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Introduction for some proposed *Haworthia* taxa.

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Introduction

Over the past few years I have had the good fortune to visit haworthias in their natural habitats in South Africa. I have also been able to build up quite a large *Haworthia* collection (now about 8000 plants) with the support of some South African friends, as well as South African nurseries. Comparing all these plants and using my interpretation of what constitutes a *Haworthia* taxon, I concluded that there are some new taxa to be introduced. I plan to describe their most important features and, of course, present pictures. When I have finished my investigations of the floral characters, I will publish the final list of new taxa together with a new infrageneric classification and species concept. I expect to find more new taxa during my future field trips in South Africa and I expect others will too.

Species concept

To explain why I plan to introduce the following taxa, I will briefly mention the categories of my classification to distinguish between species:

1. floral characters and flowering time,
2. type of habitat (ecological features),
3. morphological characters of the plant such as its leaves and roots,
4. distribution and localities.

In Bayer's concept a taxon is very much determined by its occurrence within a geographically defined area, whereas in my concept it is more the type of habitat. For example, when plants morphologically similar to *cymbiformis*, but with *cooperi* colouration, occur at a locality within the distribution area of *cymbiformis*, Bayer calls this a *cooperi*-coloured *cymbiformis*. In my concept the *cooperi*-coloured plant will only be called *cymbiformis* when it grows in a *cymbiformis*-habitat. *H. cooperi* grows in stony/rocky areas in grassland and open scrub, whereas *cymbiformis* grows on cliffs above rivers with running water. Although there are similar looking specimens of both taxa (*cooperi* var. *truncata* and *cymbiformis* var. *obtusata*) which can be confused by their leaf features, they can be easily distinguished by their flowers and, of course, the habitat, if this is known.

In my preliminary species concept, which I publish with this paper, I recognise several taxa in the status rank of variety. My understanding of a variety depends mostly on vegetative characters as well as ITS distribution and localities. Within the distribution area of a taxon there can exist several ecotypic variants, which do not share the same locality. Co-occurrence of related taxa at the same locality means for me two different species. In this case there must be a "barrier" which keeps them separate and that means there is genetic distance.

The vegetative features of each variant are genetically stable and there is no, or only a little, difference in floral characters and flowering time. The geographical distance and the ecological factors lead to differences in vegetative features, which distinguish separate variants within a taxon.

You must also take into consideration the time factor. Maybe in the future, under the influence of ecological factors, a variety will become a separate species. Diversification is a mechanism of evolution, but with highly adapted plants there is also the high risk of disappearance of a taxon when the ecological factors change. I believe that all combinations of the vegetative characters we know in *Haworthia*, for example glabrous or pubescent leaf surface etc. are possible, but not all have survived or not all have been found. There is a chance for explorers; they wait to be found!

New taxa to be recognised.

I list below 18 probable new taxa in alphabetical order of the provisional names I have given them. In botanical nomenclature, it is not usual to distinguish varieties of a taxon by quoting the locality names, but to give them their own names. A combination of a taxon name with a locality name, to name different varieties, is not valid according to the ICBN, which is why one has to describe a taxon with a name and preserve a type specimen. This will be done soon. There are more new taxa under study. They will be reported in the near future, but they need more observation.

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Fig. 1. *Haworthia albertinensis* n.n. IB4997= DP94-01
East of Albertinia [3421BA]



Fig. 2. *Haworthia bayeri* var. *scabrifolia* n.n. IB6383 = VDV445
East of Ezeljachtpoort, 30 km NE of George [3322DA]



Fig. 3. *Haworthia devriesii* n.n. IB6930-2 = VDV643
North of Prince Albert [3322AA]



Fig. 4. *H. esterhuizenii* n.n. IB733 = DT1908
30km West of Swellendam [3420AA]

The status of the following taxa may be changed in the final classification, but it is relatively certain that they will be upheld as individual taxa.

***H. albertinensis* n.n. Fig. 1. Page 3.**

This taxon was discovered by Mary Parisi, who gave me some of her field collected seeds from which I grew plants. They are now mature and have flowered several times. As already reported in other papers, it is recognisably different from *splendens*, which is where Bayer places it as a form. The flowering time is much earlier than that of *splendens* and also the floral characteristics are quite different from *splendens*. The shape of leaves are more like those of *H. acuminata*, but with the colourful surface of *splendens*. I need to observe material in habitat in order to decide finally whether it is a separate species or a variety of *splendens* or *acuminata*.

***H. bayeri* var. *scabrifolia* n.n. Fig. 2. Page 3.**

Long before Hammer & Venter described *H. bayeri*, plants from the Uniondale area were well distributed under the name of *H. uniondalensis* n.n. I observed them and the plants from South and SW of Oudthoorn for a long time in cultivation and for some time in habitat.

I agree with the rejection of the name *correcta*, because it is doubtful. Therefore the description of *bayeri* was a good solution by Hammer & Venter, but I think the plants from South and SW of Oudthoorn are a separate variant of *H. bayeri* (Essie Esterhuizen upholds the name *correcta* for this plants [= *H. bayeri* var. *scabrifolia* n.n.]), and that it is better to give them this new name, also because Scott used *correcta* for the Uniondale plants which may cause confusion among collectors! This variety has only a few leaves with smaller end areas and in many cases no markings and a very scabrid surface, which gives it its name. The type has a more robust peduncle; the plants are nearly double the size of the variety and with many more leaves. The leaves have more rounded tips, not so pointed, and with very well marked translucent end areas with different patterns in contrast to the variety. The surfaces are more often smooth than rough.

***H. devriesii* n.n. Fig. 3. Page 3.**

This is a remarkable new discovery made by Vincent De Vries, owner of the nursery Izimakana Succulents, which he made on one of his numerous explorations. I was most impressed when he sent me some pictures of the flowers, which resemble a great deal the flowers of *H. pehlemanniae* and *H. globosiflora*, but with slightly longer petals and the tube is less globose than that of the former. The plant looks like an intermediate of *globosiflora* and *decipiens*. It does not offset (so far as is known) and is well hidden under bushes in the sandy soil of the banks of a river North of Prince Albert. It is really intermediate between *globosiflora* and *decipiens* in respect of floral and leaf characters and also because of the distribution area, which must be observed very carefully. I expect more records of this taxon will be found.

***H. esterhuizenii* n.n. Fig. 4. Page 3.**

At the western border of the distribution area of *turgida*, about 25 km West of Swellendam, this variety is to be found growing on the southern slopes of Bromberg. The rosettes are very small with numerous leaves, with translucent end areas and toothed



Fig. 5. *Haworthia jansenvillensis* n.n. IB6996-2
Just North of Jansenville [3224DC]

is a different plant from the Bedford area, SW of Adelaide, which is intermediate between *blackbeardiana* and *cooperi*. Because of a mistake in the grid reference in the first description of *pringlei* you might think that its distribution extends that far west, but when you look at the holotype in PRE Herbarium you will see a more delicate and glabrous plant, which resembles greatly the *gracilis/cooperi* plants NW of Grahamstown. This new taxon is a very large growing plant. I observed specimens 15-20 cm Ø at the

margins and keels. The floral characteristics look a bit more like those of *H. mirabilis* than those of *H. turgida*. It was collected by several collectors, such as Derek Tribble, Vincent DeVries and Essie Esterhuizen himself. Essie provisionally named it in his classification [Alsterworthia International(1)2001] as *H. turgida* var. *compacta* n.n., but I plan to name it in his honour, because he is one of the principle “Haworthiophiles”, who has given me and others a deep insight into the “World of Haworthias”.

H. jansenvillensis n.n. Fig. 5. Page 4.

Jansenville may be at the southwestern border of the distribution area of this taxon, but I have chosen this name because I observed several plant localities there. North of Jansenville I also observed very spectacular specimens. Bayer treats plants from these localities, among others, as his *decipiens* var. *pringlei*, but *pringlei*



Fig. 6. *Haworthia leightonii* var. *davidii* n.n. IB6970-2
100 km from Port Alfred on R72 [3327BA]



Fig. 7. *Haworthia leightonii* var. *doldii* n.n. IB6972-2
Tyolomnqa River [3327AB]

Jansenville locality, not offsetting, with very strong bristles at the margins and keels (1-2). The leaves are also very broad as in *decipiens* (maybe this is the reason why Bayer put it here) and flat. It develops a very strong and long inflorescence with many flowers.

H. leightonii var. davidii n.n. Fig. 6. Page 4.

David Cumming

showed me this new taxon in habitat and I was impressed by this very nice looking plant, which will surely become a collector’s item. It grows on a hill SW of East London between the *leightonii* localities at the coast and *cooperi* var. *pilifera*, which are more inland. It resembles to some degree the *H. atilinea* sensu Scott, which he reports from this area too. Its leaf and floral characteristics are intermediate. In this case I prefer to treat

it as a variety because I need to see



Fig. 8. *H. mucronata* var. *calitzdorpensis* n.n. IB5425 = VDV244
30 km SE of Calitzdorp [3321DC]

more records before I make a final conclusion of its taxonomic status. You will recognise this taxon very easily by its long and very translucent end areas, which show only a few but clear, reddish veins. The shape is very acuminate and it is as thick as wide, which gives it a nearly conical appearance.

H. leightonii var. doldii n.n. Fig. 7. Page 4.

Tony Dold first found this remarkable new plant, which I was shown by David Cumming. It is another intermediate based on locality as well as on morphological features. It links *H. tenera* from the NW with *H. leightonii* in the East. It grows under bushes or in cracks of a rocky plateau near a river. It offsets freely, the size of rosettes are between *tenera* and *leightonii*. It has taller leaves with toothed margins and keels like *tenera*, but longer than that of *tenera* and the reddish colour

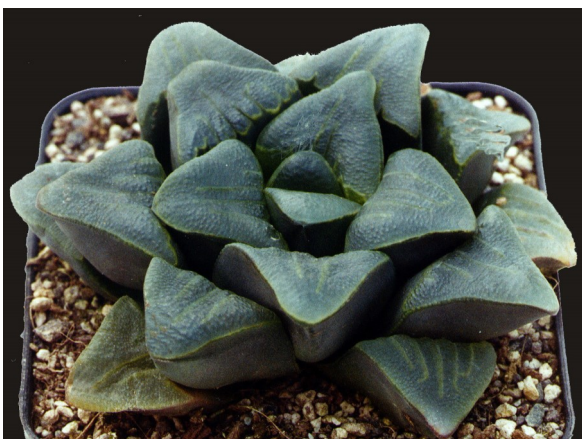


Fig. 9. *Haworthia magnifica* var. *pseudomutica* n.n. IB673
Korinte Veldam, NW of Riversdale [3421AA]

of *leightonii*. The flower is more like the *leightonii* flower. The final taxonomic status cannot be decided until more populations are found.

H. magnifica var. pseudomutica n.n. Fig. 9. Page 4.

This is a taxon, also known in cultivation for some time, introduced by Charles Craib with the name *H. mutica*. It grows North of Riversdale on rocky areas of a slope. Bayer treats it as *H. magnifica* var. *atrofusca*, which is situated more in the southern and southwestern parts of Riversdale. The plant rosette is larger in size as are the leaves. They are not so acuminate as *atrofusca* and the leaf tips are rounded, which might be the reason why Craib called it 'mutica'. Floral characters are the same as for *magnifica*, but the size and shape of the rosette and leaves are different from *atrofusca*.



Fig. 10. *Haworthia multifolia* var. *sandkraalensis* IB640 Sandkraal, SW of Van Wyksdorp [3321CD]

H. mucronata var. calitzdorpensis n.n. Fig. 8. Page. 4.

Around Calitzdorp are several localities of this new taxon. Vincent DeVries and David Cumming showed me some of them. It grows under bushes on rocky slopes. You will recognise them easily as a *mucronata*-type because of its yellowish green colour and the shape of the rosette. The distinguishing features from *mucronata* are the translucent upper part of the leaves and the toothed margins and keels.



Fig. 11. *Haworthia odetteae* n.n. IB6998 East of turnoff to Lootskloof [3224DD]

H. multifolia var. sandkraalensis n.n. Fig. 10. Page 5.

This taxon is well known in cultivation as *multifolia* from Sandkraal. It is intermediate between *wimii* [= *H. emelyae* var. *major* (G.G.Sm.) M.B.Bayer] and *multifolia* with regard to the leaf features, but belongs clearly to *multifolia*



Fig. 12. *Haworthia picta* var. *janvlokii* n.n. IB5334 Near Kammanassie Dam, 10 km S of Dysseldorp [3322CB]



Fig. 13. *Haworthia picta* var. *tricolour* n.n. IB6775 Rooiberg Pass, SW of Calitzdorp [3321DA]

concerning floral characters. Sandkraal is east of the locality for *H. wimii* while Springfontein, the locality for *H. multifolia*, is west of the locality for *wimii*.

H. odetteae n.n. Fig. 11. Page 5.

This new taxon has been distributed under the name of *bolusii* from Lootskloof. Further localities are now known close by. It is quite distinct from *bolusii*, not only because of its locality, but also because of the floral and leaf characteristics. The rosette size is half the size of *bolusii*. The leaves are very narrow, dark green in colour and opaque, without any translucent marks. The margins and keels bear fine white hairs. The flowering time is 2 month earlier than *bolusii*. The inflorescence is much smaller with fewer flowers than *bolusii*. It is a delicate species which I will name after Odette Cumming, the wife of David, who gives a great deal of supports to our travels.



Fig. 14. *Haworthia scottii* n.n. IB5418 Gamka East, 10 km SE of Calitzdorp [3321DA]

H. picta var. janvlokii n.n. Fig. 12. Page 5.

This new taxon I have already introduced in Cactus & Co 2(4) 1998. It grows on several localities at Kammanassie Dam. As regards floral



Fig. 15. *Haworthia tradouwensis* n.n. IB5510
Top of Tradouw Pass [3320DC]

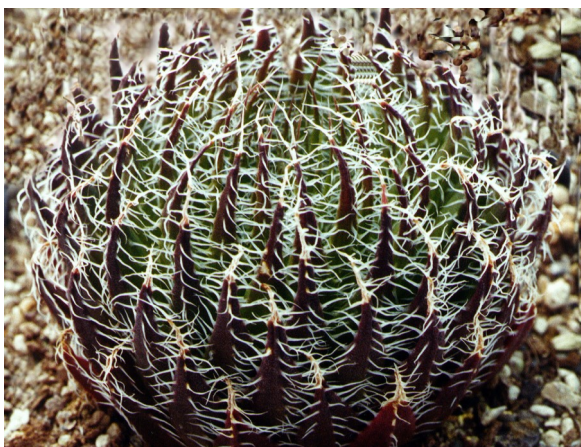


Fig. 16. *Haworthia tretiensis* n.n. IB5372
Tretyre, 30 km SE of Steytleville [3324BC]



Fig. 17. *Haworthia truncata* var. *minor* n.n. IB6629
NE of Kammanassie Dam [3322CB]



Fig. 18. *Haworthia viscosa* var. *variabilis* n.n. IB7193-2
Brandekraal, Joubertskraalrivier [3324CD]

characteristics it belongs more to *picta*, but as regards its leaf features it has the shape and size of *comptoniana*, but the coloration of *picta*. I will name it in honour of Jan Vlok, an explorer par excellence of South African flora, who was the first to find it.

***H. picta* var. *tricolor* n.n. Fig. 13. Page 5.**

This taxon is known from several collections made by different collectors. The most widespread plants in cultivation are those from Kobus Venter JDV87-149 and Gerhard Marx GM256. The collections were made along the southern entrance of Rooiberg Pass, SW of Calitzdorp. This locality is the most western of the *picta*-complex, not including the intermediate forms with *magnifica/multifolia/wimii*, which surely exist, waiting to be found further SW. The floral characteristics are much the same as for *picta* as are the size and shape of the leaves, but the surface is smooth, opaque with coloration resembling that of *splendens*. The most important reason to treat it as a variety is its distinct locality. I will name it after its leaf colour.

***H. scottii* n.n. Fig. 14. Page 5.**

In his book, Colonel Scott used the name *integra* for plants which are recorded from the Gamka road area, SE of Calitzdorp. From the herbarium material in Berlin, especially the type of *H. integra*, it is clear that Bayer's *H. rycroftiana* is a redescription of *H. integra*, which means it is one of the *aristata (unicolor/venteri)* group, but with different floral characteristics. Besides the locality given by Scott, I have seen several more along the same road. They remain quite small, growing among pebbles in quite sunny conditions, which gives them their very dark coloration. The leaves are quite short and obtuse. The margins are translucent and sometimes there are translucent dots on the leaf surface. They occur with toothed and glabrous margins and keels. The floral characteristics are between the *arachnoidea*-type and *archeri (dimorpha)* where it also fits quite well in respect of leaf characteristics. I will name it in honour of Colonel Scott, one of the pillars of the "World of Haworthias".

***H. tradouwensis* n.n. Fig. 15. Page 6.**

This taxon has been known for some time in cultivation. It occurs at several localities in Tradouw Pas and SW of Barrydale. It has been distributed under the name of *H. arachnoidea* var. *setata* because it looks like *setata* at first glance. It seems to be an intermediate form between *setata* and *mucronata* sensu Bayer.

In the case of an intermediate form, my rule for the new species concept is that when only the leaf characters are intermediate and the floral characters are close to one of the taxa with which the leaf characters are intermediate, I put it as a variety of the taxon with which the floral characters are close. When the floral characters are also intermediate, I handle it as a separate species.

In this case, I have provisionally decided to treat it as a separate species. What are the features that cause me to recognise it as such? Well, first it has translucent leaf margins, which is the connection with Bayer's *mucronata*. The leaves are much narrower than in the *arachnoidea*-type, with a remarkable pale green leaf colour, which does not redden in stronger light. The bristles are very soft, more hair-like and it clusters more than the other taxa of *arachnoidea*. We should also not forget the distribution area, which is at the southern border of the main distribution area of *arachnoidea* and *mucronata*. I have observed this species in habitat and cultivation.

***H. tretiensis* n.n. Fig. 16. Page 6.**

This taxon is also known from cultivation and was distributed mainly by Sheilam Nursery under the name of *H. arachnoidea* var. *xiphiophylla*. When I received this plant I immediately thought that I had never seen a taxon of this type. A little later I got similar looking plants from Vincent de Vries with different locality data, but close to the first one. Essie Esterhuizen writes about this plant (private communication): "This is a most attractive plant in the field. I first saw it on the Uitkyk farm south of Steytlerville. It grows as single plants mostly under bushes at that locality. What struck me was the dark brown colour and contrasting white bristles. Just Northeast of Steytlerville there is a locality with blue/green leaves. Clifton Marais also collected the dark brown form at Advise-Steytlerville and also from Mannejtjie."

The most obvious feature is the leaves, which have a purplish colour and, in contrast, very white bristles. Even in not-so-sunny conditions it retains its colours. Also the plants do not offset, not even when they are mature, whereas *xiphiophylla* does freely. Also the locality, which is much further to the Northwest near Bloukopprante, SE of Steytlerville up to the area around Steytlerville itself, separates them from *H. xiphiophylla* as well as from *H. arachnoidea*.

H. truncata var. minor n.n. Fig. 17. Page 6.

This taxon was distributed by Izimakana Succulents as 'hairy *truncata*'. Plants from one of the known records are all covered with hair like bristles, but at another locality there are also nearly glabrous plants to be found. So what makes them really different from the *truncata*-type besides the distinct locality? It is its small size. Even in cultivation after years, it remains small, and of course the inflorescence is small too with fewer flowers.

H. viscosa var. variabilis n.n. Fig. 18. Page 6.

For some time many different varieties of *viscosa* were upheld, but now Bayer regards them all as synonyms. I treat *H. beanii* as a separate species, because the leaf arrangement is really random in contrast to the arrangement of *viscosa* in three rows. The former varieties of *viscosa* also have a three row leaf arrangement, but vary in size, colour and surface of their leaves. This new taxon grows at a locality at the southern border of *viscosa* not far away from *pungens*. At this place we observed plants with quite long leaves, some of them are extremely elongated. The surface is a

little rough. Further on grows a natural hybrid between these plants and *H. fasciata*, which has the shape of the *fasciata* leaves, but the surface of *viscosa*. Flowers of the hybrids are unknown so far so I cannot say which plays the dominant part. These hybrids resemble *longiana* a little. I will name this variety as *variabilis* because of its variable leaf length.

Conclusion.

This is the preliminary report on the new taxa based on a search for a consistent classification. The final status of some taxa presented here may be changed when the results of the investigation of floral characteristics are published, but it is important to present the taxonomic elements now, to better understand any eventual regrouping from the results of the study of floral characteristics. Any comments or ideas on these new taxa will be welcome.

Photographs by the author.

Alsterworthia International - Subscription Renewals for 2003

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In the past two years there have been two increases in postage rates in the UK and an increase in printing costs. The inclusion of four additional pages in some issues of the journal has also increased printing & postage costs. We shall continue to subsidise the journal with surpluses from book sales but a small increase in the subscription is necessary to maintain viability. Airmail outside Europe is expensive. As each issue is printed at the beginning of the month preceding the month of issue even surface mail should reach

the most distant places about the end of the month of issue. Surface mail is therefore a reasonable and less expensive alternative to airmail.

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Floral characters: superstitions in taxonomic criteria

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Previous intrageneric systems of *Haworthia*

Many intrageneric systems for the genus *Haworthia* have been proposed by several researchers. The section system by Poellnitz (1938) or Jacobsen (1960) was commonly used for a long time. These sections, however, were based on leaf shape, marginal teeth, windows or stem length, mostly vegetative characters, and some of these criteria were very vague and superficial.

Uitewaal (1947) divided the genus *Haworthia* into 3 large groups based on floral characters, mostly by the shape of the transverse section of the perianth tube (triangular or hexangular) and the thickness of the peduncle (thin or robust). Uitewaal (1947a) also separated the genera *Astroloba* and *Poellnitzia* from *Haworthia* based on floral distinctions. Bayer (1971) followed this arrangement based on floral characters and divided *Haworthia* into 3 subgenera. He did not, however, make any further divisions and the position of species groups, formerly recognised as sections, is still unsolved. Pilbeam (1983) tried to arrange former sections under Bayer's subgenera, and Esterhuizen (2001) also proposed a similar system.

There are several problems with Bayer(Uitewaal)'s system, but Bayer still maintains his system to date, emphasising that this is the only system based on floral characters.

Superstition of floral characters in classification.

Floral characters are used as criteria in classification because they are thought to be more suitable than vegetative ones, but why are they thought to be so? It is generally proposed that reproductive organs should be used for taxonomic criteria because species are established by reproductive isolation and the variations in floral characters are generally smaller and more stable than vegetative variations. Though these explanations are not in themselves invalid, they contain very serious misunderstandings.

Apart from the fact that reproductive isolation is not a standard for classification in many plants, classification by reproductive isolation is only appropriate for terrestrial animals (including insects etc) with internal fertilisation. In such animals, the difference in genital organs may directly affect the possibility of fertilisation. In plants, the differences in floral organs e.g.. number or shape of tepals, may not affect fertilisation. Insects may come to and fertilise flowers with any tepal number. The number or shape of tepals is not so important as nectar for most insects, except specialised ones for certain kinds of flower.

Plant identification and phylogenetic study should be

separated in any consideration of this explanation. For plant identification, floral characters are more stable than vegetative characters in different environmental condition. It is well established that floral characters are important in identification. In phylogenetic study, however, the following points should be considered.

1) Stable characters in phylogenesis are also important for the arrangement of a taxonomic system.

2) It is, however, impossible to observe (provide evidence for) stability of certain characters in phylogenesis or evolution.

3) The stability of a character in phylogenesis is only presumed by the observation that the character (state) is shared by many allied species. This is the meaning of "phylogenetic stability of a character" .

4) It is indispensable, therefore, to compare many characters among many species to ascertain to what extent they are shared before deciding the priority (phylogenetic stability) of a character in classification.

5) It is only possible after such comparison to evaluate whether or not a floral character is more important (stable) than any vegetative characters in classification.

There is no theoretical ground for floral characters to be more important than vegetative ones in systematic taxonomy. The importance of floral characters in taxonomy is not an *a priori* standard but only an experimental trend. The opinion that a "taxonomic system based on floral characters is more scientific" may sound impressive and be erroneously believed by many amateur taxonomists, but it is actually a complete superstition with no scientific basis.

What is the true criterion in taxonomy?

What, then, is the true criterion for the evaluation of a character in a taxonomic system? Why are floral characters seen to be important in general? Why is the number of pistils used by Linnaeus in his system not upheld today? Why is the number of cotyledons considered to be very important in angiosperms, even though it is a vegetative character?

The importance of a character in taxonomy does not depend on whether it is a character concerned with reproduction, nor whether it is stable in environmental variation. It really depends on its conformity or correlation with many other characters. In other words, if a character correlates (runs parallel) with many other characters in many species, it is an important character in the classification of the group.

Let's explain concretely with an example of *Haworthia*.

The division of *Haworthia* by the transverse section of perianth tube (triangular or hexangular, Uitewaal 1947) is thought to be an important standard for *Haworthia* classification even today, because this character

correlates (accords) well with many other characters in *Haworthia*. Though Bayer emphasised this is a floral character, this is not the reason for its importance. On the other hands, the standard for the section used by Poellnitz or Jacobsen is not upheld today, because they do not correlate well with many other characters.

Furthermore, Bayer (Uitewaal) divided *Haworthia* into two large groups based on the shape of the transverse section of the perianth tube, and then subdivided one of them into two smaller groups based on peduncle thickness or nature of the junction of the perianth with the pedicel. Why does transverse section have priority in their system? How do they decide such an order? Both are floral characters.

Table 1 and 2 are hypothetical systems based on floral characters. Table 1 is based on the longitudinal section of the perianth tube. Table 2 is based firstly on the thickness of the peduncle and then the transverse section. Both systems are completely based on floral characters and give different results but, of course, they are false systems. Why is the system based on transverse section of the perianth perceived as reasonable, but one based on longitudinal section false? And why is the system based on the reverse order of characters false?

Characters supporting the same division in a group have the same importance in the system. For example, number of tepals (multiple of 3), distribution of vascular bundles, or lack of cambium have the same importance with the number of cotyledons in angiosperm classification. The number of cotyledons is only a representative of those many characters.

The same situation may be pointed out with regard to karyotype, chemical element of the cell, isozyme or DNA sequence. These are so-called internal characters in contrast with outer morphological characters, and are often believed to be a more reliable basis for classification. There are no scientific bases, however, for the internal characters being more important in classification than the outer characters. Their importance lies in their conformity with other characters too. If the data has no or low conformity with that of many other characters, it may be considered to be an error or individual mutation, even though it is the data of DNA.

The importance of a character in classification becomes established only after comparison with many other characters, since it does not depend on the nature of the character itself, but on the conformity or correlation with

Table 1. A system for *Haworthia* based on the floral characters. False example 1.

- | | |
|----------------------------------------------------------------------|------------------------------|
| 1. perianth tube very inflated at middle..... | subgenus <i>Globosiflora</i> |
| perianth tube not very inflated (=slim)..... | 2 |
| 2. perianth in longitudinal section cylindric or ventricose..... | subgenus <i>Haworthia</i> |
| perianth in longitudinal section trigonal or elongated trigonal..... | subgenus <i>Trigonoflora</i> |

Main members

- subg. *Globosiflora*: *H. globosiflora*, *H. pehlemanniae*, *H. (Ast.) spiralis*
- subg. *Haworthia* (*Cylindriflora*): *H. arachnoidea*, *H. retusa*, *H. attenuata*, *H. glauca*
- subg. *Trigonoflora*: *H. scabra*, *H. venosa*, *H. viscosa*, *H. minima*, *H. (Ast.) foliolosa*

Table 2. A system for *Haworthia* based on the floral characters. False example 2.

- | | |
|-----------------------------------------------------------|-------------------------------------|
| 1. peduncle very thick or robust | subgenus <i>Robustipedunculares</i> |
| peduncle slim or moderate..... | 2 |
| 2. perianth at base triangular or rounded triangular..... | subgenus <i>Haworthia</i> |
| perianth at base hexangular or rounded hexangular..... | subgenus <i>Hexangulares</i> |

Main members

- subg. *Robustipedunculares*: *H. retusa*, *H. truncata*, *H. kingiana*, *H. (Ast.) spiralis*,
- subg. *Haworthia*: *H. arachnoidea*, *H. cymbiformis*, *H. angustifolia*, *H. graminifolia*
- subg. *Hexangulares*: *H. scabra*, *H. venosa*, *H. limifolia*, *H. coarctata*, *H. glauca*

There is no basis for considering a character itself as inherently important whether it is a transverse section or a longitudinal, or a floral or a vegetative. The importance of a character is based on its correlation or conformity with other characters, not on its nature such as floral or vegetative. The transverse section of a perianth is more important than the longitudinal section only because the division by the former is more parallel with many other characters.

other characters.

All the characters, however, do not necessarily conform well with each other. Some may not conform and there will be differences in the degree of correlation even in the correlated characters. It is fruitless to discuss which character should be upheld as the standard or which characters are the most important criteria for the group. Each character may have important information. The question is not the choice of characters but the synthesis of all the information as far as is possible.

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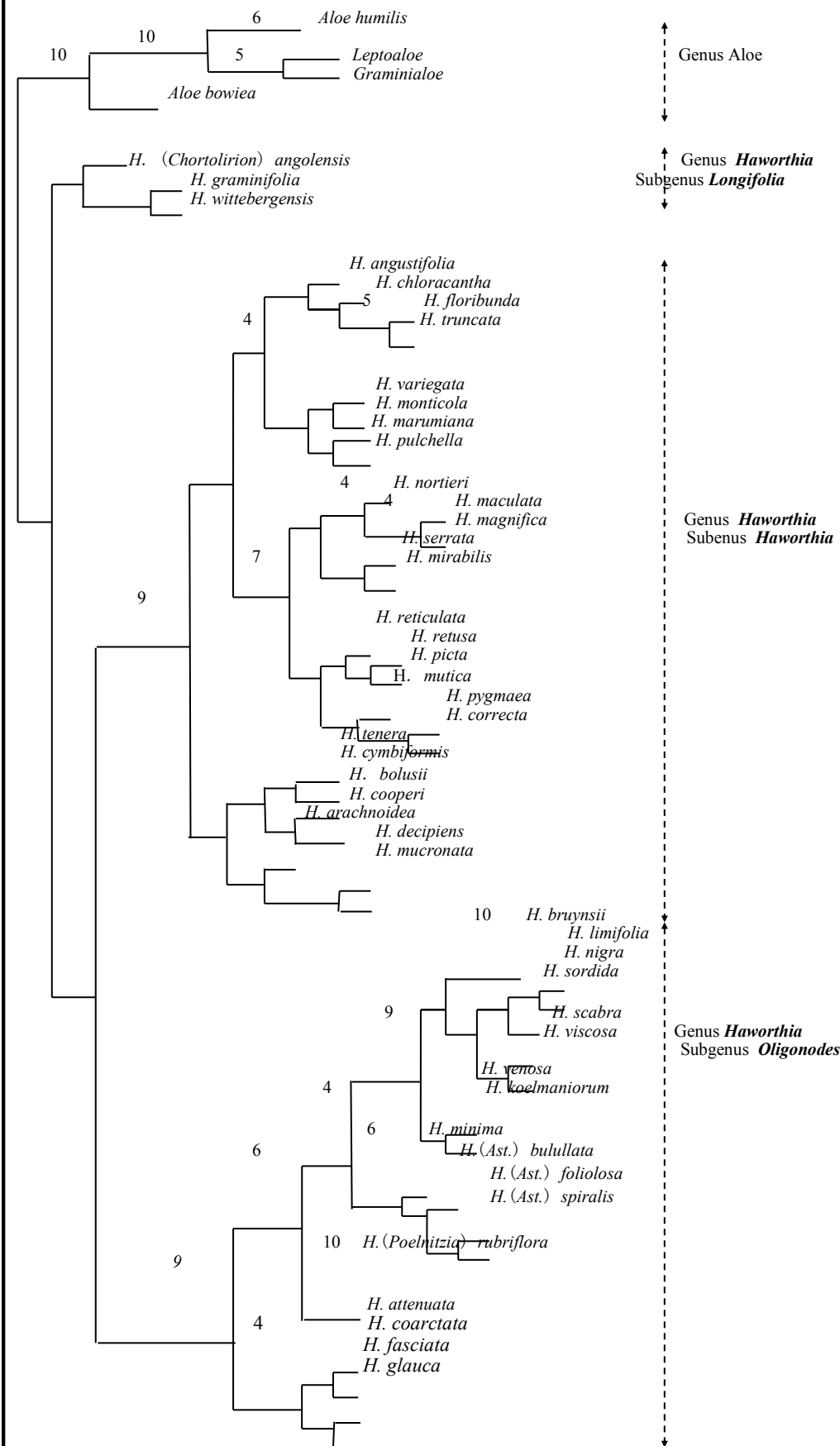
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Fig. 1 A cladogram of *Haworthia* by MP method using 110 characters - 35 floral, 35 cell & tissue and 40 vegetative (one of two trees).



Key

_____ = one change only. 4 _____ = number of changes above one.

It becomes exponentially more difficult to analyse conformity among characters, according to the increase in the number of characters in the subject groups. Such analysis, however, becomes far easier today using computer software of numerical or cladistical taxonomy. Analysis using many characters may be very stable, since the calculated result is supported by many characters. The division of a group supported by many characters is stable, even if some characters are rejected or erroneously evaluated in calculation. The stability or confidence of each division (phylogenetic clades) can be also examined by computer such as bootstrap method.

Cladistic analysis in *Haworthia*

Cladistic analysis of Aloaceae genera including *Haworthia* was done by Smith & Van Vyk (1991). It is impossible, however, to compare *Aloe* or *Haworthia* as a whole, since they include many heterogeneous groups within the genera. Other genera in Aloaceae seem to be homogeneous and can be compared at generic level.

Fig. 1 page 13 is a phylogram of 50 groups in *Haworthia* and relatives based on 110 morphological characters; 35 floral, 35 cell and tissue, and 40 vegetative, in which all (5) of the floral characters used by Bayer (1971) are included.

There are many floral characters in *Haworthia*, more than 35. We can make several different systems of *Haworthia* by using any 5 floral characters. Those systems are all “based on floral characters” .

Whether it is floral or vegetative, it is a consequence of a system based on a few characters that it becomes very biased in which the differences of those characters may be over stressed. This is the real reason why the genera *Astroloba*, *Poellnitzia* and the subgenus *Robustipedunculares* could be split off.

Fig 1 indicates that the analysis based on 110 characters gives a result different from that of Bayer's. It is more reliable because of its broader character base.

The detail of this analysis will be presented in a scientific journal with more additional characters (in submission).

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L A T E B R E A K I N G N E W S

I n g o B r e u e r

Dr. Hayashi, Japan, describes 5 new haworthias from the Section *Retusae* in Issue No. 7 2002 of *Haworthia Study*, the Journal of the *Haworthia Society of Japan*. The publication of more detailed diagnostic tables is scheduled for a later date.

Dr Hayashi described the *Haworthia* recorded from Sandkraal (*H. multifolia* var. *sandkraalensis* n.n. sensu Breuer in this issue) as *H. breueri*. I am delighted to have given my name to a *Haworthia*, the genus in which I have such a great interest. He described also the *splendens* like plant found by Mary Parisi (my *H. albertinensis* n.n.) as *H. esterhuizenii* in honour of Essie Esterhuizen; the scabrid form of *H. bayeri* David Cumming and I found together with Vincent de Vries (*H. bayeri* var. *scabrifolia* n.n. sensu Breuer) as *H. hayashii*; the *atrofusca/mutica* plant from Charles Craib from North of Riversdale (my *H. magnifica* var. *pseudomutica* n.n.) as *H. enigma* and the *H. bayeri* form from Uniondale as *H. correcta* var. *lucida*. I agree with naming the first four as separate taxa, but with the last one I have problems distinguishing it from some forms of *H. bayeri* from the De Rust area. This needs more observations. Dear *Haworthia* collectors, do not think your collection is complete. There will be more collectors items in the near future as there is so much unexplored land! Congratulation to Dr. Hayashi for his work..

This Journal also contains many high quality pictures, mainly of exotic looking cultivars of haworthias, which the Japanese collectors like so much. From the pictures you can see what excellent growers the Japanese collectors are! The infinite variety of facial makings that can be achieved in *H. truncata* continue to be demonstrated. Accentuated leaf colour, including milkiness, frostiness, pink, purple, red, yellow, is

demonstrated in a number of species. The accentuation of markings such as lines and projections and their colours continues.

For those of you who may be interested, there are illustrations of plants on offer by Horikawa Cactus Garden, the prices for which range from 12,000 to 15,000 Yen.

References:

- Introduction for some proposed *Haworthia* taxa by Ingo Breuer. *Alsterworthia International* 2(3)2-7. (This issue.)
- Haworthia Study* No. 7, 2002

Aloe Africana erecta, triangularis et triangulari folio viscoso

~~The front cover illustration was published in 1703 as t. 31 in Commelin's *Praeludia Botanica* with a pre-Linnean phrase name (African Aloe erect, triangular and triangular sticky leaves). Linné classified the taxon as *Aloe viscosa* in 1753. Willdenow reclassified it as *Apicra viscosa* in 1811 and in 1812 Haworth reclassified it as *Haworthia*.~~

The variability of the species gave rise to the erection of additional species first in the genus *Aloe* and then in *Haworthia* (*asperiuscula*, *concinna*, *cordifolia*, *indurata*, *torquata*) and to the subdivision, in particular, of *H. viscosa*. All subsequently became synonyms of *H. viscosa*. Currently there is a proposal to erect a new variety of *H. viscosa*. Please see Ingo Breuer's article on pages 2-7 of this issue.

PUBLICATION OF TWO NEW CULTIVARS

Harry C.K. Mak
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***Haworthia* 'Lady Lai Kuen'** H.C.K. Mak n. cv. [Ham 538]
(*Haworthia bayeri* x *Haworthia emelyae* var. *comptoniana*)

This cultivar is one of my earliest hybrids made in Hong Kong in 1990. It is exactly the same as the one I received from my friend Mr. Joseph Cheng from Canada (ex Japan). Each leaf has a very large triangular window which is more translucent than that in *Haworthia emelyae* var. *comptoniana*. Like *Haworthia bayeri*, there are several (up to 10) whitish deeply imbedded lines in the windows. The lines are seldom branched and crossed. They usually run parallel towards the leaf base. The translucent window area is slightly rough. All leaf tips end with a bristle up to 5 mm long. Overall each rosette may be up to 9 cm across with leaves up to 3.5 cm long, 2 cm wide and 1.3 cm thick. Even under good growing conditions, it offsets slowly. This beautiful cultivar is named after my most unforgettable friend Miss Lai Kuen Liu. Propagation is easily achieved by either taking offsets or by leaf cutting.



Fig. 19. *Haworthia* 'Lady Lai Kuen'

***Gasteria carinata* var. *retusa* 'White Shark'** H.C.K. Mak n. cv. [Ham1010/IS11337, ex Ray Allcock]

Though labelled as *Gasteria disticha* in the 1982 ISI list, the correct name according to Ernst van Jaarsveld's monograph should be *Gasteria carinata* var. *retusa*. This is a wonderful shark skinned *Gasteria* collected at De Wet near Worcester. The tubercles are extremely large and white. They are arranged on both leaf surfaces and edges. It is the best of the best forms of this species I have ever seen. The leaves are arranged in two rows and often undulate when young. Due to the uniqueness of the above features, it deserves a cultivar name, 'White Shark'. The same plant has been mentioned by Dr. G.R. Allcock in *Haworthiad* 9:2 (p.27). Here I have to express my gratitude to him for giving me this remarkable gift which first flowered in January 2002. The spread of this plant is now about 20 cm. In cultivation the plant size seems to be bigger than in habitat. The leaves in my plant are already 10 cm long, which is longer than

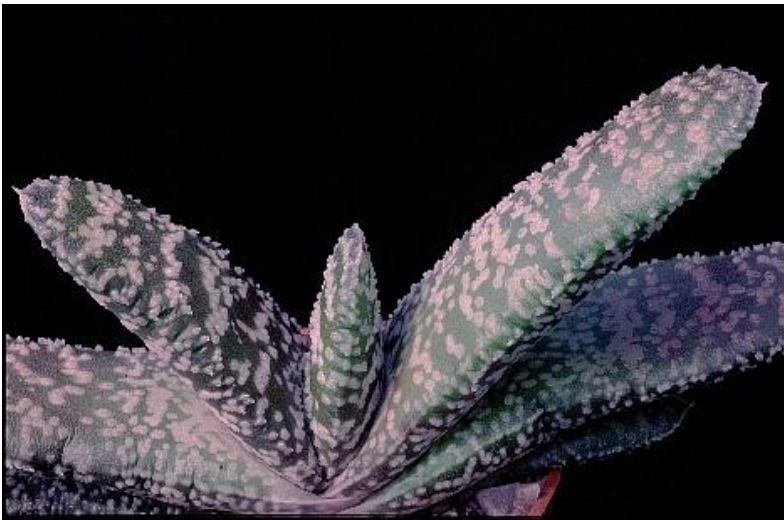


Fig. 20. *Gasteria carinata* v. *retuse* 'White Shark'

the maximum described by Jaarsveld. It is expected to grow even longer and larger.

Two selected *Haworthia* hybrids

Haworthia fasciata* x *Haworthia viscosa
[Ham2278 produced in 1997, seed sown in May 1998]

The most common hybrids now in cultivation are produced within the subgenus *Haworthia*. Due to difficulty in setting seed, hybrids in the subgenus Hexangulares are still quite rare. This is an exceptionally special one involving *Haworthia fasciata* as the pollen acceptor. It is a painstakingly slow grower. A size of only 6 cm is achieved in nearly 4 years. Unfortunately only one plant survives. The leaves are very hard and the colour is dark brown to bronze. It looks like a living sculpture which has inherited desirable features from both parents: tough texture, dot-like tubercles on leaves, sharp leaf tips. However, its colour is unique. Whether it will grow columnar is still not known. It takes at least 2 to 4 years to evaluate its full morphological features. At this stage it is still stemless.



Fig. 21. *Haworthia fasciata* x *Haworthia viscosa*

Two selected *Haworthia* hybrids (continued)

Photographs pages 15 & 16 by the author



Fig. 22. *Haworthia truncata* hybrid Ham 303.

Haworthia truncata hybrid [Ham303 ex John Henshaw]

No one will deny the weirdness of this plant. At the same time it is one of the love-at-first-sight plants. It is definitely a hybrid and is one of the seedlings from a seed pod of *Haworthia* "Mantelii" which is a hybrid of *Haworthia truncata*. It is unfortunate that the other parent is unknown. From its general appearances, it is highly likely that the other parent is a hard-leaved *Haworthia* probably *Haworthia pumila*. Initially the leaves are distichous in growth. At maturity they form a spiral. The leaf texture is intermediate between hard and soft with concolorous tubercles on the upper third of the leaf surface. From young to maturity, the leaf tip changes from acuminate to cuspidate and to apiculate. Finally the sharp, short tip nearly disappears altogether and the leaf end is more or less truncate. As expected, it is a slow grower and is reluctant to offset. Leaf-cutting seems to be the easiest way to propagate it. To appreciate the plant completely

further observation is needed. Without doubt it is one of the wonders in the genus *Haworthia*.

Comments on two selected cultivars

Aloe 'Dorian Black' [Ham 2716 ex J. Pilbeam Aug. 2000]

Dwarf aloes, particularly hybrids, are always one of my favourites. They do not take up too much space. In other words, more plants can be housed in my glasshouse. Amongst the dwarf hybrids, 'Dorian Black' is an irresistible beauty, with lots of tubercles on the leaf surfaces, cartilaginous leaf margins, and broad and short leaves. Each rosette is about 12 cm across with leaves 7 cm long and 3 cm wide. Overall it looks like a miniature zebra plant sculpture. It is really a living artwork! Up to now I do not have any detailed information on the origin of this plant. I would be grateful to receive any information on the parents. Propagation is not a problem for this nice plant. Offsetting and leaf cutting are the easiest methods.

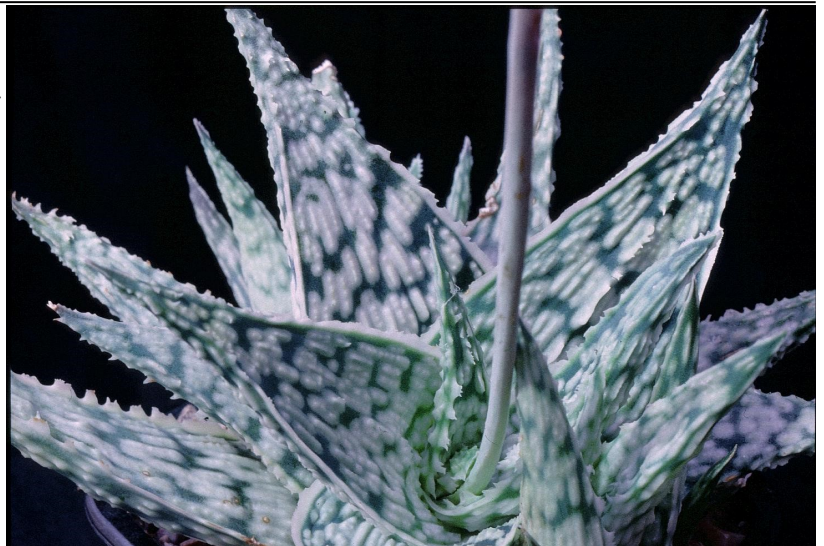


Fig. 23. *Aloe 'Dorian Black'*

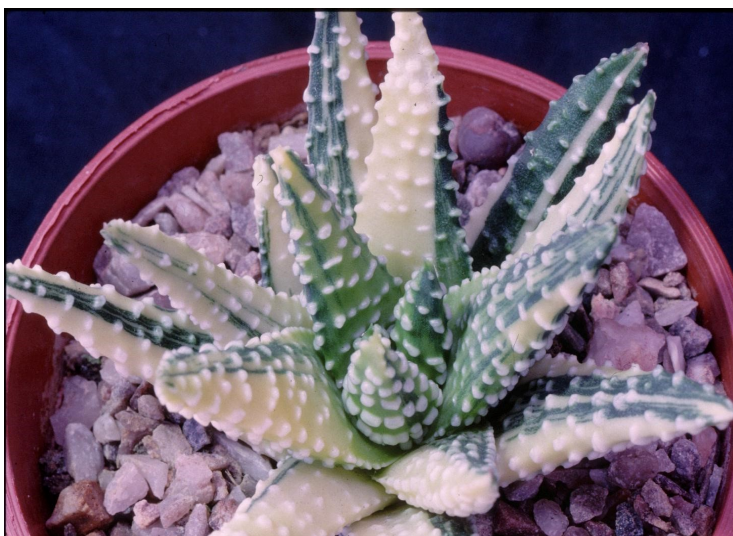


Fig. 24. *Haworthia pumila* variegated. Ham 750

Haworthia pumila variegated [Ham750 ex H. Omori ex Mrs Aoki, Japan]

The same plant is illustrated in Tony Sato's book as "Donatsu Fuyunoseiza Nishiki" and in Y. Hirose's book as "Doughnut Fuyu no Seiza Nishiki". As discussed in my comment in *Haworthiad* 13:2, I reject both names as cultivar names because they are just vernacular names of the species in Japanese (ICNCP Art. 17.13 & 14). This yellow variegate looks particularly attractive when combined with the whitish tubercles on both sides of the leaves. As it grows bigger the doughnut shape of the tubercles becomes more conspicuous. The picture illustrated here came from Mrs. H. Omori (ex Mrs. Aoki) from Japan in 1999. The cultivar is quite slow growing and reluctant to offset. Eventually it should reach a size of at least 10cm in diameter. The only way to propagate it is to damage its growing point by either removing the growing head or cutting the whole plant into 2-4 parts with a sharp knife. After drying, the parts have to be rooted in sterilized, well-drained growing medium. However, this does need enough courage!

Unitary production of inflorescence and leaves in *Aloe glauca*

Harry Mays

Studying plants in habitat is always an interesting exercise. Examining populations for uniformity and variability, to see to what extent descriptions accurately describe them, can produce new information, which not only adds to our knowledge, but can occasionally reveal rare characters with a potential for the development of new and outstanding features. Much more rarely, an outstanding and unusual feature is discovered, which arouses great excitement and prompts the mind to visualise a cultivar which is unique in every way. Such an event is rare indeed.

There is a small population of *Aloe glauca* with a few plants on both sides of the main road east of Calvinia in South Africa. Examination of a number of them revealed nothing particularly unusual. There were plants of different ages, mainly single heads. The leaves had fine longitudinal stripes, but were hardly blue-grey. They were green with only the slightest suggestion of blue and that required a little imagination. This colour can be associated with lower light intensity and good growth in a relatively prolonged rainy season, which the area had experienced. The leaves were long, broad at the base and narrowed at the middle to form a narrower upper half. The leaf edges bore strong, brown teeth. Plants were in flower. The racemes were produced between the upper leaves and had thick peduncles with prominent bracts. The racemes grow with buds vertically disposed. The buds open and die progressively from the bottom to the top. As a bud opens, it moves to the horizontal position, becoming pendent when open. The

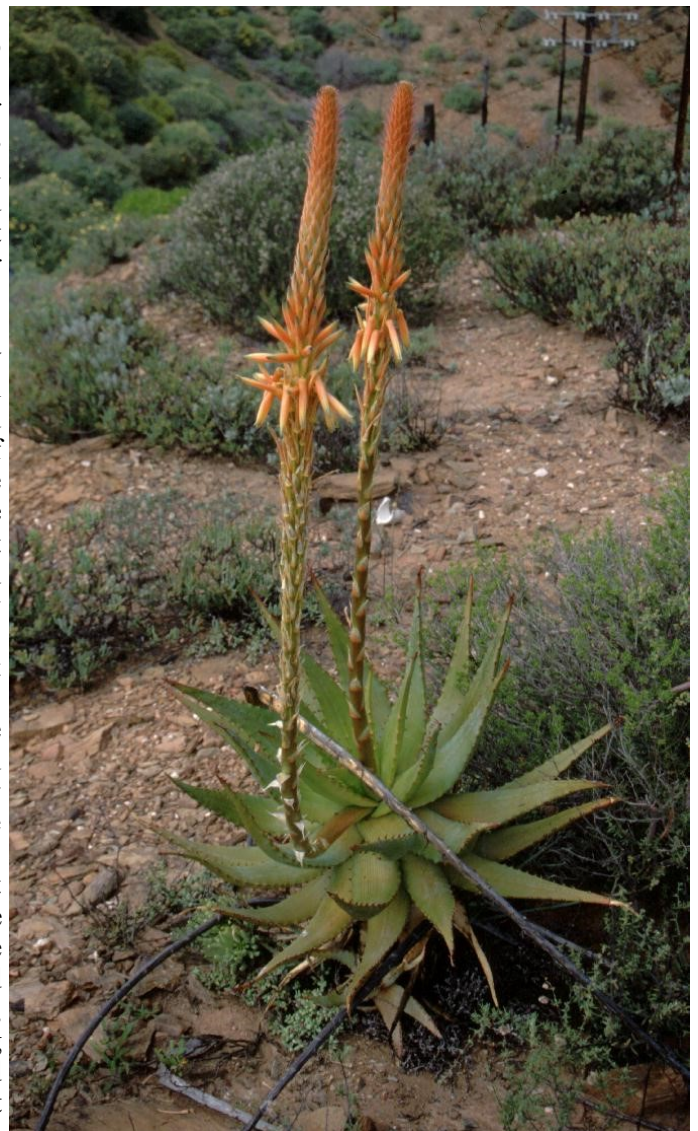


Fig. 25. *Aloe glauca* in habitat east of Calvinia



Fig. 26. *Aloe glauca*
Arrangement of fruits, flowers and buds.

flowers are orange tinged pink. There was, therefore nothing to get excited about, one just admired the plants and expressed regret

that an accumulation of dead leaves at the base was unsightly, but from the plant's point of view a consequence of normal development.

Fortunately the urge to see just one more plant is always there, which was certainly fortunate on this occasion, because it resulted in the discovery of a plant with the raceme and leaves combined, a truly unique event. The normal biochemical developmental processes ensure that the various parts develop in a standard way, resulting in the raceme and leaves being separate structures. The oldest part of a leaf is the tip as leaves grow from the base. The oldest part of a raceme is the base as raceme grow from the tip. In *Aloe glauca* the base of the raceme is tightly surrounded by a number of leaves, about 5. It is the surrounding leaves into which the raceme had been incorporated. It seems that a leaf, which would be above the base of the peduncle, has part of the raceme incorporated into the centre of the back, one below into the centre of the upper side. A leaf adjacent has a part incorporated into the left edge if situated to the right and into the right edge if situated to the left. Of course leaves may not be directly above or below or to the left or right of what would have been the position of the base of the raceme. If the leaf is situated below but to the

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Fig.27. *Aloe glauca* showing disposition of linear floral conglomerations on leaves adjacent to the normal point of emergence of the raceme. Note remains of a dead floral conglomeration from a previous year on the upper side of the leaf at top right.

Fig. 28. Close up of an *Aloe glauca* floral conglomeration with die-back at the older tip and a few individual flowers just visible at the lower edge.



***Bulbine semibarbata* (R.Br.) Haw., a Leek lily by any other name.**

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According to Robert Sweet's *Hortus Botanicus* of 1830 p. 525, *Bulbine semibarbata* (as *Anthericum semibarbatum*) was introduced to cultivation in Britain in 1820. It was, however, by no means the first *Bulbine* to try its roots out so far north. Sweet gives 26 species names under *Bulbine* in cultivation by 1830 amongst which the perennial *B. frutescens*, (now better known as *B. caulescens*) was introduced about 1702 and the South African *B. annua* in 1731.

For many years several species have found a place in horticulture as ornamentals and more recently the South African *B. caulescens* and the Australian *B. semibarbata* have come in to vogue as hardy outdoor plants. For years plants of *B. semibarbata* survived out of doors year round at the Royal Botanic Gardens, Kew in the boarder at the edge of the Temperate house. A colony of *B. semibarbata* in my garden has happily persisted for three years without any winter protection and seeded

itself about. Last year it began to appear down the street from my house and I note since that others have observed its desire to travel. One British nursery destroyed its stock on the grounds that it was too invasive. It is now available in Cornwall at several nurseries and seed germinates easily.

My first plant came from Abbey Brook Nurseries, then near Sheffield; in those days (1975) a plant sold for 20p! Currently *B. semibarbata* masquerades in cultivation under various names. Most frequently it can be found under the misapplied names *B. bulbosa* and *B. annua*. After growing many seed samples and plants from different sources I can confirm that so far only *B. semibarbata* is in cultivation in Britain. It is possible that the other two species are present but, if so, they are very rare and only in specialist collections. Judging by the confusion of names in cultivation, the problem comes with separating *B. bulbosa* (R.Br.) Haw. and *B. annua* (L.) Willd., from each other and from *B.*

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right, part of the raceme is incorporated into the left edge of a leaf as well as the centre of the upper surface. If it is situated above but to the left it is incorporated into the right edge and centre of the underside. Fig. 27 shows clearly one leaf with part of the raceme in the centre of the upper side, one in the centre of the lower side, one in the right edge and centre of the underside, one in the left edge and centre of the upper side and one in the left edge.

The incorporated raceme has been greatly distorted. A leaf itself is acting as the "peduncle". The orange-tinged-pink flowers are tightly packed and largely undifferentiated though a few individual flowers can be seen emerging from the lower edge of the close up, fig. 28. The oldest part of the linear floral conglomeration is at the top of the leaf as it was produced first; the youngest at the bottom as it was produced last. In a normal inflorescence the flowers die back progressively upwards from the lower, older flowers. It seems that in the floral conglomeration, the oldest portion also dies back first. This is the dark, dead area at the top in the close up, fig. 28.

One can only speculate at this stage about the cause of the unitary production of raceme and leaves. There are known pathogens which distort the growth of *Aloe* inflorescences in some way, but the inflorescences are separate structures. These pathogens are not known to combine an inflorescence with adjacent leaves though the possibility cannot be ruled out. The possibility of a mutation in the genes is an alternative, plausible explanation. The mutation could take place in the initial developmental process of the raceme and affect that raceme only. Racemes in other years would be normal unless the same mutation occurred again, which is extremely unlikely. An alternative explanation is that a

mutation has occurred in the nucleus, which is permanent and would affect inflorescence production every year. The possibility of this having happened is reinforced by the leaf in the top right hand corner of fig. 27, which would be associated with the inflorescence of a previous year, bearing a linear floral conglomeration scar down the centre of the top. The production of an inflorescence combined with the adjacent leaves in at least two years suggests a nuclear mutation in the floral genes, which will affect all flowering events.

Not only is the combination of raceme and leaves unusual, it is also attractive. Such a cultivar would be in great demand if available, but one is never likely to materialise. Although some *Aloe* leaves have been known to root, none are recorded as ever having produced offsets and the tissue culture of aloes from leaf tissue has also proved unsuccessful*. There was no evidence at all that seed had ever been set by the flowers on the linear floral conglomeration. Photographs are all that we have to admire.

* Alsterworthia International ISSN 1474-4635 2(1)10. Vegetative and invitro propagation of aloes by Robert Wellens, Succulent Tissue Culture, Holland.

Photographs by the author.

semibarbata. This latter is easy to separate as it is the only species of the three in which just three of the six filaments are bearded. Hence it is an easy matter to determine that plants grown from seed currently offered by Chiltern Seeds as the South African *B. annua*, are the Australian *B. semibarbata*. More surprising was the discovery that seed supplied by specialists with South African field collection data also gave rise to plants which key out as *B. semibarbata*. This widespread confusion may be due partly to the synopsis and key presented in Jacobsen, *Lexicon of Succulent Plants* 116 (1970) which gives the impression that only *B. annua* is annual (it can be weakly perennial in cultivation) and without subterranean storage organs. *Bulbine semibarbata*, which is also annual (facultatively at least in the wild, but often perennial in cultivation) and tuberless, is treated in Jacobsen, under *Bulbiniopsis Borzi*, (a concept since abandoned), hence it is not readily apparent to the reader that it should be compared with *B. annua*.

The most recent account of the genus is in Egli, *Illustrated handbook of Succulent plants: Monocotyledons* 233-245 (2001). Most unfortunately the new Handbook does not provide keys below generic level, but depends for identification on comparison of descriptions by the reader, which in the case of *B. annua* and *B. bulbosa*, is not facilitated by inconsistent data as both descriptions originated with different authors. If only it had been produced to the standards of the *European Garden Flora*! Computer programs are available for generating identification keys of several types and, considering that the book was prepared from a data base, the production of keys would hardly have been an impossibility. As it is the absence of keys to species greatly reduces its usefulness. One key difference among the cultivated annuals is the presence of a subterranean tuber in *B. bulbosa* along with larger flowers. The following key points out some of the differences.

Key to 'annual' *Bulbine* species in cultivation.

- 1a.** Three staminal filaments bearded; beardless filaments shorter.....*B. semibarbata*
- 1b.** Staminal filaments all bearded.....
2
- 2a.** Large perennial; tuber present; perianth segments 9-22 mm long.....
....*B. bulbosa*
- 2b.** Small annual; tuber absent; perianth segments 5-6 mm long.....*B. annua*

Illustrations:

- B. annua*: Curtis's Botanical Magazine 35: t.1451 (1812) as *Anthericum annuum*.
- B. bulbosa*: Curtis's Botanical Magazine 57: t.3017 (1830) as *Anthericum bulbosum*; Morley, B.D. & Toelken, H.R. (1983) Flowering Plants in Australia 326; Black, J.M. (1986) Flora of South Australia 4: 1751.
- B. semibarbata*: Blackall, W.E. & Grieve, B.J. (1974) How to know Western Australian wildflowers pt.1: 60; Rotherham *et al.*, (1975) Plants of Western New South Wales and southern Queensland 130; Cunningham *et al.*, (1981) Plants of western New South Wales 183.

It should be noted that in Australia another three species are recognised which are similar to *B. bulbosa* in possessing beards on all six staminal filaments. However, of these *B. alata* does form natural hybrids with *B. semibarbata* in some areas of New South Wales and South Australia. These hybrids all retain the six bearded filaments. See E.M. Watson in *Flora of Australia* 45: 236-241, 468-470 (1987).

Seed size and shape is another useful character with those of *B. bulbosa* being noticeably larger. Several suppliers are currently offering what appears to be genuine *B. bulbosa* seed. However, seed of *B. bulbosa* from Australia has proved very difficult to germinate. The Australian species of the genus have been investigated cytologically and present an interesting complex, for details see Watson, E.M. Cytoevolutionary studies in the genus *Bulbine* Wolf. 1. The Australian perennial taxa (*B. bulbosa* s. l.), *Austral. J. Bot.* 34(5): 481-504 (1986); 2. The Australian annual taxa (*B. semibarbata* s. l.), *op. cit.* 505-522.

As mentioned above, one other *Bulbine* is cultivated commonly, sometimes out of doors in the south-west of Britain, but usually as a conservatory plant. This is *B. caulescens* L. (syn. *B. frutescens*), which is very different in habit from the 'annual' species, with a creeping rhizome and all six filaments bearded. The account in the *European Garden Flora* 1: 131 (1986) allows easy separation of *B. caulescens* from *B. semibarbata*. Several cultivars have been named in *B. caulescens*, which is itself very variable in the wild. The most commonly encountered morph is a yellow flowered plant. This currently proliferates in the border at the dry environment end of the Princess of Wales Conservatory at Kew Gardens, all be it under the cultivar name 'Hallmark' which is distinguished by its darker orange perianth segments. See G. Rowley in *Ashingtonia* 8(1): 7-8; 8(2): 23; 8(11): 127-128 (1973).

This year (2002) has seen the appearance of yet another *Bulbine* offered for out door cultivation. It is *B. abyssinica* A. Rich., which has a wide distribution in Africa from South Africa (Natal) to Ethiopia, extending in to the Arabian Peninsula with several localities in Yemen. Descriptions and illustrations can be found in *Flora of Ethiopia and Eritrea* 6: 111-112 (1997) and *Flora of Somalia* 4: 33-34 (1995).

Julian Shaw would like to hear from anyone who has the genuine *Bulbine annua* in cultivation. *Bulbine annua* has six bearded filaments as opposed to *Bulbine semibarbata*, which has only three filaments bearded. Some plants in cultivation are incorrectly named!

Please contact Julian direct if you cultivate the genuine *Bulbine*