THE GENUS CAPPARIS (CAPPARACEAE) FROM THE INDUS TO THE PACIFIC

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CONTENTS

SUMMARY

This is a taxonomic revision of the genus *Capparis* in South and Southeast Asia, Malesia, Australia, and the Pacific. In this area, four sections are distinguished: 1. sect. *Capparis*, monotypic with *C. spinosa*, 2. sect. *Sodada*, monotypic with *C. decidua*, 3. sect. *Monostichocalyx* in a new circumscription containing most of the species formerly included in sect. *Eucapparis*, with about 65 species in the area under revision, 4. sect. *Busbeckea*, with 12—14 species in all.

Of the 79 species recognized, 7 are new, viz. *C. cataphyllosa, cinerea, koioides, monantha, pachyphylla, rigida,* and *rufidula*, and 2 are elevated from varietal to specific rank, viz. *C. annamensis* (*C. grandiflora* var. *annamensis* Baker *f.*) and *C. pranensis* (*C. thorelii* var. *pranensis* Pierre *ex* Gagn.). Of the 11 subspecies recognized under *C. acutifolia, micracantha,* and *sikkimensis* 9 are newly described or new in rank, like 3 out of the 8 varieties under *C. loranthifolia, micracantha,* and *spinosa*. Under *C. brachybotrya*, 2 formae have been maintained, under *C. floribunda*, 1 is reduced. Three species, *C. dielsiana* with 2 varieties, *C. longipes*, and *C. muelleriana*, have been recorded as incompletely known besides.

Chapters on characters and internal relationships, and plant-geographic remarks have been added. All type specimens are cited with the names based on them, the other collections only as far as they are important for the knowledge of the distribution. Notes dealing with deviating specimens, nomenclatural problems, related species in Africa, &c. are given under the taxa.

Starting from the idea that solitary large flowers and a beaked ovary with relatively many carpels, the presence of empty spiny bract-like cataphylls at the base of a shoot, and straight thorns are primitive characters, an attempt has been made to devise a subdivision of Sect. *Monostichocalyx* into 7 tentative Groups to show their natural interrelationships and possible derivation.

It is regarded as most likely, that the genus, as represented in the area under revision, originated in southern India/Ceylon and/or Gondwanaland, and migrated into Australia, and later through the Indo-Chinese Peninsula to the northwest and northeast, and into Malesia.

An index to numbered collections has been added. *Hypselandra* Pax & Hoffm. (syn. *Meeboldia* Pax & Hoffm.) is reduced to *Maerua*. B.S. Sun's new taxa from China are discussed in an appendix.

INTRODUCTION

Capparis, by far the largest genus of the *Capparaceae* in the Old World [1]), has for a long time been in taxonomic neglect. Hooker *f.* & Thomson in the Flora of British India 1 (1872) 173—180, gave a good revision of 31 species, though they did not evaluate 9 older names based on Indian material. Gagnepain's Essai d'une classification des Capparis d'Asie, in Morot, J. de Bot. 21 (1908) 61—65, discussed characters and relationships of 43 species (36 in our present circumscription), but Gagnepain had a habit of forgetting about difficult things.

It was the late Dr B. H. Danser's intention to write up the family for the Flora Malesiana, but his death in 1943 prevented this. An actual beginning was made by his pupil, Dr P. Buwalda in 1946 upon his repatriation from Japanese captivity. That work was about halfway, when Buwalda in 1947 died. When I left for Bogor, Indonesia, in 1955, Dr C. G. G. J. van Steenis handed me Buwalda's manuscript, which I worked up and completed for the Flora Malesiana I, 6 (1960) 61—105.

In the course of that study it became clear that the problems in *Capparis*, the most intriguing genus, could not be solved without knowledge of the species in the dry regions adjacent to Malesia. Thus, following the species under revision throughout their area, the only satisfactory way of working, it became soon apparent that the present study should cover the whole of the OldWorld. I had to exclude Africa and Mediterranean Europe for practical reasons only. The arid borderlands between these countries and Asia must therefore be the western limit of this revision. It is crossed by few but difficult species: *Capparis decidua*, *sepiaria*, *spinosa*, and *tenera*, and these will have to be well scrutinized by students of the African and Mediterranean flora. Meanwhile, a few occasional remarks relating to African *Capparis* have been inserted.

In 1961 a 22-page mimeographed booklet under the title 'Provisional keys to Capparis in Asia and Malaysia' was issued by the Flora Malesiana Foundation. It represents the subfinal stage of the present work, and has no pretention of being any regular publication. Two of the new MS. names in it have since been withdrawn. *Capparis cochinchinensis* has been reduced to *C. diffusa* and *C. marginalis* has become *C. annamensis;* besides, several other alterations were made.

During the preparation of this thesis I had the opportunity to examine what I believe is most of the literature on the subject, the cited references representing a selection. As for the examined material, amounting to *c.* 800 collections from Malesia and 2800 others, my only regret is not to have seen the Banks Herbarium in the British Museum.

It is a great privilege to acknowledge here with gratitude the substantial support received from the Dutch Organization for Pure Scientific Research (Z.W.O.), which enabled me to visit, on the way back to Holland in 1958, the Herbaria at Florence, Geneva, and Paris, and subsequently in 1959 and 1961 the Herbaria at Kew and the British Museum, London.

Professor Dr H. J. Lam, the former Director of the Rijksherbarium, Leiden, and Professor Dr C. G. G. J. van Steenis, Director of the Flora Malesiana Foundation and present Director of the Rijksherbarium, are here remembered for their generosity, enabling me to carry out this work as a part of my official duty. Particularly to Dr van Steenis I am indebted for much more, in fact, as a botanist I owe almost everything to him.

Gratefully acknowledged help was also received from Miss Emmy van Nieuwkoop, who typed out great parts of the manuscript, and from Miss Ruth van Crevel, who with her well-known artistic skill made the drawings from sometimes badly dried material.

[1]) *Maerua*, with nearly half the number of species, runs second.

LIST OF THE HERBARIA OF WHICH MATERIAL WAS EXAMINED

Material of the following herbaria was examined and their cooperation is here gratefully acknowledged. Institutes which I personally visited have been marked with an asterisk *.

A, Arnold Arboretum, Cambridge, Mass., U.S.A.
ABD, Department of Botany of the University, Aberdeen, U.K.
AD, Botany School, University of Adelaide, South Australia.
ASSAM, Forest Herbarium, Shillong, Assam, India.
BKF, The Forest Herbarium, Bangkok, Thailand.
BLAT, The Blatter Herbarium, St. Xavier's College, Bombay, India.
BM, British Museum (Nat. Hist.), London, U.K. *
BO, Herbarium Bogoriense, Bogor, Java, Indonesia. *
BRI, Botanic Museum and Herbarium, Brisbane, Australia.
C, Botanical Museum and Herbarium, Copenhagen, Denmark.
CAL, Indian Botanic Gardens, Howrah, Calcutta, India.
CGE, Botany School, University of Cambridge, U.K.*
DD, Forest Research Institute and Colleges, Dehra Dun, India.
E, The Royal Botanic Garden, Edinburgh, U.K.
FI, Herbarium Universitatis Florentinae, Florence, Italy. *
G, Conservatoire et Jardin Botaniques, Geneva, Switzerland. *
GH, The Gray Herbarium of Harvard University, Cambridge, Mass., U.S.A.
K, Herbarium of the Royal Botanic Gardens, Kew, U.K. *
KEP, Forest Research Institute, Kepong, Malaya. *
L, Rijksherbarium, Leiden, Netherlands. *
LWU, National Botanic Gardens, Lucknow, India.
MEL, National Herbarium of Victoria, Melbourne, Australia.
MH, Madras Herbarium, Coimbatore, India.
MICH, University Herbarium, Michigan, Ann Arbor, Mich., U.S.A.
P, Muséum National d'Histoire Naturelle, Paris, France. *
PNH, Philippine National Herbarium, Manila, P.I.
PUH, Herbarium, College of Liberal Arts, Quezon City, P.I.
SAN, Forest Department, Sandakan, North Borneo.
SAR, Sarawak Museum, Kuching, Sarawak. *
SING, Herbarium of the Botanic Gardens, Singapore, Malaya. *
TI, Botanical Institute, Faculty of Science, Tokyo, Japan.
U, Botanisch Museum en Herbarium, Utrecht, Netherlands. *
UC, Herbarium of the University of California, Berkeley, Cal., U.S.A.
US, National Museum, Smithsonian Institution, Washington, D.C., U.S.A.
W, Naturhistorisches Museum, Vienna, Austria. *
ZT, Institut für spezielle Botanik, Zürich, Switzerland.

THE CHARACTERS IN CAPPARIS

1. **Innovation** is here used as a term to denote the very young twigs with leaves as well as the young inflorescences. If an indumentum is present, it covers the innovations evenly although it disappears at very different stages. Sometimes the base of an innovation is surrounded by cataphylls, discussed in § 7.

2. The **twigs** are slender, straight or zig-zag from node to node; this is more or less a specific character, the latter condition correlating with strong thorns. The twigs are terete (rarely angular when young) and smooth, but warty in *C. radula*. The bark does not develop cork before the leaves in that part have fallen.

3. **Heteroblasty.** In Sect. *Monostichocalyx* some species (*C. diversifolia, micracantha, quiniflora, sepiaria, zeylanica*) may produce sterile shoots with linear leaves. It is not certain whether this property is regular for seedlings of those species. The strange and apparently local phenomenon is recommended in the attention of field workers.

Several species in Sect. *Busbeckea* produce sterile juvenile shoots. These are mostly hairy, have acicular thorns (only in *C. mitchellii* recurved) tending to distichy; the leaves are subsessile, ovate-cordate and mucronate, or linear. The fertile shoots of such species are unarmed, the leaves spirally arranged, petiolate, with a narrow base. The small-sized species *C. humistrata* and *thozetiana* have fertile twigs of the juvenile kind, which may be explained as precocious flowering. In *C. nobilis* the primary shoots seem to be of the adult kind.

In any species, scrutinizing field workers may bring news.

4. **Habit.** *Capparis spinosa* is procumbent, *sepiaria* is shrubby, *scortechinii* is a climber, *lucida* a tree. To all these kinds, names of other species can be assigned with more or less certainty. Most species are sprawling shrubs, and presumably it depends on the habitat whether or not they will become climbers. The maximum height probably does never exceed about 10 metres.

5. The innovations are mostly clad with a typical kind of **indumentum** which mostly disappears at a time that varies with the species, but this is less so in Sect. *Busbeckea*: if such a plant is not glabrous from the beginning, the hairs are generally long-persistent.

The indumentum remains longer on the inflorescence than on the twigs, and there longer than on the leaves, and there the upper surface is invariably glabrescent before the lower. Vestiges of indumentum are often found in corners near the leaf axils.

The shape of the hairs and their colour is often specific, although rarely the colour may change from red-brown in the younger parts to grey in the older (*C. zeylanica*). In *C. spinosa* the hairs are floccose, if mostly simple, sometimes giving the innovations a jelly-like aspect. In the Zeylanica-Subgroup of the Seriales, the hairs are stellate; in the Cataphyllosa-Group we often find 2-armed balance-hairs. *Capparis beneolens* is unique for its red hammer-hairs with a long end and a short.

6. The **thorns** are never caducous, but in many cases wanting or abortive. This is mostly the case in fertile twigs, although in *C. lanceolaris*, if only in Java, the thorns in the inflorescence are particularly well-developed. It is evident that thorns can seldom be used as a character in the key. If they are present, however, their shape and direction is constant, except in the erratic species *C. rotundifolia*.

With their stipular nature in view, we regard straight, acroscopic thorns as more primitive than recurved or wanting thorns.

Unfortunately, collectors neglect the parts of the plant that bear, for our purpose, the finest thorns. Plants sometimes seem to develop long vegetative shoots with very large thorns which persist for years and grow with the knob whereon they sit, attaining 1 cm or so in length, while the fertile twigs are practically unarmed. This property may also be specific.

7. **Cataphylls** (or *Niederblätter* in German) are the reduced or modified first leaves produced by a shoot; here the term denotes the small subulate bract-like scales that surround, in some species, the base of an innovation, whether fertile or sterile. The presence or absence of these cataphylls is a useful specific character in many cases, here for the first time introduced. In *C. micracantha* and *olacifolia*, flowers may be replaced by small bunches of cataphyll-like scales. Bracts and bracteoles (which should be termed hypsophylls, in this context) often perfectly match the cataphylls at the base of the inflorescence.

Seeing that the species which we consider advanced on account of other characters, like *C. beneolens, echinocarpa, erycibe, floribunda, lasiantha, quiniflora, urophylla*, have no cataphylls, we are inclined to regard their presence as a primitive character. This is in accordance with the general idea about the meaning of presence or absence of organs.

8. The length of the **petiole** varies from 2 mm to 2½ cm or occasionally more. The petiole is concave above and more or less specifically light- or dark-coloured in the dried state. As for the indumentum, the petiole matches the twig near the place of its insertion.

9. The leaves develop gradually or in distinct **flushes,** depending on the climate. Sometimes the young leaves are flaccid. Mostly the leaves develop simultaneously with the flowers or earlier, but in *C. zeylanica* the growth of leaves is mostly checked before and during anthesis; the plant seems then to bear spears with nothing but flowers. In the dry season part of the leaves are shed, presumably proportional to the intensity of the drought. Incidentally a *Capparis* has been reported to be completely bare in the dry season.

10. The **phyllotaxis** is mostly 2/5, but there are tendencies to distichy, weak in *C. acutifolia* and *urophylla*, stronger in *C. lobbiana*, *pyrifolia*, and *tenera*, very strong in *C. sarmentosa* and the juvenile shoots in Sect. *Busbeckea*, where the leaves are perfectly distichous on the lateral branches.

11. As for **leaf texture,** each species has fairly well its own kind. There is some correlation with the humidity of the environment, but even in rain forest species the texture is surprisingly strong and parchment-like when fresh.

12. The **shape of the leaves** is variable and not very specific, in this sense that there are remarkably few species wherein the leaves are ovate without exception (*C. acutifolia* ssp. *bodinieri*, *echinocarpa*, *olacifolia*, *siamensis*). Exclusively obovate leaves have not been found, and most species have ovate and obovate leaves with all kinds between.

The proportion between length and width is a character of fair constancy. The size of the leaf in one species varies, like most organs in *Capparis*, with a factor 1½—2, sometimes 3, exceptionally 4.

One of the strangest phenomena in the genus is the fact that in several species the plants from the Andaman Islands have about 1½ times as large leaves as elsewhere in their area.

The leaf base is far more often cuneate in Sect. *Busbeckea* than in Sect. *Monostichocalyx;* in the latter the leaf top is far more often acuminate than in the former. A few special characters in the leaf top are specific: the notch in *C. sepiaria*, the leathery tip in *C. micracantha* ssp. *micracantha*, more distinct in *C. zeylanica*, and the caudate tip in *C. urophylla*.

13. **Nerves.** As the midrib is always raised beneath, the descriptions refer to the upper surface, where it is often sunken to a specific degree. Besides, it displays other characters of specific value; these are hard to describe in brief, but useful to study when fragmentary specimens must be compared.

The nerve-pattern is a common one in this family, with a few specific variations. There is a weak nerve near the very base of the leaf, then under an angle of about 60°, a variable number of 3—10 nerves on either side (for convenience denoted as 'pairs' although this is not true) depart from the midrib to become archingly connected near the margin; they peter out towards the top. Between two nerves there is mostly a weaker vein. There are several variations: the first 2—3 nerves depart from the very base of the leaf (*C. siamensis*); the nerves make a sharper angle with the midrib (*C. diversifolia*); the intermediate vein may be suppressed (*C. grandis, quiniflora*); the arching nerve may be suppressed (*C. grandis*), or very strong (*C. buwaldae*); the lower nerves may be very strong and the higher nerves suppressed (*C. trinervia*, which is, by the way, quite variable in venation).

The visibility of the reticulation in the dried state is to a certain degree specific and but partly dependent on the leaf texture. Many minor vegetative features of species are as typical as difficult to describe.

The shine of the upper surface is in several cases quite specific, too.

14. The **colour** of the dried vegetative parts is quite characteristic. Thus in the Moonii-Group a brown-purple tinge pervades all vegetative parts. The leaves are often concolorous, like in *C. micracantha* which is recognizeable from its yellow-green tinged leaves alone (although they are dark green when fresh), rarely discolorous like in *C. pranensis* where the upper surface is dark green, the lower purple-brownish.

In *C. lucida* and others the flowers remain white throughout anthesis; in *C. zeylanica* the stamens never fail to turn pink. But often differences among one species are on record, the flowers varying from white to yellow to pink to reddish. Sometimes this can be explained by the blotch on the upper petals which starts yellow and turns dark purplish or red or brown in the course of the day, while the rest of the flower remains white.

The colour of the fruit is often hard to gather from field notes because practically no collector notes the state of ripeness of his fruit. The present descriptions refer to fresh material. There is quite a variation: yellow fruits in *C. lasiantha* and *scortechinii*, orange in *callophylla* and *floribunda*, red in *decidua*, *zippeliana*, and many others, purple in *grandis*, dull brown-violet in *lucida*, blackish in *acutifolia* and *lobbiana*.

15. The **inflorescence** is racemose; there are a number of patterns played round by a considerable variation. The simplest condition is the twig with solitary flowers in the leaf axils (Brevispina-Group; fig. 1). Specialization may involve the grouping together of flowers towards the top of a twig, or serial multiplication of flowers in a basal direction. These lines of specialization occur more or less independently in several Groups.

The pedicels are comparatively long, and generally subtended by a small caducous bract which may have two basal bracteoles (in this genus, like in *Crateva*, obviously homologous with stipules). Solitary and serial pedicels bear no hypsophylls, but in some species, like *C. micracantha*, flowers may be replaced by a bunch of bract-like scales.

In nearly all non-serially flowering species the preference of the flowers for the top of a twig is apparent. The result is a terminal corymb (*C. moonii*, fig. 2; most of the Sect. *Busbeckea*) of which the rhachis may be somewhat clavate (*C. roxburghii*, fig. 4), or a terminal raceme (*C. klossii* and *scortechinii*, fig. 5) which may become very well-defined (*C. assamica*, fig. 6). Another line leads to the production of short lateral twigs with apical flowers. The **subumbels** are a sort of inflorescential units. Rarely are they solitary and terminal (*C. diffusa*, fig. 3), but often there are a few, each subtended by a more or less reduced leaf in the apical region (*C. formosana*, *zippeliana*). Some other leaves may subtend solitary flowers, so that leafy panicles are formed (*C. lanceolaris*, fig. 14); when the leaves are reduced a well-defined terminal stalked panicle is the result (*C. erycibe*, fig. 16). In a few species, most of the subumbels are lateral (*C. lobbiana*, fig. 15). Many intergrades between these stages considerably aggravate the task of describing such inflorescences. Another line of evolution results in the contraction of a flowering twig to a short, axillary, densely-flowered rhachis (*C. decidua*, fig. 9). A few specimens of *C. pubiflora* possess both such small leafy twigs with solitary flowers and the small axillary flower bunches which are typical for that species (fig. 8). The thicker axillary rhachis of *C. brachybotrya* (fig. 7) may be due to convergence. One plant of *C. brachybotrya* was seen to have two of such rhachises serially arranged one above the other. This shows that the serial arrangement of flowers in *Capparis* is merely convergence. This idea is confirmed by the observation that in *C. lasiantha* and *olacifolia* (fig. 10) solitary as well as serial flowers occur, sometimes on the same plant. Besides, contrary to other inflorescence types, no correlation between serial flower arrangement and other properties could be detected. This obviates its value as a character for subdivision.

The **flowers in a row** always open from top to base. There is little correlation between

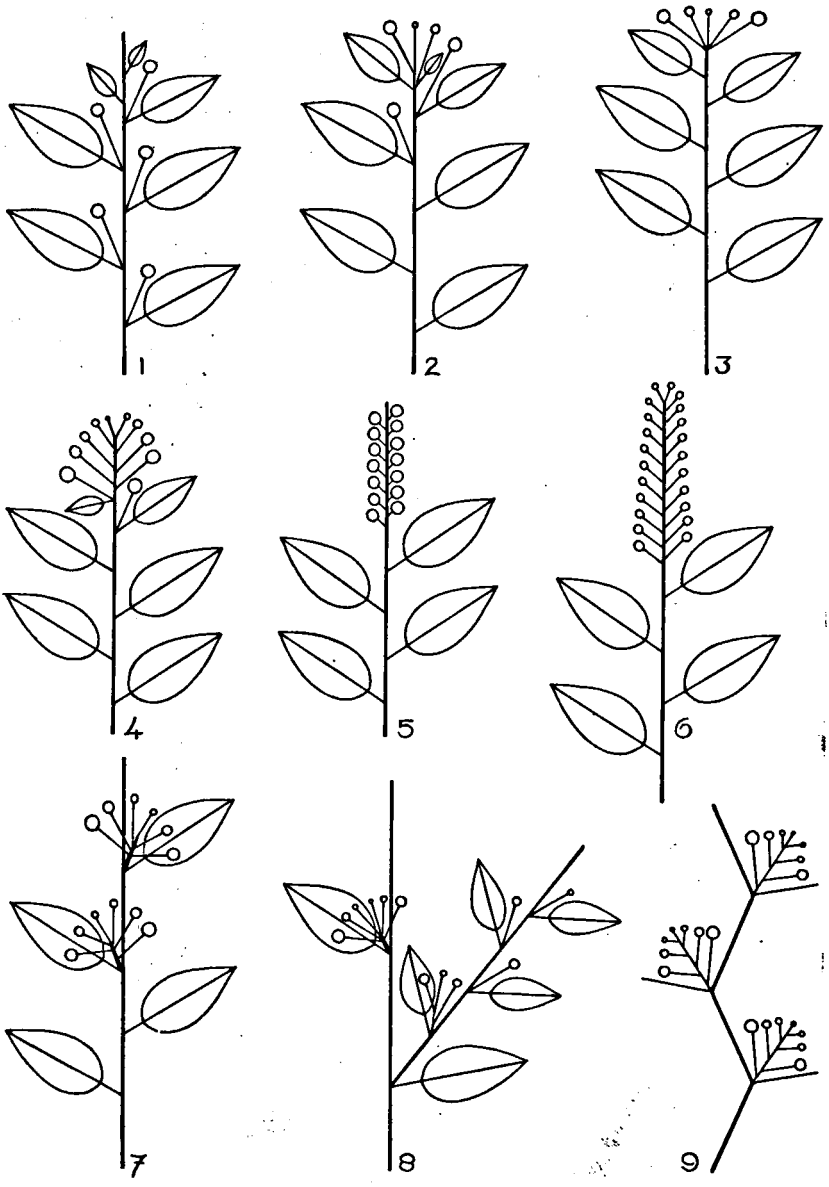


Fig. 1—9. Inflorescences in *Capparis* species, schematic. 1. *C. grandiflora*, 2. *C. moonii*, 3. *C. diffusa*, 4. *C. roxburghii*, 5. *C. burmanica*, 6 & 7. *C. brachybotrya*, 8. *C. pubiflora*, 9. *C. decidua*.

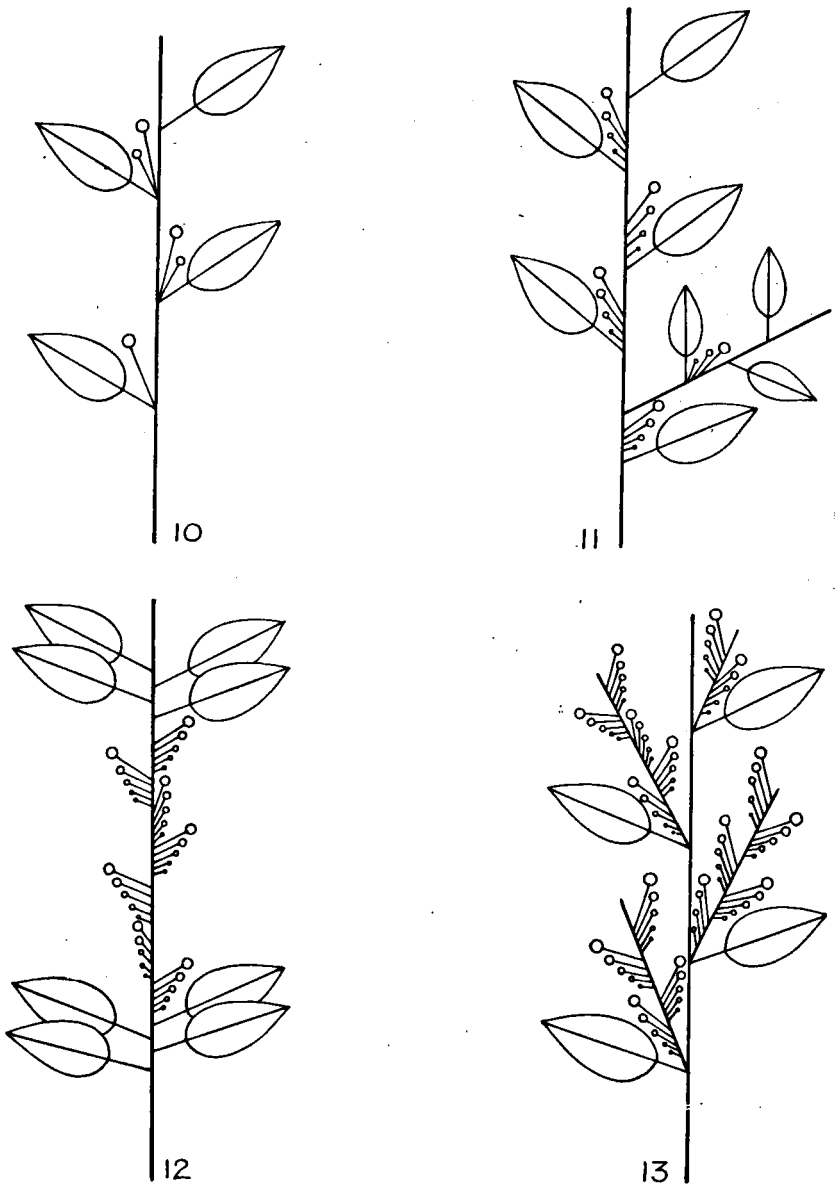


Fig. 10—13. Inflorescences in *Capparis* species, schematic. 10. *C. olacifolia*, 11. *C. quiniflora*, 12. *C. multiflora*, 13. *C. rufidula*.

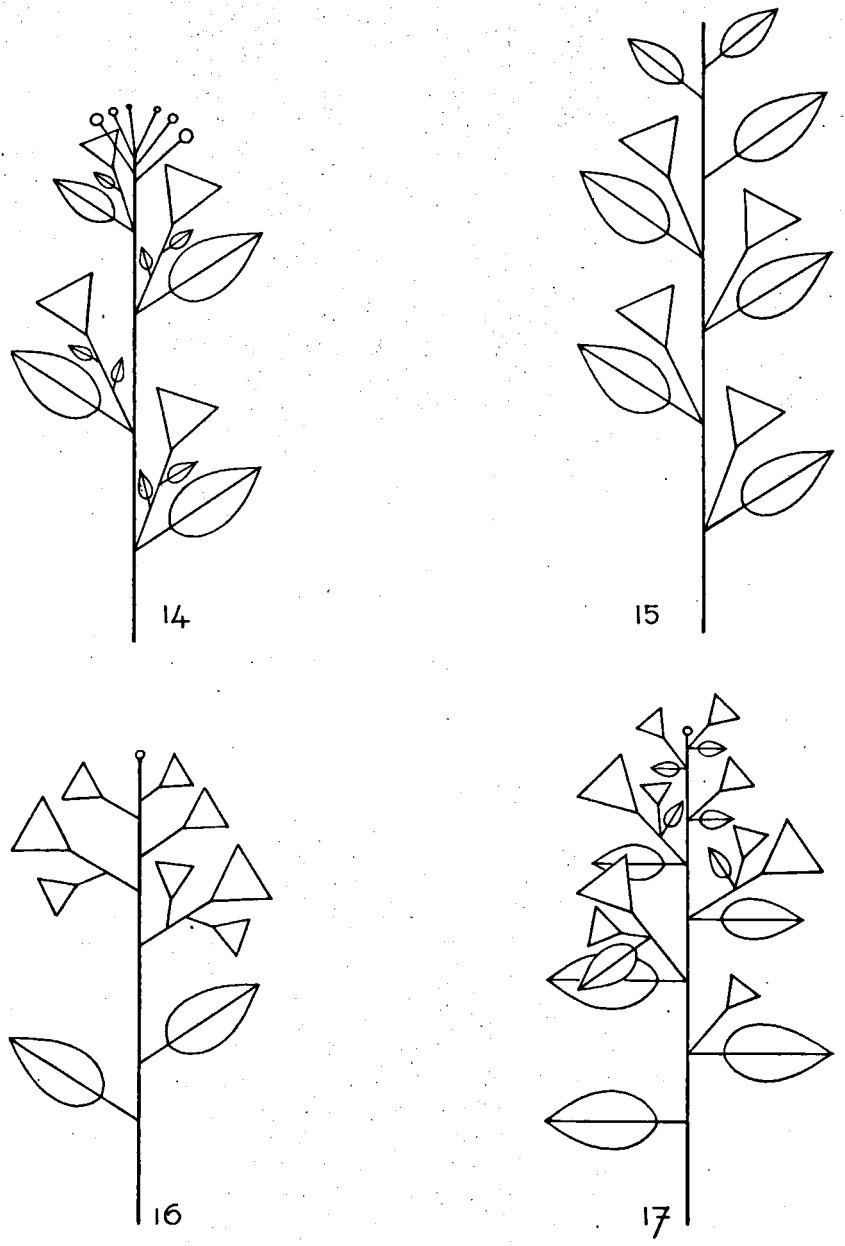


Fig. 14—17. Inflorescences in *Capparis* species, schematic. A triangle symbolizes a subumbel. 14. *C. lanceolaris*, 15. *C. lobbiana*, 16. *C. erycibe*, 17. *C. cataphyllosa*.

their size and number in one row, which varies from 2 to 12 in the genus. It is remarkable that sometimes as an exception instead of the apical flower in the row, a twig develops (*C. quiniflora*, fig. 11). Dr F. Weberling told me that serial multiplication of flowers is not uncommon in *Rubus* and other genera.

Several species show retardation in development of the leaves in the floriferous part of the twig. In *C. multiflora* (fig. 12) the flowers develop in a leafless segment of a twig that is to grow through, so that the fruits are borne between two tufts of leaves. In *C. rufidula* (fig. 13) the flowers are borne serially on special thin lateral twigs; apparently the leaves on such twigs do not develop or are early shed. *Capparis zeylanica* was mentioned in § 9.

The flowers that do not set fruit will be shed; their pedicels leave a scar in the row.

16. The **calyx** consists of the outer (median) and the inner pair of sepals. The pairs are unequal if the outer pair covers most of the inner pair, or subequal. The sepals of the outer pair (connate in bud in Sect. *Busbeckea*) are mostly mutually equal, but in Sect. *Capparis* the protraction of the adaxial (odd) sepal may cause a considerable zygomorphism in the flower; this tendency is also found in Sect. *Sodada*, and slightly in species of Sect. *Monostichocalyx*. In some specimens of *C. zippeliana* one of the outer sepals surrounds the others for two thirds. The inner sepals are always mutually equal, thinner, and in *C. divaricata* and *loranthifolia* more or less petaloid.

Particularly in *C. floribunda* does the calyx often persist somewhat longer than the corolla.

The size of the sepals (measured right across), and hence of the mature bud, is one of the best floral characters, and more or less constantly proportionate to the size of the other parts of the flower.

Before anthesis the calyx envelops the corolla, except in *C. brevispina*, where the sepals of the mature bud cover the petals for no more than one third.

17. The **corolla.** The pedicel always turns so that the adaxial part of the flower, with its small disk, is topside. Hence the two adaxial petals are here termed the upper pair, often slightly different from the lower, abaxial pair.

The prevailing structure (in small-flowered species the corolla may be practically actinomorphic) of the corolla can be visualized by means of 2 rectangular scraps of paper, of 10 by 3 cm, and a coin; the latter represents the disk. Press it to the paper in the lower left-hand corner, and fold the paper obliquely backwards, along the broken line in the figure. This represents the right upper petal, as seen from the left. A mirror-image of the first scrap, pressed to the other side of the coin, serves as the left petal. Drawing the blotch completes the picture (fig. 18).

The upper petals, conjoining with their base to surround the disk, leave a very narrow frontal slit between, enabling insects with a suited tongue to extract the nectar.

The lower petals are sometimes slightly longer and narrower than the upper, always directed obliquelly downwards and even-coloured.

In Sect. *Busbeckea* the petals are often wider than in Sect. *Monostichocalyx* and less regularly shaped; the upper pair seems not to enclose the disk so neatly and to lack the colourful blotch.

Because of its tender texture and variability, the corolla has less value as a character for study in the herbarium.

18. The receptacle, here referred to as the **torus**, is slightly conical, varies in diameter with the size of the flower to 5—6 mm, and has no outgrowths except the adaxial, small, obscurely bilobed **disk.** This may attain ½—2 mm, but is in dried material often hard to trace. See also § 17.

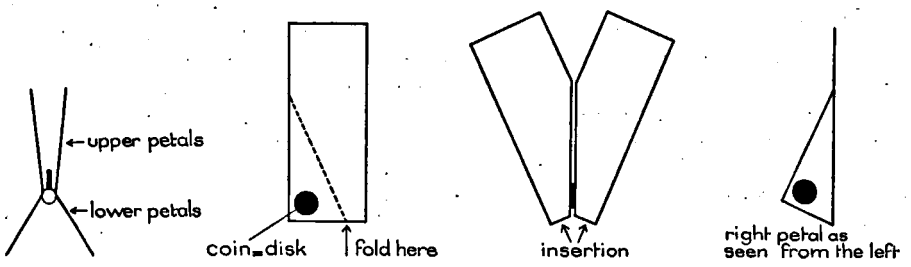


Fig. 18. How to make a *Capparis* flower.

19. The number of **stamens** is a character of some importance. It is surprisingly constant in the flowers of one plant. For a species it is, however, even where there are but 6—12, never invariable, and between species it differs enormously between 6 and 200. The relation between size of flower and number of stamens is none too close:

	Length of sepals in mm	Number of stamens
C. floribunda	2—4	7—9
C. quiniflora	4—5	7—8
C. pyrifolia	4—5	± 50
C. lanceolaris	6—7	± 20
C. burmanica	6—7	± 50
C. flavicans	6—8	± 20

although in the larger flowers there are always many stamens.

In bud, the filaments are sigmoid. As their length, after expansion, approximates that of the gynophore, the former figure has been omitted from the descriptions. Neither have the anthers been described, because they vary in size with the flower but are otherwise much the same.

20. The **gynophore,** functionally a singular means to elevate the stigma to the level of the anthers, offers good characters; in the same plant its length may vary with a factor 2, but it remains constant in length during the period from anthesis to fruit. The indumentum which may be on it at flowering time is highly specific. Already at anthesis the gynophore is sturdy in one species, filiform in another, and it is a specific character whether the gynophore will become incrassate and lignified in fruit, together with the pedicel, the whole being named the **stipe.** In *C. flavicans* the stipe may be as thick as 10 mm, far more than necessary to support the fruit.

In some species the gynoecium tends to abortion, some flowers having a gynophore of a few mm only, with a vestigial ovary.

21. After sufficient study, each species might be recognizeable by its **ovary** alone. The presence of an indumentum is independent from that on the gynophore, but equally specific. More important are three partially correlated characters, first the number of placentas or carpels (which is considered of more weight than the number of ovules), second the size, and third the shape of the ovary. From primitive to advanced we note three cases: 1) the large ovaries, i.e. over 4 mm long, always have 4 (to 8) placentas; only such ovaries may be furrowed, and end in a beak, 2) the ovaries of 2—4 mm have 3—4 placentas, 3) the ovaries of 1—2 mm have 2, sometimes 3, placentas, and are, like the former, always smooth and have no beak. Without ignoring *C. beneolens* with 4 placentas

in its ovary of 1¼ mm, some value may be attached to the above general rule. Except in *C. nobilis* and *radula* where it is mushroom-shaped, the stigma is mostly inconspicuous.

22. Only a fraction of the flowers develop into a **fruit**, which is a leathery berry with 1 or 2 to many seeds. The shape of the fruit is fusiform (mostly of 4 or more carpels and showing the sutures; primitive) to globose. Often a large ovary results in an umbonate fruit. The **pericarp** is relatively thick before maturity, gradually decreasing to its eventual thickness of 1—4 mm, proportional to the size of the fruit. In *C. scortechinii* the pericarp is 2—2½ cm thick and woody-corky. Mostly it is smooth, but within several species, particularly those of Sect. *Busbeckea*, there is a varying amount of fairly characteristic sculpture.

In many species the fruit is not or defectively known, and collectors should always take down the state of ripeness. Only in *C. spinosa* are there several, and in *C. lasiantha* many records of dehiscence; both species have fusiform fruits.

23. The **seeds** lie without order in the pulpy mass, in which at maturity no funicles seem to be discernible. Each seed is surrounded by an adherent layer of tougher pulp of about half its diameter. The seeds are asymmetrically reniform, dull brown and smooth (warty in *C. radula*); their size ranges from 4 by 3 by 2 cm (*C. beneolens*) to 23 by 17—25 by 10 mm (*C. scortechinii*).

24. **Concluding remarks.** Many species show a mixture of primitive and advanced characters. The gynoecium in *C. spinosa* is primitive, the calyx is certainly not. The inflorescence and corolla of Sect. *Busbeckea* are primitive, the calyx is not, nor is its heteroblasty. Contradictions of this kind can be resolved by shifting our point of view from the species to the characters which make them. For if there were no characters, there would be no taxa; a taxon as such exists through its characters, and is in fact nothing but a collection of properties (which it shares with other taxa) and of characters (which separate it from other taxa). The properties and characters can be presumed to have a history of their own connected with that of the chromosomes which have carried them, compared with which the taxa are short-lived.

It is therefore illogical to term a taxon primitive or advanced in the phylogenetical sense. A taxon is but a contemporary section through a bundle of genetic factors which manifest themselves in the present, more or less random combination. The taxonomic structure of a genus is better explained by showing what phylogenetic tendencies prevail in it, than by arranging all taxa according to their 'affinity'. From this point of view, the taxonomic structure of a group has not been elucidated before each of the characters that occur among it has been reasonably and convincingly given a place on an imaginary phylogenetic ladder. Rather than the species, the characters must be phylogenetically evaluated.

INTERRELATIONS AND SUBDIVISION

1. Against **De Candolle's distinction,** under his Section *Eucapparis*, of *Pedicellares*, *Corymbosae*, and *Seriales* (without statement of rank), based on the arrangement of the flowers, has never much been said. Three objections can be advanced: 1) with the arrangement of the flowers in *Corymbosae* and *Seriales* no other characters correlate; 2) the limits are not sharp, since species have been found with both solitary and corymbose flowers, and with both solitary and serial flowers; 3) some species, like *C. brachybotrya*, *burmanica*, *pubiflora*, *scortechinii*, have the flowers arranged in a way that does not fit into the system. The above subdivision is therefore abandoned, but still the arrangement of the flowers is regarded as one of the best points to start a new attempt from.

To be satisfactory, such an attempt would require the demonstration of far more characters to be phylogenetically primitive or advanced than I here can adduce. But even now it is apparent that some species contain more primitive or advanced characters than others. Such species could be placed together in a 'primitive' or 'advanced' group. Much the same situation then results as the one criticised in § 24 above, but the contradiction to which I pointed has been straightened out.

The Groups discussed in the sequel are tentative, particularly from the nomenclatural point of view. Part of the species placed in them are mentioned in the discussion, all of them being found in the synoptic key to the species of Sect. *Monostichocalyx* (p. 410).

The 'subdivision' given by Pax & Hoffmann (1936) is nothing but a partial copy of a key by Gilg & Benedict (1915) to the African species, and not worth discussing.

2. **The Brevispina-Group.** In § 21 of the foregoing we mentioned a correlation between some yet independent properties of the ovary: length over 4 mm, carpels 4 or more, apical beak present. If compared with other ovaries, the former are primitive according to the hypothesis that reduction of size, of number, and of organ parts is a widely spread evolutionary trend [1]). Such ovaries are found on plants where, as compared with other *Capparis*, the arrangement of the flowers seems quite unspecialized, namely solitary in the axil of a common leaf. Since the large size of the flowers may be caused by better nutrition, it is better left out of the present correlation.

This combination of primitive characters is shared by *C. annamensis*, *brevispina*, *grandiflora*, *monantha*, *siamensis*, and *spinosa*. In the last species, however, the calyx tends strongly to zygomorphy, and many more differences justify the placing of *C. spinosa* in a different section. The remaining species form quite a homogeneous group, *C. brevispina* having more primitive characters than the others, viz. cataphylls, straight thorns, a thin fruit stipe, and a thin pericarp. To stress the primitiveness of many features of the group, it has been named after *C. brevispina*.

If we consider a slight acropetaly of the flowers, or a low degree of serial multiplication not important enough to affect the pattern set by the characters of the five species mentioned, then *C. baducca*, *diversifolia*, *radula*, should be added. *Capparis flavicans* and *olacifolia*, of more remote affinity, will be discussed later.

From the ancestors of this group all other groups seem to have developed by modifying characters or by adding new ones along various evolutionary lines. The Brevispina-Group inhabits the Deccan Peninsula and Ceylon, with an important extension eastwards into the Indo-Chinese Peninsula, and one small outlier (*C. olacifolia*) in the Himalaya. In no other countries occur such 'primitive' species.

3. **The Section Busbeckea.** The connate sepals of *C. divaricata* account for the assigning of this South Indian species to the Australian section. Otherwise, *C. divaricata* would be placed in the Brevispina-Group in which it would take a place apart for the distinct juvenile shoots that it may produce; these shoots resemble those of the Australian *C. umbonata*. The size of the flowers and their arrangement match best with those of *C. moonii*. The third Indian species apt for comparison is *C. rotundifolia*, which has many advanced characters and extends into Burma and Cambodia, but is unique in Asia for its long, straight, acicular thorns which together with the small, ovate, cordate leaves cannot fail to recall the juvenile shoots of *Busbeckea* species.

Hence we conclude that the origin of Sect. *Busbeckea* is to be sought in or near the southern part of the Indian subcontinent.

[1]) The apical beak might be a mark of specialization as well. But firstly the gynophore, prevalent in the whole family, would make such a specialization rather superfluous, and secondly, this view cannot be fitted into a picture half as coherent as the above one.

4. **The Moonii-Group.** Large flowers are crowded towards the top of twigs which thus tend to develop into subumbels; ovary medium-sized without a beak, mostly consisting of 4 carpels, fruit and seeds large. The plants are mostly purplish tinged all over in the herbarium, the thorns recurved or reduced, the leaves bear sometimes a callous tip. Here belong *C. moonii, cleghornii, roxburghii*, all endemic in southern India/Ceylon, and the outliers *C. sikkimensis* from the Himalaya to Formosa, *C. callophylla* in Malesia and *C. zippeliana* in East Malesia and the Pacific; these three species form almost a continuum, derived from the South Indian stock.

5. **The Trinervia-Group.** From the Moonii-Group, a minor developmental line goes to *C. trinervia* and its allies *C. klossii, scortechinii*, and *viburnifolia*. They have in common a typical brown indumentum, large flowers in a primitive inflorescence, 4 placentas in a medium-sized ovary, recurved thorns, and often brown-tinged nerves in the leaf. Each species has its own specializations; the group ranges from Yunnan to Malaya and northern Sumatra.

6. **The Grandis-Group.** Presumably from old stock and but remotely affinite to the Brevispina-Group are two, perhaps three, loosely related species which have in common a typical short soft pubescence. Thorns are weak or wanting, the flowers are corymbose, medium-sized, with 2—3 carpels. *Capparis grandis* occurs from South India to Indo-China, where its closest relative, *C. mekongensis*, is endemic; *C. burmanica* is endemic in Upper Burma.

7. **The Cataphyllosa-Group.** A long developmental line can be drawn from the Brevispina-Group (particularly from the Southeast Asian cataphyll-bearing *C. siamensis*) to a number of species with specialized inflorescences which can be derived from the one in *C. pubiflora*. Here specialized lateral twigs with axillary flowers are step by step reduced to short axillary bracteate racemes. Cataphylls are present (hence the name of both the Group and *C. cataphyllosa*), the flowers comparatively small, with mostly 3 carpels. The indumentum in the group consists of balance-hairs or hooked hairs, the thorns are straight, the inflorescence is a longer or shorter axillary axis with small scattered or acropetal flowers subtended by thorn-like bracts and bracteoles; there are 2—3 carpels, the fruit is small and globose. All species seem closely related, only in some (*C. multiflora, rufidula*) there is serial multiplication of the flowers, in others (*C. cataphyllosa, cinerea, pachyphylla*) the inflorescence is subumbellate on a variously long stalk or rarely sort of paniculate. There is a striking resemblance between the two large-leaved species that extend to the north, *C. multiflora* having the flowers in rows of 7—10 on a bare twig between two tufts of leaves, *C. assamica* having the flowers not serial but in a long (sub)-terminal raceme.

The group occupies the eastern Himalaya to Yunnan, the mountains on the Assam-Burma border, and the Arakan Yoma, down to Tenasserim. More species of this group are expected from this area. Only *C. pubiflora* extends far into Malesia.

Capparis beneolens, very specialized and difficult to place, may have its closest connection with this group, for its peculiar red hammer-hairs.

8. **The Subumbellates.** From the Moonii-Group we can project another line which expresses the trend towards the grouping of flowers to subumbels. The Group has many species rich in advanced characters, for instance *C. lobbiana* from the Philippines and *C. dasyphylla* from Hainan, both having cordate short-stalked leaves, a dense indumentum, the pedicels few and thin. Like some others, they penetrate the rain forests as a new habitat. The flowers in the Group are medium-sized to small, the ovary has 2, seldom 3 carpels and no beak, the fruits are generally small and globose.

From the **Lanceolaris-Subgroup,** where the inflorescence is still a more or less

leafy panicle, the differentiation goes further, the flowers becoming more neatly subumbellate and smaller; then the subumbels themselves become leafless umbels. One developmental line leads to solitary axillary (rarely terminal) subumbels, like in the **Sepiaria-Subgroup,** another line leads by the gathering of umbels to the terminal panicle of the **Cantoniensis-Subgroup.** In *C. cantoniensis* there are still leaves in the panicle; the culmination of this development is in *C. erycibe*, wherein the panicle is leafless and pedunculate. Both species live in the rainforest, what I think is a relatively new habitat for the genus.

The centre of development of all these subgroups is the Indo-Chinese Peninsula and western Malesia, probably the perimeter of the original centre on the ancient Sunda-Shelf with its mosaic of wet and dry places. There are outliers to South India (*C. parviflora, floribunda*), the Sino-Himalaya (*C. cantoniensis*), and Australia (*C. lanceolaris*). *Capparis sepiaria*, the most successful species, surpasses all others in distribution.

9. The **Emended Seriales.** The species with serial flowers are the most difficult to interpret. Most of them have advanced characters, some are taxonomically isolated; however, a serial arrangement of the flowers does not imply a common origin of all the species endowed with it. *Capparis olacifolia* and *radula* belong definitely to the Brevispina-Group, *C. multiflora* to the Cataphyllosa-Group. Moreover, the number of flowers in a row is so variable within some species that it looses its value as a character. For convenience the name *Seriales* has been retained for a Group which is, as a whole, tentative; possibly the two Subgroups here distinguished should be kept further apart.

The plants of the **Micracantha-Subgroup** have simple hairs or no hairs, and cataphylls. Here belong *C. micracantha* with straight thorns, medium-sized flowers, and sutured sometimes fusiform fruits, with its close allies *C. buwaldae, cucurbitina*, and *rigida*, from Indo-China and Formosa to the Moluccas and Timor. Some characters in the Subgroup are suggestive of *C. radula* and *siamensis* of the Brevispina-Group, and there is a great resemblance between *C. micracantha* and *C. brachybotrya* of the Cataphyllosa-Group, the latter differing mainly in the short inflorescence axis, which occurs sporadically even serially in two's.

The origin of the **Zeylanica-Subgroup** is more obscure. The species bear stellate hairs of reddish or brownish colour often long-persistent, and no cataphylls. Here belong, besides *C. zeylanica* with its recurved thorns, comparatively large flowers, and mostly globose fruits not visibly sutured, its northern ally *C. acutifolia*, its southern ally *C. pyrifolia*, and *C. tenera*. On the southern hemisphere, on the SW. Pacific coasts two close relatives occur, *C. quiniflora* and *C. lasiantha*. *Capparis sarmentosa* must somehow have developed from the same stock, although its connections are still obscure; it may be a relict of a greater species complex.

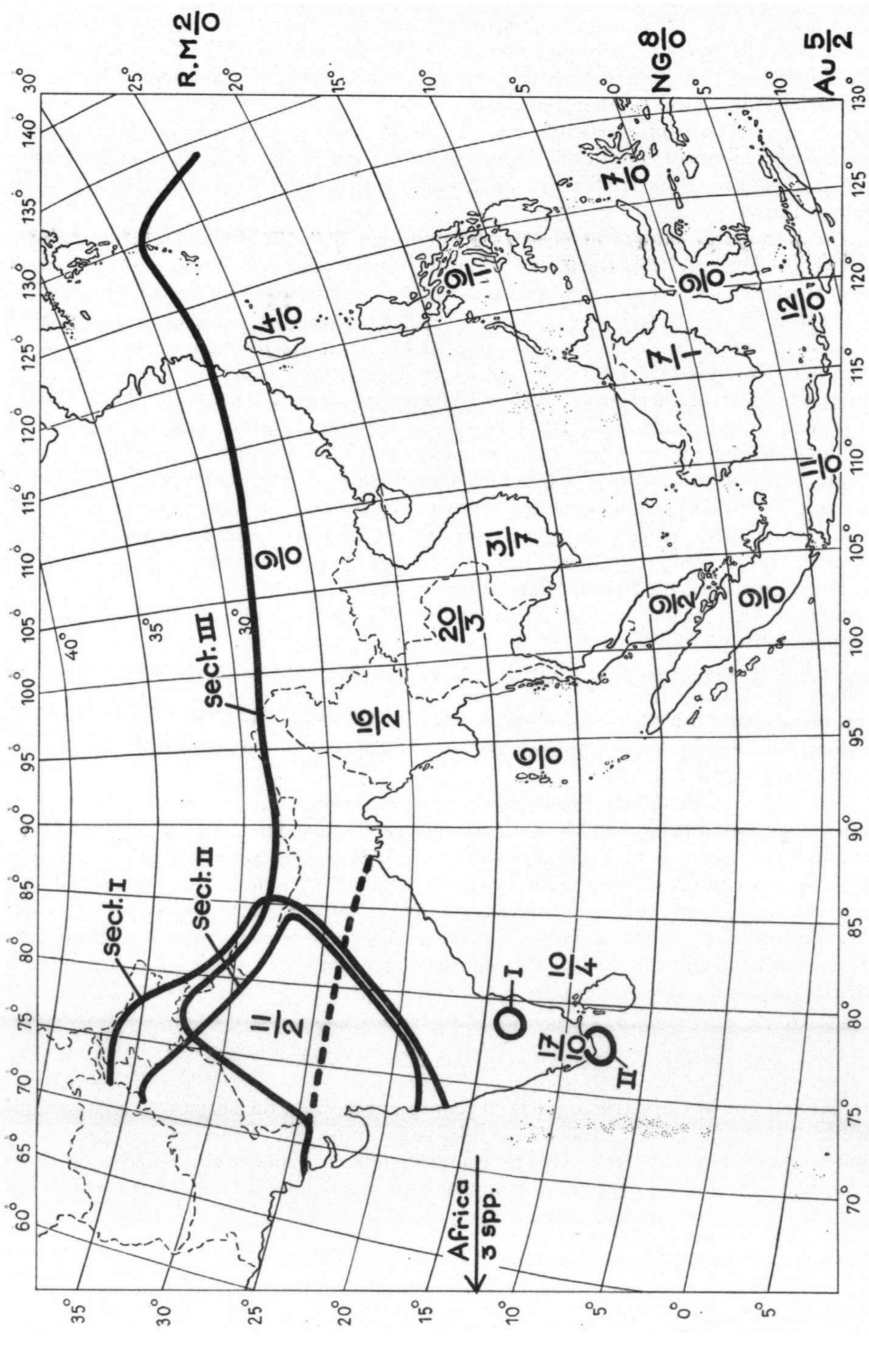
PHYTOGEOGRAPHICAL REMARKS

1. **Settlement of Capparis in parts of its present area.** In the chapter on relationships we have developed a few ideas on the relative primitiveness of the Groups in *Capparis*, and we have seen that certain Groups centre in different regions. If we may venture to reconstruct the possible sequence of population of these regions by *Capparis*, the following very tentative and imperfect picture emerges.

Most new Groups developed in:

a. Gondwanaland, southern India/Ceylon (*Brevispina-Group*).

b. Australia (Sect. *Busbeckea*).


R.M 2/0
NG 8/0
Au 5/2
Sect. I
Sect. II
Sect. III
Africa
3 spp.

c. Southern India/Ceylon (*Moonii-Group*).
d. Indo-Chinese Peninsula (*Brevispina-Group, Moonii-Group, Trinervia-Group*).
e. Indo-Chinese Peninsula-Philippines-eastern Malesia (*Moonii-Group, Subumbellates, Seriales-Group*).

Most new species developed in:

f. Southern China-Himalaya (*Moonii-Group, Seriales-Group*).
g. Sunda-Shelf (*Seriales-Group, Subumbellates*).
h. Australia (*Seriales: Zeylanica-Subgroup*).
i. Pacific (Sect. *Busbeckea*).
j. Indo-Chinese Peninsula (*Grandis-Group*).
k. Burma-Himalaya (*Seriales-Group, Cataphyllosa-Group*).

Recent immigrations of newly developed species into:

l. Australia (*Subumbellates*).
m. India (*Subumbellates, Seriales-Group*).
n. Pacific (*Seriales-Group, Moonii-Group*).
o. Pacific, Australia (recent introduction of *C. spinosa*).

2. The **areas of the four sections** under discussion are of three kinds: *a*) mainly southwestern Asiatic, Sect. *Capparis* and Sect. *Sodada*, *b*) mainly southern and southeastern Asiatic and African, Sect. *Monostichocalyx*, *c*) mainly Australian, Sect. *Busbeckea*.

3. The areas of Sect. *Capparis* and Sect. *Sodada* in India are surprisingly alike, being bordered in the east by the line Katmandu—Bombay, with an isolated station for both in the south of the Deccan Peninsula.

4. The 3 species of Sect. *Monostichocalyx* that are **common to Asia and Africa**, *C. acutifolia*, *sepiaria*, and *tenera*, have all close relatives in Asia and are wide-spread in the continent, at least as far east as the Gulf of Siam.

5. The **numbers of species** and endemics for each country or island group can be seen in fig. 19; the pattern for West Malesia has undergone a few alterations since the Flora Malesiana revision was published in 1960 (see there the map on p. 73).

6. **Endemism** is generally low. In Siam it amounts to 15 %. In Ceylon proper no species are endemic, but 4 Indian species extend to Ceylon. Six more species are endemic in southern India proper. If we consider the Deccan Peninsula and Ceylon as one whole, 59 % of the species there is endemic.

No taxon but *C. micracantha* var. *henryi* is endemic in Formosa.

The Sino-Himalaya is rather rich in endemics, namely *C. acutifolia* ssp. *bodinieri*, *C. burmanica*, *cataphyllosa*, *cinerea*, *multiflora*, *pachyphylla*, *rufidula*, *sikkimensis* ssp. *sikkimensis*, most of them inadequately known, but as the area is occupied by three countries, the high figure does not show on the map.

Of the 18 Australian species, 5 occur also outside that continent, and 7 occupy a small area, all of these in SE. Queensland,

7. As for Sect. *Monostichocalyx*, **the line which cuts off the Deccan Peninsula** between Kutch and Calcutta is crossed by only 4 species out of the total of 23 for India and Pakistan. *Capparis grandis* covers the whole of the Deccan, goes in Rajasthan to

Fig. 19. Distributional limits of *Capparis* sect I. *Capparis*, sect. II. *Sodada*, each with a disjunct station in southern India, and sect. III. *Monostichocalyx*, of which also the density of species per country is given. Northern and southern India have been separated according to the broken line. The figure above the hyphen indicates the total number of species, the figure below the hyphen the number of endemics. For their endemics, southern India and Ceylon have been regarded as one region, southern India proper having 6 endemics, Ceylon proper none. R.M. stands for Riukius and Marianas, NG for New Guinea, Au for Australia. For Hainan the figures are $\frac{9}{1}$.

27°N; *C. olacifolia* inhabits the eastern Himalaya but has one isolated station in Orissa at 19°N; *C. tenera* inhabits the West coast of the Deccan and penetrates the eastern Himalaya through the Indo-Chinese Peninsula; *C. sepiaria* is ubiquitous in S. and SE. Asia, going in Rajasthan to nearly 30°N.

Except for *C. olacifolia*, all these species cover large areas. Apart from these 4 species and 2 more (*C. spinosa* and *decidua*, the only species that occur both in the most southerly and in the most northerly part of India), the *Capparis* floras of North and South India are completely separated.

8. From a comparison of the areas of the species involved it appeared that in the **region between the Himalaya, Formosa, and Malaya,** no subdivision among the species of Sect. *Monostichocalyx* can reasonably be made.

In northern and central Malaya, the area of several continental species ends; there is a weak connection with northern Sumatra (*C. diffusa, trinervia*). A few species more or less border the South China Sea southwards to Java (*C. erycibe, longestipitata, pyrifolia*).

9. Several species (*C. callophylla, floribunda, micracantha* var. *micracantha, pubiflora, pyrifolia, sepiaria, zeylanica*) surround but certainly **avoid the everwet rain forest area** of Sumatra, southern Malaya, West Java, Borneo. For maps, see Fl. Mal. I, 6 (1960) fig. 12, 14, 15, 18, 19, 20, 21.

10. In the **Andaman Islands,** and sometimes on the adjacent mainland of Burma, the leaves are remarkably larger than in the remainder of the population. This holds good for 4 of the 6 species, viz. *C. cantoniensis, floribunda, sepiaria,* and *tenera*. In *C. micracantha* and *zeylanica* the leaves are normal-sized.

11. The *Capparis* flora of **Australia** is heterogeneous. In southwestern Australia (which was an island for long geological periods) *Capparis* does not occur. Of Sect. *Monostichocalyx*, 2 out of 5 species are endemics: *C. lasiantha*, widely distributed along the northern and eastern coast, and *C. sarmentosa*, in a small area in Queensland. Of the 3 other species, *C. lanceolaris* and *sepiaria* are outliers of their Malesian centre; only *C. quiniflora* can be looked upon as more Australia-centered, extending into Malesia and to Fiji in the Pacific.

12. The whole **Capparis-flora of Australia is of Asiatic origin.** The remote centre of speciation in Queensland, the endemics with their apparent relict areas, and the presence of both ancient and recent elements are suggestive of an intricate history. So much is clear that Sect. *Busbeckea* must be supposed to be of South Indian stock, or anyway Sect. *Busbeckea* and the Brevispina-Group are of a common stock that once populated southern India/Ceylon and/or Gondwana-land. There is not the slightest indication that during the postulated migration to Australia, Malesia was ever touched; *C. lucida* must have penetrated SE. Malesia from the Australian centre.

In **Madagascar** the *Capparis* flora is poor, and the Brevispina-Group is there not represented.

13. **Within Sect. Busbeckea,** *C. arborea* (the most variable one), *artensis, lucida,* and *nobilis* form a complex of species, confined to the humid strip of *c.* 60 km wide along the east coast of Australia and to the islands near it.

Three less related species, *C. loranthifolia, mitchellii,* and *umbonata,* prefer the dry interior; *C. loranthifolia* and *umbonata* have narrow *Acacia*-like leaves, *C. loranthifolia* and *mitchellii* a dense indumentum in common; the latter goes as far south as 37° 36′.

14. **New Caledonia** is somewhat remarkable for its *Capparis*, although not enough is known. Three *Busbeckea* species are either endemic (*C. artensis, dielsiana*) or slightly different from the Australian stock (*C. loranthifolia*). *Capparis quiniflora* is wider distributed.

15. In **the Pacific,** the *Capparis* of Sect. *Monostichocalyx* are merely outliers of Asiatic

(*C. sikkimensis* in the Riukius), or Malesian (*C. zippeliana* in Micronesia and Melanesia), or Australian (*C. quiniflora* in Polynesia) species. For Sect. *Busbeckea*, see the former paragraph. *Capparis spinosa* var. *mariana* must have been an early introduction, now in arid places from Hawaii to East Malesia.

16. The main **centres of speciation** now in existence are 1) the lowlands of South India/Ceylon, 2) southeastern Queensland, 3) the lowlands of the Indo-Chinese Peninsula, particularly of SE. Annam, 4) the eastern Himalaya and the hills of Upper Burma and Yunnan, 5) central Malaya.

17. **Polymorphism** is often local: *C. zeylanica* in Upper Burma, *C. lanceolaris* in the Philippines, *C. micracantha* in Indo-China, and others.

PRESENTATION OF DATA

1. The outcome of this study has been determined by the two opposite requirements that govern any work in descriptive biology: to be complete and to be concise. The great facilities I enjoyed to examine most of the literature and material in existence, have emphasised the taxonomist's task of **selecting the data** he has obtained. Completeness has, of course, been sought in the evaluation of validly published names for material from the area under revision. The most significant cuts could be made in the citation of references and of specimens.

2. **Nomina nuda** have not been considered in the text, except in a few cases where such names have come into usage. Names published without a Latin description after 1935 and hence invalid, have also been evaluated. In order to clear up the genus, misinterpretations have been corrected on a large scale.

3. If a **reference** to a work has been given, this generally means that the item holds a significant contribution to the knowledge of the taxon, to the right or to the wrong. References to copied information and to mere records of collections have been left out. The citation of standard works, good or bad, relieved the synonymy of many references to precursory papers; this holds particularly for the Flora Malesiana. In the post-Hookerian local Floras of India, the authors often gave so many valuable additions, that these works regularly have been cited.

4. The **citation** of scores **of specimens** of common species from a well-explored country takes much print and gives little useful information. Citation of 'representative specimens' puts up the question what such specimens represent. The species? In the absence of a common agreement on the concept of species, the only means of representing a species seems to be the taxonomic description, besides the citation of all the existing collections. However, as the distribution of a taxon is determined by the whole of those collections, it is sensible to select for documentation such specimens which are of particular value for the knowledge of the distribution. These are collections from scattered and/or remote or otherwise noteworthy stations. If there are 1, 2 or 3 from an island or country or province, they have been cited in the sequel. If there are 4—10, they have been denoted as 'several', over 10 have been denoted as 'many'.

Co-ordinates of latitude and longitude have been given where this was necessary for projecting the limits of an area.

5. For the **subdivision of the area** under revision I have mainly followed Hooker's 'A sketch of the flora of British India' (1904), which covers both India and Pakistan. Burma has somewhat arbitrarily been split up along the 24th parallel which cuts off North Burma, the meridian of 94°30′ E which cuts off Arakan from Upper Burma, the meridian of 97°E which cuts off East Burma and South Burma, the latter from Lower

Burma, which is separated from Upper Burma by the 20th parallel. For Indo-China the old French subdivision has been retained for practical reasons. For Siam the subdivision by Smitinand has been adopted (see Kern, Reinwardtia 6: 26, 28. 1961; Jacobs, Blumea 11: 467. 1963). The subdivision of Malesia was devised by Van Steenis, Fl. Mal. I, 1 (1950) lxxvi, map 1; the subdivision of the Pacific is by Van Balgooy, Blumea 10 (1960) 428. For the subdivision of China and the Australian continent the political boundaries have been used.

6. **Type specimens** have all been cited, and, because name and specimen are logically inseparable, each specimen with the name(s) based on it forms a separate paragraph. Holotypes have only been designated for accepted names. Abbreviated notes about the fertility of the specimens (*y.* standing for young, *st.* for sterile) and full details about locality and date have been added because these may be helpful in cases of bad labelling.

7. **Deviating specimens** have been kept out of the descriptions; they are discussed in the Notes. There are many of them, but thus procedure is the only way of ruling out this source of uncertainty about the circumscription of the taxon involved.

8. It is difficult to see **the use of Latin** for brief explanations in the synonymy amidst an English text otherwise than as the maintenance of an esoteric relict. Therefore that use has been restricted to standard words like *non*, *ex*, and *in*. The abbreviation (*n.v.*) stands for 'non vidi' of specimens and literature.

9. Within each section, the species have been placed in **alphabetical order**; the numbers are there to be referred to in the Identification List. Since no way has yet been found to transform the more-dimensional image that is required to express the supposed relationships into the one-dimensional order of the numerical system, any such attempt is misleading. For remarks on affinity (or better: resemblance), we refer to that special chapter, and to some Notes under the species.

10. The fact that so common a term as 'elliptic' comprises two unrelated factors, namely the length/width proportion but also that the leaf is widest in the middle, is not the only objection against the current terminology to define the **leaf shape.** Another objection is that the variation among leaves in one species, or often in one individual, is far greater than is covered by one term. Moreover, as these terms need to cover a certain range of variation, they are of necessity inexact. Thus leaf descriptions usually consist of series of long similar-sounding words instead of a simple figure which expresses the leaf index with perfect accuracy. In combination with an indication of the place where the leaf is widest, the leaf shape in most species can be defined in a line of print. But as the value of such figures is proportional to the amount of examined material, no figures have been worked out if material was scanty, and the conventional terms are given.

11. **Vernacular names** have been disregarded, because I feel unqualified to discriminate in this alien field of science.

12. **Keys.** Three keys are offered. For proper identification flowers are needed.

The first is a key to the sections.

The second is a general key to the species.

The third is a key to the species of Sect. *Monostichocalyx* in which the species of this section are in the first fork arranged in seven groups 1a—1g and the seventh again into two subgroups. These groups are considered tentative alliances of natural affinity.

CAPPARIS

Capparis [Tourn. *ex*] L., Gen. Pl. 5th ed. (1754) 222; Sp. Pl. (1753) 503; Lam., Enc. Méth. Bot. 1 (1785) 604; DC., Prod. 1 (1824) 245; B. & H., Gen. Pl. 1 (1862) 108; Boiss., Fl. Orient. 1 (1867) 419; Gagn. in Morot, J. de Bot. 21 (1908) 53; Pax & Hoffm. in E. & P., Pfl. Fam. 2nd ed. 17b (1936) 172; Jacobs, Fl. Mal. I, 6 (1960) 69; Wild, Fl. Zambes. 1 (1960) 235; DeWolf, Fl. East Trop. Afr. (in press); — *Hombak* Lippi *ex* Adans., Fam. Pl. 2 (1763) 408. — *Sodada* Forsk., Fl. Aegypt. Arab. (1775) 81. — *Busbeckea* Endl., Prod. Fl. Norfolk. (1833) 64. — *Olofuton* Rafin., Sylva Tellur. (1838) 108. — *Oligloron* Rafin., Sylva Tellur. (1838) 109.

Evergreen shrubs [1]), often climbing or sprawling, sometimes small trees. *Indumentum* mostly present, hairs mostly simple, sometimes stellate or 2-armed, often glabrescent. Twigs terete with scanty pith, sometimes the base of a shoot surrounded by cataphylls, i.e. strongly reduced leaves like narrow bud-scales. Growth continuous or flush-wise. Leaves spirally arranged, with in the lateral branches sometimes a tendency to distichy, mostly subtended by a pair of stipular *thorns* which are either straight or recurved but sometimes wanting, especially on the fertile twigs; the thorns often well developed and persistent on the main branches. Petiole short, in colour and indumentum alike the twig in that place. *Leaf* blade herbaceous to coriaceous, with often characteristic tinges in the dried state, entire, the nerves arcuating fairly regularly and interlooping near the margin; in one species the leaves reduced and early caducous. Sometimes thorny sterile shoots bear different leaves. *Flowers* pedicellate, solitary in the axils or often conferted racemosely near the top of more or less specialized twigs (often subumbellate), or sometimes arranged to a more or less leafy panicle, or multiplied serially to a supra-axillary row (anthesis basiscopical); bract mostly present but early caducous, rarely 2 basal bracteoles present. Anthesis mostly after the leaves have developed, rarely before. *Sepals* in 2 whorls of 2, caducous after anthesis, the outer pair more or less concave and enveloping the bud, valvate or imbricate, mostly free, sometimes connate in bud but splitting lengthwise at anthesis; in few species the adaxial sepal more or less deeply saccate; inner pair of sepals always free, flattish, the margins free or valvate or imbricate. *Petals* 4, imbricate, rather delicate, not unguiculate, mostly obovate, caducous after anthesis, the two adaxial ones (upper pair) with asymmetrical base closely coherent but not connate and surrounding a small disk, the two abaxial ones (lower pair) quite free; rarely all petals equal and free. Torus (receptacle) flattish to subconical, with a small adaxial disk. *Stamens* (6—)20—50 (—200) radiating, exceeding the petals, glabrous, anthers small, subbasifixed, introrse. *Gynophore* about as long as the stamens, not or hardly stretching in fruit but sometimes incrassate; ovary 1-locular, 1—6 mm long, sometimes beaked, placentas 2—6(—10) with few to many ovules; stigma mostly obscure. In a few species the gynoecium sometimes vestigial. *Fruits* on a more or less thickened stipe (i.e. the pedicel and the gynophore together), a berry with a leathery to corky, smooth to sculptured pericarp, elongate to globose, 1-locular, in a few species occasionally dehiscent. *Seeds* 1 to many, embedded in pulp, obliquely reniform, fairly large, with a circinnate embryo which consumes the initially present endosperm. Germination (always?) epigaeal.

Distribution. Pantropic with outliers in the subtropics; number of species about 250, half of which in the New World.

Ecology. Lowlands, occasionally in the mountains up to *c.* 2300 m. Most species prefer a seasonal period of drought, some prefer everwet rain forest conditions, very few are adapted to arid conditions. Most species are found in thickets, savannahs, coastal vege-

[1]) The present description applies only to the genus in the area under revision.

tations, etc. It depends on the climate whether the growth is continuous or flush-wise.

The kind of flower with numerous radiating stamens, as it occurs in *Capparis*, is, flower-biologically, likely to represent the basic condition in this family. The production of nectar seems to represent a later development. Radlkofer, who gave an extensive description of the flower of *C. micracantha*, found that the sweet nectar excreted by the disk can only be reached through a very small slit nearly halfway up between the upper petals (Sitz. Ber. Bay. Ak. Wiss. 14, 1884, 111—116). This fact, the great distance between the anthers and the nectar, and the difficulty for insects to land on the flower, especially at nocturnal anthesis, renders this species apt to be pollinated by Sphingids, as has repeatedly been stated to occur in *Capparis*. In many species the median part of the upper petals bears a red, pink, or yellow honey-guide.

Capparis lucida and *C. spinosa* are known to be noctiflorous; *C. erycibe*, *C. micracantha*, and *C. pubiflora* were observed to flower in the daytime; they may be open and scenting during the night as well.

The fruit-setting is always partial, and the size of the fruits within one species varies with the number of seeds that the fruit contains.

Dispersal of the fruits and seeds is probably performed by animals. Elmer found birds feeding on *C. micracantha* seeds; in *C. lucida* and other species the fruits have a dull purple colour which is an indication of chiropterochory.

KEY TO THE SECTIONS

1. Leaves well-developed and persistent.
  2. Sepals all free in bud.
    3. One sepal of the outer pair (mostly deeply) saccate . . . . . Sect. **1. Capparis**
    3. Both sepals of a pair equal . . . . . Sect. **3. Monostichocalyx**
  2. Outer pair of sepals connate in bud . . . . . Sect. **4. Busbeckea**
1. Leaves to 2 by 0.3 cm, soon caducous . . . . . Sect. **2. Sodada**

KEY TO THE SPECIES [1])

1. All sepals free in bud.
  2. Flowers with 2—10 arranged in a supra-axillary row or sometimes only small bundles of cataphylls in their place.
    3. Sepals 5 mm or shorter.
      4. Stamens 18(—20) or fewer.
        5. Each flower series subtended by a normally developed leaf.
          6. Gynophore 1 cm or longer.
            7. Leaves small, ovate, 1½—2½ cm caudate. Gynophore 1—2 cm **62. C. urophylla**
            7. Leaves, if acuminate, with a tip 1 cm or shorter, but never caudate.
              8. Thorns straight, 6—7 mm . **37b. C. micracantha** ssp. **micracantha** var. **henryi**
              8. Thorns recurved or wanting.
                9. Gynophore 2—2½ cm. Nerves 6—11 pairs. Sepals hairy outside. Fruit smooth. **47. C. quiniflora**
                9. Gynophore 1½—2 cm. Nerves 3—6 pairs.
                  10. Ovary glabrous. Fruit subglobose, 1¼ cm or smaller, smooth **58. C. tenera**
                  10. Ovary pubescent. Fruit ovoid, 2 cm or larger, densely set with corky warts. **21. C. echinocarpa**
          6. Gynophore ¼ cm or shorter, puberulous towards the base. Plant densely puberulous. Leaves smaller than 3 cm. Fruit 6—8 mm Ø . . . . . **7. C. beneolens**
        5. Leaves in the flower-bearing part of the twig reduced.

[1]) Not included are those species which are incompletely known, viz. 42, 49, 67, 81, and 82.

11. Flower-bearing twigs small, axillary, red-hairy. Thorns wanting. Cataphylls none. Gynophore 4—6 mm. (Fruit unknown) . . . . . **52. C. rufidula**
11. Flower-bearing part of the twig between two flushes of leaves. Thorns weak, ascending. Cataphylls present. Gynophore 6—12 mm. Fruit *c.* 1 cm Ø . . **40. C. multiflora**

4. Stamens 20 or more.
12. Twigs and adult leaves brown-puberulous below. Fruit globose, 8—12 mm Ø. Thorns straight . . . . . **46. C. pyrifolia**
12. Twigs and adult leaves glabrous.
13. Thorns recurved. Fruit mostly elongate, 3 cm or longer.
14. Fruit tuberculate. Midrib of the leaves depressed all over. Stamens 20—30. **11. C. buwaldae**
14. Fruit smooth. Midrib of the leaves depressed at the base. Stamens *c.* 20. **17. C. cucurbitina**
13. Thorns wanting or straight. Fruit globose, 1—1½ cm Ø . . . **3. C. acutifolia**

3. Sepals 6 mm or longer.
15. Leaves shorter than 2½ cm. . . . . **53. C. sarmentosa**
15. Leaves longer than 3 cm.
16. Stamens 20 or fewer. Gynophore in flower hairy towards the base. Fruit elongate. Plant densely tomentose. . . . . **33. C. lasiantha**
16. Stamens more than 20.
17. Thorns recurved.
18. Innovations glabrous, twigs minutely warty. Gynophore in flower glabrous. **48. C. radula**
18. Innovations densely reddish or greyish tomentose. Leaves leathery-mucronate. Gynophore in flower hairy towards the base . . . . . **65. C. zeylanica**
17. Thorns straight or wanting. Gynophore glabrous.
19. Ovary glabrous, 3 mm or shorter.
20. Ovary *c.* 2 by 1 mm; placentas 2. Cataphylls none. Fruit 1—1½ cm Ø. **3. C. acutifolia**
20. Ovary *c.* 3 by 2 mm; placentas 4. Base of shoots with cataphylls. **37. C. micracantha**
21. Stamens fewer than 60. Sepals mostly obtuse. Fruit (sub) globose. **37a. C. micracantha** ssp. **micracantha**
21. Stamens more than 60. Sepals acute to acuminate. Fruit elongate, acute. **37c. C. micracantha** ssp. **korthalsiana**
19. Ovary densely tomentose, 4—6 mm long. Base of shoots with cataphylls. Leaves ovate. Fruit globose, pointed, 1 cm or smaller . . . . . **41. C. olacifolia**

2. Flowers arranged otherwise, in racemes or terminal corymbs or spikes or subumbels or solitary axillary; in that case 4 or more placentas in the ovary.
22. Young shoots and inflorescence at the base surrounded by cataphylls.
23. Gynophore (and ovary) hairy during anthesis.
24. Gynophore longer than 2½ cm. . . . . **56. C. siamensis**
24. Gynophore shorter than 2½ cm.
25. Leaves 5—27½ cm long. Stamens 20—50.
26. Petals to 10 mm long. Flowers in axillary bundles . . . **45. C. pubiflora**
26. Petals over 30 mm long. Flowers solitary in the leaf axils **38. C. monantha**
25. Leaves 1—4½ cm long. Stamens 6—12 . . . . . **23. C. flavicans**
23. Gynophore glabrous during anthesis.
27. Ovary glabrous during anthesis.
28. Leaves shorter than 14 cm. Young twigs hairy.
29. Gynophore 1½ cm or longer.
30. Sepals 6 mm or shorter. Stamens *c.* 30—36.
31. Gynophore 2—2½ cm. Twigs greyish hairy. Inflorescence short-stalked, few-flowered . . . . . **15. C. cinerea**
31. Gynophore 1½—2 cm. Innovations with minute red hairs. Inflorescence on a leafless stalk 5—6 cm long, many-flowered **14. C. cataphyllosa**
30. Sepals 10 mm or longer. Stamens over 60. Gynophore 3—4 mm. Young twigs red-brown hairy. . . . . **6. C. baducca**
29. Gynophore 11—14 mm. Twigs brownish hairy. Inflorescences on a small axillary axis. Stamens *c.* 56 . . . . . **25. C. fusifera**
28. Leaves longer than 14 cm. Young twigs glabrous.

32. Gynophore 2—3½ cm. Rachis of inflorescence axillary, short and thick. **8. C. brachybotrya**
32. Gynophore 0.6—0.9 cm. Rachis of inflorescence long and slender **5. C. assamica**
27. Ovary hairy during anthesis. . . . . **9. C. brevispina**
22. Young shoots and inflorescences not surrounded by cataphylls.
33. Leaves minute (up to 2 by 0.3 cm), soon caducous. Flowers in racemes, strongly zygomorphic, with one saccate sepal . . . . . **2. C. decidua**
33. Plant bearing well-developed and persistent leaves.
34. Leaves underneath densely set with brown hairs. Ovary with 4(—5) placentas.
35. Gynophore shorter than 4 cm.
36. Sepals *c.* 15 mm long. Stamens *c.* 75 . . . . . **64. C. viburnifolia**
36. Sepals 8 mm or shorter. Stamens 35 or less.
37. Gynophore during anthesis glabrous. Stamens *c.* 30—35. (Fruit unknown).
38. Leaves 3—4 times as long as wide, *c.* 15—20 cm long **32. C. laotica**
38. Leaves less than 2½ times as long as wide, *c.* 3½—9 cm long. **18. C. dasyphylla**
37. Gynophore during anthesis hairy all over. Stamens 6—12. Fruit on a thick stipe, irregularly sculptured, hoary-tomentose. . . . **23. C. flavicans**
35. Gynophore 5 cm or longer. Flowers in a terminal spike . **54. C. scortechinii**
34. Leaves underneath glabrous or glabrescent or with fulvous, greyish, or whitish hairs.
39. Flowers axillary, solitary.
40. Sepals 6—8 mm long. Leaves 2½ cm or shorter. . . . . **53. C. sarmentosa**
40. Sepals 12 mm or longer. Leaves mostly longer than 2½ cm.
41. Leaves approximately orbicular, not acuminate. Midrib flattish.
42. Gynophore and ovary glabrous during anthesis.
43. Twigs when young with a whitish cobweb-like indumentum. Leaves more than ½ cm petiolate. Calyx often strongly zygomorphic. **1. C. spinosa**
43. Twigs with a brownish tomentum of stellate hairs. Leaves 2—3 mm petiolate. . . . . **26. C. grandiflora**
42. Gynophore and ovary hairy during anthesis . . **4. C. annamensis**
41. Leaves more than twice as long as wide, acuminate. Midrib (sometimes shallowly) sulcate . . . . . **30. C. koioides**
39. Flowers arranged in inflorescences. Leaves mostly elongate.
44. Plant often dull purplish tinged when dried. Innovations pubescent, late glabrescent, longer than 7½ cm. Flowers subumbellate. Sepals 7—18 mm long, densely hairy outside. Stamens 30—120. Gynophore 2½—5½ cm, glabrous; placentas 4. Fruit more than 2½ cm Ø on a thick stipe . . . . . **57. C. sikkimensis**
44. Plant showing a different combination of characters.
45. Gynophore 3½ cm or longer.
46. Flowers in a corymb or subumbellate. Pedicels 2—5½ cm. Leaves narrower than 10 cm.
47. Stamens more than 100. Gynophore 5½—8 cm. Outer sepals glabrous outside, inner sepals puberulous outside. Fruit smooth, *c.* 8 cm Ø. . . . . **39. C. moonii**
47. Stamens less than 100.
48. Adult leaves hairy beneath.
49. Thorns straight. Hairs patent . . . . . **34. C. lobbiana**
49. Thorns recurved. Hairs appressed **31. C. lanceolaris**
48. Adult leaves glabrous beneath.
50. Flowers arranged in a corymb towards the (sometimes incrassate) top of normal twigs, sometimes also a few lateral subumbels present.
51. Pedicels and sepals glabrous. Leaves brownish when dried. . . . . **51. C. roxburghii**
51. Pedicels and sepals outside hairy. Leaves greenish with brown nerves when dried . . . **61. C. trinervia**
50. Flowers arranged in lateral subumbels.
52. Stamens 50 or more.
53. Leaves 4—8(—11) by 1½—2½(—3¾) cm, green when dry. Fruit 3—4½ cm long . . . **63. C. versicolor**

53. Leaves (8—)14½—26 by (3½—)5—9(—14) cm, brownish red when dry, mostly with a callous tip. Fruit 5—6½ cm long . **12. C. callophylla**
52. Stamens 45 or less.
54. Adult twigs glabrous. Midrib flattish above the middle . . . . . **66. C. zippeliana**
54. Adult twigs at any rate with vestiges of pubescence near the leaf insertion **31. C. lanceolaris**
46. Flowers in a raceme. Pedicels 2½ cm or shorter. Leaves wider than 10 cm . . . . . **29. C. klossii**
45. Gynophore shorter than 3½ cm.
55. Leaves with cordate base, 4½ cm or shorter, with mucronate top. Thorns often long and acicular . . . . . **50. C. rotundifolia**
55. Leaf base rounded or blunt or acutish or rarely subcordate, blade mostly longer than 4 cm. Thorns, if present, recurved.
56. Midrib of leaves sunken at least in the basal part.
57. Gynophore longer than 20 mm.
58. Sepals glabrous, or sometimes only ciliate at the margins.
59. Leaves 3 cm or shorter, with notched top. Flowers solitary, axillary . . . . . **63. C. versicolor**
59. Leaves 3½ cm or longer, with acute top. Flowers in ± 5-flowered, peduncled subumbels. **31. C. lanceolaris**
58. Sepals puberulous outside.
60. Sepals 3—5½ mm long . . . **35. C. longestipitata**
60. Sepals *c.* 7½ mm long . . . . . **28. C. khuamak**
57. Gynophore shorter than 20 mm.
61. Gynophore shorter than 12 mm.
62. Petiole *c.* 2 mm. Flowers in lateral subumbels. **43. C. parviflora**
62. Petiole 3 mm or more.
63. Leaves wider than 4½ cm. Inflorescence a stalked, leafless, terminal panicle. . . . **22. C. erycibe**
63. Leaves narrower than 4½ cm.
64. Gynophore 4—12 mm **13. C. cantoniensis**
64. Gynophore 1—1½ mm **60. C. tonkinensis**
61. Gynophore longer than 12 mm. . . . **19. C. diffusa**
56. Midrib of the leaves flattish or raised in the basal part.
65. Gynophore during anthesis hairy at the base **27. C. grandis**
65. Gynophore during anthesis glabrous.
66. Gynophore longer than 2½ cm . . . **16. C. cleghornii**
66. Gynophore shorter than 2½ cm.
67. Ovary 4 mm or longer . . . **20. C. diversifolia**
67. Ovary shorter than 4 mm. Outer sepals 6 mm or shorter, in bud free.
68. Flowers in terminal racemes, or panicles. Thorns none. Stamens *c.* 50 . . . . **10. C. burmanica**
68. Flowers subumbellate. Stamens 45 or less.
69. Stamens *c.* 8. . . . . **24. C. floribunda**
69. Stamens 20 or more.
70. Plant unarmed. Stamens *c.* 20. **36. C. mekongensis**
70. Plant mostly with strong, recurved thorns. Stamens *c.* 30 or more.
71. Twigs glabrous from the first. Upper leaf surface livid or greenish, and glossy, undersurface brownish and dull. Gynophore vigorous . **44. C. pranensis**
71. Twigs hairy when young, late glabrescent. Leaves ± concolorous.

72. Midrib above glabrous like the whole upper leaf surface. Leaf top notched. Fruit stipe less than 1 mm thick . . . . . **55. C. sepiaria**
72. Midrib above hairy in the basal part. Leaf top entire. Fruit stipe 1½—3 mm thick **59. C. thorelii**

1. Outer pair of sepals connate in bud, splitting longitudinally at anthesis.
73. Adult leaves glabrous above.
74. Leaves on fertile twigs less than 4 times as long as wide.
75. Ovary during anthesis glabrous.
76. Adult twigs unarmed. Hairs simple.
77. Leaves in the dried state green or brownish or reddish tinged. Twigs glabrous or velvety or rarely appressed-pubescent. Leaves in the juvenile shoots distichous.
78. Gynophore during anthesis glabrous.
79. Flower buds 15—25 mm long, pointed, always solitary in a leaf axil. Gynophore 4½—8 cm.
80. Pedicels 2½—4 cm. Flower buds 15—20 mm long. Fruit smooth, 3—3½ cm Ø . . . . . **69. C. artensis**
80. Pedicels 4—6 cm. Flower buds 18—25 mm long. Fruit sculptured, over 7 cm Ø . . . . . **76. C. nobilis**
79. Flower buds 8—15 mm long, often globose not pointed, often with 2 in a leaf axil. Gynophore 2—5 cm. Fruit 2—3 cm Ø . . . . . **68. C. arborea**
78. Gynophore during anthesis hairy towards the base. Flowers with 2—14 in a terminal corymb. Leaves 6—9 cm long. Fruit 2½—5 cm Ø . . **74. C. lucida**
77. Leaves in the dried state pallescent or glaucescent, 18—40 mm petiolate, 1.1—1.9 times as long as wide. Twigs hoary-puberulous. Flower buds 19—23 mm long, often 4-angular . . . . . **70. C. canescens**
76. Adult twigs thorny. Hairs stellate. . . . . **71. C. divaricata**
75. Ovary during anthesis hairy. Leaves obovate with tapering base, coriaceous, glaucous, densely hairy beneath, to 6½ cm long. Gynophore 5½—7 cm. Fruit 5—7½ cm Ø. **75. C. mitchellii**
74. Leaves on fertile twigs more than 4 times as long as wide.
81. Pedicels 2 cm or longer. Leaves longer than 4 cm.
82. Plant glabrous. Leaves 1—3 cm petiolate, 10—23 cm long. Flower buds 15—16 mm long. Gynophore 5—7½ cm . . . . . **80. C. umbonata**
82. Plant (mostly densely) hairy. Leaves 3—6 mm petiolate, 4—7 cm long. Flower buds *c.* 12 mm long. Gynophore 2½—6½ cm . . . . . **73. C. loranthifolia**
81. Pedicels shorter than 2 cm. Leaves 1½—5 cm long, ½—1½ mm petiolate. Flower buds *c.* 6—7 mm long. Gynophore 9—18 mm . . . . . **79. C. thozetiana**
73. Adult leaves densely hairy above, at any rate in the median part. Plant densely yellowish velvety.
83. Gynophore 5 cm or longer.
84. Ovary hairy . . . . . **75. C. mitchellii**
84. Ovary glabrous. Flower buds ribbed . . . . . **78. C. shanesiana**
83. Gynophore *c.* 11 mm. Flower buds *c.* 7 mm long . . . . . **72. C. humistrata**

SYNOPTIC KEY TO GROUPS AND SPECIES OF SECT. MONOSTICHOCALYX [1])

1*a*. Flowers mostly large, axillary, solitary, rarely serial to 3 in a row. Ovary with (2—)4—6 placentas, elongate, mostly longer than 3 mm, often furrowed and beaked. Plants mostly tomentose. **I. Brevispina-Group** (fork 2)

1*b*. Flowers large (sepals mostly over 10 mm), corymbose to subumbellate. Plants largely glabrous or in parts hoary-puberulous, often red-brownish in the herbarium, the leaves sometimes with a callous tip. Stamens over 25. Gynophore long; ovary medium-sized, smooth, glabrous, with (2—)4 placentas. Fruit and seeds large. . . . . **II. Moonii-Group** (fork 11)

[1]) Not included is 67. *C. longipes*, which is incompletely known.

1*c*. Flowers large (sepals 8—15 mm long, torus *c.* 5 mm wide), in corymbs or subumbels or racemes. Plants with brown hairs. Twigs angular when young, with mostly strong, recurved thorns. Leaves with obscure nerves, dull greenish with brown-coloured nerves, longer than 6 cm. Stamens 30—75. Ovary medium-sized, glabrous, placentas 4. Fruit on a woody stipe.
III. Trinervia-Group (fork 16)

1*d*. Flowers more or less neatly subumbellate, the (sub)umbels axillary and/or arranged to panicles. Flowers medium-sized to small (sepals 2—10 mm long). Stamens under 70. Ovary 1—3 mm long, glabrous; placentas 2—4 . . . . . **IV. Subumbellates** (fork 19)

1*e*. Flowers small to medium-sized (sepals 4—11 mm long). Indumentum soft, dense, velvety, yellowish, long-persistent. Thorns mostly wanting. Leaves acute or obtuse or rounded but not acuminate. Inflorescences racemose or paniculate, bracts *c.* 2 mm. Placentas 2—4. Fruit (as far as known) globose, 2½—3½ cm diameter, purplish when dried . . . . . **V. Grandis-Group** (fork 36)

1*f*. Flowers large to small (sepals 3—14 mm long), arranged on a long or short leafless bracteate axis, or subumbellate. Shoots with cataphylls at the base. Hairs 2-armed or hooked or acroscopically curved. Thorns generally ascending. Leaves mostly over 8 cm long, mostly dull.
VI. Cataphyllosa-Group (fork 38)

1*g*. Flowers mostly small, to medium-sized (sepals 3—15 mm long), serial in supra-axillary rows (or sometimes small bundles of cataphylls in their place), exceptionally all solitary but in that case the twigs red-hairy and the leaves shorter than 3½ cm. Indumentum, if present, often (red-)brownish.
VII. Seriales-Group (fork 45)

I. Brevispina-Group

2. Leaves suborbicular, small. Flowers in some of the leaf axils. Sepals 12 mm or longer. Ovary some 5—8 mm. Thorns strong, recurved. Cataphylls none.
3. Stamens more than 80. Gynophore glabrous. Sepals *c.* 14—18 mm long . **26. C. grandiflora**
3. Stamens 50—60. Gynophore hairy. Sepals *c.* 12—13 mm long. . . . . **4. C. annamensis**
2. Leaves mostly elongate. Flowers tending to crowd with a few at the apex of normal twigs. Fruit pointed.
4. Shoots with cataphylls at the base.
5. Stamens more than 60. Young twigs brown-red tomentose. Thorns straight but mostly wanting. Leaves brownish when dry, ovate, few-nerved. Sepals 11—15 mm long. Ovary furrowed, hairy. Fruit 4 cm or longer. . . . . **6. C. baducca**
5. Stamens (20—)30—40(—50). Ovary 4 mm or longer, beaked, tomentose during anthesis. Thorns straight.
6. Pedicels glabrous. Thorns and leaves variable. Flowers axillary. Sepals much shorter than the petals, 5—10 mm. Gynophore glabrous; placentas 4. Fruit 2½—3 cm long. **9. C. brevispina**
6. Pedicels hairy.
7. Sepals 8—10 mm long; petals *c.* 16—20 mm.
8. Flowers solitary. Outer sepals inside villous, inner sepals outside so. First nerves basipetal. Gynophore 2—2¾ cm, hairy; placentas mostly 4. Fruit *c.* 3½ cm long, sculptured. . . . . **56. C. siamensis**
8. Flowers mostly serial. Sepals glabrous but ciliate. Gynophore *c.* 3 cm; placentas 2. Fruit ¾—1 cm, 1-seeded . . . . . **41. C. olacifolia**
7. Sepals *c.* 16 mm long; petals *c.* 35 mm. Flowers solitary. Leaves *c.* 6 cm long, ovate acute, glossy above. . . . . **38. C. monantha**
4. Shoots without distinct cataphylls at the base. Placentas 4—6.
9. Twigs finely warty, completely glabrous. Thorns recurved. First nerves basipetal. Flowers serial. Sepals 10—11 mm long. Gynophore 16—23 mm, glabrous; ovary 2½—3 mm, smooth during anthesis but deeply furrowed after. Fruit on thin stipe; seeds warty . **48. C. radula**
9. Twigs smooth, hairy or glabrescent.
10. Stamens *c.* 60 or more. Sepals free in bud, subequal, *c.* 7 mm long. Gynophore *c.* 8—11 mm, ovary glabrous, placentas 4. Fruit on a thin stipe, *c.* 3 cm long, pericarp thin and not sculptured . . . . . **20. C. diversifolia**
10. Stamens 6—12. Plant densely brown-tomentose. Leaves 1½—4 cm long, first nerves basipetal. Sepals 6—8 mm long. Gynophore 1¼—2½ cm, ovary hairy. Fruit on a thick woody stipe, sculptured, hairy, 2½—4 cm long . . . . . **23. C. flavicans**

II. Moonii-Group

11. Stamens *c.* 120—140. Sepals *c.* 13 mm or longer, inner pair puberulous outside. Leaves *c.* 7—14 cm long.
    12. Flowers with up to 6 at the top of normal twigs. Torus 5—7 mm wide. Outer pair of sepals glabrous. Gynophore 5½—8 cm. Fruit on stipe 5—6 mm thick, *c.* 8 cm Ø, smooth. **39. C. moonii**
    12. Flowers largely subumbellate. Torus 3—5 mm wide. Outer pair of sepals puberulous outside. Gynophore 3—5½ cm. Fruit on stipe *c.* 6—11 mm thick, *c.* 5—6½ cm Ø, sometimes with irregular sculpture . . . . . **57. C. sikkimensis**
11. Stamens 25—80. Sepals (5—)10—18 mm long.
    13. Leaves shorter than 8 cm, often obovate.
        14. Pedicels and sepals glabrous. Flowers at the (often thickened) top of twigs or in subumbels. Thorns wanting or small. Stamens *c.* 45—50. Gynophore 4½—5½ cm. Fruit on stipe to *c* 5 mm thick, 4½—5 cm Ø . . . . . **51. C. roxburghii**
        14. Pedicels and sepals hairy. Flowers corymbose. Thorns vigorous, recurved. Stamens *c.* 65. Gynophore 2½—3½ cm. (Fruit unknown) . . . . . **16. C. cleghornii**
    13. Leaves 8 cm or longer. Flowers in lateral subumbels.
        15. Placentas 4. Sepals 7—18 mm long. Stamens 50—80. Gynophore glabrous. Fruit on a thick and woody stipe, smooth, 5—6½ cm Ø . . . . . **12. C. callophylla**
        15. Placentas 2. Sepals 5—6(—12) mm long. Stamens 25—45. Gynophore sometimes hairy at the base. Fruit on a thin stipe, to 4½ cm Ø . . . . . **66. C. zippeliana**

III. Trinervia-Group

16. Flowers corymbose or subumbellate, on pedicels 2—5 cm. Stamens mostly over 50. Gynophore 3—5 cm. Fruit some 5 cm or shorter.
    17. Sepals *c.* 9—12 mm, pale puberulous. Gynophore glabrous. Leaves *c.* 2.4—3.3 times as long as wide, some 10—14 cm long, the nerves often reduced in number and then steeply ascending. **61. C. trinervia**
    17. Sepals *c.* 15 mm long, dark brown-villous. Gynophore white-hairy at the base. Leaves *c.* 1.6—2.4 times as long as wide, 7—9 cm long, Fruit hairy(?) . . . . . **64. C. viburnifolia**
16. Flowers in a raceme mostly terminal or sometimes lateral.
    18. Leaves 1½—7½ cm wide, pubescent when young, soon glabrescent. Pedicels ½—1 cm. Sepals 8—11 mm. Stamens *c.* 35—50. Fruit to 12½ cm Ø . . . . . **54. C. scortechinii**
    18. Leaves more than 10 cm wide, persistently pubescent beneath. Pedicels *c.* 1¾—2½ cm. Sepals 11—13 mm long. Stamens *c.* 55. (Fruit unknown). . . . . **29. C. klossii**

IV. Subumbellates

19. Flowers medium-sized (sepals 6—10 mm long), rather roughly arranged to (mostly axillary) subumbels bearing often 1—2 reduced leaves, or rarely the flowers axillary on small twigs. Cataphylls none. Leaves greenish when dried. Stamens (15—)20—70. Gynophore slender, (1½—)2—5 cm, glabrous . . . . . **IVa. Lanceolaris-Subgroup**
    20. Innovations puberulous; mostly soon glabrescent. Midrib sunken. Fruit 2½—4½ cm long.
        21. Sepals glabrous. Fruit on a thin stipe (in *C. koioides* unknown).
            22. Stamens 85 or more. Subumbels lateral on a vigorous peduncle bearing *c.* 2—4 flowers, or flowers solitary conferted at the top of a twig. Leaves 8½—12½ cm long. Sepals *c.* 16 mm long. Gynophore 4¾ cm. Placentas 4. (Fruit unknown) . **30. C. koioides**
            22. Stamens 70 or less.
                23. Leaves 3—8(—11) cm long. Subumbels lateral on a vigorous peduncle bearing *c.* 2—4 flowers; rarely flowers solitary towards the top. Sepals *c.* 10 mm long. Stamens (30—)50—70. Gynophore 3½—5 cm. Placentas 2—3. Fruit *c.* 3—4½ cm Ø; seeds *c.* 15—21 mm long . . . . . **63. C. versicolor**
                23. Leaves (3½—)6½—12(—16) cm long. Subumbels (sometimes united to a terminal, rarely lateral, panicle) on slender peduncle bearing *c.* 5—15 flowers. Sepals *c.* 6—7(—10) mm long. Stamens *c.* 20(—40). Gynophore (2—)3—4(—5) cm. Placentas 3—4. Fruit *c.* 2¼—3½ cm Ø; seeds *c.* 8—12 mm long **31. C. lanceolaris**

21. Sepals puberulous outside. Placentas 4. Fruit on a stipe 3—4 mm thick **28. C. khuamak**
20. Plants velvety, the indumentum persistent on both twigs and leaves underneath. Leaf base rounded, subcordate.
24. Indumentum yellowish. Thorns straight. Leaves mostly ovate, 4—8(—15) cm long. Sepals 5—7 mm long. Gynophore 1½—4½ cm; placentas 2. Fruit on a thin stipe, 1½ cm Ø.
34. C. lobbiana
24. Indumentum brown. Thorns, if present, recurved. Placentas 4.
25. Flowers solitary axillary on small subumbel-like twigs. Indumentum when young pale, soon turning brown. Leaves 3½—9 cm long. Sepals 6—7 mm long. Stamens *c.* 35. Gynophore 16—20 mm. (Fruit unknown) . . . . . **18. C. dasyphylla**
25. Flowers umbellate on a short peduncle. Leaves *c.* 15—20 cm long, with sunken midrib and nerves. Sepals *c.* 6 mm long. Stamens *c.* 30. Gynophore *c.* 2½ cm. (Fruit unknown).
32. C. laotica
19. Flowers small (sepals 2—6 mm), neatly subumbellate or umbellate, exceptionally in a short, stalked raceme, the (sub)umbels axillary and/or more or less neatly arranged to a panicle mostly with some leaves in the lower part. Young parts mostly puberulous, rarely tomentose. Cataphylls none. Thorns mostly present, recurved. Stamens less than 45. Gynophore shorter than 2(—3) cm, mostly glabrous; placentas 2(—4). Fruit some 1—1½(—3) cm Ø, globose, not pointed.
26. Plants hairy in the young parts. Leaves subcoriaceous or herbaceous, generally concolorous. Gynophore thin during anthesis.
27. Flowers in umbels or subumbels which are axillary or terminal.
28. Thorns either recurved all of one kind, or wanting. Leaves longer than 5 cm, or notched at the top if shorter; base rounded to acute . . . . . **IVb. Sepiaria-Subgroup**
29. (Sub)umbels lateral. Stamens more than 20. Pedicels 1—2(—4) cm.
30. Thorns mostly strong, recurved, rarely wanting. Innovations hairy, more or less glabrescent. Reticulation in the leaves obscure.
31. Midrib above glabrescent as is the leaf surface. Fruit 1—1½ cm, the stipe less than 1 mm diam. Pubescence greyish to fulvous. Leaves late glabrescent beneath . . . . . **55. C. sepiaria**
31. Midrib above hairy in the basal part. Fruit 1½—2 cm, on stipe 1½—3 mm thick. Pubescence fulvous to brownish. Leaves early glabrescent beneath.
59. C. thorelii
30. Thorns wanting. Youngest parts hairy but very soon glabrescent. Leaves acute with blunt tip, reticulation rather distinct. Stamens *c.* 50. Gynophore 5—6 mm; placentas 2. Fruit pisiform . . . . . **43. C. parviflora**
29. Umbels terminal, subsessile, few-flowered; pedicels filiform, 2—5 cm. Leaves notched. Stamens 12—15. Gynophore *c.* 14—18 mm . . . . **19. C. diffusa**
28. Thorns recurved 2—8 mm to straight acicular 7—13 mm. Leaves 1—3(—4½) cm long, base cordate, top mostly mucronate. Sepals 4—5 mm long. Gynophore (7—)13—20 mm; placentas 2 . . . . . (apart:) **50. C. rotundifolia**
27. Subumbels (rarely short racemes) arranged to a terminal panicle mostly with some leaves in the lower part, some often also axillary . . . . . **IVc. Cantoniensis-Subgroup**
32. Gynophore 2—3 cm. Midrib sunken in the basal part. Sepals 3—5½ mm. Stamens 18—30. (Fruit unknown) . . . . . **35. C. longestipitata**
32. Gynophore 1½ cm or shorter.
33. Stamens 20—45.
34. Inflorescence leafy-paniculate, or subumbellate, or a raceme. Leaves 4½ cm or narrower.
35. Gynophore 4—12 mm. Habit mostly shrubby, twigs mostly green-brownish tinged. Leaves 4—12½ cm long, acuminate. Flowers in panicles. Stamens 20—45. . . . . **13. C. cantoniensis**
35. Gynophore 1—1½ mm. Liana, twigs dull brown-purplish-tinged. Leaves 3½—8½ cm long, mostly not acuminate. Flowers in subumbels or in racemes which are sometimes arranged to a smal panicle. Stamens 19—24.
60. C. tonkinensis
34. Panicle leafless, hanging on a short leafless peduncle. Leaves 4½—8½ cm wide, often obovate. Sepals 4—6 mm. Stamens 20—40. Gynophore 2—5 mm in flower, 4—12 mm in fruit . . . . . **22. C. erycibe**
33. Stamens 7—12. Thorns mostly wanting. Panicles rich-flowered; sepals 2—4 mm long. Gynophore 4—6(—10) mm; placentas 4. Fruit 1½—2½ cm Ø.
24. C. floribunda

26. Plant glabrous. Leaves thick-coriaceous, glossy greenish above, dull brownish below, with distinct nerves and reticulation. Subumbels often arranged to a terminal panicle. Sepals *c.* 6 mm long; stamens *c.* 30. Gynophore comparatively thick during anthesis and after, (6—)8—10 mm; placentas 2. Fruit *c.* 2—3 cm Ø . . . . . (apart:) **44. C. pranensis**

V. Grandis-Group

36. Leaves 3—4½ cm long, subcoriaceous, mostly obovate. Flowers in a raceme. Sepals *c.* 6—7 mm long. Stamens *c.* 50. Gynophore 10—12 mm, vigorous, glabrous . . . . . **10. C. burmanica**
36. Leaves (3—)5 cm or longer, herbaceous to subcoriaceous, suborbicular to rhombic or ovate. Flowers in subumbels or panicles.
    37. Flowers more or less neatly subumbellate. Sepals *c.* 6—9 mm long. Stamens *c.* 30—50. Gynophore 1—3 cm, hairy towards the base. . . . . **27. C. grandis**
    37. Flowers paniculate. Sepals *c.* 4 mm long. Stamens *c.* 20. Gynophore *c.* 5 mm long (or longer?), glabrous. Leaves herbaceous, ovate. (Fruit unknown) . . . . . **36. C. mekongensis**

VI. Cataphyllosa-Group

38. Innovations hairy. Flowers on a slender axis. Sepals shorter than 8 mm. Stamens less than 60. Placentas 2—3.
    39. Gynophore and ovary glabrous. Placentas 2.
        40. Fruit (as far as known) globose. Stamens less than 40.
            41. Inflorescence subumbellate or fasciculate. Stamens 30—40.
                42. Leaves subcoriaceous to herbaceous. Pedicels 1½—2½ cm.
                    43. Flowers with 25—40 together. Indumentum reddish, soon disappearing. Leaves ovate, 9—11½ cm long, Sepals 4½ mm long. Gynophore 1½—2 cm. (Fruit unknown). . . . . **14. C. cataphyllosa**
                    43. Flowers with few together. Indumentum greyish. Leaves 8—10 cm long. Gynophore 2—2½ cm. (Fruit unknown) . . . . . **15. C. cinerea**
                42. Leaves thick-coriaceous. Indumentum fulvous. Flowers to 6 in racemose axillary bundles which are sometimes arranged to a panicle. . . **42. C. pachyphylla**
            41. Inflorescence elongate, the flower-bearing part leafless. Stamens less than 20.
                44. Flowers racemose on a (sub)terminal axis, each subtended by a bract 2 mm long. Leaves 6—8 mm petiolate, midrib and nerves sunken. Stamens 16—20. Fruit 1-seeded . . . . . **5. C. assamica**
                44. Flowers serial with 7—10 in a row subtended by a bract 2—3 mm long, rarely by a normal leaf; the flower-bearing part of a twig between two flushes of leaves. Leaves 8—11 mm petiolate, midrib very narrowly raised. Stamens *c.* 12. Fruit 1—4-seeded . . . . . **40. C. multiflora**
        40. Fruit elongate. Stamens *c.* 56. Indumentum brownish. Leaves 9½—15 cm long. Flowers 2—6 on a small axillary axis. Sepals 5 mm long. Gynophore 11—14 mm. Placentas 2. Fruit 3¾—4½ cm long . . . . . **25. C. fusifera**
    39. Gynophore and ovary densely hairy. Inflorescence axis slender, *c.* ¼ cm long, occasionally the flowers also axillary on small twigs. Sepals 4—7 mm. Stamens 20—30(—50). Placentas 3. Fruit globose, 1½—2 cm diam. . . . . **45. C. pubiflora**
38. Innovations glabrous. Flowers on a thick short axis. Sepals 11—14 mm long. Stamens more than 80. Gynophore 2—3½ cm. Placentas 4. Fruit elongate, 4—6 cm long. . . . . **8. C. brachybotrya**

VII. Seriales-Group

45. Leaves longer than 3½ cm.
    46. Shoots with cataphylls at the base. Innovations glabrous or soon glabrescent, the hairs simple. Leaves mostly coriaceous and pale or glaucous green when dried **VIIa. Micracantha-Subgroup**
        47. Thorns soon obsolete. Leaves *c.* 5½—7½ cm long. Flowers unknown. Fruit subglobose, 2½ cm Ø or larger, on a stipe *c.* 2 mm thick . . . . . **19. C. rigida**
        47. Thorns persistent if mostly small; straight. Leaves longer than 8 cm. Sepals *c.* 5½—13 mm long, mostly with hairy margins. Fruit (in var. *henryi* not known) 3—17 cm long, often elongate, on a stipe 4—6 mm thick . . . . . **37. C. micracantha**

46. Shoots without cataphylls.
48. Plant practically glabrous in all parts. Leaves 6—23½ cm long, distinctly acuminate. Sepals 3—5 mm long. Stamens 20—30. Fruit elongate, 2 cm or longer.
49. Midrib sunken all over. Fruit 2—5½ cm long, tuberculate. Stamens 20—30. **11. C. buwaldae**
49. Midrib sunken only in the basal part. Fruit 5½—7½ cm long, smooth, articulated with the gynophore. Stamens *c.* 20 . . . . . **17. C. cucurbitina**
48. Innovations hairy with often reddish stellate hairs. . . . **VIIb. Zeylanica-Subgroup**
50. Gynophore during anthesis nearly always glabrous. Tomentum, if present, fulvous-brownish.
51. Sepals (4—)6—8(—9) mm long. Stamens 20—30. Thorns none or straight. Gynophore filiform, 2—3 cm. Fruit 1—1½ cm, often pointed. . . **3. C. acutifolia**
51. Sepals 5 mm or shorter. Stamens 12—20. Gynophore 1—2(—2½) cm.
52. Ovary with 2 placentas. Fruit ¾—1 cm Ø.
53. Pedicels more than ¾ cm long. Sepals 3 mm or longer, glabrous outside.
54. Leaves 2—4(—6) cm wide, mostly obovate, midrib shallowly sunken, top abruptly ¾ cm acuminate. Thorns strong, recurved **58. C. tenera**
54. Leaves 1½—2(—2½) cm wide, mostly ovate, midrib flattish, top gradually 1½—2½ cm acuminate. Thorns weak, ascending but mostly wanting . . . . . **62. C. urophylla**
53. Pedicels *c.* ¾ cm long, with 6—8 serially on small-hairy lateral leafless twigs. Sepals *c.* 2 mm long, red-hairy outside. Leaves rhombic, *c.* 10 by 5 cm . . . . . **52. C. rufidula**
52. Ovary with 3—4 placentas. Plants mostly late glabrescent.
55. Thorns straight. Stamens *c.* 20. Tomentum brownish, long-persistent. Gynophore 1¾—2(—2½) cm; placentas 3. Fruit globose, ¾—1¼ cm Ø. **46. C. pyrifolia**
55. Thorns recurved or wanting. Stamens 12 or less. Leaves with a brown mucro. Fruit 2—3 cm long.
56. Leaves 3½—7½ cm long, ovate, lowest nerves close together. Gynophore 1½—2 cm, ovary hairy, placentas 3. Fruit sculptured. Plant soon glabrescent. Thorns strong. . . . . **21. C. echinocarpa**
56. Leaves *c.* 7—12 cm, all nerves parallel at 45°; intermediate veins often wanting. Tomentum brown or grey, long-persistent. Gynophore 2—2½ cm, sometimes hairy at the base, ovary glabrous, placentas 4. Fruit smooth. . . . . **47. C. quiniflora**
50. Gynophore during anthesis hairy at the base. Tomentum initially thick and often reddish or orangish brown, later pale or greyish. Thorns recurved.
57. Stamens 30—45(—70). Leaves with a recurved callous tip, otherwise very variable. Flowers often developing before their subtending leaves. Sepals 6—11(—15) mm. Gynophore 2—6½ cm; placentas 4. Fruit 1—5 cm long, on a stipe 3—6 mm thick. **65. C. zeylanica**
57. Stamens 10—20. Leaf top not callous. Flowers developing after the leaves. Plant thick-tomentose. Calyx zygomorphic, sepals 6(—8) mm. Gynophore *c.* 2—3½ cm; placentas 3(—4). Fruit sometimes elongate, 3½—4 cm long, on a thin stipe. **33. C. lasiantha**
45. Leaves 3½ cm or shorter. Twigs reddish-hairy, the hairs persistent, tapering towards their ends. Thorns small, recurved. Calyx with 1 sepal slightly saccate.
58. Leaves spirally arranged, with a slightly thickened margin, reticulation obscure. Hairs often hooked, with a longer and a very short arm. Sepals 2½—3 mm long. Stamens 6—7. Gynophore 3—5 mm, hairy towards the base. Fruit 6—8 mm Ø . . . . . **7. C. beneolens**
58. Leaves distichous, not thickened at the margin, reticulation distinct. Hairs simple, curved acroscopically. Sepals 6—8 mm long. Stamens *c.* 19—22. Gynophore 14—24 mm, glabrous. Fruit *c.* 1—1½ cm long . . . . . **53. C. sarmentosa**

Section 1. **Capparis**

Type species: *C. spinosa* L.

Hairs at the innovations simple. Leaves well-developed and persistent, 1—2 times as long as wide, top generally rounded, mucronate. Cataphylls none. Pedicels axillary solitary, mostly exceeding the leaves. Flowers large, the bud being 1—2½ cm in diameter; sepals in bud all free, the adaxial sepal of the outer pair more or less distinctly saccate. Fruits spindle-shaped, pericarp thin, the 5—10 carpel sutures distinct. Seeds 3—4 mm diameter.

Distribution. Southern Europe, Africa, Madagascar, southwestern Asia, eastern Malesia, western Pacific, Australia. One species.

Ecology. Noctiflorous plants of dry regions.

Note. 1. *Capparis spinosa* is the type species of the genus (see Britton, N. Am. Trees, 1908, 405, and Intern. Rules Bot. Nomencl. 3rd ed., 1935, 140), and the section which is here proposed bears therefore the generic name. In its previous circumscription, the section *Capparis* — or *Eucapparis* DC. with most authors — also contained the species that have here been placed under Sect. *Monostichocalyx.*

1. **Capparis spinosa** L. — *C. antanossarum* Baill. (see Note 12). — *C. cartilaginea* Decne. (1b). — *C. cordifolia* Lam. (1d). — *C. elliptica* Hausskn. & Bornm. (see Note 5). — *C. galeata* Fres. (1b). — *C. hereroensis* Schinz (see Note 9). — *C. himalayensis* Jafri (1c). — *C. leucophylla* DC. (1c, see Note 1). — *C. mariana* Jacq. (1d). — *C. mucronifolia* Boiss. (see Note 13). — *C. murrayana* Grah. (1a). — *C. napaulensis* DC. (1a). — *C. nummularia* DC. (1e). — *C. obovata* Royle (see Note 7). — *C. ovata* Desf. (1a). — *C. sandwichiana* DC. (1d). — *C. uncinata* Edgew. (1b).

Prostrate shrubs, mostly. Innovations with rather long white hairs, variously glabrescent. Thorns mostly present, divaricate, pale yellowish. Petiole *c.* ½ cm to sometimes 1½ cm. Leaves various in texture, approximately orbicular to elliptic, with a rounded base and a more or less distinctly mucronate top; 1—4(—7½) cm long; midrib rather obscure above, nerves few pairs, thin, reticulation obscure. Flowers solitary, axillary, sparsely scattered along the twigs on a sturdy pedicel which mostly equals or slightly exceeds the leaves. Flower buds ultimately 1½—2½ cm diameter. Calyx almost symmetrical to strongly zygomorphic, the posterior sepal then being exceedingly saccate. Petals slightly exceeding the sepals. Stamens numerous, about 50—190, slightly exceeding the petals. Gynophore (2½—)4—8 cm long, sometimes hairy towards the base; ovary 4—8 mm long, placentas 5—10. Fruit ellipsoid, ovoid, or obovoid, 2—5 by 1—1½ cm, with a thin pericarp; seeds *c.* 3—4 mm diameter.

Distribution. Europe: Mediterranean region. Africa: northern and northeastern part; eastern coast; southwestern Africa (? see Note 9); Madagascar (see Note 12). Asia: Turkey, the Caucasus, the Near East, Arabia, Iran, Afghanistan, West Pakistan, to Kashmir and Nepal, India (Punjab, Rajasthan, western Deccan Peninsula to Mahableshwar at 17°N and probably also in the southern peninsula; see Note 10). Also in East Malesia and the Pacific (var. *mariana;* see there) and in Australia (var. *nummularia;* see there).

Notes. 1. *Capparis spinosa* represents, in my opinion, one species, polymorphic and variable enough to embrace all the 'related species' that have been described. This complex represents furthermore a separate section of *Capparis.* The above synonymy is complete for the area covered by this study; a few synonyms from elsewhere may be new.

Only a comprehensive study of all the material over the whole vast area of this species can reveal its infraspecific structure. As this lies outside the scope of the present work, I do not feel justified to make infraspecific distinctions in the material from India, except in two cases where an apparently homogeneous population stands out against the rest.

These are here distinguished as var. *galeata* and var. *himalayensis*. The remainder of the Indian material will have to be considered anew in connection with the populations in the Middle and Near East.

2. It was a great disappointment to discover that the most recent paper devoted to *Capparis spinosa*, that by Zohary, Bull. Res. Counc. Israel 8D (1960) 49—64, is of very little use for an understanding of the variation in this species. Zohary's paper is, particularly for the distribution, poorly documented; it gives no keys, and the descriptions, if present at all, are sketchy and not apt for a mutual comparison. Measurements are coarse and scanty. For these reasons, the delimitations of his taxa are often obscure; even characters to justify his distinction between *C. spinosa* and *ovata* have not been given. Neither will his remarks like this: 'certain varieties intercross in their overlapping areas', and this: 'the limits of such species are not always clear-cut, as there are marked (!) transitions from one species to another due to intercrossing in their overlapping areas' convince the reader of the value of these distinctions. On Jafri's paper of four years before, Zohary did not give any comment.

3. Burtt & Lewis, Kew Bull. (1949) 299, denoted the specimen of *C. aculeata* [L., Hort. Cliff. (1737) 203] in the Hortus Cliffortianus Herbarium (BM) as the type of *C. spinosa*. This sheet, which I have seen, is sterile: twigs slender, very little hairy and early glabrescent; internodes 1¾—3½ cm, twigs straight, thorns recurved, not very strong, 2 mm; petiole 7 mm, leaves suborbicular to elliptic, 23—33 by 16—24 mm, slightly notched and mucronulate. The inscription reads 'Capparis Lin. nota, fructu minore folio rotundo C B p. 480 spinosa 4'. Boissier's description of *C. spinosa* var. α could apply to it, but it remains to be seen whether the variety can ever be ascertained.

In passing I found under *Capparis* in the Hortus Cliffortianus Herbarium two more species. There is a good flowering specimen of *C. cynophallophora* under its proper name. Under the name *C. baducca* there are two sheets. The first is a good specimen but sterile and not a *Capparis*. The second is a fairly good specimen from which the fruits have disappeared; it might be a Capparacea but not an Asiatic one.

4. Edgeworth, J. Linn. Soc. Lond. Bot. 6 (1862) 184, in his Flora of Multan, West Pakistan, remarks tc *C. spinosa*: 'I find no description of the dehiscence of the fruit in any European flora . . . When ripe the skin separates and curls up in 3 or 4 segments like a Martagon, showing the seeds immersed in crimson pulp . . . The fruit is pickled by the natives. I preserved the buds in European style and found them first rate.' See for the dehiscent fruit also var. *nummularia*.

5. *Capparis elliptica* Hausskn. & Bornm., Mitt. Thür. Bot. Ver. N. F. 6 (1904) 49, *non* Span. 1841, has here been mentioned on Jafri's authority; I have not seen a type specimen. A new, broader-leaved var. *maskatensis* is described under that species, too.

6. *Capparis fontanesii* DC., Prod. 1 (1824) 245 was a *nomen novum* for *C. ovata* Desf., *non* Bieb. from Mauritania near Oran in northern Africa. Both names have been mentioned by F. v. M. Fragm. Phytogr. Austral. 9 (1875) 173 as synonyms under *C. spinosa*, and although the type specimen was not seen, I believe the reduction is correct.

7. The type of *C. obovata* probably belongs to var. *himalayensis*, but the material gives no complete certainty.

8. Jafri remarks that '*C. nepalensis* Wall. (*nomen nudum*) quoted as a synonym of var. *leucophylla* by Hook. *f.* & Th., and *C. napaulensis* DC. from Nepal is nothing but a state of *C. spinosa*' (and therefore not of var. *himalayensis;* M.J.). I have seen the type specimen of *C. napaulensis* DC. at the British Museum.

9. Probably *C. hereroensis* Schinz, Bull. Herb. Boiss. i, 3 (1895) 396; also belongs here. It has been recorded from southwestern Africa on several places between 23 and 27°S within *c.* 20 km from the coast.

10. Blatter, J. Bomb. Nat. Hist. Soc. 18 (1908) 763, mentioned *C. spinosa* for northern Coimbatore in the south of the Deccan Peninsula at 900 m.

11. *Capparis spinosa* var. *rupestris* (Sibth.) Hook. *f.* & Th. in Hook *f.*, Fl. Br. Ind. 1 (1872) 173 is according to Hooker & Thomson 'perhaps not Indian', and for this reason is here left out of consideration. The same holds for *C. spinosa* var. *canescens* Coss. and var. *parviflora* Boiss., cited by Blatter *c.s.* (1919) 61 from Baluchistan, but according to Jafri (1956) 197 they are wrong interpretations.

12. *Capparis antanossarum* Baill., Bull. Soc. Linn. Paris 1 (1885) 462, from Madagascar also belongs under *C. spinosa*. The plant is tomentose, thorny, the leaves orbicular with a hooked tip, the flowers medium-sized, very zygomorphic. Possibly it belongs to var. *galeata*, well matching specimens of this variety from Aldabra I. between Madagascar and Zanzibar.

KEY TO THE VARIETIES

1. Calyx strongly zygomorphic, one sepal being deeply saccate.
  2. Twigs early glabrescent or glabrous.
    3. Gynophore hairy near the base, 6—7 cm. . . . . **1d. var. mariana**
    3. Gynophore glabrous, 5 cm or shorter.
      4. Habit sprawling. Leaves suborbicular, 6—9 mm petiolate. . . . . **1e. var. nummularia**
      4. Habit erect. Leaves ovate, 15—18 mm petiolate. . . . . **1b. var. galeata**
  2. Twigs late glabrescent. Petiole 2—7 mm. Gynophore 4½—7 cm, sometimes hairy near the base. **1c. var. himalayensis**
1. Calyx approximately actinomorphic, the adaxial sepal only more or less shallowly saccate. **1a. parts of C. spinosa**

1a. parts of *Capparis spinosa* L., Sp. Pl. (1753) 503; DC., Prod. 1 (1824) 245; whole of it in the sense of Edgew., J. Linn. Soc. Lond. Bot. 6 (1862) 184; Brandis, Indian Trees (1906) 33; Blatter, J. Bomb. Nat. Hist. Soc. 18 (1908) 763; Cooke, Fl. Pr. Bombay 1 (1909) 44; Talbot, For. Fl. Bombay Sind 1 (1909) 52, f. 32; Jafri, Pakistan J. For. 6 (1956) 197. — *C. spinosa* var. *vulgaris* Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 173. — Type: see Note 3.

C. napaulensis DC., Prod. 1 (1824) 246. — Type: *Wallich s.n.* (G-DC), India, Napaul, fl. 1821.

C. murrayana Grah., Cat. Pl. Bombay Vic. (1839) 9; Wight, Ic. Pl. Ind. Or. 2 (1840) t. 379; Dalz. & Gibs., Bombay Fl. (1861) 9; Drury, Handb. Ind. Fl. 1 (1864) 41; Dalz., J. Linn. Soc. Lond. Bot. 13 (1872) 72, *'murrayii'*. — Type not seen: *Graham*?, India, Mahableshwar, or *Gibson*, India, Loghur, Malcolm, Hurrychunderjee.

C. obovata Royle, Ill. Bot. Himal. 1 (1839) 73, *non* Ham. *ex* DC. 1824; Cambess. Pl. Rar. Ind. Or. Jacquem. (1843) 21, t. 21, see Note 7. — Type: *Royle s.n.* (DD), India, Kunawar, Hangoo, fl. 12/9.

See above, under the species.

1b. var. **galeata** (Fres.) Hook. *f.* & Th., in Hook. *f.*, Fl. Br. Ind. 1 (1872) 173; Blatter, J. Bomb. Nat. Hist. Soc. 18 (1908) 763. — *C. galeata* Fres., Mus. Senckenb. 2 (1837) 111; T. Anderson, J. Proc. Linn. Soc. Lond. Bot. 5 (1860) 5; Boiss., Fl. Orient. 1 (1867) 421; Oliv., Fl. Trop. Afr. 1 (1868) 95; Dalz., J. Linn. Soc. Lond. Bot. 13 (1872) 72; Blatter, Rec. Bot. Surv. Ind. 7 (1915) 107; 8 (1919) 44; Engler, Veg. Erde 9 (1915) 234, f. 148; Gilg & Bened., Bot. Jahrb. 53 (1915) 189; Blatter, J. Bomb. Nat. Hist. Soc. 25 (1918) 724; O. Schwartz, Mitt. Inst. Allg. Bot. Hamb. 10 (1939) 67. — Type not seen, probably from Aethiopia.

C. cartilaginea Decne., Ann. Sc. Nat. ii 3 (1835) 273; Burtt & Lewis, Kew Bull. (1949) 299; Jafri, Pakistan J. For. 6 (1956) 199, map; Zohary, Bull. Res. Counc. Israel 8D (1960) 60. — Type: *Bové 143* (K? *n.v.*), Désert du Sinai, 'Lassaf', Arabia.

C. uncinata Edgew., J. As. Soc. Beng. 16 (1847) 1213 (*n.v.*). — Type not seen.

A shrub 1½—3 m, the branches erect. *Indumentum* short, coarse, felty, greyish, very soon disappearing. Twigs seemingly vigorous, but in the field soft and brittle. *Thorns* mostly present, divaricating, more or less recurved, 2—4 mm, orange-yellow. Petiole 1½—2¾ cm. *Leaves* when fresh probably fleshy, when dried thick-herbaceous, elliptic to ovate, 2½—4 by 2—2½ cm on the fertile twigs, to 6¼ by 4¾ cm on the sterile twigs; base rounded-acutish, top rounded to acute with a mucro minute to 1½ mm; midrib narrow, somewhat raised above, nerves 3—4 pairs, thin, surfaces dull grey-greenish when dried, glabrous. Pedicel vigorous, 5½—9¾ cm, glabrous, darkish coloured almost all over. *Calyx* zygomorphic, the posterior sepal being very deeply saccate, 2½—4½ cm long, 1¾—2½ cm deep, the other sepals *c.* 2—2½ by 1—1¼ cm, glabrous. *Petals* to 3 by 3—5 cm, the upper pair approximately obdeltoid. *Stamens* to *c.* 200 *Gynophore* 3¾—4½ cm, glabrous; ovary 5 by 2 mm, placentas 8—10. *Fruits* on a vigorous stipe, *c.* 10 by 4 cm, red (Anderson 1860).

INDIA, northwest. Kathiawar, Dwarka: *Santapau 16794, 16795, 16801.*

Distribution. (mainly compiled from literature) Africa: Egypt (Sinai desert); Sudan (Kordofan at *c.* 15°N 30°E), Ethiopia (Harar at *c.* 9°30'N 42°E), Tanganyika (Mombasa at *c.* 4° on the coast), the islet of Hanish in the Red Sea at *c.* 13°N 43°E, and Socotra; Madagascar (probably; see Note 12 under the species). Asia: Arabia (Yemen, Aden, Hadramaut, Muscat, Oman, Kuwait), Iran (SE. corner at *c.* 27—28°N 62°E, the var. *lanceolata;* see Note 3), West Pakistan (Baluchistan near the coast of the Arabian Sea), India (Kathiawar at Dwarka near the Gulf of Kutch, at 22°15'N 69°E).

Ecology. Deserts, rocks, stone walls; in S. Arabia recorded to 2000 m alt.

Notes. 1. In specimens from the Sinai desert and eastern Africa the leaves on the fertile twigs were found to be 1.1—1.9 times as long as wide and 5—6 by 2¾—5¼ cm.

2. The saccate sepal, which accounts for the spectacular flower, is largely a quantitative character; in fact there are no qualitative characters at all to suggest that this variety would deserve specific rank besides *C. spinosa;* part of its characters occur in any other variety.

3. I know of two varieties that have been described, *C. galeata* var. *lanceolata* Blatter (1918) 724 from SE. Iran, and *C. galeata* var. *montana* Schweinf., Bull. Herb. Boiss. 2 App. 2 (1894) 100 from Yemen, but have not seen material.

1c. var. **himalayensis** (Jafri) Jacobs, *stat. nov.* — *C. himalayensis* Jafri, Pakistan J. For. 6 (1956) 197, t. 1, f. 1B, with map. — Type: *G. Watt* (E), northwestern Himalayas, Rampur on the Sutlej River, fl. V. 1890.

Also, according to Jafri: *C. spinosa* var. *leucophylla* (*non* DC.) Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 173. — *C. leucophylla* (*non* DC.) Collett, Fl. Simlensis (1902) 38.

Diffuse shrub, prostrate or hanging (Jafri). *Hairs* long, intermingled with shorter ones, silky, initially ruffled, later appressed and ultimately crusty or disappearing. *Thorns* divaricate, slightly recurved, straw-yellow, 4—6 mm. Petiole (2—)4—7 mm. *Leaves* subcoriaceous, (0.9—)1.0—1.7 times as long as wide, 1.9—4.1 by 1.4—3.4 cm, widest about the middle, base rounded, top acute, mucronate, surfaces early glabrescent. Pedicels 3—6½ cm, laxly hairy, pale but darker coloured near the top. *Calyx* strongly zygomorphic,

the posterior sepal being saccate 1.7—4.0 cm long, 9—15 mm deep, the other sepals 18—30 mm long, *c.* 8—15 mm wide, the outer pair laxly hairy, glabrescent. *Petals* about as long as the anterior sepal. *Stamens* probably variable in number. *Gynophore* 4½—7 cm, often hairy towards the base; ovary somewhat obovoid, 6—8 by 3 mm. *Fruits* (defectively known) somewhat obovoid, 2—2½ by 1 cm.

INDIA NORTH. Western Himalaya, *c.* 34°N 72°20'E: *Steward & Nasir 27912*; Himachal Pradesh: many NEPAL, western part. Tibrikot, 29°N 82°44'E: *Polunin, Sykes & Williams 2139*; Riri Bazar, 28°N 83°26'E: *R. L. Fleming 881.*

Distribution. Asia: India, western Himalaya, from Rawalpindi eastwards to Himachal Pradesh and western Nepal.

Ecology. Flowers May to August; from Nepal a plant was collected with both flowers and fruits in November, at 60 m; up to 2250 m.

Notes. 1. The type of *C. leucophylla* DC., collected by *Oliver & Bruguière* (P) between Baghdad and Aleppo, was figured in Delessert, Ic. Sel. Pl. 3 (1837) 6, t. 10; the plate shows small symmetrical flowers. As far as I can judge, Jafri was perfectly right in segregating *C. himalayensis* from *C. leucophylla*. Of the type specimen of his *C. himalayensis*, I saw only the photograph, his plate 1.

As Jafri's publication is difficult to obtain, his statement on the question is here quoted in full. 'Boissier in Flora Orientalis (1867) recognised six varieties of *C. spinosa*. One of these, var. *leucophylla* (DC.) Boiss. (syn. *C. leucophylla* DC.) has hitherto been confused in all the Indian Floras. *Capparis leucophylla* DC. was originally described from Persia, and Boissier cited his variety from Persia and Mesopotamia, but does not mention its geographical area beyond that. The main character mentioned for this variety is its indumentum — dense, floccose-hairy. One who has not looked into the type specimens would be inclined to assign some of the northwestern Himalayan specimens (as it has been done by most of the authors) to this variety on the indumentum character. But a careful study of the type specimen of *C. leucophylla* DC. will show that the Himalayan plants actually belong to a different species. The main difference is in the floral characters, but also the degree of pubescence which is not so pronounced as it is in *C. leucophylla* specimens from Iraq and Iran. The flowers in *C. leucophylla* are small, very similar to those of *C. parviflora* Boiss., while in the northwestern Himalayan specimens they are much larger with deeply galeate anterior sepal like those in *C. cartilaginea*. Thus, it was a mistake introduced by Hook. *f.* & Th. to equate the northwestern Himalayan specimens with the so-called var. *leucophylla* (DC.) Boiss; this was carried further by Collett 1902, when he recognized it as a distinct species but wrongly called it *C. leucophylla* DC. Therefore, the taxonomic status of these Himalayan specimens has hitherto remained undecided or wrongly determined.'

1d. var. **mariana** (Jacq.) K. Sch., Bot. Jahrb. 9 (1888) 201; Jacobs, Fl. Mal. I, 6 (1960) 89, f. 23. — *C. mariana* Jacq., Hort. Schoenbr. 1 (1797) 57, t. 109; Willd., Sp. Pl. 2 (1799) 1133; DC., Prod. 1 (1824) 245; Decne., N. Ann. Mus. Hist. Nat. Paris 3 (1834) 426; Safford, Contr. U.S. Herb. 9 (1905) 212; Burk., Dict. Ec. Pr. Mal. Pen. 1 (1935) 443. — Type: *Anonymous* (W? *n.v.*), Pacific, Marianas.

C. cordifolia Lam., Enc. Méth. Bot. 1 (1785) 609; Merr., En. Philip. 2 (1923) 210; Kaneh., J. Dept. Agr. Kyushu 4 (1935) 321. — Type: see Note 3.

C. sandwichiana DC., Prod. 1 (1824) 245; Gaud., Bot. Voy. Bonite Atlas (1842) t. 55; A. Gray, U.S. Expl. Exp. Bot. 1 (1854) 69; Drake del C., Fl. Polyn. Fr. (1893) 5; Pope, Man. Ways. Pl. Haw. (1929) 77, f. 36; F. B. H. Brown, Bull. Bish. Mus. 130 (1935) 96;

Degener, Fl. Hawaii. 1 (1937) fam. 142, with plate. — Type: '*Menzies in h. Banks*' (*n.v.*), Pacific, Sandwich Is.

C. baducca (*non* L.) Blanco, Fl. Filip. (1837) 438.

C. sandwichiana var. *zoharyi* Degener, Phytologia 7 (prob. 1961) 370. — Type: *Degener 27254* (*n.v.*), Pacific, Sandwich Is., Kauai.

Tree? or shrub, mostly prostrate. *Indumentum* short, floccose, greyish, soon disappearing. *Thorns* wanting. Petiole ¾—1¼ cm. *Leaves* glaucous, somewhat fleshy when fresh, herbaceous when dried, 1.0—2.0 times as long as wide, and ovate when elliptic, (1½—) 2½—6(—7½) by *c.* 2½—5¼ cm; base truncate to rounded, top rounded to obtuse, seldom somewhat emarginate, with a minute mucro, midrib above shallowly sunken in the basal part, nerves *c.* 5—7 pairs. Pedicel 4½—7½ cm, glabrescent. *Calyx* strongly zygomorphic, the posterior sepal being deeply saccate *c.* 2½—4 cm long, 1¾—2½ cm deep, the other sepals *c.* 2—2½ by ¾—2½ cm. Upper *petals* more or less rhombic, *c.* 3—5½ by 2—4 cm, with a thick fleshy base, lower petals 3—3½ by 1½—3¼ cm. *Stamens* 100—190 in number, 4½—6 cm. *Gynophore* 6—7 cm, laxly hairy towards the base; ovary 5—8 by 1—2 mm, placentas *c.* 5—6. In fruit the pedicel straight, the gynophore somewhat coiled, *fruits* ellipsoid, 2½—5 by 1¼—1½ cm, olive-green with distinct ribs; pulp yellow.

LESSER SUNDA ISLANDS. Semau: *de Voogd 2328*. — Timor, western half: several; eastern half: *Cinatti 330*; *van Steenis 18024*. PHILIPPINES. Luzon, Rizal Prov., Malabon: *Merrill, Sp. Blanc. 516*. PACIFIC NORTH. Marianas: *Anon. 561* (P-LA); *Gaudichaud s.n.*, fl. Saipan: *Momose 14*; *Fritz*, st. 1903; *Fosberg 31294*. Tinian: *Fosberg 24918*; *Kanehira 2277*. Guam: several. — West Carolines, Palau Is.: several. East Carolines, Kusaie: *Kamiya 246*. — Polynesia. Marshall Is., Jaluit: *Koidzumi*, buds I. 1915. Nauru I.: *Catala*, fl. IX. 1951; *Burges K 17*. — Solomons: *Wharton*, fl. 1894. Bellona I.: *Templeton Crocker exp.*, fl. VI. 1933; *L.S. Brown W/313*. — New Hebrides, Opa Lepers I.: *Comines 277*. — Fiji Is. Vatu Lele: *Tothill 6*. Kandavu: *A. C. Smith 319*. Viti Levu: *Greenwood 917*. Aiwa: *Bryan Jr. 494A*. — Samoa: *Vaupel 630*. Savaii: *Christophersen 2662, 2782, 3342*. — Tonga Is., Tongatapu: *Yuncker 16250*. — Cook Is., Niue: *Yuncker 10112*. Rarotonga: *Cheeseman 506*. — Tuamotu Is. Henderson I., 24°20′S 128°20′W: *St. John & Fosberg 15062*. Makatea: *Wilder 1117*. Aurora I.: *H. F. Moore 275, 544*. — Austral Is. Rurutu: *Stokes 59*; *St. John 16726*. — Sandwich Is.: many. Midway: *Bartsch 95*; *Caum 23*. Eastern I.: *Bryan*, st. VIII. 1902. NEW CALEDONIA. Cap de Flotte: *Balansa 1697*.

Distribution. Malesia: Philippines (Luzon, cultivated here and there, Bohol), eastern Lesser Sunda Islands (Semau, Timor, Leti), Bismarck Archipelago (New Ireland, New Britain). Pacific: scattered from the Carolines, the Solomons, and New Caledonia eastwards to the Sandwich Is. and Henderson I.

Ecology. Prefers semi-arid or seasonal conditions, dry lavas, limestone, coastal stations, &c. Up to *c.* 350 m.

Notes. 1. *Pritzel 284* from northwestern Australia, which Jacobs (1960) 91 alleged to var. *mariana*, should actually be placed under var. *nummularia*.

2. The plant is supposed to have naturalized in the Pacific after introduction by the Spaniards or Portuguese from southern Europe; for a discussion of the matter see Jacobs (1960) 90.

3. Lamarck stated to have received his material from Sonnerat, but the latter never visited the Marianas. He attached himself, however, to Commerson, and worked with him for three years in Mauritius, Bourbon, and Madagascar. Jacquin also described the plant from the Marianas but did not mention a collector's name. It remains therefore obscure who brought plants or seeds from the Marianas, but obviously not an early botanical explorer. The seeds may have been derived from the Spanish export at Guam and cultivated in Mauritius where Sonnerat obtained his specimens.

1e. var. **nummularia** (DC.) F. M. Bailey, Syn. Queensl. Pl. (1883) 15. — *C. nummularia* DC., Prod. 1 (1824) 246; Benth., Fl. Austral. 1 (1863) 94; Bailey, Queensl. Fl. 1 (1899)

58; Compr. Cat. Queensl. Pl. 1 (1909) 40, f. 18; Domin, Bibl. Bot. Heft 89 (1925) 685. — Type: *Anonymous s.n.* (G-DC, holo; L, P), Australia, Iles stériles (*n.v.*), st.; see Note 4.

C. spinosa (L. not mentioned) F. v. M., Syst. Census Austral. Pl. 1 (1882) 5; Black, Fl. S. Austral. 2 (1948) 369.

C. nummularia var. *minor* Domin, Bibl. Bot. Heft 89 (1925) 686. — Type: *Domin* (PR? *n.v.*), Australia, Queensland, Flinders River, near Hughenden, II. 1910.

A prostrate shrub, spreading to 3½ m diameter, to 2 m tall. *Indumentum* short to very short, rather lax, whitish, rarely yellowish, felty, early disappearing but often forming a thin crust on the twig and lending it a pruinose aspect. Twigs thin, never erect. *Thorns* often vestigial to sometimes 3 mm, patent/recurved. Petiole 6—9 mm. *Leaves* subcoriaceous but not firm in texture, orbicular to elliptic and ovate, 1½—3¾ by 1½—2½ cm; base rounded, top very obtuse to more or less emarginate with a mucro to 1 mm mostly recurved; nerves 4—6 pairs, thin, reticulation sometimes distinct, surfaces dull, glabrous. Pedicel 2—5 cm, variably coloured when dried, glabrous. *Calyx* very strongly zygomorphic, the posterior sepal being deeply saccate, 1¾—3¼ cm long, 1—2½ cm deep, the other sepals 2—2½ by 1—1½ cm. *Petals* to *c.* 1¾—2½ by 1½—6 cm, the upper pair more or less obdeltoid. *Stamens* 2½—3 cm. *Gynophore* 3½—5 cm, glabrous; ovary *c.* 5 by 2—3 mm, placentas 5—7. In fruit the pedicel straight, the gynophore curved, *fruits* ellipsoid, 2¼—4 by 1¼—2½ cm, strongly ribbed; see also Note 1.

WESTERN AUSTRALIA. Coast: *Baudin*, st. 1801; *hb. Richard*, st. 1802. Depuch I.: *Bynoe, voy. Beagle*, fl. 1838—40. 'Iles stériles': *anon.*, st. From north to south: Point Larrey, 19°59'S 119°06'E: *Hugham*, fr. Port Walcott: *Harper 14*. Roeburne: *Forrest*, fl. 1878; *Pritzel 284*. Dampier Is.: *Walcott*, fr. 1875. Monte Bello Is.: *F. L. Hill 410, exp. Campania 44*. Fortescue R.: *F. von Mueller*, fr. VI. 1878. Ashburton R.: several. Williambury, 23°51'S 115°07'E: *Bunbury hb. Morrison*, fl. Shark Bay: *Milne, H. M. S. Herald*, fl. fr. Dirk Hartog I.: several. Murchison R.: *Oldfield*, fr. Houtman Abrolhos Is., *c.* 28°S 114°E: *Bynoe*, fl. fr.; *Gilbret 68*.

NORTHERN TERRITORY. Vaughan Springs, *c.* 22°S 131°E: *Chippendale NT 249*. MacDonnell Ranges and along Finke R.: many. Alice Springs and vicinity: several. Lake Nash, 21°S 138°E: *Chippendale NT 1796*; *Dittrich*, fl. fr. 1886.

QUEENSLAND. Flinders R.: *F. von Mueller*, fl. Saxby: *Armit 972*. Western Q.: *MacGillavry 2215*. Cloncurry Distr.: *Grant*, fl. 3.II.1949; *Pearson 137*. Georgina R.: *Bick*, st.; *Boyle*, fr. 27.I.1935; *Perry 813*. Mt. Isa: *Everist 3348*. Richmond: *Mahoney 4*. Hughenden, 21°S 144°E: *Helms 1102; Longman*, fl. IX. 1925.

Distribution. Australia, in the west mostly along the coast and on offshore islands, from 20° to 28°S; in the centre between 22° and 25°S, NW to S of Alice Springs, and further eastwards to 144°E in central Queensland.

Ecology. Inland, mostly in beds of dry watercourses, and on rocks near the seashore, mostly under arid conditions; open plains, bare country, also in depressions and near water. S. E. Pearson remarked with a Queensland specimen: 'mainly frequenting creek and riverside situations, but also occasionally found on the hillsides.... Shrub not touched by animals. Flowers in November or immediately after early summer rains, at which time it becomes heavily infested by ants... The flowers wither on the bush.'

Uses. Good fodder (A. C. Boyle *in sched.*).

Notes. 1. In *F. L. Hill, H. M. S. Campania 44*, from S. Hermite I. off Western Australia, the fruit was reported to be orange and fleshy; a decayed state of the fruit has been preserved with the specimen (BM), where only a star-shaped thing remains with 7 legs 4 by ½ cm; this suggests that the fruit is dehiscent. *Winkworth 243* from Alice Springs bears a note 'fruit turning yellow when split open'.

2. In *Sabine Helms 1102* from Hughenden in central northern Queensland the indumentum is somewhat coarser, the thorns are stronger, the leaves to 1.8 times as long as wide, the pedicel is hairy, the odd sepal 1½ cm long and deep, and the gynophore hairy towards the base.

3. Australian vernacular names are given by Cleland & Tindale, Proc. Roy. Soc. S. Austral. 82 (1959) 133.

4. The type may have been collected by *Labillardière*, who visited Western Australia with D'Entrecasteaux's expedition in 1791—1794. The first dated collection is *Baudin* (P) of 1801, from the West coast of Australia. The second dated collection is probably *Cunningham 234* (BM, K) from Dirk Hartog I., January 1822. Collections by *Bynoe* and by *Gilbert* from Abrolhos I. date from 1840 and 1842 respectively.

We must assume that this variety was introduced into Australia on account of similar considerations as were advanced with regard to var. *mariana*, notably 1) the uniformity of the Australian population, 2) the geographic disjunction between the distribution of this variety and the proper *C. spinosa*, 3) the absence of taxonomic relationships between *C. spinosa* var. *nummularia* and any Malesian or Australian species, 4) its absence in the oldest collections from Australia.

As the plant is not known from any of the islands in Torres Straits or from the East coast of Australia, the conclusion is that it must have been introduced somewhere on the NW. coast, and found its way to the centre of the continent and far into the arid part of Queensland, apparently being somewhat better adapted to drought than var. *mariana*.

This opinion, formed in the herbarium, is not shared by Mr. G. Chippendale, botanist at Alice Springs. In a letter of March, 1962, he wrote: 'I feel that it is a true native in the central semi-arid areas of Australia. It does not extend, to my knowledge, into the northern wetter climatic area, and its distribution here is in small areas such as gorges in the ranges, where it is associated with river beds. These areas often have some plants with a curious distribution, including several whose nature is certainly relict. It is most unlikely that this species was introduced by human agency.'

Section 2. **Sodada**

(Forsk.) Endl., Gen. Pl. (1839) 839; Benth. & Hook. *f.*, Gen. Pl. 1 (1862) 109. — *Sodada* Forsk., Fl. Aegypt. Arab. (1775) 81. — *Hombak* Lippi *ex* Adans., Fam. Pl. 2 (1763) 408. — *Capparis* sect. *Hombak* (Lippi *ex* Adans.) O. Kze. in Post & Kuntze, Lexic. Gen. Phan. (1903) 98; Pax & Hoffm. in E. & P., Pfl. Fam. 2nd ed. 17b (1936) 180.

Type species: *C. decidua* (Forsk.) Edgew.

Hairs at the innovations simple. Leaves to 2 by 0.3 cm, soon caducous. Cataphylls none. Pedicels in short axillary racemes. Flowers medium-sized; sepals in bud all free, the adaxial sepal of the outer pair more or less distinctly saccate. Fruit globose, small, pericarp rather thin, the 4 carpel sutures obscure. Seeds 2—5 mm diameter.

Distribution. Africa, southwestern Asia. One species.

Ecology. Shrubby plants in arid regions.

Notes. 1. *Sodada* as a genus was reduced to *Capparis* by Robert Brown, in Denh. & Clapp., Narr. Afr. App. (1826) 225; it has never comprised more species than the present one. *Hombak* was published as a generic name only. *Lindackera* Sieber with its only species *L. capparoides* Sieb. *ex* Steud., Nomencl. 2nd ed. 2 (1841) 50 are *nomina nuda*.

2. There is much convergence between *Capparis decidua* and the monotypic Australian genus *Apophyllum* F. v. M. Both occur in arid country; the resemblance is in the bushy way of growth, terete twigs, and small, linear, deciduous leaves occasionally subtended by stipular thorns (small and rare in *Apophyllum*). The inflorescences may be racemose in both, but in *Apophyllum* the flowers may as well be arranged along the twigs. *Apophyllum* differs from *Capparis* in having a distinct annular disk. The flowers are dioecious: in the

♂ flowers the gynoecium is known to be wanting, but I also found a vestigial gynoecium of nearly ½ mm with a few hairs, in the ♀ flowers there are 0—3 stamens bearing empty thecae. The ovary and its stigma are oblique. An examination of *C. T. White 12329*, kindly performed by Mr W. A. van Heel at the Rijksherbarium, disclosed that there is one single ovule, that the ovary wall shows no suture, but that the stigma is bilobed which is suggestive of two carpels; the actual number could, however, not be ascertained, neither from the vascular system nor otherwise. Although a possible relationship might be presumed between *Apophyllum* and *Capparis* sect. *Sodada*, the study of more material is required first.

2. Capparis decidua (Forsk.) Edgew., J. Linn. Soc. Lond. Bot. 6 (1862) 184; Pax in E. & P., Pfl. Fam. iii, 2 (1891) 231, f. 139; Blatter, Rec. Bot. Surv. Ind. 7 (1915) 109; 8 (1919) 44; Blatter *c.s.*, J. Ind. Bot. 1 (1919) 60; Pax & Hoffm. in E. & P., Pfl. Fam. 2nd ed. 17b (1936) 180, f. 93; Schwartz, Mitt. Inst. Allg. Bot. Hamb. 10 (1939) 66; Jafri, Pakistan J. For. (1956) 11. — *Sodada decidua* Forsk., Fl. Aegypt. Arab. (1775) 81; Delile, Fl. Eg. (1812) 74, t. 26 f. 2; Boiss., Fl. Orient. 1 (1867) 419. — *C. sodada* R. Br. in Denh. & Clapp., Narr. Afr. App. (1826) 225. — Type: *Forskål (n.v.)*, Arabia, Yemen, 'Arab. Sodad'.

C. aphylla Roth, Nov. Sp. Pl. Ind. Or. (1821) 238; DC., Prod. 1 (1824) 246; W. & A., Prod. (1834) 27; Royle, Ill. Bot. Himal. 1 (1839) 72; Dalz. & Gibs., Bombay Fl. (1861) 9; Drury, Handb. Ind. Fl. 1 (1864) 41; Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 174; Brandis, For. Fl. NW. C. India (1874) 14, t. 3; Cooke, Fl. Pr. Bombay 1 (1901) 46; Brandis, Indian Trees (1906) 33; Blatter, J. Bomb. Nat. Hist. Soc. 18 (1908) 763; Talbot, For. Fl. Bombay Sind 1 (1909) 57, f. 36; Dunn in Gamble, Fl. Pr. Madras 1 (1915) 44; Parker, For. Fl. Punjab (1918) 19. — Type: *Heyne hb. Roth 1072* (C) Southern India, Tuticoryn. Siwalapari, st., ? 1795.

Low shrub to small tree 6 m., rarely attaining 10 by 1 m. *Innovations* pale-puberulous with small simple gelatinouslooking hairs but very soon glabrescent, or completely glabrous. Twigs slender, often zigzag, light greenish when dried. Cataphylls only at the base of arrested twigs, otherwise wanting. *Thorns* straight, rather vigorous, pointing upwards, sometimes patent, 3—7 mm, occasionally wanting. *Leaves* only on the young twigs, soon caducous, linear, ¼—2 cm by 1—3 mm, inclusive the more or less obscure petiole; top ending in a short, stiff, pale, mucrolike prickle. *Racemes* lateral, often with a twig serially inserted above them, rhachis slender, 0.3—10 cm long, whitish puberulous but soon glabrescent, with a few to ± 12(—20) flowers; thorns and bracts none or vestigial; or sometimes the flowers scattered at the basal part of a normally developed twig; pedicels 1—1½ cm, densely white or fulvous tomentose to glabrous. *Flowers* mostly brick-red, sometimes pink, rarely yellow. *Sepals* 8—13 mm long, margin floccose-ciliate, surfaces densely tomentose to glabrous, mucronulate, the adaxial sepal saccate and about half as deep as long, the others linear-lanceolate, 2—3 mm wide, the abaxial one slightly keeled, narrowed at the base, the inner pair petaloid. *Petals* about as long as the sepals, puberulous, the upper pair ± 4—6 mm wide, more or less obdeltoid, largely hidden in the saccate sepal; lower pair lanceolate to subrhombic, 3—6 mm wide. Torus 2 mm wide. *Stamens* 8—18, length 13—16 mm. *Gynophore* 11—19 mm, glabrous; ovary globose, 2 mm diameter with a beak 1 mm long, glabrous, placentas 4, stigma small, flattish. *Fruit* on thin stalk, globose, with a small point of the old style, ¾—1½ cm diameter, pericarp thin, firmly herbaceous, smooth, deep red when ripe. Seeds 2—5 by 2—4 by 2 mm.

INDIA. Many scattered localities within the following line. Peshawar, 34°01'N 71°40'E: *Nath 15393*. Rawalpindi: several. Jhelum: several. Kumaun, Barah (*n.v.*): *Col. Davidson*, fl. III. 1876. Raxaul, 26°58'N 84°51'E: *Mundkur 5*. Rehli, 23°38'N 79°08'E: *Witt*, fl. Buldana, 20°31'N 76°18'E: *Rogers 1400*. Jeur, 18°15'N 75°14'E: *Woodrow*, fl. Poona, 18°34'N 73°58'E: *Cooke*, fl. V. 1889. Also: „North Canara": *Brandis hb. Beddome 251*, and „Tuticorin", 8°48'N 78°10'E: *Heyne hb. Roth 1072*.

Distribution. Northeast Africa: Upper Egypt, Nubia, Cordofan, coastal regions of Aethiopia and Somaliland. Western Asia: Sinai, Arabia, Socotra, S. Persia, Baluchistan, the Indus Plain, south of the Himalaya in the Upper Gangetic Plain eastwards to Raxaul, northwestern and very southern part of the Deccan Peninsula.

Ecology. A plant of arid regions and deserts, also in dry scrub vegetations, at low altitudes. Very common in the deserts of Rajasthan; see Blatt. & Hallb., J. Bomb. Nat. Hist. Soc. 26 (1918) 222, t. 9A, 28A. The young shoots with the leaves come out in November to March; flowers March-April, sometimes to June, the bushes often crowded with scarlet blossoms. Roots immense, spreading deep and wide (Brandis 1874). According to Puri & Jain, Proc. Inst. Sc. India 24 (1958) 149, phot., the flowers are orange; the same authors give ecological particulars. Mani, Agra Un. J. Res. Sc. 8 (1959) 98, t. 8, described a couple of galls on the stem and leaves.

Uses. The flower buds, *'pasi'*, are cooked when fresh as a potherb, in Sind also pickled, as are the young fruits; the ripe fruit is eaten. The quick-burning wood is used as fuel and occasionally for timber; it is even-grained and tough (cf. Blatter, J. Bomb. Nat. Hist. Soc. 31, 1927, 905). Watt, Dict. Ec. Prod. Ind. 2 (1889) 130, also gives some medicinal applications.

Notes. 1. Parker (1918) remarked: 'with *Prosopis spicigera* and *Salvadora oleoides* forming the bulk of the 'rakh' vegetation. Reproduction is mainly by root-suckers. As a young plant it forms rounded bushes of densely interlaced twigs but later the lower branches are shed leaving a clear bole to 8 ft girth, usually 4—5 ft girth. The flower buds and ripe fruits are pickled.'

2. Anatomical details are given by Sabnis, J. Ind. Bot. 1 (1919) 66, f. 27, 36, 37; see also there, p. 67—70.

Sect. 3. **Monostichocalyx**

Radlk., Sitz. Ber. Ak. Münch. Math. Phys. Kl. 14 (1885) 101; Pax & Hoffm. in E. & P., Pfl. Fam. 2nd ed. 17b (1936) 180. — Type species: *C. micracantha* DC.

Capparis sect. *Eucapparis* (series) *Pedicellares* DC., Prod. 1 (1824) 245, in part, and (series) *Seriales* DC., Prod. 1 (1824) 247, and (series) *Corymbosae* DC., l.c.

Hairs at the innovations simple or 2-armed or stellate Leaves well-developed and persistent, generally more than 1½ times as long as wide, top mostly acuminate. Cataphylls sometimes present. Pedicels axillary or variously arranged to a racemose inflorescence. Flowers small to medium-sized, rarely large; sepals in bud all free, both sepals of one pair (sub)equal. Fruit some times spindle-shaped but mostly globose, with a leathery pericarp, the 2—4(—6) carpel sutures nearly always obscure. Seeds mostly exceeding 5 mm in size.

Distribution. Africa except the dry northern part. Asia: West Pakistan and India south of the Himalaya to China south of the 27th parallel, also Formosa, Hainan, the Andaman and Nicobar Is, and Ceylon. All over Malesia, with outliers in Australia (North, Northeast, and East coast to *c.* 32°S) and in the Pacific (Riukiu Is, Marianas, New Caledonia, Fiji). Number of species in Asia, Malesia, Australia, and the Pacific 64, in Africa about 40.

Ecology. Most of the species prefer a monsoon climate, but some penetrate the everwet primary forests.

Wood anatomy. Seven Indian species of this section have been described by Purkyastha & Kazmi in Chowdhury & Ghosh, Indian Woods 1 (1958) 38—40. The wood appeared to be specifically different.

Note. 1. This section contains the majority of the species that most authors hitherto have placed under *Capparis* sect. *Eucapparis* DC. This name, however, now must go to the monotypic section which contains *C. spinosa*. The section *Monostichocalyx*, the only name available for it in its present circumscription, originally contained *C. micracantha* as only species. The aestivation of the calyx, the character on which Radlkofer distinguished his section, is in my opinion not significant, and the reasons for retention of the name are entirely nomenclatural.

3. Capparis acutifolia Sweet. — *C. bodinieri* Lévl.: 3c. — *C. chinensis* G. Don: 3a. — *C. kikuchii* Hay.: 3a. — *C. leptophylla* Hay.: 3a. — *C. membranacea* Gard. & Champ.:

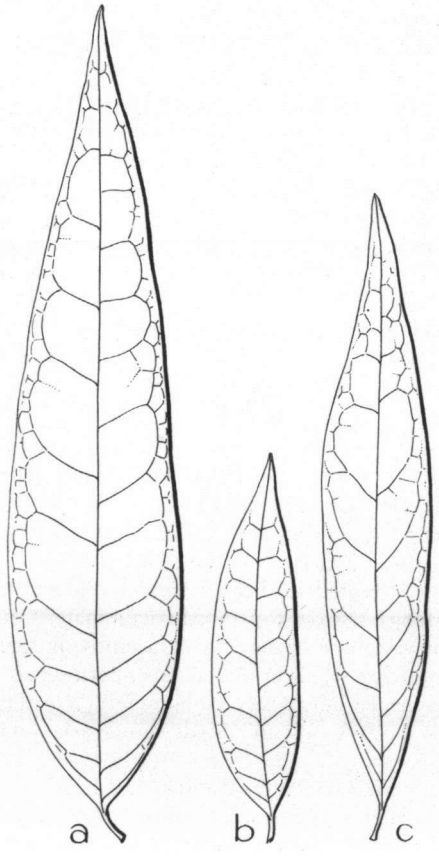


Fig. 20. *Capparis acutifolia* Sw. ssp. *acutifolia*, leaves — a. of *Chun 6411* b. of *Esquirol 1210*, c. of *CCC 14740*, all × 2/3.

Fig. 21. *Capparis acutifolia* Sv., a deviating specimen with stalked inflorescences, × 2/3 (from *Poilane 7186*).

3a. — *C. membranacea* var. *angustissima* Hemsl.: 3a. — *C. membranifolia* Kurz: 3b. — *C. sabiaefolia* Hook. *f.* & Th.: 3d. — *C. subtenera* Craib & W. W. Sm.: 3c. — *C. tenuifolia* Hay.: 3a. — *C. vientianensis* Gagn.: 3d. — *C. viminea* Hook. *f.* & Th.: 3b. — *Ficus marchandii* Lévl.: 3b. — For misinterpretations, see under the subspecies. — **Fig. 20—24.**

Indumentum, if present, very short, floccose, brownish, consisting of minute irregularly stellate hairs. Cataphylls none. For habit and leaves (occasionally distichous) see under the subspecies. Petiole 4—7(—11) mm. *Flowers* serial in rows of 2—4(—6); pedicels ¾—1½(—4) cm. Sepals subequal, (4—)6—8(—9) by 3—4 mm, in bud the outer pair not completely covering the inner pair, boat-shaped, ovate, inner pair elliptic, margins tomentose. Petals obovate, (6—)9—12(—14) by 3—5 mm, rounded, margins and mostly the surfaces tomentose. Stamens (20—)28—35, equalling the gynophore to ½ cm longer. *Gynophore* (1¼—)1¾—2¾(—3¼) cm, filiform, glabrous; ovary pear-shaped, *c.* 2 by 1 mm, glabrous, 2(—3) placentas. In fruit neither the pedicel nor the gynophore incrassate. *Fruits* globose, often pointed, 1—1½ cm in diameter, pericarp thin, blackish when ripe. Seeds 1—3(—8), *c.* 7 by 6 by 3 mm.

Distribution. Asia: India (Sikkim, Assam), Burma, China (south of the 27th parallel), Formosa, Hainan, Indo-China, Siam. Tropical East Africa? see Note 1.

Note. 1. The African *C. orthacantha* Gilg & Bened. 1935 from Tanganyika and Moçambique is closely related to *C. acutifolia*, and may even rank as a subspecies under it, nearest then to ssp. *sabiaefolia*. The leaves are subcoriaceous, widest about the middle. DeWolf, Fl. Trop. East Afr. (in press), reduced *C. orthacantha* as a variety under *C. viminea* Oliv., but the latter is, in my opinion, conspecific with *C. tenera* Dalz.

KEY TO THE SUBSPECIES

1. Innovations tomentose, late glabrescent. Leaves widest at or below the middle, 2—2.5 times as long as wide; nerves 5—7 pairs.
   2. Leaves widest at the middle, herbaceous; base somewhat decurrent along the petiole. Thorns mostly wanting . . . . . **3b.** ssp. **viminea**
   2. Leaves widest below the middle, firmly herbaceous to subcoriaceous; base rounded to acute but not decurrent. Thorns mostly present . . . . . **3c.** ssp. **bodinieri**
1. Innovations glabrous to early glabrescent.
   3. Leaves more than 2.4 times as long as wide, widest at or below the middle; nerves 7 pairs or more.
      4. Leaves thinly herbaceous, 7½—10 cm long, base rounded, nerves 7—8(—10) pairs. Petals inside densely tomentose . . . . . **3d.** ssp. **sabiaefolia**
      4. Leaves firmly herbaceous, 9—13 cm long, base acute, nerves 8—10 pairs. Petals glabrous but tomentose at the margin . . . . . **3a.** ssp. **acutifolia**
   3. Leaves 1.8—2.3 times as long as wide, widest at or above the middle; nerves 4—5(—6) pairs. **3e.** ssp. **obovata**

3a. ssp. **acutifolia.** — *C. acutifolia* Sweet, Hort. Brit. 2nd ed. (1830) 585. — *C. acuminata* (*non* Willd.) Lindl., Bot. Reg. 16 (1830) t. 1320. — *C. chinensis* G. Don, Gen. Hist. Dichlam. Pl. 1 (1831) 278. — Type: Lindley's description and plate, based on flowering material sent from China, Kwangtung, by *J. Reeves*, and reportedly cultivated by the Royal Horticultural Society, London (*n.v.*).

C. membranacea Gard. & Champ., Hook. J. Bot. Kew Gard. Misc. 1 (1849) 241; Benth., Fl. Hongk. (1861) 18; Hance, Ann. Sc. Nat. v, 5 (1866) 206; Hemsl., Ann. Bot. 9 (1895) 145; Mats. & Hay., J. Coll. Sc. Tokyo 22 (1906) 27; Hay., Ic. Pl. Formos. 1 (1911) 56; Gagn., Fl. Gén. I.-C. Suppl. 1 (1939) 160, for var. *annamensis* see Note 5. — Type: *Champion s.n.* (K), China, Hong Kong, fl.

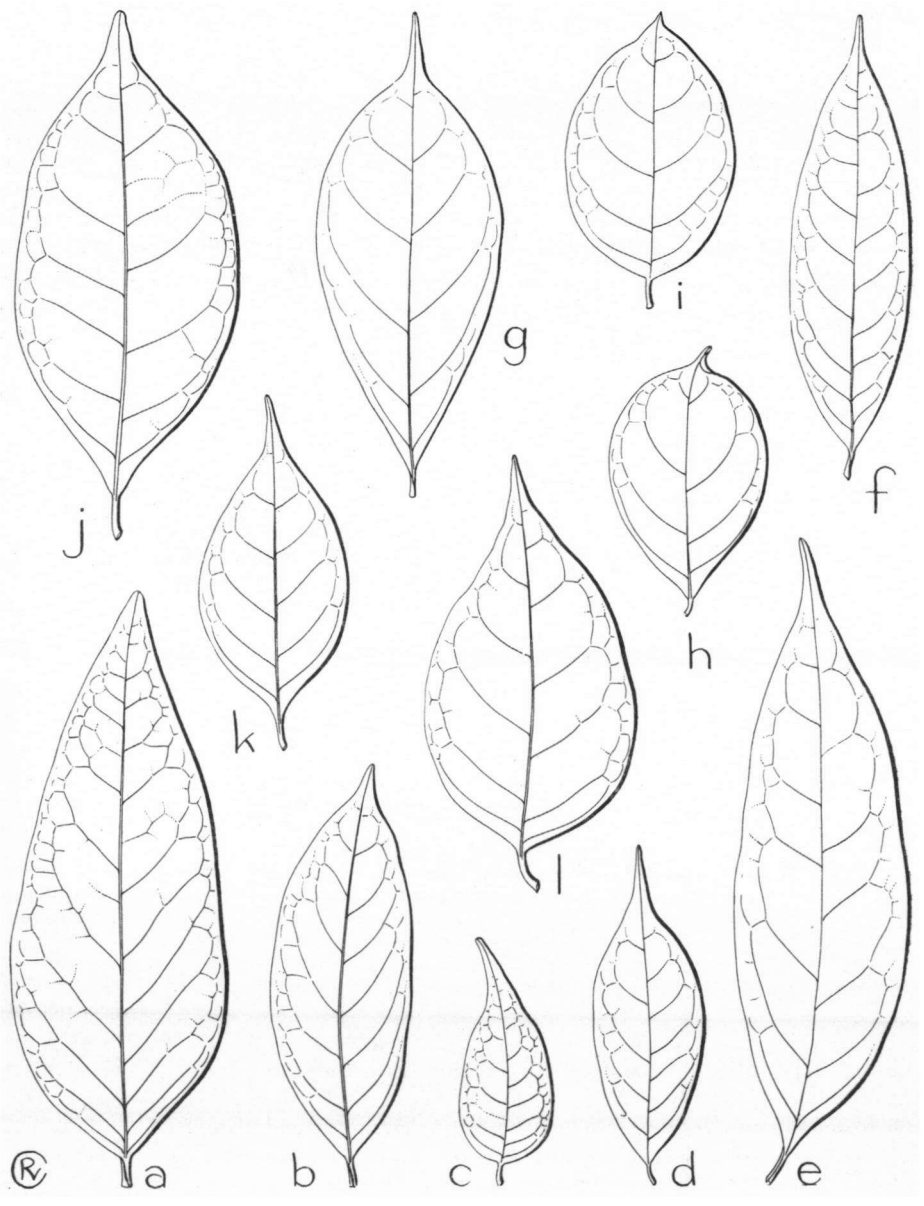


Fig. 22. *Capparis acutifolia* S w., leaves, all × $^{2}/_{3}$ — ssp. *bodinieri* (Lévl.) Jacobs, a. of *Henry 9124D*, b. of *Forrest 8077*, c. of *Rock 2891* — ssp. *sabiaefolia* (Hook. *f.* & Th.) Jacobs, d. of *Garrett 943*, e. of *Lace 4753*, f. of the type, *Hooker f. & Thomson s.n.* — ssp. *obovata* Jacobs, g. of the type, *Pételot 5686*, h. of *Poilane 10737*, i. of *Winit 1900* — ssp. *viminea* Jacobs, j. of *McClure 20110*, k and l. of *Lau 53*.

C. membranacea var. *angustissima* Hemsl., Ann. Bot. 9 (1895) 145; Li, Woody Fl. Taiwan (1963) 236. — Type: *A. Henry 471* (A, K), China, Formosa, Bankinsing Mts, fr.

C. viminea (*non* Hook. f. & Th.) Li, Woody Fl. Taiwan (1963) 236.

C. kikuchii Hay., Ic. Pl. Formos. 3 (1913) 21; Kaneh., Formos. Trees (1936) 235, f. 176. — Type: *Kikuchi s.n.* (L, phot., TI), China, Formosa, Toko, fl. VI. 1913.

C. leptophylla Hay., Ic. Pl. Formos. 3 (1913) 23; Kaneh., Formos. Trees (1936) 236, f. 177. — Type: *Sasaki s.n.* (L, phot., TI), China, Formosa, Ako, Makinsho, fl. III. 1910.

C. tenuifolia Hay., Ic. Pl. Formos. 3 (1913) 23; Kaneh., Formos. Trees (1936) 236. — Type: *Mori 2930* (L, phot., TI), China, Formosa, Ako, Toko, fl. IV. 1907. — **Fig. 20, 21, 23.**

Shrub or climber, 1—2(—7) m, glabrous or very early glabrescent. *Thorns* mostly wanting, if present up to 3 mm, straight, ascending, rarely patent. *Leaves* firmly herbaceous, rarely subcoriaceous, fairly light green when dry, (2.2—)3.0—4.4(—7.0) times as long as broad, the broadest at or below the middle, (4½—)9—13(—22½) by (½—)2½—4 (—5) cm; base mostly acute to cuneate, rarely rounded, top tapering, slightly acuminate, tip acute to blunt; midrib flat to slightly sunken, nerves ± 8—10 pairs, reticulation distinct on both sides. *Flowers* fragrant. Petals glabrous but tomentose at the margin, especially towards the top.

CHINA. Fukien. Yenping, 26°40'N 118°07'E: *Chou 8405*. Foochow, 26°09'N 119°17'E: *Rickett*, fr. 1897; *Warburg 5755*. — Kwangtung, various localities: many. FORMOSA: many. INDO-CHINA. S. Annam. Langbian: *Chevalier 40389*. Blao: *Schmid 9*. See also Note 5.

Distribution. Asia: SE. China, Formosa, Indo-China (S. Annam).

Ecology. Forests and thickets, sometimes open situations, moist or dry, clayey to very rocky, up to 1200 m. Flowers mainly April-May, fruits recorded from all seasons.

Notes. 1. Both of the names *C. acutifolia* and *C. chinensis* were introduced as *nomina nova* because of Lindley's erroneous interpretation.

2. Lindley's plate and description were made on greenhouse material sent to England by John Reeves, who resided at Canton and Macao, in the province of Kwangtung, where the subspecies occurs that shows the characters given by Lindley, viz. ovate, 8—10-nerved, glabrous leaves. That the flowers in Lindley's specimen were solitary can be explained by a kind of depauperation as is occasionally seen.

3. The width of the leaves in one plant may be very variable.

4. This species was also depicted in the unpublished work that is commonly cited as Braam, Ic. Pl. Chin. (1821), t. 29. De Candolle 1824, 247, referred this plate, with doubt, to *C. acuminata* Willd. (our *C. pyrifolia*).

5. *Capparis membranacea* var. *annamensis* Gagn. was described only in French and therefore not valid. Gagnepain marked his material as 'Capparis membranacea Gardn. et Ch. var.'; there are three collections, all from Annam. *Chevalier 40389* from Lang-bian, in flower, has a thin brown pubescence on the twigs, and pedicels of ± 2½ cm. It falls completely within the variability of the present species, more than *Poilane 7186* (fig. 21), from Ba-na near Tourane, wherein the flower rows are sometimes imposed on top of a very short axillary stalk, the pedicels being 4—5 cm long (2½ cm according to Gagnepain); the internodes are long and slender and glabrous, the leaves comparatively large. *Poilane 8085*, from the Col des Nuages near Tourane, matches it exactly, except for its being in (unripe) fruit; the fruits are globose and elongate, ± 6—12 by 6 mm.

3b. ssp. **viminea** Jacobs, *nom. nov.*. — *C. viminea* Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 179, *nom. illeg.*, *non* Oliv. 1868, see Note 1; Brandis, Indian Trees (1906) 36; Gagn., Fl. Gén. I.-C. 1 (1908) 183; Craib, Fl. Siam. En. 1 (1925) 84; Kanj. &

Fig. 23. *Capparis acutifolia* Sw. ssp. *acutifolia* — a. Habit, b. fruit, both × $^{2}/_{3}$ (a from *Tsang 25230*, b. from *CCC 14740*).

Das, Fl. Assam 1 (1934) 78; Rehder, J. Arn. Arb. 17 (1936) 332; not of Fern.-Vill., Noviss. App. (1880) 11, which is *C. zeylanica*. — Type: *Hooker f. field number 48, distr. number 17* (CGE, K, holo; L, W), India, Sikkim, 1—5000', yfr.

C. membranifolia Kurz, J. As. Soc. Beng. 42 ii (1874) 70, in key; For. Fl. Burma 1 (1877) 61, descr. — Type: *Kurz 1826* (CAL, K), Burma, Pegu, Choungmenah Choung, fl.

Ficus marchandii Lévl., Fedde Rep. 12 (1913) 533; see Rehder, J. Arn. Arb. 17 (1936) 332. — Type: *Esquirol s.n.* (A, phot., fragm.), China, Kweichow, fr.

Capparis sp. Merr., Lingn. Sc. J. 5 (1927) 83. — Specimen: *McClure CCC 9520* from Hainan.

C. membranacea (*non* Gard. & Champ.) Merr., Lingn. Sc. J. 5 (1927) 83.

Capparis sp. Hand.-Mazz., Symb. Sin. 7 (1929) 100; from descr. — **Fig. 22j, k, l.**

Shrub, rarely climbing, up to 6 m, trunk thorny, up to 15 cm diam. *Innovations* densely minutely light brown tomentose, soon to late glabrescent. *Thorns* mostly wanting, if present (on the main twigs) straight, ascending, up to 4 mm. Petiole 6—7(—11) mm. *Leaves* herbaceous, sometimes to subcoriaceous, light green when fresh and mostly so when dry, 1.9—2.5(—3.0) times as long as wide, widest at the middle or somewhat lower, (6½—)7½—10½(—13½) by (3—)3½—5(—6¾) cm; base more or less abruptly narrowed into the petiole, top up to 1 cm acuminate, tip blunt to acutish; midrib comparatively broad, sunken above in the basal part; nerves 5—7 pairs, reticulation more or less distinct; surfaces glabrous but vestiges of the tomentum long persistent on the main nerves. Flowers mostly white, with dark anthers. Sepals much equal, outside tomentose, glabrescent, the margins ciliate. Petals 7(—9) mm long, densely tomentose. *Fruits* 1—1½ cm diam., dark-coloured, pulp yellow. Seeds 1—3(—5), ± 7 by 6 by 3 mm.

INDIA NORTH. Eastern Himalaya. Sikkim: several. Bhutan: *Gamble 1040/120*; *Griffith 181A, 1765*. Lhuntse Dzong, 27°40'N 91°06'E: *Ludlow & Sheriff 20154*. — Assam. NE. Frontier Agency, Rahung: *R. S. Rao 7382*. Gowahatti: *King's coll.*, fl. IV. 1938. BURMA. Lower B., Pegu: *Kurz 21* (*498*), *1826*. — East B. Shan Hills: *Collett 625*. — South B. Martaban: *Kurz 21* (wrong location?). Mergui: *Griffith 181*. CHINA. Kweichow: *Esquirol 3227, 4184, s.n.*, fr. Gan-lay: *Esquirol 347*. — Kwangsi: *Tsoong 2843*; *Wang 41232* HAINAN: many. INDO-CHINA. Tonkin: many. — Laos. Cahn Trap: *Spire 1250*. Vientiane: *Thorel*, fl. 1866—8. Paklai: *Thorel*, st. 1866—8. — Annam. Vinh: *Pételot 4332*. Quang Tri: several. Tourane: *Clemens 4002*. Lang-Bian: *Chevalier 31256*.— Cochin-China: *Harmand*, fr. 1877. SIAM. North S.: Doi Chieng Dao: *Garrett 1304*. — NE. S. Tali: *Kerr 8806*.

Distribution. Asia: NE. India, through central Burma to S. China and Hainan; N. and NE. Siam through Laos to Annam and southwards to Cochin-China.

Ecology. Thickets, forests, dry and moist, sandy or loamy soil. In Sikkim up to 1500 m, elsewhere up to 500 m alt. In Hainan flowers Jan.-March, fruits in May; in Kweichow 3 months later.

Note. 1. The name *Capparis viminea* was first published by Oliver, Fl. Trop. Afr. 1 (1868) 97, with the addition 'Hook. *f.* and Thoms. Fl. Ind. ined.' Oliver's species, however, was found to be conspecific with *C. tenera* Dalz. 1850, under which, therefore, it comes as a synonym. The Indian *C. viminea* Hook. *f.* & Th. 1872 was based on a different type specimen, and is therefore a homonym. However, because the latter name has always been in current use for a well-known taxon and has never been used in the rank of subspecies, it is kept here in this new status.

3c. ssp. **bodinieri** (Lévl.) Jacobs, *stat. nov.* — *C. bodinieri* Lévl., Fedde Rep. 9 (1911) 450; Rehder, J. Arn. Arb. 10 (1929) 195. — Type: *Bodinier s.n.* (A, E, holo; L, phot.), China, Yunnan, Yun-Nan-Sen, fl. 24. III. 1897.

C. tenera (*non* Dalz.) Dunn, J. Linn. Soc. Lond. Bot. 39 (1911) 426; Diels, Notes Gard. Edin. (1912) 90.

C. subtenera Craib & W. W. Sm., Notes Gard. Edin. 9 (1916) 90. — Type: *Forrest 2028* (E, holo; K), China, Yunnan, Teng, Chuan, Cho Valley, 26°N, fl. IV. 1906. — **Fig. 22a, b, c.**

Shrub or small tree (never reported climbing), 1—3(—10) m. *Innovations* with a light brown, rarely greyish tomentum, glabrescent, mostly late. *Thorns* mostly present, up to 4 mm. *Leaves* firmly herbaceous to subcoriaceous, ovate, (1.8—)2.0—2.8(—3.3) times as long as broad, (3½—)5—11(—18) by (1½—)2—4(—6) cm; base rounded to acute, top gradually acuminate, tip blunt; midrib rather broad, slightly raised to sunken, nerves 5—7(—9) pairs, reticulation subdistinct to obscure. *Sepals* all with some tomentum at the margin, especially towards the top, sometimes also the outer sepals obtuse. *Petals* up to 14 by 4½ mm, tomentose, also on the surfaces. *Gynophore* very rarely thinly puberulous towards the base.

INDIA NORTH. Eastern Himalaya. Sikkim, below Kurseong, 26°51'N 88°18'E: *Lacaita H 178*. Bhutan. Teashigang-Chunkara: *Ludlow & Sheriff 1218*. Lhuntse Dzong, 27°40'N 91°06'E: *Ludlow & Sheriff 18869*. BURMA. Haka: *Dickason 7451*. North B. Taping Valley, 24°20'N: *Forrest 9654*. CHINA. Szetchwan. Huili, 26°39'N 102°11'E: *Handel-Mazzetti 1037*. — Yunnan. Hokin, 26°34'N 100°13'E: *Feng 799*. Peyentsin, 27°N 102°E: *Siméon Ten 134*. Yangtse, 27°15'N 103°E: *Forrest 10691*. South of this line: many. — Kweichow. So fou: *Cavalerie 3292*.

Distribution. Asia: NE. India through N. Burma to SW. China.

Ecology. Thickets or open situations, sometimes on limestone, between 800 and 2700 (—3200?) m alt. Flowers February to May; fruits mainly between May and August.

Use. The evergreen, decorative, prickly plant is used for hedges in villages.

3d. ssp. **sabiaefolia** (Hook. *f.* & Th.) Jacobs, *stat. nov.* — *C. sabiaefolia* Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 179; Brandis, Indian Trees (1906) 36; Craib, Fl. Siam. En. 1 (1925) 83; Kanj. & Das, Fl. Assam 1 (1934) 78; Gagn., Fl. Gén. I.-C. Suppl. 1 (1939) 170. — Type: *Hooker f. & Thomson 1692* (BM, C, CGE, G, GH, K, holo; L, P, W), India, Assam, Khasia Hills, 4—6000', yfr. 13. VII., fr. 28. VII. 1850.

C. vientianensis Gagn., Bull. Soc. Bot. Fr. 85 (1939) 599, see Note 2. — Type: *Kerr 20748* (BM, K, P), Indo-China, Laos, Borikan, fl. 29. III. 1932. — **Fig. 22d, e, f.**

Shrub or tree or climber, glabrous. *Thorns* wanting or almost so; see Note 1. Petiole ½ cm. *Leaves* thinly herbaceous, in the herbarium often dark-coloured, (2.1—)2.4—3.4 (—4.0) times as long as wide, widest at or below the middle, (5¼—)7½—10(—13½) by (2—)2½—3½(—4¾) cm; base rounded to (rarely) acutish, top gradually acuminate, tip ¾—1½ cm long, blunt to acute; midrib slightly sunken above, sometimes in the basal part only, nerves thin, 7—8(—10) pairs, reticulation fairly distinct. *Flowers* often with only 1—2. Sepals glabrous, only the inner pair ciliate. Petals outside largely glabrous, inside densely tomentose. *Fruits* inadequately known.

INDIA NORTH. Assam. Konoma: *G. Watt 11571*. Reliang: *R. S. Rao 2587*. Kameng Frontier Div., *c.* 27°N 93°E: *Panigrahi 15390*. NE. Frontier Agency: *De 17895*. Khasim-Jaintia Hills: several. Nowgong: *De 18656*. Naga Hills: several. Aka Hills: *Bor 15331, 19449*. Manipur, E. of Ukhrul: *Kingdon-Ward 17323*. BURMA. Kalau: *Dickason 1006*. North B. Kachin Hills, *c.* 26°N 97°E, Phalé: *Pottinger*, fl. III. 1897. Bhamo Div., Sinlum: *Cubitt 331*. — Arakan, Chin Hills: *Dun 215*. — Upper B. Shan Hills Terai: *Collett 499*. — East B. Shan States. Kengtung, 21°16'N 99°39'E: *Dickason 9187*; *McGregor 184*. Salween Distr. Dwenko: *Chin 6742*. — South B. Dawna Range, *c.* 17°30'N 98°E: *Lace 4753*. SIAM. North S. Doi Angka, 18°35'N 98°29'E: *Garrett 943*; *Kerr 5297*; *Winit 1335*. INDO-CHINA (see Note 2). Tonkin. Hanoi, 21°N 106'E: *Balansa 4080*. — Laos. Berikhane, 18°35'N 103°44'E; *Kerr 20748*.

Distribution. Asia: NE. India, throughout Burma, through N. Siam, to northern Indo-China.

Ecology. In thickets and open scrubby slopes, between 1000 and 2000 m. Flowers March-April; in Assam, flowers in May, fruits August-October (Kanjilal & Das).

Notes. 1. In *Kingdon-Ward 11490* the thorns are up to 5 mm long, pointing upwards.

2. The type of *C. vientianensis*, and an unnumbered Thorel specimen which closely matches it, are somewhat deviating. Their thorns are 4 mm long, the leaves thin in texture, 12½ by 4¼ cm, with 5—6 pairs of nerves; pedicels up to ½ cm; outer sepals ovate, 7 by 4 mm, glabrous, inner sepals 7 by 3 mm, elliptic, ciliolate; petals *c.* 9 by 3 mm, woolly at the base; stamens *c.* 23; gynophore 24 mm. Together with, as it seems, *Balansa 4080* from Tonkin, wherein the leaves are up to 15½ by 7¼ cm, the pedicels up to 15 mm, and the gynophores up to 29 mm, they are the only specimens known from Indo-China.

3e. ssp. **obovata** Jacobs, *ssp. nov.* — Type: *Pételot 5685* (A, holo; L, phot. fragm., P, US), Indo-China, Tonkin, Hanoi, fl. IV. 1935. — **Fig. 22g, h, i.**

Capparidis acutifoliae subspecies glabra vel mox glabrescens foliis 1.8—2.3-plo longioribus quam latis, obovatis vel ellipticis nervis utrinque 4—5, raro 6.

Shrub or small tree, rarely scandent, 1½—2½(—6) m, glabrous to rarely early glabrescent. *Thorns* ascending, up to 2 mm, sometimes wanting. Petiole 3—6 mm. *Leaves* firmly herbaceous, (1.5—)1.8—2.3(—2.7) times as long as wide, widest above or at the middle, (4¼—)6—10½ by 2½—5¼ cm; base acute, top more or less abruptly acuminate, tip ¼—1¼ cm, blunt; midrib mostly shallowly sunken, at least in the basal part, nerves thin, 4—5(—6) pairs, reticulation distinct. *Sepals* comparatively wide, obtuse, outside glabrous, inside sometimes densely tomentose, inner pair ciliate and sometimes also the outer pair. *Gynophore* 2½—3 cm. *Fruit* unknown.

INDO-CHINA. Tonkin, near Hanoi: *Balansa 4079*; *Pételot 5686, 7849*. — Annam. Nghé-An: *Chevalier 32545*. Prov. Quang Tri: several. Hue: *Eberhardt 3324*. Tourane: *Clemens 4002*. SIAM, North S. Lampang, 18°N 99°30'E: *Winit 1900*. — Central S., near Bangkok: *Kerr*, yfr. 27.VI.1920 (prob.). S. BURMA. S. Tenasserim: *Parkinson 1613*. Mergui. Pawut: *Parkinson 2516*.

Distribution. Asia: northern Indo-China, through Siam to southernmost Burma.

Ecology. Common in open places, to *c.* 100 m alt. Flowers March-May, in southern Burma in January.

Note. 1. Of all subspecies under *C. acutifolia*, this one is closest related to *C. pyrifolia*, which has a persistent indumentum, and to *C. tenera*, which has recurved thorns.

4. Capparis annamensis (Baker *f.*) Jacobs, *stat. nov.* — *C. grandiflora* Wall. *ex* Hook. *f.* & Th. var. *annamensis* Baker *f.*, J. Nat. Hist. Soc. Siam 4 (1921) 127. — Type: *Kloss s.n.* (BM), Indo-China, Annam, Tourcham, fl. V. 1918. — **Fig. 24.**

Woody vine or low (sprawling?) shrub. *Innovations* densely greyish tomentellous with stellate hairs, late glabrescent, especially the twigs. Cataphylls none. *Thorns* recurved, 2—3 mm, sharp. Petiole 4—6 mm. *Leaves* firmly herbaceous, ± 1.3—1.8 times as long as wide, slightly ovate to sometimes slightly obovate, 2½—4 by 1½—2¼ cm; base obtuse, top rounded, sometimes emarginate, mucronulate; midrib shallowly sunken, nerves 2—3 pairs, thin, like the reticulation rather distinct above, obscure below; upper surface somewhat glossy. *Flowers* solitary, axillary; pedicels 9—15 mm, vigorous, tomentellous. Sepals pointed, outer pair ± 12 by 5½ mm, boat-shaped, outside almost glabrous, inside tomentellous towards the margins, inner pair ovate, ± 13 by 6½ mm; sparsely tomentellous outside, glabrous inside. Petals 18—23 by 6—9 mm, obovate, almost truncate, glabrous, yellow, the upper pair with an orange or brownish blotch. Torus ± 2 mm wide. Stamens

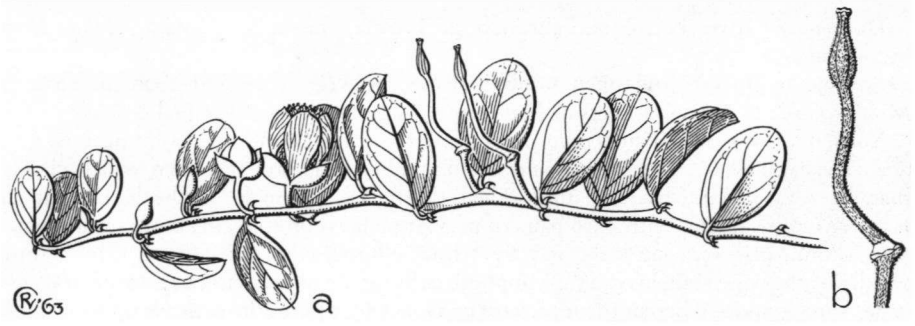


Fig. 24. *Capparis annamensis* (Baker *f.*) Jacobs — a. habit, × $^2/_3$, b. gynophore, × $1^1/_2$ (from *Chevalier 30525*).

52—57, slightly exceeding the gynoecium. *Gynophore* 1¾—2½ cm, densely tomentellous; ovary ovoid-cylindric, 8—9 mm long in all, 1½ mm wide, with 5—6 furrows and as many placentas, densely tomentellous except sometimes the 2 mm long beak and 1 mm wide knob-shaped stigma. *Fruit* unknown.

INDO-CHINA. Annam. Nhatrang, 12°15'N 109°10'E, and vicinity: *Chevalier 30525*; *Robinson 1021*. Prov. Phanrang: *Chevalier 30559A*; *Kloss s.n.*, fl. V. 1918. Phanri, 11°11'N 108°33'E: *Evrard 1614*.

Distribution. Asia: Indo-China, a small area in southeastern Annam.
Ecology. Apparently at low elevation. Flowers February to March and October.

5. Capparis assamica Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 177; Brandis, Indian Trees (1906) 35; Kanj. & Das, Fl. Assam 1 (1934) 76. — Type: *Griffith 602 hb. East India Company 188* (K), India, East Bengal, fl.

C. gallatlyi King, Ann. Gard. Calc. 5 (1896) 118, t. 133B. — Type: *Gallatly 880* (BM, CAL, K), Burma, Tenasserim, Moolar Plain, fl. IV. 1877.

Shrub, perhaps climbing, 2—3 m. *Innovations* very sparsely pubescent, with appressed, subsessile, 2-armed balance-hairs, soon glabrescent. Shoots at the base with cataphylls. *Thorns* to 1 mm, straight, directed upwards, but often wanting. In the leaf axils often a small abortive bracteate shoot. Petiole 6—8 mm. *Leaves* subcoriaceous, ± 3—3½ times as long as wide, widest about the middle or above, (15—)18—21 by (4½—)5½—6½ cm; base acute, top fairly abruptly acuminate, tip up to 1 cm, blunt, mucronate; midrib deeply sunken all over, nerves subdepressed, 8—10 pairs, reticulation distinct; surfaces glabrous, rather dull. *Inflorescence* a densely flowered terminal or subterminal raceme 11—18(—28) cm long, peduncle short or none, the basal part surrounded by conferted bracts, rhachis slender with small decurrent ribs, sparsely puberulous, bracts subulate, 2 mm, glabrous, pedicels solitary in the axil of a bract, filiform, 1¼—1¾ cm, sparsely puberulous. *Flowers* white. Sepals subequal, elliptic, ovate, 3—4 mm long, sparsely puberulous outside. Petals ovate, truncate, 4 by 1½ mm, puberulous towards the base. Stamens 16—20, ± 10 mm. *Gynophore* 6—9 mm, glabrous; ovary 1½ mm long, glabrous, placentas 2. *Fruits* on thin stalk, globose, ¾ cm diameter, red, 1-seeded.

INDIA NORTH. East Bengal: *Griffith 602*. — Assam. Khasi-Jaintia Hills: several. NE. Frontier Agency. Kamlang Gorge, ?28°12'N 94°40'E: *Kingdon-Ward 18572*. Chenlang-Khela; *Panigrahi 14441*. Pasighat, 28°N 95°20'E: *Deka 16938*. BURMA. North B. Myitkyina, 25°24'N 97°25'E, Nanna Res.: *Su Koe 9252*. Bhamo: *Cubitt 579*. — South B. Tenasserim, Moolar Plain: *Gallatly 880*. Tavoy, 14°02'N 98°12'E: *Russell 2017*. CHINA. Yunnan. Dah-menglung, Che-li: *Wang 77892*. INDO-CHINA. Laos, 17°22'N 104°50'E: *J. Vidal 1247*.

Distribution. Asia: northeastern India; scattered stations in Burma, S. China, and Laos.

Ecology. Dense forest, lowlands up to 1100 m, 'always in the jungle'. 'A bushy shrub with white flowers in long pendent festoons, which give a very charming effect' (Kingdon-Ward).

6. Capparis baducca Rheede *ex* Linnaeus, Sp. Pl. (1753) 504; Lam., Enc. Méth. Bot. 1 (1785) 607, not of Blanco, Fl. Filip. 1 (1837) 438, which is *C. spinosa* var. *mariana*. — [*Badukka* Rheede, Hort, Malab. 6 (1686) 105, t. 57.] — Type: *Rheede's description and plate*.

C. rheedii DC., Prod. 1 (1824) 246. — *C. brevispina* var. *rheedii* (DC.) Thw., En. Pl. Zeyl. (1858) 15, name only, the material being *C. brevispina*. — Type: in *hb. Banks (n.v.)*.

C. heyneana Wall. *ex* W. & A., Prod. (1834) 25; Drury, Handb. Ind. Fl. 1 (1864) 39; Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 174; Trimen, Handb. Fl. Ceylon 1 (1893) 61; Cooke, Fl. Br. Bombay 1 (1901) 45; Brandis, Indian Trees (1906) 33; Talbot, For. Fl. Bombay Sind 1 (1909) 54, f. 34; Dunn in Gamble, Fl. Pr. Madras 1 (1915) 45. — Type: *Heyne hb. Wallich 6985A* (K), India, fl.

C. formosa Dalz., Hook. J. Bot. Kew Gard. Misc. 2 (1850) 40; Dalz. & Gibs., Bombay Fl. (1861) 9; Drury, Handb. Ind. Fl. 1 (1864) 39. — Type: *hb. Dalzell 1615* (K), India, Canara, Chartee Ghant, fl.

Large, much-branched shrub or tree 5—6 m; the trunk thorny. *Innovations* brown-red tomentose with small stellate hairs, soon glabrescent. Twigs brown-red when dry, sometimes verruculose; shoots at the base with cataphylls. *Thorns* straight, patent, up to 2 mm, but often wanting or vestigial. Petiole (½—)¾—1 cm. *Leaves* coriaceous, sometimes brownish tinged when dry, 2.0—3.0 times as long as wide, ovate, (7—)9—14 by (3½—)4—5½(—6½) cm, base acute to blunt or retuse, top acute or subacuminate, mucronate; midrib and main nerves flattish or slightly sunken, with a narrow keel above, very prominent and brown or yellowish coloured below, nerves 2—4 pairs, conferted towards the base, reticulation distinct, especially below; upper surface more or less glossy. Flowers solitary, axillary, occasionally on a twig ± 1 cm long with bract-like scales and no leaves; pedicels 1¼—2 cm, tomentose. Calyx at anthesis only for the half enveloping the flower. Outer pair of sepals ± 11—15 by 6 mm, boat-shaped, sparsely tomentose outside, densely villose towards the top inside, inner pair 11—17 by 6—8 mm, flat, densely villose outside, inside sometimes so towards the top. Petals 3—5 by 1½—3 cm, more or less obovate, glabrous, at first white, later pale bluish, the upper pair with a yellow blotch. Torus ± 2 mm wide. Stamens about 80—106, somewhat exceeding the gynophore. *Gynophore* (1¾—)3—4 cm, glabrous; ovary 4-angular with densely tomentose furrows between, 5 by 1½ mm, placentas 4. *Fruits* (immature) 4 cm, ovoid, beaked (Hooker).

INDIA SOUTH. *Wight 66*; *hb. Wallich 6985A*, *B.* Concan/Bombay, *c.* 19°N: *Dalzell*, fl.; *Stocks & Law*, fl. Mysore, near Dharwar, *c.* 15°30'N 75°04'E: *Santapau 10912*. Canara coast: several. Malabar coast. Taliparamba: *Barber 8781*. Courtallam: *Wight 87*. Madras. Mettupalayam, 11°18'N 76°57'E: *Kalyanam*, fl. 1. 1948. Anaimalai Hills, *c.* 10°30'N 77°E: *Beddome 228*, *229*.

Distribution. Asia: India, west side of the Deccan Peninsula south of Bombay.

Ecology. Evergreen rain forest, apparently at low elevation. Flowers about April; according to Drury in the hot season.

Notes. 1. In his original concept of this species, Hort. Cliff. (1737) 204, Linnaeus comprised also American elements. To this fact De Candolle's remark must refer, under *C. rheedii*, that in *C. baducca* of Linnaeus several elements were mixed up. In 1753, however, Linnaeus appears to have separated the American and the Asiatic element; he

refers to Rheede and states 'habitat in India'. As Rheede's plate is well recognizeable, the name *C. baducca* which Linnaeus based on it should be acknowledged.

2. A close relative seems to be *C. erythrocarpos* Isert 1789, with recurved thorns, leaves 2—8½ by 1—4¼ cm, pointed buds, 2 sepals petaloid, 6 placentas in the ovary which has a hairy top, a fusiform fruit ribbed 5 by 3 cm. It is a variable species, from Uganda, Kenya, Tanganyika, and Guinea to Ethiopia, southward to Angola and N. Rhodesia. Its var. *rosea* (Klotsch) DeWolf, Fl. Trop. East Afr. (in press) is smaller in all parts and has a hairy ovary; it occurs in Kenya, Tanganyika, Zanzibar, N. and S. Rhodesia, Nyasaland, and Mozambique.

7. Capparis beneolens Gagn., Bull. Soc. Bot. Fr. 85 (1939) 597, Latin descr.; Fl. Gén. I.-C. Suppl. 1 (1939) 162, f. 15, French descr. — Lectotype: *Poilane 9320* (A, K, L, P, holo), Indo-China, southern Annam, Ca-Na, fl. 24. XII. 1923.

Bush 1—2 m, sometimes climbing up to 8 m. *Innovations* densely puberulous with peculiar hammer-like red hairs on a patent stalk with a long end pointing acroscopically and a short end pointing basiscopically; late glabrescent; cataphylls none. Internodes of the main twigs 2—2½ cm, of the lateral twigs ½—1 cm. *Thorns* recurved, 1 mm, sometimes wanting. Petiole 3—5 mm. *Leaves* subcoriaceous, 1.7—2.7 times as long as wide, widest about the middle, (1½—)2—3½ by (¾—)1—1½ cm; base rounded, top acute, rarely bluntish, mucronate; midrib flat above, subprominent below, nerves 3—4 pairs, obscure, thin; surfaces soon glabrescent, fairly glossy, margin distinct. *Flowers* white, deliciously fragrant, serial, with 2—6 in a row; pedicels 5—8 mm, hairy. Sepals 2½—3 by 1—2½ mm, thinly hairy outside, the odd sepal ovate, boat-shaped, acute, the other 3 subequal, elliptic. Petals 3—3½ by 1—1½ mm, somewhat ciliate, otherwise glabrous. Stamens 6—7, 4—5 mm, anthers ± 1 mm long. *Gynophore* 3(—5) mm, puberulous towards the base; ovary ovoid, 1—1½ by ½—¾ mm, glabrous, placentas 4. *Fruit* globose, 6—8 mm diam., pericarp thin. Seeds 1—7, ± 4 by 3 by 2 mm.

INDO-CHINA. Annam. Ca Na, 11°21'N 108°53'E: *Poilane 5607, 9320.* Nhatrang, 12°15'N 109°10'E, and vicinity: several.

Distribution. Asia: Indo-China, in a small area in southeastern Annam.

Ecology. Sandy-rocky soil, also from deforested sands near a brackish silted river mouth. Seems to be fertile throughout the year. The plant gives the impression to be xerophilous.

Note. 1. In the type I found a flower with 6 normally developed stamens and 2 underdeveloped ones, the filament being 1½ mm, the anther ⅔ mm long.

8. Capparis brachybotrya Hall. *f.*, Fedde Rep. 2 (1906) 59; Jacobs, Fl. Mal. I, 6 (1960) 73, f. 8.

Branchlets stout, slightly zig-zag, glabrous, internodes 2½—5 cm. Shoots at the base with cataphylls. *Thorns* slightly recurved, minute to 2 mm long. *Leaves* coriaceous, elliptic, oblong or sublanceolate, light green when dry, glabrous, 13—21½ by 5—10½ cm; base obtusely acutish to rounded; top rounded and 2—10 mm acuminate, with a dark and stiff tip; nerves (6—)7—9(—10) pairs, sunken above. Petiole stout, 1—1½ cm. Racemes axillary, sometimes serially in twos; rachis stout, (1—)2½ cm, up to 20-flowered, pale-puberulous, glabrescent, at the very base surrounded by conferted bracts. Bracts subulate, small, early caducous; bracteoles stiff, subulate, minute, later caducous. Pedicel 1—2½ cm, slightly thickened towards the top, puberulous, glabrescent. *Flowers* (pinkish) white, scented. Buds subglobose, occasionally apiculate, 1 cm diam. Sepals subequal, *c.*

11—14 by 6—10 mm, more or less mucronulate, outer pair subglabrous, inner pair outside puberulous along the margin. Petals 12—20 by 6—10 mm, outside puberulous, especially in the upper part; upper petals the smallest, in the basal median part densely puberulous inside; lower petals glabrous inside. Stamens (80—)100—160, filaments white. *Gynophore* 2—3½ cm; ovary ovoid, 2—3 by 1 mm, placentas 4, stigma ½ mm, all glabrous.

8a. forma **brachybotrya.** — Type: *Jaheri 137* (BO), Malesia, Kai Islands, fl.

Leaves elliptic, 1.7—2.1 times as long as broad, 14—22 by 7½—10½ cm, with rounded base. *Fruits* on a gynophore 1½—2¼ cm, ellipsoid with narrowed base and short, abruptly acuminate top, 4—5½ by 3¼ cm, pericarp leathery. Seeds ∞, *c.* 10 by 7 by 5 mm, light brown.

MOLUCCAS. Kai Is: *Jaheri 137, 138.* NEW GUINEA. Vogelkop Peninsula. Kebar: *Vink BW 11390.* Manokwari: *Koster BW 312, BW 4356; Zieck BW 2353A.* — Batanta Is: *van Royen 3262.*

Distribution. Malesia: Moluccas (Kai Is), New Guinea (Vogelkop and Batanta Is).

Ecology. Primary and secondary forest, up to 250 m.

Note. 1. The fruits belonging to the type specimen were separated from it and got lost; the only collection of ripe fruits now available was made by van Royen. He informed me that the short peduncle with several fruits on their long stalks was quite showy. The fresh fruits are somewhat larger than the dry ones, red, smooth, and they possess the abruptly pointed base and apex.

8b. forma **angustifolia** (Hall. *f*) Jacobs, Fl. Mal. I, 6 (1960) 75, f. 8. — *C. brachybotrya* var. *angustifolia* Hall. *f.*, Fedde Rep. 2 (1906) 60. — Type: *Koorders 16342* (BO), Malesia, NE. Celebes, Kajuwata, fl. III. 1895.

Leaves oblong, 2.4—3.3 times as long as broad, 13—21½ by 5—7 cm, with obtusely acutish to rounded base. *Gynophore* 4½ cm; *fruit* (almost mature?) elongate, 4 by 1½ cm, pericarp thin. Seeds ∞, *c.* 8 by 7 by 4 mm.

CELEBES. NE. Peninsula. Minahasa: *Koorders 16342.* — SE. Peninsula. Pangkadjene: *Teijsmann 12594.* NEW GUINEA. Vogelkop Peninsula. Ransiki near Manokwari: *Kostermans 2819.*

Distribution. Malesia: Celebes (Pangkadjene, Minahasa), New Guinea (Vogelkop Peninsula).

Ecology. Coastal forest.

Notes. 1. In sterile state very similar to *C. micracantha*, but easily distinguished by the axillary inflorescence with a thick rachis, *C. micracantha* having a supra-axillary row of pedicels or their scars.

2. *Teijsmann 12594* from SW. Celebes, has a fruit supposed to be almost ripe. It is elongate, 4 by 1½ cm, the pericarp thin and smooth but somewhat constricted around the seeds which are ± 8 by 7 by 4 mm. The pedicel is 5 cm long, the gynophore 4½ cm, both a little incrassate.

Though I cannot estimate the importance of the difference in fruits I have my doubts on the value of this forma, but the material is insufficient.

9. Capparis brevispina DC., Prod. 1 (1824) 246; W. & A., Prod. (1834) 24; Wight, Hook. Ic. Pl. 2 (1837) t. 126; Thw., En. Pl. Zeyl. (1858) 15, incl. var. β *rheedii* (DC.) Thw. for the material only, excl. var. γ *rotundifolia* ('Rottb.') Thw., which is *C. rotundifolia;* Dalz. & Gibs., Bombay Fl. (1861) 9; Drury, Handb. Ind. Fl. 1 (1864) 38; Dunn in Gamble,

Fl. Pr. Madras 1 (1915) 45; Dunn, Kew Bull. (1916) 63; Haines, Bot. Bihar Or. (1925) 31. — Type: *Roxburgh* (G-DC), India, fl. m. Lambert 1815.

C. wallichiana W. & A., Prod. (1834) 25; Drury, Handb. Ind. Fl. 1 (1864) 38. — Type: *Wight Cat. 98 (n.v.)*, India.

C. acuminata (*non* Willd.) Roxb., Fl. Ind. ed. Carey 2 (1832) 566.

C. zeylanica (*non* L.) Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 174; Trimen, Handb. Fl. Ceylon 1 (1893) 61; Cooke, Fl. Pr. Bombay 1 (1901) 45; Brandis, Indian Trees (1906) 33; Talbot, For. Fl. Bombay Sind 1 (1909) 53, f. 33.

Dense shrub or slender tree. *Innovations* more or less densely stellate hairy, fairly soon glabrescent; their base surrounded by many cataphylls. Twigs light brownish when dry, sometimes verruculose. *Thorns* straight or slightly recurved, patent or slightly pointing upwards, up to 4 mm, rarely vestigial. Petiole 2—8 mm. *Leaves* coriaceous, very variable in shape and size, (1.3—)1.8—4.0 times as long as wide, widest about or below the middle, 3½—13½ by 1¼—3½(—5¼) cm, base acute to subcordate, top acute with a stiff mucro; midrib shallowly sunken, nerves ± 4—6 pairs, thin, reticulation distinct; upper surface rather glossy. *Flowers* solitary, axillary, sometimes on small lateral twigs, pedicels 1¾—3 cm, glabrous. Buds obovoid, at anthesis only for ± the half covered by the sepals. Sepals unequal, 5—12 by 3—5 mm, acute outer pair boat-shaped subacuminate, glabrous outside, sparsely tomentose to densely villose towards the margin inside, inner pair ovate ± 2 mm longer than the outer pair, sparsely tomentose to densely villose towards the margin outside, glabrous inside. Petals obovate, 1½—3¼ by ½—1¼ cm, sparsely tomentose towards the top, white, the upper pair with a yellow blotch turning purplish. Torus ± 2 mm wide. Stamens about 30—35. *Gynophore* 1¾—3½ cm, glabrous; ovary ovoid, long-beaked, 5—6 by 1½ mm, thick-tomentose, placentas 4; in some flowers the gynoecium vestigial. In fruit the pedicel and the gynophore not woody and hardly incrassate, up to 2 mm. *Fruits* ovoid to sometimes ellipsoid, distinctly pointed, ± 2½—3 by 1½—2 cm, pericarp smooth, thin, red or bright orange-pink. Seeds in white creamy foetid pulp (Talbot), ± 6—8 by 5—7 by 4—6 mm.

INDIA SOUTH. Unlocated: *Banks*, st.; *Wight 67, 97, 99, 101*. Malabar: *hb. Rottler*, st. II. 1817. Simhachellan: *Elliott*, yfr. 1852. Cultivated, Bombay: several. — Deccan. Orissa. Puri Div., *c.* 19°49'N 85°54'E: several. Ganjam Distr.: *Gamble 14205*. Andhra Pradesh. Kurnool, *c.* 15°51'N 78°E: *Wagh 5852, 5854*. Further southwards in the Carnatic: several scattered localities. CEYLON: many.

Distribution. Asia: India, Deccan Peninsula (for certain only in the eastern part, south of the Cuttack River), Ceylon.

Ecology. Jungle and dry forest tracts, apparently at low elevations. Flowers March-April, fruits April-July.

Use. The green fruit is sliced, dried, cooked, and eaten (Trimen).

Note. 1. We will try to sketch the nomenclatural puzzle in which three species were involved for more than a century: *C. zeylanica* L. 1753 (better known as *C. horrida* Linn. . 1781), *C. pyrifolia* Lam. 1785 (better known as *C. acuminata* Willd. 1799), and *C. brevispina* DC. 1824.

Capparis zeylanica was described on a Hermann specimen from Ceylon, still in the British Museum but early forgotten. The younger Linnaeus described the same species as *C. horrida* on a Koenig specimen, also from Ceylon. Willdenow later treated both as separate species. De Candolle applied the name *C. zeylanica* L. to *C. pyrifolia* Lam.; *C. acuminata* Willd., which is the same, was kept apart by him.

Roxburgh (1832) interpreted *C. zeylanica* correctly. For *C. acuminata*, however, he took *C. brevispina* DC. Wight & Arnott (1834) gave a correct interpretation of *C.*

brevispina, except that *C. rotundifolia* cited by them in the synonymy is a different species. Their concept of *C. zeylanica* is also correct, except that *C. acuminata* cited by them in the synonymy does not belong there, but under *C. pyrifolia*. Their idea of *C. horrida* is also correct, only did they not combine it with *C. zeylanica*.

Hooker & Thomson (1872) applied the name *C. zeylanica* (with exclusion of the correct interpretation by W. & A.) to *C. brevispina* DC.; the latter name is cited by them in the synonymy. The proper *C. zeylanica* was named *C. horrida*, which has become in current use. This misinterpretation was followed by all the post-Hookerian Indian Floras, until Dunn (1915) reverted to the correct names, unnoticed, however, by numerous authors all over the vast area of *C. zeylanica*, who kept naming it *C. horrida*. Not until 1960, when the Flora Malesiana revision appeared, was the epithet *horrida* abandoned.

Thanks are due to Dr Gordon P. DeWolf for his valuable help in this matter.

10. Capparis burmanica Coll. & Hemsl., J. Linn. Soc. Lond. Bot. 28 (1890) 19, t. 2; Brandis, Indian Trees (1906) 35. — Type: *Collett 495* (CAL, K, holo), Upper Burma, Shewenoungbu, fl.

Small tree or shrub 4—6 m. *Innovations* densely fulvo-greyish puberulous, late glabrescent. Twigs slender. *Thorns* none. Petiole 6—10 mm. *Leaves* subcoriaceous, ± 1.2—2.0 times as long as wide, widest at the middle or mostly above, sometimes the leaf even obcordate, 3—4½ by 2—3½ cm; base cuneate, top rounded, notched to emarginate, rarely acute; midrib slightly raised, nerves ± 3 pairs, thin, reticulation obscure; upper surface first glabrescent, then glossy, lower surface dull, the indument mostly persistent. *Inflorescence* a raceme ± (5—)10—14 cm long, terminal on apical twigs, thus sometimes forming a panicle, with 2—3 dozens of flowers; hairy. Bracts 2 mm long early caducous; pedicels ¾—1 cm. *Flowers* white throughout. Sepals unequal, 6—7 by 4—5 mm, glabrous inside, outer pair subcoriaceous, very concave, outside densely puberulous towards the base, inner pair thinner, ovate, outside sparsely puberulous. Petals obovate, 7—9 by ± 3 mm, more or less puberulous inside. Stamens ± 47—50. Torus 3 mm wide. *Gynophore* 10—12 mm, vigorous, glabrous; ovary 2 mm long, glabrous, stigma pointed, placentas 2. In fruit the rhachis of the inflorescence woody, also the pedicel which is especially incrassate towards the ends and sometimes still puberulous; gynophore to 6 mm incrassate all over. *Fruits* globose, at least 3—3½ cm diameter, pericarp 2—3 mm thick, glossy, smooth, purplish-black when dry. Seeds?

BURMA. Upper B. Kyoukmyoung: *Abdul Huk*, fr. VII. 1891. Mandalay area: *Abdul Huk*, fr. VIII. 1890; *White 393*. Meiktila Distr.: *Collett 495*; *Rogers 544*. Minbu, 20°09'N 94°52'E, and vicinity: *Aubert & Gage*, fl. 17. III. 1903; *Shaik Mokim 32*; *Rogers 954*. — East B. Shan Hills: *Abdul Huk 74*. Tongla, 21°59'N 97°2°6'E: *Abdul Huk 5, 6*.

Distribution. Asia: Central Burma, region of the Irrawaddy near Mandalay, and the area east of it.

Ecology. Dry country at low altitude.

Use. Fruits eaten in times of scarcity.

11. Capparis buwaldae Jacobs, Fl. Mal. I, 6 (1960) 85. — Type: *Hallier f. 2573* (BO, holo; L), Malesia, W. Borneo, Liang Gagang Hill, fl. fr. III. 1894.

Climbing shrub or liana 2—15 m, glabrous in all parts. *Thorns* recurved, 1—3 mm, often wanting. Petiole 4—7(—10) mm. *Leaves* firmly herbaceous, (2.2—)2.4—4(—5) times as long as wide, widest below to above the middle, 6—13(—23½) by (1½—)2½—4½ (—8) cm; base rounded to acute, top narrowed, acuminate, tip 3—20 mm long, acute,

often mucronulate; midrib sunken, nerves (4—)6—9 pairs, distinctly looped and arcuating towards the margin, reticulation distinct. *Flowers* white, as a rule on slender, short, lateral twigs, serial, 2—4, supra-axillary. Pedicels slender, 1—3(—4) cm long, glabrous. Buds acute, *c.* 3 mm diam. Sepals ovate, 3—5 by 2—3 mm, with a slightly thickened and more or less acute top, outer pair almost glabrous at the margins, inner pair slightly ciliate. Petals very thin, 4—6 by 2—3 mm, white, outside more pubescent than inside, often minutely ciliate. Stamens 20—30, *c.* 2 cm long. *Gynophore* (10—)13—20 mm, ovary *c.* 1½ mm long, smooth, stigma ½ mm long, all glabrous. In fruit the pedicel hardly incrassate and the gynophore slightly so. *Fruits* orange or red, globose to ellipsoid, (2—)3—5½ by (2—)2½—3½ cm, shortly umbonate at the top and sometimes also at the base; pericarp woody to coriaceous, 2—3 mm thick, more or less tuberculate. Seeds ∞, embedded in whitish pulp, 10 by 6—8 by 5—6 mm, smooth, brown.

BORNEO. Sarawak. Saribas: *Hewitt*, fl. VIII. 1908. — Brunei: *Corner BRUN 5349*; *Jacobs 5574*. — North B. Jesselton: several. Mount Kinabalu: several. Sandakan: *Nicholson SAN 21197*; *D. D. Wood 1104*. — Kalimantan. North along the Equator: *Hallier 2573*; *Jaheri exp. Nieuwenhuis 1560*; *Endert 2944*. Sampit River, Handjalipan: *Alston 13460*. — Pulau Laut: *van Slooten 2292*.

Distribution. Malesia: throughout Borneo (also P. Laut).

Ecology. Forests, jungle, along rivers, from the lowland up to *c.* 1600 m.

Use. Two collectors mention the fruit (pulp) to be edible.

Note. 1. In vegetative characters much resembling *C. micracantha* ssp. *korthalsiana* but distinguished by the recurved thorns, the narrower leaves with long and slender tip, and the nerves being more prominent towards the margin.

12. Capparis callophylla Blume, Bijdr. 2 (1825) 53; Jacobs, Fl. Mal. I, 6 (1960) 81, with map; Back. & Bakh. *f.*, Fl. Java 1 (1964) 184. — *C. tylophylla* Spreng., Syst. Veg. 4, 2 (1827) 204; Miq., Fl. Ind. Bat. I, 2 (1858) 101; Choix (1864) t. 2; Illustr. (1870) 22; Merr., En. Philip. 2 (1923) 213. — Type: *Blume 970* (L, holo; K, U), Malesia, Java, Rumpin, fl.

Capparis sp. Vidal, Phan. Cum. (1885) 94. — *C. cumingii* Merr. & Rolfe, Philip. J. Sc. 3 (1908) Bot. 101. — Type: *Cuming 1232* (BM, CGE, FI, K), Malesia, Luzon, Albay Prov., fl. fr. 1841.

Capparis sp. Vidal, Rev. Pl. Vasc. Filip. (1886) 47. — Specimens: *Vidal 1132* (*n.v.*) and *1134*.

C. turczaninowii Elmer, Leafl. Philip. Bot. 5 (1913) 1755. — Type: *Elmer 12720* (A, BM, BO, E, G, GH, K, L, P, U, US, W), Malesia, Palawan, Addison Peak, fl. III. 1911.

C. mucronata Elmer, Leafl. Philip. Bot. 5 (1913) 1757. — Type: *Elmer 13080* (A, BM, BO, E, G, GH, K, L, P, U, US, W), Malesia, Palawan, Mt Pulgar, st. IV. 1911.

C. robusta Heine, Mitt. Bot. Staatss. Münch. Heft 6 (1953) 211; Pfl. Samml. Clemens (1953) 41. — Type: *Clemens 28427* (A, BM, BO, G, K, L, M), Malesia, Borneo, Mt Kinabalu, Tenompok, 1500 m, fr. II. 1932.

Climbing, glabrous shrub, few m high. Twigs stout, (reddish-)brown when dry; internodes 2—7 cm. *Thorns* often wanting, if present recurved, up to 5 mm long. Petiole 1—2(—2½) cm, stout, dark-coloured, rough. *Leaves* coriaceous, often reddish brown when dry, broadest in the middle, (1½—)2—3(—3½) times as long as wide, (8—)14½—20 (—26) by (3½—)5—9(—14) cm; margin slightly recurved; base more or less acute to rounded, sometimes subcordate, top rounded (or emarginate) and mostly with a hardened tip or shortly and bluntly acuminate; midrib above flat to sunken; nerves *c.* 6—7 pairs. Inflorescence a more or less leafy, terminal panicle of subumbels. Pedicels 2—4½

cm. Bracts. early caducous. *Flowers* white, pink, or red-brown. Outer *sepals* coriaceous, subpersistent, 10—13 by 8 mm, rough; inner sepals subcoriaceous, 12—14 by 6—10 mm, thinner towards the margin. *Petals* oblong to obovate-subspathulate, 22—35 by 6—11 mm. Torus 4—5 mm wide. Stamens *c.* 50—80, filaments light red, 3½—4½ cm, anthers 2—3 by 1 mm. *Gynophore* 3—4½ cm, red towards the base, ovary ellipsoid, placentas 4, *c.* 4 by 2—3 mm, both glabrous. In fruit the pedicel (especially towards both ends), the torus, and the gynophore towards the top, considerably incrassate. *Fruits* globose to ellipsoid, 5—6½ cm long, pericarp 2—5 mm thick, smooth, yellowish orange. Seeds ∞, *c.* 1 by ½ cm.

SUMATRA. Palembang Res., *c.* 3°40'S 102°36'E: *Forbes 2582.* WEST JAVA. Bogor Res.: several. — Madura: *Teijsmann 1789 HB.* BORNEO. North B. Mount Kinabalu: several. Patikang, Keningau: *Angian 10689* = ? *FMS 55172.* Mount Sidungol: *Keith 9325.* PHILIPPINES. Balabac I.: *Ramos & Edaño 49904.* — Palawan: *Elmer 12720, 13080.* — Mindoro. Mount Yagan: *Sulit & Conklin PNH 16872.* Abra de Ilog: *Sulit PNH 13786.* — Luzon: several, various provinces. — Polillo: *Fox PNH 8962.* — Bohol: *Ramos 43260.* — Mindanao. Surigao Prov.: *Wenzel 2832.* Cotabato Prov.: *Ramos & Edaño BS 84992.* Davao Prov.: *Ramos & Edaño BS 49029.* Zamboanga Prov.: *Williams 2122.* CELEBES. Northeast C. Minahasa: *Koorders 16353.* — Southwest C. Pangkadjene: *Teijsmann 11776, 21147.*

Distribution. Malesia: North Borneo, Philippines, Celebes, Madura, West Java, South Sumatra, *i.e.* in the perimeter of the West Malesian everwet region.

Ecology. Mostly on dry, often calcareous soil, but also in moister habitats, in secondary forest, *etc.*, from the lowland up to 700, in North Borneo up to 1700 m.

Notes. 1. *Clemens 28427* and *Carr SF 26850*, both from Mt Kinabalu, are more vigorous than any other plants; the fruits of the latter are the biggest I saw and perhaps the only ripe ones.

2. Elmer, under the descriptions of *C. mucronata* and of *C. turczaninowii*, gives interesting particulars about the wood.

13. Capparis cantoniensis Lour., Fl. Cochinch. (1790) 331, ed. Willd. (1793) 404; DC., Prod. 1 (1824) 253 (*'cantonensis'*); Merr., Comm. Lour. (1935) 173; Jacobs. Fl. Mal. I, 6 (1960) 76, with map; Back. & Bakh. *f.*, Fl. Java 1 (1964) 185. — *Olofuton racemosum* Rafin., Sylva Tellur. (1838) 108. — Neotype: *Levine 1247* (A, E, holo; GH, K, L, US), China, Kwangtung, Canton & vic., fl. 9. III. 1917.

C. salaccensis Blume, Bijdr. 2 (1825) 54; Miq., Fl. Ind. Bat. I, 2 (1858) 101; Illustr. (1870) 23, t. 12A, excl. var. *celebica*, which is *C. lanceolaris.* — Type: *Blume s.n.* (L, sh. 899.53.328), Malesia, Java, Mt Salak, fl. IV.

C. pumila Champ. *ex* Benth., Hook. J. Bot. Kew Gard. Misc. 3 (1851) 260; Benth., Fl. Hongk. (1861) 18; Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 177; Forbes & Hemsl., J. Linn. Soc. Lond. Bot. 23 (1886) 51; Brandis, Indian Trees (1906) 35; Gagn., Fl. Gén. I.-C. 1 (1908) 188; Kanj. & Das, Fl. Assam 1 (1934) 76. — Type: *Champion (n.v.)*, China, Hong Kong, Black Mountain, I. 1850 (see Note 4).

C. sciaphila Hance, Ann. Sc. Nat. v 5 (1866) 206. — Type: *Hance 7490* (BM, K), China, Hong Kong, fl. VIII. 1861.

C. hasseltiana Miq., Illustr. (1870) 24, t. 13. — Type: *van Hasselt s.n.* (L, U), Malesia, Java, Bantam, G. Karang, fl.

C. celebica Miq., Illustr. (1870) 26. — Type: *Forsten 344* (L), Malesia, NE. Celebes, Belang, fl. X. 1840.

C. ambigua Kurz, For. Fl. Burma 1 (1877) 65; Brandis, Indian Trees (1906) 35. — Type: *Kurz (n.v.)*, Burma, Andaman Is, South Andaman, fl. (see Note 3).

C. pumila var. *arfeuilleana* Gagn., Fl. Gén. I.-C. 1 (1908) 189. — Type: *Pierre 4008* (P), Indo-China, S. Cochin-China, Baria, Mt Dinh, fl. X. 1866.

Cudrania bodinieri Lévl., Fedde Rep. 13 (1914) 265. — *Vanieria bodinieri* (Lévl.) Chun, J. Arn. Arb. 8 (1927) 21. — Type: *Bodinier 1413* (A, E, L, phot.; P), China, Hong Kong, yfr. I. 1896.

Slack climber, 3—20 m. Twigs almost straight, greenish or greyish, angular and puberulous when young, terete and glabrescent when older; internodes *c.* 1½—4 cm. *Thorns* patent to recurved, 2—5 mm long, especially on flowering branches minute or wanting. Petiole 5—6(—10) mm, hairy as the twig. *Leaves* subcoriaceous, sometimes discolorous, oblong to lanceolate, (2.3—)2.5—4(—5) times as long as wide, sometimes ovate, rarely obovate, above glabrous and (olive)greenish when dried, beneath sparsely puberulous but soon glabrescent and often brownish when dried, young leaves salmon-reddish, (4—)5½—10½(—12½) by (1½—)2—3½(—4½) cm; base obtuse to acutish, top narrowed, acuminate, tip often blunt, sometimes slender and acutish, mucronate; midrib above sunken all over; nerves inconspicuous, 6—9(—11) pairs. *Flowers* sometimes fragrant, in axillary subumbels which are often arranged in a terminal panicle *c.* 15—20 cm long, each a few cm peduncled, sparsely hairy. Pedicels slender, ½—2 cm. Bracts subulate, 1—2 mm long, caducous; bracteoles basal, minute, sometimes wanting. Buds globular, 4—5 mm diam. Outer *sepals* 3—6(—7) mm diam., sometimes sparsely puberulous at the base outside, inner sepals elliptic to obovate, 3½—7(—8) by 3—6 mm, with membranous, ciliate margin. *Petals* white (sometimes greenish or pinkish?), (3½—)5—6½ by 2—3(—4) mm, mostly obovate, pubescent. Stamens 20—45, 15—25(—32) mm long, filaments white. *Gynophore* 4—12 mm, glabrous, ovary approximately ellipsoid, 1½ by 1 mm, glabrous, placentas 2. *Fruits* globose to ellipsoid, 1—1½ cm diam., pericarp thin, leathery, smooth. Seeds one to few, globular and 5—6 mm to elliptic and 10 by 7 by 5 mm.

INDIA NORTH. Sikkim, *c.* 27°N 88°30'E, *c.* 600—750 m: several. — Bengal. Darjeeling: *Gamble 1035, hb. Clarke 28030.* Duars, *c.* 26°30'N 90°E: *Haines 1113.* — Assam. Khasi-Jaintia Hills: several. Naga Hills: *Meebold 7271.* BURMA. Taoo Highlands: *Brandis 1106.* North B. Katha, 24°11'N 96°20'E: *Su Koe 9210.* — Arakan. Chin Hills, *c.* 22°15'N 93°30'E, 1500 m: *Po Khant 2450.* — South B. Dawna Range, *c.* 17°N 98°E, 1500 m: *Lace 4619.* ANDAMANS: many. CHINA. Yunnan. Fo-Hai, 21°56'N 100°25'E, 1000 m: *Wang 74614*; 275 m: *Wang 74696, 74697.* — Kwangsi. Tou Ngok Shan: *Tsang 23142.* Ping Nam Hsien: *Wang 40432.* Yao Shaw, Ping Nam: *Wang 39270.* — Kwangtung, various localities, incl. Hong Kong: many. — Fukien. Amoy: *Chung 4529, 4726, 4852.* Foochow, 26°09'N 119°17'E: *Tang 13120*; *Warburg 5756.* HAINAN: many. INDO-CHINA. Tonkin. 7 Pagodes: *d'Alleizette*, fl. IX. 1908; *Mouret 133.* Near Hanoi: *Balansa 4715.* Ninh Thai: *Bon 3318.* — Annam. Quangtri: *Poilane 31245.* Hue: *Clemens 3202.* Quangnam, 1000—1200 m: *Poilane 31723.* — Cochin-China. Baria, Mt Dinh: *Pierre 4008.* Saigon: *d'Alleizette*, fl. VII. 1909. SIAM. North S. Nan, 18°47'N 100°50'E: *Winit 1789.* — Peninsular S. Kaw Tao, 10°06'N 99°50'E: *Kerr*, fl. 14. IX. 1928, *12774, 16022.* Kaw Samui, 9°30'N 100°E: *Put 1292.* SUMATRA. Central S. West Coast Res.: *Korthals*, st. Mount Kerintji, 1°50'S 101°15'E 1000 m: *Robinson & Kloss*, fl. III. 1914. JAVA. West J. Bantam Res. G. Karang: *van Hasselt*, fl.; *Koorders 40701.* Bogor Res.: many. Priangan: many. — Central J. Kedu Res. G. Sumbing: *Lörzing 411.* Semarang Res. Ambarawa: *Koorders 27670, 35991.* G. Unggaran: *Junghuhn*, fl. IV/VI; *de Visser Smits*, fl. VI. 1919. — East J. Madiun Res. Ponorogo: *Koorders 29177.* G. Wilis: *Koorders 23332, 29582.* Malang Res. G. Semeru: *Backer 3625, 3670.* Besuki. G. Idjen: *Backer 25374*; *Koorders 28522.* Jang Plateau: *van Steenis 11129.* Bondowoso: *Zollinger 2938.* LESSER SUNDA ISLANDS. Bali: *de Voogd 2727.* — Lombok: *Elbert 846, 998.* — W. Sumbawa. Mount Batulanteh, 800 m: *Kostermans 18425.* PHILIPPINES. Mindanao. Davao Prov.: *Ramos & Edaño BS 48919, BS 49127, BS 49358.* CELEBES. Northeast C. Belang: *Forsten 344.* — Southwest C. Lona: *Warburg 15966.* Makassar: *Rant 35.* MOLUCCAS. Sula Is. Mangoli: *Atje 211.* — Buru. Fakal: *Sapiin exp. Toxopeus 473.*

Distribution. Asia: India, eastern Himalaya through Burma to southeastern China and Hainan; Andamans and Indo-Chinese Peninsula southwards to the Isthmus of Kra. Malesia: central Sumatra, Java eastwards to Sumbawa; northwards through Celebes and the western Moluccas to the southern Philippines.

Ecology. Forests and forest edges, frequently in the shade; seems to prefer moist places. Fertility throughout the year. In the Himalaya, Burma, Sumatra, and Java it is found between (700—)1200 and 1750(—2000) m. In Hong Kong and vicinity it occurs near sea-level, and the same is probably the case in the Philippines and the Sula Is.

Notes. 1. As Merrill stated, Loureiro's description is not quite satisfactory, since it does not apply completely to any species. The most probable conclusion, however, is that Merrill's interpretation is the correct one indeed.

2. There is some regional variability. In SE. Asia the leaves are generally no longer than 5—6 cm, whereas in Malesia they often attain 7—8 cm or more. In Malesia the flowers are slightly larger in all parts, too, and the internodes, peduncles, and pedicels longer than in SE. Asia. As it is seen in most species of *Capparis*, the leaves in the Andaman plants are averagely larger than elsewhere, attaining 10—15 by 4—4½ cm, ovate, long-acute, thorns often reduced, the fruits sometimes fusiform, 2½ by ¾ cm, 2 seeds one above the other. In the two Lombok specimens, collected by Elbert, the leaf-top is rounded to acutish.

A few specimens from Mindanao were originally identified as *C. sepiaria*, and indeed show resemblance to that species, as the leaves are comparatively small with a slightly notched top. On account of the midrib, however, which is narrowly sulcate, I reckon them to belong here. They are from altitudes below 300 m.

3. Kurz's description leaves no doubt of the conspecificity of his *C. ambigua* with *C. cantoniensis*, and a number of later Andaman collections by King were inscribed by the latter as *C. ambigua*, but I have never seen a Kurz specimen that belonged to this species.

4. Bentham cited as the type of '*C. pumila* Champ.' a plant seen by J. G. Champion in Hong Kong in the Black Mountain, 'when in company with Mr. Fortune, in January 1850'. I have not seen a plant with such a label; in the Kew Herbarium, *Playfair 353*, also from Hong Kong, has been marked as the type.

14. Capparis cataphyllosa Jacobs, *sp. nov.* — Type: *BaPe 12026* (K), Burma, Arakan Yoma, Sandoway, fl. 17. II. 1931. — **Fig. 25.**

Innovationes sparse puberulae, basi multis cataphyllis. Spinae rectae ascendentes. Folia breve petiolata coriacea virescentia in herbario, ovata c. 9—11½ cm longa 3¾—4¼ cm lata basi subcordata apice acuta, costa basi depressa, faciebus utrinque glabris opacis. Flores numerosi apice pedunculi 5—6 cm longi, mediae magnitudine, staminibus c. 36, gynophorio 1½—2 cm longo glabro ovario placentis 2. Fructus ignotus.

Climber. *Innovations* densely puberulous with minute simple hairs from the base hooked in an acroscopical direction and mostly raspberry-red, soon glabrescent; with many cataphylls at the base. Twigs straight, weakly ribbed, greenish in the dried state. *Thorns* with strong base, straight, directed *c.* 45° upwards, *c.* 3 mm but frequently vestigial. Petiole 4—5 mm, light-coloured. *Leaves* coriaceous, light greenish in the dried state, ovate, 9—11½ by 3¾—4¼ cm; base subcordate, top acute to (scarcely) subacuminate, mucronulate; midrib shallowly depressed towards the base, flattish in the upper half, yellowish beneath, nerves 7—9 pairs, thin, subprominent above, finer reticulation obscure on both sides; surfaces glabrous, dull. *Flowers* with 2—3 dozens conferted near the top of axillary subumbels on a *c.* 5—6 cm long leafless stalk (see Note 1); pedicels thin, 1—1½ cm, subtended by minute thorn-like bracts and bracteoles. *Sepals* subequal, *c.* 4½ mm long; the parts that are exposed in bud with a very sparse indumentum as described above, inside glabrous; outer pair very concave, 2½ mm wide, ciliolate, inner pair fairly concave, 3½—4 mm wide, ciliate. *Petals* white, 6 by 3½ cm, thin, woolly-ciliate. Stamens *c.* 36. *Gynophore* 15—20 mm, filiform, glabrous; ovary ellipsoid, *c.* 1½ by 1 mm, glabrous, placentas 2, stigma point-like. *Fruits* unknown.

Fig. 25. *Capparis cataphyllosa* Jacobs, × $^{2}/_{3}$ (from the type, *BaPé 12026*).

Distribution. Asia: southwestern Burma, 18°28'N 94°20'E.

Ecology. Flowers in February.

Note. 1. The inflorescence has been described with the first flowers just open. It is possible that the aspect will be different when development is finished.

15. Capparis cinerea Jacobs, *sp. nov.* — Type: *Kingdon-Ward 17347* (A BM, holo; NY), India, Manipur/Burma frontier area, Khaiyang, fl. 1. V. 1948.

Ramuli dense cinereo-puberuli, basi bracteosae. Folia breve petiolata, coriacea lanceolata ± 10 cm longa basi obtusa apice subacuminata, costa sulcata utrinque sparse pubescente ceterum glabra. Flores in umbellis axillaris dispositi 2 cm pedicellati; sepalis subaequalibus 6 mm longis glabris ciliatis, staminibus ± 30—35, gynophorio 2—2½ cm glabro ovario glabro 2 placentis. Fructus ignotus.

Shrub; *innovations* densely set with small simple greyish-fulvous hairs which are hooked or curved upwards, the base surrounded by cataphylls. Twigs straight, late or not glabrescent. *Thorns* fairly vigorous, conical, ascending, 1—2 mm. Petiole 4—5 mm. *Leaves* coriaceous, ± 2.5—3 times as long as wide, widest about the middle, some 8—10 by 3½ cm; base obtuse, top slightly acuminate with acute tip; midrib above sunken, nerves 7—8 pairs, thin and rather obscure above, reticulation rather obscure on both sides, surfaces dullish, darkish green above, more yellowish below, thinly pubescent on the midrib on both sides and on the main nerves below, otherwise glabrous. *Flowers* pink-flushed, with some 5 in lateral subumbels 1—2 cm stalked; bracts subulate 1—2 mm, pedicels 1½—2½ cm, puberulous. Sepals subequal, elliptic, ± 6 by 4 mm, outer pair partly covering the inner pair, ciliate. Petals obovate, ± 9 by 4 mm, whitish tomentose on both sides. Torus 1½ mm wide. Stamens ± 30—35, 2½ cm long. *Gynophore* 2—2½ cm, glabrous; ovary ellipsoid, 1½ mm long with indistinct stigma, glabrous; placentas 2. *Fruit* unknown.

Distribution. Asia: northeastern India, Manipur, *c.* 25°N 95°E.

Ecology. Open hillsides, 1800 m. Flowers May.

Note. 1. Closely related to *C. cataphyllosa* in the same mountain chain but more towards the south.

16. Capparis cleghornii Dunn, Kew Bull. (1916) 61, descr.; in Gamble, Fl. Pr. Madras 1 (1915) 46, name; Blatter, J. Bomb. Nat. Hist. Soc. 31 (1927) 905; Rao & Raghavan, Blumea 12 (1964) 313, f. 1, map. — Type: *Cleghorn D176* (K), India, Deccan Peninsula, Balalrogdroog (now spelled Ballalraya Durg, *c.* 14°N 75°E), fl. 13. IV. 1846.

Straggling shrub over 2 m, twigs fulvous-pubescent, late glabrescent, dark-coloured when dried. *Thorns* rather vigorous, patent-recurved, 3—6 mm. Petiole 7—10 mm. *Leaves* subcoriaceous, ± 1.6—2.4 times as long as wide, obovate, 5½—7(—10) by 2½—4½ cm; base acutish, top rounded, abruptly acuminate with a short blunt tip; midrib flat, nerves 4—6 pairs, thin, reticulation obscure; surfaces dull, pinkish when young and fresh, greenish when dried, glabrous. *Flowers* solitary towards the top of (sometimes small) twigs to conferted with a few at the top, white; pedicels slender, 2½—4 cm, hairy. *Sepals* thick, subequal, strongly concave, 10—12 by 7—9 mm, outside densely hairy, inside glabrous. *Petals* about 14—16 by 7—8 mm, hairy towards the base on both sides. Torus ± 3 mm wide. Stamens 65—80, white first, reddish later, some 2¾ cm. *Gynophore* 2½—4½ cm, glabrous; ovary 2½ mm long, glabrous; placentas 3—4. *Fruits* on slender dark-coloured stalk, dark purple fresh and dried, globose and umbonate, seen 14—18 mm Ø, reported 3—4 cm Ø, endocarp scarlet. Seeds 1—4, 15—18 by 14—15 mm.

INDIA SOUTH. *Gough*, fl. Concan: *Stocks*, fl. North Kanara. Malemane Ghat: *Ambo hb. Sedgwick & Bell 7222*. South Kanara. Mangalore: *ed. Hohenacker 420*. Mysore: several.

Distribution. Asia: India, Deccan Peninsula, a small area in the Western Ghats of Mysore between 12° and 14°N (see map, Blumea 12: 315).

Ecology. Outskirts of evergreen forests, very commonly associated with *Wagatea*, *Mezoneuron*, and *Caesalpinia mimosoides*, at 300—1400 m altitude in very wet climate. Flowers February, fruits May.

Note. 1. Although Dunn's description consists of only two lines, it must be considered as valid. He stated that Hooker & Thomson's and Cooke's concept of *C. roxburghii* also embraced *C. cleghornii*, as these authors described the sepals as hairy or sometimes hairy, which is only true for the latter. More particulars are given by Rao & Raghavan.

17. Capparis cucurbitina King, J. As. Soc. Beng. 58 ii (1889) 395; Ann. Gard. Calc. 5 (1896) 119, t. 136; Ridl., Fl. Mal. Pen. 1 (1922) 124; Jacobs, Fl. Mal. I, 6 (1960) 85. — Lectotype: *King's Coll. 10027* (BM, CAL, holo; G, K, P), Malesia, Malaya, Perak, fl. IX. 1886.

Scandent, 6—10 m high; twigs slightly zig-zag, (nearly) glabrous; internodes *c.* 2 cm. *Thorns* recurved, 2—3 mm long, sharp. Petiole ½—¾ cm. *Leaves* herbaceous, obovate, *c.* 2½ times as long as wide, *c.* 9—18½ by 3½—7½ cm; base generally rather abruptly rounded and acute, top rounded and rather abruptly acuminate, tip narrow and acute, 1—1½ cm; midrib sunken in the basal part; nerves 6—8 pairs, thin, reticulation distinct on both sides; surfaces glabrous. *Flowers* in mature state unknown, pale green, yellow inside, 2—3, serial. Pedicels 2—3 cm. *Sepals* ovate-lanceolate, 4 mm long, acuminate. *Petals* broadly elliptic, obtuse. Stamens *c.* 20. In fruit neither the pedicel nor the torus incrassate, the *gynophore* 11—17 mm, slightly thickened, obviously articulated with the fruit. *Fruits* irregularly spindle-shaped, (3½—)5½—7½ by 1½—2½ cm, the base slightly acuminate-tapering, the top umbonate; pericarp 1 mm thick, leathery, light green-yellow to glossy orange. Seeds ∞, 9 by 7 by 7 mm.

MALAYA. Perak: *King's coll. 10027, 10795.* Ulu Bubong: *King's coll. 8824.* Dindings: *Ridley 10261.* Parit forest reserve: *Symington 39490.*

Distribution. Malesia: Malaya, endemic in Perak, *i.e.* between about 4° and 6°N, 100°30′ and 101°30′E.

Ecology. Dense mixed lowland jungle, up to 200 m.

Notes. 1. The only flowering material which we have is *King's Coll. 8824* (CAL). Contrary to King I found the sepals not puberulous but glabrous.

2. Differs vegetatively from *C. micracantha* ssp. *korthalsiana* in that the leaves of the latter are much coarser and thicker, while in *C. cucurbitina* the leaf tip is longer and more slender.

18. Capparis dasyphylla Merr. & Metc., Lingn. Sc. J. 16 (1937) 192, f. 5. — Type: *Lau 3445* (A, holo; P), China, Hainan, Kan-en Distr., Chim Fung Ling, fl. III. 1934.

Climber, densely pubescent, the hairs whitish in the *innovations*, soon turning light brown, erect, persistent. *Thorns* recurved 1—2 mm but mostly abortive or wanting. Petiole 2—3 mm. *Leaves* firmly herbaceous, 1.8—2.3 times as long as wide, widest below to rarely above the middle, 3½—9 by 2—4 cm; base rounded and subcordate, top mostly acute, sometimes rounded or subacuminate or notched; midrib flattish to shallowly sunken, nerves (5—)7—9 pairs, thin beneath, obscure above, reticulation obscure; surfaces dull, above to some extent glabrescent. *Flowers* white, solitary, axillary, a few floral leaves conferted towards the top of small-leaved twigs; pedicels filiform, 1½—2 cm. *Sepals* unequal, thin, ± 6—7 by 4 mm, outer pair very concave, outside hairy towards the base, inner pair ciliate, otherwise glabrous. *Petals* ± 7—8 by 4—5 mm, outside sparsely hairy towards the base, inside glabrous. Stamens ± 35. *Gynophore* 16—20 mm, filiform, glabrous; ovary 1½ mm long, glabrous, acute, stigma obscure, placentas 4. *Fruit* unknown.

HAINAN. Western H. Kan-en Distr.: *Lau* 3445. Ch'ang-kiang Distr.: *Lau 1240.*

Distribution. Asia: endemic in Hainan.

Ecology. Forest or thickets on sandy soil. Flowers March.

Note. 1. The original description gives *c.* 15 stamens. This number was probably counted in an old flower where part of the stamens were lost.

The number of 5 petals in the original description needs verification as soon as more material comes in.

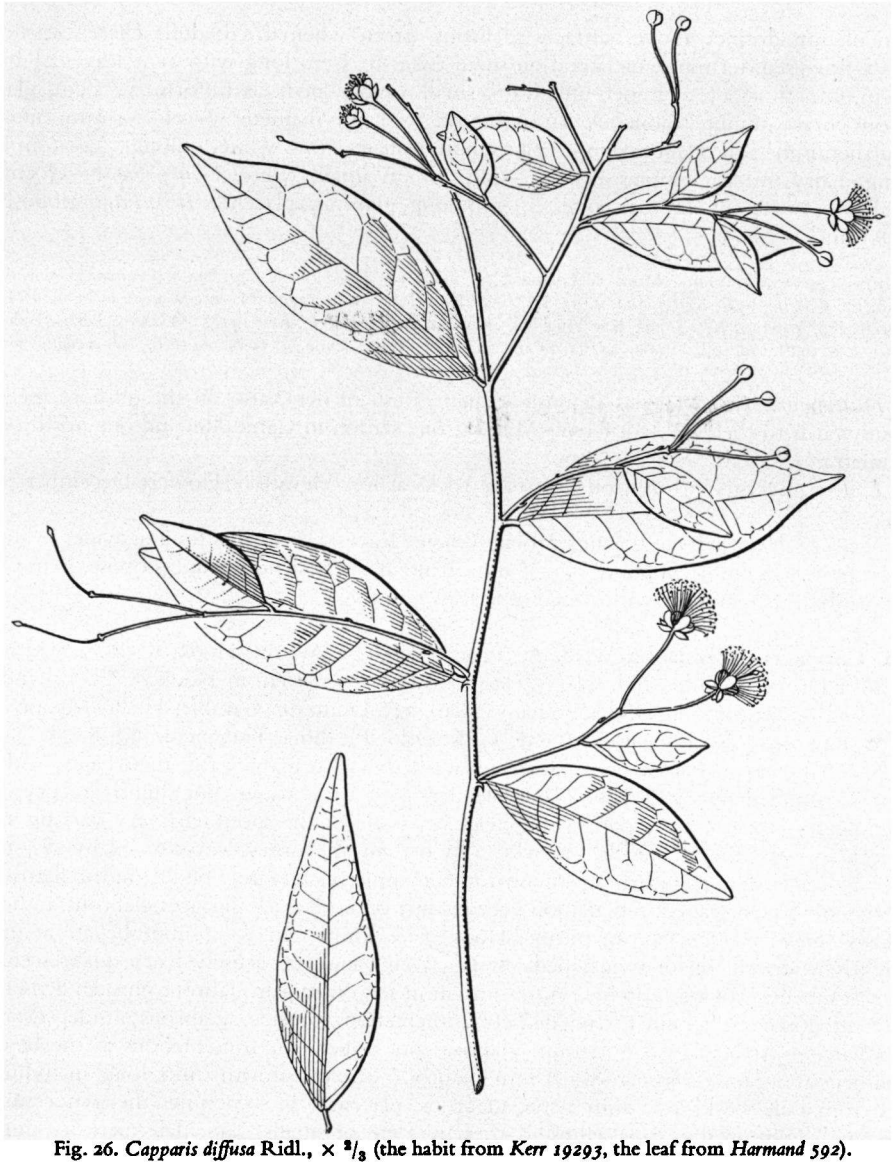


Fig. 26. *Capparis diffusa* Ridl., × $^{2}/_{3}$ (the habit from *Kerr 19293*, the leaf from *Harmand 592*).

19. **Capparis diffusa** Ridl., J. Str. Br. As. Soc. n. 59 (1911) 68; Fl. Mal. Pen. 1 (1922) 122; Henderson, J. Mal. Br. As. Soc. 18 (1939) 35; Jacobs, Fl. Mal. I, 6 (1960) 81. — Type: *Ridley 15174* (K, SING, holo), Malesia, Malaya, Perlis, Bukit Lagi, fl. III. 1910. — **Fig. 26.**

Straggling shrub or climber. Twigs straight, without cataphylls, when young brown-puberulous, glabrescent. *Thorns* recurved, 1—3 mm, rarely wanting. Petiole 2—4 mm. *Leaves* firmly herbaceous, *c.* 1.7—2.9 times as long as wide, *c.* 5—8½ by 2½—4(—5) cm, ovate to obovate; base rounded to blunt, top blunt, sometimes subacuminate, sometimes notched; midrib slightly raised but sunken towards the base, nerves 5—7 pairs, thin,

reticulation distinct above, surfaces glabrous, green when dried, dull. *Umbels* sessile, 3—5-flowered, terminal, or lateral on small twigs to 5 cm long with 1—2 leaves 2½ by 1 cm, sometimes a few umbels united to a small panicle; pedicels filiform, 2—5 cm, glabrous; bracts minute, caducous. Buds globose, 3—4 mm diameter. *Sepals c.* 4 mm, outer pair hemispherical, glabrous, inner pair elliptic, ciliate. *Petals* white, oblong, *c.* 4—6 mm long, hairy inside. Stamens 12—15(—20), anthers small, white. *Gynophore* 1—1¾ cm, glabrous; ovary subglobose, acute, *c.* 1 mm long, glabrous, placentas 2(?). *Fruits* globose, *c.* 8 mm Ø.

INDO-CHINA. Cambodia. Mont de Chaudoc, *c.* 11°N 105°E: *Harmand 592*. SIAM. Peninsular S. Kaw Tao, 10°06'N 99°50'E: *Kerr 12709*, st. 24. IX. 1928. Kaw Prap: *Kerr 12520*. Nawng Wai, 9°33'N 99°10'E: *Kerr 12279*. Yanyao: *Kerr 18202*. Kao Hua Tek: *Kerr 19293*. Terutao I.: *Kerr 14185*. MALAYA. Perlis, Bukit Lagi, *c.* 6°30'N 100°10'E: *Ridley 15174*. SUMATRA. Pulau We, Sabang, 5°53'N 95°17'E: *van Steenis 5701*.

Distribution. Asia/Malesia: Peninsular Siam south of Kra, also on the offshore islets, southwards to the NW. corner of Malaya; one station in Cambodia and one north off Sumatra.

Ecology. Evergreen forest on limestone rocks at low elevation. Flowers December to May.

Note. 1. *Harmand 592* belongs probably here; leaves 3½ times as long as wide, ovate, 4—7 by 1.2—2 cm; gynophore 14—18 mm; fruit on a very slender stipe, globose, ¾ cm Ø, probably near maturity, with 1 seed of at least 5 mm.

20. Capparis diversifolia W. & A., Prod. (1834) 27; Wight, Hook. Ic. Pl. 2 (1837); t. 181; Drury, Handb. Ind. Fl. 1 (1864) 41; Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 175; Brandis, Indian Trees (1906) 34; Dunn in Gamble, Fl. Pr. Madras 1 (1915) 45. — Type: *Wight 952* (CGE, G, K, holo; P), India, Travancore (?), fl.

Shrub 1½—2 m. *Innovations* whitish stellate-hairy, soon glabrescent, their base mostly not surrounded by cataphylls. *Thorns* slender, 2—3 mm, patent but slightly recurved. Petiole 2—5 mm. *Leaves* coriaceous, ovate, in some of the specimens very variable in width and size, the smallest leaf then ± 2 by 0.3 cm, the largest leaves 6—7½ by 2¾—3¼ cm; base acutish to rounded, top attenuate, acute, mucronate, rarely blunt; midrib flattish, nerves 6—7 pairs, raised, reticulation very distinct on both sides; surfaces glabrous, rather glossy. *Flowers* (4 cm across, purple, Hook. *f.* & Th.), with 3—5 subumbellate at the slightly widened top of twigs; pedicels 1—2½ cm, angular, densely hairy, glabrescent. *Sepals* subequal, ovate, ± 7 by 4 mm, subacuminate, outer pair glabrous outside, densely tomentellous inside, inner pair densely tomentellous outside, glabrous inside. *Petals* obovate, ± 10—17 by 5—10 mm, glabrous but upper pair tomentellous at the base. Stamens about 65. *Gynophore* 8—11 mm, glabrous; ovary fusiform, 5 mm long, including a 2 mm long beak, *c.* 2 mm wide, glabrous, placentas 4; sometimes the gynoecium vestigial. *Fruit* on thin stipe, ellipsoid, *c.* 3 by 2 cm or smaller, apiculate, pericarp thin, when dried contracted around the seeds, red. *Seeds* 6—10, *c.* 7 by 7 by 3 mm.

INDIA SOUTH. *Leschenault*, fr. Pondichéry, 12°N 97°50'E: *Pierre*, fr. 1861. Courtallum: *Wight*, fl. VII. 1835. Travancore: *Wight 952*. Anamallay, 10°20'N 77°E: *Beddome*, fl. 1873. Tanjore: *Pierre 5510*. Tinnevelly: *Barber 541*; *hb. Beddome 238*; *Daniel & Raju 20442*.

Distribution. Asia: India, Deccan Peninsula south of a line between Pondichéry and the Anaimalai Hills.

Ecology. Rocky soil in hilly country.

Notes. 1. In some specimens, inclusive the type, the leaves vary much, irrespective, as

it seems, of their place on the twig. In other specimens the leaves are very similar in size and shape, then always large. There should be more material.

2. Contrary to previous descriptions, the youngest twigs are glabrescent and not "quite glabrous".

21. Capparis echinocarpa Pierre *ex* Gagn., Bull. Soc. Bot. Fr. 55 (1908) 212; Fl. Gén. I.-C. 1 (1908) 195; Craib, Fl. Siam. En. 1 (1925) 80; Gagn., Fl. Gén. I.-C. Suppl. 1 (1939) 164. — Type: *Pierre 4016* (P), southwestern Siam, Rachaburi, Petchaburi River, fr. VI. 1868.

C. nana Craib, Kew Bull. (1922) 233. — Type: *Kerr 5723* (ABD, BM, K, P, UC), northern Siam, Muang Petchabun, fl. III. 1922.

Shrub, some 1 m high. *Innovations* thinly whitish pubescent-tomentose, glabrescent. *Thorns* vigorous, recurved, 2—4 mm. Petiole 4—7 mm, dark brown. *Leaves* subcoriaceous, ovate, 1.5—2.0(—2.4) times as long as wide, 3½—6(—7½) by (1½—)2½—3½ cm; base rounded to sometimes acutish, top tapering and gradually acuminate, the tip 3—17 mm, blunt to acute, brown-mucronate; midrib flat to shallowly sunken, yellowish beneath, nerves thin, somewhat conferted towards the base, 5(—6) pairs, reticulation not distinct. *Flowers* solitary, or serial with 2—3 in a row; pedicels filiform, 1—1½ cm, glabrescent. *Sepals* ovate to elliptic, ± 5 by 2½ mm, acutish, often mucronulate, outer pair not completely covering the inner pair, not or sparsely pubescent outside, inner pair pubescent outside, especially towards the membranous margins. *Petals* 6 by 2 mm (sometimes the lower pair slightly longer than the upper), pubescent, especially outside. Stamens 8—10. *Gynophore* 1½—2 cm, sometimes puberulous towards the base, glabrescent; ovary pear-shaped, with knobshaped stigma, 2 by 1—1½ mm, white or greyish pubescent, glabrescent, placentas 3. In fruit the pedicel not, the gynophore slightly incrassate. *Fruit* approximately ovoid, more or less apiculate, sometimes slightly elongated at the base, ± 2¾ by 2 cm (*ex coll.*), pericarp ± 4 mm thick, densely set with corky, small, obtuse, wart-like protuberances. Seeds several, ± 8 by 6 by 4 mm.

SIAM. Eastern S. Petchabun, 16°N 100°30'E: *Kerr 5723*. Dong Praya Yen, *c.* 15°30'N 101°45'E: *Kerr 19914, 19915*. Chaiyapum: *Kerr 19938*. — Central S. Saraburi: *Kerr 7031*. Kanburi: *Kerr 19535*; *Put 3051*. — Southwest S. Ratburi, *c.* 13°N 100°E: *Kerr 10647*; *Pierre 4016*.

Distribution. Asia: central part of Siam.
Ecology. Bamboo forests at low elevation.

22. Capparis erycibe Hall. *f.*, Bull. Herb. Boiss. 6 (1896) 216; Jacobs, Fl. Mal. I, 6 (1960) 75, f. 9; Back. & Bakh. *f.*, Fl. Java 1 (1964) 184. — Type: *Hallier f. 779A* (BO, holo; L), Malesia, W. Java, Tjampea, Mt Tjibodas, fl. V. 1895.

C. paniculata Ridl., J. Fed. Mal. St. Mus. 10 (1920) 129; Fl. Mal. Pen. 1 (1922) 124; Baker *f.*, J. Bot. 63 Suppl. (1924) 5. — Type: *Ridley s.n.* (K, SING), Malesia, Malaya, Kelantan, Chaning Woods, fl. II. 1917.

Climber, about 1½(—14?) m. Twigs slack, brownish, brown-puberulous, especially when young, slightly zig-zag. *Thorns* up to 2 mm long, recurved, mostly wanting. Petiole 4—10 mm. *Leaves* herbaceous to subcoriaceous, often reddish brown when dry, glabrous above, glabrescent beneath, 1.8—2.5(—2.8) times as long as wide, widest above, sometimes at the middle, (9½—)12—16(—20) by 4½—8½ cm, base mostly narrowed, sometimes rounded, acute to obtuse; top rounded to acuminate, mucronate; midrib above mostly narrowly sunken; nerves *c.* 6—8 pairs, glabrous above, glabrescent beneath. Panicle mostly brown-puberulous on a *c.* 5—10 cm long, slender peduncle terminal

on a twig of which the upper part has mostly lost its leaves, *c.* 10—20 by 5—15 cm. Pedicels slender, 4—18 mm. Bracts minute, sometimes wanting. *Flowers* white to greenish, sometimes tinged reddish. *Sepals* unequal, 4—6 by 2½—3 mm, the outer pair sometimes sparsely puberulous outside, the inner pair with broad membranous margin, glabrous. *Petals* 4 (occasionally 5 or 6), 4½—6 by 1—4 mm, suborbicular to subspathulate, sometimes puberulous, especially at the base. Stamens 20—40, 5—6(—8) mm. *Gynophore* 2—5 mm, glabrous; ovary ovoid to spindle-shaped, 2 by 1 mm, glabrous; in fruit the gynophore 4—12 mm long, with the pedicel and torus a little incrassate. Mature *fruit* not known, globose, *c.* 1½ cm diam., pericarp thin, leathery, smooth or finely papillate. Seeds 1—4, 9—10 by 7—9 by 4—5 mm.

INDO-CHINA. Annam. Hue, 16°28'N 107°35'E, 1200—1300 m: *Vidal 757A, 758.* Nhatrang, 12°15'N 109°10'E, and vicinity: several. SIAM. Peninsular S. Ban Kawp Kep, *c.* 8°50'N: *Kerr 13298.* Kao Kalakiri, *c.* 6°50'N: *Kerr 14883.* MALAYA. Kelantan. Chaning Woods: *Ridley*, fl. II. 1917. — Pahang. Kuala Tembelung: *Ridley*, fl. VIII. 1891. SUMATRA. South S., probably near Bengkulu, *c.* 4°S 102°30'E: *Forbes 1696, 1719A.* JAVA. West J. Djakarta Res. Tjikao, G. Parung: *Blume 1264.* Bogor Res. Tjampea, G. Tjibodas: several. — East J. Besuki Res. Tjuramanis: several. Mount Raung, 500—600 m: *Jacobs 4838.* Puger: *Koorders 20832.* Rogodjampi: *Koorders 29032.* BORNEO. Sarawak. 16 miles S. of Kuching: *Anderson S14273.* Mount Braang: *Haviland b.u.d.n.*, fl.

Distribution. Asia/Malesia: scattered around the Sunda Shelf. In Annam near the coast; Peninsular Siam southwards to *c.* 3°N in Malaya; southern Sumatra, West and East Java, Sarawak.

Ecology. Forests, often on limestone, up to 600 m, in Indo-China to 1300 m. Flowers December-June, fruits July-November.

Notes. 1. The material of *C. paniculata* Ridl. is somewhat different from the Javanese *C. erycibe* by its being less hairy, by the longer pedicels, the glabrous sepals, the more orbicular petals, and the smaller number of stamens; its fruit is unknown. The only Bornean specimen, collected by Haviland (SAR), and the only Sumatran specimens, *Forbes 1696* and *1719A*, agree quite well with the type of *C. paniculata.*

2. In his provisional MS. the late Dr Buwalda stated: petals 4—6. At examining some flowers I found one with 5 petals. This is an exceptional number.

3. There are 3 collections from Indo-China, all from the vicinity of Nhatrang in Annam. These are reckoned to *C. erycibe.* Mutually they agree very well. The characters in which they deviate from typical *C. erycibe* follow here. Twigs mostly rather densely fulvous-brown pubescent. Thorns 2—3 mm, slender, recurved. Petiole ½ cm. Leaves greenish and not brownish when dried, 7½—13½ by 3½—5½ cm, slightly ovate to obovate; base subcordate; upper surface glossy, glabrous, lower surface dull, glabrous in *C. B. Robinson 1461*, hairy along the midrib in *Poilane 6733*, hairy all over in *Poilane 6195.* Gynophore 5 mm. All 3 specimens are in fruit. They come from forest on sandy, loamy, or rocky soil, 300—600 m altitude, collected March—May.

The variability of Malesian *C. erycibe* covers this material well enough for the author to refrain from attributing a taxonomic rank to it, the more as material is so scarce and flowers are unknown. Gagnepain did not give an opinion on them. *J. Vidal 757A* and *758*, from near Hue in Annam at 1300 m, perfectly agree with the Malesian material.

4. There are 2 collections from Peninsular Siam, which mutually agree very well. *Kerr 13298* (BM) is from *c.* 8°50'N, in flower; *Kerr 14883* (BM) is from *c.* 6°50'N, in fruit. Both are climbers in evergreen forest, at 100—200 m altitude. The young parts are red-brown pubescent, the twigs and leaves apparently early glabrescent, the petioles and the inflorescence late or not. Thorns recurved, 2 mm or smaller. Leaves dull greenish, 5—8 mm petiolate, 2.4—3.7 times as long as wide, widest at the middle or slightly above,

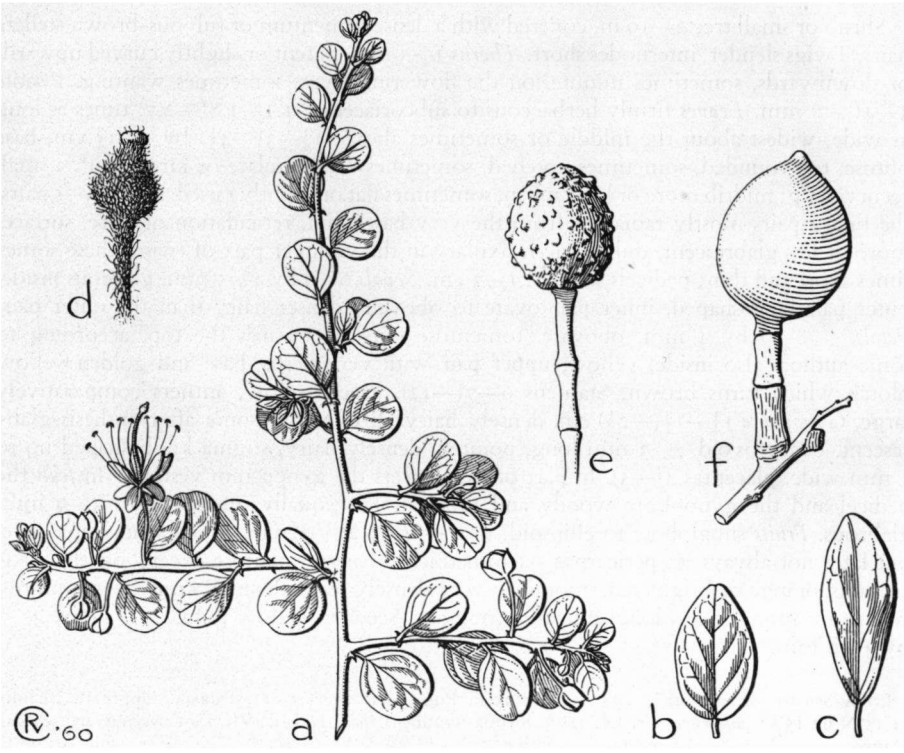


Fig. 27. *Capparis flavicans* Kurz — a. habit, × 2/3, b.—c. leaves, × 2/3, d. gynophore, × 4, e.—f. fruits, × 2/3 (a, d from *Béjaud 51*, b from *Thaworn RFD 17910*, c, f from *Robinson 1815*, e from *Harmand 249*.)

12—15½ by 4—5 cm, base obtuse to blunt, top gradually acuminate, midrib shallowly sunken all over, nerves 6—7 pairs, reticulation inconspicuous. Panicle 5 cm stalked, 15 cm long, pedicels *c.* 1½ cm. Sepals glabrous, subequal, 3½ by 2½ mm, petals 3 by 2 mm, hairy towards the base on both sides, stamens 18. Gynophore 8—9 mm, glabrous; fruit when ripe globose, 1 cm diameter, smooth, pericarp thin.

The Siamese specimens differ from the Indo-Chinese ones and from the Malesian *C. erycibe* in their being more glabrous and narrower-leaved, besides in floral characters. If they are conspecific with *C. erycibe*, under which they are provisionally kept, then certainly there is in that species a considerable polymorphism. More material is needed.

23. Capparis flavicans Kurz, J. As. Soc. Beng. 39 ii (1870) 62. — Type: *Teijsmann HB 5931* (BO, CAL, holo; K, U), southwestern Siam, Radburi, Kankian, fl.

C. flavicans Wall. *ex* Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 179, *nom. illeg.*; Kurz, For. Fl. Burma 1 (1877) 63; Coll. & Hemsl., J. Linn. Soc. Lond. Bot. 28 (1890) 19; Brandis, Indian Trees (1906) 35; Craib, Aberd. Univ. St. 57 (1912) 12; Fl. Siam. En. 1 (1925) 80.

— Type: *Wallich 7003* (K), Burma, at Genang huen and Selainmew, fr. 1826.

C. cambodiana Pierre *ex* Gagn., Bull. Soc. Bot. Fr. 55 (1908) 210; Fl. Gén. I.-C. 1 (1908) 194. — Type: *Pierre 501* (K, P), Indo-China, Cambodia, prov. Samrong-tong, yfr. 1870; see Note 2. — **Fig. 27.**

Shrub or small tree 2—10 m, covered with a dense tomentum of fulvous-brown stellate hairs. Twigs slender, internodes short. *Thorns* 1—3 mm, patent or slightly curved upwards or downwards, sometimes minute, on the flowering twigs sometimes wanting. Petiole 3—4(—7) mm. *Leaves* firmly herbaceous to subcoriaceous, 1.1—1.8(—2.7) times as long as wide, widest about the middle or sometimes above, 1¼—3(—4½) by 1—1¾ cm, base obtuse, top rounded, sometimes notched, sometimes mucronulate or rarely with a small recurved tip; midrib more or less sunken, sometimes flat or slightly raised, nerves 3—5 pairs, the first 2 pairs mostly radiating from the very base, thin, reticulation obscure, surfaces more or less glabrescent, dull. *Flowers* axillary in the younger part of twigs, these sometimes short and thin; pedicels slender, 1—3 cm. *Sepals* 6—8 by 4—5 mm, glabrous inside, outer pair boat-shaped, inner pair ovate to obovate, denser hairy than the outer pair. *Petals* ± 8—9 by 4 mm, obovate, tomentose outside towards the top, according to some authors also inside, yellow, upper pair with very fleshy base and golden yellow blotch which turns brown. Stamens 6—7(—12), green-yellow, anthers comparatively large. *Gynophore* 1¼—1¾(—2½) cm, densely hairy all over but some after anthesis glabrescent, ovary ovoid, ± 3 mm long, pointed, densely hairy, stigma knob-shaped up to 1 mm wide, placentas 4(—5). In part of the flowers the gynoecium vestigial. In *fruit* the pedicel and the gynophore woody and more or less equally incrassate, to 3—9 mm, glabrous. *Fruits* subglobose to ellipsoid, ± 2½—4 by 2½—3½ cm, when young apiculate, but later not always so, pericarp 2—5 mm thick, hoary-tomentose except on the protrusions, orange or bright red, smooth to very densely set with small knobs ± 2 mm out which are more or less longitudinally arranged. Seeds in yellow pulp, ± 6—8 by 3—7 by 3—6 mm.

INDIA SOUTH. Sriharikota?, *c.* 13°40'N 80°10'E, Pula-Tiga: *Brandis 081.* BURMA. Upper B. Bhamo, 24°15'N 97°15'E; *Anderson*, yfr. IX. 1868. Kyoukmyoung: *Abdul Huk*, fr. VII. 1891. Myingyan: several. Magwe, 20°08'N 94°55'E: several. Pyawbwe, 20°41'N 96°04'E: *Collett 88.* Tongla, 21°59'N 97°26'E: *Abdul Huk 4*, yfr. VII. 1890. — Lower B. Bilin, 17°14'N 97°12'E: *King's coll. 377.* INDO-CHINA. Laos. Na-hai near Vientiane *c.* 18°N 102°40'E: *Vidal 2220.* Bassac, 14°54'N 105°51'E: *Thorel 2012.* — Annam. Nhatrang, 12°15'N 109°10'E: *Hayata 452, 453.* Phanrang: *Poilane 5859, 30492.*— Cambodia: many, in various localities. — Cochin-China: *Harmand 1176, hb. Pierre 501.* SIAM. North S. Lampang, 18°26'N 99° 30'E: *Winit 844.* Uttaradit: *Kerr*, fl. 24. IV. 1922. — Central S.: several. — Northeast S. Khon Kaen: *Smitinand 4484=RFD 16102.* — East S. Korat: several. Ubon, 15°15'N 104°50'E: *Lakshnakara 902.* — Southwest S. Kanburi: *Kerr 10621*; *Marcan 2410.* Radburi: *Teijsmann 5931.* Pran: *Pierre*, fl. 1869. — Peninsular S. Thungsong, 8°24'N 99°58'E: *Sanan Thaworn 563=RFD 17910.*

Distribution. Asia: from central Burma southeastwards to southern Indo-China, through Siam into the Peninsula.

Ecology. Dry scrub, deforested land, evergreen jungle, dry dipterocarp forest on poor sandy or rocky soil, also on termitaries, at low elevations. Flowers mostly February-March, fruits mostly about September.

Use. The leaves are eaten as curry and also as a galactogene.

Notes. 1. *Capparis flavicans* is currently cited with Wallich as author, who introduced the name under number 7003 of his Catalogue as a *nomen nudum.* This name was validated by a description by Hooker & Thomson in 1872, but two years before, Kurz had published *C. flavicans* validly as a new species, without a reference to Wallich. Although in his later publications Kurz always cited Wallich as the author, the latter cannot formally be regarded as such.

2. Three collections were incorporated in the Herbarium Pierre under number 501. One, with young fruit strongly sculptured, is from Samrongtong in Cambodia, collected in 1870 by Pierre; this is the type of *C. cambodiana.* The others, with flowers, are from

Cochin-China, collected by Harmand in 1876, and from Pnom-Penh in Cambodia, collected by Pierre in 1870.

3. *Thorel 2012* comprises two different collections: a fruiting specimen from Oudan (in Cambodia), and a flowering from Bassac. The latter sheet had been marked as the type, but this is erroneous, since Gagnepain did not cite this specimen under his description.

4. The flowers are mostly reported yellow, but also pink and white.

24. Capparis floribunda Wight, Ic. Pl. Ind. Or. 2 (1840) 35, t. 14; Thw., En. Pl. Zeyl. Add. (1864) 399; Drury, Handb. Ind. Fl. 1 (1864) 41; Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 177; Kurz, For. Fl. Burma 1 (1877) 65; Trimen, Handb. Fl. Ceylon 1 (1893) 64; Brandis, Indian Trees (1906) 35; Dunn in Gamble, Fl. Pr. Madras 1 (1915) 46; Jacobs, Fl. Mal. I, 6 (1960) 78, with map. — Type: *Wight propr. 2439* (K), India, fl. fr.

Crataeva octandra Blanco, Fl. Filip. (1837) 400; 2nd ed. (1845) 280; 3rd ed. 2 (1878) 155, *non Capparis octandra* Jacq. — Type unknown.

C. oligandra Griff., Not. Pl. As. 4 (1854) 577. — Type: *Griffith 1103* (K), Burma, Mergui, fl.; see Note 4.

C. luzonensis Turcz., Bull. Soc. Nat. Moscou 27, 2 (1854) 324; Merr., Sp. Blanc. (1918) 159; En. Philip. 2 (1923) 212. — Type: *Cuming 1201* (BM, CGE, FI, K, L, P, W), Malesia, Luzon, Ilocos Norte Prov., fl.

C. andamanica King, Ann. Gard. Calc. 5 (1896) 119, t. 137; Brandis, Indian Trees (1906) 35. — Type: *King's Coll. s.n.* (CAL, K), Burma, Andaman Is, South Andaman, Hobdaypur, fl. 30. I. 1892.

C. oligostema Hay., Ic. Pl. Formos. 3 (1913) 22; Kudo & Masam., Ann. Rep. Taihoku Gard. 2 (1932) 103. — Type: *Hayata s.n.* (L, phot., TI), China, Formosa, Koshun, Kuraru, fl. V. 1912.

C. luzonensis var. *ampla* Merr., En. Philip. 2 (1923) 212. — Type: *Ramos BS 8093* (L, phot., US), Malesia, Luzon, Isabela Prov., fl. V. 1909.

C. floribunda f. *induta* Jacobs, Fl. Mal. I, 6 (1960) 78; Back. & Bakh. *f.*, Fl. Java 1 (1964) 184. — Type: *de Voogd 673* (A, BO, L), Malesia, E. Java, Muwung, fl. IX. 1927.

Shrub or climber (?), few m high, glabrous in all parts but rarely puberulous with simple fulvous hairs. *Thorns* small, recurved, but mostly wanting. Petiole ½—1½(—2) cm. *Leaves* firmly herbaceous, mostly 2½—3 times as long as wide, widest at or sometimes below the middle, narrowed towards the top, (4—)6—10(—13) by (1½—)2½—4(—6) cm; base mostly rounded and more or less acute, top variable; midrib mostly sunken, nerves 7—9 pairs, thin, reticulation obscure; margin often slightly recurved. *Flowers* numerous in small subumbels *c.* 1—2 cm stalked and arranged together in a terminal panicle up to 15 by 10 cm, with some additional smaller axillary panicles. Flowers white; *sepals* subequal, very concave, elliptic to orbicular, 2—4 by 1½—2½ mm, patent and persistent for a short time after anthesis, inner pair sometimes wider with a wide, membranous margin. *Petals* very thin, oblong or ovate, 3—5 by 1½—2 mm. Stamens 7—9(—12). *Gynophore* 4—6 mm (in Ceylon to 10 mm), glabrous, ovary ovoid, ¾—1½ mm long, glabrous, placentas 4. *Fruits* on a thin stipe, globose, 1½—2(—2½) cm diameter, soft, fleshy, pericarp leathery, smooth, orange at maturity; seeds 1—3, *c.* 13 by 10 by 6 mm.

INDIA SOUTH. Orissa. Puri Div., *c.* 20°N 86°E: *Haines 4637*. Madras. Courtallam: *Rottler*, fl. VIII. 1818. CEYLON: *Thwaites CP 3766*. BURMA. Lower B. Bassein, 16°46′N 94°45′E: *Kermode 7124*. — South B. Mergui: *Griffith 1103*. ANDAMAN ISLANDS: many. SIAM. Peninsular S. Kaw Tao, 10°06′N 99°50′E: several. Krabi, 8°04′N 98°55′E: *Kerr 18773*. Patalung, 7°38′N 100°05′E: *Kerr 15357*. INDO-CHINA, Annam, Quinhon, 13°47′N 109°11′E: *Poilane 17970*. Nhatrang, 12°15′N 109°10′E, and vicinity: several. FORMOSA. *Kusano*,

fr. I. 1909. Koshun, Kuraru: *Hayata*, fl. V. 1912. PHILIPPINES. Babuyan Is, Dalupiri, *c.* 19°N 121°15'E: *Bartlett 15143*. — Luzon, various provinces: many. — Mindoro, north coast: *Kienholz*, st. IV/V. 1924. — Palawan. Near Taytay: *Merrill 11525*. Aborlan, 9°25'N: *Sulit PNH 12401*. MOLUCCAS. Halmaheira: *Teijsmann 5537*. — Tidore: *de Vriese & Teijsmann*, fr. 1859/60. — W. Ceram, Kaibobo: *Rutten 1673*. — Sula Is. Sulabesi: *Atje 235*. — Kai Is: *Jaheri 237*. Kai Ketjil. Tual: *Beccari sh. 741-D*. JAVA. East J. Surabaja Res. Muwung: *de Voogd 673*. — Kangean Is. Ardjasa: *Backer 26813*.

Distribution. Asia: India, scattered in the Deccan Peninsula south of a line between about 12°N in the west and 20°N in the east, Ceylon, Andamans, Lower Burma to Peninsular Siam, SE. Annam, Formosa. Malesia, scattered stations round the West Malesian everwet area: the Philippines, the Moluccas southeastwards to the Kai Islands, E. Java and the nearby Kangean group.

Ecology. Evergreen forest, dry country, on rocky soil, sometimes on limestone, sometimes in coastal vegetation, generally in the lowlands, once at 1600 m.

Elmer found 'many fruits opened and the seeds eaten by birds'.

Notes. 1. The forma *induta*, formerly described on account of its dense persistent indumentum, is on second thoughts considered not to deserve taxonomic recognition, but is better regarded as a strain of local variation. As in some specimens from Indo-China an indumentum occurs which disappears early, there is no basis left for this forma as a taxon.

2. *Poilane 17970* from Annam has fruits of 1 cm diameter, these are reported yellow and edible.

3. Large-leaved specimens (8—10 cm or longer by 5 cm or wider) are known from the Andaman Is (where the same phenomenon is known in a number of other species, too) and from the adjacent mainland of Burma.

4. Under *C. oligandra*, Griffith gives only "Mergue" in his text. So his number *1103* was labelled, and it is the only *C. floribunda* among his material.

25. Capparis fusifera Dunn, Kew Bull. (1914) 377; in Gamble, Fl. Pr. Madras 1 (1915) 45. — Type: *Barber 5726* (K, holo; MH), S. India, Udumanparai, Anamalais, fr. 30. IV. 1903.

C. parviflora (*non* Hook. *f.* & Th.) Bedd., Ic. Pl. Ind. Or. (1874) 65, t. 276; Dunn in Gamble, Fl. Pr. Madras 1 (1915) 46.

C. tomentella Dunn in Gamble, Fl. Pr. Madras 1 (1915) 46; Kew Bull. (1916) 62. — Type: *Beddome 61* and *243* (K; both numbers on the sheet), S. India, Travancore, buds, received V. 1869 and III. 1872.

A spreading, much-branched, large shrub (Beddome). Twigs with some cataphylls at the base; slender, rather densely brown-puberulous, the hairs acroscopically curved, long-persistent. *Thorns* to 3 mm, slightly recurved, or wanting. Petiole dark-coloured, 4—10 mm. *Leaves* firmly herbaceous, 2—4 times as long as wide (see Note 1), widest at the middle, *c.* 9½—15½ by 3—6 cm, base obtuse, top long-tapering and gradually acuminate to rounded and fairly abruptly acuminate, tip acute, midrib sunken but flattish near the top, nerves 8—11 pairs, looped, prominent beneath, subprominent above, reticulation distinct; surfaces dullish, glabrous except for some pubescence in the furrow of the midrib, grey-greenish in the herbarium. *Inflorescence* a small axillary axis ½—1 cm long, pubescent, bearing several minute hairy bracts of which 2—6 subtend a pedicel 6—12 mm filiform glabrous. Calyx glabrous, the sepals sometimes ciliate, thin, *c.* 5 mm diameter, membranous towards the margin, outer pair in bud completely covering the inner pair. Petals *c.* 6 by 3½ mm (upper pair) and 5½ by 1¾ mm (lower pair), sparsely hairy. Stamens *c.* 56. *Gynophore* glabrous; ovary spindle-shaped *c.* 1½ by 1 mm, glabrous, placentas 2.

Fruit on a gynophore 11—14 mm long and hardly incrassate, spindle-shaped, *c.* 3¾—4½ by *c.* 2 cm, skin thin, warty; seeds several, *c.* 17 by 12 by 7 mm.

INDIA SOUTH. Travancore: *Beddome 61, 243.* Anamallays: *hb. Beddome 237.* Udumanparai: *Barber 5726.*

Distribution. Asia: India, southern part of the Deccan Peninsula (Travancore and Tinnevelly District; according to Beddome also common in the Polleary Pass and about Courtallum).

Ecology. To 1000 m altitude.

Notes. 1. Beddome adds: „The leaves are very variable, some of my specimens having them very narrow". I have not seen such specimens.

2. The material is very scanty. The differences with *C. parviflora* are slight and still defectively known. In *C. parviflora* the twigs are early glabrescent, the cataphylls wanting, the leaves smaller, the inflorescences essentially terminal, the stamens fewer, the (immature) fruit pisiform.

Dunn was correct when he stated that *C. parviflora* Hook. *f.* & Th. was misinterpreted by Beddome, whose plant he renamed *C. tomentella.* He failed, however, to identify his own species *C. fusifera* with *C. tomentella,* where it belongs to all probability.

3. The flower has been described on *Beddome 61,* the fruit on *Barber 5726.*

4. It is doubtful whether *C. tomentella* Dunn in Gamble (1915) was validly published. In 1916 it was, but as the name is a synonym, it does not matter here.

5. Beddome's plate is quite good, and matches well his numbers *61* and *273* which I have seen. The plate also shows, rather infirmly drawn, a globose fruit 13 mm in diameter. The two Beddome numbers cited are only in flower, but perhaps the fruit belongs to an unnumbered Beddome specimen from Tinnevelly anno 1879 (MH) of true *C. parviflora;* here the fruit is 9 mm in diameter.

26. Capparis grandiflora Wall. *ex* Hook. *f.* & Th. in Hook. *f.,* Fl. Br. Ind. 1 (1872) 174; Brandis, Indian Trees (1906) 33; Dunn in Gamble, Fl. Pr. Madras 1 (1915) 45; Dunn, Kew Bull. (1916) 61. — Type: *Heyne hb. Wallich 6984A* (K), India, fl. 23. XII. 1821.

C. pyrifolia (*non* Lam.) W. & A., Prod. (1834) 25; Wight, Ic. Pl. Ind. Or. 3 (1846) t. 1047; Drury, Handb. Ind. Fl. 1 (1864) 38.

Low shrub with spreading branches; it rarely attains over 2 ft in height but the lateral branches cover a larger space (Wight). *Innovations* covered with a coarse tomentum of stellate hairs persistent on the twigs, the leaves more or less glabrescent. *Thorns* recurved, 2—4 mm, brown, sharp. Petiole 2—3 mm. *Leaves* subcoriaceous, about 1.5(—2.1) times as long as wide, widest below or sometimes about the middle, 1½—3 by 1—1¼ cm, base rounded to subcordate, top acute to rounded, mucronate; midrib sunken, mostly with hairs in the furrow, nerves 3—4 pairs, thin, as the reticulation distinct above, obscure below, upper surface glossy. *Flowers* solitary, axillary, pedicels ¾—2 cm, vigorous, tomentose. *Sepals* ± 14—18 by 10 mm, outer pair boat-shaped, outside glabrous or sparsely tomentose, inside villose towards the margins, inner pair ovate, thin, outside villose towards the margin, inside glabrous. *Petals* white, obovate-triangular, almost truncate, 2½—3½ by 1¼ cm, glabrous. Torus 2 mm wide. Stamens 87—101, exceeding the gynoecium by ½ cm; filaments white, anthers blue. Gynophore 1¾—2 cm, glabrous, ovary ovoid-cylindric, 5—8 by 1½ mm, placentas and furrows 4—5; stigma cushion-shaped, *c.* 1½ mm wide, sometimes hairy, otherwise the ovary glabrous. *Fruit* on stipe 2 mm thick, ovoid, *c.* 4¾—7½ cm long, including a beak to 5 mm, 1½—3 cm wide; seeds *c.* 5 mm.

INDIA SOUTH. Anamallays and Kurnool Hills, *c.* 15°45'N 78°E: *Beddome 226*. 'Mysore': several. Nilgherries, *c.* 11°30'N 77°E: many.

Distribution. Asia: southern India in the eastern foothills of the Nilgherry Mountains and adjacent parts of Mysore and Coimbatore.

Ecology. "Flowering most part of the year, but in greatest perfection during the cool season immediately after the rains" (Wight); up to 1200 m altitude. Fruits in July.

27. Capparis grandis Linn. *f.*, Suppl. (1781) 263; Lam., Enc. Méth. Bot. 1 (1785) 606; Willd., Sp. Pl. 2 (1799) 1135; DC., Prod. 1 (1824) 248; Moon, Cat. Ind. Exot. Pl. Ceylon (1824) 41, see under *C. moonii*, Note 1; W. & A., Prod. (1834) 27; Wight, Ic. Pl. Ind. Or. 1 (1838) t. 21; Thw., En. Pl. Zeyl. (1858) 16; Drury, Handb. Ind. Fl. 1 (1864) 40; Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 176; Trimen, Handb. Fl. Ceylon 1 (1893) 63; Brandis, Indian Trees (1906) 34; Gagn., Fl. Gén. I.-C. 1 (1908) 192; Talbot, For. Fl. Bombay Sind 1 (1909) 59, f. 38. — Type: *Koenig (n.v.)*, Ceylon.

C. maxima Heyne *ex* Roth, Nov. Pl. Sp. Ind. Or. (1821) 237; DC., Prod. 1 (1824) 248. — Type: *B. Heyne (n.v.)*, India orientalis.

C. obovata Buch.-Ham. *ex* DC., Prod. 1 (1824) 248. — Type: *hb. Banks (n.v.)*, India, Mysore.

C. racemifera DC., Prod. 1 (1824) 248. — Type: *hb. Lambert (n.v.)*, India orientalis.

C. bisperma Roxb., Fl. Ind. ed. Carey 2 (1832) 568; W. & A., Prod. (1834) 26; Drury, Handb. Ind. Fl. 1 (1864) 39. Miscopied "*C. disperma*", Walp. Rep. 1 (1842) 199. — Type: probably lost; see W. & A., l.c.

C. grandis var. *auricans* Kurz, J. As. Soc. Beng. 43 ii (1874) 70; For. Fl. Burma 1 (1877) 64. — *C. auricans* (Kurz) Craib, Kew Bull. (1922) 169; Fl. Siam. En. 1 (1925) 79; Gagn., Fl. Gén. I.-C. Suppl. 1 (1939) 168. — Type: *Kurz 1827* (BO, CAL), Lower Burma, Prome Distr., Pegu Yomah, st.; see Note 4.

C. mekongensis var. *crispata* Craib, Kew Bull. (1922) 170; see Note 3. — Type: *Kerr 2396* (ADB, BM, K), northern Siam, Muang Sa, Nan, fl. 17. II. 1912.

Crooked tree 5—12 by 0.30 m, or shrub. Twigs fulvous or greyish with a dense pubescence of short curved hairs, often slightly thickened at the leaf insertions, a small axillary bud mostly visible. *Thorns* 3—9 mm, more or less recurved, but often wanting, especially on the fertile twigs. Petiole 6—14 mm. *Leaves* firmly herbaceous to subcoriaceous, 1.0—2.0(—2.6) times as long as wide, widest mostly about the middle, sometimes above or below, (3—)5—7(—9) by 3—4(—5½) cm; base acutish, rarely cuneate, top mostly acute, rarely rounded or subacuminate or notched, sometimes mucronate; midrib flattish or at the base shallowly sunken, nerves 5—7(—12) pairs, thin, rather close and more or less parallel, mostly without intermediary nerves, mutually connected towards the margin but not to a definite marginal nerve, reticulation rather distinct; upper surface totally or largely glabrescent, latest on the midrib, mostly dull, lower surface densely set with rather long straight fulvous or greyish hairs. *Flowers* white, with up to 20 more or less densely conferted terminally; often in the axil of the upper leaves also a subumbel or rarely a solitary flower. Pedicels (¾—)1¼—2(—3) cm, puberulous. *Sepals* herbaceous, sparsely puberulous outside, outer pair boat-shaped, *c.* 6—9 by 4—7 mm, inner pair flattish, obovate, 6—11 mm long, glabrous but the margins ciliate. *Petals* obovate, 8—13 by 3—4 mm, glabrous or puberulous inside. Stamens (12?—)30—50. *Gynophore* 1—3 cm, hairy towards the base, ovary ovoid, 2 by 1 mm, glabrous, placentas 2(—3?), stigma knob-shaped. In fruit the pedicel still hairy, the gynophore glabrous, both (late) incrassate to 2—3 mm. *Fruit* globose, often somewhat umbonate, 2½—3 cm

diameter, pericarp coriaceous, smooth purple, flesh said to be pink. Seeds few to ± 15, 11—13 by 8—12 by 5 mm.

INDIA NORTH. Rajasthan. Ajmer, 26°29′N 74°40′E: *Lowrie*, fl. VII. 1885. Merwara, 25°38′N 73°58′E: *Lowrie*, fl. fr. VIII. 1884, 4510. Mount Abu, 24°41′N 72°50′E: several. Ahmedabad Distr. Talod: *Sedgwick 1255*. — Kathiawar Peninsula: many, Dwarka, 22°15′N 69°03′E: *Shrama D176*. INDIA SOUTH. Berar, *c.* 22°N 77°E: *Witt 1399, 1400*. Chanda, *c.* 20°N 79°30′E: *Haines 3678, 3679, 5929*. — Orissa. Addatigala, 17°31′N 82°03′E: *Wagh 3001*. South of this line, at various scattered localities: many. CEYLON: *Pierre*, fl. yfr. V. 1861; *Thwaites CP 1071*; *Walker 97*. BURMA. Upper B. Myingyan Distr., *c.* 21°30′N 95°E: several. Minbu: *Shaik Mokim 10*. — Lower B. Pegu, Prome Distr.: several. SIAM. North S. Lampun, 18°36′N 99°02′E: *Winit 99*, Near Nan, 18°47′N 100°50′E: *Kerr 2396*. Me Chang: *Kerr 3177*. Lampang: *Praoet 4* = *RFD 9748*. — ?Central S. Noh Pai: *Marcan 2314*. INDO-CHINA. Annam. Phanrang, 11°34′N 109°E: *Poilane 9149, 9866*. — Cochin-China. Chaudoc, *c.* 11°N 105′E: *Pierre 4064*.

Distribution. Asia: India, from Ajmer in Rajasthan southwestwards to the Gulf of Kutch, southeastwards to the mouth of the Godavari River and further south in the Deccan; Ceylon. Lower Burma south of Mandalay, northern Siam, and southeastern Indo-China.

Ecology. In forests, also in grassland, often on rocky soil, below 1000 m alt. Seems to be fertile throughout the year. According to Kurz, the leaves are shed in the hot season, and the young leaves are flaccid. In several specimens part of the ovaries are transformed into globose brownish galls 4—5 mm diameter on an a few mm long gynophore.

Use. The wood is white, moderately hard, durable; much used by the natives in Madras for plough-shares and rafters (Watt, Dict. Ec. Prod. Ind. 2, 1889, 131); also good for turning (Kurz 1877, 64). In S. Annam the bark is sought after by Chinese for making little torches to be used at religious ceremonies.

Notes. 1. *Santapau 17606* from Mt Abu is a young sterile specimen, densely fulvous pubescent. Thorns straight, 6—9 mm, more vigorous than in *C. rotundifolia* which it resembles. Leaves suborbicular or ovate, 1½—3 cm long, nerves 6—8 pairs, thin, yellowish. It might represent a sort of juvenile stage, otherwise not known of this species.

2. In *Barber 7340* from S. India the leaves are slightly transversely elliptic, 4 by 5 to 5 by 6 cm.

3. The type of *C. mekongensis* var. *crispata* agrees with *Winit 99*; both have thin-textured leaves and a glabrous gynophore. Winit's plant is richer-flowered than *C. grandis* mostly is; the sepals and young petals are 6 mm long, the stamens 28—30 in number, the gynophore *c.* 23 mm. Both specimens represent a local variation of *C. grandis*, thereby approaching *C. mekongensis*, its closest relative.

Also interesting is *Kerr 3177*. The leaves are thinner in texture, more rounded, and with very glossy, short, lax, appressed hairs.

4. *Kurz 1827* is the only *C. grandis* I saw from the Calcutta Herbarium. It bears two inscriptions, "C. auricans Kz" and "C. grandis L." Brandis remarks that he has seen a specimen with these inscriptions, deviating in the smaller flowers on longer pedicels, but Kurz did not mention these as characters, and the present specimen is sterile. However, specimens like the one Brandis refers to, are not rare in this species.

28. Capparis khuamak Gagn., Bull. Soc. Bot. Fr. 85 (1939) 598, partly, see Note 1; Fl. Gén. I.-C. Suppl. 1 (1939) 167, not the figure, which is *C. versicolor*. — Lectotype: *Poilane 2005* (BO, L, P, holo; UC), Indo-China, Laos, Sam-neua, fr. 8. X. 1920.

Climber 4—15 m. Twigs densely fulvous-puberulous, late glabrescent. *Thorns* slightly recurved, up to 2—3 mm long or wanting. Petiole 10—12 mm, hairy as the twig. *Leaves* subcoriaceous, 2.2—3 times as long as wide, widest at or above the middle, 6½—9½ by

2½—3½ cm; base acute, top subacuminate, tip minutely notched or acute and mucronulate; midrib shallowly sunken, below thinly puberulous or glabrous, nerves 5—9 pairs, thin, reticulation obscure, surfaces glabrous. *Flowers* with 7—12 conferted towards the top of lateral slender few-leaved twigs some 5 cm long. *Sepals* obovate, puberulous outside, outer pair ± 7½ by 4½ mm, inner pair ± 6½ by 3½ mm. *Petals* 6—6½ by 3—3½ mm, pubescent inside towards the base. Stamens ± 25. *Gynophore* 2½—3½ cm, glabrous (in part of the flowers the gynoecium vestigial); ovary ellipsoid, ± 1¾ by 1¼ mm, glabrous, placentas 4, stigma completely sessile, ± ¼ mm. In fruit the pedicel and gynophore incrassate to 3—4 mm. *Fruit* globose, 3—4 cm diam., pericarp *c.* 3 mm thick, rough, pulp pink, smelling. Seeds ± 20 by 15 by 10 mm.

INDO-CHINA. Laos. Muong Seng, ?21°10'N 101°06'E: *Poilane 16953*. Sam Neua, 20°25'N 104°04'E: *Poilane 2005*. — Annam. Prov. of Kontum, 14°23'N 108°E: *Poilane 32085, 32237*. — Cochin-China. 'Dans la chaine de partage entre Mekong et Annam': *Pierre*, fr. VIII. 1890 (probably).

Distribution. Asia: Indo-China, scattered between northern Laos and Cochin-China.
Ecology. In forests on loamy soil, 700—1500 m.
Uses. The fruits are soft and edible.
Note. 1. Gagnepain did not appoint a type. Of the six collections cited under the original description, only two belong here, the others being *C. versicolor. Poilane 32085* and *32237* came in later.

29. Capparis klossii Ridl., J. Fed. Mal. St. Mus. 10 (1920) 81; Craib, Fl. Siam. En. 1 (1925) 81. — Type: *Kloss 6845* (K), Peninsular Siam, Tasan, fl. 28. III. 1919.

Climber. *Innovations* densely fulvous-puberulous, late or not glabrescent. Twigs vigorous, terete, without cataphylls at the base, always(?) straight. *Thorns* conical, broad-based, 2—3 mm, pointing somewhat downwards. Petiole *c.* 1½—1¾ cm. *Leaves* coriaceous, elliptic, *c.* 18—25 by 10—15 cm; base obtuse, rounded, or subcordate, top seems to be rounded; midrib flat, nerves 7—8 pairs, comparatively thin, reticulation obscure; surfaces greenish when dried, dull, glabrous above, more or less densely fulvous-puberulous beneath. *Flowers* with about 1—3 dozens in a raceme mostly terminal sometimes lateral *c.* 13—25 cm long, densely puberulous; pedicels *c.* 1¾—2½ cm, widened towards the top, shallowly sulcate, subtended by a pair of thorns and by a bract *c.* 17 mm long including a stalk 5—7 mm, limb 3 mm wide. *Sepals* firm-textured, the outer pair very concave, in bud partly enveloping each other, *c.* 11—13 by 6—7 mm, outside almost invisibly puberulous, inside glabrous; inner sepals unknown (see Note 1). *Petals* white, approximately spathulate, *c.* 1½—2 by ¾—1 cm, hairy at the base. Torus *c.* 5 mm wide, flat. Stamens about 55. *Gynophore* 4½—5½ cm, vigorous, glabrous; ovary 4 by 3 mm, globose with a short stigmatic point, glabrous, placentas 4. *Fruit* on a woody stipe at least 8 mm thick, globose(?), at least 5 cm diameter.

SIAM. Peninsular S. Isthmus of Kra. Tasan, 10°30'N: *Kerr 16301*; *Kloss 6845*.

Distribution. Asia: endemic in the Isthmus of Kra.
Ecology. In scrub at low altitude. Flowers March, fruits (immature) December.
Notes. 1. Among the scrappy type material, the inner sepals were not found. The two collections agree very well.
2. *Capparis scortechinii* has much narrower leaves, 2—5 times as long as wide, up to 7 cm wide. Nevertheless the two, both being inadequately known, may appear to be conspecific.

30. Capparis koioides Jacobs, *sp. nov.* — Type: *Chevalier 38761* (L, phot., P, holo), Indo-China, Annam, Nhatrang Prov., Hon Bà massif, 800—1000 m, fl. 25. VIII. 1918.

Rami recti mox glabrescentes spinis stipularibus paulo recurvatis fulvis. Petiolus 6—8 mm. Folia in sicco viridia oblonga c. 8½—12½ ad 3½—4½ cm, basi acuta ad obtusa apice acumine 1 cm longo obtuso, costa sulcata nervis utrinque c. 8, tenuibus, glabra. Flores pauci solitarii apicem versus rami vel umbellati in ramulo, in pedicello firmo complanato, majores, calyce glabro c. 16 mm longo, staminibus c. 85—100, gynophorio glabro 4¾ cm ovario glabro placentis 4. Fructus ignotus.

Climber, *innovations* early glabrescent. Twigs straight, without cataphylls, green in dried state. *Thorns* slightly recurved, fulvous, 2—4 mm. Petiole 6—8 mm, darkish-coloured, *Leaves* subcoriaceous, widest about the middle, *c.* 8½—12½ by 3½—4½ cm, base acute to obtuse, top rather abruptly acuminate, tip *c.* 1 cm, narrow obtuse slightly notched; midrib (sometimes shallowly) sulcate all over, brownish beneath, nerves *c.* 8 pairs, thin, subprominent, reticulation not distinct; surfaces quite glabrous, green in the dried state, little glossy above, dull beneath. *Pedicels* few, solitary, axillary at the top of twigs or umbellate on small lateral twigs, 2½—3¼ cm, vigorous, somewhat flattened and ribbed, subglabrous. *Sepals* subequal, firm-textured, boat-shaped, ovate, *c.* 16 by 7 mm, glabrous. *Petals c.* 2½—2¾ by 1½—1¾ cm, white, somewhat pubescent near the base, otherwise glabrous. Stamens *c.* 85—100. *Gynophore* 4¾ cm, glabrous; ovary ellipsoid or ovoid, *c.* 4 by 2 mm, glabrous, placentas 4; stigma inconspicuous. *Fruit* unknown.

INDO-CHINA. Annam. Massif Hon Bà, *c.* 12°N 109°E: *Chevalier 38761*. SIAM. Peninsular S. Kew Chang, 9°50'N 98°26'E: *Kerr 16565*.

Distribution. Asia: a small island west off Peninsular Siam, and southeastern Annam.

Ecology. In Kaw Chang in evergreen forest bordering the beach; in Annam at 800—1000 m.

Note. 1. The name was given because of the resemblance with *C. versicolor* (of which *C. koi* is a synonym), which differs in smaller leaves, thinner terete pedicels, a smaller calyx, a thinner and shorter gynophore, and fewer stamens.

31. Capparis lanceolaris DC., Prod. 1 (1824) 248; Miq., Fl. Ind. Bat. I, 2 (1858) 101; Jacobs, Fl. Mal. I, 6 (1960) 77; Back. & Bakh. *f.*, Fl. Java 1 (1964) 184. — Type: *Leschenault s.n.* (P), Malesia, Java, fl.

C. subspinosa Roxb., Fl. Ind. ed. Carey 2 (1832) 568. — Type: *Anonymous hb. Roxburgh 2527* (BR), Malesia, Moluccas, st.

C. roxburghii (*non* DC.) Span., Linnaea 15 (1841) 166.

C. elliptica Span., Linnaea 15 (1841) 166. — Type: uncertain, see Note 4.

C. platyacantha Turcz., Bull. Soc. Nat. Moscou 27, 2 (1854) 323. — Type: *Zollinger 2268ZM* (A, BM, BO, FI, G, P), Malesia, E. Java, Bangil, fl. IX. 1844.

C. callophylla (*non* Bl.) Miq., Pl. Jungh. (1855) 397; Fl. Ind. Bat. I, 2 (1858) 101, partly, see Note 5.

C. salaccensis var. *celebica* Miq., Illustr. (1870) 23, t. 12b. — Type: *Forsten s.n.* (L), Malesia, NE. Celebes, Tondano, fr. VII. 1840.

C. uberiflora F. v. M., Fragm. Phyt. Austr. 9 (1875) 172; Bailey, Queensl. Fl. 1 (1899) 58; Compr. Cat. Queensl. Pl. 1 (1909) 40, f. 19; Domin, Bibl. Bot. Heft 89 (1925) 684, see Note 7. — Type: *Dallachy s.n.* (K, MEL), Australia, Queensland, Rockingham Bay, Brook I., fl. 22. X. 1865.

C. oblongata Merr., Philip. J. Sc. Suppl. 1 (1906) 15; En. Philip. 2 (1923) 212. — Type:

R. Meyer FB 2632 (BO, K, L, phot., SING, US), Malesia, Luzon, Mt Mariveles, fl. II. 1905.

C. copelandii Elmer, Leafl. Philip. Bot. 2 (1910) 680; Merr., En. Philip. 2 (1923) 210. — Type: *Elmer 10943* (A, BM, BO, E, G, GH, K, L, US, W), Malesia, Mindanao, Mt Apo, fr. VI. 1909.

C. torricellensis Laut., Bot. Jahrb. 52 (1914) 112. — Type: *Schlechter 14392* (BO), Malesia, New Guinea, Torricelli Mts, fl. IV. 1902.

C. viridis Elmer, Leafl. Philip. Bot. 8 (1919) 3076. — Type: *Elmer 18061* (A, BO, GH, K, L, phot., US, W), Malesia, Luzon, Mt Maquiling, fr. VI/VII. 1917.

Scandent shrub, few (up to 25) m high, rarely self-supporting and *c.* 1½ m high. Twigs mostly overhanging, straight, fulvous to red-brownish puberulous when young, sooner or later (rarely not) glabrescent but nearly always vestiges of the pubescence persistent near the leaf axils. *Thorns* mostly present, recurved, up to 7 mm long. *Leaves* subcoriaceous, above glabrous, beneath mostly glabrous, sometimes fulvous-puberulous, whether or not glabrescent, (1.5—)2.0—4.0(—4.7) times as long as broad, broadest in the middle, (3½—)6½—12(—16) cm long, (1¾—)2—4(—7) cm broad; base acutish to rounded or subcordate, top acuminate, rarely rounded to subemarginate, tip mostly acute-mucronate, margin often markedly recurved, especially towards the top; midrib above sunken mostly all over, rarely flat; nerves 6—10 pairs, hardly visible; petiole (½—)¾—1(—1½) cm. *Flowers* conferted more or less densely towards the top of slender lateral twigs 2—7 cm, occasionally leafy and up to 15 cm, more or less glabrescent, or forming subumbels mostly axillary, sometimes terminal, mostly simple, sometimes branched. Pedicels (1¼—)2—2½(—3) cm, glabrous, sometimes each with a pair of distinct thorns at the base. Bracts small, caducous, narrow, hairy. Flowers white, yellow-white, pink, or red, once recorded pale green outside, whether or not fragrant. *Sepals c.* 6—7(—10) by 5 mm, with membranous margin, glabrous; outer pair herbaceous, inner pair flatter and thinner, rarely minutely ciliate. *Petals* obovate, 8—11 by 4—6 mm, puberulous towards the base, especially inside. Stamens *c.* 20(—40), 2—3 cm. *Gynophore* (2—)3—4(—5) cm, ovary ellipsoid, 1—2 mm long, with 3—4 placentas, both glabrous. Fruits few; pedicel, torus, and gynophore but little incrassate. *Fruit* (sub)globose, 2¼—3½ cm, bluish black. Seeds 3 or more, *c.* 8—12 by 6—12 by 5 mm.

PHILIPPINES. Luzon, various provinces: many. — Polillo: *Fox PNH 8997*. — Alabat: *Ramos & Edaño BS 48032, BS 48317*. — Guimaras: *Sulit PNH 11718*. — Tawitawi: *Alcasid & Celestino PNH 7494*. — Mindanao. Davao Distr.: *Copeland 705*; *Elmer 10943*; *Ramos & Edaño BS 49409*. CELEBES. Northeast C.: Minahasa: several. — Central C. Lato-u, *c.* 3°30'S 121°E: *Kjellberg 3930*. — Southwest C. Pangkadjene: several. — Salajar Is: *Teijsmann 13835*. — Butung: *Elbert 2714, 6436, 6437, 6438*. MOLUCCAS. Central Ceram. Amahai: *Treub*. — Nusa Laut: *Chr. Smith*, fl. III. 1797. JAVA. Central J. Djokja Res. G. Gambing: *Junghuhn*. Semanu: *den Berger 205*. Kedu Res. G. Sumbing, 1650 m: *Lörzing 518*. Temanggong: *Teijsmann*, fr. VI. 1853. — East J., various localities: many. — Madura. Arosbaja: *Backer 19257*. LESSER SUNDA ISLANDS. Western Sumbawa, Mount Batulanteh, 500—600 m: *Kostermans 18614*. — Timor: *Spanoghe*, fl. Oikabiti: *Teijsmann*, fl. — Damar: *Riedel*, fr. — Tanimbar Is. Jamdena: *van Borssum Waalkes 4034*. NEW GUINEA. Vogelkop Peninsula. Near Manokwari: *Kostermans 2959*. — Geelvink Bay. Nabire: *Kanehira & Hatusima 11423*. Schouten I. Biak: *Feuilletau de Bruyn 373*. — Central North N.G. Cycloop Mountains. Arso: *Gjellerup 646*. — Territory: several, various localities. — Papua. Bioto: *White 691*. Isuarava: *Carr 15745*. — New Ireland. Ugana: *Peekel 20, 212*. QUEENSLAND. North Barnard I. (*n.v.*): *Tandy*, fr. XII. 1928. — Endeavour River, east coast at *c.* 16°S: *Persick*, fl. 1883. Cairns: *Nugent 117*. Rockingham Bay, at 18°11'S: *Dallachy*, fl. 22. X. 1865.

Distribution. East and South Malesia: Philippines, Celebes with some adjacent islands, central Ceram with adjacent islet, Central and East Java with adjacent Nusa Barung and Madura, in the Lesser Sunda Islands from Sumbawa to Jamdena; New Guinea with

adjacent islands. Northeast Australia: in Queensland along the east coast southwards to Rockingham Bay.

Ecology. Forests, thickets, hedges, mostly on dry calcareous rocky soil, also in coastal vegetation, up to 700 m, once at 1650 m.

Notes. 1. In sterile state very similar to *C. floribunda*, but this species has commonly somewhat longer petioled, mostly ovate leaves narrowing gradually towards the apex, whereas a sharply acuminate leaf tip is typical for *C. lanceolaris*, especially in the Philippines. Some sterile New Guinea specimens resemble *C. zippeliana* (see there).

2. In the Philippines some deviating specimens have been described as distinct species: *C. oblongata*, *C. viridis*, and *C. copelandii*. In the first two the innovations are glabrous to early glabrescent, the leaf base is obtuse to subcordate, the apex is narrow and sharply acuminate, the sepals are 9—10 mm long, the inner pair being sometimes minutely ciliate; sometimes also small thorns are found in the inflorescence! Besides, in some specimens identified as *C. oblongata*, the subumbels are conferted towards the end of the twigs and are merely subtended by minute puberulous bracts, resulting in impressive inflorescences 10—15 cm long. This latter feature, however, varies even in different duplicates of the type collection. Two other Philippine specimens have densely pubescent twigs and leaf underside; this material (in fruit) was described as *C. copelandii*.

3. The specimens from Java are characterized by generally well developed thorns which are also found in the inflorescence and by comparatively small leaves ($3\frac{1}{2}$—8 cm).

4. Under "*C. Roxburghii*? (*C. elliptica* Span.)" Spanoghe l.c. gives a short description of a specimen from Timor. This could fit with *C. lanceolaris*, except for the sentence "pedicellis . . . folio longioribus", which does neither apply to any Timorese *Capparis* except for the different *C. sepiaria*, nor to the specimen which I think Spanoghe had at hand. This is preserved at Leyden, bears a label "Java? Spanoghe" and also a separate strip with in another, presumably Spanoghe's, handwriting "*Capparis Roxburghii*? DeC." The specimen fails in the characters typical for material from Java, so that it could be very well from Timor. It seems not impossible that Spanoghe mistakenly described the inflorescences as too long, and that this plant belongs here. The name "*elliptica*" was not found on any label.

5. A specimen collected by *Junghuhn s.n.* (L) on G. Gambing near Djokjakarta was the first of *C. lanceolaris* which came to Miquel's hands, but he misinterpreted it (and mentioned it in the Plantae Junghuhnianae) as *C. callophylla*, which he apparently did not regard as conspecific with *C. tylophylla* Spreng., mentioned in the Illustrations. In the latter work, no *C. callophylla* occurs; presumably Miquel overlooked the specimen involved. In fact, there is no material of *C. callophylla* collected by Junghuhn.

6. *C. lanceolaris* is very closely related to *C. khuamak* and *C. versicolor*, and, especially on account of their resemblance in vegetative characters, arguments could be advanced to combine them as 3 subspecies. *C. khuamak*, however, is too badly known to be compared in details with the other two. *C. lanceolaris* and *C. versicolor* have each a different range of variability (especially great in *C. lanceolaris*) and are geographically well-separated.

7. The Australian specimens are almost completely glabrous, with scarcely developed thorns and a gynophore of 20 mm length.

32. Capparis laotica Gagn., Bull. Soc. Bot. Fr. 55 (1908) 212; Fl. Gén. I.-C. 1 (1908) 193. — Type: *Thorel 2582* (L, P, holo), Indo-China, Laos, Bassac, fl. 1866/1868.

Shrub 1—2 m. Twigs zigzag, brown-velutinous, the indumentum long-persistent. *Thorns* recurved, 1—2 mm, black-topped. Petiole 2—5 mm, slightly incrassate. *Leaves*

firmly herbaceous, about 3—4 times as long as wide, parallel-sided, about 15—20 by 4—6 cm; base rounded and subcordate, top gradually acuminate, tip slender, 1½—2 cm, acute; midrib, primary and main secondary nerves sunken, nerves 8—10 pairs, distinct and yellowish below, reticulation above obscure, below distinct; in the herbarium surfaces above darkish green, fairly glossy, glabrous but brown-velutinous on the midrib and primary nerves, below paler green, and brown-velutinous all over. *Inflorescenses* terminal, flowers nearly all crowded to an umbel at the top of a hairy peduncle 1½—2 cm; bracts filiform, 1½ mm long, hairy; pedicels filiform, ± 2 cm, fulvous-velutinous. *Sepals* subequal, slightly concave, more or less elliptic, 6 by 3 mm, fulvous-velutinous outside (the inner pair only so in the central part), glabrous inside. *Petals* obovate, ± 10 by 3—4 mm, villous at the base. Torus 1 mm wide. Stamens 30, long 2 cm (Gagnepain). *Gynophore* ± 28 mm, filiform, dark-coloured, glabrous; ovary ovoid to fusiform, 3 by 1 mm, dark-coloured, glabrous, stigma small, paler, placentas 4. *Fruit* unknown.

Distribution. Asia: Indo-China, Laos, Bassac, 14°54'N 105°51'E.
Ecology. In the mountains (Gagnepain).

33. Capparis lasiantha R. Br. *ex* DC., Prod. 1 (1824) 247; Benth., Fl. Austral. 1 (1863) 94; Bailey, Queensl. Fl. 1 (1899) 57; Domin, Bibl. Bot. Heft 89 (1925) 684; Black, Fl. S. Austral. 2 (1948) 369. — *C. lasiantha* var. *normalis* Domin, Bibl. Bot. Heft 89 (1925) 685. — Type: *R. Brown s.n.* (G-DC, holo; BM, K), Australia, fl.; see Note 2.

C. lasiantha var. *citricarpa* Domin, Bibl. Bot. Heft 89 (1925) 685. — Type: *Domin* (PR, *n.v.*), Australia, Qld., Flinders River near Hughenden, fr. II. 1910.

C. lasiantha var. *rhombifolia* Domin, Bibl. Bot. Heft 89 (1925) 685. — Type: *Domin* (PR, *n.v.*), Australia, West Qld., near Nonda, fr. II. 1910.

Climber or twiner, occasionally shrubby, a few m high, the trunk up to 10 cm diameter; in nearly all parts covered with a thick *tomentum* initially more or less orange-brown, later turning greyish. Twigs slender, zig-zag. *Thorns* rather vigorous, recurved, 3—4 mm, with glabrous top, on fertile twigs often abortive. *Juvenile shoots* (sterile): twigs bended, very prickly. Leaves tending to distichy, subsessile, parallel-sided, *c.* 1—2 cm by 2—4 mm, gradually growing larger. *Adult shoots*: petiole 2—4(—6) mm. Leaves reported greyish or blue-green above, yellow-green beneath when fresh, coriaceous, ovate to subrhombic or elongate, (1.7—)3—4(—5.2) times as long as wide, (2½—)5—6½(—9½) by (¾—)1½—2(—3) cm; base blunt to rounded, top blunt to obtuse, sometimes with a blackish mucro, rarely notched; midrib slightly raised above, nerves rather obscure, 4—5(—6) pairs, especially the basal ones very oblique, reticulation obscure; surfaces glabrescent to some extent. *Flowers* white, serial in rows of 2—3, in some axils solitary; pedicels 1—1½(—2½) cm. *Sepals* 6—8(—12) by 3—4 mm, outer pair boat-shaped, ovate, acute, the odd one slightly but distinctly saccate at the base, glabrous only inside towards the base, inner pair elliptic to elongate, with membranous margin, glabrous inside. *Petals* obovate, 10—16 by 2½—4 mm, glabrous inside. Disk ± ¾ mm. Stamens (10—) 20—22, equalling the gynophore, anthers 2 mm long. *Gynophore* 1¾—2(—3½) cm, hairy in the basal half, glabrescent; ovary ellipsoid, 2—2½ by 1 mm, glabrous, placentas 3(—4). *Fruit* ellipsoid and more or less irregularly tapering at both ends to globular, ± 3½—4 by 1½—2 cm, (always?) dehiscent, pericarp thin, yellow. Seeds (3—) many, ± 5 by 4½ by 3 mm.

WESTERN AUSTRALIA. Along the coast southwards. Cambridge Gulf, 15°S 127°30'E: *Cunningham 456*; *Keiller*, fl. 1887. — King Sound, 17°S; *Hughan*, fl. — Fortescue River, 21°S: *Cussack*, fl. 1895. — Gascoyne River, 25°S: *Mrs. Gribble 17.* — Kimberleys, ?26°S 120'E: *Lazarides 6336*; *Panton*, fl. 1884. NORTHERN

TERRITORY. Boomerang W. H., Willowrah H.S., *c.* 21°S 133°E: *Chippendale NT 4768.* — Brunchilly, *c.* 19°S 134°E: *Chippendale NT 7085.* — Argadargade, *c.* 22°S 136°30'E: *Chippendale NT 379.*— Tobermory, *c.* 22°S 138°E: *Chippendale NT 222.* — North of this line, various localities: several. QUEENSLAND, NEW SOUTH WALES. Cloncurry, 20°41'S 140°30'E: *Pollock 11.* — Charleville, 26°25'S 146°13'E: *Clemens*, fl. XI. 1945. — Burren Junction, 30°08'S 149°E, and in an area 50 km around: several. — Gular (= ?Gulargambone, 31°21'S 148°32'E): *Clelland*, fl. 30. X. 1911. — Northeast of this line, in scattered localities to the coast: many; northwards to Rockingham Bay, *c.* 18°11'S: *F. von Mueller*, fr.

Distribution. Australia: along the northwestern coast north of Shark Bay; in the northeastern parts of the continent, roughly bordered by a line from Joseph Bonaparte Gulf to Newcastle in New South Wales (not recorded from Arnhem Land and from the Cape York Peninsula).

Ecology. Rare or locally common, on sands, grey and red soils, also on heavier gravelly soil, sometimes on limestone or on seasonally flooded land, in monsoon forest, eucalypt forest, or open situations. Apparently fertile throughout the year.

Use. A. C. Boyle gives the following note to a specimen of this 'true splitarse': "fruit splits into two segments and is much sought after by both blacks and whites. Personally I did not like it".

Notes. 1. *Capparis chrysomeia* Bojer from Madagascar seems very near to *C. lasiantha*; its gynophore is hairy towards the base only.

2. The Geneva duplicate, which must be the holotype, bears no number. In Kew there are two specimens, *R. Brown 70*, inscribed "Capparis canescens Broad Sound No. 70 descr." in Brown's hand, and *R. Brown 4930*, not further by him annotated. The specimens look like duplicates from the same plant; 70 might have been a field number. If this is true, which I think likely, then all this material, collected between 1802 and 1805, belongs to one collection.

3. In *Humbert 5093* from Madagascar, identified as *Capparis richardi* Baill., which could be examined by me, the hairs remain red-brown throughout, the leaves are *c.* 0.6—1 cm wide, the midrib flat above, the flowers in rows of 2—4, the sepals 3—6 mm, the petals *c.* 4—8 mm, the stamens 10—15, the placentas 4. The fruits seen in other Paris specimens of this species are 3 cm Ø, globose. The bended twigs, the one slightly saccate sepal, the basal hairiness of the gynophore, and other overall resemblances suggest its being near *C. lasiantha*, but African material should be examined before the matter can be solved.

34. Capparis lobbiana Turcz., Bull. Soc. Nat. Moscou 27, 2 (1854) 323; Jacobs, Fl. Mal. I, 6 (1960) 79, f. 13. — Type: *Lobb 467* (BM, CGE, FI, G, K, W; the holotype in Turczaninow's herbarium not seen), Malesia, "Java", actually Luzon, fl. 1849.

C. sepiaria var. *acuta* Vidal, Rev. Pl. Vasc. Filip. (1886) 47. — Type: *Vidal y Soler 24* Malesia, Luzon, Sipcot, fl.

C. littoralis Merr., Philip. J. Sc. 7 Bot. (1912) 270; En. Philip. 2 (1923) 211. — Type: *Curran FB 11111* (L, phot., US), Malesia, Luzon, Tayabas Prov., fr. IV. 1908.

C. loheri Merr., Philip. J. Sc. 7 Bot. (1912) 270; En. Philip. 2 (1923) 211. — Type: *Loher 6787* (*n.v.*, PNH?), Malesia, Luzon.

C. palawanensis Merr., Philip. J. Sc. 10 Bot. (1915) 304; En. Philip. 2 (1923) 212. — Type: *Merrill 9459* (A, BM, BO, GH, K, L, P, SING, US), Malesia, Palawan, Lake Manguao, fr. IV. 1913.

C. ilocana Merr., Philip. J. Sc. 13 Bot. (1918) 13; En. Philip. 2 (1923) 211. — Type: *Ramos BS 27120* (K, L, phot., P, US), Malesia, Luzon, Burgos, fl. II/III. 1917.

Climber 1½—4 m. Twigs slender, densely set with patent, straw-coloured hairs up to ½ mm long, rarely almost glabrous or soon glabrescent; the leaves sometimes in two rows.

Fig. 28. *Capparis longestipitata* Heine, × $^{2}/_{3}$ (from *Chevalier 38671*).

Thorns straight, 2(—5) mm, slender, pointing upwards, rarely downwards. Petiole 2—4(—12) mm. *Leaves* herbaceous, (1.5—)1.8—2.5(—4.3) times as long as wide, widest below to rarely about the middle, 4—8(—15) by 2—3½(—5) cm; base cuneate, sometimes rounded, rarely acute, top narrowed, acute to acuminate, often mucronate; midrib shallowly sunken in the basal part, yellowish, sparsely hairy underneath, nerves 6—8 pairs, thin, reticulation often obscure; surfaces mostly dull, glabrous or sparsely hairy above, hairy beneath, especially on the nerves. *Subumbels* axillary, the peduncle ½—6 cm, slender, sometimes bearing one or a few small leaves, hairy; pedicels slender, 1½—3 cm, mostly sparsely hairy; bracts small, subulate. *Flowers* white or pale pink. *Sepals* persistent for a short time, ± equal, concave, orbicular, thin, outer pair 5—6 mm diameter, herbaceous, mostly hairy, inner pair 6—7 mm diameter, thinner, ciliate. *Petals* ovate, 2—4 by 2½—3 mm, ciliate. Stamens 15—60, 8—12 mm long. Torus small. *Gynophore* 1½—3(—4¾) cm, glabrous; ovary ovoid, ± 2 mm long, glabrous, stigma obscure, placentas 2. *Fruit* on a stalk only slightly incrassate, globose, ± 1½ cm diameter, pericarp leathery, thin, smooth, glossy, blackish. Seeds few, ± 5 mm long.

PHILIPPINES. Batan, 20°25'N 122°E: *Ramos BS 80430.* — Babuyan Is. Dalupiri: *Bartlett 15162.* — Luzon, various provinces: many. — Mindoro. Paluan: *Ramos BS 39726.* Mount Yagaw: *Sulit & Conklin PNH 17613.* — Palawan. Lake Manguao: *Merrill 9459.* — Mindanao. Cotabato Prov. Buayan: *Ramos & Edaño BS 85132.* Nutol: *Ramos & Edaño BS 85241.*

Distribution. Malesia: Philippines (not known from the Sulu Archipelago).

Ecology. Prefers dry, rocky soil; primary forests, bamboo thickets, etc., below 600 m.

Notes. 1. A variable species; differs at first sight from *C. lanceolaris* by the straight thorns.

2. *Capparis palawanensis* represents a form with very large leaves, but intergrades occur. *Capparis littoralis* represents a glabrous form; in some specimens of common *lobbiana* the leaves are also soon glabrescent. Material of *C. ilocana* is poor; it seems to represent another glabrous paramorph with vestigial thorns and subcoriaceous leaves.

35. **Capparis longestipitata** Heine, Mitt. Bot. Staatss. Münch. Heft 6 (1953) 210; Pfl. Samm. Clemens (1953) 41; Jacobs, Fl. Mal. I, 6 (1960) 77. — Type: *Clemens 29812* (A, BM, BO, G, K, L, M, holo), Malesia, North Borneo, Mt Kinabalu, Tenompok 1500 m, fl. VIII. 1932. — **Fig. 28.**

Innovations greyish puberulous, glabrescent. *Thorns* recurved 3—4 mm, or wanting. Petiole ± 1 cm, hairy as the twig. *Leaves* firmly herbaceous, oblong to slightly obovate, 5—7 by 2½—3½ cm, base rounded, top acuminate with ½—1½ cm long, acute tip; midrib sunken in the basal part, sometimes hairy below, nerves 5—7 pairs thinly prominent on both surfaces, reticulation distinct, surfaces glabrous. *Subumbels* ± 15-flowered, in the axils of the higher leaves and some terminal, ± 1½—2½ cm pedunculate; pedicels 8—15 mm, on small distinct sort of cushions; bracts subulate, few mm long, very soon caducous. *Buds* globose, 3—5 mm diam. Outer pair of *sepals* 3—5½ by 3—4 mm, densely greyish puberulous outside, inner pair sometimes smaller, flattish. *Petals* white, 4—6 by 2 mm, glabrous or pubescent. Stamens 18—30, ¾—2 cm. *Gynophore* 2—3 cm, glabrous, ovary subovoid, 1½ mm long, glabrous. *Fruit* only known when very young, probably globose and smooth.

INDO-CHINA. Annam, Prov. Nhatrang, *c.* 12°15'N 109°E, Hon Ba Massif, 1000 m: *Chevalier 38671.* BORNEO. North B. Mount Kinabalu, 6°03'N 116°32'E, 1500 m: *Clemens 29812.*

Distribution. Both sides of the South China Sea: in SE. Annam and North Borneo.

Ecology. In forest, 1000—1500 m.

Notes. 1. Differs from *C. cantoniensis* in its longer gynophore and its midrib being only sunken in the basal part, from *C. lanceolaris* in the smaller flowers. To both it is very near.

2. There are slight differences between the Annam and the Borneo material; see Fl. Mal. I, 6: 77.

3. Part of the flowers of the type specimen seem to have developed defectively and such ones may have served for the measurements recorded by Heine.

36. Capparis mekongensis Gagn., Bull. Soc. Bot. Fr. 55 (1908) 213; Fl. Gén. I.-C. 1 (1908) 192. — Type: *Thorel 3257* (P), Indo-China, Laos, Vientiane, buds 1866/1868.

Small tree. Twigs slender, terete, densely fulvous pubescent, pale yellowish. *Thorns* none. Petiole 8—10 mm. *Leaves* herbaceous, about twice as long as wide, widest about the middle or below, 7—11 by 3½—6 cm; base acute, top blunt; midrib slightly depressed or flattish, nerves some 7—8 pairs, thin, reticulation thin and rather obscure; surfaces dull, above sparsely puberulous but densely on the midrib, underneath evenly densely puberulous all over. *Panicles* terminal, hairy as the twigs, some 30 cm long and 17 cm wide in all, consisting of several smaller long-stalked panicles of which the lower ones are subtended by a leaf; these panicles consisting of several racemes bearing 4—8 flowers, subumbel-like bracts subulate, 1—3 mm, soon caducous, pedicels ± 1—1½ cm, slender. *Flowers* only known in bud. *Sepals* subequal, strongly concave, thinly puberulous outside, glabrous inside, outer pair herbaceous, 4 by 2 mm, inner pair very thin, 3½ by 3 mm. *Petals* obovate, 4 by 2 mm (at least), glabrous. Torus 1½ mm wide. Stamens about 20. *Gynophore* 5 mm or longer, glabrous, ovary ± 1½ mm long, ovoid, glabrous, placentas 3(—4?). *Fruit* unknown.

Distribution. Asia: Indo-China (Laos, see Note 2).

Notes. 1. The drafted flower analysis which Gagnepain attached to the holotype sheet is in some respects contradictory to the descriptions later published by him. So in the original description (1908, 213) he says that the petals are hairy at the base, that there are 20—30 stamens, and 3—4 placentas. In his pencil analysis he says that the petals are glabrous, that there are 19 stamens and 3 placentas. As far as I could verify from the immature material, the data of this analysis are correct. In the published description he gives 7—8 by 4—5 cm for the leaves and 10—15 mm for the petiole, which is not correct. Also his figure of 15 mm for the filaments seems too high. In Gagnepain's second description the stamens have become 30 in number, and the placentas 4; I don't know how.

2. Gagnepain gives for the one collection that is known of this species, no less than 6 localities, all of them in Laos, but some pretty far apart. I have seen 2 sheets only, obviously taken from the same plant. The holotype sheet bears "Vien-Chang" as a locality, (which is Vientiane) the other "Nong-kay".

3. *Capparis mekongensis* var. *crispata* Craib, Kew Bull. (1922) 170 is *C. grandis;* see there, Note 3.

37. Capparis micracantha DC. — *C. bariensis* Pierre *ex* Gagn. (37a). — *C. billardieri* DC. (37a). — *C. callosa* Bl. (37a). — *C. donnaiensis* Pierre *ex* Gagn. (37a). — *C. finlaysoniana* Wall. *ex* Hook. *f.* & Th. (37c). — *C. flexuosa* Bl. (37a). — *C. forsteniana* Miq. (37a). — *C. hainanensis* Oliv. (37a). — *C. henryi* Matsum. (37b). — *C. korthalsiana* Miq. (37c). — *C. liangii* Merr. & Chun (37a). — *C. myrioneura* Hall. *f.* (37a). — *C. petelotii* Merr. (37a). — *C. odorata* Blanco (37a). — *C. roydsiaefolia* Kurz (37a). — *C. venosa* Merr. (37a).

KEY TO THE INFRASPECIFIC TAXA

1. Stamens fewer than 60(—75). Ripe fruit (sub)globose. Sepals mostly obtuse. . . ssp. **micracantha**
   2. Stamens more than (16—)20. Thorns 2—4 mm . . . . . **37a.** var. **micracantha**
   2. Stamens 12—16. Thorns 6—7 mm. Formosa. . . . . **37b.** var. **henryi**
1. Stamens 60—100. Ripe fruit elongate, acute. Sepals acute to acuminate. West Malesia. **37c.** ssp. **korthalsiana**

37a. ssp. **micracantha** var. **micracantha.** — *C. micracantha* DC., Prod. 1 (1824) 247; Blume, Bijdr. 2 (1825) 52; Spreng., Syst. Veg. 4, 2 (1827) 204, miscopied "*micrantha*", *non* A. Rich.; Miq., Fl. Ind. Bat. I, 2 (1858) 99; Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 179; Kurz, For. Fl. Burma 1 (1877) 61; Radlk., Sitz. Ber. Bayer. Ak. Wiss. 14, 1 (1884) 118—132; Brandis, Indian Trees (1906) 36; Merr., Philip. J. Sc. Suppl. 1 (1906) 58; Backer, Fl. Batav. (1907) 57, incl. "var. *callosa* (Bl.) Hall. *f.*"; Gagn., Fl. Gén. I.-C. 1 (1908) 186; Ridl., Fl. Mal. Pen. 1 (1922) 123, f. 11; Merr., En. Philip. 2 (1923) 212; Parkinson, For. Fl. Andamans (1923) 82; Craib, Fl. Siam. En. 1 (1925) 82; Merr., Philip. J. Sc. 29 (1926) 317; Lingn. Sc. J. 5 (1927) 83; Sasaki, Cat. Govt. Herb. Taihoku (1930) 230 ("var. *candolleana* Wall. *f.*"); Merr. & Chun, Sunyatsenia 2 (1934) 30; Gagn., Fl. Gén. I-C. Suppl. 1 (1939) 162; Jacobs, Fl. Mal. I, 6 (1960) 85, with map; Back.& Bakh. *f.*, Fl. Java 1 (1964) 185. Not of Blanco, Fl. Filip. 2nd ed. (1845) 305; 3rd ed. (1878) 200, t. 188, which is *C. zeylanica.* — Type: *Lahaye s.n.* (G-DC, holo; P), Malesia, Java, fl.

C. billardierii DC., Prod. 1 (1824) 247; Miq., Fl. Ind. Bat. I, 2 (1858) 99. — Type: *hb. Desfontaines (n.v.)*, Malesia, Moluccas, Buton, fl.

C. callosa Blume, Bijdr. 2 (1825) 53; Miq., Illustr. (1870) 29, t. 16; Naves in Blanco, Fl. Filip. 3rd ed. (1877—1883) t. 180. — Type: *Blume 1560* (L), Malesia, Java, Linggadjati ("Linga jattie"), fl. fr. X.

C. flexuosa (*non* L., *nec* Vellozo) Blume, Bijdr. 2 (1825) 53.

C. odorata Blanco, Fl. Filip. (1837) 439; Merr., Philip. J. Sc. 3 Bot. (1908) 77. — Type unknown.

C. forsteniana Miq., Illustr. (1870) 32, t. 18; Hall. *f.*, Bull. Herb. Boiss. 6 (1898) 343. — Type: *Forsten 324* (L), Malesia, NE. Celebes, Belang, fr. X. 1840.

C. roydsiaefolia Kurz, J. As. Soc. Beng. 39 ii (1870) 62; For. Fl. Burma 1 (1877) 61; Gagn., Fl. Gén. I.-C. 1 (1908) 196. — Type: *Teijsmann HB (n.v.)*, Siam.

C. hainanensis Oliv., Hook. Ic. Pl. 16 (1887) t. 1588; Merr., Lingn. Sc. J. 5 (1927) 83. — Type: *B. C. Henry 7* (K), China, Hainan, fl. III.

Capparis sp. Williams, Bull. Herb. Boiss. ii 5 (1905) 24. — *Schomburgk 107, 108.*

C. myrioneura Hall. *f.*, Fedde Rep. 2 (1906) 60, excl. var. *latifolia* and *Koorders 16341*, which are *C. pubiflora.* — Type: *Teijsmann 5773* (BO), Malesia, NE. Celebes, Menado, st.; see Note 11.

C. bariensis Pierre *ex* Gagn., Bull. Soc. Bot. Fr. 55 (1908) 209; Fl. Gén. I.-C. 1 (1908) 188. — Type: *Pierre 38* (A, BM, BO, K, L, P), Indo-China, Cochin-China, Mt Dinh, Baria, fl. III. 1867.

C. donnaiensis Pierre *ex* Gagn., Bull. Soc. Bot. Fr. 55 (1908) 211; Fl. Gén. I.-C. 1 (1908) 186. — Type: *Pierre 4012* (K, P), Indo-China, Cochin-China, Bien-hoa, Tan-man, fl. III. 1877.

Capparis sp. Ridl., J. Str. Br. As. Soc. 59 (1911) 69; see Note 4.

C. venosa Merr., Philip. J. Sc. 10 Bot. (1915) 305; En. Philip. 2 (1923) 213. — Type: *Whitford FB 14216* (PNH?), Malesia, Mindanao.

C. liangii Merr. & Chun, Sunyatsenia 2 (1934) 29. — Type: *Ko 52177* (A, K, P), China, Hainan, Po-ting, fl. IV. 1932.

C. petelotii Merr., J. Arn. Arb. 23 (1942) 166. — Type: *Pételot 2618* (A), Indo-China, Tonkin, Mt Bani, fl. VII. 1940.

Stout shrub or small tree, rarely climbing, 2—6(—10) m; trunk greyish, finely fissured and set with small knobs each surmounted by a thorn; branchlets when young sparsely pubescent. Shoots at the base surrounded by cataphylls. *Thorns* 2—4(—7) mm long, patent or directed upwards, straight or slightly curved. Petiole 6—10(—15) mm. *Leaves* (sub)coriaceous, glabrous, 1.7—2.9(—4.1) times as long as wide, mostly broadest about halfway, sometimes below, or rarely above the middle, 8—24(—32½) by 4—9(—12½) cm; base mostly rounded, sometimes blunt to subcordate or acute, top broader or narrower rounded, sometimes slightly emarginate, or acute, rarely acuminate, dark-tipped; midrib subprominent above, nerves 5—7(—10) pairs, reticulation distinct; surfaces light green when dry. *Flowers* up to 6, serial. Pedicels 1(—2) cm. *Sepals* subequal, firmly herbaceous, 5½—13 by 2½—5½ mm, ± boat-shaped, ovate to oblong, the margins mostly hairy. *Petals* oblong to lanceolate, 10—25 by 3—7 mm, white, honey-guide yellow, turning dark red or brownish, or dark violet. Stamens *c.* (16—)20—35(—75); filaments 18—30 mm. *Gynophore* 15—30(—35) mm, glabrous, ovary ovoid to ellipsoid, *c.* 3 by 2 mm, glabrous, exceptionally hairy but soon glabrescent, placentas 4, in some flowers the gynoecium vestigial. In fruit the gynophore 4—6 mm diam., the pedicel thinner. *Fruit* globose to ellipsoid, with 4 longitudinal sutures, 3—6½ by 3—4½ cm, yellow, orange, or red; pericarp smooth, 2 mm thick, when dry woody-coriaceous, pulp juicy. Seeds *c.* 6—8 by 4½—7 by 3—5 mm, red to shiny black.

BURMA. Lower B. Distr. of Sandoway, 18°28'N 94°20'E: *Parkinson 8868*. Karen Country (?= Karenni, *c.* 18°N 97°E): *Kurz*, st. Delta of the Irrawaddy: many. — South B., various localities: many. ANDAMAN ISLANDS: *Parkinson 180, 1015*. Middle Andaman: *Ram 3783*. CHINA. Yunnan. Manhao, 23°02'N 103°14'E: *Handel-Mazzetti 5828*. HAINAN: many. INDO-CHINA. Tonkin. West T.: *Bon 5984*. Mount Bani, *c.* 21°N 105° 30'E: *Fleury hb. Chevalier 37778*; *Pételot 2618*. Phu-ly: *d'Alleizette*, fl. VII. 1908. — Laos. Darlac: *Schmid 929*. Mine Bartholome, vill. San: *Mme Coléni hb. Pételot 4438*. Vientiane area: *Vidal 811, 2639*. Paklay: *Vidal 2129*. — Annam. Quangtri: *Poilane 10917*. Hue: *Harmand hb. Pierre 1833*; *Squires 352*. Nhatrang area: several. Ca Na: *Poilane 5895, 6013, 12553*. Bimh-che: *Poilane hb. Chevalier P 130*. — Cambodia, various localities: many. — Cochin-China: many. SIAM. North S. Near Lampun, 18°36'N 99°02'E: *Kerr 2571*. Lampang, 18°16'N 99°30'E: *Winit 1630*. Phrae, 18°07'N 100°09'E: *Tum Thapthimthawng 15=RFD 6985*. — South of this line: many localities. MALAYA. Perlis: several. — Langkawi Is: several. — Kelantan: *Curtis*, yfr. II. 1893. — Kedah: several. — Kelantan: *Corner*, fr. IV. 1937; *Ridley*, fl. II. 1917. — Trengganu: *Holttum SF 15190*; *Yapp 312*. Kp. Padang Negara: *Sinclair SF 39811*. — Johore: Dayang I. (*n.v.*): *Fielding*, fl. X. 1892. SUMATRA. South S. Ranau Lake, 5°S 104°E: *Forbes 2101*. JAVA. Pulau Penaitan: *van Borssum Waalkes 258, 452, 652*. — West, Central, East: many each. — Kangean Is: several. — Madura: several. LESSER SUNDA ISLANDS. Bali, Lombok, Sumbawa, Komodo, Flores, Alor, Timor, altogether: many. — Wetar: *Elbert 4655*; *Riedel*, fl.; *Treub*, fl. 1893. BORNEO. North B., in various places along the coast: several. — ?Brunei. Tampakan: *Apostal FD 5916*. — Banggi I.: *Castro & Melegrito 1640*; *Kloss SF 19237*. PHILIPPINES: many. CELEBES: many. — Buton: *La Billardière*, fl.; *Ventenat*, fl. MOLUCCAS. Halmaheira: *de Vriese & Teijsmann*, fr. 1859/60.

Distribution. Asia: from Lower Burma to Yunnan near the Tonkin border and to Hainan; throughout the Indo-Chinese Peninsula southwards to northeastern Malaya. In Malesia surrounding the western everwet area: Philippines, coast of North Borneo, Celebes, Halmaheira; in the Lesser Sunda Islands eastwards to Wetar and Timor; westwards to Sunda Straits and southern Sumatra.

Ecology. Light shade of monsoon forest, teak, or evergreen forest, on dry, often calcareous soil, also in thickets, savannahs, hedges, etc., not seldom coastal, mostly in the lowlands, highest record 1400 m. Main flowering seasons: Burma and Andamans, February; Siam, February-March; Indo-China, March; Hainan, April; Malesia, throughout the year. The fruits seem to be ripe 2—3 months later.

Anatomy. Raghavan investigated the vascular supply of the floral parts in a '*C. flexuosa*' from Java, cultivated at Kew (the plant was no longer living in 1959) (J. Linn. Soc. Bot. 52, 1939, 247).

Molisch stated that nearly all the parenchyma cells of the petiole, the leaves, and the stem contain a strongly refractive crystal of lime. Also bodies of silicon are sometimes found (Ber. Deut. Bot. Ges. 34, 1916, 154—160).

Notes. 1. Vegetatively sometimes resembling *C. zeylanica*, but this species has recurved thorns, those in *C. micracantha* being straight.

2. *Koorders 16341* from NE. Celebes is a paratype of *C. myrioneura* Hall. *f.*; the plant is sterile but belongs most probably to *C. pubiflora.*

3. Under *C. forsteniana*, Miquel cites a Zipelius specimen from Timor, with the MS. name *C. ovalifolia.* This is an entirely glabrous old twig of *C. zeylanica.* Another specimen cited by Miquel, collected by Forsten in Celebes (on the label only "Gorontalo - Capparis Forsteniana v.") also belongs to *C. zeylanica.*

4. Ridley, under "*Capparis sp.*", refers to a Keith specimen from Bangtaphan, Lower Siam. *Keith 86*, from that place, belongs here; it is the only *Capparis* of this collector. Ridley left no inscription on the sheet and his remarks do not quite agree with the plant, but this could be the specimen he intended.

5. A number of species has been described, based on specimens representing extremes of the variability range of this polymorphic species. It has appeared that, except for var. *henryi* and ssp. *korthalsiana*, all characters supposed to hold good for the distinction of paramorphs, intergrade. Often this is due to environmental influence. A good example is found in material from Hainan, from where *C. liangii* and *C. hainanensis* have been described. There is plenty of material from this island, and mostly with field notes. The majority of the specimens have the following characters: thorns wanting, leaves 14—21 (—25) by 6—8(—9) cm, buds ± 6—10 mm long, stamens (16—)18—22(—28). This description applies to *C. liangii* Merr. & Chun. It appears that all these specimens were collected in forest, and that they are undistinguishable from material of similar habitats in West Java.

The plant, described as *C. hainanensis* Oliv. has small leaves (that is, on the apical part of the twig that is available) of 8¼ by 3½ cm. Thorns slightly recurved, 2 mm long, flowers supra-axillary, solitary, with 1—2 bundles of cataphylls between the pedicel and the petiole; pedicel vigorous 2 cm. Sepals subequal, 14—15 by 5 mm, the inner pair with felty margin; petals *c.* 20 mm long; gynophore 34 mm.

The impression was gathered that this plant would belong to the *brevispina*-Group (Oliver himself suggested affinity to *C. heyneana*, our *C. baducca*), but the vegetative parts, even with the slightly recurved thorns, leave no doubt of the identity. A few specimens intergrade between the type of *C. hainanensis* and the commoner forms of *C. micracantha.* As far as field notes are available, such small-leaved specimens (leaves 7—12½ cm long, sepals *c.* 10 mm long, stamens 60—75) are all from open habitats.

From Indo-China 3 species have been described. The first is *C. bariensis*: thorns small or wanting, leaves ± 11—15 cm long, mostly obovate, buds ± 5—6 mm, stamens ± 16, ovary minutely hairy, soon glabrescent. The second is *C. donnaiensis*: thorns mostly wanting, leaves ± 20—28 cm, mostly lanceolate, buds ± 6—12 mm, stamens ± 60. The third is *C. petelotii*: thorns wanting, leaves up to 32½ by 12 cm (nerves no more than 9 pairs), buds ± 10 mm, stamens ± 30. All these characters intergrade, except, of course, the indumentum on the ovary in *C. bariensis* (the gynophore is always glabrous), which is a qualitative character. But not seeing any character correlated with this, I regard it as a mere variation.

6. In E. Java I found the leaves darkish green above and below, nerves light green above, yellowish below; young leaves glossy green. In the daytime, the flowers are fully open, odourless, the sepals patent, green; the petals white, the upper pair bearing in the basal median part inside a yellow spot which turns yellow-brown and finally dark blood-red; the disk produces sweet nectar; the filaments are white, anthers light grey; gynophore white, ovary green with dull purple stigma. The flower buds were frequently visited by ants. Fruits were not seen.

7. In *Kerr s.n.* (BM), st. 15. III. 1928 from Satul in Peninsular Siam, the leaves are 16½ by 1½—2 cm. The patent thorns, the tinge of the leaves, the venation, and the bundles of cataphylls in a supra-axillary row determine the identity.

8. *Rollet 968* (P) from Cambodia, 2 km from Bo Keo towards Stung Trang, is vegetatively, as far as the bad condition of the leaves reveals, perfectly like *C. micracantha*, including the supra-axillary serial bundles of cataphylls. There is, however, one flower which is supra-axillary on a glabrous pedicel 13 mm. The calyx is like in *C. micracantha*: sepals subequal, ovate, acute, 15 by 6 mm, glabrous with tomentellous margin. Petals somewhat rectangular-obovate, 50—53 by 23 mm, glabrous. Stamens *c.* 73. Gynophore 27 mm, glabrous, ovary *c.* 6 by 2 mm, including a short beak, glabrous, placentas 4.

The specimen deviates from *C. micracantha* in the solitary flower with the enormous petals. As efforts to obtain more material have been in vain, it is placed here awaiting more data.

9. *Capparis billardierii*, *C. flexuosa*, and *C. roydsiaefolia* were described on specimens in which the gynoecium is abortive.

10. Radlkofer's section *Monostichocalyx* comprised *C. flexuosa*, *C. callosa*, and *C. micracantha*, all conspecific and not deserving a higher rank.

11. I have not found *Teijsmann 5773* from Celebes, Menado, indicated by Hallier *f.* as the type of *C. myrioneura*. However, *Teijsmann 5873* (in BO and CAL sterile, in K and U fruiting) from that same locality, is *C. micracantha*. Hallier described only sterile Bogor material. By the assumption of a printing error of 7 for 8, the whole case would be explained.

37b. var. **henryi** (Matsum.) Jacobs, *stat. nov.* — *C. henryi* Matsum., Bot. Mag. Tokyo 13 (1899) 33(*n.v.*); Matsum. & Hay., J. Coll. Sc. Tokyo 22 (1906) 26, t. 3; Hay., Ic. Pl. Formos. 1 (1911) 33; 3 (1913) 21; Li, Woody Fl. Taiwan (1963) 235, f.86. — Type: *A. Henry 570* (A, BM, E, K, L, phot., P, TI, holo; US), China, Formosa, Takow, fl.; see Note 2.

Shrub *c.* 2 m. *Thorns* 6—7 mm, straight or slightly curved upwards. Petiole ¾ cm. Leaves 8—12½ by 3¾—5½ cm, slightly ovate to slightly obovate, upper part rounded. Pedicels 2—5 in a row, ¾(—1) cm, sparsely puberulous, soon glabrescent. *Flowers* often developing on the young parts of the twigs before the leaves. Buds ovate, acute, 5 mm long. Petals *c.* 11—12 by 3—3½ mm, puberulous on both sides, especially towards the top. Stamens 12—16, 20—25 mm long. *Gynophore* 18—20 mm, ovary 2½ mm. *Fruit* unknown.

FORMOSA. *Tashiro A63.* Botan-sha: *Miyake*, st. I. 1900. Kontei: *Hayata*, yfr. 1912. Kural: *Hayata*, fl. III. 1912. Koshun Prov.: *Wilson 10989*; *A. Henry 579* (= *Playfair 220*); *Faurié 502.* Between Pau-lyau and Fon-kang: *Owatari*, fl. III. 1898. Taihauro River: *Price 581.*

Distribution. Asia: endemic in Formosa.

Note. 1. Except for the low number of stamens, all characters of this variety are found among the great complex of forms that has to be designated as the 'typical variety'. Nevertheless is the combination conspicuous, and restricted to Formosa.

2. *A. Henry 570* seems to have been thoroughly mixed up with *Playfair 220*, for the material, or notes, or both. The material seems homogeneous, and mostly Henry is cited as the collector, except on a scrap in the Kew Herbarium which reads "220 Apes Hill. Small shrub. Fl. white & yellow" and another "Taiwan 1/89. Comm. Playfair" followed by illegible initials. It does not appear from Henry's account in Kew Bull. (1896) 66 that his and Playfair's collections were merged; the latter sent his material to the British Museum.

35c. ssp. **korthalsiana** (Miq.) Jacobs, Fl. Mal. I, 6 (1960) 86, with map. — *C. korthalsiana* Miq., Illustr. (1870) 31, t. 17. — Lectotype: *Korthals s.n.* (L), Malesia, southeastern Borneo, Pulu Lampei, fr.

C. finlaysoniana Wall. *ex* Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 179; King, J. As. Soc. Beng. 58 ii (1889) 395; Ridl., Fl. Mal Pen. 1 (1922) 124; Kew Bull. (1925) 77. — Type: *Wallich hb. 6992B* (K), Malesia, Malaya, Singapore, yfr. X. 1822.

Climber 6—9 m. *Fruit* oblong, *c.* 6—17 by 2½—3¾ cm, tapering to the top and sometimes to the base, "rich red and yellow, 4-cornered". *Leaves* acuminate, not mucronate, mostly recurved, never cordate at the base. Sepals very acute and slightly cucullate at the top, the buds therefore (sub)acuminate. *Flowers* comparatively large. Stamens very numerous (up to 100).

SUMATRA. Central S. West Coast Residency, *c.* 0°101°E: *Korthals*, fl. — South S. Bengkulu, *c.* 3°S 102°E: *Brooks 7614*. Lampongs: *Zollinger*, fl. 20. IX. 1845. MALAYA. Perak: *King's coll. 10521*. Ulu Bubong: *King's coll. 10690*. — Pahang. Rumpin: *Yeop CF 3178*. — Johore. Masai: *McCaul SF 38407*. — Singapore: several. BORNEO. Sarawak. Dulit (?Range, *c.* 3°20'N 114°E): *Native coll. 2564*. Mount? Kowon: *Haviland 1723*. — South Kalimantan. Area of Banjarmasin, *c.* 3°30'S 115°E: *Korthals*, fl. 1836, fr. 1836; *Motley 914*.

Distribution. Malesia, in the western everwet area: the southern half of Sumatra and of Malaya; southwestern half of Borneo.

Notes. 1. Much about the rank and delimitation of this paramorph must remain tentative. The shape of the fruit and the number of stamens are good distinctive characters; when these are present, the leaves and sepals are also acuminate. However, especially in Java, a considerable variability is found in the tops of leaves and sepals of ssp. *micracantha*, which in these characters then sometimes resembles ssp. *korthalsiana;* such specimens were often identified by earlier botanists as *C. callosa* or *flexuosa*. Unfortunately are fully mature fruits of this species from Java unknown; the immature fruits from there are sometimes slightly elongate. The Java plants, however, have always the number of stamens normal for ssp. *micracantha*. For the time being, it seems better to bring all the Java material to ssp. *micracantha*.

The areas of both subspecies, thus defined, overlap slightly, but not much. The ssp. *korthalsiana* then seeks the everwet rain forest area of Sumatra, S. Malaya, and Borneo, avoided by ssp. *micracantha*. Unfortunately there are no field notes indicating the ecological claims of ssp. *korthalsiana*, but it is quite possible that this prefers wetter forest than ssp. *micracantha* does.

2. Vegetatively, there is a resemblance with *C. buwaldae* and *C. cucurbitina;* see there.

38. Capparis monantha Jacobs, *sp. nov.* — Type: *Marcan 2601* (ABD, BM, holo), southwestern Siam, Pran, Ban Pak Tawan, fl. 25. II. 1931.

Innovationes stellato-tomentellae. Spinae rectae, patentes. Folia coriacea, ovata, 5½—6 cm longa 2½—3 cm lata, basi rotundata apice acuta mucronulata supra glabra nitida. Flores solitarii breve pedicellati, sepalis c. 14 mm longis 6 mm latis, extus tomentellis intus

glabris, petalis 34 mm longis 16 mm latis, staminibus plus quam 46, c. 4 cm longis, gynophorio 21 mm tomentoso, ovario tomentoso 7 mm longo apicem 3 mm longum incluso, placentis 4. Fructus ignotus.

Shrub 1 m high. Twigs slightly zig-zag, at the base with very few cataphylls, when young greyish stellate-tomentellous, later glabrescent and densely verruculose. *Thorns* straight, patent or slightly directed upwards, 2½—4 mm. Petiole 4—5 mm. *Leaves* coriaceous, ovate, 5—6 by 2½—3 cm; base rounded or obtuse, top acute to gradually subacuminate, mucronulate; midrib subprominent, or depressed in the lower half, yellowish beneath, nerves 3—4 pairs under an angle of *c.* 45° with the midrib, subprominent on both sides, reticulation vague above, obscure beneath; upper surface glossy particularly when young, glabrous, olive-green in the dried state, lower surface yellow-green, dull, glabrescent, latest on the nerves. *Flowers* solitary axillary or terminal on short pedicel. *Sepals c.* 14—18 by 6—8 mm, inner pair somewhat wider and thinner than the outer pair, approximately obovate with acute top, tomentellous outside, glabrous inside. *Petals c.* 34 by 16—20 mm, obovate, all white and glabrous but the upper pair with an elongate yellow blotch and there laxly tomentellous. Stamens counted 46 but there may be more, *c.* 4 cm long. *Gynophore* 21 mm, golden-brown tomentellous all over; ovary 7—11 mm long including a 3—6 mm long beak, hairy as the gynophore, placentas 4, stigma capitate. *Fruit* unknown.

SIAM. Southwest S. Pran River area, *c.* 12°20'N 100°E: *Ladell 220*; *Marcan 2601*.

Distribution. Asia: endemic in a small area in SW. Siam.

Ecology. Limestone hill at 100 m.

Note. 1. Resembling *C. siamensis*, but there the leaf top is more obtuse, the nerves are depressed, the surface is dull, the flowers are smaller with petals hairy towards the top, and *C. annamensis*, but there the thorns are recurved, the leaves smaller and more rounded, the petals smaller.

39. Capparis moonii Wight, Ill. Ind. Bot. (1840) 35; Thw., En. Pl. Zeyl. (1858) 16; Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 175; Trimen, Handb. Fl. Ceylon 1 (1893) 62; Cooke, Fl. Pr. Bombay 1 (1901) 46; Brandis, Indian Trees (1906) 34; Talbot, For. Fl. Bombay Sind 1 (1909) 58, f. 37; Dunn in Gamble, Fl. Pr. Madras 1 (1915) 45; Blatter, J. Bomb. Nat. Hist. Soc. 31 (1927) 905; for var. *tomentosa*, see Note 2. — Type: *Wight s.n.* (K), India, Ceylon, fl. III. 1836.

Very large climber (Trimen), stem to 15 cm diam., or shrub 2—3 m tall. *Innovations* puberulous only in the very first, plant otherwise glabrous. Twigs dull purplish brown; tender shoots reported flagellate, unarmed, puberulous. *Thorns* recurved, 2—3 mm, rarely wanting. Petiole 8—15 mm. *Leaves* subcoriaceous, 1.9—3.2 times as long as wide, widest at or slightly below the middle, (6—)7½—16 by 3—5(—7) cm; base rounded to subcordate, top more or less rounded, with a short, blunt, leathery tip; midrib shallowly sunken, nerves some 6 pairs, thin, reticulation thin and rather indistinct. *Flowers* 8—10 cm across, conferted with up to 6 towards the top of a twig, the lower ones in a leaf axil; bracts not seen, apparently very soon caducous; pedicels vigorous, 2½—9 cm, angular and sometimes sparsely puberulous towards the top. *Sepals* 13—25 mm diam., outer pair very concave and glabrous, inner pair flattish and fulvous-puberulous outside. *Petals* white, obovate, 20—35 by 10—22 mm, pubescent inside towards the base. Torus 5—7 mm wide. Stamens ± 130—140, filaments white, turning brick-red. *Gynophore* 5½—9 cm, glabrous; ovary ovoid to ellipsoid, 3—4 by 2½—3 mm, glabrous, placentas 4.

In *fruit* the pedicel and the gynophore woody and incrassate to 5—6 mm, dull purplish brown. Fruit subglobose to ellipsoid, some 8½ by 5—8 cm to 12—13 by 10 cm (Puri & Jain), sometimes umbonate, pericarp 5—6 mm thick, smooth. Seeds about 17 by 13 by 11 mm.

INDIA SOUTH. Bombay. Khandala, 18°45'N 74°E: several. — North Kanara: many. — Coimbatore Distr.: *Horoyavaswami 5277*. Nilghiri Mts, *c.* 11°30'N 77°E: *Pierre*, fl. 1877. Anamallays: *hb. Beddome 232*. — Travancore. Aryankavu: *Bourdillon 915*. — Tinnevelly: *Barber 3135*. — Goodaloor (= Cuddalore, 11° 43'N 79°46'E): *Clarke 11329*.

Distribution. Asia: India, Deccan Peninsula, south of Bombay in the Western Ghats, and south of the 12th parallel also in the eastern part of Madras; Ceylon.

Ecology. Among clumps of jungle, in moist or even marshy soil (Wight), evergreen forest, "scattered in the moist forests particularly near the fringes", to 1350 m. Flowers December—March; fruits March—April to August. Apparently a rare plant. Several collectors refer to the beauty of the large white flowers.

Uses. Dr H. Santapau wrote me in 1961 that in the vicinity of Bombay "*Capparis moonii* is being used in the treatment of tuberculosis of the lungs and the reports seem to be satisfactory; I have not heard, however, that the alkaloidal or other principles have been extracted from the plant. For the last two or three years, most of the plants which I knew about Kandale have been cut down."

G. S. Puri & S. K. Jain wrote a brief communication, Bull. Bot. Survey India 2 (1960) 170—171, phot., also stating that the fruits are promising as a source for a medicine against tuberculosis. They refer to a paper by Shah & Sukkawala, Indian J. Pharm. 21 (1959) 305—307 (*n.v.*).

Notes. 1. It is not quite clear whether or not Wight based his name on a supposed misinterpretation of *C. grandis* Moon (1824) 41, a *nomen nudum* of which the specimen might be in Peradenya (see Trimen l.c.), but it is not an important question either, since Wight himself appointed a type.

2. The type specimen of var. *tomentosa* Blatt. & Hallb. in Blatt., J. Bomb. Nat. Hist. Soc. 31 (1927) 905, with tomentose twigs and leaves, collected at Sion Wood on Bombay I. was not seen by me, and according to Dr R. S. Rao of Poona (to author), it is possible that no type sheet for this variety has ever been maintained. In his opinion, the tomentose character is variable and the formation of a variety on such a character not appropriate. For this reason, I decided not to retain var. *tomentosa* as a taxon.

3. In *Barber 3135* the leaves are *c.* 12 by 2½ cm.

4. Living specimens have been examined by Dr R. S. Rao, Poona, who comments (in litt.; abbreviated) as follows. "The specimens were collected in February 1962 when the plants were both in flowering and fruiting stages. At N. Kanara (alt. 150 m) the flowering season had almost come to an end and young fruits were seen in abundance but at Khandala (alt. 700 m) flowering had just commenced. The discrepancy in the flowering period is mainly due to the higher altitude and cooler climate at Khandala. From a study of herbarium specimens it is not possible to differentiate the Khandala specimens from the N. Kanara ones. In nature, the N. Kanara forms are more robust, shrubby in nature, 2—3 m tall only, and the young parts of branches are sparsely tomentose, almost seemingly glabrous with the naked eye. The Khandala plants are extensive climbers wherever there is a good support; young branches are tomentose. The bushy nature of the N. Kanara plants can be explained because of their growth in exposed rocky hillocks with no large trees to lend them support.

The fruits of the N. Kanara form are scarlet when cut afresh, the colour deepening on

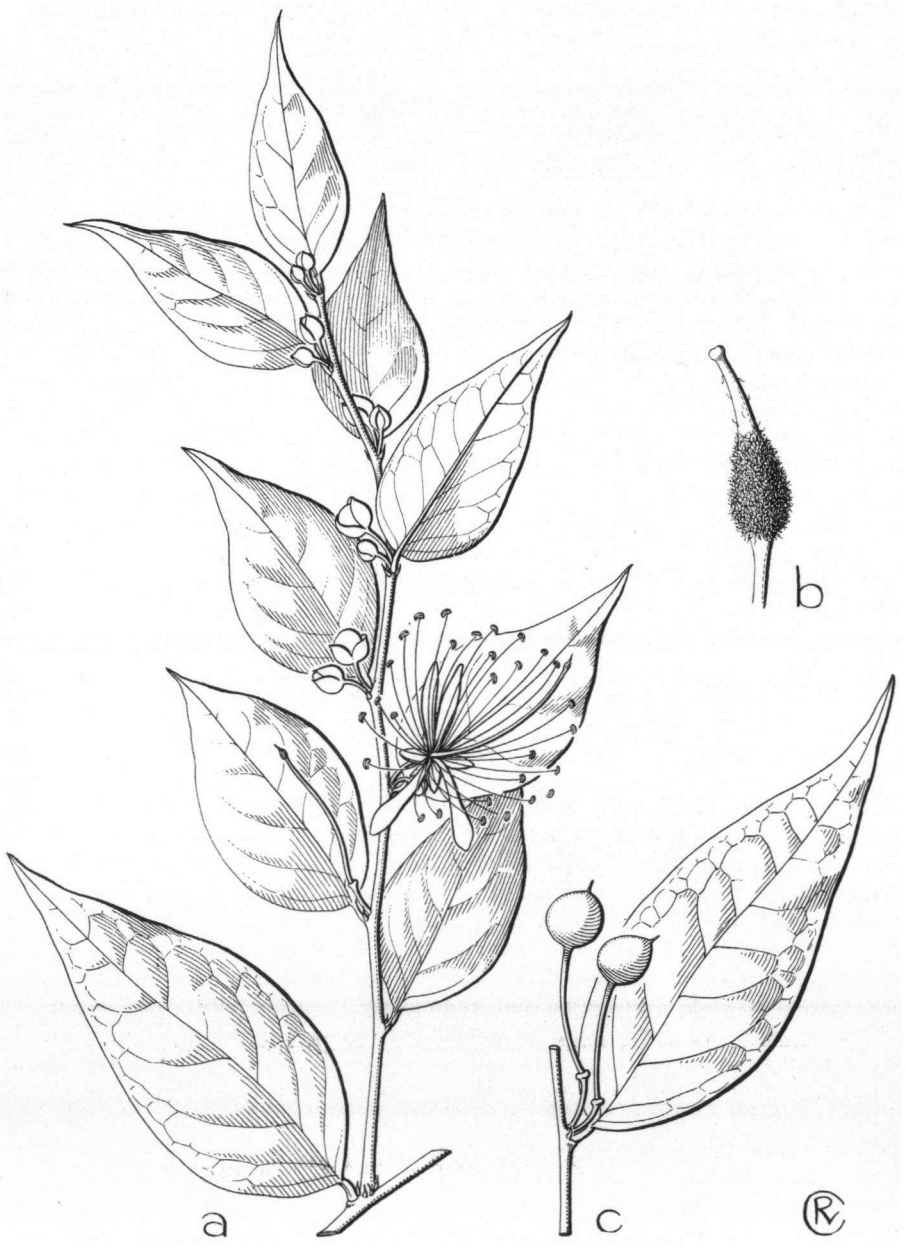


Fig. 29. *Capparis olacifolia* Hook. *f.* & Th. — a. Habit, × $\frac{2}{3}$, b. ovary, × 6, c. leaf with fruits, × $\frac{2}{3}$ (a, b from *Chatterjee s.n.*, c. from *T. Anderson s.n.*).

exposure to air. The Khandala fruits are whitish or pale rose when cut afresh but in a few minutes on exposure to sun and air, turn scarlet to the same intensity as the N. Kanara ones."

40. Capparis multiflora Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 178; Kurz, For. Fl. Burma 1 (1877) 61; Brandis, Indian Trees (1906) 36; Kanj. & Das, Fl. Assam 1 (1934) 36. — Type: *Griffith hb. East India Company 186* (K, holo; P), India, eastern Himalaya, Darjeeling, fl. yfr.

Shrub or tree up to 5 m, sparingly branched. *Indumentum* consisting of whitish balance-hairs on a very short stalk with more or less equal and often very long ends. Twigs slender; innovations soon glabrescent, the base with cataphylls. *Thorns* weak, ascending, 1 mm long, exceptionally wanting. Petiole 8—11 mm. *Leaves* herbaceous, (2.3—)3.0—3.7 (—4.4) times as long as wide, widest above or sometimes about the middle, 12—22(—28) by (3½—)4—6(—12) cm; base more or less tapering, cuneate to acute, top more or less tapering, gradually to abruptly acuminate, tip up to 1½ cm, blunt; midrib above very narrowly raised, nerves 7—10 pairs, fairly thin, reticulation distinct, lax; surfaces dull. *Flowers* white, sweet-scented, serial with 7—10 in a row ½—1 cm long, these generally subtended by a reduced subulate bract-like leaf 2—3 mm long with 2 minute adnate thorns, sometimes subtended by a normal leaf, hence the twigs being densely beset with flowers for a length of 10—20 cm between the previous and the latest flush of leaves. Pedicels filiform, 6—23 mm. Sepals 3—4 by 1½—3 mm, glabrous or sparsely puberulous, outer pair boat-shaped, ovate, obtuse, inner pair ovate to obovate, rounded, with wide membranous margin, puberulous at the top. Petals *c.* 6 by 3 mm, glabrous. Disk distinct, ¾ mm. Stamens *c.* 10—12. *Gynophore* 6—12 mm, glabrous; ovary ovoid, 1½ by 1 mm, glabrous or sometimes thinly puberulous, placentas 2, ovules few. Gynoecium sometimes abortive (Kanjilal & Das). Fruits 1—3 in a row, on a thin stipe, subglobose, *c.* 1 cm diameter, pericarp thin, blackish? Seeds 1—4, *c.* 8 by 6 by 4 mm.

INDIA NORTH. Eastern Himalaya. Sikkim, *c.* 27°30'N 88°10'E: many. Bhutan, *Gamble 7521*; *Haines 1071*. Southwest B. Dumsong: *Gamble 3904, 3905*. — Assam. Kameng Frontier Division, *c.* 27°30'N 92°40'E: several. Lakhimpur area: *Clarke 37955*; *Kanjilal 3665, 4387*. Siang area, *c.* 28°40'N 95°E: *Rao 17476*. Tirap Frontier Division, *c.* 27°30'N 96°E: *Deb 26150*. Naga Hills: *Bor 6352*. Cachar Hills, *c.* 25°30'N 93°20'E: *Prazer*, yfr. 1890. Manipur, *Watt 7146*; *c.* 25°N 94°E: *Srivastava c.s. 83176*. BURMA. North B., *c.* 26°N 97°E: *Kingdon-Ward 6648*. Unlocated: *hb. Beddome 241*; *Griffiith 187*; *Toppin 3179*. Frontier Tract Bahpara, Pankin-La: *Kingdon-Ward 11356, 11357*. CHINA. Yunnan. Pingpien Hsien: *Tsai 60200, 61160, 62088*. Tsing-pian: *Tsai 52476*. Mengtsze, 23°20'N 103°21'E: *A. Henry 11146*.

Distribution. Asia: northeast India, Burma, Yunnan.

Ecology. Seems to prefer moist places; in forests, etc., from 500 m (rarely lower) to 1500(—2000) m alt. Flowers March—June, fruits September—December.

41. Capparis olacifolia Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 178; Coll. & Hemsl., J. Linn. Soc. Lond. Bot. 28 (1890) 21; Brandis, Indian Trees (1906) 36; Kanj. & Das, Fl. Assam 1 (1934) 77; Mooney, Suppl. Bot. Bihar Or. (1950) 21; Sebastine & Henry, Bull. Bot. Surv. Ind. 2 (1960) 31. Not of Gagn., Fl. Gén. I.-C. Suppl. 1 (1939) 171, which is *C. siamensis*. — Lectotype: *Hooker f. s.n.* (C, G, K, holo; P), India, Sikkim, 1—4000', fl. fr. — **Fig. 29.**

Shrub or small tree with spreading branches, 1—5 m. *Innovations* at the base surrounded by a few cataphylls, densely fulvous or greyish tomentose with small *c.* 5-armed stellate hairs; the leaves glabrescent. *Thorns* slender, straight, 3—5(—8) mm, ascending or rarely patent. Petiole 5—6 mm, hairy as the twig. *Leaves* more or less firmly herbaceous, ovate,

(2.0—)2.2—2.6(—3.5) times as long as wide, 8—13(—16) by (3½—)4—5(—6) cm; base rounded, top tapering, gradually acuminate, the tip blunt to acutish, mucronulate; midrib flat, nerves (5—)6—7(—8) pairs, reticulation not distinct, surfaces early glabrescent, rather glossy above. *Flowers* serial with 2(—3) in a row or in some axils solitary, white, upper petals with a pale yellow or purple bloth; pedicel ¾—1½ cm, hairy. *Sepals* 8—10 by (3—)4—5(—6) cm, outer pair boat-shaped, ovate, acute, pointed, surfaces glabrous but margin tomentose, inner pair elliptic with membranous tomentose margin. *Petals* (15—)17—22 by ± 5 mm (the lower pair ± 2 mm longer than the upper pair), obovate, rounded, tomentose outside towards the top and along the margins. Disk ± 1 mm. Stamens some 34—38, equalling the gynophore, anthers 2 mm long. *Gynophore* 2¾—3½ cm, often slightly incrassate towards the top, glabrous; ovary ellipsoid, 1—1½ mm wide, densely tomentose (see Note 2), passing into a slender glabrous style with knob-shaped stigma, the whole 4—6 mm long; placentas 2. *Fruit* globose, beaked with the persistent style 2 mm long, ¾—1 cm diam., pericarp fairly thick, red. Seeds 1(—3), ± 7—8 by 6 by 5 mm.

INDIA SOUTH. Deccan. Orissa. Kalahandi Distr., *c.* 19°22'N 83°11'E: *Mooney 1708*. Mount Mahendragiri, 19°N 84°19'E: *Fisher & Gage 6*; *Gamble 13948*; *Saran c.s. 5883, 58867*. Jeypur Hills, *c.* 18°51'N 82°41'E: *hb. Beddome 253*. INDIA NORTH. Eastern Himalaya. Nepal: *Wallich 6990B*. Sattewati, 5000': *Stainton, Sykes & Williams 8892*. Biratnagar, 26°27'N 87°17'E: *Stainton 4*. North Bengal and Sikkim, *c.* 27°30'N 88°10'E: many. Bhutan, *Griffith* 1766. Baska Duar: *Cooper 3705*; *Gamble 3908/121*. Rilli Valley: *Gamble 241*. Hatisar: *Ludlow & Sheriff 18501*. — Assam. Goalpara: *Dina Nath 13021*; *Kanjilal 7477*. Kamrup: *Kanjilal 5041, 5454*; *Mann 818*. Nowgong Distr.: several. N. C.(achar?) Hills: *Kanjilal 6783*. BURMA. Upper B. Shan Hills, *c.* 19°—22°N 97°E: *Collett 376, 615, 669*.

Distribution. Asia: India, foothills of the Himalaya from eastern Nepal to the Kameng Frontier Division and, more southwards, to the Cachar Hills in Assam; also in the eastern Deccan between the Rivers Mahanadi and Godavari, and in the Shan Hills of Upper Burma. See also Note 3.

Ecology. Forests, also in grassy land, on dry soil, below 1300 m altitude. Flowers March-April, fruits January-Februari next year.

Notes. 1. The species has been attributed to Indo-China. This is due to confusion with *C. siamensis*, very similar to *C. olacifolia*, but in the former the flowers are always solitary and the gynophore hairy all over.

2. In *Collett 615* the ovary is very thinly hairy to glabrous.

3. Also recorded from Mancholai in Madras, *c.* 8°35'N 77°20'E: *Sebastine & Henry 5882* (*n.v.*), by Sebastine & Henry l.c.

42. Capparis pachyphylla Jacobs, *sp. nov.* — Type: *Kingdon-Ward 11183* (BM, holo; CAL, L), India, Assam/Burma border area, Tuzu Gorge, buds 14. III. 1935.

Innovationes dense fulvo-puberulae; basi cataphyllis instructae. Ramuli sero glabrescentes. Spinae parvae paulo recurvatae. Folia brevissime petiolata, crasse coriacea oblonga 8—13 cm longa 4—5¾ cm lata, basi subcordata apice obtusa mucronulata, costa subdepressa nervis obscuris. Flores in fasciculis axillaribus vel in panicula parva dispositis, minores, staminibus c. 33, gynophorio glabro ovario glabro placentis 2. Fructus ignotus.

Shrub or small tree with big, scrambling branches. *Innovations* densely puberulous with simple fulvous hairs curved towards the top; with cataphylls at the base. Twigs straight, late glabrescent. *Thorns* patent slightly recurved 1—3 mm. Petiole 3—5 mm, mostly light-coloured. *Leaves* thick-coriaceous, widest about the middle to slightly higher or lower, *c.* 8—13 by 4—5¾ cm; base subcordate, top rounded to obtuse, mucronulate; midrib flattish to shallowly depressed at the base to all over, yellow-brown beneath,

nerves 5—7 pairs, thin, subdepressed above, reticulation obscure; surfaces dull, in the dried state green above, light green beneath. *Flowers* with up to *c.* 6 in racemose bundles which are axillary or arranged along a lateral or subterminal stalk up to 3 cm long to a sort of panicle. Pedicels *c.* ½—¾ cm, filiform, subglabrous, subtended by thorn-like bracts and bracteoles. *Sepals c.* 5—6 mm, subequal, outside very sparsely puberulous, ciliate, outer pair very concave, inner pair flatter. *Petals c.* 7 mm long, white (turning?) to purple, fringed with long hairs. Stamens *c.* 33. *Gynophore* glabrous (see Note 1); ovary small, glabrous, placentas 2. *Fruit* unknown.

INDIA NORTH. Assam. Aka Hills. Yisi, *c.* 27°N 93°E: *Bor 2866.* Assam/Burma frontier area. Tuzu River Gorge, *c.* 25°30'N 95°E: *Kingdon-Ward 11183.*

Distribution. Asia: northeast India, Aka Hills and Manipur.

Ecology. Common on steep cliffs and banks of gorge, in dry windy places, at 600 and 1200 m. Flowers March-April.

Note. 1. As the flowers were not yet open, the length of the gynophore is uncertain.

43. Capparis parviflora Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 176; Brandis, Indian Trees (1906) 34; Dunn in Gamble, Fl. Pr. Madras 1 (1915) 46. — Type: *Wight Kew distr. 70* (GH, K, holo), India, Shevagerry Hills, fl. fr.

A spreading irregularly branched shrub. *Innovations* fulvous-puberulous, glabrescent early; cataphylls none. *Thorns* small, straight and directed upwards, but mostly wanting. Petiole 2 mm. *Leaves* subcoriaceous, some 3 times longer than wide, widest at the middle, *c.* 5½—8½(—12) by 1¾—3(—4) cm; base blunt, top gradually acuminate, tip up to 1 cm, blunt; midrib sunken in the basal half, nerves *c.* 6—8(—9) pairs, thin, reticulation rather distinct above, less so beneath; surfaces dull, greenish above, yellow green beneath. *Flowers* with 3—5 (—10; Brandis) forming a subterminal (sub)umbel ½—1(—1½) cm stalked; bracts subulate, 1—2 mm, caducous, pedicels filiform, 7—13 mm. *Sepals* subequal, 3 mm long. *Petals* obovate, 3—3½ mm, inside hairy at the base. Stamens 17—26. *Gynophore* filiform, 5—6 mm, glabrous; ovary ovoid 1½ mm long, light-coloured, glabrous, placentas 2. *Fruit* (mature?) pisiform (*c.* 9 mm diameter, smooth) with 1 seed.

INDIA SOUTH. Deccan. Shewageri (different spellings;? = Shevaroy, *c.* 11°40'N 78°20'E) Hills: *Wight 70.* Anamallays: *Beddome*, fl. 1870. Tinnevelly: *Beddome*, fl. fr. 1879; *239.*

Distribution. Asia: India, southern Peninsula.

Notes. 1. This species was once confused with *C. fusifera*, and the distinction is still difficult, particularly in the leaves; see also under *C. fusifera*, Note 2.

2. The above description refers only to the type, except for the data in brackets, which were derived from two Beddome collections.

44. Capparis pranensis (Pierre *ex* Gagn.) Jacobs, *stat. nov.* — *C. thorelii* var. *pranensis* Pierre *ex* Gagn., Bull. Soc. Bot. Fr. 55 (1908) 214; Fl. Gén. I.-C. 1 (1908) 190; Craib, Fl. Siam. En. 1 (1925) 84; Gagn., Fl. Gén. I.-C. Suppl. 1 (1939) 165. — Type: *Pierre Siam 188, hb. 4018* (K, P, holo), soutwestern Siam, Muong Pran, yfr. VIII. 1868.

C. corymbosa (*non* Lam.) Baker *f.*, *c.s.*, J. Nat. Hist. Soc. Siam 4 (1921) 128. — **Fig. 30.**

Climber 4—10 by 0.10 m or shrub 1½—2 m; glabrous. Twigs zig-zag, vigorous, dull purplish brown. *Thorns* strong, hooked, 2—4 mm. Petiole 4—7 mm, minutely warty. *Leaves* coriaceous, sometimes showing a tendency to fold the upper surfaces lengthwise together, (1.2—)1.8—2.2 times as long as wide, widest about or above the middle,

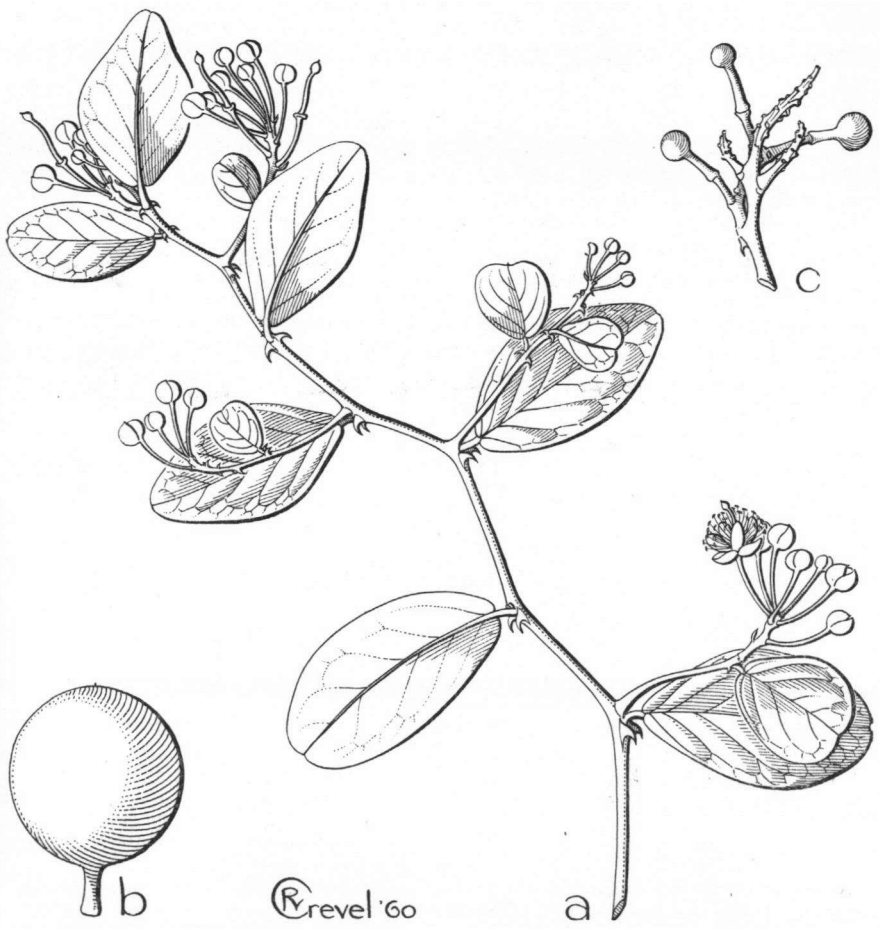


Fig. 30. *Capparis pranensis* (Pierre *ex* Gagn.) Jacobs — a. Habit, b. fruit, c. branch, all × $\frac{2}{3}$ (a from *Poilane 5862*, b from *Fleury hb. Chevalier 39090*, c from *Poilane 6088*).

(3—)4—6(—7) by 2—3(—4) cm; base subcordate to obtuse, top obtuse to rounded, sometimes a few mm emarginate, sometimes with a small mucro; midrib flattish or slightly raised, nerves 3—5 pairs, as the reticulation distinct above, obscure below; upper surface glossy, livid or greenish, lower surface dull brownish. *Flowers* yellow, fragrant, with 3—10 conferted towards the top of slender lateral twigs, these often arranged to a terminal panicle ± 12 by 10 cm; pedicels slender, 9—15 mm; bracts subulate, 3—5 mm, soon caducous. *Sepals* very concave, ± 5½—6 by 4—5½ mm, purplish brown when dry, inner pair with membranous margin, sometimes ciliate. *Petals* ± 7—8 by 3—4 mm, upper pair subfalcate, base very fleshy and thinly pubescent on both sides, inner pair straight, pubescent only inside. Torus ± 2 mm wide. Stamens ± 29—33. *Gynophore* vigorous, (6—)8—11 mm, glabrous; ovary ovoid, 1½ mm long, pointed,

glabrous, placentas 2. In fruit the pedicel and the gynophore early incrassate, ultimately to 3—5 mm. *Fruit* globose, some 2—3 cm diameter, pericarp 2 mm thick, smooth, red. Seeds few, in orange pulp, ± 12 by 9 by 5 mm.

INDO-CHINA. Annam, near the coast. Tourane, 16°N: *Lecomte & Finet 920.* Nhatrang area: *Poilane 4548, 6088.* Phanrang area, southwards to Ca Na, 11°21'N: several. — Cambodia, Battambang, 13°06'N 103°12'E: *Vidal 1157* ?=*Schmid*, fr. 31. V. 1961. SIAM. Southwestern S. Pran, 12°15'N 100°E: *Pierre Siam 188 hb. 4018.* Prachuap, *c.* 11°50'N 99°49'E: *Put 2263*; *Winit 664.*

Distribution. Asia: southwestern corner of Siam, southern Indo-China.

Ecology. Moist loamy or sandy soil, more or less open country, apparently at low altitudes. Flowers mostly March, fruits mostly October. The fruits are eaten by birds and seem to be edible for man, too.

Once reported climbing in a solitary tree on an enormous termitary 2½ m high.

45. Capparis pubiflora DC., Prod. 1 (1824) 246; Deless., Ic. Sel. Pl. 3 (1837) t. 12; Miq., Illustr. (1870) 27, t. 15; Jacobs, Fl. Mal. I, 6 (1960) 82, f. 16—17, with map; Back. & Bakh. *f.*, Fl. Java 1 (1964) 184. — Type: *Anonymous s.n.* (G-DC, P, holo), Malesia, Timor, fl.

C. nigricans Span., Linnaea 15 (1841) 165. — Type: *Spanoghe s.n.* (L), Malesia, Timor, fl.

C. cerasifolia A. Gray, U.S. Expl. Exp. Bot. 1 (1854) 71; Merr., En. Philip. 2 (1923) 210. Miscopied as *C. crassifolia* C. Mueller, Walp. Ann. 7 (1868) 189, not of Kurz, J. As. Soc. Beng. 42 ii (1874) 227, which is *C. zeylanica.* — Type: *A. Gray, exp. Wilkes, s.n.* (K, L, phot., US), Malesia, Sulu Arch., fl.

C. brachyscias Turcz., Bull. Soc. Nat. Moscou 27, 2 (1854) 323. — Type: *Zollinger 2929ZM* (BO, G, P), Malesia, E. Java, Bondowoso, fl. 3. VI. 1845.

C. lasiopoda Turcz., Bull. Soc. Nat. Moscou 27, 2 (1854) 322. — Type: *Cuming 955* (BM, CGE, FI, G, K, L, P, W), Malesia, Luzon, fl.

C. pubiflora var. *moluccana* Miq., Illustr. (1870) 28. — Type: *Teijsmann HB 1945* (BO, U), Malesia, Ambon, Saparua, fr.

C. pubiflora var. *sumatrana* Miq., Illustr. (1870) 28. — Type: *Korthals s.n.* (U), Malesia, Sumatra, fl.

C. pubiflora var. *perakensis* Scort. *ex* King, J. As. Soc. Beng. 58 ii (1889) 394. — *C. perakensis* (Scort. *ex* King) Ridl., Fl. Mal. Pen. 1 (1922) 124. — Type: *Scortechini 1784* (CAL, K), Malesia, Malaya, Perak, Kuala Dipang, fl. II. 1883.

C. myrioneura Hall. *f.*, Fedde Rep. 2 (1906) 60, in part; see under *C. micracantha* Note 2.

C. dealbata (*non* DC.) Backer, Schoolfl. (1911) 62.

C. borneensis Merr., Pl. Elmer. Born. (1929) 91. — Type: *Elmer 20872* (A, BM, BO, G, K, L, P, SING, U, UY), Malesia, North Borneo, Tawao, fl. fr. X. 1922/III. 1923.

C. braianensis Gagn., Bull. Soc. Bot. Fr. 85 (1939) 597; Fl. Gén. I.-C. Suppl. 1 (1939) 164. — Type: *Poilane 24484* (P), Indo-China, Annam, Braian, near Djiring, Haut Donnai, fl.

Shrub 2—5 m. *Innovations* densely set with silky balance-hairs with a short stalk and two long equal ends pointing lengthwise, soon glabrescent or seldom late; the base surrounded by cataphylls. *Thorns* straight or slightly curved upwards, and patent 3—6 mm, wanting or vestigial in the Philippine specimens. Petiole 5—8(—11) mm. *Leaves* herbaceous to subcoriaceous (1.7—)2.7—3(—4.4) times as long as wide, widest above the middle to rarely below, (5—)8—16(—27½) by 2½—6(—9) cm; base acute to blunt, sometimes rounded, top acuminate, the tip up to 2 cm, acute to blunt; midrib sometimes sunken, nerves (6—)7—9(—13) pairs, yellowish, reticulation distinct; surfaces rather dull,

glabrous. *Flowers* either with 1—5(—10) in short axillary racemes, in the axil of a leaf reduced to a densely tomentose subulate bract with 2 basal bract-like stipules, or sometimes the flowers axillary on a short young twig; pedicels ½—3(—5) cm, glabrescent. *Sepals* subequal, herbaceous, 4—7 by 2½—4 mm, outside puberulous, outer pair acute to blunt, sometimes slightly cucullate, inner pair blunt to rounded. *Petals* mostly obovate, 7—10 by 3—4 mm, outside soft-hairy at top and margins, white, inside white or pale green or pale pink, honey-guide deep salmon-red or salmon-pink. *Stamens* 20—30(—50), filaments white, anthers at the dorsal side pale bluish, at the ventral side violet, connective white, pollen dull blue. *Gynophore* 1½—2½ cm, densely white-tomentose; ovary ellipsoid, 2½ mm long, hairy as the gynophore, stigma small, knob-shaped, glabrous, placentas 2—3. *Fruit* on a glabrous stalk but little incrassate, subellipsoid, 12—21 by 10—19 mm, umbonate, pericarp leathery, verruculose, glabrous, black, sometimes with reddish or bluish tinge or yellowish (once reported from New Guinea). Seeds 5—15(—25), ± 6 by 5 by 4 mm.

HAINAN: several. INDO-CHINA. Tonkin, Sontay Prov. Mt Bani, *c.* 21°06'N 105°32'E: *Pételot 2646.* — Annam. Djiring, 11°35'N 108°05'E, 1200 m: *Poilane 24484.* SIAM. North S. Chiengrai, *c.* 20°N 99°51'E: *Garrett 273.* — Southwest S. Klang Dong, 14°40'N 98°50'E: *Larsen 9424.* — ?Southeast S. Chon Buri: *Smitinand 5453.* MALAYA. Kelantan. Chaning Woods: *Ridley*, fl. I. 1917. — Perak. Kuala Dipang: *Scortechini 1784.* — Selangor: *Burkill SF 6369.* — Pahang: *Henderson SF 25220.* G. Senuyan: *Henderson SF 22319.* SUMATRA. North S. Atjeh. Gajo Lands: *van Steenis 9287.* — Central S.: several. — South S.: *Forbes 1759.* JAVA. West J. Lembang: *Korthals*, fl.— Central J. Rembang: *Beumée 5591*; *Blokhuis*, fl. VIII. 1918; *Teijsmann* fl. VII. 1864. — East J.: many. — Nusa Barung: *Jacobs 4719.* — Madura: several. LESSER SUNDA ISLANDS. Bali: several. — Lombok. Mt Rindjani: *Elbert 1663, 2030.* — E. Sumbawa. Dompu: *Elbert 3990.* — Timor: several. BORNEO. North B. Tawao, 4°16'N 117°54'E: *Elmer 20872.* PHILIPPINES. Palawan: *Elmer 12721.* — Luzon: many. — Mindanao: many. Pujada I.: *Edaño PNH 11661.* — Sulu Is: *Gray, Wilkes's exp.*, fl. CELEBES. North C.: many. — Southwest C. Pangkadjene: *Teijsmann 12126, 12274.* Tjamba: *Teijsmann 12537.* — Southeast C. Rumbia: *Elbert 2981.* Sanggona: *Kjellberg 1116.* MOLUCCAS. Halmaheira. Soa Tobaru: *Beguin 1996.* — Ambon: *Binnendijk 163.* Saparua: *Teijsmann HB 1945.* — Ceram: *Rutten 2227*; *Teijsmann HB 5016*; *de Vriese*, fr. 1857/61. NEW GUINEA. Vogelkop Peninsula, 1°S 132°—134°E: *Beccari PP18*; sh. *738*; *Koster BW 6901, BW 7161*; *Vink BW 11350.*

Distribution. Asia: Hainan, scattered in Indo-China and Siam (not Peninsular S.). Malesia: northern Malaya, Sumatra, Java to Timor; northeast Borneo, the Philippines, Celebes to the northern part of the Vogelkop Peninsula of New Guinea.

Ecology. Dry places, hedges, roadsides, teak forests, brushwood, jungle, & c. in the lowlands, to 1200 m.

46. Capparis pyrifolia Lam., Enc. Méth. Bot. 1 (1785) 606, *excl.* var. β, which is *C. zeylanica;* DC., Prod. 1 (1824) 246; Deless., Ic. Sel. Pl. 3 (1837) t. 11; Jacobs, Fl. Mal. I, 6 (1960) 84, with map; Back. & Bakh. *f.*, Fl. Java 1 (1964) 185. Not of W. & A., Prod. (1834) 25, which is *C. grandiflora.* — Type: *Poivre s.n.* (P-JU, cat. 11252), Inde, fl. (depicted in Delessert).

C. zeylanica (*non* L.) Lour., Fl. Cochinch. (1790) 330, see Merr., Comm. Lour. (1935) 173.

C. acuminata Willd., Sp. Pl. 2 (1799) 1131; DC., Prod. 1 (1824) 247; Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 178; Koord., Exk. Fl. Java 2 (1912) 293. Not of De Wildeman (1903) from Africa, which is *C. erythrocarpa* Isert. — Type not seen.

C. zeylanica (*non* L.) DC., Prod. 1 (1824) 247, as for Java; W. & A., Prod. (1834) 25.

C. foetida Blume, Bijdr. 2 (1825) 52; Gagn., Fl. Gén. I.-C. 1 (1908) 184; Craib, Fl. Siam. En. 1 (1925) 80; Gagn., Fl. Gén. I.-C. Suppl. 1 (1939) 161. — Type: *Blume 1194* (L, P), Malesia, Java, Batavia, fl.

Oligloron zeylanica (L.) Rafin., Sylva Tellur. (1838) 109, *pro descr. typo excl.*

C. dasypetala Turcz., Bull. Soc. Nat. Moscou 27, 2 (1854) 322. — Type: *Zollinger 2265* (BM, BO, FI, G, G-BOISS, P), Malesia, E. Java, Bangil, fl. IX. 1844.

C. oxyphylla Miq., Pl. Jungh. (1855) 397. — Type: *Junghuhn s.n.* (L, U), Malesia, C. Java, Mt Unggaran, buds.

C. horrida (*non* Linn. *f.*) Miq., Illustr. (1870) 34, for the synonyms *C. foetida* and *C. oxyphylla.*

C. kerrii Craib, Kew Bull. (1922) 232; Fl. Siam. En. 1 (1925) 81, see Note 2; Gagn., Fl. Gén. I.-C. Suppl. 1 (1939) 169. — Type: *Kerr 3568* (ABD, BM, K, UC), northern Siam, Ban Pong Yeng, fl. 29. III. 1915.

Shrub, sometimes climbing 1½—2½(—3½) m; *innovations* with minute, stellate, ferruginous hairs; glabrescent. Twigs mostly straight, exceptionally zigzag-bended. *Thorns* patent, straight or slightly curved upwards, 1—3(—4) mm. Petiole ± ½ cm. *Leaves* on lateral branches mostly in one plane, more or less firmly herbaceous, (1.2—)1.7—2.2 (—3.0) times as long as wide, widest often below, sometimes about to above the middle, 5—9½(—15) by 2½—4½(—6½) cm; base rounded to blunt, top acuminate, the tip ½—1½ cm, mostly blunt; midrib sometimes sunken, nerves ± 5 pairs, yellowish, reticulation distinct; lower surface later glabrescent than the upper. *Flowers* serial with 2—4; pedicels (1—)1½—2(—2½) cm, slender, densely hairy, glabrescent except the top. *Sepals* subequal, elliptic-ovate, 4—5 by 2½—4 mm, minutely hairy outside. *Petals* elliptic to oblong, 6—8 by 2—4 mm, on both sides floccose-hairy, whitish, or pale yellow, or greenish, or violet tinged, upper pair with a yellow, later red, honey-guide. Torus ± 2 mm wide. Stamens ± 20, long 15—23 mm. *Gynophore* 18—20(—25) mm, glabrous, ovary 1 by ¾ mm, glabrous, placentas 3. *Fruit* stipe hardly incrassate; fruit approximately globose, 8—12 mm diameter, pericarp minutely roughish when dry, glossy, black when ripe (once reported red). Seeds 2—6, 6 by 3—4 by 2 mm.

INDO-CHINA. Laos: several, unlocated. Luang Prabang, 19°53′N 102°10′E: *d'Alleizette*, fl. IV. 1913. — Annam. Hue: *Squires 281.* Dalat: *Squires 829.* — Cambodia: several. — Cochin-China: several. SIAM. North S. Near Chiengmai, 18°18′N 98°59′E: *Kerr 2560, 3568.* Tak, 16°51′N 99°08′E: *Bunkird RFD 6988.* — Central S.: many. — Southeast S.: *Kerr 9813*; *Murton 71.* — Peninsular S., *c.* 8°30′N; Nakawn Srithammarat: *Sanan Thaworn 560, 947*; King Panom: *Kerr 18326.* SUMATRA. North S. East Coast Res. Laubalang: *Lörzing 11246.* JAVA. West: many. — Central: many. — East: many. — Kangean Is. Ardjasa: *Backer 26849.* Duko: *Dommers 23, 52.* LESSER SUNDA ISLANDS. Bali. Buleleng: *Teijsmann 2774.* — Sumbawa. West S. Mt Batulanteh: *Kostermans 19039.* East S. Dompu: *Elbert 4088.*

Distribution. Asia: scattered through the Indo-Chinese Peninsula southwards to *c.* 8°30′N. Malesia: Java to Sumbawa, one station in North Sumatra.

Ecology. Lowlands and hills in drier places, teak forest, brushwood, hedges, limestone hills, up to about 850 m. In Asia flowers December to April, fruits about September; in Malesia fertile throughout the year.

Notes. 1. The row of flowers is sometimes very short and it may then be difficult to perceive the nature of the inflorescence. *Capparis pubiflora*, which might be confused with such specimens of *C. pyrifolia*, differs in the hairy gynophore and the larger fruit, over 12 mm.

2. The type of *C. kerrii* differs merely by its thick red indumentum which persists on the nerves; the sepals are early glabrescent outside and the stamens 26—27 in number. A similar, though somewhat thinner, indumentum has *Kerr 10509* from SW. Siam. As long as no other distinctive characters are found (the fruits are unknown), this material will be kept as a local deviating strain under *C. pyrifolia.*

47. Capparis quiniflora DC., Prod. 1 (1824) 247; Benth., Fl. Austral. 1 (1863) 94; Bailey, Queensl. Fl. 1 (1899) 57; Domin, Bibl. Bot. Heft 89 (1925) 685; Specht, Rec. Exp. Arnhem L. 3 (1958) 230; Jacobs, Fl. Mal. I, 6 (1960) 89, f. 22, with map. — Type: "Novae Hollandiae orâ boreali, v.s. in h. Mus. Par." (*n.v.*).

C. trapeziflora Span., Linnaea 15 (1841) 165. — Type: *Spanoghe s.n.* (L), Malesia, Timor, fl.

C. richii A. Gray, U.S. Expl. Exp. Bot. 1 (1854) 69, see Note 3; Seemann, Fl. Vit. (1865) 6; Drake del C., Ill. Fl. Ins. Pac. (1890) 107. — Type: *Wilkes' exp. s.n.* (GH, P, US), Pacific, Fiji Is, fl.

C. subcordata Span., Linnaea 15 (1841) 166; Miq., Illustr. (1870) 34. — Type: *Spanoghe s.n.* (L), Malesia, Timor, fl.

C. neocaledonica Vieill. *ex* Guill., Bull. Soc. Bot. Fr. 83 (1936) 578; Schltr., Bot. Jahrb. 39 (1906) 113, *nomen nudum.* — Type: *Schlechter 15085* (BM, G, P), Pacific, New Caledonia, Nouméa, fl. X. 1902.

Climbing shrub. *Innovations* densely minutely grey or ferruginous-tomentose, sometimes glabrescent; internodes up to 9 cm. *Thorns* recurved, *c.* 1—2(—3) mm, sharp, sometimes wanting, especially on flowering twigs. Petiole 5—17 mm. *Leaves* subcoriaceous to coriaceous, often brownish green when dry, ovate to (rarely) obovate, 1.6—4.3 times as long as wide, (5½—)7—9(—12) by 1¼—4(—7½) cm; base rounded, subcordate, blunt, or acute, top mostly attenuate and acuminate, rarely blunt, acumen up to ½ cm, acutish with a minute, thickened mucro; midrib flat to shallowly sunken, nerves 6—8(—11) pairs under an angle of *c.* 45°; intermediate veins often wanting, reticulation distinct; margin sometimes crinkled; above soon glabrescent and glossy. *Flowers* white, serial, sometimes developing before the leaves at the end of young twigs, 2—10 in a row 2—12 mm long, pedicels 6—17 mm, hairy as the twigs, finally glabrescent; floral leaves sometimes abortive. *Sepals* herbaceous, partly covering each other, subequal, acute, ferruginous-tomentellous outside, outer pair *c.* 4—5 by 2—3 mm, the inner pair narrower and flattish. *Petals* ovate to elliptic, 5—7 by 2—4 mm, slightly unequal, puberulous on both sides. Stamens 7—8(—12), filaments 20—27 mm. *Gynophore* 2—2¾ cm, glabrous or glabrescent at the base; ovary ovoid, *c.* 1½ by 1 mm, placentas 4; stigma knob-shaped; occasionally the gynoecium vestigial. *Fruit* on stalk slightly incrassate (sub-)globular, *c.* 2—2¾ by 2—2½ cm, pericarp corky-leathery, *c.* 1½—2½ mm thick, with small scattered warts. Seeds ∞, up to 7—8 by 5—6 by 4 mm.

CELEBES. Eastern peninsula: *Kaudern 435.* LESSER SUNDA ISLANDS. Lombok: *Zollinger 3211.* — Sumbawa. Bima: *Elbert 3827.* — Sumba. Kabaniru: *Teijsmann*, fl. fr. — Flores. Labuhan Badjo: *Soehanda exp. de Jong 272.* — Semau: *Teijsmann 8836.* — Timor: *Spanoghe*, fl., 2 coll. MOLUCCAS. Tanimbar Is: *Riedel*, fl. — Kai Is: *Jaheri 238.* Kai Ketjil. Tual: *Beccari sh. 739B, 740; Jensen 412.* NEW GUINEA. Near Hollandia, 2°37'S 140° 39'E: *Brass 8845,* — Papua. Central District: *Schodde 2647.* Port Moresby, 9°30'S 147°07'E: *Quisumbing PNH 65805; White 50, 57; Womersley & Thorne NGF 12846.* TORRES STRAIT. Goode I.: *Powell 1882.* — Hammond I.: *Rayner*, fl. IX. 1860. — Horn I.: *Blake*, fl. VII. 1943. — Prince of Wales I.: *R. Brown 4933, 4935,* NORTHERN TERRITORY. Crocodile I., 12°S 135°E: *Wilkins 201.* Northeastern Arnhem Land: several. QUEENSLAND. Cape York: *Hann 164; Hill 38; MacGillavry voy. Rattlesnake 485.* Near Cape Flinders: *Cunningham 198.* PACIFIC NORTH. Fiji Is: *Rich? Wilkes's expl. exp.*, fl. NEW CALEDONIA: many. Ile d'Icié: *Deplanche 389.* Ile des Pins: *Compton 2275.*

Distribution. Malesia: SE. Celebes, Lombok to Tanimbar and Kai Is, New Guinea (N. coast and Papua); islands in Torres Strait; Australia: N. coast, and NE. coast from Cape York to Cairns; Pacific: New Caledonia, Fiji.

Ecology. Prefers obviously coastal habitats or edges of savannah in drier areas, rambling on shore trees, bound to a seasonal climate, in the lowland.

Notes. 1. Although in fertile material the leaves are variable in shape, the venation is constant and very characteristic.

2. The Australian specimens ("Careening Bay", *Cunningham, King's 3rd voy.* fl. fr. 1820, unlocated) are much more uniform in leaf index than those of Malesia where it does not exceed 1.8.

3. In the material described by A. Gray from Fiji as *C. richii* the leaf-shape is remarkably variable, one specimen having the average leaf-index, the second having leaves 9½—11 by 1½—1¾ cm, the third having linear leaves *c.* 4—10 cm by 1—4 mm. In West Flores a similar, also sterile linear-leaved specimen was collected (*Soehanda, exp. De Jong 272*, BO, K, L); its thorns are strongly recurved, 1—3 mm, the leaves measure 4—10 by 0.1—0.4 cm. As I observed in several other species of *Capparis* such sterile shoots have larger thorns than the fertile twigs. Might such shoots have been developed under exceptionally dry weather conditions?

4. The only collection from Bali is a duplicate specimen from Bogor in Paris with a Zollinger label "Leg. Teysmann, Balie, Buleling". As no other sheets were seen from Bali, the location seems to be erroneous.

5. Bentham remarks: "Some barren shoots, with very small ovate, rhomboid, or oblong leaves, assume a totally different aspect from the rest of the plant."

48. Capparis radula Gagn., Bull. Soc. Bot. Fr. 55 (1908) 213; Fl. Gén. I.-C. 1 (1908) 187, t. 16A; Craib, Fl. Siam. En. 1 (1925) 83. — Type: *Harmand 1094* (P), Indo-China, Laos, Bassac, fl. I. 1877. — **Fig. 31.**

Shrub ± 2½—3 m, in the vegetative parts glabrous. Twigs brown-yellowish, densely set with minute warts. Cataphylls very few. *Thorns* recurved, 3—4 mm. Petiole 5—6 mm. *Leaves* coriaceous, ± 1.5—2.1 times as long as wide, widest at the middle or below, ± 4½—9½ by 2½—6½ cm; base rounded, top rounded with a recurved mucro, sometimes notched or acutish; midrib sunken, nerves 4—6 pairs, thin, yellowish below, the first 2 pairs inserted very near the base, reticulation distinct on both sides; lower surface dull, upper surface sometimes glossy. *Flowers* serial with 1—3, or small bundles of empty bracts being in their place; pedicel ¾—2 cm, smooth, glabrous. Buds acuminate. *Sepals* equal to unequal, puberulous outside, and inside in the marginal parts, outer pair somewhat triangular, ± 9 by 3—5 mm, inner pair (or all) elliptic, ± 9—11 by 3—5 mm. *Petals* white, obovate, ± 11—14 by 6 mm, the upper pair yellow red and hairy at the base inside, otherwise probably glabrous. Torus 2 mm wide. *Stamens* ± 30—40, 1¾—2 cm, anthers blue. *Gynophore* 16—23 mm, glabrous; ovary ovoid, ± 2½—3 by 2 mm, glabrous with 4—5 placentas and a distinct, wide, cushion-shaped stigma; soon after anthesis a number of ribs developing as many as placentas. *Fruit* on a hardly thickened (to 2 mm) stipe, subglobose to ovoid, ± 4½—6 by 3—4 cm; pericarp thin smooth; seeds ± 8 by 6 by 4 mm, densely tuberculate, the warts nearly 1 mm and all apart.

INDO-CHINA. Central Laos. Left bank of the Mekong: *Harmand*, fl. 1875/77; *Pierre 1861*. Bassac, 14°54'N 105°51'E: *Harmand 1094*; *Thorel*, buds 1866/68. — Cambodia. Kg. Thom.: *Béjaud 419*. — S. Cochin-China: *Harmand 4020*. SIAM. East S. Ubon. Samsip: *Kerr 8359*. — North S. Raheng, 16°51'N 99°08'E: *Kerr 2982*. — Central S.: *Kerr 3938*; *Marcan 1636*; *Winit 564*.

Distribution. Asia: Siam, Indo-China (Laos, Annam, Cochin-China).

Ecology. Scrub jungle and high grass savannahs at low altitudes. Flowers January-April, fruits November.

Notes. 1. From all allied species distinct by its minutely warty twigs.

2. The material is scanty and for the description of the flower I had to rely on an

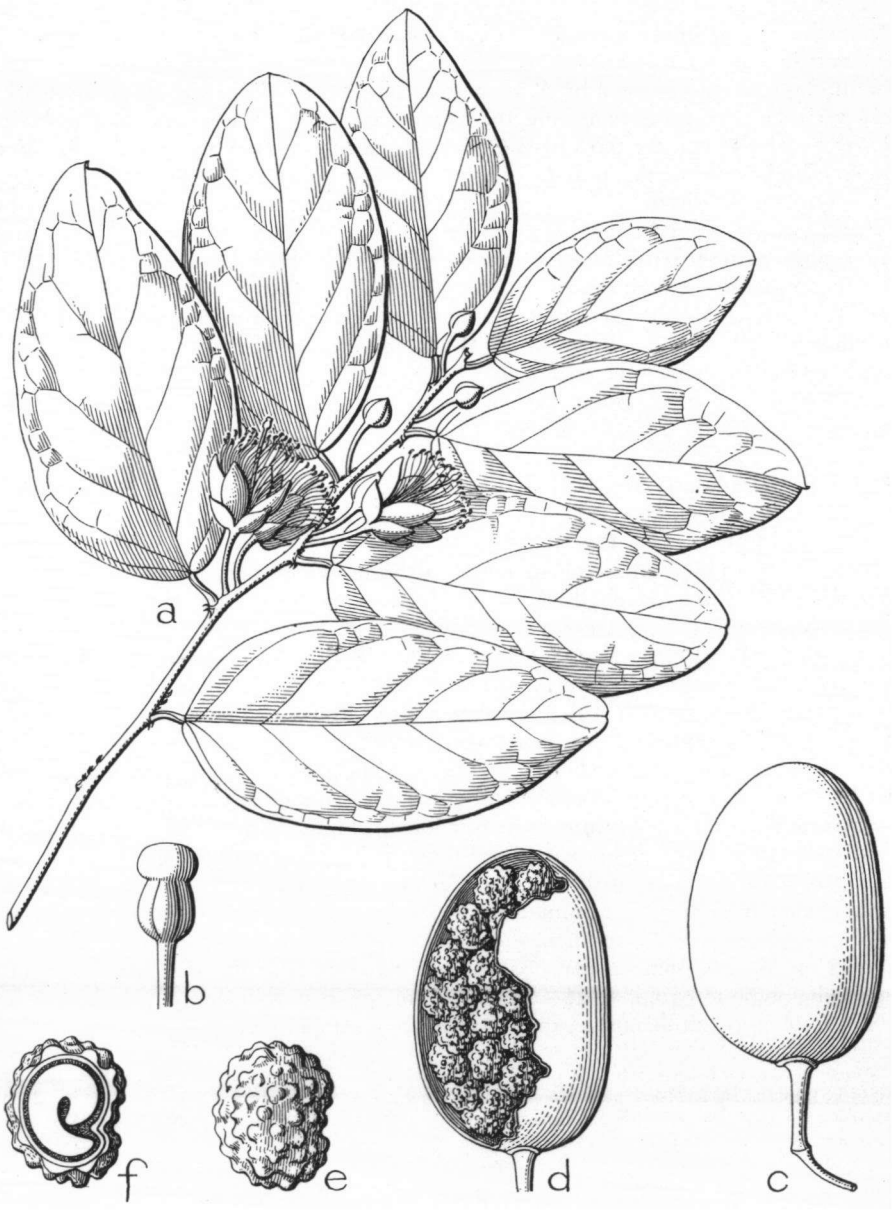


Fig. 31. *Capparis radula* Gagn. — a. Habit, × $\frac{2}{3}$, b. ovary, × 4, c. fruit, × $\frac{2}{3}$, d. inside of the fruit with seeds, × $\frac{2}{3}$, e. seed, × 2, f. length section through seed, × 2 (a—b from *Béjaud 419*, c—f after a pencil analysis made by *Pierre* to his number *1861, exp. Harmand*).

analysis in pencil by Gagnepain. It seems possible that sometimes the inner sepals are slightly petaloid.

49. **Capparis rigida** Jacobs, *sp. nov.* — Type: *Poilane 9081* (L, phot., P, holo), Indo-China, Annam, Ca-Na, fr. 10. XII. 1923.

Frutex vel liana glaberrima, ramulis fulvis basi cataphyllis. Folia ± 1 cm petiolata oblonga ± 6 cm longa 3 cm lata basi acuta apice subacuminata costa prominula nervis utrinque 6—7 supra nitida. Flores seriatim dispositi ceterum ignoti. Fructus pedicello 1.8 cm et gynophorio 2.6 cm longo 2 mm crasso subglobosus ± 2.8 cm longus 2.4 cm diametro leavis.

Shrub 1½ m or climber 7—8 m, completely glabrous, with yellowish twigs at the base surrounded by some cataphylls. *Thorns* very weak, ascending, and only present on the innovations, later obsolete. Petiole 8—12 mm. *Leaves* coriaceous, 1.8—2.4 times as long as wide, widest at the middle or slightly lower, ± 5½—7½ by 2¼—3¾ cm; base acute, top subacuminate; midrib subprominent, nerves 6—7 pairs, rather irregular, reticulation rather obscure on both sides; surfaces occasionally with a faint glaucous tinge (when dried), glossy above, dull below. *Flowers* serial with about 2, or small bundles of empty bracts in their place, otherwise unknown. *Fruit* on a stipe 2 mm thick consisting of the pedicel 1.8 cm and the gynophore 2.6 cm long, subglobose, 2.8 by 2.4 cm, smooth, yellowish glossy.

INDO-CHINA. Annam. Ca Na, 11°21'N 108°53'E: *Poilane 8493, 9081.*

Distribution. Asia: Indo-China, southeastern Annam.
Ecology. Deforested very rocky soil at 300 m altitude. Fruits December.

50. **Capparis rotundifolia** Rottl., Neue Schr. Ges. Naturf. Fr. Berl. 4 (1803) 185; DC., Prod. 1 (1824) 245; Dunn in Gamble, Fl. Pr. Madras 1 (1915) 46; Dunn, Kew Bull. (1916) 62. — Type: *Rottler s.n.* (K, P, holo), India, Madras, fr. X. 1799.

C. pedunculosa Wall. *ex* W. & A., Prod. (1834) 27; Wight, Hook. Ic. Pl. 2 (1837) t. 128; Thw., En. Pl. Zeyl. (1858) 16; Drury, Handb. Ind. Fl. 1 (1864) 40; Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 176; Bedd., Ic. Pl. Ind. Or. (1874) 66, t. 277; Dalz. & Gibs., Bombay Fl. (1861) 9; Trimen, Handb. Fl. Ceylon 1 (1893) 63; Cooke, Fl. Pr. Bombay 1 (1901) 47; Brandis, Indian Trees (1906) 34. — Type: *Russell hb. Wallich 6993G* (K), India, western Peninsula, fl.

C. longispina Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 176; Bedd., Ic. Pl. Ind. Or. (1874) 66, t. 281; Brandis, Indian Trees (1906) 34; Talbot, For. Fl. Bombay Sind 1 (1909) 60, f. 39; Blatter, J. Bomb. Nat. Hist. Soc. 31 (1927) 906. — *C. pedunculosa* var. *longispina* (Hook. *f.* & Th.) Trimen, Handb. Fl. Ceylon 1 (1893) 63. — Type: *Stocks hb. Hooker f. & Thomson s.n.* (K), India, Concan, fl. fr.

C. orbiculata Wall. *ex* Hook. *f.* & Th., in Hook. *f.*, Fl. Br. Ind. 1 (1872) 176; Kurz, For. Fl. Burma 1 (1877) 64; Gagn., Fl. Gén. I.-C. 1 (1908) 191. — Type: "Segain Hills, Burma, *Wallich, Griffith*" (*n.v.*).

Dense shrub 3—5 m or climber. Twigs slender, straight, with short internodes, densely pubescent, sooner or later glabrescent. *Thorns* recurved 2—5(—8) mm, to straight, acicular (2—)7—13 mm (see Note 1). Petiole 1—3 mm. *Leaves* subcoriaceous, (0.8—) 1.0—2.0(—4.0) times as long as wide, ovate to suborbicular, 1—3(—4½) by (¾—)1—2 (—2¾) cm; base cordate, top rounded and/or acute to abruptly acuminate with acute tip ½ cm, mostly mucronate; midrib rather obscure above, sometimes narrowly sunken, nerves 3—5 pairs, thin, sometimes obscure; margin often slightly revolute; surfaces

mostly glabrous, to rather densely pubescent especially on the nerves, upper surface often minutely wrinkled. *Flowers* with a few (—10) at the very top of lateral peduncles 2—15 mm, or of 1-leaved twigs 3—5 cm long occasionally axillary solitary; pedicels filiform, 1½—3(—4) cm, glabrous. *Sepals* thin, very imbricate, glabrous, rarely sparsely puberulent outside, ± 4—5 by 2—3 mm, outer pair with narrow, inner pair with wider membranous margin. *Petals* very thin, of about the same size as the sepals, pubescent inside towards the base. Stamens 27—36. Torus small. *Gynophore* (7—)13—20 mm, filiform, glabrous; ovary 1½ mm long, pointed, glabrous, placentas 2. In fruit the pedicel not, the gynophore hardly incrassate; sometimes slightly so towards the top. *Fruit* globose, sometimes with a small point, 1—1¼ cm diameter, pericarp 1 mm thick, smooth. Seed 1, 7—10 by 6—10 by 5—6 mm.

INDIA SOUTH. Malabar. Bassein, 19°21'N 72°52'E: *Santapau 4119*. Mahableshwar: several. Konkan. Matheran: *d'Almeida 17613*. Canara: *Stocks*, fl. fr. — Deccan. Sriharikota I., 13°15'N 80°14'E: *Gamble 20394, 21616*. Southern Madras: several. CEYLON: several. BURMA. Upper B. Minbu, 20°09'N 94°52'E: *Shaik Mokim 12*. Pakokku, 21°20'N 95°05'E: *Smales 51*. Mandalay area, *c.* 21°57'N 96°04'E: *Rogers 801*. — East B. Tonglu, 22°N 97°26'E: *Abdul Huk 16*. INDO-CHINA (?; see Note 3). Cambodia. Pnom Penh, 11°35'N 104°55'E: *Pierre*, yfr. 1870.

Distribution. Asia: India, Deccan Peninsula, south of Bombay in the western part, south of Nellore in the eastern part, Ceylon, Central Burma, one record from Cambodia.

Ecology. Open situations near evergreen rain-forests (Talbot) or drier country, up to *c.* 1350 m. Flowers February-March, fruits mostly August-September.

Notes. 1. The most conspicuous and puzzling feature of this species is the thorns, and the great variability among them has brought about some confusion. In a twig of *Thwaites CP 1069*, of several pairs of thorns, one is recurved and 2 mm, the other acicular and 5 mm long. It is remarkable that in this species the occurrence of long thin thorns concurs with subsessile, small, cordate, mucronate leaves. This is also found in the juvenile shoots of certain species in Sect. *Busbeckea*, but there the juvenile forms are mostly sterile.

2. Very near *C. thorelii*; see there.

3. I am still in doubt about the only record from Indo-China. On his way thither, Pierre collected in southern India; his specimen might actually be from there.

51. Capparis roxburghii DC., Prod. 1 (1824) 247; W. & A., Prod. (1834) 26; Wight, Ic. Pl. Ind. Or. 3 (1846) t. 1048, with descr.; Thw., En. Pl. Zeyl. (1858) 15; Drury, Handb. Ind. Fl. 1 (1864) 40; Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 175, in part, see under *C. cleghornii*, Note 1; Trimen, Handb. Fl. Ceylon 1 (1893) 62; Cooke, Fl. Pr. Bombay 1 (1901) 46; Brandis, Indian Trees (1906) 34; Talbot, For. Fl. Bombay Sind 1 (1909) 58; Dunn in Gamble, Fl. Pr. Madras 1 (1915) 45. Not of Dunn, Kew Bull (1911) 426, which is *C. sikkimensis* ssp. *yunnanensis*. — *C. corymbosa* Roxb., [Hort. Beng. (1814) 93, name] Fl. Ind. ed. Carey 2 (1832) 569, *non* Lam. 1785. — Type: Roxburgh's description and unpublished plate; see Note 1.

Large woody climber (Trimen) or shrub. Twigs brown-fulvous puberulous, sooner or later glabrescent, dull purplish brown. *Thorns* recurved, up to 2 mm long, but mostly wanting. Petiole 1—1½ cm, glabrous. *Leaves* subcoriaceous, brownish when dry, 1.6—2.4 times as long as wide, widest at or above the middle, (3½—)4½—8 by (1½—)2¼—3½ cm; base blunt to cuneate, top rounded or blunt or acutish; midrib shallowly sunken to flattish, nerves (4—)6 pairs, thin, reticulation obscure, surfaces glabrous, mostly dull. *Flowers* mostly with up to 15 conferted towards the top of a twig over a distance of up to 4 cm, sometimes also with a few in lateral subumbels or at the top of small lateral twigs; the

flower-bearing part of a twig often slightly incrassate and mostly remaining puberulous. Pedicels slender, 2½—3 cm, angular towards the top, glabrous. *Sepals* 10—12 mm long, glabrous, outer pair very concave, ± 6 mm wide, inner pair flattish, ± 8 mm wide. *Petals* obovate, 13—15 by 7—10 mm, pubescent towards the base, especially inside. Torus ± 4 mm wide. Stamens some 45—50. *Gynophore* 4½—5½ cm, glabrous, ovary ellipsoid, ± 3½ by 2½ mm, glabrous; placentas 4(—5). In fruit the pedicel and the gynophore incrassate to 5 mm and dull purplish brown. *Fruit* glossy orange, globose, sometimes apiculate (Trimen), 4½—5 cm diameter, the seeds 15 mm long.

INDIA SOUTH. Deccan. Crissa. Puri Distr. Khurda, 20°10'N 85°42'E: *Haines 3716, 4070.* Madras. Naggur (?= Nagari, *c.* 13°40'N 79°45'E) Hills: *Wight 68.* Coinbatore Distr., *c.* 11°N 77°30'E: *Fischer 1862.* Anamallay Plains: *hb. Beddome 223.* Tinnevelly Distr.: *Anon. MH 15187.* CEYLON: many.

Distribution. Asia: India, eastern side of the Deccan Peninsula south of the Cuttack River, Ceylon.

Ecology. Dry low country (Trimen) up to 500 m. On the continent, flowers April-May, in Ceylon, also in August.

Note. 1. *Capparis roxburghii* DC. was proposed as a *nomen novum* for *C. corymbosa* Roxb. The latter had originally been named *C. aguba* Roxb. MS., and figured, according to Wight & Arnott, in the collection of drawings of the East India Company under number 158. Apparently this plate was never published; it may be now in the British Museum. De Candolle stated to have seen a type specimen in the Banks Herbarium, also in the BM, which I have not seen either. From the descriptions and from the material named by Wight the identity is, however, certain.

52. Capparis rufidula Jacobs, *sp. nov.* — Type: *Haines H4* (K), Upper Burma, Shwebo, yfr. 29. XI. 1914.

Ramuli dense appresse rubro-puberuli sero glabrescentes, cataphyllis spinaeque nullis. Folia subcoriacea 1—2¾ cm petiolata rhombica 9—10 cm longa 4½—5 cm lata, basi apiceque acuta, glabra, opaca. Flores 6—8 seriatim dispositi ramulis parvis axillaribus efoliatis pedicello ¾ cm, sepalis ovatis 2 mm longis, ceterum ignoti, gynophorio 4½—6 mm glabro ovario glabro placentis 2. Fructus pisiformis.

Small tree. Twigs slightly zigzag-bended, innovations densely set with small, appressed, red balance hairs, late glabrescent; no cataphylls at the base. *Thorns* wanting. Petiole 1—2¾ cm. *Leaves* subcoriaceous, subrhombic to ovate, *c.* 9—10 by 4½—5 cm, base and top acutish; midrib flattish towards the base, subprominent towards the top, nerves *c.* 6 pairs, thin, subprominent, reticulation indistinct; surfaces glabrous, concolorous, dull darkish green in the dried state. *Flowers* with *c.* 6—8 in rows ½—¾ cm long on numerous slender, axillary, leafless, red-hairy twigs 5—10 cm long, pedicels *c.* ¾ cm, red-hairy. *Sepals* ovate, acute, 2 mm long, red-hairy outside; flower otherwise unknown. *Gynophore* 4½—6 mm, glabrous; ovary 1½ by 1 mm, glabrous, placentas 2, stigma point-like. *Fruit* globose, 8 mm or somewhat more in diameter.

Distribution. Asia: Upper Burma. One collection known.

Ecology. Flowers in November.

53. Capparis sarmentosa Cunn. *ex* Benth., Fl. Austral. 1 (1863) 95; F. v. M., Fragm. Phyt. Austral. 9 (1875) 173; Bailey, Queensl. Fl. 1 (1899) 58; Maiden & Betche, Proc. Linn. Soc. N.S.W. 30 (1905) 354; Bailey, Compr. Cat. Queensl. Pl. 1 (1909) 40; Domin, Bibl. Bot. Heft 89 (1925) 686. — Type: *Cunningham 62* (BRI, G, K, holo, MEL, P, W), Australia, New South Wales, Moreton Bay, fl. IX. 1824.

Dense shrub to *c.* 2 m high, sometimes climbing. *Innovations* densely set with simple, red-brown, later paler, hairs which are bent acroscopically shortly above the base; the hairs on the twigs long-persistent. Leaves distichous in all specimens examined. The vegetative parts intergrade between two extreme forms here described. *The poor form*: densely branched, internodes short, to 2 mm, thorns acicular, straight or slightly curved, patent or somewhat directed upwards, with darker top, sometimes to 5 mm and exceeding the leaves. Petiole almost none. Leaves coriaceous, small, to 2½ by 2 mm, ovate with rounded base and blunt top without a mucro; midrib subprominent, nerves 2—3 pairs, obscure; surfaces dull, early glabrescent. No fertility, or very rarely. *The rich form*: laxly branched, internodes *c.* 1¼—2½ cm, thorns recurved, *c.* 2 mm, sharp, with darker top. Petiole ¾—1½ mm. Leaves subcoriaceous, elliptic or subrhombic to suborbicular, to 2½ by 1¼—1¾ cm, base rounded, top rounded to obtuse, sometimes notched, mostly with a minute nerve-tip; midrib subprominent, yellowish beneath, nerves *c.* 4 pairs, the lowest pair inserted at the very base, reticulation distinct; surfaces dull, very early glabrescent. Pedicels solitary or serial with 2, 1—1½ cm, hairy especially towards the top. *Sepals* equal, elliptic, *c.* 6—8 by 3—4 mm, glabrescent, the odd sepal but little saccate, the inner and sometimes also the outer ones with woolly margins. *Petals* 9—13 by 4—5 mm, glabrous but sometimes with woolly margins. *Stamens* 19—22. *Gynophore* 14—24 mm, filiform, glabrous; ovary ovoid, 2½ by 1¼ mm, glabrous, placentas 4. *Fruit* on a thin stipe, probably when 1-seeded globose, *c.* 1 cm diam., when 2- or more (— *c.* 12-) seeded subcylindrical with tapering ends, *c.* 1½—2½ by ¾—1¼ cm, or ovoid (Bentham).

QUEENSLAND. Between Mackenzie and Archers' River, *c.* 25°30'S 148°E: *Leichhard*, fl. 15. X. 1843. Maryborough, 25°32'S 152°36'E: *Ramsay*, st. — Eidsvold, 25°23'S 151°08'E: *Bancroft*, fl. XI. 1915. — Condamine, 26°58'S 150°07'E: *Hartmann 173*. — Cabarlah, 27°35'S 15°54'E: *Simmonds*, fr. IV. 1910. — Maroon, 28°S 152°54'E: *Michael 1989*. — Within this line: many.

Distribution. Australia, endemic in a small area in southeastern Queensland and the very north of New South Wales; also reported from Cairncross Is (not located).

Ecology. On the edges of scrub; once reported from a mangrove vegetation. The poor form as here described seems to appear in the winter season. The vegetative habit of one branch is always homogeneous. Flowers emerge practically always from branches with leaves of 8 mm and longer.

Use. According to Bailey (1909) 40, the fruits are edible.

Notes. 1. There is a complete series of intergrades between the poor form and the rich form. These terms are used because the forms do not fit in the contradictions sterile *v.* fertile, or juvenile *v.* adult.

2. The position of this species is hard to determine. The leaf shape and size, the flowers and their position, point to affinity with *C. flavicans*. The typical indumentum of red hooked hairs is suggestive of its belonging in the Seriales, Zeylanica Subgroup. The variability in vegetative parts is of a kind which is typical for Sect. *Busbeckea;* on the Asiatic continent these features are also found in *C. rotundifolia*, which might be a more distant relative.

3. One of the three sheets in the type cover at Kew has "Dirk Hartog I." as locality, which is on the west coast of Australia. It is supposed to have been mislabelled.

54. Capparis scortechinii King, J. As. Soc. Beng. 58 ii (1889) 394; Ann. Gard. Calc. 5 (1896) 118, t. 135; Ridl., Fl. Mal. Pen. 1 (1922) 122; Jacobs, Fl. Mal. I, 6 (1960) 71. — Type: *King's coll. 8083* (CAL, holo, K), Malesia, Malaya, Perak, Batang Padang Distr., fl. VIII. 1885.

Climbing shrub, 2—10 m. Twigs straight, angular and brown-pubescent, terete and glabrescent when older; internodes 1—3 cm. *Thorns* strong, recurved, 2—4 mm. Petiole *c.* 1 cm. *Leaves* (sub)coriaceous, pubescent when young, soon glabrescent, ovate to obovate, 2—5 times as long as broad, 6½—12(—21) by 1½—5(—7½) cm; base narrowed, acute; top rounded to narrowed, more or less acuminate, dark-mucronate; midrib flat above; nerves *c.* 5—6 pairs. Raceme terminal, 2½—10 cm long, brown pubescent all over. Bracts 10 by 1½—2 mm, sometimes larger and resembling small leaves. Pedicels ½—1 cm, leaving a prominent scar. Sepals densely pubescent outside, with membranous, ciliate margin 1 mm broad, outer pair coriaceous, orbicular, 8—11 mm diam., inner pair subcoriaceous, ovate, 2—6 by 4½ mm, densely pubescent outside. Petals pink, *c.* 8—9 by 4½—6 mm, obovate, notched, with cuneate base, sparsely pubescent inside, or glabrous. Stamens 35—50, *c.* 15 mm. *Gynophore c.* 5—6½ cm, ovary ovoid, 1¾ by ¾ mm, both glabrous. In part of the flowers the gynoecium vestigial; in fruit the pedicel and the gynophore woody, incrassate up to 16 mm, the gynophore transversely wrinkled. *Fruit* globose, *c.* 10(—12½) cm diam., pericarp woody, 2—2½ cm thick, smooth, yellow. Seeds ± 23 by 17—25 by 10 mm.

MALAYA. Perak. *Scortechini 191.* Gunong Booboo: *Sinclair 9916.* Batang Padang Distr.: *King's coll. 8083.* — Trengganu. Ulu Brang: *Moysey & Kiah SF 33676.* — Pahang. Cameron Highlands: *Henderson SF 23551.* Fraser Hill: *Kalong 22381*; *Purseglove P4248.* — Selangor. Bukit Putih Reserve: *Jasin 10837.* Kepong: *Hamid FMS 36005.* — Penang. Batu Fringi: *Curtis 239.* SUMATRA. Banka I. Sungei Liat: *Teijsmann*, st. IX (probably).

Distribution. Malesia: the central part of Malaya, and probably in Banka.

Ecology. In rain-forests, up to 1400 m.

Notes. 1. An entirely glabrous sterile specimen collected by Teijsmann *s.n.* (BO) in Banka, probably belongs here.

2. In the type collection both flowers with a vestigial and a well developed gynoecium are represented.

55. Capparis sepiaria L., Syst. Nat. 10th ed. 2 (1759) 1071; Sp. Pl. 2nd ed. (1762) 720; Burm. *f.*, Fl. Ind. (1768) 118; Lam., Enc. Méth. Bot. 1 (1785) 606; Willd., Sp. Pl. 2 (1799) 1133; DC., Prod. 1 (1824) 247; Roxb., Fl. Ind. ed. Carey 2 (1832) 568; W. & A., Prod. (1834) 26; Cambess., Pl. Rar. Ind. Or. Jacquem. (1843) 21, t. 22; Jacquem., Voy. Ind. Bot. 4 (1844) 21, t. 24; Drury, Handb. Ind. Fl. 1 (1864) 40; Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 177, as for var. *vulgaris*; Trimen, Handb. Fl. Ceylon 1 (1893) 65; Cooke, Fl. Pr. Bombay 1 (1901) 47; Brandis, Indian Trees (1906) 34; Gagn., Fl. Gén. I.-C. 1 (1908) 191; Blatter, J. Bomb. Nat. Hist. Soc. 18 (1908) 763; Talbot, For. Fl. Bombay Sind 1 (1909) 61, f. 40; Merr., En. Philip. 2 (1923) 212, excl. var. *acuta* Vidal *in syn.*, which is *C. lobbiana;* Craib, Fl. Siam. En. 1 (1925) 83; Merr., Lingn. Sc. J. 5 (1927) 83; Gagn., Fl. Gén. I.-C. Suppl. 1 (1939) 165; Jafri, Pakistan J. For. 6 (1956) 201; Wild, Fl. Zambes. 1 (1960) 238, f. 37c; Jacobs, Fl. Mal. I, 6 (1960) 79, with map; Back. & Bakh. *f.*, Fl. Java 1 (1964) 185. — Type: *Anonymous s.n.* (LINN, cat. 664. 4), "Ind. hab. ad sepes", fl.

C. sepiaria β *glabrata* DC., Prod. 1 (1824) 247. — Type: *Anonymous s.n.* (G-DC), Malesia, Timor, fl.

C. incanescens DC., Prod. 1 (1824) 247; G. Don, Gen. Hist. Dichlam. Pl. 1 (1831) 279, "*canescens*"; W. & A., Prod. (1834) 26; Wight, Hook. Ic. Pl. 2 (1837) t. 123. — *C. sepiaria* var. *incanescens* (DC.) Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 177. — Type: "Mysore; v.s. in h. Banks" (*n.v.*).

C. stylosa β *velutina* DC., Prod. 1 (1824) 246. — Type: *Buchanan* ("in hb. Banks", *n.v.*), India, Mysore.

C. umbellata R. Br. *ex* DC., Prod. 1 (1824) 247, see Note 1; Benth., Fl. Austral. 1 (1863) 93; Bailey, Queensl. Fl. 1 (1899) 57; C. T. White, Proc. Roy. Soc. Queensl. 34 (1922) 31; Domin, Bibl. Bot. Heft 89 (1925) 684; Specht, Rec. Exp. Arnhem L. 3 (1958) 230. — Type: *R. Brown s.n.* (G-DC), Australia, fl. sent 1819.

C. emarginata Presl, Rel. Haenk. 2 (1835) 85, *non* A. Rich. ± 1841; Merr., En. Philip. 2 (1923) 211. — Type: *Haenke* (PR? *n.v.*), Malesia, Luzon.

C. retusella Thw., En. Pl. Zeyl. (1858) 16. — *C. sepiaria* var. *retusella* (Thw.) Thw., En. Pl. Zeyl. Addenda (1864) 400; Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 177; Murty & Singh, Proc. Inst. Sc. India 27B (1961) 13—17. — Type: *Thwaites CP 2550* (BM, CGE, DD, G, K, P, US, W), Ceylon, fl. fr.

C. subacuta Miq., Illustr. (1870) 35, in part, see Note 10.

C. glauca Wall. *ex* Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 180; Kurz, J. As. Soc. Beng. 43 ii (1874) 70; For. Fl. Burma 1 (1877) 65; Coll. & Hemsl., J. Linn. Soc. Lond. Bot. 28 (1890) 19. — Type: *hb. Wallich 7005* (K), Burma, Pegemew, Pagodas, st.

C. flexicaulis Hance, Trimen J. Bot. 16 (1878) 225; Forbes & Hemsl., J. Linn. Soc. Lond. Bot. 23 (1886) 50. — Type: *Bullock hb. Hance 20274* (A, phot., E), China, Hainan, Hoi-han, fl. summer 1877.

C. glauca var. *angustifolia* Coll. & Hemsl., J. Linn. Soc. Lond. Bot. 28 (1890) 19; see Note 5. — Type: *Collett 538* (BM, CAL, K), Upper Burma, Meiktila, fl. 1887.

C. trichopetala Valeton, Bull. Dép. Agr. Ind. Néerl. 10 (1907) 72. — Type: *Koch 618* (L), Malesia, SW. New Guinea, Merauke, fl. XI. 1905.

C. affinis Merr., Philip. J. Sc. 10 Bot. (1915) 303; En. Philip. 2 (1923) 210. — Type: *Escritor BS 21853* (BM, K, L, P, US), Malesia, Palawan, fr. VIII. 1913.

Wide, much-branched shrub a few m high, sometimes climbing. *Innovations* densely fulvous or greyish, rarely whitish puberulous. Twigs stout, zig-zag, sooner or later glabrescent. *Thorns* generally vigorous, recurved, 3—5(—8) mm. Petiole 2—4(—7) mm. *Leaves* firmly herbaceous to subcoriaceous, greyish green when dried (in the Philippines sometimes brownish), mostly (1.5—)1.8—2.3(—4) times as long as wide, exceptionally linear, see Note 3, widest about the middle to sometimes above or below, (1½—)3½—5½ (—10) by (1—)1½—2½(—4) cm; base acute or blunt or rounded to rarely subcordate, top variable, often rounded, but nearly always notched; midrib sometimes slightly sunken at the base, nerves 4—6(—8) pairs, thin, reticulation largely obscure; surfaces mostly dull, upper surface early glabrescent, lower surface mostly persistently hairy. *Subumbels* few- to 26-flowered, at the top of small lateral twigs, rarely terminal; pedicels filiform, ¾—2(—3) cm, glabrous. *Sepals* ovate, 3—6 by 3—5 mm, occasionally minutely ciliate, outer pair herbaceous with a narrow membranous margin, inner pair somewhat smaller, very thin, largely membranous. *Petals* 4½—7½ by 1¼—3 mm, very thin, white, more or less pubescent, especially outside at the base of the upper pair. *Stamens* 30—45. *Gynophore* (4—)6—10(—15) mm, often puberulous towards the base; ovary ovoid, 1½—2 by 1 mm, glabrous, placentas 2(—3). *Fruit* on a rather thin stipe, more or less fleshy, (sub)globose, 1—1½ cm in diameter, pericarp subcoriaceous, smooth, whitish-yellowish to almost black. Seeds 1—2, *c.* 8 by 5 by 4 mm (once 14 by 10 by 8 mm).

INDIA. Mount Abu, 24°41'N 72°50'E: *Kaul c.s. 9567*; *Santapau 4114H.* — Tavi River, *c.* 32°N 74°E: *Janki Prasad 9903.* — Karnal, 29°41'N 76°58'E: *Drummond 1254, Kew no. 20162 and 20203.* — Tundla Ravines, 27°13'N 78°14'E: *Duthie 4511.* — Near Lucknow, 26°50'N 80°58'E: *Mukerjee 19909*; *Verma 47060.* — Tangor, 25°25'N 83°47'E: *Witt*, fl. II. 1914. — Sambalpur, 21°28'N 84°04'E: *Mooney 3352.* — South of this line: many. — Calcutta (?Gardens): *Clarke 21738.* — East Bengal: *Griffith 603*; *Haines 2325.* CEYLON:

Koenig, fl.; *Rottler*, fl. 22. VI. 1788; *Thwaites CP 1063, CP 2550*; *Walker 106*. ANDAMAN ISLANDS: many. BURMA. Lower B. Prome: *anon. 1824 CAL-sh. 28847*, st. — Upper B. Pauk, 21°25′N 94°30′E: *Smales 194*. Meiktila: several. — East B. Tongla, 21°59′N 97°26′E: *Abdul Huk*, yfr. VII. 1890. CHINA. Kwangsi. Hop Po city: *Liang 69305*. — Kwangtung. Pakhoi, 21°29′N 109°10′E: *Plaiyfair 237*. Canton, 23°08′N 113°20′E: *Tsoong 3028*, HAINAN: many. INDO-CHINA. Tonkin, *Balansa 1377*. Haiphong, 20°50′N 106°41′E: *A. Henry 9518*. West T.: *Bon 5340*. — Laos (unlocated): *Thorel 2064*; *Vidal 1006bis*. — Annam. Hue/Tourane: *Clemens 3099*. Tourcham: *Fleury hb. Chevalier 39057*; *Hayata 79*. Ca Na: *Evrard 2488*. Phanri: *Evrard 1620*. — Cambodia. Leach, 12°18′N 103°51′E: *Poilane 17808*. — Cochin-China. Baria: *Pierre 4015*. Bienhoa: *d'Alleizette*, fl. VI. 1909. SIAM. North S.: *Groff 5868, 5997*; *Kerr 609*. — Northeast. S. Wang Saphung, 17°22′N 101°41′E: *Dee Bunpheng 401*. — Central S.: several —. Southwest S.: several. — Peninsular S. Kampengpet, 7°09′N 100°16′E: *Kerr 15980*. MALAYA. Perlis. Padang Besar: *Kerr 13636*. — Kedah: *Holttum SF 19827*. Alor Star: *Ridley 15170*. JAVA. West J. Muara Angke: *Meijer 1804*. Tandjung Priok: *Backer 33591, 33592*. — Central J. Semarang: *Docters van Leeuwen-Reijnvaan*, fl. IX. 1909; *de Voogd 13*. Rembang: *Büsgen 85*; *van Steenis 17456*. — East J.: many. — Madura: several. — Kangean Is: several. LESSER SUNDA ISLANDS. Bali: several. — Sumbawa: *Kostermans 18866*; *Zollinger 3382*. — Flores. Barie: *Zollinger 3331*. — Alor: *Jaag 484*. — Timor, West and East: many. — Wetar: *Riedel*, fl. — Leti: *Treub*, fl. 1893. — Babar: *Treub*, fl. 1893. — Tanimbar Is: *Buwalda 4597*; *Pleyte*, fl. fr. III. 1957. PHILIPPINES. Balabac: *Kienholz BS 15495*. — Palawan: *Alcacid PNH 6029*; *Curran FB 3534*; *Escritor BS 21853*. — Luzon. Ilocos Norte Prov.: *Ramos BS 27317, BS 32748*. Union Prov.: *Escritor BS 21115*. Pangasana Prov.: *Clemens*, fl. III. 1924; *Cuming 957*; *Otanes BS 18318*. Tarlac Prov.: *Vidal 28*. Bulacan Prov.: *Fenix 237*. Rizal Prov.: many. Batangas Prov.: *Gordon PNH 36855*; *Ramos BS 22323*; *Santos PNH 39153*. — Cuyo: *Gutierrez PNH 40485*; *Kienholz BS 15536, BS 15542*. — Mindoro: *Conklin PNH 19153*; *Kienholz 101*. — Mindanao. Zamboanga Prov.: several. Davao Prov. Mati: *Ramos & Edaño BS 48975*. — Sulu Is: *Santos 3722*. — Cagayan Is: *Wilkes's exp.*, fl. BORNEO. North B. Lahad Datu, 5°01′N 118°20′E: *Valera 10267, 49041*. CELEBES. Northeast C.: *Lam 2441*; *Pasik 6*. — Southwest C. Makassar: *Barclay*, fl. 1840. — Salajar Is: *Teijsmann? 1836*. — Buton: *hb. La Billardière*, fl. MOLUCCAS. Halmaheira: *Teijsmann 5539*. — Buru: *Binnendijk*, st. — Ambon: *de Vriese & Teijsmann*, fr. — Kai Is. Tual: *Jensen 195, 393*. NEW GUINEA. Merauke, 8°30′S 140°22′E: *Kalkman BW 3117*; *Koch 618*. — Erap, 6°35′S 146°43′E: *Henty NGF 10693*. — Near Port Moresby, 9°30′S 147°07′E: *Chalmers*, fr. 1880; *Brass 796*; *White 48*. — Lower Fly River, *c.* 8°17′S 142°E: *Brass 8230*. WESTERN AUSTRALIA. Vansittart Bay, 126°E: *Cunningham 457*. NORTHERN TERRITORY. Victoria River, *c.* 15°S 130°E: *F. von Mueller*, fl. 1885. Port Darwin: *Schultz 572*. Arnhem Land, coast: several. MacArthur River, *c.* 16°24′S 136°05′E: *Dietrich*, fl. IX/X. 1886. QUEENSLAND. Settlement Creek, 16°S 138°E: *Brass 388*. Burketown, 17°43′S 139°30′E: *MacIntosh*, fl. XI. 1905. Mitchell and Flinders River: *Palmer 13*. — Prince of Wales I.: several. Near Coen, 13°50′S 143°11′E: *Smith 11778, 11904*. Southwards along the coast to Bowen, 20°S 148°10′E: several. Percy I., 21°40′S 150°25′E: *Irgon*, fr. III. 1906.

Distribution. Africa: widely in eastern and southeastern tropical Africa and Madagascar (see Note 4; also South Africa?). Asia: Ceylon; in India south of the line Kutch-Ahmedabad-Lahore-Benares-Cuttack Delta, in northern India and Ceylon rare, in southern India common (also West Pakistan? see Note 6); Andaman Islands; central Burma to Kwangtung and Hainan; scattered in the Indo-Chinese Peninsula south of the 24th parallel to the very north of Malaya. Malesia: in West and Central Java rare along the northern coast, in East Java common, through the Lesser Sunda Islands to the Kai Islands; the Philippines but not in the everwet eastern parts, one station on the NE. coast of North Borneo, Celebes and some adjacent islands, the Moluccas and the southern and eastern part of New Guinea. Australia: from Vansittart Bay at 126°E. along the coast of Arnhem Land, the Gulf of Carpentaria, Prince of Wales I., and the eastern coast of Queensland southwards to 22°; reported to extend to *c.* 32° in New South Wales. — See Note 16.

Ecology. Dry thickets, hedges, teak forests, scrub and jungle in the lowlands, often near the sea shore, solitary or gregarious, with a preference for seasonal drought. During the dry period in fruit; then often a good deal of the leaves are shed.

Notes. 1. In eastern Malesia specimens are found which intergrade between 'typical' *C. sepiaria* and the Australian population known as *C. umbellata;* the latter has straighter twigs with thorns less developed or often wanting, larger, ovate, soon glabrescent leaves, fewer flowers in a shorter-stalked umbel. In some specimens the midrib is sunken over its entire length.

2. *Capparis sepiaria* and *cantoniensis* are easily distinguished by the midrib, flattened in the former, sunken in the latter.

3. Narrow-leaved specimens occur occasionally. From the Philippines we have *Gaudichaud s.n.* from near Manila, wherein the leaves are 6—7 mm wide, being *c.* 10 times as long as wide, and *A. Gordon PNH 36855* from Luzon, wherein the leaves are 7—11 mm wide, i.e. 4—6 times as long as wide. In a *Cunningham* collection (BM) from Vansittart Bay in NW. Australia, the leaves are 35 by 5—8 mm; thorns 1 mm. In *L. S. Smith 11904*, a seedling of 2 ft high from Queensland, the thorns are 2 mm long, the leaves 1 mm petiolate, *c.* 30 by 2 mm and acute to *c.* 18 by 4 mm and slightly notched at the top.

4. *Capparis sepiaria* occurs widely in eastern and southeastern tropical Africa and Madagascar, where it is known as *C. corymbosa* Lam. It is there even far more heterogeneous than in its Asiatic and Australian area. All the African material that I could see at Kew has a notched leaf top, but sometimes a red-brown tinge when dried, sometimes patent hairs, sometimes deciduous leaves, mostly larger flowers, with often a longer and thicker gynophore; on such characters DeWolf, Fl. Trop. East Afr. (in the press), based several varieties, of which the var. *subglabra* (*C. sansibarensis* Gilg) comes so near the Asiatic population that some specimens can hardly be distinguished. Wild, Fl. Zambes. 1 (1960) 237, recognized *C. sepiaria* but did not mention infraspecific taxa. *C. citrifolia* Lam. from South Africa seems also to be conspecific with *C. sepiaria*.

5. *Capparis glauca* Wall. *ex* Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 180; Kurz, J. As. Soc. Beng. 43 ii (1874) 32; For. Fl. Burma 1 (1877) 65; Coll. & Hemsl. J. Linn. Soc. Lond. Bot. 28 (1890) 19, only known from Burma, is here provisionally kept under *C. sepiaria*. The type material from western Upper Burma at *c.* 21°30′N 94°30′E, is almost too bad for identification. Twigs greyish tomentellous, thorns recurved, sharp, leaves glaucous, lanceolate, 5 by 1¼ cm, cuneate at the base, rounded at the top, midrib slightly sunken or flattish. The flowers seem to be with 2—3 in short-stalked subumbels which together form a terminal panicle up to *c.* 12 by 6 cm; pedicels 1¼ cm. Gynophore 3 mm, fruit globose, blackish, 1¼ cm diameter, one seed 6 by 5 by 4 mm. In *Robertson 1826* (DD) from Myingyan in Upper Burma the leaves agree with the former; there are a few pedicels at the top of small lateral twigs; fruits orange-pink when fresh, purplish when dried, 12—18 mm ø, on gynophore 2 mm long. On *Collett 539* (CAL) from near Meiktila, the flowers were described for the first time. Twigs and petioles densely greyish puberulous, thorns 2—3 mm, recurved. Leaves small, obovate, base acute; glabrescent. Flowers with *c.* 6—25 densely subumbellate; pedicels filiform *c.* 1—1½ cm, glabrous. Buds globose, 3 mm ø, glabrous like the whole flower. Stamens 20—22 (not 12—15). Gynophore 2—3 mm; ovary subglobose, with distinct stigma. In the type of *C. glauca* var. *angustifolia*, the leaves, as far as left, are 4 by 0.7 cm, top rounded or with a nerve-tip 1 mm. Flowers arranged like in the former; stamens 20. In *Lace 4877* (DD, E, K), also from Meiktila, the leaves are 17 mm wide, with notched top, the fruiting gynophore 4 mm.

As far as we can judge from this material, *C. glauca* represents a local deviating strain of *C. sepiaria*, with a variously developed tendency to produce narrow glaucescent leaves, small flowers with fewer stamens, and a shorter gynophore. The glaucescent leaves and the short gynophore are unique, the other characters sometimes appear elsewhere in the population.

6. Although Jafri (1956) mentioned the species from West Pakistan, none of the specimens I have seen came from as far west as that.

7. This species is, of course, not quite homogeneous throughout its vast area. Specimens with comparatively large leaves, as occur among the Malesian material, are never found

on the mainland of Asia and in Hainan. But in the Andamans all specimens have comparatively large leaves, notably up to *c.* 10 by 4½ cm (var. *grandifolia* Kurz *ex* Prain). The smallest flowers in this species are found among the material of India.

8. In *Kienholz BS 15536* and *15542* from Cuyo Is, P.I., the leaves are glossy brown when dry, instead of the normal green-greyish colour, and so are the twigs and the indument. Another deviating feature is the wanting of thorns in some of the nodes. On account of the zigzag-bended twigs, the leaves which are 5—6 cm long and notched at the top, with flattish midrib, and the arrangement of the flowers which have a gynophore 10 mm long, I reckon them to *C. sepiaria.*

9. *Vidal 1129*, cited by him unidentified, belongs here.

10. Under *C. subacuta* (the present *C. lucida*) Miquel cites a specimen collected by Teijsmann in Halmaheira. This belongs to *C. sepiaria.*

11. *C. retusella* Thwaites, later reduced by him to *C. sepiaria* as a variety, has rather narrow leaves, ± 3 times as long as wide, and a slender habit.

12. *C. incanescens* DC., by Hooker *f.* & Thomson reduced to *C. sepiaria* as a variety, represents a fairly rare variation of the Indian population, with a very short but dense whitish indumentum, strong thorns sometimes black, small leaves sometimes not notched but pointed.

13. *Lei*, to his number *1255* of Hainan, states that the fruits are poisonous.

14. *C. flexicaulis* Hance is described with 20 stamens.

15. DeCandolle described *C. umbellata* on an unnumbered duplicate of which it is hard to locate the original at Kew among the plants of this species which Robert Brown collected.

16. The distribution of this species reflects its preference for seasonal drought. In the Philippines it is confined to those provinces where there is a pronounced dry period, although the total annual rainfall is higher than in the eastern parts with a more even climate where *C. sepiaria* is not found; see Merrill, En. Philip. 4 (1926) map 2 and 4. Only SE. Mindanao seems to be an everwet station. In Java, *C. sepiaria* follows the influence of the dry east monsoon from East Java, where it is a common species, along the low northern coast to Djakarta.

56. Capparis siamensis Kurz, For. Fl. Burma 1 (1877) 63; Gagn., Fl. Gén. I.-C. 1 (1908) 195; Craib, Kew Bull. (1922) 234; Fl. Siam. En. 1 (1925) 84. — Type: *Teijsmann HB 5927* (ABD, BO, CAL, holo, GH, K, U), southwestern Siam, Radburi, fl.; see Note 4.

C. macropoda Pierre *ex* Gagn., Fl. Gén. I.-C. 1 (1908) 196; Craib, Fl. Siam. En. 1 (1925) 81. — Type: *Pierre 4007* (P), Indo-China, Cambodia, Kamchay Mts, fr. V. 1874.

C. adunca Craib, Kew Bull. (1922) 231; Fl. Siam. En. 1 (1925) 78; Gagn., Fl. Gén. I.-C. Suppl. 1 (1939) 166. — Type: *Kerr 5672* (BM, K), northern Siam, Muang Pichit, fl. III. 1922.

C. winitii Craib, Kew Bull. (1922) 234; Fl. Siam. En. 1 (1925) 84; Gagn., Fl. Gén. I.-C. Suppl. 1 (1939) 166 ("*winiti*"). — Type: *Kerr 2938* (BM, K), northern Siam, Muang Hawt, fl. 14. III. 1913.

Shrub, sometimes a tree, sometimes reported climbing, 3—8 m. *Innovations* greyish to brownish tomentose with stellate hairs; twigs sooner or later glabrescent; shoots at the base surrounded by some cataphylls. *Thorns*, if developed, slender, patent, somewhat curved mostly downwards rarely upwards, 1—3 mm. Petiole ¾—1¼ cm. *Leaves* firmly herbaceous, 1.5—2.3(—3.0) times as long as wide, ovate, (5—)6—9(—11) by 3—4½(—6) cm; base subcordate, top narrowed, acute to blunt, often subacuminate, mostly mucro-

nulate; midrib and main nerves above narrowly keeled but sunken as a whole, underneath well-prominent and brownish or yellowish coloured; nerves 4—5 pairs, the first 2 pairs radiating from the very base, reticulation distinct below; surfaces soon glabrescent except sometimes on the nerves above, dull. *Flowers* axillary; pedicels ¾—1¼ cm, tomentose. *Sepals* 8—10 by 3—5 mm, outer pair boat-shaped, outside sparsely stellate-hairy, inside densely villose at least at the margins, inner pair outside densely villose, especially towards the top, inside glabrous. *Petals* obovate-triangular to sometimes spathulate (13—) 18—27 by 7—10 mm, outside brown-villous towards the top, inside glabrous, greenish or whitish, the upper pair with a deep-yellow blotch, fading red. Torus ± 2½ mm wide. Stamens ± 36—46. *Gynophore* slightly curved, 2—2¾ cm, densely greyish tomentose all over, ovary ovoid, pointed, 5 by 1½ cm, densely tomentose, stigma knob-shaped, placentas 4, also 3 and 5 reported. In fruit the pedicel and the gynophore woody, incrassate to 4—5 mm. *Fruit* subglobose to ellipsoid or ovoid, ± 3—3½ by 2½—3½ cm, pointed, at any rate so when young, pericarp 2—3 mm thick, more or less densely set with small knobs up to 2 mm out more or less longitudinally arranged in 8 rows, red and sometimes partly hairy when ripe. Seeds ± 7 by 5 by 4 mm.

SIAM. North S. Lampang, 18°16'N 99°30'E: *Winit 856*. Raheng: *Winit 100*. — Central S.: several. — Southwest S.: many. Prachuap, 11°50'N 99°49'E: *Put 2290*; *Winit 663*. — Northeast S. Wang Saphung, 17°22'N 101°41'E: several. Pu Wieng: *Kerr 20005*; *Lakshnakara 1328*.— East S. Korat: *Put 2182*. — Southeast S. Krabin: *Kerr 9754*. INDO-CHINA. Cambodia. Leach, 12°18'N 103°51'E: *Poilane 17800*. Kamput, 10°37'N 104°11'E: *Pierre 4007*.

Distribution. Asia: Siam except in the Peninsula south of Prachuap, and Cambodia.

Ecology. Mixed deciduous forest, bamboo forest, open dry jungle, edge of evergreen forest, at low altitudes, to 1200 m in Burma. According to Craib, the plant is deciduous.

Uses. Bark and wood are locally used (in NE. Siam) in medicine for children.

Notes. 1. Gagnepain's statement, Fl. Gén. I.-C. Suppl. 1 (1939) 471, that *C. olacifolia* would occur adventitious in Cambodia, rests on a wrong identification of a *C. siamensis* specimen.

The gynophore, hairy in *C. siamensis*, glabrous in *C. olacifolia*, is one of the simplest characters for distinction.

2. It is apparent that Craib wished to maintain a distinction between *C. macropoda* and *C. siamensis* on account of the tuberculate fruit in the former. But even in the limited material available, there are intergrading specimens.

3. *Poilane 18700* is somewhat deviating. As far as can be stated, it is completely glabrous. The pedicel is twisted, as sometimes occurs in this group of species. The fruiting gynophore is 2½ cm, glabrous, not woody and only to 2 mm incrassate. The fruit is 3¾ by 3½ cm, the pericarp thin and smooth. The leaves match exactly those of *C. siamensis*, where it most probably belongs. The plant, a tree 6 by 0.15 m, comes from a big termitary.

4. The Calcutta specimen bears no collector's number and no mention of the name *siamensis*, but it matches exactly the Bogor duplicate, and on both has been written "Capparis brevispina var. γ". On the Calcutta sheet this has been crossed out. Nevertheless, it should be regarded as the holotype, since Kurz worked there.

57. Capparis sikkimensis Kurz. — *C. bhamoensis* Raizada (57b). — *C. cathcarti* Hemsl. *ex* Gamble (57a). — *C. formosana* Hemsl. (57d). — *C. masaikai* Lévl. (57c). — *C. yunnanensis* Craib & W. W. Sm. (57b).

Trees, shrubs, or climbers 4½—6 m. *Innovations* with indumentum of pale to red-brown, simple, short hairs, late glabrescent; twigs often dull purplish-brown tinged.

Thorns recurved, up to 6 mm, but mostly wanting. Petiole (¾—)1¼—2 cm. *Leaves* subcoriaceous to coriaceous, 1.6—2.6 times as long as wide, widest about the middle to rarely below, 7½—14(—19) by 3½—7½(—10) cm; base acutish, top rounded, sometimes more or less narrowed, often abruptly and shortly acuminate or only a small callous tip present; midrib flattish to shallowly sunken, nerves 6—8 pairs, thin, reticulation rather obscure; surfaces soon glabrescent, when fresh glaucous with purplish midrib and nerves, when dry mostly red-brownish tinged, dull or glossy. Peduncles up to 10 cm, angular, bearing 3—8(—20) pedicels conferted towards the top, and sometimes a few depauperated leaves; *subumbels* axillary, the apical ones often forming together a terminal panicle, or the flowers solitary in the upper leaf axils; pedicels 1¾—5½ cm, hairy. *Sepals* subcoriaceous, 7—21 mm long, densely fulvous-puberulous outside, outer pair very concave, and *c.* 5—14 mm wide, inner pair *c.* 6—15 mm. *Petals* obovate, *c.* 12—28 by 5—8 mm, hairy inside, white. Torus 2—5 mm wide. *Stamens c.* 30—120, (mostly?) pink. *Gynophore* (2½—)3½—5½ cm, glabrous; ovary 2—4 by 1½—2 mm, glabrous, placentas 4. *Fruit* on a stipe 3—11 mm incrassate, globose to ellipsoid or ovoid, sometimes umbonate or pointed *c.* (2½—)5—6½ by (2½—)5—5½ cm, deep purple, pericarp to 10 mm thick, smooth but sometimes sculptured (see Note 2). Seeds *c.* 16—21 by 12—15 by 10—11 mm.

Distribution. Asia: northeastern India, through Upper Burma and southern China to Formosa and the Riu Kiu Islands (according to Hosokawa), southwards from Hainan and Tonkin along the coast of Annam.

Ecology. Shady forests and open thickets, often along streams, between 1200 m (sometimes lower) and 1700, rarely 2300 m. Flowers mostly April-June, fruits mostly August-November.

Use. The seeds provide an important medicine, known as "Q-ning". The fruit is edible and medicinal, and the seeds are chewed.

Notes. 1. The species is very polymorphic, and particularly in Formosa and Hainan closely related to *C. callophylla.* For the present subdivision into subspecies, no more than thirty collections were available, and especially from Burma-Yunnan more material is desired.

2. The sculpture of the fruit is variable. Of *Wilson 11021* from Formosa, for instance, the fruit in the US-duplicate is smooth, in the A-duplicate coarsely sculptured. In southern China a fruit is produced with several conspicuous, irregular, more or less longitudinal, narrow ridges ½ cm out, which converge in a sort of apical acumen. Such fruits look as if made from papier-maché. I found no indication of an insect having caused this gall-like deformation.

3. *Capparis bhamoensis* cannot be maintained as a species. Its flowers are not so neatly arranged to subumbels as they mostly are in *C. sikkimensis*, but axillary towards the top of normal twigs. In the type, which I could see thanks to Dr Raizada's courtesy, there are two lateral twigs 6 and 6½ cm long, which bear a few flowers near the top; these subumbel-like structures were not figured in Raizada's plate. The thorns are somewhat ascending. The plant comes nearest to the type of *C. yunnanensis.*

4. In *Poilane 12529* from southern Annam, the plant is dark brown-purple tinged, the young twigs are hoary-puberulous, the thorns occur only on the main branches, 5 mm long recurved. The few leaves present are 1¼ cm petiolate, ± 6½—8 by 2—2¾ cm, widest at the middle, acutish to both ends, glossy above, dull beneath. The flowers are arranged towards the end of lateral twigs 23—30 cm long; pedicel 3 cm. Only one fruit is present, approximately ripe, globose, 5 cm ø, pointed, the thin pericarp now coarsely

wrinkled, seems to have been smooth when fresh; seed 15 mm or longer. It was a liana 25—28 m, from 700—800 m; the fruits were yellow and edible.

5. Fom *C. masaikai* Lévl. must be excluded *Cavalerie 2347* (cited by Léveillé as *3347*), which is *Reevesia pubescens* Mast. (Sterc.); see Rehder, J. Arn. Arb. 10 (1929) 195.

6. Kurz did not appoint a type specimen. The fine plate given by Prain, however, depicted a Kurz specimen from Kurseong. There was no such specimen among the Calcutta material examined, but this does not entirely rule out the possibility that it still exists. *Kurz s.n.* (CAL), from Sikkim, Kurseong, is regarded as the type, and if this is no longer extant, Prain's drawing should be taken for it. Prain had it under the name *C. cathcarti*, but the type of that name must be a Cathcart specimen from Darjeeling, which was also listed by Prain, and of which a drawing exists at Kew; Hooker & Thomson referred to this under *Capparis sp.*

57a. ssp. **sikkimensis.** — *C. sikkimensis* Kurz, J. As. Soc. Beng. 43 ii (1875) 181. — Type: *Kurz* (CAL, *n.v.*), India, Sikkim, Kurseong, figured in Prain, Ann. Gard. Calc. 9, 1 (1901) t. 10, see Note 6.

C. cathcarti Hemsl. *ex* Gamble, Darjeeling List 2nd ed. (1896) 6 (*n.v.*); Prain, Ann. Gard. Calc. 9, 1 (1901) 8, text. — *Capparis sp.* Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 180; Gamble, Darjeeling List (1878) 5 (*n.v.*). — Type: *Cathcart s.n.* (K, *n.v.*), India, Sikkim, Darjeeling, 4000′, figured on a drawing in the Kew collection.

Indumentum lax, fulvous. *Leaves* subcoriaceous, comparatively small to medium-sized (to 12 cm long), often ovate, acuminate, surfaces dull, glabrous. *Flowers c.* 6—20 in a subumbel; sepals 7—8 mm long; stamens 28—36 (Prain). *Fruit* globose, smooth, *c.* 2½—4 cm diam.; seeds few.

INDIA NORTH. Sikkim. Darjeeling, 27°02′N 88°20′E: *Clarke 28031*; *Gamble 1037A.* — Assam. Naga Hills, *c.* 26°N 94°30′E: *Bor 2799.* Manipur, 25°08′N 94°24′E: *Kingdon-Ward 17520.* BURMA. Arakan. Chin Hills, *c.* 23°N 93°30′E: *Dunn 140.*

Distribution. Asia: northeastern India and western Burma.

57b. ssp. **yunnanensis** (Craib & W. W. Sm.) Jacobs, *stat. nov.* — *C. yunnanensis* Craib & W. W. Sm., Notes Gard. Edin. 9 (1916) 91; Merr., J. Arn. Arb. 23 (1942) 167. — Type: *A. Henry 12986* (not *12896*; A, E, holo, K, US), China, Yunnan, Szemao, fl.

C. roxburghii (*non* DC.) Dunn, J. Linn. Soc. Lond. Bot. 39 (1911) 426.

C. bhamoensis Raizada, Ind. For. Rec. n.s. 3 (1941) 127, f. 4; see Note 3. — Type: *Smales X6* (DD), Burma, Bhamo, fl. IV. 1923.

Indumentum fulvous brown. *Leaves* comparatively large, widest at the middle, acute or with a small acumen, surfaces glabrous, dull. *Flowers* very large, sepals *c.* 15—21 mm long; stamens *c.* 120. *Fruit* globose, as far as known.

BURMA. North B. Bhamo, 24°15′N 97°15′E: *Smales X6.* CHINA. Yunnan. Lung-ling Hsien, 1700 m, 24°33′N 98°40′E: *Tsai 55550, 55557.* Tsang Yuan, 1600 m, 23°09′N 99°19′E: *Wang 73244.* Fo-Hai, 975 m, 21°25′N 100°25′E: *Wang 74694.* Szemao, 22°46′N 101°03′E: *Henry 322, 12986.* Chengkang (?= Chenkiang, 24°40′N 102°50′E): 2300 m: *Yü 17095.* INDO-CHINA. Tonkin. Chapa, 1200 m, 22°20′N 103°50′E: *Pételot 5591.*

Distribution. Asia: North Burma, Yunnan, Tonkin.

57c. ssp. **masaikai** (Lévl.) Jacobs, *stat. nov.* — *C. masaikai* Lévl., Fl. Kouy-Tchéou (1914/5) 59, see Note 5. — Type: *Esquirol 3230* (A, phot., E, L, phot.), China, Kweichow, fl. V. 1912.

Indumentum dark brown-red; innovations scarlet-tinged. *Leaves* small to medium-sized (to *c.* 14 cm long), widest at the middle, acuminate, surfaces dull, underneath hairy and the nerves darker. *Flowers* medium-sized; sepals *c.* 9—11 mm long; stamens *c.* 55—65. *Fruit* with lengthwise ribs, see Note 2.

CHINA. Kweichow (no further locations). *Esquirol 3230*. Lo Roey: *Esquirol 4039*. — Kwangsi. Tsin Lung Shan: *Ching 6893*. Me-kon, 22°50'N 108°19'E: *Ching 8481*. — Kwangtung. Shih Wan Da Shan, *c.* 22°N 108°E: *Liang 70073*.

Distribution. Asia: southern and southeastern China.

57d. ssp **formosana** (Hemsl.) Jacobs, *stat. nov.* — *C. formosana* Hemsl., Ann. Bot. 9 (1895) 145; Matsum. & Hay., J. Coll. Sc. Tokyo 22 (1906) 26; Hay., Ic. Pl. Formos. 1 (1911) 56; Hosokawa, Trans. Nat. Hist. Soc. Formosa 23 (1933) 216; not Kaneh., Formosan Trees (1936) 234, f. 174 which is *C. micracantha* var. *henryi;* Li, Woody Fl. Taiwan (1963) 235. — Type: *A. Henry 501A* (K), China, Formosa, Bankinsing Mts and Ape's Hill, fl. 1894.

HAINAN: *Chun & Tso 44087*; *How 73409*; *Liang 64986*. FORMOSA: many.

Distribution. Asia: Riu Kiu Islands (*n.v.*; Hosokawa), Formosa, Hainan.

Notes. 7. Of all the four subspecies, this one is nearest to *C. callophylla*, but the latter is entirely glabrous.

8. *Capparis kanehirai* Hayata *ex* Kaneh., Formosan Trees (1936) 235, f. 175, was invalidly published; the type collection in the Taihoku Herbarium consists of two sheets, marked *Kanehira 10863* and *10864*, from Formosa, Kankao, fr. XII. 1918; the duplicates in the Tokyo Herbarium are unnumbered.

58. Capparis tenera Dalz., Hook. J. Bot. Kew Gard. Misc. 2 (1850) 41; Drury, Handb. Ind. Fl. 1 (1864) 42, "*tener*"; Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 179, as for var. *dalzellii*; Trimen, Handb. Fl. Ceylon 1 (1893) 65; Cooke, Fl. Pr. Bombay 1 (1901) 47; Gagn., Fl. Gén. I.-C. 1 (1908) 183; Talbot, For. Fl. Bombay Sind 1 (1909) 63, f. 42; Dunn in Gamble, Fl. Pr. Madras 1 (1915) 46; Kanj. & Das, Fl. Assam 1 (1934) 78. — Type: *hb. Dalzell s.n.* (DD, holo, K), India, Syhadree, fl.

C. tetrasperma Thw., En. Pl. Zeyl. (1858) 15. — *C. tenera* var. *zeylanica* Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 179. — Type: *Thwaites CP 614* (BM, BO, CGE, DD, FI, G, GH, K, P, US, W, not *614bis*, which is a later collection), India, Ceylon, fl. yfr. V. 1846.

C. tenera var. *latifolia* Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 179. — Type: *Wallich hb. 6997* (G, K) Burma, Martaban, fl. 1829.

C. disticha Kurz, J. As. Soc. Beng. 43 ii (1874) 70, name; For. Fl. Burma 1 (1877) 62, descr.; Craib, Fl. Siam. En. 1 (1925) 80. — Type: *Kurz 20* (CAL, sh. 29134), S. Burma, Martaban, fl.

Shrub or climber, up to 3 m, often the spreading branches and leaves distichous. *Innovations* glabrous or tomentose and early glabrescent, the leaves first. *Thorns* strongly recurved, sharp, 3—4 mm. Petiole (3—)5—6 mm. *Leaves* [1]) herbaceous to coriaceous, the broadest mostly above, sometimes at the middle or rarely lower, (1.4—)1.8—2.0 (—2.7) times as long as broad, (4—)5—7(—11½) by 2—4(—6) cm; base rounded to subcordate, sometimes acutish, top rather abruptly acuminate, tip some ¾ cm, blunt; midrib

[1]) For the Andaman specimens, see Note 1.

shallowly sunken, nerves (3—)4—5 pairs, reticulation distinct to obscure. Pedicels (1—)2—4(—6), serial, (1½—)2—3(—3½) cm, filiform. *Flowers* fragrant. *Sepals* (3½—)4—5½ by 2—2½ mm, outside glabrous but sometimes hairy inside, outer pair largely covering the inner pair, boat-shaped, ovate, acute, inner pair ovate to elliptic, obtuse to acute, sometimes hairy at the margin. *Petals* white, (mostly?) the upper pair with red basal spot, 4—5(—7) by 1¾—2¼ mm, sometimes the upper pair broader and/or the lower pair longer than the other; ovate, rounded, margin and surfaces tomentose. Torus and disk small. *Stamens* (7—)8—18. *Gynophore* (12—)15—20(—25) mm, filiform, glabrous; ovary pear-shaped, ± 1½ by ½ mm, glabrous, stigma knob-shaped; placentas 2, ovules few. In fruit neither the pedicel nor the gynophore incrassate. *Fruit* subglobular, ¾—1(—1¼) cm diam., sometimes pointed, pericarp thin, deep orange or red when ripe. Seeds 1—2(—4), ± 5 by 4 by 3 mm.

INDIA SOUTH. Malabar, Bombay Presidency: several. Concan: *Stocks & Law*, fl. Sirsi, 14°40'N 74°51'E: *Braganza 577*. North Kanara: *Bell hb. Sedgwick 3977*; *Young*, fl. Kerala. Taliparamba, 12°02'N 75°20'E: *Barber 8687*. Balurangan Hills (*n.v.*): *hb. Beddome 252*. CEYLON: several. INDIA NORTH. Sikkim (wrong location?): *Thomson*, fl. 1857. — Assam. Nowgong Distr., *c.* 26°10'N 92°20'E: *Clarke 37595*; *Kanjilal 2928 (or 2892?)*; *4198*. Sibsagar, *c.* 26°20'N 94°E: *Kanjilal 1727*; *Srivastava 81278*. Manipur, *Watt 7210*. Keibul: *Srivastava 81935*. Imphal, 24°47'N 93°55'E: *Jagarmani 796*. BURMA. North B. Kachin Hills, *c.* 26°N 97°E: *Pottinger*, fl. III. 1897. Myitkyina: *Maung Mya 2855*. — East B. Laikan, 21°N 98°E: *Abdul Khalil*, fl. 1894. Shan Hills: *Collett 614*. — Upper B.: several. — Lower B.: many. — South B. Martaban: several. Tenasserim: several. ANDAMAN ISLANDS: several. SIAM. North S. Chiengmai area, *c.* 20°N 100°E: *Garrett 161, 185*; *Kerr 5127*. Chiengmai, 18°18'N 98°59'E: *Kerr 606*; *Khanthvhai RFD 22785*; *Suvarnakoses RFD 10664*. — Central S. Bangkok: *Marcan 277*. — Southwest S. Ratburi, 13°30'N 99°50'E: *Pierre 4014*.

Distribution. Africa: Kenya, Tanganyika, Dahomey, Nigeria, Congo, Angola, Mozambique (see Note 2). Asia: India, west coast of the Deccan Peninsula, Ceylon; Assam, Burma, north to Southwest Siam, and Andaman Islands.

Ecology. Jungle, below 1000 m alt. Flowers mostly February (southern Burma) to April-May (Assam), fruits 3—5 months later. In Assam, and perhaps elsewhere, cultivated in hedges.

Notes. 1. In the Andaman specimens, as usual, the leaves are generally large (up to 10 cm long) and ovate to elliptic.

2. In Africa the species is known under the names *C. viminea* Hook. *f.* & Th. *ex* Oliv. 1868, *C. welwitschii* Pax & Gilg, *C. lilacina* Gilg, and perhaps under others.

59. Capparis thorelii Gagn., Bull. Soc. Bot. Fr. 55 (1908) 214, excl. var. *pranensis*, which is *C. pranensis;* Fl. Gén. I.-C. 1 (1908) 190; Craib, Fl. Siam. En. 1 (1925) 84. — Type: *Thorel 2037* (K, P, holo), Indo-China, Cambodia, Oudan, fr. 1866/1868.

Shrub 1—2 m to spreading tree 4 m, sometimes climbing; habit vigorous to slender. *Innovations* densely fulvous-brownish puberulous, leaves early glabrescent, twigs late, often zig-zag. *Thorns* vigorous, 3—5 mm, strongly recurved, sometimes many of them towards the tip of twigs. Petiole 3—7 mm. *Leaves* herbaceous to subcoriaceous sometimes, ± 1.8—2.0(—2.5) times as long as wide, widest about or mostly above the middle, ± 2—3½(—4) by 1½—2(—4) cm; base subcordate to rounded, top rounded, sometimes finely notched; midrib flattish or sunken, hairy above at least in the basal half, nerves some 6 pairs, thin, reticulation obscure. Flowers white, with up to 8 in lateral short-stalked subumbels or occasionally axillary, the *subumbels* often grouped to a terminal leafy panicle; pedicels 1—1¾ cm, slender. Sepals thin, ± 5 by 2 mm, sometimes ciliate, glabrous but the inner pair sometimes puberulous inside towards the base. Petals very thin, ± 5—6 by 3 mm, pubescent inside towards the base. Stamens ± 35. *Gynophore*

¾—1½ cm, filiform, glabrous; ovary ovoid, pointed, 1—1½ mm long, glabrous, placentas 2. In fruit the pedicel and the gynophore, especially the former, comparatively much incrassate and woody, to 3 mm thick. *Fruit* globose, 1½—2½ cm diam., orange when fresh, blackish in the herbarium, pericarp ± 3 mm thick, smooth. Seeds 1—2, ± 15 by 10 by 10 mm.

SIAM. Northeast S. Wang Saphung, 17°22′N 101°41′E: *Kerr 8635*; *Suvarnakoses RFD 17055* — East S.: several. — Central S. Nakhawn Sawan, 15°40′N 100°04′E: *King 5483*. — Southwest S. Ratburi, 13°30′N 99°50′E: *Kerr 9027*; *Teijsmann 5926*. INDO-CHINA. Annam. ?Phanrang Prov., 11°34′N 109°E?: *Poilane 30532*. — Cambodia. Kompong Speu, 11°25′N 104°32′E: *Poilane 17436*. Northwestern C.: several.

Distribution. Asia: Siam (not in the North and the Peninsula) and southern Indo-China.

Ecology. Dry scrub forest on sandy soil at low elevation. Flowers January-March, fruits July-September.

Notes. 1. The variability in this species is not satisfactorily known. In many characters it seems intermediate between *C. sepiaria* and *C. rotundifolia*. From both it differs by the larger fruit on a considerably thickened stipe. This character occurs also in *C. flavicans*, but there the stipe is even thicker. *Capparis thorelii* differs from *flavicans* in the glabrous gynophore and the vigorous recurved thorns.

2. *Teijsmann 5926 HB*, distributed as *C. roxburghii* DC., is a sterile specimen and almost completely leafless. From the brownish pubescence and a leaf fragment which shows a hairy midrib above, it is supposed to belong here. The thorns on the main twig are slightly recurved and 8—10 mm long.

3. From *Kerr 8635* the impression is obtained that the species is (at least for a good deal) deciduous and produces new leaves shortly before the flowers.

60. Capparis tonkinensis Gagn., Bull. Soc. Bot. Fr. 55 (1908) 215; Fl. Gén. I.-C. 1 (1908) 189, t. 16B; Fl. Gén. I.-C. Suppl. 1 (1939) 165. — Type: *Bon 4016* (L, fragm., P, holo), Indo-China, Tonkin, Mts Làng Hê, fl. fr. 18. X. 1888.

C. indochinensis Merr., Un. Calif. Publ. Bot. 10 (1924) 424. — Type: *Pételot 1463* (A, L, fragm., P, UC), Indo-China, Tonkin, Cho Ganh, fl. IX. 1923.

Liana 2—5 m, with long slack branches. *Innovations* densely grey-brownish to fulvous puberulous, fairly soon glabrescent. Twigs slender, with a dark dull brown-purple tinge. *Thorns* recurved, to 3 mm, on the fertile twigs sometimes wanting. Petiole 3—8 mm. *Leaves* subcoriaceous, 2.0—3.5 times as long as wide, widest at the middle to frequently below, 3½—8½ by 1¾—4 cm; base rounded to blunt or to subcordate, top acute to sometimes gradually acuminate, mucronulate, rarely notched; midrib sunken, nerves 6—7 pairs, thin and hardly visible, reticulation obscure; surfaces glabrous, above mostly glossy and olive-green tinged, beneath dull and brownish tinged. Flowers in *subumbels* solitary in the axils ½—1½ cm pedunculate, or with up to *c.* 35 in a true raceme with a rachis up to 2 cm on which the pedicels are inserted on a sort of small cushion; the racemes sometimes arranged to a small panicle; pedicels 5—8 mm. *Sepals* very concave, outer pair 2½—3½ by 2—2½ mm, glabrous or laxly puberulous outside, inner pair 2½—4 by 2½—3 mm, ciliate or fimbriate. *Petals* equal, obovate, 2½—5 by 2—2½ mm, the margins woolly. *Stamens* 19—24. *Gynophore* 1—1½ mm, glabrous; ovary conical, 1¼—1½ by ¾ cm, glabrous, placentas 2, ovules few. *Fruit* on a gynophore to 2 mm, subellipsoid, 9—14 by 6—10 mm; pericarp thin, smooth; seed 1, rarely 2.

INDO-CHINA. Tonkin: several. — Annam, coast. Vinh. 18°42′N: *Poilane 16466*. Nhatrang, 12°15′N: several. Phanrang, 11°34′N: several.

Distribution. Asia: along the eastern coast of Indo-China.

Ecology. Forest, often on rocky soil, but also on sand, loam, or limestone, up to 800 m altitude. Seems to be fertile throughout the year.

Notes. 1. This species is polymorphic and difficult to segregate from *C. cantoniensis* on the one hand and from *C. parviflora* on the other. *Capparis cantoniensis* has greenish or greyish twigs in the herbarium (from Malesia mostly purple-brown, but there the leaves are considerably larger), the leaf base is acute, the subumbels arranged to a terminal panicle. *Capparis parviflora*, as far as it is known, has a shrubby habit, lacks the purplish tinge, has longer leaves with dull surfaces, longer and more slender peduncle and pedicels, longer gynophore, and the ovary more truncate.

The peculiar racemose inflorescence occurs also in *C. longestipitata*, but the latter is at a glance distinguished by the far longer gynophore.

2. *Poilane 9681* is reported a tree 12—13 m by 1 m girth and with a clear bole of 10 m. This is incredible and the herbarium speciment suggests a climbing plant.

3. *Capparis tonkinensis* var. *annamensis* Gagn. 1939, belongs here but was described in French and hence invalid.

61. Capparis trinervia Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 175; Kurz, For. Fl. Burma 1 (1877) 64; Brandis, Indian Trees (1906) 35; Gagn., Fl. Gén. I.-C. 1 (1908) 193; Suppl. 1 (1939) 168; Jacobs, Fl. Mal. I, 6 (1960) 73, with map. — Type: *Helfer hb. East India Company 185* (K), Burma, Tenasserim, fl.

C. kunstleri King, J. As. Soc. Beng. 58 ii (1889) 396; Ridl., Fl. Mal. Pen. 1 (1922) 122. — Type: *King's Coll. 8337* (CAL, K), Malesia, Malaya, Perak, G. Booboo, fr. XII. 1885.

Climber or shrub up to 4 m. *Innovations* ferruginous-tomentose, sooner or later glabrescent. Twigs angular. *Thorns* 1—3(—6) mm, patent or recurved, mostly downwards, rarely upwards. Petiole (7—)10—14(—18) mm. *Leaves* subcoriaceous, in dried state dull green with brownish main nerves, ± 2.4—3.0(—3.3) times as long as wide, widest at or slightly above the middle, (6—)10—14(—19) by (2¾—)3½—6½ cm; base cuneate, top acuminate with acute tip ± ¾ cm; midrib above flattish or shallowly sunken towards the base, below often hardly raised, nerves (2—)3—8(—10) pairs, reticulation invisible or almost so; margin often somewhat revolute; surfaces early glabrescent, the nerves latest. *Flowers* with (3—)5—10(—15) conferted towards the top of twigs, sometimes also in subumbels on 3—4 cm long peduncles in the axils of the highest leaves. Pedicels rather vigourous, 2—5 cm, hairy, in the axils of the upper leaves or of very soon caducous ± 4 mm long narrow bracts, *Sepals* ± 9—12 by 11 mm, very imbricate, outside densely orange-yellow puberulous, the inner pair with membranous margin. *Petals* light red or white, obovate, ± 12—15 by 8—9 mm, pubescent towards the base on both sides, the margins crisp towards the top. Torus 5—6 mm wide, flattish. *Stamens* ± (30—)60—70. *Gynophore* 2¾—4½(—5) cm, glabrous, light red (see also Note 1); ovary 2—2½ by 1½ mm, with distinct stigma, glabrous, placentas 4. In fruit the pedicel and the gynophore woody, incrassate to 4—6 mm. *Fruit* deep yellow, globose, sometimes perhaps apiculate, *c.* 3½—5 cm diameter, or perhaps larger, pericarp *c.* 4 mm thick or more. Seeds 15—23 by 10—14(—20) by 6—13 mm.

BURMA. South B. Salween Distr.: *Maung Po Chin 6817*. Tavoy Distr.: many. Mergui: *Meebold 14900*. SIAM. Peninsular S. Puket Prov., *c.* 7°52'N 98°22'E: *Curtis 2926* (? bad specimen). INDO-CHINA. Tonkin. Tu Phap: *Balansa 4076*. Phu Tho, 21°23'N 105°13'E: *Fleury hb. Chevalier 32276*. South T.: *Bon 3413*. — Laos. Borikhane, 18°35'N 103°44'E: *Kerr 20764*. Attopeu, *c.* 14°51'N 106°56'E: *Harmand 1415*. — Annam. Dakto: *Poilane 35551*, Blao, 11°33'N 107°49'E: *Poilane 21760*. MALAYA. Perak. Gunong Booboo, 4°40'N 100°50'E: *King's coll. 8337*. SUMATRA. East Coast Res. Tinggi Radja, *c.* 3°S 98°30'E: *Jochems 27*; *Lörzing 1700*

Distribution. Asia: southern Burma, Indo-China, peninsular Siam and northwestern Malaya. Malesia: northern Sumatra.

Ecology. A creeper reported climbing in dense jungles, and from dry, almost bare limecinder ledges, at low elevation.

Note. 1. A rare species with a great polymorphism which is not sufficiently known. In a few specimens from Burma the leaves are subtriplinerved, i.e. one pair of weak nerves arises from the very leaf base and one strong pair arises shortly above it. In some other specimens there are 3—5 pairs and in several specimens the leaves have more; I could not make a demarcation. The leaf between the nerves gives the impression to lack any reticulation or structure; it might be a bit fleshy when fresh.

In the specimens from Burma and Indo-China the gynophore is thin-puberulous towards the base; in the material from Malesia it is glabrous. In a few specimens from Burma 30—40 stamens were counted. The other, as far as it could be stated, have 60—70.

62. Capparis urophylla Chun, J. Arn. Arb. 29 (1948) 419. — Type: *Z. S. Chung (T. S. Tsoong) 81701* (A, SYS, holo), China, Kwangsi, Hang-On-Yuen, fl. VI. 1936.

Shrub 2—6 m. Twigs slender, mostly entirely glabrous, but the *innovations* sometimes with minute purplish brown stellate hairs, glabrescent, green when dry. *Thorns* to 1 mm, slender, curved upwards but nearly always wanting. Petiole 3—5 mm. *Leaves* herbaceous, the blade widest at or mostly below the middle, total length (2.2—)3—4(—5.4) times the width, (3—)4—8½ by 1¼—2(—2¼) cm; base acutish, top gradually caudate, the tip linear, 1½—2½ by ¼ cm, blunt; midrib flattish, pale yellow underneath, nerves 4—6 pairs, thin as the reticulation; surfaces glabrous, dullish. *Flowers* serial with 2 or solitary in the axil, white; pedicels ¾—1½ cm. *Sepals* subequal, ovate, elliptic, ± 3—5 by 2—3 mm, glabrous outside, densely tomentose inside. *Petals* 6—7 by 2½—3½ mm, densely tomentose inside. Torus 1 mm wide. *Stamens* ± 14—20. *Gynophore* 1—2 cm, filiform, glabrous; ovary 1 mm long, glabrous, placentas 2. *Fruit* on thin stalk, globose, ¾—1 cm diam., smooth, yellow-orange. Seed 1, ± 6 by 5 by 4 mm.

CHINA. Yunnan. Szemao, 22°46'N 101°03'E: *Henry 10215*. Chengkiang (?= Chenkiang, 24°40'N 102° 50'E): *Yü 17382*. Watershed Black River and Maokai (*n.v.*): *Rock 2909*. — Kwangsi: several. — Kwangtung: Shi Wan Da Shan, *c.* 22°N 108°E: *Liang 70019*. INDO-CHINA. Laos. Muang Cha area, 1400 m, *c.* 19°N 103°E: *Kerr 21129*; 2000 m: *Vidal 1586*.

Distribution. Asia: southern China, northern Laos.

Ecology. Damp forest, ravines, also roadsides, on sandy soil, between 350 and 2000 m. Flowers March-July, fruits August-October.

63. Capparis versicolor Griff., Not. Pl. As. 4 (1854) 577; Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 175; Kurz, For. Fl. Burma 1 (1877) 65; Brandis, Indian Trees (1906) 35; Jacobs, Fl. Mal. I, 6 (1960) 93. — Type: *Griffith 936* (K), Burma, Mergui, fl. I. 1835.

C. larutensis King, J. As. Soc. Beng. 58 ii (1889) 393; Ann. Gard. Calc. 5 (1896) 118, t. 134; Ridl., Fl. Mal. Pen. 1 (1922) 122; Jacobs, Fl. Mal. I, 6 (1960) 89, see Note 3. — Type: *King's Coll. 5103* (CAL, K, SING), Malesia, Malaya, Perak, Larut, fl.

C. koi Merr. & Chun, Sunyatsenia 2 (1934) 28. — Type: *Ko 52225* (A, NY, US), China, Hainan, Po-ting, fl. IV. 1932.

C. khuamak Gagn. Bull. Soc. Bot. Fr. 85 (1939) 598, in part, see Note 1; Fl. Gén. I.-C. Suppl. 1 (1939) 167, f. 15.

C. nhatrangensis Gagn., Bull. Soc. Bot. Fr. 85 (1939) 598; Fl. Gén. I.-C. Suppl. 1 (1939) 165, see Note 4. — Type: *Poilane 4746* (P), Indo-China, Annam, Nhatrang, fl. fr. 27. IX. 1929. — **Fig. 32.**

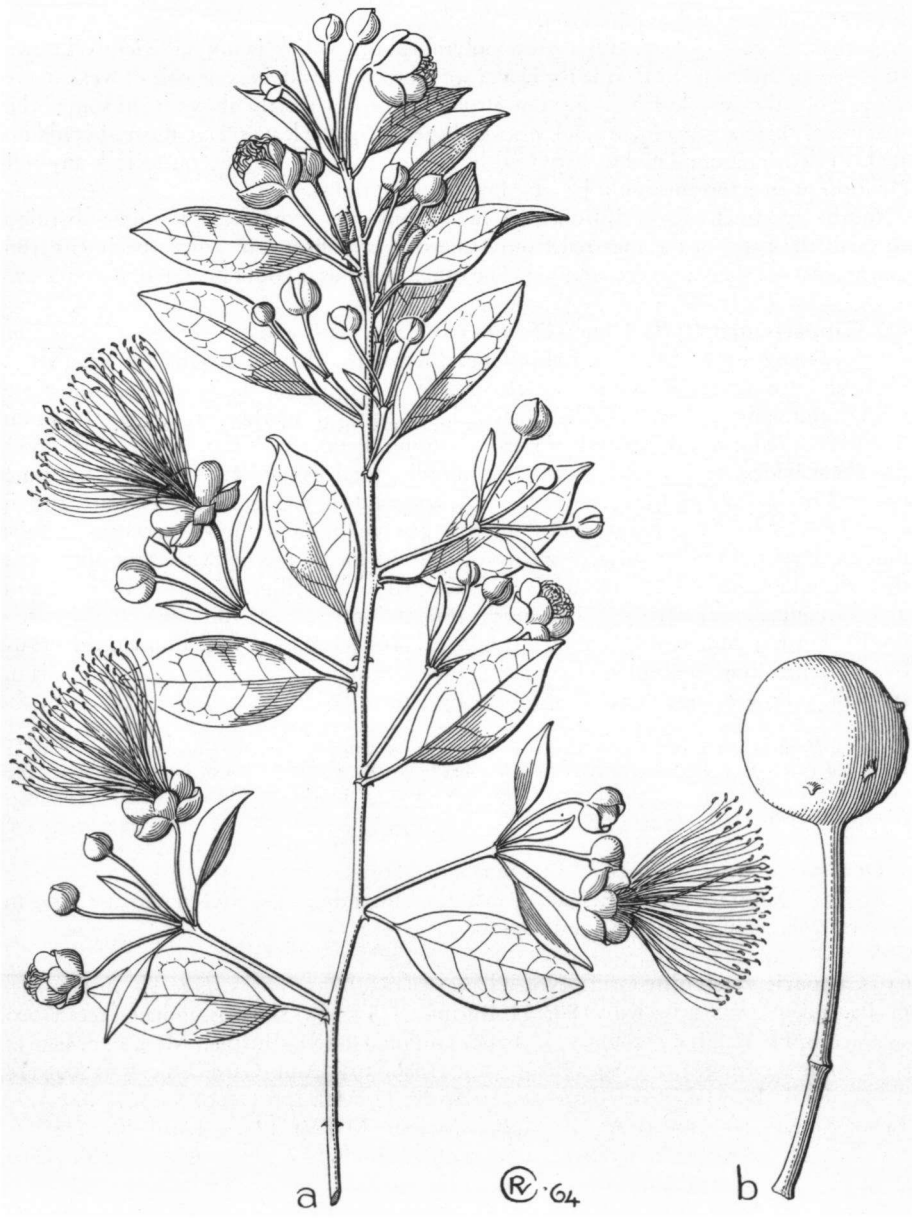


Fig. 32. *Capparis versicolor* Griff. — a. Habit, b. fruit, both × $\frac{2}{3}$ (a from *Lei 591*, b from *Tsang 28663*).

Climber, sometimes shrub, 2—12 m by ± 3 cm. *Innovations* brown-puberulous when young, sometimes glabrous. *Thorns* patent to slightly recurved, 1—2(—5) mm, sometimes wanting, or only a blunt base present. Petiole 7—9 mm. *Leaves* subcoriaceous, (2.0—) 2.5—3.0(—3.2) times as long as wide, widest slightly below to slightly above the middle, 4—8(—11) by 1½—2½(—3¾) cm; base acute, top more or less acuminate, tip minutely notched or sometimes blunt; midrib narrowly sunken all over, yellowish underneath, nerves 6—7(—9) pairs, obscure, margin flat. *Inflorescence* axillary and/or terminal, peduncle straight, sturdy, 1¼—7 cm, somewhat angular with 2—4 flowers at the top, sometimes bearing a few more or less depauperated leaves; sometimes the inflorescence reduced to a 1-flowered peduncle few mm long or, towards the twig top, some flowers may be axillary on a long pedicel. Pedicels 1¾—3½ cm, vigorous. *Flowers* fragrant, for colour see Note 2. *Sepals* ± 10 by 7—10 mm, elliptic to suborbicular, glabrous. *Petals* suborbicular to obovate, 10—17 by 7—14 mm, glabrous or pubescent inside towards the base. Torus ± 3 mm wide. *Stamens* 50—70, equalling the gynophore. *Gynophore* (3½—)4—5 cm, filiform, glabrous; ovary with 2—3 ovoid, ± 1½ by 1—1½ mm, glabrous placentas. In fruit the pedicel and the gynophore incrassate to 2—3 mm. *Fruit* globose, black, 3—4½ cm diam. (sometimes 1-seeded and then smaller), sometimes umbonate, pericarp ± 2½ mm thick, rough, sometimes with a few small irregular knobs. Seeds few, 15—21 by 15 by 10—12 mm.

CHINA. Kwangsi. Shap Man Taai Shan (*n.v.*): *Tsang 22030*. — Kwantung; several, northwards to Yun Fou, 25°N 109°E: *Wang 548*; eastwards to Kwai Shan, 23°41′N 114°45′E: *Tsang 28663*. HAINAN: many. INDO-CHINA. Annam, coast. Vinh, 18°42′N: *Chevalier 32497*; *Eberhardt 4925*; *Poilane 16538*. Tourane, 16°04′N: *Clemens 3132*. Nhatrang, 12°15′N: *Poilane 4746*. BURMA. South B. Mergui, *c.* 12°26′N 98°34′E: *Griffith 936*. MALAYA. Perak. Larut: *King's coll. 5193*. Kampar: *Ridley 9646*. Selangor. Klang (? 3°N 101° 25′E) Gates: *Ridley*, fl. I. 1921.

Distribution. Asia: southern China, Hainan, the coastal region of Annam; in Peninsular Burma and the central western part of Malaya.

Ecology. In light forest and shrubbery, on dryish sandy soil, also along streams, up to 1800 m.

Notes. 1. Gagnepain cited 6 collections under *C. khuamak*. Four of these belong here, namely *Chevalier 32497*, *Clemens 2132*, *Eberhardt 4925*, and *Poilane 16538*. In the picture of *C. khuamak* given by Gagnepain, Fl. Gén. I.-C. Suppl. 1 (1939) 163, f. 15, the flowers were drawn after *Eberhardt 4925* (most probably), the fruits after *Poilane 16538*.

2. The colour of the flowers is recorded very differently. The field notes give: white, whitish pink, pink, red, purple, and yellow with maroon stamens.

3. The few collections known as *C. larutensis* have comparatively small leaves, but specimens like *CCC 9804 McClure* from Hainan show that such plants may also occur elsewhere in the area. Further, *C. larutensis* is very late glabrescent, but this is also subject to great variation within the species. The type, for instance, is alsmost entirely glabrous. In *C. larutensis* the sepals are *c.* 7 mm long, and 30 stamens have been counted, but otherwise the scarce material fits so well in *C. versicolor*, that there is no reason to keep it apart as a taxon.

4. It is with even more hesitation than in the case of *C. larutensis*, that *C. nhatrangensis* is here reduced to *C. versicolor*. Only the type is known, also very similar, though, to *CCC 9804*. A few important points of the former are given here, apart from the description of *C. versicolor*. Thorns conical, 2 mm, slightly recurved. Leaves with a tendency to fold the upper halves lengthwise together, 2¾—3 by 1¼ cm, widest slightly above the middle, nerves 4—5 pairs but almost invisible. Flowers axillary, solitary, towards the

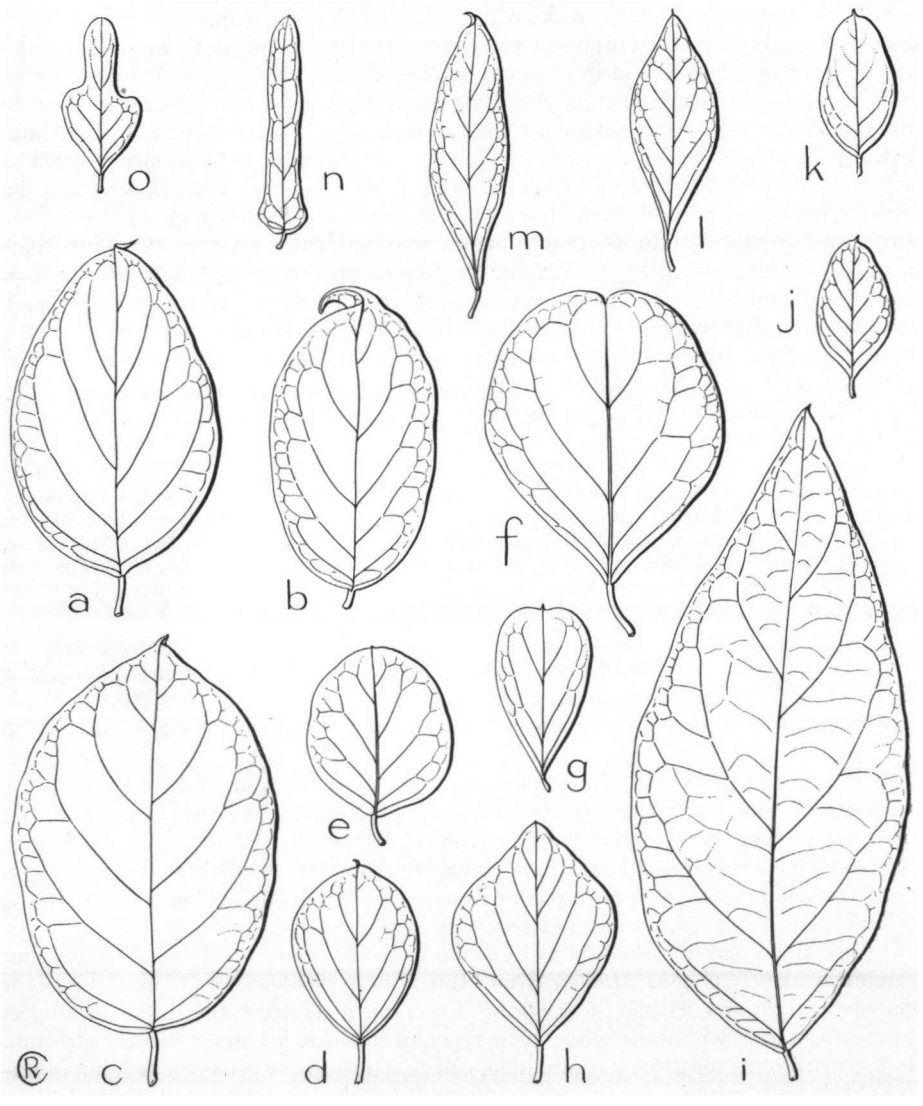


Fig. 33. *Capparis zeylanica* L., local leaf variations — a. From the Andaman Is., *Parkinson 181*, b. from Annam, *Poilane 4866*, c. from Annam, *Pierre 3379*, d. from Annam (*C. "latifolia"*), *Poilane 2964*, e. from northern India, *Vaid s.n.*, f. from Siam (*C. "latifolia"*), *Kerr 5738*, g. from Hainan (*C. "hastigera* var. *obcordata"*), *Lau 3236*, h. from Burma, *White 24*, i. from northern India (sterile shoot), *P. Das 44*, j. from southern India, *Griffith 74*, k. from Hainan, *Lau 1280*, l. from Hainan, *Lau 5857*, m. from Hainan, *Lau 229*, n. from Annam, *Evrard s.n.*, o. from Hainan (*C. "hastigera"*), *Henry s.n.*, all × ½.

top of twigs. Sepals subequal, very concave, thin, 6—8 mm diam., glabrous but ciliate at the top, inner pair with wide membranous margin. Petals in full-grown state unknown. Stamens 31. Gynophore 25 mm, filiform, glabrous; ovary 2 mm long, glabrous, stigma point-like, placentas 3. Fruit immature, on stipe 3 mm thick, subglobose, 3 by 2.6 cm, pericarp roughish. In the original description Gagnepain mentioned a sort of horn-like protrusion on the inside of the outer sepals, but nothing of the kind was found be me.

64. Capparis viburnifolia Gagn., Bull. Soc. Bot. Fr. 85 (1939) 598; Fl. Gén. I.-C. Suppl. 1 (1939) 168. — Type: *Poilane 25565* (P, holo, UC), Indo-China, Tonkin, Phong Tho, fl. IV. 1936.

Liana 2—6 m, perhaps larger. *Innovations* densely dark brown-villose. Twigs angular, very late glabrescent. *Thorns* 2—6 mm, more or less recurved. Petiole 1—1½ cm. *Leaves* coriaceous, 1.6—2.2(—2.6) times as long as wide, ovate to obovate, 7—9 by 3½—5¼ cm; base subcordate to blunt, top abruptly acuminate with blunt tip ¼—1 cm; midrib flattish to shallowly sunken, nerves 5—6 pairs, thin, shallowly sunken towards the margin, reticulation obscure; margin, sometimes strongly, revolute when dry; surfaces when dry dull green with brown-villose main nerves, late glabrescent above, densely golden-brown villose underneath. *Flowers* with some 3—12 conferted at the top of twigs. Pedicels rather vigorous, 2—3 cm. *Sepals* very imbricate, 15 mm long, brown-villose outside, outer pair ± 6 mm wide, inner pair ± 10 mm wide, with lighter membranous margin. *Petals* at least ± 2 by 1½ cm, violet, whitish pubescent, especially outside. Torus ± 5 mm wide. *Stamens* ± 75, filaments dark pink. *Gynophore* at least 2 cm, probably longer, white-villose at the base; ovary ± 3 mm long, glabrous, placentas 4. *Fruit* unknown, but see Note 2.

CHINA. Yunnan. Menghet(?): *Bons d'Anty 271 hb. Henry 12380.* Fo-Hai, 21°56'N 100°25'E: *Wang 73795.* INDO-CHINA. North Tonkin: *Poilane 27197.* Phong Tho, 22°33'N 103°03'E: *Poilane 25565.* — Annam. Near Phanrang, 11°34'N 109°E: *d'Alleizette*, buds VI. 1909; *Poilane 17289.*

Distribution. Asia: Yunnan and coastal Indo-China southwards to Phanrang.

Ecology. Reported from 700 and from 1000 m altitude.

Notes. 1. Open flowers are not yet known.

2. *Wang 73796* is a meagre specimen with small, partly emarginate leaves and axillary pedicels, but probably belongs here. Its gynophore is 4¼—5 cm, incrassate to 5 mm; the fruit, unripe, is ellipsoid, 5 by 4 cm, the pericarp is 2 mm thick, hard, smooth, and very densely velvety with short yellow-brown hairs.

65. Capparis zeylanica L., Sp. Pl. 2nd ed. (1762) 720; Lam., Enc. Méth. Bot. 1 (1785) 605; Willd., Sp. Pl. 2 (1799) 1132; DC., Prod. 1 (1824) 247, for the Ceylon material; Roxb., Fl. Ind. ed. Carey 2 (1832) 567; W. & A., Prod. (1834) 25; Drury, Handb. Ind. Fl. 1 (1864) 39, see Note 8; Dunn in Gamble, Fl. Pr. Madras 1 (1915) 46; Kew Bull. (1916) 62; Jafri, Pakistan J. For. 6 (1956) 10; Jacobs, Fl. Mal I, 6 (1960) 87, f. 5, with map; Back.& Bakh. *f.*, Fl. Java 1 (1964) 185. Not with Lour., Fl. Cochinch. (1790) 330, which is *C. pyrifolia*, nor with Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 174, which is *C. brevispina. Oligloron zeylanica* (L.) Rafin., Sylva Tellur. (1838) 109, *excl. descr.* — Type: *Hermann* (BM, *n.v.*), India, Ceylon; see under *C. brevispina*, Note 1.

C. horrida Linn. *f.*, Suppl. (1781) 264; Lam., Enc. Méth. Bot. 1 (1785) 606; Willd., Sp. Pl. 2 (1799) 1132; DC., Prod. 1 (1824) 246; W. & A., Prod. (1834) 26; Wight, Ic. Pl. Ind. Or. 1 (1839) t. 173; Thw., En. Pl. Zeyl. (1858) 15; Drury, Handb. Ind. Fl. 1 (1864) 39; Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 178; Trimen, Handb. Fl.

Ceylon 1 (1893) 64; Brandis, Indian Trees (1906) 35, f. 14; Blatter, J. Bomb. Nat. Hist. Soc. 18 (1908) 763; Gagn., Fl. Gén. I.-C. 1 (1908) 185; Talbot, For. Fl. Bombay Sind 1 (1909) 62, f. 41; Merr., En. Philip. 2 (1923) 211; Craib, Fl. Siam. En. 1 (1925) 81; Kanj. & Das, Fl. Assam 1 (1934) 77; Quis., Medic. Pl. Philip. (1951) 338. — Type: *Koenig* (*n.v.*), India, Ceylon.

C. pyrifolia β, Lam., Enc. Méth. Bot. 1 (1785) 606, according to DC., Prod. 1 (1824) 247.

C. dealbata DC., Prod. 1 (1824) 246, not with Backer, Schoolfl. (1911) 62, which is *C. pubiflora*. — Type: *Anonymous s.n.* (G-DC), Malesia, Timor, fr.

C. acuminata (*non* Willd.) DC., Prod. 1 (1824) 247.

C. quadriflora DC., Prod. 1 (1824) 247. — Type: *Anonymous? s.n.*, *m.* Lambert (G-DC), India or., fl. sent 1816.

C. terniflora DC., Prod. 1 (1824) 247. — Type: *Anonymous s.n.* (P), India, Coromandel, fl.

C. aurantioides Presl, Rel. Haenk. 2 (1835) 86. — Type: *Haenke* (PR, *n.v.*), Philippines, Luzon, fr.

C. linearis (*non* Jacq.) Blanco, Fl. Filip. (1837) 438.

C. nemorosa Blanco, Fl. Filip. (1837) 438. — Type unknown.

C. micracantha (*non* DC.) Blanco, Fl. Filip. 2nd ed. (1845) 305; 3rd ed. (1878) 200, t. 188.

Capparis sp. Griffith, Not. Pl. As. 4 (1854) 579; Ic. (1854) t. 608. — *Griffith?* (*n.v.*), Burma, Bamo, 26. IV. 1837.

C. rufescens Turcz., Bull. Soc. Nat. Moscou 27, 2 (1854) 321. — Type: *Zollinger 3381* (BM, BO, FI, G, L, P), Malesia, Sumbawa, fl. VIII. 1847.

C. erythrodasys Miq., Pl. Jungh. (1855) 397. — Type: *Junghuhn s.n.* (L, U), Malesia, C. Java, Mt Gambing, fl.

C. hastigera Hance, Seem. J. Bot. 6 (1868) 296; Coll. & Hemsl. J. Linn. Soc. Lond. Bot. 28 (1890) 20; Cooke, Fl. Pr. Bombay 1 (1901) 47; Brandis, Indian Trees (1906) 33; Merr., Lingn. Sc. J. 5 (1927) 83. — Type: *Hance 13732* (A, phot., BM), China, Kwangtung, Pak-Sha, fl. 19. XI. 1866.

C. swinhoii Hance, Seem. J. Bot. 6 (1868) 296. — Type: *Swinhoe hb. Hance 14409* (A, phot., BM), China, Hainan, fl. III. 1868.

C. horrida β *erythrodasys* Miq., Illustr. (1870) 34. — Type: *Junghuhn s.n.* (L), Malesia, Java, Gunong Gambing, st.

C. crassifolia Kurz, J. As. Soc. Beng. 42 ii (1874) 227; For. Fl. Burma 1 (1877) 62. Not with C. Mueller, Walp. Ann. 7 (1868), which is *C. pubiflora*. — Type: *Kurz 1825* (CAL, K), Lower Burma, Pegu, fl. 20. III.

C. polymorpha Kurz, J. As. Soc. Beng. 42 ii (1874) 227; For. Fl. Burma 1 (1877) 63, *non* A. Rich. 1831. — Type: *Kurz 1828* (CAL), Lower Burma, Pegu, yfr. IV. 1854.

C. viminea (*non* Hook. *f.* & Th.) Fern.-Vill., Noviss. App. (1880) 11.

C. xanthophylla Coll. & Hemsl., J. Linn. Soc. Lond. Bot. 28 (1890) 20; Brandis, Indian Trees (1906) 36. — Type: *Collett 93* (K), Upper Burma, Jemethen, fl. II. 1888.

C. myrioneura var. *latifolia* Hall. *f.*, Fedde Rep. 2 (1906) 61. — Type: *Riedel s.n.* (BO, K), Malesia, NE. Celebes, Gorontalo, fr.

C. horrida var. *paniculata* Gagn., Fl. Gén. I.-C. 1 (1908) 185. — Type: *Julien 1274* (E, G, P), Indo-China, Cambodia, fl. VI. 1874.

C. latifolia Craib, Kew Bull. (1922) 232; Fl. Siam. En. 1 (1925) 81; Gagn., Fl. Gén. I.-C. Suppl. 1 (1939) 169. — Type: *Kerr 5738* (ABD, BM, K, P, UC), northern Siam, Lom Sak, yfr. 3. IV. 1922; see Note 2.

C. subhorrida Craib, Kew Bull. (1922) 234; Fl. Siam. En. 1 (1925) 84; Gagn., Fl. Gén.

I.-C. Suppl. 1 (1939) 170. — Type: *Kerr 5826* (ABD, BM, K), northern Siam, Nakawn Tai, yfr. 13. IV. 1922.

C. hastigera var. *obcordata* Merr. & Metc., Lingn. Sc. J. 16 (1937) 192. — Type: *Lau 3236* (A, P), China, Hainan, Ue Lung Shan, fl. I. 1934. — **Fig. 33.**

Climbing or rambling shrub, 2—5(—10) m. *Innovations* densely brown-red to greyish tomentose, sooner or later glabrescent *Thorns* recurved, 3—6 mm long. Petiole ½—1(—2) cm. *Leaves* subcoriaceous, (1.2—)1.7—2.3(—2.9) times as long as wide, widest below or at the middle, rarely higher, 4—10(—18) by 3½—5½(—9) cm; base rounded, sometimes subcordate, rarely acute, top acute to rounded, rarely slightly acuminate, with a recurved, stiff, leathery, dark-coloured mucro up to 3(—4) mm long; midrib flattish to subdepressed above, nerves 3—8 pairs, reticulation distinct above; surfaces above soon glabrescent and glossy, below later or not glabrescent, and dull. *Flowers* often developing before the leaves on young twigs, sometimes profusely and then quite showy, serial. Pedicels 2—6 in a row, 4—20(—30) mm, hairy. *Sepals* outside more or less densely tomentellous, margin densely hairy, outer pair orbicular to elliptic, acute to rounded, 6—11(—15) by 5—9 mm, the odd one the largest, inner pair elliptic to oblong with more rounded top, 6—10 by 3—7 mm. *Petals* whitish, oblong, rounded, 9—12(—19) by 3½—5(—8) mm, mostly largely glabrous, upper pair with a pinkish to reddish basal-median spot. Disk ± 1 mm diam. Stamens 30—45(—70), 2—3½(—5) cm, white, turning reddish, anthers ± 2 by 1 mm. *Gynophore* (2—)4—5(—6½) cm, puberulous towards the base; ovary ellipsoid, 1½—2½ by 1—1½ mm, placentas 4, stigma ½ mm long, both glabrous. In fruit the pedicel sometimes still hairy, gynophore glabrous, as the pedicel incrassate to 3—6 mm. *Fruit* globular to ellipsoid, up to 5 by 4 cm, pericarp ± 2 mm thick, woody-leathery, smooth, reddish, orange, or purple. Seeds ∞, 5—7 by 5—4½ mm.

INDIA. Bombay and vicinity: several. — South of Simla, 31°07′N 77°09′E: *Schlagintweit 7687.* — Bengal: several. — Sylhet: *Srinivasan*, fl. 12. IV. 1947. — Garo Hills: *Kanjilal 5282.* Chittagong Hill Tracts: *King's coll. 259*; *Hooker f. & Thomson*, st. 28. XII. 1850. — South of this line: many. — Assam. Goalpara, *c.* 26°20′N 90°30′E: *Mann 82*; *Nayar 51012.* CEYLON: *Bates*, fl.; *Leschenault*, fl.; *Simpson 3905*; *Thwaites CP 1058*; *Walker*, fl. 1833. BURMA. North B. Near Bhamo, 24°15′N 97°15′E: several. — Upper B.: many. — East B.: many. — Lower B.: many. — Arakan. Mindat, 750 m, 21°21′N 93°58′E: *Kingdon-Ward 21857.* — South B. Martaban: *Kurz 926.* Amherst, *c.* 16°04′N 97°34′E: *Lace 4722.* ANDAMAN ISLANDS. Manglutan: *Parkinson 444.* Havelock I.: *Parkinson 181.* Middle Andaman: *Parkinson 1167.* CHINA. Kwangtung. Pakhoi, 21°29′N 109°10′E: *Playfair 138.* Paksha: *Hance 13732.* HAINAN: many. INDO-CHINA. Tonkin. Haiphong: *Balansa 4075.* Quang Yen: *d'Alleizette 225.* — Laos: several. — Annam: many. — Cambodia: several. — Cochin-China: several. SIAM. North S.: several. — Central S.: several. — Northeast S. Wang Saphung: several. — Southwest S.: several. Ratburi, 13°30′N 99°50′E: *Teijsmann 5935, 5949.* JAVA. Central J. Gunung Gambing, *c.* 7°50′S 110°24′E: *Junghuhn*, fl. — East J.: several, various places. LESSER SUNDA ISLANDS. Sumbawa: *Zollinger 3381.* — Semau: *Teijsmann 8834.* — Timor: several. PHILIPPINES. Luzon, various provinces: many. — Mindoro. Mount Yagaw, 700 m: *Conklin PNH 17430.* — Mindanao: several. — Sulu Arch. Pangasinan: *Callery*, fr. 1840. — Malamaui I.: *Vidal 2074.* CELEBES. Northeast C. Gorontalo: *Forsten*, fl. IX. 1841; *Riedel*, fr. — Southwest C.: *Noerkas exp. van Vuuren 91, 173*; *Teijsmann 14102.* — Salajar Is. Bonerate I.: *Docters van Leeuwen 1457.*

Distribution. Asia: India, largely east of the line Ahmedabad-Delhi-Simla and south of the 500 m contour of the Himalaya, through Assam, Burma, and Kwangtung to Hainan; through the Indo-Chinese Peninsula to Ratburi, also the Andamans and Ceylon. Malesia: the Philippines, Celebes, and from Timor westwards to Central Java.

Ecology. Forest edges, bushes, savannahs, hedges, limestone hills, bound to seasonal climatic conditions, up to 700(—1000) m altitude. In the continental monsoon areas, flowers February-April, the fruits *c.* 5 months later. In Malesia apparently not seasonally fertile.

Notes. 1. In several specimens, most of them from Upper Burma, the others from

Annam, Canton, and Hainan, the leaves are narrow (sometimes 3 mm) and parallel-sided in the central and apical part, whereas at the base a pair of more or less distinct lateral rounded lobes occur; even the leaf may be linear with two small basal lobes. Hance distinguished his *C. hastigera* on account of this unusual leaf-shape; however, I have reason to suppose that both normal and lobate leaves may occur in one and the same plant, and this makes me reluctant to give any taxonomical recognition to this peculiar variation. In such plants the flowers tend to be comparatively small.

Under *C. hastigera*, Collett & Hemsley (1890) remark "This singular species was collected by Griffith at Malé on the Irrawaddy, and is the *Capparidea* mentioned by him in his J. of Travels 1, p. 103". The reference was not seen by me; the specimen might have been *Griffith Burma & Mal. Pen. 189*.

2. In the type of *C. latifolia* the leaves seem to be remarkably obcordate. This is due to a defective development of the leaf apex, and it would be unjust to regard this as anything worth of basing a species on. Three specimens from Indo-China and Burma seem to match that specimen. However, it appears that in those plants the leaves are normally developed, only are they suborbicular. But between such leaves and normal ones intergrades may exist.

3. In the majority of the specimens from Hainan, the leaves are singularly uniform. They are no longer than 7 cm and 2½ cm wide or less, elliptic to obovate, the base cuneate, the apical tip small, the nerves making a sharp angle (± 40°) with the midrib. The flowers are comparatively small: sepals 7—9 mm, petals 14—18 mm long. Hance described such material as *C. swinhoii*, but since it does not exceed anyway the normal variability range of *C. zeylanica*, I see no reason to keep it taxonomically distinct.

4. The type material of *C. polymorpha* represents a tendency shown by more Burmese material. The leaves are somewhat rhombic, soon glabrescent, the nerves somewhat conferted towards the base, the young fruits often pointed.

5. The type of *C. crassifolia* Kurz shows some resemblance with his *C. polymorpha*, but the leaves are more elliptic, some of them obovate, and somewhat later glabrescent. Contrary to Kurz's description, the gynophore is hairy at the base.

6. The description of *C. subhorrida* Craib applies completely to *C. zeylanica*. I wonder how Craib on account of one specimen could give an extensive description of the leaves and yet state that the plant is deciduous. I did not find any other indication whether this plant would shed its leaves periodically, and have my doubts.

7. Sometimes sterile twigs are collected with leaves considerably larger than in the fertile ones, up to 21 by 8 cm. Such leaves have the normal number of nerves and the dark apical mucro. Contrary to some Australian species, the thorns are here no more than moderately developed. A similar production of large-leaved, sterile shoots can be seen in cultivated specimens, in Europe as well as in the tropics.

8. Drury's treatment of *C. zeylanica* covers 3 species: *C. zeylanica* L. (name, distribution, and references to W. & A. and DC.), *C. pyrifolia* Lam. (reference to *C. acuminata* Willd. and the description) and *C. acutifolia* Sw. (reference to Lindley's plate of that species in Bot. Reg. t. 1320).

9. The nomenclatural confusion about this species is explained under *C. brevispina*, Note 1.

66. Capparis zippeliana Miq., Illustr. (1870) 25, t. 14; Jacobs, Fl. Mal. I, 6 (1960) 82, with map. — Type: *Zipelius s.n.* (L, U, holo), Malesia, New Guinea, fl.

C. zippeliana var. *novohibernica* Laut., Bot. Jahrb. 52 (1914) 114, f. 1e. — Type: *Peekel 380* and *733* (B, *n.v.*), Malesia, New Ireland.

C. dahlii Gilg & K. Sch., Notizbl. Berl. Dahl. 1 (1896) 208. — *C. zippeliana* var. *novo-britannica* Laut., Bot. Jahrb. 52 (1914) 114, f. 1f. — Type: *Dahl 162* (B, *n.v.*), Malesia, New Britain.

C. carolinensis Kaneh., Bot. Mag. Tokyo 48 (1934) 919, f. 6; J. Dept Agr. Kyushu 4 (1935) 321. — Type: *Kanehira 2428* (US), Pacific, Caroline Is, Palau, fl. 10. VIII. 1933.

Small climber. Twigs slender, glabrous, rarely glabrescent. *Thorns* mostly wanting, if present slightly recurved, up to 3 mm. Petiole (¾—)1—1½(—1¾) cm. *Leaves* firmly herbaceous, often dull red-brownish when dry, broadest in the middle, (1.7—)2.2—2.8 (—3.5) times as long as wide, (8—)13—20(—26) by (4½—)5—8(—10) cm, glabrous or rarely thinly puberulous below; margins subrevolute; base rounded or acutish or subcordate, top (rarely sharply) acuminate, or rarely emarginate; midrib above mostly sunken in the basal part, to flat; nerves 5—9 pairs. Subumbels up to 10-flowered, mostly sparsely puberulous, sometimes axillary but mostly arranged in a terminal panicle, slender, 2—7(—12) cm peduncled. Pedicels 1—4½(—6) cm. Bracts small, subulate, hairy, caducous. Sepals subpersistent, outside sparsely hairy or glabrous, with membranous margin, 5—6(—12) mm diam.; outer pair subcoriaceous, one often initially enveloping the bud for 2/3; inner pair suborbicular, herbaceous. Petals obovate, 6—8 by 2½—4 mm, white, minutely puberulous on both sides, base narrowed, top rounded (sometimes crisped?). Torus 1½—2 mm wide. Stamens *c.* 25—45, (1½—)2½—3 cm long, white or pale pink; anthers 1½—2½ by ½ mm. *Gynophore* 2—3½(—4) cm, often thinly puberulous at the base, soon glabrescent; ovary ellipsoid, 1½ by 1 mm, placentas 2. In fruit the pedicel, torus, and gynophore are rather incrassate. *Fruit* ovoid or ellipsoid, *c.* 4½ by 3½ cm, top sometimes umbonate, pericarp thin, leathery, smooth, red. Seeds ∞, *c.* 12 by 9 by 6 mm.

LESSER SUNDA ISLANDS. Tanimbar Is. Jamdena: *Buwalda 4666, 4796.* MOLUCCAS. Kai Is. Tual: *Jensen 71, 72.* NEW GUINEA. Vogelkop Peninsula, northeastern corner: several. — Schouten I. Biak: *Schram BW 9340*; *de Wilde 1230.* — Southwest N.G.: *Zipelius*, fl. — Territory N.G., various localities: many. PACIFIC NORTH. Carolines. Palau: *Kanehira 2428, & Hatusima 4641*; *Nishida*, fl. 13. IX. 1939. — New Britain. Cape Hoskins: *Floyd NGF 6555* (probably). — Solomons. Ulawa: *Brass 2988.*

Distribution. East Malesia (Tanimbar and Kai Islands, New Guinea) and West Pacific (Micronesia, Bismarck Archipelago, Solomons).

Ecology. Primary and secondary rain-forests, sometimes on rocky soil, up to ± 1200 m alt.

Notes. 1. In the sterile state much resembling *C. lanceolaris*, though the different average leaf-size is generally a good character; besides, *C. lanceolaris* is pubescent on the mature twig near the leaf-insertion which is glabrous in *C. zippeliana.*

2. In *J. J. F. E. de Wilde 1230* from Biak in W. New Guinea, growing on very poor coral soil, all organs attain just the minimum size as above described, while the gynophore is 14 mm only.

INCOMPLETELY KNOWN

67. Capparis longipes Merr., Philip. J. Sc. 13 Bot. (1918) 12; En. Philip. 2 (1923) 211; Jacobs, Fl. Mal. I, 6 (1960) 93; *non* Standl. 1922. — Type: *Ramos BS 26980* (K, L, phot., US), Malesia, Luzon, Abra, fr. (*n.v.*).

Scandent, glabrous shrub, branches slender with cataphylls at the base. *Thorns* straight, usually 2—4½ mm. *Leaves* 2—3 mm petiolate, membranaceous to chartaceous, lanceolate, 7—11 by 2—3 cm, base acute, top narrowing, gradually acuminate, tip acute; nerves *c.* 15 pairs, distinct like the reticulation, surfaces green or greenish-olivaceous when dried.

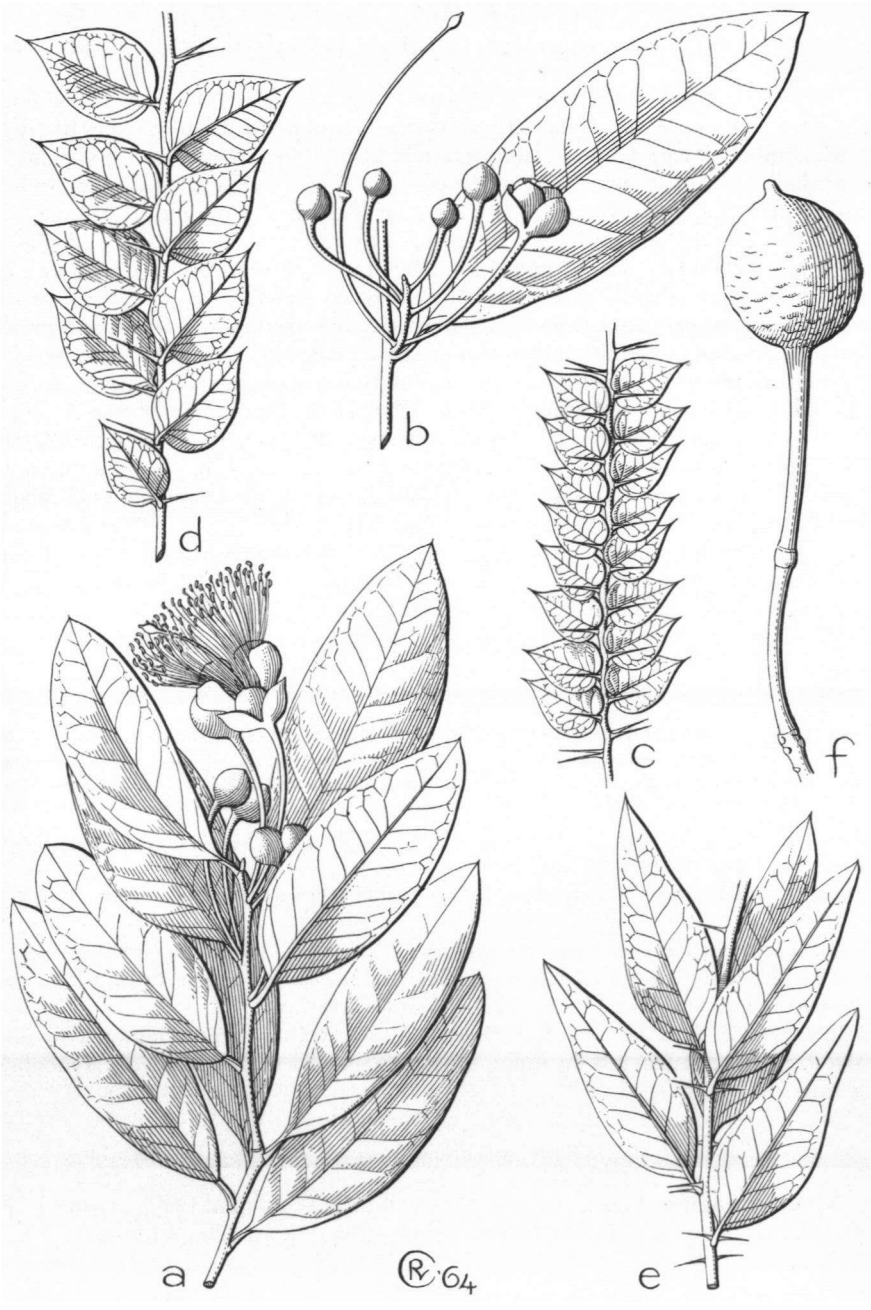


Fig. 34. *Capparis arborea* (F. v. M.) Maiden — a. Adult shoot, b. axillary raceme, c—e. juvenile shoots in consecutive stages, f. fruit, all × $\frac{2}{3}$ (a,c from *Kenny* anno 1906, b from *C. T. White* anno 1915, d from *Cunningham s.n.*, e from *C. T. White* anno 1938, f from *C. T. White 12221*).

Infructescences axillary, very slender, sparingly branched, up to 20 cm long, each branch bearing a single fruit on a pedicel *c.* 3 cm. *Fruit* globose, *c.* 12 mm diameter, brown when dried, glabrous.

Distribution. Malesia: Philippines, Luzon, one collection.

Note. 1. Might belong to *C. pubiflora;* see Jacobs l.c.

Section 4. **Busbeckea**

(Endl.) Benth. & Hook. *f.*, Gen. Pl. 1 (1862) 109, "*Busbeckia*"; Benth., Fl. Austral. 1 (1863) 95; Pax & Hoffm. in E. & P., Pfl. Fam. 2nd ed. 17b (1936) 182. — *Busbeckea* Endl., Prod. Fl. Norfolk. (1833) 63; F. v. M., Fragm. Phyt. Austral. 2 (1860) 51. — Type species: *C. nobilis* (Endl.) Benth.

Hairs at the innovations simple, rarely stellate. Leaves well-developed and persistent, generally more than 1½ times as long as wide, top mostly acute; juvenile shoots mostly different from adult shoots. Cataphylls none. Pedicels mostly corymbose. Flowers medium-sized to large; outer pair of sepals connate in bud, splitting lengthwise at anthesis; both sepals of each pair equal. Fruit globose with a rather thick pericarp, the 3—4 carpel sutures obscure. Seeds (as far as known) exceeding 5 mm in size.

Distribution. Australia, with outliers in southern India and Ceylon, southeastern Malesia, and the western Pacific. Number of species 13—15.

The centre of speciation is in Queensland, where all the continental Australian species occur; in Western Australia south of Vansittart Bay and the Kimberleys, none are found. No more than 4 species occur west of the 140th meridian. *Capparis nobilis* and *artensis* occur entirely outside Australia in the Pacific, there being endemic in very small areas; *C. divaricata* is endemic in southern India and Ceylon; *C. lucida* is the only species that extends from Australia to eastern Java and SE. Celebes. For the species of New Caledonia, see also under *C. loranthifolia* Notes 2 and 3, and under Incompletely known species.

Ecology. Predominantly in arid regions.

Note. 1. The only other section in *Capparis* where the outer sepals are connate is Sect. *Calyptrotheca* Eichl., Fl. Bras. 13, 1 (1865) 269, 278, from South America. It differs from Sect. *Busbeckea* in having 4 receptacular scales, minute appressed stipules, and stellate hairs. I doubt any transpacific relationships of Sect. *Busbeckea*, and am inclined to seek its links with the rest of *Capparis* in southern India; see p. 397, 402.

68. Capparis arborea (F. v. M.) Maiden, Proc. Linn. Soc. N.S.W. 28 (1903) 696. — *Busbeckea arborea* F.v.M., Fragm. Phyt. Austral. 1 (1858) 163. — *C. nobilis* var. *arborea* (F. v. M.) Domin, Fedde Rep. 11 (1912) 201; Bibl. Bot. Heft 89 (1925) 687, t. 26 f. 2. — Lectotype: *Thozet s.n.* (MEL), Australia, Queensland, Rockhampton, fl.

C. nobilis, in part, for the Australian population only: Benth., Fl. Austral. 1 (1863) 95; Bailey, Queensl. Fl. 1 (1899) 59.

C. nobilis var. *pubescens* Benth., Fl. Austral. 1 (1863) 96; Maiden & Betche, Proc. Linn. Soc. N.S.W. 30 (1905) 354; Maiden, For. Fl. N.S.W. 7 (1923) 61, t. 284. — Type: *Cunningham (n.v.)*, Australia, Queensland, Brisbane River, fr.

C. nobilis var. *laurina* Domin, Fedde Rep. 11 (1912) 201; Bibl. Bot. Heft 89 (1925) 687, t. 26 f. 1. — Type: *Cunningham s.n.* (BM), Australia, Queensland, Moreton Bay, st. 1827. — **Fig. 34.**

A stunted shrubby tree or rambling shrub 8—10 m, trunk *c.* 10—15 cm diameter,

some branches with strong conical thorns. *Juvenile shoots, the first and second stage*: twigs densely set with simple, erect, brownish or greyish hairs of unequal length, rather short to minute; internodes ½—1¼ cm. Thorns acicular, straight, patent to sometimes divaricate, 5—11 mm. Leaves distichous, ½—2 mm petiolate, coriaceous, 1.3—2.0 times as long as wide, ovate, up to 2—4½ by 1—2¼ cm; base cordate to sometimes rounded, top acuminate to sometimes acute with a mucro 1—2 mm; midrib flattish, nerves 3—5 pairs, more or less obscure like the reticulation; surfaces glabrous, the first stage glaucous when dried. *Juvenile shoots, third stage*: like the former, but twigs more or less densely set with simple, patent, brownish, minute hairs of equal length, internodes 1—1¼ cm. Leaves more or less spirally arranged, 2—3 mm petiolate, thick-coriaceous, *c.* 2—3 times as long as wide, ovate, *c.* 4½—6½ by 2¼ cm; base rounded, top acute and mucronate to blunt; midrib shallowly sunken, nerves 5—7 pairs, somewhat obscure like the reticulation. *Adult shoots*: twigs practically glabrous to densely set with simple, patent or sometimes appressed, rather short to very short, yellowish hairs. Thorns mostly wanting, if present straight, ascending, to 4 mm, rather vigorous. Petiole 0.6—1.9 cm. Leaves spirally arranged, firmly coriaceous, (1.7—)2.0—3.3(—3.8) times as long as wide, widest at the middle to slightly lower, (5½—)9—13(—14½) by (1½—)2¼—4½(—6) cm; base acutish, top acute, or subacuminate, or blunt to rarely obtuse, sometimes protracted into a mucro 1—2 mm long; midrib shallowly sunken, rather narrow, often brownish tinged, nerves 6—10 pairs, thin, rather irregular, reticulation variably distinct; surfaces dullish, glabrous above, sometimes persistently hairy beneath; in narrow leaves the margin sometimes recurved. *Flowers* along the twig, subtended by leaves, solitary but often collateral in pairs, exceptionally with 3—7 in axillary bundles or in racemes with a slender rachis up to 1¾ cm long and neither leaves nor (mostly) bracts; pedicels 3—5¾ cm, slender to vigorous, hairy, sometimes glabrous. Bud mostly globose, sometimes ovoid and pointed. Outer *sepals* coriaceous, 8—15 by 8—10 mm, outside minutely hairy, sometimes glabrous; inner sepals flattish, oblong, 13—19 by 8—11 mm, thick in the middle, thinner towards the margin, glabrous. *Petals* obovate, sometimes to 7 mm clawed, 13—31 by 10—15 mm, inside towards the base laxly woolly hairy, margin fimbriate. Torus 3—4 mm, conical. Stamens *c.* 95—110 (see Note 5). *Gynophore* (1.9—)3¼—5 cm, glabrous; ovary ovoid, *c.* 4 by 2½ mm, glabrous, placentas 3—4, stigma inconspicuous. *Fruit* on a stipe *c.* 3 mm incrassate, (sub) globose, sometimes umbonate, *c.* 2—3¾ by 2—3¼ cm; seeds *c.* 9 by 7 by 4 mm.

QUEENSLAND. Moreton Distr. (?12°S 142°40'E): *Bailey*, st.; *Clemens*, fl. I. 1945; *England*, fl. XII. 1918. Near Coen, 17°50'S 143°11'E: *Smith 11862*. Atherton Tableland, 17°S 145°30'E: *MacDonald*, st. 18. II. 1942. Further southwards near the coast: many. Eidsvold, 25°23'S 151°08'E: *Bancroft*, fl. yfr. NEW SOUTH WALES: many, southwards to Newcastle, 32°55'S: *Cunningham*, fl.

Distribution. Australia: frequent within 150 km from the eastern coast, from Cape York Peninsula to Newcastle in New South Wales.

Ecology. Light rain or monsoon forest up to 800 m; also behind mangroves.

Notes. 1. This species surpasses all others of Sect. *Busbeckea* in variability; a few collections which were very deviating have not been included in the description but are commented on in the following.

From Mt Dryander at *c.* 20°25'S near the coast in Queensland, there are two practically identical specimens, *Michael 1095* (BO) and *1163* (BRI). The shoots are fairly typically juvenile, but fertile. Twigs laxly set with simple, patent, minute, yellowish hairs; internodes 1¼—1½ cm. Thorns straight, acicular, patent, 2—4 mm. Petiole 2—4 mm. Leaves with a tendency to distichy, coriaceous, *c.* 6—8½ by 3¼—4½ cm, top acute 1—2 mm

mucronate. The leaves that represent the younger stage are ovate with rounded base, on the shorter petioles and with the longer thorns; the leaves of the further stage are elliptic with acute base, on the longer petioles and with the shorter thorns. Pedicels few, in pairs, 14 mm. Gynophore 14—15 mm, 2 mm thick. Fruit globose, 29 mm diameter; seed *c.* 9 by 7 by 4 mm.

From Isis at *c.* 25°S in Queensland, *Sabine Helms 137* shows characters of *C. arborea* as well as of *C. lucida*. The plant has a leafy terminal corymb consisting of *c.* 12 flowers with another pair of flowers in the axil of a lower leaf. The buds are globose, not pointed, ultimately *c.* 9 mm diameter; the gynophore of 28 mm is thinly hairy towards the base. The leaves are 1½ cm petiolate, 7—8 by 3—3.4 cm. As for the flowers in pairs and for their size, the plant would belong to *C. arborea*, as for the inflorescence and the hairy gynophore, to *C. lucida*.

In *L. S. Smith 11852* from Queensland, 15 mi. ENE. of Coen, the fruits are distinctly elongated; according to the collector they are "green, ± pointed at both ends, broadest a little below the middle, up to 6 ins. long and 2 ins. diameter". The pericarp is also faintly sculptured, and ± 5 mm thick.

3. Maiden & Betche (1905, repeated 1923), named the species *C. nobilis*, which is at variance with Maiden's publication of 1903, here cited under *C. nobilis* from Norfolk. They say that a plant thought to be var. *pubescens* Benth. also differs from the species proper in the climbing habit, attaining a length of 36 m with a diameter of 10 cm, and that the flowers of the climbing form are smaller than those in the arborescent forms. Unfortunately, the Australian collections have been most poorly annotated; we think that Maiden's statement needs verification.

4. The fruit is extremely bitter to the taste, is eaten by some scrub animal, possibly the Ring Tail Opossum. The gummy substance exuded from cut ends of the branches can be brought to explosion with a lighted match. Thus reported D. Fraser.

5. In one plant 41 stamens were counted; in others 93, 94, and 96 were found.

6. Occasionally the buds are transformed to galls *c.* 1½ by 2½ cm in size, brownish and with irregular protrusions 4 mm long.

7. Mueller's original publication gives a Thozet collection from Fitz Roy River and a Mueller & Hill one from Moreton Bay, but no such labels were with the Melbourne material examined, whereas the above cited plant bears the name in Mueller's own handwriting.

69. Capparis artensis Montrouzier, Mém. Ac. Lyon Sc. 10 (1860) 177; Guill., Bull. Soc. Bot. Fr. 83 (1936) 578, excl. var. *angusta;* see *C. dielsiana.* — Type: *Montrouzier 2* (P, fragmentary; the holotype may be in Lyon), Pacific, Isle of Art off New Caledonia, fl.

Climber. *Juvenile shoots* (see Note 1): youngest twigs with minute, lax, simple, erect hairs, internodes *c.* ½ cm. Thorns acicular, straight, patent, 4—7 mm. Leaves distichous, 1 mm petiolate, thinly herbaceous, ovate, 1—1½ by ¾—1 cm; base cordate, top acute and mucronate; midrib, nerves (2—3 pairs), and reticulation thin but distinct, surfaces dull glaucous when dried. Further developed twigs with somewhat denser and shorter hairs, internodes to 2 cm. Thorns recurved, *c.* 4 mm. Leaves spirally arranged, *c.* 4 mm petiolate, subcoriaceous, ovate, 4¼—5 by 1¾—2½ cm; base subcordate to rounded, top acute, not mucronate; midrib thin, raised above, nerves 3—5 pairs, thin but distinct like the reticulation; surfaces dull glaucous when dried. *Adult shoots*: twigs brownish-violet tinged, hairs simple, dense, minute, varying in length, looking crystal-jelly-like, glabrescent. Thorns none. Petiole 1½—2½ cm, brownish. Leaves subcoriaceous, 1.6—2.2 times as long

as wide, mostly ovate, 6—10 by 3¼—5¼ cm; base rounded to acutish, top obtuse to blunt or acutish; midrib flat, brownish, nerves 6—8 pairs, more or less irregular, reticulation distinct; surfaces rather glossy, glabrous. *Flowers* white with 2—6 conferted more or less near the top of a twig or of lateral twigs 2¾—4 cm; pedicels *c.* 2½—4 cm, vigorous; the floral leaves sometimes caducous. Outer *sepals* thick-coriaceous, *c.* 1½—2 by 1¼—1½ cm, distinctly pointed, puberulous outside; inner sepals subcoriaceous but thinner to the margin, flattish, 13—14 by 7—10 mm, outside glabrous, inside with a thin crust of appressed hairs. *Petals* approximately 2 by 1¼ cm, unguiculate, thin-woolly inside. Stamens 80. *Gynophore* 5½—8 cm, glabrous, ovary ovoid, *c.* 4 by 2½—3 mm including a short beak, glabrous, all brownish tinged when dried; placentas 4. *Fruit* on a stipe 3 mm incrassate, globose, 3—3½ cm diameter, dull purplish violet.

PACIFIC NORTH. New Hebrides. Efate. Undine Bay: *Kajewski 228*. NEW CALEDONIA. New Caledonia, *Roberts*, st. 1886. Ouen Toro: *Franc 2294*; *Le Rat 122*. Magenta: *Le Rat 287*, Vallée de Thy: *McKee 3872*, *3878* (probably). — Nhéa I.: *Virot 555*. — Art].: *Montrouzier 2*. — Loyalty Is. Lifou: *Bergeret 70*.

Distribution. Pacific: New Hebrides and New Caledonia with adjacent islets.

Ecology. Low shrubby hills, in forest, often near coasts. Flowers mostly in December, fruits in April.

Notes. 1. The description of the juvenile shoots has been made on *MacKee 3872* (the youngest stage) and *3878*, both from the same crevice under a rock. The identification is not absolutely certain as no adult material is available. The recurved thorns of *3878* are most unusual in this section. But as no such form is known of the closely related *C. quiniflora* (the other *Capparis* of New Caledonia), as *3872* perfectly agrees with juvenile material of *C. lucida* from deep shade, and as both of the cited numbers are obviously conspecific, we place them here.

2. *C. artensis* is so close to *C. lucida*, that it could be very well put as a subspecies under the latter. In this section, however, the species concept must be taken tentatively narrower than in Sect. *Monostichocalyx*, and data are scantier.

70. Capparis canescens Banks *ex* DC., Prod. 1 (1824) 246; Benth., Fl. Austral. 1 (1863) 96, excl. var. *glauca*, which is *C. muelleri*; Bailey, Queensl. Fl. 1 (1899) 59; Queensl. Agr. J. 22 (1909) 316; Domin, Bibl. Bot. Heft 89 (1925) 688. — Type: *Banks s.n.* (BM, *n.v.*) Australia, Queensland, Bay of Inlets, yfr.; see Note 1.

C. areolata Bailey, Compr. Cat. Queensl. Pl. 1 (1909) 40, name, f. 19ter; Queensl. Agr. J. 26 (1911) 126, descr., t. 13; Domin, Bibl. Bot. Heft 89 (1925) 688. — Type: *McMullan s.n.* (BRI, K, MEL), Australia, Queensland, Tiaro, fl. fr. 10. I. 1911.

C. armata Domin, Fedde Rep. 11 (1912) 200; Bibl. Bot. Heft 89 (1925) 687, t. 26 f. 4, 5; see Note 4. — Type: *Domin s.n.* (PR? *n. v.*), Australia, Queensland, east of Jericho, III. 1910.

Small tree or erect shrub to 5 m. *Indumentum* very dense, hoary, consisting of simple, more or less appressed, short cream-coloured hairs. *Juvenile stage*, first: leaves 1—2 mm stalked, 2¼—3 by 1¾—2½ cm, rather densely puberulous, laxer hairy above (the following flush denser hairy). Juvenile stage, second: twigs straight, leaves spirally arranged, thorns patent, straight, 6—10 mm. Leaves *c.* ¾ cm petiolate, thick-coriaceous, ovate-cordate, c. 4 by 3½ cm, 5 mm mucronate, midrib reddish tinged benaeth, nerves somewhat raised above, reticulate, surfaces glabrous. *Adult shoots*: twigs rather vigorous, persistently hairy (or glabrous, see Note 3). Thorns conical, reflexed, often wanting on the flowering branches (Bentham). Petiole 1¾—4 cm. *Leaves* spirally arranged, coriaceous, 1.1—2.0 times as long as wide, widest at the middle to sometimes above, 4½—8½(—10) by 2½—5¾

cm; base acute to wedge-shaped, top rounded to acute, sometimes obtuse, sometimes to 2 mm mucronate; midrib flat, underneath slightly raised and reddish tinged, nerves 4—7 pairs, thin, reticulation mostly obscure; surfaces dull (see Note 5). *Flowers* white or pale yellow, with 2—4 near the top of a twig, or in the axils of the uppermost 5—7(—12; partly caducous?) leaves solitary, or collaterally in twos; pedicels mostly vigorous, 3—9½ cm, hairy, flattened towards the top. Buds prominently 4-angular; the median keel of both of the outer sepals slightly sharper than the keels formed by their sutures; also the inner sepals sharply keeled towards the base, their margins flat. Outer *sepals* coriaceous, 19—23 by 12—15 mm, sometimes hairy; inner sepals thinner, 16—21 by 5—8 mm, sometimes obovate, the top occasionally cucullate, always glabrous. *Petals* obovate but very irregularly shaped, *c.* 3 by 1½—2 cm, glabrous but sometimes woolly at the base, white but sometimes with pink trimmings. Torus *c.* 6—9 mm, flat, later conical. *Stamens* 86—161, not exceeding 6½ cm? *Gynophore* 6¾—8 cm, glabrous, reddish-brown tinged, thus contrasting to the grey-fulvous hairy pedicel; ovary ellipsoid, 4—6 by 2—3 mm, glabrous, placentas 4—5, stigma obscure. *Fruit* on a stipe incrassate to *c.* 6 mm, globose, *c.* 2½—7½ cm diameter, irregularly reticulate and/or *c.* 8—10-ribbed towards the base, or more or less profusely sculptured otherwise.

QUEENSLAND. Torres Strait. Moa, now Darnley I.: *Bick 76.* Thursday I.: *Hockings*, fr. IX. 1935. — Gulf of Carpentaria. Mitchell River, *c.* 16°S 142°E: *Palmer 82.* Palmer River, ibidem: *Wycliffe 100.* — Near Coen, 13°50′S 143°11′E: *Smith 11939.* — Near Herberton, 17°20′S 145°55′E: *Burton*, fl. — Jericho, 23°34′S 146°10′E: *Clemens*, fl. IV. 1946. — Darling Downs, *c.* 27°30′S 150°E: *White & Everist 2*, 23. V. 1936. — Within this line: many.

Distribution. Australia: some islands in Torres Strait, and the eastern half of Queensland.

Ecology. Open bush, savannahs, open Eucalypt forest.

Notes. 1. The type specimen was not located by me; Domin (1925) wrote that it is scrappy and has on a nearly 8 cm long gynophore an umbonate warty young fruit.

2. Two unnumbered Clemens collections from Jericho are completely glabrous and a variety could be based on them, but the probability remains that some day a laxly hairy or glabrescent intergrade will turn up.

3. *R. Brown 4932* (2 sheets in BM, 1 sheet in K) is a mixture of *C. canescens* (certainly) and *C. lucida* (probably); the latter was by Brown numbered *592*, named *C. lucida*, and located "Northumberland Islands" (21°30′S off the Queensland coast). *R. Brown 4930* bears the name *Capparis canescens* in the collector's own handwriting, but actually it is *C. lasiantha.*

4. The type of *C. armata* is presumably at Prague. As a paratype Domin cited a von Mueller specimen which I recognized as *C. canescens;* moreover, Domin's description leaves little doubt.

5. The brown colour of material collected long ago or preserved in a tropical institute contrasts remarkably with the pallascent or glaucescent tinge of recent collections.

71. Capparis divaricata Lam., Enc. Méth. Bot. 1 (1785) 606; DC., Prod. 1 (1824) 252; W. & A., Prod. (1834) 77; Wight, Ic. Pl. Ind. Or. 3 (1844/5) t. 889; Thw., En. Pl. Zeyl. (1858) 15; Hook. *f.* & Th. in Hook. *f.*, Fl. Br. Ind. 1 (1872) 174; Trimen, Handb. Fl. Ceylon 1 (1893) 61; Cooke, Fl. Pr. Bombay 1 (1901) 45; Brandis, Indian Trees (1906) 33; Talbot, For. Fl. Bombay Sind 1 (1909) 55, f. 35. — Type: *Anonymous s.n.* (P-JU, cat. 11,259), India, Coromandel côte, st.

C. stylosa DC., Prod. 1 (1824) 246, excl. β *velutina*, which is *C. sepiaria;* Dalz. & Gibs., Bombay Fl. (1861) 10; Drury, Handb. Ind. Fl. 1 (1864) 38; Dunn in Gamble, Fl. Pr.

Fig. 35. *Capparis divaricata* Lam. — a. Habit, leaves of average shape, b. branch with narrow leaves; two sepals petaloid, c. branch with different full-grown leaves, d. fruit, all × $\frac{2}{3}$ (a from *Wight propr. 88*, b from *Beddome* anno 1873, c from *Madras Herbarium 12102*, d from *Wight Kew Distr. 64*).

Madras 1 (1915) 45; Dunn, Kew Bull. (1916) 61. — Type: *Koenig* (BM, *n.v.*), India, Coromandel, fl. — **Fig. 35.**

Shrub or small tree. *Innovations* whitish or fulvous tomentose with small stellate hairs, early glabrescent. Twigs slender, greenish when dry, more or less zig-zag. *Thorns* variable, straight or curved upwards or downwards, or patent, 3—7 mm, often 180° diverging, seldom occasionally wanting. Petiole (1—)3—6(—7) mm. *Leaves* variable, subcoriaceous, 1.4—7.0 times as long as wide, on slender sterile shoots even up to 14 times, either widest near the base, or elliptic, or linear, (2—)3—6½ by ¾—2¾ cm, sometimes narrower, to 3 mm; base obtuse to acutish, top in the linear leaves acute to blunt, in the wider leaves narrowed and obtuse to blunt, mucronulate; midrib somewhat raised, nerves 3—5 pairs, more or less conferted towards the base, thin, reticulation obscure; surfaces dull. *Flowers* green (Brandis) or red, solitary, axillary or with 2—3 at the top of a twig which is sometimes reduced to ± 2 cm in length; pedicels 1—2½ cm, tomentose to glabrous. Young buds dull greyish tomentellous, glabrescent. Outer *sepals* in bud connate with only their narrow tips free, at anthesis splitting irregularly, elliptic, boat-shaped, 10—14 by 4—7 mm, 1—2 mm acuminate, tip densely hairy inside, otherwise more or less sparsely tomentose outside; inner pair 15—27 by 3—9 mm, or perhaps longer, petaloid. *Petals* very variable, linear, 17—40 by 3—11 mm, acuminate to rounded, tomentose towards the top. Stamens about 57—65, filaments yellowish, reddish at base, anthers white (Talbot). *Gynophore* 1¾—2½ cm, vigorous, glabrous; ovary ovoid, 5—7 mm long in all, 2 mm wide, 5—6-ribbed, glabrous, beak 2—3 mm, stigma cushion-shaped, 1—1½ mm wide, more or less tomentellous. In fruit the pedicel often twisted. *Fruit* on a somewhat woody, rather irregularly incrassate, to 4—6 mm long stalk., globose to subellipsoid, 3½—4½ by 4 cm (some say to 7½ cm diameter), plus an apical cylindric point 4—6 mm long, pericarp 2—3 mm thick, red when ripe, with some 10 longitudinal ribs and a multitude of small knobs scattered more or less regulary between. Seeds in white pulp (Talbot), ± 7 by 6 by 5 mm.

INDIA SOUTH. Poona, 18°34'N 73°58'E: *anon.* (DD), fl. 1893. — Jeur, 18°15'N 75°14'E: *Woodrow*, fl. — Kurnool Distr., *c.* 16°N 78°E: *Gamble 10904, 10915, 10922.* — Pondichéry, 12°N 79°50'E: *Pierre 5510.* — South of this line: many. CEYLON: *Simpson 9389*; *Thwaites CP 1072*; *Worthington 4503.*

Distribution. Asia: India, Deccan Peninsula south of the line Bombay-Poona-Kurnool-Madras; Ceylon.

Ecology. Dry country, thorny forests, stony ground and 'black soil', up to 700 m. Flowers February-March.

Notes. 1. Dunn (1916) proposed to reject Lamarck's name which was based on sterile linear-leaved material that could, according to Dunn, as well belong to *C. diversifolia.* Here Lamarck's name is retained because in my opinion there is sufficient certainty, however defective the type material may be. A form of *C. diversifolia* where all the leaves on one branch are so narrow as in Lamarck's material, is thusfar not known.

2. Wight found the plant either as a small much-branched shrub with linear leaves and then sterile, or more rarely as a small tree with a round dense top, and only in this stage in flower. A plant, however, collected by *Beddome* (MH) at Paulaghaut in 1873, bears a flower on a linear-leaved twig. In this species apparently linear leaves and sterility are not linked.

3. In *Bourne 4794* the (detached) fruit is smooth.

4. Some leaves of *C. divaricata* and *C. diversifolia* look very similar, but in *C. divaricata* the nerves make an angle of *c.* 45° with the midrib, and those in *C. diversifolia* an angle of *c.* 60°. In *C. divaricata* the nerves tend to confert towards the base, in *C. diversifolia* they

branch off from the midrib at regular distances, but in the narrowest leaves this character disappears.

5. *Capparis divaricata* figures as a link between Sect. *Monostichocalyx* (*Brevispina*-Group) and Sect. *Busbeckea*. The connate sepals are regarded as the decisive character for its belonging under the latter. The adult twigs of *C. divaricata* are generally thorny; in Sect. *Busbeckea* they are not, but on the other hand, *C. divaricata* is remarkable for its difference between sterile and fertile twigs (a character which is regular in Sect. *Busbeckea* while it is also sporadically found in *C. sepiaria* and *C. quiniflora*), and for its lengthwise ribbed, sculptured fruit (also found in *C. flavicans* of the *Brevispina*-Group, in *C. canescens* of Sect. *Busbeckea* and less distinctly in a few others of either section). The stellate hairs of *C. divaricata*, not uncommon in Sect. *Monostichocalyx*, are unknown in Sect. *Busbeckea;* the structure of its ovary is similar to that in the Brevispina-Group, but the species agrees with *C. loranthifolia* in its petaloid inner sepals. The distributional disjunction could be explained in the same way as the one between Sect. *Busbeckea* and Sect. *Monostichocalyx*.

6. Pollen of this species was described and figured by Ph. Guinet, Pollens As. Trop. 1 (1962) t. 11. Two sorts of pollen were found in the same anther.

72. Capparis humistrata (F. v. M.) F. v. M., Syst. Census Austral. Pl. 1 (1882) 5; Bailey, Queensl. Fl. 1 (1899) 60; Domin, Bibl. Bot. Heft 89 (1925) 690. — *Busbeckea humistrata* F. v. M., Fragm. Phyt. Austral. 5 (1866) 156. — Type: *Bowman s.n.* (K, MEL, holo), Australia, Queensland, Stanwell, fl.

A stunted, spreading, little bush to 1 m tall. *Indumentum* fairly dense, consisting of simple, erect, yellowish hairs unequal in length, to nearly 1 mm long. Twigs slender, persistently hairy, internodes *c.* ¾ cm long. *Thorns* acicular, straight, divaricate, 6—8 mm. Petiole 1—2 mm. *Leaves* spirally arranged, subcoriaceous, ovate, 22—27 by 7—9 mm; base rounded, top acute 2 mm mucronate; midrib somewhat raised, nerves *c.* 4—5 pairs, rather obscure like the reticulation; margin somewhat recurved and undulate; surfaces greyish tinged, dull, hairy on both sides, the denser underneath. *Flowers* white, solitary axillary along the twig, pedicels 8—10 mm, hairy. Outer *sepals* subcoriaceous, *c.* 7 by 5 mm, hairy outside; inner sepals *c.* 5 by 4 mm, glabrous(?). *Petals* with a short claw, obovate, *c.* 12 by 5 mm, slightly pubescent near the base. Torus 2 mm wide. *Stamens c.* 30. *Gynophore c.* 11 mm, filiform, glabrous; ovary ellipsoid, 2½ by 1½ mm, glabrous, placentas 5; stigma obscure. *Fruit* unknown.

QUEENSLAND. Near Rockhampton, 23°22'S 150°32'E: *Bowman* fl.; *O'Shanesy 1546*.

Distribution. Australia: endemic in southeastern Queensland (and "common about Rosewood").

Note. 1. This species bears the same acicular thorns as other species only have in their juvenile shoots, and it is not known whether here any difference between juvenile and adult shoots exists.

73. Capparis loranthifolia Lindl. — *Busbeckea loranthifolia* (Lindl.) F. v. M.: 73a. — **Fig. 36c, d.**

73a. var. loranthifolia. — *C. loranthifolia* Lindl. in Mitch., J. Exp. Trop. Austral. (1848) 220; Benth., Fl. Austral. 1 (1863) 97; Bailey, Queensl. Fl. 1 (1899) 60; Domin, Bibl. Bot. Heft 89 (1925) 689; Black, Fl. S. Austral. 2 (1948) 369. — *Busbeckea loranthifolia* (Lindl.) F. v. M., Fragm. Phyt. Austral. 1 (1858) 164. — Type: *Mitchell 159* (CGE, *n.v.*), Australia, Queensland, Mt Faraday, 1. VII. 1846.

Dense tree 2—8 m high, 30 cm diam., or shrub, with spreading crown, bark dark grey-brown, narrowly fissured and cracked. *Hairs* simple, short, pale, somewhat appressed. *Juvenile shoots* in habit, branching, and indumentum like the adult twigs. Thorns straight, acicular, patent to slightly directed upwards, to 4—7 mm. Leaves spirally arranged, short-petiolate, *c.* 2½—4 cm long in all, 3—5 mm wide; base tapering, top acutish, midrib flattish to shallowly sunken above, raised beneath, surfaces early glabrescent, dull. *Adult shoots*: twigs fairly slender, densely hairy to laxly hairy and glabrescent, internodes rather short. Thorns none. Petiole 3—6(—10) mm. Leaves thick-coriaceous, elongate, widest about the middle but sometimes spathulate, 4—7 cm by 8—14(—18) mm; base acute to tapering into the petiole, top bluntish to acute, sometimes with a faint leathery tip; midrib flattish above, more or less raised beneath, nerves 5—8 pairs, connected near the margin, reticulation obscure; surfaces early glabrescent, mostly dull. *Flowers* with 1—5 conferted at the top of a twig tending to a corymbose arrangement, pedicel 2—4 cm, hairy as the twig, slender, later vigorous. Outer sepals coriaceous, *c.* 12 by 10 mm, pointed, laxly minutely puberulous outside. Inner sepals more petaloid, *c.* 13 by 5 mm, obovate, with a few woolly hairs inside. Petals cream-coloured, *c.* 1¾ by 1¼ cm, inside towards the base with some long hairs. Stamens *c.* 36—48, white. *Gynophore c.* 2½—9 cm, glabrous, white; ovary ellipsoid, *c.* 4 by 2 mm, without a beak, glabrous, placentas 4. *Fruit* on stipe 2—2½ mm incrassate, globose, sometimes apiculate, *c.* 2½—4 cm diam., pericarp *c.* 2 mm thick, smooth or occasionally coarsely netted; seeds *c.* 7—8 mm long.

NORTHERN TERRITORY. 185 mi. NNE. of Alice Springs, *c.* 20°50′S 134°20′E: *Lothian 464*. SE. of Murray Downs, *c.* 21°S 135°E: *Winkworth 531*. Delmore Downs, *c.* 22°30′S 135°E: *Chippendale NT 3220*. 30 mi. NE. of Anthony's Lagoon, *c.* 18°S 135°30′E: *Hill 531*. QUEENSLAND. Stanwell. 20°S 143°E: *O'Shanesy 1137*. Near Quilpie, 26°35′S 144°14′E: several. Paroo, 29°S 144°26′E: *Cotter*, fl. 1855. Curragh, 28°S 145° 40′E: *Hubbard & Winders 6204*. Jericho, 23°34′S 146°10′E: *Clemens*, yfr. 5. IV. 1946. Near Charleville, 26° 25′S 146°13′E: several. Suttor River, *c.* 21°S 146°E: *F. von Mueller*, fr. Mount Faraday, 24°54′S 147°18′E: *Mitchell 380*. Springsure, 24°09′S 148°04E′: *MacLaughlin*, fr. X. 1959. Roma, 26°32′S 148°46′E: *Francis*, fr. II. 1927; *Anon. 226* (MEL), fr. Rockhampton, 23°22′S 150°32′E: *Tenison Woods*, fr.

Distribution. Australia: central part of the continent through the southern half of Queensland, southwards to *c.* 30° in New South Wales (Black). Except for one specimen from Rockhampton, not in the proximity of coasts.

Ecology. Mixed soft-wood forest, in fine red soil, in brown silty clay loam near creeks, also in cleared country, regarded locally as a pest.

73b. var. **bancroftii** C. T. White *ex* Jacobs, *var. nov.* — Type: *T. L. Bancroft s.n.* (BRI, sh. 33,475), Australia, Queensland, Eidsvold, fr.

Indumentum in ramulis foliisque laxissimum. Folia linearia ovata. Fructus plerumque dense tuberculatus.

Indumentum very sparse. *Juvenile shoots* much like the adult ones, but thorns to 3—6 mm, slightly recurved, and leaves sometimes as narrow as 4½ mm. *Adult shoots*: thorns mostly wanting or small, petiole 2—5(—12) mm. *Leaves* glabrous or very sparsely hairy and hence looking more green and conspicuously veined than in the type variety, (3.6—) 4.1—5.2(—8.0) times as long as wide, widest below to sometimes about the middle, 4¼—8½ by 1—1¾ cm, base blunt to acute, top blunt. *Fruits* to 6 cm diameter, generally densely set with fairly regular roundish tubercles of *c.* 1—3 mm; hard, dull purplish when dried.

QUEENSLAND. Roma, 26°30′S 148°40′E: *E. G. Scotter*(?), fr. 30. VIII. 1944; *Soutter*, fr. X. 1928. Near Miles, 26°40′S 150°09′E: *White 1142*. Near Rockhampton, 23°22′S 150°32′E: *Meston*, fr. VIII. 1906; *Adams*, fl. X. 1946. Eidsvold, 25°23′S 151°08′E: *Bancroft*, fl. fr.; *White*, st. 21. IV. 1925.

Distribution. Australia: southern Queensland. With doubt from Mount Faraday, 25°S 147°18'E. From New Caledonia a deviating form; see Notes 2 and 3.

Notes. 1. Thanks are due to Mr S. L. Everist, Brisbane, who kindly put the late Mr C. T. White's notes and material at my disposal. Originally, White had in mind to give *C. bancroftii* the rank of species, which I have not done because only quantitative differences with C. loranthifolia could be found. There are intermediates, but very few. One of them is *Lazarides & Story 126*, from Springsure, where the indumentum is almost none, while the leaves are widest about the middle and the fruits are sparsely tuberculate.

C. T. White 1142 (one of the few specimens represented in many herbaria) somewhat deviates in the long petioles and the nearly smooth (young) fruits.

2. *McKee 5537* and *6492*, both from Mt Kaala in New Caledonia, are unlike any other New Caledonian plant, but come very near *White 1142*. The twigs are laxly puberulous, and bear a few pairs of vestigial downward pointed thorns. Petiole 7—10 mm, brownish. Leaves coriaceous, more or less parallel-sided, sometimes ovate, *c.* 3—3½ times as long as wide, 4½—6¼ by 1—2¼ cm, base acutish-rounded, top obtuse, midrib flat, yellowish-green, nerves 6—7 pairs, reticulation distinct, surfaces glabrous, glossy above, dull beneath, olive-green in the dried state. Pedicels probably up to 8 in the upper 1—3 cm of a twig, 11—14 mm, hairy. Gynophore 11—14 mm. Fruit on a slender stipe, globose; mature?, 15—24 mm diameter. A straggling or semi-erect shrub 1 m high.

Before more complete material comes in, I refrain from placing it definitively.

3. *Vieillard 2293* (K) from the hills at Gatope, New Caledonia, is a scrappy specimen that might belong among the foregoing ones. The twigs are set with persistent, simple, appressed, rather short, greyish hairs. Thorns none. Petiole 9—12 mm. Leaves subcoriaceous, often somewhat obovate, 2½—3½ cm by 8—13 mm, base cuneate, top rounded, midrib slightly raised, with a faint reddish tinge, nerves *c.* 4 pairs, reticulation rather obscure; surfaces glabrous, glossy above. Two hairy pedicels are at the top of a twig, 1¾ cm long. Gynophore 2¾—3 cm. Fruit on a stipe to 2½ mm incrassate, immature, globose, 2 cm diameter.

74. Capparis lucida (Banks *ex* DC.) Benth., Fl. Austral. 1 (1863) 96; F. v. M., Fragm. Phyt. Austral. 9 (1875) 173; Bailey, Queensl. Fl. 1 (1899) 60; Britten, Ill. Austral. Pl. 1 (1900) 6, t. 6; Domin, Bibl. Bot. Heft 89 (1925) 688, with f. *normalis*; Jacobs, Fl. Mal. I, 6 (1960) 92, with map; Back. & Bakh. *f.*, Fl. Java 1 (1964) 184. — *Thylachium lucidum* Banks *ex* DC., Prod. 1 (1824) 254. — Type: *Banks & Solander s.n.* (P, holo), Australia, Queensland, Booby I., fl. 1770.

Busbeckea corymbiflora F. v. M., Fragm. Phyt. Austral. 1 (1858) 163. — Type: *F. von Mueller s.n.* (K, MEL), Australia, Queensland, Howick Is, fl. VIII. 1855.

C. subacuta Miq., Fl. Ind. Bat. I, 2 (1858) 101; Illustr. (1870) 35, t. 19, for the material from Java; see also under *C. sepiaria;* K. & V., Bijdr. 4 (1896) 260; Koord., Exk. Fl. Java 2 (1912) 293, as *C. acuta.* — Type: *Teijsmann s.n.* (BO, CAL, L, U), Malesia, E. Java, Puger, yfr. VIII. 1854.

C. lucida forma *pubescens* Domin, Bibl. Bot. Heft 89 (1925) 688. — Type: *Cunningham, King's 2nd voy. 458* (BM), Australia, northwestern coast, Vansittart Bay, fl. IX. 1818.

Capparis sp. Domin, Bibl. Bot. Heft 89 (1925) 686. — *H. Tryon s.n.* (BRI), Australia, Queensland, Percy I., st. 1905/6.

Tree or shrub 2—12 m, once reported very intricately branched with branches reaching to the ground, and straggling over nearby trees. *Hairs* simple, rather short, more or less straight, velvety, white to fulvous or greyish. *Juvenile shoots*: twigs slender, straight, weakly ribbed, densely puberulous. Thorns acicular, straight, slightly directed upwards,

2—2½ mm. Leaves often more or less distichous, 5—7 mm petiolate, firmly herbaceous, rhombic to elliptic, sometimes ovate, 3—5 by 2—2½ cm; base acute, top rounded to acute, mucronate; midrib flattish above, raised beneath, light-coloured, nerves 5—7 pairs, thin but distinct like the reticulation; surfaces glabrous, sometimes glossy above. *Adult shoots*: twigs fairly vigorous, more or less densely velvety. Thorns none. Petiole 4—18(—25) mm, often with a bud in the axil. Leaves firmly herbaceous to thin-coriaceous, (1.6—)2.4—3.2 times as long as wide, widest mostly below, sometimes about the middle, and in that case the leaves rarely rhombic, 6—9 by 2—4 cm; base acute, top rounded or blunt or acute, sometimes with a leathery mucro; midrib flattish above, raised beneath, often brownish or reddish tinged, nerves 4—6 pairs, thin but distinct like the reticulation; surfaces glabrous, above sometimes glossy, otherwise dull. *Flowers* white to pale yellow, with 2—14 more or less corymbose in the upper few cm of a twig conferted, their subtending leaves sometimes reduced to bracts or caducous; pedicels 1¾—5½ cm, slender to vigorous, widened towards the top, puberulous or velvety. Outer *sepals* coriaceous, pointed, *c.* 13 by 10 mm, pubescent only when young; inner sepals thinner, elliptic or sometimes obovate, pointed, *c.* 9—13 by 5—7 mm, glabrous. *Petals c.* 1½—2 by 1¼—1½ cm, pubescent at the very base. Torus *c.* 4—5 mm wide, conical. *Stamens c.* 50—83. Gynophore 2½—6½ cm, thinly pubescent towards the base; ovary *c.* 3½ by 2 mm, including a very short beak, glabrous, placentas (3—)4. *Fruit* on a stipe to *c.* 2 mm incrassate, globose, 2½—5 cm diameter, pericarp *c.* 3 mm thick, smooth, dull purplish brown; seeds *c.* 9 by 6 by 5 mm.

JAVA. East J. Puger: many. LESSER SUNDA ISLANDS. Komodo: *Muchtar 45, 58*; *de Voogd 2870*. — Pada: *Hoogerwerf 103*. — Timor: *Forbes 4024*. CELEBES. Southeast C. Rumbia: *Elbert 2984*. NEW GUINEA. Papua. Region of Port Moresby: several. WESTERN AUSTRALIA. Vansittart Bay, 14°S 126°E: *Cunningham 458*. QUEENSLAND. Torres Strait, *Bauerlen*, past fl. 1885. Booby I.: *Cunningham 71*; *Hill 114*. — All along the east coast and adjacent islets; many, southwards to Brisbane River, 27°30'S: *F. von Mueller*, fr. VII. 1855.

Distribution. East Malesia: East Java to Timor, and SE. Celebes, SE. New Guinea, ?Bismarck Archipelago. Australia: on the NW. coast, and east of Carlton Station (see Note 3), from the islands in Torres Strait all along the eastern Queensland coast southwards to, perhaps, Clarence River in New South Wales (see Note 4).

Ecology. Seems bound to coastal habitats; reported from open forested flats and tidal flats, but in Malesia also from savannahs and from an edge of a permanent swamp. For the fruits and heteroblasty, see Jacobs (1960).

Notes. 1. The description in the Flora Malesiana was largely based on a specimen in cultivation, which appears to have produced larger leaves and more flowers than any wild specimen examined. The present description should therefore be regarded as better characterizing the species under natural conditions; only the juvenile shoots have been described from cultivation as no wild material of these was available to me.

2. In *Steers s.n.* from Queensland, 1936, the gynophore is glabrous all over.

3. I hesitate to place *R. A. Perry 2651* from Point Springs, Western Australia, in *C. lucida*. The habit is rather crooked, the internodes are short, thorns none. Twigs very densely whitish puberulous. Petiole 7—10 mm. Leaves firmly coriaceous, 4—5¼ by 2¼—3 cm, widest about the middle, base acute, top rounded; midrib flattish, nerves 6—8 pairs with practically none petering out between, thin but very distinct underneath, reticulation obscure but more clear towards the margin; surfaces dull, mostly light brownish when dried, thinly puberulous above, densely so beneath. Flowers with a few on terminal hairy racemes 3—6½ cm long, pedicels *c.* 2½ cm, vigorous. Buds 1⅜ cm diameter. Outer sepals 17—18 mm long, hairy, top subacuminate, inner sepals elliptic, 15 by 11 mm, glabrous,

Fig. 36. *Capparis mitchellii* (Lindl. *ex* F. v. M.) Benth. — a—b. Juvenile shoots in consecutive stages, × ⅔ (a from *Chippendale 3045*, b from *Cunningham 503*). — *Capparis loranthifolia* Lindl. — c—d. Juvenile shoots, e. flowering branch, f. a specimen from New Caledonia, all × ⅔ (c, e from *C. T. White 11631*, d from *C. T. White BRI sh. 33641*, f from *McKee 6492*).

top rounded. Petals *c.* 25 mm long, hairy inside at the base. Stamens many. Gynophore at least 4 cm, glabrous all over, ovary 5 by 2½ mm, glabrous, placentas 4.

4. There is some material from Clarence River at *c.* 30°S in New South Wales, but its identity is not quite certain. *Beckler s.n.*, sterile, is unarmed, the leaves 1.3 + 14 by 6 cm. In *Wilcox s.n.*, just past flower, August, the leaves are 1½ + 11 by 4 cm, the gynophore is very thick, to 2½ mm. In *Wilcox s.n.*, in fruit, October, the leaves are 0.7 + 10 by 3.7 cm, the fruits in bad condition, the seeds 10 by 5 mm.

75. Capparis mitchellii (Lindl. *ex* F. v. M.) Benth., Fl. Austral. 1 (1863) 96, "*mitchelli*"; Bailey, Queensl. Fl. 1 (1909) 60; Maiden, For. Fl. N.S.W. 7 (1923) 49, t. 280; Domin, Bibl. Bot. Heft 89 (1925) 689; Black, Fl. S. Austral. 2 (1948) 369, f. 528. — *Busbeckea mitchellii* [*C. mitchellii* Lindl. in Mitch., Three Exp. Int. Austral. (1838) 315, name only] *ex* F. v. M., Fragm. Phyt. Austral. 2 (1860) 53, t. 4. — Type: *Lindley s.n.* (MEL), South Australia, Lake Torrens, fl. fr. 1849. — **Fig. 36a, b.**

First a dense, intricately branched, thorny bush, later a small tree 3—7(—10) m, trunk to 40 cm diam., with black deeply fissured bark and dense, spreading crown; occasionally climbing. *Indumentum* consisting of simple, minute, white, more or less curved to appressed hairs, giving the plant a downy-felty appearance. *Juvenile shoots*: thorns patent, recurved, 2—4 mm. Petiole (1—)2—6 mm. Leaves spirally arranged, coriaceous, more or less ovate or rhombic, *c.* (¾—)1¼—2 by (½—)¾—1 cm, base acute, top acute to bluntish, mucronate, midrib slightly sunken. *Adult shoots*: thorns none. Petiole 6—11 mm, mostly with a small bud in the axil. Leaves thick-coriaceous, more or less elliptic, 1.9—3.1 times as long as wide, widest about or above the middle, 3½—6½ by 1¼—3¼ cm; base acute and often somewhat decurrent, top acutish to bluntish, rarely with a harder tip; midrib flattish to faintly raised above, somewhat raised beneath and yellowish, nerves 3—4 pairs, hardly discernible underneath, reticulation sometimes discernible above, never beneath; surfaces (like the twigs) with a somewhat glaucous tinge and often looking pruinose, above densely puberulous, late glabrescent, rather glossy, beneath very densely (once laxly) hairy and dull. *Flowers* creamy yellow, with 1—4 near the top of twigs, pedicels vigorous, 3—4 cm, hairy as the twigs. Outer *sepals* *c.* 15—18 by 10—17 mm, pointed, very rigid, minutely hairy outside; inner sepals 11—18 by 7—12 mm, ovate-elliptic acuminate or/to obcordate, occasionally petaloid, with a few long hairs inside. *Petals* pale yellow, sometimes unguiculate, *c.* 2½—3 by 2 cm, fimbriate, inside verruculose with some woolly hairs near the centre and the base. Stamens *c.* 120—130. *Gynophore* 5½—7½ cm, sometimes thinly hairy in the lower half, ovary pear-shaped, *c.* 5—5½ by 2½ mm, including a beak 2 mm, densely hairy (occasionally glabrous), placentas 4—5. *Fruit* on stipe to 4 mm incrassate, globose to ellipsoid or ovoid, *c.* 4—7½ by 3—7½ cm, purple to blackish at maturity, surface smooth but with some irregular knob-like protrusions, dull yellow-hairy to glabrous; seeds *c.* 7—10 mm long.

NORTHERN TERRITORY. Mount Liebig, *c.* 22°20′S 131°40′E: *Cleland 2B*, fr. 18. VIII. 1957; southwards to 205 km SW. of Alice Springs: *Anon.* (AD), fl. (recent); with between: *Cleland 129B*; *Hill 87*; *Lothian 276*. — Taylor's Creek, 21°S 134°E: *Lothian 415*; southwards to Finke River, *c.* 25°S 135°E: *Kempe 4*, fr. 1880, with between in the MacDonnell Ranges many. SOUTH AUSTRALIA. Near Wirrealpa, 31°38′S 137°E: *Hill 394*. Lake Torrens: *Lindley*, fl. fr. 1849; *F. von Mueller*, fr. 1881. Frome Distr., *c.* 31°S 140°E: *Maroske 9*; *White*, fl. XII. 1920. QUEENSLAND. Gulf of Carpentaria, Plains of Promise: *F. von Mueller*, fl. IX. 1856. — Mount Isa, 20°50′S 139°29′E: *Everist 1725*. — Barcaldine, 23°31′S 145°27′E: *White 12331*. — Emerald, 23°30′S 148°08′E: *Francis* fl. 2. IV. 1923. — Near Rockhampton, 23°22′S 150°32′E: *White 11029*. — South of this line, various localities: several. NEW SOUTH WALES: many. VICTORIA. Mount Wallace, 30 km ESE. of Balaratt, 37°36′S 144°E: *Anon.* (AD, sh. 961. 191. 06), fl.

Distribution. Australia: (Western Australia, Vansittart Bay; Bentham), in the centre of the continent, and from the Gulf of Carpentaria through Queensland, mainly in the subtropical parts; southwards to Victoria, and Lake Torrens in South Australia.

Ecology. Savannah, very open forest, and grassland, *Acacia* and *Eucalyptus* woodland, sometimes on red loamy soil or limestone; to 300 m altitude. The fruits are eaten, even when green, by white cockatoos; also the seeds are said to be eaten by birds.

Use. The bark is used in native medicine, the wood is good for engraving and carving, the fruit is eaten by the natives (Bailey). Sheep are ravenous after the young growth (Maiden). See Cleland & Tindale, Trans. Roy. Soc. S. Austral. 82 (1959) 132, also for vernacular names.

Notes. 1. The variety *pubescens* Benth., recorded under *C. mitchellii* by Bailey (1909) properly belongs to *C. nobilis.*

2. *Capparis mitchellii* and *umbonata* seem to form a 'pair' with regard to their distribution: *C. mitchellii* south of the Capricorn, *C. umbonata* north of it, the areas adjoining very perfectly throughout Central Australia to the east coast.

76. Capparis nobilis (Endl.) Benth., Fl. Austral. 1 (1863) 95, in part, as for the Norfolk population only; also Bailey, Queensl. Fl. 1 (1899) 59; Maiden, Proc. Linn. Soc. N.S.W. 28 (1903) 695, see Note 1. — *Busbeckea nobilis* Endl., Prod. Fl. Norfolk. (1833) 64. — *C. nobilis* var. *typica* Domin, Fedde Rep. 11 (1912) 201; Bibl. Bot. Heft 89 (1925) 686. — Type: *Ferd. Bauer s.n.* (BM, W, holo), Pacific, Norfolk I., fl. 1804/5; see Note 2.

"*C. elegans* (Endl.) F. v. M.", as cited by Pax, E. & P., Pfl. Fam. iii, 2 (1891) 231, *non* Mart. 1839.

C. nobilis var. *citrina* Cunn. [Hook. Lond. J. Bot. 1 (1842) 115, name] *ex* Domin, Fedde Rep. 11 (1912) 201; Bibl. Bot. Heft 89 (1925) 687, t. 26 f. 3. — Type: *Cunningham 11* (BM), Pacific, Norfolk J., fr.

Climber. *Juvenile shoots*: see Note 3. *Adult shoots* initially and sometimes rather densely set with simple, short, somewhat appressed, yellowish, crystal-jelly-like looking hairs, early glabrescent or glabrous; twigs dull brown-purplish tinged. Thorns none. Petiole 1—2½ cm. Leaves subcoriaceous, 1.6—2.6 times as long as wide, widest at the middle to a little lower, (6—)8—10½ by 3—5 cm; base acutish to rounded, top acute; midrib flat, reddish-brown tinged, nerves 6—7 pairs, somewhat irregular, reticulation thin but distinct, surfaces glabrous, more or less glossy. *Flowers* pale yellow, with *c.* 4—12 solitary axillary in the upper 8—12 cm of the twig arranged to a leafy raceme, although part of the floral leaves sometimes are shed; pedicels vigorous, medianly compressed, 4—6 cm. Outer *sepals* thick-coriaceous, 18—25 by 12—15 mm, glabrous or almost imperceptibly hairy; inner sepals oblong, 16—22 by 6—8 mm, flattish, thick in the centre, thinner towards the margins, glabrous. *Petals c.* 2½—3 by 1½ cm, hairy inside. Torus 6—7 mm wide, conical. *Stamens c.* 136. *Gynophore* (4—)4½—6 cm, glabrous; ovary ovoid, *c.* 5 by 2½ mm, glabrous, with distinct flat stigma *c.* 1 mm wide; placentas 5. Fruit (after Bauer's plate) on a stipe to 5 mm incrassate; lemon-shaped, *c.* 7½—8½ by 5—6½ cm, slightly umbonate, pericarp fairly regularly set with warts a few mm in size, dull purplish brown, *c.* 5 mm thick, seeds in yellow pulp, *c.* 8 mm diam.

PACIFIC SOUTH. Norfolk I.: *Ferd. Bauer*, fl.; *Cunningham 11*; *MacCorrish*, fl. XI. 1938, *12*, fl. I. 1939; *Robinson*, fl. 1884.

Distribution. Pacific: Norfolk I. and Philip I. (south off the former).

Ecology. Forests in the interior, and frequent on cliffs.

Notes. 1. Maiden (1903) made a detailed comparison between the Norfolk and the

Australian plants going under the name *C. nobilis*. Although I believe that he interchanged the "almost globular" fruits of the Australian specimens with the "lemon-shaped, often with crested ridges" of the Norfolk ones, I think Maiden was right in segregating them as two species.

2. Endlicher refers to plates 100 and 167 of Ferd. Bauer's Illustr. Pl. Norfolk. These plates were printed but never published; a coloured copy of both (numbered, however, 81A, the flowers, and 81B, the fruits) is in the Vienna Herbarium.

3. Not many specimens are known, and no juvenile shoots similar to those of the other species of the section. In *McCorrish* there is a slender sterile twig, angular, glabrous, internodes 2—3¾ cm, thorns hooked, 4 mm; leaves spirally arranged, 1—1½ cm petiolate, 9½ by 3 cm, widest in the middle, base obtuse, top acute. Similar shoots are known of *C. callophylla*, but of no Australian species.

77. Capparis ornans F. v. M. *ex* Benth., Fl. Austral. 1 (1863) 95; Bailey, Queensl. Fl. 1 (1899) 58; Compr. Cat. Queensl. Pl. 1 (1909) 40, f. 19bis; Queensl. Agr. J. 26 (1911) 126, t. 12; Domin, Bibl. Bot. Heft 89 (1925) 686. — *Busbeckea ornans* F. v. M., Fragm. Phyt. Austral. 5 (1866) 165. — Type: *Fitzalan s.n.* (K, holo, MEL), Australia, Queensland, Port Denison, fl.

A tall woody climber to the tops of trees. *Indumentum* very dense, hoary, consisting of simple, more or less appressed, short, cream-coloured hairs. Twigs straight, very late glabrescent. *Thorns* recurved, 3—4 mm, wanting on the fertile twigs. Petiole (¾—)2½—3½ cm. *Leaves* thin-coriaceous, 1.1—1.8 times as long as wide, ovate to subrhombic, 6¼—8½ by 4—7 cm; base subacute, top obtuse; midrib shallowly sulcate near the base, reddish tinged beneath, nerves *c.* 6—7 pairs, reticulation distinct; surfaces brownish when dried, mostly dull, above sometimes glossy and darker than beneath, very soon glabrescent. *Flowers* solitary, axillary with a preference for the top of a twig. Buds round in section; outer *sepals* thick-coriaceous, 33 by *c.* 20 mm, with acute top, outside minutely puberulous towards the base; inner sepals *c.* 25 by 16 mm, thinner and flattish. *Petals* at least 4¼ cm long. Stamens many. *Gynophore* 6½—7½ cm, glabrous, brownish tinged when dried; ovary ellipsoid, *c.* 10 by 4½ mm including a beak 3 mm, stigma obscure. *Fruit* on a stipe to 5 mm incrassate, brownish when dried, ovoid, *c.* 9—10 by 5—6 cm, pericarp 1½—3 mm thick, practically smooth or with *c.* 8—10 weak ribs towards the base; seeds *c.* 9 mm long.

QUEENSLAND. Rockingham Bay, 18°11'S: *Dallachy*, st. Port Denison, *c.* 20°S: *Fitzalan*, fl. Sellheim, 20°S 146°E: *Marks*, fr. 1911. Rockhampton, 23° 22'S: *O'Shanesy 169*; *Thozet 209*. Near Port Curtis, *c.* 24°S: *White 12472*.

Distribution. Australia: endemic in southeastern Queensland, within 100 km from the coast.

Ecology. On the edge of rain forest.

78. Capparis shanesiana F. v. M., Fragm. Phyt. Austral. 10 (1877) 94; Bailey, Queensl. Fl. 1 (1899) 59; Domin, Bibl. Bot. Heft 89 (1925) 689. — Type: *O'Shanesy 2003* (K, MEL, holo), Australia, Queensland, Gracemere, fl. 1877; see Note 3.

Erect tree 3 m high with dense, dark green, regular crown. Trunk 15—23 cm diameter, 1¼ m high. Bark hard, whitish-grey, deeply and coarsely furrowed, becoming smoother and mottled on the branchlets. *Indumentum* fairly dense, the hairs simple, single, erect, rather long, yellowish, altogether velvety. Juvenile shoots unknown. *Adult shoots*: twigs slender, persistently hairy. *Thorns* vigorous, 3—4 mm, slightly curved, or wanting. Petiole 6—15 mm. *Leaves* spirally arranged, thick-coriaceous, *c.* 3—5 times as long as

wide, widest in to slightly below the middle, *c.* 6½—10½(—12) by 2—4 cm; base acute, top blunt; midrib slightly sunken towards the base, nerves *c.* 5—7 pairs, reticulation rather obscure; surfaces dull, yellow-brownish tinged especially underneath, above sometimes greenish, densely hairy underneath all over, above sparsely so, or only in the median part. *Pedicels* few, more or less laxly conferted towards the top of a twig, occasionally along a terminal rachis to 3 cm long, the lower ones solitary in a leaf axil (the higher leaves shed or reduced?), 3½—7 cm, vigorous, compressed near the top, hairy. Buds round with some 12 distinct longitudinal ribs, hairy. Outer *sepals c.* 17—22 by 12—15 mm, laxly puberulous, inner sepals *c.* 14—17 by 11—14 mm, (always?) 3-topped, hairy outside in the median part. *Petals* nearly 3½—4 by *c.* 1½ cm, hairy. Torus 5—7 by 4 mm wide. For stamens see Note 1. *Gynophore* 4¾—9 cm, laxly woolly near the base or glabrous; ovary ovoid, *c.* 5 by 2½ mm, sometimes a slight swelling present between its base and the top of the gynophore, glabrous or densely hairy; stigma obscure. *Fruit* globose, umbonate, about 5 cm diameter, with very wrinkly surface.

QUEENSLAND. Mount Atherton, 17°15'S 145°30'E: *O'Shanesy N40 ser. 9.* Honeycomb: *Lazarides & Story 76.* Emerald, 23°30'S 148°08'E: *Francis*, fl. 2. IV. 1923. Rockhampton: *O'Shanesy 2003*; *Tenison Woods*, fr. Blackwater: *Francis*, buds III. 1930. Biloela, 24°21'S 150°30'E: *Marriott*, st. III. 1936.

Distribution. Australia, endemic in southeastern Queensland.

Ecology. On solonetzic soil with *Eucalyptus populnea* and sparse grasses. Fruit in September.

Notes. 1. *O'Shanesy N. 40 ser. 9* (MEL) from Mt Atherton, 20. III. 1868, has leaves to *c.* 1.7 times as long as wide, 2 cm petiolate, and to 10½ by 5—6¼ cm. There are 90 stamens and 4 placentas in a bud. It is mentioned separately because the leaves are much wider than in the other specimens of this poorly known species.

2. In the herbarium, the reddish-brown gynophore contrasts with the yellow-green tinge of the leaves, the latter being the sort of colour that is suggestive of the presence of aluminium.

3. In the Melbourne herbarium there are 2 sheets involved in the typification. One has flower buds, and bears in F. von Mueller's hand "*Capparis Shanesiana* F. v. M. Rockhampton, P. O'Shanesy". Of this specimen there is a duplicate at Kew; the Melbourne sheet has been designated as the holotype.

The other sheet bears no handwriting of von Mueller's, but the label, obviously by O'Shanesy himself, reads "n. 2003. *Capparis lucida*? A small spreading tree with a grey rough bark, stipularly prickles hooked, fruit globular, more than 2 inches in diameter, very rugose, muricate, and umbonate, on a stipe of three inches. Brigalow scrubs, Gracemere, not frequent, P. A. O'Shanesy 1877". Von Mueller copied these dates, obviously regarding this sheet too as a duplicate.

79. Capparis thozetiana (F. v. M.) F. v. M., Syst. Census Austral. Pl. 1 (1882) 5; Bailey, Queensl. Fl. 1 (1899) 61; Domin, Bibl. Bot. Heft 89 (1925) 690. — *Busbeckea thozetiana* F. v. M., Fragm. Phyt. Austral. 5 (1866) 104. — Type: *Thozet 150* (K, MEL, holo, P), Australia, Queensland, Rockhampton, fl.

An erect shrub; branches said to be slender and pendulous. *Indumentum* of simple, lax, appressed, short or minute, whitish hairs. Twigs slender, brownish or green when dried, sparsely hairy; internodes ½—1 cm. *Thorns* divaricate, slightly recurved, slender but sharp, 1—2½ mm, or acicular, straight, 4 mm, in the latter case seen only at the main branchlets, the other being unarmed. Petiole ½—1½ mm. *Leaves* spirally arranged, coriaceous, linear, 1¾—5¼ cm by 2—9 mm; base obtuse to cuneate, top acute, to 2 mm mu-

cronate; midrib very shallowly sunken, sometimes reddish, nerves *c.* 5—6 pairs, slightly prominent, reticulation rather obscure; margins sometimes recurved; surfaces glabrous, dull, brownish or green when dried. *Flowers* axillary along the twig, solitary or occasionally collateral in twos; pedicels slender, 9—18 mm, hairy. Outer *sepals* 6—7 by 4—5 mm, subcoriaceous, glabrous, inner sepals *c.* 5 by 3 mm. *Petals c.* 8—9 by 3 mm, with some hairs inside. Torus 2 mm wide. *Stamens* 16—20. *Gynophore* 13—15 mm, glabrous; ovary ellipsoid, 2 by 1½ mm, glabrous, placentas probably 3. *Fruit* not seen, said to be 3¼ cm Ø.

QUEENSLAND. *Bowman*, fl. Rockhampton area, *c.* 23°30'S 150°E: *O'Shanesy 2052, 3029*; *Thozet 150*.

Distribution. Aústralia, endemic in southeastern Queensland near Rockhampton.

80. Capparis umbonata Lindl. in Mitch., J. Exp. Trop. Austral. (1848) 257; Benth., Fl. Austral. 1 (1863) 97; Bailey, Queensl. Fl. 1 (1899) 60; Ewart *c.s.*, Proc. Roy. Soc. Vict. 24 n.s. (1912) 256; Domin, Bibl. Bot. Heft 89 (1925) 689. — *Busbeckea umbonata* F. v. M., Fragm. Phyt. Austral. 1 (1858) 164. — *C. umbonata* forma *exumbonata* Domin, Bibl. Bot. Heft 89 (1925) 690. — Type: *Mitchell s.n.* (BM, K, holo), Australia, Queensland, Belyando, yfr. 2. IX. 1846.

C. acacioides Diels & O. Schwarz, Fedde Rep. 24 (1927) 84. — Type: *Bleeser A4* (B, *n.v.*), Australia, Northern Territory, Port Darwin and vicinity.

C. citrifera O. Schwarz, Fedde Rep. 24 (1927) 84. — Lectotype: *Bleeser 544* (B, *n.v.*, MEL, iso), Australia, Northern Territory, Port Darwin, fl. XI. 1919.

Tree 4—5 m high, bole with thick tessellate bark, branchlets and foliage drooping, flowers erect. Plant completely glabrous, except part of the flower. *Juvenile shoots*: twigs slender, green, internodes sometimes to 10 cm. Thorns straight, acicular, patent to slightly directed upwards, 1½—6 mm. Leaves spirally arranged, short-petiolate, coriaceous, linear, *c.* 3—4 cm long in all, 2—3 mm wide, base tapering, top tapering, mucronate; midrib flattish on both sides, nerves hardly discernible. *Adult shoots*: twigs mostly slender, smooth, thorns nearly always wanting, when present straight, appressed, 1 mm long, weak, black. Petiole 1—3 cm. *Leaves* coriaceous, sometimes falcate, linear, 10—23 by ¾—2¾ cm, at least 4 times as long as wide, widest at the middle or somewhat lower; base narrowed into the petiole, top rounded to acute, often with a mucro or point to ½ cm long; midrib faintly raised or flattish on both sides, nerves 2—4 pairs, very oblique and not connected by an arcuating marginal vein, rather obscure, reticulation obscure, surfaces dull, often purplish tinged in the dried state, when fresh bright or dark green. *Flowers* yellowish white, with up to 6 axillary towards the end of a twig, the subtending leaves sometimes shed; pedicel 2—5½ cm, vigorous, widened to the top. Outer *sepals* coriaceous, pointed, *c.* 15—16 mm long and wide. Inner sepals thinner, elongate, *c.* 15—18 by 5—7 mm. *Petals* 2—3 by 1½ cm, fimbriate, obovate, hairy at the base. *Stamens c.* 57—103. *Gynophore* 5—9½ cm, glabrous; ovary ovoid or ellipsoid, *c.* 3—4½ by 3 mm, without a beak, glabrous, placentas 4. *Fruit* yellow or red at maturity; globose, 3—4½ cm diameter, woody, whether or not with a protuberance at the top; seeds about 5—10, embedded in hard, almost woody pulp (after Ewart *c.s.*). The fruit is also compared with a guava (Bynoe).

WESTERN AUSTRALIA. Lagrange Bay, 18°S 122°E: *All Hughan* (?), st. II. 1869. — Kimberleys, *c.* 18°S 126°E: several. NORTHERN TERRITORY. Sandover, *c.* 22°S 135°E: *Barnes 1235*; *Chippendale NT 1166*. — Manners Creek, *c.* 22°S 138°E: *Chippendale NT 171, 174, 179*. — North of this line: many. — Crocodile I. north of Arnhem Land: *Wilkins 207*. QUEENSLAND. Burketown, 17°43'S 139°30'E: *Fawssett 42*. Duchess, 21°22'S 139°50'E: *Everist & Smith 210*; between: several. — Mount Carbine, 16°31'S 145°07'E: *Merrotsy 40*. Port Denison: *Dallachy*, fr.; *Fitzalan*, yfr. Edgecombe Bay: *F. von Mueller*, fl. Broadsound, 22°30'S 150°E: *Bowman 132*.

Distribution. Tropical Australia, from the northwestern coast to eastern Queensland, not in northern Queensland.

Ecology. Dry savannah, often on red soil, sandy or gravelly. The data about the bark are suggestive of fire-resistency. Fruits in central Australia in July-August. After the foliage has been eaten by cattle, juvenile shoots develop.

INCOMPLETELY KNOWN

81. Capparis dielsiana Schltr., Bot. Jahrb. 39 (1906) 112. — Type: *Schlechter 15253* (B, *nv.* P, iso), Pacific, New Caledonia, Ngoye, 400 m.

The type material of *C. dielsiana* is very poor. The twig is densely puberulous, petiole 13 mm, leaves *c.* 7 by 2¾ cm, ovate, acute. Some 20 young buds are conferted at the upper 6 cm of the twig, to 1½ cm pedicellate. Schlechter added: „an erect shrub to 3 m" (whereas *C. artensis* is a liana).

81b. C. dielsiana var. **angusta** Schltr., Bot. Jahrb. 39 (1906) 112. — *C. artensis* var. *angusta* (Schltr.) Guill., Bull. Soc. Bot. Fr. 83 (1936) 578. — Type: *Schlechter 15129* (B, *n.v.*, K, P), Pacific, New Caledonia, Ngoye, 100 m, buds 28. XI. 1902.

In the type of *C. dielsiana* var. *angusta*, the twigs are brownish dark tinged, sooner glabrescent, the petiole 13 mm, the leaves 6½—7½ by 1½ cm, tapering to both ends. About a dozen very young buds are in the axils of the higher leaves, the very top of the twigs bearing neither leaves nor flowers. This plant looks like a rheophyte, which agrees with Schlechter's remark that *C. dielsiana* occurs on steep banks.

Both specimens, although closest related to *C. artensis*, fall so far out of the variability range of that species, that more and better material will have to be collected before they can satisfactorily be placed.

82. Capparis muelleri Domin, Bibl. Bot. Heft 89 (1925) 688, t. 26 f.6,7.—*C. canescens* var. *glauca* Benth., Fl. Austral. 1 (1863) 96; Bailey, Queensl. Agr. J. 22 (1909) 316. — Type: *F. von Mueller s.n.* (K), Australia, Queensland, "between the Flinders & Lynd. Gulf of Carpent. Sept. 56.", approximately at 18°30'S 141°E, yfr.

The only material is the scrappy type specimen. Twigs rather vigorous, persistently hairy with simple, fairly dense, cream-coloured, appressed, very short hairs, aspect hoary. Thorns none. Petiole 15—18 mm. Leaves thick-coriaceous, 7—9½ by 3.4—3.8 cm; base acutish, top obtuse, midrib somewhat raised, nerves 4—6 pairs, reticulation distinct above, obscure beneath, surfaces glabrous, dull, pallescent with a faint reddish tinge. Pedicels axillary in the apical portion of a twig, vigourous, 5—7 cm, hairy. Gynophore 4½—9 cm. Fruit immature, 2½ by 2 cm, umbonate.

Domin segregated Bentham's variety as a species, found the name *C. glauca* preoccupied by Wall. *ex* Hook. *f.* & Th.

The plant seems near to *C. canescens* and *C. shanesiana*, but the leaves are, in my opinion, essentially different from those in either species.

Capparis *sp.* — *Vieillard 105* (field no. *67*; P) from New Caledonia, could not be classified and might be a different species. The pubescence consists of simple, very dense, rather long hairs not very straight or appressed, but underneath the leaves the indumentum is lax and the hairs are comparatively long. Twigs rather slender, persistently hairy. Thorns none. Petiole 13—16 mm. Leaves subcoriaceous, ovate, *c.* 6½—8 by 3—3¼ cm; base rounded, top acute, midrib flat and hairy above, dark-coloured especially beneath,

nerves 7—8 pairs, thin, reticulation rather obscure, surfaces dull, hairy beneath (see above), brown when dried. Flowers in one specimen on hairy lateral twigs to 2½ cm long, few, in the other specimen with *c.* 8 racemose along the upper 4½ cm of the twig, where the leaves have been shed; pedicels 1½—3½ cm long, hairy. Buds at least 2 cm long including an apical point ½ cm long, densely hairy; in the early stages when the transition to the pedicel is not yet marked, the whole bud seems spindle-shaped. Torus 6 mm wide. No more is known.

The plant which is especially remarkable for the hairy undersurface of its leaves, has some resemblance with *C. dielsiana* (see above) and with *C. artensis*, but the present scarce material permits of no more definite conclusion. A field worker, who undertakes an inventarization of *Capparis* in New Caledonia would find a fruitful work to do.

EXCLUDED FROM CAPPARIS

Capparis apetala Roth, Nov. Pl. Sp. Ind. Or. (1821) 238 = **Maerua apetala** (Roth) Jacobs, Blumea 12 (1964) 207 (*Capparaceae*). — Type: *Heyne s.n.* (K, iso), India orientalis, st. 8. VII. 1808.

Capparis carandas Burm. *f.*, Fl. Ind. (1768) 118, 119 = **Carissa carandas** L. (*Apocynaceae*); see Jacobs, Fl. Mal. I, 6 (1960) 93.

Capparis heteroclita Roxb., Fl. Ind. ed. Carey 2 (1832) 570 = **Maerua oblongifolia** (Forsk.) A. Rich. (*Capparaceae*). — Type: "Roxburgh, m. Lambert 1816" (G-DC), fl.

Capparis trifoliata Roxb., Fl. Ind. ed. Carey 2 (1832) 571 = **Crateva adansonii** DC. ssp. **trifoliata** (Roxb.) Jacobs, Blumea 12 (1964) 199 (*Capparaceae*).

Capparis variabilis Wall., Cat. (1832) no. 7004, *nomen nudum*. — *Niebuhria? variabilis* Kurz, J. As Soc. Beng. 43 ii (1874) 68, *nomen*; For. Fl. Burma 1 (1877) 59, descr. — *Niebuhria siamensis* Kurz, For. Fl. Burma 1 (1877) 59. — *Boscia variabilis* (Kurz) Coll. & Hemsl., J. Linn. Soc. Lond. Bot. 28 (1890) 18, t. 1. — *Crataeva mucronulata* O. Kuntze, Rev. Gen. 1 (1891) 38, "*mucronata*", in Ind. Kew. — *Maerua mucronulata* (O. Kuntze) Williams, Bull. Herb. Boiss. ii 5 (1905) 24, "*mucronata*". — *Niebuhria decandra* Gagn., Bull. Soc. Bot. Fr. 55 (1908) 323. — *Meeboldia variabilis* (Kurz) Pax & Hoffm. in E. & P., Pfl. Fam. 2nd ed. 17b (1936) 187, *descr. germ.* — *Hypselandra variabilis* (Kurz) Pax & Hoffm., Fedde Rep. 41 (1936) 128 = **Maerua siamensis** (Kurz) Pax in E. & P., Pfl. Fam. 2nd ed. 17b (1936) 196 (*Capparaceae*).

Maerua siamensis, a common species of SE. Asia, displays a considerable variation. In one specimen I saw simple leaves 4—5 mm petiolate among ternate leaves 14—15 mm petiolate, but a leaf may be much longer stalked and bear up to 5 leaflets. *Wallich*'s sterile specimen *7004* (K) and Collett & Hemsley's plate represent what I think rare cases of all leaves in one plant being simple and borne on as short a stalk as are the leaflets in the common forms. When Pax & Hoffmann found that *Meeboldia* (described invalidly, by the way) already existed in the *Umbelliferae*, they gave it the name *Hypselandra*, which is hereby reduced.

LIST OF EVALUATED NAMES

The numbers referred to are those of the species under which a name is to be found. New names have been printed in **bold type**, accepted names in plain type, others in *italics*. Invalidly published names have been incorporated, *nomina nuda* and manuscript names not. Only those names have been entered which belong to the genus *Capparis*, either as correct names or synonyms. Names in appendix are not included.

IDENTIFICATION LIST

This list contains the numbered collections examined, which are referred to the number of the taxon in the text. Type specimens are marked with (T). Collections from Malesia have already been published, in the Identification List of Malaysian Specimens, number 7, mimeographed, 1960. The recent ones have been incorporated. Specimens with an asterisk * have been discussed in the Notes.

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37. *Rodin 580:* 1d. *Roe CSIR Lawes 23:* 33. *C. G. Rogers 249:* 65; *402:* 23; *406:* 27; *544:* 10; *801:* 50; *937:* 65; *938:* 23; *954:* 10; *1400:* 2. *D. P. Rogers 30:* 1d. *Rollet 615:* 37; *931:* 46; *968*:* 37. *Royle 131:* 55. *Russell 2017:* 5.

Safford & Seale 1108: 1d. *Sallé 8:* 55. *Sampson 1530:* 13. *Sangkhachant 614:* 37. *San Mg. 6905:* 65. *Santapau 1447:* 39; *1786:* 55; *1974:* 39; *1982:* 65; *3316—3318:* 39; *3633:* 39; *4114H:* 55; *4119:* 50; *4121:* 65; *4130:* 55; *7542:* 2; *7577:* 2; *7725:* 27; *8672:* 65; *10912:* 6; *12263:* 39; *12524:* 50; *13125:* 50; *13764:* 27; *13785:* 27; *14208:* 2; *14228:* 55; *16794:* 1b; *16795:* 1b; *16801:* 1b; *16972:* 65; *17160:* 65; *17419:* 65; *17160:* 65; *17419:* 65; *17606*:* 27; *18290:* 65; *18291:* 65; *18466:* 55. *Santos PNH 39121:* 37; *PNH 39152:* 24; *PNH 39153:* 55. *Saran c.s. 25240:* 65; *25604:* 65; *25860:* 65; *58331:* 9; *58833:* 41; *58867:* 41; *78707:* 58. *Sauliere 201:* 71. *Saxton 2872:* 2. *Schlagintweit 7687:* 65; *10618:* 2. *Schlechter 14392:* 31 (T); *15085:* 47 (T). *Schmid field no. 9:* 3a; *99:* 3; *927:* 45; *929:* 37; *13154:* 37. *Schneider 3237:* 3c. *Schock 1:* 3c. *Schodde 2647:* 47. *Schomburgk 107:* 37; *108:* 46; *Schultz hb. Schomburgk 572:* 55; *575:* 80; *685:* 80; *852:* 80; *864:* 80. *Schram BW 9340:* 66. *Scortechini 232:* 33; *304:* 70; *1784:* 45 (T). *Scouller 28:* 75. *Searight 211:* 41. *Sedgwick 1255:* 27; *3785:* 71; *Bell 4 hb. Sedgwick "3977 = 3872":* 58; *5913:* 27; *27856:* 27. *Sedgwick & Bell 5174:* 55; *5524:* 39; *Ambo hb. Sedgwick & Bell 7222:* 16; *Nana hb. Sedgwick & Bell 7287:* 50. *Seidenfaden 2288:* 37. *Setchell 15671:* 1d; *15691:* 1d. *Shah 1118:* 2; *1137:* 65; *1326:* 65; *1878:* 55; *1898:* 2; *2012:* 55; *6569:* 9; *6570:* 9; *8699:* 95; *9720:* 65. *Shaik Mokim 10:* 17; *12:* 50; *32:* 10; *142:* 65; *496:* 37; *547:* 61; *651:* 61; *1208:* 65. *Shankermani 207:* 65. *Sharma 20258:* 3d. *Shenoy 2498:* 55. *Shrams D175:* 27. *De Sigaldy 359/519:* 37. *De Silva 20:* 9. *Simond 197:* 3b. (Hong Kong) *Simpson 26:* 3a. Ceylon *Simpson 8086:* 51; *8104:* 51; *8204B:* 51; *8241:* 58; *8311:* 58; *9251:* 9; *9305:* 65; *9389:* 71; *9631:* 39; *9821:* 9; *9936:* 50. *A. Singh* c.s. *55525:* 65; *55735:* 65. *J. Singh 142:* 65; *162:* 65. *R. Singh 1120:* 2. *Smales X6*:* 57b (T); *34:* 65; *51:* 50; *65:* 65; *66:* 23; *68:* 23; *194:* 55. *A. C. Smith 319:* 1d. *L. S. Smith 10533:* 53; *10688:* 74; *10772:* 74; *10774:* 33; *11074:* 74; *11778:* 55; *11862*:* 68; *11904:* 55; *11932:* 74; *11939:* 70; *12054:* 70. *L. S. Smith & Everist 879:* 75. *L. S. Smith & L. J. Webb 3127:* 68. *Smitinand 1207 = RFD 7762:* 65; *4484 = RFD 16102:* 23; *5449 = RFD 21347:* 37; *5453:* 45; *5552:* 46. *Soehanda 272*:* 47 *Sorensen c.s. 1931:* 23; *2189:* 59; *6996:* 65. *Soutter 445:* 75. *Specht 154:* 55; *697:* 47; *772:* 47; *1203:* 55. *Speck 1617:* 33; *4795:* 33. *Spire 47:* 61; *1037:* 65; *1250:* 3b. *Sprague 70:* 2. *Squires 281:* 46; *352:* 37; *361:* 65; *810:* 65; *829:* 46. *Srivastara c.s. 25705:* 65; *46094:* 65; *46805:* 55; *49494:* 65; *61738:* 39; *81278:* 58; *81935:* 58; *83176:* 40; *89909:* 66. *Stainton 4:* 41. *Stainton, Sykes & Williams 8892:* 41. *Van Steenis 12868*:* 46; *20457:* 1d. *Steiner PNH 22908:* 37; *PNH 36440:* 37. *Steward & Cheo 511:* 57b; *1209:* 62. *Steward & Nasir 27912:* 1e. *Steward 16328:* 2; *16540:* 1. *St. John 16726:* 1d; *21500:* 1d. *St. John & Fosberg 15062:* 1d. *J. F. G. Stokes 59:* 1d. *S. J. Stokes 45:* 80. *Stone 4240:* 1d. *Stuart 31:* 52; *994:* 75. *Su Koe 9210:* 13; *9252:* 5. *Sulit PNH 34751:* 31. *Sutherlans 10:* 75. *Suvarnakoses 92 = RFD 10664:* 58; *1290 = RFD 17055:* 59; *1296 = RFD 16282:* 65; *1298 = RFD 16284:* 56; *1371 = RFD 16318:* 65. *Suvarnasuddhi 7:* 46. *Syam 22560:* 13.

Taam Ying Wah 6: 62. *Takamatsu 1475:* 1c. *Talbot 927:* 39; *1951:* 2. *Taleon PNH 33721:* 37. *Talmy 51:* 37; *93:* 46. *Tang 13120:* 13. *Tashiro A 63:* 37b. *Tejendra Mohan Ghosh 446:* 65. *Ten 134:* 3c; *217:* 3c. *Teijsmann HB 1945:* 45 (T); *HB 5016:* 45 (T); *HB 5926*:* 59; *HB 5927*:* 56 (T); *HB 5931:* 23 (T); *HB 5935:* 65; *HB 5949:* 65; *12594:* 8. *Thanawn Premrasmi RFD 665:* 37. *Thapthimthawng 15 = RFD 6985:* 37. *Thaworn 263 = RFD 13003:* 37; *560 = RFD 17397:* 46; *563 = RFD 17910:* 23; *947:* 46. *J. B. Thompson 280:* 1d. *R. Thompson 16:* 65; *751:* 27. *G. Thomson 117:* 65; *127:* 65. *T. Thomson 478 hb. H. f. & Th.:* 65. *Thon 60:* 68; *69:* 70. *Thorel 9:* 65; *285:* 37; *287:* 37; *677:* 46; *709:* 46; *752:* 65; *759(?):* 65; *857:* 65; *2012*:* 23; *2037:* 59 (T); *2058:* 65; *2064:* 55; *2582:* 32 (T); *2831:* 65; *3257:* 36 (T). *Thozet 12:* 33; *55:* 33; *150:* 79 (T); *209:* 77; *336:* 78. *Thwaites CP 614:* 58 (T); *CP 1058:* 65; *CP 1059:* 9; *CP 1060:* 9; *CP 1062:* 9; *CP 1063:* 55; *CP 1065:* 51; *CP 1069*:* 50; *CP 1071:* 27; *CP 1072:* 71; *CP 2415:* 39; *CP 2480:* 51; *CP 2509:* 9; *CP 2550:* 55 (T); *CP 3766:* 24. *To & Tsang 12777:* 3a. *Toppin 2666:* 58; *3020:* 58; *3179:* 40. *Topping 3229:* 1d. *Tothill 6:* 1d. *Treutler 166:* 40. *Tsai 51482:* 3c; *52476:* 40; *53013:* 3c; *53423:* 3c; *53443:* 3c; *53489:* 3c; *53603:* 3c; *55550:* 57b; *55557:* 57b; *57302:* 3c; *60160:* 40; *60200:* 40; *61178:* 57b; *62088:* 40. *Tsang (859) L.U. 16358:* 13; *(916) L.U. 16415:* 63; *(69) L.U. 16818:* 37; *(546) L.U. 17295:* 3b; *(648) L.U. 17397:* 63; *20229:* 63; *20374:* 3a; *20539:* 3a; *21663:* 13; *22030:* 63; *23142:* 13; *25230:* 3a; *28663:* 63; *29718:* 3a. *Tsang, Tang & Fung (1) L.U. 17532:* 65; *(101) L.U. 17632:* 13; *(136) L.U. 17667:* 3b. *Tsang & Wong CCC 14230:* 13; *CCC 14740:* 3a. *Tsiang 1188:* 13; *1200:* 13; *1593:* 13; *1738:* 13; *1936:* 13; *1993:* 13; *2575:* 55; *12430:* 3c. *Tsiang & Wang 16046:* 3c. *Tso 20122:* 3a. *Tsoong 2717:* 1b; *2843:* 3b; *3028:* 55. *Tsui 340:* 13. *Tucker 257:* 75. *Tutcher 972:* 3a.

Urquhart 164: 3a.

Vaupel 630: 1d. *Verma 47060:* 55. *Verreaux 623:* 68. *J. Vidal 757A:* 22; *758:* 22; *811:* 37; *1006bis:* 55; *1157:* 44; *1158:* 23; *1247:* 5; *1291:* 23; *1586:* 63; *2129:* 37; *2220:* 23; *2639:* 37; *2656:* 46; *2686:* 65; *2695:* 46; *2765/DB:* 46. *Vidal y Soler 24:* 34 (T). *Vieillard 107:* 47; *108:* 47; *2293*:* 73. *Vink BW 11350:* 45; *11390:* 8. *Virot 555:* 69; *921:* 47. *De Voogd 673:* 24 (T).

Wagh 1799: 65; *3001:* 27; *5852:* 9; *5854:* 9; *6035:* 55; *7356:* 9. *Walker 36:* 39; *97:* 27; *106:* 55; *136:* 58.

Walker Arnott 196: 27. *hb. Wallich 6981B:* 65; *6981E:* 65; *6983C:* 56 (& *s.n.:* 2); *6984A:* 26 (T); *6984B:* 26; *6985A, B:* 6 (T); *6990B:* 41; *6990C:* 65; *6992B:* 37c (T); *6993D:* 55; *6993E:* 55; *6993F:* 55; *6993G:* 50 (T); *6993H:* 55; *6996A, B:* 27; *6997:* 58 (T); *7002:* 13; *7005*:* 55 (T). *Walter 6:* 1. *Wang 522:* 3a; *548:* 63; *1806:* 13; *1875:* 63; *3195:* 13; *32707:* 55; *32739:* 65; *32779:* 3b; *33038:* 3b; *33190:* 37; *33976:* 13; *35795:* 13; *36434:* 13; *36669:* 3b; *36831:* 3b; *39270:* 13; *40432:* 13; *41232:* 3b; *41255:* 57; *62922:* 3c; *62940:* 3c; *72005:* 3c; *72115:* 3c; *72772:* 3c; *73244:* 57b; *73796*:* 64; *74117:* 3c; *74284:* 3c; *74614:* 13; *74694:* 57b; *74696:* 13; *74697:* 13; *74717:* 3c; *75041:* 3c; *75048:* 3c; *76081:* 3c; *76881:* 3c; *77543:* 3c; *77892:* 5. *Wankworth 197:* 75; *579:* 75. *Warburg 5755:* 3a; *5756:* 13. *Watt 7146:* 40; *7210:* 58; *11571:* 3d. *Wawra 2074:* 1c. *Weatherhead 381:* 68. *Weiss 2758:* 3a; *3354:* 13. *C. T. White 48:* 55; *50:* 47; *1130:* 73b; *1142*:* 73b; *1506:* 74; *1938:* 68; *2440:* 68; *2480:* 73b; *7322:* 53; *10097:* 74; *11029:* 75; *11631:* 73; *11768:* 75; *12220:* 74; *12221:* 68; *12330:* 33; *12331:* 75; *12471:* 33; *12472:* 77. *C. T. White & Everist 2:* 70. *O. E. White 24:* 65; *363:* 65; *393:* 10. *hb. Wight Kew distr. 62:* 26; *63:* 9; *64:* 71; *65:* 65; *66:* 26; *67:* 9; *68:* 51; *69:* 27; *70:* 43 (T); *71:* 55; *72:* 55; *hb. Wight propr. 66:* 6; *87:* 6; *88:* 71; *89:* 50; *90:* 65; *91:* 2; *92:* 65; *93:* 58 (& 46); *94:* 26; *96:* 71; *97:* 9; *99:* 9; *101:* 9; *103:* 27; *104:* 51; *105:* 55; *106:* 55; *108:* 55; *115:* 50; *195:* 55; *517:* 65; *887:* 55; *952:* 20 (T); *1197:* 39; *2439:* 24 (T). *De Wilde 1230*:* 66. *Wilder 1117:* 1d. *Wilford 296:* 13. *Wilkins 201:* 47; *207:* 80. *L. Williams 17156:* 37; *17276 = BKF 18154:* 37. *Wilson 10989:* 37b; *11021*:* 57d. *Winit 88:* 58; *89:* 65; *99*:* 27; *100:* 56; *564:* 48; *663:* 56; *664:* 44; *844:* 23; *856:* 65; *1335:* 3d; *1630:* 37; *1789:* 13; *1900:* 3e. *Winkworth 197:* 75; *243:* 1e; *340:* 75; *531:* 73; *990:* 80. *Witt 1:* 56; *3:* 37; *4:* 37; *M27:* 55; *625:* 46; *1399:* 27; *1400:* 27; *1401:* 65; *7989:* 65; *7991:* 55. *Womersley NGF 13483:* 66. *Womersley & Thorne NGF 12846:* 47. *Worthington 224:* 51; *1248:* 9; *1249:* 51; *4309:* 51; *4503:* 71; *5173:* 50. *Wright 16:* 3a. *Wycliffe 100:* 70.

Yü 11129: 3c; *15893:* 3c; *16514:* 3c; *17095:* 57b; *17382:* 62. *Yuncker 10112:* 1d; *10212:* 1d; *16250:* 1d.

Zimmermann 63: 37. *Zollinger 2265:* 46 (T); *2268 ZM:* 31 (T); *2929 ZM:* 45 (T); *3381:* 65 (T).

APPENDIX: EVALUATION OF B. S. SUN'S NEW TAXA FROM CHINA

While this paper was in the press, Dr L. A. Lauener of Edinburgh pointed my attention to a paper by B. S. Sun, 'New species and varieties of Capparaceae from China', Acta Phytotax. Sinica 9 (April 1964) 109—116, and kindly sent it to me on microfilm. No less than 8 species and 3 varieties are here described as new. Part of them have been based on pre-war material of which I examined duplicates. They are:

Capparis chingiana B. S. Sun, Acta Phytot. Sin. 9 (1964) 115. — Type: *R. C. Ching 6588* (KUN, PE, holo; W, fruits only), Kwangsi, Fan-Shan, Lan La Tung, fr. 29. VII. 1928 = 57. *C. sikkimensis* Kurz, subspecies uncertain.

Capparis cuspidata B. S. Sun, Acta Phytot. Sin. 9 (1964) 111. — Type: *T. T. Yü 17832* (KUN, PE, holo; A, E), Yunnan, Chengkang, Maliling, 1850 m, fr. 18. VIII. 1938 = 62. *C. urophylla* Chun; the 'muricate' fruits have simply been described unripe. *Wang 76881*, also listed under *C. cuspidata*, is 3c. *C. acutifolia* Sw. ssp. *bodinieri* (Lévl.) Jacobs.

Capparis fohaiensis B. S. Sun, Acta Phytot. Sin. 9 (1964) 114. — Type: *Wang 74694* (KUN, PE, holo; A), Yunnan, Fo-Hai, 975 m, fl. VII. 1936 = 57b. *C. sikkimensis* Kurz ssp. *yunnanensis* (Craib & W. W. Sm.) Jacobs. The fruits are described 13 by 7½ cm.

Capparis trichocarpa B. S. Sun, Acta Phytot. Sin. 9 (1964) 113. — Type: *Wang 73796* (KUN, PE, holo; A), Yunnan, Fo-Hai, 1520 m, fr. V. 1936 = 64. *C. viburnifolia* Gagn., probably, see Note 2.

Capparis viminea Hook. *f.* & Th. var. *ferruginea* B. S. Sun, Acta Phytot. Sin. 9 (1964) 112. — Type: *Wang 88961* (KUN, PE, *n.v.*), Yunnan, Foo-ning.

The other cited specimens that I have examined: *Esquirol 3228, 4148, How 73109, Lei 421, Tsang & Fung 136*, all belong to 3b. *C. acutifolia* Sw. ssp. *viminea* Jacobs.

Of the following taxa I have not seen cited material

Capparis fengii B. S. Sun, Acta Phytot. Sin 9 (1964) 113. — Type: *Feng 22452* (KUN, PE, *n.v.*), Yunnan, Wen-Shan, 1300 m, fl. 5. V. 1962.

Probably conspecific with 63. *C. versicolor*, already known from Kwangsi and Kwangtung; the author himself points to the resemblance, but found the leaves 9—12 cm.

Capparis membranacea Gardn. & Champ. var. *puberula* B. S. Sun, Acta Phytot. Sin. 9 (1964) 112. — Type: *L. Den 6802* (KUN, PE, *n.v.*), Kwangtung, She-Shing, 12. VII. 1958.

To be identified, under *C. acutifolia* Sw., either with 3b. ssp. *viminea* Jacobs, or with 3c. ssp. *bodinieri* (Lévl.) Jacobs, which both have an indumentum.

Capparis subsessilis B. S. Sun, Acta Phytot. Sin. 9 (1964) 110. — Type: *T. D. Li 3112* (KUN, PE, *n.v.*), Kwangsi, Lung-Tsin, fr. 22. X. 1956.

The description deviates from that of 62. *C. urophylla* Chun, in the leaves being 9—12½ by 3½—5 cm, and the 'gynophore' being 2½—3.8 cm, but this may apply to the whole stipe.

Capparis tenera Dalz. var. *caudata* B. S. Sun, Acta Phytot. Sin. 9 (1964) 111. — Type: *Yunnan Complex exp. 6071* (KUN, PE, *n.v.*), Yunnan, Mae-Kiang, 900—1200 m, 31. III. 1955.

Must be 62. *C. urophylla* Chun.

Capparis trichopoda B. S. Sun, Acta Phytot. Sin. 9 (1964) 116. — Type: *P. Y. Mao 4316* (KUN, PE, *n.v.*), Yunnan, Ping-bing, 1440 m, fl. V. 1954.

The description is suggestive of a small-flowered 57. *C. sikkimensis* Kurz; this species is still badly known and I cannot ascertain the subspecies.

Capparis wui B. S. Sun, Acta Phytot. Sin. 9 (1964) 109. — Type: *C. Y. Wu* (KUN, PE, *n.v.*), Yunnan, Yuan-chiang, 500—600 m, VI. 1957.

The author suggests affinity with *C. spinosa*, but I do not recognize the description, which is here translated: Shrub 2—4 m. *Twigs* terete, slender; thorns small, recurved, bark pale-green, densely velvety ferruginous-pubescent. *Leaves* 3.2—5.2 by 2—3.8 cm, elliptic or slightly oblong-elliptic, top acute or rounded and retuse, base slightly cordate; texture subcoriaceous, nerves 6—7 on either side, distinct beneath, obscure above, when in fruit hairy to the midrib above and to the midrib and nerves beneath, reticulation inconspicuous. Petiole very short, *c.* 1—2 mm long, densely hairy. *Flowers* solitary axillary, pedicels *c.* 2 cm, hairy; bud *c.* 1—1.2 cm diameter. Two outer sepals cymbiform, *c.* 8—9 mm long, outside hairy, inside glabrous, two inner sepals flattish, oblong-obovate, at the base laterally somewhat pubescent. Petals oblong *c.* 1—1.2 cm long, outside glabrous, inside white-tomentose. Stamens *c.* 38, the filaments *c.* 3 cm long. Gynophore glabrous *c.* 3—4 cm long; ovary ellipsoid, glabrous, placentas 4, many-ovulate. Fruit elliptic *c.* 3 by 1.8 cm (unripe?), warty when dried; seeds unknown.

This most reminds me of 56. *C. siamensis*, but there the gynoecium is hairy.