

# ALSTERWORTHIA INTERNATIONAL

THE  
SUCCULENT ASPHODELACEAE  
JOURNAL



*Haworthia agnis* L. Battista. North East of type locality.

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## E-mail addresses

If you have not already sent your current e-mail address to the editor, would you please e-mail it to him now at <hmays@freenetname.co.uk>. Please note that some e-mail addresses on record are not valid, either because they have been changed or because writing may have been misinterpreted. To ensure that an e-mail address already sent in longhand is correctly recorded, you might like to send it again in print.

The special arrangements made for Haworthia Study were e-mailed at the beginning of November, 2002, to members for

whom e-mail addresses were recorded, as the information was not available for inclusion in that issue. It was assumed that overseas members in particular would appreciate the opportunity to include any orders for Haworthia Study with Alsterworthia International membership renewals. Advanced notification of urgent items e.g. seed lists, may also be notified by e-mail, with full details in the next journal. The despatch of journal back issues and books, the receipt of bank notes, etc are all notified by e-mail if the e-mail addresses have been supplied.

## *Bulbine favosa* (Thunberg) Roemer & Schultes

In the Illustrated Handbook of Succulent Plants – Monocotyledons this species is quoted as "*Bulbine favosa* (Thunberg) Roemer & Schultes", distribution "Western Cape" and flowering time "autumn". In Veld & Flora 88(2)77 Graham Williamson records "*Bulbine favosa* (Thunberg) Schult. & Schult. f." with distribution "from the highlands of Zimbabwe through Gauteng, Mpumalanga, the Eastern Cape to as far as the Western Cape". In an informative article in Veld & Flora 88(1)20-21 dealing with the species in habitat in Gauteng and Mpumalanga, the species name was incorrectly quoted as *Bulbine flavosa*. Plants were observed flowering mainly in the early summer. The inflorescences are described as "spikes", a term used for flowers directly attached to the main stem (without a stalk), but the illustrations show the flowers with stalks. These populations are to be re-evaluated



*Bulbine favosa*

when next in flower.

As *Bulbine favosa* has a caudex and its thin, wiry, grass-like leaves reach no more than 10" (25+cm) high, it can be attractively displayed and cultivated in a small pot. In habitat the species is a geophyte, with the caudex in the ground, but in cultivation the caudex, a more or less oblong tuber some 3cm long by 1cm or so wide, can be displayed about half raised above the compost. The yellow, bearded-filament flowers are produced readily in cultivation as well as in habitat.

### References

Illustrated Handbook of Succulent Plants –  
Monocotyledons  
Veld & Flora 88(1)20-21 and 88(2)77.

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# *Haworthia zenigata* or *Haworthia minima*?

Harry C. K. Mak

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In *Haworthiad* 15:1(2001), Dr. Hayashi published *H. zenigata* for the plant labelled “*Haworthia margaritifera* v. *beaukmannii*”, which was sent from South Africa to Dodson. No data was associated with the plant. (See “*Haworthia beaukmannii*” An editorial enquiry and an informative response. *Alsterworthia International* 2(2)11). Clearly the name on the label is not correct and no reference can be traced for it. Up to now there has been no rediscovery of this plant in the field. However, Dr. Hayashi claimed that the Moeras River plants (*Haworthia kingiana* JDV96/30) in Bayer’s *Haworthia Revisited* (p.208) are of this species. A closer examination on JDV96/30 reveals their differences. In JDV96/30 the tubercles are not so dense and there are only a few on the upper surface of the leaves. Its tubercles are not so raised. These are two different plants.

It is very rare that a plant of horticultural origin with no field data is published as a species. In February 2001, I received “*Haworthia zenigata*” (Fig. 1) from Mrs. H. Omori. I grow it alongside *Haworthia kingiana* (Fig.2.) and *Haworthia minima* (Fig. 3.). The results of the comparison over two years are shown in Table 1, page 4.

In Dr. Hayashi’s description, the leaf surface in “*H. zenigata*” is glazed and yellowish. By examining his photo and my plant, this seems not to be so. From the table, it is clear that “*H. zenigata*” is in fact a form of *H. minima* rather than *H. kingiana*. After only one year, there are already three offsets emerging from the gap between the two outermost leaves. This growth habit is exactly the same as in *Haworthia minima* v. *poellnitziana*. Furthermore it is not susceptible to leaf die-back suggesting it is related to *minima* instead of *kingiana*. (Fig. 4 - not yet offsetting).

Among the species in the genus *Haworthia*, some show only slight variation within the species while others show great variation. There are great variations in *H. minima* particularly with respect to tubercles. The tubercles vary from scarce to dense, raised to very raised, irregular to rounded, glassy (transparent) to ivory

(opaque). “*Haworthia zenigata*” should be treated as a beautiful form of *H. minima* which has been brought into cultivation. Therefore it is better to reclassify it as a cultivar. Though it is closest to *Haworthia minima* there

(continued on page 4)

is still room left for discussion over its true identity. To avoid further confusion over its name, I propose to retain only the genus and cultivar epithet while dropping



Fig. 1. *Haworthia minima* ‘Zenigata’ (Ham496)



Fig. 2. *Haworthia kingiana* with leaf die-back (Ham492)



Fig. 4.. *H. minima* var. *poellnitziana* ex Woodside (Ham985)



Fig. 3. *Haworthia minima* [Swellendam] (Ham986)



## *Haworthia* 'Midori Nosono' verses *Haworthia* 'Moori Nusono'

In *Alsterworthia International* Volume 1, Issue 1, page 9 a photograph of *Haworthia* 'Moori Nusono' was published. As it had not been possible to trace the original

description or source of the plant, an appeal was made for this information. So far none has been received, but amongst a number of photographs sent in by Jos Verhoeven, Belgium was one with a plant labelled *Haworthia* 'Midori Nosono'.



Fig. 5. *Haworthia* 'Moori Nusono'

same. The overall shape of the leaves is the same but the leaves of *Haworthia* 'Moori Nusono' are more turgid, which is not surprising as the plant was in full growth

and had been well watered for some time before the photograph was taken. The green is also lighter in *Haworthia* 'Moori Nusono', which is at least partly the result of cultivation conditions,



Fig. 6. *Haworthia*. 'Midori Nosono'

as other plants of the same clone have a somewhat darker green. It does seem that *Haworthia* 'Midori Nosono' and *Haworthia* 'Moori Nusono' are the same cultivar, with *Haworthia* 'Moori Nusono' being a corruption of *Haworthia* 'Midori Nosono'.

The similarity of *Haworthia* 'Midori Nosono' and *Haworthia* 'Moori Nusono' in the photographs is striking. The marginal teeth, the end bristle, the lines and windows and the nature of the white areas are the

(Continued from page 3)  
the species epithet.

*Haworthia* 'Zenigata'  
H.C.K. Mak n.cv. (Syn.  
*Haworthia zenigata*  
Hayashi, ICNCP Art.  
16.3 & 17.3).

For similar reasons,  
*Haworthia opalina* is  
reclassified here as:  
*Haworthia minima*  
'Opalina' H.C.K. Mak n.cv.  
(Syn. *Haworthia opalina*  
Hayashi).

I agree with M.B. Bayer that *Haworthia opalina* Hayashi is just a selected population of *Haworthia minima* with minor differences in the tubercles. They have the distinct uniform features of denser, raised, glassy tubercles, somewhat paler in colour. [see *Haworthiad* 15:1 (p.19 Fig. 8) and *Haworthia Revisited* p 211 JDV84/81]. As these so beautiful plants have been brought into cultivation and propagated, they deserve a cultivar name. Photographs by the author.

References:

1. Bayer, B. 1999 *Haworthia Revisited: a Revision of the Genus*. Umdaus Press.

2. Hayashi, M. 2001 *Haworthiad* 15:1(p.16-20). Some new species and varieties of *Haworthia*

3. Journal of the Japan Succulent Society No.291 (1991 August).

4. Trehane, P. et al. 1995 *International Code of Nomenclature for Cultivated Plants*. Quarterjack publishing.

|  | <i>H. kingiana</i>                 | " <i>H. zenigata</i> " | <i>H. minima</i>         |
|--|------------------------------------|------------------------|--------------------------|
| 1. Colour                                | bright green to yellow             | green to dark green    | pale green to dark green |
| 2. Size of rosette                       | big                                | small                  | small                    |
| 3. Offsetting                            | seldom                             | very often             | very often               |
| 4. Leaf die-back in poor ventilated area | very often                         | seldom                 | seldom                   |
| 5. Leaf                                  |                                    |                        |                          |
| a)                                       | very thick                         | thick                  | thick                    |
| b)                                       | very broad base                    | not very broad         | not very broad           |
| c)                                       | tip not tapering                   | tapering leaf end      | tapering leaf end        |
| d)                                       | short                              | long                   | long                     |
| e)                                       | surface shiny or slightly glaucous | surface dull           | surface dull             |
| 6. Tubercles                             |                                    |                        |                          |
| a)                                       | usually not dense                  | very dense             | usually dense            |
| b)                                       | flat                               | raised                 | raised                   |
| c)                                       | few on upper surface               | on both surfaces       | on both surfaces         |

Table 1. Comparison of *H. kingiana*, "*H. zenigata*" and *H. minima*.

# Book Review: *Alsterworthia International*, Special Issue No. 1. Ingo Breuer An *Haworthia* species concept update

Reviewed by Paul Forster Email: paulforster@uq.net.au

Not being one to let the grass grow under the feet of the newly launched journal '*Alsterworthia International*', the publisher, Harry Mays, has now produced a special issue under the above title. This 24 page softcover magazine is wholly written by Ingo Breuer of Germany, an enthusiastic student of the genus *Haworthia*. Essentially this publication is a synopsis of the species and infraspecific taxa (varieties and forma) of *Haworthia* that Breuer intends to recognise in his forthcoming taxonomic account of the genus. Breuer has essentially taken elements from the classifications and nomenclatures proposed by Bayer, Esterhuizen, Hayashi and Scott, and produced a 'compromise' classification.

I sort of expected some sort of definition of 'species' given the title, but this is not included at all and there is perhaps confusion by the author as to what a 'species concept' is. I also don't think that any of these authors (Bayer, Breuer, Esterhuizen, Hayashi) have fully come to terms with just what 'subspecies' and 'varieties' are meant to imply in plant systematics. But if this were the case, then we would have few varieties in *Haworthia* and a lot of subspecies.

This booklet comprises a detailed checklist of names (species, varieties, forma) for taxa to be recognised in *Haworthia*, along with a list of names placed in synonymy, hence the magazine might have been better entitled as being a 'checklist'. There is also a comprehensive listing of basionyms and synonyms, and a cross-comparison of names recognised by Breuer, Bayer, Esterhuizen, Hayashi and Scott. All of the taxa to be recognised are illustrated with a single colour photo of each. The quality of some of the scanning for these is variable, but one can certainly gain an appreciation of the entities to be recognised.

An immediate comparison can be made with the taxa recognised by Bruce Bayer in his book '*Haworthia Revisited – a revision of the genus*' and the forthcoming '*Haworthia Update*'. Bayer seems to have fallen into the trap of trying to demonstrate his proposed infrageneric phylogeny (i.e. relationships between species and below) in the nomenclature. This has resulted in a rather unwieldy system with 'species' comprising from few to rather many 'varieties' (viz. *H. cooperi* – *H. gracilis* – *H. decipiens*). While it has been well demonstrated by Bayer that many of the entities show intergradation in vegetative morphology, it doesn't mean that the 'super species/species group' should be recognised as 'species'. Breuer has attempted to select a compromise classification with many more taxa recognised at species level than Bayer. This proposed infrageneric classification is apparently not only based on vegetative morphology and distribution as per Bayer, but also floral morphology which seems to have been ignored by that prior author.

I guess we now have to wait for Vol. 3 of '*The World of*

*Haworthias*' by Ingo for all to be revealed, but in most cases, his proposed classification looks attractive to the end-user. The end-user is of some importance here. Unlike the vast majority of plant groups, the genus *Haworthia* has intense interest focussed on it from an horticultural/collector viewpoint. If we end up with a 'super species' concept as developed defacto by Bayer, then there is a massive move away from the Linnean binomial system. Breuer's system will result in a system more user-friendly to the collector and primarily of taxa named as binomials with fewer infraspecifics.

Perhaps Ingo Breuer should also consider the following slight changes to his proposals –

1. Retain *H. gigas* at specific level. It should also be noted that the rule of priority only applies at rank (this was also ignored by Bayer). Hence if *H. gigas* is to be recognised as a variety of *H. arachnoidea*, then it has to be called *H. arachnoidea* var. *scabrispina* as this varietal name has priority at that rank.
2. Retain *H. gordoniana* as a variety of *H. cooperi*, but remove *H. pilifera*, *H. dielsiana*, *H. venusta* and *H. cooperi* var. *truncata* from being varieties of *H. cooperi*, and instead propose them as varieties of *H. pilifera*.
3. Retain *H. maraisii* at specific level, distinct from *H. magnifica*.
4. Forget about *H. opalina* and *H. truncata* var. *minor* as being worthy of recognition.
5. With regard to *H. reticulata* var. *subregularis*, note that the priority at rank rule once again applies.
6. Think about validly describing *H. limifolia* var. *striata*.

Note the corrections in the second and third printings of Special Issue No. 1:- *H. limifolia* var. *acrana* to var. *arcana* and *H. picta* var. *tricolour* to var. *tricolor*

Finally I have my reservations as to whether *H. tuberculata* is distinct from *H. scabra*, and whether *H. maraisii* is distinct from *H. schuldiana*. Some of the 'new species and varieties' to be recognised such as *H. albertinensis*, *H. jansenvillensis*, *H. tradouwensis* and *H. multifolia* var. *sandkraalensis* are so obvious that it is a wonder that they haven't been named already. For some of the 'new species' with which I am unfamiliar such as *H. devriesii*, *H. odetteae* and *H. scottii*, I guess we will have to wait for enlightenment in the revision.



# *Aloe vera* in habitat

Ingo Breuer

In March 2001 I gave two lectures on haworthias during the 50th anniversary of the Maltese Cacti and Succulent Society. René Zahra, who organised my stay in Malta, showed me the historical buildings as well as the endemic flora. He knows both extremely well. I was most impressed and recognised such a lot of beautiful things.

One day we walked on the smaller, neighbouring island of Gozo to a natural locality of *Aloe vera*, growing on a rocky slope overlooking a bay at Wied-is-Sabbara. Figs 7 & 8.

René told me, that this is the only place where *Aloe vera* is growing wild in the field and here it produces seeds. Normally *Aloe vera* plants only offset and the flowers do not set seed. I have not made these observations myself and can only report them from what René told me. The behaviour of *Aloe vera* at that locality allows us to speculate that it might be the locality of origin of the species, which was already known by the Romans. Perhaps distribution started from that place?

It would be interesting to learn if there are any other known places with naturally growing *Aloe vera* setting seeds!

Photographs by the author.



*Aloe vera*

Fig. 7 (above). Smaller plants from restricted root runs in rock crevices.  
Fig. 8 (below). Robust plants with freer root runs.



## THREATENED PLANTS OF MADAGASCAR

In an effort to help save the threatened plants of Madagascar, Kew Botanical Gardens has launched an appeal to raise money for developments in Madagascar. Local botanists and horticulturists will be trained in conservation work, nurseries will be provided, propagation techniques will be developed and basic materials will be supplied. This could be the basis of a local nursery industry to supply a sustainable trade world wide and provide plants for reintroduction into protected areas. The work will concentrate on orchids, palms and succulents. A large night blooming succulent, *Aloe suzanne*, is one which is severely threatened in its natural habitat.

Donations to the appeal should be sent to  
Friends of Kew,  
9 Albert Drive, Burgess Hill,  
RH15 9BR, UK

Fig. 9  
*Aloe suzanne*  
Toliara, Madagascar





## Harry Chi-king Mak – a portrait.

Harry Chi-king Mak, was born in Hong Kong in 1961. He is a graduate of the Chemistry Department of Hong Kong University.

During his college years, he developed a considerable interest in horticulture. In 1983, with a group of friends, he founded the Hong Kong House Plant Society. Seeking to expand his horticultural knowledge, he joined various local and overseas plant societies. He is now a member of many international plant societies, including those based in the United Kingdom, U.S.A., Japan, Zimbabwe and South Africa. He became a member of IOS in 1995.



Fig. 10. Harry Chi-King Mak

Harry has talked on specialist topics, especially cacti and other succulents, for a number of local Hong Kong horticulture societies, and has often appeared on Hong Kong television. He has also taught horticultural courses for various educational organisations. When in Hong Kong, he served as a committee member and judge at local flower

shows.

In 1995, he left Hong Kong to set up home in the United Kingdom. At present he is a committee member of the Manchester Branch of the British Cactus and Succulent Society. He was the IT secretary of the Haworthia Society (1999 & 2000).

Harry's main interest is breeding and propagating succulent plants, especially haworthias and their hybrids, variegated succulents and cristate and monstrose forms. He now has over 2,700 cacti and succulent species in his greenhouses. In addition, he devotes much of his spare time to the compilation of photo albums of succulents to share with other

enthusiasts. To date, Harry has published three books - two photo albums on cacti and other succulents and one on air plants, orchids, carnivorous and other ornamental plants. His latest works are two compact discs, CD-Succulent Versions 1 & 2.

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## Haworthia Study, journal of the Haworthia Society of Japan.

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The Editor of *Alsterworthia International*, Harry Mays, has been appointed Honorary Agent for *Haworthia Study*, the journal of the Japanese Haworthia Society for all countries outside Japan. The editor of *Haworthia Study* is Dr M. Hayashi, Research Institute of Evolutionary Biology, Tokyo.

*Haworthia Study* is issued twice a year in June and December. There are normally 16 A4 pages per issue with many colour illustrations. Japanese hybrids and cultivars are main features of all issues. The range seems to be endless; new variations are constantly being produced. Articles are in Japanese with brief, occasionally longer, English summaries, but a large proportion of each journal is taken up with colour photographs.

Compared with much of the western world, Japan is an expensive country and particularly so for aesthetic work and other non-essential items (Koi fish, art, books etc). The annual subscription in Japan for the Japanese Haworthia Society is the equivalent of about £60, US\$90. For non-Japan subscribers, there are now two types of subscription:

1. £36 available to everyone outside Japan. *Haworthia Study* will be sent direct from Japan to subscribers.

Payment must be made to Harry Mays.

2. A reduced rate of £16, €26, A\$36, US\$28, per year for *Haworthia Study* for subscribers to *Alsterworthia International*. Payment may be made in British pounds and other selected currencies to 9 *Alsterworthia International* Agents with subscriptions to *Alsterworthia International*. Under this arrangement *Haworthia Study* will be sent to Harry Mays in bulk by surface mail then distributed with *Alsterworthia International*.

Back numbers are also available on special offer; £50, €80, A\$145, US\$85 for numbers 1 to 8 (Number 9 summer of 2003), a very significant saving. Back numbers will be sent direct from Japan, but payments must be made via Harry Mays.

*Please note that only one subscription per year for Haworthia Study and only one for the back issues is allowed per non-Japan subscriber.*

If you require further information please contact Harry Mays - postal and e-mail addresses page 2.

# Blast Furnace *Haworthia* Cultivation.

by Gerhard Marx.

Soon after moving to Tucson, Arizona, in May 1999, my wife and I visited a local business where there were some magnificent roses in bloom outside the shop. The owner of the business noticed my wife's admiration for the roses and came outside to explain that they were his pride and joy and that it was an achievement to have roses blooming so nicely in this severely hot and dry climate. He also rambled on about what kinds of roses one can grow in Tucson with the proper care and precautions and I remember some of those were teas, grandifloras and floribundas, the latter name calling up some *Haworthia* associations for me.

Upon our departure, he presented my wife with a little booklet that had been produced by the Rose Society of Tucson, entitled "Blast Furnace Rose Gardening". I was amused by the title at first but, about a month later, I started to understand the appropriateness of the title.

I always thought those cowboy movies laid it on a bit when they suggested that a villain tied to a saguaro cactus will burn to death in a few hours. Well, today I know that the Americans are after all not such exaggerating gasbags as some popular misconceptions may have them. This is a harsh country in terms of weather conditions and to have tamed the Arizona desert must have taken the toughest of men.

After living for three years in Tucson, I can summarize the climate as follows. There are five seasons, a dry summer, a wet summer, a short autumn, a relatively short winter and a short spring. The dry summer starts about mid April and continues until early July. Normally by early May the first 100F degree (38C) days starts. Every day from now on for the next four months the temperature will reach a maximum of just above or just below the 100F mark! The nights fall to a minimum average of 68F (20C) during the early part of May, but by end of June they can on occasions remain above 85F (30C). In some low-lying areas the night minimum can be as high as 95F at times! Very uncomfortable, but still tolerable, due to the fact that the average humidity is in the region of 12 %, sometimes as low as 4%! It's a dry heat, as they say.

Soon after the 4<sup>th</sup> of July Independence Day fireworks celebrations, it is as if the gods get the hint and some real thunder and lightning start in the late afternoons and this is the beginning of the 'monsoon' season. During this time it can rain in the late afternoons as frequently as three time per week on the same spot and almost every afternoon there are some showers falling somewhere visible on the horizon. Suddenly the average humidity is about 50% and this is the time of the year when the heat really gets to one. Imagine a 110 F (43C) day with humidity of 60%!

By mid to late August the rain stops and by mid September the heat calms down, but it can still be in the mid 90's F at times, as late as early October. Normally by late September night temperatures start dropping regularly below 65F (18C) and for a few weeks the weather is just perfect. Unfortunately the coldness sets

in fast and by early November the first frosts can be expected. Yet, throughout the first part of December the days can still reach a high of 70F (21C). Christmas marks the beginning of real winter and by early January the nights drop constantly to 32F (0C) or below, sometimes as low as 17F (-9C) and rarely somewhat lower. During the winter there can be some soft drizzling rain on occasion following a cold front (snow on the mountains and rain in the valleys), but some years this is almost totally absent. By mid February the worst cold is over, but there can be frost up to about mid March at times. However, from mid February onward the days reach the 70's (low 20's C) and at times even 80F (26C). By late April all hell breaks loose again.

Right through the year the days are characterized by cloudless skies. The number of sunny days per year in Tucson must be well over 300, probably even 350, and the light intensity here is incredibly high. Even the toughest miniature Mesembs like Lithops and Dinteranthus do not survive out in the full sun in this area. Some shading must be provided during most of summer, or they will get burnt and cooked. Well, in reality, the local critters would have finished them off long before then. The Sonoran desert birds, rabbits, squirrels and rats are desperate and ravaging eaters and they seem to have the supernatural ability to detect a juicy bite from miles away.

By now just about every *Haworthia* grower reading this must have realized the fatal hostility that these plants are faced with in this area. Imagine how a coastal species like *Haworthia pygmaea* must feel in these conditions. And, as we all know, most haworthias occur naturally in areas adjacent to the coast. There are only a handful of species that penetrated the inland desert areas in South Africa, which can vaguely compare to the conditions of the Sonoran desert.

After having grown haworthias in one of the most favourable climates imaginable in Grahamstown, South Africa, for several years, I suffered the same shock as my *Haworthia* plants that moved with me. Within a few weeks some were so shrivelled that I feared that they would not make it. All I could do was to keep them as cool as possible and added another layer of 50% shade cloth below the 50% shade cloth of the Arid Lands greenhouse. Of course, one thing that Chuck Hanson had discovered years before was that the best way to grow most of the succulents in this area is to remove any form of heat insulating transparent cover from the greenhouse roofs in April in order to grow the plants all summer long only under 50% shade cloth. The disadvantage is that all the monsoon rains of July and August fall on the plants but that proved to be not much of a problem. Even the winter growers seem to be fine with the monsoon rains. Very few cases of rot occur. The main goal is just to keep the plants as cool and well-ventilated as possible in such searing heat. Due to the light intensity, most euphorbias, aloes, cacti and other sun-loving plants keep their shape very well and look



fine under the 50% shade cloth. Only the toughest species can gradually adapt to growing in the full sun outside in these conditions, but even in the case of the tough local cacti like *Ferocactus wislizenii* and *Cereus giganteus* (Saguaro), the younger plants survive initially for many years in the shade of desert trees and shrubs.

I soon realized that watering haworthias in summer here has little effect. It is simply too warm for them to grow actively and in many cases the rosettes lose their tight compactness and become gaping and etiolated plants. It is clear that the heat has the stretching effect. The best way to prevent the etiolation is to keep the plants on the dry side in summer. Only a light watering once a week to keep the roots from drying out is enough.

Only by mid to late September do the haworthias show signs of relief and growth. By late October they look well and healthy again and, of course, by then the greenhouses get covered and the plants are not exposed to temperatures below 45 F (7C) during the winter. So, right through winter the haworthias look fine and happy and all of them grow actively.

The early to mid spring bloomers produce lots of flowers and the seed harvest is as good as can be expected. However, from late April onwards, the dry heat starts to inhibit fruit formation. By the beginning of June the pollination of certain species becomes impossible. All the summer flowering haworthias produce lots of flowers but the constant dry and hot air has the effect that the pollen desiccates before it ripens. I tried everything, including getting up before sunrise when it is still relatively cool, to attempt pollination, but even then the pollen is just rock hard in the form of little, dry balls. This means that some of the best and most desirable haworthias, like most of the *H. magnifica*, *H. marumiana* var. *dimorpha*, *H. maraisii* and some *H. arachnoidea* varieties do not produce any fruit under such conditions.

The Sonoran Desert is clearly not the perfect climate in which to grow haworthias. It is a situation where ideally

one needs to cool them in summer and heat them in winter as the periods of ideal weather for them are the very short bits of spring and fall. Yet, despite the unsuitable climate, it was interesting to see how well these plants could cope with it all. It was also interesting to see which haworthias suffered most and which did not seem to mind the constant dry heat. As mentioned, generally the nice flat retuse species had the tendency to develop semi-erect leaves and less compact rosettes due to the heat. *Haworthia magnifica* varieties, *H. pygmaea* and particularly *H. mutica* suffered most. But surprisingly enough, the majority of haworthias look fine and species like *H. emelyae* and its var. *comptoniana* look almost unaffected and particularly the form of *H. emelyae* from east of Vanwyksdorp (Rooiberg Pass) look absolutely perfect here, even better than in South Africa! Other species which look reasonably fine here are things like *H. venosa* and its varieties, *H. koelmaniorum* and var. *mcmurtryi*, *H. limifolia* and varieties, *H. cooperi* and varieties, *H. arachnoidea* and varieties, *H. decipiens* and varieties, *H. bolusii* and varieties and several more. *H. truncata* and its var. *maughanii* grow well and produce good seed, but they look horrible. Both develop very uneven and etiolated leaves and it is almost impossible to keep *H. truncata* as flat and compact as it should be.

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## Penrock Seeds and Penrock Plants

Charles Craib

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Penrock Seeds and Penrock Plants, of which I am the owner, is a mail order nursery and seed merchant business situated north of Johannesburg. It supplies the retail market, the wholesale market and also more recently bulk wholesale plant supplies. The seed business occupies a niche market supplying a number of seeds not readily sourced elsewhere. The seed list usually features several of the more unusual *Aloe* species, particularly S.A Grass *Aloe* species. Some haworthia seed is supplied.

The nursery specialises in aloes, bulbs and caudiciforms. Aloes are germinated from seed in the nursery and then grown on to maturity by Simply Indigenous Nursery situated in the North West Province. Please contact Mrs Leigh Nieuwoudt at [indigenous@icon.co.za](mailto:indigenous@icon.co.za) if you wish to order aloes.

There is a regular newsletter on the website written once every two months. Most newsletters cover the natural habitat distribution and cultivation of plants supplied in seed form or else through the nursery. The website deals with rare and ornamental

plants and new introductions to horticulture. Some are illustrated. The information is updated periodically. Specialised cultivation information of use to the hobbyist grower and commercial nurseries, may be downloaded for a fee. Details are available on the website.

Seed and plant lists are usually e-mailed, not web listed, but where people do not have computers the lists are sent via airmail post. We have a main list for seeds and plants and this is periodically updated with supplementary lists. When people ask for a seed or plant list they should indicate if they want supplementary lists sent to them. Seeds are documented, but this information is only sent out if it is specifically requested. There is no charge for the seed or plant lists sent irrespective of whether these are e-mailed or sent via airmail post.

The costs of CITES certificates and phytosanitary certificates may be obtained when ordering from the nursery involved.

## *Haworthia intermedia* Von Poelln.

### "The name suggests the difficulty in describing just what to do with this element"

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#### Introduction

Intermedia means "between" and, as Bayer wrote, "The name suggests the difficulty in describing just what to do with this element". This reminds the author that Luigi Battista, when exploring the Lemoenpoort area, mentioned that he found an element, something between *H. maculata* and *H. pubescens*, but more towards *H. maculata*.

As von. Poelln. described *Haworthia intermedia* in 1937 and *Haworthia schuldiana* var. *maculata* in 1940, the name *H. intermedia* has priority over *H. maculata*, should these two plants be regarded as the same species. Throughout the article the name *H. maculata* is used because that is the current name applied to *H. intermedia*.

#### Discussion

Ever since the author started his collection in 1983, the interrelationship of the species in the Worcester/Robertson Karoo has fascinated him. Nearly every locality visited in that area has produced plants that show some relationship with another species. Also in *Haworthia Revisited*, Bayer constantly referred to this interrelationship. After extensive field work in the Worcester/Robertson Karoo, the author also read Bayer's articles and books very carefully in order to take advantage of his field experience of the area. This was done in particular to try and understand the interrelationship of the species in the area.

In this article the author is giving his own views on *H. intermedia*, *H. maculata*, *H. maraisii* var. *notabilis* and *H. pubescens* var. *livida* and supporting it with remarks expressed by Bayer as well as Herbarium records. A complete diagram of the interrelationship of the species

in the subgenus *Haworthia* in the Worcester/Robertson Karoo, as seen by the author, is given at the end of the article.

#### The West-East relationship of *H. maculata*

During the first part of the 1990's many days were spent in the field to try to establish the relationship between *H. maculata* and *H. maraisii* var. *notabilis*. The only conclusion the author came to was that the plants from Buitenstekloof (fig. 11) are just as much related to *H. maculata* to the west as to *H. maraisii* var. *notabilis* to the east. This was based purely on the general features of the plants. When Bayer put the plants from Buitenstekloof under *H. maculata*, the author was very pleased, but was of the opinion that *H. maraisii* var. *notabilis* should also be a variety of *H. maculata*, because the plants from Buitenstekloof have the same general features as *H. maraisii* var. *notabilis*.

The following remarks by Bayer and herbarium records support the view that *H. maraisii* var. *notabilis* is also *H. maculata*: "A problem is the occurrence of populations apparently of *H. maculata* in the mountains to the north of Worcester (both high altitude- Audensberg Peak, and low altitude - at Sandhills)". According to the Herbarium records, the Hexrivier plants flower November/December with the Brandvlei collection and are identical to the plants of Audensberg (See fig. 12) and similar to *H. maculata* of Brandvlei Dam. A similar element (as the Hexriver plants) occurs eastwards towards Robertson at Buitenstekloof, ....." In the *Haworthia Handbook*, Bayer linked *H. maraisii* var. *notabilis* with *H. maculata* var. *intermedia* at Buitenstekloof when he wrote "The type (of *H. notabilis*) is Wolkloof, Robertson (fig. 14), but it occurs from Klaasfoogds to Buitenstekloof." In *Haworthia*

#### Simplified map to locate the places mentioned in the article.

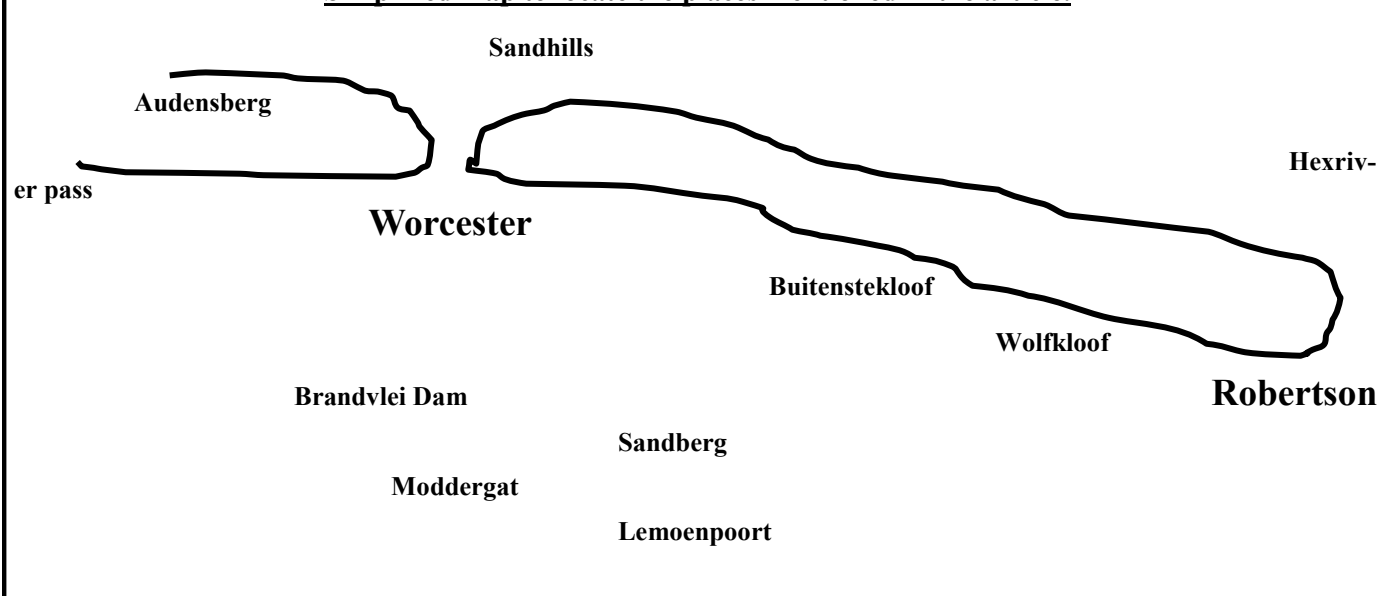






Fig. 11. *Haworthia intermedia* Buitenstekloof



Fig. 12. *Haworthia intermedia* Audensberg

Revisited he even went further by stating "Nevertheless it may be correct to place them (*H. maculata* var. *intermedia* and *H. maraisii* var. *notabilis*) together in one species as there is also a population recorded midway between the two at Agtervink."

#### The North-South relationship of *H. maculata*

When the author visited Ingo Breuer's collection during 2000, he saw a plant from Lemoenpoort, which was clearly *H. maculata*. That immediately re-awakened his interest in *H. maculata* and he decided to visit the Lemoenpoort area to gain first hand experience of this plant. It was Luigi Battista who discovered a locality of *H. pubescens* var. *livida* in this area. The author was surprised to see *H. maculata* and not the typical *H. pubescens* var. *livida* as seen in collections, although smaller plants with more incurving leaves were also present. That is the reason why Luigi said that he found something between *H. maculata* and *H. pubescens*. After seeing the plants (fig.13 left plant) the author was convinced that *H. pubescens* var. *livida* should be a variety of *H. intermedia*.

The following remarks by Bayer and the quoted herbarium records seem to be compatible with the author's conclusions: "This latter form at Lemoenpoort

(*H. pubescens* var. *livida*) is in a quartzitic ridge again near *H. herbacea*, and it resembles *H. maculata* in the relative proportions of its leaves. *H. maculata* occurs in a more recognisable form about 5 km to the west at Moddergat, at a far southern locality for the species". Moddergat according to a Herbarium record is between the farms Arbeidsgenot and Die Hoek and the plants there are identical to the Brandvlei specimens (fig 13 right plant). Herbarium record KG 184/ 70: "Small form, rather more bluish translucent than typical (*H. pubescens*) flowers hort. December with *H. maculata* ex Brandvlei, Hexriver Mountains and Hexriver Pass (Lower)." (There is also another record referring to *H. maculata* cf. *pubescens* from Lemoenpoort) When describing *H. pubescens*, Bayer wrote "*H. pubescens* resembles *H. schuldtiana* in size, colour and nature of surface excrescences, but is more densely muricate and pubescent. It is nearer to *H. herbacea*, *H. reticulata* and *H. maculata* as regards leaf shape and arrangement and also in floral structure and flowering time."

#### Interrelationship of *H. intermedia* with other species in the subgenus *Haworthia* in the Worcester/Robertson Karoo

Putting the interrelationship into words to do justice to what you are trying to convey is not easy and therefore



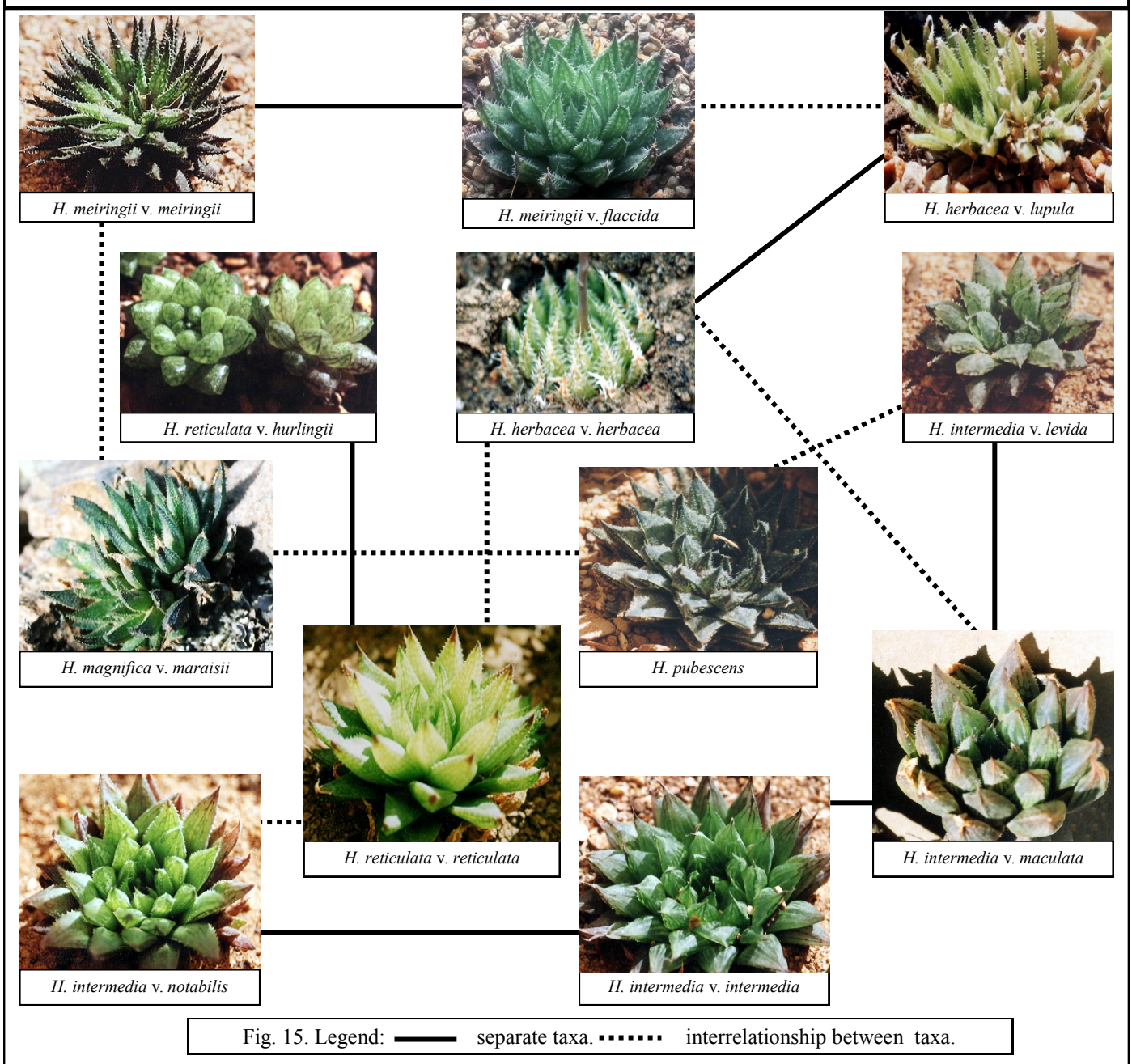
Fig. 13. *Haworthia intermedia*  
Left Lemoenkloof. Right Brandvlei



Fig. 14. *Haworthia intermedia*  
(*H. notabilis*) Wolfkloof



**Interrelationship of *H. intermedia* with other species, subgenus *Haworthia*, Worcester/Robertson Karoo**



the author decided to explain his views by means of the above graphic illustration.

**Conclusion**

The logical conclusion to which I came is that *H. intermedia* is a more variable and more widespread species than originally known and exists as the following varieties:

1. *H. intermedia* var. *intermedia* which includes *H. intermedia* (Kakteenkunde 1937: 134, 1937) and *H. maculata* var. *intermedia* [Haworthia Revisited 91 (1999)]
2. *H. intermedia* var. *maculate* which includes *H. schuldtiana* var. *maculate* (Feddes Repertorium 49: 25,1940), *H. maculate* [Haworthia Handbook 130 (1976)] and *H. maculata* var. *maculata* (Haworthia Revisited 90 (1999)).
3. *H. intermedia* var. *notabilis* which includes *H. maraisii* var. *notabilis* [Haworthia Handbook 141

(1976)] and *H. notabilis* (Feddes Repertorium 44:134,1938).

4. *H. intermedia* var. *livida* which includes *H. pubescens* var. *livida* (Haworthia Revisited 134 1999).

Photographs by the author.



# ADDITIONAL NOTES ON *H. AGNIS* L. BATTISTA

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*Haworthia. agnis* was described as a new species because it was not possible to place it in either the *Haworthia nortieri* or the *Haworthia globosiflora* complex. Its features just did not fit the descriptions of either. Before being described as a new species, *H. agnis* was compared with plants of *H. nortieri* and *H. globosiflora* from different localities. In this article the comparisons are evaluated and a distribution map is presented to indicate the area we are discussing.

As mentioned in the original description of *H. agnis* (Alsterworthia International July, 2002) the most critical differences between it and *H. nortieri* and *H. globosiflora* are the presence of the prominent, large, pellucid, white teeth on the upper half/third of the face of the leaves, the shape of the leaves, the colour of the inner segments of the flower, the shape of the flower and the size and shape of the seed.

As well as the comparison of the main characters of the three species involved, it is important to be able to give details of the known distribution area for the new species, so I decided to return to the Knersvlakte to carry out further field studies. They turned out to be quite successful. A large area around the type locality was explored and four new localities were discovered: one to the south, two to the north east and one to north west of the type locality.

The first new locality is east of Vanrhynsdorp (fig. 16) where plants very similar to *H. agnis* were discovered and observed. These plants had lighter green leaves, with fewer pellucid spots and fairly strong teeth on the upper surface of the leaves, with the same flower as in the type. There were a good number of specimens growing under bushes on the northern slopes of low hills. They showed many similarities with plants from the foothills of the Van Rhynspas.

Unlike plants from the foothills of Van Rhynspas, in this locality there was much more constancy in general characters. This new locality was richer in succulents than all the other *H. agnis* localities with different Apocynaceae spp, *Crassula* spp., a nice form of *Anacampseros retusa*, *Adromischus* spp., various bulbs and Mesembs and a *Fockea* sp. *H. agnis* plants found there were in full flower during September.

The second new locality is quite close to the type locality, but only a few plants were found. Plants were identical to the type, growing under the few remaining bushes and between and under rocks on the southern slopes of very low kopjes, quite poor in succulents. These plants were also in flower.

The third new locality is at a good distance from the type locality. I was pleased to find many plants, almost all of them in flower, growing under bushes (front cover) and between and under rocks on the west south west aspect of a low kopje (fig. 17). It was nice to find seedlings (fig. 18), so I had the opportunity to compare them with mine in cultivation and saw



Fig. 16. *Haworthia agnis* east of Vanrhynsdorp



Fig. 17. *Haworthia agnis* NE of type locality



Fig. 18. *Haworthia agnis* seedlings NE of type locality





Fig. 19 *Haworthia agnis* NW of type locality

were present. One of these was the ubiquitous *Adromischus marianae*. The fourth new locality is north west of the type. There plants were growing in between and under rocks on the western aspect and on the top of low kopjes (fig. 19). Here leaves were more spiny and with pellucid spots on the upper surface. These plants were also in flower. Together with *H. agnis*, a nice *Phyllobolus* sp. and an interesting *Euphorbia* sp. were found in addition to a *Bulbine* sp., *Conophytum* sp. and *Adromischus marianae*.



Fig. 20. *Haworthia nortieri* Maskam

no differences: also habitat seedlings showed at a young age the development of the prominent, white teeth on the surface of the leaves. Plants with many pellucid spots and strong teeth on the upper surface of the leaves, as well as a few plants with fewer pellucid spots and teeth, were present. Few other succulents



Fig. 21. Plant from Van Rhynspas



Fig. 22. *H. globosiflora* SE Nieuwoudtville

*H. nortieri* from the Maskam (the old var. *giftbergensis*) (fig. 20) is also closely related to *H. agnis*, much more so than other forms of *H. nortieri* from around Clanwilliam (fig. 23). Different populations on the Giftberg were examined. Amongst them I also discovered some plants with fine teeth on the upper surface of the leaves, with flower shape different from that of *H. agnis* and canary yellow inner segments (fig. 35, page17) and with lanceolate leaves, not obovate acute as in *H. agnis*.

Plants from the foothills of Van Rhynspas were observed in cultivation. In habitat no clusters were found among the populations at the foothills of Van Rhynspas, but after a short time in cultivation they started to cluster whereas *H. agnis*, *H. globosiflora* and *H. nortieri* do not make cluster in normal conditions. Van Rhynspas plants (fig. 21) seem to have more turgid leaves than the three mentioned species. Compared with *H. agnis* plants from west of Van Rhynspas (one of the new localities), plants





Fig. 23. *Haworthia nortieri* south of Clanwilliam

from the foothills of Van Rhynspas also show more turgid leaves and less pellucid spots and strong teeth on the surface of the leaves. In cultivation clusters of Van Rhynspas plants are really very similar to *H. reticulata/herbacea* clusters (the dubious *H. guttata*) from south of Eilandia.

In the Compton Herbarium in Cape Town, I found an interesting record of a plant from Uitkomst farm in the Nieuwoudtville district. It had been compared first with *H. nortieri* from two other localities and then identified as *H. globosiflora*, maybe because of the flower but, unfortunately, no pictures of the flower were found. It is also possible that this plant had been identified as *H. globosiflora* only because its general features were closer to that species than to *H. nortieri*. After a search of Uitkomst farm I was able to locate the plant on the top of the escarpment south west of Nieuwoudtville (fig. 22). It seems to be very closely related to *H. agnis* in general features. Maybe it was here where plants with normal flowers (not globose) mentioned by Bayer in his book were found and this could be a link between the two species or maybe it is simply *H. agnis*.

Looking at these new discoveries, one can see that *H. agnis* has a well defined distribution area showing a good constancy in general characters and in flowers and it is definitely different from *H. nortieri* and *H. globosiflora*, the closest species.

Bayer in "Haworthia Revisited. A revision of the genus" wrote the following: "the decision to include *H. pehlemanniae* within this species (*H.*



Fig. 24 (1). *Haworthia agnis*

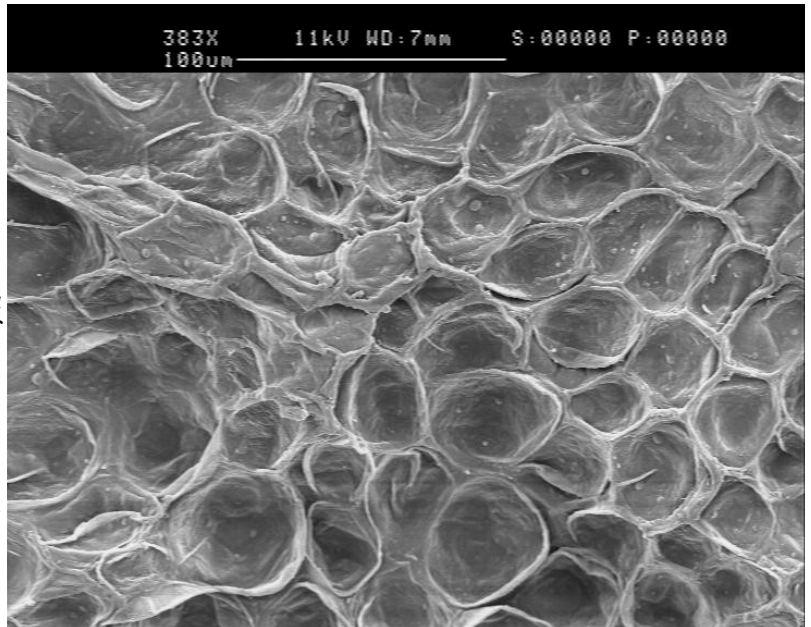


Fig. 25. *Haworthia agnis*

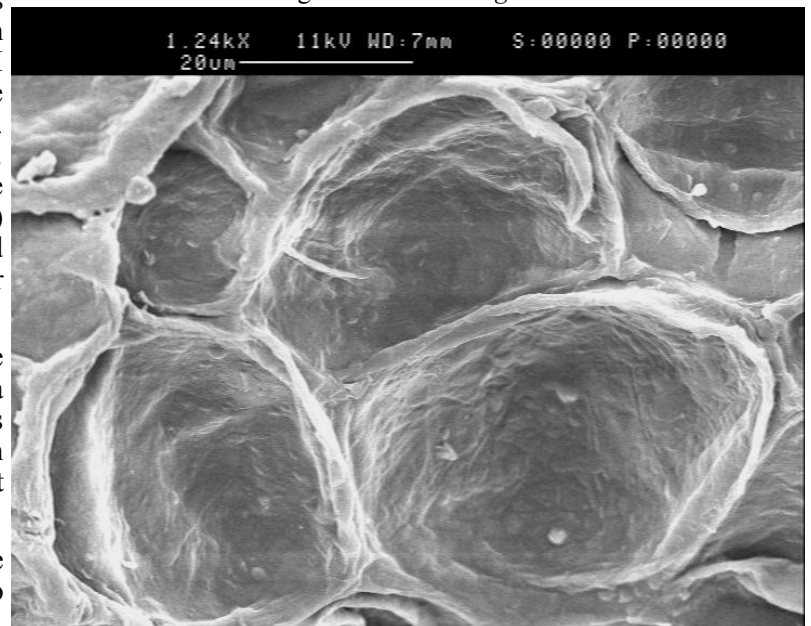


Fig. 26. *Haworthia agnis*

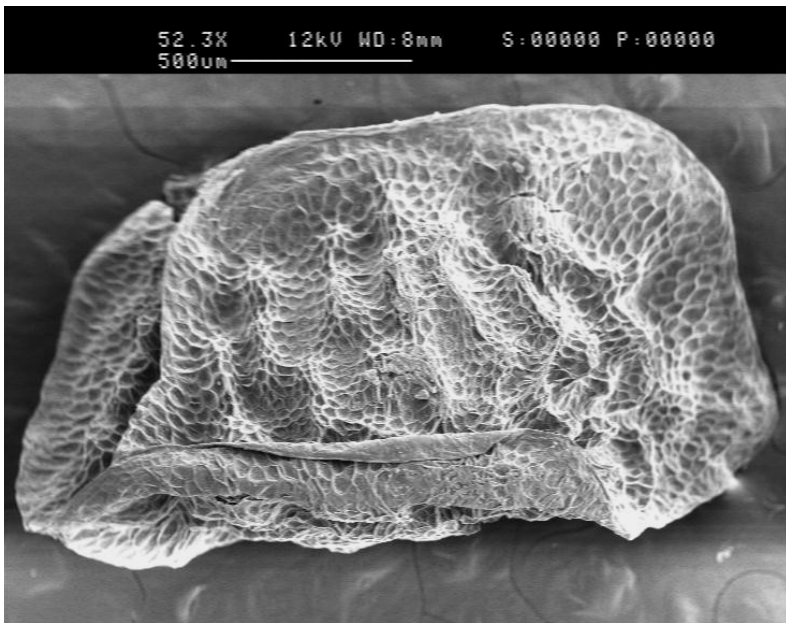


Fig 27. *Haworthia globosiflora* SE Nieuwoudtville

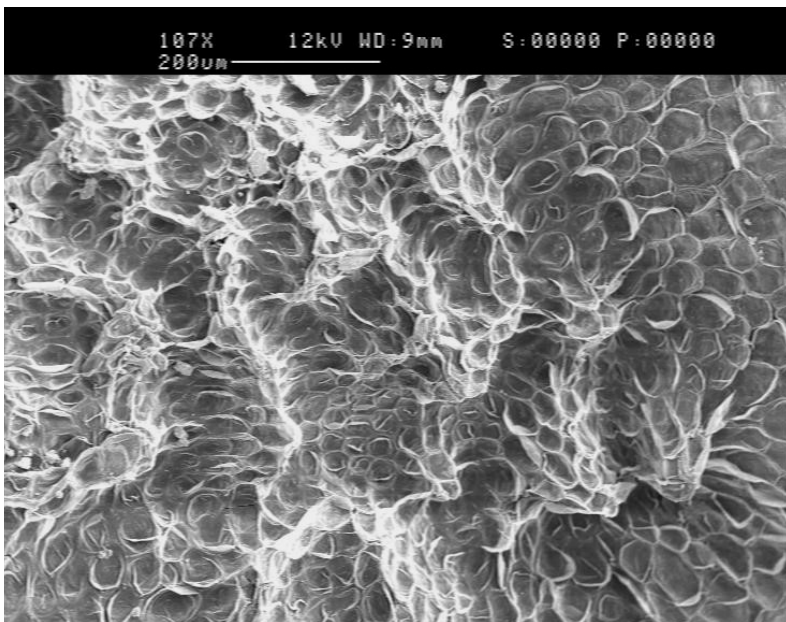


Fig. 28. *Haworthia globosiflora* SE Nieuwoudtville

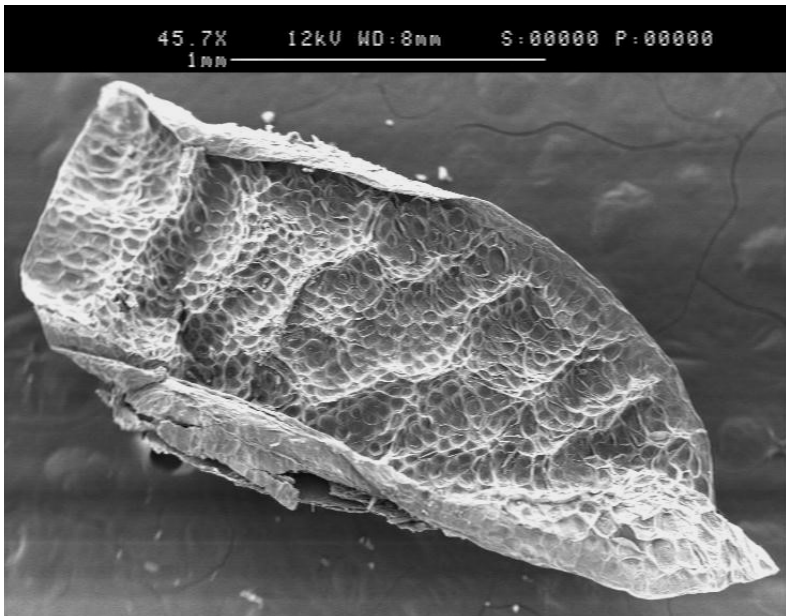


Fig. 29. *Haworthia nortieri* Maskam.

*nortieri*) is also on account of the flower which is identical to that of var. *globosiflora*'. In the case of *H. agnis* the flower is totally different from *H. globosiflora* and this clearly separates the two species. Figs. 33-35.

In addition to the field research, a SEM study was made on seed of the three specie involved in the discussion (*H. agnis*, *H. nortieri* and *H. globosiflora*).

As is evident from the figures, seed of *H. nortieri* from Maskam (fig. 29) is different from the seed of *H. agnis* (fig.24) and *H. globosiflora* (fig. 27). It is longer and thicker. The structure of the third integument (aril, *the outside of the seed*) is more or less the same as that of the other two even if cells seem to be bigger (Note the magnification at the top of each photograph). The hilum region is different. Unfortunately the micropyle is not visible.

Seed of *H. globosiflora* from South East of Nieuwoudtville is different from the others: it is clearly bigger than seed of both *H. agnis* and plants from the foothills of Van Rhynspas (note the scale bars at the top of the photographs). The structure of the third integument (aril) is more or less the same as in *H. agnis* and in *H. nortieri* from Maskam, but it seems more irregular than in plants from the foothills of Van Rhynspas (Fig. 30). The hilum region is different in the other species while the micropyle is not visible. The shape of the seed is also different.

Seed of plants from the foothills of Van Rhynspas seems to be closer to those of *H. agnis* in shape and aril structure; the hilum region is different and the micropyle is not visible. Compared with the other seeds it is quite different in shape, aril structure and hilum region. In this seed the surface of the aril seems to be more regular then in the others.

Seed of *H. agnis* shows similarities with seed of plants from the foothills of Van Rhynspas though the structure of the aril seems to be more irregular. The hilum region of *H. agnis* is clearly different and the shape is also different. It is evident that this seed is smaller than the others.

In the close-ups of the seeds, it is interesting to see that the aril makes folds over the remains of the cells.

The following (page 18) is a comparison table with data measured on the SEM pictures.

The comparison of SEM pictures strengthens the idea that *H. agnis* is different from *H. nortieri* and *H. globosiflora* and a species in its own right. Plants from the foothills of Van Rhynspas need more investigation. Most probably a long time ago there was only one species in the area examined, but over time climatic change occurred and different populations of plants became segregated giving them the opportunity to change to adapt to new conditions; meanwhile some populations in between disappeared, preventing the exchange of genetic material.



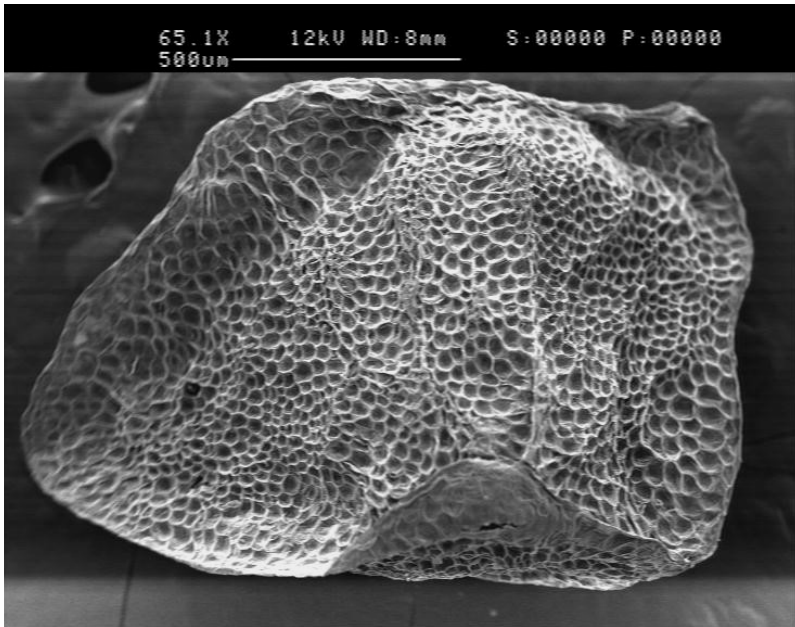


Fig. 30. Plant from foothills of Vanrhynspas

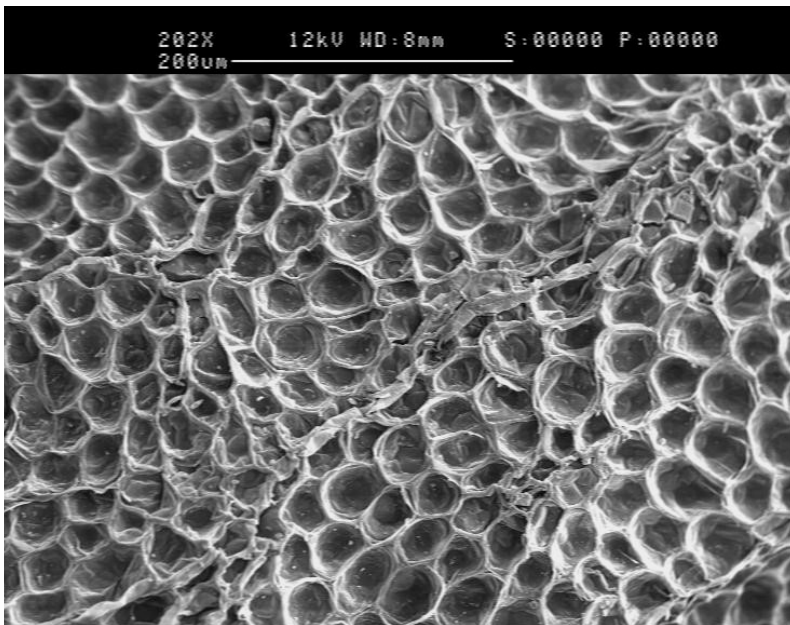


Fig. 31. Plant from foothills of Vanrhynspas



Comparison of flowers

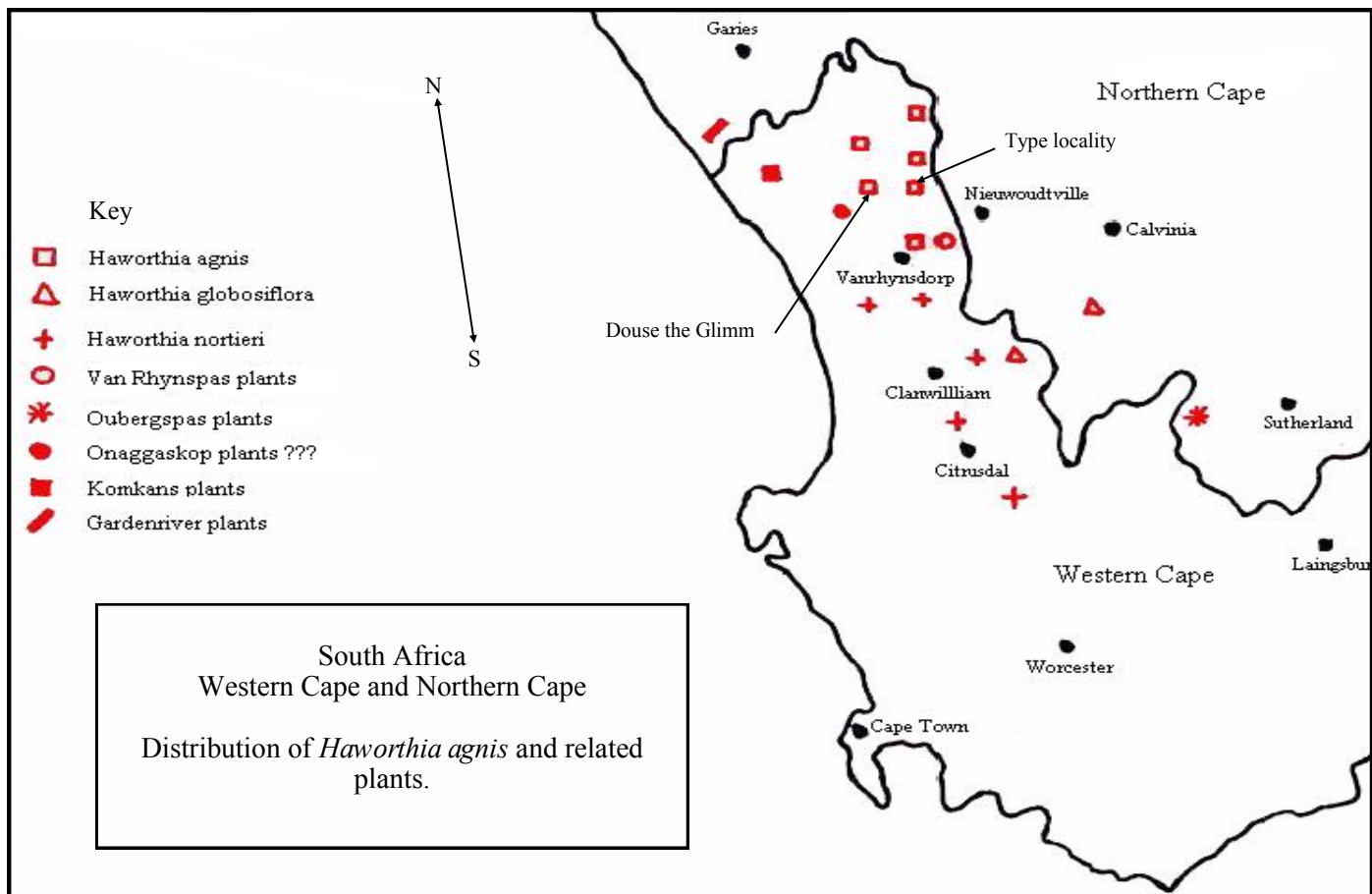
Fig. 32 (above) *Haworthia agnis* E. of Vanrhynsdorp

Fig. 33 (bottom left) *Haworthia agnis* Type Locality

Fig. 34 (bottom centre) *Haworthia globosiflora*  
SE Nieuwoudtville

Fig. 35. (bottom right) *Haworthia nortieri* Maskam





**Acknowledgments**

Thanks are due to the Padova Herbarium, in particular to the curator Dr. Rossella Marcucci and to Dr. Magda Biasiolo for their availability and for making the SEM pictures. I am also grateful to my friends Dr. Robert Archer (NBI Pretoria) and Essie Esterhuizen for their precious support and advices.

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Photographs by the author.

| <u>Plant</u>                                   | <u>Seed length</u> | <u>Cell Dimension</u>  |
|--|--------------------|--|
| <i>H. agnis</i><br>Type locality               | 1.3 mm             | 36 to 50 micrometer (on the close-up)<br>29 to 50 micrometer (on the whole seed) |
| <i>H. globosiflora</i><br>SE of Nieuwoudtville | 2 mm               | 46 to 62 micrometer (on the close-up)<br>44 to 83 micrometer (on the whole seed) |
| <i>H. nortieri</i> Maskam                      | 2.6 mm             | 54 to 100 micrometer (on the whole seed)   |
| Plants from the foothills of Van Rhynspas      | 1.6 mm             | 40 to 55 micrometer (on the close-up)<br>40 to 75 micrometer (on the whole seed) |
| Comparative details of seed.                   |                    |  |

Fig. 36 (right). *Bulbinella latifolia* in full flower. Kamieskroon, S. A.

South Africa is a source of many glasshouse and garden plants. It could claim a proportion of the proceeds from the sale of its flora if, when, the decisions taken at the CBD April, 2002 are implemented.

Photograph: Heather Angel



# Molecular Systematic Study of the Succulent Asphodelaceae

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The long-standing taxonomic challenges that face systematists and growers interested in understanding the evolution and classification of the Asphodelaceae subfamily Alooideae (Aloaceae by some authors) will receive some assistance with the initiation of a new line of research in the Succulent Plant Systematics Laboratory at Iowa State University. The research will centre on the problematic genus *Haworthia* and attempt to address the major questions: How is the genus *Haworthia* related to the other Alooideae genera, and how are the major species groups of *Haworthia* related to one another?

Evolutionary relationships and the classification of Alooideae have been topics of great consternation since Duval first segregated *Haworthia* from *Aloe* in 1809. The current classification system recognises all Alooideae genera as distinct taxa with each arising independently from a single and unique ancestor. Within *Haworthia*, the most accepted classification system divides the genus into three subgenera. The above classification systems follow traditional systematic techniques and base all evolutionary hypotheses on morphological evidence. Historically, morphology has been virtually the only method available for comparing taxa and generating a hypothesis of evolutionary relationships (or phylogeny). Today, investigations into evolutionary patterns utilise the DNA (or molecular) material of the taxa of interest. Molecular phylogenetics enables the independent testing of various evolutionary hypotheses and can serve as the foundation for a classification system.

Our research program utilises DNA techniques to examine the

intergeneric relationships between *Haworthia*, *Gasteria*, *Astroloba*, *Poellnitzia*, *Chortolirion* and *Aloe* (in part). Once a reliable understanding of the intergeneric relationships has been determined, more detailed, infrageneric studies of the primary species groups and general interspecific relationships within *Haworthia* and *Gasteria* are planned. Thus, a well-resolved phylogeny for each of these genera is the desired result of the research program. Evaluation of the present classification systems will then be possible using these data derived from the study of DNA variation.

The preliminary data accumulated over the past academic year have revealed some surprising results. The most interesting is the suggestion that *Haworthia*, as currently circumscribed, may have at least two independent origins. It appears that all *Haworthia* species do not share a common ancestor. Some species of *Haworthia* seem to be more closely related to members of the genera *Gasteria* or *Astroloba* than to other *Haworthia* species. Further analyses will enable the reevaluation of these preliminary results and hopefully lead to a more robust hypothesis of evolutionary relationships within and between the Alooideae genera. All of these molecular systematic studies on the succulent Asphodelaceae are part of the thesis research of Mr. Jeff Noll, and will be supervised by Dr. Robert Wallace. Comments and queries regarding this research are welcome (jnoll@iastate.edu).

## Trading in wild plants - duties and rewards

The Convention on Biological Diversity (CBD) aims to promote the conservation of biological diversity, the sustainable use of its resources and the fair and equitable sharing of benefits arising from the use of genetic resources. Over 180 countries are signatories to the CBD. Decisions taken by the signatories may eventually become law.

At a meeting of the signatories in April, 2002 an important decision was taken, that anyone introducing an alien plant

would be responsible for any environmental damage, including the cost of restoration work. This will be an additional cost for nurseries, which may make them more reluctant to introduce new plant material. If you think that all plants from the Asphodelaceae are not potentially invasive, a possible threat to native UK plants and to those of other countries, have a look at the article "*Bulbine semibarbata* (R.Br.) Haw., a Leek Lily by any other name" by Julian M. H. Shaw in the November issues of *Alsterworthia International* [2 (3)19-20]. Does *Bulbinella latifolia* have potential for garden use? Fig. 36 shows the species growing near



Kamieskroom, South Africa.

Clear guidelines were also adopted for the implementation of the decision made in 1992 that a country should share in the proceeds of its native plants. Aloes, some of which are now naturalised or farmed in non-native countries, are the source of raw materials for the pharmaceutical industry.



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