. and emigrant al.) SIPH clavate, pale on basal 0.4 but dark in middle and at apex, c. 2× cauda which bears 5 hairs. ANT III with (0–)1–4 rhinaria clustered near base *Wahlgreniella ossiannilssoni*
 – Spring populations with 2nd and/or 3rd generation apt., and without that combination of characters 8
8. Dorsal body hairs long and usually thick, with expanded or capitate apices, often much longer than ANT BD III, and arising from prominent tuberculate bases (usually such hairs are on all tergites, but in one species only on head and ABD TERG 8 or 7–8). First tarsal segments with 5 hairs 9
 – Dorsal body hairs with blunt or pointed apices, usually shorter than or as short as ANT BD III, or if longer then pointed and/or without prominent tuberculate bases. First tarsal segments with 2–6 hairs 15
9. SIPH bearing several long capitate hairs 10
 – SIPH without capitate hairs 11
10. SIPH 1.25–1.75× cauda. R IV+V 1.05–1.35× HT II. Hairs on ANT IV and V similar in length to, or only a little shorter than, those on ANT III *Chaetosiphon chaetosiphon*
 – SIPH 2.0–3.2× cauda. R IV+V 0.85–1.0× HT II. Hairs on ANT IV and V all clearly shorter than the longest hairs on ANT III, and shorter than basal diameters of the segments on which they are placed *Chaetosiphon gracilicorne*
11. Dorsal hairs on ABD TERG 1–7 all very small, long hairs only being present on head and ABD TERG 8 or 7–8 *Chaetosiphon* sp. near *glabrum*
 – ABD TERG 1–7 with long hairs 12
12. ANT PT/BASE less than 2 13
 – ANT PT/BASE more than 2 (except fund.) 14
13. SIPH less than 1.5× cauda. Dorsal hairs tapering, with apices only slightly expanded. Tergum wrinkled, with dusky cross-bands *Chaetosiphon glabrum*
 – SIPH more than 2× cauda. Dorsal hairs very thick, almost cylindrical, with apices markedly expanded. Tergum papillated, pale *Chaetosiphon coreanum*
14. Head smooth dorsally. SIPH less than 2.5× cauda *Chaetosiphon tetrarhodum*
 – Head spinulose dorsally. SIPH more than 2.5× cauda *Chaetosiphon thomasi*
15. Dorsal thoracic and abdominal cuticle strongly rugose, papillate or variolate. ANT PT/BASE often less than 1.8 16
 – Dorsal cuticle smooth, or if somewhat rugose then wrinkled or corrugated. ANT PT/BASE mostly more than 1.8 22
16. ANT tubercles well developed and bearing forwardly directed processes. Median frontal tubercle undeveloped. SIPH strongly clavate, and more than 3× cauda, which is swollen on basal half *Ferusaphis xanthinae**
 – ANT tubercles undeveloped or developed but lacking forwardly-directed processes. SIPH cylindrical or clavate, and less than 3× cauda, which is not swollen basally 17

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17. ANT tubercles well developed, divergent, and median frontal process undeveloped, so that there is a frontal sinus. ANT 0.9–1.25× BL, with ANT PT/BASE 2.6–3.6. First tarsal segments with 3 hairs. R IV+V stiletto-shaped, 1.3–1.6× HT II *Raychaudhuriaphis capitata**
 – ANT tubercles weakly developed, but median frontal tubercle often very well developed, and middle part of front of head always furthest forward in dorsal view. ANT less than 0.5× BL, with ANT PT/BASE 0.7–1.8. First tarsal segments with 5 hairs. R IV+V not stiletto-shaped, 0.7–1.1× HT II **18**
18. Front of head broadly convex in dorsal view, with no distinct median frontal tubercle. ANT PT/BASE 0.6–0.9. SIPH distinctly clavate, 1.5–1.9× cauda *Myzaphis juchnevitschae**
 – Median frontal tubercle evident, quadrate or rounded in shape. ANT PT/BASE 0.8–1.75. SIPH cylindrical or clavate, 1.6–2.4× cauda **19**
19. Dorsal body hairs long and pointed, much longer than ANT BD III *Myzaphis tianshanica**
 – Dorsal body hairs short and blunt, much shorter than ANT BD III **20**
20. Median frontal tubercle rounded, bearing 4 hairs mostly 1.1–2.0× ANT BD III. Dorsum with two broad dark longitudinal pleural stripes *Myzaphis bucktoni*
 – Median frontal tubercles quadrate or rounded (sometimes rather low), bearing 2–4 hairs 0.3–1.1× ANT BD III. Dorsum pale **21**
21. Median frontal tubercle quadrate, usually with 2 hairs 0.3–0.6× ANT BD III. ANT PT/BASE 1.25–1.75. SIPH clavate. Subgenital plate with only 4–7 hairs *Myzaphis rosarum*
 – Median frontal tubercle rounded, sometimes rather low, with 2–4 hairs 0.8–1.1× BD III. ANT PT/BASE 0.8–1.4. SIPH cylindrical or only very slightly swollen distally. Subgenital plate with 9–12 hairs *Myzaphis turanica*
22. Head with numerous spicules, at least on ventral surface. ANT tubercles steep-sided and spiculate or scabrous **23**
 – Head without spicules, or with a few minute ones. ANT tubercles variously developed, if well developed then with smooth divergent inner faces **31**
23. First tarsal segments with 5 hairs. ANT PT/BASE 1.6–2.0 *Myzaphis avariolosa*
 – First tarsal segments with 2–3 hairs. ANT PT/BASE 1.7–5.5 **24**
24. ANT III with (2–) 5–18 rather large rhinaria in a row, the sensoriated part often being infuscated. Cauda with 5–8 (usually 7) hairs, the basal 4 hairs being long and pointed and the distal 3–4 short and blunt *Rhodobium porosum*
 – ANT III without rhinaria or with 1–4 small rhinaria near base. Distal caudal hairs not evidently shorter than basal ones **25**
25. Dorsum with a large black U-shaped patch, and broad dark cross-bars or paired patches on thorax *Neomyzus circumflexus*
 – Dorsum without a U-shaped patch, with or without other pigmentation **26**
26. ANT III with 1–2 (–4) small rhinaria near base (rarely 0 on one side) *Aulacorthum solani*
 – ANT III without rhinaria **27**
27. SIPH clavate. R IV+V 0.9–1.0 (–1.1)× HT II *Myzus persicae*
 – SIPH cylindrical or tapering, or slightly swollen subapically, in which case R IV+V is more than 1.1× HT II **28**

28. Dorsum with an intersegmental pattern of dark ornamentation. ANT 0.5–0.6× BL, with ANT PT/BASE 1.7–2.8 *Myzus ornatus*
- Dorsum with or without more extensive dark sclerotisation. ANT 0.65–1.2× BL, with ANT PT/BASE 2.5–5.0 **29**
29. Head densely spiculate dorsally as well as ventrally. Inner faces of ANT tubercles with apically convergent processes. Median frontal tubercle undeveloped. R IV+V 1.3–1.4× HT II. SIPH 2.5–2.8× cauda, which is constricted near base *Myzus japonensis*
- Dorsal surface of head without or with only a few spicules. Inner sides of ANT tubercles not apically convergent. R IV+V 0.8–1.4× HT II. SIPH 1.5–2.7× cauda, which is not constricted at base **30**
30. SIPH 1.5–1.9× cauda. R IV+V less than 0.12 mm, 0.8–1.1× HT II. Dorsal abdomen always pale and membranous *Ericaphis fimbriata*
- SIPH 2.0–2.7× cauda. R IV+V usually more than 0.12 mm, 1.1–1.4× HT II. Dorsal abdomen sclerotic, usually with an ill-defined darker mid-dorsal region of varying extent *Ericaphis wakibae*
31. SIPH pale and 0.17–0.36 mm long, 0.06–0.14× BL. First tarsal segments all with either 5 or 6 hairs. ANT II with 5–7 hairs. R IV+V 0.55–0.70× HT II **32**
- SIPH dark or pale, but if pale then more than 0.36 mm long, and more than 0.14× BL. First tarsal segments with 2, 3 or 5 hairs. ANT II with 4 hairs and/or R IV+V more than 0.75× HT II **33**
32. First tarsal segments with 5 hairs (1 sense peg). Cauda triangular, a little longer than its basal width, with rather pointed apex *Pseudocercidis tutigulus*
- First tarsal segments with 6 hairs (2 sense pegs). Cauda pentagonal or rounded apically, not longer than its basal width in dorsal view *Pseudocercidis rosae*
33. SIPH with subapical reticulation (at least 3–4 rows of closed polygonal cells) **34**
- SIPH without subapical polygonal reticulation (although sometimes with 1–3 interconnected transverse striae proximal to flange) **47**
34. Longest hairs on ANT III 0.6 or more× BD III **35**
- Hairs on ANT III 0.55 or less× BD III **42**
35. SIPH pale at least on basal half, sometimes dusky towards apices **36**
- SIPH dark, except sometimes at extreme bases **37**
36. ANT 0.9–1.4× BL. Longest hair on ABD TERG 3 is 21–37 μm long. Cauda has 8–12 (–13) hairs *Macrosiphum euphorbiae*
- ANT 1.3–1.7× BL. Longest hair on ABD TERG 3 is 33–49 μm long. Cauda has 10–19 hairs *Macrosiphum centranthi*
37. ANT III without rhinaria. SIPH with reticulation consisting of more than 20 rows of numerous small polygonal cells on distal c.0.3 of length. First tarsal segments with 5 hairs *Eomacrosiphum nigromaculosum*
- ANT III with 1 or more rhinaria. SIPH with reticulation consisting of less than 12 rows of large polygonal cells, on distal 0.1–0.2 of length. First tarsal segments with 3 hairs **38**
38. SIPH thick, tapering, c.6–7× longer than their diameter at midlength, with a very small flange *Macrosiphum pachysiphon*
- SIPH almost cylindrical for most of length, 9–19× longer than their diameter at midlength, with a rather well-developed flange **39**

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39. Head and ANT I and II dark. SIPH entirely dark. ANT III with 10–36 rhinaria **40**
 – Head and ANT I and II pale/dusky. SIPH usually pale at extreme bases. ANT III with 1–18 rhinaria **41**
40. ANT III with a cluster of 10–35 rhinaria concentrated on basal part *Macrosiphum rosae*
 – ANT III with 23–36 rhinaria distributed over most of length *Macrosiphum mordvilkoii*
41. ANT III, and usually also tibiae, entirely dark (although populations persisting on roses until late summer may have paler appendages). ABD TERG 7 and 8 each usually with a pair of spinal tubercles (STu) *Macrosiphum pallidum*
 – ANT III pale except for rhinariated part and extreme tip, and tibiae usually with pale middle sections. ABD TERG 7 and 8 usually without STu *Macrosiphum impatientis*
42. Femora with at least distal 0.25 very dark **43**
 – Femora pale, sometimes shading to dusky/dark at apices **46**
43. Cauda 0.15–0.20× BL and 0.5–0.7× SIPH **44**
 – Cauda 0.09–0.125× BL and 0.3–0.4× SIPH **45**
44. R IV+V 0.95–1.2× HT II. ANT tubercle with 3 hairs. ANT III with 4–10 rhinaria on swollen basal part *Sitobion ibarae*
 – R IV+V 0.65–0.85× HT II. ANT tubercle with 1 hair. ANT III with 1–5 rhinaria *Sitobion akebiae*
45. BL c.4mm. ANT III pale except at apices, with 6–12 rhinaria not in a single row, and longest hairs c.0.3× BD III *Sitobion rosivorum**
 – BL 2.5–2.9mm. ANT III entirely dark with 5–9 rhinaria in a single row, and hairs all minute, the longest c.0.2× BD III *Sitobion kamtshaticum*
46. Longest hairs on ANT III 20–27µm, 0.4–0.55× BD III. R IV+V with 7–9 accessory hairs. SIPH 1.5–2.0× cauda, which tapers to a pointed apex *Sitobion rosaeiformis*
 – Longest hairs on ANT III 14–22µm, 0.3–0.4× BD III. R IV+V with 5–6 accessory hairs. SIPH 1.8–2.7× cauda, which has a blunt, rounded apex *Sitobion fragariae*
47. ANT tubercles well developed, with divergent inner faces. ABD TERG 1 and 7 without marginal tubercles (MTu). ANT III with 0–30 rhinaria, if the number is small then they are concentrated on basal part **48**
 – ANT tubercles absent, or if weakly developed then ABD TERG 1 and 7 have MTu. ANT III usually without rhinaria, or with 1–4 on distal half **58**
48. ANT III longer than ANT IV+V together, thickened, and bearing 20–40 rhinaria, not in a single row. Dorsal abdomen with extensive dark pigmentation. Femora dark except at bases. Cauda dark *Aphiduromyzus rosae*
 – ANT III not longer than ANT IV+V together, and bearing 0–30 rhinaria, if with more than 10 they are in a single row. Body and appendages mainly pale **49**
49. SIPH very long, 0.37–0.5× BL **50**
 – SIPH 0.14–0.35× BL **51**
50. Longest hairs on ANT III more than 0.6× BD III. SIPH slightly swollen on distal part *Amphorophora catharinae*
 – Longest hairs on ANT III less than 0.5× BD III. SIPH thin and cylindrical on distal part *Acyrtosiphon gossypii*

51. SIPH clavate. ANT III without rhinaria. R IV+V 1.0–1.5× HT II. Cauda with 4–6 (usually 5) hairs
Wahlgreniella nervata
 – SIPH tapering, cylindrical or slightly expanded apically. ANT III usually with rhinaria. R IV+V
 0.6–1.5× HT II. Cauda with 5–12 (usually at least 7) hairs **52**
52. ANT PT more than 2.2× SIPH, which are only 0.8–1.2× cauda *Acyrtosiphon pseudodirhodum*
 – ANT PT less than 2.1× SIPH, which are 1.4–4.0× cauda **53**
53. R IV+V 1.0–1.5× HT II, and bearing (7–) 10–18 accessory hairs. ANT PT/BASE 4.4–7.5
Acyrtosiphon malvae (s. lat.)
 – R IV+V 0.55–0.95× HT II and bearing 2–11 accessory hairs. ANT PT/BASE 2.5–7.5 **54**
54. First tarsal segments with 5 hairs. ANT PT/BASE 5.1–7.5 *Acyrtosiphon pentatrichopus*
 – First tarsal segments with 3 hairs. ANT PT/BASE 2.0–5.2 **55**
55. SIPH more than 0.65 mm long, 0.25–0.35× BL **56**
 – SIPH less than 0.65 mm long, 0.15–0.24× BL **57**
56. ANT III with 16–24 rhinaria in a row extending over most of length. Hairs on ABD TERG 8 c. 65 µm
 long *Metopolophium rosaesuctum**
 – ANT III with 0–3 small rhinaria near base. Hairs on ABD TERG 8 up to c.45 µm long
Metopolophium alpinum
57. SIPH 1.35–1.75× cauda. R IV+V 0.6–0.7× HT II, with 4–7 accessory hairs. SIPH with rather weak
 imbrication *Metopolophium dirhodum*
 – SIPH 2.0–2.5× cauda. R IV+V 0.75–0.85× HT II, with 6–10 accessory hairs. SIPH with coarse
 imbrication *Metopolophium montanum*
58. SIPH pale or dusky. ABD TERG 1 and 7 without MTu. R IV+V with 6–9 accessory hairs
Pseudaphis abyssinica
 – SIPH dark. ABD TERG 1 and 7 with MTu. R IV+V with 2 (–3) accessory hairs **59**
59. Stridulatory apparatus present, with ridges on abdominal sternites 6 and 7 and a row of peg-like hairs
 on hind tibiae **60**
 – No stridulatory apparatus **61**
60. SIPH 0.4–0.7× cauda. ANT PT/BASE 2.3–3.4. ABD TERG 8 with 4–12 hairs *Toxoptera odinae*
 – SIPH 1.1–1.5× cauda. ANT PT/BASE 3.5–5.3. ABD TERG 8 with 2–3 hairs *Toxoptera aurantii*
61. Longest hairs on ANT III 0.4–0.7 (–0.8)× BD III. Cauda with 4–7 (–9) hairs **62**
 – Longest hairs on ANT III (0.5–) 0.7–2.2× BD III. Cauda with (7–) 8–25 hairs **63**
62. Dorsal abdomen with an extensive black shield. SIPH and cauda both black *Aphis craccivora*
 – Dorsal abdomen without dark markings. Cauda paler than SIPH *Aphis gossypii*
63. ANT III–VI and tibiae almost entirely black. MTu usually present on ABD TERG 2 and 4 as well as
 1 and 7 *Aphis stranvaesia*
 – ANT III–VI and tibiae mainly pale or dusky, only dark apically. MTu only sporadically present on ABD
 TERG 2–4 **64**
64. Dorsal abdomen without dark markings. SIPH 1.1–1.45× ANT III and 2.8–3.4× ANT BASE VI. Cauda
 with 7–15 hairs (usually 9–11) *Aphis spiraeicola*
 – Dorsal abdomen with dark markings. SIPH 0.6–1.1× ANT III and 1.5–2.7× ANT BASE VI. Cauda
 with 9–25 hairs (often more than 15) **65**

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65. Dorsal abdomen often with dark median sclerites on ABD TERG 1–6, sometimes fused between segments. SIPH 0.7–1.0× cauda, which is finger-shaped, with a constriction *Aphis neospireae*
 – Dorsal abdomen with only scattered small, mainly intersegmental sclerites on ABD TERG 1–6. SIPH usually longer than cauda, which is tongue-shaped, without a constriction *Aphis fabae*

Roscoea **Zingiberaceae**
Roscoea sp. *Pentalonia nigronervosa*

Rosmarinus **Labiatae**
R. officinalis *Aphis gossypii*; *Myzus ornatus*

Use key to polyphagous aphids, p. 1020.

Rostellularia see *Justicia*

Rostraria see *Koeleria*

Rosularia **Crassulaceae**
R. platyphylla *Aphis sedi*

Rothia **Leguminosae**
R. hirsuta *Aphis gossypii*

Rothmannia **Rubiaceae**
R. capensis *Toxoptera citricidus*

Rottboellia **Gramineae**
R. cochinchinensis *Aphis gossypii*
R. exaltata *Rhopalosiphum maidis*
R. glandulosa *Rhopalosiphum maidis*

Use key to apterae of grass-feeding aphids under *Digitaria*.

Rotula **Boraginaceae**
Rotula sp. *Aphis gossypii*

Roystonea **Palmae**
R. regia *Cerataphis brasiliensis*

Rubia **Rubiaceae**
R. agostinoi *Dysaphis pyri*
R. akane *Aphis gossypii*; [*Cavariella heraclei*];
 [*Macrosiphum rubifoliae* Shinji 1922 (nomen dubium)]
R. chinensis *Aphis gossypii*
R. cordifolia (incl. var. *mingista*) *Aphis fabae*, *gossypii*, *spiraecola*;
Brachycaudus helichrysi;
 [*Macrosiphum rubifoliae* Shinji 1922 (nomen dubium)];
 [*Melanaphis sacchari*]; [*Myzackaia verbasci*];
Myzus cerasi, *cerasi* ssp. *umefoliae*, *ornatus*;
Neomyzus circumflexus; *Toxoptera citricidus*

<i>R. fruticosus</i>	<i>Aphis solanella, spiraecola</i>
<i>R. peregrina</i>	<i>Aphis fabae; Macrosiphum euphorbiae</i>
<i>R. tinctorum</i>	<i>Aphis fabae, rubiae</i>
<i>Rubia</i> sp.	<i>Myzus persicae</i>

Key to apterae on *Rubia*:-

- Dorsal abdomen with an extensive black sclerotic shield. ANT tubercles well developed, scabrous, and head densely spiculose. SIPH black, coarsely imbricated, 2.3–2.8× cauda and 1.3–1.8× ANT III
Myzus cerasi (incl. ssp. *umefoliae*)
 – Without that combination of characters **2**
- Head and ABD TERG 7 and 8 with spinal tubercles (STu), usually paired. ABD TERG 1–5 with marginal tubercles (MTu). Cauda short, helmet-shaped with 5 (or sometimes 6) hairs *Dysaphis pyri*
 – STu absent from head, rarely on ABD TERG 7–8. If ABD TERG 2–5 all with MTu then they are also present on ABD TERG 7. Cauda short or long, often with more hairs **3**
- First tarsal segments all with 2 hairs (i.e., all lacking sense pegs). SIPH black, ANT tubercles weakly developed, prothorax and ABD TERG 1 and 7 with marginal tubercles, and longest hairs on ANT III less than 0.4× BD III *Aphis rubiae*
 – First tarsal segments with 3–3–2 or 3–3–3 hairs, i.e., at least first segments of fore- and mid-tarsi with sense pegs, and other characters not in that combination
 go to key to polyphagous aphids, p. 1020

Rubus*R. allegheniensis**R. apetalus**R. arcticus**R. argutus* see *ostroyfolius**R. asper**R. caesius**R. caesius* var. *turkestanicus**R. calcynoides**R. canadensis**R. chamaemorus**R. corchorifolius**R. coreanus**R. corylifolius**R. crataegifolius**R. cuneifolius**R. dalmaticus**R. deliciosa**R. discolor* see *ulmifolius***Rosaceae***Aphis rubifolii; Ericaphis wakibae; Prociphilus erigeronensis**Aphis gossypii; Aulacorthum solani; Myzus ornatus;**Pseudaphis abyssinica**Amphorophora rubi; Aulacorthum solani;**Macrosiphum euphorbiae, rubiarctici**Acyrtosiphon rubi**Aphis ruborum;**Amphorophora amurensis, rubi, rubi* ssp. *zhuravieni;**Brachycaudus helichrysi; Illinoia davidsoni;**Macrosiphum funestum**Acyrtosiphon rubi**Aulacorthum solani**Aphis rubifolii**Amphorophora rubi;**Aphis frangulae, rubiradicis, ruborum;**Macrosiphum euphorbiae**Aphis ichigocola; Matsumuraja rubicola, rubifoliae**Aphis ichigo; Matsumuraja rubi*[*Amphorophora* sp. (as *rubi*)]*Aphis ichigo, ichigocola; Matsumuraja rubi; Sitobion akebiae**Aphis rubifolii*[*Longicaudus trirhodus*]*Utamphorophora bossekiae*

HOST LISTS AND KEYS

- R. ellipticus* *Acyrtosiphon rubi* ssp. *elliptici*; *Amphorophora* sp.;
Aphis fabae, *gossypii*, *rubifolii*, *ruborum*, *longisetosa*;
Brachycaudus helichrysi; [*Capitophorus carduinus*];
[*Hyperomyzus carduellinus*]; *Macrosiphum pachysiphon*;
Matsumuraja capitophoroides; *Metopolophium rubifoliae*;
Myzus ornatus; *Sitobion fragariae*
- R. fissus* [*Amphorophora* sp. (as *rubi*; Janiszewska, 1963: 494)];
Macrosiphum funestum
- R. frondosus* *Aphis rubifolii*, *spiraecola*; *Aulacorthum solani*;
Illinoia rubicola
- R. fruticosus* *Acyrtosiphon rubi*; *Amphorophora rubi*;
Aphis [*idaei*], *longisetosa*, *ruborum*; [*Hyadaphis coriandri*];
Macrosiphum funestum, *rosae*;
Metopolophium rubifoliae; *Sitobion fragariae*
- R. glandulosus* *Macrosiphum funestum*
- R. hirsutus* *Aulacorthum solani*; *Matsumuraja rubifoliae*
- R. hispidus* [*Hyalomyzus eriobotryae*]
- R. hochstetterorum* *Aphis ruborum*
- R. idaeus* *Amphorophora idaei*; *Aphis gossypii*, *idaei*, *ruborum*;
Macrosiphum euphorbiae;
Matsumuraja hirakurensis, *rubifoliae*; [*Myzaphis bucktoni*];
Myzus ornatus; [*Pachypappa warschavensis*];
Pemphigus rubiradicis
- R. idaeus* var. *aculeatissimus* *Amphorophora amurensis*; *Matsumuraja rubi*, *taisetusana*
- R. idaeus* var. *melanolasius* *Amphorophora agathonica*; *Aphis idaei*; *Illinoia rubicola*
- R. idaeus* ssp. *strigosus* *Amphorophora agathonica*, [*rubi*];
Aphis idaei, *rubicola*, *rubifolii*; *Aulacorthum solani*;
Illinoia rubicola; *Macrosiphum euphorbiae*;
Sitobion fragariae
- R. illecebrosus* [*Rhopalosiphoninus ichigo* (Shinji, 1922)]
- R. laciniatus* *Amphorophora rubitoxica*; *Aphis rubifolii*, *ruborum*;
Sitobion fragariae
- R. lasiocarpus* *Macrosiphum pachysiphon*; *Matsumuraja capitophoroides*;
[*Myzus* sp. (Raychaudhuri, 1984)]; *Sitobion rosaeiformis*
- R. leucodermis* *Aphis rubifolii*; *Amphorophora rubicumberlandi*
- R. lineatus* *Aphis longisetosa*
- R. loganobaccus* see *ursinus* var.
- R. macilentus* *Macrosiphum pachysiphon*;
Matsumuraja capitophoroides
Amphorophora agathonica
- R. macropetalus*
- R. melanolasius* see *idaeus* var.
- R. microphyllus* *Matsumuraja rubi*, *rubifoliae*
- R. mollifolius* *Aphis ichigo*
- R. mollucata* *Hyalomyzus raoi*
- R. moluccanus* [*Amphorophora* sp. (Raychaudhuri, 1984)]; *Aphis gossypii*
- R. nitidus* *Macrosiphum funestum*
- R. niveus* *Acyrtosiphon rubi*; [*Aphis* sp. (David et al., 1971a)];
Matsumuraja rubifoliae

<i>R. nutkanus</i> see <i>parviflorus</i>	
<i>R. occidentalis</i>	<i>Amphorophora agathonica, rubicumberlandi, rubitoxica, sensoriata; Aphis idaei, rubicola, rubifolii;</i> [‘ <i>Capitophorus</i> sp.’ (Cutright, 1925)]; [<i>Pemphigus rubi</i> Thomas (= <i>populitransversus</i> ?)]
<i>R. odoratus</i>	<i>Amphorophora agathonica; Macrosiphum</i> sp.
<i>R. opulifolius</i>	<i>Metopolophium chandrani</i>
<i>R. palmatus</i>	<i>Aphis longisetosa;</i> <i>Matsumuraja nuditerga, rubi, rubifoliae, rubiphila;</i> <i>Myzus persicae</i>
<i>R. paniculata</i>	<i>Hyalomyzus raoi</i>
<i>R. parviflorus</i> (incl. <i>nutkanus</i>)	<i>Amphorophora agathonica, pacifica, parviflori;</i> <i>Illinoia davidsoni, maxima, [rubicola];</i> [<i>Macrosiphum</i> sp. (Leonard, 1974)]; <i>Myzus ornatus</i> <i>Aphis ichigocola; Sitobion akebiae</i>
<i>R. parvifolius</i>	<i>Aphis ichigo; Matsumuraja sorini</i>
<i>R. peltatus</i>	<i>Aphis ichigo, idaei; Amphorophora agathonica</i>
<i>R. phoenicolasius</i>	<i>Aphis gossypii; Macrosiphum euphorbiae</i>
<i>R. pinnatus</i>	<i>Amphorophora rubi; Aphis ruborum; Macrosiphum funestum</i>
<i>R. plicatus</i>	<i>Amphorophora agathonica, tigwatensa; Aphis rubifolii;</i> <i>Myzus persicae</i>
<i>R. procerus</i>	<i>Amphorophora stolonis; Ericaphis wakibae</i>
<i>R. pubescens</i>	<i>Hyalomyzus raoi</i>
<i>R. reticulata</i>	<i>Matsumuraja rubi</i>
<i>R. ribesoides</i>	<i>Aphis gossypii, longisetosa; Macrosiphum pachysiphon;</i> <i>Matsumuraja capitophoroides, Matsumuraja</i> sp. (Queensland; BMNH colln, leg. V.F.Eastop, 2n=18)
<i>R. rosaefolius</i>	<i>Metopolophium rubifoliae</i>
<i>R. rosaefolius</i> var <i>maximowiczii</i>	<i>Matsumuraja rubifoliae; Microlophium rubiformosanum</i>
<i>R. rugosus</i>	<i>Matsumuraja capitophoroides</i>
<i>R. sachalinensis</i>	<i>Amphorophora amurensis; Aphis ichigo, idaei;</i> <i>Matsumuraja rubi, taisetsusana</i>
<i>R. sanctus</i>	<i>Aphis craccivora, ruborum; Myzus persicae</i>
<i>R. sanguineus</i>	<i>Aphis craccivora, ruborum; Myzus persicae</i>
<i>R. saxatilis</i>	[<i>Amphorophora</i> sp. (as <i>rubi</i>)]; <i>Aulacorthum cylactis; Macrosiphum rubiarctici;</i> <i>Sitobion fragariae</i>
<i>R. spectabilis</i>	<i>Amphorophora forbesi; Illinoia maxima;</i> <i>Macrosiphum euphorbiae</i>
<i>R. spinosus</i>	<i>Acyrthosiphon rubi</i>
<i>R. stellatus</i>	<i>Macrosiphum rubiarctici</i>
<i>R. strigosus</i> see <i>R. idaeus</i> ssp.	
<i>R. sulcatus</i>	<i>Amphorophora rubi</i>
<i>R. takesimensis</i>	<i>Aphis ichigo</i>
<i>R. tenuifolia</i>	<i>Aphis fabae</i>
<i>R. trifidus</i>	<i>Aphis ichigo</i>
<i>R. turquinensis</i>	<i>Aphis spiraecola; Aulacorthum solani;</i> <i>Neomyzus circumflexus</i>

HOST LISTS AND KEYS

<i>R. ulmifolius</i> (incl. <i>discolor</i>)	<i>Acyrtosiphon rubi</i> ; <i>Amphorophora idaei</i> , <i>rubi</i> , <i>parviflori</i> ; <i>Aphis</i> [<i>affinis</i>], <i>ruborum</i> ; <i>Aulacorthum solani</i> ; <i>Macrosiphum rosae</i> ; <i>Sitobion fragariae</i>
<i>R. ursinus</i> var. <i>loganobaccus</i>	<i>Aphis idaei</i> , <i>rubifolii</i> ; <i>Illinoia davidsoni</i> ; [<i>Hyperomyzus lactucae</i>]
<i>R. ursinus</i> var. <i>macropetalus</i>	<i>Amphorophora parviflori</i> , <i>rubitoxica</i>
<i>R. vitifolius</i>	<i>Amphorophora rubitoxica</i>
<i>R. volkensis</i>	<i>Myzus ornatus</i>
<i>R. xylenica</i>	<i>Matsumuraja capitophoroides</i>
<i>Rubus</i> sp.	<i>Amphorophora</i> [<i>bonnevilla</i> (al. only)], <i>kesocqua</i> ; [<i>Aphis rubicolens</i> (nomen dubium)]; [<i>Betulaphis longicornis</i>]; <i>Hyalomyzus himachali</i> ; [<i>Illinoia reticulata</i>]; [<i>Longicaudus himalayensis</i>]; <i>Macrosiphum pallidum</i> , [<i>rudbeckiarum</i>], <i>Macrosiphum</i> sp. (Korea, leg. W.H. Paik); <i>Maculolachnus rubi</i> ; <i>Matsumuraja formosana</i> , <i>rubea</i> , <i>urticae</i> ; <i>Metopolophium lacheni</i> ; <i>Paraphorodon omeishanensis</i> ; [<i>Sappaphis piri</i>]; <i>Sitobion</i> [<i>aulacorthoides</i> , <i>cornifoliae</i>], <i>kamtshaticum</i> ; [<i>Tuberoaphis hydrangeae</i> ssp. <i>digitata</i>]

Key to apterae on *Rubus*:-

1. ANT PT/BASE less than 1. SIPH either absent or as pores on low dark hairy cones 2
– ANT PT/BASE more than 1. SIPH tubular 4
2. SIPH as pores on low dark hairy cones. ANT densely hairy, with sec. rhinaria on ANT III–VI, and PT/BASE 0.5–0.6 *Maculolachnus rubi*
– SIPH absent. ANT sparsely hairy, without sec. rhinaria. ANT PT/BASE less than 0.5 3
3. R IV+V 0.08–0.12 mm long, and without accessory hairs. Hairs at apices of tibiae and on first tarsal segments short and thick. Cauda and anal plate not projecting posteriorly *Pemphigus* spp.
– R IV+V 0.13–0.175 mm long, with 4–8 accessory hairs. Hairs at apices of tibiae and on first tarsal segments long and fine. Cauda and anal plate forming a dark posterior projection of the abdomen *Prociphilus erigeronensis*
4. Dorsal body, or at least front of head and ABD TERG 7 and 8, with long, capitate hairs, the longest at least 1.5× longer than ANT BD III., arising from prominent tuberculate bases. ANT I often with a prominent projection on inner side at apex (but ANT tubercles without projections). Head finely spiculose 5
– Dorsal hairs all less than 1.5× BD III or if longer then with pointed apices. ANT I without a projection (unless ANT tubercle has much longer projection). Head spiculose, smooth or wrinkled 16
5. ABD TERG 1–7 with spinal capitate hairs arising from large paired finger-like processes, maximally 120–240 µm long, much longer than the hairs borne upon them 6
– ABD TERG 1–7 without finger-like processes, if with long capitate spinal hairs then these arise from broadly conical tuberculate bases shorter than or not much longer than the hairs borne upon them 7
6. Thorax and ABD TERG 1–5 with paired marginal process similar in length to the spinal ones (Figure 47a) *Matsumuraja rubicola*
– Thorax and ABD TERG 1–5 with marginal hairs arising from conical tuberculate bases shorter than or hardly longer than the hairs borne upon them (Figure 47b) *Matsumuraja rubi*

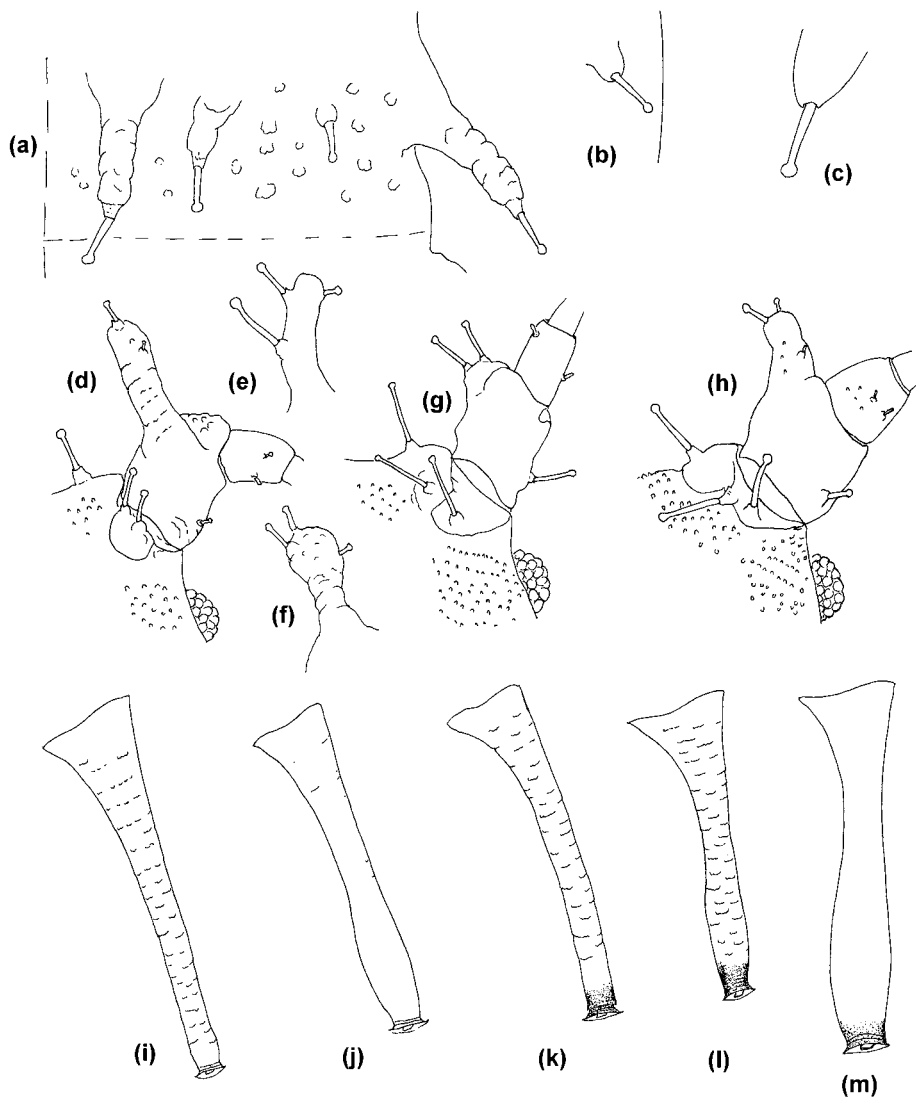


Figure 47 Apterae of *Matsumuraja* on *Rubus*. (a) ABD TERG 3 (right side) of *Matsumuraja rubicola*, (b) marginal hair on ABD TERG 3 of *M. rubi*, (c) spinal hair on ABD TERG 3 of *M. capitophoroides*, (d) ANT I and II of *M. rubiphila*, (e) projection on ANT I of *M. capitophoroides*, (f) projection on ANT I of *Matsumuraja* sp. with $2n = 18$, BMNH, Queensland, (g) ANT I and II of *M. sorini*, (h) ANT I and II of *M. rubifoliae*, (i) SIPH of *M. rubea*, (j) SIPH of *M. taisetsusana*, (k) SIPH of *M. hirakurensis*, (l) SIPH of *M. rubifoliae*, (m) SIPH of *M. sorini*.

7. ANT I with a long finger-like projection that is as long as or longer than the maximum width of ANT I (e.g., Figure 47d,e,f) 8
 – ANT I with or without a projection, if with a finger- (or thumb-) like projection then this is distinctly shorter than the maximum width of ANT I (e.g., Figure 47g,h) 10

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8. Dorsal hairs on ABD TERG 1–5 minute, only ABD TERG 6–8 with long capitate hairs arising from tuberculate bases. SIPH blackish apically *Matsumuraja rubiphila*
- Dorsal hairs on ABD TERG 1–5 mostly longer than ANT BD III with prominent tuberculate bases of similar height to the hairs borne upon them (Figure 47c). SIPH with pale or dusky apices **9**
9. Projection on ANT I club-like, with rounded, expanded apex (Figure 47f). ANT III when ANT 6-segmented) 1.10–1.35× ANT IV *Matsumuraja* sp. with 2n=18 (Queensland, BMNH colln)
- Projection on ANT I not expanded apically (Figure 47e). ANT III 1.4–1.75× ANT IV
Matsumuraja capitophoroides (or *M. formosana* – see text)
10. Spinal and pleural hairs on ABD TERG 1–5 short, not longer than ANT BD III **11**
- Spinal and pleural hairs on ABD TERG 1–5 longer than ANT BD III **12**
11. Apices of ANT III–V pale or dusky. ABD TERG 1–5 with inconspicuous, minute hairs (this character also visible in embryos) *Matsumuraja nuditerga*
- Apices of ANT III–V or IV–V dark. ABD TERG 1–5 with hairs varying from 0.2–1.0× BD III (embryos with long capitate hairs on all ABD TERG) *Matsumuraja rubifoliae* (part)
12. ANT III with some long capitate hairs, maximally 1–2× BD III. ANT pale **13**
- ANT III with all hairs shorter than BD III. ANT dark or with dark apices to some segments **14**
13. SIPH cylindrical on distal half or with slight subapical swelling, and lightly imbricated throughout except near base and apex (Figure 47i). ANT c.0.8× BL *Matsumuraja rubea*
- SIPH swollen on distal half, smooth or with only the basal part lightly imbricated ventrally (Figure 47j). ANT 0.5–0.6× BL *Matsumuraja taisetsusana*
14. R IV+V c.2× HT II, with 4–6 accessory hairs. ANT flagellum dark except for basal half of III. SIPH cylindrical on distal half (Figure 47k) *Matsumuraja hirakurensis*
- R IV+V less than 1.5× HT II, with 2 accessory hairs. ANT III–V pale or with dusky or dark apices. SIPH usually somewhat swollen on distal half (Figure 47l, m) **15**
15. ANT I with projection on inner side at apex very low, with height less than 0.5× ANT II (Figure 47g). SIPH smooth throughout (Figure 47m) *Matsumuraja sorini*
- ANT I with prominent projection of height more than 0.5× ANT II (Figure 47h). SIPH imbricated (Figure 47l) *Matsumuraja rubifoliae* (part)
16. Head with numerous spicules, at least on ventral surface. ANT tubercles with inner faces spiculose or scabrous and almost parallel or apically convergent, or with forwardly directed processes **17**
- Head without spicules, or with a few minute ones anterioventrally. ANT tubercles variously developed, if well developed then with smooth divergent inner faces **26**
17. SIPH cylindrical or tapering **18**
- SIPH slightly to moderately swollen on distal part **23**
18. ANT tubercles with forwardly-directed finger-like projections, about as long as ANT I and each bearing 5–6 short capitate hairs. Dorsum densely ornamented with small papillae *Paraphorodon omeishanensis*
- ANT tubercles without finger-like processes. Dorsum not densely papillate **19**
19. Dorsum with a large black U-shaped patch, and broad dark cross-bars or paired patches on thorax *Neomyzus circumflexus*
- Dorsum without a U-shaped patch, with or without other pigmentation **20**
20. Dorsum with an intersegmental pattern of dark ornamentation. ANT 0.5–0.6× BL, with ANT PT/BASE 1.7–2.8 *Myzus ornatus*

- Dorsum with or without more extensive dark sclerotisation. ANT longer than BL, with ANT PT/BASE 2.4–5.3 **21**
- 21.** Head without spicules dorsally, or with very few. ANT III without rhinaria. Tergum sclerotic and variably pigmented, sometimes with a dark central dorsal abdominal area. Cauda with 4–6 hairs
Ericaphis wakibae
- Head densely spiculose dorsally as well as ventrally. ANT III with 0–4 rhinaria near base. Tergum unpigmented. Cauda with 7 hairs, rarely 6 or 8 **22**
- 22.** ANT III with 0–1 rhinaria (often 0). ANT PT/BASE 2.4–4.5. R IV+V 1.3–1.7× HT II. (Al. with 3–8 rhinaria spaced out along ANT III) *Aulacorthum cylactis*
- ANT III with 0–4 rhinaria, but usually with 1–2. ANT PT/BASE 4.0–5.3. R IV+V 1.1–1.4× HT II. (Al. with 5–26 rhinaria on ANT III) *Aulacorthum solani*
- 23.** Tergum pigmented and strongly rugose **24**
- Tergum pale, not rugose **25**
- 24.** R IV+V 1.3–1.4× HT II. Cauda with 5–7 hairs *Hyalomyzus raoi*
- R IV+V 0.8–0.9× HT II. Cauda with 4 hairs *Hyalomyzus himachali**
- 25.** Head densely spinulose dorsally as well as ventrally. Inner faces of ANT tubercles scabrous and apically convergent. ANT PT/BASE 3.0–4.5. R IV+V 0.9–1.0× HT II. HT I with 2 hairs (no sense peg). SIPH 1.9–2.5× cauda, which bears 5–8 hairs *Myzus persicae*
- Head only spiculose ventrally. Inner faces of ANT tubercles not apically convergent. ANT PT/BASE 3.8–7.2. R IV+V 1.1–1.33× HT II. HT I with 3 hairs (sense peg present). SIPH 2.5–3.2× cauda, which bears 12–17 hairs *Amphorophora forbesi*
- 26.** SIPH with subapical reticulation (at least 4–5 rows of closed polygonal cells, occupying 0.1 or more of total length of SIPH) **27**
- SIPH without subapical polygonal reticulation, or with 1–3 rows of polygonal cells or interconnected transverse striae occupying less than 0.06 of total length) **40**
- 27.** Longest hairs on ANT III 0.6 or more×BD III **28**
- Hairs on ANT III 0.55 or less×BD III **36**
- 28.** SIPH swollen proximal to reticulated section **29**
- SIPH tapering or cylindrical **31**
- 29.** R IV+V 1.9–2.2× HT II. ANT III with 20–23 rhinaria (–47 in alatiforms). Marginal tubercles (MTu) very small or absent. (Al. without a dark spot at tip of forewing) *Illinoia davidsoni*
- R IV+V 1.4–1.85× HT II. ANT III with 7–22 rhinaria. Well-developed MTu usually present at least on ABD TERG 2–5. (Al. with dark spot at tip of forewing) **30**
- 30.** MTu usually present on all of ABD TERG 1–7, and spinal tubercles (STu) usually on ABD TERG (6–) 7–8. ANT PT/BASE 5.5–8.2 *Illinoia rubicola*
- MTu usually only on ABD TERG 2–5, and STu absent. ANT PT/BASE 4.5–6.2 *Illinoia maxima*
- 31.** SIPH mainly pale, or dusky towards apices. Femora with pale/dusky apices *Macrosiphum euphorbiae*
- SIPH mainly or entirely dark, sometimes pale at bases, in which case femora have dark apices **32**
- 32.** SIPH thick, tapering, c.6–7× longer than their diameter at midlength, with a very small flange *Macrosiphum pachysiphon*

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- SIPH almost cylindrical for most of length, 9–23× longer than their diameter at midlength, with a rather well-developed flange 33
- 33. Head dark. SIPH entirely dark. ANT III with 10–36 rhinaria *Macrosiphum rosae*
- Head pale/dusky. SIPH usually pale at extreme bases. ANT III with 1–20 rhinaria 34
- 34. SIPH with 1–10 hairs on basal half. R IV+V with 5–8 accessory hairs *Macrosiphum rubiarctici*
- SIPH without hairs. R IV+V with 12–20 accessory hairs 35
- 35. SIPH very long, c.0.33× BL and 2.5–3.5× cauda. R IV+V 1.2–1.5× HT II, with 14–20 accessory hairs *Macrosiphum funestum*
- SIPH 0.23–0.28× BL, and 1.2–1.7× cauda. R IV+V 0.9–1.2× HT II, with 12–18 accessory hairs *Macrosiphum pallidum*
- 36. Cauda c.0.28mm long, shorter than ANT BASE VI (c.0.36mm) *Macrosiphum* sp. (Korea, BMNH colln, leg W.H. Paik)
- Cauda 0.20–0.51 mm long, 1.8–3.5× ANT BASE VI (0.08–0.15 mm) 37
- 37. Femora with dark distal section. ANT III–VI entirely dark, or pale only at base of III 38
- Femora pale or only dusky at apices. ANT III–VI pale except at apices of segments 39
- 38. Hairs on ANT III all minute, the longest c.0.2× BD III. Femora densely spinulose on distal part *Sitobion kamtshaticum*
- Longest hairs on ANT III 0.3–0.5× BD III. Femora not densely spinulose *Sitobion akebiae*
- 39. Longest hairs on ANT III 20–27µm, 0.4–0.55× BD III. R IV+V with 7–9 accessory hairs. SIPH 1.5–2.0× cauda, which tapers to a pointed apex *Sitobion rosaeiformis*
- Longest hairs on ANT III 14–22µm, 0.3–0.4× BD III. R IV+V with 5–6 accessory hairs. SIPH 1.8–2.7× cauda, which has a blunt, rounded apex *Sitobion fragariae*
- 40. SIPH swollen on distal half, with narrower section on basal half (clavate) 41
- SIPH tapering or cylindrical on distal half, without a narrower basal section 53
- 41. BL less than 2 mm. Tergum pitted, strongly rugose. SIPH coarsely imbricated. Head with median frontal tubercle and ANT tubercles similarly developed *Utamphorophora bossekiae*
- BL more than 2 mm. Tergum smooth. SIPH smooth or only weakly imbricated. Head with median frontal tubercle undeveloped or weakly developed, and ANT tubercles very well developed, so that there is a deep frontal sinus 42
- 42. R IV+V 0.6–0.8× HT II 43
- R IV+V 1.1–2.0× HT II 44
- 43. ANT III bearing 23–35 rhinaria, and with longest hairs 10–14µm long, 0.2–0.3× BD III *Amphorophora sensoriata*
- ANT III bearing 10–20 rhinaria, and with longest hairs 20–25µm long, 0.4–0.5× BD III *Amphorophora rubicumberlandi*
- 44. ANT PT/BASE c.2.4–2.5 *Amphorophora kesocqua*
- ANT PT/BASE 3.9–7.6 45
- 45. Hairs on ABD TERG 3 short, the longest 12–22µm, c.0.25–0.5× hairs on ABD TERG 8 and 0.4–0.8× longest hairs on ANT III. ANT III–VI usually dark except at base of III, and tibiae and SIPH often also dusky/dark (Al. with dark forewing veins, esp. Cu_{1a} and Cu_{1b}) 46
- Longest hairs on ABD TERG 3 are 25–60µm, more than 0.5× hairs on ABD TERG 8 and as long as or longer than longest hairs on ANT III. ANT, tibiae and SIPH pale or dark. (Al. with hyaline forewing veins) 47

46. SIPH dusky/dark and conspicuously imbricated throughout, 2.2–2.8× cauda. R IV+V 0.75–1.1× ANT BASE VI and 1.2–1.45× HT II, bearing 22–26 accessory hairs *Amphorophora tigwatensa*
 – SIPH variably pigmented, with swollen part almost smooth or with weak imbrication, 1.6–2.2× cauda. R IV+V 1.1–1.5× ANT BASE VI, 1.35–1.75× HT II, and bearing 14–21 accessory hairs *Amphorophora rubitoxica*
47. ANT and tibiae almost entirely dark *Amphorophora amurensis*
 – ANT and tibiae pale or dusky except at segmental apices **48**
48. R IV+V 1.8–2.0× HT II. SIPH 2.3–2.7× cauda. Cauda 1.3–1.8× R IV+V and 1.7–2.1× ANT BASE VI *Amphorophora pacifica*
 – R IV+V 1.05–1.85× HT II, but **if** more than 1.7× **then** SIPH 1.7–2.4× cauda, which is 1.5–2.7× R IV+V and 2.2–3.4× BASE VI **49**
49. SIPH shading to dusky or dark on distal part *Amphorophora agathonica*
 – SIPH entirely pale, or dark/dusky only in contrasting band at apex **50**
50. SIPH with maximum width of swollen part more than 2× minimum width of stem. Cauda with 7–9 hairs *Amphorophora stolonis*
 – SIPH with maximum width of swollen part less than 2× minimum width of stem. Cauda with 7–21 hairs **51**
51. R IV+V 1.45–1.85× HT II, and bearing 17–28 accessory hairs. SIPH imbricated for most of length, including swollen part, and coarsely so on basal part *Amphorophora parviflora*
 – R IV+V 1.05–1.3× HT II, and bearing 9–16 accessory hairs. SIPH smooth on swollen part, and smooth or very faintly imbricated on basal part **52**
52. ANT PT 6.7–8.3× R IV+V (usually more than 7× – measure several specimens) *Amphorophora idaei*
 – ANT PT 5.4–7.2× R IV+V (usually less than 7×) *Amphorophora rubi*
53. ANT tubercles well developed, with divergent inner faces. ABD TERG 1 and 7 without marginal tubercles (MTu). ANT III usually with 1–14 rhinaria, if the number is small then they are concentrated on basal part **54**
 – ANT tubercles absent, or if weakly developed then ABD TERG 1 and 7 have MTu. ANT III usually without rhinaria, or with 1–4 on distal half **58**
54. SIPH almost entirely dark, pale only at bases, and usually with 2–3 rows of ill-defined polygonal reticulation proximal to the well-developed flange **55**
 – SIPH mainly pale, sometimes darker at apices, without subapical reticulation **56**
55. R IV+V 1.20–1.33× HT II, with 8–11 accessory hairs. ANT III with 4–14 rhinaria. First segments of fore tarsi with 4–5 hairs, of mid- and hind tarsi with 3–4 hairs. Cauda rather short and tapering, pointed at apex *Microlophium rubiformosanum*
 – R IV+V 0.95–1.05× HT II, with 5–8 accessory hairs. ANT III with 3–5 rhinaria. First tarsal segments all with 3 hairs. Cauda long, thick and finger-like, rounded at apex *Metopolophium rubifoliae*
56. R IV+V 0.67–0.79× HT II *Metopolophium chandrani*
 – R IV+V 0.8–1.2× HT II **57**
57. Hairs on ABD TERG 3 maximally 0.8–1.2× ANT BD III, and those on ANT III maximally 0.5–1.6× BD III. R IV+V with 6 accessory hairs. Tergum membranous *Metopolophium lacheni**
 – Hairs on ABD TERG 3 maximally 0.2–0.5× ANT BD III, and those on ANT III maximally 0.3–0.5× BD III. R IV+V with 7–10 accessory hairs. Tergum sclerotic, with papillation or wrinkles *Acyrthosiphon rubi* (incl. ssp. *elliptici*)

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58. R IV+V with 5–9 accessory hairs. Prothorax and ABD TERG 1 and 7 without marginal tubercles (MTu) **59**
 – R IV+V with 2 (–4) hairs. Prothorax and ABD TERG 1 and 7 with MTu (except sometimes in very small individuals with BL less than 1 mm) **60**
59. Cauda helmet-shaped, constricted at base, not longer than its basal width. Tergum membranous. SIPH smooth, with a subapical annular incision *Brachycaudus helichrysi*
 – Cauda elongate triangular, not constricted at base, longer than its basal width. Tergum with broad sclerotic cross-bands. SIPH imbricated, without a subapical annular incision *Pseudaphis abyssinica*
60. SIPH thin on distal half, 2.3–3.5× cauda *Aphis idaei*
 – SIPH less than 2.2× cauda **61**
61. SIPH only 0.06–0.10 mm long, 0.6–0.8× cauda. ABD TERG 2–4 and 6 usually with MTu, as well as 1 and 7 *Aphis rubiradicis*
 – SIPH more than 0.12 mm long, 0.8–2.2× cauda. ABD TERG 2–6 with or without MTu **62**
62. SIPH pale or dusky, sometimes dark at apices **63**
 – SIPH entirely dark brown or blackish **67**
63. ANT 5-segmented **64**
 – ANT 6-segmented **66**
64. Dorsal body hairs mostly very long, the longest 2.5–4.0× ANT BD III. Cauda with 4(–5) hairs. BL only 0.6–0.9 mm *Aphis rubicola* (summer dwarfs)
 – Dorsal body hairs shorter. Cauda with (4–) 6–11 hairs. BL usually more than 0.9 mm **65**
65. Cauda with 7–11 hairs. ANT PT/BASE 1.6–2.6 *Aphis rubifolii*
 – Cauda with 4–7 hairs. ANT PT/BASE 2.4–3.6 *Aphis ruborum* (some summer dwarfs)
66. ANT PT/BASE 2.0–2.6. Cauda with (8–) 10–12 hairs. R IV+V with (2–) 3–4 accessory hairs. ABD TERG 8 with 3–5 hairs *Aphis rubicola*
 – ANT PT/BASE 2.6–4.0. Cauda with (4–) 6–9 hairs. R IV+V with 2 accessory hairs. ABD TERG 8 with 2 (rarely 3 or 4) hairs *Aphis ruborum*
67. ANT 5-segmented with PT/BASE 4.3–5.2. Longest hairs on ANT III 1.0–1.7× BD III. Cauda pale. Dorsal abdomen with dark rounded sclerites at bases of hairs *Aphis ichigocola*
 – ANT 5- or 6-segmented, with PT/BASE 1.3–3.6, and other characters not in that combination **68**
68. SIPH 0.8–1.05× cauda, which bears 7–8 hairs. Hairs on ABD TERG 3 long and pointed, maximally 2.0–2.5× ANT BD III. R IV+V 1.3–1.7× HT II *Aphis longisetosa*
 – SIPH 0.8–2.2× cauda, but if less than 1.1× cauda then either dorsal abdominal hairs are much shorter or cauda bears more than 10 hairs. R IV+V 0.9–1.4× HT II **69**
69. MTu regularly present on ABD TERG 2–5 as well as 1 and 7. Subgenital plate with up to 16 hairs on anterior half. Cauda dark and bearing 7–9 hairs *Aphis ichigo*
 – MTu only of sporadic occurrence on ABD TERG 2–5. Subgenital plate usually with 2 hairs on anterior half, rarely up to 9. Cauda pale, dusky or dark, with 4–24 hairs
 polyphagous *Aphis* spp.; go to key to polyphagous aphids, p. 1020, starting at couplet 24

Rudbeckia

- R. ampla*
R. amplexicaulis
R. flava

Compositae

- Macrosiphum rudbeckiarum*; *Uroleucon rudbeckiae*
Macrosiphum rudbeckiarum; *Uroleucon rudbeckiae*
Uroleucon rudbeckiae

<i>R. hirta</i> (incl. <i>serotina</i>)	<i>Aphis fabae</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Uroleucon ambrosiae</i> , <i>leonardi</i> , [<i>martini</i>], <i>rudbeckiae</i>
<i>R. laciniata</i>	[<i>Metopolophium dirhodum</i> (as <i>Myzus haywardi</i>)]; <i>Myzus persicae</i> ; <i>Neomyzus circumflexus</i> ; <i>Uroleucon nigrotuberculatum</i> , <i>rudbeckiae</i>
<i>R. montana</i>	<i>Macrosiphum rudbeckiarum</i>
<i>R. nitida</i>	<i>Aphis fabae</i> ; <i>Brachycaudus helichrysi</i>
<i>R. serotina</i> see <i>hirta</i>	
<i>R. tageteiodes</i> (? <i>tagetes</i>)	<i>Aphis gossypii</i> , [<i>kurosawai</i>], <i>spiraecola</i> ; [<i>Aulacorthum nipponicum</i>]; <i>Brachycaudus helichrysi</i>
<i>Rudbeckia</i> spp.	<i>Aphis helianthi</i> , [<i>umbrella</i>]; <i>Trama troglodytes</i>

Key to apterae on *Rudbeckia*:-

1. HT II greatly elongated, more than 0.5× hind tibia. SIPH absent *Trama troglodytes*
– HT II normal. SIPH present, tubular **2**
2. SIPH with a distal zone of reticulation (at least 4–5 rows of closed polygonal cells) **3**
– SIPH without polygonal reticulation go to key to polyphagous aphids, p. 1020
3. SIPH long and thin, more than 1.7× cauda, with reticulation of large polygonal cells on subapical 0.06–0.20 of length **4**
– SIPH rather thick, less than 1.6× cauda, with reticulation of small polygonal cells on distal 0.25 or more of length **5**
4. SIPH less than 1.1 mm long *Macrosiphum euphorbiae*
– SIPH more than 1.1 mm long *Macrosiphum rudbeckiarum*
5. Femora pale/dusky, sometimes with darker patch on anterior side at apices. SIPH becoming gradually darker distally, much paler at base than at apex. Postsiphuncular sclerites and scleroites at bases of dorsal hairs pale and inconspicuous *Uroleucon rudbeckiae*
– Femora dark distally. SIPH entirely dark. Postsiphuncular sclerites and at least some of scleroites at base of dorsal hairs pigmented **6**
6. R IV+V 0.85–1.1× ANT BASE VI. ANT PT/BASE 4.7–5.6. Cauda with 19–32 hairs (usually more than 23) *Uroleucon nigrotuberculatum*
– R IV+V 1.1–1.4× ANT BASE VI. ANT PT/BASE 5.5–7.2. Cauda with 12–27 hairs (usually less than 23) **7**
7. SIPH 1.1–1.3× cauda. ANT PT/BASE 5.5–6.5. Marginal tubercles (MTu) absent *Uroleucon ambrosiae*
– SIPH 1.25–1.55× cauda. ANT PT/BASE 6.3–7.2. Small MTu usually present on some segments (easier to see on dark marginal sclerites of al.) *Uroleucon leonardi*

Ruellia

R. ciliosa
R. coccinea
R. hirbstii
R. paniculata
R. prostrata
R. simplex
R. tuberosa
R. tweediana

Acanthaceae

Myzus persicae
Aphis gossypii
Aphis gossypii; *Myzus ornatus*
Aphis craccivora, *gossypii*
Aphis gossypii
Aphis gossypii, *spiraecola*
Aphis gossypii; *Micromyzodium strobilanthi*
Aphis gossypii; *Macrosiphum cuscutae*

HOST LISTS AND KEYS

Key to apterae on *Ruellia*:-

1. Tergum with an extensive dark sclerotic shield covering ABD TERG 1–5, and broad dark cross-bands on 6–8. Head spiculose with well-developed ANT tubercles, their inner faces divergent. R IV+V 1.4–1.8× HT II
Micromyzodium strobilanthi
- Without that combination of characters; if there is an extensive dark dorsal shield then head is without spicules, ANT tubercles are weakly developed and R IV+V is less than 1.3× HT II **2**
2. Hind tibiae entirely black. SIPH with subapical polygonal reticulation. ANT 1.4–1.7× BL, with PT/BASE 5.5–6.8
Macrosiphum cuscutae
- Hind tibiae with at least middle section pale, and other characters not in that combination
go to key to polyphagous aphids, p. 1020

Rumex

R. abyssinicus

R. acetosa

R. acetosella

R. alpinus

R. altissimus

R. ambiguus

R. angiocarpus

R. aquaticus

R. arcticus

R. bequaerti

R. bucephalophorus (incl. *hispanicus*)

R. confertus

R. conglomeratus

R. coreanus

R. crispus

Polygonaceae

Aphis fabae, gossypii, spiraeicola;

Brachycaudus rumexicolens; Myzus ornatus

Aphis acetosae, craccivora, fabae, rumicis;

Aulacorthum solani; Brachycaudus rumexicolens;

Dysaphis radicola; Macrosiphum euphorbiae;

Myzus ascalonicus, [certus], persicae

Aphis acetosae, acetosae ssp. rumicivora, etiolata, fabae, gossypii, middletonii, nasturtii, polygonacea, rumicis, sambuci, spiraeicola; Aulacorthum solani;

Brachycaudus helichrysi, rumexicolens;

Dysaphis emicis (as *albocinerea*);

Myzus ascalonicus, ornatus, persicae;

Pemphigus [bursarius], populivenae

Aphis fabae, rumicis; Brachycaudus rumexicolens

Aphis ['*malvae* Walker' of Wilson, 1918], *middletonii*, [*relata* Walker (nomen dubium)], *rumicis*;

Aphis acetosae, fabae

Aphis fabae; Myzus ornatus; Neotoxoptera oliveri;

Pemphigus sp. (as *bursarius*)

Aphis fabae, nasturtii, rumicis; Dysaphis foeniculus

Brachycaudus rumexicolens

Aphis fabae, gossypii, spiraeicola;

Brachycaudus rumexicolens; Macrosiphum euphorbiae

Aphis etiolata, rumicis; Myzus persicae

Aphis acetosae, [euonymi], rumicis; Aulacorthum solani;

Dysaphis emicis; Pemphigus plicatus

Aphis [euonymi], fabae, mordvilkoii, nasturtii, rumicis, [scabiosae Schrank of Nevsky, 1929], solanella;

Brachycaudus helichrysi; Dysaphis foeniculis, radicola

Aphis ?horii

Aphis acetosae, craccivora, [euonymi], fabae, gossypii,

[ilicis of Roepke (1928)], middletonii, nasturtii, rumicis, sambuci, solanella, spiraeicola; Aulacorthum solani;

Brachycaudus helichrysi, rumexicolens;

Dysaphis [apiifolia], emicis, radicola, rumecicola;

- Macrosiphum euphorbiae*, *venaefuscae*;
Myzus antirrhinii, *ascalonicus*, *cymbalariae*, *ornatus*,
persicae; *Neomyzus circumflexus*;
Pemphigus [*betae*], [*bursarius*], *populitransversus*,
populivenae;
R. cyprius *Brachycaudus rumexicolens*; *Myzus persicae*
R. dentatus *Aphis fabae*, *?rhoicola*, [*rubifolii*], *rumicis*;
Myzus persicae
R. domesticus *Aphis fabae*, *nasturtii*, *rumicis*
R. flexuosus *Aphis fabae*
R. hastatus *Aphis frangulae*, *solanella*; *Brachycaudus rumexicolens*;
Macrosiphum pachysiphon; *Tricaudatus polygoni*
R. hispanicus see *bucephalophorus*
R. hydrolapathum *Aphis acetosae*, *fabae*, *nasturtii*, *rumicis*, *sambuci*;
Dysaphis radicola
R. hymenosepalus *Aphis fabae*
R. induratus *Brachycaudus rumexicolens*
R. intermedius *Aphis fabae*
R. japonicus *Aphis craccivora*, *gossypii*, [*rumicis*]; *Aulacorthum solani*;
Dysaphis rumecicola; *Myzus persicae*; *Prociphilus kuwanai*
R. lapathum *Aphis rumicis*
R. longifolius *Aphis fabae*, *rumicis*; *Brachycaudus rumexicolens*;
Dysaphis emicis
R. lunaria *Aphis gossypii*, *nasturtii*; *Brachycaudus rumexicolens*;
Myzus ornatus, *persicae*; *Neomyzus circumflexus*
R. maritimus *Aphis rumicis*
R. nepalensis *Acyrtosiphon rubi*;
Aphis craccivora, *fabae*, *gossypii*, *spiraecola*;
Brachycaudus helichrysi, *rumexicolens*;
[*Capitophorus indicus*]; *Dysaphis emicis*, *foeniculus*;
Myzus ornatus, *persicae*; *Trichosiphonaphis polygoni*
R. nervosus (incl. var. *usamberensis*) *Aphis gossypii*, *nasturtii*, *spiraecola*;
Brachycaudus rumexicolens
R. obtusifolius *Aphis fabae*, *gossypii*, [*hederae*], [*ilicis*], *mordvilkoii*,
nasturtii, *rumicis*, *sambuci*, *solanella*, *viburni*;
Aulacorthum solani; *Brachycaudus rumexicolens*;
Dysaphis emicis, *radicola*; *Macrosiphum euphorbiae*;
Myzus ascalonicus, *certainus*, *ornatus*, *persicae*
R. occidentalis *Pemphigus* sp. (as *betae*)
R. paraguayensis [*Baizongia solanophila* Blanchard, 1944
(=*Pemphigus populitransversus*?)]
R. patientia *Aphis gossypii*
R. paulsenianus *Brachycaudus rumexicolens*; [*Brachyunguis rhei*]
R. pseudoalpinus *Aphis rumicis*; *Dysaphis radicola*; [*Nasonovia ribisnigri*]
R. pulcher *Aphis fabae*, *nasturtii*, *rumicis*, *solanella*;
Brachycaudus rumexicolens; *Dysaphis emicis*, *meridialis*;
Myzus ornatus
R. rhaponticum *Macrosiphum euphorbiae*

HOST LISTS AND KEYS

<i>R. salicifolius</i>	<i>Aphis nasturtii</i>
<i>R. sanguineus</i>	<i>Aphis rumicis</i>
<i>R. scutatus</i>	<i>Aphis nasturtii</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus rumexicolens</i> ; <i>Myzus ornatus</i>
<i>R. stenophyllus</i>	<i>Aphis fabae</i> , <i>rumicis</i>
<i>R. thyrsiflorus</i>	<i>Aphis acetosae</i>
<i>R. tianshanicus</i>	<i>Aphis rumicis</i>
<i>R. turcestanicus</i>	<i>Aphis solanella</i> (as <i>euonymi</i>); <i>Brachyunguis harmalae</i> (as <i>plotnikovi</i>); <i>Pemphigus</i> sp. (as <i>lactucarius</i>)
<i>R. verticillatus</i>	<i>Aphis rumicis</i>
<i>R. vesicarius</i>	<i>Aphis craccivora</i> ; <i>Brachycaudus rumexicolens</i> ; <i>Myzus persicae</i>
Rumex spp.	[<i>Acyrtosiphon malvae</i>]; <i>Akkaia bengalensis</i> ; [<i>Anuraphis subterranea</i>]; [<i>Anoecia corni</i>]; [<i>Aphis confusa</i> , <i>plantaginis</i>]; <i>Brachycaudus cardui</i> ; [<i>Capitophorus mitegoni</i> (as <i>indicus</i>)]; [<i>Cavariella pastinacae</i> (as <i>Rhopalosiphum rumicis</i>)]; [<i>Dysaphis ranunculi</i> , <i>plantaginea</i>]; [<i>Impatientinum asiaticum</i> ssp. <i>dalhousiensis</i>]; <i>Indomasonaphis rumicis</i> ; <i>Longisiphoniella subterranea</i> ; <i>Pemphigus dorocola</i> ; [<i>Protrama longitarsus</i> ssp. <i>sclerodensis</i>]; <i>Rhopalosiphoninus staphyleae</i> ssp. <i>tulipaellus</i> ; [<i>Sappaphis piri</i>]; <i>Trama antennata</i> ; <i>Toxoptera aurantii</i> ; [<i>Uroleucon cichorii</i>]

Key to apterae on *Rumex*:-

1. ANT PT/BASE 0.2–0.3. SIPH absent or present as small pores on broad hairy cones 2
 - ANT PT/BASE 0.5 or more. SIPH tubular 4
2. HT II very elongate, more than 0.5× hind tibia. Dorsal body hairs numerous, bristle-like. SIPH as small pores on broad hairy cones *Trama antennata*
 - HT II normal. Dorsal body hairs sparse, not bristle-like. SIPH not evident 3
3. R IV+V with 4 or more accessory hairs (?) Wax gland plates present on head, thorax and abdomen (?) *Prociphilus kuwanai**
 - R IV+V usually without accessory hairs. Wax gland plates only present on abdomen *Pemphigus* spp.
4. Head cuticle with extensive spiculosity, at least on ventral side 5
 - Head cuticle smooth, wrinkled, corrugated or partially papillated; without spicules, or with only a few spicules anterioventrally 13
5. SIPH dark, flangeless, with coarse denticulate imbrication, tapering from a very broad base, with distal part cylindrical or slightly swollen subapically *Trichosiphonaphis polygoni*
 - SIPH pale or dark, with a distinct reflexed flange; tapering, cylindrical or clavate 6
6. SIPH tapering, coarsely imbricated, with a slight S-curve. Dorsal abdomen with a pattern of dark inter-segmental markings. ANT PT/BASE 1.8–2.5 *Myzus ornatus*
 - SIPH tapering, cylindrical or swollen distally, not curved, not coarsely imbricated. Dorsal abdomen with or without dark markings. ANT PT/BASE 2.6–5.3 7

7. Dorsum with dark markings **8**
 – Dorsum pale **9**
8. SIPH markedly clavate, 2.5–3.5× cauda. Dorsum with dark segmental markings, often fused across ABD TERG 3–5 but not forming a U-shaped sclerite **8**
Rhopalosiphoninus staphyleae ssp. *tulipaellus*
 – SIPH cylindrical, 1.8–2.3× cauda. Dorsal abdomen with a U-shaped sclerite *Neomyzus circumflexus*
9. SIPH tapering/cylindrical on distal half. ANT III usually with 1–2 small rhinaria near base **9**
Aulacorthum solani
 – SIPH at least slightly swollen on distal part. ANT III without rhinaria **10**
10. SIPH less than 0.82× ANT III, and almost smooth on swollen part **11**
 – SIPH more than 0.83× ANT II, with swollen part imbricated **12**
11. Stem of SIPH a little thicker than hind tibia at its midpoint, (Al. with dark-bordered forewing veins and without a black central dorsal abdominal patch) *Neotoxoptera oliveri*
 – Stem of SIPH a little thinner than hind tibia at its midpoint. (Al. with hyaline forewing veins and a black central dorsal abdominal patch) *Myzus ascalonicus*
12. R IV+V in most specimens with only one pair of lateral accessory hairs (plus 0–3 ventral accessory hairs). Value of function cauda/(ANT III× PT) in range 0.80–1.52, but rarely more than 1.25 except in small specimens (those with ANT III less than 0.32 mm) *Myzus persicae*
 – R IV+V in most specimens with two pairs of lateral accessory hairs. Value of function cauda/(ANT III× PT) in range 1.2–2.7 (rarely less than 1.25) *Myzus certus*
13. Cauda very broadly rounded, hardly developed, much less than half as long as its basal width in dorsal view. SIPH small, broad-based, conical, shorter than their basal widths **13**
Brachycaudus rumexicolens
 – Cauda helmet-shaped, triangular, tongue- or finger-shaped, more than 0.7× its basal width in dorsal view. SIPH usually longer than their basal widths **14**
14. SIPH dark, 6–8× longer than cauda which is short and rounded and bears 10–15 hairs **14**
Longisiphoniella subterranea
 – SIPH pale or dark, less than 4× cauda **15**
15. Cauda helmet-shaped, not longer than its basal width in dorsal view, and bearing 4–8 hairs **16**
 – Cauda tongue-shaped, finger-shaped, bluntly rounded or bluntly triangular, but if as short as its basal width then bearing more than 8 hairs **22**
16. Spinal tubercles (STu) usually present at least on head and ABD TERG 8, or 7 and 8. Marginal tubercles (MTu) also usually present on most segments. SIPH without a subapical annular incision. Spiracular apertures reniform, those on ABD TERG 1 and 2 placed on a single, fused marginal sclerite **17**
 – STu absent, and MTu only sporadically present. SIPH with a subapical annular incision. Spiracular apertures large and rounded, on separate sclerites on ABD TERG 1 and 2 **21**
17. STu usually present on all segments from head to ABD TERG 8 **18**
 – STu usually only on head and ABD TERG 8, or 7 and 8 **19**
18. Hairs on ANT III and ABD TERG 1–5 fine-pointed, those on ANT III longer than 45µm, 2 or more× ANT BD III. R IV+V 1.55–1.70× HT II *Dysaphis rumecicola*
 – Hairs on ANT III and ABD TERG 1–5 often with blunt apices, those on ANT III being all less than 45µm long, less than 2× BD III. R IV+V 1.3–1.6× HT II *Dysaphis emicis*

HOST LISTS AND KEYS

19. SIPH 1.2–1.8× cauda. Longest hairs on ABD TERG 3 are 24–39µm long, as long as or longer than ANT BD III *Dysaphis foeniculus*
 – SIPH 2.0–2.5× cauda. Longest hairs on ABD TERG 3 are 8–23µm long, shorter than ANT BD III **20**
20. Longest hairs on ANT III 20–40µm long, 0.9–1.5× BD III *Dysaphis radicola* s.str.
 – Longest hairs on ANT III 8–13µm long, 0.4–0.7× BD III *Dysaphis radicola* ssp. *meridialis*
21. Dorsal abdomen with an extensive solid black shield. ANT III 0.31–0.47mm, 2.4–3.4× HT II. R IV+V 0.17–0.24mm. SIPH dark, imbricated, 1.7–3.4× cauda *Brachycaudus cardui*
 – Dorsal abdomen without a black shield. ANT III 0.07–0.25mm, 0.9–2.2× HT II. R IV+V 0.10–0.15mm. SIPH pale, smooth, 0.8–2.0× cauda *Brachycaudus helichrysi*
22. SIPH markedly clavate **23**
 – SIPH tapering or cylindrical **24**
23. ANT tubercles well developed, their inner faces divergent, and median frontal tubercle hardly developed. Longest hair on ANT III c.0.7× BD III. ABD TERG 7 and 8 without median tubercular processes *Indomasonaphis rumicis**
 – ANT tubercles weakly developed, median frontal tubercle prominent and scabrous. Longest hair on ANT III less than 0.5× BD III. ABD TERG 8, or 7 and 8, with a median tubercular process bearing a pair of short hairs *Tricaudatus polygoni*
24. ANT tubercles with longer-than-wide forward-pointing projections. SIPH black, very rugose, scaly or warty *Akkaia bengalensis*
 – ANT tubercles without forward-pointing projections. SIPH pale or dark, not very scaly or warty **25**
25. ANT tubercles very well developed, their inner faces divergent, so that there is a deep frontal sinus. ANT III with 1 or more small rhinaria on basal part. ABD TERG 1 and 7 without marginal tubercles (MTu) **26**
 – ANT tubercles weakly developed. ANT III without rhinaria, or with rhinaria not restricted to basal part. ABD TERG 1 and 7 with MTu **28**
26. SIPH without polygonal reticulation. Longest hair on ANT III 0.3–0.5× BD III. Tergum sclerotic, papillate or strongly wrinkled *Acyrtosiphon rubi*
 – SIPH with a subapical band of polygonal reticulation. Longest hair on ANT III 0.6–1.0× BD III. Tergum membranous **27**
27. SIPH mainly dark, paler at base. ANT PT/BASE 6–8. ANT BASE VI 1.4–1.6× R IV+V. Cauda with 7 hairs *Macrosiphum venaefuscae*
 – SIPH pale, sometimes darker towards apices. ANT PT/BASE 5.3–6.2. ANT BASE VI 0.9–1.3× R IV+V. Cauda with 8–14 hairs *Macrosiphum euphorbiae*
28. ANT PT/BASE less than 1. SIPH about as long as their basal widths, 0.2–0.6× cauda *Brachyunguis harmalae*
 – ANT PT/BASE more than 1.5. SIPH longer than their basal widths, at least 0.8× cauda **29**
29. Well-developed MTu consistently present on ABD TERG 2–4 as well as 1 and 7, those on 7 being large, similar in diameter to SIPH at midlength **30**
 – MTu sporadically present on ABD TERG 2–4, more often absent. MTu on ABD TERG 7 usually of basal diameter much less than that of SIPH at midlength **34**
30. ABD TERG 2–6 with broad dark cross-bands. R IV+V 1.1–1.25× HT II **31**
 – ABD TERG 2–6 without dark cross-bands. R IV+V 1.0–1.6× HT II **32**

31. Longest hair on ANT III 1.0–1.6× BD III *Aphis acetosae* s.str.
 – Longest hair on ANT III 0.3–0.7× BD III *Aphis acetosae* ssp. *rumicivora*
32. SIPH 1.3–1.9× cauda, which is tongue-shaped and bears 8–13 hairs. Longest hair on ANT III 0.3–0.5× BD III *Aphis etiolata*
 – SIPH 2.0–3.5× cauda, which is short and blunt and bears 10–20 hairs. Longest hair on ANT III 0.5–1.9× BD III **33**
33. Longest hairs on ANT III 0.5–1.0× BD III *Aphis sambuci*
 – Longest hairs on ANT III 1.5–1.9× BD III *Aphis horii*
34. Anterior half of subgenital plate with 9–28 hairs. Dorsal abdomen with a pattern of dark cross-bands, variably developed and sometimes reduced or fragmentary on ABD TERG 1–5, but consistently well-developed on ABD TERG 6–8, with an especially broad one on 6 *Aphis rumicis*
 – Anterior half of subgenital plate with 2–14 hairs, rarely more than 9. Dorsal abdomen without dark markings or with cross-bands only well-developed on ABD TERG 8 or 7–8 **35**
35. SIPH black, 0.25–0.48 mm long, 1.9–2.3× cauda which is also black, usually has a distinct midway constriction, and bears 7–11 hairs. Dorsal abdomen without any dark markings *Aphis polygonacea*
 – Without the above combination of characters; if black SIPH are present **and** more than 1.8× cauda then **either** cauda is not also black, **or** it has more than 11 hairs, **or** dorsal abdomen has dark sclerotic shield go to key to polyphagous aphids, p. 1020, starting at couplet 24 (But note that specimens running to *Aphis gossypii* could be *A. frangulae*, or if with ANT PT/BASE 1.9–2.2 they could possibly be the N Indian species tentatively identified as *A. rhoicola*.)

Rumohra*R. mutica***Davalliaceae***Macromyzus woodwardiae***Ruppia***R. maritima***Potamogetonaceae***Rhopalosiphum nymphaeae***Russelia***R. equisetiformis* (incl. *juncea*)**Scrophulariaceae***Aphis gossypii*, *spiraecola*; *Aulacorthum solani*;
Brachycaudus persicae; *Myzus ornatus*, *persicae*
*Acyrtosiphon ilka**R. juncea*Key to apterae on *Russelia*:–

- SIPH pale, slender, tapering/cylindrical and without subapical polygonal reticulation. Head smooth with inner faces of ANT tubercles divergent *Acyrtosiphon ilka*
- SIPH pale or dark, when pale either with subapical polygonal reticulation or clavate and/or head densely spiculose go to key to polyphagous aphids, p. 1020

Ruta*R. chalepensis**R. graveolens***Rutaceae***Neomyzus circumflexus*
Aphis fabae, *nasturtii*; *Aulacorthum solani*;
Macrosiphum euphorbiae; *Myzus persicae*;
[*Uroleucon jaceae*]
Brachyunguis rutae
*Aphis spiraecola**R. sieversii**Ruta* sp.

HOST LISTS AND KEYS

Key to apterae on *Ruta*:-

- ANT PT/BASE c.0.8. SIPH pale, c.1.3× cauda which is also pale, broadly conical, and bears c.16 hairs
*Brachyunguis rutae**
- ANT PT/BASE more than 1.5. SIPH pale or dark, if pale then more than 1.5× cauda which is tongue-
or finger-shaped and bears less than 13 hairs go to key to polyphagous aphids, p. 1020

Sabia

S. japonica

Sabiaceae

[*Akkaia taiwana*]; [*Mollitrichosiphum taiwanum*]

Sabicea

S. africana

S. venosa

Rubiaceae

Aphis gossypii

Aphis gossypii

Sabinea

S. punicea

Leguminosae

Aphis craccivora

Saccharum (incl. *Erianthus*)

S. narenga

S. officinarum

S. ravennae

S. spontaneum

Saccharum sp.

Gramineae

Rhopalosiphum maidis

Brachycaudus helichrysi; *Ceratovacuna lanigera*;

Forda orientalis; *Geoica lucifuga*; *Hysteroneura setariae*;

Melanaphis indosacchari, *sacchari*, *sorghii*;

Rhopalosiphum maidis; *Sipha flava*; *Sitobion miscanthi*;

Tetraneura fusiformis, *javensis*, *nigriabdominalis*

Paracletus cimiciformis

Ceratovacuna lanigera, [*longifila*]; *Hysteroneura setariae*

Ceratovacuna perglandulosa; *Melanaphis donacis*

Use key to apterae of grass-feeding aphids under *Digitaria*.

Sageretia

S. brandrethiana

S. theezans

Rhamnaceae

Aphis frangulae

Myzus ornatus, *persicae*; *Toxoptera aurantii*

Use key to polyphagous aphids, p. 1020

'*Saggina*' of del Guercio, 1913; probably *Sorghum bicolor* var. *saccharatum*

Sagina

S. crassicaulis

S. micrantha

S. procumbens

Caryophyllaceae

[*Staticobium loochooense*]

Aulacorthum solani

Myzus ascalonicus, *certus*, *cymbalariae*, *persicae*

Use key to apterae on *Cerastium*.

Sagittaria

S. guayanensis

S. latifolia

Alismataceae

Rhopalosiphum nymphaeae

Aphis gossypii, *nasturtii*; *Aulacorthum solani*;

Rhopalosiphum nymphaeae

*S. sagittifolia**Aphis fabae, nasturtii; Macrosiphum euphorbiae; Rhopalosiphum maidis, nymphaeae; Siphya glyceriae Rhopalosiphum nymphaeae**S. trifolia* (incl. var. *edulis*)Key to apterae on *Sagittaria*:-

1. Tergum heavily sclerotised with long spine-like hairs and numerous small denticles between the hairs. SIPH stump-like, cauda knobbed. ANT PT/BASE less than 1.5 *Siphya glyceriae*
- Tergum not sclerotic, dorsal hairs not spine-like. SIPH tubular, cauda tongue- or finger-shaped. ANT PT/BASE more than 1.5 **2**
2. SIPH dusky or dark and swollen on distal half. Dorsal cuticle with a reticulate pattern of bead-like spinules *Rhopalosiphum nymphaeae*
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Saintpaulia*S. diplotricha**S. ionantha**Saintpaulia* sp.**Gesneriaceae***Neomyzus circumflexus**Aphis gossypii; [Idiopterus nephrolepidis]; Myzus persicae;**Neomyzus circumflexus; Toxoptera aurantii**Macrosiphum euphorbiae*

Use key to polyphagous aphids, p. 1020.

Salacca*S. edulis***Palmae***Astegopteryx nipae; Cerataphis brasiliensis*Use key to apterae on *Calamus*.***Salicornia****S. europaea**Salicornia* sp.**Chenopodiaceae***[Sitobion alopecuri (as salicornii Richards)]**Aphis salsolae****Salpichroa****S. orangifolia* (incl. *rhomboidea*)**Solanaceae***Myzus persicae****Salsola* (incl. *Caroxylon*)***S. arborescens**S. baryosma**S. collina**S. kali**S. komarovii**S. lanata**S. pestifer**S. richleri**S. ruthenica**S. soda**S. tragus**Salsola* spp.**Chenopodiaceae***Brachyunguis salsolacearum**Brachyunguis harmalae**Chaitaphis tenuicauda; [Schizaphis rufula]**Aphis salsolae; Brachycaudus helichrysi; Myzus persicae;**[Schizaphis rufula]**Clypeoaphis suaedae**Chaitaphis ?tenuicauda**Aphis craccivora; Asiphonaphis utahensis;**[Bipersona torticauda]**Brachyunguis berezhkovi, harmalae**Aphis salsolae**Aphis craccivora**Myzus persicae**Clypeoaphis stavropolensis; Dysaphis ubsanurensis*

HOST LISTS AND KEYS

Key to apterae on *Salsola*:-

1. Dorsal hairs with expanded, often furcate apices (e.g., Figure 36a). Cauda long and thin, 4–5× longer than its middle width (e.g., Figure 36c) 2
 - Dorsal hairs blunt or pointed. Cauda less than 3× its middle width 3
2. Longest hairs on front of head 1.0–1.2× ANT BD III. ANT PT/BASE 1.9–2.1 2
 - Chaitaphis shaposhnikovi**
 - Longest hairs on front of head 1.7–2.0× ANT BD III. ANT PT/BASE 1.45–1.8 2
 - Chaitaphis tenuicauda*
3. ANT PT/BASE 1.4–3.0. SIPH 1.1–2.5× cauda. Clypeus normal 4
 - ANT PT/BASE 0.5–c.1.2. SIPH 0.4–0.9× cauda. Clypeus globose or hemispherical 6
4. Cauda shorter than its basal width. Spinal tubercles (STu) present on head and ABD TERG 7–8 4
 - Dysaphis ubsanurensis*
 - Cauda longer than its basal width. STu never on head and absent or sporadically present on ABD TERG 7–8 5
5. Dorsal abdomen with an extensive black sclerotic shield 5
 - Aphis craccivora* or *A. salsolae*
 - Dorsal abdomen without a black sclerotic shield 5
 - go to key to polyphagous aphids, p. 1020
6. Clypeus weakly sclerotised, pale or dusky. R IV+V with 2 accessory hairs. HT I with 2 hairs (no sense peg). Well-developed marginal tubercles (MTu) present on prothorax and ABD TERG 1 and 7. ANT PT/BASE 0.5–0.7. Cauda conical, less than 2× longer than its basal width 7
 - Clypeus strongly sclerotised, dark (e.g., Figure 36d). R IV+V with 4 or more accessory hairs. HT I with 3 hairs. MTu absent, or small and indistinct. ANT PT/BASE 0.8–c.1.2. Cauda finger-like, more than 2× its basal width 9
7. SIPH c. 0.4× cauda which bears c.10 hairs 7
 - Brachyunguis berezhkovi**
 - SIPH 0.5–0.7× cauda which bears 6–8 hairs 8
8. SIPH cylindrical, slightly constricted basally. Clypeus globose 8
 - Brachunguis salsolacearum**
 - SIPH conical, broader at base (Figure 36h). Clypeus hemispherical 8
 - Brachunguis harmalae*
9. SIPH adpressed to abdomen. ANT PT/BASE c.1.2. R IV+V with c.8 accessory hairs 9
 - Clypeoaphis (?) stavropolensis**
 - SIPH not adpressed to abdomen. ANT PT/BASE 0.8–1.0. R IV+V with 4–6 accessory hairs 9
 - Clypeoaphis suedae*

Salvia (incl. *Ramona*)

S. aegyptiaca
S. aethiopsis
S. africana (or *caerulea*)
S. apiana
S. arborescens
S. aspera
S. aurea
S. austriaca
S. azurea
S. caerulea (or *africana*)
S. ceratophylloides

Labiatae

Myzus persicae
Aphis fabae, salviae
Aphis gossypii
Aulacorthum solani; Myzus ornatus, persicae
Eucarazzia elegans
Aphis gossypii
Macrosiphum euphorbiae; Myzus ornatus
Aulacorthum solani
Hyalomyzus collinsoniae; Myzus ornatus
Aphis gossypii
Aphis salviae; Eucarazzia elegans

<i>S. coccinea</i>	<i>Acyrtosiphon bidenticola</i> ; <i>Aphis gossypii</i> , <i>spiraecola</i> ; <i>Macrosiphum salviae</i> ; <i>Myzus ornatus</i>
<i>S. cubensis</i>	<i>Macrosiphum salviae</i>
<i>S. deserta</i>	<i>Aphis salviae</i>
<i>S. farinacea</i>	<i>Macrosiphum euphorbiae</i>
<i>S. glandulifera</i>	<i>Acyrtosiphum malvae</i> group
<i>S. glutinosa</i>	<i>Chaetosiphon heterotrichum</i> ; <i>Ovatomyzus boraginacearum</i>
<i>S. grandiflora</i>	[<i>Aphis</i> sp. (Bozhko, 1976a)]
<i>S. greggii</i>	<i>Myzus persicae</i>
<i>S. hierosolymitana</i>	<i>Ovatomyzus boraginacearum</i>
<i>S. horminoides</i>	<i>Ovatomyzus boraginacearum</i>
<i>S. horminum</i> see <i>viridis</i>	
<i>S. leucantha</i>	<i>Aphis gossypii</i> ; [<i>Greenidea anonae</i> , <i>kumaoni</i>]; <i>Myzus persicae</i>
<i>S. mellifera</i>	<i>Eucarazzia elegans</i> ; <i>Macrosiphum salviae</i>
<i>S. micrantha</i>	<i>Aphis gossypii</i> , <i>spiraecola</i> ; <i>Macrosiphum</i> [<i>mesosphaeri</i>], <i>salviae</i>
<i>S. microphylla</i>	<i>Aulacorthum solani</i> ; <i>Myzus ornatus</i>
<i>S. misella</i>	<i>Macrosiphum</i> [<i>mesosphaeri</i>], <i>salviae</i>
<i>S. nemorosa</i>	<i>Aphis craccivora</i> , <i>salviae</i> ; <i>Macrosiphum euphorbiae</i>
<i>S. nigrescens</i>	<i>Aphis spiraecola</i> ; <i>Toxoptera aurantii</i>
<i>S. nilotica</i>	<i>Sitobion colei</i>
<i>S. nipponica</i>	<i>Myzus siegesbeckiae</i>
<i>S. nutans</i>	<i>Aphis salviae</i>
<i>S. occidentalis</i>	<i>Aphis gossypii</i> ; <i>Macrosiphum salviae</i> ; <i>Toxoptera aurantii</i>
<i>S. officinalis</i>	<i>Aphis craccivora</i> , <i>fabae</i> , <i>passeriniana</i> , <i>salviae</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus cardui</i> , <i>helichrysi</i> ; <i>Myzus ornatus</i>
<i>S. polystachya</i>	<i>Aphis gossypii</i>
<i>S. pratensis</i>	<i>Aphis fabae</i> , <i>salviae</i> ; <i>Aulacorthum solani</i> ; <i>Eucarazzia elegans</i>
<i>S. rectiflora</i>	<i>Eucarazzia elegans</i>
<i>S. rhytidea</i>	<i>Klimaszewskia salviae</i>
<i>S. rutilans</i>	<i>Aphis gossypii</i>
<i>S. satureja</i> (? <i>Satureja</i> sp.)	<i>Eucarazzia elegans</i>
<i>S. scapiformis</i>	<i>Aphis gossypii</i>
<i>S. sclarea</i>	<i>Aphis salviae</i> ; <i>Klimaszewskia salviae</i>
<i>S. splendens</i>	<i>Aphis egomae</i> , <i>gossypii</i> , <i>passeriniana</i> ; <i>Aulacorthum</i> [<i>prasinum</i>], <i>solani</i> ; <i>Eucarazzia elegans</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus ornatus</i> ; <i>Neomyzus circumflexus</i>
<i>S. stachyoides</i>	<i>Aphis ramona</i>
<i>S. verbenacea</i>	<i>Aphis craccivora</i> , <i>gossypii</i> , <i>salviae</i> ; <i>Brachycaudus helichrysi</i> ; <i>Myzus ornatus</i> , <i>persicae</i>
<i>S. verticillata</i>	<i>Aphis fabae</i> , <i>salviae</i> , <i>verticillatae</i> ; <i>Aulacorthum solani</i> ; [<i>Cryptomyzus ribis</i>]
<i>S. virgata</i>	<i>Aphis salviae</i>
<i>S. viridis</i> (incl. <i>horminum</i>)	<i>Eucarazzia elegans</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i>

HOST LISTS AND KEYS

Salvia spp.

Aphis nasturtii, [narzikulovi], raji, [umbrella];
 [Bituberculata inexpecta Rusanova (nomen dubium)];
Macropodaphis rechingeri (as kulundensis)

Key to apterae on *Salvia*:-

1. Fore femora greatly enlarged, about twice as thick as mid femora, and fore tibiae with strengthened bases. Dorsum adorned with numerous mammariform or quadrate processes, each bearing a wax gland and 1–3 hairs. Cauda knobbed *Macropodaphis rechingeri*
 - Fore femora not enlarged. Dorsum without such processes. Cauda not knobbed 2
2. SIPH strongly swollen, with maximum diameter of swollen part more than 2× minimum diameter of stem (Figure 48a). SIPH 5.4–8.2× cauda *Eucarazzia elegans*
 - SIPH not swollen or less swollen, and less than 4.5× cauda 3
3. Dorsal cuticle of head nodulose or spiculose. ANT tubercles well developed, with scabrous and steep-sided or gibbous inner faces 4
 - Dorsal cuticle of head more-or-less smooth, without nodules or spicules (although there may be some spicules ventrally). If ANT tubercles are well developed then their inner faces are smooth and slightly to markedly divergent 7
4. Hairs on ANT III and dorsal abdomen mostly thick and 21–43µm long, maximally 1.0–1.2× BD III, with slightly to distinctly expanded apices (Figure 48b) *Chaetosiphon heterotrichum*
 - Hairs on ANT III and dorsum very short, 5–10µm, less than 0.5× BD III 5

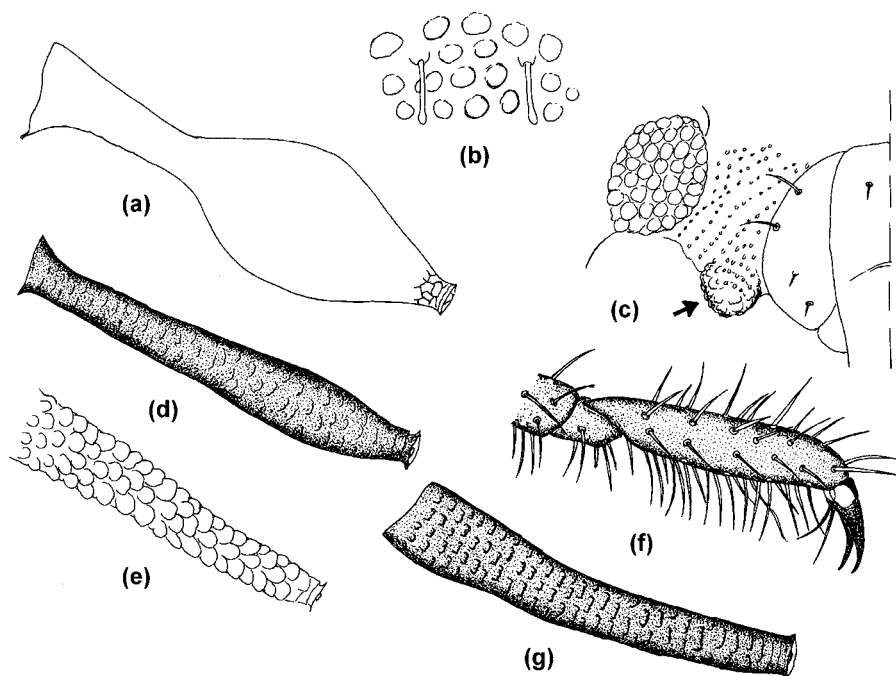


Figure 48 Apterae on *Salvia*. (a) SIPH of *Eucarazzia elegans*, (b) dorsal hairs and cuticle of *Chaetosiphon heterotrichum*, (c) ventral side of head of *Hyalomyzus collinsoniae* showing scabrous tubercle (arrowed), (d) SIPH of *H. collinsoniae*, (e) SIPH of *Myzus siegesbeckiae*, (f) hind tarsus of *Klimaszewskia salviae*, (g) SIPH of *Aphis verticillatae*.

5. Head posteroventrally with a pair of scabrous tubercles placed on either side of clypeus (Figure 48c). SIPH dusky to dark, evidently clavate (Figure 48d). (Al. with dark-bordered forewing veins and sec. rhin. distributed III 42–65, IV 18–42, V 1–9) *Hyalomyzus collinsoniae*
- Head without posteroventral tubercles. SIPH pale or dusky, tapering/cylindrical or clavate. (Al. with forewing veins not dark-bordered and sec. rhin. distributed III 6–28, IV 0–10, V 0–3) **6**
6. SIPH 3–4× cauda, cylindrical/tapering, coarsely imbricated (Figure 48e). Cauda often basally constricted, with 4 hairs. (Al. with sec. rhin. distributed III c.26–28, IV c.9–10, V 1–3) *Myzus siegesbeckiae*
- SIPH 1.8–2.7× cauda, cylindrical/tapering or clavate, coarsely or normally imbricated. Cauda not basally constricted, with 4–8 hairs (Al. with sec. rhin. distributed III 4–28, IV 0–8, V 0) go to key to polyphagous aphids, p. 1020, starting at couplet 5
7. ANT tubercles well developed, extending forward well beyond middle part of head in dorsal view, with inner faces slightly to broadly divergent. ABD TERG 1 and 7 without marginal tubercles (MTu) **8**
- ANT tubercles undeveloped or weakly developed, not or hardly projecting beyond middle of front of head in dorsal view (if at all developed then ABD TERG 1 and 7 have MTu) **14**
8. Longest hairs on ANT III 8–20µm, 0.2–0.6× BD III **9**
- Longest hairs on ANT III 22–36µm, 0.6–1.2× BD III **12**
9. Tergum with extensive dark sclerotisation. SIPH entirely black with a distal zone of polygonal reticulation *Sitobion coleii*
- Tergum pale. SIPH pale at least basally, with or without some subapical polygonal reticulation **10**
10. ANT dark beyond base of III, and SIPH dark distally, with 1–2 rows of subapical polygonal reticulation *Acyrtosiphon bidenticola*
- ANT and SIPH pale, SIPH without any polygonal reticulation **11**
11. ANT III with 1–10 rhinaria. ANT tubercles with inner faces broadly divergent. Cauda tapering, broadest at base and bearing 7–12 hairs *Acyrtosiphon malvae* group
- ANT III without rhinaria. ANT tubercles slightly divergent, rounded at inner apices. Cauda constricted basally and usually bearing 5 hairs *Ovatomyzus boraginacearum*
12. R IV+V with c.25–30 accessory hairs. Tibial apices and tarsi densely clothed with long hairs (Figure 48f). First tarsal segments with 5 hairs. (ANT III of al. with 40–50 rhinaria) *Klimaszewskia salviae*
- R IV+V with 7–10 accessory hairs. Tibial apices and tarsi not densely hairy. First tarsal segments with 3 hairs. (ANT III of al. with 12–21 rhinaria) **13**
13. Hind tibiae and SIPH entirely or mainly dark, femora dark distally. R IV+V 1.25–1.55× HT II. Dorsal abdomen with or without a dark central patch *Macrosiphum salviae*
- Hind tibiae and SIPH pale or dark only distally, femora entirely pale. R IV+V 0.8–1.0× HT II. Dorsal abdomen never with a dark patch *Macrosiphum euphorbiae*
14. Cauda helmet-shaped, with 4–8 hairs. SIPH with a subapical annular incision. Spiracular apertures large and rounded. ABD TERG 1 and 7 without marginal tubercles (MTu) **15**
- Cauda triangular or tongue-shaped, with 4–28 hairs. SIPH without a subapical annular incision. Spiracular apertures reniform. ABD TERG 1, and usually also 7, with MTu **16**
15. Dorsal abdomen with an extensive solid black shield. ANT III 0.31–0.47 mm, 2.4–3.4× HT II. R IV+V 0.17–0.24 mm. SIPH dark, imbricated, 1.7–3.4× cauda *Brachycaudus cardui*
- Dorsal abdomen without a black shield. ANT III 0.07–0.25 mm, 0.9–2.2× HT II. R IV+V 0.10–0.15 mm. SIPH pale, smooth, 0.8–2.0× cauda *Brachycaudus helichrysi*

HOST LISTS AND KEYS

16. Dorsal abdomen with extensive dark sclerotisation on ABD TERG 1–6, with pale polygonal reticulation **17**
 – ABD TERG 1–6 pale or with only small scattered dark sclerites **18**
17. R IV+V 0.87–1.18× HT II (rarely more than 1.1×) *Aphis craccivora*
 – R IV+V 1.1–1.42× HT II (usually at least 1.13×) *Aphis salviae*
18. R IV+V 0.19–0.23 mm, 2.0–2.2× HT II. Marginal abdominal hairs 78–103 µm long, 3–4× ANT BD III. MTu present on ABD TERG 1 but often absent from ABD TERG 7 *Aphis raji*
 – Without that combination of characters **19**
19. R IV+V with 5–7 accessory hairs. ANT PT/BASE 1.5–1.8. SIPH pale, or dark only at apices *Aphis ramona*
 – R IV+V with 2 (–3) accessory hairs, and other characters not in that combination **20**
20. R IV+V 1.54–2.02× HT II, which is very short *Aphis passeriniana*
 – R IV+V less than 1.5× HT II **21**
21. SIPH long and almost cylindrical on distal half, with coarse imbrication; 6.8–9.0× longer than their midlength diameter (Figure 48g). Cauda pale or dusky *Aphis verticillatae*
 – SIPH pale or dark, tapering, with normal imbrication, and rarely more than 6.5× longer than their midlength diameter, unless SIPH and cauda are both black **22**
22. ANT 5-segmented. (SIPH dark, cauda pale) *Aphis egomae**
 – ANT 6-segmented (except sometimes in summer dwarfs)
 go to key to polyphagous aphids, p. 1020, starting at couplet 25

Salvinia

Salviniaceae

One aphid species, *Rhopalosiphum nymphaeae*, is recorded from three *Salvinia* spp; *auriculata*, *molesta*, *natans*.

Samolus

Primulaceae

S. valerandi

Aphis triglochinis

Sanchezia

Acanthaceae

S. nobilis

Aphis gossypii, *spiraecola*

Sanchezia sp.

Myzus ornatus

Use key to polyphagous aphids, p. 1020.

Sanguinaria

Papaveraceae

S. canadensis

Linosiphon sanguinarium

Sanguisorba (incl. *Poterium*)

Rosaceae

S. albiflora

Aphis sanguisorbicola

S. menendezii

Myzus persicae

S. minor (incl. *muricata*)

Acyrtosiphon malvae ssp. *poterii*, *malvae* ssp.

(= *Poterium sanguisorba*)

sanguisorbae;

Aphis sanguisorbae, *sanguisorbae* ssp. *poterii*;

Aulacorthum solani; *Macrosiphum euphorbiae*;

Myzus ascalonicus, *ornatus*

<i>S. officinalis</i>	<i>Aphis craccivora</i> (? – as <i>laburni</i>), <i>gossypii</i> , <i>sanguisorbae</i> , <i>sanguisorbicola</i> ; <i>Aulacorthum solani</i> ; [<i>Cryptosiphum artemisiae</i>]; [<i>Macchiatiella itadori</i>]; <i>Myzus ornatus</i> , <i>persicae</i>
<i>S. parviflora</i>	<i>Aphis sanguisorbicola</i>
<i>S. sitchensis</i>	<i>Aphis sanguisorbicola</i>
<i>S. spinosa</i>	<i>Aphis sanguisorbae</i>
<i>S. tenuifolia</i>	<i>Aphis sanguisorbicola</i>
<i>Sanguisorba</i> sp.	<i>Aphis soan</i>

Key to apterae on *Sanguisorba*:-

- SIPH black, cauda pale/dusky. ANT tubercles weakly developed. ABD TERG 1 and 7 with marginal tubercles (MTu) **2**
- SIPH pale (sometimes darker at apices), ANT tubercles well developed and ABD TERG 1 and 7 without MTu; **or** SIPH and cauda both black
go to key to polyphagous aphids, p. 1020 (but note that, if specimens run to *Acyrtosiphon malvae*, there are 2 subspecies described as specific to *S. minor*)
- Cauda with c.13–14 hairs. Longest hairs on ANT III 1.0–1.5× BD III *Aphis soan*
- Cauda with 4–9 (–10) hairs. Longest hairs on ANT III 0.3–1.0× BD III **3**
- R IV+V 0.87–1.0× HT II. Longest hairs on ANT III (0.6–) 0.7–1.0× BD III. First segments of fore and mid tarsi usually with 4 hairs (2 sense pegs). SIPH 1.5–2.1× cauda. ABD TERG 2–4 without MTu *Aphis sanguisorbicola*
- R IV+V 1.07–1.27× HT II. Longest hairs on ANT III 0.3–0.7 (–0.8)× BD III. First segments of fore and mid tarsi with 3 hairs (1 sense peg). SIPH 0.9–2.5× cauda. ABD TERG 2–4 with or without MTu **4**
- MTu often present (and sometimes large) on at least some of ABD TERG 2–4, as well as large ones on ABD TERG 1 and 7. Marginal hair on ABD TERG 1 is less than 0.5× height of MTu on same segment. SIPH 0.9–1.5 (–1.7)× cauda *Aphis sanguisorbae*
- MTu absent from ABD TERG 2–4, and rather small on ABD TERG 1 and 7. Marginal hair on ABD TERG 1 is 0.7–1.8× height of MTu on same segment. SIPH 1.3–2.5× cauda *Aphis gossypii*

Sanicula

S. canadensis
S. crassicaulis
S. europaea

S. marilandica
S. menziesii
Sanicula sp.

Umbelliferae

Aphis clydesmithi, *saniculae*
Aphis sp. (California, USA: BMNH colln)
Aphis fabae; *Aulacorthum solani*;
Cavariella aegopodii, *salicicola*, *simlaensis*;
Macrosiphum holmani
Aphis fabae, *saniculae*
Aphis helianthi (? – as *cornifoliae*); *Myzus persicae*
Aphis thaspis

Key to apterae on *Sanicula*:-

- ABD TERG 8 with a backwardly directed median process bearing 2 hairs near apex. ANT PT/BASE less than 1.5 **2**
- No supracaudal process. ANT PT/BASE more than 1.5 **4**

HOST LISTS AND KEYS

2. Tergum dark-pigmented, at least in central area. SIPH blackish. Supracaudal process $c.0.33\times$ cauda
*Cavariella simlaensis**
– Tergum not dark-pigmented. SIPH pale. Supracaudal process $0.75-1.5\times$ cauda **3**
3. Supracaudal process longer than ($1.2-1.5\times$) cauda. SIPH coarsely imbricated and stout, less than $5\times$
longer than the maximum width of the swollen part *Cavariella salicicola*
– Supracaudal process mostly shorter than ($0.75-1.05\times$) cauda. SIPH weakly imbricated and more than
 $5\times$ longer than maximum width of swollen part *Cavariella aegopodii*
4. ANT tubercles weakly developed. ABD TERG 1 and 7 with marginal tubercles (MTu). SIPH pale,
dusky or dark **5**
– ANT tubercles well developed. ABD TERG 1 and 7 without MTu. SIPH pale, or dark only at apices **10**
5. ANT 5-segmented. Rostrum very long, reaching to well past hind coxae and almost to bases of SIPH,
with R IV+V more than $1.5\times$ HT II *Aphis clydesmithi*
– ANT normally 6-segmented. Rostrum much shorter, with R IV+V less than $1.4\times$ HT II **6**
6. ANT III–V (of apt.) usually with sec. rhin. (III 0–14, IV 0–12, V 0–8) *Aphis saniculae*
– ANT III–V (of apt.) without sec. rhin. (except in alatiform specimens) **7**
7. HT I with 3 hairs (medial sense peg present). SIPH $1.5-2.5\times$ cauda *Aphis helianthi*
– HT I almost always with 2 hairs (no sense peg). SIPH $0.8-1.6\times$ cauda **8**
8. Longest hair on ANT III $0.8-3.4\times$ BD III. Marginal hair on ABD TERG 1 is at least $1.2\times$ height of
MTu on same segment. Cauda bearing 11–24 hairs *Aphis fabae*
– Longest hair on ANT III $0.2-0.7\times$ BD III. Marginal hair on ABD TERG 1 is $0.2-0.9\times$ height of MTu
on same segment. Cauda bearing 7–12 hairs **9**
9. Longest hairs on ABD TERG 1–3 and ANT III $10-15\mu\text{m}$. Head and ANT I–II dark, and dorsal abdomen
usually with pigmented hair-bases, postsiphuncular sclerites and cross-bands on ABD TERG 7–8. SIPH
and cauda dusky/dark *Aphis thaspis*
– Longest hairs on ABD TERG 1–3 and ANT III $16-24\mu\text{m}$. Head, ANT I–II and dorsal abdomen pale,
SIPH dusky or dark with paler mid-section, cauda pale/dusky
Aphis sp. (California: BMNH, leg. D. Hille Ris Lambers)
10. Femora dark distally. SIPH with a distal zone of polygonal reticulation. Longest hairs on ABD TERG
8 more than $2\times$ ANT BD III *Macrosiphum holmani*
– Without that combination of characters go to key to polyphagous aphids, p. 1020, starting at couplet 4

Santolina

S. chamaecyparissus

S. rosmarinifolia

S. viridis

Santolina sp.

Compositae

Aphis fabae; *Aulacorthum solani*;

Coloradoa bournieri

Aphis (*Protaphis*) sp. (Mier Durante, 1978);

Brachycaudus helichrysi; *Coloradoa moralesi*

Coloradoa bournieri

Coloradoa bournieri ssp. *iberica*; *Myzus persicae*

Key to apterae on *Santolina*:-

1. ANT PT/BASE less than 1 and ABD TERG 1 and 7 with marginal tubercles (MTu)
Aphis (*Protaphis*) sp. (Spain: Mier Durante, 1978)
- Without that combination of characters **2**

2. Dorsal hairs expanded distally, like partly-opened fans. SIPH clavate, dark towards apices. R IV+V with convex sides, stiletto-shaped 3
 – Without that combination of characters go to key to polyphagous aphids, p. 1020
3. R IV+V $0.67-0.80 \times$ HT II. Hairs on ABD TERG 8 only $3-12 \mu\text{m}$ long, shorter than ANT BD III *Coloradoa moralesi*
 – R IV+V $1.25-1.52 \times$ HT II. Hairs on ABD TERG 8 are $17-23 \mu\text{m}$, about equal to or longer than ANT BD III *Coloradoa bournieri*

Sanvitalia*S. procumbens**Sanvitalia* sp.*Aphis fabae*[*Myzus certus*], *ornatus*, *persicae***Compositae**

Use key to polyphagous aphids, p. 1020 (but note that specimens running to *Myzus persicae* might be *M. certus*).

Sapindus see Blackman and Eastop (1994)

Sapium see Blackman and Eastop (1994)

Saponaria*S. boissieriana**S. officinalis**Saponaria* sp.*Myzus cymbalariae*, *persicae**Myzus persicae**Aphidura ornatella* (as *bahratia*)**Caryophyllaceae**

Key to apterae on *Saponaria*:– (All 3 spp. listed have clavate SIPH.)

- Tergum with extensive dark sclerotisation. Head dark, without or with very few spicules. Longest frontal hairs at least $40 \mu\text{m}$. Mesosternum with a pair of scabrous tubercular processes *Aphidura ornatella*
 – Without that combination of characters go to key to polyphagous aphids, p. 1020

Saposhnikovia*S. divaricata**Aphis gossypii***Umbelliferae****Saraca***S. declinata**S. indica**Toxoptera aurantii**Toxoptera aurantii***Leguminosae****Sarcobatus***S. rubra* (?)*S. vermiculatus*[*Brachyunguis tetrapteralis*]*Aphis unaweepiensis*;*Brachyunguis bishopi*, *bonnevillensis***Chenopodiaceae**

Key to apterae on *Sarcobatus*:–

1. ANT PT/BASE $1.2-1.6$. R IV+V $1.5-1.8 \times$ HT II. SIPH $1.8-2.0 \times$ cauda which is triangular, about as long as its basal width *Aphis unaweepiensis*
 – ANT PT/BASE $0.7-1.0$. R IV+V $0.8-1.1 \times$ HT II. SIPH $0.4-1.25 \times$ cauda, which is tongue-shaped, longer than its basal width 2

HOST LISTS AND KEYS

2. Longest hairs on ANT III 22–47 µm, and on ABD TERG 8, 41–60 µm. SIPH 0.7–1.25× cauda. ABD TERG 2–5 as well as 1 and 7 often with marginal tubercles (MTu) *Brachyunguis bishopi*
– Longest hairs on ANT III 8–14 µm, and on ABD TERG 8, 14–27 µm. SIPH 0.4–0.8× cauda. MTu only on ABD TERG 1 and 7 *Brachyunguis bonnevillensis*

Sarcochilus

S. hartmanni

Orchidaceae

Cerataphis orchidearum

Sarcococca

S. pruniformis

S. ruscifolia

Euphorbiaceae

[*Jacksonia* sp. (Banerjee *et al.*, 1969 – 2 males)]

Aulacorthum solani; *Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Sarcopharyngia see *Tabernaemontana*

Sarcopoterium

S. spinosum

Rosaceae

Aphis gossypii

Sarcostemma (incl. *Funastrum*)

S. clausum

Asclepiadaceae

Aphis craccivora, *gossypii*, *nerii*

Use key to polyphagous aphids, p. 1020.

Sarothamnus see *Cytisus*

Sarracenia

S. purpurea

Sarraceniaceae

Macrosiphum jeanae; [*Myzocallis multisetis*]

Saruma

Saruma henryi

Aristolochiaceae

Aulacorthum rhamni

Sasa see Blackman and Eastop (1994)

Satureja

S. acinos see *Acinos arvensis*

S. calamintha see *Calamintha officinalis*

S. hortensis

Aphis fabae

S. vulgaris see *Clinopodium vulgare*

Labiatae

Saurauia

S. nepalensis

Actinidiaceae

Aphis fabae

Sauropus

S. albicans

S. androgynus

Euphorbiaceae

Schoutedenia ralumensis

Aphis eugeniae

Use key to apterae on *Breynia*.

HOST LISTS AND KEYS

4. SIPH with c.4–5 hairs, c.3× longer than cauda, which bears 10–13 hairs. First tarsal segments with 5 hairs *Macrotrichaphis rarissima**
 – SIPH with (0–) 5–21 hairs, 1.6–2.5× longer than cauda which bears 20–28 hairs. First tarsal segments with 3 hairs *Macrosiphoniella lazoica**
5. SIPH only 0.10–0.14× BL, reticulated on distal 0.5–0.7 of length. Cauda triangular, pointed, only about as long as its basal width. ANT tubercles very low *Macrosiphoniella saussureae*
 – SIPH more than 0.14× BL, reticulated on less than distal 0.5. Cauda tongue- or finger-shaped, longer than its basal width. ANT tubercles well developed **6**
6. SIPH 1.0–1.1× cauda, with reticulation on distal 0.34–0.38. R IV+V 0.8–0.9× HT II *Macrosiphoniella victoriae*
 – SIPH 1.1–2.2× cauda, with reticulation on distal 0.12–0.36. R IV+V 1.0–2.0× HT II **7**
7. ANT III very long, 1.5–2.1× ANT IV+V together, and bearing very numerous (96–135) strongly protruberant secondary rhinaria *Uroleucon formosanum*
 – ANT III shorter than or about equal in length to ANT IV+V together, with 18–56 rhinaria **8**
8. SIPH 2.0–2.2× cauda, with reticulation on distal 0.12–0.17 of length. R IV+V very long and thin, 1.8–2.0× HT II *Uroleucon budhium*
 – SIPH 1.1–1.9 (–2.0)× cauda, with reticulation on distal 0.19–0.36 of length. R IV+V 1.0–1.85× HT II **9**
9. Crescent-shaped antesiphuncular sclerites present **10**
 – Antesiphuncular sclerites absent **12**
10. R IV+V 1.0–1.1× HT II *Uroleucon skurichinae**
 – R IV+V 1.5–1.85× HT II **11**
11. SIPH 0.25–0.30× BL, with reticulation on distal 0.24–0.27 of length. Cauda long and finger-like, 2.6–3.1× its basal width. R IV+V 1.7–1.85× HT II *Uroleucon saussureae*
 – SIPH c. 0.14× BL, with reticulation on distal 0.28–0.36 of length. Cauda elongate triangular, pointed at apex, 1.7–2.0× its basal width. R IV+V 1.5–1.7× HT II *Uroleucon ussuriense*
12. SIPH 1.1–1.3× the long, pale cauda, which bears 25–35 hairs. Hind tibia with a row of short peg-like hairs *Uroleucon fuchuense*
 – SIPH 1.5–2.0× the pale, dusky or dark cauda, which bears either 12–20 hairs or more than 40. Hind tibia without peg-like hairs **13**
13. Cauda paler than SIPH, with apical hairs distinctly shorter than more proximal ones *Uroleucon kumaoni**
 – Cauda as dark as SIPH, with hairs all similarly long **14**
14. Cauda with more than 40 hairs. R IV+V 1.65–1.8× HT II. Tibiae black *Uroleucon giganteum*
 – Cauda with 13–20 hairs. R IV+V 1.1–1.3× HT II. Tibiae pale in middle *Uroleucon gobonis (or compositae?)*
15. Dorsal body hairs long, thick and capitate, arising from tuberculate bases **16**
 – Dorsal body hairs short, or if long then pointed and not arising from tuberculate bases **17**
16. ANT III with 2–4 thick, capitate hairs about as long as middle diameter of segment. Dorsal abdominal hairs duplicated or triplicated, so that there are 12–16 long thick capitate hairs per segment *Capitophorus formosartemisiae*
 – ANT III with all hairs very short. Dorsal abdominal hairs not duplicated, so that there are 6 per segment *Capitophorus elaeagni*

17. ANT tubercles moderately to well developed, their inner faces divergent. ANT III with a few rhinaria on basal part **18**
 – ANT tubercles absent or weakly developed. ANT III without rhinaria **20**
18. Tergum with an extensive dark sclerotic shield. Head dark and densely spiculose. Cauda short, less than 2× its basal width, with 4 hairs *Chitinosiphon abdomenigrum**
 – Tergum pale. Head pale, not densely spiculose. Cauda finger-like, more than 2× its basal width, with 6–10 hairs **19**
19. ANT longer than BL, with ANT PT/BASE 6.5–7.0. SIPH more than 2× cauda *Acyrtosiphon rubi*
 – ANT shorter than BL, with ANT PT/BASE 3.5–4.2. SIPH less than 2× cauda *Acyrtosiphon dauricum**
20. Cauda helmet-shaped, not more than 1.1× longer than its basal width in dorsal view, and bearing 4–6 hairs. ABD TERG 7 without marginal tubercles (MTu). R IV+V with 4–6 accessory hairs **21**
 – Cauda tongue-shaped, more than 1.2× its basal width in dorsal view, and bearing 5–24 hairs. ABD TERG 7 (and 1) always with MTu. R IV+V with 2 accessory hairs **22**
21. SIPH dark, cylindrical, with slight distal swelling, 2.0–2.2× cauda. MTu often present on ABD TERG 1–5. Spiracular apertures reniform *Dysaphis pavlovskyana* (ssp. *indica*)
 – SIPH pale, conical, 0.8–1.3 (–2.0)× cauda. MTu absent. Spiracular apertures large and rounded *Brachycaudus helichrysi*
22. R IV+V 1.3–1.5× HT II. MTu usually present on ABD TERG 1–4 and 7 *Aphis saussuraeradicis**
 – R IV+V 0.9–1.1 (–1.4)× HT II. MTu only sporadically present on ABD TERG 2–4
 go to key to polyphagous aphids, p. 1020, starting at couplet 24

Savia*S. sessiliflora***Euphorbiaceae***Toxoptera aurantii***Savignya***S. parviflora***Cruciferae***Myzus persicae***Saxifraga***S. aizoides***Saxifragaceae***Aphis triglochinis*; *Brachycaudus helichrysi*;
Cavariella [aquatica], *saxifragae**S. aizoon* see *paniculata**S. alpigena* see *stellaris**S. aquatica**Rhopalosiphum nymphaeae**S. canaliculata**Aphis fabae**S. cochlearis**Macrosiphum euphorbiae**S. cuneifolia*[*Sitobion avenae*]*S. cymbalaria**Macrosiphum euphorbiae**S. decipiens**Myzus ascalonicus**S. fusca* (incl. *kikubuki*)*Taiwanomyzus montanus**S. granulata**Aphis craccivora*; *Nasonovia dasyphylli**S. groenlandica**Nasonovia vannesii**S. hirsuta**Aphis fabae**S. hypnoides**Nasonovia dasyphylli**S. leucanthemifolia* (incl. *michauxii*)*Nasonovia carolinensis**S. lingulata**Aphis fabae*; *Nasonovia dasyphylli*

HOST LISTS AND KEYS

<i>S. michauxii</i> see <i>leucanthemifolia</i>	
<i>S. nivalis</i>	<i>Nasonovia saxifragae</i>
<i>S. oppositifolia</i>	<i>Nasonovia brevipes</i> , <i>saxifragae</i>
<i>S. paniculata</i> (incl. <i>aizoon</i>)	<i>Aulacorthum solani</i> ; <i>Nasonovia dasyphylli</i> , <i>saxifragae</i>
<i>S. philadelphica</i>	<i>Aphis gossypii</i>
<i>S. punctata</i>	<i>Myzus asamensis</i>
<i>S. rosacea</i>	<i>Macrosiphum euphorbiae</i>
<i>S. rotundifolia</i>	<i>Nasonovia dasyphylli</i> , <i>ribisnigri</i>
<i>S. sarmentosa</i>	<i>Macrosiphum euphorbiae</i>
<i>S.× somedana</i>	<i>Nasonovia saxifragae</i>
<i>S. splendens</i>	<i>Macrosiphum euphorbiae</i> (as <i>gei</i>); <i>Myzus persicae</i>
<i>S. stellaris</i> (incl. <i>alpigena</i>)	<i>Nasonovia dasyphylli</i>
<i>S. stolonifera</i>	<i>Aphis spiraeicola</i> ; <i>Neomyzus circumflexus</i>
<i>S. tricuspidata</i>	<i>Nasonovia vockerothi</i>
<i>S. umbrosa</i>	<i>Aphis sambuci</i>
<i>Saxifraga</i> spp.	[<i>Macrosiphum constrictum</i>]; <i>Myzus ornatus</i> ; [<i>Nasonovia acyrthosiphon</i>]

Key to apterae on *Saxifraga*:-

1. ABD TERG 8 with a backwardly-directed process similar in length to and almost covering cauda. ANT PT/BASE 0.9–1.0. Tergum strongly sclerotised, often dark. SIPH swollen distally
Cavariella saxifragae
- No supracaudal process, ANT PT/BASE more than 1.5 and other characters not in that combination **2**
2. Head spiculose. SIPH black, somewhat clavate, more than 2.7× cauda which is also black and bears 4–5 hairs. Dorsum with extensive black sclerotisation
Taiwanomyzus montanus
- Without that combination of characters **3**
3. Thoracic spiracular apertures much larger than abdominal ones. ANT III usually with more than 10 sec. rhin., and often some also on IV, or IV and V **4**
- Thoracic spiracular apertures similar in size to abdominal ones. ANT III with or without a few (1–10) rhinaria on basal part, none on IV or V **11**
4. Cauda usually with 7 hairs, rarely 6, 8 or 9. ANT PT/BASE 7.0–11.4 (usually more than 8.4). SIPH without imbrication. Dorsal abdomen with paired intersegmental markings
Nasonovia ribisnigri
- Cauda almost always with 5 hairs. ANT PT/BASE 2.5–8.4. SIPH usually with some imbrication. Dorsum pale or with more extensive dark sclerotisation **5**
5. Dorsal abdomen with extensive dark sclerotisation, fused between tergites to form a large dark patch **6**
- Dorsal abdomen pale or with dark cross-bars, not fused between tergites **7**
6. ANT PT/BASE (3.6–) 5.0–8.8. SIPH 1.4–2.5× cauda. Sec. rhin. distributed ANT III 10–42, IV 0–21, V 0–4
Nasonovia dasyphylli
- ANT PT/BASE 2.5–4.7 (–5.4). SIPH 1.2–1.6× cauda. Sec. rhin. distributed ANT III 4–25, IV 0–2, V 0
Nasonovia saxifragae (dark form)
7. ANT PT/BASE (4.8–) 5.7–8.2. Longest hairs on ANT III often longer than 0.7–1.3× BD III **8**
- ANT PT/BASE 2.5–4.2 (–5.0). Longest hairs on ANT III 0.5–1.0× BD III **9**

8. Abdomen usually with short dusky/dark spinal cross bars on ABD TERG 1–6, and separate sclerites at bases of pleural and marginal hairs. R IV+V 1.6–2.2× HT II. SIPH with spinules on imbrications
Nasonovia carolinensis
– Abdomen without dark sclerites on ABD TERG 1–6. R IV+V 1.4–1.5× HT II. SIPH without spinules on imbrications
*Nasonovia vannesii**
9. R IV+V c.2× HT II, with c.10 accessory hairs
*Nasonovia brevipes**
– R IV+V 1.2–1.8× HT II, with 12–16 accessory hairs **10**
10. SIPH 0.11–0.12× BL, 0.9–1.3× cauda, and 3.5–4× diameter at midlength
Nasonovia vockerothi
– SIPH 0.16–0.24× BL, 1.4–1.8× cauda, and more than 5× diameter at midlength
Nasonovia saxifragae (pale form)
11. Dorsal cuticle with bead-like spinules arranged in polygons, each polygon enclosing 1–4 separate spinules. SIPH dusky-dark, clavate
Rhopalosiphum nymphaeae
– Dorsal cuticle without spinules arranged in polygons. SIPH pale or dark, clavate, cylindrical or tapering **12**
12. Marginal abdominal tubercles (MTu) present on at least ABD TERG 1–4 and 7. SIPH and cauda dark. SIPH 1.7–3.5× cauda which is short and rounded and bears 10–20 hairs
Aphis sambuci
– MTu absent or only regularly present on ABD TERG 1 and 7, and other characters not in above combination **13**
13. ANT PT/BASE 1.1–1.8. MTu on ABD TERG 1 and 7. SIPH rather pale, tapering, 0.7–1.3× cauda. (Al. with sec. rhin. distributed ANT III 25–60, IV 9–25, V 7–17)
Aphis triglochinis
– ANT PT/BASE 1.8–6.2, and other characters not in that combination **14**
14. Head densely spiculose. SIPH dark, coarsely imbricated, cylindrical or slightly swollen on distal half, distinctly constricted at apex, with a large flange. R IV+V 1.5–1.7× HT II
Myzus asamensis
– Without that combination of characters go to key to polyphagous aphids, p. 1020

Scabiosa

S. africana
S. argentea
S. arvensis see *Knautia arvensis*
S. atropurpurea
S. banatica
S. canescens
S. caucasica
S. columbaria

S. maritima
S. ochroleuca (incl. *polymorpha*)
S. officinalis (?)
S. songorica
S. succisa see *Succisa pratensis*
S. ucranica
Scabiosa sp.

Dipsacaceae

Macrosiphum rosae
Aphis spiraecola

Aphis confusa, fabae; Macrosiphum rosae
Aphis confusa
Aphis confusa
Aulacorthum solani; Macrosiphum rosae; Myzus persicae
Aphis confusa, thomasi; Macrosiphum rosae, weberi;
Ovatomyzus chamaedryst
Aphis confusa; Macrosiphum rosae, weberi
Aphis confusa, thomasi; Macrosiphum rosae
Macrosiphum rosae
Dysaphis cephalariae

Aphis confusa, thomasi
Aphis gossypii

HOST LISTS AND KEYS

Key to apterae on *Scabiosa*:-

1. ANT tubercles undeveloped or weakly developed. ABD TERG 1 and 7 (at least) with marginal tubercles (MTu). Cauda pale or dark 2
 - ANT tubercles well developed. ABD TERG 7 without MTu. Cauda pale 6
2. Cauda helmet-shaped or bluntly triangular, shorter than its basal width in dorsal view. Head and all thoracic and abdominal segments with spinal tubercles (STu), and MTu present on ABD TERG 1-7 3

*Dysaphis cephalaria**

 - Cauda tongue-shaped, much longer than its basal width. STu absent, and MTu only regularly present on ABD TERG 1 and 7 3
3. Femoral hairs all shorter than diameter of trochantrofemoral suture. Cauda pale, dusky or dark with 4-9 hairs 4
 - Many femoral hairs long and fine-pointed, exceeding diameter of trochantrofemoral suture. Cauda black with 7-24 hairs 5
4. Posterior hair on hind trochanter 0.2-0.5× diameter of trochantrofemoral suture. Hairs on anterior half of subgenital plate 0.2-0.6× ANT BD III Aphis thomasi
 - Posterior hair on hind trochanter 0.6-1.1× diameter of trochantrofemoral suture. Hairs on anterior half of subgenital plate 1.2-2.0× ANT BD III Aphis confusa (or Aphis gossypii - see text)
5. ANT III 0.9-1.2× cauda, which usually has a distinct midlength constriction and bears 6-15 (usually 9-11) hairs. Dorsal abdomen without any dark markings Aphis spiraeicola
 - ANT III 1.2-1.9× cauda which is usually without any constriction and bears 11-24 hairs. Dorsal abdomen usually with scattered dark markings anterior to SIPH and dark cross-bands on ABD TERG 7 and 8 Aphis fabae
6. Head without spicules 7
 - Head spiculose 9
7. Head pale. SIPH pale, slightly swollen distally, without subapical polygonal reticulation. ANT III without rhinaria Ovatomyzus chamaedrys
 - Head dark. SIPH dark with a subapical zone of polygonal reticulation. ANT III with 5-35 rhinaria 8
8. Body spindle-shaped. SIPH thicker than hind tibiae at their respective midlengths, and 1.8-2.2× head width across (and including) eyes Macrosiphum rosae
 - Body oval. SIPH about equal in thickness to hind tibiae at midlength, and 1.1-1.5× head width across eyes Macrosiphum weberi
9. SIPH slightly clavate. ANT 0.7-1.0× BL, without rhinaria on ANT III Myzus persicae
 - SIPH tapering/cylindrical. ANT 1.1-1.3× BL, with (0-) 1-2 (-4) rhinaria near base of ANT III Aulacorthum solani

Scaevola

S. frutescens
S. koenigii
S. sericea
S. taccada
Scaevola sp.

Aphis gossypii
Aphis gossypii
Aphis gossypii
Aphis gossypii
Myzus persicae

Goodenaceae

Use key to polyphagous aphids, p. 1020.

Scaligeria

S. bucharica

Dysaphis munirae

Umbelliferae

Scandix*S. pecten-veneris***Umbelliferae***Aphis craccivora, fabae; Cavariella aegopodii; Myzus persicae; Semiaphis dauci*Use key to apterae on *Daucus*.**Schanginia see Sueada****Schefflera (incl. Agalona, Didymopanax, Dzygotheca, Heptapleurum, Tupidanthus)****Araliaceae***S. actinophylla**Aphis gossypii, hederiae, spiraeicola**S. arborea**Cavariella araliae**S. arboricola**Aphis gossypii, hederiae; Toxoptera aurantii**S. calyptratus**Macrosiphum euphorbiae; Toxoptera aurantii**S. lutchuensis**Cavariella araliae; Toxoptera aurantii**S. morototoni**Toxoptera aurantii**S. octophylla**Cavariella araliae; Neomyzus circumflexus;**Toxoptera aurantii**S. stelznesiana**Aphis gossypii**S. umbellifera**Macrosiphum euphorbiae**S. veitchii**Myzus persicae**S. venulosa**Aphis gossypii; Myzus persicae**Schefflera* sp.*Brachycaudus helichrysi*Key to aphids on *Schefflera*:-

1. ABD TERG 8 with a long backwardly-directed process, broad at base but with a narrow apex that extends beyond cauda *Cavariella araliae*
- No supracaudal process **2**
2. SIPH and cauda both black. R IV + V 1.3–1.6× HT II. Apt. often alatiform, with 0–19 rhinaria on ANT III. Marginal tubercles (MTu) frequently present on ABD TERG 2–4, as well as 1 and 7 *Aphis hederiae*
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Scheuchzeria*S. palustris***Scheuchzeriaceae***Aphis triglochinis;**[Macrosiphum nasonovi* of Zirnits, 1927]**Schimpera***S. arabica***Cruciferae***Aphis craccivora; Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Schinus see Blackman and Eastop (1994)**Schizanthus***Schizanthus* sp.**Solanaceae***Neomyzus circumflexus***Schizophragma***S. hydrangeoides***Hydrangeaceae***Taiwanomyzus montanus*

HOST LISTS AND KEYS

Schizostachyum

S. blumii

S. brachycladum

S. lima

S. zollingeri

Gramineae

Astegopteryx singaporensis; *Ceratoglyphina bambusae*;

Pseudoregma pendleburyi

Astegopteryx singaporensis; *Ceratoglyphina bambusae*;

Glyphinaphis bambusae

Ceratovacuna hoffmani

Ceratoglyphina bambusae

Use key to aphids on *Bambusa* in Blackman and Eastop (1994), which also see for accounts of these aphids.

Schistostylis

S. coccinea

Iridaceae

Macrosiphum euphorbiae; *Neomyzus circumflexus*

Use key to polyphagous aphids, p. 1020.

Schizopepon

S. bryoniifolius

Cucurbitaceae

Aulacorthum magnoliae

Schkuhria

S. pinnata

Compositae

Uroleucon compositae

***Schlumbergera* (incl. *Zygocactus*)**

S. bridgesii

Schlumbergera sp.

Cactaceae

Aphis fabae; *Myzus persicae*

Brachycaudus helichrysi

Use key to polyphagous aphids, p. 1020.

Schoenoplectus

S. triqueter

Cyperaceae

Schizaphis scirpi

Use key under *Scirpus*.

Schoenus

S. nigricans

Cyperaceae

Rhopalosiphum padi; *Sipha glyceriae*

Use key to apterae on *Scirpus*.

Schomburgkia

Schomburgkia sp.

Orchidaceae

Cerataphis orchidearum

Schouwia

S. thebaica

Cruciferae

Aphis gossypii

Scilla

S. biflora

S. madeirensis

Scilla sp.

Hyacinthaceae

Myzus persicae

Myzus hemerocallis

Dysaphis tulipae

Key to apterae on *Scilla*:-

1. SIPH dark. Cauda helmet-shaped, not longer than its basal width in dorsal view. Spinal tubercles (STu) present on head and ABD TERG 8, or 7 and 8 *Dysaphis tulipae*
- SIPH pale. Cauda tongue-shaped, much longer than its basal width. STu absent from head, and rarely on ABD TERG 8 **2**
2. SIPH tapering or cylindrical on distal half, more than 2.5× cauda, with coarse imbrication. (Al. without a black dorsal abdominal patch) *Myzus hemerocallis*
- SIPH slightly to moderately swollen on distal half, less than 2.5× cauda, with normal imbrication. (Al. with a black dorsal abdominal patch) *Myzus persicae*

Scindapsus*Scindapsus* sp.**Araceae***Rhopalosiphum nymphaeae****Scirpoides****S. holoschoenus***Cyperaceae***Colopha hispanica*; *Schizaphis scirpi*; *Sitobion avenae*Use key to apterae on *Scirpus*.***Scirpus****S. americanus**S. atrocinctus**S. caespitosus* see *Trichophorum**S. californicus**S. campestris**S. cernuus**S. grossus**S. holoschoenus* see *Scirpoides**S. lacustris**S. maritimus**S. microcarpus**S. palustris**S. rubrotinctus**S. speciosus**S. sylvaticus**S. tabernaemontani**S. triqueter* see *Schoenoplectus**S. validus**S. vulgaris**Scirpus* spp.**Cyperaceae***Thripsaphis ballii**Schizaphis scirpicola**Rhopalosiphum rufiabdominale**Rhopalosiphum musae**Schizaphis scirpi**Carolinaia scirpi**Hyalopterus pruni*; *Rhopalosiphum nymphaeae*;
Schizaphis minuta, *scirpi*; *Sitobion avenae*, *fragariae*;
*Subsaltusaphis picta**Rhopalosiphum maidis*; *Sipha glyceriae*;
Subsaltusaphis picta; *Vesiculaphis theobaldi**Ceruraphis eriophori**Sipha glyceriae**Ceruraphis eriophori*, *viburnicola* (in greenhouse)*Schizaphis scirpi**Ceruraphis eriophori*; *Rhopalosiphum padi*;*Schizaphis scirpi*; *Subsaltusaphis ornata*;*Rhopalosiphum nymphaeae**Rhopalosiphum cerasifoliae**Sitobion avenae**Atheroides hirtellus*; *Metopolophium dirhodum*;*Saltusaphis scirpus*; *Schizaphis brachytarsus*, *caricis*

HOST LISTS AND KEYS

Key to apterae on *Scirpus* (and *Scirpoides*):-

1. SIPH tubular; tapering, cylindrical or swollen, clearly longer than their basal widths **2**
 – SIPH in form of short truncate cones not clearly longer than their basal widths, or present merely as pores, or completely absent **20**
2. SIPH very small, thin and flangeless, less than 0.7× cauda *Hyalopterus pruni*
 – SIPH not thin, more than 0.8× cauda, with a distinct apical flange **3**
3. Front of head between ANT produced into 3 large separate rounded processes, each bearing spine-like hairs. SIPH scabrous, cylindrical for most of length and abruptly narrowed distally, with a small terminal aperture. ANT PT/BASE 1.37–1.8 *Vesiculaphis theobaldi*
 – Front of head not produced into 3 large rounded processes bearing spine-like hairs. SIPH various, but not very small at apex. ANT PT/BASE more than 1.8 **4**
4. Tergum almost entirely dark, and SIPH jet black **5**
 – Tergum usually pale, sometimes with dusky/dark central patch or dark markings. SIPH pale or dark **6**
5. SIPH short, less than 0.1× BL, with close-set rows of fine spinules *Ceruraphis viburnicola*
 – SIPH more than 0.2× BL, with coarse denticulate imbrication *Ceruraphis eriophori*
6. ANT tubercles moderately to well developed, projecting beyond middle part of head in dorsal view, smooth and divergent or bearing rounded scabrous or spiculose processes. ANT III with 1–4 small rhinaria near base **7**
 – ANT tubercles weakly developed, not projecting beyond middle of head in dorsal view. ANT III without rhinaria **10**
7. Head with inner sides of ANT tubercles developed as rounded, scabrous or spiculose processes. R IV +V 1.2–1.3× HT II *Carolinaia scirpi*
 – Head with inner sides of ANT tubercles smooth and divergent. R IV +V 0.60–0.85× HT II **8**
8. SIPH pale, without subapical polygonal reticulation *Metopolophium dirhodum*
 – SIPH dark, with a subapical zone of polygonal reticulation **9**
9. SIPH 1.75–2.25× cauda, which has a rounded apex *Sitobion fragariae*
 – SIPH 1.0–1.5× cauda, which has a more pointed apex *Sitobion avenae*
10. ANT 5-segmented, bearing long hairs up to 4–5× BD III. ANT PT/BASE 4.5–5.9, with PT usually curved *Rhopalosiphum rufiabdominale*
 – ANT 5- or 6-segmented, but if 5-segmented then hairs are much shorter and/or ANT PT/BASE is less than 3.6 **11**
11. ABD TERG 8 with 5–13 hairs. Hind tibia with numerous long, fine hairs, exceeding 2× its diameter at midlength, along whole length. Longest hairs on ANT III longer than BD III. Papilliform marginal tubercles usually present on all or most of ABD TERG 1–7 **12**
 – ABD TERG 8 with 2–4 hairs. Hind tibia with shorter hairs, or if with hairs about 2X its middle diameter then these do not extend to basal part. Longest hairs on ANT III rarely exceeding BD III. Marginal tubercles present or absent from ABD TERG 2–6 **15**
12. ANT III with 15–16 hairs. SIPH 2.57–2.83× cauda *Schizaphis brachytarsus*
 – ANT III with 6–13 hairs. SIPH 1.50–2.78× cauda **13**
13. Subgenital plate usually with 2–4 hairs on anterior half (rarely up to 10). Dorsal body and ANT hairs variable in length; often some of those on both ANT III and ABD TERG 3 have blunt apices and are less than 50µm long (range 28–87µm and 29–100µm respectively). R IV +V 1.02–1.25 (–1.38)× HT II. (Al. with (0–) 2–5 rhinaria on ANT V) *Schizaphis caricis*

- Subgenital plate with (3–) 5–14 hairs on anterior half. Dorsal body hairs all more than 65 μm long with pointed apices; hairs on ANT III and ABD TERG 3 are in range (30–) 50–108 μm and 81–132 μm respectively. R IV+V either 0.89–1.14 or 1.25–1.43 \times HT II. Al with 0–1 rhinaria on ANT V **14**
- 14.** R IV+V 0.89–1.14 \times HT II. Hairs on ANT III 53–108 μm long *Schizaphis scirpi*
- R IV+V 1.25–1.43 \times HT II. hairs on ANT III (30–) 50–83 μm long *Schizaphis scirpicola*
- 15.** SIPH distinctly clavate, 1.8–2.4 \times cauda *Rhopalosiphum nymphaeae*
- SIPH not clavate, 1.2–1.9 \times cauda **16**
- 16.** ANT with primary rhinaria on ANT V much smaller than that on VI, its diameter 0.3–0.4 \times width of segment at that point. SIPH pale with dark apices. *Schizaphis minuta*
- ANT with primary rhinarium on ANT V about the same size as that on VI, its diameter more than 0.5 of width of segment at that point. SIPH pale or dark **17**
- 17.** ANT PT/BASE 1.7–2.8. R IV+V 0.8–0.9 \times HT II. Body rather elongate oval *Rhopalosiphum maidis*
- ANT PT/BASE 2.8–5.2. R IV+V 0.9–1.25 \times HT II. Body rather broadly oval **18**
- 18.** Longest hairs on ANT III 0.75–1.0 \times BD III. Dorsal body hairs pointed. SIPH 1.2–1.5 \times cauda *Rhopalosiphum musae*
- Longest hairs on ANT III 0.4–0.6 \times BD III. Dorsal body hairs short and blunt. SIPH 1.5–1.9 \times cauda **19**
- 19.** SIPH uniformly dark, cylindrical for most of length or with slight swelling of distal part, with a smooth distinctly constricted region subapically. Cauda dark *Rhopalosiphum padi*
- SIPH pale/dusky with darker apices, tapering gradually from base and with only slight subapical constriction. Cauda pale/dusky *Rhopalosiphum cerasifoliae*
- 20.** Dorsal body hairs long and spine-like **21**
- Dorsal body hairs short with pointed apices, or fan- or mushroom-shaped **22**
- 21.** Body elongate. Tergum entirely black *Atheroides hirtellus*
- Body oval. Tergum not black, ornamented with numerous small pointed denticles between the hair-bases *Sipha glyceriae*
- 22.** Body balloon-shaped, with eyes of only 3 facets, ANT and legs greatly reduced and SIPH absent. Faceted wax glands present on all segments *Colopha hispanica*
- Body elongate, with compound eyes and well-developed appendages. SIPH present, stump-like or raised pores. No faceted wax glands **23**
- 23.** Fore and mid tibiae thickened at base, forming a smooth sclerotic ‘patella’ (clearly different from base of hind tibia). SIPH stump-shaped. ABD TERG 8 with a pair of large rounded tubercular processes, each bearing 2 long hairs *Saltusaphis scirpus*
- Fore and mid tibiae constricted at base like hind tibiae. SIPH as slightly raised pores. ABD TERG 8 enlarged, entirely sclerotic, semicircular or emarginate posteriorly **24**
- 24.** Dorsal hairs pointed. ABD TERG 8 with posterior margin rounded, not distinctly emarginate. ANT PT/BASE 0–5–0.6 *Thripsaphis ballii*
- Dorsal hairs mushroom-shaped. ANT TERG 8 distinctly emarginate posteriorly. ABD PT/BASE 0.8–1.1 **25**
- 25.** Dorsum usually with well-marked and clearly defined pleural longitudinal dark stripes that run almost the full length of the body (with small breaks between segments); these stripes are almost as dark as the intersegmental muscle plates, and are either side of a very pale spinal region that carries no trace of a darker spinal stripe. (Wholly dark forms also sometimes occur) *Subsaltusaphis ornata*

HOST LISTS AND KEYS

- Dorsum either almost unpigmented (except for muscle plates), or with ill-defined dark pleural longitudinal stripes or rows of paired patches that are paler than intersegmental muscle plates. When pleural bands are well developed then there is also between them at least a trace of a dark spinal stripe. (Wholly dark forms are not known to occur) *Subsaltusaphis picta*

(If specimens collected from *Scirpus* run to couplet 23, it would be advisable also to check that they are not one of the numerous other *Carex*-feeding Saltusaphidine species, by taking them through couplets 5–53 of key B to apterae on *Carex*.)

Scleranthus

S. annuus

Illecebraceae

Myzus persicae

Scleria

S. elata

Cyperaceae

Aulacorthum scirpi of Ghosh and Raychaudhuri, 1972, nec.
van der Goot

S. pilosissima

Carolinaia caricis

S. pterota

Carolinaia caricis

S. racemosa

Aphis gossypii

S. scandens

Carolinaia caricis

S. scrobiculata

Carolinaia hillerislambersi

Key to apterae on *Scleria*:-

1. ANT tubercles well developed, their inner faces scabrous and parallel or slightly divergent. Tergum entirely dark. ANT c. 0.75–0.8× BL
Aulacorthum scirpi of Ghosh and Raychaudhuri, 1972, nec. van der Goot*
 - ANT tubercles weakly developed. Tergum pale or dark. ANT 0.26–0.75× BL **2**
2. Dorsal cuticle strongly wrinkled or variolate. ANT 5- or 6-segmented, 0.26–0.33× BL, with PT/BASE 1.0–1.5. SIPH pale/dusky, with very coarse imbrication, cylindrical for most of length and abruptly narrowing subapically *Carolinaia caricis*
 - Dorsal cuticle smooth or almost smooth. ANT usually 6-segmented, 0.6–0.75× BL, with PT/BASE 2.0–3.8. SIPH dark to blackish, tapering, with normal imbrication **3**
3. ANT III with 2–4 rhinaria on swollen part near base. ANT PT/BASE c.3.75. R IV+V with 4 accessory hairs. ABD TERG 8 with 4 hairs. ABD TERG 1 and 7 without marginal tubercles (MTu) *Carolinaia hillerislambersi*
 - ANT III without rhinaria. ANT PT/BASE 2.0–3.2. R IV+V with 2 accessory hairs. ABD TERG 8 with 2 hairs. ABD TERG 1 and 7 with MTu *Aphis gossypii*

Sclerocarya see Blackman and Eastop (1994)

Scleropodium

S. purum see *Pseudoscleropodium*

Brachytheciaceae

Scoliopus

S. bigelovii

Trilliaceae

Ericaphis scoliopi

Scolopia see Blackman and Eastop (1994)

Scolymus

S. hispanicus
Scolymus sp.

Use key to apterae on *Carduus*.

Compositae

Aphis fabae, [*rerricola*], *Brachycaudus cardui*
Uroleucon aeneum

Scoparia

S. dulcis

Scrophulariaceae

Aphis gossypii

Scorpiurus

S. muricata

Leguminosae

Aphis craccivora

Scorzonera (incl. *Podospermum*)

S. cana
S. hirsuta
S. hispanica

S. humilis
S. parviflora
S. purpurea
S. subaphylla
S. tau-saghyz

S. tortuosissima
Scorzonera spp.

Compositae

[*Aphis medicaginis* of Rusanova, 1942 (= *craccivora*?)]
Aphis fabae
Aphis fabae; *Brachycaudus tragopogonis*;
Neomyzus circumflexus
Brachycaudus tragopogonis; *Uroleucon scorzonerae*
Aphis aralensis, fabae; *Brachycaudus tragopogonis*
Aphis fabae, scorzonerae
Acyrthosiphon ghanii
Aphis scorzonerae; *Brachyunguis tausaghyz*;
Rectinasus buxtoni; *Smynthuroides betae*
Uroleucon tortuosissimae
[*Anuraphis controversus* Rusanova (nomen nudum)];
Aphis spiraeicola; [*Paracletus cimiciformis*]

Key to apterae on *Scorzonera*:-

1. ANT PT/BASE less than 0.3. Body and appendages densely hairy. SIPH absent 2
- ANT PT/BASE at least 0.5. Body and appendages not densely hairy. SIPH present 3
2. ANT V BASE and R IV+V both very long, respectively about 1.7 and 2.5× width of head between antennal bases. ANT II similar in length to ANT I, much shorter than III *Rectinasus buxtoni*
- ANT V BASE and R IV+V of normal length, both about 0.5× width of head between antennal bases. ANT II about twice as long as ANT I, similar in length to III *Smynthuroides betae*
3. ANT III with 4–40 rhinaria, extending over at least 0.33 of its length. ANT tubercles developed but low, with smooth, broadly divergent inner faces 4
- ANT III without rhinaria, or with only a few on less than basal 0.33 of length. ANT tubercles undeveloped or not as above 6
4. SIPH pale or only dark at apices, without distal polygonal reticulation. Dorsum pale or with only small dusky marginal and antesiphuncular sclerites. ANT III with 4–11 rhinaria, in a row *Acyrthosiphon ghanii*
- SIPH dark, with polygonal reticulation on distal 0.17–0.4 of length. Dorsum pale or with dusky/dusky sclerites at hair bases, antesiphuncular sclerites absent. ANT III with 7–40 rhinaria, not in a row 5

HOST LISTS AND KEYS

5. Cauda dark. Dorsal abdomen with pigmented scleroites at bases of hairs, and postsiphuncular sclerites. ANT III with 25–40 rhinaria. SIPH with polygonal reticulation on distal 0.17–0.20
Uroleucon scorzonerae
- Cauda pale. Dorsal abdomen without any pigmented sclerites. ANT III with 7–19 rhinaria (–30 in alatiform apt.). SIPH with reticulation on distal 0.3–0.4
*Uroleucon tortuosissimae**
6. Dorsal abdomen with extensive dark sclerotisation comprising broad spinopleural cross-bands or paired patches on ABD TERG 1–7, and separate marginal sclerites. Spiracular apertures rounded. ABD TERG 1 and 7 without marginal tubercles (MTu). Cauda helmet-shaped, less than 0.8× its basal width
Brachycaudus tragopogonis
- Dorsal abdomen pale or with a different pattern of sclerotisation. Spiracular apertures reniform. ABD TERG 1 and 7 with well-developed MTu. Cauda bluntly conical, 0.9–1.2× its basal width **7**
7. ANT PT/BASE within range 0.6–1.3. (SIPH and cauda both very short) **8**
- ANT BASE more than 1.5 go to key to polyphagous aphids, p. 1020
8. SIPH pale, c.0.5–0.6× cauda, which bears 6–8 hairs
*Brachyunguis tausaghyz**
- SIPH dark, 0.65–c.1× cauda, which bears 7–18 hairs **9**
9. SIPH 0.65–0.77× cauda, which bears 16–18 hairs
*Aphis aralensis**
- SIPH about equal in length to cauda, which bears 7–14 hairs
Aphis scorzonerae

Scrophularia

S. auriculata (incl. *aquatica*)

S. canina

S. glabrata

S. lanceolata

S. leporella

S. nodosa

S. scorodonia

S. vernalis

Scrophularia sp.

Scrophulariaceae

Myzus persicae

Aphis verbasci

Aphis verbasci

Macrosiphum euphorbiae, [*Macrosiphum* sp. (Leonard, 1974: 111)]

Macrosiphum euphorbiae

[*Hyalomyzus monardae* (as *Phorodon scrophulariae*)]

[*Cryptomyzus galeopsidis*]

Macrosiphum euphorbiae; *Myzus persicae*;

Uroleucon scrophulariae

Aphis frangulae group

Key to apterae on *Scrophularia*:-

1. SIPH black with polygonal reticulation on about distal 0.2 of length. Cauda black. ANT III with 20–25 rhinaria
Uroleucon scrophulariae
- SIPH pale or dark, if dark then without polygonal reticulation. Cauda pale or dark. ANT III with 0–10 rhinaria **2**
2. R IV+V 1.6–1.9× HT II. Cauda short and dark with 8–12 hairs
Aphis verbasci
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Scurrula

S. atropurpurea

S. fusca

S. korthalsii

S. philippensis

Loranthaceae

Greenidea [*psidii*] *rappardi*

Greenidea rappardi; *Toxoptera aurantii*

Tuberaphis loranthi

Greenidea [*psidii*] *rappardi*; *Sinomegoura citricola*;

Toxoptera aurantii

Use key to apterae on *Loranthus*.

Scutellaria

S. discolor
S. drummondii
S. galericulata

S. hastifolia
S. lateriflora
S. multiglandulosa
S. repens
S. scandens
S. sieversii
S. transiliensis
Scutellaria spp.

Labiatae

Myzus ornatus
Aphis middletonii
 [*Aphis chloris* of Wilson and Vickery, 1918 (plant genus given in error as *Scrophularia*?);
Macrosiphum euphorbiae
Aulacorthum solani
Pseudasiphonaphis corni
Aphis gossypii
Aphis gossypii
Aphis gossypii; [*Brevicoryne brassicae*]
Cryptomyzus alativica
Cryptomyzus alativica
 [*Aphis* sp. (Davletshina, 1964)];
Myzus sp. (India; BNMH colln, leg. K. Narayanan);
Neomyzus circumflexus

Key to apterae on *Scutellaria*:-

1. SIPH as very small, rimless cones, shorter than their basal widths. ABD TERG 1–7 all with well-developed marginal tubercles (MTu), longer than SIPH. ANT hairs long and fine, 2–3× BD III
Pseudasiphonaphis corni
 – Without that combination of characters **2**
2. Dorsal body hairs long and capitate. ANT III with 10–37 rhinaria *Cryptomyzus alativica*
 – Dorsal hairs not long and capitate. ANT III with 0–10 rhinaria **3**
3. Head spiculose with inner faces of ANT tubercles converging anteriorly. ANT shorter than BL, without sec. rhin. and with PT/BASE 1.7–3.0. Small, oval aphids, BL less than 2mm. SIPH not clavate **4**
 – Without that combination of characters go to key to polyphagous aphids, p. 1020
4. Dorsal abdomen with intersegmental pattern of dark ornamentation. ANT PT/BASE 1.7–2.5. SIPH weakly S-shaped with a well-developed flange, of diameter c.1.5× the minimum diameter subapically *Myzus ornatus*
 – Dorsum without dark intersegmental markings. ANT PT/BASE 2.7–3.0. SIPH straight with small flange of diameter only 1.1–1.2× minimum subapical diameter *Myzus* sp., India

Scutia

S. buxifolia

Rhamnaceae

Toxoptera aurantii

Secale

S. africanum
S. cereale

Gramineae

Macrosiphum euphorbiae
Anoecia vagans; *Diuraphis noxia*;
Forda formicaria, *marginata*;
Metopolophium dirhodum, *festucae* ssp. *cerealium*;
Rhopalosiphum maidis, *padi*; *Schizaphis graminum*;
Sitobion akebiae, *avenae*, *fragariae*, *miscanthi*;
Tetraneura ulmi

Use key to apterae of grass-feeding aphids under *Digitaria*.

HOST LISTS AND KEYS

Sechium

S. edule

Use key to aphids on *Cucurbita*.

Securinega

S. fruticosa

S. virosa

Use key to apterae on *Breynia*.

Securigera

S. varia

***Sedum* (incl. *Hylotelephium*)**

S. aizoon

S. alboroseum

S. album

S. altissimum

S. amplexicaule

S. anglicum

S. annuum

S. argutum

S. asiaticum

S. bupleuroides

S. dasyphyllum

S. ewersii

S. forsterianum (incl. *rupestre*)

S. iwarenge

S. japonicum

S. kamtschaticum

S. lanceolatum

S. maximum

S. middendorffianum

S. pallescens

S. polytrichoides

S. purpureum

S. reflexum

S. roseum see *Rhodiola*

S. rupestre

S. sediforme (incl. *altissima*)

S. selskianum

S. spectabile

S. spurium

S. telephium

Sedum spp.

Cucurbitaceae

Aphis craccivora, *fabae*, *gossypii*, *spiraecola*;
Aulacorthum magnoliae, *spinocaudatum*; *Myzus persicae*

Euphorbiaceae

Aphis fabae

Aphis gossypii, *spiraecola*; *Schoutedenia ralumensis*;
[*Sitobion* sp. (Millar, 1994)]; *Toxoptera citricidus*

Leguminosae

Aphis craccae

Crassulaceae

Aphis sedi, *sediradicis*; *Eriosoma moriokense*

Aphis sedi

Aphis sedi

Myzus persicae

Aphis sedi

Aphis sedi; *Macrosiphum euphorbiae*

Aphis sedi

Aphis sedi

Aphis sedi

Aphis sedi

Aphis sedi; *Nasonovia dasyphylli*

Aphis sedi

Aphis sedi

Aphis gossypii

Aphis sedi

Aphis [*pomi*], *sedi*; [*Macrosiphoniella formosartemisiae*]

Macrosiphum euphorbiae

Aphis sedi

Aphis sedi

Aphis sedi

Aphis sedi

Aphis gossypii, *nasturtii*, *sedi*

Aphis fabae, *gossypii*, *sedi*, [*Aphis* sp. (Davletshina, 1964)]

Aphis sedi

Aphis sedi

Aphis sedi

Aphis sedi

Aphis sedi; [*Smynthurodes betae*]; [*Tetraneura ulmi*]

Aphis fabae, *gossypii*, *sedi*

Aphis acrita; [*Brevicoryne brassicae*];

Myzus [*certus*], *ornatus*; *Neomyzus circumflexus*;

Eriosoma ulmi

Key to apterae on *Sedum* (and *Sempervivum*):–

1. ANT less than 0.25× BL, with PT short and stumpy. SIPH as large pores with partially sclerotised rimes, ringed with hairs. Wax glands present, each consisting of a central facet surrounded by a ring of smaller facets *Eriosoma* sp. (*moriokense*, *ulmi*)
- ANT more than 0.4× BL, with long PT. SIPH tubular. No discrete wax glands 2
2. ANT tubercles weakly developed. ABD TERG 1 and 7 with marginal tubercles (MTu) 3
- ANT tubercles well developed. ABD TERG 1 and 7 without MTu 9
3. R IV+V c. 0.8× HT II. (Al. with sec. rhin. distributed ANT III 32–40, IV 8–15, V 0–2) *Aphis acrita**
- R IV+V 0.9–1.7× HT II. (Al. with sec. rhin. distributed III 3–25, IV 0–2 (–10), V 0–1) 4
4. ABD TERG 2–4 or 2–6 as well as 1 and 7 with well-developed, hemispherical or conical MTu 5
- ABD TERG 2–4 only sporadically with small papilliform MTu 6
5. R IV+V 1.5–1.7× HT II, with (2–) 3–4 accessory hairs. Longest hairs on ANT III 1.2–1.8× BD III *Aphis sediradicis**
- R IV+V c. 1.2× HT II, with 2 accessory hairs. Longest hairs on ANT III c. 0.5× BD III *Aphis smirnovi**
6. SIPH pale with dark apices *Aphis nasturtii*
- SIPH entirely dark 7
7. Cauda black with 11–24 hairs. Dorsal abdomen with dark cross-bands on ABD TERG 7 and 8, and some dark markings anterior to SIPH. Femora with many fine hairs longer than trochantrofemoral suture *Aphis fabae*
- Cauda pale or dark with 4–8 hairs. Dorsal abdomen with or without dusky cross-bands on ABD TERG 7 and 8, usually without any dark markings anterior to SIPH. Femoral hairs all much shorter than trochantrofemoral suture 8
8. ANT PT/BASE 1.6–2.3. SIPH 0.9–1.4× cauda, which bears 4–6 hairs and is usually rather dark, only a little paler than SIPH *Aphis sedi*
- ANT PT/BASE 2.1–3.2. SIPH 1.3–2.5× cauda, which bears 4–8 hairs and is usually pale/dusky, markedly paler than SIPH *Aphis gossypii*
9. Thoracic spiracular apertures much larger than abdominal ones. ANT III usually with numerous sec. rhin., and often some also on IV, or IV and V 10
- Thoracic spiracular apertures similar in size to abdominal ones. ANT III with or without a few (1–10) rhinaria on basal part, none on IV or V go to key to polyphagous aphids, p. 1020, starting at couplet 4
10. Cauda usually with 7 hairs, rarely 6, 8 or 9. ANT PT/BASE 7.0–11.4 (usually more than 8.4). ANT III with 5–36 rhinaria, IV and V with 0. SIPH without imbrication. Dorsal abdomen with paired inter-segmental markings *Nasonovia ribisnigri*
- Cauda almost always with 5 hairs. ANT PT/BASE 3.6–8.4. Sec. rhin. distributed ANT III 10–42, IV 0–21, V 0–4. SIPH with some imbrication. Dorsal abdomen with extensive dark sclerotisation, fused between tergites to form a large dark patch *Nasonovia dasyphylli*

*Selaginella**Selaginella* sp.

Selaginellaceae

*Pentalonia nigronervosa**Selenicereus**S. grandiflorus*

Cactaceae

Aphis craccivora

HOST LISTS AND KEYS

Selenipedium

S. vittatum

Orchidaceae

Cerataphis orchidearum

Selinum

S. carvifolia

S. tenuifolium

Umbelliferae

Aphis fabae, selini; Aulacorthum solani;
Cavariella aegopodii; Hyadaphis foeniculi

Dysaphis selinumi

Key to apterae on *Selinum*:-

1. ABD TERG 8 with a backwardly-directed process above the cauda, bearing 2 hairs. ANT PT/BASE 0.64–1.25 *Cavariella aegopodii*
– No supracaudal process. ANT PT/BASE more than 2 **2**
2. SIPH dark, clavate, 0.9–1.4× cauda *Hyadaphis foeniculi*
– SIPH not as above **3**
3. SIPH much shorter than HT II. ABD TERG 1–4 and 7 usually (?) with well-developed marginal tubercles (MTu) *Aphis selini**
– SIPH longer than HT II. MTu either absent, or present on ABD TERG 2–4 but not on 1 and 7, or regularly present only on ABD TERG 1 and 7 **4**
4. Head smooth with ANT tubercles low and middle of front of head broadly convex. ABD TERG 7 regularly with a pair of spinal tubercles (STu). MTu often present on ABD TERG 2–4, but not 1 and 7. SIPH thick, 0.08–0.10× BL, 1.78–2.20× their basal widths and 2.0–2.75× cauda, which is triangular, 1.20–1.33× its basal width, and bears only 2–3 hairs *Dysaphis selinumi**
– Without that combination of characters go to key to polyphagous aphids, p. 1020

Semiaqilegia

S. adoxoides

Ranunculaceae

Aulacorthum solani

Sempervivum

S. heuffelii

S. kosaninii

S. soboliferum

S. tectorum

Sempervivum sp.

Crassulaceae

Nasonovia dasyphylli

Nasonovia ribisnigri

[*Aphis sempervivae*]

Aphis sedi; Macrosiphum euphorbiae

Aphis fabae

Use key to apterae on *Sedum*.

Senebiera* DC see *Coronopus

***Senecio* (incl. *Kleinia*)**

S. adonidifolius

S. affinis

S. alatus

S. alpinus

S. ambavilla

S. angulatus

S. abrotanifolius

S. aquaticus

Compositae

Seneciobium balachowskyi

Aphis craccivora

Brachycaudus helichrysi

Macrosiphum alpinum

Aphis gossypii

Macrosiphum euphorbiae

Aulacorthum solani; Rhopalosiphoninus staphyleae

Brachycaudus cardui

<i>S. arenarius</i>	<i>Brachycaudus cardui</i>
<i>S. atratus</i>	<i>Aphis lugentis</i>
<i>S. aureus</i>	<i>Aphis gossypii</i> , <i>lugentis</i> ; <i>Macrosiphum euphorbiae</i> , <i>pallidum</i> ; <i>Pemphigus</i> sp. (as <i>lactucae</i>)
<i>S. barbertonicus</i>	<i>Aphis gossypii</i>
<i>S. biafrae</i>	<i>Aphis gossypii</i>
<i>S. bicolor</i>	<i>Aphis fabae</i> ; <i>Brachycaudus cardui</i>
<i>S. bonariensis</i>	<i>Aphis fabae</i>
<i>S. borysthenicus</i>	<i>Aphis jacobaeae</i>
<i>S. bracteolatus</i>	<i>Aphis papillosa</i> ; <i>Pehuenchaphis agilissima</i>
<i>S. brasiliensis</i>	<i>Brachycaudus helichrysi</i> ; <i>Macrosiphum euphorbiae</i>
<i>S. cacaliaster</i>	<i>Aphis cacaliasteris</i>
<i>S. campestris</i>	<i>Brachycaudus cardui</i>
<i>S. cannabifolius</i>	<i>Aphis fabae</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; <i>Uroleucon sonchi</i> (ssp. <i>afghanicum</i> ?)
<i>S. canus</i>	<i>Aphis senecionis</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i>
<i>S. carpetanus</i>	<i>Aphis cacaliasteris</i> (as ssp. <i>helvetica</i>)
<i>S. chrysanthemoides</i>	[<i>Aphis verbasci</i>]; <i>Brachycaudus helichrysi</i>
<i>S. cinerarius</i>	<i>Aphis gossypii</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Brachycaudus cardui</i> , <i>helichrysi</i> ; <i>Myzus ornatus</i> , <i>persicae</i> ; <i>Neomyzus circumflexus</i>
<i>S. confusus</i>	<i>Aphis spiraeicola</i> ; <i>Aulacorthum solani</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i> ; [<i>Rhodobium porosum</i>]; <i>Uroleucon ambrosiae</i>
<i>S. consanguineus</i> (incl. var. <i>major</i>)	<i>Hyperomyzus carduellinus</i> ; <i>Macrosiphum euphorbiae</i>
<i>S. coronatus</i>	[<i>Aphis</i> sp. (Millar, 1994)]
<i>S. covasii</i>	<i>Aphis papillosa</i>
<i>S. crassifolius</i>	<i>Myzus persicae</i>
<i>S. cruentus</i> see <i>Cineraria cruenta</i>	
<i>S. densifolius</i>	<i>Aphis gossypii</i> ; <i>Brachycaudus helichrysi</i>
<i>S. diversiflorus</i>	<i>Brachycaudus helichrysi</i>
<i>S. doria</i> (incl. var. <i>macrophyllus</i>)	<i>Aphis jacobaeae</i>
<i>S. doronicum</i>	<i>Allocotaphis quaestionis</i>
<i>S. dryadeus</i>	<i>Brachycaudus helichrysi</i>
<i>S. elegans</i>	<i>Myzus persicae</i>
<i>S. erraticus</i>	<i>Brachycaudus cardui</i>
<i>S. erucifolius</i>	<i>Aphis jacobaeae</i> ; <i>Brachycaudus cardui</i> ; <i>Uroleucon cichorii</i>
<i>S. filaginoides</i>	<i>Aphis papillosa</i> , <i>senecionicoideis</i> ; <i>Brachycaudus helichrysi</i> ; <i>Pehuenchaphis agilissima</i>
<i>S. flavus</i>	[<i>Acyrtosiphon pisum</i>]; <i>Hyperomyzus lactucae</i> ; <i>Myzus persicae</i>
<i>S. fluviatilis</i>	<i>Aphis jacobaeae</i> ; <i>Brachycaudus virgatus</i>
<i>S. fuchsii</i>	<i>Aphis cacaliasteris</i> ; <i>Brachycaudus helichrysi</i>
<i>S. fulgens</i>	<i>Myzus persicae</i>
<i>S. gallicus</i>	<i>Aphis fabae</i> , <i>jacobaeae</i> ; <i>Brachycaudus cardui</i> , <i>helichrysi</i> ; <i>Macrosiphum euphorbiae</i>

HOST LISTS AND KEYS

<i>S. gilliesii</i>	<i>Aphis papillosa</i> ; <i>Brachycaudus helichrysi</i> ; <i>Pehuenchaphis agilissima</i>
<i>S. glabellus</i>	<i>Aphis lugentis</i>
<i>S. grandidentatus</i>	<i>Brachycaudus cardui</i>
<i>S. heritieri</i>	<i>Brachycaudus helichrysi</i>
<i>S. huntii</i>	<i>Brachycaudus helichrysi</i>
<i>S. ×hybridus</i>	<i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus ornatus</i> , <i>persicae</i> ; <i>Neomyzus circumflexus</i>
<i>S. hydrophyllus</i>	<i>Aphis lugentis</i>
<i>S. ilicifolius</i>	<i>Brachycaudus helichrysi</i>
<i>S. inaequidens</i>	<i>Aphis gossypii</i> , <i>nerii</i> ; <i>Brachycaudus helichrysi</i>
<i>S. integerrimus</i>	<i>Brachycaudus helichrysi</i>
<i>S. integrifolius</i>	<i>Aphis fabae</i>
<i>S. jacobaea</i>	<i>Aphis fabae</i> , <i>jacobaeae</i> , <i>lugentis</i> , [<i>terricale</i>]; <i>Aulacorthum solani</i> ; <i>Brachycaudus cardui</i> , <i>helichrysi</i> , <i>lateralis</i> ; <i>Eriosoma patchiae</i> ; [<i>Geoica utricularia</i>]; [<i>Macrosiphoniella subterranea</i>]; <i>Macrosiphum euphorbiae</i> ; [‘ <i>Macrosiphum jacobaeabalsamita</i> ’ (Rafinesque) of Hottes (1931)]; <i>Myzus persicae</i> ; <i>Uroleucon cirsicola</i> , <i>sonchi</i> , <i>syrdariense</i>
<i>S. kaempferi</i> (= <i>Farfugium Japonicum</i>)	<i>Aphis</i> [<i>fukii</i>], <i>gossypii</i> ; <i>Aulacorthum solani</i> ; <i>Myzus ornatus</i> ; <i>Neomyzus circumflexus</i>
<i>S. leucanthemifolius</i>	<i>Myzus persicae</i>
<i>S. lineatus</i>	<i>Aphis gossypii</i>
<i>S. linifolius</i>	<i>Aphis fabae</i> ; <i>Brachycaudus cardui</i>
<i>S. litoralis</i>	<i>Aphis gossypii</i>
<i>S. lugens</i>	<i>Aphis lugentis</i>
<i>S. lyratipartus</i>	<i>Hyperomyzus carduellinus</i>
<i>S. madagascariensis</i>	<i>Brachycaudus helichrysi</i> ; <i>Macrosiphum euphorbiae</i>
<i>S. megaglossus</i>	[<i>Aphis</i> sp. (Leonard, 1972a: 104)]; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i>
<i>S. microglossus</i>	<i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i>
<i>S. mikanioides</i>	<i>Aphis fabae</i> , <i>gossypii</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i>
<i>S. nemoralis</i>	[‘ <i>Macrosiphum jacobaeabalsamita</i> ’ (Rafinesque) of Hottes (1931)]
<i>S. nemorensis</i> (incl. <i>jacquinianus</i>)	<i>Aphis seneciocrepiphaga</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; <i>Myzus ornatus</i> , <i>persicae</i> <i>Brachycaudus cardui</i> , <i>helichrysi</i> ; [<i>Uroleucon gobonis</i>]
<i>S. ovatus</i>	<i>Brachycaudus helichrysi</i>
<i>S. oxyodontus</i>	<i>Nasonovia ribisnigri</i>
<i>S. paludosus</i>	<i>Aphis duckmountainensis</i>
<i>S. pauperculus</i>	<i>Aphis gossypii</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i>

<i>S. phryganthemoides</i> (?)	<i>Brachycaudus helichrysi</i>
<i>S. pierotii</i>	<i>Uroleucon seneciocola</i>
<i>S. pinnulatus</i>	<i>Aphis craccivora</i> , <i>gossypii</i>
<i>S. polyphlebius</i>	<i>Aphis spiraeicola</i> ; <i>Toxoptera aurantii</i> ; <i>Uroleucon ambrosiae</i>
<i>S. pratensis</i>	<i>Aphis lugentis</i>
<i>S. pseudoarnica</i>	<i>Aphis seneciocrepiphaga</i>
<i>S. quadridentatus</i>	<i>Brachycaudus helichrysi</i>
<i>S. radicans</i>	<i>Myzus persicae</i>
<i>S. repens</i>	[<i>Aphis</i> sp. (Leonard, 1972a)]; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i>
<i>S. rigidus</i>	<i>Brachycaudus helichrysi</i>
<i>S. rivularis</i>	<i>Brachycaudus cardui</i> ; <i>Myzus ornatus</i>
<i>S. rupestris</i>	<i>Brachycaudus cardui</i> , <i>lateralis</i>
<i>S. salicifolia</i>	<i>Brachycaudus helichrysi</i>
<i>S. sarracenicus</i>	<i>Aphis jacobaeae</i>
<i>S. scandens</i>	[<i>Astegopteryx xinglongensis</i>]; <i>Brachycaudus helichrysi</i> ; <i>Indomasonaphis anaphalidis</i>
<i>S. scopulinus</i>	<i>Aphis lugentis</i> , <i>middletonii</i>
<i>S. serra</i>	<i>Aphis</i> sp. (Idaho, BMNH colln, leg. G.F. Knowlton)
<i>S. serrulatus</i> var. <i>gracilis</i>	<i>Aphis gossypii</i>
<i>S. setulosus</i>	<i>Brachycaudus helichrysi</i>
<i>S. smallii</i>	<i>Uroleucon ambrosiae</i> , <i>pseudambrosiae</i>
<i>S. sonchifolius</i> see <i>Emilia</i>	
<i>S. spartioides</i>	<i>Aphis lugentis</i> , <i>senecioradicis</i>
<i>S. squalidus</i>	<i>Brachycaudus helichrysi</i> ; <i>Macrosiphum euphorbiae</i>
<i>S. stapeliiformis</i>	<i>Aphis gossypii</i>
<i>S. subalpinus</i>	<i>Aphis cacaliasteris</i>
<i>S. subulatus</i>	<i>Aphis senecionicooides</i>
<i>S. subumbellatus</i>	<i>Aphis intrusa</i> , <i>malalhuina</i> , <i>papillosa</i> , <i>senecionicooides</i> ; <i>Blanchardaphis poikila</i> ; <i>Brachyunguis paradoxus</i> ; <i>Pehuenchaphis agilissima</i>
<i>S. sylvaticus</i>	<i>Aphis cacaliasteris</i> , [<i>Aphis</i> (<i>Protaphis</i>) sp. (Mier Durante, 1978)]; <i>Brachycaudus cardui</i> , <i>helichrysi</i>
<i>S. tenuifolius</i>	<i>Aphis spiraeicola</i> ; <i>Brachycaudus helichrysi</i> ; <i>Neomyzus circumflexus</i> ; <i>Toxoptera odinae</i> ; <i>Uroleucon compositae</i> ? (as <i>solidaginis</i>)
<i>S. tomentosus</i>	<i>Aphis middletonii</i>
<i>S. tournefortii</i> (=pyrenaicus)	<i>Aphis haroi</i>
<i>S. triangularis</i>	<i>Aphis lugentis</i>
<i>S. triligulatus</i>	[<i>Capitophorus formosartemisiae</i>]
<i>S. trineurus</i>	<i>Aphis spiraeicola</i>
<i>S. tuberosa</i> (ex. <i>Cacalia</i>)	[<i>Uroleucon</i> sp. (<i>rudbeckiae</i> ?)]
<i>S. uintahensis</i>	<i>Macrosiphum pallidum</i>
<i>S. vernalis</i>	<i>Aphis fabae</i> ; <i>Brachycaudus cardui</i> , <i>helichrysi</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i>
<i>S. viscosus</i>	<i>Brachycaudus cardui</i> ; <i>Macrosiphum euphorbiae</i> ; [<i>Uroleucon</i> (<i>Uromelan</i>) sp. (as <i>jaceae</i>)]

HOST LISTS AND KEYS

S. vulgaris

Aphis fabae, *gossypii*, *jacobaeae*, *solanella*;
Aulacorthum solani;
Brachycaudus cardui, *helichrysi*, *lateralis*;
Macrosiphum euphorbiae;
Myzus ascalonicus, *ornatus*, *persicae*;
Neomyzus circumflexus;
Uroleucon ambrosiae, [*Uroleucon (Uromelan)* sp.
 (as *jaceae*)]

Senecio spp.

Acyrtosiphon malvae, *rubi*; [*Anoecia corni*];
Aphis sp. nr *lugentis* (Utah, BMNH colln);
Blanchardaphis capitophoroides; *Eumyzus nokuli*;
Euthoracaphis longisetosa; [*Nipponaphis* sp.];
 [*Rhopalosiphum nymphaeae*]; *Toxoptera aurantii*;
Uroleucon bicolor, *compositae*, *formosanum*

Key to apterae on *Senecio*:-

1. Body aleyrodiform, subcircular, heavily sclerotised, dark, with reduced appendages, and bearing numerous long fine dorsal and marginal hairs *Euthoracaphis longisetosa*
 – Body of normal aphid form **2**
2. ANT less than 0.33× BL, with ANT PT/BASE less than 0.7. Dorsal wax glands evident. SIPH absent or as large pores. Cauda broadly rounded, not evident **3**
 – ANT more than 0.33× BL, with ANT PT/BASE more than 0.7. No discrete wax glands. SIPH absent, poriform, conical or tubular. Cauda not broadly rounded **4**
3. SIPH present as large pores with partially sclerotised rims, ringed with hairs. Wax glands present on all segments, each generally comprising a ring of facets around a central pore *Eriosoma patchiae*
 – SIPH absent. Wax glands only on all or some of ABD TERG 3–7 and comprising pore-plates of uniform small polygonal facets *Pemphigus* sp.
4. Cauda helmet-shaped, usually somewhat constricted at base, not longer than its basal width **5**
 – Cauda triangular, tongue- or finger-shaped, usually much longer than its basal width **10**
5. SIPH pale or slightly dusky, or darker only distally, 0.8–2.0× cauda. R IV+V 1.1–1.5× HT II **6**
 – SIPH uniformly dusky or dark, more than 1.8× cauda. R IV+V 1.3–2.0× HT II **7**
6. Cauda black. SIPH densely imbricated. Dorsal abdomen with extensive dusky sclerotisation, and numerous rigid hairs with tuberculate bases, some of them having furcate apices, longest hairs being 3.0–3.6× ANT BD III *Eumyzus nokuli**
 – Cauda pale. SIPH almost smooth. Dorsal abdomen unsclerotised, with hairs sparse, without tuberculate bases or furcate apices, and much shorter *Brachycaudus helichrysi*
7. Dorsal abdomen with transverse dark sclerotic bars, not fused between tergites and interrupted in midline on ABD TERG 1–4. Marginal tubercles (MTu) often present on ABD TERG 2–4, and sometimes on 1 and/or 5 *Brachycaudus virgatus*
 – Dorsal abdomen with an extensive solid black shield covering ABD TERG 1–6. MTu only irregularly present on ABD TERG 2–4, and never on 1 and 5 **8**
8. SIPH long and thin, more than 5× cauda, which bears more than 20 hairs. ANT with numerous sec. rhinaria on III (distal part), IV and V. ANT PT/BASE more than 6 *Allocotaphis quaestionis*

- SIPH 2.1–3.4× cauda which bears 6–8 hairs. ANT without sec. rhin. (except in alatiform specimens, and then only on III). ANT PT/BASE 3.2–5.1 9
- 9. Hairs on ABD TERG 8 are 30–61 µm long. Longest hairs on hind femur 10–25 µm long 9
Brachycaudus lateralis
- Hairs on ABD TERG 8 are at least 70 µm long. Longest hairs on hind femur more than 25 µm long 9
Brachycaudus cardui
- 10. SIPH absent, or present as small black sclerotic cones shorter than their basal widths 11
- SIPH conical or tubular, as long as or longer than their basal widths 13
- 11. SIPH absent. Marginal tubercles (MTu) always present on ABD TERG 1, 6 and 7, and often also on 2–4. ANT PT/BASE 1.6–2.0, R IV+V 1.05–1.25× HT II 11
Seneciobium balachowskyi
- SIPH as black sclerotic cones, shorter than their basal widths. MTu differently distributed, never on ABD TERG 6. ANT PT/BASE 1.2–1.8. R IV+V either 0.75–0.85× or 1.7–1.8× HT II 12
- 12. Tergum mainly pale and membranous. ANT III with 12–35 hairs, the longest 0.9–3.0× BD III. ANT III and IV both with rhinaria. R IV+V 1.5–1.8× HT II, longer than PT. MTu consistently on ABD TERG 1–4, but rarely on 7. SIPH placed on anterior part of ABD TERG 6 12
Pehuenchaphis agilissima
- Tergum with variable dark sclerotisation. ANT III with 3–14 hairs, the longest 0.7–1.2× BD III. ANT III and IV without rhinaria. R IV+V 0.8–1.0× HT II, shorter than PT. MTu on ABD TERG 1 and 7. SIPH placed (as normal) on ABD TERG 5 12
Aphis malalhuina
- 13. Marginal tubercles (MTu) present on ABD TERG 1, and usually also (at least) on ABD TERG 7. SIPH dark, without polygonal reticulation 14
- MTu absent from ABD TERG 1 and 7, and only irregularly on 2–6. SIPH pale or dark, with or without a distal zone of polygonal reticulation 27
- 14. ANT III–IV (–V) with sec. rhinaria, with almost always more rhinaria on IV than on III. Tibiae entirely dark 15
- ANT III and IV with or without rhinaria, but if there are any on III then there are always fewer on IV. Tibiae mainly pale, dark only distally 23
- 15. MTu present regularly on ABD TERG 2–4 as well as 1 and 7 16
- MTu only consistently present on ABD TERG 1 and 7 17
- 16. R IV+V with 4–8 accessory hairs. SIPH 0.55–0.8× cauda 16
Aphis senecioradicis
- R IV+V with 2 (–3) accessory hairs. SIPH 1.4–2.3× cauda 16
Aphis jacobaeae
- 17. ANT III with acute hairs 12–54 µm long, 0.7–1.1 (–2.1)× BD III. ANT BASE VI 0.09–0.15 mm but rarely exceeding 0.135 mm. ABD TERG 2–4 without MTu. Anterior half of subgenital plate usually with 2–6 hairs (mode 3–4), but populations with 4–12 (mode 5–6) occur. SIPH 1.1–1.6 (mostly 1.2–1.5)× cauda 18
- ANT III with fine-pointed hairs 32–58 µm long, (1.1–) 1.4–3.3× BD III. ANT BASE VI 0.124–0.20 mm, when less than 0.14 then cauda about equal in length to SIPH. ABD TERG 2–4 with or without some MTu. Anterior half of subgenital plate with 5–20 hairs 19
- 18. Cauda tongue-shaped, parallel-sided or weakly tapering for much of length and broadly rounded at apex. ANT PT/BASE 1.4–2.4, mostly 1.6–2.1 18
Aphis lugentis
- Cauda tapering to an almost pointed apex. ANT PT/BASE 1.35–1.55 18
Aphis senecionis
- 19. R IV+V with 2–4 (–5) accessory hairs (examine several specimens) 20
- R IV+V with 2 accessory hairs 21

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20. ABD TERG 2–4 each with (4–) 5–10 marginal hairs on each side. Cauda with 14–20 hairs
Aphis cacaliasteris
 – ABD TERG 2–4 each with 2–4 marginal hairs on each side. Cauda with 9–17 hairs
Aphis haroi
21. SIPH 1.1–1.55× cauda. ANT PT/BASE 1.35–1.55. ABD TERG 2–4 sporadically with MTu
Aphis sp. (Idaho, BMNH colln, leg. G.F. Knowlton)
 – SIPH 0.95–1.1× cauda. ANT PT/BASE 1.6–1.95. ABD TERG 2–4 without MTu **22**
22. Sec. rhin. distributed ANT III 3–26, IV 10–20, V 0–6 *Aphis duckmountainensis*
 – Sec. rhin. distributed ANT III 0–4, IV 1–10, V 1–5 *Aphis seneciocrepiphaga**
23. MTu present on ABD TERG 1–4 (–6) and 7 of most specimens. SIPH 0.4–0.9× cauda. ANT PT/BASE 1.0–2.0 **24**
 – MTu only regularly present on ABD TERG 1 and 7. SIPH 0.4–2.5× cauda. ANT PT/BASE 1.3–4.5 **25**
24. MTu very variable in size (and sometimes even absent); often very large on prothorax and ABD TERG 1–4, but smaller and often absent from ABD TERG 5, 6 and even 7. Longest hairs on ANT III 0.6–1.7× BD III
Aphis papillosa
 – MTu consistently present on prothorax and ABD TERG 1–4 and 7, sometimes also on 5 and 6; all of similar size. Longest hairs on ANT III 0–4–0.9× BD III
Aphis senecionicooides
25. ABD TERG 2–5 with a large dark sclerotic patch, sometimes with small perforations intersegmentally **26**
 – ABD TERG 2–5 membranous or with only small scattered sclerites, or with broad cross-bands leaving large intersegmental spaces go to key to polyphagous aphids, p. 1020, starting at couplet 25
26. ANT III with 0–7 rhinaria. (ANT III of al. with 10–13 rhinaria) *Aphis intrusa*
 – ANT III without rhinaria, except in alatiform specimens. (ANT III of al. with 3–10 rhinaria)
Aphis craccivora
27. ANT tubercles undeveloped. ANT PT/BASE 1.3–1.9 **28**
 – ANT tubercles moderately to well developed. ANT PT/BASE 1.7–11.4 **29**
28. SIPH 0.33–0.62× cauda. ABD TERG 8 with 2 (–4) hairs *Brachyunguis paradoxus*
 – SIPH 1.2–1.5× cauda. ABD TERG 8 with 10–18 hairs *Aphis* sp. nr *lugentis* (Utah, BMNH colln)
29. SIPH with a distal zone of polygonal reticulation (at least 4–5 rows of closed polygonal cells) **30**
 – SIPH without a distinct distal zone of polygonal reticulation (but sometimes with 1–3 indistinctly defined rows of cells) **43**
30. SIPH pale or dusky, or at least usually with a pale section at base, with polygonal reticulation on distal 0.1–0.2 of length, often on a somewhat constricted section, and comprising large cells of max. diam. more than 0.25× width of SIPH at that point. First tarsal segments with 3 hairs **31**
 – SIPH entirely dark, or paler only in middle, with polygonal reticulation on distal 0.16–0.4 of length, comprising numerous small cells of max. diam. less than 0.25× width of SIPH at that point. First tarsal segments with 5 hairs **33**
31. SIPH mainly dark, usually with pale bases. Tibiae mainly dark *Macrosiphum pallidum*
 – SIPH and tibiae pale, or dark only at apices **32**
32. BL 4.3–4.8 mm. ANT III with 6–17 rhinaria (al. with 20–30). Femora and SIPH with dark brown-black apices
Macrosiphum alpinum

- BL 2.0–4.0mm. ANT III with 1–7 (–10) rhinaria (al. with 12–21). Femora and SIPH pale or dusky at apices *Macrosiphum euphorbiae*
- 33.** Cauda almost as dark as SIPH **34**
- Cauda much paler than SIPH **37**
- 34.** Tibiae wholly dark. Hind femora with basal half pale and distal half dark, with a rather sharp transition between. SIPH 1.4–1.8× cauda, which bears 18–30 hairs **35**
- Tibiae with paler middle section. Hind femora mainly dark, only pale on basal 0.2–0.35 of length. SIPH 1.7–2.1× cauda, which bears 11–22 hairs **36**
- 35.** ANT PT 0.67–0.77× ANT III. ANT PT/BASE 3.9–4.2. SIPH 1.65–1.9× cauda *Uroleucon syrdariense*
- ANT PT 0.8–1.2× ANT III. ANT PT/BASE 4.0–6.2. SIPH 1.3–1.8× cauda *Uroleucon jaceae*
- 36.** ANT III with c.22 rhinaria not extending beyond basal 0.6 of length *Uroleucon seneciocola*
- ANT III with more than 30 rhinaria extending over 0.7–0.9 of length *Uroleucon compositae*
- 37.** ANT III 1.5–2.0× longer than ANT IV+V together, and bearing 96–135 strongly protruberant rhinaria *Uroleucon formosanum*
- ANT III less than 1.2× ANT IV+V together, and usually bearing less than 95 rhinaria **38**
- 38.** Crescent-shaped antesiphuncular sclerites present. ANT III with 56–97 rhinaria extending over 0.85–0.97 of length *Uroleucon cichorii*
- Antesiphuncular sclerites absent or vestigial. ANT III with 8–36 rhinaria extending over 0.3–0.7 of length **39**
- 39.** SIPH 1.1–1.5× cauda, with reticulation on distal 0.25–0.36 of length. Coxae pale **40**
- SIPH 1.4–2.1× cauda, with reticulation on distal 0.16–0.27 of length. Coxae pale, dusky or dark **41**
- 40.** HT II rather long and thin, 6 or more × longer than its maximum thickness and 0.9–1.1× R IV+V *Uroleucon pseudambrosiae*
- HT II less than 5× its maximum thickness and 0.70–0.85 × R IV+V *Uroleucon ambrosiae*
- 41.** R IV+V 1.2–1.8× HT II. Cauda with 30–45 hairs *Uroleucon cirsicola*
- R IV+V 0.8–0.9× HT II. Cauda with 23–34 hairs **42**
- 42.** Dorsal abdominal hairs with somewhat expanded apices and all with dark scleroites at bases. Coxae pale, concolorous with trochanters and bases of femora *Uroleucon bicolor*
- Dorsal abdominal hairs pointed and mostly without dark scleroites at bases. Coxae dusky/dark in comparison with trochanters and bases of femora *Uroleucon sonchi*
- 43.** Head densely spiculose, with steep-sided or apically convergent ANT tubercles
go to key to polyphagous aphids, p. 1020, starting at couplet 5
- Head without spicules, or with few only on ventral side. Inner faces of ANT tubercles divergent **44**
- 44.** SIPH clavate **45**
- SIPH tapering/cylindrical **47**
- 45.** Cauda bearing 35–60 hairs. ANT III without rhinaria. Dorsal hairs long, with expanded apices, those on ABD TERG 3 being much longer than ANT BD III *Indomasonaphis anaphalidis*
- Cauda with 6–10 hairs. ANT III with 5–30 rhinaria. Dorsal hairs short and blunt, shorter than ANT BD III **46**
- 46.** Hairs on ABD TERG 8 are 8–19µm long, and on ANT tubercles 6–11µm. Secondary rhinaria distributed ANT III 11–29, IV (0)–1–16, V 0 (–9). ANT PT/BASE 4.3–5.6. ANT PT 1.6–2.3× cauda *Hyperomyzus carduellinus*

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- Hairs on ABD TERG 8 are 30–50µm long, and on ANT tubercles 18–30µm. Secondary rhinaria distributed ANT III 4–20, IV 0 (–1), V 0. ANT PT/BASE 4.8–7.4. ANT PT 2.0–3.0× cauda
Hyperomyzus lactucae
- 47. SIPH entirely dark, rather coarsely imbricated, with 1–3 poorly defined rows of polygonal reticulation at apices. First tarsal segments with 5 hairs **48**
- SIPH pale, sometimes with dusky/dark apices, without any subapical reticulation. First tarsal segments with 3 hairs **49**
- 48. ANT PT/BASE c.3.2. SIPH c.19.5× width at midlength, and c.3.5× HT II
Blanchardaphis capitophoroides
- ANT PT/BASE 3.75–4.9. SIPH 9.5–15× midlength width, and 1.9–2.9× HT II
Blanchardaphis poikila
- 49. Thoracic spiracles enlarged, much larger than abdominal spiracles. ANT PT/BASE 7.0–11.4, usually more than 8.0. Hairs on ANT III 0.7–1.1× BD III. Dorsum usually with paired dark intersegmental markings
Nasonovia ribisnigri
- Thoracic spiracles similar in size to abdominal ones. ANT PT/BASE less than 7.5. Hairs on ANT III less than 0.7× BD III. Dorsum without any dark markings **50**
- 50. Tergum pale but sclerotic; rugose, papillated or strongly wrinkled. R IV+V 0.87–1.13× HT II
Acyrtosiphon rubi
- Tergum membranous, smooth or only slightly wrinkled. R IV+V 1.0–1.5× HT II
Acyrtosiphon malvae group

Senecioides see *Vernonia*

Senna see *Cassia*

Seriphidium

S. balchanorum

S. baldshuanicum

S. brevifolium

S. canum

S. cinum

S. ferganense

S. glanduligerum

S. halophilum

S. herba-album (incl. ssp. *valentinum*)

Compositae

Xerobion cinae

Xerobion artemisiae; *Aphis elongata*;

Macrosiphoniella nigropilosa

Coloradoa submissa

Aphis canae; *Artemisaphis artemisicola*;

Macrosiphoniella absinthii; *Microsiphoniella canadensis*;

Obtusicauda coweni;

Pleotrichophorus artemisicola, *pullus*, *rusticatus*;

Pseudoepameibaphis tridentatae

Xerobion cinae; *Cryptosiphum astrachanicae*;

Rectinasus buxtoni

Xerobion artemisiae; [*Coloradoa tadhica*];

Macrosiphoniella tadshikana

Xerobion cinae

Aphis elatior, *miranda*; *Cryptosiphum astrachanicae*;

Macrosiphoniella seriphidii

Coloradoa campestris

Macrosiphoniella absinthii, *dimidiata*, *pulvera*;

Xerobion blascoi, [*Xerobion* sp. (Spain; N. Pérez, pers. comm.)]

- S. karatavicum* *Aphis miranda*; *Macrosiphoniella seriphidii*;
Xerobion terraealbae
- S. lercheanum* (incl. *astrachanica*) *Cryptosiphum astrachanicae*
- S. maritimum* [*Aphis commoda* Walker 1848; nomen dubium];
Coloradoa heinzei, submissa;
Cryptosiphum artemisiae, caspicae; [*Diuraphis frequens*];
Macrosiphoniella abrotani, absinthii, atra ssp,
latysiphon, procerae, pulvera;
Pleotrichophorus glandulosus; *Xerobion cinae*
- S. nitrosum* *Aphis elatior, elongata*; *Brachyunguis tausaghyz*
- S. nutans* *Pleotrichophorus gnaphalodes* (?)
- S. pauciflorum* *Obtusicauda dolichosiphon* ssp. *praecellens*
- S. porrectum* *Cryptosiphum astrachanicae*; *Macrosiphoniella seriphidii*
- S. rhodanthum* *Macrosiphoniella alativica*
- S. rigidum* *Obtusicauda coweni, Obtusicauda* sp.;
Pleotrichophorus infrequens, quadritrichus
- S. santolinum* [*Coloradoa* sp. (Kadyrbekov, 2002d)];
Macrosiphoniella kirgisica, seriphidii, szalaymarszoi;
Xerobion alakuli
- S. santonicum* *Aphis hortobagyii*; *Macrosiphoniella pulvera*;
Obtusicauda moldavica
- S. schrenkianum* *Aphis elatior, miranda*; *Cryptosiphum astrachanicae*;
Macrosiphoniella seriphidii;
Xerobion artemisiae, terraealbae
- S. scopaeiformis* *Coloradoa heinzei*; *Macrosiphoniella kirgisica, seriphidii*
- S. sublessingianum* *Cryptosiphum astrachanicae*; *Macrosiphoniella seriphidii*
- S. tauricum* *Coloradoa heinzei, taurica*; *Xerobion caspicae*;
Macrosiphoniella tuberculatumartemiscicola
- S. tenuisectum* *Titanosiphum neoartemisiae, neoartemisiae* ssp. *hissaricum*
- S. terrae-albae* *Coloradoa heinzei*; *Cryptosiphum astrachanicae*;
Macrosiphoniella kirgisica, seriphidii, terraealbae;
Xerobion alakuli, terraealbae
- S. tridentatum* *Aphis canae, chrysothamnicola, filifoliae, hermistonii*;
infrequens, oregonensis, reticulata, utahensis;
Brachycaudus helichrysi;
Epameibaphis atricornis, frigidae, utahensis;
Flabellomicrosiphum knowltoni, tridentatae;
[*Forda marginata*]; [*Hyperomyzus occidentalis* (vagr.?)];
[*Illinoia grindeliae*]; *Macrosiphoniella artemisiae*;
Microsiphoniella acophorum, artemisiae, oregonensis;
Nevadaphis sampsoni;
Obtusicauda anomella, artemisiphila, coweni, filifoliae;
frigidae, zerothermum;
Pleotrichophorus decampus, glandulosus, heterohirsutus;
infrequens, longipes, [oestlundii], pseudoglandulosus;
pullus, [pyncnorhysus], quadritrichus, quadritrichus ssp.
pallidus, rusticatus, spatulavillus, zoomontanus;
Pseudoepameibaphis essigi, tridentata, xenotrichis

HOST LISTS AND KEYS

<i>S. tripartitum</i>	<i>Pleotrichophorus zoomontanus</i>
<i>S. turanicum</i> (incl. <i>turcomanicum</i>)	[<i>Brachyunguis afghanica</i>]; <i>Pleotrichophorus afghanensis</i>
<i>S. validum</i>	<i>Coloradoa heinzei</i> ; <i>Macrosiphoniella kirgistica</i> , <i>seriphidii</i>
<i>S. vallesiaceum</i>	<i>Macrosiphoniella vallesiaceae</i>

See *Artemisia* for a combined key to apterae on *Artemisia* and *Seriphidium*.

Serissa

S. japonica

Rubiaceae

Aphis gossypii, *serissae*
Aulacorthum magnoliae; *Neomyzus circumflexus*

Key to apterae on *Serissa*:-

- ANT 5-segmented. SIPH a little shorter than cauda *Aphis serissae**
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Serjania

S. diversifolia

S. polyphylla

S. subdentata

S. triquetra

Aphis spiraecola

Aphis spiraecola

Aphis craccivora, *gossypii*

Aphis spiraecola

Sapindaceae

Use key to polyphagous aphids, p. 1020.

Serratula

S. arvensis see *Cirsium arvense*

S. centauroides

S. coronata

S. quinquefolia

S. tinctoria (incl. var. *monticola*)

S. wolffii

Serratula sp.

Uroleucon mongolicum

Uroleucon jaceae

Uroleucon capsicum

Aulacorthum solani; *Brachycaudus helichrysi*;

Uroleucon minor

Aphis serratularadici; *Uroleucon giganteum*

[*Uroleucon sonchi*]

Compositae

Key to apterae on *Serratula*:-

1. ANT 5-segmented. Prothorax and ABD TERG 2-4 as well as 1 and 7 all with well-developed hemispherical marginal tubercles. R IV+V 1.5-1.7× HT II and bearing 2-4 accessory hairs. SIPH 0.9-1.1× cauda, both shorter than R IV+V. Cauda triangular with 6-8 hairs *Aphis serratularadici**
- ANT usually 6-segmented. MTu either absent or only consistently present on prothorax and ABD TERG 1 and 7, and other characters not in the above combination 2
2. SIPH dark with a distal zone of polygonal reticulation 3
- SIPH pale or dark, but if dark then without polygonal reticulation go to key to polyphagous aphids, p. 1020
3. Cauda as dark as, or almost as dark as, SIPH 4
- Cauda much paler than SIPH 6
4. Cauda with c.40-60 hairs. R IV+V 1.4-1.7× HT II. ANT III with 22-66 rhinaria *Uroleucon giganteum*
- Cauda with 13-28 hairs. R IV+V 1.1-1.4× HT II. ANT III with 15-54 rhinaria 5

5. Cauda with 13–24 hairs. ANT III with 15–21 rhinaria *Uroleucon minor*
 – Cauda with 22–28 hairs. ANT III with 16–54 rhinaria *Uroleucon jaceae*
6. Cauda with 7–11 hairs. First tarsal segments with 3 hairs. Hind tibia without a row of peg-like hairs *Uroleucon mongolicum*
 – Cauda with 24–41 hairs. First tarsal segments with 5 hairs. Hind tibia with a row of peg-like hairs *Uroleucon caspicum*

Sesamum*S. indicum* (= *orientale*)*S. radiatum*

Aphis craccivora, *gossypii*, *nasturtii*;
Macrosiphum euphorbiae; *Myzus persicae*
Aphis gossypii

Use key to polyphagous aphids, p. 1020.

Sesbania (incl. Daubetonia)*S. aculeata**S. aegyptiaca**S. coerulescens**S. grandiflora**S. macrantha**S. punicea**S. sesban**S. tripetii*

Aphis craccivora
Aphis craccivora
Aphis craccivora
Acyrtosiphon gossypii
 [Sitobion sp. (Millar, 1994)]
Aphis craccivora
Aphis craccivora; *Macrosiphum euphorbiae*;
Myzus persicae
Myzus persicae

Key to apterae on *Sesbania*:–

1. SIPH pale, long and distally very thin, about 3× cauda *Acyrtosiphon gossypii*
 – SIPH pale or dark, c. 2× cauda or less **2**
2. SIPH with distal band of polygonal reticulation *and* hairs on ANT III less than 0.5× BD III *Sitobion* sp.
 – SIPH *either* without a distal band of polygonal reticulation *or* hairs on ANT III more than 0.5× BD III
 go to key to polyphagous aphids, p. 1020

Seseli (incl. Libanotis)*S. austriacum**S. campestre**S. devenyense**S. dichotomum**S. elatum**S. ledebouri**S. leucospermum**S. libanotis**S. montanum**S. nanum**S. osseum*

Umbelliferae
Acyrtosiphon nigripes ssp. *blattnyi*; *Aphis franzi*;
Defractosiphon franzi; *Semiaphis dauci* ssp. *seselii*
Defractosiphon brevisiphon
Semiaphis dauci ssp. *seselii*
Dysaphis seselii
Acyrtosiphon nigripes ssp. *blattnyi*;
Defractosiphon brevisiphon
Aphis brohmeri, *grosmanae*
Acyrtosiphon nigripes ssp. *blattnyi*
Aphis podagrariae
Aphis fabae; *Dysaphis libanotidis*
Aphis fabae
Acyrtosiphon nigripes ssp. *blattnyi*;
Defractosiphon brevisiphon

HOST LISTS AND KEYS

<i>S. pallasii</i>	<i>Hyadaphis foeniculi</i>
<i>S. schrenkianum</i>	<i>Cavariella aegopodii</i> ; <i>Dysaphis foeniculus</i> ; <i>Semiaphis dauci</i>
<i>S. seseloides</i>	[<i>Dysaphis mordvilkoii</i>]; <i>Semiaphis heraclei</i>
<i>S. tortuosum</i>	<i>Aphis schilderi</i> , <i>seselii</i> ; <i>Semiaphis dauci</i> ssp. <i>seselii</i>
<i>S. transcaucasicum</i>	<i>Aphis umbelliferarum</i>
<i>S. unicaule</i>	<i>Dysaphis unicauli</i>
<i>Seseli</i> spp.	[<i>Aphis seselii</i> Lichtenstein (nomen nudum)]; <i>Dysaphis viennoti</i> ; <i>Semiaphis anthrisci</i>

Key to apterae on *Seseli*:-

1. ANT tubercles well developed, with inner faces smooth and divergent. Head, ANT and legs almost entirely black. SIPH long, thin and black. ANT III with 9–26 rhinaria 2
 - ANT tubercles undeveloped or weakly developed, not projecting beyond middle part of head in dorsal view, and other characters not in above combination 2
2. ABD TERG 8 with a posteriorly projecting process above cauda. SIPH clavate, 0.17–0.23× BL and 1.8–2.5× cauda. ANT PT/BASE 0.64–1.25 3
 - No supracaudal process. SIPH cylindrical or tapering, or if clavate then shorter and/or ANT PT longer 3
3. Cauda helmet-shaped or triangular, less than 1.1× its basal width in dorsal view 4
 - Cauda elongate triangular or tongue-shaped, more than 1.2× its basal width 10
4. SIPH longer than cauda, which is helmet-shaped (pentagonal). ANT III–IV without rhinaria 5
 - SIPH 0.3–0.6× cauda, which is triangular. Rhinaria present on ANT III, and sometimes on IV 9
5. Spinal tubercles (STu) present on head and ABD TERG 8, or 7 and 8 6
 - STu absent 8
6. Longest hairs on ANT III 1.0–2.1× BD III 7
 - Longest hairs on ANT III 0.4–0.8× BD III 7
7. Marginal tubercles (MTu) present on ABD TERG 7 (as well as 1–5). SIPH up to 0.14× BL 8
 - MTu only present on ABD 7 in a minority (12.7%) of specimens. SIPH c.0.11× BL 8
8. ANT 0.33–0.5× BL. SIPH 0.07–0.08× BL 9
 - ANT 0.69–0.85× BL. SIPH 0.09–0.11× BL 9
9. Flat or hemispherical marginal tubercles (MTu) consistently present on ABD TERG 1–5 and 7 10
 - MTu absent or inconspicuous, or not consistently present on any ABD TERG 10
10. MTu present on prothorax and (at least) ABD TERG 1 and 7 11
 - MTu present or absent, but not on ABD TERG 1 and 7 11
11. MTu consistently present on ABD TERG 2–4 (–5) as well as 1 and 7 12
 - MTu consistently on ABD TERG 1 and 7, but only irregularly on 2–5 12
12. SIPH 0.6–0.8× cauda, which bears 6–9 hairs. ANT PT/BASE 1.6–2.0. R IV+V 0.8–0.95× HT II 13
 - SIPH 1.0–1.6× cauda, which bears 12–31 hairs. ANT PT/BASE 2.3–3.3. R IV+V 1.0–1.3× HT II 13

13. Longest hairs on ANT III 1.7–2.8× BD III. Cauda with 20–31 hairs
 – Longest hairs on ANT III 0.4–0.6× BD III. Cauda with 11–19 hairs
Aphis brohmeri
Aphis grossmanni
14. Cauda with 4–8 hairs. Longest hairs on ANT III 0.25–0.5× BD III
 – Cauda with 8–24 hairs. Longest hairs on ANT III 0.8–3.6× BD III
Aphis schilderi
15
15. Longest hairs on ANT III 2.0–3.6× BD III
 – Longest hairs on ANT III 0.8–2.2× BD III
Aphis podagrariae
Aphis fabae
16. SIPH 0.75–1.4× cauda
 – SIPH 0.12–0.6× cauda
17
18
17. SIPH 0.9–1.4× cauda, swollen on distal part, with a flange and large terminal aperture. ANT III without rhinaria
Hyadaphis foeniculi
 – SIPH 0.75–0.9× cauda, tapering, with a narrow rounded apex and small subterminal aperture. ANT III with 0–6 rhinaria on distal part, and IV with 1–7 (1–11 on III+IV if fused)
Defractosiphon franzi
18. SIPH very short, 0.12–0.2× cauda, mammariform or conical, shorter than basal width, with a small subapical aperture
Defractosiphon brevisiphon
 – SIPH 0.4–0.6× cauda, longer than their basal widths, with terminal aperture
19
19. Posterior hair on hind trochanter less than 0.5× diameter of trochantrofemoral suture
Semiaphis dauci (incl. ssp. *seselii*)
 – Posterior hair on hind trochanter more than 0.6× diameter of trochantrofemoral suture
20
20. SIPH cylindrical or slightly swollen, more than 1.5× their basal widths. ABD TERG 2–4 usually with small hemispherical MTu
Semiaphis anthrisci
 – SIPH tapering, less than 1.5× their basal widths. MTu absent or rare
Semiaphis heraclei

Sesleria*S. coerulea***Gramineae***Anoecia corni*; *Paraclotus cimiciformis*; *Tetraneura ulmi*Use key to grass-feeding aphids under *Digitaria*.**Setaria (incl. Chaetochloa)***S. aurea**S. barbata**S. chevalieri**S. faberii**S. geniculata**S. glauca**S. imberbis**S. incrassata**S. intermedia***Gramineae***Rhopalosiphum maidis**Geoica lucifuga*; *Tetraneura fusiformis**Toxoptera aurantii**Rhopalosiphum maidis**Carolinaia howardii*; *Hysteroneura setariae*;*Rhopalosiphum maidis*; *Sipha flava*; *Sitobion pauliani*;*Tetraneura fusiformis**Anoecia corni*, *cornicola*, *fulviabdominalis*, *vagans*;*Aphis gossypii*, *middletonii*; [*Dysaphis microsiphon*];*Geoica utricularia*; *Hysteroneura setariae*;*Rhopalosiphum maidis*, *padi*, *rufiabdominale*;*Sipha elegans*, *maydis*; *Sitobion avenae*, *miscanthi*, *pauliani*;*Tetraneura basui*, *fusiformis*, *radicicola/yezoensis**Aphis fabae**Rhopalosiphum maidis**Tetraneura fusiformis*

HOST LISTS AND KEYS

<i>S. italica</i>	<i>Anoecia corni</i> ; <i>Melanaphis sacchari</i> ; <i>Rhopalosiphum maidis, padi, rufiabdominale</i> ; <i>Schizaphis graminum</i> ; <i>Sitobion avenae, miscanthi</i> ; <i>Tetraneura caerulescens, javensis, nigriabdominalis,</i> <i>yezoensis</i>
<i>S. lutescens</i>	<i>Rhopalosiphum maidis</i>
<i>S. macrostachya</i>	<i>Pseudoregma panicola</i>
<i>S. makerensis</i> (?)	<i>Rhopalosiphum maidis</i>
<i>S. megaphylla</i>	<i>Geoica lucifuga</i> ; [<i>Sitobion</i> sp. (Millar, 1994)]; <i>Tetraneura fusiformis</i>
<i>S. pallide-fusca</i>	<i>Aphis gossypii</i> ; <i>Geoica lucifuga</i> ; <i>Myzus ornatus</i> ; <i>Tetraneura fusiformis</i>
<i>S. palmifolia</i>	<i>Ceratovacuna panici</i> ; <i>Smynthuroides betae</i>
<i>S. paniculata</i> (? <i>paniculifera</i>)	<i>Geoica lucifuga</i> ; <i>Sitobion miscanthi</i>
<i>S. phleoides</i>	<i>Rhopalosiphum maidis</i>
<i>S. plicata</i>	<i>Hysteroneura setariae</i> ; <i>Rhopalosiphum maidis</i> ; <i>Sitobion lambersi</i>
<i>S. poiretiana</i>	<i>Sitobion africanum</i>
<i>S. pumila</i>	<i>Aphis gossypii</i> ; <i>Tetraneura fusiformis</i>
<i>S. sphacelata</i> (incl. vars <i>aurae,</i> <i>splendida</i>)	<i>Hysteroneura setariae</i> ; <i>Rhopalosiphum maidis</i> ; <i>Sitobion africanum, graminis, pauliani</i> , [<i>Sitobion</i> sp. (Millar, 1994)]; <i>Tetraneura fusiformis</i>
<i>S. tenuifolia</i> (?)	<i>Sitobion africanum</i>
<i>S. trinervia</i>	<i>Sitobion africanum</i>
<i>S. verticillata</i>	<i>Aphis gossypii</i> ; <i>Hysteroneura setariae</i> ; <i>Rhopalosiphum maidis</i> ; <i>Sipha maydis</i> ; <i>Sitobion africanum</i> ; <i>Tetraneura nigriabdominalis</i>
<i>S. viridis</i>	<i>Anoecia corni, cornicola, fulviabdominalis</i> ; <i>Aphis gossypii, middletonii</i> ; <i>Forda marginata</i> ; <i>Geoica utricularia</i> ; <i>Hysteroneura setariae</i> ; [<i>Kaltenbachiella nirecola</i>]; <i>Myzus persicae</i> ; <i>Rhopalosiphum maidis, padi, rufiabdominale</i> ; <i>Schizaphis graminum</i> ; <i>Sipha elegans, flava, maydis</i> ; <i>Sitobion akebiae, avenae</i> ; <i>Tetraneura fusiformis, ulmi, yezoensis</i> ; [<i>Toxoptera setariae</i> Rusanova 1942 (nomen nudum)]
<i>Setaria</i> spp.	<i>Anoecia setariae</i> ; <i>Aploneura lentisci</i> ; <i>Carolinaia setariae</i> ; <i>Ceratovacuna perglandulosa</i> ; <i>Forda marginata</i> ; <i>Geoica setulosa</i> ; <i>Paracletus bykovi, cimiciformis</i> ; <i>Pseudaphis sijui</i> ; [<i>Pyrolachnus imbricatus</i>]; <i>Sitobion bamendae, fragariae</i> ; <i>Tetraneura ulmi</i>

Use key to apterae of grass-feeding aphids under *Digitaria*.

Setoreasea see *Tradescantia*

Severinia

S. buxifolia

Use key to polyphagous aphids, p. 1020.

Rutaceae

Aphis gossypii; *Myzus persicae*

Shepherdia*Sh. argentea***Elaeagnaceae***Capitophorus elaeagni, hippophaes, shepherdiae, similis*Key to apterae on *Shepherdia*:-

(All 4 spp. have thick hairs with expanded apices, arising from tuberculate bases. The key is not applicable to fundatrices.)

1. SIPH distinctly swollen subapically on inner side, to more than 1.2× the minimum width basad **2**
 - SIPH cylindrical or tapering, or only slightly swollen subapically, to less than 1.1× minimum width basad **3**
2. Cauda not longer than R IV+V, and bearing 5 hairs. Dorsal cuticle variolate. ANT PT/BASE 2.0–2.8 *Capitophorus shepherdiae*
 - Cauda much longer than R IV+V, and bearing 7–9 hairs. Dorsal cuticle smooth between hair-bases. ANT PT/BASE 5.5–8.9 *Capitophorus hippophaes*
3. ABD TERG 1–4 each with 6–8 hairs (usually 1 pair each of spinal, pleural and marginal hairs per tergite). R IV+V 1.4–1.5× HT II and shorter than cauda which bears 7–11 hairs *Capitophorus elaeagni*
 - ABD TERG 1–4 each with 2 pairs of spinal and pleural hairs, and usually with 3 marginal hairs on each side. R IV+V 1.9–2.3× HT II and longer than cauda, which bears 5–6 hairs *Capitophorus similis*

Sherardia*Sh. arvensis***Rubiaceae***Aphis fabae; Brachycaudus helichrysi; Myzus ascalonicus, cerasi (as veronicae), persicae*Key to apterae on *Sherardia*:-

- Dorsal abdomen with an extensive black sclerotic shield. SIPH black, coarsely imbricated, 2.3–2.8× cauda and 1.3–1.8× ANT III *Myzus cerasi*
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Shibataea*Sh. kumasaca***Gramineae***Glyphinaphis bambusae*

(See Blackman and Eastop (1994) for accounts of bamboo aphids.)

Shortia*Sh. galacifolia***Diapensiaceae***Amphorophora laingi* (? – Leonard, 1968)**Sibiraea***S. altaiensis**S. laevigata***Rosaceae***Aulacorthum solani**Acyrtosiphon ignotum*Key to apterae on *Sibiraea*:-

- Head spiculose, with steep-sided ANT tubercles. SIPH 0.20–0.25× BL and 2.1–2.5× cauda. R IV+V 1.1–1.4× HT II *Aulacorthum solani*
- Head not spiculose, ANT tubercles with broadly divergent inner faces. SIPH 0.25–0.33× BL and 1.7–2.0× cauda. R IV+V 0.65–0.85× HT II *Acyrtosiphon ignotum*

Sicyos*S. angulata**S. edulis* see *Sechium edule***Cucurbitaceae***Macrosiphum euphorbiae*

HOST LISTS AND KEYS

Sida

S. acuminata

S. acuta

S. alba

S. asperifolia (?*acerifolia*)

S. carpinifolia=*acuta*

S. cordifolia

S. garckeana

S. glomerata

S. palmata

S. procumbens

S. pyramidata

S. rhombifolia

S. schimperiana

S. spinosa

S. urens

Sida spp.

Malvaceae

Aphis gossypii

Aphis gossypii, *spiraecola*; *Myzus persicae*;

Toxoptera aurantii

Aphis gossypii

Aphis gossypii

Aphis fabae, *gossypii*

Aphis gossypii

Aphis gossypii

Aphis gossypii

Aphis gossypii

Aphis gossypii

Aphis gossypii, *spiraecola*

Myzus ornatus, *persicae*

Aphis gossypii

Aphis gossypii

Aphis coreopsidis, *nasturtii*; *Aulacorthum solani*;

[*Macrosiphum salviae*]; [*Sumatraphis celti*];

Toxoptera citricidus

Key to apterae on *Sida*:-

- SIPH 0.24–0.40× BL, about twice as long as the much paler cauda. Head, ANT I, II and basal part of III very pale, contrasting with dark rest of ANT *Aphis coreopsidis*
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Sideroxylon (inc. *Mastichodendron*, *Dipholis*)

S. foetidissimum

S. salicifolium

Toxoptera aurantii

Toxoptera aurantii

Sapotaceae

Sieglingia

S. decumbens

Anoecia furcata, *nemoralis*; *Forda formicaria*

Gramineae

Use key to apterae on grasses under *Digitaria*.

Sieversia see *Geum*

Sigesbeckia

S. glabrescens

S. orientalis

S. pubescens

Sigesbeckia sp.

Compositae

Myzus [*sigesbeckiae*], *sigesbeckicola*

Aphis gossypii; *Coloradoa rufomaculata*;

Myzus sigesbeckicola

Coloradoa rufomaculata; *Myzus sigesbeckicola*

Rhopalosiphoninus tiliae

Key to apterae on *Sigesbeckia*:-

1. SIPH black, markedly swollen into a spindle shape on distal two-thirds. Cauda triangular *Rhopalosiphoninus tiliae*
- SIPH pale or dark, not markedly swollen. Cauda tongue- or finger-shaped 2

2. Head with well-developed, steep-sided, scabrous ANT tubercles. SIPH pale, tapering from broad base, with very coarse imbrication, 3.5–4.0× cauda. Subgenital plate strongly produced posteriorly, broadly conical
Myzus siegesbeckicola
- Without that combination of characters 3
3. Triommatidium merged with compound eye, so that there is no distinct ocular tubercle. Dorsal hairs fan-shaped. Front of head weakly convex in dorsal view, ANT tubercles undeveloped. ANT PT/BASE 1.4–2.0. SIPH cylindrical for most of length, slightly swollen subapically. R IV+V with slightly concave sides
Coloradoa rufomaculata
- Triommatidium forming a distinct ocular tubercle at posterior margin of eye, dorsal hairs with blunt or pointed apices, and other characters not in above combination
- go to key to polyphagous aphids, p. 1020

Silaum (incl. *Silaus*)

S. alpestre
S. besseri
S. pratense
S. silaus

Aphis fabae
Aphis silaumi
Cavariella aegopodii
Aphis fabae; *Aulacorthum solani*; *Cavariella aegopodii*;
Myzus ascalonicus

UmbelliferaeKey to apterae on *Silaum*:-

1. ABD TERG 8 with a backwardly directed process above the cauda, bearing 2 hairs. R IV+V without accessory hairs. ANT PT/BASE less than 1.5. SIPH clavate
Cavariella aegopodii
- No supracaudal process, and other characters not in that combination 2
2. ABD TERG 1 and 7 with marginal tubercles (MTu). Cauda and SIPH both dark 3
- ABD TERG 1 and 7 without MTu. Cauda and SIPH pale
go to key to polyphagous aphids, p. 1020, starting at couplet 5
3. R IV+V 0.9–1.1× HT II. ANT 6-segmented
Aphis fabae
- R IV+V c.1.4–1.5× HT II. ANT often seeming 5-segmented due to fusion of III and IV
*Aphis silaumi**

Silene (incl. *Oberna*, *Otites*, *Melandrium*)

S. alba see *latifolia*
S. behen
S. brahuica
S. commutata
S. conoidea
S. crassipes
S. cucubalus see *vulgaris*
S. czerei
S. dichotoma
S. dioica (= *diurnum*, *rubrum*)

S. dubia
S. fruticosa
S. gallica

S. inflata see *vulgaris*

Caryophyllaceae

Brachycaudus lychnidis, *populi*
[*Aphidura* sp. (Kadyrbekov, 2002d)]
Aphidura ornatella
Aphidura picta; *Myzus persicae*; [*Rhopalosiphum maidis*]
Myzus persicae

Brachycaudus populi
Brachycaudus lychnidis
Aphis fabae, *sambuci*;
Brachycaudus klugkisti, *lychnicola*, *lychnidis*;
Myzus ornatus, *persicae*; [aphid gall: Wahlgren, 1956]
Brachycaudus lychnidis
Aphidura picta
Aphidura sp. (France: BMNH colln, leg. G. Remaudière);
Aulacorthum solani; *Brachycaudus lychnidis*

HOST LISTS AND KEYS

<i>S. italica</i>	<i>Aphidura delmasi, ornata</i>
<i>S. jensiseensis</i>	<i>Aphis silenicola</i>
<i>S. kuschakewiczii</i>	<i>Aphidura ornatella</i>
<i>S. latifolia</i> (= <i>Melandrium album</i>)	<i>Aphis fabae; Aulacorthum solani;</i> <i>Brachycaudus divaricatae, klugkisti, lychnidis, populi;</i> <i>Myzus certus, persicae; Volutaphis schusteri</i>
<i>S. latifolia</i> × <i>dioica</i>	<i>Brachycaudus klugkisti; Myzus persicae</i>
<i>S. lithophila</i>	<i>Aphidura ornatella</i>
<i>S. littoralis</i>	<i>Brachycaudus populi</i>
<i>S. longiflora</i>	<i>Aphis fabae, sambuci</i>
<i>S. macrostyla</i>	<i>Aphis silenicola</i>
<i>S. maritima</i> see <i>uniflora</i>	
<i>S. multifida</i>	<i>Brachycaudus divaricatae, lychnidis</i>
<i>S. nemoralis</i>	<i>Brachycaudus klugkisti</i>
<i>S. noctiflora</i>	<i>Aphis craccivora, sambuci; Brachycaudus klugkisti, lychnidis;</i> <i>Macrosiphum euphorbiae; Myzus certus;</i> [<i>Uroleucon rudbeckiae</i>]
<i>S. nutans</i>	<i>Aphis austriaca; Brachycaudus lychnidis, pallidus;</i> <i>Brachycolus cucubali</i>
<i>S. otites</i>	<i>Aphidura ornata, pannonica; Volutaphis centaureae</i>
<i>S. parviflora</i>	<i>Aphidura pujoli</i>
<i>S. pendula</i>	<i>Volutaphis centaureae</i>
<i>S. repens</i>	<i>Aphis sileneophaga, silenicola</i>
<i>S. rosea</i> see <i>uniflora</i>	
<i>S. salzmännii</i>	<i>Brachycaudus lychnidis</i>
<i>S. scabrifolia</i>	[<i>Uroleucon sileneobium</i>]
<i>S. schafta</i>	<i>Brachycaudus populi</i>
<i>S. sendtneri</i>	<i>Brachycaudus lychnidis</i>
<i>S. thymifolia</i>	<i>Aphidura picta</i> (as <i>mingens</i>)
<i>S. uniflora</i> (incl. <i>maritima</i>)	<i>Acyrtosiphon auctum;</i> <i>Brachycaudus klugkisti, lychnidis, populi;</i> <i>Macrosiphum euphorbiae, penfroense, stellariae;</i> <i>Myzus ornatus, persicae</i> <i>Myzus certus</i>
<i>S. viridiflora</i>	<i>Aphis fabae; Brachycaudus lychnidis; Myzus certus</i>
<i>S. viscosa</i>	<i>Aphidura ornatella; Aphis fabae;</i> <i>Brachycaudus lychnidis, populi; Brachycolus cucubali;</i> <i>Macrosiphum euphorbiae, hartigi, stellariae;</i> <i>Myzus ascalonicus, certus, persicae; [Pemphigus inflatae]</i>
<i>S. vulgaris</i> (incl. <i>cucubalis, inflata</i>)	<i>Volutaphis alpinae</i>
<i>S. vulgaris</i> var. <i>alpina</i>	<i>Aphidura ornatella; Aulacorthum solani;</i> <i>Brachycolus cucubali; Macrosiphum stellariae</i>
<i>S. wallichiana</i>	<i>Aphidura ornata, ornatella, pannonica</i> ssp. <i>cretacea</i>
<i>S. wolgensis</i>	<i>Aphidura picta, Aphidura</i> sp. (Iran: BMNH colln, leg. G. Remaudière); [<i>Roepkea marchali</i>]
<i>Silene</i> spp.	

Key to apterae on *Silene*:-

1. Cauda semicircular or helmet-shaped, shorter than its width at base in dorsal view. Marginal tubercles (MTu) small or absent, and never on ABD TERG 7. Spiracular apertures large and rounded. Dorsum usually with an extensive dark sclerotic shield **2**
 – Cauda tongue-shaped, finger-shaped, or if short and rounded then there are large MTu on ABD TERG 7. Spiracular apertures reniform. Dorsum with or without an extensive dark sclerotic shield **7**
2. R IV+V $0.8-1.0 (-1.09) \times$ HT II *Brachycaudus populi*
 – R IV+V $(1.0-)$ $1.1-1.6 \times$ HT II **3**
3. ANT III with 7–15 hairs, the longest 17–29 μm long, $0.5-1.3 \times$ BD III, and $0.29-0.56 \times$ the longest spinal hair on ABD TERG 3–4. Cauda with 6–12 hairs *Brachycaudus klugkisti*
 – ANT III with 13–24 hairs, the longest 24–69 μm long, $0.9-2.8 \times$ BD III, and $0.63-1.4 \times$ the longest spinal hair on ABD TERG 3–4. Cauda with 11–18 hairs **4**
4. R IV+V $2.95-8.3 \times$ longest spinal hair on ABD TERG 3–4, which is 17–57 μm long **5**
 – R IV+V $1.80-2.85 \times$ longest spinal hairs on ABD TERG 3–4, which is 54–85 μm long **6**
5. R IV+V 0.163–0.177 mm long, with 5–10 accessory hairs. ANT III $2.72-3.13 \times$ SIPH *Brachycaudus pallidus*
 – R IV+V 0.183–0.218 mm long, with 8–14 accessory hairs. ANT III $2.05-2.42 \times$ SIPH *Brachycaudus lychnidis*
6. Hairs on ANT III with blunt or acute apices, the longest $1.0-1.8 \times$ BD III. R IV+V $1.0-1.42 \times$ HT II *Brachycaudus divaricatae*
 – Hairs on ANT III with very finely pointed apices, the longest $(1.8-)$ $2.0-3.0 \times$ BD III. R IV+V $1.28-1.74 \times$ HT II *Brachycaudus lychnicola*
7. Marginal tubercles (MTu) always present on prothorax and ABD TERG 1 and 7, and sometimes on other segments **8**
 – MTu of irregular occurrence, sometimes present on prothorax and some of ABD TERG 1–5 (–6), but never on ABD TERG 7 **14**
8. ABD TERG 2–4 (–6) as well as 1 and 7 with well-developed MTu **9**
 – ABD TERG 2–4 only irregularly with small MTu **11**
9. SIPH $0.55-0.95 \times$ cauda, which is finger-like. MTu placed on dark marginal sclerites. R IV+V $0.95-1.15 \times$ HT II *Aphis silenicola*
 – SIPH $1.7-3.5 \times$ cauda, which is short and rounded. MTu not placed on dark marginal sclerites. R IV+V $1.1-1.7 \times$ HT II **10**
10. Cauda with 7–12 hairs. (Al. with sec. rhin. III 17–20, IV c.4, V 0) *Aphis austriaca*
 – Cauda with 10–20 hairs. (Al. with sec. rhin. III 12–44, IV 10–27, V 3–15) *Aphis sambuci*
11. SIPH $0.4-0.5 \times$ cauda. R IV+V $c.0.7 \times$ HT II *Aphis silenephaga**
 – SIPH $0.7-2.2 \times$ cauda. R IV+V $0.9-1.2 \times$ HT II **12**
12. Tergum with an almost solid black shield, occasionally fragmented *Aphis craccivora*
 – Tergum without extensive dark sclerotisation anterior to SIPH **13**
13. SIPH pale with dark apices. Longest hairs on ANT III $0.4-0.7 \times$ BD III. Dorsal abdomen without any dark markings *Aphis nasturtii*
 – SIPH black. Longest hairs on ANT III $0.8-3.4 \times$ BD III. Dorsal abdomen with dark cross-bands on ABD TERG 7–8, and usually some small dark markings anterior to SIPH *Aphis fabae*

HOST LISTS AND KEYS

14. SIPH very short, barrel-shaped, $0.39\text{--}0.53\times$ cauda *Brachycolus cucubali*
 – SIPH at least $0.8\times$ cauda **15**
15. Head densely spiculate both dorsally and ventrally, with well-developed, steep-sided ANT tubercles **16**
 – Head smooth, or with a few spicules ventrally. ANT tubercles weakly developed or if well developed then with smooth, divergent inner faces **20**
16. SIPH slightly to moderately clavate **17**
 – SIPH tapering/cylindrical **19**
17. SIPH $0.54\text{--}0.81\times$ ANT III, almost smooth surfaced, with a narrow stem similar in thickness to middle part of hind tibia *Myzus ascalonicus*
 – SIPH $0.82\text{--}1.34\times$ ANT III, normally imbricated, with narrowest part of stem distinctly thicker than middle part of hind tibia **18**
18. R IV+V in most specimens with only one pair of lateral accessory hairs (plus 0–3 ventral accessory hairs). Value of function cauda/(ANT III \times PT) in range 0.80–1.52, but rarely more than 1.25 except in small specimens (those with ANT III less than 0.32 mm) *Myzus persicae*
 – R IV+V in most specimens with two pairs of lateral accessory hairs. Value of function cauda/(ANT III \times PT) in range 1.2–2.7 (rarely less than 1.25) *Myzus certus*
19. BL 1–2 mm. ANT PT/BASE 1.7–2.8. ANT III without rhinaria. SIPH coarsely imbricated, with a slight ‘S’-curve. Dorsum with a pattern of intersegmental dark spots *Myzus ornatus*
 – BL 1.8–3 mm. ANT PT/BASE 4.0–5.5. ANT III with (0–) 1–2 (–4) rhinaria near base. SIPH normally imbricated, rather straight. Dorsum without dark intersegmental markings *Aulacorthum solani*
20. SIPH with a subapical zone of polygonal reticulation **21**
 – SIPH without polygonal reticulation **24**
21. ANT III with 15–25 rhinaria extending over most of length. SIPH $1.3\text{--}1.4\times$ cauda *Macrosiphum hartigi*
 – ANT III with 1–12 rhinaria concentrated near base or on basal half. SIPH $1.5\text{--}2.2\times$ cauda **22**
22. ANT PT/BASE 3.1–4.8. SIPH $1.4\text{--}1.8\times$ cauda which bears 12–22 hairs *Macrosiphum penfroense*
 – ANT PT/BASE 4.2–6.4. SIPH $1.7\text{--}2.3\times$ cauda which bears 8–16 hairs **23**
23. Femora usually with a dark spot or patch near apices. ABD TERG 2–3 with longest hair 26–56 μm , usually as long as or longer than ANT BD III. Subgenital plate with 2–13 hairs in addition to those on posterior margin *Macrosiphum stellariae*
 – Femora pale or only slightly dusky at apices. ABD TERG 2–3 with longest hair 21–37 μm , usually shorter than ANT BD III. Subgenital plate with 2 (–4) hairs on anterior part *Macrosiphum euphorbiae*
24. SIPH $0.85\text{--}1.4\times$ cauda **25**
 – SIPH $1.5\text{--}2.8\times$ cauda **27**
25. SIPH tapering/cylindrical. ANT III with 0–3 rhinaria near base *Acyrtosiphon auctum*
 – SIPH swollen on apical c.0.7. ANT III with or without rhinaria, if with rhinaria then these are on distal half **26**
26. ANT PT/BASE 2.5–3.0. SIPH $1.2\text{--}1.4\times$ cauda. R IV+V longer than HT II. First tarsal segments with 3 hairs *Volutaphis centaureae*
 – ANT PT/BASE 1.8–2.2. SIPH $0.95\text{--}1.1\times$ cauda. R IV+V shorter than HT II. First tarsal segments with 4 hairs *Volutaphis alpinae*

27. ANT III with 6–26 rhinaria (all or most being on distal half), and IV with 0–9. ANT PT/BASE 4.7–7.4. Tergum without dark sclerotisation *Volutaphis schusteri*
 – ANT III–IV without rhinaria. ANT PT/BASE 2.4–4.5. Tergum often with dark sclerotisation **28**
28. ABD TERG 2–3 with longest hairs 15–55 µm long, 0.7–2.0× longer than ANT BD III **29**
 – ABD TERG 2–3 with longest hairs 4–12 µm long, 0.2–0.6× longer than ANT BD III **31**
29. SIPH clavate. Tergum with an almost solid black shield extending over ABD TERG 1–6, and incorporating marginal sclerites *Aphidura ornatella*
 – SIPH tapering/cylindrical. Dorsum with irregular sclerotisation, or with an extensive shield over ABD TERG 1–5 but not incorporating marginal sclerites **30**
30. ABD TERG 2–3 with longest hairs 15–20 µm, 0.7–1.0× ANT BD III. Dorsal abdomen with variable, broken sclerotisation, usually as paired patches with a broad spinal gap *Aphidura* sp. (France, BMNH colln)
 – ABD TERG 2–3 with longest hairs 35–55 µm, 1.5–2.0× ANT BD III. Dorsal abdomen with a large central oval sclerite on ABD TERG (1–) 2–5 *Aphidura delmasi*
31. Tergum with an extensive almost solid black shield extending over metanotum and ABD TERG 1–6, usually incorporating marginal sclerites *Aphidura ornata*
 – Tergum pale or with variable sclerotisation, sometimes extensive but with large windows spinally and marginally, not forming a solid black shield **32**
32. SIPH markedly clavate, with swollen part asymmetrical, its maximum width c.1.5× minimum width basad *Aphidura* sp. (Iran, BMNH colln)
 – SIPH tapering, cylindrical or only slightly clavate **33**
33. Tergum without dark markings. SIPH pale or dusky, slightly clavate, 1.5–1.8× cauda, which is bluntly triangular *Aphidura pujoli*
 – Tergum usually with some dark sclerotisation. SIPH dark, tapering/cylindrical (sometimes appearing slightly swollen distally, but without a measurably narrower section basad); 1.9–2.8× cauda, which is tongue-shaped **34**
34. ANT PT/BASE 4.0–5.7. Hairs on ANT III and ABD TERG 2–3 minute, maximally 4–7 µm long, 0.15–0.3× BD III. SIPH 2.2–2.8× cauda *Aphidura pannonica*
 – ANT PT/BASE 2.5–4.0. Hairs on ANT III and ABD TERG 2–3 maximally 8–12 µm, 0.4–0.6× BD III. SIPH 1.9–2.5× cauda *Aphidura picta*

Silphium

S. compositum
S. integrifolium
S. laciniatum
S. perfoliatum

Compositae

Uroleucon ambrosiae
Macrosiphum pallens; *Uroleucon rudbeckiae*
Iowana frisoni
Uroleucon rudbeckiae

Key to apterae on *Silphium*:-

1. ANT tubercles undeveloped, front of head broad and flat in dorsal view. ANT 5-segmented, with c.5 rhinaria on distal half of ANT III. Large marginal tubercles (MTu) present on prothorax and ABD TERG 1–5 and 7. SIPH short, tapering, conical, without distal reticulation. Cauda broadly rounded, shorter than its basal width *Iowana frisoni**
- ANT tubercles well developed, ANT 6-segmented. MTu absent or only ever on ABD TERG 2–4. SIPH with a distal zone of polygonal reticulation, and cauda finger-shaped **2**

HOST LISTS AND KEYS

2. SIPH long, thin, pale, with a few rows of large polygonal cells on less than distal 0.2 of length. ANT III with longest hairs less than $0.5 \times$ BD III, and with 2–4 rhinaria *Macrosiphum pallens*
 – SIPH thick, mainly or entirely dark, with numerous rows of small polygonal cells on distal 0.25–0.4 of length. ANT III with longest hairs as long as or longer than BD III, and with 8–31 rhinaria **3**
3. Femora pale/dusky, sometimes with darker patch on anterior side at apices. SIPH becoming gradually darker distally, paler at base than at apex. Postsiphuncular sclerites and scleroites at bases of dorsal hairs pale and inconspicuous *Uroleucon rudbeckiae*
 – Femora dark distally. SIPH entirely dark. Postsiphuncular sclerites and at least some of scleroites at base of dorsal hairs pigmented *Uroleucon ambrosiae*

Silybum

S. marianum

Silybum sp.

Use key to apterae on *Cynara*.

Compositae

Aphis fabae, *spiraecola*, *Aphis* (*Protaphis*) sp. (Mier Durante, 1978); *Brachycaudus cardui*, *helichrysi*; *Capitophorus elaeagni*; *Dysaphis lappae* ssp. *cynarae*; *Macrosiphum euphorbiae*; *Protrama radialis*; *Trama troglodytes*; *Uroleucon aeneum* [*Rectinasus buxtoni*]

Sinapidendron

S. rupestre

Sinapis

S. alba

S. arvensis

Cruciferae

Brevicoryne brassicae

Cruciferae

Brevicoryne brassicae;
Lipaphis erysimi, *pseudobrassicae*;
Macrosiphum euphorbiae; *Myzus persicae*
Brevicoryne brassicae;
Lipaphis erysimi, *pseudobrassicae*;
Macrosiphum euphorbiae; *Myzus persicae*
Nasonovia ribisnigri; *Smynthuroides betae*

Key to apterae on *Sinapis*:-

1. SIPH slightly swollen, but not clavate (without narrow section on basal half). ANT tubercles absent, or if developed then not projecting forward beyond middle of head, so that front of head is convex, straight or sinuate in dorsal view. ABD TERG 1 and 7 without marginal tubercles (MTu) **2**
 – Without this combination of characters; i.e., **if** SIPH are present then they are tapering, cylindrical or clavate (with narrow section on basal half), and **either** ANT tubercles are very well-developed **or** ABD TERG 1 and 7 have MTu **4**
2. ANT III $2.5\text{--}3.7 \times$ SIPH, which are $0.8\text{--}1.0 \times$ the broad-based triangular cauda. Dorsal abdomen usually with paired dark markings on most tergites *Brevicoryne brassicae*
 – ANT III $1.2\text{--}1.7 \times$ SIPH, which are $1.2\text{--}1.6 \times$ the tongue-shaped cauda. Dorsal abdomen usually with cross-bands on ABD TERG 7 and 8, but without markings anterior to SIPH **3**
3. ANT III+PT together $1.95\text{--}2.5 \times$ SIPH (90% of specimens less than $2.4 \times$) *Lipaphis erysimi*
 – ANT III+PT together $2.1\text{--}3.2 \times$ SIPH (90% of specimens more than $2.4 \times$) *Lipaphis pseudobrassicae*

4. Thoracic spiracles enlarged, much larger than abdominal spiracles. ANT PT/BASE 7.0–11.4, usually more than 8.0. Hairs on ANT III 0.7–1.1× BD III. Dorsum usually with paired dark intersegmental markings *Nasonovia ribisnigri*
 – Without that combination of characters go to key to polyphagous aphids, p. 1020

Sinoarundinaria* (incl. *Yushania*)S. niitakayamensis**S. reticulata***Gramineae**

Chaitoregma tattakana; *Cranaphis formosana*;
Melanaphis arundinariae;
Takecallis arundinariae, takahashii
Melanaphis sacchari

Use key for *Arundinaria* and accounts of bamboo-feeding aphids in Blackman and Eastop (1994).

Sinningia* (incl. *Corytholoma*, *Rechsteineria*)S. eumorpha*×*leucotrichia**S. speciosa**S. verticillata**Sinningia*×*Gloxinia***Gesneriaceae**

Aulacorthum solani
Aulacorthum solani; *Myzus persicae*; *Neomyzus circumflexus*
Aulacorthum solani
Aulacorthum solani (Leonard, 1972a)

Use key to polyphagous aphids, p. 1020.

Siphocampylus*S. cernuus***Campanulaceae***Aphis spiraeicola****Sison****S. amomum***Umbelliferae***Aphis fabae****Sisymbrium****S. alliaria**S. altissimum**S. arnotianum**S. aromaticum* (?)*S. bermudiana* (?)*S. canescens**S. capense**S. incisum**S. irio**S. loeselii**S. officinale**S. polymorphum**S. sofia*=*Descurainia sophia**S. thellungii**Sisymbrium* spp.**Cruciferae**

Lipaphis fritzmulleri; *Myzus persicae*; *Nasonovia ribisnigri*
Lipaphis erysimi, pseudobrassicae
Lipaphis erysimi
Lipaphis erysimi
 [*Dysaphis foeniculus*]
Myzus persicae
Myzus persicae
Aphis nasturtii
Aphis gossypii; *Myzus persicae*
Lipaphis fritzmulleri
Aphis nasturtii; *Brevicoryne brassicae*; *Lipaphis erysimi*;
Myzus ascalonicus, persicae; *Nasonovia ribisnigri*;
 [*Sitobion fragariae*]; [*Uroleucon cichorii*]
Lipaphis sisymbrii; *Neosappaphis paradoxa*

Lipaphis erysimi; *Macrosiphum euphorbiae*;
Myzus persicae
Acyrtosiphon malvae; *Smynthuroides betae*

HOST LISTS AND KEYS

Key to apterae on *Sisymbrium*:-

1. ANT 4-segmented (in al. as well as apt.). ANT III with c.7–9 contiguous sec. rhinaria on distal 0.7. Rather large, flat marginal tubercles (MTu) present on ABD TERG 1–7. SIPH cylindrical, flangeless, pale with dark tips, c.3.5× cauda which is helmet-shaped and bears c.20 hairs
*Neosappaphis paradoxa**
 – ANT 5- or 6-segmented, and other characters not as above **2**
2. SIPH slightly swollen on distal half, with narrowest part just below flange. ANT tubercles absent, or if developed then not projecting forward beyond middle part of head, so that front of head is convex, straight or sinuate in dorsal view. ABD TERG 1 and 7 without marginal tubercles (MTu) **3**
 – Without this combination of characters; i.e., **if** SIPH are present then they are tapering, cylindrical or clavate (with narrow section on basal half), and **either** ANT tubercles are very well-developed **or** ABD TERG 1 and 7 have MTu **7**
3. SIPH 0.8–1.05× cauda, and more-or-less barrel-shaped **4**
 – SIPH 1.1–c.1.7× cauda **5**
4. Cauda broad-based, triangular, about as long as basal width, with 7–8 hairs. Dorsal abdomen usually with paired dark markings on most tergites *Brevicoryne brassicae*
 – Cauda tongue-shaped, longer than its basal width, with 4 hairs. Dorsal abdomen without dark markings anterior to SIPH *Lipaphis fritzmulleri*
5. SIPH c.1.7× cauda, which is c.2.5× R IV+V *Lipaphis sisymbrii**
 – SIPH 1.1–1.6× cauda, which is 1.2–2.0× R IV+V **6**
6. ANT III+PT together 1.95–2.5× SIPH (90% of specimens less than 2.4×) *Lipaphis erysimi*
 – ANT III+PT together 2.1–3.2× SIPH (90% of specimens more than 2.4×) *Lipaphis pseudobrassicae*
7. Thoracic spiracles enlarged, much larger than abdominal spiracles. ANT PT/BASE 7.0–11.4, usually more than 8.0. Hairs on ANT III 0.7–1.1× BD III. Dorsum usually with paired dark intersegmental markings *Nasonovia ribisnigri*
 – Without that combination of characters go to key to polyphagous aphids, p. 1020

Sisyrinchium

S. idahoensis
Sisyrinchium sp.

Iridaceae

Macrosiphum euphorbiae
Dysaphis tulipae

Use key to apterae on *Iris*.

Sitanion

S. hystrix

Gramineae

Sitobion fragariae

(or use key to apterae of grass-feeding aphids under *Digitaria*)

Sium

S. cicutaefolium
S. latifolium

S. reflexum (?)

S. sisarum

Umbelliferae

Aulacorthum solani; *Cavariella salicicola*
Aphis fabae; *Cavariella aegopodii*;
Macrosiphum euphorbiae; *Pemphigus protospirae*
Aphis fabae, *helianthi*; *Cavariella aegopodii*, *salicicola*;
Hyadaphis foeniculi; *Paramyzus sii*
Aphis fabae

<i>S. suave</i> (incl. var. <i>nipponicum</i>)	<i>Aphis gossypii</i> , <i>nasturtii</i> , [<i>sedi</i>]; <i>Cavariella angelicae</i> , [<i>hendersoni</i>], <i>konoii</i> , <i>salicicola</i> ; <i>Paramyzus sii</i>
<i>S. tenue</i>	<i>Cavariella salicicola</i>
<i>Sium</i> sp.	<i>Cavariella cicutae</i> , <i>salicis</i>

Key to apterae on *Sium*:–

1. ANT PT/BASE less than 0.5. SIPH absent *Pemphigus protospirae*
– ANT PT/BASE more than 0.6. SIPH present **2**
2. ABD TERG 8 with a posteriorly projecting process above cauda, bearing 2 apical hairs. Tergum variolate **3**
– No supracaudal process. Tergum smooth or wrinkled **7**
3. SIPH tapering/cylindrical, without any swelling. ANT 5-segmented *Cavariella angelicae*
– SIPH clavate; swollen on distal half to at least 1.2× narrowest part of basal half **4**
4. Supracaudal process conical or finger-like, not projecting to tip of cauda **5**
– Supracaudal process large, conical, extending beyond and usually covering cauda **6**
5. ANT PT/BASE 0.6–1.3. R IV+V 0.7–0.95× HT II, and without accessory hairs *Cavariella aegopodii*
– ANT PT/BASE 1.35–2.0. R IV+V 1.0–1.2× HT II, with 2 accessory hairs *Cavariella konoii*
6. R IV+V 1.05–1.2× HT II. SIPH short and stout, narrowing only at base *Cavariella salicicola*
– R IV+V 0.85–1.04× HT II. SIPH with narrower basal stem extending over about 0.3 of length *Cavariella salicis*
7. SIPH pale, coarsely imbricated, markedly clavate, with maximum width of swollen part 1.7–2.2× more than minimum width of stem, and with a constricted subapical region and a very well-developed (swollen) flange. Head densely nodulose and spiculose, with well-developed ANT tubercles, their inner faces slightly convergent. ANT III with 1–3 rhinaria in a row near base *Paramyzus sii*
– Without that combination of characters **8**
8. SIPH clavate and 0.9–1.4× cauda *Hyadaphis foeniculi*
– SIPH tapering or cylindrical (or if clavate then more than 1.5× cauda)
go to key to polyphagous aphids, p. 1020

Smilacina see *Maianthemum**Smilax**S. campestris**S. china**S. dominguensis**S. excelsa**S. ferox**S. glauca**S. glycyphylla**S. herbacea**S. hispida***Smilacaceae***Myzus persicae**Aleurosiphon smilacifoliae*; *Aphis gossypii*, *smilacisina*;*Impatientinum impatiens*; [*Rhopalomyzus smilacis*];*Sitobion dismilaceti*, *smilacicola*, *smilacifoliae**Toxoptera aurantii**Aphis fabae**Sitobion sikkimense*[*Neoprociphilus aceris*]*Sitobion smilacifoliae**Neoprociphilus aceris**Neoprociphilus aceris*

HOST LISTS AND KEYS

<i>S. lasioneuron</i>	<i>Neoprociphilus aceris</i>
<i>S. macrophylla</i>	<i>Impatientinum (Neoimpatientinum) smilaceti</i>
<i>S. nipponica</i>	<i>Aulacorthum smilacis</i>
<i>S. oldhami</i>	<i>Aulacorthum smilacis</i>
<i>S. parvifoliae</i>	<i>Impatientinum asiaticum</i> ssp. <i>dalhousiensis</i>
<i>S. riparia</i>	<i>Impatientinum impatiens</i>
<i>S. rotundifolia</i>	<i>Neoprociphilus aceris</i>
<i>S. sieboldii</i>	<i>Sitobion smilacifoliae</i>
<i>S. stenopetala</i>	<i>Sitobion smilacicola</i>
<i>Smilax</i> spp.	<i>Aphis spiraecola</i> ; <i>Aulacorthum magnoliae</i> ; [<i>Myzus cerasi</i>]; <i>Neomyzus circumflexus</i> ; [<i>Rhopalosiphoninus smilacifoliae</i>]; <i>Sinomegoura citricola</i> , [<i>rhododendri</i>]

Key to apterae on *Smilax*:-

1. ANT PT/BASE less than 0.2. Eyes 3-faceted (triommatidia). Large dorsal wax gland plates present on thorax and abdomen. SIPH as slightly raised pores. Cauda very broadly rounded
 - ANT PT/BASE more than 2. Eyes multifaceted. No discrete wax gland plates. SIPH tubular. Cauda tongue- or finger-like 2
2. ANT tubercles weakly developed. ABD TERG 1 and 7 always with marginal tubercles (MTu). SIPH without a subapical zone of polygonal reticulation 3
 - ANT tubercles well developed, so that there is a frontal sinus. ABD TERG 1 rarely and ABD TERG 7 never with MTu. SIPH with or without subapical polygonal reticulation 8
3. ANT PT/BASE 3.8–5.0. Stridulatory apparatus present *Toxoptera aurantii*
 - ANT PT/BASE 1.9–3.5. No stridulatory apparatus 4
4. R IV+V with 4–9 accessory hairs. ANT III with long fine hairs, 2–3× longer than BD III. ABD TERG 1–6 each with a pair of (long, fine) pleural hairs in addition to the spinal and marginal pairs *Aleurosiphon smilacifoliae*
 - R IV+V with 2 accessory hairs. ANT III with longest hairs 0.4–2.2× BD III. ABD TERG 1–6 without pleural hairs 5
5. Cauda pale, dusky or dark, and bearing 4–8 hairs. Longest hair on hind femur 12–35µm 6
 - Cauda black and bearing 7–24 hairs. Longest hair on hind femur 24–90µm 7
6. SIPH 0.9–1.2× cauda, with 6–8 hairs *Aphis smilacisina*
 - SIPH 1.3–2.5× cauda, with 4–8 hairs *Aphis gossypii*
7. Dorsal abdomen with dark cross-bands on ABD TERG 7 and 8, and usually with some small dark sclerites anterior to SIPH. Cauda without a constriction, and bearing 11–24 hairs *Aphis fabae*
 - Dorsal abdomen without dark dorsal markings, except rarely a narrow cross-band on ABD TERG 8. Cauda usually with a constriction, and bearing 7–15 hairs *Aphis spiraecola*
8. Head spiculose, at least on ventral side 9
 - Head not spiculose 12
9. Dorsal abdomen without any dark markings. SIPH slightly clavate 10
 - Dorsal abdomen with often extensive dusky or dark sclerotic markings. SIPH tapering/cylindrical 11

10. ANT III without rhinaria. Femora pale. Head pale and densely spiculose dorsally as well as ventrally, with apically convergent scabrous ANT tubercles *Myzus persicae*
 – ANT III with a small rhinarium near base. Femora dark distally. Head dark and spiculose only on ventral side, with inner faces of ANT tubercles almost parallel *Aulacorthum magnoliae*
11. Dorsal abdomen with a U-shaped black sclerite centered on ABD TERG 2–4, not extending to marginal areas. Femora pale distally *Neomyzus circumflexus*
 – Dorsal abdomen with variably-developed dusky or dark sclerotisation, extending into marginal areas when well developed. Femora dark distally *Aulacorthum smilacis*
12. SIPH pale on about basal 0.3, and 0.8–1.1× cauda, which is black *Sinomegoura citricola*
 – SIPH wholly dark, at least 1.2× cauda, which is pale **13**
13. SIPH 0.15–0.19× BL, calf-shaped, usually somewhat constricted at base, without subapical reticulation or with a few rows of strongly transverse cells on distal 0.15 or less **14**
 – SIPH 0.20–0.40× BL, tapering from a broad base, with reticulation on distal 0.2–0.3 of length **16**
14. Dorsal abdomen with marginal areas of ABD TERG 1–6 dark, but with a pale central area. First tarsal segments with 4 hairs *Impatientinum (Neoimpatientinum) smilaceti**
 – Dorsal abdomen with a solid black sclerotic shield covering ABD TERG 1–6. First tarsal segments with 3 hairs **15**
15. Basal part of SIPH and ABD TERG 6 quite smooth. Spiracular sclerites on ABD TERG 1 and 2 small and distinctly separated *Impatientinum impatiens*
 – Basal part of SIPH and ABD TERG 6 spiculose. Spiracular sclerites on ABD TERG 1 and 2 very close, almost contiguous *Impatientinum asiaticum* ssp. *dalhousiensis*
16. SIPH 0.20–0.28× BL *Sitobion sikkimense** (or *dismilaceti*?*)
 – SIPH 0.3–0.4× BL **17**
17. Dorsal abdomen with dusky or dark sclerotisation, varying from dusky fragmented sclerites to a complete dorsal shield. SIPH 1.4–1.9× cauda, which is distally thin and tapering, nearly 3× longer than its basal width, and bears 6–8 hairs. Femora and tibiae without glandular pores *Sitobion smilacifoliae*
 – Dorsal abdomen without dusky/dark markings. SIPH c.2.7× cauda, which is stout, about 2× its basal width and bears c.16 hairs. Femora and tibiae with numerous small glandular(?) pores *Sitobion smilacicola**

Smithia*S. sensitiva***Leguminosae***Aphis craccivora****Smodingium*** see Blackman and Eastop (1994)***Smyrniium****Sm. olusatrum***Umbelliferae**

Aphis fabae; *Cavariella aegopodii*;
Dysaphis crataegi, *lauberti*;
Hyadaphis foeniculi; *Myzus ornatus*
Aphis fabae
Dysaphis apiifolia

*Sm. perfoliatum****Smyrniium* sp.**Use key to apterae on *Conium*.

HOST LISTS AND KEYS

Sobralia

S. leucoxantha

Sobralia sp.

Use key to apterae on *Cymbidium*.

Solandra

S. grandiflora

Solanum

S. acanthoideum

S. aculentissimum

S. americanum

S. antillarum

S. aurantiacum

S. auriculatum

S. aviculare

S. bahamense

S. betaceum

S. brachyantherum

S. capsicastrum

S. caribaeum=*nigrum*

S. carolinense

S. catombelense

S. chacoensis

S. ciliatum

S. clavatum

S. dilleni

S. douglasii

S. dulcamara

S. elaeagnifolium

S. flagellare

S. giganteum

S. guanicense

S. guianense

S. incanum

S. indicum

S. integrifolium

S. intrusum

S. jasminoides

S. khasianum

S. luteum

Orchidaceae

Toxoptera aurantii

Cerataphis orchidearum

Solanaceae

Myzus persicae

Solanaceae

Aphis gossypii

Aphis gossypii

Aphis solanella; *Macrosiphum euphorbiae*; *Myzus persicae*

Aphis gossypii, *spiraecola*; *Toxoptera aurantii*

Myzus ornatus

Aphis gossypii

Myzus persicae

Aphis gossypii

Aphis nerii

Brachycaudus helichrysi

Macrosiphum euphorbiae; *Myzus persicae*

Macrosiphum euphorbiae; *Myzus persicae*

Myzus persicae

Aphis gossypii

Neomyzus circumflexus

Aphis craccivora, *fabae*, *spiraecola*;

Myzus ornatus, *persicae*; *Toxoptera citricidus*, *odinae*

Aphis fabae

Smynthuroides betae

[*Acyrtosiphon pisum*];

Aphis fabae, *solanella*, [*solani* Kittel (invalid name)];

Aulacorthum solani; *Macrosiphum euphorbiae*;

Myzus persicae

Aphis gossypii; *Myzus persicae*

Macrosiphum euphorbiae; *Myzus persicae*

[*Aphis scabiosae* of Theobald (1927) and Wilson (1918)];

Aulacorthum solani; *Myzus persicae*

Macrosiphum euphorbiae; *Myzus persicae*

Aphis fabae

Macrosiphum euphorbiae

Aphis gossypii; *Myzus persicae*

Aphis gossypii

Aphis solanella

Aphis fabae, *gossypii*; *Aulacorthum solani*;

Macrosiphum euphorbiae; *Myzus persicae*;

Neomyzus circumflexus

Rhopalosiphum rufiabdominale

Aphis fabae, *gossypii*, *solanella*; *Myzus persicae*

- S. lycopersicon* see *Lycopersicon*
esculentum
- S. macranthum*
- S. marginatum*
- S. mauritianum*
- S. melongena*
- S. montanum*
- S. muricatum*
- S. nigrum* (incl. *caribaeum*,
schutesii, *villosum*)
- S. nodiflorum*
- S. officinale*
- S. panduriforme*
- S. persicum*
- S. pinnatifidum*
- S. pseudocapsicum*
- S. quitoense*
- S. racemiflorum*
- S. rostratum*
- S. sarrachoides*
- S. seaforthianum*
- S. sepicula*
- S. sisymbriifolium*
- S. sodomeum*
- S. stramonifolium*
- S. sublobatum*
- S. texanum*
- S. torvum*
- S. tuberosum*
- Aphis gossypii*
- Aphis fabae* (?*solanella*); *Macrosiphum euphorbiae*;
Myzus persicae
- Aphis gossypii*, *spiraecola*
- Aphis craccivora*, *fabae*, *gossypii*, *nasturtii*, *spiraecola*;
Aulacorthum solani; *Macrosiphum euphorbiae*;
Myzus antirrhinii, *persicae*; *Neomyzus circumflexus*;
[*Pentalonia nigronervosa*]; *Rhopalosiphum padi*;
Toxoptera citricidus
- Aphis gossypii*; *Macrosiphum euphorbiae*; *Myzus persicae*
- Macrosiphum euphorbiae*
- Aphis craccivora*, [eonymi], *fabae*, *gossypii*, *middletonii*,
nasturtii, [*neoreticulata* of Ossiannilsson, 1964a
(*fabae* group)], *nerii*, *solanella*, [*solani* Kittel (invalid
name)], *spiraecola*, [*umbrella*];
Aulacorthum solani; *Macrosiphum euphorbiae*;
Myzus ornatus, *persicae*; *Neomyzus circumflexus*;
Smynthuodes betae
- Aphis solanella*
- Aphis fabae*
- Aphis gossypii*; *Macrosiphum euphorbiae*; *Myzus persicae*
- Myzus persicae*
- Brachycaudus helichrysi*
- Aulacorthum solani*; *Macrosiphum euphorbiae*;
[*Metopolophium dirhodum*]; *Myzus persicae*
- Aphis gossypii*
- Aphis gossypii*
- Aphis spiraecola*; [*Rhopalosiphum maidis*]
- [*Brevicoryne brassicae*]
- Aphis fabae*, *gossypii*; [*Myzus* sp. (imm.)]
- Aphis gossypii*
- Aphis gossypii*, *spiraecola*
- Aphis gossypii*
- Aphis gossypii*
- Aphis fabae*; *Myzus persicae*
- Aphis gossypii*
- Aphis fabae*, *gossypii*, *spiraecola*; *Aulacorthum* [*dasi*], *solani*;
Brachycaudus helichrysi; [*Dysaphis emicis*];
Myzus persicae; *Toxoptera aurantii*; [*Uroleucon reynoldense*]
- Aphis fabae*, *frangulae*, *gossypii*, *nasturtii*, *spiraecola*;
Aulacorthum solani; *Macrosiphum euphorbiae*;
Myzus antirrhinii, *ascalonicus*, *ornatus*, *persicae*;
Neomyzus circumflexus; *Pemphigus* sp.;
Rhopalosiphoninus latysiphon;
Rhopalosiphum rufiabdominale; *Smynthuodes betae*;
[*Tuberocephalus misakurae*]; *Uroleucon compositae*

HOST LISTS AND KEYS

<i>S. variabile</i>	<i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i>
<i>S. verbasciflorum</i>	<i>Aphis gossypii</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; <i>Myzus persicae</i>
<i>S. villosum</i>	<i>Aphis solanella</i> , [<i>solani</i> Kittel (invalid name)]
<i>S. wendlandii</i>	<i>Aphis gossypii</i> ; <i>Myzus persicae</i>
<i>S. xanthum</i>	<i>Myzus persicae</i>
<i>Solanum</i> spp.	[<i>Hyperomyzus lactucae</i>]; <i>Myzus cymbalariae</i>

Use key to polyphagous aphids, p. 1020.

Solenanthus

S. biebersteinii
S. hirsutus

Boraginaceae

Brachycaudus mordvilkoii
Brachycaudus bicolor

Use key to apterae on *Echium*.

Solenostemon

S. monostachyus
S. scutellarioides

Labiatae

Aphis gossypii
Sitobion colei

Key to apterae on *Solenostemon*:-

- Tergum with extensive dark sclerotisation. SIPH with a distal zone of polygonal reticulation. ABD TERG 1 and 7 without marginal tubercles (MTu) *Sitobion colei*
- Tergum without dark sclerotisation. SIPH without polygonal reticulation. ABD TERG 1 and 7 with MTu *Aphis gossypii*

Solidago

S. altissima

S. arguta
S. aspera
S. bicolor
S. boottii
S. caesia

S. canadensis (= *altissima* L., and
incl. var. *salebrosa*)

S. decurrens
S. elongata
S. erecta
S. fistulosa
S. flexicaulis

S. gigantea (incl. *leiophylla*)

Compositae

[*Aphis gibbosa* Rafinesque (invalid name)];
Macrosiphum euphorbiae;
Uroleucon [*ambrosiae*], *caligatum*, *luteolum*,
nigrotuberculatum, *pieloui*
Uroleucon nigrotuberculatum
Uroleucon luteolum
Cachryphora serotinae; *Uroleucon nigrotuberculatum*
Uroleucon gravicorne
Aphis coreopsidis, *fabae*; *Pemphigus bursarius*;
Uroleucon caligatum, *luteolum*
Acuticauda solidaginifoliae; *Aphis middletonii*, *spiraecola*;
Brachycaudus helichrysi; *Cachryphora canadensis*;
Illinoia goldamaryae; *Pemphigus bursarius*;
Prociphilus erigeronensis; *Smynthuroides betae*;
Uroleucon caligatum, *erigeronense*, *gravicorne*,
nigrotuberculatum, *pieloui*, *solidaginis*, *vancouverense*
Aphis solidagophila; *Uroleucon lactucicola*
Uroleucon [*ambrosiae*], *nigrotuberculatum*
Pemphigus bursarius
Uroleucon sp. (as *rudbeckiae*)
Uroleucon solirostratum
Uroleucon caligatum, *gigantiphagum*, *luteolum*,
nigrotuberculatum, *pieloui*, [*rudbeckiae*]

<i>S. graminifolia</i> (incl. <i>lanceolatum</i>)	<i>Pemphigus bursarius</i> ; <i>Prociphilus erigeronensis</i> ; <i>Uroleucon lanceolatum</i> , <i>olivei</i>
<i>S. hispida</i>	<i>Uroleucon gravicorne</i> (? – as <i>canadense</i>)
<i>S. juncea</i>	<i>Uroleucon caligatum</i> , <i>gigantiphagum</i> , <i>gravicorne</i> , <i>luteolum</i> , <i>nigrotuberculatum</i>
<i>S. kurilensis</i>	<i>Uroleucon lactucicola</i>
<i>S. lanceolatum</i> see <i>graminifolia</i>	
<i>S. macrophylla</i>	<i>Uroleucon sijkensi</i>
<i>S. microglossa</i>	<i>Uroleucon nigrotibium</i> (? – Brazil)
<i>S. missouriensis</i>	<i>Brachycaudus helichrysi</i> ; <i>Myzus ascalonicus</i> ; <i>Neomyzus circumflexus</i> ; <i>Uroleucon atripes</i> , <i>luteolum</i> , <i>vancouverense</i> [<i>Aphis jacobea-balsamita</i> Rafinesque (invalid name)]; <i>Uroleucon cadens</i> , <i>gravicorne</i> , <i>luteolum</i> , <i>nigrotibium</i> , <i>nigrotuberculatum</i>
<i>S. nemoralis</i>	[<i>Aphis gibbosa</i> Rafinesque (invalid name)]; <i>Cachryphora serotinae</i> ; <i>Uroleucon caligatum</i> , <i>luteolum</i> , <i>nigrotibium</i> , <i>nigrotuberculatum</i>
<i>S. odora</i>	[<i>Aphis gibbosa</i> Rafinesque (invalid name)]; <i>Cachryphora serotinae</i> ; <i>Uroleucon caligatum</i> , <i>luteolum</i> , <i>nigrotibium</i> , <i>nigrotuberculatum</i>
<i>S. patula</i>	<i>Uroleucon pieloui</i>
<i>S. rigida</i>	<i>Brachycaudus helichrysi</i> ; <i>Cachryphora serotinae</i> ; <i>Illinoia goldamaryae</i> ; [<i>Uroleucon</i> sp. (as <i>rudbeckiae</i>)] <i>Cachryphora serotinae</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Uroleucon</i> [<i>ambrosiae</i>], <i>caligatum</i> , <i>lanceolatum</i> , <i>luteolum</i> , <i>pieloui</i> , <i>nigrotuberculatum</i>
<i>S. rugosa</i>	<i>Aphis gossypii</i> , <i>spiraecola</i> ; <i>Uroleucon</i> [<i>ambrosiae</i>], <i>erigeronense</i> , <i>luteolum</i> , <i>nigrotuberculatum</i> , <i>zayasi</i>
<i>S. sempervirens</i>	<i>Aphis fabae</i> , <i>middeltonii</i> , <i>tsujii</i> ; <i>Cachryphora canadensis</i> , <i>serotinae</i> ; [<i>Uroleucon</i> sp. (as <i>rudbeckiae</i>)], [<i>U. (Uromelan)</i> sp. (as <i>solidaginis</i>)]
<i>S. serotina</i>	<i>Uroleucon</i> [<i>ambrosiae</i>], <i>gravicorne</i> <i>Uroleucon lactucicola</i>
<i>S. speciosa</i>	[<i>Uroleucon pseudambrosiae</i>]
<i>S. spiraeifolia</i>	<i>Uroleucon luteolum</i> , <i>nigrotuberculatum</i>
<i>S. uliginosa</i>	<i>Aphis fabae</i> , <i>solidaginis</i> ; <i>Brachycaudus helichrysi</i> ; <i>Macrosiphum euphorbiae</i> ; [<i>Nasonovia ribisnigri</i>]; <i>Uroleucon lactucicola</i> , <i>solidaginis</i> ,
<i>S. ulmifolia</i>	<i>Aphis tsujii</i> ; <i>Uroleucon amamianum</i> , <i>lactucicola</i>
<i>S. virgaurea</i>	<i>Uroleucon amamianum</i> , <i>lactucicola</i> <i>Acuticauda asterensis</i> ; <i>Aphis craccivora</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus cardui</i> ; <i>Cachryphora imbricaria</i> ; <i>Hyperomyzus inflatus</i> ; <i>Uroleucon arnesense</i> , <i>bereticum</i> , <i>boreale</i> , <i>brevitarsus</i> , [<i>chrysopsidicola</i>]
<i>S. virgaurea</i> var. <i>asiatica</i>	
<i>S. virgaurea</i> var. <i>gigantea</i>	
<i>Solidago</i> spp.	

HOST LISTS AND KEYS

Key to apterae on *Solidago*:-

1. ANT PT/BASE less than 1. Eyes with 3 facets. SIPH absent. Dorsal wax glands present 2
 - ANT PT/BASE more than 1. Eyes multifaceted. SIPH present, tubular. No discrete wax glands 3
2. R IV+V shorter than last antennal segment (BASE+PT), and without any accessory hairs. Hairs at apices of tibiae and first tarsal segments short and thick. Abdomen without posterior projection Pemphigus sp.
 - R IV+V longer than last antennal segment (BASE+PT), and bearing 4-8 accessory hairs. Hairs at apices of tibiae and first tarsal segments long and fine. Anus borne on posterior projection of the abdomen Prociphilus erigeronensis
3. SIPH with distal reticulation (at least 2-3 rows of closed polygonal cells) 4
 - SIPH without polygonal reticulation (sometimes with subapical transverse striae) 28
4. SIPH pale or only dusky towards apices, with polygonal reticulation on subapical 0.04-0.2 of length. ANT III with 1-10 rhinaria 5
 - SIPH dark at least on distal part (although overcleared specimens may be wholly pale), with polygonal reticulation on distal 0.2-0.5 of length. ANT III with 4-47 rhinaria 6
5. SIPH slightly swollen on distal half, with reticulated subapical zone only 0.04-0.08 of total length (Figure 49a). Hairs on ANT III and dorsal body 0.2-0.4× BD III. Cauda with 7 hairs Illinoia goldamaryae
 - SIPH cylindrical on distal half, with reticulated subapical zone 0.13-0.2 of total length. Hairs on ANT III and body 0.6-1.1× BD III. Cauda with 8-12 hairs Macrosiphum euphorbiae

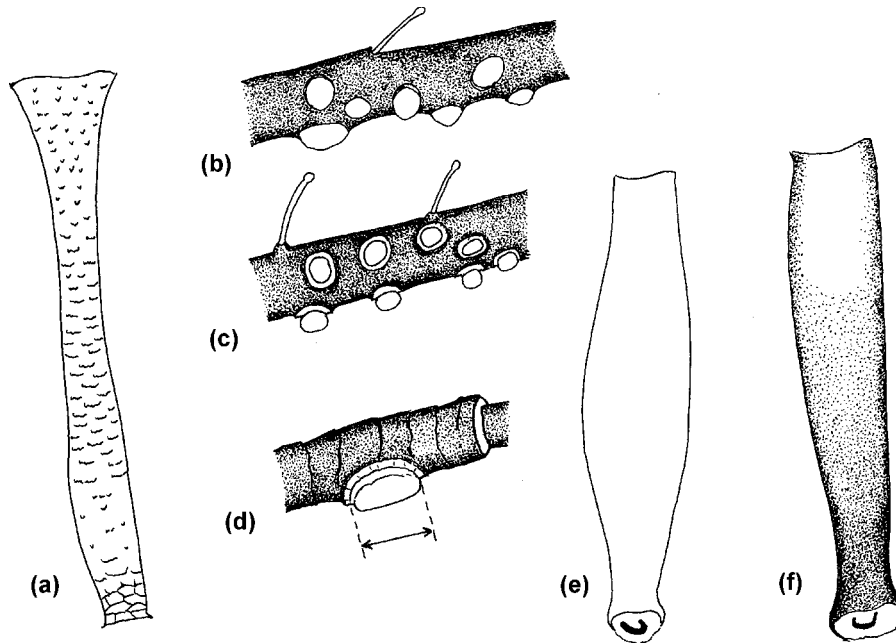


Figure 49 Apterae on *Solidago*. (a) SIPH of *Illinoia goldamaryae*, (b) secondary rhinaria on ANT III of *Uroleucon gravicorne*, (c) same for *U. cadens*, (d) primary rhinarium on ANT V of *U. solidaginis*, (e) SIPH of *Cachryphora serotinae*, (f) SIPH of *C. canadensis*.

6. SIPH with at least a pale section at base 7
 – SIPH entirely dark 14
7. SIPH 1.8–2.3× cauda, which usually has 1–3 subapical hairs that are shorter than those more basad and have blunt or sharply curved apices *Uroleucon erigeronense*
 – SIPH 1.1–1.7× cauda, which has subapical hairs similar in length to those more basad, and usually with pointed apices 8
8. R IV+V 0.8–1.0 (–1.05)× HT II. SIPH with reticulation only on distal 0.2–0.25 of length *Uroleucon bereticum*
 – R IV+V 1.1–1.5× HT II. SIPH with reticulation on distal 0.25–0.5 of length 9
9. SIPH longer than ANT III, pale on basal 0.5 or more of length, and with reticulation on distal 0.25–0.33 *Uroleucon zayasi*
 – SIPH not longer than ANT III, and pale only on basal 0.3 or less, with reticulation extending over 0.33–0.5 10
10. Second tarsal segments usually without ventral hairs on proximal 0.6 (hair bases may be present, but hairs undeveloped). Cauda with 6–12 hairs 11
 – Second tarsal segments with ventral hairs on proximal 0.6. Cauda with 9–18 hairs 12
11. ANT III with strongly protruberant rhinaria maximally 16–20µm in diameter, and almost rimless, so that edge of dome of rhinarium forms a smooth continuum with raised cuticle surrounding it (Figure 49b) *Uroleucon gravicorne*
 – ANT III with rhinaria maximally 8–15µm in diameter, each surrounded by a shelf-like ridge, from which the dome of the rhinarium arises almost perpendicularly (the more normal condition of the genus; Figure 49c) *Uroleucon cadens*
12. HT II 0.09–0.105 mm, shorter than maximum width of hind femur. ABD TERG 8 with 5–9 hairs. SIPH 1.6–1.7× cauda, which is not attenuated distally *Uroleucon brevitarsus*
 – HT II 0.125–0.17 mm, longer than maximum width of hind femur. ABD TERG 8 with 4 hairs. SIPH 1.1–1.3× cauda, which is attenuated distally 13
13. Paired spinal tubercles (STu) usually present on most or all of ABD TERG 2–7 (occasionally absent from some specimens) *Uroleucon caligatum*
 – STu absent *Uroleucon luteolum*
14. Cauda black like SIPH. Tibiae with pale section in middle 15
 – Cauda pale or dusky, distinctly paler than SIPH (or if rather dark then tibiae are entirely black) 17
15. SIPH less than 1.3× cauda, with reticulation on distal 0.33–0.4 of length *Uroleucon amamianum*
 – SIPH more than 1.3× cauda, with reticulation on distal 0.2–0.33 of length 16
16. Primary rhinarium on ANT V 25–40µm long (Figure 49d). ANT III either wholly dark, or infuscated in rhinariated section, which is swollen, usually to 1.25–1.6× BD III *Uroleucon solidaginis*
 – Primary rhinarium on ANT V 16–27µm long. ANT III pale or dusky with rhinariated part only slightly swollen, to less than 1.25× BD III *Uroleucon lactucicola*
17. SIPH 0.82–1.11× cauda. R IV+V 0.86–1.12× HT II. Dorsal hairs all arising from conspicuous blackish scleroites *Uroleucon lanceolatum*
 – SIPH 1.15–1.8× cauda. R IV+V 0.95–1.55× HT II. Scleroites at bases of dorsal hairs pale, dusky or dark 18
18. Tibiae entirely dark 19
 – Tibiae pale or with distinctly paler proximal section 22

HOST LISTS AND KEYS

19. Cauda with 13–20 hairs **20**
 – Cauda with 22–32 hairs **21**
20. ANT III with 13–47 rhinaria (rarely less than 20). ABD TERG 8 with (3–) 4 hairs. First tarsal segments with (4–) 5 hairs *Uroleucon atripes*
 – ANT III with 7–16 rhinaria. ABD TERG 8 with 2 (–4) hairs. First tarsal segments with 3 (–4) hairs *Uroleucon nigrotibium*
21. Coxae and cauda both dusky/dark compared with bases of femora. ANT III with 9–24 rhinaria, usually confined to basal 0.33–0.5 *Uroleucon vancouverense*
 – Coxae and cauda similar in pigmentation to bases of femora. ANT III with 15–38 rhinaria, usually extending onto distal half *Uroleucon nigrotuberculatum*
22. R IV+V 1.30–1.55× HT II. Cauda with 10–18 hairs **23**
 – R IV+V 0.95–1.25× HT II. Cauda with 10–42 hairs **25**
23. ANT III with 5–9 rhinaria clustered on basal half. SIPH only a little longer than cauda, which bears 10–13 hairs. BL not more than 2 mm *Uroleucon solirostratum**
 – ANT III with 12–36 rhinaria usually extending onto distal half. SIPH at least 1.33× cauda, which bears 12–18 hairs. BL at least 2 mm **24**
24. ABD TERG 2–4 usually with small marginal tubercles (MTu). Hind femur with a rather abrupt transition from pale to black on distal 0.20–0.25 of length. BL 2.8–3.4 mm *Uroleucon sijkpensi*
 – MTu absent. Hind femur shading gradually from pale to dusky brown at apex. BL 2.0–2.6 mm *Uroleucon arnesense*
25. Cauda with 10–17 hairs *Uroleucon boreale*
 – Cauda with (15–) 20–42 hairs **26**
26. ANT III with 7–17 rhinaria restricted to basal 0.4 *Uroleucon olivei*
 – ANT III usually with 20–46 rhinaria extending onto distal half (midsummer dwarf individuals may have fewer) **27**
27. R IV+V 1.05–1.25× HT II. Small marginal tubercles (MTu) sometimes present on some of ABD TERG 2–4 *Uroleucon pieloui*
 – R IV+V 0.95–1.10× HT II. MTu absent *Uroleucon gigantiphagum*
28. SIPH black and very markedly swollen, with maximum width of swollen part 2.2–3.2× minimum width near base. ANT with numerous sec. rhinaria; III 37–40, IV 1–7, V 0–1 *Hyperomyzus inflatus*
 – SIPH pale or dark, tapering, cylindrical, or swollen to a lesser extent. ANT with sec. rhinaria III 0–12, IV 0–6, V 0–5 **29**
29. Head spiculose, with well-developed, steep-sided ANT tubercles
 go to key to polyphagous aphids, p. 1020, starting at couplet 5
 – Head smooth with ANT tubercles undeveloped or weakly developed **30**
30. Spiracular apertures rounded. ABD TERG 1 and 7 without marginal tubercles (MTu). Cauda short, helmet-shaped or triangular, less than 1.4× its basal width in dorsal view, with 4–6 (–8) hairs **31**
 – Spiracular apertures small and reniform. ABD TERG 1 and 7 with MTu. Cauda tongue- or finger-like or, if less than 1.4× its basal width then with more than 10 hairs **37**
31. SIPH swollen or cylindrical, smooth and slightly constricted subapically, and with a smooth rounded swollen flange, giving it a knob-like apex. ANT III with 0–7 rhinaria, 0 on IV **32**
 – SIPH conical or tapering with a sharply defined subapical annular incision, and flange not swollen. ANT III with or without rhinaria, but if with then there are also some on IV **34**

32. Metanotum and ABD TERG 1–6 completely covered by a solid dark shield. SIPH dusky/dark, only slightly swollen, with maximal width of swelling on basal half (Figure 49f). ANT PT/BASE 3.4–5.2
Cachryphora canadensis
 – No solid dark dorsal shield. SIPH distinctly swollen, with maximal width of swelling at midlength or on distal half (e.g., Figure 49e). ANT PT/BASE 2.2–3.9 **33**
33. R IV+V 1.05–1.25× HT II. ANT PT/BASE 2.2–3.2. Prosternum with spinulose imbrication
Cachryphora imbricaria
 – R IV+V 1.25–1.45× HT II. ANT PT/BASE 2.9–3.9. Prosternum not spinulose
Cachryphora serotinae
34. ANT with 1–15 rhinaria on III and 4–11 on IV **35**
 – ANT III and IV without rhinaria **36**
35. Cauda shorter than its basal width. Longest hairs on ANT III 27–50µm, c.2× BD III. Dorsum usually with a solid black shield
Acuticauda solidaginifoliae
 – Cauda longer than its basal width. Longest hairs on ANT III 8–16µm, shorter than BD III. Dorsum without a solid black shield
Acuticauda asterensis
36. Dorsal abdomen with an extensive solid black shield. ANT III 0.31–0.47mm, 2.4–3.4× HT II. R IV+V 0.17–0.24mm. SIPH dark, imbricated, 1.7–3.4× cauda
Brachycaudus cardui
 – Dorsal abdomen without a black shield. ANT III 0.07–0.25mm, 0.9–2.2× HT II. R IV+V 0.10–0.15mm. SIPH pale, smooth, 0.8–2.0× cauda
Brachycaudus helichrysi
37. Dorsum with an extensive black sclerotic shield **38**
 – Dorsum without an extensive black shield **39**
38. ANT hairs very long and fine, those on III more than 2× BD III. Cauda with c.15–17 hairs
Aphis tsujii
 – Longest hairs on ANT III 0.3–0.8× BD III. Cauda with 4–9 hairs
Aphis craccivora
39. Well-developed MTu consistently present on ABD TERG 2–5 as well as 1 and 7 **40**
 – MTu only consistently present on ABD TERG 1 and 7 **41**
40. ANT 5-segmented. Dorsal abdomen without any dark markings. Longest hairs on ANT III 0.4–0.9× BD III
*Aphis solidagophila**
 – ANT 6-segmented. ABD TERG 7 and 8 (at least) with black cross-bands. Longest hairs on ANT III (presumably) more than 0.8× BD III
*Aphis solidaginis**
41. SIPH black, 0.24–0.40× BL, c.2× the much paler cauda. Head, ANT I, II and basal part of III very pale, contrasting with dark rest of ANT. Hairs on ANT III minute, the longest less than 0.4× BD III
Aphis coreopsidis
 – Without that combination of characters go to key to polyphagous aphids, p. 1020, starting at couplet 25

Solidaster (Solidago*×*Aster hybrid)**Compositae***Uroleucon nigrotuberculatum****Soliva****S. anthemifolia***Compositae***Pemphigus* sp. (as *betae*);
Rhopalosiphum rufiabdominale

Use key to polyphagous aphids, p. 1020.

Sollya

S. fusiformis

Sonchus (incl. *Embergonia*)

S. acaulis

S. arvensis

S. asper (incl. *glaucensans*)

S. brachyotus

S. caudatus (?)

S. congestus

S. cornutus

S. exauriculatus

S. glaucescens

S. hydrophyllus

S. lachnocephalus

S. lactuoides

S. leptocephalus

S. luxurians

S. macrophyllus see *Lactuca*

S. maritimus

S. megalocarpus

S. nanus

S. oleraceus

Pittosporaceae

Myzus persicae

Compositae

Macrosiphum euphorbiae

Acyrtosiphon scariolae;

Aphis craccivora, *fabae*, [*jacobaeae*], *scorzonerarum*,
spiraecola; *Brachycaudus cardui*, *helichrysi*;

[*Capitophorus elaeagni*]; *Dysaphis radicivorans*;

Hyperomyzus carduellinus, *lactucae*, *pallidus*;

Macrosiphum euphorbiae; *Myzus persicae*;

Pemphigus bursarius, *matsumurai*;

Trama caudata, [*nigrarta*];

Uroleucon [*carthami*], *cichorii*, *formosanum*, *picridis*,
sonchi, *U. (Uromelan)* sp. (as *solidaginis* – perhaps
compositae)

[*Acyrtosiphon vasiljevi*];

Aphis craccivora, *fabae*, *gossypii*, [*sonchi*], [*A. (Protaphis)*
sp. (Bozhko, 1976a: 80)]; *Aulacorthum solani*;

Hyperomyzus carduellinus, *lactucae*, *pallidus*;

Macrosiphum euphorbiae; *Myzus ornatus*, *persicae*;

Pemphigus bursarius;

Trama caudata, [*mordvilkoii* Börner 1940], *troglydytes*;

Uroleucon ambrosiae, [*bicolor*], *cichorii*, *formosanum*,
sonchellum, *sonchi*, [*tussilaginis*]

Brachycaudus cardui; *Hyperomyzus carduellinus*, *lactucae*;

Myzus ornatus; *Uroleucon sonchi*

Uroleucon sonchi

Hyperomyzus lactucae; *Uroleucon sonchi*

Aphis kenanae

Aphis gossypii

Hyperomyzus lactucae; *Uroleucon sonchi*

Hyperomyzus lactucae

Aphis gossypii; *Macrosiphum euphorbiae*

Uroleucon formosanum

Aphis gossypii

Aulacorthum solani; *Hyperomyzus carduellinus*;

Macrosiphum euphorbiae; *Uroleucon compositae*, *sonchi*

Aphis terricola; *Nasonovia ribisnigri*

Hyperomyzus carduellinus, *lactucae*

Macrosiphum euphorbiae

Acyrtosiphon ghanii, *lactucae*, [*pisum*], *rubi*;

Aphis coreopsidis, *craccivora*, *gossypii*, *kenanae*,

[*molluginis*], *pseudocardui*, *spiraecola*, *terricola*, *Aphis*
sp. (Millar, 1994);

Aulacorthum solani; *Brachycaudus helichrysi*;

	[<i>Brevicoryne brassicae</i>];
	<i>Hyperomyzus carduellinus</i> , <i>lactucae</i> , <i>pallidus</i> ;
	<i>Macrosiphum euphorbiae</i> ; <i>Myzus ornatus</i> , <i>persicae</i> ;
	<i>Nasonovia ribisnigri</i> ; <i>Neomyzus circumflexus</i> ;
	<i>Pemphigus bursarius</i> ; <i>Toxoptera aurantii</i> ;
	<i>Trama caudata</i> , <i>maritima</i> , <i>troglydites</i> ;
	<i>Uroleucon ambrosiae</i> , [<i>carthami</i>], <i>cichorii</i> , <i>compositae</i> ,
	<i>formosanum</i> , <i>pseudambrosiae</i> , <i>sonchellum</i> , <i>sonchi</i>
	[<i>Utamphorophora commelinensis</i>]
<i>S. palmensis</i>	<i>Uroleucon sonchi</i>
<i>S. palustris</i>	<i>Aphis craccivora</i> ; <i>Hyperomyzus lactucae</i> , <i>pallidus</i>
<i>S. radicans</i>	<i>Hyperomyzus lactucae</i> ; <i>Uroleucon sonchi</i>
<i>S. squarrosus</i>	<i>Aphis gossypii</i> ; <i>Hyperomyzus lactucae</i> ;
	<i>Macrosiphum euphorbiae</i> ; <i>Myzus ornatus</i> ;
	<i>Uroleucon picridis</i>
<i>S. tenerrimus</i>	<i>Hyperomyzus lactucae</i> ; <i>Uroleucon sonchi</i>
<i>S. tuberifer</i>	<i>Hyperomyzus lactucae</i> ; <i>Uroleucon sonchi</i>
<i>S. wilmsii</i>	<i>Uroleucon sonchi</i>
<i>Sonchus</i> spp.	<i>Acyrtosiphon ilka</i> , <i>rubi</i> ; [<i>Aphis exsors</i>];
	<i>Aulacorthum magnoliae</i> ; [<i>Capitophorus carduinus</i>];
	[<i>Chaitomyzus rhododendri</i>]; [<i>Cryptosiphum artemisiae</i>];
	[<i>Forda formicaria</i>]; [<i>Hayhurstia atriplicis</i>];
	<i>Myzus ascalonicus</i> ; [<i>Nasonovia compositellae</i>];
	<i>Neomyzus zhangjianjiensis</i> ; [<i>Sitobion rosaeiformis</i>];
	<i>Smynthuroides betae</i> ; <i>Uroleucon aeneum</i> , [<i>jaceae</i>]

Key to apterae on *Sonchus*:-

1. HT II very elongate, more than 0.5× hind tibia 2
 – HT II of normal length, similar to fore and mid tarsi 4
2. Eyes with 3 facets. SIPH absent *Trama troglodytes*
 – Eyes with many facets. SIPH present as pores on shallow cones 3
3. ANT III 1.80–2.35× (usually 2.0–2.2×) ANT IV, and 0.90–1.35× (usually 1.0–1.25×) ANT V *Trama caudata*
 – ANT III 2.1–2.8× (usually 2.4–2.7×) ANT IV, and 1.35–1.80× (usually 1.5–1.7×) ANT V *Trama maritima*
4. SIPH with a subapical zone of polygonal reticulation occupying 0.12–0.43 of total length 5
 – SIPH (if present) without any subapical polygonal reticulation, or with striae containing a few closed cells but occupying less than 0.1 of total length 14
5. SIPH pale, sometimes dusky towards apices, with reticulation of large polygonal cells on distal 0.12–0.20 of length *Macrosiphum euphorbiae*
 – SIPH black, with reticulation of numerous rather small polygonal cells on distal 0.16–0.43 of length 6
6. Cauda almost as dark as SIPH 7
 – Cauda much paler than SIPH 8

HOST LISTS AND KEYS

7. ANT III with 48–86 rhinaria extending over 0.85–0.92 of length of segment. ANT III 1.8–2.5× ANT V. Cauda with 10–22 hairs. ABD TERG 2–4 without marginal tubercles (MTu) *Uroleucon compositae*
- ANT III with 20–45 rhinaria on basal 0.35–0.52 of length. ANT III 1.4–1.9× ANT V. Cauda with 20–34 hairs. ABD TERG 2–4 regularly with MTu (90% with 5 or more), often larger than hair bases *Uroleucon aeneum*
8. ANT III 1.5–2.0× longer than ANT IV+V together **9**
- ANT III less than 1.2× ANT IV+V together **10**
9. ANT III with 96–135 strongly protruberant rhinaria. Cauda 1.3–1.9× ANT V. ANT PT/BASE 4.8–6.3 *Uroleucon formosanum*
- ANT III with 49–93 rhinaria, which do not protrude strongly. Cauda 0.85–1.3× ANT V. ANT PT/BASE 6.0–8.4 *Uroleucon sonchellum*
10. R IV+V 0.73–0.88× HT II. Dorsal hairs on ABD TERG 1–5 usually not on dark scleroites, or on very small scleroites. Coxae dark *Uroleucon sonchi*
- R IV+V 0.9–1.84× HT II. Dorsal hairs on ABD TERG 1–5 all or mostly placed on dark scleroites. Coxae pale or dark **11**
11. Crescent-shaped black antesiphuncular sclerites present. ANT III with 25–97 secondary rhinaria occupying at least 0.8 of segment **12**
- Antesiphuncular sclerites absent or indistinct. ANT III with 8–46 secondary rhinaria on basal 0.5–0.7 of segment **13**
12. R IV+V 1.45–1.84× HT II *Uroleucon picridis*
- R IV+V 1.17–1.33× HT II *Uroleucon cichorii*
13. HT II rather long and thin, about 6× its maximum thickness, and 0.9–1.1× R IV+V *Uroleucon pseudambrosiae*
- HT II shorter, less than 5× its maximum thickness and 0.7–0.95× R IV+V *Uroleucon ambrosiae*
14. SIPH markedly clavate. ANT III with 4–40 rhinaria **15**
- SIPH (if present) cylindrical, tapering or if clavate then ANT III with 0–3 (–9) rhinaria **17**
15. Hairs on ABD TERG 8 are 8–19µm long, and on ANT tubercles 6–11µm. Secondary rhinaria distributed ANT III 11–29, IV (0)–1–16, V 0 (–9). ANT PT/BASE 4.3–5.6. ANT PT 1.6–2.3× cauda *Hyperomyzus carduellinus*
- Hairs on ABD TERG 8 are 30–50µm long, and on ANT tubercles 18–30µm. Secondary rhinaria distributed ANT III 4–40, IV 0–2, V 0. ANT PT/BASE 4.8–7.9. ANT PT 2.0–3.0× cauda **16**
16. SIPH 3–5× longer than maximum width of swollen part, which is 1.6–2.4× minimum width on basal part. R IV+V 0.9–1.12× HT II (mostly 0.95–1.1×). (Al. with a compact black solid trapezoid dorsal abdominal patch, with hardly any perforations) *Hyperomyzus pallidus*
- SIPH 4–7× longer than maximum width of swollen part, which is 1.3–2.0× minimum width on basal part. R IV+V 0.8–1.07× HT II (mostly 0.9–1.0). (Al. with a very irregular and variably shaped dorsal abdominal patch, interrupted by extensive perforations) *Hyperomyzus lactucae*
17. Head spiculose with well-developed ANT tubercles, their inner faces scabrous and parallel or apically convergent **18**
- Head without spicules, and ANT tubercles if well developed then with inner faces divergent **20**
18. Abdomen with a dark dorsal abdominal patch. SIPH tapering/cylindrical **19**
- Without that combination of characters go to key to polyphagous aphids, p. 1020, starting at couplet 5

19. ANT III with 6–9 rhinaria (al. with 22–23 on III and 7–9 on IV) *Neomyzus zhangjianjiensis*
 – ANT III with 0–3 rhinaria (al. with 14–28 on III and 2–8 on IV) *Neomyzus circumflexus*
20. Head with well-developed ANT tubercles, their inner faces smooth and divergent. SIPH long, tubular and pale, or only dark towards apices **21**
 – Head with ANT tubercles undeveloped or weakly developed. If long SIPH are present then they are entirely dark **25**
21. Thoracic spiracles enlarged, much larger than abdominal spiracles. ANT PT/BASE 7.0–11.4, usually more than 8.0. Hairs on ANT III 0.7–1.1× BD III. Dorsum usually with paired dark intersegmental markings *Nasonovia ribisnigri*
 – Thoracic spiracles similar in size to abdominal ones. ANT PT/BASE less than 7.5. Hairs on ANT III less than 0.7× BD III. Dorsum without any dark markings **22**
22. R IV+V with 16–25 accessory hairs *Acyrthosiphon lactucae/scariolae* group
 – R IV+V with 6–11 accessory hairs **23**
23. ANT III with 4–11 rhinaria in a row extending over 0.33–0.9 of length. ANT PT/BASE 2.5–3.5 *Acyrthosiphon ghanii*
 – ANT III with 1–5 rhinaria clustered near base. ANT PT/BASE 3.0–6.0 **24**
24. Dorsal cuticle papillated or wrinkled. Cauda dusky, with 7–10 hairs *Acyrthosiphon rubi*
 – Dorsal cuticle smooth. Cauda pale, with 5–8 hairs *Acyrthosiphon ilka*
25. ANT PT/BASE 0.7–1.4. R IV+V longer than the very short dark tubular SIPH **26**
 – ANT PT/BASE either less than 0.5 or more than 1.5. R IV+V shorter than SIPH (or SIPH absent) **28**
26. Cauda with 7–10 hairs *Aphis scorzonerae*
 – Cauda with 12–25 hairs **27**
27. ANT PT 0.75–1.05× SIPH. ANT PT/BASE 0.8–1.0 *Aphis terricola* group (incl. *kenanae*)
 – ANT PT 1.06–1.4× SIPH. ANT PT/BASE 1.0–1.4 *Aphis pseudocardui*
28. Cauda helmet-shaped, about as long as its basal width, with 4–8 hairs **29**
 – Cauda either not developed at all or much longer than its basal width, tongue- or finger-shaped, with 4–26 hairs **31**
29. Head and ABD TERG 8 or 7–8 with spinal tubercles (STu), and large MTu also present on most segments. SIPH without a subapical annular incision. Spiracular apertures reniform *Dysaphis radicivorans**
 – STu absent, and MTu of only sporadic occurrence. SIPH with a subapical annular incision. Spiracular apertures large and rounded **30**
30. Dorsal abdomen with an extensive solid black shield. ANT III 0.31–0.47 mm, 2.4–3.4× HT II. R IV+V 0.17–0.24 mm. SIPH dark, imbricated, 1.7–3.4× cauda *Brachycaudus cardui*
 – Dorsal abdomen without a black shield. ANT III 0.07–0.25 mm, 0.9–2.2× HT II. R IV+V 0.10–0.15 mm. SIPH pale, smooth, 0.8–2.0× cauda *Brachycaudus helichrysi*
31. ANT III–VI dark, contrasting with pale ANT I–II and head. SIPH long, thin and black, 0.24–0.4× BL, contrasting with pale cauda *Aphis coreopsidis*
 – Without that combination of characters go to key to polyphagous aphids, p. 1020

HOST LISTS AND KEYS

Sophia Adams nec L. see *Descurainia*

Sophia L. see *Pachira*

Sophora

S. moorcroftiana

Myzus persicae

See also Blackman and Eastop (1994).

Leguminosae

Sorbaria

S. sorbifolia (incl. var. *stellipila*)

Chusiphuncula sorbarisucta; *Macrosiphum sorbi*;

S. tomentosa

Myzus [*formosanus*], *sorbi*

Rosaceae

Key to apterae on *Sorbaria*:-

(All 3 spp. have SIPH more than 2.7× cauda, which has 5–8 hairs.)

1. SIPH clavate. Head smooth *Chusiphuncula sorbarisucta*
 - SIPH tapering/cylindrical. Head with spicules at least on ventral surface **2**
2. SIPH dark, 0.25–0.35× BL, with moderate imbrication and a subapical zone of polygonal reticulation. *Macrosiphum sorbi*
 - SIPH pale, 0.21–0.23× BL, with coarse imbrication and no subapical reticulation *Myzus sorbi*

Sorghastrum

S. nutans

Hysteroneura setariae

Sorghastrum sp.

Sipha flava

Gramineae

Use key to apterae of grass-feeding aphids under *Digitaria*.

Sorghum

S. arundinaceum see *bicolor*

S. bicolor (incl. vars *arundinaceum*,
drummondii, *saccharatum*)

Aphis gossypii;
[*Chaitophorus populialbae* (as *Myzocallis saccharinus*)?];
Hysteroneura setariae; *Rhopalosiphum maidis*;
Melanaphis sorghi;
Sitobion avenae, *leelamaniae*, [*Sitobion* sp. (Millar, 1994)]
Melanaphis sorghi; *Rhopalosiphum maidis*, *padi*;
[*Sitobion* sp. (Millar, 1994)]

S. caffrorum

S. caudatum

Aphis gossypii

S. cernuum

Rhopalosiphum maidis

S. dochna

Rhopalosiphum maidis

S. dora

Rhopalosiphum maidis

S. durra=*vulgare*

S. fulvum

Rhopalosiphum maidis

S. guineense

Melanaphis sorghi

S. halepense

Anoecia corni, *mirae*; *Melanaphis sorghi*, *pyraria*;

Paraclotus cimiciformis;

Rhopalosiphum maidis, *rufiabdominale*;

Schizaphis graminum; *Sipha flava*, *maydis*; *Sitobion avenae*;

Tetraneura africana, *fusiformis*, *ulmi*

<i>S. kavirondo</i>	<i>Melanaphis sorghi</i> ; <i>Rhopalosiphum maidis</i>
<i>S. nervosum</i>	<i>Sitobion miscanthi</i>
<i>S. roxburgii</i>	<i>Melanaphis sorghi</i> ; <i>Rhopalosiphum maidis</i>
<i>S. saccharatum</i> see <i>vulgare</i>	
<i>S. sudanense</i>	<i>Rhopalosiphum maidis</i>
<i>S. verticilliflorum</i>	<i>Melanaphis sorghi</i> ; <i>Rhopalosiphum maidis</i>
<i>S. vulgare</i> (incl. var. <i>japonicus</i>)	<i>Anoecia corni</i> ; <i>Aphis fabae</i> , <i>gossypii</i> ; <i>Diuraphis noxia</i> ; <i>Forda hirsuta</i> , <i>orientalis</i> ; <i>Geoica lucifuga</i> ; <i>Hysteroneura setariae</i> ; <i>Melanaphis sorghi</i> ; [<i>Prociphilus bumeliae</i>]; <i>Pseudaphis sijui</i> ; <i>Rhopalosiphum maidis</i> , <i>padi</i> ; <i>Schizaphis graminum</i> ; <i>Sipha flava</i> , <i>maydis</i> ; <i>Sitobion africanum</i> , <i>avenae</i> , <i>leelamaniae</i> , <i>miscanthi</i> ; <i>Tetraneura capitata</i> , <i>chui</i> , <i>fusiformis</i> , <i>javensis</i> , <i>nigriabdominalis</i> , <i>nigriabdominalis</i> ssp. <i>shanxiensis</i> , <i>triangula</i>

Use key to apterae of grass-feeding aphids under *Digitaria*.

Sparaxis

- S. tricolor*
***Sparaxis* spp.** (and hybrids)

Iridaceae

- Aphis gossypii*; *Macrosiphum euphorbiae*
Myzus persicae; *Neomyzus circumflexus*

Use key to polyphagous aphids, p. 1020.

Sparganium

- Sp. erectum*
Sp. ramosum
Sp. simplex
***Sparganium* sp.**

Typhaceae

- Schizaphis scirpi*
Rhopalosiphum nymphaeae; *Schizaphis scirpi*
Rhopalosiphum nymphaeae
Rhopalosiphum enigmae

Key to apterae on *Sparganium*:-

- ANT and dorsal body with very long, fine hairs, up to 3× ANT BD III. Dorsal cuticle without spiculose ornamentation *Schizaphis scirpi*
 - ANT and dorsal body with shorter hairs. Dorsal cuticle with a pattern of spicules arranged in polygons, each polygon enclosing one or more additional spicules **2**
- SIPH clavate. Longest hairs on ANT III less than 0.8× BD III *Rhopalosiphum nymphaeae*
 - SIPH not clavate. Longest hairs on ANT III 0.8–2.0× BD III *Rhopalosiphum enigmae*

Sparmannia

- Sp. africana*

Tiliaceae

- Uroleucon compositae*

Spartina

- Sp. cynosuroides*
Sp. juncea
Sp. maritima
Sp. stricta see *maritima*
Sp. ×townsendii

Gramineae

- Anoecia corni*
Prociphilus erigeronensis
Sipha littoralis

Sipha littoralis

Use key to apterae of grass-feeding aphids under *Digitaria*.

HOST LISTS AND KEYS

Spartium

Sp. junceum

Sp. scoparium see *Cytisus*

Key to apterae on *Spartium*:–

1. Body spindle-shaped, pale. ANT longer than BL. SIPH pale, thin and cylindrical on distal half. Cauda elongate finger-shaped, pale 2
 - Body oval, often with dark dorsal markings. ANT shorter than BL. SIPH dark, tapering from base to apex. Cauda tongue-shaped, pale or dark 3
2. SIPH 0.42–0.50× BL and 2.5–3.5× cauda *Acyrtosiphon gossypii*
 - SIPH 0.23–0.38× BL and 1.2–1.9× cauda *Acyrtosiphon pisum*
3. Cauda with 11–25 hairs. Dorsal abdomen usually with a few small dark spots anterior to SIPH *Aphis fabae*
 - Cauda with 4–13 hairs. Dorsal abdomen usually with extensive dark sclerotisation 4
4. SIPH 0.5–0.8× cauda. Hairs on ANT III 0.8–1.3× BD III *Aphis genistae*
 - SIPH 1.1–2.2× cauda. Hairs on ANT III 0.05–0.75× BD III 5
5. R IV+V 0.88–1.16× HT II (mostly 0.9–1.05×). Anterior half of genital plate with 2 (–3) hairs *Aphis craccivora*
 - R IV+V 0.97–1.3× HT II (mostly 1.06–1.2×). Anterior half of genital plate with 2–8 hairs (mode 4, mean 5.2) *Aphis cytisorum*

Spartocytisus see *Cytisus*

Spathodea see Blackman and Eastop (1994)

Specularia see *Legousia*

Spergula

Sp. arvensis

Caryophyllaceae

Aphis gossypii, *nasturtii*, *sambuci*;
Neomyzus circumflexus; *Sitobion avenae*

See key under *Spergularia*.

Spergularia

Sp. diandra

Sp. marina

Sp. rubra

Sp. rupicola

Spergularia spp.

Caryophyllaceae

Myzus persicae

[*Myzus* sp. (Leonard, 1968: 357)]

Macrosiphum euphorbiae; *Myzus certus*, *persicae*

Myzus persicae

Aphis sambuci; *Sitobion avenae*

Key to aphids on *Spergula* and *Spergularia*:–

1. Head without spicules 2
 - Head densely spiculose 6

2. SIPH with a subapical zone of polygonal reticulation. ABD TERG 1 and 7 without marginal tubercles (MTu) 3
 - SIPH without subapical reticulation. ABD TERG 1 and 7 with MTu 4
3. SIPH dark, 1.1–1.4× cauda, with reticulation on distal 0.19–0.35 of length. ANT hairs maximally 0.3–0.5× BD III *Sitobion avenae*
 - SIPH pale, 1.7–2.2× cauda, with reticulation on distal 0.13–0.2 of length. ANT hairs maximally 0.6–1.0× BD III *Macrosiphum euphorbiae*
4. SIPH black, 2.1–3.5× cauda which is short and bears 10–20 hairs. ABD TERG 2–4 consistently with well-developed flat MTu *Aphis sambuci*
 - SIPH pale or dark, 0.9–2.2× cauda which is much longer than its basal width and bears 4–11 hairs. ABD TERG 2–4 only sporadically with small MTu 5
5. SIPH uniformly dark. Hairs on hind femur all shorter than diameter of femur at its base *Aphis gossypii*
 - SIPH usually rather pale, darker at apex. Hairs on hind femur mainly longer, some of them about as long as, or longer than, diameter of femur at its base *Aphis nasturtii*
6. Dorsal abdomen with a large roughly horseshoe-shaped patch, and dark cross-bars on thorax. SIPH not clavate *Neomyzus circumflexus*
 - Dorsum without any distinctive dark markings. SIPH at least slightly clavate 7
7. R IV+V in most specimens with only one pair of lateral accessory hairs (plus 0–3 ventral accessory hairs). Value of function cauda/(ANT III× PT) in range 0.80–1.52, but rarely more than 1.25 except in small specimens (those with ANT III less than 0.32 mm) *Myzus persicae*
 - R IV+V in most specimens with two pairs of lateral accessory hairs. Value of function cauda/(ANT III× PT) in range 1.2–2.7 (rarely less than 1.25) *Myzus certus*

Spermacoce (incl. *Borreria*)***Spermacoce* spp.****Rubiaceae**

Aphis gossypii, *spiraecola*; *Macrosiphum euphorbiae*;
Myzus persicae; *Uroleucon compositae*

[One or more of the above polyphagous aphid species have been recorded from each of the following *Spermacoce* spp.: *chaetocephala*, *eupatorioides*, *hispidula*, *laevis*, *octodon*, *ocymoides*, *princeae*, *pusilla*, *ruelliae*, *scabra*, *senensis*, *stachydea*, *verticillata*.]

Use the key to polyphagous aphids, p. 1020.

Spermadictyon* (incl. *Hamiltonia*)**Sp. squarretus******Sp. suaeveolens*****Rubiaceae**

[*Capitophorus hippophaes*]
Aphis gossypii, *spiraecola*

Use key to polyphagous aphids, p. 1020.

Sphaeralcea***Sphaeralcea* sp.****Malvaceae**

Aphis craccivora; *Uroleucon ambrosiae*

Use key to polyphagous aphids, p. 1020.

Sphaeranthus***S. flexuosus******S. suaeveolens*****Compositae**

Aphis gossypii
Myzus ornatus

Use key to polyphagous aphids, p. 1020.

HOST LISTS AND KEYS

Sphaerophysa

S. salsula

Leguminosae

Aphis craccivora (? – as *laburni*)

Sphagnum

Sphagnum sp.

Sphagnaceae

Myzodium modestum

(or use key to aphids on mosses under *Polytrichum*)

Sphenogyne* see *Ursinia

Sphenomeris

S. chinensis

Dennstaedtiaceae

Micromyzella filicis

Spilanthus

Sp. acmella

Sp. acuminata

Sp. iabadicensis

Sp. urens

Compositae

Aphis gossypii, *spiraecola*; *Brachycaudus helichrysi*;

Myzus persicae; *Uroleucon compositae*

Myzus persicae

Neomyzus circumflexus

Aphis coreopsidis, *gossypii*

Key to apterae on *Spilanthus*:–

- ANT III-VI dark, contrasting with pale ANT I-II and head, which has ANT tubercles weakly developed. SIPH long, thin and black, 0.24–0.4× BL, contrasting with pale cauda, and without polygonal reticulation *Aphis coreopsidis*
- Without the above combination of characters go to key to polyphagous aphids, p. 1020

Spinacia

Sp. oleracea

Chenopodiaceae

Aphis craccivora, *fabae*, *gossypii*, *spiraecola*;

Aulacorthum solani; *Hayhurstia atriplicis*;

[*Lipaphis erysimi*]; *Macrosiphum euphorbiae*;

Myzus ornatus, *persicae*; *Pemphigus* sp(p);

[*Sitobion miscanthi*]

Use key to apterae on *Beta*.

Spiraea

Sp. alba

Sp. aquilegifolia (= *thalictrifolia*)

Sp. × *arguta*

Sp. aruncus

Sp. baldshuanica

Sp. bella

Sp. betulifolia

Sp. blumei

Sp. × *bumalda*

Rosaceae

Acyrtosiphon ignotum; *Aphis spiraeicola*;

Brachycaudus spiraeae

Aphis spiraeophaga

Acyrtosiphon ignotum; *Aphis spiraeicola*;

Brachycaudus spiraeae; *Illinoia spiraeae*

Aphis spiraeicola; *Macrosiphum euphorbiae*

Tricaudatus polygoni

Acyrtosiphon ignotum; *Aphis fabae*, *spiraecola*;

Myzus persicae; *Tricaudatus polygoni*

Aphis spiraeophaga, *spiraephila*

Aphis spiraeicola; *Myzus persicae*

Acyrtosiphon ignotum; *Aphis fabae*, *spiraecola*;

Illinoia spiraeae; *Macrosiphum euphorbiae*

<i>Sp. canescens</i>	<i>Acyrtosiphon ignotum</i> ; <i>Aphis spiraeaphaga</i> ; [<i>Cavariella himachali</i>]
<i>Sp. cantoniensis</i>	<i>Aphis gossypii</i> , <i>pomi</i> , <i>spiraecola</i> , <i>spiraephaga</i> ; <i>Parachaitophorus spiraeae</i>
<i>Sp. chamaedryfolia</i>	<i>Aphis fabae</i> , <i>grandis</i> , <i>pomi</i> , <i>spiraecola</i> ; <i>Aulacorthum magnoliae</i> ; <i>Brachycaudus spiraeae</i>
<i>Sp. × cinerea</i>	<i>Acyrtosiphon ignotum</i>
<i>Sp. collosa</i>	<i>Aphis spiraeicola</i> ; <i>Myzus ornatus</i>
<i>Sp. corymbosa</i>	<i>Aphis spiraeicola</i> ; <i>Brachycaudus helichrysi</i> ; [<i>Schoutedenia ralumensis</i>]; <i>Sitobion rosaeiformis</i> ; <i>Tricaudatus polygoni</i>
<i>Sp. crenata</i>	<i>Aphis pomi</i> , <i>spiraecola</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i>
<i>Sp. douglasii</i>	<i>Acyrtosiphon ignotum</i> ; <i>Aphis fabae</i> , <i>pomi</i> ; <i>Aspidophorodon longicauda</i> ; <i>Illinoia spiraeae</i> ; <i>Macrosiphum euphorbiae</i> , <i>willamettense</i> ; aphid gall – Wahlgren, 1956: 51 <i>Aphis spiraeophila</i>
<i>Sp. elegans</i>	
<i>Sp. filipendula</i> see <i>Filipendula</i> <i>vulgaris</i>	
<i>Sp. florepleno</i> see <i>prunifolia</i>	
<i>Sp. gemmata</i>	<i>Aphis spiraeicola</i> ; <i>Myzus persicae</i>
<i>Sp. hypericifolia</i>	<i>Acyrtosiphon ignotum</i> , <i>soldatovi</i> ssp. <i>tadzhikistanica</i> ; <i>Aphis spiraeicola</i> , <i>spiraephaga</i> , <i>ucrainensis</i> ; <i>Brachycaudus spiraeae</i> ; <i>Tricaudatus polygoni</i>
<i>Sp. japonica</i> (incl. vars <i>acuminata</i> , <i>alpina</i>)	<i>Aphis fabae</i> , <i>spiraecola</i> , <i>spiraephaga</i> ; <i>Illinoia spiraeae</i> ; <i>Macrosiphum</i> sp. (Canada, BMNH colln); <i>Myzus persicae</i> ; <i>Parachaitophorus spiraeae</i>
<i>Sp. lanceolata</i>	<i>Aphis neospiraeae</i>
<i>Sp. lasiocarpa</i>	<i>Aphis ucrainensis</i>
<i>Sp. latifolia</i>	<i>Acyrtosiphon ignotum</i> , <i>pseudodirhodum</i> ; <i>Aphis spiraeicola</i> , <i>spiraephila</i> ; <i>Illinoia spiraeicola</i>
<i>Sp. lindleyana</i>	<i>Myzus</i> sp. (primary host form of <i>M. ornatus</i> ? – see text)
<i>Sp. longigemmis</i>	<i>Aphis spiraeicola</i> ; <i>Myzus persicae</i>
<i>Sp. media</i>	<i>Acyrtosiphon ignotum</i> ; <i>Aphis grata</i> , <i>mutini</i> , <i>spiraephaga</i> , <i>ucrainensis</i>
<i>Sp. menziesii</i>	<i>Aspidophorodon longicauda</i> ; <i>Brachycaudus spiraeae</i> ; <i>Macrosiphum euphorbiae</i>
<i>Sp. nipponica</i> (incl. <i>tosaensis</i>)	<i>Acyrtosiphon ignotum</i> ; <i>Aphis spiraeicola</i> , <i>spiraephaga</i> ; <i>Myzus persicae</i>
<i>Sp. obovata</i>	<i>Acyrtosiphon ignotum</i>
<i>Sp. oleracea</i>	<i>Myzus persicae</i>
<i>Sp. opulifolia</i>	<i>Aphis pomi</i> , <i>spiraecola</i> ; aphid gall – Wahlgren, 1956: 51
<i>Sp. plena</i> see <i>prunifolia</i>	
<i>Sp. prunifolia</i> (incl. <i>florepleno</i> , <i>plena</i>)	<i>Acyrtosiphon ignotum</i> ; <i>Aphis spiraeicola</i> , <i>spiraephaga</i>
<i>Sp. × pseudosalicifolia</i>	<i>Brachycaudus spiraeae</i>

HOST LISTS AND KEYS

<i>Sp. salicifolia</i>	<i>Acyrthosiphon ignotum, soldatovi</i> ; <i>Aphis fabae, neospiraeae, pomi, spiraeicola, spiraeophaga,</i> <i>ucrainensis, ulmariae; Brachycaudus spiraeae;</i> <i>Illinoia spiraeicola; Macrosiphum cholodkovskiy, rosae;</i> <i>Parachaitophorus sikhotealinicus</i>
<i>Sp. ×semiflorens</i>	<i>Acyrthosiphon ignotum</i>
<i>Sp. sericea</i>	<i>Acyrthosiphon ignotum</i>
<i>Sp. sorbifolia</i>	<i>Myzus ornatus</i>
<i>Sp. splendens</i>	<i>Aphis spiraeicola</i>
<i>Sp. steveni</i>	<i>Aphis grata, kamtchatica</i>
<i>Sp. thalictrifolia</i> see <i>aquilegifolia</i>	
<i>Sp. thunbergii</i>	<i>Aphis [kogomecola], spiraeicola, spiraeophaga;</i> <i>Illinoia spiraeicola; [aphid gall – Wahlgren, 1956: 51]</i> <i>Aphis spiraeicola</i> <i>Aphis spiraeicola</i>
<i>Sp. tinus</i>	
<i>Sp. tomentosa</i>	
<i>Sp. tosaensis</i> (see <i>nipponica</i>)	
<i>Sp. trichocarpa</i>	<i>Acyrthosiphon ignotum; Aphis spiraeicola, spiraeophaga;</i> <i>Myzus persicae</i> <i>Aphis spiraeophaga</i>
<i>Sp. trilobata</i>	
<i>Sp. ulmaria</i> see <i>Filipendula ulmaria</i>	
<i>Sp. ulmifolia</i>	<i>Aphis spiraeicola; Brachycaudus spiraeae; Myzus persicae</i>
<i>Sp. vanhouttei</i>	<i>Aphis spiraeophaga, ucrainensis; Illinoia spiraeae</i>
<i>Sp. vestita</i>	<i>Macrosiphum cholodkovskiy</i>
<i>Sp. wilsoni</i>	<i>Aphis spiraeophaga</i>
<i>Spiraea</i> spp.	<i>Acyrthosiphon rubi; [Clethrobium dryobius];</i> <i>Illinoia macgillivrayae; Macrosiphum pachysiphon;</i> <i>[Metopolophium sonchifoliae]; Myzus cymbalariae;</i> <i>[Myzackaia verbasci]; [Neobetulaphis immaculata];</i> <i>Neomyzus circumflexus; [Semiaphis heraclei];</i> <i>[Toxoptera citricidus]; [Tuberaphis indica]</i>

Key to apterae on *Spiraea*:-

1. Dorsal body hairs very long and thick, arising from tuberculate bases on dark scleroites. Eyes usually reduced to 3 facets. SIPH as dark, very broad-based cones. Cauda with 2 long hairs 2
- Dorsal body hairs shorter or fine if long, not arising from tuberculate bases on dark scleroites. Eyes large, multifaceted. SIPH tubular, pale or dark. Cauda with 4 or more hairs 3
2. ANT III with 1–4 sec. rhin. and IV with 1, placed near apices of segments. RIV+V a little shorter than HT II Parachaitophorus sikhotealinicus*
- ANT without sec. rhin. R IV+V a little longer than HT II Parachaitophorus spiraeae
3. ABD TERG 1 and 7 with marginal tubercles (MTu) 4
- ABD TERG 1 and 7 without MTu 16
4. SIPH short, only 0.4–0.5× cauda, which bears 13–16 hairs. ANT PT/BASE 1.3–1.5 Aphis spiraeophila
- SIPH 0.6–2.5× cauda. ANT PT/BASE 1.0–2.9, but if less than 1.7 then cauda bears less than 13 hairs 5

5. Abdomen with either a dark dorsal shield or at least some scattered dark markings on ABD TERG 1–6, following the polygonal pattern of reticulation of the cuticle, and usually with dark transverse sclerites on ABD TERG 7 and 8 **6**
 – Abdomen without any dark markings on ABD TERG 1–8, and without or with only lightly-pigmented sclerites on 8, or 7 and 8 **13**
6. ABD TERG 2–4 as well as 1 and 7 with well-developed marginal tubercles (MTu) **7**
 – MTu only consistently present on (prothorax and) ABD TERG 1 and 7 **8**
7. ABD TERG 1–6 with an extensive dark shield. SIPH 0.7–1.15× cauda. Longest hairs on ANT III 0.5–1.0× BD III *Aphis ucrainensis**
 – ABD TERG 1–6 with scattered dark markings. SIPH at least 1.5× cauda. Longest hairs on ANT III more than 1.5× BD III *Aphis kamchatica**
8. ANT III with 1–6 rhinaria. ANT PT/BASE 1.0–1.5. Tergum with extensive dark sclerotisation *Aphis mutini**
 – ANT III usually without rhinaria (except in alatform specimens). ANT PT/BASE 1.4–3.5. Tergum with or without extensive dark sclerotisation **9**
9. Longest hairs on ANT III 0.5–0.9× BD III. R IV+V 0.65–0.92× HT II *Aphis spiraephaga*
 – Longest hairs on ANT III 0.8–3.4× BD III, but if shorter than BD III then R IV+V is more than 0.92× HT II **10**
10. ABD TERG 1–6 as well as 7 and 8 with broad dark cross-bands. BL 2.7–3.1 mm *Aphis grandis**
 – ABD TERG 1–6 without broad dark cross bands. BL 1.3–3.6 mm **11**
11. ABD TERG 7 and 8 (or 6–8) with dark dorsal cross-bands, but ABD TERG 1–5 with only small, scattered sclerites. SIPH 0.8–1.6× cauda. R IV+V 0.9–1.1× HT II *Aphis fabae*
 – ABD TERG 7 and 8 with or without narrow cross-bands, but ABD TERG 1–5 with more extensive sclerotisation, usually comprising an irregular perforated and often incomplete spinal stripe or central patch. SIPH 0.6–1.0× cauda. R IV+V 0.7–1.0× HT II **12**
12. Longest hairs on ANT III 1.6–2.2× BD III. ANT PT/BASE 1.8–2.45. R IV+V 0.85–1.2× HT II. Cauda with 9–23 hairs *Aphis neospiraeae*
 – Longest hairs on ANT III 1.1–1.6× BD III. ANT PT/BASE 1.4–2.0. R IV+V 0.7–0.9× HT II. Cauda with 3–11 hairs *Aphis grata*
13. Femoral hairs all shorter than trochantrofemoral suture. Longest hairs on ANT III 0.4–0.8× BD III. Cauda with 4–8 hairs *Aphis gossypii*
 – Femora with at least some long, fine-pointed hairs, longer than trochantrofemoral suture. Longest hair on ANT III 0.5–1.7× BD III. Cauda with 6–19 hairs **14**
14. Cauda pale or dusky, without any constriction at midlength, less than 2× longer than its midlength width. SIPH pale, dusky or dark, if dark then often less so in middle region. ABD TERG 2–4 often with MTu *Aphis ulmariae*
 – Cauda dark, with a midlength constriction, and more than 2× longer than its width at the narrowest midlength point. SIPH dark. ABD TERG 2–4 with or without MTu **15**
15. Marginal tubercles (MTu) present on ABD TERG 2–4. Cauda with 10–19 hairs (rarely less than 13) R IV+V more than 0.13 mm *Aphis pomi*
 – MTu absent from ABD TERG 2–4. Cauda with 7–15 hairs (rarely more than 12). R IV+V less than 0.125 mm *Aphis spiraeicola*

HOST LISTS AND KEYS

16. SIPH with subapical reticulation (at least 3–4 rows of closed polygonal cells) **17**
 – SIPH without subapical polygonal reticulation (sometimes with a few transverse interconnected striae) **26**
17. SIPH dark for at least distal half of length **18**
 – SIPH pale, or dark only towards apices **20**
18. SIPH thick, tapering, c.6–7× longer than their diameter at midlength, with a very small flange
Macrosiphum pachysiphon
 – SIPH almost cylindrical for most of length, 9–19× longer than their diameter at midlength, with a rather well-developed flange **19**
19. Front of head black. ANT III with 10–35 rhinaria. Longest hairs on ANT III 0.7–1.1× BD III. SIPH 1.9–2.4× cauda
Macrosiphum rosae
 – Front of head pale/dusky. ANT III with 3–5 rhinaria. Longest hairs on ANT III 0.4–0.55× BD III. SIPH 1.5–2.0× cauda
Sitobion rosaeiformis
20. SIPH swollen on distal third to 1.2–1.5× their minimum diameter basad. Longest hairs on ANT III 0.2–0.45× BD III **21**
 – SIPH cylindrical on distal half (except that subapical reticulated section may be somewhat constricted). Longest hairs on ANT III 0.5–1.2× BD III **23**
21. First tarsal joints with 3 hairs. Longest hairs on ANT III 0.30–0.45× BD III. ANT V 1.8–2.4× cauda. Swollen part of SIPH very lightly imbricated
Illinoia spiraeicola
 – First tarsal joints with 4–5 hairs. Longest hairs on ANT III 0.20–0.25× BD III. ANT V 1.2–1.8× cauda. Swollen part of SIPH moderately imbricated **22**
22. SIPH 1.65–2.3× cauda. R IV+V 0.125–0.141 mm long, 0.85–1.15× HT II *Illinoia spiraeae*
 – SIPH 2.35–2.6× cauda. R IV+V 0.150–0.177 mm long, 1.05–1.25× HT II. *Illinoia macgillivrayae*
23. SIPH dark distally. R IV+V 1.0–1.2× HT II. Cauda with 9–19 hairs **24**
 – SIPH pale or only slightly dusky towards apices. R IV+V 0.7–1.0× HT II. Cauda with 6–12 hairs **25**
24. Longest hairs on ANT III 0.8–1.2× BD III. Cauda with 11–19 hairs *Macrosiphum cholodkovskiyi*
 – Longest hairs on ANT III 0.6–0.8× BD III. Cauda with 9–10 hairs
Macrosiphum sp. (B.C., Canada, on *S. japonica*, BMNH colln, leg. C.-k. Chan)
25. Longest hairs on ANT III 0.52–0.55× BD III. Cauda 1.3–1.8× ANT VI BASE, with 6–9 (usually 7) hairs. ANT VI BASE 2.0–2.6× R IV+V
Macrosiphum willamettense
 – Longest hairs on ANT III 0.6–1.0× BD III. Cauda 2.1–3.5× ANT VI BASE, with 8–12 hairs. ANT VI BASE 0.9–1.5× R IV+V
Macrosiphum euphorbiae
26. Cauda helmet-shaped, not longer than its basal width in dorsal view. SIPH smooth, conical, with a subapical annular incision. Spiracular apertures large and rounded **27**
 – Cauda finger-shaped, much longer than its basal width. SIPH without a subapical annular incision. Spiracular apertures small, reniform or occluded **28**
27. R IV+V 1.2–1.3× HT II. HT I with 3 hairs (sense peg present). Dorsal abdomen pale
Brachycaudus helichrysi
 – R IV+V 0.8–1.0× HT II. HT I with 2 hairs (no sense peg). Dorsal abdomen often with dark sclerotisation
Brachycaudus spiraeae
28. ABD TERG 8, or 7 and 8, with conical or finger-like hair-bearing spinal processes. SIPH smooth **29**
 – ABD TERG 7 and 8 without any projections. SIPH smooth or imbricated **30**

29. SIPH dusky/dark, longer than cauda, markedly inflated distally over c.0.75 of length, with maximum width of swollen part c.2.5× minimum width of stem, and with a distinct flange. ABD TERG 7 and 8 with bluntly conical spinal tubercles *Tricaudatus polygona*
 – SIPH pale, not longer than cauda, cylindrical or only slightly clavate, and completely flangeless. ABD TERG 8 with a finger-like projection above cauda *Aspidophorodon longicauda*
30. Head densely spiculose, at least on ventral side **31**
 – Head not spiculose **32**
31. ABD TERG (1–) 2–3 (–5) with conspicuous papillate marginal tubercles (MTu). Head, prothorax (sometimes) and ABD TERG 7 and 8 (often) with paired spinal tubercles (STu). ANT PT/BASE 1.9–2.4. Dorsum pale. SIPH tapering/cylindrical and coarsely imbricated *Myzus* sp. on *S. lindleyana* (possible primary host forms of *M. ornatus*?)
 – ABD TERG without or with only sporadic flat inconspicuous MTu, and STu absent from head and prothorax and sporadic on ABD TERG 7–8. If ANT PT/BASE less than 2.5 then dorsum has pattern of intersegmental markings go to key to polyphagous aphids, p. 1020, starting at couplet 5
32. ANT PT more than 2.2× SIPH, which are only 0.8–1.2× cauda. ANT III with 5–30 rhinaria *Acyrtosiphon pseudodirhodum*
 – ANT PT 0.8–1.4× SIPH, which are 1.7–2.5× cauda. ANT III with 1–8 rhinaria **33**
33. SIPH 1.7–2.0× cauda. R IV+V 0.55–0.85× HT II *Acyrtosiphon ignotum*
 – SIPH 2.1–2.9× cauda. R IV+V 0.9–1.1× HT II **34**
34. Dorsal cuticle papillated or markedly wrinkled. R IV+V 0.9–1.1× ANT BASE VI, and bearing 7–10 accessory hairs *Acyrtosiphon rubi*
 – Dorsal cuticle rather smooth. R IV+V c.0.7× ANT BASE VI, with 6 accessory hairs *Acyrtosiphon soldatovi*

Spiranthes

Sp. grayi

Orchidaceae

Rhopalosiphum nymphaeae

Spirodela

Sp. polyrrhiza

Lemnaceae

Rhopalosiphum nymphaeae

Spodiopogon (incl. Eccoilopus)

Sp. cotulifer

Sp. rhizophorus

Gramineae

Sitobion yasumatsui

Hysteroneura setariae

Use key to apterae of grass-feeding aphids under *Digitaria*.

Spondias see Blackman and Eastop (1994)

Sporobolus

Sp. africanus

Sp. berteroanus

Sp. diander

Sp. festivus

Sp. indicus

Gramineae

Hysteroneura setariae; *Sitobion graminis*

Hysteroneura setariae

Hysteroneura setariae

Hysteroneura setariae

[*Pterasthenia shiraensis*]; *Schizaphis graminum*;

Sipha flava; *Sitobion africanum*, *graminis*;

Tetraneura fusiformis

Sp. mildbraedii

Hysteroneura setariae; *Myzus ornatus*; *Sitobion graminis*

HOST LISTS AND KEYS

<i>Sp. mysorensis</i>	<i>Rhopalosiphum rufiabdominale</i>
<i>Sp. neglectus</i>	<i>Schizaphis graminum</i>
<i>Sp. poiretii</i>	<i>Hysteroneura setariae</i>
<i>Sp. pyramidalis</i>	<i>Hysteroneura setariae</i> ; <i>Myzus ornatus</i> ;
	<i>Rhopalosiphum maidis, padi</i> ; <i>Sitobion graminis</i>
<i>Sp. virginicus</i>	<i>Rhopalosiphum maidis</i>
<i>Sporobolus</i> sp.	<i>Geoica lucifuga</i>

Use key to apterae of grass-feeding aphids under *Digitaria*.

Spuriopimpinella

Sp. calycina

Umbelliferae

Semiaphis heraclei

Stachyopsis

S. ovata

S. lamiflora

Labiatae

Cryptomyzus transiliensis

Cryptomyzus malkovskii, transiliensis

Key to apterae on *Stachyopsis*:-

(Both species have long capitate dorsal hairs arising from tuberculate bases.)

- Cauda helmet-shaped, not longer than its basal width. ANT III with numerous (18–53) rhinaria, and also 3–15 on ANT IV. SIPH tapering to apex *Cryptomyzus malkovskii*
- Cauda tongue-shaped, much longer than its basal width. ANT III with 1–4 rhinaria near base, IV with 0. SIPH swollen on distal half *Cryptomyzus transiliensis*

Stachys

S. ajugoides

S. alpina

S. annua

S. arvensis

S. betonica see *officinalis*

S. bullata

S. californica

S. ciliata

S. cretica

S. germanica

S. glutinosa

S. heraclea

S. japonica (incl. *intermedia*)

S. lanata

S. officinalis (incl. *betonica*)

S. olympica

S. palustris

S. recta

S. rigida (incl. ssp. *quercetorum*)

S. scopulorum

S. sericea

Labiatae

Aulacorthum solani

Ovatomyzus stachyos

Cryptomyzus ribis; *Kaltenbachiella pallida*; [*Pemphigus* sp.]

Aphis gossypii, stachydis; *Cryptomyzus ribis*

Amphorophora stachyophila; *Neomyzus circumflexus*

Aulacorthum solani

Cryptomyzus ribis

Aphis stachydis (? – see text)

Cryptomyzus korschelti; *Ovatomyzus stachyos*

Aphis stachydis

Ovatomyzus chamaedryis

Aphis gossypii; *Cryptomyzus ribis*

Ovatomyzus stachyos

Cryptomyzus heinzei

Ovatomyzus stachyos

Aphis stachydis; *Aulacorthum solani*; *Cryptomyzus ribis*;

Myzus persicae; *Uroleucon stachydis*

Aphis [eupatorii], *stachydis*; *Cryptomyzus ribis*

Amphorophora stachyophila

Aphis stachydis, [*Aphis* (*Cerosipha*) sp. (Weiss, 1955)];

Cryptomyzus galeopsidis, korschelti, ribis, stachydis;

Uroleucon stachydis

Myzus ornatus

S. sylvatica
Stachys sp.

Aphis stachydis; *Cryptomyzus korschelti*
Aphis tashevi

Key to apterae on *Stachys*:-

1. ANT 4- (occasionally 5-) segmented, less than $0.15 \times BL$, with PT/BASE less than 1. SIPH absent. All segments with wax glands, each consisting of a ring of roundish facets around a central field
Kaltenbachiella pallida 2
- ANT usually 6-segmented, more than $0.2 \times BL$, with PT/BASE more than 1.5. No evident dorsal wax glands 2
2. Dorsal body hairs long and thick, much longer than ANT BD III, and many or all of them with knobbed or expanded apices, and arising from tuberculate bases (e.g., Figure 50a) 3
- Dorsal body hairs mostly shorter than BD III; pointed or blunt, or if with somewhat expanded apices then without tuberculate bases 6
3. SIPH $1.1-2.1 \times$ cauda. R IV+V $0.9-1.1 \times$ HT II, and bearing 2-5 accessory hairs. Longest hairs on ANT III $1.0-1.3 \times$ BD III
Cryptomyzus galeopsidis 4
- SIPH $2.4-4.0 \times$ cauda. R IV+V $0.9-1.8 \times$ HT II, and bearing 6-17 accessory hairs. Longest hairs on ANT III $0.4-0.9 \times$ BD III 4
4. SIPH $2.3-3.1 \times$ cauda. R IV+V $1.3-1.4 \times$ HT II, and bearing 6-8 accessory hairs *Cryptomyzus ribis* 5
- SIPH $3.1-3.9 \times$ cauda. R IV+V $1.5-1.8 \times$ HT II, and bearing 8-17 accessory hairs 5
5. R IV+V with 11-17 accessory hairs. Longest hairs on ANT I much longer and thicker than any hairs on ANT III. Longest dorsal hairs more than $100 \mu m$ long
Cryptomyzus korschelti
- R IV+V with 7-9 accessory hairs. Longest hair on ANT I similar in size to longest hair on ANT III. Longest dorsal hairs less than $80 \mu m$ long
Cryptomyzus heinzei

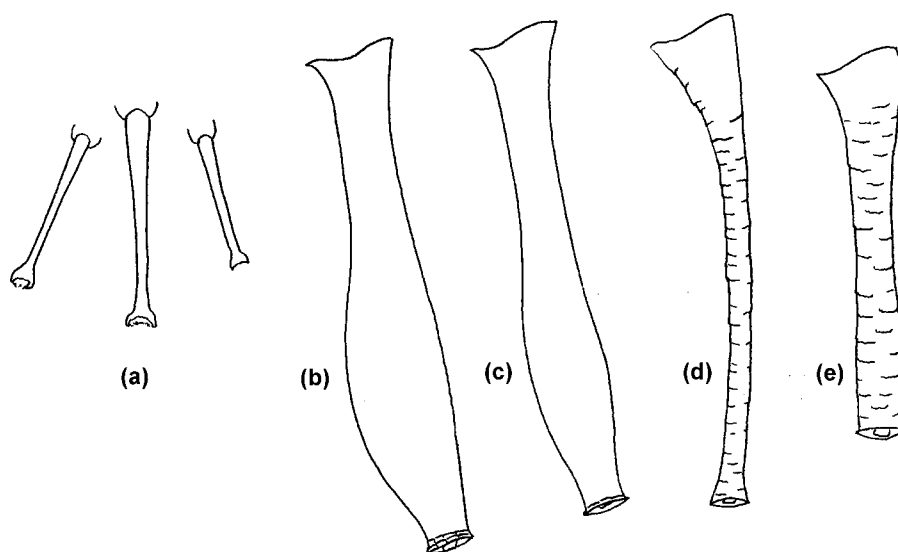


Figure 50 Apterae on *Stachys*. (a) Dorsal hairs of *Cryptomyzus ribis*, (b) SIPH of *Cryptomyzus stachydis*, (c) SIPH of *Amphorophora stachyophila*, (d) SIPH of *Ovatomyzus stachydis*, (e) SIPH of *O. chamaedrys*.

HOST LISTS AND KEYS

6. Head densely spinulose, with ANT tubercles well developed, their inner faces scabrous and parallel of apically convergent go to key to polyphagous aphids, p. 1020, starting at couplet 5
 – Head without spicules, ANT tubercles undeveloped, weakly developed, or if well developed then with inner faces smooth and divergent 7
7. ANT tubercles well developed. ABD TERG 1 and 7 without marginal tubercles (MTu) 8
 – ANT tubercles undeveloped or weakly developed. ABD TERG 1 and 7 with MTu 12
8. ANT III with 44–72 rhinaria. SIPH dusky to dark, with a distal zone of polygonal reticulation. Cauda dusky to dark with c.20–22 hairs *Uroleucon stachydis*
 – ANT III with 0–25 rhinaria. SIPH pale, without polygonal reticulation. Cauda pale with 5–13 hairs 9
9. BL 2.5–3.5 mm. ANT III with 2–25 rhinaria. SIPH smooth, distinctly clavate 10
 – BL 0.9–1.6 mm. ANT III without rhinaria. SIPH imbricated, cylindrical or only slightly swollen subapically 11
10. SIPH 2.9–4.1× cauda and markedly swollen over distal 0.7, with maximum width of swollen part 1.7–2.0× minimum width basad (Figure 50b). ANT PT/BASE 8.4–9.8. R IV+V with 5–8 accessory hairs *Cryptomyzus stachydis*
 – SIPH 1.7–2.4× cauda, swollen on distal 0.5 to a maximum of c.1.6× minimum width basad (Figure 50c). ANT PT/BASE 6.2–8.1. R IV+V with 26–30 accessory hairs *Amphorophora stachyophila*
11. SIPH 15–23× longer than their midlength diameter (Figure 50d). Longest hair on ANT tubercles 0.9–1.3× BD III *Ovatomyzus stachyos*
 – SIPH 9–14× longer than their midlength diameter (Figure 50e). Longest hair on ANT tubercles 0.5–0.8× BD III *Ovatomyzus chamaedrys*
12. ANT III with 0–10 sec. rhinaria on distal part, IV with 3–9 and V with 0–4. Rostrum very short, length of sclerotised part of stylet groove less than 0.4 mm *Aphis tashevi*
 – ANT without sec. rhinaria (except in alatiform specimens). Rostrum longer, length of sclerotised part of stylet groove more than 0.4 mm *Aphis stachydis* (or *A. gossypii*?)

Stachytarpheta

S. angustifolia

S. jamaicensis

Stachytarpheta sp.

Aphis gossypii

Aphis gossypii

[*Hysteroneura setariae*]

Verbenaceae

Stachyurus

S. praecox

Xenosiphonaphis conandri, japonica

Stachyuraceae

Key to al. fundatrigeniae:–

(Populations on *Stachyurus* consist of fund. and al. only, and fund. of × *conandri* is undescribed.)

- BL 1.6–2.1 mm. Dorsal abdomen with very broad dark cross-bands on ABD TERG 1–7, partially fused across ABD TERG 3–6 with only small gaps between them. Sec. rhin. III 17–20, IV 7–8, V 0–1 *Xenosiphonaphis conandri*
- BL 2.4–3.0 mm. Dorsal abdomen with dark cross-bands partly fused marginally, but with wide gaps between them in spinal region. Sec. rhin. III 22–26, IV 4–9, V 0–1 *Xenosiphonaphis japonica*

Staphylea

S. bumalda

S. pinnata

Aphis gossypii; Indomegoura indica, nigrotibiae

Rhopalosiphoninus staphyleae

Staphyleaceae

Key to apterae on *Staphylea*:-

1. Legs dark. Cuticle of head smooth or slightly wrinkled, ANT tubercles well developed with inner faces broadly divergent. SIPH dark, more-or-less barrel-shaped, thickest in middle **2**
 - Legs mainly pale and other characters not in that combination go to key to polyphagous aphids, p. 1020
2. BL more than 3 mm. Cauda elongate, much longer than wide, more than 0.5× SIPH. R IV+V 0.7–0.9× HT II. SIPH almost cylindrical on proximal 0.7 of length, narrowing only subapically *Indomegoura indica*
 - BL less than 3 mm. Cauda triangular, about as long as its basal width, less than 0.5× SIPH. R IV+V 0.9–1.1× HT II. SIPH elongate barrel-shaped, narrowing proximally as well as subapically *Indomegoura nigrotibiae*

Statice see *Limonium*

Stauntonia

S. hebandra
S. hexaphylla

Lardizabulaceae

Amphicercidus laniger
Sitobion akebiae

Couplet to separate these two species:-

(Both species have dark SIPH, non-spiculose head and low, broadly divergent ANT tubercles.)

- Cauda short, conical with rounded apex, about as long as its basal width in dorsal view. SIPH without polygonal reticulation. ANT with finely pointed hairs, many of them longer than BD III *Amphicercidus laniger*
- Cauda much longer than its basal width. SIPH with distal polygonal reticulation. ANT with short blunt hairs, less than 0.5× BD III *Sitobion akebiae*

Steganotaenia

S. araliacea

Umbelliferae

Aphis fabae; *Hyadaphis coriandri*

Use key to apterae on *Coriandrum*.

***Steirodiscus* (incl. *Gamolepis*)**

S. chrysanthemoides

Compositae

[*Aphis* sp. (Leonard, 1972a)]; *Myzus ornatus, persicae*;
[*Uroleucon* sp. (Leonard, 1972a:111)]

Use key to polyphagous aphids, p. 1020.

Steironema see *Lysimachia*

Stelechocarpus

S. burakol

Annonaceae

Toxoptera aurantii

Stelis

S. cubensis
S. ekmanii
S. ophiglossoides

Orchidaceae

Sitobion luteum; *Toxoptera aurantii*
Sitobion luteum
Sitobion luteum; *Toxoptera aurantii*

Use key to aphids on orchids under *Cymbidium*.

Stellaria

S. aquatica

Caryophyllaceae

Aphis nasturtii; *Brachycolus stellariae*;
Myzus persicae, stellariae; [*Sitobion akebiae*]

HOST LISTS AND KEYS

<i>S. crispata</i>	<i>Abstrusomyzus phloxae</i> ; <i>Myzus ascalonicus</i> , <i>persicae</i>
<i>S. dichotoma</i>	<i>Stellariopsis songini</i>
<i>S. graminea</i>	<i>Brachycolus stellariae</i> ; <i>Macrosiphum stellariae</i>
<i>S. holostea</i>	<i>Brachycolus stellariae</i> ;
	<i>Macrosiphum euphorbiae</i> , <i>stellariae</i> , [gei]; <i>Myzus titschaki</i>
<i>S. jamesiana</i>	<i>Aphis fabae</i>
<i>S. longipes</i>	<i>Brachycolus brachysiphon</i>
<i>S. media</i>	<i>Acyrtosiphon auctum</i>
	<i>Aphis craccivora</i> , <i>fabae</i> , <i>gossypii</i> , <i>nasturtii</i> , <i>sambuci</i> ;
	<i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ;
	<i>Macrosiphum euphorbiae</i> ;
	<i>Myzus ascalonicus</i> , <i>certus</i> , <i>cymbalariae</i> , <i>ornatus</i> , <i>persicae</i> ;
	<i>Neomyzus circumflexus</i> ;
	<i>Neotoxoptera oliveri</i> , [sunkangensis];
	<i>Rhopalosiphum rufiabdominale</i> ; [<i>Sipha maydis</i>]
<i>S. nemorum</i>	<i>Aulacorthum solani</i> ; <i>Brachycolus stellariae</i>
<i>S. tianshanica</i>	<i>Acyrtosiphon ilka</i>
<i>S. uliginosa</i>	<i>Aphis nasturtii</i>
<i>Stellaria</i> sp.	[<i>Macrosiphum incertum</i> Mordvilko (= <i>stellariae</i> ?)]

Key to apterae on *Stellaria*:-

1. SIPH pale with subapical polygonal reticulation (at least 4–5 rows of closed cells). ANT III with 1–13 rhinaria, and with longest hairs $0.6-1.2 \times$ BD III 2
 - SIPH pale or dark, without polygonal reticulation. ANT III with 0–3 rhinaria, if with any then longest hairs less than $0.5 \times$ BD III 3
2. Femora usually with a dark spot or patch near apices (Figure 51a). ABD TERG 2–3 with longest hair $26-56 \mu\text{m}$, usually as long as or longer than ANT BD III. Subgenital plate with 2–13 hairs in addition to those on posterior margin *Macrosiphum stellariae*
 - Femora pale or only slightly dusky at apices. ABD TERG 2–3 with longest hair $21-37 \mu\text{m}$, usually shorter than ANT BD III. Subgenital plate with 2 (–4) hairs on anterior part *Macrosiphum euphorbiae*
3. Head not spiculose, with ANT tubercles undeveloped or weakly developed, or if well developed then having smooth, broadly divergent inner faces 4
 - Head spiculose, with well-developed ANT tubercles, their inner faces scabrous and parallel or apically convergent 12

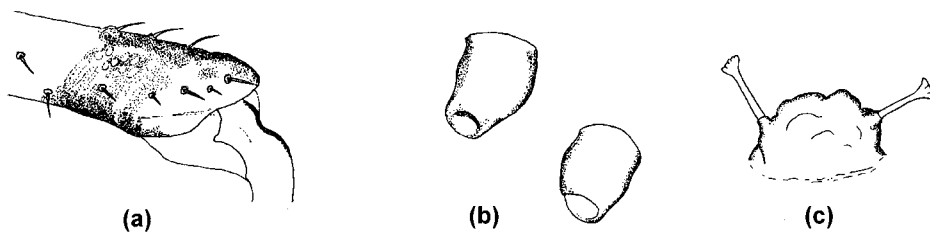


Figure 51 Apterae on *Stellaria*. (a) End of hind femur of *Macrosiphum stellariae*, (b) two examples of SIPH of *Brachycolus stellariae*, (c) dorsal abdominal hairs of *Stellariopsis songini*.

4. ANT 5-segmented, bearing long hairs up to 4–5× BD III *Rhopalosiphum rufiabdominale*
 – ANT usually 6-segmented, with much shorter hairs 5
5. SIPH very small, flangeless, conical or barrel-shaped (e.g., Figure 51b), less than 0.3× cauda 6
 – SIPH more than 0.6× cauda 7
6. ANT PT/BASE 2.4–3.6. Cauda triangular, much shorter than PT *Brachycolus stellariae*
 – ANT PT/BASE 1.2–1.5. Cauda elongate, longer than PT *Brachycolus brachysiphon**
7. ABD TERG 1–5 each with 10–12 hairs (2 marginal, 1 pleural and 2–3 spinal pairs), which have capitate or spatulate apices and arise from rough wart-like tubercles (Figure 51c) *Stellariopsis songini*
 – ABD TERG 1–5 each usually with 6 hairs with blunt or pointed apices, and not arising from tubercles 8
8. ABD TERG 1 and 7 without marginal tubercles (MTu). SIPH pale 9
 – ABD TERG 1 and 7 with MTu. SIPH pale or dark 11
9. Cauda helmet-shaped, not longer than its basal width, with 4–6 hairs. SIPH conical, with a subapical annular incision. Spiracular apertures large and rounded. ANT III without rhinaria
Brachycaudus helichrysi
 – Cauda tongue-shaped, much longer than its basal width, with 7–13 hairs. SIPH tubular, without a subapical annular incision. Spiracular apertures reniform. ANT III usually with 1–3 rhinaria 10
10. SIPH 0.15–0.20× BL and 0.8–1.4× cauda. ANT PT/BASE 1.8–3.0 *Acyrtosiphon auctum*
 – SIPH 0.23–0.33× BL and 1.5–2.5× cauda. ANT PT/BASE 3.0–4.4 *Acyrtosiphon ilka*
11. ABD TERG 2–4 or 2–5 as well as 1 and 7 with large flat MTu. SIPH black, 2.1–3.5× cauda
Aphis sambuci
 – ABD TERG 2–4 without MTu, or occasionally with small papilliform MTu. SIPH pale or dark, 0.7–2.5× cauda polyphagous *Aphis* spp.; go to key to polyphagous aphids, p. 1020, starting at couplet 24
12. SIPH gradually tapering from base to apex 13
 – SIPH with slight to moderately swelling of distal part 15
13. ANT PT/BASE 1.7–2.8. ANT III without rhinaria. Dorsal abdomen with dark intersegmental spots
Myzus ornatus
 – ANT PT/BASE 4.0–5.5. ANT III usually with 1–3 small rhinaria near base. Dorsal abdomen pale or with more extensive dark markings 14
14. Dorsum with extensive dark markings, including a roughly horseshoe-shaped abdominal patch
Neomyzus circumflexus
 – Dorsum without dark markings *Aulacorthum solani*
15. SIPH 0.82–1.34× ANT III 16
 – SIPH 0.54–0.81× ANT III 18
16. ANT tubercles themselves rather low, but with scabrous processes extending forward from ANT bases. SIPH weakly swollen subapically (over about distal 0.25). Dorsum with an evident reticulate pattern
Abstrusomyzus phloxae
 – ANT tubercles broadly rounded, without forwardly-directed processes. SIPH slightly to moderately swollen over about distal 0.5. Dorsum without a reticulate pattern 17
17. R IV+V in most specimens with only one pair of lateral accessory hairs (plus 0–3 ventral accessory hairs). Value of function cauda/(ANT III×PT) in range 0.80–1.52, but rarely more than 1.25 except in small specimens (those with ANT III less than 0.32 mm) *Myzus persicae*
 – R IV+V in most specimens with two pairs of lateral accessory hairs. Value of function cauda/(ANT III×PT) in range 1.2–2.7 (rarely less than 1.25) *Myzus certus*

HOST LISTS AND KEYS

18. SIPH with a narrow basal stem, its narrowest part thinner than, or as thin as, hind tibia at midlength. R IV+V 1.4–1.6× HT II, with 7–15 accessory hairs *Myzus ascalonicus*
 – SIPH thicker on basal half, its narrowest part thicker than hind tibia at midlength. R IV+V 0.9–1.6× HT II, with 2–8 accessory hairs **19**
19. R IV+V 0.9–1.05× HT II. SIPH c.1.8× the tongue-shaped cauda *Myzus titscheki*
 – R IV+V 1.2–1.6× HT II. SIPH more than 2× the triangular (tapering) cauda **20**
20. ANT PT/BASE 2.5–3.3. SIPH very coarsely imbricated on swollen part. Dorsal cuticle very rugose *Myzus cymbalariae*
 – ANT PT/BASE 3.5–4.8 SIPH smooth or normally imbricated on swollen part. Dorsal cuticle not rugose **21**
21. ANT PT/BASE 4.3–4.8. (Al. with wing-veins not dark-bordered, with a solid black patch on ABD TERG 3–4, fused across tergites and constricted in midline, and with sec. rhin. distributed III 39–52, IV 29–31, V 6–11) *Myzus stellariae*
 – ANT PT/BASE 3.5–4.3. (Al. with wing-veins black-bordered, with broad dark cross-bands on ABD TERG 2–5 only partially fused between tergites, and with sec. rhin. distributed III 12–47, IV 0–13, V 0–2) *Noetoxoptera oliveri* (or *sungkangensis**)

Stellera

S. chamaejasme
S. lessertii

Thymelaeaceae

Aphis brachychaeta
Brachyunguis sp. (Iran: BMNH colln)

Key to apterae on *Stellera*:-

- SIPH as very short dark cones, shorter than their basal widths, less than 0.3× cauda. ANT PT/BASE c.0.5 *Brachyunguis* sp. (Iran: BMNH colln, leg. G. Remaudière)
 – SIPH tubular, 0.8–1.4× cauda. ANT PT/BASE 1.6–2.2 *Aphis brachychaeta*

Stemmacantha (incl. *Rhaponticum*)

S. carthamoides

Compositae

Uroleucon gobonis

Stenactis see *Erigeron*

Stenosiphonium

S. parviflorum
S. russelianum

Acanthaceae

Aphis gossypii; [*Hysteroneura setariae*]
Aphis gossypii

Stenotaphrum

S. diminiatum
S. secundatum

Gramineae

Geoica lucifuga; *Hysteroneura setariae*; *Sitobion africanum*
Hysteroneura setariae; *Sipha flava*

Use key to apterae of grass-feeding aphids under *Digitaria*.

Stenotheca

S. muronata

Gramineae

Pseudoregma panicola

Stephanandra

S. incisa
S. tanakae

Rosaceae

Toxoptera odinae
Aulacorthum magnoliae

Use key to polyphagous aphids, p. 1020.

Stephania*S. abyssinica**S. forsteri**S. japonica*

Use key to polyphagus aphids, p. 1020.

Stephanomeria (incl. Ptilora)*S. pauciflora***Steris see Lychnis****Stevia***S. glandulosa**S. subpubescens*Key to apterae on *Stevia*:-

- SIPH very markedly clavate, dark, cauda pale. Tergum with an extensive dark sclerotic shield. ANTIII with 19–30 sec. rhinaria, IV with 0–18, V 0–5. ABD TERG 1 and 7 without marginal tubercles (MTu) *Hyperomyzus niger*
- SIPH tapering, pale with darker apices, cauda dark. Tergum mostly pale and membranous. ANT III with 0–15 rhinaria, IV with 0–4, V 0–1. ABD TERG 1 and 7 with MTu *Aphis solitaria*

Stigmaphyllon*S. affine**S. sagraeanum**S. tomentosum*

Use key to polyphagous aphids, p. 1020.

Stilbe*Stilbe* spp.**Stipa (incl. Achnatherium, Lasiagrostis)***S. capillata**S. comata**S. elegantissima**S. gigantea**S. lagascae**S. leucotricha**S. speciosa* (?)*S. splendens**S. viridula**Stipa* spp.**Menispermaceae***Aphis fabae*, *gossypii*; *Brachycaudus helichrysi*;[*Sitobion* sp. (Millar, 1994)]*Aphis gossypii*; *Toxoptera odinae**Toxoptera odinae***Compositae***Uroleucon bonitum***Compositae***Hyperomyzus niger**Aphis solitaria*; *Hyperomyzus niger***Malpighiaceae***Aphis gossypii**Aphis craccivora*, *gossypii*, *spiraecola**Aphis craccivora***Stilbaceae***Macrosiphum euphorbiae***Gramineae***Anoecia stipae*, [*Anoecia* sp. (Bozhko, 1976a)];*Chaetosiphella stipae*, *tschernavini*;[*Holmania chaetosiphon* (al. vagrant)]*Diuraphis tritici**Rhopalosiphum padi**Chaetosiphella stipae**Metopolophium dirhodum**Schizaphis graminum**Hysteroneura setariae**Atheroides karakumi*; *Chaetosiphella stipae**Schizaphis graminum**Carolinaia rhois*;*Chaetosiphella* sp. (BMNH colln; France, Yugoslavia);[*Dysaphis ubsanurensis*]; *Sipha maydis*Use key to apterae on grasses under *Digitaria*.

HOST LISTS AND KEYS

Stizolobium see *Mucuna*

Stocksia

S. brahuica

Sapindaceae

Brachyunguis kaussarii

Stoebe

Stoebe sp.

Compositae

Toxoptera aurantii

Stranvaesia see *Photinia*

Stratiotes

Stratiotes sp.

Hydrocharitaceae

Rhopalosiphum nymphaeae

Straussia see *Psychotria*

Strelitzia

S. alba

S. augusta

S. nicolai

S. reginae

Strelitzia sp.

Strelitziaceae

Cerataphis brasiliensis

Cerataphis brasiliensis

Aphis fabae; *Cerataphis brasiliensis*;

Rhopalosiphum padi

Dysaphis tulipae; *Rhopalosiphum musae*;

Schizaphis rosazevedoi

Pentalonia nigronervosa

Key to apterae on *Strelitzia*:-

1. Body dorsoventrally flattened, almost circular, wholly sclerotic with a continuous crenulate margin of wax glands. Head with a pair of forwardly directed horns. SIPH present as pores
Cerataphis brasiliensis
 - Body not dorsoventrally flattened, without marginal wax glands or frontal horns. SIPH tubular **2**
2. SIPH and femora covered with irregular, transverse rows of spicules. ANT PT/BASE 5.8-8.1. (Alata with dark-bordered wing veins, with radius and costa fused for part of lengths to form a closed cell behind the pterostigma)
Pentalonia nigronervosa
 - SIPH and femora smooth or imbricated, not markedly spiculose. ANT PT/BASE 1.4-5.8. (Alata with normal wing venation, veins not dark-bordered) **3**
4. Cauda helmet-shaped, a little shorter than its basal width. Spinal tubercles (STu) present on head and ABD TERG 8, or 7 and 8
Dysaphis tulipae
 - Cauda tongue-shaped, longer than its basal width in dorsal view. STu absent **5**
5. SIPH short and thick (0.08-0.11× BL, 2.9-3.3× longer than their midlength diameter, and 1.2-1.5× R IV+V), and strongly constricted subapically before the well-developed flange *Rhopalosiphum musae*
 - SIPH 0.12-0.17× BL, 3.5-6.0× their midlength diameter and (1.3-) 1.5-2.9× R IV+V, with or without a subapical constriction **6**
6. Hairs on hind tibiae mostly shorter than diameter of hind tibia at midlength. SIPH cylindrical for most of length, with a smooth, constricted subapical region
Rhopalosiphum padi
 - Many of hairs on hind tibia much longer than its midlength diameter. SIPH gradually tapering from base to flange, with no smooth subapical constriction **7**
7. Cauda pale, contrasting with black SIPH, and bearing 4-8 hairs. SIPH 1.7-2.5× cauda
Schizaphis rosazevedoi
 - Cauda dark like SIPH, and bearing 11-24 hairs. SIPH 0.8-1.6× cauda *Aphis fabae*

Streptocarpus*S. rexii**S. saxorum****Streptocarpus* spp.** (and hybrids)**Gesneriaceae***Aulacorthum solani**Myzus persicae*[*Idiopterus nephrolepidis*]; [*Micromyzodium filicium*];*Myzus ornatus*; *Neomyzus circumflexus*

Use key to polyphagous aphids, p. 1020.

Streptopus*S. amplexifolius***Convallariaceae***Macrosiphum insularis****Streptosolen****S. jamesonii***Solanaceae***Macrosiphum euphorbiae****Striga****S. hermonthica***Scrophulariaceae***Aphis gossypii****Strobilanthes* (incl. *Goldfussia*, *Perilepta*)***S. atropurpureus**S. dalhousianus**S. dyerianus**S. helictus**S. lactatus**S. penstemonoides****Strobilanthes* sp.****Acanthaceae***Aphis craccivora*, *fabae*, *gossypii*, *nasturtii*;*Neomyzus strobilantheae*; [*Tricaudatus polygoni*]*Aphis gossypii*; *Micromyzodium strobilantheae*;*Nasonovia rostrata**Aphis gossypii**Aphis gossypii**Myzus ornatus**Aphis gossypii*; *Nasonovia rostrata*; [*Tricaudatus polygoni*]*Melanaphis strobilantheae*; *Myzus persicae*Key to apterae on *Strobilanthes*:–

1. Spiracular pores on thorax very large and rounded, more than 4× larger than those on abdomen. R IV +V 0.21–0.33 mm long, about 2× HT II, and bearing 22–30 accessory hairs. Dorsal body hairs long with blunt or slightly expanded apices *Nasonovia rostrata*
- Spiracular pores on thorax not distinctly larger than those on abdomen. R IV +V shorter, with fewer accessory hairs. Dorsal body hairs if long then pointed **2**
2. Head not spiculose. ANT tubercles weakly developed. ABD TERG 1 and 7 with marginal tubercles (MTu) **3**
- Head spiculose. ANT tubercles variably developed. ABD TERG 1 and 7 without MTu **4**
3. ANT PT/BASE 1.2–1.75. R IV +V c.1. 6× HT II. SIPH 0.8–1.0× cauda, which bears 10–11 hairs *Melanaphis strobilantheae**
- Without that combination of characters go to key to polyphagous aphids, p. 1020, starting at couplet 24
4. SIPH slightly to moderately clavate **5**
- SIPH tapering/cylindrical **6**
5. ANT III with 1–4 rhinaria near base. SIPH 3.0–3.5× cauda, which bears 5 hairs. Dorsal abdomen with variably developed brownish sclerotisation *Neomyzus strobilantheae**
- ANT III without rhinaria. SIPH 1.9–2.5× cauda, which bears 5–8 hairs. Dorsal abdomen unsclerotised *Myzus persicae*

HOST LISTS AND KEYS

6. ANT PT/BASE 5.5–6.8. Dorsal abdomen with extensive dark sclerotisation. Hairs on ABD TERG 1–5 longer than ANT BD III. ANT tubercles with broadly divergent, spiculose inner faces
Micromyzodium strobilanthei
- ANT PT/BASE 1.7–2.8. Dorsal abdomen with a pattern of dark intersegmental spots. Hairs on ABD TERG 1–5 minute, much shorter than ANT BD III. ANT tubercles with steep-sided, scabrous inner faces
Myzus ornatus

Strongylodon

S. macrobotrys

Leguminosae

Toxoptera aurantii

Strophanthus

S. divaricatus

Apocynaceae

Aulacorthum solani; *Myzus persicae*;
Toxoptera aurantii

Use key to polyphagous aphids, p. 1020.

Struchium

S. sparganophorum

Compositae

Aphis gossypii

Stylochaeton

Stylochaeton sp.

Araceae

Aphis gossypii

Stylosanthes

S. guyanensis

Leguminosae

Aphis craccivora

Styphnolobium

S. japonicum

Leguminosae

Toxoptera odinae

Styrax see Blackman and Eastop (1994)

***Suaeda* (incl. *Schaginia*)**

S. aegyptiaca

S. asphaltica

S. baccata

S. californica

S. fruticosa see *vera*

S. glauca

S. maritima

S. monoica

S. palaestina

S. suffrutescens

S. vera (incl. *fruticosa*)

Suaeda sp.

Chenopodiaceae

[*Aphis* sp. (Israel, Arava valley; imm. only)]

Brachyunguis harmalae

Brachyunguis harmalae

Brachyunguis cahuille (as *tetrapteralis*)

[*Brachyunguis suaedus*]; *Clypeoaphis suaedae*

Clypeoaphis suaedae, *suaedae* ssp. *suaedicola*

Brachyunguis harmalae

Brachyunguis harmalae

Brachyunguis cahuille (as *tetrapteralis*)

Chaitaphis tenuicauda; *Clypeoaphis suaedae*

Aphis sp. (Korea; BMNH colln, leg. W.H. Paik);

Hayhurstia atriplicis;

Xerobion sp. (Sinai, BMNH colln, leg. E. Mescheloff)

Key to apterae on *Suaeda*:–

1. SIPH a little longer than the similarly dark cauda, which is finger-like, somewhat constricted in middle and rounded at apex, and bears 4–5 hairs. ANT PT/BASE 1.5–1.7 *Aphis* sp. (Korea; BMNH)
- SIPH shorter than cauda and other characters not in that combination 2

2. Dorsal hairs with expanded, often furcate apices. Cauda long and thin, 4–5× longer than its middle width
Chaitaphis tenuicauda
- Dorsal hairs blunt or pointed. Cauda less than 4× its middle width 3
3. SIPH black, volcano-shaped, much shorter than their basal diameters (e.g., Figure 36f). Cauda dusky and broadly rounded, about 0.5× its basal width, with c.13 hairs
Xerobion sp. (Sinai, BMNH)
- SIPH barrel-shaped, or weakly tapering to apex, and pale. cauda at least as long as its basal width, with 4–9 (–12) hairs 4
4. ANT PT/BASE 1.4–2.5. ANT, legs, SIPH and cauda all dark, or mainly dark
Hayhurstia atriplicis
- ANT PT/BASE 0.4–1.0. ANT, legs, SIPH and cauda pale 5
5. SIPH tubular or barrel-shaped, much longer than their basal widths (Figure 36i). Cauda finger-like, more than 2× its basal width. ANT PT/BASE 0.8–1.0. R IV+V with 4–6 accessory hairs. MTu absent, small or indistinct. Clypeus dark, globose (Figure 36d)
Clypeoaphis suaedae
- SIPH not longer than their basal widths (Figure 36g, h). Cauda conical, less than 2× its basal width. ANT PT/BASE 0.4–0.7. R IV+V with 2 accessory hairs. MTu present on prothorax and ABD TERG 1 and 7. Clypeus pale or dark, swollen or globose 6
6. Clypeus strongly sclerotised, dark, globose. ABD TERG 8 with 2 hairs, the longest 15–25 µm long
Brachyunguis cahuille
- Clypeus pale, swollen but not globose. ABD TERG 8 with (2–) 3–4 hairs, the longest 28–36 µm long
Brachyunguis harmalae

Succisa*S. pratensis***Dipsacaceae***Aphis [confusa], succisae; Macrosiphum rosae, weberi*Key to apterae on *Succisa*:-

1. BL 1.3–2.0 mm. ANT tubercles undeveloped. ANT hairs long, numerous, wavy and finely pointed, the longest 3–4× BD III. ABD TERG 1 and 7 with marginal tubercles (MTu). SIPH without polygonal reticulation
Aphis succisae
- BL 1.8–4.2 mm. ANT tubercles well developed, with smooth, divergent inner faces. ANT hairs maximally 0.7–1.1× BD III. ABD TERG 1 and 7 without MTu. SIPH with a subapical zone of polygonal reticulation 2
2. Body spindle-shaped. SIPH thicker than hind tibiae at their respective midlengths, and 1.8–2.2× head width across (and including) eyes
Macrosiphum rosae
- Body oval. SIPH about equal in thickness to hind tibiae at midlength, and 1.1–1.5× head width across eyes
Macrosiphum weberi

Succisella*S. inflexa***Dipsacaceae***Aulacorthum solani***Sutherlandia***S. frutescens***Leguminosae***Acyrtosiphon pisum***Swainsonia***Sw. salsola***Leguminosae***Aphis craccivora***Swertia***Sw. eminii**Swertia* sp.**Gentianaceae***Myzus ornatus*[*Capitophorus elaeagni*]

HOST LISTS AND KEYS

Swinglea

Sw. glutinosa

Symphoricarpos

S. albus

S. mollis

S. occidentalis

S. orbiculatus (incl. *vulgaris*)

S. parishii

S. pauciflorus

S. racemosus

S. rivularis

S. symphoricarpos

S. vulgaris see *orbiculatus*

Symphoricarpos spp.

Rutaceae

Aphis spiraecola

Caprifoliaceae

Amphicercidus pulverulens;

Aphis fabae, *gossypii*, *spiraephaga*;

Aphthargelia symphoricarpi; *Aulacorthum solani*;

Hyadaphis foeniculi; *Macrosiphum euphorbiae*, *rosae*;

[*Phorodon humuli*]

Cedoaphis incognita

Amphicercidus pulverulens; *Aphthargelia symphoricarpi*;

Cedoaphis incognita

Amphicercidus pulverulens; *Aphthargelia symphoricarpi*;

Hyadaphis foeniculi; *Macrosiphum rosae*

Aphthargelia symphoricarpi

Aphthargelia symphoricarpi

Amphicercidus pulverulens; *Aphthargelia symphoricarpi*;

Macrosiphum euphorbiae

Rhopalomyzus lonicerae

Aphthargelia symphoricarpi

[*Artemisaphis artemisicola*]; [*Ericaphis harmstoni* (al. only)];

Macrosiphum sp. (Idaho, BMNH colln, leg. S.E. Halbert and J.H. Martin)

Key to apterae on *Symphoricarpos*:-

1. SIPH with a subapical zone of reticulation (at least 4–5 rows of clearly-defined polygonal cells) **2**
– SIPH without a subapical zone of polygonal reticulation **4**
2. ANT PT 2.8–4.2× SIPH. Cauda 0.9–1.3× ANT BASE VI. R IV+V 0.5–0.7× HT II
Macrosiphum sp. (Idaho)
– ANT PT 0.6–1.7× SIPH. Cauda 2–4× ANT BASE VI. R IV+V 0.9–1.2× HT II **3**
3. Head and ANT I-II black. SIPH black. ANT III with 10–36 rhinaria *Macrosiphum rosae*
– Head, ANT I-II and SIPH pale. ANT III with 1–10 rhinaria *Macrosiphum euphorbiae*
4. ANT III or III-V with numerous small rhinaria along most of length of segment(s). Cauda short and rounded or helmet-shaped, not longer than its basal width in dorsal view **5**
– ANT III-V without rhinaria or with only 1–3 rhinaria near base. Cauda tongue- or finger-shaped, or triangular, as long as or longer than its basal width in dorsal view **6**
5. Sec. rhinaria (c.50) only on ANT III, which is very long, about as long as IV+V together. Cauda with c.10 hairs. Marginal tubercles (MTu) not apparent *Amphicercidus pulverulens*
– Sec. rhinaria on ANT III 13–28, IV 8–18 and V 1–8. ANT III much shorter than IV+V together. Cauda with at least 20 long fine hairs. ABD TERG 1–7 with flat round MTu
Cedoaphis incognita
6. Dorsal abdomen with extensive dark sclerotisation. SIPH black, 0.8–1.2× the paler, triangular cauda. ABD TERG 1–5 with hemispherical MTu *Aphthargelia symphoricarpi*
– Dorsal abdomen pale, or if with any dark sclerotisation then cauda is tongue- or finger-shaped and both SIPH and cauda are equally dark. MTu absent or present on ABD TERG 1–5 **7**

7. SIPH swollen distally or in middle 8
 – SIPH tapering or cylindrical 9
8. SIPH 0.9–1.4× cauda, which is rather long and finger-like. Prothorax with a dark trapezoid sclerite ventrally *Hyadaphis foeniculi*
 – SIPH 1.9–2.5× cauda, which is rather short, tongue-shaped. Prothorax without a dark ventral sclerite *Rhopalomyzus loniceræ*
9. Dorsal abdomen with variably developed dark sclerotisation on ABD TERG 1–6 as well as 7 and 8. Femora wholly dark. R IV+V 0.65–0.92× HT II. Cauda with 7–17 hairs *Aphis spiraephaga*
 – Without that combination of characters go to key to polyphagous aphids, p. 1020

Symphytum

S. asperum
S. caucasicum
S. officinale

S. orientale
S. peregrinum
S. tauricum
S. tuberosum
S. uplandicum

Symphytum sp.

Boraginaceae

Brachycaudus cardui; *Ovatomyzus boraginacearum*
Ovatomyzus boraginacearum
Aphis fabae, *gossypii*, *symphyti*; *Aulacorthum solani*;
Brachycaudus cardui, *helichrysi*, *mordvilkoii*;
Macrosiphum euphorbiae; *Myzus ascalonicus*, *ornatus*;
Ovatomyzus boraginacearum
Aulacorthum solani; *Ovatomyzus boraginacearum*
Ovatomyzus boraginacearum
Brachycaudus cardui
Brachycaudus cardui, *helichrysi*
Aulacorthum solani; *Brachycaudus cardui*;
Macrosiphum euphorbiae; *Myzus persicae*;
Ovatomyzus boraginacearum
Brachycaudus virgatus; *Myzus antirrhinii*

Use key to apterae on *Anchusa*, which covers all these species.

Symphyzicarpus see *Heterostemma*

Symplocos, *Syncarpia* see Blackman and Eastop (1994)

Synedrella

S. nodiflora

Compositae

Aphis gossypii, *spiraecola*; *Geopemphigus floccosus*;
 [*Tetraneura nigriabdominalis*]; *Uroleucon ambrosiae*

Key to apterae on *Synedrella*:–

- ANT PT/BASE less than 0.5. SIPH absent. Groups of wax glands present dorsally on head, thorax and abdomen *Geopemphigus floccosus*
 – ANT PT/BASE more than 1. SIPH tubular. No discrete groups of dorsal wax glands
 go to key to polyphagous aphids, p. 1020

Syneilesis

S. palmata

Compositae

Brachycaudus helichrysi

Syngonium

S. podophyllum
Syngonium sp.

Araceae

Aphis gossypii
Aulacorthum solani

Use key to polyphagous aphids, p. 1020.

HOST LISTS AND KEYS

Synosma

S. suaveolens

Compositae

Uroleucon sp. (as *rudbeckiae*)

Syntherisma see *Digitaria*

Synurus

S. deltoides

S. pungens

Compositae

Aphis fabae; *Capitophorus elaeagni*; *Uroleucon gobonis*

Capitophorus rostratus

Key to apterae on *Synurus*:-

1. Dorsal body hairs with expanded apices, long and thick at least on head and ABD TERG 7-8, and arising from tuberculate bases 2
 - Dorsal hairs not long and capitate nor arising from tuberculate bases
go to key to polyphagous aphids, p. 1020 (where specimens running to
Uroleucon compositae may be *U. gobonis*)
2. R IV+V 2.6-3.7× longer than HT II *Capitophorus rostratus*
 - R IV+V c.1.4-1.5× longer than HT II *Capitophorus elaeagni*

Syrenia

S. angustifolia

S. cana

S. siliculosa

Cruciferae

Smiela syreniae

Smiela syreniae

Lipaphis jungarica

Key to apterae on *Syrenia*:-

- SIPH as dark cones. Cauda helmet-shaped, shorter than its basal width. ANT III with rhinaria on distal part. ANT PT/BASE 0.9-1.6. Dorsal hairs c.50µm long and slightly capitate *Smiela syreniae*
- SIPH thin and cylindrical. Cauda conical tongue-shaped, longer than its basal width. ANT III with rhinaria towards basal part. ANT PT/BASE c.2.5. Dorsal hairs very short (6-8µm) and blunt *Lipaphis jungarica**

Syringa

S. amurensis

S. emodi

S. japonica

S. persica

S. reticulata

S. reticulata var. *mandshurica*

S. vulgaris

Syringa spp.

Oleaceae

Aulacorthum syringae; *Prociphilus oriens*

Aulacorthum syringae; *Prociphilus oriens*

Aulacorthum syringae; *Prociphilus oriens*

Aphis craccivora

Aulacorthum syringae

[*Macrosiphum malvicola* Matsumura (nomen dubium)]

Aulacorthum syringae; *Prociphilus americanus*, *bumeliae*

Aphis gossypii; *Myzus persicae*

Key to apterae on *Syringa* (except couplets 1-3 which can be applied to al.):-

1. Wax pore plates present. ANT PT/BASE less than 0.5. (Spring colonies of fund. with all progeny al.) 2
 - No discrete wax glands. ANT PT/BASE more than 1 4
2. Al. (progeny of fund.) with at least 4 sec. rhin. on ANT V *Prociphilus oriens*
 - Al. (progeny of fund.) with 0-2 sec. rhin. on ANT V 3
3. ANT III more than 5×ANT II, as long as or longer than ANT IV+V together. Head with a pair of large posterior wax pore plates, conspicuous as clearly delimited pale areas *Prociphilus bumeliae*

- ANT III less than $5 \times$ ANT II, usually shorter than ANT IV + V together. Head without or with only small or ill-defined wax pore plates, not forming clearly delimited pale areas *Prociphilus americanus*
- 4. ANT III–VI dark, with PT/BASE more than 5. Tibiae wholly dark, femora contrastingly pale except apices. SIPH dark, tapering, with a well-developed flange. Cauda pale *Aulacorthum syringae*
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Syzygium see Blackman and Eastop (1994)

***Tabernaemontana* (incl. *Conopharyngia*,
Ervatamia, *Sarcopharyngia*)**

Apocynaceae

<i>T. amblycarpa</i>	<i>Toxoptera aurantii</i>
<i>T. chippii</i>	<i>Sitobion krahi</i>
<i>T. coronaria</i>	<i>Aphis gossypii</i> ; <i>Myzus persicae</i>
<i>T. divaricata</i>	<i>Aphis gossypii</i> , <i>spiraecola</i>

Use key to apterae on *Rauwolfia*.

Taeniatherum

Gramineae

<i>T. caput-medusa</i>	<i>Rhopalosiphum padi</i>
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(or use key to apterae of grass-feeding aphids under *Digitaria*)

Tagetes

Compositae

<i>T. erecta</i>	<i>Aphis gossypii</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Prociphilus erigeronensis</i> ; <i>Toxoptera odinae</i> ; <i>Uroleucon ambrosiae</i>
<i>T. lunulata</i>	<i>Geopemphigus torsus</i>
<i>T. minuta</i>	<i>Aphis spiraecola</i> ; <i>Aulacorthum solani</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Uroleucon compositae</i>
<i>T. patula</i>	<i>Aphis fabae</i> , <i>gossypii</i> , <i>spiraecola</i> ; <i>Aulacorthum solani</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus ornatus</i> , <i>persicae</i> ; <i>Neomyzus circumflexus</i> ; <i>Toxoptera odinae</i>
<i>T. tenuifolia</i>	<i>Brachycaudus helichrysi</i> ; <i>Myzus persicae</i>
<i>Tagetes</i> spp.	<i>Aphis craccivora</i> ; <i>Neotoxoptera oliveri</i> ; <i>Geopemphigus blackmani</i> (?)

Key to apterae on *Tagetes*:-

1. ANT PT/BASE less than 0.5. SIPH absent. (These characters must also apply: body sparsely hairy, head with dorsal wax plates, and R IV + V with 2–10 accessory hairs) **2**
- **Either** ANT PT/BASE more than 1.5 and SIPH present, **or** bracketed characters not in that combination go to key to polyphagous aphids, p. 1020
2. Abdomen with a dark posterior extension of cauda and anal plate, which is strongly convex. R IV + V $0.95\text{--}1.2 \times$ HT II and bearing 4–10 accessory hairs. (Al. sexupara without dark dorsal abdominal cross-bands) *Prociphilus erigeronensis*
- Cauda and anal plate not on a dark posterior extension of the abdomen. (Cauda very small, and anal plate divided into dorsal and posteroventral parts by a marked concavity.) R IV + V $0.74\text{--}0.96 \times$ HT II, with 2 accessory hairs. (Al. sexupara with dark cross-bands on ABD TERG 3–8) *Geopemphigus* sp.(p)

HOST LISTS AND KEYS

Taeniatherum

T. caput-medusae

Talguenea

T. quinquenervis

Talinum

T. caffrum

T. triangulare

Use key to polyphagous aphids, p. 1020.

Tamarix see Blackman and Eastop (1994)

Tanacetum

T. annuum

T. argenteum

T. artemisioides

T. balsamita (= *Balsamita suaveolens*,
incl. *majus*)

T. bipinnatum

T. boreale

T. coccineum

T. corymbosum

T. longifolium

T. macrophyllum see *Pyrethrum*

T. multifidum see *vulgare*

T. parthenifolium

T. parthenium

T. praeteritum (incl. *massicyticum*)

T. pseudachillea

T. vulgare (incl. *multifidum*)

Tanacetum spp.

Gramineae

Rhopalosiphum padi

Rhamnaceae

Aphis sp. (S America: BMNH colln)

Portulacaceae

Aphis craccivora, *gossypii*

Aphis craccivora, *gossypii*; *Toxoptera aurantii*

Compositae

Brachycaudus helichrysi; *Myzus persicae*

Macrosiphum euphorbiae

Macrosiphoniella artemisiae

Brachycaudus cardui, *helichrysi*;

Macrosiphoniella artemisiae, *tanacetaria*; *Myzus persicae*

Macrosiphoniella tanacetaria

Aphis fabae;

Macrosiphoniella abrotani ssp. *chosoni*, *antennata*, *atra* ssp.
latysiphon, [*borealis*], [*tanacetaria* ssp. *divia*];

Uroleucon [*cephalonopli*], *simile*

Coloradoa rufomaculata; *Metopeurum fuscoviride*

Brachycaudus helichrysi;

Macrosiphoniella miestingeri, *tanacetaria*, *anacetaria* ssp.
titalica; *Metopeurum fuscoviride*; *Myzus persicae*;

Uroleucon minor, *tanaceti*

Coloradoa tanacetina;

Metopeurum fuscoviride

Macrosiphoniella tapuskae

Aphis fabae, *gossypii*, *spiraecola*;

Brachycaudus cardui, *helichrysi*;

Macrosiphoniella artemisiae, *oblonga*, *tanacetaria*;

Nasonovia ribisnigri; *Uroleucon tanaceti*

Macrosiphoniella absinthii

Macrosiphoniella aktashica ssp. *hirsuta*,

[*Macrosiphoniella* sp. (Kadyrbekov, 2003c)]

Aphis fabae, *spiraecola*, [*tanaceti* (nomen dubium)],
vandergooti; *Aulacorthum solani*;

Brachycaudus cardui, *helichrysi*; *Coloradoa tanacetina*;

Macrosiphoniella millefolii, *persequens*, *tanacetaria*

Macrosiphum euphorbiae;

Metopeurum borystenicum, *buryaticum*, *enslini*, *fuscoviride*;

Pleotrichophorus glandulosus; *Uroleucon bereticum*, *tanaceti*

Macrosiphoniella aktashica, [*ludoviciana*]

Key to apterae on *Tanacetum*:-

1. SIPH with a distal zone of polygonal reticulation, occupying 0.08–0.8 of length 2
– SIPH without any polygonal reticulation 22
2. SIPH with at least basal part pale or dusky, although often darker distally 3
– SIPH wholly dark, or dark at base as well as apex, sometimes paler in middle 8
3. SIPH 0.7–1.3× cauda, with polygonal reticulation on distal 0.45–0.67 of length 4
– SIPH 1.5–2.6× cauda, with polygonal reticulation on distal 0.08–0.42 5
4. SIPH short and rather thick, c.0.10–0.12× BL and 0.7–1.0× cauda. ANT BASE VI 1.4–1.5× R IV+V 4
Macrosiphoniella abrotani (incl. ssp. *chosoni*)
– SIPH thin in middle, 0.13–0.16× BL and 1.0–1.3× cauda. ANT BASE VI 1.9–2.3× R IV+V 5
Macrosiphoniella oblonga
5. SIPH 2.4–2.6× cauda 5
– SIPH 1.5–2.3× cauda 6
Macrosiphoniella aktashica (incl. ssp. *hirsutum*)
6. SIPH with zone of polygonal reticulation ending in some transversely elongate cells and a small but distinct flange. Hairs on ABD TERG 3 less than 40µm long 6
Macrosiphum euphorbiae
– SIPH flared at apex and completely lacking any flange, the zone of polygonal reticulation ending abruptly at apex (e.g., Figure 5i). Longest hairs on ABD TERG 3 more than 50µm long 7
7. SIPH with distal zone of polygonal reticulation not exceeding 0.25 of length. Cauda with 8–16 hairs (normally c.10). R IV+V 0.7–1.0× ANT BASE VI and 0.95–1.1× HT II 7
Macrosiphoniella tapuskae
– SIPH reticulated on distal 0.32–0.42 of length. Cauda with 15–30 hairs. R IV+V 0.5–0.6× ANT BASE VI and 0.70–0.85× HT II 8
Macrosiphoniella persequens
8. Cauda tapering, triangular, less than 1.7 times longer than its basal width (Figure 52a,b). ANT tubercles weakly developed, so that front of head is shallowly concave in dorsal view 9
– Cauda finger-like, tapering or parallel-sided, more than 1.7 times its basal width. ANT tubercles usually well developed, so that there is a deep frontal sinus 12

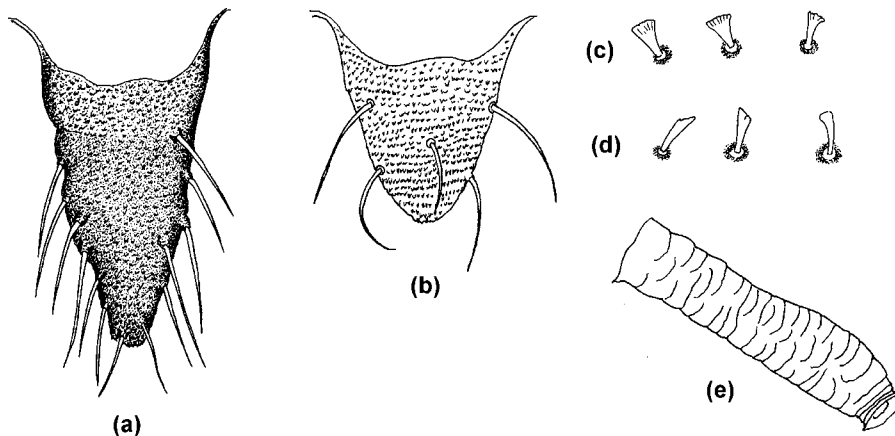


Figure 52 Apterae on *Tanacetum*. (a) cauda of *Metopeurum fuscoviride*, (b) cauda of *M. borystenicum*, (c) dorsal abdominal hairs of *Coloradoa rufomaculata*; (d) same for *C. tanacetina*, (e) SIPH of *C. tanacetina*.

HOST LISTS AND KEYS

9. SIPH only c.0.5× cauda *Metopeurum enslini*
 – SIPH 1.3–2.3× cauda **10**
10. SIPH dusky, c.2.2–2.3× cauda, which is pale, triangular with blunt apex, and bears 4–6 hairs (Figure 52b) *Metopeurum borystenicum*
 – SIPH dark, 1.3–2.0 (–2.2)× cauda, which is dusky/dark, elongate triangular with a rather narrow apex, and bears 9–20 hairs (e.g., Figure 52a) **11**
11. Dorsal body hairs very short and blunt, those on ABD TERG III maximally c.10µm *Metopeurum fuscoviride*
 – Dorsal body hairs pointed, those on ABD TERG III c.59–60µm *Metopeurum buryaticum**
12. SIPH reticulated on distal 0.17–0.25 of length. First tarsal segments with 5 hairs **13**
 – SIPH reticulated on distal 0.3–0.7 of length. First tarsal segments with 3 hairs **16**
13. Cauda dark like the uniformly dark SIPH **14**
 – Cauda pale or dusky, SIPH either uniformly dark or with pale middle section **15**
14. ANT III with 15–21 rhinaria on basal 0.6 of length. SIPH 1.6–1.7× cauda, which bears 13–24 hairs *Uroleucon minor*
 – ANT III with 38–62 rhinaria distributed over 0.65–0.95 of length. SIPH 1.3–1.6× cauda, which bears 11–14 (–17) hairs *Uroleucon simile*
15. Dorsal hairs arising from small dark scleroites. SIPH dark at both ends but usually with paler middle section; 1.7–3.2× cauda which is rather short, tapering and bears 5–10 hairs *Uroleucon tanacetii*
 – Dorsal hairs not on dark scleroites. SIPH uniformly pigmented, 1.2–1.5× cauda which bears 11–17 hairs *Uroleucon bereticum*
16. Dorsal hairs arising from black sclerites or scleroites. Conspicuous black crescent-shaped antesiphuncular sclerites present **17**
 – Dorsal hairs not arising from sclerites or scleroites. Antesiphuncular sclerites absent or faintly pigmented **20**
17. Tibiae with pale middle sections. SIPH c.1.5–1.6× cauda, with reticulation on distal 0.3–0.35 of length *Macrosiphoniella miestingeri*
 – Tibiae entirely black. SIPH 0.6–1.1× cauda, with reticulation on distal 0.45–0.63 **18**
18. ANT III with (14–) 29–55 rhinaria. Dorsal sclerites in spinal region partially fused to form short cross-bands *Macrosiphoniella absinthii*
 – ANT III with 5–28 rhinaria. Dorsal hairs usually all or mostly on separate scleroites **19**
19. Cauda with 10–20 hairs. ANT III with 5–14 rhinaria (9–32 in al.) *Macrosiphoniella atra* ssp. *latysiphon*
 – Cauda with 24–30 hairs. ANT III with 8–28 rhinaria (35–57 in al.) *Macrosiphoniella millefolii*
20. SIPH 0.90–1.45× cauda and flask-shaped; constricted at base, strongly swollen on basal half, narrowing on reticulated distal section to less than half the maximum width of the swollen part, and flared at apex (Figure 13h) *Macrosiphoniella antennata*
 – SIPH tapering from base to apex, 0.6–0.9× cauda **21**
21. ANT III usually entirely black, with 12–32 rhinaria. SIPH reticulated on distal 0.41–0.52 of length. R IV+V 0.7–0.85× HT II and 0.55–0.75× ANT BASE VI *Macrosiphoniella tanacetaria*
 – ANT III paler at base, and bearing 3–14 rhinaria. SIPH reticulated on distal 0.45–0.69 of length. R IV+V 0.85–1.05× HT II and 0.67–1.0× ANT BASE VI *Macrosiphoniella artemisiae*
22. Triommatidium merged with compound eye, so that there is no distinct ocular tubercle. Dorsal hairs small, fan- or club-shaped, or at least with somewhat expanded apices. Front of head weakly convex in

- dorsal view, ANT tubercles undeveloped. ANT PT/BASE 1.4–2.0. SIPH cylindrical for most of length, slightly swollen subapically (e.g., Figure 52e). R IV+V with slightly concave sides. Cauda less than 1.5× its basal width, with 4–5 hairs **23**
- Triommatidium forming a distinct ocular tubercle at posterior margin of eye. Dorsal hairs with blunt or pointed apices, or if with expanded apices then long, with rod-shaped stems. Other characters not in above combination **24**
- 23.** Dorsal hairs fan-shaped (Figure 52c). RIV+V more than 1.1× HT II. SIPH 0.17–0.2× BL, with basal part almost smooth (Figure 12o) *Coloradoa rufomaculata*
- Dorsal hairs very small and weakly club-shaped, or with only slightly expanded apices (Figure 52d). R IV+V less than 1.1× HT II. SIPH 0.13–0.18× BL, with basal part coarsely imbricated like distal part (Figure 52e) *Coloradoa tanacetina*
- 24.** Hairs on ABD TERG 1–5 numerous, long, and all or mostly with distinct, more-or-less cylindrical rod-like stems, broadening distally into fan-shaped or capitate apices. R IV+V stiletto-shaped with a pair of very long accessory hairs near base *Pleotrichophorus glandulosus*
- Hairs on ABD TERG 1–5 without fan-shaped or distinctly capitate apices. R IV+V not stiletto-shaped and without any very long accessory hairs **25**
- 25.** ANT PT/BASE 8–11. ANT III with 7–28 rhinaria extending over 0.4–0.7 of length. Spiracular apertures on pro- and metathorax much larger than those on abdomen *Nasonovia ribisnigri*
- ANT PT/BASE 1.7–6.0. ANT III with 0–3 rhinaria near base. Thoracic spiracular apertures reniform, similar in size and form to abdominal ones **26**
- 26.** Large transparent domed marginal tubercles (MTu) present on all of at least ABD TERG 1–4 and 7 (Figure 5j). ANT PT/BASE 4.1–6.0 *Aphis vandergooti*
- MTu absent, or only constantly present on ABD TERG 1 and 7; if the latter then ANT PT/BASE 1.8–3.7 **27**
- 27.** Cauda helmet-shaped, not longer than its basal width in dorsal view. SIPH with a distinct subapical annular incision. Spiracular apertures large and rounded **28**
- Cauda tongue- or finger-shaped, much longer than its basal width. SIPH without a subapical annular incision. Spiracular apertures reniform go to key to polyphagous aphids, p. 1020
- 28.** Dorsal abdomen with an extensive solid black shield. ANT III 0.31–0.47 mm, 2.4–3.4× HT II. R IV+V 0.17–0.24 mm. SIPH dark, imbricated, 1.7–3.4× cauda *Brachycaudus cardui*
- Dorsal abdomen without a black shield. ANT III 0.07–0.25 mm, 0.9–2.2× HT II. R IV+V 0.10–0.15 mm. SIPH pale, smooth, 0.8–2.0× cauda *Brachycaudus helichrysi*

Tapinanthus

T. cordifolius
Tapinanthus sp.

Loranthaceae

Tuberaphis loranthi
Sitobion ?asirum

Use key to apterae on *Loranthus*.

Taraxacum

T. arctogena
T. dens-leonis
T. erythrospermum
T. hibernicum
T. kok-saghyz
T. lacerum
T. laevigatum

Compositae

Metopolophium arctogenicolens
Aphis gossypii, [*intybi*]; *Uroleucon taraxaci*
Aulacorthum solani; *Myzus ascalonicus*
Aphis taraxacicola
Aphis scorzonerae, *taraxacicola*; *Uroleucon taraxaci*
Aphis madderdae
[*Uroleucon* sp. (Leonard, 1968: 358)]

HOST LISTS AND KEYS

<i>T. mongolicum</i>	<i>Aphis taraxacicola</i> ; <i>Uroleucon gobonis</i>
<i>T. monochlamydeum</i>	<i>Aphis betpakdalensis</i> , <i>scorzoneræ</i>
<i>T. officinale</i>	[<i>Anuraphis farfaræ</i>]; <i>Aphis craccivora</i> , <i>eugeniæ</i> , <i>fabæ</i> , <i>gossypii</i> , <i>knowltoni</i> , <i>middletonii</i> , <i>scorzoneræ</i> , <i>spiraecola</i> , <i>taraxacicola</i> , [<i>terricola</i>], [<i>vandergooti</i>]; <i>Aulacorthum solani</i> ; [<i>Cavariella salicicola</i>]; <i>Dysaphis microsiphon</i> , [<i>radicola</i>], <i>taraxaci</i> ; [<i>Geoica lucifuga</i>]; <i>Hyperomyzus lactucae</i> ; <i>Macrosiphum euphorbiæ</i> ; <i>Myzus ascalonicus</i> , <i>cymbalariae</i> , <i>ornatus</i> , <i>persicæ</i> ; [<i>Nasonovia (Kakimia)</i> sp. (Leonard, 1968)]; <i>Neomyzus circumflexus</i> ; <i>Pemphigus bursarius</i> ; <i>Prociphilus erigeronensis</i> ; <i>Protrama taraxaci</i> ; <i>Trama rara</i> , <i>taraxaci</i> , <i>troglydites</i> ; <i>Uroleucon ambrosiæ</i> , <i>cichorii</i> , <i>compositæ</i> , [<i>nigrotuberculata</i>], <i>pseudambrosiæ</i> , <i>taraxaci</i> <i>Aphis gossypii</i> ; <i>Aulacorthum solani</i> ; <i>Myzus persicæ</i> ; <i>Trama taraxaci</i> ; <i>Uroleucon formosanum</i> <i>Aphis scorzonerae</i> ; <i>Trama rara</i> <i>Uroleucon taraxaci</i> [<i>Acyrtosiphon pisum</i>]; [<i>Anoecia corni</i>]; <i>Aulacorthum palustre</i> , [<i>rufum</i>]; [<i>Dysaphis ranunculi</i>]; <i>Hyperomyzus carduellinus</i> ; <i>Nasonovia ribisnigri</i> ; <i>Smynthuroides betæ</i> ; <i>Trama caudata</i> ; <i>Uroleucon hypochoeridis</i> , [<i>tussilaginis</i>]
<i>T. platycarpum</i>	
<i>T. serotinum</i>	
<i>T. vulgare</i>	
<i>Taraxacum</i> spp.	

Key to apterae on *Taraxacum*:-

1. HT II greatly elongated, more than 0.5× hind tibia. Body and appendages densely covered with fine hairs 2
- HT II of normal length. Body and appendages not densely covered in fine hairs 5
2. SIPH absent 3
- SIPH present as raised pores 4
3. HT II 0.84–0.92× length of hind tibia. Eyes with many facets *Trama rara*
- HT II 0.60–0.73× length of hind tibia. Eyes with only 3 facets *Trama troglodytes*
4. ANT PT/BASE more than 0.5. ANT III with c.15 rhinaria. HT II less than 0.7× hind tibia *Protrama taraxaci**
- ANT PT/BASE less than 0.4. ANT III usually without rhinaria. HT II more than 0.7× hind tibia *Trama caudata* (or *Trama taraxaci**? – see text)
5. ANT PT/BASE less than 0.5. SIPH absent 6
- ANT PT/BASE more than 0.7. SIPH present, tubular or conical 7
6. R IV+V 0.08–0.12mm long, and without any accessory hairs. Hairs at apices of tibiae and first tarsal segments short and thick. Cauda and anal plate not projecting posteriorly *Pemphigus bursarius*
- R IV+V 0.13–0.175mm long, and bearing 4–8 accessory hairs. Hairs at apices of hind tibiae and first tarsal segments long and fine. Cauda and anal plate forming a dark posterior projection of the abdomen *Prociphilus erigeronensis*

7. SIPH dark with an extensive distal zone of reticulation comprising numerous small polygonal cells. Dorsal abdominal hairs all or mostly placed on small dusky or dark scleroites **8**
 – SIPH if dark then without polygonal reticulation. Dorsal abdomen with any dark markings not associated with hair bases **13**
8. Crescent-shaped antesiphuncular sclerites present **9**
 – Antesiphuncular sclerites absent or vestigial **10**
9. R IV+V 0.84–1.08× HT II *Uroleucon hypochoeridis*
 – R IV+V 1.17–1.33× HT II *Uroleucon cichorii*
10. Postsiphuncular sclerites absent or small, not much larger than scleroites at other hair bases, which are large, black and numerous, and sometimes merged together. ANT and tibiae entirely black. Cauda as black as SIPH and rather short and thick, with 8–12 hairs *Uroleucon taraxaci*
 – Large dark postsiphuncular sclerites present. Scleroites at bases of dorsal hairs smaller and less numerous, never merged, usually paler than SIPH. ANT III usually pale at base, and tibiae with paler middle sections. Cauda pale or dark, if dark then long and bearing 13–20 hairs **11**
11. Coxae and cauda dusky/dark. ANT III with 33–86 rhinaria on 0.7–0.95 of length *Uroleucon compositae* (or *gobonis*?)
 – Coxae and cauda pale. ANT III with 8–39 rhinaria on 0.4–0.7 of length **12**
12. HT II rather long and thin, 6 or more× longer than its maximum thickness and 0.9–1.1× R IV+V *Uroleucon pseudambrosiae*
 – HT II less than 5× its maximum thickness and 0.70–0.85× R IV+V *Uroleucon ambrosiae*
13. Well-developed marginal tubercles (MTu) consistently present on ABD TERG 2–4, as well as on several other segments **14**
 – MTu only sporadically present, and then small, on ABD TERG 2–4, although they may be well developed on other segments **16**
14. Cauda finger-like or elongate triangular, with 5–14 hairs. Head without STu *Aphis taraxacicola* (or *A. eugeniae*? – see text)
 – Cauda helmet-shaped, not longer than its basal width in dorsal view, with 4–5 (–6) hairs. Head with a pair of spinal tubercles (STu) **15**
15. SIPH very short, only 0.03–0.08 mm long, 0.4–0.8 (–1.2)× cauda *Dysaphis microsiphon*
 – SIPH c.0.11 mm long, c.2× cauda *Dysaphis taraxaci**
16. R IV+V as long as or longer than cauda, which is dark and bluntly triangular **17**
 – R IV+V shorter than cauda, which is tongue- or finger-shaped **20**
17. ANT PT/BASE 1.5–2.4 **18**
 – ANT PT/BASE 0.9–1.3 **19**
18. Hairs on ANT III all shorter than BD III. SIPH usually longer than cauda *Aphis middletonii*
 – Longest hairs on ANT III 1.0–1.5× BD III. SIPH usually shorter than cauda *Aphis knowltoni*
19. ANT III usually with 1–5 rhinaria on distal part. Hairs on front of head 1.7–2.0× ANT BD III. ABD TERG 6 (as well as 1 and 7) consistently with MTu *Aphis betpakdalensis**
 – ANT III without rhinaria. Hairs on front of head c.0.6× ANT BD III. ABD TERG 6 without MTu *Aphis scorzonerae*
20. ANT tubercles well developed and head smooth, or with spicules on ventral surface only **21**
 – **Either** ANT tubercles undeveloped/ weakly developed and ABD TERG 1 and 7 with MTu, **or** head densely spiculose both dorsally and ventrally **26**

HOST LISTS AND KEYS

21. SIPH clavate 22
 – SIPH tapering or cylindrical on distal half 23
22. Hairs on ABD TERG 8 are 8–19 µm long, and on ANT tubercles 6–11 µm. Secondary rhinaria distributed ANT III 11–29, IV (0–) 1–16, V 0 (–9). ANT PT/BASE 4.3–5.6. ANT PT 1.6–2.3× cauda
Hyperomyzus carduellinus
 – Hairs on ABD TERG 8 are 30–50 µm long, and on ANT tubercles 18–30 µm. Secondary rhinaria distributed ANT III 4–20, IV 0 (–1), V 0. ANT PT/BASE 4.8–7.4. ANT PT 2.0–3.0× cauda
Hyperomyzus lactucae
23. Thoracic spiracles enlarged, much larger than abdominal spiracles. ANT PT/BASE 7.0–11.4, usually more than 8.0. ANT III with 7–28 rhinaria extending over 0.4–0.7 of length. Dorsum usually with paired dark intersegmental markings
Nasonovia ribisnigri
 – Thoracic spiracles similar in size to abdominal ones. ANT PT/BASE less than 7. ANT III with 1–8 (–10) rhinaria on basal part. Dorsum without any dark markings 24
24. SIPH with at least 4 rows of polygonal reticulation. Longest hairs on ANT III 0.6–1.0× BD III
Macrosiphum euphorbiae
 – SIPH without polygonal reticulation, or with only 1–3 indistinct rows of transversely elongate cells. Longest hairs on ANT III 0.2–0.5× BD III 25
25. (Based on ovip.) ANT III with at least 3–8 rhinaria. R IV+V c.0.7× HT II. Head with median frontal tubercle well developed, and without spicules
*Metopolophium arctogenicolens**
 – ANT III with 1–3 rhinaria. R IV+V 1.2–1.3× HT II. Head with median frontal tubercle weakly developed, and with some small spicules ventrally
Aulacorthum palustre
26. ANT tubercles undeveloped, ANT PT/BASE c.1.7–1.8, SIPH cylindrical, only c.2× longer than wide, about as long as cauda which bears only 4 hairs
*Aphis madderæ**
 – Without that combination of characters go to key to polyphagous aphids, p. 1020

Taxillus

T. sutchuenensis

Loranthaceae

Tuberaphis loranthicola (= *takenouchii*?)

Use key to apterae on *Loranthus*.

Teclea see Blackman and Eastop (1994)

Tecoma

T. capensis

T. indicans

T. shirensis

T. stans

Bignoniaceae

Aphis gossypii; *Myzus persicae*

Aphis nerii

Myzus persicae

Aphis gossypii; *Myzus ornatus*, *persicae*; *Toxoptera aurantii*

Use key to polyphagous aphids, p. 1020.

Tectaria

Tectaria sp.

Dryopteridaceae

Macrosiphum miho

Use key to apterae on ferns under *Polypodium*.

Telekia

T. speciosa

Compositae

Brachycaudus helichrysi; *Capitophorus pakansus*;

Uroleucon telekia

Key to apterae on *Telekia*:-

1. ANT III with 2–5 long capitate hairs. Dorsal body hairs numerous long and capitate, arising from large tubercles, the longest hairs being 3–4× ANT BD III (Figure 34b). R IV+V 2.2–2.5× HT II
Capitophorus pakansus
- ANT and dorsal body hairs not long and capitate, without tuberculate bases. R IV+V less than 2× HT II **2**
2. SIPH long, cylindrical, black, with polygonal reticulation on distal 0.17–0.25 of length, 2.0–2.4× cauda which is long and finger-like and bears 20–26 hairs. (Additional diagnostic characters for this species: dorsal hairs all arising from dark scleroites; R IV+V 1.5–1.8× HT II; first tarsal segments with 3 hairs)
Uroleucon telekia
- SIPH short, conical pale, without polygonal reticulation, 0–8–2.0× cauda which is helmet-shaped and bears 4–6 hairs
Brachycaudus helichrysi

(or otherwise go to key to polyphagous aphids, p. 1020)

Teline see *Genista****Tellima****T. grandiflora***Saxifragaceae***Aulacorthum solani*; *Macrosiphum tolmiea*;*Nasonovia stroyani*Key to apterae on *Tellima*:-

1. ANT III with 18–33 rhinaria along most of length, and IV with 0–8. Abdominal spiracular apertures almost completely covered by cow1-like opercula. R IV+V 1.6–2.2× HT II *Nasonovia stroyani*
- ANT III with 0–10 rhinaria on basal part, IV with 0. Abdominal spiracular apertures not or only partly covered by opercula. R IV+V less than 1.6× HT II **2**
2. SIPH with subapical polygonal reticulation. R IV+V 1.3–1.5× HT II, with 12–16 accessory hairs. ANT III usually without rhinaria
Macrosiphum tolmiea
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Telosma*T. cordatum***Asclepiadaceae***Myzus persicae****Tephroseris****T. crispa***Compositae***Brachycaudus cardui****Tephrosia****T. barbiger**T. bracteolata**T. candida**T. cinerea**T. glomerulifera**T. nana**T. purpurea**T. reptans**T. senna**T. totta**T. virginiana***Leguminosae***Aphis craccivora**Aphis gossypii**Aphis craccivora*, *gossypii**Aphis craccivora**Aphis craccivora**Aphis craccivora**Aphis craccivora*; *Megoura dooarsis**Aphis craccivora**Aphis craccivora**Aphis craccivora**Microparsus tephrosiae*

HOST LISTS AND KEYS

T. vogelii
Tephrosia spp.

Aphis craccivora, *glycines*, *gossypii*; *Myzus persicae*
Brachycaudus helichrysi; [*Longicaudus himalayensis*];
Sitobion africanum

Key to apterae on *Tephrosia*:-

1. SIPH black, with a subapical zone of polygonal reticulation. Dorsum with variably developed segmental dark bars or paired patches *Sitobion africanum*
- SIPH pale or dark, without polygonal reticulation. Dorsum either unsclerotised or with a solid dark sclerotic shield 2
2. ANT tubercles very well developed, with smooth divergent inner faces. ANT longer than BL, with PT/BASE more than 5. SIPH swollen in middle 3
- ANT tubercles undeveloped or weakly developed. ANT shorter than BL, with PT/BASE less than 4. SIPH conical, tapering or cylindrical 4
3. SIPH 1.0–1.1× cauda. R IV+V 1.0–1.1× HT II *Microparsus tephrosiae*
- SIPH 1.3–1.6× cauda. R IV+V 0.70–0.85× HT II *Megoura dooarsis*
4. Dorsal abdomen with an extensive solid black shield. Cauda black *Aphis craccivora*
- Dorsal abdomen without dark markings. Cauda pale/dusky, paler than SIPH 5
5. Cauda 0.08–0.135× BL (only more than 0.12× BL in very small specimens with BL less than 1 mm), and 0.8–1.25× ANT V; pale to dusky, without a constriction, less than 3× longer than its width at midlength, and bearing 4–7 (usually 5–6) hairs *Aphis gossypii*
- Cauda 0.12–0.175× BL, and 1.05–1.7× ANT V; very pale, usually with a slight mid-way constriction, more than 3× longer than its narrowest width at midlength, and bearing 5–10 (usually 7–9) hairs *Aphis glycines*

Terminalia see Blackman and Eastop (1994)

Ternstroemia
T. gymnanthera
T. peduncularis

Theaceae

Aulacorthum magnoliae
Toxoptera aurantii

Use key to polyphagous aphids, p. 1020.

Tessaria
T. absinthoides see *Pluchea*

Compositae

Tetracera
T. indica
T. volubilis

Dilleniaceae

Toxoptera aurantii
Aphis gossypii

Use key to polyphagous aphids, p. 1020.

Tetradenia (incl. *Iboza*)
T. multiflora
T. riparia
Tetradenia sp.

Labiatae

[*Sitobion* sp.]
Eucarazzia elegans; *Sitobion coleii*
[*Metanipponaphis cuspidatae*]

Key to apterae on *Tetradenia*:-

1. SIPH strongly swollen, with maximum diameter of swollen part more than 2× minimum diameter of stem, smooth except for a little subapical polygonal reticulation (Figure 48a). SIPH 5.4–8.2× cauda
Eucarazzia elegans
- SIPH not swollen or much less swollen, and less than 3.5× cauda **2**
2. SIPH dark with subapical polygonal reticulation. Dorsum with an extensive solid dark shield across ABD TERG 1–5, fused with marginal and antesiphuncular sclerites. Longest hairs on ANT III less than 0.5× BD III
Sitobion colei
- SIPH if dark then without polygonal reticulation, and other characters not in that combination
go to key to polyphagous aphids, p. 1020

Tetradymia*T. canescens***Compositae***Aphis tetradymia*; *Pleotrichophorus tetradymiae*Key to apterae on *Tetradymia*:-

(Note: both species have black SIPH.)

- Dorsal hairs numerous, with knobbed apices, and arising from tuberculate bases. R IV+V stiletto-shaped, with concave sides. ANT PT/BASE 2.5–3.4. Marginal tubercles (MTu) absent. Cauda pale, finger-like, with 5 hairs
Pleotrichophorus tetradymiae
- Dorsal hairs pointed, without tuberculate bases. R IV+V not concave-sided. ANT PT/BASE 1.1–2.0. Very large MTu present on ABD TERG 1 and 7. Cauda dark, triangular, not longer than its basal width, with 8–14 hairs
Aphis tetradymia

Tetragonocalamus*T. calamus***Gramineae***Takecallis taiwanus*(Or use key to aphids on *Bambusa* in Blackman and Eastop, 1994)***Tetragonolobus* see *Lotus******Tetrapanax****T. papyrifera***Araliaceae**[*Aphis* sp. (Leonard, 1972a:104)];
Cavariella araliae, *nigrocaudata*

Couplet for separating these two species:-

(Note: both spp. have ABD TERG 8 with a backwardly directed process above the cauda)

- Supracaudal process much longer than cauda. SIPH, cauda and genital plate unpigmented
Cavariella araliae
- Supracaudal process about as long as cauda. Distal part of SIPH, cauda and genital plate blackish
Cavariella nigrocaudata

Teucrium*T. canadense*
*T. chamaedrys***Labiatae***Aphis ?aliena*; *Macrosiphum euphorbiae*; *Myzus persicae*
Aphis aliena, *teucrii*; *Aulacorthum solani*;
Ovatomyzus chamaedrys
Ovatomyzus chamaedrys
Aphis teucrii
Aphis middletonii
Aphis aliena, *teucrii**T. divaricatum*
T. flavum
T. laciniatum
T. montanum

HOST LISTS AND KEYS

T. ortale
T. polium
T. scorodonia

Teucrium spp.

Aphis gossypii
Aphis teucrii, [*salviae*], *Aphis* sp. (Italy, BMNH colln)
Aphis aliena, [*'scorodoniae* del Guercio' (see text under
aliena); *Ovatomyzus chamaedryst*
Aphis fabae, [*teucrii* Lichtenstein (nomen nudum)]

Key to apterae on *Teucrium*:–

1. Head smooth with ANT tubercles developed, their inner faces steep-sided. ANT III without rhinaria. SIPH pale, without polygonal reticulation, slightly swollen distally. Cauda pale, constricted at base, and bearing 5 (–7) hairs *Ovatomyzus chamaedryst*
- Without that combination of characters **2**
2. ANT tubercles weakly developed. ABD TERG 1 and 7 with marginal tubercles (MTu) **3**
- ANT tubercles well developed. ABD TERG 1 and 7 without MTu
go to key to polyphagous aphids, p. 1020
3. Cauda black with more than 10 hairs. ABD TERG 7 and 8 with dark cross-bands, and usually there are also dark dorsal markings anterior to SIPH **4**
- Cauda pale, dusky or dark, with 4–10 hairs. ABD TERG 7 and 8 usually without cross-bands, or with a narrow band on 8 only, and no dark markings anterior to SIPH **5**
4. Cauda tongue-shaped, much longer than its basal width. ANT III without rhinaria. ANT PT/BASE 2.1–3.8 (mostly 2.4–3.6) *Aphis fabae*
- Cauda short, bluntly triangular, not longer than its basal width. ANT III often with a few rhinaria on distal part. ANT PT/BASE 1.4–2.1 *Aphis middletonii*
5. R IV+V 0.85–1.22× ANT BASE VI, 1.10–1.45× HT II and 0.61–1.0× cauda, which is distinctly paler than SIPH *Aphis gossypii*
- R IV+V 1.14–2.25× ANT BASE VI, 1.30–2.12× HT II and 0.69–1.40× cauda, which is not much paler than SIPH **6**
6. R IV+V 1.68–2.25× ANT BASE VI and 1.72–2.12× HT II *Aphis* sp. on *T. polium*, Italy, etc. (BMNH colln)
- R IV+V 1.14–1.64× ANT BASE VI and 1.30–1.63× HT II *Aphis aliena* or *teucrii* (see text under these names)

Thalia

Th. geniculata

Marantaceae

Aphis gossypii; *Hysteroneura setariae*;
Sitobion miscanthi, [*Sitobion* sp. (Remaudière and
Autrique, 1985)]

Key to apterae on *Thalia*:–

(Note: all spp. have uniformly dark SIPH and a pale or dusky cauda)

1. SIPH with a subapical zone of polygonal reticulation *Sitobion* sp(p).
- SIPH without polygonal reticulation **2**
2. Cauda long and pale, with 4 hairs, contrasting with black calf-shaped SIPH (slightly swollen on basal part), and dark coxae and femora *Hysteroneura setariae*
- Cauda pale or dusky with 4–8 hairs, SIPH dark and tapering, coxae and femora pale *Aphis gossypii*

Thalictrum

Ranunculaceae

<i>Th. adiantifolium</i> see <i>minus</i>	
<i>Th. amurense</i>	<i>Longicaudus trirhodus</i>
<i>Th. angustifolium</i>	<i>Aphis thalictri</i>
<i>Th. aquilegifolium</i>	<i>Aphis thalictri</i> ; <i>Longicaudus trirhodus</i>
<i>Th. buschianum</i>	<i>Longicaudus trirhodus</i>
<i>Th. chelidonii</i>	<i>Longicaudus dunlopi</i>
<i>Th. collinum</i>	<i>Aphis thalictri</i> ; <i>Longicaudus trirhodus</i>
<i>Th. contortum</i>	<i>Aphis neothalictri</i> , <i>thalictri</i> ; <i>Longicaudus trirhodus</i>
<i>Th. cornuti</i>	<i>Longicaudus trirhodus</i>
<i>Th. delavayi</i>	<i>Longicaudus trirhodus</i>
<i>Th. dioicum</i>	<i>Nasonovia purpurascens</i>
<i>Th. diptercarpum</i>	<i>Aphis thalictri</i>
<i>Th. flavum</i> (incl. <i>glaucum</i>)	<i>Aphis thalictri</i> ; <i>Aulacorthum solani</i> ; <i>Longicaudus dunlopi</i> , <i>trirhodus</i> <i>Longicaudus trirhodus</i>
<i>Th. foetidum</i>	
<i>Th. glaucum</i> see <i>flavum</i>	
<i>Th. hypoleucum</i> see <i>minus</i>	
<i>Th. kemense</i>	<i>Aphis neothalictri</i> , <i>thalictri</i> ; <i>Longicaudus trirhodus</i>
<i>Th. lucidum</i>	<i>Aphis thalictri</i>
<i>Th. majus</i>	<i>Longicaudus trirhodus</i> ssp. <i>iranicus</i>
<i>Th. minus</i> (incl. <i>adiantifolium</i> , <i>hypoleucum</i>)	<i>Aphis gossypii</i> , <i>neothalictri</i> , <i>thalictri</i> ; [<i>Chaetosiphon alpestre</i>]; <i>Longicaudus trirhodus</i> ; <i>Myzus persicae</i>
<i>Th. pauciflorum</i>	<i>Acyrtosiphon ranunculum</i>
<i>Th. petaloideum</i>	<i>Aphis thalictri</i>
<i>Th. polygamum</i>	<i>Nasonovia purpurascens</i>
<i>Th. pseudominus</i>	<i>Longicaudus trirhodus</i>
<i>Th. purpurascens</i>	<i>Nasonovia purpurascens</i>
<i>Th. rariflorum</i>	<i>Nasonovia altaensis</i>
<i>Th. revolutum</i>	<i>Aphis fabae</i> ; <i>Nasonovia purpurascens</i>
<i>Th. rochebrunianum</i>	<i>Longicaudus trirhodus</i>
<i>Th. rhynchocarpum</i>	<i>Aulacorthum solani</i> ; <i>Sitobion thalictri</i>
<i>Th. simplex</i>	<i>Aphis hasanica</i> , <i>thalictri</i> ; <i>Longicaudus trirhodus</i>
<i>Th. simplex</i> var. <i>boreale</i> = <i>rariflorum</i>	
<i>Th. sparsiflorum</i>	<i>Longicaudus trirhodus</i>
<i>Th. squarrosus</i>	<i>Longicaudus trirhodus</i>
<i>Th. thunbergii</i>	<i>Longicaudus trirhodus</i>
Thalictrum spp.	[<i>Aphis thalictri</i> ssp. <i>orangii</i>]; <i>Illinoia thalictri</i> ; <i>Longicaudus cornutus</i> , <i>himalayensis</i> , <i>kumauni</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Pemphigus matsumurai</i>

Key to apterae on *Thalictrum*:-

- | | |
|---|-----------------------------|
| 1. ANT PT/BASE less than 0.5. SIPH absent | <i>Pemphigus matsumurai</i> |
| - ANT PT/BASE more than 0.5. SIPH present | 2 |
| 2. SIPH shorter than cauda | 3 |
| - SIPH longer than cauda | 12 |

HOST LISTS AND KEYS

3. SIPH very short, less than 0.5× cauda 4
 – SIPH 0.6–0.9× cauda 7
4. ANT III much shorter than ANT IV+V together. First tarsal segments with (2–) 3 hairs. Cauda broadly triangular, not or hardly longer than its basal width in dorsal view, with 9–12 hairs
Aphis thalictri (s. str.)
 – ANT III much longer than IV+V together. First tarsal segments with 5 or 6 hairs. Cauda finger-like, much longer than its basal width, with 8–19 hairs 5
5. ANT PT/BASE 2.6–3.5. Dorsal cuticle corrugated and papillate. Cauda with 8–12 hairs
*Longicaudus cornutus**
 – ANT PT/BASE 0.91–2.08. Dorsal cuticle smooth. Cauda with 13–19 hairs 6
6. ANT PT/BASE 0.91–1.46 *Longicaudus trirhodus*
 – ANT PT/BASE 1.56–2.08 *Longicaudus dunlopi*
7. ANT III much longer than IV+V together. First tarsal segments with 5–6 hairs 8
 – ANT III much shorter than ANT IV+V together. First tarsal segments with 2–3 hairs 9
8. ANT PT/BASE less than 2. First tarsal segments with 6 hairs *Longicaudus himalayanesis**
 – ANT PT/BASE 2.5–3.2. First tarsal segments with 5 hairs *Longicaudus kumauni**
9. ANT III with 3–12 rhinaria on basal half. Marginal tubercles (MTu) absent from ABD TERG 1 and 7. R IV+V with (3–) 4 accessory hairs *Nasonovia altaensis*
 – ANT III without rhinaria. MTu always present on ABD TERG 1 and 7. R IV+V with 2 (–3) accessory hairs 10
10. Hind femora with long fine hairs, many of them longer than trochantrofemoral suture. Cauda with 11–24 hairs *Aphis fabae* (part)
 – Hind femora with hairs all shorter than trochantrofemoral suture. Cauda with 9–13 hairs 11
11. MTu usually present on ABD TERG 2–4 as well as 1 and 7. ANT PT/BASE 2.2–2.5. R IV+V 0.8–0.9× HT II *Aphis hasanica**
 – MTu only sporadically on ABD TERG 2–4. ANT PT/BASE 1.6–2.1. R IV+V 0.6–0.8× HT II *Aphis neothalictri**
12. SIPH with a subapical zone of polygonal reticulation (at least 4–5 rows of closed polygonal cells) 13
 – SIPH without any distinct polygonal reticulation (sometimes with 1–3 subapical rows of interconnecting transverse striae) 15
13. SIPH black, with polygonal reticulation on distal 0.3–0.4 of length. ANT black, except at base of III. Cauda dark *Sitobion thalictri*
 – SIPH, ANT and cauda mainly pale. SIPH reticulated on distal 0.08–0.2 of length 14
14. SIPH distinctly swollen proximal to reticulated part. Hairs on ANT III not exceeding 0.5× BD III *Illinoia thalictri*
 – SIPH cylindrical on distal part (sometimes with reticulated part somewhat constricted). Longest hairs on ANT III 0.6–1.0× BD III *Macrosiphum euphorbiae*
15. Head densely spiculate, dorsally as well as ventrally. ANT tubercles well developed with inner faces scabrous and steep-sided 16
 – Head not spiculate. ANT tubercles if well developed then with smooth, divergent inner faces 17
16. SIPH slightly clavate. ANT III without rhinaria *Myzus persicae*
 – SIPH tapering/cylindrical. ANT III almost always with 1–2 (–3) small rhinaria on basal part *Aulacorthum solani*

17. ANT III with 5–19 rhinaria. SIPH dusky or dark distally, but paler on at least basal 0.3
Nasonovia purpurascens
 – ANT III with 0–2 rhinaria. SIPH wholly dark, or only paler at extreme base **18**
18. ANT tubercles well developed, ANT 0.9–1.4× BL, PT/BASE c.3.8–3.9. SIPH 2.4–3.0× cauda. ABD TERG 1 and 7 without marginal tubercles (MTu)
*Acyrtosiphon ranunculum**
 – ANT tubercles weakly developed. ANT 0.5–0.8× BL, PT/BASE 2.0–3.5. SIPH 1.0–2.5× cauda. MTu present on ABD TERG 1 and 7 **19**
19. SIPH darker than cauda, which bears 4–8 hairs. Femoral hairs mostly short. Dorsal abdomen without dark markings
Aphis gossypii
 – SIPH and cauda both black, the latter bearing 11–24 hairs. Femora bearing many long, fine hairs. Dorsal abdomen with dark cross-bands on ABD TERG 7 and 8, and usually with scattered small sclerites on other tergites
Aphis fabae

Thamnocalamus

Thamnocalamus sp.

Gramineae

Melanaphis meghalayensis

See key to bamboo-feeding aphids in Blackman and Eastop (1994).

Thamnoseric

Th. lacerata

Compositae

Brachycaudus helichrysi

Thapsia

Th. garganica

Th. villosa

Umbelliferae

Anuraphis pyrilaseri; *Dyaphis crataegi* ssp. *kunzei*

Aphis craccivora, *fabae*; *Cavariella aegopodii*

Key to apterae on *Thapsia*:-

1. ABD TERG 8 with a posteriorly projecting process above cauda. SIPH clavate. ANT PT/BASE 0.6–1.3
Cavariella aegopodii
 – No supracaudal process. SIPH tapering/cylindrical. ANT PT/BASE more than 1.5 **2**
2. Cauda helmet-shaped, not longer than its basal width. Well-developed spinal and marginal tubercles (STu and MTu) present **3**
 – Cauda tongue-shaped, longer than its basal width. STu absent, MTu sporadic or only consistently present on ABD TERG 1 and 7 **4**
3. Head densely spiculose. SIPH shorter than R IV+V, with close-set annular rows of blunt spinules. Cauda with 10–12 hairs. STu on ABD TERG 1–5
Anuraphis pyrilaseri
 – Head not spiculose. SIPH longer than R IV+V, normally imbricated. Cauda with 5 hairs. STu on head and ABD TERG 8
Dysaphis crataegi ssp. *kunzei*
4. Dorsal abdomen with an extensive dark sclerotic shield. Cauda with 4–7 hairs *Aphis craccivora*
 – Dorsal abdomen without an extensive dark sclerotic shield. Cauda with 11–24 hairs *Aphis fabae*

Thaspium

One aphid species, *Aphis thaspiae*, is recorded from 3 species of *Thaspium*; *aureum*, *barbinode* and *trifoliatum*.

Umbelliferae

Thaumatococcus

Th. daniellii

Marantaceae

Pentalonia nigronervosa

HOST LISTS AND KEYS

Thea = Camellia

Thelepogon

Th. elegans

Aphis gossypii

Gramineae

(or use key to apterae of grass-feeding aphids under *Digitaria*)

Thelesperma

Th. megapotamicum

Brachycaudus helichrysi

Compositae

Thelymitra

Th. longifolia

Macrosiphum euphorbiae

Orchidaceae

Thelypteris (incl. Lastrea)

Th. dryopteris

Th. palustris

Th. phegopteris

Th. quelpaertensis

Thelypteris spp.

Thelypteridaceae
Amphorophora ampullata; *Macrosiphum dryopteridis*
Macrosiphum dryopteridis
Amphorophora ampullata; *Macrosiphum dryopteridis*
Amphorophora ampullata, *scabripes*
Micromyzella filicis; *Micromyzodium filicium*

Use key to apterae of fern-feeding aphids under *Polypodium*.

Themeda (incl. Anthistiria)

Th. arguens

Th. ciliata

Th. coromandeliana (?)

Th. triandra

Th. villosa

Gramineae
Hysterononeura setariae; *Sitobion graminis*, *lambersi*
Sitobion rosaeiformis
Melanaphis sacchari
Baizongia pistaciae; *Sipha maydis*;
Sitobion avenae, *graminis*, [*Sitobion* sp. (Millar, 1994)]
Ceratovacuna lanigera

Use key to apterae of grass-feeding aphids under *Digitaria*.

Theobroma

Th. cacao

Sterculiaceae
Aphis gossypii, *spiraecola*;
Cervaphis rappardi, *schouteniae*;
Macrosiphum martorelli; *Toxoptera aurantii*

Key to apterae on *Theobroma*:-

1. Body with very long, branched, hair-bearing marginal processes 2
 – Body without such processes 3
2. Dorsal abdominal hairs all more-or-less acute, lanceolate, or sometimes slightly bifurcate. Marginal processes on abdomen either with one type of hair (usually bifurcate) at ends of lateral branches or with, near the base, one or two dorsal branches with a thin, acute hair *Cervaphis schouteniae*
 – Dorsal abdominal hairs very blunt, often club-shaped with nearly globular apices, and extremely numerous. Marginal processes on abdomen with pointed or bifurcate hairs at ends of lateral branches, but dorsal branches bearing very blunt or club-shaped hairs like those on mid-dorsal processes *Cervaphis rappardi*
3. Body elongate spindle-shaped, with well-developed ANT tubercles, their inner faces smooth and divergent. SIPH long and dark except at bases, with a subapical zone of polygonal reticulation on about distal 0.2 of length *Macrosiphum martorelli*
 – Without that combination of characters go to key to polyphagous aphids, p. 1020

Thereianthus*Th. spicatus*(or use key to apterae on *Iris*)**Iridaceae***Macrosiphum euphorbiae****Thermopsis****Th. montana* (incl. *venosa*)*Th. pinetorum**Thermopsis* sp.**Leguminosae***Macrosiphum albifrons**Macrosiphum zionense**Aphis helianthi*Key to apterae on *Thermopsis*:-

1. SIPH dark with a subapical zone of polygonal reticulation. ANT and tibiae black
Macrosiphum zionense
- SIPH if dark then without polygonal reticulation. ANT and tibiae pale, or with paler basal sections **2**
2. SIPH pale or dusky with subapical polygonal reticulation. ANT III with 17–40 rhinaria
Macrosiphum albifrons
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Thesium*Th. aggregatum**Th. chinense**Th. divaricatum**Th. dollineri**Th. intermedium**Th. ramosum***Santalaceae***Sitobion africanum**Aphis neothesii**Macrosiphum albertinae**Aphis thesii**Macrosiphum albertinae**Aphis thesii*Key to apterae on *Thesium*:-

1. SIPH without any polygonal reticulation. Cauda dark. Prothorax and ABD TERG 1 and 7 with hemispherical marginal tubercles (MTu). Dorsum usually with dark sclerotisation completely or partly fused between ABD TERG 2–4 (–6) to form a solid or perforated shield **2**
- SIPH with a subapical zone of polygonal reticulation. Cauda pale. Prothorax and ABD TERG 1 and 7 without MTu. Dorsum if with dark markings then these are not fused between tergites **3**
2. R IV+V 1.05–1.25× HT II. Posterior hair on hind trochanter maximally c.0.25× diameter of trochantro-femoral suture. Dorsal shield usually perforated between tergites *Aphis thesii*
- R IV+V 0.8–0.9× HT II. Posterior hair on hind trochanter 0.4–0.5× diameter of trochantrofemoral suture. Dorsal shield not usually perforated between tergites *Aphis neothesii*
3. Dorsal abdomen with variably developed segmental dark markings, sometimes absent. ANT III with 1–3 rhinaria, and with longest hairs 0.2–0.4× BD III. SIPH entirely black *Sitobion africanum*
- Dorsal abdomen membranous. ANT III with 10–15 rhinaria, and longest hairs 0.6–1.0× BD III. SIPH mostly black but paler at base *Macrosiphum albertinae*

Thespesia*Th. acutiloba**Th. danis**Th. populnea***Malvaceae***Aphis gossypii*[*Aphis* sp. (Millar, 1994)]*Aphis gossypii****Thevetia****Th. peruviana***Apocynaceae***Aphis gossypii*, *spiraecola*; *Myzus persicae*

Use key to polyphagous aphids, p. 1020.

HOST LISTS AND KEYS

Thlaspi

Th. arvense

Th. aureum

Use key to apterae on *Brassica*.

Thrinicia* see *Leontodon

Thuidium

Th. tamariscifolium

(or use key to moss-feeding aphids under *Polytrichum*)

***Thuja* see Blackman and Eastop (1994)**

Thunbergia

Th. alata

Th. coccinea

Th. erecta

Th. fragrans

Th. grandiflora

Th. lancifolia

Use key to polyphagous aphids, p. 1020.

Thymus

Th. alternans

Th. austriacus

Th. chamaedrys

Th. cretaceus

Th. dimorphus

Th. drucei

Th. glabrescens

Th. kernerii

Th. longicaulis

Th. mastichina

Th. praecox (incl. *arcticus*)

Th. pseudo-lanuginosa

Th. serpyllum

Th. vulgaris

Thymus sp.

Key to apterae on *Thymus*:-

1. ANT usually 4-segmented, 0.12–0.15× BL, with PT/BASE less than 0.5. Eyes 3-faceted. SIPH absent. Legs very short, with fore- and mid-tarsi usually 1-segmented. Dorsal wax glands present on head, thorax and ABD TERG 1–8, comprising facets surrounding an elongate central area
Kaltenbachiella pallida
- ANT 5- or 6-segmented, more than 0.5× BL, with PT/BASE more than 1. Eyes multifaceted, SIPH present, tarsi 2-segmented and wax glands not evident

Cruciferae

Aulacorthum solani; *Lipaphis erysimi*, *pseudobrassicae*;

Myzus persicae; *Neomyzus circumflexus*

Aphis fabae

Thuidiaceae

[*Jacsonia papillata*]; *Pseudacaudella rubida*

Acanthaceae

Aphis gossypii

Aphis spiraeicola; *Myzus ornatus*

Aphis gossypii

Aphis spiraeicola; *Toxoptera aurantii*

Myzus persicae; *Toxoptera aurantii*

Aphis gossypii

Labiatae

Aphis serpylli

Aulacorthum solani

Aphis serpylli

Aphis serpylli

Aphis serpylli

Aphis serpylli

Aulacorthum solani

Aphis serpylli

Aphis serpylli

Aphis mastichinae, *serpylli*

Aphis serpylli

Myzus ornatus

Aphis serpylli; *Kaltenbachiella pallida*

Myzus ornatus

Myzus ascalonicus

2. ABD TERG 1 and 7 with marginal tubercles (MTu). Head without spicules, and with ANT tubercles weakly developed. SIPH 0.54–1.33× cauda, both black 3
 – ABD TERG 1 and 7 without MTu. Head spiculose, ANT tubercles well developed with steep-sided, scabrous inner faces. SIPH 2.1–2.7× cauda, both pale or dusky
 go to key to polyphagous aphids, starting at couplet 5
3. ABD TERG 2–6 usually without MTu. Caudal hairs long *Aphis serpylli*
 – ABD TERG 2–6 with large flat MTu. Caudal hairs short *Aphis mastichinae*

Thysanolaena*Th. agrostis**Th. maxima***Gramineae***Pseudoregma panicola*; *Sitobion miscanthi*[*Glyphinaphis bambusae*]; *Melanaphis sacchari*;*Pseudoregma panicola*Use key to apterae of grass-feeding aphids under *Digitaria*.***Thyrsostachys****Th. siamensis***Gramineae***Ceratovacuna doipuiensis* (Sirikajornjaru *et al.*, 2002)

(or try keys to bamboo-feeding aphids in Blackman and Eastop, 1994)

Tiarella*T. cordifolia***Saxifragaceae***Nasonovia tiarellae****Tibouchina****T. granulosa**T. holosericea**T. moricandiana**T. rosaeiformis* (?)*T. sellowiana**T. semidecandra***Melastomataceae***Aphis spiraeicola**Myzus ornatus**Myzus ornatus**Aphis gossypii**Myzus ornatus**Aphis gossypii*, *nasturtii*, *spiraeicola*;*Aulacorthum solani*; *Macrosiphum centranthi*;*Myzus ornatus*, *persicae**T. urvilleana**Myzus ornatus**T. viminea**Myzus ornatus**T. weddellii**Myzus ornatus*Key to apterae on *Tibouchina*:-

- SIPH with a subapical zone of polygonal reticulation. Apices of femora and SIPH dark. ANT 1.2–1.6× BL. Longest hairs on ABD TERG 3 are 33–50µm long. Cauda with 11–19 hairs *Macrosiphum centranthi*
- SIPH are without polygonal reticulation and/or other characters are not in that combination
 go to key to polyphagous aphids, p. 1020

Tidestromia*T. lanata* (?lanuginosa)*Aphis craccivora***Amaranthaceae*****Tigridia****Tigridia* sp.*Dysaphis tulipae***Iridaceae*****Timonius****T. amboinicus**Aphis spiraeicola**T. compressicaulis**Aphis spiraeicola***Rubiaceae**

HOST LISTS AND KEYS

Tinnea

T. aethiopica

Labiatae

Aphis gossypii

Tinospora

T. cordifolia

Tinospora sp.

Menispermaceae

Aphis craccivora

Aphis gossypii

Use key to polyphagous aphids, p. 1020.

Tipuana

T. tipu

Leguminosae

Aphis craccivora

Tithonia

T. diversifolia

Compositae

Acyrtosiphon bidenticola; *Aphis gossypii*, *spiraecola*;

Myzus ornatus; *Neomyzus circumflexus*;

Uroleucon ambrosiae

Aphis gossypii

Myzus persicae; *Uroleucon ambrosiae*

Uroleucon ambrosiae

Aphis craccivora; [*Uroleucon* sp. (Leonard, 1972a)]

T. grandiflora

T. rotundifolia

T. thurberi

Tithonia spp.

Key to apterae on *Tithonia*:-

- ANT tubercles well developed with smooth divergent inner faces. ANT dark except at base, with ANT PT/BASE 5.9–7.5. SIPH dark except for basal 0.2–0.3 of length, with any subapical polygonal reticulation restricted to much less than 0.1 of length
Acyrtosiphon bidenticola
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Tocoyena

T. longiflora

Rubiaceae

Aphis gossypii, *spiraecola*

Use key to polyphagous aphids, p. 1020.

Toddalia

T. asiatica

Rutaceae

Toxoptera aurantii

Tolmiea

T. menziesii

Saxifragaceae

Aulacorthum solani; *Macrosiphum tolmiea*;

Nasonovia stroyani

Use key to apterae on *Tellima*.

Tolpis

T. fruticosa

Compositae

Pemphigus bursarius

Toona see Blackman and Eastop (1994)

Tordylium

T. aegyptiacum

T. maximum

Umbelliferae

Aphis fabae

Aphis fabae

Torenia*T. fournieri**Torenia* sp.**Scrophulariaceae***Myzus persicae**Aphis nasturtii*

Use key to polyphagous aphids, p. 1020.

Torilis*T. africana*=*arvensis* ssp. *heterophylla**T. anthriscus**T. arvensis* (incl. ssp. *heterophylla*)*T. japonica**T. leptophylla**T. nodosa***Umbelliferae***Aphis fabae*; *Cavariella pastinacae*; *Hyadaphis foeniculi*;
*Semiaphis anthrisci**Acyrtosiphon ilka*; *Aphis fabae*, [*toriliae*];
Aulacorthum solani; [*Brachycaudus lateralis*];
Cavariella aegopodii;*Dysaphis apiifolia*, *crataegi*, *foeniculus*;
Hyadaphis foeniculi; *Macrosiphum euphorbiae*;
Myzus ornatus, *persicae*; *Semiaphis anthrisci**Aphis fabae*; *Cavariella aegopodii*, [*araliae*], *japonica*;
Dysaphis crataegi ssp. *aethusae*, [*Dysaphis* sp., U.P., India
(Stroyan, 1985: 366)];*Macrosiphum gei*; *Semiaphis heraclei**Aphis craccivora*; *Semiaphis anthrisci**Aphis fabae*Key to apterae on *Torilis*:-

1. ABD TERG 8 with a wart-like or finger-like medial process, bearing 2 hairs 2
- ABD TERG 8 without a medial hair-bearing process 4
2. SIPH tapering and coarsely imbricated. Process on ABD TERG 8 wart-like, shorter than ANT II 2
Cavariella japonica
- SIPH clavate, smooth or with normal imbrication. Process on ABD TERG 8 quadrate or finger-like, longer than ANT II 3
3. ANT PT/BASE 2.6–4.0 *Cavariella pastinacae*
- ANT PT/BASE 0.6–1.3 *Cavariella aegopodii*
4. SIPH very small and flangeless; less than 0.5× cauda and often not much longer (1.0–1.8×) than their diameter at midlength 5
- SIPH more than 0.6× cauda, and with a flange 6
5. SIPH cylindrical or slightly swollen, more than 1.5× their basal widths. ABD TERG 2–5 usually with small hemispherical MTu *Semiaphis anthrisci*
- SIPH tapering, less than 1.5× their basal widths. MTu absent or rare *Semiaphis heraclei*
6. Cauda helmet-shaped, not longer than its basal width. ABD TERG 8, or 7 and 8, usually with spinal tubercles (STu) 7
- Cauda tongue- or -finger shaped, much longer than its basal width. STu usually absent 9
7. SIPH short and broad-based, rarely more 2× their basal width. Hairs on frons long and fine, the longest almost as long as ANT I *Dysaphis foeniculus*
- SIPH 2.5–3.0× their basal width. Hairs on frons very short and blunt 8
8. Posterior hair on hind trochanter 0.24–0.56 (rarely more than 0.5)× length of trochantrofemoral suture. Longest hair on ABD TERG 8 is 11–38µm, rarely longer than 30µm. ABD TERG 7 frequently with paired marginal tubercles (MTu) *Dysaphis apiifolia*

HOST LISTS AND KEYS

- Posterior hair on hind trochanter 0.42–1.00 (rarely less than 0.5)× length of trochantrofemoral suture. Longest hair on ABD TERG 8 is 25–80 μm, rarely shorter than 30 μm. ABD TERG 7 frequently without any MTu, and they are rarely paired *Dysaphis crataegi* (incl. ssp. *aethusae*)
- 9.** SIPH mainly pale, with a subapical zone of polygonal reticulation **10**
- SIPH pale or dark, without polygonal reticulation **11**
- 10.** Longest hair on ABD TERG 8 is 38–63 μm, 0.6–1.4× ANT BD III. Anterior half of subgenital plate usually (77%) with only 2 hairs (18% with 3, 5% with 4–6 hairs) *Macrosiphum euphorbiae*
- Longest hair on ABD TERG 8 is 66–106 μm, 1.4–2.0× ANT BD III. Anterior half of subgenital plate with 2–11 hairs, usually (77%) with 4–8 hairs *Macrosiphum gei*
- 11.** SIPH clavate, dark (except in summer dwarfs) and 0.9–1.4× cauda. Head smooth with ANT tubercles undeveloped *Hyadaphis foeniculi*
- **If** SIPH are clavate then they are pale and 1.7–2.5× cauda, and head is spiculate with well-developed ANT tubercles **12**
- 12.** SIPH pale, long, tapering or cylindrical on distal half. ANT tubercles with smooth, broadly divergent inner faces, and median frontal tubercle evident *Acyrtosiphon ilka*
- SIPH pale or dark, if pale then ANT tubercles have steep-sided, scabrous inner faces, and median frontal tubercle is undeveloped go to key to polyphagous aphids, p. 1020

Tormentilla see *Potentilla*

Torrabasia

T. cuneifolia

Celastraceae

Aphis spiraeicola; *Toxoptera aurantii*

Use key to polyphagous aphids, p. 1020.

Torrubia see *Pisonia*

Tortula

T. muralis

Pottiaceae

Muscaphis musci

(or use key to apterae of moss-feeding aphids under *Polytrichum*)

Tournefortia

T. bicolor

T. glabra

T. hirsutissima

T. maculata

Boraginaceae

Aphis spiraeicola

Aphis spiraeicola

Aphis craccivora, *gossypii*, *spiraeicola*; *Toxoptera aurantii*

Aphis spiraeicola

Use key to polyphagous aphids, p. 1020.

Townsendia

T. sericea

Compositae

Myzus persicae

Toxicodendron see *Rhus*

Trachelanthus

T. korolkowi

Boraginaceae

Brachycaudus bicolor

Trachelium

Tr. caeruleum

Campanulaceae

Dysaphis henrystroyani

Trachelospermum*Tr. asiaticum**Tr. jasminoides***Apocynaceae***Aphis gossypii*; *Eutrichosiphum parvulum**Aphis gossypii*; *Eutrichosiphum parvulum*;*Myzus persicae*; *Toxoptera aurantii*Key to apterae on *Trachelospermum*:-

- SIPH cigar-shaped with numerous long bristle-like hairs, like those on dorsal body and appendages.
Dorsum with a dark sclerotic shield *Eutrichosiphum parvulum*
- SIPH without hairs. Dorsum without a dark sclerotic shield go to key to polyphagous aphids, p. 1020

Trachymene*Trachymene* sp.*Aphis fabae***Umbelliferae****Tradescantia (incl. Setoreasea, Zebrina)***Tr. flaminensis**Aphis gossypii*; *Aulacorthum solani*;*Myzus persicae*; *Neomyzus circumflexus**Tr. pendula**Aphis gossypii**Tr. purpurea**Aulacorthum solani**Tr. virginiana**Myzus persicae**Tradescantia* sp.*Myzus ornatus***Commelinaceae**

Use key to polyphagous aphids, p. 1020.

Tragopogon (incl. Geropogon)*Tr. angustifolius**Brachycaudus tragopogonis**Tr. borystenicus**Brachycaudus tragopogonis**Tr. brevirostris**Brachycaudus tragopogonis**Tr. coloratus**Brachycaudus tragopogonis**Tr. crocifolius**Brachycaudus tragopogonis**Tr. dasyrhynchus**Brachycaudus tragopogonis**Tr. dubianskyi**Brachycaudus tragopogonis**Tr. dubius* (incl. *major*)[*Aphis* (*Protaphis*) sp. (Mier Durante, 1978)];*Brachycaudus* [*prunicola*], *tragopogonis**Tr. glaber**Uroleucon sonchi**Tr. graminifolius**Aphis fabae**Tr. hybridus**Brachycaudus helichrysi*; *Uroleucon sonchi**Tr. longirostris**Aphis spiraeicola*; *Brachycaudus tragopogonis* ssp. *setosus**Tr. major* see *dubius**Tr. orientalis*[*Aphis jacobaeae*]; *Brachycaudus tragopogonis*;*Hyperomyzus lactucae*; *Uroleucon cirsicola*, *cirsii**Tr. paradoxus**Brachycaudus tragopogonis**Tr. phaenopappus**Uroleucon* sp. (Lebanon, BMNH colln)*Tr. porrifolius**Aphis gossypii*, *nasturtii*; *Brachycaudus tragopogonis*;*Hyperomyzus lactucae*; *Macrosiphum euphorbiae*;*Prociphilus erigeronensis*; *Smynthuodes betae*;*Trama caudata**Tr. pratensis**Aphis fabae*, [*rerricola*]; *Brachycaudus tragopogonis*;*Macrosiphum euphorbiae*; *Myzus persicae**Tr. tauricus**Brachycaudus tragopogonis*

HOST LISTS AND KEYS

Tr. ucrainicus
Tragopogon spp.

Brachycaudus tragopogonis
[*Anuraphis ferganica* (nomen nudum)]

Key to apterae on *Tragopogon*:-

1. HT II very elongate, 0.75–0.85× hind tibia. SIPH as small low cones *Trama caudata*
– HT of normal length. SIPH (if present) tubular 2
2. Dorsum with extensive dark sclerotisation, including broad dark cross-bands on thorax and ABD TERG 1–7, the more anterior ones divided in middle. Cauda helmet-shaped, shorter than its basal width in dorsal view 3
– Dorsal abdomen unsclerotised, or with sclerites only at bases of SIPH and dorsal hairs. Cauda rounded, helmet-shaped or finger-like 4
3. ABD TERG 3 with hairs 8–15 µm long *Brachycaudus tragopogonis*
– ABD TERG 3 with hairs 16–40 µm long *Brachycaudus tragopogonis* ssp. *setosus*
4. SIPH black with a zone of reticulation comprising numerous small polygonal cells on distal 0.16–0.27 of length 5
– SIPH if present and black then without polygonal reticulation 8
5. Dorsal hairs not arising from dark scleroites *Uroleucon sonchi*
– Dorsal hairs arising from dark scleroites 6
6. First tarsal segments with 3 hairs. Cauda tapering from base to apex, with 12–16 hairs *Uroleucon* sp. (Lebanon, BMNH colln)
– First tarsal segments with 5 hairs. Cauda long and finger-like, with 20–45 hairs 7
7. Crescent-shaped antesiphuncular sclerites present. SIPH 0.25–0.34× BL. Cauda with 20–33 hairs *Uroleucon cirsii*
– No antesiphuncular sclerites. SIPH 0.32–0.42× BL. Cauda with 30–45 hairs *Uroleucon cirsicola*
8. SIPH distinctly clavate, ANT III with 4–20 rhinaria, and ANT PT/BASE 4.6–8.0. Head smooth with well-developed, broadly divergent ANT tubercles *Hyperomyzus lactucae*
– Without that combination of characters go to key to polyphagous aphids, p. 1020

Tragus

Tragus sp.

Gramineae

Rhopalosiphum maidis

Trapa

Tr. bispinosa

Tr. natans

Trapaceae

Rhopalosiphum nymphaeae

Rhopalosiphum nymphaeae

Trema

T. micrantha

Ulmaceae

Aphis spiraeicola

Trevoa

Tr. trinervia

Rhamnaceae

Macrosiphum euphorbiae; *Myzus persicae*

Use key to polyphagous aphids, p. 1020.

Triadenum

Tr. virginicum

Guttiferae

Hyalomyzus pocsinus

Trianthema

Tr. portulacastrum

Aizoceae

Aphis gossypii

Tribolium* (incl. *Plagiochloa*)Tr. uniolae***Gramineae***Geoica lucifuga****Tribulus****Tr. bimucronatus**Tr. cistoides**Tr. cristatus**Tr. maximus* see *Kallstroemia**Tr. pentandrus**Tr. pterophorus**Tr. terrestris**Tr. zeyheri***Zygophyllaceae**[*Hyadaphis foeniculi*]; *Aphis craccivora**Aphis craccivora**Aphis craccivora**Aphis gossypii**Aphis craccivora**Aphis craccivora*, *fabae*, *gossypii*; *Myzus persicae**Aphis craccivora*

Use key to polyphagous aphids, p. 1020.

Trichachne* see *Digitaria***Trichilia****Tr. lagoensis***Meliaceae***Aphis* sp. (Brazil; BMNH colln)***Tricodendron* see Blackman and Eastop (1994)*****Trichodesma****Tr. indicum**Tr. physaloides**Tr. zeylandicum***Boraginaceae**[*Aphis* sp. (Pakistan)]*Macrosiphum euphorbiae**Aphis gossypii*; *Brachycaudus helichrysi*;*Macrosiphum euphorbiae*

Use key to polyphagous aphids, p. 1020.

Tricholaena*Tr. repens*=*Tr. rosea**Tr. rosea**Tr. teneriffae**Tricholaena* sp.**Gramineae***Hallaphis ilharcoi*; *Hysteroneura setariae*;*Sitobion africanum*, *graminis*, *matatum*, *neusi*, *yakini*;*Tetraneura fusiformis**Colopha graminis**Sipha flava*Use key to apterae on grasses under *Digitaria*.***Tricholepis****Tr. furcata**Tr. stewartae***Compositae***Capitophorus tricholepidis*; *Uroleucon kumaoni**Uroleucon kumaoni*Key to apterae on *Tricholepis*:-

- Body and appendages pale. Dorsal body hairs long and thick, arising from tuberculate bases, with knobbed apices. SIPH long, thin and pale, without polygonal reticulation. ANT III without rhinaria
Capitophorus tricholepidis
- Body and appendages with dark pigmentation, incl. small scleroites at bases of dorsal hairs, which do not have distinctly knobbed apices. SIPH black, rather thick, with a distal zone of polygonal reticulation. ANT III with 39-49 rhinaria
Uroleucon kumaoni

HOST LISTS AND KEYS

Trichopilia

Tr. fragrans

Tr. marginata (incl. *coccinea*)

Sitobion luteum

Sitobion luteum

Orchidaceae

(Or use key to apterae on orchids under *Cymbidium*)

Trichophorum

Tr. caespitosum

Hyalopterus pruni

Cyperaceae

Trichosanthes

Tr. anguina

Tr. cucumerina

Tr. cucumeroides

Tr. dioica

Aphis gossypii, [*umbrella*]

Aphis gossypii

Aphis gossypii

Aphis gossypii, [*umbrella*]

Cucurbitaceae

Trichostigma

Tr. octandrum

Aphis gossypii

Phytolaccaceae

Tricuspis see Tridens

Tricyrtis

Tr. formosana

Tr. hirta

Aulacorthum solani

Aulacorthum solani

Convallariaceae

Tridax

Tr. procumbens

Aphis craccivora, *gossypii*, *spiraecola*;

Brachycaudus helichrysi; *Hyperomyzus carduellinus*;

[*Hysteroneura setariae*]; *Myzus ornatus*, *persicae*;

[*Rhodobium porosum*]; *Uroleucon ambrosiae*

Compositae

Key to apterae on *Tridax*:-

- SIPH distinctly clavate, and almost smooth. ANT III with 11-29 rhinaria, and sec. rhinaria also often present on IV and V. Head smooth with well-developed divergent ANT tubercles

Hyperomyzus carduellinus

- Without that combination of characters

go to key to polyphagous aphids, p. 1020

Tridens

Tr. flava (= *Tricuspis seslerioides*)

Hyalopteroides humilis

Gramineae

Trientalis

Tr. latifolia

Aulacorthum solani; *Myzus persicae*

Primulaceae

Use key to polyphagous aphids, p. 1020

Trifolium

Tr. agrarium

Tr. alexandrinum

Tr. alpestre

Tr. angustifolium

Tr. arvense

Acyrtosiphon pisum; *Therioaphis trifolii*

Acyrtosiphon pisum; *Aphis craccivora*, *gossypii*;

Nearctaphis bakeri; *Therioaphis trifolii*

Acyrtosiphon pisum; *Aphis craccivora*; *Aulacorthum solani*;

Myzus ornatus, *persicae*; *Therioaphis subalba*

Acyrtosiphon pisum; *Aphis craccivora*, *fabae*

Acyrtosiphon pisum; *Brachycaudus helichrysi*;

Macrosiphum euphorbiae; *Therioaphis trifolii*

Leguminosae

<i>Tr. aureum</i> (=agrarium auct.)	<i>Therioaphis trifolii</i>
<i>Tr. campestre</i>	<i>Acyrthosiphon pisum</i> ; <i>Aphis craccivora</i> ; <i>Myzus ornatus</i> ; <i>Therioaphis trifolii</i>
<i>Tr. cryptopodium</i>	<i>Aphis craccivora</i>
<i>Tr. dubium</i>	<i>Acyrthosiphon pisum</i> ; <i>Aphis ?coronillae</i> (as <i>scaliai</i>); <i>Myzus ornatus</i> , <i>persicae</i>
<i>Tr. elatius</i> see <i>incarnatum</i>	
<i>Tr. filiforme</i>	<i>Acyrthosiphon pisum</i>
<i>Tr. hybridum</i>	<i>Acyrthosiphon</i> [<i>malvae</i>], <i>pisum</i> ; <i>Aphis craccivora</i> , <i>nasturtii</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; <i>Nearctaphis bakeri</i> , <i>crataegifoliae</i> ; <i>Prociphilus erigeronensis</i> ; <i>Therioaphis trifolii</i>
<i>Tr. incarnatum</i> (incl. <i>elatius</i>)	<i>Acyrthosiphon pisum</i> ; <i>Aphis craccivora</i> , <i>fabae</i> ; <i>Aulacorthum solani</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Nearctaphis bakeri</i> ; <i>Therioaphis trifolii</i>
<i>Tr. lupinastrum</i>	<i>Acyrthosiphon pisum</i> ; <i>Therioaphis trifolii</i>
<i>Tr. medium</i>	<i>Acyrthosiphon pisum</i> ; <i>Myzus persicae</i> ; <i>Therioaphis subalba</i> , <i>trifolii</i>
<i>Tr. montanum</i>	<i>Aphis craccivora</i> ; <i>Therioaphis subalba</i>
<i>Tr. ochroleucon</i>	<i>Aphis craccivora</i>
<i>Tr. officinale</i>	<i>Acyrthosiphon pisum</i> ; <i>Therioaphis riehmii</i>
<i>Tr. pannonicum</i>	<i>Acyrthosiphon pisum</i>
<i>Tr. pratense</i>	<i>Acyrthosiphon kondoi</i> , <i>pisum</i> ; <i>Aphis craccivora</i> , <i>coronillae</i> , <i>gossypii</i> , <i>nasturtii</i> , <i>spiraecola</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; [<i>Geoica utricularia</i>]; <i>Megoura viciae</i> ; <i>Myzus ornatus</i> , <i>persicae</i> ; <i>Nearctaphis bakeri</i> , [<i>sensoriata</i>]; <i>Pemphigus ?populi</i> (Zwölfer, 1958), <i>Pemphigus</i> sp. (as <i>lactucae</i>); [<i>Sitobion akebiae</i>]; <i>Therioaphis brachytricha</i> , <i>luteola</i> , <i>trifolii</i>
<i>Tr. procumbens</i>	<i>Acyrthosiphon pisum</i> ; <i>Subacyrthosiphon cryptobium</i> ; <i>Therioaphis ?trifolii</i> (as <i>ononidis</i>)
<i>Tr. prutetianum</i>	<i>Aphis craccivora</i> ; <i>Myzus persicae</i>
<i>Tr. repens</i>	<i>Acyrthosiphon kondoi</i> , <i>pisum</i> ; <i>Aphis craccivora</i> , <i>coronillae</i> , <i>gossypii</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; <i>Myzus ornatus</i> , <i>persicae</i> ; <i>Nearctaphis bakeri</i> ; <i>Neomyzus circumflexus</i> ; [<i>Sipha glyceriae</i>]; <i>Subacyrthosiphon cryptobium</i> ; <i>Therioaphis trifolii</i>
<i>Tr. repens-latum</i>	<i>Nearctaphis bakeri</i>
<i>Tr. resupinatum</i>	<i>Acyrthosiphon pisum</i> ; <i>Aphis craccivora</i> , <i>gossypii</i> ; <i>Myzus ornatus</i> ; <i>Nearctaphis bakeri</i>
<i>Tr. scabrum</i>	<i>Acyrthosiphon pisum</i> ; <i>Brachycaudus helichrysi</i>
<i>Tr. subterraneum</i>	<i>Acyrthosiphon pisum</i> ; <i>Aphis craccivora</i> ; [<i>Schizaphis graminum</i>]
<i>Tr. tomentosum</i>	<i>Aphis craccivora</i>
<i>Trifolium</i> spp.	<i>Abstrusomyzus phloxae</i> ; <i>Nearctaphis californica</i> , <i>zabapsis</i> ; [<i>Semiaphis heraclei</i>]

HOST LISTS AND KEYS

Key to apterae on *Trifolium* (couplets 1–2 **only** can also be applied to alatae):–

1. Fore coxae greatly enlarged. SIPH in form of small truncate cones. Cauda knobbed, anal plate bilobed 2
 - Fore coxae normal. Form of SIPH (if present) various. Cauda tongue- or finger-shaped, anal plate entire 6

2. All viviparae are al. ABD TERG 1–7 each with 4 hairs 16–26 μm long *Therioaphis riehmi*
 - Apt. commonly present. ABD TERG 1–7 each usually with more than 4 hairs, the longest of which are either less than 16 μm or more than 26 μm long 3

3. All hairs on ABD TERG 1–7 very short, 7–10 μm long, much shorter than ANT BD III, and arising from rugose sclerotic patches (Figure 40c) *Therioaphis brachytricha*
 - Longest hairs on ABD TERG 1–7 more than 30 μm long and arising from conical processes 4

4. ABD TERG 1–5 each with only 4 long hairs (2 spinal, 2 marginal) arising from large conical processes, although often with additional much smaller hairs in pleural region (Figure 53a) *Therioaphis subalba*
 - ABD TERG 1–5 mostly with at least 6 long hairs of similar length all arising from large conical processes 5

5. ABD TERG 1–5 each rather regularly with 6 long hairs, arising from conical processes on evenly pigmented dusky sclerites without dark borders (Figure 53b) *Therioaphis luteola*
 - ABD TERG 1–5 each with more than 6 hairs, arising from conical processes on sclerites that have dark borders (Figure 40f) *Therioaphis trifolii* (s. lat.)

6. Head spiculose or nodulose, **but** with ANT tubercles undeveloped. SIPH with close-set, strongly spiculate imbrication 7

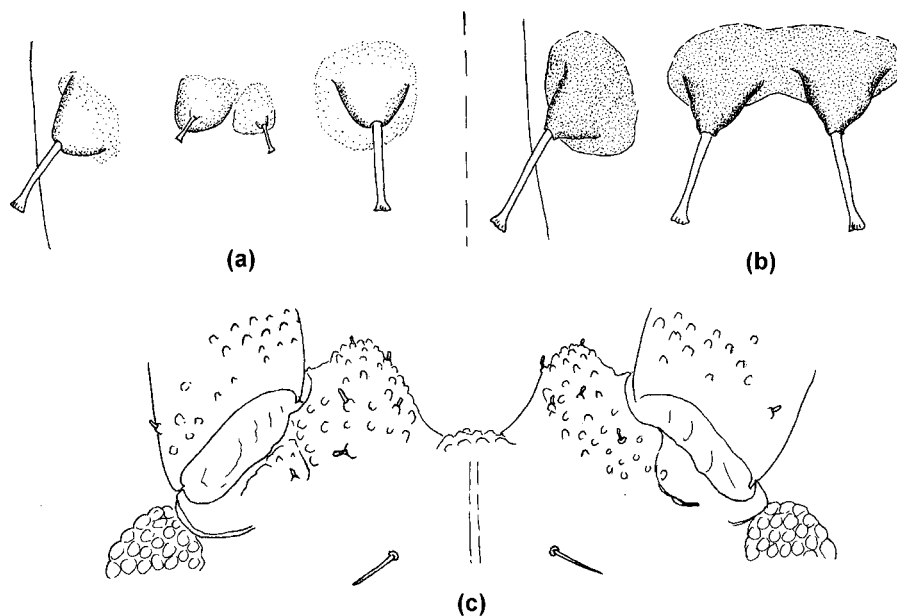


Figure 53 Apterae on *Trifolium*. (a) ABD TERG 3 (left side) of *Therioaphis subalba*, (b) same for *Th. luteola*, (c) front of head (ventral aspect) of *Subacyrthosiphon cryptobium*.

- Head smooth or, if spiculose or nodulose then with ANT tubercles well developed. SIPH (if present) with normal imbrication 11
- 7. Hind tibiae with numerous circular scent glands *Nearctaphis sensoriata*
- Hind tibiae without scent glands 8
- 8. Dorsal abdomen with extensive sclerotisation, variably developed but at least with complete broad dark cross-bands covering most of ABD TERG 5–8 9
- Dorsal abdomen with at most with dark bars on ABD TERG 5–8, more anterior segments having small dark or pale brown sclerites at bases of hairs 10
- 9. Dorsal surface of head evenly and densely nodulose. ANT PT/BASE 2.1–2.7 *Nearctaphis californica*
- Dorsal surface of head with dispersed spicules. ANT PT/BASE 1.3–1.7 *Nearctaphis zabapsis**
- 10. R IV+V 0.14–0.18 mm long, and usually with 4 accessory hairs. Dorsal hairs mostly not arising from dark sclerites. SIPH dusky or dark *Nearctaphis crataegifoliae*
- R IV+V 0.10–0.13 mm long, with 2 (–3) accessory hairs. Dorsal hairs all or mostly arising from dark sclerites. SIPH pale *Nearctaphis bakeri*
- 11. ANT tubercles very well developed **and** head not densely spiculose/nodulose 12
- Either ANT tubercles are not developed or only weakly developed, or head is densely spiculose/nodulose 16
- 12. Head black. SIPH black and swollen in middle, similar in length to cauda, which is also black *Megoura viciae*
- Head pale or dusky. SIPH pale or dark towards apices, not swollen in middle and much longer than the cauda, which is also pale 13
- 13. ANT tubercles scabrous or nodulose ventrally (Figure 53c). Small dark ante- and postsiphuncular sclerites present, and dusky sclerotic cross-bands on ABD TERG 7 and 8 *Subacyrthosiphon cryptobium*
- ANT tubercles not scabrous or nodulose. No dark dorsal sclerotisation 14
- 14. SIPH with a subapical zone of reticulation, comprising 4–5 rows of large polygonal cells. Longest hairs on ANT III 0.6–1.0× BD III *Macrosiphum euphorbiae*
- SIPH without polygonal reticulation. Hairs on ANT III all shorter than BD III 15
- 15. ANT I with 9–23 hairs. ANT BASE VI 0.25–0.40 mm long, 1.8–3× longer than R IV+V. SIPH attenuate distally, with diameter at midlength similar to or less than middle diameter of hind tibia *Acyrthosiphon pisum*
- ANT I with 6–10 hairs. ANT BASE VI 0.13–0.20 mm long, 1–1.5× longer than R IV+V. SIPH not attenuate distally; diameter at midlength greater than middle diameter of hind tibia *Acyrthosiphon kondoi*
- 16. Dorsal abdomen with extensive dark sclerotisation, divided into polygons 17
- Dorsal abdomen not extensively sclerotised go to key to polyphagous aphids, p. 1020
- 17. ABD TERG 2–4 (–6) rather regularly bearing dome-shaped marginal tubercles (MTu), totalling 4–10 on these tergites *Aphis coronillae*
- ABD TERG 2–6 usually without MTu, rarely with 1–3 small ones *Aphis craccivora*

Trigloch*Tr. maritimum**Tr. palustre***Juncaginaceae***Aphis triglochinis*; *Rhopalosiphum nymphaeae*, *padi*;*Sitobion avenae**Schizaphis palustris*

HOST LISTS AND KEYS

Key to apterae on *Triglochin*:-

1. SIPH dark with a subapical zone of polygonal reticulation, 1.1–1.4× the much paler cauda
Sitobion avenae 2
– SIPH without polygonal reticulation, and SIPH and cauda with similar pigmentation 2
2. ANT PT/BASE 1.1–1.8 *Aphis triglochinis* 3
– ANT PT/BASE 2.6–5.2 3
3. Dorsal cuticle dusky/dark, sclerotic and very rough, with close-set irregular angular denticulation. Marginal abdominal tubercles (MTu) absent. SIPH short, tapering without a subapical constriction, 0.08–0.11× BL. ANT PT/BASE 2.6–3.1 *Schizaphis palustris*
– Dorsal cuticle pale, ornamented with a pattern of spinules arranged in polygons. Small MTu present on ABD TERG 1 and 7. SIPH 0.11–0.21× BL, clavate or cylindrical on distal half, with a smooth constricted region close to flange. ANT PT/BASE 3.1–5.8 4
4. SIPH clavate, more than 2× cauda. ANT PT/BASE 3.1–4.0 *Rhopalosiphum nymphaeae*
– SIPH not clavate; not more than 2× cauda. ANT PT/BASE 3.6–5.2 *Rhopalosiphum padi*

Trigonella

Tr. arabica
Tr. coerulea
Tr. foenum-graecum

Tr. radiata
Tr. stellata

Leguminosae

Aphis craccivora
Therioaphis riehmi
Acyrthosiphon pisum; *Aphis craccivora*, *gossypii*;
Myzus persicae; *Therioaphis riehmi*
Acyrthosiphon pisum
Acyrthosiphon gossypii, *pisum*; *Aphis craccivora*

Use key to apterae on *Melilotus*.

Triplaris

Tr. brasiliana
Tr. cumingiana

Polygonaceae

Macrosiphum euphorbiae
Aphis gossypii

Use key to polyphagous aphids, p. 1020.

Triplochlamys

Tr. multiflora

Malvaceae

Myzus persicae

Tripleurospermum

Tr. inodorum (see *perforatum*)
Tr. maritimum (incl. *ambiguum*)

Tr. perforatum (incl. *inodorum*)

Compositae

Aphis fabae, *lindae*; *Aulacorthum solani*;
Brachycaudus cardui, *helichrysi*
Aphis craccivora, *dudichi*, *fabae*, *vandergooti*;
Aulacorthum solani;
Brachycaudus cardui, *helichrysi*, *lateralis*;
Coloradoa inodorella;
Macrosiphoniella abrotani, *millefolii*, *oblonga*,
tanacetaria, *tapuskae*;
Macrosiphum euphorbiae; *Metopeurum matricariae*;
Myzus persicae; *Pemphigus bursarius*, *fuscicornis*

Use key to apterae on both *Matricaria* and *Tripleurospermum* under *Matricaria*.

Tripogon*Tr. jacquiomontii**Hysteroneura setariae***Gramineae**(or use key to apterae of grass-feeding aphids under *Digitaria*)**Tripsacum***Tr. latifolium**Hysteroneura setariae**Tr. laxum**Rhopalosiphum maidis***Gramineae**Use key to apterae of grass-feeding aphids under *Digitaria*.**Trisetaria***Tr. koelerioides**Sipha maydis*; *Sitobion avenae**Tr. linearis**Rhopalosiphum padi*; *Sipha maydis*;*Schizaphis graminum*; *Sitobion fragariae***Gramineae**Use key to apterae of grass-feeding aphids under *Digitaria*.**Trisetum***Tr. flavescens**Forda formicaria*; *Rhopalosiphum padi*; *Sipha maydis*;
Sitobion avenae, *fragariae*; *Tetraneura ulmi**Tr. spicatum**Sitobion fragariae**Tr. subspicatum**Rhopalosiphum padi***Gramineae**Use key to apterae of grass-feeding aphids under *Digitaria*.***Tristania*** see Blackman and Eastop (1994)**Tristemma***Tr. mauritianum**Toxoptera aurantii***Melastomataceae****Triteleia***Tr. hyacinthina**Aulacorthum solani***Alliaceae****Triticum***Tr. aestivum*

Gramineae

Anoecia corni, *fulviabdominalis*, *vagans*;
Aphis craccivora, *middletonii*; *Baizongia pistaceae*;
Carolinaia rhois; *Cavariella aquatica*;
Diuraphis agropyronophaga, *frequens*, *noxia*, *tritici*;
Forda [*auralenta*], *formicaria*, *hirsuta*, *marginata*,
[*multicoma*], *orientalis*, *riccobonii*;
Geoica lucifuga; *Hysteroneura setariae*;
Metopolophium dirhodum, *festucae* ssp. *cerealium*,
longicaudatum;
Myzus persicae; *Paraclotus bykovi*, *cimiciformis*;
Pemphigus [*betae*], *vulgaris*;
Rhopalosiphum insertum, *maidis*, *padi*, *padiformis*,
rufiabdominale; *Schizaphis graminum*;
Sipha elegans, *flava*, *maydis*, *uvarovi*;
Sitobion africanum, *akebiae*, *avenae*, *graminis*, *miscanthi*,
yakini; *Smynthuodes betae*;
Tetraneura africana, *chui*, *fusiformis*, *radicicola*, *ulmi*

HOST LISTS AND KEYS

Tr. caninum
Tr. dicoccoides
Tr. dicoccum
Tr. durum

Tr. monococcum
Tr. polonicum
Tr. repens see *Agropyron*
Tr. sativum see *aestivum*
Tr. vulgare see *aestivum*
Triticum sp.

Melanaphis pyrararia
Melanaphis pyrararia; *Sitobion fragariae*
Metopolophium dirhodum; *Rhopalosiphum padi*
Anoecia vagans; *Aploneura lentisci*; *Diuraphis noxia*;
Geoica harpazi, *utricularia*; *Metopolophium dirhodum*;
Rhopalosiphum maidis, *padi*; *Schizaphis graminum*;
Sitobion akebiae, *fragariae*; *Smynthurodes betae*
Diuraphis noxia; *Metopolophium durhodum*;
Rhopalosiphum maidis, *padi*

Anoecia nemoralis; *Forda rotunda*; *Paracletus donistorpei*

Use key to apterae of grass-feeding aphids under *Digitaria*.

***Tritonia* (incl. *Montbretia*)**

Tritonia sp.

Triumfetta

Tr. pentandra
Tr. pilosa

Tr. rhomboidea

Iridaceae

Macrosiphum euphorbiae; [*Sitobion fragariae*]

Tiliaceae

Aphis gossypii
Brachycaudus helichrysi; *Myzus persicae*;
Neomyzus circumflexus
Aphis gossypii, *spiraecola*; *Aulacorthum solani*;
Myzus ornatus; *Sitobion triumfettae*;
Uroleucon compositae

Key to apterae on *Triumfetta*:-

- SIPH dark with polygonal reticulation on subapical 0.10–0.17 of length. Cauda pale. Dorsal abdomen pale or with faint sclerotic cross-bands. Longest hairs on ANT III 0.3–0.4× BD III

Sitobion triumfettae

- Without the above combination of characters

go to key to polyphagous aphids, p. 1020

Trollius

Tr. altaicus
Tr. chinensis
Tr. europaeus

Tr. pumilus
Trollius sp. (and cult.)

Ranunculaceae

Aphis nasturtii
Aphis fabae
Aulacorthum solani; [*Brachycaudus cardui*];
Macrosiphum trollii
Aulacorthum solani
Myzus persicae

Key to apterae on *Trollius*:-

- SIPH with a subapical zone of polygonal reticulation. ANT III with 20–36 small rhinaria in an irregular row over 0.4–0.75 of length

Macrosiphum trollii

- Without that combination of characters

go to key to polyphagous aphids, p. 1020

Tropaeolum

Tr. majus

Tropaeoleaceae

Aphis fabae, *fabae* ssp. *mordvilkoii*, *gossypii*, *nasturtii*;
Aulacorthum solani; *Brevicoryne brassicae*;
Lipaphis erysimi; *Macrosiphum euphorbiae*;
Myzus ornatus, *persicae*; *Neomyzus circumflexus*

Tr. officinale
Tropaeolum sp.

Myzus persicae
Aphis sp. (Chile, BMNH colln, leg. R. Carrillo)

Key to apterae on *Tropaeolum*:-

1. SIPH slightly swollen, but not clavate (without narrow section on basal half). ANT tubercles absent, or if developed then not projecting forward beyond middle part of head, so that front of head is convex, straight or sinuate in dorsal view. ABD TERG 1 and 7 without marginal tubercles (MTu) **2**
 - Without this combination of characters; i.e., **if** SIPH are present then they are tapering, cylindrical or clavate (with narrow section on basal half), and **either** ANT tubercles are very well developed **or** ABD TERG 1 and 7 have MTu **3**
2. ANT III 2.5–3.7× SIPH, which are 0.8–1.0× the broad-based triangular cauda. Dorsal abdomen usually with paired dark markings on most tergites *Brevicoryne brassicae*
 - ANT III 1.2–1.7× SIPH, which are 1.2–1.6× the tongue-shaped cauda. Dorsal abdomen usually with cross-bands on ABD TERG 7 and 8, but without markings anterior to SIPH *Lipaphis erysimi*
3. SIPH and cauda both equally dark. Cauda with 9–24 hairs. Longest hairs on ANT III at least 0.7× BD III **4**
 - Without that combination of characters go to key to polyphagous aphids, p. 1020
4. ABD TERG 1–7 with broad dark cross-bands, partially fused between segments. Longest hairs on ANT III 0.7–0.9× BD III. R IV+V 0.8–0.9× HT II. Cauda elongate triangular, tapering almost to a point, with 9–10 hairs *Aphis* sp. (Chile, BMNH colln)
 - ABD TERG 1–5 without broad dark cross-bands, at most with only scattered dark irregular sclerites. Longest hairs on ANT III 0.8–2.4× BD III. R IV+V 0.9–1.4× HT II. Cauda tongue-shaped, rather rounded at apex, and bearing 11–24 hairs **5**
6. Length of rostrum (from base of protractor apodeme) 0.69–0.79 mm. R IV+V (0.9–) 1.0–1.4× HT II *Aphis fabae* ssp. *mordvilkoii*
 - Length of rostrum 0.44–0.62 mm. R IV+V 0.85–1.05× HT II *Aphis fabae* s.str.

Tulipa

T. bakeri
T. gesneriana

T. prismatica
T. sylvestris
Tulipa spp.

Liliaceae

Myzus ornatus
Aphis gossypii; *Aulacorthum solani*; *Dysaphis tulipae*;
Macrosiphum euphorbiae; *Myzus persicae*;
Neomyzus circumflexus; *Rhopalosiphoninus staphyleae*;
Sitobion akebiae
Macrosiphum euphorbiae
Dysaphis tulipae; *Myzus ascalonicus*
Aphis fabae, *spiraecola*; *Myzus cymbalariae*;
Rhopalosiphoninus latysiphon, *staphyleae* ssp. *tulipaellus*

Key to apterae on *Tulipa*:-

1. Cauda helmet-shaped, not longer than its basal width in dorsal view. Head and ABD TERG 7 and 8 with paired spinal tubercles *Dysaphis tulipae* **2**
 - Without that combination of characters
2. SIPH dark, tapering, 1.4–1.9× the much paler cauda, and with a subapical zone of polygonal reticulation. Longest hairs on ANT III less than 0.6× BD III *Sitobion akebiae*
 - Without that combination of characters go to key to polyphagous aphids, p. 1020

HOST LISTS AND KEYS

Tupidanthus* see *Schefflera

Turbina

T. oblongata

Use key to polyphagous aphids, p. 1020.

Turgenia

T. latifolia

Use key under *Caucalis*.

Turnera

T. angustifolia see *ulmifolia*

T. subulata

T. ulmifolia (incl. *angustifolia*)

***Turnera* sp.**

Use key to polyphagous aphids, p. 1020.

Turritis* see *Arabis

Tussilago

T. farfara

T. petasites

***Tussilago* spp.**

Key to apterae on *Tussilago*:-

- | | | |
|----|--|----------------------------------|
| 1. | SIPH absent. Eyes 3-faceted. ANT PT/BASE less than 0.5 | 2 |
| – | SIPH present, tubular. Eyes multifaceted. ANT PT/BASE more than 1 | 3 |
| 2. | HT II greatly elongated, more than 0.5× hind tibia. Body and appendages densely clothed in fine hairs. | |
| | No discrete wax glands | <i>Trama troglodytes</i> |
| – | HT II of normal length. Body and appendages sparsely hairy. Posterior abdomen with wax glands | <i>Pemphigus bursarius</i> |
| 3. | Dorsal hairs long and thick with knobbed apices | 4 |
| – | Dorsal hairs not thick, if long then with fine apices | 5 |
| 4. | ANT III with 2–4 thick capitate hairs, 0.6–0.8× BD III (Figure 54a) | <i>Capitophorus similis</i> |
| – | ANT III with c.6 thick capitate hairs, longer than BD III | <i>Capitophorus takahashii</i> * |
| 5. | Cauda semicircular or helmet-shaped, shorter than its basal width in dorsal view | 6 |
| – | Cauda tongue- or finger-like, longer than its basal width in dorsal view | 9 |

Convolvulaceae

Macrosiphum euphorbiae; *Myzus persicae*

Umbelliferae

Brachycaudus crassitibiae

Turneraceae

Aphis gossypii

Aphis gossypii; *Macrosiphum euphorbiae*

Toxoptera aurantii; [*Subvatomyzus leucosceptri*]

Compositae

Anuraphis farfarae; *Aphis fabae*, [*vandergooti*];

Aulacorthum solani;

Brachycaudus cardui, *helichrysi*;

Capitophorus similis, *takahashii*; *Chomaphis mira*;

[*Dysaphis pyri*]; *Macrosiphum euphorbiae*;

Myzus ascalonicus, *ornatus*, *persicae*;

Pemphigus bursarius; *Trama troglodytes*;

Uroleucon tussilaginis

Brachycaudus helichrysi

[*Aphis aliena*]; *Aulacorthum cirsicicola*

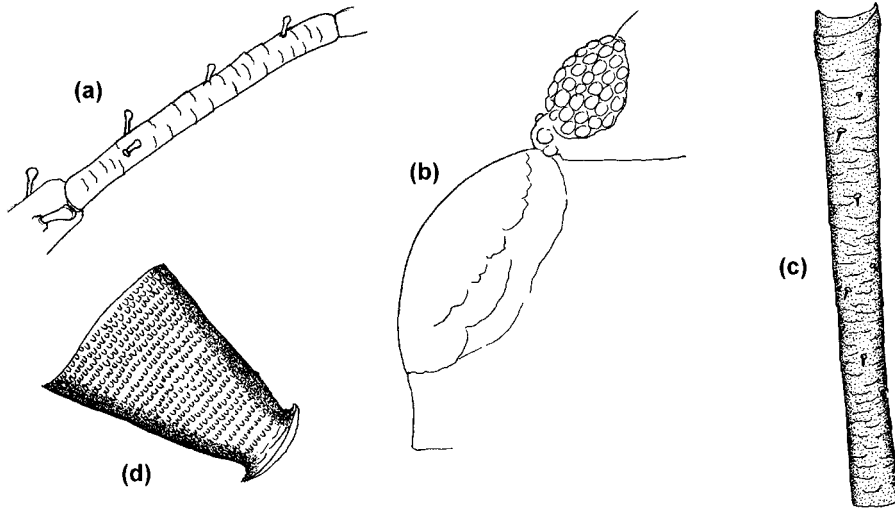


Figure 54 Apterae on *Tussilago*. (a) ANT III of *Capitophorus similis*, (b) prothoracic marginal tubercle of *Chomaphis mira*, (c) SIPH of *Ch. mira*; (d) SIPH of *Anuraphis farfarae*.

6. Prothorax with a pair of very large marginal tubercles (MTu), up to 2.5× diameter of compound eye (Figure 54b), and ABD TERG 1–5 also with very large MTu. SIPH long and flangeless, more than 7× cauda, and bearing some small pointed hairs (Figure 54c) *Chomaphis mira*
 - Prothorax if with MTu then these are smaller than compound eyes. ABD TERG 1–5 with or without MTu. SIPH less than 4× cauda, and without hairs 7
7. Paired spinal tubercles (STu) present on all segments, and marginal tubercles (MTu) on prothorax and ABD TERG 1–5. SIPH with close-set rows of fine spinules (Figure 54d) *Anuraphis farfarae*
 - STu and MTu absent, or rarely present on 1–2 segments. SIPH smooth or with normal imbrication 8
8. Dorsal abdomen with an extensive solid black shield. ANT III 0.31–0.47 mm, 2.4–3.4× HT II. R IV + V 0.17–0.24 mm. SIPH dark, imbricated, 1.7–3.4× cauda *Brachycaudus cardui*
 - Dorsal abdomen without a black shield. ANT III 0.07–0.25 mm, 0.9–2.2× HT II. R IV + V 0.10–0.15 mm. SIPH pale, smooth, 0.8–2.0× cauda *Brachycaudus helichrysi*
9. SIPH with polygonal reticulation on distal 0.1–0.2 of length. Head smooth with well-developed ANT tubercles, their inner faces smooth and divergent 10
 - SIPH without polygonal reticulation. If ANT tubercles are well developed then head is at least ventrally spiculose 11
10. SIPH dark at base and apex, with middle part paler. Head, prothorax and ANT I–II black. ANT III with 6–18 rhinaria. Cauda with 12–25 hairs. R IV + V 1.3–1.5× HT II *Uroleucon tussilaginis*
 - SIPH mostly pale, only dusky towards apex. Head, prothorax and ANT I–II pale. ANT III with 1–10 rhinaria. Cauda with 8–12 hairs. R IV + V 0.8–1.0× HT II *Macrosiphum euphorbiae*
11. ANT 1.6–1.7× BL, which is 2.7–4.1 mm. Hind tibiae very long, 0.9–1.5× BL. ANT III with 3–12 rhinaria. Ventral side of head densely spinulose/nodulose, but dorsal surface almost smooth *Aulacorthum cirsicola*
 - ANT 0.6–1.5× BL, which is 1.0–3.0 mm. Hind tibia 0.4–0.8× BL. ANT III without rhinaria, or with 1–3 rhinaria. Either head without spicules or densely spiculose/nodulose on both dorsal and ventral surfaces go to key to polyphagous aphids, p. 1020

Tylophora

T. asthmatica

Typha

T. angustata

T. angustifolia

T. australis

T. capensis

T. domingensis

T. elephantina

T. latifolia

T. laxmanni

T. major

T. minima

T. minuta

T. orientalis

Typha spp.

Asclepiadaceae

Aphis nerii

Typhaceae

Ceruraphis eriophori; *Hyalopterus amygdali*;
Rhopalosiphum nymphaeae, *padi*
Aphis typhae; *Ceruraphis eriophori*;
Hyalopterus amygdali, *pruni*; *Schizaphis rosazevedoi*, *scirpi*
Hyalopterus pruni; *Rhopalosiphum padi*; *Schizaphis scirpi*
Rhopalosiphum nymphaeae; *Schizaphis eastopi*
Hysteroneura setariae; *Myzus persicae*;
Rhopalosiphum padi; *Schizaphis rosazevedoi*
Schizaphis rosazevedoi
Aphis gossypii, *typhae*; *Ceruraphis eriophori*;
Hyalopterus pruni;
Rhopalosiphum enigmae, *maidis*, *nymphaeae*, *padi*;
Schizaphis rosazevedoi, *rotundiventris*, *scirpi*;
Sipha glyceriae; *Sitobion avenae*
Schizaphis scirpi
Rhopalosiphum nymphaeae
Ceruraphis eriophori; *Rhopalosiphum nymphaeae*, *padi*
Rhopalosiphum padi
Hyalopterus pruni; [*Rhopalosiphoninus staphyleae*];
Rhopalosiphum enigmae
Aphis fabae; *Mordvilkoella skorkini*;
Rhopalosiphum laconae; *Sitobion fragariae*

Key to apterae on *Typha*:-

1. Dorsal hairs long, thick and spine-like. ANT 5-segmented, with ANT PT/BASE c.1. SIPH stump-shaped. Cauda with distal part a rounded knob *Sipha glyceriae*
- Dorsal hairs not long, thick and spine-like. ANT 5- or 6-segmented, with ANT PT/BASE more than 1.3. SIPH tubular, or as slightly raised pores, cauda not knobbed **2**
2. ANT 5-segmented, only 0.17–0.2× BL. SIPH as slightly raised pores. Cauda helmet-shaped or triangular, with apical part extended and bearing 6–8 hairs *Mordvilkoella skorkini**
- ANT (5- or) 6-segmented, at least 0.3× BL. SIPH tubular. Cauda tongue or finger-shaped **3**
3. SIPH very small, thin and flangeless, less than 0.7× cauda *Hyalopterus pruni/amygdali*
- SIPH similar in thickness to, and at least 0.8× cauda, with an apical flange **4**
4. Tergum almost entirely dark, and SIPH jet black, with coarse denticulate imbrication *Ceruraphis eriophori*
- Tergum usually pale, sometimes with dusky/dark central patch or dark markings. SIPH pale or dark **5**
5. SIPH with a subapical zone of polygonal reticulation. ANT III with (0–) 1–4 small rhinaria near base **6**
- SIPH without polygonal reticulation. ANT III without rhinaria **7**
6. SIPH 1.7–2.25× cauda, which has a rounded apex *Sitobion fragariae*
- SIPH 1.1–1.4× cauda, which has a more pointed apex *Sitobion avenae*

7. Head densely spiculose, with well-developed ANT tubercles, their inner faces scabrous and apically convergent. SIPH pale and slightly clavate *Myzus persicae*
- Head not spiculose, with ANT tubercles rather weakly developed, or only developed to a similar extent to median frontal tubercle. SIPH dusky or dark, tapering, cylindrical or clavate **8**
8. Dorsal abdominal cuticle with a pattern of blunt spicules arranged in polygons, each polygon enclosing one or more additional spicules. SIPH usually appearing slightly to distinctly swollen in middle or on distal part, narrowing just before flange **9**
- Dorsal abdominal cuticle sometimes with polygonal reticulation but this is not spiculose, and neither do the polygons enclose spicules. SIPH tapering gradually from base to flange, or swollen on basal half **13**
9. SIPH slightly but distinctly clavate (with narrower section on basal half) *Rhopalosiphum nymphaeae*
- SIPH without narrower section on basal half **10**
10. Body rather elongate oval. SIPH only 0.07–0.08× BL, without a subapical constriction and with a small flange. ANT PT/BASE 1.7–2.8 *Rhopalosiphum maidis*
- Body more broadly oval. SIPH 0.12–0.17× BL, with a subapical constriction and large flange. ANT PT/BASE 3.1–6.3 **11**
11. SIPH less than 2× cauda. Small marginal tubercles (MTu) present only on (prothorax and) ABD TERG 1 and 7 *Rhopalosiphum padi*
- SIPH more than 2× cauda. MTu usually present on some or all of ABD TERG 2–6 as well as 1 and 7 **12**
12. ABD TERG 2–6 as well as 1 and 7 all with well-developed conical MTu, those on 7 being 35–50µm in basal diameter. Longest hairs on ANT III 0.5–0.7× BD III. ANT PT/BASE 4.0–5.0 *Rhopalosiphum laconae*
- ABD TERG 2–6 irregularly with small MTu. MTu on ABD TERG 7 20–30µm in basal diameter. Longest hairs on ANT III 0.8–2.0× BD III. ANT PT/BASE 4.6–6.3 *Rhopalosiphum enigmae*
13. Cauda black with 11–24 hairs **14**
- Cauda pale, dusky or dark, with 4–10 hairs **15**
14. ABD TERG 2–4 (–6) with well-developed MTu *Aphis typhae*
- ABD TERG 2–4 only sporadically with small MTu *Aphis fabae*
15. Hind tibial hairs short, not or only distally exceeding width of tibia at midlength **16**
- Hind tibial hairs mostly much longer than width of tibia at midlength **18**
16. Cauda long, pale finger-like, with 4 hairs. Hind femora dark over at least distal half. SIPH calf-shaped (slightly swollen on basal half) *Hysteroneura setariae*
- Cauda tongue-shaped, pale, dusky or dark, with 4–8 hairs. Hind femora pale, or darker only towards apex. SIPH tapering, not swollen on basal half **17**
17. ANT PT/BASE 2.0–3.0. SIPH 1.3–2.5× cauda, which bears 4–8 hairs *Aphis gossypii*
- ANT PT/BASE 4.8–6.6. SIPH 2.2–3.0× cauda, which bears 4–5 hairs *Schizaphis rotundiventris*
18. Coxae and trochanters dark. Hairs on ANT III 53–108µm long *Schizaphis scirpi*
- Coxae and trochanters pale. Hairs on ANT III 18–38µm long **19**
19. Posterior dorsal cephalic hairs are 25–35µm long, and hairs on ABD TERG 6 are 35–53µm long *Schizaphis eastopi*
- Posterior dorsal cephalic hairs are 37–79µm long, and hairs on ABD TERG 6 are 56–98µm long *Schizaphis rosazevedoi*

HOST LISTS AND KEYS

Typhonium **Araceae**
T. trilobatum *Aphis gossypii*

Typhonodorum **Araceae**
Typhonodorum sp. *Pentalonia nigronervosa*

Uapaca see Blackman and Eastop (1994)

Ulex **Leguminosae**
U. europaeus *Aphis fabae, ulicis*
Ulex sp. *Aphis gossypii*

Key to apterae on *Ulex*–

- Dorsum with extensive black sclerotisation. R IV+V 1.2–1.4× HT II. Cauda with 8–15 hairs. Longest hairs on ANT III 0.64–1.05× BD III *Aphis ulicis*
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Ulmaria see *Filipendula*

Umbellularia see Blackman and Eastop (1994)

Umbilicus **Crassulaceae**
U. rupestris *Aphis sedi*

Uncaria (incl. Ourouparia) **Rubiaceae**
U. formosana *Aphis gossypii*
U. sessilifructus *Toxoptera aurantii*

Use key to polyphagous aphids, p. 1020.

Uncinia **Cyperaceae**
U. ferruginea *Sitobion miscanthi*
Uncinia sp. *Thripsaphis unciniae*

Use keys to apterae on *Carex*.

Uniola **Gramineae**
U. spicata see *Distichlis spicata*

Urechtites see *Pentalinon*

Urena **Malvaceae**
U. lobata *Aphis gossypii, spiraecola; Aulacorthum solani;*
Myzus ornatus, persicae; Neomyzus circumflexus
U. trilobata *Aphis gossypii*

Use key to polyphagous aphids, p. 1020.

Urginea **Hyacinthaceae**
U. maritima *Smynthurodes betae*

Urochloa **Gramineae**
U. bulboides *Hysteroneura setariae; Rhopalosiphum maidis*
U. helopus *Tetraneura fusiformis*

<i>U. oligotricha</i>	<i>Hysteroneura setariae</i> ; <i>Rhopalosiphum maidis</i>
<i>U. panicoides</i>	<i>Tetraneura fusiformis</i>
<i>U. trichopus</i>	<i>Hysteroneura setariae</i>

Use key to apterae of grass-feeding aphids under *Digitaria*.

Urospermum

U. dalechampii
U. picroides

Compositae

Nasonovia ribisnigri; *Uroleucon hypochoeridis*
Brachycaudus helichrysi; *Nasonovia ribisnigri*

Key to apterae on *Urospermum*:–

1. Cauda helmet-shaped, not longer than its basal width. SIPH short, conical, with an annular incision proximal to flange. Spiracular apertures large and rounded. Dorsum without any dark markings. ANT III without rhinaria *Brachycaudus helichrysi*
 - Cauda finger-like, much longer than its basal width. SIPH tubular, without a subapical annular incision. Spiracular apertures partially occluded or reniform. Dorsum with dark markings. ANT III with rhinaria **2**
2. SIPH dark with a zone of reticulation comprising numerous small polygonal cells, on distal 0.16–0.34 of length. Dorsal hairs all arising from dark scleroites. Crescent-shaped antesiphuncular sclerites present. Thoracic spiracles not distinctly larger than abdominal ones *Uroleucon hypochoeridis*
 - SIPH mainly pale, without any polygonal reticulation. Dorsal abdomen without dark hair-bearing scleroites, but usually with a pattern of paired dark intersegmental markings. No antesiphuncular sclerites. Thoracic spiracles much larger than abdominal ones *Nasonovia ribisnigri*

Ursinia (incl. *Sphenogyne*)

Ursinia sp.

Aphis gossypii

Compositae**Urtica**

U. angustifolia
U. dioica

Urticaceae

Aphis urticata; *Microlophium sibiricum*; *Myzus dycei*
Aphis [*davletshinae*], *fabae*, [*tertia* Walker (nomen dubium)],
urticata; *Macrosiphum euphorbiae*, *tenuicauda*;
Metopeurum urticae;
Microlophium carnosum, *sibiricum*, *Microlophium*
sp. (2n=16; UK, BMNH colln);
Myzus ascalonicus, *dycei*, *ornatus*, *persicae*;
Neomyzus circumflexus; [*Phorodon humuli*];
Rhopalosiphoninus latysiphon, *staphyleae*;
[*Uroleucon simile*]
U. dubia *Aphis fabae*, *urticata*; *Macrosiphum euphorbiae*;
Myzus ornatus, *persicae*
U. fissa *Aphis urticata*; *Microlophium carnosum*; *Myzus dycei*
U. gracilis (incl. var. *holosericea*) [*Acyrtosiphon pisum*]; *Amphorophora urtica*;
Aphis fabae, *helianthi*; *Macrosiphum euphorbiae*, *tenuicauda*;
Microlophium carnosum, *sibiricum* ssp. *tenuicauda*
Myzus dycei
U. incisa *Amphorophora urtica*; *Aphis fabae*;
U. lyalli [*Macrosiphum* sp. (Leonard, 1974)]
U. massaica *Microlophium carnosum*
U. membranacea *Aphis solanella*

HOST LISTS AND KEYS

<i>U. parviflora</i>	<i>Aphis gossypii</i> ; <i>Microlophium carnosum</i> ; <i>Myzus dycei</i> ; [<i>Sitobion rosaeiformis</i>]
<i>U. pilulifera</i>	<i>Aphis spiraeicola</i> , <i>urticata</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i>
<i>U. platyphylla</i>	<i>Aulacorthum solani</i> ; <i>Microlophium</i> [<i>carnosum</i>], <i>sibiricum</i> ; <i>Myzus dycei</i>
<i>U. thunbergiana</i>	<i>Aphis urticata</i> ; <i>Myzus dycei</i>
<i>U. urens</i>	<i>Acyrtosiphon malvae</i> ; <i>Aphis fabae</i> , <i>spiraecola</i> , <i>urticata</i> ; <i>Aulacorthum solani</i> ; <i>Microlophium carnosum</i> , <i>sibiricum</i> , <i>sibiricum</i> ssp. <i>tenuicauda</i> ; <i>Myzus ascalonicus</i> , <i>cymbalariae</i> , <i>persicae</i>
<i>Urtica</i> spp.	[<i>Aphis elegantula</i> , <i>rhamnifila</i> , <i>Aphis</i> sp. (David <i>et al.</i> , 1971c: 559)]; <i>Brachycaudus helichrysi</i> ; <i>Macrosiphum edrossi</i>

Key to apterae on *Urtica*:-

1. Head smooth or with a only few spicules ventrally, and with very well-developed ANT tubercles, their inner faces divergent and almost smooth 2
 - ANT tubercles **either** weakly developed **or**, if ANT tubercles are well developed, then their inner faces are spiculose or scabrous and parallel or apically convergent, and head has numerous spicules or nodules ventrally, or both dorsally and ventrally 8
2. SIPH with distal reticulation comprising at least 4–5 rows of closed polygonal cells and occupying 0.12–0.25 of total length 3
 - SIPH without polygonal reticulation, or with only 1–2 rows of polygonal cells occupying up to 0.08 of total length 4
3. R IV+V 0.8–1.0× HT II. Longest hairs on ANT III 30–38µm, 0.6–1.0× BD III 5
 - R IV+V 1.1–1.3× HT II. Longest hairs on ANT III 40–50µm, 0.9–1.3× BD III 5
4. ANT flagellum black except at base of III. SIPH black except for basal 0.2–0.25. Cauda long and thin, c. 4× longer than its width at midlength, with 7 hairs 5
 - ANT pale or dusky, or dark only at apices of segments. SIPH pale, sometimes darker distally. Cauda thicker, 2–3× longer than its midlength width, with 6–15 hairs 5
5. Longest hairs on ABD TERG 3 are 10–22µm long. SIPH 1.5–2.4× cauda, with diameter of flange less than 1.25× narrowest subapical diameter 6
 - Longest hairs on ABD TERG 3 are 23–70µm long. SIPH 2.3–3.1× cauda, and with a large flange of diameter more than 1.4× narrowest subapical diameter 6
6. R IV+V with 4–6 accessory hairs. Tergum sclerotic, wrinkled, with longest hairs on ABD TERG 3 less than 50µm long. Cauda with 7–10 hairs 7
 - R IV+V with 7–19 accessory hairs. Tergum almost smooth, with longest hairs on ABD TERG 3 more than 50µm long. Cauda with 10–15 hairs 7
7. ANT I with 7–11 hairs. R IV+V with 7–13 accessory hairs. Anterior part of subgenital plate with 2–9 hairs 8
 - ANT I with 13–18 hairs. R IV+V with 13–19 accessory hairs. Anterior part of subgenital plate with 10–15 hairs 8

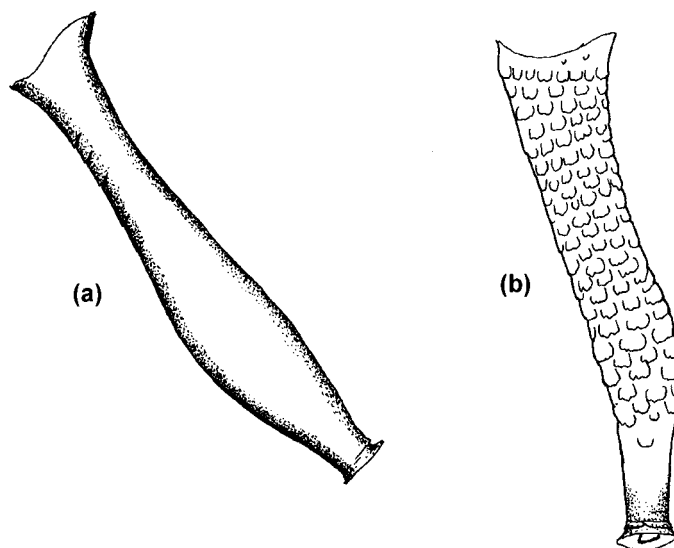


Figure 55 Apterae on *Urtica*. (a) Right SIPH of *Amphorophora urtica*, (b) left SIPH of *Myzus dycei*.

8. SIPH almost flangeless, with polygonal reticulation on distal 0.4–0.5 of length. ANT III with 9–14 rhinaria extending onto distal half. Cauda elongate triangular, pale, with c.20 hairs
*Metopeurum urticae**
- SIPH with a flange, and without polygonal reticulation. ANT III with 0–5 rhinaria on basal part. Cauda if pale then with 4–15 hairs **9**
9. Head spiculose on ventral surface only. ANT III with 1–5 rhinaria. SIPH distinctly clavate, smooth except for subapical striation (Figure 55a). Cauda with 9–16 hairs
Amphorophora urtica
- Head either without spicules or densely spiculose dorsally as well as ventrally, and other characters not in above combination **10**
10. SIPH 2.8–3.3× cauda, and of characteristic shape; cylindrical and coarsely imbricated for most of length, slightly swollen on inner side at about 0.7 of length, with part distal to this tapering, smooth and somewhat bent outwards (Figure 55b)
Myzus dycei
- SIPH either less than 2.7× cauda or, if longer, then SIPH are markedly and symmetrically clavate **11**
11. ANT tubercles undeveloped. SIPH pale, or dusky only at apices. ABD TERG 1 and 7 with marginal tubercles (MTu). MTu also usually present on some or all of ABD TERG 2–4 (except in summer dwarfs)
Aphis urticata
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Utricularia

U. vulgaris

Lentibulariaceae

Rhopalosiphum nymphaeae

Uvaria see Blackman and Eastop (1994)

Vaccaria

V. hispanica

Caryophyllaceae

Brachycaudus lychnidis

HOST LISTS AND KEYS

***Vaccinium* (incl. *Oxycoccus*)**

V. alaskaense
V. ashei
V. corymbosum

V. delavayi
V. griffithium
V. japonicum
V. leonis
V. leschenaultii
V. macrocarpon

V. maderense
V. myrtillosum

V. oxycoccus
V. parvifolium

V. pennsylvanicum
V. stamineum
V. uliginosum

V. vacillans
V. varingiaefolium
V. vitis-idaea

Vaccinium spp.

Ericaceae

Ericaphis wakibae; *Macrosiphum parvifolii*
Ericaphis scammelli
Aphis gossypii; *Brachycaudus helichrysi*;
Ericaphis fimbriata, *scammelli*; *Illinoia azaleae*;
Macrosiphum euphorbiae; *Myzus ornatus*;
Neomyzus circumflexus
Macrosiphum euphorbiae
Aphis nasturtii; *Sitobion* sp. (India: Raychaudhuri, 1984)
Aulacorthum vaccinii
Aphis spiraeicola; *Neomyzus circumflexus*; *Toxoptera aurantii*
 [gall of unknown aphid – Mani, 1973]
Ericaphis scammelli; *Illinoia azaleae*, *borealis*, *pepperi*;
Myzus ornatus; *Neomyzus circumflexus*;
Smynthuroides betae
Aphis gossypii, *spiraeicola*; *Toxoptera aurantii*
Acyrtosiphon brachysiphon; *Aphis vaccinii*;
Aulacorthum flavum, *rufum*; *Pachypappa myrtillosum*;
Wahlgreniella vaccinii
Aphis vaccinii; *Macrosiphum nasonovi*
Macrosiphum parvifolii, sp. nr *parvifolii* (B.C.;
 BMNH colln, leg. C.-k. Chan)
Illinoia pepperi
Illinoia azaleae, *pepperi*
Acyrtosiphon brachysiphon, *knechteli*; *Aphis vaccinii*;
Aulacorthum flavum, *rufum*, *vaccinii*;
 [Cavariella aegopodii]; *Ericaphis latifrons*;
Macrosiphum nasonovi; *Sitobion paludum*;
Wahlgreniella vaccinii
Aphis vaccinii; *Illinoia azaleae*
Aphis gossypii; *Toxoptera aurantii*
Aphis vaccinii; *Aulacorthum rufum*;
Macrosiphum euphorbiae; *Myzus ornatus*;
Neomyzus circumflexus; *Wahlgreniella vaccinii*
Aulacorthum pterinigrum; *Illinoia finni*

Key to apterae on *Vaccinium*:-

(For an illustrated key to common aphids on blueberries see Blackman and Eastop, 2000.)

1. ANT PT/BASE less than 0.5. Eyes 3-faceted. SIPH absent. 2
- ANT PT/BASE more than 1.5. Eyes multi-faceted. SIPH present, tubular 3
2. Body and appendages densely hairy. ANT II elongate, similar in length to III. Anal plate displaced dorsally. No discrete wax-pore plates. BL 1.7–2.5 mm *Smynthuroides betae*
- Body and appendages sparsely hairy. ANT II much shorter than III. Anal plate in normal posteroventral position. Wax pore-plates present. BL 1.2–1.4 mm *Pachypappa myrtillosum*
3. SIPH slightly to moderately clavate (swollen on distal half, with narrower section on basal half) 4
- SIPH cylindrical or tapering (without a narrower section on basal half) 10

4. SIPH with a zone of polygonal reticulation distal to the swollen part (e.g., Figure 56b,d). ANT III with 1 or more rhinaria on basal half 5
 – SIPH without polygonal reticulation (e.g., Figure 56e). ANT III without rhinaria 9
5. Longest hairs on ANT III $0.6\text{--}1.0\times$ BD III. Cauda thick, parallel-sided for most of length, broadly rounded at apex, and bearing 9–13 hairs (Figure 56a) *Macrosiphum parvifolii*
 – Longest hairs on ANT III $0.3\text{--}0.7\times$ BD III. Cauda tapering from base to near apex, sometimes slightly constricted near midlength, with 7–10 hairs (e.g., Figure 56c) 6
6. R IV+V $0.67\text{--}1.1\times$ HT II 7
 – R IV+V (1.1–) $1.2\text{--}1.8\times$ HT II 8
7. SIPH dark, sometimes paler at extreme base, less than $10\times$ longer than maximum width of swollen part *Illinoia pepperi*
 – SIPH pale and more than $10\times$ longer than width of swollen part *Illinoia finni*
8. First tarsal segments with 3 (rarely 4) hairs. R IV+V $1.4\text{--}1.8\times$ HT II. SIPH $1.7\text{--}2.3\times$ cauda *Illinoia borealis*
 – First tarsal segments with 5 (rarely 4) hairs. R IV+V $1.1\text{--}1.4\times$ HT II. SIPH $2.2\text{--}2.5\times$ cauda *Illinoia azaleae*

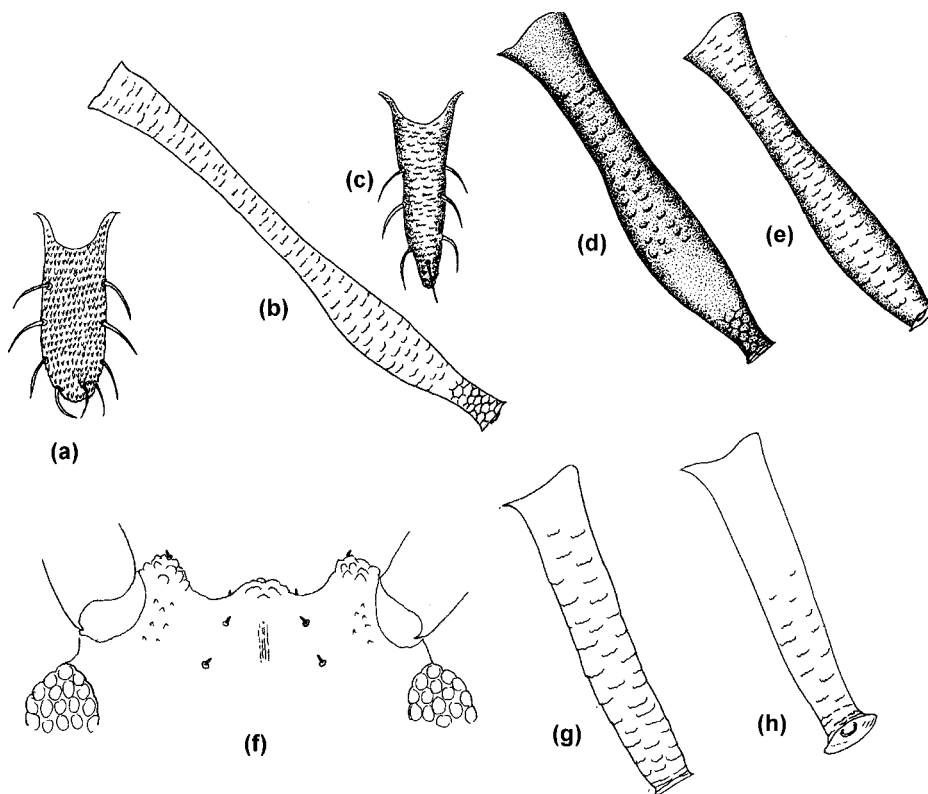


Figure 56 Apterae on *Vaccinium*. (a) cauda of *Macrosiphum parvifolii*, (b) SIPH of *M. parvifolii*, (c) cauda of *Illinoia pepperi*, (d) SIPH of *I. pepperi*, (e) SIPH of *Wahlgreniella vaccinii*, (f) front of head (dorsal aspect) of *E. latifrons*, (g) SIPH of *E. scammelli* (paratype), (h) SIPH of *E. latifrons*.

HOST LISTS AND KEYS

9. Head densely spiculose dorsally as well as ventrally, with inner faces of ANT tubercles apically convergent. ANT PT/BASE 2.8–4.5. ANT III–V pale. R IV+V 0.9–1.0 (–1.1)× HT II, with 2–7 accessory hairs *Myzus persicae*
- Head sparsely spiculose, especially dorsally, with inner faces of ANT tubercles parallel. ANT PT/BASE 4.0–6.8. ANT III–V each with dark apices. R IV+V 1.1–1.3× HT II, with 7–11 accessory hairs *Wahlgreniella vaccinii*
10. ANT tubercles scabrous at least on ventral side. Head with numerous spicules, at least on ventral surface **11**
- ANT tubercles if developed then almost smooth. Head with or without spicules **19**
11. ANT 1.1–1.5× BL, with ANT PT/BASE 3.7–5.2 **12**
- ANT 0.6–1.05× BL, with ANT PT/BASE 1.7–3.7 **14**
12. Dorsal abdomen with a dark central U-shaped patch, and thorax with dark cross bands, but marginal areas of body unpigmented. R IV+V with 2 accessory hairs *Neomyzus circumflexus*
- Dorsal abdomen with or without dark sclerotisation, but not in form of U-shaped central patch leaving marginal areas unpigmented. R IV+V with 5–13 accessory hairs **13**
13. R IV+V 1.5–1.7× HT II, with 9–13 accessory hairs. Dorsal cuticle very wrinkled, variably pigmented but often mostly dark, with large marginal and postsiphuncular sclerites forming a broad dark stripe on each side of body *Aulacorthum pterinigrum*
- R IV+V 1.0–1.2× HT II, with 6–8 accessory hairs. Dorsal cuticle sclerotic but smooth, pale or mottled with dark, but without dark marginal stripes *Aulacorthum rufum*
14. Median frontal tubercle prominent, and ANT tubercles tending to be rather low, so that front of head has w-shaped outline in dorsal view (e.g., Figure 56f). ANT III without rhinaria **15**
- Median frontal tubercle weakly developed, much lower than the well-developed ANT tubercles. ANT III with or without rhinaria **16**
15. ANT PT/BASE 2.3–3.4. SIPH with a small flange (Figure 56g) *Ericaphis scammelli* (or *fimbriata*?)
- ANT PT/BASE 1.9–2.2. SIPH with a prominent flange (Figure 56h) *Ericaphis latifrons*
16. Dorsal cuticle pale. R IV+V 0.9–1.0× HT II *Aulacorthum flavum*
- Dorsal cuticle with dusky or dark sclerotisation, or dark markings. R IV+V 1.0–1.7× HT II **17**
17. Dorsal cuticle wrinkled, with a pattern of dark intersegmental markings. R IV+V with 2 accessory hairs *Myzus ornatus*
- Dorsal cuticle smooth with a variably-pigmented but extensive dusky to dark sclerotic shield. R IV+V with 4–11 accessory hairs **18**
18. R IV+V 1.0–1.2× HT II, with 4–7 accessory hairs. ANT III usually with 1 or more rhinaria on basal half *Aulacorthum vaccinii*
- R IV+V 1.2–1.7× HT II, with 8–11 accessory hairs. ANT III rarely with rhinaria, except in alatform specimens *Ericaphis wakibae*
19. SIPH with a subapical zone of reticulation (at least 4–5 rows of closed polygonal cells) **20**
- SIPH without subapical reticulation, or with only 1–2 rows of polygonal cells **23**
20. Longest hairs on ANT III 0.6–1.0× BD III **21**
- Longest hairs on ANT III 0.3–0.5× BD III **22**
21. Apices of femora dark *Macrosiphum nasonovi*
- Apices of femora pale *Macrosiphum euphorbiae*

22. SIPH entirely black, 1.4–1.9× cauda, with reticulation on distal 0.18–0.21 of length
Sitobion paludum
 – SIPH pale, dusky or dark-tipped, 2.0–2.4× cauda, with reticulation on distal 0.09–0.13 of length
Macrosiphum sp. nr. *parvifolii* (B.C.; BMNH colln, leg.C-K Chan)
23. Cauda helmet-shaped, not longer than its basal width in dorsal view. Spiracular apertures large and rounded. SIPH short, conical, smooth, with a subapical annular incision
Brachycaudus helichrysi
 – Cauda tongue- or finger-shaped, much longer than its basal width. Spiracular apertures reniform. SIPH imbricated, tapering, without a subapical annular incision 24
24. ANT tubercles moderately to well developed, with smooth divergent inner faces. SIPH pale. ANT III with (0–) 1–9 rhinaria. ABD TERG 1 and 7 without marginal tubercles (MTu) 25
 – ANT tubercles weakly developed or undeveloped. SIPH pale or dark. ANT III without rhinaria. ABD TERG 1 and 7 with MTu 26
25. SIPH 0.14–0.17× BL, 1.0–1.5× cauda and 3.0–3.7× R IV+V *Acyrtosiphon brachysiphon*
 – SIPH 0.28–0.48× BL, 1.4–1.9× cauda and 5.5–7.3× R IV+V *Acyrtosiphon knechteli*
26. Dorsal abdomen with a variably developed pattern of dark sclerotic markings, sometimes tending to form dark transverse bars on ABD TERG 1–6 as well as 7 and 8. SIPH and cauda both black, SIPH 0.75–1.20× cauda, which bears 8–16 hairs *Aphis vaccinii*
 – Without that combination of characters
 go to key to polyphagous aphids, p. 1020, starting at couplet 24

Vahlia*V. dichotoma**Aphis gossypii***Vhaliaceae****Vaillantia** see **Valantia****Valantia** (incl. **Vaillantia**)*V. muralis**Aphis gossypii***Rubiaceae****Valeriana***V. alliariaefolia**Macrosiphum centranthi*, *cholodkovskyi**V. ceratophylla**Aphis valerianae*; *Macrosiphum valerianae**V. collina**Aphis spiraephaga**V. coreana**Aphis patvaliphaga**V. cruschenica**Aphis fabae**V. edulis**Aphis valerianae*; *Macrosiphum valerianae**V. fauriei**Aphis fabae*, [*patriniae*], *spiraecola**V. grisebachiana**Aphis fabae**V. montana**Aphis fabae**V. officinalis**Aphis fabae*, *gossypii*, *valerianae*;*Dysaphis brancoi*, *brancoi* ssp. *rogersoni*, *leefmansii*,*leefmansii* ssp. *krumbholzi*, *leefmansii* ssp. *valentinae*;*Macrosiphum centranthi*, *euphorbiae*, *rosae*, *valerianae**V. olitoria* see *Valerianella**V. phu**Aphis fabae*; *Macrosiphum rosae**V. pyrenaica**Myzus persicae**V. salina**Aphis fabae*

HOST LISTS AND KEYS

<i>V. sambucifolia</i>	<i>Dysaphis brancoi</i>
<i>V. sitchensis</i>	<i>Aphis fabae</i>
<i>V. tiliaefolia</i>	<i>Aphis fabae</i> ; <i>Macrosiphum rosae</i>
<i>V. trachycarpa</i>	<i>Aphis fabae</i> , <i>valerianae</i>
<i>V. tripteris</i>	<i>Aphis valerianae</i> ; <i>Macrosiphum centranthi</i>
<i>V. tuberosa</i>	<i>Myzus ornatus</i> , <i>persicae</i>
<i>V. valerianifolia</i>	<i>Aphis gossypii</i> ; [<i>Uroleucon gobonis</i>]
<i>V. wallichii</i>	<i>Aphis spiraecola</i> ; <i>Myzus</i> [<i>dycei</i>], <i>ornatus</i> ; <i>Sitobion aulacorthoides</i>
<i>Valeriana</i> spp.	<i>Aphis pseudovalerianae</i> , <i>solanella</i> ; <i>Aulacorthum solani</i> ; <i>Dysaphis brancoi</i> ssp. <i>malina</i> , <i>Macrosiphum stellariae</i> ; [<i>Nearctaphis bakeri</i>]

Key to apterae on *Valeriana*:-

1. SIPH with a subapical zone of polygonal reticulation 2
– SIPH without polygonal reticulation 8
2. Longest hairs on ANT III less than 0.5× BD III. R IV+V 1.25–1.45× HT II
Sitobion aulacorthoides
– Longest hairs on ANT III 0.6–1.2× BD III. R IV+V 0.7–1.2× HT II 3
3. SIPH wholly dark 4
– SIPH at least with paler basal section 5
4. ANT III with 10–36 rhinaria, not in a row *Macrosiphum rosae*
– ANT III with 4–9 rhinaria in a row *Macrosiphum valerianae*
5. Femora entirely pale. Longest hairs on ABD TERG 3 always less than 38µm long. Cauda with 8–12 (–13) hairs *Macrosiphum euphorbiae*
– Femora usually darker at apices. Longest hairs on ABD TERG 3 usually more than 39µm. Cauda with 8–21 hairs 6
6. R IV+V 1.0–1.2× HT II. Longest hairs on ABD TERG 3 usually more than 50µm (43–68µm) long *Macrosiphum cholodkovskyi*
– R IV+V 0.7–1.0× HT II. Longest hairs on ABD TERG 3 usually less than 50µm (26–56µm) long 7
7. ANT 1.3–1.7× BL. Longest hair on ABD TERG 8 usually less than 60µm (48–66µm) long *Macrosiphum centranthi*
– ANT 0.95–1.4× BL. Longest hair on ABD TERG 8 usually more than 60µm (37–86µm) long *Macrosiphum stellariae*
8. Cauda helmet-shaped, not longer than its basal width. Spinal tubercles (STu) present on head, and often on ABD TERG 8, or 7 and 8. ABD TERG 1–5 (–7) with large dome-shaped marginal tubercles (MTu) 9
– Cauda tongue- or finger-shaped, longer than its basal width. STu absent from head, and rarely on ABD TERG 7 or 8. MTu only ever regularly present on (prothorax and) ABD TERG 1 and 7 14
9. Longest hair on ANT III 42–67µm long. ABD TERG 6 and 7 mostly without MTu. SIPH 0.21–0.27 mm long, 3.3–3.8× width at midlength. Cauda with 5–7 hairs *Dysaphis brancoi* ssp. *malina**
– Longest hair on ANT III 11–34µm long. ABD TERG 6 and 7 usually with MTu. SIPH 0.26–0.44 mm long, 3.5–9.7× width at midlength. Cauda with 6–16 hairs 10

10. Longest hair on ABD TERG 8 is 73–93µm. SIPH uniformly dark *Dysaphis brancoi* ssp. *rogersoni*
 – Longest hair on ABD TERG 8 is 14–70µm. SIPH pale or dark 11
11. Longest hair on ABD TERG 8 only 14–22µm long. SIPH mainly pale
Dysaphis leefmansi sensu stricto
 – Longest hair on ABD TERG 8 in range 28–70µm. SIPH pale or dark 12
12. SIPH dark, sometimes paler at base, but at least with distal part as dark as anal plate. ANT PT 0.22–0.35 mm long, 0.5–1.0× ANT III. Cauda with 6–12 hairs *Dysaphis brancoi* sensu stricto
 – SIPH mostly pale, sometimes darker distally but not as dark as anal plate. ANT PT 0.25–0.53 mm long, usually longer than (0.7–1.6×) ANT III. Cauda with 7–16 hairs 13
13. ABD TERG 7 without STu, and often only a single one is present on ABD TERG 8 (range 0–2, mean 1.3) *Dysaphis leefmansi* ssp. *krumbholzi**
 – ABD TERG 7 often with STu, and usually a pair present on ABD TERG 8 (range on 7+8 is 1–4, mean 2.9) *Dysaphis leefmansi* ssp. *valentinae**
14. Cuticle of head spiculose. ANT tubercles well developed with steep-sided inner faces. ABD TERG 1 and 7 without MTu go to key to polyphagous aphids, p. 1020, starting at couplet 5
 – Cuticle of head not spiculose. ANT tubercles weakly developed. ABD TERG 1 and 7 always with MTu 15
15. R IV+V 0.6–0.85× HT II. Longest hairs on ant III 0.3–0.6× BD III 16
 – R IV+V 0.9–1.4× HT II. Longest hairs on ant III 0.4–2.2× BD III 17
16. SIPH 0.7–1.05× cauda, which bears 7–15 hairs. R IV+V 0.7–0.85× HT II *Aphis spiraephaga*
 – SIPH 0.9–1.8× cauda, which bears 3–6 hairs. R IV+V 0.6–0.7× HT II *Aphis patvaliphaga**
17. SIPH with 1–4 hairs. R IV+V with 4–5 accessory hairs *Aphis pseudovalerianae*
 – SIPH without hairs. R IV+V with 2 (–3) accessory hairs 18
18. Cauda pale or dusky, distinctly paler than SIPH and bearing 4–8 hairs. Femora with all hairs much shorter than width of trochantrofemoral suture *Aphis gossypii*
 – Cauda and SIPH both dark, cauda with 7–24 hairs. Many of femoral hairs exceeding width of trochantrofemoral suture 19
19. Abdomen without dark dorsal markings *Aphis spiraecola*
 – Abdomen with dark cross-bands on ABD TERG 7 and 8, and often with dark markings anterior to SIPH 20
20. ANT I–VI and femora rather uniformly pigmented. ANT PT.BASE 1.7–1.9 *Aphis valerianae*
 – ANT III–IV mainly pale, contrasting with dark ANT I–II, and femora with basal part much paler than distal part. ANT PT/BASE 1.8–4.0 *Aphis fabae* group (incl. *solanella*)

Valerianella*V. olitoria**Valerianella* sp.**Valerianaceae***Macrosiphum euphorbiae**Aphis fabae*

Use key to polyphagous aphids, p. 1020.

Valerianoides see Stachytarpheta**Vallisneria***V. spiralis***Hydrocharitaceae***Rhopalosiphum nymphaeae*; [*Therioaphis trifolii*]

HOST LISTS AND KEYS

Vancouveria **Berberidaceae**
V. hexandra *Macrosiphum vancouveriae*

Vanda **Orchidaceae**
V. coerulea *Sitobion indicum, luteum*
V. suavis *Cerataphis orchidearum*
V. tricolor *Cerataphis orchidearum*

Use key to apterae of orchid-feeding aphids under *Cymbidium*.

Vangueria **Rubiaceae**
V. madagascariensis *Aphis spiraeicola*

Vanilla **Orchidaceae**
V. fragrans *Cerataphis orchidearum*
V. planifolia *Cerataphis orchidearum*
V. wrightii *Cerataphis orchidearum*

(or use key to aphids on orchids under *Cymbidium*)

Veltheimia **Hyacinthaceae**
V. viridifolia *Myzus persicae*

Venidium see *Arctotis*

Vepris see Blackman and Eastop (1994)

Veratrum **Melanthiaceae**
V. album (incl. *lobelianum*) *Aphis fabae, veratri*
V. californicum *Aphis coweni, fabae*
V. dahuricum *Aphis coweni, fabae, takagii*
V. lobelianum see *album*
V. maackii (var. *japonicum*) *Aulacorthum solani*
V. nigrum *Aphis fabae, veratri*
V. oxysepalum *Aphis coweni, takagii*
V. ussuriense *Aphis coweni, takagii*
V. viride *Aphis coweni, fabae, veratri*, [*Aphis* sp. (Leonard, 1968)]
Veratrum sp. [*Hyadaphis veratri* Shinji, 1942]

Key to apterae on *Veratrum*:-

1. Head densely spiculose with well-developed, steep-sided ANT tubercles. ANT III with longest hairs less than 0.5× BD III. SIPH pale. ABD TERG 1 and 7 without marginal tubercles (MTu) 2
Aulacorthum solani (or try key to polyphagous aphids, p. 1020)
- Head without spicules, ANT tubercles not developed. ANT III with longest hairs more than 0.8× BD III. SIPH dark. ABD TERG 1 and 7 with MTu 2
2. R IV+V 0.9–1.1× HT II. ABD TERG 2–4 only sporadically with MTu *Aphis fabae*
 – R IV+V 1.2–1.7× HT II. ABD TERG 2–4 regularly with MTu 3
3. ANT PT/BASE 1.3–2.2. (Al. with sec. rhin. distributed ANT III 15–22, IV 2–7, V 0) *Aphis coweni*
 – ANT PT/BASE 2.3–5.1. (Al. with sec. rhin. distributed ANT III 8–16, IV 0–3, V 0–1) 4

4. ANT PT/BASE 2.3–3.4. ANT III with 8–12 hairs. SIPH 0.8–2.1× cauda *Aphis veratri*
 – ANT PT/BASE 4.5–5.1. ANT III with 17–20 hairs. SIPH 2.1–2.8× cauda *Aphis takagii*

Verbascum

Scrophulariaceae

<i>V. abietinum</i>	<i>Myzus persicae</i>
<i>V. austriacum</i>	<i>Aphis verbasci</i>
<i>V. blattaria</i>	<i>Aphis craccivora</i> ; <i>Macrosiphum euphorbiae</i>
<i>V. brevipedicellatum</i>	<i>Uroleucon compositae</i>
<i>V. chinense</i>	<i>Aphis verbasci</i>
<i>V. lychnitis</i>	<i>Aphis verbasci</i>
<i>V. nigrum</i>	<i>Aphis verbasci</i> , <i>wellensteini</i>
<i>V. phlomoides</i>	<i>Aphis verbasci</i>
<i>V. pulverulentum</i>	<i>Aphis verbasci</i>
<i>V. sinuatum</i>	<i>Aphis verbasci</i>
<i>V. songarium</i>	<i>Aphis verbasci</i>
<i>V. speciosum</i>	<i>Aphis wellensteini</i>
<i>V. thapsiforme</i>	<i>Aphis verbasci</i>
<i>V. thapsus</i>	<i>Aphis fabae</i> , <i>verbasci</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; [<i>Myzackaia verbasci</i>]
<i>V. tripolitanum</i>	<i>Aphis verbasci</i>
<i>Verbascum</i> spp.	<i>Acyrtosiphon malvae</i>

Key to apterae on *Verbascum*:-

1. R IV+V long and narrow, 1.6–1.9× HT II, 1.3–1.9× cauda and 0.7–1.5× ANT PT **2**
 – R IV+V relatively much shorter go to key to polyphagous aphids, p. 1020
2. Well-developed, flattish marginal tubercles (MTu) present on ABD TERG 2–4, 2–5 or 2–6 as well as 1 and 7. Posterior hair on hind trochanter less than 0.5× diameter of trochantrofemoral suture *Aphis wellensteini*
 – MTu on ABD TERG 1 and 7 only, very rarely on 2–4. Posterior hair on hind trochanter 0.5–1.2× diameter of trochantrofemoral suture *Aphis verbasci*

Verbena

Verbenaceae

<i>V. aubletia</i> = <i>canadensis</i>	
<i>V. bipinnatifida</i>	<i>Aphis gossypii</i>
<i>V. bracteosa</i>	<i>Aphis gossypii</i>
<i>V. canadensis</i>	<i>Aphis</i> [<i>aubletia</i>], <i>middletonii</i>
<i>V. chamaedryfolia</i>	<i>Acyrtosiphon malvae</i> ; <i>Aphis</i> [<i>capsellae</i>]; <i>Brachycaudus helichrysi</i>
<i>V. glauca</i>	<i>Aphis matilei</i>
<i>V. hastata</i>	[<i>Aphis verbenahastata</i> Rafinesque (invalid name)]
<i>V. hortensis</i>	<i>Aphis gossypii</i>
<i>V.</i> × <i>hybrida</i>	<i>Aphis gossypii</i> , <i>nasturtii</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i>
<i>V. litoralis</i>	<i>Aphis gossypii</i>
<i>V. officinalis</i>	<i>Aphis fabae</i> , [<i>capsellae</i>], [<i>frangulae</i>], <i>gossypii</i> , <i>mamonthovae</i> , <i>solanella</i> ; <i>Brachycaudus helichrysi</i> ; [<i>Macrosiphum verbenae</i>]

HOST LISTS AND KEYS

<i>V. peruviana</i>	<i>Aphis gossypii</i> ; <i>Myzus ornatus</i>
<i>V. rigida</i>	<i>Aphis gossypii</i> ; <i>Aulacorthum solani</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i>
<i>V. stricta</i>	[<i>Macrosiphum verbenae</i>]
<i>Verbena</i> spp.	[<i>Aphis malvae</i> Walker of Buckton (1879)]; <i>Aulacorthum magnoliae</i> ; [<i>Myzus siegesbeckicola</i>]; [<i>Ovatus crataegarius</i>]

Key to apterae on *Verbena*:-

1. **Either** ANT tubercles well developed **or** cauda dark with 10 or more hairs
 go to key to polyphagous aphids, p. 1020
 – ANT tubercles absent or weakly developed **and** cauda pale or dusky with 4–8 hairs **2**
2. Cauda helmet-shaped, not longer than its basal width. SIPH smooth, pale, conical, with a subapical annular incision. Spiracular apertures large and rounded. ABD TERG 1 without marginal tubercles (MTu) *Brachycaudus helichrysi*
 – Cauda tongue-shaped, longer than its basal width. SIPH imbricated, pale or dark, tapering, without a subapical annular incision. Spiracular apertures reniform. ABD TERG 1 (at least) with MTu **3**
3. ABD TERG 7 without MTu. ANT PT/BASE 1.3–1.8 *Aphis matilei*
 – ABD TERG 7 with MTu. ANT PT/BASE 2.0–4.2 **4**
4. SIPH mainly pale, dark only at apices *Aphis nasturtii*
 – SIPH entirely dark **5**
5. ANT PT/BASE 2.0–3.0. Femora pale *Aphis gossypii*
 – ANT PT/BASE 3.2–4.3. Femora rather dusky *Aphis mamonthovae*

Verbesina (incl. *Actinomeris*)

V. alata
V. alternifolia
V. encelioides

V. myriocephala
V. occidentalis
V. squarrosa (?)
V. virginica

Compositae

Uroleucon ambrosiae
Uroleucon ambrosiae, rurale
Aphis fabae, gossypii; *Macrosiphum euphorbiae*;
Neomyzus circumflexus
Uroleucon verbesinae
Uroleucon rurale
 [*Uroleucon squarrosus* (Sanborn, 1904; nomen dubium)]
Uroleucon rurale, verbesinae

Key to apterae on *Verbesina*:-

1. SIPH dark with reticulation on distal 0.23–0.35 of length, comprising numerous small polygonal cells **2**
 – SIPH if dark then without polygonal reticulation go to key to polyphagous aphids, p. 1020
2. SIPH less than 1.5× cauda, which is pale. Dorsal hairs mostly arising from small dark scleroites. Anterior-siphuncular sclerites and marginal tubercles (MTu) absent *Uroleucon ambrosiae*
 – SIPH more than 1.5× cauda, which is dark. Dorsal hairs without dark basal scleroites. Dusky anterior-siphuncular sclerites present, with associated MTu **3**
3. R IV+V 1.2–1.56× HT II, less than 4× longer than its basal width *Uroleucon rurale*
 – R IV+V very long and thin, 1.6–1.9× HT II, and more than 4× longer than its basal width *Uroleucon verbesinae*

Vernonia

V. acunae
V. adoensis
V. ambigua
V. amygdalina

V. angusticeps
V. baldwinii
V. brazzavillensis
V. chapmanii
V. chinensis

V. cinerea

V. divaricata
V. fallax
V. fasciculata
V. glabra

V. guianensis
V. hieracioides
V. lasiopus

V. leopoldi
V. lindheimeri
V. menthaefolia
V. nigrifolia
V. noveboracensis

V. patula
V. pauciflora
V. perrottetii
V. poskeana
V. punctata
V. roxburghii
V. scorpioides
V. segregata
V. sutherlandii
V. wrightii
Vernonia spp.

Compositae

Uroleucon ambrosiae
Uroleucon compositae, [*Uroleucon* sp. (Millar, 1994)]
Aphis gossypii
Aphis gossypii, *spiraecola*; *Sitobion congolense*;
Uroleucon compositae
Aphis gossypii
Aphis vernoniae
Uroleucon compositae
Aphis gossypii
Aphis gossypii; *Brachycaudus helichrysi*;
Uroleucon compositae
Aphis carthami, *craccivora*, *gossypii*, *spiraecola*;
[*Macrosiphoniella sanborni*]; *Macrosiphum euphorbiae*;
[*Rhopalosiphum padi*]; *Toxoptera aurantii*;
Uroleucon ambrosiae, *compositae*, *minutum*, *vernoniae*,
vernicola
Uroleucon ambrosiae
Aphis spiraecola
Aphis middletonii, *vernoniae*; [*Uroleucon rudbeckiae*]
Aphis craccivora, *evansi*, *gossypii*, *pseudocardui*;
Uroleucon compositae, *compositae* ssp. *evansi*,
[*Uroleucon* sp. (Millar, 1994)]
Aphis sp. (Leonard, 1974); *Sitobion congolense*
Aphis craccivora, *spiraecola*
Aphis craccivora, *gossypii*, *pseudocardui*;
Sitobion congolense, *mucatha*; *Uroleucon compositae*
Uroleucon compositae
[*Uroleucon rudbeckiae*]
Aphis spiraecola
Aphis gossypii
Aphis vernoniae, [*Aphis* sp. (Leonard, 1968)];
[*Uroleucon rudbeckiae*]
Aphis gossypii; *Uroleucon vernoniae*
Aphis fabae; *Uroleucon compositae*, *compositae* ssp. *evansi*
Aphis gossypii
Aphis gossypii
Uroleucon ambrosiae
Brachycaudus helichrysi; *Uroleucon sonchi*
Uroleucon compositae
Uroleucon ambrosiae
Uroleucon compositae
Toxoptera aurantii
Capitophorus elaeagni; [*Macrosiphoniella sanborni*];
Myzus ornatus; *Sitobion nigeriense*;
[*Subvatomyzus leucosceptri*]

HOST LISTS AND KEYS

Key to apterae on *Vernonia*:-

1. ANT PT/BASE 0.7–1.4. R IV+V longer than ANT PT. SIPH short, dark, stump-shaped, 0.65–1.0× cauda, which is short, triangular, and bears more than 10 hairs 2
 - ANT PT/BASE more than 1.4, R IV+V shorter than ANT PT, and other characters not in that combination 4
2. ANT PT/BASE 1.0–1.4 (measure several specimens). ANT III usually without rhinaria (rarely with 1–3) *Aphis pseudocardui*
 - ANT PT/BASE 0.7–1.0. ANT III often with 1–10 rhinaria 3
3. R IV+V 1.2–1.38× HT II. Cauda with a rather pointed apex (Figure 57a) *Aphis evansi*
 - R IV+V 1.4–1.6× HT II. Cauda with a rounded apex *Aphis carthami*
4. SIPH with subapical reticulation (at least 2–3 rows of closed polygonal cells) 5
 - SIPH without any distinct subapical polygonal reticulation 15
5. SIPH dark with reticulation comprising numerous (100+) closed polygonal cells over distal 0.16–0.35 of length. First tarsal segments with 3 or 5 hairs 6
 - SIPH pale or dark with fewer polygonal cells over distal 0.07–0.20 of length. First tarsal segments with 3 hairs 12
6. Cauda dark 7
 - Cauda pale compared with SIPH 10
7. ANT III mainly pale with 1–3 rhinaria. First tarsal segments with 3 hairs *Uroleucon minutum*
 - ANT III dark with 41–78 rhinaria. First tarsal segments with 5 hairs 8
8. R IV+V 1.5–1.8× HT II. ANT III with 23–57 rhinaria *Uroleucon vernoniae*
 - R IV+V 1.1–1.4× HT II. ANT III with 46–82 rhinaria 9

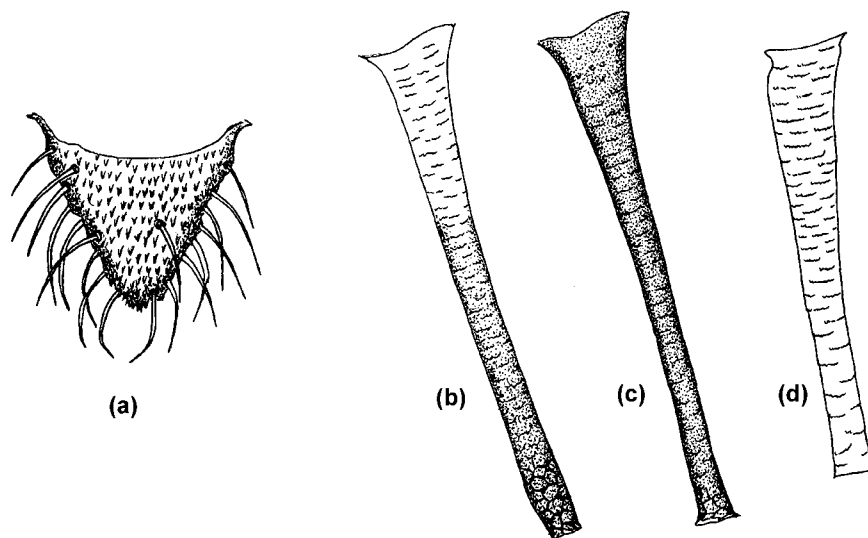


Figure 57 Apterae on *Vernonia*. (a) cauda of *Aphis evansi* (type), (b) SIPH of *Sitobion congolense* (type), (c) SIPH of *S. nigeriense* (type), (d) SIPH of *Aphis vernoniae*.

9. SIPH 1.8–2.3× cauda (mean 2.0–2.1) *Uroleucon compositae* s. str.
 – SIPH 1.6–2.0× cauda (mean 1.8) *Uroleucon compositae* ssp. *evansi*
10. Coxae dark. SIPH dark at base and apex but often paler in middle, with reticulation on distal 0.16–0.27 of length. Dorsal hairs without dark basal scleroites *Uroleucon sonchi*
 – Coxae pale. SIPH entirely dark, with reticulation on distal 0.25–0.35 of length. Dorsal hairs mostly arising from small dark scleroites 11
11. R IV+V 1.05–1.43× HT II. ANT III with 8–31 rhinaria. Tibiae often paler in middle *Uroleucon ambrosiae*
 – R IV+V 1.45–1.65× HT II. ANT III with 3–20 rhinaria. Tibiae entirely dark *Uroleucon veronicola*
12. Longest hairs on ANT III 0.6–1.0× BD III *Macrosiphum euphorbiae*
 – Hairs on ANT III very short and blunt, 0.2–0.4× BD III 13
13. R IV+V 1.2–1.3× HT II. SIPH very slightly swollen on subapical reticulated part, and with a very small flange (Figure 57b) *Sitobion congolense*
 – R IV+V 0.85–1.2× HT II. SIPH without subapical swelling, cylindrical or slightly flared near apex, and with a well-developed flange (e.g., Figure 57c) 14
14. R IV+V 0.85–1.0× HT II *Sitobion nigeriense*
 – R IV+V 1.05–1.2× HT II *Sitobion mucatha*
15. Hairs on front of head and dorsal body thick and capitate, mostly long and thick, and arising from tuberculate bases. ANT PT/BASE 6.0–9.2 *Capitophorus elaeagni*
 – Dorsal hairs not thick and distinctly capitate, without tuberculate bases. ANT PT/BASE less than 6 16
16. ANT PT/BASE 1.5–1.9. SIPH pale, 6.5–11.2× their width at midlength, constricted at base and cylindrical or slightly flared on distal half, and almost flangeless (Figure 57d) *Aphis vernoniae*
 – ANT PT/BASE 1.8–4.5. SIPH pale or dark, not constricted at base, and of different form
 go to key to polyphagous aphids, p. 1020

Veronica

V. abyssinica

V. agrestis

V. anagallis

V. anagallis-aquatica

V. anagalloides

V. × andersonii

V. arvensis

V. beccabunga

V. campylopoda

V. chamaedryx

Scrophulariaceae

Aulacorthum solani; *Myzus ornatus*

Aphis [*clematidis* ssp. *simalensis*], *gossypii*;

Aulacorthum solani; *Brachycaudus helichrysi*;

[*Brevicoryne brassicae*]; *Macrosiphum euphorbiae*;

Myzus ascalonicus; *Nasonovia ribisnigri*

Aphis frangulae ssp. *beccabungae*;

Myzus [*amygdalinus*], *cerasi*

Aphis nasturtii; *Aulacorthum solani*; *Dysaphis gallica*;

Macrosiphum euphorbiae; *Myzus cerasi*, *ornatus*

Aulacorthum solani

Myzus ornatus

Aphis gossypii; *Nasonovia ribisnigri*

Aphis frangulae ssp. *beccabungae*, *nasturtii*, *triglochinis*;

Aulacorthum solani; *Brachycaudus helichrysi*;

Cryptomyzus galeopsidis; *Myzus cerasi*, *ornatus*

Aphis frangulae ssp. *beccabungae*

Aphis berlinskii, *frangulae* ssp. *beccabungae*,

korshunovi, [*veronicae* Walker of Bozhko, 1976a];

Aulacorthum solani; [*Baizongia pistaciae*]

HOST LISTS AND KEYS

	<i>Myzus cerasi</i> , <i>cerasi</i> ssp. <i>veronicae</i> , <i>ornatus</i> ;
	<i>Nasonovia ribisnigri</i> ; <i>Zinia veronicae</i>
	<i>Brachycaudus helichrysi</i>
	<i>Myzus persicae</i>
	<i>Myzus ornatus</i> , <i>persicae</i>
	<i>Aphis craccivora</i> , <i>gossypii</i> ; <i>Myzus persicae</i>
<i>V. chinensis</i>	
<i>V. cymbalaria</i>	
<i>V. derwentia</i>	
<i>V. didyma</i> (incl. <i>lilacina</i>)	
<i>V. elatior</i> see <i>longifolia</i>	
<i>V. grandis</i>	
<i>V. hederifolia</i>	
<i>V. incana</i>	
<i>V. longifolia</i> (incl. <i>elatior</i>)	
	<i>Myzus ascalonicus</i>
	<i>Aphis gossypii</i> , <i>nasturtii</i> ;
	<i>Myzus ascalonicus</i> , <i>ornatus</i> , <i>persicae</i> ; <i>Nasonovia ribisnigri</i>
	<i>Aphis frangulae</i> ssp. <i>beccabungae</i> , <i>korshunovi</i> ;
	<i>Nasonovia ribisnigri</i>
	<i>Aphis frangulae</i> ssp. <i>beccabungae</i> , <i>korshunovi</i> ;
	<i>Brachycaudus helichrysi</i> ; <i>Cryptomyzus ribis</i> ;
	<i>Macrosiphum euphorbiae</i> ;
	<i>Myzus ascalonicus</i> , <i>cerasi</i> , <i>persicae</i> ; <i>Zinia veronicae</i>
	<i>Aphis korshunovi</i>
	<i>Macrosiphum euphorbiae</i>
	<i>Aphis berlinskii</i> , <i>gossypii</i> ; <i>Aulacorthum solani</i> ;
	<i>Brachycaudus helichrysi</i> ; <i>Myzus ascalonicus</i> ;
	<i>Nasonovia ribisnigri</i>
	<i>Macrosiphum euphorbiae</i>
	<i>Brachycaudus helichrysi</i> ; <i>Nasonovia ribisnigri</i>
	<i>Aphis gossypii</i>
	<i>Macrosiphum euphorbiae</i>
	<i>Aphis gossypii</i> ; <i>Aulacorthum solani</i> ;
	<i>Brachycaudus helichrysi</i> ; <i>Dysaphis pulverina</i> ;
	<i>Macrosiphum euphorbiae</i> ;
	<i>Myzus ascalonicus</i> , <i>ornatus</i> , <i>persicae</i> ; [<i>Nearctaphis bakeri</i>]
	<i>Aulacorthum solani</i> ; <i>Myzus ascalonicus</i> , <i>persicae</i>
	<i>Aphis gossypii</i> ; <i>Myzus ornatus</i> , <i>persicae</i>
	<i>Aphis gossypii</i> , <i>veronicicola</i> ; <i>Aulacorthum solani</i>
	<i>Acyrtosiphon malvae</i> ; <i>Aphis korshunovi</i>
	<i>Aphis fabae</i> , <i>frangulae</i> ssp. <i>beccabungae</i> , <i>nasturtii</i> ,
	<i>korshunovi</i> ;
	<i>Aulacorthum knautiae</i> , <i>solani</i> ; <i>Brachycaudus helichrysi</i> ;
	<i>Myzus cerasi</i>
	<i>Cryptomyzus galeopsidis</i>
	<i>Brachycaudus helichrysi</i> ; <i>Nasonovia ribisnigri</i>
	[<i>Aphis beccabungae</i> ssp. <i>turanica</i> (nomen dubium)];
	<i>Dysaphis microsiphon</i> ; [<i>Hyalomyzus eriobotryae</i>];
	[<i>Jacksonia papillata</i>]; <i>Rhopalosiphum nymphaeae</i>
<i>V. michauxii</i>	
<i>V. montana</i>	
<i>V. officinalis</i>	
<i>V. opicatha</i> (? <i>opatha</i>)	
<i>V. orsiniana</i>	
<i>V. peregrina</i>	
<i>V. perfoliata</i>	
<i>V. persica</i>	
<i>V. prostrata</i>	
<i>V. serpyllifolia</i>	
<i>V. sibirica</i>	
<i>V. spicata</i>	
<i>V. teucrium</i>	
<i>V. tournefortii</i>	
<i>V. urticifolia</i>	
<i>Veronica</i> spp.	

Key to apterae on *Veronica*:-

1. Cauda short, helmet-shaped or triangular, not longer than its basal width in dorsal view 2
- Cauda elongate triangular, tongue- or finger-shaped, at least 1.1× longer than its basal width in dorsal view 6

2. SIPH 0.4–2.0× cauda. Head smooth 3
 – SIPH 2.5–5.1× cauda. Ventral side of head with numerous small nodules or spicules or with fine spinulose imbrication 5
3. ANT and dorsal body hairs short, usually shorter than BD III. Head without spinal tubercles (STu), and marginal tubercles (MTu) often absent. Dorsum without dark sclerotisation *Brachycaudus helichrysi*
 – Longest ANT and dorsal body hairs longer than BD III. Head with or without STu, and ABD TERG 1–5 with well-developed MTu. Dorsum with variably developed dark markings 4
4. SIPH only 0.03–0.08 mm long, 0.4–0.8 (–1.2)× cauda *Dysaphis microsiphon*
 – SIPH 0.11–0.18 mm long, 1.1–1.6× cauda *Dysaphis pulverina*
5. Dorsal abdomen with extensive dark sclerotisation. Large, convex spinal and marginal tubercles (STu and MTu) present. SIPH 3.8–5.1× cauda, which bears 14–23 hairs *Zinia veronicae*
 – Dorsal abdomen without dark sclerotisation. STu and MTu irregularly present, small. SIPH 2.5–3.4× cauda, which bears 4–6 hairs *Dysaphis gallica*
6. Head densely spiculose or nodulose, at least on ventral surface, and with well-developed ANT tubercles, their inner faces steep-sided, parallel or apically convergent 7
 – Head without spicules, or with only a few minute ones on ventral side. ANT tubercles weakly developed, or if well developed then with smooth, divergent inner faces 9
7. Dorsal abdomen with an extensive dark dorsal shield. SIPH and cauda dark *Myzus cerasi* group (incl. *M. veronicae*)
 – Dorsal abdomen pale or with restricted dark markings. SIPH and cauda pale or dusky 8
8. Head with anteriodorsal part devoid of spicules. SIPH 0.25–0.30× BL, slightly swollen on distal part, and with at least 2–3 rows of closed polygonal cells subapically *Aulacorthum knautiae*
 – Head densely spiculose or nodulose both dorsally and ventrally. SIPH 0.14–0.28× BL, cylindrical/tapering or slightly to moderately swollen, without any distinct rows of closed polygonal cells
 go to key to polyphagous aphids, p. 1020, starting at couplet 5
9. ANT tubercles well developed, their inner faces smooth and divergent. ABD TERG 1 and 7 without marginal tubercles (MTu) 10
 – ANT tubercles weakly developed, not extending forward beyond middle of front of head in dorsal view. ABD TERG 1 and 7 with MTu 14
10. SIPH with polygonal reticulation on distal 0.13–0.20 of length *Macrosiphum euphorbiae*
 – SIPH without polygonal reticulation 11
11. Dorsal body hairs long, thick and capitate, arising from tuberculate bases 12
 – Dorsal body hairs not long, thick and capitate, without tuberculate bases 13
12. SIPH 1.1–2.1× cauda. R IV+V 0.9–1.1× HT II, with 2–5 accessory hairs. Longest hairs on ANT III 1.0–1.3× BD III *Cryptomyzus galeopsidis*
 – SIPH 2.4–3.1× cauda. R IV+V 1.3–1.5× HT II, with 6–8 accessory hairs. Longest hairs on ANT III 0.4–0.9× BD III *Cryptomyzus ribis*
13. Thoracic spiracles enlarged, much larger than abdominal spiracles. ANT PT/BASE 7.0–11.4, usually more than 8.0. Hairs on ANT III 0.7–1.1× BD III. Dorsum usually with paired dark intersegmental markings *Nasonovia ribisnigri*
 – Thoracic spiracles similar in size to abdominal ones. ANT PT/BASE less than 7.5. Hairs on ANT III less than 0.7× BD III. Dorsum without any dark markings *Acyrtosiphon malvae*

HOST LISTS AND KEYS

14. ABD TERG 2 and 3 as well as 1 and 7 consistently with conical or mammariform MTu, which are usually also on ABD TERG 4, and sometimes on 5 and 6 **15**
 – MTu only irregularly present on some of ABD TERG 2–4, and never on 5 and 6 **16**
15. Longest hairs on ANT III 0.33–0.5× BD III. ANT PT/BASE 2.3–3.3. SIPH 1.67–2.17× cauda, which bears 6–9 hairs *Aphis berlinskii*
 – Longest hairs on ANT III more than 2× BD III. ANT PT/BASE 3.3–4.1. SIPH 1.1–1.43× cauda, which bears 11–17 hairs *Aphis veronicicola**
16. Cauda with 11–24 hairs. Longest hairs on ANT III 0.8–3.5× (but usually more than 1.3×) BD III *Aphis fabae*
 – Cauda with 4–11 hairs. Longest hairs on ANT III 0.4–1.3× BD III **17**
17. ANT PT/BASE 1.1–1.8. SIPH 0.7–1.3× cauda. (Sec. rhin. in al. ANT III 25–60, IV 9–25, V 7–17) *Aphis triglochis*
 – ANT PT/BASE 1.8–4.1. SIPH 0.9–2.5× cauda. (Sec. rhin. in al. ANT III 4–16, IV 0–6, V 0–2) **18**
18. Longest hairs on ANT III 0.8–1.3× BD III. Dorsal abdominal hairs long and fine-pointed; those on ABD TERG 3 more than 2× BD III *Aphis korshunovi*
 – Longest hairs on ANT III 0.4–0.7× BD III. Dorsal abdominal hairs short, those on ABD TERG 3 maximally 1.3× BD III **19**
19. Dorsal abdomen with an extensive black patch. SIPH and cauda both black *Aphis craccivora*
 – Dorsal abdomen without any extensive dark markings **20**
20. SIPH pale with dark apices. Cauda pale. R IV+V 1.0–1.2× HT II *Aphis nasturtii*
 – SIPH entirely dark. Cauda pale, dusky or dark. R IV+V 1.1–1.5× HT II **21**
21. ANT PT/BASE 2.3–4.1. R IV+V 1.2–1.5× HT II. (Sec. rhin. in al. ANT III 5–11, IV 0–5, V 0–1) *Aphis frangulae* ssp. *beccabungae*
 – ANT PT/BASE 2.1–3.0. R IV+V 1.1–1.4× HT II. (Sec. rhin. in al. ANT III 6–12, IV 0, V 0) *Aphis gossypii*

Vetiveria

V. zizanioides

Viburnum

V. acerifolium

V. arboricola (incl. *odoratissimum*)

V. atrocyaneum

V. awabuki

V. bitchiuense

V. × bodnantense

V. bracteatum

V. burejaeticum

V. carlesii

V. cassinoides

V. coriaceum

Gramineae

Hysteroneura setariae

Caprifoliaceae

Aphis fabae, *viburni*, *viburniphila*, [*viburnum-acerifolium* Rafinesque (invalid name)];

Ceruraphis eriophori, *viburnicola*

Wahlgreniella viburni

Aphis gossypii

Aphis gossypii, *spiraecola*; *Sinomegoura citricola*;

Toxoptera odinae

Ceruraphis eriophori

Aulacorthum solani; *Ceruraphis eriophori*;

Myzus ascalonicus, *ornatus*

Myzus persicae

Myzus persicae

Aphis fabae, *viburni*; *Ceruraphis eriophori*

Aphis viburniphila; *Ceruraphis eriophori*

Toxoptera odinae

<i>V. cotinifolium</i>	<i>Ceruraphis eastopi, eriophori</i>
<i>V. dentatum</i> (incl. <i>pubescens</i>)	<i>Aphis crassicauda, fabae, spiraeicola, viburniphila</i> ; <i>Ceruraphis eriophori, viburnicola</i>
<i>V. dilatatum</i>	<i>Shinjia orientalis</i>
<i>V. edule</i>	[<i>Acyrtosiphon macrosiphon</i>]; <i>Aphis fabae</i> ; [<i>Prociphilus xylostei</i>]
<i>V. ellipticum</i>	<i>Ceruraphis viburnicola</i> ; [<i>Utamphorophora humboldti</i>]
<i>V. erosum</i>	<i>Shinjia orientalis</i> ; <i>Toxoptera odinae</i>
<i>V. farreri</i>	<i>Rhopalosiphoninus staphyleae</i>
<i>V. foetidum</i>	<i>Aphis gossypii, spiraeicola</i> ; <i>Myzus ornatus</i> ; <i>Toxopterae citricidus, odinae</i>
<i>V. formosanum</i>	<i>Toxoptera odinae</i>
<i>V. furcatum</i>	<i>Toxoptera odinae</i>
<i>V. glomeratum</i>	<i>Aphis spiraeicola</i> , [<i>Aphis</i> sp. (Leonard, 1974)]; <i>Myzus persicae</i>
<i>V. japonicum</i>	<i>Aphis spiraeicola</i> , [<i>Aphis</i> sp. (Leonard, 1974)]; <i>Myzus persicae</i> ; <i>Shinjia orientalis</i>
<i>V. × juddii</i>	<i>Ceruraphis eriophori</i>
<i>V. lantana</i>	<i>Aphis fabae, lantanae, lantanae</i> ssp. <i>coriaria, viburni</i> ; <i>Ceruraphis eriophori, viburnicola</i> ; <i>Myzus persicae</i>
<i>V. lauristinus</i>	<i>Aphis fabae</i>
<i>V. lentago</i>	<i>Ceruraphis viburnicola</i>
<i>V. lobophyllum</i>	[<i>Aphis</i> sp. (Leonard, 1974)]
<i>V. lutescens</i>	<i>Toxoptera odinae</i>
<i>V. macrocephalum</i>	<i>Aphis fabae</i> ; <i>Ceruraphis eriophori</i> ; <i>Myzus persicae</i>
<i>V. mongolicum</i>	<i>Aphis fabae</i>
<i>V. odoratissimum</i>	<i>Aphis fabae, spiraeicola</i> ; <i>Ceruraphis viburnicola</i> ; <i>Myzus ornatus, persicae</i> ; <i>Toxoptera aurantii, odinae</i>
<i>V. opulus</i> (incl. vars <i>americana</i> , <i>calvescens, roseum, sterilis</i>)	<i>Aphis fabae, fabae</i> ssp. <i>mordvilkoii, gossypii</i> , [<i>grossulariae</i>], [<i>hederae</i>], [<i>ilicis</i>], <i>lantanae, spiraeicola, viburni</i> , <i>viburniphila</i> , [<i>viburnum-acerifolium</i> Rafinesque (invalid)], [<i>viburnum-opulus</i> Rafinesque (invalid)]; <i>Aulacorthum solani</i> ; <i>Ceruraphis eriophori, viburnicola</i> ; [<i>Dysaphis plantaginea</i>]; [<i>Hyperomyzus lactucae</i>]; <i>Myzus ornatus, persicae</i> ; <i>Toxoptera odinae</i>
<i>V. photinioides</i> (?)	<i>Aphis spiraeicola</i> ; <i>Toxoptera odinae</i>
<i>V. plicatum</i> (incl. <i>tomentosum</i>)	<i>Aphis viburniphila</i> ; <i>Myzus ornatus, persicae</i>
<i>V. prunifolium</i>	<i>Aphis illinoisensis</i> ; <i>Macrosiphum euphorbiae</i> ; <i>Myzus persicae</i>
<i>V. pubescens</i> see <i>dentatum</i>	
<i>V. rafinesquianum</i>	<i>Aphis crassicauda, viburniphila</i>
<i>V. recognitum</i>	<i>Ceruraphis viburnicola</i>
<i>V. rigidum</i>	[<i>Aphis</i> sp. (Leonard, 1974)]; <i>Myzus persicae</i>
<i>V. roseum</i>	<i>Aphis viburni</i>
<i>V. sargentii</i>	<i>Aphis nerii, viburni</i> ; <i>Ceruraphis viburnicola</i> ; <i>Shinjia orientalis</i> ; <i>Toxoptera odinae</i> ; <i>Viburnaphis viburnicola</i>
<i>V. sieboldi</i>	[<i>Aphis</i> sp. (Leonard, 1974)]; <i>Myzus persicae</i> ; <i>Viburnaphis viburnicola</i> ; <i>Toxoptera odinae</i>

HOST LISTS AND KEYS

<i>V. suspensum</i>	<i>Aphis gossypii</i> , <i>spiraecola</i> ; <i>Ceruraphis viburnicola</i> ; <i>Macrosiphum euphorbiae</i>
<i>V. tinus</i>	<i>Aphis gossypii</i> , <i>lantanae</i> , <i>spiraecola</i> , <i>viburni</i> ; <i>Toxoptera aurantii</i>
<i>V. tomentosum</i>	<i>Toxoptera odinae</i>
<i>V. trilobum</i>	<i>Aphis fabae</i> , <i>fabae</i> ssp. <i>mordvilkoii</i> ; <i>Ceruraphis viburnicola</i> ; <i>Myzus persicae</i>
<i>V. urceolatum</i>	<i>Myzus persicae</i>
<i>V. veitchi</i>	<i>Ceruraphis eriophori</i>
<i>V. villosum</i>	<i>Aphis spiraecola</i>
<i>Viburnum</i> spp.	<i>Aphis</i> [<i>crinosa</i>]; <i>Mastopoda pteridis</i> ; [<i>Myzackaia verbasci</i>]; [<i>Phorodon viburni</i>]; [<i>Rhopalomyzus smilacis</i>]; <i>Rhopalosiphum rufiabdominale</i>

Key to apterae on *Viburnum* (couplet 1 and 3 can be applied to fund. and al.):–

1. Tarsi vestigial, without claws 2
– Tarsi normal, with a pair of claws 3
2. Head spiculose. ANT 5-segmented *Mastopoda pteridis*
– Head without spicules. ANT 6-segmented *Shinjia orientalis*
3. ABD TERG 7 with a pair of marginal tubercles (MTu) 4
– ABD TERG 7 without MTu 11
4. (Not applicable to fund.) ABD TERG 8 with (2–) 3–12 long hairs associated with a dark transverse sclerotic band, and often (except in small specimens) there are variably developed dark sclerotic markings on more anterior tergites 5
– ABD TERG 8 bearing 2 hairs, with or without a dark transverse band, without dark dorsal markings more anteriorly 10
5. ABD TERG 2–4 regularly with MTu and MTu also sometimes on 5 and/or 6 (total 6–9 on these 5 segments) *Aphis viburni*
– ABD TERG 2–4 with a total of 0–6 MTu (fare more than 4, and 0 on 5 or 6) 6
6. ABD TERG 1–5 each with a single pair of spinal hairs, much shorter than ventral hairs on same segments. Cauda more than 1.2× longer than its basal width in dorsal view 7
– ABD TERG 1–5 each with spinal hairs often duplicated (not in fund.), and often fine-pointed and as long as or longer than ventral hairs on same segments. Cauda 0.6–1.3× longer than its basal width in dorsal view 9
7. Hairs on ANT III very long and fine, maximally 2.45–3.5× BD III 8
– Longest hairs on ANT III 0.8–2.4× BD III *Aphis fabae* (incl ssp. *mordvilkoii*)
8. ABD TERG 8 with 2–4 hairs. Cauda with 14–18 hairs. ABD TERG 2–4 only sporadically with MTu (0–2 in total). Dorsal abdomen with variably developed sclerotic markings, never forming a solid sclerotic shield *Aphis lantanae* s. str.
– ABD TERG 8 with 4–12 hairs. Cauda with 17–24 hairs. ABD TERG 2–4 regularly with some MTu (1–6 in total). Dorsal abdomen often with an almost solid sclerotic shield *Aphis lantanae* ssp. *coraria*
9. Cauda 0.9–1.3× its basal width. ANT III often with up to 15 small rhinaria, not in a row. (Al. with sec. rhin. III 20–28 not in a row, IV 5–7, V 0–2) *Aphis viburniphila*

- Cauda 0.5–0.9× its basal width. ANT III without rhinaria (except in obvious alatforms). (Al. with sec. rhin. III 7–14 in a row, IV and V 0) *Aphis crassicauda*
- 10.** Hind legs black except at bases of femora (not fund.). Fore- and mid-legs also mainly dark, except for fore femora which are entirely pale *Aphis illinoisensis*
- Hind tibiae pale or with paler mid sections. If fore- and mid-legs are mainly dark then fore femora are also dark distally go to key to polyphagous aphids, p. 1020, starting at couplet 22
- 11.** ANT tubercles undeveloped or very weakly developed, not projecting beyond convex middle part of front of head in dorsal view. SIPH entirely dark. (Spring colonies often comprise only fund. and emigrant al.; couplets 11–14 can be applied to these morphs) **12**
- ANT tubercles moderately to well developed. SIPH pale or dusky, or dark only distally **15**
- 12.** SIPH bearing several hairs. Cauda rounded, distinctly shorter than its basal width, with 8–15 hairs. Hind tibia with 7–15 scent glands on distal part *Viburnaphis viburnicola*
- SIPH without hairs. Cauda tapering to a blunt or almost pointed apex, as long as or a little longer than its basal width, and bearing 5–7 hairs. Hind tibia with or without scent glands **13**
- 13.** Dorsum of fund. with extensive dark sclerotisation. SIPH (all morphs) more than 2× cauda, black, and very coarsely imbricated *Ceruraphis eriophori*
- Dorsum of fund. mainly pale. SIPH (all morphs) 1.1–2.0× cauda, pale or dark, and either almost smooth, or with a few wavy lines of blunt spicules, or with very fine close-set spiculose imbrication **14**
- 14.** SIPH weakly and sparsely imbricated (apt. – fund?), or with a few wavy lines of blunt spicules (al., Figure 58a). ANT V and VI of al. with very large elongate primary rhinaria with naked rims (Figure 58c). Hind tibia without scent glands *Ceruraphis eastopi*
- SIPH (all morphs) with very fine close-set rows of spiculose imbrication (Figure 58b). ANT V and VI of al. with primary rhinaria of normal size, rounded, with fimbriate rims. Distal part of hind tibia with scent glands (Figure 58d) *Ceruraphis viburnicola*
- 15.** SIPH strongly swollen over about distal 0.75 of length, with maximum width of swollen part c.2× minimum width near base. Head without spicules. ANT tubercles only moderately developed, and median tubercle prominent *Wahlgreniella viburni**

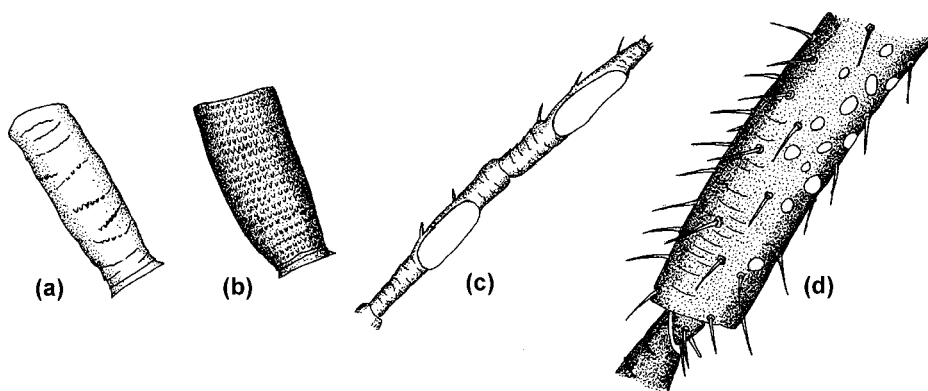


Figure 58 Aphids on *Viburnum*. (a) SIPH of spring migr. al. of *Ceruraphis eastopi* (type); (b) SIPH of spring migr. al. of *C. viburnicola*, (c) ANT V and BASE VI of spring migr. al. of *C. eastopi* (type), (d) end of hind tibia of spring migr. al. of *C. viburnicola*.

HOST LISTS AND KEYS

- Without the above combination of characters; if SIPH are strongly swollen then head is spiculose with well-developed, steep-sided or apically convergent ANT tubercles, and median tubercle not developed
go to key to polyphagous aphids, p. 1020, starting at couplet 4

Vicia

V. alpestris
V. americana
V. amoena

V. amurensis

V. angustifolia (incl. var. *segetalis*)
V. atropurpurea
V. benghalensis
V. calcarata
V. cassubica
V. cracca

V. dasycarpa
V. dumetorum
V. faba (incl. var. *minor*)

V. flava (?*flavida*)
V. gigantea
V. hirsuta
V. incana
V. japonica
V. ludoviciana
V. lutea
V. megalotropis
V. narbonensis
V. onobrychioides
V. pannonica
V. peregrina
V. pilosa
V. pseudo-orobus

V. pulchella
V. purpurea
V. sativa

Leguminosae

Acyrthosiphon pisum
Acyrthosiphon pisum; *Macrosiphum creelii*
Acyrthosiphon pisum;
Aphis craccivora, *craccivora* ssp. *pseudacaciae*;
Megoura crassicauda
Aphis craccivora, *craccivora* ssp. *pseudacaciae*;
Megoura crassicauda
Acyrthosiphon pisum; *Megoura crassicauda*, *viciae*
Acyrthosiphon pisum
Acyrthosiphon pisum; *Aphis craccivora*
Aphis cracca
Aphis cracca; *Megoura viciae*
Acyrthosiphon loti, *pisum*; *Aphis cracca*, *craccivora*, *fabae*;
Aulacorthum solani; *Megoura crassicauda*, *viciae*
Acyrthosiphon pisum; *Aphis cracca*
Aphis cracca
Acyrthosiphon gossypii, *pisum*;
Aphis cracca, *craccivora*, *fabae*; *Aulacorthum solani*;
Brachycaudus helichrysi; *Macrosiphum creelii*, *euphorbiae*;
Megoura crassicauda, *viciae*;
Myzus antirrhinii, *ornatus*, *persicae*; *Smynthuroides betae*
Megoura crassicauda
Acyrthosiphon pisum
Acyrthosiphon pisum
Aphis cracca
Aphis craccivora; *Megoura crassicauda*
Acyrthosiphon pisum
Aphis cracca
Aphis craccivora; *Megoura crassicauda*
Aphis craccivora
Aphis craccivora
Acyrthosiphon pisum; *Aphis craccivora*, *fabae*
Aphis craccivora
Aphis craccivora
Aphis cracca
Aphis craccivora, *craccivora* ssp. *pseudacaciae*;
Megoura crassicauda
Aphis craccivora
Acyrthosiphon pisum; *Aphis craccivora*
Acyrthosiphon pisum;
Aphis craccivora, *fabae*, *gossypii*, *nasturtii*;
Aulacorthum solani; *Macrosiphum euphorbiae*;
Megoura viciae; *Myzus ornatus*

<i>V. sepium</i>	<i>Acyrtosiphon pisum</i> ; <i>Aphis craccivora</i> , <i>fabae</i> ; <i>Aulacorthum solani</i> ; <i>Megourella tribulis</i> ; <i>Megoura viciae</i> ; <i>Myzus persicae</i>
<i>V. tenuifolia</i> (incl. <i>stenophylla</i>)	<i>Aphis cracciae</i>
<i>V. unijuga</i>	<i>Megoura crassicauda</i>
<i>V. venosa</i>	<i>Acyrtosiphon pisum</i> ; <i>Megoura nigra</i>
<i>V. villosa</i>	<i>Acyrtosiphon pisum</i> ; <i>Aphis cracciae</i> ; <i>Megoura viciae</i>
<i>Vicia</i> spp.	<i>Myzus cymbalariae</i> ; <i>Neomyzus circumflexus</i>

Key to apterae on *Vicia*:-

(For an illustrated keys to apterae on cultivated legumes see Blackman and Eastop, 2000)

1. ANT PT/BASE less than 1. SIPH absent *Smynturodes betae*
- ANT PT/BASE more than 1.5. SIPH present **2**
2. Dorsal abdomen anterior to SIPH with an extensive solid black shield **3**
- Dorsal abdomen anterior to SIPH membranous or with only small scattered dark markings **5**
3. SIPH 0.7–1.0× cauda *Aphis cracciae*
- SIPH 1.1–2.2× cauda **4**
4. Dorsal hairs on ABD TERG 1–3 much shorter than ANT BD III, and those on ABD TERG 8 usually blunt and about equal to BD III *Aphis craccivora* s.str.
- Dorsal hairs on ABD TERG 1–3 as long as or a little longer than ANT BD III, and those on ABD TERG 8 pointed and c. 2× BD III *Aphis craccivora* ssp. *pseudacaciae*
5. Head smooth with well-developed ANT tubercles, their inner faces divergent **6**
- Either head densely spiculate and ANT tubercles with steep-sided, scabrous inner faces, or ANT tubercles undeveloped or weakly developed go to key to polyphagous aphids, p. 1020
6. SIPH pale or only dusky towards apices, tapering or cylindrical. Cauda pale **7**
- SIPH dark, swollen in middle or on distal half. Cauda pale or dark **11**
7. SIPH with a subapical zone of polygonal reticulation. Longest hairs on ANT III 0.6–1.2× BD III **8**
- SIPH without polygonal reticulation. Longest hairs on ANT III less than 0.5× BD III **9**
8. ANT BASE VI 0.8–1.3× R IV+V *Macrosiphum euphorbiae*
- ANT BASE VI 1.4–2.0× R IV+V *Macrosiphum creelii*
9. ANT BASE VI 0.14–0.17 mm. SIPH not attenuated distally, 0.20–0.25× BL, and thicker than hind tibiae at their respective midlengths *Acyrtosiphon loti*
- ANT BASE VI 0.23–0.40 mm. SIPH attenuated distally, 0.22–0.50× BL, as thin as or thinner than hind tibiae at their respective midlengths **10**
10. SIPH 0.42–0.50× BL and 2.5–3.5× cauda *Acyrtosiphon gossypii*
- SIPH 0.22–0.38× BL, and 1.2–1.9× cauda *Acyrtosiphon pisum*
11. SIPH 1.5–1.7× cauda. All dorsal abdominal hairs arising from conspicuous dark scleroites *Megourella tribulis*
- SIPH 0.8–1.33× cauda. Scleroites at bases of dorsal hairs small or absent **12**
12. Tibiae pale on basal 0.6–0.7. R IV+V 0.88–1.0× HT II. ANT III with usually more than 50 (28–64) rhinaria *Megoura nigra*
- Tibiae entirely dark. R IV+V 0.63–0.87× HT II. ANT III with less than 50 rhinaria **13**

HOST LISTS AND KEYS

13. ANT III with 5–26 (usually 10–18) rhinaria, not in a row, on basal 0.75 of segment (ANT IV of al. with 0–7 rhinaria) *Megoura viciae*
 – ANT III with (15–) 21–50 rhinaria in a row extending over 0.75–0.90 of segment. (ANT IV of al. with more than 17 rhinaria) *Megoura crassicauda*

Vicoa see *Pentanema*

Victoria

V. regia

Nymphaceae

Rhopalosiphum nymphaeae

Vigna (incl. *Voandzeia*)

V. ambacensis

V. catjang see *unguiculata*

V. cylindrica see *unguiculata*

V. difformis

V. frutescens

V. luteola

V. mungo

V. nuda

V. reticulata

V. sesquipedalis

V. sinensis

V. subterranea

V. triloba

V. unguiculata (incl. vars *catjang*,
cylindrica)

Leguminosae

Aphis gossypii

Aphis gossypii

Aphis craccivora

Aphis craccivora, *gossypii*; *Macrosiphum euphorbiae*;
Microparsus brasiliensis, *vignaphilus*

Aphis craccivora

Aphis craccivora

Aphis gossypii

Aphis craccivora

Acyrtosiphon gossypii, *pisum*;

Aphis craccivora, *gossypii*; *Aulacorthum solani*;

Macrosiphum euphorbiae; *Myzus ornatus*

Aphis craccivora, *gossypii*

Aphis craccivora

Acyrtosiphon gossypii;

Aphis craccivora, *fabae*, *gossypii*, *spiraecola*;

Brachycaudus helichrysi; *Macrosiphum euphorbiae*;

Microparsus brasiliensis; *Myzus ornatus*, *persicae*;

Smynthuroides betae

Anomalosiphum indigoferae

Vigna sp.

Key to apterae on *Vigna*:-

- SIPH with a subapical ring of hairs with expanded apices. ABD TERG 8 with hair-bearing backwardly directed processes. Cauda broad with a median stylus *Anomalosiphum indigoferae*
 – SIPH (if present) without hairs. ABD TERG 8 without processes. Cauda if developed then helmet-shaped, tongue- or finger-like **2**
- Cauda helmet-shaped, not longer than its basal width. SIPH pale, smooth, conical, with a subapical annular incision. Spiracular apertures large and rounded *Brachycaudus helichrysi*
 – Cauda (if developed at all) tongue- or finger-shaped. SIPH (if present) tapering, cylindrical or clavate, imbricated, without a subapical annular incision. Spiracular apertures reniform
 go to key to apterae on *Phaseolus*

Viguiera

V. cordifolia

V. dentata (incl. *helianthoides*)

V. multiflora

Compositae

Aphis wahena

Acyrtosiphon bidenticola; *Uroleucon ambrosiae*

Uroleucon ambrosiae

Key to apterae on *Viguiera*:-

1. ANT tubercles weakly developed, ANT c.0.75× BL, with sec. rhin. distributed III 3–5 (on distal part), IV 6–10, V 1–4. SIPH dark, 2.2–2.6× cauda which bears 4 hairs *Aphis wahena*
– Without that combination of characters **2**
2. SIPH pale basally, slender, 20–35× longer than diameter at midlength, and with any polygonal reticulation extending for less than 0.1 of length *Acyrtosiphon bidenticola*
– SIPH uniformly dark, thicker, 6–12× diameter at midlength, with a distal zone of reticulation consisting of numerous polygonal cells on distal c.0.33 of length *Uroleucon ambrosiae*

(or if none of these fits, then try key to polyphagous aphids, p. 1020)

Villarsia*Villarsia* sp.**Menyanthaceae***Aulacorthum solani***Villebrunea** see **Oreocnide****Viminaria***V. juncea***Leguminosae***Aphis* sp. (Leonard, 1972a)**Vinca***V. difformis**V. major***Apocynaceae***Aphis gossypii**Aphis gossypii, nerii; Aulacorthum solani;**Brachycaudus helichrysi; Macrosiphum euphorbiae;**Myzus ornatus, persicae; Neomyzus circumflexus;**Rhopalosiphoninus latysiphon, staphyleae;**Smynthuroides betae**V. minor**Aulacorthum solani; Brachycaudus helichrysi;**Macrosiphum euphorbiae; Myzus persicae;**Rhopalosiphoninus latysiphon, staphyleae**V. rosea* see *Catharanthus**Vinca* sp.[*Acyrtosiphon pisum*]

Use key to polyphagous aphids, p. 1020.

Vincetoxicum*V. hirundinaria**V. nigrum**V. officinale***Asclepiadaceae***Aphis fabae; Aulacorthum solani**Aphis nerii**Aphis nerii*

Use key to polyphagous aphids, p. 1020.

Viola*V. acuminata**V. arvensis**V. canina**V. collina**V. cucullata**V. eugeniae**V. glabella**V. hederacea***Violaceae***Aphis violaeradicis**Aulacorthum solani; Myzus ascalonicus, certus, persicae**Aulacorthum solani**Aphis violaeradicis**Aulacorthum solani**Myzus ascalonicus**Macrosiphum violae**Myzus cymbalariae*

HOST LISTS AND KEYS

<i>V. mandshurica</i>	<i>Aphis sumire</i> ; <i>Neotoxoptera violae</i>
<i>V. nutallii</i>	<i>Neomyzus circumflexus</i>
<i>V. odorata</i>	<i>Aphis gossypii</i> ; <i>Aulacorthum solani</i> ; <i>Myzus ornatus</i> , <i>persicae</i> ; <i>Neotoxoptera oliveri</i> , <i>violae</i> ; <i>Rhopalosiphoninus latysiphon</i> , <i>staphyleae</i>
<i>V. palustris</i>	<i>Aphis violae</i>
<i>V. persicifolia</i>	<i>Aphis violae</i>
<i>V. philippica</i> ssp. <i>munda</i>	<i>Aphis sumire</i>
<i>V. prionantha</i>	[? <i>Aphis gossypii</i> (Chu, 1949, on roots with eggs, = <i>violaeradicis</i> ?)]
<i>V. reichenachiana</i>	<i>Myzus ornatus</i>
<i>V. septentrionalis</i>	<i>Myzus ascalonicus</i>
<i>V. tricolor</i> (incl. vars <i>hortensis</i> , <i>maxima</i>)	<i>Aphis gossypii</i> , <i>nasturtii</i> , [<i>umbrella</i>], <i>violae</i> ; <i>Aulacorthum solani</i> ; <i>Brachycaudus helichrysi</i> ; [<i>Illinoia azaleae</i>]; <i>Macrosiphum euphorbiae</i> ; <i>Myzus ascalonicus</i> , <i>certus</i> , <i>cymbalariae</i> , <i>ornatus</i> , <i>persicae</i> ; <i>Neotoxoptera oliveri</i> ; <i>Neomyzus circumflexus</i> ; <i>Rhopalosiphoninus staphyleae</i> [<i>Delphiniobium violisuctum</i>]
<i>V. verecunda</i>	<i>Myzus certus</i> , <i>ornatus</i> , <i>persicae</i> ; <i>Neomyzus circumflexus</i>
<i>V. × wittrockiana</i>	[? <i>Aphis gossypii</i> (Chu, 1949, on roots with eggs, = <i>violaeradicis</i> ?)]
<i>V. yedoensis</i>	<i>Abstrusomyzus phloxae</i> ; [<i>Acyrtosiphon pisum</i>]; [<i>Aphis plantaginis</i>]
<i>Viola</i> spp.	

Key to apterae on *Viola*:-

1. ANT tubercles absent or weakly developed, not projecting beyond middle of front of head in dorsal view 2
 - ANT tubercles well developed, projecting forward so that there is a mid-frontal sinus 7
2. SIPH smooth, pale, conical, with a subapical incision below the flange. Cauda helmet-shaped, not longer than its basal width. Spiracular apertures large and rounded. ABD TERG 1 and 7 without marginal tubercles (MTu) *Brachycaudus helichrysi*
 - SIPH imbricated, pale or dark, tapering, without a subapical annular incision. Cauda longer than its basal width. Spiracular apertures reniform. ABD TERG 1 and 7 with MTu 3
3. ABD TERG 2-4, and often 5 and 6, with MTu *Aphis violae*
 - MTu of only sporadic occurrence on ABD TERG 2-6 4
4. SIPH usually pale, or only dark at apices. (Sec. rhin. in al. ANT III 5-16, IV 1-6, V 0-2) *Aphis nasturtii*
 - SIPH entirely dark. (Sec. rhin. in al. ANT III 3-12 (-15), IV 0 (-2), V 0 (-1)) 5
5. Hairs on ANT, legs and dorsal body very short, e.g. longest hair on ANT III 0.2-0.4× BD III, posterior hair on hind trochanter 0.3-0.5× diameter of trochantrofemoral suture. Marginal sclerites usually apparent on ABD TERG 1-5 *Aphis sumire*
 - Hairs longer, e.g., longest hair on ANT III 0.4-1.0× BD III, posterior hair on hind trochanter 0.5-1.5× diameter of trochantrofemoral suture. Marginal sclerites usually not apparent 6
6. (Al. with 3-5 sec. rhin on ANT III) *Aphis violaeradicis**
 - (Al. with 3-12 (-15) sec. rhin on ANT III) *Aphis gossypii*

7. Head not spiculose, or with spicules only ventrally, and with inner faces of ANT tubercles smooth and divergent. SIPH not or only very slightly swollen, and with subapical reticulation (at least 4–5 rows of closed polygonal cells) **8**
 – Head spiculose both dorsally and ventrally, with steep-sided or apically convergent ANT tubercles. SIPH without any distinct subapical reticulation, unless grossly swollen **9**
8. R IV+V 0.94–1.26× HT II (rarely less than 1). Ventral side of head with a broad band of spinules on each side running from ANT tubercles to posterior margin *Macrosiphum violae**
 – R IV+V 0.8–1.0× HT II. Ventral side of head without spinules *Macrosiphum euphorbiae*
9. SIPH tapering/cylindrical **10**
 – SIPH slightly to markedly clavate **12**
10. ANT PT/BASE 1.7–2.8. ANT III without rhinaria. Dorsal abdomen with dark intersegmental spots *Myzus ornatus*
 – ANT PT/BASE 4.0–5.5. ANT III usually with 1–3 small rhinaria near base. Dorsal abdomen pale or with more extensive dark markings **11**
11. Dorsum with extensive dark markings, including a roughly horseshoe-shaped abdominal patch. SIPH less than 10× midlength width, with a moderate flange. R IV+V with 2 accessory hairs *Neomyzus circumflexus*
 – Dorsum without dark markings. SIPH more than 10× midlength width, with a large flange. R IV+V usually with 6 accessory hairs *Aulacorthum solani*
12. SIPH markedly clavate, so that maximum width of swollen part is more than 2× minimum width basad. Dorsal abdomen with dark markings **13**
 – SIPH more moderately clavate, with maximum width of swollen part less than 2× minimum width basad. Dorsal abdomen without dark markings **14**
13. SIPH with swollen part 3.7–4.8× thicker than the narrow cylindrical basal part, and a narrowly constricted subapical region with polygonal reticulation. ANT III without rhinaria *Rhopalosiphoninus latysiphon*
 – SIPH with swollen part not more than 3.2× the minimum width of the rather thick basal part, and subapical region not narrowly constricted, with a few rows of transverse striae proximal to flange. ANT III usually with 1–4 rhinaria on a thickened part near base *Rhopalosiphoninus staphyleae*
14. SIPH 0.82–1.34× ANT III **15**
 – SIPH 0.54–0.81× ANT III **17**
15. ANT tubercles themselves rather low, but with scabrous processes extending forward from ANT bases. SIPH weakly swollen subapically (over about distal 0.25). Dorsum with an evident reticulate pattern *Abstrusomyzus phloxae*
 – ANT tubercles broadly rounded, without forwardly-directed processes. SIPH slightly to moderately swollen over about distal 0.5. Dorsum without a reticulate pattern **16**
16. R IV+V in most specimens with only one pair of lateral accessory hairs (plus 0–3 ventral accessory hairs). Value of function cauda/(ANT III×PT) in range 0.80–1.52, but rarely more than 1.25 except in small specimens (those with ANT III less than 0.32 mm) *Myzus persicae*
 – R IV+V in most specimens with two pairs of lateral accessory hairs. Value of function cauda/(ANT III×PT) in range 1.2–2.7 (rarely less than 1.25) *Myzus certus*
17. SIPH with a narrow basal stem, its narrowest part thinner than, or as thin as, hind tibia at midlength. R IV+V 1.4–1.6× HT II, with 7–15 accessory hairs *Myzus ascalonicus*

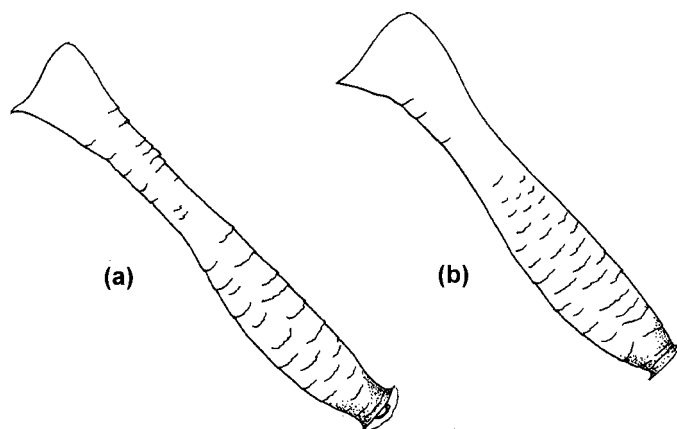


Figure 59 Apteræ on *Viola*. (a) SIPH of *Neotoxoptera violae*, (b) SIPH of *Neotoxoptera oliveri*.

- SIPH thicker on basal half, its narrowest part thicker than hind tibia at midlength. R IV+V 0.9–1.6× HT II, with 2–8 accessory hairs **18**
- 18.** ANT PT/BASE 2.5–3.3. SIPH very coarsely imbricated on swollen part. Dorsal cuticle very rugose. (Al. with wing veins without dark borders) *Myzus cymbalariae*
- ANT PT/BASE 3.5–4.8 SIPH smooth or normally imbricated on swollen part. Dorsal cuticle not rugose. (Al. with dark-bordered wing-veins) **19**
- 19.** SIPH 10–15× longer than minimum diameter of constricted region on basal half (Figure 59a). R IV+V 1.4–1.6× HT II *Neotoxoptera violae*
- SIPH 7–9× longer than minimum diameter of constricted region on basal half (Figure 59b). R IV+V 1.2–1.4× HT II *Neotoxoptera oliveri*

Virectaria

V. major

Virgilia

V. oroboides

Viscaria

V. atropurpurea see *Lychnis viscaria* ssp.
atropurpurea

V. vulgaris

Rubiaceae

Myzus ornatus

Leguminosae

Aphis craccivora

Caryophyllaceae

Aphis fabae, sambuci; Brachycaudus lychnidis; Volutaphis centaureae

Use key to apteræ on *Silene*.

Viscum

V. album

V. articulatum

V. coloratum

V. rotundifolium

Viscaceae

Tuberaphis coreana, viscisucta

Mesothoracaphis rappardi

Tuberaphis coreana

Sitobion sp. (Millar, 1994)

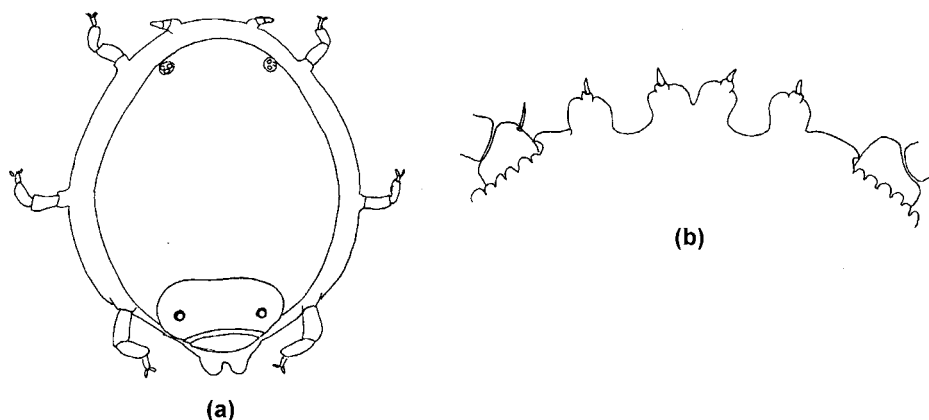


Figure 60 Apterae on *Viscum*. (a) General body form of *Mesothoracaphis rappardi*, (b) front of head of *Tuberaphis coreana*.

Key to apterae on *Viscum*:-

1. SIPH tubular, with a subapical zone of polygonal reticulation. Anal plate entire. Eyes multifaceted
Sitobion sp.
- SIPH as slightly raised pores. Anal plate bilobed. Eyes reduced to a few (usually only 3) facets **2**
2. Head, thorax and abdominal segment I fused to form sclerotic, pill box-like prosoma (Figure 60a). ANT greatly reduced, 3-segmented, $0.07-0.09 \times BL$
Mesothoracaphis rappardi
- Cuticle membranous, pale, head fused to prothorax only. ANT 5-segmented, $0.20-0.27 \times BL$ **3**
3. Front of head with 4 rounded spine-bearing tubercles, the medial pair conjoined at bases (Figure 60b). Thorax and abdomen with a continuous fringing row of wax glands
Tuberaphis coreana
- Front of head without tubercles. Wax glands not evident
*Tuberaphis viscisucta**

Visnea

V. mocanera

Vitex

V. agnus-castus

V. doniana

V. japonica (?)

V. lucens

V. negundo

V. rehmannii

V. strickeri

V. trifolia

Vitex spp.

Theaceae

Toxoptera aurantii

Verbenaceae

Aphis fabae, gossypii, nasturtii, viticis;

Myzus ornatus, persicae

Aphis gossypii

Aphis gossypii, ?nasturtii

Aphis gossypii; Myzus ornatus, persicae

Aphis gossypii, [punicae]

Aphis gossypii

Aphis gossypii

Aphis gossypii

Aphis spiraeicola; Brachycaudus helichrysi;

[Megoura lespedezae]

Key to apterae on *Vitex*:-

- R IV+V tapering almost to a point, $1.05-1.30 \times HT$ II. ABD TERG 1 and 7 with marginal tubercles (MTu). SIPH tapering, pale or rather dark but never blackish, cauda pale with 6–13 hairs. Longest hairs on ANT III $0.4-0.75 \times BD$ III. Hind tibial hairs all shorter than width of tibia at midlength

Aphis viticis

HOST LISTS AND KEYS

- R IV+V with blunt or rounded apex, and if ABD TERG 1 and 7 have MTu then other characters are not in that combination go to key to polyphagous aphids, p. 1020

Vitis

V. aestivalis
V. bicolor
V. bourquiniana
V. californica
V. candicans
V. cantoniensis
V. champini
V. cinerea
V. cordifolia
V. labrusca
V. riparia (incl. *vulpina*)
V. rupestris
V. tiliaefolia
V. trifoliata
V. vinifera

Vitis spp.

Vitaceae

Viteus vitifoliae
Aphis illinoisensis
Viteus vitifoliae
Toxoptera aurantii
Viteus vitifoliae
Greenidea viticola
Viteus vitifoliae
Viteus vitifoliae
Aphis illinoisensis; *Viteus vitifoliae*
Aphis illinoisensis; *Viteus vitifoliae*
Aphis illinoisensis, [*ripariae*]; *Viteus vitifoliae*
Viteus vitifoliae
Aphis illinoisensis
Aphis gossypii
Aphis craccivora, *fabae*, *gossypii*, [*hederae*],
illinoisensis, *spiraecola*, [*vitis* Scopoli, 1763];
Aploneura ampelina; *Aulacorthum solani*; *Geoica lucifuga*;
Pemphigus sp., *Prociphilus oleae*; *Viteus vitifoliae*
Macrosiphum euphorbiae; *Myzus ornatus*, *persicae*;
Smynthuroides betae

Key to apterae on *Vitis*:-

1. Body pyriform, broadest anteriorly. ANT 3-segmented *Viteus vitifoliae*
 – Body not broadest anteriorly. ANT 5- or 6-segmented **2**
2. ANT PT/BASE less than 0.5. SIPH absent **3**
 – ANT PT/BASE more than 1. SIPH present, tubular **7**
3. Body spindle-shaped with very short ANT and legs (e.g., hind tibia only 0.07–0.15× BL), and sparse, short hairs. R IV with 2 hairs (often inconspicuous) *Aploneura ampelina*
 – Body oval or globular with longer ANT and legs (e.g., hind tibia 0.12–0.23× BL). Hairs usually more numerous and/or longer, if short and sparse then R IV without hairs **4**
4. Hairs on body and appendages short and sparse. R IV without accessory hairs *Pemphigus* sp.
 – Body and appendages with longer and/or more numerous hairs. R IV with 4 or more hairs **5**
5. Anus and anal plate displaced dorsally. Some dorsal body hairs spatulate, and longest marginal hairs 130–150µm long *Geoica lucifuga*
 – Anus and anal plate normally positioned. Dorsal hairs all pointed. Longest marginal hairs less than 50µm long **6**
6. Body densely clothed in fine hairs. ANT 5-segmented, with ANT II elongate, similar in length to ANT III *Smynthuroides betae*
 – Body more sparsely hairy. ANT 6-segmented, with II much shorter than III *Prociphilus oleae*

WALDSTEINIA

7. SIPH with numerous very long hairs *Greenidea viticola*
 – SIPH without hairs **8**
8. Hind tibiae entirely black *Aphis illinoisensis*
 – Hind tibiae pale, or at least with extensive pale middle sections **9**
9. Head densely spiculose, ANT tubercles well-developed with inner faces almost parallel. SIPH long and tapering/cylindrical, with a well-developed flange. ANT III usually with 1–2 small rhinaria near base **10**
 – Without that combination of characters go to key to polyphagous aphids, p. 1020
10. Cauda with 5 hairs (2 lateral pairs plus one subapical hair). Distal halves of femora black *Aulacorthum kuwanai**
 – Cauda with (6–) 7 hairs (3 lateral pairs). Femora entirely pale or only dusky towards apices *Aulacorthum solani*

Voandzeia see *Vigna*

Volutaria see *Amberboa*

Vriesea

Bromeliaceae

V. ringens

Sitobion luteum

Vriesea sp.

Rhopalosiphum rufiabdominale

Key to apterae on *Vriesea*:–

- Dorsal abdomen with a large black oval patch. SIPH black with a distal zone of polygonal reticulation *Sitobion luteum*
 – Without that combination of characters go to key to polyphagous aphids, p. 1020

Vulpia (incl. *Zerna*)

Gramineae

V. bromoides

[*Sitobion* sp.]

V. geniculata

Forda marginata;

Metopolophium festucae ssp. *cerealium*;

Sipha maydis; *Sitobion avenae*, *fragariae*

V. inermis see *Bromus*

V. membranacea

Metopolophium sabihae

V. myuros

Israelaphis alistana;

Metopolophium festucae ssp. *cerealium*;

Schizaphis graminum; *Sitobion avenae*, *fragariae*

Vulpia sp.

Rhopalosiphum maidis

Use key to apterae of grass-feeding aphids under *Digitaria*.

Wahlenbergia

Campanulaceae

W. abyssinica (ssp. *abyssinica*)

Uroleucon compositae

W. perrotetii

Aphis gossypii

W. serpyllifolia

Macrosiphum euphorbiae

Use key to polyphagous aphids, p. 1020.

Waldsteinia

Rosaceae

W. fragarioides

Rhopalosiphoninus staphyleae

HOST LISTS AND KEYS

Waltheria

W. americana

W. indica

Use key to polyphagous aphids, p. 1020.

Wasabia see *Eutremia*

Watsonia

W. rosea

Watsonia spp.

Sterculiaceae

Aphis gossypii; *Myzus persicae*

Aphis gossypii

Iridaceae

Neomyzus circumflexus

Macrosiphum euphorbiae;

Rhopalosiphum rufiabdominale; *Sitobion africanum*

Key to apterae on *Watsonia*:-

- SIPH black, with a distal zone of polygonal reticulation. Longest hairs on ANT III less than 0.6× BD III. Dorsal abdomen with variably developed dark cross-bands *Sitobion africanum*
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Wedelia

W. calycina

W. glauca

W. paludosa

W. rugosa

W. trilobata

Wedelia sp.

Compositae

Aphis gossypii

Uroleucon sp. near *macolai* (Argentina; BMNH colln)

Rhopalosiphum nymphaeae

Aphis spiraecola

Acyrtosiphon bidenticola; *Aphis gossypii*;

Neomyzus circumflexus; *Uroleucon ambrosiae*

Uroleucon ambrosiae ssp. *lizerianum*

Key to apterae on *Wedelia*:-

1. SIPH entirely dark and with an extensive distal zone of polygonal reticulation. Dusky/dark scleroites present at bases of at least some of dorsal hairs **2**
- SIPH pale or dark, if dark then without or with very little polygonal reticulation. Dorsal hairs not arising from scleroites **3**
2. Cauda pale, contrasting with dark SIPH *Uroleucon ambrosiae* (incl. ssp. *lizerianum*)
- Cauda dusky, not much paler than SIPH *Uroleucon* sp. near *macolai*
3. ANT tubercles well developed with smooth divergent inner faces. ANT dark except at base, with ANT PT/BASE 5.9–7.5. SIPH dark except for basal 0.2–0.3 of length, with subapical polygonal reticulation restricted to much less than 0.1 of length *Acyrtosiphon bidenticola*
- Without that combination of characters **4**
4. Dorsal cuticle with a pattern of spinules arranged in polygons, with 1–3 spicules in the center of each polygon. SIPH clavate *Rhopalosiphum nymphaeae*
- Dorsal cuticle without spinules arranged in polygons. SIPH not clavate go to key to polyphagous aphids, p. 1020, starting at couplet 4

Weigela

W. coraeensis

W. floribunda

W. florida

W. hortensis

Caprifoliaceae

Micromyzus diervillae

Myzus ornatus, *persicae*

Aphis fabae; *Micromyzus diervillae*; *Neotoxoptera weigeliae*

Aulacorthum solani; *Micromyzus diervillae*;

Neotoxoptera weigeliae; *Rhopalosiphoninus celtifoliae*

W. japonica
W. praecox
W. subsessilis
Weigela spp.

Micromyzus diervillae
Micromyzus diervillae; *Neotoxoptera abeliae* (?), *yasumatsui*
Neotoxoptera weigeliae
Aphis gossypii, [*Aphis* sp. (Leonard, 1964b:101)];

Key to apterae (excepted where otherwise indicated) on *Weigela*:-

(This key can be applied to fundatrices and al. in spring populations, when these are the only available morphs.)

1. Head without spicules, ANT tubercles weakly developed. ABD TERG 1 and 7 with marginal tubercles (MTu) go to key to polyphagous aphids, p. 1020, starting at couplet 24
- Head spiculate (or if smooth in al. then SIPH dark and clavate). ABD TERG 1 and 7 without MTu 2
2. SIPH not clavate, almost cylindrical on distal half (except sometimes for subapical constriction) 3
- SIPH slightly to markedly clavate (i.e. with narrower section on basal half) 5
3. Dorsal abdomen with a pattern of dark intersegmental markings. SIPH rather thick, less than 10× longer than their width at midlength, with a slight S-curve *Myzus ornatus*
- Dorsal abdomen without dark intersegmental markings. SIPH more than 10× longer than their width at midlength, and rather straight 4
4. ANT PT/BASE 4.0–5.5. SIPH 2.1–2.5× cauda, with a large flange. ANT III usually with 1–3 rhinaria near base *Aulacorthum solani*
- (Fund?) ANT PT/BASE 1.4–2.0. SIPH 2.5–3.2× cauda, with a small flange (Figure 61a). ANT III without rhinaria *Micromyzus diervillae*
5. (Fund.) Cauda with 10–12 hairs. R IV+V 1.4–1.6× HT II. (Al with smooth head, thick, dark SIPH – Figure 61b, and primary rhinarium on ANT V elongate, its long axis 1.2–1.4× diameter of segment – Figure 61c) *Rhopalosiphoninus celtifoliae*

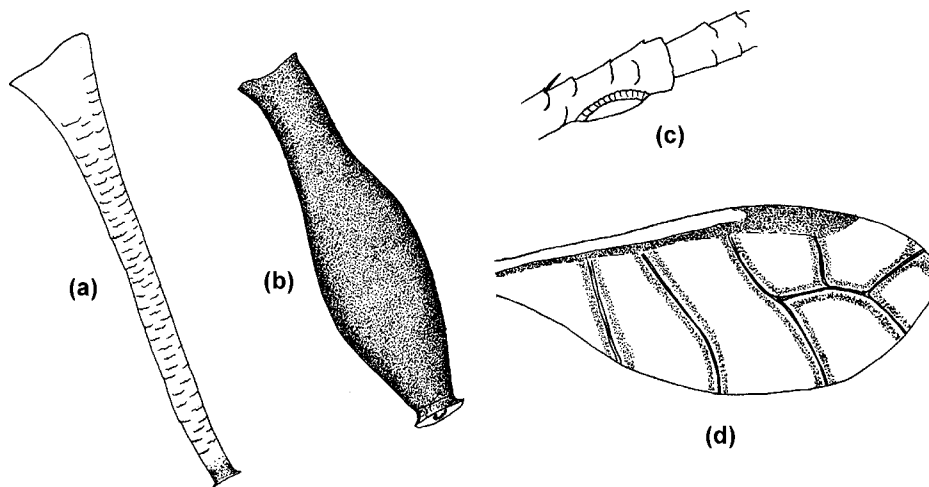


Figure 61 Aphids on *Weigela*. (a) SIPH of *Micromyzus diervillae* (fund.?), (b) SIPH of spring migr. al. of *Rhopalosiphoninus celtifoliae*, (c) ANT V of spring migr. al. of *Rh. celtifoliae*, (d) forewing of spring migr. al. of *Neotoxoptera weigeliae*.

HOST LISTS AND KEYS

- Cauda with 5–8 hairs. R IV+V either 0.9–1.4 or 1.7–2.1× HT II. (Al. with spiculose head, thinner, pale/dusky SIPH, and primary rhinaria on ANT V almost circular, its diameter less than that of segment) 6
- 6. ANT PT/BASE 2.8–4.5. (Al. with forewing-veins not dark-bordered) *Myzus persicae*
- (Fund.) ANT PT/BASE much less (c.0.7 in 2 spp., unknown in 3rd). (Al. with forewing-veins thickly bordered with fuscous) 7
- 7. Al. with sec. rhin. distributed ANT III 29–37, IV 11–23, V 6–11, and media of forewing fused to radial sector (Figure 61d) *Neotoxoptera weigeliae*
- Al. with sec. rhin. distributed ANT III 6–15, IV 0–6, V 0–5, and media of forewing well separated from radial sector 8
- 8. Al. with R IV+V 1.6–2.1× HT II, and sec. rhin. distributed ANT III 10–15, IV 4–6, V 2–5 (possibly unreliable, as based on al. from secondary host) *Neotoxoptera yasumatsui*
- Al. with R IV+V 1.1–1.4× HT II, and sec. rhin. distributed III 6–13, IV 0, V 0 *Neotoxoptera abeliae*

Weingartneria see *Corynephorus*

Weinmannia

Weinmannia sp.

Cunoniaceae

Neomyzus circumflexus

Wendlandia

W. densiflora

W. glabrata

W. paniculata

Wendlandia spp.

Rubiaceae

Myzus debregeasiae

Aphis spiraecola

Toxoptera odinae

Myzus ornatus; *Sinomegoura citricola*, [*rhododendri*]

Key to apterae on *Wendlandia*:-

- Head spiculose. Dorsal abdomen without dark markings. ANT 1.1–1.2× BL, with ANT PT/BASE 3.9–4.2. R IV+V 1.3–1.5× HT II. SIPH pale, 2.1–2.4× cauda *Myzus debregeasiae**
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Westoniella

W. eriocephala

Compositae

Brachycaudus helichrysi

Whipplea

Wh. modesta

Hydrangeaceae

Aphis sp. (California, USA; BMNH colln)

Wickstroemia see *Wikstroemia*

Widdringtonia see Blackman and Eastop (1994)

Wigandia

W. caracasana

Hydrophyllaceae

Myzus persicae; *Toxoptera aurantii*

Use key to polyphagous aphids, p. 1020.

Wikstroemia

W. viridiflora (incl. *indica*)

Thymelaeaceae

Aphis craccivora; *Sitobion wikstroemiae*

Key to apterae on *Wikstroemia*:-

- SIPH dark, with subapical polygonal reticulation. R IV+V short, blunt, convex-sided, 0.65–0.75× HT II. ANT III with longest hairs only 0.2–0.3× BD III, and 1–3 rhinaria near base
Sitobion wikstroemiae
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Wissadula*W. periplocifolia**Aphis gossypii***Malvaceae****Wisteria***W. chinensis**Aulacophoroides hoffmanni**W. floribunda* (incl. var. *macrobotrys*)*Aphis craccivora, fabae, gossypii; Aulacorthum solani;**Myzus persicae**W. sinensis**Aphis craccivora, fabae, gossypii, spiraecola;**Aulacorthum solani; Myzus persicae**Wisteria* sp.*Macrosiphum euphorbiae***Leguminosae**Key to apterae on *Wisteria*:-

- ANT, SIPH and distal 0.7 of femora blackish, cauda pale. Head minutely spiculose with well-developed divergent ANT tubercles. ABD TERG 2–7 with broad dusky sclerotic bands or paired patches
Aulacophoroides hoffmanni
- Without that combination of characters go to key to polyphagous aphids, p. 1020

Withania*W. somnifera**Aphis fabae, gossypii, [umbrella]; [Lipaphis erysimi];**Myzus persicae***Solanaceae**

Use key to polyphagous aphids, p. 1020.

Wollastonia*W. biflora**Aphis gossypii***Compositae****Woodfordia***W. floribunda**Aphis gossypii, [umbrella]**W. fruticosa**Aphis nasturtii, spiraecola***Lythraceae**

Use key to polyphagous aphids, p. 1020.

Woodsia*W. ilvensis**Macrosiphum woodsiae**W. mollis**Macrosiphum longirostratum**W. oregana**Macrosiphum woodsiae**W. scopulina**Macrosiphum woodsiae**W. silvestris* (?)*Macrosiphum woodsiae***Dryopteridaceae**Key to apterae on *Woodsia*:-

(Both spp. have R IV+V with 13–35 accessory hairs, ANT III with a row of 6–21 rhinaria, and SIPH with rather indistinct subapical reticulation; otherwise go to key to fern-feeding aphids under *Polypodium*)

- R IV+V 0.18–0.21 mm long, 1.54–1.95× HT II *Macrosiphum longirostratum*
- R IV+V 0.12–0.15 mm long, 1.38–1.61× HT II *Macrosiphum woodsiae*

HOST LISTS AND KEYS

Woodwardia
W. radicans

Blechnaceae
Macromyzus woodwardiae

Wulfenia
W. amherstiana

Scrophulariaceae
Myzus ornatus

Wulffia
W. baccata
W. stenoglossa

Compositae
Aphis spiraeicola
Aphis gossypii

Use key to polyphagous aphids, p. 1020.

Wyethia
Wyethia sp.

Compositae
Aphis helianthi

Xanthium
X. canadense

X. chinense
X. commune
X. echinatum
X. italicum
X. spinosum
X. strumarium

Xanthium spp.

Compositae
Aphis middletonii; *Capitophorus xanthii*;
Uroleucon ambrosiae
Capitophorus xanthii; *Uroleucon ambrosiae*, *compositae*
Prociphilus erigeronensis
Capitophorus xanthii
Capitophorus xanthii; *Uroleucon ambrosiae*
Aphis helianthi; *Myzus persicae*
Aphis anuraphoides, *elongata*, *fabae*, *gossypii*;
Rectinasus buxtoni; *Trama troglodytes*
Aphis spiraeicola; *Brachycaudus helichrysi*;
Smynthuroides betae

Key to apterae on *Xanthium*:-

1. HT II very elongate, more than 0.5× hind tibia. SIPH absent *Trama troglodytes*
– HT II of normal length. SIPH present or absent **2**
2. ANT 5-segmented, with ANT V BASE very long, more than 15× longer than the short peg-like PT.
R IV+V extremely long, similar in length to hind femur *Rectinasus buxtoni*
– ANT 5- or 6-segmented, base of last segment and R IV+V relatively much shorter **3**
3. Dorsal body hairs mushroom-shaped, arising from tuberculate bases. SIPH swollen on apical third,
3.2–4.5× cauda *Capitophorus xanthii*
– Dorsal body hairs not mushroom-shaped, nor arising from tuberculate bases. SIPH (if present) less than
2.5× cauda **4**
4. ANT PT/BASE 0.85–1.3 (–1.4). ABD TERG 1 and 7 with well-developed marginal tubercles (MTu).
SIPH stump-shaped **5**
– ANT PT/BASE either less than 0.5 (in which case SIPH absent) or more than 1.5. ABD TERG 1 and
7 with or without Mtu go to key to polyphagous aphids, p. 1020
5. SIPH 0.77–0.82× cauda. Longest hairs on ANT III 1.1–1.2× BD III *Aphis elongata*
– SIPH 0.9–1.2× cauda. Longest hairs on ANT III 0.6–0.8× BD III *Aphis anuraphoides*

Xanthoceras
X. sorbifolium

Sapindaceae
Periphyllus lyropictus

Xanthosoma

X. atrovirens
X. nigrum
X. sagittifolium
X. violaceum

Araceae

Pentalonia nigronervosa
Aphis gossypii; *Pentalonia nigronervosa*
Aphis gossypii; *Pentalonia nigronervosa*
Aphis gossypii; *Macrosiphum euphorbiae*;
Pentalonia nigronervosa

Key to apterae on *Xanthosoma*:-

- SIPH and femora covered with irregular, transverse rows of spicules. ANT PT/BASE 5.8–8.1. SIPH pale basally and dark distally. (Alata with dark-bordered wing veins, with radius and costa fused for part of lengths to form a closed cell behind the pterostigma) *Pentalonia nigronervosa*
- SIPH and femora smooth or imbricated, not markedly spiculate. ANT PT/BASE 1.4–6.2. SIPH pale or uniformly dark. (Alata with normal wing venation, veins not dark-bordered)
 go to key to polyphagous aphids, p. 1020

Xeranthemum

X. annuum
X. inapertum
Xeranthemum sp.

Compositae

Aphis elatior
Macrosiphoniella xeranthemi; *Aphis anuraphoides*
 [*Aphis intybi*]

Key to apterae on *Xeranthemum*:-

1. ANT, legs, SIPH and cauda all almost entirely dark. SIPH tubular with polygonal reticulation on distal c.0.3 of length. Cauda long and finger-like *Macrosiphoniella xeranthemi*
- ANT and tibiae mainly pale, only dark at apices. SIPH stump-shaped, without polygonal reticulation. Cauda bluntly triangular **2**
2. R IV+V 1.45–1.65× HT II. SIPH 0.9–1.2× cauda. Hairs on ANT III 0.6–0.8× BD III *Aphis anuraphoides*
- R IV+V 1.25–1.35× HT II. SIPH 0.8–1.0× cauda. Hairs on ANT III 0.3–0.4× BD III *Aphis elatior*

Xerophyllum

X. tenax

Melanthiaceae

Aphis helianthi

Ximenia

X. americana
X. caffra

Olacaceae

Aphis gossypii
Sitobion africanum, [*Sitobion* sp. (Remaudière and Autrique, 1985)]

Key to apterae on *Ximenia*:-

- SIPH black, with a distal zone of polygonal reticulation. Longest hairs on ANT III less than 0.6× BD III. Dorsal abdomen with variably developed dark cross-bands *Sitobion africanum*
- Without that combination of characters
 go to key to polyphagous aphids, p. 1020

Xolisma see Lyonia**Xylosma**

X. congesta

Flacourtiaceae

[*Aphis* sp. (Leonard, 1972a:104)];
Toxoptera aurantii, *citricidus*

HOST LISTS AND KEYS

X. venosum
Xylosma sp.

[*Aphis* sp. (Leonard, 1972a:104)]
[*Ceratovacuna lanigerum*];
[*Tuberculatus paranaracola, yokoyamai*]

Use key to polyphagous aphids, p. 1020.

Xylosteum see *Lonicera*

Xysmalobium

X. undulatum

Asclepiadaceae

Aphis gossypii

Yoanis

Y. australis

Orchidaceae

Aulacorthum sp. (New Zealand, BMNH, leg. R. Sunde)

Youngia

Y. japonica

Compositae

Aphis nerii; *Myzus lactucicola, persicae*;
Neomyzus circumflexus;
Uroleucon formosanum, gobonis
Uroleucon formosanum

Y. sonchifolia

Key to apterae on *Youngia*:-

1. SIPH dark with a distal zone of polygonal reticulation. ANT III with 18–135 rhinaria **2**
– SIPH pale or dark, if dark then without polygonal reticulation. ANT III without or with much fewer rhinaria **3**
2. ANT III 1.5–2.0× longer than ANT IV+V together, and bearing 96–135 strongly protruberant rhinaria. Cauda pale *Uroleucon formosanum*
– ANT III much shorter than IV+V together, and bearing 18–48 rhinaria. Cauda dark *Uroleucon gobonis*
3. Dorsum with extensive uniformly dusky/dark sclerotisation. Head spiculose with well-developed scabrous ANT tubercles. SIPH slightly clavate. R IV+V 0.7–0.9× HT II *Myzus lactucicola*
– Without that combination of characters go to key to polyphagous aphids, p. 1020

Yucca

Y. angustifolia
Y. filamentosa

Agavaceae

Aphis helianthi
Aphis fabae, helianthi; *Aulacorthum solani*;
Macrosiphum euphorbiae; *Myzus persicae*;
Neomyzus circumflexus; *Rhopalosiphoninus staphyleae*
Aphis helianthi
Aphis helianthi
Aphis gossypii, [*yuccae* Lichtenstein (nomen nudum)]

Y. glauca
Y. mohavensis
Yucca spp.

Use key to polyphagous aphids, p. 1020.

Yushania see *Sinarundinaria*

Zalaca see *Salacca*

Zantedeschia (incl. *Richardia* Kunth, nec. L.)

Z. aethiopica

Araceae

Aulacorthum solani; *Dysaphis tulipae*;
Myzus ascalonicus, persicae; *Neomyzus circumflexus*;
Rhopalosiphoninus latysiphon

Z. africana see *aethiopica*

Z. scabra (?) *Aphis gossypii*

Key to apterae on *Zantedeschia*:–

1. Cauda helmet-shaped, not longer than its basal width in dorsal view. Spinal tubercles (STu) present on head and ABD TERG 8, or 7 and 8 *Dysaphis tulipae*
- Cauda tongue-shaped, longer than its basal width. STu absent from head, and rarely on ABD TERG 8
go to key to polyphagous aphids, p. 1020

Zanthoxylum (incl. *Fagara*)

Z. ailanthoides

Z. alba

Z. americanum

Z. avicennae

Z. bungeanum

Z. bungei (incl. *simulans*)

Z. coco

Z. cubense

Z. flavum

Z. gillettii

Z. macrophyllum

Z. mantshurica

Z. microphyllum

Z. nitidum

Z. ornatum (?)

Z. piperitum

Z. planispinum

Z. rhoifolium

Z. scandens

Z. schinifolium

Z. simulans see *bungei*

Zanthoxylum sp.

Rutaceae

[*Myzus xanthomelii* Shinji (nomen dubium)];

Toxoptera citricidus, *odinae*

Toxoptera citricidus

Aphis fabae, *nasturtii*

Toxoptera citricidus

Aphis gossypii; [*Sorbaphis chaetosiphon*]

Aphis fabae, *gossypii*, *nasturtii*; *Myzus persicae*

Toxoptera citricidus

Toxoptera aurantii

Toxoptera aurantii

Toxoptera aurantii

Aphis spiraeicola; *Toxoptera aurantii*

Toxoptera citricidus

Toxoptera odinae

Hyperomyzus gansuensis; *Toxoptera odinae*

Aphis spiraeicola; *Neomyzus circumflexus*;

Sinomegoura citricola; *Toxoptera aurantii*, *citricidus*, *odinae*

Aphis gossypii; [*Myzus xanthomelii* Shinji (nomen nudum)];

Toxoptera odinae

Aphis gossypii

Toxoptera citricidus

Toxoptera victoriae

Toxoptera citricidus, *odinae*

Myzus ornatus

Key to apterae on *Zanthoxylum*:–

1. SIPH pale and markedly swollen, c.1.7× cauda. ANT III-IV with many small round rhinaria. ANT PT/BASE c.6 *Hyperomyzus gansuensis**
- Without that combination of characters **2**
2. ANT VI BASE with 5–7 hairs. ANT III, IV and most of V completely lacking in pigment, paler than rest of cuticle. SIPH 0.8–1.08× cauda. ABD TERG 8 with 5–8 hairs. (Stridulatory apparatus present) *Toxoptera victoriae*
- ANT VI BASE usually with 2 hairs, and other characters not in above combination. (Stridulatory apparatus present or absent)
go to key to polyphagous aphids, p. 1020

Zea (incl. *Euchlaena*)

Z. mays

Gramineae

Anoecia corni; *Aphis fabae*, *gossypii*, *middletonii*, *solanella*;
Colopha graminis, *ulmicola*; *Geoica lucifuga*, *utricularia*;

HOST LISTS AND KEYS

Hysteroneura setariae; *Macrosiphum euphorbiae*;
Melanaphis sorghi; *Metopolophium dirhodum*;
Myzus obtusirostris, persicae; *Pemphigus brevicornis*;
Rhopalosiphoninus indicus;
Rhopalosiphum maidis, padi, rufiabdominale;
Schizaphis graminum; *Sipha flava, maydis*;
Sitobion africanum, akebiae, avenae, leelamaniae, miscanthi;
Tetraneura radicularis, ulmi
Rhopalosiphum padi; *Schizaphis graminum*

Z. mexicana

Use key to apterae of grass-feeding aphids under *Digitaria*.

Zebrina* see *Tradescantia

Zehneria

Z. scabra

Aphis gossypii

Z. umbellata

Aphis gossypii

Cucurbitaceae

***Zelkova* see Blackman and Eastop (1994)**

Zerna* see *Vulpia

Zeugites

Z. americana

Hysteroneura setariae; *Neomyzus circumflexus*;
Rhopalosiphum padi

Gramineae

Use key to apterae of grass-feeding aphids under *Digitaria*.

***Zigadenus* (incl. *Zygadenus*)**

Z. nuttallii

Macrosiphum martini

Z. venenosus

Macrosiphum kiowanepum

Melanthaceae

Key to apterae on *Zigadenus*:-

(Both species have long and mostly dark ANT, legs and SIPH, the latter being 0.8–1.3 mm long)

– ANT III with 3–8 rhinaria on basal half. SIPH reticulated on distal 0.12–0.17 of length

Macrosiphum kiowanepum

– ANT III with c.30 rhinaria over most of length. SIPH reticulated on distal 0.27–0.31

*Uroleucon martini**

Zilla

Z. spinosa

Myzus persicae

Cruciferae

Zingiber

Z. kawagooii

Pentalonia nigronervosa

Z. officinale

Aphis gossypii; *Astegopteryx [nipae]*, *styracophila*;

Pentalonia nigronervosa

Z. spectabile

Pentalonia nigronervosa

Zingiber spp.

Myzus ornatus; *Pentalonia kalimpongensis*;

Pseudoregma sundanica

Zingiberaceae

Use key to apterae on *Hedychium*.

Zinnia

Z. angustifolia

Aphis fabae

Z. elegans

Aphis [euonymi], *fabae*, *gossypii*, *nasturtii*, *spiraecola*;

Compositae

Z. multiflora
Zinnia spp.

Brachycaudus helichrysi; *Macrosiphum euphorbiae*;
Myzus ornatus, *persicae*
Aphis gossypii
Uroleucon compositae, [*kashmiricum*]

Use key to polyphagous aphids, p. 1020.

Zizania

Z. aquatica
Z. latifolia

Gramineae

Rhopalosiphum nigrum
Melanaphis sacchari; *Rhopalosiphum rufiabdominale*

Use key to apterae of grass-feeding aphids under *Digitaria*.

Zizia

Z. aptera
Z. aurea

Zizia sp.

Umbelliferae

Aphis fabae
Aphis helianthi, *saniculae*, *spiraecola*, *thaspis*;
Cavariella aegopodii, [*archangelicae*], [*pastinacae*]
[*Anuromyzus cotoneasteris*]

Use key to apterae on *Cicuta*.

Zizifora

Zizifora sp.

Labiatae

Aphis craccivora, *gossypii*

Use key to polyphagous aphids, p. 1020.

Zizyphus see Blackman and Eastop (1994)

Zornia

Z. pratensis

Leguminosae

Aphis craccivora

Zoysia

Z. japonica

Gramineae

Geoica lucifuga; *Tetraneura nigriabdominalis* (or *fusiformis*?)

Use key to apterae of grass-feeding aphids under *Digitaria*.

Zygadenus see *Zigadenus*

Zygocactus see *Schlumbergia*

Zygophyllum

Z. fabago

Z. simplex

Zygophyllaceae

Acyrtosiphon gossypii; *Aphis craccivora*, *gossypii*;
Brachyunguis zygophylli
Aphis craccivora

Key to apterae on *Zygophyllum*:-

1. ANT PT/BASE 0.6–0.8. SIPH stumpy, 0.25–0.75× cauda *Brachyunguis zygophylli*
- ANT PT/BASE more than 1.5. SIPH longer than cauda **2**
2. SIPH pale and attenuated distally, thinner than hind tibiae at their respective midpoints, 0.33–0.45× BL and 2.5–3.5× cauda *Acyrtosiphon gossypii*
- SIPH pale or dark, thicker and relatively shorter go to key to polyphagous aphids, p. 1020

Key to apterae of polyphagous aphids

This key includes the 35 most polyphagous aphid species, which occur numerous times in the host lists of many plant genera. When you use this key you will normally have been directed to it, or to some starting point within it, from some point in another key. However, it may also be used on its own if, for example, an aphid is found on a plant from which no aphids have previously been recorded, or when the aphid that you are trying to identify does not seem to correspond to any of the aphid species listed under a particular plant genus. If either of these two problems occur then you may of course have an undescribed species, but it is far more likely that the aphid is a polyphagous species not previously recorded from that plant. Almost all polyphagous aphids have a long list of synonyms, because they have been described as new species again and again when found on previously unrecorded hosts.

If you are going to spend much time identifying aphids then it is a good idea to learn to recognise these polyphagous species and their chief characteristics. So, for each of the 20 or so most polyphagous Macrosiphini and Aphidini, we have included a few additional recognition features. It is advisable to check through these each time, in order to confirm that your aphid really is a common polyphagous species, rather than something new.

To provide further help with recognition of polyphagous aphids, the Photographic Guide in Volume 2 includes photographs of slide-mounted apterae of all except one of the 35 species in this key (the exception being *Aphis solanella* which is superficially indistinguishable from *A. fabae*).

1. SIPH absent. ANT PT/BASE less than 0.5. Eyes of 3 facets 2
 - SIPH present, conical or tubular. ANT PT/BASE more than 1.25. Eyes multifaceted 4
2. Body and appendages conspicuously hairy. Primary rhinaria with naked, sclerotic rims. ANT II elongate, about 2× ANT I and similar in length to ANT III. Anus in posteriodorsal position, with anal plate enlarged and surrounded on 3 sides by the U-shaped ABD TERG 8 8
 - Smynthuroides betae* (Plate 2f)
 - Body and appendages with sparse, short hairs. Primary rhinaria with ciliated rims. ANT II not elongate, not much longer than ANT I and much shorter than III. Anus in normal posteroventral position 3
3. Wax pore plates present on head, thorax and abdomen, especially well developed marginally on abdomen. R IV+V 0.130–0.175 mm long, with 4–8 accessory hairs. Cauda and anal plate forming a dark, rounded posterior projection of the abdomen *Prociphilus erigeronensis* (Plate 2h) 2h
 - Wax pore plates absent from head and typically also from thorax and margins of abdomen; usually with 4 (2 spinal and 2 pleural) on each of ABD TERG 3–6 and 1 spinal pair on ABD TERG 7. R IV+V 0.08–0.12 mm long, with 0 (–2) accessory hairs. Cauda and anal plate not produced posteriorly *Pemphigus* sp. (Plate 2g; check with host list for probable species) 2g
4. Head ornamented with numerous spicules, often in rows, usually both dorsally and ventrally (in one case only ventrally). ANT tubercles well developed, with inner faces steep, almost parallel, gibbous or apically convergent, or with forwardly projecting processes 5
 - Head without spicules, or with a few minute ones ventrally. ANT tubercles undeveloped or variably developed, if well developed then with smooth divergent inner faces 15
5. Distal half of SIPH tapering or cylindrical, with no point where it is thicker than in a more basal part 6
 - Distal half of SIPH clavate, or with at least with some degree of swelling, so that at some point distally or subapically it is thicker than in a more basal part 8

KEY TO APTERAE OF POLYPHAGOUS APHIDS

6. ANT 0.5–0.6× BL, with PT/BASE 1.7–2.8. ANT III without rhinaria. Dorsal abdomen with a pattern of dark intersegmental spots. SIPH coarsely imbricated, and often with a shallow ‘S’-curve. (Check also: R IV+V 1.1–1.3× HT II, with 2 accessory hairs. SIPH 2.1–2.7× cauda, with 4–6 hairs) 7
Myzus ornatus (Plate 18f)
- ANT 1.1–1.5× BL, with ANT PT/BASE 4.0–5.5. ANT III usually with 1–3 small rhinaria near base. Dorsal abdomen pale or with more extensive dark markings. SIPH moderately imbricated and rather straight 7
7. Dorsum with extensive dark markings, including a roughly horseshoe-shaped dorsal abdominal patch and paired large dark patches on thorax. SIPH less than 10× midlength width, with a moderate flange. R IV+V 1.2–1.7× HT II, with 2 accessory hairs. Inner faces of ANT tubercles apically convergent. (Al. with 14–26 rhin. on ANT III and 2–8 on IV) 9
Neomyzus circumflexus (Plate 19c)
- Dorsum without dark markings. SIPH more than 10× midlength width, with a large flange. R IV+V 1.1–1.4× HT II, and usually with 6 accessory hairs. Inner faces of ANT tubercles approximately parallel. (Al. with 5–26 rhin on III and none on IV) 10
Aulacorthum solani (Plate 22i)
8. SIPH markedly clavate, so that maximum width of swollen part is more than 2× minimum width basad. Dorsal abdomen with dark markings 9
- SIPH more moderately clavate, with maximum width of swollen part less than 2× minimum width basad. Dorsal abdomen without dark markings 10
9. SIPH with swollen part 3.7–4.8× thicker than the narrow cylindrical basal part, and a narrowly constricted subapical region with polygonal reticulation. ANT III without rhinaria 11
Rhopalosiphoninus latysiphon (Plate 21a)
- SIPH with swollen part not more than 3.2× the minimum width of the rather thick basal part, and subapical region not narrowly constricted, with a few rows of transverse striae proximal to flange. ANT III usually with 1–4 rhinaria on a thickened part near base 12
Rhopalosiphoninus staphyleae (Plate 21b)
10. SIPH 0.82–1.34× ANT III 11
- SIPH 0.54–0.81× ANT III 12
11. ANT tubercles themselves rather low, but with scabrous processes extending forward from ANT bases. SIPH weakly swollen subapically (over about distal 0.25). Dorsum with an evident reticulate pattern. (Al. with broken dusky/dark dorsal abdominal cross-bands) 11
Abstrusomyzus phloxae (Plate 17h)
- ANT tubercles broadly rounded, without forwardly directed processes. SIPH slightly to moderately and asymmetrically swollen over about distal 0.6. Dorsum without a reticulate pattern. (Al. with a dark dorsal abdominal patch, solid except for a small posterior window). (Check also: ANT PT/BASE 2.8–4.5, hairs on ANT tubercles 0.2–0.6× ANT BD III, R IV+V 0.9–1.0 (–1.2) with 2–7 hairs) 11
Myzus persicae (Plate 18h)
- [Note: mid- to dark green aphids running to *M. persicae* in this key and occurring in rather dense colonies on the undersides of leaves of certain plants may be *A. antirrhinii*; see text.]
12. SIPH with a narrow basal stem, its narrowest part thinner than, or as thin as, hind tibia at midlength. R IV+V (1.3–) 1.4–1.6× HT II, with 7–15 accessory hairs. (Check also: ANT tubercles with inner faces almost parallel, SIPH 2.3–3.3× cauda, with maximum diam. of swollen part 1.5–1.8× minimum diam. of stem) 12
Myzus ascalonicus (Plate 19a)
- SIPH thicker on basal half, its narrowest part thicker than hind tibia at midlength. R IV+V 0.9–1.4 (–1.5)× HT II, with 2–8 accessory hairs 13

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13. ANT PT/BASE 2.5–3.3. SIPH very coarsely imbricated on swollen part. Tergum very rugose. (Al. with wing veins without dark borders.) (Check also: ANT tubercles very scabrous, their inner faces convergent, with spatulate hairs 0.2–0.4× BD III, femora strongly scabrous)
Myzus cymbalariae (Plate 19b)
- ANT PT/BASE 3.5–5.3 SIPH smooth or normally imbricated on swollen part. Tergum not rugose. **14**
14. BL 1.1–2.9 mm. Femora mainly pale, SIPH not conspicuously dark-tipped. ANT III without rhinaria. Head spiculose dorsally as well as ventrally. (Al. with wing veins broadly dark-bordered)
Neotoxoptera oliveri (Plate 19d)
- BL 2.3–3.9 mm. Femora dark except at bases, and SIPH conspicuously dark-tipped. ANT III usually with a single rhinarium near base. Dorsal side of head almost devoid of spicules. (Al. with unbordered wing veins)
Aulacorthum magnoliae (Plate 22h)
15. Cauda helmet-shaped, not longer than its basal width, with 4–6 hairs. SIPH smooth, pale, conical, with a subapical incision below the flange. ANT tubercles undeveloped. ABD TERG 1 and 7 without marginal tubercles (MTu). Spiracular apertures large and rounded. Dorsum without any dark markings
Brachycaudus helichrysi (Plate 9i)
- Cauda tongue-shaped, finger-shaped, tapering or triangular, usually much longer than basal width, if not then it has 10 or more hairs. SIPH pale or dark, imbricated, without any marked subapical annular incision. ANT tubercles variably developed, if weakly developed then ABD TERG 1 and 7 have MTu. Spiracular apertures reniform. Dorsum with or without dark markings **16**
16. ANT tubercles well-developed, with divergent inner faces. SIPH pale or dark, but if entirely dark then with a distal zone of polygonal reticulation. ABD TERG 1 and 7 without MTu Body tends to be spindle-shaped with length of SIPH much more than 0.5 of the distance between their bases **17**
- ANT tubercles little developed, or if somewhat developed then with middle part of front of head also projecting forward somewhat, so that the outline is sinuous in dorsal view. SIPH dark or pale with dark apices, never with polygonal reticulation. ABD TERG 1 and 7 constantly with MTu (although these may be very small). Body oval with length of SIPH usually 0.5 or less than the distance between their bases **22**
17. SIPH with a distal or subapical zone of reticulation, comprising at least 4–5 rows of closed polygonal cells **18**
- SIPH without polygonal reticulation **21**
18. SIPH pale or dark, with reticulation comprising a few rows of rather large polygonal cells on subapical 0.12–0.20 of length. Dorsal hairs not arising from pigmented scleroites. First tarsal segments with 3 hairs (all close to the apex) **19**
- SIPH dark, with reticulation comprising many rows of numerous small polygonal cells on distal 0.25–0.43 of length. Some or all of dorsal hairs usually arising from small pigmented scleroites. First tarsal segments with 5 hairs (one pair placed laterally) **20**
19. SIPH pale, or only dusky towards apices. ANT and legs mainly pale. MTu and STu usually absent. (Check also: ANT PT/BASE 5.3–6.2, longest hairs on ANT III 0.6–1.0× BD III, R IV+V 0.8–1.0× HT II, SIPH 1.7–2.2× cauda)
Macrosiphum euphorbiae (Plate 25g)
- SIPH dark, sometimes paler towards bases. ANT, femoral apices and tibiae usually dark. Abdomen often with MTu on some of ABD TERG 2–4, and ABD TERG 7 and 8 each usually with a pair of spinal tubercles (STu)
Macrosiphum pallidum (Plate 25h)
20. Cauda pale, contrasting with dark SIPH, which are 1.0–1.5× cauda. Coxae pale. ANT III with 8–35 rhinaria. (Check also: R IV+V 1.15–1.43× HT II with 7–9 accessory hairs, cauda with 16–27 hairs, MTu absent)
Uroleucon ambrosiae (Plate 28d)

KEY TO APTERAE OF POLYPHAGOUS APHIDS

- Cauda almost as dark as SIPH, which are 1.7–2.3× cauda. Coxae dark. ANT III with 51–77 rhinaria. (Check also: R IV+V 1.1–1.4× HT II with 7–9 accessory hairs, cauda with 10–23 hairs, MTu absent) *Uroleucon compositae* (Plate 28f)
- 21.** SIPH 0.75–1.0× the thick black cauda, which bears 10–24 hairs. Femora and SIPH dark on distal halves *Sinomegoura citricola* (Plate 24i)
- SIPH 1.8–2.2× the pale cauda, which bears 6–12 hairs. Femora and SIPH pale. (Also check: longest hairs on ANT III 0.30–0.6× BD III, ANT VI BASE 100–170µm long, R IV+V 0.9–1.4× HT II, with usually 10–17 accessory hairs) *Acyrtosiphon malvae* (Plate 23a)
- 22.** SIPH almost cylindrical for most of length or with very slight swelling of distal part, constricted subapically and then broadened again to a well-developed flange (as if a noose had been placed around near the apex and tightened slightly). Tergum of thorax and abdomen with a reticulate pattern of strings of small bead-like spicules arranged in polygons, most polygons enclosing one to many additional similar spicules **23**
- SIPH tapering gradually over most of length, without any subapical constriction and usually with a small or moderate flange. Tergum smooth, wrinkled, or reticulated, but without bead-like spicules arranged in polygons **24**
- 23.** ANT usually 5-segmented with longest hairs on ANT III 3–5× BD III. ANT PT often with an upward curve. ABD TERG 8 with 4–8 hairs *Rhopalosiphum rufiabdominale* (Plate 8h)
- ANT 6-segmented with longest hairs shorter than BD III. ANT PT usually rather straight. ABD TERG 8 with 2 (–3) hairs. (Also check: ANT PT/BASE 3.5–5.6, SIPH 1.4–1.9× cauda which bears 4–5 hairs) *Rhopalosiphum padi* (Plate 8g)
- 24.** Dorsal abdomen with an extensive solid black sclerite centered on ABD TERG 4–5. Cauda black like SIPH, tongue-shaped, rather pointed and bearing 4–7 hairs. (Also check: ANT PT/BASE 1.3–3.0, longest hair on ANT III 0.3–0.7× BD III, R IV+V 0.9–1.2× HT II, al. with 3–8 sec. rhin. on ANT III, none on IV) *Aphis craccivora* (Plate 6d)
- Dorsal abdomen with or without dark markings, but without an extensive solid black sclerite. Cauda pale or dark, but if black then usually with more than 7 hairs **25**
- 25.** Stridulatory apparatus present, consisting of a conspicuous pattern of ridges on ventrolateral areas of abdominal sternites 5 and 6, and a row of short, peg-like hairs on the hind tibia **26**
- Stridulatory apparatus not present **28**
- 26.** SIPH much shorter than 0.4–0.6× cauda. ANT PT/BASE 2.5–3.0 *Toxoptera odinae* (Plate 8a)
- SIPH 0.9–1.5× cauda. ANT PT/BASE 3.5–5.0 **27**
- 27.** Longest hairs on ANT III 12–27µm long, 0.5–1.0× BD III. Longest hairs on hind tibia up to 60µm long, less than 0.6× HT II. Cauda with 10–26 hairs (rarely more than 20). BL often less than 2mm *Toxoptera aurantii* (Plate 8b)
- Longest hairs on ANT III 29–64µm long, 1.5–2.0× BD III. Longest hairs on hind tibia up to 80–110µm long, 0.7–1.0× HT II. Cauda with 19–54 hairs (rarely less than 25). BL usually more than 2mm *Toxoptera citricidus* (Plate 8c)
- 28.** SIPH less than 0.1× BL, shorter than R IV+V. ANT III with 0–12 rhinaria. ANT PT/BASE 1.4–2.1. ANT PT 1.0–1.5× R IV+V. Cauda bluntly triangular. Dorsal abdomen usually with variably developed dark markings *Aphis middletonii* (Plate 7e)
- SIPH 0.1–0.26× BL, longer than R IV+V. ANT III usually without rhinaria (except in alatifirm specimens). ANT PT/BASE 1.4–4.7. ANT PT 1.7–3.2× R IV+V. Cauda usually tongue- or finger-shaped. Dorsal abdomen with or without dark markings **29**

HOST LISTS AND KEYS

29. ABD TERG 1–4 (–5) and 7 with large flattish or domed marginal tubercles (MTu). SIPH 2.2–4.5× cauda which is short and rounded, not much longer than its basal width, and bears 13–21 hairs
Aphis sambuci (Plate 7a)
- MTu only sporadically occurring on ABD TERG 2–5 and then small and placed on marginal sclerites (if these are present). Cauda tongue- or finger-shaped, distinctly longer than its basal width, with 4–24 hairs **30**
30. SIPH mainly pale or dusky, only dark towards apices. (Also check: ANT PT/BASE 1.8–3.5, longest hair on ANT III 0.4–0.7× BD III, R IV+V 1.0–1.2× HT II, SIPH 0.9–1.6× cauda which bears 5–11 hairs, al. sec. rhin. distributed ANT III 8–16, IV 1–6, V 0–2) *Aphis nasturtii* (Plate 6g)
- SIPH uniformly dark **31**
31. Hind tibiae mainly dark. ANT PT/BASE 3.4–4.7. R IV+V 1.25–1.6× HT II. SIPH 1.7–2.7× cauda.
Aphis nerii (Plate 6h)
- Hind tibiae pale for more than half of length. ANT PT/BASE 1.4–3.5. R IV+V 0.85–1.3 (–1.5)× HT II. SIPH 0.7–2.5× cauda **32**
32. Cauda pale, dusky or dark, bearing 4–7 (–8) hairs. Longest hind femoral hairs only 0.4–0.7× diameter of trochantrofemoral suture. (Also check: ANT PT/BASE 2.0–3.0, R IV+V 1.1–1.5× HT II, SIPH 1.3–2.5× cauda, al. with sec. rhin. distributed ANT III 3–15, IV almost always 0) *Aphis gossypii* (Plate 7c)
- [Note: specimens running to *A. gossypii* on certain plants, especially in Europe, could belong to a member of the very similar *A. frangulae* group, especially if they have ANT PT/BASE in range 2.6–3.8, ABD TERG 8 with a dusky/dark cross-band, and al. with 1–3 rhinaria on ANT IV; see text under both these names.]
- Cauda always dark like SIPH, and bearing 7–24 hairs. Longest hind femoral hairs usually more than 0.7× diameter of trochantrofemoral suture **33**
33. Dorsal abdomen without any dark markings. Cauda usually with a midway constriction, and bearing 7–15 hairs. (Also check: ANT PT/BASE 1.9–2.9, longest hairs on ANT III 0.5–1.7× but usually 0.7–1.0× BD III, SIPH 0.9–1.7× cauda, al. with sec. rhin. distributed ANT III 6–11, IV 0–5)
Aphis spiraecola (Plate 7b)
- Dorsal abdomen with dark bands on ABD TERG 8, or 7 and 8, and often with dark markings anterior to SIPH **34**
34. ANT I dark, but ANT II pale or dusky, concolorous with basal half of III. Dorsal abdomen usually without any dark markings anterior to SIPH (except for dark intersegmental muscle sclerites). ANT III 1.05–1.95× PT, (1.6–) 2.0–4.0 (–5.0)× R IV+V, and 1.5–2.5 (–2.8)× cauda. SIPH 1.5–2.5 (–2.8)× cauda. HT I with 3 hairs (sense peg present). ABD TERG 8 with 2–11 hairs. (Al. with 15–40 rhinaria on ANT III)
Aphis helianthi (Plate 6i)
- ANT I and II both dark, contrasting with III. Dorsal abdomen usually with some dark markings anterior to SIPH (in addition to dark intersegmental muscle sclerites). ANT III 0.65–1.3× PT, 1.2–2.6 (–3.0)× R IV+V and 1.2–1.6 (–1.9)× cauda. SIPH 0.7–1.6× cauda. HT I with 2 hairs (no sense peg). ABD TERG 8 with 2–5 (–7) hairs. (Al. with 10–23 rhinaria on ANT III) **35**
35. SIPH 2.4–5.4× longest marginal hair on ABD TERG 1–3. Longest hair on ANT III 17–69 μm (mostly 35–60 μm, and only less than 30 μm in hot weather dwarfs). Longest hair on hind femur 45–100 μm (mostly 70–90 μm, and only less than 60 μm in hot weather dwarfs). SIPH 2.8–5.1× their diameter at midlength, 0.8–1.6× cauda and 0.08–0.17× BL. R IV+V 0.85–1.12× HT II. ANT PT/BASE (1.8–) 2.1–3.4 (–3.8)
Aphis fabae (Plate 6e)
- SIPH 5.4–17.0× longest marginal hair on ABD TERG 1–3. Longest hair on ANT III 15–35 μm (mostly 20–30 μm). Longest hair on hind femur 45–75 (–82) μm. SIPH 3.5–7.5× their diameter at midlength, 1.3–1.9× cauda and 0.13–0.20× BL. R IV+V (0.98–) 1.03–1.30× HT II. ANT PT/BASE 2.8–4.1
Aphis solanella

VOLUME 2

The Aphids

Introduction

In this volume we provide information on the aphids feeding on herbaceous plants and shrubs that were listed in Volume I, treating them in alphabetical order of genera, and of species within genera. All species of which the host plant is known are included, even those appearing in square brackets in the lists because we had inadequate information to include them in the keys. If a species listed in Volume I is not found in the alphabetical sequence then it is probably mentioned in the discussion of some other species. The index to aphid species names at the end of this book will indicate where to look.

As in Blackman and Eastop (2000), the classification of Aphidoidea follows that of Remaudière and Remaudière (1997), with the revisions of family names proposed by Nieto Nafria *et al.* (1998). In the course of compiling this book we have recognised more than 100 synonymies and made several other taxonomic changes. These are listed and discussed in a separate publication (Eastop and Blackman, 2005).

Under each genus name we give a short diagnosis and references to the most recent revisionary accounts. The information given for each species wherever possible includes appearance in life and range of body length (BL) of the apterous vivipara (apt.), host plant(s) and feeding site, distribution, life cycle – including whether the aphid is heteroecious (heter.) or monoecious (mon.) and holocyclic (hol.) or anholocyclic (anhol.) and times of appearance of oviparae (ovip.) and males, any other systematic or biological information that we consider relevant, and chromosome number (2n female). Some information about the alate vivipara (al.) may also be provided if this can aid identification. BL gives an indication of size, but for many species this will be based on only a few specimens, and it will only accurately reflect the full size range in the case of better-known species.

We have omitted references to original descriptions prior to 1996 as these are available in Remaudière and Remaudière (1997) or, in the case of earlier descriptions, by consulting Smith's (1972) bibliography after looking up the date of description in Remaudière and Remaudière. We have included references to any significant information about the species published subsequent to its original description, e.g., redescrptions, descriptions of other morphs or biological studies. Previously unpublished information on host plant and distribution from slide labels of specimens in the collection of the Natural History Museum (BMNH) is also included. The treatment of economically important species is very selective as information about these is available in Blackman and Eastop (2000), and from web searches. More detailed information about distribution of European aphids can be found at www.faunaeur.org. Previously unpublished chromosome numbers are indicated by an asterisk (*); references prior to 1986 can be found in published lists (Kuznetsova and Shaposhnikov, 1973; Blackman 1980, 1986; Kurl, 1986a; and for India, Kar *et al.*, 1990).

A regionally classified list of faunal works on Aphidoidea published before 1999, as well as other main sources of information about aphids and different aspects of their biology is provided by Blackman and Eastop (2000: Section E). Below we list regional accounts published since 1999, plus some omitted from previous lists.

Regionally classified faunal works (supplementary to Blackman and Eastop, 2000)

World

Quednau (1999, 2003) Atlas of World Calaphidinae (Volumes I and II).

West Palaearctic

Chumak (2004) Annotated list of aphids of Ukrainian Carpathians
Nieto Nafría *et al.* (1999) Aphids of Belgium; list, notes and bibliography.
Nieto Nafría *et al.* (2002a) Review of Lachninae, Eriosomatinae and
Pterocommatini of Iberian peninsula.
Nieto Nafría *et al.* (2004a) Website with lists and distribution maps of European
aphids.
Nieto Nafría *et al.* (2005) Review of Aphidinae-Aphidini of Iberian peninsula.
Petrović (1998) List of Serbian aphids, host plants and bibliography.

Middle East

Hodjat (1993) Annotated list of Iranian aphids.
Remaudière and Talhouk (2000) Annotated list of species in Syria and Lebanon.
Swirski and Amitai (1999) Annotated list of species in Israel.

Eastern Palaearctic and Oriental

Huang *et al.* (2004) Comparison of faunas of Taiwan and mainland China.
Lee *et al.* (2002c) Illustrated review of Korean aphids, Part I
(Aphidinae).
Noordam (2004) Aphids of Java, Parts V (Aphidini) and VI
(Macrosiphini, Lachninae, Neophyllaphidinae,
Pemphiginae).
Tao (1999) List of Aphidoidea of China.

Afrotropical

Remaudière and Le Rü (1994) Aphids of Congo; list of species, host plants, flight
activity.

Nearctic

Pike *et al.* (2003) Illustrated guide to alate aphids of western N
America.
Stoetzel and Hilburn (1990) Aphids of Bermuda.

Neotropical

Nieto Nafría *et al.* (1994) Aphids of Argentina.
Nieto Nafría *et al.* (2004b) Aphids of Argentinian Tierra del Fuego.
Ortego (1998a) Aphids of Argentinian Patagonia.

Systematic treatment of aphids (in alphabetical order of genera)

Abstrusomyzus Jensen and Stoetzel

Aphidinae: Macrosiphini

Four N American species previously placed in *Ovatus* but perhaps more closely related to *Myzus* (Jensen and Stoetzel, 1999). Characteristic features are the SIPH with slight subapical swelling and small flange, and the reticulate dorsal cuticle.

Abstrusomyzus leucocrini (Gillette and Palmer)

Apt. pale green to brownish green or black; BL 1.6–1.8 mm. On leaves of *Leucocrinum montanum* in Colorado, USA (Palmer, 1952, as *Myzus*). Probably mon. hol. (Jensen and Stoetzel, 1999).

Abstrusomyzus phloxae (Sampson)

Plate 17h

Apt. pale apple-green; BL 1.2–1.8 mm. Recorded from many plant species and genera in different families (*Achillea*, *Agoseris*, *Apocynum*, *Capsella*, *Carex*, *Centaurea*, *Cerastium*, *Galium*, *Phacelia*, *Phlox*, *Plantago*, *Polygonum*, *Ranunculus*, *Stellaria*, *Trifolium*, *Viola*). Usually it colonises the basal or rosette leaves of low-growing plants. Widely distributed in N America; in eastern USA it is most common on *Plantago*, where colonies are often attended and sheltered by ants (Jensen and Stoetzel, 1999). Populations from different parts of N America in BMNH colln show differences in ratio of R IV+V to HT II, but it is unclear whether these are related to host plant or geographical location. Apparently mostly anhol., although males have been produced in culture (BMNH, leg. C.-k. Chan), and ovip. were collected from *Fragaria vesca* in Nova Scotia (BMNH, leg. H.T. Shultz). 2n=18*.

Abstrusomyzus reticulatus (Heie)

Apt. shining back; BL 1.6–1.9 mm. On undersides of curled leaves of *Oxalis* sp. (probably *stricta*) in N Carolina, USA. Ovip. and al. males in Oct.

Abstrusomyzus valuliae (Robinson)

Apt. blackish, BL c.1.2–1.3 mm. Al. have 2–7 rhinaria on ANT III. On *Fragaria vesca* in Manitoba, Canada.

Acaudella Nevsky

Aphidinae: Macrosiphini

Two palaeartic species on Polygonaceae with 5-segmented ANT, no evident cauda and characteristically shaped SIPH. The second species with much longer ANT PT and al. with more rhinaria on ANT III is undescribed and occurs on *Polygonum equisetiformis* in Israel and Cyprus (BMNH colln, leg. V.F.Eastop).

Acaudella puchovi Nevsky

Apt. dark green, BL c.1.4 mm. In large numbers on undersides of leaves of *Atraphaxis buxifolia* in Uzbekistan (Samarkand).

Acaudinum Börner

Aphidinae: Macrosiphini

Five palaeartic species with a broadly rounded cauda living without host alternation on *Centaurea*. Holman (1991b) provided a revision and a key to species. They are adapted for ant attendance.

Acaudinum beheni Remaudière and Davatchi

Apt. shining dark brown, BL 1.5–1.75 mm. On basal leaves of *Centaurea behen* in western Asia (Iran, Turkey, Armenia, Azerbaijan), attended by ants. Ovip. and apt. (alatiform) males in late Sept (Tuatay and Remaudière, 1965).

Acaudinum bulgaricum Holman

Apt. dull dark brown to black, BL 1.4–1.9 mm. On *Centaurea solstitialis* in Bulgaria, feeding on upper and undersides of leaves and also on stem and branches, attended by ants. An al. male was collected in early Sept (Holman, 1991).

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Acaudinum centaureae (Koch)

Plate 10h

Apt. shining black, BL 1.7–2.5 mm. At bases of leaf stalks of *Centaurea* spp., often in ant shelters (Stroyan, 1950; Holman 1991). Widely distributed in Europe. Ovip. in Sept–Oct. 2n=10.

Acaudinum longisetosum Holman

Apt. matt or slightly shiny jet black, BL 1.9–3.2 mm. At stem base and root collar of *Centaurea* spp., especially *C. scabiosa*, in spring, later also living on terminal parts of plants, attended by ants. Czech and Slovak Republics, Romania, Switzerland, Italy and Ukraine. Ovip. and apt. males in Oct.

Acaudinum roumanicum Holman

Apt. matt or slightly shiny jet black, BL 1.6–2.7 mm. At stem bases of *Centaurea rhenana* in spring, later on terminal parts of plants, attended by ants. Closely related to *A. longisetosum*; the discriminant given in the key is based on work of Holman (1991). Romania, Bulgaria and Slovakia. Sexual morphs unknown.

Acuticauda Hille Ris Lambers

Aphidinae: Macrosiphini

Two nearctic and one palaeartic species on Compositae, possibly related to *Brachycaudus* but with sec. rhin. in apt., capitate dorsal hairs and a differently shaped cauda (Hille Ris Lambers, 1956c). Leclant and Remaudière (1967) compared and keyed the species.

Acuticauda asterensis Gillette and Palmer

Figure 15g,h

Apt. pale yellowish green; BL c.1.3 mm. Al. have black wing veins. On leaves and stems of *Aster* spp. in USA (Colorado, New York and Wisconsin); there is one record from *Solidago* requiring substantiation. Ovip. and al. males in autumn (Palmer, 1952).

Acuticauda erigerontis Leclant and Remaudière

Apt. deep golden yellow with brown ANT and SIPH; BL 1.2–1.5 mm. Al. have dark wing veins. On *Erigeron acer* in the French Alps, rolling the leaves of the basal rosettes (Leclant and Remaudière, 1967). Mon. hol., with apt. males.

Acuticauda solidaginifoliae (Williams)

Plate 10c

Apt. shining reddish or greenish brown with a black dorsal shield; BL 1.8–2.0 mm. On leaves of *Solidago* spp., which are folded along mid-ribs to become pod-like. Widely distributed in northern and western USA. Mon. hol., with ovip. and apt. males in Sept–Oct (Palmer, 1952).

Acutosiphon Basu, Ghosh and Raychaudhuri

Aphidinae: Macrosiphini

One species near *Vesiculaphis* but with distinctive SIPH. Hille Ris Lambers (1973b) discussed its taxonomic position and probable host relationship.

Acutosiphon obliquoris R.C. Basu, A.K. Ghosh and Raychaudhuri

Figure 18a

Apt. dark or reddish brown; BL 1.6–2.1 mm. Sec. rhin. in al. III 25–28, IV 12–14, V 1–3. Originally described from *Cotula* (Compositae), but this is an unlikely host, and subsequent collections indicate possible host alternation between Ericaceae (*Lyonia ovalifolia*) and Cyperaceae (*Carex*, *Cyperus*); see Hille Ris Lambers (1973b) and Miyazaki (1977). In India (Assam) and Nepal.

Acyrtosiphon Mordvilko

Aphidinae: Macrosiphini

A mostly palaeartic genus of c.80 species mon. hol. on various dicots, particularly Leguminosae, Rosaceae, and Euphorbiaceae. They are typically rather large broadly spindle-shaped, short-haired aphids with long ANT, legs, SIPH and cauda, usually green but sometimes brownish, pink, or yellow. Eastop (1971) gave keys for the identification of the species then known, and there are accounts of the species of Fennoscandia and Denmark by Heie (1994), of the Japanese species by Miyazaki (1971) and of the Indian species by Raychaudhuri *et al.* (1978). Meier (1958) reviewed, and provided photographs of, the European legume feeders.

***Acyrtosiphon argus* Miyazaki**

Apt. pale green, with a dark green spinal stripe; BL 1.8–2.9 mm. Described from *Daphne odora* in Japan, colonising the undersides of leaves and the flowers. Infested leaves turn yellowish or dark brown, and heavy infestation can cause early defoliation and death of shrubs (orig. descr.). Previously collected on *Daphne* sp. in China (BNMH colln, coll. VFE, 31.v.1985). Populations in Japan (perhaps introduced from the Asian mainland) were apparently anhol.

***Acyrtosiphon assiniboinensis* Robinson**

Apt. green; BL 2.2–2.8 mm. Sec. rhin. in al. III 15–18. On *Potentilla fruticosa* in Canada (Manitoba, NW Territories, Yukon).

***Acyrtosiphon astragali* Eastop**

Apt. green, BL 2.2–2.8 mm. In large colonies on stems of *Astragalus* sp(p), falling readily when disturbed (Narzikulov, 1972). Recorded from Afghanistan, Pakistan, Tajikistan and Kashmir (BMNH colln). Al. undescribed.

***Acyrtosiphon auctum* (Walker)**

Apt. pale yellow–green, green or pale pink, slightly wax-bordered intersegmentally; BL 1.9–2.8 mm. Al. have a dark head and thorax and reddish abdomen. On various Caryophyllaceae (*Cerastium*, *Honckenya*, *Silene*, *Stellaria*) and Cruciferae (*Cakile*, *Capsella*), mainly in sand dune habitats, in N Europe, including Iceland (Heie, 1994), and Greenland (BMNH colln, leg. J.M. Cotton). Mon. hol. with ovip. and apt. males in Sept–Oct (in Scotland; BMNH colln, leg. H.L.G. Stroyan).

***Acyrtosiphon auriculae* Martin**

Apt. pale to bright green; BL 1.8–2.85 mm. On upper surfaces of young apical leaves of a cultivated hybrid *Primula* (section Auricula); experimental host transfers indicated specificity to this section of the genus (Martin, 1981). Only known from England, although al. of a possible geographic variant of this species were trapped in Corsica. Mon. hol. with apt. males. 2n=8.

***Acyrtosiphon bidenticola* Smith**

Apt. bright green with mainly dark ANT, legs and SIPH; BL 1.6–2.0 mm. On various Compositae (*Aster*, *Bidens*, *Erechtites*, *Gnaphalium*, *Helianthus*, *Lagascea*, *Tithonia*, *Wedelia*), and populations have also been found on *Bocconia frutescens* (Mexico, BMNH colln, leg. R. van den Bosch) and *Salvia coccinea* (Jamaica, Tannice Hall, pers. comm.). C and S America (Brazil, Cuba, Jamaica, Mexico, Puerto Rico, Venezuela). 2n=8*.

***Acyrtosiphon bistorti* Ivanoskaya**

Apt. yellowish green; BL c.4.1 mm. Sec. rhin. in al. III c.8. In inflorescences of *Persicaria bistorta* in W Siberia.

***Acyrtosiphon boreale* Hille Ris Lambers**

Apt. green, yellowish green or yellowish; BL 2.7–3.2 mm. Sec. rhin. in al. III 2–9. On *Potentilla* spp. in N Europe, Greenland and Canada (Baffin Island). There are also records from Switzerland, Hungary and Kazakhstan, although the distinction from other members of the *malvae* group is not clear enough to be certain about the extent of its distribution. Mon. hol., with apt. males. 2n=10.

***Acyrtosiphon brachysiphon* Hille Ris Lambers**

Apt. waxy green; BL 1.8–2.8 mm. On undersides of leaves and young shoots of *Vaccinium* spp., esp. *V. uliginosum*. Boreoalpine (Baffin I, Greenland, Iceland, Scandinavia, N Russia, Switzerland). Mon. hol. with apt. males, life cycle abbreviated in Greenland (Hille Ris Lambers, 1952), ovip. in Sept. in Switzerland (Meier, 1972).

***Acyrtosiphon brevicorne* Hille Ris Lambers**

Color of apt. unrecorded, probably green, like ovip.; BL of apt. 1.8–2.3 mm. On *Dryas* spp. Distribution is boreoalpine; N Canada, Greenland, Sweden and Switzerland. Mon. hol., with ovip. and apt. males in

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Jul–Aug in the Arctic, and in October in Switzerland (Meier, 1972). Strathdee *et al.* (1995) studied cold-hardiness of eggs under laboratory conditions.

Acyrtosiphon capitellum Zhang

Apt. green with dark apices to ANT segments, femora and tibiae, and dark basal parts of SIPH, BL c.3.3 mm. On *Fragaria vesca* in China (G. Zhang and Qiao, 1998c).

Acyrtosiphon caraganae (Cholodkovsky)

Apt. green with variably developed grayish wax stripes between segments, and often a bright green spinal stripe; BL 2.6–4.3 mm. On leaves and young growth of woody Leguminosae, especially species of *Caragana* and *Colutea*, often forming large colonies. Probably originating in the Altai region, it now occurs in parks and gardens in temperate regions throughout the Northern Hemisphere. Mon. hol.; males are apt. in western Europe and al. in Russia, Switzerland and E Canada (Eastop, 1971). Populations in W Europe and Tajikistan have been distinguished as subspecies, *A. caraganae occidentale* Hille Ris Lambers and *A. caraganae tadzhikistanicum* Narzikulov. 2n=10 (also for ssp. *occidentale*).

Acyrtosiphon (Liporrhinus) chelidonii (Kaltenbach)

Apt. pale green or greenish white, covered with grayish-white wax powder except along segmental borders; BL 1.5–2.3 mm. On *Chelidonium majus*, forming colonies on upper parts of stems and on young leaves. In Europe, E Siberia, Korea and Japan. Ovip. and al. males in Netherlands in Oct–Nov (Hille Ris Lambers, 1947a).

Acyrtosiphon churchillense Robinson

Apt. green; BL 2.1–2.6 mm. On *Oxytropis* spp. and some other Leguminosae (*Melilotus alba*, and probably *Hedysarum mackenzii*) in N Canada (N Manitoba, Yukon, NW Territories). Mon. hol. with ovip. and apt. males in Jul–Aug (Robinson, 1979 and BMNH colln, leg. A.G. Robinson). Close to *A. kondoi*; see couplet for separating these species on *Oxytropis*.

Acyrtosiphon corsicae Remaudière and Leclant

Apt. pale green; BL 2.2–2.6 mm. Al. have 8–10 rhinaria on ANT III. On *Euphorbia spinosa* in Corsica (Remaudière and Leclant, 2000).

Acyrtosiphon crepidis Holman and Szelegiewicz

Apt. green, with ventral side pruinose; BL 1.7–2.2 mm. Other morphs unknown. On *Crepis tenuifolia* in Mongolia.

Acyrtosiphon cyparissiae (Koch)

Apt. green with black front part of head and mainly black appendages or, esp. in warmer climates, yellowish green with appendages mainly brown or brownish yellow; BL 2.4–3.4 mm. On *Euphorbia* spp., feeding mainly on upper sides of upper leaves, often in large numbers. In Europe (but UK records apply to other species), Middle East, C Asia and China. Mon. hol. with al. males (Hille Ris Lambers, 1947a). In warmer regions the less-pigmented form *A. cyparissiae* ssp. *propinquum* Mordvilko is more common (Eastop, 1971), although it needs to be confirmed that this is not merely an effect of the environment. Another nominal subspecies, *A. cyparissiae* ssp. *turkestanicum* Nevsky, is reported from Kazakhstan.

Acyrtosiphon daphnidis Ilharco

Apt. green to yellowish-green with red eyes, body with grayish white powder accentuating dorsal segmentation; BL 2.4–2.8 mm. In small colonies on undersides of younger leaves of *Daphne gnidium*. In Portugal, Spain and Canary Islands.

Acyrtosiphon dauricum Szelegiewicz

Apt. green; BL 2.3–2.6 mm. Described from *Saussurea salicifolia* in Mongolia, but this may not be the true host (Szelegiewicz, 1964a).

Acyrtosiphon echinospartii Nieto Nafria and Mier Durante

Apt. pale green, with somewhat darker appendages; BL 2.6–3.1 mm. On *Echinospartium lusitanicum* in Spain.

Acyrtosiphon ericetorum Hille Ris Lambers

Apt. color in life unknown, probably pale green; BL c.1.9–2.3 mm. On *Genista* spp. in Netherlands, Italy and Austria. Mon. hol.; the original description was of ovip. and apt. males. Apt. vivip. were described by Nieto Nafria and Mier Durante (1985). This aphid only seems to differ from *A. genistae* by its small size, which could be an effect of the host plant.

Acyrtosiphon euphorbiae Börner

Apt. green, tinged with yellow; BL 2.3–4.4 mm. On *Euphorbia* spp., in small colonies on upper sides of leaves, sometimes mixed with *E. cyparissiae*. In Europe, N Africa and the Middle East. Life cycle apparently unknown. A closely related form, *A. pareuphorbiae*, occurs in China.

Acyrtosiphon fragariaevescae Nevsky

Apt. brownish, with pale ANT, SIPH and cauda; BL c.2 mm. Al. have 13–22 rhinaria on ANT III, and ANT PT/BASE c.4.1. On *Fragaria grandifolia* in C Asia. Apart from the shorter ANT PT this species seems close to *A. rubi*.

Acyrtosiphon fragrum Zhang

Apt. green with black SIPH; BL c.3.9 mm. On *Fragaria* sp. in China (G. Zhang and Qiao, 1998c).

Acyrtosiphon genistae Mordvilko

Apt. green to yellow green, with dark brown SIPH; BL c.3.4 mm. On *Genista tinctoria*, at ends of stems and branches. In Russia and Ukraine (Bozhko, 1976a). *A. ericetorum* from another *Genista* sp. in Austria could be small specimens of this aphid.

Acyrtosiphon ghanii Eastop

Apt. color in life unknown; BL 2.0–2.4 mm. On Compositae (*Sonchus*, *Scorzonera*) in Pakistan (Naumann-Etienne and Remaudière, 1995). 2n=10? (Kapoor and Gautam, 1994, but aphid was possibly misidentified as host was *Medicago*).

Acyrtosiphon (Xanthomyzus) glaucii (Narzikulov)

Apt shining greenish-white to white; BL 1.8–2.2 mm. On *Glaucium* spp. in C Asia. [Host plant of type material is given as *G. fimbrilligerum* in original description, but as *G. corniculatum* on slide labels of specimens in BMNH colln with same date and locality, leg. Narzikulov.]

Acyrtosiphon gossypii Mordvilko

Plate 23c

Apt. green, dusted with fine wax; BL 2.5–3.8 mm. Host plants are mainly Leguminosae especially tribe Phaseoleae (*Dolichos*, *Phaseolus*, *Vigna*, but not known from *Glycine*), Malvaceae (including cotton) and Zygophyllaceae; more rarely on other plants incl. Cruciferae. Populations with particular host preferences may occur in different regions (Blackman and Eastop, 2000). In S Europe, N Africa, Middle East, SW and C Asia, India, China, and possibly Korea and Japan. Anhol. over much of its range, but mon. hol. on *Alhagi camelorum* in C Asia. *A. umarovi* (q.v.) is probably a synonym. 2n=6.

Acyrtosiphon hissaricum Umarov

Apt. green; BL c.3.9 mm. Al. have BL c.3.1 mm and 20–30 sec. rhin. on ANT III. On *Cicer songaricum* in Tajikistan. Similar to *A. rubi*, but much larger.

Acyrtosiphon ignotum Mordvilko

Apt. pale green or yellowish green; BL 2.2–3.4 mm. Sec. rhin. in apt. III 1–8, in al. III 7–13. At shoot tips of *Spiraea* spp., often in large colonies. Also recorded from *Sibiraea laevigata*. N Europe, N India, Siberia, Mongolia (many records are as *A. spiraeae*). 2n=10 (Kuznetsova and Shaposhnikov, 1973), but Khuda-Bukhsh and Pal (1986) record 2n=14 for an aphid identified as this species collected on *Deutzia corymbosa*.

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Acyrtosiphon ilka Mordvilko (= *Acyrtosiphon bidentis* Eastop)

Apt. green, often with darker green dorsal cross-bands; BL 1.4–2.7 mm. On Papaveraceae (*Glaucium*, *Papaver*), Compositae (*Bidens*, *Carthamus*, *Lampsana*, *Picris*), Cruciferae (*Erysimum*, *Isatis*), Linaceae (*Linum*) and plants in several other families. In S Europe, Middle East, S Siberia, Africa. The African populations are found on a very similar range of hosts to the Eurasian ones, but tend to have longer, more slender SIPH, and were described as a distinct species, *A. bidentis* Eastop, but this seems only to be a geographical variant of *A. ilka* (Eastop and Blackman, 2005), as also may *A. mordvilko* Nevsky, described from *Linum usitatissimum* in C Asia, and *A. papaverisuctum* (q.v.) Other possible members of this group are *A. papaverinum* Nevsky ex Pek and *A. titovi* Mordvilko, both recorded from *Papaver somniferum* in C Asia but neither formally described.

Acyrtosiphon knechteli (Börner)

Apt. green or red; BL 2.0–3.0 mm. On undersides of leaves and on young shoots of *Vaccinium uliginosum* in N and C Europe and W Siberia. Mon. hol. with ovip. and al. males at end of Aug (Heikinheimo, 1990).

Acyrtosiphon kondoi Shinji

Plate 23b

Apt. bluish green; BL 2.1–2.9 mm. On stems and leaves of Leguminosae, mainly of tribes Trifoleae (*Medicago*, *Melilotus*, *Trifolium*) and Loteae (*Dorycnium*, *Lotus*) but also on *Astragalus* (Galegeae) and *Lens* (Viceae). An important pest of alfalfa (Blackman and Eastop, 2000), now widely distributed in Asia, N and S America, S Africa, Australia and New Zealand. Mon. hol. in Japan (Kawada, 1992), apparently anhol. in most other places. $2n=10$.

Acyrtosiphon (Tlja) lactucae (Passerini)

Apt. pale yellowish green or pink, with pale gray wax bloom; BL 1.7–2.9 mm. On stems and undersides of leaves of *Lactuca* spp. Europe, Middle East, and introduced to N America. Mon. hol., with al. males. $2n=16$. *A. scariolae* (q.v.) is probably a distinct species with $2n=18$, but further work is necessary to confirm this.

Acyrtosiphon (Xanthomyzus) lambersi Leclant and Remaudière

Apt. yellowish green, lightly wax-dusted on abdomen; BL 1.4–2.7 mm. On *Glaucium* spp. in S Europe, N Africa and the Middle East. Anhol. in France (orig. descr.).

Acyrtosiphon loti (Theobald)

Apt. green, frequently with faint grayish transverse lines, or more rarely pink; BL 1.7–2.9 mm. On *Lotus* spp., *Anthyllis vulneraria*, *Hippocrepis comosa*, *Onobrychis sativa*, and sometimes on certain other herbaceous Leguminosae, including *Medicago sativa*. Europe, eastward to Turkey, and recently found in Argentina (J. Ortego, pers. comm.). Mon. hol., with both apt. and al. males. $2n=10$.

Acyrtosiphon malvae (Mosley)

Plate 23a, Figure 30c

Apt. green, yellowish or grayish green, or pinkish red; BL 1.5–3.2 mm. Sec. rhin. in apt. III 1–24, in al. III 12–31. On many plants, but particularly herbaceous Rosaceae. A complex taxon, in which several forms with more specific host plant associations are recognised as subspecies, although slide-mounted specimens cannot usually be identified to subspecies level unless large samples are available. Populations of pale green or red aphids on many Geraniaceae (*Geranium*, *Pelargonium*, *Erodium*) and Malvaceae (*Alcea*, *Malva*), as well as many plants in other families, are regarded as *A. malvae* s. str., and are of almost world-wide distribution, with anholocycly in warmer climates and indoor populations. *A. malvae* ssp. *agrimoniae* (Börner) is yellowish green and found in flowerheads or on undersides of leaves of *Agrimonia* spp. in Europe and W Asia. *A. malvae* ssp. *poterii* Prior and Stroyan is bright salmon pink, yellowish or green and found on *Poterium sanguisorba* in UK. *A. malvae* ssp. *potha* Börner is pale yellowish or grayish green and associated with *Alchemilla* spp., and possibly also *Acaena* spp. and *Geum rivale*, throughout Europe. Records of this subspecies from *Potentilla* are possibly all referable to the very similar *A. boreale* (q.v.). *A. malvae* ssp. *rogersii* (Theobald) is green or yellow-green, often shiny, and may form large colonies on young leaves of *Fragaria* in N and W Europe (Blackman and Eastop, 2000). *A. malvae* ssp. *sanguisorbae* Seccombe was described from *Poterium sanguisorba* in

Afghanistan. The recognised subspecies are apparently all mon. hol. on their respective host plants; both apt. and al. males occur in this group, and occasional hybridisation probably occurs between host-specific and more polyphagous populations, further confusing the taxonomic situation (Prior and Stroyan, 1964; Müller, 1972). $2n=10$ (incl. ssp. *poterii*, *rogersii*).

Acyrtosiphon matilei Remaudière and Leclant

Apt. green, BL 1.7–2.4 mm. Living all year round on *Euphorbia spinosa*, with one ovipara found in November (Remaudière and Leclant, 2000). In S France, Italy and former Yugoslavia. The description is very close to that of *A. pareuphorbiae* on *Euphorbia* in China.

Acyrtosiphon moltshanovi Mordvilko

Apt. pale yellow or greenish; BL 2.4–3.7 mm. Described from an unidentified plant in Tajikistan, and subsequently reported from various plants in Pakistan and India; the true host is uncertain but is possibly *Peucedanum tenuifolium* (David and Hameed, 1975).

Acyrtosiphon neerlandicum Hille Ris Lambers

Apt. green with a yellowish tinge; BL 3.6–4.4 mm. On *Euphorbia* spp. in NW Europe.

Acyrtosiphon nigripes Hille Ris Lambers

Apt. green with black appendages; BL 2.8–4.0 mm. On *Laserpitium siler* in S and C Europe. Populations on *Peucedanum* are regarded as a subspecies, *A. nigripes* ssp. *peucedani* (Bohško); this was described as shiny brown by Szelegiewicz (1967; specimens from *P. officinale*), but bright shiny green in orig. descr. (from *P. ruthenicum*). Another possibly subspecific form occurs on *Seseli*; this was described and compared with *A. nigripes* s. str. by Pintera (1957b), under the name *A. superba* Börner (which is a synonym of *nigripes*). The name *A. nigripes* ssp. *blattnyi* Pintera ex Szelegiewicz is applicable to this form.

Acyrtosiphon ononis (Koch)

Apt. green or red; BL 2.7–3.9 mm. On *Ononis* spp. in Europe. Mon. hol. with apt. males (Meier, 1958). A close relative of *A. pisum*, and often regarded as a subspecies.

Acyrtosiphon papaverisuctum (Zhang, Chen, Zhong and Li)

Apt. ivory white; BL 2.3–2.8 mm. On *Papaver somniferum* in Gansu Prov., China (Zhang, 1999, as *Impatientinum*). Perhaps a geographical variant of *A. ilka*.

Acyrtosiphon pareuphorbiae Zhang

Apt. color in life unrecorded; BL c.2.5 mm. On *Euphorbia* sp. in Yunnan province, China.

Acyrtosiphon parvum Börner

Apt. green to dark green, sometimes with dusky antennae, legs and SIPH; BL 1.9–2.5 mm. On young growth, and later on undersides of leaves, of *Chaemocytisus*, *Cytisus* and *Genista* in E, C and S Europe. *A. supranubium*, described from *Cytisus supranubius* in the Canaries (Carnero and Nieto Nafria, 1995), seems likely to be this species.

Acyrtosiphon pentatrichopus Hille Ris Lambers

Apt. color in life unknown; BL 3.0–3.4 mm. Al. undescribed. On *Rosa fendleri* and *Rosa* sp. in western USA (Colorado, Utah). Fund. collected on *R. fendleri* in May (Hille Ris Lambers, 1974).

Acyrtosiphon phaseoli Chakrabarti, A.K. Ghosh and Raychaudhuri

Apt. dull white to slightly grayish; BL 2.7–3.0 mm. On undersides of leaves of a *Phaseolus* sp. in India (HP). Al. undescribed. *A. pisivorum*, described from *Pisum sativum* in China, is very similar, and may be a synonym ($2n=14$ for *pisivorum*; Chen and Zhang, 1985a). [If *Macrocaudus phaseoli* Shinji, described from *Phaseolus* in Japan is rediscovered and proves to be an *Acyrtosiphon*, then this species (if not a synonym) will require a replacement name.]

***Acyrtosiphon pisum* (Harris)**

Plate 23d

Apt. green or pink, ANT dark at apices of segments, imm. wax-dusted; BL 2.5–4.3 (–5.5) mm. On young growth and developing pods of many herbaceous and some shrubby Leguminosae, and an important pest of peas and alfalfa (Blackman and Eastop, 2000). Almost cosmopolitan. Mon. hol. in temperate regions, with both apt. and al. males. In Europe and Central Asia, *A. pisum* is a complex of races and subspecies with different host ranges and preferences (Müller, 1985), more than one of which has been introduced to other parts of the world, and incipient speciation seems to be in progress, in which populations on different host plants are genetically divergent (Hawthorne and Via, 2001; Simon *et al.*, 2003; Blackman and Eastop, in press). This aphid has recently been selected for genome sequencing. The form usually found on *Ononis* is here judged to be sufficiently distinct to warrant separate species status. $2n=8$.

***Acyrtosiphon porrifolii* (Börner)**

Apt. presumably yellow–green; BL 1.5–1.8 mm. On *Hieracium porrifolium* in Austria. Males are al. (Börner, 1950).

***Acyrtosiphon primulae* (Theobald)**

Apt. pale yellow or greenish yellow, shiny, with apices of ANT and legs dark; BL 2.0–2.5 mm. Al. have dark dorsal cross-bands and postsiphuncular sclerites. On undersides of leaves of *Primula* spp. in Europe, introduced to Tasmania, New Zealand (Heie, 1994, as *Microlophium*), and California (BMNH colln, leg. R.C. Dickson). The generic position of this species is uncertain. $2n=16$.

***Acyrtosiphon pseudodirhodum* (Patch)**

Apt. pale cream to white; BL 2.2–3.5 mm. On various Rosaceae (*Geum*, *Potentilla*, *Rosa*, *Spiraea*) in north-eastern USA and Canada. MacGillivray (1968) redescribed this species. Two other undescribed, somewhat similar spp. occur in western N America, one on *Chamaebataria millefolium* in California (BMNH colln, leg. P. Rude) and the other on *Holodiscus discolor* (California, BMNH colln, leg. C. Lagace) and *Cercocarpus parvifolius* (Colorado; BMNH colln, leg. F.C. Hottes and D. Hille Ris Lambers). Both have R IV+V $0.9\text{--}1.0\times$ HT II ($0.72\text{--}0.82$ in *pseudodirhodum*), 4–6 accessory hairs on R IV (2 in *pseudodirhodum*), and longer hairs ($46\text{--}50\mu\text{m}$) on ABD TERG 3 ($14\text{--}20\mu\text{m}$ in *pseudodirhodum*). The *Chamaebataria* aphid has SIPH $0.18\text{--}0.2$ of body length, whereas the aphid on *Holodiscus* and *Cercocarpus* has very thick SIPH $0.125\text{--}0.15$ of body length and only $2.5\text{--}3.6\times$ longer than their width at midlength ($6.0\text{--}7.9\times$ longer in *pseudodirhodum* and $5.3\text{--}5.8\times$ longer in the *Chamaebataria* aphid). Life cycles of all three species are unknown, but the sample from Colorado on *Cercocarpus* included al. males.

***Acyrtosiphon purshiae* (Palmer)**

Apt. mid-green, shining or slightly frosted, with dark appendages; BL 2.0–2.5 mm. On leaves and stems of *Purshia tridentata* in western USA (Palmer, 1952, as *Macrosiphum*).

***Acyrtosiphon ranunculum* L.K. Ghosh**

Apt. yellowish white, ANT ringed with black, legs mainly pale, SIPH brown-black, cauda pale; BL 2.2–2.6 mm. On stems, petioles and undersides of leaves of *Thalictrum pauciflorum* in Himachal Pradesh, India.

***Acyrtosiphon rubi* Narzikulov (= *Metopolophium sonchifoliae* Raychaudhuri, LK Ghosh and Das)**

Apt. shining green; BL 1.6–2.9 mm. Al. have 18–34 rhinaria on ANT III. On *Rubus* spp. and *Fragaria* sp., but apparently with polyphagous tendencies, because there are also rather numerous records from plants outside Rosaceae (*Catamixis*, *Desmodium*, *Fagopyrum*, *Hieracium*, *Polygonum*, *Rumex*). In mountainous regions of Tajikistan, Nepal (BMNH colln, leg. K.C. Sharma) and N India. Ovip. and al. males were described (on *Rubus*) from Himachal Pradesh, India by Raychaudhuri *et al.* (1980). The specimens from *Rubus ellipticus* in N India (Uttar Pradesh) described by Stroyan and Nagaich (1964) as ssp. *elliptici*, are smaller and have a less rugose dorsal cuticle, but other specimens from this host in Nepal are typical *rubi*. $2n=12$.

Acyrthosiphon rubifoliae (Raychaudhuri, M.R. Ghosh and R.C. Basu)

Apt. pinkish green; BL 3.3–4.2 mm. Sec. rhin. in al. III c.22. Described from *Rubus ellipticus* (as a *Metopolophium*), and subsequently also recorded from *Potentilla nepalensis* (Raychaudhuri, L.K. Ghosh and Das, 1980). In N India (H.P., Nagaland, Sikkim).

Acyrthosiphon scalare (Richards)

Apt. pale green or yellow; BL 1.7–1.9 mm. Other morphs unknown. On *Potentilla fruticosa* in Ontario, Canada (as *Chaetosiphon*).

Acyrthosiphon scariolae Nevsky

Apt. pale yellow–green, finely wax-powdered; BL 2.2–2.8 mm. Described from *Lactuca serriola* (= *scariola*) in C Asia, and specimens assigned to this species have subsequently been collected on *Lactuca* spp. (*saligna*, *serriola*, *virosa*) and *Sonchus arvensis* in Europe, Middle East and N America (Canada), but further work is needed to confirm the distinction from *A. lactucae* (q.v.). $2n=18$.

Acyrthosiphon shinanonum Miyazaki

Apt. green with black apices to ANT, femora and tibiae; BL 2.5–3.1 mm. On *Geum calthifolium* (var. *nipponicum*) in Japan.

Acyrthosiphon soldatovi Mordvilko

Apt. green, with dark ANT and dusky yellow, black-tipped SIPH; BL 1.9–3.2 mm. On *Spiraea* spp., esp. *salicifolia*, in E Siberia. Also in N India (Simla: BMNH colln, leg. K. Narayanan), and Tajikistan (Narzikulov and Umarov, 1969); the latter population was mon. hol. with al. males on *S. hypericifolia*, and regarded as a subspecies, *A. soldatovi tadzhikistanica*.

Acyrthosiphon svalbardicum Heikinheimo

Apt. very variable in color, pale pink, yellow, green or brown with darker dorsal markings; BL 1.2–1.9 mm. On *Dryas octopetala* in Spitzbergen. Mon. hol. with ovip. and apt. males in early Aug (Strathdee *et al.*, 1993).

Acyrthosiphon thracicum Tashv

Apt. green, BL 2.7–3.2 mm. On *Euphorbia platyphyllos* in Bulgaria, and also recorded from Czech Republic on *E. polychroma* (Holman, 1965). Remaudière and Leclant (2000) compared it with the closely related *A. euphorbiae*.

Acyrthosiphon umarovi Narzikulov

Apt. green; BL 2.9–3.8 mm. On upper parts of stems of *Astragalus* sp. in Afghanistan. Al. undescribed. It seems probable that this is a synonym of *Acyrthosiphon gossypii*.

Acyrthosiphon vandenboschi Hille Ris Lambers

Apt. color in life unknown; BL 3.7–4.4 mm. Sec. rhin. in al. III 42–60. On *Potentilla glandulosa* in California, USA.

Acyrthosiphon vasiljevi Mordvilko

Apt. green; BL not recorded. On leaves of *Cucurbita pepo* in C Asia.

Acyrthosiphon wasintae (Hottes)

Apt. pale dull green; BL 1.4–1.7 mm. Living singly on undersides of leaves of *Potentilla fruticosa* in western USA (Colorado, Utah) and Canada (Alberta; BMNH colln, leg. D. Hille Ris Lambers). Mon. hol., with al. males (Palmer, 1952).

Akkaia Takahashi

Aphidinae: Macrosiphini

An E Asian genus with *Phorodon*-like projections on the ANT tubercles, but the head is not spiculose, the spiracular apertures on abdominal segments 1–5 are remarkably small, there are typically paired processes on ABD TERG 7 and a larger median one on ABD TERG 8, the subgenital plate has a posterior projection, and the cauda has a characteristic knobbed shape. Al. look very different from apt. and have numerous

THE APHIDS

tuberculate sec. rhin., peculiar hypha-like projections associated with the primary rhinaria, and much thinner, clavate SIPH. Most species are only known from *Polygonaceae*, but one is known to have a sexual phase on *Enkianthus*. M.R. Ghosh *et al.* (1976) reviewed the species in E India, and the Japanese species were reviewed by Takahashi (1961a) and Miyazaki (1971).

Akkaia bengalensis A.N. Basu Figure 42u

Apt. orange with black SIPH; BL 2.1–2.5 mm. sec. rhin. in al. III 25–37, IV 9–11 (M.R. Ghosh *et al.*, 1976). On undersides of leaves of *Polygonum* and *Persicaria* spp. in India (Meghalaya, Sikkim, W Bengal) and probably Japan, as the aphid illustrated and described by Moritsu (1983) as *A. odaiensis* may be this species. Close to *A. taiwana*, and the distinction between the two needs additional verification.

Akkaia neopolygoni M.R. Ghosh, A.K. Ghosh and Raychaudhuri Figure 42w

Apt. green to deep green; BL c. 2.4–2.5 mm. Al. undescribed. On apical parts and undersides of leaves of *Polygonum* and *Persicaria* spp. in India (Arunachal Pradesh, Sikkim, W Bengal).

Akkaia odaiensis Takahashi

Apt. yellow with all appendages pale; BL 1.8–2.0 mm. Al. undescribed. On *Polygonum thunbergii* in Japan. Moritsu's (1983) account refers to another species, probably *A. bengalensis*.

Akkaia polygoni Takahashi Plate 20b, Figure 42s,v

Apt. yellow or orange-yellow, appendages concolorous with body; BL 1.9–2.4 mm. Sec. rhin. in al. III 40–48, IV 14–17, V 0–3. On stems and upper sides of leaves of *Polygonum* and *Persicaria* spp. in Japan, China, Taiwan and Korea (BMNH colln, leg. K.S. Boo). Heter. hol., with sexual phase on *Enkianthus* spp. and *Pieris japonica* (Takahashi, 1961a; Miyazaki, 1971). 2n=24.

Akkaia sikkimensis Agarwala and Raychaudhuri

Apt. color unknown; BL 2.5–2.6 mm. Described from *Raphanus sativus*, but this will not be the true host. India (Sikkim).

Akkaia taiwana Takahashi Figure 42r,t

Apt. pale brownish white with jet black siph.; BL 1.8–2.1 mm. Sec. rhin. in al. III 22–32, IV 6–13 (6-segmented ANT) or III 28–34 (5-segmented ANT). On *Polygonum thunbergii* and *Polygonum* sp. in S Japan, Taiwan, China, Sri Lanka (BMNH colln, leg. Lund Univ. Ceylon Expedition 1962), and al. have been trapped in NSW, Australia (Carver, 1976).

Aleurodaphis van der Goot

Hormaphidinae: Cerataphidini (?)

A little-known genus with eight nominal species in E Asia. Molecular data has cast some doubt over whether it belongs in Cerataphidini (Stern *et al.*, 1997). Four species are described from Compositae, and at least three of these are anhol. in Japan (Takahashi and Sorin 1958, Sorin and Miyazaki 2004). Apt. are aleyrodiform with a complete crenulate margin of wax glands, as in *Cerataphis*, but differ from that genus by absence of frontal horns and a more evident division between prothorax and mesothorax. At least one species (*A. takenouchii*) probably host-alternates from *Styrax*, as in related genera, to an as yet unknown secondary host (Aoki and Usuba, 1989), but one species was recently described forming leaf-roll galls on *Stewartia monadelphae* (Theaceae). Others are described from *Bambusa* and *Salix* (Blackman and Eastop, 1994). Sorin and Miyazaki (2004) reviewed and keyed the Japanese species

Aleurodaphis asteris Takahashi and Sorin Plate 3a

Apt. black, aleyrodiform, with a fringe of wax; BL 1.0–1.1 mm. On *Aster* spp. in Japan and Korea, living all year on stems at or just below ground level, but young larvae move to distal parts of stems in spring and summer. Anhol., with seven apparently non-overlapping generations per year on *Aster* (= *Gymnaster*) *savatierei* (Takahashi and Sorin, 1958). Al. unknown. 2n=c.32.

Aleurodaphis blumeae van der Goot

Apt. red-black, not as black as *A. asteris*, with broad wax fringe, and developing distinctive white spinal wax markings (Moritsu, 1983); BL 0.9–1.4 mm. On stems and undersides of young leaves of *Blumea*,

causing slight leaf-curl (Calilung, 1967). Also recorded from various other Compositae (*Adenocaulon*, *Carpesium*, *Chrysanthemum*, *Cynoglossum*, *Kalimeris*), and from *Mazus miquelii* (BMNH colln, leg. W.H. Paik). In E and SE Asia (China, Japan, Korea, Taiwan, Assam, Philippines, Java, Malaysia).

Aleurodaphis impatientis Sorin and Miyazaki

Apt. blackish brown to dark purple brown with marginal white wax; BL 1.2–1.3 mm. On leaves and stems of *Impatiens* spp. in Japan. Anhol., overwintering at stem bases (Sorin and Miyazaki, 2004). $2n=c.30^*$.

Aleurodaphis ligulariae Sorin and Miyazaki

Apt. blackish brown to dark purple brown with marginal white wax; BL 1.9–2.1 mm. On undersides of leaves, stem apices and flowerstalks of *Ligularia fischeri* in Japan. Anhol., overwintering on basal parts of *Ligularia* and in leaf litter (Sorin and Miyazaki, 2004).

Aleurodaphis mikaniae Takahashi

Apt. reddish brown, with a fringe of wax; BL 1.3–1.6 mm. In dense colonies on stems of *Mikania scandens* in Taiwan. $2n=c.30$.

Aleurosiphon Takahashi

Aphidinae: Aphidini

One E Asian species closely related to *Aphis* but with differences in chaetotaxy of dorsal body, R IV+V and second tarsal segments, and in the position of the marginal tubercles on ABD TERG 7 in fundatrices (Takahashi, 1966). Al. have dark-bordered wing veins.

Aleurosiphon smilacifoliae (Takahashi)

Apt. dark green, thickly covered with wax powder; BL 1.4–2.1 mm. On *Smilax* spp., feeding along main veins on underside of leaves. Japan, Korea, China and Taiwan. Mon. hol. with ovip. and al. males in Oct (Takahashi, 1923). $2n=8$.

Allocotaphis Börner

Aphidinae: Macrosiphini

A monotypic genus for a hairy aphid with elongate SIPH and a short cauda.

Allocotaphis quaestionis (Börner)

Plate 10d

Apt. black; BL 2.3–2.8 mm. On undersides of leaves of *Senecio doronicum*. Heter. hol. with sexual phase on *Malus* (Hille Ris Lambers and Wildbolz, 1958). Distribution is apparently boreoalpine, in Carpathians, Caucasus, and Alps.

Aloephagus Essig

Eriosomatinae: Fordini

A monotypic genus probably of African origin. Absence of SIPH, short, 5-segmented ANT, elongate rostrum and characteristic habitat and appearance in life make confusion with other aphids unlikely. Hille Ris Lambers (1954a) redescribed *Aloephagus* and discussed its taxonomic position.

Aloephagus myersi Essig

Plate 1e

Apt. densely wax-dusted; BL 1.8–2.5 mm. On *Aloe* spp., living under the leaf bases, attended by ants. Widespread in Africa south of the Sahara, where it is probably native, but originally described from California, and also found in glasshouses in Europe. Probably partially heter. hol. in Africa with sexual phase on *Pistacia* (Blackman and Eastop, 1994), anhol. elsewhere. $2n=22$.

Alphitoaphis Hottes

Aphidinae: Macrosiphini

One species on *Lonicera* in N America related to *Hyadaphis* but with thinner SIPH and hind wings of al. having only one oblique vein. Aphids collected on *Eupatorium* sp., at ground level with ants, in USA (Washington DC; BMNH colln, leg. A. Jensen), may also belong to this genus.

***Alphitoaphis lonicericola* (Williams)**

Apt. yellowish brown (Hottes, 1926) or reddish purple (orig. descr.), dusted with wax powder; BL 1.6–2.1 mm. On young growth of *Lonicera* spp., causing leaf-curl. In USA (Minnesota, Nebraska, Illinois, Kansas). Sec. rhin. in al. very numerous, III 35–47, IV 24–30, V 14–17 (Hottes, 1926). Life cycle unknown.

***Amegosiphon* Narzikulov**

Aphidinae: Macrosiphini

A genus for one species on *Berberis* in C Asia, characterised by unusual features of SIPH and cauda.

***Amegosiphon platicaudum* Narzikulov**

Figure 17a,d

Apt. rather elongate-bodied with long appendages, pale green to yellowish with an irregular red spinal stripe; BL 1.8–2.7 mm. On undersides of leaves of *Berberis* spp. in Iran and Tajikistan. Ovip. and alatform (brachypt.?) males occur in Oct–Nov (Remaudière and Davatchi, 1959, as *Elbourzaphis behboudii*).

Ammiaphis

Aphidinae: Macrosiphini

One palaeartic species on Umbelliferae with well-developed marginal tubercles on ABD TERG 1-(3-) 5 and apt. with sec. rhinaria.

***Ammiaphis sii* (Koch)**

Plate 10e

Apt. pale green or yellow-green, lightly wax-dusted, with black SIPH; BL 1.9–2.1 mm. On *Falcaria* spp., in summer colonies on stems and in leaf-sheaths, and in spring and autumn at bases of stems and on young shoots. C and E Europe, SW and C Asia (Azerbaijan; Rusanova, 1948, as *Aphis falcarii*). Mon. hol. acc. to Börner (1952).

***Amphicercidus* Oestlund**

Aphidinae: Macrosiphini

Ten species in Asia and N America mostly associated with *Lonicera*, characterised by having sec. rhin. in apt. and a very short broadly rounded cauda.

***Amphicercidus alticola* (Narzikulov and Mukhamediev)**

Apt. pale green with dark appendages; BL 2.3–2.6 mm. Sec. rhin. in al. III 24–32. On *Lonicera nummularifolia* in C Asia (Tajikistan). A population with apt. having more rhinaria on ANT III was described as a subspecies, *A. alticola* ssp. *tschatcalica* (Mukhamediev and Akhmedov).

***Amphicercidus flocculosus* (Gillette and Palmer)**

Plate 10i

Apt. with blackish brown thorax and abdomen, and dull orange to clay-colored head, sides of body and bases of SIPH., wax-powdered; BL 2.1–2.8 mm. Sec. rhin. in al. III c.40, IV 8–16. On leaves and twigs of *Lonicera* and *Symphoricarpos* in western USA and Mexico. Mon. hol., with ovip. and al. males in Oct–Nov (Palmer, 1952).

***Amphicercidus forsythiae* Zhang, Zhong and Zhang**

Apt. grayish-green with white powder; BL 3.1–3.2 mm. Al. have broad dark dorsal cross-bands tending to merge across ABD TERG 4–6, and sec. rhin. III 113–116, IV 0–2. On *Forsythia suspensa* in Yunnan, China. Apart from the small number of sec. rhin. on ANT III of apt. – a character which is likely to depend on the degree of alatiformity – this could be *A. japonicus*.

***Amphicercidus japonicus* (Hori)**

Apt. dark reddish to greenish- or yellowish-brown, with abundant white wax; BL 2.5–3.4 mm. Sec. rhin. in al. III 80–152, IV 0–4. On young shoots and twigs of *Lonicera* spp. in E Asia (N India, China, Korea, E Siberia, Japan). Mon. hol., with ovip. and al. males in Oct in Japan (Miyazaki, 1971), but perhaps anhol. in India (Hille Ris Lambers and Basu, 1966, as *A. indicus*). 2n=8 (Chen and Zhang, 1985b).

***Amphicercidus laniger* (Takahashi)**

Apt. brownish-green, densely covered in white wax powder; BL 1.9–2.5 mm. Sec. rhin. in al. III 2–5 (in middle region). On young stems of *Stauntonia hebandra* in Taiwan. Al. described by Takahashi (1929).

Amphicercidus lonicerae Maity and Chakrabarti

Apt. wax-covered; BL 3.2–3.6 mm. Sec. rhin. in al. III 55–75, IV 4–6. In downwardly rolled leaves of *Lonicera quinquelocularis* in N India. $2n=8?$ (Khuda-Bukhsh, 1980, as *Amphicercidus* sp.; $2n=18$ was recorded by Khuda-Bukhsh and Pal (1983) but this was probably an error).

Amphicercidus lonicericola (Mukhamediev)

Apt. pale green, wax-covered; BL 1.8–2.2 mm. On *Lonicera altmannii* in C Asia.

Amphicercidus pulverulens (Gillette)

Apt. dull greenish-brown with abundant wax; BL 2.5–3.1 mm. Sec. rhin. in al. III c.40, IV 0. On bark of *Symphoricarpos* spp., at or below ground level. In western USA and Canada. Mon. hol., with ovip. and apt. males in Oct–Nov (Palmer, 1952).

Amphicercidus sinilonicericola Zhang

Apt. color in life unrecorded, presumably wax-covered; BL c.3.0 mm. On *Lonicera japonica* in China. Possibly a synonym of *A. japonicus*.

Amphicercidus tuberculatus David, Narayanan and Rajasingh

Apt. green, wax-covered; BL 2.1–2.6 mm. Sec. rhin. in al. III 50–63, IV 0–3 (David *et al.*, 1972). On *Lonicera quinquelocularis* in N India. $2n=6$ (3 samples; Chauhan and Kurl, 1990) or 12 (Pal and Khuda-Bukhsh, 1984).

Amphorophora Buckton

Aphidinae: Macrosiphini

About 27 species, mostly nearctic, with a few E and W palaeartic. About half live on *Rubus*. A few have become fern feeders. They are all medium-sized to large aphids, usually greenish and rather pale, with long appendages bearing short to medium-length hairs. The SIPH are long, pale or dusky and slightly to moderately swollen on distal half. Most species on *Rubus* occur in loose colonies on shoots or solitarily on leaves. Mostly mon. hol. as far as known, with many al. produced in third parthenogenetic generation. Heie (1995) reviewed the species of NW Europe. The nearctic species need revision. The great variation in chromosome number is discussed by Blackman (1980).

Amphorophora agathonica Hottes

Apt. pale green with SIPH pale at base, becoming darker towards apices; BL 2.4–4.7 mm. On young stems and undersides of leaves of *Rubus idaeus* var. *strigosus*, and occasionally in small numbers on other *Rubus* spp. Widely distributed in N America north of about latitude 38°N. See Kennedy and Schaefer (1974) for population studies. Mon. hol. with al. males. $2n=14$.

Amphorophora ampullata Buckton

Figure 43e

Apt. green, with SIPH dark-tipped; BL 3.0–5.0 mm. On undersides of fronds of ferns in numerous genera (*Aspidium*, *Asplenium*, *Athyrium*, *Cystopteris*, *Dryopteris*, *Matteucia*, *Onoclea*, *Polypodium*, *Polystichum*, *Thelypteris*). Europe, Asia and N America. Mon. hol. with al. males. Originally described from *Cystopteris montana*, the name is probably being applied to a complex of species with different fern associations. In USA, populations mainly associated with *Onoclea sensibilis* and *Matteucia* spp. (Onocleaceae) are regarded as a subspecies, *A. ampullata* ssp. *laingi*, and populations colonising various ferns in NE India and Nepal also have distinctive features (*A. ampullata* ssp. *bengalensis* Hille Ris Lambers and A.N. Basu). Populations on *Athyrium felix-femina* in Netherlands and UK have a longer R IV+V and other morphological differences as well as a different karyotype (see below), and thus represent an undescribed species. $2n=12$ for samples from *Dryopteris* and *Polystichum* in UK and Japan (RLB), for ssp. *bengalensis* from NE India (Kurl and Chauhan, 1986a), and for ssp. *laingi* from Canada; $2n=10^*$ for a sample from *Athyrium felix-femina* in UK.

Amphorophora amurensis (Mordvilko)

Apt. green with ANT, legs and SIPH blackish, and pale cauda; BL 3.0–3.5 mm. On *Rubus* spp. in E Asia. Takahashi (1961c) provided a description of this species as *A. rubiphaga*. $2n=14$.

Amphorophora (Galiaphis) annae (Ossiannilsson)

Figure 29f

Apt. whitish yellow, pale yellowish-green or pale green, with darker apices to ANT segments, legs and SIPH; BL 1.8–2.3 mm. On stems and undersides of leaves of *Galium boreale* in N Europe (Sweden, Finland, E Germany). Ovip. in Aug–Sept, apt. males in Sept (Ossiannilsson, 1954).

Amphorophora catharinae (Nevsky)

Apt. green, eyes black, ANT segments white with black apices, SIPH pale with dusky apices; BL 2–3 mm. Sec. rhin. in al. III 10–12. At shoot tips and on undersides of leaves of *Rosa* spp. in Uzbekistan, and also in Iran, Afghanistan, Tajikistan and Kashmir (BMNH colln).

Amphorophora coloutensis Smith and Knowlton

Apt. pale whitish with greenish brown abdominal spinal stripe; BL 2.9–3.4 mm. On *Geranium* spp. (wild) in western USA (Colorado and Utah). Mon. hol., with ovip. and al. males in late July/August (orig. descr.).

Amphorophora (Galiaphis) cryptotaeniae (Takahashi)

Apt. pale, SIPH dark-tipped; BL 1.0–1.3 mm. On *Cryptotaenia japonica* in Japan. Generic position uncertain.

Amphorophora filipendulae Miyazaki

Apt. green or greenish yellow, with mainly dark SIPH; BL 2.5–3.9 mm. On undersides of leaves and young shoots of *Filipendula kamschatica* in Japan (Miyazaki, 1971) and Kamtschatka (Pashtshenko, 1988a). Mon. hol.

Amphorophora forbesi Richards (= *Aulacorthum capilanoense* Robinson)

Apt. pale green or whitish; BL 2.7–3.8 mm. On undersides of leaves of *Rubus spectabilis* in western N America (B.C., Oregon). This species has an unusual combination of characters (large size, spiculate ventral side to head, steep-sided slightly scabrous ANT tubercles, no rhinaria on ANT III, slightly swollen SIPH and a rather hairy cauda), so its generic position is not at all clear. 2n=12.

Amphorophora gei (Börner)

Apt. pale green or yellowish green, with dusky or dark SIPH and cauda; BL 2.2–3.9 mm. On undersides of leaves of *Geum* spp., especially *G. rivale* in moist, shady places (Heie, 1995). Also recorded from *Alchemilla vulgaris* and *Filipendula ulmaria*. Widespread in Europe, and introduced to western USA (Idaho: BMNH colln, leg. J.H. Martin). Mon. hol. on *Geum*; Hille Ris Lambers (1947b) described the fund., but sexuales have apparently never been found. 2n=12.

Amphorophora geranii Gillette and Palmer

Apt. ‘dull greenish yellow to pinkish, mottled with sooty or grass-green’; BL 2.4–3.7 mm. Al. were described in Palmer (1952). On leaves of *Geranium richardsoni* in western USA (Colorado, Idaho, Utah).

Amphorophora idaei (Börner)

Apt. pale green, rather shiny, with pale SIPH; BL 2.6–4.1 mm. On undersides of leaves of *Rubus idaeus* s.str., and cultivated varieties derived from it. Europe. Mon. hol., with al. males. Blackman *et al.* (1977) distinguished this species from *A. rubi*, under which name it was often previously included. See also Blackman and Eastop (2000). 2n=18.

Amphorophora (Galiaphis) japonica (Takahashi)

Apt. green; BL c.1.5 mm. Host recorded as ‘*Anemone* (?)’. Japan. Host and generic position uncertain.

Amphorophora kesocqua Hottes

Apt. bluish green, SIPH becoming darker distally; BL c.3 mm. On *Rubus* sp. in Colorado, USA. Possibly these are fund. of *A. tigwatensa*.

Amphorophora pacifica Hill

Apt. shining very pale greenish white with a darker green rather wavy spinal stripe, somewhat interrupted posteriorly; BL 2.1–3.0 mm. On undersides of leaves of *Rubus parviflorus* in California, USA, where it is anhol., overwintering on young foliage at apices of older shoots (orig. descr.). 2n=18.

***Amphorophora parviflora* Hill**

Apt. pale green; BL 3.1–4.3 mm. On *Rubus parviflorus*, and sometimes in small numbers on certain other *Rubus* spp., in B.C., Canada. $2n=12$.

***Amphorophora pawtincae* Hottes**

Apt. pea-green; BL 2.5–3.7 mm. On leaves, stems and flowers of *Primula parryi* in western USA (Colorado, Oregon) (Palmer, 1952).

***Amphorophora rossi* Hottes and Frison**

Apt. whitish green with a darker green spinal stripe; BL 1.9–3.0 mm. On *Geum* spp., especially *G. canadense*, in north-east USA and eastern Canada. Mon. hol.; the original description included fund. $2n=46^*$.

***Amphorophora rubi* (Kaltenbach)**

Apt. shiny pale yellowish green to green with pale SIPH; BL 2.2–4.7 mm. On undersides of leaves of *Rubus* spp., esp. *fruticosus* s. lat., in Europe, and introduced to New Zealand. Mon. hol. with al. males, or anhol. in regions with mild winters. Records of *A. rubi* on raspberries mostly refer to *A. idaei* in Europe and *A. agathonica* in N America. $2n=20$.

***Amphorophora rubicumberlandi* Knowlton and Allen**

Apt. color in life unrecorded; BL 2.6–3.7 mm. On canes of wild and cultivated black raspberries (*Rubus occidentalis*, *R. leucodermis*) in north-western USA (Oregon, Washington).

***Amphorophora rubitoxica* Knowlton**

Plate 24g

Apt. shiny deep green, or yellow-green with a darker green spinal stripe, with SIPH dusky-dark; BL 2.3–3.5 mm. On young shoots and under leaves of many *Rubus* spp., and causing lesions on leaves of *R. occidentalis*, but not colonising *R. idaeus*. Western N America. Life cycle not studied. $2n=30$.

***Amphorophora scabripes* Miyazaki**

Figure 43d

Apt. pale green with two longitudinal dark green pleural stripes, and black-tipped SIPH; BL 4.8–5.7 mm. On *Thelypteris* (= *Lastrea*) *quelpaertensis* in Japan.

***Amphorophora sensoriata* Mason**

Apt. very pale bluish green with dark ANT, and SIPH dusky towards apices; BL 2.8–3.5 mm. On stems of *Rubus occidentalis*, dropping off readily when disturbed. In north-eastern N America, as far south and west as Kansas. $2n=72$.

***Amphorophora stachyophila* Hille Ris Lambers**

Figure 50c

Apt. rather shiny pale green, rarely greenish pink; BL 2.5–3.5 mm. On stems and undersides of leaves of *Stachys* spp, esp *rigida*, in western N America (California, Oregon, B.C.). $2n=12$.

***Amphorophora stolonis* Robinson**

Apt. pale green; BL 2.6–3.1 mm. On stems or at ends of runners of *Rubus pubescens* in Manitoba, Canada. Mon. hol. with al. males (orig. descr.). $2n=48$.

***Amphorophora tigwatensa* Hottes**

Apt. pinkish brown or greenish, with ANT, legs and SIPH mainly dark brown, cauda paler; BL 2.8–4.1 mm. On undersides of leaves and young stems of *Rubus procerus* (Leonard, 1974). Western N America. $2n=40^*$.

***Amphorophora tuberculata* Brown and Blackman**

Figure 30d

Apt. shining deep green; BL 2.2–3.4 mm. On leaves and flowerheads of *Geranium macrorrhizum* in SE England and Bulgaria; specific to this host, and presumably native to montane areas of continental Europe where this plant is native. Mon. hol., with both apt. and al. males (orig. descr.). $2n=4$.

***Amphorophora urtica* Essig**

Figure 55a

Apt. dark red to grayish; BL 3.2–3.6 mm. On undersides of larger leaves of *Urtica* spp. in western N America (California, Utah, B.C.). Life cycle unknown, but presumably anhol. in California, as apt. and al. vivip. were abundant in Dec–Jan (orig. descr.).

Amphorosiphon Hille Ris Lambers

Aphidinae: Macrosiphini

One European species related to *Amphorophora* but with ante- and post-siphuncular sclerites and a long, very hairy rostrum.

Amphorosiphon pulmonariae (Börner)

Plate 24h

Apt. pale to dark green with black SIPH and posterior dorsal abdominal markings; BL 2.5–3.0 mm. On undersides of leaves and petioles of *Pulmonaria* spp. in Europe (Netherlands, Germany, Poland, Bulgaria, Czech Republic, Hungary, Ukraine). Mon. hol. with apt. males (Hille Ris Lambers, 1949).

Anaulacorthum A.K. Ghosh and Raychaudhuri

Aphidinae: Macrosiphini

A genus for two oriental species close to *Aulacorthum*, but with 4 hairs on the first tarsal segments. The second species is *A. zhangjiajense*, from an unidentified composite plant in Hunan Prov., China, described as a subspecies of *Neomyzus circumflexus*.

Anaulacorthum fagopyri A.K. Ghosh and Raychaudhuri

Figure 28a

Apt. pale brown; BL 2.3–2.8 mm. On undersides of young and old leaves of *Fagopyrum cymosum* in W Bengal, India. Al. undescribed.

Anoecia Koch

Anoeciinae

A distinctive genus of uncertain taxonomic position, consisting of about 20 species mostly associated with *Cornus* and/or subterranean parts of Gramineae or Cyperaceae. Mostly palaeartic and extending into the oriental region, but several species are known only from N America. Some species alternate between *Cornus* and Gramineae, while others are entirely subterranean on Gramineae or Cyperaceae, where they overwinter either as eggs or anholocyclically, usually attended by ants. Adult apt. of most species on grass roots are medium-sized greenish gray or gray in color, with a sclerotic dorsal abdominal plate. They have compound eyes and are fairly mobile when disturbed. Immatures are paler, white or cream in color. Al. have a large dark pterostigma providing a conspicuous dark spot on the forewing, and often there is a black dorsal abdominal patch. Accounts are available for C Europe (Zwölfer, 1958), NW Europe (Heie, 1980b), the Iberian peninsula (Nieto Nafria and Mier Durante, 1998), India (Chakrabarti *et al.*, 1982), Japan (Sorin, 1999) and N American Rocky Mountain region (Palmer, 1952). Halbert (1991) keyed the N American species. See also Blackman and Eastop (1994).

Anoecia caricis Pergande

Apt. color not noted; BL c. 1.4 mm. On roots of *Carex* sp. in USA.

Anoecia corni (Fabricius)

Plate 3d

Apt. greenish gray to brown with sclerotised parts dark gray; BL 1.9–2.8 mm. Al. are gray and black with a conspicuous black pterostigma and a black dorsal abdominal patch. On roots of numerous species of Gramineae, including cereals. Europe, N and S Africa, C and E Asia, India, and N America. Heter. hol. with a sexual phase on *Cornus sanguinea* in both Europe and N America. 2n=6.

Anoecia cornicola (Walsh)

Apt. whitish or yellowish with cross-bands, wax-powdered; BL c. 1.7 mm. On roots of various grasses (*Andropogon*, *Digitaria*, *Eleusine*, *Muehlenbergia*, *Panicum*, *Poa*, *Setaria*) in N America, and also recorded from Brazil (BMNH colln). heter. hol. with *Cornus* spp. (*amomum*, *stolonifera*) as primary hosts (presumably anhol. on grass roots in Brazil). Al. produced on grasses Aug–Oct have a dark dorsal abdominal patch (Palmer 1952, as *A. querci*). 2n=10.

Anoecia equiseti Halbert

Apt. cream-colored with gray sclerotic areas; BL 2.1–2.4 mm. Late summer al. commonly with vestigial wings. In ant-attended colonies on roots of *Equisetum laevigatum* in Idaho, USA, and Manitoba, Canada (BMNH colln, leg. A.G. Robinson). Life cycle uncertain, mon. hol. or anhol.; ovip. were produced in late Aug, and eggs laid but no males were observed and eggs may have been inviable (Halbert, 1991).

Anoecia fulviabdominalis (Sasaki)

Apt. gray-green; BL 2.1–2.5 mm. On roots of *Oryza*, and sometimes other Gramineae (*Agropyron*, *Triticum*, *Hordeum*, *Imperata*, *Echinochloa*, *Digitaria*). E Asia (Japan, Korea). Heter. hol. with a sexual phase on *Cornus* species (*controversa*, *brachypoda*), although anhol. overwintering may also occur. Tanaka (1961) gave an account (in Japanese) of its biology, summarised in Yano *et al.* (1983).

Anoecia furcata (Theobald) (= *A. nemoralis* Börner)

Apt. dark green to blackish brown; BL 1.4–2.4 mm. Al. with black dorsal abdominal patch. On roots of numerous grasses (*Alopecurus*, *Arrhenatherum*, *Bromus*, *Deschampsia*, *Elymus*, *Festuca*, *Panicum*, *Phleum*, *Poa*, *Sieglingia*), attended by ants. Europe, India, China. Mainly anhol. on grass roots; part of the population may go through a sexual phase on *Cornus sanguinea*, but this has not been clearly established. Zwölfer (1957) and Paul (1977) studied variation in frequency and distribution of spatulate hairs. $2n=12$.

Anoecia graminis Gillette and Palmer

Apt. dull black with dusky bands, wax-dusted; BL 1.6–2.5 mm. Al. have no black dorsal abdominal patch. On roots of *Hordeum* sp. in Colorado, USA. Apparently mon. hol., with ovip. in Sept. (Palmer, 1952). Closely related to the European *A. furcata*. $2n=8$.

Anoecia haupti Börner

Apt. greenish to brown with sclerotic parts dark gray; BL 2.1–2.6 mm. Al. with a dark dorsal abdominal patch. On roots of grasses (*Bromus*, *Eragrostis*, *Poa*). Europe (Germany, Spain, Portugal, Italy). Heter. hol. with sexual phase on *Cornus sanguinea* (Zwölfer, 1957). $2n=8$.

Anoecia himalayensis Chakrabarti and Maity

Apt. color in life unrecorded, probably greenish or brown with gray sclerotic parts; BL 1.8–2.0 mm. On roots of unidentified grass species in N India (H.P., U.P.).

Anoecia krizusi (Börner)

Apt. blue-green with dark gray dorsal sclerotisation; BL 2.1–2.5 mm. Al. unknown. On roots of *Elymus* (*Agropyron*) *caninum*, with tentative identifications also from *Agrostis* sp., *Dactylis glomerata* and *Lolium perenne*. Germany, ?UK (Stroyan, 1964). Mon. hol. on grass roots (Zwölfer, 1957, as *Neanoecia*). Appears closely related to *A. haupti*.

Anoecia major Börner

Apt. brown with extensive dark gray sclerotisation; BL 2.2–3.0 mm. Al. with large black dorsal abdominal patch. On roots of grasses, esp. *Phalaris arundinacea* (also *Brachypodium*, *Calamagrostis*). Europe. Probably heter. hol. with sexual phase on *Cornus*. Very close to *A. corni* and hybrids may occur. $2n=8$ ($2n=7$ in possible hybrids with *corni*; Blackman, 1980).

Anoecia mirae Narzikulov

Apt. brown, with broad dark abdominal cross-bands; BL c.2.7 mm. On *Sorghum halepense* in S Tajikistan. Probably a synonym of *A. major*.

Anoecia oenotherae Wilson

Apt. yellowish, with dusky cross-bands; BL c.1.5 mm. On roots of *Oenothera biennis*, apparently widely distributed in N America. Al. sexuparae produced on *Oenothera* roots in autumn are small (1.4–1.8 mm), with 0–4 sec. rhin. on III, and dark cross-bands on ABD TERG 3–7 rather than a solid black patch. Heter. hol., migrating to *Cornus* spp. Records of other *Anoecia* spp. from *Oenothera* roots may be due to misidentification.

Anoecia (Paranoecia) pskovica Mordvilko

Apt. grayish-white; BL 2.4–2.7 mm. On roots and subterranean runners of Cyperaceae (*Carex*, *Eriophorum*) in N and C Europe. Mon. hol. with ovip. and apt. males from mid-Oct. Usually ant-attended, but eggs are covered in protective wax and not collected and stored by ants (Zwölfer, 1957).

THE APHIDS

Anoecia radiciphaga Pal and Raychaudhuri

Apt. color in life unrecorded; BL 1.7–2.1 mm. On roots of *Eragrostis nigra* and unidentified grass species in NE India (W Bengal).

Anoecia setariae Gillette and Palmer

Apt. pale orange-yellow with brownish head and dusky cross-band on posterior abdomen; BL 1.6–2.0 mm. Al. commonly have vestigial wings. In ant-attended colonies on roots of grasses (*Echinochloa*, *Setaria*), apparently widely distributed in N America (Smith and Parron, 1978). Probably mon. hol.; ants were observed to gather eggs in Sept (Halbert, 1991).

Anoecia stipae Mamontova

Apt. pale brown with blackish head, legs and tips of ANT, and dark cross-bands on ABD TERG 7 and 8; BL c. 2 mm. On roots of *Stipa capillata* in chalky ground in Ukraine.

Anoecia vagans (Koch) (= *Anoecia willcocksii* Theobald; Zwölfer, 1957)

Apt. yellowish, pale green or olive green; BL 2.1–2.7 mm. Al. produced on Gramineae have a black dorsal abdominal patch. On roots of various grasses and cereals (*Agropyron*, *Arrhenatherum*, *Bromus*, *Cynodon*, *Elymus*, *Eragrostis*, *Festuca*, *Hordeum*, *Lolium*, *Panicum*, *Poa*, *Triticum*). Europe, Egypt, Israel, Turkey, India, E Siberia. Heter. hol. with sexual phase on *Cornus sanguinea* (Zwölfer, 1957). 2n=12.

Anoecia zirnitsi Mordvilko

Apt. grayish-green or brownish-green; BL 1.5–2.1 mm. Al. unknown. On thin roots of various grasses (*Agrostis*, *Brachypodium*, *Festuca*, *Lolium*). Europe. Mon. hol. with ovip. in Oct–Dec, eggs being stored by *Lasius flavus* (Zwölfer, 1957). Males unknown; Zwölfer's suggestion that ovip. may be parthenogenetic requires further investigation.

Anomalaphis Baker

Greenideinae: Cervaphidini

Two Australian species on Myrtaceae (one on *Agonis* and the other on *Leptospermum*). ANT of both apt. and al. 5-segmented, and ABD TERG 7 and 8 each bear slender hair-bearing processes. SIPH are cylindrical or tapering, with a ring of 3–8 hairs on the distal half, and cauda is broadly rounded.

Anomalaphis comperei Pergande ex Baker

Plate 5f

Apt. dark brownish or grayish green with a yellowish spinal stripe; BL 1.2–1.6 mm. Al. have shiny black thoracic lobes and a black dorsal abdominal patch. On *Agonis flexuosa* in W Australia, which may be the only true host, although the original records of this aphid were from *Acacia* and *Eucalyptus*. Mon. hol., with ovip. in Feb (Carver, 1971).

Anomalosiphum Takahashi

Greenideinae: Cervaphidini

Five species associated with woody, mostly shrubby, Connaraceae, Leguminosae and Xanthophyllaceae in E and SE Asia. The host of one species in China (*A. takahashii* Tao) is unknown. Apt. have 4-segmented ANT, bear slender hair-bearing processes on ADB TERG 7 and 8, and have a cauda tipped with a stylus. Al. have 5-segmented ANT, much smaller abdominal processes, and the caudal process often indistinct. Life cycles unknown. Martin and Agarwala (1994) and Quednau and Martin (2006) revised the genus.

Anomalosiphum indigoferae A.K. Ghosh, M.R. Ghosh and Raychaudhuri

Apt. dark brown to black; BL 1.1–1.4 mm. Al. are larger, BL 1.4–1.7 mm. On young twigs of *Indigofera* sp(p). in India (W. Bengal). There are also records from *Vigna* sp. and *Phyllanthus* sp.; the latter record is of al. only, probably vagrants. 2n=18.

Anomalosiphum murphyi Martin and Agarwala

Plate 5g

Apt. probably dark-pigmented; BL 1.2–1.6 mm. On *Rourea* sp. and *Xanthophyllum stipitatum* in Singapore, and on ?*Sindora* sp. in Sarawak (Martin and Agarwala, 1994). Al. in Singapore in Jan.

Anomalosiphum philippensis Martin and Agarwala

Apt. probably dark-pigmented; BL 1.3–1.4 mm. Al. larger, 1.5–1.8 mm. On *Dalbergia ferruginea* in the Philippines (Martin and Agarwala, 1994). Apt. and al. in Feb–Apr. Al. also trapped in Papua New Guinea

Anomalosiphum pithecolobii Takahashi

Apt. probably green; BL 1.3–1.4 mm. Al. greenish-yellow. On young leaves and shoots of *Pithecolobium lucidum* in Taiwan.

Anomalosiphum tiomanensis Martin and Agarwala

Apt. pale green; BL 1.3–1.5 mm. On new apical growth of *Dalbergia torta* in W Malaya. Apt. and al. collected in Feb (Martin and Agarwala, 1994).

Anthracosiphon Hille Ris Lambers

Aphidinae: Macrosiphini

A genus for two species feeding on runners of *Potentilla*, with subapical reticulation on the SIPH, extensive dark dorsal sclerotisation and ventral spiculosity on the head.

Anthracosiphon crystleae Smith

Apt. reddish brown, sclerotic areas shiny, with black ANT and SIPH; BL 1.8–2.4 mm. Sec. rhin. in al. III 11–16. On runners of *Potentilla canadensis* and *Potentilla* sp. in eastern USA (N Carolina, Pennsylvania). Presumably mon. hol., with al. males (orig. descr.).

Anthracosiphon hertae Hille Ris Lambers

Plate 26i

Apt. shiny black dorsally, lead-colored with rosy hue ventrally, appendages blackish; BL 2.3–2.8 mm. Sec. rhin. in al. III 20–34. On runners of *Potentilla* spp. (*anserina*, *palustris*) in NW Europe. Mon. hol. with al. males and ovip. in Sept (orig. descr. and Prior, 1971).

Anuraphis del Guercio

Aphidinae: Macrosiphini

A palaeartic genus of about 10 spp., with fundatrices typically folding leaves of *Pyrus* in spring, their all-al. progeny migrating to basal parts of Umbelliferae, or Compositae of the *Tussilago* group, where they are ant-attended. (The name *Anuraphis* has been applied more widely in the past to include spp. currently placed in *Brachycaudus* and *Dysaphis*.) See Heie (1992) for an account of 3 spp. in NW Europe, Barbagallo and Cocuzza (2003) for morphometric studies and a key to western palaeartic spp., and Kolesova (1970, 1972) for ecological studies of 4 spp. in Crimea.

Anuraphis cachryos Barbagallo and Stroyan

Apt. very dark brown to black, BL 2.0–3.0 mm. On main root and leaf bases below soil level of *Cachrys* spp. Also recorded from *Echinophora tenuifolia* and *Ferula communis*. Described from S Italy, where it is apparently anhol., and also recorded from Iran and Turkey (Ozdemir *et al.*, 2005).

Anuraphis capparis Nevsky

Apt. brown; BL c.1.9 mm. On *Capparis spinosa* in C Asia. Presence of marginal tubercles on ABD TERG 1 and 7 indicates that this is not an *Anuraphis*; perhaps an immature *Aphis* sp?

Anuraphis catonii Hille Ris Lambers

Apt. bright yellowish or greenish; BL c.1.8 mm. On *Pimpinella* spp. at ground level. Heter. hol., with sexual phase on *Pyrus* (Blackman and Eastop, 1994, 2000). Europe. 2n=26.

Anuraphis cortusae Nevsky

Apt. pale green with black eyes and dark tips to SIPH; BL c. 1.9 mm. On *Cortusa matthiola* in C Asia.

Anuraphis farfarae (Koch)

Figure 54d

Apt. dark grayish green; BL 2.2–3.1 mm. On subterranean parts of *Petasites* spp. and *Tussilago* spp. Heter. hol., with sexual phase on *Pyrus* (Blackman and Eastop, 1994, 2000). Europe, Asia, and reportedly (Bodenheimer and Swirski, 1957) in N America. 2n=12.

THE APHIDS

Anuraphis ferulae Shaposhnikov

Apt. color in life unknown; BL c. 3.3 mm. On sheaths of lower leaves of *Ferula* spp. in Tajikistan. Probably heter. hol., with *Pyrus* as the primary host (orig. descr.).

Anuraphis pyrilaseri Shaposhnikov

Apt. pale ochre-yellow with pale green cross-bands; BL 2.3–3.1 mm. On basal parts of various Umbelliferae (*Cachrys*, *Ferula*, *Laser*, *Laserpitium*, *Opopanax*, *Thapsia*). In S, C and E Europe. Heteroecious holocyclic in E Europe (Crimea), with *Pyrus communis* as primary host. Anholocyclic (on *Ferula*) in S Italy (Barbagallo and Stroyan, 1982). $2n=12$.

Anuraphis shaposhnikovi Barbagallo and Cocuzza

Apt. yellowish-ochreous to brownish; BL 1.8–2.6 mm. On root collar and leaf bases of *Magydaris pastinacea* and *Opopanax chironium* in S Italy. Closely related to *A. subterranea*, but with relatively shorter R IV+V and fewer spinal tubercles (Barbagallo and Cocuzza, 2003).

Anuraphis subterranea (Walker)

Plate 9h

Apt. brown; BL 2.0–3.4 mm. In large ant-attended colonies inside lower leaf sheaths, at stem bases and on subterranean parts of plants in several genera of Umbelliferae, esp. *Heraclium* and *Pastinaca*. Heter. hol., with sexual phase on *Pyrus* (Blackman and Eastop, 1994, 2000). Europe and C Asia. $2n=26$.

Anuromyzus Shaposhnikov

Aphidinae: Macrosiphini

One species on *Cotoneaster*, related to *Dysaphis* but with extensive dorsal sclerotisation and differences in SIPH and cauda (Shaposhnikov, 1959).

Anuromyzus cotoneasteris (Shaposhnikov)

Figure 24a,b

Apt. very shiny dark brown to black, BL 2.2–2.5 mm. Sec. rhin. in al. (in spring) III 63–80, IV 18–23, V 3–6. On undersides of curled leaves of *Cotoneaster* spp. Known from Georgia, S Ukraine (BMNH colln, leg G. Shaposhnikov) and S France (BMNH colln, leg. G. Remaudière). Mon. hol., with ovip. and al. males in Oct (orig. descr.). $2n=12$.

Aphidura Hille Ris Lambers

Aphidinae: Macrosiphini

A palaeartic genus of 13 described species, with perhaps another 8 or more species undescribed in collections, mostly in S Europe to C Asia. They feed mainly at stem apices of Caryophyllaceae, but are little studied and life cycles are mostly unknown. Some species may host-alternate from Rosaceae, as one species (*A. bozkhoae*; see Blackman and Eastop, 1994) is described from *Prunus*, and two from *Prinsepia*. The presence of a pair of mesosternal tubercles indicates a relationship with *Brachycaudus* subgenus *Acaudus*; other *Brachycaudus*-like characters are the tendency for extensive dorsal sclerotisation, and the subapical annular incision of the SIPH.

Aphidura acanthophylli Remaudière

Apt. pale; BL 1.4–1.7 mm. Sec. rhin. in al. III 15–22, IV 3–11, V 0–4. On an *Acanthophyllum* sp. in Iran.

Aphidura delmasi Remaudière and Leclant

Apt. shining dark brown with black SIPH and pale cauda; BL 1.3–2.0 mm. Sec. rhin. in al. III 3–8. On *Silene italica* in S Europe (France, Sicily, Greece). Probably mon. hol.

Aphidura gypsophilae Mamontova-Solukha

Apt. yellow, BL c.1.9–2.1 mm. Sec. rhin. in al. III 10–15. On undersides of leaves and stems of *Gypsophila paniculata* in Ukraine.

Aphidura mordvilkoii Shaposhnikov

Apt. brownish; BL not recorded. On *Prinsepia sinensis* in Russia. It seems likely that *A. prinsepieae* is a synonym.

Aphidura ornata Hille Ris Lambers

Apt. shining black with unsclerotised areas pale greenish-gray, SIPH black and cauda greenish-yellow; BL 1.8–2.2 mm. In rather dense colonies on stem apices and peduncles of *Silene* spp., sometimes visited by ants. Europe (Italy, France, Switzerland, Hungary, Russia, Ukraine).

Aphidura ornatella Narzikulov and Winkler

Apt. dark brown with unsclerotised areas green; BL 1.9–2.6 mm. Al. undescribed. Singly on shoot apices and peduncles of *Silene* spp. and *Saponaria* sp., in Tajikistan and NW India (David *et al.*, 1970, as *A. bharatia*).

Aphidura pannonica Szelegiewicz

Apt. green with black dorsal markings, black SIPH and dark green cauda; BL 1.7–2.3 mm. Sec. rhin. in al. III 14–22. On *Silene* spp. in E Europe. A Ukrainian population was given subspecies status (*A. pannonica* ssp. *cretacea* Mamontova-Solukha), but it is difficult to see the justification for this. $2n=12$.

Aphidura picta Hille Ris Lambers (= *Aphidura mingens* Pintera)

Plate 11i

Apt. yellowish to green with pale brown head and prothorax, variable shiny brown dorsal abdominal markings, and dark brown–black SIPH; BL 1.2–2.1 mm. Sec. rhin. in al. III 25–39. On flower-stalks of *Silene* spp. and *Dianthus* spp. in SE Europe and SW Asia (Sicily, Greece, Bulgaria, former Yugoslavia, Israel, Turkey, Iran).

Aphidura prinsepieae Pashtshenko

Apt. green or brownish green; BL c.1.8 mm. On shoot apices and petioles of *Prinsepiea sinensis* in E Siberia (Pashtshenko, 1988a). Probably synonymous with *A. mordvilkoii*.

Aphidura pujoli (Gómez Menor)

Apt. greenish, with pale/dusky SIPH and cauda; BL 1.5–2.1 mm. Sec. rhin. in al. 22–25. On *Dianthus* spp., esp. *D. caryophyllus*, in S and E Europe, and Pakistan (Naumann-Etienne and Remaudière, 1995) and also tentatively recorded from *Silene parviflora* (Bozhko, 1976). Mon. hol. in Corsica, where ovip. and al. males were collected in Oct (BMNH colln, leg. F. Leclant).

Aphiduromyzus Umarov and Ibraimova

Aphidinae: Macrosiphini

One rather large species on *Rosa* in C Asia with an unusual combination of dark dorsal pigmentation, pale SIPH, blackish cauda, and numerous sec. rhin. in apt. as well as al., with no clear relationship to other rose-feeding aphids.

Aphiduromyzus rosae Umarov and Ibraimova

Apt. dark green or brown with ANT I, II and VI, femora and cauda blackish, SIPH pale; BL c.2.8 mm. Sec. rhin. in apt. III 20–25, in al. III 30–35, IV c.6, V c.2. Al. have an extensive black dorsal abdominal patch. On *Rosa* sp. in Tyan-Shan Mountains, C Asia.

Aphis L.

Aphidinae: Aphidini

The largest aphid genus containing more than 400 species, most of which occur in the northern hemisphere, but a few are native to S America, New Zealand, and Australia. Mostly small to medium-sized aphids, often greenish but varying from pale to dark green, and sometimes yellow, brown, reddish, or black. Most species live on shrubs or herbs, with relatively few on trees. They usually live on the young foliage and often distort the leaves, but some species live on young twigs or at the base of the stem, or on the roots. Most species are attended by ants which may construct earthen shelters for the species living just above soil level. There are evident species groups associated with particular groups of plants, e.g., subgen. *Bursaphis* host-alternating between *Ribes* and Onagraceae, but there seems to be no overall pattern of host association and aphid morphology on which to base a subgeneric classification with world-wide applicability. The primary hosts of the relatively few *Aphis* species that host-alternate also provide no evidence of primitive host associations. An

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interesting possible explanation might lie in a recent suggestion that northern *Aphis* species might be derived from southern hemisphere ancestors (von Dohlen and Teulon, 2003).

Accounts are available for the British Isles (Stroyan 1984), Fennoscandia/Denmark (Heie, 1986), Iberian peninsula (Nieto Nafria *et al.*, 2005), Mongolia (Holman and Szelegiewicz, 1971), E Siberia (Pashtshenko, 1992, 1993a–c, 1994a–c) and Japan (Takahashi, 1966). Brown (1989) keyed al. of the NW European species. Cook (1984b) reviewed and keyed the N American Compositae-feeding species. Remaudière (1994) keyed the S American species. Rusanova (1948) reviewed and keyed species in Azerbaijan, and described several new species that have not subsequently been recognised. Kadyrbekov (2001b) reviewed and keyed the C Asian species of the subgenus *Protaphis*, treating it as separate genus, and Remaudière (1993b) revised subgenus *Bursaphis*. With some reservations we follow Kadyrbekov (2001c) in transferring all the species previously placed in *Aphis* subgenus *Absinthaphis* to *Xerobion*.

Aphis aba Miller

Apt. with deep brown head and thorax, paler brown to pale red abdomen with dark brown marginal spots; BL 1.2–1.4 mm. Sec. rhin. in al. III 18–22, IV 4–6, V 2–3. On leaf petioles and midribs of *Iva xanthifolia* in Massachusetts, USA.

Aphis acaenaevora Mier Durante and Ortego

Apt. greenish yellow, lightly wax-dusted, with dark brown or black head, thorax, SIPH and cauda; BL 1.8–2.4 mm. Sec. rhin. in apt. 1–8, al. unknown. On *Acaena splendens*, forming colonies at base of stem at or slightly below ground level. Argentina (Andean region of Patagonia). Mon. hol. with ovip. and apt. males in late April (Mier Durante and Ortego, 1998).

Aphis acaenovinae Eastop

Apt. bright apple-green with three rusty orange blotches on abdomen, one at base of each SIPH and the other in between; BL 1.4–2.0 mm. Sec. rhin. in apt. III 0–5, in al. III 3–8, IV 0–2. On *Acaena ovina*, living at ground level in rosette, attended by ants. SE Australia. $2n=8$ (D.F. Hales, pers. comm.)

Aphis acanthoidis (Börner)

Apt. dark green; BL 1.1–1.6 mm. On leaf rosettes and developing flower stems of *Carduus crispus* ssp. *multiflorus* (= *acanthoides*). Germany, Austria, Netherlands.

Aphis acetosae L.

Apt. dark green to black; BL 1.5–2.7 mm. On stems and inflorescences of *Rumex* spp., esp. *acetosa*, often in large ant-attended colonies. It has also been found on *Rheum* spp. (Pashtshenko, 1988a). Europe, Iran, and E and W Siberia; also recorded from USA (needs confirmation). A shorter-haired form on roots of *Rumex acetosella* in England and Denmark was described as a subspecies, *A. acetosae rumicivora*, by Heie (1986).

Aphis (Toxopterina) achillearadicis Pashtshenko

Apt. dark green; BL c.1.4 mm. In small dense colonies on roots of *Achillea ptarmicifolia*. E Siberia (Maritime Terr.). Clearly it is closely related to *A. vandergooti*, and therefore we have transferred it to subgenus *Toxopterina*.

Aphis achyranthi Theobald

Apt. dull yellowish brown with dark brown SIPH and cauda, imm. yellow with white wax (David, 1958); BL 1.2–1.7 mm. Sec. rhin. in al. III 16–20, IV 9–12, V 3–5. Described from *Achyranthes* sp. in S India (Theobald, 1929), and there are samples from *A. aspera* in BMNH colln from Pakistan (leg. M.A. Ghani). David (1958) redescribed it from *Punica granatum* in S India, colonising tender shoots, not attended by ants, and dropping readily when disturbed. $2n=8$ (Kurl and Chauhan, 1986b).

Aphis acrita Smith

Apt. grayish pulverulent, with dark SIPH and cauda; BL 1.7–1.9 mm. On *Sedum* sp. in Ohio, USA. Mon. hol., with both apt. and al. males (orig. descr.).

Aphis affinis del Guercio

Apt. pale yellow (small specimens) to dark mottled green; BL 0.6–1.1 mm. On *Mentha* spp., usually clustered on stem apices, attended by ants. S Europe, S Russia, Middle East, India and Pakistan. Very small apt. (BL 0.57–0.83 mm) collected on *M. suaveolens* in Azores (BMNH colln, leg. F. Ilharco) are probably this species. Mon. hol. with apt. males (Tuatay and Remaudière, 1964). Ilharco (1987) redescribed apt. and al. vivip. $2n=8$.

Aphis (Protaphis) afghanica (Narzikulov and Umarov)

Apt. green with darker dorsal markings; BL c. 1.6 mm. On leaves and shoot apices of *Artemisia turanica* in Afghanistan.

Aphis agastachyos Hille Ris Lambers

Apt. broadly oval, dark green, BL 1.5–2.0 mm, curling leaves of *Agastache urticifolia* in USA (Idaho, Utah). Al. have large dark marginal and postsiphuncular sclerites. Apt. males and ovip. collected along with vivip. in July (orig. descr.), indicating that the life cycle may be abbreviated.

Aphis agrariae Bozhko

Apt. dark brown, lightly wax-dusted, with black dorsal abd. cross-bands and black appendages; BL c.2.2–2.3 mm. On *Euphorbia agraria*, colonising stems, flower stalks and leaves, in Ukraine.

Aphis albella Nevsky

Apt. white or pale yellow, with appendages only slightly dusky; BL c.1.8–2.1 mm. On undersides of leaves of *Cichorium intybus*, and also recorded in smaller numbers from *Portulaca*, *Hibiscus* and *Foeniculum officinale*. S Kazakhstan/Uzbekistan. Apart from the absence of pigmentation, which might be due to a genetic aberration or unusual environmental conditions, this species could be *A. gossypii*.

Aphis alchemillae Börner

Apt. are shiny, dark green to black, with pale legs and ant.; BL 1.2–2.2 mm. On *Alchemilla* spp. (*conjuncta*, *glaberrima*, *vulgaris*) colonising stems, petioles and undersides of leaves, and sometimes in inflorescences (Börner, 1952). Germany, Austria. [From examination of specimens in the BMNH collection there appear to be two *Aphis* species on *Alchemilla* under this name, one collected from ant shelters at the stem bases of an unidentified species in Austria (leg. R.N.B. Prior), and the other from *A. conjuncta* in Frankfurt Botanical Garden (leg. M. Mackauer). Further work is necessary to see whether either of these is *alchemillae* Börner.]

Aphis (Protaphis) alhagii Juchnevitch

Apt. dark green, wax dusted; BL c.1.7 mm. On *Alhagi pseudalhagi* in SE Kazakhstan.

Aphis aliena Theobald

Apt. green to dark green; BL 1.0–1.9 mm. Sec. rhin. in al. III 4–7, IV 0–3. On rhizomes and basal parts of *Teucrium* spp., esp. *scorodonia*, in ant shelters. Europe (England, Ireland, France, Spain, Portugal, Italy, Czech Republic) and Pakistan. Most pre-1983 records of this species are as *A. scorodoniae* (see Stroyan, 1984). There seem to be no clear morphological differences between these root-feeding populations and those of *A. teucrii* curling the apical leaves.

Aphis alstroemeriae Essig

Apt. color in life unknown, probably dark; BL 1.6–2.1 mm. Sec rhin. in al. III 5–11, IV 0–2. On an unidentified species of *Alstroemeria* (Chilean Lily) in Aconcagua Province, Chile. Remaudière (1994) redescribed the paratypes in the BMNH collection.

Aphis amaranthi Holman

Apt. dull olive green or reddish brown, BL 1.5–2.1 mm. On *Amaranthus* spp., colonising the roots and stem bases, and sometimes on the leaves or in the inflorescences, attended by ants. Al. have no dorsal abdominal sclerotisation except laterally and at bases of SIPH, and sec. rhin. III 8–22, IV 0–8, V 0–2, those on III being distributed irregularly (not in a row). Brazil, Cuba and USA (California – BMNH colln, leg. H. Walker, 1975, Florida – Halbert *et al.*, 2000, Georgia and Louisiana -trapped al. in BMNH colln). Life cycle unknown; most common in winter in Cuba. $2n=8$.

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Aphis (Protaphis) ancathiae Kadyrbekov

Apt. greenish marked with dark brown, SIPH black; BL 1.46–1.7 mm. On roots of *Ancathia igniaria* in Kazakhstan (Kadyrbekov, 2001b).

Aphis angelicae Lee and Seo, nec. Koch 1854

Apt. pale yellow; BL not recorded. On *Angelica decursiva*, in ant shelter on stem. Korea. Perhaps not an *Aphis*; apart from the 5-segmented ANT, it seems to have many features in common with the species described from *A. sinensis* in China under the name *Dysaphis angelicophaga* (q.v). [Note: if these two should prove to be synonymous, then *angelicophaga* becomes the valid name, as *Aphis angelicae* is preoccupied.]

Aphis (Protaphis) anthemiae (Ivanoskaya)

Apt. dark greenish, with slight gray wax film, SIPH black and cauda green; BL 1.7–1.8 mm. On roots of an *Anthemis* sp. in Azerbaijan, attended by ants.

Aphis (Protaphis) anthemidis (Börner)

Apt. color in life unrecorded; BL 1.4–2.0 mm. On roots of *Anthemis tinctoria* in C and E Europe. Mon. hol. with apt. males (Tashev, 1964a). Very similar to *A. carlinae* and *A. dudichi*; experimental work is needed to determine whether or not these are all distinct species.

Aphis antherici Holman (= *liliago* Müller)

Apt. dark bluish green, olive brown or reddish brown to black, with basal part of antennal flagellum, and tibiae for most of their lengths, whitish; BL 1.1–2.2 mm. Sec. rhin in al. III 8–21, IV 0–3. On basal parts of *Anthericum liliago*, living in ant shelters. Czech Republic, Germany. Mon. hol. with apt. or brachypt. males. Holman (1966) and Müller (1968a, as *A. liliago*) both gave full accounts of this aphid.

Aphis (Protaphis) anuraphoides (Nevsky)

Plate 7d

Apt. green to dark green, coated with mealy wax; BL 1.5–2.1 mm. Sec. rhin. in al. III 5–10, IV 0–2. On upper sides of leaves, stems and flowerheads, often in large numbers. On plants in several composite genera of tribe Cardueae (*Carthamus*, *Carduus*, *Cirsium*, *Cousinia*). Records from genera in other subfamilies of Compositae are likely to be misidentifications. Ukraine, S Russia and C Asia. Kadyrbekov (2001b) redescribed this species. Very similar to *A. carthami*.

Aphis apocynicola Holman

Apt. olive to brownish green with black head and SIPH, and pale cauda; BL 1.9–2.4 mm. Large colonies were found on the terminal parts of the shoots of *Apocynum scabrum* in Uzbekistan, and records of *A. apocyni* Koch from *Apocynum venetum* in Kazakhstan, Uzbekistan and Tadzhikistan are referable to this species. *A. apocyni* from China could be hot weather dwarfs of this species. Life cycle is unknown.

Aphis (Protaphis) aralensis (Kadyrbekov)

Apt. greenish, with dark brown head, dorsal markings, SIPH and cauda, covered with a slight gray wax film; BL 1.7–2.0 mm. On *Scorzonera parviflora*, at base of stem, attended by ants. S Kazakhstan (Kadyrbekov, 2001b).

Aphis araliaeradicis Strom

Apt. pale brown, BL c.1.6 mm. Sec. rhin. in apt. III 0–5, and in al. III 8–11. Described from *Aralia nudicaulis* in Wisconsin, USA, forming ant-attended colonies on roots and stem-bases. Also recorded from California (Smith and Parron, 1978). Presumably mon. hol., but males undescribed.

Aphis arbuti Ferrari

Apt. wine red; BL 1.7–2.7 mm. On woody Ericaceae (*Arbutus unedo*, *Erica arborea*) in S Europe. Close to *A. fabae* and only distinguishable by color in life and host association. Apparently mon. hol. (Barbagallo and Stroyan, 1982).

Aphis arctiumi Bozhko

Apt. yellow–green, wax-dusted; BL c.1.5 mm. On *Arctium tomentosum* in Ukraine.

Aphis agrimoniae (Shinji)

Apt. green, with pale legs and ant., BL 1.2–1.8 mm. Al. have dark ant. with sec. rhin. III 12–24, IV 9–17, V 4–8. On *Agrimonia* spp. in E Asia (Japan, Korea, E Siberia). Bozhko (1976a) described a similar aphid from *Agrimonia eupatoria* in Ukraine as a subspecies, *A. a. ucrainica*.

Aphis armata Hausmann

Apt. black in life, resembling *A. fabae*; BL 2.2–2.9 mm. On flower stems of *Digitalis* spp., vigorously attended by ants. In Europe, from UK to Italy (Barbagallo and Patti, 1998), Turkey, and introduced to B.C., Canada (BMNH colln, leg. C.-k. Chan). Distribution is uncertain, as morphology of parthenogenetic generations overlaps with that of long-haired members of the *A. fabae* group. Mon. hol., with ovip. having hind tibiae much less swollen than *A. fabae*. 2n=8.

Aphis artemisiphaga Holman

Apt. green or dark green, mottled, matt; BL 1.1–1.5 mm. At base of stem of *Artemisia* spp., attended by ants, in E Siberia.

Aphis artemisiphila Holman

Apt. green, similar to *A. artemisiphaga*; BL 1.5–1.8 mm. On roots of an unidentified *Artemisia* sp., attended by ants, in E Siberia. Holman (orig. descr.) noted that differences from *A. artemisiphaga* could be seasonal and require confirmation.

Aphis (Protaphis) artemisivora Holman

Apt. dull green, lightly wax-dusted, with a dark dorsal pattern; BL 1.9–2.4 mm. In ant-attended colonies on roots of an unidentified *Artemisia* sp. in Mongolia.

Aphis asclepiadis Fitch

Apt. pale green with short black SIPH; BL 1.4–2.3 mm. Sec. rhin. in al. III 22–35. On Asclepiadaceae in USA and Canada, and perhaps also on *Apocynum* spp. Closely related to, and difficult to separate from, *A. helianthi*, which may also occur on these plants. Many host and locality records of *asclepiadis* may be referable to *helianthi*, and in any case the distinction between these two species needs experimental confirmation. The specimens keyed as *asclepiadis* in this book all came from *Asclepias syriaca* in E Canada (Ontario, New Brunswick). There is also some confusion with *A. nerii* in the literature. 2n=8.

Aphis astericola Tissot

Apt. dark reddish brown with mainly dark appendages; BL c.1.7 mm. Sec. rhin. in al. III 7–9, IV 0, V 0. Only known from *Aster* sp. in Florida, USA.

Aphis astragali Ossiannilsson

Figure 16i

Apt. dull black, powdered with whitish wax; BL 1.9–2.7 mm. On *Astragalus* spp. in Sweden and Finland, where it is also recorded from *Oxytropis campestris*, and where ovip. and al. males are produced (on both host genera) as early as July (Heikinheimo, 1984). *A. masoni* on islands in subarctic Canada is possibly a synonym.

Aphis astragalicola Holman and Szelegiewicz

Apt. black, with middle parts of ant. and tibiae whitish; BL 0.9–1.2 mm. On *Astragalus* sp., ‘presumably living on the basal parts of the stems’ (from orig. descr.). In central Russia (Transbaikalia). Al. and sexual morphs unknown.

Aphis astragalina Hille Ris Lambers

Figure 16j

Apt. color in life unknown; BL c.2.4–2.5 mm. Described from a white-flowered leguminous plant in Montana, USA and *Astragalus* sp. in Alberta, Canada, and there are later records from *Astragalus pectinatus* in Alberta and from *Hedysarum alpinum* in Manitoba (Robinson, 1991) and Alaska (BMNH colln, leg. A.G. Robinson).

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Aphis aubletia Sanborn

Apt. undescribed, al. with black head and thorax and dusky to pale brown abdomen, SIPH concolorous with abdomen, and CAUDA 'black on distal half, hirsute' (orig. descr.); BL of al. c.1.3 mm. Sec. rhin. in al. III 7, IV 3, V 1. Colonising all the above-ground parts of *Verbena aubletia* (= *canadensis*) in May in Kansas, USA. Not recorded since original description.

Aphis austriaca Hille Ris Lambers

Apt. pale sea-green, darker marginally, with head and prothorax blackish green, very faintly pruinose; BL 1.6–1.9 mm. Sec. rhin. in al. (1 specimen) III 17–20, IV 4. On roots of *Silene* sp., probably *S. nutans*, in Austria. Ant-attended. Very closely related to *A. sambuci*, and possibly just a variant anhol. population of that species.

Aphis axyriphaga Pashtshenko

Apt. dark dingy-green, BL c.1.3 mm. Holotype apt. has a pair of dark irregular sclerotic patches on dorsal abdomen, leaving broad unsclerotised spinal band. Al. has 4 large sec. rhin. on III. On undersides of leaves of *Axyris amaranthoides* in E Siberia.

Aphis axyriradicis Pashtshenko

Apt. dark emerald green, BL c.1.7 mm. On roots of *Axyris amaranthoides*, attended by ants. Al. undescribed. E Siberia.

Aphis baccharicola Hille Ris Lambers

Apt. color in life unknown, BL 1.4–1.7 mm. Sec. rhin. in al. III 14–22, IV 0. On *Baccharis pilularis* and *Baccharis* sp. in western USA (California, Oregon). A member of the *A. helianthi* group, but with long, finely-pointed antennal hairs.

Aphis balloticola Szelegiewicz

Apt. dark gray–blue to mottled green; BL 1.0–2.0 mm. On stems and undersides of leaves of *Ballota* spp. causing slight downward leaf-curl in early summer (Stroyan, 1984). Also recorded from *Dracocephalum nutans* and *Marrubium* spp. Sec. rhin. in al. III 3–12, IV 0–3. Mon. hol., with al. males (Börner, 1950; Tuatay and Remaudière, 1964, as *Aphis ballota*). Throughout Europe (except Scandinavia), Morocco, and eastward to Crimea, Iran and Turkey. A member of the *A. frangulae* complex, difficult to distinguish except by biology and host plant.

Aphis berberidorum Ortego and Mier Durante

Apt. brown, with ant. and legs partly pale; BL 1.5–2.4 mm. Sec. rhin in al. III 6–12. On *Berberis* spp. in the S Andes (Chile and Argentina). Males are al. (Ortego and Mier Durante, 1997). Apparently a member of the *craccivora* group (subgen. *Pergandeida*).

Aphis berlinskii Huculak

Apt. matt brownish green to dark green, SIPH dark, cauda also dark but somewhat paler than SIPH; BL 1.1–1.4 mm. Sec. rhin. in al. III 6–8. On *Viburnum* spp., forming colonies on roots and underground runners, or tented over by ants. Only known from Poland. Mon. hol., with ovip. and apt. males in late Aug–Sept (orig. descr.).

Aphis berteroeae Szelegiewicz

Apt. with dark green abdomen, rest of body blackish green or blackish; BL 1.25–1.6 mm. Sec. rhin in al. III 3–5. In small, ant-attended colonies on roots of *Berberoa incana*, feeding on smaller roots 30–50 cm below the surface. Only known from Poland. Mon. hol., with apt. males (orig. descr.).

Aphis (Protaphis) betpakdalensis (Kadyrbekov)

Apt. dark greenish variably marked dorsally with dark brown, and a slight gray film of wax; BL 1.9–2.2 mm. On roots of *Taraxacum monochlamydeum*, attended by ants (Kadyrbekov, 2001b). Kazakhstan.

Aphis (Protaphis) bimacula (Narzikulov and Umarov)

Apt. dark green, wax-dusted, with dark brown head, ant., apices of femora and tibiae, and a pair of black patches on the dorsal abdomen between the short, dark SIPH; BL c.1.45 mm. Colonising apices of stems of *Campanula* sp. in Afghanistan.

Aphis bozhkoe Eastop and Blackman

(Replacement name for *A. eupatorii* Bozhko; Eastop and Blackman, 2005) Apt. yellowish with brown appendages; BL c.1.9–2.0 mm. Sec. rhin. in al. III 23–27, IV 12–15, V 4. On *Eupatorium cannabinum* in Ukraine (Bozhko, 1976a, as *A. eupatorii*).

Aphis brachychaeta Holman

Apt. reddish brown; BL 1.5–2.2 mm. Sec. rhin. in al. III 5–9, IV 0–2. On (probably) *Stellera chamaejasme*, colonising upper parts of roots and at bases of stems, attended and sheltered by ants. Mongolia. Presumed to be mon. hol.

Aphis brachysiphon Narzikulov

Apt. dark brown; BL 1.3–1.7 mm. On *Clematis orientalis* in C Asia (Iran, Tajikistan, Uzbekistan, Afghanistan; Remaudière and Remaudière, 1997).

Aphis breviseta Holman

Apt. bright yellowish green; BL 1.1–1.9 mm. Sec. rhin. in al. III 3–6, IV 0 (–1). On *Potentilla* spp., living on basal parts of stems and rhizomes, under earthen sheaths built by ants. In steppe localities in E Europe. Mon. hol. with apt. males (orig. descr.).

Aphis brevitarsis Szelegiewicz

Apt. dark green with black SIPH and CAUDA; BL 1.8–2.1 mm. On stem of a *Mentha* sp. in Mongolia.

Aphis brohmeri Börner

Apt. dark purplish brown, BL 1.5–2.6 mm. Immatures have no discrete pleural wax spots (cf. *fabae*). Sec. rhin. in al. III 9–18, IV 0–3. Colonies occur low down on stems and leaf sheaths of *Anthriscus sylvestris*, attended by ants. There are also records from some other Umbelliferae, e.g. *Heracleum* and *Pastinaca* (Chumak, 2004), *Carum* and *Seseli* (Ivanoskaya, 1977), although slide-mounted specimens may easily be confused with *A. fabae*, and it is possible that some natural hybridisation occurs. Widely distributed in N and C Europe, and W Siberia. Mon. hol., with apt. males (Heie, 1986).

Aphis brotericola Mier Durante

Apt. black, sometimes dusted with gray wax powder; BL 1.5–2.2 mm. Sec. rhin. in al. III 5–16, IV 0–5. Forming dense colonies on leaves of *Euphorbia* spp. in Spain, Italy (Barbagallo and Patti, 1998), France, Turkey and Morocco. Mon. hol. in Spain, with al. males (García Prieto *et al.*, 2001).

Aphis brunellae Schouteden

Apt. yellowish or whitish, sometimes with a mid-dorsal suffusion of dark green; BL 1.0–1.6 mm. On stems, in bracts of inflorescences and on undersides of leaves of *Prunella* spp., attended by ants. Widely distributed in Europe. Mon. hol. with apt. males; ovip. with markedly swollen hind tibiae bearing c.100 scent glands.

Aphis brunnea Ferrari

Apt. brown-black; BL 1.7–2.5 mm. On shoot apices of *Ononis* spp. (especially *natrix*) in the Mediterranean area and Middle East. Also recorded from *Anthyllis cytisoides* (Nieto Nafria *et al.*, 2005). 2n=8.

Aphis bupleuri (Börner)

Apt. brown covered with grayish-white wax powder; BL 1.3–1.9 mm. On stems, lateral shoots and inflorescences of *Bupleurum* spp. in Europe (France, Spain, Germany, Poland, Italy, Hungary, Czech Republic, Rumania, Ukraine). One of a group of closely related wax-covered *Aphis* species on *Bupleurum*, the others being *caroliboerneri*, *funitecta* and *talgarica*. Nieto Nafria *et al.* (1986) tabulated morphological differences, and Kadyrbekov (2001a) provided a key. Mon. hol. with al. males, and ovip. with strongly swollen

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hind tibiae bearing more than 200 scent glands. *A. bupleurisensoriata* Bozhko is a synonym (Kadyrbekov, 2001a).

Aphis cacaliasteris Hille Ris Lambers

Apt. plump-bodied, matt gray-black with black appendages; BL 2.0–3.1 mm. Sec. rhin in apt. III 0–20, IV 7–15, V 0–3, in al. III 23–40, IV 12–20, V 0–3. On *Senecio* spp. and related genera of tubuliferous Compositae (*Adenostyles*, *Doronicum*) in S and C Europe. Mon. hol., with ovip. and al. males in July–Sept. Lampel (1984) gave a full account.

Aphis calaminthae (Börner)

Apt. color and BL not recorded. In loosely rolled leaves and inflorescences of *Calamintha officinalis* in S Germany and Austria. Specimens from *Acinos arvensis* in Czech Republic (BMNH colln, leg. H.L.G. Stroyan) may also be this species, and are included in the key to apt. on *Clinopodium*, etc. as '*A. ?calaminthae*'.

Aphis callunae Theobald

Apt. plump-bodied, blackish, brownish violet or dark brown, with wax powder on dorsum arranged in hexagonal fields, and dark brown to black appendages; BL 1.0–1.5 mm. Immatures are greenish. Al. have rhin. distributed ANT III 3–7, IV 0–3. On terminal shoots and inflorescences of old, straggly plants of *Calluna vulgaris*, well-camouflaged and easily overlooked. In N and W Europe, and also recorded from B.C., Canada. Mon. hol. on *Calluna*, with ovip. and al. males in Sept in N Germany (al., and brachypt. and apt. males, were obtained in culture; Müller, 1976b).

Aphis (Zyxaphis) canae Williams

Figure 12v

Apt. are green with darker head and dorsal abdominal patch or mottling, and white wax markings including a transverse band on anterior abdomen; BL c.1.6 mm. On stems and leaves of *Artemisia* and *Seriphidium* spp. in western USA (see Palmer, 1952). There is some confusion in the literature with *A. hermistonii* and *A. oregonensis*, but the three species seem separable by the key characters given.

Aphis cari Essig

Apt. transparent white, yellow or pale yellowish green with distinctive dark green dorsal markings, including a transverse bar between SIPH; BL c.1.7 mm. Sec. rhin. in al. III 15–50, IV 0–4. On stems of *Carum kelloggii*, and also recorded from *Angelica tomentosa*, in California, USA. Only known from original description, and it seems possible that these are hot weather dwarfs of *Aphis helianthi* (q.v.).

Aphis (Protaphis) carlinae (Börner)

Apt. dark blue–green; BL 1.5–2.1 mm. On rosette leaves of *Carlina* spp. in C and E Europe. Mon. hol. Tashev (1964a) redescribed this species, incl. ovip.; it is very similar to, and possibly synonymous with, *A. dudichi*.

Aphis caroliboerneri (Remaudière)

Apt. gray covered with dense waxy secretion; BL 1.0–1.3 mm. In small colonies on flowerheads of *Bupleurum fruticosum*. Only known from France and Spain.

Aphis (Protaphis) carthami (Das)

Apt. dark green or reddish brown coated with grayish white wax, and often there are a pair of dark spots on dorsal abdomen just anterior to SIPH; BL 1.6–2.3 mm. Sec. rhin. in apt III 0–6, IV 0–2, in al. III 5–7, IV 2–3. On stems and flowers of *Carthamus tinctorius* and other *Carthamus* spp., attended by ants. N Africa, Lebanon, Iran, S Kazakhstan, Pakistan. Specimens in BMNH colln from *Atractylis flava* and *Hedypnois rhagadioloides* in Egypt and from *Cirsium lanceolatum* in N Yemen also may be this species, although these are intermediate in some respects between *carthami* and *anuraphoides*. N African records of *anuraphoides* and *pseudocardui* from *Carthamus* are possibly referable to *carthami*. *A. echinopsis* on *Echinops* is very similar and possibly a synonym.

Aphis caryopteridis Holman

Apt. dark green with dark SIPH and cauda; BL 1.0–1.5 mm. Sec. rhin. in al. III 3–5. On stems of *Caryopteris mongholica*, ant-attended. Mongolia.

***Aphis ceanothi* Clarke**

Apt. dull reddish or amber-brown, with black head and black markings posterior to SIPH; BL 1.0–2.0 mm. On flower stems and leaves of *Ceanothus* spp. in western USA and Canada; also found (in California) on *Noltea africana* (BMNH, leg. E.O. Essig). Sec. rhin. in al. III 11–26, IV 0–3. Mon. hol.; ovip. and apt. males were collected in Sept in Manitoba, Canada (BMNH colln, leg. A.G. Robinson).

***Aphis celastrii* Matsumura (Synonym of *spiraecola* acc. to Moritsu, 1983)**

Apt. 'dark brown with a greenish shade' according to the original description. There is doubt about the identity of this species. The name has since been applied to yellow-green aphids on *Celastrum*, *Deutzia*, *Ilex* and *Polygonum* in Japan (Higuchi and Miyazaki, 1969) and Korea (Lee *et al.*, 2002c) which, according to the description given by Takahashi (1966), and slides in the BMNH colln determined as *celastrii* by Takahashi, are not clearly distinct from *A. spiraecola*.

***Aphis cephalanthi* Thomas**

Apt. dark purplish brown to almost black, lightly wax-dusted; BL 0.9–1.7 mm. Sec. rhin. in al. III 9–15, IV 0–5. On leaves, stems and flowerheads of *Cephalanthus occidentalis*, widely distributed in N America, and also in Cuba (as *Schizaphis* sp.; Holman, 1974b). Well-developed marginal tubercles are present on most segments and, atypically for an *Aphis*, the tubercles on abdominal tergite 7 are posterior to, and on a level with, the spiracles. Ovip. and al. males in late Sept (in New York; BMNH colln, leg. L.L. Pechuman).

***Aphis cerastii* (Börner)**

Apt. dark gray, BL 1.2–1.6 mm. On subterranean parts of *Cerastium arvense* in Germany. Males are apt.

***Aphis cercocarpi* Gillette and Palmer**

Apt. shining greenish black with ant. and legs mainly pale, and SIPH and cauda black; BL 1.3–2.0 mm. On leaves and twigs of *Cercopus montanus* in W USA (California, Colorado).

***Aphis chilopsidi* Davletshina**

Apt. pale green to dark greenish brown, wax-dusted, with dark SIPH and pale cauda; BL c.1.6–1.7 mm. In small colonies on leaves and petioles of *Chilopsis linearis* in Uzbekistan.

***Aphis chloris* Koch**

Apt. pale green or lemon yellow, occasionally darker green, with dark head, apices of ant. and legs, and SIPH; BL 1.0–1.9 mm. Sec. rhin. in al. III 5–9, IV 0–2. On *Hypericum* spp., usually living in ant-attended colonies at stem bases just below soil surface, occasionally on aerial parts. Widespread in Europe, across Asia to China, and introduced for control of *Hypericum perforatum* to S Africa (Durr, 1983) and Australia (Briese and Jupp, 1995). Mon. hol., with apt. males. Wilson (1938) made one of the earliest studies of induction of sexual morphs using this species. 2n=8.

***Aphis (Protaphis) chondrillae* (Mordvilko in Tarbinsky and Plaviltchikov)**

Apt. dark green with slight gray wax film, with black SIPH and dark brown dorsal markings; BL 1.8–1.9 mm. On roots or subterranean stems of *Chondrilla* sp., ant-attended. S Kazakstan (Kadyrbekov, 2001b).

***Aphis (Zyxaphis) chrysothamni* Wilson**

Figure 21j

Apt. have wine-colored head and pale green to pinkish abdomen with (usually) a dark spot anteriorly, and some wax at the end; BL 1.0 (summer dwarfs)–2.4 mm. Sec. rhin. in al. III 4–10, IV 0–5, V 0.1. On *Chrysothamnus nauseosus* in western N America. Ovip. and apt. males in late Sept in Utah (BMNH colln, leg. G.F. Knowlton).

***Aphis (Zyxaphis) chrysothamnicola* (Gillette and Palmer)**

Figure 21k

Apt. dusky reddish brown or dull blackish green with dark bands on posterior abdomen; BL 1.7–2.1 mm. Sec. rhin. in al. III 3–7. On leaves and stems of *Chrysothamnus nauseosus* in western USA (Rocky Mountain region). Ovip. and apt. males in Oct.

***Aphis ciceri* Müller**

Figure 16h

Apt. dark green, appearing black, shiny on dorsum; BL 2.2–2.6 mm. On lower part of stem of *Astragalus ciceri*, just above the soil surface, attended by ants. Only known from Germany (Jena). Ovip. and apt. males were obtained in Sept–Oct (orig. descr.).

***Aphis cimicifugae* Holman**

Apt. grass green with black SIPH and CAUDA; BL 1.8–2.3 mm. Sec. rhin. in al. III 3–10. On *Cimicifuga dahurica*, on upper parts of stems and in inflorescences, attended by ants; also recorded from *Actaea* sp. (Pashtshenko, 1994b). In E Siberia.

***Aphis cirsiioleracei* (Börner)**

Apt. brownish gray, lightly wax-dusted; BL 1.2–1.6 mm. On basal parts, and later in upwardly rolled leaves of *Cirsium* spp., in C and E Europe (Germany, Switzerland, Czech Republic, Poland). Mon. hol. according to Börner (1952). It has been suggested that *A. viridescens* Bozhko, described from *Cirsium elodes* in Ukraine is a synonym, although Bozhko's species was pale green in life.

***Aphis cirsiphila* Pashtshenko**

Apt. color in life unknown; BL c.2 mm. In dense colonies on leaves and stems of *Cirsium* spp. in E Siberia. Mon. hol.

***Aphis cisticola* Leclant and Remaudière**

Apt. yellow to bluish green, with light dusting of wax, dark apices to legs and ant., and black SIPH and cauda; BL 1.0–1.8 mm. Sec. rhin. in al. III 3–7. On young growth of *Cistus* spp. and *Halimium* spp., forming dense colonies on leaves, shoots and flower stems, attended by ants). Nieto Nafria *et al.* (2005) also record it from four *Helianthemum* spp. In S France, Corsica, Italy, Portugal and Spain.

***Aphis clematicola* Pashtshenko**

Apt. yellow–green, wax-dusted; BL c.1.5 mm. On *Clematis fusca* in E. Siberia, forming large dense colonies on undersides of leaves, attended by ants.

***Aphis clematidis* Koch**

Apt. dark olive green with a blackish spinal stripe, marbled with white wax powder; BL 1.7–2.3 mm. Smaller, paler specimens may occur in midsummer. On young shoots, flower stems and leaves of *Clematis* spp. in C and S Europe. Pigmentation and length of SIPH show great variation, and there has been confusion with *A. vitalbae*; reliable differences from that species are the longer pointed hairs on the appendages and longer hind tarsal segment II (Tashev, 1964b). Mon. hol. (Börner, 1952). 2n=8.

***Aphis clematiphaga* Pashtshenko**

Apt. bright green and dark green, without wax markings; BL c.2.2 mm. On stems, flower shoots and undersides of leaves of *Clematis* spp. in E Siberia. Mon. hol. Visited by ants.

***Aphis clerodendri* Matsumura**

Apt. straw-colored to bright yellow green or olive-green; BL 1.1–1.9 mm. On *Clerodendron* spp. in E Asia (Japan, Korea, Vietnam, Taiwan, Philippines, Papua/New Guinea) and Australia (Carver *et al.*, 2003), forming loose leaf pseudogalls. Sec. rhin. in al. III 3–8. Very close to *A. gossypii*, and the characters that separate the two species in E Asia may not be reliable for other parts of the world. Takahashi (1966) described a subspecies, *A. clerodendri amamiana*, specific to *C. yakusimense* in Japan, but this seems indistinguishable from *A. gossypii*. 2n=8.

***Aphis cliftonensis* Stroyan**

Apt. rather bright pale green; BL 0.8–1.2 mm. On roots of *Helianthemum nummularium*, in ant shelters. In England and Sweden (BMNH coll. VFE). Mon. hol. with apt. males (Stroyan, 1984).

***Aphis clinepetae* Pashtshenko**

Apt. pale yellow-green or dark green, usually wax-dusted; BL c.1.5 mm. Sec. rhin. in al. III 9–18, IV 2–6, V 0–2. In small, dense colonies on stems and flowers of *Nepeta manchuriensis*, and more rarely on

Clinopodium chinense, in E Siberia. [Aphids from *Calamintha multiflora* in Crimea (BMNH colln, leg. J. Holman) have apt. intermediate in morphology between this species and *clinopodii*, but include an al. with sec. rhin. distributed III 8 and 11, IV 3 and 3, so are possibly this species.]

***Aphis clinopodii* Passerini**

Apt. blackish green; BL 0.9–1.3 mm. Sec. rhin. in al. III 2–5. Curling and distorting terminal leaves of *Clinopodium* spp. in Europe (England, France, Spain, Italy, Germany, Poland, Austria, Czech Republic, Ukraine). Also recorded from *Calamintha sylvatica*. One of a closely-related group of European species on Labiatae, and very similar to *A. serpylli* (but with a longer ANT PT) and *A. origani* (but with shorter SIPH). Mon. hol. Several colonies in SE England were all attended by the ant *Myrmica sabuleti* (Wood-Baker, 1979). 2n=8.

***Aphis clydesmithi* Stroyan**

Apt. dull green; BL 1.1–1.3 mm. Sec. rhin. in al. III 2–3. On *Sanicula canadensis*, living at base of stem and on root collar, attended by ants. N Carolina, USA.

***Aphis coffeata* Mamontova**

Apt. coffee brown with pale CAUDA; BL c. 1.8 mm. Sec. rhin. in al. (one specimen) III 12–13, IV 0–2. In colonies on stems and in flowerheads of *Melampyrum nemorosum* in Ukraine.

***Aphis comari* Prior and Stroyan**

Apt. blue-green, very dark green or bluish black; BL 1.0–1.9 mm. Sec. rhin. in al. III 4–8. On shoots or leaves of *Potentilla palustris* growing in sphagnum bogs, sometimes in ant shelters built from plant debris. In N and NW Europe (UK, Denmark, Finland, Poland). Mon. hol., with apt. and brachypt. males (orig. descr.).

***Aphis comosa* (Börner)**

Apt. brown with shining black dorsum, antennal flagellum and middle sections of tibiae pale; BL 1.5–2.4 mm. Sec. rhin. in al. III 4–9. On *Melilotus albus* and *Lathyrus pratensis* in Europe (France, Germany, Austria, Italy, Spain). Some records may apply to *A. pseudocomosa* (q.v.). Redescribed by Hoffmann (1972).

***Aphis confusa* Walker**

Apt. pale yellow, yellowish green, green or dark green, depending on location on host; BL 1.0–2.3 mm. Sec. rhin. in al. III 3–7, IV 0–1. On *Knautia* and *Scabiosa*, occurring both as larger green or dark green aphids on upper parts of stems and inflorescences, or in summer as smaller and paler yellow or yellowish green specimens on undersides of leaves, at base of stems or on roots (Heie, 1986). Ant-attended. Widely distributed in Europe. Mon. hol., with apt. males. A very variable species, and there is no reliable way of distinguishing it morphologically from the equally variable polyphagous *A. gossypii*, which may sometimes occur on Dipsacaceae. *A. gossypii* is, however, unlikely to occur on basal parts of the plant, and is less assiduously ant-attended. In *A. gossypii* there is also usually more contrast between the pigmentation of SIPH and cauda.

***Aphis coprosmae* Laing**

Apt. wax-covered in life (VFE, unpubl. data); BL c. 1.6 mm. Al. remarkable in having III with only 0–1 sec. rhin. On *Coprosma* in New Zealand (Cottier, 1953). Mon. hol.; eggs are laid on stem of plant and hatch in Sept.

***Aphis coreopsidis* (Thomas)**

Plate 6c

Apt. bright yellow to yellow green with black ant. and SIPH; BL 1.5–1.8 mm. On leaves and flower stalks of various Compositae (*Bidens*, *Clibadium*, *Coreopsis*, *Eupatorium*, etc.), Malvaceae (*Hibiscus*, *Sida*) and Labiatae (*Blephilia*, *Nepeta*) in N, Central and S America, and al. have been trapped in Ghana and Uganda. Host-alternating to *Nyssa sylvatica* in N America (Hottes and Frison, 1931); populations elsewhere are presumably anhol.

***Aphis coridifoliae* Mier Durante and Ortego**

Apt. pale or greenish yellow powdered with white wax, with brown-black SIPH and CAUDA, and frequently with dark brown intersegmental markings on dorsal abdomen; BL 1.0–1.7 mm. Sec. rhin. in al. III 4–8. In

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small dense colonies on *Baccharis coridifolia*, and perhaps on other *Baccharis* spp., in Argentina (Mier Durante and Ortego, 1999).

Aphis coronillae Ferrari

Apt. dark brown to brownish green with shiny black dorsal shield (not wax-powdered); BL 1.3–2.2 mm. Sec. rhin. in al. III 3–9, IV 0–2. Living on basal parts of certain Leguminosae (*Coronilla*, *Trifolium*, *Medicago*), sheltered by ants. Widely distributed in Europe. Mon. hol., with males (mostly apt., occasionally brachypt. or al.) and ovip. appearing in Sept. Hoffmann (1968) studied host relationships and described populations on *Medicago lupulina* as a subspecies (*A. coronillae arenaria* Hoffmann, as *scaliai* ssp.). Stroyan (1984) discussed morphological variation in relation to geography and host plant. *A. yangbajaingana* Zhang, in Tibet on *Medicago*, is very similar but has shorter, thicker SIPH.

Aphis coronopifoliae Bartholomew

Apt. green, BL 1.4–1.7 mm. Sec. rhin. in al. III 11–17, IV 2–7. On *Cotula coronopifolia* in California, USA. It seems likely, as suggested by Cook (1984a), that this species is *A. mimuli* (q.v.).

Aphis (Bursaphis) costalis Cook

Apt. color in life unknown, probably pale; BL 1.5–1.8 mm. On *Mimulus* spp. in California, USA (Hille Ris Lambers, 1974, as *mimuli* Oestlund). Life cycle unknown; it is a member of the *oenotherae* group, which typically host-alternate between *Ribes* and Onagraceae.

Aphis cottieri Carver

Apt. brown-black, shining; BL 2.2–2.7 mm. Al. without sec. rhin. On *Muehlenbeckia* spp. in New Zealand. Ovip. in April, males unknown (Carver, 2000).

Aphis (Protaphis) cousinia (Kadyrbekov)

Apt. dark greenish with slight gray film; BL 1.6–2.3 mm. On roots of *Cousinia alata*, attended by ants (Kadyrbekov, 2001b). In C Asia (S Kazakhstan). Closely related to *A. (P) terricola*.

Aphis coweni Palmer

Apt. lead-gray to greenish black; BL 1.4–2.0 mm. Sec. rhin. in al. III 15–22, IV 2–7. On leaves of *Veratrum* spp. (*californicum*, *viride*) in western N America, and apparently also on various *Veratrum* spp. in E Siberia (Pashchenko, 1988a, as *A. veratri*).

Aphis craccae L.

Apt. black, covered in gray wax powder; BL 1.9–2.8 mm. Sec. rhin. in al. III 7–13. Living in often dense, ant-attended colonies on terminal growth, flowers and seed-pods of vetches (*Vicia* spp., especially *V. cracca*). Records from other hosts may be based on confusion with other ‘black-backed’ Aphis species. Widely distributed in Europe, eastward to China, Japan and Korea, and also in north-eastern USA and Canada. Ovip. and al. males appear in Sept (Heie, 1986).

Aphis craccivora Koch

Plate 6d, Figure 41k

Apt. shining black, imm. lightly dusted with wax; BL 1.4–2.2 mm. Sec. rhin. in al. III 3–8. Colonising young growth of numerous plants, particularly Leguminosae; plants in other families tend to be colonised more in dry season. A major pest of leguminous crops (Blackman and Eastop, 2000). Worldwide, but particularly common in warm temperate and tropical regions. Anhol. almost everywhere, but mon. hol. populations (with al. males) recorded from Germany and India. A long-haired variant in E Asia is distinguished as a subspecies, *A. craccivora* ssp. *pseudoacaciae* Takahashi (1966). 2n=8.

Aphis crassicauda Smith and Eckel

Apt. reddish tan to light brown, dusted with wax; BL 1.1–2.1 mm. Sec. rhin. in al. III 7–14. On *Viburnum* spp. in N Carolina, USA. Mon. hol., with ovip. and apt. males in Sept–Oct (orig. descr.).

Aphis crepidis (Börner)

Apt. dark bluish green to yellow–green, not wax-powdered; BL 1.15–1.95 mm. On *Crepis* spp., living in ant shelters at base of plant, and also once found on *Picris echioides* (in Italy: BMNH colln, leg. H.L.G.

Stroyan and D. Hille Ris Lambers). In W, C and S Europe, including Iberian peninsula. Mon. hol.; ovip. in Sept, males apparently undescribed. $2n=8$.

Aphis curtisetata Holman

Apt. green to dark green; BL 1.0–1.7 mm. On *Hieracium* spp., living mostly on basal parts of plants, and in early summer on inflorescences. Ant-attended. In Austria, Czech Republic, Slovakia, Bulgaria, Moldova and Ukraine. Mon. hol., with apt. males (Holman, 1998).

Aphis cuscutae Davis

Apt. pale green, thinly wax-dusted; BL 1.5–2.1 mm. Al. have antennal segment III swollen with numerous tuberculate sec. rhin. Described from *Cuscuta epithymum* growing on alfalfa in Utah, USA, and also found on *Cuscuta* sp. on *Rhus laurina* in California (BMNH colln, leg. R.C. Dickson).

Aphis cytisorum Hartig

Apt. black, dark brown or very dark green, usually densely covered in gray wax powder; BL 1.5–2.8 mm. Common on foliage and developing seed pods of woody Leguminosae (*Laburnum*, *Cytisus*, *Spartium*, etc.) in Europe, and also widespread in N America. Sec. rhin. in al. III 6–9, IV 0, V 0 in *A. cytisorum* s. str., and III 5–9, IV 0–2, V 0–1 in *A. cytisorum* ssp. *sarothamni* Franssen, which occurs on *Cytisus scoparius* in Europe. Stroyan (1984) compared morphometric parameters of the two subspecies. Apt. are almost impossible to separate, but ovip. of *sarothamni* have more swollen hind tibiae than *cytisorum*, with many more scent glands. Males are al. There is a complex of closely-related species on woody Leguminosae in Europe, including others with very similar apt. on *Cytisus* and *Chamaecytisus* (*A. pseudocytisorum*, *A. zweigelti*). $2n=8$ (both subspecies).

Aphis danielae Remaudière

Apt. black; BL 1.6–2.5 mm. On *Lycium* spp. in Chile and Argentina. In Chile colonies also occur regularly on flower buds of a cactus, *Echinopsis chilensis* (Heie *et al.*, 1996). Mon. hol., with ovip. and apt. males in April (Remaudière and Ortego, 1998).

Aphis dasiphorae Holman

Apt. reddish brown, powdered with grayish wax; BL 1.2–2.4 mm. Sec. rhin. in al. III 4–10. In dense colonies on terminal parts of shoots of *Potentilla* (as *Dasiphora*) spp. in E Russia and Mongolia. Apparently mon. hol.

Aphis davletshinae Hille Ris Lambers (= *althaeae* Nevsky)

Apt. pale green, BL 1.6–1.8 mm, on undersides of leaves and stems of *Alcea* and *Althaea* spp., often forming large colonies which curl leaves and stunt young growth. Nevsky (1929, as *althaeae*) also recorded it from *Malva* and *Convolvulus*. In Europe (Germany, Poland, Russia, Spain, ?Sweden, Canary I.) and SW and C Asia (Iran, Turkey, Lebanon, Kazakhstan, Uzbekistan). Mon. hol. (Börner and Heinze, 1957).

Aphis debilicornis (Gillette and Palmer)

Apt. dark olive buff; BL 1.6–2.1 mm. In curled leaves and on stems of *Helianthus* spp., widely distributed in USA. Mon. hol., with ovip. and al. males in Sept (in Colorado; Palmer, 1952).

Aphis decepta Hottes and Frison

Apt. yellow with dark dorsal markings posterior to SIPH, dark brown SIPH and brown CAUDA; BL 1.4–2.2 mm. Sec. rhin. in al. III 37–48, IV 0–4. On undersides of leaves of *Pastinaca sativa* (a European plant) in north-east USA (Illinois, New York, Pennsylvania) and on *Heracleum lanatum* in Manitoba, Canada (Rojanavongse and Robinson, 1976).

Aphis (Protaphis) delottoi (Eastop)

Apt. color in life unknown, probably dark green or brown dusted with wax; BL 1.5–1.8 mm. Sec. rhin. in apt. III 0–4, in al. III 9–13, IV 0–4. On *Pluchea dioscoridis*, probably at base of plant with ants. In Eritrea, and possibly Nigeria (Eastop, 1961a).

Aphis dianthiphaga Pashtshenko

Apt. dark emerald green, BL c.1.4–1.5 mm. In small to medium-sized colonies feeding at bases of stems of *Dianthus repens* in E Siberia.

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Aphis diluta Pashtshenko

Apt. pale or bright green; BL c.1.8 mm. Sec. rhin. in al. III 11–25, IV 9–17, V 5–12. On stems and under leaves of *Potentilla supina*, forming large, loose colonies, and sometimes causing leaf deformation. Possibly also on *Geum aleppicum*. E. Siberia.

Aphis dlabolai Holman

Apt. color in life unknown, probably black dusted with whitish wax; BL 1.8–2.4 mm. Sec. rhin. in al. III 6–13, IV 0. On *Euphorbia* sp. in Iran.

Aphis droserae Takahashi

Apt. greenish black, with appendages mainly dark; BL 1.0–1.2 mm. On flowers and undersides of leaves of *Drosera* spp. in China and Taiwan (Tao, 1991).

Aphis duckmountainensis Rojanavongse and Robinson

Apt. black; BL 2.0–2.4 mm. Sec. rhin. in apt. III 3–26, IV 10–20, V 0–6, in al. III 44–53, IV 14–22, V 3–8. On terminal growth of *Senecio pauperculus* in Manitoba, Canada.

Aphis (Protaphis) dudichi (Börner)

Apt. color in life unrecorded; BL 1.5–2.0 mm. On roots of *Matricaria* and *Trichopleurospermum* spp. in C and E Europe. Börner's material was redescribed by Tashev (1964a), who gave some possible differences from the very similar *A. anthemidis*, but these could be host-related, and it has been treated in catalogs as a synonym. However, it resembles *A. carlinae* even more closely, and further work is needed to establish whether one, two or three species are involved.

Aphis ecbalii Rusanova

Apt. yellow–brown or dirty yellow, with dark SIPH and yellow CAUDA; BL 1.9–2.1 mm. Sec. rhin. in al. III 8–13, IV 1–3. In colonies on leaves and shoots of *Ecballium* in Azerbaijan. Probably a member of the *frangulae* group; the description does not allow apt. to be differentiated from those of *A. gossypii*.

Aphis (Protaphis) echinopsis (Hille Ris Lambers)

Apt. color in life unrecorded, probably dark green with some wax; BL 1.2–2.2 mm. Sec. rhin. in apt. absent, in al. III 6–10, IV 0–1. On stems and leaves of *Echinops spinosus*, and possibly other *Echinops* spp., in NE Africa (Egypt, Eritrea, Ethiopia) and Middle East (Israel, Yemen). Records of *A. anuraphoides* and *A. pseudocardui* on *Echinops* in this region should perhaps all be referred to this species. However, the distinction from *A. carthami* on *Carthamus* is unclear, and *A. (P.) echinopsicola* (Kadyrbekov), described from *Echinops albi-caulis* in C Asia, seems to be intermediate in morphology between *A. echinopsis* and *A. terricola*.

Aphis egomae Shinji

Apt. pale yellow to yellow-green or orange, with black SIPH; BL small, unrecorded. Sec. rhin. in al. III 3–6. On *Perilla frutescens* and *Salvia splendens*, feeding on undersides of young leaves and causing severe leaf-curl. Japan (Moritsu, 1983) and S Korea (Lee *et al.*, 2002c).

Aphis (Protaphis) elatior (Nevsky)

Apt. dark green, with a fine blue pruinose covering, black eyes (cf. *elongata*) and black transverse bands on posterior abdomen; BL 1.5–2.0 mm. Described from roots of *Artemisia annua*, and subsequently recorded from other *Artemisia* and *Seriphidium* spp. Records from various other Compositae (Ivanoskaya, 1960; Narzikulov *et al.*, 1971) should probably be referred to other *Protaphis* spp. Ant-attended. In Russia and Central Asia (Kadyrbekov, 2001b).

Aphis elatinoidei Nevsky

Apt. pale green; BL 1.2–1.6 mm. On *Elatinoidea elatiae* in Uzbekistan (see also Davletshina, 1964).

Aphis elegantula Szelegiewicz

Apt. green mottled with darker green, with black SIPH and cauda; BL 1.75–2.1 mm. Sec. rhin. in al. III 3–6, IV 0–1, V 0–1. On *Polygonum angustifolium* in Mongolia (Szelegiewicz, 1964a).

Aphis (Protaphis) elongata (Nevsky)

Apt. glaucous green with blue-gray pruinose covering, dark head and black markings on thorax. Eyes red (cf. *elator*). BL 1.4–1.7 mm. On roots and subterranean stems of *Artemisia* and *Seriphidium* spp., attended by ants. Uzbekistan, SE Kazakhstan, and Iran (BMNH colln, leg. R. van den Bosch). Records of this species from W Siberia and Denmark are possibly ascribable to *A. miranda* (Kadyrbekov, 2001b).

Aphis (Bursaphis) epilobiaria Theobald

Apt. reddish brown to very dark blackish brown or blackish green, with a striking pattern of dense pleural wax bands across the dorsum, except for a spindle-shaped mid-dorsal clear area; BL 2.1–2.7 mm. Sec. rhin. in al. III 8–13, IV 2–8, V 0–2. On shoot apices and inflorescences of *Epilobium hirsutum*, and occasionally other *Epilobium* spp., in Europe (Stroyan, 1984; Heie, 1986). Mon. hol., with ovip. and al. males in Sept. 2n=8.

Aphis (Bursaphis) epilobii Kaltenbach

Apt. brown or greenish black, rather more uniformly wax-powdered than *A. epilobiaria*, and smaller; BL 1.3–2.1 mm. Sec. rhin. in al. III 9–20, IV 3–10, V 0–4. On upper parts of stems, flowerheads and undersides of upper leaves of *E. montanum*, and more rarely other species such as *E. lanceolatum*. Usually without ant attendance. Widespread in Europe. Mon. hol., with ovip. and al. males in Sept. 2n=8.

Aphis epipactis Theobald

Apt. very dark green, almost sooty black; BL c.1.3–1.7 mm. On *Epipactis* spp. in Europe. There are no satisfactory distinguishing characters, and possible synonymy have been suggested with *A. fabae* (Börner, 1952) or, more likely because of the long hairs and frequent presence of marginal tubercles on ABD TERG 2–4, *A. ilicis* (Eastop and Hille Ris Lambers, 1976) or *A. viburni* (Stroyan, 1984); *Epipactis* possibly acts as a reserve host for various members of the *A. fabae* group.

Aphis equiseticola Ossiannilsson

Apt. light green or dark green: BL 1.4–2.0 mm. Sec. rhin. in al. III 8–11, IV 0–5, V 0. On *Equisetum silvaticum* in N Europe (Sweden, Germany). Presumably mon. hol., with al. males in early Aug (Heie, 1986).

Aphis (Protaphis) erigerontis Holman

Apt. dark green dusted with bluish gray wax; BL 1.5–1.9 mm. Sec. rhin. in al. III 27–32, IV 10–15, V 7–13, VI 3–4. In ant shelters on root collar and roots of *Erigeron acer*. Czech Republic. Mon. hol., with apt. males (orig. descr.).

Aphis eryngiglomerata Bozhko

Apt. greenish black, dusted with wax powder; BL 1.6–2.2 mm. Sec. rhin in al. III 5–15, IV 0–3. In ant-attended colonies on *Eryngium* spp. in E Europe (Czech Republic, Poland, Ukraine).

Aphis esulae (Börner)

Apt. pale brown, sometimes blackish dorsally especially behind and between SIPH; BL 1.8–2.3 mm. Sec. rhin. in al. III 9–12. On *Euphorbia esula*, and possibly on other *Euphorbia* spp., in Austria, Bulgaria and Hungary. A member of the difficult *A. euphorbiae* group, distinguished in Börner's very brief original description by its short hairs and association with *E. esula*. Szelegiewicz (1962) provided a redescription on the basis of specimens from Bulgaria, and his interpretation is followed here. However, populations of *A. euphorbiae* group with short hairs are not restricted to *E. esula*, and this plant may also be colonised in W Europe by aphids with typical *A. euphorbiae* morphology, so further work is needed.

Aphis etiolata Stroyan

Apt. pale yellowish, whitish or bluish green; BL 1.4–2.0 mm. Sec. rhin. in al. III 3–5. On roots of *Rumex acetosella* and *R. bucephalophorus* in ants' nests, rather deep in soil. In Europe (England, Netherlands, Sweden, Poland, Czech Republic, Spain). Mon. hol., with apt. males.

Aphis eugeniae van der Goot

Apt. orange-yellow to brownish-orange with black SIPH and CAUDA; 1.4–1.6 mm. Most commonly on Euphorbiaceae, with a preference for woody species (*Glochidion*, *Breynia*, *Phyllanthus*), but plants in other

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families may be colonised, e.g., Compositae (*Chromolaena*, *Clibadium*), Convolvulaceae (*Convolvulus*), Dipsacaceae (*Dipsacus*), Malvaceae (*Hibiscus*) and Myrtaceae (*Eugenia*). Throughout E and SE Asia, and in Australia (Eastop 1966, as *A. hardyi*). Calilung (1976) gave an account of this species in the Philippines. $2n=8$.

Aphis eupatorii Passerini

Apt. dark green, or whitish yellow in midsummer dwarfs; BL 0.9–2.0 mm. Sec. rhin. in al. III 4–10, IV 0–4. In ant-attended colonies on young growth and undersides of leaves of *Eupatorium cannabinum* in Italy. Mon. hol., fundatrices being found in early June (Barbagallo and Stroyan, 1982). A member of the *frangulae* group, close to *frangulae* s. str. (q.v.) which, according to Börner (1952), has *Eupatorium cannabinum* as a secondary host in Germany. No reliable morphological discriminants are available.

Aphis euphorbiae Kaltenbach

Apt. blackish brown, shiny or wax-dusted, with tibiae pale brown except at apices, and SIPH and CAUDA black; BL 1.3–2.4 mm. Sec. rhin. in al. III 7–18, IV 0–5. On upper parts of stems of *Euphorbia* spp., especially (in Europe) *E. cyparissia*. Throughout Europe (rare in N), in SW and C Asia, introduced to Australia (Victoria) and USA (only record is from Nebraska; Williams, 1911). A member of a taxonomically difficult group of closely-related species on *Euphorbia*. Records of *A. euphorbiae* from Africa, as well as many of those from S Europe and the Middle East, seem to be referable to *A. tirucallis*.

Aphis euphorbicola Rezwani and Lampel

Apt. dark brown or grayish brown, lightly wax-dusted; BL 1.0–1.7 mm. Sec. rhin. in al. III 6–12, IV 1–2. On undersides of leaves and shoots of *Euphorbia denticulata* in Iran.

Aphis (Protaphis) evansi (Eastop)

Figure 57a

Apt. color in life not recorded; BL 1.2–1.9 mm. On *Vernonia glabra*, at base of stem with ants. Also recorded from *Leucospermum cordifolium* and *Hypochoeris radiata*. In southern Africa (Botswana, Tanzania, Zimbabwe, S Africa).

Aphis exploratus Rusanova

Apt. greenish yellow or dark orange, SIPH yellowish with darker apices, cauda yellow; BL 1.5–1.9 mm. Sec. rhin. in al. III 6–8, IV 0–3. On leaves, flowers and fruits of *Paliurus* in Azerbaijan. Possibly this was *A. nasturtii*.

Aphis exsors Rusanova

Apt. brown or green, with dark SIPH and cauda; BL 1.6–2.3 mm. Sec. rhin. in al. III 9, IV 3–4, V 2. On various Compositae (e.g., *Conyza canadense*, *Dahlia*, *Sonchus*) in Azerbaijan.

Aphis fabae Scopoli

Plate 6e

Apt. matt black with variably developed white wax markings; BL 1.5–3.1 mm. Sec. rhin. in al. III 7–33, IV 0–10, V 0–1. On a wide range of sec. hosts, incl. many crops (Blackman and Eastop, 2000). Widespread in temperate regions of northern hemisphere, and also in S America and Africa, but in tropics it tends to be replaced by its shorter-haired close relative *A. solanella*. Three subspecies are recognised, based largely on biological differences: *A. fabae* s. str., *A. fabae cirsiacanthoidis* and *A. fabae mordwilkoii*. Heter. hol. in Europe with sexual phase (of *A. fabae* s. str. and ssp. *cirsiacanthoidis*) usually on *Euonymus europaeus*, sometimes *Viburnum opulus*. In summer *A. fabae* s.str. can be found on many plants including Leguminosae, Papaveraceae and Chenopodiaceae, but will not colonise *Cirsium arvense* or *Solanum nigrum*. Principal summer host of *A. fabae cirsiacanthoidis* is *Cirsium arvense*. *A. fabae mordwilkoii* has a sexual phase on *Viburnum opulus* or *Philadelphus coronarius* and migrates particularly to *Arctium* spp. and *Tropaeolum majus*. For more detailed reviews of host plants and taxonomic relationships see Stroyan (1984) and Blackman and Eastop (in press). $2n=8$ (all subspecies).

Aphis (Protaphis) filaginea (del Guercio)

Apt. dark green to brownish; BL not recorded. Described from *Filago germanica*, and also possibly on *F. gallica*, if the same as *Aphis filaginis* Lichtenstein, which is a nomen nudum. In S France and Portugal (Börner, 1952).

***Aphis (Zyaxaphis) filifoliae* (Gillette and Palmer)**

Figure 12s

Apt. are brownish amber to dark brown or blackish, with lighter brown markings and a reticulate pattern of white wax; BL c.1.1 mm. On leaves and stems of *Artemisia* and *Seriphidium* spp., and also reported to occur on *Chrysothamnus nauseosus*, in western USA. Mon. hol.; ovip. and apt. males were collected in early Oct (see Palmer, 1952).

***Aphis filipendulae* Matsumura**

Apt. dark greenish brown, yellow-green or green, powdered with wax; BL c. 1.0–1.3 mm. On *Filipendula* spp. in Japan (Hokkaido) and E Siberia (Takahashi, 1966; Pashtshenko, 1988a).

***Aphis (Bursaphis) fluvialis* Martin**

Apt. bluish green with a slight wax bloom; BL 1.0–1.7 mm. On shoot apices and flower stalks of *E. hirsutum* in Africa (W Sudan). Attended by ants. Probably anhol. Martin (1982) discussed the possible origins of the aphid and its host from Europe. 2n=9.

***Aphis foeniculivora* Zhang**

Apt. green, BL c. 1.4 mm. On *Foeniculum vulgare* in China. Apart from a longer ANT PT, this species could not be distinguished by its published description from *A. gossypii*.

***Aphis folsomii* Davis**

Apt. reddish brown; BL 1.6–1.8 mm. On *Parthenocissus* spp., forming dense clusters along midribs of leaflets and petioles, attended by ants (Williams, 1911, as *Aphis parthenocissi*). Widely distributed in USA east of Rocky Mountains.

***Aphis forbesi* Weed**

Apt. dark bluish green, with yellowish mottling; BL 1.0–1.9 mm. Immatures are yellowish green. Al. have black dorsal abdominal cross-bands and only 2–4 sec. rhin. on III. In ant-attended colonies on shoots and at bases of leaf petioles of *Fragaria* spp., and also sometimes on the roots. Native to N America, and introduced into Europe about 1928; also in Japan and S America. Mon. hol. with apt. males; Marcovitch (1925) discovered the photoperiodic induction of sexual morphs in aphids while working with this species. 2n=8.

***Aphis (Protaphis) formosana* (Takahashi)**

Apt. dark green, with black head, ant., SIPH and CAUDA; BL c.1.8 mm. On *Blumea* spp. in Taiwan. Sec. rhin. in apt. III 1–5, in al. III 6–8, IV 0–1.

***Aphis frangulae* Kaltenbach**

Apt. various shades of yellow, green, blue–green, brown or greenish black, sometimes mottled; BL 1.7–2.4 mm. Sec. rhin. in al. III 3–16, IV 0–7, V 0–3. A complex of species/subspecies utilising a wide range of herbaceous plants, some of which have a sexual phase in Europe on *Rhamnus*. Stroyan (1984) reviewed the group and discussed the taxonomic problems. In Europe, *A. frangulae* s.str. migrates from *Rh. frangula* to *Epilobium angustifolium*, also occurring frequently on *Capsella bursa-pastoris* and *Lysimachia vulgaris*, and *A. frangulae beccabungae* Koch migrating from the same primary host preferentially colonises *Veronica beccabungae*, but also occurs on *Solanum tuberosum* and various Labiatae. Summer populations on Labiatae are practically indistinguishable from those of other species in the complex (e.g., *ballotica*, *lamiorum*, *nepetae*) that are mon. hol. on various Labiatae. Populations outside Europe (SW and C Asia, N America, can only be identified as *frangulae* (s. lat.). There are no fully reliable morphological discriminants, perhaps because natural hybridisation may tend to confuse secondary host associations and life cycle categories, and there are also geographical differences, which may change with time. For example, Stroyan (1984, p.124) noted a *frangulae*-like aphid that had recently been collected in England on *Hypericum*; this seems to be the same as an *Aphis* sp. collected in Syria and Lebanon prior to 1954 (BMNH colln, leg. A.L. Talhouk). Al. in populations on *Nepeta* from Spain (leg. H.L.G. Stroyan) and USA (Idaho, Utah; leg. G.F. Knowlton) all have a large number of sec. rhin. distributed over ANT III, IV and V, and may be a distinct species. The cosmopolitan pest *A. gossypii* (q.v.) is closely related, and introduces a further complication to the taxonomic treatment of the group, as it can be conveniently

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treated as a subspecies of *frangulae* in Europe (Stroyan, 1984; Heie, 1986), but this becomes untenable when world-wide populations are taken into account (Blackman and Eastop, in press).

Aphis franzi Holman

Apt. color in life unknown; BL 1.1–1.7 mm. Al. undescribed. On *Seseli austriacum* in Austria.

Aphis fraseriae Gillette and Palmer

Apt. yellowish green, mottled with darker green, often blackish, with dark SIPH and CAUDA; BL c.2 mm. Sec. rhin. in apt. III 0–15, in al. III 18–28, IV 1–7. On flower stalks of *Frasera speciosa* in western USA (Palmer, 1952). Distinguished from polyphagous *Aphis* spp. by long R IV+V and short ANT PT.

Aphis fukii Shinji

Apt. dark gray–brown or black, with black SIPH and CAUDA; BL 2.1–2.5 mm. Sec. rhin. in al. III 20–32, IV 5–11, V 1–7. Curling and twisting leaves of *Petasites* spp. in E Asia (Japan, Korea, Sakhalin, Taiwan). Also recorded (from Japan) on *Senecio kaempferi* (= *Farfugium japonicum*). 2n=8.

Aphis fumanae Remaudière and Leclant

Apt. very dark green to black, shining; BL 0.9–1.3 mm. Sec. rhin. in al. III 3–8. In small colonies on shoots and flower peduncles of *Fumana* spp. in S France, Spain and Italy. Mon. hol. with apt. males (orig. descr.). Colonies were attacked by the aphidiid parasitoid *Lysiphlebus fabarum* Marsh.

Aphis funitecta (Börner)

Apt. densely wax-covered, BL 1.6–2.4 mm. On *Bupleurum longifolium* in Germany. Mon. hol., with apt. males, and ovip. having unswollen hind tibiae (Nieto Nafria *et al.*, 1986).

Aphis galiiscabri Schrank

Figure 29a

Apt. greenish black, heavily wax-powdered, BL 1.1–2.2 mm. On upper parts of *Galium* spp., and also *Asperula* spp., causing shortening of stems so that leaves and flowers of young shoots become close-set. In Europe, W Siberia, Mongolia and Canada (Nieto Nafria *et al.*, 2005). Populations in S Italy show some morphological differences (Stroyan, 1984). Fundatrices in May (BMNH colln), sexual morphs apparently unknown.

Aphis gallowayi Robinson

Apt. dark brown to black, BL 1.6–2.2 mm. On *Astragalus pectinatus* in Alberta, Canada. Very similar to *A. astragalina*, and which has been found on the same plant.

Aphis genistae Scopoli

Apt. black, coated with wax meal; BL 1.4–2.6 mm. Sec. rhin. in al. III 4–8. On *Genista* spp. in Europe, eastward to Ukraine. Sometimes with ants. Mon. hol., with ovip. and al. males in Sept. 2n=8.

Aphis gentianae (Börner)

Apt. dark green, BL 1.2–1.6 mm, at stem bases of Gentianaceae (*Blackstonia*, *Centaurium*, *Gentiana*) in C, S and E Europe. Sexual morphs were found in Poland in Sept (Szelegiewicz, 1975). [A related species, *A. orocantabrica*, was recently described from *Gentiana lutea* in Spain (Garcia Prieto and Nieto Nafria, 2005)]

Aphis gerardianae Mordvilko

Apt. grayish black to black, wax-dusted; BL 1.0–1.7 mm. Sec. rhin. in al. III 8–11, IV 0. On stems and flower stalks of *Euphorbia sequieriana* (incl. *gerardiana*) in C and E Europe (Jörg and Lampel, 1988). It is attended by the ant *Plagiolepis pygmaea* (Szelegiewicz, 1966).

Aphis glareosae Bozhko

Apt. dark brown, wax-dusted; BL c.2 mm. Sec. rhin. in al. III 10–12, IV 1–3. On *Euphorbia glareosa*, and also on *E. pannonica* (BMNH colln, leg. J. Holman), in E Europe (Hungary, Czech Republic, Bulgaria, Rumania, Ukraine). Ovip. have been collected on *E. glareosa* in Oct (BMNH colln, leg. J. Holman).

Aphis globosa Pashtshenko

Apt. pale green with some dark abdominal markings, BL c. 1.8 mm. On underground stems of *Artemisia gmelinii* in E Siberia. Biology unknown.

Aphis glycines Matsumura

Apt. yellow with black SIPH; BL 1.2–1.7 mm. Sec. rhin. in al. III 4–9. On stems and undersides of leaves of various Leguminosae, particularly *Glycine* spp., and a major pest of soybean (Blackman and Eastop, 2000); also recorded from *Amphicarpaea*, *Desmodium*, *Phaseolus* and *Pueraria*. In E and SE Asia, and recently (2000) introduced to USA and E Australia. Heter. hol. in China and Japan with *Rhamnus* spp. as primary hosts (S. Takahashi *et al.*, 1993).

Aphis gossypii Glover

Plate 7c

Apt. varying from dark blackish green or green mottled with dark green (larger specimens in favourable conditions) to very pale whitish yellow (small specimens in crowded colonies or hot conditions); BL 0.9–1.8 mm. Sec. rhin. in al. III (3–) 6–12 (–15), IV 0 (–2). On a very wide range of host plants, its polyphagy being particularly evident during the dry season in hot countries. A major pest of cotton and cucurbits, and in glasshouses in cold temperate regions (Blackman and Eastop, 2000). Distributed almost worldwide, and particularly abundant and well-distributed in the tropics, including many Pacific islands. Anhol. in most parts including Europe, where it is usually treated as a member of the *A. frangulae* group (q.v.), but there is host alternation in parts of E Asia and N America, with several unrelated plants utilised as primary hosts (incl. *Catalpa bignonioides*, *Hibiscus syriacus*, *Celastrus orbiculatus*, *Rhamnus* spp. and *Punica granatum*). Zhang and Zhong (1982) also noted mon. hol. populations on cotton and *Hibiscus* in China. Some populations regarded as *A. gossypii* may be functioning as distinct species; for example, populations with a sexual phase on *Rubia cordifolia* in Japan that seem to be isolated from those on other primary hosts (Inaizumi, 1981), and a Compositae-feeding form in Europe and N Africa that can produce sexual morphs under certain conditions (*A. parvus* Theobald? see Margaritopoulos *et al.*, 2006). Populations producing eggs on roots of various plants (*Ixeris*, *Lactuca*, *Marrubium*, *Viola*) in China identified as *A. gossypii* (Chu, 1949) may be other closely-related mon. hol. species, e.g., *A. violaeradicis* (q.v.). Taxonomic implications of the genetics, biology and distribution of *A. gossypii* were reviewed by Blackman and Eastop (in press). 2n=8.

Aphis grandis Juchnevitch

Apt. with dark brown head and prothorax, rest of thorax and abdomen yellow with broad brownish cross-bands and marginal spots, appendages mainly dark brown; BL 2.8–3.1 mm. Sec. rhin. in al. III 23–27. In ant-attended colonies on green shoots of *Spiraea chamaedryfolia* in Kazakhstan (Azatau Mountains). Apparently migrating in June to an unknown secondary host.

Aphis grata Pashtshenko

Apt. brown, pulverulent; BL 1.3–1.9 mm. Sec. rhin. in al. III 8–9. In small dense colonies on undersides of leaves and flower stems of *Spiraea* spp. in E Siberia.

Aphis gratiolae Bozhko

Apt. yellowish with greenish mottling; BL c. 1.2 mm. Sec. rhin. in al. III 4–5. On *Gratiola officinalis* in Ukraine.

Aphis gregalis Knowlton

Apt. bluish green to yellowish green with darker head and pronotum, and variably-developed dorsal abdominal dark markings; BL 1.2–1.9 mm. Sec. rhin. in al. III 2–7, IV 1–2. On *Chrysothamnus* spp. in western USA (western slopes of Rocky Mountains), often in large colonies on shoot tips, leaves and flower-stems, causing stunting and distortion of growth. Ovip. and apt. males in Oct (orig. descr.). Closely related to *A. ornata*, and without any clear distinguishing characters in slide-mounted specimens.

Aphis grossmannae Börner

Apt. color in life unknown, probably dark green; BL 1.8–2.5 mm. Sec. rhin. in al. III 6–12. On stems and umbels of *Peucedanum oreoselinum* in N, C and E Europe and W Siberia. There are also records

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from other Umbelliferae (*Cicuta virosa*, *Seseli ledebouri*), and from *Parasenecio* (= *Cacalia*) *hastatus* (Ivanoskaya, 1977; probably not a normal host). Szelegiewicz (1964b) provided a redescription.

Aphis (Bursaphis) grossulariae Kaltenbach

Apt. dull grayish green to dark green or yellow-green, with pale SIPH; BL 1.2–2.1 mm. Sec. rhin. in al. III 7–17, IV 4–10, V 0–5. Host-alternating between *Ribes* spp., mainly *R. grossularia*, and *Epilobium* spp., especially *E. montanum*. Certain other Onagraceae (*Clarkia*, *Fuchsia*) may also be utilised as secondary hosts. Colonies on gooseberry cause considerable leaf-curl. On *Epilobium* the aphids feed on the flower-heads, and in Europe may form mixed colonies with *A. epilobii*. In Europe, C Asia, across Siberia, and introduced to N America. 2n=8.

Aphis gypsophilae Holman

Apt. shining dark green; BL 1.6–2.1 mm. Sec. rhin. in al. III 10–14, IV 1–3, V 0–3. On *Gypsophila dahurica* in Mongolia.

Aphis haroi Nieto Nafría

Apt. matt black; BL 2.1–3.1 mm. Sec. rhin. in apt. III 0–14, IV 2–18, V 0–5, al. undescribed. On *Senecio tournefortii rournetortio* in Spain. Mon. hol. with apt. males (orig. descr.).

Aphis hasanica Pashtshenko

Apt. black, with waxy coating; BL c.1.9mm. Al. undescribed. On *Thalictrum simplex* in E Siberia. Ant-attended.

Aphis healyi Cottier

Apt. black, paler laterally, often with greenish tinge, SIPH and cauda black; BL c. 2.2mm. Sec. rhin. in al. 0 (–1). On terminal parts of *Carmichaelia subulata* in New Zealand. 2n=8*.

Aphis hederæ Kaltenbach

Apt. dark brown or dull black; BL 1.4–2.5 mm. Sec. rhin. in al. III 8–25, IV 0–13, V 0–4. On young shoots and foliage of *Hedera helix*, sometimes on other Araliaceae (*Aralia*, *Schefflera*), and also on *Cuscuta* (Convolvulaceae). Widespread in Europe, W and SW Asia, S Africa, New Zealand, and also common and widespread in N America and temperate S America. Mon. hol.; males may be apt. or al. [Possibly a species complex; two other closely related taxa have been described, *A. boerneri* Franssen and *A. pseudohederæ* Theobald, but these are treated here as variant populations of *A. hederæ*.] 2n=8.

Aphis hederiphaga Takahashi

Apt. dark green or brown; BL 2.0–2.2 mm. Sec. rhin in al. III 6–8, IV 0–2. In large colonies on new growth and leaves of *Hedera* spp. in Japan, and Korea (Lee *et al.*, 2002c).

Aphis hedysari Holman

Apt. blackish brown with basal parts of antenna and most of tibiae whitish; BL 2.4–2.7 mm. Sec. rhin. in al. III 6–11, IV 0–4. On *Hedysarum austrosibiricum* in Russia (Transbaikalia), living in dense colonies on terminal plants of host.

Aphis heiei Holman

Apt. bluish green to dark green; BL 1.3–1.8 mm. On stems and leaves of *Hieracium umbellatum*. So far only known from sandy areas on W coast of Jutland, Denmark (Holman, 1998).

Aphis helianthemii Ferrari

Apt. bright pale green, or dark bluish green (ssp. *thermophila* Börner), or blackish (ssp. *obscura* Bozhko), the more pigmented specimens having dusky/dark head, ant., femora, SIPH and cauda, and dark to black distal sections of tibiae; BL 0.8–1.8 mm. Sec. rhin. in al. III 2–6, IV 0. On upper parts of stems and flowers of *Helianthemum* spp., widely distributed in Europe. *A. helianthemii* ssp. *thermophila*, described from *H. canum*, has been treated as a separate species by several authors, but there are no good distinguishing characters for slide-mounted specimens, and the color variants are not consistently associated with particular

species of host plant. The key couplet provided by Remaudière and Leclant (1972) will not work for some British populations of *helianthemi* (BMNH colln), nor for some Spanish *thermophila* (Nieto Nafria, 1976). We are therefore treating all these populations as one variable species. *A. cisticola* is closely related.

***Aphis helianthi* Monell**

Plate 6i

Apt. yellowish green to deep olive green mottled with yellowish green, with black SIPH; BL 1.5–2.5 mm. Sec. rhin. in al. III 15–40, IV 0–2. Colonies occur in late spring and summer on stems and leaves of many genera and species, especially in Compositae and Umbelliferae. In western and northern USA and Canada. Heter. hol. with sexual phase on *Cornus*. The name is possibly being applied to a complex of species with more specific secondary host relationships analogous to the *A. fabae* group in Europe. Addicott (1981) synonymised *A. heraclella*, the name previously often applied to populations on Umbelliferae, with *A. helianthi* on the basis of host transfers and morphological studies involving *Cornus*, Umbelliferae and *Epilobium* (Onagraceae), but not Compositae. Robinson and Chen (1969) had previously obtained transfers from *Cornus* and *Helianthus* to *Sium suave*, but not to other Umbelliferae. 2n=8.

***Aphis heracleicola* Shinji**

Apt. pale green with dark SIPH and cauda; BL c. 1.3–1.4 mm. Sec. rhin. in al. III 10–14, IV 4–8. On *Heracleum lanatum* in Japan. Could not be included in key to apt. on *Heracleum* on the basis of the information available, although al. should be recognisable by the distribution of rhinaria on III–IV.

***Aphis (Zyxaphis) hermistonii* Wilson**

Figure 12u

Apt. are dark gray-green with white powdery markings and thick black SIPH; BL 0.9–1.4 mm. On leaves and young shoots of *Artemisia filifolia* and *Seriphidium tridentatum* in western USA. Records from *Chrysothamnus* may be misidentifications. There is some confusion in the literature with *A. canae* and *A. oregonensis*, but the three species seem separable by the key characters given.

***Aphis herniariae* Mamontova-Solukha**

Apt. brownish with dark SIPH and cauda; BL c. 1.1 mm. Al. undescribed. On *Herniaria besseri* in Ukraine.

***Aphis hieracii* Schrank**

Apt. bluish to dark green, with dark head, SIPH and CAUDA; BL 0.8–2.8 mm. Sec. rhin. in al. III 5–10, IV 0–3. In ant-attended colonies on stems and leaves of *Hieracium* spp. in N, E and C Europe, E Siberia (Pashtshenko, 1992), and introduced to N America. Mon. hol. with apt. males. Dwarf apt. occur in mid-summer (Holman, 1998).

***Aphis hillerislambersi* Nieto Nafria and Mier Durante**

Apt. dark olive-green to black covered in grayish wax; BL 1.3–2.0 mm. Sec. rhin. in al. III 8–15, IV 0–3, V 0 (–2). On *Euphorbia* spp., recorded from Spain, Canary I., Madeira (BMNH colln and Ilharco, 1974, as *A. paralius* Hille Ris Lambers, nomen nudum), France (BMNH colln, leg. F. Leclant), Italy, (BMNH colln, leg. AW Beck and D. Hille Ris Lambers), Yugoslavia (BMNH colln, leg. H.L.G. Stroyan) and Turkey (BMNH colln, leg. B. Kovanci). The Spanish populations were found to be anhol. (orig. descr.).

***Aphis hiltoni* Essig**

Apt. pale green with dark head and dorsal abdominal markings, partially covered with white powdery wax; BL c. 1.3 mm. Sec. rhin. in al. III 4–6 (large). Described from dense colonies on apical twigs of *Artemisia californica* in California, USA, but there are apparently no subsequent records.

***Aphis hispanica* Hille Ris Lambers**

Apt. color in life unknown, probably dark and wax-dusted; BL 1.0–1.3 mm. Sec. rhin. in al. III 6–7. On *Euphorbia* sp. in Spain (orig. descr.) and Corsica, and Tuatay and Remaudière (1965) described ovip. and al. males from an unidentified *Euphorbia* sp. in Oct in Turkey.

***Aphis holodisci* Robinson**

Color in life unknown; BL 1.9–2.3 mm. Sec. rhin. in al. III 18–27, IV 0–6, V 0. Mon. hol. on *Holodiscus discolor* in north-western USA (Oregon) and Canada (B.C.).

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Aphis horii Takahashi

Apt. blackish-green; BL 2.1–2.7 mm. On stems and leaf petioles of *Sambucus* spp. in Japan, and also found in Korea on *Euscaphis japonica* (Paik, 1965, as *Sappaphis euscaphis*). Closely related to *A. sambuci*, but with long, fine hairs on the head and antennae. Host alternation to roots of Caryophyllaceae, Polygonaceae, etc., as in *A. sambuci* is not recorded in the literature, but specimens possibly of this species have been collected in Korea on *Rumex coreanus* (Lee *et al.*, 2002c). 2n=8 (Chen and Zhang, 1985b).

Aphis humuli (Tseng and Tao)

Apt. yellowish green with black eyes and blackish brown SIPH; BL c.1.2 mm. Sec. rhin. in al. III 8–14. On *Humulus japonicus* (= *scandens*?) in China and Taiwan (BMNH colln, leg. C-C. Tao).

Aphis hyperici Monell

Apt. pale reddish to purple, wax-covered; BL c.1.0–1.3 mm. On young twigs and undersides of leaves of *Hypericum* spp. in Illinois and Missouri, USA. 2n=8*.

Aphis hypericiphaga Pashtshenko

Apt. yellowish green, yellow or yellow–orange, with bands of wax; BL c. 2 mm. Sec. rhin. in al. III 6–11, IV 0–2. On undersides of leaves of *Hypericum* spp. in E Siberia, and N Korea (Lee *et al.*, 2002c).

Aphis hypericiradicis Pashtshenko

Apt. yellow–green with dark green anterior and posterior parts of body, black SIPH and green cauda (immatures almost white); BL c.1.4 mm. In large ant-attended colonies on stem bases and roots of *Hypericum* spp. in E. Siberia.

Aphis hypochaeridis (Börner)

Apt. bright yellow to pale greenish yellow, with orange spots at bases of the dark SIPH, and a dusky CAUDA; BL 0.7–1.6 mm. Sec. rhin. in al. III 5–8, IV 0–4. In ant-attended colonies at base of stem and on undersides of radical leaves of *Hypochaeris* spp. in Europe. Mon. hol.; fund. in April (BMNH colln), sexual morphs not observed.

Aphis ichigo Shinji

Apt. bluish green; BL 1.8–2.1 mm. Sec. rhin. in al. III 4–7, IV 0–2. On young shoots and leaves of *Rubus* spp. in Japan, Korea and E Siberia, and also found on *Fallopia japonica* (= *Polygonum cuspidatum*), which is perhaps the sec. host (Takahashi, 1966). 2n=8.

Aphis ichigocola Shinji

Apt. brownish yellow with brown head and blackish SIPH; BL 1.5–2.0 mm. Sec. rhin. in al. III 4–6. On *Rubus* spp. in Japan, China and Korea, and also recorded from *Fragaria* spp. in China (Tao, 1999) and Korea (Lee *et al.*, 2002c).

Aphis idaei van der Goot

Apt. yellow mottled with green or pale green to yellow, with long thin curved dusky or dark-tipped siphunculi; BL 1.0–2.0 mm. In dense ant-attended colonies at shoot tips of *Rubus idaeus*, causing severe leaf-curl, and later on undersides of leaves. Related cultivars, e.g., loganberry, and *R. occidentalis*, are also colonised. Throughout Europe, W. Siberia, and in New Zealand and N America (B.C.; BMNH colln, leg. R. Stace-Smith). Mon. hol. with apt. males. 2n=8.

Aphis (Protaphis) iliensis (Kadyrbekov)

Apt. dark greenish with gray wax film, with dark dorsal sclerotisation, SIPH and cauda; BL c.1.6–1.7 mm. On stems and flowers of *Acroptilon australe*, attended by ants. SE Kazakhstan.

Aphis illinoisensis Shimer

Apt. rather shiny, deep reddish-brown to almost black; BL 1.6–2.1 mm. On Vitaceae (*Ampelocissus*, *Cissus*, *Parthenocissus*, *Vitis*) in eastern and central USA, C and S America (as far south as Uruguay), and recently

Plate 6f

introduced into Turkey (Remaudière *et al.*, 2003) and Greece (J. Margaritopoulos, pers.comm., 2005). Heter. hol. in USA (Virginia) with a sexual phase on *Viburnum prunifolium* (Baker, 1917), probably anhol. elsewhere.

Aphis impatientis Thomas

Apt. olive, purplish brown or brownish, dusted with white wax; BL 1.5–1.8 mm. Al. with sec. rhin. distributed ANT III 9–17, IV 3–7, V 0. On *Impatiens* spp. in north-eastern USA and Canada. Mon. holocyclic, with al. males.

Aphis impatiphila Pashtshenko

Apt. pale green; BL c.1.7–1.8 mm. Ant-attended, on roots of *Impatiens glandulifera* in E Siberia.

Aphis impatiradicis Pashtshenko

Apt. pale green; BL c.1.7 mm. Ant-attended, on roots of *Impatiens glandulifera* in E Siberia.

Aphis indigoferae Shinji

Apt. brick-brown, covered in white wax; BL c.1.2 mm. . Al. have sec. rhin. distributed ANT III 8–10, III 1–4. On *Indigofera* sp. in Japan.

Aphis (Zyxaphis) infrequens Knowlton in Knowlton and Smith

Color of apt. in life not recorded; BL 1.5–1.75 mm. On *Chrysothamnus parryi* in Utah, USA. Al. were collected from *Seriphidium tridentatum*, but these were possibly vagrants (Palmer, 1952). Very similar to *A. chrysothamnicola*, and it needs to be confirmed as a distinct species.

Aphis intrusa Ortego

Apt. shining dark brown: BL 1.3–1.9 mm. Sec. rhin. on ANT III in apt. 0–4 (–7), in al. 10–13 (2 specimens). On *Senecio subumbellata* in Argentina (Ortego, 1998a). Very close to *A. craccivora*; further collections are needed to confirm the distinction.

Aphis intybi Koch

Apt. black, wax-powdered; BL 1.2–2.3 mm. Sec. rhin. in al. III 3–8. On young growth of *Cichorium intybus* in spring, and later at stem bases in ant shelters. In Europe, Mediterranean region, W and C Asia east to Pakistan (Naumann-Etienne and Remaudière, 1995), and it has been intercepted at ports of entry to USA (Stoetzel and Russell 1991). Mon. hol. on *Cichorium*, with apt. males (Tuatay and Remaudière, 1964). Records from other plants are most probably misidentifications. Populations in the Mediterranean/Middle East region differ somewhat from those in N and C Europe by having few if any marginal tubercles on abdominal segments 2–6, and longer hairs on abdominal tergite 8.

Aphis ishkovi Kadyrbekov

Apt. pale brown tinged with gray, with dark head, SIPH and cauda; BL 1.7–2.1 mm. In small ant-attended colonies on green shoots and in inflorescences of *Myricaria bracteata* in SE Kazakhstan.

Aphis iteae (Tissot)

Apt. brown; BL. c.1.2 mm. Al. have 5–9 rhin. on ANT III. On *Itea virginica* in Florida, USA.

Aphis jacobaeae Schrank

Apt. very dark green to dark brown or black; BL 1.5–2.6 mm. Sec. rhin. in apt. 0–12, IV 1–15, V 0–3, in al. III 17–38, IV 0–20, V 0–8. In compact colonies on stems, inflorescences and undersides of leaves of *Senecio jacobea*, attended by ants, and sometimes in ant shelters at stem bases (Stroyan, 1984). In W, C and E Europe. Mon. hol. according to Börner (1952).

Aphis janischi (Börner)

Apt. black, wax-dusted; BL 1.8–2.7 mm. On leaf bases and stems of *Cirsium oleraceum* (rarely *arvense*) in Europe (Denmark, Finland, Sweden, Germany, Poland, Austria). Further studies are needed to show whether or not this species is biologically distinct from *A. fabae* s. lat., especially *A. fabae cirsiacanthoidis*, as there are no reliable morphological discriminants.

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Aphis jurineae Bozhko

Apt. blackish brown; BL 2.0–2.3 mm. Al. have 4–6 rhin. on ANT III. Forming large colonies on stems of *Jurinea cyanoides* in Ukraine.

Aphis kaltenbachi Hille Ris Lambers

Apt. gray due to heavy coat of wax meal; BL 1.2–1.7 mm. Sec. rhin. in al. III 5–8. On *Genista anglica*, in small compact colonies on young shoots, not visited by ants, and also on *Ononis* spp. (Hille Ris Lambers, 1956a, as *A. schoutedeni*). In the Netherlands, and probably also in Germany. Mon. hol., with ovip. and apt. males in early Oct.

Aphis kamtchatica Pashtshenko

Apt. black, imm. greenish black; BL c.2.7 mm. Sec. rhin. in al. III 20–27, IV 0–9. On young shoots, stems and undersides of leaves of *Spiraea stevenii* in E Siberia (Kamchatka). Ant-attended. Mon. hol., with fund. in late June (orig. descr.).

Aphis (Protaphis) kareliniae Kadyrbekov, Renxin and Shao

Apt. yellow–green, with slight gray wax film and dark brown head, SIPH and dorsal markings; BL 2.1–2.1 mm. Sec. rhin. in al. (1 specimen) III 6–8, IV 1. On roots of *Karelinia caspia*, attended by ants. Xinjiang-Uygur region, W China (Kadyrbekov *et al.*, 2002).

Aphis klimeschi (Börner)

Apt. grayish green to dark greenish brown, not waxy; BL 1.2–2.3 mm. Sec. rhin. in al. III 6–10, IV 0–5, V 0–2. In basal ant-shelters on *Anthyllis vulneraria* in Europe and Morocco. Mon. hol. with apt. males.

Aphis (Protaphis) knowltoni Hottes and Frison

Apt. greenish blue to yellowish green, with black dorsal markings and grayish pruinose reticulation; BL 1.8–2.3 mm. Sec. rhin. in apt. III 0–13, IV 1–8, V 0–3, VI BASE 0–1; in al. III 20–32, IV 7–15, V 3–8. In ant-attended colonies on roots of *Taraxacum officinale* and also recorded from *Achillea millefolium* (Palmer, 1952) and *Dahlia* sp. (BNHM colln, leg. A.G. Robinson). Palmer also records it from *Zea mays*, but this needs confirmation as there is possible confusion with *A. middletonii*. In USA and Canada (Manitoba). Mon. hol., with ovip. in Sept. (males undescribed). 2n=8.

Aphis kogomecola Matsumura

Apt. yellowish green; BL c.1.5 mm. On *Spiraea thunbergii* in Japan, rolling leaves together. Not since recognised, and the fact that the cauda was not evident suggests that it might be a *Brachycaudus*, possibly *B. helichrysi*.

Aphis korshunovi Ivanoskaya

Apt. dull black, without wax, ANT and legs dark except for basal part of ANT III, femoral bases and middle parts of tibiae, SIPH and cauda black; BL 0.9–2.2 mm. Sec. rhin. in al. III 5–9, IV 0–1. On *Veronica* spp. in N Europe (Denmark, Finland) and east to W Siberia. Mon. hol. with ovip. and apt. males in late Aug (Heikinheimo, 1978, as *A. pseudolysimachiae*).

Aphis kosarovi Tashev, Popov and Berova

Apt. black, resembling *A. fabae*; BL 1.9–2.5 mm. On *Digitalis* spp. in E Europe (Bulgaria). Mon. hol.; ovip. (with only slightly thickened hind tibiae) and al. males were collected in Oct. [Originally described as a subspecies of *A. armata*, but having much shorter hairs. The specimens in the original description (Tashev *et al.*, 1970) were noted as lacking symbionts. Three apt. on a slide from Tashev in the BMNH collection have leg hairs mostly short, but with a few hairs long and distorted. This raises the possibility that the shortness of the hairs is due to nutritional deficiency in an asymbiotic population of *A. armata*.]

Aphis kurosawai Takahashi

Apt. green or yellow-green, wax-powdered, with dark SIPH and CAUDA; BL 1.1–2.0 mm. A common species on leaves of *Artemisia* spp. in E Asia (India, Nepal, E Siberia, China, Korea, Taiwan, Japan). Holman (1987)

Figure 12t

lists morphometric data in comparison with other *Artemisia*-feeding species. Holman's data for *A. kurosawai* from the E Siberia agree with BMNH specimens from Japan and Taiwan, but specimens from the Himalayas have a longer R IV + V (1.5–1.9× HT II, as opposed to 1.36–1.6× HT II), and may be a distinct form, for which the name *A. lhasartemisiae* Zhang (described from Tibet) is available. Sexual morphs have apparently not been recorded, but some specimens collected on *Artemisia lavandulaefolia* in China (BMNH colln, leg. V.F. Eastop) appear to be fundatrices. *A. artemifoliae* Shinji 1922 is a synonym according to Takahashi (1966). 2n=8.

***Aphis laciniariae* Gillette and Palmer**

Apt. pale green (Hottes and Frison, 1931; as *A. zilora*); BL 1.1–1.4 mm. Sec. rhin. in al. III 4–8. On leaves and stems of *Liatris* spp. in USA. Ovip. and apt. males in Colorado in Sept–Oct (Palmer, 1952).

***Aphis (Protaphis) lactucicola* Kadyrbekov**

Apt. dark greenish with slight gray wax film, brown head, usually a brown central dorsal transverse mark just anterior to SIPH, and dark brown SIPH; BL 1.6–1.9 mm. In ant-attended colonies on roots of *Lactuca serriola* in SE Kazakhstan. Closely related to *A. pseudocardui* (q.v.).

***Aphis lambersi* (Börner)**

Apt. dark green, purplish brown or almost black; BL 1.3–2.2 mm. Sec. rhin. in al. III 7–19, IV 0–5, V 0–2. On root collar and in basal leaf sheaths of *Daucus carota*, ant-attended. Also recorded from *Conopodium majus* (Nieto Nafria *et al.*, 2005), and a large sample of summer dwarfs from *Foeniculum* in the Italian Alps (BMNH colln, leg. R. Stäger) may also be this species. (Aphids originally recorded from *Pimpinella saxifraga* in Spain as *A. lambersi* are a new species with only 4–5 caudal hairs and smaller marginal tubercles, *A. jacetana* Garcia Prieto and Nieto Nafria.) Throughout Europe. Mon. hol. with apt. males. 2n=8.

***Aphis lamiorum* (Börner)**

Apt. dark blue-green to dark green; BL 1.6–2.2 mm. On *Lamium* spp., causing downward leaf-curl of shoot apices. Ant-attended. Mon. hol., with ovip. present in mid-Aug (BMNH colln, leg. V.F. Eastop) and having hind tibiae only slightly swollen, and apt. males (orig. descr.). Closely related to the *frangulae* group; spring and summer apt. are practically indistinguishable from those of the host-alternating *A. frangulae* ssp. *beccabungae*, which migrates to *Lamium* from *Frangula* (Stroyan, 1984). Apparently widely distributed in Europe, but some of these records may be summer colonies of *A. frangulae beccabungae*, from which it is not morphologically distinct.

***Aphis lantanae* Koch**

Apt. dark greenish brown with variably developed dark dorsal sclerotic markings; BL 1.5–2.1 mm. In curled leaves, on young stems or under senescing leaves of *Viburnum lantana*. Ant-attended. Europe. Mon. hol. with al. males. Stroyan (1984) gave subspecies status to an alpine form, *A. lantanae coriaria* Börner, found in Austria, Switzerland, Andorra and Italy, which has apt. or alatiform males.

***Aphis leontodontis* (Börner)**

Apt. greenish black; BL 1.2–1.7 mm. Sec. rhin. in al. III 5–10, IV 1–3, V 0–1. On *Leontodon* spp., colonising undersides of etiolated basal parts of leaves at soil level, often in ant shelters. In Europe, (Denmark, Sweden, Germany, Poland, Czech Republic). Mon. hol.. Records of *A. taraxacicola* from *Leontodon* should probably be referred to this species.

***Aphis lhasaensis* Zhang**

Apt. presumably shining black; BL c. 2.3 mm. On *Phaseolus vulgaris* in Tibet. Possibly large specimens, or a variant population, of *Aphis craccivora*, which may sometimes have marginal tubercles consistently on abdominal tergites 2–4 (see Stroyan, 1984).

***Aphis lichtensteini* Leclant and Remaudière**

Apt. shining pale yellow to green, with dark apices to ant. and legs, and black SIPH and cauda: BL 0.9–1.7 mm. Sec. rhin. in al. III 4–11, IV 0–2. On *Cistus* spp., especially *C. monspeliensis*, around the Mediterranean (S France, Corsica, Sardinia, Sicily, Spain, Algeria). It tends to form small colonies on leaves and

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along the flower stalks, causing some deformation in the form of spiral rolling of the leaves. Only rarely ant-attended. Apparently anhol.

Aphis ligulariae Holman

Apt. color in life unknown, presumably dark with ANT and tibiae mainly pale, SIPH and cauda dark; BL 2.1–2.2 mm. On basal parts of *Ligularia schmidtii* in E Siberia. Presumably mon. hol.

Aphis (Anthemidaphis) ligusticae Barbagallo and Stroyan

Apt. yellow–green to yellowish white or cream; BL 1.0–1.7 mm. Al. undescribed. On underground stolons of *Achillea ligustica*, attended by ants. Italy (Sicily). Mon. hol. with ovip. in late Sept–Nov (orig. descr.).

Aphis liliophaga Holman

Apt. dull dark green; BL 1.7–2.2 mm. Sec. rhin. in al. III 6–10, IV 0–1. On seed capsules of *Lilium tenuifolium* in Mongolia.

Aphis limonicola Pashtshenko

Apt. black; BL c. 1.2 mm. On undersides of leaves of *Limonium platyphyllum* in Russia (on a plant that was shipped from Altai to Vladivostok).

Aphis lindae Danielsson

Apt. color in life unknown; BL 1.2–1.6 mm. On basal part of stem of *Tripleurospermum maritimum*, growing between stones near seashore, not attended by ants. Only known from Sweden.

Aphis lini (Bozhko)

Apt. brown, wax-dusted, with black SIPH and cauda; BL c. 2.0–2.1 mm. In dense colonies on stems and young shoots of *Linum nervosum* in Ukraine.

Aphis linorum (Bozhko)

Apt. dark green to nearly black, with antennal flagellum, femora and tibiae whitish basally and black distally; BL 1.4–1.9 mm. In ant-attended colonies on the root collar of *Linum perenne* in E Europe (Slovak Republic, Ukraine). Mon. hol., with ovip. and apt. males in Oct (Holman, 1966, as *Aphis lini*).

Aphis lithospermi Wilson

Apt. dark green with black dorsal markings, and black ant., SIPH and cauda; BL c. 2.1 mm. Sec. rhin. in al. III 9–12, IV c.2. On *Lithospermum pilosum* in California and Oregon, USA.

Aphis longini Huculak

Apt. matt dirty green to olive brown; BL 1.7–2.3 mm. In large ant-attended colonies at bases of stems of *Knautia arvensis* in Poland. Mon. hol., with ovip. and apt. males in Oct (orig. descr.).

Aphis longirostrata Hille Ris Lambers

Apt. dark green to dull bluish green; BL 1.0–1.8 mm. In ant shelters on root collars and etiolated leaf bases of *Plantago* spp., esp. *P. maritima*, but not only in coastal habitats. Europe. Mon. hol. with apt. males.

Aphis longisetosa Basu

Apt. pale whitish with legs pale, SIPH and cauda dark; BL 1.2–1.7 mm. Sec. rhin. in al. III 3–8 (Chakrabarti and Raychaudhuri, 1975, as *A. ruborum* ssp. *longisetosa*). On undersides of leaves of *Rubus* spp. N India, Pakistan, Nepal and Thailand. $2n=6$ and/or $2n=8$ (see refs in Kar *et al.*, 1990; the discrepancy requires further investigation).

Aphis longituba Hille Ris Lambers (= *Aphis clematidis* ssp. *simalensis* Kumar and Burkhardt)

Apt. pale green, mottled with darker green on abdomen, with ant. and legs pale, and SIPH black-tipped; BL 1.3–1.6 mm. On young leaves of *Clematis grata* and *Clematis* sp. in Pakistan and India. The small CAUDA combined with dark-tipped SIPH are distinctive.

Aphis loti Kaltenbach

Apt. warm dark brown, without wax; BL 1.2–2.1 mm. Sec. rhin. in al. III 4–8, IV 0–2. On shoot apices and inflorescences of *Lotus* spp. and *Anthyllis* spp., sometimes ant-attended. Widely distributed in Europe. Mon. hol. with apt. males. Some records of *A. craccivora* on *Lotus* may be this species. $2n=8$.

Figure 41j

Aphis lotiradicis Stroyan

Apt. dirty greenish brown; BL 1.25–1.9 mm. Sec. rhin. in al. III 4–8, IV 0–3. On basal parts of stem and roots of *Lotus* spp. in sandy soils, tented over by ants. In Netherlands, UK, Finland, Poland, Serbia, Czech Republic and Spain. Mon. hol.; ovip. and apt. males in Oct.

Aphis lugentis Williams

Apt. dark yellow-brown with greenish tinge, to dark olive or dull blackish green, with entirely dark appendages; BL 1.9–2.8 mm. Sec. rhin. in apt. III 0–11, IV 0–11, V 0–2; in al. III 19–39, IV 7–20, V 0–4. On leaves, stems and roots of *Senecio* spp., and an *Erigeron* sp., in western and southern USA, and W Canada. Mon. hol., with ovip. and al. males in Oct (Palmer, 1952, and as *A. nyctalis*). Although *A. nyctalis* seems to be a synonym, there are other closely-related N American species on *Senecio* with longer and finer hairs, including *A. senecionis* (q.v.) and an undescribed species lacking marginal tubercles. These all belong to a holarctic group of *Senecio*-feeders, characterised by apt. with dark tibiae and rhinaria on ANT IV, that needs further investigation.

Aphis lupinehansonii Knowlton

Apt. color in life unrecorded; BL 1.7–2.4 mm. On *Lupinus* sp. in north-west USA.

Aphis lupini Gillette and Palmer

Apt. dusky olive to blackish green; BL 2–3 mm. On leaves and stems of *Lupinus decumbens* (= *argenteus*) in western USA. Mon. hol. (Palmer, 1952).

Aphis lupoi Barbagallo and Stroyan

Apt. green or yellow-green, wax-dusted, with head brownish; BL 1.0–1.8 mm. Sec. rhin. in al. III 3–8. On stems and undersides of leaves of *Cistus incanus* in Sicily, where it is probably anhol. (orig. descr.). Also found in Portugal. Sometimes visited by ants.

Aphis lupuli Rusanova

Apt. greenish yellow, with dark SIPH and yellow cauda; BL 1.6–1.7 mm. Sec. rhin. in al. III 8, IV 4. In large colonies on shoots of hops (*Humulus lupulus*) in Azerbaijan. Possibly this was *A. nasturtii*.

Aphis lycopicola (Shinji)

Apt. yellowish to yellowish green with dark siphuculi and cauda; BL c.0.9 mm. Sec. rhin in both apt. and al. III c.5. On *Lycopus* spp. in Japan.

Aphis lysimachiae Bozhko

Apt. grass green; BL c.1.9 mm. On *Lysimachia vulgaris* in Ukraine.

Aphis madderæ Robinson

Apt. color in life unrecorded; BL 0.9–1.3 mm. On root crown of *Taraxacum lacerum* in N Manitoba, Canada.

Aphis magnopilosa Nevsky

Apt. blackish-brown or black, BL c.2.5 mm. A long-haired member of the *Aphis fabae* group (q.v.) described from *Centaurea* sp. in Uzbekistan. Morphological variation in subsequent collections of *A. fabae*-like aphids on *Centaurea* spp. in Uzbekistan was discussed by Holman (1987).

Aphis malhaluina Mier Durante, Nieto Nafría and Ortego

Apt. dark brown to black, rather shiny; BL 1.3–2.1 mm. Sec. rhin. in al. III 4–12, IV 0–4. In dense colonies on stems of *Senecio subumbellatus*, sometimes near the root. Argentina. Mon. hol. with al. males (Mier Durante *et al.*, 2003).

Aphis mamonthovæ Davletshina (= *Aphis verbenæ* Nevsky, 1929, nec. Macchiatii, 1883)

Apt. brown with rather dark brown ANT and legs, dark brown SIPH and pale brown cauda; BL 1.2–1.8 mm. On *Verbena* spp., esp. *V. officinalis*. S and E Europe, N Africa (Ethiopia), Middle East (Lebanon, Turkey), C Asia and N India (BMNH colln, leg. S.S. Sekhon). Closely related to the *A. frangulæ* group, and European records of this group from *Verbena* are probably referable to this species. Anhol. in Sicily (Barbagallo and Stroyan, 1982).

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Aphis (Bursaphis) manitobensis Robinson and Rojanavongse

Apt. pale green with pale SIPH; BL 1.6–2.2 mm. On *Ribes* sp. in Canada (Manitoba), and on *R. nigrum* in Mongolia (BMNH colln., leg. H. Szelegiewicz). Mon. hol. with apt. males (BMNH colln.).

Aphis marthae Essig

Apt. shining black; BL 1.5–2.5 mm. Sec. rhin. in al. III 11–21, IV 0–5. Described from an unknown shrub or tree, and subsequently collected from *Quillaja saponaria* (Remaudière, 1994). Chile. There is a very similar species in BMNH colln, also from Chile, leg. I. Rosebaum, collected on *Cryptocarya alba*.

Aphis martinezi Nieto Nafría, Ortego and Mier Durante

Apt. black; BL 0.85–1.5 mm. Sec. rhin. in al. III 5–7. In dense colonies on stems and leaves of *Mulinum spinosum* in Mendoza Province, Argentina (Nieto Nafría *et al.*, 1999b).

Aphis masoni Richards

Apt. blue-green, wax-powdered; BL 1.9–2.4 mm. Sec. rhin in al. III 8–15, IV 1–4. On *Oxytropis* spp. in Canada (Baffin Island, Victoria Island, and Churchill, Manitoba: orig. descr. and BMNH colln, leg. W.R. Richards). Also on *Astragalus alpinus*; a slide in the BMNH collection labelled as a paratype (coll. W.R.M. Mason, leg. W.R. Richards and D. Hille Ris Lambers) has an aptera collected from this host on Baffin Island, 11.viii.1959, although this data is not listed in the original description. Apart from shorter SIPH it is very similar to *A. astragali* in N Europe.

Aphis mastichinae Pérez Hidalgo and Nieto Nafría

Apt. green; greenish-blue or yellowish-green; BL 0.9–1.2 mm. On roots of *Thymus mastichina* in Spain. Mon. hol. with apt. males (Pérez Hidalgo and Nieto Nafría, 2004).

Aphis matilei Nieto Nafría, Ortego and Mier Durante

Apt. pale green; BL 0.95–1.25 mm. Al. not recorded. In compact colonies on the flower-stems of *Verbena glauca* in Argentina (Nieto Nafría *et al.*, 2000). Mon. hol., with ovip. and apt. males in March.

Aphis medicaginis (Koch) (= *Doralis meliloti* Börner)

Apt. gray–green to black, wax-dusted; BL 1.7–2.0 mm. On basal parts and roots of *Medicago* and *Melilotus* spp. in Europe. Specimens on *Ononis spinosa* from France (BMNH colln, leg. F. Leclant) are also possibly this species. Hoffmann (1972) provided a redescription (as *meliloti* Börner). Mon. hol.

Aphis melosae Mier Durante and Ortego

Apt. in spring and autumn shining dark brown to blackish brown with BL 1.5–2.1 mm, in summer light brown to dark green with BL 0.9–1.5 mm. Sec. rhin. in apt. III 0–6, in al. III 7–13, IV 0–4, V 0–2. In dense colonies on stems, leaf axils and undersides of leaves of *Grindelia* spp. in Argentina (Mier Durante and Ortego, 1999), and also found on *Haplopappus* sp. (BMNH, leg. C.I.B.C.).

Aphis (Protaphis) middletonii Thomas (= *Aphis armoraciae* Cowan,

= *Aphis maidiradicis* Forbes, = *Aphis menthaeradicis* Cowan)

Plate 7e

Apt. pale green, bluish green, gray–green or olive-green, dusted with grayish wax and with variably developed dark dorsal cross-bands, more apparent in apt. than in al.; BL 1.5–2.5 mm. Sec. rhin in apt. III 0–31, IV 0–16, V 0–6, in al. III 13–43, IV 0–14, V 0–7. Ant-attended colonies occur commonly in western and central USA on roots of plants in numerous families incl. Compositae, Cruciferae, Gramineae, Labiatae and Umbelliferae. Aphids of this group are also recorded from Compositae in Brazil, and from *Opuntia* roots in Australia and S Africa. Eastop and Blackman (2005) concluded on the basis of multiple discriminant analysis that a single name should be applied to this group, the oldest available being *A. middletonii* Thomas. Mon. hol., but anhol. overwintering is probably also common. In the N American literature, populations identified as *A. armoraciae* are stated to produce al. males, whereas *maidiradicis* and *menthaeradicis* have apt. males, and oviparae of *menthaeradicis* are said to have very few scent glands on their hind tibiae (Palmer, 1952); however, the criteria for naming these populations are unclear, and experimental work is needed to show whether these differences are

of any taxonomic significance. Two other N American taxa described by Pack and Knowlton (1929), *A. crypta* and *A. gutierrezis* (as *Anuraphis gutierrezis*), are closely related and probably part of this group. $2n=8$.

***Aphis mimuli* Oestlund**

Apt. pale to mid yellowish green or apple-green with pale SIPH and cauda; BL 1.9–2.2 mm. Spring colonies curl young leaves of *Ribes* spp. (*aureum*, *nigrum*) in N America. Heter. hol., migrating in May–June to plants in wet situations (*Mimulus*, *Rorippa*, *Veronica*, *Bidens cernua*), paralleling *A. triglochinis* in Europe (Hille Ris Lambers, 1974, as *A. ribiensis*). Cook (1984a) gave a redescription.

***Aphis (Zyzaena) minutissima* (Gillette and Palmer)**

Apt. are dark brown to black, covered with a white powdery reticulation; BL 0.9–1.25 mm. On leaves and stems of *Artemisia filifolia* and *Seriphidium tridentatum* in W USA. Ovip. and al. males collected in Oct (Palmer, 1952).

***Aphis (Protaphis) miranda* Kadyrbekov**

Apt. dark greenish with slight gray film, dark reddish eyes, black SIPH and green cauda; BL 1.4–1.8 mm. In ant-attended colonies on roots of *Artemisia* and *Seriphidium* spp. in Kazakhstan (orig. descr.), W Siberia (Ivanoskaya, 1977, as *alexandrae*) and Europe (Denmark, Poland – Heie, 1986, as *elongata*; Czech Republic – BMNH colln, leg. J. Holman). Probably mon. hol.; an ovipara from *A. campestris* in Poland (BMNH colln, leg. L. Olesinski) may be this species.

***Aphis mirifica* (Börner)**

Apt. yellowish, green or mottled bluish green with black SIPH; BL 1.2–2.2 mm. Sec. rhin. in al. III 6–9, IV 0 (–1), V 0. On *Epilobium angustifolium*, forming ant-attended colonies on flowerheads, stems and undersides of leaves (which may be curled), or in ant shelters on stem at or below ground level (where the aphids may be yellowish). Mainly recorded from N Europe, but it has more recently been found in Italy (Barbagallo and Patti, 1998). Mon. hol., with apt. males.

***Aphis mizutakarashi* Shinji**

Apt. green with slight bluish-white waxy pulverulence, with mainly yellowish ant., and dark SIPH and cauda (Moritsu, 1983); BL not recorded. Imm. very pale yellow-green. On Cruciferae (*Barbarea*, *Cardamine*) in Japan.

***Aphis mohelnensis* Holman**

Apt. bluish green with dark head, SIPH and cauda; BL 1.2–1.9 mm. On *Hieracium* spp., living on terminal parts, mainly in the inflorescences. In Czech Republic, Bulgaria and Uzbekistan (Holman, 1998).

***Aphis molluginis* (Börner)**

Apt. green, BL 1.2–1.7 mm. Sec. rhin. in al. III c.2 (on distal part). At stem bases or on subterranean parts of *Galium* spp. in N and NW Europe. Ovip. are known from Denmark (Heie, 1986).

***Aphis mongolica* Szelegiewicz**

Apt. greenish yellow with dark SIPH and cauda; BL 0.8–2.0 mm. Sec. rhin. in al. III (=III+IV fused) 7–14 (Holman, 1988). On ground-level stems of *Potentilla tanacetifolia* var. *filipendula* and *Potentilla* sp. in Mongolia and E Siberia. Mon. hol. (orig. descr.).

***Aphis montanicola* Hille Ris Lambers (= *pulsatillae* Ossiannilsson, 1959)**

Apt. shiny bronze-black (orig. descr.) to dull dark green or greenish black with mainly pale ant. and tibiae; BL 1.5–2.0 mm. Sec. rhin. in al. III 3–7. On *Pulsatilla* spp. and *Anemone silvestris* in Europe (Switzerland, Sweden) and also recorded from W Siberia, Mongolia and E Siberia (Holman, 1987; as *A. pulsatillae*). Colonising stem bases early in season, and later on leaves and flowers; attended by ants. Mon. hol.; sexual morphs unknown, but fundatrices have been described from *Pulsatilla montana* (orig. descr.) and *P. vulgaris* (Ossiannilsson, 1959).

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Aphis mulini Hille Ris Lambers

Apt. color in life unknown, probably blackish; BL 1.7–2.0 mm. Al. undescribed. On *Mulinum* sp. (probably *spinosum*) in Patagonia, Argentina. [*A. mulini* is one of a group of S American *Aphis* with thick SIPH and dorsal abdominal sclerotisation that is often fragmented. *A. melosae* is also closely related, and has very different-looking spring and summer generations, suggesting a need for more detailed studies on the *Mulinum* feeders.]

Aphis mulinicola Hille Ris Lambers

Apt. color in life unknown, probably blackish; BL c. 1.8–1.9 mm. Al. undescribed. On *Mulinum* sp. (probably *spinosum*) in Patagonia, Argentina.

Aphis multiflorae Barbagallo and Stroyan

Apt. green with brown head, SIPH and cauda; BL 0.9–1.4 mm. Sec. rhin. in al. III 3–5, IV 0–2. On apical parts of young shoots of *Erica* spp. and *Daboecia cantabrica*. In Italy (Sicily), S France and Spain.

Aphis mutini Pashtshenko

Apt. color in life unknown, probably with shining dark brown or black dorsal shield; BL 1.8–2.2 mm. Sec. rhin. in al. III 7–9. On *Spiraea media* in E Siberia. Fund. in early June (orig. descr.).

Aphis myopori Macchiati

Apt. predominantly dark green, size not recorded. Described from a plant named as '*Myoporum pictum*' in Sardinia, and subsequently found on the same plant in mainland Italy (Calabria; Macchiati, 1882). Possibly it was *A. gossypii*.

Aphis myrsinitidis Petrović and Leclant

Apt. dark brown to very dark brown–red with thick white pleural wax spots; BL 1.7–2.1 mm. Sec. rhin. in al. III 9–11, IV 3–5, V 1–3. On *Euphorbia myrsinites* in the Balkans (Petrović and Leclant, 1998), and also found on *Euphorbia* spp. in Jordan, Lebanon, Iran, Turkey and Morocco (BMNH colln, leg. T. Mustafa, D. Hille Ris Lambers, E.S. Brown, N. Tuatay and J.H. Martin respectively). Mon. hol.; ovip. and al. males were collected in Iran in late Oct.

Aphis narzikulovi Szelegiewicz

Apt. (fund.) dark green to greenish black, with black SIPH and cauda; BL 1.8–2.2 mm. Only the fundatrix is described, collected in Mongolia from a plant originally identified as *Salvia* sp., but this was probably an error, the likely host being a species of *Dracocephalum* (Szelegiewicz, 1964a; Holman, 1988). One of the many dark green aphids of the *A. frangulae* group living on Labiatae.

Aphis nasturtii Kaltenbach

Plate 6g

Apt. yellow to yellowish green with dark apices to ANT and leg segments and SIPH; BL 1.3–2.0 mm. Sec. rhin. in al. III 8–16, IV 1–6, V 0–2. On a wide range of herbaceous plants in summer, including *Nasturtium officinale*, *Solanum tuberosum*, *Veronica beccabunga*, *Drosera rotundifolia* (Müller, 1978) and *Rumex* spp.; Stroyan (1984) lists host genera in 28 different families. Now almost world-wide (not yet in Australasia). Heter. hol., with a sexual phase on *Rhamnus cathartica*. 2n=8.

Aphis neilliae Oestlund

Apt. dark olive-green to black; BL 1.3–1.8 mm. Sec. rhin. in al. III 25–37, IV 14–23, V 7–15). On leaves and stems of *Physocarpus* spp. in N America. Mon. hol. with apt males (Palmer, 1952).

Aphis nelsonensis Cottier

Color of apt. in life unrecorded; BL c. 1.3 mm. Sec rhin. in al. III 2–4 (BMNH colln, leg. A.D. Lowe). On *Epilobium* sp. in New Zealand.

Aphis neoartemisiphila Pashtshenko

Apt. green, BL c. 1.4 mm. Al. (1 specimen) with 0–1 rhinaria on ANT III. On stems of *Artemisia mandshurica* in E Siberia.

Aphis neomonardae Rojanavongse and Robinson

Apt. are brownish to bluish green, BL 1.2–2.0 mm, on *Agastache foeniculum* and *Monarda fistulosa*, in Manitoba, Canada. Al. are light green to bluish green with brown marginal and postsiphuncular sclerites.

Aphis neonewtoni Pashtshenko

Apt. shining dark brown, with black SIPH and pale cauda; BL c. 1.8 mm. Al. undescribed. On upper sides of leaves of *Iris uniflora* in E Siberia.

Aphis neopolygona Shinji

Apt. salmon red; BL c. 1.25 mm. Sec. rhin. in al. III 28–32, IV 12–15, V 2–5. On *Barbarea* spp. and *Fagopyrum esculentum* in Japan. The short ANT PT and al. with numerous rhin. suggest that this may be *A. triglochinis*.

Aphis neospiraeae Takahashi

Apt. reddish brown to dark brown with black dorsal sclerotisation, wax-dusted, middle parts of tibiae whitish; BL 1.3–2.3 mm. Sec. rhin. in al. III 6–20, IV 0–7, V 0–3. On shoot apices of *Spiraea salicifolia* and *Rosa maximowicziana* in E Asia (E Siberia, Korea, Japan). Pashtshenko (1988a) synonymised *A. tshernovae* Holman and Szelegiewicz with *A. neospiraeae*, and this is accepted here. Holman (1987) pointed out some differences, which could be geographical variation.

Aphis neothalictri Pashtshenko

Apt. dark green to black, wax-dusted; BL c. 2.4 mm. Sec. rhin. in al. III 18–27, IV 6–10, V 2–5. On flower stems, pedicels and undersides of leaves of *Thalictrum* spp. in E Siberia (Kamchatka). Described as a subspecies of *A. thalictri*.

Aphis neotheresii Pashtshenko

Apt. brown, wax-dusted; BL c. 1.8 mm. Sec. rhin. in al. III 38–46, also some on IV and V (numbers not specified). In dense, ant-attended colonies on stems of *Thesium chinense* in E Siberia.

Aphis nepetae Kaltenbach

Apt. yellowish with head, SIPH and distal parts of ant. and legs black; BL 1.3–1.7 mm. On *Nepeta* spp. in Europe (not Scandinavia or UK). Also recorded from USA (Smith and Parron, 1978), although al. on slides labelled as *nepetae* in BMNH from Utah and Idaho (leg. G.F. Knowlton) have more numerous rhinaria distributed over ANT III, IV and V, indicating that they must be another species in the *frangulae* group. Mon. hol. in Germany according to Börner (1952). Mier Durante and Nieto Nafria (1978) redescribed this species on the basis of Spanish material. Biological studies are needed to verify the taxonomic relationships of this and other *frangulae*-like species on Labiatae.

Aphis nerii Boyer de Fonscolombe

Plate 6h

Apt. bright lemon yellow with dark ant. and legs, and black SIPH and cauda; BL 1.5–2.6 mm. Sec. rhin. in al. III 5–19, IV 0–4. In large dense colonies on growing shoots and along leaf midribs of *Nerium oleander*, and also found on many other plants, especially Asclepiadaceae and Apocynaceae. Widely distributed in tropical and subtropical regions including many Pacific islands, and in glasshouses in colder climates. Anhol. almost everywhere; sexual morphs are produced in Japan, but the life cycle is uncertain (Takada and Miyazaki, 1993). The aposematic coloration may be linked with sequestration of cardiac glycosides from its host plants (Malcolm, 1990). 2n=8.

Aphis nevskiyi (Ivanoskaya)

Apt. of unknown color, with black markings laterally and on posterior abdominal segments, and red eyes; BL c. 0.2 mm. On *Euphorbia* sp. in Azerbaijan.

Aphis newtoni Theobald

Apt. dark green to greenish brown or black, with black SIPH and cauda, imm. often marked with white wax; BL 1.7–2.4 mm. Sec. rhin. in al. III 9–20, IV 3–10, V 0–3. Low down on leaf blades, and later on

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flower stalks and in inflorescences, of *Iris* spp, often on plants growing in damp places or in water. Europe, Korea and Mongolia. Accessible colonies are usually ant-attended. Mon. hol. with apt. males (Gottschalk, 1990). 2n=8.

Aphis nivalis (Hille Ris Lambers)

Apt. of unknown color; BL c.1.8–2.0 mm. On *Epilobium* sp. in Greenland.

Aphis nonveilleri Petrovic and Remaudière

Apt. very pale, finely wax-powdered; BL 0.9–1.3 mm. On roots of *Asperula cynanchica*, in ant shelters. Montenegro. Mon. hol. with ovip. in mid-late Aug (Petrovic and Remaudière, 2002).

Aphis nudicauda Danielsson

Apt. pale green; BL 1.1–1.8 mm. On roots of *Filipendula vulgaris* in Sweden. Mon. hol.; fund. described (orig. descr.), but al. vivip. and sexuals unknown.

Aphis ochropus Koch

Apt. yellowish green or greenish yellow; BL 1.2–2.0 mm. Sec. rhin. in al. III 10–11, IV 2–3. On *Dipsacus sylvestris* in Germany, Poland and Hungary. This species was frequently regarded as a synonym of *A. confusa* Walker until Müller (1987) showed that it could not be transferred to *Knautia arvensis*, and listed morphological differences for most morphs. Mon. hol., with ovip. and apt. males in Sept.

Aphis odorikonis Matsumura

Apt. dark green; BL 1.8–2.2 mm. Sec. rhin. in al. III 6–13. On *Lamium album* var. *barbatum* in Japan (Takahashi, 1966), and also recorded from *Ixeridium dentatum* in S Korea (Lee *et al.*, 2002c), so the host relationship requires clarification.

Aphis (Bursaphis) oenotherae Oestlund (= *ribigillettei* Allen and Knowlton; = *neomexicana* Cockerell and Cockerell)

Apt. pale yellowish green to dark green with pale SIPH; BL 1.5–2.0 mm. Apparently host-alternating in N America between *Ribes* spp. (*aureum*, *alpinum*, *nigrum*), and various Onagraceae (*Epilobium*, *Oenothera*), although this needs to be confirmed experimentally. Introduced into Europe (Müller, 1974), and now also in Hawaii, Japan, Korea and Australia (NSW). Closely related to the European species *A. grossulariae*, which has a very similar biology. 2n=8.

Aphis oestlundi Gillette

Apt. pale green with blackish apices to ant, legs and SIPH; BL c.1.8–2 mm. On leaves and stems of *Oenothera biennis* in N America. Mon. hol., with apt. males (Hottes and Frison, 1931). 2n=8.

Aphis ogilviei Theobald

Apt. yellowish brown or tan, with black head, eyes, SIPH and cauda; BL 1.8–2.3 mm. Sec. rhin. in al. III 6–10, IV 0–2. On *Lilium longiflorum* (var. *eximium*) in Bermuda.

Aphis (Anthemidaphis) oligommata Tashev

Figure 5k

Apt. wax-dusted, color unknown; BL c.1.5 mm. Al. undescribed. On root of *Anthemis tinctoria* in S Bulgaria. Apt. and ovip. assigned to this species have also been collected on subterranean parts of *Achillea* spp. in France, Spain, Poland, Slovakia and Sicily. Barbagallo and Stroyan (1982) provided a morphometric comparison with *A. ligusticae*.

Aphis orchidis Bozhko

Apt. dull black; BL c.2.5 mm. On *Orchis purpurea* in Ukraine.

Aphis (Zyxaphis) oregonensis Wilson

Apt. are dark grayish brown tinged with wine red; BL c.1.7 mm. On leaves and young twigs of *Artemisia ludoviciana* (var. *gnaphalodes*) and *Seriphidium tridentatum* in western USA. There is some confusion in the literature with *A. canae* and *A. hermistonii*, but the three species seem separable by the key characters given.

Aphis origani Passerini

Apt. dark mottled green; BL 1.0–1.8 mm. Sec. rhin. in al. III 2–8. On *Origanum* spp., forming ant-attended colonies on stems and in young leaves and inflorescences, and causing strong leaf-curl. In Europe (not Scandinavia) and C Asia. Recorded as mon. hol., although the sexual morphs do not seem to have been described.

Aphis ornata (Gillette and Palmer)

Figure 211

Apt. are pale pinkish, with darker head and pronotum, and with variably-developed dark markings or bands on dorsal abdomen; BL 1.4–1.8 mm. Sec. rhin. in al. III 7–10, IV 1–2. On leaves and stems of *Chrysothamnus* spp. and *Ratibida columnaris* in Colorado, USA (eastern slopes of Rockies) The preferred host may be *Ch. nauseosus* var. *graveolens*). Ovip. and apt. males in Oct (Palmer, 1952). Closely related to *A. gregalis*, and there seem to be no reliable distinguishing characters for slide-mounted specimens.

Aphis orobanches Passerini

Apt. dark green; BL unknown. On root and at base of stem of *Orobanche* spp. in Italy. Described from *O. ramosa* near Bologna, and recorded on *O. mutelii* in Calabria by Macchiati (1883). Wilson and Vickery (1918) also list records from *O. lutea* and *Lathraea squamaria* (Scrophulariaceae), but the species is regarded as a *nomen dubium*.

Aphis oxytropiradicis Pashtshenko

Apt. green; BL c.1.0 mm. Al. undescribed. On an *Oxytropis* sp., living on underground part of stem near root. E Siberia.

Aphis oxytropis Pashtshenko

Apt. brown, wax-dusted; BL c.2.1–2.2 mm. Al. undescribed. In ant-attended colonies on flower stems and lower parts of flowers of *Oxytropis oxyphylla*. E Siberia. Appears closely related to *A. astragali*.

Aphis paludicola Hille Ris Lambers (= *Pergandeida palustris* Börner)

Apt. color in life unknown, probably dark and wax-dusted; BL 2.3–2.7 mm. Sec. rhin. in al. III 9–15, IV 0–7, V 0–4. On *Euphorbia palustris* in Germany and Ukraine. Tashev (1966) provided a redescription based on some of Börner's specimens.

Aphis panzeriae Holman

Apt. dark green, bluish green or dull grass-green; BL 1.5–2.1 mm. On root collars of *Panzeria* (= *Panzerina*) *lanata* in Mongolia.

Aphis papillosa Mier Durante, Nieto Nafria and Ortego

Apt. dark brown to black, rather shiny (imm. matt); BL 1.0–1.9 mm. Sec. rhin. in al. III (1-) 4–14, IV 0–3 (–5). On *Senecio* spp., living in dense colonies on stems, sometimes close to the root. Argentina and Chile. Mon. hol. with apt. males (Mier Durante *et al.*, 2003).

Aphis paravanoi Nieto Nafria, Ortego and Mier Durante

Apt. orange or dark green with yellowish SIPH and CAUDA; BL 0.95–1.5 mm. Sec. rhin. in al. III 2–6, IV 0–1. On stems and leaves of *Mulinum spinosum* in Argentina. Mon. hol., with ovip. and apt. males in March (Nieto Nafria *et al.*, 1999b).

Aphis parietariae Theobald

Apt. dark to pale green, or as pale yellowish summer dwarfs; BL 0.9–1.7 mm. Sec. rhin. in al. III 4–8, IV 0–2, V 0. In dense colonies on stems, under leaves and on inflorescences of *Parietaria* spp. In Europe, N Africa and Middle East. Mon. hol., with apt. males (sec. rhin. distributed III 2–14, IV 7–20, V 1–12). 2n=8.

Aphis pashtshenkoae Remaudière

Apt. yellow-green, wax-dusted; BL c.2 mm. Al. undescribed. In dense colonies on undersides of apical leaves of *Lysimachia davurica* (Pashtshenko, 1993c, as *A. lysimachiae*). E Siberia (Maritime Terr.).

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Aphis passeriniana (Del Guercio)

Apt. mottled dull green to dark green; BL 1.2–1.8 mm. Sec. rhin. in al. III 3–12, IV 0–3, V 0–1. Up growing shoots, in curled leaves and among inflorescences of *Salvia* spp. Ant-attended. In Europe and Middle East. Presumably mon.hol., although sexual morphs have apparently not been described.

Aphis patagonica Blanchard

Apt. brick red, BL 1.5–2.3 mm. Sec. rhin. in al. III 2–6. On *Berberis* spp. in Chile and Argentina. Ortego and Mier Durante (1997) redescribe the species, including ovip. collected in Jan. Apt. males occur in Jan (BMNH colln, and Nieto Nafría *et al.*, 2004b).

Aphis patriniae Takahashi

Apt. yellowish green to green; BL 1.0–1.4 mm. On *Patrinia* spp., colonising axils of stem leaves (Holman, 1987). In E Siberia, Japan and Korea. There is a record from *Valeriana fauriei* in Korea (Lee *et al.*, 2002c).

Aphis patrinicola Holman

Apt. pale green; BL 1.05–1.45 mm. On *Patrinia scabiosifolia*, colonising root collar and basal part of stem, sheltered by ants. In E Siberia.

Aphis patriniphila Holman

Apt. green or yellow; BL 1.25–1.63 mm. On *Patrinia rupestris*, probably living on terminal parts of plant, in Mongolia. Seems close to *A. spiraeicola*.

Aphis patvaliphaga Pashtshenko

Apt. green or yellow-green, sometimes with end of abdomen dark brown; BL c. 1.4–1.5 mm. On leaves and stem of *Patrinia* spp. and *Valeriana coreana* in E Siberia.

Aphis pavlovski Narzikulov

Apt. brown with black SIPH; BL 1.7–1.9 mm. On roots of *Hypericum scabrum* in Tajikistan.

Aphis pediculariphaga Pashtshenko

Apt. dark dingy green, almost black; BL c.1.6–1.7 mm. On *Pedicularis resupinata* in E Siberia, colonising basal or upper part of stem, and undersides of leaves, attended by ants.

Aphis penstemonicola Gillette and Palmer

Apt. pale green, with brownish head and dark markings on posterior abdomen; BL 1.8–2.0 mm. On leaves and stems of *Penstemon* sp. in western USA (Utah, Colorado), and also collected on *P. virens* in Alberta, Canada (BMNH colln, leg. AM Harper). Mon. hol., with ovip. and apt. males in Oct (Palmer, 1952). This seems to be a very variable species; see footnote in Palmer (1952: 161).

Aphis periplocophila Zhang

Apt. dark green, with black SIPH: BL c.2.0 mm. On *Periploca sepium* in China. A member of the *frangulae/gossypii* group.

Aphis pernilleae Heie

Apt. green or bluish green, SIPH dark or pale with dark apices; BL 0.7–1.6 mm. In dense, ant-attended colonies on roots of *Hypochaeris* sp. (probably *glabra*), down to 21 cm below surface. In Denmark, and aphids on *Andryala* spp. in Spain have now been assigned to this species (Nieto Nafría *et al.*, 2005). Mon. hol.; ovip. in Sept.

Aphis peucedani Szelegiewicz

Apt. dark green; BL 1.6–2.2 mm. Sec. rhin. in al. III 5–6, IV 0–2. On *Peucedanum officinale* in Hungary, colonising young shoots and later in summer within leaf sheaths (orig. descr.).

Aphis (Debilisiphon) peucedanicarvifoliae (Bozhko)

Apt. dirty green; BL c.2.0 mm. On *Peucedanum carvifolia* in Ukraine.

Aphis phaceliae Gillette and Palmer

Apt. yellowish green to canary-yellow mottled with bluish green, with rusty yellow head, black SIPH and pale CAUDA; BL c. 1.2–1.7 mm. Sec. rhin. in al. III 7–12, IV 1–4. On leaves and stems of *Phacelia* sp. in Colorado, USA (Palmer, 1952).

Aphis philadelphicola Pashtshenko

Apt. green, with blackish SIPH and CAUDA; BL 1.6–2.1 mm. Sec. rhin. in al. III 5–9, IV 0–2. On *Philadelphus* spp. in E Siberia.

Aphis phlojodicarpi Pashtshenko

Apt. dingy blackish green, wax-powdered; BL c.1.9 mm. On *Phlojodicarpus* spp. in ant-attended colonies on stems, in inflorescences and in upper leaf sheaths. E Siberia. Mon. hol. (orig. descr.).

Aphis (Protaphis) picridicola Holman (= *Protaphis striata* Hille Ris Lambers, = *Protaphis funicularis* Müller)

Apt. bluish gray, bluish green, pale green or dark gray–green, with black dorsal markings and powdered with bluish gray wax; BL 1.4–2.1 mm. Sec. rhin. in apt. III 0–11, IV 1–8, V 0–5, in al. III 9–15, IV 1–6, V 1–4. On *Hypochaeris* spp., *Leontodon* spp. and *Picris hieracioides*, living basally on root collar and lower leaves, attended by ants. Europe. Mon. hol., with apt. males (orig. descr. and Müller, 1968a, as *Protaphis funicularis*).

Aphis pilosellae (Börner)

Apt. pale green to dark green, mottled, with black SIPH and CAUDA; BL 0.9–1.7 mm. Sec. rhin. in al. III 7–14. On *Hieracium* spp., mostly of the *Pilosella* group, colonising undersides of basal leaves and subterranean runners. Ant-attended. In Europe, eastward to Russia and Ukraine (Holman, 1998).

Aphis pilosicauda Gillette and Palmer

Apt. olive green, lightly wax-powdered; BL 1.5–1.9 mm. On stems of *Cirsium* sp. near ground, or on roots, in Colorado, USA. Ovip. and apt. males in Oct (Palmer, 1952).

Aphis plantaginis Goeze

Apt. dark green, imm. paler; BL 1.2–2.2 mm. Sec. rhin. in al. III 3–8, IV 0 (–1). Under leaves and on leaf bases and subterranean stems of *Plantago* spp. In Europe, C Asia, W and E Siberia, and also recorded from USA (New York). Mon. hol. with apt. males (Heie, 1986).

Aphis platylobii Carver and White

Apt. orangey-brown appearing grayish due to dusting of white wax; BL 1.1–1.6 mm. Sec. rhin. in al. III 0–3 only. On young shoots and leaves of *Platylobium formosum*. Not attended by ants. In NSW, Australia. $2n=8^*$.

Aphis pleurospermi Pashtshenko

Apt. dark green to dark brownish green; BL c.2.2 mm. On stems or inflorescences of *Pleurospermum uralense* in E Siberia. Mon. hol. (orig. descr.; fund. in early June).

Aphis poacyni Zhang, Chen, Zhong and Li

Apt. color in life unrecorded; BL c.1.4 mm. On *Apocynum venetum* in Xinjiang, China (Zhang, 1999). These specimens could be hot-weather dwarfs of *A. apocynicola*.

Aphis podagrariae Schrank

Apt. black in life, BL 1.4–2.5 mm. Immatures often have pleural spots of wax as in *A. fabae*. Sec. rhin. in al. III 12–18, IV 1–7, V 0–2. In ant-attended colonies causing tightly bunched leaf-curl on young foliage of *Aegopodium podagraria*. Later it may occur on other parts of the plant, but does not live preferentially in the inflorescences, as do summer generations of *A. fabae* (*s. lat.*) on this host. Also recorded from *Seseli libanotis* (Ossinnilsson, 1959). Mon. hol. on *Aegopodium*, with al. or occasionally brachypt. males. Throughout Europe (except SW), and eastward to Kazakhstan. Difficulties of distinguishing preserved specimens of this species from members of the *fabae* complex that colonise *Aegopodium* are discussed by Stroyan (1984).

THE APHIDS

Aphis polemoniradicis Pashtshenko

Apt. dark green, slightly pruinose; BL c.1.5 mm. Sec. rhin. in apt. III 0–2, in al. III 4–5, IV 0–1, V 0–1. On roots or leaf bases of *Polemonium racemosum*. Ant-attended. In E Siberia.

Aphis pollinaria (Börner)

Apt. reddish brown with a dorsal wax pattern; BL 1.3–1.8 mm. Sec. rhin. in al. III 6–14, IV 0–4, V 0 (–2). On apical parts of *Epilobium* spp. in C and E Europe (Germany, Czech Republic, Slovakia). It often forms mixed colonies with *A. epilobii*, and sometimes also with *A. spiraephaga* (Holman, 1990). No key characters could be found to distinguish *Aphis onagraphaga* Pashtshenko, described from *Epilobium* spp. in E Siberia, from *A. pollinaria*, and it seems likely to be a synonym.

Aphis polygonacea Matsumura

Apt. dark green; BL 1.7–2.0 mm. Sec. rhin. in al. III 7–9 (–16?), IV 0–2 (–7?). On *Fallopia sachalinense*, *Polygonum* sp. and probably other Polygonaceae, in Japan and Kuril Islands (Pashtshenko, 1988a). Colonies are ant-attended and distort leaves (BMNH colln data). Some al. found on *Polygonum hydropiper* in Queensland, Australia (Eastop, 1966: 483; as *Aphis* sp.) could possibly be this species. A record from *Rumex acetosella* in India (Chowduri *et al.*, 1969a) needs confirmation.

Aphis polygonata Nevsky (= *avicularis* Hille Ris Lambers)

Apt. dark brown to black with short pale SIPH; BL 1.6–2.2 mm. Sec. rhin. in al. III 12–17, IV 2–8, V 0–1. On creeping mats of *Polygonum aviculare*, attended by ants and also recorded from *Persicaria* spp. Europe, Middle East, C Asia, and also in California, USA. Mon. hol. with al. males (Remaudière and Remaudière, 1997). 2n=8*.

Aphis pomi DeGeer

Apt. yellow-green with black. SIPH and dark cauda: BL 1.3–2.2 mm. Sec. rhin. in al. III 6–11, IV 0–4. On young shoots of Pyroidea including *Chaenomeles*, *Cydonia* and *Pyracantha*, usually ant-attended and causing leaf curl. Later generations occur on undersides of leaves. In Europe, N Africa, SW and C Asia eastward to India and Pakistan, and N America (although many N American records apply to *A. spiraecola*). Oriental records of *A. pomi* on various hosts (e.g., in Japan) all seem to apply to other species, and Cottier (1953) in New Zealand had *A. spiraecola*. Mon. hol. with apt. males. 2n=8.

Aphis ponomarenkoi Holman

Apt. green with brown head and appendages; BL 1.3–1.6 mm. On *Eleutherococcus senticosus* in E Siberia.

Aphis (Bursaphis) popovi Mordvilko

Apt green; BL c. 2 mm. On *Ribes* sp. in E Russia (Yakutia).

Aphis potentillae Nevsky

Apt. very dark green or black; BL c.1.7 mm. On aerial parts of *Potentilla* spp. in C and E Asia (Pashtshenko, 1988a, Lee *et al.*, 2002c).

Aphis praeterita Walker (= *diphaga* Walker; *epilobiina* Walker)

Apt. greenish yellow, sometimes mottled with green, with SIPH usually dark and cauda pale; BL 1.2–1.9 mm. Sec. rhin. in al. III 7–12, IV 0–5, V 0–1. On undersides of leaves and at shoot apices of *Epilobium hirsutum*, and sometimes other *Epilobium* spp., but apparently not *angustifolium*; Walker's original description from this host was apparently in error (Stroyan, 1984). Widely distributed in Europe. Mon. hol., with al. males. Not usually ant-attended.

Aphis proffti (Börner)

Apt. are pale light green or yellowish green with pale legs and ant.; BL 0.7–1.5 mm. Sec. rhin. in al. III 12–18, IV 4–9, V 3–5. On undersides of leaves and in inflorescences of *Agrimonia* spp. (*eupatoria*, *odorata*) in Europe (Denmark, Sweden, France, Spain, Germany, Austria, Poland, Hungary, Czech Republic, former Yugoslavia). Biology unstudied, but an ovip. was collected on *A. eupatoria* in Sweden in Oct (BMNH, coll. F. Ossiannilsson). Closely related to the E Asian species *A. argrimoniae*.

Aphis propinqua Holman

Apt. color in life unknown, probably blackish dusted with whitish wax powder; BL 1.9–2.3 mm. Sec. rhin. in al. III 12–19, IV 0–4. On *Euphorbia* sp., collected from terminal parts and inflorescences, in Iran.

Aphis psammophila Szelegiewicz

Apt. green to dark green with brownish head, dark SIPH (sometimes pale at base) and a pale/dusky cauda; BL 1.0–1.5 mm. Sec. rhin in al. III 3–8, IV 0–1. On *Campanula rotundifolia* and *Jasione montana*, living on subterranean parts of the plant in ants' nests, in dunes and other sandy areas (Heie, 1986). In S and C Europe. Mon. hol., with apt. males.

Aphis pseud euphorbiae Hille Ris Lambers

Apt. color in life unknown, probably wax-dusted: BL 1.4–1.8 mm. On *Euphorbia lanata* in Israel. Closely related to *A. euphorbiae* and *A. tirucallis*, and possibly an unpigmented, hot-weather form of the latter species.

Aphis (Protaphis) pseudocardui Theobald

Figure 31c

Apt. dark green or brown with covering of gray mealy wax, short black SIPH, and often there are a pair of dark spots on dorsal abdomen just anterior to SIPH; BL 1.5–2.0 mm. In ant-attended, often dense colonies on stems, upper sides of leaves, flowerheads, or on root collars. Described from 'thistles (*Carduus* sp.)' in S Africa; however this could have been *Sonchus* which is widely known as 'thistle' in Africa. Since recorded from other parts of Africa, Mediterranean region and Middle East and various other Compositae (*Arctotheca*, *Berkheya*, *Carduus*, *Carthamus*, *Cichorium*, *Hypochaeris*, *Lactuca*, *Pluchea*, *Pulicaria*, *Vernonia*), although some of these records may be referable to other closely related species, including the *terricola* group. $2n=8$.

Aphis pseudocomosa Stroyan

Apt. dark warm brown with shiny black dorsum, imm. reddish brown to magenta with waxy bloom; BL 1.5–2.3 mm. Sec. rhin in al. III 6–11, IV 0–2. In small ant-attended colonies up shoots and in inflorescences of *Lathyrus pratensis* (Stroyan, 1984), and also found on *Onobrychis* in Switzerland (BMNH colln). Widely distributed in Europe. Mon. hol. with apt males.

Aphis pseudocytisorum Hille Ris Lambers

Apt. black densely powdered with pearly gray wax; BL 1.2–1.6 mm. Al. not recorded. Described from colonies on young shoots and petioles of *Cytisus nigricans* in Italy, and aphids identified as this species have subsequently been collected in Hungary and France on other *Cytisus* (and *Chamaecytisus*) spp., and in Italy on *Spartium junceum*. However, the features distinguishing *pseudocytisorum* from *cytisorum* (shorter SIPH and less dorsal sclerotisation) vary greatly in this group and should be treated warily. Of the specimens in the BMNH collection, only those from Italy have SIPH as short as the type material.

Aphis pseudopaludicola Tashev

Apt. color in life unrecorded, probably dark and wax-dusted; BL 1.8–2.2 mm. Sec. rhin. in al. III 12–17, IV 2–3. On stem, petioles and undersides of leaves of *Euphorbia cyparissias* in Bulgaria.

Aphis pseudopulchella Blanchard

Apt. color in life unknown; BL c.1.8 mm. Al. not described. On *Euphorbia portulacoides* in Argentina.

Aphis pseudovalerianae Gillette and Palmer

Apt. pale olive-green with brown head, darker marginal areas, dark ANT and legs, and black SIPH and cauda; BL 1.4–1.7 mm. Sec. rhin. in al. III 14–20, IV 3–7, V 1–5. On roots of a *Valeriana* sp. in Colorado. Mon. hol., with ovip. in Sept (Palmer, 1952).

Aphis pulchella Hottes and Frison

Apt. bluish green and lightly wax-dusted in life; BL c.1.6–1.7 mm. Sec. rhin. in al. III 5–7. On *Euphorbia* sp. in Illinois, USA, and there are also records from Montana and N Carolina. Mon. hol.; ovip. and al. males were collected in late Sept (Hottes and Frison, 1931).

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Aphis pulegii Del Guercio

Apt. pale yellow to dark green; BL 0.9–1.4 mm. On *Mentha pulegium* and *M. × piperita*, feeding on young shoots and undersides of leaves in spring, moving in summer to base of stem. Ant-attended. In Spain, Portugal, Sicily and Morocco. Ilharco (1987) redescribed this species and compared it with the closely related *A. affinis*.

Aphis pulsatillaephaga Pashtshenko

Apt. green to dark green, BL of holotype 1.55 mm. On *Pulsatilla* spp. in E Siberia, living at base of stem. Al. unknown.

Aphis pulsatillicola Holman

Apt. dark green to blackish, in some specimens the dorsal abdomen bright green; BL 1.4–2.2 mm. Sec. rhin. in al. III 4–6 (large). Described from *Pulsatilla pratensis* ssp. *nigricans*, living on the root collar and stem base early in season, later up the stem and on leaves; ant-attended. Only known from Czech Republic. Mon. hol., with apt. males (orig. descr.).

Aphis punicae Passerini

Apt. yellowish-green with dark-tipped SIPH; BL 1.0–1.7 mm. Sec. rhin. in al. III 4–11, IV 0–5. On upper sides of mature leaves of *Punica granatum*, concentrated along the midribs and around the leaf margins. Also recorded from *Duranta plumieri* and *Plumbago capensis*. Mediterranean region, Middle East, Ethiopia, India and Pakistan. Mon. hol. on *Punica*, with alate males, but in Israel there is also anhol. overwintering on *Duranta* (Swirski, 1954). See also Blackman and Eastop (2000). 2n=8.

Aphis raji (Kumar and Burkhardt)

Apt. creamy white, BL c.1.4–1.7 mm. Sec. rhin. in al. III 6–7 (rather tuberculate, on distal part). On Labiatae (*Callicarpa*, *Colebrookea*, *Salvia*; BMNH colln) and *Cyathula tomentosa* (Amaranthaceae; David *et al.*, 1970, as *A. leptorhyncha*) in N India. [Information about chaetotaxy and relative length of R IV+V given in the original description does not agree with paratypes in the BMNH colln.]

Aphis ramona Swain

Apt. rich dark green with head dusky brown; BL 1.1–1.2 mm. On *Salvia stachyoides* in California and Utah (BMNH colln).

Aphis reticulata Wilson

Apt. brown, with a reticulate pattern over the entire body; BL c.1.7 mm. Sec. rhin. in al. III c.40 (protruberant) IV and V 0. Described from *Seriphidium tridentatum* in Oregon, and apparently not found since 1915.

Aphis rheicola Nevsky

Apt. yellowish orange or shining brown; BL c.2.3 mm. On undersides of leaves of *Rheum maximoviczii* in S Kazakstan. [This species is tentatively keyed to *Aphis fabae* group on the basis of Nevsky's description, but not enough information is given to be certain of this. Hairs on ANT and body are said to be short and sparse.]

Aphis rhoicola Hille Ris Lambers

Apt. brown; BL 1.7–2.0 mm. Described from *Rhus abyssinica* in Eritrea. Also tentatively recorded from *Rumex* spp. in N India (David *et al.*, 1971a; Raychaudhuri, 1984; BMNH colln, leg. D. Hille Ris Lambers). The Indian specimens have a longer ANT PT (PT/BASE 1.9–2.2, cf. 1.5–1.9 for Eritrean types), shorter SIPH (SIPH 1.5–1.7× cauda, cf. 1.8–2.1×) and a darker cauda, so may be another species in the difficult *A. frangulae* group.

Aphis ripariae Oestlund

Apt. pale yellowish green; BL not recorded. On undersides of leaves of *Vitis riparia* in Minnesota, USA.

Aphis roberti Nieto Nafria, Ortego and Mier Durante

Apt. shiny black; BL 0.9–1.7 mm. Al. undescribed. In dense colonies on flowerheads of *Mulinum spinosum* in S Patagonia (Argentina) and S Chile (Nieto Nafria *et al.*, 1999b).

Aphis roepkei Hille Ris Lambers

Apt. pale greenish yellow; BL 1.3–1.7 mm. Sec. rhin. in al. III 3–6. In small ant-attended colonies on lower parts of stems and leaf petioles, and on roots, of *Potentilla* spp., esp. *reptans*. Europe (Sweden, Germany, N Italy, Poland, Czech Republic), W Asia, and also recorded from *P. chinensis* in E Siberia (Pashtshenko, 1988a).

Aphis roripae (Palmer)

Apt. pale to mid green, with pale SIPH and cauda; BL 1.3–1.8 mm. Sec. rhin. in apt. III 0–9, in al. III 10–19 (ANT 5-segmented). On stems and leaves of *Rorippa hispida* in western USA (Palmer, 1952).

Aphis rostella (Zhang, Chen, Zhong and Li)

Apt. leaf green, with pale SIPH and cauda; BL 1.5–2.1 mm. Sec. rhin. in al. III 7–8, IV 2. On *Malva sinensis* in Xinjiang, China (Zhang, 1999, as *Rhopalosiphum rostellum*). Resembles *A. umbrella*, but with rather longer R IV+V.

Aphis rubiae Narzikulov

Apt. yellowish green, with black SIPH and brown cauda; BL c.1.8 mm. Sec. rhin. in al. III 7–9, IV 3–4. In large colonies on stems and undersides of leaves of *Rubia tinctorum* in Tajikistan.

Aphis rubicola Oestlund

Apt. pale yellowish green, with pale appendages; BL 0.6–1.2 mm. Sec. rhin. in al. III 3–10. On leaves and shoot apices of *Rubus idaeus* var. *strigosus* and *R. occidentalis* in N America. Mon. hol., with apt. males. The minute long-haired summer dwarfs with 5-segmented ANT may often have been misidentified as *A. rubifolii*. See also Blackman and Eastop (2000). 2n=8.

Aphis rubicolens (Hori)

Recorded from *Rubus* sp. in Japan (Hori, 1929, as ‘ichigo-gosetsu-aburamushi [= berry aphid with 5-segmented antenna], *Cerosiphia rubicolens* Hori’), but original description cannot be found.

Aphis rubifolii (Thomas)

Apt. pale greenish-yellow with pale appendages; BL 0.9–1.4 mm. Sec. rhin. in al. III 2–7. On wild and cultivated *Rubus* spp., esp. blackberries. Records from *R. idaeus* var. *strigosus* may be confusing this species with summer dwarfs of *A. rubicola*. N America. Mon. hol. with apt. males.

Aphis rubiradicis Robinson

Apt. gray; BL 1.2–1.4 mm. On roots of *Rubus chamaemorus* in Saskatchewan, Canada. Mon. hol., with ovip. and apt. males present in early Aug (orig. descr.).

Aphis ruborum (Börner)

Apt. blue-green (spring) or pale yellow–green (summer); BL 0.8–2.0 mm. Sec. rhin. in al. III 4–10 (large), IV 0–1. In dense spring colonies on young shoots of *Rubus fruticosus* (agg.), and later under leaves, in flowers and on developing fruits. Also sometimes on *Fragaria* × *ananassa*, and found in Chile on *R. idaeus* (BMNH colln, leg. R.H. Converse). In Europe, N Africa, SW and C Asia eastward to India and Pakistan, and introduced to Chile. Mon. hol. with apt. and al. males. Some of the records from India may apply to the longer-haired *Aphis longisetosa* (q.v.). Populations in BMNH colln from former Yugoslavia on both *R. fruticosus* and *R. caesius* have a longer ANT PT and may be an undescribed species. 2n=8.

Aphis rukavishnikovi Ivanoskaya

Apt. bright green with dark SIPH and cauda; BL 3.5–4.0 mm. Sec. rhin. in al. III 8–10, IV 4–5, V 1–2. In small colonies on undersides of leaves of *Caltha silvestris*. N Asia.

THE APHIDS

Aphis rumicis L.

Apt. dull black or very dark brown: BL 1.4–2.8 mm. Sec. rhin. in al. III 6–20, IV 0–2. On *Rumex* spp., feeding on undersides of leaves in spring and rolling them longitudinally into tubes. Later on stems and inflorescences. It can also occur on *Rheum* spp. (Stroyan, 1984, Lee *et al.*, 2002c). Ant-attended. Widely recorded in N Hemisphere, although at least some Japanese records (e.g. Takahashi, 1966) apply to a different species. Mon. hol., with apt. males and ovip. with barely swollen hind tibiae. 2n=8.

Aphis salicariae Koch

Apt. reddish brown to brown, with a wax bloom giving a pinkish appearance; BL 1.7–2.3 mm. Sec. rhin. in al. III 12–28, IV 0–2. Host-alternating between *Cornus alba* and *Epilobium angustifolium*, where colonies are formed on undersides of leaves along midribs and are often attended by ants. Also recorded from *E. obscurum* (Chumak, 2004). Migration to *Cornus* in Oct. In N, C and E Europe, across Siberia, and in N America. 2n=8.

Aphis salsolae (Börner)

Apt. reddish brown, and unusually active when disturbed (J. Holman, pers. comm.); BL 1.4–1.9 mm. On certain genera of Chenopodiaceae (*Kochia*, *Salicaria*, *Salsola*) in S Europe, and the Mediterranean and Black Sea regions (France, Germany, Italy, Israel, Bulgaria, Rumania, Turkey, Crimea). When mounted on slides this species is indistinguishable from *A. craccivora*.

Aphis salviae Walker

Apt. brown, shining; BL 1.5–2.1 mm. On *Salvia* spp. and also recorded from *Lavandula multifida* and *Teucrium polium*. Europe (France, Spain, Portugal, Switzerland, Poland, Hungary, Czech Republic, Bulgaria), Israel and Turkey. Mon. hol. with apt. males (Nieto Nafria *et al.*, 1986).

Aphis sambuci L.

Plate 7a

Apt. gray–green to dark blue–green powdered with grayish wax; BL 1.4–3.1 mm. Sec. rhin. in al. from sec. hosts III 30–44, IV 10–27, V 3–15. On roots of plants in several genera, particularly Caryophyllaceae (*Cerastium*, *Dianthus*, *Silene*, *Melandrium*, *Moehringia*, *Spergula*), also often on *Rumex*, *Capsella*, *Oenothera* and *Saxifraga*. Attended and sheltered by ants. Holarctic (except that long-haired populations in Japan and Korea are regarded as a different species, *A. horii*), and introduced to S America (Brazil, Argentina). Heter. hol., with a sexual phase on *Sambucus*, on which it forms dense spring colonies around young stems. Anhol. overwintering on roots occurs regularly in Europe (Jacob, 1949; Iglisch, 1966), and probably elsewhere. 2n=8.

Aphis sanguisorbae Schrank

Apt. blackish brown; BL 1.1–2.2 mm. Sec. rhin. in al. III 4–8, IV 0–1, V 0–1. In ant shelters on basal parts of *Sanguisorba* spp. In Europe (Sweden, England, France, Spain, Germany, Poland, Czech Republic, former Yugoslavia), and Israel (BMNH colln, on *S. spinosum*). Blackish green aphids on *S. minor* are regarded as a subspecies, *A. sanguisorbae* ssp. *poterii* (Börner), following Stroyan (1984). They tend to have shorter hairs and more weakly developed marginal tubercles (Holman, 1987). Mon. hol. with apt. males.

Aphis sanguisorbicola Takahashi

Apt. shining dark brown to black, with black SIPH and whitish green cauda; BL 1.0–2.3 mm. On *Sanguisorba* spp. in E Asia.

Aphis saniculae Williams

Apt. green (original description) or golden yellow with yellowish brown head (Hottes and Frison, 1931, as *A. luridis*); BL c.1.5 mm. Sec. rhin. in al. III 21–50, IV 6–15, V 1–7. In ant-attended colonies on undersides of leaves of *Sanicula canadensis*, which may be curled downwards to form small ‘leaf-nests’ (Williams, 1911; Stroyan, 1970); also recorded from leaves and flower stalks of *Zizia* spp., and from *Cicuta maculata* (Rojanavongse and Robinson, 1977). In USA (Illinois, Nebraska, Kansas) and Canada (Manitoba). It is very similar in morphology to *A. thaspiae* inhabiting the same range of umbelliferous hosts, but apparently there

are consistent color differences in life which correlate with the presence/absence of sec. rhin. in the apt. morph. Experimental work is needed to confirm whether or not these two species are really distinct.

Aphis saussurearadicis Pashtshenko

Apt. brown, wax-powdered; BL c.1.6mm. Sec. rhin. in al. III 9–12. On *Saussurea* spp., living in small, dense colonies on radical leaves and roots, attended by ants. E Siberia and Korea (Lee *et al.*, 2002c; although the al. illustrated by them has ANT III with at least 20 rhinaria). Mon. hol. with ovip. in mid-Aug (orig. descr.). In Korea recorded also from *Ligularia stenocephala*.

Aphis schilderi (Börner)

Apt. dark green; BL 1.5–2.0mm. Sec. rhin. in al. III 4–7, IV 0–2. On stems, and later in summer on leaf sheaths, of *Peucedanum* spp. in Germany, Hungary and Poland (Szelegiewicz, 1964b, 1966). Attended by ants. Mon. hol. according to Börner (1952).

Aphis (Bursaphis) schneideri (Börner)

Apt. dark green, dusted with bluish gray wax; BL 1.2–2.3mm. Sec. rhin. in al. III 13–18, IV 2–11, V 0–3. In spring colonies on young growth of *Ribes* spp., most typically *R. nigrum*, causing curling and crumpling of young leaves., and later on undersides of leaves. Ant-attended. Europe (not Iberian peninsula), and east to Turkey, Kazakhstan and W Siberia. Mon. hol. with apt. males.

Aphis schuhi Robinson

Appearance in life unknown; BL 1.3–1.6mm. On *Holodiscus discolor* in Oregon, USA. Al. unknown.

Aphis (Protaphis) scorzonerae (Mordvilko)

Apt. brownish green, covered with ‘rather bright azure-blue velvet-like powder’ (Ghilarov, 1937, as *Xerophilaphis scorzonerae*); BL 1.7–2.3mm. In ant-attended colonies on roots (where they may feed in lesions produced by the ants; Ghilarov, 1937) and at bases of leaves, of Compositae (*Taraxacum*, *Hieracium*, *Scorzonera*, *Sonchus*). Austria (BMNH colln. leg. H. Franz), C Russia, Ukraine, N Caucasus, and eastward to Kazakhstan.

Aphis sedi Kaltenbach (= *Aphis tahosalea* Hottes and Wehrle)

Apt. dark green to almost black; BL 1.0–1.7mm. Sec. rhin. in al. III 5–11, IV 0–2. On young stems, in inflorescences and under leaves of *Sedum* spp. and other Crassulaceae. Ant-attended. Europe, east to Transcaucasia and W Siberia, N Korea (Lee *et al.*, 2002c), and in N and S America, Australia and New Zealand (BMNH colln). Mon. hol. with apt. males (Heie, 1986). 2n=8.

Aphis sediradicis Pashtshenko

Apt. green or dark green; BL c. 1.2–1.3mm. In small colonies on root and stem base of *Sedum aizoon*. E Siberia.

Aphis selini (Börner)

Apt. pale or dark blue-green; BL 1.2–1.5mm. Sec. rhin. in al. III 7–10, IV 3–4, V 0–1. On prostrate stems/stolons of *Selinum carvifolia* in Germany. It seems possible that *A. umbelliferarum* (Shaposhnikov) is a synonym.

Aphis sempervivae Mamontova-Solukha

Apt. dark green, wax-dusted; BL c.0.7mm (?). On *Sempervivum soboliferum* in Ukraine.

Aphis seneciocrepiphaga Pashtshenko

Apt. blackish green, slightly wax-dusted; BL c.1.9mm. Sec. rhin. in al. III 26–33, IV 8–15, V 0–5. On *Senecio* spp. and *Crepis tectorum*, living on undersides of upper leaves and flower stems, attended by ants. In E Russia (Sakhalin, Kuril Islands, Yakutia).

Aphis senecionicooides Blanchard

Apt. black, rather shiny; BL 1.1–2.1. Sec. rhin. in al. III 5–15 (–23), IV 0–7, V 0–3. On *Senecio* spp., forming dense, tranquil colonies on stems. Argentina. Mon. hol. with al. males (Mier Durante *et al.*, 2003).

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Aphis senecionis Williams

Apt. dark olive-green, with dusky to dark brown legs and dusky brown SIPH; BL 1.7–1.9mm. In large colonies on upper stems, leaves and flower-stalks of *Senecio canus*. Western USA. Closely related to *A. lugentis*.

Aphis senecioradicis (Gillette and Palmer)

Apt. dusky blue–green with head brownish, and dark appendages; BL 2.2–2.8mm. Sec. rhin. in apt. III 1–5, IV 1–5; in al. III 5–8, IV 1–6. On roots of *Senecio spartioides* and *Senecio* sp. in western USA (Colorado, Idaho). Mon. hol. with ovip. and apt. males on late Oct. (Palmer, 1952).

Aphis sensoriatæuphorbiæ Bozhko

Apt. brown, wax-dusted; BL c.1.8–2.0mm. Sec. rhin. in al. (1 antenna only) III 19, IV 11, V 8. On *Euphorbia lathyris* in Ukraine.

Aphis septentrionalis Pashtshenko

Apt. brown or black; BL c.1.5mm. On *Pedicularis resupinata* and *Pedicularis* sp. in E Siberia, colonising inflorescences, and upper and basal parts of stem, often in dense colonies. Mon. hol., with ovip. and apt. males in late July (orig. descr.).

Aphis serissae (Shinji)

Apt. pale green; BL unrecorded (BL of al. 1 mm). Al. with c.4 sec. rhin. on ANT III. On *Serissa japonica* in Japan, and recorded on *Artemisia princeps* in Korea (Paik, 1965).

Aphis serpylli Koch

Apt. dark green with a slight waxy bloom; BL 1.0–1.4mm. Sec. rhin. in al. III 4–9, IV 0–2. On shoots and inflorescences of *Thymus* spp., and certain other Labiatae (*Coridothymus*, *Micromeria*). Attended and sometimes tented over by ants. In Europe, Middle East and C Asia. Mon. hol. with apt. males. In BMNH colln there is an undescribed, closely related species collected on *Hyssopus officinalis* in Switzerland.

Aphis serratularadicis Pashtshenko

Apt. pale green; BL c.1.2mm. In small dense colonies on roots of *Serratula wolfii* in E Siberia.

Aphis (Debilisiphon) seselii (Bozhko)

Apt. green or dark green; BL c.1.6mm. On lower part of stem of *Seseli tortuosum* in Ukraine. [This is probably a synonym of *A. umbelliferarum*; the main difference from *A. umbelliferarum* that Bozhko gives in her (1963) key is the lack of marginal tubercles, and we have followed this in our key, yet a specimen in BMNH identified as *seselii* by Bozhko has well-developed marginal tubercles like those of *umbelliferarum*.]

Aphis shaposhnikovii Holman

Apt. are yellowish brown, covered with a whitish gray powder; BL 1.75–2.0mm. On *Arctium tomentosum*, feeding at bases of leaves close to ground, sheltered by ants. E Siberia (Maritime Terr.).

Aphis sierra Essig

Apt. deep green, often with a bluish cast, with mainly dark ant., and dark markings on posterior abdomen which may include a broad dark cross-band on ABD TERG 6, bridging the large postsiphuncular sclerites; BL 1.5–1.8mm. On *Penstemon newberryi* in Sierra Nevada, California, and also collected on *P. fruticosus* in B.C., Canada (BMNH colln, leg. R. Danielsson). Mon. hol., with ovip. and apt. males in the Sierra Nevada in Aug (orig. descr.). Very closely related to *A. penstemicola*; it needs to be confirmed whether the differences between these two warrant separate species status.

Aphis silaumi Bozhko

Apt. dirty green, wax-dusted, with dark SIPH and cauda; BL c. 1.4mm. On *Silaum besseri* in Ukraine.

Aphis silenephaga Pashtshenko

Apt. dark dingy green, wax-dusted; BL c.1.6mm. Sec. rhin. in apt. III–IV 0–2, V 0–1; al. III 15–21, IV 5–9, V 2–5. On upper part of stem and undersides of leaves of *Silene repens* in E Siberia.

Aphis silenicola Holman and Szelegiewicz

Apt. black; BL 1.6–2.3 mm. Sec. rhin. in apt. III 0–6, IV 0; in al. III 5–8, IV 0–2. On apical parts of *Silene* spp. in E Siberia and Mongolia.

Aphis smilacisina Zhang

Apt. green with black SIPH and cauda; BL 1.2–1.5 mm. On *Smilax china* in Hangzhou, China. [The original description gives the number of caudal hairs as 12–16; nine paratypes were studied and found to have only 6–8 caudal hairs.]

Aphis smirnovi Orlova

Apt. matt dark green; BL 1.2–1.8 mm. Sec. rhin. in al. III 2–4. At base of stem of *Sedum purpureum*, ant-attended. Russia (Moscow and Volgograd regions).

Aphis soan (Ivanoskaya)

Apt. greenish brown; BL c. 2.6 mm. On *Sanguisorba* sp. in Russia (Novosibirsk and Krasnoyarsk regions, and Tuva).

Aphis solanella Theobald

Apt. dull black, sometimes with white wax markings; BL 1.2–2.6 mm. Sec. rhin. in al. III 9–22, IV 0–7, V 0–1. On a wide range of herbaceous plants, including many colonised by its close relative *A. fabae*, but additionally and characteristically *Solanum nigrum*, and also *Fallopia convolvulus* (Stroyan, 1984, as *A. fabae solanella*). *A. remaudieri* Börner, described from *Rhododendron ferrugineum* in the French Alps is possibly this species. In Europe, and with a more extensive distribution than *A. fabae* in Asia, Africa and S America. Heter. hol. in N Europe with a sexual phase on *Euonymus europeaus*. Thieme and Dixon (2004) reviewed the taxonomic status of *A. solanella*. $2n=7$ (5 samples from Iran) and 8 (UK).

Aphis solidaginis (Börner)

Apt. presumably dark brown or black; BL not recorded. On *Solidago virgaurea* in Austria. Apparently this is a member of the *A. fabae* group; if recognised again and confirmed as a valid species it will need a replacement name, as *Aphis solidaginis* is preoccupied.

Aphis solidagophila Pashtshenko

Apt. yellow–green; BL c.1.5 mm. Sec. rhin. in al. (ANT 5-segmented) III 9–20, IV 0–3. Living in small to moderate-sized colonies on inner sides of leaves of *Solidago decurrens* near roots, attended and sheltered by ants.

Aphis (Bursaphis) solitaria McVicar Baker

Apt. greenish to brownish, slightly pruinose; BL 1.6–2.2 mm. Sec. rhin. in al. III 8–34, IV 0–8, V 0–3. On *Ribes* spp. in Mexico. Heter. hol., migrating to various Compositae (*Baccharis*, *Bidens*, *Cosmos*, *Chrysanthemum*, *Eupatorium*, *Oxyloba*, *Simsia*, *Stevia*), and occasionally *Penstemon* (Scrophulariaceae). Anhol. populations also persist through the year on Compositae. Remaudière (1933b) provided a full account of this species.

Aphis (Protaphis) sonchi (Narzikulov and Umarov)

Apt. dark green, wax-dusted; BL c.1.6 mm. Sec. rhin. in al. III 10–11, IV 3–4, V 3. On stems and leaves of *Sonchus asper* in Afghanistan. Not clearly differentiated from other members of the *terricola* group (q.v.).

Aphis spiraeicola Patch (= *A. citricola* of many authors)

Plate 7b

Apt. bright greenish yellow to apple green with brown head and black SIPH and cauda; BL 1.2–2.2 mm. Sec. rhin. in al. III 6–11, IV 0–5. On a very wide range of sec. hosts in over 20 families, but especially on Caprifoliaceae, Compositae, Rosaceae (including hosts of the very similar *A. pomi*), Rubiaceae and Rutaceae, and particularly on plants of shrubby habit. A major pest of *Citrus* (Blackman and Eastop, 2000). Almost world-wide. Heter. hol. in E Asia and N America with a sexual phase on *Spiraea*; in Japan there is also a form with a sexual phase on *Citrus* (Komazaki *et al.*, 1979), that is likely to be a separate species or subspecies. Anhol. elsewhere. $2n=8$.

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Aphis spiraephaga Müller

Apt. dark grayish brown, with transverse dorsal bands of wax, and with very dark appendages; BL 0.9–2.0 mm. Sec. rhin. in al. III 7–20, IV 0–5, V 0–2. In dense colonies on young shoots of *Spiraea* spp., but this species seems to be rather polyphagous, with records from *Epilobium* spp. (see Holman, 1990), and other genera in several plant families (*Arabis*, *Carum*, *Erica*, *Filipendula*, *Helichrysum*, *Symphoricarpus*, *Trinia* and *Valeriana*; Müller, 1987). In Europe, W Siberia and Mongolia (Heie, 1986). Mon. hol., with al. males. $2n=8$.

Aphis spiraephila Patch

Apt. hazel to chestnut-brown to almost black with powdery reticulations, dark head, SIPH and cauda, ANT and legs mainly pale; BL 1.3–1.7 mm. On leaves and twigs of *Spiraea* spp., widespread in N America. Mon. hol. with ovip. in Oct (Palmer, 1952), males apparently undescribed. $2n=8$.

Aphis stachydis Mordvilko

Apt. yellowish green or dark green, SIPH brown and cauda pale; BL 1.3–1.8 mm. Sec. rhin. in al. III 5–7, IV 0–1. In rolled leaves or on flower-stems and flowers of *Stachys* spp., esp. *St. recta*. S, C and E Europe, and eastward to W Siberia and Transcaucasia (Jörg and Lampel, 1988). Holman (1961b) found aphids with shorter SIPH on roots of *St. cretica* in Crimea, that he suggested were midsummer dwarfs of *A. stachydis*. Apparently mon. hol., although sexual morphs do not appear to have been described.

Aphis stranvaesiae Takahashi

Apt. green, with appendages almost entirely black; BL c.2.0 mm. Sec. rhin. in al. III 7–9, IV 0–2. On *Stranvaesia* (= *Photinia*) *niitakayamensis* in Taiwan, and also recorded from *Rosa* sp. (Tao, 1999).

Aphis stroyani Szelegiewicz

Apt. bright yellow with black SIPH; BL 1.1–1.8 mm. On rosette leaves and root collar of *Picris* spp. and *Reichardia* sp. In S, C and E Europe. Mon. hol. (Börner, 1950, as *Doralina picridis*).

Aphis subnitida (Börner)

Apt. shining black; BL 1.5–2.2 mm. Sec. rhin. in apt. III 9–18, IV 2–9, V 0–3, in al. III 16–22, IV 4–8, V 1–3. Ant-attended colonies occur on succulent stems of *Pimpinella* spp. in Europe (Sweden, Denmark, Netherlands, Portugal, Germany, Austria, Poland, Czech Republic, former Yugoslavia, Ukraine) and W Siberia. $2n=8$.

Aphis subviridis (Börner)

Apt. pale green; BL 1.0–1.3 mm. On roots and rosette leaves of *Potentilla* spp., esp. *argentea*, in C and E Europe. Mon. hol. according to Börner (1952).

Aphis succisae Holman

Apt. brown to velvet black; BL 1.3–2.0 mm. Sec. rhin. in al. III 12–16, IV 1–3. On *Succisa pratensis*, at stem bases and on ground-level leaves in ant shelters. In Czech Republic (S Bohemia). Mon. hol. with ovip. and apt. males in Sept–Oct (orig. descr.).

Aphis sumire Moritsu

Apt. matt dark green to black; BL 1.0–1.2 mm. Sec. rhin. in al. III 4–6, IV 0 (Takahashi, 1966). In ant-attended colonies on *Viola* spp. in E Asia (Japan, China, Korea, E Siberia).

Aphis symphyti Schrank

Apt. pale yellowish green to dark green, rarely lemon yellow, with dark head and SIPH; BL 1.3–2.0 mm. Sec. rhin. in al. III 8–12, IV 1–4, V 0–2 (cf. *gossypii*). Living scattered under leaves of *Symphytum officinale*, or when numerous extending up the stems and in the inflorescences (Stroyan, 1984). Also recorded from various other Boraginaceae, but many of these records may apply to *A. gossypii*, with which there is wide overlap in all features of morphology. Throughout Europe (except Scandinavia and Iberian peninsula). Mon. hol., with al. males; life cycle is only known to be completed on *S. officinale*.

Aphis sywangi Zhang, Cheng, Zhong and Li

Color of apt. in life unrecorded; BL c.2.3 mm. On *Apocynum venetum* in Xinjiang, China (Zhang *et al.*, 1999).

Aphis tacita Huculak

Apt. dull blackish green, finely wax-dusted; BL 1.4–2.5 mm. In large ant-attended colonies on roots, and in ant shelters at bases of stems, of *Astragalus arenarius*. Only known from Poland. Al. unknown. Mon. hol, ovip. and apt. males appearing in late Aug–Sept (orig. descr.). *A. astragalicola* in central Russia is probably a close relative.

Aphis takagii Takahashi

Apt. color in life unrecorded; BL 1.7–2.2 mm. Sec. rhin. in al. III 8–13, IV 0–3. On *Veratrum* spp. in Japan and E Siberia. Mon. hol., with ovip. and apt. males appearing in June (orig. descr., as *A. veratri* ssp. *takagii*).

Aphis talgarica Kadyrbekov

Apt. blackish brown with gray tinge; BL 1.6–1.9 mm. In small colonies on leaf petioles of *Bupleurum longifolium* in SE Kazakhstan (Kadyrbekov, 2001a).

Aphis taraxacicola (Börner)

Apt. mottled dark green; BL 1.3–2.3 mm. Sec. rhin. in al. III 5–13, IV 0–4, V 0–1. On root collar and under rosette leaves of *Taraxacum* spp., tented over with soil by ants, most often in dry, open locations. Throughout Europe, C Asia, and also recorded from Korea (Lee *et al.*, 2002c). Mon. hol. with apt. males. *A. eugenyi* (Ivanoskaya), described from *T. officinale* in W Siberia, is not clearly distinct and may be this species. 2n=8.

Aphis tashevi Szelegiewicz

Apt. probably green; BL 1.8–2.0 mm. Sec. rhin. in al. III (7–) 21–25, IV (0–) 9–14, V (0–) 3–5. On *Stachys* sp. in Bulgaria. The apt. are very similar to *A. stachydis*, and might be considered as alatiform specimens of that species, but for the correspondingly high rhinial numbers of 4 of the 5 al. present in the type series (the fifth al. may be *stachydis*).

Aphis taukogi Shinji

Only al. described; green, BL c.1.6 mm, sec. rhin. III 28–32, IV 8–15. On leaves, stems and flowers of *Bidens tripartita* in Japan. Mon. hol. according to Shinji, with eggs laid on stem near ground, but the species has apparently not been more recently collected.

Aphis (Protaphis) terricola Rondani

Plate 7f

Apt. are dark green, with pruinose covering; BL 1.3–2.0 mm. Sec. rhin. in apt. III 0–10, IV 0–4, in al. III 7–13, IV 1–4. On *Centaurea* spp., and also recorded from plants in several other composite genera (see below). On ground rosettes of young plants, later on stems and inflorescences. In S, C and E Europe (France, Austria, Switzerland, Italy, Spain, Portugal, Canary Islands, Germany, Poland, Czech Republic, Hungary, Bulgaria, Ukraine), Iran (Reswani, 1990; as *alexandrae*), Israel, Egypt, Sudan, and introduced to S America (Argentina, Brazil, Chile). Mon. hol. (Börner, 1952, as *alexandrae*). [There are a number of *Aphis (Protaphis)* species described from Compositae in Europe, C Asia and N Africa that cannot be satisfactorily distinguished from *terricola*. These include *alexandrae* Nevsky, *hartigi* Hille Ris Lambers, *hyaleae* Kadyrbekov and *centaurea* Gomez-Menor, all described from *Centaurea* spp.; *kenanae* Müller and Tigani from *Sonchus cornutus*; and *ignatii* Gomez-Menor from an unidentified composite plant. Hille Ris Lambers (1967) compared some of these species with *terricola*. Kadyrbekov (2001b) described several more species in this group (*ancathiae*, *aralensis*, *cousinia*, *turanica*) and provided a key to Russian *Protaphis*, but did not compare any of them with *terricola*. It needs to be demonstrated, and confirmed by experimental studies, that the differences are more than the result of local or environmental variation.] 2n=8.

THE APHIDS

Aphis tetradymia Knowlton

Apt. bluish green with blackish ANT, SIPH and cauda; BL 1.3–1.8 mm. Al. undescribed. On aerial parts of *Tetradymia canescens* in Idaho and Utah, USA. Mon. hol. with ovip. in Sept (BMNH colln, leg. G.F. Knowlton).

Aphis teucrii (Börner)

Apt. bright green to dark green; BL 1.0–1.9 mm. Sec. rhin. in al. III 4–6. On *Teucrium* spp., esp. *chamaedrys*, feeding on shoot apices and causing curling of leaves (cf. *A. aliena*). Europe (Channel Is, France, Austria, Czech Republic, Italy, Switzerland). Mon. hol. This aphid morphologically resembles *A. aliena*, and host transfer experiments are needed to investigate the possibility that only one species is involved, with different preferred feeding sites on different host-plants. Related aphids on *T. polium* have a longer R IV+V and are an undescribed species, with specimens in BMNH colln from Italy, France, Iran and Lebanon.

Aphis thalictri Koch

Apt. grayish to yellowish green powdered with gray wax; BL 1.9–2.8 mm. Sec. rhin. in al. III 6–11, IV 0–2. Under leaves, up stems and in flowerheads of *Thalictrum* spp. (Stroyan, 1984). In Europe (England, Denmark, Sweden, Germany, Switzerland, Russia), C Asia, W Siberia, and also recorded from N Korea (Lee *et al.*, 2002c). Mon. hol. Bozhko (1976a) described a population from *Thalictrum* sp. in Ukraine as a subspecies, *A. thalictri* ssp. *orangii*. [Another form that was originally described as a subspecies of *A. thalictri* (*neothalictri* Pashtshenko) is here treated as a separate species.]

Aphis thaspüi Oestlund

Apt. dark green with chocolate brown head and thorax, and brown patches at bases of SIPH (Hottes and Frison, 1931, as *A. signatis*); BL 1.3–1.8 mm. Sec. rhin. in al. III 28–56, IV 5–11, V 0–6. On various Umbelliferae (*Cicuta maculata*, *Sanicula* sp., *Thaspium* spp., *Zizia aurea*) in USA and Canada (Manitoba). Very similar in morphology to *A. saniculae* (q.v.). 2n=8.

Aphis thecomae Davletshina

Apt. dark brown; BL c.1.5 mm. On stem apices, flowerheads and fruit of *Campsis radicans* in Uzbekistan. Mon. hol. with ovip and al. males in Oct (orig. descr.).

Aphis thesüi Holman

Apt. black; BL 1.4–1.9 mm. Al. undescribed. At stem bases and on root collars of *Thesium* spp., attended by ants. Czech and Slovak Republics. Mon. hol. with apt. males (orig. descr.).

Aphis thomasi (Börner)

Apt. straw yellow; BL 1.1–1.3 mm. On basal parts of *Scabiosa* spp., and also recorded from *Dipsacus* and *Knautia*. In Europe. Müller (1987) compared morphology of apt. with those of *A. confusa* and *A. ochropus*. Closely related to *A. confusa*, but with shorter hairs.

Aphis tianschanica Kadyrbekov

Apt. blackish brown; BL c.2.0–2.1 mm. On roots of *Potentilla bifurca* in SE Kazakhstan, ant-attended (Kadyrbekov, 2001a).

Aphis tirucallis Hille Ris Lambers

Apt. dark brown to black, wax-dusted; BL 1.5–2.0 mm. Sec. rhin. in al. III 6–9, IV 0, V 0. On *Euphorbia* spp. Described originally as a subspecies of *A. euphorbiae*, this form is widely distributed in Africa (Millar, 1994), and there are also specimens in the BMNH collection from Mediterranean Middle East and Pakistan.

Aphis tomentosi Bozhko

Apt. brown, with dark SIPH and cauda; BL c. 1.8 mm. On *Arctium tomentosa* in Ukraine.

Aphis toriliae Rusanova

Apt. brownish yellow or chocolate-colored, with dark SIPH and cauda; BL 1.6–2.1 mm. Sec. rhin. in al. III 5–20, IV 0–2. On *Torilis arvensis* in Azerbaijan.

***Aphis tormentillae* Passerini**

Apt. greenish black; BL 1.0–1.7 mm. Sec. rhin. in al. III 4–8. On *Potentilla* spp., esp. *erecta*, tending to be dispersed on stems, petioles and undersides of leaves, not usually visited by ants. Throughout Europe. Mon. hol. with al. males.

***Aphis torquens* Holman**

Apt. dark brown to blue-black; BL 1.9–2.9 mm (spring), 1.4–1.8 mm (summer). Sec. rhin. in al. III 7–20, IV 0–4. On undersides of young leaves of *Petasites* spp., which are strongly curled and crumpled, attended by ants. Recorded from Czech Republic, Hungary (BMNH colln) and E Siberia (Holman, 1987); differences in R IV+V length and hair length are reported between these populations Mon. hol., with ovip. and apt. males in Oct (orig. descr.).

***Aphis triglochinis* Theobald**

Apt. dirty green or brownish, BL 1.5–2.7 mm. Sec. rhin. in al. III 25–60, IV 9–25, V 7–17. Migrating from the primary host *Ribes* to a variety of sec. host plants living in wet places, including species of *Anemone*, *Barbarea*, *Borago*, *Cardamine*, *Drosera*, *Myosotis*, *Nasturtium*, *Portulacaceae*, *Rorippa*, *Triglochin* and *Veronica*. Throughout Europe, and across Asia to Mongolia and E Siberia. Possibly also in Japan, as either or both of two species described by Shinji, *A. cardamine* (currently regarded as a *nomen dubium*) and *A. neopolygoni* (q.v.), could be this aphid, having similarly short ANT PT and al. with numerous rhin., although described as salmon red/brown in life. Rakauskas (1998) reviewed the literature and host records of *A. triglochinis*, and discussed the possible existence of host races. 2n=8.

***Aphis tripolii* Laing**

Apt. green with dusky head, with appendages dusky to dark distally; BL 1.3–2.5 mm. Sec. rhin. in al. III 6–18, IV 2–6, V 0–2. On upper parts of leaves and in inflorescences of *Aster tripolium*, in coastal salt marshes or on mud flats in Europe. Apparently specific to this plant and habitat. Mon. hol. with al. males.

***Aphis tsujii* Shinji**

Apt. dark brown, with black SIPH and cauda; BL 1.9–2.5 mm. Sec. rhin. in al. III 13–18, IV 0, V 0–6. On *Solidago* and *Eupatorium* spp. in Japan (Takahashi, 1966).

***Aphis (Protaphis) turanica* (Kadyrbekov)**

Apt. color in life unrecorded, probably dark green; BL 1.5–2.1 mm. On roots of *Cirsium sieversii* in C Asia (S Kazakhstan; Kadyrbekov, 2001b). Closely related to *A. terricola*, and possibly a synonym.

***Aphis typhae* Mamontova**

Apt. appearance in life unknown; BL c.1.7 mm. On *Typha* spp. in Ukraine.

***Aphis ucrainensis* Zhuravlyov (= *Aphis turkestanica* Kadyrbekov)**

Apt. shining black, slightly wax-dusted; BL 1.2–2.1 mm. Sec. rhin. in al. III 7–10, IV 0–2. In compact colonies on young shoots of *Spiraea* spp. in Ukraine and eastward to SE Kazakhstan (Kadyrbekov, 2001a, as *A. turkestanica*). Mon. hol. with ovip. and apt. males in Oct (Zhuravlyov, 1997).

***Aphis ulicis* Walker**

Apt. blackish green with a shiny black dorsal shield, coated with silvery gray wax; BL 1.3–2.6 mm. Sec. rhin. in al. III 4–9, IV 0–1. In dense ant-attended colonies on young growth, flowers and seed-pods of *Ulex* spp., esp. *U. europaeus*. In W Europe. Mon. hol. with al. males. For a fuller account see Jacob (1948b). 2n=8.

***Aphis ulmariae* Schrank**

Apt. green, mottled with dark green, and darker head and legs; BL 1.1–2.4 mm. Sec. rhin. in al. III 5–8, IV 0–1. On *Filipendula* spp., in ant-attended colonies, curling leaves, and also recorded from *Spiraea salicifolia*. In Europe, W and E Siberia (Holman, 1987), Korea (Lee *et al.*, 2002c) and USA. Mon. hol., with al. males.

***Aphis (Debilisiphon) umbelliferarum* (Shaposhnikov)**

Apt. very dark green slightly shiny, with antennal segment III and basal parts of tibiae whitish; BL c.1.8–2.1 mm. In colonies at stem bases and on radical leaves of Umbelliferae (*Cachrys*, *Cenolophium*, *Peucedanum*,

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Seseli), usually in ant shelters). Russia (Ural Mountains). [*A. seselii* (Bozhko) is probably a synonym, and it is possible that *umbelliferarum* is itself a synonym of *A. selini* (Börner).]

Aphis umbrella (Börner)

Apt. pale green or yellowish green, with pale or dark-tipped SIPH; BL 1.7–2.3 mm. Sec. rhin. in al. III 4–13, IV 0–5, V 0–1. On *Malva* spp. and certain other Malvaceae, causing umbrella-like leaf-curl of terminal leaves. Ant-attended. In Europe, Middle East and C Asia; records from elsewhere are probably mostly due to confusion with *A. nasturtii* and *A. gossypii*. However, *A. rostellum* described from China (q.v.) is closely related to *A. umbrella* and may be a geographical variant. Mon. hol. with al. males in N Europe, probably anhol. in warmer regions. $2n=6^*$ and 7 in Iran, $2n=8^*$ in Israel, Cyprus, Italy and UK.

Aphis unaweepiensis Hottes

Apt. pale blue–gray to greenish gray; BL 2.0–3.0 mm. On roots of *Sarcobatus vermiculatus* in Colorado, USA. This species may be related to *A. middletonii*, but differs in its longer R IV+V and less hairy cauda.

Aphis urticata Gmelin

Apt. dark bluish green (spring) to pale yellow (summer); BL 0.90–2.2 mm. Sec. rhin. in al. III 5–11, IV 0–5, V 0–1. In dense ant-attended spring colonies at tips of growing shoots of *Urtica dioica*, and later as summer dwarfs on undersides of leaves. In Europe, Middle East, C Asia and N America. Mon. hol. with apt. males; life cycle and biology were studied by Müller and Holtfreter (1978).

Aphis (Zyxaphis) utahensis (Knowlton)

Color of apt. in life unrecorded, BL 1.5–1.6 mm. Described from *Seriphidium tridentatum* in Utah, USA.

Aphis utsugicola Monzen

Apt. yellowish green with brown head and large dark brownish dorsal abdominal spot; BL c.1.9–2.0 mm. Sec. rhin. in al. III 8–10, IV 5–6. Colonies roll the terminal leaves of *Deutzia scabra* in Japan.

Aphis uvaeursi Ossiannilsson

Apt. dark brownish green or black; BL 1.3–1.9 mm. Sec. rhin. in apt. III 0–14, IV 0–2, in al. III 9–17, IV 0–2, V 0–1. On *Arctostaphylos uva-ursi*, forming dense colonies on shoot apices of prostrate mats, tented over by ants. In Scotland, Norway, Sweden, Germany and Poland. Mon. hol. with apt. males (Szelegiewicz, 1976).

Aphis vaccinii (Börner)

Apt. shining greenish black with a fine wax bloom; BL 1.3–2.0 mm. Sec. rhin. in al. III 8–17, IV 0–4. On stems of *Vaccinium* spp. and *Andromeda* spp., ant-attended. In Europe north of Alps, and W Siberia. Mon. hol. with al. males (Heie, 1986). Closely related to the *Aphis fabae* group, but usually smaller and with more development of dorsal sclerotisation.

Aphis valerianae Cowen

Apt. blackish green with dusky or brownish ANT and legs and black SIPH and cauda; BL 1.8–2.5 mm. Sec. rhin. in al. III 27–42, IV 0–16, V 0–14. On leaves and stems of *Valeriana* spp. in western N America (B.C., Idaho, Utah, Colorado, New Mexico; BMNH colln). Mon. hol. with ovip. and al. males in Sept (Palmer, 1952).

Aphis valleii Hille Ris Lambers and Stroyan

Apt. black covered in grayish white wax powder; BL 1.4–2.1 mm. Sec. rhin. in al. III 11–16, IV 4–5, V 0–1. Described from ‘a very tall *Euphorbia* sp.’ in Italy, and since found on *E. amygdaloides* and *E. characias*, in Spain, Portugal, Bulgaria, Greece and Turkey.

Aphis (Toxoptera) vanderghoti (Börner)

Apt. dark blue-green, or yellow; BL 1.4–2.0 mm. Al. with media usually once-branched. Sec. rhin. in al. III 3–7. In ant shelters on roots, stolons and basal leaf petioles of composite plants of tribe Anthemidae, e.g., *Achillea*, *Matricaria*, *Tanacetum*. Widespread in Europe. Mon. hol., with apt. males. *A. obiensis* (Ivanoskaya), described from *Achillea millefolium* in Russia are probably small specimens of this species.

Figure 5j

***Aphis (Bursaphis) varians* Patch**

Apt. dark blue-green with pale SIPH; BL 1.0–2.2 mm. On spring growth of *Ribes* spp., crumpling leaves and stunting growth. Heter. hol., migrating in late spring to Onagraceae, especially *Epilobium angustifolium*, where its relations with ants have been intensively studied (e.g. Breton and Addicott, 1992). Patch (1927) gave life cycle details. N America, and possibly Mongolia (BMNH colln., leg. H. Szelegiewicz) and E Siberia (Pashtshenko, 1988a), although Pashtshenko recorded *Borago officinalis* and *Portulaca oleracea* as secondary hosts, suggesting that the E Asian species may be distinct. 2n=8.

***Aphis veratri* Walker**

Apt. black, not shining, with slight grayish bloom (orig. descr.); BL 1.5–2.3 mm. Sec. rhin. in al. III 10–16, IV 0–3, V 0–1. On *Veratrum* spp. in Europe (not UK, Scandinavia or Iberia), eastward to Caucasus. Records from E Siberia (Pashtshenko, 1988a) seem to apply to the N American species *A. coweni*. Mon. hol., with apt. males and ovip. in Aug in Switzerland (BMNH colln, leg. Stäger).

***Aphis verbasci* Schrank**

Apt. bright golden yellow to pale green, slightly pulverulent, with black somewhat curved SIPH; BL 1.7–2.5 mm. Sec. rhin. in al. III 25–27, IV 4–8. Under basal leaves of *Verbascum* spp., and also recorded from *Scrophularia* and *Buddleja* spp. Europe (except Scandinavia), Middle East and N Africa. Records from N India (Chowdhuri *et al.*, 1969a) are from unlikely hosts (*Senecio* and *Polygonum*), and possibly apply to another species. Mon. hol., but sexual morphs undescribed. 2n=8.

***Aphis vernoniae* Thomas**

Figure 57d

Apt. greenish yellow with pale appendages; BL c.1.4–1.6 mm. Sec. rhin. in al. III 4–8, IV 0–1. On growing points, flower stems and undersides of leaves of *Vernonia* spp., and also recorded from *Eupatorium* and *Helenium* (Hottes and Frison, 1931). In eastern and central USA.

***Aphis veronicicola* Holman**

Apt. dull black; BL 1.6–2.1 mm. Sec. rhin. in al. III 4–7, V 0–2. On stem apices and inflorescences of *Veronica sibirica*, attended by ants. E Siberia (Ussurijsk).

***Aphis verticillatae* (Börner)**

Figure 48g

Apt. mottled yellow-green; BL 1.5–1.8 mm. Sec. rhin. in al. III 3–5. On *Salvia verticillata*, on undersides of basal leaves and young shoots. C and E Europe (Austria, Germany, Hungary, Poland, Czech Republic).

***Aphis viburni* Scopoli**

Apt. brownish green to black, sometimes with paired dorsal wax markings; BL 1.5–3.0 mm. Sec. rhin. in al. III 11–24, IV 0–5. On *Viburnum* spp. (esp. *V. opulus*), in curled leaves, ant-attended. Possibly sometimes on orchids of the genus *Epipactis*, if *A. epipactis* is a synonym (Stroyan, 1984). Europe, C Asia, W Siberia, and introduced to N America. Mon. hol. with apt. males. 2n=8.

***Aphis viburniphila* Patch**

Apt. reddish brown mottled with paler shades, with blackish head and SIPH; BL 1.7–2 mm. Sec. rhin. in al. III 20–28, IV 5–7, V 0–2. On leaves and stems of *Viburnum* spp., apparently widely distributed in N America (although some confusion with *A. viburni* and *A. fabae* ssp. *mordvilkoii* seems likely). Mon. hol., with ovip. in Oct (males apparently not recorded).

***Aphis vineti* Hoffmann**

Apt. blackish, without wax (?); BL 1.3–1.9 mm. Sec. rhin. in al. III 3–10, IV 0–1. On ground stems and roots of *Coronilla varia* in Germany. Mon. hol. with ovip. and apt. males in Oct (Hoffmann, 1972).

***Aphis violae* Schouteden**

Apt. mottled dark green; BL 1.1–2.0 mm. Sec. rhin. in al. III 5–10, IV 0–3. On basal and subterranean parts of *Viola* spp., tented over by ants. Europe (not Mediterranean). Mon. hol. with apt. males. 2n=8.

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Aphis violaeradicis Pashtshenko

Apt. brown, imm. green; BL c.1.5 mm. Sec. rhin. in al. III 3–5, IV 0, V 0–1. On *Viola* spp., living at base of stem or on root or leaf rosette, often in an ant shelter. E Siberia. Mon. hol. (orig. descr.). Although it is clearly distinct in its biology, the description of this species does not differentiate it morphologically from *A. gossypii*. Chu (1949) recorded *A. gossypii* with eggs on roots of *Viola* spp. in China which could be this species.

Aphis vitalbae Ferrari

Apt. varying from very dark green to pale green or yellowish in summer, without wax (cf. *A. clematidis*); BL 1.2–1.9 mm. On shoot tips, petioles and undersides of leaves of *Clematis vitalbae* in Europe. Mon. hol. with ovip. and apt. males in Oct–Nov (Tashev, 1964b).

Aphis viticis Ferrari

Apt. grass-green with brown SIPH in spring to pale straw-colored with pale SIPH in midsummer dwarfs; BL 0.8–1.7 mm. Sec. rhin. in al. ANT III 4–9, IV 0–2. On *Vitex agnus-castus* in S Europe and Middle East. Mon. hol. Barbagallo and Stroyan (1982) redescribed apt. and al. vivip., and Nieto Nafria *et al.* (1986) provided brief descriptions of the sexual morphs.

Aphis vladimirovi Orlova

Apt. matt brownish black; BL 1.7–2.1 mm. Sec. rhin. in al. (1 specimen) III 4–5. On stems of *Corispermum marschalii*, attended by ants. Russia (Volgograd province).

Aphis wahena Hottes and Wehrle

Apt. probably black; BL c.1.1–1.5 mm. Sec. rhin. in al. III 12–15, IV 6–9, V 3–4. On *Viguiera cordifolia* in Arizona, USA.

Aphis wartenbergi (Börner)

Color of apt. in life unrecorded; BL c.1.5–1.7 mm. On *Carduus defloratus* ssp. *glaucus*, rolling ground-level leaves. In Austria and Czech Republic (BMNH colln, leg. J. Holman). Mon. hol. acc. to Börner.

Aphis wellensteini (Börner)

Apt. dark green or olive; BL 1.9–2.1 mm. On *Verbascum* spp. in C and E Europe (Austria, Czech Republic, Ukraine).

Aphis xylostei (Börner)

Apt. probably dark greenish brown; BL unrecorded. On *Lonicera xylosteum* in Austrian Alps.

Aphis yangbajaingana Zhang

Apt. dark brown, wax-dusted; BL 1.7–1.8 mm. On *Medicago sativa* in Tibet. Ovip. on paratype slide in late Sept. Close to *A. coronillae* (q.v.).

Aphis zonassa Knowlton

Apt. black, with wholly black appendages; BL c.1.5–1.7 mm. Sec. rhin. in al. III 15–21, IV 9–11. On *Chrysothamnus parryi* and *Chrysothamnus* sp., in Utah and Colorado, USA.

Aphis zweigelti Börner

Color of apt. in life unrecorded, probably blackish and densely covered with gray wax; BL 1.6–2.0 mm. Described (briefly) from *Chamaecytisus supinus* (= *Cytisus capitatus*) in Austria, and subsequently recorded from *C. supinus* in Austria (BMNH colln, leg. Franz) and Bulgaria (Szelegiewicz, 1962). The specific distinction from *A. cytisorum*, however, remains unclear.

Aphthargelia Hottes

Aphidinae: Macrosiphini

One N American species on *Symphoricarpos* somewhat resembling *Brevicoryne* but with dark, very distinctly reticulate dorsal cuticle, and dark rounded marginal tubercles on ABD TERG 1–5.

Aphthargelia symphoricarpi (Thomas)

Plate 12h

Apt. black or dusky green with powdery white cross-bands on ABD TERG 1, 4, 5 and 8 appendages mostly pale; BL 2.0–2.8 mm. Sec. rhin. in al. III 38–55, IV 31–36, V 23–31. On twigs of *Symphoricarpos* spp. in western and central USA and Canada. Mon. hol., with ovip. and apt. males in Sept–Oct. 2n=14.

Aploneura Passerini

Eriosomatinae: Fordini

A small palaeartic genus with alternation between galls on *Pistacia* and the roots of Gramineae and vines, but also a strong tendency to anholocycly on the roots of secondary host plants. Apt. have very short 4- or 5-segmented ANT; al. have 6-segmented but unusually short ANT which are distinctive because ANT III and IV both bear a single, large secondary sensorium on the distal half, resembling the primary sensoria on V and VI. Apt. on roots produce copious white wax and are not attended by ants. Al. hold their wings flat in repose, unlike *Baizongia* and *Slavum* (q.v.), in both of which the wings are held roof-like. However in the case of *Slavum*, no satisfactory structural characters have been found to support its generic separation from *Aploneura*, which is therefore in doubt.

Aploneura ampelina Mokrzecky (= *Slavum lentiscoides* Mordvilko?)

Apt. pale, in white wax; BL c.1.6 mm. On roots of *Vitis vinifera* in S Europe, Crimea and C Asia; also in S Africa and probably more widespread. Also reported from woody Rosaceae (*Cydonia*, *Malus*, *Pyrus*; Mamontova, 1955). Occurrence on grasses requires confirmation. Al. of *A. ampelina* may be distinguished from those of *A. lentisci* by the shape of the sensorium on ANT VI, which has its long axis across the segment in *ampelina*, along the segment in *lentisci*. Life cycle still unclear; it may be synonymous with *Slavum lentiscoides*, which forms galls on *Pistacia vera*, but experimental work is needed to confirm this. See Mordvilko (1935) for further information.

Aploneura lentisci (Passerini)

Plate 1f

Apt. pale yellow with darker head, covered with fine white wax which is flocculent at posterior end; BL 1.1–3.0 mm. On roots of numerous species of Gramineae, and occasionally of dicots (e.g., *Ranunculus*, *Veronica*). In W, C and S Europe, Middle East, C Asia, Africa (Morocco, Kenya, Nigeria, Zimbabwe), Australia, New Zealand, Argentina, and California (BMNH colln, leg. C. Lagace, iii.1966). Heter.hol. in Mediterranean region, galling the leaves of *Pistacia lentiscus* (Blackman and Eastop, 1994). Elsewhere anhol. on grass roots, although large flights in late summer may consist almost entirely of sexuparae, even where primary host is unavailable. See also Blackman and Eastop (2000). 2n=16.

Aploneura werthi Börner

Apt. wax-covered; BL 1.4–1.8 mm. On roots of *Carex ?curvula* in the French Alps (Börner, 1952, p. 476).

Artemisaphis Knowlton and Roberts

Aphidinae: Macrosiphini

A genus erected for a N American *Artemisia*-feeding aphid with low ANT tubercles, a ventral protruberance on the anal plate and a short, distinctively shaped cauda. Possibly it belongs in *Obtusicauda*, as the distinction is blurred by a species described from China (*longicauda* Zhang) which has a similar anal plate but a longer cauda more typical of *Obtusicauda* (see under *Obtusicauda moldavica*). *Metopeurum* also has a similar development of the anal plate, as well as low ANT tubercles, but has small spiracles like *Macrosiphoniella*, whereas *Obtusicauda* and *Artemisaphis* have large rounded spiracles.

Artemisaphis artemisicola (Williams)

Figure 13b,c

Apt. shiny dark reddish wine-colored, BL 1.7–2.0 mm. Forming large colonies on leaves and stems of *Artemisia* (and *Seriphidium*) spp. in western USA (Palmer, 1952). There are single records also, possibly of vagrants, on *Chrysothamnus* sp. and *Cirsium vulgare*.

Asiphonaphis Wilson and Davis

Aphidinae: Aphidini

Two N American and one E Asian species related to *Aphis* but completely lacking SIPH. Both apt. and al. have prominent marginal tubercles on all abdominal segments (Robinson, 1964). One of the N

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American species is mon. hol. on *Prunus* (see Blackman and Eastop, 1994). The genus is unlikely to be monophyletic.

Asiphonaphis japonica Torikura

Apt. dark brown; BL 1.4–1.8 mm. In small colonies on basal parts of a *Carex* sp. in Japan. Affinity with N American species placed in this genus is uncertain.

Asiphonaphis utahensis Knowlton

Only al. described, collected from *Salsola pestifer* in Utah, USA. This is possibly not the true host.

Asiphonella Theobald

Eriosomatinae: Fordini

Two species with host alternation between *Pistacia*, on which they form large, cock's comb-like galls, and the roots of Gramineae, especially *Cynodon dactylon*. Apt. on grass roots have 3-faceted eyes which are noticeably protuberant, and well-developed segmental wax glands secreting a coating of white flocculent wax. The two species are difficult to distinguish on their secondary host plants, although the migrants from *Pistacia* are readily distinguishable. Both apt. and al. have 6-segmented antennae. An account is given by Remaudière and Tao (1957). See also Blackman and Eastop (1994).

Asiphonella cynodonti (Das)

Apt. light green to dull green with a dark head, whole body covered with white wax powder; BL 1.6–2.0 mm. On roots of *Cynodon dactylon* and probably certain other grasses. In Iran there is a sexual phase on *Pistacia khinjuk* (Davatchi, 1958). Iran, Pakistan, and India. The original description (Das, 1918) included biological observations.

Asiphonella dactylonii Theobald

Plate 1g

Apt. pale yellow, yellowish green to green, head darker, whole body covered in bluish-white wax; BL 1.6–2.0 mm. On roots of *Cynodon dactylon* and certain other grasses (*Oplismenus compositus*, *Chrysopogon ciliata*, and *Digitaria decumbens*). There is a sexual phase on *Pistacia chinensis* in China, and presumed anhol. populations on grasses are recorded from Egypt, Sudan, Zimbabwe, Philippines, Bermuda, New Mexico, Guyana, Brazil, and Argentina. Blanchard (1944) gave an account of this aphid on *Cynodon* in Argentina, under the name *Paraprociophilus graminis*, and Silva (1985) provided a more recent account from Brazil.

Aspidaphis Gillette

Aphidinae: Macrosiphini

Two species with 5-segmented ant., reduced SIPH (in both apt. and al.), very short hairs, and ABD TERG 8 produced into a large cowl-like supracaudal process. Imm. have spinulose hind tibiae.

Aspidaphis adjuvans (Walker)

Plate 14i, Figure 42o,p

Apt. yellowish, brownish yellow or pale bluish green; BL 1.3–2.0 mm. Living cryptically on *Polygonum aviculare*, often at roadsides or on paths. Europe, SW, C and E Asia, and N America. Mon. hol. with apt. males (Tuatay and Remaudière, 1964). $2n=12$ (Robinson and Chen, 1969), 14^* and 16^* (Israel, Iran, Cyprus; significance of karyotype variation is unknown).

Aspidaphis porosiphon Börner

Apt. dull, pale green; BL c. 1.7–1.9 mm. Living singly on leaf blades of *Festuca rubra* growing in lush herbage. Europe (UK, Sweden, Germany, Czech Republic). Mon. hol. with ovip and apt. males in Oct (Stroyan, 1966).

Aspidophorodon Verma

Aphidinae: Macrosiphini

A small genus with two species on *Salix* (subgen. *Aspidophorodon*; see Blackman and Eastop, 1994) and two associated with Rosaceae (subgen. *Eoessigia*).

Aspidophorodon (Eoessigia) indica (David, Rajasingh and Narayanan)

Figure 24c–e

Apt. narrow-bodied, pale green or pale brown with a dark green streak; BL 1.2–2.1 mm. In spring on *Cotoneaster obtusus*, feeding along the main veins on upper sides of young leaves; heter. hol., migrating in April–May to *Potentilla* sp. (Chakrabarti and Banerjee, 1993a). In NW India (H.P., U.P.).

***Aspidophorodon (Eoessigia) longicauda* (Richards)**

Apt. milky white, lightly pulverulent; BL 1.7–2.0 mm. Al. with dusky/dark head and thorax and milky white abdomen with two longitudinal pigmented stripes. On undersides of leaves of *Spiraea* spp. in B.C., Canada. Life cycle unknown. $2n=20^*$.

Astegopteryx* Karsch*Hormaphidinae: Cerataphidini**

An oriental genus of over 30 species with host alternation between *Styrax* and monocots, mostly bamboos. The morphs from galls on *Styrax* differ greatly in morphology from those on secondary host plants, which were originally described in different genera (*Trichoregma*, *Oregma*). Apt. of *Astegopteryx* on secondary hosts are small aphids with well-developed frontal horns and segmentally arranged wax glands, forming large colonies on the leaves. Most species probably have the ability to maintain themselves continuously by parthenogenetic reproduction on their secondary hosts. Evans *et al.* (1995) studied parasitoids (*Encarsia* spp.). Noordam (1991) reviewed the Javanese species, and for bamboo-feeding species see Blackman and Eastop (1994).

***Astegopteryx nipae* (van der Goot)**

Apt. with gray head and thorax, bright brownish red abdomen, and a wax fringe; BL 0.9–1.6 mm. In large numbers in clusters on the undersides of leaves of palms, especially those with fan-like or climbing growth habits (*Calamus*, *Daemonorops*, *Nypa*, *Salacca*), and also recorded from *Musa* × *sapientium* (but see under *A. styracophila*). Invariably attended by ants. In Malaysia, Indonesia, Solomon Islands, New Hebrides, Fiji, and Tonga. See also Blackman and Eastop (2000).

***Astegopteryx pandani* (Takahashi)**

Apt. pale brown to brown with whitish antennae and legs and long marginal tufts of white wax; BL c. 1.4 mm. On *Pandanus tectorius* in Sumatra, and redescribed from *Freycinetia javanica* in Java (Noordam, 1991). On undersides of leaves, attended by ants. Other morphs and life cycle unknown.

***Astegopteryx rhapsidis* (van der Goot)**

Apt. yellowish brown to dark brown, with a wax fringe; BL 1.2–2.0 mm. Forming numerous ant-attended colonies on undersides of leaves of palms. In Taiwan, Philippines, Palau Islands, Malaysia, Indonesia, and the Solomon Islands. See also Blackman and Eastop (2000).

***Astegopteryx styracophila* Karsch**

Apt. green or brown, sometimes with a reddish or violet tinge, with wax secretion; BL 0.9–1.3 mm. In ant-attended colonies on undersides of leaves of Zingiberaceae (*Alpinia*, *Amomum*, *Languas*, *Zingiber*) in E and SE Asia. Records of an *Astegopteryx* sp. from *Musa sapientium* are also likely to be this aphid, but close similarity to the palm-feeding species *A. nipae*, makes definite identification difficult. Sexual phase is on *Styrax benzoin*, on which the aphids are very different morphologically and live in banana-bundle-shaped galls (Kurosu *et al.*, 1998).

Atarsos* Gillette*Aphidinae: Macrosiphini**

One nearctic species on Compositae that completely lacks tarsi. (Note: R IV has 10–20 accessory hairs, more than illustrated by Palmer, 1952).

***Atarsos grindeliae* Gillette**

Apt. shining pale yellow to pale green with pale to dusky appendages; BL 1.3–1.8 mm. On leaves of *Grindelia squarrosa* and plants in related composite genera (*Aster*, *Machaeranthera*). Described from Colorado, USA, and also found in Canada (Manitoba). Ovip. and apt. males in Sept-Oct (Palmer, 1952). $2n=12$.

Atheroides* Haliday*Chaitophorinae: Siphini**

Five palaeartic species of very elongate-bodied grass-feeding aphids, with short ANT and legs, and a sclerotic tergum with fused head and pronotum and often fused ABD TERG 2–7. Cauda and anal plate are

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broadly rounded, with cauda usually obscured in dorsal view by ABD TERG 8, the hairs on which are very long and thick.

Atheroides brevicornis Laing

Apt. brownish to black; BL 1.7–2.1 mm. On upper sides of leaves of grasses (*Puccinellia*, *Festuca*) in coastal habitats around N Europe and the Black Sea (UK, Sweden, Netherlands, Germany, Crimea, Ukraine), and also found in a salty pond-side habitat in Hungary (Pintera, 1965, as *A. aplangi*). Records from *Carex* and *Juncus* perhaps need confirmation as these aphids are often collected by sweeping from mixed vegetation. Life cycle unknown.

Atheroides doncasteri Ossiannilsson

Apt. dirty yellow to brownish; BL 1.7–2.1 mm. Only known from *Deschampsia caespitosa*. Europe (Netherlands, Sweden, Czech Republic, Hungary, W Siberia; Heie, 1982). Life cycle unknown.

Atheroides hirtellus Haliday

Apt. black with ventral side yellowish; BL 2.0–2.8 mm. On *Deschampsia caespitosa* in Europe (UK, France, Netherlands, Sweden, Finland, Germany, Poland and Spain), and also recorded in Jilin province, China (Tao, 1999). *Juncus* and *Scirpus* spp. are also recorded hosts, but these specimens may have been swept from mixed vegetation. Mon. hol., ovip. in early Sept in Scotland (BMNH colln). 2n=8.

Atheroides karakumi Mordvilko

Apt. yellowish brown; BL c.2.3 mm. In grooves of leaf blades of *Stipa* (= *Lasiagrostis*) *splendens* in Caucasus and C Asia (Kazakhstan; Juchnevitch, 1960, as *A. lasiagrostites*). Life cycle unknown.

Atheroides serrulatus Haliday

Plate 5b

Apt. yellow or yellowish brown; BL 1.9–2.4 mm. On leaves of various grasses (*Agrostis*, *Alopecurus*, *Brachypodium*, *Bromus*, *Calamagrostis*, *Cynosurus*, *Dactylis*, *Deschampsia*, *Festuca*, *Holcus*, *Hordeum*, *Nardus*, *Phalaris*, *Poa*). Also recorded quite frequently from Cyperaceae (*Carex*, *Juncus*), although this needs confirmation because the specimens may have been collected by sweeping or beating mixed vegetation. Widespread in Europe; also recorded from W Siberia, Korea (BMNH colln, leg. W.H. Paik), and Canada (Québec, Richards, 1972a; B.C., Forbes and Chan, 1989). Mon. hol. with ovip. and apt. males in late Sept–Nov. 2n=8.

Aulacophoroides Tao

Aphidinae: Macrosiphini

Three species in E Asia on Leguminosae, with a spinulose *Aulacorthum*-like head, but also with characters similar to *Megoura*.

Aulacophoroides formosana (Takahashi)

Apt. green with yellowish brown head, black ANT and SIPH, yellowish brown legs except for black tarsi, and a yellow CAUDA; BL c.2.7 mm. On *Millettia reticulata* in Taiwan and China (Tao, 1963).

Aulacophoroides hoffmanni (Takahashi)

Apt. dark red with black ANT and SIPH; BL c.2.5–2.7 mm. On *Wisteria chinensis* in China. Al. was described by Tao (1963, as *Subacyrthosiphon*). Mon. hol.; ovip collected in Oct (Takahashi, 1937, as *Acyrtosiphon*). 2n=14*.

Aulacophoroides virgatae Szelegiewicz

Apt. shining green with black ANT and SIPH; BL 1.9–2.4 mm. On terminal shoots of *Lespedeza virgata* in Korea.

Aulacorthum Mordvilko

Aphidinae: Macrosiphini

Nearly 40 species of *Aulacorthum* are known, the majority from the eastern palaeartic and oriental regions. The remaining species are western palaeartic; the few described from North America seem to belong to other genera, e.g., *Ericaphis*. The genus is defined by the parallel-sided inner faces of the spinulose antennal tubercles. *Neomyzus* has hitherto been treated as a subgenus of *Aulacorthum*, but DNA studies indicate

that they are not so closely related. *A. solani* is one of the most polyphagous aphids and *A. magnoliae* in E Asia is also recorded from members of many different plant families. There is a similar lack of pattern in the hosts of the plant-specific species. Eight species of *Aulacorthum* are described from Compositae, four from Liliaceae, three each from Ericaceae and Labiatae, and two from Dipsacaceae, Lauraceae, Oleaceae, Rosaceae, and Rutaceae. Accounts are available from Europe (Hille Ris Lambers, 1947b, 1949; Heie 1994), Japan (Miyazaki, 1971, in *Acyrtosiphon*), Korea (Lee, 2002), India (Raychaudhuri, 1980), Java (Noordam, 2004), and Canada (Richards, 1972b).

***Aulacorthum aegopodii* Börner**

Apt. opaque creamy white with yellow spots at bases of SIPH; BL 2.0–2.4 mm. Al. have 4–8 sec. rhin. on ANT III (cf. *A. solani*). On *Aegopodium podagraria* in Europe (Netherlands, Germany; as *A. solani* ssp. *aegopodii*). Mon. hol., with al. males; it did not hybridise readily with *A. solani* s.str. in laboratory experiments (Müller, 1976a).

***Aulacorthum asteris* Takahashi**

Apt. white or pale yellowish, with dusky sensoriated part of ANT III, dark apices to ant. segments and femora, and SIPH pale in middle, dark at base and apex; BL 2.5–3.5 mm. On *Aster (Kalimeris) yomena* in Japan and an unidentified *Aster* sp. in Korea (Lee *et al.*, 2002c).

***Aulacorthum cirsiicola* (Takahashi)**

Apt. large, broadly spindle-shaped pale lemon-yellow, pink or green aphids with ant. and legs banded with black, and black-tipped SIPH; BL 2.5–4.1 mm. Mon. hol., feeding on upper leaves and stems of *Cirsium* spp., and also recorded from certain other Compositae (*Arctium*, *Petasites*, *Tussilago*). Japan, China, Korea, Taiwan and E Siberia. 2n=10.

***Aulacorthum cylactis* Börner**

Apt. shining green; BL 1.4–1.9 mm. Al. have dark head and thorax and rather pale brown dorsal abdominal cross-bands. On undersides of rolled leaves of *Rubus saxatilis* in Europe (Denmark, Sweden, Finland, Germany). Mon. hol. with apt. males (Ossiannilsson, 1959). Sometimes treated as a subspecies of *A. solani*.

***Aulacorthum dasi* A.K. Ghosh, R.C. Basu and Raychaudhuri**

Apt. chocolate brown, with blackish brown head, basal parts of SIPH, and cauda: BL c.2–7–2.9 mm. Al. have dark bands across the dorsal abdomen. Described from an unidentified composite plant, with a later record from *Artemisia* sp. (Raychaudhuri, 1984).

***Aulacorthum dorsatum* Richards**

Apt. yellowish green or lemon yellow with dark ANT and variably developed black markings, maximally consisting of broad cross-bands on pro- and mesonotum and a broad, brown/black median stripe extending from metanotum to ABD TERG VI, joined to a broad band between the black SIPH (C.-k. Chan, pers. comm.); BL 1.9–2.4 mm. Al. have a black dorsal abdominal patch. On viscous racemes of *Gaultheria shallon*, sometimes on the terminal shoot and occasionally producing imm. on lower surface of mature leaves. Mon. hol. (C.-k. Chan, pers. comm.). Western N America (B.C., Oregon, California). 2n=12*.

***Aulacorthum esakii* (Takahashi)**

Apt. shining black; BL c. 2.0–2.2 mm. Al. undescribed. On *Paederia* spp. in Japan.

***Aulacorthum euphorbophagum* Zhang, Chen, Zhong and Li**

Apt. yellow; BL c. 1.9 mm. Al with dark bars joined between ABD TERG 3–6 in midline. On undersides of leaves of *Euphorbia pekinensis* in NW China (Zhang, 1999). Closely related to *A. solani*, but with longer HT II.

***Aulacorthum flavum* Müller**

Apt. shining yellow or greenish yellow, with yellowish brown spots at bases of SIPH; BL 1.5–2.1 mm. On leaves and shoot apices of *Vaccinium* spp., esp. *V. uliginosum*. N and C Europe. Mon. hol., with ovip. and al. males in late Aug–Sept in Finland (Heikinheimo, 1990). 2n=12*.

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Aulacorthum glechomae Takahashi

Apt. white; BL c. 1.5 mm. Al. have extensive dark dorsal markings. On *Glechoma hederacea* (var. *grandis*) in Japan and Korea, feeding solitarily on undersides of leaves (Miyazaki, 1971, as *Acyrtosiphon*). Also recorded in Korea from *Mukdenia (Aceriphyllum) rossii* (Lee *et al.*, 2002c). Imm. have spinulose tibiae suggesting that this species may really belong in *Neomyzus*.

Aulacorthum kerriae (Shinji)

Apt. black except for yellow central area on dorsal abdomen, basal part of ANT III, basal parts of femora, tibiae and cauda, and middle parts of SIPH (Shinji, 1930); BL c.2.0–2.3 mm. On *Kerria japonica* in Japan, curling young leaves at growing points in late spring. Also recorded from *Petasites* sp. (Takahashi, 1965a). Mon. hol., with ovip. and al. males in late Sept–Oct (orig. descr.). [The aphid described and illustrated by Moritsu (1983) as *Acyrtosiphon kerriae* (Shinji) seems to be *Aulacorthum solani*.]

Aulacorthum knautiae Heie

Apt. yellowish or pale greenish, often shiny, without pigment spots at bases of SIPH; BL 2.3–2.9 mm. On undersides of leaves of *Knautia arvensis* in Europe. Mon. hol., with ovip. and apt. males in Sept–Oct (orig. descr.).

Aulacorthum kuwanai (Takahashi)

Apt. shining brownish yellow, with blackish apices to segments of ANT and legs, and to SIPH; BL 1.5–1.8 mm. On *Vitis* sp. in Taiwan.

Aulacorthum langei (Börner)

Apt. rather evenly pale green, without any darker spots at bases of SIPH (cf. *A. solani*); BL 1.9–2.3 mm. Al. usually have dark dorsal abdominal cross-bands. On *Pulmonaria officinalis*, feeding on leaves, which become irregularly curled, and petioles. Europe (Germany, Czech Republic, Sweden). Mon. hol. with apt. males (Müller, 1976a, as *A. solani* ssp. *langei*).

Aulacorthum ligularicola Lee

Apt. with dark reddish brown head, thorax and abdomen milky white or pale yellow with large red patches at bases of dusky SIPH; BL 2.7–3.4 mm. On undersides of leaves of *Ligularia fischeri*, causing severe curling. In mountainous regions of S Korea (Lee, 2002).

Aulacorthum magnoliae (Essig and Kuwana)

Plate 22h

Apt. distinctively colored with reddish head and prothorax, rest of body yellow-green to green, tibiae and ANT usually wholly black, SIPH pale basally with dark apices, cauda dark; BL 2.3–3.9 mm. Polyphagous, feeding mainly on leaves of plants in over 20 different families, including *Citrus* and many ornamental shrubs and trees. China, Japan, Korea and E Siberia. Indian records are mostly from Cucurbitaceae and need confirmation due to confusion with *A. spinacaudatum* (q.v.). Apparently almost entirely anhol., with only a 'relict' holocycle in Japan (Takahashi, 1923; Matsuka and Imanishi, 1982). See also Blackman and Eastop (2000). 2n=12 (ex. cult. on potato, Japan).

Aulacorthum majanthemii Müller

Apt. shining brown; BL c.2.5–2.7 mm. On *Maianthemum bifolium*, yellowing leaves. Europe (Denmark, Germany, Poland, Russia, Switzerland). Mon. hol. with ovip. and al. (brachypt.) males found in late Sept in N Germany (orig. descr.).

Aulacorthum myriopterani Zhang

Apt. color in life not recorded; BL c. 2.4 mm. On *Myriopteron extensum* in Yunnan Prov., China. 2n=10 (Chen and Zhang, 1985b)

Aulacorthum nepetifolii Miyazaki

Apt. blackish brown; BL 2.5–2.9 mm. On *Nepeta subsessilis* var. *yesoensis*. Japan and S Korea.

Aulacorthum nipponicum (Essig and Kuwana)

Apt. yellowish red to pink with black head, SIPH and cauda; BL 2.2–2.5 mm. On leaves and stems of *Paederia* spp. in E Asia (Japan, Taiwan, China, Thailand, Korea, Java, NE India). Anhol. in Taiwan, mon. hol. near Tokyo with ovip. and al. males in late Oct (Takahashi, 1923, as *Macrosiphum paederiae*).

Aulacorthum palustre Hille Ris Lambers

Apt. pink or pale green, frequently with darker rust-colored or green spots at bases of SIPH; BL 2.4–3.2. Immatures have cross-bands of wax powder. On undersides of leaves of liguliflorous Compositae such as *Hypochaeris*, *Leontodon*, *Picris* and *Taraxacum*. In Europe, east to Poland and Czech Republic, and south to Italy. Males trapped in UK in Oct, but possibly mainly anhol., as found on underside of rosette leaves of *Taraxacum* in UK in Feb (BMNH colln, J.H. Martin). 2n=34*.

Aulacorthum (Perillaphis) perillae (Shinji)

Apt. yellowish brown, rather shining, with black ant. and SIPH and pale cauda; BL 1.6–2.0 mm. Al. have a shiny black thorax and a dark brown dorsal abdominal pattern of sclerotisation. On undersides of leaves of *Perilla* spp. (*frutescens*, *ocymoides*) in E Asia; W Bengal (BMNH colln, leg. A.N. Basu), Japan, Szechuan, Taiwan and Korea. Takahashi (1965a) provided a redescription. *Aulacorthum (Perillaphis) siniperillae* (Zhang), described from *Perilla frutescens* in China (as *Cryptaphis*) is very similar, and possibly a synonym.

Aulacorthum phytolaccae Miyazaki

Apt. with black sclerotic dorsum, imm. green; BL 2.0–2.7 mm. Described from *Phytolacca esculenta*, and specimens of apparently the same species were also found on undersides of leaves of *Comanthosphace* sp., attended by ants (BMNH colln, R.L. Blackman). Al. undescribed. In Japan. 2n=10* (specimens from *Comanthosphace*).

Aulacorthum pirolacearum Szelegiewicz

Apt. shining orange or dark green, imm. white or yellowish; BL 1.7–2.1 mm. Al. have large brown marginal and intersegmental sclerites. On various Ericaceae–Pyrolaceae (*Moneses*, *Pyrola*, *Ramischia*) in Poland. It is possibly synonymous with *A. rufum* (q.v.).

Aulacorthum pterinigrum Richards

Appearance of apt. in life not recorded, but presumably greenish or yellowish with a mainly brown-black abdomen, laterally as well as dorsally, with pale submarginal longitudinal stripes; BL about 2.2 mm. Host of type material was originally recorded in error as ‘*Pteris*’, but was actually *Pieris* (Ericaceae), and there are subsequent records from *Vaccinium* spp. and *Gaultheria shallon* (C.-k. Chan, pers. comm. viii.2005), and also from *Akebia quinata* (Lardizabalaceae) (Robinson and Chan, 1988). Only known from B.C. (Canada). Al. males have been reared in the laboratory (C.-k. Chan, pers. comm. x.2005). [This species is listed as a *Sitobion* in Remaudière and Remaudière (1997), but is transferred back to *Aulacorthum* here, adopting the narrower concept of *Sitobion* advocated by Jensen (1997). Its generic position is however uncertain.]

Aulacorthum rhamnii M.R. Ghosh, A.K. Ghosh and Raychaudhuri

Apt. yellowish green; BL c.1.8–2 mm. Described from colonies on apical leaves of *Rhamnus nepalensis*. Subsequently recorded from *Eurya* sp. and other unidentified plants (Raychaudhuri *et al.*, 1980). The host plant relationships need clarification.

Aulacorthum rufum Hille Ris Lambers

Apt. green or dirty reddish brown, slightly wax-powdered laterally and ventrally; BL 2.0–2.7 mm. On young shoots and undersides of leaves of *Vaccinium* spp., usually *V. myrtilus*. NW, N and C Europe. Mon. hol. with apt. males. *A. pirolacearum* on plants in other genera of Ericaceae has a longer ANT PT, but is not otherwise clearly distinguishable and could be a synonym.

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Aulacorthum scirpi A.K. Ghosh and Raychaudhuri, 1972, nec. van der Goot

Apt. dark with black SIPH; BL 1.7–1.8 mm. On *Scleria elata* in Assam, India. Described under the name *Aulacorthum scirpi* van der Goot, which is now thought to be a species of *Carolinaia* (*Juncomyzus*); see Noordam (2004).

Aulacorthum sclerodorsi Kumar and Burkhardt

Apt. pale brown with darker markings on dorsal thorax and abdomen, and black tips to SIPH; BL c.2.8–2.9 mm. Al. have a rather extensive black dorsal abdominal patch. On ‘*Nepata*’ (presumably *Nepeta*) sp. in India (H.P.).

Aulacorthum sedens Müller

Apt. in life whitish, slightly greenish, shiny, with tips of SIPH rather dark; BL 1.4–2.4 mm. On undersides of lower leaves of *Knautia arvensis* in Germany and Poland, and also recorded from Italy (van Harten and Coceano, 1981). Mon. hol., with ovip. and al. males in late Sept (orig. descr.).

Aulacorthum smilacis Takahashi

Apt. yellow with variably developed dark markings, ANT and legs banded with black, and black-tipped SIPH; BL 1.8–1.9 mm. Al. undescribed. On *Smilax* spp. in Japan. 2n=10.

Aulacorthum solani (Kaltenbach)

Plate 22i

Apt. shining pale whitish or yellowish green with darker green, orange or rust-colored spots at bases of SIPH, to dull green or greenish brown; BL 1.8–3.0 mm. Al. have dark head and thorax and a variably-developed pattern of dark dorsal abdominal cross-bands, and 8–18 (mostly 9–15) sec. rhin. on ANT III. Extremely polyphagous, colonising plants in many different families of both dicots and monocots. Probably of European origin, now almost world-wide. Mon. hol. with apt. and (more rarely) al. males, and with the unusual ability to go through the sexual phase on many different plant species. Commonly anhol. in mild climates and glasshouses. Populations occur with particular host associations, some of which are persistent. A population with a dark dorsal shield living on maritime *Convolvulus* near Auckland, New Zealand has been known since 1939 (Cottier, 1953); it transferred readily to sprouting potato tubers in 1983 and maintained its dark pigmentation in culture for several generations (V.F. Eastop, unpubl. data). *A. aegopodii*, *A. cylactis* and *A. langei* are morphologically similar but biologically distinct taxa in Europe closely related to *A. solani*. There are also some recognisably distinct permanently anhol. forms that are not reliably distinguishable on morphological grounds alone from *A. solani*, such as *A. prasinum* Börner, studied in Germany by Müller (1970). See also Blackman and Eastop (2000). 2n=10.

Aulacorthum speyeri Börner

Apt. are shiny black except for pale yellow areas on mesonotum and ABD TERG 1 and 5, with mainly pale ant. and legs, SIPH dark at base and apex, and dark cauda; BL 1.9–2.9 mm. On undersides of leaves of *Convallaria majalis*, *Polygonatum multiflorum* and some other Convallariaceae. Also occasionally found in small numbers in concealed situations on certain other plants (*Anthericum*, *Lycopus*, *Potentilla*). Infested leaves of *Convallaria* develop large yellow spots and become desiccated. In NW Europe, Italy, Hungary, and eastward to Iran. Müller (1979) gave an account of this aphid. Ovip. and al. males in Oct in N Europe. 2n=10.

Aulacorthum spinacaudatum (Kumar and Burkhardt)

Apt. pale yellow; BL c. 3.0 mm. Al. are light brown with black head and thorax. Described from *Cucumis sativus* in India (H.P.). Specimens from *Cucurbita pepo* in West Bengal (BMNH colln, leg. A.N. Basu) and from *Sechium edule* previously identified as *A. magnoliae* seem to be this species, and there are other Indian records of *A. magnoliae* on Cucurbitaceae that should be referred to *A. spinacaudatum*. A small sample collected in mid-Sept from ‘ragi’ (BMNH colln, CIE A15689) included an al. male. 2n=12* (Khuda-Bukhsh and Basu, 1987, as *A. magnoliae*).

Aulacorthum takahashii (Mason)

Apt. white to pale yellowish, with black tips to ANT segments, tibiae and SIPH; BL c.2.1 mm. On leaves of *Polgia japonica* in Taiwan.

Aulacorthum vaccinii Hille Ris Lambers

Apt. shining black, with appendages pale with dark apices, SIPH sometimes dark; BL 1.4–2.1 mm. On *Vaccinium uliginosum* in N Europe and Czech Republic and also recorded from *V. japonicum* and *Leucothoe* in Japan (Miyazaki, 1971). Mon. hol. on *Vaccinium*, with ovip. and al. males in Aug–Sept in N Europe (Heikinheimo, 1990).

Aulacorthum vandenboschi Hille Ris Lambers

Apt. large, broadly spindle-shaped, orange aphids with black appendages; BL c.3.5 mm. Al. have brown marginal sclerites and thin dorsal cross-bands. On *Cirsium japonicum* in Japan.

Aulacorthum watanabei (Miyazaki)

Apt. yellow to orange-yellow in spring, creamy white in summer, with shining black head and sclerotised parts of thorax and abdomen, mainly pale ant. and legs, dark SIPH and pale yellow cauda; BL c.3.0 mm. On undersides of leaves of *Convallaria keiskei* in Japan (Miyazaki, 1971).

Avicennina Narzikulov

Aphidinae: Macrosiphini

One or more C Asian species on *Lonicera* with long clavate SIPH and a short hairy cauda. Kadyrbekov (2002e) recorded undescribed species from *Lonicera* and *Heracleum* in C Asia.. [The *Prunus*-feeding species described in this genus (*A. indica*; see Blackman and Eastop, 1994) belongs in *Tumoranuraphis* Zhang, Chen, Zhong and Li, in Zhang (1999), as *Tumoranuraphis indica*, new combination (Eastop and Blackman, 2005).]

Avicennina sogdiana Narzikulov

Apt. green with darker green markings; BL 2.7–2.9 mm. On *Lonicera* spp. in C Asia. Ovip. occur in Oct (Mukhamediev and Akhmedov, 1982).

Baizongia Rondani

Eriosomatinae: Fordini

One species related to *Geoica* but without spatulate hairs and with well-developed wax pore plates.

Baizongia pistaceae (L.)

Plate 1h

Apt. whitish or pale yellow, powdered with wax; BL 1.6–2.3 mm. On roots of numerous grass species (e.g., *Agrostis*, *Dactylis*, *Festuca*, *Poa*, *Triticum*). Throughout Europe, the Middle East, N Africa, Kenya, India, and Pakistan. Heter. hol. in the Mediterranean region with sexual phase and large, horn-like galls on *P. palaestina* (see Blackman and Eastop, 1994). Elsewhere anhol. on grass roots. Invariably attended by ants, especially *Lasius flavus*, and may overwinter in ants' nests. 2n=24.

Berberidaphis Narzikulov

Aphidinae: Macrosiphini

One species in C Asia superficially resembling *Liosomaphis* but with better developed ANT tubercles, longer ANT and a short rounded cauda.

Berberidaphis lydiae (Narzikulov)

Apt. shiny pale yellow, BL 1.7–2.7 mm. On undersides of leaves of *Berberis* spp. in mountainous regions of Tajikistan. Ovip. and small apt. males appear in Oct–Nov (Narzikulov, 1957, as *Liosomaphis lydiae*).

Bipersona Hottes

Aphidinae: Macrosiphini

A genus for one nearctic species related to *Uroleucon* but with a distinctive cauda and anal plate.

Bipersona ochrocentri (Cockerell)

Plate 28h, Figure 22e

Apt. brick-red to ochre-red with black appendages; BL 3.2–3.8 mm. In large colonies on leaves and stems of *Cirsium ochrocentrus*, and also on '*Cnicus*' sp., in western USA. Ovip. and apt. males in Sept–Oct (Palmer, 1952).

Blanchardaphis Ortego, Nieto Nafría and Mier Durante Aphidinae: Macrosiphini

Two species on *Senecio* in S America with dark cylindrical SIPH having a little poorly defined reticulation at apices, and 5 hairs on first tarsal segments. A third undescribed species has been collected on *Cuphea* in Brazil (Curitiba; BMNH colln, leg. S Lazzari). Originally described as *Blanchardia*, the name was changed to *Blanchardaphis* by Ortego *et al.* (1998).

Blanchardaphis capitophoroides (Blanchard)

Apt. dark reddish; BL c.3 mm. Sec. rhin. in apt. III 18–20, al. undescribed. On *Senecio* sp. in Argentina. Ortego *et al.* (1997, as *Blanchardia*) compared measurements with those of *B. poikila*.

Blanchardaphis poikila (Ortego, Nieto Nafría and Mier Durante)

Apt. dark pink with a narrow longitudinal greenish mark on ABD TERG 2–5; BL 2.2–3.0 mm. Sec. rhin. in apt. III 5–14, in al. 16–19. In dense colonies on flowering stems of *Senecio subumbellatus* in Argentina. Mon. hol., with al. males (Ortego *et al.*, 1997, as *Blanchardia*).

Brachycaudus van der Goot

Aphidinae: Macrosiphini

A genus of c.50 mainly palaeartic species characterised by rounded spiracular apertures, short cauda, and SIPH with a subapical annular incision below the flange. There are species groups associated with Ranunculaceae (subgenus *Brachycaudina*), Caryophyllaceae (subgenus *Acaudus*) and Scrophulariaceae (subgenus *Scrophulaphis*), and other common hosts are in Polygonaceae and Boraginaceae. Primary hosts of heteroecious species are normally *Prunus*. Remaudière (1952) revised the European species then known, and Heie (1992) provided an account of the species of Fennoscandia and Denmark. Burger (1975) reviewed European species then placed in *Acaudus*. Andreev (2004) revised the subgeneric classification.

Brachycaudus (Mordvilkomemor) acaudata (Hille Ris Lambers)

Apt. color in life unknown, probably greenish with extensive blackish dorsal sclerotisation; BL 1.5–1.7 mm. Host of type specimens from Greenland unknown, but subsequently collected from stems of *Persicaria viviparum* in arctic Canada (Baffin I; Richards, 1963a). Records of *B. acaudata* from *Rhodiola* (= *Sedum*) *rosea* in Iceland and Wales are referable to *B. sedi*. Mon. hol. with apt. males (orig. descr.).

Brachycaudus (Brachycaudina) aconiti (Mordvilko)

Apt. shining black, BL 2.0–2.6 mm. Sec. rhin. of apt. III 0–8, in al. 7–12. On *Aconitum* spp. and *Delphinium* spp. colonising flower stems and leaf petioles, and rarely on undersides of leaves. In Europe, C Asia and Siberia. Mon. hol., with apt. males (Nosyrev, 1968). Closely related to *B. napelli* in Europe; differing rhinarial numbers on antennal segment III are often given as a discriminant between the two, but may not always be reliable due to alatifformity.

Brachycaudus (Mordvilkomemor) amygdalinus (Schouteden)

Apt. green with variably developed dark dorsal markings, usually as cross-bands posterior to SIPH; BL 0.8–2.1 mm. Al. have a dark dorsal central abdominal patch. On *Polygonum* (particularly small-leaved) spp., *Persicaria maculosa* and *Fagopyrum cymosum*. On *Polygonum aviculare* they feed hidden under the thin bracts surrounding the nodes (Talhok, 1977). In Europe, Middle East, Pakistan and S Africa. Heter. hol., with sexual phase on *Prunus* spp. (*amygdalus, persica*), but also frequently anhol. on Polygonaceae, even where primary hosts are available. $2n=12^*$.

Brachycaudus (Nevskyaphis) ballotae (Passerini)

Apt. color in life unknown, probably shiny dark green to black; BL c.1.7–1.9 mm. On shoots of *Ballota nigra*, attended by ants (Szelegiewicz, 1981). In Czech Republic, Hungary, N Italy and Poland. Mon. hol.

Brachycaudus (Nevskyaphis) bicolor (Nevsky)

Figure 9b

Apt. shining yellowish tinged with pink, to pale green, with a large shiny black dorsal abdominal patch; BL c.2.1–2.4 mm. In ant-attended colonies on root collars, and at bases of leaves near ground level, of Boraginaceae (*Anchusa*, *Cerithe*, *Cynoglossum*, *Heliotropium*, *Lindelofia*, *Myosotis*) and also recorded from

Codocephalum (Compositae). In UK (Stroyan, 1955), S Europe (Madeira, Portugal, Spain, Italy), Egypt, Caucasus, Tajikistan, Uzbekistan and Afghanistan. Sexual morphs unrecorded; apparently anhol. in Italy (Barbagallo and Patti, 1998). 2n=12.

***Brachycaudus (Mordvilkomemor) brevirostratus* Pashtshenko**

Apt. dirty green to pale brown; BL c.1.3 mm. On *Polygonum* spp. in E Siberia. Possibly this is a synonym of *B. rumexicolens*.

***Brachycaudus (Prunaphis) cardui* (L.)**

Plate 10a

Apt. shiny black dorsally, light green to yellowish or reddish ventrally (imm. green or reddish); BL 1.9–2.3 mm. Sec. rhin. in al. III 15–36, IV 0 (–4). In dense ant-attended colonies on stems and leaves of many species of Compositae (e.g., *Arctium*, *Carduus*, *Cirsium*, *Cynara*, *Chrysanthemum*, *Tanacetum*, *Matricaria*) and Boraginaceae (e.g., *Borago*, *Cynoglossum*, *Echium*, *Symphytum*), and also frequently on other plants, e.g., *Capsella*. In Europe, Asia, N Africa, N America. Heter. hol. with sexual phase on *Prunus*, esp. *P. domestica*. C Asian populations with longer hairs are regarded as a subspecies, *B. cardui* ssp. *turanica* Mordvilko (differentiated by Andreev, 1999). 2n=10.

***Brachycaudus cerasicola* (Mordvilko)**

Apt. shining yellowish brown to dark brown; BL 1.7–2.0 mm. On stems and flowerheads of various Labiatae (*Eremostachys labiosa*, *Perovskia abrotanoides*, *Phlomis* sp.) and Scrophulariaceae (*Pedicularis pycnantha*) in C Asia (Nevsky, 1929; Narzikulov and Daniyarova (1990). Heter. hol., with sexual phase on *Prunus (Cerasus) verrucosa*. [This species was erroneously synonymised with *B. pilosus* in Blackman and Eastop (1994).]

***Brachycaudus (Appelia) cerinthis* Bozhko**

Apt. shining blackish, BL 1.6–2.1 mm. On stems, flower stalks and bracts, and deforming flower buds, of *Cerinthe* spp. In Czech Republic, Hungary and Ukraine.

***Brachycaudus crassitibiae* Nevsky**

Apt. dark brown with paler appendages; BL c.1.3–1.4 mm. Sec. rhin. in al. III 4–6. On *Turgenia (~Caucalis) latifolia* in S Kazakhstan.

***Brachycaudus (Acaudus) divaricatae* Shaposhnikov**

Apt. shining dark brown; BL on secondary host unknown. On *Silene* (incl. *Melandrium*) spp. in SW Asia (N Caucasus, Turkmenia, Iran). Heter. hol., with sexual phase on *Prunus* spp. (Shaposhnikov, 1962).

***Brachycaudus gentianae* Daniyarova**

Apt. shining brown; BL c. 1.8 mm. On *Gentiana olgae* in Tajikistan.

***Brachycaudus helichrysi* (Kaltenbach)**

Plate 9i

Apt. very variable, pale green, pale yellow, whitish or pinkish; BL 0.9–2.0 mm. Sec. rhin. in al. III 13–46, IV 0–18. On stems and in flowerheads of numerous plant species, esp. Compositae (e.g., *Achillea*, *Ageratum*, *Aster*, *Bidens*, *Chrysanthemum*, *Cineraria*, *Erigeron*, *Gnaphalium*, *Helianthus*, *Matricaria*, *Senecio*) and Boraginaceae (e.g., *Anchusa*, *Cynoglossum*, *Myosotis*, *Symphytum*), but also many others incl. *Rumex*, *Saxifraga*, *Trifolium*, *Veronica*. World-wide, and a major pest (see Eastop and Blackman, 2000). Heter. hol. with sexual phase on *Prunus* spp. (esp. *domestica*, *insititia*, *spinosa*) in colder climates, anhol. in warmer regions and in glasshouses. 2n=12.

***Brachycaudus (Prunaphis) iranicus* Davatchi and Remaudière**

Figure 9a

Apterae greenish yellow to pale green with shiny brown dorsal markings (a transverse bar on the mesonotum, a central abdominal patch and presiphuncular sclerites) and brown SIPH; BL 1.6–2.0 mm. On undersides of leaves of *Anchusa azurea* (= *italica*) and *A. strigosa*, feeding close to the main veins, in the Middle East (Iran, Turkey, Israel, Lebanon and Syria). The al. (hitherto undescribed) has dark antennae, sec. rhin. on III 13–16, and a central abdominal sclerite on ABD TERG 5–6, fused each side with presiphuncular sclerites, and with a large central lacuna. Mon. hol. with al. males (Davatchi and Remaudière, 1953).

THE APHIDS

***Brachycaudus (Prunaphis) jacobii* Stroyan**

Apt. black and shiny dorsally, olive green ventrally; BL 1.4–2.0 mm. Sec. rhin. in al. III 6–16, IV 0–2. At base of stem or on roots of *Myosotis* and *Pulmonaria* spp., ant-attended. Europe (UK, Netherlands, Germany, Italy). Mon. hol. with apt. males (Müller, 1975a). 2n=12.

***Brachycaudus (Acaudus) klugkisti* (Börner)**

Apt. shining black dorsally, red-brown ventrally; BL 1.5–2.5 mm. Sec. rhin. in al. III 11–31 (in a row), IV 0–8. On upper parts of *Silene* (incl. *Melandrium*) spp. Europe. Mon. hol. with apt. males (Müller, 1987). 2n=10.

***Brachycaudus (Nevskyaphis) lamii* Koch**

Apt. with shining black dorsum; BL 1.8–2.2 mm. On *Lamium* spp., especially *L. album*, in Europe (Germany, Poland, Switzerland, Italy, Slovakia). Mon. hol., with ovip. in Oct. (BMNH colln, leg. D. Hille Ris Lambers).

***Brachycaudus (Prunaphis) lateralis* (Walker)**

Apt. with shining black dorsum, ventrally green or reddish; BL 1.6–2.6 mm. On stems and leaves, usually close to ground, of plants in numerous genera of Compositae incl. *Arctium*, *Anthemis*, *Carduus*, *Cirsium*, *Chrysanthemum*, *Galinsoga*, *Leucanthemum*, *Matricaria* and *Senecio*. Also found on *Capsella*. Europe, eastward to Ukraine. Mainly anhol., although a sexual phase may sometimes occur on *Prunus* (Müller and Horatschek, 1979). Closely related to *B. cardui*, and often treated as a subspecies.

***Brachycaudus (Scrophulaphis) linariae* Stroyan**

Apt. deep blackish green, shiny (imm. pale green); BL 1.4–1.9 mm. Sec. rhin. in al. III 11–33, IV 6–9, V 0–2. On basal parts of *Linaria* spp., attended by ants. In UK, Denmark, Sweden, Finland, France, Germany and most of eastern Europe (Andreev and Mamontova, 1998). Life cycle unknown.

***Brachycaudus (Nevskyaphis) lucifugus* Müller**

Apt. yellowish green with shiny dark brown to black dorsum; BL 1.3–2.2 mm. Sec. rhin. in al. III 15–30, IV 2–9, V 0–1. On roots and at leaf bases of *Plantago lanceolata*, in Europe (UK, Germany, Hungary). Ant-attended. Mon. hol. with apt. males (orig. descr. and Stroyan, 1964a).

***Brachycaudus (Acaudus) lychnicola* Hille Ris Lambers**

Apt. reddish brown with shining black dorsal shield; BL 1.9–2.3 mm. Sec. rhin. in al. III 23–35, IV 0–4. On roots, stem-bases and lower leaves of *Lychnis flos-cuculi* and *Silene* (incl. *Melandrium*) spp., attended by ants. NW Europe (Netherlands, Sweden). Mon. hol. with apt. males (orig. descr.).

***Brachycaudus (Acaudus) lychnidis* (L.)**

Apt. reddish brown with shining brown–black dorsal shield; BL 1.8–2.9 mm. Sec. rhin. in al. III 15–34, IV 0–4. On stems, leaves and flowers of *Lychnis* and *Silene* (incl. *Melandrium*) spp. Europe, eastward to W Siberia, Turkey and Caucasus. Mon. hol. with apt. males (Heie, 1992). 2n=12.

***Brachycaudus (Nevskyaphis) malvae* Shaposhnikov**

Apt. shining blackish green; BL 1.8–2.3 mm. On *Malva* spp., in ant-attended colonies at base of stem and on lower leaves. In England, Spain, S Russia, Ukraine, and also China, if *B. atuberculatus* Zhang 1981 is a synonym (Andreev, 2004). 2n=12.

***Brachycaudus (Scrophulaphis) mimeuri* Remaudière**

Apt. shining pale to dark brown; BL 0.7–1.4 mm. Sec. rhin. in al. III 16–19, IV 1–6, V 0–1. On roots of *Euphrasia* and *Odontites* spp. in S and E Europe; for distribution see Jörg and Lampel, 1988, but also in Denmark (Heie, 1992) and Sicily (Barbagallo and Stroyan, 1982), and possibly also in S Australia on *Parmentocellia latifolia* (Eastop, 1966, as ?*B. persicaecola*). Not attended by ants (Hille Ris Lambers, 1967). Presumably anhol., and closely related to *B. persicae* (q.v.).

***Brachycaudus (Prunaphis) mordvilkoii* Hille Ris Lambers**

Apt. green with shiny black dorsal shield; BL 1.7–2.3 mm. Sec. rhin. in al. III 12–21, IV 3–6, V 0–1. On certain Boraginaceae (*Anchusa*, *Echium*, *Solenanthus*, *Symphytum*), with one record from Compositae

(*Hieracium pilosella*). Widely distributed in Europe (but not recorded from Scandinavia or Iberian peninsula). Mon. hol. with apt. males (Müller 1975a).

***Brachycaudus (Brachycaudina) napelli* (Schrank)**

Figure 6b,c

Apt. shining black with end of abdomen red; BL 2.0–2.9 mm. Sec. rhin. in alatiform apt. 3–25, in al. III 23–27. On *Aconitum* spp., esp. *napellus*, forming colonies on stems, flowers and fruits, and sometimes on leaves. Only occasionally on *Delphinium* spp. In W and NW Europe (not UK), south to Spain, and also recorded from Austria. Closely related to *B. aconiti* (q.v.). Mon. hol. with apt. males.

***Brachycaudus (Acaudus) pallidus* Andreev**

Apt. shining dark brown; BL 1.5–2.2 mm. On roots of *Silene nutans* in Moldova.

***Brachycaudus (Scrophulaphis) persicae* (Passerini)**

Apt. with shiny brown-black dorsum; BL 1.4–2.4 mm. Mostly known as a world-wide pest of peach (Blackman and Eastop, 2000), but al. from *Prunus* have been transferred successfully to *Euphrasia* sp. and *Rhinanthus glaber* and subsequently to *Melampyrum pratense* (Burger, 1975), so it seems probable that there is a facultative host alternation from *Prunus* to Scrophulariaceae at least in Europe. On Scrophulariaceae it lives on the above-ground parts (Heie, 1992). There are also records from *Odontites*, but these may be referable to *B. mimeuri* (q.v.), a closely-related anholocyclic form on roots of Scrophulariaceae that has also become widely distributed. $2n=10$.

***Brachycaudus (Nevskyaphis) plantaginis* Holman and Szelegiewicz**

Apt. yellowish brown with shiny dark dorsum; BL c. 1.9–2.1 mm. Al. undescribed. Ant-attended, on root collar of *Plantago depressa* and *P. major* in Mongolia and E Siberia (Pashtshenko, 1988a).

***Brachycaudus (Acaudus) populi* (del Guercio)**

Apt. red–brown with shiny black dorsal shield; BL 1.6–2.9 mm. Sec. rhin. in al. III 19–36, IV 0–3. On upper parts of *Silene* spp., widely distributed in Europe, eastward to Crimea. Mon. hol. with apt. and al. males. Closely related to *B. lychnidis*, and confused with that species prior to Burger (1975). $2n=12$.

***Brachycaudus (Acaudus) rinariatus* Andreev**

Apt. with shining black dorsal shield; BL 1.7–2.2 mm. Al. have secondary rhinaria distributed III 36–48, IV 16–19, V 1–6. On *Linaria vulgaris* in E Europe (Russia, Moldova, Ukraine).

***Brachycaudus (Brachycaudina) rociadae* (Cockerell)**

Figure 6a

Apt. shining reddish brown to black, fading to hazel brown anteriorly and posteriorly; BL c. 2.0 mm. Imm. bright coral red. On stems and leaves of *Delphinium* spp.; feeding on leaves causes them to curl tightly (Palmer, 1952). Widely distributed in N America. Mon. hol., with ovip. and apt. males in mid-July (Ontario; BMNH colln, leg. S.F. MacDonald) or early Oct (Colorado and Manitoba).

***Brachycaudus (Mordvilkomemor) rumexicolens* (Patch)**

Apt. reddish with variably developed dark dorsal markings; BL 1.3–2.1 mm. Al. have more-or-less fused cross-bands on posterior abdominal tergites. In inflorescences of *Rumex acetosella*, and sometimes on other Polygonaceae (*Fagopyrum*, *Persicaria*, *Polygonum*). In Europe, W and C Asia, India, Australia, N and S America. Mon. hol., with apt. males (Tuatay and Remaudière, 1964). *B. brevirostratus* in E Siberia might be this species. $2n=12$.

***Brachycaudus salicinae* Börner**

Apt. shining gray–black; BL 1.4–1.9 mm. In rolled leaves of *Inula* spp., especially *salicina*, in Europe (Germany, France, Czech Republic). Mon. hol. (Börner, 1952).

***Brachycaudus (Mordvilkomemor) sedi* (Jacob)**

Apt. yellowish green, with dark cross-bands on posterior abdomen; BL 1.0–2.1 mm. On stem apices and flowers of *Rhodiola* (= *Sedum*) *rosea*, causing distortion. In Europe (including Iceland, as *Thuleaphis acaudata*; Prior and Stroyan, 1960) and W Siberia (Ivanoskaya, 1975, as *Rhodiolaphis cholsunensis*). Mon. hol., with ovip and apt. males appearing in August (orig. descr.). $2n=8^*$.

THE APHIDS

Brachycaudus (Mordvilkomemor) shaposhnikovi Narzikulov

Apt. shining yellowish green with black dorsal sclerotic markings, SIPH pale with tips darker; BL 2.1–2.7 mm. Sec. rhin. in al. III 15–18. Mon. hol. on *Atraphaxis pyrifolia* in Tajikistan (Narzikulov and Daniyarova, 1990).

Brachycaudus spiraeae Börner

Apt. light green to grayish brown with variable dark dorsal markings; BL 1.2–1.8 mm. Sec. rhin. in apt. III 0–11, IV 0–1, in al. III 23–34, IV 5–13, V 0–2. On *Spiraea* spp., in leaves rolled and curled into narrow ‘pods’. Europe, W Siberia and C Asia. Mon. hol. 2n=12.

Brachycaudus (Appelia) tragopogonis (Kaltenbach)

Apt. shining gray–brown to dark brown; BL 1.4–2.3 mm. On aerial parts of *Tragopogon* spp. in Europe, and introduced to S America (Brazil, Chile). Mon. hol. In W Europe there is possible confusion with the morphologically similar *B. prunicola*, which is mostly mon. hol. on *Prunus spinosus*, but may have a facultative migration to *Tragopogon*. Hille Ris Lambers (1948) described a subspecies with long dorsal hairs, *B. tragopogonis* ssp. *setosus*, on *T. longirostris* in Israel, and collections from SW and C Asia and Pakistan may be of this form (Mostafawy, 1967). 2n=12 (2n=11 and 12 for samples of ssp. *setosus* from Israel and Iran respectively).

Brachycaudus umbelliferarum Nevsky

Apt. pale brown or yellowish green with dark brown pleural and marginal spots, or entirely dark brown; BL c.2.4 mm. On roots of an umbelliferous plant, probably *Heracleum* sp. SE Kazakhstan. With marginal tubercles on prothorax, ABD TERG 1, 2 and 7, this species is unlikely to be a *Brachycaudus*, and is regarded by Andreev (2004) as a nomen dubium.

Brachycaudus (Nevskyaphis) virgatus Shaposhnikov

Color of apt. in life unknown, probably greenish with darker head and dorsal markings; BL 1.6–1.8 mm (2 specimens). On stems and leaves near base of host plants, which are Boraginaceae (*Anchusa*, *Symphytum*) and the composite *Senecio fluviatilis*. Alatae not described. Only known from southern Ukraine.

Brachycaudus viridanus (Nevsky)

Apt. pale green, BL 1.3–1.7 mm. On stems of *Cousinia* sp. in Uzbekistan. Al. are also pale (brownish head and thorax and pale green abdomen), and have about 7 rhinaria on ANT III. This species was synonymised by with *B. cardui* (presumably ssp. *turanica*), and could possibly be a dwarf form of that species lacking dark sclerotisation.

Brachycolus Buckton

Aphidinae: Macrosiphini

Four or five species with very short broad-based conical or barrel-shaped flangeless SIPH and triangular cauda associated with Caryophyllaceae. Heie (1992) reviewed the species in W Europe.

Brachycolus brachysiphon Richards

Apt. color in life unobserved; BL c.1.8 mm. On *Stellaria longipes* in N Canada.

Brachycolus cerastii (Kaltenbach)

Figure 51b

Apt. dirty green, wax-powdered; BL 1.3–1.7 mm. Sec. rhin. in al. III 3–6. On *Cerastium* spp., esp. *C. arvense*, causing shoots to be stunted and deformed into gall-like structures. Europe. Mon. hol. (but sexual morphs apparently undescribed). 2n=14.

Brachycolus cucubali (Passerini)

Plate 13d

Apt. whitish yellow to pale green, wax-powdered; BL 1.4–2.2 mm. Sec. rhin. in al. III 9–16, IV 0–2. On *Silene* spp., rolling leaves into elongate pseudogalls (Heie, 1992, as *Hayhurstia*). Europe and N Africa. Mon. hol. (but sexual morphs apparently undescribed).

Brachycolus stellariae (Hardy)

Apt. pale green, wax-powdered; BL 1.1–2.0 mm. Sec. rhin. in al. III 4–9, V 0–1. On upper sides of leaves of *Stellaria* spp., which are rolled into oblong pseudogalls. Also recorded from *Moehringia trinerva*. Europe. Mon. hol. with apt. males (Heie, 1992).

***Brachycorynella* Aizenberg**

Aphidinae: Macrosiphini

Two palaeartic species with different biologies, similar to *Brachycolus* but with shorter ANT and PT, and very short conical SIPH.

***Brachycorynella asparagi* (Mordvilko)**

Apt. green, covered with gray mealy wax; BL 1.2–1.8 mm. On *Asparagus* spp., causing stunting of shoots and ‘rosetting’ of leaves, which turn blue–green. Europe, and introduced into N America, China and Korea (see also Blackman and Eastop, 2000). Mon. hol. with al. males. 2n=10.

***Brachycorynella lonicerina* (Shaposhnikov)**

Figure 38c

Apt. green, dusted with grayish wax powder, BL c.1.8 mm. On *Lonicera* spp., feeding on upper sides of leaves, which are folded in half (Shaposhnikov, 1964, as *Semiaphis*). In C Asia, S Russia, Ukraine and Iran. Heter. hol. with unknown secondary host (Remaudière and Remaudière, 1997: 298). Ovip. and al. males appear on *Lonicera* in late Sept–Oct (Narzikulov, 1965; Mukhamediev and Akhmedov, 1982). 2n=10*.

***Brachymyzus* A.N. Basu**

Aphidinae: Macrosiphini

One species in India with a *Myzus*-like head but with thick truncate SIPH and an unusual cauda.

***Brachymyzus jasmini* A.N. Basu**

Apt. with head, thorax and antennae blackish brown, abdomen greenish, BL 1.6–2.1 mm. On leaves and young shoots of *Jasminum humile* in NE India (West Bengal). Oviparae were described from Sikkim on *Nellia* (*Neillia*?) sp. (Rosaceae), and an al. male was found on *Pilea microphylla* (Mondal *et al.*, 1978). There is possibly host alternation between *Neillia* and *Jasminum*.

***Brachysiphoniella* Takahashi**

Aphidinae: Macrosiphini

One or more species of grass-feeding aphids in E and SE Asia, with distinctive very short black SIPH and a long dark rather hairy cauda.

***Brachysiphoniella apiaca* Zhang and Zhang**

Apt. color in life unrecorded; BL c.1.6 mm. On *Apium graveolens* in China (L. Zhang and G. Zhang, 2000a). Host needs confirmation, as this aphid is very similar to the grass-feeding *B. montana*.

***Brachysiphoniella montana* (van der Goot)**

Plate 14d

Apt. brownish green, densely covered in mealy wax; BL 1.1–1.9 mm. On grasses, well-adapted to aquatic species such as *Leersia hexandra* due to its waxy coat. Also recorded from *Cynodon*, *Eleusine*, *Microstegium*, *Miscanthus*, *Oryza* (as *Melanaphis vandergooti* Raychaudhuri and Banerjee), *Panicum*, *Pennisetum* and *Phragmites*. India, Bangladesh, Nepal, China, Taiwan, Vietnam, Korea, Japan, Philippines, Malaysia, Indonesia, and Australia (NSW). Presumably mainly anhol., but at least in Korea there may be host alternation to *Pyrus* spp. (Lee *et al.*, 2002c).

***Brachyunguis* Das**

Aphidinae: Aphidini

About 30 species mainly on xerophytic plants, mostly Chenopodiaceae. Related to *Aphis* but with a very short ANT PT (shorter than in *Aphis* subg. *Protaphis*) and very short pale SIPH. The clypeus is often globose, but the extent of its enlargement varies considerably, and subgeneric separation of *Xerophilaphis* on grounds of greater enlargement of clypeus (Remaudière and Halbert, 1996) does not seem warranted. Palaeartic species and one described from S America are coated in mealy wax in life, but wax production is not reported for N American species. Kadyrbekov (1999c) provided a key to species, and Kadyrbekov (2001c) summarised the characters of the genus and transferred several species to it.

***Brachyunguis agriphylli* Bozhko**

Apt. green, wax-powdered, with dark green pleural markings; BL c.1.5–1.6 mm. In large colonies on *Berkheya* (= *Agriphyllum*) *arenarium* in Ukraine.

THE APHIDS

Brachyunguis atraphaxidis (Nevsky)

Apt. dark green, with paler appendages, body wax-dusted; BL c.1.6–1.7 mm. In small colonies on leaves and flowers of *Atraphaxis frutescens*, attended by ants. C Asia (Kazakhstan).

Brachyunguis bahamondesi Remaudière and Halbert

Apt. pale, with apices of tibiae, tarsi and SIPH black, body color in life unrecorded, BL 1.0–2.2 mm. On Chenopodiaceae (*Chenopodium*, *Atriplex*) in Argentina.

Brachyunguis berezhkovi (Ivanoskaya)

Apt. pale green, pruinose, with pale appendages; BL c.1.4–1.6 mm. In small ant-attended colonies at shoot terminals of *Salsola richteri* in C Asia (Turkmenia).

Brachyunguis bicolor Ivanoskaya

Apt. gray with darker patches laterally, wax-dusted; BL c.1.3 mm. On *Cynanchum acutum*, singly or in small colonies on stems, flowers and flower stalks, attended by ants. In Turkmenistan and Ukraine (as *B. cynanchiacuti* Bozhko).

Brachyunguis bishopi Remaudière and Halbert

Apt. pale, color in life unrecorded, BL 1.2–2.3 mm. On terminal parts of *Sarcobatus vermiculatus* in western USA. Ovip. and apt. males occur in Oct (orig. descr.).

Brachyunguis blanchardi Remaudière and Bahamondes

Apt. dark gray, wax-dusted, BL 1.6–2.0 mm. On *Chenopodium* (= *Allenrolfea*) *vaginata* in Argentina. The clypeus is greatly enlarged in this species, indicating specialisation on Chenopodiaceae.

Brachyunguis bonnevillensis Knowlton

Apt. bluish green, with pale appendages; BL 1.0–2.1 mm. Al. have a shiny black head and thorax. On leaves, flower stems and new shoots of *Sarcobatus vermiculatus*. Well camouflaged on lower surfaces of leaves, and with a dwarf form in summer (Palmer, 1952). Also recorded from *Atriplex canescens* (Remaudière and Halbert, 1996), although there is possible confusion with *B. tetrapteralis* (q.v.). In western USA and Mexico.

Brachyunguis cahuille (Dickson)

Figure 36g

Apt. dull dark green, BL 0.9–1.4 mm. On leaves of *Suaeda* spp. in southern California, Arizona and Mexico (Remaudière and Halbert, 1996; as *B. tetrapteralis*).

Brachyunguis calligoni (Nevsky)

Apt. light green covered with wax meal, BL 1.3–1.7 mm. On young shoots of *Calligonum* spp. (*eriopodium*, *setosum*, *?comosum*) in Uzbekistan.

Brachyunguis cuscutae (Nevsky)

Apt. green, densely covered with wax; BL 1.2–1.5 mm. In immense numbers on flowers and stalks of *Cuscuta* spp. in early Nov (Ivanoskaya, 1960). Uzbekistan.

Brachyunguis cynanchi (Nevsky)

Apt. dull red to dark violaceous, coated with fine mealy wax; BL 1.2–1.8 mm. On *Cynanchum acutum* in Uzbekistan, found in large numbers on apical parts of stems, flower stalks and upper sides of leaves (Ivanoskaya, 1960).

Brachyunguis harmalae Das

Plate 7h, Figure 36h

Apt. deep green anteriorly, yellower spotted with dark green in region of SIPH, thickly dusted with white wax powder; BL 1.2–2.0 mm. On *Peganum harmala* and various mainly xerophytic plants including *Atriplex*, *Calligonum*, *Calotropus*, *Citrus*, *Gossypium* and *Rumex*. Often ant-attended. Eastop and Raccah (1988) listed 12 hosts in seven different plant families. In C. and E Asia, Middle East, Africa and the Iberian peninsula. Mon. hol. on *Peganum* in Pakistan, with both apt. and al. males (orig. descr.), probably mainly anhol. elsewhere. 2n=8.

Brachyunguis kaussarii Remaudière and Davatchi

Apt. color in life unknown; BL 1.3–1.6 mm. ANT III of al. with 7–9 sec. rhin. On *Stocksia 'bralmica'* (presumed error for *brahuica*) in Iran.

Brachyunguis letsoniae Das

Apterae are green, covered in white wax powder, BL c. 1.85 mm. Al. have dark cross bars on ABD TERG 6–8, and 6–8 rhinaria on ANT III. Feeding on young growth and inflorescences of *Argyreia scandens* (as *Letsonia scandens*) in Pakistan in Oct.

Brachyunguis lycii (Nevsky)

Apt. pale green coated with mealy wax; BL 1.2–1.6 mm. In large colonies on leaves and fruits of *Lycium ruthenicum* in C Asia. Specimens conforming to Nevsky's description have also been found on *Lycium* spp. in Cyprus, Egypt and Iran (BMNH colln), although it is unclear how this species differs from *B. harmalae* colonising various other plants in these regions. $2n=8^*$.

Brachyunguis monstratus Kadyrbekov

Apt. mainly pale brown; BL 1.0–1.3 mm. In inflorescences of *Atraphaxis virgata*, Kazakhstan (Kadyrbekov, 1999c).

Brachyunguis paradoxus Mier Durante, Ortego and Nieto Nafría

Apt. pale green to yellowish green powdered with white wax; BL 1.1–2.0 mm. On *Senecio subumbellatus*, and perhaps on another Andean *Senecio* sp., forming small dense colonies on aerial parts, especially flower stems. Argentina and Chile. Mon. hol., but males undescribed. A separate subgenus (*Andinaphis*) was erected for this species, as it has several unique features for a *Brachyunguis*; a relatively long PT, a sense peg on HT I, and complete absence of marginal tubercles (Mier Durante *et al.*, 1997).

Brachyunguis peucedani (Nevsky)

Apt. pale green covered with wax; BL 1.6–1.8 mm. On flowers and stems of *Peucedanum pseudoreoselinum* in Uzbekistan, and recorded from *Ferula* spp. in Kazakhstan by Kadyrbekov (2003c). To judge from the descriptions by Nevsky and by Ivanoskaya (1960), placement of this species in *Semiaphis* by Eastop and Hille Ris Lambers (1976) and Remaudière and Remaudière (1997) seems to have been in error.

Brachyunguis rhei (Nevsky)

Apt. yellowish brown; BL c. 2 mm. On *Rheum maximoviczii*, forming large colonies on undersides of leaves. S Kazakhstan.

Brachyunguis rutae (Nevsky)

Apt. dark green, with a mealy wax covering, SIPH and cauda green; BL 1.4–2.0 mm. On *Ruta sieversii*, forming large colonies on upper and undersides of leaves. C Asia (Uzbekistan).

Brachyunguis salsolacearum (Nevsky)

Apt. green, covered with fine pruinose secretion, SIPH and cauda green, dorsal abdomen with small dark green spots; BL 1.3–1.9 mm. In large numbers on young growth and stems of various Chenopodiaceae/Salsolaceae (*Anabasis*, *Girgensohnia*, *Halocharis*, *Salsola*) in C Asia (Narzikulov and Daniyarova, 1990).

Brachyunguis saxaulica (Nevsky)

Apt. brownish yellow, greenish or dark brown, covered with fine wax; BL 1.6–2.1 mm. At ends of young shoots of *Arthrophytum ammodendron*, forming 'cone-like pseudogalls', ant-attended. Also recorded from *Haloxylon aphyllum*. Kazakhstan, Tajikistan, Turkmenia (Ivanoskaya, 1960).

Brachyunguis skafi Remaudière and Talhouk

Apt. very dark, blackish; BL 1.2–1.9 mm. On *Astragalus* spp. in Turkey, Iran and Lebanon. Mon. hol. with ovip. and apt. males in Sept–Oct (Remaudière and Talhouk, 2000).

THE APHIDS

***Brachyunguis suaedus* (Paik)**

The apt. described from *Suaeda glauca* in Korea by Paik (1965, as *Hyalopterus*) is *Clypeoaphis suaedae*, and the al. may be vagrants from another plant. The length of ANT PT and black pigmentation suggest that it does not belong in *Brachyunguis*, where it is currently placed.

***Brachyunguis tausaghyz* (Nevsky ex Ivanoskaya)**

Apt. greenish yellow, with pruinose covering, and pale SIPH; BL c.1.6 mm. On *Scorzonera tausaghyz* and *Seriphidium nitrosum* in Kazakhstan, colonising flower heads (Narzikulov *et al.*, 1971). *B. afghanica*, described from *Artemisia turanica* in Afghanistan (Narzikulov and Umarov, 1972), does not seem to be distinguishable from this species on the basis of the published descriptions.

***Brachyunguis tetrapteralis* (Cockerell)**

Apt. pale grayish green to blue-green, with ANT dusky/dark distally; BL 1.0–1.7 mm. On stems and leaves of *Atriplex* spp in western and south-western USA, and Mexico. Usually ant-attended. Records from *Suaeda* (e.g., Remaudière and Halbert, 1996) should perhaps all be referred to *B. cahulle*, which has a dark, very swollen clypeus, shorter SIPH and shorter ANT PT. Records from *Sarcobatus* are possibly all referable to *B. bonnevillensis*, and records from plants outside the Chenopodiaceae also need to be treated warily. The synonymy of *Aphis piutapa* (Hottes and Wehrle, 1951, on *Lycium parviflorum*) with *B. tetrapteralis* is possibly incorrect, as the description of *A. piutapa* differs in certain respects such as the shape of the cauda. The palaeartic species *B. harmalae* is very similar, but has slightly longer dorsal body hairs.

***Brachyunguis zawadovskii* (Nevsky)**

Apt. green, covered with mealy wax; BL 1.6–1.9 mm. In large colonies on upper sides of leaves of *Lycium turcomanicum* in C Asia.

***Brachyunguis zygophylli* (Nevsky)**

Apt. yellow, yellow-green or green to dark green, in life covered with dense mealy wax; BL 1.6–2.0 mm. In large colonies on stems, flowers and undersides of leaves of *Zygophyllum fabago*. C Asia, and Spain (Gómez-Menor, 1951, as *Brachyunguis zygophylli*).

***Braggia* Gillette and Palmer**

Aphidinae: Aphidini

About 10 nominal taxa on *Eriogonum* in western USA. Related to *Aphis* but characterised by a combination of short ANT PT, short SIPH and a very short broad cauda. The dorsal cuticle is strongly reticulated and often has variably developed dark sclerotisation. Apt. often have sec. rhin. on ANT III or III-V. Hille Ris Lambers (1966a) reviewed the genus and keyed the species.

***Braggia agathona* (Hottes)**

Apt. pinkish brown, often with a dark central spot on the abdomen, the whole body covered with white wax; BL 1.4–1.8 mm. On undersides of leaves of *Eriogonum corymbosum* in Colorado, USA. Mon. hol., with ovip. and al. males in Oct (orig. descr.).

***Braggia deserticola* Hille Ris Lambers**

Apt. shining black dorsally, gray and wax-powdered ventrally, with black appendages; BL 1.1–1.8 mm. Found in small numbers in flowerheads of *Eriogonum fasciculatum*, incl. ssp. *polifolium*, in California, and Mexico (BMNH colln, leg. G. Remaudière). A sample from *Eriogonum* sp. at a higher altitude was distinguished as a subspecies, *B. deserticola thanatophila* Hille Ris Lambers.

***Braggia echinata* Gillette and Palmer**

Figure 27e

Apt. grayish olive-green, usually with a slight rusty area at base of each SIPH, and with white dorsal reticulations and pale, thick hairs giving a frosted appearance; BL 1.3–1.9 mm. On leaves and stems of *Eriogonum* sp(p.) in western USA (Colorado, Utah). Ovip. and al. males in Oct (Palmer, 1952).

***Braggia eriogoni* (Cowen)**

Plate 8d, Figure 27a,b,g

Apt. black or brownish black with dorsal white reticulation, accentuated by a wax secretion; BL 1.5–2.0 mm. On leaves, stems and flowerheads of *Eriogonum* spp. in western USA. Hille Ris Lambers (1966a) distinguished several subspecies on the basis of differences in hair length, siphuncular shape and extent of dorsal pigmentation, but further work is needed to investigate whether any of the observed variation is correlated with host plant, season or geographical distribution. A collection from Oregon on *Eriogonum compositum* (BMNH colln, leg. D. Hille Ris Lambers) seems to be a related but distinct species. Sexuals have not been described.

***Braggia uncompahgreensis* Hottes**

Figure 27f

Apt. pale gray–green, with frosty appearance due to thick pale dorsal hairs; BL 0.9–1.4 mm. On *Eriogonum corymbosum* in Colorado, USA. Ovip. and al. males occur in Oct (Palmer, 1952). Doubtfully distinct from *B. echinata*.

***Braggia urovaneta* (Hottes)**

Figure 27c,d

Apt. black, appearing gray due to powdering with wax; BL 0.9–1.5 mm. On flower stems and upper parts of *Eriogonum* sp(p). in western USA (California, Colorado, Utah). Ovip. and al. males were collected in Colorado on *E. corymbosum* in early Oct (orig. descr.). Hille Ris Lambers (1966a) distinguished a population on *E. latifolium* in California as a subspecies, *B. urovaneta* ssp. *pachysiphon*.

***Brevicoryne* van der Goot**

Aphidinae: Macrosiphini

Eight palaeartic and one Canadian arctic species associated with Cruciferae, related to *Lipaphis* and characterised by very low rounded ANT tubercles, short SIPH and broad triangular cauda. Eastop in Hodjat (1981) gave a key to al. vivip. of Middle Eastern species.

***Brevicoryne arctica* Richards**

Apt. very dark blue or green, with wax; BL 1.7–2. mm. Sec. rhin. in al. III 12–13, IV 5. On *Lesquerella arctica* in N Canada (Ellesmere I.). Mon. hol. with ovip. and apt. males in late July (orig. descr.).

***Brevicoryne barbareae* Nevsky**

Apt. dark green, dark brown to black, with appendages dark except for pale ANT III and tibiae (black at apices); BL 1.5–2.0 mm. Sec. rhin. in al. III 17–20, IV 3–5. On undersides of leaves of *Barbarea vulgaris* in Uzbekistan. This name has been applied to a species in NW India that differs from Nevsky's species in several respects, having apt. with extensive dorsal sclerotisation, dark tibiae, a much longer cauda, and al. (brachyptera) with rhin. distributed ANT III 35–36, IV 0–1 (David and Hameed, 1975). Al. males have been described of this Indian species (L.K. Ghosh *et al.*, 1980, as *B. barbareae*).

***Brevicoryne brassicae* (L.)**

Cabbage Aphid or Mealy Cabbage Aphid

Plate 12f

Apt. grayish green or dull mid-green with dark head and dark dorsal thoracic and abdominal markings, densely coated in grayish white mealy wax; BL 1.6–2.6 mm. On many genera and species of Cruciferae, and a major pest of field crops (Blackman and Eastop, 2000) in all temperate and warm temperate parts of the world. Mon. hol. with al. males in colder regions, anhol. wherever winters are mild. 2n=16.

***Brevicoryne crambe* Bozhko (= *Brevicoryne crambinistataricae* Bozhko)**

Apt. pale green, wax-dusted, BL 1.9–2.8 mm. On terminal shoots and stems of *Crambe tatarica*, and also recorded from species in other crucifer genera (*Barbarea*, *Isatis*, *Diplotaxis*, *Sisymbrium*; Shaposhnikov, 1964). In Hungary and Ukraine.

***Brevicoryne jiyuguanensis* (Zhang, Chen, Zhong and Li)**

Apt. silvery whitish green, powdered with wax; BL 1.5–1.8 mm. On *Armoracia rusticana* in Gansu Prov., China (Zhang, 1999, as *Brachycolus*). The broadly triangular cauda and many (15–19) thick hairs on ABD TERG 8 as well as the host association indicate that the species belongs in this genus.

THE APHIDS

Brevicoryne lonicerina Mukhamediev and Akhmedov

Apt. pale green with brown appendages; BL 2.3–2.6 mm. On *Lonicera* spp. in C Asia.

Brevicoryne nigrisiphunculata Hodjat

Apt. yellow to dusky green, with short black SIPH; BL 2.1–2.7 mm. On undersides of older leaves of *Crambe* and *Brassica* in Turkey, Iran, Armenia (Szelegiewicz, 1979, as *B. crambinistataricae*) and Ukraine.

Brevicoryne shaposhnikovi Narzikulov

Apt. pale green dusted with gray wax; BL c.1.6–1.7 mm. On *Lonicera* spp. in C Asia (Mukhamediev and Akhmedov, 1982).

Burundiaphis Remaudière

Aphidinae: Macrosiphini

One African species superficially resembling *Paczoskia*, but with R IV+V having numerous short stiff hairs and very long SIPH without subapical reticulation. Al. are unknown.

Burundiaphis autriquei Remaudière

Apt. shining greenish black; BL 2.2–2.9 mm. On *Davallia chaerophylloides* epiphytic on oil-palms, often in mixed colonies with *Micromyzella*. Only known from Burundi (Remaudière and Autrique, 1985).

Cachryphora Oestlund

Aphidinae: Macrosiphini

Three little-known nearctic species with similar apically knobbed SIPH to *Epameibaphis*, but without the stileto-shaped R IV+V of anthemid-feeding aphids, their hosts being *Solidago*.

Cachryphora canadensis Hille Ris Lambers

Figure 49f

Apt. 'green with a black dorsal shield' (from slide label in BMNH colln); BL 1.0–1.3 mm. On *Solidago* spp. in eastern USA (N Carolina, Pennsylvania) and Canada (Ontario).

Cachryphora imbricaria Richards

Apt. dusky yellow with dark apices to ANT, legs and SIPH; BL 1.1–1.7 mm. On *Solidago* sp. in N Carolina, USA.

Cachryphora serotinae (Oestlund)

Plate 15d, Figure 49e

Apt. golden yellow to yellowish apple-green, SIPH dusky with dark apices; BL 1.1–1.3 mm. On *Solidago* spp. in western USA (Colorado, Idaho, Utah). Mon. hol., with ovip. and apt. males in Oct (Palmer, 1952, as *Rhopalosiphum serotinae*).

Capitophorus van der Goot

Aphidinae: Macrosiphini

About 30 species of pale, sometimes almost translucent, slender aphids with elongate appendages. Apt. bear long capitate hairs at least on the head and posterior abdominal segments. Al. have only much shorter hairs, a dark dorsal often quadrate abdominal patch, and numerous rhinaria on ANT III, IV, and usually V. Widely distributed in palaeartic and oriental regions, and there are also 5 N American species. Species are either heter. hol. with a sexual phase on Elaeagnaceae, migrating to Compositae and Polygonaceae, or mon. hol. on Compositae or Polygonaceae. Regional accounts are available for W Europe (Hille Ris Lambers, 1953), NW Europe (Heie, 1994), N America (Corpuz-Raros and Cook, 1974), N India (Raychaudhuri, 1980) and Japan (Miyazaki, 1971).

Capitophorus archangelskii Nevsky

Apt. pale green, with pink eyes; BL 1.2–1.8 mm. On *Elaeagnus* spp. in Central Asia, from Iran to West Bengal. Nevsky (orig. descr.) noted that colonies occurred throughout the summer on *Elaeagnus* in Uzbekistan, with ovip. and al. males in Oct–Nov. However, it is recorded from *Calendula* sp. in Pakistan (Naumann-Etienne and Remaudière, 1995), so either there is a facultative migration to *Calendula* as secondary host, or two species of *Capitophorus* are being confused.

***Capitophorus bulgaricus* Tashev**

Apt. pale green; BL 1.3–1.75 mm. Al. undescribed. On undersides of leaves, usually along the veins, of *Cirsium* spp. In Bulgaria, Italy and Switzerland (BMNH colln, leg. D. Hille Ris Lambers). Mon. hol. on *Cirsium*; Barbagallo and Patti (1998) described ovip. and males, collected Oct.

***Capitophorus carduinus* (Walker)**

Figure 22b

Apt. pale greenish white to yellowish green, almost translucent, often with 2 indistinct darker green longitudinal stripes; BL 1.6–2.2 mm. On *Carduus* and *Cirsium* spp., mainly on undersides of lower leaves. Europe, W Siberia, Iraq, E Himalayas, Korea. Records from N and S America may all be referable to *C. elaeagni*. Apt. of *C. carduinus* tend to have much smaller capitate spinal hairs on the anterior ABD TERG than *C. elaeagni*, but in warm conditions (or when alatiform), *C. elaeagni* may also have smaller hairs. 2n=16.

***Capitophorus cirsiiaphagus* Takahashi**

Figure 22d

Apt. pale green to white; BL c.1.5–1.6 mm. As noted by Miyazaki (1971), the spinal hairs on ABD TERG 1–5 vary greatly in length and are often minute. On undersides of leaves of *Cirsium* spp. in Japan, Korea and E Siberia. Paik (1965) gives *Aster tataricus* var. *hortensis* as the host in Korea. Life cycle unknown, probably mon. hol. on *Cirsium*. 2n=16* (recorded as *C. elaeagni* in Blackman, 1986).

***Capitophorus elaeagni* (del Guercio)**

Plate 16e

Apt. pale greenish white to yellowish green with dark tips to SIPH; BL 1.4–2.5 mm. On certain Compositae (*Arctium*, *Carduus*, *Cirsium*, *Cynara*, *Gerbera*, *Silybum*) mainly feeding on undersides of lower leaves. Heter. hol., with sexual phase on Elaeagnaceae, usually *Elaeagnus* spp. (Blackman and Eastop, 1994). Widely distributed through warm temperate and temperate regions of all continents. *C. evelaeagni* Zhang, described from *C. segetum* in China, will come to *elaeagni* in the key to aphids on *Cirsium*, and is probably a short-haired or alatiform variant of this species. 2n=16.

***Capitophorus eniwanus* Miyazaki**

Apt. white or pale yellow; BL 2.0–2.1 mm. On *Polygonum* and *Persicaria* spp. in Japan and E Siberia. Life cycle unknown. [A sample (with 2n=10*) of small (BL 1.3–1.7 mm) al. spring migrants with numerous sec. rhin. (III 46–68, IV 26–39, V 11–23) from Elaeagnaceae in China near Beijing (leg. V.F. Eastop) could possibly be this species.]

***Capitophorus essigi* Hille Ris Lambers**

Apt. probably very pale; BL 2.1–2.4 mm. On *Persicaria alpina* and *Aconogon phytolaccaefolium* in western USA (California, Washington).

***Capitophorus formosartemisiae* (Takahashi)**

Apt. white; BL 1.1–1.8 mm. On undersides of leaves of *Artemisia* spp., and occasionally recorded from other Compositae (*Dendranthema*, *Erigeron*, *Saussurea*, *Senecio*). In China, Szechuan, Taiwan, India, Japan and E Siberia. 2n=16.

***Capitophorus gnathalifoliae* Shinji**

Apt. green, BL not recorded. On *Gnaphalium hypoleucum* in Japan.

***Capitophorus himachali* Chakrabarti and Maity**

Apt. pale; BL 1.7–2.0 mm. On *Polygonum* sp. in Himachal Pradesh, India. Its distinctness from *C. eniwanus* in Japan needs to be confirmed.

***Capitophorus hippophaes* (Walker)**

Apt. pale greenish to yellowish white, sometimes with longitudinal rows of green spots; BL 1.7–2.4 mm. On undersides of leaves of *Polygonum* and *Persicaria* spp. Europe, N Africa, Middle East, C and E Asia; N, C and S America. Heter. hol. with sexual phase on *Hippophaë* and *Elaeagnus* (Blackman and Eastop, 1994). A complex of forms exists, including anhol. populations distributed to various parts of the world and distinguishable by differences in size and distribution of dorsal capitate hairs. These include *C. hippophaes*

ssp. javanicus Hille Ris Lambers in E and SE Asia, Australia, Africa (Kenya), N and S America, and **C. hippophaes ssp. mitegoni** Eastop widely distributed in Africa and also in India, Bangladesh, Nepal, Philippines, New Guinea and Australia. $2n=10$ (incl. ssp. *javanicus* and *mitegoni*).

Capitophorus horni Börner

Figure 22a

Apt. very pale green aphids, translucent, often with 2 faint brighter green dorsal longitudinal stripes, or yellowish; BL 1.6–2.5 mm. On undersides of leaves of *Cirsium* spp., and also sometimes on *Cynara scolymus* (Robert, 1969) in Europe and W Asia. Mon. hol., with al. males. Subspecies or incipient species occur with different host associations. *C. horni* s. str. feeds on *Cirsium oleraceum* in Europe (Denmark, Norway, Sweden, Germany, Austria). **C. horni ssp. gynoxantha** Hille Ris Lambers feeds on *Cirsium arvense*, more rarely *C. helenioides* and *C. vulgare*, and is more widely distributed (N and C Europe, Israel, and a sample from *C. falconeri* in Kashmir in BMNH colln may also be this form). [The al. vivip. of *horni* s.str. is undescribed; an imm. al. in a sample from Vienna (BMNH colln, leg D. Hille Ris Lambers) has adult cuticle showing distribution of sec. rhin. III 21–22, IV 5–10, V 4–5, differing from ssp. *gynoxantha* (III 22–35, IV 12–19, V 2–8; Hille Ris Lambers, 1953)]. $2n=16$.

Capitophorus inulae (Passerini)

Figure 34c

Apt. transparent yellowish white; BL c.1.5–1.6 mm. On *Inula* spp., especially *I. conyza*, in Europe, and around the Mediterranean, where it is found also on *Dittrichia viscosa* and *Pulicaria* spp., occurring eastward to C Asia. Introduced to Australia (A.C.T.; BMNH, coll. V.F. Eastop). Sexual morphs and life cycle unknown; possibly anhol. in S England. $2n=16$.

Capitophorus jopepperi Corpus-Raros and Cook

Figure 8b

Apt. narrowly spindle-shaped, pale to dark green, BL 1.3–1.5 mm. Described from *Ambrosia artemisifolia* in N Carolina, USA, and since found on the same host in Mexico (BMNH colln, leg. G. Remaudière).

Capitophorus litanensis Raychaudhuri, Singh and Raychaudhuri

Apt. color in life unrecorded; BL c.1.5 mm. On *Bidens* sp. in Manipur, India.

Capitophorus montanus Takahashi

Figure 22c

Apt. pale green; BL c.1.0–1.3 mm. On leaves of *Cirsium* spp. in Taiwan, Japan, Korea and E Siberia.

Capitophorus pakansus Hottes and Frison

Figure 34b

Apt. white or greenish yellow; BL 1.3–2.2 mm. On undersides of leaves of *Inula* spp., and also recorded from *Telekia speciosa* (Chumak, 2004). Europe, eastward to Ukraine, and eastern N America. Heter. hol., with sexual phase on *Elaeagnus*. Hille Ris Lambers (1953) provided a detailed account (as *vandergooti*). $2n=16^*$.

Capitophorus rostratus Miyazaki

Apt. milky or creamy white; BL 1.0–1.4 mm. On the densely hairy undersides of leaves of *Synurus pungens* in Japan. Mon. hol. with ovip. and al. males in early Oct (orig. descr.).

Capitophorus shepherdiae Gillette and Bragg

Figure 8c

Apt. pale green with darker apices to legs and SIPH; BL 1.25–2.30 mm. In spring colonies on *Shepherdia argentea* in western USA. Apparently persisting on *Shepherdia* throughout the summer, but morphologically similar aphids have been found on *Artemisia* spp. in California, so there may be a partial migration which needs to be confirmed by transference tests (Corpus-Raros and Cook, 1974).

Capitophorus similis van der Goot

Figure 54a

Apt. yellowish white to white; BL 1.5–2.6 mm. On undersides of leaves of *Tussilago*, *Petasites* and *Homogyne*. Europe, W Asia and E Himalayas. Heter. hol., with sexual phase on *Elaeagnus* and *Hippophaë* (Blackman and Eastop, 1994), or anhol. in milder climates (Patti, 1983). Factors controlling sexual morph production were studied by Loher and Lampel (1983).

Capitophorus takahashii Strand

Apt. white; BL c. 1.5 mm. On *Petasites tricholobus* and *Tussilago farfara* in Taiwan (Takahashi, 1925: 21, as *Capitophorus* sp; Tao, 1999).

***Capitophorus tricholepidis* Chakrabarti**

Apt. pale brown; BL 1.2–1.5 mm. On undersides of leaves of *Tricholepis furcata*, attended by black ants. U.P., India.

***Capitophorus xanthii* (Oestlund)**

Apt. pale greenish; BL 1.4–2.0 mm. On *Xanthium* spp. in N America. Heter. hol., with *Elaeagnus* and *Hippophae* as primary hosts (Corpuz-Raros and Cook, 1974).

***Caricosipha* Börner**

Chaitophorinae: Siphini

One species in Europe characterised by its stalked eyes and long black pointed hairs.

***Caricosipha paniculatae* Börner**

Plate 5c

Apt. yellowish or reddish with brown sclerotic patches to completely black dorsally, with pale ANT, legs and SIPH; BL 1.5–2.4 mm. On leaves of *Carex* spp., widely distributed in Europe. Mon. hol. with apt. males. Active insects, running fast when disturbed (Heie, 1982).

***Carolinaia* Wilson**

Aphidinae: Macrosiphini

About 16 nearctic and neotropical species associated with *Rhus* as primary hosts, and migrating to inflorescences of Gramineae and Cyperaceae. Reviewed by Remaudière and Muñoz-Viveros (1993), and subgenus *Glabromyzus* was reviewed (as a full genus) by Cook (1984c).

***Carolinaia caricis* Wilson**

Figure 18e

Apt. greenish yellow, tinged with brown; BL c.1.4–1.7 mm. Al. have sec. rhin. only on ANT III. On various Cyperaceae, where it feeds mainly on the inflorescences. Apparently heter. hol. in eastern USA, where Smith (1980) made successful transfers from *Rhus radicans* to *Carex* spp. It presumably lives continuously on Cyperaceae at tropical latitudes (Puerto Rico, Venezuela). Very similar to *C. tissoti* (q.v.).

***Carolinaia carolinensis* Smith**

Apt. (fund.) yellowish orange; BL c.2.2 mm. Al. have central black dorsal abdominal patch. On *Rhus radicans* in N Carolina, USA, causing slight cupping of leaves on ground (orig. descr.); other species on this host have been found only on leaves of shoots climbing in trees.

***Carolinaia (Glabromyzus) corazonensis* Remaudière and Muñoz Viveros**

Apt. matt black with paler ANT and legs; BL 1.4–1.8 mm. On *Cyperus incompletus* in Mexico. Al. have 8–13 sec. rhin. on ANT III.

***Carolinaia cyperi* Ainslie**

Apt. black or grayish black, BL 1.0–1.5 mm. Al. have 7–11 sec. rhin. on ANT III, and 0–1 on IV. On *Cyperus* spp., and far more rarely on other Cyperaceae. It forms large and dense colonies on the basal parts of the leaves, and is common throughout C America (Florida to Surinam). It has economic importance as a vector of sugar cane mosaic potyvirus. Sexual morphs are unknown.

***Carolinaia floridensis* Remaudière and Muñoz Viveros**

Apt. color in life unknown; BL 1.2–1.5 mm. Al. with large dark dorsal abdominal patch. On *Rhus radicans* in Florida, USA. Apparently anhol. on *Rhus*.

***Carolinaia (Juncomyzus) floris* (Miyazaki)**

Apt. yellowish brown to reddish brown, BL 1.4–1.7 mm. Sec. rhin in al. III 9–15. On *Juncus* and *Carex* in Japan, living in inflorescences.

***Carolinaia (Juncomyzus) hillerislambersi* (Calilung)**

Apt. greenish black or black; BL 1.7–2.0 mm. Sec. rhin. in al. III 10–16. On stems of *Scleria scrobiculata* in the Philippines. Ant-attended. An al. has subsequently been collected in Papua New Guinea (BMNH colln, leg. J.H. Martin).

THE APHIDS

Carolinaia (Glabromyzus) howardii (Wilson)

Apt. brown with dark brown SIPH; BL 1.5–2.1 mm (on *Rhus*; 1.1– on grasses). Heter. hol. between *Rhus radicans* and various Gramineae (e.g., *Elymus*, *Glyceria*, *Panicularia*) (C.F. Smith, cited in Remaudière and Muñoz Viveros, 1993). Records from cereal crops should probably be referred to *C. rhois* (Cook, 1984c). In eastern USA.

Carolinaia (Juncomyzus) javanica Noordam

Apt. dirty green, with brown head, thorax and sides of abdomen, SIPH black-tipped., cauda pale with wax at end; BL 1.22–1.67 mm. Sec. rhin. in al. III 4–8. On spikelets of *Cyperus* spp. in Java (Noordam, 2004).

Carolinaia justiciae Shinji

Apt. yellowish, BL unrecorded. Sec. rhin. in al. III c.8. On *Justicia procumbens* var. *leucantha* in Japan (Kyushu, Saitama, Morioka; orig. descr.). Generic position uncertain, and regarded as a nomen dubium by Remaudière and Remaudière (1997).

Carolinaia (Juncomyzus) obscura (Hille Ris Lambers)

Apt. color in life unrecorded; BL 1.2–1.8 mm. On *Juncus effusus*, colonising leaves and stems near ground, often in ant shelters (Miyazaki, 1971). In Japan, and (possibly) Thailand (Remaudière and Muñoz Viveros, 1993).

Carolinaia (Glabromyzus) rhois (Monell)

Plate 12a

Apt. yellow-brown, pale rusty brown or greenish yellow with black SIPH; BL 1.9–2.3 mm (on *Rhus*). In spring colonies on undersides of leaves of *Rhus* spp., especially *typhina*. Heter. hol., migrating to flower-heads of various Gramineae (e.g., *Avena*, *Dactylis*, *Elymus*, *Hordeum*, *Phleum*, *Triticum*). Widely distributed in N America. See also Blackman and Eastop (2000).

Carolinaia rhusifoliae (Richards)

Apt. shining black with brownish head and prothorax, ANT pale basally and dark distally, legs pale, SIPH dark; BL c.1.8 mm. On undersides of mature leaves of *Rhus radicans* in Ontario, Canada.

Carolinaia (Glabromyzus) schlingeri (Hille Ris Lambers)

Apt. color in life unknown, probably rather dark; BL 1.4–1.7 mm. Al. have a large dark dorsal abdominal patch. Described from *Rhus (Toxicodendron)* sp. (probably *diversiloba*) in California. Life cycle unknown, possibly migrating to Gramineae or Cyperaceae; specimens from *Luzula* spp. in B.C., Canada (BMNH colln, leg. C.-K. Chan) may be the secondary host form of this species. Ovip. occur on *Rhus* in Oct (BMNH colln, leg. D. Hille Ris Lambers).

Carolinaia (Juncomyzus) scirpi (van der Goot)

Apt. shiny black or brownish black, BL c.2 mm. Al. have 7–9 sec. rhin. on ANT III. On *Scirpus grossus* in Java, feeding on the flower stalks and beneath the inflorescences. There are also records from *Cyperus* spp. and *Carex baccans* in Java (Noordam, 2004). Apt. from *Scleria elata* in Assam, India, described under the name of *Aulacorthum scirpi* van der Goot (A.K. Ghosh and Raychaudhuri, 1972), are a different species, probably correctly placed in *Aulacorthum* (q.v.).

Carolinaia (Glabromyzus) setariae Remaudière and Muñoz Viveros

Apt. dark brown, with black SIPH (sometimes pale basally) and pale cauda; BL 1.4–1.9 mm. Sec. rhin. in al. 4–7. On *Setaria* sp. in Mexico.

Casimira Eastop

Aphidinae: Aphidini

A genus for two species close to *Aphis* but with all first tarsal segments bearing two hairs (no medial sense peg), and abdominal segment 7 lacking the usual marginal tubercle. Al. also differ in forewing venation from typical *Aphis*, having a once-branched media like *Toxoptera*. The host of an Indian species assigned to this genus was unidentified.

***Casimira canberrae* (Eastop)**

Apt. black, wax-powdered; BL 1.3–1.7 mm. Al. have 1–4 secondary rhinaria on ANT III. On young leaves at growing points of *Epilobium* spp. in E Australia (Canberra, NSW; Eastop, 1966). Mon. hol. with ovip. in May (D Hales, pers. com.). 2n=8*.

***Catamergus* Oestlund**

Aphidinae: Macrosiphini

Two N American species related to *Macrosiphum* but with relatively small thin SIPH.

***Catamergus fulvae* (Oestlund)**

Plate 26b, Figure 33g

Apt. green, powdered with wax; BL 2.3–2.8 mm. On lower parts of *Impatiens* spp. in north-eastern and mid-western USA, and E Canada (Ontario, Québec, Newfoundland). Mon. hol. with ovip. and al. males in Sept (BMNH colln, leg. J.P. Sijpkens).

***Catamergus kickapoo* (Hottes and Frison)**

Apt. whitish green with dusky brown tips to appendages; BL 1.9–2.2 mm. On undersides of leaves of *Polygonatum* spp. in eastern USA and Canada. Mon. hol. with ovip. and al. males in Aug–Sept (Hottes and Frison, 1931). 2n=10.

***Cavariella* del Guercio**

Aphidinae: Macrosiphini

A holarctic genus of about 30 spp., about half of them in Asia. Characteristic of the genus are the two hairs close together on ABD TERG 8, placed on a prominent tubercle or supracaudal process. In al. this tubercle is generally less conspicuous than in apt., but its presence is indicated by the close proximity of the two hairs. Al. have broad dark bars on dorsal abdomen often coalesced into a solid patch on ABD TERG 3–5. Most species host-alternate between *Salix* and Umbelliferae or the closely-related Araliaceae. Species of subgenus *Cavariellinepicauda* have large abdominal marginal tubercles of similar size and distribution to those of *Pterocomma*. Taxonomic revisions and/or keys are available for Europe (Hille Ris Lambers, 1947b), Fennoscandia and Denmark (Heie, 1992), Siberia (Ivanoskaya, 1980), Siberia (Pashtshenko, 1988a), Japan (Miyazaki, 1971), India (Raychaudhuri, 1980) and N America (Stroyan, 1969a). See Blackman and Eastop (1994) for accounts of *Salix*-feeding generations.

***Cavariella aegopodii* (Scopoli)**

Plate 15h, Figure 10b

Apt. green or yellowish green; BL 1.0–2.6 mm. On leaves and umbels of numerous genera and species of Umbelliferae (incl. *Aegopodium*, *Anethum*, *Angelica*, *Anthriscus*, *Apium*, *Carum*, *Chaerophyllum*, *Cicuta*, *Crithmum*, *Cryptotaenia*, *Daucus*, *Ferula*, *Foeniculum*, *Heracleum*, *Laserpitium*, *Lomatium*, *Oenanthe*, *Sium*, *Smyrniium*). A major cosmopolitan pest of cultivated Umbelliferae (Blackman and Eastop, 2000). Heter. hol., with sexual phase on various *Salix* spp., or anhol. on Umbelliferae in warmer climates. [*C. lllhasana* Zhang, described from apt. and al. on *Medicago sativa* (unlikely to be the true host) in Tibet, shows no clear morphological differences from *C. aegopodii*, and may be a synonym. However, the absence of records from carrots in eastern Asia, which are a favoured host of *C. aegopodii*, suggests that a different species may occur there.] 2n=10.

***Cavariella angelicae* (Matsumura)**

Figure 10e

Apt. yellowish green; BL c.2.1 mm. On various Umbelliferae (*Angelica*, *Heracleum*, *Pastinaca*, *Sium*) in Japan, Korea and E Siberia. *Alangium platanifolium* (var. *macrophyllum*) is also recorded as a host in Korea (Paik, 1965), but these were probably vagrants.

***Cavariella (Cavariellia) aquatica* (Gillette and Bragg)**

Plate 15i, Figure 35a,b

Apt. pale yellowish green, wax-dusted underneath; BL 1.3–2.6 mm. On various species of Gramineae, Juncaceae and Cyperaceae in wet habitats, and occasionally recorded from dicotyledons. In Europe, SW and C Asia, W Siberia, Pakistan, N India, China (as *C. zhangii* Zhang, Chen, Zhong and Li, in Zhang, 1999) and also in N America (Colorado, Manitoba, NW Territories). Heter. hol., with *Salix* spp. as primary hosts. Remaudière (1970) gave a full account. 2n=8*.

THE APHIDS

Cavariella araliae Takahashi

Apt. pale yellow or pale green; BL 1.3–2.1 mm. On young stems and shoots of Araliaceae (*Aralia*, *Schleffera*, *Tetrapanax*), and also recorded from *Broussonetia kazinoki* (Lee *et al.*, 2002c). E Asia (Japan, Okinawa, Korea, E Siberia, China, Taiwan). 2n=14.

Cavariella archangelicae (Scopoli)

Figure 10c,f

Apt. green or yellowish, with SIPH wax (discharged by prodding abdomen) colorless to slightly greenish (cf. *konoii*); BL 1.5–2.6 mm. On *Angelica* spp. and certain other Umbelliferae (*Apium*, *Heracleum*, *Myrrhis*, *Peucedanum*, *Pimpinella*). Heter. hol. with sexual phase on *Salix* in Europe and Iceland (Blackman and Eastop, 1994, 2000). Also recorded from western N America (Utah, Alaska). 2n=6.

Cavariella aspidaphoides Hille Ris Lambers

Apt. probably green, BL c. 1.3–1.5 mm. On *Daucus maximus* in Israel, presumably with host alternation to *Salix*; apt. and al. from the primary host were subsequently described from Iran (Hille Ris Lambers, 1970c).

Cavariella bunii Narzikulov and Mukhamediev

Apt. green, BL 1.8–2.3 mm. On *Bunium persicum* and *Bunium* sp. in Tajikistan (Alayskiy Khrebet mountains). Not clearly distinct from *C. aegopodii*.

Cavariella cicutae (Koch)

Apt. shining yellowish with two longitudinal green stripes; BL 1.5–2.1 mm. In large colonies on upper parts of stems of aquatic plants in several genera of Umbelliferae (*Berula*, *Cicuta*, *Sium*) in Europe (Hille Ris Lambers, 1947b). Mon. hol. on aquatic Umbelliferae (Hille Ris Lambers, 1952). Records of a sexual phase on *Salix* in Ukraine and Iran are probably referable to *C. salicicola* (q.v.), apt. of which on its secondary hosts are not clearly distinguishable from those of *cutae*. Records from *Salix* in Sicily (Barbagallo and Stroyan, 1982; Barbagallo and Patti, 1998) are likely to be *C. rutila* Mamontova, which was erroneously synonymised with *C. cicutae* but has longer SIPH similar to those of *C. aegopodii*, and no dorsal subapical hair on the cauda (see Blackman and Eastop, 1994). Secondary host forms of *C. rutila* have not been described; Chumak (2004) records them from *Anthriscus* and *Levisticum* in Ukraine, but these could be *salicicola*. 2n=10

Cavariella gilbertiae Takahashi

Apt. milky white to yellowish brown; BL 1.8–2 mm. On *Dendropanax* spp. in Japan and Korea. Also collected in Korea on *Miscanthus purpurascens* (Lee *et al.*, 2002c.)

Cavariella (Cavariellinepicauda) heraclei Takahashi

Apt. white; BL 2.3–3.0 mm. On *Angelica* and *Heracleum* spp. in Japan (Miyazaki, 1971).

Cavariella himachali L.K. Ghosh

Apt. greenish with two deep green streaks along sides of abdomen; BL c.2.1 mm. On apical shoots of *Spiraea canescens* and *Indigofera gerardiana* in NW India (H.P.). The host plants are unlikely for a *Cavariella*, and require confirmation. (Note that *Nudisiphon folisacculata* with similar siphunculi is also recorded from *Spiraea* and ?*Indigofera* in this region.)

Cavariella japonica Essig and Kuwana

Figure 10h

Apt. variably colored, yellowish to brownish; BL 1.5–2.4 mm. On various Umbelliferae (*Angelica*, *Anthriscus*, *Cryptotaenia*, *Dystaenia*, *Ledebouriella*, *Pastinaca*, *Peucedanum*, *Torilis*). Japan, Korea and E Siberia. In S Korea many samples have been collected also from *Ranunculus japonicus* (Lee *et al.*, 2002c). Heter. hol. with *Salix* spp. as primary hosts (Miyazaki, 1971). 2n=8.

Cavariella konoii Takahashi

Figure 10d,g

Apt. green, or yellow-green with faint darker green longitudinal stripes, with SIPH wax distinctly yellow (cf. *archangelicae*); BL 1.6–2.9 mm. On several genera of Umbelliferae (*Angelica*, *Apium*, *Cicuta*, *Myrrhis*, *Peucedanum*, *Sium*), and also recorded from *Tetrapanax* (Araliaceae). Holarctic. Heter. hol. with sexual phase on *Salix*. Difficult to distinguish from *archangelicae* when on slides; Stroyan (1964a) gave distinguishing

characters. Stroyan (1969a) discussed N American records and geographical variation, and considered that records of *C. hendersoni* Knowlton and Smith from *Cicuta maculata* and *Sium suave* should be assigned to *C. konoii* (Stroyan, 1969a). 2n=8.

Cavariella (Cavariellinepicauda) largispiracula Zhang, Chen, Zhong and Li

Apt. color in life unrecorded; BL 1.6–2.7 mm. On *Angelica sinensis* in Gansu, China (Zhang, 1999).

Cavariella nigrocaudata Takahashi

Apt. dark brownish with appendages mainly dark; BL c.2 mm. On *Tetrapanax papyriferus* in Japan.

Cavariella nipponica Takahashi

Apt. whitish; BL c.1.6 mm. On various Umbelliferae (*Angelica*, *Heracleum*, *Pachypleurum*) in E Asia (China, Japan, Korea, E Siberia). In S Korea many samples have been collected also from *Ranunculus japonicus* (Lee *et al.*, 2002c). Heter. hol. with *Salix* spp. as primary hosts.

Cavariella (Cavariellinepicauda) oenanthei (Shinji)

Figure 10i

Apt. pale green with dark head and very variably developed dark dorsal markings; BL 1.5–2.1 mm. On several genera of Umbelliferae (*Angelica*, *Cryptotaenia*, *Oenanthe*), on stems at ground level, often in ant shelters (Miyazaki, 1971). In Japan, Korea, E Siberia and C Asia (Tajikistan; Narzikulov, 1975). 2n=8.

Cavariella pastinacae (L.)

Apt. pale green; BL 1.8–2.9 mm. On Umbelliferae, esp. *Heracleum*, but also recorded from *Angelica*, *Carum*, *Chaerophyllum*, *Cicuta*, *Foeniculum*, *Pastinaca* and *Torilis*. Heter. hol. with sexual phase on *Salix*. Europe, N America (first record as *Siphocoryne essigi*; Gillette and Bragg, 1918), and more recently Argentina (Nieto Nafria *et al.*, 1994). *C. kamtshatica* Ivanoskaya, recorded from *Angelica* and *Heracleum* in Kamchatka is not clearly separable from its published description, and could be large *pastinacae*. 2n=8.

Cavariella salicicola (Matsumura)

Figure 10a

Apt. green with pale bluish wax markings; BL 1.7–2.2 mm. On various Umbelliferae (incl. *Angelica*, *Apium*, *Cnidium*, *Cryptotaenia*, *Levisticum*, *Oenanthe*, *Pastinaca*, *Sanicula*, *Sium*), with a preference for plants growing in water or marshy situations. Also recorded from *Phryma leptostachya* var. *oblongifolium* (Phrymaceae) and *Ranunculus japonicus*. Heter. hol., with sexual phase on various *Salix* spp. (Blackman and Eastop, 1994). Japan, China, Korea, E Siberia, Tibet, India, and also westward to Iran and Ukraine, if heter. hol. populations previously recorded as *C. cicutae* (Mamontova-Solukha, 1961; Hodjat, 1993) are this species. 2n=10.

Cavariella salicis (Monell)

Apt. probably greenish; BL 1.6–2.1 mm. On various Umbelliferae (*Angelica*, *Oenanthe*, *Sium*) in eastern and central USA. Heter. hol. with *Salix* spp. as primary hosts. Confused in earlier N American literature with *C. aegopodii* (Stroyan, 1969a).

Cavariella (Cavariellinepicauda) sapporoensis Takahashi

Apt. whitish; BL c. 3.0 mm. On *Angelica* and *Heracleum* spp. in Japan (Miyazaki, 1971) and Korea, where many samples have been collected also from *Arisaema amurense* var. *serratum* (Lee *et al.*, 2002c).

Cavariella saxifragae Remaudière

Apt. blackish; BL 1.4–1.8 mm. Sec. rhin. in al. III 13–24, IV 0–2. Feeding is restricted to *Saxifraga aizoides*. In France (Pyrénées) and Scotland (Stroyan, 1964a). Mon. hol. with ovip. and apt. (alatiform) males (orig. descr.).

Cavariella simlaensis Chowdhuri, R.C. Basu and Raychaudhuri

Apt. presumably dark brown or blackish in life; BL c.2.3 mm. Sec. rhin. in al. III 48–65, IV 8–13, V 2–6. On *Sanicula europaea* in India (H.P.). This is possibly the secondary host form of *C. nigra* (see Blackman and Eastop, 1994).

THE APHIDS

Cavariella theobaldi (Gillette and Bragg)

Apt. rather bright green, with dusky, tapering SIPH; BL 1.8–2.8 mm. On *Heracleum*, *Pastinaca* and sometimes other genera of Umbelliferae (e.g., *Aegopodium*, *Angelica*, *Chaerophyllum*). Europe, W Siberia, Turkey and north-eastern N America. Heter. hol. with sexual phase on *Salix*. In view of the amount of morphological variation between populations, the name may be being applied to more than one species. $2n=8$.

Cedoaphis Oestlund

Aphidinae: Macrosiphini

Two N American species with sec. rhin. in apt. and a helmet-shaped cauda. The two have different biologies and different cuticular sculpture, and are unlikely to be truly congeneric.

Cedoaphis incognita Hottes and Frison

Apt. yellowish green with dusky brown head; BL 2.0–3.0 mm. Sec. rhin. in al. III 22–28, IV 15–18, V 10–14. On *Symphoricarpos* spp., feeding on leaves in summer, and on roots (fund.) in spring. Widely distributed in USA. Mon. hol., although sexual morphs apparently undescribed (Palmer, 1952, as *Aphis*).

Cedoaphis maxsoni (Palmer)

Plate 11f

Apt. pale amber with variably developed dark dorsal patches; BL 1.3–2.7 mm. Sec. rhin. in al. III 30–46, IV 18–20, V 1–5. Described from small specimens (BL 1.3–1.7 mm) on roots of *Eriogonum* sp. in late summer in Colorado, USA. Subsequently much larger specimens (BL 2.3–2.7 mm) were collected in spring from Compositae (*Petasites*, *Senecio*) in Oregon (BMNH colln, leg. D. Hille Ris Lambers) and California (BMNH colln, leg. R.C. Dickson). Ovip. were found on *Eriogonum* in late Aug (Palmer, 1952, as *Amphicercidus*).

Cepigillettea Granovsky

Calaphidinae: Calaphidini

Closely related to *Calaphis*, with three N American species, one of which feeds on Myricaceae.

Cepigillettea myricae Patch

Plate 4a

Apt. and al. green with ANT dusky or dark distally, and SIPH either wholly or apically black; BL c.2.5 mm. On leaves of *Myrica* spp. in north-eastern USA and E Canada. Mon. hol., with ovip. and apt. males in Sept (BMNH colln, leg. M.E. MacGillivray).

Cerataphis Lichtenstein

Hormaphidinae: Cerataphidini

About 6 SE Asian species, some alternating from galls on *Styrax* to monocots including bamboo, palms, screw pines, and orchids in their native regions, but several species more widely distributed by commerce on their palm and orchid secondary hosts. Apt. are dorsoventrally flattened, and with a marginal ring of wax. Al. have media of forewing once-branched and 5-segmented ANT. Noordam (1991) reviewed the Javanese species, Russell (1996) provided a key to the species on palms and orchids, and see also Blackman and Eastop (1994).

Cerataphis brasiliensis (Hempel) (= *variabilis* Hille Ris Lambers; = *fransseni*

Hille Ris Lambers; = *palmae* Ghesquière of many authors)

Plate 3b

Apt. aleurodiform, dark brown fringed with white wax; BL 1.0–1.8 mm. On leaves of palms and certain other monocots (e.g., *Acorus*, *Musa*). Heter. hol. with a sexual phase on *Styrax benzoin* in Java and Malaya (Stern *et al.*, 1995, as *C. fransseni*). Anhol. populations are common throughout the tropics. See also Blackman and Eastop, 2000. $2n=18^*$.

Cerataphis freycinetiae van der Goot

Apt. dull black, aleurodiform with an encircling flat fringe of white; BL 1.3–1.6 mm. On young leaves of *Freycinetia* and *Pothos* spp., and aphids provisionally identified as this species have also been collected on *Poikilospermum* sp. (BMNH colln, VFE 16,237). Widely distributed in SE Asia, and also recorded from Australia (Queensland, BMNH colln, leg. J.H. Martin).

Cerataphis jamuritsu (Takahashi)

Apt. dark gray or reddish with an encircling fringe of white wax; BL 2.1–2.4 mm. On the rattan *Calamus quinquesetinervius* (as *quinquesstinervus*), in ant shelters in southern Taiwan (Kurosu *et al.*, 2004). Heter. hol., forming large bell-shaped galls on *Styrax suberifolium* (Blackman and Eastop 1994, as *Astegopteryx*).

Cerataphis lataniae (Boisduval)

Apt. shiny brown or orange-brown, with a flat white fringe of wax around margin; BL 0.9–1.3 mm (Noordam, 1991). Apparently widespread on palms, especially *Latania* and *Cocos nucifera*, through the tropics, and in glasshouses, but exact distribution is uncertain because of confusion with *C. brasiliensis*. Also recorded from *Acorus calamus*.

Cerataphis orchidearum (Westwood)

Figure 25a

Apt. dark reddish brown to black dusted with wax, with a fringe of radiating plates of white wax; BL 1.0–1.6 mm. On various Orchidaceae, widely distributed in the tropics, and in European and North American glasshouses. Earlier records of *C. lataniae* from orchids probably all refer to this species. Anhol.; sexual phase not known. See Heie (1980b) or Zimmerman (1948; under *C. lataniae*) for further information. $2n=16^*$ (samples from *Cymbidium*, *Dendrobium* and *Epidendrum*) or 18 (samples from *Angraecum*, *Sarcochilus* and *Butia*).

Cerataphis pothophila Noordam

Apt. brownish black with a flat encircling fringe of white wax; BL 1.35–1.55 mm. On undersides of leaves of *Pothos roxburghii* in Java.

Ceratovacuna Zehntner

Hormaphidinae: Cerataphidini

About 10 species in SE Asia, some alternating from galls on *Styrax* to bamboos, or living only on bamboos and other large Gramineae such as sugar cane. Taxonomic accounts are available for Japan (Takahashi, 1958), Korea (Paik, 1965), India (M.R. Ghosh *et al.*, 1974), Taiwan (Tao, 1966; Liao, 1976 – bamboo-feeding species) and Java (Noordam 1991). Earlier authors placed the species in *Oregma*. See also Blackman and Eastop (1994) for bamboo-feeding species.

Ceratovacuna graminum (van der Goot)

Apt. black or grayish black, with dark appendages, body covered with a thin dense layer of wax; BL 1.8–2.1 mm. Sec. rhin. in al. III 25–35, IV 7–9, V BASE 9–13. On undersides of leaves of a grass (presumed to be *Panicum* sp.) in Java, and on an unidentified grass in Vietnam (Szelegiewicz, 1968, as *?orientalis*).

Ceratovacuna lanigera Zehntner

Plate 3c

Apt. pale green or brownish yellow or grayish brown, densely covered with white wax that forms thick columns at margins of body, and may become filamentous (Noordam, 1991; Rueda and Calilung, 1975); BL 1.4–2.3 mm. Al. are brown–black with sec. rhin. III 16–25, IV 5–10, V BASE 2–9. Imm. al. cluster together and produce abundant long filamentous wax. On lower sides of leaves of Gramineae (*Miscanthus*, *Oplismenus*, *Pseudechinolaena*, *Saccharum*, *Themeda*). In dense colonies, often attended by ants. India, Nepal, Bangladesh; E and SE Asia, Fiji and Solomon Islands. Apparently anhol. everywhere; Kurosu and Aoki (1986) found many al. sexuparae in a colony on sugar cane in Japan, and obtained some first instar sexual morphs, but these were possibly non-functional. A serious pest of sugar cane in SE Asia, but in Japan and Fiji it has only been found on *Miscanthus*, suggesting geographical variation in its host plant preferences; possibly there is also confusion with the very similar *C. panici*. See also Blackman and Eastop (2000). $2n=12$.

Ceratovacuna nekoashi (Sasaki)

Apt. densely covered in white wax wool; BL 1.5–1.9 mm. On undersides of leaves of various grasses (*Apluda*, *Arthraxon*, *Microstegium*, *Miscanthus*, *Oplismenus*). Japan, Taiwan, Korea and Uttar Pradesh, India (Chakrabarti and Maity 1982). Heter. hol. in Japan, forming ‘cat’s paw’-like galls on *Styrax* in spring. See also Blackman and Eastop (1994). $2n=12$.

THE APHIDS

Ceratovacuna panici (Van der Goot)

Apt. yellowish or brownish, with white wax forming columns marginally, shorter than is sometimes the case in *C. lanigera* (Noordam, 1991); BL 1.5–1.9 mm. Al. have sec. rhin III 17–30, IV 7–15, V BASE 6–14. On undersides of leaves of tropical grasses (*Cynodon*, *Microstegium*, *Panicum*, *Paspalum*, *Setaria*) in Java. Life cycle unknown. Fully redescribed by Noordam (1991). Closely related to *C. lanigera*, and possibly some records of *C. lanigera* from grasses other than *Saccharum* outside Java are referable to this species.

Ceratovacuna perglandulosa R.C. Basu, A.K. Ghosh and Raychaudhuri

Apt. appearance in life unrecorded, but presumably secreting abundant wax; BL 1.8–2.2 mm. On *Saccharum officinarum* in India (Meghalaya), and also recorded from '*Grassum prothama*' (Basu *et al.*, 1975), an untraceable plant name.

Ceratovacuna spinulosa (A.K. Ghosh and Raychaudhuri)

Apt. appearance in life unrecorded, but presumably secreting wax; BL 1.2–1.3 mm. On *Ischaemum albens* in W Bengal, India.

Ceriferella Carver and Martyn

Lizeriinae

Two Australian species producing thick strands of wax from numerous dorsal wax glands. Apt. have eyes reduced to 3 facets, and 5-segmented ANT. The host plant of one species is still unknown (Carver and Martyn, 1965).

Ceriferella leucopogonis Carver and Martyn

Apt. dark reddish brown with long thick strands of white wax dorsally and laterally; BL 0.8–1.1 mm. Singly or in small colonies on foliage of *Leucopogon* spp. in SE Australia.

Ceruraphis Börner

Aphidinae: Macrosiphini

Three nominal species, one nearctic and two palaeartic, that host-alternate between *Viburnum* and Cyperaceae. Although the three species share some features and are clearly related in biology, each has some unique morphological peculiarities which could justify separate generic or subgeneric status. The genus was reviewed by Chakrabarti and Medda (1985), and MacGillivray (1960) compared the two species in N America.

Ceruraphis eastopi Hille Ris Lambers

Figure 58a,c

Apt. (fund.?) color unrecorded, but presumably pale gray, green or brown with blackish head and SIPH; BL 3.4–3.8 mm. On *Viburnum* spp., in pseudogalls formed by folding leaf margins ventrally (Bhattacharya *et al.*, 1980). Heter. hol., with unknown secondary host, probably in Cyperaceae. N India and Pakistan. [Orig. desc. of *eastopi* is of al. and imm. only, collected on *Viburnum cotinifolium* in Pakistan in Sept. The apt. described by Bhattacharya *et al.* (1980) from *Viburnum* sp. in Garhwal Himalaya (U.P.) in June are keyed by us as *eastopi*, but are possibly the fund. of a different species.]

Ceruraphis eriophori (Walker)

Plate 11e

Apt. (incl. fund.) blackish; BL (fund.) 2.5–3.0 mm, BL (apt. on Cyperaceae) 2.0–2.8 mm. In spring curling leaves of *Viburnum* spp., migrating from second generation to Cyperaceae (*Carex*, *Cyperus*, *Eriophorum*, *Luzula*, *Typha*). Apt. on secondary hosts have a tuft of wax at end of abdomen. Europe, N India (BMNH colln, leg. S Chakrabarti) and N America. Ant-attended. 2n=14.

Ceruraphis viburnicola (Gillette)

Figure 58b,d

Apt. (fund.) dark green, wax-dusted, with black ANT, legs, SIPH and cauda; BL 2.5–3.0 mm. In curled leaves of *Viburnum* spp. in spring. N America. Heter. hol., migrating to Cyperaceae on basis of greenhouse transfers (MacGillivray, 1960), although not yet collected in field on secondary hosts. Apt. reared on *Scirpus* were brown dorsally and pink ventrally with pink head and no white wax tuft at the end of the abdomen, and had BL 1.9–2.4 mm (cf. *eriophori*; MacGillivray, 1960). Sexuales on *Viburnum* in Sept–Nov. (Palmer, 1952). 2n=14.

***Cervaphis* van der Goot**

Greenideinae: Cervaphidini

A small genus in India and SE Asia distinguished by apt. with remarkably long and numerous hair-bearing processes, the marginal processes being branched, with each branch ending in a hair. These processes are reduced in al. (except on the head) to low, flat, hair-bearing tubercles. SIPH are long, cylindrical, slightly curved outwards and slightly swollen subapically where there is a ring of hairs. Hille Ris Lambers (1956b) and A.K. Ghosh (1982b) revised the genus and A.K. Ghosh and Agarwala (1993) reviewed the Indian species. See also Blackman and Eastop (1994, 2000).

***Cervaphis rappardi* Hille Ris Lambers**

Apt. yellow or greenish yellow; BL 1.2–1.7 mm. On flowers, flowerstalks, and sometimes on leaves, young shoots, or young fruit of *Theobroma cacao*, attended by ants (*Dolichoderus*). Feeding may cause flower heads to shrivel and fall off. Colonies also occur on *Nephelium lappaceum* which may be the native host plant, and *Aglaia* sp. Indonesia, Malaysia, New Guinea, Philippines, and India, where a subspecies, *C. rappardi indica* A.N. Basu was described from *Cajanus cajan* in Assam and W Bengal. $2n=8$ for ssp. *indica* (Kar *et al.*, 1990).

***Cervaphis schouteniae* van der Goot**

Plate 5h

Apt. whitish green to yellowish white; BL 1.5–1.9 mm. On undersides of young leaves, feeding along main veins near petioles. Host plants include trees and shrubs mainly in Tiliaceae (*Actinophora*, *Grewia*, *Microcos*, *Schoutenia*), but also Sterculiaceae (*Guazuma*, *Pterospermum* – and *Theobroma* is also a possible ‘reserve’ host). Malaysia, Indonesia, Philippines, Thailand, Cambodia and India. Sexuials are unrecorded. See also Blackman and Eastop (1994).

***Chaetogeioica* Rемаудиере and Tao**

Eriosomatinae: Fordini

Eight E Asian species related to *Geoica* but with al. having ciliated secondary rhinaria. Complete life cycles presumably involve alternation between *Pistacia* and grass roots but have not been confirmed for any species. The root-feeding forms are known for only two species in India (Raychaudhuri *et al.*, 1978b).

***Chaetogeioica graminiphaga* Raychaudhuri, Pal and M.R. Ghosh**

Apt. color in life unrecorded; BL c.1.9 mm. On roots of various grass species (*Capillipedium*, *Eleusine*, *Ischaemum*, *Polypogon*) in W Bengal and Manipur, India. Life cycle unknown.

***Chaetogeioica polychaeta* Raychaudhuri, Pal and M.R. Ghosh**

Apt. creamy white to pink or pale brown, with conspicuous pubescence; BL 1.5–2.3 mm. On roots of *Capillipedium* sp., *Oryza sativa* and other Gramineae in W Bengal and Manipur, India. Al. and life cycle unknown.

***Chaetomyzus* Ghosh and Raychaudhuri**

Aphidinae: Macrosiphini

One Asian species on *Rhododendron*, perhaps related to *Indomasonaphis* but a much smaller aphid with scabrous dorsal processes, few caudal hairs, and first tarsal segments with 3 hairs. ‘*Liosomaphis*’ *rhododendrophila* is similar in many respects but has first tarsal segments with 5 hairs.

***Chaetomyzus rhododendri* A.K. Ghosh and Raychaudhuri**

Apt. color in life unrecorded; BL 1.8–2.4 mm. On undersides of young leaves of *Rhododendron arboreum* and *Rhododendron* sp. in N India (Assam, H.P., U.P.) and Nepal. Chakrabarti *et al.* (1971) provided a redescription. A small sample of 1 al. and 2 imm. from *Sonchus* in Nepal (BMNH colln) suggests that the secondary host is a composite, as in the related *Indomasonaphis*.

***Chaetosiphella* Hille Ris Lambers**

Chaitophorinae: Siphini

A small genus on of dark, elongate-bodied aphids on grasses closely related to *Atheroides* but, strangely for a grass-feeder, with a stiletto-shaped R IV+V. The genus is little-studied and the BMNH collection includes some undescribed species (see below under *stipae*).

Chaetosiphella berlesei (del Guercio)

Apt. dull dark gray to black; BL c.2mm. On upper sides of leaves of grasses (*Aira*, *Corynephorus*, *Deschampsia*, *Festuca*), mainly in dry sandy habitats, dropping off plant and running when disturbed. Europe (not UK or Iberian Peninsula) and W Siberia. Mon. hol. with apt. males (Heie, 1982).

Chaetosiphella stipae Hille Ris Lambers (= *Chaetosiphella pamirica* Narzikulov)

Apt. dark gray or blackish brown to dull black; BL 1.7–2.0 mm (Hille Ris Lambers, 1947c, as *Ch. tshernavini* ssp. *stipae*). On *Stipa* spp. in Europe, W Siberia, C Asia and Mongolia (BMNH colln, leg. H. Szelegiewicz). In C Asia it was also found on *Acantholimon pamiricum* (Plumbaginaceae; Narzikulov, 1970, as *Ch. pamirica*). Much larger specimens (BL c.2.6 mm) from *Ammophila arenaria* in Portugal (BMNH colln, leg. F.A. Ilharco) may be a variant population or subspecies, and a distinct undescribed species with a much shorter (but still stiletto-shaped) R IV+V has been collected on *Stipa* sp. in France and former Yugoslavia (BMNH colln, leg. D. Hille Ris Lambers). Mon. hol. with apt. males (Nieto Nafria and Mier Durante, 1998).

Chaetosiphella tshernavini (Mordvilko)

Apt. blackish gray; BL 1.5–1.8 mm. On leaves of *Corynephorus canescens* and *Festuca* sp. in Germany, Poland, Czech Republic and S Russia (Heie, 1982).

Chaetosiphon Mordvilko

Aphidinae: Macrosiphini

About 20 species widely distributed in the Northern Hemisphere and mostly associated with Rosaceae of the *Rosa–Fragaria–Potentilla* group, characterised by having 5 hairs on all first tarsal segments, apt. with conspicuous capitate hairs, cylindrical SIPH and a short cauda. Al. have inconspicuous dorsal hairs and dorsal abdominal pigmentation, fundatrices have shorter hairs than later generations of apt, and parasitised apt. may also have short dorsal hairs. The economically important species, placed in the subgenus *Pentatrichopus*, were formerly included in *Capitophorus*. They are not attended by ants. Accounts are available for Europe (Hille Ris Lambers, 1953; Heie, 1994), Japan (Miyazaki, 1971), India (David *et al.*, 1971), and N America (Schaefers, 1960; Richards, 1963b). Remaudière (1991) provided a key to species.

Chaetosiphon alpestre Hille Ris Lambers

Apt. shiny pale green with a slightly brownish tinge; BL 1.5–2.1 mm. Al. have a dark central dorsal abdominal patch. On flower stems, petioles and young stems of *Potentilla* spp. in Europe (France, Switzerland, Italy, Sweden, Poland, Czech Republic). Aphids collected on *Artemisia* sp. in Mongolia were also identified as this species (Szelegiewicz, 1963). Two subspecies have been described, ***Ch. alpestre* ssp. *airolense*** Hille Ris Lambers found in Switzerland on *P. puberula* and also in Sweden on *P. megalantha* (Ossiannilsson, 1959), and ***Ch. alpestre* ssp. *orientale*** Shaposhnikov, found in W Kazakhstan on undersides of leaves of *P. supina*. Mon. hol., with al. males (ssp. *airolense*).

Chaetosiphon (Pentatrichopus) alpinum (Börner)

Apt. probably very pale whitish or yellowish; BL 1.4–1.8 mm. In leaf axils of *Potentilla* spp. in Austria.

Chaetosiphon chaetosiphon (Nevsky)

Apt. pale orange (orig. descr.), or pale green to mid-green, shiny (Hille Ris Lambers, 1953); BL 2.0–2.6 mm. Al. have a large black dorsal abdominal patch. On *Rosa* spp. in S Europe, C Asia and Kashmir. Life cycle unknown; fund. in May in Switzerland.

Chaetosiphon (Pentatrichopus) coreanum (Paik)

Apt. pale yellow to almost white; BL 1.7–1.9 mm (spring), 0.9–1.3 mm (summer). Al. with dark dorsal abdominal patch. On young growth in spring, and later on undersides of leaves, of *Rosa* spp. Japan and Korea. Mon. hol., ovip. in Oct (Miyazaki, 1968). 2n=8.

Chaetosiphon (Pentatrichopus) fragaefolii (Cockerell)

Plate 16c

Apt. translucent yellowish white to pale greenish yellow; BL 0.9–1.8 mm. Al. have a brown-black dorsal abdominal patch. On *Fragaria* spp., especially cultivated varieties; it occurs frequently on *F. chiloensis* in

America, but rarely on *F. vesca* in Europe. Also sometimes found on *Potentilla anserina*. An important cosmopolitan vector of strawberry viruses (Blackman and Eastop, 2000). Mainly anhol.; ovip. and both apt. and al. males are produced in certain lab. cultures, but are rare in field. There has been some confusion in the N American literature with *Ch. thomasi* (Blackman *et al.*, 1987). $2n=13, 14$ or 15 .

Chaetosiphon (Pentatrachopus) glabrum David, Rajasingh and Narayanan

Apt. pinkish brown or green, with dark dorsal abdominal cross-bands and brown appendages; BL 1.3–1.9 mm. Al. also with dark abdominal cross-bands. On *Rosa* spp. in Himachal Pradesh, India. Very similar apt. but with most dorsal body hairs very small have been collected on *Rosa* sp. in Kashmir (BMNH colln, leg. N.D. Rishi), and could be a hot-weather form of *glabrum*, or possibly parasitised individuals.

Chaetosiphon (Pentatrachopus) gracilicorne David, Rajasingh and Narayanan

Apt. pale greenish yellow to dark green with pale appendages; BL 1.4–1.65 mm. On *Rosa* spp. in India (H.P.). Chakrabarti (1976) described al. vivip. and ovip, both collected (as well as apt. vivip.) in Dec. $2n=16$ (Dutta and Gautam, 1993)

Chaetosiphon (Chaitomyzus) heterotrichum Chakrabarti, A.K. Ghosh
and Raychaudhuri

Figure 48b

Apt. dull white; BL 1.8–2.1 mm. Al. without dark dorsal abdominal markings. On undersides of leaves of *Salvia glutinosa* and *Salvia* sp. in N India (U.P.).

Chaetosiphon (Chaitomyzus) hirticorne (Takahashi)

Apt. yellow, with dusky to blackish ANT III–VI, but pale legs and SIPH; BL c.1.5 mm. Al. are undescribed. On *Clinopodium* sp. in Japan (the host has a question mark in the original description, but not on the label of the co-type slide in BMNH colln, leg. M. Sorin).

Chaetosiphon (Pentatrachopus) hottesi Stroyan

Apt. pale whitish yellow to yellowish green; BL 1.9–2.1 mm. Al. have dorsal abdomen with dusky sclerotic bars, not fused into solid patch. On *Potentilla glandulosa* and *Rosa* sp. in western USA (Colorado, Utah) and Canada (B.C.).

Chaetosiphon (Pentatrachopus) jacobi Hille Ris Lambers

Apt. similar to *fragaefolii* but darker, with tergum brownish; BL 1.2–1.8 mm. On thin-leaved wild *Fragaria* spp. in western USA, colonising cultivated strawberries only in glasshouse or laboratory conditions. Apparently entirely anhol. (Blackman *et al.*, 1987). $2n=17$.

Chaetosiphon janetscheki (Börner)

Apt. color in life unknown; BL 1.6–1.9 mm. On *Geum* sp. (either *montanum* or *reptans*) in Austria, and also on *Geum* plants imported to UK from Switzerland (Hille Ris Lambers, 1953). Life cycle unknown.

Chaetosiphon (Pentatrachopus) minor (Forbes)

Apt. yellow–green; BL 1.0–1.4 mm. On stems and undersides of leaves of *Fragaria* spp. in eastern North America, Venezuela, Japan (Miyazaki, 1971), Korea and the Philippines. Mon. hol., with al. males. See also Blackman and Eastop (2000). $2n=12$.

Chaetosiphon (Pentatrachopus) muelleri Remaudière

Apt. whitish cream or yellowish; BL 1.0–1.4 mm. Dorsal abdomen of al. with a dark central patch, sometimes subdivided. On undersides of leaves of *Potentilla speciosa* in Turkey.

Chaetosiphon (Pentatrachopus) potentillae (Walker)

Apt. yellowish or whitish; BL 1.4–2.1 mm. On *Potentilla* spp., living singly or in small numbers on young leaves. Europe and N America. Mon. hol., with ovip. and apt. males in Sept–Oct (Heie, 1994).

Chaetosiphon (Pentatrachopus) tetraerhodum (Walker)

Apt. pale green to yellow–green, occasionally reddish; BL 1.0–2.6 mm. Al. have a black central abdominal patch. On both wild and cultivated *Rosa* spp., colonising shoot tips in spring, and later much smaller

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individuals live dispersed on undersides of mature leaves. World-wide, except E Asia. Mon. hol., with dark olive-green ovip. and small dark apt. males in Oct (Heie, 1994). 2n=14 (two UK samples) or 16* (one sample from A.C.T., Australia).

Chaetosiphon (Pentatrichopus) thomasi Hille Ris Lambers

Apt. yellowish green; BL 1.0–2.6 mm. On both wild and cultivated *Rosa* spp. in N America. Certain *Potentilla* spp. (e.g., *P. monspeliensis*, but apparently not *P. anserina*) may also be colonised. Mon. hol. on *Rosa rugosa* in B.C., with both apt. and al. males. Populations on *Rosa multiflora* in New Zealand appear to be morphologically distinct from both *thomasi* and *fragaefolii*, and a form with distinctive al. on *R. fendleri* in western USA (Utah, Colorado) may also be an undescribed taxon (Blackman *et al.*, 1987). 2n=12.

Chaitaphis Nevsky

Aphidinae: Macrosiphini

Five (or more) species on Chenopodiaceae in E Europe and Asia, reviewed and keyed by Kadyrbekov (2002c).

Chaitaphis camphorosmae (Hille Ris Lambers)

Apt. pale green, with apices of appendages brownish; BL 1.1–1.6 mm. On *Camphorosma* spp. Austria and W Kazakhstan. Mon. hol.; ovip. and al. males in Sept (orig. descr., as *Hayhurstia*). Redescribed by Kadyrbekov (2002c).

Chaitaphis kazakhstanica Kadyrbekov

Apt. pale green with grayish tinge, with front of head and apices of appendages darker; BL 1.1–1.5 mm. In clumped and reddened apical leaves of *Bassia sedoides* (Kadyrbekov, 2002c). Kazakhstan.

Chaitaphis safavii Remaudière

Figure 36b

Apt. very pale green, with apices of appendages darker; BL 1.4–1.6 mm. On *Kochia cana* in Iran. Mon. hol., with ovip. and al. males in Oct (Remaudière, 1989b).

Chaitaphis shaposhnikovii Kadyrbekov

Apt. color in life unknown, probably green; BL 1.4–1.7 mm. On *Salsola* sp. in W Kazakshtan (Kadyrbekov, 2002c). Closely related to *Ch. tenuicauda*.

Chaitaphis tenuicauda Nevsky

Figure 36a,c

Apt. yellow-green, with dark apices to ANT, legs and SIPH; BL 1.1–1.6 mm. In dense colonies on stems of *Kochia* spp., and also recorded from certain other Chenopodiaceae (*Salsola*, *Suaeda*), although according to Kadyrbekov (2002c) this species does not occur on *Salsola lanata*. Iran, Uzbekistan, Kazakhstan, Pakistan and India (New Delhi; BMNH colln, leg. Menon). Mon. hol., with ovip. and al. males in Nov–Dec (Remaudière, 1989b). [Kadyrbekov (2002c) redescribed *Ch. tenuicauda* from *Kochia prostrata* in Kazakhstan, but his specimens have a larger ratio of R IV+V to HT II than specimens from *Kochia* spp. (*prostrata*, *childsii*) in India (BMNH colln) and from Chenopodiaceae in Pakistan (Remaudière, 1989b).]

Chitinosiphum Yuan and Xue

Aphidinae: Macrosiphini

(= *Radiaphis* Pashtshenko 2000; = *Radicisiphum* Zhang, Chen, Zhong and Li, in Zhang, 1999)

Five or six species in E Asia somewhat resembling *Aulacorthum* but adapted for root feeding, with rather low, divergent ANT tubercles, ANT III of apt. with 3–16 rhinaria spread out on basal half, extensive dorsal sclerotisation, SIPH with distal part heavily imbricated, and a short dark cauda. Pashtshenko (2000c) keyed the 5 species known from E Siberia (as *Radiaphis*). Synonymies are discussed by Eastop and Blackman (2005).

Chitinosiphum cardui (Pashtshenko)

Apt. yellow-green with sclerotised dorsal abdominal patch; BL c. 2.3 mm. On roots of *Carduus crispus*, attended by ants (Pashtshenko, 2000c, as *Radiaphis*). E Siberia (Primorskii).

Chitinosiphum cirsorhizum (Zhang, Chen, Zhong and Li) (= *Radiaphis cirsii* Pashtshenko 2000; = *Unisitobion cirsiariston* Zhang, Chen, Zhong and Li, in Zhang, 1999)

Apt. yellow-green with a large greenish-brown dorsal abdominal patch, shining or pruinose; BL 1.9–2.5 mm. On underground part of stem and roots of *Cirsium* spp. in NW China (Zhang, 1999, as *Aulacorthum*) and E Siberia (Pashtshenko, 2000c, as *Radiaphis cirsii*). Mon. hol. with ovip. and al. males in Oct. (An ovip. with barely swollen hind tibiae bearing few scent glands, indicating lack of host alternation, was on a slide labelled as the holotype of *Unisitobion cirsiariston*.)

Chitinosiphum doellingeriae (Pashtshenko)

Apt. whitish green with brownish green sclerotised dorsal abdominal patch; BL c.2.0 mm. On basal part of stem and roots of *Aster scaber* (= *Doellingeria scabra*), attended by ants (Pashtshenko, 2000c, as *Radiaphis*). E Siberia (Primorskii Terr.).

Chitinosiphum kalimeris (Pashtshenko)

Apt. green with dark greenish gray dorsal abdominal patch; BL c.2.4 mm. On roots of *Kalimeris incisus* attended by ants (Pashtshenko, 2000c, as *Radiaphis*). E Siberia (Primorskii Terr.).

Chitinosiphum abdomenigrum Yuan and Xue (= *Radiaphis saussureae* Pashtshenko 2000)

Apt. white with large grayish green dorsal abdominal patch; BL c.2.0 mm. On *Saussurea nigrescens* in Shaanxi Province, China, and also found on basal part of stem of *Saussurea* sp. attended by ants, in Amur Province, E Siberia (Pashtshenko, 2000c, as *Radiaphis saussureae*).

Chomaphis Nevsky

Aphidinae: Aphidini

One species in Europe and W Asia on roots of Compositae, related to *Aphis* but with first tarsal segments bearing 4–4–3 hairs, a very short cauda, long SIPH bearing small hairs, and very large marginal tubercles.

Chomaphis mira Mordvilko

Figure 54b,c

Apt. color in life unknown; BL 2.0–2.5 mm. On roots of *Petasites* and *Tussilago* in Russia and Kazakhstan, and an al. has been recorded from N Italy by van Harten and Coceano (1981), who provided a redescription. 2n=8.

Chondrillobium Bozhko

Aphidinae: Macrosiphini

One species in Europe on *Chondrilla* (Compositae) superficially resembling *Hyalopteroides* but perhaps closer to *Pleotrichophorus*.

Chondrillobium blatnyi (Pintera)

Apt. pale green, BL 1.8–2.9 mm. On undersides of leaves of *Chondrilla juncea* in Europe, from France to Bulgaria, Greece, Turkey and Ukraine. Ovip. and apt. males were described from Turkey (Tuatay and Remaudière, 1965). Populations studied by Caresche *et al.* (1974) in the Mediterranean area were anhol.

Chusiphuncula Zhang

Aphidinae: Macrosiphini

A genus for one species in China on *Sorbaria*, compared by the author with *Rhopalosiphoninus*, but probably more closely related to *Wahlgreniella*.

Chusiphuncula sorbarisucta Zhang (= *Himalayaphis sorbarisorbifoliae* Zhang, Chen, Zhong and Li)

Apt. green; BL c.2.0 mm. Al. with 7 sec. rhin. on ANT III. On *Sorbaria sorbifolia* in NW China (Zhang and Chen, 1998).

Clypeoaphis Soliman

Aphidinae: Macrosiphini

One or two species on Chenopodiaceae, with a swollen clypeus like that of *Brachyunguis* feeding on this plant family, but the absence of marginal abdominal tubercles and placement of spiracles on anterior abdominal segments suggest that this genus belongs in Macrosiphini (Remaudière and Bahamondes, 1987).

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Clypeoaphis (?) *stavropolensis* Ivanoskaya

Apt. yellowish brown; BL c.1.9 mm. On *Salsola* sp. in W Siberia. [The generic position of this species is uncertain; it was described as having small marginal tubercles on prothorax and ABD TERG 1 and 7, but other features (length of ANT PT, number of hairs on R IV+V and HT I, shape of SIPH and cauda) indicate a closer affinity to *Clypeoaphis suaedae* than to *Brachyunguis* (*Xerophilaphis*).]

Clypeoaphis suaedae (Mimeur)

Plate 15c, Figure 36d,i

Apt. pale olive-green or yellowish green, covered with grayish white wax powder; BL 1.2–1.4 mm. In small colonies or scattered on stems of *Suaeda* spp. in saltmarshes and similar habitats. Also recorded from *Kochia scoparia* and *Salsola komarovii*. Al. are rare (Gimingham, 1942). In Europe, N Africa, Middle East and Korea. Mon. hol., with ovip. and apt. males in Sept (BMNH colln, leg. H.L.G. Stroyan). A population from the Netherlands with shorter and blunter hairs on head and ABD TERG 8 is regarded as a subspecies, *C. suaedae* ssp. *suaedicola* Hille Ris Lambers.

Codonopsimyzus Lee

Aphidinae: Macrosiphini

One species in E Asia perhaps related to *Cryptomyzus* but with very short dorsal hairs. Life cycle is unknown.

Codonopsimyzus sasammi Lee

Apt. milky white except for black ANT joints and tarsi; BL 1.6–2.0 mm. Al. have ANT, legs and SIPH black, sec. rhin. III 34–55, IV 14–26, V 5–16, and a black quadrate dorsal abdominal patch. On undersides of leaves of *Codonopsis lanceolata* in Korea (Lee, 2002).

Colopha Monell

Eriosomatinae: Eriosomatini

Five northern hemisphere species related to *Kaltenbachiella*, mostly producing colonies with abundant wax on roots or aerial parts of Gramineae or Cyperaceae. Three of them have a sexual phase and galls on *Ulmus* (Blackman and Eastop, 1994). Akimoto (1985a) and Smith (1985) revised the genus.

Colopha compressa (Koch)

Plate 1a, Figure 20i

Apt. dark yellowish, secreting flocculent wax; BL 0.9–1.5 mm. On roots of *Carex* and *Eriophorum*, sometimes in ants' nests. Heter. hol. with sexual phase and galls on *Ulmus* spp. Europe, eastward to Turkey and W Siberia. 2n=16.

Colopha graminis (Monell)

Apt. in gray woolly wax; BL c.1.2–1.8 mm. On roots, stems and leaves of Gramineae, e.g., *Aira caespitosa* and *Agrostis plumosa*, from which it was originally described, and *Leersia virginica* (Patch, 1910a). Heter. hol. with sexual phase and galls on *Ulmus* spp. (Blackman and Eastop, 1994). N America. Some authors (e.g., Palmer, 1952; Akimoto, 1985a) have synonymised *graminis* with *ulmicola*, and apt. exules of the two cannot be separated, but Smith (1985) considered that there was sufficient evidence to regard the two species as distinct.

Colopha hispanica Nieto Nafria and Mier Durante

Apt. dirty yellowish gray to very pale grayish brown covered with white wax powder; BL 1.4–2.7 mm. Living endophytically within stems of *Scirpoides holoschoenus* (the only known truly endophytic aphid). In Spain and France (Nieto Nafria *et al.*, 2002a). Apparently anhol.

Colopha kansugei (Uye)

Figure 20g

Apt. in gray woolly wax; BL 1.2–1.6 mm. In conspicuous colonies on aerial parts of *Carex* spp. and unidentified grasses; in spring and summer it may also occur on roots (Akimoto, 1985a). Japan, Ryuku Islands, Taiwan, China, and Nepal. Apparently mainly anhol. on *Carex*; sexual generations are unknown, although al. sexup. are produced in autumn in Japan. Possibly this species belongs in *Zelkovaphis*.

***Colopha ulmicola* (Fitch)**

Apt. reddish-brown, secreting white wax-wool; BL c.1.2–1.8 mm. On upper leaves and flower-stems of *Eragrostis poaeoides* var. *megastachya*, and also recorded from certain other Gramineae, incl. *Panicum* and *Zea*. In spring and summer it may also be found on the roots (Patch, 1910b). In N America, with *Ulmus* spp. as primary hosts, the return migration to elm being in Sept–Nov.

Colophina* Börner*Eriosomatinae: Eriosomatini**

Five E Asian species related to and morphologically resembling *Eriosoma* but biologically distinct (Akimoto, 1983), with particularly complex life cycles and polymorphism (Aoki, 1980). Two species are known to alternate between *Zelkova* and the aerial parts of *Clematis* (Blackman and Eastop, 1994), while the other three are only known from *Clematis*.

***Colophina arctica* Zhang and Qiao**

Apt. presumed covered in wax wool; BL 2.0–3.3 mm. On *Clematis brevicaudata* in Beijing City, China (Zhang and Qiao, 1997b). primary host unknown.

***Colophina arma* Aoki**

Apt. dark brown covered in white wax-wool; BL 2.4–3.3 mm. On *Clematis stans* in Japan, in spring attacking leaves and crumpling them to form pseudogalls, in summer and autumn forming colonies on stems and peduncles. First instar larvae of three types are produced, normal, ‘midget’ and soldier (Aoki, 1977). Al. sexuparae are produced in autumn and are thought to migrate to *Zelkova serrata*, where globular leaf-edge galls are produced in spring. The midget larvae hibernate under bark of lignified stems, providing an alternative life cycle (Aoki, 1980). 2n=10 (female), 8 (male).

***Colophina clematicola* (Shinji)**

Apt. very small, dark brick-brown, secreting white wax-wool; BL 0.8–1.3 mm. On stems, leaves and peduncles of *Clematis terniflora* in Japan, and collected from *Clematis* sp. in New Zealand (BMNH colln, leg. C. Butcher). In autumn colonies become large and produce al. sexuparae, which presumably migrate to *Zelkova*, on which galls have been artificially induced (Aoki and Kurosu, 2000) although not yet found in nature. Overwintering of first and second instar nymphs occurs on *C. terniflora* in Japan (Aoki *et al.*, 1997). 2n=20.

***Colophina clematis* (Shinji)**

Apt. dark brown covered in white wax-wool; BL 2.2–2.8 mm. In dense colonies on stems and peduncles of *Clematis apiifolia* in Japan; also known from Korea (on *C. trichotoma*). The colonies on *C. apiifolia* in Japan are usually in shade near the ground, and produce al. sexuparae in autumn that migrate to *Zelkova serrata*, but overwintering also occurs on *Clematis* as first instar larvae (Aoki, 1980). 2n=11 (female), 9 (male).

***Colophina monstiflora* Aoki**

Apt. presumably brown covered in white wax-wool; BL 3.6–5.4 mm. In large colonies on stems of *Clematis floribunda* in Taiwan (Aoki, 1983). Large first instar pseudoscorpion-like soldiers are produced. Al. sexuparae are produced in autumn, but the primary host (if any) is not known.

Coloradoa* Wilson*Aphidinae: Macrosiphini**

Despite its name an Old World genus of c.30 species, living monoeciously on Anthemidae (Compositae). Characteristic features are the spatulate body hairs shaped like partly opened fans, the stiletto-shaped R IV + V and the reduction and ventral displacement of the ocular tubercles, so that they are often not evident in dorsal view. Heinze (1960) and Heie (1992) reviewed the European species.

***Coloradoa abrotani* (Koch)**

Figure 12h

Apt. greenish with SIPH and cauda yellowish brown; BL 1.2–1.6 mm. On leaves of *Artemisia abrotanum* and also recorded from *A. afra*. In N Europe (Germany, Sweden), and introduced to Canada (New Brunswick). Sexual morphs apparently unknown.

Coloradoa absinthii (Lichtenstein) Figure 12m
 Apt. greenish with tips of ANT and tarsi black; BL 1.7–2.0 mm. On undersides of lower leaves of *Artemisia absinthium*, also *A. abrotanum*. Widely distributed in Europe, eastward to Armenia, and introduced to N America (New York, Manitoba). Ovip. in Oct, males undescribed.

Coloradoa achilleae Hille Ris Lambers Figure 5a
 Apt. pale green to grayish green or reddish; BL 1.1–1.6 mm. On leaves of *Achillea millefolium*. Europe, eastward to Russia and Turkey (Jörg and Lampel, 1988), and introduced to USA (N Carolina; Halbert *et al.*, 2000). Ovip. and apt. males in late Sept–Oct.

Coloradoa angelicae (del Guercio) (= *absinthiella* Ossiannilsson) Figure 12n
 Apt. green, with tips of ANT, legs and SIPH and entire cauda brownish; BL 1.2–1.8 mm. On *Artemisia absinthium* (the original host plant was probably misidentified), often occurring with *C. absinthii*. Throughout Europe and eastward to Iran, and introduced to N America (Montana, New York).

Coloradoa artemisiae (del Guercio) Figure 12p
 Apt. dirty green or reddish, with black tips of ANT and tarsi; BL 1.3–1.8. On *Artemisia* spp., most usually *A. vulgaris*, on the upper parts of the plant. Throughout Europe, India (Bhutan), Nepal, and introduced to USA and Canada. Ovip. in Sept. (Heie, 1992), males undescribed. 2n=16

Coloradoa bournieri Remaudière and Leclant
 Apt. pale green, with dark apices to appendages; BL 1.1–1.5 mm. On *Santolina chamaecyparissius*, *S. viridis* and *Santolina* sp. Europe (England, France, Spain, Italy), and Middle East (Israel, Iran, Lebanon; BMNH colln). Anhol. where studied (France, orig. descr.), and probably elsewhere. A Spanish population was described as a subspecies, *C. bournieri* ssp. *iberica*, but might be a variant clone. 2n=22*.

Coloradoa brevisiphon Bozhko
 Apt. green with whitish legs, SIPH and cauda; BL c.1.3 mm. Living well-concealed on flower stems of *Artemisia procera* in Ukraine (Bozhko, 1976b). Sexual morphs unknown.

Coloradoa campestrella Ossiannilsson
 Apt. pale yellow to green, with brown tips of ANT, tarsi, and (sometimes) SIPH; BL 1.3–1.6 mm. On *Artemisia* spp. in Europe, Pakistan and also in Japan, China and Korea (as *artemisiae* ssp. *artemiscicola*). Ovip. described (Ossiannilsson, 1959), but not the male.

Coloradoa campestris (Börner) Figure 12l
 Apt. green with blackish brown SIPH and cauda; BL 1.1–1.3 mm. On *Artemisia* spp. in Europe; Jörg and Lampel (1988) discussed its habitat and distribution. Ovip. figured by Heinze (1960), male undescribed.

Coloradoa heinzei (Börner)
 Apt. green or reddish, with apical parts of ANT, legs and SIPH dark; BL 1.0–1.3 mm. On upper parts of *Seriphidium* (= *Artemisia*) *maritimum*, and also recorded from *S. tauricum*. In Europe, and eastward to Pakistan. Stroyan (1979a) gave a full redescription including ovip. and apt. males collected in UK in Sept.

Coloradoa huculaki Szelegiewicz
 Apt. have dark green head and thorax, and yellowish green to green abdomen, with dark apices to ANT and legs, green to brownish green SIPH and pale yellowish green cauda; BL 1.3–1.6 mm. Described from *Artemisia pontica* in Hungary, and also found in China (BMNH). *C. brevopilosa* Ivanoskaya, described from *A. sieversiana* in Siberia, seems not clearly distinguishable on the basis of the published description. Sexual morphs unknown. 2n=c.24* (based on immature specimen from China).

Coloradoa indica Verma
 Appearance in life unknown: BL of apt. 0.65–0.9 mm. Described from an unidentified *Artemisia* sp. in Kashmir; later collected from *A. sibirica* in Kashmir (BMNH colln, leg. N.D. Rishi), and also in China (coll. V.F. Eastop). Probably close to *C. ponticae*, which it resembles apart from its larger size and 6-segmented ANT. Sexual morphs unknown.

Coloradoa inodorella Ossiannilsson

Apt. green, with appendages often dark distally; BL 1.3–1.7 mm. On leaves of *Tripleurospermum inodorum* in NW and C Europe, eastward to Russia and Turkey. Also found on *Matricaria discoidea*. Ovip and apt. males were described by Ossiannilsson (1959).

Coloradoa moralesi Remaudière and Leclant

Apt. pale green with apices of appendages darker; BL 1.1–1.6 mm. On *Santolina rosmarinifolia* in Spain (Sierra de Guadarrama).

Coloradoa nodulosa Zhang

Appearance in life unknown; BL of apt. c.1.6 mm. On *Artemisia annua* in China (Beijing). This is possibly *C. viridis*.

Coloradoa palmerae (Börner)

Apt. dirty green; BL 1.4–1.7 mm. On *Artemisia alba*, living inconspicuously on the margins of the finely divided leaves. Alatoid nymphs are strikingly brownish yellow. Hille Ris Lambers (1967) redescribed this aphid and discussed differences from *C. absinthii*. Found in France, Italy and Hungary. Sexual morphs unknown.

Coloradoa paradoxa Szelegiewicz

Apt. pale green with ANT, legs and SIPH brownish green, and CAUDA dirty green to yellowish; BL 1.2–1.5 mm. On unidentified *Artemisia* sp(p). in Turkey, Uzbekistan, Pakistan and Mongolia. Specimens in BMNH from Turkey contain parasitoid larvae. Originally described from Mongolia as a subspecies of *C. heinzei*. *C. paradoxa* could be the fundatrix generation of a species that has 6-segmented ANT and longer body hairs in later generations.

Coloradoa ponticae (Börner)

Figure 12k

Appearance in life unknown; BL 1.0–1.5 mm. On *Artemisia pontica* in Czech Republic (Heinze, 1960), and also found on an unidentified *Artemisia* in China (BMNH, coll. VFE). Probably close to *C. indica* (q.v.). $2n=16^*$.

Coloradoa procerae (Bozhko)

Apt. green; BL c.1.1 mm. On *Artemisia scoparia* in Ukrainian steppes (Bozhko, 1976b; orig. descr. from *A. procera* presumably in error?). Possibly this is *C. viridis*.

Coloradoa rufomaculata (Wilson)

Plate 15a, Figures 12o, 52c

Apt. pale green, often with yellow spots at SIPH bases; BL 1.0–1.7 mm. On stems and undersides of leaves of cultivated chrysanthemums (*Dendranthema*), *Chrysanthemum coronarium*, and sometimes on other Compositae (*Artemisia*, *Pentzia*, *Siegesbeckia*, *Tanacetum*). Throughout the world, occurring mainly in glasshouses in cold temperate regions. Probably anhol. almost everywhere, although ovip. are known from Australia and New Zealand. $2n=8$ or 17 (Panigrahy and Patnaik, 1991, both samples from *Chrysanthemum coronarium*) or 18 (Das *et al.*, 1985); it is very unlikely that 8 and 17/18 would be found in the same species, so two species are probably being confused under the one name.

Coloradoa santolinae Hille Ris Lambers

Figure 5b

Apt. green; BL 1.2–1.4 mm. Described from *Achillea santolina* in Israel, and subsequently also recorded from this host in Iran and Afghanistan, and from *Artemisia monosperma* in Israel (BMNH colln). Able to transmit cucumber mosaic potyvirus (strain 2; B. Raccah, pers. comm.). Sexual morphs unknown. $2n=20^*$ (specimens from *A. monosperma*).

Coloradoa scopariae Szelegiewicz

Apt. yellowish green with brownish ANT and legs, brownish yellow SIPH and dirty yellow to green cauda; BL 1.1–1.4 mm. On *Artemisia scoparia* in Mongolia. Sexual morphs unknown.

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Coloradoa submissa Doncaster

Figure 12j

Appearance of apt. in life unknown; ovip. found in Oct in Denmark were dirty yellowish or greenish brown, wax powdered, with head, pronotum, SIPH and cauda brown-black (Heie, 1992). On *Seriphidium* (= *Artemisia*) *maritimum* in UK and Denmark, and also collected from *Artemisia gallica* in France, and from *A. capillaris* in Korea (BMNH colln, leg W.H. Paik). Ovip. and al. males in England in Sept (BMNH colln, leg. H.L.G. Stroyan).

Coloradoa tadzhica Narzikulov

Apt. green, sometimes tinged with yellowish-pink; BL c.1.3 mm. On *Seriphidium* (= *Artemisia*) *ferganense* in Tadzhikistan (Narzikulov, 1958; as *Neaphis artemisiae*). Sexual morphs unknown.

Coloradoa tanacetina (Walker)

Figure 52d,e

Apt. yellowish green, with tips of ANT and tarsi dark; BL 1.1–2.0 mm. On *Tanacetum vulgare*, feeding on edges of leaves, and also recorded from *Dendranthema* spp. (Ossiannilsson, 1959) and *Leucanthemum vulgare* (BMNH colln, leg. H.L.G. Stroyan). In Europe, and introduced to USA (Halbert *et al.*, 2000). Ovip. and apt. males in Sept.

Coloradoa taurica (Mamontova-Solukha)

Apt. brown; BL c.1.1–1.2 mm. On *Artemisia* and *Seriphidium* spp. in Crimea, and also in Afghanistan (BMNH, leg. R. van den Bosch). Sexual morphs unknown.

Coloradoa viridis (Nevsky)

Figure 12l

Apt. green; BL 1.0–1.6 mm. On *Artemisia annua* in Iran, Azerbaijan, Mongolia (Szelegiewicz, 1963) and China (BMNH colln). Sexual morphs unknown. *C. kondoi* (Shinji) might be this species (as also might *C. nodulosa* and *C. procerae*, q.v.). $2n=16^*$.

Cryptaphis Hille Ris Lambers

Aphidinae: Macrosiphini

This genus includes one palaeartic and one nearctic species living concealed on the basal parts of Gramineae, and resembling *Metopolophium* except for their long, capitate hairs. The other three Asian species currently placed in this genus from Labiatae and Geraniaceae are generally similar to the grass feeders but have spinulose heads, and are perhaps closer to *Aulacorthum* (*Perillaphis*).

Cryptaphis bromi Robinson

Apt. shining brown; BL 1.2–1.6 mm. Al. have broad dark dorsal abdominal cross-bands. On *Bromus inermis*, feeding cryptically on brown stems at bases of plants. Canada (Manitoba). Mon. hol. with ovip. in Nov. $2n=16$.

Cryptaphis garwahlensis Bhattacharya, Mandal and Chakrabarti

Apt. color in life unrecorded; BL 2.1–2.4 mm. On *Lamium album*, causing curling and blistering of leaves. U.P., India.

Cryptaphis geranicola (Shinji)

Apt. yellowish brown to blackish, BL 1.7–2.1 mm. Al. have a solid dark dorsal abdominal patch (Miyazaki, 1971). On undersides of leaves of *Geranium* spp., causing heavy leaf-curl. Mon. hol. in Japan, and also recorded from Tajikistan (Narzikulov, 1975) and E Siberia (Pashtshenko, 1988a). $2n=14$.

Cryptaphis menthae Takahashi

Apt. blackish with mainly dark appendages; BL c.2.1 mm. Al. have broad dark abdominal cross-bands and large marginal sclerites. On Labiatae (*Isodon*, *Mentha*, *Plectranthus*), ‘crisping’ leaves, in Japan. Mon. hol.; fund. were found on *Isodon inflexus* (Miyazaki, 1971).

Cryptaphis poae (Hardy)

Plate 24c

Apt. very shiny, green mottled with red or yellowish with brown markings, to brownish black; BL 1.3–2.0 mm. Al. have broad dark dorsal abdominal partly fused cross-bands. In small colonies at bases of various

grasses (e.g., *Festuca*, *Holcus*, *Poa*) just below soil level, or under stones, usually in shady, damp situations. Widespread in Europe. Mon. hol., with ovip. and apt. males in Oct. $2n=20$.

Cryptaphis rostrata Chakrabarti and Raychaudhuri

Apt. pale brown (in life?); BL 1.2–1.5 mm. Al. have broad dark abdominal cross-bands and large dark marginal sclerites (BMNH colln, leg. S. Chakrabarti). Described from an unidentified Labiate plant, and subsequently found on *Plectranthus rugosus*. India (H.P.).

Cryptomyzus Oestlund

Aphidinae: Macrosiphini

About 17 Old World species associated with *Ribes* and/or Labiatae. Apt. have long ANT, swollen siphunculi, sec. rhin. on ANT III (except fundatrices), and long capitate hairs on body and often on ANT and legs. ANT I usually has an angular projection at its apex. Al. have a dark dorsal abdominal patch or cross-bands. Two species have been introduced into N America, presumably as eggs on *Ribes*. Accounts are available for Europe (Hille Ris Lambers, 1953; Heie, 1994), Kazakhstan (Kadyrbekov, 1993) and Japan (Miyazaki, 1971). The species were often included in earlier accounts of *Capitophorus*. Guldmond (1990, 1991a) reviewed the evolution of host plant relationships and life cycles, and Guldmond and Eggers-Schumacher (1989) studied allozyme differences.

Cryptomyzus alativica Kadyrbekov

Apt. greenish-yellow; BL 1.5–2.1 mm. On *Scutellaria* spp. in Kazakhstan.

Cryptomyzus alboapicalis (Theobald)

Apt. pale greenish, with a green spinal stripe, or yellowish with faint greenish cross-bands; BL 1.6–2.9 mm. On undersides of leaves of *Lamium album*, occasionally on *Ballota nigra*, and able to reproduce in the laboratory on *L. amplexicaule* and *L. purpureum*, but not on *L. maculatum* (Guldmond, 1991b). In N Europe, across to W Siberia and Caucasus. Mon. hol. with apt. males, or sometimes anhol. $2n=12$.

Cryptomyzus ballotae Hille Ris Lambers

Apt. green; BL 1.7–2.1 mm. On *Ballota nigra*, with records also from *Lamium album*, *Leonurus* sp., *Marrubium vulgare* and *Melittis melissophyllum*. The specimens from *Leonurus* sp. in UK (BMNH colln, leg. V.F. Eastop) have shorter antennal, femoral and rostral hairs and could be a distinct taxon. In W, C and S Europe, and possibly Pakistan, where it may be heter. hol. with a sexual phase on *Ribes orientale* (Naumann-Etienne and Remaudière, 1995). Probably anhol. in Europe; ovip. and al. males have been obtained in the laboratory, ovip. being produced on *Ribes alpinum*, although not found on this species in nature (Guldmond, 1991a). $2n=12$.

Cryptomyzus behboudii Remaudière and Davatchi

Apt. white; BL 1.3–1.6 mm. On undersides of the basal, densely hairy leaves of *Phlomis olivieri*. Iran and Turkey. Mon. hol. with ovip. and al. males in Sept–Oct (Tuatay and Remaudière, 1964).

Cryptomyzus galeopsidis (Kaltenbach)

Apt. pale greenish white, often with faint green spinal stripe; BL 1.3–2.6 mm. On undersides of leaves of *Ribes* spp., most commonly *R. nigrum*. Heter. hol., migrating to *Lamium* and *Galeopsis* (Labiatae), occasionally other Labiatae, and *Veronica* (Scrophulariaceae), where they live dispersed on undersides of leaves. Europe (incl. Iceland and Faroes), Russian Far East, and N America. Populations mon. hol. on *Ribes* in Europe have been distinguished as subspecies, *G. galeopsidis citrinus* Hille Ris Lambers which is lemon yellow and occurs on *R. rubrum*, and *G. galeopsidis dickeri* Hille Ris Lambers which is found only on *R. nigrum*. Guldmond (1990, 1991b) studied the genetic relationships between life cycle category and host preferences in this species complex (see also discussion by Heie, 1994). $2n=12$.

Cryptomyzus heinzei Hille Ris Lambers

Apt. color unrecorded; BL 1.6–1.8 mm. Described from *Clinopodium vulgare* in Germany, but Guldmond (1991a) considered that its normal sec. host is *Stachys officinalis*, on which it has been found in Spain,

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Germany, Hungary and Czech Republic. Host alternation occurs to *Ribes alpinum*. It is closely related to and difficult to distinguish morphologically from *C. ballotae* (Guldemon and Eggers-Schumacher, 1989).

***Cryptomyzus korschelti* Börner**

Apt. pale whitish green with some bright green mottling, or (on *Ribes*) rose pink to salmon red; BL 1.5–2.5 mm. Heter. hol., migrating from *Ribes alpinum* to undersides of leaves of *Stachys silvatica*, and also able to colonise certain *Lamium* spp. and *Galeopsis tetrahit*, although it may not occur naturally on these plants. On *Ribes* the aphids live in cavities beneath red or yellow leaf blister galls, which can persist late into summer, and may eventually produce small apt. males (Guldemon, 1990). Widely distributed in Europe, and eastward at least to C Asia (Narzikulov and Umarov, 1969 – and probably also Nevsky, 1929 – as *C. ribis*).

***Cryptomyzus leonuri* Bozhko**

Apt. whitish with a greenish tinge; BL c.1.8 mm. On *Leonurus cardiaca* in E Europe (Poland, Russia, Ukraine).

***Cryptomyzus (Alataumyzus) malkovskii* Kadyrbekov**

Apt. yellow-green with ANT and legs mainly brown, and brown SIPH; BL 2.1–2.6 mm. Heter. hol., migrating from *Ribes* spp. to *Stachyopsis lamiiflora* in Kazakhstan (Kadyrbekov, 2002e).

***Cryptomyzus maudamanti* Guldemon**

Apt. pale yellow to pale green, sometimes with a faint green spinal stripe; BL 1.1–2.3 mm. Heter. hol., migrating from *Ribes rubrum* to *Lamium galeobdolon*. Other *Lamium* spp. and *Galeopsis tetrahit* were colonised with reduced fecundity in the laboratory (Guldemon, 1991a). In England, Netherlands, Germany, Czech Republic and Italy (Barbagallo and Patti, 1998).

***Cryptomyzus (Phlomimyzus) multipilosus* Kadyrbekov**

Apt. pale green; BL 1.6–2.2 mm. On *Lamium album* and *Leonurus turkestanicus* in Kazakhstan (Kadyrbekov, 2000).

***Cryptomyzus ribis* (L.)**

Plate 22a, Figure 50a

Apt. very pale green to pale yellow or whitish; BL 1.2–2.6 mm. On *Ribes* spp., especially *R. rubrum*, living in concavities on undersides of leaves formed by brownish or purplish red blister galls. Heter. hol., migrating to leaves and stems of *Stachys* spp., with occasional records from other Labiatae. Europe, C Asia, E Siberia, Korea, Japan, China and N America. [However, both the host range and the distribution are uncertain due to confusion with subsequently described species, particularly in C Asia (*C. korschelti*) and the Far East (*C. taoi*).] 2n=12.

***Cryptomyzus (Ampullosiphon) stachydis* (Heikinheimo)**

Figure 50b

Apt. pale yellowish, whitish or pale green, with a spinal row of green spots; BL 2.7–3.1 mm. On young leaves of *Ribes* spp. in spring in N Europe, causing yellowish vein-banding. Heter. hol., migrating to undersides of leaves of Labiatae (*Galeopsis*, *Lamium*, *Stachys*). Stenseth (1971) studied its life cycle in Norway. 2n=12*.

***Cryptomyzus (Phlomimyzus) tadjikistanica* Narzikulov and Daniyarova**

Apt. green or pale green, ANT and legs dusky; BL c.2.1 mm. In small colonies on undersides of leaves of *Phlomis canescens* in Tajikistan.

***Cryptomyzus taoi* Hille Ris Lambers**

Color of apt. in life unrecorded, probably pale; BL c.2.0–2.3 mm. Described from *Marrubium supinum*, and also found on *Lamium album* var. *barbatum* (Miyazaki, 1971), *L. amplexicaule* and *Leonurus sibiricus*. In China, Mongolia, Japan, Korea and E Siberia. Heter. hol., with *Ribes* spp. (*burejense*, *fasciculatum* var. *chinense*) as primary hosts (Lee *et al.*, 2002c). 2n=12.

***Cryptomyzus transiliensis* Kadyrbekov**

Apt. pale green; BL 2.0–2.2 mm. On *Stachyopsis lamiiflora* in Kazakstan.

***Cryptomyzus ulmeri* (Börner)**

Apt. mid to darkish green with faint cross-bands on dorsal abdomen; BL 1.0–1.5 mm. On undersides of leaves of *Lamium maculatum*, and probably specific to this plant, although it can feed on *L. amplexicaule* and *L. purpureum* in the laboratory (Guldemon, 1991a). Mon. hol., with al. males. In W and C Europe.

***Cryptosiphum* Buckton**

Aphidinae: ?Macrosiphini

A genus for 8 or 9 rather small, broadly oval aphids with short appendages galling leaves of *Artemisia*, a habit that has resulted in reduction of appendages and other characters, so that their taxonomic affinities are uncertain, and they have been placed in either Aphidini or Macrosiphini by different authors. While normally reliable characters for Aphidini such as marginal tubercles on ABD TERG 1 and 7 are lacking, *C. artemisiae* has a very *Aphis*-like $2n=8$ karyotype. However, the latest revision, by Kadyrbekov (2002b), places *Cryptosiphum* in Macrosiphini. The genus extends from W Europe to E Asia, and from Siberia to S India and Burma, with most species in N Asia. Heie (1986) gave a brief generic diagnosis, and Ivanoskaya (1960) keyed the species of former USSR.

The taxonomy is difficult and, as with another xerophyte-associated genus with short appendages, *Brachyunguis*, the separate identity of several of the nominal species is suspect. The ANT of al. are considerably longer than of apt., but apt. specimens occur with ANT of intermediate length. The short appendages do not lie flat in slide preparations, and this magnifies errors of measurement. Populations in central and western Europe are easily separated (couplet 47 of Key A of *Artemisia*) into two host-specific species (*artemisiae* and *brevipilosum*), but apt. of this group from Asia are commonly intermediate in the characters that discriminate European apterae, although al. consistently have the lower number of sec. rhin. that is characteristic of *C. brevipilosum*.

***Cryptosiphum artemisiae* Buckton**

Plate 14g

Apt. dark red or brown to almost black, wax-powdered; BL 1.1–1.9 mm. In globular red or yellowish leaf galls on various *Artemisia* spp. throughout the palaeartic region. Mon. hol.; ovip. (with conspicuously swollen hind tibiae) and al. males occur in Sept–Oct in England (BMNH colln, leg. H.L.G. Stroyan, J.H. Martin). Several populations from China with ANT PT/BASE 1.05–1.30 (as opposed to 0.45 in fund. and 0.7–1.0 in summer apt. of *C. artemisiae* s. str.) have been described as a subspecies, *C. artemisiae* ssp. *linanense* Zhang, but are probably a distinct species, possibly *C. sieversianae* (q.v.). Chinese populations (of *C. artemisiae* s. str.) were heavily parasitised. $2n=8$.

***Cryptosiphum astrachanicae* Ivanoskaya**

Apt. broadly oval, BL c. 1.0–1.1 mm. In leaf galls on *Seriphidium* spp. in S Russia, and S and W Kazakhstan (Kadyrbekov, 2002b).

***Cryptosiphum brevipilosum* Börner**

Apt. broadly oval, brownish, wax-powdered, BL 1.1–1.3 mm. Distorting the shoots of *Artemisia campestris* in C and E Europe (Germany, Poland, Hungary, Ukraine), eastward to Kazakhstan (Kadyrbekov, 2002b). *C. atriplicivorum* Zhang, Chen, Zhong and Li on *Artemisia* sp. in China (Zhang *et al.*, 1999) is closely related or synonymous.

***Cryptosiphum dracunculum* Kadyrbekov**

Apt. brownish, thickly powdered with white wax; BL 1.1–1.5 mm. In leaf galls on *Artemisia dracunculus* in Kazakhstan (Kadyrbekov, 2002b).

***Cryptosiphum innokentyi* Ivanoskaya**

Apt. broadly oval, pale green, thickly wax-powdered; BL c. 1.3 mm. In cigar-shaped leaf galls on *Artemisia frigida* and another *Artemisia* sp. in Russia (Siberia: Kuznetskiy Alatau, Tuva).

***Cryptosiphum mordvilkoii* Ivanoskaya**

Apt. brownish, with thick white wax film; BL 0.9–1.2 mm. In oblong galls on *Artemisia* sp(p). in southern Urals and N Kazakhstan (Kadyrbekov, 2002b).

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Cryptosiphum sieversianae Ivanoskaya

Apt. yellowish green or brownish with thick white wax film; BL c.1.4 mm. In leaf galls on *Artemisia sieversiana* in S Russia (Kulundinskaya) and E Kazakstan (Kadyrbekov, 2002b). *C. artemisiae* ssp. *linanense*, recorded from several *Artemisia* spp. in China, could be large specimens of this aphid.

Ctenocallis Klodnitsky

Calaphidinae: Panaphidini

A genus for three species on Leguminosae with body of apt. bearing long finger-like marginal backwardly directed processes. These processes are also present in a much reduced form in al.

Ctenocallis dobrovljanskyi Klodnitsky

Apt. straw-colored with brown dorsal sclerites; BL c. 1.5 mm. On *Cytisus* spp., colonising young growth, leaves and leaf petioles. Recorded from W. Russia, Ukraine, W Kazakhstan, Czech Republic, Austria and N Italy. Mon. hol.; ovip. and small al. males were collected in Sept in Italy (BMNH colln, leg. H.L.G. Stroyan).

Ctenocallis israelicus Hille Ris Lambers

Apt. yellowish with brown to blackish brown dorsal sclerites; BL 1.5–1.7 mm. On leaves of *Calicotome* spp. in the Mediterranean area (France, Spain, Italy and Israel). Broza *et al.* (1992) noted that attacks by this aphid killed seedling plants after forest fires. $2n=16^*$.

Ctenocallis setosus (Kaltenbach)

Plate 4b

Apt. yellowish with brown dorsal sclerites; BL 1.5–1.6 mm. Feeding inconspicuously, flattened against the midribs, on the upper sides of leaves of *Cytisus* (= *Sarothamnus*) *scoparius*. In Europe (including UK) and N America (N Carolina, Ontario, NW Pacific region). Ovip. and al. males in Sept. $2n=18^*$.

Davatchiaphis Remaudière

Aphidinae: Macrosiphini

A genus for one very long-bodied species on *Phragmites*, somewhat resembling *Brachycolus* but with *Phorodon*-like processes on the ANT tubercles.

Davatchiaphis persica Remaudière

Plate 14e

Apt. pale green; BL 2.1–2.4 mm. On upper sides of leaves of *Phragmites australis* (var. *stenophyllus*) in Iran (Remaudière, 1964). Mon. hol. with ovip. and apt. males in Nov.

Decorosiphon Börner

Aphidinae: Macrosiphini

One distinctive moss-feeding species with long stiff hairs on appendages, spinulose head and swollen SIPH, as well as the pointed ANT PT and characteristically-shaped cauda of a moss-feeding aphid.

Decorosiphon corynothrix Börner

Plate 17a, Figure 44c

Apt. brownish green to brownish yellow; BL 1.4–1.9 mm. On basal parts of *Polytrichum* spp. growing in damp, shady situations. Also recorded from *Catharinaea* (= *Atrichum*) *undulata*. Europe and eastern N America. Anhol. Heinze (1953) provided full descriptions of apt. and al., and Müller (1973b) discussed its biology.

Defractosiphon Börner

Aphidinae: Macrosiphini

Two palaeartic species on Umbelliferae, related to *Hyadaphis* but with distinctive SIPH morphology.

Defractosiphon brevisiphon Mamontova

Plate 13c

Apt. mottled green with slight whitish pulverulence, head yellowish; BL 1.6–1.9 mm. Al. undescribed. On *Seseli* spp. (*campestre*, *elatum*, *osseum*) in Europe (specimens in BMNH colln from Czech Republic, France, Hungary, former Yugoslavia, Ukraine).

Defractosiphon franzi Börner

Figure 41a

Apt. shining green on dorsal abdomen, anteriorly yellowish brown; BL 1.8–2.8 mm. Described from *Seseli austriacum*, and subsequently found on *Peucedanum* spp., in rows on upper sides of leaflets with heads directed towards the petioles (Müller, 1973a, as *D. rugosus*). Infested leaves turn yellow. In Germany and Ukraine. Mon. hol. on *Peucedanum*, with ovip. and al. males in Oct.

***Delphiniobium* Mordvilko**

Aphidinae: Macrosiphini

Ten large species mostly associated with *Aconitum*, tending to have aposematic coloration and probably sequestering toxins from the host plant. They have remarkably large thoracic spiracles (Hille Ris Lambers, 1947a). Qiao and Zhang (2000) reviewed and keyed the Chinese species.

***Delphiniobium aconitifoliae* Zhang and Qiao**

Apt. red and yellow with mainly black appendages; BL c. 3.6 mm. On young shoots and upper sides of leaves of *Aconitum kusnezofii* in China. Mon. hol., with ovip. and al. males in Oct (Qiao and Zhang, 2000).

***Delphiniobium bogdouli* Szelegiewicz**

Apt. undescribed; al. shining brown, BL 3.7 mm. On *Aconitum barbatum* in Mongolia.

***Delphiniobium canadense* (Robinson)**

Apt. lemon yellow (immatures whitish); BL 2.1–2.6 mm. On *Lonicera involucrata* in western N America. Mon. hol., with ovip. and apt. males in Jun-Jul (BMNH colln, leg. C.-k. Chan). 2n=20*.

***Delphiniobium carpaticae* Mamontova**

Apt. whitish-green, with cauda and tips of SIPH dark; BL c.3.2 mm. On *Aconitum* spp. in Ukraine. Not clearly distinct from *D. lycoctoni* except in pigmentation.

***Delphiniobium. gyamdaense* Zhang**

Apt. yellow with black appendages; BL c.3.0–3.1 mm. On an *Aconitum* sp. in China and Tibet (Qiao and Zhang, 2000).

***Delphiniobium hanla* Paik**

Figure 6k

Apt. yellowish orange with mainly black appendages, SIPH yellowish orange basally and black distally; BL 3.1–3.8 mm. On *Aconitum* spp. and *Delphinium* spp. in Korea and E Siberia, colonising upper parts of flower stems (Pashtshenko, 1988a).

***Delphiniobium junackianum* (Karsch)**

Plate 25e, Figure 6h,i

Apt. bluish green, with mainly dark ANT, legs, SIPH and cauda; BL 2.9–4.7 mm. On *Aconitum* and *Delphinium* spp., forming colonies mainly on upper parts of stems and between flowers. In NW and C Europe, and east to W Siberia. Mon. hol., with ovip. and al. males in late Sept–Oct.

***Delphiniobium lycoctoni* Börner**

Figure 6j

Apt. yellowish, with pale ANT, legs and SIPH, cauda dark gray; 3.0–4.2 mm. On *Aconitum lycoctonum*, curling and spotting leaves. Austria, France, Italy. Very similar to *D. carpaticae* except for pigmentation.

***Delphiniobium ussuriense* Pashtshenko**

Apt. green, shiny, with dark appendages; BL c.3.6 mm. On upper parts of stems of *Artemisia sylvatica* in E Siberia (Primorskii) (Pashtshenko, 2000b). The generic placement of this species is uncertain.

***Delphiniobium yezoense* Miyazaki**

Apt. green or bluish green, with mainly pale, black-tipped appendages and a black cauda; BL 2.9–3.5 mm. On *Aconitum* spp. in Japan. Mon. hol., with ovip. and al. males in Oct (Miyazaki, 1971). 2n=12 (Chen and Zhang, 1985a).

***Diuraphis* Aizenberg**

Aphidinae: Macrosiphini

Nine or ten species of narrow-bodied wax-dusted with very short SIPH, mostly living in the rolled leaves of Gramineae. The group is possibly entirely palaeartic but was little known until *D. tritici* was described from Colorado, USA, in 1911, and there were serious outbreaks of *D. noxia* on barley in Russia in 1912. Subgenus *Holcaphis* differs from *Diuraphis* s. str. by lacking a process on ABD TERG 8. Accounts are available for NW Europe (Heie, 1992) and China (Zhang *et al.*, 1991b). Kovalev *et al.* (1991) provided a key to apt.

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Diuraphis (Holcaphis) agrostidis (Muddathir)

Apt. yellowish green, densely wax powdered, with head and appendages blackish; BL 1.7–2.6mm. In unfurled leaves of *Agrostis* spp., esp. *stolonifera*. Europe. Mon. hol. with ovip. and apt. males in late Sept–Oct (orig. descr.). 2n=12.

Diuraphis (Holcaphis) bromicola (Hille Ris Lambers)

Apt. undescribed, probably like ovip. which are pale green, powdered with gray wax, with head darker; BL 1.6–2.0mm. On *Bromus inermis* in E Europe (Germany, Russia). Mon. hol. with ovip. and apt. males in Sept–Oct (orig. descr.).

Diuraphis (Holcaphis) calamagrostis (Ossiannilsson)

Apt. pale yellowish with dark head and appendages, white wax-powdered; BL 1.5–2.5 mm. In swollen leaf sheaths and longitudinally-rolled leaves of *Calamagrostis* spp. N Europe (Sweden, Finland, Poland). Samples have also been collected from two *Carex* spp. (Heie, 1992), although these were possibly vagrants. Mon. hol. with ovip. in early Sept (orig. descr.).

Diuraphis (Holcaphis) elymophila Zhang

Apt. pale green, wax-powdered; BL c.2mm. On *Elymus dahuricus* in Mongolia. The description does not clearly distinguish it from *D. frequens* or *D. holci*.

Diuraphis (Holcaphis) frequens (Walker)

Apt. pale green, wax-powdered, with head darker, and blackish appendages; BL 1.3–2.1 mm. Usually colonising *Elymus repens*, bunching the still unfurled leaves and stopping growth. Also recorded from *Hordeum*, *Leymus*, *Lolium* and *Triticum*. Widespread in Europe, Asia (Turkey, Mongolia) and N America. Mon. hol. on *Elymus* with ovip. and apt. males in Oct (Hille Ris Lambers, 1939b). *Diuraphis (Holcaphis) elymophila* is probably a synonym. 2n=14.

Diuraphis (Holcaphis) holci (Hille Ris Lambers)

Apt. green, wax-powdered, with dark green head and appendages; BL 1.3–2.1 mm. Usual hosts are *Holcus* spp., but there are also records from *Agropyron* and *Poa*. Europe and N America. Mon. hol. on *Holcus* with ovip. in Oct. 2n=14.

Diuraphis mexicana (McVicar Baker)

Apt. yellow-brown with brown head and appendages, copiously covered in wax powder; BL 1.4–2.0mm. In rolled leaves of *Bromus* spp., and also found on *Dactylis glomerata* (Richards, 1959, as *Brachycolus nodulus*). Mexico, Colorado, USA (BMNH colln, leg. M. Stoetzel) and B.C., Canada. Peña-Martinez and Vera-Castello (1998) compared it with *D. noxia*. Mainly anhol. in Mexico, perhaps mon. hol. at higher latitudes. 2n=8*.

Diuraphis muehlei (Börner)

Apt. dirty yellowish, wax-powdered, with brownish head and appendages; BL 1.3–2.0mm. In rolled, yellowed leaves of *Phleum pratense*. Europe. Mon. hol. with apt. males (orig. descr.), ovip. in Oct (BMNH colln, paratypes, leg. C. Börner).

Diuraphis noxia (Kurdjumov)

Plate 13e

Apt. pale yellow–green or gray–green lightly dusted with white wax powder; BL 1.4–2.3 mm. On grasses and cereals (*Anisantha*, *Andropogon*, *Bromus*, *Elymus*, *Hordeum*, *Triticum*; see Kindler and Springer, 1989). Very injurious to wheat and barley; infested leaves are rolled into tubes and desiccated, and infested ears become bent. Of palaeartic origin, now widespread; S Europe, C Asia, Middle East, N Africa, Kenya, S Africa, Chile, Argentina, and introduced to N America in 1986. Mon. hol. with apt. males in cold temperate climates, probably anhol. elsewhere. There is a large literature; Puterka *et al.* (1993) studied worldwide genetic variation, and see Blackman and Eastop (2000) for other refs. Russian language literature was reviewed by Kovalev *et al.* (1991). 2n=10.

Diuraphis (Holcaphis) tritici (Gillette) (= *Diuraphis (Holcaphis) agropyronophaga* Zhang)
Apt. pale yellowish green with a powdery white coating of wax; BL 1.1–2.2 mm. In curled leaves of grasses, esp. *Agropyron occidentale* and *Elymus* spp., and also sometimes on *Triticum*. Described from N America (Colorado, Montana, Illinois); also in Peru (Wille, 1940) and E Asia (China, Tibet, Mongolia), where it possibly originated (Zhang *et al.*, 1991b, as *D. agropyronophaga*). Zhang *et al.* (1991b) noted that it was able to colonise wheat (*Triticum* sp.) in fields treated with 2,4-D herbicide, because this curls wheat leaves and thus provides a suitable microclimate for the aphid. Mon. hol. with ovip. and apt. males in Oct (Palmer, 1952). See Parker (1916) for an early account of the biology.

***Durocapillata* Knowlton**

Aphidinae: Macrosiphini

One western N American species of uncertain affinities with stiff capitate hairs and distinctive SIPH morphology.

***Durocapillata utahensis* Knowlton**

Plate 15b, Figure 21i

Apt. shining yellow-green with black tips to ANT, legs and SIPH; BL 1.3–1.5 mm. Curling leaves and distorting young growth of *Chrysothamnus viscidiflorus* in Idaho and Utah, USA. Mon. hol. with ovip. and apt. males in late Sept–Oct (Palmer, 1952).

***Dysaphis* Börner**

Aphidinae: Macrosiphini

An old world genus of c.100 species, characterised by a short cauda, often short SIPH, and frequent presence of spinal tubercles on head and ABD TERG 7 and 8. Most species host-alternate between Pyroidea and herbaceous plants in various families, especially Umbelliferae but also Campanulaceae, Compositae, Valerianaceae, Plantaginaceae and Polygonaceae. On their herbaceous hosts they usually live concealed at stem bases inside sheathing leaves, where they are attended and sheltered by ants. Some are mon. hol. on herbaceous plants. In subgenus *Pomaphis* the secondary host apt. differ substantially from those on the primary host, to some extent resembling apt. of small *Myzus*. Shaposhnikov (e.g., 1956, 1990) and Stroyan (1957a, 1963, 1985) worked extensively on this genus in Russia and UK, and there are accounts for Fennoscandia and Denmark (Heie, 1992) and India (Chakrabarti and Medda, 1993). Blackman and Eastop (1994) provided accounts and keys for the primary host forms. The numbers of sec. rhin. given in accounts below refer to al. (and in some cases apt.) produced in colonies on secondary hosts.

***Dysaphis acroptilidis* Daniyarova (or Narzikulov and Daniyarova)**

Apt. greenish brown, wax-dusted; BL c.2.6 mm. Sec. rhin. in al. III 35–40, IV 18–20. On *Acroptilon repens* in Tajikistan.

***Dysaphis allii* Daniyarova**

Apt. pale green, dusted with grayish wax; BL c.1.7 mm. On roots of a wild *Allium* sp. in Tajikistan.

***Dysaphis angelicae* (Koch)**

Apt. yellowish gray or greenish gray, wax-powdered; BL 1.7–2.2 mm. Sec. rhin. in al. III 46–87, IV 15–37, V 0–13. In lower leaf bases of *Angelica* spp., ant-attended. Europe, N America. Heter. hol., with sexual phase on *Crataegus*. 2n=12.

***Dysaphis angelicophaga* Zhang, Chen, Zhong and Li**

Apt. ivory-white, wax-dusted; BL c.1.8 mm. Sec. rhin. in al. III 61–67, IV 7–11, V 1–2. On roots of *Angelica sinensis*, ant-attended (and stated to be an important pest). Gansu Province, China (Xinglong mountains, 2170 m; Zhang, 1999). Not a typical *Dysaphis*; the hairy cauda suggests that it may be placed in the wrong genus.

***Dysaphis (Pomaphis) anisoidis* Barbagallo and Stroyan**

Apt. shining black dorsally and pruinose ventrally; BL 1.0–1.8 mm. At base of stem and on root collar of *Pimpinella anisoides* (Barbagallo and Stroyan, 1982). In France and Italy. Presumably mon. hol.;

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Stekolshtshikov (1998) distinguished populations in Armenia on *Pimpinella tripartita* as a subspecies, *D. anisoidis* ssp. *nairi*, collected fund. from this plant, and obtained ovip. and al. males in lab. cultures. Ant-attended.

Dysaphis annulata (Börner)

Only known from the holotype apt., described as from *Ranunculus*, but belonging to the *brancoi* group which is usually associated with *Valeriana*, so the original host record may have been in error (see Stroyan, 1963).

Dysaphis anthrisci Börner

Apt. bluish gray coated with wax powder; BL 1.9–2.3 mm. Sec. rhin. in al. III 42–67, IV 13–26, V 0–7. At leaf bases of *Anthriscus silvestris*, ant-attended. Europe. Heter. hol., with sexual phase on *Malus*. Populations migrating from *Malus* to *Anthriscus nemorosa* in Russia are regarded as a subspecies, *D. anthrisci* ssp. *majkopica* (Shaposhnikov, 1965), although aphids from *A. nemorosa* in Armenia show intermediate morphology (Stekolshtshikov and Lobanov, 2002). A closely related species, *D. ussuriensis*, lives all year round on *Anthriscus aemula* in east Asia and will key to *anthrisci* in the *Anthriscus* aphid key; it can only be distinguished by use of a complex discriminant function (Shaposhnikov and Stekolshtshikov, 1989). *D. brachycyclica*, *D. bunii*, *D. chaerophylli*, *D. chaerophyllina*, *D. devecta* and *D. radicola* are also very closely related species in Europe and C Asia, differing more in biology than in morphology; this group is reviewed by Stekolshtshikov and Lobanov (2002). $2n=12$ (incl. ssp. *majkopica*).

Dysaphis apiifolia (Theobald)

Apt. yellowish to greenish gray, wax-powdered; BL 1.6–2.4 mm. Sec. rhin. in al. III 45–99, IV 16–34, V 0–7. Forming dense colonies at leaf bases of various Umbelliferae (*Anethum*, *Ammi*, *Apium*, *Conium*, *Foeniculum*, *Laserpitium*, *Levisticum*, *Petroselinum*, *Peucedanum*, *Ptychotis*, *Smyrnum*), attended and sheltered by ants. A world-wide pest of celery and parsley (Eastop and Blackman, 2000). Heter. hol. in N and C Europe, with sexual phase on *Crataegus* ('ssp. *petroselini*', for which *Petroselinum* may be the preferred secondary host; see Stroyan, 1963). The more widely-distributed form ('*D. apiifolia* s.str.') occurs in Middle East, C Asia, Africa, Mauritius, Australia, N and S America, and is mostly anhol., but may be partially heter. hol. in the Mediterranean basin (Stroyan, 1985). $2n=12$.

Dysaphis armeniaca Shaposhnikov

Apt. greenish–pinkish brown, slightly shiny on dorsal surface; BL c.1.5 mm. Heter. hol. between *Malus* spp. and an unknown secondary host in Armenia (Shaposhnikov, 1986). *Ligusticum alatum* elicited a settling response from spring migrants, but colonies did not survive on this plant, so the secondary host could be a related species.

Dysaphis atina A.K. Ghosh, R.C. Basu and Raychaudhuri

Color of apt. in life not recorded; BL 1.8–2.6 mm. On *Cnicus wallichii* in N India (H.P., U.P., Jammu and Kashmir), Pakistan (Murree: BMNH colln, leg. M.A. Ghani), and also in Iran on *C. arvensis* (BMNH colln, leg. R. van den Bosch). The host plant of the Jammu and Kashmir specimens was recorded as a *Carduus* sp. (perhaps being used in the broader sense to include *Cirsium*). Al. was described by Chakrabarti and Medda (1993).

Dysaphis (Pomaphis) aucupariae (Buckton)

Apt. pinkish or reddish yellow, SIPH with dark tips and brownish patches around bases; BL 1.1–2.0 mm. Sec. rhin. in al. III 42–58, IV 10–24, V 0–6. On undersides of leaves of *Plantago* spp., especially *P. lanceolata*, in grooves between veins. Ant-attended. Europe, the Azores, Australia (Carver and Hales, 1983), New Zealand (BMNH, leg. J. Farrell), USA (Washington; BMNH, leg. S.E. Halbert). Heter. hol., with sexual phase on *Sorbus*. $2n=12^*$.

Dysaphis bonomi (Hille Ris Lambers)

Apt. pale to dull grayish green with dark dorsal bands or patches, wax-dusted; BL 1.2–2.5 mm. Sec. rhin. in apt. (usually alatiform) III 0–33, IV 1–12, V 0–1, in al. III 27–43, IV 6–13, V 0–3 (III and IV sometimes fused in both morphs). On basal parts of *Pastinaca sativa*, attended by ants. Europe. Mon. hol. with apt. males.

Dysaphis brachycyclica Shaposhnikov

Apt. probably pinkish gray, wax-dusted; BL c.2.6–3.0 mm. On basal parts of *Chaerophyllum bulbosum* in Russia (northern Caucasus), Ukraine and Armenia, and also found on *Ch. hirsutum* and *Ch. temulum* in Germany (Shaposhnikov, 1965). Heter. hol., with sexual phase on *Malus*; the return migration occurs in mid- to late July. Regarded as a subspecies of *D. flava* by Stekolshchikov and Lobanov (2002), which seems to differ only in general body size across all morphs. Also closely related to *D. chaerophyllina* (q.v.); the characters given to separate these two species in the key to *Chaerophyllum* aphids may not be reliable for all specimens and/or all populations.

Dysaphis brancoi (Börner)

Apt. dark gray or yellowish-greenish gray dusted with wax powder, imm. pale to pinkish gray; BL 1.9–2.5 mm. Sec. rhin. in apt. (normally alatiform) III 0–10, IV 5–25, V 0–5, in al. At bases of stems and on shallow roots of *Valeriana* spp., esp. *officinalis*, attended by ants. Europe, C Asia (Kazakhstan), India (Chakrabarti and Medda, 1993) and E Siberia. Heter. hol., with sexual phase on *Malus*. Populations in UK show certain differences from those in continental Europe and are regarded as a subspecies, *B. brancoi* ssp. *rogersoni* Stroyan. The E Siberian populations also host-alternate from *Malus* to *Valeriana* but are even more distinct (*D. brancoi* ssp. *malina* Shaposhnikov and Stekolshchikov), and should perhaps have separate species status. In continental Europe there are a group of closely related taxa that are mon. hol. on *Valeriana* (see *D. leefmansii*).

Dysaphis (Pomaphis) brevirostris (Börner)

Apt. pale brown, with brown SIPH; BL 1.2–1.6 mm. Sec. rhin. in al. III 30–40, IV 8–12, V 4–6. On *Campanula rotundifolia* and *Jasione montana* in W Europe (UK, Germany). Mon. hol. or anhol. on Campanulaceae. A member of the *D. sorbi* group; Barbagallo and Patti (1994) key the 3 European spp. on Campanulaceae.

Dysaphis bunii Shaposhnikov

Apt. not described from life but probably bluish or pinkish gray, wax-powdered, with dark dorsal abdominal cross-bands; BL c.2 mm. On *Bunium* sp. in W Turkmenia. Heter. hol., with *Malus pumila* as primary host (Shaposhnikov, 1956). A member of the *D. anthriscii* group.

Dysaphis candicans (Passerini)

Apt. whitish, wax-dusted; BL unknown. At base of stem and on root collar of *Orobranche ramosa* in Italy (Bologna). Not recorded since original description; see Stroyan (1963).

Dysaphis capsellae (Mordvilko ex Nevsky)

Apt. color in life unknown; BL c.1.7 mm. On radical leaves of *Capsella bursa-pastoris* in C Asia. A member of the difficult *D. foeniculus* group; Stroyan (1985) noted that members of this group as well as other *Dysaphis* spp. may use *Capsella* as a ‘reserve host’, but Shaposhnikov (1987a) subsequently provided a key with some discriminants, treating *capsellae* as a subspecies of *foeniculus*.

Dysaphis caucasica Shaposhnikov

Apt. probably grayish pink, wax-dusted, BL not recorded. On a *Chaerophyllum* sp. (? *C. aureum*) in Russia (Transcaucasia). Life cycle unknown.

Dysaphis centaureae (Börner)

Apt. appearance in life unrecorded; BL 1.4–1.6 mm. On roots and rhizomes of *Centaurea* spp. C and E Europe (Austria, Czech Republic, Ukraine). Mon. hol. acc. to Börner (1952).

Dysaphis cephalariae Narzikulov

Apt. dirty green, with grayish-green wax pulverulence; BL c.1.9 mm. On rhizomes of *Scabiosa soongorica* in Tajikistan (Narzikulov and Daniyarova, 1990).

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Dysaphis cephalarioides Shaposhnikov

Apt. dirty greenish brown, bluish gray or bluish green, without dorsal pulverulence; BL c.1.5 mm. On stem bases and root collars of *Cephalaria* spp. in S Ukraine and Armenia. Mon. hol.; ovip. and al. males were obtained on *C. gigantea* in September (Stekolshtshikov, 1998).

Dysaphis chaerophylli (Börner)

Apt. grayish pink, wax-dusted, BL 1.5–2.6 mm. Sec. rhin. in al. III 47–73, IV 15–25, V 0–4. On roots, stems and leaf bases of *Chaerophyllum* spp., attended by ants. W, C and E Europe. Heter. hol., with sexual phase on *Malus*.

Dysaphis chaerophyllina Shaposhnikov

Apt. presumably grayish pink, wax-dusted; BL 2.4–3.2 mm. On basal parts of *Chaerophyllum maculatum* and, in some areas, *C. bulbosum*. Russia (N Caucasus), Armenia and Ukraine (Crimea). Heter. hol., with sexual phase on *Malus*. Shaposhnikov (1990) and Stekolshtshikov and Lobanov (1990) compared life cycle and morphology of this species with the closely-related *D. brachycyclica*. See also Blackman and Eastop (1994). 2n=12.

Dysaphis cnidii Shaposhnikov and Stekolshtshikov

Apt. pale greenish gray, wax-dusted; BL 1.4–1.63 mm. In ant shelters at bases of lower leaves of *Cnidium ajanense* in E Siberia (Shaposhnikov and Stekolshtshikov, 1989). Life cycle unknown. One of a group of species with long ANT hairs living on Umbelliferae in E Asia, closely related to *D. mordvilkoii* and probably with *Malus* as primary host.

Dysaphis cousiniae Narzikulov

Apt. wax-powdered, BL 2.2–3.1 mm. On basal parts of *Cousinia* spp., *Handelia trichophylla* and *Arctium majus* in Tajikistan (Stroyan, 1985). A variant population was described as a subspecies, *D. cousiniae minor*.

Dysaphis crataegi (Kaltenbach)

Apt. yellowish gray or greenish gray, wax-powdered; BL 1.4–2.5 mm. Sec. rhin. in al. III 31–89, IV 4–30, V 0–4. In dense ant-attended colonies on basal parts of various Umbelliferae. Heter. hol., with sexual phase on *Crataegus*, or anhol. on secondary hosts in warmer regions or where introduced. Europe, Middle East, C Asia and USA. In Europe three subspecies with different secondary host associations are recognised: (1) *D. crataegi* s.str. preferring *Daucus carota*, but also sometimes on *Myrrhis* and *Anthriscus*; (2) *D. crataegi* ssp. *kunzei* (Börner) preferring *Pastinaca sativa*; and (3) *D. crataegi* ssp. *aethusae* (Börner) preferring *Aethusa cynapium* and *Torilis japonica*. In SW Asia two further subspecies are recognised; (4) *D. crataegi* ssp. *heraclei* Shaposhnikov and Moralev migrating from *Crataegus orientalis* to *Heracleum pastinacifolium*; and (5) *D. crataegi* ssp. *pallida* with an unknown secondary host. All these taxa are part of a larger group (subgenus *Crataegaria* Shaposhnikov) that includes *angelicae*, *apiifolia*, *laserpitii*, *lauberti* and (possibly) *ranunculi*. Stroyan (1958, as *Sappaphis*) studied relationships within the group, and suggested that occasional hybridisation between species may be occurring. 2n=12 (on *Daucus*).

Dysaphis crithmi (Buckton)

Apt. gray to greenish gray, wax-powdered; BL 1.7–2.2 mm. In sheathing leaf-bases of *Crithmum maritimum* growing in sheltered situations such as rock clefts, crevices in sea-walls, etc. (Stroyan, 1963). In W and S Europe, including Iberian peninsula and Mediterranean islands (Corsica, Malta, Cyprus). Apparently completely anhol.

Dysaphis deltoidei Shaposhnikov and Stekolshtshikov

Apt. pink-gray with gray-brown cross-bands, dusted with white wax; BL 1.6–1.9 mm. On roots and stem-bases of *Peucedanum deltoideum* in E Siberia. Heter. hol. with sexual phase on *Malus mandshurica* (Stekolshtshikov, 1998).

***Dysaphis emicis* (Mimeur)**

(= *Sappaphis albocinerea* Hille Ris Lambers, = *Dysaphis rheicola* Daniyarova)

Apt. gray-green with dark gray patch on prothorax and dark cross-bands on posterior abdominal tergites; BL 1.5–3.1 mm. On roots (sometimes deep down) of Polygonaceae (*Emex*, *Rheum*, *Rumex*) in Europe, N Africa, Middle East, C Asia, India, Pakistan, China and Brazil. Also recorded from *Mesembryanthemum* spp. (in Madeira; Ilharco, 1984) and *Pedicularis olgae* (in Tajikistan; Stroyan, 1985). Mon. hol. on *Rumex acetosella* in Netherlands, with ovip. and apt. males in Oct. (Hille Ris Lambers, 1956a, as *Sappaphis albocinerea*), but with widely distributed anhol. populations in warmer climates.

***Dysaphis eremuri* (Narzikulov)**

Apt. dark brown mottled with gray wax; BL c.2.3–2.4 mm. In large colonies on root collars of *Eremurus* spp. in C Asia (Tajikistan, Uzbekistan). The Uzbekistan population had a shorter rostrum and was distinguished as a subspecies, *D. eremuri* ssp. *baisunensis* (Narzikulov).

***Dysaphis ferulae* (Nevsky)**

Apt. pale brown, with small dark brown spots on dorsal abdomen, dusted with gray wax; BL 2.0–2.8 mm. On *Ferula* spp. in C Asia. Stroyan (1985) pointed out that this species must be closely related to *D. foeniculus*; Shaposhnikov (1987b) re-examined type specimens of *D. ferulae* and provided comparative data.

***Dysaphis flava* Shaposhnikov**

Apt. grayish green or brownish; BL 1.4–2.6 mm. On root collar of *Chaerophyllum bulbosum*. NW and SE Russia, W and E Kazakhstan. Heter. hol., with sexual phase on *Malus*, the return migration occurring in mid- to late July as in the closely-related *D. brachycyclica*, which is regarded as a subspecies by Stekolshnikov and Lobanov (2002).

***Dysaphis foeniculus* (Theobald)**

Plate 11a

Apt. gray-green lightly dusted with wax; BL 1.6–2.3 mm. In dense colonies on basal parts of various Umbelliferae, incl. *Anethum*, *Apium*, *Daucus*, *Foeniculum*, *Ferula*, and also recorded occasionally from *Rumex*. In S Europe, Mediterranean area, Middle East, C Asia, India, Pakistan, Africa, Australia, New Zealand, N and S America. *D. foeniculus* s. str. is apparently anhol. everywhere, but in C Asia there is a closely related heter. hol. form with a sexual phase on *Malus*, treated as a subspecies by Shaposhnikov (1987a), *D. foeniculus* ssp. *malidauci*, and migrating to a similar range of secondary hosts. Stroyan (1985) and Shaposhnikov (1987a,b) reviewed the complex of species and/or subspecies around *D. foeniculus*, which includes *capsellae*, *ferulae* and *pulverina*. 2n=12 (incl. *malidauci*).

***Dysaphis (Pomaphis) gallica* (Hille Ris Lambers)**

Apt. dark mottled blackish green, usually with a reddish tinge at bases of SIPH; BL 1.2–1.6 mm. Sec. rhin. in al. III 54–92, IV 16–35, V 0–8. Described from *Antirrhinum majus* in Israel, and subsequently recorded from *Linaria vulgaris* in UK, France, Switzerland, Italy (Stroyan, 1957a), and *Veronica anagallis-aquatica* in Sicily (Patti, 1983). Heter. hol. in N Germany; the primary host is unconfirmed, but in experimental transfers gynoparae produced numerous ovip. on *Cotoneaster tomentosus* (Müller, 1968b).

***Dysaphis handeliae* Daniyarova (or Narzikulov and Daniyarova)**

Apt. pale brown, with wax; BL c.2.0–2.1 mm. On basal parts of *Handelia trichophylla* in Tajikistan.

***Dysaphis (Pomaphis) henrystroyani* Barbagallo and Patti**

Apt. pale greenish, with ANT, legs, SIPH and cauda mostly pale (imm. salmon-pink); BL 1.4–1.8 mm. Sec. rhin. in al. III 27–41, IV 8–14, V 4–8. On leaves, tender stems and flowers of *Trachelium coeruleum*, leaves becoming curled and twisted. Not ant-attended. Only known from Sicily. Possibly anhol. Closely related to *D. sorbi* and *D. brevirostris*.

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Dysaphis hirsutissima (Börner)

Apt. bluish green with dark dorsal pattern of paired sclerites and cross-bands; BL 1.5–2.3 mm. Sec. rhin. in al. III 33–74, IV 19–36, V 1–11. On stem bases and in leaf sheaths of *Anthriscus sylvestris*, ant-attended. Europe. Mon. hol., males so far undescribed. 2n=12.

Dysaphis hissarica Daniyarova

Apt. greenish-yellow tinged with brown; BL c.2.4 mm. On *Ferula ovina* in C Asia.

Dysaphis lappae (Koch)

Apt. dirty olive greenish to brownish, sometimes with a purple tinge, and older adults may have yellowish margins to abdomen; BL 1.7–2.5 mm. Sec. rhin. in al. III 37–55, IV 9–19, V 0–1. On stem bases, root collars and roots of *Arctium* spp., ant-attended. Also recorded from *Petasites alba*. In Europe, Transcaucasia, C Asia and W Siberia; also N Africa (Egypt, Eritrea), and (ssp. *cynarae*) introduced to S America (Brazil). Mon. hol. on *Arctium*, with ovip. and al. males in September. Very similar aphids on *Cirsium arvense* in Europe and on *Cynara* spp. in the Mediterranean region are currently classified as subspecies, ***D. lappae* ssp. *cirsii*** (Börner) and ***D. lappae* ssp. *cynarae*** (Theobald) respectively. The former subspecies is possibly a synonym of the C Asian *D. radicevorans*. Colonies of *D. lappae cirsii* are reportedly not ant-attended (Stroyan, 1963). In Sicily, anhol. populations of *D. lappae cynarae* have also been found on *Cirsium syriacum*, *Lupsia galactites* and *Silybum marianum* (Barbagallo, 1974).

Dysaphis laserpitii (Börner)

Apt. yellowish gray or greenish gray, wax-dusted; BL 2.1–2.2 mm. On *Laserpitium latifolium* in Europe (Germany, France, Sweden, Poland, Austria). Heter. hol. with sexual phase on *Crataegus* (Heie, 1992).

Dysaphis lauberti (Börner)

Apt. pinkish-gray to greenish gray, wax-powdered; BL 1.7–2.6 mm. Sec. rhin. in al. III 46–93, IV 11–40, V 0 (–5). In ant-attended colonies in lower leaf bases and on root collar of Umbelliferae, typically *Heracleum sphondylium* but also sporadically on *Conium*, *Foeniculum*, *Pastinaca* and *Smyrnum*. Europe (UK, Netherlands, Germany, Spain). Similar aphids collected on *Heracleum lehmannianum* in Tajikistan show some differences from European populations (Stroyan, 1985). Some samples from *Pastinaca* in UK have shorter, blunter ANT hairs and could be hybrids between *lauberti* and *crataegi* (Stroyan, 1963). Heter. hol., with sexual phase on *Crataegus* (a member of the *crataegi* group).

Dysaphis leefmansi (Hille Ris Lambers)

Apt. pale green to olive with a brownish dorsal sclerotic pattern; BL 1.8–2.2 mm. On roots of *Valeriana officinalis* in ants' nests in Europe. Mon. hol. with al. males. Müller (1961) described German populations as a distinct species (*krumbholzi*), but Shaposhnikov and Stekolshtshikov (1994) compared populations from Netherlands, Germany and Russia (St Petersburg), and gave the German and Russian populations subspecies status (***D. leefmansi* ssp. *krumbholzi*** Müller and ***D. leefmansi* ssp. *valentinae*** Shaposhnikov respectively). Apt. of the three forms are less easily distinguished than other morphs (fund., al. vivip., ovip. and males; see keys in Shaposhnikov and Stekolshtshikov, 1994).

Dysaphis libanotidis Shaposhnikov

Apt. dark gray with slight greenish tinge, slightly pulverulent; BL not given. On *Seseli* (= *Libanotis*) *montanum* in Russia (N Caucasus). *D. seselii* may be this species.

Dysaphis ligulariae Narzikulov

Apt. greenish gray, wax-covered; BL c.2 mm. On *Ligularia* spp. in Tajikistan (Narzikulov and Daniyarova, 1990).

Dysaphis (Pomaphis) maritima Hille Ris Lambers

Apt. brownish or pinkish yellow or pinkish red, with dark tips to appendages; BL 1.8–2.1 mm. Sec. rhin. in al. III 25–49, IV 5–12, V 0–4. On aerial parts of *Plantago* spp. in coastal areas, not usually ant-attended. NW Europe, Iceland. Mon. hol. with al. males. 2n=12*.

Dysaphis (Cotoneasteria) microsiphon (Nevsky)

Plate 11d

Apt. greenish yellow, probably somewhat waxy; BL c.2.1–2.3 mm. In spring slightly rolling leaves of *Cotoneaster* spp., then migrating to roots of herbaceous plants in several different families including Labiatae (*Clinopodium*, *Mentha*), Rosaceae (*Fragaria*, *Geranium*), Compositae (*Cnicus*, *Artemisia*, *Taraxacum*) and Scrophulariaceae (*Mazus*, *Pedicularis*, *Veronica*). In Ukraine, Iran, Georgia, Turkmenia, Tajikistan, Uzbekistan, Pakistan and NW India. Chakrabarti and Medda (1993) compared the morphology of populations on different hosts. The extent of the dorsal sclerotic pattern in apt. on secondary hosts varies greatly between populations. $2n=12$.

Dysaphis mirabilis (Nevsky)

Apt. yellowish with dark brown cross-band on last abdominal tergite; BL c.2.7 mm. Forming large colonies in curled leaves of *Ferula* spp. in C Asia. A member of the difficult *D. foeniculus* species complex; Shaposhnikov (1987b) suggested synonymy with *D. ferulae*.

Dysaphis mordvilkoii Shaposhnikov

Described from *Malus* spp. in E Siberia (see Blackman and Eastop, 1994). Possibly migrating to basal parts of *Seseli* (= *Libanotis*) *seseloides*, but apt. exules are undescribed and the life cycle needs confirmation (Shaposhnikov, 1986). Specimens from *Cnidium monnieri* in China (Beijing; BMNH, coll. V.F. Eastop) may also be this species.

Dysaphis munirae Shaposhnikov

Apt. color unknown; BL 2.0–2.4 mm. Unlike many *Dysaphis*, the first tarsal taxonomy is not 3,3,2 but 3,3,3 (i.e., HT I has a sense peg). On *Scaligera bucharica* in Tajikistan. Heter. hol., with a sexual phase on *Crataegus pontica*.

Dysaphis narzikulovi Shaposhnikov

Apt. pale brown, with wax; BL c.2.4–2.5 mm. On basal parts of *Arctium leiospermum* in Tajikistan (Narzikulov and Daniyarova, 1990).

Dysaphis neostroyani Ilharco

Apt. greenish gray with wax powder; BL 1.5–1.9 mm. On stems and leaves of *Ophrys fusca* in Portugal, and on *Orchis* sp. in France. Stroyan (1985) summarised its distinguishing characters. Bozhko (1976a) recorded a *Dysaphis* on *Orchis* in Ukraine which might be this species.

Dysaphis newskyi (Börner)

Apt. pinkish to lilac gray, wax-powdered; BL 1.5–2.7 mm. Sec. rhin. in apt. (all alatiform) III 4–55, IV 0–20, V 0–3; in al. III 42–69, IV 11–24, V 0–5 (in one al. of ssp. *aizenbergi* from Finland III 33–35, IV 8–10, V 2). In ant-attended colonies in basal leaf sheaths and on root collar of *Heracleum* spp. in Europe (UK, Austria). Mon. hol. with apt. males. Short-haired vicariant forms on *Angelica* spp. in Sweden, and on *Heracleum sibiricum* in N Russia and Finland, are currently regarded as subspecies, *D. newskyi* ssp. *ossian-nilssoni* Stroyan and *D. newskyi* ssp. *aizenbergi* (Shaposhnikov) respectively. $2n=12$ for ssp. *aizenbergi*.

Dysaphis oreoselini Szelegiewicz

Apt. pale greenish to whitish yellow, without wax; BL 1.5–2.0 mm. In Poland, especially in southern steppes, living on roots and basal parts of *Peucedanum oreoselinum*, not attended by ants. Mon. hol., with apt. males (orig. descr.).

Dysaphis papillata (Nevsky)

Apt. cream–yellow, with black dorsal spots, and cross-bands on posterior abdomen; BL c.2.3 mm. On leaves of *Cachrys* (as *Prangos*) *pubularia* and *Prangos bucharica* in C Asia. A member of the difficult *D. foeniculus* species complex; Shaposhnikov (1987b) suggested synonymy with *D. ferulae*.

Dysaphis (Pomaphis) pavlovskyana Narzikulov

Color and size of apt. on secondary host not reported. Migrating from *Sorbus* spp. to flowerstalks and flowers of *Hesperis matronalis* in western Siberia (Ivanoskaya, 1977). *Plantago* sp. is also recorded as a secondary

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host by Stekolshstshikov (1998). Originally described (from *Sorbus*) in Tajikistan. Chakrabarti and Medda (1993) described aphids migrating from *Sorbus* to *Saussuria piperithera* in India as a subspecies, *D. pavlovskyana* ssp. *indica*; which probably deserves full species status. $2n=12$ (Khuda-Bukhsh and Pal, 1983).

Dysaphis peucedani Szelegiewicz

Apt. greenish white, with blackish ANT, legs and SIPH, wax-powdered; BL 1.8–2.6 mm. On roots of *Peucedanum oreoselinum*, attended by ants. In Hungary and Rumania (Holman and Pintera, 1981, as *Dysaphis* sp. ?*uralensis*).

Dysaphis physocaulis Shaposhnikov

Apt. dark gray–green coated with white wax; BL 1.8–2.4 mm. Sec. rhin. in al. (gyn.) III 48–55, IV 18–24, V 0–2. On *Myrrhoides* (= *Physocaulis*) *nodosa* in Crimea. Heter. hol. with sexual phase on *Malus*. The parthenogenetic phase is abbreviated, gynoparae being produced and migrating back to apple in June (Shaposhnikov, 1990).

Dysaphis pimpinellae Shaposhnikov

Apt. brown, green, yellowish or pink-green, pruinose ventrally; BL 1.8–2.2 mm. At bases of lower leaves of *Pimpinella* sp., in ant shelters, and on roots of *P. aromatica* (Shaposhnikov, 1986). In S Russia (Armenia, Georgia). Life cycle unknown.

Dysaphis (Pomaphis) plantaginea (Passerini)

Plate 11c

Apt. pinkish or reddish yellow, with dark-tipped SIPH; BL 1.4–1.7 mm. Sec. rhin. in al. III 54–92, IV 16–40, V 1–11. In ant-attended colonies on undersides of leaves of *Plantago* spp., especially *lanceolata*. Europe, N Africa, Asia, N and S America. Heter. hol., with sexual phase on *Malus*, where it is an important pest (Blackman and Eastop, 2000). In E Asia (Japan, Taiwan) there are populations on *Plantago* that are morphologically indistinguishable from *plantaginea*, but they have a different feeding site, at the bases of leaf petioles, and there are no records from apple, suggesting that a distinct species, for which the name *D. plantagifoliae* (Shinji) is available, occurs in that region. $2n=12$.

Dysaphis (Pomaphis) plantaginis (Pašek)

Apt. whitish or yellowish, with dark-tipped appendages; BL c.2 mm. On roots and leaf bases of *Plantago* spp. in Slovakia. Al. unknown.

Dysaphis pseudomolli Narzikulov

Apt. dark bluish green dusted with gray wax; BL c.1.4–1.8 mm. On basal parts of *Cousinia pseudomollis* in Tajikistan.

Dysaphis pulverina (Nevsky)

Apt. pale green to greenish yellow, densely covered with bluish mealy wax; BL 1.8–2.4 mm. Sec. rhin. in al. III 19–36, IV 0–9. On upper and lower sides of leaves of *Plantago* sp. in C Asia (Nevsky, 1929), and also recorded from Iran on *Veronica persica* and *Ceratocephalus falcatus* as well as *Plantago* (Stroyan, 1972a, as ssp. *iranica*, synonymised with *pulverina* by Shaposhnikov, 1987a). Very close to *D. foeniculus*, and treated as a subspecies of *foeniculus* by Shaposhnikov (1987a).

Dysaphis (Pomaphis) pyri (Boyer de Fonscolombe)

Figure 29d

Apt. pink to reddish brown, powdered with gray wax; BL 1.0–1.4 mm. Sec. rhin. in al. III 15–60, IV 6–22, V 0–8. Feeding at or below ground level on roots and prostrate stems of *Galium* spp. and sometimes other Rubiaceae (*Asperula*, *Rubia*). Europe, N Africa, Middle East, C Asia, N India, Nepal and Pakistan. Heter. hol., with sexual phase on *Pyrus*, and sometimes *Cydonia*. Kolesova (1974) gave a detailed account of its life history in Crimea. $2n=12$.

Dysaphis radicivorans (Nevsky)

Apt. yellowish green, with brown head, prothorax and dorsal cross-bands on posterior abdominal tergites; BL 1.8–2.2 mm. On roots of Compositae (*Cirsium*, *Sonchus*) in C Asia (Shaposhnikov, 1956). Closely related to

Dysaphis lappae ssp. *cirsii* in Europe, but longer-haired (judging from the redescription of *radicivorans* by Narzikulov and Daniyarova, 1990, which differs in several respects from Nevsky's original account).

Dysaphis radicola (Mordvilko) Figure 2a
Apt. greenish gray to leaden gray, wax-powdered; BL 1.5–2.6 mm. Sec. rhin. in al. III 31–53, IV 7–16, V 0–1. On roots of *Rumex* spp., ant-attended. Europe, and introduced to USA and Australia. Mon. hol. with sexual phase on *Malus* in continental Europe, but also commonly anhol. on *Rumex*. A short-haired form in Russia was described as a subspecies, *D. radicola* ssp. *meridialis* Shaposhnikov; similar short-haired populations occur in Greece, Spain and Portugal. An anhol. population in Georgia was described as a subspecies, *D. radicola* ssp. *anholocyclica*, by Stekolshtshikov and Lobanov (2002). 2n=12.

Dysaphis ranunculi (Kaltenbach) Figure 45c
Apt. mottled gray-green, brownish around SIPH bases, wax-dusted, with variable darker sclerotisation; BL 1.7–2.3 mm. Sec. rhin. in (mostly alatiform) apt. III 0–26, IV 0–13, V 0–5, in al. III 40–71, IV 13–30, V 0–11. On basal parts of *Ranunculus* spp., ant-attended. Europe and C Asia. Heter. hol. with sexual phase on *Crataegus*.

Dysaphis rara Shaposhnikov
Described from ovip.; BL c.1.8 mm. On *Capsella bursa-pastoris* in Ukraine, and possibly apt. vivip. collected in Czech Republic (Stroyan, 1985: 351; Holman, 1991c) are this species (although other short-haired *Dysaphis* may also be using *Capsella* as a reserve host). Presumably mon. hol. on *Capsella*; ovip. in late Sept (orig. descr.).

Dysaphis (Pomaphis) reaumuri (Mordvilko) Figure 29e
Apt. grayish green, with rust-red spots around SIPH, lightly wax-dusted; BL 1.0–1.5 mm. Sec. rhin. in al. III 29–42, IV 4–12, V 0–4. At stem bases and on roots of *Galium* spp., esp. *mollugo*, attended by ants. Heter. hol. with sexual phase on *Pyrus* (see Blackman and Eastop, 1994, 2000). S Europe and C Asia. Kolesova (1974) gave a detailed account of its life history in Crimea. 2n=12.

Dysaphis rumecicola (Hori)
Apt. milky white, pale green or dark purplish brown, wax-dusted; BL 2.2–2.6 mm. On *Rheum* and *Rumex* spp., at bases of stems sheltered by ants. In Japan (Miyazaki, 1971), Korea (Lee *et al.*, 2002c) and India (H.P., U.P.; Chakrabarti and Medda, 1993).

Dysaphis selinumi Chakrabarti and Medda
Apt. appearance in life unrecorded; BL c.2 mm. On *Selinum tenuifolium* in Uttaranchal and U.P., India. Similar to the Japanese species *D. taisetsusana*.

Dysaphis seselii Vaskovskaya
Apt. pale greenish gray, wax-dusted; BL c.1.2 mm. On *Seseli dichotomum* in Crimea. The description, although detailed, does not clearly distinguish this species from *D. libanotidis*, another short-haired *Dysaphis* described from a related umbellifer.

Dysaphis (Pomaphis) shaposhnikovii Stekolshtshikov
Apt. greenish yellow brown, with dark brown SIPH; BL c.2.2 mm. In leaf axils and upper sides of leaf bases of *Plantago* sp. in E Russia (Primorsk). Mon. hol. (Stekolshtshikov, 1998).

Dysaphis sibirica Shaposhnikov
Apt. in life undescribed, BL unrecorded. Host-alternating between *Malus* and *Aegopodium alpestre* (Stekolshtshikov, 1998) in E Siberia.

Dysaphis (Pomaphis) sorbi (Kaltenbach)
Apt. dull yellowish; BL 1.3–1.7 mm. Sec. rhin. in al. III 45–76, IV 20–26, V 5–9. On basal parts of *Campanula* spp. and *Jasione montana*. In Europe east to Turkey and Caucasus (old records from N America are probably *plantaginea*). Heter. hol. with sexual phase on *Sorbus* (see Blackman and Eastop, 1994).

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Barbagallo and Patti (1994) provided a key to distinguish it from two closely-related spp. on Campanulaceae (*brevirostris* and *henrystroyani*). $2n=12$.

Dysaphis tadzhikistanica Daniyarova

Apt. yellowish green to whitish, wax-dusted; BL c.2.3–2.4 mm. On *Ferula jaeschkeana* in C Asia. Shaposhnikov (1987a) gave some additional morphological data, comparing it with other members of the *D. foeniculus* species complex.

Dysaphis taisetsusana (Miyazaki)

Apt. green, wax-covered; BL c.2.2–2.3 mm. Described from an unidentified umbelliferous plant, living under the leaf sheaths, and subsequently recorded from? *Peucedanum* sp. (Stroyan, 1985). The cauda is unusual for a *Dysaphis* in being elongate triangular, distinctly longer than its basal width, and longer than R IV+V. Only known from Japan. The Indian species *D. selinumi* is similar.

Dysaphis taraxaci Daniyarova

Apt. pale brown, with wax; BL c.1.7 mm. On basal parts of *Taraxacum officinale* in Tajikistan.

Dysaphis tschildarensis Daniyarova

Apt. grayish brown, wax-dusted; BL c.2.6–2.7 mm. On *Ferula jaeschkeana* in C Asia. Populations on *Angelica decurrens* are regarded as a subspecies, *D. tschildarensis* ssp. *tuberculata* Shaposhnikov. Heter. hol. with sexual phase on *Pyrus communis* (Shaposhnikov, 1988).

Dysaphis tulipae (Boyer de Fonscolombe)

Plate 11b

Apt. whitish, wax-powdered; BL 1.7–2.3 mm. Sec. rhin. in al. III 24–55, IV 3–14, V 0. On many monocots incl. *Arum*, *Chionodoxia*, *Crocus*, *Freesia*, *Gladiolus*, *Iris*, *Lilium*, *Moraea*, *Musa*, *Scilla* and *Strelitzia*, colonising shoots and leaves of growing plants, and on underground stems and bulbs. Records from Umbelliferae, e.g., in Bermuda (Stoetzel and Hilburn, 1990) may be due to confusion with the very similar *D. foeniculus*. Sometimes ant-attended. Almost cosmopolitan (but not yet found in S America). Apparently entirely anhol. $2n=11$ or 12.

Dysaphis ubsanurensis Ivanoskaya

Apt. brownish; BL c.2.1 mm. On basal parts of a *Salsola* sp., sheltered by ants. Siberia.

Dysaphis unicauli Mukhamediev

Apt. dark green powdered with grayish wax; BL 1.4–2.0 mm. On *Seseli unicaule*, feeding on undersides of leaves, which mostly become rolled and twisted. C Asia.

Dysaphis uralensis Shaposhnikov

Apt. pale green, without wax; BL 1.7–2.1 mm. On roots of *Peucedanum alsaticum* in Russia and Kazakhstan, and alatiform apt. agreeing with the description of this species have also been collected on *Pastinaca* in Sweden (BMNH colln, leg. V.F. Eastop).

Dysaphis ussuriensis Shaposhnikov and Stekolshtshikov

Apt. greenish gray, lightly dusted with white wax; BL c.2.4 mm. On root collar and basal leaf sheaths of *Anthriscus aemula* in east Siberia (Stekolshtshikov, 1998). Closely related to *D. anthrisci* (q.v.), but without host alternation.

Dysaphis vandenboschi Stroyan

Apt. color in life unrecorded; BL 1.6–2.4 mm. On *Lepidium* (= *Cardaria*) *draba* in Italy, S France and Iran. Shaposhnikov (1987b) described a population with more tubercles on *Lepidium crassifolium* in Ukraine as a subspecies, *D. vandenboschi* ssp. *lepidii*.

Dysaphis (Pomaphis) viennoti Remaudière

Apt. shining black; BL 1.0–1.2 mm. On *Seseli* sp., active and easily disturbed, ant-attended. Iran. Mon. hol. with ovip. and al. males in early Sept (orig. descr.).

***Eichinaphis* Narzikulov**

Aphidinae: Macrosiphini

One or two species in C Asia on Chenopodiaceae, related to *Chaitaphis*.

***Eichinaphis pamirica* Narzikulov**

Apt. greenish brown to dark brown, with a pair of dark spots on the dorsal abdomen; BL 1.3–1.6 mm. In small colonies on stems and young growth of *Krascheninnikovia* (= *Eurotia*) *ceratoides* in Tajikistan (Eastern Pamirs), and on *Krascheninnikovia* sp. in Iran (BMNH colln, leg. G. Remaudière). *E. turanica* Kadyrbekov, described from *Krascheninnikovia* (= *Ceratoides*) spp. in the desert region of Kazakhstan, is differentiated by having longer, thicker dorsal hairs on more tuberculate bases, and by higher SIPH/cauda and ANT/BL ratios. However, Iranian specimens show intermediate characters, and it seems likely that only one variable species is involved.

***Elatobium* Mordvilko**

Aphidinae: Macrosiphini

Eight species mostly living on trees, esp. conifers (see Blackman and Eastop, 1994).

***Elatobium chomoense* Zhang in Zhang and Zhong**

Apt. color in life unknown; BL 2.2–2.5 mm. On *Artemisia* sp. (from orig. descr.; host identified as *A. arenaria* on label of slide with holotype) in Tibet. Host is unusual for this genus and requires confirmation.

***Eomacrosiphum* Hille Ris Lambers**

Aphidinae: Macrosiphini

A genus for one *Macrosiphum*-like species with 5 hairs on first tarsal segments and other distinctive features.

***Eomacrosiphum nigromaculosum* (MacDougall) (= *Bipersona hottesi* Knowlton and Smith)**

Apt. bright red with black bands or patches on dorsal abdomen, black SIPH held at right-angles to body, and black and yellow legs; BL 2.0–2.8 mm. On stems of wild and cultivated *Rosa* spp. in western N America. Mon. hol. with al. males (Palmer, 1952).

***Eonaphis* Essig**

Greenideinae: Schoutedeniini

A genus for four species in Madagascar differing from *Schoutedenia* in the presence of spinal processes on the head (two pairs) and all segments to ABD TERG 7, and marginal processes at least from ABD TERG 4 and 7. Remaudière (1988) provided a key to the genus.

***Eonaphis euphorbiae* Quednau**

Apt. dirty brownish to blackish green, shiny; BL 1.1–1.6 mm. Sec. rhin. in al. III 8–16, IV 0–2 (Remaudière, 1988). On *Euphorbia* spp. in Madagascar. Ovip. were found in Nov.

***Eonaphis pauliani* Essig**

Color of apt. in life unrecorded; BL 1.0–1.6 mm. Sec. rhin. in al. III 39–44, IV 3–4 on IV (Remaudière, 1988). On *Euphorbia* spp. in Madagascar. The original description apparently confused the host plant with that of *Paulianaphis madagascariensis* (see Remaudière, 1988).

***Eotrama* Hille Ris Lambers**

Lachninae: Tramini

Four species in Middle East and C Asia differing from *Trama* in having a longer rostrum and shorter hind tarsi with relatively well-developed HT I. Czylok (1990) reviewed the genus, transferring some species from other genera.

***Eotrama bazarovi* (Narzikulov)**

Apt. pale; BL 5.0–5.5 mm. On roots of *Myricaria alopecuroides* in Tajikistan. Possibly a synonym of *E. tamaricis* (see Blackman and Eastop, 1994, as *Protrama*).

***Eotrama moerickei* Hille Ris Lambers**

Apt. pale yellowish; BL 3.4–4.2 mm. Sec. rhin. in apt. III 0–15, IV 4–10, V 3–6, VI 0–2; in al. III 35–36, IV 7–8, V 5–7, VI 1–2. On roots of thistles (*Cirsium* sp.?) in Lebanon.

***Epameibaphis* Oestlund**

Aphidinae: Macrosiphini

Three N American species on *Artemisia* and *Seriphidium*, with the typical stiletto-shaped R IV+V of aphids feeding on Anthemideae, and related to *Pseudoepameibaphis*, *Flabellomicrosiphum* and the palaeartic genus *Coloradoa*, but with unusual knobbed SIPH. Knowlton and Smith (1936) reviewed the genus.

***Epameibaphis atricornis* Gillette and Palmer**

Apt. frosted brown to greenish with black appendages; BL 1.2–1.4 mm. On *Artemisia longifolia* and *Seriphidium tridentatum* in western USA. Sexual morphs not recorded.

***Epameibaphis frigidae* (Oestlund)**

Figure 12e

Apt. pale glaucous green, with frosted appearance due to numerous pale dorsal hairs (Gillette and Palmer, 1932); BL 1.0–1.3 mm. On leaves and stems of *Artemisia frigida* in western USA and Canada (Saskatchewan, Manitoba). Mon. hol.; ovip. were collected in Nov in Colorado (BMNH colln, leg. L.C. Bragg).

***Epameibaphis utahensis* Knowlton and Smith**

Figure 12f

Apt. grayish green with numerous pale dorsal hairs giving them a whitish to gray appearance; BL 0.9–1.3 mm. On *Seriphidium tridentatum* in western USA. Mon. hol.; ovip. and al. males found in Oct in Utah (orig. descr., and BMNH colln, leg. G.F. Knowlton, 1969).

***Ephedraphis* Hille Ris Lambers**

Aphidinae: Aphidini

Two palaeartic species with the general characters of *Aphis*, but R IV+V clearly has modifications for feeding on *Ephedra*, with the microsensilla placed laterally on a short, acute, beak-like process (Nieto Nafria and Mier Durante, 1985).

***Ephedraphis ephedrae* (Nevsky)**

Apt. blackish green with black eyes, ANT yellowish except at base, legs with femora brown and tibia yellow, and dark SIPH; BL 1.4–2.0 mm. Colonising stems of various *Ephedra* spp. in Europe (Spain, France, Ukraine) and Asia (Turkey, Iran, Turkmenistan, Uzbekistan, Kazakhstan, Tajikistan, N India). Mon. hol., with ovip. and al. males in late Sept–early Nov in C Asia (Narzikulov *et al.*, 1973). Mamontova-Solukha (1963) described a subspecies from Ukraine, *E. ephedrae* ssp. *taurica*, but the specimens in the BMNH collection come within the range of variation shown by other populations of *E. ephedrae*.

***Ephedraphis gobica* Szelegiewicz**

Apt. dark green, almost black; BL c.2.3 mm. On *Ephedra* spp. in Mongolia. Other morphs and biology unknown. A population in W China was described as a subspecies, *E. gobica* ssp. *xinjiangica* (Kadyrbekov *et al.*, 2002).

***Epipemphigus* Hille Ris Lambers**

Eriosomatinae: Pemphigini

A genus of 4–5 poplar gall-forming species, resembling *Pachypappa* in that fund. have no wax pore-plates and al. have sec. rhin. with ciliated rims, but also with some characters of *Pemphigus*, eg. al. have forewings with unbranched media and the first instar exules have short empodial hairs. Secondary hosts are definitely established for only 2 species. Chakrabarti and Banerjee (1993b) reviewed the genus, and for primary host generations see Blackman and Eastop (1994).

***Epipemphigus imaicus* (Cholodkovsky)**

Apt. with wax; BL 1.8–2.2 mm. On roots of *Polygonum alatum* in N India. Colonies live inside small cocoon-like chambers on fine rootlets (Chakrabarti and Banerjee 1993b). Heter. hol. with sexual phase and galls on *Populus ciliata*. 2n=18.

***Epipemphigus marginalis* Chakrabarti and Banerjee**

Apt. (BL 1.5–1.8 mm) presumed to be this species were found on roots of *Impatiens falcifer* (Chakrabarti and Banerjee, 1993b), but there is possible confusion with *E. niisimae*, the secondary host of which is now

known to be an *Impatiens* (see below), and which has not yet been recorded from India. *E. marginalis* has a sexual phase and galls on *P. ciliata* in India.

***Epipemphigus niisimae* (Matsumura)**

Apt. exules from sec. host not yet described, but Aoki *et al.* (1996) transferred al. emigrants from galls on *P. maximowiczii* and established colonies on roots of *Impatiens nolitangere*. Records from Compositae (*Agrimonia pilosa*, *Bidens tripartita*) are based on uncertain identifications (Aoki 1975), and the identity of exules from *Impatiens* in India described as those of *E. marginalis* (see above) also needs confirmation. The species is known on its primary host from Japan, Korea and E Siberia. 2n=20.

***Ericaphis* Börner**

Aphidinae: Macrosiphini

About 6 N American aphids associated with Rosaceae, Ericaceae, and Liliaceae, and 3 European species from Ericaceae. Before 1959 the species were mostly placed in *Macrosiphum* or *Myzus*. Prior (1971) gave a key to the British species then known (as *Fimbriaphis*, in which most species were previously placed), and Heie (1992) reviewed the two Scandinavian species.

***Ericaphis ericae* (Börner)**

Apt. green or brownish green, with tips of ANT and legs black; BL 1.1–1.7 mm. Al. have a dark dorsal abdominal patch with clear windows. On *Erica* spp., especially *E. tetralix*, feeding on flowers and in shoot apices, where it is often overlooked because of small size and cryptic coloration. Also recorded from *Calluna vulgaris* and *Daboecia cantabrica*. In N and W Europe, east to Poland and south to the Iberian peninsula. Mon. hol., with ovip. and apt. males in Sept–Oct.

***Ericaphis fimbriata* (Richards)**

Apt. pink or green; BL 1.1–1.9 mm. Al. have a dark dorsal abdominal patch. On cultivated strawberries (*Fragaria* sp.) and *Rosa nutkana* (BMNH colln, leg. C.-k. Chan) in western N America (Oregon, B.C.). Also recorded from *Vaccinium corymbosum* (Forbes, 1962). Apparently mon. hol. on all these plants (C.-k. Chan, pers. comm.), indicating that the name is probably being applied to a complex of morphologically similar species, which includes *E. scammelli* (q.v.). 2n=14.

***Ericaphis harmstoni* (Knowlton)**

Al. only described, BL 2.3–2.5 mm, on *Symphoricarpus* sp. in Washington, USA. True host and generic placement need to be confirmed.

***Ericaphis latifrons* (Börner)**

Apt. yellow–green, with tips of ANT and legs black; BL 1.3–1.9 mm. Al. have broad dark cross-bands more or less fused into a patch. On various Ericaceae, most usually *Empetrum nigrum* but also recorded from *Calluna vulgaris*, *Erica umbellatum* and *Vaccinium uliginosum*. In N and W Europe, incl. Iceland, east to Poland and the Kola peninsula, and south to the Iberian peninsula. Ovip. and apt. males occur in Aug–Oct (earlier at more northerly latitudes). Heikinheimo (1990) gave an account of this species.

***Ericaphis lili* (Mason)**

Apt. color in life unrecorded; BL 1.8–2.3 mm. Described from *Lilium candidum* in Oregon, and also recorded from lilies in California, Washington and B.C. (BMNH colln). Previously confused with *E. scopioli* (q.v.).

***Ericaphis scammelli* (Mason)**

Plate 22f

Apt. pale yellow–green; BL 1.5–2.4 mm. Al. has dark brown dorsal abdominal markings partly fused into a central patch, with a conspicuous pale window between SIPH. On young shoots of various Ericaceae in N America, and introduced to Europe (UK, Netherlands, N Italy). British populations were described as a subspecies of *E. fimbriata*, (*pernettyae*), and are mon. hol. on *Pernettya* (= *Gaultheria*) *mucronata*, with ovip. and al. males in Oct–Nov (Prior, 1971). In Italy it is mon. hol. on *Vaccinium* spp. (Barbagallo *et al.*, 1999). 2n=14.

THE APHIDS

Ericaphis scoliopi (Essig)

Apt. pale yellow or whitish; BL c.2mm. Al. has a whitish to pale yellow abdomen with a large black dorsal patch. Described from leaves of lilies (*Lilium* spp. and *Scoliopus bigelovi*). Western USA (California, Oregon). Synonymy with *E. lilii* (Mason) has been previously suggested, but after examination of specimens from the Essig collection it is clear that the two species are distinct.

Ericaphis wakibae (Hottes) (= *Placoaphis siphunculata* Richards)

Plate 22g

Apt. pale brownish green or greenish yellow, with dorsal abdomen somewhat sclerotic and variably tanned, often with darker brown spinal and marginal regions, and SIPH pale brown with pale areas around their bases; BL 1.6–2.8mm. Al. usually have an extensive dark dorsal abdominal patch with a clear window between SIPH. Originally described from *Pedicularis*, but since recorded mainly from Rosaceae (*Fragaria*, *Rosa*, *Rubus*). Widely distributed in N America, and introduced to UK. Mon. hol. on *Fragaria* in England (Prior, 1971); life cycle in N America unstudied, but possibly there is at least a partial migration to Ericaceae, as apt. have been collected on *Menziesia ferruginea*, *Vaccinium alaskaense* and *Gaultheria shallon* in B.C. (BMNH colln, leg. C.-k. Chan). A similar species occurs on *Chamaebatia foliosa* in California (BMNH colln, leg. D. Hille Ris Lambers). 2n=12.

Ericolophium Tao (= *Neoacyrthosiphon* Tao)

Aphidinae: Macrosiphini

About 10 E Asian species mostly associated with *Rhododendron*. *Ericolophium* is still poorly known and needs biological study as well as further systematic revision. Host alternation is suspected (Chakrabarti *et al.*, 1983), as in the closely related genus *Indomasonaphis*, but no secondary hosts have been identified. Some nominal species differ from one another only in dorsal abdominal pigmentation. *Chaetomyzus* and *Indiaphis* are also closely related, and may not be worthy of separate generic status.

Ericolophium alpigeniae Zhang, Zhong and Zhang

Apt. undescribed, al. green with a dark dorsal abdominal patch; BL c.3.8mm. Sec. rhin. in al. III 134–158, IV 1–6. On *Rhododendron simsii* in Yunnan Province, China. But for the slightly clavate SIPH, which put its generic position in some doubt, the first tarsal chaetotaxy (5:5:5) and hairy R IV and cauda would put this species close to *Ericolophium holsti*.

Ericolophium euryae (Takahashi)

Apt. (acc. to original description, from *Eurya* sp. in Taiwan) are yellow with black dorsal markings consisting of bands on head and pronotum, a large abdominal patch, a band behind and confluent with the SIPH, and a patch reaching the end of the abdomen (Takahashi, 1937); BL 1.2–1.5mm. There are also records from *Eurya japonica* in Java (BMNH, leg. P. van der Goot) and NE India (A.K. Ghosh, 1974b, and BMNH colln, leg. D. Raychaudhuri) The BMNH specimens from Java lack pigmentation (possibly lost during slide preparation), and the single BMNH specimen from NE India (W Bengal) differs from the original description by lacking the black posterior abdominal patch.

Ericolophium holsti (Takahashi)

(= *Neomasonaphis rhododendris* Chakrabarti, Mandal and Raha)

Plate 23f

Apt. green with pale brownish SIPH and pale green cauda (orig. descr.); BL 2.4–3.5mm. Sec. rhin. in al. III 60–110, IV 0–12. On undersides of young leaves of *Rhododendron* spp. in Taiwan, India (H.P., U.P., W Bengal, Assam) and Pakistan (Naumann-Etienne and Remaudière, 1995, as *Indumasonaphis inulae*; identification corrected by G. Remaudière, pers. comm., 27.ix.2004). 2n=22 (Dutta and Gautam, 1993).

Ericolophium itoe (Takahashi)

Apt. reddish brown with a greenish tint; BL 1.8–2.0mm. Sec. rhin. in al. III 30–38, IV 4–7, V 0(-2). On *Rhododendron* spp. in Taiwan, and Japan (Miyazaki, 1971, as *Elatobium itoe*). 2n=18*.

Ericolophium nigripunctatum (Zhang, Zhong and Zhang)

Apt. green with reddish head, thorax and cauda, and a dark dorsal abdominal patch; BL c.2.7–2.8 mm. Sec. rhin. in al. III 34–41. On *Rhododendron simsii* in Yunnan Province, China. Very close to *E. rectisiphon* from the same locality and host plant.

Ericolophium ninguidum (Zhang, Chen, Zhong and Li)

Apt. green; BL c.2.3 mm. On undersides of leaves of *Rhododendron przewalskii* in Qinghai Prov., China (Zhang, 1999, as *Neoacyrthosiphon*).

Ericolophium ovalifolii (M.R. Ghosh, A.K. Ghosh and Raychaudhuri)

Apt. green; BL c.3.2 mm. Al. undescribed. On apical leaves of *Lyonia* (= *Pieris*) *ovalifolia* in W Bengal, India (M.R. Ghosh *et al.*, 1971, as *Neoacyrthosiphon taiheisanum* ssp. *ovalifolii*), and also recorded from *Rhododendron* sp. in Meghalaya (Chakrabarti *et al.*, 1983). We give this taxon full species status.

Ericolophium rectisiphon (Zhang, Zhong and Zhang)

Apt. yellowish green or pale green, with darker green dorsal markings; BL c.2.6 mm. Al. undescribed. On *Rhododendron simsii* in Yunnan Province, China. Very close to *E. nigripunctatum*.

Ericolophium rhododendri (M.R. Ghosh, A.K. Ghosh and Raychaudhuri) Figure 46i,j

Apt. dark green; BL c.2.2 mm. Sec. rhin. in al. c.70–72, IV 30–40 V c.12. On undersides of leaves of *Rhododendron arboreum* in W Bengal.

Ericolophium taiheisanum (Takahashi)

Apt. blackish brown; BL c.2.5 mm. On upper sides of leaves, along midribs, of *Rhododendron formosanum* in Taiwan. Al. undescribed.

Ericolophium takahashii (A.K. Ghosh)

Apt. probably pale green; BL 2.0–2.5 mm. Described from one apt. and one imm. al. collected on *Anemone rivularis*, but the true hosts are *Rhododendron* spp. (Chakrabarti *et al.*, 1983, as *Neoacyrthosiphon*). In India (U.P., W Bengal) and Nepal. Mon. hol., with ovip. and al. males on *Rh. campylocarpum* in Oct (Chakrabarti and Raychaudhuri, 1975).

Ericolophium tianchiense (Zhang, Chen, Zhong and Li)

Apt. green; BL 2.8–2.9 mm. On leaves of *Rhododendron* sp. in Xinjiang, China (Zhang, 1999, as *Neoacyrthosiphon*).

Eriosoma Leach

Eriosomatinae: Eriosomatini

About 20 species with *Ulmus* spp. as primary hosts, mostly migrating to Pyroidea or to roots of Grossulariaceae. *Eriosoma* on secondary hosts typically have rather conspicuous siphuncular pores with partially chitinised rims and surrounding hairs. Alatae usually have a once-branched media in the forewing. Danielsson (1982) gave an account of the species found on *Ribes* roots in Europe, Akimoto (1983) provided a revision of the Japanese species, and accounts are also available for NW Europe (Heie, 1980b), Iberian peninsula (Nieto Nafria *et al.*, 2002a), N America (Smith, 1985), India (A.K. Ghosh, 1984) and E Siberia (Pashtshenko, 1988a). See also Blackman and Eastop (1994).

Eriosoma (Schizoneura) anncharlotteae Danielsson

Apt. yellow to pale red in white wax wool; BL 1.1–1.9 mm. Al. sexup. in autumn, with sec. rhin. III 25–33, IV 4–6. On roots of *Ribes alpinum*. Heter. hol., with sexual phase on *Ulmus* spp. Europe, and also reported from China (Zhang *et al.*, 1985).

Eriosoma antennieurfum Zhang

Described from one alata (sexupara?) collected from roots of *Helianthus annuus* in China (Zhang and Qiao, 1997a).

THE APHIDS

Eriosoma auratum Akimoto

Apt. on secondary host undescribed, but reported to colonise roots of *Anthriscus syvestris* (Akimoto, 1985b). Japan. Heter. hol. with sexual phase and galls on *Ulmus* (see Blackman and Eastop, 1994). 2n=12.

Eriosoma crataegi (Oestlund)

Apt. bluish-black covered in white mealy wax, and often with two long wax filaments extending from the end of the abdomen; BL 2.0–3.0 mm. Widely distributed in N America. *Crataegus* is the usual secondary host (Blackman and Eastop, 1994), but it is also recorded from *Pyracantha* sp. Heter. hol. with sexual phase and galls on *Ulmus* spp. 2n=12.

Eriosoma (Mimaphidus) flavum Jancke

Apt. yellowish (cf. *pyricola*), with filamentous wax; BL 1.0–1.2 mm. Deep underground on roots of *Cydonia oblonga* or *Pyrus communis*. Europe (England, Netherlands), Israel (exules on *Cydonia*), Iran (BMNH colln, leg. S.H. Hodjat) and Georgia (as *gomboriense*; Dzhibladze 1965). Heter. hol. with sexual phase and galls on *Ulmus* spp. (Blackman and Eastop, 1994).

Eriosoma (Schizoneura) grossulariae (Schüle)

Apt. pale red to yellowish white in white wax wool; BL 1.0–2.3 mm. Al. sexup. in autumn bluish gray to black, with sec. rhin. III 15–24, IV 2–5. On roots of *Ribes uva-crispa*, *R. sanguineum*, and sometimes *R. rubrum*. Heter. hol., with sexual phase on *Ulmus* spp. Europe, Japan, and introduced to N America. Danielsson (1982) distinguished this species from *E. ulmi* and studied its host preferences. 2n=10.

Eriosoma harunire Akimoto

Apt. on secondary host undescribed, but reported to be on *Plantago aristata* (Akimoto, 1985b). Japan. Heter. hol. with sexual phase and galls on *Ulmus* (see Blackman and Eastop, 1994). 2n=10.

Eriosoma japonicum (Matsumura)

Apt. oval, with dark head and appendages, secreting flocculent wax; BL 1.5–1.7 mm. On roots of Rosaceae (*Agrimonia*, *Geum*, *Fragaria*). Heter. hol., with *Ulmus japonica* as primary host. Japan, China and E Siberia. 2n=10.

Eriosoma lanigerum (Hausmann)

Woolly Apple Aphid

Apt. purple, red, or brown, covered with a thick white flocculent wax; BL 1.2–2.6 mm. On roots, stems or branches of rosaceous trees and shrubs, incl. *Cotoneaster*, and more rarely on *Cydonia*. Almost world-wide (wherever apples are grown). Anhol. See also Blackman and Eastop (1994, 2000). 2n=12.

Eriosoma lanuginosum (Hartig)

Plate 1b

Apt. variable in color, pale yellow to reddish, BL 2.0–2.7 mm. On fibrous rootlets of *Cydonia vulgaris* and *Pyrus communis*. Europe, Middle East, C Asia, and introduced into S Africa. Heter. hol. with sexual phase and galls on various *Ulmus* spp. (Blackman and Eastop, 1994). Often confused with *E. pyricola*, a smaller species with more caudal hairs which has a much wider geographical distribution. 2n=10.

Eriosoma moriokense Akimoto

Apt. presumably secreting wax; BL c.1.3 mm. On roots of *Sedum*. Japan, China (BMNH colln, leg. V.F. Eastop), and probably Korea (Akimoto, 1983). Heter. hol., with sexual phase and galls on *Ulmus* (Blackman and Eastop, 1994). 2n=10.

Eriosoma nigra Akimoto

Apt. oval, dark-pigmented, secreting wax; BL 1.5–1.8 mm. On roots of *Epilobium* sp. in Japan (Akimoto, 1983). Apparently anholocyclic on *Epilobium*; al. found in September had embryos with mouthparts (i.e., were not sexuparae).

Eriosoma (Mimaphidus) patchiae (Börner and Blunck)

Apt. secreting wax; BL 2.0–2.3 mm. On roots of *Senecio* and *Cineraria*. Widely distributed in Europe, and perhaps also in China (as *E. dilaniginosum* Zhang). Heter. hol. with sexual phase on *Ulmus* (see Blackman and Eastop, 1994). 2n=10.

***Eriosoma pyricola* Baker and Davidson**

Apt. yellowish pink when immature, pink to red when adult, rather sparsely clothed with filamentous wax; BL 1.3–2.0 mm. On fibrous rootlets of *Cydonia vulgaris* and *Pyrus communis*. *E. pyricola*, which was for a long time synonymised with *lanuginosum* until the work of de Fluiter, is apparently native to S Europe, Turkey, and introduced to N and S America, Australia and New Zealand. Heter. hol. with sexual phase and galls on *Ulmus* spp. (see Blackman and Eastop, 1994).

***Eriosoma (Schizoneura) ulmi* (L.)**

Apt. pale red to brownish red, in wax wool; BL 0.8–2.0 mm. Al. sexup. in autumn dark bluish gray to black, with sec. rhin. III 14–23, IV 1–3. On roots of *Ribes* spp. (especially *nigrum*, *rubrum*, *aureum*). Marchal (1933) recorded it from *Sedum* sp. in France, but this might be another species. Heter. hol., with sexual phase on *Ulmus* spp. Europe, Iceland, C Asia, Mongolia and China (Heie, 1980b). 2n=10 (Europe), but Chen and Zhang (1985a) recorded 2n=16 from China, possibly having another, closely related species.

***Eriosoma yangi* Takahashi**

Apt. on secondary host undescribed but reported to colonise roots of *Salix* and *Fragaria* (Akimoto, 1985b). Japan, S Korea and China. Heter. hol. with sexual phase on *Ulmus* (see Blackman and Eastop, 1994). 2n=10.

Eucarazzia* del Guercio*Aphidinae: Macrosiphini**

One distinctive species with markedly clavate SIPH associated with Labiatae, al. having distinctive markings on wings and body.

***Eucarazzia elegans* (Ferrari) (= *Berberidaphis nepetae* Narzikulov and Mukhamediev;**

= *Rhopalosiphoninus sensoriatu*s Chakrabarti

Plate 27c, Figure 48a

Apt. pale green; BL 1.4–2.1 mm. On undersides of leaves, shoots, and flowers of *Mentha* spp. and various other Labiatae (*Salvia*, *Coleus*, *Lavandula*, *Melissa*, *Nepeta*, *Origanum*, etc.). Al. have extensive and distinctive black dorsal abdominal markings, SIPH with swollen part dark and the cylindrical basal part paler, and wings with dark triangular spots at the ends of all the veins. In Mediterranean area, Middle East, C Asia, N India, and also now in Africa south of the Sahara (Burundi, Kenya, S Africa, Zimbabwe), western USA (California, Oregon) and S America (Argentina: Ortego, 1994; Bolivia: Remaudière *et al.*, 1992). Single al. have been trapped in UK. Life cycle unrecorded and sexual morphs unknown. 2n=12.

Eumyzus* Shinji*Aphidinae: Macrosiphini**

Eleven E Asian species with various host associations, and in none is the life cycle completely known. Three species on woody Rosaceae in spring in India (Blackman and Eastop, 1994) migrate to unknown secondary hosts. Three species on *Impatiens* and two on *Hydrangea* induce galling responses in their hosts. *Eumyzus* have a spinulose head like *Myzus* but the ANT tubercles are divergent and the dorsal hairs are rather long and stiff with tuberculate bases.

***Eumyzus clinopodii* Takahashi**

Apt. broadly oval, pale (?green) with pale brownish ANT and legs; BL 1.1–1.5 mm. In Japan; described from *Clinopodium gracile*, and subsequently collected from two other labiates, *Isodon japonicus* and *Plectranthus japonicus* (BMNH colln, leg. M. Sorin and T. Miyake). Its generic position is uncertain.

***Eumyzus darjeelingensis* R.C. Basu and Raychaudhuri**

Appearance in life unknown; BL of apt. 1.3–1.9 mm. On *Hydrangea paniculata* in W Bengal, India, presumably in leaf-roll galls. Al. have 4–9 secondary rhinaria on ANT III.

***Eumyzus gallicola* Takahashi**

Apt. color in life unknown; BL c.1.9 mm. In bag-shaped pseudogalls on leaves of *Impatiens noli-tangere* in Japan (Miyazaki, 1971). 2n=12.

THE APHIDS

Eumyzus hydrangi Chakrabarti and Bhattacharya

Apt. color in life unknown; BL 1.2–1.4 mm. In closed marginal leaf-roll galls on *Hydrangea scandens* in U. P., India. Medda and Chakrabarti (1986) described the al., which have sec. rhin. distributed III 8–13, IV 0–2.

Eumyzus impatiensae (Shinji)

Plate 17e, Figure 33f

Apt. pink, red or reddish brown, with SIPH and cauda, and apices of ANT and legs, black; BL 1.8–2.0 mm. Forming bag-shaped pseudogalls on veins of leaves of *Impatiens* spp. in Japan, Korea, E Siberia and India (U.P.). Redescribed by Miyazaki (1971). Mon. hol. (Gredina 1996). $2n=12$ (Blackman, 1986) or 10 (Pal and Khuda-Bukhsh 1980).

Eumyzus indicus Medda and Chakrabarti

Apt. dark brownish; BL 1.5–2.1 mm. In bag-galls protruding from undersides of leaves of *Impatiens* spp. in U.P., India.

Eumyzus nokuli Raychaudhuri, Singh and Raychaudhuri

Apt. color in life unknown; BL c.1.5 mm. On *Senecio* sp. in Manipur, India. No effect on the host plant is reported, and the generic position of this aphid is uncertain.

Euthoracaphis Takahashi

Hormaphidinae: Nipponaphidini

Three species of small heavily sclerotised aphids, two living on Lauraceae (see Blackman and Eastop, 1994) and one reportedly on *Senecio*, which is an unlikely host for this group.

Euthoracaphis longisetosa A.K. Ghosh and Raychaudhuri

Apt. presumably black in life; BL not recorded. Described from 4 apt. found on undersides of leaves of a *Senecio* sp. in A.P., India. This is probably not the true host.

Eutrichosiphum Essig and Kuwana

Greenideinae: Greenideini

About 40 mostly tree-dwelling species with an elongate oval or pear-shaped body, a long, tapering and distinctly subdivided R IV+V, hirsute SIPH without any reticulation in apt., and a cauda without a median process. See Blackman and Eastop (1994) for further information.

Eutrichosiphum parvulum Eastop and Hille Ris Lambers

Plate 5i

Apt. shining black, with head yellowish brown; BL 1.2–1.6 mm. On stems and undersides of leaves of *Trachelospermum* spp. in China and Taiwan (Takahashi, 1923, as *Eu. minutum*). $2n=26^*$.

Eutrichosiphum roepkei (van der Goot)

Apt. pale yellowish brown, with dark apices to SIPH; BL c.1.6 mm. In small numbers on young shoots and leaves of ?*Eurya* sp. attended by ants. Malaysia (Singapore).

Ferusaphis Zhang, Chen, Zhong and Li

Aphidinae: Macrosiphini

One species in China with *Phorodon*-like processes on the ANT tubercles, strongly wrinkled tergum, clavate SIPH and a characteristically shaped cauda.

Ferusaphis xanthinae Zhang, Chen, Zhong and Li

Apt. leaf green; BL 1.8–1.9 mm. On young shoots and undersides of leaves of *Rosa xanthina* in Gansu Prov., China (Zhang, 1999).

Flabellomicrosiphum Gillette and Palmer

Aphidinae: Macrosiphini

Two N American species on *Seriphidium* with the typical stillette-shaped R IV+V of aphids feeding on Anthemideae, and related to *Epameibaphis*, *Pseudoepameibaphis* and the palaeartic genus *Coloradoa*, but with reduced SIPH. Smith (1937) reviewed the genus.

***Flabellomicrosiphum knowltoni* Smith**

Apt. dull slate gray to pinkish, overlaid with pale hairs giving it a frosted appearance; BL 0.9–1.5 mm. On *Seriphidium tridentatum* in western USA (Arizona, Utah). Mon. hol.; ovip. have been collected in Oct in Utah (BMNH colln, leg. G.F. Knowlton).

***Flabellomicrosiphum tridentatae* (Wilson)**

Plate 15e, Figure 12d

Apt. pale green, appearing frosted dorsally due to the numerous pale fan-shaped hairs; BL 0.9–1.5 mm. On leaves and flower stems of *Seriphidium tridentatum* in western USA.

***Forda* von Heyden**

Eriosomatinae: Fordini

About 10 old world species typically alternating in the Mediterranean region and SW Asia between galls on *Pistacia* and the roots of Gramineae, but with anhol. populations distributed more widely on grass roots. Both *F. formicaria* and *F. marginata* have been introduced into N America. Accounts are available of root-living morphs by Mordvilko (1935) and Remaudière (1999); from NW, C and S Europe (Heie, 1980b; Zwölfer, 1958; Roberti, 1983; Nieto Nafria *et al.*, 2002a), and India (Chakrabarti *et al.*, 1982; A.K. Ghosh, 1984). See also Blackman and Eastop, 1994.

***Forda formicaria* von Heyden**

Plate 2b

Apt. off-white to dull yellow (often with a darker mediodorsal stripe) or various shades of dark green or bluish green, body highly domed; BL 2–3 mm. On roots of numerous grasses and cereals (incl. *Agropyron*, *Agrostis*, *Bromus*, *Cynodon*, *Dactylis*, *Deschampsia*, *Festuca*, *Hordeum*, *Lolium*, *Poa*, *Secale*, and *Triticum*), and sometimes on Cyperaceae (*Carex*, *Cyperus*), attended by ants, or in ants' nests. Heter. hol. in Mediterranean area with sexual phase and galls on *Pistacia* spp. (see Blackman and Eastop (1994). Europe, N Africa, Middle East, C Asia, Siberia, and N America. Probably partially anhol. even where the primary hosts are available, but in N Europe and N America exclusively anhol. on roots of Gramineae, often overwintering in ants' nests. Börner (1952–3) recognised several different forms on the roots of Gramineae in Central Europe, and it seems possible that several taxa are confused under this name. 2n=18–23.

***Forda hirsuta* Mordvilko**

Apt. straw-colored to orange, dorsally highly domed; BL 1.7–3.2 mm. On roots of Gramineae (e.g., *Agropyron*, *Bambusa*, *Cynodon*, *Elymus*, *Heteropogon*, *Hordeum*, *Poa*, *Triticum*), and also on found on *Cyperus* (BMNH colln, Iran, leg. V.F. Eastop). Ant-attended. Heter. hol. with sexual phase and galls on *Pistacia* spp., incl. *P. vera* (see Blackman and Eastop, 1994) in Crimea, Caucasus, Iran, Iraq, Turkey, C Asia, and presumed anhol. populations on grass roots occur in Portugal (Ilharco, 1975), in Russia as far north as Leningrad, and eastward to E Siberia (Pashtshenko, 1988a). 2n=18.

***Forda hirsutissima* Remaudière**

Apt. pale; BL (1 specimen) 2.4 mm. On root of *Triticum* sp. in Turkey (Remaudière, 1999).

***Forda longicornis* Remaudière and Leclant**

Apt. creamy white; BL 2.3–3.4 mm. On roots of unidentified grasses and in ants' nests. France, Spain and Portugal. Life cycle unknown; al. sexup. were collected in April (Remaudière, 1999).

***Forda marginata* Koch**

Plate 2a

Apt. brownish yellow or greenish yellow, body highly domed dorsally; BL 1.7–3.1 mm. On numerous species of Gramineae including *Agropyron*, *Agrostis*, *Avena*, *Bromus*, *Dactylis*, *Festuca*, *Hordeum*, *Lolium*, *Poa*, *Secale*, and *Triticum*. Heter. hol. with sexual phase and galls on *Pistacia* spp. in Mediterranean region and SW Asia (see Blackman and Eastop, 1994), and with anhol. populations on grass roots in N and C Europe, India, Siberia, China and N America, overwintering in ants' nests. The morphological variation shown by anhol. populations suggests that they may correspond to a group of closely related species, but the taxonomy will only be clarified by further studies of primary host-plant relationships. 2n=17–20 (soma), or 25–40 (germ-line cells; Blackman, 1987).

THE APHIDS

Forda orientalis George

Apt. are yellowish white to citron yellow, very much arched dorsally; BL c.3.5 mm. On roots of Gramineae (*Botriochloa*, *Pennisetum*, *Saccharum*, *Sorghum*, *Triticum*) in Israel, Iran, India (David, 1969), Pakistan, and E Siberia (Mordvilko, 1935, as *F. ussuriensis*). Ant-attended. The sexual phase is unknown, unless *F. kaussarii* (described from *P. khinjuk* in Iran) is this species. Two species of *Forda* described from *Triticum* in China, *F. auralenta* Zhang and Qiao and *F. multicomata* Zhang (in Zhang and Qiao, 1998d) are possible synonyms.

Forda pawlowae Mordvilko

Apt. pale yellow, body domed, with brownish appendages; 1.6–2.8 mm. On roots of *Dactylis glomerata* and *Bromus erectus* in C and E Europe (Zwölfer, 1958, as *F. dactylidis*). Ant-attended. Anhol., but possibly with a sexual phase and galls on *Pistacia* in SW Asia, if *F. mordvilko* is a synonym (Szelegiewicz, 1982).

Forda riccobonii (Stefani)

Apt. color in life unrecorded; BL 1.7–3.0 mm. On roots of grasses, incl. *Botriochloa* sp. and *Dicanthium* sp., in India (Chakrabarti *et al.*, 1982), ant-attended. Heter. hol. with sexual phase and galls on *Pistacia* spp. in Mediterranean region and SW Asia (see Blackman and Eastop, 1994). 2n=18 (somatic cells) or 30 (germ-line cells; Blackman, 1987).

Forda rotunda Theobald

Apt. dusky olive- to apple-green, body highly domed; BL 1.8–3.3 mm. On roots of Gramineae (*Brachypodium*, *Dactylis*, *Festuca*, *Poa*, *Polypogon*), ant-attended (Zwölfer, 1958, as *F. skorkini*). Europe (France, Netherlands, Germany, Poland, Russia, Ukraine, Italy, Spain), N Africa (Morocco, Algeria) and Middle East (Turkey, Saudi Arabia). Al. morphs and sexual phase unknown (see Remaudière, 1999).

Geoica Hart

Eriosomatinae: Fordini

An old world genus of about 10 species alternating between galls on *Pistacia* and the roots of Gramineae, and sometimes Cyperaceae. The taxonomy is difficult, particularly around *G. utricularia* (see Brown and Blackman, 1994). Accounts are available for the morphs on *Pistacia* by Davatchi (1958) and Blackman and Eastop (1994), and root-feeding generations are in accounts for N, C and S Europe (Heie, 1980b; Zwölfer, 1958; Roberti, 1939, respectively); and for India (Raychaudhuri, 1980; A.K. Ghosh, 1984).

Geoica anchusae Narzikulov

Apt. yellowish green or pale green, with grayish wax; BL c.2.9 mm. On roots of *Anchusa italica* in Tajikistan.

Geoica harpazi Brown and Blackman

Apt. appearance in life unknown; BL 1.7–2.6 mm. On roots of Gramineae (*Ammophila*, *Hordeum*, *Triticum*) in Israel. Heter. hol. with sexual phase and galls on *Pistacia atlantica*.

Geoica lucifuga (Zehntner)

Apt. pale yellowish or yellowish brown with a light covering of white wax; BL 1.9–3.5 mm. Al. have a yellowish abdomen with a broad transverse bar on each tergite, largest on the posterior segments. On roots of many genera and species of Gramineae and Cyperaceae, usually attended by ants. Recorded also from the roots of grape vine in C Asia (Nevsky, 1929). World-wide except in cold temperate northern regions (Blackman and Eastop, 2000). Anhol. on roots of Gramineae and Cyperaceae. The holocycle has not been described; Mordvilko (1935) suggested that the primary host might be *Pistacia sinensis*, and Naumann-Etienne and Remaudière (1995) provided further circumstantial evidence for this, but it awaits experimental confirmation. 2n=14 (Kulkarni, 1984) or 18*.

Geoica setulosa (Passerini)

Apt. off-white or pale greenish gray; BL 1.6–2.6 mm. On roots of grasses (e.g., *Agrostis*, *Briza*, *Festuca*, *Holcus*), attended by ants. NW and C Europe, Italy, Iran, Turkey, and also now in USA. Heter. hol. in Iran with *Pistacia khinjuk* as the primary host (Davatchi, 1958). In Europe exclusively anhol. on grass roots, often overwintering in the nests of *Lasius flavus*. 2n=20 and 24.

Geoica sikkimensis Raychaudhuri, Pal and M.R. Ghosh

Apt. brownish; BL 1.9–2.1 mm. On roots of *Polyopogon fugax*, and probably other Gramineae, in Sikkim and W Bengal, India.

Geoica utricularia (Passerini)

Plate 1i

Apt. off white, cream or yellowish white, lightly dusted with wax; BL 1.6–3.0 mm. Al. have a pale yellowish green abdomen with dark transverse bars, largest on the more posterior tergites. On roots of numerous species of grasses and cereals (e.g., *Agrostis*, *Avena*, *Bromus*, *Deschampsia*, *Festuca*, *Hordeum*, *Lolium*, *Phleum*, *Poa*, *Triticum*, *Zea*), invariably ant-attended. Throughout Europe and in North Africa (Morocco), the Middle East, Central Asia, N America, and China (as ssp. *urunquiensis* Qiao). Heter. hol. in Mediterranean region and Middle East, with sexual phase and galls on *Pistacia* spp., but the name has been applied to a complex of populations/species with different *Pistacia* spp. as primary hosts (Wertheim, 1954; Davatchi, 1958; Koach and Wool, 1977; Brown and Blackman, 1994). A full account of the life history in Italy of *G. utricularia* s. str., whose primary host is *P. terebinthus*, was given by Roberti (1939, 1983). In C and N Europe and N America, one or more members of the *G. utricularia* group are anhol. on roots of Gramineae; these populations vary considerably in chaetotaxy, particularly of R IV+V, ABD TERG 8, cauda and anal plate. 2n=16, 17, and 18.

Geopemphigus Hille Ris Lambers

Eriosomatinae: Fordini

The only endemic nearctic genus of Fordini, with at least 5 spp. in southern USA and C America, forming galls on *Pistacia* and migrating especially to roots of Compositae, although the life cycles of all species are incompletely known. Al. have dark brown-black dorsal abdominal cross-bands. They are related to palaeartic *Baizongia* and *Asiphoniella*. Muños Viveros and Remaudière (1999) reviewed this genus.

Geopemphigus blackmani Muños Viveros and Remaudière

Apt. probably rather dark, with white wax; BL 1.6–1.9 mm. Al. (sexuparae) have dark dorsal abdominal cross-bands and sec.rhin. distributed ANT III 19–28, IV 2–4, V 0 (–1). On roots of Compositae (*Dyssodia*, *Tagetes*) in Mexico (Muños Viveros and Remaudière, 1999). (These are believed to be the secondary host forms of *G. blackmani*, which has a sexual phase and gall-feeding generations on *Pistacia mexicana*, but this needs to be confirmed experimentally).

Geopemphigus floccosus (Moreira)

Plate 2c

Apt. (orig. descr.) pale dirty greenish yellow, with tufts of white wax; BL 1.9–2.2 mm. Al. (virginoparae) have dark dorsal abdominal cross-bands, and sec.rhin. distributed ANT III 14–20, IV 1–3, V 0–1, VI BASE 0. On roots of *Ipomaea* (Convolvulaceae), and populations apparently of this species have also been found on *Synedrella* (Compositae) and *Dioscorea* (Dioscoreaceae). In southern USA, C America, Caribbean and S America as far south as São Paulo, Brazil. Probably mainly or entirely anhol., as no al. sexuparae have been found, but there could perhaps be heter. hol. populations in regions where primary hosts are available; emigrant al. of '*Geopemphigus* sp. A', described from galls on *Pistacia mexicana* (Muños Viveros and Remaudière, 1999), are very similar to al. virginoparae produced by root-feeding colonies of *G. floccosus*.

Geopemphigus torsus Muños Viveros and Remaudière

Apt. probably rather dark, with white wax; BL 1.6–2.7 mm. Al. (sexuparae) have dark dorsal abdominal cross-bands and sec.rhin. distributed ANT III 17–28, IV 1–4, V 0–2, VI BASE 0 (–1). On roots of Compositae (*Bidens* and/or *Tagetes*) in Mexico (Muños Viveros and Remaudière, 1999). (These are believed to be the secondary host forms of *G. torsus*, which has a sexual phase and gall-feeding generations on *Pistacia mexicana*, but this needs to be confirmed experimentally).

Gharezia Stroyan

Eriosomatinae: Eriosomatini

One rather elongate-bodied *Carex*-feeding species found in both Asia and N America, perhaps most closely related to *Byrsocryptoides* (see Blackman and Eastop, 1994), but with a much shorter rostrum.

THE APHIDS

Ghariesia polunini Stroyan

Apt. grayish due to wax covering; BL 1.9–2.1 mm. Originally found on leaves of a plant of Cyperaceae, either *Carex* or *Kobresia*, in Pakistan. Subsequently recorded from California (Hille Ris Lambers, 1966a), and from B.C. Canada, where colonies in flocculent wax were found on stems and inflorescences of *Carex mertensii* (Footitt and Mackauer, 1980). Al. have narrow transverse sec.rhin.distributed III 10–12, IV 1–3, V 1–4, VI 1–2. Life cycle and origins unknown; possibly anhol. and/or with a migration to Ulmaceae in its native region.

Glendenningia MacGillivray

Aphidinae: Macrosiphini

A genus for one N American species on *Philadelphus* only known from al., with a distinctive form of cauda and sensoriation of ANT.

Glendenningia philadelphi MacGillivray

Apt. undescribed; BL of al. 2.2–2.8 mm. On *Philadelphus gordonianus* (= *lewisii*) in B.C., Canada. Life cycle unknown; the fact that all individuals were al. in June suggests that migration occurs to an unknown secondary host. (The form of the cauda is similar to that of aphids that feed on mosses.)

Gredinia Pashtshenko

Aphidinae: Macrosiphini

One species with large thoracic spiracles on *Saussurea* in E Asia, possibly related to *Delphiniobium* but with 5 hairs on first tarsal segments, and tapering SIPH bearing hairs (Pashtshenko, 2000b).

Gredinia pilosotuba Pashtshenko

Apt. black, shining; BL c.2.8 mm. Al. unknown. On shoot apices of *Saussurea pulchella* in E Siberia (Primorskii). Life cycle unknown. Except for the large thoracic spiracles the description of this species, from two specimens, closely matches that of *Macrosiphoniella lazoica*, found on the same host.

Greenidea Schouteden

Greenideinae: Greenideini

About 50 E Asian species of pear-shaped aphids with long hairy SIPH that have pale reticulation, and a rounded cauda with an apical papilla. Al. are more long-bodied and have longer SIPH. About half the species are in subgenus *Trichosiphum*, in which the SIPH reticulation is confined to a basal region. *Greenidea* are mainly tree-living (see Blackman and Eastop, 1994), and many of the records from herbaceous plants are almost certainly of vagrants from trees. They occur from Japan to eastern Australia and from India to the Philippines. The genus was reviewed by Raychaudhuri (1956) and accounts are available for Japan (Takahashi, 1962), India (A.K. Ghosh and Agarwala, 1993), China (Chang and Zhong, 1979a), Taiwan (Liao, 1978), Java (Noordam, 1994) and USA (Halbert, 2004).

Greenidea (Trichosiphum) anonae (Pergande)

Apt. have dark brown abdomen, yellow–brown head and thorax, and black outwardly-curved SIPH; BL 1.3–1.8 mm. On undersides of young leaves of *Annona* species. and also recorded from *Artabotrys*, *Antidesma*, *Baccauria*, *Polyalthia*, *Symplocos*. India, Japan, Java, Malaya and Sumatra. Anhol; a single al. male is known, collected in central India in February. Sometimes ant-attended. $2n=22$.

Greenidea (Trichosiphum) bucktonis A.K. Ghosh, R.C. Basu and Raychaudhuri

Apt. brownish yellow, with slightly darker SIPH; BL 1.6–1.7 mm. Described from an unidentified plant, but later recorded from *Oreocnide integrifolia* and various other plants (A.K. Ghosh and Agarwala, 1993), the true host(s) being uncertain. India (Meghalaya, Sikkim, U.P., W Bengal).

Greenidea (Trichosiphum) camelliae Agarwala and A.K. Ghosh

Apt. dark brown with yellowish head; BL 1.2–1.5 mm. On a species of *Camellia* in N India (Meghalaya). Other morphs undescribed.

***Greenidea ficicola* Takahashi**

Apt. yellowish brown to dark brown with long dark brown outwardly-curved hairy SIPH; BL 1.7–2.8 mm. Normally on *Ficus* spp. (see Blackman and Eastop 1994, 2000), but there are Indian records from other hosts, possibly all of vagrants. E and SE Asia, Australia, Africa (Burundi) and USA (Halbert, 2004). No sexual morphs known. $2n=22$.

***Greenidea (Trichosiphum) myricae* Takahashi**

Apt., green with tips of SIPH dark brown; BL 2.1–2.5 mm. SIPH about $0.3\times$ BL in apterae and $0.8\times$ BL in alatae. Described from specimens feeding on a young leaf of *Myrica rubra* in Taiwan, but aphids collected two years earlier on *Alnus formosana* were later identified by Takahashi as this species (Raychaudhuri, 1956; specimens now in BMNH colln), and this seems a more probable host plant. [Note: this species was erroneously listed as occurring on two other *Myrica* spp. in Blackman and Eastop (1994).]

***Greenidea (Paragreenidea) parthenocissi* Saha and Chakrabarti**

Apt. greenish; BL 2.1–2.7 mm. On undersides of leaves of *Parthenocissus semicordata* in N. India (U.P.). Al. ovip. and al. males were collected in Sept–Oct (orig. descr.).

***Greenidea (Trichosiphum) psidii* van der Goot (= *formosana* Maki; see Halbert, 2004)**

Apt. dark brown with long yellowish-brown SIPH, curved outwards apically; BL 1.8–2.6 mm. On young shoots and undersides of Myrtaceae, and aphids identified as this species are also recorded from other plants such as *Ficus*, *Glycosmis* and *Engelhardtia*. In India, Bangladesh, Nepal, China, Taiwan, Japan, Loochoo, Java, Sumatra, Philippines, Hawaii and California. Biology is little known and sexual morphs are unrecorded. The name *G. psidii* is probably being applied to a group of species, the taxonomy of which requires clarification (see Blackman and Eastop, 1994 as *G. formosana*). Some Indian populations have a short R IV+V and are regarded as a subspecies, *G. psidii* ssp. *heeri* Raychaudhuri, M.R. Ghosh, Banerjee and A.K. Ghosh; see A.K. Ghosh and Agarwala (1993). $2n=18$ (Kulkarni and Kacker, 1979) or 7–9 (Kurl, 1986b, for ssp. *heeri*).

***Greenidea rappardi* Raychaudhuri**

Apt. shining brown, with paler brown head, thorax and band across between SIPH; BL 1.6–1.9 mm. On young shoots, undersides of young leaves and flower-buds of *Scurrula* and *Loranthus* sp. in Java (Noordam, 1994).

***Greenidea (Trichosiphum) siamensis* Takahashi**

Apt. greenish black, with black SIPH; BL 1.3–1.7 mm. from *Rhodomyrtus* sp. (?) in Thailand (as *G. anonae* ssp. *siamensis*), and given full species status by Robinson (1972).

***Greenidea (Paragreenidea) symplocosis* A.K. Ghosh, R.C. Basu and Raychaudhuri**

Apt. pale (color unrecorded), with long pale SIPH; BL 3.1–3.3 mm. On *Symplocos* (Blackman and Eastop, 1994), but with a record also (vagrants?) from *Eurya* sp. (A.K. Ghosh and Agarwala, 1993). India (Meghalaya, Sikkim, W Bengal).

***Greenidea (Paragreenidea) viticola* Takahashi**

Apt. brownish yellow, sometimes dusky on dorsum, with dark ANT and SIPH; BL 2.6–3.0 mm. On *Vitis cantonensis* in Taiwan.

Gypsoaphis* Oestlund*Aphidinae: Macrosiphini**

A genus for one N American species on *Lonicera* related to old world *Hyadaphis* and *Semiaphis*, but with SIPH reduced to pores, a rounded CAUDA, and a full set of marginal abdominal tubercles.

***Gypsoaphis oeslundi* Hottes**

Plate 13f, Figure 38b

Apt. green, wax-covered; BL 1.5–3.3 mm. Al. have secondary rhinaria on ANT III and IV. On young shoots and leaves of *Lonicera* spp. in N America (Hottes and Frison, 1931). Life cycle unknown. $2n=4$.

Hallaphis Doncaster

Aphidinae: Macrosiphini (?)

Four African species with a spinulose head, no ANT tubercles, usually 5-segmented ANT, *Rhopalosiphum*-like SIPH and a short rounded cauda; an unusual combination which means that their systematic position is uncertain. The two species of which apt. are known feed on grass roots, and the morphological convergence with *Rhopalosiphum* is probably due to this rather than to any taxonomic affinity. Van Harten (1972b) provided keys to the al. morph.

Hallaphis ilharcoi van Harten

Apt. dark olive-green (imm. brownish yellow); BL 1.3–1.8 mm. Sec.rhin. in al. III 3–7. On roots of grasses (*Tricholaena rosea*?) a few cm. below the surface, attended by ants (*Pheidole* sp.). Only known from Angola (Ilharco, 1972b).

Hallaphis rhodesiensis (Hall)

Apt. green; BL 1.7–2.1 mm. On roots of unidentified Gramineae. Africa south of Sahara (see Millar, 1994).

Hayhurstia del Guercio

Aphidinae: Macrosiphini

One species on Chenopodiaceae with very small, slightly clavate SIPH with a small flange, distinctly shorter than the finger-like cauda.

Hayhurstia atriplicis (L.)

Plate 14b

Apt. green, covered with white wax powder; BL 1.5–2.9 mm. On Chenopodiaceae, usually *Atriplex* and *Chenopodium* spp, living inside pod-like yellowish pseudogalls formed by rolling leaves upwards. Widespread in Europe and Asia, also in N and C Africa, and N and C America. Mon. hol., with ovip. in Oct.; males apt. or al. (Heie, 1992). 2n=14.

Helosiphon Leclant

Aphidinae: Macrosiphini

One European species, possibly related to *Anuraphis*, with unusual features of SIPH and anal plate.

Helosiphon eryngii Leclant

Plate 9g

Apt. yellow to gray–green orange with dark appendages, sometimes with a reddish area anterior to SIPH; BL 1.4–2.1 mm. Living on *Eryngium campestre*, at bases of petioles and at stem bases, attended by ants. In S France and Spain. Mon. hol., with apt. males (orig. descr.).

Hillerislambersia A.N. Basu

Aphidinae: Macrosiphini

One species in N India with very long fine-pointed dorsal body hairs, thick SIPH with distal reticulation, and a short cauda.

Hillerislambersia darjeelingi A.N. Basu

Plate 28a

Apt. pale green, with a longitudinal dark green stripe on each side of thorax and anterior abdomen; BL 2.3–2.9 mm. Described from large colonies on undersides of leaves of a *Lonicera* sp. in W Bengal, causing inward rolling and hardening of leaves. It has since recorded from *Holboellia latifolia* (possibly the true host?) and *Rhododendron* sp (Raychaudhuri, 1980). Life cycle unknown; apparently anhol. in type locality.

Himalayaphis A.K. Ghosh and Verma

Aphidinae: Macrosiphini

One very large species in northern India with markedly clavate SIPH, long ANT and long dorsal hairs with knobbed apices and tuberculate bases. The nearest relatives would appear to be *Rhododendron*-feeding genera such as *Chaetomyzus* and *Neoacyrthosiphon*.

Himalayaphis anemones A.K. Ghosh and Verma

Apt. greenish, BL 4.2–4.7 mm, collected from undersides of leaves of *Anemone* sp. in H.P., India. Al. are still undescribed and the life cycle is unknown.

***Holmania* Szelegiewicz**

Aphidinae: Macrosiphini

One species in Mongolia with long thick capitate dorsal hairs and 5 hairs on first tarsal segments like *Chaetosiphon* and a similar host association with *Potentilla*, but with SIPH having both hairs and polygonal reticulation. R IV+V is relatively long and hairy.

***Holmania chaetosiphon* Szelegiewicz**

Plate 16d

Apt. probably whitish in life with dark joints to ANT segments, dark ANT PT, dark femoral and tibial apices, tarsi and R IV+V; BL 1.7–2.0 mm (based on 4 apt. in BMNH colln, leg. H. Szelegiewicz). Described from one vagrant al. on *Stipa*, but *Potentilla sibirica* (= *pennsylvanica*) was subsequently recorded as the host (Holman and Szelegiewicz, 1972).

***Hyadaphis* Kirkaldy**

Aphidinae: Macrosiphini

About 15 palaeartic species associated with Caprifoliaceae and/or Umbelliferae of the tribe Apiodeae, with 14 of the 22 recorded host genera in the subtribe Apiaceae. The best-known species alternate between *Lonicera* and the aerial parts of Umbelliferae. Morphologically, *Hyadaphis* are similar to *Lipaphis*, and both these genera were placed in *Rhopalosiphum* in some earlier accounts. Heie (1992) reviewed the species found in Fennoscandia and Denmark. Remaudière and Halbert (2000) provided keys to all morphs of the 3 species introduced to America. There is no satisfactory account of the world fauna.

***Hyadaphis agabiformis* (Nevsky)**

Apt. yellowish orange with a fine pruinose secretion; BL c.1.3–1.4 mm. (Specimens in ethanol turn black.) On *Bupleurum linearifolium* in Kazakhstan.

***Hyadaphis bicincta* Börner**

Apt. gray–green, probably pruinose; BL 1.2–2.0 mm. In upwardly-rolled leaves of *Lonicera nigra* in Europe (France, Austria, Czech Republic).

***Hyadaphis bupleuri* Börner**

Apt. green or brownish green, with darker appendages, BL 1.6–1.9 mm. (Specimens remain pale in ethanol (see *agabiformis* and *mongolica*). In often dense colonies on upper sides of leaves, young shoots and inflorescences of *Bupleurum* spp. In Europe (Austria, France, Germany, Hungary, Poland, Czech Republic, Ukraine). Mon. hol. with ovip. and apt. males in Sept (BMNH colln, leg. C.Börner).

***Hyadaphis coriandri* (Das)**

Plate 13a, Figure 41b

Apt. dirty greenish in color with dark green dorsal mottling and rust-red patches at bases of dark brown SIPH, variably dusted with white mealy wax; BL 1.3–2.1 mm. On numerous species of Umbelliferae (*Anethum*, *Carum*, *Coriandrum*, *Cuminum*, *Daucus*, *Foeniculum*, *Pimpinella*), living mainly in the umbels. *Coriandrum* is particularly susceptible to attack (Blackman and Eastop, 2000). Occasionally found colonizing plants outside the Umbelliferae (*Mentha*, *Amaranthus*, *Glycine*). Probably of Asian origin, now in Portugal, Spain, the Mediterranean region, the Middle East, C Asia, India, Pakistan, Africa, USA (Florida) and Peru. Probably anhol. over much of its range, but a holocycle with a sexual phase on *Lonicera nummulariifolia* occurs in Iran, the progeny of the fundatrix all migrating to Umbelliferae in the second generation (Remaudière and Halbert, 2000). 2n=12*, 13 and 14.

***Hyadaphis ferulae* Kadyrbekov**

Apt. yellowish tinged with gray; BL 1.6–2.0 mm. On *Ferula* spp. in Kazakhstan. Apart from the slightly shorter SIPH, the description does not clearly distinguish this species from *H. coriandri*.

***Hyadaphis foeniculi* (Passerini)**

Plate 13b, Figure 38g

Apt. grayish green or light green with dark appendages; BL 1.3–2.6 mm on primary hosts, 1.4–2.0 mm on secondary hosts. On *Lonicera* spp., especially *L. xylostemum*, and sometimes *Symphoricarpos*, curling leaves upwards in spring, migrating to various Umbelliferae, where they colonise stems, leaves and inflorescences. Common secondary hosts are *Angelica*, *Apium*, *Conium*, *Foeniculum*, *Pastinaca*, *Peucedanum* and

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Pimpinella, but apparently not *Daucus*. Widespread in Europe, especially in the north, eastward to Turkey and Iraq, and in N America (New York, New Brunswick, California). Confused in the literature with *H. passerinii*, and populations with intermediate conditions can occur, indicating that hybridisation may occur where hol. populations are sympatric. There are possibly two other undescribed species close to *H. foeniculi* in Lebanon (BMNH colln, leg. D. Hille Ris Lambers); apt. from *L. etrusca* have the cauda paler and more pointed than usual, and apt. from *L. nummularifolia* have a mesosternal sclerite in addition to the usual prosternal one (noted by Remaudière and Talhouk, 2000: 164). $2n=14$ for samples of *H. foeniculi* from *Conium* and *Foeniculum*. One sample from *Lonicera* had $2n=13$ (a *foeniculi* × *passerinii* hybrid?), and one sample from *Foeniculum* had a mixture of $2n=12$ and $2n=14$ individuals (R.L. Blackman, previously unpublished data).

Hyadaphis galaganiae Nevsky

Apt. yellow–green with dark appendages; BL c.1.6 mm. On *Muretia* (= *Galagania*) *fragrantissima* in S Kazakhstan. SIPH are short, and the description does not distinguish it from *H. coriandri*.

Hyadaphis mongolica Szelegiewicz

Apt. pale green to yellowish green, with dark appendages; BL 1.5–1.8 mm. Specimens become black in ethanol. On *Bupleurum scorzonerifolium*, colonising especially the flower stems, in Mongolia and N Korea (Lee *et al.*, 2002c).

Hyadaphis passerinii (del Guercio)

Figure 38f

Apt. grayish green or light green with dark appendages; BL 1.2–2.4 mm on primary hosts, 1.0–1.9 mm on secondary hosts. On *Lonicera* spp., especially *caprifolium* and *periclymenum*, curling leaves upwards in spring, migrating to various Umbelliferae, particularly *Daucus*, and also on *Conium* and *Pastinaca*, colonising stems, leaves and inflorescences. Anhol. on Umbelliferae in warmer climates. In Europe, especially the south, Mediterranean region, Middle East, Pakistan, India, and introduced to southern Africa, Australia, New Zealand, N and S America. Confused in literature with *H. foeniculi* (q.v.). $2n=12$ for 12 samples from *Lonicera* and one sample from *Daucus* (cf. *foeniculi*).

Hyadaphis polonica Szelegiewicz

Apt. green to yellowish green, coated with wax powder, with dark green appendages; BL 1.6–2.0 mm. On upper part of root of an umbelliferous plant, probably *Carum carvi*, in Poland, and recorded also in Finland, from *Lonicera*, its primary host (Heie, 1992).

Hyadaphis tataricae (Aizenberg)

Apt. yellow–green to brownish yellow, coated with grayish wax powder; BL 1.1–2.5 mm. On *Lonicera* spp. in Europe, C Asia and N America. Mon. hol., with ovip. and al. males in late Aug–Nov (Voegtlin, 1984b). Remaudière and Halbert (2000) provide discriminants from *H. coriandri* and *H. foeniculi/passerinii* for all morphs. $2n=14$

Hyalomyzus Richards

Aphidinae: Macrosiphini

A *Myzus*-like genus with 9 N American species, plus 3 little-known Indian species which possibly do not belong here. *Hyalomyzus* are related to *Ovatus* but have clavate SIPH and apt. with a strongly wrinkled tergum. Several of the N American species apparently have a sexual phase on *Crataegus*, but none of their life cycles have been properly studied (Voegtlin, 1984a). Bhattacharya (1994) reviewed the Indian species. Stoetzel *et al.* (1999) reviewed the genus and provided a cladistic analysis and key to the N American species.

Hyalomyzus collinsoniae (Pepper)

Figure 48c,d

Apt. greenish to purple or wine-colored; BL 1.3–2.0 mm. Al. have dark-bordered wing veins and numerous sec.rhin.; III 42–65, IV 18–42, V 1–9. On *Collinsonia canadensis* and *Salvia azurea* (Labiatae); also collected on a *Crataegus* sp., which is presumably the primary host. In western USA (New York, Pennsylvania, Mississippi, N Carolina). Closely related to *H. eriobotryae*; Stoetzel *et al.* (1999) discussed the differences, largely restricted to al.

***Hyalomyzus eriobotryae* (Tissot)**

Plate 18b

Apt. greenish purple to brown, with light fluffy wax at tip of cauda; BL 1.0–2.0 mm. Sec.rhin. in al. III 40–60, IV 22–40, V 5–19. The presumed secondary host populations occur on *Lycopus virginicus* in eastern N America, and are also recorded from *Hyptis capitata* in Cuba (Holman, 1974b). The sexual phase occurs on *Crataegus* and possibly other woody Rosaceae, but host alternation has not been adequately demonstrated (Stoetzel *et al.*, 1999).

***Hyalomyzus fragaricola* L.K. Ghosh**

Color of apt. in life unrecorded; BL c.1.6–1.7 mm. Al. unknown. On *Fragaria* sp. in N India (H.P.).

***Hyalomyzus himachali* Bhattacharya**

Color of apt. in life unrecorded; BL 1.9–2.1 mm. Al. unknown. On *Rubus* sp. in India (H.P.).

***Hyalomyzus jussiaeae* Smith**

Apt. dirty greenish brown, with reddish area around SIPH; BL 1.3–1.9 mm. Sec.rhin. in al. III 26–39, IV 9–24, V 3–9. On *Ludwigia* (= *Jussiaea*) spp. in C America (Cuba, Puerto Rico, Honduras) and USA. Also collected on *Drosera capillaris* and *Isnardia* (= *Ludwigia?*) *intermedia* (as *H. tissoti* (Nielsson and Habeck, 1971). Possibly heter. hol. in parts of USA, with sexual morphs collected on *Crataegus* in Oct (Stoetzel *et al.*, 1999).

***Hyalomyzus mitchellensis* Smith**

Apt. pale to dark green, or light amber to orange, with black SIPH; BL 1.3–1.9 mm. On *Hypericum mitchellianum* in N Carolina, USA, living at bases of leaf axils and on flower buds, and on stems under rocks. Also on *Hypericum* sp. in Pennsylvania (Nielsson and Habeck, 1971, as *H. sensoriatum*). Mon. hol., with ovip. and apt. males in Oct (orig. descr.).

***Hyalomyzus monardae* (Davis)**

Apt. yellow–brown; BL 1.2–1.6 mm. Sec.rhin. in al. III 7–9, IV 0–5, V 0–1. On *Monarda fistulosa*, twisting and curling the leaves (Hottes and Frison, 1931, as *Phorodon monardae*). Widely distributed in USA. [Note: ICZN (Opinion 1818, Sept. 1995) has ruled in favor of an application to suppress *scrophulariae* Thomas in favor of *monardae* Davis.]

***Hyalomyzus orphnophlebos* Stoetzel, Jensen and Miller**

Color of apt. in life unknown; BL c.1.6–1.8 mm. Al. have dark-bordered wing veins, and sec.rhin. III 37–50, IV 10–17, V 0–4. On *Collinsonia serotina*, and also collected from *Crataegus aestivalis*, the presumed primary host (Stoetzel *et al.*, 1999). In USA (Mississippi).

***Hyalomyzus pocosinus* Stoetzel, Jensen and Miller**

Apt. red, with tip of cauda covered in light fluffy wax; BL 1.0–1.7 mm. Sec.rhin. in al. III 22–34, IV 10–21, V 5–10. On lower stem and rootlets of *Triadenum virginicum* in Maryland, USA. Mon. hol. with ovip. and apt. males in Oct (Stoetzel *et al.*, 1999).

***Hyalomyzus raoi* Hille Ris Lambers**

Color of apt. in life unknown; BL 2.3–2.8 mm. Sec.rhin. in al. III 35–42, IV 7–11, V 0–1. On *Rubus* spp. in India. Al. have a dark dorsal abdominal patch which may justify its placement in a separate genus, *Neohyalomyzus* (R.C. Basu *et al.*, 1976; Stoetzel *et al.*, 1999). However because al. of the two other Indian species are unknown their position is also uncertain, so for the present we retain all three in *Hyalomyzus*. 2n = 8 (Khuda-Bukhs and Kar, 1990).

***Hyalomyzus sensoriatum* (Mason)**

Color of apt. in life unknown; BL probably c.2 mm. Sec.rhin. in al. III 45–62, IV 27–43, V 11–17. Described from the primary host, *Crataegus*, in Washington, DC, and probably with host alternation to *Lycopus americana*, as al. males and gynoparae from Long Island, New York (BMNH colln, leg. M.D. Leonard) seem to be this species.

***Hyalomyzus triangulatus* Voegtlin**

Apt. pale yellow to greenish yellow in spring, with pale yellow appendages, SIPH darker yellow with dusky apices, abdomen darker yellow-green in autumn; BL 1.1–1.6 mm. In leaf axils on *Hypericum* spp. in eastern USA (Illinois, Maryland). Mon. hol., with ovip. and al. males in Oct–Nov (Voegtlin, 1984a).

***Hyalopteroides* Theobald**

Aphidinae: Macrosiphini

One species with the morphological adaptations often associated with grass feeding; elongate body, short blunt R IV+V and short appendages, as well as very short, flangeless SIPH.

***Hyalopteroides humilis* (Walker)**

Plate 14f

Apt. pale yellowish, with pale appendages; BL 2.3–3.0 mm. On upper sides of leaves of *Dactylis glomerata*, leaves of which are turned brown by heavy attacks. Usually specific to this host, with only single records from grass species in other genera (*Bromus*, *Holcus*, *Muhlenbergia*, *Tridens*). Europe, and introduced to USA (Essig, 1953). Mon. hol. with ovip. and al. males on Oct (Heie, 1994). Dransfield (1979) reported on parasitoids. 2n=16.

***Hyalopterus* Koch**

Aphidinae: Aphidini

A genus now restricted to 2–3 species related to *Rhopalosiphum* but with smaller SIPH, alternating between *Prunus* spp. and *Phragmites*. The many only distantly related species with small SIPH formerly placed in *Hyalopterus* are now distributed in other genera. The precise number of species of *Hyalopterus* is uncertain. Specimens from plums and close relatives tend to have more slender SIPH and smaller marginal abdominal tubercles than those from apricot, peach, and almond, and these two forms are generally regarded as distinct species, although the differences are not always consistent on a world-wide scale, and there may be a third, still unrecognised species (see below), so we have not attempted to separate them in keys. Stroyan (1984) and Heie (1986) reviewed the genus.

***Hyalopterus amygdali* (Blanchard) and *Hyalopterus pruni* (Geoffroy)**

Plate 9d

Apt. pale green mottled with darker green, covered with white wax meal, on leaves of *Phragmites* spp., sometimes on *Arundo donax* and other Gramineae, or Cyperaceae, in watery situations; BL 1.5–2.6 mm. Heter. hol. in temperate regions, with sexual phase on *Prunus*; primary hosts of *H. pruni* are mainly *Prunus domestica* and *P. armeniaca*, and those of *H. amygdali* are *P. amygdalus* and *P. persica*. Spampinato *et al.* (1988) and Masco *et al.* (1997) found electrophoretic differences which indicate that the name '*H. amygdali*' probably includes two sibling species, one mainly colonising *P. amygdalus* and the other favoring *P. persica* as primary host. *H. pruni* is cosmopolitan, but may have geographical races or subspecies, e.g. in SE Asia (Eastop, 1966). *H. amygdali* is recorded from Europe, Mediterranean region, Middle East, C Asia, Pakistan and China. Populations of *Hyalopterus* on *Phragmites* along the rivers of tropical Africa, e.g. the Gambia, are presumably entirely parthenogenetic. See also Blackman and Eastop (1994, 2000). 2n=10 for both species.

***Hydaphias* Börner**

Aphidinae: Macrosiphini

A palaeartic genus on *Galium* and related Rubiaceae, characterised by the thin, often inwardly curved, flangeless SIPH. Heie (1992) provided an account of the species in Scandinavia.

***Hydaphias carpaticae* Mamontova-Solukha**

Apt. dirty yellow with pale green spinal stripe; BL c.1.9–2.0 mm. Colonising stems of *Galium intermedium* in Ukraine. Al. have 26–28 sec.rhin. on ANT III and 5–6 on IV, whereas al. of other described species have 10–20 on III and 0–4 on IV.

***Hydaphias molluginis* Börner**

Plate 13g, Figure 29k

Apt. dirty green or greenish yellow with dark appendages; BL 1.4–2.0 mm. In ant-attended colonies close to ground, on shoots and flower stems that become deformed and stunted. Described from *Galium mollugo* in Germany. The name *H. hofmanni* Börner is commonly applied to very similar aphids on *G. verum* that tend to

have smaller marginal abdominal tubercles, but the development of such tubercles is notoriously variable and environmentally dependent. None of the other characters that have been used in the literature were consistent in separating the specimens from *G. verum* and *G. mollugo* in the BMNH collection, and it seems probable that experimental work may show that one variable species is involved. *H. helvetica* Hille Ris Lambers, described from *G. verum* and completely lacking marginal abdominal tubercles, is also likely to be a synonym. Aphids of the *H. molluginis* group occur throughout Europe, and across Asia to E Siberia and Korea. Ovip. occur in Sept.

Hydaphias mosana Hille Ris Lambers

Figure 29j

Apt. dull, pale yellowish green to dark green with dusky appendages; BL 1.0–1.6 mm. On subterranean parts of *Galium mollugo* and *G. verum*, attended by ants. Throughout Europe, including England and Spain (BMNH colln, leg. J.H. Martin), eastward to Turkey. Ovip. and apt. males in Sept (orig. descr.).

Hydronaphis Shinji

Aphidinae: Macrosiphini

Five species in E Asia with spinulose head, long dorsal hairs and a short cauda, described from a wide variety of host plants, generally feeding on subterranean parts. Life cycle is known of only one species. Miyazaki (1971) reviewed the Japanese species, but in Japan there are also possibly undescribed species from Hamamelidaceae, Hydrangeaceae, Marantaceae, Myrtaceae and Orchidaceae (M. Miyazaki, pers. comm.).

Hydronaphis calanthes Sorin

Apt. reddish orange with blackish brown SIPH and pale cauda; BL c.2.1–2.3 mm. On *Calanthe discolor* in Japan, attacking the plant at ground level. Al. and other morphs undescribed.

Hydronaphis colocasiae Raychaudhuri, Raha and Raychaudhuri

Color and size of apt. unknown. BL of al. c.2.7–2.9 mm. Sec.rhin. in al. III 9–13, IV 0, and a black dorsal abdominal patch (Singh *et al.*, 1980). On *Colocasia* sp. in India (Nagaland).

Hydronaphis impatiens Shinji

Plate 17d

Apt. black with black antennae, SIPH and cauda; BL c.2 mm. At stem-bases and on roots of *Impatiens* spp. in Japan. Heter. hol., with a return migration to the primary hosts *Corylopsis* spp., in Oct (Takahashi, 1986).

Hydronaphis laportae Miyazaki

Apt. dull yellow with dorsum dark brown to black, SIPH pale with black apices, cauda pale; BL 1.6–1.8 mm. Sec.rhin. in al. III 28–37, IV 8–14, V 2–6. On undersides of leaves (orig. descr.), or perhaps more commonly on roots (Takahashi, 1986), of *Laportea bulbifera* in Japan.

Hydronaphis liriopes Aida

Apt. whitish yellow, with a dark green to blackish central abdomen patch, black SIPH and pale cauda; BL 1.6–1.9 mm. Sec.rhin. in al. III 33–43, IV 10–18, V 0–4. On roots of *Liriope platyphylla* in Japan.

Hyperomyzus Börner

Aphidinae: Macrosiphini

About 18 species associated with *Ribes* as primary hosts, and mostly having liguliflorous Compositae as secondary hosts, but some (subgenus *Hyperomyzella*) migrating to Scrophulariaceae. Except for the swollen SIPH they resemble *Nasonovia*, which have similar biology. *Hyperomyzus* s.str. (5 species) and subgenus *Hyperomyzella* are of palaeartic origin, while 8 of the 12 known species of subgenus *Neonasonovia* are nearctic. Hille Ris Lambers (1949), Heinze (1961), Müller (1969b) and Heie (1994) gave accounts of the European species, and Hille Ris Lambers (1974) reviewed some species of *Neonasonovia*. American species are mostly found in accounts of *Amphorophora*, in which genus many of them were originally described.

Hyperomyzus carduellinus (Theobald)

Plate 21e

Apt. pale green with brown apices to segments of ANT and legs; BL 1.8–2.7 mm. Al. generally have a more solid and compact central abdominal patch than in the very similar *H. lactuca*, and sec.rhin. III 34–64, IV 14–31, V 5–13. On various Compositae (*Gynura*, *Ixeridium*, *Lactuca*, *Prenanthes*, *Reichardia*, *Senecio*, *Sonchus*, *Taraxacum*, *Tridax*). In southern Africa, India, Japan, Korea, SE Asia, Australia, New Zealand, Fiji, and more recently recorded from Florida (Halbert *et al.*, 2000). Apparently entirely anhol. 2n=12.

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Hyperomyzus (Neonasonovia) gansuensis (Zhang, Chen, Zhong and Li)

Apt. green; BL 2.0–2.4 mm. On *Zanthoxylum nitidum* (unlikely to be the true host) in Gansu Prov., China (Zhang, 1999, as *Liosomaphis*).

Hyperomyzus (Neonasonovia) hieracii (Börner)

Apt. shining brownish black, with black SIPH; BL 1.7–2.0 mm. On upper parts of stems and in inflorescences of *Hieracium* spp. in Europe (UK, Denmark, Germany, Austria, Switzerland). Sexual morphs undescribed.

Hyperomyzus (Neonasonovia) inflatus (Richards)

Apt. color in life not noted; BL c.2.0–2.2 mm. Al. undescribed; specimens in BMNH (Pennsylvania, N Carolina) have a black dorsal abdominal patch and sec.rhin. III 56–67, IV 14–18, V 3–5. The apt. was described from *Solidago* sp. in Minnesota, USA, but subsequent records (Maine, N Carolina, Pennsylvania: BMNH colln) have all been from *Hieracium*, and this is probably the true host.

Hyperomyzus lactucae (L.)

Plate 21d

Apt. opaque green with pale appendages; BL 2.0–3.2 mm. Al. have a rather fragmented dark dorsal abdominal patch, pale brownish SIPH, and sec.rhin. III 30–62, IV 4–22, V 0–8. Heter. hol. in temperate regions with *Ribes* spp., esp. *nigrum*, as primary hosts, feeding on undersides of young leaves which curl slightly and acquire yellow spots. Migrating in late May–June to form colonies on upper parts of stems and flowerheads of *Sonchus* spp, and occasionally other related Compositae. Common and almost world-wide, except southern Africa; in tropics it tends to be replaced by *H. carduellinus* (q.v.). Anhol. on *Sonchus* in warmer regions. See also Blackman and Eastop (2000). 2n=12.

Hyperomyzus lamsanae (Börner)

Apt. ivory white, with dark apices to segments of ANT and legs; BL 2.3–3.0 mm. Sec.rhin. in al. III 45–75, IV 18–32, V 3–12. On undersides of leaves of *Lampsana communis*. Europe. Mon. hol. with ovip. and al. males in Oct (Hille Ris Lambers, 1953). 2n=12.

Hyperomyzus (Neonasonovia) nabali (Oestlund)

Apt. shiny green, SIPH brown on distal half; BL 2.0–3.0 mm. Sec.rhin. in apt. III 3–27, in al. III 87–130, IV 31–53, V 0–15. On stems, flowerheads and undersides of leaves of *Prenanthes* (= *Nabalus*) *alba* in eastern N America (also there are two al. from Utah in BMNH colln, leg. G.F. Knowlton, that appear to be this species). Apparently heter. hol., with sexual phase on *Ribes gracile* (and perhaps other *Ribes* spp.; spring forms described by Mason, 1925, as *Amphorophora hayhursti* and *A. pergandei*).

Hyperomyzus (Neonasonovia) niger (McVicar Baker)

Apt. very shiny black; BL 1.3–1.8 mm. Al. unknown. On *Stevia* spp. in Mexico. Apt. redescribed by Hille Ris Lambers (1974).

Hyperomyzus (Neonasonovia) nigricornis (Knowlton)

Only al. described, BL 1.3–1.8 mm, sec.rhin. III 46–68, IV 3–11. On *Ribes aureum* and *R. nigrum* in Utah, USA (Knowlton and Allen, 1945, as *Amphorophora*). Probably heter. hol., migrating to a composite sec.host; some apt. and al. in BMNH colln from either *Hieracium* or *Picris* (leg. J.H. Martin) seem to be this species, which is very similar to *H. ribiellus* but with darker tibiae and SIPH, and more sec.rhin.

Hyperomyzus pallidus Hille Ris Lambers

Apt. opaque greenish or yellowish white with pale appendages; BL 2.3–3.5 mm. Al. have a more or less solid black dorsal abdominal patch, and black SIPH (cf. *lactucae*). In spring colonies at shoot tips and on undersides of young curled leaves of *Ribes uva-crispa*, and sometimes *R. alpinum*. Heter. hol., migrating to *Sonchus* spp., where it colonises undersides of lower leaves (Hille Ris Lambers, 1953). Europe, W Siberia, and (introduced to) N America.

Hyperomyzus (Neonasonovia) petiolaris (Knowlton and Allen)

(= *Amphorophora fronki* Knowlton)

Apt. green, siph. darker on distal halves; BL 2.1–2.4 mm. Sec.rhin. in apt. III 12–15, in al. III 50–77, IV 2–8. On foliage of *Ribes* spp. (*nigrum*, *petiolaris*) in western USA (Washington, Utah). Probably mon. hol. on *Ribes* (ovip. in late July; Palmer, 1952, as *Amphorophora fronki*).

Hyperomyzus (Neonasonovia) picridis (Börner and Blunck)

Plate 21g

Apt. shining yellow-green with brownish dorsal intersegmental markings and dusky siph.; BL 2.4–3.0 mm. Heter. hol. with *Ribes alpinum* as primary host, migrating to *Picris* spp., *Crepis* spp. and *Rhagadiolus stellatus*. Also recorded from *Hieracium* sp. (Theobald, 1926, as *Amphorophora hieracioides*), but the host plant may have been misidentified. Colonies on *Picris* are usually fairly small and occur just beneath the inflorescences. Widespread in Europe. Ovip. and al. males in Oct (Hille Ris Lambers, 1949). 2n=12.

Hyperomyzus (Hyperomyzella) rhinanthi (Schouteden)

Plate 21f

Apt. yellowish green, green or dark green with extensive shiny black dorsal sclerotisation including a large abdominal patch, ANT and legs mainly black, SIPH and cauda black; BL 2.4–3.0 mm. Spring colonies feed on young growth of *Ribes* spp. (*aureum*, *rubrum*), curling and distorting leaves into leaf-nests. Heter. hol., migrating to flowers of certain Scrophulariaceae; *Rhinanthus* spp. (esp. *major*), *Euphrasia* spp. (Heie, 1994) and *Pedicularis verticillata* (Austria, BMNH colln, leg. H.L.G. Stroyan). It seems to prefer cool moist habitats. Europe, incl. Iceland and Faroes, and Canada (Québec: Cloutier *et al.*, 1986). 2n=12.

Hyperomyzus (Neonasonovia) ribiellus (Davis)

Apt. yellow-green to green, with pale SIPH that are only very slightly swollen on distal half; BL c. 1.9–2.1 mm. Sec.rhin. in apt. III 7–37, in al. III 30–43, IV 0 (–1). In ant-attended colonies on shoot tips and undersides of young leaves of *Ribes* spp. in N America. Mon. hol., with al. males (Palmer, 1952, as *Amphorophora ribiella*). Davis (1909) provided a full description of this aphid under the name *Macrosiphum cynosbati*. 2n=12.

Hyperomyzus (Neonasonovia) sandilandicus (Robinson)

Apt. green, BL 2.2–2.9 mm. Al. have markedly tuberculate sec.rhin. distributed III 39–63, IV 0 (–2). On *Crepis tectorum* in Canada (Manitoba).

Hyperomyzus sinilactucae Zhang

Apt. unknown. Al. (4 specimens) similar to *H. lactucae* but with more sec. rhin. (III 61–94, IV 19–32, V 7–8). On *Cirsium segetum* (which may not be the true host) in Hebei Prov., China.

Hyperomyzus (Neonasonovia) thorsteinni Stroyan

Apt. bright yellow-green, shining; BL 1.5–2.0 mm. On *Euphrasia* spp., on young growth and in inflorescences which become slightly curved and stunted. Iceland, Norway and UK. Mon. hol., with al. males (Stroyan, 1972b, as *H. boernerii* ssp. *thorsteinii*).

Hyperomyzus (Neonasonovia) zirnitsi Hille Ris Lambers

Apt. shiny green; BL 2.2–2.9 mm (spring), 1.8–2.4 mm (summer). Sec.rhin. in al. III 75–101, IV 16–34, V 0–4. In spring colonies on shoot apices, petioles and curling leaves of *Ribes* spp. (*alpinum*, *rubrum*). Europe, and Mongolia. Heter. hol., migrating to *Euphrasia* spp. (Ossiannilsson, 1959) and also *Pedicularis* sp. A subspecies with a shorter cauda and fewer sec.rhinaria, *H. zirnitsi* ssp. *boernerii* Prevost, lives monoecciously on *Euphrasia rostkoviana* in Switzerland, and its al. are reported from Finland (Heikinheimo, 1990).

Hysteroneura Davis

Aphidinae: Aphidini

A monotypic genus characterised by the hind wing with a single oblique vein, the long terminal process of the antenna and the long pale cauda.

Hysteroneura setariae (Thomas)

Rusty Plum Aphid

Plate 9a

Apt. brown with black SIPH and pale CAUDA; BL 1.3–2.1 mm. In colonies at the bases of the spikelets of many genera and species of Gramineae, sometimes on leaves or unripe seeds, often attended by ants. Some-

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times on Cyperaceae and on seedlings of oil palms and coconuts. Heter. hol. in temperate N America with a sexual phase usually on *Prunus domestica*. Of N American origin, with anhol. populations now widely distributed throughout the warmer parts of the world after rapid spread in mid-1960's. Carver (1976) found sexuales and eggs on *P. persica* in Australia, but it is not known whether the holocycle was completed. See also Blackman and Eastop (2000). $2n=12$.

Idiopterus Davis

Aphidinae: Macrosiphini

A genus for one distinctive fern-feeding species.

Idiopterus nephrolepidis Davis

Plate 19g, Figure 43i

Apt. black with pale legs, pale ANT ringed with black, SIPH black basally and pale distally, and a black cauda; BL 1.2–1.6 mm. Al. have broadly black-bordered forewing veins and a large white spot on pterostigma. On many genera and species of ferns (*Acrostichum*, *Adiantum*, *Asplenium*, *Anemia*, *Blechnum*, *Blotiella*, *Ceropteris*, *Dicranopteris*, *Dryopteris*, *Gymnocarpium*, *Nephrolepis*, *Pityrogramma*, *Polypodium*, *Poly-stichum*, *Pteridium*, *Pteris*). Records from other plants are probably all vagrants. Perhaps neotropical in origin (Holman, 1974b), now almost cosmopolitan, but confined to glasshouses and caves in northern temperate regions. Apparently entirely anhol. See Steffan (1962) and Heie (1994) for further information. $2n=13$.

Illinoia Wilson

Aphidinae: Macrosiphini

About 45 North American species and one from the Caucasus. *Illinoia* are mostly characterised by weakly clavate SIPH bearing distally a few rows of polygonal reticulation. The species from cultivated *Rhododendron* mostly bear 5 hairs on the first tarsal segments. The subgenus *Masonaphis* contains about 8 species, 6 of them on Ericaceae in N America. *Illinoia* s.str. contains about 30 species, 9 of them (including the Russian one) associated with Ericaceae, with 6 of the species known from eastern North America. Seven species of *Illinoia* s.str. and one *Masonaphis* live on Compositae. The 3–4 species of subgenus *Oestlundia* are associated with *Rubus* and the 2 subspecies of *Amphorinophora* live on *Lonicera*. MacGillivray (1958) revised *Illinoia* (= *Ericobium*) using the name *Masonaphis* for the full genus. See also Blackman and Eastop (1994).

Illinoia andromedae (MacGillivray)

Apt. shiny bright green with darker appendages, BL 1.9–2.3 mm. Specimens beaten from mixed vegetation of *Andromeda glaucophylla* and *Vaccinium myrtilloides* fed on leaves of *A. glaucophylla*, which is thus the only confirmed host plant. Only known from apt. collected in Québec, Canada.

Illinoia azaleae (Mason)

Figure 46a

Apt. rather shiny deep green; BL 1.9–2.7 mm. Al. have quite dark wing-veins. On young stems and leaves of *Rhododendron* spp. (incl. azaleas); also sometimes on other Ericaceae (*Andromeda*, *Leucothoe*, *Pieris*, *Vaccinium*) and occasionally on some other plants (*Myrica*, *Viola*, *Tulipa*). In eastern N America, and introduced to Europe, S Africa, Hawaii, Australia and New Zealand. Life cycle unknown; ovip. sometimes occur, but not males. In colder climates it is an indoor or glasshouse pest of potted azaleas and can cause defoliation. A form described by Tissot and Pepper (1944) from *Kalmia latifolia* in Pennsylvania was regarded by MacGillivray (1958) as a subspecies, *Illinoia azaleae* ssp. *kalmiaflora*. It differs in the ratio of R IV + V to HT II from *I. azaleae* on *Rhododendron* (1.6–1.7 in *kalmiaflora*, 1.1–1.45 in *azaleae*), and is probably a good species. On the other hand, *Amphorophora rhododendronia* Mason, regarded as a subspecies of *azaleae* by MacGillivray, should probably be treated as a synonym. $2n=10$.

Illinoia borealis (Mason)

Color in life not recorded, probably green with dark SIPH; BL 1.7–2.5 mm. On new growth of Ericaceae (*Vaccinium*, *Gaultheria*), and also recorded from *Myrica aspleniifolia*. In north-eastern USA. Specimens in the BMNH colln from *Clintonia* identified as *borealis* seem to be *pallida* (q.v.).

Illinoia brevitarsis (Gillette and Palmer)

Apt. pale yellowish green to yellow; BL 2.3–3.2 mm. On leaves of *Clematis ligusticifolia* in western USA. Mon. hol., al. males and ovip. in late Sept–Oct (Palmer, 1952). [In BMNH colln. there is an undescribed *Macrosiphum* sp. from the same host in Oregon (leg. D. Hille Ris Lambers, no. T85), distinguishable by the characters given in the key.]

Illinoia canadensis (MacGillivray)

Apt. rather shiny, yellowish green mid-dorsally, darker green laterally with dark spots at the bases of the dark-tipped SIPH; BL c.2.7 mm. On *Myrica* sp. in New Brunswick, Canada. Life cycle unknown.

Illinoia ceanothi (Bartholomew)

Apt. green, BL 2.0–2.5 mm. On leaves on unidentified *Ceanothus* sp(p). in California, USA. Sec. rhin. in al III 5–9 on basal part (BMNH colln, leg. R.C. Dickson and H.L.G. Stroyan). Mon. hol., with ovip. and apt. males in Oct (BMNH colln, leg. R.C. Dickson).

Illinoia corylina (Davidson)

Apt. color in life unknown: BL 2.3–2.5 mm. Sec. rhin. in apt. 2–4, in al. III 23–28. Host plant uncertain; described from *Corylus rostrata*, but Davidson (cited in Mason, 1925) stated that it was more common on ‘ninebark’ (*Physocarpus capitatus*), and in the BMNH colln (leg. D. Voegtlin) there are 2 apt. and 2 imm. that run to this species in MacGillivray’s (1958) key, but collected from *Aquilegia formosa*. Apt. hitherto undescribed. Only known from California (USA).

Illinoia (Amphorinophora) crystleae (Smith and Knowlton)

Apt. pale whitish green, with pale appendages, dark only on tarsi and R IV+V; BL 3.7–5.0 mm. On leaves of *Lonicera involucrata* in western N America. Ovip. and al. males occur in Aug–Sept (MacGillivray, 1958; Palmer, 1952). A form described by Essig on *L. ledebourii* in California (as *Amphorophora bartholomewi*) is regarded as a subspecies, *I. crystleae* ssp. *bartholomewi*. 2n=16*.

Illinoia (Oestlundia) davidsoni (Mason)

Plate 25d

Apt. pale green, slightly waxy, with brown–black SIPH; BL 3.3–4.3 mm. On leaf petioles and undersides of leaves of *Rubus parviflorus* in western N America. *Amphorophora arnicae* Glendenning is regarded as a synonym, with host alternation between *Rubus* and *Arnica* spp. suspected (MacGillivray, 1958), but this has still not been confirmed experimentally. The collection data for the BMNH specimens suggests that there may be two similar species on *Arnica*, one migrating from *Rubus* and the other not. 2n=12.

Illinoia dzhibladzeae Shaposhnikov

Apt. yellowish brown, shining brown dorsally, SIPH paler with black apices; BL 1.9–2.5 mm. On undersides of leaves and on young shoots, flowers and fruits of *Rhododendron flavum* and *Rhododendron* sp. in Ukraine, Georgia and Turkey (BMNH colln, leg. N Tuatay).

Illinoia finni (MacGillivray)

Apt. undescribed, but some large greenish white apt. collected on *Vaccinium* sp. in Idaho (BMNH colln, leg. J.H. Martin) could be this species; BL of these apt. 3.3–3.4 mm. BL of al. paratypes 2.2–2.5 mm (2 specimens), collected on ‘huckleberry’ (*Gaylussacia* or *Vaccinium*; we have included it under both these genera) in Ohio, USA. Close to *I. pepperi* (MacGillivray, 1958).

Illinoia goldamaryae (Knowlton)

Figure 49a

Apt. bright green (Essig, 1942, as *Amphorophora patchiae*); BL 1.8–2.9 mm. Forming dense colonies on young growth of species of *Aster*, *Conyza*, *Erigeron* and *Solidago* (MacGillivray, 1958). Widespread in USA and E Canada, and introduced to England, where it was common in the London area on cultivated Michaelmas daisies and golden rods in 1960–62, but has not been recorded since 1973. Sexual morphs and life cycle unknown; the population introduced to England was apparently anhol.

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Illinoia gracilicornis (MacGillivray)

Apt. (ovip.) reddish with 'delicate glassy extremities'; BL 1.7–2.0 mm. On *Cercocarpus montanus* in Colorado, USA. Only ovip. are known.

Illinoia grindeliae (Williams)

Apt. grayish green, SIPH pale with dusky apices; BL 1.6–2.5 mm. Al. may have 1–2 sec. rhin. on ANT IV and V, as well as 17–21 on III. On *Grindelia squarrosa*, and possibly specific to this host, in western and central USA and Canada. MacGillivray (1958) differentiated some samples from Colorado and Utah as a subspecies (*palmerae*), giving the host as *Grindelia* sp., but paratypes that she donated to the BMNH colln are labeled as collected from *G. squarrosa*, and specimens subsequently collected do not provide evidence of any correlation between morphology and geographical distribution or host plant.

Illinoia (Masonaphis) lambersi (MacGillivray)

Figure 46b

Apt. green, pink or yellow, often mixed in same colony; BL 2.2–3.3 mm. On young leaves, shoots and flowers of *Rhododendron* spp. Native to western N America, and introduced to Europe (UK, Denmark, Netherlands, Germany) and S America (Chile). Life cycle unknown, probably mainly anhol. in Europe (Hille Ris Lambers, 1973a). 2n=10.

Illinoia macgillivrayae (Hille Ris Lambers)

Apt. pale yellowish green; BL 2.6–3.2 mm. Sec. rhin. in al. III 7–9 (1 specimen, BMNH colln). In small colonies on young leaves of *Raphiolepis indica*, and subsequently found on other Rosaceae (*Chaenomeles japonica*, *Pyrus kawakamii*, *Holodiscus discolor* and *Spiraea* sp.), as well as one sample from *Corylus cornuta* (BMNH colln, leg. C.-k. Chan). In western USA (California) and Canada (B.C.). Very similar to *I. spiraeae*, but larger and with a relatively longer R IV+V.

Illinoia masoni (Knowlton)

Apt. bluish green, with pale appendages; BL 1.8–2.8 mm. On leaves of *Helianthus* spp. in western USA (Palmer, 1952). In laboratory tests, Rogers and Thompson (1978) found various degrees of resistance to this species in N American perennial species of *Helianthus*.

Illinoia (Oestlundia) maxima (Mason)

Apt. white with black SIPH (unpubl. observations, RLB); BL 2.9–3.9 mm. Al. have dark pterostigma and a dark spot at tip of forewing. On leaves of *Rubus parviflorus* in western N America (B.C. to California). Mon. hol. with abbreviated life cycle, ovip. and al. males being produced in 3rd or 4th generation from late May (Calif.) – July (Frazer and Forbes, 1968). Population dynamics of this aphid (Gilbert, 1980) and its interactions with a parasitoid (Gilbert and Gutierrez, 1973) have been studied intensively. 2n=12.

Illinoia (Masonaphis) menziesiae Robinson

Apt. green to salmon pink; BL 2.0–2.5 mm. Al. unknown. On undersides of leaves of *Menziesia ferruginea* in Alberta, Canada. Also collected in B.C. (BMNH colln, leg. C.-k. Chan.) Mon. hol., with ovip. and imm. males in early Sept. (SIPH are unusual for genus in having little or no distal swelling. The specimens described by Robinson are probably fund.) 2n=10*.

Illinoia pallida (Mason)

Apt. color in life unrecorded; BL 1.7–2.6 mm. Al. undescribed. On *Clintonia borealis* in north-eastern USA and Canada (Maine, New Brunswick). Apt. redescribed by MacGillivray (1958).

Illinoia (Masonaphis) paqueti (MacGillivray)

Figure 46c

Apt. whitish, yellowish or reddish, wax-dusted, with black-tipped SIPH; BL 3.1–4.0 mm. On felty undersides of old senescing leaves of *Rhododendron* (= *Ledum*) *groenlandicum* in Canada (Québec, Labrador) and Alaska (BMNH colln). Mon. hol., with ovip. and al. males in late Aug. (MacGillivray, 1958).

Illinoia pepperi (MacGillivray) Figure 56c,d
 Apt. green or red, with rather dark ANT, legs and SIPH; BL 1.7–2.8 mm. On *Vaccinium* spp. in north-eastern N America. Mon. hol. with ovip. and al. males in Oct (MacGillivray, 1958). Elsner and Kriegel (1989) studied distribution and seasonal phenology in Michigan. $2n=28$ (Blackman and Eastop, 2000).

Illinoia phacelia (Essig)
 Apt. green with dark-tipped appendages; BL c.2.5–2.7 mm. On undersides of leaves of *Phacelia* sp. in California, USA. Al. redescribed by MacGillivray (1958).

Illinoia (Masonaphis) pinawae (Robinson) Figure 46e
 Apt. pale yellowish green; BL 1.9–2.5 mm. Al. undescribed. On *Rhododendron* (= *Ledum*) *groenlandicum* in Canada (Manitoba, Ontario).

Illinoia (Masonaphis) rhododendri (Wilson) Figure 46b,d
 Apt. green or pink, sometimes with dorsal cuticle sclerotic and rather smoky; BL 2.4–2.8 mm. On *Rhododendron* sp(p) in north-western USA. Life cycle uncertain but may be abnormal, with fund. in late July, and possible early production of sexuals (MacGillivray, 1958).

Illinoia (Masonaphis) rhokalaza (Tissot and Pepper)
 Apt. light yellowish brown, sometimes with greenish tinge, with dark brown to ANT, legs and SIPH; BL 2.2–2.9 mm. On *Rhododendron* spp., *Leucothoe fontanesiana* and *Kalmia latifolia* in eastern USA (MacGillivray, 1958).

Illinoia richardsi (MacGillivray)
 Apt. white with pale appendages, with only apices of ANT segments, apices of tibiae and tarsi darker to blackish; BL 2.6–3.2 mm. Al. are also very pale but have brownish head, thorax, ant. and legs, and rather dark wing veins. On undersides of leaves and in inflorescences of *Anaphalis margaritacea* and *Gnaphalium bicolor*; often found in the inflorescences with *Uroleucon russellae*. Widely distributed in USA and Canada. Hille Ris Lambers (1966a) described a form in California with thicker and less swollen SIPH as a subspecies, *I. richardsi* ssp. *pacifica*. Sexual morphs and life cycle unknown. $2n=10$.

Illinoia (Oestlundia) rubicola (Oestlund)
 Apt. greenish yellow, often with a broad dark green spinal stripe; BL 3.1–4.6 mm. Al. with dark pterostigma and large black spot at tip of forewing. On stems of *Rubus idaeus* var. *strigosus*, and occasionally on other closely-related *Rubus* spp., widely distributed in N America. Mon. hol., with ovip. and al. males in Oct. $2n=12$.

Illinoia simpsoni (MacGillivray)
 Apt. color in life unknown; BL 1.8–2.1 mm. On *Linnaea borealis* in Maine, USA.

Illinoia spiraeae (MacGillivray)
 Apt. color in life unknown; BL 2.7–2.9 mm. Al. undescribed. On *Spiraea* spp. in north-western USA (Oregon) and B.C., Canada. There are also samples in BMNH colln from certain other shrubby Rosaceae (*Holodiscus discolor*, *Photinia davidiana*), and also from plant genera in other families (*Deutzia*, *Rhus*, *Salix*, *Yucca*) indicating that this species has polyphagous tendencies. $2n=10$.

Illinoia spiraeicola (Patch)
 Apt. various hues of red, green and yellow; BL 2.5–3.2 mm. On *Spiraea* spp., widely distributed in N America. Specimens identified as this species have also been collected from undersides of leaves of a tall *Thalictrum* sp. Redescribed by MacGillivray (1958).

Illinoia subviride (MacDougall)
 Apt. delicate green, similar in color to hairs of the host plant. On *Aster alpinus* in Washington, USA. $2n=10^*$.

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Illinoia thalictri (MacGillivray)

Apt. very pale sea-green to yellowish green, lightly wax-dusted; BL 2.0–2.3 mm. On leaves and petioles of an unidentified *Thalicttrum* sp. in Colorado, USA. Mon. hol. with ovip. and al. males in Sept (MacGillivray, 1958).

Illinoia wahnaga (Hottes)

Apt. pale whitish green to milky white, with black eyes; BL 2.2–2.6 mm. Living singly on undersides of leaves of Convallariaceae (*Convallaria*, *Maianthemum*) in N America (Colorado, B.C., Manitoba). Ovip. and apt. males in Sept–Oct in Manitoba (Robinson, 1965). 2n=10.

Impatientinum Mordvilko

Aphidinae: Macrosiphini

A small genus typically host-alternating between *Smilax* and *Impatiens* in Asia, although two species have spread on *Impatiens* spp. to Europe, and one was described from *Cuphea* in Mexico. Reviews are available for Europe (Heie, 1994), Japan (Miyazaki, 1971) and Korea (Lee and Havelka, 2001a).

Impatientinum americanum Remaudière

Apt. shining black; BL 1.7–2.2 mm. On *Cuphea aequipetala* in Mexico. Al. are unknown.

Impatientinum asiaticum Nevsky

Plate 25f, Figure 33a,c

Apt. bright green, pink or red, with extensive shiny brown-black dorsal shield, black SIPH and yellow to whitish cauda; BL 2.1–3.1 mm. On undersides of leaves along main veins, and later in dense colonies on flowerstalks, of *Impatiens* spp., especially *I. parviflora*. Probably originally in C Asia (Tien Shan), now widely distributed in Europe (Holman, 1971; Heie, 1994). A subspecies, *I. asiaticum* ssp. *dalhousiensis*, was described from *Smilax parvifolia* in NW India (Verma, 1969, as *I. impatiensae dalhousiensis*). *I. asiaticum* s.str. is mon. hol. on *Impatiens* in Europe (with al. males), but the N Indian subspecies may be heter. hol. between *Smilax* and *Impatiens*. 2n=16.

Impatientinum balsamines (Kaltenbach)

Apt. green with extensive shiny black dorsal shield, black SIPH and pale cauda; BL 2.0–2.7 mm. Singly or in small colonies on undersides of leaves of *Impatiens* spp. but especially associated with *I. noli-tangere*. Probably E Asian in origin, now widely distributed in Europe and Asia. Mon. hol. with al. males. 2n=16.

Impatientinum impatiens (Shinji)

Figure 33b,d

Apt. yellowish green to bluish green or orange–red with an extensive shiny black dorsal shield, black SIPH and pale cauda; BL 2.4–3.5 mm. On *Impatiens* spp. (especially *I. textori*) in Asia (Japan, Korea, E Siberia, Taiwan, N India). Fund. were described from *Smilax china* in Japan (Miyazaki, 1971), so there is presumably a host alternation between *Smilax* (primary host) and *Impatiens*, but this needs to be confirmed experimentally. *Macrosiphum smilaceti* Takahashi is probably a synonym. 2n=16.

Impatientinum (Neoimpatientinum) smilaceti Agarwala, Mondal and Raychaudhuri

Color of apt. in life not recorded, presumably green or reddish with broad dark marginal longitudinal bands, black SIPH and pale cauda; BL 2.8–3.0 mm. On *Smilax macrophylla* in Sikkim, India. [This is a secondary homonym of *Macrosiphum smilaceti* Takahashi, if that species is *I. impatiens*.]

Indiaphis A.N. Basu

Aphidinae: Macrosiphini

Four Indian species on Ericaceae, closely related to *Ericolophium*, and possibly not warranting a separate genus. A.K. Ghosh (1991) provided a key to species. Al. have dark dorsal abdominal cross bands or a quadrate patch.

Indiaphis crassicornis A.N. Basu

Plate 23g, Figure 46h

Apt. pale glassy white, dusted with wax; BL 1.7–2.0 mm. Sec. rhin. in al. III 21–40, IV 0–8. On *Rhododendron* spp. in India (Punjab, W Bengal). Al. males in Punjab in Nov (BMNH colln, leg. C.I.B.C.).

Indiaphis indica (L.K. Ghosh, Verma and Raychaudhuri)

Apt. color in life unrecorded, probably pale with dark-tipped SIPH; BL 1.4–2.4 mm. Sec. rhin. in al. III 44–56, IV 1–7, V 0–2. On an unidentified *Rhododendron* sp. in India (H.P., U.P.).

Indiaphis rostrata A.K. Ghosh and Raychaudhuri

Apt. pale yellow; BL 1.8–2.0 mm. On undersides of leaves of an unidentified *Rhododendron* sp. in India (Sikkim). Only known from apt.; these were collected in March and may be fund., which would explain the 5-segmented ANT and short PT. However, because of the long R IV+V they are probably not fund. of *I. crassicornis*.

Indiaphis setosa (Hille Ris Lambers and A.N. Basu)

Apt. green to dark green, with brown legs and dark brown SIPH; BL 1.6–2.2 mm. Sec. rhin. in al. III 8–12, IV 0. On *Agapetes* (= *Pentapterygium*) *serpens*, often in rather large colonies on tender parts of shoots and sometimes on undersides of leaves. India (W Bengal).

Indoidiopterus Chakrabarti, A.K. Ghosh and Raychaudhuri

Aphidinae: Macrosiphini

One E Asian species on *Geranium*. The species was transferred to *Neotoxoptera* by Naumann-Etienne and Remaudière (1995), but the unusual nature of the spiracular plates and the dorsal hairs, taken together with the wing venation of the al., seems to warrant the reinstatement of the genus.

Indoidiopterus geranii (Chowdhuri, R.C. Basu, Chakrabarti and Raychaudhuri)

Figure 30e,f

Color of apt. unrecorded; BL 1.6–1.8 mm. Al. was described by Chakrabarti *et al.* (1972). On *Geranium* spp. in NW India and Pakistan. Al. males were trapped in Pakistan (Naumann-Etienne and Remaudière, 1995; as *Neotoxoptera geranii*). 2n=12.

Indomasonaphis Verma

Aphidinae: Macrosiphini

(= *Neomasonaphis* A.K. Ghosh and Raychaudhuri)

Three species in N India and Pakistan, at least two of which have host alternation between *Rhododendron* and Compositae. They have characters (e.g., spinulose hind tarsi, al. with numerous sec.rhin.) shared with other members of a group of Asian genera associated with *Rhododendron* (*Chaetomyzus*, *Ericolophium*, *Indiaphis*).

Indomasonaphis anaphalidis (A.N. Basu)

Figures 34a, 46g

Apt. elongate oval, rather shiny pale green to lemon yellow, BL 3.4–4.8 mm. Al. have variably developed black dorsal abdominal patch. Males are al. Originally described from *Anaphalis triplinervis* in W Bengal, feeding on tender shoots and leaves without causing noticeable damage, and since recorded from various other Compositae (*Inula*, *Ageratum*, *Gerbera*, *Senecio*, *Artemisia*), as well as some unlikely hosts (*Eurya japonica*, *Morus alba*, *Oxalis corniculata*). Heter. hol. with sexual phase on *Rhododendron* spp. in N India (Verma, 1971, as *Indomasonaphis indica*; Chakrabarti *et al.* (1983) as *Indomasonaphis tuberculatus*) and Pakistan (Naumann-Etienne and Remaudière, 1995, as *Neomasonaphis tuberculatus*).

Indomasonaphis inulae (A.K. Ghosh and Raychaudhuri)

Apt. elongate-bodied, color in life unrecorded, probably pale; BL 2.8–3.4 mm. On *Rhododendron* sp. and *Inula cappa* in N India. Host alternation between these two plants (with *Rhododendron* as the primary host) is believed to occur (Chakrabarti *et al.*, 1983; Chakrabarti and Banerjee, 1993a). 2n=32 (Kurl and Chauhan, 1988).

Indomasonaphis rumicis (Chakrabarti and Raychaudhuri)

Apt. green to brown; BL c.3.8–3.9 mm. Al. have dark dorsal abdominal cross-bands. On undersides of leaves of an unidentified *Rumex* sp., and (as 2 al. males) on *Oxyria digyna*, in N India (U. P.). Also collected (as

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immature al.) on *Gerbera* (assuming that ‘*Garbera*’ was a typographic error), which is a more probable host for a species in this genus. Al. males in Oct (orig. descr.).

Indomegoura Hille Ris Lambers

Aphidinae: Macrosiphini

Four species in E Asia with dark, somewhat swollen SIPH reticulated at apices. Two species have Staphyleaceae as primary hosts. The other two species were described from unidentified plants. Zhang and Qiao (1998b) reviewed the genus in China.

Indomegoura indica (Van der Goot)

Plate 20i

Apt. orange yellow, covered in white wax, with stout, dark SIPH; BL 3.1–4.2 mm. On leaves of *Hemerocallis* spp., which is the secondary host plant. Migration occurs to *Staphylea bumalda* and *Euscaphis japonica* (Miyazaki, 1971). However, there is some uncertainty about the life cycle as Takahashi (1923), in describing the biology, recorded apt. sexup. and both apt. and al. males on the primary host plant. In Japan, Korea, China, Taiwan and India. $2n=10$.

Indomegoura nigrotibiae (Tao)

Apt. color in life unknown; BL 2.2–2.5 mm. On *Staphylea bumalda* (Miyazaki, 1971). Taiwan, Japan and Korea (Lee *et al.*, 2002c). Al. undescribed.

Iowana Hottes

Aphidinae: Aphidini

One nearctic species known only from two apt. collected in Iowa, USA in 1925 with very short and sparse hairs on body and appendages, a short rounded cauda, short flangeless SIPH, well-developed marginal tubercles and a little-differentiated anal plate. It should possibly be regarded as a subgenus of *Aphis*.

Iowana frisoni Hottes

Apt. color unknown, ‘most likely pale green’; BL c.2.1–2.2 mm. In leaf axils of *Silphium laciniatum* in Iowa, USA.

Ipuka van Harten and Ilharco

Aphidinae: Macrosiphini

Two species on Compositae in Africa and SE Asia, possibly most closely related to *Aulacorthum*, but ANT of apt. as well as al. bear numerous sec.rhin. on III–V, and immatures have spinulose hind tibiae (van Harten and Ilharco, 1976).

Ipuka dispersa van Harten and Ilharco

Plate 22e

Apt. greenish yellow with ill-defined dark transverse bars on thorax and abdomen, dark red eyes, ANT black except at base of III, legs yellowish except for black knees and tarsi, SIPH black and cauda pale yellowish; BL 1.6–2.2 mm. On *Emilia* spp., often living concealed in leaf sheaths. In Africa, Sri Lanka, SE Asia and Australia. Apparently anhol.

Ipuka melantherae van Harten and Ilharco

Apt. greenish yellow to yellowish orange, with an orange spot around SIPH, blackish SIPH and pale yellowish cauda; BL 1.8–2.2 mm. On undersides of leaves of *Melanthera* sp. in Angola.

Iranaphias Remaudière and Davatchi

Aphidinae: Macrosiphini

One species only known from Iran, apparently related to *Hydaphias* but with first tarsal chaetotaxy 2,2,2, much shorter SIPH and cauda, and apt. with numerous, long pointed dorsal hairs (Remaudière and Davatchi, 1959).

Iranaphias dehbandi (Remaudière and Davatchi)

Apt. are very broadly oval, dark-colored with slight pruinosity; BL 1.0–1.4 mm. Sec. rhin. in al. III 16–24, IV 0–3. On *Galium* sp. in Iran (Izadbar), at 2600 m altitude.

***Israelaphis* Essig**

Israelaphidinae

A small, distinctive and probably rather ancient genus of grass-feeding aphids found only in the Mediterranean region and western Iberia. The life cycle is very unusual, and related to the Mediterranean climate. The parthenogenetic phase exploits short-lived annual grasses with a winter growth period following autumnal rains, sexuals being produced and diapausing eggs laid in spring. Al. are apparently very rare and only known for one species, so dispersal is very limited. Barbagallo and Patti (1999) reviewed the genus and discussed its possible affinities. Nieto Nafria and Mier Durante (1998) reviewed the Iberian species.

***Israelaphis alistana* Mier Durante**

Apt. dark green, with rather darker appendages than *I. carmini*; BL 2.1–2.5 mm. On grasses (*Anthoxanthum*, *Vulpia*) in Spain (Zamora). Mon. hol. with ovip. and apt. males in May–June (Mier Durante, 1978, as *I. tavaresi* ssp. *alistana*). Ovip. are dark green (cf. *carmini*). Slide-mounted specimens are not reliably separable from *I. carmini*, and in view of the low dispersal ability of these aphids (no al. are known), it seems likely that the original subspecies designation of *alistana* was correct, and that it is a local isolated variant population of *carmini*. 2n=18.

***Israelaphis carmini* Essig**

Apt. greenish yellow, with slight wax covering, and pale appendages; BL 1.9–3.0 mm. On grasses (*Avena*, *Bromus*, *Hordeum*, *Koeleria*) in hilly regions of Israel, Sicily and Portugal. Mon. hol. with ovip. and apt. males in Mar–May (Ilharco, 1965, as *I. tavaresi*; Barbagallo and Patti, 1999). Ovip. are brown (cf. *alistana*). 2n=18.

***Israelaphis ilharcoi* Barbagallo and Patti**

Apt. grass-green or yellowish green, with slight whitish wax secretion, head brownish, appendages dark-tipped; BL 2.3–3.0 mm. Al. unknown. On grasses, esp. *Bromus* subg. *Anisantha*, in Sicily and Portugal. Mon. hol., with eggs hatching in Oct., apt. vivip. developing during winter months and giving rise to ovip. and apt. males in spring (Barbagallo and Patti, 1999).

***Israelaphis lambersi* Ilharco**

Plate 5a

Apt. greenish yellow to yellow; BL 2.0–2.9 mm. On upper surfaces of leaves of grasses (*Avena*, *Phalaris*, *Phleum*) in Portugal and southern Spain. Al. are very rare and have abnormal wing venation (Ilharco, 1966). Mon. hol.; apt. males in early spring (orig. descr.). 2n=16*.

***Iziphya* Nevsky**

Saltusaphidinae

About 14 species of squat-bodied, distinctively marked sedge-feeding aphids, leaping from host when disturbed. Al. have banded wing veins. Richards (1970) reviewed the world fauna and Heie (1982) the species in NW Europe.

***Iziphya albipes* Richards**

Apt. black with a pale area on anterior abdomen, yellowish median area on head, and yellowish tibiae and tarsi; BL c.1.5–1.8 mm. On *Carex* sp. (growing on rocky hillsides) in Québec, Canada.

***Iziphya americana* (Baker)**

Figure 19d

Apt. yellowish or grayish with black dorsal markings; BL c.2.1–2.4 mm. On *Carex* spp. in north-eastern USA and Canada. Ovip. were swept from *C. tribuloides* in Oct in Oregon (BMNH, leg. D. Voegtlin).

***Iziphya austriaca* Börner**

Apt. yellowish with blackish gray markings; BL 1.4–2.1 mm. On leaves of *Carex canescens*. Very closely related to, and possibly synonymous with, *I. bufo*; the very minor differences could be due to host plant and/or the wet habitat. In N Europe, Austria, Ukraine and Iran. *I. oettingenii* Quednau is possibly the fund. of this species (Quednau, in Remaudière and Remaudière 1997).

Iziphya bufo (Walker)

Plate 4d

Apt. yellowish with blackish gray markings, consisting usually of a pair of large dark areas on the metathorax and a dark arc joining SIPH; BL 1.4–2.0 mm. Al. have a dark central dorsal abdominal patch and broadly banded wing veins. On various *Carex* spp., especially *C. arenaria*, and also on *Cyperus rotundus* (BMNH colln, leg. R. van den Bosch), with odd records from *Juncus* and grasses; it seems to occur in drier situations than *I. austriaca*, such as sandhills and steppe regions. Ovip. and apt. males occur in Sept–Oct. Widespread in Europe. This is a very variable species, particularly with regard to the shape of the abdominal and tibial hairs, and its morphological discrimination from both *I. austriaca* and *I. memorialis* is not at all clear. Populations on *C. humilis* in France with very long posterior dorsal abdominal hairs (BMNH colln., leg. R. van den Bosch) will run to *I. bufo* in the key to *Carex* aphids, but are probably an undescribed species.

Iziphya flabella (Sanborn)

Apt. yellowish green, with dark dorsal markings usually consisting of paired dark areas on head, metathorax and abdomen, leaving a clear spinal stripe; BL 1.5–2.0 mm. On leaves of *Carex* spp. (especially small species in low-lying meadows). Widely distributed in N America. Ovip. and apt. males occur in early Oct (Palmer, 1952).

Iziphya ingegardae Hille Ris Lambers

Figure 19c

Apt. yellowish with dark dorsal markings; BL 1.8–2.2 mm. On *Carex canescens* and *C. leporina* in northern Europe (Sweden, Germany, Poland). Ovip. and apt. males in Sweden in early Sept (Ossiannilsson, 1959).

Iziphya mackaueri Quednau

Color of apt. in life not observed, presumably pale; BL c.2.3 mm. On *Carex* sp. in a wet bog in Ontario, Canada.

Iziphya maculata Nevsky

Apt. greenish yellow with dark dorsal markings of very variable extent; BL 1.6–1.9 mm. Head dark between ANT bases, but usually with a pale medial area between eyes. Described from *Cynodon dactylon* in Uzbekistan, and there have been subsequent collections from this host in Ukraine (Mamontova, 1959) and Czech Republic (BMNH colln, leg. P. Starý and J. Holman), so this may be a common host for this species, although it is also known from *Carex* sp., in Poland (Quednau, 1969), and from *Juncus* sp. Very heavily pigmented specimens with completely black heads, from *Carex ligerica* in Czech Republic (BMNH colln, leg. D. Hille Ris Lambers), also run to *maculata* in the key to *Carex* aphids, but may be a distinct taxon.

Iziphya memorialis Börner

Apt. probably yellowish with dark dorsal markings; BL 1.6–1.9 mm. On *Carex* spp. (*praecox*, *stellulata*, possibly *montana*) in Europe (Czech Republic, Austria, Germany., Poland and Sweden). Sexuials appeared in Sweden in early Sept (Ossiannilsson, 1959).

Iziphya mordvilkoï Quednau and Shaposhnikov

Apt. yellowish green with dark dorsal markings; BL c.2.1 mm. On *Carex* sp. in E.Siberia.

Iziphya spenceri Richards

Apt. color in life not observed, probably yellowish with dark dorsal markings; BL c.1.7–1.8 mm. Described from an unknown host in B.C., Canada, but it seems to be a palaeartic aphid occurring on *Carex* sp(p). in dry steppe country in Mongolia (Quednau, 1969; as *mongolica*), and also recorded from Hungary (Szelegiewicz, 1981).

Iziphya variabilis Quednau

Apt. color in life not observed, probably yellowish with dark markings; BL c.1.7–1.8 mm. On *Carex* sp. in mountainous steppe country in Mongolia.

Iziphya vittata Richards

Apt. rather elongate-bodied, yellowish or grayish with variable black dorsal markings, often consisting mainly of spots at hair bases, with ANT black except for basal part of segment III; BL 1.8–2.3 mm. On

leaves of *Carex* spp. in wet places, widely distributed in N America. Ovip. appear in Aug in Quebec (Hille Ris Lambers, 1960; as *I. punctata*).

***Jacksonia* Theobald**

Aphidinae: Macrosiphini

Three species related to *Myzus* but with distinctive SIPH morphology (one species, *sikkimensis* M.R. Ghosh, R.C. Basu and Raychaudhuri, is described from al. only, on an unidentified grass).

***Jacksonia campanulata* Chakrabarti and Raychaudhuri**

Appearance in life unrecorded; BL c.1.0–1.1 mm. On *Campanula* spp. in N India.

***Jacksonia papillata* Theobald**

Plate 18c

Apt. brownish green, olive-green, dull greenish yellow or reddish, slightly wax-powdered on underside, with brown head, ANT and legs, dark-tipped SIPH and dark cauda; BL 1.5–1.9 mm. On various grasses (*Dactylis*, *Deschampsia*, *Festuca*, *Poa*), living cryptically on colorless basal parts of stems. Often recorded from moss samples, not surprisingly in view of its habitat, but it is suspected to sometimes feed on mosses (Müller, 1973b), and there are also records, probably casual occurrences, from potato (orig. descr.), *Lysimachia* and *Veronica* (Heie, 1994). In regions with temperate oceanic climates throughout the world, including many oceanic islands (e.g., Iceland, Faroes, Azores, Auckland Is., Macquarie Is., S Georgia). Apparently anhol., and al. are rare (Stroyan, 1950a).

***Juncobia* Börner**

Saltusaphidinae

One species associated with *Juncus*, closely related to *Iziphyia* and perhaps not distinct enough to justify a separate genus. The ANT PT is very short, and the dorsal hairs are all fan-shaped and without tuberculate bases.

***Juncobia leegei* (Börner)**

Plate 4e

Apt. yellowish with blackish gray markings; BL 1.6–1.9 mm. On leaves of *Juncus* spp. in Europe, eastward to Ukraine. (The original host record from *Carex* was in error – see Börner, 1952). Al. have bordered wing veins with dark patches at the apices. Mon. hol.; ovip. and apt. males in Sweden in late Aug (Ossiannilsson, 1959; Heie, 1982).

***Kaburagia* Takahashi**

Eriosomatinae: Fordini

An E Asian genus related to nearctic *Melaphis* and likewise (in the one species where the life cycle is known) alternating between galls on *Rhus* and mosses. Only one sexuparous generation matures on mosses, overwintering in an immature stage, as in *Schlechtendalia chinensis* (q.v.).

***Kaburagia rhusicola* Takagi**

Appearance in life of imm. sexup., which hibernate on the moss *Erythrodontium leptothallum*, is undescribed. Al. sexup. mature in spring and migrate back to *Rhus* (Xiang, 1980/81). China and Korea.

***Kaltenbachiella* Schouteden**

Eriosomatinae: Eriosomatini

About 4 species associated with *Ulmus* as primary hosts and Labiatae as secondary hosts, and a fifth species recently described from galls on *Carpinus*. A.K. Ghosh (1981) reviewed and keyed the species, and there are also accounts for E Asia (Akimoto, 1985a) and China (Jiang *et al.*, 2004). See also Blackman and Eastop (1994).

***Kaltenbachiella elsholtziae* (Shinji)**

Apt. densely wax-coated; BL 1.1–1.4 mm. On *Elsholtzia* spp., living in small hollows between leaf veins. The leaves become intensely wrinkled and distorted around the hollows, and turn reddish purple along the midrib. In Japan, Korea and E Siberia. Al. sexup. emerge from the galls in Sept–Oct in Japan, migrating to an unknown primary host (Akimoto, 1985a). In the past this species has been erroneously regarded as the secondary host generations of *K. japonica*. 2n=32.

THE APHIDS

Kaltenbachiella nirecola (Matsumura)

Apt. presumably secreting abundant wax; BL 1.4–1.7 mm. On roots of *Polygonum orientale* in Japan (Akimoto, 1985a) and on *Persicaria hydropiper* in China (G. Qiao, pers. comm.). Heter. hol. with sexual phase and galls on *Ulmus* spp. (see Blackman and Eastop, 1994).

Kaltenbachiella pallida Haliday

Apt. yellowish white secreting flocculent wax; BL 0.9–1.3 mm. On subterranean parts of Labiatae (*Mentha*, *Galeopsis*, *Origanum*, *Thymus*). Immature stages are pale orange-yellow. Heter. hol. with sexual phase and galls on *Ulmus* spp. (see Blackman and Eastop, 1994). In Europe, N Africa, C Asia, Middle East, W Siberia and China. A population on *Mentha haplocalyx* in China was described as a subspecies, ***K. pallida* ssp. *dongtaiensis*** Zhang (in Zhang and Qiao, 1997b), although the reported differences would appear to warrant separate species status. $2n=28$.

Kaltenbachiella ulmifusa (Walsh and Riley)

Apt. yellowish orange with wax-wool (C.F. Smith, pers. comm.); BL unrecorded. On roots of *Lycopus virginicus* (transfers from primary host made by Smith, 1985), and possibly other Labiatae. Heter. hol. with sexual phase and galls on *Ulmus rubra* (see Blackman and Eastop, 1994). N America, and recently reported (on *Ulmus*) in China (Jiang *et al.*, 2004).

Kaochiaoja Tao

Aphidinae: Macrosiphini

Two E Asian species similar to *Neomyzus*, but apt. have no sec. rhinaria.

Kaochiaoja arthroxonis (Takahashi)

(= *Micromyzus granotiae* Ghosh, Ghosh and Raychaudhuri)

Apt. from *Arthroxon* in Taiwan were described as shining dark brown with yellowish brown head (orig. descr.). Apt. from an unidentified grass in West Bengal (BMNH colln, leg. D.K. Nath) also have a pale/dusky head, and those described as *Micromyzus granotiae* (from *Garnotia* sp.?) from W Bengal (A.K. Ghosh *et al.*, 1970a) also have a dusky head and are said to be dark brown in life with a coating of wax. However, apt. of Japanese populations on various Gramineae (e.g., *Microstegium*, *Digitaria*) are described as salmon pink to reddish brown in life, with a black head and dorsal abdominal patch (Miyazaki, 1971; as *K. pollinae*). Further work is needed to establish whether this is all one variable species. BL of apt. 1.0–1.6 mm. Al. (acc. to orig. descr.) have blackish head, thorax, ANT and SIPH, and yellow abdomen with a black patch between SIPH. In India (W Bengal), Taiwan and Japan.

Kaochiaoja pileophaga Zhang

Apt. black-brown; BL c.1.4–1.5 mm. On *Pilea notata* in Hunan Prov., China. Al. undescribed. Generic position is uncertain.

Karamicrosiphum Zhang

Aphidinae: Macrosiphini

One species in China related to *Macrosiphum* or *Sitobion*, with capitate dorsal hairs, and first tarsal segments with 4 hairs.

Karamicrosiphum humulosum Zhang and Qiao

Color in life unknown; BL c.2.9 mm. On *Humulus scandens* in Beijing, China (Zhang and Qiao, 1998c). This species should possibly be in *Sitobion*, where there are a number of other species with 4 hairs (2 sense pegs) on all first tarsal segments.

Klimaszewska Szelegiewicz

Aphidinae: Macrosiphini

A distinctive genus of 3 Asian species on Labiatae with well-developed spinal and marginal tubercles, very hairy RIV+V, first tarsal segments with 5 hairs, and al. with brown-bordered forewing veins. Kadyrbekov (1999b) provided a key to the species.

Klimaszewska dracocephali Szelegiewicz

Apt. whitish yellow; BL c.2.2 mm. On leaves of *Dracocephalum foetidum* in Mongolia.

Klimaszewska lophanthi Kadyrbekov

Apt. pale green; BL 2.2–2.5 mm. On flower stalks of *Lophanthus schrenki* in Kazakhstan (Kadyrbekov, 1999b).

Klimaszewska salviae (Nevsky)

Figure 48f

Apt. pale green; BL 2.5–3.0 mm. On stems and inflorescences of *Salvia sclarea* in Kazakhstan (Narzikulov and Umarov, 1969), and G Remaudière found it on *Salvia rhytidea* in Iran (Remaudière and Remaudière, 1997: 303).

Kugegania Eastop

Aphidinae: Macrosiphini

One African species characterised by the presence of a pair of spinal tubercles on the head, and al. with reduced wing venation and without a black dorsal abdominal patch.

Kugegania ageni (Eastop)

Apt. color in life unknown; BL 1.2–1.6 mm. Al. have forewings lacking a radius in more than 90 per cent of specimens and a once-branched media, and hindwings without oblique veins. On etiolated parts of grasses (*Digitaria*, *Pennisetum*) in Africa south of Sahara.

Laingia Theobald

Chaitophorinae: Siphini

One narrow-bodied species differing from *Atheroides* by the position of SIPH (on ABD TERG 6, as opposed to ABD TERG 5 in *Atheroides*) and by lack of a dorsal sclerotic carapace.

Laingia psammae Theobald

Apt. dirty straw-colored to grayish green; BL 1.6–2.8 mm. Al. with dark transverse bars on dorsal abdomen. Typically found in inflorescences of *Ammophila arenaria* in sand dunes, but also on *Calamagrostis epigeios* at more inland locations, and also recorded in Sweden from *Elymus*, *Calamagrostis arundinacea* and *Deschampsia caespitosa* (Heie, 1982), and in Iberian peninsula on *Carex acutiformis*. Widely distributed in Europe, C Asia, and also in E Siberia (Pashtshenko, 1988a). Mon. hol. with apt. males, ovip. being found in Iberia in Oct (Nieto Nafria and Mier Durante, 1998).

Landisaphis Knowlton and Ma

Aphidinae: Macrosiphini

A genus for one little-known N American species with flattened, mostly spatulate dorsal hairs, a reticulate dorsal cuticle and clavate SIPH. The sclerites of the spinal hairs on ABD TERG 6–8 are developed into rugose conical processes (less developed in al.).

Landisaphis davisii Knowlton and Ma

Figure 37a

Apt. color in life unrecorded, BL 0.9–1.4 mm. Described from apt. collected on undersides of leaves of *Chenopodium album*, although this perhaps requires confirmation as subsequent records have been from Cruciferae (*Lepidium perfoliatum*, *Descurainia sophia*; BMNH colln), and it has been reared on *Capsella bursa-pastoris* (A. Jensen, pers. comm). Only known from the state of Washington.

Lehrius Gredina

Aphidinae: Macrosiphini

One species in E Siberia with well-developed ANT tubercles and flangeless SIPH, seemingly close to *Jacksonia* but with a cauda more typical of a moss-feeding aphid, although it was not found on mosses.

Lehrius papillicaudus Gredina

Apt. yellowish green; BL c.1.2 mm. Al. unknown. On *Elsholtzia pseudocristata* in E Siberia. To judge from its description this species could be *Myzus isodonis* (Takahashi).

***Lepidaphis* Kadyrbekov, Renxin and Shao**

Aphidinae: Macrosiphini

Two eastern palaeartic species on *Lepidium* in desert regions, related to *Brevicoryne* and *Brachycolus* but with numerous hairs on front of head and ABD TERG 8, and a short ANT PT (Kadyrbekov *et al.*, 2002). Life cycles are unknown.

***Lepidaphis deformans* (Nevsky)**

Apt. greenish, with slight wax film; BL 1.7–2.2 mm. Sec. rhin. in al. (1 specimen) III 12–14. In leaf galls on *Lepidium* spp. in Uzbekistan, S Kazakhstan and Xinjiang-Uygur region of W China (Kadyrbekov *et al.*, 2002).

***Lepidaphis terricola* Kadyrbekov, Renxin and Shao**

Apt. greenish, with slight gray wax film; BL 1.9–2.1 mm. On roots of *Lepidium* spp. in SE Kazakhstan and Xinjiang-Uygur region of W China (Kadyrbekov *et al.*, 2002).

***Linaphis* Zhang**

Aphidinae: Macrosiphini

One species in China with most of the characters of a *Lipaphis*, and possibly belonging in that genus, in which case the more usual host may be a crucifer.

***Linaphis lini* Zhang**

Apt. grass-green; BL c.1.8 mm. On *Linum usitatissimum* in Yinchuan prov., China. Populations built up to damaging levels in July. Life cycle unrecorded.

***Linosiphon* Börner**

Aphidinae: Macrosiphini

Three palaeartic and one nearctic species resembling *Illinoia* in the tendency for SIPH to be swollen proximal to the subapical, reticulated zone, but the degree of swelling varies considerably within species. Heie (1994) provided an account of two species in Europe.

***Linosiphon asperulophagum* Holman**

Apt. green or pinkish with shiny brown-black dorsum, head and basal antennal joints, and dark SIPH BL 1.7–2.3 mm. Al. as yet undescribed; a specimen in the BMNH collection (leg. H.L.G. Stroyan) has ANT III with 5–6 small rhinaria, and dorsal abdomen with incomplete dark cross bars and large marginal and postsiphuncular sclerites. On undersides of leaves and upper parts of stems of *Asperula odorata* in Czech Republic. Records from other localities and from *Galium* spp. need confirmation as all other specimens in BMNH identified as *L. asperulophagum*, including those recorded from Hungary on *Asperula* by Szelegiewicz (1966), are referable to *L. galii* (q.v.). Ovip. and al. males in Oct (orig. descr.).

***Linosiphon galii* Mamontova**

Plate 26a

Apt. shiny green or brown with variably developed black pigmentation of dorsum, and having dusky brown SIPH with dark apices; BL 1.7–2.0 mm. Al. have incomplete dark dorsal abdominal cross bands and large marginal and postsiphuncular sclerites. On undersides of leaves of *Galium* spp. and *Asperula odorata*. This species has been confused with *L. asperulophagum* but has a shorter R IV+V and longer HT II, the ratio between these two providing a reliable discriminant. In Ukraine, Czechoslovakia, Hungary, Poland and Germany.

***Linosiphon galiophagum* (Wimshurst)**

Apt. shiny green, their SIPH pale with dark apices; BL 1.7–2.5 mm. Al. have dark marginal abdominal and intersegmental pleural sclerites but no dark cross-bands. On *Galium* spp., living on undersides of leaves along veins, and on young shoots. In Europe as far south as Corsica, and eastward to W Siberia. Ovip. in Oct (Heie, 1994).

***Linosiphon sanguinarium* (Hottes and Frison)**

Apt. with pearly white to yellowish head and posterior part of abdomen incl. SIPH and cauda, thorax and anterior abdomen being bright shining ruby-red (presumably due to sap of host); BL c.1.6 mm. On

undersides of leaves, feeding singly near larger veins, of *Sanguinaria canadensis*. In north-eastern and north-central USA. Mon. hol. (Hottes and Frison, 1931).

***Liosomaphis* Walker**

Aphidinae: Macrosiphini

Five species resembling *Cavariella* but without a supracaudal process, and typically associated with *Berberis*.

***Liosomaphis atra* Hille Ris Lambers**

Apt. dark purplish brown, dirty greenish in centre of dorsal abdomen, with pale legs and ANT, SIPH dark on distal half; BL c.1.3–1.6 mm. Al. have a brown dorsal abdominal patch (Ghosh and Pramanik, 1976). On *Berberis* spp. in E. Asia (India, Pakistan, China). 2n=17 (male? – Kurl and Chauhan, 1988)

***Liosomaphis berberidis* (Kaltenbach)**

(= *Liosomaphis turanica* Narzikulov)

Plate 16a, Figure 17e,f

Apt. yellow to yellow–green, or pinkish to orange–red (two color forms), slightly wax-powdered; BL 1.1–2.3 mm. Al. have dark head, thorax and antennae, but little or no dark dorsal abdominal pigmentation. On undersides of leaves of *Berberis* and *Mahonia*. Throughout Europe, east to India (BNMH colln), and introduced to N America, Australia and New Zealand. Ovip. and al. males appear in UK in late Sept–Nov. 2n=18.

***Liosomaphis himalayensis* A.N. Basu**

Apt. shiny pale yellowish, with green to yellowish brown markings on thorax and abdomen; BL 1.7–2.5 mm. Al. have dorsal abdomen with variable brownish sclerotisation (A.K. Ghosh, 1969). On undersides of leaves of *Berberis* spp. in India., Nepal and China. Al. males were found on snow in Dec at an altitude of 2490 m (Ghosh and Pramanik, 1976). 2n=18.

***Liosomaphis ornata* Miyazaki**

Apt. reddish brown or dark brown, mottled with dull green; BL 1.4–2.1 mm. Al. have a large dark dorsal abdominal patch. On leaves and young growth of *Berberis* spp. Japan, China (Zhang, 1999, as *Rhopalosiphoninus yuzhongensis*) and E Siberia. Fundatrices in early May (orig. descr.).

***Liosomaphis rhododendrophila* Zhang, Zhang and Zhong**

Apt. undescribed; BL of al. c.2.8 mm. On *Rhododendron simsii* in Yunnan Prov., China. Generic position uncertain, perhaps nearer *Chaetomyzus*.

***Lipamyzodes* Heinze**

Aphidinae: Macrosiphini

A genus for one species superficially resembling *Lipaphis*, but perhaps more closely related to *Myzus*.

***Lipamyzodes matthiolae* Doncaster**

Plate 12e

Apt. mid to dark green or blue–green, with the head pale gray and pulverulent; BL 1.9–2.5 mm. Al. have a solid black dorsal abdominal patch and black SIPH. Described from *Arabis* and *Matthiola*, and subsequently collected on *Galium* (BMNH colln, leg. J.P. Doncaster). In England and Wales, and single al. have been found on *Glaucium grandiflorum* in Lebanon (BMNH, leg. D. Hille Ris Lambers) and on *Cardaria draba* in USA (Washington; BMNH, leg. L. Fox). Life cycle and sexual morphs unknown.

***Lipaphis* Mordvilko**

Aphidinae: Macrosiphini

About 12 mostly western palaeartic species associated with Cruciferae, related to *Brevicoryne* and characterised by weakly developed ANT tubercles, apt. with short ANT which are almost always without sc. rhin., a sclerotic but often weakly pigmented tergum, and weakly swollen SIPH. Subgenus *Lipaphidiella* is distinguished by the presence of a conical, rather scabrous supracaudal process. Accounts are available by Doncaster (1954), Heinze (1960), Prior (1971) and Heie (1992).

THE APHIDS

***Lipaphis alliariae* Müller**

Apt. almost black; BL 1.6–2.1 mm. Sec. rhin. in al. III c.22, IV 5–6. On *Alliaria petiolata* in Europe (France, Sweden, Finland, Poland, Germany). Mon. hol. with ovip. and apt. males in Oct (Müller, 1955, as *erysimi* ssp. *alliariae*).

***Lipaphis cochleariae* Jacob**

Apt. dull olive green with variably-developed brown patches; BL 1.2–2.1 mm. Sec. rhin. in al. III 19–30, IV 5–11, V 0–4 (previously unpubl. data; BMNH colln, leg. H.L.G. Stroyan). On *Cochlearia officinalis* in the intertidal zone, on rosettes of young plants, or in flower-heads. Only known from UK (England, Scotland, Wales). Mon. hol., with ovip. and apt. males in Oct (Stroyan, 1957b).

***Lipaphis erysimi* (Kaltenbach)**

Apt. yellowish green, dirty green or brownish; BL 1.5–2.3 mm. Sec. rhin. in al. III 9–32, IV 2–10, V 0–3. On various Cruciferae (*Arabis*, *Capsella*, *Coronopus*, *Erysimum*, *Isatis*, *Lepidium*, *Matthiola*, *Sinapis*, *Sisymbrium*, *Thlaspi*, etc.), but not usually of field *Brassica* crops. Europe. Mon. hol. with apt. males. The name has been commonly applied to the world-wide crucifer pest, *L. pseudobrassicae* (q.v.). 2n=10.

***Lipaphis fritzmülleri* Börner**

Apt. dark green; BL 1.3–1.8 mm. Sec. rhin. in al. III 11–16. On *Sisymbrium* spp., occurring on flowers in spring and on lower leaves in summer. Sweden, Germany, Austria, W Russia and Iran. Mon. hol. with ovip. and small apt. males in Oct. 2n=10.

***Lipaphis (Lipaphidiella) jungarica* Kadyrbekov, Renxin and Shao**

Apt. greenish; BL c.1.7 mm. Sec. rhin. in apt. III 3–5 (1 specimen), in al. III 7–12, IV 0–3. On upper sides of leaves of *Syrenia siliculosa* in W China (Kadyrbekov *et al.*, 2002). Also recorded from *Hypecoum erectum* (Papaveraceae), but these could be vagr. al. (only 1 apt. was found, presumably on *Syrenia*).

***Lipaphis (Lipaphidiella) lepidii* (Nevsky)**

Figure 37b

Apt. pale green; BL 1.2–1.6 mm. Sec. rhin. in al. III 34–48, IV (0–) 1–6, V 0–1. On undersides of leaves, stems and flower-stalks of *Lepidium* spp. in Middle East and C Asia, eastward to Pakistan. A Romanian population with longer SIPH is regarded as a subspecies, *L. lepidii* ssp. *lepidiicardariae* (Knechtel and Manolache, 1944, as *Myzaphis*).

***Lipaphis pseudobrassicae* Davis**

Plate 12d

Apt. yellowish green, gray–green or olive–green, with a white wax bloom, which in humid conditions may become a dense mealy coat; BL 1.4–2.4 mm. Sec. rhin. in al. III 15–30, IV 3–13, V 0–3. On many genera and species of Cruciferae, incl. *Barbarea*, *Brassica*, *Capsella*, *Iberis*, *Raphanus* and *Rorippa*. An important world-wide pest of brassica crops (Blackman and Eastop, 2000). Mon. hol. in Japan, with apt. males (Kawada and Murai, 1979, as *L. erysimi*), and sexual morphs have also been reported from India, China and New Zealand, but predominantly anhol. in warm climates. 2n=8 or 9 (anhol. populations in most parts of the world have 2n=9).

***Lipaphis rossi* Börner**

Apt. dark gray–green with a slight waxy bloom, with a dark gray–brown head, broad dark gray–brown bars across the dorsum, and large marginal sclerites; BL 1.2–1.6 mm. Sec. rhin. in al. III 27–53, IV 10–26, V 2–12. Mon. hol. on *Arabis hirsuta*, with apt. males, in UK (Prior, 1971). Infested plants had stunted flower stems and deformed inflorescences. Also recorded from Netherlands, Denmark, Sweden and Germany (on *Arabis thaliana*; Heinze, 1960). A form on *Coringia orientalis* in Ukraine was described as a subspecies, *L. rossi* ssp. *coringiae* Bozhko, and a population agreeing with this subspecies was found in Finland on *Galium mollugo* (Heikinheimo, 1984). However, there is a possibility that this species will prove to be synonymous with *L. turritella*, as the only substantive difference is its smaller body size (V.F.Eastop, unpubl. data).

***Lipaphis (Lipaphidiella) ruderalis* Börner (= *Lipaphis berteroella* Mamontova)**

Figure 37c

Apt. grayish green; BL 1.8–2.2 mm. Sec. rhin. in al. III 35–40, IV 5–7. On undersides of leaves, stems and flower-stalks of *Lepidium* spp. in E Europe, and also in China (Tao, 1999). *L. berteroella* Mamontova, described from *Berteroa incana* and *Lepidium ruderales* in Ukraine, appears to be a synonym.

***Lipaphis sisymbrii* Bozhko**

Apt. yellow–green; BL c. 1.7–1.8 mm. Sec. rhin. in al. III 26–30, IV 8. On *Sisymbrium polymorpha* in Ukraine.

***Lipaphis turritella* (Wahlgren)**

Plate 12c

Apt. greenish yellow to yellowish brown, dusted with white wax; BL 1.5–2.3 mm. Sec. rhin. in al. III 40–53, IV 10–24, V 2–12. On *Arabis* (= *Turritis*) *glabra*, causing deformation of inflorescences. Also recorded from *Erysimum cheiranthoides* (Ivanoskaya, 1977). Europe, eastward to W Siberia and Ukraine.

***Lipaphis unguibrevis* Zhang**

Apt. color in life unrecorded; BL c. 1.9 mm. Sec. rhin. in al. III 5–8, IV 0–2. On *Brassica* sp. at 3800 m in Tibet.

***Lizerius* Blanchard**

Lizeriinae

A S American genus with primitive features and affinities to the African genus *Paoliella*. Hosts are known for four species, several others being known only from trapped al. All four species occur on trees in Lauraceae and Combretaceae, although one was described from *Bougainvillea* (Nyctaginaceae). Quednau (1974) reviewed the genus with keys to all known apt. and al. See also Blackman and Eastop (1994).

***Lizerius cermeli* Quednau**

Plate 6b

Apt. whitish with green head and darker ANT, legs and posterior abdominal processes; BL 1.8–2.4 mm. Described from a large colony of mainly al. on *Bougainvillea* sp(p). in Brazil, but recently apt. were found on *Combretum laxum* in Belize (BMNH colln, coll. J.H. Martin) which is probably a more usual host. Al. have been trapped in Argentina and Venezuela. Ovip. were found (on *Bougainvillea*) in Brazil (Curitiba) in early Nov (Quednau, 1974).

***Longicaudinus* Hille Ris Lambers**

Aphidinae: Macrosiphini

One E Asian species resembling *Longicaudus* but with differences in ANT morphology and first tarsal chaetotaxy (Hille Ris Lambers, 1965).

***Longicaudinus corydalisicola* (Tao)**

Apt. pinkish gray with pale appendages, a pale spinal stripe and glassy white wax secretion on sides and end of abdomen; BL 1.7–2.3 mm. Imm. are pale greenish yellow, and al. have a dark dorsal abdominal central patch. On *Corydalis* spp. in Japan and Taiwan.

***Longicaudus* van der Goot**

Aphidinae: Macrosiphini

A rather distinctive genus of c.6 species in Europe and Asia, typically host-alternating between *Rosa* and *Thalictrum*. They generally have short SIPH (completely absent in fund.), a long hairy cauda and a very long ANT III which in the al. bears numerous tuberculate rhinaria. The most recent revisions are by Chakrabarti and Banerjee (1991) and Remaudière (1993a).

***Longicaudus cornutus* Chakrabarti and Banerjee**

Apt. color in life unrecorded; BL c.2.5 mm. On *Thalictrum* sp. in U.P., India.

***Longicaudus dunlopi* Hille Ris Lambers**

Apt. creamy white; BL 1.7–2.4 mm on *Rosa*, 2.8–3.0 mm on *Thalictrum*. Heter. hol. with *Rosa canina* as primary host, migrating to *Thalictrum flavum* in marshy, often flooded situations (Remaudière, 1993a).

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Europe (France, Netherlands), and apt. collected on *Th. chelidonii* in India are possibly this species (Chakrabarti and Raychaudhuri, 1975), as also may be certain Japanese populations previously described as *L. trirhodus* ssp. *japonicus* Hille Ris Lambers (Remaudière, 1993a).

Longicaudus himalayensis Hille Ris Lambers

Described from 2 al. collected on ?*Quercus*, which according to Chakrabarti and Banerjee (1991) were gynoparae that originated from *Thalictrum* sp. An apt. from *Rosa* described as *himalayensis* (David *et al.*, 1971b) is included in the *Rosa* key on the basis of David *et al.*'s description, although it seems to be a different species with shorter SIPH and higher ratio of R IV+V to HT II (see Remaudière, 1993). *L. himalayensis* is also included in the *Thalictrum* key on the basis of information in the key by Chakrabarti and Banerjee (1991), who reared one apt. from *Thalictrum*. There is however no proper description of apt. of *L. himalayensis*, either from *Rosa* or *Thalictrum*.

Longicaudus kumauni Chakrabarti and Banerjee

Apt. color in life unrecorded; BL c.1.2 mm. On *Thalictrum* sp. in U.P., India.

Longicaudus naumanni Remaudière

Figure 11c

Apt. very pale, presumably whitish green, BL 1.6–2.7 mm. Heter. hol. between *Rosa macrophylla* and *Aquilegia pubiflora* in Pakistan. The fund. on *Rosa* gives rise directly to emigrant al., which have 60–90 sec. rhin. on a very long ANT III (Remaudière, 1993a). Sexual morphs unknown.

Longicaudus netuba (Zhang, Chen, Zhong and Li)

Apt. (fund.) yellowish green; BL (fund.) 1.6–1.7 mm (only fund. and imm. described). On young shoots of *Rosa omeiensis* in Xinjiang, China (Zhang, 1999, as *Netubusaphis netuba*). Possibly a synonym of *L. naumanni*.

Longicaudus trirhodus (Walker)

Plate 14h, Figure 11b

Apt. yellowish green to pale apple-green, lightly wax-dusted; BL 1.6–2.7 mm. Al. with an irregular-shaped dorsal abdominal black patch. In small colonies on leaves and blossom buds of *Rosa* spp. in spring. Heter. hol., migrating for the summer to *Aquilegia* and *Thalictrum* spp. In Europe, Asia and N America. A mon. hol. population on *Thalictrum majus* in Iran, with ovip. differing morphologically from those on *Rosa*, was described as *L. trirhodus* ssp. *iranicus* by Remaudière (1993a). 2n=12.

Longisiphoniella Chakrabarti, Saha and Mandal

Aphidinae: Macrosiphini

One species in India with a short broad cauda and, considering its subterranean habit, remarkably long SIPH. [*Spinaphis* L.K. Ghosh may be an older name for the genus, as the type and only known species *Spinaphis multisetosa*, described from apt. on an unknown host, is similar in many respects.]

Longisiphoniella subterranea Chakrabarti, Saha and Mandal

Appearance of apt. in life not recorded, BL 2.0–2.5 mm. Collected from roots of various plants (*Artemisia* sp., *Cynoglossum glochidiatum*, *Rumex* sp.) in W Himalaya. It seems unlikely that all these are true host plants. Al. have large, protruberant sec. rhin. distributed III 23–30, IV 0–6, V 0–1.

Loniceraphis Narzikulov

Aphidinae: Macrosiphini

One little-known species overwintering on *Lonicera* in C Asia.

Loniceraphis paradoxa Narzikulov

Apt. (fund.) whitish green; BL 3.4–3.9 mm. In spring colonies on undersides of leaves and growing points of *Lonicera* spp. in C Asia, migrating in second generation to an unknown secondary host. Gynoparae, ovip. and al. males occur in early Oct (Mukhamediev and Akhmedov, 1982).

Macchiatiella del Guercio

Aphidinae: Macrosiphini

A well-defined genus in E Asia on *Rhamnus* and/or Polygonaceae, characterised by very long ANT PT, spiracles of abdominal segments 1 and 2 well-separated, and a short broad cauda. Apt. have sec. rhin. on

ANT III and al. have them on III–IV (–V). The species-level taxonomy is difficult and in need of further work.

Macchiatiella itadori (Shinji)

Plate 11g

Apt. yellow, brownish yellow or green with shiny black dorsal abdominal patch and black SIPH; BL 1.7–2.2 mm. On *Polygonum* and related genera (*Aconogonon*, *Fallopia*, *Fagopyrum*, *Reynoutria*). in Japan, E Siberia and Korea. Life cycle uncertain; host alternation to *Rhamnus* has been suggested (Miyazaki, 1971; Blackman and Eastop, 1994), based on synonymy with *Acaudus rhamni* Hori, but this may not be correct, because Hori (1927) stated that his aphid lived all year on *Rhamnus* and produced apt. as well as al. males. 2n=12.

Macchiatiella rhamni (Boyer de Fonscolombe)

Apt. yellow–brown or yellow–green with dark dorsal markings and pale SIPH; BL 1.9–2.3 mm. Aphids assigned to *M. rhamni* s. lat. occur on undersides of leaves of *Polygonum* spp. in C Asia, Mongolia and Korea. C Asian populations are regarded as a subspecies, *M. rhamni* ssp. *turanica* (Nevsky, 1928, as *Neanuraphis tarani*), and are believed to have a sexual phase on *Rhamnus* (Nevsky, 1929, as *Neanuraphis catharticae*). Anhol. populations of *M. rhamni* s.str. occur commonly on *Rhamnus* in S Europe (Barbagallo and Stroyan, 1982) but, contrary to Blackman and Eastop (1994), there appear to be no authentic European records of it from *Polygonum*. Specimens in BMNH colln. from *Polygonum* in Mongolia (leg. H. Szelegiewicz) and Korea (leg. W.H. Paik) have more extensive dark pigmentation and longer cephalic hairs. Those from Mongolia have spinal and marginal abdominal tubercles, but less frequently than in European specimens, and those from Korea are without tubercles (as in *M. itadori*). *M. rhamni* is also recorded from Siberia on *Bassia* (= *Echinopsilon*) *sedoides* (Ivanoskaya, 1977, as *Neanuraphis rhamni*), but this aphid has longer SIPH.

Macromyzella Ghosh, Basu and Raychaudhuri

Aphidinae: Macrosiphini

One species in E Asia, related to *Macromyzus* but with shorter hairs and unsclerotised dorsum.

Macromyzella polypodicola (Takahashi)

Apt. yellow, orange or cream-colored, with black SIPH and cauda; BL c.2mm. On ferns (*Asplenium*, *Diplazium*, *Dryopteris*, *Polystichum*) in E and SE Asia (Japan, Okinawa, Korea, Thailand, China, Taiwan, Philippines, Malaysia, Indonesia, New Britain). Takahashi (1963, as *Macromyzus*) provided a redescription.

Macromyzus Takahashi

Aphidinae: Macrosiphini

Three medium–large Asian fern-feeding species with spiculose head, SIPH with subapical reticulation, and a rugose dorsal cuticle with raised dark hair-bearing sclerites. The apparent relationship with *Tuberoaphis* would be substantiated if the host alternation reported for *M. woodwardiae*, with a sexual phase and a remarkably modified fundatrix on *Hydrangea* (Miyazaki, 1972), could be experimentally confirmed.

Macromyzus (Anthracosiphoniella) maculatus (A.N. Basu)

Apt. yellowish green with dark brown dorsal markings; BL c.2.4–2.6 mm. On undersides of fronds of various ferns (*Asplenium*, *Athyrium*, *Dryopteris*, *Eriosorus*) in N India. Apparently anhol. (orig. descr., and A.K. Ghosh, 1974a).

Macromyzus manoji Raha and Raychaudhuri

Apt. presumably brown with pale-tipped SIPH: BL c.2.4 mm. On ferns (*Asplenium*, *Cheilanthes*), and also recorded from ‘*Disclesrea alata*’, presumably an error for *Dioscorea alata*, although this is unlikely to be a true host. India (W Bengal). Records of *M. woodwardiae* in W Bengal may refer to this species, including one of ovip. on an unidentified plant in Jan (A.K. Ghosh, 1974a; see orig. descr.).

Macromyzus woodwardiae (Takahashi)

Plate 22b, Figures 32b, 43c

Apt. on ferns brown with black SIPH, legs with black distal parts to femora and yellowish tibiae; BL 2.2–2.8 mm. In Japan, Taiwan, China, Korea, Nepal and India. On undersides of fronds and new growth of ferns in many genera. Anhol. on ferns in most places, but in Japan it is apparently also partially heter. hol.,

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orange–yellow fund. and al. spring migrants having been described from *Hydrangea* (Miyazaki, 1972). Fund. have long dorsal processes like those of *Tuberoaphis* on *Hydrangea*, and the two genera are evidently closely related, so the unknown secondary hosts of *Tuberoaphis* may be ferns. However the life cycle of *M. woodwardiae* still needs experimental confirmation with host transfers. Records of *M. woodwardiae* from W Bengal are referable to *M. manoji* (Raha and Raychaudhuri, 1978). $2n=12$.

***Macropodaphis* Remaudière and Davatchi**

Macropodaphinae

A distinctive genus of ten Asian species with greatly enlarged fore femora and numerous dorsal tubercular processes bearing hairs and wax glands. Ivanoskaya (1981) provided a key to species then known, and (1982) discussed relationships within the genus. W. Zhang *et al.* (1995) reviewed the genus in China.

***Macropodaphis dasiphorae* Ivanoskaya**

Apt. pale green with dark head, basal segments of ANT, and cauda; BL c.3.8 mm. On *Potentilla fruticosa* in Siberia. Differing in size and color from *M. primigenius* on same host, although the differences could possibly be environmentally induced.

***Macropodaphis dzhungarica* Kadyrbekov**

Apt. glaucous lilac-colored, with mainly dark appendages; BL c.1.5–1.7 mm. On *Potentilla* (= *Pentaphylloides*) *parviflora* in Kazakhstan. Closely related to *M. primigenius*.

***Macropodaphis ivanoskajae* Kadyrbekov**

Apt. pale green, with mainly pale brown appendages; BL c.1.4–1.6 mm. Dispersed on upper and lower sides of leaves of *Potentilla* sp. in Kazakhstan.

***Macropodaphis paradoxa* Zachvatkin and Aizenberg**

Plate 3i, Figure 12c

Apt. pale green or yellowish green, appendages mainly pale with dark apices; BL 1.5–2.0 mm. Described from *Carex* in E Siberia, but subsequently also recorded by Ivanoskaya (1965) in Siberia from *Potentilla* spp. and *Artemisia frigida* (as *M. alexanderi* and *M. kurajensis*), and one (or both) of these plant genera are more likely to be the true hosts. *M. tsherepanovi* Ivanoskaya, described from *Potentilla supina* in Siberia, is closely related and might also be this species.

***Macropodaphis primigenius* Ivanoskaya**

Apt. glaucous lilac, with dark head, ANT, femora, SIPH and cauda; BL 1.6–2 mm. On *Potentilla fruticosa* in Siberia, and on ?*Carex* sp. in Mongolia (BMNH colln, leg. H. Szelegiewicz).

***Macropodaphis rechingeri* Remaudière and Davatchi**

Figure 12a,b

Apt. pale green (orig. descr.) or yellowish gray (Ivanoskaya, 1963, as *M. kulundensis*), with dorsal tubercles very evident; BL 1.4–2.1 mm. On undersides of leaves of *Artemisia austriaca* var. *orientalis* in Iran, moving very quickly when disturbed (orig. descr.). *M. kulundensis*, collected on *Salvia* sp. in Siberia, is regarded as a synonym (Quednau in Remaudière and Remaudière, 1997).

***Macropodaphis tubituberculata* Zhang and Zhang**

Apt. green, with whitish dorsal tubercles evident; BL c.2.2 mm. On *Carduus crispus* in China.

***Macrosiphoniella* del Guercio**

Aphidinae: Macrosiphini

About 115 old world and 5 nearctic species, often having SIPH and cauda similar in length, with SIPH reticulated over distal half. Most species feed on Anthemideae and have a stiletto-shaped R IV+V. At least half the species feed on *Artemisia* and 6–8 species are known from each of *Achillea*, *Aster*, *Helichrysum*, *Centaurea*, and other Cynareae, with fewer from *Chrysanthemum* and other Anthemidae. The numerous species colonising *Artemisia* with little evidence of host specificity, and often without apparent biological differences, is difficult to understand and worthy of closer study. Host alternation does not occur. Although found throughout the Northern Hemisphere the genus has a distinctly continental distribution, with about 30 per cent described from C Asia, Siberia, Mongolia and China. Accounts are available for W Europe

(Hille Ris Lambers, 1938), European Russia (Shaposhnikov, 1964), Siberia (Ivanovskaya, 1977), India (R.C. Basu and Raychaudhuri, 1976b), Mongolia (Holman and Szelegiewicz, 1974, 1978), Korea (Szelegiewicz, 1980; Lee *et al.*, 2002c), China (Tao, 1963), E Siberia (Pashtshenko, 1998a,b, 1999a,b), Japan (Miyazaki, 1971) and N America (Robinson, 1987).

***Macrosiphoniella abrotani* (Walker)**

Apt. grayish green or dull grass green, wax-dusted, with a dark medial stripe with mainly pale legs and ANT, and SIPH brownish with darker apices; BL 2.4–3.1 mm. Usually found on young stems of *Artemisia abrotanum*; also recorded from some other *Artemisia* and *Seriphidium* spp. and from *Tripleurospermum* (= *Matricaria*) *inodora*, with a single record from *Achillea millefolium*. In Europe and N Africa, and introduced to S Africa, Australia, north-eastern USA and Canada. A form corresponding morphologically to southern European populations has been introduced into Argentina (BMNH colln, leg. J. Ortego). Populations in E Asia have been distinguished as subspecies; *A. abrotani* ssp. *chosoni* Szelegiewicz on *Artemisia* spp. in Korea and China (Lee *et al.*, 2002c; Szelegiewicz, 1980; Zhang *et al.*, 1987), also recorded from *Tanacetum boreale* in E Siberia (Pashtshenko, 1988a), and *A. abrotani* ssp. *sainshandi* Szelegiewicz on *A. sieversiana*. in Mongolia (Holman and Szelegiewicz, 1978). Two species described from *A. scoparia* in NW China (Zhang, 1999), *M. hofuchui* and *M. tsizhongii*, are also members of this group and are not clearly distinct from *abrotani* (but the illustration of a SIPH ascribed to *M. hofuchui* is of a member of the *M. antennata* group). Ovip. and al. males appear on *A. abrotanum* in Europe in Sept–Oct.

***Macrosiphoniella absinthii* (L.)**

Apt. reddish brown, wax-powdered, with black head, ANT, legs, SIPH and cauda, and a black spot in the centre of the abdomen; BL 1.7–2.5 mm. Commonly on upper parts of stems of *Artemisia absinthium* in N and C Europe, eastward to Siberia; also in N Africa and the Mediterranean area, where it occurs on other *Artemisia* and *Seriphidium* spp. There are also records from *Dendranthema zawadzki* (in Poland; Heie, 1995) and *Tanacetum praeteritum*. Introduced to USA and Canada. Apt. males and ovip. occur in Oct in England (BMNH colln). Al. males are recorded from Latvia (Opmanis, 1928). 2n=12.

***Macrosiphoniella achlys* Zhang, Chen, Zhong and Li**

Apt. shining black; BL c.2 mm. On stems of *Artemisia scoparia* in Xinjiang-Uygur region of China (Zhang, 1999). A member of the *atra* group.

***Macrosiphoniella aetnensis* Barbagallo**

Figure 31m

Apt. green, covered with grayish wax powder except for a bare central dorsal abdominal area; BL 1.7–2.2 mm. On *Helichrysum italicum*, living on stems and undersides of leaves, in Italy. Apparently the production of sexual morphs occurs late; vivip. were present in Nov, and an ovip. was collected in Dec (Barbagallo, 1970).

***Macrosiphoniella ajaniae* Kadyrbekov**

Apt. shining black, BL 1.3–1.5 mm. In small colonies on flowerheads of *Ajania fastigiata* in SE Kazakhstan (Kadyrbekov, 1999a). Probably a member of the *atra* group.

***Macrosiphoniella aktashica* (Nevsky)**

Apt. pale green, with black-tipped SIPH and black-banded ANT and legs; BL 2.8–3.1 mm. On undersides of leaves of *Tanacetum* sp(p). in C Asia. A longer-haired form on *T. pseudoachillea* and *Achillea* sp. was described as a subspecies, *M. aktashica* ssp. *hirsuta* Daniyarova. The distinction from the very similar *M. tapuskae* needs to be verified. [Note: *M. (Asterobium) aktashica* Nevsky from *Aster* is another species, see under *M. asteris*.]

***Macrosiphoniella alativica* (Nevsky)**

Apt. rather elongate-bodied, pale green with ANT and upper halves of SIPH dusky; BL 2.0–2.8 mm. On flower stalks of *Artemisia dracunculoides* in C Asia (Uzbekistan, Kazakhstan). Records from other *Artemisia* species should be treated circumspectly as the name has been wrongly applied. *M. alativica* has been placed as a member of the *nitida* group (e.g., Holman and Szelegiewicz, 1978), close to *M. dracunculi*, but this

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does not fit well with the original description. *M. lambersi* (q.v.) has been erroneously placed as a synonym. *M. tadshikana* may be closely related.

Macrosiphoniella albiartemisiae Zhang, Chen, Zhong and Li

Apt. blackish brown; BL c.1.7 mm. On *Artemisia stelleriana* in Qinghai Prov., China (Zhang, 1999).

Macrosiphoniella altaica Ivanoskaya

Apt. pale green with dark ANT, legs, SIPH and cauda; BL c.2 mm. On upper parts of stems of *Artemisia frigida* in Siberia. Probably a member of the *nitida* group.

Macrosiphoniella (Phalangomyzus) antennata Holman and Szelegiewicz Figure 13h

Apt. elongate spindle-shaped, bluish or pinkish pruinose with brown head and a dark spot between SIPH, and with appendages (including SIPH and cauda) mainly blackish brown; BL 2.7–4.2 mm. On *Artemisia* spp., living singly or in small groups on the lower sides of leaves. In Mongolia, E Siberia and Korea. *M. antennata* ssp. *takahashii* is placed as a synonym by Lee *et al.* (2002c). *M. annulata* Zhang, described from China on *Artemisia capillaris*, resembles *antennata* but is green in life, and mounted specimens have pale middle sections to the tibiae. A second sample of *antennata*-group aphids from China (BMNH colln, VFE 18,135), from *Artemisia ?annua*, also has pale middle sections to the tibiae, but the SIPH are shorter like *antennata* s. str. from Mongolia. Until this variation in pigmentation and siphuncular length has been studied further it seems best to apply the name *antennata* to all members of this group. $2n=12^*$ (for VFE 18,135).

Macrosiphoniella (Papillomyzus) arctica Pashtshenko

Apt. greenish gray, sometimes with pinkish tinge, wax-dusted; BL c.2.5 mm. In small dense colonies on upper parts of *Artemisia arctica* in NE Siberia (Pashtshenko, 1999a). Other morphs unknown.

Macrosiphoniella arenariae Bozhko

Apt. green with appendages mainly dark and with dark dorsal abdominal markings, especially on ABD TERG 2–4; BL c.2 mm. On stems of *Artemisia arenaria* in Ukraine, and later recorded from other *Artemisia* spp (Bozhko, 1976a). It is possibly a member of the *atra* group, although these are usually black in life.

Macrosiphoniella artemisiae (Boyer de Fonscolombe) Figure 13m

Apt. grayish green, wax dusted, with appendages mainly black; BL 2.3–3.6 mm. Common on upper parts of *Artemisia vulgaris*, especially between inflorescences, and frequently forming large colonies. Several other species of *Artemisia* are also recorded as hosts, and there are also records from *Leucanthemum vulgare* and *Tanacetum parthenium*. Throughout Europe, eastward to Siberia, Mongolia and China, and introduced to N America. Populations on *Artemisia arborescens* in Sicily were described as a subspecies, *M. artemisiae* ssp. *meridionalis* Barbagallo, distinguished by smaller size, shorter SIPH and fewer sec. rhin. and caudal hairs. Similar aphids are also found in the Canary Islands. The E Asian *M. yomogifoliae* is closely related and has been regarded as a subspecies. *M. sibirica* Ivanoskaya, on *Artemisia* spp. in Siberia, cannot be differentiated from *M. artemisiae* using its published description, and *M. tanacetaria* ssp. *divia* described from *Tanacetum* and *Ambrosia* in E Siberia (Pashtshenko, 1999a), may also be a synonym. Ovip. and al. males appear in Sept–Oct in W Europe. $2n=12$.

Macrosiphoniella (Asterobium) asteris (Walker)

Apt. brownish green with black dorsal spots, body somewhat wax-powdered, with appendages mainly dark; BL 2.3–3.2 mm. On *Aster tripolium*, in small colonies on upper parts of stems and in the inflorescences; also recorded from *A. sedifolius* (in Spain). Throughout Europe, and also recorded from Korea (Lee *et al.*, 2002c). Ovip. and apt. males in early Oct (N. Italy; Hille Ris Lambers, 1938). [*M. (A.) aktaschica* Nevsky, described from *Aster* in C Asia as a subspecies of *M. asteris*, has relatively longer SIPH (c.0.2×BL and c.1.3×cauda).

Macrosiphoniella atra (Ferrari)

Apt. shiny black with mainly black appendages; BL c.1.8–2.1 mm. In shoot tips and inflorescences of *Artemisia alba* (= *camphorata*) in Italy (Roberti, 1958), and also found on other *Artemisia* spp. and in other parts of Europe (France, Netherlands, Hungary, former Yugoslavia, Bulgaria, Greece). Holman and Szelegiewicz (1978)

described a subspecies, *M. atra* ssp. *latysiphon*, from Mongolia, and this form is also reported from Korea on *Artemisia* spp. and *Tanacetum boreale* (Lee *et al.*, 2002c). Holman and Szelegiewicz (1978) discussed morphological variation in the *atra* group, which includes *M. atrata* Umarov (on *Artemisia* sp. in Tajikistan), and *M. nigropilosa* Nevsky (described from *Artemisia persica* in Kazakhstan, and also recorded from other *Artemisia* and *Seriphidium* spp., and from *Thymus serpyllum* in Central Asia; see Narzikulov and Umarov, 1969). A member of the *atra* group is also present in NW India (Bindra and Sekhon, 1969, as *hikosanensis*). The *atra* group may also include *M. achlys*, *M. ajaniae*, *M. albiartemisiae*, *M. brevisiphona*, *M. himalayana* and *M. santolinifoliae*. Kadyrbekov (1999a) provided a key to distinguish some of these species then described.

***Macrosiphoniella austriacae* Bozhko**

Apt. pale brown (with darker transverse bars on dorsal abdomen), densely covered in white wax powder; BL c.1.8–1.8 mm. On stems of *Artemisia austriaca* in S Ukraine. Close to *M. teriolana*.

***Macrosiphoniella borealis* Pashtshenko**

Apt. green with mainly pale brown appendages; BL c.2.6 mm. On flower stems of *Artemisia arctica*, *A. tanacetaria* and (one sample) *Tanacetum boreale*, usually forming small dense colonies, in NE Siberia (Pashtshenko, 1998a). Ovip. and an apt. male were collected in Aug.

***Macrosiphoniella (Asterobium) bozhkoe* Remaudière**

Apt. dark green, wax-dusted; BL c. 2.5 mm. On *Linosyris villosa* in Ukraine (Bozhko, 1976b, as *M. ucrainica*).

***Macrosiphoniella brevisiphona* Zhang**

Appearance in life unknown, probably dark as it appears to be a member of the *atra* group; BL c.2.4 mm. On *Artemisia* sp. in Tibet. A paratype specimen has been examined, and seems close to *M. atra* ssp. *latysiphon*.

***Macrosiphoniella caucasica* (Wojciechowski)**

Apt. matt brownish black; BL 1.7–1.9 mm. On flowers and fruits of *Pyrethrum* sp. in Russia (Caucasus).

***Macrosiphoniella cayratiae* Tseng and Tao**

Color in life unknown; BL c.2.4 mm. On *Cayratia japonica* in China.

***Macrosiphoniella cegmidi* Szelegiewicz**

Apt. bright greenish, with SIPH dark at apices; c. BL 1.7–2.0 mm. On *Artemisia* sp. in Mongolia. (See comment under *M. szalaymarzsoi*.)

***Macrosiphoniella (Sinosiphoniella) chaetosiphon* Takahashi and Moritsu** Figure 13e

Apt. dark red with black SIPH and cauda, BL 2.0–2.5 mm. On *Artemisia* spp. in Japan and Korea. Generic placement was discussed by Holman and Szelegiewicz (1979).

***Macrosiphoniella chamaemelifoliae* Remaudière and Leclant** Figure 13o

Apt. are pale green, wax dusted, with head, ANT, legs, SIPH and cauda black; BL 1.6–2.6 mm. In colonies, often very dense, on shoots of *Artemisia chamaemelifolia* at altitudes of 1600–2000 m in the French Alps. Ovip. and both apt. and al. males appear from Aug–Oct, fundatrices in late June. *Aphidius absinthii* and *Ephedrus niger* are recorded as parasitoids of this species (orig. descr.).

***Macrosiphoniella cinerascens* Hille Ris Lambers**

Apt. bright sea-green, with dorsal pattern of white powder; BL 2.1–2.6 mm. On lower leaves of *Achillea californica*, turning their tips brown. California, USA.

***Macrosiphoniella (Asterobium) crepidis* Holman and Szelegiewicz**

Apt. yellowish green, covered with a grayish wax powder, with dark appendages; BL 1.8–2.5 mm. On *Crepis* spp. in Mongolia.

***Macrosiphoniella cymbariae* Bozhko**

Apt. dark yellow–brown; BL c.2.2 mm. On *Cymbaria borysthenica* in Ukraine.

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Macrosiphonella (Asterobium) davazhamci Holman and Szelegiewicz

Apt. matt green, dusted ventrally with grayish wax powder; BL 1.9–2.6 mm. On *Aster hispidus* in Mongolia, and on *Aster* sp. in China, nr Beijing (BMNH colln, leg. V.F. Eastop). Imm. ovip. and al. males were found in Sept (orig. descr.).

Macrosiphoniella dimidiata Börner

Figure 13j

Apt. are brown or greenish, wax powdered, with black head, SIPH and cauda, and mainly black (except at bases) ANT and legs; BL 1.8–2.7 mm. On upper parts of shoots of *Artemisia* spp. (usually *campestris*) throughout most of continental Europe, east to Turkey. In Israel it occurs on *A. monosperma* (BMNH colln). *M. lena*, described from *Artemisia commutata* in E Siberia (Pashtshenko, 1998a), is possibly this species, and *M. kirgisisca* Umarov in C Asia also seems closely related. [There is an argument for using the earlier name *fasciata* del Guercio for this species (Leclant, 1968b), but the application of this name is confused and we therefore here retain the more generally accepted name *dimidiata*.] Ovip. and apt. males occur in Oct in Finland (Heikinheimo, 1997). 2n=12*.

Macrosiphoniella dracunculi (Umarov)

Apt. are green with dark SIPH, BL c.2.6–2.8 mm, on stems of *Artemisia dracunculus* in Kyrgyzstan. Probably close to *M. nitida*, but with shorter ANT PT and longer SIPH (Holman and Szelegiewicz, 1978).

Macrosiphoniella (Asterobium) elegans Pashtshenko

Apt. shining black; BL c.2.9 mm. On shoot apices and flower buds of *Aster dahuricus* in E Siberia (Pashtshenko, 1999a).

Macrosiphoniella elenae Pashtshenko

Apt. dark brown; BL c.1.9 mm. Found in small sparse colonies on stems of *Artemisia stolonifera*, visited by ants (the short SIPH and cauda are clearly adaptations for ant attendance). In E Siberia (Pashtshenko, 1999b).

Macrosiphoniella (Asterobium) erigeronis Nevsky

Apt. shining brown, with black SIPH and cauda; BL 1.7–2.5 mm. Forming dense colonies on flower stalks of *Erigeron acer* in C Asia (Uzbekistan). A population on *Linosyris villosa* in Kazakhstan was described as a subspecies, *M. erigeronis* ssp. *villosae* Smailova.

Macrosiphoniella femorata Bozhko

Apt. dark green; BL c.1.9 mm. On *Hieracium umbellatum* in Ukraine. Could not be included in the key to aphids on *Hieracium* on the basis of the published description.

Macrosiphoniella formosartemisiae Takahashi

Apt. shiny black with mainly blackish brown appendages, BL c.1.8–2.2 mm. On stems of *Artemisia* spp. in Japan, China, Korea, Taiwan, E Siberia, Mongolia and India. Sexuales do not appear to have been described; the species is anhol. in Taiwan (Takahashi, 1923). Holman and Szelegiewicz (1978) compare Mongolian and Japanese material. 2n=10.

Macrosiphoniella frigidae Ivanoskaya

Apt. yellowish green with a pattern of dark dorsal abdominal pigmentation and dark appendages; BL c.2.7 mm. In small colonies on *Artemisia frigida* and *Artemisia* sp. in Siberia. Probably a member of the *dimidiata/teriolana* group.

Macrosiphoniella frigidicola Gillette and Palmer

Apt. are bluish green, wax-powdered, with SIPH dusky at apices; BL c.1.6–1.7 mm. On leaves of *Artemisia frigida*, and perhaps sometimes on other *Artemisia* spp. and *Seriphidium tridentatum*, although there is possible confusion with *M. abrotani*. In central and western N America; records from eastern N America are more likely to be *abrotani*. A record from *Krascheninnikovia lanata* was probably of vagrants. Ovip. and apt. males appear in Oct in Colorado (Palmer, 1952).

Macrosiphoniella frigidivora Holman and Szelegiewicz

Figure 13l

Apt. are green or pinkish green dusted with fine gray wax powder, with blackish ANT, legs, SIPH and cauda; BL 1.6–2.2 mm. At ends of shoots of *Artemisia frigida* in Mongolia. A paratype specimen of *M. hokkaidensis* in BMNH colln from Japan is very similar, and the distinction between these two species needs to be confirmed.

Macrosiphoniella (Asterobium) galatellae Bozhko

Apt. shining brownish black with black appendages; BL 2.3–2.7 mm. In small colonies of very mobile aphids on flower stems of *Aster* spp., dropping readily when disturbed (Bozhko, 1976b). E Europe (Hungary, Slovakia, Ukraine) and S Russia (Ciscaucasia).

Macrosiphoniella gaoloushana Zhang, Chen, Zhong and Li

Apt. black; BL 1.8–2.5 mm. On *Artemisia japonica* in Gansu Prov., NW China (Zhang, 1999).

Macrosiphoniella glabra (Gillette and Palmer)

Apt. shining ‘shamrock green’, with dusky spots at bases of dorsal hairs, mainly black legs and ANT, and black SIPH; BL 1.8–2.3 mm. Singly or in small colonies on leaves and flowerheads of *Artemisia dracunculoides* in western USA (Colorado, Utah, Wisconsin), and there is also a record from *Chrysothamnus viscidiflorus*. Ovip. and apt. males appear in Sept–Oct (Palmer, 1952).

Macrosiphoniella (Phalangomyzus) gmelinicola Szelegiewicz

Apt. shiny black with blackish ANT, legs, SIPH and cauda; BL c.3.2–3.3 mm. On upper parts of stems of *Artemisia* spp. in Korea and E Siberia.

Macrosiphoniella (Phalangomyzus) grandicauda Takahashi and Moritsu

Apt. pale yellow or pale green with mainly dark brown ANT and legs, black SIPH and pale cauda; BL 2.5–3.9 mm. On *Artemisia* spp., especially on older leaves, in Japan, China, Korea, E Siberia, India and Nepal; there are also records (from Japan) on *Arctium lappa* and *Petasites japonicus*. 2n=12 (Chen and Zhang, 1985b).

Macrosiphoniella helichrysi Remaudière

Figure 31f

Apt. gray with black appendages, the body covered in wax powder except for a shiny black central dorsal abdominal patch and spots anterior to bases of SIPH.; BL 1.4–2.6 mm. On shoot apices and in flowerheads of *Helichrysum* spp., the adult apt. dropping readily from the plant when disturbed. In S Europe, Turkey, and introduced to S Africa. Aguiar and Ilharco (2005) provided a detailed redescription. Sexual morphs are apparently unknown.

Macrosiphoniella (Sinosiphoniella) hikosanensis Moritsu

Figure 13g

Apt. reddish yellow with reddish head and prothorax, mainly pale ANT and tibiae, mainly dark femora, dark antesiphuncular spots, and black SIPH and cauda (Moritsu, 1983); BL 1.5–2.8 mm. On undersides of older leaves of *Artemisia* spp. in Japan, Korea, and E Siberia. Indian records of *M. hikosanensis* apply to other species, mostly *kikungshana*, but Bindra and Sekhon (1969) had a member of the *atra* group.

Macrosiphoniella (Ramitrichophorus) hillerislambersi Ossiannilsson

Apt. reddish with (in life) a large black dorsal abdominal spot, and dark appendages including SIPH and cauda; BL 1.6–1.9 mm. On *Helichrysum arenarium*, colonising parts near or just below ground level. Attended by ants. In Denmark, Sweden, Germany and Switzerland (Heie, 1995).

Macrosiphoniella himalayana Saha and Chakrabarti

Apt. blackish; BL 1.9–2.4 mm. on undersides of leaves and in inflorescences of *Artemisia* spp. in India. Ovip. and al. males were collected in Oct (orig. descr.). Probably a member of the *M. atra* group (q.v.).

Macrosiphoniella hokkaidensis Miyazaki

Apt. yellowish green, without wax (acc. to orig. descr., but see Lee *et al.*, 2002c), with head reddish brown, and ANT, legs (except base of femora), SIPH and cauda black; BL 1.8–2.6 mm. Described from *Artemisia*

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montana in Japan, and there are also records from several *Artemisia* spp. in E Siberia (Pashtshenko, 1988a) and N Korea (Lee *et al.*, 2002c). *M. frigidivora* Holman and Szelegiewicz on *A. frigida* in Mongolia is closely related and possibly the same species, although described as wax-powdered in life.

***Macrosiphoniella huaidensis* Zhang**

Apt. green; BL c.2.5 mm. On *Artemisia* sp. in China. 2n=12 (Chen and Zhang, 1985b)

***Macrosiphoniella huochengensis* Zhang, Chen, Zhong and Li**

Apt. color in life and BL unrecorded. On leaves of *Artemisia scoparia* in Xinjiang-Uygur region of China (Zhang, 1999). (Also recorded from *Euphorbia lunulata*, but these were presumably vagrants.)

***Macrosiphoniella insignata* Kadyrbekov**

Apt. shining black; BL 1.3–1.7 mm. At shoot apices of an *Artemisia* sp. in SE Kazakhstan (Kadyrbekov, 1999a).

***Macrosiphoniella (Asterobium) ixeridis* Holman, Lee and Havelka**

On *Ixeris chinensis* in Korea (Holman *et al.*, 2001; nomen nudum).

***Macrosiphoniella (Ramitrichophorus) janckei* Börner**

Figure 31g

Apt. reddish brown to black, with green spots at bases of siph., powdered with wax; BL 1.8–2.0 mm. On stalks, flowerheads and undersides of leaves of *Helichrysum arenarium*. In N Germany, Poland, Ukraine and W Siberia. Ovip. and apt. males in late Sept (Müller, 1975a).

***Macrosiphoniella jaroslavi* Szelegiewicz**

Apt. green, dusted with fine gray wax powder, with blackish ANT, legs, SIPH and cauda; BL 1.6–2.3 mm. On tips of shoots and in inflorescences of *Artemisia messerschmidtiana* (var. *discolor*) in Korea.

***Macrosiphoniella kalimpongense* R.C. Basu and Raychaudhuri**

Appearance of apt. in life unknown; BL 2.6–3.3 mm. On *Artemisia vulgaris* and *Artemisia* sp. in India (West Bengal) and Nepal (BMNH colln).

***Macrosiphoniella kareliniae* Kadyrbekov, Renxin and Shao**

Apt. greenish with gray wax film, SIPH brown with basal third pale; BL 2.0–2.5 mm. On stems of *Karelinia caspia* in C and S Kazakhstan and Xinjiang-Uygur region of W China (Kadyrbekov *et al.*, 2002).

***Macrosiphoniella kaufmanni* Börner**

Figure 13m

Apt. green, lightly wax-dusted (according to Bozhko, 1976a), with dark SIPH and cauda; BL c.1.9–2.2 mm. On *Artemisia pontica* in Czech Republic and Hungary, and also recorded from Ukraine on *A. arenaria* (Bozhko, 1976b). There is no adequate description of this species. Remaudière and Leclant (1972) distinguish it from *M. chamaemelifoliae*. Mon. hol. according to Börner (1952), but sexual morphs are undescribed.

***Macrosiphoniella kikungshana* Takahashi**

Apt. shining brown with mainly dark brown appendages; BL 2.1–3.2 mm. On undersides of older leaves of *Artemisia* spp. in China, Korea, E Siberia, Nepal and India (Sikkim). Szelegiewicz (1980) redescribed the species, and also described a population on *A. sylvatica* in Korea with shorter dorsal hairs and paler femora as a subspecies, *A. kikungshana* ssp. *sylvaticae* (but see Lee *et al.*, 2002c). Ovip. occur in Oct (Sikkim). Some of the Indian records of *M. hikosanensis* should be referred to this species (see Basu and Raychaudhuri, 1976b). 2n=12.

***Macrosiphoniella kirgisica* Umarov**

Apt. grayish green with dark green spots on dorsal abdomen, and dark brown ANT, legs, SIPH and cauda; BL c.2.0–2.1 mm. In large colonies on stems of several *Artemisia* spp. (Kadyrbekov 2003c) in C Asia (Kazakhstan, Kyrgyzstan, Xinjiang-Uygur region of China). We could not distinguish this species from *M. dimidiata* on the basis of the published description.

***Macrosiphoniella (Sinosophoniella) kuwayamai* Takahashi**

Figure 13f

Apt. dull green–black dusted with transverse bands of gray wax powder, reddish head and mainly black ANT, legs, SIPH and cauda; BL 1.5–3.2 mm. On *Artemisia* spp., usually living on lower parts of stems and older leaves. In Japan, Korea, China and E Siberia. Szelegiewicz (1980) redescribed apt. and al. vivip. of this species from Korea.

***Macrosiphoniella lambersi* Verma**

Color of apt. in life unknown; SIPH pale and cauda with 7 hairs in the holotype according to the original description, but an apt. in the BMNH colln labelled as a paratype (leg. K.D. Verma) has dark SIPH and its cauda has 11 hairs. The measurement of the base of ANT VI must also be wrong in the original description; the paratype has ANT PT/BASE ratio of 3.86. On *Artemisia scoparia* in India (Jammu). It has been erroneously synonymised with *M. alativica* in catalogs.

***Macrosiphoniella lazoica* Pashtshenko**

Apt. blackish green; BL c.2.3 mm. At stem bases of *Saussurea pulchella*, attended by ants. E Siberia (Pashtshenko, 1999b).

***Macrosiphoniella leucanthemi* (Ferrari)**

Apt. yellowish green, with a darker green or reddish brown band between the SIPH, and appendages with contrasting pale and dark sections; BL 2.3–2.7 mm. Al. have conspicuously brown-bordered wing veins. On undersides of basal leaves of *Leucanthemum* spp. in Europe (Italy, Hungary, France, Netherlands), and also recorded from USA (Oregon, BMNH colln, leg. D. Hille Ris Lambers; Pennsylvania, Robinson 1987).

***Macrosiphoniella lidiae* Umarov**

Apt. green, powdered with wax, with appendages dark except for bases of ANT III and SIPH; BL c.1.9 mm. In large colonies at tops of stems of an *Artemisia* sp. in Kazakhstan.

***Macrosiphoniella lijiangensis* Zhang, Zhong and Zhang**

(= *Macrosiphoniella sensorinuda* Zhang, Zhong and Zhang)

Appearance in life unknown: BL 2.4–2.8 mm. On *Artemisia vulgaris* in China (Hengduan mountain region).

***Macrosiphoniella (Asterobium) linariae* (Koch)**

Figure 15a,b

Apt. brownish black, with black appendages; BL c. 2.4–2.8 mm. On stems of *Aster linosyris* in Germany and N Italy. Ovip. and al. males in Oct (Hille Ris Lambers, 1938).

***Macrosiphoniella lithospermi* Bozhko**

Apt. shining brown with dark brown dorsal markings, SIPH and cauda black; BL c. 3 mm. In colonies on stems of *Lithospermum arvense* in Ukraine (Bozhko, 1976b).

***Macrosiphoniella longirostrata* Holman and Szelegiewicz**

Apt. ‘in life probably resembling *M. frigidivora*’ (q.v.), as it was collected with that species and only distinguished subsequently in slide-mounted preparations; BL 1.6–2.1 mm. On *Artemisia frigida* in Mongolia. [The specimens recorded under this name from *A. stellariana* in Sakhalin by Pashtshenko (1988a) were presumably *M. sachalinensis* (q.v.). See also comment under *M. szalaymarzsoi*.]

***Macrosiphoniella lopatini* (Umarov)**

Apt. grass green powdered with grayish wax, with SIPH dark only on reticulated part; BL c.3.4–3.6 mm. On stems of an *Artemisia* sp. in Tajikistan. Al. unknown.

***Macrosiphoniella ludoviciana* (Oestlund)**

Apt. glaucous green or yellowish green dusted with grayish white wax; BL 2.0–2.8 mm. Commonly on leaves of *Artemisia ludoviciana*, and also recorded from *A. vulgaris*. A record from *Tanacetum* sp. may have been misidentified *M. persequens*, and a record from *Krascheninnikovia* (= *Axyris*) *lanata* was probably of vagrants. Widely distributed in N America (Palmer, 1952; Robinson, 1987). Ovip. and al. males in Oct. 2n=12.

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Macrosiphoniella maculata Nevsky

Apt. yellow–green or green with black dorsal spots and antesiphuncular sclerites; BL 1.8 mm. On *Medicago sativa* (which is unlikely to be its true host) in the Pamirs at 3600 m, Tajikistan.

Macrosiphoniella madeirensis Aguiar and Ilharco

Apt. pale gray mostly covered with fine whitish wax powder but leaving black central dorsal spot; BL 1.9–2.9 mm. On terminal shoots and leaf petioles of *Helichrysum melaleucum* in Madeira (Aguiar and Ilharco, 2005).

Macrosiphoniella (Ramitrichophorus) medvedevi (Bozhko)

Figure 31e

Apt. gray with brownish red speckling, or reddish yellow; BL 1.6–2.6 mm. On stems and flowers of *Helichrysum arenarium* in Ukraine and Poland, attended by ants (Szelegiewicz, 1958, as *M. nasti*).

Macrosiphoniella miestingeri (Börner)

Apt. color in life unrecorded; BL 2.7–3.0 mm. Under lower leaves of *Tanacetum corymbosum*, which are curved and yellowed. Germany.

Macrosiphum millefolii (De Geer)

Plate 27a, Figure 5g

Apt. yellowish green, powdered with gray wax except for spinal stripe on abdomen and presiphuncular spots, and with black appendages; BL 2.1–3.6 mm. On *Achillea* spp., especially *A. millefolium*, forming colonies especially in the inflorescences. Also occasionally found on plants in related genera (*Leucanthemum*, *Tanacetum*, *Tripleurospermum*). Common throughout most of Europe, W Siberia, and introduced to N America. In E Siberia a form occurs with more sec. rhin. in apt. (38–59, as opposed to 8–28 in European populations) and a rather shorter ANT PT (*M. millefolii* ssp. *orientalis* Pashtshenko, 1998b). *M. sudkharis* (q.v.) could be a cold-temperature form of *M. millefolii*. Ovip. and al. males occur in Sept–Oct in NW Europe (Heie, 1995). Sobhani (1970) studied biology, life cycle and morphology of *M. millefolii* in Germany. 2n=12.

Macrosiphoniella mutellinae Börner

Apt. thickly dusted with gray wax; BL 1.7–2.3 mm. On *Artemisia genepi* and *A. mutellina* in Austria. A single, presumably vagrant, apt. was found on *Leontopodium alpinum* in the French Alps (Remaudière, 1954).

Macrosiphoniella (Chosoniella) myohyangsani Szelegiewicz

Apt. pale green, with lead-colored posterior abdomen and blackish appendages; BL 2.7–3.7 mm. On lower parts of stems of *Artemisia* spp. in Mongolia, E Siberia, China and Korea (Lee *et al.*, 2002c). 2n=12 (Chen and Zhang, 1985b).

Macrosiphoniella (Ramitrichophorus) nikolajevi Kadyrbekov

Apt. reddish brown; BL 2.1–2.4 mm. On flower stalks of *Helichrysum maracandicum* in S Kazakhstan (Kadyrbekov, 1999b). Al. undescribed.

Macrosiphoniella nitida Börner

Apt. light olive–brown or reddish, shiny on back but wax-powdered on abdomen, with legs mainly pale brown and SIPH and cauda black; BL c.2.6–2.9 mm. On *Artemisia dracunculus* in Germany, former Yugoslavia and Iran (BMNH colln). Aphids collected on this host in Mongolia with a longer R IV+V and shorter dorsal hairs are regarded as a subspecies, *M. nitida* ssp. *soongarica* Szelegiewicz (Holman and Szelegiewicz, 1978), although should perhaps have full species status. *M. dracunculi* also appears closely related.

Macrosiphoniella (Phalangomyzus) oblonga (Mordwilko)

Plate 27c

Apt. long-bodied, pale green or apple green, with a darker green spinal stripe, and mostly pale appendages; BL 3.0–5.1 mm. Usually found dispersed on undersides of lower leaves of *Artemisia vulgaris*, also sometimes on other *Artemisia* spp., on cultivated florists' chrysanthemum (*Dendranthema indicum*, *morifolium*, *frutescens*), and occasionally on plants in other related genera (*Leucanthemum*, *Tanacetum*). Ovip. and apt. males in Sept–Oct in W Europe. It occurs throughout Europe and across Asia to Japan and Taiwan. Some Asian populations have been given the status of separate species; *M. hidaensis* Takahashi and Moritsu in Japan and E Siberia, *M. paraoblonga* R.C. Basu and Raychudhuri in India, and *M. similioblonga* Zhang in

China (also recorded from Korea; Lee *et al.*, 2002c). Further work would be needed to show that these are not all one geographically variable species. $2n=12$.

***Macrosiphoniella olgae* (Nevsky)**

Apt. brownish yellow, with dark dorsal spots, wax-dusted; BL 2.2–2.8 mm. On *Gnaphalium sylvaticum* in C Asia. Al. unknown.

***Macrosiphoniella oronensis* Szelegiewicz**

Apt. shiny brown, with mainly pale ANT and legs and blackish brown SIPH and cauda; BL 2.0–2.4 mm. On undersides of older leaves of *Artemisia japonica* in Korea.

***Macrosiphoniella (Papillomyzus) papillata* Holman**

Apt. grayish green, covered with a waxy secretion, with black appendages; BL 2.1–3.2 mm. On stems and undersides of leaves of *Centaurea* spp., and also found on *Crupina vulgaris* (with heavily infested *Centaurea* close by). Described from Crimea, and since found in Iran, Turkey, Bulgaria, Greece and France (Remaudière and Remaudière, 1997: 305).

***Macrosiphoniella (Ramitrichophorus) paradoxa* (Bozhko)**

Apt. matt dark brown, with black ANT and SIPH; BL c.1.6 mm. On shoot tips and among flowers of *Helichrysum suaveolens* in Ukraine and S Russia (Shaposhnikov, 1964). Closely related to *U. janckei*, and possibly a geographical or seasonal variant of that species.

***Macrosiphoniella paucisetosa* Robinson**

Color of apt. in life unrecorded, probably pale greenish except for blackish brown ANT (beyond base of III), tibiae and SIPH (except basally); BL 1.8–2.5 mm. On *Artemisia* spp. in Manitoba, Canada (Robinson, 1987).

***Macrosiphoniella (Phalangomyzus) pennsylvanica* (Pepper)**

Apt. green with two longitudinal rows of wax markings; BL 1.9–2.5 mm. On *Achillea millefolium* in N America. Mon. hol. with ovip. and al. males in Oct (orig. descr., as *Macrosiphum*).

***Macrosiphoniella (Phalangomyzus) persequens* (Walker)**

Apt. green, with darker green spinal stripe, and dark apices to ANT, legs and SIPH; BL 4.2–5.2 mm. On undersides of lower leaves of *Tanacetum vulgare* in Europe, and also recorded from *Pyrethrum millefoliatum* (Bozhko, 1976a). Ovip. and apt. males in Sept–Oct. $2n=12$.

***Macrosiphoniella procerae* Bozhko**

Apt. matt green, lightly wax-dusted, with dark apices of SIPH; BL c. 1.9 mm. In small colonies on upper parts of stems of *Artemisia procera* in Ukraine (Bozhko, 1976b).

***Macrosiphoniella pseudoartemisiae* Shinji**

Apt. pale yellow–brown with greenish tinge (slide label, Japanese specimens, BMNH colln); BL 1.8–2.8 mm. A common species on *Artemisia* spp. in E and SE Asia (Japan, Korea, Indonesia, Malaysia, N and S India, Sri Lanka) and introduced to S America (Brazil; BMNH colln). There has been some confusion with another common and widely distributed E Asian species, *M. yomogifoliae*, which has entirely black tibiae. This is usually a reliable means of distinguishing the two species, but one population of *M. pseudoartemisiae* from Java in the BMNH collection also has entirely black hind tibiae. Another discriminant is the caudal hair number; 10–14 in *pseudoartemisiae*, 16–32 in *yomogifoliae*. $2n=10$ (Pal and Khuda-Bukhsh, 1982, Dutta and Gautam, 1993) or $2n=12$ (Kar and Khuda-Bukhsh, 1988; perhaps this was misidentified *yomogifoliae*?).

***Macrosiphoniella ptarmicae* Hille Ris Lambers**

Apt. green, wax-powdered, with olive patches at bases of SIPH; BL 2.2–3.3 mm. On *Achillea ptarmica* in Europe, and eastward to C Asia. Ovip. and al. males in Sept–Oct. Sobhani (1970) studied biology, life cycle and morphology of *M. ptarmicae* in Germany.

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Macrosiphoniella pulvera (Walker)

Apt. grayish green or grayish white, heavily wax-powdered; BL 1.9–2.9 mm. On undersides of leaves of *Seriphidium maritimum*, with which they are concolorous. There are also records from several other *Artemisia* and *Seriphidium* spp. Widely distributed in Europe (not Italy or Iberian peninsula), and eastward across Asia to Mongolia; the Mongolian aphids, collected on *A. adamsi*, differed in some respects from European populations (Holman and Szelegiewicz, 1978). *M. pulvera* ssp. *khinganica*, described as shining green in life and collected on *A. mongolica* in E Siberia, differs from *M. pulvera* in several morphological features, including longer ANT hairs (Pashtshenko, 1998b), and is probably a distinct species. Ovip. and apt. males of *M. pulvera* appear in Sept in Europe.

Macrosiphoniella (Asterobium) quinifontana Zhang, Chen, Zhong and Li

Apt. color in life unrecorded; BL c.1.6 mm. On stems of *Aster tataricus* and *Artemisia* sp. (a less likely host) in Gansu Province, China (Zhang, 1999). Seems closely related to *M. galatellae*.

Macrosiphoniella (Papillomyzus) riedeli Szelegiewicz

Color of apt. in life unknown; BL 2.9–3.4 mm. On *Carduus*, *Centaurea* and *Cuprina* in western Asia (Syria, Lebanon, Sinai, Iran). Al. not described and biology unknown. The only difference between this species and *M. papillata* seems to be in the degree of pigmentation, and it should possibly be synonymised with that species.

Macrosiphoniella sachalinensis Pashtshenko

Apt. gray–green, wax-dusted; BL c.1.9–2.0 mm. In inflorescences of *Artemisia stellariana* in Sakhalin (Pashtshenko, 1998b).

Macrosiphoniella sanborni (Gillette)

Plate 27b

Apt. shiny, dark red–brown to blackish brown, broadly spindle-shaped, with black, relatively short and thick SIPH, shorter than the black cauda; BL 1.0–2.3 mm. A widespread pest on cultivated florists' chrysanthemum (*Dendranthema indicum*, *morifolium*, *frutescens*) on undersides of leaves. Of E Asian origin, where it often occurs on other Compositae (*Anthemis*, *Artemisia*, *Aster*). Sexual morphs are unknown. See also Blackman and Eastop (2000). $2n=12$ (many samples from UK and India, and one from China*; but Chen and Zhang (1985a, b) recorded $2n=10$ for a sample from China).

Macrosiphoniella santolinifoliae Kadyrbekov

Apt. shining blackish brown; BL 1.6–1.9 mm. On flower stalks of *Artemisia santolinifolia* in SE Kazakhstan (Kadyrbekov, 1999a). A member of the *M. atra* group.

Macrosiphoniella (Sinosophoniella) saussureae Holman and Szelegiewicz

(= *Macrosiphoniella chita* Pashtshenko)

Apt. reddish brown to brownish black; BL 1.5–2.2 mm. Sec. rhin. in apt. III 9–24, IV 0–4, in al. III 20+, IV 5–6. On flower stalks of *Saussurea salicifolia*, attended by ants (the short SIPH and cauda are modifications for ant attendance). Mongolia and E Siberia (Pashtshenko, 1999b, as *M. chita*).

Macrosiphoniella scopariae Bozhko

Apt. rose pink, finely dusted with grayish wax, BL c.2.3 mm. In large, rather dispersed colonies on undersides of leaves of *Artemisia scoparia* in Ukraine (Bozhko, 1976b).

Macrosiphoniella sejuncta (Walker)

Figure 5h

Apt. variable, often a mix of green and brown individuals, with pale-based SIPH; BL 2.5–3.1 mm. On *Achillea millefolium*, living on leaves close to ground level. Europe, and eastward to W Siberia. Mon. hol., with ovip. and apt. males in Sept–Oct (Heie, 1995). $2n=10$.

Macrosiphoniella seriphidii Kadyrbekov

Apt. pale green with silvery sheen, SIPH dark distally; BL 2.1–2.7 mm. On *Seriphidium* spp. in S Kazakhstan and Xinjiang-Uyгур region of China (Kadyrbekov, 2000; Kadyrbekov *et al.*, 2002). Very similar to *M. terraealbae*.

Macrosiphoniella sibirica Ivanoskaya

Apt. greenish brown with dark ANT, legs, SIPH and cauda; BL c.3.1 mm. On stems and inflorescences of *Artemisia* spp. in Siberia. Close to or synonymous with *M. artemisiae*.

Macrosiphoniella sieversianae Holman and Szelegiewicz

Apt. green, powdered with whitish wax, with ANT and legs mainly dark, and SIPH dark distally; BL 2.2–2.8 mm. On upper parts of stems of *Artemisia sieversiana* in Mongolia.

Macrosiphoniella sikkimartemisiae Agarwala and Raychaudhuri

Appearance in life and size of apt. unknown; ANT and legs partly pale, SIPH and cauda dark. On *Artemisia* sp. in India (Sikkim).

Macrosiphoniella sikhotealiensis Pashtshenko

Apt. green, wax-dusted, with dark brown to black appendages; BL c.3.6 mm. Other morphs unknown. On upper parts of stems of *Artemisia stolonifera* in E Siberia (Pashtshenko, 1998b).

Macrosiphoniella silvestrii Roberti

Apt. covered in white wax except for shiny black areas on dorsum; BL 2.8–3.0 mm. On upper parts of stems of *Achillea*, *Anthemis arvensis* and *Matricaria* in S Italy (Barbagallo, 1970; Barbagallo and Stroyan, 1982).

Macrosiphoniella sojaki Holman and Szelegiewicz

Appearance of apt. in life unknown, probably wax-powdered, with blackish brown ANT, legs, SIPH and cauda; BL 1.7–2.3 mm. On *Artemisia rutifolia* in Mongolia.

Macrosiphoniella (Asterobium) soosi Szelegiewicz

Apt. light green with black head and appendages; BL 1.9–3.0 mm. On *Aster punctatus*, living on undersides of leaves, in Hungary.

Macrosiphoniella (Chosoniella) spinipes A.N. Basu

Figure 13d

Apt. shiny green with blackish SIPH and dusky cauda; BL 1.8–3.8 mm. On undersides of leaves and young shoots of *Artemisia vulgaris* in N India (Basu and Raychaudhuri, 1976b). $2n=10$ (Kar *et al.*, 1990).

Macrosiphoniella staegeri Hille Ris Lambers

Apt. dark brown to black dusted with whitish wax; BL c.2.7–2.9 mm. On leaves and stems of *Centaurea* spp. in S Europe, Turkey and Armenia. A subspecies was described from Ukraine (*M. staegeri* ssp. *ucrainica* Bozhko). Ovip. and al. males were found in Turkey in Oct (Tuatay and Remaudière, 1964); probably anhol. in mild climates, e.g., Sicily (Patti, 1983).

Macrosiphoniella subaequalis Börner

Apt. are light brown to pinkish dusted with whitish gray wax, with dark ANT, SIPH and cauda; legs with femora dark except at base and tibiae with pale middle section. BL 2.1–3.1 mm. On young shoots of *Artemisia campestris* (where it may be mixed with *M. dimidiata*), and also recorded from *A. rupestris* and *A. variabilis*. In continental Europe (France, Poland, Austria, Switzerland, Italy). Jorg and Lampel (1988) review information about this species.

Macrosiphoniella subterranea (Koch)

Apt. reddish brown dusted with grayish wax except on mid-dorsum and around bases of siph., appendages with contrasting pale and black sections, SIPH and cauda black; BL 2.6–3.5 mm. On undersides of leaves of *Leucanthemum* spp., causing yellow spots. Widely distributed in Europe (Heie, 1995), and also in N America (Ontario, Pennsylvania; Robinson, 1987). Ovip. and al. males in Oct–Nov. $2n=12$.

Macrosiphoniella sudhakarisi Banerjee, A.K. Ghosh and Chakrabarti

Apt. pale green (imm. white), with mainly dark appendages; BL 1.3–1.6 mm. On inflorescences and young leaves of *Achillea millefolium* at a high altitude in U.P., India. This is possibly a cold-temperature form of *M. millefolii*.

***Macrosiphoniella szalaymarzsoi* Szelegiewicz**

Apt. green, powdered with fine gray wax, with ANT dark distally, legs dark except for bases of femora and middle parts of hind tibiae, and SIPH dark distally and paler at base; BL c.2.3–2.5 mm. On terminal shoots of *Artemisia alba* ssp. *saxatilis* in Hungary, and also collected on *A. herba-alba* in Israel (BMNH, leg. V.F.Eastop). Separated in the key from three similar species (*cegmidi*, *longirostrata*, *taesongsanensis*) on the basis of the published descriptions, but the discriminants given are liable to environmentally induced variation, and the group evidently requires further study. $2n=12^*$.

***Macrosiphoniella tadshikana* Narzikulov**

Apt. green, wax-dusted, with SIPH dark except at bases; BL c.2.6 mm. On upper parts of stems of *Seriphidium ferganense* in Tajikistan. *M. alativica* may be closely related.

***Macrosiphoniella taesongsanensis* Szelegiewicz**

Apt. green, powdered with fine gray wax. Head dark brown, with a colorless, semicircular spot at posterior margin. ANT and SIPH pale basally and dark distally, legs mainly pale; BL c.1.7–2.0 mm. On terminal parts of shoots of *Artemisia* spp., especially *princeps* var. *orientalis*, in Korea (Lee *et al.*, 2002c), China (Zhang and Liu, 1986) and E Siberia (Pashtshenko, 1988a). (See comment under *M. szalaymarzsoi*.)

***Macrosiphoniella tanacetaria* (Kaltenbach)**

Apt. are pale gray–green, dusted with fine wax powder, with black ANT, legs, SIPH and cauda; BL 3.2–4.1 mm. The principal host plant is *Tanacetum vulgare*, on which it is mon. hol. with al. males, but the range of reserve hosts seems greater than in most *Macrosiphoniella*, including records from other *Tanacetum* spp., species of *Achillea*, *Anthemis*, *Artemisia*, *Aster*, *Bidens*, *Chamaemelum*, *Chrysanthemum*, *Dendranthema* and *Matricaria*, and also *Salvia officinalis* (Labiatae). On *Tanacetum* in summer, the flowers and flower stems are colonised. Throughout Europe, Morocco, Israel, Mongolia, Siberia, and introduced to N and S America. Two forms in the Mediterranean region are regarded as subspecies; one of these, *M. tanacetaria* ssp. *bonariensis* Blanchard, has SIPH longer relative to the cauda, and is the form that has been introduced into S America. The other, *M. tanacetaria* ssp. *italica* Hille Ris Lambers, occurs in Italy, Austria and former Yugoslavia and appears to be specific to *Tanacetum corymbosum*. Massonet *et al.* (2002) and Massonet and Weisser (2004) studied genetic variation in French and German populations. $2n=12$.

***Macrosiphoniella tapuskae* (Hottes and Frison)**

Plate 27d, Figure 5i

Apt. pale green, with darker green spot on ABD TERG 5 between SIPH bases; BL 2.5–3.3 mm. On various Anthemidae (*Achillea*, *Anacyclus*, *Anthemis*, *Argyranthemum*, *Artemisia*, *Chrysanthemum*, *Matricaria*, *Tanacetum*), usually feeding on lower leaves. Europe, eastward to C and S Russia, SW Asia, N Africa and N America. Mon. hol. with ovip. and apt. males in Sept–Nov. *M. aktashica*, and also *M. aktashica* ssp. *hirsuta* (q.v.), are possibly synonyms. $2n=12$.

***Macrosiphoniella teriolana* Hille Ris Lambers**

Figure 13i

Apt. yellowish green, powdered with gray wax, with appendages all black except for base of ANT III; BL c.1.7–2.0 mm. On *Artemisia campestris* in N Italy. Only known definitely from the type locality; other records are referable to *M. dimidiata*.

***Macrosiphoniella terraealbae* Kadyrbekov**

Apt. pale green with silvery sheen, ANT and legs brown to dark brown, SIPH dark except basally; BL 1.5–2.4 mm. On *Seriphidium terrae-albae* in S Kazakhstan and Xinjiang-Uygur region of China (Kadyrbekov, 2000; Kadyrbekov *et al.*, 2002). Very similar to *M. seriphidii*.

***Macrosiphoniella (Papillomyzus) tuberculata* (Nevsky)**

Apt. green, SIPH brown, paler at base; BL 1.8–2.9 mm. On stems and undersides of leaves of *Picnomon acarna*, and also recorded from *Cousinia* sp. (as *M. cousiniae* Lampel and Rezwani). The original host was recorded as *Carduus* sp., but this was perhaps a misidentification. Middle East and C Asia (Israel, Iran, Syria, Turkey, Uzbekistan). Mon. hol. with ovip. and al. males in Oct in Turkey (Tuatay and Remaudière, 1965).

***Macrosiphoniella (Papillomyzus) tuberculatumartemiscicola* Bozhko**

Apt. green, powdered with gray wax, with appendages mainly dark; BL c.2.8mm. In small colonies on flower stems of *Seriphidium tauricum* in Crimea.

***Macrosiphoniella umarovi* Narzikulov**

Figure 13k

Apt. green, wax-dusted, with mainly brown appendages but pale spots at apices of femora, and pale cauda; BL c.1.9–2.2mm. On leaves and stems of an *Artemisia* sp. in Afghanistan. Keyed on basis of specimens in BMNH agreeing with the original description, collected in 1975 from *Artemisia* sp. in Afghanistan (leg. R. van den Bosch).

***Macrosiphoniella usquertensis* Hille Ris Lambers**

Apt. brownish, powdered with grayish wax, with ANT and legs yellow and black, SIPH and cauda black; BL 2.4–3.2mm. Principal host plant is *Achillea millefolium*, but sometimes found on *Artemisia campestris*. It lives on the lower leaves of *Achillea*, which eventually turn brownish and wither (Heie, 1995). Widely distributed in Europe, and an al. has been found in Quebec, Canada (Robinson, 1987). Ovip. and al. males occur in NW Europe in late Aug–Oct. Sobhani (1970) studied biology, life cycle and morphology of *M. usquertensis* in Germany, and Sobhani and Iglisch (1972) compared morphology of males with that of *M. ptarmicae*.

***Macrosiphoniella vallesiaca* Jörg and Lampel**

Apt. dark green powdered with grayish white wax, with appendages mainly pale to dark brown; BL 1.7–2.4mm. On apices of young shoots of *Artemisia vallesiaca* in Switzerland.

***Macrosiphoniella (Asterobium) victoriae* Kadyrbekov**

Apt. dark green, with mainly dark brown appendages; BL 2.2–2.4mm. On *Saussurea elegans* in SE Kazakhstan (Kadyrbekov, 1999a).

***Macrosiphoniella xeranthemi* Bozhko**

Apt. pale brown with black appendages; BL 2.2–3.0mm. On *Xeranthemum inapertum* in E Europe (Czech Republic, Ukraine).

***Macrosiphoniella xinjiangica* Kadyrbekov, Renxin and Shao**

Apt. bright green; BL 2.5–3.0mm. On stems of *Artemisia dracunculus* in Xinjiang-Uygur region of W China (Kadyrbekov *et al.*, 2002).

***Macrosiphoniella yangi* Takahashi**

Only apparently known from original collection, from ‘a composite’. Placed in subgenus *Asterobium* by Szelegiewicz (1980), but it does not seem to belong there, and it is unclear where the host record from *Aster* sp. originated.

***Macrosiphoniella (Asterobium) yomenae* (Shinji)**

Figure 15c

Apt. dirty yellow–brown to green with brown–black head and pronotum, brown spots anterior to bases of SIPH, and brown–black appendages; BL c.2.6mm. On *Aster* and related genera (*Boltonia*, *Erigeron*, *Kalimeris*) in Japan, Korea, China and E Siberia Also recorded from *Hieracium* sp. in E Siberia (Pashtshenko, 1988a), and from *Artemisia* spp. and *Chrysanthemum boreale* in Korea (Lee *et al.*, 2002c, and BMNH colln), which may indicate a wider host range, but this needs further confirmation. 2n=12.

***Macrosiphoniella (Sinosiphoniella) yomogicola* (Matsumura)**

Apt. are gray to rust brown with dark transverse bars on dorsal abdomen, and dark ANT, legs, SIPH and cauda; BL 2.0–3.2mm. On *Artemisia* spp. in Japan, China, Korea and E Siberia (Sakhalin, Kuril Is.) Also recorded from *Dendranthema indica* and *Ixeridium dentatum* (Lee *et al.*, 2002c).

***Macrosiphoniella yomogifoliae* (Shinji)**

Apt. yellow–green to deep mid-green, powdered with gray wax, with mainly dark ANT and legs, black SIPH and brown cauda; BL 2.0–3.5mm. On *Artemisia* spp., *Chrysanthemum* spp. (*morifolium*,

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nipponicum) and *Tanacetum* spp. in E and SE Asia (Japan, Korea, China, E Siberia, India, Taiwan, Vietnam, Malaysia, Indonesia). Also recorded from *Gnaphalium multiceps* (= *affine*) in Korea (Lee *et al.*, 2002c). Closely related to European *M. artemisiae*, but more often confused with *M. pseudoartemisiae* (q.v.). $2n=12$.

***Macrosiphoniella zeya* Pashtshenko**

Apt. brown, BL c.1.9–2.0 mm; imm. greenish pinky brown. On upper parts of stems of *Artemisia messerschmidiana* in E Siberia (Pashtshenko, 1998b).

***Macrosiphum* Passerini**

Aphidinae: Macrosiphini

About 120 species with long ANT and legs, long SIPH usually with polygonal reticulation on distal 5–30 per cent (mostly 8–18 per cent in apt. and 15–25 per cent in al.), hairs of medium length, and little or no dorsal abdominal pigmentation. Several of the well-known species (*rosae*, *euphorbiae*, *pallidum*) alternate from *Rosa* to herbaceous secondary hosts, but most species are mon. hol. on a wide variety of herbs and shrubs. Males are usually alate. About half the species are described from N America, although some of these have seldom or never been recognised again and may really be synonyms of better known species. About 36 species are known from Europe and the remainder are from C and E Asia. Three S American species may also belong in *Macrosiphum*. *Sitobion*, often treated as a subgenus of *Macrosiphum*, is now regarded as a separate genus. Accounts of *Macrosiphum* are available for Europe (Hille Ris Lambers, 1939a; Heie, 1994), Germany (Muller, 1969b), Switzerland (Meier, 1961), C Asia (Nevsky, 1929; Narzikulov and Umarov, 1969), Japan (Miyazaki, 1971), Korea (Lee *et al.*, 2002c), China (Tao, 1963), and India (David, 1976). N American *Macrosiphum* were reviewed by Palmer (1952 – Rocky Mountain region), Hottes and Frison (1931 – Illinois), Patch (1919 – eastern USA), and Soliman (1927 – California). MacGillivray (1968) and Jensen (1998) gave more recent information on some N American species, and Jensen (1997) clarified the distinction between *Macrosiphum* and *Sitobion*. Fern-feeding species, which seem to form a distinct group within *Macrosiphum* (or possibly a separate genus (with $2n=16$, whereas *Macrosiphum* typically have $2n=10$) were reviewed and keyed by Jensen and Holman (2000).

***Macrosiphum adianti* (Oestlund)**

Figure 43f

Apt. yellow, greenish or pink; BL 1.0–2.1 mm. On *Adiantum* spp., esp. *A. pedatum*, in N America. Mon. hol. with apt. males. Records from other ferns are probably due to misidentification (Jensen and Holman, 2000).

***Macrosiphum aetheocornum* Smith and Knowlton**

Figure 30a

Apt. greenish; BL c.3.0–3.5 mm. On *Geranium* sp. (wild) in western USA (Rocky Mountain region). This species is unusual in having some specimens (but not all) with hairs on SIPH (Palmer, 1952, and BMNH colln, leg. G.F. Knowlton).

***Macrosiphum agrimoniellum* (Cockerell)**

Apt. are broadly spindle-shaped, light apple-green with apices of ANT segments and tibiae darker; BL 2.8–3.3 mm. Forming large colonies on flower stems of *Agrimonia eupatoria*, widely distributed in N America (New Mexico, Utah, Illinois, New York, Massachusetts, New Brunswick). Al. undescribed.

***Macrosiphum albertinae* Hille Ris Lambers**

Apt. apple-green with ANT, tibiae and SIPH mainly dark, and cauda pale green; BL 2.4–2.9 mm. In small numbers on upper sides of leaves of *Thesium intermedium* in N Italy, former Yugoslavia (BMNH, leg. V.F. Eastop) and Czech Republic (BMNH, leg. H.L.G. Stroyan), and on *Th. divaricatum* in France (BMNH, leg. G. Remaudière). Al. undescribed.

***Macrosiphum albifrons* Essig**

Apt. pale bluish gray–green, dusted with white wax; BL 3.2–5.1 mm. Al. have brown pterothorax. On leaves, stems and flowers of *Lupinus* spp., and also recorded from *Thermopsis montana*. N America, and introduced to Europe and S America (Brazil). Mon. hol. with al. males. See also Blackman and Eastop (2000). $2n=10$.

***Macrosiphum alpinum* Meier**

Apt. pale yellowish green; BL 4.3–4.8 mm. On *Senecio alpinus*, feeding on undersides of middle and lower leaves, in Switzerland.

***Macrosiphum amygdaloides* Theobald**

Apt. broadly spindle-shaped, yellow green, mid green, pink, magenta or wine red, with black apices of ANT, femora, tibiae and SIPH; BL 1.5–3.7 mm. On *Euphorbia* spp. in Europe (England, Germany, Austria, Switzerland, Corsica, Italy). Mon. hol. with al. males (Meier, 1961). $2n=10$.

***Macrosiphum atragenae* Holman**

Apt. whitish green with dark apices to ANT segments, legs and cauda; BL 3.7–4.55 mm. In small groups on undersides of leaves of *Clematis alpina* in the Carpathians (Slovakia, Romania).

***Macrosiphum audeni* Macdougall**

Apt. pale green; BL 2.3–2.9 mm. On upper sides of leaves of *Nuphar lutea* in north-west USA (Washington) and Canada (B.C.). Very similar to *M. euphorbiae*, but specimens in the BMNH collection (coll. A.P. Macdougall) have a relatively longer ANT PT and shorter hind tarsus II.

***Macrosiphum badium* Jensen**

Apt. dark reddish brown, brick-colored; BL 2.3–3.1 mm. On *Maianthemum* spp. in Oregon, USA. Mon. hol., with ovip. and both apt. and al. males in Oct (Jensen, 2000).

***Macrosiphum berchemiae* Takahashi**

Apt. blue-green; BL c.1.8 mm. On *Berchemia lineata* and *B. floribunda* in China. *M. berkemiae* (Shinji) is possibly a synonym.

***Macrosiphum berkemiae* (Shinji)**

Apt. deep green with mainly black ANT and legs, black SIPH and pale yellow cauda; BL 1.3–1.8 mm (Miyazaki, 1980a). On *Berchemia racemosa* in Japan. Life cycle unknown.

***Macrosiphum bisensoriatum* Macdougall**

Apt. dark green; BL c.3.4 mm. On undersides of leaves of *Ribes lacustre* in B.C., Canada. Life cycle unknown.

***Macrosiphum bupleuri* Kadyrbekov**

Apt. yellow or yellow-green, with dark tips to SIPH; BL 2.6–3.6 mm. On inflorescences and undersides of leaves of *Bupleurum aureum* in SE Kazakhstan (Kadyrbekov, 2000).

***Macrosiphum centranthi* Theobald**

Apt. whitish green, yellowish green or green with darker green spinal stripe, with dark brown eyes (not red as in *euphorbiae*), and femora and SIPH darker towards apices; BL 2.0–3.6 mm. Sec. rhin. in al. III 17–26. On leaves and stems of Valerianaceae (*Centranthus*, *Valeriana*), sometimes in mixed colonies with *M. rosae*, and colonies also occur sporadically on various other plants. Europe (UK, Switzerland), India, and Africa (Mozambique, Tanzania, S Africa). Indian populations seem more polyphagous, with records from *Chrysanthemum*, *Cineraria*, *Mangifera*, *Rosa*, *Tibouchina*, etc. (David, 1976). Mon. hol. in Europe, with al. males (Meier, 1961), probably anhol. elsewhere. $2n=10$.

***Macrosiphum cerinthiacum* Börner**

Apt. pale yellow with dark brown apices to ANT, legs and SIPH, and dark ‘knees’; BL c.3.5 mm. Sec. rhin. in al. III c.35–40. On undersides of leaves of *Cerithe minor* in France (BMNH colln, leg. J.H. Martin), Austria, Hungary and Ukraine. Life cycle unknown.

***Macrosiphum cholodkovsyi* (Mordvilko) (= *Macrosiphum corallinum* Theobald)**

Apt. yellow-green to dark blue-green or vivid coral-pink to red, with femora and SIPH dark distally; BL 3.1–5.1 mm. Sec. rhin. in al. III 9–28. On upper leaves, stems and inflorescences of *Filipendula ulmaria*, and occasionally on *Valeriana* spp. Europe, eastward to W Siberia, Transcaucasus and Turkey. Mon. hol., with al. males (Heie, 1994). $2n=10$.

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***Macrosiphum claytoniae* Jensen**

Apt. dark reddish or greenish brown; BL 1.8–2.7 mm. Immatures dusted with purplish or bluish gray wax. On *Claytonia* spp., especially *C. sibirica*, in north western USA (Oregon, Washington) and Canada (B.C.). Apparently entirely anhol., surviving the winter in mild humid areas west of the Cascade Mountains (Jensen, 2000). $2n=16^*$.

***Macrosiphum clematifoliae* Shinji**

Apt. rather large, spindle-shaped, pale yellow–green to green with a darker blue–green spinal stripe, and black SIPH that are pale at their bases; BL 2.8–3.5 mm. On *Clematis* spp., feeding on both sides of leaves. In Japan, Korea and Taiwan. Mon. hol. in Japan (Miyazaki, 1971). $2n=18$ (the karyotype suggests that this species may be a *Sitobion*).

***Macrosiphum clematophagum* Zhang, Chen, Zhong and Li**

Apt. green; BL c.2.3 mm. On leaves of *Clematis florida* in Gansu Province (Xinglongshan mountains, 2200 m), China (Zhang, 1999).

***Macrosiphum clydesmithi* Robinson**

Figure 43g

Apt. pale green; BL 1.7–3.0 mm. Heter. hol., migrating from *Holodiscus discolor* to *Pteridium aquilinum* in western N America, from Mexico to Washington. In western Oregon remigration to *Holodiscus* occurs in Oct–Nov, a few weeks earlier than *M. pteridis*, which utilises the same hosts (Jensen and Holman, 2000). $2n=16$.

***Macrosiphum constrictum* Patch**

Apt. color in life unknown; BL unrecorded. On *Pedicularis* sp. and *Saxifraga* sp. on St Paul and St George (Pribilof Islands, Bering Sea). Mon. hol.; ovip. occurred (on *Pedicularis*) in June (orig. descr.). Generic position uncertain.

***Macrosiphum corallorhizae* Cockerell**

Apt. green, SIPH long, blackish in middle and at apices; BL 2.5–3.0 mm. On *Corallorhiza* spp. in USA (New Mexico) and Canada (B.C.; Forbes and Chan, 1989).

***Macrosiphum creelii* Davis**

Apt. pale green, pink or yellow; BL 2.3–4.0 mm. On various Leguminosae (*Lathyrus*, *Lens*, *Medicago*, *Phaseolus*, *Pisum*, *Vicia*) in western N America. Halfhill (1982) studied its host plant preferences and temperature relations. Apparently mon. hol., but males not yet described. $2n=10$.

***Macrosiphum cuscutae* Holman**

Apt. broadly spindle-shaped, orange with black appendages; BL 2.5–3.0 mm. On *Cuscuta umbellata* in Cuba; this appears to be the main host, and its color is identical to that of the aphid, but smaller colonies have been also found on species of *Cissus*, *Pavonia* and *Ruellia* (orig. descr.).

***Macrosiphum cyatheae* (Holman)**

Apt. pale green, with dark brown ANT and tibiae; BL 1.6–3.0 mm. Singly or in small colonies on undersides of fronds of *Cyathea balanocarpa* and *Pteridium caudatum* in Cuba (orig. descr., as *Acyrthosiphon*), and subsequently found on *Pteridium* in Venezuela, and on *Pteridium* sp. and unidentified epiphytic ferns in E Mexico (Jensen and Holman, 2000).

***Macrosiphum cystopteris* Robinson**

Apt. dark green to greenish black; BL 2.2–2.5 mm. On undersides of fronds of *Cystopteris bulbifera* in USA (Pennsylvania), and also recorded from *Cystopteris* sp. in Mexico (Jensen and Holman, 2000). Mon. hol., with ovip. in late Sept (in USA).

***Macrosiphum daphinidis* Börner**

Apt. pale yellowish or whitish green with slightly darker spinal stripe, with dark brown eyes (cf. *euphorbiae*), entirely pale femora, and SIPH only slightly darker at apices; BL 2.4–4.2 mm. Sec. rhin. in al. III

26–47. On *Daphne* spp., especially *D. mezereum*, forming small, rather loose colonies on growing buds and shoots, and scattered on undersides of leaves (Watson, 1982). In Europe, and introduced to western North America (Oregon, B.C.). Mon. hol., with ovip. and al. males (Heie, 1994) in Sept. $2n=10$.

***Macrosiphum diervillae* Patch**

Apt. milky white with pale appendages; BL 2.9–3.4 mm. Living singly on undersides of leaves of *Diervilla lonicera* in north-eastern USA and E Canada. Mon. hol.; ovip. and males (immature) were collected in Sept in New Brunswick (MacGillivray, 1968).

***Macrosiphum doronicicola* Leclant**

Apt. spindle-shaped, green to greenish white with dark apices to appendages: BL 2.9–4.2 mm. Forming small colonies on flower stems and flowerheads of *Doronicum austriacum* in SW Europe (France, Spain). Mon. hol., apparently with an abbreviated parthenogenetic phase; fundatrices were collected in mid-Jun, and ovip. and al. males were present in mid-July (orig. descr.).

***Macrosiphum dryopteridis* (Holman)**

Apt. yellowish green to bright or pale green, sometimes pale yellow or pinkish; BL 1.7–2.4 mm. On various ferns (*Athyrium*, *Dryopteris*, *Gymnocarpium*, *Thelypteris*), feeding on undersides of fronds along veins. N and C Europe. Mon. hol. with ovip. and al. males in Sept–Oct (orig. descr.). Possibly there are host-specific populations; Müller (1988) found that a bright green form on *Gymnocarpium dryopteris* and a yellowish green form on *Athyrium filix-femina* bred true in the laboratory, with hybrids having intermediate coloration.

***Macrosiphum echinocysti* Bartholomew**

Apt. forest green, with slight whitish bloom, head paler, eyes dark red, and with a dark green spinal stripe; BL 2.4–3.5 mm. On *Echinocystis* sp. in California, USA (San Francisco); in large numbers on the undersides of leaves and dropping readily when disturbed (orig. descr.). The author could not find this species again when he visited the site the following year, and it has not been collected since.

***Macrosiphum edrossi* Essig**

Apt. yellowish or greenish, with mainly dark appendages; BL 2.3–2.8 mm. On an *Urtica* sp. in Peru.

***Macrosiphum equiseti* (Holman)**

Apt. spindle-shaped, uniformly green or pinkish with apices of appendages dark brown to blackish; BL 1.6–2.6 mm. In small groups on undersides of branches of *Equisetum* spp. in Europe and Canada (B.C.). Mon. hol. on *E. sylvaticum* in Czech Republic, with ovip. and apt. males in Sept (orig. descr.). $2n=16$.

***Macrosiphum euphorbiae* (Thomas)**

Plate 25g

Apt. usually green, sometimes yellowish, pink or magenta, with red eyes, and femora and SIPH pale or only slightly darker towards apices; BL 1.7–3.6 mm. Imm. rather long-bodied, paler than adults but with a dark spinal stripe, and dusted with grayish wax. Al. with pale greenish to yellow–brown thorax, and sec. rhin. III 12–21. Of N American origin, now almost world-wide. Heter. hol. with sexual phase on *Rosa* in north-eastern USA, but elsewhere probably mainly or entirely anhol. on secondary hosts in more than 20 different plant families. See Blackman and Eastop (2000). $2n=10$.

***Macrosiphum fagopyri* A.K.Ghosh and Raychaudhuri**

Apt. pale yellowish with yellowish brown SIPH; BL 4.2–4.8 mm On young growth and undersides of leaves of *Fagopyrum* sp., and later recorded from *F. cymosum* (Raychaudhuri *et al.*, 1980), in NE India. Males possibly of this species were described by David (1976).

***Macrosiphum floridae* (Ashmead)**

Apt. shining pale green, with pale SIPH. On *Rosa laevigata* in Florida.

***Macrosiphum funestum* (Macchiati)**

Apt. rather dull mid- to dark green, or magenta to reddish brown, with mainly dark ANT and SIPH; BL 1.9–4.0 mm. On young shoots and leaves of *Rubus* spp., esp. *R. fruticosus* s. lat. Also recorded from *Galium*

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sp. and *Geranium robertianum*, and similar aphids were found in Iran an *Anchusa* sp. (BMNH, leg. (S.H. Hodjat). Throughout Europe, eastward to Moldova and Turkey, and also recorded from Canada. Mon. hol., with al. males; probably anhol. in areas with mild winters. $2n=10$.

***Macrosiphum fuscicornis* Macdougall**

Apt. dark olive-green, with red eyes and uniformly dark tibiae; BL c.3.2 mm. Found on stems and leaf buds of *Epilobium angustifolium* in Canada (B.C.), and apparently not recorded since.

***Macrosiphum gauri* (Williams)**

Apt. bright green or pink, with dark ANT, dark brown to black SIPH and a dusky cauda; BL 2.7–3.9 mm. On *Gaura* and *Oenothera* spp., widely distributed in North America. MacGillivray (1968) provided a redescription. Records of the very similar *M. pallidum* from Onagraceae should probably all be referred to this species.

***Macrosiphum gei* Koch**

Apt. are spindle-shaped, mid-green to bluish green, or mauve with green mottlings to wine red, with femora and SIPH dark at apices; BL 1.9–5.4 mm. Sec. rhin. in al. III 8–26. On *Geum* spp., especially *urbanum*, and on certain Umbelliferae (*Anthriscus*, *Chaerophyllum*, *Conium*, *Myrrhis*, *Torilis*), and occasionally on Caryophyllaceae, usually scattered or in small colonies on the undersides of the leaves. Dense colonies form on upper parts of stems of *G. urbanum* during flowering. In Europe, W Siberia, and introduced to N America (USA, Canada, Bermuda). Mon. hol. on *Geum*, with al. males and some populations possibly host-alternating to Umbelliferae. $2n=10$.

***Macrosiphum geranii* (Oestlund)**

Apt. with glaucous appearance due to a covering of fine white powder; BL of apt. unrecorded, BL of al. 2.3–3.3 mm (orig. descr., and BMNH colln, leg. J.O. Pepper). On *Geranium maculatum* in eastern USA. Records from western USA may all be referable to *M. euphorbiae*, and aphids from a cultivated *Geranium* sp. in Manitoba (Robinson and Bradley, 1965) are an undescribed *Macrosiphum* species with shorter SIPH (BMNH colln, leg. A.G. Robinson). $2n=10$.

***Macrosiphum hamiltoni* Robinson**

Apt. pale green with ANT joints, tarsi and tips of SIPH dusky; BL 2.2–3.1 mm. Originally described from specimens collected on *Humulus lupulus* in Manitoba, Canada, but since collected from *Cornus* spp. in Manitoba and New Brunswick. From dates of collection host alternation seems unlikely, so *Cornus* is probably the usual host. $2n=10$.

***Macrosiphum hartigi* Hille Ris Lambers**

Apt. green, with a faint grayish wax bloom, ANT and legs yellowish brown, with apices of tibiae and tarsi brown, SIPH green with black apices, cauda green; BL c.3.6 mm. On *Silene vulgaris*, feeding on upper parts of flowerstalks and under leaves (Hille Ris Lambers, 1931, as *M. montanum*). S Europe (Italy, Austria, Switzerland).

***Macrosiphum helianthi* (Tao)**

Apt. yellowish green with ANT, apices of femora and tibiae, tarsi and whole of SIPH blackish brown; BL c. 2.4 mm. Described from specimens collected in Szechuan prov., China, in 1936, and apparently not recorded since.

***Macrosiphum hellebori* Theobald and Walton**

Apt. yellow–green with darker marbling, with dark apices to ANT segments, femora, tibiae and SIPH; BL 1.7–4.3 mm. On undersides of leaves of *Helleborus* spp. in Europe, and introduced to New Zealand. Mon. hol., with ovip. and al. males in September in continental Europe, but overwintering mainly as viviparae in UK. Badmin (1991) studied the population ecology of this species in SE England. $2n=10$.

***Macrosiphum holmani* Leclant**

Apt. green or red, with brown head, ANT, legs, SIPH and cauda; BL 2.1–3.1 mm. On flower-stalks and flower-heads of *Sanicula europaea* in Europe (Corsica, Czech Republic, Romania). Mon. hol., with ovip. and al. males in late Aug–Oct (orig. descr.).

***Macrosiphum holodisci* Jensen**

Apt. white; BL 2.0–3.4 mm. Mon. hol. on *Holodiscus discolor* in north-western USA. Ovip. and apt. males in Sept–Oct (Jensen, 2000).

***Macrosiphum impatientis* Williams**

Apt. shining green to dark green with strikingly black SIPH; BL 1.7–3.8 mm. In north-eastern and midwestern USA. Heter. hol., migrating from *Rosa* spp. (*multiflora*, *carolina*) to *Impatiens* spp. (Jensen, 1998). Some records of *M. pallidum* on *Impatiens* (e.g., MacGillivray, 1968) may be referable to this species. $2n=10^*$.

***Macrosiphum inexpectatum* Leclant**

Apt. green, similar in color to host plant; BL 1.6–3.2 mm. On *Euphorbia insularis*, and apparently specific to this host, in Corsica. Mon. hol. with apt. males.

***Macrosiphum insularis* (Pergande)**

Apt. pale brownish yellow, with appendages mainly pale; BL 2.5–3.4 mm. On undersides of leaves of Con-vallariaceae (*Maianthemum*, *Polygonatum*, *Streptopus*) in western N America (Colorado, Arkansas, Utah, B.C. and St. Paul I.). Mon. hol., with ovip. and al. males in Sept (Palmer, 1952, as *M. yagasogae* Hottes; see also Jensen, 2000).

***Macrosiphum (Unisitobion) isodonis* (Sorin)**

Apt. yellowish green, with broad lateral longitudinal dark stripes, black ANT, legs and SIPH, and pale cauda; BL 1.9–2.2 mm. Immatures whitish (Moritsu, 1983; as *Unisitobion ?corylicola*). On undersides of leaves of *Isodon japonicus* in Japan. Closely related to *M. perillae* on related hosts in China and Korea.

***Macrosiphum jasmini* (Clarke)**

Apt. yellowish green, with pale SIPH. In small colonies on undersides of leaves of *Jasminum* sp. in California, USA.

***Macrosiphum jeanae* Robinson**

Apt. green with slightly darker appendages; BL c.1.8–2.0 mm. Feeding inside the pitchers of *Sarracenia purpurea* in Manitoba, Canada. Mon. hol. with ovip. and al. males in Sept (orig. descr.). A very similar, undescribed species occurs on *Darlingtonia californica* in California (BMNH colln, leg. D.W. Nielsen).

***Macrosiphum kiowanepum* (Hottes)**

Apt. bluish or greenish with a reddish tinge, pruinose, with very long dark brown to black ANT, tibiae and SIPH; BL 2.6–3.2 mm. On undersides of leaves and flower stems, described from *Camassia* (as *Quamasia*) *hyacintha*; also recorded from species of *Zigadenus*, *?Penstemon*, *Geum ciliatum* and from *Helenium hoopesii* (BMNH colln, leg. T.D.A. Cockerell). It seems unlikely that all these are true hosts. In western USA and Canada (New Mexico, Colorado, Utah, Washington, Alberta, B.C.).

***Macrosiphum knautiae* Holman**

Apt. yellowish green to grass-green, very rarely pinkish, with dark head and thorax and black SIPH; BL 2.3–3.8 mm. On undersides of leaves and shoot apices of *Knautia drymeia* in Czech Republic. Mon. hol., with ovip. and al. males in Oct (orig. descr.). Swiss material included under the name *knautiae* by Holman is here regarded as *M. silvaticum*, although Rakauskas (2003) has shown that these populations are probably geographic variants of a single species.

***Macrosiphum lambi* Robinson**

Apt. green; BL 2.3–3.1 mm. Sec. rhin. in apt. III 4–45, in al. III 62–106. On *Athyrium filix-femina* in eastern N America, and also collected on *Dryopteris thelypteris* in Alaska (BMNH colln, leg. A.G. Robinson).

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Macrosiphum lapponicum Shaposhnikov

Apt. green, yellow or red; BL c.4 mm. Sec. rhin. in apt. III 37–46, al. unknown. On *Athyrium alpestre* (host identity requires confirmation) in NW Russia (Khibiny mts).

Macrosiphum laseri Holman

Apt. yellow to yellowish green; BL 3.1–3.8 mm. On *Laser trilobum* and *Laserpitium latifolium*, mostly feeding on upper part of stem and in inflorescences, more rarely on undersides of leaves, which turn yellowish. In Crimea, Hungary (Szelegiewicz, 1966) and France (BMNH colln, leg. G. Remaudière).

Macrosiphum lilii (Monell)

Apt. red and yellow with dark SIPH; BL 2.5–3.2 mm. On *Lilium* spp. (and possibly other Liliaceae) in eastern USA. The aphids were described from bulbs imported from Japan (Comstock, 1879), but there have been no subsequent Japanese records. See also Blackman and Eastop (2000).

Macrosiphum lisae Heie

Apt. whitish or yellowish white, with ANT pale except for dark segmental apices, and legs pale; BL 2.5–3.7 mm. On *Epilobium angustifolium*, colonising undersides of middle and lower leaves of the smaller plants that grow in shady places and rarely flower, reproducing vegetatively. In N Europe. Mon. hol., with ovip. and al. males appearing in Aug–Sept (orig. descr.).

Macrosiphum longirostratum Jensen

Apt. green with dark tips to ANT, leg and SIPH; BL 2.2–2.8 mm. Singly or in small groups along mid-ribs on undersides of leaves of *Woodsia mollis* in Mexico. Mon. hol., with ovip. and al. males in Oct (Jensen, 2000).

Macrosiphum martorelli Smith

Apt. bright yellow–green with SIPH dark except at base; BL 2.7–2.9 mm. On flowers, young leaves, and pods of *Theobroma cacao* in the Caribbean (Cuba, Dominican Republic, Jamaica). Attended by the ant *Solenopsis geminata* (orig. descr.).

Macrosiphum meixneri Börner

Apt. yellowish green, dusted with white wax; BL 3.2–4.5 mm. On *Euphorbia* sp. (*austriaca*, *hyberna*) in Austrian and French Alps, and in Spain (Cantabrian mts). Mon. hol. with al. males (Nieto Nafria and Mier Durante, 1991).

Macrosiphum melampyri Mordvilko

Apt. green with dark distal parts of ANT, femora, tibiae and SIPH; BL 3.2–4.0 mm. On *Melampyrum* spp. and *Digitalis purpurea* in N Europe (UK to NW Russia). Heie (1994) gave a redescription. Mon. hol.; ovip. and al. males on *Melampyrum pratense* in Sweden in late August (BMNH colln, leg. F. Ossiannilsson). A related, undescribed species was found on *Melampyrum* sp. in Pennsylvania, USA (BMNH collection, leg. H.L.G. Stroyan).

Macrosiphum mentzeliae Wilson

Apt. light to mid-green with dorsal reddish patch, or pinkish; BL 1.8–3.0 mm. On leaves of *Mentzelia albicaulis* (and possibly other *Mentzelia* spp.) in western USA and Mexico. Mon. hol., with ovip. and al. males in Oct (Palmer, 1952).

Macrosiphum mertensiae Gillette and Palmer

Apt. color in life unrecorded; BL 2–3 mm. On leaves of *Mertensia* sp. in western USA.

Macrosiphum mesosphaeri Tissot

Apt. yellowish green to bottle green, with dark ANT, legs and SIPH; BL 1.9–3.2 mm. On *Hyptis* and *Ocimum* spp. in southern USA (Florida), Mexico, Puerto Rico, Cuba, Venezuela and Argentina (the latter as *M. hyp-tidis* Blanchard, 1944), and on *Plectranthus* sp. in Jamaica (T. Hall, pers. comm). Large specimens that are apparently this species have also been collected on *Quercus* in Colombia, Mexico (BMNH, leg. R. Peña) and Costa Rica (BMNH, leg. J.H. Martin). Life cycle unknown. It has been treated as a synonym of *M.*

salviae; differences between apt. of the two species are given by Remaudière and Remaudière (1997), and in the key to aphids on *Ocimum*.

***Macrosiphum miho* Jensen and Holman**

Apt. pale yellowish green; BL 1.1–2.2 mm. On ‘*Aspidium* sp.’ growing in rock walls (Hottes and Frison, 1931, as *M. adianti*), which is probably either *Dryopteris marginalis* or *Polypodium virginianum* (Jensen and Holman, 2000). Apparently mon. hol., as fund. were collected in May.

***Macrosiphum minatii* (Das, Raychaudhuri and Raychaudhuri)**

Apt. pale brown, BL 1.8–4.4 mm. On *Delphinium* sp., with collections also from other unidentified Ranunculaceae, in H. P., India. Described in *Uroleucon*, but transferred to *Macrosiphum* by Chakrabarti and Medda (2004).

***Macrosiphum mordvilko* Miyazaki**

Apt. green or yellowish green with shiny black head and prothorax, mainly black ANT and black SIPH; BL 2.5–3.8 mm. Sec. rhin. in apt. 23–36, in al. 30–40. On undersides of young leaves of *Rosa* spp., especially *R. rugosa*, in E Asia (not usually on cultivated roses). Mon. hol. with ovip. in Oct. (orig. descr.).

***Macrosiphum multipilosum* Nevsky**

Apt. undescribed. Al. with pale green or pale yellow abdomen and brownish thorax, smoky cauda, darker SIPH, black ANT and legs; BL c.2.7 mm. Al. have c.50 rhin. on ANT III, and numerous long dorsal body hairs. On stems and undersides of leaves of *Helichrysum punctatum* in S Kazakhstan. This species is more likely to belong in *Macrosiphoniella* or *Uroleucon* than in *Macrosiphum*.

***Macrosiphum nasonovi* Mordvilko**

Apt. grayish green or red, BL 2.0–3.6 mm. Al. have dark brown head and thorax and green abdomen and 7–11 sec. rhin. on ANT III. Morphologically very similar to *M. euphorbiae*. Recorded from several genera of Ericaceae (*Andromeda*, *Chamaedaphne*, *Oxycoccus*, *Vaccinium*) in northern Europe (Finland, Latvia, Russia) and France (Pyrenées). Mon. hol. on *Vaccinium* and *Andromeda*, with ovip. and al. males in Sept (Müller, 1989).

***Macrosiphum niwanistum* (Hottes)**

Apt. pale green, dusted with white wax powder; BL c.2.8–3 mm. On undersides of leaves of *Mertensia paniculata* in Colorado, USA, and there is also a record from Ohio (Smith and Parron, 1978). Mon. hol., with ovip. and apt. males in late Aug–Sept (Palmer, 1952, and BMNH colln, leg. D. Hille Ris Lambers).

***Macrosiphum occidentale* (Essig)**

Apt. very pale yellow to whitish; BL 2.6–3.5 mm. On undersides of leaves of *Oemleria cerasiformis*, and possibly *Prunus emarginata* (see Jensen, 2000), in north-western USA and Canada (B.C.). Mon. hol. on *Oemleria*, with al. males (Jensen, 2000). 2n=16

***Macrosiphum olmsteadi* Robinson**

Color of living apt. unknown, probably pale green; BL 2.6–3.0 mm. On *Aster macrophyllus* in Ontario, Canada. Ovip. and al. males in Oct.

***Macrosiphum oredonense* Remaudière**

Apt. pale green, with very long legs, pale except at apices; BL 2.4–4.5 mm. On undersides of leaves, and later in small compact colonies on stems and young fruits of *Lonicera nigra* in S France, Germany, Switzerland and Czech Republic. Mon. hol., with ovip. and reddish brown al. males produced in Aug (Müller, 1989).

***Macrosiphum oregonense* Jensen**

Apt. shiny green; BL 2.3–3.7 mm. On undersides of leaves of *Lysichiton americanum*, often in semiaquatic situations. In western N America (Oregon, Washington, B.C.). Mon. hol. with ovip. and al. males in Oct (Jensen, 2000).

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Macrosiphum orthocarpus Davidson

Apt. bright pea-green, with black ANT and SIPH; BL more than 3 mm. Among flower-spikes of *Orthocarpus purpurascens* in California, USA.

Macrosiphum osmaroniae Wilson

Apt. pale to mid-green; BL 2.7–3.5 mm. On spring growth of *Oemleria cerasiformis*, migrating in late April–May to pass the summer in small populations on *Pteridium aquilinum* (Jensen and Holman, 2000), with a return migration to *Oemleria* in Oct. In north-western USA (Oregon, Washington) and Canada (B.C.). $2n=16^*$.

Macrosiphum pachysiphon Hille Ris Lambers

Apt. very pale pink with stout black SIPH; BL 3.0–3.5 mm. Al. with dusky sclerotic pattern on dorsal abdomen. On *Rubus* spp (especially *lasiocarpus*) and sometimes on other Rosaceae (*Rosa*, *Potentilla*, *Spiraea*). Records from other plants (*Berberis*, *Rumex*) are probably of vagrants. In India and Pakistan. Life cycle unknown. $2n=18$.

Macrosiphum pallens Hottes and Frison

Apt. pale whitish green, with pale SIPH and cauda; BL 1.9–2.4 mm. Al. pale yellow–green, without marginal sclerites. On *Silphium integrifolium* in Illinois, USA, with a record also from *Ambrosia trifida*.

Macrosiphum pallidum (Oestlund)

Plate 25h

Apt. green or pink, with ANT, femoral apices, tibiae, tarsi dark, and SIPH dark except at bases; BL 2.1–4.6 mm. Sec. rhin. in apt. 3–14, in al. 14–22. On wild *Rosa* spp. and various other Rosaceae (*Agrimonia*, *Fragaria*, *Geum*, *Potentilla*), and also apparently able to colonise a wide range of other plants, although some records may be misidentifications of other species (e.g. records from *Oenothera* are probably all *M. gaurae*). Widespread in N America. Life cycle still seems to be unknown. MacGillivray (1968) provided a detailed redescription (as *M. pseudorosae* Patch). A very similar but paler species on *Oxalis oregona* in Oregon (BMNH colln, leg. D. Hille Ris Lambers) is undescribed. $2n=10$.

Macrosiphum parvifolii Richards

Figure 56a,b

Apt. green or red, powdered with white wax, with dark tips to appendages; BL 3.0–3.5 mm. Al. undescribed. On *Vaccinium* spp. in B.C., Canada (orig. descr. and BMNH colln). A similar undescribed species, but with shorter hairs, cylindrical SIPH and a thinner cauda, has been collected in B.C. (Vancouver area) on *V. parvifolium* and *Pieris japonica* (BMNH colln, leg. C.-k. Chan). Al. of this latter species have paired dark pleural abdominal markings, and 9–13 sec. rhin. on ANT III. $2n=16$.

Macrosiphum pechumani MacGillivray

Apt. milky white, with black head and appendages; BL 2.5–3.1 mm. On Convallariaceae (*Convallaria majalis*, *Maianthemum racemosum*) in north-eastern USA (New York, Washington DC) and Canada (Ontario; BMNH, leg. M. Sypkens). Mon. hol., with ovip. and al. males in Sept–Nov (orig. descr.). Records from plants in other families (*Fragaria*, *Hibiscus*, *Pyrola*) are likely to be vagrant individuals, although Leonard (1968) recorded ovip. from *Hibiscus*.

Macrosiphum penfroense Stroyan

Apt. apple green, imm. with wax bloom; BL 1.9–3.4 mm. On *Silene uniflora* (= *maritima*) in England and Wales, feeding in small groups in flowers, or singly on buds or on upper surfaces of leaves. Apparently anhol., with delayed production of ovipariform apt. under lab. conditions (G.W. Watson, unpubl. observations). Described as a subspecies of *M. sileneum* (= *M. stellariae*), but the consistent differences in morphology and host plant indicate that it should have separate species status (Watson, 1982). $2n=10$.

Macrosiphum (Unisitobion) perillae (Zhang)

Apt. pale yellow with broad dark lateral longitudinal stripes, black ANT, legs and SIPH and pale cauda; BL 1.8–2.9 mm. On upper parts of stems and undersides of leaves of certain Labiatae (*Isodon*, *Mentha*, *Perilla*) in China, Korea and Japan (Moritsu, 1982, as *M. corylicola*). Mon. hol. on *Isodon inflexus*, with ovip. and

al. males in Oct (Lee *et al.*, 2001). (A record from *Rosa multiflora* could be a misidentification of host plant.) $2n=18$ (Chen and Zhang, 1985a).

Macrosiphum polanense Pašek

Apt yellowish white to pale green; BL 3.8–4.6 mm. In large colonies on flower stems of *Cicerbita alpina* in Slovakia (Pol'ana). Mon. hol. with ovip. and al. males in September (orig. descr.).

Macrosiphum potentillae (Oestlund)

Color of apt. in life unrecorded; BL c. 2.2 mm (BMNH colln, leg. D. Hille Ris Lambers). On undersides of leaves of *Potentilla anserina* and *Potentilla* sp. in USA (Minnesota, Kansas, Oregon).

Macrosiphum potentillicaulis Miller

Apt. pale red with mainly dark appendages; BL 2.4–3.4 mm On *Potentilla bakeri* in Idaho, and subsequently collected in Wyoming (BMNH colln, leg. G.F. Knowlton). Except for the relatively longer SIPH, the description of this species does not distinguish it from *M. pallidum*.

Macrosiphum prenanthidis Börner

Apt. green or violet brownish; BL 3.2–3.8 mm. Sec. rhin. in apt. III 9–16, in al. III 20–30. On *Prenanthes purpurea* in Europe (Austria, Bulgaria, Czech Republic, France, Germany, Switzerland). Mon. hol. with al. males.

Macrosiphum pseudogeranii Chakrabarti and Raychaudhuri

Color of apt. not recorded; BL 2.8–3.5 mm. On *Geranium* spp. in NW India (H.P., U.P.). Probably mon. hol.; Raychaudhuri *et al.* (1980) described the ovipara (from *Polygonum* – a vagrant?), and Maity and Chakrabarti (1984) described the al. vivip. and male.

Macrosiphum ptericolens Patch

Apt. pale yellowish green to darker shiny green; BL 2.3–3.3 mm. Sec. rhin. in apt. III 3–35, in al. III 27–66. On *Pteridium aquilinum* in N America east of the Rocky Mountains, and introduced to Europe (Lawton and Eastop, 1975) and S America (Brazil). Records from other ferns are probably attributable to other *Macrosiphum* spp. (see Jensen and Holman, 2000). Mon. hol. with al. males on *Pteridium*, but in USNM there are al., ovip. and a male that are apparently *M. ptericolens* collected on *Ilex verticillata* in Pennsylvania suggesting that host-alternation might also occur. $2n=16$.

Macrosiphum pteridis Wilson

Figure 43h

Apt. very pale green; BL 2.5–4.2 mm. Heter. hol., migrating from *Holodiscus discolor* to *Pteridium aquilinum* in western USA and Canada (Jensen and Holman, 2000). Detailed descriptions of all morphs occurring on *Holodiscus* are given by Forbes and Chan (1993; as *Sitobion blackmani*). Wilson's type material included *M. clydesmithi*, and there is also confusion in the literature with *M. rhamni* (e.g., Robinson, 1980). $2n=16$.

Macrosiphum pulcherinum (Nevsky)

Apt. bright green, with a slightly mealy coat, SIPH and cauda pale green; BL 1.8–2.2 mm. On stems and leaves of *Lactuca* sp. in Uzbekistan.

Macrosiphum ranunculi Pašek

Apt. yellowish white to pale greenish yellow; BL unrecorded. On *Ranunculus auricomus* in Slovakia. Mon. hol. (orig. descr.).

Macrosiphum raysmithi Hille Ris Lambers

Apt. very pale green to whitish green, with pale appendages except for tarsi and apices of ANT segments; BL 3.4–3.7 mm. In large, very compact colonies on undersides of leaves of *Lonicera ledebourii* in California.

Macrosiphum rebecca Jensen and Holman

Apt. green to bright green with front of head darker; BL 1.8–2.3 mm. On pedicels and along veins on undersides of fronds of *Adiantum* sp(p.) in Mexico. Probably heter. hol., migrating to an unknown primary host (Jensen and Holman, 2000).

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Macrosiphum rhamni (Clarke)

Apt. pale yellow; BL 1.8–2.6 mm. On ferns (*Pteridium aquilinum*, *Polypodium hesperium*), heter. hol., with sexual phase on *Rhamnus* (Jensen *et al.*, 1993). Colonies are frequently ant-attended. In western N America. Closely related to *M. clydesmithi* but ranging further west (California) and north (B.C.).

Macrosiphum rosae (L.)

Plate 25i

Apt. green or deep pink to red–brown or magenta, with shiny black head and prothorax, bicolored yellow and black ANT and legs, black SIPH and pale yellow cauda; BL 1.7–4.2 mm. On young growth of wild and cultivated *Rosa* spp. in spring, migrating to Dipsacaceae (*Dipsacus*, *Knautia*, *Succisa*) and Valerianaceae (*Centranthus*, *Valeriana*), and also sometimes in summer on other plants. esp. other Rosaceae, and Onagraceae. Host alternation is facultative; colonies can remain on *Rosa* through the summer, producing some sexuals in autumn. Anhol. in warmer regions. World-wide, except for E and SE Asia; records from Japan apply to *M. mordvilkoii*. See also Blackman and Eastop (2000). 2n=10.

Macrosiphum rubiarctici Heikinheimo

Apt. have dark reddish violet head and thorax, and brownish violet abdomen, with greenish brown spots at bases of SIPH, and ANT and SIPH black except at bases; BL 2.5–3.4 mm. On flowerstalks of *Rubus* spp. (*arcticus*, *saxatilis*, *stellatus*) in Scandinavia and Russia (near Moscow; BMNH colln, leg. J. Holman). Life cycle unknown.

Macrosiphum rudbeckiarum (Cockerell) (= *Macrosiphum cockerelli* Hottes)

Apt. pale green, with mainly pale appendages (somewhat darker in autumn); BL 2.9–4.2 mm. On undersides of leaves of *Rudbeckia* spp. in western USA. Mon. hol. with ovip. and al. males in Sept. Hottes (1949) gave a very full description.

Macrosiphum salviae Bartholomew

Apt. dark chestnut brown with black ANT, legs and SIPH, and usually a central black dorsal abdominal patch; BL 2.0–2.5 mm. On Labiatae (*Inga*, *Salvia*, *Leonurus*, *Ocimum*) in California, USA, Cuba and Puerto Rico. (The record from *Ocimum* could be misidentified *M. mesosphaeri*, which was for some time regarded as a synonym.)

Macrosiphum silvaticum Meier

Apt. green, or more rarely red; BL 3.0–4.3 mm. On undersides of leaves and shoots of *Knautia* spp. in Switzerland. Probably a synonym of *M. knautiae*; Rakauskas (2003) found populations on *Knautia* spp. in Lithuania, Poland and Russia (Moscow region) with intermediate characters.

Macrosiphum (Unisitobion) sorbi Matsumura

Apt. pale yellow to yellow–green, with brown head and variably developed brown spinal and marginal longitudinal stripes, joined in region of SIPH, which are jet black; BL 2.3–3.8 mm. On undersides of leaves of *Sorbaria sorbifolia* in Japan and Korea (Lee *et al.*, 2001). Mon. hol., with ovip. and al. males in late Oct in Japan (Miyazaki, 1971). The host was originally given as *Sorbus japonica*, but this may have been in error.

Macrosiphum stellariae Theobald (= *Macrosiphum sileneum* Theobald)

Figure 51a

Apt. yellowish green, green or red, all segments of appendages, including femora and SIPH, having blackish apices; BL 1.8–4.4 mm. In small, loose colonies on young shoots of various Caryophyllaceae (*Dianthus*, *Gypsophila*, *Silene*, *Stellaria*), and sometimes on certain other plants (*Papaver*, *Ranunculus*, *Valeriana*). Europe, and introduced to Canada (B.C.) and New Zealand. 2n=10.

Macrosiphum tenuicauda Bartholomew

Apt. green; BL 1.7–2.6 mm. On *Urtica* spp. in western N America (California, Colorado, B.C.). C.-k. Chan (pers. comm.) was able to rear this species for two years on young celery plants in the laboratory. 2n=10*.

Macrosiphum timpanogos Knowlton

Apt. pale; BL 4.1–5.0 mm. Probably collected on ‘a lupine of some kind’ in western USA (Utah).

Macrosiphum tinctum (Walker) (= *Macrosiphum epilobiellum*)

Apt. mid- to blue-green with a darker spinal stripe (a red form is recorded from Switzerland), femora entirely pale and SIPH dusky at apices; BL 2.0–4.0 mm. Sec. rhin. in al. 11–26. On *Epilobium* spp., especially *E. angustifolium* and *E. montanum*, feeding in small numbers on stems, flower-buds and seed-cases. Mon. hol., with ovip. and al. males in late Aug–Sept. 2n=10.

Macrosiphum tolmiea (Essig)

Apt. green with black-tipped SIPH; BL c.3 mm. On 3 spp. of Saxifragaceae, *Tolmiea menziesii*, *Tellima grandiflora* and *Mitella caulescens*, near streams or seeps in shady locations, in north-western USA and B.C., Canada. Probably anhol. (Jensen, 2000).

Macrosiphum trollii Börner

Apt. pale yellowish or pale green; BL 3.0–4.3 mm. On undersides of leaves and on flowers of *Trollius europaeus*. Europe, with borealpine distribution. Mon. hol., but males undescribed.

Macrosiphum tuberculiceps (Essig)

On *Achlys triphylla* in north-western USA. Mon. hol. with al. males and ovip. in Oct–Nov. (Jensen, 2000).

Macrosiphum valerianae (Clarke)

Apt. dark dirty reddish green to brown with mainly blackish appendages; BL 2.1–4.0 mm. On leaves and stems of *Epilobium angustifolium* and *Valeriana* spp. in western USA and Canada. Mon. hol. in northern Manitoba (Robinson, 1979, as *M. subarcticum*). Antolin and Addicott (1988) studied habitat selection and competition with *Aphis varians* on *E. angustifolium* in Colorado.

Macrosiphum vancouveriae Jensen

Apt. very pale green to white with pale brown eyes; BL 2.2–3.8 mm. On *Vancouveria hexandra* in north-western USA. Life cycle uncertain, but probably mon. hol. on *Vancouveria*, al. males and ovip. occurring in Oct–Nov. (Jensen, 2000).

Macrosiphum venaefuscae Davis

Apt. pale green; BL 2.5–2.8 mm. On Polygonaceae (*Fallopia*, *Polygonum*, *Rumex*) in eastern N America. Mon. hol. with al. males; sexual morphs and eggs are found on *Rumex* (orig. descr.).

Macrosiphum verbenae (Thomas)

Apt. bright pea-green with 2–3 darker green longitudinal stripes on abdomen, ANT pale with dusky tips, eyes black, SIPH pale, cauda rather short and whitish (orig. descr.); BL not recorded ('medium size'). On leaves of a *Verbena* sp. in Illinois, USA. Since recorded from *Verbena* spp. in numerous states (Smith and Parron, 1978), but there are no type specimens and no further account of this species, and many of these records could be *M. euphorbiae*.

Macrosiphum vereshthagini Mordvilko

Apt. green, wax-dusted, with apices of ANT and SIPH darker; BL 3.9–4.8 mm. On *Cimicifuga foetida* in Russia (Altai region).

Macrosiphum violae Jensen

Apt. very pale green, with pale brown eyes; BL 2.2–3.3 mm. On *Viola glabella* in north-western USA. Attempts to transfer to two other *Viola* spp. were unsuccessful (Jensen, 2000). Mon. hol. with ovip. and al. males in Sept–Oct.

Macrosiphum walkeri Robinson

Apt. yellow, green, pink or red; BL 1.7–3.3 mm. On numerous genera and species of ferns (*Adiantum*, *Asplenium*, *Athyrium*, *Davallia*, *Dicksonia*, *Dryopteris*, *Matteuccia*, *Nephrolepis*, *Osmunda*, *Pellaea*, *Polypodium*, *Polystichum*, *Woodwardia*) in western N America. Anhol. in western Oregon, overwintering on *Polypodium* and *Polystichum*, although ovip. (without males) were found on *Athyrium*. 2n=16.

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Macrosiphum weberi Börner

Apt. dark red or dark violet, with black SIPH; BL 1.8–3.0 mm. In small, frequently ant-attended colonies on stems of *Succisa pratensis*, and sometimes also on *Scabiosa* spp. Europe. Records from *Knautia* are probably all referable to *M. knautiae*. Mon. hol., with al. males.

Macrosiphum willamettense Jensen

Apt. shining pale greenish white, imm. slightly waxy; BL 2.3–3.5 mm. On young growth of *Spiraea douglasii* in north-western USA and Canada (B.C., Oregon, Washington). Mon. hol. with ovip. in Oct (Jensen, 2000). $2n=10^*$.

Macrosiphum wilsoni Jensen

Apt. pale yellowish white; BL 2.2–3.9 mm. On *Disporum* spp. in north-western USA (Oregon, Washington) and Canada (BC). Mon. hol., with ovip. and al. males in Oct (Jensen, 2000).

Macrosiphum woodsiae Robinson

Apt. dark green; BL 1.3–2.5 mm. Described from *Woodsia ilvensis* in N Canada, and subsequently found on other *Woodsia* spp., *Cryptogramma* and *Pellaea* in Oregon, USA, perhaps specialising on ferns at high altitudes/latitudes (Jensen and Holman, 2000). Probably mon. hol. on *Woodsia*. $2n=16^*$.

Macrosiphum zionense Knowlton

Apt. green with black appendages; BL c.4.1 mm. On *Lupinus* sp. in western USA (Utah).

Macrotrichaphis Miyazaki

Aphidinae: Macrosiphini

Two E Asian species related to *Uroleucon* but with SIPH bearing hairs. First tarsal segments all have 5 hairs. Biology is hardly known.

Macrotrichaphis rarissima Pashtshenko

Apt. dark brown; BL c.2.3 mm. On apical leaves of *Saussurea* sp. in E Siberia.

Macrotrichaphis yatsugatakenis Miyazaki

Figure 13a

Apt. color in life unknown; BL 1.9–2.3 mm. Described from an unknown host in Japan, but there are specimens in BMNH colln from *Artemisia princeps* var. *orientalis* in Korea (leg. W.H. Paik).

Maculolachnus Gaumont

Lachninae: Lachnini

Three species related to *Lachnus* but associated with Rosaceae, without any distinct pattern of pigmentation of forewings, and with dorsal hairs often placed on dark sclerites.

Maculolachnus rubi A.K. Ghosh and Raychaudhuri

Apt. dark brown; BL 2.7–3.0 mm. On apices of stems of *Rubus* sp., attended by ants, in Meghalaya, India.

Maculolachnus sippenski Hille Ris Lambers

Apt. yellowish brown to dark brown or blackish; BL 2.4–3.8 mm. On wild *Rosa* spp., in colonies on stems near ground, probably ant-attended. Mon. hol. with apt. males. In N America and Mongolia. $2n=10$.

Maculolachnus submacula (Walker)

Plate 3e

Apt. yellowish brown to dark chestnut brown; BL 2.7–3.8 mm. On stems near ground on new growth in shade, or (in summer) on surface roots of wild and cultivated *Rosa* spp., invariably ant-attended. Mon. hol. with ovip. and apt. males in Sept–Oct. Europe, eastward to Ukraine, and India. Gottschalk (1989) gave an account of this aphid in Germany. $2n=10$.

Margituberculatus Zhang, Zhong and Zhang

Aphidinae: Macrosiphini

One species in China known only from al., related to *Trichosiphonaphis* but with long narrow hair-bearing marginal abdominal processes (which one might expect to be present also in apt.), and forewings with a short straight radial sector.

Margituberculatus longituberculatus Zhang, Zhong and Zhang Figure 42a
 Apt. unknown, al. with black head and thorax and whitish abdomen with a dark central patch; BL c.2.1 mm.
 On *Polygonum* sp. in China. Although only al. are known the host is probably correct as the genus is related
 to *Trichosiphonaphis*.

Mariaella Szelegiewicz Aphidinae: Macrosiphini
 One species possibly related to *Brachycolus* or *Brachycorynella* but with a short rounded cauda as well as
 very short conical SIPH.

Mariaella lambersi Szelegiewicz
 Apt. pale green to yellow, dusted with gray wax powder; BL 1.1–1.8 mm. On young shoots of *Myricaria*
germanica, recorded from Poland (orig. descr.), Slovakia (BMNH colln, leg. J. Holman) and Iran (BMNH
 colln, leg. G. Remaudière). Mon. hol., with ovip. and apt. males in Poland in Oct (BMNH colln, leg.
 J. Nast).

Mastopoda Oestlund Aphidinae: Macrosiphini
 One N American species with greatly reduced tarsi and 5-segmented ANT, possibly with host alternation
 between *Viburnum* and ferns like *Shinjia* in E Asia, although this needs to be confirmed.

Mastopoda pteridis Oestlund
 Apt. yellowish white; BL c.1.7 mm. On *Pteridium aquilinum* in north-eastern USA and Ontario, Canada
 (Patch, 1910b; Robinson, 1966). Possibly heter. hol., as also collected from ‘ant sheds on leaf petioles’ of
Viburnum sp. (Robinson, 1966, citing J.O. Pepper). Males are recorded from *Pt. aquilinum* in Sept.

Matsumuraja Schumacher Aphidinae: Macrosiphini
 Fourteen E Asian species, plus undescribed from Australia (see below), with long capitate hairs arising from
 tubercles, which are often extended into fingerlike processes. Al. where known have a black dorsal abdom-
 inal patch and numerous sec. rhin. on ANT III–V. They are all associated with *Rubus*, but unusually this
 may be the ancestral *secondary* host, as the only species in which the life cycle has been clarified has a
 sexual phase on *Clethra* (fund. having a very distinctive morphology; Takahashi, 1959). Takahashi and Sorin
 (1965) and Miyazaki (1971) keyed the Japanese species.

Matsumuraja capitophoroides Hille Ris Lambers Figure 47c,e
 Apt. pale yellow, ANT dark at segmental apices; BL 1.3–2.3 mm. On *Rubus* spp. in Pakistan, Nepal, India
 and Sri Lanka. According to Chakrabarti and Banerjee (1993a) there is host alternation between *Rubus*
 (as primary host) and *Poa annua* (as secondary host) in India, but this seems very unlikely and needs
 confirmation. As noted by Hille Ris Lambers (orig. descr.), this species differs from the description of
M. formosana only in lengths of tubercular bases of spinal hairs, which could vary according to environ-
 ment or degree of alatiformity. 2n=14.

Matsumuraja formosana Takahashi
 Apt. white, ANT dusky at segmental apices; BL c.1.8 mm. Al. unknown. On *Rubus* sp. and *Fragaria* ×
ananassa in Taiwan (Tao, 1963). *M. capitophoroides* is a possible synonym (see above).

Matsumuraja hirakurensis Sorin Figure 47k
 Apt. orange, with ANT dark except for basal part of III; BL c.1.2–1.3 mm. On *Rubus idaeus* and *Rubus* sp.
 in Japan.

Matsumuraja nuditerga Hille Ris Lambers
 Apt. color in life unknown; BL 1.2–1.4 mm. On *Rubus* sp. in Japan. There is also a record from ?*Pilea* sp.
 in W Bengal (Ghosh and Raychudhuri, 1972), but the specimens had a shorter R IV+V and may not be
 this species. 2n=14.

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Matsumuraja rubea Sorin Figure 47l
Apt. entirely white; BL c.1.2mm. On *Rubus* sp. in Japan (Takahashi and Sorin, 1965). 2n=14.

Matsumuraja rubi (Matsumura) Figure 47b
Apt. pale yellowish or greenish white; BL 1.0–1.6mm. On *Rubus* spp. in Japan, E Siberia and Korea. Heter. hol., with gynoparae and al. males produced in late Oct, returning to unknown primary host (Takahashi, 1959). 2n=14.

Matsumuraja rubicola Takahashi Figure 47a
Apt. yellow, ANT dusky at segmental apices, BL c.1.8–2.0mm. On *Rubus* sp. and *Fragaria* × *ananassa* in Taiwan (Tao, 1963).

Matsumuraja rubifoliae Takahashi Plate 20a, Figure 47h,l
Apt. (on *Rubus*) yellow or white, ANT with segmental apices often blackish; BL 1.3–1.7mm. Al. have black clavate SIPH. On shoot tips and undersides of young leaves of *Rubus* spp. in E Siberia, China, Thailand, Taiwan, Korea, Japan and Ryukyu. Heter. hol. in Japan (Takahashi, 1959), with sexual phase on *Clethra barbinervis*; fund. is a very different, much larger, pale yellow aphid (BL 3–4mm). Commonly also anhol. on evergreen *Rubus* in Japan, and probably elsewhere. Small forms occur on certain *Rubus* spp. in summer with small dorsal hairs and thicker, more swollen SIPH (Takahashi and Sorin, 1965). 2n=14.

Matsumuraja rubiphila Takahashi Figure 47d
Apt. yellow, apices of ANT segments and SIPH blackish; BL c.1.5mm. On *Rubus palmatus* in Japan (Takahashi and Sorin, 1965). 2n=14.

Matsumuraja sorini Takahashi Figure 47g,m
Apt. whitish yellow with mainly pale appendages; BL c.1.7–1.8mm. On *Rubus peltatus* in Japan (Takahashi and Sorin, 1965).

Matsumuraja taisetsusana Miyazaki Figure 47j
Apt. pale yellow, apices of ANT segments and SIPH dusky; BL 1.6–1.9mm. On *Rubus idaeus* var. *aculeatis-simus* in Japan, and on *R. sachalinensis* and *Rubus* sp. in Sakhalin and E Siberia (Pashtshenko, 1988a).

***Matsumuraja* sp.** Figure 47f
Apt. yellow–green, BL 1.1–1.6mm. On *Rubus rosaefolius* in Queensland, Australia (BMNH colln, leg. V. F. Eastop, 15.vi.89). A single al. trapped at Galton Res. Lab., Queensland, 29.iv.87 (BMNH, leg. J. Thomas) is probably also this species. 2n=18*.

Megoura Buckton Aphidinae: Macrosiphini
Seven species in Europe and Asia with swollen cigar-shaped siphunculi, associated with Leguminosae. Regional accounts are available from NW Europe (Heie, 1995), Japan (Miyazaki, 1971), and Korea (Lee *et al.*, 2002b), the latter account including a key to the world species.

Megoura brevipilosa Miyazaki
Apt. are of unknown body color; BL c.2.6–3.0mm. Al. are reddish vermilion with a little white wax powder dorsally. On *Lespedeza* spp. in Japan and E Siberia; on *L. bicolor* var. *japonica* it was found on undersides of old leaves. Mon. hol., with ovip. and al. males in Nov–Dec (Sorin and Shinohara, 1973).

Megoura crassicauda Mordvilko
Apt. green with black head, prothorax, ANT, legs, SIPH and cauda; BL 3.0–3.7mm. On stems and growing points of *Vicia* and *Lathyrus* spp. in E Asia (E Siberia, China, Taiwan, Japan, Korea). In Korea it is also recorded from *Pisum sativum* and *Amphicarpea edgeworthii*. [The name *M. japonica* (Matsumura) has been used for this species by Chinese and Japanese authors.] 2n=10.

Megoura dooarsis (A.K. Ghosh and Raychaudhuri)
Apt. green to dark green with purplish brown head, and dorsal abdomen with three rows of roundish or transversely oval whitish wax spots; BL 2.2–2.9mm. On both sides of leaves and on twigs of *Indigofera*

spp., and also recorded from *Hedysarum campanulatum* and *Tephrosia purpurea*. India, Pakistan, Afghanistan, Kashmir and Thailand. $2n=20$ (Dutta and Gautam, 1993).

Megoura lespedezae (Essig and Kuwana)

Plate 25a

Apt. greenish to yellowish with dark brown ANT, legs dark brown except for distal halves of tibiae, black SIPH and yellow cauda; BL 1.8–2.5 mm. On *Lespedeza* spp. in China, Taiwan, Korea, E Siberia and Japan. Also recorded from *Cajanus cajan*, *Desmodium trifolium* and *Indigofera teysmanni* in India (Raychaudhuri, 1984, partly as *Neomegouropsis cajanae*), and from *L. thunbergii* in Switzerland (Giacalone and Lampel, 1996). $2n=14$.

Megoura litoralis Müller

Apt. pale green with brownish head and prothorax and appendages, and darker brown SIPH; BL 3.0–4.4 mm. On young growth, flowers and fruits of *Lathyrus japonicus* ssp. *maritimus* in NW and N Europe. Mon. hol. with al. males (Heie, 1995).

Megoura nigra Lee

Apt. dark reddish brown; BL 3.1–4.3 mm. On young stems and undersides of leaves of *Vicia venosa* in S Korea. Mon. hol. with ovip. and al. males in mid–Oct (Lee *et al.*, 2002b).

Megoura viciae Buckton

Plate 25b

Apt. dark bluish green to apple-green with black head, prothorax, ANT, legs, SIPH and cauda; BL 3.0–5.0 mm. On young apical parts of stems of Leguminosae, esp. *Lathyrus* and *Vicia* spp. Europe, Middle East, N and C Asia, Ethiopia. Mon. hol. with ovip. and al. males in Aug–Sept. Studies on this aphid included the classic work on photoperiodism and morph determination by Lees (1973), and the first characterisation of an aphid sex pheromone (Dawson *et al.*, 1987). See also Blackman and Eastop (2000). $2n=10$.

Megourella Hille Ris Lambers

Aphidinae: Macrosiphini

Two species related to *Megoura* but with longer SIPH, a dorsal pattern of dark spinal, pleural and marginal sclerites in both apt. and al., and a habit of living on basal parts of their host plants.

Megourella purpurea Hille Ris Lambers

Plate 25c

Apt. dirty reddish violet, pink or greenish, with black dorsal spots; BL 2.1–2.9 mm. On *Lathyrus pratensis*, on basal parts at or near ground level. Europe. Mon. hol., with ovip. and apt. males (Heie, 1995).

Megourella tribulis (Walker)

Apt. dark green to black with black ANT, legs, SIPH and cauda; BL 2.4–3.0 mm. On *Vicia sepium*, on base of stem at or near ground level. N and NW Europe. Presumably mon. hol. (Heie, 1995), but males have not yet been recorded.

Megourina Hille Ris Lambers

Aphidinae: Macrosiphini

A genus for one western N American species superficially similar to *Megourella* but perhaps more closely related to nearctic *Nasonovia* (*Kakimia*), with 4–5 hairs on first tarsal segments and long, somewhat capitate hairs, the marginal ones being placed on unusual domed sclerites (Hille Ris Lambers, 1974).

Megourina lagacei Hille Ris Lambers

Apt. of unknown body color; BL 2.5–3.0 mm. Al. have black head and thorax, 47–55 sec. rhin. on III, and dark (not bordered) wing veins. On *Aquilegia formosa* in California. Biology and sexual morphs unknown.

Meguroleucon Miyazaki

Aphidinae: Macrosiphini

A genus for one E Asian *Macrosiphum*-like species with an unusual pattern of dorsal sclerotisation and 4 hairs (including 2 sense pegs) on all first tarsal segments (Miyazaki, 1971).

Meguroleucon codonopsicola Miyazaki

Apt. yellowish green with a milky tint, with brown head, black ANT and SIPH, very large black postsiphuncular sclerites, and a pale cauda; BL 2.2–2.6 mm. Al. have 37–44 sec. rhin. on III. On *Codonopsis* spp.

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in Japan and Korea (Lee *et al.*, 2002c), living on stems and undersides of young leaves without causing any deformation. In Korea it has also been collected on *Platycodon grandiflorum*. Biology and sexual morphs unknown.

***Melanaphis* van der Goot (= *Longiunguis* van der Goot) Aphidinae: Aphidini**

About 20 old world species with short SIPH, mainly associated with Gramineae. All have dark forewing veins with media twice-branched. A few species are known to alternate from Rosaceae (Pyroidea) like the closely related genus *Rhopalosiphum*. Three species are European but most of the remainder are native to E Asia and associated with *Miscanthus* or Bambusae. Accounts are available from Iberian peninsula (Nieto Nafria *et al.*, 2005), Japan (Sorin, 1970), China (Zhang *et al.*, 2001), Taiwan (Liao, 1976), India (Raychaudhuri and Banerjee, 1974), and NE India (Raychaudhuri *et al.*, 1980). Halbert and Remaudière (2000) compared species in the *miscanthi/sacchari* group. For the bamboo-feeding species see Blackman and Eastop (1994).

***Melanaphis arthroxonophaga* Zhang, Qiao and Zhang**

Apt. color in life unknown; BL c.1.1 mm. On *Arthroxon hispidus* in China (Liaoning prov.; Zhang *et al.*, 2001).

***Melanaphis bambusae* (Fullaway)**

Apt. dark brown to black with waxy gray dorsal abdominal markings, legs with dark femora and pale tibiae; BL 0.8–1.4 mm. Mostly on bamboos (Blackman and Eastop, 1994) but occasionally on other grasses. In E and SE Asia, Australia, India, Mediterranean area and USA (Louisiana, Hawaii). Heter. hol. in Japan between *Photinia vilosa* and bamboos (Sorin, 1962a); elsewhere (and also commonly in Japan) populations are anhol. on bamboos. 2n=8, 10 or 12 (reason for discrepancy needs investigation).

***Melanaphis daisenensis* (Sorin)**

Apt. blackish, with yellow ANT and tibiae and black tarsi: BL c.1.5–1.6 mm. On *Miscanthus* sp. in Japan. Very closely related to, and possibly not distinct from, *M. miscanthi*.

***Melanaphis donacis* (Passerini)**

Apt. brown; BL 1.5–2.2 mm. On *Arundo donax* and *Phragmites australis*. S Europe, Mediterranean, N Africa, Middle East, C Asia, eastward to India and Pakistan. Mon. hol. in S France with apt. males (BMNH colln). 2n=8.

***Melanaphis elizabethae* (Ossiannilsson)**

Apt. dark brown, slightly wax-powdered; BL 2.0–2.7 mm. In inflorescences and under leaves of *Phragmites australis* (= *communis*). N Europe (Scotland, Denmark, Sweden, Finland – Heikinheimo, 1997). Mon. hol. (Heie, 1986).

***Melanaphis graminisucta* Zhang**

Apt. reddish brown; BL 1.5–1.8 mm. On an unidentified species of Gramineae in Hunan prov., China.

***Melanaphis indosacchari* (David)**

Apt. dull dark brown; BL 1.1–1.5 mm. In ant-attended colonies on exposed upper leaves of *Saccharum officinarum* in S India, and also sometimes on *Iseilema laxum*. Some specimens in mixed populations with *M. sacchari* on *Echinochloa colonum* in the Philippines (BMNH colln, leg. M.R. Gavarra) seem also to be *M. indosacchari* (or *M. sorini*, if the two are indeed distinct species). Varma *et al.* (1978) studied its ecology and control measures.

***Melanaphis jamatonica* (Sorin)**

Apt. color in life unknown; BL 1.3–1.8 mm. On *Miscanthus* sp. in Japan. Specimens from *Miscanthus sinensis* in Korea (BMNH colln, leg W.H. Paik) will also key to *jamatonica*, but differ from the Japanese material by lacking scent glands on the hind tibiae.

***Melanaphis japonica* (Takahashi)**

Apt. yellow or purple, dusted with wax (Moritsu, 1983); BL 1.3–1.6 mm. On *Miscanthus sinensis* in Japan, and also recorded from Korea (Lee *et al.*, 2002c – but these specimens might be *M. jamatonica*). Ovip. and al. males in Sept; eggs are laid on undersides of leaves (Sorin, 1970). $2n=c.22^*$.

***Melanaphis koreana* (Sorin)**

Apt. color in life unknown; BL 1.5–1.8 mm. On *Miscanthus sinensis* in Korea and E Siberia (Pashtshenko, 1988a). [Specimens in the BMNH colln, determined by Sorin as *M. koreana* (leg. W.H. Paik, Yangi, Korea, 11.vi.61), have shorter SIPH than the type material (1.0–1.1× longer than basal width, compared with c.1.45× basal width)].

***Melanaphis luzulella* (Hille Ris Lambers)**

Apt. dark green, almost black; BL 1.2–1.8 mm. On *Luzula* spp., in spring and early summer at stem bases and on upper surfaces of basal parts of leaves, tented over by ants, later also onto aerial shoots. N, C and E Europe. Mon. hol. with apt. males (Heie, 1986).

***Melanaphis miscanthi* (Takahashi)**

Apt. yellowish gray, dirty yellow or dark purple; BL 1.2–1.9 mm. On *Miscanthus* sp. in Taiwan. Redescribed by Halbert and Remaudière (2000).

***Melanaphis montana* (Sorin)**

Apt. greenish dark brown (but see also Moritsu, 1983:184); BL c.1.2–1.3 mm. On *Miscanthus sinensis* in Japan, and also found on *Leersia* in Thailand (BMNH colln, leg. Napompeth). Very close to, and possibly synonymous with, *M. tateyamaensis*.

***Melanaphis pahanensis* (Takahashi)**

Apt. on Gramineae brownish purple secreting cottony wax; BL 1.2–1.4 mm. Described from an unidentified grass resembling *Arundinaria* in Malaya and subsequently on *Pennisetum purpureum* (BMNH colln, leg. S.K. David) and unidentified Gramineae in N India. Heter. hol. with sexual phase on *Pyrus kumaoni* in N India (Medda and Chakrabarti, 1992).

***Melanaphis pyraria* (Passerini)**

Apt. on grasses yellowish to reddish purple; BL 1.1–1.7 mm. Color differs according to host species and condition; on *Arrhenatherum* it is reddish purple, hidden under deformed leaves, while on *Poa*, *Brachypodium* and *Triticum* it is a smaller, yellowish aphid. Europe, Middle East, Caucasus and Transcaucasia. Heter. hol. with a sexual phase on *Pyrus communis*; apt. on *Pyrus* have an extensive brown–black dorsal patch (Blackman and Eastop, 1994, 2000). $2n=8$.

***Melanaphis sacchari* (Zehntner) (= *formosana* Takahashi 1921, 1931 nec. Sorin, 1970)**

Apt very variable in color according to host plant and environmental conditions; pale yellow, yellow–brown, dark brown, purple, or even pinkish; BL 1.1–2.0 mm. In ant-attended colonies on Gramineae, especially *Saccharum*; also sometimes on other Gramineae (*Arthraxon*, *Echinochloa*, *Oryza*, *Oryzopsis*, *Panicum*, *Pennisetum*, *Sorghum*, *Themeda*, *Thysanolaema*), and there are also records from Araceae (*Arum*, *Caladium*). S Africa, India, Sri Lanka, Laos, China, Philippines, Australia, Hawaii, C and S America. Probably anhol. almost everywhere that it occurs, but reported to be mon. hol. (with al. males) in China (Zhang and Zhong, 1983), with *Miscanthus sacchariflorus* as the overwintering host (Wang *et al.*, 1961). Zimmerman (1948) gave a general account of the biology, including natural control by parasites and predators, in Hawaii. Most of the ecological studies of *M. sacchari* on sorghum in Africa and Asia should probably be referred to *M. sorghi* (q.v.). The *M. sacchari/sorghi/miscanthi* group is closely related to the host-alternating *M. pyraria* in Europe. $2n=8$ for samples from Hong Kong and India; but Khuda-Bukhsh and Kar (1990) recorded $2n=10$ from India. [A record of $2n=22$ for *M. sacchari* in Japan (Blackman, 1986) is referable to another, undescribed species.]

Melanaphis sorghi (Theobald)

Plate 8f

Apt. white or yellow, sometimes larger individuals have a variably-developed black dorsal abdominal patch; BL 1.1–2.0 mm. On Gramineae, esp. *Sorghum*, favouring the axils of the lower leaves, but large colonies extend over the whole leaf. Also sometimes on other Gramineae (*Eleusine*, *Panicum*, *Saccharum*, *Zea*). Africa, Middle East, E and SE Asia (India, Pakistan, China, Thailand, Japan, Philippines). Probably mostly anhol. although Setokuchi (1975) reported a holocycle on *Sorghum* in Japan, and David (1977) recorded ovip. in Feb–Mar in NW India. See also Blackman and Eastop (2000). 2n=8.

Melanaphis sorini Halbert and Remaudière

(= *formosana* Sorin 1970, nec Takahashi 1921, 1931)

Apt. wine red, purple or tan; BL 1.0–1.8 mm. On *Miscanthus* spp. in Japan and Taiwan, and introduced to USA (Florida, California; Halbert and Remaudière, 2000). Mon. hol. in Japan, with al. males (Sorin, 1970, as *Longiunguis formosanus*); the Florida population may be anhol. This species seems closely related to and morphologically almost indistinguishable from *M. indosacchari*, but the form introduced into Florida would not colonise *Saccharum* in laboratory tests (Halbert and Remaudière, 2000).

Melanaphis strobilanthes Medda and Chakrabarti

Apt. color in life unrecorded, probably pale with darker head; BL 1.2–1.6 mm. On *Strobilanthes* sp. in U.P., India.

Melanaphis tateyamaensis (Sorin)

Apt. reddish purple; BL c.1.6 mm. On undersides of leaves of *Miscanthus* sp. in Japan. Possibly these are larger specimens of *M. montana*.

Melanaphis yasumatsui (Sorin)

Apt. dark purple, with white powdery wax; BL 1.2–1.5 mm. On *Miscanthus* sp. in Japan, and recorded from *M. sinensis* in E Siberia (Pashtshenko, 1988a).

Melanaphis zhanhuaensis Zhang, Qiao and Zhang

Apt. purplish red; BL c.1.5 mm. On subterranean part of *Imperata cylindrica* var. *major* in China (Shandong province; Zhang *et al.*, 2001). Apart from the subterranean habit this species seems indistinguishable from *M. sorghi*.

Melaphis Walsh

Eriosomatinae: Fordini

One nearctic species related to several E Asian genera and having a similar host alternation from *Rhus* to mosses. The antiquity of this host association was discussed by Moran (1989).

Melaphis rhois (Fitch)

Apt. on mosses pale with darker ANT and legs; BL 0.8–1.2 mm. Heter. hol., with sexual phase and galls on *Rhus* spp. in N America (Blackman and Eastop, 1994). Anhol. populations also occur all year round on mosses, and have been introduced into Europe (Sweden, UK). 2n=26.

Meringosiphon Carver

Greenideinae: Cervaphidini

One W Australian species with 6-segmented ANT, long dorsal body hairs arising from low tuberculate bases, and SIPH with hairs on basal half as well as subapically. Al. have forewings with twice-branched media.

Meringosiphon paradiscus Carver

Apt. probably brownish; BL 1.55–1.76 mm. Host plant uncertain, but swept from areas where *Daviesia divaricata* was the dominant vegetation (orig. descr.). W Australia.

Mesothoracaphis Noordam

Hormaphidinae: Nipponaphidini

One species on Loranthaceae and Viscaceae in SE Asia with sclerotised, box-like body and greatly reduced ANT and legs.

Mesothoracaphis rappardi (Hille Ris Lambers and Takahashi) Figure 60a
Apt. brownish black, somewhat shiny; BL 0.95–1.14 mm. On young shoots or older twigs of *Dendrophthoe* and *Viscum* spp. in Java (Noordam, 1991).

Metopeuraphis Narzikulov and Smailova Aphidinae: Macrosiphini
One species in C Asia, related to *Metopeurum* but living on Chenopodiaceae and with prothorax and ABD TERG 2–4 usually having well-developed marginal tubercles.

Metopeuraphis atriplicis Narzikulov and Smailova
Apt. green dusted with grayish wax, BL c.1.7–1.9 mm. In small colonies on undersides of leaves of *Atriplex* sp(p). in Kazakhstan. Biology and sexual morphs unknown.

Metopeurum Mordvilko Aphidinae: Macrosiphini
About 10 spp. on Compositae, mostly described from C and E Europe, related to *Macrosiphoniella* but with morphology adapted for ant attendance. Mamontova and Tshumak (1994) provided a key to species.

Metopeurum achilleae Bozhko
Apt. pale reddish brown, wax-dusted; BL c.1.8 mm. On flower stalks of *Achillea gerberi* in Ukraine. Very close to *M. capillatum*.

Metopeurum borystenicum Bozhko
Apt. pale bluish or reddish green; BL c.1.9 mm. In dense colonies on stems and leaves of *Tanacetum vulgare* in Ukraine.

Metopeurum buryaticum (Pashtshenko) (new combination)
Apt. pinkish lilac, in life with large blackish violet dorsal abdominal spot; BL c.2.8 mm. On flower stems of *Tanacetum vulgare*, attended by ants (Pashtshenko, 1999b, as *Macrosiphoniella (Sinosiphoniella)*). Siberia (eastern shore of Lake Baikal). [Except for the long dorsal body hairs the description closely matches that of *M. fuscoviride*.]

Metopeurum capillatum (Börner)
Apt. color unrecorded; BL 2.1 mm (one specimen). On *Achillea* sp., possibly either *atrata* or *moschata*. Austrian Alps.

Metopeurum enslini (Börner)
Apt. blackish; BL 2.6–3.0 mm. On stems and root collars of *Tanacetum vulgare*. Germany, and Ukraine (Bozhko, 1963).

Metopeurum fuscoviride Stroyan Plate 27g, Figure 52a
Apt. with dark brown head and thorax, reddish or green abdomen with a black central patch (disappearing in preserved specimens), and black SIPH and cauda; BL 1.8–2.9 mm. In large ant-attended colonies on *Tanacetum vulgare*, and occasionally on other *Tanacetum* spp., with single records also from *Achillea millefolium*, *Leucanthemum vulgare* and *Artemisia alba* (the latter from Kazakhstan as ssp. *kasachstanica*; Smailova, 1974). Europe, W Siberia and C Asia. Mon. hol. with ovip. and apt. males in late Aug–Sept. 2n=8.

Metopeurum gentianae Mamontova and Tshumak
Apt. dark green, with yellow ANT and legs; BL not given. On *Gentiana asclepiadea* in Ukraine.

Metopeurum matricariae Bozhko
Apt. reddish brown with darker dorsal abdominal spots, black SIPH and pale cauda; BL c.2.2 mm. In dense colonies on stems of *Matricaria chamomilla*, and also recorded from *Tripleurospermum inodorum* (Mamontova-Solukha, 1966). Ukraine.

Metopeurum millefolii Mamontova and Tshumak
Apt. ash-gray; BL 1.6–1.8 mm. On *Achillea millefolium* in Ukraine.

THE APHIDS

Metopeurum urticae Mamontova and Tshumak

Apt. yellow with dark ANT, head, legs and SIPH; BL 2.1–2.4 mm. On undersides of leaves of *Urtica dioica* in Ukraine.

Metopolophium Mordvilko

Aphidinae: Macrosiphini

About 18 species resembling *Acyrtosiphon* but perhaps more closely related to *Sitobion*, and like that genus typically with Rosaceae as primary hosts and migrating to Gramineae. The generic positions of the few species with other host associations are uncertain. Accounts are available for Europe (Stroyan, 1982; Heie, 1994) and N India (Raychaudhuri *et al.*, 1980). Blackman *et al.* (1989) discussed enzyme differences between closely-related European species.

Metopolophium albidum Hille Ris Lambers

Apt. yellowish white or yellowish green, without a green spinal stripe, but sometimes with green spots at bases of SIPH; BL 1.9–2.7 mm. On grasses, esp. *Arrhenatherum elatius*, sometimes in large numbers causing red and yellow discoloration of grass blades (Stroyan, 1950b). Europe. Mon. hol. with ovip. and al. males in Nov (orig. descr.). $2n=16^*$.

Metopolophium alpinum Hille Ris Lambers

Apt. dull green with pale appendages; BL 2.6–3.8 mm. Al. have dusky narrow dorsal abdominal cross-bands. In spring colonies on *Rosa* spp. in the French and Swiss Alps. Presumably heter. hol., migrating to grasses as subsequently found on *Poa alpina* in Austria. Also recorded from *Carex*. Ovip. and al. males on wild *Rosa* leaves in Oct (orig. descr.).

Metopolophium arctogenicolens Richards

Apt. ovip. pale green; BL 2.0–2.4 mm. Apt. vivip. unknown. Described from ovip. and one apt. male collected in July–Aug on *Taraxacum arctogenum* on Ellesmere I., NW Territories, Canada. Specimens were maintained on this plant in the laboratory (orig. descr.).

Metopolophium chandrani (David and Narayanan) (= *M. graminum* Raychaudhuri,

L.K. Ghosh and Das, = *M. simlaense* Chakrabarti and Raychaudhuri)

Apt. yellowish green; BL 1.9–2.6 mm. On grasses (*Bromus*, *Poa*) in India. Ovip. and al. males were collected (along with apt. vivip.) on *Rubus opulifolius* in H.P. in Dec (Agarwala and Mahapatra, 1990). Also recorded from *Rosa* sp., and from an unidentified shrub (as *M. simlaense*).

Metopolophium (Metopolophinum) darjeelingensis L.K. Ghosh

Apt. greenish with brighter green spinal stripe, appendages pale except for apices of ANT; BL 2.2–2.5 mm. On *Hypericum* sp. in W Bengal; the host plant is unusual for a member of this genus, but is confirmed by a subsequent collection (Raychaudhuri *et al.*, 1978a, as *M. davidi*). The species is also unusual in having spinulose femora and 4 hairs on first tarsal segments, justifying its placement in a separate subgenus. [Note: *M. darjilingense* Raychaudhuri, M.R. Ghosh and R.C. Basu (1978) is a different species, from an unknown host; see also under *M. lacheni*.]

Metopolophium dirhodum (Walker)

Plate 23h

Apt. green or yellowish green with a brighter green spinal stripe, and ANT with dark apices to each segment; BL 1.6–2.9 mm. Al. with rather pale abdomen, sometimes with indistinct brownish cross-bars on anterior tergites. On wild and cultivated *Rosa* spp. in spring, heter. hol., migrating in June to numerous species of Gramineae and Cyperaceae. Widely distributed in temperate parts of world. Commonly anhol. in W Europe where it is a major cereal pest (see Blackman and Eastop, 2000). $2n=18$.

Metopolophium fasciatum Stroyan

Apt. pale green with darker green spinal stripe, frequently with yellow spots at bases of SIPH; BL 1.7–3.4 mm. On grasses, esp. *Arrhenatherum elatius*. Only known from UK. Potentially heter. hol., as ovip. and al. males occur on *Rosa canina* in Nov, but thought to be predominantly anhol. in UK (Stroyan, 1982).

[We have examined type specimens of *M. berberinutritum* Zhang, Chen, Zhong and Li, described from (vagrants on?) *Berberis* in China (Zhang, 1999); this has longer ANT (1.33× BL as opposed to c.1.0× BL in UK populations of *fasciatum*, but is otherwise very similar.] 2n=18*.

Metopolophium festucae (Theobald)

Apt. rather shiny, evenly yellowish green to green or salmon pink, with ANT progressively darker from III to VI; BL 1.4–2.2mm. Al. have conspicuous dark dorsal abdominal cross-bands. On many genera and species of Gramineae in Europe (incl. Iceland), with populations on cereal crops regarded as a subspecies, *M. festucae* ssp. *cerealium* Stroyan. There are records of aphids resembling *M. festucae* from Argentina, Bolivia, and western USA. Mon. hol. with al. males, but anhol. overwintering common in both subspecies. See also Blackman and Eastop (2000). 2n=16 (incl. ssp. *cerealium*).

Metopolophium friscum Hille Ris Lambers

Apt. shining green, with ill-defined olive or brownish green dorsal abdominal shield, and dark ANT, SIPH and cauda; BL 1.3–2.4mm. On *Poa* spp., esp. *P. trivialis*, feeding on upper sides of leaf-blades in shady, damp situations. In NE, N and C Europe, and possibly N America (Börner, 1952). Mon. hol. with ovip. and apt. males in Oct. (anhol. in UK).

Metopolophium lacheni Agarwala, Mondal and Raychaudhuri

Apt. color in life unknown; BL c.1.8–2.4mm. Al. have dark dorsal abdominal cross-bands. On *Rubus* sp. in NE India (Sikkim). Ovip. and al. males were collected in Dec (orig. descr., as *M. darjeeligenese* ssp. *lacheni*).

Metopolophium longicaudatum David and Hameed

Apt. pale; BL 2.2–2.9mm. On wheat (*Triticum* sp.) in H.P., India. Other morphs unknown.

Metopolophium montanum Hille Ris Lambers

Apt. evenly green or apple green, without a darker green spinal stripe; BL 1.8–2.8mm. Al. have conspicuous dark dorsal abdominal cross-bands. In spring colonies on wild *Rosa* spp. in montane regions of Switzerland, France and Spain. Presumably heter. hol., migrating to grasses as subsequently found on *Poa alpina* in Austria. Ovip. on wild *Rosa* leaves in Oct (orig. descr.).

Metopolophium mukhamedievi Akhmedov

Apt. shining pale green: BL 2.2–2.9mm. On *Lonicera microphylla* in C Asia. Not clearly distinct from *M. dirhodum*.

Metopolophium palmerae (Hille Ris Lambers)

Plate 23i

Apt. probably green: BL c.2.7mm. On *Elymus* sp. in Colorado, USA.

Metopolophium pedicularus (Richards)

Apt. color in life unknown; BL c.2.8mm. On *Pedicularis seudetica* in arctic Canada (NW Territories). Mon. hol.; ovip. and apt. males were collected in mid-August (orig. descr.). The generic position of this species is uncertain.

Metopolophium rosaesuctum Zhang

Apt. reddish green; BL c. 3.4mm. Al. undescribed. On *Rosa* sp. in China.

Metopolophium rubifoliae Raychaudhuri, M.R Ghosh and R.C. Basu

Apt. color in life unrecorded; BL 3.3–4.2mm. Al. with faint brown dorsal abdominal markings. On *Rubus ellipticus* in India (Nagaland, Sikkim).

Metopolophium sabihae Prior

Apt. yellow–green, apple green or blue–green; BL 1.3–2.1mm. On *Festuca rubra* and *Vulpia membranacea* growing in sand dunes. W Europe (France, UK). Anhol., or partially mon. hol., with both apt. (or brachypt.) and al. males produced in cult. in Nov (orig. descr.).

THE APHIDS

Metopolophium tenerum Hille Ris Lambers

Apt. dirty green or reddish, rather shiny; BL 1.3–2.2 mm. On *Deschampsia flexuosa* and *Festuca* spp. NW and N Europe. Mon. hol., with ovip. and al. males in Oct (orig. descr.).

Micraphis Takahashi

Aphidinae: Macrosiphini

One species in E Asia of uncertain affinities; possibly related to *Coloradoa*, except that the eyes have distinct posterior ocular tubercles and although feeding on *Artemisia*, R IV+V is not stiletto-shaped.

Micraphis artemisiae (Takahashi)

Apt. yellow or greenish, BL c.1.3 mm. On leaves and stems of *Artemisia capillaris* in China, Taiwan and Japan. Al. have 12–18 sec. rhin. on III and 4–7 on IV. Life cycle unknown.

Microlophium Mordvilko

Aphidinae: Macrosiphini

Four or five species mostly on *Urtica*, with SIPH similar to *Aulacorthum* but with smooth, very large and somewhat divergent ANT tubercles.

Microlophium carnosum (Buckton)

Plate 23e

Apt. various shades of green, pink or reddish purple; BL 3.1–4.3 mm. Al. with dark marginal sclerites but only faint spino–pleural markings. On undersides of leaves and up stems of *Urtica* spp., esp. *U. dioica*. Also recorded from *Girardinia cuspidata* (Tao, 1999). Europe, Asia east to Mongolia, Africa (al. trapped in Rwanda; BMNH colln, leg. D. Goffinot), and N America. Mon. hol. with al. males. Perrin (1976) studied its population ecology and natural enemies. $2n=20$. [In UK another, undescribed species occurs on *U. dioica* which can be distinguished morphologically by the characters given in the key, and has $2n=16$. This is possibly the species with $2n=16$ from Crimea listed as *M. evansi* Theobald by Kuznetsova and Shaposhnikov (1973).]

Microlophium rubiformosanum (Takahashi)

Apt. green, with ANT and leg segments blackish distally, and SIPH blackish except at bases; BL c.3.5 mm. Al. without dorsal abdominal markings. On *Rubus* spp. in Taiwan and Japan. $2n=12$.

Microlophium sibiricum (Mordvilko)

Apt. brownish green or dark green; BL 3.4–4.4 mm. Al. with dark spinopleural as well as marginal markings. On undersides of leaves and up stems of *Urtica* spp., esp. *U. urens*. Europe (not UK) and across Asia to E Siberia, possibly also Japan (Miyazaki, 1971, as *Acyrtosiphon carnosus*); also in USA, where populations occur mainly on *U. gracilis* and are regarded as a subspecies, *M. sibiricum* ssp. *tenuicauda*, although there seem to be no distinct morphological differences from the old world form. Mon. hol., with apt. males.

Micromyzella Eastop

Aphidinae: Macrosiphini

About 12 mostly fern-feeding African spp. related to *Micromyzus* but with 2–3 hairs (one sense peg) on first tarsal segments, and al. have more normal wing venation, with wing veins dark but not heavily bordered, radial sector more moderately curved and media once– or twice–branched. Apt. often have dark SIPH and dusky or dark dorsal sclerotisation. Remaudière and Autrique (1985) revised the genus, providing keys to apt. and al.

Micromyzella anisopappi Remaudière

Apt. pale with black SIPH apices and cauda; BL c.1.5–1.7 mm. Al. have sec. rhin. III 10–15, IV 2–4, V 0(–2), and variably developed dorsal abdominal markings. On *Anisopappus africanus*, often in company with *Sitobion hirsutirostris*. In Burundi.

Micromyzella davalliae Remaudière

Apt. dark with black appendages incl. cauda; BL 1.4–2.5 mm. Al. have sec. rhin. III 26–42, IV 12–23, V 4–11, and dorsal abdomen with dark cross–bands. Common in the rainy season on the epiphytic fern *Davallia chaerophylloides* growing on oil palms in Burundi (Remaudière and Autrique, 1985). Mon. hol., producing ovip. and al. males in late Feb–April.

***Micromyzella eliei* Remaudière**

Apt. black, except for basal parts of ANT and femora, tibiae and cauda; BL 1.6–2.1 mm. Al. have sec. rhin. III 30–34, IV 22–26, V 10–11 (one specimen). On *Helichrysum odoratissimum* in Burundi.

***Micromyzella filicis* (van der Goot)**

Apt. grass-green, sometimes with a black dorsal abdominal spot, black ANT and SIPH; BL c.1.7 mm. Al. have 8–14 sec. rhin. on ANT III only and no dark dorsal abdominal spot. On undersides of fronds, or in furled fronds, of ferns in many genera (*Antrophyum*, *Asplenium*, *Blechnum*, *Pityrogramma*, *Polypodium*, *Pteris*, *Sphenomeris*, *Thelypteris*). Java (Noordam, 2004), and introduced to New Zealand where it was collected on *Platyserium* sp. (BMNH colln, leg. V.F. Eastop). 2n=36 (in New Zealand).

***Micromyzella judenkoi* (Carver)**

Apt. undescribed; BL of al. 1.2–1.7 mm. Al. have sec. rhin. III 9–18, IV 0–8, V 0–4. Described from al. vivip. and an al. male caught in yellow trays in Australia and Sri Lanka. Subsequently apt. collected on ferns (*Asplenium*, *Athyrium*, *Cheilanthes*) in N India have been assigned to this species, but without a published description. Al. have also been trapped in Hong Kong and the Philippines (BMNH colln).

***Micromyzella kathleenae* Remaudière**

Figure 43q

Apt. color in life unrecorded, probably rather pale, with dark SIPH and black cauda; BL 1.7–2.0 mm. Al. with sec. rhin. III 15–23, IV 12–16, V 8–12, and paired dark patches on abdominal tergites. On *Asplenium aethiopicum* in Burundi.

***Micromyzella pterisoides* (Theobald)**

Figure 43p

Apt. dark, with ANT and legs mainly dark, black SIPH and paler cauda; BL 1.8–2.2 mm. Al. with 7–15 sec. rhin. on III only and an often extensive dusky or dark dorsal abdominal patch. On ferns (*Arthropteris*, *Asplenium*, *Davallia*, *Drynaria*, *Nephrolepis*, *Osmunda*, *Pleopeltis*) in eastern and southern Africa. Ovip. and al. males occur in colonies in small numbers in rainy season (Remaudière and Autrique, 1985).

***Micromyzella sleonensis* (Eastop)**

Figure 43o

Apt. brown; BL 1.4–1.6 mm. Al. with sec. rhin. III 2–9, IV 0–2. On stems of ferns of family Adiantaceae (*Adiantum*, *Pellaea*), described from Sierra Leone, and also recorded from Kenya and S Africa (BMNH colln).

***Micromyzella sophiae* Remaudière**

Apt. color in life unrecorded, probably rather pale with variably developed dark sclerotic dorsal markings, ANT, SIPH, and distal parts of femora dark, cauda pale; BL 1.5–1.9 mm. Al. with sec. rhin. III 14–24, IV 8–15, V 2–6 and paired dark patches on abdominal tergites. On *Asplenium aethiopicum* in Burundi, in mixed colonies with *M. kathleenae*.

***Micromyzodium* David**

Aphidinae: Macrosiphini

Eight Asian species on a range of host plants, related to *Micromyzus* and *Micromyzella* but with long dorsal body hairs.

***Micromyzodium dasi* Verma**

Apt. bright yellow with dark head, ANT and SIPH; BL c. 1.9–2.0 mm. Sec. rhin. in al. III 20–35, IV 10–20, V 0–2. Described from undersides of fronds of an unidentified fern, and subsequently recorded (incl. an al. male) from *Adiantum caudatum* and *Cheilanthes* sp. (Saha and Chakrabarti, 1988b). NW India.

***Micromyzodium filicium* David**

Plate 17b

Apt. shining black, ANT dark beyond III, legs dark at femoral apices, SIPH dark at base and apex but with middle part white; BL 1.5–2.0 mm. Sec. rhin. in al. III 12–16. In large numbers on undersides of fronds or on young growth of various ferns (*Adiantum*, *Asplenium*, *Cheilanthes*, *Eriosorus*, *Nephrolepis*, *Pityrogramma*, *Polypodium*, *Pteris*, *Thelypteris*). Also recorded from plants in some angiosperm families; *Didymocarpus* and *Streptocarpus* (Gesneriaceae), *Aristolochia* (Aristolochiaceae), *Cypripedium* (Orchidaceae)

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and *Geranium* (Geraniaceae). The number of such records suggests that these were not all vagrants, but this extended host range needs further confirmation. N and S India, Nepal. $2n=12$.

Micromyzodium kuwakusae (Uye)

Apt. yellow with a large black dorsal abdominal patch; BL 1.4–1.8 mm. Al. with a black patch and sec. rhin. III 30–34, IV 12–18, V 5–9. On *Fatoua villosa* in Japan. Described in *Macrosiphoniella* and regarded as a nomen dubium in catalogues, but rediscovered by M. Miyazaki (pers. comm., 1979), who donated specimens to BMNH colln.

Micromyzodium levipes (R.C. Basu and Raychudhuri)

Apt. color in life unrecorded; BL c.1.5 mm. Described from *Chromolaena* (= *Eupatorium*) *odorata* in India (A.P.).

Micromyzodium nipponicum (Moritsu)

Apt. dark brown (immatures pale bluish gray); BL 1.4–1.6 mm. On *Perilla frutescens* var. *crispa* and *Perilla* sp. in Japan. Colonies are formed on the roots.

Micromyzodium polypodii Takahashi

Figure 43j

Apt. yellow with blackish ANT, SIPH and cauda; BL c. 2 mm. Al. with forewing veins broadly bordered with fuscous, and black dorsal abdominal markings including a large central patch. On unidentified ferns in Japan.

Micromyzodium spinulosum Miyazaki

Apt. shining black, with yellowish brown ANT and legs, black SIPH and pale cauda; BL 1.1–1.5 mm. Sec. rhin. in al. III 7–13. On stems of grasses (*Digitaria adscendens*, *Oplismenus compositus*) in Japan. $2n=10$.

Micromyzodium strobilanthesi L.K. Ghosh

Apt. blackish brown, with ANT and legs mainly yellowish, with distal parts of femora dark brown and dark SIPH; BL 1.7–2.1 mm. Al. undescribed. On *Strobilanthes dalhousianus* (Acanthaceae) in N India. One greenish black apt. also identified as this species was collected from *Ruellia tuberosa* (Raychaudhuri *et al.*, 1980).

Micromyzus van der Goot

Aphidinae: Macrosiphini

About 10 species of mostly E Asian fern-feeding aphids close to *Micromyzella* but with usually 4 hairs (incl. 2 sense pegs) on first tarsal segments, and al. having dark-bordered wing veins and a strongly curved radial sector.

Micromyzus diervillae Matsumura

Apt. pale green or green; BL c.1.9 mm. Al. have forewings with a pale pterostigma (cf. *Neotoxoptera weigeliae*) and veins narrowly bordered with fuscous, and dorsal abdomen with dark cross-bands. On *Weigela* spp. in Japan, Korea and E Siberia. Probably heter. hol., with migration to an unknown secondary host (a fern?). Fullest description is by Takahashi (1965c, as *M. weigeliae*).

Micromyzus katoi (Takahashi)

Plate 17c, Figure 43r

Apt. black (orig. descr.) or shining orange–brown, paler spinally and darker on margins and at bases of SIPH, ANT and legs banded black and white, SIPH blackish brown, cauda pale (Noordam, 2004); BL 1.5–2.1 mm. Al. with sec. rhin. on III only, 2–6 (Taiwan) or 8–14 (Java, Australia). On undersides of fronds of ferns in certain genera (*Microsorium*, *Platyserium*, *Polypodium*). Described from Taiwan, and subsequently recorded from Indonesia and Australia. However, the non-Taiwanese material may be a distinct species with different color in life, a relatively longer R IV+V, and al. with more sec. rhin.

Micromyzus mawphlangensis A.K. Ghosh

Apt. pale with a brown spinal patch on ABD TERG 1–3, dark brown SIPH and pale cauda; BL c.2.1–2.2 mm. Al. have 3–9 sec. rhin. on III only, brown-bordered wing veins and dusky segmental spinopleural abdominal sclerites. On a *Polypodium* sp. in N India.

Micromyzus niger van der Goot

Figure 43k

Apt. shining brown–black, ANT, femora, tibiae and SIPH pale with black tips, cauda very dark gray, almost black, with white wax on distal part (Noordam, 2004); BL 0.9–1.3 mm. On undersides of fronds of ferns, which may be curved inward. Recorded from ferns in several genera (*Adiantum*, *Eriosorus*, *Pityrogramma*, *Pteris*). Specimens from the grass *Dactyloctenium aegyptiacum* in the BMNH colln are presumably vagrants. In Indonesia, Singapore, India and Sri Lanka.

Micromyzus nikkoensis Miyazaki

Apt. whitish to pale yellow with ANT black, tibiae mainly dark, SIPH pale with dark tips, cauda pale; BL 1.5–1.7 mm. On *Athyrium pycnosorum* (Miyazaki, 1971) and *Gymnogramma totta* (BMNH colln, leg. R.L. Blackman) in Japan. 2n=12.

Micromyzus osmundae Takahashi

Apt. yellow with black ANT and tibiae, and pale SIPH and cauda; BL c.2 mm. Al. undescribed. On *Osmunda* spp. in Japan.

Micromyzus pojanii (Cermeli and Smith)

Apt. shiny brown with dusky to black appendages; BL 1.6–1.8 mm. Al. have strongly bordered wing veins and sec. rhin. III 13–16, IV 1–4. On an unidentified broad-leaved fern in Venezuela (Cermeli and Smith, 1979, as *Picturaphis*).

Micromyzus vandergooti Noordam

Apt. orange–brown or brownish red, with black SIPH and pale cauda; 1.3–1.7 mm. On ferns of genus *Pyrrosia* (as *Cyclophorus*, *Drymoglossum*), found living (in one case) on the upperside of a leaf ‘protected by a roof’ (Noordam, 2004). Java.

Microparsus Patch

Aphidinae: Macrosiphini

About 11 nearctic and neotropical species on Leguminosae. They are mostly brightly-colored aphids and al. have dark-bordered wing veins. Subgenus *Picturaphis* have clavate SIPH. Apt. have marginal tubercles on ABD TERG 2–4. Cermeli and Smith (1979) provided keys to species of *Picturaphis*.

Microparsus (Picturaphis) brasiliensis (Moreira)

Plate 19e

Apt. shiny greenish dark brown to black (imm. paler, brownish yellow); BL 1.6–2.0 mm. Al. are dark brown to black with wing veins heavily black-bordered. On various Leguminosae (*Centrosema*, *Dolichos*, *Indigofera*, *Phaseolus*, *Vigna*); widely distributed in the Caribbean, C and S America, and also recorded from Florida, USA. Biology unknown; presumably anholocyclic.

Microparsus desmodiorum Smith and Tuatay

Apt. pale yellowish green to green with head dark yellow to brownish orange, ANT, legs and SIPH mainly dark, cauda yellow–orange; BL 1.5–2.0 mm. On *Desmodium* spp., in eastern USA, feeding on terminals and seed-pods without distorting growth. Ovip. and al. males in Oct–Nov (orig. descr.).

Microparsus olivei Smith and Tuatay

Figure 26c,d

Apt. dark green, with head orange to brownish, ANT and legs bicolored yellow and black, SIPH black and cauda orange; BL 1.4–1.9 mm. On *Desmodium* spp. in eastern USA, feeding on leaves and terminals and causing some curling. Ovip. and al. males in Sept–Oct (orig. descr.).

Microparsus (Picturaphis) puertoricensis (Smith)

Apt. shining reddish brown; BL 1.3–1.9 mm. On *Phaseolus adenanthus* in Puerto Rico. Al. were described by Smith and Gaud (1974).

Microparsus rhynchosiae Remaudière and Peña Martínez

Apt. shining green, with ANT black except at base, dark apices to femora, and tibiae, tarsi and distal halves of SIPH, and a dark band on ABD TERG 8; BL 1.7–2.1 mm. On a *Rhynchosia* sp. in Mexico, colonising undersides of leaves of prostrate stems at soil level. Mon. hol., with ovip. and al. males in Oct (orig. descr.).

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Microparsus singularis (Hottes and Frison)

Apt. bright green with orange–brown head, black ANT except for base of segment III, black and yellow legs, black SIPH and yellow–orange cauda; BL 1.9–2.2 mm. On *Lespedeza* spp., especially *L. repens*, in eastern USA. Mon. hol. with ovip. and apt. males in Oct (Smith and Heie, 1963, as *Megouroparsus kislankoi*).

Microparsus tephrosiae (Smith)

Apt. amber to reddish brown, BL 2.3–2.7 mm. Described from *Tephrosia virginiana*, on which large colonies may occur and cause stunting of growth. There are also records from *Astragalus* and *Coursetia* (= *Cracca*). In eastern USA (Florida, Mississippi, North Carolina). Ovip. and al. males in Oct (orig. descr.).

Microparsus variabilis Patch

Apt. green with head and cauda yellow to dark orange, ANT and legs variably pigmented, SIPH wholly dark or paler towards bases; BL 1.6–2.0 mm. On *Desmodium* spp. and *Amphicarpaea monoica* in eastern USA. It tightly curls the leaves of *Desmodium*, and lives on stems and undersides of leaves of *Amphicarpaea* (Hottes and Frison, 1931). Ovip. and al. males in mid–Aug (Smith and Tuatay, 1960).

Microparsus (Picturaphis) venezuelensis (Cermeli and Smith)

Figure 26a,b

Apt. dull greenish to bluish black (*venezuelensis* s. str.), or dull reddish brown (*venezuelensis* ssp. *meridensis*); BL 1.8–2.6 mm. On *Desmodium* spp. in Venezuela. The two subspecies possibly colonise different species of *Desmodium*.

Microparsus (Picturaphis) vignaphilus (Blanchard)

Apt. dark brown to blackish; BL 1.9–2.4 mm. On several genera of Leguminosae (*Cologania*, *Phaseolus*, *Vigna*) in S America (Argentina, Brazil, Colombia, Mexico).

Microsiphoniella Hille Ris Lambers

Aphidinae: Macrosiphini

Four North American species on Anthemideae, related to the palaeartic genus *Microsiphum*, but with much longer dorsal hairs. Three of the species have a dark sclerotic tergum. Smith and Knowlton (1938) and Palmer (1952) reviewed the genus (as *Microsiphum*).

Microsiphoniella acophorum (Smith and Knowlton)

Apt. pear-shaped, shiny brownish black to black, with pale ANT III and mainly pale tibiae; BL 1.0–1.5 mm. Colonising stems and leaves of *Seriphidium tridentatum* and *Artemisia longifolia* in western USA. Ovip. and al. males in Sept–Oct (Palmer, 1952).

Microsiphoniella artemisiae (Gillette)

Plate 27h

Apt. blackish brown to cinnamon brown, with base of ANT III and most of tibiae pale; BL 1.6–2.0 mm. On stems and leaves of *Artemisia* and *Seriphidium* spp. Widely distributed in N America. Ovip. and apt. males in Sept–Oct (Palmer, 1952).

Microsiphoniella canadensis (Williams)

Apt. pale green, BL c.2.4 mm. On stems and leaves (causing some leaf-curl) of *Artemisia* and *Seriphidium* spp. in Nebraska, USA, and there are also records from Oregon and Kansas (Smith and Parron, 1978). This species, originally placed in *Cryptosiphum*, has not been adequately described, and its generic placement is problematic.

Microsiphoniella oregonensis (Wilson)

Apt. shining chocolate brown, with ANT III–IV pale and tibiae mainly pale; BL c.1.2–1.4 mm. On leaves and stems of *Seriphidium tridentatum* in western USA (Palmer, 1952), Ovip. and al. males in Oct.

Microsiphum Cholodkovsky

Aphidinae: Macrosiphini

About 12 palaeartic species forming ant-attended colonies on stems of Compositae, related to *Microsiphoniella* but with much reduced SIPH (which still have some polygonal reticulation) and a broad-based

triangular cauda. The species in NW Europe were reviewed by Heie (1995), and those in E Europe by Bozhko (1963). They all seem to be strictly monophagous.

***Microsiphum giganteum* Nevsky**

Apt. broadly pear-shaped, pale rose-red or pale green with dark head, a broad brown band across the prothorax, and black ANT and legs; BL 2.1–3.2 mm. On stems of *Artemisia dracunculus* in C Asia (Kyrgyzstan, Tajikistan). Apart from its color in life this species is difficult to distinguish from *M. procerae*.

***Microsiphum heptapotamicum* Kadyrbekov**

Apt. brownish to brown–black; BL 1.6–1.8 mm. In ant-attended colonies on roots and at bases of stems of *Achillea millefolium* in S Kazakhstan (Kadyrbekov, 2000).

***Microsiphum jazykovi* Nevsky (= *Microsiphum wahlgreni* Hille Ris Lambers)**

Apt. pear-shaped, shiny brown on head and thorax with abdomen deep green–black, and ANT and legs mainly dark brown–black; BL 1.7–2.2 mm. In dense colonies on upper parts of flower stems of *Artemisia absinthium*, attended by ants (orig. descr.). In N and C Europe, and C Asia (Uzbekistan). Mon. hol.; fund. described from Switzerland (Hille Ris Lambers, 1947a; as *M. wahlgreni*).

***Microsiphum millefolii* Wahlgren**

Plate 27i, Figure 5d,e

Apt. pear-shaped, yellowish or grayish red to dark brown with dark head, antennae, legs, siphunculi and cauda; BL 1.8–2.5 mm. On lower parts of stems of *Achillea millefolium*, attended by ants. Throughout most of Europe. Mon. hol., with apt. males (Heie, 1995).

***Microsiphum nudum* Holman**

Apt. pear-shaped, grayish or greenish black; BL 1.75–2 mm. On *Achillea nobilis*, living on basal parts of stem and rootstock, in ant shelters. In E Europe (Bulgaria, Hungary, Slovakia), Crimea, and probably in C Asia (Kadyrbekov, 2000; as *M. minus*). Mon. hol., with ovip. and apt. males in Oct (orig. descr.).

***Microsiphum procerae* Bozhko**

Apt. pear-shaped, shining brown with dark antennae and legs; BL c. 1.9–2.1 mm. On upper parts of flower stems of *Artemisia procera* in Ukraine. *M. subalpicum* Mamantora, described from the same host plant in Armenia, cannot be separated on the basis of the published descriptions.

***Microsiphum ptarmicae* (Cholodkovsky)**

Apt. dark brown; BL c. 1.5–1.6 mm. On *Achillea ptarmicae* in Ukraine. An aphid on *A. millefolium* in Ukraine is regarded as a subspecies, *A. ptarmicae* ssp. *minus* Bozhko. Very close to, if not the same as, *millefolii* according to Hille Ris Lambers (1947a) and Holman (1961a). Discriminants in our key are based on Kadyrbekov (2000).

***Microsiphum pyrethri* Bozhko**

Apt. brown tinged with red; BL c. 1.7 mm. On *Pyrethrum millefoliatum* in Ukraine.

***Microsiphum woronieckae* Judenko**

Apt. pear-shaped, dusky pink on thorax, abdomen reddish black, ANT black, legs black except for yellowish basal halves of femora; BL 2.2–3.0 mm. In compact ant-attended colonies on lower parts of stems of *Artemisia vulgaris*. N and C Europe, east to Ukraine. Ovip. and apt. males in Sep–Oct (Hille Ris Lambers, 1947a). 2n=12*.

***Misturaphis* Robinson**

Aphidinae: Aphidini

One species in Canada apparently related to *Aphis* but without marginal tubercles on ABD TERG 1 and 7. ANT are 5-segmented in both apt. and al.

***Misturaphis shiloensis* Robinson**

Apt. grayish or silvery green to pale green, BL 1.05–1.7 mm. On *Artemisia caudata* in Manitoba, Canada. Sec. rhin. in al. III 10–14, IV 1–3. Sexual morphs are unknown.

***Mordvilkoïella* Shaposhnikov**

Aphidinae: Aphidini (?)

Two species on Gramineae currently placed in Aphidini because of a possible relation to *Hyalopterus*, but with short 5-segmented ANT, SIPH reduced to pores and no marginal abdominal tubercles. It could have a closer affinity to *Holcaphis* and belong in Macrosiphini.

***Mordvilkoïella jacutensis* Pashtshenko**

Apt. pale yellowish green; BL c.2.3 mm. On *Festuca pratensis* in E Siberia.

***Morvilkoïella skorkini* (Mordvilko)**

Apt. color in life unknown; BL unrecorded. In leaf sheaths of *Phragmites australis* in Russia and Ukraine (Shaposhnikov, 1964).

***Mordvilkoja* del Guercio**

Eriosomatinae: Pemphigini

One N American species migrating from *Populus* to *Lysimachia*, with its secondary host generations very similar to those of *Thecabius* subgenus *Parathecabius*.

***Mordvilkoja vagabunda* (Walsh) (= *Parathecabius stammeri* Zwölfer)**

Apt. on sec. host dirty yellowish white, with wax secretion; BL 2–3 mm. On roots and stem-bases of *Lysimachia* spp. in N America, and also found on *L. vulgaris* roots in Germany (Zwölfer, 1957, as *Parathecabius stammeri*) and Japan (BMNH, leg. S. Acki). Heter. hol. with sexual phase and galls on *Populus* spp. of the *deltoides* group in N America (Blackman and Eastop, 1994). Smith (1971) gave a full account of the life cycle. The population on *Lysimachia* in Germany was anhol. 2n=20.

***Muscaphis* Börner**

Aphidinae: Macrosiphini

About eight species, all except two of which probably host-alternate between Pyroidea and mosses, although four have only been collected on mosses, and host alternation has only been experimentally established in two species, one in Mexico (Remaudière and Muñoz Viveros, 1985) and the other in Russia (Stekolshtshikov and Shaposhnikov, 1993). Primary host relationships are reviewed by Blackman and Eastop (1994).

***Muscaphis cuspidata* (Stroyan)**

Apt. dark greenish brown with brown ANT and legs and shiny black dorsum and SIPH; BL 0.9–1.3 mm. On the mosses *Acrocladium cuspidatum* and *Drepanocladus aduncus* (Amblystegiaceae) close to or below water level. Europe (England, Germany Czech Republic), This aphid can live submerged, apparently because the papillate sculpturing of the cuticle is able to trap a layer of air around the body (orig. descr., and Müller, 1975b, as *Aspidaphium cuspidati*). Anhol., with a specialised overwintering 4th instar (Müller, 1973b).

***Muscaphis escherichi* (Börner)**

(= *Muscaphis drepanosiphoides* of Blackman and Eastop 1994) Plate 16i, Figure 44h

Apt. shiny pale brown to ochreous brown or greenish, with brown ANT and legs and dark reddish brown to black SIPH; BL 0.9–1.1 mm. On a wide variety of mosses in the genera *Acrocladium* (Amblystegiaceae); *Brachythecium*, *Eurhynchium*, *Pseudoscleropodium*, *Ptilium* (Brachytheciaceae); *Dicranum* (Dicranaceae); *Hylocomium*, *Pleurozium*, *Rhytidiadelphus* (Hylocomiaceae); *Hypnum* (Hypnaceae), *Mnium* (Mniaceae); *Pohlia* (Bryaceae); and *Polytrichum* (Polytrichiaceae). Widely distributed in Europe, and in USA (Utah) and Korea (Lee and Havelka, 2001b). Anhol. almost everywhere on mosses, but heter. hol. populations with a sexual phase on *Sorbus* occur in Russia (migrating apparently specifically to the moss *Plagiothecium laetum*), N Korea and USA (with unknown secondary hosts). The Russian holocyclic population was regarded by Stekolshtshikov and Shaposhnikov (1993) as a subspecies, *M. escherichi* ssp. *irae* Shaposhnikov; differences from N Korean populations on *Sorbus* were noted by Lee *et al.*, 2002c. 2n=12* (for ssp. *irae*, as *Toxoptarella*; Kuznetsova and Shaposhnikov, 1973).

Muscaphis mexicana Remaudière and Muñoz Viveros

Apt. yellow, yellowish green, often dark anteriorly, with reddish patches at bases of SIPH, or (in older adults) almost black; BL 0.6–0.8 mm. On an unidentified moss in Mexico. Heter. hol., with a sexual phase on *Crataegus*.

Muscaphis musci Börner

Figure 44a, b,j

Apt. grayish yellow, pale brown, or shiny dark olive-green, with reddish brown SIPH; BL 0.5–1.0 mm. On mosses in the genera *Acrocladium*, *Amblystegia* (Amblystegiaceae); *Barbula*, *Tortula* (Pottiaceae); *Brachythecium*, *Eurhynchium*, *Pseudoscleropodium* (Brachytheciaceae); *Bryum* (Bryaceae); *Catharinaea*, *Polytrichum* (Polytrichaceae); *Hylocomium* (Hylocomiaceae); and *Mnium* (Mniaceae). Europe (Belgium, Denmark, England, Germany, Switzerland, Czech Republic) and N America (New Brunswick, N Carolina, Idaho). Life cycle uncertain; possibly heter. hol. with an unknown primary host, but collection of active stages in autumn/winter (Müller, 1973b, as *M. stammeri*; Tinguely, 1993) indicates that it is at least partially anhol.

Muscaphis utahensis (Smith and Knowlton)

Figure 44i

Apt. dark brown; BL 0.7–1.1 mm. On mosses in western USA (Idaho, Utah, Washington); the only recorded host is *Cratoneurum filicinum*.

Myzackaia A.N. Basu

Aphidinae: Macrosiphini

Four species in India and E Asia, three described from *Polygonum* and one from an unknown host, closely related to *Trichosiphonaphis*, but with a dark sclerotic tergum, black hairless SIPH with a well-developed flange, and cauda with a distal constriction. The 3 species below are very similar and their distinctness needs to be confirmed by further work.

Myzackaia nitakensis (Takahashi)

Apt. black; BL c.1.5–1.6 mm. On *Polygonum* sp., Taiwan.

Myzackaia polygonicola A.N. Basu

Figure 42b,c

Apt. probably black; BL 1.6–1.9 mm. On *Polygonum runcinatum* and *Polygonum* sp. in W Bengal, India.

Myzackaia verbasci (Chowdhuri, R.C. Basu, Chakrabarti and Raychaudhuri)

Plate 20e

Apt. brownish black to black, a little shiny; BL 1.3–1.6 mm. Sec. rhin. in al. III 19–31, IV 0–4, V 0 (BMNH colln, leg. A.N. Chowdhuri). On *Polygonum alatum* and *Polygonum* sp(p), feeding on young shoots and under leaves, which are rolled inward (Basu, 1969, as *M. himalayensis*). India (W Bengal, Kashmir, Himachal Pradesh), and al. possibly of this species have been trapped in the Philippines (BMNH colln, leg. V. Calilung). The original description included specimens collected on *Verbascum thapsus*, but this is unlikely to be a true host. 2n=12.

Myzaphis van der Goot

Aphidinae: Macrosiphini

Seven species on Rosaceae (*Rosa*, *Potentilla*). Apt. are rather elongate oval, and dorsoventrally-flattened, with short appendages and rugose dorsal cuticle. They generally have 5 hairs on first tarsal segments, and al. have a dark dorsal abdominal patch. The single species described from Canada has 2 hairs on first tarsal segments and al. with no dorsal patch, so perhaps should be regarded as generically distinct.

Myzaphis avariolosa David, Rajasingh and Narayanan

Apt. green; BL c.2 mm. On *Rosa macrophylla* in H.P., India. Other morphs and life cycle unknown.

Myzaphis bucktoni Jacob

Apt. pale yellow to pale green with brown dorsal markings consisting of a brown head, two large brown patches on pronotum, and paired broad stripes extending from mesothorax to base of cauda, converging between SIPH.; BL 1.0–1.9 mm. Al. have a pale brown central dorsal abdominal patch. On *Rosa* spp., usually dispersed along mid-ribs on upper sides of leaves. Europe, Mongolia (Holman and Szelegiewicz, 1972), and introduced to USA. Mon. hol. in UK, with ovip. and apt. males in Nov (orig. descr.). 2n=13* (1 sample from Portugal).

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Myzaphis canadensis Richards

Apt. pale green to yellow; BL c.1.5–1.6mm. Al. have no dorsal abdominal dark patch. On *Potentilla fruticosa* in Ontario, Canada.

Myzaphis juchnevitschae Kadyrbekov

Apt. dark grayish brown; BL 1.4–1.8mm. On *Rosa alberti* in SE Kazakhstan.

Myzaphis rosarum (Kaltenbach)

Plate 15g

Apt. yellow–green to green; BL 1.2–2.4mm. On wild and cultivated *Rosa* (especially rambler roses) and frequently also on shrubby *Potentilla* spp. They feed mainly along mid-ribs on both upper and undersides of young leaves. Occasionally found on *Fragaria* spp. Europe, Asia, Morocco, S Africa, New Zealand, N and S America. Mon. hol. on Rosaceae in Europe, with ovip. and apt. males in Nov. Anhol. in New Zealand, and probably elsewhere. $2n=4$.

Myzaphis tianshanica Kadyrbekov

Apt. yellow–green; BL 1.4–1.8mm. On *Rosa alberti* in SE Kazakhstan.

Myzaphis turanica Nevsky

Apt. green; BL 1.4–1.7mm. Al. have a paler and more irregularly-shaped dorsal abdominal patch than *M. rosarum*. On *Rosa bruniana* in C Asia (Nevsky, 1929, as ssp. of *M. rosarum*), and subsequently recorded from wild and cultivated *Rosa* sp(p). in Sweden, Israel, Italy, India, Mongolia and Brazil. Mon. hol. with al. males (Tuatay and Remaudière, 1965).

Myzocallis Passerini

Calaphidinae: Panaphidini

About 37 species of small, delicate, usually yellowish aphids with a knobbed cauda and bilobed anal plate, mostly living on Fagaceae. Imm. usually have long, capitate dorsal hairs. Adult vivip. are all al., except in a few species. See Blackman and Eastop (1994).

Myzocallis myricae (Kaltenbach)

Al. yellow or orange, with black longitudinal markings on head and thorax, and paired black spinal and marginal sclerites on ABD TERG 1–7; BL 1.8–2.0mm. Brachypterous specimens are common. On undersides of leaves and young growth of *Myrica gale* in N and NW Europe (Heie, 1982). Mon. hol.; sexuales in October. $2n=14$.

Myzodium Börner

Aphidinae: Macrosiphini

Four species with a nodulose head with rounded ANT and medial tubercles, and the characteristically-shaped ANT PT and cauda of moss-feeding aphids, although two were described from other hosts.

Myzodium knowltoni Smith and Knowlton

Apt. color in life not observed, presumably pale with slightly darker appendages; BL 0.9–1.7mm. Al. have sec. rhin. distributed ANT III 20–35, IV 6–14, V 0–6, and dusky dorsal abdominal cross-bands, sometimes coalesced. Extracted from unidentified moss samples using a Berlese funnel (Smith and Robinson, 1975). Utah, USA.

Myzodium lutescens (Zhang and Qiao)

Apt. grayish yellow; BL c.1.6–1.8mm. Al. with a black dorsal abdominal patch and sec. rhin. distributed ANT III 44–54, V 18–19, V 3–4. On *Carissa spinarum* in Fujian. Prov., China (Zhang and Qiao, 1998a, as *Evallocotaphis*), and subsequently collected from a species of Compositae (G. Qiao, pers. comm.). The true host is more likely to be a moss.

Myzodium mimulicola (Drews and Sampson)

Apt. reddish green; BL 1.4–1.9mm. Al. have sec. rhin. distributed ANT III 17–23, IV 6–9, V 1–5, and abdomen with broad dark segmental cross-bands. Found in large numbers on *Mimulus floribundus* at two sites in California, USA.

Myzodium modestum (Hottes)

Plate 16g, Figure 44e,g

Apt. reddish brown to dark brown or olive, sometimes greenish posteriorly, dorsum shiny, ANT and legs brown, SIPH blackish; BL 1.2–1.9 mm. Al. have sec. rhin. distributed ANT III 21–45, IV 7–13, V 0–4, and a large dark dorsal abdominal patch. On various mosses; recorded from *Catharinaea* and *Polytrichum* (Polytrichaceae); *Pohlia* (Bryaceae); and *Rhacomitrium* (Grimmiaceae). In Europe, Iceland, Jan Mayen, Greenland, and N America. Apparently anhol. (Müller, 1973b).

Myzosiphum Tao

Aphidinae: Macrosiphini

Two species, one with an unknown host in China, and one known only from the Ruykyu Islands, related to *Myzus* but SIPH have subapical reticulation.

Myzosiphum ruykyuense Tao

Apt. color in life unrecorded; BL c.2.3 mm. Sec. rhin. in al. III 26–28, IV 9–10, V 2–3. On *Polygonum* sp., Okinawa.

Myzotoxoptera Theobald

Aphidinae: Macrosiphini

One species similar to *Rhopalosiphoninus* but with less swollen SIPH and a short pentagonal cauda.

Myzotoxoptera wimshurstae Theobald

Plate 20h

Apt. shining dark olive green with blackish head, SIPH and cauda; BL 1.5–1.8 mm. On *Cardamine* spp., feeding at bases of stems and on roots. Only known from England and Czech Republic (BMNH colln, leg. J. Holman). Mon. hol., with ovip. and apt. males in Sept–Oct (Prior 1971).

Myzus Passerini

Aphidinae: Macrosiphini

About 55 old world, mostly oriental, aphids with gibbous ANT tubercles. Al. usually have sec. rhin. only on ANT III, and a black dorsal abdominal patch. Primary hosts of host-alternating species are *Prunus*, but the secondary hosts are in many different families, and a few species are very polyphagous. Accounts are available for Fennoscandia and Denmark (Heie, 1994), C Europe (Heinze, 1960), Japan (Miyazaki, 1971), China (Tao, 1963), Java (Noordam, 2004) and India (Basu and Raychaudhuri, 1976a). See also Blackman and Eastop (1994).

Myzus (Nectarosiphon) ajugae Schouteden

Apt. small, brownish to dirty yellowish green, BL 1.4–2.0 mm, in tightly curled leaves of *Ajuga* spp. (*gen-ensis*, *orientalis*, *reptans*) usually in deep shade. Al. have a black dorsal abdominal patch and sec. rhin. ANT III 7–12, IV 0 (–3). Mon. hol., with apt. males in Oct. Widely distributed in Europe (UK, Netherlands, Belgium, Germany, Switzerland, Italy (Sicily), Hungary and former Yugoslavia). For a detailed account see Meier (1954). 2n=12.

Myzus alectorolophi Heinze

Apt. reddish brown or yellowish brown, with SIPH pale or dusky, occasionally with dark apices; BL 1.3–1.9 mm. On *Rhinanthus alectorolophus* in Germany, and also recorded from Finland (Heie, 1994). Closely related to *M. cerasi*, and possibly a synonym. Life cycle unknown.

Myzus (Nectarosiphon) antirrhinii (Macchiati)

Apt. mid gray–green to dark green, occasionally dark red; BL 1.4–2.2 mm. On leaves and young growth of numerous plants, on which it may be confused with *M. persicae* (Blackman and Paterson, 1986). Europe, E Asia, Australia and western N America. Unlike *M. persicae*, it often forms large, dense colonies, and only produces al. rather sporadically. Anhol. everywhere, but there is recent evidence of a possible sexual phase in Japan (H. Takada, pers. comm.). Separation from *M. persicae* is difficult except using enzyme or molecular analysis (Hales *et al.*, 2000). R IV+V length is in the range 0.102–0.128 mm (*persicae* 0.09–0.122 mm), SIPH are rather uniformly darker and more swollen distally, and the function [(138×ANT PT)+(708

THE APHIDS

×R IV+V)–(53×ANT III)–(500×ANT BASE VI)] is usually greater than 58 (usually less than 58 in *persicae*). 2n=11, 12, 13 or 14.

Myzus asamensis Takahashi

Apt. whitish yellow (orig. descr.), pale green or green, with black SIPH; BL c.1.7 mm. On foliage of 'a plant resembling *Saxifraga*' in Japan, and subsequently collected from *Saxifraga punctata* in E Siberia (Pashtshenko, 1988a).

Myzus (Sciomyzus) ascalonicus Doncaster

Plate 19a

Apt. shining pale brownish green, straw-colored or dirty yellow, with tips of ANT and legs black; BL 1.1–2.3 mm. Al. have a dark dorsal abdominal patch and sec. rhin distributed either III 7–21, IV 0–6, V 0–3, or III 24–56, IV 12–39, V 2–18 (both types of ANT can occur in one individual). Extremely polyphagous, with hosts in more than 20 families, but particularly Alliaceae, Caryophyllaceae, Compositae, Cruciferae, Liliaceae and Rosaceae (see also Blackman and Eastop, 2000). Almost world-wide, including sub-Antarctic islands (Hullé *et al.*, 2003), and apparently completely anhol. everywhere. Unknown before 1940, and possibly of hybrid origin, although the parentage is unclear. Often placed in subgenus *Nectarosiphon*, but it clearly does not belong there, and is closer to *Myzus cymbalariae*. 2n=12.

Myzus (Nectarosiphon) asteriae Shinji

Figure 15f

Apt. yellow, BL c.1.8 mm, on upper sides of leaves of *Aster* and related genera (*Boltonia*, *Kalimeris*) in Japan, Korea and E Siberia. Al. have dark head and thorax, and a large dark dorsal abdominal patch (Takahashi, 1965b). This is probably the species listed by Essig and Kuwana (1918) as a *Rhopalosiphum* on *Boltonia indica*. 2n=12.

Myzus biennis Sanborn

Apt. not described; al. green with a dark dorsal abdominal patch, and BL c.2.6 mm. In colonies on terminal stems of *Oenothera biennis* in Kansas, USA. *M. oenotherae* could be a synonym.

Myzus boehmeriae Takahashi

Apt. white or yellowish white with pale appendages, BL 1.6–2 mm. On undersides of leaves of *Boehmeria* spp. in Japan, Taiwan and S Korea. Mon. hol. in Japan; al. males and ovip. in Nov (Miyazaki, 1971).

Myzus borealis Ossiannilsson

Apt. brownish yellow with variably developed dark brown dorsal spots, to almost black; BL 1.3–1.6 mm. On *Galium boreale* in N Europe (Sweden, Finland) and on *G. rubioides* in Ukraine (Bozhko, 1976a, as *M. rubioidis*). Ovip. and al. males were reared in Sweden (orig. descr.).

Myzus brevisiphon A.N. Basu

Figure 421,m

Apt. dark brown; BL 1.2–1.7 mm. Sec. rhin. in al. III 14–23, IV 0–5. On undersides of leaves of *Polygonum alatum*, *Polygonum* sp. and *Persicaria capitatum* sometimes curling and yellowing leaves. In India (W. Bengal, Meghalaya, U.P.). Life cycle unknown; al. males in late Sept–Oct (Ghosh, 1974b). To judge from a paratype slide in the BMNH colln, the synonymy with *M. formosanus* Takahashi proposed by Eastop and Hille Ris Lambers (1976) is incorrect.

Myzus cerasi (Fabricius)

Apt. shining dark brown to yellowish brown or olive green, with black SIPH and brown cauda; BL 1.1–1.7 mm. On stems of *Galium* and *Asperula* spp. (Rubiaceae), also on Scrophulariaceae (*Euphrasia*, *Rhinanthus*, *Veronica*) and, especially in N America, certain Cruciferae (*Capsella*, *Cardamine*, *Coronopus*, *Lepidium*). Typically heter. hol., with sexual phase on *Prunus* spp., especially *P. cerasus* and *P. avium* (Blackman and Eastop, 1994, 2000). In Europe, Asia, Australia, New Zealand and N America. The name is probably being applied to a complex of sibling species or subspecies with different life cycles and host associations (Dahl, 1968; Gruppe, 1988). Some populations in N Europe are mon. hol. on *Galium* and *Veronica*, and differences from *cerasi* in morphology of the fundatrix (Dahl, 1968) indicate that they may be specifically distinct, or should at least be regarded as a subspecies, *M. cerasi* ssp. *veronicae* (Walker). In Japan and Korea, another

form regarded as a subspecies, *M. cerasi* ssp. *umefoliae* (Shinji), migrates from *Prunus mume* to *Artemisia capillaris* (Takahashi, 1965b), and should perhaps be regarded as a distinct species. *M. alectorolophi*, *M. borealis* and *M. erythraeae* are also very closely related members of the *cerasi* group. $2n=10$.

***Myzus (Nectarosiphon) certus* (Walker)**

Apt. pink to dark reddish brown; BL 1.2–2.0 mm. Sec. rhin. in al. III 8–20, IV 0 (–4). On Caryophyllaceae (*Cerastium*, *Dianthus*, *Stellaria*) causing spotting and curling of leaves, and also on Violaceae. Mon. hol., with apt. males; anhol. populations also occur. Europe, Iran, and North America. Closely related to and difficult to distinguish morphologically from *M. persicae*; distinguishing characters for al. of the two species in trap catches are given by Hille Ris Lambers (1959). For a detailed account see Meier (1954). $2n=12$.

***Myzus (Sciamyzus) cymbalariae* Stroyan**

Plate 19b

Apt. dull yellowish green or yellowish brown, to dark brown or crimson red (more pigmented in cold conditions); BL 1.2–2.0 mm. Al., unlike other *Myzus*, have more or less separate transverse dark bands on the dorsal abdomen. Polyphagous, colonizing a similar range of hosts to *M. ascalonicus* (especially species in Alliaceae, Caryophyllaceae, Compositae, Iridaceae, Liliaceae, Scrophulariaceae, and Violaceae). Apparently entirely anhol., although males have been obtained in trap catches and reared in laboratory cultures. Origin unknown; present distribution indicates recent dispersal by man (England, Scotland, Switzerland, Italy, Spain, Rwanda, S Africa, India, Pakistan, Australia, New Zealand, Bolivia and Chile). For further information see Brown (1983). $2n=12$.

***Myzus debregeasiae* Noordam**

Apt. yellowish white; BL 1.3–1.7 mm. Singly on undersides of older leaves of *Debregeasia longifolia* (Urticaceae) in Java, and also collected from *Wendlandia densiflora* (Rubiaceae) (Noordam, 2004).

***Myzus (Nectarosiphon) dianthicola* Hille Ris Lambers**

Apt. deep yellow–green; BL 1.3–2.0 mm. On *Dianthus caryophyllus*, usually in glasshouses, causing white or yellow spots or blotches on the leaves. Closely resembling *M. persicae*, but distinguishable from that species by the reaction of the host plant, and from *M. certus* by its color in life. In N America, W Europe, and New Zealand. Apparently completely anhol. $2n=14$ (heterozygous).

***Myzus duriatae* Noordam**

Apt. brownish black; BL 1.3–1.5 mm On flower-buds of *Aeschynanthus radicans* in Java (Noordam, 2004).

***Myzus dycei* Carver**

Figure 55b

Apt. green or yellow, with pale appendages; BL 1.4–2.0 mm. Sec. rhin. in al. III 13–23, IV 1–2. On Urticaceae (*Girardinia*, *Laportea*, *Urtica*) in Australia and E Asia (Japan, China, Korea, E Siberia, Nepal and India). Life cycle unclear; it was found on *Ulmus pumila* and *Hemiptelea davidii* in S Korea by Lee *et al.* (2002c), who suggested host alternation, but these are probably alternative secondary hosts (Ulmaceae being allied to Urticaceae). $2n=12$.

***Myzus erythraeae* Mamontova**

Apt. shining brown, with dark SIPH and cauda; BL c.1.3 mm. On *Centaurium vulgare* (= *Erythraea centaurium*) in Ukraine. Not clearly distinguishable from *M. cerasi*, which has been recorded from this plant.

***Myzus fataunae* Shinji**

Apt. white or whitish green with pale appendages, BL 1.0–1.6 mm. Sec. rhin. in al. III 7–11. Described from *Fatoua* (as *Fatauna*) sp. (Moraceae), but since recorded only from Urticaceae (*Boehmeria*, *Pilea*; Takahashi 1965b, Miyazaki, 1971). In Japan and Korea. Alate males have been collected in October (BMNH colln, leg. M. Sorin). $2n=8$.

***Myzus filicis* A.N. Basu**

Figure 43n

Apt. creamy yellow; BL 1.5–1.7 mm. On underside of fronds of an unidentified fern in W Bengal, India, and also collected on unidentified ferns in Nepal (BMNH colln, leg. K.C. Sharma and R. van den Bosch).

***Myzus formosanus* Takahashi**

Figure 42n

Apt. dark brown to black, with pale ANT and legs, and blackish SIPH and cauda; BL 1.6–1.8 mm. Al. apparently undescribed. On *Polygonum* spp., rolling leaves. In Taiwan and India (W Bengal; David *et al.*, 1972, as *M. leptotrichus*). $2n=12$.

***Myzus godetiae* Shinji**

Apt. pale green; BL c.1.6 mm. Al. have dark dorsal abdominal cross-bands. On *Clarkia amoena* in California, USA. Not recorded since the original description, which is not adequate for inclusion in a key. It could possibly be *M. hemerocallis*, or *Abstrusomyzus valuliae*.

***Myzus hemerocallis* Takahashi**

Apt. pale yellowish green or greenish white; BL 1.6–2.4 mm. Attacking basal parts of young leaves of *Hemerocallis* spp. and *Agapanthus umbellatus*. On plants grown in shade it may form large colonies in the flower-heads. Presumably of east Asian origin, but now widely distributed on *Hemerocallis*. Present distribution is India, Pakistan, China, Taiwan, Korea, Japan, Indonesia, Australia, New Zealand, Kenya (BMNH, coll. V.F. Eastop), S Africa, France (Remaudière and Munos-Viveros, 1992); N, S and C America (BMNH colln). It is not a typical *Myzus*, and possibly would be more correctly placed in the genus *Hyalomyzus*. Life cycle not known. $2n=12^*$ for specimens from China, Kenya and Brazil (R.L. Blackman, unpublished data), but Chen and Zhang (1985a) recorded $2n=8$ from China.

***Myzus (Nectarosiphon) icelandicus* Blackman**

Apt. red–brown; BL 1.5–1.9 mm. Al. with sec. rhin. III 13–17, IV 0–3. Mainly on Caryophyllaceae (*Cerastium*, *Silene*, *Stellaria*) but also in summer it is common on various other plants in Crassulaceae, Cruciferae, Gentianaceae and Polygonaceae. Only in Iceland. Mon. hol. with an abbreviated life cycle, ovip. and apt. males in Jul–Aug, found on *Cerastium* and *Sedum* (Prior and Stroyan, 1960, as *M. polaris*). $2n=10$.

***Myzus indicus* R.C. Basu and Raychaudhuri**

Apt. pale, BL 1.2–1.5 mm. On *Boehmeria* sp. in Meghalaya, India. In most respects the description of this aphid agrees with the polyphagous species *Myzus ornatus*, differing only in the characters given in the key to aphids on *Boehmeria*. Other morphs unknown.

***Myzus isodonis* (Takahashi)**

Apt. yellow, with pale yellow appendages; BL c. 1.2 mm. On *Isodon* sp. in Japan and Korea. Probably this is not a *Myzus*; it could be the secondary host form of a *Tuberocephalus*. *Lehrius papillicaudus* Gredina described from *Elscholtzia* in E Siberia may be a synonym.

***Myzus japonensis* Miyazaki**

Apt. pale yellow to yellowish green or green; BL 1.4–1.9 mm. Sec. rhin. in al. III 17–24, IV 7–12, V 3–7. On undersides of leaves of *Rosa rugosa* in Japan and Korea. Ovip. and al. males in late Oct (Miyazaki, 1968).

***Myzus kalimpongensis* (M.R. Ghosh, R.C. Basu and Raychaudhuri)**

Apt. color in life unrecorded, probably pale; BL 1.5–1.7 mm. On *Artemisia* sp. and *Leonurus sibiricus* (only one of which is likely to be the true host). NE India (W Bengal).

***Myzus kawatabiensis* Miyazaki**

Figure 42j,k

Apt. orange-red to brick-red with black head, SIPH and cauda; BL 1.1–1.3 mm. Sec. rhin. in al. III 12–17, IV 1–5, V 0–1. On *Polygonum thunbergii*, curling margins of leaves. In Japan and possibly E Siberia (as *M. formosanus*; Pashtshenko, 1988a). To judge from paratypes in the BMNH colln, the synonymy of this species with *M. formosanus* Takahashi (Eastop and Hille Ris Lambers, 1976) is incorrect. This species might be a synonym of *M. polygoniyanai* Shinji, described from *P. viscosum*.

***Myzus (Nectarosiphon) lactucicola* Takahashi**

Apt. with dorsum shining brown-black, appendages pale yellow; BL 1.5–1.7 mm. Al. has rhinaria on ANT III–IV or III–V. On undersides of leaves of *Lactuca* spp., *Crepidiastrum lanceolata* and *Youngia japonica* in Japan (Miyazaki, 1971), and on *Ixeridium dentatum* and *Ixeris polycephala* in Korea (Lee *et al.*, 2002c).

***Myzus (Galiobium) langei* (Börner)**

Plate 18i, Figure 29b,c

Apt. somewhat flattened, dull yellowish to pale green, the abdomen tinged anteriorly with rosy red; BL 1.3–1.9 mm. Al. have a large dark dorsal abdominal patch. Imm. are bright rosy red. On *Galium* spp., stunting and deforming new growth so that the foliage becomes bunched like a ‘witches’ broom’ (Stroyan, 1950b). Colonies are visited by ants. In NW, N and C Europe, south to Italy and east to Kazakhstan. Narzikulov distinguished one population on *G. verum* in Kazakhstan as a separate species, *M. (Galiobium) galinarium*.

***Myzus lefroyi* R.C. Basu and Raychaudhuri**

Apt. color in life unrecorded; BL c.1.2–1.4 mm. On an unidentified fern in W Bengal, India. Generic position uncertain; should probably be in *Micromyzus* or *Micromyzella*.

***Myzus (Nectarosiphon) linariae* Holman**

Apt. yellowish green to yellow with somewhat dusky head, ANT, legs and cauda, and SIPH darker at apices; BL 1.6–2.3 mm. On upper parts and inflorescences of *Linaria genistifolia* in Czech and Slovak Republics, Serbia (Petrović, 1998), Hungary, Italy and Turkey. Mon. hol., with ovip. and apt. males in Sept–Oct (orig. descr.).

***Myzus lythri* (Schrank)**

Apt. pale green or yellowish green with pale appendages, often with brownish head and prothorax and reddish posterior abdomen; BL 1.5–2.1 mm. Al. have a large quadrate dark dorsal patch. On leaves and stems of Lythraceae (*Lythrum*) and Onagraceae (*Epilobium*, *Fuschia*) and also sometimes on certain other plants in aquatic situations. Heter. hol., with sexual phase on *Prunus mahaleb*. Shaposhnikov (1964) recorded a form living on *Lythrum* without host alternation. Europe, SW and C Asia, and introduced to N America. Possibly also in Korea, where males of this or a very similar species were attracted in large numbers to pheromone traps (Boo *et al.*, 2000). 2n=12.

***Myzus moriokae* Shinji**

Apt. dark green with black markings on thorax and sides of abdomen, dark SIPH and black cauda; BL c.1 mm. Al. have black transverse bands on dorsal abdomen. On young shoots as well as older leaves of *Boehmeria* spp. in Japan. Not found since orig. descr., and the long hairs make its generic position uncertain (Takahashi, 1965b). Ovip. were included in orig. descr.

***Myzus mushaensis* Takahashi**

Apt. green; BL 1.0–1.1 mm. On *Isodon japonicus* in Japan, Taiwan and Korea. Specimens in BMNH colln from *Scutellaria* sp. at Nainital, India (leg. K. Narayanan) could also be this species, apt. exules of which are similar to those of *M. siegesbeckiae*. Heter. hol. with sexual phase on *Prunus* spp. (Blackman and Eastop, 1994).

***Myzus (Nectarosiphon) myosotidis* Börner**

Apt. yellowish green; BL 1.5–1.9 mm. Al. with sec. rhin. III 9–12, IV 0–4. In rolled leaves of *Myosotis scorpioides* (=palustris). England, Germany, Switzerland. Mon. hol. with ovip. and apt. males in Sept–Oct. For a detailed account see Meier (1954). 2n=12.

***Myzus (Nectarosiphon) ninae* Gredina**

Apt. color in life unrecorded; BL c.0.7 mm? (all measurements possibly miscalculated). On *Artemisia* sp. in E Siberia (Gredina, 1996).

***Myzus obtusirostris* David, Narayanan and Rajasingh**

Apt. shining black with dark appendages; BL 1.2–1.7 mm. On grasses and bamboos in India, Pakistan and Sri Lanka; common on *Zea* in Pakistan (Hamid, 1984). Life cycle unknown; males are al. (BMNH colln, leg. C.I.B.C.). *M. maculocarpus* R.C. Basu and Raychaudhuri, described from an unidentified grass in W Bengal, may be a pale form of this species. 2n=12.

THE APHIDS

Myzus oenotherae Williams

Apt. pea green; BL not recorded. On stem and leaves on *Oenothera biennis* in Nebraska, USA. Possibly a synonym of *M. biennis*.

Myzus ornatus Laing

Plate 18f

Apt. pale yellow or green, marked dorsally with a characteristic pattern of dark green or brownish dots and transverse streaks; BL 1.0–1.7 mm. Living singly on the leaves of host plants in many different plant families including especially Bignoniaceae, Compositae, Labiatae, Polygonaceae, Primulaceae, Rosaceae, and Violaceae. World-wide on cultivated ornamental plants, but although common in India since 1956, there is still only one record from SE Asia (New Guinea). Anhol. everywhere, in colder climates probably overwintering in glasshouses, on pot plants, or in sheltered situations. Ovip. unknown, but the al. male is described from India (Chakrabarti and Raychaudhuri, 1975), and specimens from *Spiraea lindleyana* in the Himalayas (BMNH colln, leg. S. Sekhon) are possibly the primary host forms. See also Blackman and Eastop (2000). 2n=12.

Myzus (Prunomyzus) padellus Hille Ris Lambers and Rogerson

(= *Cyrtomyzus pedicularis* Gredina)

Apt. bright yellow to yellowish-green; BL 1.3–2.3 mm. Al. with a small dark dorsal abdominal patch. On *Galeopsis* (Labiatae), *Pedicularis* and *Rhinanthus* (Scrophulariaceae). Heter. hol. with sexual phase on *Prunus padus* (see Blackman and Eastop, 1994, and Kloft, 1954). Europe (England, Norway, Sweden, Finland, Austria, Switzerland, Russia), W and E Siberia, N Korea.

Myzus (Nectarosiphon) persicae (Sulzer)

Plate 18h

Apt. whitish green, pale yellow–green, gray–green, mid-green, pink, red or almost black, rather uniformly colored, not shiny; BL 1.2–2.1 mm. Sec. rhin. in al. III 7–14, IV 0. Imm. al. are often pink or red, especially in autumn populations. Extremely polyphagous on herbaceous plants in over 40 different plant families. Probably of E Asian origin, now world-wide. Heter. hol. in cold climates, with sexual phase mostly on *Prunus persica*. Partially anhol. in milder climates, and exclusively so in tropics or in absence of primary host. Populations colonising tobacco are distinguished as a subspecies, *M. persicae* ssp. *nicotianae* (Blackman and Eastop, in press). See also Blackman and Eastop (2000). 2n=12 (incl. ssp. *nicotianae*).

Myzus philadelphi Takahashi

Apt. yellow in life with a pattern of dark green dorsal transverse stripes (which disappears in preserved material), dark ANT, legs and SIPH, and a pale cauda; BL 2.2–2.6 mm. Collected on *Philadelphus satsumi* and *Deutzia crenata* in spring in Japan, and on *Hydrangea macrophylla* form *otaksa* in Korea (Paik, 1972). Miyazaki (1971) described the fundatrix.

Myzus pileae Takahashi

Apt. pale yellowish green; BL c.1.4–1.5 mm. Sec. rhin. in al. III 19–23, IV 2–5. On *Pilea hamaoi* in Japan.

Myzus (Nectarosiphon) polaris Hille Ris Lambers

Apt. color in life unrecorded, probably reddish; BL 1.8–2.1 mm. Sec. rhin. in al. III 12–18, IV 1–4. On *Cerastium alpinum* in Greenland and NE Canada (N Québec, Baffin I). Mon. hol. with an abbreviated cycle, ovip. and apt. males in July–Aug.

Myzus siegesbeckiae Takahashi

Figure 48e

Apt. on summer hosts yellow or whitish, with pale appendages; BL 0.8–1.1 mm. Described from *Sigesbeckia glabrescens* (?), but there was some uncertainty about this (Takahashi, 1965b), and the true secondary hosts are Labiatae (*Plectranthus*, *Isodon*, *Salvia*). Heter. hol., with sexual phase on *Prunus* spp. (wild cherries), where spring populations are of much darker aphids (Blackman and Eastop, 1994, as *Myzus yamatonis*). Japan, Taiwan, China, Korea and India (Simla; BMNH colln, leg. S. Chakrabarti).

***Myzus siegesbeckicola* Strand**

Figure 15d,e

Apt. pale to dark green, BL 1.2–1.5 mm. Al. have paired dark spinopleural sclerites on abdominal tergites 4 and 5 (Basu and Raychaudhuri, 1976a, and BMNH colln, leg. M. Miyazaki). On *Sigesbeckia* spp., and also recorded from other Compositae (*Artemisia*, *Aster*, *Chromolaena*, *Montanoa*), in Asia (Taiwan, Sumatra, Japan, Korea, E Siberia, India). Possibly this species would be more correctly placed in *Tuberocephalus*.

***Myzus sorbi* Bhattacharya and Chakrabarti**

Apt. yellowish; BL 1.6–1.9 mm. On undersides of leaves of *Sorbaria tomentosa* at above 2000 m in W Himalaya, India. Feeding causes leaves to curl at margins, and heavy infestations cause twisting, shrinking and yellowing of leaves. Mon. hol., with ovip. and al. males in Oct–Nov (Medda and Chakrabarti, 1987). 2n=12.

***Myzus (Nectarosiphon) stellariae* (Strand)**

Apt. green; BL 1.6–2.0 mm. On *Stellaria aquatica* and *Stellaria* sp. in Taiwan and Japan, and al. have been trapped in Korea (BMNH colln). Takahashi (1965b) provided a redescription.

***Myzus (Nectarosiphon) titschaki* (Börner)**

Apt. color unrecorded; BL c.1.8 mm. Described from specimens sieved from grass, sedge or rush tussocks, but subsequently collected from *Stellaria holostea* (BMNH colln, leg. D. Hille Ris Lambers), which is a more probable host. Only known from Poland.

***Myzus varians* Davidson**

Plate 18g

Apt. pale green to green, with distal halves of siphunculi conspicuously black; BL 1.7–2.3 mm. On *Clematis* spp. E Asia (China, Japan, Korea, Thailand), introduced to N America (pre-1912) and Europe (about 1947). Spring colonies on *Prunus persica* roll the young leaves longitudinally. Heter. hol. with sexual phase on *P. persica* (see Blackman and Eastop, 2000). N American populations seem to be anhol. on *Clematis*. 2n=12.

***Nasonovia* Mordvilko**

Aphidinae: Macrosiphini

About 45 species with enlarged spiracular openings, cylindrical SIPH, and apt. with sensoria on ANT III. About two-thirds of the species are nearctic; nearly half are associated with the related families Saxifragaceae and Grossulariaceae, host-alternating species having *Ribes* as primary hosts. The old world subgenus *Nasonovia s.str.* is largely associated with Compositae and particularly *Hieracium*. There are species on Ranunculaceae in both old and new worlds and species groups on Polemoniaceae and Scrophulariaceae in N America. Heie (1979) revised the world fauna, and Heie (1994) reviewed the species in Fennoscandia and Denmark. Kadyrbekov (1995b) reviewed the species in Kazakhstan, and synonymised subgen. *Eokakimia* Heie with subgen. *Aconitaphis* Ivanoskaya.

***Nasonovia (Aconitaphis) alativica* Kadyrbekov**

Figure 6g

Apt. dingy green or pale brown, with red eyes, ANT and legs dingy yellow with apices of segments dark brown, SIPH and cauda dark brown; BL 2.5–3.2 mm. On flowers and flower stems of *Aconitum* spp., often forming large colonies, in Kazakhstan (Kadyrbekov, 1995b).

***Nasonovia (Kakimia) alpina* (Gillette and Palmer)**

Apt. pale green, sometimes with dark intersegmental markings; BL 2.1–2.5 mm. On Scrophulariaceae (*Mimulus*, *Orthocarpus*, *Pedicularis*) in western N America. Al. vivip. and males are produced in late Aug, suggesting host alternation, but attempted transfers to *Ribes* were unsuccessful (Gillette and Palmer, 1934). Heie (1979) suggested that it might be a mid- to late summer form of *N. cynosbati*. 2n=10.

***Nasonovia (Ranakimia) altaensis* Stenseth**

Apt. pale green; BL 2.4–2.9 mm. Al. with dusky to dark dorsal abdominal markings. On *Thalictrum simplex* ssp. *borealis* (= *rariflorum*) in N Norway and N Finland. Mon. hol. with ovip. and al. males in Jul–Aug (Heikinheimo, 1991).

THE APHIDS

Nasonovia (Kakimia) aquilegiae (Essig)

Apt. pale or with a dark dorsal patch; BL 1.6–3.0 mm. On *Aquilegia* spp., widely distributed in N America. Mon. hol. with ovip. and al. males in Oct–Nov. Heie (1979) discussed the variable pigmentation, and Heie (1987) described geographical variation. $2n=10$.

Nasonovia (Kakimia) arizonensis Heie

Color of apt. when alive unknown, imm. dirty greenish; BL 1.9–2.4 mm. On an uncultivated *Ribes* sp. in Arizona, USA, curling and spotting leaves. Small specimens (BL 1.3–1.75 mm) from *R. cereum*, Utah, vii.1965, BMNH colln leg. G.F. Knowlton, are probably this species.

Nasonovia (Kakimia) borealis Heie

Apt. color in life unknown, probably pale yellowish with ANT and tips of leg segments and SIPH dark; BL 1.9–2.9 mm. On *Heuchera richardsonii* in Canada (Manitoba, Ontario).

Nasonovia (Kakimia) brachycyclica Holman

Apt. bright green or pinkish, with shining brown–black dorsal sclerotisation; BL 2.2–3.0 mm. Al. mainly dark brown to black. On *Ribes uva-crispa* in Europe (Czech Republic, France, Germany). Mon. hol., with an abbreviated life cycle, ovip. and al. males being produced in early June (orig. descr.).

Nasonovia (Kakimia) brevipes (Börner)

Apt. probably pale brown; BL c.1.8 mm. Börner (orig. descr.) believed that the host was *Hieracium*, which would be unusual for a *Kakimia*, and requires confirmation. We have included it in the key to apterae on *Saxifraga*, as this is a more likely host in the type locality (Heie, 1979). Described from Austrian Alps, and an al. vivip. trapped in the Netherlands is possibly this species (Heie, 1994).

Nasonovia (Kakimia) carolinensis Heie

Apt. greenish, dirty yellow, or slightly brownish; BL 1.8–2.5 mm. On *Saxifraga leucanthemifolia* (= *michauxii*) in eastern USA (Appalachian mts, N Carolina). Probably mon. hol.; ovip. in late Sept (orig. descr.).

Nasonovia (Kakimia) castelleiae (Sampson)

Color of apt. unrecorded; BL 1.9–2.5 mm. On *Castilleja* spp. in western USA (California, Oregon) and Canada (Alberta, B.C., Manitoba). Ovip. and al. males in Aug–Sept (Heie, 1979).

Nasonovia (Kakimia) collomiaae Palmer

Apt. pale yellowish; BL 1.2–2.2 mm. On leaves of *Collomia linearis* in Colorado and Utah, USA. Ovip. and al. males in Oct–Nov (Palmer, 1952).

Nasonovia compositellae Theobald

Apt. shining black dorsally; BL 1.6–2.5 (ssp. *iberica* 2.3–3.1) mm. On *Hieracium* spp. in Europe, feeding (ssp. *nigra*) in spring on the upper sides of the leaves which fold upwards to enclose the colonies, later feeding on stems and inflorescences. Currently regarded as including three subspecies: (1) *N. compositellae* ssp. *compositellae* occurs in NW Europe and Iceland and is mon. hol. with ovip. and apt. males in Aug–Sept (Prior and Stroyan, 1960); (2) *N. compositellae* ssp. *nigra* (Hille Ris Lambers) is widely distributed in Europe, reproducing parthenogenetically throughout the year in UK, sexual morphs only having been recorded from the Alps (Prior and Stroyan, 1960); (3) *N. compositella* ssp. *iberica* Heie in Spain (host plant probably *Hieracium* sp.). $2n=11$ heterozygous* for ssp. *nigra* (one UK sample).

Nasonovia (Capitosiphon) crenicornia Smith and Knowlton

Figure 30b

Apt. light green with faint dark spinal stripe; BL 3.5–5.1 mm. On *Geranium richardsoni* and *Geranium* sp. in western USA (Palmer, 1952; as *Macrosiphum crenicornum*). Mon. hol., with ovip. and al. males in Jul–Aug.

Nasonovia (Kakimia) cynosbati (Oestlund)

Plate 21i

Apt. pale green, usually with dark tips to ANT segments and SIPH; BL 1.8–3.0 mm. Al. have very variable dorsal abdominal pigmentation; pale green or (esp. in more northerly populations) with variably developed

cross-bands or a *Myzus*-like patch. On wild and cultivated *Ribes* spp., and also recorded from *Heuchera* (Heie, 1979, 1980a). Widely distributed in N America. Mon. hol., with ovip. and al. males in Sept–Oct. *N. (K.) suguri* Shinji is possibly this species. $2n=10$.

***Nasonovia (Kakimia) dasyphylli* Stroyan**

Apt. pale green to yellowish green, sometimes tinged with red, and with a variably developed black dorsal abdominal patch; BL 1.3–3.0 mm. On Crassulaceae (*Sedum*, *Aichryson*, *Sempervivum*) and Saxifragaceae (*Saxifraga*). Europe, south to Spain, Italy (Barbagallo and Patti, 1998) and Canary Islands (BMNH colln, on *Aichryson dichotomum*, leg. K.W.R. Zwart), and eastward to Caucasus. Mon. hol. in E Europe with apt. males, but apparently anhol. in UK. Heie (1979) compared populations from different parts of Europe. $2n=12^*$ (heterozygous; one sample from UK, coll. J.H. Martin).

***Nasonovia (Kakimia) davidsoni* Heie**

Apt. dark reddish brown with extensive dark dorsal sclerotisation and dark appendages; BL c.2.0–2.1 mm. On flowerstalks of *Heuchera* spp. in W California. Mon. hol., with an abbreviated life cycle, producing ovip. and al. males as early as May (Davidson, 1915; as *Macrosiphum heucherae*).

***Nasonovia (Kakimia) dzhetisuensis* Kadyrbekov**

Apt. green; BL c.2.8–2.9 mm. On *Polemonium caucasicum*, feeding singly on stems. In Kazakhstan. Mon. hol., with ovip. and al. males in early Aug (Kadyrbekov, 1995b).

***Nasonovia (Kakimia) grossa* Heie**

Apt. with an extensive dark dorsal abdominal patch and black SIPH; BL 2.9–3.2 mm. On *Ribes* spp. in the Rocky Mountain region, USA.

***Nasonovia (Ranakimia) heiei* Kadyrbekov**

Body color of apt. unrecorded but probably dark, shiny, with red eyes, and appendages pale green darker at apices; BL 1.8–2.9 mm. On *Aquilegia* spp. in Kazakhstan, feeding on stems below flower heads, and also once collected from *Delphinium elatum* (Kadyrbekov, 1995b).

***Nasonovia (Kakimia) heucherae* (Thomas)**

Apt. tan to light brown with variable dorsal sclerotisation, and appendages mainly dusky to dark brown; BL 1.8–2.4 mm. On *Heuchera* spp. in USA east of Rocky Mountains. Mon. hol., with an abbreviated life cycle, producing ovip. and al. males in May–June (Heie, 1979). *N. davidsoni* in California is closely related.

***Nasonovia (Kakimia) hottesi* Heie**

Apt. unknown; BL of al. 2.5–3.2 mm. Only known from al. collected from *Polemonium* sp. (probably the true host; Heie, 1979) and *Antirrhinum* sp. In Illinois, USA.

***Nasonovia (Kakimia) houghtonensis* (Troop)**

Apt. pale yellow–green to straw-yellow; BL 1.5–2.9 mm. Al. have a pale abdomen with no dorsal markings. The species seems to be a complex of races or subspecies mon. hol. on *Ribes* spp. in N America, partly separated by geographical, life cycle and/or host plant differences, with intermediate forms sometimes occurring (Heie, 1979). *N. houghtonensis* ssp. *cerei* (Gillette and Palmer) is the most hairy and has the longest SIPH, and may be the ancestral form for the group; it occurs in the Rocky Mountain region and produces al. males and ovip. in Jul–Sept. *N. houghtonensis* ssp. *russellae* Heie is also in the Rocky Mountain region, preferring different *Ribes* spp., with ovip. and al. males in Jul–Aug. *N. houghtonensis* s. str. attacks the Houghton variety of *R. uva-crispa*, is widely distributed in N America and has apt. males, producing its sexual morphs in Sept–Oct. *N. houghtonensis* ssp. *occidentalis* Heie occurs in north-western USA (life cycle is unknown), and *N. houghtonensis* ssp. *similis* Heie occurs widely in Canada, producing ovip and apt. males in Aug–Oct.

***Nasonovia jammuensis* Verma**

Apt. pale brown with darker brown head and thorax; BL 2.1–3.2 mm. On undersides of leaves of *Delphinium* spp. in NW India (Heie, 1979). $2n=12$ (Dutta and Gautam, 1993).

THE APHIDS

Nasonovia (Kakimia) muesbecki Knowlton and Allen

Apt. color in life unknown, probably pale with dusky markings; BL 2.4–2.8 mm. On *Ribes sanguineum* in western USA (California, Oregon, Washington). Apparently heter. hol., migrating in May–June to an unknown sec. host, probably a species of Polemoniaceae, as it is closely related to *N. takala* (Heie, 1979). Very similar aphids on *Polemonium foliosissimum* in Utah have been described as a subspecies, *N. (K.) muesbecki ssp. montana* (Heie, 1987).

Nasonovia nivalis (Börner)

Apt. shining yellow–brown with brown segmental markings or cross-bars; BL 1.7–2.3 mm. On *Hieracium* spp. in Austria. Mon. hol. with ovip. in autumn, males unknown (Heie, 1979).

Nasonovia pilosellae (Börner)

Apt. shining green to black; BL 1.2–2.5 mm. On *Hieracium* spp. living in spring inside upwardly rolled leaves, later moving onto stems and flowers (Hille Ris Lambers, 1949). In Europe. Mon. hol., with ovip. and apt. males in October.

Nasonovia (Kakimia) polemonii (Gillette and Palmer)

Apt. pale to mid green, with distal parts of ANT and legs dark; BL 2.4–c.3.2 mm. On leaves and stems of *Polemonium* spp. in western USA (Colorado, Idaho, Utah).

Nasonovia (Ranakimia) purpurascens (Oestlund)

Apt. green, yellowish green or pale olive-green; BL 2.2–3.3 mm. Al. with dorsal abdomen pale or with indistinct markings. On *Thalictrum* spp. in N America and possibly also on *Aquilegia* sp (Leonard, 1970). Mon. hol. with an abbreviated life cycle (ovip. and al. males in May–June).

Nasonovia (Ranakimia) ranunculi Heie

Apt. rather pale, color unknown; BL c. 2.8–2.9 mm. On *Ranunculus* sp. in Colorado, USA).

Nasonovia (Kakimia) ribifolii (Davidson)

Apt. yellowish green with variable dark markings; BL c.2.0 mm. On *Ribes* spp. in California, curling and blistering leaves (host in original description given as *R. glutinosum*, but corrected to *R. malvaceum* on slide label). Mon. hol., with very abbreviated life cycle; fundatrices adult in March, and ovip. and al. males in May (Heie, 1979).

Nasonovia ribisnigri (Mosley)

Plate 21h

Apt. shiny pale green to apple-green, sometimes reddish, with a dorsal pattern of dark brown markings when on secondary hosts; BL 1.3–2.7 mm. Al. have a conspicuous pattern of black abdominal markings. In small colonies at shoot tips and in curled young leaves of *Ribes* spp. in spring, migrating to various plants in Compositae (*Cichorium*, *Crepis*, *Hieracium*, *Lactuca*, *Lampsana*), Cruciferae (*Sinapis*, *Sisymbrium*), Scrophulariaceae (*Euphrasia*, *Veronica*) and Solanaceae (*Nicotiana*, *Petunia*). It seems more able to colonise plants with sticky hairs than most other aphids. Europe, Middle East, C Asia, N and S America and New Zealand. See also Heie (1979, 1994) and Blackman and Eastop (2000). 2n=12.

Nasonovia rostrata David and Hameed

Color of apt. in life unrecorded, probably rather pale; BL 1.6–2.1 mm. Originally described (both apt. and al.) from *Clerodendron infortunatum*, and there have been subsequent collections from Compositae (*Adenocaulon*, *Conyza*) and Acanthaceae (*Strobilanthes*). Heie (1979) redescribed the aptera. On *Strobilanthes* spp. the aphids infest both undersides of leaves and inflorescences, and produce ovip. and al. males in Oct (Saha and Chakrabarti, 1988a), so these are probably the true hosts. In N India (U.P., H.P.). 2n=12.

Nasonovia (Aconitaphis) salebrosa Ivanoskaya in Ivanoskaya & Ostanin

Apt. shining pale green with dark brown head, ANT, legs, cauda and dorsal markings, red eyes and pale SIPH; BL c.3.7 mm. On *Aconitum excelsum* and *Delphinium elatum* in Siberia (orig. descr.), and also found on *D. elatum* in Kazakhstan (Kadyrbekov, 1995b).

***Nasonovia (Kakimia) sampsoni* Heie**

Apt. pale green, BL 1.8–2.5 mm. Living between the flowers of *Castilleja* spp. in western North America (California, Alberta).

***Nasonovia (Kakimia) saxifragae* (Doncaster and Stroyan)**

Apt. color in life unknown, presumably often very dark dorsally, and with dark appendages; BL c.2.0–2.1. On *Saxifraga* spp. in Greenland, Iceland, Jan Mayen I., Norway (Heikinheimo, 1990) and northern Britain (where a paler form occurs; see Heie, 1987). Mon. hol., with ovip. and apt. males in Aug–Sept (Heie, 1979).

***Nasonovia (Kakimia) smithi* Heie**

Apt. yellow tan, usually brownish or greenish, with extensive dark dorsal sclerotisation and mainly dark appendages; BL 1.3–2.5 mm. On *Heuchera villosa* in western mountains of N Carolina. Mon. hol., with ovip. and al. males in Sept–Oct (orig. descr.).

***Nasonovia (Kakimia) stroyani* Heie**

Color of apt. in life unknown, probably pale yellow or pale green with ANT dark distally, SIPH dusky-dark distally and cauda dusky-dark; BL 2.3–2.8 mm. Al. have dark cross-bands on the dorsal abdomen, fused into a patch on tergites 3–5. On leaves and upper parts of stems of *Tellima grandiflora* and *Boykinia elata* in western USA and Canada. The *Nasonovia* sp. near *cynosbati* observed by Jensen (2000: 451) on *Tolmiea menziesii* and two other species of Saxifragaceae is also presumably this aphid. Life cycle unclear; on *Tolmiea* it may overwinter parthenogenetically (Jensen, 2000), but imm. apt. males have been collected in March (orig. descr.), and there are 5 males in BMNH collected in early June in B.C. (Victoria; leg. E.O. Essig). Previously confused with *N. cynosbati*; Heie (orig. descr.) compared these two closely related species.

***Nasonovia (Kakimia) takala* (Hottes)**

Apt. yellowish green; BL 2.3–2.9 mm. On leaves of *Ipomopsis aggregata* in western USA (California, Colorado, Idaho). Mon. hol., with ovip. and al. males in Sept.

***Nasonovia (Kakimia) tiarellae* Heie**

Apt. unknown. BL of al. 1.7–2.4 mm. On *Heuchera americana* and *Tiarella cordifolia* in N Carolina, USA. Mon. hol., with an abbreviated life cycle, ovip. and al. males in Apr–Jun.

***Nasonovia (Kakimia) vannesii* Stenseth**

Apt. dark green; BL c.3.0–3.1 mm. Al. with black dorsal abdominal patch and cross-bands. On cultivated *Ribes* in Norway, but suspected (Heie, 1979) to be of N American origin, and there are similar specimens from *Ribes divaricatum* in California in BMNH colln (leg. D. Hille Ris Lambers). Probably at least partially heter. hol.; imm. males and an adult al. male provisionally assigned to this species were found by Heikinheimo (1990) on *Saxifraga groenlandica* in Finland in late Aug.

***Nasonovia (Kakimia) vockerothi* (Richards)**

Apt. pale, color not recorded; BL 2.1–2.7 mm. Al. with dark dorsal cross-bands, partially fused. On *Saxifraga tricuspidata* in NE Canada.

***Nasonovia (Aconitaphis) wahinkae* (Hottes)**

Figure 6d,e,f

Apt. shining green–bronze to dark green; BL 2.3–3.6 mm. On *Aconitum columbianum* and *Delphinium occidentale* in western USA (Rocky Mountain region). Mon. hol.; ovip. and al. males on *D. occidentale* in Aug–Sept in Utah (Heie, 1979). Populations on cultivated *Delphinium* in Canada (Manitoba) and Alaska differ in chaetotaxy and rhinarial number, and are regarded by Heie (1979) as a subspecies, *N. (A.) wahinkae* ssp. *robinsoni* (Richards).

***Nasonovia werderi* Lampel**

Color of apt. unknown, BL 2.3–2.4 mm. On *Aquilegia alpina* in Switzerland, feeding on flower stems and inflorescences in July.

THE APHIDS

Nasonovia williamsi (Smith and Parron)

Apt. shining yellowish green to amber–yellow; BL 1.5–2.3 mm. On undersides of leaves of *Potentilla* spp., causing leaf-curl. In western USA (California, Idaho, Utah, Oregon, Nebraska) and Canada (Nebraska, Manitoba).

Nearctaphis Shaposhnikov

Aphidinae: Macrosiphini

About 12 North American species with short, imbricated siphunculi and a rather short cauda, alternating from Pomoidea mostly to Leguminosae and Scrophulariaceae. Hille Ris Lambers (1970a) revised the genus, and Robinson (1984) provided a key to species. See also Blackman and Eastop (1994).

Nearctaphis argentinaeradicis Gillette and Palmer

Apt. pale; BL 1.4–1.7 mm. On roots of *Potentilla anserina* in Colorado, USA. Mon. hol., with ovip. in late Aug (Palmer, 1952). Hille Ris Lambers (1974) redescribed this species.

Nearctaphis bakeri (Cowen)

Plate 9e, Figure 40i

Apt. dark green to salmon pink with variably developed dorsal dark spots or patches; BL 1.1–2.4 mm. On various Leguminosae (e.g., *Medicago*, *Melilotus*, *Trifolium*, *Trigonella*), and sometimes on plants in other families (*Capsella*, *Castilleja*, *Valeriana*, *Veronica*). A principal pest of *Trifolium pratense* (Blackman and Eastop, 2000). Native to N America, now also in S America, S Europe, Middle East, C Asia, India and Japan. Heter. hol. in N America with sexual phase on Pomoidea (Blackman and Eastop, 1994). $2n=12$.

Nearctaphis californica Hille Ris Lambers

Apt. color in life unknown, probably dark; BL 2.2–2.9 mm. On *Melilotus albus* and ‘either *Trifolium* or *Medicago*’, in California, USA, and probably migrating from *Sorbus* as primary host, if specimens in the BMNH colln from B.C., Canada are indeed the same species (Blackman and Eastop, 1994: 771). $2n=12$.

Nearctaphis crataegifoliae (Fitch)

Apt. olive–yellow or pink to brilliant red; BL 1.7–2.3 mm. On stem bases, runners and roots of Leguminosae (*Trifolium*, *Melilotus*, *Lathyrus*). Heter. hol., with sexual phase on Rosaceae (*Crataegus*, *Cydonia*). In central and eastern N America. Aphids with a similar biology in western USA (California, Colorado, Utah) have much darker pigmentation of head, posterior abdomen and SIPH, and were described as a subspecies, *N. crataegifoliae* ssp. *occidentalis* Hille Ris Lambers.

Nearctaphis hottesi Hille Ris Lambers

Apt. grayish green with a very irregular dorsal abdominal pattern of ‘twisted lines in olive to reddish brown’; BL c.1.4–1.8 mm. In flower heads of *Castilleja linariaefoliae* in Colorado, USA. Probably migrating to an unknown primary host; alate males were collected on *Castilleja* in September.

Nearctaphis kachena (Hottes)

Apt. dark green, mottled with dark brownish black, with yellowish green SIPH; BL 1.5–2.0 mm. In flower-heads of *Castilleja* spp. in western USA.

Nearctaphis nigrescens Hille Ris Lambers

Apt. color in life unknown, probably dark green to black; BL c.2.7–2.8 mm. On *Melilotus albus* in Utah, USA. The primary host is possibly *Crataegus* sp. Described as a subspecies of *N. californica*, but the differences appear to warrant full species status.

Nearctaphis sclerosa (Richards)

Apt. dark brown; BL c.2 mm. On *Lathyrus* spp. (*nevadensis*, *nutalli*) in western N America (B.C., Colorado). Apparently heter. hol. with an early return to the primary host, *Crataegus douglasii* (orig. descr., as *Roepkea sclerosa*).

Nearctaphis (Amelanchieria) sensoriata (Gillette and Bragg)

Apt. color on secondary host unrecorded; BL c.2 mm. Recorded from *Medicago hispida*, a non-indigenous plant, in California (Hille Ris Lambers, 1970a). Sexual phase occurs on *Amelanchier* (Hille Ris Lambers,

1970a); probably heter. hol., with unknown native Leguminosae as secondary hosts, but confirmation is needed as populations persist into summer on *Amelanchier*. Western USA.

Nearctaphis vera (Shaposhnikov)

Apt. undescribed; al. dirty green, BL c.2.7 mm. Sec. rhin. in al. III 42–44, IV 25–27, V 10–13. On *Oxytropis sordida* in N Russia (Khibiny mts, Kola peninsula; Heie, 1992, as *Mamontova vera*) and Finland (Heie, 1995).

Nearctaphis yohoensis Bradley

Apt. dark brown; BL 1.7–2.2 mm. Most commonly recorded from *Sorbus* (Blackman and Eastop, 1994), but collected on *Cotoneaster acutifolia* in early July in Alaska, and at the same time on *Pedicularis* sp. (Robinson, 1984). It is unclear whether host alternation was occurring between *Cotoneaster* and *Pedicularis*, or whether both were acting as secondary (or accidental) hosts.

Nearctaphis zabapsis (Richards)

Apt. color in life unobserved, probably dark; BL c.1.5 mm. On roots of *Trifolium* sp. in Colorado, USA.

Neoamphorophora Mason

Aphidinae: Macrosiphini

Two species with clavate SIPH related to *Wahlgreniella* but with shorter ANT with a shorter PT, and no rhinaria on ANT III of apt. (A similar undescribed species from *Rhododendron* in Turkey has apt. with sec. rhin. distributed distally on ANT III and spiculose tarsi, and probably requires the creation of a new genus.)

Neoamphorophora kalmiae Mason

Apt. pale green with pale appendages and variably developed, ill-defined, dark brown to black dorsal pigmentation; BL 1.6–2.1 mm. Imm. are pale and slightly waxy. Al. have paired dark sclerites on ABD TERG 3 and 4, and sometimes on other tergites. On *Kalmia angustifolia* in north-eastern USA and E Canada. Mon. hol., with ovip. and al. males in Sept (MacGillivray, 1967).

Neoamphorophora ledi (Wahlgren)

Apt. green or brownish pink, SIPH dark brown with paler bases; BL 1.8–2.5 mm. On *Rhododendron* (= *Ledum*) *palustre* in N Europe. Mon. hol. with al. males (Heie, 1995).

Neoantalus Remaudière

Pterastheniinae

Two species differing from *Pterasthenia* in absence of wax glands and marginal abdominal processes, and al. have sec. rhin. on ANT III–V (Remaudière and Autrique, 1985).

Neoantalus aeshynomenidis (van Harten and Ilharco)

Apt. green; BL 1.25–1.7 mm. In small numbers on growing tips of *Aeschynomene dimidiata* in Angola. Very close to *N. humulariae* and possibly a synonym (Remaudière and Autrique, 1985).

Neoantalus humulariae (van Harten and Ilharco)

Apt. bright yellow to dark green; BL 1.5–1.9 mm. On undersides of leaves and sometimes on flowers of *Humularia welwitschii* in Angola. Al. have also been trapped in Burundi (Remaudière and Autrique, 1985). Partially mon. hol., with ovip. and al. males collected along with apt. and al. vivip. in early July (orig. descr.).

Neobacillaphis Huculak

Saltusaphidinae

Two species related to *Subsaltusaphis* but shorter bodied, and with spinopleural and marginal sclerites of anterior abdominal tergites distinctly separated.

Neobacillaphis striata (Bozhko)

Apt. orange with a pair of broad brown longitudinal pleural stripes; BL c.1.4 mm. On *Carex distans* in S Russia (Ciscaucasia).

THE APHIDS

Neobacillaphis szelegiewiczzi Huculak

Plate 4f

Apt. brown with darker pleural and marginal longitudinal bands; BL 2.2–2.6 mm. Al. have 9–13 rhinaria on ANT III. On *Carex* spp. in N Poland.

Neomyzus van der Goot

Aphidinae: Macrosiphini

About 9 Asian species with distinctive black dorsal markings, previously placed as a subgenus of *Aulacorthum*, but differing in several morphological features (shape of head, hairs on R IV+V, imm. with spinulose hind tibiae) that place them closer to the *Myzus* group of genera.

Neomyzus circumflexus (Buckton)

Plate 19c

Apt. nearly white or pale yellow to bright green, with distinctive sclerotic dorsal markings, consisting of transverse bands or paired patches on the thorax and a large, roughly U-shaped, patch on the abdomen; BL 1.2–2.6 mm. Extremely polyphagous, feeding on numerous species of both monocots and dicots, and even ferns and conifers. In temperate climates found especially in glasshouses and on house plants (e.g., *Cineraria*, *Cyclamen*, *Fuschia*, *Zantedeschia*). Virtually world-wide, presumably due to transportation by man. Origin unknown, but E Asia seems most likely. Apparently entirely anhol.; sexual morphs have not been recorded. See also Blackman and Eastop (2000). $2n=8$ (except one record of $2n=10$; Kar and Khuda-Bukhsh, 1986).

Neomyzus codonopsis (Miyazaki)

Apt. greenish white with black markings (see Takahashi, 1965a, as *Aulacorthum taiwanum*); BL 1.6–2.3 mm. Occurring singly on leaves of *Codonopsis lanceolata* in Japan. Al. undescribed. Formerly placed as a subspecies of *taiwanus*. $2n=36$.

Neomyzus dendrobii (A.N. Basu)

Figure 25d

Apt. creamy yellow, ornamented with a pattern of brown to purplish brown segmental markings; BL 1.6–2.4 mm. On young stems of *Dendrobium* sp. in W Bengal, India. Anhol.

Neomyzus dicentrae (A.N. Basu)

Apt. pale yellowish with brown dorsal markings; BL 1.6–2.5 mm. Al. have a large dark dorsal abdominal central patch. Forming colonies on undersides of leaves of *Dicentra thalictifolia* in NE India (W Bengal).

Neomyzus parthenocissi (Takahashi)

Apt. color in life unrecorded; BL 1.0–1.3 mm. Described from *Parthenocissus tricuspidata* (Vitaceae), and also collected on *Schizophragma hydrangeoides* (Hydrangeaceae; BMNH colln, leg. R.L. Blackman). Only known from Japan. $2n=12$.

Neomyzus primulus (A.K. Ghosh, Banerjee and Raychaudhuri)

Apt. white with black dorsal markings; BL 1.6–1.8 mm. On *Primula* sp. in Sikkim, India.

Neomyzus strobilantheae (L.K. Ghosh)

Apt. color in life unrecorded; BL 2.1–2.4 mm. On young shoots of *Strobilanthes atropurpureus* in H.P., India. Generic placement is uncertain.

Neomyzus taiwanus (Takahashi)

Apt. white with black dorsal markings; BL c. 2.3 mm. On *Codonopsis javanica* (ssp. *japonica*) in Taiwan (Tao, 1963). Al. are unknown.

Neomyzus zhangjianjiensis Zhang

Apt. pale red with black dorsal markings; BL c. 2.6 mm. On *Sonchus* sp. in Hunan prov., China. Described as a subspecies of *N. circumflexus*.

Neoprociphilus Patch

Eriosomatinae: Pemphigini

One large nearctic aphid with host alternation between *Acer* and *Smilax*.

***Neoprociphilus aceris* (Monell)**

Apt. pale brown to purplish, producing varying amounts of wax wool, which forms a tuft at end of abdomen; BL 3.7–4.5 mm. On stems and leaves of *Smilax* spp. in N America. Heter. hol. with sexual phase on *Acer saccharum* in eastern USA (Blackman and Eastop, 1994), but outside the range of *A. saccharum* overwintering can occur as close-knit clusters of first instars in leaf litter, even in cold winter conditions. In spring these first instars may climb plants and be dispersed by wind, with wax filaments acting as sails (Lee and Robinson, 1978). $2n=14$.

***Neorhopalomyzus* Tao**

Aphidinae: Macrosiphini

Two E Asian *Myzus*-like species with a sexual phase on *Lonicera*.

***Neorhopalomyzus lonicericola* (Takahashi)**

Apt. (fundatrix) dirty yellow, with black-tipped SIPH; BL 2.7–3.5 mm. On *Lonicera* spp., feeding on undersides of leaves, which turn yellow and spotted with purple, but are not curled (Hori, 1938, as *Amphorophora lonicericola*). All progeny of fund. are al., with sec. rhin. (8–14) on ANT III only, migrating to an unknown secondary host. Ovip. and al. males occur in late Sept–Oct. In China, Japan, Korea (Lee *et al.*, 2002c) and E Siberia. Presumed gynoparae from Korea have sec. rhin III 34–58, IV 19–34, V 0–12 (BMNH, leg. V. F. Eastop.).

***Neorhopalomyzus lonicerisuctus* Zhang, Zhang and Zhong**

Apt. (fund.) dark brown, dusted with white wax powder; BL c.2.6 mm. On *Lonicera* spp. in China.

***Neosaltusaphis* Hille Ris Lambers**

Saltusaphidinae

A single species related to *Subsaltusaphis*, but with the posterior corners of ABD TERG 7 and the anterior corners of the pronotum developed into processi, and the dorsal hairs minute and spatulate.

***Neosaltusaphis bodenheimeri* Hille Ris Lambers**

Figure 20a

Apt. straw-colored, with ANT black on distal halves; BL c.2.3 mm. Al. unknown. Host unknown, 'presumably a *Carex* species' according to orig. descr., although swept from a wet meadow which included other Cyperaceae.

***Neosappaphis* Hille Ris Lambers**

Aphidinae: Macrosiphini

Two species resembling *Anuraphis* but with smooth SIPH (flangeless in the type species) and 4- or 5-segmented ANT.

***Neosappaphis franzi* Hille Ris Lambers**

Apt. appearance in life unknown; BL 1.6–1.95 mm. Apt. with sec. rhin. III 2–3, IV 11–24 (also present in imm.), al. unknown. Sieved from a meadow in which *Armeria* (presumably *maritima*) was the dominant plant, on Illas Cies I., NW Spain. Al. unknown.

***Neosappaphis paradoxa* (Mamontova-Solukha)**

Apt. pale greenish; BL c.1.9 mm. On roots of *Sisymbrium polymorpha* in Ukraine.

***Neothelaxes* Chakrabarti and Quednau**

Thelaxinae

Two species on *Parthenocissus* in N India, related to *Thelaxes* but with dorsal body hairs arranged in single rows, and differences in the form of R IV+V and in embryonic chaetotaxy (Chakrabarti and Quednau, 1996).

***Neothelaxes parthenocissi* Chakrabarti and Quednau**

Appearance in life unknown; BL of al. 1.0–1.5 mm. On *Parthenocissus semicordata* in N India (U.P.). Mon. hol.; ovip. were collected in Oct.

***Neothelaxes viticola* Chakrabarti and Quednau**

Appearance in life unknown; BL of al. 1.6–2.2 mm. On *Parthenocissus semicordata* in N India (U.P.).

***Neotoxoptera* Theobald**

Aphidinae: Macrosiphini

A genus for 5–6 *Myzus*-like aphids with clavate SIPH and dark-bordered wing-veins, probably of oriental origin. Three species are now widespread and seem to be entirely anholocyclic, but two in E Asia host-alternate with Caprifoliaceae as primary hosts, as in the somewhat similar genus *Rhopalomyzus*. Accounts are available for Australia (Carver, 1980), Japan (Miyazaki, 1971; Sorin, 1971) and Korea (Lee *et al.*, 2002c).

***Neotoxoptera abeliae* Takahashi**

Apt. (fund.) green; BL c.2 mm. Al. have black head, thorax, ANT and SIPH, and broadly banded wing veins. On Caprifoliaceae (*Abelia*, *Lonicera*) in spring, apparently migrating in the second generation to an unknown secondary host. Pashtshenko (1988a) recorded ovip. from *Weigela praecox*, but these may have been *N. weigeliae* (q.v.). The type specimens were collected from *Abelia spathulata*; the host was erroneously given as *Deutzia gracilis* in orig. descr. Japan, Korea and E Siberia.

***Neotoxoptera formosana* (Takahashi)**

Apt. shining magenta-red to almost black; BL 1.6–2.3 mm. Al. very dark red to black with wing-veins heavily black-bordered, the borders being of rather constant width along the lengths of the veins. On leaves of *Allium* spp., or on bulbs in store. In E and SE Asia, Australia, New Zealand, Hawaii, Brazil, N America, St Helena, and recently found in NW Europe; on onion sets imported into Finland from the Netherlands in 1994 (BMNH colln), and in 1999–2000 on onions in UK (BMNH colln, leg. R. Hammon). Apparently completely anhol. everywhere. Hori and Komatsu (1997) studied repellency of rosemary oil and its components to this aphid. 2n=12.

***Neotoxoptera oliveri* (Essig)**

Plate 19d, Figure 59b

Apt. dark-red to almost black; BL 1.1–2.0 mm. Al. with wing veins heavily black-bordered, the borders widening out at base and apex of each vein. Host range is remarkably similar to that of *Myzus ascalonicus*; most commonly on certain Alliaceae (*Allium*), Caryophyllaceae (*Stellaria*) and Violaceae (*Viola*), but also recorded from plants in several other families. In Portugal, Africa, Pakistan, Korea, Australia, New Zealand, western USA, Mexico, Panama, Bermuda and Brazil. Apparently anhol. everywhere; Naumann-Etienne and Remaudière (1995) recorded a single male from Pakistan. It was not possible to distinguish *N. sungkanensis* Hsu from *N. oliveri* on the basis of the published description.

***Neotoxoptera violae* (Pergande)**

Figure 59a

Apt. purplish or dark wine-red; BL 1.0–1.7 mm. Al. are dark wine-red with broadly banded wing-veins. On undersides of leaves of *Viola* spp. In N and S America, Hawaii, Australia, New Zealand, China, Taiwan and Korea. African records are all referable to *N. oliveri*. No sexual morphs known. 2n=12 (this record was erroneously attributed to *N. oliveri* in Blackman and Eastop, 2000).

***Neotoxoptera weigeliae* Lee and Seo**

Figure 61d

Apt. (fund.?) greenish; BL 1.0–1.3 mm. Al. dark brown with large black dorsal abdominal patch and forewings with dark pterostigma (cf. *Micromyzus diervillae*) and diffusely bordered veins. On *Weigela* spp. in Korea, Japan, and possibly E Siberia (Pashtshenko, 1988a, as ovip. of *N. abeliae*). Heter. hol., probably migrating in the second generation to an unknown secondary host.

***Neotoxoptera yasumatsui* Sorin**

Apt. reddish to deep brown; BL c.1.4–1.5 mm. Al. blackish brown with a large central dorsal abdominal patch and broadly banded wing-veins. On *Boltonia lautureana* (as *Aster lautureanus*) in Japan, forming small colonies that distort apical parts of subterranean stems and young leaves at or just below ground level (orig. descr.). Heter. hol.; migration to the primary host *Weigela praecox* is recorded in E Siberia (Pashtshenko, 1988a). Apt. collected on *Artemisia vulgaris* var. *indica* in Japan were described as a subspecies, *N. yasumatsui artemisiae* Sorin (2001).

***Nevadaphis* Drews**

Aphidinae: Aphidini

One little-known species in N America related to *Aphis*, with greatly reduced SIPH and cauda.

***Nevadaphis sampsoni* Drews**

Apt. dirty yellow to reddish brown, often mottled; BL c.1.9 mm. In colonies on roots of *Seriphidium tridentatum*, sometimes ant-attended, in USA (Nevada, California). Other morphs are unknown.

***Nevskyella* Ossiannilsson**

Saltusaphidinae

Three species closely related to *Iziphya*, but with accessory rhinaria on ANT VI placed close to the primary rhinarium, no modification of the basal dorsal hairs on the tibiae, and dorsal hairs very numerous, short and mushroom-shaped. [*Nevskyella tuberculata* Zhang and Zhang, described from a single trapped al. in China, differs from either of the species below in having a pair of tubercles posteriolaterally on the pronotum, and a longer ANT PT.]

***Nevskyella fungifera* (Ossiannilsson)**

Apt. yellow or brownish yellow, sometimes with dark paired dorsal patches on metathorax and abdomen, or uniformly brownish; BL c.1.6–1.7 mm. Al. have bordered wing veins with dark spots at their apices. On *Carex caryophyllea*, living on all above-ground parts of the plant. Only known from Sweden (Heie, 1982). Mon. hol., with ovip. and apt. males in Sept and fund. in May.

***Nevskyella meridionalis* Hille Ris Lambers and van den Bosch**

Apt. creamy to yellowish, with paired dark dorsal patches; BL 1.5–1.7 mm. On undersides of leaves of *Carex halleriana*, only known from France. Al. undescribed. Mon. hol., with ovip. and apt. males in Oct (orig. descr.).

***Nietonafriella* Ortego**

Aphidinae: Macrosiphini

One S American species resembling *Uroleucon (Lambersius)* but with an enlarged clypeus.

***Nietonafriella euclipteata* Ortego**

Apt. greenish yellow to dark green, sometimes with a darker green, orange or reddish brown band between and around bases of SIPH; BL 1.6–2.2 mm. Al. have 11–19 sec. rhin. on ANT III. On apices of young stems of *Eupatorium patens* in W Argentina. Mon. hol., with apt. males (Ortego, 1998b).

***Nippodysaphis* Hille Ris Lambers**

Aphidinae: Macrosiphini

One species in Japan with a short cauda, resembling *Dysaphis (Pomaphis)*, but lacking marginal or spinal tubercles.

***Nippodysaphis deutziae* (Hille Ris Lambers)**

Figure 32d

Appearance in life unknown; BL (fundatrix) c.2.35 mm. On *Deutzia crenata* in Japan. Spring populations heavily curl leaves (Miyazaki, 1971), and migrate in second generation to an unknown secondary host. Emigrant al. have a dark dorsal abdominal patch, and sec. rhin. distributed III 3–10, IV 0–5. Presumed gynoparae from Japan and Korea in BMNH colln have barely coalescing transverse dorsal abdominal cross-bands and sec. rhin. distributed III 19–26, IV 8–11, V 2–5.

***Nippolachnus* Matsumura**

Lachninae: Lachnini

An oriental genus of 4–5 species characterized by the absence of an ocular tubercle (triommatidium). Associated mainly with *Eriobotrya*, but parthenogenetic generations may utilise other woody Rosaceae. A.K. Ghosh (1982a) reviewed the genus. See also Blackman and Eastop (1994).

***Nippolachnus piri* Matsumura**

Apt. long-bodied, pale green with some bluish white dorsal wax, with pale brown legs and ANT; BL 3.0–3.7 mm. On undersides of leaves, feeding along main veins of *Eriobotrya japonica*, *Pyrus* and related woody

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Roseaceae, including *Rhaphiolepis* spp. In India, Japan, China, Korea and Taiwan. Sexual reproduction and overwintering as eggs occur in Japan on *Eriobotrya* and *Rhaphiolepis*. Otake (1995) studied aspects of its overwintering and spring colony development on *Rhaphiolepis*. See also Blackman and Eastop (1994, 2000).

Nudisiphon Chakrabarti and Bhattacharya Aphidinae: Macrosiphini

A genus for one Indian species with flangeless SIPH. Apt. have a peculiar cauda with a curved, horn-like hairless apex, whereas in al. the cauda is elongate triangular with a hairy apex.

Nudisiphon folisacculata (Kumar and Burkhardt) Plate 14a

Apt. presumably pale, wax-covered; BL 2.2–2.4 mm. Al. have numerous sec. rhin. distributed over half the circumferences of ANT III–V. On *Spiraea* sp. in India (H.P.), causing leaves to fold upwards and parallel to the midrib, forming ‘fluffy sac-like pseudogalls’ (orig. descr., as *Xenosiphonaphis*). An al. male was collected in Aug. Also recorded from the same region on *Indigofera* (?) sp. (Chakrabarti and Bhattacharya, 1982, as *N. chitinicauda*).

Nurudea Matsumura Eriosomatinae: Fordini

About 5 species with galls on *Rhus* in E Asia, and probably all migrating to mosses as secondary hosts. *Nurudea meitanensis* (Tsai and Tang) and *N. shiraii* (Matsumura) are recorded from mosses, but their biology is little known and the moss-feeding generations are undescribed. It is likely that only one sexuparous generation matures on mosses, overwintering in an imm. stage, as in *Schlechtendalia chinensis* (q.v.).

Obtusicauda Soliman Aphidinae: Macrosiphini

About 10 species occurring in N America and Asia, feeding exclusively on Compositae-Artemisiinae. Probably most closely related to *Macrosiphoniella*, although some features such as the stiletto-shaped R IV + V may be due to convergent evolution on the same host plants. Holman and Szelegiewicz (1979) revised the palaeartic species, and the nearctic species were reviewed by Robinson and Halbert (1989). Most earlier accounts placed the species in other genera (*Macrosiphum*, *Macrosiphoniella*, *Narzykulovia*).

Obtusicauda anomella (Knowlton and Allen)

Appearance in life unrecorded; BL of apt. 1.4–2.0 mm. On *Seriphidium tridentatum* in Utah (not collected since 1937). Al. unknown.

Obtusicauda artemisiphila (Knowlton and Allen)

Color of apt. not recorded; BL 1.7–2.1 mm. Al. are green to blackish green. Described from *Seriphidium tridentatum* in Utah, and also found in Idaho, Nevada and Montana.

Obtusicauda coweni (Hunter) Plate 28b

Apt. dark olive brown to greenish black, with a metallic lustre; BL 1.2–2.3 mm. On leaves and shoot tips of *Artemisia* and *Seriphidium* spp. in western N America. We follow Robinson and Halbert (1989) who synonymised several species under the name *coweni* in recognising a single, variable species. SIPH length is particularly variable, even within a population, but more reliable features are the long ANT PT and the rounded, pigmented scleroites at the bases of many dorsal abdominal hairs. *O. zerothermum* may also be a synonym. The Asian species *O. moldavica* seems remarkably similar and also shows wide morphological variation. Mon. hol.; ovip. and al. males in late Oct–Nov (BMNH colln). 2n=12*.

Obtusicauda dolychosiphon (Umarov)

Apt. shining brownish black, BL 1.8–2.9 mm. Described from *Artemisia persica* in Tajikistan, and similar aphids have been found in Kazakhstan (on *Seriphidium pauciflorum*; described as a subspecies, *O. dolychosiphon* ssp. *praecellens* Smailova), Uzbekistan, Kyrgyzstan, Iran and Pakistan (on *Artemisia* spp.). Holman and Szelegiewicz (1979) tabulated morphometric data and reviewed host plant range and distribution.

Obtusicauda filifoliae (Gillette and Palmer)

Apt. are cinnamon brown to yellowish brown, tinged laterally with yellow ochre; BL 1.7–2.3. On leaves and shoot tips of *Artemisia filifolia* and *Seriphidium tridentatum* in western USA. Mon. hol.; Robinson and Halbert (1989) examined type specimens of two Knowlton and Allen species collected in Apr–May and considered them both to be fund. of *filifoliae*.

Obtusicauda frigidae (Oestlund)

Apt. are shining dark metallic green; BL 1.8–2.3 mm. On leaves and young growth of *Artemisia* spp. and *Seriphidium tridentatum* in western N America, and there are also records from E Canada (New Brunswick, Nova Scotia; Smith and Parron, 1978). Mon. hol.; ovip. and apt. males in late Sept–Nov, fund. in late May (Palmer, 1952).

Obtusicauda moldavica (Bozhko)

Apt. are blackish, BL 1.95–3.0 mm. On terminal parts of *Artemisia* spp. and *Seriphidium santonicum*, forming dense colonies of rather immobile, ‘dead-looking’ aphids that produce copious honeydew (Holman and Szelgiewicz, 1979). In Moldova, Hungary, Crimea and Kazakhstan. Aphids from an *Artemisia* sp. in Tajikistan were described as a new species (*O. crassitubia*) by Narzikulov and Umarov (1969), but this was placed as a subspecies of *moldavica* by Holman and Szelgiewicz (1979), who tabulated morphometric data for this group and reviewed host plants and distribution. *O. nilkaensis* on *Artemisia capillaris* in Xinjiang, China (Zhang *et al.*, 1999, described as *Uroleucon nilkaense*) is closely related and a possible synonym, as is *O. longicauda* Zhang, described from ‘Gramineae’ in Tibet (Zhang and Zhong, 1981).

Obtusicauda mongolica Holman and Szelgiewicz

Apt. are shining black, slightly wax-powdered; BL 1.6–2.2 mm. On *Artemisia frigida* in Mongolia.

Oedisiphum van der Goot

Aphidinae: Macrosiphini

One or two species in E Asia resembling *Brachycaudus* but with reniform spiracular apertures, and with a long R IV+V adapted for feeding on Compositae-Gnaphalieae.

Oedisiphum compositarum van der Goot

Plate 10b

Apt. brownish green with black SIPH; BL 1.4–1.8 mm. Al. have numerous sec. rhin. on ANT III–V and an extensive black dorsal abdominal patch. On flower-stalks and flowers of a *Gnaphalium* species in Java (orig. descr.), and subsequently (1951) collected from *Gn. luteo-album* and *Gn. japonicum* (BMNH colln, leg. F.W. Rappard).

Oedisiphum soureni A.N. Basu (= *indicum* A.K. Ghosh)

Apt. pale brown (probably sometimes darker), BL 1.3–1.7 mm. Feeding on undersides of leaves and inflorescences of *Anaphalis* spp., without causing noticeable injury, in W Bengal, and also recorded from *Gnaphalium luteo-album* in U.P. (India). Al. undescribed. Very similar to *Oe. compositarum* apart from hair length, and the distinction between the two needs further confirmation. 2n=8.

Ossiannilssonina Hille Ris Lambers

Aphidinae: Macrosiphini

One palaeartic species on *Galium* with paired spinal protruberances on ABD TERG 3–5 and unpaired cauda-like processes on ABD TERG 6, 7 and 8. SIPH are short, curved and flangeless as in certain other genera associated with *Galium*.

Ossiannilssonina oelandica Hille Ris Lambers

Plate 14c, Figure 29g

Apt. greenish to lemon yellow with mainly pale appendages; BL 1.7–2.0 mm. On *Galium boreale*, especially in sunny locations, in Sweden, Finland (Heikinheimo, 1997, describing al.) and Germany. Mon. hol., with ovip. and al. males in late Aug–Sept (Ossiannilsson, 1959; Heie, 1992).

Ovatomyzus Hille Ris Lambers

Aphidinae: Macrosiphini

Three European species similar to *Myzus* but the head is not spiculose and al. have numerous sec. rhin. on ANT III–V as in *Ovatus*. Only anhol. populations are known, feeding mainly on Labiatae and Boraginaceae.

Ovatomyzus boraginacearum Eastop

Plate 18a

Apt. whitish to pale greenish yellow (brownish yellow to orange in overwintering populations); BL 0.9–1.6 mm. Al. have a black dorsal abdominal patch and sec. rhin. distributed III 19–29, IV 7–17, V 1–7 (Heie, 1994). Living scattered on the undersides of leaves of its host plants, which are mainly Boraginaceae (*Anchusa*, *Pulmonaria*, *Symphytum*), and less commonly *Salvia* spp. (Labiatae); also recorded from *Geum urbanum* (Rosaceae) and *Knautia arvensis* (Dipsacaceae) (Eastop, 1987). Specimens from *Eupatorium cannabinum* (Compositae) described by Theobald (1926) as *Myzus eupatorii* also seem to be this species. In Europe (England, Germany, Netherlands, Sweden, Czech Republic) and Iran. Apparently entirely anhol., with a specialised hibernating apt. morph (Müller, 1969a, as *calaminthae*). 2n=12.

Ovatomyzus chamaedrys (Passerini)

Figure 50e

Apt. yellowish white to whitish green (darker at colder temperatures); BL 0.8–1.5 mm. Al. have a black dorsal abdominal patch and sec. rhin. distributed III 31–36, IV 6–15, V 0–1. On undersides of leaves of certain labiates, especially *Clinopodium vulgare* and *Teucrium* spp., and also recorded from *Scabiosa columbaria* (Dipsacaceae) and *Lithodora diffusa* (Boraginaceae); the same plant families as *O. boraginacearum*, but with different preferred hosts. There are records from England, Wales, Denmark, France, Spain, Italy, Germany and Austria. Apparently there is no sexual phase.

Ovatomyzus stachyos Hille Ris Lambers

Figure 50d

Apt. pale greenish white; BL 1.0–1.5 mm. Al. have dark dorsal abdominal patch and sec. rhin. distributed III 30–44, IV 10–20, V 0–5. On *Stachys* spp., living dispersed on undersides of older leaves, often hidden under hairs. Europe (Denmark, Sweden, UK, France, Netherlands, Portugal). Apparently there is no sexual phase. 2n=12*.

Ovatus van der Goot

Aphidinae: Macrosiphini

Ten old world species resembling *Myzus*, but al. have no dorsal abdominal patch and often have more secondary rhinaria. They are all associated with Pyroidea and/or Labiatae. Accounts are available for Europe (Müller, 1969a), NW Europe (Heie, 1994), Japan (Miyazaki, 1971) and Korea (Lee *et al.*, 2002c). The native American species previously placed in *Ovatus* have been transferred to a new genus, *Abstrusomyzus* (Jensen and Stoetzel, 1999). See also Blackman and Eastop (1994).

Ovatus crataegarius (Walker)

Plate 17i

Apt. yellowish green, mid- to pale green or greenish white; BL 1.0–1.9 mm. Sec. rhin. in al. III 11–52, IV 2–24, V 0–9. On undersides of leaves of *Mentha* and some other Labiatae (*Melissa*, *Nepeta*). Heter. hol., with *Crataegus* and related woody Rosaceae as primary hosts, or anhol. where climatic conditions permit. Presumably European in origin, now almost world-wide. In Japan there may be another species (*malicolens* Hori?) with an unknown secondary host, which occurs on *Malus* and *Cydonia*, but not on *Crataegus* and *Mentha*. See also Blackman and Eastop (2000). 2n=12.

Ovatus glechomae Hille Ris Lambers

Apt. rather dark, dirty brown or brownish green, usually darker laterally; BL 1.6–2.0 mm. Sec. rhin. in al. III 10–14, IV 5–9, V 2–5. Living in small colonies at soil level on etiolated stems and runners of *Glechoma hederacea*, usually under stones. In NW Europe (Netherlands, England, N Germany, Sweden). Mon. hol., with ovip. and apt. males in Sept–Oct.

Ovatus insitus (Walker)

Apt. greenish white, rather shiny; BL 0.9–2.2 mm. Sec. rhin. in al. III 25–79, IV 9–57, V 1–24. On stems or rhizomes of *Lycopus europaeus*. Heter. hol., with *Crataegus* and *Mespilus* as the usual primary hosts

(Blackman and Eastop, 1994). Europe, SW and C Asia, Siberia. *O. lycopi* (Nevsky) is closely related and possibly a synonym. $2n=12$.

***Ovatus (Ovatoides) inulae* (Walker)**

Figure 34d,e

Apt. yellow to lemon yellow or pale green; BL 1.0–1.6 mm. On undersides of leaves, shoot apices and flowers of *Pulicaria* (= *Inula dysenterica*), and also recorded from several other composite genera (*Adenostyles*, *Galactites*, *Helichrysum*). Widely distributed in Europe (England Belgium, France, Germany, Portugal, Italy, Yugoslavia, Russia) and Central Asia (Shaposhnikov, 1964). Mon. hol., with al. males (Schouteden, 1900). Ovip. were collected in Oct in England (Theobald, 1926).

***Ovatus malisuctus* (Matsumura)**

Apt. dark yellowish brown to brownish green with black SIPH and distal halves of femora; BL 1.0–1.7 mm. Imm. shiny yellow (Moritsu, 1983). Curling young leaves of *Chaenomeles* spp. (also *Malus* spp.; Blackman and Eastop, 1994). In China, Japan, Korea, Taiwan, and also recorded from Georgia (as *Myzus chaenomeles* Dzhibladze). Mon. hol. See also Blackman and Eastop (1994). $2n=12$.

***Ovatus mentharius* (van der Goot)**

Apt. greenish white; BL 1.2–1.8 mm. Sec. rhin. in al. III 12–21, IV 7–11, V 0–5. On undersides of leaves of *Mentha* spp. Mon. hol. with al. males. Europe, Middle East.

***Ovatus minutus* (van der Goot)**

Apt. bright yellow; BL c.1.3 mm. In curled top leaves, probably of *Plectranthus* (= *Coleus aromaticus*), in Java. Aphids from *Leonurus sibiricus* in Meghalaya, India, provisionally identified as *minutus* (Ghosh and Raychaudhuri, 1972), were probably *Myzus ornatus*.

***Ovatus nipponicus* Takahashi**

Apt. yellow; BL c.1.7–1.9 mm. On *Mentha* sp(p). in Japan, and also collected in Korea on *Mentha canadensis* (BMNH colln, leg. W.H. Paik). Apparently at least partially anhol.; vivip. occurred in Dec and Mar, and an ovip. was found in late Mar (orig. descr.).

***Pachypappa* Koch**

Eriosomatinae: Pemphigini

About 10 species mostly host-alternating between *Populus* and roots of *Picea* (see Blackman and Eastop, 1994).

***Pachypappa myrtilli* Börner**

Apt. secreting wax; BL 1.2–1.4 mm. Described from roots of *Vaccinium myrtilloides* in Germany.

***Paczoskia* Mordvilko**

Aphidinae: Macrosiphini

About 12 rather large, shiny brown species and subspecies mostly in E Europe and W Asia, related to *Macrosiphoniella*, with both pre- and postsiphuncular sclerites well developed, and mostly associated with *Echinops*. The *Echinops* feeders have a long wedge-shaped R IV+V; Holman (1981b) provided a key and detailed morphological comparisons.

***Paczoskia brevipilosa* Tashev**

Apt. shining dark brown; BL 1.9–2.8 mm. On leaves of *Echinops* spp. in Bulgaria and Rumania (Holman, 1981b). Biology not studied; Holman suggested that its morphology might indicate a close association with ants and subterranean life at some stage in its life cycle.

***Paczoskia colchica* Holman**

Apt. shiny brown, BL 2.6–3.8 mm. On undersides of leaves of *Echinops galaticus* in S Russia (Krasnodar). Mon. hol., with ovip. and apt. males in late Oct (Holman, 1981b).

***Paczoskia jurineicola* (Bozhko)**

Apt. shining dark brown with black appendages; BL c.2.2 mm. On *Jurinea stoechadifolia* in Ukraine, forming dispersed colonies on undersides of leaves (Bozhko, 1976b).

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Paczoskia longipes (Tashev)

Apt. shining dark brown, BL 4.3–4.7 mm. On *Echinops* spp. in E Europe (Bulgaria, Poland, Romania).

Paczoskia major Börner

Apt. shining dark brown, BL 2.4–4.3 mm. Described from *Echinops spaerocephalatus* in Germany, and since found on this host in various E European countries. It was also common on stems of *E. ritro* in Turkey (Remaudière and Tuatay, 1963). Sexuals in Sept–Oct, with both apt. and al. males (orig. descr.). A form on *E. microcephalus* and *Echinops* sp. in Bulgara and Turkey is regarded as a subspecies, ***P. major* ssp. bulgarica** Holman.

Paczoskia meridionalis Holman

Apt. shining dark brown, BL 3.1–4.2 mm. On *Echinops* spp. in Iran, Israel, Lebanon and former Yugoslavia. Holman (1981b) compared the morphology of different populations.

Paczoskia obtecta Börner

Plate 27e

Apt. shiny bronze brown, with bright red eyes, black SIPH and cauda, ANT black except at base of III, and legs yellowish with dark segmental apices; BL 3.1–4.3 mm. On undersides of lower leaves, and later on upper parts of stems, of *Centaurea* spp. In Europe (France, Sweden, Denmark, Germany, Poland, Austria, former Yugoslavia, Hungary, Czech Republic), and in Israel. Sexual morphs apparently unknown. 2n=12.

Paczoskia paczskii Mordvilko

Apt. shining dark brown, BL 2.3–4.2 mm. On stems and undersides of leaves of *Echinops* spp. in Europe (France, Rumania, S Ukraine). Mon. hol.; ovip. in France in Oct. Nevsky (1929) described a subspecies from *E. karatavicus* in Uzbekistan, ***P. paczskii* ssp. turanica**, and Holman (1981b) compared various populations and described ***P. paczskii* ssp. ruthenica** from *E. ruthenicus* in Hungary and Crimea.

Paoliella Theobald

Lizeriinae

About 22 species on woody Burseraceae and Combretaceae in Africa (plus one in India), closely related to the S American genus *Lizerius*. For further information see Blackman and Eastop (1994).

Paoliella pteleopsidis Quednau

Apt. unknown (and possibly not produced); BL of al. c.1.8 mm. On *Pteleopsis anisoptera* in Angola.

Papulaphis Robinson

Aphidinae: Macrosiphini

One fern-feeding N American species, related to *Macrosiphum* but with unusual ANT sensoriation. Al. often have a once-branched media.

Papulaphis sleesmani (Pepper)

Plate 26c, Figure 43b

Apt. lemon yellow to lemon green; BL 1.6–2.1 mm. On *Adiantum pedatum* and *Cystopteris bulbifera* in eastern USA.

Parachaitophorus Takahashi

Parachaitophorinae

Two oriental species on *Spiraea* with apt. having 3-faceted eyes and very long dorsal hairs arising from tuberculate bases.

Parachaitophorus sikhotealinicus Pashtshenko

Apt. pale brown; BL c.1.5–1.6 mm. On *Spiraea salicifolia*, forming compact ant-attended colonies on stems at bases of young offshoots. E Siberia.

Parachaitophorus spiraeae (Takahashi)

Apt. color in life unrecorded; BL 1.3–1.7 mm. On *Spiraea* spp. in Japan and Korea. The al. was described by Takahashi (1961b). The apt. was described and illustrated by Takahashi as having small eyes with many facets; however, these specimens may have been partially alatiform, as all specimens in BMNH colln, including several sent and identified by Takahashi, have only triommatidia.

***Paracletus* von Heyden**

Eriosomatinae: Fordini

Four species resembling *Forda* except for the longer outer margin of the hind coxae. Hille Ris Lambers (1954b) discriminated the species on the material then available.

***Paracletus bykovi* (Mordvilko)**

Apt. yellowish white; BL 2.4–3.5 mm. On roots of many species of Gramineae (*Calamagrostis*, *Festuca*, *Hordeum*, *Setaria*, *Poa*); also *Luzula* (Juncaceae). E Europe (Poland, Ukraine), Turkey, Transcaucasia; and Uzbekistan, where a population was described as *P. bykovi* ssp. *uzbekistanica* Kan. Apparently mainly or entirely anhol., although Mordvilko (1935) described a sexupara collected on trunk of *Pistacia mutica* in Georgia. Different from other *Paracletus* in several respects, and possibly deserving of separate generic or subgeneric status (as *Hemitrama*).

***Paracletus cimiciformis* von Heyden**

Plate 2d

Apt. shining waxy yellowish white with body dorsoventrally flattened, especially at lateral margins; BL 2.4–3.5 mm. On roots of many species of Gramineae (e.g., *Agrostis*, *Festuca*, *Hordeum*, *Oryza*, *Poa*, *Triticum*). Europe, Mediterranean region including N Africa, Middle East, C Asia, Korea, China and Japan. Heter. hol. in Middle East, with sexual phase and galls on *Pistacia* spp. (Blackman and Eastop, 1994). Elsewhere anhol. on roots of Gramineae, where it is always attended by ants, especially *Tetramorium* spp. Some regionally variant populations have been described as subspecies (*panicumi* Bozhko, on *Panicum miliaceum* in Ukraine, and *zhanhuanus* Zhang and Qiao (Zhang and Qiao, 1998d) on *Triticum aestivum* in China). For fuller information see Zwölfer (1958) and references therein. T. Zhang *et al.* (1987) studied the biometrics of this aphid in China. 2n=16.

***Paracletus donisthorpei* Theobald**

Apt. pale; BL c.2.9–3.0 mm. Described from nests of the ant *Tapinoma nigerrimum*, and since found on roots of *Triticum* sp. and unidentified woodland grasses (Nieto Nafria *et al.*, 2002a). Italy, Spain and Algeria. Life cycle unknown; sexup. have been collected on *Pistacia terebinthus* (Roberti, 1939).

***Paracletus subnudus* Hille Ris Lambers**

Color of apt. in life unknown; BL of last instar imm. 2.6–3.0 mm. On *Hordeum sativum* (= *vulgare*) in Israel.

***Paracolopha* Hille Ris Lambers**

Eriosomatinae: Pemphigini

Two species in E Asia closely related to *Colopha*, but with unbranched media in forewing, and apt. on secondary hosts have SIPH. One species is heter. hol. between *Zelkova* and bamboos (Blackman and Eastop, 1994), the other is only known from *Carex*. Akimoto (1985a) gave a full account.

***Paracolopha takahashii* Akimoto**

Apt. appearance in life unknown; BL 1.25–1.5 mm. On basal part of *Carex breviculmis* ssp. *royleana* in Japan. Only known from original collection (1956).

***Paramyzus* Börner**

Aphidinae: Macrosiphini

Three palaeartic species, one on Rosaceae and two on Umbelliferae, resembling *Myzus* but with apt. having sec. rhin. on ANT III. Shaposhnikov and Stekolshtshikov (1989) reviewed the genus and provided a key to species.

***Paramyzus heraclei* Börner**

Plate 18e

Apt. white or yellow, shiny, pale except for tarsi; BL 1.3–1.9 mm. On undersides of basal leaves of *Heracleum* spp., causing many small yellow spots and slight vaulting of the leaves. Recorded also from *Angelica* spp. in Japan (Miyazaki, 1971). Mon. hol. on *Heracleum* in Germany, with al. males; a full account of the life cycle and sexual morphs was given by Müller (1977b). Widely distributed in Europe (not recorded from Scandinavia), and in E Siberia and Japan. Japanese populations are possibly a different race or subspecies, *P. heraclei* ssp. *similis* Takahashi (see also Shaposhnikov and Stekolshtshikov, 1989).

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Paramyzus longirostris Miyazaki

Apt. pale yellow, yellow or green, with ANT black towards tips; BL 1.1–1.4 mm. Al. undescribed. On *Potentilla* spp. in Japan and E Siberia (Kamchatka), and also found on *Fragaria* sp. in Japan (BMNH colln, leg. R.L.Blackman). 2n=14.

Paramyzus sii Shaposhnikov and Stekolshchikov

Apt. shiny greenish yellow with black eyes and tarsi, greenish SIPH and whitish cauda; BL 1.6–2.0 mm. Al. undescribed. On *Sium suave*, at leaf bases and on inflorescences. E. Siberia (Vladivostok).

Paraphorodon Tseng and Tao

Aphidinae: Macrosiphini

One species in China with *Phorodon*-like digitiform process on the ANT tubercles, and dorsal cuticle densely papillated.

Paraphorodon omeishanaensis Tseng and Tao

Apt. pale green, with dusky ANT; BL c.1.3 mm. Al. undescribed. On undersides of leaves of an unidentified *Rubus* sp. in China. This species has been mistakenly synonymised with *Phorodon cannabis*.

Patchiella Tullgren

Eriosomatinae: Pemphigini

One palaeartic species host-alternating between *Tilia* and Araceae.

Patchiella reaumuri (Kaltenbach)

Apt. whitish, with a powdery wax coating, and more flocculent wax on posterior abdomen; BL 1.9–2.5 mm. On roots of *Arum* spp., and other Araceae (*Arisaema*, *Colocasia*). Heter. hol. in Europe, with sexual phase and large leaf-nest galls on *Tilia* (Blackman and Eastop, 1994). Anhol. populations are probably widespread, as they have been found on roots of *Colocasia* in Hawaii and Solomon Is. Stroyan (1979b) fully described the morphs from *Arum* roots.

Paulianaphis Essig

Greenideinae: Schoutedeniini

One species in Madagascar differing from *Schoutedenia* in the presence of marginal as well as spinal processes on ABD TERG 7, these bearing 6–7 small hairs on their basal half. Remaudière (1988) reviewed the genus.

Paulianaphis madagascariensis Essig

Color of apt. in life unrecorded; BL c.1.8 mm. Believed to have been collected on an *Apocynum* sp., and possibly forming a leaf gall on this plant. The original description appears to have confused the hosts of this aphid and *Eonaphis pauliani* (see Remaudière, 1988).

Pehuenchaphis Mier Durante, Nieto Nafria and Ortego

Aphidinae: Aphidini

One species in S America on roots of *Senecio*, related to *Aphis* but with reduced SIPH placed on ABD TERG 6, reduced triommatidia, an unusual distribution of marginal tubercles, and distinctive biology.

Pehuenchaphis agilissima Mier Durante, Nieto Nafria and Ortego

Apt. dark green to brown, sometimes wax-dusted; BL 1.5–2.4 mm. Sec. rhin. in apt. III 14–18, IV 0–10. On *Senecio* spp., living in small ant-attended groups on thick, lignified roots, and at bases of lignified stems, moving quickly when disturbed. Mon. hol. with apt. males (Mier Durante *et al.*, 2003).

Peltaphis Frison and Ross

Saltusaphidinae

One species in N America distinguished by its dark sclerotic carapace, with ABD TERG 2–6 fused together, and by the long dorsal hairs which often have furcate apices.

Peltaphis hottesi Frison and Ross

Apt. dark brown, almost black; BL c.2.1–2.3 mm. On *Carex* spp., only known from Illinois, USA and Québec, Canada. Al. unknown. Mon. hol., with ovip. and apt. males in Oct–Nov (orig. descr.).

***Pemphigus* Hartig**

Eriosomatinae: Pemphigini

A genus with more than 70 nominal species living on plant roots (mostly dicots), and/or forming galls in spring and early summer on the leaves and twigs of *Populus* (see Blackman and Eastop, 1994). Most species are only known from their gall generations; some species may be permanently anhol. on roots, but life cycles are mostly unknown. *Pemphigus* are distributed rather evenly throughout the N Hemisphere; 17 are described from Europe, 10 from the Middle East and C Asia, 16 from E Asia, and 21 from N America. Many species are recognised as distinct only from morphology of galls and emigrant al. produced on *Populus*, or by experimental host transfers that show specificity to particular secondary hosts. Identification of apt. from roots using morphological criteria is generally difficult or impossible, so host records to species level based on apt. alone are almost always suspect. Zwölfer (1958) provided morphometric parameters for populations of unidentified *Pemphigus* spp. on roots of Gramineae and various dicots in S Germany. Accounts are available for Britain (Furk and Prior, 1975), Fennoscandia and Denmark (Heie, 1980b), Iberia (Nieto Nafria *et al.*, 2002a), Japan (Aoki, 1975), China (Chang and Zhong, 1979b), India (A.K. Ghosh, 1984), and N America (Smith, 1985). Biology and ecology of most root-feeding populations are little known; a *Pemphigus* species from *Gnaphalium* in India (western Himalaya; leg. S. Chakrabarti), sent to BMNH for karyotyping in 1989 was heavily parasitised by an unidentified mermithid parasite (this being the first published record of a mermithid–aphid host association).

***Pemphigus betae* Doane**

Apt. yellowish aphids secreting white wax; BL 1.9–2.4 mm. Sec. rhin. in al. sexup. III 5–8, IV 1–3. On roots of *Beta vulgaris*, also perhaps on other Chenopodiaceae such as *Chenopodium album*, *Rumex* and possibly *Spinacia*. Heter. hol. in western N America, with a sexual phase and galls on *Populus* spp. (Blackman and Eastop, 1994). Anhol. overwintering on beet roots also seems to occur widely. Possibly synonymous with *P. populivenae* Fitch, which name has been applied to a chenopod-feeding species migrating from *Populus trichocarpa* in California (Grigarick and Lange, 1962). Harper (1963), studying the life cycle in Alberta, noted that *P. angustifolia* and *P. balsamifera* were the principal primary hosts of *P. betae*. Galls of *P. betae* are usually on the underside of the poplar leaf on or adjacent to the mid-rib (Harper, 1959), while those of *P. populivenae* are usually in a similar position on the upper side. There may be a complex of *Pemphigus* species in western North America with different poplar species as primary hosts. Taxonomic affinities with palaeartic populations of *Pemphigus* on chenopod roots (see *P. fuscicornis*) are also unclear. The evolutionary ecology of *Pemphigus betae* has been studied intensively in Utah, including life cycle variation and the initiation of the return migration of sexuparae from chenopod roots (Moran *et al.*, 1993a,b). See also Blackman and Eastop (2000).

***Pemphigus borealis* Tullgren**

Al. sexup. yellowish, with tufts of wax, BL c.2 mm, sec. rhin. III 8–10, IV 2–3. On roots of *Bidens* spp., colonies consisting only of imm. al. sexup. (Dolgova, 1970). Heter. hol. with sexual phase and galls on *Populus* spp. (Blackman and Eastop, 1994). Europe and Asia. 2n=20.

***Pemphigus brevicornis* (Hart)**

Apt. pale, with wax; BL c.1.8 mm. Described from apt. on corn (*Zea*) roots in Illinois, USA, and since recorded from roots of various plants in Illinois (Hottes and Frison, 1931) and other states, but there are no good criteria for identification. Al. sexup. with sec. rhin. III 5–7, IV 1–4 (acc. to Hottes and Frison, 1931).

***Pemphigus bursarius* (L.)**

Plate 2g

Apt. yellowish white with a tuft of white wax on the posterior part of the abdomen.; BL 1.6–2.5 mm Al. from root-feeding colonies (sexuparae) have a brownish orange abdomen and sec. rhin. III 5–10, IV 1–4. On roots of Compositae (e.g., *Cichorium*, *Lactuca*, *Lampsana*, *Sonchus*, *Taraxacum*, *Tussilago*). Records of *P. bursarius* from roots of plants in other families may be mainly referable to other *Pemphigus* spp., although it is possible that non-Compositae plants are sometimes colonised. Not attended by ants. Europe,

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Middle East, C Asia, Siberia, N and S Africa, N America, and perhaps Australia and New Zealand. Heter. hol. in Europe with sexual phase and galls on *Populus* spp., most frequently *P. nigra* (Blackman and Eastop, 1994), but also commonly anhol. on roots. Miller *et al.* (2005) found genetically distinct populations on different secondary host plants. See also Blackman and Eastop (2000). $2n=20$.

Pemphigus echinochloaphaga (Zhang, Qiao and Chen)

Apt. appearance in life unknown; BL 1.9–2.2 mm. On ‘grass’ (*Echinochloa* sp.?) in China (Zhang, 1999, as *Desiforda*).

Pemphigus fataunae Shinji

Apt. undescribed, al. (sexuparae?) from roots of *Fatoua* (as *Fatauna*) *pilosa* in Japan had sec. rhin. distributed ANT III 6, IV 3–4, V 1. These may possibly have been sexuparae of *Epipemphigus niisimae*.

Pemphigus fuscicornis (Koch)

Apt. pale yellow or yellow-green to grayish green with wax tuft on posterior abdomen; BL 1.4–2.2 mm. Sec. rhin. in al. sexup. III 5–8, IV 1–3. On roots of *Tripleurospermum perforatum* (= *Matricaria inodora*) in Europe (UK, Denmark, Sweden, Germany). Originally also described from *Chenopodium* roots, and this name has therefore also been applied to very similar aphids found on Chenopodiaceae (*Beta*, *Chenopodium*) in C and E Europe, although these might be an anhol. population of *P. betae* introduced from N America (Blackman and Eastop, 2000). Anhol. on *Tripleurospermum*; al. sexup. are produced in autumn but the sexual phase and primary host are unknown. Studies of microsatellite DNA variation in *P. bursarius* by Miller *et al.* (2005) may have included this species. $2n=20$.

Pemphigus gairi Stroyan

Apt. pinkish ochreous or pale straw-colored; BL 1.3–2.0 mm. Sec. rhin. in al. sexup. III 4–7, IV 2–4. On roots of *Aethusa cynapium*. Heter. hol., with sexual phase and galls on *Populus nigra* (Blackman and Eastop, 1994). Only known from England, but probably more widespread in Europe.

Pemphigus groenlandicus (Rübsamen)

Apt. color in life unrecorded, secreting wax; BL 1.5–2.1 mm. Al. sexup. with sec. rhin. III 4–6, IV 2. On roots of unidentified Gramineae in Greenland (Hille Ris Lambers, 1952). Anhol., although producing sexup. Zwölfer (1958) noted that populations on roots of various grass species in Germany (*Agrostis*, *Arrhenatherum*, *Avena*, *Cynosurus*) agreed well with this species, and there are subsequent records from France and Spain (Nieto Nafria *et al.* 2002a). Differences from *P. similis* Börner, recorded from ?*Agrostis alpina*, *Nardus stricta* and *Poa laxa* in the Austrian Tyrol, and from *P. vulgaris* Raychaudhuri, Pal and M.R. Ghosh, described from *Triticum aestivum* and unidentified Gramineae in Sikkim and W Bengal, India, have not been established.

Pemphigus hydrophilus Narzikulov

Apt. yellowish green, secreting flocculent wax; BL 1.9–2.2 mm. Sec. rhin. in one al. (sexup.?) III 6, IV 5, V 2. On the moss *Cratoneurum filicinum*, and possibly also on *Hygrohypnum luridium*. In Tajikistan at 1600–1700 m.

Pemphigus immunis Buckton

Apt. secreting copious wax; BL 1.2–1.8 mm. Al. sexup. with sec. rhin. III 5–7, IV 2–3. On roots of annual *Euphorbia* spp. (Hille Ris Lambers, 1973b). S and E Europe, N Africa, SW and C Asia, Pakistan, NW India and China. A record from *Euphorbia* in USA (as *brevicornis*) may also be this species. Heter. hol. with sexual phase and galls on *Populus* spp., esp. *nigra* (Blackman and Eastop, 1994). $2n=20$ (or $2n=10$ acc. to Pal and Khuda-Bukhsh, 1982).

Pemphigus matsumurai Monzen

On roots of *Thalictrum* sp. (BMNH colln, leg. S Aoki). Heter. hol. with sexual phase and galls on *Populus* spp. (Blackman and Eastop, 1994). E and C Asia. $2n=12$ (karyotype, unusual for *Pemphigus*, confirmed for Japanese samples from *Thalictrum**).

Pemphigus mordvilkoii Cholodkovsky

Apt. likely to be this species have been collected on roots of *Helipterum* (= *Acroclinium*) *roseum*, and other Compositae (*Galinsoga*, *Gnaphalium*; BMNH colln) in Pakistan, Nepal and India. Bozhko (1979) also recorded it from *Mentha* sp. in E Russia. Heter. hol. with sexual phase and galls on *Populus ciliata* (Blackman and Eastop, 1994). 2n=20 (Dutta and Gautam, 1993).

Pemphigus passeki Börner

Described from roots of *Carum carvi*; it is very similar to *P. phenax* but separated on the basis of morphological differences in al. sexup. In NW and C Europe, eastwards to Altai region of Russia. Heter. hol., with sexual phase and galls on *Populus nigra* var. *italica*. Prinsen (1990) studied the spring migration to *Carum* roots. 2n=22.

Pemphigus phenax Börner and Blunck

Apt. pale lemon yellow to yellowish white with white wax; BL 1.7–2.6 mm. On roots of wild and cultivated *Daucus carota* in N Europe and W Siberia. Heter. hol. with sexual phase and galls on *Populus nigra* var. *italica*. Populations may also persist parthenogenetically on carrots remaining in the ground through the winter. For a more detailed account see Stroyan (1964b).

Pemphigus populi Courchet

Apt. pale yellow-green, with white wax; BL 1.9–2.6 mm. Al. sexup. with sec. rhin. III 4–7, IV 1–2. On roots of Leguminosae (*Lathyrus*, *Melilotus*, *Medicago*). Europe, W Siberia, Middle East, SW and C Asia, China. Heter. hol. with sexual phase and galls on *Populus nigra* (Blackman and Eastop, 1994).

Pemphigus populicaulis Fitch

Apt. purported to be this species were recorded from *Oenanthe sarmentosa* in Alberta (Glendenning, 1924). Hottes and Frison (1931) suggested that *P. brevicornis* (q.v.) might be a synonym. Heter. hol., with sexual phase and galls usually on *Populus deltoides* (Blackman and Eastop, 1994). N America. 2n=20.

Pemphigus populinigrae (Schrank)

Apt. yellow-green, with white wax-wool; BL 2.0–2.2 mm. Al. sexup. with sec. rhin. III 7–9, IV 2–4. On roots of *Filago* and *Gnaphalium*. Europe, N Africa, W and E Siberia, SW and C Asia. Heter. hol. with sexual phase and galls mostly on *Populus nigra* (Blackman and Eastop, 1994), but often also anhol. (Mordvilko, 1935). 2n=22.

Pemphigus populitransversus Riley (and *P. obesinymphae*, see below)

Apt. dirty pale yellow with dusky head and appendages, secreting white wax; BL 2.0–2.5 mm. Al. sexup. with sec. rhin. III 4–8, IV 1–4. On roots of Cruciferae (e.g., *Brassica*, *Coronopus*, *Eutrema*, *Lepidium*, *Rorippa*). Not attended by ants. *Rumex* also seems to be colonised occasionally, but most records from secondary hosts outside the Cruciferae are probably referable to other *Pemphigus* species. Heter. hol. with sexual phase and galls on *Populus* spp., esp. *P. deltoides* and *P. sargentii*, but also commonly overwintering on crucifer roots. Widespread in USA east of the Rocky Mountains (Sokal and Riska, 1981), extending into Canada (Saskatchewan) and Mexico. Also nominally recorded on *Populus* in S America (Argentina, Chile), S Africa, and the Azores, and presumed anhol. populations have been found on crucifer roots in Brazil, New Zealand and England (BMNH collection). Interpretation of N American literature on *P. populitransversus* is hampered by confusion with another species, *P. obesinymphae*, that is morphologically indistinguishable on crucifer roots but migrates at a different time to *Populus deltoides*, and has a different hatching time and gall shape on the primary host (Aoki and Moran, 1994). 2n=20.

Pemphigus protospirae Lichtenstein

Apt. pale yellowish green or yellow, with abundant white wax especially on posterior abdomen; BL 1.6–2.3 mm. On semiaquatic species of Umbelliferae (*Apium nodiflorum*, *Berula erecta*, *Oenanthe aquatica*, *Sium latifolium*), colonising roots of plants on banks, or sheathing leaf-bases of plants in water. Europe, W Siberia,

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C Asia, and possibly China. Heter. hol. with sexual phase and galls usually on *Populus nigra* (Blackman and Eastop, 1994).

Pemphigus rubiradicis Theobald

Apt. dirty greenish brown, with flocculent white wax on abdomen; BL 1.7–2.2 mm. On roots of *Rubus idaeus* in England (Kent).

Pemphigus tartareus Hottes and Frison

Described from al. sexup. collected on roots of *Bidens* sp. in Illinois, USA. Heter. hol. with sexual phase and galls on *Populus deltoides* (Blackman and Eastop, 1994, as *P. junctisensoriatus*). Smith (1985) made successful host transfers from *Populus* to *Dichondra repens* as well as to *Bidens*.

Pemphigus tibetapolygoni Zhang

Apt. presumably with wax; BL c.2.5 mm. On roots of a *Polygonum* sp. in Tibet.

Pemphigus trehernei Foster

Apt. yellowish white to greenish white with grayish white wax forming tufts on abdomen; BL 1.3–2.4 mm. Sec. rhin. in al. sexup. III 3–7, IV 1–3. On roots of *Aster tripolium* in western Europe, and probably specific to this halophytic host. Al. sexup. produced in Sept–Dec presumably migrate to produce sexuals on *Populus nigra*, on which galls have been obtained experimentally (orig. descr.).

Pemphigus vesicarius Passerini (= *Pemphigus coluteae*)

Apt. secreting wax; BL 2.7–3.0 mm. On roots of *Colutea arborescens* (Remaudière and Coffin, 2001). Al. sexup. (with sec. rhin. distributed III 7–10, IV 2–4, V 0–2) are produced in Oct, and migrate to *Populus nigra*, where large galls are produced in spring (Blackman and Eastop, 1994). Europe, Algeria, SW and C Asia, Afghanistan and India.

Pentalonia Coquerel

Aphidinae: Macrosiphini

Three species of small brownish aphids with symmetrically swollen SIPH, the al. having broadly dark-banded forewings with very characteristic venation, the radius strongly curved and almost touching or fused with the media for part of its length, making a closed or nearly closed cell.

Pentalonia gavarri Eastop (= *Micromyzus brachiariae* A.K. Ghosh)

Apt. dull black; BL 0.7–1.0 mm. Inside unfurling new grass blades (*Centrotheca*, *Oplismenus*). Originally described from al. trapped in Philippines. Apt. described by Martin (1987) from W Malaysia, and specimens presumed to have been collected from *Brachiaria* sp. (although the host-plant is not explicitly stated) in India (Assam), described by A.K. Ghosh (1978) as *Micromyzus brachiariae*, clearly correspond well with this species. Al. have also been trapped in New Britain and Australia (Carver and Hales, 1983).

Pentalonia kalimpongensis (A.N. Basu)

Apt. reddish brown, with dark-tipped appendages; BL 1.5–1.9 mm. On Zingiberaceae (*Curcuma*, *Elleteria*, *Hedychium*) in India. In transfer experiments it did well on other Zingiberaceae (*Canna* sp., *Amomum sabulatum*; orig. descr., as *Micromyzus*). Mon. hol.; ovip. and al. males described from *Elleteria* by Mondal *et al.* (1978). 2n=12 (Khuda-Bukhsh and Kar, 1990).

Pentalonia nigronervosa Coquerel

Plate 19f

Apt. reddish brown to almost black, with black-tipped ANT; BL 1.1–1.8 mm. On plants in the families Musaceae, Araceae, and Zingiberaceae, often found living under the old leaf bases, usually ant-attended. Widespread through all tropical and subtropical parts of the world, and in hothouses in Europe and N America. Probably anhol. almost everywhere; sexual morphs have been recorded from India and Nepal (Bhanotar and Ghosh, 1969; K.C. Sharma, pers. comm.). See also Blackman and Eastop (2000). 2n=14.

***Pentamyzus* Hille Ris Lambers**

Aphidinae: Macrosiphini

Four species in southern S America and one in western USA, possibly most closely related to *Carolinaia*, with 5-segmented ANT in all morphs. Four of the five species are grass feeders, and one (*P. tenuis*) has strongly modified morphology which parallels that of unrelated grass-feeding aphids. Nieto Nafria *et al.* (2002b) reviewed the genus.

***Pentamyzus acaenae* (Schouteden)**

Apt. pale green; BL 1.0–2.5 mm. On leaves and shoots of *Acaena splendens* in S Argentina (Tierra del Fuego). Mon. hol. with abbreviated life cycle, ovip. and apt. males in Jan (Nieto Nafria *et al.*, 2002b).

***Pentamyzus falklandicus* Hille Ris Lambers**

Apt. color in life unknown; BL 2.4–3.0 mm. On *Poa flabellata* on Falkland Is.

***Pentamyzus fueginus* Nieto Nafria, Mier Durante and Ortego**

Apt. reddish brown to greenish brown; BL 1.8–2.6 mm. On outer-facing surfaces of leaves of *Alopecurus magellanicus* and *Hordeum comosum* growing in moist situations. S Argentina (Tierra del Fuego). Mon. hol. with an abbreviated life cycle, ovip., and apt. males occurring in Jan (Nieto Nafria *et al.*, 2002b).

***Pentamyzus graminis* Hille Ris Lambers**

Plate 12b

Apt. uniformly green; BL 1.6–2.0 mm. On basal parts of unidentified grasses, in somewhat moist and sunless situations, in California, USA. Mon. hol., with numerous ovip. and some apt. males occurring with apt. vivip. in March.

***Pentamyzus tenuis* Brown**

Apt. color in life unknown, probably wax-covered; BL 2.3–2.9 mm. On *Poa alopecurus* on Falkland Is, and on *Alopecurus magellanicus* on Tierra del Fuego (Nieto Nafria *et al.*, 2002b).

***Phorodon* Passerini**

Aphidinae: Macrosiphini

A small palaeartic genus of *Myzus*-like aphids with finger-like processes on the ANT tubercles and a host association with Cannabidaceae. The host-alternating species have *Prunus* as primary hosts.

***Phorodon cannabis* Passerini**

Plate 19h

Apt. shiny yellowish green with 3 green longitudinal stripes, or pale to mid-green without stripes; BL 1.5–2.7 mm. Al. have a dark dorsal abdominal patch, and sec. rhin. III 15–30, IV 2–13, V 0–2. On undersides of leaves of and on flower stems of *Cannabis* spp. In C, E and S Europe, across Asia to Japan, and N Africa. Mon. hol., with ovip. and al. males in Sept–Nov (Müller and Karl, 1976). 2n=12.

***Phorodon humuli* (Schrank)**

Plate 19i

Apt. pale green with darker green medial and lateral longitudinal stripes; BL 1.0–2.1 mm. Al. have a dark dorsal abdominal patch and sec. rhin. III 23–35, IV 1–11, V 0. On undersides of leaves and on flowers and fruits on *Humulus lupulus*. Heter. hol., with sexual phase on *Prunus* spp. (see Blackman and Eastop, 1994, 2000). Europe, SW Asia, N Africa (Ethiopia), N America and New Zealand. 2n=12.

***Phorodon humulifoliae* Tseng and Tao**

Apt. pale yellowish green or green with dark head, ANT, legs, and cauda; BL c.1.8 mm. SIPH are strongly curved outward and brownish towards their apices. On leaves of *Humulus japonicus* in China (Chekiang, Szechuan). 2n=12 (Chen and Zhang, 1985b).

***Phorodon japonensis* Takahashi**

Apt. pale yellow-green, very like *P. humuli*; BL 1.4–1.8 mm. On *Humulus scandens* in E Asia (Japan, Korea, E Siberia, Taiwan). Heter. hol. with sexual phase on *Prunus* spp. Described as a subspecies of *Ph. humuli*. 2n=12.

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Phorodon viburni Matsumura

Apt. undescribed, al. brownish, BL c.1.5 mm. On undersides of leaves of a *Viburnum* sp. in Japan. Not found since orig. descr. (1918).

Pleotrichophorus Börner

Aphidinae: Macrosiphini

About 60 species of mainly pale green to yellow aphids bearing numerous short capitate hairs, and with slender, often elongate appendages. With only a few possible exceptions the species live on Compositae, mostly on Anthemideae (29 spp., of which 24 are on *Artemisia* and 4 on *Achillea*) and Astereae (19 spp., of which 15 are on *Chrysothamnus*), with a few species on Inuleae (*Gnaphalium*, *Helichrysum*). The genus is predominantly American (49 species), with seven European and only three central Asiatic and one E Asian species known. Many of the species were originally described in *Capitophorus*. Daniyarova and Narzikulov (1984) reviewed the genus, and regional accounts are available for Europe (Holman, 1965a; Leclant, 1968a; Heie, 1994) and America (Hille Ris Lambers, 1969; Corpuz-Raros and Cook, 1974).

Pleotrichophorus achilleae Holman

Apt. greenish or pinkish white, with dusky to dark appendages; BL 1.6–2.3 mm. On undersides of leaves of *Achillea pectinata* (= *kitaibeliana*) in E Europe (Slovakia, Hungary). Mon. hol. with ovip. and apt. males in Oct (Holman, 1965a).

Pleotrichophorus ambrosiae Hille Ris Lambers

Figure 8a

Apt. pale green to whitish green with dusky apices to ANT and legs, BL 1.8–2.3 mm. On undersides of leaves of *Ambrosia* spp., widely distributed in USA, and in Mexico and Cuba (Holman, 1974b). Al. have no central dorsal abdominal patch (cf. *Capitophorus* spp.). Mon. hol. in USA (e.g., Colorado), with al. males (Corpuz-Raros and Cook, 1974).

Pleotrichophorus amsinckii Richards

Apt. pale green, appearing ‘weakly pulverulent’ due to dense dorsal hairs; BL 1.6–1.8 mm. On *Amsinckia intermedia* in B.C., Canada and also recorded from Washington, USA (on *Eriogonum* sp., presumably not a true host).

Pleotrichophorus antennarius Corpuz-Raros and Cook

Apt. color in life unknown; BL 1.1–1.6 mm. On *Antennaria plantaginifolia* and *Antennaria* sp. in D.C., USA. Mon. hol. with ovip. and apt. males in Oct (Corpuz-Raros and Cook, 1974).

Pleotrichophorus artemisicola (Williams)

Apt. pale green with pulverulent appearance due to dense, capitate hairs, with mainly dark ANT and legs, black SIPH and white cauda; BL 1.7–1.9 mm. On upper part of stem and leaves of *Seriphidium cana*. Very active. Described from Nebraska, USA, and there are also records from California, Oregon and Kansas.

Pleotrichophorus asterifoliae (Strom)

Apt. shiny dirty white to pale yellow with ANT and legs distally dark; BL 1.8–2.4 mm. On *Aster* sp. in northern USA and Canada, forming large colonies on undersides of lower leaves of plants growing in shady areas. Ovip. were found in autumn in Wisconsin, USA (orig. descr.).

Pleotrichophorus brevinectarius (Gillette and Palmer)

Apt. mid-green, with frosted appearance due to dorsal hairs; BL 1.3–2.0 mm. On leaves and stems of *Artemisia longifolia*, and also recorded from *A. vulgaris* and *Artemisia* sp., in western USA (Colorado, Montana, Wyoming).

Pleotrichophorus chrysanthemi (Theobald)

Plate 16f

Apt. pale green to yellowish; BL 1.8–2.4 mm. On undersides of leaves of florists’ chrysanthemums, (*Dendranthema* spp.), often forming large colonies on yellowing leaves. Described from S Africa, and since recorded from Europe, Egypt, Zimbabwe, India (H.P., Nepal, Korea, Japan, Australia, N America, and Brazil. *Capitophorus formosanus* Takahashi, recorded from Japan and Taiwan on *Chrysanthemum*, is pos-

sibly this species. Apparently entirely anhol.; no sexual morphs are known. [*P. chrysanthemi* is difficult to distinguish from *P. glandulosus* and may not deserve separate species status. Al. from *Dendranthema* generally have fewer sec. rhin. (9–20 on ANT III and none on IV) than those from *Artemisia vulgaris*, which have 14–23 on ANT III and 0–8 on IV (most with 3 or more on IV). Best discriminant for apt. is perhaps the number of hairs on ABD TERG 8; *P. chrysanthemi* has 5–11 (64 per cent with 7–8), and *P. glandulosus* has 8–13 (65 per cent with 9–10). Populations of this species group on *Artemisia apiacea* in China (BMNH colln, leg. VFE) resemble *chrysanthemi* rather than *glandulosus*, and Lee *et al.* (2002c) also identified populations on *Artemisia princeps* var. *orientalis* in Korea as *chrysanthemi*; it seems likely that *chrysanthemi* may have arisen quite recently in E Asia as an anhol. form or clone able to feed on *Dendranthema*, and subsequently dispersed widely on florists' chrysanthemums.]

***Pleotrichophorus decampus* (Knowlton and Smith)**

Figure 14k

Apt. bluish green to apple-green with 'whitish cast' due to dorsal hairs; BL 1.3–2.0 mm. On *Artemisia californica* and *Seriphidium tridentatum* in western USA and Mexico. Records from other *Artemisia* spp. are mostly assignable to *P. pseudoglandulosus*, with which there is much confusion in the literature. Ovip. and al. males of *P. decampus* occur on *S. tridentatum* in Utah in Oct (Corpuz-Raros and Cook, 1974).

***Pleotrichophorus deviatus* Müller**

Apt. dull whitish; BL 1.8–2.4 mm. On undersides of leaves of *Hieracium* spp. in Europe. Ovip. and apt. males in Sept (orig. descr.).

***Pleotrichophorus diutius* Corpuz-Raros and Cook**

Apt. green, BL 1.6–2.2 mm. On leaves of *Artemisia dracunculoides* and *Artemisia* sp. in USA (Colorado, Minnesota). This species is confused with *P. wasatchii* in Palmer (1952); see Corpuz-Raros and Cook (1974).

***Pleotrichophorus duponti* Hille Ris Lambers**

Apt. dull grayish green with green transverse stripes; BL 1.6–2.1 mm. On lower leaves of *Achillea* spp., falling when disturbed. Europe. Ossiannilsson (1959) recorded it from *Leucanthemum vulgare*. Mon. hol. on *Achillea* with ovip. and apt. males in Sept–Oct (Hille Ris Lambers, 1953). 2n=14.

***Pleotrichophorus elongatus* (Knowlton)**

Figure 21f

Apt. shining apple green, slenderly spindle-shaped; BL 1.7–2.9 mm. On leaves and apical parts of *Chrysothamnus* spp. in western USA. As suggested by Palmer (1952) and Hille Ris Lambers (1969), *P. palmerae* (Knowlton) is probably a synonym; the characters given to distinguish it from *elongatus* by Knowlton, and by Corpuz-Raros and Cook (1974), are those likely to be found in alatifform specimens.

***Pleotrichophorus filaginis* (Schouteden)**

Apt. purplish gray, BL 1.5–2.2 mm. Al. have dark brown abdominal pleural intersegmental sclerites. On *Filago* and *Gnaphalium* spp., and also recorded from *Helichrysum arenarium*. They feed solitarily or in small single-parent families on upper- and undersides of leaves. Mon. hol., producing ovip. and apt. males in Oct (Hille Ris Lambers, 1953).

***Pleotrichophorus filifoliae* (Palmer)**

Apt. small, mid-green, with frosted appearance due to dorsal hairs; BL 1.0–1.3 mm. On leaves of *Artemisia filifolia* in Colorado, USA. Only known from original collection.

***Pleotrichophorus glandulosus* (Kaltenbach)**

Figure 14e

Apt. yellowish white, sometimes greenish, occasionally with a pale green median stripe; BL 1.4–2.6 mm. On undersides of lower leaves of *Artemisia vulgaris*, and sometimes on other *Artemisia* and *Seriphidium* spp. Records from other genera are probably of vagrants, or based on misidentifications. In Europe and across Asia to Japan, China, Korea and Taiwan, and introduced to eastern N America; records from western N America are possibly all due to confusion with other species (e.g., *decampus*, *gnaphalodes*, *pseudoglandulosus*). Also in Uruguay (BMNH colln, leg. VFE); but al. from *A. verticillatum* in Uruguay resemble *P.*

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chrysanthemi (q.v.) in lacking sec. rhin. on ANT IV. Ovip. and apt. males of *P. glandulosus* occur on *Artemisia vulgaris* in Sept–Oct (Heie, 1994, Corpuz-Raros and Cook, 1974). 2n=14.

Pleotrichophorus gnaphalodes (Palmer) Figure 14f,h
Apt. pale green with frosted appearance; BL 1.3–2.2 mm. On undersides of leaves of *Artemisia douglasiana* and *A. ludoviciana* in western USA, and in Mexico on *A. mexicana* (BMNH colln, leg. G. Remaudière).

Pleotrichophorus gregarius (Knowlton) Figure 21b,e
Apt. brown to greenish brown in summer and autumn, with ANT black at apices of III and IV and dark on V–VI, and SIPH pale at bases but dark distally; BL 1.8–3.2 mm. Spring generations are dark brown to chocolate brown. On growing points and leaves of *Chrysothamnus* spp., with especially large, dense colonies developing on rabbit brush (*Ch. nauseosus*), in western USA. Ovip. and al. males occur in Oct–Nov. (orig. descr.).

Pleotrichophorus helichrysi Bozhko Figure 311,n
Apt. transparent white or pale greenish, with dull grayish appearance due to the numerous fan-shaped dorsal hairs; BL 1.5–2.1 mm. Living well-camouflaged on undersides of leaves of *Helichrysum arenarium*. In Denmark, Poland, Czech Republic and S Russia (Bozhko, 1976b; Heie, 1994).

Pleotrichophorus heterohirsutus (Gillette and Palmer) Figure 14g
Apt. pale green with frosted appearance due to dorsal hairs; BL 1.0–1.8 mm. On leaves and stems of *Seriphidium tridentatum*, forming crowded colonies on young plants, in western USA (Colorado, Idaho, Utah, Wyoming). Ovip. and apt. males in Sept (Palmer, 1952).

Pleotrichophorus hottesi Hille Ris Lambers
Apt. grayish green; BL 1.9–2.3 mm. On *Achillea* spp. (?*lanulosa*, *millefolium*) in N America (Colorado, N Carolina, Manitoba). Mon. hol. with apt. males in Sept (orig. descr.).

Pleotrichophorus infrequens (Knowlton and Smith) Figure 14a
Apt. pale (color unrecorded), BL c.1.3–1.4 mm. On leaves of *Seriphidium tridentatum* in western USA (Idaho, Utah, Oregon) and Mexico (BMNH, leg. G. Remaudière). Specimens collected from *Seriphidium rigidum* (Oregon: BMNH collection) have a rather larger cauda, and may represent a different taxon.

Pleotrichophorus lagacei Hille Ris Lambers
Color of apt. in life unknown, probably very pale with frosted appearance; BL 1.8–2.5 mm. On *Haplopappus bloomeri* at an altitude of 2600 m in California, USA.

Pleotrichophorus longinectarius (Gillette and Palmer)
Apt. pea-green, with frosted appearance; BL 2.0–2.5 mm. On leaves and stems of *Artemisia longifolia* and *Artemisia* sp. in western USA (Utah, Wyoming) and Canada (Alberta, Manitoba).

Pleotrichophorus longipes (Gillette and Palmer) Figure 14b
Apt. bluish apple green, and apparently wax-dusted; BL 2.4–3.0 mm. Living singly and well-camouflaged on leaves of *Seriphidium tridentatum* in western USA (California, Colorado, Idaho, Utah, Wyoming). Ovip. and apt. males occur in Sept (Palmer, 1952).

Pleotrichophorus longirostris Hille Ris Lambers
Apt. color in life unknown; BL 1.6–1.9 mm. On *Eriophyllum staechadifolium* in California, USA. This species has fan-shaped dorsal hairs and a long stiletto-shaped R IV+V (0.17–0.19 mm), similar in length to the short thin SIPH.

Pleotrichophorus magnautensus (Knowlton and Smith) Figure 21c
Apt. green, with short black SIPH; BL 2.3–2.7 mm. On *Chrysothamnus viscidiflorus* in Utah, Wyoming and Colorado, USA. Al. are undescribed.

Pleotrichophorus narzikulovi Umarov
Apt. green, apparently dusted with gray wax; BL 2.5–3.0 mm. Living in small colonies on *Artemisia dracunculus* in C Asia (Kyrgyzstan). Al. unknown.

***Pleotrichophorus obscuratus* Hille Ris Lambers**

Apt. grayish green, appearing waxy due to dorsal hairs, with dark ANT, legs, apices of SIPH, cauda and anal plate, and sometimes conspicuously dark subgenital plate; BL 1.3–1.8 mm. On *Artemisia californica* in California, and there are similar specimens in the BMNH collection from ?*Seriphidium canum* in Oregon. Apparently rather rare. Al. undescribed.

***Pleotrichophorus oestlundii* (Knowlton)**

Figure 21h

Apt. bluish green to apple green, appearing to have white pruinosity due to dense dorsal covering of fan-shaped hairs; BL 1.5–2.3 mm. On *Chrysothamnus* spp. in western USA. Ovip. (red to brownish red in life) and al. males occur in Oct (orig. descr.).

***Pleotrichophorus ohioensis* Smith**

Apt. greenish with grayish white overcast due to fan-shaped hairs; BL 2.1–2.4 mm. On undersides of leaves of *Helianthus* sp. in Ohio, USA. Ovip. and al. males in mid-Oct (orig. descr.).

***Pleotrichophorus packi* (Knowlton)**

Figure 21g

Apt. rather slenderly spindle-shaped, bluish green to apple green or yellow, appearing rather shiny or frosted due to fan-shaped dorsal hairs, with long dark SIPH, curved outward apically; BL 1.9–3.5 mm. On leaves of *Chrysothamnus* spp. in western USA. Ovip. and al. males in late Oct–Nov. (Palmer, 1952). Corpuz-Raros and Cook (1974) described one sample with shorter siphunculi and a more hairy cauda from *Ch. nauseosus* as a subspecies, *P. packi* ssp. *brevis*, although from their description this seems closer to *P. sporadicus*.

***Pleotrichophorus parilis* Corpuz-Raros and Cook**

Apt. pale, color unknown, BL 1.4–2.0 mm. On *Artemisia dracunculoides* in Minnesota, USA. Ovip. and al. males occur in Sept (Corpuz-Raros and Cook, 1974).

***Pleotrichophorus patonkus* (Hottes and Frison)**

Figure 5c

Apt. apple green with darker green spinal and lateral stripes, with hoary appearance due to the numerous capitate dorsal hairs; BL c.1.6–1.9 mm. On *Achillea millefolium* in central USA (Illinois, Missouri, Tennessee, Kentucky). Aphids collected from *Erigeron philadelphicus* in Illinois (BMNH colln, VFE 18,253) may also be this species. Records prior to 1974 including the original description are confused with *P. pseudopatonkus* (q.v.); the distinction between these two species still needs further confirmation. Hottes and Frison (1931) described ovip. and al. males collected in Oct–Nov, but these may have at least partly been *P. pseudopatonkus*.

***Pleotrichophorus patonkusellus* Corpuz-Raros and Cook**

Apt. color in life unknown, probably pale green with hoary appearance due to the dense capitate hairs; BL 1.1–1.6 mm. On *Achillea millefolium* and *Achillea* sp. in Utah, USA (Corpuz-Raros and Cook, 1974). Very similar to *P. patonkus* apart from the denser and somewhat shorter dorsal hairs, and possibly just a local variant of that species.

***Pleotrichophorus persimilis* Börner**

Apt. pale yellowish red to brownish, appearing wax-powdered; BL 1.9–2.6 mm. On *Artemisia campestris* and *A. scoparia*, in Europe, and east to Iran and Kazakhstan. Ovip. and apt. males occur on *A. campestris* in Sept in Germany (Hille Ris Lambers, 1953). Green aphids with rather shorter appendages found in Afghanistan on *A. turanica* are regarded as a subspecies, *A. persimilis* ssp. *afghanensis* Narzikulov and Umarov (Daniyarova and Narzikulov, 1984).

***Pleotrichophorus pseudoglandulosus* (Palmer)**

Figure 14j

Apt. bluish green, with frosted appearance due to dorsal hairs; BL 1.1–2.0 mm. Living singly on leaves and stems of *Artemisia* spp. (*douglasiana*, *frigida*, *ludoviciana*, *vulgaris*) in western USA, and in Canada (Manitoba, Saskatchewan). There has been considerable confusion with other species in the literature; records of *P. glandulosus* from native American *Artemisia* spp. in western USA are likely to be this species, and most records from *Seriphidium tridentatum* are probably referable to the very similar *P. decampus*. *P. intermedius*,

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described from *A. frigida* in Minnesota (Corpuz-Raros and Cook, 1974) is also very similar and possibly a local variant. Ovip. and apt. males (cf. *decampus*) occur in Oct–Nov in Colorado (Palmer, 1952) and in Sept in Manitoba (BMNH colln, leg. A.G. Robinson).

Pleotrichophorus pseudopatonkus Corpuz-Raros and Cook

Apt. whitish green to green, BL 1.3–1.9 mm. On *Achillea millefolium* and *Achillea* sp. in north, central and eastern USA, western Canada (New Brunswick) and Mexico (BMNH, leg. G. Remaudière). Very similar to *P. patonkus*, but with a shorter, less acute R IV+V and shorter SIPH (Corpuz-Raros and Cook, 1974). Ovip. and al. males are possibly included in original description of *P. patonkus* (Hottes and Frison, 1931).

Pleotrichophorus pullus (Gillette and Palmer)

Figure 14d

Apt. brown with appendages mainly dark brown to black; BL 1.7–2.0 mm. On leaves of *Artemisia longifolia* and *Seriphidium* spp. (*canum*, *tridentatum*) in western USA (Palmer, 1952). *P. rusticatus* (Knowlton and Smith) is very similar and regarded as a synonym by Hille Ris Lambers (1969). Corpuz-Raros and Cook (1974) resurrected *P. rusticatus* as a good species on the basis of differences in shape of the frontal hairs, but after examining types of both, we think this is probably only local variation.

Pleotrichophorus pycnorhysus (Knowlton and Smith)

Figure 21a

Apt. pale green to apple-green, somewhat shiny, with long, dark-tipped SIPH; BL 1.6–2.3 mm. On *Chrysothamnus viscidiflorus* and *Gutierrezia* sp. in Utah, USA; also recorded from Idaho and Montana. Also recorded from *Seriphidium tridentatum*, but this is unlikely to be a true host plant.

Pleotrichophorus quadritrichus (Knowlton and Smith)

Figure 14c,i

Apt. bluish green, with grayish cast due to dorsal hairs, and usually with dark SIPH; BL 1.1–2.0 mm. On *Artemisia* and *Seriphidium* spp. in western USA. The variation in this species was discussed by Corpuz-Raros and Cook (1974), who created subspecies *P. quadritrichus* ssp. *vulgaris* and *P. quadritrichus* ssp. *pallidus*; the latter is a pale form that is keyed separately and resembles *P. gnaphalodes*. Main distinguishing features for the *quadritrichus* group are the large, constricted cauda (a feature shared with *P. gnaphalodes*), and the often strap-like apices of the frontal hairs. Ovip. and al. males occur in Oct.

Pleotrichophorus remaudierei Leclant

Apt. pale green with a darker spinal stripe; BL 1.2–1.6 mm. Living singly on undersides of leaves of *Erigeron acer* in the French Alps. Mon. hol.; fund. were collected in April (Leclant, 1968a).

Pleotrichophorus spatulavillus (Knowlton and Smith)

Apt. pale green, with white frosted appearance; BL 1.4–1.7 mm. On *Seriphidium tridentatum* and *Artemisia* sp. in Idaho and Utah, USA.

Pleotrichophorus sporadicus (Knowlton)

Apt. spindle-shaped, apple-green, described as ‘heavily pruinose above’ (presumably an effect of the fan-shaped/spatulate dorsal hairs), with mainly dark SIPH; BL 2.1–4.1 mm. On leaves and stems of *Chrysothamnus nauseosus* in western USA. Ovip. were found in Oct. This is one of a complex of forms described from this host, and distinguished mainly by differences in number and form of dorsal hairs, which are likely to be influenced by environment and by degree of alatiformity. *P. neosporadicus* Corpuz-Raros and *P. packi* ssp. *brevis* are both very close to *P. sporadicus*, and we could not find reliable distinguishing characters for either of them.

Pleotrichophorus stroudi (Knowlton)

Color of apt. in life not noted, presumably pale with frosted appearance due to fan-shaped dorsal hairs, and with ANT and SIPH dark except at their bases; BL 2.0–2.5 mm. Host uncertain (swept from brush); probably *Chrysothamnus nauseosus* var. *latisquameus*, or *Poliomintha incana* (Smith and Parron, 1978). New Mexico, USA. It belongs to a taxonomically difficult group of closely related forms feeding on *Ch. nauseosus* in western USA (see *packi*, *sporadicus*).

Pleotrichophorus tetradymiae Smith and Knowlton

Apt. 'black to blackish green' (?), with black SIPH; BL 1.5–2.1 mm. On *Tetradymia canescens* in Rocky Mountain region of USA.

Pleotrichophorus triangulatus Corpuz-Raros and Cook

Apt. green; BL c.1.7 mm. On *Agoseris* sp. in western USA (California, Colorado).

Pleotrichophorus utensis (Pack and Knowlton)

(= *Capitophorus acanthovillus* Knowlton and Smith)

Figure 21d

Apt. green with black SIPH; BL 1.4–1.9 mm. On *Chrysothamnus viscidiflorus* and *Gutierrezia* spp. in western USA (Utah, Nevada, Oregon). *P. acanthovillus* has been distinguished from *P. utensis* occurring on the same hosts solely on the basis of differences in shape of dorsal hairs in apt., and in particular the sub-apical caudal hair(s), which are said to be pointed in apt. of *acanthovillus*, and flattened apically in *utensis* (Corpuz-Raros and Cook, 1974). This character is unreliable as it is related to the degree of alatiformity, al. having longer and less expanded hairs than apt.

Pleotrichophorus villosae Robinson

Apt. very pale green, almost silvery (due to dense covering of fan-shaped dorsal hairs); BL 1.6–2.1 mm. On *Chrysopsis villosa* in Manitoba, Canada. Al. and other morphs undescribed.

Pleotrichophorus wasatchii (Knowlton)

Apt. greenish, with apparent pruinosity due to dense covering of fan-shaped hairs; BL 1.6–2.1 mm. On *Chrysothamnus* spp. in western USA. Records from other host plants and from eastern USA are probably all due to confusion with other species; see Corpuz-Raros and Cook, 1974.

Pleotrichophorus xerozoous (Knowlton and Smith)

Apt. green, with ANT dark distally, and SIPH pale basally and dusky on distal half; BL 1.7–2.5 mm. Al. unknown. On *Chrysothamnus* spp. in Idaho and Utah, USA. This species is closely related to the much commoner *P. gregarius*, and is possible a seasonal variant, differing in color in life as well as in characters given in key.

Pleotrichophorus zoomontanus (Knowlton and Smith)

Apt. grayish green, BL 1.7–2.4 mm. On *Seriphidium tridentatum* and *Artemisia* spp. in western USA (Colorado, Idaho, Utah, Wyoming). It resembles *P. longinectarius*, especially in having similarly protruding compound eyes, but has a shorter R IV+V and differences in frontal and dorsal hairs (Corpuz-Raros and Cook, 1974). Al. undescribed.

Polytrichaphis Miyazaki

Aphidinae: Macrosiphini

Two E Asian species on Illiciaceae, with numerous dorsal hairs and thick, tapering siphunculi resembling *Indiaphis*, but first tarsal segments have 2 hairs displaced from apex, the tergum is membranous and eyes have distinct ocular tubercles. Al. have dark-bordered wing veins and sec. rhin. on ANT III–IV or III–V.

Polytrichaphis fragilis Miyazaki

Apt. yellow to pale-yellowish green with dark brown SIPH and pale cauda; BL c.1.6–1.8 mm. On undersides of leaves of *Illicium anisatum* in Japan (Miyazaki, 1971).

Polytrichaphis illicium Qiao and Zhang

Apt. black; BL c.1.6–1.8 mm. On *Illicium verum* in China (Qiao and Zhang, 2001).

Prociphilus Koch

Eriosomatinae: Pemphigini

About 50 species lacking SIPH but with well-developed wax glands. They mainly form leaf-nest pseudogalls on Rosaceae, Caprifoliaceae, and Oleaceae (and perhaps other families), from which they mostly migrate to roots of Coniferae, a few species going to roots of monocots, and occasionally dicots. Twenty species are American, 20 occur in the Far East, 7 in Europe, and 3 in C Asia. Life cycles of many species

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are unknown. Accounts are available for NW Europe (Heie, 1980b), C Asia (Narzikulov, 1964), India (A.K. Ghosh, 1984), Japan (Inouye, 1956), China (Tao, 1970), and America (Smith, 1974). See also Blackman and Eastop (1994).

Prociphilus americanus (Walker)

Apt. (fund.) dark brown to black, globose, in curled terminal leaves or on twigs and suckers of Oleaceae, usually *Fraxinus* but with records also from *Forsythia* and *Syringa*. Al. produced in second generation from late April are very dark green to black with dusky, bluish-tinged wings and long bluish white wax flocks extending posteriorly; BL 2.8–4.8 mm. Heter. hol., migrating to form wax-covered colonies on *Abies* roots (Blackman and Eastop, 1994).

Prociphilus bumeliae (Schrank)

Apt. (fund.) brown covered with wax wool, in loose 'leaf-nests' of Oleaceae, usually *Fraxinus* but sometimes *Ligustrum* or *Syringa*. Spring colonies also form on bark of stems and branches. All progeny are emigrant al., secreting white wax; BL 3.8–5.5 mm, migrating in May–June to found wax-covered colonies on roots of *Abies* (Blackman and Eastop, 1994). NW, C and E Europe. Records from E Asia should probably all be referred to *P. oriens*.

Prociphilus chaenomelis Lee, Seo and Hwang

Apt. (fund.) undescribed, al. dark brown producing copious wax; BL 2.1–2.8 mm. In rolled leaves of *Chaenomeles sinensis* in Korea. Presumably heter. hol., migrating to unknown secondary host.

Prociphilus clerodendri Okamoto and Takahashi

Apt. not described. Al. with head, eyes, ANT and mesothorax black, legs black and reddish brown, and abdomen yellowish green with a reddish tinge, secreting white cottony wax; BL c.4.5 mm. On *Clerodendron trichotomum* in Korea.

Prociphilus (Neoparacletus) corrugatus (Sirriner)

Apt. (exules) milky white, sometimes tinged with pale brown, entirely covered with wax powder; BL 2.9–3.8 mm. In large colonies on roots of Cyperaceae; *Juncus* are the most commonly recorded hosts, but it may also occur on *Carex* (Strom, 1942, as *Neoparacletus caricis*). Widely distributed in N America. Migration occurs in autumn to the primary host, *Crataegus*, but populations also persist on Cyperaceae. See also Blackman and Eastop (1994).

Prociphilus (Stagona) diloniceræ Zhang

Apt. (fundatrix) undescribed; BL of al. (fundatrigenia) c.3.6 mm. On *Lonicera* sp. in Tibet. Secondary host unknown.

Prociphilus erigeronensis (Thomas)

Plate 2h

Apt. (exules) white to pale yellow with darker head, ANT, legs, and end of abdomen, secreting white wax; BL 1.7–2.3 mm. In ant-attended colonies on roots of many plants, especially Compositae (*Ambrosia*, *Aster*, *Cichorium*, *Erigeron*, *Lactuca*, *Solidago*, *Tragopogon*), Gramineae (*Agrostis*, *Muhlenbergia*, *Poa*, *Triticum*) and Leguminosae (*Arachis*, *Phaseolus*, *Trifolium*). Widely distributed in USA, and also recorded from Ontario, Canada, and from Puerto Rico. Predominantly anhol.; Smith (1974) redescribed this species, including al. sexup., and discussed a possible partial holocycle with *Crataegus* (or *Amelanchier*) as primary host. The name is possibly being applied to more than one species.

Prociphilus gambosae Zhang and Zhang

Apt. (exules) grayish green, secreting long wax flocks; BL c.2.4 mm. On *Jambosa caryophylla* in Hebei, China.

Prociphilus (Stagona) himalayensis Chakrabarti

Apt. (fund.) pale brown; BL 2.2–3.3 mm. Rolling terminal leaves of *Lonicera quinquelocularis* in India (H.P.). All progeny al. (BL 2.3–3.0 mm), migrating in May–June to roots of *Pinus excelsa*. Al. sexuparae (BL 2.6–3.4 mm) return to *Lonicera* in Nov–Dec (Banerjee and Chakrabarti, 1993). ***P. trinus*** Zhang, col-

lected from *L. japonica* in China, is probably a synonym on the basis of the published description. The distinction between *P. himalayensis* and the C Asian species *P. umarovi* is also unclear.

***Prociphilus (Stagona) konoii* Hori**

Apt. (fundatrix) yellowish green; BL 2.5–3.0 mm. Curling terminal leaves of *Lonicera* spp. longitudinally (orig. descr.). All progeny al. (BL 2.5–2.8 mm), migrating in June–July to roots of *Picea glehni*. Sexuparae return to *Lonicera* in Oct–Nov. In Japan and E Siberia. $2n=18$.

***Prociphilus kuwanai* Monzen**

Apt. exules, presumably secreting white wax, possibly occur on roots of *Rumex japonicus* (Higuchi and Miyazaki, 1969), but this still needs confirmation. In Japan, Korea and E Siberia Heter. hol., with sexual phase and leaf-galls on *Pyrus* (Blackman and Eastop, 1994).

***Prociphilus longianus* Smith**

Apt. (exules) appearance in life unrecorded, presumably secreting white wax, with conspicuous dark sclerotic tubular extension of anal plate around cauda; BL 2.7–3.3 mm. Host uncertain; recorded from a ‘gall on *Conophilus americanus*’ (presumably *Conopholis americana*), also from base of stem of a ‘garden geranium’, roots of an unidentified grass, and from ants’ nests.

***Prociphilus (Stagona?) lonicerae* Shinji**

Apt. (fund.) green; BL not recorded. Rolling young leaves of *Lonicera japonica* in Japan. All progeny al. (BL c.2.1 mm), migrating in early June to unknown secondary host.

***Prociphilus oleae* (Leach)**

Apt. (fund.) covered in white wax wool; BL c.3.2 mm. On young growth of *Olea europea* in spring, and also recorded from *Phillyrea media*, not causing leaf deformation. In Mediterranean region. Heter. hol., migrating from Oleaceae to roots of an unknown secondary host; some specimens collected on vine roots may be this species (Barbagallo and Stroyan, 1982). Roberti and Monaco (1987) gave an account of this species in Italy.

***Prociphilus oriens* Mordvilko**

Apt. (fund.) in spring leaf-nests on Oleaceae (*Fraxinus*, *Forsythia*, *Syringa*), and sometimes on various other plants such as woody Rosaceae and *Lonicera* (Kôno, 1940). Progeny are all al., covered with white wax, BL: 3.5–5.5 mm. Heter. hol., migrating in June–early July to roots of *Abies* (Blackman and Eastop, 1994). India, China, E Russia, Korea and Japan (type locality).

***Prociphilus (Stagona?) umarovi* Narzikulov**

Apt. (fund.) green; BL 2.0–2.3 mm. Curling leaves of *Lonicera* spp. in spring. All progeny al. (BL 2.2–3.6 mm), migrating in June to unknown host (but see *P. himalayensis*). In C Asia (Kazakhstan, Tajikistan).

***Prociphilus ushikoroshi* Shinji**

Apt. (fund.) yellowish green, secreting white wax; BL c.2.2 mm. On leaves of *Photinia* (= *Pourthiaca villosa* in spring, causing edges of leaves to curl towards underside and become thickened and yellowish green (Monzen, 1929, as *P. pourthiaca*). All second generation are al. (BL c. 2.1 mm, sec. rhin. III 10–14, IV 4–7, V 1–4, VI 0.1), migrating in June. Secondary host is uncertain, possibly roots of *Larix* (Shinji, 1932). Al. sexuparae return to deposit sexual morphs on trunk of *Photinia* in Oct (Monzen). In Japan and Korea. [In India, al. with many more sec. rhin. (III 35–36, IV 9–10, V 10–11, VI 0–2) have been collected on *Photinia notoniana* (A.K. Ghosh *et al.*, 1970a; *Prociphilus* ‘sp. A’).]

***Prociphilus (Stagona) xylostei* (De Geer)**

Figure 38a

Fund. secreting copious wax; BL 3.0–4.6 mm. On *Lonicera* spp. in spring, causing leaves to curl and become spotted with yellow (Mordvilko, 1935, Heie, 1980b). All second generation are al. (BL 2.3–3.7 mm), migrating in late June–July to found colonies on roots of *Picea abies* (Blackman and Eastop, 1994). Widely distributed in Europe, in India (U. P., Kashmir), and introduced to N America. Populations in E Siberia are regarded as a subspecies, *P. xylostei* ssp. *ussuricus* Pashtshenko. $2n=10$ (samples from Europe and India).

***Protrama* Baker**

Lachninae: Tramini

Five palaeartic species with greatly elongate hind tarsi and SIPH present as pores on pigmented flat cones. Apt. are often alatiform with variable dorsal sclerotisation. Like *Trama* they mostly live on roots of Compositae, and are mainly anhol., at least in W Europe. Accounts are available for W Europe (Eastop, 1953; Heie, 1995), Iberia (Nieto Nafria *et al.*, 2002a), Poland (Szelegiewicz, 1978), C Asia (Narzikulov, 1963) and India (A.K. Ghosh, 1982a).

***Protrama flavescens* (Koch)**

Apt. (all alatiform) dirty white or cream with variable dark dorsal cross-bars; BL 2.7–3.8 mm. Al. and intermediates between al. and apt. very common. On roots of *Artemisia* spp., and sometimes on *Chrysanthemum*, *Cichorium* and certain other Compositae. Europe, and perhaps in India if *P. longitarsus sclerodensus* is a synonym. Anhol. $2n=40-42$.

***Protrama longitarsus* (Ferrari)**

Appearance in life unknown, probably rather green or gray with darker dorsal cross-bands; BL about 3.0–3.8 mm. On roots of *Artemisia campestris* in Italy and Switzerland (Eastop, 1953), and also recorded from Germany, Poland and Czech Republic. Börner (1952) recorded it from *Doronicum caucasicum*. Life cycle unknown; probably mainly anhol., but ovip. were collected in Oct in Germany (BMNH colln, leg. H Zwölfer). No satisfactory morphological discriminants to distinguish *P. longitarsus* from *P. ranunculi* have been found. Heavily pigmented specimens in India without sec. rhin. on ANT III were described as a subspecies, *P. longitarsus ssp. sclerodensus* Kumar, and similar aphids have since been recorded from roots of various plants (A.K. Ghosh, 1982a). However, specimens under the name *sclerodensus* in the BMNH collection are indistinguishable from *P. flavescens*.

***Protrama radialis* (Kaltenbach)**

Plate 3f

Apt. dirty white to pale yellow or pale brownish green, with brown SIPH cones; BL 2.5–3.4 mm. In ant-attended colonies on roots of various Compositae-Cynareae (*Arctium*, *Carduus*, *Cirsium*, *Cynara*). Europe (not Iberian peninsula). Apparently completely anhol. $2n=c.60$.

***Protrama ranunculi* (del Guercio)**

Apt. (all alatiform) dirty white or cream with variable dark dorsal cross-bars; BL 2.8–3.7 mm. On roots of *Ranunculus* spp. attended by ants. Europe, W Siberia, C Asia. $2n=c.36$.

***Protrama taraxaci* Kan**

Apt. brownish green; BL c. 2.5 mm. On roots of *Taraxacum officinale* in Uzbekistan.

***Pseudacaudella* Börner**

Aphidinae: Macrosiphini

One moss-feeding species similar to *Myzodium* but with lower and less scabrous ANT tubercles, and adaptations for surviving adverse conditions without a sexual phase.

***Pseudacaudella rubida* Börner**

Plate 16h, Figure 44d,f

Apt. shining olive green to brown with rusty patches at SIPH bases; BL 0.7–1.0 mm. Sec. rhin. in al. III 7–15, IV 3–7, V 0–2. On mosses in various genera; *Acrocladium*, *Climacium*, *Dicranum*, *Hylocomium*, *Mnium*, *Pleurozium*, *Polytrichum*, *Pseudoscleropodium*, *Thuidium*). Europe, Morocco (BMNH colln, leg. P.N. Lawrence), Brazil (leg. S. Lazzari) and USA (N Carolina), and al. have been trapped in New Zealand (leg. J.A. and P.A. Ware). It seems able to survive in dry as well as humid habitats, and is adapted for anholocycle, with a specialised overwintering 2nd instar having a dark sclerotic cuticle and a wax coat (Müller, 1973b; Tinguely, 1993). However there is possibly host alternation from *Sorbus* in Ukraine (as *Staegeriella* sp.; Bozhko, 1976a: 30).

***Pseudaphis* Hille Ris Lambers**

Aphidinae: Macrosiphini

Three species in Africa and Asia, differing from *Sitobion* by their completely undeveloped ANT tubercles and several other characters. Aldryhim and Ilharco (1997) revised the genus.

***Pseudaphis abyssinica* Hille Ris Lambers**

Apt. pale green with variably developed dark dorsal cross-bands; BL 1.4–2.2 mm. In ant-attended colonies on *Rosa* spp. and *Rubus apetalus* in E Africa (Eritrea, Ethiopia, Burundi), and also found on unidentified Gramineae in Yemen (Aldryhim and Ilharco, 1997), indicating that host alternation probably occurs. Al. have been reported from India (A.K. Ghosh *et al.*, 1971b).

***Pseudaphis arabica* Aldryhim and Ilharco**

Apt. brown with darker head, thorax and dorsal abdominal cross-bands; BL 1.7–2.2 mm. In flower-heads of *Pennisetum setaceum* in Saudi Arabia and Eritrea (Aldryhim and Ilharco, 1997). Closely related to *P. sijui*, differing only in its larger size and more extensive sclerotisation, which differences could be environmentally determined.

***Pseudaphis sijui* (Eastop)**

Plate 26g

Apt. dark olive-green to brown, slightly wax-dusted; BL 1.1–1.6 mm. In flower-heads of various grasses (*Cenchrus*, *Exothea*, *Hyparrhenia*, *Miscanthus*, *Pennisetum*, *Setaria*, *Sorghum*), and also *Cyperus* sp., in E Africa (Kenya, Burundi). Remaudière and Autrique (1985) give further information.

***Pseudasiphonaphis* Robinson**

Aphidinae: Aphidini

One N American species with very small flangeless SIPH, well-developed lateral tubercles and extensive wax secretion (Robinson, 1965).

***Pseudasiphonaphis corni* (Tissot)**

Apt. brownish covered in wooly gray wax; BL 1.6–2.1 mm. In dense colonies on main stems and flower-stalks of *Pilea pumila*, obscured by copious flocculent wax. Also reported to occur on *Scutellaria lateriflora* (Robinson, 1965) and *Chelone glabra* (Leonard, 1968). In eastern USA and Canada. Probably heter. hol.; spring colonies occur on *Cornus* (host alternation needs experimental confirmation). Al. males in Oct on *Pilea* (Hottes and Frison, 1931, as *Asiphonaphis anogis*).

***Pseudobrevicoryne* Heinze**

Aphidinae: Macrosiphini

Three palaeartic species related to *Brevicoryne* but with very short SIPH, first tarsal segments with 3,3,2 hairs, and apt. with sec. rhin. They roll the leaves of Cruciferae.

***Pseudobrevicoryne buhri* Börner**

Apt. yellowish, powdered with gray wax; BL 1.5–2.3 mm. Al. have sec. rhin. III 35–56, IV 5–11, V 3–6. In colonies on upper sides of leaves of *Barbarea* spp., which are rolled longitudinally upwards. Also recorded from *Brassica campestris* (Shaposhnikov, 1964). In N Europe, including UK, Scandinavia, N Germany and N Poland, and south-eastward to Carpathians and Ukraine.

***Pseudobrevicoryne erysimi* Holman**

Apt. grayish green to pale green, covered in wax powder, with dark brown to black appendages; BL 1.1–1.8 mm. Al. have sec. rhin. III 20–31, IV 2–5, V 0–1. Living on upper sides of leaves of *Erysimum* spp., which are rolled upwards into compact tubes and usually become reddish to dirty purple. Known from Czech Republic and Hungary. Mon. hol., with apt. males (orig. descr.).

***Pseudobrevicoryne leclanti* Petrović and Remaudière**

Apt. green, covered in white wax powder; BL 1.3–1.9 mm. Al. have sec. rhin. III 30–38, IV 4–7, V 1–3. On upper sides of leaves of *Arabis alpina*, causing lateral parts of leaves to fold upwards towards midrib. Known only from Montenegro (former Yugoslavia). Mon. hol. with apt. males and ovip. in mid-Aug (Petrović and Remaudière, 2002).

***Pseudocercidis* Richards**

Aphidinae: Macrosiphini

Two species in western N America, possibly related to *Sitobion* but with first tarsal segments bearing 5 or 6 hairs, short cylindrical SIPH, and a short cauda.

***Pseudocercidis rosae* Richards**

Plate 26h

Apt. covered with white wax powder; BL 2.2–3 mm. Inside curled or folded leaflets of terminal leaves of *Rosa* spp., usually in shaded conditions, in western USA and Canada. Mon. hol, although found on *Lupinus nootkatensis* in Alaska (BMNH colln, leg. F.W. Hottes). Al. are rare. Ovip. and al. males occur in Sept (Robinson, 1963). 2n=12.

***Pseudocercidis tutigulus* (Hottes)**

Apt. pale yellow–green; 2.3–2.7 mm. On undersides of leaves and flower-stems of *Capnoides* (as *Corydalis*) sp. in Colorado, USA. The host of some specimens in BMNH colln. (leg. H.L.G. Stroyan and F.C. Hottes, 10.vii.1966) is tentatively identified as *C. brandegeei*. Heter. hol., with sexual phase on wild *Rosa*, on which al. males and ovip. were found in Sept (Hille Ris Lambers, 1961, as *Adactynus tutigula*). [This species has previously been placed in *Kakimia* (Palmer, 1952) and *Acyrtosiphon* (e.g., Blackman and Eastop, 2000).]

***Pseudoepameibaphis* Gillette and Palmer**

Aphidinae: Macrosiphini

Four N American species on *Artemisia* and *Seriphidium*, with the typical stillette-shaped R IV+V of aphids feeding on Anthemideae, and related to *Epameibaphis*, *Flabellomicrosiphum* and the palaeartic genus *Coloradoa*, but with characteristically shaped SIPH. Palmer (1952) reviewed the genus.

***Pseudoepameibaphis essigi* Knowlton and Smith**

Apt. whitish yellow to orange–green, with pale appendages; BL 0.7–1.1 mm. On *Seriphidium tridentatum* in western USA. Mon. hol.; ovip. and al. males found in Utah in Oct (BMNH colln, leg. G.F. Knowlton).

***Pseudoepameibaphis glauca* Gillette and Palmer**

Apt. glaucous green, pulverulent, with pale appendages; BL 1.2–1.5 mm. On leaves and stems of *Artemisia frigida* in western USA. Mon. hol. with apt. males (Palmer, 1952). The account by Knowlton and Smith (1938) under this name applies to *P. tridentatae*.

***Pseudoepameibaphis tridentatae* (Wilson)**

Plate 15f, Figure 12g

Apt. pale yellowish with frosted appearance due to numerous pale fan-shaped dorsal hairs; BL 1.3–1.5 mm. On leaves and stems of *Seriphidium tridentatum* in western USA, and collected from *Artemisia cana* in Saskatchewan, Canada (BMNH colln, leg. W.R. Richards). Mon. hol.; ovip. and al. males in Utah in Oct–Nov (BMNH colln, leg. G.F. Knowlton).

***Pseudoepameibaphis xenotrichis* Knowlton and Smith**

Apterae are greenish, with whitish appearance due to numerous pale fan-shaped dorsal hairs; BL 0.9–1.2 mm. On *Seriphidium tridentatum* in western USA.

***Pseudoregma* Doncaster**

Hormaphidinae: Cerataphidini

About 12 species of wax-dusted aphids living mostly in SE Asia on Zingiberidaceae or bamboos, with only one species specialising on other Gramineae. Most were originally placed in *Oregma*. Host alternation with *Styrax* as primary host has been established for only one species. The genus is noted for its pseudoscorpion-like ‘soldiers’ (Aoki, 1987). Noordam (1991) gave a thorough account of the species in Java. For bamboo-feeding species see Blackman and Eastop (1994).

***Pseudoregma alexanderi* (Takahashi)**

Apt. pale brown to brownish black with a purple tinge, lightly dusted with wax powder that is often thicker on the posterior abdomen; BL 2.2–4.3 mm. Usually in large colonies on bamboos, but there are also records from *Miscanthus* and *Echinochloa*. Life cycle unclear. Taiwan, China, Sumatra, Nepal and NE India. See also Blackman and Eastop (1994). 2n=12.

***Pseudoregma nicolaiiae* (Takahashi)**

Apt. brownish black, secreting columns of white powdery wax in four longitudinal rows; BL 1.6–1.8 mm. On undersides of leaves, along veins towards middle of leaves (cf. *sundanica*), of various Zingiberaceae

(*Elettaria*, *Etilingera*, *Hedychium*. SE Asia (Java, Malaya, Sumatra). Very closely related to *P. sundanica* (Stern *et al.*, 1997).

Pseudoregma panicola (Takahashi)

Apt. brownish black or dark brownish red–violet, secreting columns of dense white wax; BL 1.1–1.9 mm. On many genera and species of tropical grasses (*Andropogon*, *Capillipedium*, *Cyrtococcum*, *Eragrostis*, *Ichnananthus*, *Lasiacis*, *Oplismenus*, *Panicum*, *Paspalum*, *Pseudoechinolaena*, *Setaria*, *Stenotheca*, *Thysanolaena*), on undersides of leaves, stems and inflorescences. Africa, S India, E and SE Asia, New Zealand (Cottier, 1953). Life cycle unknown, presumably mainly or entirely anhol. Noordam (1991) provided full descriptions of known morphs.

Pseudoregma sundanica (Van der Goot)

Apt. blackish brown or black, sometimes with tufts of white wax marginally and spinally; BL 1.1–2.0 mm. On various Zingiberaceae (*Alpinia*, *Amomum*, *Costus*, *Etilingera*, *Zingiber*), colonising bases of leaves, stems and petioles, attended by ants (Noordam, 1991). Also recorded from *Curculigo capitulata*. Java, Malaya, Sumatra, Philippines. Heter. hol. in Sumatra with sexual phase and galls on *Styrax paralleloneura* (Stern *et al.*, 1997).

Pterasthenia Stroyan

Pterastheniinae

A small African genus mainly associated with woody Leguminosae (e.g., *Millettia* spp.; see Blackman and Eastop, 1994). There are several records of the type species, *Pterasthenia shiraensis* Stroyan, from Gramineae, but these plants are almost certainly not used as hosts, and there are now records of this species from *Millettia* in Kenya (BMNH colln, leg J.H. Martin) and Tanzania (BMNH colln, leg. D. Hollis). Remaudière and Quednau (1988) reviewed *Pterasthenia* and made *Antalus* a subgenus.

Pterasthenia (Antalus) albata (Adams)

Plate 6a

Apt. with head and prothorax reddish brown, rest of thorax and first two abdominal segments dark green, rest of abdomen yellow green, legs conspicuously wax-powdered and body studded with clumps of white wax; BL 1.3–1.8 mm. Al. brown and green with much reduced hindwings. On *Indigofera spicata* in C Africa (Burundi, Malawi, Zimbabwe, Tanzania). Common in Central Province area of Malawi in dry season, becoming rare with advent of rains (Adams, 1965).

Pterochloroides Mordvilko

Lachninae: Lachnini

A monotypic genus, characterised by the double row of large spinal tubercles on the abdomen.

Pterochloroides persicae (Cholodkovsky)

Apt. shiny, dark brown to black; BL 2.7–4.2 mm. In colonies along undersides of branches of Prunoideae, and some Pyroideae incl. *Cydonia vulgaris*. In Mediterranean area, Middle East, C Asia, India, Pakistan. See Blackman and Eastop (2000) for further information. 2n=20.

Raychaudhuriaphis Pramanick, Samanta and Raychaudhuri

Aphidinae: Macrosiphini

One Indian species on *Rosa* with some characters of *Chaetosiphon*, but with spinulose head and 3 hairs on first tarsal segments.

Raychaudhuriaphis capitata Pramanick, Samanta and Raychaudhuri

Apt. pale, color unrecorded; BL c.1.2 mm. Al. unknown. On *Rosa involucrata* in India (Manipur).

Rectinasus Theobald

Eriosomatinae: Fordini

One species having secondary host morphs with a very long hairy R IV+V and al. with distinctive ANT sensoriation. Affinities with other genera of Fordini were discussed by Remaudière and Davatchi (1956).

Rectinasus buxtoni Theobald

Plate 2e, Figure 31a,b

Apt. pale yellow; BL 2.2–3.3 mm. Al. sexup. produced on secondary hosts have sec. rhin. distributed III c.60, IV 5–6. On roots of various Compositae (*Artemisia*, *Centaurea*, *Chondrilla*, *Helichrysum*, *Scorzonera*, *Silybum*, *Xanthium*); also recorded from *Orobanche*, *Citrus*, *Gossypium*, *Papaver* (Zumreoglu and Akbulut, 1984) and Gramineae (BMNH colln). In S Europe (Italy, Serbia, Spain), SW and C Asia, N Africa (Algeria). Heter. hol. with a sexual phase on *Pistacia* in SW Asia (Israel, Lebanon, Iran, Turkey), elsewhere anhol. on roots of secondary hosts and in ants' nests. Roberti (1939) and Tizado and Nieto Nafria (1993) provided information on secondary host populations. 2n=26.

Rhodobium Hille Ris Lambers

Aphidinae: Macrosiphini

One species differing from *Acyrtosiphon* and *Metopolophium* in its scabrous ANT tubercles, and from *Aulacorthum* in having sec. rhin. along the whole length of ANT III and lack of dorsal pigmentation in al. An account was given by Heie (1994).

Rhodobium porosum (Sanderson)

Plate 24b

Apt. yellow to yellow–green, rather shiny, with brown head; BL 1.2–2.5 mm. Al. have a bright green abdomen with no dorsal markings. On *Rosa* spp., esp. cultivated varieties, and *Fragaria* spp. Perhaps N American in origin, now widely distributed. Mon. hol. in N America, with ovip. and al. males occurring on both *Rosa* and *Fragaria* (MacGillivray, 1963), but the yellow form on *Fragaria* in N America is possibly distinct. Also hol. on *Rosa* in parts of Europe (Müller and Steiner, 1988), but generally anhol. on cultivated roses in glasshouses, or outside in warmer climates. 2n=14.

Rhopalomyzus Mordvilko

Aphidinae: Macrosiphini

Eleven species with clavate SIPH, small but evident ANT tubercles, and al. with sec. rhin. on both ANT III and IV. Apt. are similar to those of *Myzus*, *Neotoxoptera*, and *Dysaphis* (*Pomaphis*). Those with known life cycles alternate between *Lonicera* and Gramineae in the temperate northern hemisphere. Accounts are available for Europe (Hille Ris Lambers, 1953; Heinze, 1960; Heie, 1994), C Asia (Narzikulov and Umarov, 1969), and N America (Palmer, 1952, in *Rhopalosiphum*).

Rhopalomyzus alaica Mukhamediev and Akhmedov

Apt. (fund.) dark brown with brown cauda, SIPH paler; BL 2.2–2.7 mm. On *Lonicera microphylla* in C Asia. Second generation are apparently all al., migrating to unknown secondary host. Ovip. and al. males in late Sept–Oct (Mukhamediev and Akhmedov, 1982).

Rhopalomyzus codonopsidis Umarov

Apt. very pale, translucent white; BL c.1.6–1.8 mm. Al. have numerous sec. rhin. distributed III c.60–64, IV 28–30, V 13–14. On *Codonopsis clematidea* in C Asia. Heter. hol. with sexual phase on *Lonicera*; Kadyrbekov (2002e) collected ovip. and al. males on *L. korolkovii* in Kazakhstan in early Oct that he attributed to this species.

Rhopalomyzus coerulescens Narzikulov

Apt. yellowish green; BL 1.7–2.6 mm. On *Lonicera* spp. in C Asia. Ovip. and al. males in Sept–Oct (Mukhamediev and Akhmedov, 1982).

Rhopalomyzus ferganica Mukhamediev and Akhmedov

Apt. dark green; BL 2.3–2.6 mm. On *Lonicera nummularifolia* in C Asia. Ovip. and al. males in Oct (Mukhamediev and Akhmedov, 1982).

Rhopalomyzus grabhami (Cockerell)

Apt. on grasses greenish black, slightly shiny, with dark appendages; BL 1.4–1.7 mm. At bases of stems of unidentified grasses (laboratory-reared on *Poa annua*; Hille Ris Lambers, 1966a). Western N America. Heter. hol. with sexual phase on *Lonicera*, where fund. and their al. progeny in spring roll leaves and cause bright red–yellow blotches.

Rhopalomyzus hissarica Narzikulov

Apt. (fund.) dark green; BL 2.0–2.2 mm. On *Lonicera* spp. in C Asia. Al. have sec. rhin. distributed ANT III 43–46, IV 22–23, V 5–6. Mukhamediev and Akhmedov (1982) discussed its biology.

Rhopalomyzus (Judenkoa) loniceræ (Siebold)

Apt. (fund.) dark green with dark head, ANT, legs, SIPH and cauda, body powdered with grayish wax; BL 2.0–2.6 mm. On leaves of *Lonicera* in spring, rolling leaves towards undersides and causing yellow and red spots. Heter. hol., migrating in second generation to grasses, esp. *Phalaris arundinacea*, where it is a yellowish aphid forming dense colonies on leaves. Sexualls commonly occur in autumn on *Symphoricarpos* in NW Europe (Heie, 1994), although it is not known if the life cycle can be completed on that plant. Europe, C. Asia, W and E Siberia, and N America. 2n=12.

Rhopalomyzus narzikulovi Mukhamediev and Akhmedov

Apt. matt green, lightly dusted with gray wax powder; BL 2.3–2.6 mm. On *Lonicera bracteolaris* in C Asia. Ovip. and al. males return in Sept from an unknown secondary host (Mukhamediev and Akhmedov, 1982).

Rhopalomyzus poae (Gillette)

Plate 18d

Apt. on grasses reddish brown, dark brown or blackish, wax-powdered on underside, with dusky/dark appendages; BL 1.3–1.8 mm. On basal parts of grasses (*Agrostis*, *Dactylis*, *Festuca*, *Glyceria*, *Phalaris*, *Poa*), often on etiolated stems under stones. Europe, USA, and there are also records from Pakistan, Bolivia and Peru. Heter. hol. with sexual phase on *Lonicera*, all progeny of fund. being al. Anhol. in mild climates. Wood-Baker (1970) provided biological notes.

Rhopalomyzus smilacis (Matsumura)

Apt. (probably) dirty yellow; BL c.3 mm. On upper parts of shoots of *Smilax china* and *Viburnum* sp. in Japan. This species has not been identified since the original description (1918), which is insufficient for it to be included in keys. Its generic position and true host plant are also uncertain.

Rhopalomyzus tianshanica Narzikulov

Apt. green. On *Lonicera* spp. in C. Asia. Ovip. and al. males in early Oct (Mukhamediev and Akhmedov, 1982).

Rhopalosiphoninus Baker

Aphidinae: Macrosiphini

About 19 species with well-developed ANT tubercles, large and strongly clavate SIPH, and a short triangular cauda, living on a variety of plants but occurring particularly in cryptic habitats in the summer. Ten species are from India and the Far East, 6 are European, and 3 are known only from N America. Accounts are available for Europe (Hille Ris Lambers, 1953; Heinze, 1961; Heie, 1994), Siberia (Pashtshenko, 1988a), Japan (Miyazaki, 1971), India (Bhattacharya and Chakrabarti, 1982), and North America (Smith and Knowlton, 1977).

Rhopalosiphoninus (Pseudorhopalosiphoninus) calthæ (Koch)

Apt. shining brownish black; BL 2.1–3.0 mm. On undersides of leaves of *Caltha palustris* growing in the shade in Europe. Mon. hol. with ovip. and apt. males in Aug. (Finland) to Oct (Netherlands; Hille Ris Lambers, 1953).

Rhopalosiphoninus celtifoliae Shinji

Figure 61b,c

Color of apt. fund. in life unknown (al. yellowish orange with black dorsal patch); BL (of fund.) 3.0–3.2 mm. On *Weigela*, *Deutzia* and *Diervilla* in spring, migrating in second generation to an unknown host (Miyazaki, 1971). (Originally described from *Prunus pseudocerasus*, but this is unlikely to be a host.) Only known from Japan.

Rhopalosiphoninus deutzifoliae Shinji

Apt. green, with ANT and legs pale darkening apically, and dark SIPH and cauda; BL 2.4–2.7 mm. On *Deutzia scabra* (= *crenata*) in Japan, and also recorded from *Philadelphus tenuifolius* in E Siberia (Pashtshenko, 1988a). Spring populations occur on leaves and stems, curling leaves, migrating to unknown host. Al. have a

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large black dorsal patch and 12–20 sec. rhin. on ANT III only. This is possibly the primary host form of the widely distributed anhol. bulb and potato pest *Rh. latysiphon* (q.v.), which has not been recorded from E Asia.

Rhopalosiphoninus elsholtze Chakrabarti and Medda

Color of apt. in life unrecorded; BL 1.5–1.8 mm. On *Elsholtzia fruticosa* in U.P., India. Al. undescribed.

Rhopalosiphoninus (Submegoura) heikinheimoi (Börner)

Apt. very dark brown to almost black, slightly shiny; BL 2.0–2.8 mm. On *Vicia cracca* and *Lotus corniculatus*, at stem bases close to ground usually hidden by tall grass or leaves. Europe. Mon. hol. with ovip. and apt. males in Oct (Hille Ris Lambers, 1953).

Rhopalosiphoninus hydrangeae (Matsumura)

Apt. pale to dull yellow, sometimes with a greenish tinge; BL c.2.3–2.4 mm. On *Hydrangea* spp. in Japan and E Siberia. Mon. hol., with ovip. and al. males in Oct (Miyazaki, 1971). 2n=12.

Rhopalosiphoninus indicus L.K. Ghosh

Color in life unrecorded, probably brown; BL 1.4–1.9 mm. On roots of *Zea mays* in Himachal Pradesh, India.

Rhopalosiphoninus latysiphon (Davidson)

Plate 21a

Apt. shiny dark olive green with very striking swollen shiny black SIPH; BL 1.4–2.5 mm. Al. have shiny olive-green to black dorsal abdominal markings. On bulbs (*Tulipa*, *Gladiolus*) and potato (*Solanum tuberosum*) tubers in store, and on roots of many plants, especially in clay soils (e.g., potato crops), or on etiolated stems or runners growing in darkness under stones (e.g., *Bromus sterilis*, *Convolvulus arvensis*, *Potentilla anserina*, *Vinca major*, *Urtica* spp.). Europe, Egypt, Rwanda, Kenya, S Africa, India, Pakistan, Nepal, Sri Lanka, Japan and E Siberia (? – see below), Australia, New Zealand, and N and S America. Anhol., overwintering on stored bulbs and potatoes in cold temperate regions; sexual morphs are not recorded. However, it is possible that *Rhopalosiphoninus deutzifoliae* (q.v.) on Hydrangaceae in Japan and E Siberia is the primary host form. See also Blackman and Eastop (2000). 2n=6 (+1).

Rhopalosiphoninus maianthemii Stroyan

Color of apt. unknown, probably yellow-green with dark sclerotic parts; BL c.1.8–2.0 mm. On roots of *Maianthemum bifolium* in Italy, and Austria (BMNH colln, leg. R.N.B. Prior). Mon. hol., with ovip. and al. males in early Sept (orig. descr.).

Rhopalosiphoninus ribesinus (van der Goot)

Apt. shining reddish brown to brownish black, with black SIPH; BL 2.2–3.0 mm. Al. with only marginal and intersegmental sclerites and sec. rhin. III 40–60, IV 6–16, V 0–1. On old canes of *Ribes rubrum*, and sometimes on *R. nigrum*, close to the ground in rather damp and shady places, or on young shoots and leaves. Europe and W Siberia. Mon. hol. with apt. males (Hille Ris Lambers, 1953).

Rhopalosiphoninus (Myzosiphon) smilacifoliae (A.K. Ghosh and Raychaudhuri)

Described from a single, possibly vagrant, al. collected on *Smilax* sp. in Sikkim, India.

Rhopalosiphoninus (Myzosiphon) solani (Thomas)

Apt. dark green tinged with brown, with black SIPH and cauda (Wilson, 1915, as *Amphorophora subterranea*); BL 1.6–2.1 mm. Originally described from tomato, but if *Amphorophora subterranea* is indeed a synonym then this species feeds subterraneously on the roots of *Dactylis glomerata*. Widely distributed in N America (Smith and Parron, 1978).

Rhopalosiphoninus (Myzosiphon) staphyleae (Koch)

Plate 21b

Apt. dark olive green or brownish with very dark green or black dorsal markings, SIPH with swollen part paler than the base or apex; BL 1.5–2.4 mm. Al. have an extensive dark green to black sclerotic dorsal patch. On subterranean parts of Liliaceae and Iridaceae (*Tulipa*, *Hemerocallis*, *Crocus*, *Anthericum*), and occasionally on roots or etiolated parts of plants in at least 11 other plant families (e.g., *Anemone*, *Capsella*, *Cardamine*, *Dentaria*, *Lamium*, *Oxalis*, *Vinca*). Europe, Africa (Kenya, S Africa), Japan (?), Australia, New Zealand, N America,

and Peru. Heter. hol. with sexual phase in Europe on *Staphylea* spp. (Blackman and Eastop, 1994), although anhol. overwintering is common. *Rh. staphyleae* ssp. *tulipaellus* Theobald is a permanently anhol. form which is particularly a pest of stored mangold beets (*Beta vulgaris*) in Europe, but is also recorded from roots of a wide range of other plant genera including *Galium*, *Lycopersicon*, *Rumex*, *Tulipa*, and *Viola*, and may also have been introduced to N America (see below). Hille Ris Lambers (1953) gives an account of *R. staphyleae* in Europe and key characters for distinguishing it from *tulipaellus*, which is treated as a distinct species by Börner and Heinze (1957) and Heinze (1961). However, *tulipaellus* may be one of several asexual 'off-shoots' of *R. staphyleae*, and it is not clear whether one or more of such forms have been distributed outside Europe. $2n=10$.

***Rhopalosiphoninus tiliae* (Matsumura)**

Apt. yellowish green, with SIPH black except at bases; BL 2.7–3.0 mm. Al. with a large dorsal abdominal black patch. On leaves and flower stalks of *Adenocaulon himalaicum* in Japan, Korea and E Siberia. Also recorded from *Sigesbeckia* sp. Heter. hol., with sexual phase on *Tilia* spp. (Miyazaki, 1971; Pashtshenko, 1988a). $2n=12$.

***Rhopalosiphum* Koch**

Aphidinae: Aphidini

About 15 species associated with *Prunus* or Pyroidea as primary hosts, and Gramineae, Cyperaceae, or more rarely other plants in summer. Most *Rhopalosiphum* and the viruses that they transmit probably originate from N America (Halbert and Voegtlin, 1998), with a subsidiary center in Asia (*R. maidis* and *R. rufiabdominale*), where the taxonomic situation has not been sufficiently investigated. Previously many other species with rather short, slightly swollen SIPH were included in *Rhopalosiphum*., including genera now placed in Macrosiphini (e.g., *Hyadaphis*, *Lipaphis*, *Rhopalomyzus*). *Rhopalosiphum* is closely related to *Melanaphis* and *Schizaphis*, and the limits of these three genera are not clearly defined. Accounts are available for Britain (Stroyan, 1972b, 1984), NW Europe (Heie, 1986), Iberian peninsula (Nieto Nafria *et al.*, 2005), NE India (Raychaudhuri, 1980), Siberia (Pashtshenko, 1988a), Japan (Takahashi, 1965c; Torikura, 1991), Australia (Eastop, 1966), Canada (Richards, 1960), and N America (Richards, 1962). See also Blackman and Eastop (1994).

***Rhopalosiphum cerasifoliae* (Fitch)**

Apt. apple-green; BL c.2 mm. On stems of Cyperaceae growing in water (*Eleocharis*, *Scirpus*) and also found on *Juncus*. Also recorded from *Carex* spp., but this needs confirmation as Voegtlin and Halbert (1990) could not obtain colonies on *Carex* despite extensive transfer attempts. Widely distributed in N America. Heter. hol., with sexual phase on *Prunus* spp. (Blackman and Eastop, 1994). $2n=8$.

***Rhopalosiphum enigmae* Hottes and Frison**

Apt. dark reddish brown to greenish brown; BL 1.7–2.3 mm. Sec. rhin. in al. III 7–11, IV 0–2. On *Typha* spp., esp. *T. latifolia*, and also recorded from *Sparganium* sp. Widely distributed in N America. Mon. hol. with al. males (Hottes and Frison, 1931). $2n=10^*$.

***Rhopalosiphum insertum* (Walker) oxyacanthae (=oxyacanthae?)**

Apt. on Rosaceae in spring rather shiny bright green or yellow-green with a darker green spinal stripe, BL 2.1–2.6 mm; on grasses in summer yellowish green with yellowish brown head and pronotum and dusky to dark brown SIPH, BL 1.4–2.0 mm. Heter. hol., in spring curling leaves of Prunoideae (incl. *Chaenomeles*, *Cotoneaster* and *Cydonia*), migrating to roots and stem bases of various Gramineae (*Agropyron*, *Agrostis*, *Alopecurus*, *Dactylis*, *Festuca*, *Glyceria*, *Phalaris*, *Poa*, *Triticum*). Attended by ants. Possibly of N American origin, now widely distributed in the palaeartic region. The aphid introduced to Australia (Ridland and Carver, 1987) and New Zealand ('sp. near *insertum*'; Bulman *et al.*, 2005) shows morphological and DNA differences from European populations, and is possibly a separate introduction from N America. Aphids resembling *R. insertum* and with similar host associations in C America, but reddish and waxy in life, may be the closely-related species *R. sanguinarium* (see Remaudière and Remaudière, 1997: 309). See also Blackman and Eastop (1994, 2000). $2n=10$.

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Rhopalosiphum laconae Taber

Apt. greenish red–bronze; BL 1.9–2.3 mm. Sec. rhin. in al. III 12–15, IV 11–3. On *Typha* spp. on the southern coastal plain of N Carolina, USA.

Rhopalosiphum maidis (Fitch)

Plate 8i

Apt. rather elongate-bodied, yellow–green to dark olive green or bluish green, sometimes dusted with wax, with short dark SIPH; BL 0.9–2.4 mm. On young leaves of grasses in more than 30 genera incl. *Avena*, *Hordeum*, *Oryza*, *Saccharum*, *Secale*, *Sorghum*, *Triticum* and *Zea*, and occasionally Cyperaceae and Typhaceae. Asiatic in origin, now virtually cosmopolitan, but cannot survive outdoors in regions with severe winter climates. Heter. hol. in Pakistan, with *Prunus cornuta* as primary host (Remaudière and Naumann-Etienne, 1991), and also reported to have *P. mume* and *P. persica* as primary hosts in Korea (Lee *et al.*, 2002c). Apparently entirely anhol. elsewhere, although males occur sporadically. This is probably the most important aphid pest of cereals in tropical and warm temperate climates, and there is an extensive literature; see Blackman and Eastop (2000). $2n=8, 9$, and 10 ; there is an association between karyotype and host plant, the barley-colonizing form in the northern hemisphere having $2n=10$, whereas populations on maize and sorghum have $2n=8$ (Brown and Blackman, 1988).

Rhopalosiphum musae Schouteden (= *Rh. scirpifolii* Gillette and Palmer)

Apt. dark brown to greenish black, sometimes with orange spots at bases of SIPH; BL 2.0–2.3 mm. On Cyperaceae (*Scirpus*, *Typha*), Musaceae (*Musa*, *Ensete*) and Strelitziaceae (*Strelitzia*). N America, and introduced to Europe, Iran, Africa and Australia. Anhol. in most parts of the world, but with a sexual phase on native N American *Prunus* spp. in western USA (Blackman and Eastop, 1994).

Rhopalosiphum nigrum Richards

Green with reddish blotches around SIPH bases; BL 1.3–2.2 mm. On *Zizania aquatica*, *Alisma* sp. (BMNH colln, leg. A. Hsu), and possibly other aquatic monocots. Canada (Ontario, Manitoba; a record from *Poa trivialis* in Oregon is doubtful). Heter. hol., with sexual phase on *Crataegus*.

Rhopalosiphum nymphaeae (L.)

Apt. reddish brown to dark olive, dusted with light gray wax, especially on ABD TERG 1–4; BL 1.6–2.6 mm. On a large variety of water plants (*Alisma*, *Butomus*, *Callitriche*, *Echinodorus*, *Juncus*, *Nuphar*, *Nymphaea*, *Potamogeton*, *Sagittaria*, *Sparganium*, *Triglochin*, *Typha*, etc.), with some ability to survive underwater. Almost cosmopolitan. Heter. hol., with sexual phase on *Prunus* spp. (see Blackman and Eastop, 1994). Used for biological control of water weeds in rice (Oraze and Grigarick, 1992). $2n=8$ (Russia, Kuznetsova and Shaposhnikov, 1973, and Italy*) or 16 (India, Behura and Bohidar, 1978, and Kurl, 1986b); the difference warrants further investigation.

Rhopalosiphum padi (L.)

Plate 8g

Apt. on Gramineae broadly oval, green mottled yellowish green or olive green, or dark olive to greenish black; often with rust-colored patches around the bases of SIPH; BL 1.2–2.4 mm. On numerous species of Gramineae, including all the major cereals and pasture grasses. Also sometimes on Cyperaceae, Iridaceae (especially *Iris*), Juncaceae, and Typhaceae, and in England it has been found overwintering on dicots (*Capsella*, *Stellaria*). Possibly palaeartic in origin, now virtually world wide. Heter. hol. with sexual phase on *Prunus* spp. (usually *P. padi* in Europe and *P. virginiana* in N America). Anhol. wherever winter conditions permit; DNA studies have shown that the commonest anhol. lineages in Europe were derived by hybridisation with another closely related species, as yet unknown (Delmotte *et al.*, 2003). See Blackman and Eastop (2000) for key references. $2n=8$.

Rhopalosiphum padiformis Richards

Apt. green, with large red patches around bases of SIPH; BL 1.4–2.2 mm. Distinguished from *R. padi* and *R. insertum* by the long, pointed hairs on the posterior abdominal tergites. Described from the flower heads of *Poa* sp. in Canada (B.C.), subsequently found on wheat in Montana, USA. Probably heter. hol. with

sexual phase on woody Rosaceae; al. males were obtained in a culture of the Montana population (T.W. Carroll and D. Yount, pers. comm). $2n=10$.

***Rhopalosiphum parvae* Hottes and Frison**

Apt. brownish yellow, reddish brown or more rarely greenish yellow; BL 1.2–1.8 mm. Sec. rhin. in al. III 7–11, IV 0–2. Described from *Carex* sp. in Illinois, USA (as var. of *Rh. enigmae*). A population feeding on inflorescences of *Scirpus lacustris* in Sicily agrees well with the original description (Barbagallo and Stroyan, 1982).

***Rhopalosiphum rufiabdominale* (Sasaki)**

Plate 8h

Apt. dark green or olive with usually a reddish area at the posterior end of the abdomen between and around SIPH; BL 1.2–2.2 mm. On roots of numerous species of Gramineae, Cyperaceae, and some dicots, particularly Solanaceae (potato, tomato). A major pest of rice (Yano *et al.*, 1983; Blackman and Eastop, 2000). Virtually world-wide, but more common in warmer climates. Heter. hol. with a sexual phase on *Prunus* spp. in E Asia (Tanaka, 1961), probably mainly anhol. elsewhere. $2n=8$.

***Rhopalosiphum rufulum* Richards**

Apt. dark brown to black, with dark appendages; BL 1.4–2.4 mm. Forming large colonies on *Acorus calamus* in NW Europe (Stroyan, 1972b; Heie, 1986). Apparently introduced in about 1970 from N America, where it is known only on its primary host, *Crataegus*. Primary host populations have still not been observed in Europe, although gynoparae and al. males are produced in large numbers in autumn, and ovip. developed and laid numerous eggs on *Crataegus monogyna* under insectary conditions (Stroyan, 1972b). $2n=8$.

***Roepkea* Hille Ris Lambers**

Aphidinae: Macrosiphini

One palaeartic species resembling *Nearctaphis* but without marginal abdominal tubercles, and the primary host is *Prunus* rather than Pomoidea.

***Roepkea marchali* (Börner)**

Plate 9f

Apt. dirty yellow–green (moss-colored), with variably-developed olive-green dorsal markings; BL 1.2–1.7 mm. On Labiatae (*Galeopsis*, *Phlomis*, *Stachys*), usually on the flower calyces. S and E Europe, and SW Asia. Heter. hol., with sexual phase on *Prunus mahaleb*. Host alternation is partial, some populations remaining and producing ovip. on the primary host. It was for many years thought that S European populations did not migrate to Labiatae and were a separate subspecies, but Barbagallo and Patti (1998) found colonies on *Galeopsis angustifolia* in Italy, and showed that there was a return migration of males and gynoparae to *Prunus*. $2n=12$.

***Saltusaphis* Theobald**

Saltusaphidinae

Related to *Iziphya*, but more long-bodied aphids with SIPH placed further back. Dorsal hairs are mostly fan-shaped, but on ABD TERG 8 there is consistently a pair of backwardly pointing processes bearing long rod-shaped hairs.

***Saltusaphis elongatus* (Baker)**

Apt. very long-bodied, yellow to orange–yellow with paired dark orange flecks on dorsal abdomen; BL 2.5–3.1 mm. Al. apparently unrecorded. On *Carex stricta* (and possibly other *Carex* spp.) in eastern N America. Ovip. (orig. descr.) and apt. males (Hottes and Frison, 1931) occur in Oct. This very distinctive species has been placed in a genus of its own, *Stenaphis* Quednau, but this name is invalid because it is preoccupied, so we have returned it to *Saltusaphis*. $2n=10$.

***Saltusaphis scirpus* Theobald**

Plate 4g, Figures 18i,k, 19a,b

Apt. long-bodied, grayish yellow to greenish yellow, with dark markings tending to form longitudinal bands, the dorsum being powdered with a very thin layer of grayish white wax; BL 2.3–2.5 mm. Al. have broad dark dorsal abdominal cross bars and dark-bordered wing veins with spots at their apices, and ANT with

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10–21 rhinaria on III. On various Cyperaceae (*Carex*, *Cyperus*, *Scirpus*; in Europe (not UK or Scandinavia), across Asia to E Siberia, widely distributed in Africa, and with a single record from USA (Ohio: Smith, 1940). Mon. hol.; ovip. and apt. males occur in Sept–Oct. [*Saltusaphis lasiocarpae* (Ossiannilsson), mon. hol. on *Carex lasiocarpa* in Sweden (Heie, 1982), has slightly longer ANT than *S. scirpus* but is not clearly distinct, and *Saltusaphis kienshuensis* Shinji, described from *Carex* sp. in S Manchuria, cannot be separated from *S. scirpus* on the basis of the published description.] $2n=10$.

Sappaphis Matsumura

Aphidinae: Macrosiphini

A small genus in E Asia, related to *Dysaphis*, but much longer-haired. The name was used in a broader sense from 1952 to 1965 to include species now in *Dysaphis*.

Sappaphis albinae Zhang, Chen, Zhong and Li, in Zhang

Apt. white; BL c.1.6mm. On roots of *Artemisia scoparia* in Gansu Prov., China (Zhang, 1999). Possibly these are early-summer exules of *S. sinipiricola*.

Sappaphis angelicograstis Zhang, Chen, Zhong and Li, in Zhang

Apt. golden yellow; BL c.1.5 mm. On roots of *Artemisia argyi* in Gansu Prov., China (Zhang, 1999). Also recorded from *Angelica sinensis*, but this is unlikely to be a true host. These are possibly late summer apt. and gynoparae of *S. sinipiricola*.

Sappaphis piri Matsumura

Plate 10f, Figure 12q

Apt. pale yellow to orange–red; BL 1.7–2.1 mm. On roots of *Artemisia* spp. in Japan, Korea and China. Miyazaki (1971) provided a full redescription. Heter. hol., with sexual phase on *Pyrus* (Blackman and Eastop, 1994). Takada and Hashimoto (1985) studied its relationships with ants and parasitoids on *Artemisia*. Zhang (1999) described two new species from NW China, *S. albinae* (q.v.) and *S. angelicograstis* (q.v.), and also listed records from *Artemisia* of two species previously described from *Pyrus*, *S. dipirivora* Zhang and *S. sinipiricola* Zhang (q.v.). These will all run to *S. piri* in the key to aphids on *Artemisia*. Further work is needed to confirm whether all or any of them are distinct from *S. piri*. $2n=12$.

Sappaphis ranunculi Miyazaki

Figure 45b,d

Apt. yellowish brown to dark brown ventrally, dark dorsally, appendages mainly dark; BL 1.6–2.0 mm. Sec. rhin. in al. III 70–78, IV 25–29, V 13–16. On *Ranunculus japonicus* in Japan, and also in Korea (BMNH colln).

Sappaphis sinipiricola Zhang

Described from apt. and al. collected on *Pyrus* in Henan prov., China, in May, and subsequently recorded from *Artemisia* (Zhang, 1999). *S. albinae* and *S. angelicograstis* (q.v.) may be seasonal forms of this species, which is itself very close to *S. piri*. [Gynoparae of *S. sinipiricola* from China have ANT PT/BASE 1.5–2.7, whereas gynoparae of *S. piri* from Japan and Korea have ANT PT/BASE 1.4–2.1. Another sample of al. from pear in Oct, described as *S. montana* Zhang, in Zhang (1999) may also be gynoparae of *S. sinipiricola*.] $2n=12$ (Chen and Zhang, 1985a).

Schizaphis Börner

Aphidinae: Aphidini

About 40 species related to *Rhopalosiphum* but with more *Aphis*-like SIPH, and the media of the forewing only once-branched. Probably about half are mon. hol. on Gramineae, and most of the rest (subgenus *Paraschizaphis*) are on Cyperaceae and Typhaceae, but a few overwinter as eggs on *Pyrus*. More than half the species are European, and the others occur in Middle East, C Asia, E Asia, Africa and N America. The *S. graminum* group comprises many very closely related and morphologically extremely similar species or subspecies, that can only be reliably identified by their associations with different grass genera or species, or by other differences in biology. Eastop (1961b) provided a key to the world fauna then known, Ilharco (2002) reviewed the world fauna of *Paraschizaphis* (treating it as a full genus), and regional accounts are available for UK (Stroyan, 1984), NW Europe (Heie, 1986), Iberian peninsula (Nieto Nafria *et al.*, 2005), China (Zhang *et al.*, 1998), Japan (Miyazaki, 1988) and E Siberia (Pashtshenko, 1988a).

Schizaphis (Paraschizaphis) acori (Shinji)

Apt. very dark green-black, with reddish tinge around bases of SIPH; BL 1.8–2.4 mm. Sec. rhin. in al. III 11–15, IV 2–8, V 0–1. On *Acorus calamus* in Japan; specimens from *Cyperus difformis* in Japan may also be this species. Mon. hol., with apt. and brachypt. males (Miyazaki, 1988). This species has been erroneously synonymised in catalogues with *S. rotundiventris*. $2n=8^*$.

Schizaphis agrostis Hille Ris Lambers

Apt. grass-green to yellowish green with darker green spinal stripe; BL 1.4–2.1 mm. On upper sides of leaves of *Agrostis* spp., esp. *alba* and *canina*; sometimes on *Poa annua*, especially on dry, sandy soil. Sometimes ant-attended. Europe. Mon. hol. with ovip. and al. males in Oct. A member of the *S. graminum* group, all of which are very closely related.

Schizaphis aurea Miyazaki

Apt. bright yellow with ANT flagellum and SIPH black, legs banded with black, cauda pale; BL 1.6–1.9 mm. On *Pennisetum alopecuroides* in Japan. Mon. hol. with ovip. and al. males in mid-Nov (Miyazaki, 1988).

Schizaphis borealis Tambs-Lyche

Apt. pale, color not recorded; BL 1.3–1.9 mm. On *Phleum pratense* in Scandinavia.

Schizaphis (Paraschizaphis) brachytarsus (Takahashi)

Apt. brown with rather long black SIPH; BL 1.4–2.3 mm. Al. unknown. Described from a plant of family Cyperaceae in Japan, and since recorded from *Carex* in Japan (neotype, described by Ilharco, 2002) and recorded from *Scirpus* in E Siberia (Pashtshenko, 1988a).

Schizaphis (Paraschizaphis) caricis (Schouteden)

Figure 18f

Apt. shiny blackish brown to blackish green; BL 1.3–2.4 mm. Sec. rhin. in al. III 7–20, IV 2–10, V 0–5. On *Carex* and *Scirpus*, living on basal parts of leaves and often in ant ‘shelters’. In Europe, eastwards to Ukraine, E Siberia (Pashtshenko, 1988a, as *caricicola*) and USA (Ilharco, 2002). Mon. hol., with apt. males (Heie, 1986).

Schizaphis chaenometiola Zhang

Apt. yellowish green, BL c.1.5 mm. On leaves of *Chaenomeles speciosa* in China (Gansu Province). Other morphs undescribed (Zhang *et al.*, 1998).

Schizaphis cuprea Miyazaki

Apt. dull brown with black ANT and SIPH, and yellow-brown legs ringed with black; BL 1.5–1.8 mm. On *Calamagrostis* sp. in Japan. Mon. hol. with ovip. and al. males in late Sept–Oct (Miyazaki, 1988).

Schizaphis dubia Huculak

Apt. green or greenish yellow; BL 1.6–2.1 mm. Described from *Calamagrostis canescens*, and there are also records from *Agrostis stolonifera* and *Bromus arvensis*. Pettersson (1971c) studied host preferences. N Europe (Finland, Poland, Sweden). Mon. hol. with al. males (orig. descr.). Pettersson (1971b) provided morphometric data and illustrated four morphs.

Schizaphis (Paraschizaphis) eastopi (van Harten and Ilharco)

Apt. black; BL 1.4–2.0 mm. Sec. rhin. in al. III 7–10, IV 1–4, V 0–1. On *Typha capensis* in southern Africa (Angola, Mozambique). Records of this species in the literature from other countries in Africa, and from Italy (Sicily) and Pakistan, should be referred to *S. rosazevedoi* (Ilharco, 2002).

Schizaphis gracilis Richards

Apt. undescribed, and appearance of al. in life unknown; BL of al. 1.4–1.8 mm. On *Carex maritima* in NW Territories, Canada.

Schizaphis graminum (Rondani)

Plate 9b

Apt. with head and prothorax yellowish or greenish straw-colored, rest of thorax and abdomen yellowish green to bluish green with a darker spinal stripe; BL 1.3–2.1 mm. On leaves of very many genera and species

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of Gramineae, often causing yellowing and other phytotoxic effects. Records from grasses in W Europe are now thought to apply to other closely related species or subspecies with more specific host associations (*agrostis*, *borealis*, *dubia*, *holci*, *jaroslavi*, *phlei*, *thunbergi*), all of which are very difficult to tell apart (e.g., Pettersson, 1971b). Of palaeartic origin, now widely distributed: S Europe, Middle East, C Asia, Africa, India, Nepal, Pakistan, Thailand, Korea, Taiwan, Japan, and N, C and S America. Records from Australia and Philippines are referable to *S. hypersiphonata*. A population without marginal tubercles on an unidentified grass (possibly *Agrostis*) in Iceland was described as a subspecies, *S. graminum* ssp. *gigjai* Stroyan. The N American 'biotypes' have been shown by mtDNA analysis to fit into 3 clades with different host relationships, the divergence of which predates modern agriculture (Shufran *et al.*, 2000). This indicates that these were three separate introductions, and that palaeartic *S. graminum* is a complex of still-unrecognised incipient species or subspecies (Blackman and Eastop, in press). Mon. hol., with al. males, in cold temperate climates, e.g., in northern USA, where overwintering in the egg stage occurs predominantly on *Poa pratensis* (although the sorghum-adapted form is able to produce sexuals at more southerly latitudes, indicating that it probably originated from further south in Europe or Asia). Anhol. wherever winter conditions permit. For more information see Blackman and Eastop (2000). 2n=8.

Schizaphis hierochlorophaga Zhang and Chen

Apt. yellowish green; BL c.1.6 mm. Al. have rhinaria distributed III 15–16, IV c.9, V 6–7. On *Cymbopogon* sp(p?). in Beijing, China (Zhang *et al.*, 1998).

Schizaphis holci Hille Ris Lambers

Apt. greenish yellow or pale yellow, with dark-tipped SIPH; BL 1.6–1.9 mm. On leaves of *Holcus* spp., usually attended by ants; infested leaves turn brown and die. Europe (UK, Netherlands, France, Germany, Austria, Czech Republic). Mon. hol. with apt. males.

Schizaphis hypersiphonata A.N. Basu

Apt. yellowish green: BL 1.1–1.7 mm. On various Gramineae (*Brachiaria*, *Chloris*, *Dactyloctenium*, *Digitaria*, *Eleusine*, *Panicum*, *Phalaris*, *Phragmites*, *Triticum*), but without having the phytotoxic effects of *S. graminum*. W Bengal, Sri Lanka, Thailand, Philippines, Irian Jaya and Australia (Eastop, 1966, as a form of *graminum*). No sexual morphs recorded. Mordvilko's (1921) description of *S. graminum* is possibly referable to this species.

Schizaphis jaroslavi (Mordvilko)

Apt. pale green to yellow green with a darker green median stripe and dark tips to SIPH, slightly wax-powdered; BL 1.5–2.1 mm. Al. with sec. rhin. III 3–6. IV 0. Recorded from various grasses (*Calamagrostis*, *Phalaris*, *Phleum*, *Secale*) in Europe (Scotland, Netherlands, Denmark, Sweden, Finland, Poland, Ukraine) and E Asia (Mongolia, Korea, Japan). However, the name is perhaps being applied to more than one species, as in Europe *S. jaroslavi* occurs on *Calamagrostis epigeios* in dry sandy habitats (Heie, 1986), whereas Japanese populations have a shorter ANT PT than European ones and were only found on the wetland grass *Phalaris arundinacea* (Miyazaki, 1988). In Korea it is recorded from a dicot, *Cocculus trilobus* (Lee *et al.*, 2002c). The European aphid has apt. males, and is often ant-attended.

Schizaphis longicaudata Hille Ris Lambers

Apt. greenish, with black-tipped SIPH; BL 1.8–2.2 mm. On grasses (*Alopecurus*, *Apera*, *Bromus*, *Luziola*, *Phalaris*); Pettersson (1971c) studied host preferences. Europe (Netherlands, Sweden, Germany, Poland, Czech Republic, Italy). Mon. hol with al. (sometimes brachypt.) males (Heie, 1986)

Schizaphis (Paraschizaphis) longisetosa (Higuchi)

Apt. dark green to nearly black; BL 1.9–2.3 mm. Sec. rhin. in al. III 12–19, IV 2–7, V 0–3. On *Carex* spp. in Japan (Higuchi, 1970). Ilharco (2002) provided a redescription, noting that the original description included specimens of *S. brachytarsus*.

Schizaphis mali Shaposhnikov

Appearance of apt. on secondary host undescribed; BL c. 1.8–1.9 mm. On *Carex* spp. in Russia. Sec. rhin. in al. (produced on *Carex*) III 12–14, IV 2–6, V 0. Heter. hol., the primary host being *Malus baccata*. $2n=8$. Appears closely related to species alternating from *Pyrus* to Cyperaceae in Russia (*S. pyri*) and Japan (*S. piricola*).

Schizaphis minuta (van der Goot)

Apt. green, BL 1.2–1.8 mm. Sec. rhin. in al. III 5–7, IV 2–3, V 0–1. On *Cyperus* spp. usually found on small, short-leaved species growing in sand, for example along dry stream beds. In Africa, Iran, E and SE Asia (India to Philippines), and Australia, and also recorded from *Scirpus lacustris* in Italy (Patti, 1983). In Korea three samples were collected from *Mazus miquelii* (Lee *et al.*, 2002c). Sexual morphs are apparently unknown.

Schizaphis muhlenbergiae (Phillips and Davis)

Apt. pale green; BL c. 1.3 mm. On *Muhlenbergia* sp., which appears to be the normal host; also on *Poa pratensis*, and colonies were established on wheat under insectary conditions (orig. descr.). USA (Indiana, Ohio, Colorado, Utah). Mon. hol. with apt. males and ovip. in Oct.

Schizaphis nigerrima (Hille Ris Lambers) (= *Schizaphis laingi* Eastop)

Apt. coal black; BL 1.7–2.3 mm. On upper sides of leaves of *Festuca pratensis*, yellowing the tips, and also recorded from *Alopecurus pratensis*. Europe (UK, Netherlands, Finland, Germany, Poland, Austria, Czech Republic and Hungary). Mon. hol. with ovip. and al. males in Oct (orig. descr.). Very similar to *S. cuprea* in Japan.

Schizaphis nigra (Baker) (= *Toxoptera viridirubra* Gillette and Palmer)

Apt. blackish green (orig. descr.; Washington DC) or reddish brown to olive green with orange around bases of SIPH (orig. descr. of *viridirubra*, Colorado); BL 1.1–2.0 mm. Sec. rhin. in al. III 6–14, IV 3–7, V 0–3. On *Carex* spp. in USA. Mon. hol., with apt., brachypt. and al. males (orig. descr.) or al. males (*viridirubra*, orig. descr.). Ilharco (2002) redescribed apt. and al. vivip. (as *Paraschizaphis nigra*).

Schizaphis (Euschizaphis) palustris (Theobald)

Figure 35c,d

Apt. yellowish brown to olive brown or dark green; BL 1.5–1.8 mm. Described from *Triglochin palustre*, and also recorded from *Poa annua*, but the more common hosts are *Juncus* spp. In marshy situations in Europe (UK, Netherlands, Germany, Slovakia, Spain (BMNH colln, leg. D. Hille Ris Lambers – ‘Franz Sp. 145’), Ukraine (Mamontova-Solukha, 1963) and India (New Delhi; BMNH colln, coll. R. Menon). Mon. hol. with apt. males (Hille Ris Lambers, 1947b).

Schizaphis (Paraschizaphis) pashtshenkoae (Ilharco)

Apt. dark green to almost black; BL c. 2.0 mm. Sec. rhin. in al. (1 specimen) III 15–16, IV 7, V 4. On *Carex* sp. in E Siberia (Ilharco, 2002).

Schizaphis phlei Orlob

Apt. yellow to pale yellowish, to pale green, with SIPH dark-tipped; BL 1.2–1.9 mm. On various grasses (*Aegilops*, *Alopecurus*, *Apera*, *Arrhenatherum*, *Phleum*) in Sweden, with *Arrhenatherum elatius* as a preferred host (Pettersson, 1971c, as *arrhenatheri*), and found causing brown leaf chlorosis on *Phleum pratense* in New Brunswick, Canada (orig. descr.). Mon. hol. with ovip. and al. males in Sept (orig. descr., and Pettersson, 1971b). It is a member of the *S. graminum* group. Pettersson (1970, 1971a) studied the sex pheromone of this species (as *borealis*). Pettersson (1971b) provided morphometric data and illustrated four morphs (as *arrhenatheri*).

Schizaphis pilipes (Ossiannilsson)

Figure 18g

Color of apt. unknown, probably dark brownish; BL 1.6–2.4 mm. Sec. rhin. in al. III 17–20, IV 7–13, V 2 (Heie, 1986). On *Carex acuta* and possibly other *Carex* spp. in Europe. Mon. hol.; ovip. were found in Sweden in Nov (Ossiannilsson, 1959). Also recorded from Finland, Denmark, Netherlands, Germany, Czech Republic and UK.

***Schizaphis piricola* (Matsumura) (= *Schizaphis siniscirpi* Zhang)**

Apt. (on secondary hosts) yellowish green to deep green, with black SIPH and ANT black except at bases; BL 0.96–1.85 mm. Sec. rhin. in al. III 15–22, IV 7–11, V 0–5 (cf. *rotundiventris*). Heter. hol. in Japan, migrating from *Pyrus* to *Cyperus rutundus*, and also found on other *Cyperus* and *Carex* spp. (Miyazaki, 1988). Very similar to *S. pyri* and *S. mali* in Russia. $2n=8$.

***Schizaphis priori* Stroyan**

Apt. color in life unrecorded, probably pale green with darker spinal stripe; BL 2.2–2.6 mm. On *Leymus arenarius* in Iceland. Mon. hol., with apt. males collected in late July (orig. descr., as *S. geijskesi* ssp. *priori*).

***Schizaphis pyri* Shaposhnikov**

Apt. (on secondary host) pale to dusky green with black ANT and SIPH, and a dark cauda; BL 1.5–2.0 mm. Living singly on undersides of leaves of *Carex* (Leclant, 1967, as *fritzmulleri*) and *Cyperus*. S France, Atlantic islands (Azores, Canaries, Madeira), Israel, Iran, Kazakhstan, W and E Siberia, Australia (Victoria). Al. produced on *Carex* in S France had sec. rhin. III 20–29, IV 7–15, V 4–5. Heter. hol. with sexual phase on *Pyrus* in Russia (Blackman and Eastop, 1994); populations elsewhere are presumably anhol.

***Schizaphis (Paraschizaphis) rosazevedoi* (Ilharco)**

Apt. of two color-forms, orange–brown to rusty brown or dark green to almost black; BL 1.3–2.4 mm. Sec. rhin. in al. III 6–16, IV 0–6, V 0–2. On *Typha* spp. and *Strelitzia reginae*. Recorded from Portugal, Madeira, France, Sicily, Israel, Iran, Pakistan, Saudi Arabia, Sudan, Burundi, S Africa and Martinique. (Some of these records were as misidentified *S. eastopi*). Apparently anhol. (Ilharco, 2002). $2n=8^*$.

***Schizaphis rotundiventris* (Signoret)**

Apt. dark green to almost black; BL 1.2–1.7 mm. Sec. rhin. in al. III 6–12, IV 0–6, V 0–4. Most commonly on *Cyperus* spp., although it can form small colonies in young unfolding leaves of palms such as *Elaeis guineensis*, and there are also records from Gramineae (*Pennisetum*, *Polytrias*) and other monocots (*Acorus*, *Typha*). Possibly there is a sexual phase on *Pyrus* in India (as *S. punjabipyri*), but this needs experimental confirmation. Presumed anhol. populations on *Cyperus* and other monocots are recorded from S Europe, Middle East, Africa, Mauritius, E and SE Asia, Australia, New Zealand, Hawaii, and most recently south-eastern USA (Halbert *et al.*, 2000). Leclant (1967) gave an account of the ‘*S. cyperi* group’. $2n=8$.

***Schizaphis rufula* (Walker)**

Apt. yellowish green with darker green spinal stripe, slightly wax-powdered, with dark-tipped SIPH; BL 1.4–3.1 mm. On leaves of various grasses, especially in sand-dune habitats (*Aegilops*, *Agropyron*, *Agrostis*, *Alopecurus*, *Apera*, *Ammophila*, *Bromus*, *Elymus*, *Leymus*). Infested leaves become yellowish brown. Pettersson (1971c) studied host preferences. Records from *Salsola*, including the original description, are presumably casual occurrences. NW Europe. Mon. hol. with apt. males. Pettersson (1971b) provided morphometric data and illustrated four morphs.

***Schizaphis (Paraschizaphis) scirpi* (Passerini)**

Plate 9c

Apt. shiny dark bronze-brown to reddish brown or blackish; BL 1.5–2.8 mm. Sec. rhin. in al. III 7–16, IV 0–8, V 0 (–1). In ant-attended colonies at leaf-bases of *Typha* and *Sparganium*, also on Cyperaceae (*Carex*, *Eriophorum*, *Scirpus*) and sometimes on Araceae (*Colocasia*), Juncaceae (*Juncus*) or Iridaceae. Throughout Europe, and in SW Asia, China, Korea and Japan. Mon. hol., with al. males (cf. *S. caricis*). European populations on *Eriophorum* spp. are regarded as a subspecies, *S. scirpi* ssp. *eriophori* Müller. $2n=8$.

***Schizaphis (Paraschizaphis) scirpicola* Hille Ris Lambers**

Apt. color in life unknown; 1.4–1.7 mm. Sec. rhin. in al. III 9–10, IV 3, V 0 (1 specimen, redescribed by Ilharco, 2002). On *Scirpus atrocinctus* in Canada (New Brunswick). Subsequently recorded from *Scirpus* spp. and *Carex* sp. in Ontario, Nova Scotia and Manitoba, and from N Carolina, USA.

Schizaphis thunebergi Heie

Apt. pale, color in life unknown; BL c.2.1–2.3 mm. On *Calamagrostis purpurea* in Finland.

Schizaphis variegata Ossiannilsson

Apt. broadly oval, mottled dark green and brown, BL c.1.8–2.0 mm. On *Carex juncella* in Sweden (Ossiannilsson, 1959). Al. and biology unknown.

Schizaphis wahlgreni (Ossiannilsson)

Figure 18h

Color of apt. unknown, probably pale, with black ANT (except at base) and SIPH and a pale cauda; BL c.2.1 mm. On *Carex vesicaria* in Sweden, Poland, Czechoslovakia and Hungary (Heie, 1986). Al. noted (Ossiannilsson, 1964b) but undescribed.

Schizaphis weingaertneriae Hille Ris Lambers

Apt. dark green powdered with bluish gray wax; BL 1.2–1.7 mm. On undersides of leaves of *Corynephorus canescens*, usually arranged in single file. In Netherlands, Poland and Czechoslovakia. Ovip. and apt. males in early Oct (orig. descr.). Not visited by ants.

Schizaphis werderi Börner

Apt. color in life unrecorded; BL 1.6–1.9 mm. On *Poa alpina* in the Alps.

Schlechtendalia Lichtenstein

Eriosomatinae: Fordini

An E Asian genus related to nearctic *Melaphis* and likewise producing galls on *Rhus* (see Blackman and Eastop, 1994). The life cycle of one species is known, and involves host alternation between *Rhus* and mosses.

Schlechtendalia chinensis (Bell)

Migration occurs from galls on *Rhus semialata* ('Chinese gall-nuts') to mosses (*Mnium* spp.) in autumn, and al. sexup. migrate back to *Rhus* in spring. Appearance of overwintering imm. stages on mosses is undescribed. China, Japan, Korea, Taiwan and Malaysia. 2n=c.36.

Schoutedenia Rübsaaamen

Greenideinae: Cervaphidini

Two species on woody Euphorbiaceae belonging to an ancient group of Gondwanian distribution. Records from other plants are probably all of vagrants.

Schoutedenia ralumensis Rübsaaamen

Apt. lemon-yellow or green; BL 1.4–1.8 mm. Al. have thickly black-bordered forewing veins. Typically found on young shoots, stems and leaves of woody Euphorbiaceae, attended by ants. Africa, India, SE Asia and eastern Australia. See Blackman and Eastop (1994) for further information. 2n=15 and 16.

Scythaphis Kadyrbekov

Aphidinae: Macrosiphini

One species in E Europe and C Asia related to *Brachycaudus* (*Thuleaphis*) and *Mariaella* but with a more setose ABD TERG 8 (Kadyrbekov, 2002b).

Scythaphis eurotiae (Mamontova-Solukha)

Apt. shiny yellow, without wax; BL 1.1–1.6 mm. On *Krascheninnikovia* (= *Eurotia*) *ceratoides*, living in galls formed by curling and thickening of the upper sides of the leaves. Al. have 5–7 sec. rhin. on ANT III only, and dark dorsal markings. In Ukraine (Mamontova-Solukha, 1968, as *Cryptosiphon eurotiae*), S and W Kazakhstan and W China (Kadyrbekov *et al.*, 2002).

Semiaphis van der Goot

Aphidinae: Macrosiphini

About 16 palaeartic species similar to *Hyadaphis* but with very short SIPH. They are typically heteroecious between *Lonicera* and Umbelliferae, or live without host alternation on one or other of these host-plant groups. A few species occur on other plants, including two on *Impatiens*. The genus is not well-known biologically and the life cycles of many species are not completely known. Populations on *Lonicera* are

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particularly difficult to assign to species. Accounts are available for NW Europe (Heie, 1992), C Europe (Heinze, 1960), European Russia (Shaposhnikov, 1964), Siberia (Ivanoskaya, 1977; Pashtshenko, 1988a), and Japan (Miyazaki, 1971).

Semiaphis aizenbergi (Narzikulov)

Apt. pale green, wax-covered; BL c.1.7 mm. On *Lonicera* spp. in C Asia. Ovip. and al. males occur in Nov (Mukhamediev and Akhmedov, 1982).

Semiaphis anthrisci (Kaltenbach)

Apt. dirty green, wax-powdered; BL 1.8–2.2 mm. Recorded from several genera of Umbelliferae (*Aegopodium*, *Anthriscus*, *Peucedanum*, *Torilis*), slightly rolling the leaves. In NW, C and E Europe, and W Siberia (Heie, 1992). Differences from several other species (*dauci*, *pastinacae*, *pimpinellae*, *sphondylii*) are minimal, and therefore host records must be treated warily; possibly the true host range is more restricted. Heikinheimo (1997) gave additional data to distinguish *anthrisci* from *dauci* and *pimpinellae* on the basis of hair lengths. Mon. hol.; ovip were collected in Sept on *Peucedanum palustre*.

Semiaphis cervariae (Börner)

Figure 41c

Apt. pale yellow-ochre, with fine wax powder; BL 1.9–2.3 mm. On *Peucedanum* spp., causing yellow and red spotting, and desiccating leaves. In Europe (Austria, Germany, Netherlands, Switzerland).

Semiaphis coniumi Bozhko

Apt. greenish with brown legs and dark green SIPH and cauda; BL c.1.9 mm. On *Conium maculatum* in Ukraine.

Semiaphis coryspermi Mamontova ex Shaposhnikov

Apt. greenish white, with waxy bloom; BL c.1.5 mm. On *Coryspermum* sp., in leaves rolled into tubes. Ukraine. Mamontova (1979) provided a more detailed description.

Semiaphis dauci (Fabricius)

Plate 13h

Apt. pale blue-green with dark brown head and waxy bloom; BL 1.3–2.1 mm. On wild and cultivated *Daucus carota*, feeding on upper sides of rolled young leaves and leaflets in spring, and later in umbels. Also recorded from *Aegopodium podagraria*. Europe and Middle East. Mon. hol. (with al. males) on *Daucus*, or anhol. Similar aphids on *Seseli* spp. are currently regarded as a subspecies, ***S. dauci* ssp. *seselii*** Börner.

Semiaphis heraclei (Takahashi)

Figures 10k, 38d

Apt. pale gray-green to yellow-green, wax-dusted, with ANT, legs, SIPH and cauda rather pale; BL c.2.1 mm. On stem or curled leaves of various Umbelliferae (*Angelica*, *Apium*, *Bupleurum*, *Carum*, *Changium*, *Cnidium*, *Coriandrum*, *Cryptotaenia*, *Daucus*, *Glehnia*, *Heracleum*, *Ligusticum*, *Oenanthe*, *Osmorhiza*, *Seseli*, *Torilis*) in E and SE Asia, India, and Hawaii. Heter. hol. with *Lonicera* spp. as primary hosts in Japan, China and E Siberia. 2n=8. [*Leycesteria formosana* is possibly an alternative primary host in India (Pal and Khuda Bukhsh, 1983), but as these authors recorded 2n=10 they possibly had a different species.]

Semiaphis horvathi Szelegiewicz

Figure 41d

Apt. pale brown, lightly wax-powdered; BL 1.6–2.0 mm. On *Peucedanum officinale*, colonising shoot tips and deforming leaves. In Hungary, and also in Czech Republic (BMNH colln, leg. H.L.G. Stroyan).

Semiaphis iliensis Kadyrbekov

Apt. yellow-green; BL 1.2–1.7 mm. On *Lonicera iliensis* in C Asia.

Semiaphis longissima Narzikulov

Apt. green, wax-dusted; BL 1.8–2.2 mm. On *Lonicera microphylla* in C. Asia. Ovip. and al. males occur in Oct–Nov (Mukhamediev and Akhmedov, 1982).

Semiaphis moiwaensis Takahashi

Apt. white with pale appendages; BL c. 2 mm. On stem and roots of *Impatiens noli-tangere* in Japan, and Korea (BMNH colln, leg. W.H. Paik). This is likely to be a synonym of *S. nolintangere*.

Semiaphis nolitangere Aizenberg

Figure 33e

Apt. pale yellowish green; BL 1.8–2.3 mm. On flowerstalks of *Impatiens noli-tangere* in Finland and Russia. Heter. hol. with ovip. and al. males in Finland, where transfers were made to *Lonicera tatarica* (Heikinheimo, cited by Heie, 1995).

Semiaphis pastinacae Börner

Apt. probably gray–green to yellow–green, with dark ANT, legs, SIPH and cauda; BL c.1.3 mm. In downwardly rolled leaflets of *Pastinaca sativa* in C Europe, (Austria, Czech Republic, Switzerland). Host alternation probably occurs with *Lonicera* spp. as primary hosts, but this needs confirmation (Heinze, 1960).

Semiaphis pimpinellae (Kaltenbach)

Apt. dull green mottled with darker green, coated with grayish wax powder; BL 1.4–1.8 mm. On *Pimpinella* spp., esp. *saxifraga*, causing leaves to curl upwards, and later in season on umbels. Ossiannilsson (1959) recorded it from *Aegopodium podagraria*. Europe (not Iberian Peninsula). Very similar to other spp. in *S. anthrisci* group.

Semiaphis rabotkinae Pashtshenko

Apt. green, wax-dusted; BL c. 2.2 mm. On *Lonicera edulis* in E Siberia.

Semiaphis sphondylii (Koch)

Figure 10j

Apt. greenish white, wax-powdered; BL 2.0–2.5 mm. In rolled leaves on *Lonicera nigra* in spring, heter. hol., migrating to various Umbelliferae (*Angelica*, *Heracleum*, *Peucedanum*). In NW and C Europe (Finland, Netherlands, Germany, Austria).

Seneciobium Remaudière

Aphidinae: Aphidini

Two *Aphis*-like species completely lacking SIPH, one in SW Europe and the other (known only from trapped al.) in S America. The European species has the dark legs and antennal sensoriation characteristic of a group of *Aphis* (incl. *jacobae* in Europe and *lugentis* in N America) that feed on *Senecio*, which suggests that, despite lacking SIPH, its separate generic status may not be warranted.

Seneciobium balachowskyi Remaudière

Apt. greenish to black, with a waxy bloom, and appendages all dark, incl. cauda; BL 1.8–2.2 mm. On stems and flowers of *Senecio adonidifolius* in the eastern Pyrenées. Mon. hol. with apt. males.

Shinjia Takahashi

Aphidinae: Macrosiphini

One E Asian species with greatly reduced tarsi, host-alternating between *Viburnum* and ferns. There is a rather strange parallel with a fern-feeding N American species in another monotypic genus, *Mastopoda pteridis*, with similarly vestigial tarsi and apparently with similar biology, but not closely related.

Shinjia orientalis (Mordvilko)

Plate 22c, Figure 43a

Apt. shining yellow with black ANT and dark tips to SIPH; BL 1.3–2.0 mm. Al. have paired brown patches partially fused across midline. On young growth of *Viburnum* spp. in spring. Heter. hol., migrating to ferns (*Athyrium*, *Eriosorus*, *Polypodium*, *Pteridium*, *Pteris*) in Japan (Sorin, 1962b, as *pteridifoliae*). Recorded from E India, Nepal, China, Korea, E Siberia, Japan, Philippines and Australia. Probably anhol. on ferns in Australia (Eastop, 1966). 2n=12*.

Sinomegoura Takahashi

Aphidinae: Macrosiphini

About 7 species with the head spinulose ventrally and with cylindrical or weakly clavate, calf-shaped SIPH and an elongate cauda, living on shrubs in E and SE Asia. Accounts are available for Japan (Miyazaki, 1971), China (Tao, 1963), Java (Noordam, 1986) and India (Raychaudhuri, 1980).

Sinomegoura citricola (van der Goot)

Plate 24i

Apt. shiny dark brown, with dark ANT and legs, SIPH pale basally and dark distally, and black cauda; BL 1.4–2.7 mm. On undersides of leaves or young growth of numerous species of tropical shrubs in about 20 families, the most frequent records being from Lauraceae and Rutaceae. India, Sri Lanka, China, Thailand, Korea, Taiwan, Malaysia, Indonesia, the Philippines, and Australia. Apparently anhol. $2n=12$ (Kulkarni, 1984; Dutta and Gautam, 1993), 16 (Chen and Zhang, 1985b) or 18 (Kar and Khuda-Bukhsh, 1986); the karyotype variation warrants investigation.

Sinomegoura coffeae Noordam

Apt. broadly spindle-shaped, shining yellow with black ANT and tibiae, SIPH browner towards apices, and cauda yellow or slightly gray; BL 2.4–3.0 mm. On undersides of leaves of *Coffea* sp. in Java and Timor (Indonesia). *Coffea* is not indigenous to SE Asia and there is presumably a native host (see Noordam, 1986).

Sinomegoura photiniae (Takahashi)

Apt. green, often tinged with pink, or pale orange, with black SIPH and pale cauda: BL 2.0–2.8 mm. On *Photinia* spp. and *Raphiolepis* spp. China, Japan and India. $2n=18$ (Khuda-Bukhsh and Kar, 1990).

Sinomegoura rhododendri (Takahashi)

Apt. green, with dark-tipped SIPH and black cauda; BL c.1.4 mm. On *Rhododendron oldhami* in Taiwan. Records from other hosts in Philippines and India are likely to be referable to other species.

Sinomegoura symplocois (van der Goot)

Apt. pale reddish brown with eyes, ANT grayish white with apices of segments black, legs pale brown with apices of tibiae and tarsi black, SIPH pale brownish yellow with dark apices, cauda black; BL c.2.9–3.0 mm. On *Eurya japonica* and *Symplocos sessilifolia* in Java. The record from *Acronychia laurifolia* in NW India (Shillong: Ghosh and Raychaudhuri, 1970) seems to be another, apparently undescribed, species, to judge from 2 al. (leg. A.K. Ghosh) with the same date, host and locality data in the BMNH collection.

Sinonipponaphis Tao

Hormaphidinae: Nipponaphidini

Three Asian species in which the dorsum of the aleyrodiform apt. is densely covered with spine-like processes (see also Blackman and Eastop, 1994).

Sinonipponaphis holboelliae (A.K. Ghosh and Raychaudhuri)

Apt. brownish, covered with mealy wax; BL 1.7–2.1 mm. Heavily infesting stems of *Holboellia latifolia* in W Bengal. Other morphs unknown.

Sipha Passerini

Chaitophorinae: Siphini

Twelve species of spiny-haired oval grass-feeding aphids with stump-shaped SIPH, 5-segmented ANT and a sclerotic tergum. The four species of *Sipha* s.str. have a knobbed cauda; two are nearctic with a smooth tergum and two palaearctic with a spinulose tergum. The eight species of subgenus *Rungsia* have a broadly rounded cauda and a smooth tergum. Accounts are available for UK (Stroyan, 1977), NW Europe (Heie, 1982), the Iberian peninsula (Nieto-Nafria and Mier Durante, 1998), European Russia (Shaposhnikov, 1964) and USA Rocky Mountain region (Palmer, 1952).

Sipha (Rungsia) aegilopis Bozhko

Apt. reddish brown with a pale spinal stripe; BL c.1.6 mm. On upper sides of leaves of *Aegilops cylindrica* in Ukraine. It was not possible to find any character to reliably discriminate this species from *S. elegans*.

Sipha agropyronensis (Gillette)

Apt. long-bodied, rusty yellow with brown pleural stripes; BL 1.6–1.9 mm. On upper surfaces of leaves of *Elymus glaucus* (as *Agropyron glaucum*), attended by ants (orig. descr., as *Chaitophorus*). Also collected on *Elymus smithii* (as *Agropyron occidentale*; BMNH colln, leg. M.A. Palmer). USA; Colorado, and Gillette also mentions collections ‘throughout the Northwest’. Mon. hol., with ovip. in Oct (Palmer, 1952).

Sipha (Rungisia) arenarii Mordvilko

Apt. greenish yellow to brown with pale longitudinal stripes; BL 2.0–2.4 mm. On *Leymus arenarius* and *Elymus hispidus* in Europe, and eastward to W Siberia and Kazakhstan. Mon. hol., with ovip. and apt. males in Oct (in Denmark; Heie, 1982).

Sipha (Rungisia) burakowskii Holman and Szelegiewicz

Apt. grayish green with brownish spots, very slightly pruinose; BL 1.8–2.3 mm. In small colonies on upper sides of leaves of *Leymus* (= *Aneurolepidium*) *pseudoagropyron* in Mongolia.

Sipha (Rungisia) elegans del Guercio

Apt. yellowish brown to brown with a paler spinal stripe; BL 1.4–2.1 mm. Al. have black dorsal abdominal markings. In small colonies on upper sides of leaves of various grasses and cereals (*Aegilops*, *Agropyron*, *Agrostis*, *Ammophila*, *Arrhenatherum*, *Bromus*, *Elymus*, *Festuca*, *Hordeum*, *Phleum*, *Puccinellia*, *Setaria*, *Triticum*) often causing leaves to roll upwards and develop yellow patches. Europe, across Asia to China and E Siberia, and in N America. Mon. hol. with slender black apt. males, in both Europe and N America. See also Blackman and Eastop (2000). 2n=6.

Sipha flava (Forbes)

Plate 5d

Apt. yellow (or green at low temperatures) with dusky transverse intersegmental markings; BL 1.3–2.0 mm. Al. have variably-developed dark dorsal abdominal markings. On leaf blades of grasses in numerous genera incl. *Andropogon*, *Avena*, *Cenchrus*, *Cymbopogon*, *Cynodon*, *Digitaria*, *Holcus*, *Hordeum*, *Panicum*, *Paspalum*, *Pennisetum*, *Saccharum*, *Setaria*, *Sorghum* and *Triticum*, often forming large colonies. Also recorded from Cyperaceae (*Carex*, *Cyperus*). USA, C and S America, and the Azores. Mon. hol. with apt. males in areas with cold winters, anhol. in warmer climates. See also Blackman and Eastop (2000).

Sipha glyceriae (Kaltenbach)

Apt. dull pale green to mid-green, sometimes reddish, often with a paler spinal stripe; BL 1.5–2.4 mm. On many species of Graminae, especially in wetlands; genera include *Agrostis*, *Aira*, *Alopecurus*, *Glyceria*, *Elymus*, *Hydrochloa*, *Oryza*, *Paspalum*, *Phalaris*, *Poa*, *Puccinellia*. Also collected from Ceratophyllaceae (*Ceratophyllum*), Cyperaceae (*Carex*, *Cyperus*, *Eleocharis*, *Schoenus*, *Scirpus*), Juncaceae (*Juncus*), Typhaceae (*Typha*) and Alismataceae (*Sagittaria*). Europe, eastward to W Siberia and C Asia, and in USA and Canada. Mon. hol., with dark apt. males. 2n=12 (Gut, 1976) or 10*.

Sipha littoralis (Walker)

Apt. green, dark green or bluish green with brownish markings, head and thorax more brownish; BL 1.4–2.2 mm. In leaf sheaths of grasses in coastal situations (*Spartina* spp., *Puccinellia maritima*, *Festuca rubra*), where they are able to survive tidal submergence. NW Europe. Mon. hol. with brown ovip. and apt. males in Oct (Heie, 1982).

Sipha (Rungisia) maydis Passerini

Plate 5e

Apt. shining dark brown to almost black on dorsal surface; BL 1.0–2.1 mm. Al. have a solid black dorsal abdominal patch. On numerous species of Gramineae, in more than 30 genera. It feeds on upper sides of leaf blades near bases, sometimes on stems or inflorescences, often attended by ants. Europe, Mediterranean region, Middle East, C Asia, India, Pakistan and S Africa. In drier climates outside NW Europe it can be a pest of cereal crops (Blackman and Eastop, 2000). 2n=12.

Sipha (Rungisia) praecocis (Bozhko)

Apt. yellowish, mottled with green; BL c.1.6 mm. On *Carex praecox* in Ukraine.

Sipha (Rungisia) taurica (Mamontova)

Apt. lemon yellow; BL 1.8–2.2 mm. On undersides of leaves of *Elymus* spp., turning them yellow. Crimea.

Sipha (Rungisia) uvarovi Mordvilko

Apt. green to dark green; BL c.1.5–1.6 mm. On wheat (*Triticum*) and various grasses (*Agropyron*, *Festuca*). S Russia, Ukraine.

***Sitobion* Mordvilko**

Aphidinae: Macrosiphini

About 66 species resembling *Macrosiphum* in the reticulation of their SIPH, but with shorter hairs, less well-developed ANT tubercles, and often with a more sclerotic dorsum. Probably they have a closer relationship with *Metopolophium*. They are about equally distributed between monocots (particularly Gramineae) and dicots. Several species are heter. hol. between dicots (*Rubus*, *Rosa*, *Akebia*) and Gramineae, and some of the other dicot-feeding species may prove to be the primary host forms of species on Gramineae. Four European species are associated with Gramineae. The 24 African species include 9 grass- and 13 from dicots. The 30 Asiatic species include only 6 from Gramineae, but 10 from orchids and other monocots and 13 from dicots. Twelve American and one European species previously in *Sitobion* were placed in *Macrosiphum* after a cladistic analysis by Jensen (1997). Five grass-feeding species with characters intermediate between *Sitobion* and *Metopolophium* are placed in subgenus *Metobion*. Accounts are available for Europe (Holman, 1961c, added to by Stroyan, 1969b), Fennoscandia and Denmark (Heie, 1994), E Africa (Eastop, 1958), W Africa (Eastop, 1961a), Japan (Miyazaki, 1971, in *Macrosiphum*), China (Tao, 1963), India (David, 1976), NE India (Raychaudhuri, 1980, in *Macrosiphum*) and E Siberia (Pashtshenko, 1988a). Sunnucks *et al.* (1996) discussed the introduced species in Australia.

***Sitobion africanum* (Hille Ris Lambers)**

Plate 26d

Apt. variably colored yellowish green to green, reddish, yellowish, or greenish brown, reddish or brownish forms being usually densely wax-covered; BL 1.6–3.1 mm. There is also a very variably developed dorsal abdominal pattern of dark pigmentation; there may be an extensive, broken pattern of sclerotisation of the whole dorsal surface or, at the other extreme, the cuticle of the paler green forms may be almost completely pale. Al. have a pattern of transverse, narrow, often interrupted dark bars on the dorsal abdomen. On Gramineae (*Aristida*, *Bothriochloa*, *Brachyaria*, *Bromus*, *Calamagrostis*, *Cenchrus*, *Cynodon*, *Dichanthium*, *Digitaria*, *Eragrostis*, *Exothea*, *Hyparrhenia*, *Panicum*, *Pennisetum*, *Setaria*, *Sorghum*, *Sporobolus*, *Stenotaphrum*, *Tricholaena*, *Triticum*, *Zea*) in Africa, Indian Ocean islands, and also recorded from Syria and Chile. In Africa it is recorded frequently on various other monocots (*Asparagus*, *Cyperus*, *Gladiolus*, *Watsonia*) and dicots (*Aeschynomene*, *Aster*, *Clematis*, *Desmodium*, *Droogmansia*, *Euphorbia*, *Ficus*, *Hakea*, *Hypericum*, *Lactuca*, *Lefeburea*, *Pavetta*, *Tephrosia*, *Thesium*, *Ximenia*). Müller and Schöll (1958) gave an account of the variation and host plants of *S. africanum* in S Africa. It may eventually transpire that this name is being applied to a complex of species. Probably mainly anhol., but Müller and Schöll (1958) described ovip. from *Ficus*.

***Sitobion akebiae* (Shinji)**

Apt. variably colored green, yellowish green or orange red, with dorsal abdomen pale or variably pigmented. Heter. hol. between *Akebia* and secondary hosts mainly in the Gramineae according to Moritsu (1944, as *granarium*) and Takahashi (1964), but Miyazaki (1971) found fund. on *Stellaria* and *Platanus*, so overwintering eggs may be laid on various plants. Summer host plants include *Elymus*, *Festuca*, *Oryza*, *Poa*, and *Triticum*; also *Gladiolus*, *Plantago*, *Ranunculus* and *Trifolium*. In Japan and Korea. Kanehira *et al.* (1988) studied population dynamics of aphids identified as *S. akebiae* in wheat fields in Japan. The more widely distributed *S. miscanthi* is very difficult to separate from *S. akebiae* and may perhaps be the same species. For further information see Yano *et al.* (1983).

***Sitobion alopecuri* (Takahashi) (= *Sitobion salicornii* Richards; synonymy by Jensen, 1997)**

Apt. yellowish brown to mid apple-green with pale to dusky SIPH, darker at apices; BL 1.8–3.2 mm. On grasses, particularly *Alopecurus*, but also in sandy habitats on *Ammophila*, *Elymus*, *Hordeum* and *Poa*. Asia (Taiwan, N India), Europe (Netherlands, UK) and N America (California, Hille Ris Lambers, 1966a, as ssp. *sylvesteri*; B.C., Richards, 1963, as *salicornii* – vagrants?; Manitoba, BMNH colln, leg. A.G. Robinson). Mon. hol. on *Alopecurus*, with al. males (Stroyan, 1991, and BMNH colln). It is characteristic of the European and N American populations to have marginal abdominal tubercles on all or most of ABD TERG 2–5, whereas these are not developed in the single oriental specimen seen (from India). *S. pseudoalopecuri*

Chakrabarti, described from an unidentified grass in H.P., India, is very similar but has a shorter, blunter cauda. $2n=18$ (sample from B.C., Canada).

***Sitobion anselliae* (Hall)**

Apt grass green to yellow green with black SIPH; BL 1.4–2.2 mm. Al. have no dark dorsal abdominal markings. On wild and cultivated orchids (*Ansellia*, *Cattleya*, *Epidendrum*, *Eulophia*). Common on *Eulophia streptopetala* in Burundi (Remaudière and Autrique, 1985). Africa (Angola, Burundi, Kenya, Rwanda, South Africa and Zimbabwe). Ant-attended (*Pheidole* sp.; van Harten and Ilharco, 1976).

***Sitobion asirum* Aldryhim and Ilharco**

Apt. pale green; BL 1.7–2.0 mm. In small colonies on upper sides of leaves of *Phragmanthera regularis* (a parasite on *Acacia*) in Saudi Arabia. Closely related to an African species on Loranthaceae, *S. loranthi*.

***Sitobion aulacorthoides* David, Narayanan and Rajasingh**

Apt. green, with dark brown apices to femora and tibiae, and SIPH also dark brown on distal half; BL 1.8–2.4 mm. Described from undersides of leaves of an unidentified plant (a ‘weed’) in NW India (H.P.). There are subsequent records of this species from various plants in NW and NE India, mainly Labiatae (*Ajuga*, *Elsholtzia*, *Perilla*, *Plectranthus*), but also from *Commelina* sp., *Rubus* sp. and *Valeriana wallichii*, which are presumably not normal host plants. Biology is unknown. $2n=18$.

***Sitobion autriquei* Remaudière**

Apt. shining brown-black, with black SIPH, and cauda pale except for dusky tip; BL 2.0–2.7 mm. On various Compositae (*Conyza*, *Crassocephalum*, *Helichrysum*) in Africa (Burundi), and also collected from species of *Plectranthus* (Labiatae) and *Laportea* (Urticaceae).

***Sitobion avenae* (Fabricius)**

Plate 26e

Apt. yellowish green or dirty reddish brown, sometimes rather shiny, with black ANT and SIPH; BL 1.3–3.3 mm. On numerous species of Gramineae, including all the cereals and pasture grasses of temperate climates, and many other monocots. On cereals the aphids prefer to feed on the upper leaves, and on the ears once these have emerged. Europe, the Mediterranean, the Middle East, C Asia, India, Nepal, Pakistan, Africa; N, C and S America. (oriental records refer to *S. miscanthi*.) Mon. hol., with al. males, on many species of Gramineae (Müller, 1977a). Anhol. overwintering is common in regions with mild winters. Rautapää (1970) studied preferences among a range of host plants. DNA studies in southern England (Sunucks *et al.* 1997) and France (Haack *et al.* 2000) have revealed host specialisation including races preferentially colonising wheat and *Dactylis glomerata*, the latter form apparently hybridising naturally with *S. fragariae*. See also Blackman and Eastop (2000, and in press). $2n=18$.

***Sitobion bamendae* (Eastop)**

Apt. green with dark dorsal abdominal cross-bands, pinkish green or olive-green to almost black; BL 1.7–2.5 mm. On grasses (*Pennisetum*, *Setaria*) in Africa (Burundi, Cameroon).

***Sitobion (Metobion) beiquei* (Hille Ris Lambers)**

Apt. pale green with bright green spinal and marginal longitudinal stripes; BL 3.9–4.2 mm. Originally beaten from mixed vegetation, subsequently collected from Gramineae (*Agrostis*, *Calamagrostis*) (BMNH colln, leg. G.W. Simpson and M.E. MacGillivray). North-western USA (Maine) and Canada (Québec).

***Sitobion (Metobion) brevirostre* (Heikinheimo)**

Apt. blackish green with dark ANT and pale SIPH; BL c.4.1 mm. Host plant unknown, but assumed here to be a species of Gramineae. Only known from Finland.

***Sitobion breyniae* Noordam**

Apt. dull green with pale brown head, black SIPH and brownish yellow cauda; BL 1.8–2.3 mm. On *Breynia microphylla* in Java (Noordam, 2004).

THE APHIDS

Sitobion burundiense Remaudière

Apt. shining dark green with black SIPH and rather dark ANT, legs and cauda; BL 2.1–2.9 mm. On *Kotschy africana* and *Cassia* sp. in Africa (Burundi). It apparently only occurs on Leguminosae.

Sitobion (Metobion) calvulum (Ossiannilsson)

Apt. dull bluish green, imm. yellowish green; 2.1–2.5 mm. Originally described from *Poa arctica* and there have been subsequent collections from this plant, but colonies have also been found apparently feeding on *Salix polaris* and above-ground stems of its root parasite *Pedicularis hirsuta*. Only known from Spitzbergen. Mon. hol., life cycle abbreviated with ovip. and apt. males in late July–early Aug (Hodkinson *et al.*, 2004, as *Acyrtosiphon*).

Sitobion caricis (Glendenning)

Only al. described (possibly of more than one species), on *Carex* sp. in northern B.C., Canada.

Sitobion cissi (Theobald)

Apt. variable in color, from pinkish brown to almost black, with some whitish wax intersegmentally; BL 2.0–2.5 mm. The extent of dark dorsal pigmentation varies from total absence in samples from S Africa, to broad dark bars or paired patches on all tergites in a collection at over 2000 m altitude in Kenya (BMNH colln, leg. J.H. Martin). Al. are brown to black with similarly variable dorsal pigmentation. On *Cissus* and *Rhoicissus* in Kenya, Zimbabwe and S Africa. Mon. hol., with ovip. and al. males collected in June in Pretoria (Eastop, 1958).

Sitobion colei (Eastop)

Apt. probably blackish in life; BL 1.7–2.3 mm. On several genera of Labiatae (*Aeollanthus*, *Ocimum*, *Plectranthus*, *Salvia*, *Solenostemon*, *Tetradenia*) in southern Africa (Remaudière and Autrique, 1985).

Sitobion congolense (Doncaster and Hille Ris Lambers)

Figure 57b

Apt. mid- to dark green; BL 2.2–2.5 mm. On young growth of Compositae (*Vernonia* spp., *Elephantopus scaber*), with records also from the guttiferous tree *Harungana madagascarensis*, which seems able to act as a reserve host for both this aphid and *S. nigeriense* (Remaudière and Autrique, 1985). Africa (Angola, Burundi, Cameroon, Congo, Ghana, Ivory Coast, Kenya, Nigeria, Zaire). Attended by ants (Duviard, 1969), and parasitised by *Aphidius camerunensis* (Remaudière and Autrique, 1985).

Sitobion dismilaceti (Zhang)

Apt. yellowish; BL c.2.7 mm. On *Smilax china* in Yunnan, China. This is possibly a synonym of *S. sikkimense* (q.v.).

Sitobion eulophiae Remaudière

Apt. black in life (but macerated specimens pale with black SIPH and femoral apices and dark cauda; BL 2.1–2.6 mm. Al. without dark dorsal abdominal markings. On the orchid species *Eulophia horsfallii* in Burundi. (Not attacking *E. streptopetala*, the host of *S. anselliae* at the same locations). Also found on *Liparis neglecta* (Remaudière and Autrique, 1985).

Sitobion fragariae (Walker)

Plate 26f

Apt. on *Rubus* and other Rosaceae in spring yellowish green with small brown intersegmental markings, with SIPH either entirely dark or pale with darker apices; BL 2.0–3.0 mm. Heter. hol., migrating to Gramineae, where apt. are dirty greenish yellow with black SIPH, and BL 1.6–2.9 mm (Blackman and Eastop, 2000). Although the principal primary hosts are *Rubus*, especially *R. fruticosus*, the sexual phase may also sometimes occur on *Fragaria*, *Rosa* and *Geum*. Europe, Asia, and introduced to S Africa, and N and S America. Type specimens of *Uroleucon qinghaiense* described from vagrants on *Artemisia* sp. in China (Zhang, 1999) are *S. fragariae* or a close relative. An aphid introduced into Australia and New Zealand and studied as *Sitobion* sp. ‘near *fragariae*’ (e.g., Sunnucks *et al.*, 1996) has a longer cauda and other morphological differences. 2n=18.

Sitobion (Metobion) graminearum (Mordvilko)

Apt. probably greenish yellow; BL 3.6–3.8 mm. On Gramineae (*Arrhenatherum*, *Deschampsia*, *Festuca*, *Poa*) in Europe (Sweden, Finland, NW Russia, Austria). An al. ascribed to this species by Heikinheimo (1990) has more caudal hairs and relatively shorter ANT PT, showing greater resemblance in these features to the N American species *S. (M.) beiquei* (al. of which are undescribed). Mon. hol. with al. males (orig. descr.).

Sitobion graminis Takahashi

Apt. dark reddish brown covered with gray wax dust, often of a bluish appearance (red in alcohol), with black ANT, legs, SIPH and cauda; BL 1.8–2.9 mm. On many genera and species of Gramineae, usually feeding on the flower stems. Also recorded from *Cyperus* and *Juncus*. In Africa, Réunion, India, Malaya, Java, New Guinea and the Philippines. Apparently anhol. 2n=18.

Sitobion gravelii (van der Goot)

Apt. pale yellow or pale brownish, with distal segments of ANT dark brown, SIPH dark brown and cauda pale; BL 3.6–4 mm. Described from an unidentified host, but there are later records from *Artemisia* and unidentified Compositae (Raychaudhuri, 1980, as *Macrosiphum spinotibium*), but these seem unlikely hosts, and it is more probably a grass feeder. N India. Ovip. were collected from an unknown host in late Nov (A.K. Ghosh *et al.*, 1971a, as *M. spinotibium*). 2n=12 (Khuda-Bukhsh and Basu, 1987, as *M. spinotibium* on *Artemisia vulgaris*).

Sitobion halli (Eastop)

Apt. uniformly pale green, with black-tipped SIPH and pale cauda; BL 1.8–2.9 mm. Imm. somewhat wax-powdered. On young growth of trees and shrubs in various families (Apocynaceae, Rubiaceae, Moraceae, Euphorbiaceae, Melianthaceae, Myrtaceae) in C and southern Africa (Remaudière and Autrique, 1985).

Sitobion hillerislambersi van Harten

Apt. bright grass-green with a black oval dorsal abdominal patch and black SIPH; BL 1.7–2.2 mm. On undersides of leaves of *Cyperus esculentus* in Angola.

Sitobion himalayensis L.K. Ghosh

Apt. greenish with dark SIPH; BL 3.7–4.3 mm. On inflorescences of *Oryzopsis lateralis* in H.P., India.

Sitobion hirsutirostris (Eastop)

Apt. pale green with a slightly darker spinal stripe, SIPH black and cauda pale; BL 2.5–3.1 mm. On *Anisopappus africanus*, and less commonly on *Helichrysum setosum* (Remaudière and Autrique, 1985). In Africa (Burundi, Cameroun).

Sitobion ibarae (Matsumura)

Apt. yellowish green or yellowish brown with pale brownish head, mainly dark ANT and legs, long blackish SIPH and long pale cauda; BL 2.1–3.1 mm. On wild and cultivated *Rosa* spp. in E and SE Asia, and introduced to Hawaii (BMNH colln, leg. E. Hardy). Life cycle unknown, perhaps anhol. at least in warmer countries. Dwarf, brownish apt. may occur in Japan in midsummer (Takahashi, 1964).

Sitobion indicum A.N. Basu

Figure 25c

Apt. probably yellowish green, with an irregular dark dorsal abdominal patch, black SIPH and pale brown cauda; BL c. 2.0–2.1 mm. On orchids, mostly *Cymbidium* spp., in hilly regions of N India (W Bengal, H.P., U.P.). Possibly entirely anhol. 2n=18.

Sitobion kamtshaticum (Mordvilko)

Apt. green with black ANT and SIPH; BL 1.5–2.9 mm. Al. have rhinaria on ANT IV as well as III. On young growth of *Rosa multiflora* and *Rubus* sp. in spring. Heter. hol., migrating to grasses (*Digitaria adscendens* and *Microstegium vimineum*; Miyazaki, 1971, as *rubiphila*). In Japan, Korea and E Siberia.

THE APHIDS

Sitobion krahi (Eastop)

Apt. green, with SIPH dark distally, cauda pale; BL 2.56–3.0 mm. Originally collected in Ghana from young growth of either *Rauwolfia vomitoria* or *Tabernaemontana* (= *Conopharyngia*) *chippii*, with subsequent records from unidentified plants in Nigeria, Sierra Leone and Tanzania (BMNH colln), and from *Mangifera indica* in Burundi (Remaudière and Autrique, 1985).

Sitobion lambersi David

Apt. pale green with brown SIPH and pale cauda; BL c.1.8 mm. On stems and in flower heads of tropical grasses (*Bothriochloa*, *Chloris*, *Cynodon*, *Dicanthium*, *Digitaria*, *Ischaemum*, *Panicum*, *Paspalum*, *Themeda*), and occasionally on Cyperaceae. Widely distributed in the old world tropics; Africa, S India, Sri Lanka, and also Fiji. The name is possibly being used for a complex of species in the old world tropics, which share the distinctive character of a cauda with only 2 long hairs.

Sitobion leelamaniae (David) (= *chanikiwiti* Eastop 1959, = *howlandae* Eastop 1959)

Apt. pale yellowish green to green or bright yellow, ANT ringed with brown, legs pale, SIPH pale brown, darker towards apices; BL 1.6–2.3 mm. On undersides of leaves of many species of grasses and cereals (*Brachiaria*, *Cynodon*, *Eleusine*, *Pennisetum*, *Sorghum*, *Zea*). Described from S India, and also in Sri Lanka, Réunion (as *S. chanikiwiti*), and widely distributed in southern Africa, where most records are as *S. chanikiwiti* and *S. howlandae*. Possibly heter. hol. with *Hagenia abyssinica* as primary host in Burundi (Remaudière and Autrique, 1985, as *S. chanikiwiti*).

Sitobion loranthei van Harten

Apt. green with SIPH and apices of ANT segments black; BL 1.7–2.7 mm. On upper and undersides of leaves of *Loranthus* sp. in Angola. There are similar aphids in the BMNH collection from *Loranthus dregei* in S Africa, but with a longer and more pointed R IV+V.

Sitobion luteum (Buckton)

Figure 25b

Apt. bright greenish yellow to pale yellowish green, with an oval black dorsal abdominal patch, ANT black except for base of III, black SIPH and pale cauda; BL 1.3–2.1 mm. Al. have only dark intersegmental markings. On many species of orchids (*Dendrobium*, *Epidendrum*, etc.), in temperate regions usually under glass. Europe, Madagascar, Mauritius, India, Singapore, Java, New Guinea, Australia, Fiji, Tahiti, USA (New Mexico, New York), C and S America. Apparently entirely anhol.; no sexual morphs have been recorded. 2n=12.

Sitobion matatum (Eastop)

Apt. shining black dorsally; BL 2.0–2.5 mm. On *Tricholaena rosea* (= *Rhynchelytron repens*) in Kenya.

Sitobion microspinulosum David, Rajasingh and Narayanan

Apt. olive green, BL c.2.8–3.0 mm. Described from *Arthraxon lancifolius* in W Bengal, feeding on stalk and inflorescence. Only known from types (holotype apt. and paratype imm. al.), which are in BMNH collection.

Sitobion milii Remaudière

Apt. gray with black segmental cross-bands; BL 1.7–2.5 mm. On *Euphorbia milii* in Burundi. Closely related to *S. phyllanthi*; see Remaudière and Autrique (1985) for a comparison of the two species.

Sitobion miscanthi (Takahashi)

Apt. variably colored green, reddish brown to dark brown with shiny black SIPH, pale cauda, and dorsal cuticle variably tanned from pale with only very small intersegmental sclerites to very dark (in the latter case the pigmented area may be entire or segmentally divided); BL 1.7–3.0 mm. On many genera and species of Gramineae. Also on *Cyperus*, and sometimes found in large numbers on dicots, particularly semi-aquatic species, e.g., *Polygonum hydropiper* (Eastop, 1966). Indian subcontinent, E and SE Asia, Australia, New Zealand, and Pacific islands, incl. Hawaii. Anhol. almost everywhere, but an ovip. (on *Polygonum chinense*) and males collected in India may be this species (see David, 1976). *S. akebiae* in Japan and Korea is closely related and on secondary hosts not practically distinguishable from *S. miscanthi*; it may be a synonym, in which case one would expect the holocycle to involve overwintering as eggs on various dicots, as in Japan.

The taxonomy of the *miscanthi/akebiae* group requires clarification by biological studies. Sunnucks *et al.* (1996) studied DNA and karyotype variation in the introduced populations in Australia, and concluded that probably two successful colonisations had occurred. Genetic evidence suggests that hybridisation may have occurred between introduced populations of *S. miscanthi* and *Sitobion* 'sp. near *fragariae*' (see above) in New Zealand (Hales *et al.*, 1998), although the sexual morphs of neither of these species have so far been found in the field there. See also Blackman and Eastop (2000). $2n=18$ in India (Kurl and Chauhan, 1988), but varies from 17 to 21 in Australian populations.

Sitobion mucatha (Eastop)

Apt. of two color forms, both appearing translucent and delicate, one very pale yellow with dark SIPH and the other pale yellow-green with dusky SIPH; BL 2.0–2.5 mm. Living singly or in small colonies on under-sides of leaves of *Vernonia lasiopus* in Kenya.

Sitobion neusi (Eastop)

Apt. shining black; BL 1.7–2.3 mm. On various tropical grasses (*Digitaria*, *Eragrostis*, *Panicum*, *Setaria*, *Tricholaena*), and also found on *Canna* and *Ensete* (BMNH colln). Kenya, Ethiopia, Burundi (at 2000 m) and Madagascar.

Sitobion nigeriense (Eastop)

Figure 57c

Apt. green with dark SIPH; BL 1.5–2.2 mm. On young growth of *Vernonia* spp. (BMNH colln), and also recorded from Guttiferae (*Harungana madagascarensis* and *Psorospermum febrifugum*), which possibly act as reserve hosts (see also *S. congolense*). Africa (Burundi, Congo, Nigeria, Kenya, Ethiopia).

Sitobion nigrinectarium (Theobald)

Apt. green with black SIPH and long pale cauda; BL 1.8–2.9 mm. On various Leguminosae (*Cajanus cajan*, *Glycine javanica*, *Crotalaria*, *Dolichos*, *Pisum*, *Rhynchosia*) in Africa, and also on Indian Ocean islands (Madagascar, Mauritius, Réunion, Anjouan). See also Blackman and Eastop (2000). $2n=18$.

Sitobion ochnearum (Eastop)

Apt. salmon-pink (possibly due to fungal infection?); BL 1.7–2.3 mm. On *Ochna* spp. in eastern and southern Africa. $2n=18^*$.

Sitobion orchidacearum (Franssen and Tiggelovend)

Apt. shiny black with dark red around the siphunculi; BL 1.4–2.7 mm. On Orchidaceae (*Coelogyne*, *Dendrobium*) in Java (Noordam, 2004).

Sitobion paludum Müller

Apt. shining green or brownish, with black head and ANT, legs with femora black except at bases, black SIPH and pale cauda; BL 1.7–3.0 mm. On *Vaccinium uliginosum* in N Europe. Heter. hol., migrating to *Rhynchospora alba*, where apt. are darker than on primary host. Müller (orig. descr.) gave a full account of its biology.

Sitobion papillatum Remaudière

Apt. dark brown, with black SIPH sometimes paler at base; BL 1.7–2.5 mm. In inflorescences of *Pennisetum purpureum* in Burundi. A shorter-haired form on a bamboo (*Arundinaria alpina*) was distinguished as a subspecies, *S. papillatum* ssp. *subnudum* Remaudière (although if the differences remain consistent after further collections this form should probably be given separate species status).

Sitobion pauliani Remaudière

Apt. pale green or pink, usually with a shiny dark olive green or brown dorsal patch; BL 1.5–2.1 mm. In inflorescences of grasses, especially *Pennisetum*, *Setaria* and *Eleusine*. Africa south of the Sahara, Madagascar, Réunion (BMNH colln, leg. G. Remaudière), Andaman and Nicobar Is., India (Orissa), Sri Lanka, Indonesia, W Malaysia (BMNH, leg. J.H. Martin), Philippines (BMNH, leg. V.J. Calilung), C America (Venezuela, Honduras, Cuba, Jamaica, Costa Rica; BMNH, leg. J.H. Martin) and S America (Brazil, S.P.; S. Matsuoka, pers. comm.).

THE APHIDS

Sitobion phyllanthi (Takahashi)

Apt. dirty olive green with brown head, dorsal markings and appendages; BL 1.5–2 mm. On various Euphorbiaceae (*Euphorbia*, *Breynia*, *Phyllanthus*); widely distributed in Africa (Millar, 1994) and in Mauritius. An al. probably of this species was trapped in Sri Lanka (BMNH colln). Müller (1959) gave an account of this species (as *S. adgnatum*).

Sitobion plectranthi M.R. Ghosh, A.K. Ghosh and Raychaudhuri

Apt. pale-colored; BL 1.7–2.1 mm. On stems and flowerstalks of *Plectranthus coetsa*, and also recorded from *Perilla* sp. In NE India.

Sitobion pseudoluteum A.K. Ghosh

Color of apt. in life unknown; BL 1.7–2.3 mm. On *Masdevallia* sp. (? – recorded as *Madenvallia*) and *Cymbidium* spp. in W Bengal and Sikkim, India. The consistency of the unusual first tarsal chaetotaxy (4,4,4) needs to be confirmed with additional material. It appears closely related to *S. orchidacearum* in Indonesia, and could be a synonym. The specimens with a dark cauda and long hairs referred to by David (1976) under the name *S. indicum* may be this species. $2n=18$ (Kar *et al.*, 1990).

Sitobion raoi (Kulkarni)

Apt. pale brown (in life?); BL 2.1–2.5 mm. On *Iseilema antheboroides* in Maharashtra, India.

Sitobion rosaeiformis (Das)

Apt. bright yellowish green, green or pinkish brown with ANT and legs mainly pale, and SIPH entirely or mainly dark with pale bases; BL 2.1–3.3 mm. On both cultivated and wild *Rosa* in India, Pakistan and Vietnam (Szelegiewicz, 1968). Also recorded from *Rubus lasiocarpus* and *Spiraea corymbosa*. Probably heter. hol. with migration to grasses, as it has been collected on *Digitaria adscendens*, although host alternation has not been confirmed experimentally by host transfers, and populations can persist on roses into the cold season. Ovip. and al. males were found on *Rosa* in Nov–Mar (David, 1976). $2n=18$.

Sitobion rosivorum Zhang

Apt. color in life unrecorded; BL c.4.2 mm. On *Rosa chinensis* and *Rosa* sp. in China. $2n=18$ (Chen and Zhang, 1985a).

Sitobion schoelli (Müller)

Apt. green, head pale brown, ANT and legs with dark apices to segments, SIPH black and cauda dusky; BL 1.4–2.2 mm. On *Kniphofia* sp. in S Africa, and Angola (BMNH colln, leg. A. van Harten).

Sitobion (Metobion) scoticum (Stroyan)

Apt. dull apple-green with dark ANT and pale brownish SIPH; BL 2.3–3.0 mm. On *Poa trivialis*, living on uppersides of leaves and hidden in inflorescences, in marshy habitat. Only known from Scotland. Mon. hol. with al. males.

Sitobion sikkimense (A.K. Ghosh and Raychaudhuri)

Apt. undescribed, probably pale green with black SIPH, and BL 2.5–3 mm. On undersides of leaves of *Smilax* sp. in N India, and subsequently recorded from *S. ferox* (David, 1976, as *Macrosiphum smilacifoliae* ssp. *ferocis*). Mon. hol. with ovip and al. males in late Oct (Raychaudhuri *et al.*, 1980). *Macrosiphum dismilaceti* described from *Smilax* in China may be a synonym.

Sitobion smilacicola (Takahashi)

Apt. pale yellow with black SIPH and yellow cauda; BL c.3 mm. Sec. rhin. in al. III 6–8. On young leaves of *Smilax stenopetala* in Taiwan, and recorded also from *S. china* in Korea (Paik, 1965). Both apt. and al. are described as having femora and tibiae with numerous small circular sensoria or pores. Records from China and India may apply to other species.

Sitobion smilacifoliae (Takahashi)

Apt. bright green to orange-red with very variably developed shining brownish black dorsal sclerotisation, femora with distal half black, SIPH black and cauda yellow; BL 2–3 mm. Sec. rhin. in al. III 5–8. On undersides of leaves of *Smilax* spp. in E Asia (Taiwan, China, Korea, Japan, Thailand).

Sitobion thalictri Remaudière

Apt. dark green with black ANT and SIPH, and dark head, legs and cauda; BL 2.0–3.1 mm. On *Thalictrum rhynchocarpum* in Burundi.

Sitobion triumfettae Remaudière

Apt. very pale yellowish green with a darker green spinal stripe and sometimes dusky dorsal cross-bands; BL 1.7–2.3 mm. On *Triumfetta rhomboidea* in Burundi.

Sitobion wikstroemiae (Mamet)

Apt. color in life unrecorded; BL 1.8–2.4 mm. On *Wikstroemia viridiflora* in Mauritius (orig. descr.) and Sri Lanka (BMNH colln, leg J. Edirisinghe). Specimens collected in Kenya on *Gnidia* sp. (BMNH, leg. J.H. Martin) and trapped in Zimbabwe (leg. C.E. Taylor) also seem to be this species. 2n=16.

Sitobion yakini (Eastop)

Apt. green, with distal; parts of ANT dusky to black, and SIPH dark distally, sometimes paler at base; BL 1.5–2.2 mm. On various tropical grasses (*Andropogon*, *Eleusine*, *Eragrostis*, *Pennisetum*, *Poa*, *Tricholaena*, *Triticum*) in Africa (Burundi, Kenya, S Africa).

Sitobion yasumatsui (Moritsu)

Apt. shiny yellowish brown with a variably-developed dark brown-black dorsal patch (see Moritsu, 1983); BL c.2.1 mm. Al. have more than 40 rhinaria on ANT III. On *Spodiogon* (= *Eccoloipus*) *cotulifera* in Japan, and *Andropogon ascinodis* in Thailand (BMNH colln, leg. H. Banziger).

Smiela Mordvilko

Aphidinae: Macrosiphini

Four palaeartic crucifer-feeding species related to *Brevicoryne*, with broad dark volcano-shaped SIPH, a short cauda, and apt. usually with rhinaria on ANT III.

Smiela fusca Mordvilko

Plate 12g

Apt. gray-brown, wax-powdered; BL 1.4–1.8 mm. On *Berteroa incana*, deforming leaves and flower buds (Müller, 1975a). In E Europe (Germany, Poland, Bulgaria, Czech Republic, Ukraine). Ovip. occur in Oct (BMNH colln, leg J. Holman).

Smiela mongolica Holman and Szelegiewicz

Apt. green, densely covered in wax powder, with mainly dark appendages; BL 0.9–1.2 mm. On *Alyssum* (= *Ptilotrichum*) *canescens*, colonising terminal parts of shoots, in Mongolia. Other morphs undescribed.

Smiela schneideri (Hille Ris Lambers)

Apt. blackish, probably wax-covered in life; BL 1.2–1.5 mm. Al. have dark transverse bars on dorsal abdomen. On *Isatis glauca*, colonising the stem apices and inflorescences, in Syria. A population found on *Alyssum tortuosum* in Crimea, with fewer sec. rhin. on ANT (of apt.) and a shorter ANT PT, was described as a subspecies, *S. schneideri* ssp. *alyssii* Mamontova-Solukha. Sexual morphs and life cycles unknown.

Smiela syreniae Bozhko

Apt. greenish brown-black, covered with dense white wax powder; BL c.1.6–1.7 mm. On *Erysimum* spp. and *Syrenia* spp. Russia, Ukraine, Slovakia, C Asia.

Sminthuraphis Quednau

Saltusaphidinae

One species related to *Iziphya* but with a very different pattern of dorsal sclerotisation, all tergites bearing numerous wax glands.

***Sminthuraphis ulrichi* Quednau**

Figure 18j

Apt. plump-bodied, covered in bluish white wax; BL c.1.5–1.6 mm. Living on ground-level stems of *Carex ligerica* in Germany, and also recorded from *Carex* spp. in France, Poland, Hungary and Czech Republic (BMNH colln). Al. have similar dorsal sclerotisation and wax gland distribution to apt., bordered wing veins with dark spots at the ends, and sec. rhin. III 9–11, IV 1–3 (BMNH colln). Mon. hol., with sexuals collected in Oct in France (Leclant, 1966).

***Smynthuroides* Westwood**

Eriosomatinae: Fordini

One palaeartic species with an elongate second antennal segment and primary rhinaria with thick sclerotised rims.

***Smynthuroides betae* Westwood**

Plate 2f

Apt. dirty yellowish white, wax-dusted, with light brown head, prothorax, ANT and legs; BL 1.6–2.7 mm. On roots of numerous dicots, particularly Compositae (*Artemisia*, *Arctium*), Leguminosae (*Phaseolus*, *Vicia*, *Trifolium*), and Solanaceae (*Solanum tuberosum*, *S. nigrum*, *Lycopersicon esculentum*); also sometimes on *Beta*, *Brassica*, *Capsella*, *Gossypium*, *Heliotropium*, *Rumex*, etc. Rarely on monocots (Gramineae, Cyperaceae). Heter. hol. in the Mediterranean region with sexual phase and galls on *Pistacia atlantica* and *P. mutica* (Blackman and Eastop, 1994). Anhol. populations on secondary host plants are virtually world-wide; for fuller information see accounts by Mordvilko (1935; as *Trifidaphis phaseoli*) or Heie (1980b). 2n=8.

***Sorbaphis* Shaposhnikov**

Aphidinae: Macrosiphini

One species related to *Sappaphis* but with 4 hairs on all first tarsal segments.

***Sorbaphis chaetosiphon* Shaposhnikov**

Plate 10g

Apt. blackish, imm. dirty yellow; BL 1.7–2.5 mm. On *Ligularia* spp., living in ant shelters at bases of stems or leaves. Also recorded from *Polygonum* (Pashtshenko, 1988a). Japan, Korea, China, E Siberia, southern Urals. Heter. hol., with sexual phase on *Sorbus* (Blackman and Eastop, 1994). 2n=38.

***Spatulophorus* Müller**

Aphidinae: Macrosiphini

Related to N American *Landisaphis* but with 2 hairs (no sense peg) on HT I, and without the development of the spinal sclerites on ABD TERG 6–8 into rugose conical processes.

***Spatulophorus alyssi* Holman**

Apt. grayish green with slight pruinosity, especially ventrally; BL 1.1–1.3 mm. Found in Sept feeding (with sexual morphs) on the upper sides of the youngest terminal leaves of young shoots of *Alyssum saxatile* in central Bohemia, Czech Republic. The inflorescences are possibly colonised earlier in the season. Mon. hol., with apt. males. Al. unknown.

***Spatulophorus incanae* Müller**

Apt. pale green to yellowish green or gray-green, BL 1.5–1.9 mm. Living inconspicuously on flower stalks and in inflorescences of *Berteroa incana*, and after flowering on undersides of leaves. Also recorded from *Capsella bursa-pastoris*. In E Europe (Germany, Hungary, Ukraine). Mon. hol. on *Berteroa*, with apt. males. Müller (orig. descr.) gave a very full account of this species.

***Staegeiriella* Hille Ris Lambers**

Aphidinae: Macrosiphini

One or more palaeartic species on *Galium* and related Rubiaceae, differing from *Hydaphias* in the shape of the SIPH. A species in Tasmania, two ovip. of which were collected on *Coprosma* (BMNH colln, leg. M. Williams) may also belong to this genus. The unnamed species from *Sorbus aucuparia* described as a *Staegeiriella* by Bozhko (1976: 30) probably does not belong in this genus, and could perhaps be the primary host form of *Pseudacaudella rubida*.

***Staegeriella necopinata* (Börner)**

Apt. dark grayish green to lead-colored, powdered ventrally with gray wax; BL 1.3–2.2 mm. On *Galium* spp., and probably also *Asperula* spp., colonising the stems and flowerheads, causing stunting and twisting of new growth. Throughout Europe. Ovip. and al. males in Oct (Hille Ris Lambers, 1947c). A second species, *S. asperulae* Bozhko, was described from *Asperula cynanchica* in Ukraine, and this name was also applied to populations on *A. aristata* in Switzerland (Jörg and Lampel, 1988). However, the characters used for separation of apt. of *S. asperulae* from those of *S. necopinata* (ratio of body width to length and shape of SIPH) are inconsistent and unreliable, and another collection of *Staegeriella* from *A. aristata* in Switzerland (BMNH colln, leg. D. Hille Ris Lambers) differs from both *S. necopinata* on *Galium* and from *S. asperulae* according to Jörg and Lampel, so it appears that a single, variable taxon may be involved.

Staticobium* Mordvilko*Aphidinae: Macrosiphini**

About 12 species similar to *Macrosiphoniella*, associated with Plumbaginaceae in salt-marsh and coastal habitats. The taxonomy is very problematic, as several of the nominal species are poorly known and not clearly differentiated in the literature. The better-known species exhibit much geographic variation, accentuated by the fact that populations are distributed linearly along coasts or isolated in salt marshes separated by deserts. Kadyrbekov (2003b) reviewed and keyed the western palaeartic species.

***Staticobium caspicum* Bozhko**

Apt. shining dark brown; BL c.2.0 mm. On *Limonium* sp. in Russia (N Caucasus). Described as a subspecies of *S. latifoliae*, but probably just a geographical variant of that species.

***Staticobium caucasicum* Bozhko**

Apt. shining dark brown; BL c.2.2 mm. On upper and undersides of leaves of a *Limonium* sp. in Ukraine.

***Staticobium gmelini* Bozhko**

Apt. brown, with pale cauda; BL c.1.9–2.0 mm. On flowerstalks and root collars of *Limonium* and *Goniolimon* spp. in Ukraine, W. Siberia and N Kazakhstan. *S. zolotarenski* (Ivanoskaya) is a synonym according to Kadyrbekov (2003b), and its host was probably *Limonium gmelinii* rather than *Helichrysum arenarium*. *S. strongilosiphon* Bozhko, and perhaps *S. insularum*, are probably also synonyms.

***Staticobium insularum* Bozhko**

Apt. dark brown with greenish tinge; BL c. 2.0–2.1 mm. On *Goniolimon tataricum* in Ukraine (Bozhko, 1961 – but on *Limonium* sp. according to Bozhko, 1976). Closely related to *S. gmelini*, and possibly a synonym.

***Staticobium latifoliae* Bozhko**

Apt. dark brown to blackish; BL 1.6–2.6 mm. On undersides of leaves and flowerstalks of *Limonium* spp. in Pakistan, Kazakhstan, Iran (Rezwani, 1990), Lebanon, Russia (N Caucasus, W Siberia), Ukraine, Bulgaria, Romania, Hungary, Greece and Italy (Barbagallo and Stroyan, 1982). *S. tauricum* Bozhko is a synonym according to Kadyrbekov (2003b).

***Staticobium limonii* (Contarini)**

Apt. dark olive-green to dark brown; BL 1.5–2.2 mm. On *Limonium* spp. in S Europe and Mediterranean area. Accounts from NW Europe are referable to *S. stacticis* (q.v.). The distinction from *S. latifoliae* seems unclear, and the separate species status of these two taxa requires further confirmation. $2n=12^*$.

***Staticobium longisetosum* Kadyrbekov**

Apt. color in life unknown; BL c.2.0 mm (one specimen). On *Limonium gmelinii* in SE Kazakhstan (Kadyrbekov, 2003b).

***Staticobium loochooense* (Takahashi)**

Apt. color in life unrecorded, probably dark; BL c. 1.4–1.5 mm. On *Limonium wrightii* in Loochoo (Japan), and on *L. tetragonum* in Korea (Paik, 1972). A sample collected from *Aster tripolium* were presumably vagrants. Redescribed by Sorin (1967).

THE APHIDS

Staticobium otolepidis Nevsky

Apt. brown, ANT dusky except yellow III–IV, SIPH black with pale bases, cauda pale yellow; BL 1.6–2.3 mm. In large colonies on flowerstalks of *Limonium otolepis* and *L. perfoliatum* in C Asia and NW China. *S. nevskyi* Hille Ris Lambers is probably the fundatrix of this species, and hence a synonym (Kadyrbekov, 2003b).

Staticobium smailovae Kadyrbekov

Apt. brownish; BL 1.8–2.2 mm. On stems of *Limonium gmelinii* in N and W Kazakhstan (Kadyrbekov, 2003b). Intermediate between *latifoliae* and *staticis* on the basis of characters given in Kadyrbekov's (2003b) description and key.

Staticobium staticis (Theobald)

Plate 27f

Apt. shiny, deep green, brown, or dirty greenish or reddish, ANT paler with dark apices, SIPH black with pale bases, cauda green, pale red or yellow; BL 2.3–2.7 mm. On upper parts of stems under inflorescences of *Limonium* spp. especially *vulgare* (= *Statice limonium*), often flooded by high tides and covered with mud (Foster, 1984). In coastal areas of NW and N Europe. A similar species but with a shorter ANT PT occurs in the Mediterranean region. Ovip. and apt. males occur in Sept in Germany (Müller, 1975b, as *S. limonii*). The sexuals described by Jacob (1948a, as *S. limonii*) from *L. humile* in N Wales were possibly of another closely related species.

Staticobium suffruticosum Kadyrbekov

Apt. dark greenish or light brownish; BL 1.9–2.3 mm. On stems of *Limonium suffruticosum* in S and SE Kazakhstan (Kadyrbekov, 2003b). Very close to *S. otolepidis*.

Stellariopsis Szelegiewicz

Aphidinae: Macrosiphini

One species in Mongolia possibly related to *Spatulophorus*, but with more numerous body hairs arising from tubercles, short conical SIPH and rather hairy R IV+V and cauda.

Stellariopsis songini Szelegiewicz

Apt. pale green, lightly dusted with wax; BL 1.5–2.1 mm. Sec. rhin. in al. III 29–34, IV 5–6, V 0–1 (1 specimen). On stems and undersides of leaves of *Stellaria dichotoma* in Mongolia.

Subacyrthosiphon Hille Ris Lambers

Aphidinae: Macrosiphini

One species living on *Trifolium* in NW Europe, with characters between *Acyrtosiphon* and *Aulacorthum*. The peculiar habitat, the presence of antesiphuncular sclerites in the aptera, and the unusual antennal sensoriation of the alatae, which have 2–14 rhinaria usually restricted to the basal half of ANT III, are distinctive features.

Subacyrthosiphon cryptobium Hille Ris Lambers

Plate 24a, Figure 53c

Apt. pale olive-green with head sometimes faintly reddish; BL 1.6–2.3 mm. Living hidden on older parts of prostrate stems of *Trifolium repens*, and dropping when disturbed so that they are rarely observed or collected. The plant shows no reaction. Mon. hol., with apt. males. Europe and USA.

Subiziphya Quednau

Saltusaphidinae

One species related to *Iziphya* and *Saltusaphis* but with exclusively mushroom-shaped dorsal hairs and a distinctive, rounded and very hairy ABD TERG 8.

Subiziphya clauseni Quednau

Apt. long-bodied, color in life unknown but probably dark, with ANT black except at bases; BL c.1.8 mm. Described from *Poa* sp., but the true host must surely be Cyperaceae, probably a *Carex* species (hence inclusion in the key to sedge aphids). Al. have broad dark dorsal abdominal cross-bars, bordered wing veins with spots at their apices, and 15–17 sec. rhin. on ANT III.

***Subovatomyzus* A.N. Basu**

Aphidinae: Macrosiphini

One species on Labiatae in India resembling *Capitophorus*, with short capitate dorsal hairs and smooth clavate SIPH.

***Subovatomyzus leucosceptri* A.N. Basu**

Apt. spindle-shaped, pale translucent green with a darker green spinal stripe, and whitish appendages; BL 1.5–1.9 mm. Al. have blackish head, thorax and antennae, a dark central abdominal patch, and numerous sec. rhin. on ANT III–V. On undersides of leaves of various labiate species in several genera (*Callicarpa*, *Colebrookia*, *Elscholtzia*, *Leucosceptrum*, *Pogostemon*), and also recorded from *Vernonia* (Compositae; as *Capitophorus vernoniae* A.K. Ghosh and Raychaudhuri), but these were possibly vagrants. Described from W Bengal, India, where it is most common in April to June and reproduces parthenogenetically throughout the year (orig. descr.). Also recorded from Sikkim and Meghalaya (A.K. Ghosh, 1973), and from Nepal (BMNH colln).

***Subsaltusaphis* Quednau**

Saltusaphidinae

About 15 *Carex*-feeding long-bodied aphids with spatulate empodial hairs, and with dorsal hairs mostly very short and mushroom-shaped, with an incised ‘cap’ so that they are stellate in dorsal view. Apt. lack sec. rhin. Al. have a dark central abdominal patch on tergites 3–5, incised intersegmentally. Richards (1971) reviewed the world fauna, and there are reviews of the European species by Stroyan (UK, 1977), Heie (NW Europe, 1982), and Nieto Nafria and Mier Durante (Iberian peninsula, 1998) and of the Japanese species by Sorin (2005).

***Subsaltusaphis aquatilis* (Ossiannilsson)**

Apt. long-bodied, pale yellowish, with dark intersegmental muscle sclerites; BL 2.1–2.6 mm. On *Carex aquatilis* in Sweden. Al. have 10–17 sec. rhin. on ANT III (Heikinheimo, 1984). $2n=8^*$.

***Subsaltusaphis canadensis* Richards**

Apt. long bodied, pale yellow with black ANT; BL c.2 mm. On *Carex* sp. in Ontario, Canada. Al. have 8–12 sec. rhin. on ANT III. Apart from its small size and lack of dorsal pigmentation this species closely resembles *S. lambersi*.

***Subsaltusaphis flava* (Hille Ris Lambers)**

Figure 20c

Apt. dull yellow, with dark intersegmental muscle sclerites (*no* longitudinal dark stripes), and antennae black except at bases; BL 1.8–2.1 mm. Al. have 8–9 sec. rhin. on ANT III. On *Carex nigra* in Europe; ovip. occur in Oct in Denmark (Heie, 1982). $2n=8$.

***Subsaltusaphis intermedia* (Hille Ris Lambers)**

Apt. yellowish white, with rather indistinct dark intersegmental muscle sclerites, and antennae black except at bases; BL 1.9–2.2 mm. Al. have 9–12 sec. rhin. on ANT III. On *Carex hirta*, living between the leaf bases. Europe (Netherlands, Austria, Germany, Czech Republic).

***Subsaltusaphis kamijiensis* Sorin**

Apt. pale yellow with dark brown intersegmental muscle sclerites and ANT dark brown except basally; BL 2.0–2.4 mm. Al. have 12–18 sec. rhin. on ANT III. On lower sides of leaves of *Carex ?reinii* in Japan. Mon. hol., with ovip. appearing in late Jan (Sorin, 2005). The distinction from *S. canadensis* needs to be confirmed. $2n=6$ (Blackman, 1980, erroneously listed as *S. saracola*.)

***Subsaltusaphis lambersi* (Quednau)**

Apt. pale yellowish, with narrow brownish intersegmental muscle plates, and a pair of brownish, sometimes rather vague and incomplete, pleural longitudinal stripes; BL 2.4–2.8 mm. On *Carex acuta* in Sweden, apparently preferring shady habitats (Ossiannilsson, 1959). There is also a record from Poland (Achremowicz, 1972). Ovip. were found in Sweden in early Sept. Al. undescribed. Except for its lack of dark markings, *S. canadensis* is not clearly distinct from *S. lambersi*.

Subsaltusaphis ornata (Theobald)

Figure 20e

Apt. yellow to ochreous yellow with two very distinct pleural longitudinal dark lines, clearly defining a pale spinal band; BL c.2.7–2.8 mm. Al. have c.13 sec. rhin. on ANT III. On various *Carex* spp., with a record also from *Scirpus sylvaticus*. Europe, and eastward to Iran (BMNH colln). 2n=8.

Subsaltusaphis pallida (Hille Ris Lambers)

Figure 20b

Apt. pale yellow, with dark intersegmental muscle sclerites; BL c.2.2–2.7 mm. Al. unknown. On *Carex* spp. (*gracilis*, *stellulata*), and there is also a record from *Juncus* (Shaposhnikov, 1964). In Europe, E Siberia (Quednau and Shaposhnikov, 1988), and probably in between.

Subsaltusaphis paniceae (Quednau)

Apt. pale yellow, with dark intersegmental muscle sclerites and variably developed longitudinal dark markings similar to those of *S. picta* (q.v.), and with ANT banded on segments III–V, VI being wholly dark; BL 1.3–2.3 mm. On *Carex* spp. in Europe (UK, Sweden, Poland, Germany, Italy, Spain). Very similar to the N American *S. virginica*.

Subsaltusaphis picta (Hille Ris Lambers)

Plate 4h

Apt. whitish yellow, with dark transverse intersegmental muscle sclerites, and somewhat less dark and variably developed longitudinal dark markings, the most heavily marked specimens having dark marginal and pleural stripes and a shorter spinal stripe; ANT black beyond basal half of segment III. BL 2.4–3.0 mm. Al. have 11–16 sec. rhin. on ANT III. On *Carex* spp. growing at the edge of water, and sometimes also on *Scirpus* in the same situation. Widely distributed in Europe, and also recorded from E Siberia (Quednau and Shaposhnikov, 1988). Ovip. and apt. males occur in Sept–Oct in Sweden and Scotland (Heie, 1982 and BMNH colln, leg. H.L.G. Stroyan). 2n=10.

Subsaltusaphis (Primoriaphis) primoriensis Quednau and Shaposhnikov

Apt. undescribed, al. pale yellow with blackish gray markings, and 4 rhinaria on ANT III; BL c.1.6 mm. On *Carex laevirostris* in E Siberia.

Subsaltusaphis (Primoriaphis) pulchra Quednau and Shaposhnikov

Apt. lemon yellow, slightly shiny, with four longitudinal black stripes; BL c.2.3 mm. Al. have 6–9 sec. rhin. on ANT III. On *Carex rubra* in E Siberia. Sorin (2005) redescribed apt., al. and ovip. from Japan. *S. taoui* Hsu ex Tao, described from *Carex* sp. in Taiwan, is very similar and might be this species.

Subsaltusaphis rossneri (Börner)

Figure 20d

Apt. ochreous yellow, usually with dusky pleural longitudinal stripes on head and thorax, and paired segmental patches plus a faint spinal stripe on abdomen; BL c.2.3–2.5 mm. Al. have 10–13 sec. rhin. on ANT III. On *Carex* spp. (*elata*, *rostrata*, *?vesicaria*) in Europe.

Subsaltusaphis sinensis Zhang, Zhang and Zhong

Apt. yellow with black dorsal markings, SIPH and cauda; BL c.1.6 mm. On *Cyperus* sp. in China. The generic placement of this species needs confirmation, as it has some features not normally found in members of this genus.

Subsaltusaphis virginica (Baker)

Apt. pale yellow, with or without faint dark longitudinal pleural and marginal stripes, and sometimes a very faint spinal stripe. ANT are pale basally and dark distally, with the base of segment IV often paler than the distal part of III but clearly darker than I and II; BL 1.9–2.9 mm. Al. have 11–15 sec. rhin. on ANT III. On *Carex* and *Scirpus* spp. in North America (records mainly from eastern US and Canada, but also from Utah) and Japan (as *S. saracola* Higuchi). Ovip. were found in Illinois in early Nov (on both *Carex* and *Scirpus eriophorum*; BMNH colln, leg. T.H. Frison and H.H. Ross). [Normally this species has a pair of long posterior marginal hairs on ABD TERG 7, and the posterior edge of ABD TERG 7 projects laterally, as is typical for *Subsaltusaphis*. However, a collection of specimens from N Carolina (BMNH colln., leg. D. Hille

Ris Lambers, no. 234) has no long marginal hairs on ABD TERG 7, only mushroom-shaped ones, and the posterior margin does not project laterally. It is possible that two species are involved, but no other distinguishing features between the two forms were apparent.]

***Swirskiaphis* Hille Ris Lambers**

Aphidinae: Aphidini

One species in the Middle East apparently related to *Aphis*, but with long thick dorsal hairs.

***Swirskiaphis polychaeta* Hille Ris Lambers**

Plate 8e

Color of apt. in life unknown; BL 1.9–2.6 mm. Al. have c.15–16 sec. rhin. on ANT III (BMNH colln, leg G. Remaudière). On Umbelliferae (*Dorema*, *Ferula*, *Prangos*) in the Middle East (Iran, Lebanon, Turkey). Life cycle unknown.

***Szelegiewiczziella* Holman**

Aphidinae: Aphidini

One species in E Asia apparently related to *Aphis*, but apt. and al. both have 4-segmented ANT, and apt. have a smooth dorsal sclerotic shield.

***Szelegiewiczziella chamaerhodi* Holman**

Apt. green with grayish wax exudation; BL 1.2–1.45. Al. have just 1–3 sec. rhin. on ANT III. Described from specimens collected on flower stems of *Chamaerhodos erecta* in August in Mongolia. Similar aphids were collected on *Artemisia vulgaris* in June in China (Liaoning province; Zhang and Zhong, 1990). The dates of collection do not support a host alternation from *Chamaerhodes* to *Artemisia*, so this possibility needs to be tested experimentally.

***Taiwanaphis* Takahashi**

Taiwanaphidinae

About 12 species of a relatively ancient group living mainly on trees, esp. Myrtaceae, in E and SE Asia (see Blackman and Eastop, 1994). Relationships with other ancient genera are discussed by Quednau and Remaudière (1994).

***Taiwanaphis decaspermi* Takahashi**

Apt. brownish black to black; BL 1.2–1.6 mm. Al. have thickly bordered wing-veins. On undersides of young leaves and shoots of *Decaspermum fruticosum* and other Myrtaceae. Japan and China. Life cycle unstudied; al. males are known from Hong Kong.

***Taiwanomyzus* Tao**

Aphidinae: Macrosiphini

About 8 palaeartic species mostly on Saxifragaceae or ferns, perhaps related to *Utamphorophora* but with dorsal spiculation of the head. Apt. usually have sec. rhin. extending in a row along ANT III.

***Taiwanomyzus alpicola* (Hille Ris Lambers)**

Figure 43m

Apt. shining black with ANT and femora mainly black, and dark SIPH and cauda; BL 1.1–1.7 mm. On ferns, (*Asplenium*, *Athyrium*, *Blechnum*, *Cystopteris*, *Dryopteris*, *Gymnocarpium*, *Polypodium*), particularly those growing in shady situations (Müller, 1987). C Europe (Germany, Switzerland, Czech Republic). Mon. hol. with ovip. and apt. males in Sept (orig. descr., as *Utamphorophora*).

***Taiwanomyzus babai* Sorin and Arakawa**

Apt. color in life unrecorded; BL c.2.3 mm. Sec. rhin. in al. III 30–34, IV 5–7, V 0. On *Osmunda japonica* in Japan (Sorin and Arakawa, 2005).

***Taiwanomyzus chrysosplenii* Miyazaki**

Apt. pale brown to reddish brown, with black ANT and cauda, SIPH also blackish but often with paler middle section; 1.3–1.6 mm. On *Chrysosplenium flagelliferum*, feeding on undersides of leaves in a wet environment (Miyazaki, 1971). Japan.

Taiwanomyzus flicis (Miyazaki) Figure 431
 Apt. pale yellow with mainly pale appendages; BL 1.2–1.7 mm. Sec. rhin. in al. III 30–39, IV 4–6, V 0 (–1). On ferns (*Athyrium*, *Dryopteris*, *Osmunda*) in Japan. Life cycle unknown; al. males were collected on *Athyrium* in late Sept (orig. descr.).

Taiwanomyzus himalayensis (Chakrabarti and Banerjee)
 Apt. color in life unrecorded, presumably pale; BL 2.0–2.3 mm. Sec. rhin. in al. III 2–6, IV 0, V 0. On ferns (*Asplenium*, *Polypodium*) in U.P., NW India (orig. descr. as *Utamphorophora*).

Taiwanomyzus montanus (Takahashi) Plate 24f
 (= *T. darjeelingensis* M.R. Ghosh, R.C. Basu and Raychaudhuri)
 Apt. yellow with extensive black dorsal markings, and black ANT, SIPH and cauda; BL 1.8–2.4 mm. On Saxifragaceae (*Astilbe*, *Saxifraga*) and also (in Japan) on Hydrangaceae (*Hydrangea*, *Schizophragma*). Taiwan, Japan, Korea, Philippines (Calilung, 1967, as *Aulacorthum*) and W Bengal, India (M.R. Ghosh *et al.*, 1977, as *T. darjeelingensis*).

Tamalia Baker Tamaliinae
 A relict nearctic genus with 4–5 species associated with galls on *Arctostaphylos*. A detailed diagnosis and review were provided by Remaudière and Stroyan (1984).

Tamalia coweni (Cockerell) Plate 3h
 Apt. dull dirty yellow to blackish, with variably-developed dark green cross-bands; BL 1.25–1.5 mm. In reddish leaf-galls on *Arctostaphylos* spp. in western N America, across boreal Canada to Ontario, and south to Mexico. Mon. hol., with al. ovip. and males produced from June to October. The peculiarities of the life cycle were discussed by Remaudière and Stroyan (1984), and studied further by Miller and Avilés (2000). *T. keltoni* Richards, described from *Arctostaphylos* sp. in Mexico, is doubtfully distinct. 2n=6.

Tamalia dicksoni Remaudière and Stroyan
 Apt. color in life unknown; BL 1.4–2.1 mm. In leaf-galls on *Arctostaphylos* sp. in California, USA. Presumably mon. hol.; males were collected in late June (orig. descr.).

Tamalia inquilinus Miller
 Apt. dark gray to brown or black; BL 1.4–1.7 mm. Living as an inquiline in leaf-galls of *T. coweni* on *Arctostaphylos* spp. (Miller and Sharkey, 2000). West coast of N America from N California to Baja California Norte, Mexico. Al. ovip. and males were collected in late July.

Tauricaphis Mamontova Aphidinae: Macrosiphini
 One species from Ukraine related to *Lipamyzodes* but with dorsal abdominal hairs arising from tubercles and apt. with sec. rhin. on ANT III.

Tauricaphis arabis Mamontova
 Apt. greenish with mainly yellowish brown appendages; BL c.1.2 mm. On *Arabis caucasica* in Ukraine. Mon. hol.; ovip. in Sept. (orig. descr.).

Tenuilongiaphis Zhang Aphidinae: Macrosiphini
 One species in China with elongate body, short ANT, long thick dorsal hairs and numerous short dorsal cylindrical processes.

Tenuilongiaphis stata Zhang and Zhong
 Apt. pale green, with two longitudinal rows of darker green spots; BL c.2 mm. Sedentary in habit, and only occurring in very small numbers, on *Artemisia* sp. in Gansu province, China (orig. descr.). Believed to be heter. hol. A fund.(?) described from an unidentified shrub (Zhang, 1999, as *Sportaphis sporta*; see Zhang and Qiao 2002), appears to be this species, and al. and ovip. described as *Ceruraphis hippophaetropis* collected on *Hippophae rhamnoides* (Zhang, 1999) seem to be the autumn forms.

***Tetraneura* Hartig**

Eriosomatinae: Eriosomatini

About 20 species in which apt. are usually very globose and have 1-segmented tarsi, and al. have a simple media in the forewing and ANT IV usually much shorter than V. At least 7 species migrate from galls on *Ulmus* to roots of Gramineae, but most species are known only from either *Ulmus* or from grass roots. Predominantly oriental and eastern palaeartic, with only *T. ulmi* in W Europe, *T. caerulescens* in SE Europe and *T. africana* in the Mediterranean and Middle East. Hille Ris Lambers (1970b) revised the world fauna, Chakrabarty and Maity (1978), Raychaudhuri *et al.* (1978b) and A.K. Ghosh (1984) gave accounts of the Indian species, and Zhang *et al.* (1991a) revised the Chinese species. See also Blackman and Eastop (1994).

***Tetraneura africana* van der Goot**

Apt. buff-colored to pale brownish with a dark brown head and prothorax, often bluish due to waxy bloom, and with whitish wax secreted posteriorly; BL 2.0–3.3 mm. In root-feeding colonies on *Cynodon dactylon*, often well below ground level, and also recorded from *Sorghum halepense*, *Calamagrostis* spp., and rarely on cereals. Recorded from Italy, Morocco, Egypt, Iraq, Transcaucasia, Turkestan and Pakistan. A smaller aphid collected on the roots of *Calamagrostis epigeios* in Poland may also be this species (Hille Ris Lambers, 1970b). Galls of *T. africana* on *Ulmus* have not been identified, although Mordvilko (1935) described sexuparae collected from *Ulmus campestris* in Italy. Populations on *Cynodon* roots are probably mainly or entirely anhol.

***Tetraneura basui* Hille Ris Lambers**

Color of apt. in life unrecorded; BL 1.5–1.8 mm. On roots of Gramineae (*Capillipedium*, *Echinochloa*, *Eleusine*, *Eragrostis*, *Oryza*, *Pogonanthum*, *Paspalum*, *Polypogon*, *Setaria*) in NE India (Raychaudhuri, 1980). It is not known whether there is a gall generation on *Ulmus*.

***Tetraneura brachytricha* Zhang and Zhang**

Color of apt. in life not recorded; BL c.2.7 mm. On roots of *Phragmites communis* in Liaoning Prov., China. Presumed to be heter. hol.; al. sexup. collected on *Ulmus* in Xinjiang were assigned to this species, but life cycle needs confirmation.

***Tetraneura caerulescens* Passerini**

Apt. orange–brown to brown, secreting bluish flocculent wax; BL 1.5–2.2 mm. On roots of grasses (*Alopecurus*, *Cynodon*, *Echinochloa*, *Eragrostis*, *Festuca*, *Setaria*) in S and SE Europe, N Africa, SW Asia, and also reported from China (Zhang *et al.*, 1991a). Heter. hol. with sexual phase on *Ulmus* (Blackman and Eastop, 1994).

***Tetraneura capitata* Zhang and Zhang**

Apt. pale reddish brown; BL c.2.2 mm. On roots of *Sorghum vulgare* in Hebei prov., China. A population on *Agropyron cristatum* in Gansu prov. was described as a subspecies, *T. capitata* ssp. *agropyricena* Zhang (in Zhang and Qiao, 1997b).

***Tetraneura fusiformis* Matsumura (= *T. nigriabdominalis* of many authors, incl. Hille Ris**

Lambers, 1970b; = *T. hirsuta* Baker)

Apt. greenish or brownish white; BL 1.5–2.5 mm. In colonies on roots of many genera and species of Gramineae, (*Agropyron*, *Axonopus*, *Cenchrus*, *Chloris*, *Cynodon*, *Dactyloctenium*, *Echinochloa*, *Eleusine*, *Eragrostis*, *Oryza*, *Panicum*, *Paspalum*, *Pennisetum*, *Saccharum*, *Setaria*, *Sorghum*), their presence often indicated by a reddish purple discoloration of the leaves. In Middle East, Africa, India, Nepal, Bangladesh, Pakistan, Sri Lanka, Andaman Is, Thailand, Japan, Korea, Indonesia, Malaysia, the Philippines, New Britain, Australia, Fiji, Tonga, Brazil, Argentina and C America. Heter. hol. in Japan, with sexual phase and galls on *Ulmus japonica*; galls are crimson when mature, with white hairs (Blackman and Eastop, 1994). Probably entirely anhol. outside the range of *Ulmus japonica*, which seems to be its only primary host; its distribution suggests that parthenogenetic overwintering is only possible in tropical and subtropical conditions. The taxonomic confusion involving the application of the name *T. nigriabdominalis* was discussed by Eastop and Blackman (2005). All African records of *T. nigriabdominalis* as well as many of those from Asia (Blackman

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and Eastop, 2000) should be referred to *T. fusiformis*, although past pest outbreaks on upland rice in Japan, and perhaps elsewhere in E Asia, were of the true *nigriabdominalis* (S. Akimoto, pers. comm.). Hille Ris Lambers (1970b, as *T. nigriabdominalis*) distinguished several root-feeding populations on the basis of abdominal chaetotaxy, and erected a subspecies, *bispina*, for his material from Africa and N America. However, most of the African material in the BM(NH) collection does not conform to *bispina*, and probably there are several distinct clonal populations distributed around the world. Raychaudhuri (1980) distinguished two populations in NE India. $2n=18$ (gall generation); $2n=17, 18, 19$ and 20 (permanently parthenogenetic populations).

***Tetraneura indica* L.K. Ghosh**

Apt. yellow; BL 1.9–2.3 mm. Al. unknown. In ant-attended colonies on roots of *Calamagrostis pilosa* in H.P., NW India.

***Tetraneura javensis* van der Goot**

Apt. whitish to yellowish white; BL 1.5–2.5 mm. On roots of Gramineae, especially sugar cane (*Saccharum officinale*), and also recorded from *Capillipedium*, *Echinochloa*, *Eleusine*, *Neyraudia*, *Oryza*, *Panicum*, *Setaria* and *Sorghum*. Pakistan, India, Java and New Guinea. Probably heter. hol. in Pakistan with sexual phase on *Ulmus wallichiana* (Hille Ris Lambers, 1970b), although the galls have not been described and the life cycle needs to be confirmed by host-plant transfers. Setokuchi (1993) studied populations on sugar cane in Japan. We have not attempted to include in the key four other species described from India that were differentiated from *T. javensis* mainly on the basis of dorsal hair chaetotaxy, as this can show much intraspecific variation; *Tetraneura kalimpongensis* Raychaudhuri, Pal and M.R. Ghosh from roots of *Saccharum* and *Penisetum* in W Bengal, *Tetraneura lambersi* Chakrabarti and Maity on an unidentified grass in U.P., *Tetraneura multisetosa* Raychaudhuri, Pal and M.R. Ghosh from roots of *Capillipedium* and *Imperata* in W Bengal, and *Tetraneura utpali* Chakrabarti, Maity and Bhattacharya from roots of *Apluda mutica* in U.P.

***Tetraneura nigriabdominalis* (Sasaki) (= *T. akinire*)**

Plate 1c

Apt. greenish or brownish white; BL 1.5–2.5 mm. In ant-attended colonies on roots of Gramineae (incl. *Cynodon*, *Digitaria*, *Echinochloa*, *Oryza*, *Saccharum*, *Setaria*). It is known particularly as a pest of rice (Blackman and Eastop, 2000), but many of the references to *nigriabdominalis*, e.g. in Africa, the Middle East, India and SE Asia, are referable to *T. fusiformis*. Tanaka (1961) studied its host preferences, although he may have had a mixture of *T. nigriabdominalis* and *T. fusiformis*. Galli and Bonvicini-Pagliai (1998) studied its relations with ants. In S and E Europe, SW Asia (Georgia), Japan, China, Korea and USA. Heter. hol. with sexual phase and galls on various *Ulmus* spp. in E Asia, S and E Europe and USA (Blackman and Eastop, 1994); probably anhol. where *Ulmus* unavailable. Populations in China were described as a subspecies, *T. nigriabdominalis* ssp. *shanxiensis* Zhang and Zhang (as *T. akinire* ssp.). $2n=18$ (gall generation).

***Tetraneura polychorema* Zhang**

Apt. color in life not recorded; BL c. 2.1 mm. On roots of an undetermined species of Gramineae in Gansu prov., China (Zhang and Qiao, 1997b).

***Tetraneura triangula* Zhang and Zhang**

Apt. color in life not recorded; BL c. 2.5 mm. On roots of various Gramineae (*Echinochloa*, *Imperata*, *Phragmites*, *Sorghum*) in Liaoning, Shanxi and Shandong provs, China.

***Tetraneura ulmi* (L.)**

Plate 1d

Apt. pale orange–yellow, yellowish white or reddish, with head, prothorax, and appendages brown; the body lightly dusted with wax; BL 1.7–2.8 mm. On numerous species of Gramineae (especially *Agropyron*, *Bromus*, *Dactylis*, *Deschampsia*, *Festuca*, *Holcus*, *Hordeum*, *Lolium*, *Poa*, *Zea*). Ant-attended, and often in ants' nests. Heter. hol., with galls in spring on *Ulmus* spp. (*campestris*, *glabra*; Blackman and Eastop, 1994), but also commonly overwintering on grass roots or in ants' nests, root-feeding colonies producing rather few sexuparae in autumn. Europe, C Asia, Middle East (Iran, Iraq, Syria, Turkey), E Siberia, N Japan, and

N America. Zwölfer (1957) made a detailed study, including comparison with the closely related and perhaps synonymous *Tetraneura longisetosa* (Dahl), collected from roots of *Brachypodium*, *Deschampsia* and *Festuca* in Germany. *Tetraneura chui* Zhang, described from *Sorghum vulgare* in China, may also be a synonym. $2n$ (*T. ulmi*)=14 (gall generation).

***Tetraneura yezoensis* Matsumura**

Apt. pale yellowish, brownish or pinkish white, with brown head and prothorax, on roots of various Gramineae (*Echinochloa*, *Eleusine*, *Eragrostis*, *Imperata*, *Miscanthus*, *Oryza*, *Saccharum*, *Setaria*, *Triticum*, etc.). India, Pakistan, Nepal, Sri Lanka, Japan, Korea, Taiwan, Malaysia, the Philippines, and Australia. Presumably anhol. on grass roots everywhere, but in Japan at least there is also host alternation to *Ulmus japonica* (Blackman and Eastop, 1994). Heter. hol. populations in Japan indicate that there is a second closely-related species, *T. radicolica* Strand, with different galls and a different diploid chromosome number (see below), and this is the name commonly applied to populations on grass roots in E and SE Asia. Both species are probably in Australia (Eastop, 1966). There are no really reliable morphological criteria for distinguishing adults of these two species on grass roots because the adult chaetotaxy of this group is extraordinarily variable. Hille Ris Lambers (1970b) noted that embryonic (and first instar) chaetotaxy is more stable within species, but embryonic hair counts are almost impossible unless the embryos are dissected out prior to mounting. *T. sikkimensis* Raychaudhuri, Pal and M.R. Ghosh, described from a small sample on *Eragrostis nigra* in Sikkim, India, is distinguished only by characters of adult chaetotaxy and may be a synonym of *T. yezoensis*. For further information see Hille Ris Lambers (1970b) and Raychaudhuri (1980). $2n=14$ (*radicolica*), $2n=12$ (*yezoensis*); Akimoto, pers. comm.

***Thecabius* Koch**

Eriosomatinae: Pemphigini

About 12 species closely related and very similar in morphology to *Pemphigus*. Spring generations form galls by folding or contorting leaves of *Populus*, migrating to found summer colonies on roots of various herbaceous plants. Secondary hosts of several species are unknown. Accounts are available for N America (Smith, 1974), NW Europe (Heie, 1980b), China (Zhang *et al.*, 1995) and Japan (Aoki, 1975, as *Pemphigus*). See also Blackman and Eastop (1994).

***Thecabius affinis* (Kaltenbach)**

Plate 2i, Figure 45a

Apt. dirty yellowish white or yellowish green with shiny wax-wool; BL 2.1–2.9 mm. At stem bases and on runners and roots of *Ranunculus* spp. Europe, Asia and N America. Heter. hol., with sexual phase and folded-leaf galls on *Populus*. Mordvilko (1935) gave an account of the life cycle and described all morphs (*Th. orientalis* Mordvilko is now regarded as a synonym). $2n=38$; this chromosome number has now been determined additionally for a sample from B.C., Canada, leg. C.-k. Chan*, so the existence of a separate N American species, *Th. populiconduplifolius*, with $2n=28$ (Harper and Macdonald, 1966), needs confirmation.

***Thecabius anemoni* (Shinji)**

Apt. dark brick-brown, with white wax secreted from posterior abdomen; BL unrecorded ('rather large'). On *Anemone hupehensis* (roots?) in Japan. Generic position uncertain.

***Thecabius (Parathecabius) auriculae* (Murray)**

Apt. white to dusky white or dirty brownish, secreting wax-wool from posterior abdomen; BL 1.3–1.5 mm. On roots of *Primula* spp. in UK, and this species may also be the one collected on *Androsace sempervivoides* and *Glaux maritima*; it is very similar to *Th. lysimachiae*, and the distinction between the two species needs further confirmation (Stroyan, 1964a). $2n=16^*$.

***Thecabius (Parathecabius) cerastii* (Börner)**

Apt. with wax-wool; BL 1.4–1.6 mm. On underground stems and roots of *Cerastium uniflorum* in Austria. Life cycle unknown.

THE APHIDS

Thecabius (Parathecabius) lysimachiae Börner

Apt. brownish or grayish green, with wax; BL 1.1–1.8 mm. On roots of *Lysimachia nummularia* in Europe and C Asia. Heter. hol., with sexual phase and galls on *Populus* (Blackman and Eastop, 1994). 2n=18.

Therioaphis Walker

Calaphidinae: Panaphidini

About 30 maculate aphid species with a knobbed cauda living on Leguminosae of the tribes Trifoliae, Loteae, Galaeagneae and Coronillae. Half the species are known only from SE Europe and the Middle East, four extend into NW Europe, and four or five extend across Russia, one as far as Japan. The world fauna was revised by Quednau (2003) and earlier accounts are available for Europe (Pintera, 1957a), Hungary (Szelegiewicz, 1969), NW Europe (Heie, 1982), the Iberian peninsula (Nieto Nafria and Mier Durante, 1998) and the Middle East (Remaudière, 1989a).

Therioaphis aizenbergi Ivanoskaya and Tomilova

Apt. (and al.) yellowish, covered dorsally with numerous large dark spots; BL c.1.4–1.7 mm. On *Caragana arborescens* in Siberia. Mon. hol.; all the morphs are included in orig. descr.

Therioaphis alatina Hille Ris Lambers and van den Bosch

Apt. pale dirty greenish yellow with dark brown markings; BL 1.3–2.2 mm. On *Ononis* spp. in France, Italy and Switzerland. Although all adult vivip. have wings, these are often small and non-functional (orig. descr.). Sexual morphs in Oct.

Therioaphis arnaultae Remaudière

Apt. probably pale yellowish with variably developed segmental markings; BL c.1.7 mm. On *Astragalus* sp(p). in Iran, Turkey and Lebanon (BMNH colln, leg. D. Hille Ris Lambers). Ovip. and al. males were present in Nov (Remaudière, 1989b). Remaudière and Talhouk (2000) provided further information on morphology of apt.

Therioaphis (Bicaudella) astragalensis (Rusanova)

Figure 16a

Apt. pale brownish or dirty yellow, BL 1.1–1.5 mm. On *Astragalus* spp. in Afghanistan, Azerbaijan and Iran. Ovip. and al. males in Oct (Remaudière, 1989b).

Therioaphis astragali (Dzhibladze)

Apt. seem not to occur; al. yellowish with black dorsal abdominal spots, and dark spots at ends of wing veins, BL 1.5–1.9 mm. On *Astragalus caucasicus* in Georgia, and also recorded from *Astragalus* sp(p). in Azerbaijan, Iran and Turkey. Ovip. and al. males in Oct (orig. descr.).

Therioaphis azerbaijanica Remaudière

Apt. probably yellowish, BL 1.3–1.7 mm. On an *Astragalus* sp. with long, pointed leaves in Iran (Tabriz). Al. and sexual morphs unknown.

Therioaphis beijingensis Zhang

Apt. unknown, al. probably yellow with four rows of dark dorsal abdominal spots (two spinal, two marginal), and dark SIPH; BL c.2.2 mm. On *Caragana frutex* in China. Apart from the pigmentation this species seems close to *T. tenera*.

Therioaphis bonjeaniae Hille Ris Lambers and van den Bosch

Figure 40g

Apt. whitish to yellowish; BL 1.5–1.75 mm. On undersides of leaflets of *Lotus* spp. in France (Alpes Maritimes). Life cycle unknown; parthenogenetic reproduction continued into Nov (orig. descr.).

Therioaphis brachytricha Hille Ris Lambers and van den Bosch

Figure 40c

Apt. very pale buff to pale yellowish with dusky spots; BL 1.3–2.0 mm. On upper sides of leaves of young growth of *Lotus* spp., especially *L. corniculatus* growing in warm, dry positions. It can also feed on *Trifolium pratense* (BMNH, leg. H. Szelegiewicz, and see orig. descr.). Widely distributed in Europe, east to Iran. Mon. hol. with al. males.

Therioaphis (Bicaudella) denaensis Remaudière

Apt. squat-bodied, yellowish with dark dorsal markings and black SIPH; BL 1.1–1.5 mm. On *Astragalus* sp. in Iran. Al. unknown. Ovip. and al. males in September (Remaudière, 1989b).

Therioaphis dorycnii (Pintera)

Figure 40a

Apt. vivip. do not occur; BL of al. c.1.7–1.8 mm. On *Lotus (Dorycnium)* spp. in E Europe (Czech Republic, Hungary). A record from Ukraine (Mamontova-Solukha, 1963) may be referable to *Th. litoralis*. Pintera (1957a) described the ovip.

Therioaphis (Bicaudella) farsiana Remaudière

Figure 16b,d

Apt. yellow, rather pale, BL 1.6–1.9 mm. On an *Astragalus* sp. of the *microthrix* group in Iran. Ovip. in Oct (Remaudière, 1989b).

Therioaphis hungarica Szelegiewicz

Apt. yellowish to orange with dark brown spots; BL 1.4–1.9 mm. Described from a reddish-flowered *Ononis* sp. in Hungary, and later collected on *Ononis spinosa* in Czech Republic (BMNH colln, leg. J. Holman). Placed as a subspecies of *Th. ononidis* in Quednau, 2003, but reinstated as a full species by Eastop and Blackman (2005).

Therioaphis kermanica Remaudière

Apt. yellowish with black dorsal spots, BL 1.5–2.0 mm. On *Astragalus pseudosquarrosus* in Iran.

Therioaphis khayami Remaudière

Figure 16f

Apt. yellowish with extensive dark dorsal markings, and also usually with some dark submarginal sclerites ventrally on abdomen; BL 1.3–1.6 mm. On *Astragalus* sp. in Iran, and Afghanistan (BMNH colln, leg. R. van den Bosch).

Therioaphis kundurensis Quednau

Apt. yellow to yellowish green; BL 1.4–1.9 mm. On undersides of leaves of *Caragana* spp., attended by ants (Quednau, 2003). E Siberia.

Therioaphis langloisi Remaudière and Leclant

Apt. golden yellow with brown transverse bands; BL 1.4–1.65 mm. In small colonies on undersides of older leaves of *Coronilla glauca* in S France, where it is anhol. (orig. descr.).

Therioaphis (Bicaudella) laurestanica Remaudière

Figure 16c,e

Apt. yellowish with dusky head and thorax and black dorsal abdominal spots; BL 1.3–1.6 mm. On an *Astragalus* sp. in Iran. Al. unknown. Ovip. and al. males occur in Sept–Oct (Remaudière, 1989b).

Therioaphis litoralis Hille Ris Lambers and van den Bosch

(= *Therioaphis hillerislambersi* Szelegiewicz; synonymy by Quednau, 2003) Figure 40e
Apt. bright yellowish to ochreous yellow; BL 1.4–1.8 mm. On *Lotus* spp. (incl. *Bonjeania*, *Dorycnium*) and *Anthyllis cytisoides*. Europe; S France, Hungary, Czech Republic, Yugoslavia, Greece and Ukraine (Mamontova-Solukha, 1963, as *dorycnii*). An ovip. was found in Oct (orig. descr.).

Therioaphis loti Hille Ris Lambers and van den Bosch

Figure 40b

Apt. vivip. do not occur; BL of al. 1.4–1.7 mm. On *Lotus* (incl. *Dorycnium*) spp. in Israel, Iran and Turkey.

Therioaphis luteola (Börner)

Figure 53b

Apt. pale yellow or whitish; BL 1.7–2.0 mm. On *Trifolium pratense* in E, W, N and C Europe. Mon. hol. with al. males (Heie, 1982).

Therioaphis natricis Hille Ris Lambers and van den Bosch

Apt. color in life unrecorded; BL 1.25–2.2 mm. On *Ononis* spp. (especially *natrrix*) in the Middle East (Israel, Lebanon). 2n=16*.

Therioaphis obscura Hille Ris Lambers and van den Bosch Figure 40d
 Apt. banded gray with black spots; BL 1.3–1.8 mm. On undersides of leaves of *Lotus (Dorycnium)* spp. in France, Spain and Italy. There is also a record from *Ononis alba*. Ovip. and al. males in Oct–Nov (orig. descr.), but also partially anhol. (Leclant, 1966).

Therioaphis ononidis (Kaltenbach)
 Apt. yellowish to orange with dark brown spots; BL 1.8–2.2 mm. On reddish-flowered *Ononis* spp. in Europe, C Asia, and also now widely distributed in N America. Ovip. and al. males in Oct. 2n=16*.

Therioaphis pteromaculata Quednau
 Only known from al., color in life unknown; BL 1.8–2.0 mm. On *Astragalus adscendens* in Iran (Quednau, 2003).

Therioaphis riehmi (Börner)
 Apt. do not occur; al. yellowish, with dark dorsal spots, and BL 2.0–2.7 mm. On undersides of leaves of *Melilotus* spp., the preferred hosts, but there are also records from species of *Medicago*, *Trigonella* and *Trifolium*. Europe, Middle East, India (Chowdhuri *et al.*, 1969b), China (1 al., BMNH colln. leg. L.A. Mound), and introduced to N America, where it is widespread. Mon. hol. with ovip. and al. males in Sept (Hille Ris Lambers and van den Bosch, 1964). 2n=16.

Therioaphis (Bicaudella) rostrata Remaudière
 Apt. yellowish, rather pale; BL c.1.2–1.4 mm. On *Astragalus gossypinus* in Iran. Al. and sexual morphs unknown (Remaudière, 1989b).

Therioaphis subalba Börner Figure 53a
 Apt. pale yellow, whitish anteriorly; BL 1.7–2.0 mm. On *Trifolium* spp. in N and C Europe; there are also records from *Medicago sativa* and *Dorycnium (= Lotus)* sp., and from *Melilotus suaveolens* in Korea (Quednau, 2003).

Therioaphis tenera (Aizenberg)
 Apt. vivip. seem not to occur. Al. yellowish, dorsal abdomen generally without dark spots, and SIPH pale; BL 1.7–2.2 mm. On *Caragana* spp., living dispersed on undersides of leaflets, mostly on lower branches. In Europe (Finland, Germany, Czech Republic, Russia, Ukraine) and introduced to Québec, Canada (Quednau, 2003). The record from E Siberia is referable to *Th. kundurensis*. A short-haired population on *C. frutex* in Ukraine was distinguished as a subspecies, *T. tenera ssp. frutex* Bozhko, and a related, more pigmented form is described from China as *T. beijingensis* (q.v.). Apt. ovip. and al. males were described from Finland (Heikinheimo, 1997); fund. are present in June and ovip. in late Aug–Sept. 2n=6*.

Therioaphis trifolii (Monell) Plate 4c, Figures 16g, 40f,h
 Apt. pale yellow, greenish white to almost white, rather shiny, with rows of light- or dark-brown pigmented raised spots; BL 1.4–2.2 mm. On many plants of Leguminosae in genera *Astragalus*, *Lotus*, *Medicago*, *Melilotus*, *Onobrychis*, *Ononis* and *Trifolium*. Originally palaeartic; Europe, N Africa, Middle East, India, Pakistan, Japan (Sorin, 1990), and China (Zhang *et al.*, 1999, as *Th. cana*). Introduced to N and S America, S Africa, and Australia. Recognisable forms with more specific host–plant relations occur within the species, and are particularly evident where separate introductions have occurred to countries outside Europe. Some of these are regarded as distinct forms or subspecies, including the Spotted Alfalfa Aphid, *Th. trifolii ssp. maculata* (Buckton), introduced to N and S America, Australia and New Zealand (see also Blackman and Eastop, 2000, and in press). *Th. trifolii ssp. ventromaculata* Müller occurs on *Astragalus onobrychus* in Austria; and is also recorded from Poland and Czech Republic (Remaudière, 1989b). Mon. hol., with al. males, in cold temperate climates of N and C Europe and more northerly USA, anhol. in warmer regions. 2n=16 (incl. ssp. *maculata*).

Thripsaphis* Gillette*Saltusaphidinae**

About 20 long-bodied, sedge-feeding aphids related to *Subsaltusaphis* but with pointed dorsal hairs, and often with wax pores. Empodial hairs are spatulate in subgenus *Thripsaphis*, but pointed in subgenus *Trichocallis*. Apt. often have rhinaria on ANT III, and al. usually have extensive dark dorsal cross bands, sometimes merging into a solid patch. Richards (1971) gave an account of the world fauna, Heie (1982) reviewed the species in NW Europe, Nieto Nafria and Mier Durante (1998) those on the Iberian peninsula, and Hille Ris Lambers (1974) provided a key to N American species of subgenus *Trichocallis*.

***Thripsaphis ballii* (Gillette)**

Plate 4i, Figure 19f

Apt. pale grayish green with extensive darker cross-bands and marginal areas, lightly wax-dusted; BL 1.9–2.5 mm. Al. have 6–8 sec. rhin. on ANT III, and dorsal abdomen with broad dark transverse bars that are sometimes partially fused across tergites 3–5. Described from *Carex nebraskensis* in western USA, producing ovip. and apt. males on this plant in Oct–Nov (Palmer, 1952). Similar aphids also occur on other *Carex* spp. in eastern USA and Canada, Europe and E Siberia, and some of these populations are regarded as separate species or subspecies, but none of the discriminating features are sufficiently reliable to use in the key. The European form, described as *T. caespitosae* Ossiannilsson, is paler, dirty yellowish in life and is only known from *C. caespitosa* in Sweden, producing its sexuals in Sept (orig. descr.). The form in Ontario, Canada, *Th. ballii* ssp. *longisetis* Richards, resembles populations in Maine and Pennsylvania, USA (BMNH colln) and in E Siberia (Quednau and Shaposhnikov, 1988) in having longer hairs on the head and ABD TERG 8 than *T. ballii* s.str. from western and southern USA; but these hairs show almost continuous length variation in BMNH specimens. $2n=8^*$ (for Pennsylvanian population).

***Thripsaphis (Larvaphis) brevicornis* (Ossiannilsson)**

Apt. very slender, probably yellowish with brown markings; BL 2.7–3.0 mm. Al. are apparently unknown. On *Carex elata* and *C. lasiocarpa* in N Europe (Sweden, Germany) and a population on *C. vulpina* in Ukraine was described as a subspecies, *T. brevicornis* ssp. *carpaticae* Mamontova. Ovip. and apt. males occur in Sept–Oct (orig. descr. and Ossiannilsson, 1959). The very short, 5-segmented ANT of this species are distinctive, and warrant the separate subgenus.

***Thripsaphis (Trichocallis) californica* Hille Ris Lambers**

Figure 19j

Apt. very pale, rather shiny yellowish white with glassy transparent legs and sides of body, but black ANT; BL 2.2–2.7 mm. Al. unknown. On *Carex ?comosa* in California, USA, and also collected on *C. amplifolia* in Washington (BMNH, leg. D. Carroll). $2n=10^*$.

***Thripsaphis caricicola* (Mordvilko)**

Apt. dark grayish brown, clothed with bluish gray wax powder; BL 2.5–2.8 mm. Al. have 25–31 rhinaria on ANT III, and dorsal abdomen with broad dark bars separated between tergites. On *Carex* spp. (*rostrata*, *vesicaria*) in N and C Europe (Heie, 1982).

***Thripsaphis (Trichocallis) cyperi* (Walker)**

Apt. yellowish green, covered with bluish white wax, with dark appendages, and extensive grayish dorsal sclerotisation leaving a pale spinal stripe; BL 2.5–3.1 mm. Al. have 8–13 sec. rhin. on III, 0–3 on IV, and dorsal abdomen with broad dark bars separated between tergites. On leaves of *Carex* spp. Widely distributed in Europe and N America, and also recorded from E Siberia (Quednau and Shaposhnikov, 1988). Ovip. and apt. males occur in Sept (UK, BMNH colln) to late Oct (Spain, Nieto Nafria and Mier Durante, 1998). There is some confusion in the literature with the species now called *T. caricicola*. It is also liable to confusion with *T. vabei* ssp. *arctica*, which is similar in life but has shorter appendages. A form in China, described as brown in life and recorded from *Cyperus* sp., is regarded as a subspecies, *T. cyperi* ssp. *wulingshanensis* Zhang and Zhang.

***Thripsaphis (Trichocallis) daviaulti* (Quednau)**

Figure 19g

Apt. very elongate, pale whitish yellow, with pale legs, ANT black distally; BL 1.9–2.3 mm. Al. unknown. In leaf sheaths of *Carex trichocarpa* in Québec, Canada. An ovip. was found in early Oct.

THE APHIDS

Thripsaphis (Trichocallis) foxtonensis Cottier

Apt. pale green to yellowish green; BL 2.4–2.7 mm. Al. have 12–17 rhinaria on ANT III, and dark transverse bars on dorsal abdomen (cf. *T. producta*). On *Carex* spp., especially colonising bases of young leaves in centre of plant. In New Zealand and Australia (NSW). It appears closely related to *T. producta*; the differences are discussed by Hille Ris Lambers (1974). $2n=10^*$.

Thripsaphis (Trichocallis) hybrida Hille Ris Lambers

Color of apt. in life unknown; BL 2.2–2.5 mm. On *Carex* sp. in California, USA. The possibility that this population was a hybrid between *T. ossiannilssoni* and *T. verrucosa* was discussed in the description of this species (Hille Ris Lambers, 1974).

Thripsaphis (Trichocallis) ossiannilssoni Hille Ris Lambers

Figure 19l

Apt. very elongate, pale grayish yellow to grayish brown with darker marginal sclerites, and a dark gray eighth abdominal tergite, secreting bluish wax wool especially at sides and end of abdomen; BL c.1.7–1.9 mm. Al. have 8–13 sec. rhin. on ANT III and 1–3 on IV. On *Carex* spp., widely distributed in Europe and across Asia to Japan (Higuchi, 1972). A form of this species also occurs in California, USA (*T. ossiannilssoni* ssp. *pacifica* Hille Ris Lambers), and in China there is a form with more extensive wax pores on *Cyperus* sp. (*T. ossiannilssoni* ssp. *hebeiensis* Zhang and Zhang).

Thripsaphis (Trichocallis) producta Gillette

Figure 19e,h

Apt. very elongate, yellowish white to pale grayish brown, secreting bluish white wax, especially at end of abdomen; BL 1.8–2.5 mm. Al. have 10–14 rhinaria on ANT III, and broad black cross-bars that are fused into a solid patch on ABD TERG 3–6. On leaves of *Carex* spp. in N America, Europe, and across Asia to E Siberia; it is now considered that palaeartic populations formerly known as *T. caricis* (Mordvilko) are this species. There are ovip. in BMNH collected in mid-July in Iceland, and in mid-Aug to Sept in UK, and ovip. and apt. males were found in Spain in mid-Oct (Nieto Nafria and Mier Durante, 1998).

Thripsaphis (Trichocallis) scabra Hille Ris Lambers

Figure 19m

Color of apt. in life unknown; BL 2.4–2.8 mm. Al. have 9–11 Sec. rhin. on ANT III. On *Carex* sp. in western USA.

Thripsaphis sensoriata Hille Ris Lambers

Only known from one al., collected away from its host plant (presumed to be a *Carex* sp.) in Greenland.

Thripsaphis uncininae Quednau

Color in life unknown, BL of apt. c.1.9–2.1 mm. Al. have 4–8 sec. rhin. on ANT III. On *Uncinia* sp. and *Carex* sp. in Chile.

Thripsaphis (Trichocallis) utahensis Knowlton and Hall

Figure 19k

Color in life unknown, BL of apt. 1.3(?)–2.6 mm. Al. has c.9 sec. rhin. on ANT III and broad dark cross-bands on dorsal abdomen. Only known from specimens swept from ‘grasses’, but presumably the host is a *Carex* sp. In western USA (Idaho, Utah). Ovip. and apt. males in Oct in Utah.

Thripsaphis (Trichocallis) verrucosa Gillette

Figure 19n

Apt. yellow or pale greenish yellow, with ANT distally black and legs mainly pale; BL 2.4–2.8 mm. Al. have 9–20 sec. rhin. on ANT III, and dorsal abdomen with broad dark bars partially separated between tergites. On *Carex* spp. in Europe, W Siberia, and widely distributed in N America. Hille Ris Lambers (1974) distinguished populations in Labrador/Alaska and SW California as *T. verrucosa* ssp. *nodulosa* and *T. verrucosa* ssp. *subverrucosa*, respectively, but the described differences could be environmentally induced. Sexuials occur in late Aug–Sept in Sweden (Ossiannilsson, 1959). $2n=10^*$.

Thripsaphis (Trichocallis) vibei Hille Ris Lambers

Figure 19l

Apt. rather like *T. cyperi*; wax-powdered in life, with dorsum mottled, dark, except for a pale spinal stripe. BL 2.3–2.7 mm. Al. have 9–10 rhinaria on the third antennal segment and broad dark dorsal abdominal

cross-bands, partly fused across tergites 3–6. On leaves of *Carex* spp. A form with a more elongate body like *cyperi*, but short ANT like *vibei* s. str., is distinguished as a subspecies, *T. vibei* ssp. *arctica* Hille Ris Lambers; this form occurs in Greenland, Iceland and N Sweden (Heie, 1982). *T. vibei* s. str. is only known from Greenland. Ovip. and apt. males of ssp. *arctica* occur in late July in Greenland, early Aug in Iceland.

***Tiliphagus* Smith**

Eriosomatinae: Pemphigini

One N American species differing from *Prociphilus* in having al. with many more sec. rhin. See also Blackman and Eastop (1994).

***Tiliphagus lycoposugus* Smith**

Apt. white to pale tan or flesh-colored, with wax; BL 2.6–2.8 mm. On tuberiferous roots of *Lycopus virginicus* in eastern USA. Heter. hol., with sexual phase and leaf-nest galls on *Tilia americana* (orig. descr.).

***Titanosiphon* Nevsky**

Aphidinae: Macrosiphini

A genus for 4–5 palaeartic spp. mostly on *Artemisia*, similar to *Uroleucon* but with very long, robust SIPH that lack polygonal reticulation. Pashtshenko (1988a) keyed the E Asian species, and Kadyrbekov (2002c) keyed those of the western palaeartic region. The synonymies given here are discussed by Eastop and Blackman (2005).

***Titanosiphon artemisiae* (Koch)**

Plate 28i

Apt. very dark green to black; BL 1.7–2.5 mm. On thin stems of *Artemisia* spp., esp. *campestris*. In Europe (S France, Italy, Switzerland, Germany, Czech Republic). This species has been confused with *T. minkiewiczzi*, so that it is not possible to apply all locality records to the correct species. Hille Ris Lambers' (1947a) account applies to a mixture of the two species. Probably mon. hol.

***Titanosiphon chondrillae* Kadyrbekov**

Apt. pale brown, or with pale brown head and thorax and dark green abdomen, with dark ANT, legs, SIPH and cauda; BL 2.1–2.5 mm. On stems and upper leaves of *Chondrilla* sp. in E Kazakhstan (Kadyrbekov, 2002c).

***Titanosiphon dracunculi* Nevsky (= *Titanosiphon baichengense* Zhang)**

Apt. have shiny orange head and thorax, mainly green abdomen, and mainly black ANT, legs and SIPH; BL 2.3–3.2 mm. On flower stems of *Artemisia dracunculus*, occurring in large colonies attended by ants (Nevsky, 1928). In C and E Asia. Ovip. and apt. males in Sept–Oct (Narzikulov and Umarov, 1969).

***Titanosiphon minkiewski* Judenko**

(= *T. benoisti* Balachowsky, = *T. kazakhstanicum* Kadyrbekov)

Apt. very dark green to blackish; BL 1.8–2.8 mm. Living singly or in small colonies on thin stems of *Artemisia* spp., esp. *campestris*, in Europe and C Asia (C France, Germany, Poland, Kazakhstan). Mon. hol., with ovip. and apt. males on *A. campestris* in Sept–Oct.

***Titanosiphon neoartemisiae* (Takahashi)**

(= *T. bellicosum* Nevsky, = *T. zaisanicum* Kadyrbekov)

Apt. pale green to pale brown or reddish, with distal segments of ANT dusky, legs basally pale with darker femoral apices, tibiae and tarsi, and SIPH dark with paler reddish bases; BL 1.7–2.8 mm. (However, specimens in the BMNH collection have very variable pigmentation, with tibiae sometimes dark but often quite pale.) Forming large ant-attended colonies on stems of *Artemisia* and *Seriphidium* spp., in SW, C and E Asia (Narzikulov and Umarov, 1969, as *T. bellicosum*; Pashtshenko, 1988a). Ovip. and al. males occur on *A. scoparia* in Oct–Nov in Central Asia (Nevsky, 1928, as *T. bellicosum*). Anhol. on *A. capillaris* in Taiwan (Takahashi, 1927). Narzikulov and Umarov (1969) described specimens from *Seriphidium tenuisectum* with particularly long SIPH (c.0.7× BL) as a subspecies, *T. neoartemisiae* ssp. *hissaricum* (as *T. bellicosum* ssp. *hissaricum*). Similar specimens were collected from *A. campestris* in Spain (BMNH colln, leg. D. Hollis), but had apt. with 11–13 rhinaria on ANT III. 2n=8* (for specimens on *A. dracunculus* in Iran, coll. V.F. Eastop).

Toxoptera Koch

Aphidinae: Aphidini

Four or five spp. resembling *Aphis* but with a stridulatory apparatus consisting of ventrolateral ridges on the abdomen and a row of peg-like hairs on each hind tibia. The group is E Asian in origin although three species are now widely distributed on *Citrus* and other shrubs. Accounts were provided by Mondal *et al.* (1976) and Martin (1991).

Toxoptera aurantii (Boyer de Fonscolombe)

Plate 8b

Apt. shiny reddish brown, brown–black or black, with black and white banded ANT and black SIPH and cauda; BL 1.1–2.0 mm. Imm. brownish. Al. have forewings with a black pterostigma and normally a once-branched media, which is unusual for Aphidinae. In dense ant-attended colonies on young shoots and undersides of young leaves of host plants, causing slight rolling, twisting, or bending of the mid-rib. Large colonies produce an audible scraping sound when disturbed. Found on more than 120 plant species in numerous families, especially Anacardiaceae, Anonaceae, Araliaceae, Euphorbiaceae, Lauraceae, Moraceae, Rubiaceae, Rutaceae, Sterculiaceae, and Theaceae, and an important vector of viruses of economically-important plants (Blackman and Eastop, 2000). Distributed throughout the tropics and subtropics including the Pacific islands, and in glasshouses in temperate climates. Apparently entirely anhol.; no sexual morphs have ever been observed in the field. Broughton and Harris (1971) analysed the sound produced by *T. aurantii*, which is the only aphid with audible stridulation. $2n=8$.

Toxoptera citricidus (Kirkaldy)

Plate 8c

Apt. very dark brown to black, with ANT not conspicuously ringed with black (cf. *aurantii*), imm. brown; BL 1.5–2.4 mm. (Specimens in alcohol color the preserving fluid deep red.) Al. have forewing with pale pterostigma and normally twice-branched media, and dark ANT III. In ant-attended colonies on young growth of host plants, rolling leaves and stunting shoots. Mainly on Rutaceae, especially *Citrus* on which it is a principal virus vector (Blackman and Eastop, 2000), but occasionally with quite large colonies on young growth of plants in other families. Widespread in Africa south of the Sahara, SE Asia, Australia, New Zealand, the Pacific Islands, and subtropical and warm temperate parts of S America; more recently it has spread to important citrus-growing areas in C America, the Caribbean and southern USA (Yokomi *et al.*, 1994; Halbert and Brown, 1996), but not yet in Mediterranean region and Middle East. Entirely anhol. through most of its range, but there is a sexual phase on *Citrus* in Japan (Komazaki, 1988). It thrives in moist warm climates and can apparently tolerate colder conditions than *T. aurantii*, for example occurring at higher altitudes, but it is not found in regions with long hot dry seasons. Michaud (1998) reviewed the literature on this aphid. $2n=8$.

Toxoptera odinae (van der Goot)

Plate 8a

Apt. gray brown to reddish brown; BL 1.3–2.4 mm. On undersides of leaves of host plants along the main veins, or in dense colonies on young shoots, ant-attended. Rather polyphagous on tropical shrubs, especially the families Anacardiaceae (*Anacardium*, *Mangifera*, *Rhus*), Araliaceae (*Aralia*, *Polyscias*, *Kalopanax*), Caprifoliaceae (*Viburnum*), Ericaceae (*Rhododendron*), Pittosporaceae (*Pittosporum*), Rubiaceae (*Coffea*, *Mussaenda*), and Rutaceae (*Citrus*). Throughout E and SE Asia, and now widespread in Africa south of the Sahara (Barbagallo and Alcantara Santos, 1989; Martin, 1989). Apparently entirely or predominantly anhol.; sexual morphs have never been recorded. Togashi (1987) studied relationships with parasitoids, predators and ants, and see also Blackman and Eastop (2000). $2n=8$.

Toxoptera victoriae Martin

Apt. shining black, imm. dull reddish brown; BL 1.6–1.8 mm. In ant-attended colonies on young shoots of *Zanthoxylum scandens*. Hong Kong.

Trama von Heyden

Lachninae: Tramini

Medium-sized to rather large pale brown or whitish aphids living mostly on roots of Compositae in association with ants. Many of the nominal species described from Europe and W Asia are little-known and not

clearly distinguishable from the type species (*troglydites*). *T. rara* is the only species in N America (formerly known there as *T. oculata*), and was probably introduced from Europe on *Taraxacum* roots. Subgenus *Neotrama* differs from *Trama* in presence of SIPH and compound eyes, but DNA studies (Normark, 1999) show a close relationship. Eastop (1953), Heinze (1962), Heie (1995), Nieto Nafría *et al.* (2002a) and Szelegiewicz (1978) provided accounts of European species. The unusual extent of karyotype variation in *Trama* was studied by Blackman *et al.* (2000).

Trama (Neotrama) afghanica Narzikulov

Apt. matt white; BL c.3.1 mm. On roots of *Euphorbia* sp. in Afghanistan. Other morphs unknown.

Trama (Neotrama) antennata Mordvilko

Apt. color unknown, probably whitish; BL c.3.4–3.7 mm. On roots of *Rumex* sp. in Tajikistan. Redescribed from the original material by Szelegiewicz (1982).

Trama (Neotrama) baronii (Hille Ris Lambers)

Appearance in life unknown, BL 4.2–4.9 mm. Described from roots of a *Carduus* sp. in Malta, in a nest of the ant *Camponotus barbaricus*, and apt. have also been collected in Lebanon and Turkey (BMNH colln). Other morphs not known.

Trama (Neotrama) bigrarta Zhang, Chen, Zhong and Li, in Zhang

Apt. dark yellow; BL unrecorded. On *Sonchus oleraceus* in Gansu prov., China (Zhang, 1999). Perhaps a synonym of *T. caudata* (or *T. maritima*).

Trama (Neotrama) caudata (del Guercio)

Apt. whitish, pale yellow or brownish; BL 2.5–3.3 mm. On roots of plants in various composite genera (*Cichorium*, *Hypochaeris*, *Picris*, *Lactuca*, *Leontodon*, *Sonchus*, *Taraxacum*). Transfers between many of these genera are successful (Eastop, 1953), and many of the other names currently listed in *Neotrama* (e.g., *delguercioi*, *horvathi*, *formicella*, *narzykulovi*) are probably synonyms. Only recorded in Europe (unless *T. taraxaci* and/or *T. bigrarta* are this species). Anhol., no sexual morphs have yet been found. $2n=9-12$ (see Blackman *et al.* 2000).

Trama centaureae Börner

Apt. gray–green; BL c.3 mm. On roots of *Centaurea* spp. in N and C Europe (Heinze, 1962, Heie, 1995).

Trama (Neotrama) euphorbiae Juchnevitch and Kan

Apt. pale green or white; BL c.2.5 mm. On roots of *Euphorbia lamprocarpa* in Kazakhstan.

Trama (Neotrama) kulinitshae Narzikulov

Apt. milky white; BL c.4.7 mm. On roots of *Ferula* sp. in C Asia (S Tajikistan).

Trama (Neotrama) maritima (Eastop)

Apt. whitish, pale yellow or brownish; BL 2.6–3.9 mm. In ant-attended colonies on roots of *Picris echioides* and *Sonchus asper* in Europe, and also in C Asia as *Protrama pamirica*, described from *Cichorium* in Tajikistan (Narzikulov, 1963), seems likely to be a synonym. Apparently anhol. $2n=10-14$ (see Blackman *et al.*, 2000).

Trama (Neotrama) nigrarta Zhang, Chen, Zhong and Li, in Zhang

Apt dark yellow. On *Sonchus arvensis* in Gansu, China (Zhang, 1999). Perhaps a synonym of *T. caudata* (or *T. maritima*).

Trama (Neotrama) penecaeca Stroyan

Apt. probably dirty grayish-white with brown head, ANT, legs, SIPH cones and sclerites of posterior segments; BL 3.8–5.0 mm. On roots of *Helianthus tuberosus* in India (Jammu, Kashmir). Possibly mon. hol.; an apt. male was described by Verma (1969).

THE APHIDS

Trama rara Mordvilko

Apt. whitish to olive-brown; BL 2.5–3.5 mm. In ant-attended colonies on roots of *Taraxacum* spp., and sometimes on certain other Compositae, e.g., *Helianthus*. Europe, Siberia, Japan and N America. 2n=12–14.

Trama (Neotrama) taraxaci Shinji

Apt. pale; BL c.1.5 mm. On (roots of ?) *Taraxacum officinale* in Japan. Possibly small or immature *T. caudata*, although that species is only certainly known from Europe.

Trama troglodytes von Heyden

Plate 3g

Apt. white, yellowish white or gray (older adults); BL 2.5–3.9 mm. In ant-attended colonies on roots of numerous Compositae (incl. *Achillea*, *Artemisia*, *Centaurea*, *Cichorium*, *Cirsium*, *Cynara*, *Helianthus*, *Lactuca*, *Lapsana*, *Sonchus*, *Taraxacum*). Europe, W Siberia, C Asia, Japan. Various names have been applied to populations on different host plants, but there is no evidence from host transfers, karyotype or DNA of any specific host associations. Long thought to be entirely anhol., but DNA evidence (Normark, 1999) and the discovery of ovip. and blind, apt. males in a population in S England (Blackman *et al.*, 2000) shows that sexual recombination occurs sometimes (but probably rarely) in this species. 2n=14–23 (see Blackman *et al.*, 2000).

Tricaudatus Narzikulov

Aphidinae: Macrosiphini

One Asian species very like *Liosomaphis*, but with tubercular spinal processes on the last two abdominal segments, and imm. have spinulose hind tibiae.

Tricaudatus polygoni (Narzikulov)

Plate 16b, Figure 42q

Apt. whitish, pale yellow or yellowish green; BL 1.6–1.7 mm. Al. have a quadrate black dorsal abdominal patch. On undersides of leaves of *Polygonum* and *Persicaria* spp., or on leaves and twigs of *Spiraea*. Other recorded hosts (*Berberis*, *Bidens*, *Prinsepia*) require confirmation. In C Asia, India (H. P.) and Japan. Heter. hol., with the sexual phase on *Spiraea* (Chakrabarti and Banerjee, 1993a). 2n=8.

Trichosiphonaphis Takahashi

Aphidinae: Macrosiphini

About 12 palaeartic, mainly E Asian *Myzus*-like species with hairs on the SIPH, typically host alternating between *Lonicera* and *Polygonum*. In *Trichosiphonaphis* s.str. (3 spp.) SIPH have a distinct apical flange, whereas in subgenus *Xenomyzus* (9 spp.) SIPH are flangeless. Rемаудиере *et al.* (1992) provided a review of the genus and key to species.

Trichosiphonaphis (Xenomyzus) alpestris (Hille Ris Lambers)

Apt. brown; BL 1.7–2.2 mm. In ant-attended colonies on twigs of *Lonicera xylosteum* in alpine Europe (Austria, France, Switzerland). Mon. hol., with ovip. and apt. males in Sept (orig. descr.).

Trichosiphonaphis (Xenomyzus) cornuta Miyazaki

Figure 42e

Apt. yellow; BL 1.2–1.3 mm. Sec. rhin. in al. III 70–73, IV 33–41, V 18–30. On *Polygonum thunbergii* in Japan.

Trichosiphonaphis (Xenomyzus) corticis (Aizenberg)

Figure 38k

Apt. dirty greenish brown; BL 1.80–2.50 mm. In ant-attended colonies on twigs of *Lonicera* spp. in E and C Europe (Russia, Poland, Romania, Germany, Czech Republic, Austria, Switzerland), and also in E Siberia (Pashtshenko, 1988a).

Trichosiphonaphis gerberae A.K. Ghosh and Raychaudhuri

Apt. pale yellowish; BL 1.9–2.2 mm. Sec. rhin. in al. III 30–32, IV 15–17, V 10–11. Described from *Gerbera macrophylla*, an unlikely host, and later records are from *Polygonum* spp. (Raychaudhuri, 1980). Life cycle unknown.

Trichosiphonaphis (Xenomyzus) lijiangensis Zhang, Zhang and Zhong

Apt. whitish; BL 1.5–1.7 mm. Al. with an extensive black dorsal abdominal patch and sec. rhin. distributed III c.21, IV c.2. On *Polygonum* sp. in Yunnan prov., China.

***Trichosiphonaphis lonicerae* (Uye)** Figure 38h,i
 Apt. shiny greenish black or blackish brown, with paler appendages; BL 2.0–2.2 mm. Sec. rhin. in al. III 32–55, IV 14–27, V 4–12. On twigs of *Lonicera* spp. in Japan and Korea. Life cycle unclear; on *Lonicera* from Apr–Nov (Remaudière *et al.*, 1992), but possibly with at least a partial migration to *Polygonum*.

***Trichosiphonaphis (Xenomyzus) polygona* (van der Goot)** Figure 42d,f
 Apt. yellow to dark green, sometimes almost black; BL 1.3–2.2 mm. Sec. rhin. in al. III 20–41, IV 8–21, V 1–11. On *Polygonum* spp. in E Asia (Japan, China, Taiwan, India, Pakistan, Java), and introduced to USA (Smith and Denmark, 1982) and Panama (Remaudière *et al.*, 1992). Miyazaki (1971) found it on the roots of the host. Life cycle unknown. 2n=12 (Chen and Zhang, 1985a, as *T. ishimikawae*).

***Trichosiphonaphis (Xenomyzus) polygonifoliae* (Shinji)** Plate 20c, Figures 38j, 42g
 Apt. greenish brown; BL 1.8–3.0 mm. Sec. rhin. in al. (from *Polygonum*) III 16–46, IV 0–16, V 0. In colonies on twigs of *Lonicera* spp. in spring, migrating in June–July to roots of *Polygonum* spp. (Hori, 1938, as *Aulacorthum lonicerae*). Gynoparae and males return to *Lonicera* in Oct. In E Asia (Japan, China, Korea, E Siberia), and introduced to Europe (France – Remaudière *et al.*, 1992, Italy – O. Petrović, pers. comm., UK – Martin, 2000, Turkey – Ozdemir *et al.*, 2005). 2n=12.

***Trichosiphonaphis polygoniformosana* (Takahashi)** Plate 20d, Figure 42i
 Apt. dull blackish brown to black, with dirty yellow SIPH and cauda; BL 1.8–2.2 mm. On *Polygonum* and *Persicaria* spp. in China, Japan, Taiwan, Korea, Thailand and E Siberia. Possibly with host alternation to *Lonicera*, but the life cycle is unclear. The original description included apt. from *L. japonica* in Taiwan, and apt. from this host in Japan were also mentioned, but these specimens are not mentioned in later publications (e.g., Takahashi, 1965c), and may have been *T. lonicerae* Uye. Specimens from Takahashi in the BMNH collection (leg. F.V. Theobald) labeled '*Lonicera japonica*, Japan' (no date) are another, very small, apparently undescribed species.

***Trichosiphonaphis (Xenomyzus) tade* (Shinji)** Figure 42h
 Apt. dark yellowish brown to muddy green with dark ANT and SIPH; BL c.1.5–1.6 mm. On stalks of *Polygonum thunbergii* in Japan (Miyazaki, 1971, Moritsu, 1983). 2n=12.

***Tshernovaia* Holman and Szelegiewicz** Aphidinae: Macrosiphini
 Two Asian species related to *Macrosiphoniella* but with a characteristic caudal structure, and an apparent association with both Campanulaceae and *Artemisia*. Contrary to Lee *et al.* (2002c), this structure is a modification of the actual cauda, rather than a process on ABD TERG 8; the protruding structure beneath it is an extension of the anal plate. It is possible that this peculiar cauda has some function in relation to ant attendance.

***Tshernovaia adenophorae* Holman and Szelegiewicz** Plate 28c, Figure 7a
 Apt. dull black with a paler transverse bar anterior to base of cauda; BL 2.0–2.8 mm. On stems and undersides of leaves of *Adenophora* spp., and also found on *Artemisia annua* (Lee *et al.*, 2002c). Ant-attended. Russia (Transbaikalia), Mongolia and Korea.

***Tshernovaia spirocaudicula* Ivanoskaya**
 Apt. yellowish, slightly waxy, with black ANT, legs, SIPH and cauda; BL c.2.2 mm. On *Artemisia* sp., and also collected from stems of 'bluebells' (Campanulaceae). Siberia.

***Tubaphis* Hille Ris Lambers** Aphidinae: Macrosiphini
 Two palaeartic species associated with Ranunculaceae, resembling *Myzus* but with a distinctive constriction at the base of the cauda. Al. are without a dark dorsal abdominal patch, and have numerous sec. rhin. on ANT III and also some in a row on IV or IV–V.

THE APHIDS

Tubaphis clematophila (Takahashi) Figures 23a,b, 45e
Apt. green, with apices of ANT segments brownish; BL c.1.8–2.0 mm. Sec. rhin. in al. III 32–36, IV 11–14, V 2–9. On *Clematis* sp. and *Ranunculus* sp. in Japan, and Korea. 2n=12.

Tubaphis ranunculina (Walker) Plate 17f, Figure 45f,g
Apt. yellowish with pale appendages; BL 1.2–1.9 mm. Sec. rhin. in al. III 23–38, IV 0–10, V 0–6. On under-sides of leaves of *Ranunculus* spp. Europe, India (W Bengal) E Siberia and Japan. Mon. hol.

Tuberaphis Takahashi Hormaphidinae: Cerataphidini
About ten species in E and SE Asia typically host-alternating between *Styrax* and Loranthaceae or Viscaceae. Determinations of the life cycles of several species (e.g., Stern *et al.*, 1997) have resulted in transfers to this genus of species described from *Styrax* and placed in the genus *Astegopteryx*, and from Loranthaceae, placed in *Rappardiella*. Noordam (1991) redescribed and keyed the species in Java (as *Rappardiella*).

Tuberaphis cerina (Noordam)
Apt. yellowish white tinged with reddish brown, with dull transparent coat of wax; BL 1.1–1.3 mm. On *Dendrophthoe pentandra*, living pressed close to surfaces of rolled leaves, attended by ants. Java.

Tuberaphis coreana Takahashi Figure 60b
Apt. color in life unrecorded, body presumably with a wax fringe; BL 1.7–2.0 mm. On *Viscum* spp. in Japan and Korea. Heter. hol. with sexual phase and galls on *Styrax* (Blackman and Eastop, 1994, as *T. taiwana*; Stern *et al.*, 1997).

Tuberaphis loranthi (van der Goot) Figure 39a–d
Apt. orange–brown, with a narrow wax fringe, and a segmentally divided dusting of mealy wax; BL 1.5–2.1 mm. On old leaves and in dense colonies on woody stems of mistletoes (*Scurrula* spp.; records from *Loranthus* should probably also be referred to this host genus). In Taiwan, India (A.K. Ghosh, 1988), Java (Noordam, 1991) and Papua-New Guinea (BMNH colln, leg. E.J. Brough). Life cycle unknown.

Tuberaphis macrosoleni Noordam
Apt. brown, with ANT and legs paler, and with a dorsal layer of flaky wax, becoming thicker and wooly on margins; BL 1.3–1.6 mm. In rolled-leaf galls on *Macrosolen cochinchinensis*. Java.

Tuberaphis scurrulae Noordam Figure 39e
Apt. velvety black or dull brownish black, with a flat narrow marginal wax fringe; BL 1.7–2.0 mm. On twigs of *Scurrula* sp. in Java.

Tuberaphis takenouchii (Takahashi)
Apt. dark grape-colored, usually with little wax; BL 1.2–1.4 mm. In rolled leaves of *Scurrula* sp. Java (Noordam, 1991, as *Rappardiella plicator*; see Stern *et al.*, 1997), Sumatra, Taiwan (Kurosu *et al.*, 1994) and Japan. Heter. hol. with sexual phase and complex, broccoli-like galls on *Styrax japonica* (Blackman and Eastop, 1994). To judge from a paratype slide in the BMNH colln., *T. loranthicola* Tao, originally described from *Taxillus sutchuenensis* in China (Tseng and Tao, 1938, as *Astegopteryx loranthi*) is probably a synonym.

Tuberaphis viscisucta Zhang
Color of apt. in life unrecorded, not wax-powdered; BL c.1.3 mm. On *Viscum album* in Yunnan, China. Likely to be a synonym of *T. takenouchii*.

Tuberoaphis Tseng and Tao Aphidinae: Macrosiphini
One or two species associated with *Hydrangea*, having long dorsal hair-bearing processes, and eyes without distinct ocular tubercles. Life cycle unknown; possibly there is a host alternation to ferns, as in the related genus *Macromyzus*.

Tuberoaphis hydrangeae Tseng and Tao

Apt. yellow, with apices of appendages dark brown; BL c.1.1–1.2 mm. On leaves of *Hydrangea aspera* in Szechuan, China.

Tuberoaphis hydrangeae* ssp. *digitata Hille Ris Lambers and Basu Plate 22d, Figure 32a

Apt. pale glassy white to pale yellowish green, with apices of appendages darker; BL 1.4–1.7 mm. On undersides of leaves of *Hydrangea robusta* in W Bengal, India, producing large numbers of al. in late May and probably migrating to an unknown secondary host (orig. descr.). *Matsumuraja indica* A.K. Ghosh, M.R. Ghosh and Raychaudhuri, described from (?) *Rubus* sp., is a synonym, but *Rubus* is an unlikely secondary host.

Tuberocephalus Shinji

Aphidinae: Macrosiphini

Twelve or more E Asian *Myzus*-like species typically making galls on *Prunus* and migrating to Anthemidae, where they are small aphids on undersides of leaves (*Tuberocephalus* s.str.) or on subterranean shoots or roots (subg. *Trichosiphoniella*). Sorin and Remaudière (1998) reviewed the genus, providing information about the life cycles of several species. See also Blackman and Eastop (1994).

Tuberocephalus artemisiae Shinji

Apt. pale yellow to dull yellow, with pale appendages, body rather elongate; BL 1.1–1.5 mm. On undersides of leaves of *Artemisia* spp., heavy infestations curling leaves and causing plants to become sooty with mould (Miyazaki, 1971). Japan. Heter. hol. with sexual phase and galls on *Prunus* spp. (Sorin and Remaudière, 1998).

Tuberocephalus (Trichosiphonella) higansakurae (Monzen)

Apt. greenish white (?); BL 1.1–1.4 mm. The secondary host generations are only known for populations regarded as a subspecies, *T. higansakurae* ssp. *hainnevilleae* Remaudière and Sorin, which migrates from leaf-galls on *Prunus* spp. to live on subterranean young shoots of *Artemisia* spp. (Sorin and Remaudière, 1998). In Japan, and on *Prunus* seedlings imported into France (Remaudière and Sorin, 1993). 2n=12.

Tuberocephalus lazikouensis Zhang, Chen, Zhong and Li, in Zhang

Apt. green; BL c.1.7 mm. On undersides of leaves of *Artemisia argyri* in Gansu, China (Zhang, 1999).

Tuberocephalus (Trichosiphonella) liaoningensis Chang and Zhong

Apt. color in life unrecorded; BL c.1 mm. On subterranean young shoots of *Artemisia vulgaris* var. *indica*. Heter. hol., with sexual phase and galls on *Prunus* spp. (Sorin and Remaudière, 1998). China and Japan. 2n = 12 (Chen and Zhang, 1985a).

Tuberocephalus (Trichosiphonella) misakurae Moritsu and Hamasaki

Apt. greenish brown; BL 0.9–1.2 mm. On thin lateral roots of *Dendranthema x morifolium* var. *sinense*. Heter. hol., with sexual phase and galls on *Prunus* (Blackman and Eastop, 1994; Sorin and Remaudière, 1998). China and Japan. 2n=12.

Tuberocephalus (Trichosiphonella) sakurae (Matsumura)

Plate 17g

Apt. deep bluish green to black, imm. greenish yellow; BL c.1.6–1.7 mm. On subterranean young shoots of *Artemisia* spp. Heter. hol., with sexual phase and galls on *Prunus* spp. (Sorin and Remaudière, 1998). Japan, China, Korea, E Siberia.

Tuberocephalus sasakii (Matsumura)

Apt. whitish, dorsoventrally flattened; BL 1.0–1.5 mm. Living singly adpressed to undersides of leaves of *Artemisia* spp. Heter. hol. with sexual phase and galls on *Prunus* (Blackman and Eastop, 1994). E and S E Asia.

Tuberocephalus (Trichosiphonella) uwamizusakurae Sorin and Remaudière

Apt. probably dark green to black; BL 1.0–1.4 mm. On curled lateral roots of *Artemisia vulgaris* var. *indica*. Heter. hol., with sexual phase and galls on *Prunus grayana* (Sorin and Remaudière, 1998). Japan.

Tubicauda Chakrabarti and Bhattacharya

Aphidinae: Macrosiphini

One species on *Hydrangea* in India, very close to *Eumyzus* and forming similar leaf-roll galls, but with longer, finely pointed dorsal hairs and a cauda similar to that found in moss-feeding aphids.

Tubicauda hydrangeae Chakrabarti and Bhattacharya

Color of apt. in life unrecorded; BL c.1.6 mm. Al. produced in early June have 25–28 sec. rhin. on ANT III and 1–4 on IV. In reddish tubular marginal leaf galls on upper surfaces of leaves of *Hydrangea* sp. in U.P., India. Life cycle unknown.

Turanoleucon Kadyrbekov

Aphidinae: Macrosiphini

Two species on Compositae: Cardueae in the desert zone of Kazakhstan, related to *Macrosiphoniella* but with an elongate R IV+V, a well-developed median frontal tubercle and 5 hairs on first tarsal segments (Kadyrbekov, 2002a). The two species are very similar and the reported differences might be due to nutrition, with *Cousinia* the more suitable host.

Turanoleucon mitjaevi Kadyrbekov

Apt. black; BL 2.2–3.2 mm. On stems of *Cousinia* spp. in deserts of S and E Kazakhstan.

Turanoleucon jashenkoi Kadyrbekov

Apt. black; BL 2.3–2.6 mm. On stems of *Echinops* spp. in deserts of S and E Kazakhstan.

Uhlmannia Börner

Aphidinae: Macrosiphini

A palaeartic genus for one species on *Asperula* and *Galium* with a projection of ABD TERG 8, a broad triangular cauda and short curved flangeless SIPH.

Uhlmannia singularis (Börner)

Apt. dark gray, almost black, covered with white powder; BL 1.4–1.8 mm. On stems of *Asperula* spp. and *Galium verum* in Europe (France, Austria, Italy, Spain, Czech Republic, Hungary, Ukraine). Ovip. and al. males in Sept (Börner, 1950).

Uroleucon Mordvilko (= *Dactynotus* Rafinesque)

Aphidinae: Macrosiphini

About 180 species with an often extensive distal band of polygonal reticulation on rather elongate SIPH, usually with 5 hairs on the first tarsal segments and often with dorsal abdominal hairs arising from pigmented spots (scleroites). Many species are dark bronzy red or almost black and live on the stems of Compositae, but some live under the rosette leaves. At least 160 species live on Compositae, 11 species live on Campanulaceae in the old world, and 9 species are described from other plant families. The males of many species are green as are the females of some, particularly members of the nearctic subgenus *Lambersius* and a related group of S American species, which live mostly on the tribe Astereae. The other nearctic species live mostly on Heliantheae (16 spp.) or Astereae (13 spp.), while palaeartic species (100+) more frequently colonize Cynareae (20 spp.) and Cichoreae (23 spp.). Only 7 species are described from Anthemideae, the hosts of most members of the related genus *Macrosiphoniella*. From about 1935 to 1975 the genus was commonly called *Dactynotus*. Accounts are available for W Europe (Hille Ris Lambers, 1939a), Fennoscandia and Denmark (Heie, 1995), European Russia (Shaposhnikov, 1964), Siberia (Ivanovskaya, 1977; Pashtshenko, 2000a, 2001), palaeartic *Inula*-feeders (Holman, 1981c), Iran (Rezwani, 1991), Kazakhstan (Kadyrbekov, 2003a), Japan (Miyazaki, 1971), Korea (Lee *et al.*, 2002c), China (Tao, 1963), India (Chakrabarti and Medda, 2004), S America (Carvalho *et al.*, 1998), Puerto Rico (Smith *et al.*, 1963) and N America (Robinson, 1985, 1986). Moran *et al.* (1999) used molecular methods to study the phylogeny and evolution of *Uroleucon* in N America and Europe. The subgeneric classification needs revision; in particular, it seems likely that there are N American species misplaced in *Uromelan*, and S American species misplaced in *Lambersius*.

***Uroleucon achilleae* (Koch)**

Apt. red or brownish red with rows of black dorsal spots, black SIPH and yellow cauda; BL c.2.4–2.6 mm. On lower leaves of *Achillea* spp. in Europe, and introduced to USA (California, Oregon). Mon. hol., with al. males. Sobhani (1970) studied biology, life cycle and morphology of *U. achilleae* in Germany. 2n=12.

***Uroleucon (Uromelan) acroptilidis* Kadyrbekov, Renxin and Shao**

Apt. brownish; BL 2.9–3.4 mm. On stems of *Acroptilon australe* in SE Kazakhstan and Xinjiang-Uyghur region of W China (Kadyrbekov *et al.*, 2002).

***Uroleucon adenocaulonae* (Essig)**

Apt. shining reddish, often tinged with olive-green; BL 2.3–2.9 mm. On flower stems of *Adenocaulon bicolor* in California, and also found on *Crepis* sp. in Oregon (Leonard, 1974).

***Uroleucon (Uromelan) adenophorae* (Matsumura)**

Figure 7c

(=*Uroleucon (Uromelan) adenophoricola* Holman)

Apt. shining dark brown to black; BL 3.7–4.2 mm. On petioles of terminal leaves of *Adenophora* spp. in Japan and Mongolia (Holman, 1975, as *U. adenophoricola*).

***Uroleucon (Uromelan) aeneum* Hille Ris Lambers**

Apt. shiny metallic bronze-black; BL 3.0–4.3 mm. On upper parts of stems of thistles (*Carduus*, *Cirsium*, *Onopordon*, *Silybum*), often forming very large colonies. Also recorded from *Arctium* and *Carthamus*, but these are likely to be casual occurrences or misidentifications. In Europe, Turkey, Armenia, Kazakhstan and E Siberia. Mon. hol., with ovip. and al. males appearing in Sept (Hille Ris Lambers, 1939). Closely related to *U. jaceae*, and originally described as a subspecies.

***Uroleucon alaskense* Robinson**

Apt. color in life unrecorded, tibiae probably uniformly dark; BL 2.5–3.1 mm. On *Achillea* sp. in Alaska.

***Uroleucon (Uromelan) amamianum* (Takahashi)**

Apt. bright shiny red to reddish brown, with black ANT, SIPH, cauda and distal halves of femora; BL 1.8–2.5 mm. On *Solidago* and *Aster* in Japan (Moritsu, 1983) and Korea (Lee *et al.*, 2002c), where it was also found on *Picris hieracioides* and *Patrinia scabiosaefolia*.

***Uroleucon ambiguum* Pashtshenko**

Apt. shining fuscous brown with brown SIPH and pale cauda; BL c.3.5 mm. Al. with only 7–9 sec. rhin. on ANT III. At stem apices of *Artemisia opulenta* in E Siberia (Kamchatka; Pashtshenko, 2000a)

***Uroleucon ambrosiae* (Thomas)**

Plate 28d

Apt. red-brown to dark brown or dull red, with black SIPH and a pale cauda; BL 2.5–3.5 mm. Mainly on *Ambrosia* and *Iva* in eastern and northern USA, where records from other plants may be misidentifications of other species (Moran, 1985). However, populations in south-western USA, and C and S America are far less specific, colonising numerous species of Compositae (e.g., *Achillea*, *Ambrosia*, *Aster*, *Cichorium*, *Coreopsis*, *Eupatorium*, *Lactuca*, *Rudbeckia*, *Senecio*, *Taraxacum*, *Xanthium*), usually occurring on the flower-stems. This more polyphagous form (regarded in S America as a subspecies, *U. ambrosiae* ssp. *lizerianum* Blanchard), has fewer sec. rhin. on ANT of both apt. and al. (Carvalho *et al.*, 1998; Bernays *et al.*, 2000). Bernays and Funk (1999, 2000) found many differences in host selection behavior between these two forms. Mon. hol. in temperate N America, with al. males; probably mainly or entirely anhol. in southern USA, and C and S America. *U. aaroni* Knowlton, described from al. only, may be a synonym. 2n=12.

***Uroleucon (Lambersius) anomalae* (Hottes and Frison)**

Apt. pale green to yellow-green, SIPH dark with pale bases; BL c.1.9–2.0 mm. At apices of flower stems of *Aster novaeangliae* in eastern USA (Moran, 1985). 2n=12.

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Uroleucon arnesense Robinson

Apt. dark green; BL 2.0–2.6 mm. Described from a small species of *Solidago* in Arnes, Manitoba. Specimens in the BMNH colln from *Solidago* sp(p) in Ontario (leg. J.P. Sijpkens) and Utah (leg. G.F. Knowlton) also agree closely with paratypes of *arnesense*. It is possible that the dwarf individuals included in the description of *U. pieloui* (Richards, 1972c) were this species.

Uroleucon asteriae Lee, Holman and Havelka

Apt. color in life unrecorded; BL 2.7–3.6 mm. On *Aster koraiensis* and *A. scaber* in N Korea (Lee *et al.*, 2002a).

Uroleucon asteromyzon Zhang, Chen, Zhong and Li, in Zhang

Apt. black; BL c.2.9 mm. On young shoot terminals of *Aster tataricum* in Gansu prov., China (Zhang, 1999). The type specimens seen had most of the pigment removed in preparation, so certain assumptions had to be made in including this species in the key to aphids on *Aster*.

Uroleucon asterophagum (Nevsky)

Apt. yellow-green, with dark ANT and pale SIPH and cauda; BL 3.0–3.5 mm. On stalks and flowerheads of *Aster* sp. and *Erigeron* sp. in C Asia, and subsequently found on *Aster grimmii* (Kadyrbekov, 2002d). Some specimens collected from *Aster himalaicus* at Wisley, UK in 1940 (BMNH colln, leg. G. Fox-Wilson) also key to this species.

Uroleucon astronomus (Hille Ris Lambers)

Apt. color in life apparently unrecorded; BL 3.1–4.3 mm. On flower stems of *Aster macrophyllus* in eastern USA and Canada. Completely host-specific according to Moran (1985) with ovip. and al. males appearing on *A. macrophyllus* in Sept in Québec (orig. descr.), although the paratype material includes specimens from *A. novaeangliae*.

Uroleucon atripes (Gillette and Palmer)

Apt. dark reddish brown to blackish red with black legs, ANT and SIPH; BL 1.8–3.0 mm. On leaves and stems of *Aster* sp., deforming stems when abundant, and also recorded from *Brickiella eupatoroides* and *Solidago missouriensis*. In western USA. Ovip. and al. males in Oct (Palmer, 1952).

Uroleucon bereticum (Blanchard)

Apt. shining green to yellowish green, with dusky ANT and dusky/dark SIPH; BL 2.1–3.1 mm. On various Compositae (*Baccharis*, *Buva*, *Conyza*, *Erigeron*, *Tanacetum*) in S America (Argentina, Brazil, Chile, Peru; Carvalho *et al.*, 1998). Delfino and Sary (2004) redescribed this species, and also described an endemic parasitoid.

Uroleucon bicolor (Nevsky)

Apt. dark brown with yellowish sides to abdomen and a yellowish spinal stripe between SIPH; SIPH black on basal and brown on distal thirds, with a greenish yellow section in middle; cauda yellow; BL 3.5–3.8 mm. In large colonies on stems of *Onopordon* sp., *Senecio* sp. and *Lactuca viminea* in C. Asia (Tajikistan). Redescribed from some of Nevsky's material by Holman (1991a), who suggested that the specimens from *Onopordon* sp. were probably a different species. Al. unknown.

Uroleucon bielawskii (Szelegiewicz)

Apt. color in life unknown; BL 2.9–3.4 mm. On wild *Lactuca* spp., and (possibly) *Hieracium pilosella*. In France, Sicily, Bulgaria, former Yugoslavia, Cyprus and Turkey.

Uroleucon bifrontis (Passerini)

Apt. lustrous olive green with black head and SIPH; BL 2–3 mm. On leaves and in inflorescences of *Inula* spp. (*bifrons*, *viscosa*) in Italy and Rumania (Holman, 1981a).

Uroleucon (Uromelan?) bonitum (Hottes)

Apt. bright red to brownish red with mainly dark appendages; BL 1.7–2.2 mm. On flower stems of *Stephanomeria pauciflora* in western USA (California, Colorado). Mon. hol. with apt. males in Oct (orig. descr., as *Macrosiphum*).

Uroleucon boreale Robinson

Apt. 'dark greenish red, appearing overall as almost black'; BL 2.3–2.8 mm. On unidentified *Solidago* sp(p). in north-western N America (Yukon, NW Territories).

Uroleucon (Satula) brachychaetum (Olive)

Apt. dark red to red–brown with blackish ANT and SIPH, and reddish or yellowish legs; BL 1.4–2.0 mm. On *Krigia* spp. in N Carolina and Michigan, USA (Moran, 1985).

Uroleucon (Lambersius) bradburyi (Olive)

Apt. green with mainly dusky-dark appendages, BL c. 2.2–2.6 mm. On *Aster* sp. in North Carolina, USA. Al. males were found in Oct (Olive, 1965). 2n=12. [A similar species, but with longer SIPH and longer R IV+V, has been collected on *Aster modestus* in Oregon (BMNH colln, leg. D. Hille Ris Lambers.)] 2n=12.

Uroleucon brevirostre Holman

Apt. blackish brown; BL 3.9–4.2 mm. On flower stems of *Mulgedium* (= *Lagedium*) *sibiricum* (Pashtshenko, 2001). Mongolia and Siberia.

Uroleucon (Lambersius) breviscriptum (Palmer)

Apt. medium green with mainly black appendages; BL 2.5–3.3 mm. On leaves and stems of *Aster* sp. in western USA. Ovip. in early Oct (Palmer, 1952, as *Macrosiphum*). *U. macgillivrayae* in eastern USA and Canada is very similar and a possible synonym.

Uroleucon brevisiphon Carvalho

Apt. color in life unknown, BL 1.8–2.5 mm. ANT, distal halves of femora, tarsi and SIPH are dark, and the coxae are also rather dark compared with other S American *Uroleucon*. On *Baccharis patagonica* in Chile (Carvalho *et al.*, 1998).

Uroleucon (Lambersius) brevitarsus (Robinson)

Apt. green; BL 2.4–3.2 mm. On terminal parts of stems of an unidentified *Solidago* sp. in Manitoba, Canada.

Uroleucon budhium (H. Banerjee, A.K. Ghosh and Raychaudhuri)

(= *tenuirostre* L.K. Ghosh; = *acutirostre* Bänziger)

Apt. (according to orig. descr. of *budhium*) pale brown with dark brown head and SIPH, ANT and legs mainly pale with dark apices (also dark sensoriated part of ANT III and distal 0.3 of femora), and pale cauda; BL 2.8–4.0 mm. Imm. creamish white. Described from colonies on undersides of young leaves, flower buds and stems of *Echinops cornigerus*, and from 'bases and apical shoots' of *Anaphalis* sp., in U.P., India. Mon. hol. in N India; the ovip. and al. male were described by Chakrabarti and Medda (2004). Holman (1981c) doubted the association with *Echinops*, but as well as records from *Inula* spp. and *Blumea* sp. (Raychaudhuri, 1980), there is also a large collection from *Saussurea albescens* (BMNH colln, leg. N.D. Rishi), indicating that it may well colonise Compositae outside the Inuleae group. However, a record from *Ficus* sp. (Raychaudhuri, 1980: 234) should certainly be discounted as vagrants. In N India (U.P., Meghalaya, W Bengal, Kashmir) and Thailand (Bänziger, 1980, as *U. acutirostre*). [Paratypes of *U. acutirostre* Bänziger, described from N Thailand, could not be distinguished from paratypes and other specimens of *U. tenuirostre* (= *budhium*) in the BMNH collection, so if the synonymy of *tenuirostre* with *budhium* is correct, *acutirostre* should also be regarded as a synonym (Eastop and Blackman, 2005). However, the color in life of *acutirostre* is recorded as dark blackish red (Bänziger, 1980). The original description of *tenuirostre* did not record the color in life.]

***Uroleucon (Lambersius) cadens* Moran**

Figure 49c

Apt. green, with ANT, legs and apical halves of SIPH black; BL 1.5–1.9 mm. On *Solidago nemoralis* in S Michigan, falling readily when disturbed.

***Uroleucon (Uromelan) calendulae* (Nevsky)**

Body of apt. brownish, appendages somewhat paler; BL c.3.5 mm. Described from flower stems and undersides of upper leaves of *Calendula arvensis*, an introduced plant, in S Kazakhstan; the native host is *Erigeron aurantiacus* (R.Kh. Kadyrbekov, pers. comm.).

***Uroleucon (Lambersius) caligatum* (Richards)**

Apt. green with black ANT, legs and distal halves of SIPH; BL 3.2–4.0 mm. On *Solidago* spp., common in north-eastern USA and Canada. Moran (1981) studied intraspecific variability in performance between three *Solidago* spp. Closely related to *U. luteolum*, which has a more southerly distribution in USA, and apparently differs only in the lack of spinal tubercles; further studies are needed, as the development of these tubercles is likely to be environmentally determined.

***Uroleucon (Uromelan) campanulae* (Kaltenbach)**

Apt. shiny reddish brown to black, with ANT, SIPH and cauda black and legs bicolored yellow and black; BL 2.1–3.7 mm. On upper parts of stems and flowers of Campanulaceae (*Campanula*, *Jasione*) in Europe and C Asia. Ovip. and al. males in Sept–Oct. Populations from different regions and hosts differ somewhat in morphology (e.g., see Heie, 1995), and there is possibly a complex of species. Specimens from *Jasione* have longer SIPH than those from *Campanula* (SIPH 0.23–0.28×BL and 1.01–1.14×cauda in apt. from *Jasione*; SIPH 0.14–0.21×BL and 0.72–0.98×cauda in apt. from *Campanula*), and R IV+V is also longer relative to HT II in *Jasione*-feeding aphids (Heie, 1995; VFE, unpublished data), suggesting that there may be two distinct species. Hille Ris Lambers (1939a) observed that the form from *Jasione* usually had little success in colonising *Campanula* spp.

***Uroleucon (Lambersius) canadense* (Richards)**

Apt. color not observed; BL c.1.6–3.2 mm. On *Solidago hispida* in Canada (Ontario, Québec). Closely related to and probably synonymous with *U. gravicorne*; the discriminants given by Richards do not differentiate this species from many specimens of *gravicorne* in the BMNH collection.

***Uroleucon carberriense* Robinson**

Apt. green, with mainly pale appendages; BL 2.2–3.0 mm. On *Chrysopsis villosa* in Canada (Manitoba and Alberta).

***Uroleucon (Uromelan) carlinae* (Börner)**

Apt. reddish brown to blackish brown, BL 2.4–3.0 mm. On *Carlina caulescens* in S and C Europe (France, Germany, Poland, Hungary, Italy, Ukraine). Ovip. and al. males appear in early Aug in Germany (orig. descr.).

***Uroleucon (Uromelan) carthami* (Hille Ris Lambers)**

Color of apt. not reported, probably reddish brown to blackish brown; BL 2.1–3.3 mm. On *Carthamus* spp. in S and C Europe, Israel, Turkey, and eastward to Pakistan and India (Kashmir). Most records from *C. tinctorius* in India are probably referable to *U. compositae*. In the European literature there is also confusion with the very closely related *U. jaceae* and *U. aeneus*, which are normally on other Compositae but can also sometimes occur on *Carthamus* (Nieto Nafria *et al.*, 1986). Sexual morphs and life cycle unknown. $2n=12^*$ (but $2n=14$ is recorded by Khuda-Bukhsh and Kar, 1990).

***Uroleucon caspicum* Rezwani and Lampel**

Apt. shiny dark brown with dark ANT, legs and SIPH, and pale cauda; BL 3.2–4.7 mm. On *Serratula quinquefolia*, living on undersides of leaves and on shoots. Iran, Russia (Caucasus). Mon. hol., with ovip. and al. males in Oct (Holman, 1991a).

***Uroleucon (Uromelan) cephalonopli* Takahashi**

Apt. medium-sized, broadly spindle-shaped, shiny dark brown–black, with black SIPH and cauda, ANT and femora mainly black, tibiae mainly yellow; BL c.3 mm. On upper parts of stems and upper leaves of *Cirsium* spp. in Japan, Korea, E Siberia and Taiwan (as *Macrosiphum ambrosiae*; Miyazaki, 1971). There are records of *U. cephalonopli* from various other genera in N Korea (Lee *et al.*, 2002c), but this species seems to have a strong preference for *Cirsium*, and there is possible confusion with other very similar species such as *U. gobonis*. There is a strong possibility that this species is synonymous with *U. cameronense* (Takahashi), which was described from an unknown composite plant in Malaya.

***Uroleucon chani* Robinson**

Apt. brownish green, with ANT (except base of III), distal parts of femora and tibiae, and SIPH, dark brown/black; BL 2.3–2.9 mm. On *Grindelia nana* in B.C., Canada. Ovip. and al. males in early Oct (orig. descr.).

***Uroleucon chilense* (Essig)**

Color in life unrecorded, BL c.3.5 mm. On *Baccharis* sp(p). in Coquimbo prov., Chile (Carvalho *et al.*, 1998).

***Uroleucon chondrillae* (Nevsky)**

Apt. dark brown with black ANT and SIPH and yellowish cauda; BL 2.6–3.8 mm. On stems and flower stalks of *Chondrilla juncea* in Europe and C Asia. Facultatively hol. in Mediterranean area, where Caresche *et al.* (1974) studied its biology and host specificity $2n=12^*$.

***Uroleucon chrysanthemi* (Oestlund)**

Apt. dark brown, with black SIPH and yellowish cauda; BL 2.2–3 mm. On *Bidens* spp. in North America. Hol., with al. males (Hottes and Frison, 1931). Very similar to *U. ambrosiae*, and records of *U. chrysanthemi* from other genera of Compositae may be referable to that species or others in the *ambrosiae* group.

***Uroleucon chrysopsidicola* (Olive)**

Apt. red–brown with black ANT and SIPH, yellowish legs with black femoral apices and tarsi, and a pale cauda; BL 1.8–2.5 mm. On *Chrysopsis* spp., of which *Ch. mariana* seems to be the usual host, with single records also from *Erigeron annuus* and *Solidago* sp. (Olive, 1963), which might be other species. In eastern USA (Florida, Georgia, North Carolina). Mon. hol., with al. males. $2n=12$.

***Uroleucon cicerbitae* Holman**

Apt. reddish brown with contrastingly whitish cauda and black SIPH; BL 3.2–4.7 mm. On *Cicerbita cacaliaefolia*, presumably on upper stems and leaves in spring, and later on inflorescences. In southern Russia (eastern shore of Black Sea). Mon. hol. with ovip. and al. males in Oct (Holman, 1991a).

***Uroleucon cichorii* (Koch)**

Apt. shining metallic brown with black ANT, legs and SIPH, and pale yellow cauda; BL 2.7–4.7 mm. On upper parts of stems of *Cichorium* and related genera of Compositae (*Crepis*, *Hieracium*, *Lactuca*, *Lampsona*, *Leontodon*, etc.). Europe, SW and C Asia, Eritrea, Mongolia, Korea and E Siberia. Mon. hol., with al. males. A member of a group of closely related species in Europe. Hille Ris Lambers (1939a) discussed variation in the group as a whole and erected three subspecies of *cichorii* based mainly on differences in host colonisation in the field; ssp. *cichorii* on *Cichorium*, ssp. *leontodonis* on *Leontodon*, and ssp. *grossum* on *Crepis*. Here we follow Heie (1995) in treating these as separate species. However, further work is needed on the stability of host associations and taxonomic relationships within this group, and the host specificity of *Cichorium*-feeding populations in particular is not clearly established, nor is it supported by consistent morphological differences. *U. cichorii* should therefore be regarded as potentially capable of living on other genera, and the keys have been constructed to take this into account. It is also likely that some records of *U. cichorii* are misidentified *U. picridis* and *U. hypochoeridis* (and vice versa).

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***Uroleucon ciefi* (Olive)**

Apt. dark brown to red-brown with dark ANT, legs and SIPH, and a pale cauda; BL 1.3–2.3 mm. Al. have 12–24 rhinaria on ANT segment III. On *Eupatorium* spp. in eastern USA (Florida, N Carolina).

***Uroleucon cirsicola* (Holman)**

Apt. spindle-shaped, dark brassy brown, with mainly black ANT, legs mainly pale brown, SIPH black on basal half but brown distally, and cauda yellow; BL 3.3–4.9 mm. On upper parts of stems and undersides of upper leaves of *Cirsium* spp. A few specimens collected in the type locality on *Arctium minus* were possibly also this species (orig. descr.), and it is also recorded from *Senecio jacobaea* and *Tragopogon orientalis* (Ivanoskaya, 1977). In Ukraine (Crimea), Turkey (BMNH colln, leg. N. Tuatay) and W Siberia.

***Uroleucon cirsii* (L.)**

Apt. bronze–brown, with dark head and prothorax, black dorsal abdominal spots, black SIPH and a yellow cauda; BL 3.2–5.2 mm. On *Cirsium* spp., forming colonies on upper parts of stems and upper leaves. Ivanoskaya (1977) recorded it from *Tragopogon orientalis*. Very common through Europe and east across Russia to W Siberia, and introduced to N America. Mon. hol., with ovip. and al. males produced in Sept–Oct. 2n=10.

***Uroleucon (Lambersius) coloradense* Robinson**

Color of apt. in life unknown; BL 2.6–2.8 mm. On *Eriogonum flavum* (Polygonaceae) in Colorado, USA. The host plant is unusual for the genus and needs to be verified by further collections.

***Uroleucon (Uromelan) compositae* (Theobald)**

Plate 28f

(= *Dactynotus orientalis* Kulkarni; Chakrabarti and Medda, 2004)

Apt. shining very dark red to almost black, with black SIPH and cauda; BL 1.9–4.1 mm. On flower-stems, and in low numbers along the mid-ribs of the leaves, of a wide range of Compositae in tropical and subtropical climates, particularly plants growing in moist or shady situations at the end of the dry season. A pest of *Carthamus tinctoria* (safflower) in India (Blackman and Eastop, 2000), and common on herbaceous *Vernonia* after the rains in Africa (Eastop, 1958). Sometimes found on non-composite plants such as *Malva* and *Morus*. Widely distributed in Africa and on the Indian subcontinent, also recorded from Sicily, Réunion, Mauritius, Taiwan and S America (Brazil, Surinam). Not known from SE Asia, although in Java its role as a general composite feeder seems to be taken over by the closely related *U. vernoniae*. Apparently anhol. everywhere, but difficult to distinguish from the E Asian species *U. gobonis*, and it could possibly be an anhol. form of that species. Early African and Indian records of *U. jaceae* and *U. solidaginis* on *Carthamus* should probably all be referred to *U. compositae*. In S and E Africa (Malawi, Tanzania, Zimbabwe) a form that feeds specifically on *Vernonia* is regarded as a subspecies, *U. compositae ssp. evansi* (Eastop). 2n=12.

***Uroleucon (Lambersius) crepusisiphon* (Olive)**

Apt. deep green with blackish ANT, legs and SIPH, and a dusky-dark cauda; BL 1.7–2.3 mm. On *Aster* spp. in eastern USA (Michigan, New York, N Carolina). Falls readily from plant when disturbed (Moran, 1985). Records of *U. ambrosiae* on *Aster* in northern N America are probably this species.

***Uroleucon dalmaticum* Holman**

Apt. reddish to blackish brown with pale tibiae and whitish or yellowish cauda; BL 1.9–2.9 mm. On undersides of leaves and sometimes in inflorescences of *Inula verbascifolia* in Croatia (Dalmatia).

***Uroleucon debile* (Takahashi)**

Apt. dirty green, somewhat pinkish, with black SIPH and dusky green cauda; BL c.2.6 mm. On stems of *Lactuca debilis* in Taiwan.

***Uroleucon deltense* Robinson**

Apt. dark red, with dark brown SIPH and pale cauda; BL 2.7–3.3 mm. On *Lactuca pulchella* in Manitoba, Canada. Al. unknown.

Uroleucon doellingeriae Pashtshenko

Apt. brown; BL c.4mm. On *Aster* (*Doellingeria*) *scaber* in E Siberia (Pashtshenko, 2000a).

Uroleucon (Uromelan) daronici (Börner)

Apt. green, shining, with dark apices to segments of ANT and legs, and black SIPH and cauda; BL 2.6–5.0 mm. On flower stems and undersides of young leaves of *Doronicum* spp. in N and C Europe. Mon. hol., with ovip. and al. males in Sept–Oct in N Germany (Thieme and Gottschalk, 1989).

Uroleucon dubium (Holman)

Apt. green to brownish green, BL 2.3–3.25 mm. In dense colonies on terminal parts of shoots of *Artemisia gmelinii* in Mongolia. Presumably mon. hol.; ovip. were collected in July, along with apt. and al. vivip., and apt. vivip. were also found in August (Holman, 1975). Collections at two separate localities suggest that *A. gmelinii* is the true host, although an unusual one for this group.

Uroleucon (Uromelan) echinatum (Kulkarni)

Apt. color in life not recorded; BL 2.3–3.0 mm. On *Echinops echinata* (recorded as '*Echinus echinatus*') in Maharashtra, India. [The original description did not discriminate this species from *U. compositae*, but S. Chakrabarti (pers. comm.) has examined type material of this species and found that ANT and dorsal abdominal hairs are shorter than originally reported, and too short for *compositae* (hairs on ANT III are 26–31 μ m, c.0.5 \times BD III; hairs on ABD TERG 3 are 47–59 μ m, 0.9–1.0 \times BD III – note that these measurements were by mistake reversed in the key by Chakrabarti and Medda, 2004).]

Uroleucon elbursicum Lampel and Rezwani

Apt. blackish brown, with pale cauda; BL 2.7–3.3 mm. In inflorescences of *Inula thapsoides* in Iran. Lampel and Rezwani (orig. descr.) tabulated the differences from related species.

Uroleucon elephantopola Robinson

Apt. dark, probably brown, but color unrecorded, BL 1.5–1.8 mm. On undersides of leaves, flower stalks and inflorescences of *Elephantopus* in USA, described from specimens collected on *E. carolinianus* in Illinois (Robinson, 1985), and subsequently found in Florida (Halbert *et al.*, 2000).

Uroleucon (Uromelan) ensifoliae Holman

Apt. dark reddish brown with black ANT, SIPH and cauda; BL 3.0–4.6 mm. On undersides of leaves of *Inula* spp. in E Europe (Slovakia, Moravia, Crimea).

Uroleucon (Uromelan?) eoessigi (Knowlton)

Apt. reddish-brown to maroon, with appendages mainly black; BL 2.2–3.3 mm. On stems and leaves of *Althaea rosea* in western and northern USA, and W Canada. Mon. hol. with apt. males. Knowlton (orig. descr., as *Macrosiphum*) gave a full account of the life cycle in Utah.

Uroleucon epilobii (Pergande)

Apt. brown or green with mainly dark appendages (orig. descr.); BL c.2.7 mm. On leaves and stems of *Epilobium angustifolium* and *Epilobium* sp. in N America (Kansas, Colorado). The Colorado aphids (Gillette and Palmer, 1934) differed in color from orig. descr. The generic position is possibly incorrect.

Uroleucon (Lambersius) erigeronense (Thomas)

Plate 28g

Apt. yellowish green with darker spinal stripe or uniformly pale green, SIPH dark distally with pale bases; BL 2.3–2.8 mm. On upper parts of stems of *Conyza* and *Erigeron* spp., and in S America it has also been found on plants in several other composite genera incl. *Aster*, *Baccharis*, *Haplopappus*, *Heterotheca*, *Grindelia* and *Lactuca*. Of N American origin, introduced to C and S America, and to Europe, where it has spread eastward to Kazakhstan. It was also recently found in Korea on *Erigeron* spp. and *Chrysanthemum lineare* (Lee *et al.*, 2002c). In the western palaeartic it has only been recorded from *Conyza canadensis*. Mon. hol. with ovip. and al. males in Sept–Oct in north temperate regions. Possibly the name is being applied to a complex of species in N America, of which *U. escalantii* (Knowlton), described from *Chrysothamnus nauseosus*, is a probable member. 2n=12.

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Uroleucon essigi Carvalho

Apt. color in life unknown, BL 2.0–2.4 mm. On *Baccharis* sp(p). in Coquimbo Province, Chile (Carvalho *et al.*, 1998).

Uroleucon eumadiae Delfino and Gonzales

Apt. shining green; BL 2.0–3.1 mm. On flowerheads and stems of *Madia* spp. in Chile (Delfino and Gonzales, 2005).

Uroleucon eupatoricolens (Patch)

Apt. dull reddish, with black SIPH and a pale cauda; BL 3.1–4.9 mm. On stems of *Eupatorium* spp. in north-eastern USA and E Canada. Al. males were collected in late August in New Brunswick (MacGillivray, 1968).

Uroleucon (Uromelan) eupatorifoliae (Tissot)

Apt. dull dark green mottled with paler areas, with ANT and legs mainly dark brown to black, SIPH black and cauda dark green; BL c.2.2–2.4 mm. Described from *Eupatorium incarnatum* in Florida, and also recorded from more northerly states in eastern USA. Sexual morphs were collected in Dec in Florida. [*Siphonophora eupatorii* Williams, described from *Eupatorium ageratoides* (= *rugosum*) in Nebraska and currently placed in *Macrosiphum*, could not be distinguished from *Uroleucon eupatorifoliae* on the basis of the original description, and is possibly an earlier name for Tissot's species.]

Uroleucon fagopyri Chowdhuri, R.C. Basu, Chakrabarti and Raychaudhuri Figure 28b

Apt. greenish brown; BL 3.2–3.7 mm. On *Fagopyrum cymosum* in NW India. Presumably mon. hol.; the ovip. (from an unidentified host plant, but collected with apt. vivip.) was described by Raychaudhuri *et al.* (1980).

Uroleucon floricola Robinson

Apt. dark brown with dark SIPH and cauda; BL 1.6–2.4 mm. In flowers of *Aster* sp. in Pennsylvania, USA.

Uroleucon formosanum (Takahashi)

Apt. shining red–brown with a broad black ‘saddle’, black SIPH and a pale yellow cauda; BL 2.4–3.1 mm. On stems, and on undersides of leaves along midribs, of *Lactuca* and related genera in E Asia (Japan, Korea, China, Taiwan, E. Siberia). Apt. specimens from *Crepis japonica* in India (W Bengal) differ in having fewer secondary rhinaria and fewer caudal hairs and were described as *U. formosanum* ssp. *crepidis* A.K. Ghosh, M.R. Ghosh and Raychaudhuri. 2n=12.

Uroleucon fuchuense (Shinji)

Apt. shining salmon red to reddish brown, with cauda concolorous with body, BL 2.5–3.8 mm. On flower stems of *Aster* spp., especially *A. scaber*, and also recorded from *Pterocypsela raddeana* (Moritsu, 1958), *Cacalia hastata* and *Saussurea grandifolia* (Lee *et al.*, 2002c). In Japan, Korea and E Siberia.

Uroleucon fuscaudatum Chakrabarti and Raychaudhuri

Color of apt. in life unrecorded; BL 2.0–2.6 mm. On *Inula rubricaulis* in N India (U.P.). 2n=12.

Uroleucon garnicai Delfino

Apt. brown with black SIPH and a pale/dusky cauda; BL 1.9–2.7 mm. Al. have 8–14 rhinaria on ANT segment III. On *Eupatorium buniifolium* in Argentina (Córdoba, Tucumán).

Uroleucon (Uromelan) giganteum (Matsumura)

Apt. large, shining very dark red, with appendages all black except for bases of femora; BL 4.0–4.3 mm. On *Cirsium* spp., and also recorded from *Dendranthema*, *Saussurea lyrata* and *Serratula wolffii*. In Japan, Korea and E Siberia.

Uroleucon gigantiphagum Moran

Apt. red–brown to dark brown, ANT and SIPH black, legs banded with black, cauda pale; BL 2.9–3.4 mm. On *Solidago gigantea* and *S. juncea* in Michigan, USA. Paratypes in the BMNH colln are not clearly separable from specimens identified as *U. nigrotuberculatum* or *U. pieloui*.

Uroleucon (Uromelan) gobonis (Matsumura)

Apt. shining greenish black to black, with black ANT, SIPH and cauda, and legs with femora mainly black and tibiae mainly yellow–brown; BL 2.3–3.6 mm. On upper stems and leaves of various Compositae, especially *Arctium*, *Atractylodes*, *Carthamus* and *Saussurea*. Also can occur on *Cirsium* (BMNH colln), but many records of *U. gobonis* from this host in E Asia are probably referable to *U. cephalonopli*. In Japan, Korea, China, Mongolia, E Siberia and Taiwan. Mon. hol. with al. males in Japan, but anhol. overwintering also occurs, and reproduction in Taiwan is exclusively parthenogenetic (Takahashi, 1923). *U. compositae* is possibly an anhol. form of *U. gobonis*, as there are no clear morphological discriminants between these two species. $2n=12$.

Uroleucon gochnatiae Delfino

Apt. dark green with black head, ANT, legs, SIPH and cauda; BL 1.9–2.5 mm. On *Gochnatia glutinosa* in Argentina (Tucumán), colonising terminal leaves.

Uroleucon (Lambersius) gravicorne (Patch)

Figure 49b

Apt. green with dark brown appendages, except for pale cauda and bases of SIPH; BL 1.6–2.4 mm. On various Compositae, especially species of *Erigeron* and *Solidago*, but also recorded from *Aster* spp. and *Chrysanthemum leucanthemum* (Olive, 1963). In Michigan, it is common on *Erigeron* spp. in Jun–Aug, but *Solidago* spp. are the more common hosts in spring and autumn (Moran, 1985). Widely distributed in N America, and also now in C and S America (Carvalho *et al.*, 1998). *U. canadense* Richards is probably a synonym. Ovip. and al. males in Oct–Nov. $2n=12$.

Uroleucon gredinae Pashtshenko

Apt. black with dark brown appendages, basal parts of ANT and femora paler; BL c.3.1 mm. On upper parts of *Campanula* sp. in E Siberia (Pashtshenko, 2000a). It is not clear how this species differs from *U. cichorii*.

Uroleucon grossum (Hille Ris Lambers)

Apt. shining metallic brown with dark ANT, legs and SIPH, and yellow cauda; BL 2.8–4.9 mm. On upper parts of stems of *Crepis* spp. in Europe, W Siberia, C Asia and Mongolia. Mon. hol. with ovip. and al. males in Europe at end of Aug (Heie, 1995). Further work is needed to confirm its distinction from *U. cichorii* (q.v.). $2n=12$.

Uroleucon hasanicum Pashtshenko

Apt. shining black with pale middle sections of tibiae and pale cauda; BL c.4.4 mm. Al. undescribed. On shoot apices and flower-shoots of *Pterocypsela indica* (Pashtshenko, 2000a). E Siberia (Primorskii).

Uroleucon (Uromelan) helenae (Hille Ris Lambers)

Apt. shiny black with a bronze tinge, BL 1.7–2.6 mm. In large, rather diffuse colonies on stems of *Carlina vulgaris* (Stroyan, 1957b) in Europe (Croatia, Czech Republic, France, Italy, Switzerland, UK). Sexual morphs unknown.

Uroleucon (Uromelan) helianthicola (Olive)

Apt. reddish brown with black appendages, including SIPH and cauda; BL 2.4–3.5 mm. On *Helianthus* spp., especially wild perennial species (Rogers *et al.*, 1978). Widespread in USA. Sexual morphs unknown. $2n=12$.

Uroleucon hieracicola (Hille Ris Lambers)

Apt. bronzy brown, with black SIPH and pale cauda; BL 2.9–3.5 mm. On flower-heads of *Hieracium canadense* in Canada (B.C., Manitoba, Ontario, Québec). Closely related to, and with little to distinguish it from, *U. ambrosiae*.

Uroleucon (Uromelan) hieracioides (Bozhko)

Apt. greenish brown, with black ANT, SIPH and cauda; BL c.2.9 mm. On *Hieracium* sp. in Ukraine.

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Uroleucon hymenocephali Rezwani and Lampel

Apt. matt grayish brown, with dark brown to blackish tibiae and SIPH; BL 2.6–3.2 mm. On *Hymenocephalus rigidus* in Iran.

Uroleucon hypochoeridis (Hille Ris Lambers)

Apt. brown or reddish brown with black ANT and SIPH; BL 2.8–4.4 mm. On upper parts of flowerstalks of *Hypochoeris* spp., and occasionally also on *Crepis*, *Leontodon* and *Taraxacum*. Widely distributed in Europe, although records may be confused with other similar species, especially *U. cichorii*. Mon. hol., with ovip. and al. males in late August–Sept. 2n=12.

Uroleucon hyssopii Narzikulov and Daniarova

Apt. brown; BL c.3.2 mm. On stems and leaves of *Hyssopus seravschanica* (Labiatae) in Tajikistan. Mon. hol. with ovip. and al. males in late Oct (orig. descr.).

Uroleucon (Lambersius) idahoensis (Miller)

Apt. pale green to creamy white, with brown ANT, legs and SIPH and a green cauda; BL c.2.3 mm. On leaves and flower stems of *Anaphalis* spp. (*margaritacea*, *subalpina*) in N America. Recorded from Idaho, Colorado (Palmer, 1952), New York (Leonard, 1963) and New Brunswick (BMNH colln, leg M.E. MacGillivray). Life cycle and sexual morphs are not recorded.

Uroleucon (Uromelan) illini (Hottes and Frison)

Apt. lemon yellow, bright green or red, with dark tips to ANT, femora and tibiae, and dark SIPH and cauda; BL c.2.7 mm. On both wild and cultivated *Helianthus* spp. in eastern USA and Canada. Ovip. and al. males in Oct (Hottes and Frison, 1931). 2n=12*.

Uroleucon impatiensicolens (Patch)

Apt. reddish brown to bronze–brown with black SIPH and pale cauda; BL 2.5–3.6 mm. On *Impatiens* spp. in north-eastern N America. Apt. and al. were redescribed by MacGillivray (1968).

Uroleucon (Belochilum) inulae (Ferrari)

Apt. grass-green, with dusky appendages; BL 2.7–3.5 mm. On flower stems and undersides of leaves of *Dittrichia* (= *Inula*) *viscosa*, and possibly related species, in S Europe and throughout the Mediterranean region, from Portugal to Lebanon. Life cycle apparently not studied. 2n=12*.

Uroleucon inulicola (Hille Ris Lambers)

Apt. brown, reddish black or dark bronze, with entirely black ANT, black SIPH and a rather dusky cauda; BL 2.4–4.7 mm. On *Inula* spp. in Europe, W Siberia and C Asia. Holman (1981c) compared several samples of this species and described regional differences, the range of variation encompassing specimens from Sweden that had been described as a subspecies (*hirticornis* Ossiannilsson). Ovip. were described from Sweden (Ossiannilsson, 1959, as ssp. *hirticornis*).

Uroleucon iranicum Holman

Apt. ‘presumably dark brown or reddish brown’, with blackish SIPH and a pale cauda; BL 2.3–3.1 mm. On *Gundelia tournefortii* in Iran, colonising the apical part of the stem. First tarsal segments are unusual for a *Uroleucon* in having only 3 hairs.

Uroleucon ivae Robinson

Apt. dark green to brown, appearing almost black; BL 3.0–3.8 mm. On *Iva xanthifolia* in N America (Manitoba, Colorado, Utah). Ovip. and al. males in Sept in Manitoba (orig. descr.). Some records of *U. ambrosiae* on *Iva* may be this species, although *U. ambrosiae* does also colonise *Iva*.

Uroleucon (Uromelan) jaceae (L.)

Apt. reddish brown or blackish brown, often shiny, with black ANT, SIPH and cauda; BL 2.8–4.7 mm. On upper parts of stems of *Centaurea* spp. in Europe, Middle East, C Asia and Pakistan, with occasional records from other composite genera, and sometimes also on certain Boraginaceae. Mon. hol. with ovip. and al.

males in late Sept in NW Europe. Apt. of *U. jaceae* on *Centaurea nigra* have sec. rhin. usually confined to basal half of ANT segment III, whereas on other *Centaurea* spp., and on *Carlina* and *Carthamus* spp. in southern Europe, sec. rhin. extend to 60–70 per cent of the length of the segment, possible because apt. tend to be more alatifform on less favorable hosts. The name may however being applied to a group of closely related species with more specific host associations. Börner (1950) described populations on *C. scabiosa* as a subspecies, *U. jaceae* ssp. *henrichi*, but his discriminants do not hold for all populations (e.g., see Heie, 1995). Most if not all records of *U. jaceae* from *Carduus* and *Cirsium* may be referable to *U. aeneum*.

***Uroleucon jaceicola* (Hille Ris Lambers)**

Apt. dark bronze–brown, with black ANT and SIPH, mainly yellow legs and a yellow cauda; BL 2.9–3.3 mm. On stems of *Centaurea nigra*, found mainly low on stem in spring and later on upper parts. In western Europe (Netherlands, UK). A population with fewer caudal hairs and fewer sec. rhin. on *Centaurea* sp. (?*paniculata*) in Italy was described as *U. jaceicola* ssp. *pasqualei* Hille Ris Lambers and Stroyan. Ovip. and apt. males of *U. jaceicola* s.str. were found on petioles of radical leaves in Oct (Hille Ris Lambers, 1939 and J.H. Martin, pers. comm). 2n=12.

***Uroleucon kamtshaticum* Pashtshenko**

Apt. shining brown; BL c.3.9 mm. On upper parts of *Aster* (two different unidentified spp., possibly the normal hosts?), with single apt. collected from *Achillea* sp. and *Picris kamtshatica* (Pashtshenko, 2000a). E Siberia (Kamchatka).

***Uroleucon kashmiricum* (Verma)**

Apt. shiny dark reddish brown to black, with SIPH black and cauda and middle parts of tibiae yellowish brown; BL 1.5–2.8 mm. On stems and young terminal leaves of *Campanula* spp. in Tajikistan, Afghanistan and N India. Records from Compositae need further confirmation. Mon. hol. on *C. incanescens* in Tajikistan (Holman, 1974a, as *U. narzykulovi*), but sexual morphs not described.

***Uroleucon katonkae* (Hottes)**

Apt. green with dusky to dark brown appendages, cauda and bases of SIPH dusky yellow; BL c.2.7–2.9 mm. On leaves of *Aster laevis* and *Brickiella grandiflora* in western USA. Ovip. and apt. males in Oct.

***Uroleucon kikioense* (Shinji)**

Apt. shiny reddish black, with black SIPH, legs bicolored yellow and black, and a yellow cauda; BL c.2.2 mm. On flower stems and undersides of leaves of Campanulaceae (*Adenophora*, *Campanula*, *Platycodon*) in Japan (Moritsu, 1983), Korea (Lee *et al.*, 2002a) and E Siberia. Pashtshenko (2001) provided a redescription. Mon. hol. on *Platycodon grandiflorum* in Korea (Lee *et al.*, 2002a).

***Uroleucon kumaoni* Banerjee, A.K. Ghosh and Raychaudhuri**

Apt. blackish; BL c.4.1 mm. Immatures grayish white. On undersides of young leaves, apical shoots and basal parts of flower stems of *Cirsium veratum* (= *Cnicus argyranthus*) and *Tricholepis furcata* in NW India). It was apparently visited by a red ant (Banerjee *et al.*, 1969). Also recorded from *Saussurea albescens* and *Tricholepis stewartii* in Pakistan (Naumann-Etienne and Remaudière, 1995). Apart from differences of pigmentation and chaetotaxy of the cauda, the description agrees closely with *U. (Uromelan) gobonis*.

***Uroleucon lactucicola* (Strand)**

Apt. shining very dark reddish brown to black except for pale ANT III and basal part of IV, pale basal halves of femora and middle parts of tibiae; BL 2.3–3.2 mm. Imm. red. On stems of *Solidago* spp., and also recorded from certain other Compositae (*Aster maackii*, *Cirsium maackii*, *Ixeridium dentatum*, *Ixeris chinensis*, *Lactuca oldhami*). E Asia (China, Korea, Japan, Taiwan, E Siberia). Ovip. and al. males were found in Nov in China (Tseng and Tao, 1938).

***Uroleucon lanceolatum* (Patch)**

Apt. (usually alatifform) dark red to reddish brown with black ANT and SIPH, legs mainly dark except for femoral bases, cauda pale; BL 2.2–3.5 mm. Al. usually have forewings with media only once-branched. On

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Solidago spp., usually *graminifolia* (= *lanceolata*), in north-eastern USA and Canada. An al. male was collected in late Aug. MacGillivray (1968) redescribed this species.

***Uroleucon leonardi* (Olive)**

Apt. dark brown to almost black, with black SIPH and pale yellow cauda; BL 2.4–3.6 mm. On *Rudbeckia* spp., especially the hairier ones (Moran, 1985), in central and north-eastern USA and E Canada. Life cycle not recorded. Very similar to *U. ambrosiae*, and early N American records of that species from *Rudbeckia* are probably mostly *leonardi*.

***Uroleucon leontodontis* (Hille Ris Lambers)**

Apt. shining brown with black ANT and SIPH and yellow cauda; BL 3.2–4.3 mm. On *Leontodon* spp. in Europe. Described as a subspecies of *U. cichorii*, this aphid has a long narrow R IV+V similar to that of *U. picridis*, and specimens in the BMNH collection are not clearly distinguishable from the latter species, except by the less frequently developed marginal abdominal tubercles, which could be related to the host on which the aphids develop. Experimental work is needed to confirm its distinctness from *U. picridis*.

***Uroleucon leontopodiicola* Lee, Holman and Havelka**

Apt. color in life unrecorded; BL 2.9–3.6 mm. On *Leontopodium coreanum* in Korea (Lee *et al.*, 2002a).

***Uroleucon (Lambersius) longirostre* (Gillette and Palmer)**

Apt. pale green with tips of ANT, legs and SIPH dusky, and cauda pale to dusky; BL 2.0–3.0 mm. On *Cirsium filipendulum* in western USA (Colorado).

***Uroleucon longisetosus* Chakrabarti and Verma**

Apt. dark brown; BL 2.7–2.8 mm. On growing shoots of *Lactuca* and *Prenanthes* spp. in N India (H.P., U.P.). Al. was described by Chakrabarti and Medda (2004). Mon. hol., with ovip. and apt. males in Oct (orig. descr.). 2n=10.

***Uroleucon (Lambersius) luteolum* (Williams) (= *tissoti* Boudreaux)**

Apt. shining green or yellow with black ANT and legs, SIPH black with pale basal fifth, and a pale cauda; BL 2.3–3.5 mm. Common on *Solidago* spp. in eastern and south-eastern USA, west to Kansas and Nebraska; uncommon further north in Michigan, Ontario and Québec (Robinson, 1986). Also recorded from *Aster*, *Conyza* and *Erigeron*, but some of the records may be misidentified other species (*erigeronense*, *gravicorne*, *macgillivrayae*). Ovip. and al. males occur on *Solidago* in Sept–Oct (Olive, 1963). 2n=12.

***Uroleucon (Lambersius) macgillivrayae* (Olive)**

Apt. shining deep green with black appendages; BL 1.7–3.0 mm. On *Aster*, *Conyza* and *Erigeron* in E Canada (orig. descr.) and north-eastern USA (Illinois, Washington DC; BMNH colln). Very similar to, and possibly synonymous with, the western N American species *U. breviscriptum* (Palmer). At least some of the records of *U. tissoti* (= *U. luteolum*) from *Aster*, *Conyza* and *Erigeron* may be referable to this species, which is very similar but has a shorter R IV+V. However, some specimens from Michigan collected from *Conyza canadensis* and identified as *macgillivrayae* (BNHM, leg. N. Moran) differ by characters given in the key, and may be a distinct species.

***Uroleucon macolai* (Blanchard)**

Apt. very variable in color, usually yellow–brown to red–brown but sometimes green, with a darker spinal stripe, rather shiny; BL 2.1–3.5 mm. Immatures are red or yellow–green. On stems and young growth of *Baccharis salicifolia* and *B. polifolia* in Argentina, Bolivia and Chile. Ovip. and al. males from Argentina were described by Remaudière *et al.*, 1992). Records from other plant genera (Carvalho *et al.*, 1998) are probably in error. 2n=12*.

***Uroleucon (Uromelan) macrosiphon* Hille Ris Lambers**

Apt. dark reddish to blackish brown; BL 3.4–3.9 mm. On thistles (*Carduus*, *Carlina*, *Cirsium*) in alpine habitats in Austria and N Italy. Biology unknown. A member of the *U. jaceae* group, and originally described as a subspecies.

Uroleucon (Lambersius) madia (Swain)

Al. dark green, slightly pruinose (color of apt. unrecorded); BL of apt (BMNH colln) 2.5–3.4 mm. On flowerheads of *Madia sativa* in California, USA.

Uroleucon (Lambersius) manitobense Robinson

Apt. green; BL 2.1–2.5 mm. On *Aster* sp. in Manitoba, Canada

Uroleucon martini (Cockerell)

Apt. shining dark wine-red, with long black SIPH; BL 2.6–3.3 mm. Immatures have a bluish waxy bloom. Al. have numerous sec. rhin. (at least 40) on ANT III. On flowerheads of *Helenium hoopesii* in New Mexico, USA (Cockerell, 1903). The species has not been recognised since. Apparently the same aphid was collected from numerous other plants in the type locality (*Rudbeckia*, *Frasera*, *Zigadenus*, *Eriogonum*, *Potentilla*, and *Ligusticum*), but these records may have been partly due to confusion with other species. [A slide of apt. and imm. collected in 1902 from *Helenium* in the type locality and labelled as '*Nectarophora martini*' was sent to BMNH by Cockerell; these specimens seem to be *Macrosiphum kiwanepum*, so Cockerell's description may include that species.]

Uroleucon maximilianicola Robinson

Apt. dark wine-colored to almost black; BL 2.6–3.4 mm. On *Helianthus maximiliani* in Manitoba, Canada. Very closely related to, and perhaps synonymous with, *U. ambrosiae*.

Uroleucon miera Tizado and Neito Nafria

Apt. dark, shiny, reddish brown with black ANT and SIPH, and legs also mainly black; BL 2.5–3.8 mm. Mon. hol. (with dark green al. males) on *Andryala* spp., and also recorded from *Hispidella hispanica* (orig. descr.) and *Rhagadiolus stellatus* (BMNH colln, leg. H.L.G. Stroyan). This species closely resembles *U. picridis*, but has a lower range of values of R IV+V, and in some published works it will key to *U. cichorii*; therefore some records of both *U. cichorii* and *U. picridis* in the Mediterranean area may apply to this aphid. In Spain, Algeria, France, Corsica, Sicily and Croatia (Korčula).

Uroleucon (Uromelan) minor (Börner)

Apt. brown with black dorsal spots, legs yellow banded with black, ANT, SIPH and cauda black; BL 2.6–4.5 mm. Originally found on *Tanacetum corymbosum*, but the normal host seems to be *Serratula tinctoria*. Europe (Austria, Czech Republic, France, Hungary, Sweden, Wales). Differences from *U. jaceae* could be host plant-related (Stroyan, 1991).

Uroleucon (Uromelan) minosmartelli Barbagallo and Patti

Apt. shiny dark brown with black ANT, SIPH and cauda, legs bicolored ochreous and black; BL 1.3–2.25 mm. On *Campanula* spp. that live in rocks and walls, colonising leaves (especially on upper sides along basal part of mid-rib) and flower stems. Described from Italy, where it is apparently anhol., at least in the south (orig. descr.), and also found in former Yugoslavia (BMNH colln, leg. H.L.G. Stroyan).

Uroleucon (Uromelan) minutum (van der Goot)

Apt. shiny dark reddish brown to blackish brown with black ANT, distal parts of femora and tibiae, SIPH and cauda; BL 1.9–2.1 mm. Sec. rhin. in al. III c.8–10. On shoot apices and undersides of leaves of *Veronica cinerea* in S India and Sri Lanka. Anhol. (David, 1956, as *dravidiana*). A record of *Macrosiphoniella sanborni* on *V. cinerea* (George, 1927) should probably be referred to this species.

Uroleucon mongolicum Holman

Apt. reddish brown with dark antennae and SIPH, pale tibiae and cauda; BL 2.3–3.6 mm. On undersides of leaves of *Serratula centaureoides* and *Serratula* sp. in Mongolia). Also recorded from *Centaurea monanthos* in Korea, and Pashtshenko (2000a) described a population on *Carduus* sp. in E Siberia as a subspecies, *U. mongolicum* ssp. *cardui*.

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Uroleucon (Uromelan) montanivorum Mosbacher

Apt. blackish brown, with a rather metallic sheen; BL 3.6–4.4 mm. On apical leaves and shoots of *Centaurea montanum* in southern Germany. Ovip. and al. males in late Aug–Sept. Mosbacher (1959) gave a full morphological and biological description.

Uroleucon monticola (Takahashi)

Apt. shiny green, dusky around bases of SIPH, with distal halves of femora and tibiae brown–black, black SIPH and a contrastingly pale yellow cauda; BL c.2.6 mm. On *Aster* and *Erigeron* in Japan, Taiwan, China and Korea (all the Japanese specimens from several localities were collected from *Aster ageratoides* var *semiamplexicaulis*; Miyazaki, 1971).

Uroleucon mulgedii (Nevsky) (= *Uroleucon altaicum* Szelegiewicz)

Apt. pale yellow–green or reddish brown, with SIPH dark only at apices; BL 2.6–3.2 mm. On *Mulgedium tataricum*, feeding on petioles and upper surfaces of leaves, and on stems and in inflorescences, dropping readily when disturbed. C Asia (Uzbekistan), Ukraine (Bozhko, 1976a), Bulgaria (Tashev, 1967, as *Macrosiphum mulgedifolii*), and also recorded from *Cichorium intybus* in Mongolia (Szelegiewicz, 1982, as *U. altaicum*, the description of which agrees closely with the redescription of Nevsky's species by Holman, 1991a).

Uroleucon murale (Buckton)

Apt. reddish brown with black SIPH and yellow cauda; BL 2.1–3.2 mm. On upper parts of stems and in inflorescences of *Lactuca* spp. (*muralis*, *quercina*) and also recorded from *Crepis* spp. (Nieto Nafría *et al.*, 1999). In Europe, eastward to Poland and S. Russia (Heie, 1995). N American records are probably erroneous (Robinson, 1985). Mon. hol., with sexuals in July–Sept in Sweden (Ossiannilsson, 1959). A specimen in the BMNH colln contains an internal cecidomyid parasitoid (?*Endaphis* sp.).

Uroleucon (Uromelan) neocampanulae (Takahashi)

Apt. brownish black with black ANT, SIPH and cauda, legs bicolored yellowish and black; BL 2.5–3.0 mm. On stems of *Campanula* spp. and *Platycodon grandiflorum* in Japan, and E Siberia (Pashtshenko, 1988a).

Uroleucon (Lambersius) nevadense Robinson

Apt. shining dark green with ANT, legs and SIPH mainly black; BL 1.1–1.3 mm. On *Brickellia microphylla* in Nevada, USA.

Uroleucon (Uromelan) nigrocampanulae (Theobald)

Apt. dark brown with black ANT, SIPH and cauda, and bicolored yellowish and brown–black legs; BL 2.7–4.0 mm. On *Campanula* spp., feeding on the leaves and causing them to become curled in spring, and later spotted with yellow. Sexual morphs are apparently unrecorded. In Europe and across Asia to E Siberia (Pashtshenko, 1988a). Very similar to *U. rapunculoides*.

Uroleucon nigrotibium (Olive)

Apt. red–brown, with black ANT, legs and SIPH, and pale cauda; BL 1.9–2.2 mm. Described from an unidentified *Solidago* sp. in N Carolina, and recorded as host-specific on *Solidago nemoralis* in Michigan, where long-lived populations consist mainly of apt. that walk frequently between plants (Moran, 1986).

Uroleucon nigrotuberculatum (Olive)

Apt. dull orange–red with dark ANT, legs and SIPH, and pale cauda; BL 2.4–4.3 mm. Mon. hol. on *Solidago* spp. in N America, and introduced to Japan, where shortly after introduction it was found on plants in several composite genera (*Callistephus*, *Chrysanthemum*, *Helianthus*, *Rudbeckia*, *Zygadenus*), and on *Oenothera erythrocephala* (Sugimoto and Matsumoto, 2000). Many of the records of *U. ambrosiae* on *Solidago* should probably be referred to this species. *U. pieloui* and *U. gigantiphagum* are very similar, seeming to differ only in the degree of leg pigmentation and/or sporadic occurrence of marginal abdominal tubercles, and may transpire to be synonyms. $2n=12$.

Uroleucon (Lambersius) nodulum (Richards)

Color of apt. in life unknown, probably green with black ANT, legs and SIPH and a pale cauda; BL c.2.0–2.2 mm. On *Aster* sp. in Ontario, Canada.

Uroleucon obscuricaudatum (Olive)

Apt. red–brown to reddish, with dark SIPH and dusky brown cauda; BL 2.7–3.4 mm. On *Helianthus strumosus* and *Heliopsis heianthoides* in north-eastern USA and Canada (Robinson, 1985).

Uroleucon obscurum (Koch)

Apt. reddish brown to bronze with black SIPH and yellow cauda; BL 2.2–3.7 mm. On upper parts of stems of *Hieracium* spp. in Europe, south to Spain (Nieto Nafría and Mier Durante, 1985) and eastward to Russia, and C Asia. There was early confusion with *U. picridis*; records of *picridis* from *Hieracium* are probably all or mostly referable to this species. Ovip. and al. males are produced over an extended period from late July–Sept in NW Europe (Ossiannilsson, 1959).

Uroleucon ochropus (Hille Ris Lambers)

Apt. probably red–brown; BL c.2.9 mm. Described from *Chrysanthemum leucanthemum* (= *Leucanthemum vulgare*); later found in large colonies on *Lactuca perennis* (Hille Ris Lambers, 1966b), and also recorded from *Mulgedium plumieri* (BMNH colln, leg. R. Stäger). In Italy, Switzerland and Germany.

Uroleucon olivei Moran

Apt. deep red with black ANT and SIPH, mainly black legs and a pale cauda; BL 2.2–3.8 mm. On stems of *Aster* spp., forming especially large colonies on *A. simplex*, and also recorded in mid to late summer from *Erigeron annuus* and *Solidago graminifolia* (Moran, 1985). In eastern USA and Canada (Manitoba, Ontario). Many of the records of *U. ambrosiae* from *Aster* in eastern North America should probably be referred to this species.

Uroleucon (Uromelan) omeishanense Tao

Apt. yellowish green with black tibiae, SIPH and cauda; BL c.2.8 mm. On *Artemisia capillaris* in Taiwan.

Uroleucon (Uromelan) orientale (van der Goot)

Apt. dark reddish brown to almost black, with black SIPH and brown cauda; BL 2.7–3.7 mm. In large colonies on undersides of leaves of *Blumea balsamifera* in SE Asia (Java, Borneo, Sarawak, Philippines). Redescribed by Calilung (1967).

Uroleucon (Uromelan) pachysiphon (Börner)

Color of apt. in life unrecorded, possibly reddish brown with black appendages; BL c.2.9–3.3 mm. On *Aster amellus* in C Europe (Germany, Czech Republic).

Uroleucon (Uromelan) parvotuberculatum (Olive)

Apt. green with dark brown appendages including SIPH and cauda; BL 2.1–2.6 mm. On *Helianthus atrorubens* in N Carolina, USA.

Uroleucon paucosensoriatum (Hille Ris Lambers)

Apt. bronzy brown, more reddish brown in region of SIPH, with black ANT and SIPH, black legs except pale basal halves of femora and pale cauda with dark tip; BL 1.9–3.6 mm. In inflorescences and on stems of *Aster* spp., especially (in Michigan) *A. umbellatus* (Moran, 1985). There is also a record from *Erigeron annuus* (Leonard, 1968). Ovip. and immature al. males were found in Maine in Sept (orig. descr.). In eastern USA and Canada. 2n=12.

Uroleucon (Lambersius) penderum Robinson

Apt. green with extreme apices of femora, ends of tibia and distal parts of SIPH dark brown; BL 1.8–2.7 mm. On *Grindelia integrifolia* on Pender I, B.C., Canada. 2n=12*. [Three other species of *Uroleucon* subgenus *Lambersius* have been collected on *Grindelia* spp. in western N. America; *U. richardsi* (q.v.), and two undescribed species close to *penderum* but distinguishable by the characters given in the key.]

THE APHIDS

Uroleucon pepperi (Olive)

Apt. dark red–brown to metallic black, BL 2.6–4.0 mm. On *Cirsium* spp. in western USA, and also recorded from *Centaurea dealbata*.

Uroleucon (Uromelan) phyteumae (Bozhko)

Apt. uniformly black, slightly shiny; BL 1.5–3.2 mm. On apical parts of *Asyneuma canescens*. Czech Republic and Ukraine. This aphid has large marginal tubercles on prothorax and ABD TERG 2–4 (Holman, 1969, as *asyneumatis*).

Uroleucon picridiphagum (Takahashi)

Apt. color in life unrecorded, probably dark brown; BL c.3.2 mm. On *Picris hieracioides* var. *japonica* in Japan. Closely related to *U. sonchi*, but with a slightly longer R IV+V and fewer hairs on cauda.

Uroleucon picridis (Fabricius)

Apt. dark shiny reddish brown, with black ANT and SIPH, legs brown-black except basal halves of femora yellow, cauda yellow; BL 2.6–3.7 mm. On *Picris* spp., forming colonies on stems just below flowers. Also recorded from other genera of liguliflorous Compositae (e.g., *Cichorium*, *Crepis*, *Hieracium*, *Ixeridium*, *Lactuca*, *Leontodon*, *Sonchus*), although some records are probably misidentifications of other species including, in the Mediterranean area, *U. miera* (q.v.). Europe, Middle East, W and E Siberia, Korea, China and Japan. Mon. hol. with ovip. and al. males in Oct.

Uroleucon pieloui (Richards)

Apt. dull red to dark brown, ANT and SIPH black, legs yellow–brown banded with black, cauda pale; BL 2.1–4.5 mm. On *Solidago*, with apparent specialisation on more pubescent spp. (Moran, 1985). In north-eastern USA and Canada. *U. gigantiphagum* is not clearly separable, and both are also very closely related to, if not synonymous with, *U. nigrotuberculatum* (q.v.).

Uroleucon pilosellae (Börner)

Apt. dark reddish brown with black SIPH and yellow cauda; BL 2.2–2.5 mm. On flower-stems of *Hieracium* spp. throughout Europe. Ovip. and al. males in Sept.

Uroleucon pseudambrosiae (Olive)

Apt. dark brown to red–brown with black ANT, legs and SIPH, and a pale cauda; BL 2.2–3.4 mm. Recorded from numerous genera and species of Compositae, but the most common hosts are *Lactuca* spp. (Olive, 1963). Records from *Aster* prior to 1985 are possibly referable to *U. olivei*. In eastern USA south to Florida, and in Canada (Manitoba, British Columbia). 2n=12.

Uroleucon pseudobscurum Hille Ris Lambers

Apt. very dark bronze, with black SIPH and pale yellow cauda; BL 2.5–3.2 mm. In large colonies on stems of *Hieracium* spp. in Italy, Hungary (BMNH, coll. V.F. Eastop), Kazakhstan (Kadyrbekov, 2003a) and also found in Japan (Miyazaki, 1971, as *picridis* on *Hieracium umbellatum*).

Uroleucon pseudomuermosum Carvalho

Apt. color in life unknown; BL 2.3–3.2 mm. On *Baccharis* sp(p). in Llanquihue prov., Chile (Carvalho *et al.*, 1998).

Uroleucon pseudotanaceti (Verma)

Apt. brown with black SIPH; BL 2.0–2.5 mm. Described from undersides of leaves of *Helianthus tuberosus* in NW India, and since found on plants in other composite genera (*Chrysanthemum*, *Cynoglossum*). Singh *et al.* (1980) found ovip. on *Chrysanthemum* sp. in Jan 2n=12.

Uroleucon ptarmicae (Bozhko)

Apt. brownish red with black SIPH and pale cauda; BL c.3.1 mm. In dense colonies on flower stems of *Achillea cartilaginea* (= *Ptarmica speciosa*) in Ukraine (Bozhko, 1976b).

***Uroleucon pulicariae* (Hille Ris Lambers)**

Apt. reddish brown with black SIPH and pale yellow cauda; BL 2.8–3.1 mm. On *Inula* spp. and *Pulicaria* spp. in Europe and C Asia, and also recorded from N Korea (Holman, 1981c).

***Uroleucon pyrethri* Holman**

Apt. brown, with SIPH slightly dusky, darker at base and apex, and a broad pale cauda; BL 3.2–4.0 mm. On *Pyrethrum macrophyllum*, feeding on undersides of leaves, especially lower ones, which tend to become yellow (orig. descr.). Russia (SW Georgia). Very similar to *U. tussilaginis*.

***Uroleucon (Uromelan) rapunculoidis* (Börner) (= *Dactynotus glomeratae* Börner)**

Apt. shiny dark brown with black ANT, SIPH and cauda; BL 3.0–3.9 mm. On stems and flowers of *Campanula rapunculoides* in Europe, and SW and C Asia. Ovip. were found in Oct in the Netherlands (Hille Ris Lambers, 1939). Very similar to *U. nigrocampanulae*.

***Uroleucon reynoldense* (Olive)**

Apt. dark orange-red; BL 1.6–2.2 mm. On *Coreopsis* spp. in eastern USA (N Carolina, Michigan). Also recorded from Jamaica on *Solanum torvum* (T. Hall, pers. comm.), but this is an unlikely host. 2n=12.

***Uroleucon (Lambersius) richardsi* Robinson**

Apt. green with ANT dark beyond base of III, distal parts of femora and whole of tibiae and tarsi dusky/dark, and SIPH dark on usually about distal 0.6 of length; BL 1.6–2.0 mm. On *Grindelia* spp. in western USA (Oregon, Utah) and Canada (Manitoba). Ovip. and apt. males in early Oct in Manitoba (Robinson, 1965). 2n=12.

***Uroleucon (Uromelan) riparium* (Stroyan)**

Apt. dark bronze–brown with black ANT, SIPH, cauda, tarsi, apices of femora and tibiae; BL 2.9–4.1 mm. Living in small colonies on the flower stems of *Crepis* spp. in NW Europe (Scotland, Sweden, Finland); in Finland also found on *Taraxacum* (Heie, 1995, citing Heikinheimo). Ovip. and al. males were found in late July in Finland.

***Uroleucon rudbeckiae* (Fitch)**

Apt. shiny bright orange–red to brick red with mainly blackish appendages, but with bases of SIPH distinctly paler, and pale/dusky cauda; BL 2.4–3.2 mm. Often in large colonies on stems of *Rudbeckia* spp. throughout N America. Records from other genera of Compositae are likely to be misidentifications. Mon. hol. with al. males. 2n=12.

***Uroleucon (Uromelan) rurale* (Hottes and Frison)**

Apt. grass-green with blackish ANT, legs, SIPH and cauda; BL 2.8–3.4 mm. On *Verbesina* spp. in eastern USA as far south as S Carolina (further south it is replaced by the closely related *U. verbesinae*). Mon. hol. with al. males. 2n=10.

***Uroleucon russellae* (Hille Ris Lambers)**

Apt. bronzy black with black ANT, legs mainly black except for basal halves of femora, black SIPH and a darkish, sometimes almost black, cauda; BL 2.5–3.3 mm. On stems and leaves, and in inflorescences, of *Anaphalis margaritacea* and *Antennaria* sp., and also collected from three *Gnaphalium* spp. in California (Hille Ris Lambers, 1966a), and from *Helichrysum virgineum* in B.C. (Forbes and Chan, 1989). Widespread in western and northern USA and across Canada. Mon. hol., with al. males (orig. descr.). 2n=12.

***Uroleucon saussureae* (Takahashi)**

Apt. reddish black, with black SIPH and pale cauda; BL 2.8–3.0 mm. On *Saussurea* spp. in Japan (Miyazaki, 1971).

THE APHIDS

Uroleucon (Uromelan) scorzonerae Danielsson

Apt. dark red or blackish red with dark SIPH and cauda; BL 2.5–3.2 mm. On undersides of leaves of *Scorzonera humilis*, which become faded and yellow. Only known from Sweden. Apparently it is visited by ants (orig. descr.).

Uroleucon (Uromelan) scrophulariae (Bozhko)

Apt. brown or reddish with black SIPH and cauda; BL c.2.7 mm. On *Scrophularia vernalis* in Ukraine.

Uroleucon (Uromelan) seneciocola (Paik)

Apt. brown; BL 2.6–2.9 mm. On *Senecio pierotii* in Korea. Near *U. compositae* (or *U. gobonis*), but with less extensive rhinaration of ANT III.

Uroleucon (Uromelan) siculum Barbagallo and Stroyan

Apt. dark brown, with appendages mainly black, BL 2.1–3.5 mm. Al. have 29–58 sec. rhin. on ANT III. This species is able to colonise an unusually wide range of hosts within Compositae (*Anthemis*, *Leucanthemum*, *Pulicaria*), and colonies have also been found more than once on flower-stems of *Rumex conglomeratus* (orig. descr.). Only recorded from Sicily and central Italy (Barbagallo and Patti, 1998).

Uroleucon sippenski Hille Ris Lambers

Apt. brown, with ANT and legs pale contrastingly banded with black, SIPH black and cauda pale; BL 2.8–3.4 mm. On *Solidago macrophylla* in Québec, Canada. Ovip. were collected in mid-Aug (orig. descr.).

Uroleucon (Uromelan) sileneobium (Narzikulov)

Apt. shining brown, with ANT, SIPH and cauda almost black; BL c.3.1 mm. On stems of *Aster sedifolius* (= *Galatella punctata*) in Tajikistan. The host was originally given as *Silene scabrifolia*, but subsequently corrected (see Remaudière and Remaudière, 1997).

Uroleucon (Uromelan) simile (Hille Ris Lambers)

Apt. shining reddish brown, with black ANT, SIPH and cauda, and legs yellowish brown with apices of segments black; BL 2.3–4.1 mm. Al. have 60–85 sec. rhin. on ANT III. Colonies form on flowerstalks of certain *Erigeron* spp., especially *E. acer*, *Conyza canadensis*, and also recorded from *Tanacetum boreale* (Pashtshenko, 1988a). It may be a pest of hybrids of *E. speciosum* x *macranthus* grown as ornamentals (Hille Ris Lambers, 1967). Throughout Europe, C Asia, India (Kashmir), W and E Siberia. Ovip. and small dark apt. males were found in Sept in the Netherlands, on undersides of radical leaves (Hille Ris Lambers, 1939a).

Uroleucon simlaense Chakrabarti, A.K. Ghosh and Raychaudhuri

Apt. gray with blackish ANT and SIPH; BL c. 3.6–3.9 mm. Al. have c.62–65 sec. rhin. on ANT III. On undersides of leaves of *Erigeron* sp. in H. P., India. 2n=12.

Uroleucon skurichinae Pashtshenko

Apt. reddish brown or brown, shining; BL c.4.4 mm. Al. have 46–57 sec. rhin. on ANT III. On *Saussurea* spp., feeding on upper parts of stems and flower shoots, and undersides of leaves (Pashtshenko, 2000a). E Siberia (Primorskii).

Uroleucon (Uromelan) solidaginis (Fabricius)

Apt. shining reddish brown with black dorsal spots, ANT and legs mainly yellowish brown with darker bands, SIPH and cauda black; BL 2.3–4.1 mm. On upper parts of stems of *Solidago virgaurea*. Europe, Asia, N Africa and N America. Mon. hol., with al. males.

Figure 49d

Uroleucon solirostratum (Richards)

Apt. color in life unobserved; BL up to 2 mm. On *Solidago flexicaulis* in Canada (Manitoba, Ontario) (Robinson, 1985).

Uroleucon sonchellum (Monell)

Apt. brick red to dark red–brown or dull red, with black SIPH and pale cauda; BL 2.2–3.0 mm. On leaves and stems of *Lactuca* and *Sonchus* spp., widely distributed in USA. Mon. hol., with sexual morphs in August (Colorado) to Oct–Nov (N Carolina). Redescribed by Olive (1963). 2n=12.

Uroleucon sonchi (L.)

Plate 28e

(= *parasonchi* Raychaudhuri, Raha and Raychaudhuri; Chakrabarti and Medda, 2004)

Apt. shiny dark brown, ANT mainly dark, legs mainly pale with black coxae and apices to femora and tibiae, SIPH black, cauda yellow; BL 2.9–4.5 mm. Mainly on *Sonchus* spp. and other genera in the tribe Lactuceae (*Lactuca*, *Cichorium*, *Hieracium*, *Ixeridium*, *Picris*, *Reichardia*), but also sometimes recorded from other Compositae. Almost world-wide. Mon. hol. with apt. males in cold northern temperate regions, presumably anhol. in milder climates. Subspecies have been described from *Cousinia* in Afghanistan (*afghanica* Narzikulov) and Kazakhstan (*stepposa* Smailova), but neither seem to be reliably differentiated from *sonchi* s. str. However, there are specimens in BMNH from Pakistan (leg. M.A. Ghani) with short dorsal hairs, and from Nepal (leg. K.C. Sharma) with 0–4 sec. rhin. on ANT IV of al., which could qualify for subspecies status. Carver (1999) gave an account of this aphid in Australia. 2n=12.

Uroleucon (Uromelan) stachydis (Bozhko)

Apt. shining blackish brown; BL c.3.3 mm. At stem apices of *Stachys* spp. in Ukraine.

Uroleucon stoetzelae Robinson

Apt. green with light to dark brown appendages, SIPH pale at bases and cauda pale; BL 1.3–1.8 mm. On *Achillea millefolium* in Pennsylvania, USA.

Uroleucon (Lambersius) suzannae Robinson

Apt. very pale green except for tips of appendages; BL 2.0–2.7 mm. Al. unknown. On *Haplopappus hirtus* var. *sonchiolius* in Oregon, USA.

Uroleucon (Uromelan) syrdariense Kadyrbekov

Apt. shining blackish brown; BL 3.1–3.4 mm. On stems of *Senecio jacobaea* in Kazakhstan (Kadyrbekov, 2003a).

Uroleucon tanacetii (L.)

Apt. bright red or reddish brown, with yellowish, black-banded ANT and legs, brown–black SIPH and yellow cauda; BL 2.2–3.4 mm. On *Tanacetum* spp., primarily on lower leaves, and on cultivated *Chrysanthemum*. Europe, W Siberia, C Asia, E Himalayas, and N America. Mon. hol., with ovip. in Oct. 2n=12.

Uroleucon (Uromelan) taraxaci (Kaltenbach)

Apt. shining dark bronze–brown, with black dorsal spots, and black ANT, legs (except femoral bases), SIPH and cauda; BL 2.5–3.8 mm. On *Taraxacum* spp., living on undersides and at bases of leaves near ground level. Europe, Kazakhstan and introduced to N America. Mon. hol. with apt. males. 2n=12.

Uroleucon tardae Hottes and Frison

Apt. dark red–brown to blackish red, with black ANT and SIPH, legs dark except for yellow–brown coxae and basal parts of femora, and cauda concolorous with abdomen; BL 1.7–2.5 mm. On *Helenium autumnale*, feeding at apices of flower stalks, directly under flowers (orig. descr.). In north-eastern USA. Ovip. and al. males occur in Oct. Redescribed by Olive (1963).

Uroleucon telekiaae (Holman)

Apt. reddish black to dark bronze, with ANT black except for III and basal part of IV, black SIPH and pale/dusky cauda; BL 3.0–4.6 mm. On apical parts and causing deformation of young leaves of *Telekia speciosa* in Europe. Mon. hol. with ovip. and al. males in Oct (Müller and Steiner, 1989).

THE APHIDS

Uroleucon (Lambersius) tenuitarsum (Gillette and Palmer)

Apt. apple green with ANT and legs mainly dusky-dark, SIPH black with a paler base, and a pale green cauda; BL 2.5–3.0 mm. On leaves of *Aster* spp. in western USA. Ovip. and al. males in early Oct (Palmer, 1952).

Uroleucon tessariae Delfino

Apt. pale green with dark ANT and SIPH; BL 2.6–3.1 mm. On flower buds and stalks of *Pluchea* (= *Tessaria*) *absinthoides*, forming dense colonies that disperse quickly when disturbed. Argentina (Tucumán).

Uroleucon tortuosissimae Rezwani and Lampel

Apt. matt brown, with dark brown SIPH and pale cauda; BL 1.8–2.6 mm. On *Scorzonera tortuosissima* in Iran.

Uroleucon (Uromelan) tripartitum (Ivanoskaya)

Apt. greenish brown with dark ANT, legs, SIPH and cauda; BL c.5.0–5.1 mm. On *Bidens tripartita* in Siberia. Seems close to *U. jaceae*.

Uroleucon (Uromelan) triphyllae Miyazaki

Figure 7b

(= *adenophorae* Miyazaki 1971 and Holman 1975, nec. Matsumura 1918)

Apt. reddish brown with mainly black appendages; BL 2.5–3.2 mm. On *Adenophora* spp. in Japan, Mongolia and Russia (Transbaikalia). This name was reinstated by Eastop and Blackman (2005).

Uroleucon (Uromelan) tschuense Kadyrbekov

Apt. shining blackish brown; BL 2.7–3.1 mm. On stems of *Erigeron oligocephalus* in Kazakhstan (Kadyrbekov, 2003a). Very close to *U. simile*.

Uroleucon (Uromelan) tuataiae Olive

Apt. are dark red–brown with blackish ANT, legs, SIPH and cauda; BL 2.4–3.1 mm. On *Ambrosia* spp., living on undersides of leaves and in inflorescences. Recorded from eastern USA (New Jersey, Pennsylvania, N Carolina, Florida) and from Cuba (Holman, 1974b). 2n=12.

Uroleucon tucumani (Essig)

Apt. red–brown, BL c.2 mm. On *Baccharis coridifolia* in Argentina and Chile (Carvalho *et al.*, 1998). *U. littorale* (Blanchard), described as dark green in life and collected on *B. melastomaefolia* (= *punctulata*) in Argentina, is very similar in morphology according to the original description.

Uroleucon tussilaginis (Walker)

Apt. shining brown, ANT pale basally and dark distally, SIPH black at base and apex but with yellowish brown middle section, cauda yellow; BL 2.4–4.3 mm. On undersides of leaves of *Tussilago* and *Petasites* spp. in Europe and C Asia. Mon. hol. with ovip. and apt. males in late Sept–Nov. 2n=8? (Kuznetsova, 1974, as *Dactynotus basalis* Walker?; however the karyotype illustrated resembles that of *Acyrtosiphon pisum*).

Uroleucon ussuriense Pashtshenko

Apt. blackish, with pale middle sections of tibiae and cauda; BL c.3.2 mm. Al. with 40–44 sec. rhin. on ANT III. On *Saussurea* spp., feeding on upper parts of stems and undersides of apical leaves (Pashtshenko, 2000a). E Siberia (Primorskii).

Uroleucon (Uromelan) uyguricum Kadyrbekov, Renxin and Shao

Apt. brownish; BL 2.1–2.3 mm. On stems of *Convolvulus pseudocantabrica* in Xinjiang-Uygur region of W China (Kadyrbekov *et al.*, 2002).

Uroleucon vancouverense Robinson

Apt. color in life unrecorded; probably with all appendages dark, incl. cauda; BL 2.5–4.4 mm. Described from a population on *Solidago canadensis* var. *salebrosa* in B.C., Canada, and also found in Alberta (BMNH colln, leg. A.M. Harper).

Uroleucon (Lambersius) vera Pashtshenko

Apt. green; BL c.2.5 mm. On upper parts of stems of *Aster ageratoides* in E Siberia (Pashtshenko, 2001).

Uroleucon (Uromelan) verbesinae (Boudreaux)

Apt. shining bright red or black, with ANT, legs, SIPH and cauda all black except for yellow bases of femora; BL 2.5–3.0 mm. On *Verbesina virginica* in south-eastern USA (Louisiana, Florida), and on *V. myriocephala* in Honduras (BMNH colln, leg. C. Evers). 2n=10.

Uroleucon (Uromelan) vernoniae (van der Goot)

Apt. shining black; BL 1.7–3.2 mm. On *Vernonia* spp. and various other Compositae (*Arctotis*, *Elephantopus*, *Emilia*, *Gynura*). Java (see Noordam, 2004).

Uroleucon vernonicola (Holman)

Apt. blackish brown, with dark ANT, legs and SIPH and pale cauda; BL 1.9–2.4 mm. On *Vernonia cinerea* in Cuba. Closely related to *U. ambrosiae*.

Uroleucon (Lambersius) zayasi (Holman)

Apt. pale green with dark ANT, legs and SIPH apices; BL 2.4–2.9 mm. On *Solidago sempervirens*, colonising upper parts of stems and inflorescences. Cuba, and Costa Rica (BMNH colln).

Uroleucon (Lambersius) zerogutierrezis (Smith and Knowlton)

Apt. bright apple green, with ANT dark except basal part of III and SIPH dark on distal half; BL 1.2–1.8 mm. On *Gutierrezia* sp. in western USA. Very similar to *U. erigeronense* in every respect except the ANT rhinarisation.

Uroleucon zinzalae (Hottes and Frison)

Apt. green with long dark green–black SIPH. and yellowish green cauda; BL c.2.7 mm. Feeding on under-sides of leaves along mid-ribs of *Polymnia canadensis* in Illinois and Michigan, USA (Moran, 1985).

Uroleucon (Lambersius) zymoziense (Knowlton)

Color of apt. in life uncertain, probably green with dusky-dark appendages, pale bases of SIPH and a pale cauda; BL 1.7–2.3 mm. On *Aster leucanthemifolius* in western USA. Sexuales in Nov (Palmer, 1952).

Utamphorophora Knowlton

Aphidinae: Macrosiphini

About 7 species of *Hyalomyzus*-like aphids with swollen SIPH, apt. often having sec. rhin. on ANT III. Their host associations are mainly with Rosaceae and/or monocots, and perhaps they have greatest affinity with *Metopolophium*. *Taiwanomyzus* are also similar but have head dorsally spiculate, and other host associations. Remaudière (1983) reviewed the genus and provided a key to species, and Cook (1984c) keyed the N American species.

Utamphorophora bossekiae (Gillette and Palmer)

Apt. pale greenish yellow or pale green, mottled or streaked with darker green; BL c.1.8 mm. On leaves and stems of *Rubus deliciosus* in western USA (Colorado, Utah).

Utamphorophora bromicola Remaudière

Apt. pale green with two dark green longitudinal submarginal stripes; BL 2.0–2.8 mm. On *Bromus carinatus*, feeding on upper sides of leaves close to veins. Mexico. Apparently anhol. (orig. descr.).

Utamphorophora commelinensis (Smith)

Apt. whitish yellow or yellowish with dark apices to ANT segments. legs and SIPH; BL 1.3–1.9 mm. Al. have a large dark saddle-like dorsal abdominal sclerite joining the bases of the SIPH. On Commelinaceae (*Callista*, *Commelina*) in Puerto Rico, and there are trapped al. in BMNH collection from Costa Rica, Guatemala, Venezuela and Brazil. There are also Puerto Rican records – probably of vagrants – from *Brassica integrifolia* and *Sonchus oleraceus* (Smith *et al.*, 1963).

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Utamphorophora humboldti (Essig)

Plate 24e

Apt. on grasses apple green with light brown head and pale SIPH and cauda; BL 1.9–2.6 mm. Al. have a green abdomen with variably developed dark intersegmental markings. In aggregations along upper sides of the leaf blades, or hidden in flower heads, of various Gramineae (*Dactylis*, *Festuca*, *Lolium*, *Poa*, *Polygonum*, etc.). Heter. hol. in N America, with *Physocarpus* spp. as primary hosts. Introduced into England, where it produces sexual morphs in autumn but is probably mainly anhol. on grasses. See Stroyan (1979a) for a detailed account. 2n=20.

Utamphorophora vibei (Hille Ris Lambers)

Apt. color in life unknown; BL 2.6–2.8 mm. Al. have dark intersegmental markings. On unidentified grasses in Greenland. Mon. hol. with ovip. in early Aug (orig. descr.).

Vesiculaphis del Guercio

Aphidinae: Macrosiphini

About 12 palaeartic species associated with Ericaceae and/or Cyperaceae, characterised by apt. having the front of the head projected forward above and in front of the ANT bases, either as a ledge or as three lobes. Miyazaki (1980a) reviewed this genus. M.R. Ghosh *et al.* (1976) reviewed the Indian species.

Vesiculaphis angusticeps Miyazaki

Apt. elongate oval, pale yellow to dull yellowish brown, sometimes with a green tint; BL 1.7–2.2 mm. On undersides of leaves of *Carex* spp. in Japan. Al. and other morphs unknown.

Vesiculaphis caerulea Miyazaki

Apt. flattened, oval, light green with dark blue head and thorax; BL 1.15–1.25 mm. On undersides of leaves of *Carex* spp. in Japan. Al. undescribed. 2n=6.

Vesiculaphis caricis (Fullaway)

Plate 20f, Figure 18b,d

Apt. (fund.) on *Rhododendron* spp. yellowish green with a brownish tinge, or dark reddish brown, with dark SIPH and cauda; BL 1.6–2.0 mm. Heter. hol., migrating to various *Cyperus* spp. and *Kyllinga brevifolia* in Japan (where it is an important pest of ‘Sichito’ sedge, *C. monophyllus*; Miyazaki, 1980a), Korea (Lee *et al.*, 2002c) and E Siberia (Pashtshenko, 1988a). Originally described from *Carex* sp. in Hawaii. Also recorded from *Cyperus rotundus* in Taiwan and W Bengal, from *Rhododendron* (azaleas) in Korea and USA (California, N Carolina, New Jersey), and there are trapped al. in BMNH colln from New Guinea, Philippines, Nepal and Sri Lanka.

Vesiculaphis cephalata Miyazaki

Apt. on *Carex* flattened, elongate oval, dull yellow; BL 2.0–2.3 mm. On undersides of leaves of *Carex* spp. in Japan. Al. have sec. rhin. distributed III 26–35, IV 5–14, V 0–7. Heter. hol.; the primary host forms on *Rhododendron* spp. are recorded from E Siberia (Pashtshenko, 1988a). 2n=20.

Vesiculaphis grandis A.N. Basu

Apt. dark brownish; BL 3.6–4.7 mm. Al. have dark dorsal spots. On young stems and lower parts of petioles of unnamed *Rhododendron* spp. in W Bengal, India. Apparently does not host-alternate.

Vesiculaphis kongoensis Takahashi

Apt. unknown, al. yellow; BL of al. 1.7–2.0 mm. On *Rhododendron reticulatum* in Japan (Miyazaki, 1980a), and also on *Rh. dauricum* and *Rh. mucronulatum* in E Siberia (Pashtshenko, 1988a). Related to *V. caricis*, and probably also with host alternation to Cyperaceae.

Vesiculaphis nubilimaculata Miyazaki

Apt. dark brown, BL 1.36–1.6 mm. On undersides of leaves of *Carex* sp. in Japan. Al. and other morphs unknown.

Vesiculaphis pieridis A.N. Basu

Apt. yellowish brown; BL 1.7–2.0 mm. On undersides of leaves of *Lyonia* (= *Pieris*) *ovalifolia* in India (Assam, W Bengal). Vivip. as well as ovip. have been found in winter (orig. desc., and Agarwala and

Mahapatra, 1990), and there are al. males in the BMNH colln (leg. S.K. Mahapatra, Darjeeling, 1986; month of colln unknown).

Vesiculaphis rhododendri A.K. Ghosh and Raychaudhuri

Apt. color in life not recorded; BL 1.9–2.1 mm. Al. not known. On *Rhododendron* sp. in India (Assam, Meghalaya). Life cycle unknown; vivip. in Feb (orig. descr.), so possibly anhol.

Vesiculaphis rotunda Miyazaki

Apt. broadly oval, pale green with extensive blackish brown to black sclerotisation of dorsum; BL. 1.2–1.4 mm. Living solitarily on undersides of leaves of *Carex siderosticta* in Japan. Al. and life cycle unknown.

Vesiculaphis theobaldi Takahashi

Plate 20g, Figure 18c

Apt. variable in color, yellowish green, pale to mid-green or brownish green to almost black; BL 1.7–2.1 mm. Al. have sec. rhin. distributed ANT III 20–35, IV 8–17, V 4–11. On undersides of leaves of *Carex* spp., mainly in shady and humid situations. Also recorded from *Eriophorum vaginatum* (BMNH, leg. R.N.B. Prior) and *Scirpus maritimus* (BMNH, coll. V.F. Eastop). Ant-attended. Widely distributed in Europe, and eastward to W Siberia. Mon. hol. on *Carex*, with al. males, but vivip. females may be found through the winter months in England (Wood-Baker, 1957, 1958). 2n=36*, 38* (samples from UK anhol.(?) populations, and 40 (Netherlands, Gut 1976).

Viburnaphis Pashtshenko

Aphidinae: Macrosiphini

A genus for one E Asian species related to *Sappaphis*.

Viburnaphis viburnicola (Sorin)

Apt. (fundatrix) bluish green, dusted with wax powder; BL 2.3–2.7 mm. On young leaves of *Viburnum* spp. in spring, crumpling and discoloring leaves. Japan and E Siberia (Pashtshenko, 1988b, as *V. pseudosenso-riata*). Heter. hol., migrating in second generation to an unknown secondary host. Ovip. and al. males were collected on *V. sieboldii* in early Dec (orig. descr., as *Sappaphis*).

Viteus Shimer (= *Daktulosphaira* Shimer)

Phylloxeridae

A genus for the grape phylloxerid, which differs from *Phylloxera* by having al. in which the distal sensorium on the antenna is not greatly enlarged. The generic classification of the Phylloxeridae is likely to remain unsatisfactory until the 34 species of *Phylloxera* described from *Carya* in N America are better known (see Blackman and Eastop, 1994).

Viteus vitifoliae (Fitch)

Apt. yellow; BL 0.7–1.4 mm. In hairy, scabrous galls on the undersides of vine leaves (but opening on the upper surface of the leaf); or on vine roots causing bird's head-like swelling and blackening of rootlets. Of N American origin, now in Europe, the Mediterranean, the Middle East, Africa, Korea, Australia, New Zealand and S America. Holocycle takes 2 years and involves a sexual phase and leaf-galling and root-feeding stages on American vine species, but on European vine (*Vitis vinifera*) it is normally anhol. on the roots. Leaf galls occur in Europe on cultivars derived from hybrids between *vinifera* and American vine species. For further information see Blackman and Eastop (2000). 2n=10.

Volutaphis Börner

Aphidinae: Macrosiphini

Three European species associated with *Silene*, closely related to *Aphidura* but without mesosternal tubercles, and apt. of two of the species have sec. rhin. on the distal part of ANT III.

Volutaphis alpinae Prior

Apt. pale yellow-green powdered with white wax; BL 1.9–3.0 mm. On *Silene vulgaris* var. *alpina*, distorting and discoloring apical parts of plant (orig. descr.). Austria. Mon. hol. with apt. males.

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Volutaphis centaureae (Börner)

Apt. pale green; BL c.1.7–1.8 mm. Described originally from *Centaurea*, but the true hosts are Caryophyllaceae (*Lychnis*, *Silene*, *Viscaria*), where it feeds on lower and rosette leaves which are turned upward and discolored. Europe (Germany, Sweden, Ukraine).

Volutaphis schusteri (Börner)

Plate 11h

Apt. yellowish to yellow–green; BL 1.7–2.4 mm. On *Silene latifolia*, causing yellowing of leaf veins. Europe. Mon. hol., but male apparently undescribed (Hille Ris Lambers, 1947a, as *Silenobium*).

Wahlgreniella Hille Ris Lambers

Aphidinae: Macrosiphini

About 6 species with elongate swollen SIPH, cauda with only 5 hairs and apt. often without rhinaria on ANT III. Mostly northern in distribution and associated with *Rosa* and/or Ericaceae. Accounts are available for W Europe (Hille Ris Lambers, 1949; Heie, 1995) and UK (Stroyan, 1979a).

Wahlgreniella australis Delfino

Apt. color in life unrecorded, presumably pale green; BL 2.0–2.8 mm. On *Cayaponia* sp. in Argentina (Córdoba), on undersides of leaves along veins.

Wahlgreniella empetri Richards

Apt. dull green with dusky appendages; BL 1.5–1.8 mm. Al. have dark brown to black head, ANT and thorax. On *Empetrum nigrum* in N Canada (Baffin I.).

Wahlgreniella lampeli Rupais

Apt. shining lemon-yellow; BL 2.1–2.6 mm. On *Empetrum hermaphroditum* in N Russia (Murmansk).

Wahlgreniella nervata (Gillette)

Plate 24d

Apt. pale green to dull mid-green, SIPH pale with darker apices; BL 1.4–2.5 mm. Al. have variably developed dark dorsal markings, sometimes fused into an irregular and much-perforated dorsal abdominal patch. On shoots or mature leaves of wild and cultivated *Rosa*. In western N America it is apparently heter. hol., migrating from *Rosa* to Ericaceae (*Arbutus*, *Arctostaphylos*, *Pieris*), although the life cycle needs further confirmation. Introduced populations on roses occur in Europe (UK), C and S America, Africa (Burundi) and Pakistan. Anhol. on roses in UK. There has been an apparently separate introduction into Europe of another anhol. population, which we treat as a subspecies, *W. nervata* ssp. *arbuti* (Davidson), shining yellowish green in life, living on Ericaceae (*Arbutus*, *Arctostaphylos*) and Empetraceae (*Empetrum*). The two populations maintain their specific host associations and slight morphological differences in the field, although they can be reared on each other's host plants in the laboratory. 2n=12.

Wahlgreniella ossiannilssoni Hille Ris Lambers

Apt. shining pale yellow, dark green, reddish brown or greenish black, with SIPH dark in middle and at tips; BL 1.5–2.3 mm. On undersides of leaves and shoots of *Arctostaphylos uva-ursi*. Boreo-alpine (N Europe, Alps and Pyrénées). Life cycle variable; mon. hol. (with al. males) on *Arctostaphylos* in N Europe and at lower altitudes, but heter. hol. with a sexual phase on alpine *Rosa* spp. at altitudes above 1800 m, migrating in the second generation to *Arctostaphylos* (Remaudière *et al.*, 1978). Fund. and ovip. of mon. hol. and heter. hol. populations show certain differences, and the genetic relationships between them are unclear. Anhol. overwintering on *Arctostaphylos* can also occur where conditions permit.

Wahlgreniella vacciniï (Theobald)

Figure 56e

Apt. shining greenish yellow or yellowish green, ANT ringed with black; BL 1.6–2.3 mm. On undersides of leaves of *Vaccinium* spp. in Europe and N America, where it is also recorded from *Arctostaphylos uva-ursi*. Probably mon. hol.; ovip. are recorded from Europe, males from N America (Heie, 1995). 2n=12.

Wahlgreniella viburni (Takahashi)

Apt. green, with tips of SIPH dusky; BL c.2 mm. Al. with sec. rhin. III c.45, IV 8–10, V 1–3. described from al. found attacking young leaves of *Viburnum arboricolum*, and from apt. and al. collected on *Mahonia morrisonensis*, so the true host is in doubt. Taiwan.

***Watabura* Matsumura** (?= *Prociphilus* Koch)

Eriosomatinae: Pemphigini

***Watabura nishiyae* Matsumura**

Only al. (sexuparae?) are described; black, with green or greenish yellow abdomen, BL c.1.6 mm. This aphid was for many years confused with *Aphidounguis mali*, but is probably a small species of *Prociphilus*, with *Cydonia* as primary host. Japan. [Note: the record of *A. mali* from *Cydonia* in Blackman and Eastop (2000) is in error.]

***Weibenaphis* Zhang, Chen, Zhong and Li**

Aphidinae: Aphidini

One species in China described as a 'genus and species dubia'. After examining some immature (paratype) specimens we conclude that the genus is probably not clearly distinct from *Aphis*.

***Weibenaphis alhagis* Zhang, Chen, Zhong and Li**

Apt. color in life unrecorded, presumably dark or with extensive dark dorsal markings; BL c.2.4 mm. On *Alhagi sparsifolia* in Xihiang, China (Zhang, 1999).

***Xenosiphonaphis* Takahashi**

Aphidinae: Macrosiphini

Two little-known E Asian species with very broad ANT tubercles and flangeless SIPH, very similar to *Jacksonia*, but imm. have no spinules on hind tibiae.

***Xenosiphonaphis conandri* Takahashi**

Apt. pale, color unrecorded; BL c.0.8 mm (?). (BL of al. 1.6–2.1 mm.) On undersides of leaves of *Conandron ramondoides*, growing on wet rocks, in Japan. Heter. hol., with a sexual phase on *Stachyurus praecox* (al. fundatrigeniae in BMNH colln, leg. M. Sori). A record and description by Ghosh and Raychaudhuri (1968) of an al. from a species of Gramineae in Sikkim, India should probably be referred to *Jacksonia papillata*.

***Xenosiphonaphis japonica* Takahashi**

Apt. (fund) color not recorded; BL c.3.1 mm (Miyazaki, 1971, as *Jacksonia*). Imm. al. densely covered with cottony wax. On undersides of leaves of *Stachyurus praecox* in Japan in spring, migrating to an unknown secondary host.

***Xerobion* Nevsky**

Aphidinae: Aphidini

About 20 species related to *Aphis* and *Brachyynuguis* with short ANT PT, a stiletto-shaped or long and pointed R IV + V, dark, volcano-shaped SIPH and a short triangular cauda. Mostly on Compositae-Anthemidae, although several including the type species are on Chenopodiaceae. Many species were recently transferred from *Absinthaphis* (Kadyrbekov, 2001c); Mier Durante and Nieto Nafria (1991) compared morphometric data for 8 species previously in that genus. Specimens from *Sueda* sp, in Sinai (BMNH colln, leg. E. Mescheloff) are similar to a specimen illustrated but not described from Korea as *Absinthaphis koraiensis* Paik (see Remaudière and Remaudière, 1997). Nieto Nafria et al. (2005) reviewed the Iberian species.

***Xerobion alakuli* (Juchnevitch)**

Apt. dark green, covered with wax powder; BL 0.9–1.2 mm. On *Artemisia* and *Seriphidium* spp. in Kazakhstan. Kadyrbekov (1995a) provided a redescription.

***Xerobion alba* (Remaudière and Davatchi)**

Figure 31d

Apt. white due to complete covering of fine wax powder, with basal parts of ANT and legs, and SIPH, dark brown; BL 1.4–2.0 mm. Sec. rhin. in apt. III 0–8, IV 1–5 and V 0–1, in al. III 11–12, IV 5–6, V 1–2. Found in colonies (with *Brachycaudus helichrysi*) on flower-stalks and inflorescences of *Helichrysum armenium* in Iran (orig. descr., as *Protaphis albus*).

THE APHIDS

Xerobion amurensis (Pashtshenko)

Apt. green, heavily wax-dusted, with dark SIPH and pale cauda; BL c.1.4–1.5 mm. On *Artemisia desertorum*, sometimes in dense colonies on upper part of plant, causing stunting of growth and clumping of leaves. E Siberia (Maritime Terr.).

Xerobion artemisiae (Narzikulov)

Apt. green, with brown SIPH and green cauda; BL c.1.2–1.3 mm. On *Artemisia* spp., colonising stems and leaf petioles, sometimes on undersides of leaves which become slightly wrinkled (Ivanoskaya, 1960). S Russia and C Asia.

Xerobion blascoi (García Prieto and Sanchís Segovia)

Apt. dull black; BL 1.0–1.6 mm. Sec. rhin. in apt. III (0–) 1–5, IV 0–3, in al. III (0–) 4–9, IV (0–) 1–3, V 0–2. In very dense colonies on terminal parts of *Seriphidium herba-album* (incl. subsp. *valentinum*) in Los Monegros, Spain (García Prieto and Sanchís Segovia, 1998, in *Aphis* subgen. *Absinthaphis*).

Xerobion brutii (Barbagallo)

Apt. dark green, dusted with grayish wax powder, with a rusty-colored patch between SIPH; BL 1.2–1.6 mm. Sec. rhin. in al. III 6–10, IV 2–3, V 0–2. On upper parts of stems and leaves of *Artemisia variabilis* in S Italy.

Xerobion camphorosmae (Tashev)

Apt. dark gray, but almost covered in life with thick wooly wax, except for small dark spots in front of SIPH and a larger dark spot on posterior abdomen; BL 1.1–1.6 mm. On *Camphorosma* in Bulgaria, colonising needle-like leaves and creeping stems; also known from SE Kazakhstan (as *Protaphis camphorosmi*; Juchnevitch, 1974). Kadyrbekov (1995a) provided a couplet separating this species from *X. eriosomatinum*.

Xerobion caspicae (Bozhko)

Apt. blackish tinged with green, wax-dusted; BL c.1.5 mm. On *Artemisia caspica* in Ukraine. Effect on host plant unknown. This species has black conical SIPH, and was transferred to *Xerobion* by Kadyrbekov (2001c).

Xerobion cinae (Nevsky)

Plate 7g. Figure 12r

(= *Aphis tashevella* Eastop and Hille Ris Lambers)

Apt. yellow–green to green, wax-coated; BL 1.3–1.7 mm. On *Artemisia* and *Seriphidium* spp., mainly on flower stalks, usually ant-attended. In E Europe (Moldova, Bulgaria), Turkey, Iran, C Asia, Afghanistan, Pakistan and Kashmir. Mon. hol. with ovip. and al. males in mid-Oct to late Nov in C Asia (orig. descr., as *Cryptosiphum*). 2n=8.

Xerobion eriosomatinum Nevsky

Plate 7i, Figure 36e,f

Apt. dark brown with a covering of white wax, except for dark antesiphuncular and postsiphuncular spots; BL 1.3–1.8 mm. In ant-attended colonies on stems and lower and upper sides of leaves on *Kochia prostrata* in Spain, N Italy (Jörg and Lampel, 1988) and eastward to Pakistan (BMNH colln) and China (L. Zhang and G. Zhang, 2000b, as *Aphis (Zyxaphis) kochiae*). Mon. hol.; ovip. were described from Kazakhstan (Smailova, 1974), and from Spain (Mier Durante *et al.*, 1989).

Xerobion georgii (Mier Durante and Nieto Nafría)

Apt. covered by grayish wax powder; BL 1.1–1.7 mm. On *Artemisia campestris* ssp. *glutinosa* in Spain. Mon. hol., with al. males found in early Nov (orig. descr.).

Xerobion hirsuta (Nevsky)

Apt. dark green to greenish brown, wax-coated; BL c.1.2 mm. On undersides of leaves and stems of an *Artemisia* sp. in Uzbekistan.

Xerobion hortobagyi (Szelegiewicz)

Apt. brownish, without wax; BL 1.0–1.2 mm. On terminal parts of *Artemisia maritima* ssp. *monogyna* (= *Seriphidium santonicum*), not visited by ants. Hungary.

Xerobion inthybi Bozhko

Apt. dark brownish green; BL c.1.5 mm. On undersides of leaves of *Cichorium intybus* in Ukraine. Possibly this species should be in *Aphis* (*Protaphis*).

Xerobion juchnevitchi Smailova

Apt. brown, wax-dusted; BL c.1.2 mm. On apical parts of *Atriplex cana* in central Kazakhstan.

Xerobion judenkoi (Szelegiewicz)

Apt. green, lightly wax-powdered; BL 1.4–1.7 mm. On apical parts of *Artemisia campestris*. Poland.

Xerobion pannonica (Szelegiewicz)

Apt. brown, without wax, almost shiny; BL 1.3–1.5 mm. In ant-attended colonies on basal parts of *Artemisia absinthium* in Hungary.

Xerobion terraealbae (Ivanoskaya)

Color of apt. in life unrecorded; BL c.1.75 mm. Sec. rhin. in apt. III 3–5, IV 1–2 and V 1, in al. III 5–6, IV 3–4, V 1–3. On *Seriphidium terrae-albae* in Kazakhstan, and also recorded from *Artemisia frigida*.

Xerobion zoiijae (Nevsky)

Apt. yellow-green with large dark spots on dorsal abdomen and dark brownish femora and SIPH; BL 1.7–2.3 mm. On stems and leaves of *Centaurea pulchella* in Turkmenistan (Repetek). Sec. rhin. in al. III 5–6, IV c.1 (orig. descr., as *Brachyunguis zoiijae*; transferred to *Xerobion* by Kadyrbekov, 2001c).

Zelkovaphis Barbagallo

Eriosomatinae: Erisomatini

Three palaeartic species with *Zelkova* as primary hosts. Secondary host generations are only known for one species, and that has not yet been confirmed by host transfers (Barbagallo, 2002).

Zelkovaphis caucasica (Dzhibladze)

Apt. appearance in life unknown, presumably with abundant wax; BL c.1 mm. An (imm.) apt. exule and some imm. and al. sexuparae thought to be this species were collected on roots of *Carex* in Iran (BMNH colln, leg. D. Hille Ris Lambers, and see Barbagallo, 2002: 296, footnote). *Z. caucasica* is heter. hol. with sexual phase on *Zelkova* in Georgia (Blackman and Eastop, 1994, as *Colopha caucasica*).

Zinia Shaposhnikov

Aphidinae: Macrosiphini

A genus for one species combining some characters of *Dysaphis* and *Brachycaudus*.

Zinia veronicae Shaposhnikov

Apt. pale green, with a dark gray slightly shiny dorsal abdominal sclerotic shield, black ANT and SIPH and dark gray head and eyes; BL c.1.7–1.8 mm. On roots of *Veronica* spp., without ants. Russia (Urals), Poland and Italy. Al. was redescribed from N Italy by van Harten and Coceano (1981).

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Photographic Guide

These photomicrographs of slide-mounted apterae from the Natural History Museum (BMNH) collection are the work of Peter York of the Photomicrography Unit, Department of Botany.

PHOTOGRAPHIC GUIDE



(a)



(b)



(c)



(d)



(e)



(f)



(g)



(h)



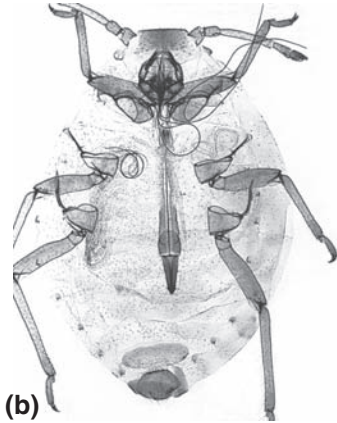
(i)

Plate 1. Eriosomatinae

(a) *Colopha compressa*; (b) *Eriosoma lanuginosum*; (c) *Tetraneura nigriabdominalis*; (d) *Tetraneura ulmi*; (e) *Aloephagus myersi*; (f) *Aploneura lentisci*; (g) *Asiphonella dactylonii*; (h) *Baizongia pistaceae*; (i) *Geoica utricularia*. (All exules from secondary hosts.)



(a)



(b)



(c)



(d)



(e)



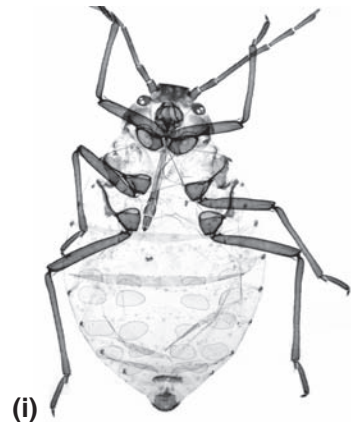
(f)



(g)



(h)



(i)

Plate 2. Eriosomatinae

(a) *Forda marginata*; (b) *Forda formicaria*; (c) *Geopemphigus floccosus*; (d) *Paraclotus cimiciformis*; (e) *Rectinasus buxtoni*; (f) *Smynthuroides betae*; (g) *Pemphigus bursarius*; (h) *Prociphilus erigeronensis*; (i) *Thecabius affinis*. (All exules from secondary hosts.)

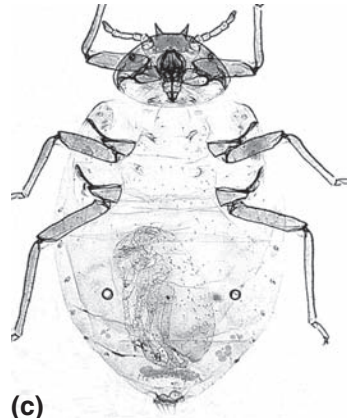
PHOTOGRAPHIC GUIDE



(a)



(b)



(c)



(d)



(e)



(f)



(g)



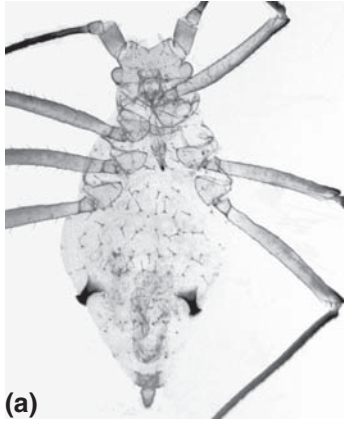
(h)



(i)

Plate 3. Hormaphidinae, Anoeciinae, Lachninae, Tamaliinae, Macropodaphidinae

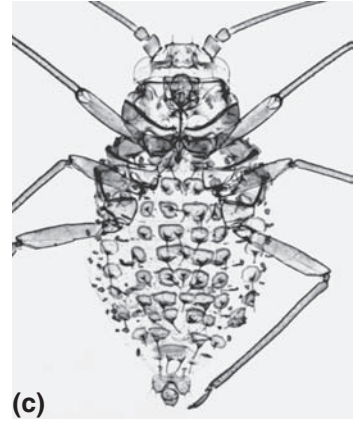
(a) *Aleurodaphis asteris*; (b) *Cerataphis brasiliensis*; (c) *Ceratovacuna lanigera*; (d) *Anoecia corni* (from grass roots); (e) *Maculolachnus submacula*; (f) *Protrama radidis*; (g) *Trama troglodytes*; (h) *Tamalia coweni* (fund.); (i) *Macropodaphis paradoxa*.



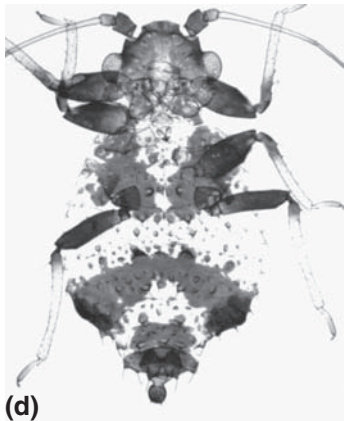
(a)



(b)



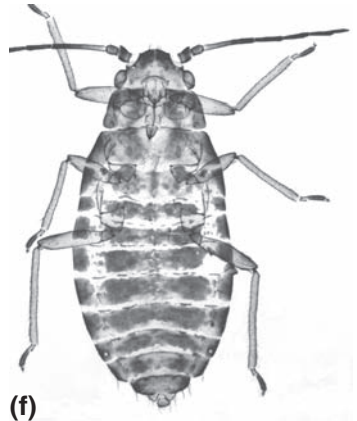
(c)



(d)



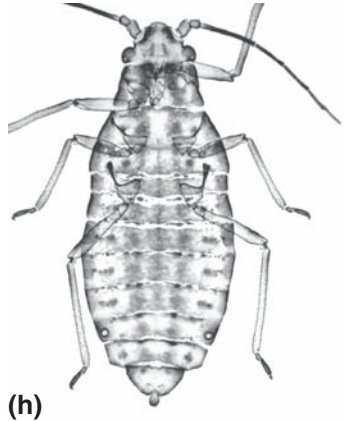
(e)



(f)



(g)



(h)



(i)

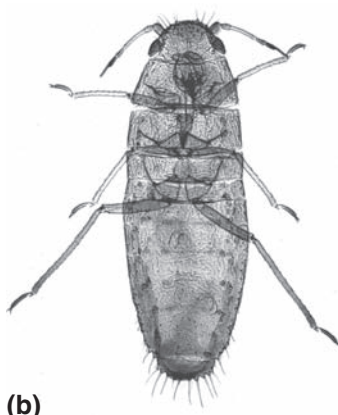
Plate 4. Calaphidinae, Saltusaphidinae

(a) *Cepegillettea myricae*; (b) *Ctenocallis setosus*; (c) *Therioaphis trifolii* spp. *maculata*; (d) *Iziphya bufo*;
 (e) *Juncobia leegei*; (f) *Neobacillaphis szelegiewiczi*; (g) *Saltusaphis scirpus*; (h) *Subsaltusaphis picta*;
 (i) *Thripsaphis ballii*.

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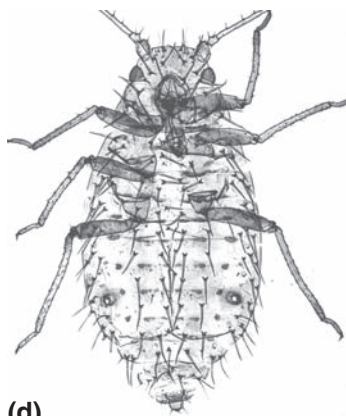
(a)



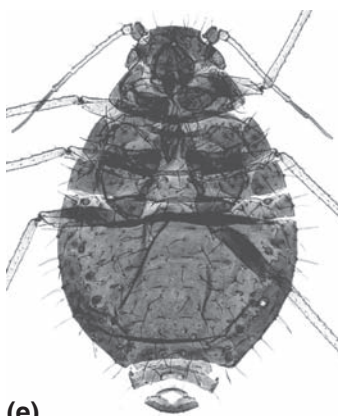
(b)



(c)



(d)



(e)



(f)



(g)



(h)



(i)

Plate 5. Israelaphidinae, Chaitophorinae, Greenideinae

(a) *Israelaphis lambersi*; (b) *Atheroides serrulatus*; (c) *Caricosipha paniculatae*; (d) *Siphia flava*; (e) *Siphia maydis*; (f) *Anomalaphis comperei*; (g) *Anomalosiphon murphyi*; (h) *Cervaphis schouteniae*; (i) *Eutrichosiphum parvulum*.

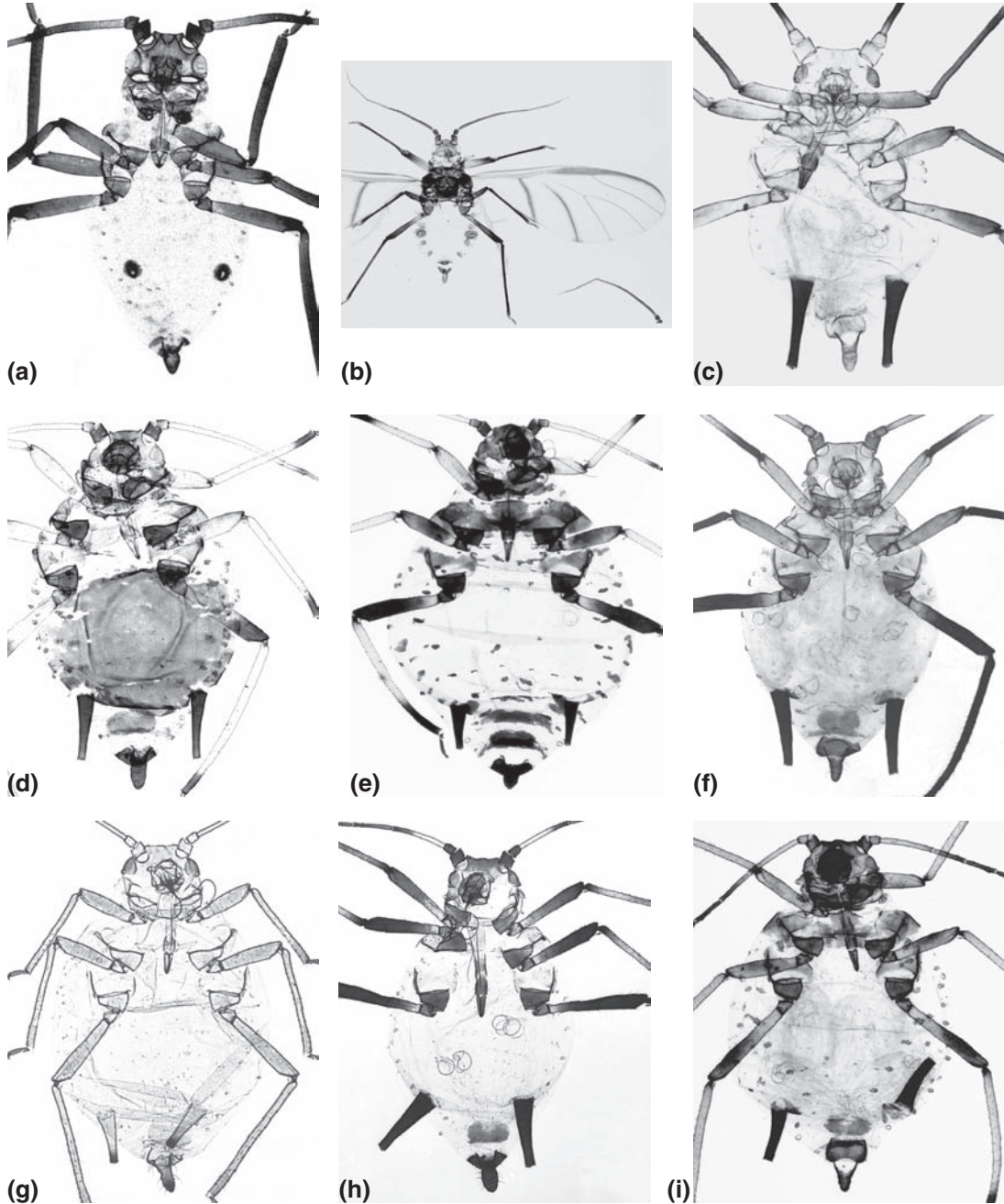
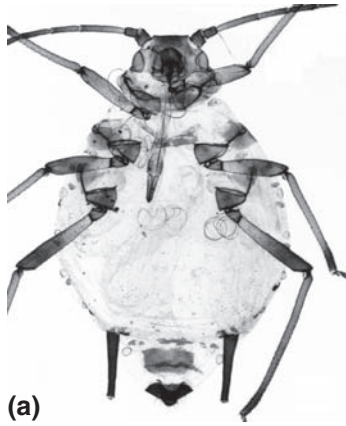


Plate 6. Pterastheniinae, Lizeriinae, Aphidinae – Aphidini

(a) *Pterasthenia albata*; (b) *Lizerius cermeli*; (c) *Aphis coreopsidis*; (d) *Aphis craccivora*; (e) *Aphis fabae*; (f) *Aphis illinoisensis*; (g) *Aphis nasturtii*; (h) *Aphis nerii*; (i) *Aphis helianthi*.

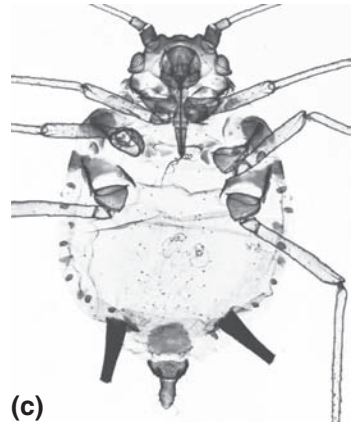
PHOTOGRAPHIC GUIDE



(a)



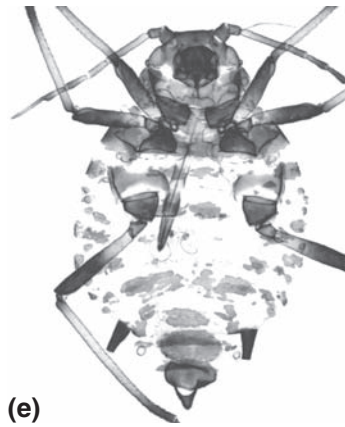
(b)



(c)



(d)



(e)



(f)



(g)



(h)



(i)

Plate 7. Aphidinae – Aphidini

(a) *Aphis sambuci* (from *Rumex* roots); (b) *Aphis spiraecola*; (c) *Aphis gossypii*; (d) *Aphis (Protaphis) anuraphoides*; (e) *Aphis (Protaphis) middletonii*; (f) *Aphis (Protaphis) terricola*; (g) *Xerobion cinae*; (h) *Brachyunguis harmalae*; (i) *Xerobion eriosomatinum*.

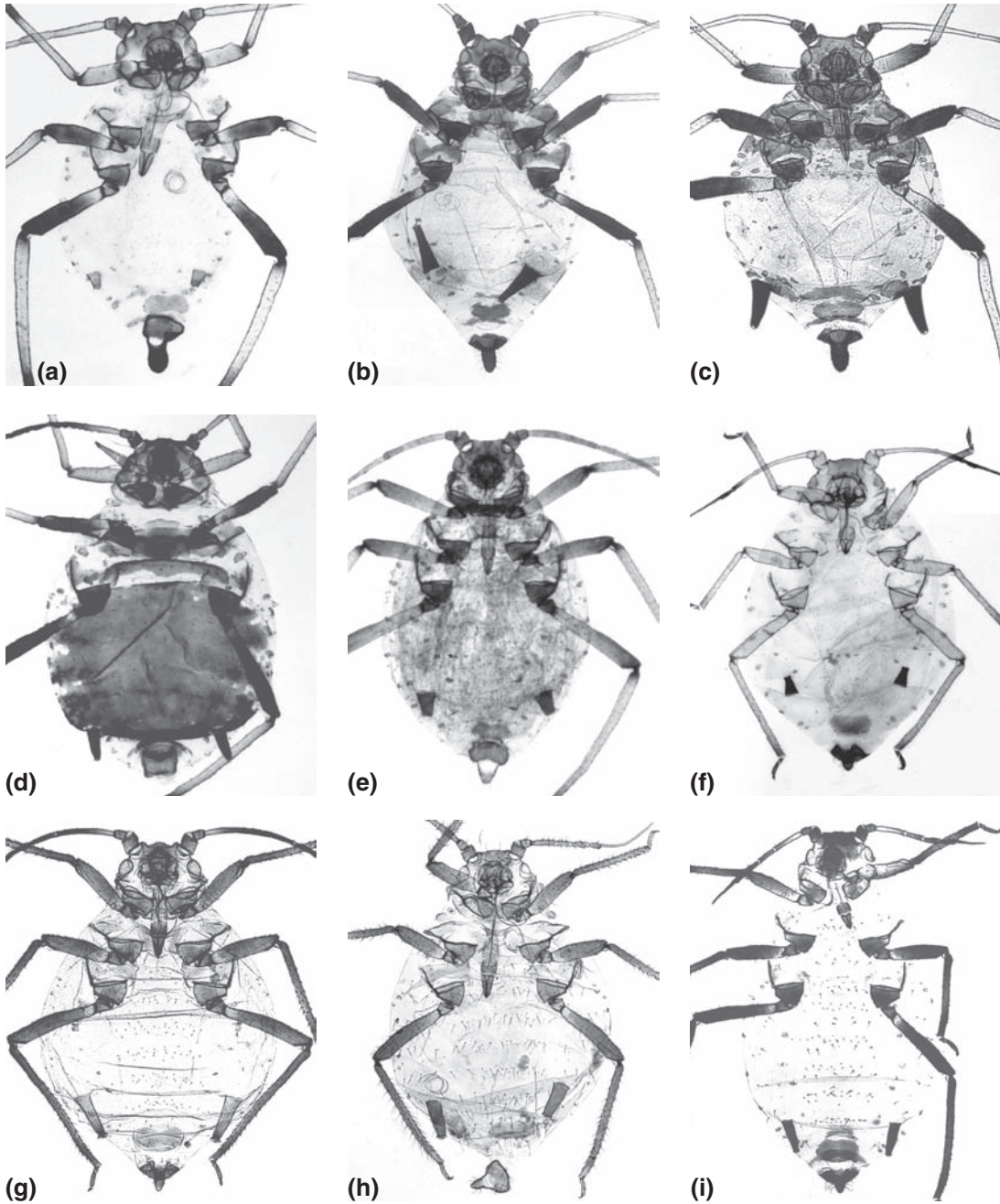


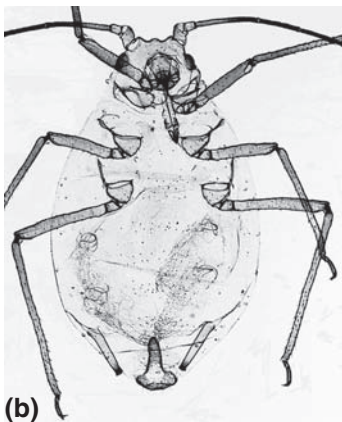
Plate 8. Aphidinae – Aphidini

(a) *Toxoptera odinae*; (b) *Toxoptera aurantii*; (c) *Toxoptera citricidus*; (d) *Braggia eriogoni*; (e) *Swiskiaphis polychaeta*; (f) *Melanaphis sorghi*; (g) *Rhopalosiphum padi*; (h) *Rhopalosiphum rufi-abdominale*; (i) *Rhopalosiphum maidis*.

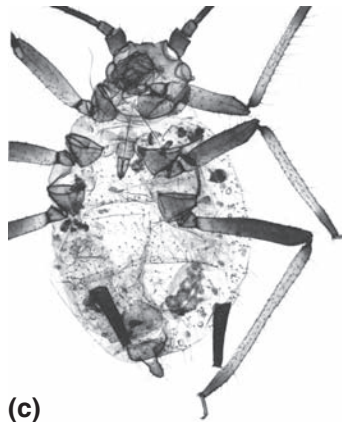
PHOTOGRAPHIC GUIDE



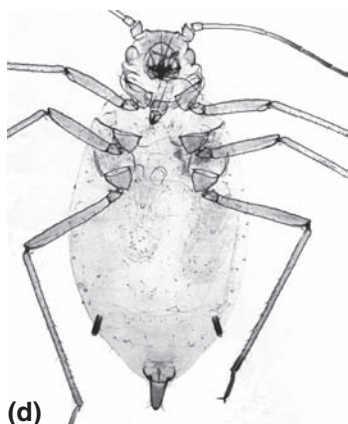
(a)



(b)



(c)



(d)



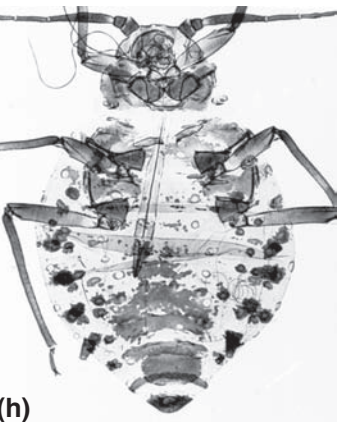
(e)



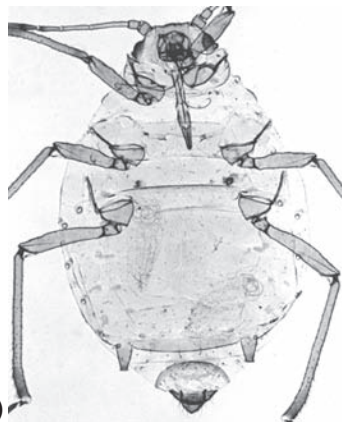
(f)



(g)



(h)



(i)

Plate 9. Aphidinae – Aphidini, Macrosiphini

(a) *Hysteroneura setariae*; (b) *Schizaphis graminum*; (c) *Schizaphis (Paraschizaphis) scirpi*; (d) *Hyalopteris pruni*; (e) *Nearctaphis bakeri*; (f) *Roepkea marchali* (from *Stachys*); (g) *Helosiphon eryngii*; (h) *Anuraphis subterranea*; (i) *Brachycaudus helichrysi*.

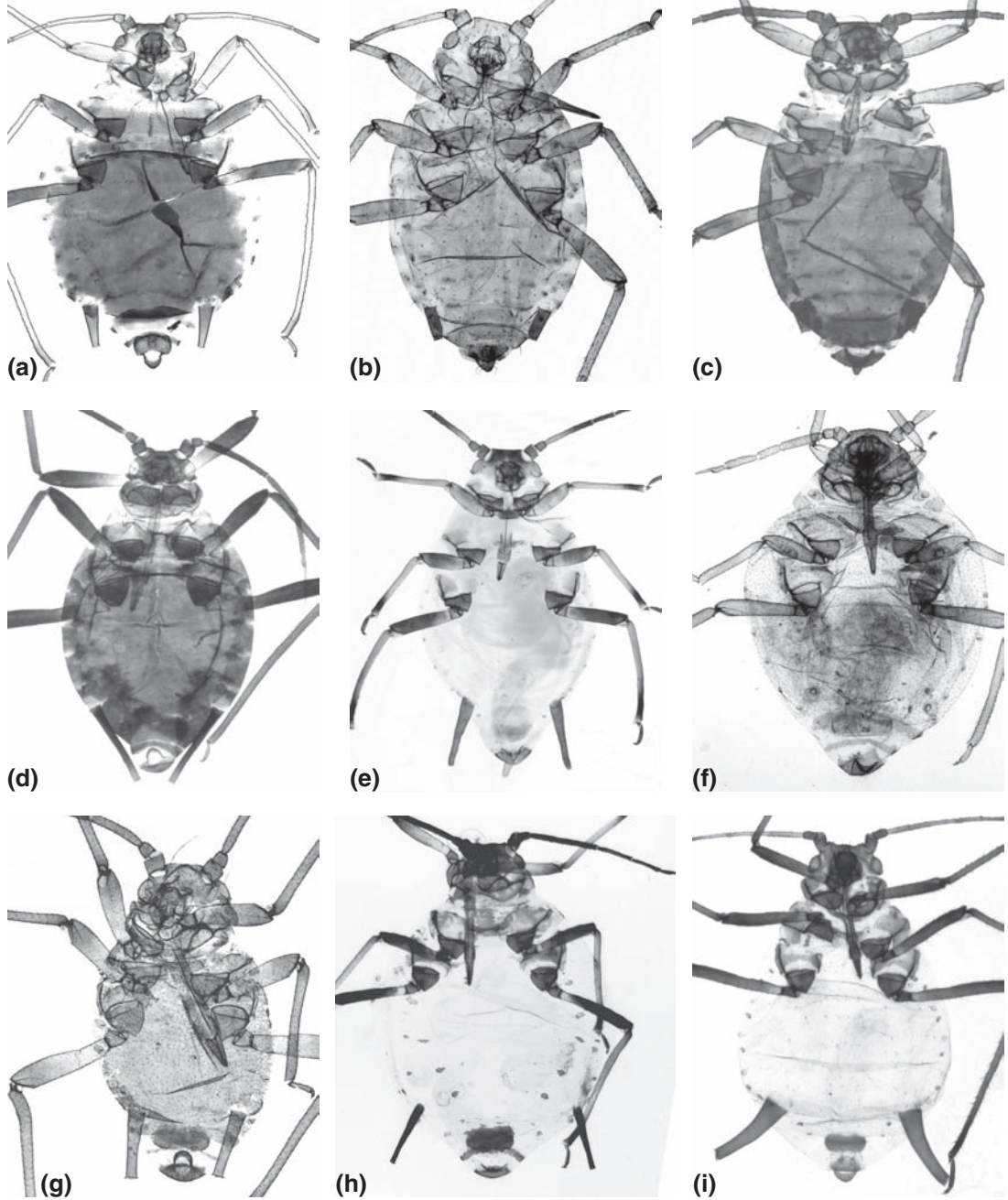


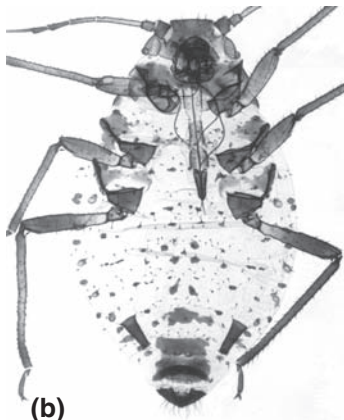
Plate 10. Aphidinae – Macrosiphini

(a) *Brachycaudus cardui*; (b) *Oedisiphum compositarum*; (c) *Acuticauda solidaginifoliae*; (d) *Allocotaphis quaestionis*; (e) *Ammiaphis sii*; (f) *Sappaphis piri* (from *Artemisia*); (g) *Sorbaphis chaetosiphon* (from *Ligularia*); (h) *Acaudinum centaureae*; (i) *Amphicercidus flocculosus*.

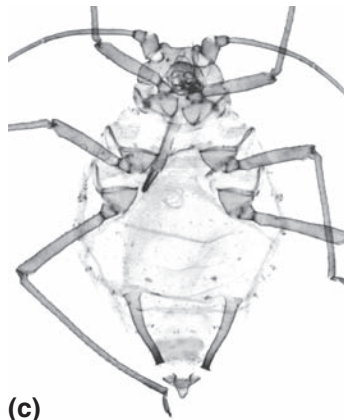
PHOTOGRAPHIC GUIDE



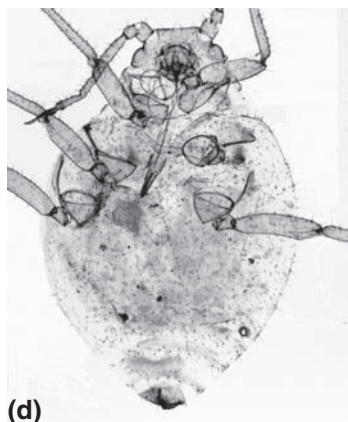
(a)



(b)



(c)



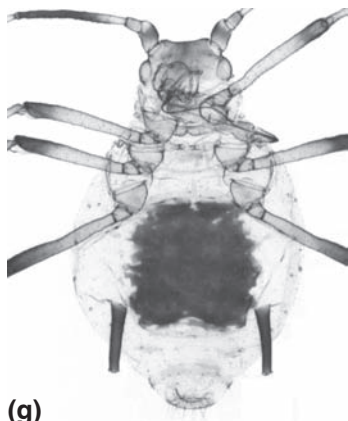
(d)



(e)



(f)



(g)



(h)



(i)

Plate 11. Aphidinae – Macrosiphini

(a) *Dysaphis foeniculus*; (b) *Dysaphis tulipae*; (c) *Dysaphis (Pomaphis) plantaginea* (from *Plantago*); (d) *Dysaphis (Cotoneasteria) microsiphon*; (e) *Ceruraphis eriophori* (from *Eriophorum*); (f) *Cedoaphis maxsoni*; (g) *Macchiatiella itadori*; (h) *Volutaphis schusteri*; (i) *Aphidura picta*.



(a)



(b)



(c)



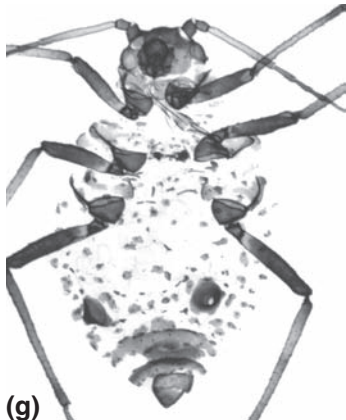
(d)



(e)



(f)



(g)



(h)



(i)

Plate 12. Aphidinae – Macrosiphini

(a) *Carolinaia (Glabromyzus) rhois* (from grasses); (b) *Pentamyzus graminis*; (c) *Lipaphis turritella*; (d) *Lipaphis pseudobrassicae*; (e) *Lipamyzodes matthiolae*; (f) *Brevicoryne brassicae*; (g) *Smiela fusca*; (h) *Aphthargelia symphoricarpi*; (i) *Staegeriella necopinata*.

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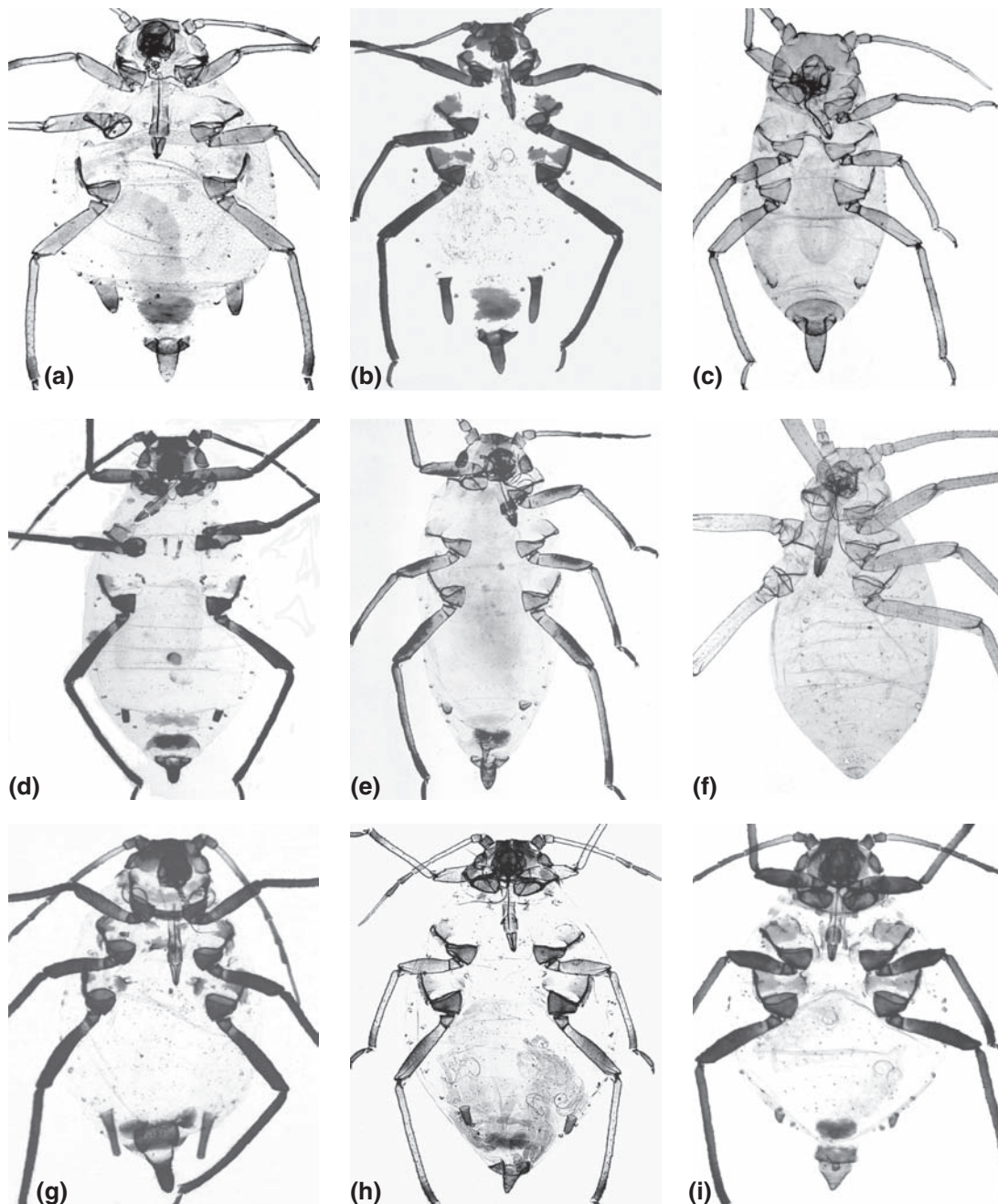


Plate 13. Aphidinae – Macrosiphini

(a) *Hyadaphis coriandri*; (b) *Hyadaphis foeniculi* (from *Foeniculum*); (c) *Defractosiphon brevisiphon*;
(d) *Brachycolus cucubali*; (e) *Diuraphis noxia*; (f) *Gypsoaphis oestlundii*; (g) *Hydaphias helvetica*;
(h) *Semiaphis dauci*; (i) *Uhlmannia singularis*.

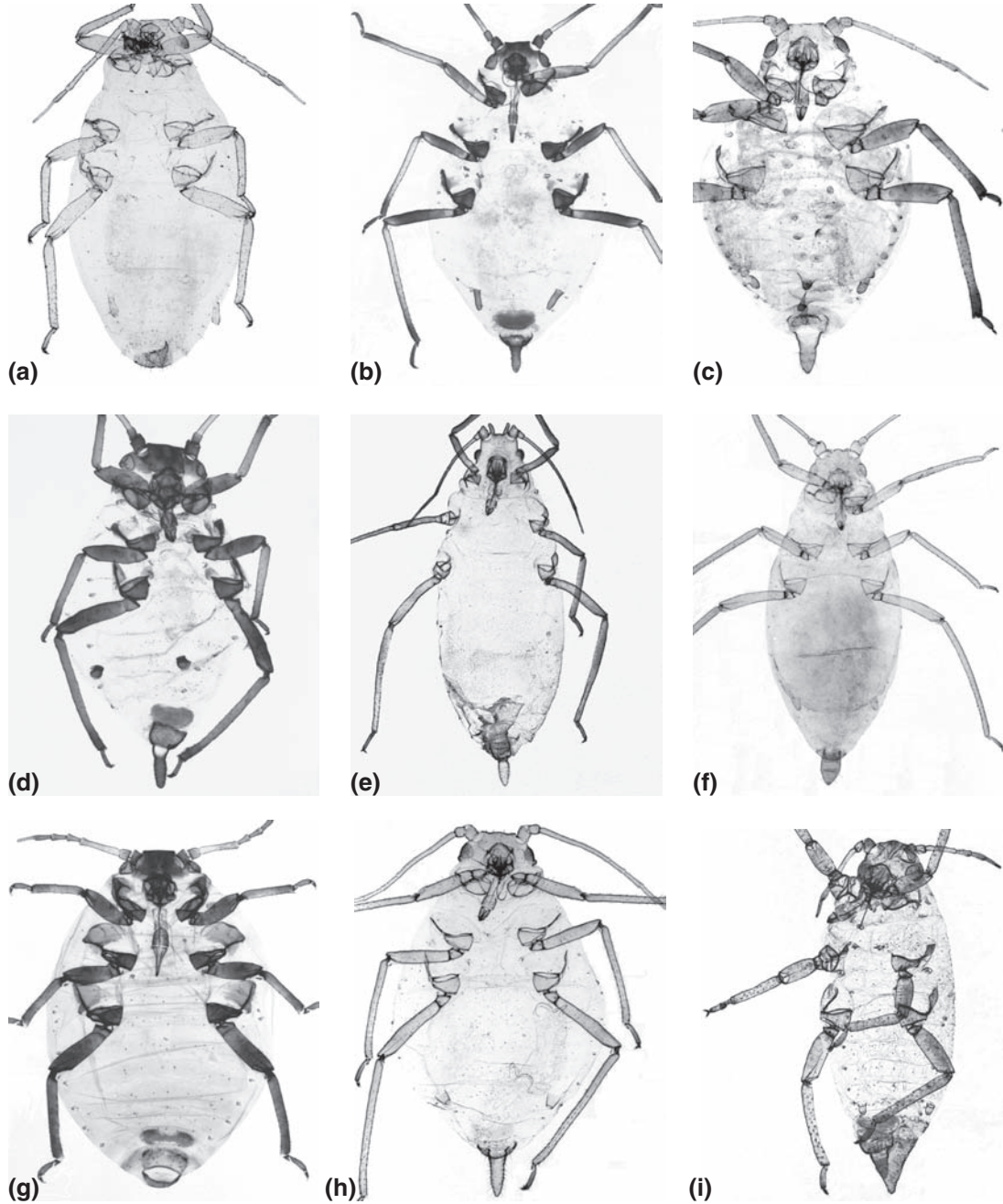


Plate 14. Aphidinae – Macrosiphini

(a) *Nudisiphon folisacculata*; (b) *Hayhurstia atriplicis*; (c) *Ossiannilssonina oelandica*; (d) *Brachysiphoniella montana*; (e) *Davatchiaphis persica*; (f) *Hyalopteroides humilis*; (g) *Cryptosiphum artemisiae*; (h) *Longicaudus trirhodus*; (i) *Aspidaphis adjuvans*.

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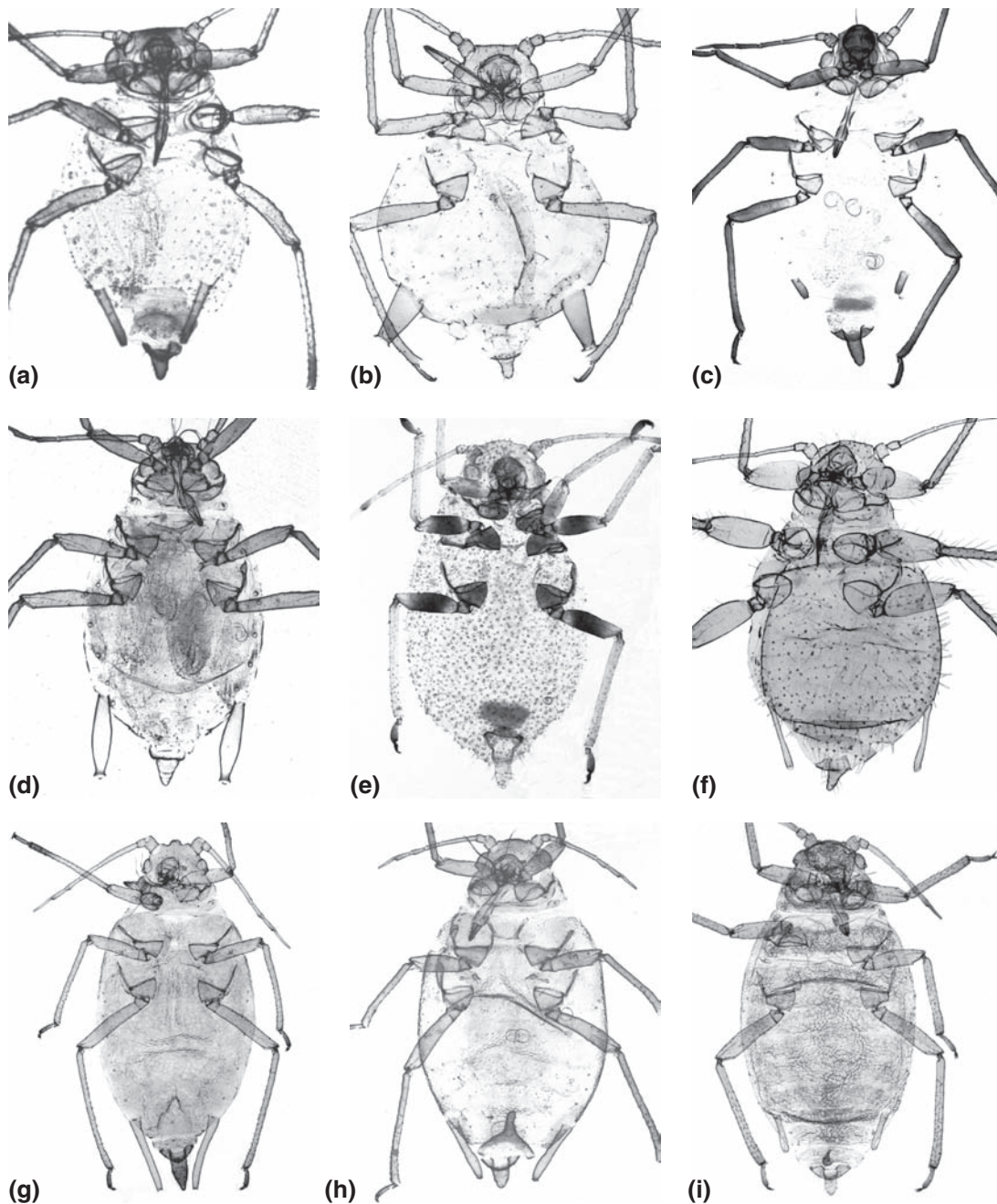


Plate 15. Aphidinae – Macrosiphini

(a) *Coloradoa rufomaculata*; (b) *Durocapillata utahensis*; (c) *Clypeoaphis suedae*; (d) *Cachryphora serotinae*; (e) *Flabellomicrosiphum tridentatae*; (f) *Pseudoepameibaphis tridentatae*; (g) *Myzaphis rosarum*; (h) *Cavariella aegopodii*; (i) *Cavariella (Cavariellia) aquatica*.

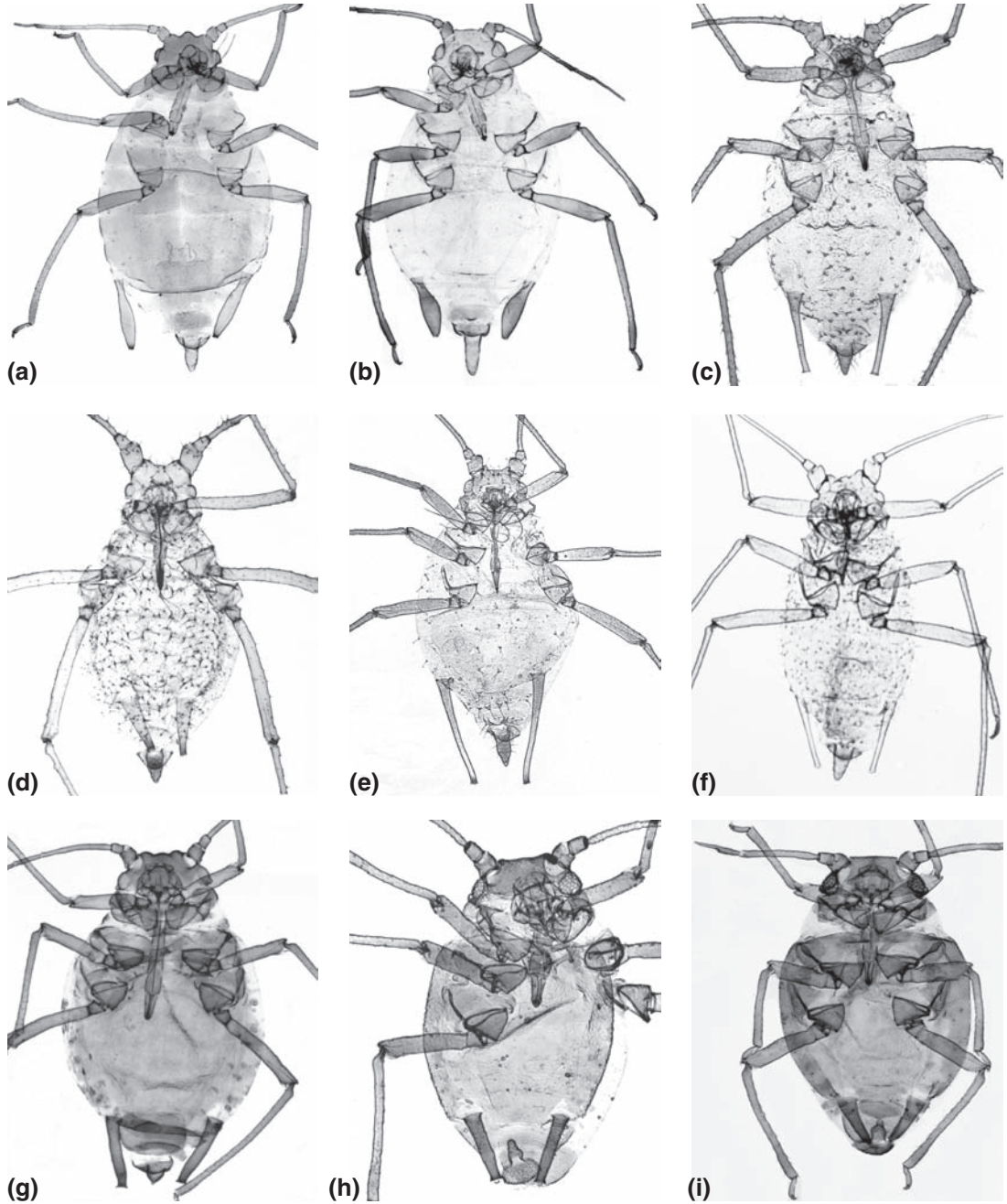


Plate 16. Aphidinae – Macrosiphini

(a) *Liosomaphis berberidis*; (b) *Tricaudatus polygoni* (from *Polygonum*); (c) *Chaetosiphon* (*Pentatrichopus*) *fragaefolii*; (d) *Holmania chaetosiphon*; (e) *Capitophorus elaeagni* (from *Cirsium*); (f) *Pleotrichophorus chrysanthemi*; (g) *Myzodium modestum*; (h) *Pseudacaudella rubida*; (i) *Muscaphis escherichi*.

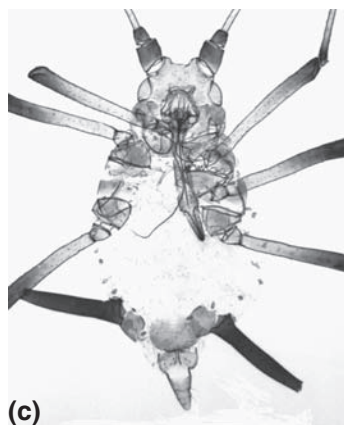
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(a)



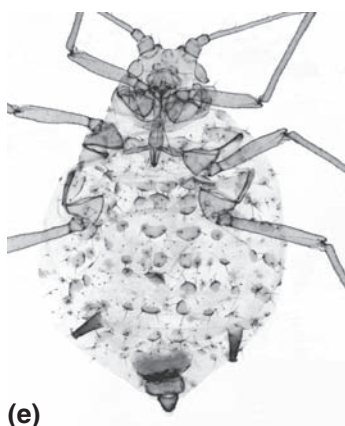
(b)



(c)



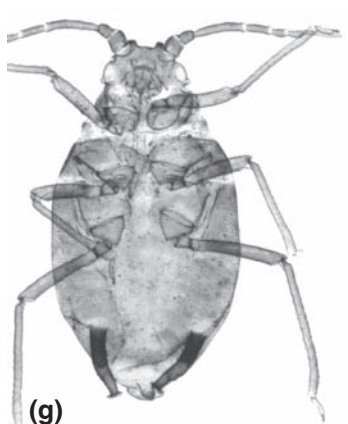
(d)



(e)



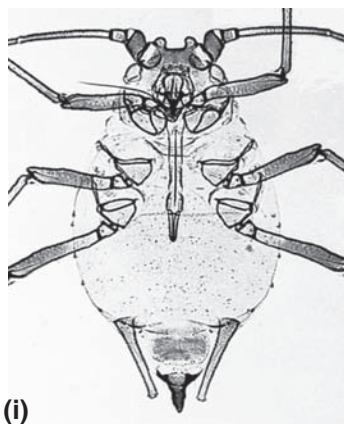
(f)



(g)



(h)



(i)

Plate 17. Aphidinae – Macrosiphini

(a) *Decorosiphon corynothrix*; (b) *Micromyzodium filicium*; (c) *Micromyzus katoii*; (d) *Hydronaphis impatiens*; (e) *Eumyzus impatiense*; (f) *Tubaphis ranunculina*; (g) *Tuberocephalus sakurae* (from *Artemisia*); (h) *Abstrusomyzus phloxae*; (i) *Ovatus crataegarius* (from *Mentha*).

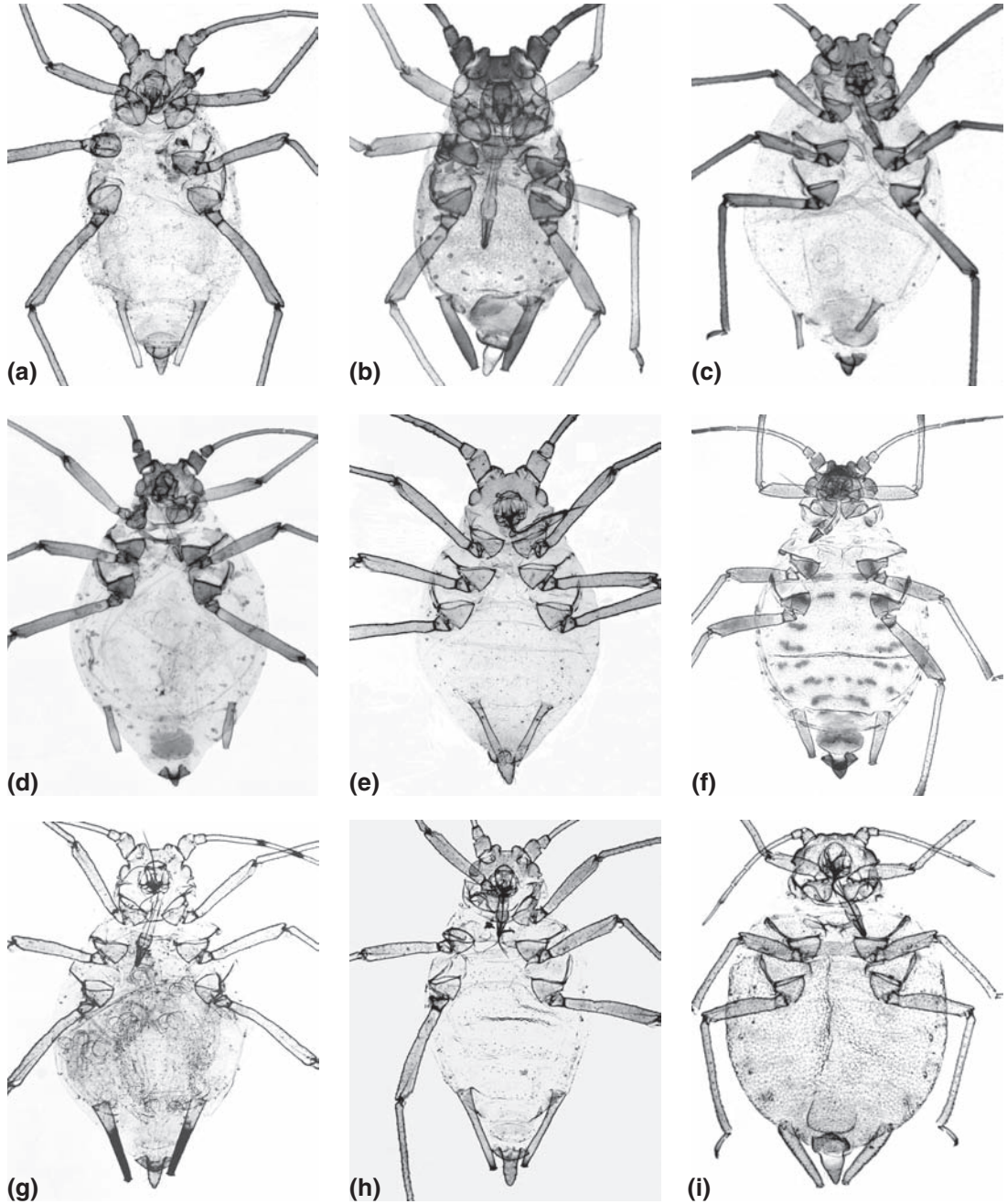


Plate 18. Aphidinae – Macrosiphini

(a) *Ovatomyzus boraginacearum*; (b) *Hyalomyzus eriobotryae* (on *Lycopus*); (c) *Jacksonia papillata*; (d) *Rhopalomyzus poae*; (e) *Paramyzus heraclei*; (f) *Myzus ornatus*; (g) *Myzus varians* (from *Clematis*); (h) *Myzus (Nectarosiphon) persicae*; (i) *Myzus (Galiobium) langei*.

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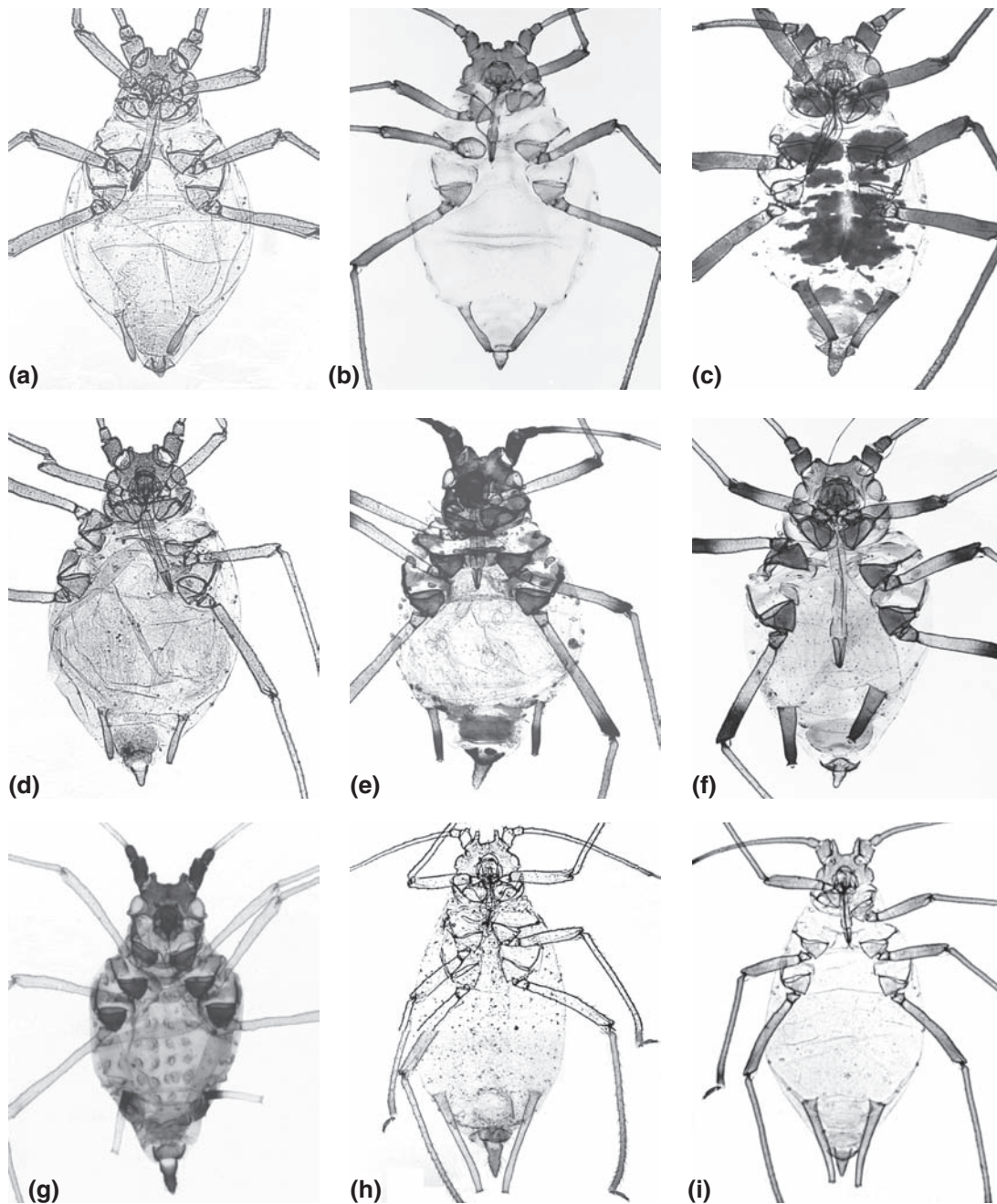


Plate 19. Aphidinae – Macrosiphini

(a) *Myzus (Sciomyzus) ascalonicus*; (b) *Myzus (Sciomyzus) cymbalariae*; (c) *Neomyzus circumflexus*; (d) *Neotoxoptera oliveri*; (e) *Microparsus (Picturaphis) brasiliensis*; (f) *Pentalonia nigronevosa*; (g) *Idiopterus nephrolepidis*; (h) *Phorodon cannabis*; (i) *Phorodon humuli* (from *Humulus*).

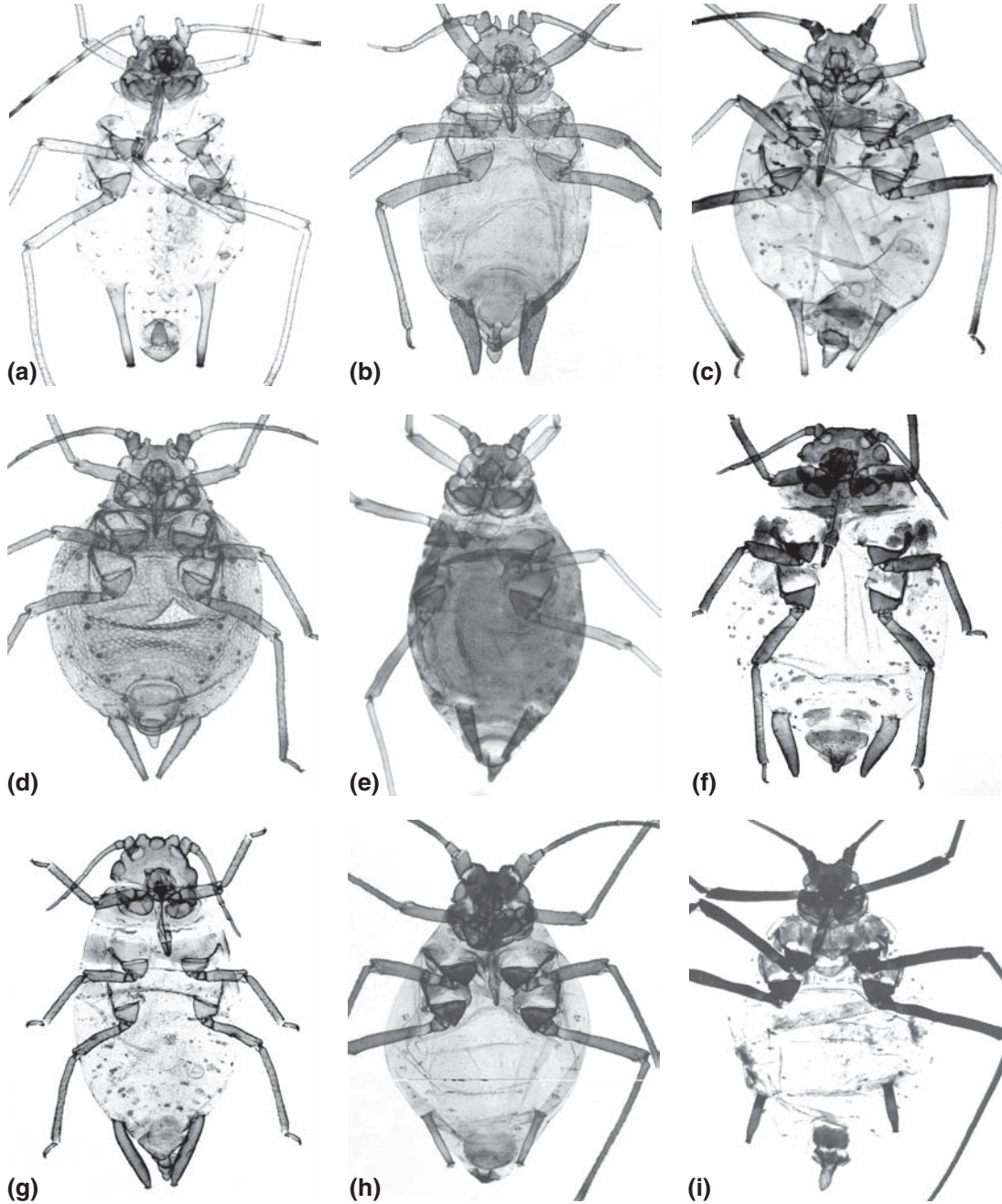


Plate 20. Aphidinae – Macrosiphini

(a) *Matsumuraja rubifoliae*; (b) *Akkaia polygoni*; (c) *Trichosiphonaphis (Xenomyzus) polygonifoliae* (from *Polygonum*); (d) *Trichosiphonaphis polygoniformosana*; (e) *Myzackaia verbasci*; (f) *Vesiculaphis caricis*; (g) *Vesiculaphis theobaldi*; (h) *Myzotoxoptera wimshurstae*; (i) *Indomegoura indica*.

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(a)



(b)



(c)



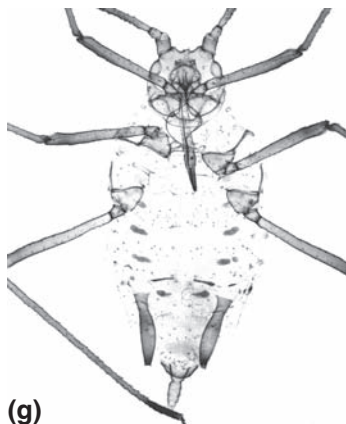
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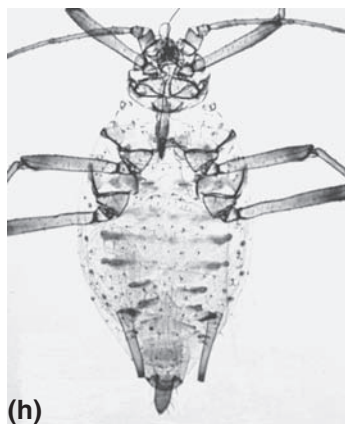
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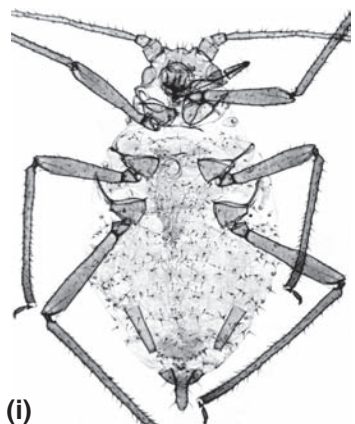
(f)



(g)



(h)



(i)

Plate 21. Aphidinae – Macrosiphini

(a) *Rhopalosiphoninus latysiphon*; (b) *Rhopalosiphoninus staphyleae*; (c) *Eucarazzia elegans*; (d) *Hyperomyzus lactucae*; (e) *Hyperomyzus carduellinus*; (f) *Hyperomyzus rhinanthi*; (g) *Hyperomyzus (Neonasonovia) picridis*; (h) *Nasonovia ribisnigri*; (i) *Nasonovia (Kakimia) cynosbati*.

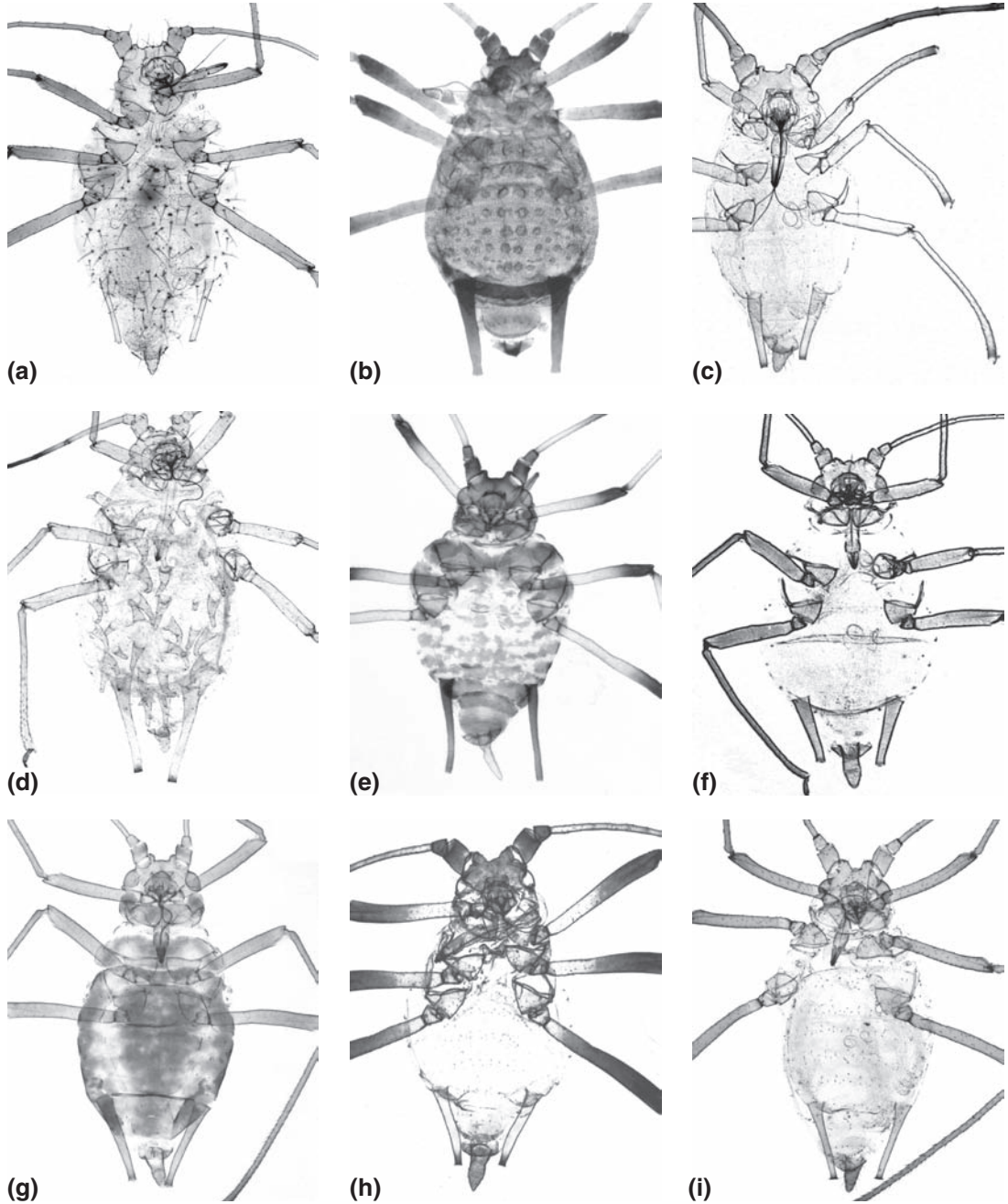


Plate 22. Aphidinae – Macrosiphini

(a) *Cryptomyzus ribis* (from *Stachys*); (b) *Macromyzus woodwardiae*; (c) *Shinjia orientalis*; (d) *Tuberoaphis hydrangeae* ssp. *digitata*; (e) *Ipuka dispersa*; (f) *Ericaphis scammelli*; (g) *Ericaphis wakibae*; (h) *Aulacorthum magnoliae*; (i) *Aulacorthum solani*.

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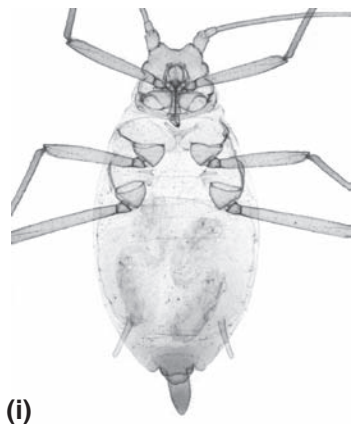
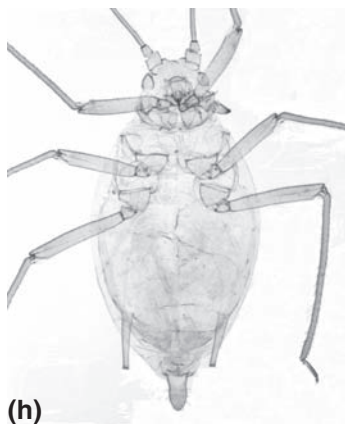
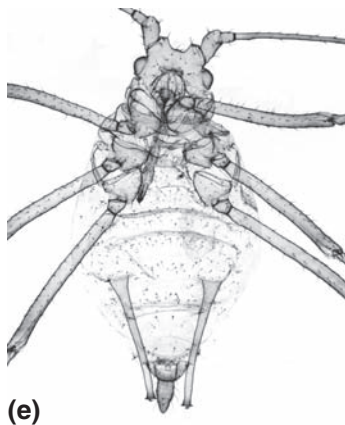
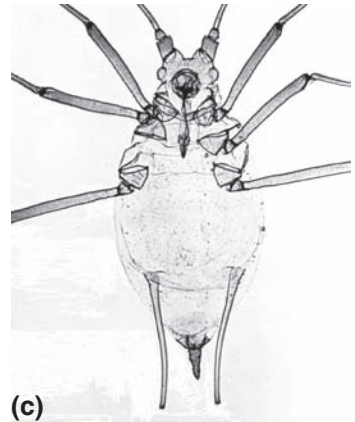
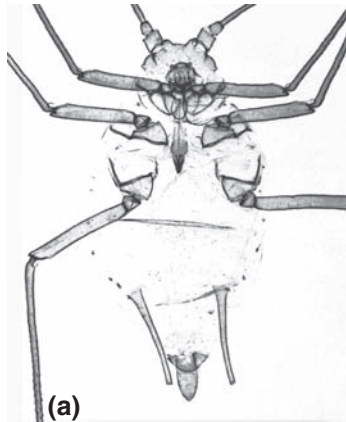


Plate 23. Aphidinae – Macrosiphini

(a) *Acyrthosiphon malvae*; (b) *Acyrthosiphon kondoi*; (c) *Acyrthosiphon gossypii*; (d) *Acyrthosiphon pisum*; (e) *Microlophium carnosum*; (f) *Ericolophium holsti*; (g) *Indiaphis crassicornis*; (h) *Metopolophium dirhodum*; (i) *Metopolophium palmerae*.

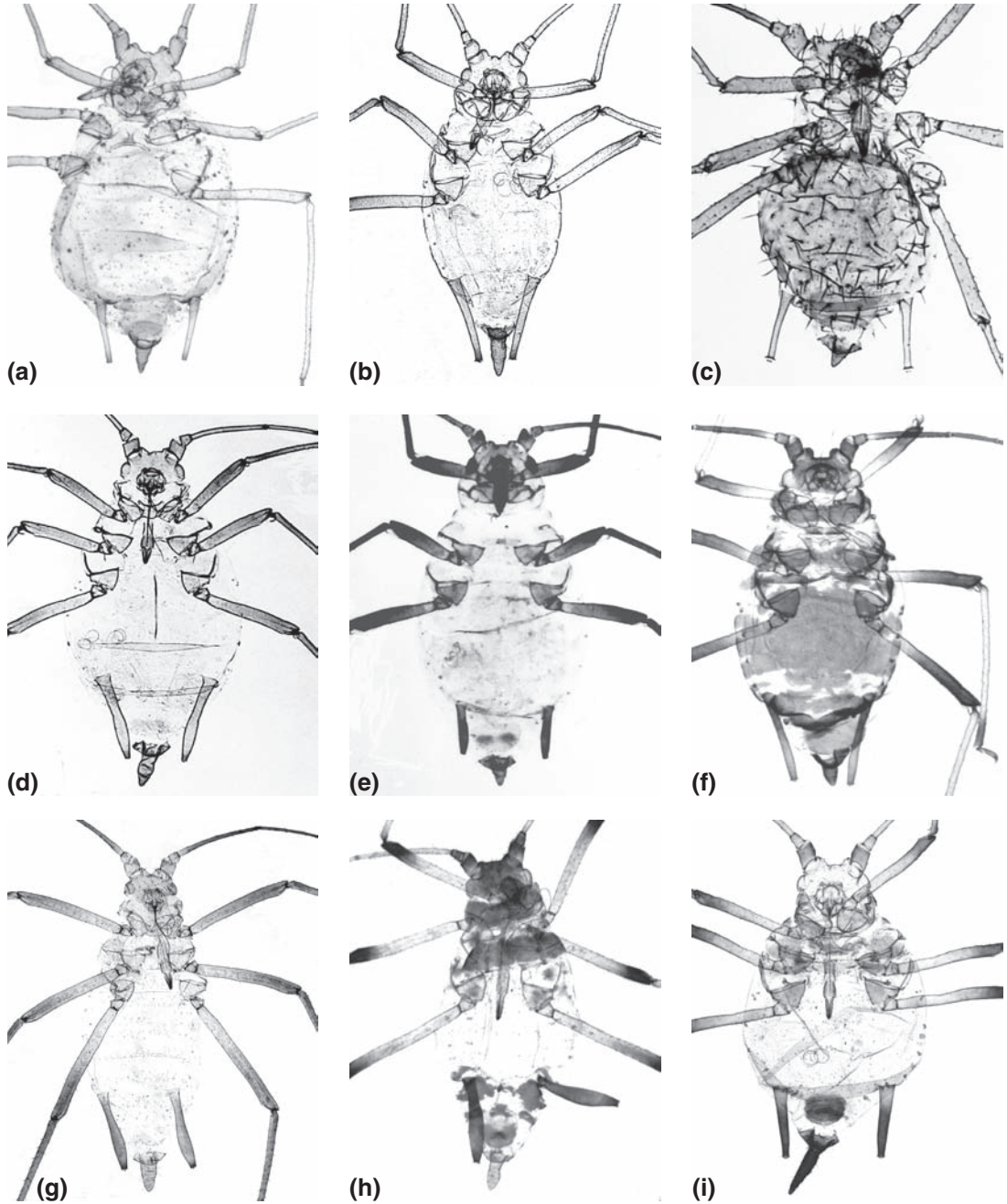


Plate 24. Aphidinae – Macrosiphini

(a) *Subacyrthosiphon cryptobium*; (b) *Rhodobium porosum*; (c) *Cryptaphis poae*; (d) *Wahlgreniella nervata*; (e) *Utamphorophora humboldti*; (f) *Taiwanomyzus montanus*; (g) *Amphorophora rubitoxica*; (h) *Amphorosiphon pulmonariae*; (i) *Sinomegoura citricola*.

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(a)



(b)



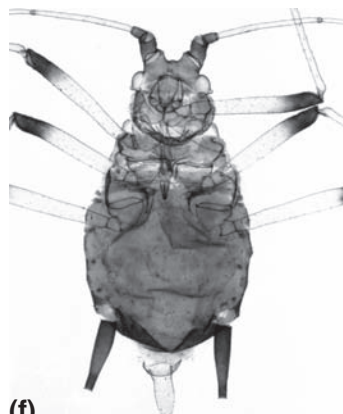
(c)



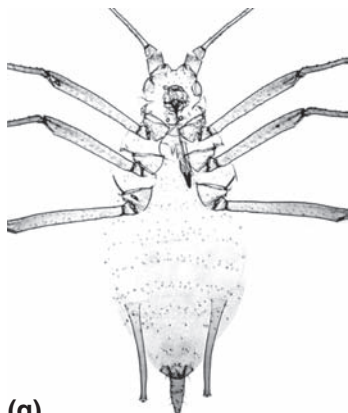
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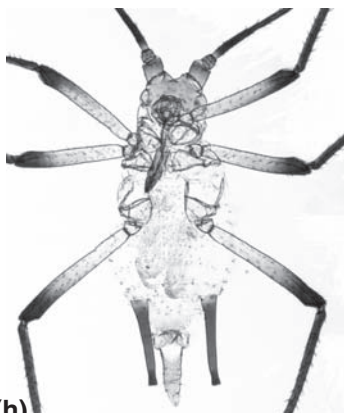
(e)



(f)



(g)



(h)



(i)

Plate 25. Aphidinae – Macrosiphini

(a) *Megoura lespedezae*; (b) *Megoura viciae*; (c) *Megourella purpurea*; (d) *Illinoia davidsoni*; (e) *Delphiniobium junackianum*; (f) *Impatientinum asiaticum*; (g) *Macrosiphum euphorbiae*; (h) *Macrosiphum pallidum*; (i) *Macrosiphum rosae*.

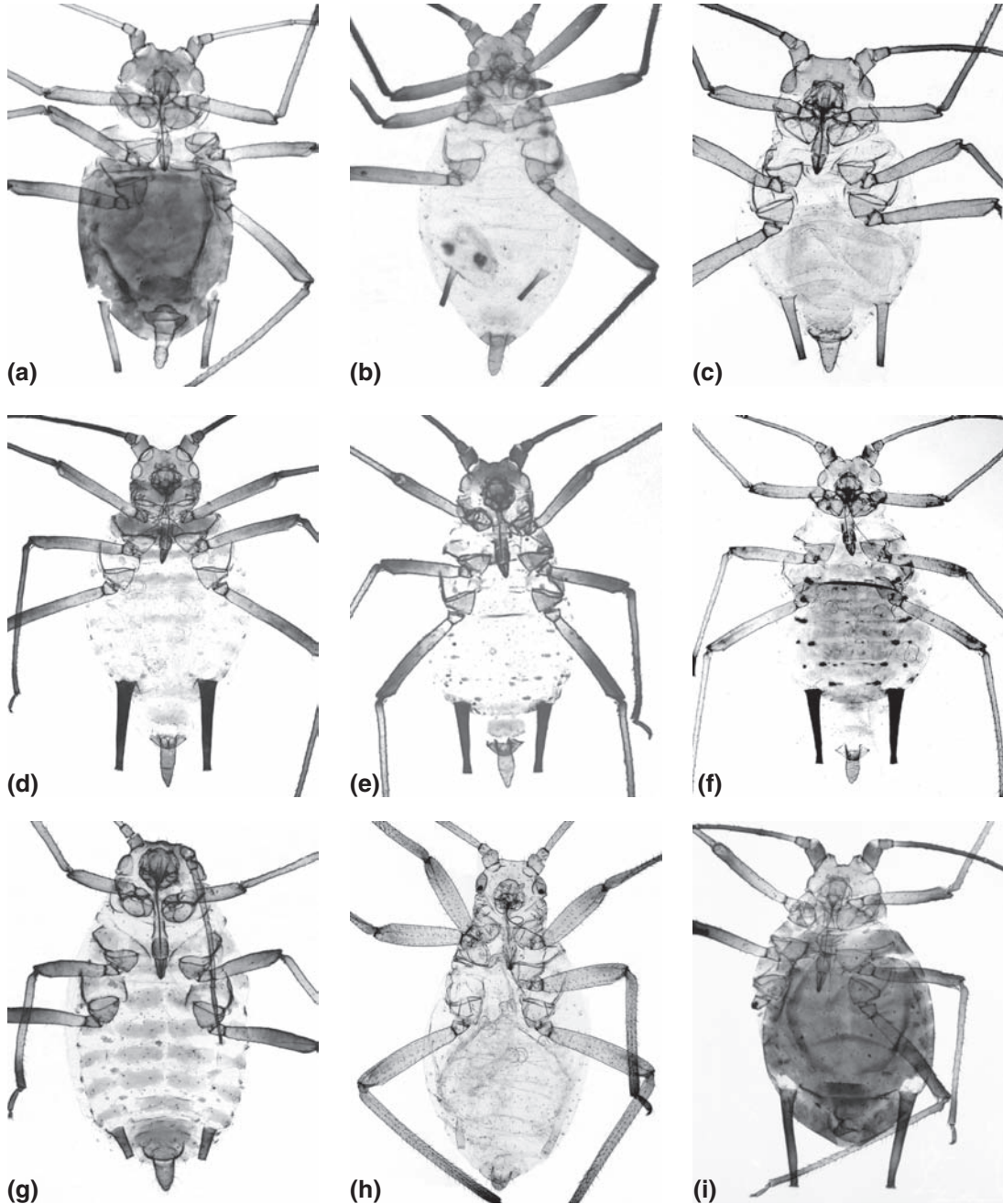


Plate 26. Aphidinae – Macrosiphini

(a) *Linosiphon galii*; (b) *Catamergus fulvae*; (c) *Papulaphis sleesmani*; (d) *Sitobion africanum*; (e) *Sitobion avenae*; (f) *Sitobion fragariae* (from grasses); (g) *Pseudaphis sijui*; (h) *Pseudocercidis rosae*; (i) *Anthracosiphon hertae*.

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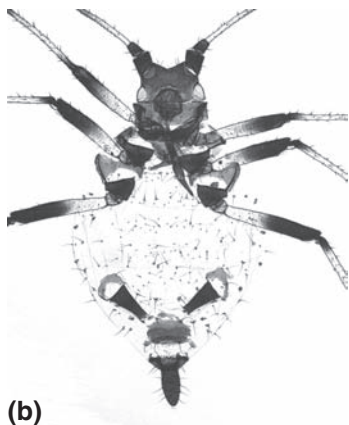


Plate 27. Aphidinae – Macrosiphini

(a) *Macrosiphoniella millefolii*; (b) *Macrosiphoniella sanborni*; (c) *Macrosiphoniella (Phalangomyzus) oblonga*; (d) *Macrosiphoniella (Phalangomyzus) tapuskae*; (e) *Paczoskia oblecta*; (f) *Staticobium staticis*; (g) *Metopeurum fuscoviride*; (h) *Microsiphoniella artemisiae*; (i) *Microsiphum millefolii*.

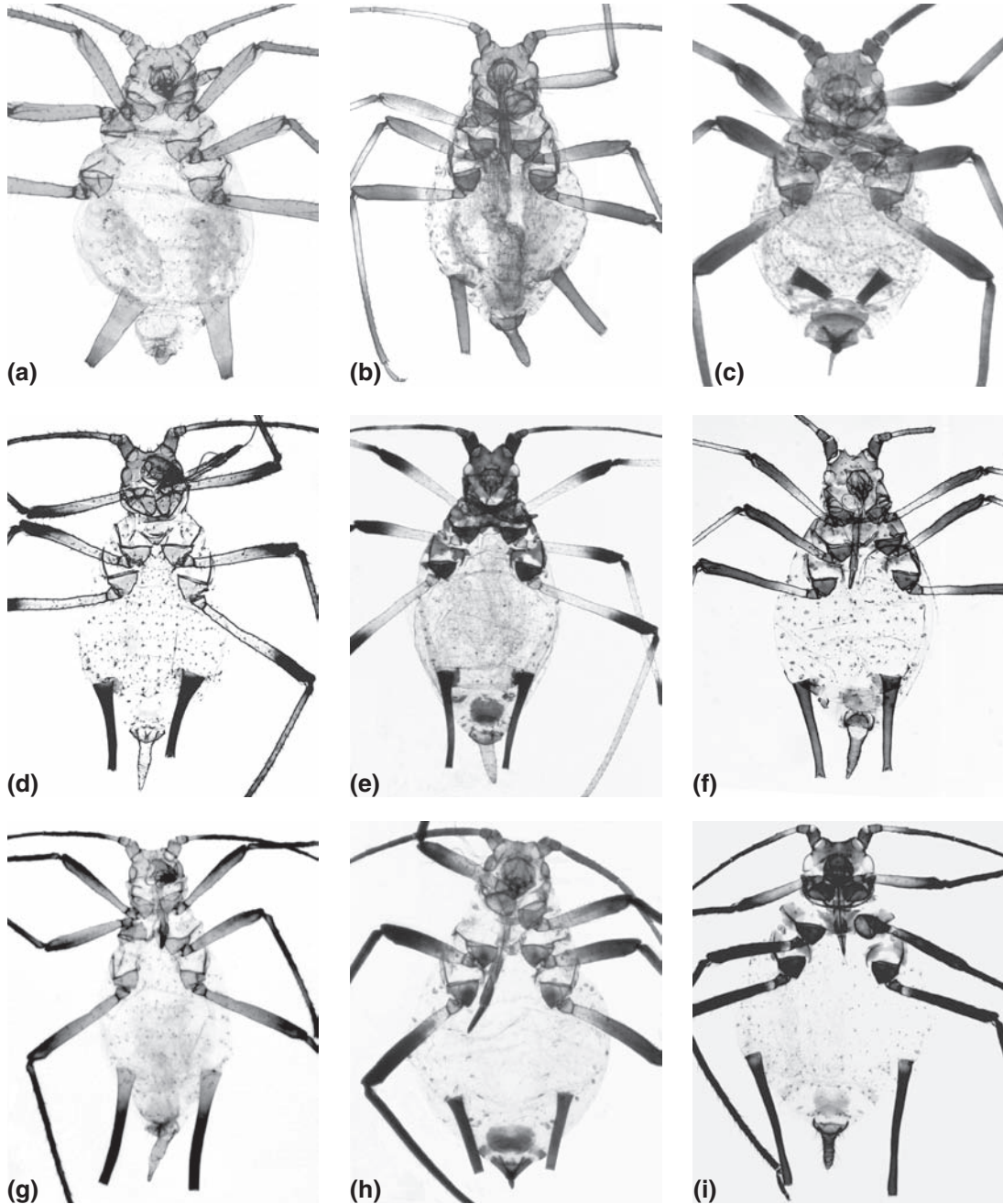


Plate 28. Aphidinae – Macrosiphini

(a) *Hillerislambersia darjeelingi*; (b) *Obtusicauda coweni*; (c) *Tshernovaia adenophorae*; (d) *Uroleucon ambrosiae*; (e) *Uroleucon sonchi*; (f) *Uroleucon (Uromelan) compositae*; (g) *Uroleucon (Lambersius) erigeronense*; (h) *Bipersona ochrocentri*; (i) *Titanosiphon artemisiae*.

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