

# ALSTERWORTHIA

# INTERNATIONAL

## THE

## SUCCULENT ASPHODELACEAE

## JOURNAL



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# New Aloe Cultivars from the USA, South Africa & Australia

Peter Schedler

Sherwood Lodge, Bradfield, Reading, RG7 6JB, UK

Aloes have long been popular amongst succulent growers and have been available from specialist growers, succulent interest groups and nurseries throughout Europe and the USA as small indoors "window-sill" plants, generally with novel leaf forms and textures. In recent years breeders, particularly in the USA, have been striving to create dwarf flowering cultivars so adding colour to their unusual leaf features (see *Miniature Aloes* by Brian Kemble, *Alsterworthia International*, Vol. 5, Issue 2 July 2005, pp. 14-16).

More recently other American succulent breeders have released a number of new miniature aloes (John Trager, Kelly Griffin, Karen Zimmerman, etc.) many through the annual succulent introduction program of the Huntington Botanical Gardens in San Marino, California. Huntington's renowned Desert Garden holds some 200 of the 589 currently known and described natural aloe species in the world.

The aim of the ISI (International Succulent Introductions) programme is to propagate and distribute new or rare succulents to collectors, nurseries and institutions. Propagation of new cultivars is by grafts, offshoots or rooted cuttings produced under nursery conditions, and in some cases by sterile *in vitro* laboratory tissue culture techniques. In line with sound conservation practices, no field collected species are sold.

Some of the recent introductions from this and similar sources in the USA are now available in Europe through tissue culture propagation and distribution by the Netherlands based STC (Succulent Tissue Culture) company.

## **Aloe 'Christmas Carol' KG ( Fig. 1 )**

A small *Aloe* of very striking appearance, from the rosette's central lime green colour to the brilliant red/orange leaf margins. In addition, it has thick, serrated succulent leaves with raised spines on them. Introduced in 2010 by Rancho Soledad Nurseries and Xeric Growers, both in California.

## **Aloe 'Guido' KG ( Fig. 2 )**

Another miniature *Aloe* comprising rosettes with white edgings and elongated white markings on the

otherwise green leaves. It grows to a maximum 20 cm in height and is only partly frost hardy.

## **Aloe 'Green Sand' (formerly 'Vito') KG ( Fig. 3 )**

A Kelly Griffin hybrid ('Vito') which was registered by the tissue culture nursery under the name 'Green



Sand' to obtain Plant Breeders' Rights for commercial sale.\* It has a rosette comprising leaves of a soft, "furry" and warty texture and appearance, which appeals to many succulent collectors and is characteristic of many of the recent miniature *Aloe* hybrids coming from this source.

\* private communication

On the outdoors front, two South African breeders, Andy de Wet and Leo Thamm, have each long been producing a range of larger flowering cultivars for garden display with the emphasis on colour and



extended flowering seasons. These have been released at steady intervals during the last few years in South Africa and several by Leo Thamm since 2006 in Australia.

The following examples illustrate some of their creations :

**Aloe ‘Hedgehog’ AdW ( Figs. 4)**

Released in South Africa in 2006 this small, compact *Aloe* (about 200 x 200 mm) is fast-growing and flowering peaks about January to February in the Northern Hemisphere (early July to late August in South Africa) when it produces reddish-pink to pale pink flowers. Leaves are grey-green in colour, edged with white teeth. It is cold tolerant down to about -5 C, and is a complex hybrid of four different *Aloe* species.

**Aloe ‘Charles’ AdW (Fig. 5)**

A more recent release (2009) growing up to 1-2 metres high. A spectacular bicoloured (red & white ) cultivar, it flowers between July and August in South Africa.

**Aloe ‘Zelda’ AdW ( Fig. 6)**

An early release from 2006 this cultivar has bicoloured pink to creamy white blossoms arising from a full, compact rosette of attractive greyish leaves. Ideal for containers, tubs or small gardens, it rarely exceeds 300



x 300 mm in size.

**Aloe ‘Copper Shower’ LT ( Figs. 7)**

Another recent release in South Africa, this cultivar produces a mass of coppery orange flower clusters. Of medium height, it is a complex hybrid with *A.*



*arborescens* as one of its constituents, which it resembles in several growth features. It produces many offshoots, which should be removed if one wishes to prevent a bushy growth habit and rather promote growth and more flowering stems. In the Northern Hemisphere this cultivar flowers between late September to early December.

*Note: most of the cultivars mentioned above have been granted Plant Breeders' Rights in their country of origin, which protects them from unauthorised propagation for sale.*

KG = Kelly Griffin, AdW = Andy de Wet, LT = Leo Thamm.

### Photograph acknowledgements.

Figs. 1-3. Peter Schedler courtesy S. Riley, Plantlife Nurseries.

Figs. 4 & 7. Peter Schedler.

Figs. 5 - 6. Andy de Wet



### A new book on Aloes.....

with an international rather than country-specific approach is now being compiled that will bring together for the first time both *Aloe* species and cultivars in a comprehensive and fully illustrated form. It is aimed at the horticultural and gardening market and the increasing numbers of succulent enthusiasts and growers who wish to expand their knowledge of this striking group of succulents, to which too little attention has been directed in the past outside their indigenous home, the continent of Africa. One of the book's features will be an illustrated compilation of all known *Aloe* cultivars and their breeders.

Peter Schedler.

### Up-to-date news.

Bruce Bayer has recently reported on FaceBook that he has been asked to submit his species classification for consideration of inclusion in a revision of *The illustrated Handbook of Succulent Plants* and that a DNA study in South Africa is recommending that *Haworthia* be included in *Aloe*.

The DNA study deals only with taxa above the rank of species and has to be "peer reviewed" for publication. Only species named in accordance with the International Code of Botanical Nomenclature will be eligible for inclusion in a revised Handbook.

J.C. Manning, SANBI, has arranged for Bruce Bayer's informal names, which do not comply with the ICBN, to be brought into line with the provisions of that code. The results are on pages 7-17.

**Date of publication 15 Feb. 2012.**

Nomina Nova recorded for the Asphodelacea for 2010 in the  
Repertorium Plantarum Succulentarum published by the I.O.S. 2011.

- Aloe acutissima* var. *berevoana* (Lavranos) J.-B. Castillon & J.-P. Castillon, *Aloe Madagascar*, 27, 2010. *Nom. inval.* (Art. 34.1b, 33.4), based on *Aloe berevoana*. [Suggested change in status on a provisional base.]
- Aloe candicans* (H. Perrier) J.-B. Castillon & J.-P. Castillon, *Aloe Madagascar*, 27, 2010. *Nom. inval.* (Art. 34.1b, 33.4), based on *Aloe deltoideodonta* var. *candicans*. [Suggested change in status on a provisional base. *Non Aloe candicans* (Haworth) Roemer & Schultes 1829.]
- Aloe candicans* var. *fallax* (J.-B. Castillon) J.-B. Castillon & J.-P. Castillon, *Aloe Madagascar*, 27, 2010. *Nom. inval.* (Art. 34.1b, 33.4), based on *Aloe deltoideodonta* var. *fallax*. [Suggested change in status on a provisional base.]
- Aloe cipolinicola** (H. Perrier) J.-B. Castillon & J.-P. Castillon, *Aloe Madagascar*, 28, 2010. Basionym: *Aloe capitata* var. *cipolinicola*.
- Aloe deltoideodonta** var. **ruffingiana** (Rauh & Petignat) J.-B. Castillon & J.-P. Castillon, *Aloe Madagascar*, 28, 2010. Basionym: *Aloe ruffingiana*.
- Aloe divaricata* ssp. *deinacantha* (T. A. McCoy & al.) J.-B. Castillon & J.-P. Castillon, *Aloe Madagascar*, 27, 2010. *Nom. inval.* (Art. 34.1b, 33.4), based on *Aloe deinacantha*. [Suggested change in status on a provisional base.]
- Aloe divaricata* ssp. *tulearensis* (T. A. McCoy & Lavranos) J.-B. Castillon & J.-P. Castillon, *Aloe Madagascar*, 27, 2010. *Nom. inval.* (Art. 34.1b, 33.4), based on *Aloe tulearensis*. [Suggested change in status on a provisional base.]
- Aloe divaricata* var. *deinacantha* (T. McCoy & al.) J.-B. Castillon & J.-P. Castillon, *Aloe Madagascar*, 27, 2010. *Nom. inval.* (Art. 34.1b, 33.4), based on *Aloe deinacantha*. [Suggested change in status on a provisional base.]
- Aloe fievettii** var. **ambatofinandrahanensis** J.-B. Castillon, *Cact.-Avent. Int. No. 85: 6-7*, ills., 2010. Typus: *Castillon 46* (TAN, P).
- Aloe gneissicola** (H. Perrier) J.-B. Castillon & J.-P. Castillon, *Aloe Madagascar*, 28, 2010. Basionym: *Aloe capitata* var. *gneissicola*.
- Aloe martialii** J.-B. Castillon, *Cact.-Avent. Int. No. 85: 3-4*, ills., 2010. Typus: *Malcomber & al. 1185* (MO).
- Aloe neilcrouchii** Klopper & G. F. Smith, *Bothalia* 40(1): 94-95, ills., 2010. Typus: *Crouch & Johnson 1247* (PRE, NH).
- Aloe newtonii** J.-B. Castillon, *Bradleya* 27: 152, ills. (p. 151), 2009. Typus: *Reynolds 7885* (TAN, K, PRE). [The name was incorrectly treated as illegitimate under Art. 52.1 in RPS 60 because of a confusing citation of synonymies.]
- Aloe nicholsii** G. F. Smith & N. Crouch, *Bradleya* 28: 103-106, ills., 2010. Typus: *Crouch 1270* (PRE, NH).
- Aloe perdita** Ellert, *Aloe* 46(3): 51, 2010. Typus: *Ellert 172* (ARIZ) [Ex cult. Bulawayo, Zimbabwe and Tucson, Arizona.]. [First published invalidly (Art. 8.2) in l.c. 45(4): 76-77, ills., 2009 ('2008') (cf. RPS 60).]
- Aloe rugosquamosa** (H. Perrier) J.-B. Castillon & J.-P. Castillon, *Aloe Madagascar*, 28, 2010. Basionym: *Aloe compressa* var. *rugosquamosa*.
- Aloe seibanica** Orlando & El Azzouni, *CactusWorld* 28 (4): 208-210, ills., 2010. Typus: *Orlando & El Azzouni 241504* (FT).
- Aloe versicolor** var. **steffanicana** (Rauh) J.-B. Castillon & J.-P. Castillon, *Aloe Madagascar*, 28, 2010. Basionym: *Aloe steffanicana*. [Sphalm. 'steffaniana'.]
- Bulbinella calcicola** J. C. Manning & Goldblatt, *Bothalia* 40(2): 197-199, ill., 2010. Typus: *Claassens & Claassens 11* (NBG, K, MO).
- Chortolirion latifolium** Zonneveld & G. Fritz, *Bradleya* 28: 32-33, ills., 2010. Typus: *Fritz 1025* (PRE).
- Haworthia** 'Ollason's Pride' P. I. Forster, *Alsterworthia Int.* 10(3): 2-3, ills., 2010. [A hybrid with *H. cooperi* as one parent. Based on *Haworthia ollasonii* G. R. Hayer 1971 (*nom. inval.*, Art. 36.1, 37.1).]
- Haworthia** Sect. **Attenuatae** (Pilbeam) Breuer, Gen. *Haworthia* Book 1, 4, 2010. Basionym: *Haworthia* Subsect. *Attenuatae*.
- Haworthia** Sect. **Turgidae** (Pilbeam) Breuer, Gen. *Haworthia* Book 1, 4, 2010. Basionym: *Haworthia* Subsect. *Turgidae*.
- Haworthia adelaidensis** (Poellnitz) Breuer, Gen. *Haworthia* Book 1, 7, 2010. Basionym: *Haworthia reinwardtii* var. *adelaidensis*.
- Haworthia angustata** (Poellnitz) Breuer, Gen. *Haworthia* Book 1, 7, 2010. Basionym: *Haworthia cymbiformis* var. *angustata*. *Haworthia anna* M. Hayashi, *Haworthia Study* 22: 10, ill., 2010. *Nom. inval.* (Art. 36.1, 37.1). *Haworthia araneoides* M. Hayashi, *Haworthia Study* 22: 10, ill., 2010. *Nom. inval.* (Art. 36.1, 37.1). [Published as provisional name.]
- Haworthia arcana** (G. F. Smith & N. Crouch) Breuer, Gen. *Haworthia* Book 1, 7, 2010. Basionym: *Haworthia limifolia* var. *arcana*.
- Haworthia baviensis* M. Hayashi, *Haworthia Study* 22: 10, ill., 2010. *Nom. inval.* (Art. 36.1, 37.1). [Published as provisional name.]
- Haworthia brevicula** (G. G. Smith) Breuer, Gen. *Haworthia* Book 1, 7, 2010. Basionym: *Haworthia reinwardtii* var. *brevicula*.
- Haworthia calitzdorpensis** (Breuer) M. Hayashi, *Haworthia Study* 22: 11, 2010. Basionym: *Haworthia mucronata* var. *calitzdorpensis*. [Sphalm. 'calitzensis'.]
- Haworthia cocksia* M. Hayashi, *Haworthia Study* 22: 10, ill., 2010. *Nom. inval.* (Art. 36.1, 37.1). [Published as provisional name.]
- Haworthia compacta** (Triebner) Breuer, Gen. *Haworthia* Book 1, 7, 2010. Basionym: *Haworthia cymbiformis* var. *compacta*.
- Haworthia coriacea** (Resende & Poellnitz) Breuer, Gen. *Haworthia* Book 1, 7, 2010. Basionym: *Haworthia tessellata* var. *coriacea*. *Haworthia corticosa* M. Hayashi, *Haworthia Study* 22: 10, ill., 2010. *Nom. inval.* (Art. 36.1, 37.1). [Published as provisional name.]
- Haworthia depauperata** (Poellnitz) Breuer, Gen. *Haworthia* Book 1, 7, 2010. Basionym: *Haworthia triebneriana* var. *depauperata*.
- Haworthia diversicolor** (Triebner & Poellnitz) M. Hayashi, *Haworthia Study* 22: 11, 2010. Basionym: *Haworthia triebneriana* var. *diversicolor*.
- Haworthia flaccida** (M. B. Bayer) Breuer, Gen. *Haworthia* Book 1, 7, 2010. Basionym: *Haworthia herbacea* var. *flaccida*.
- Haworthia glaucophylla** (M. B. Bayer) Breuer, Gen. *Haworthia* Book 1, 7, 2010. Basionym: *Haworthia limifolia* var. *glaucophylla*.
- Haworthia ikra** Breuer, Gen. *Haworthia* Book 1, 7, 2010. Typus: [neo icono]: H. Jacobsen, *Handb. Sukk. Pfl.* 2: 724, fig. 644, 1956. [Neotype designated by Breuer, *World Haworthias* 1: 201, 1998, for the replaced name.]. [*Nom. nov. pro Haworthia obtusa* f. *truncata* H. Jacobsen 1955, although labelled as "stat. nov.".]
- Haworthia inspida** Breuer, Gen. *Haworthia* Book 1, 7, 2010. Typus: *Bayer 1702* (NBG). [*Nom. nov. pro Haworthia zantneriana* var. *minor* M. B. Bayer 1999, although labelled

as "stat. nov.".]

**Haworthia janvlokii** (Breuer) Breuer, Gen. Haworthia Book 1, 7, 2010. Basionym: *Haworthia picta* var. *janvlokii*.

**Haworthia johanii** (M. Hayashi) Breuer, Gen. Haworthia Book 1, 7, 2010. Basionym: *Haworthia scabra* var. *johanii*.

**Haworthia lavrani** (C. L. Scott) Breuer, Gen. Haworthia Book 1, 7, 2010. Basionym: *Haworthia sordida* var. *lavrani*.

**Haworthia namaquensis** (M. B. Bayer) Breuer, Gen. Haworthia Book 1, 7, 2010. Basionym: *Haworthia arachnoidea* var. *namaquensis*.

**Haworthia obesa** (Poellnitz) Breuer, Gen. Haworthia Book 1, 7, 2010. Basionym: *Haworthia cymbiformis* var. *obesa*.

**Haworthia olivacea** (G. G. Smith) Breuer, Gen. Haworthia Book 1, 7, 2010. Basionym: *Haworthia reinwardtii* var. *olivacea*.

**Haworthia pallidifolia** (G. G. Smith) M. Hayashi, Haworthia Study 22: 11, 2010. Basionym: *Haworthia turgida* var. *pallidifolia*. [Repeated by Breuer, Gen. Haworthia Book 1, 7, 2010.]

**Haworthia papillaris** Breuer, Gen. Haworthia Book 1, 7, 2010. Typus: *de Vries* 124 in *Breuer* 5379 (Res. Inst. Evol. Biol. Tokyo). [*Nom. nov. pro Haworthia truncata* var. *minor* Breuer 2003, although given as "stat. nov.".]

*Haworthia patriae* M. Hayashi, Haworthia Study 22: 10, ill., 2010. *Nom. inval.* (Art. 36.1, 37.1). [Published as provisional name.]

**Haworthia paucifolia** (G. G. Smith) M. Hayashi, Haworthia Study 22: 11, 2010. Basionym: *Haworthia angustifolia* var. *paucifolia*. *Haworthia platinosa* M. Hayashi, Haworthia Study 22: 10, ill., 2010. *Nom. inval.* (Art. 36.1, 37.1). [Published as provisional name.]

**Haworthia rooivleiensis** (M. B. Bayer) Breuer, Gen. Haworthia Book 1, 7, 2010. Typus: *Bayer* s.n. in *Karoo Garden* 36/70 (NBG). [*Nom. nov. pro Haworthia heidelbergensis* var. *minor* M. B. Bayer 1999, although given as "stat. nov.".]

**Haworthia salina** (von Poellnitz) M. Hayashi, Haworthia Study 22: 11, 2010. Basionym: *Haworthia stayneri* var. *salina*.

**Haworthia scabrada** Breuer, Gen. Haworthia Book 1, 8, 2010. Typus: *Bayer* 1700 (NBG). [*Nom. nov. pro Haworthia heidelbergensis* var. *scabra* M. B. Bayer 1999, although given as "stat. nov.".]

**Haworthia scabrispina** (M. B. Bayer) Breuer, Gen. Haworthia Book 1, 8, 2010. Basionym: *Haworthia arachnoidea* var. *scabrispina*.

**Haworthia setulifera** (Poellnitz) Breuer, Gen. Haworthia Book 1, 8, 2010. Basionym: *Haworthia planifolia* var. *setulifera*.

*Haworthia similis* M. Hayashi, Haworthia Study 22: 10, ill., 2010. *Nom. inval.* (Art. 36.1, 37.1). [Published as provisional name.]

*Haworthia simofuri* M. Hayashi, Haworthia Study 22: 10, ill., 2010. *Nom. inval.* (Art. 36.1, 37.1). [Published as provisional name.]

**Haworthia standeri** (J. Esterhuizen) M. Hayashi, Haworthia Study 22: 11, 2010. Basionym: *Haworthia integra* var. *standeri*.

**Haworthia suberecta** (Poellnitz) Breuer, Gen. Haworthia Book 1, 8, 2010. Basionym: *Haworthia turgida* var. *suberecta*.

**Haworthia sublineata** (Poellnitz) Breuer, Gen. Haworthia Book 1, 8, 2010. Basionym: *Haworthia triebneriana* var. *sublineata*.

*Haworthia swanea* M. Hayashi, Haworthia Study 22: 10, ill., 2010. *Nom. inval.* (Art. 36.1, 37.1). [Published as provisional name.]

**Haworthia tenuis** (G. G. Smith) Breuer, Gen. Haworthia

Book 1, 8, 2010. Basionym: *Haworthia reinwardtii* var. *tenuis*.

**Haworthia toonensis** (M. B. Bayer) Breuer, Gen. Haworthia Book 1, 8, 2010. Basionym: *Haworthia heidelbergensis* var. *toonensis*.

**Haworthia tricolor** (Breuer) M. Hayashi, Haworthia Study 22: 11, 2010. Basionym: *Haworthia picta* var. *tricolor*.

**Haworthia variabilis** (Breuer) Breuer, Gen. Haworthia Book 1, 8, 2010. Basionym: *Haworthia viscosa* var. *variabilis*.

*Haworthia viridula* M. Hayashi, Haworthia Study 22: 10, ill., 2010. *Nom. inval.* (Art. 36.1, 37.1). [Published as provisional name.]

*Haworthia yarrowa* M. Hayashi, Haworthia Study 22: 10, ill., 2010. *Nom. inval.* (Art. 36.1, 37.1). [Published as provisional name.]

#### Editors notes:

1. Authors sometimes first publish species names provisionally. These names are not, therefore, valid at the time of publication under the ICBN and are usually followed by n.n. (nomina nova), a term sanctioned by the ICBN to indicate they are provisional and not validly published.
2. The Rep records only species names published under the provisions of the ICBN either as valid (**Bold type**) or invalid (*italics*). The ICBN article(s) under which the names are rejected are quoted. Authors subsequently validate these names in later publications.
3. Ingo Breuer's and Dr Hayashi's species names are all included in the Rep as they are published under the provisions of the ICBN.
4. The Rep does not include Bruce Bayer's species names comprised of two Latin names e.g. *H. retusa 'nigra'*, as these are published outside the provisions of the ICBN. For Bruce's species please see his Haworthia Updates, all of which except No. 1 have been published by Alsterworthia International. These modify his classification in Haworthia Revisited wherein the species were published in accordance with the ICBN, but no so in later Updates.
5. Ingo Breuer's revision of the genus Haworthia was published recently by Alsterworthia International as the Genus Haworthia, Book 1. Recommended retail price £39.50 + p & p. Member's price £24.00 + £3.50 p & p EU, £4.50 rest of the world. See Alsterworthia 11(1) 20-21.
6. For Ingo's Book 2 please see Alsterworthia International 11(3)16-17.

# A rationalization of names in *Haworthia* A list of species with new combinations and new synonyms

M.B. Bayer\* and J.C. Manning\*\*

\*PO Box 960, Kuilsriver 7579, South Africa

\*\*South African National Biodiversity Institute, P/Bag X7, Claremont 7735, South Africa

With the impending revision of the IOS Succulent Lexicon and a growing awareness that the current classification of the genus *Haworthia* is unnatural, the time is ripe to propose a list of species names that I (MBB) consider worthy of recognition. My considered opinion is that there are at most about 60 species in *Haworthia* and that a better and more critical treatment would reduce this still more. This contrasts markedly with Breuer (2010), who lists 368 'accepted' species and reports the even more startling claim that Hayashi recognises 550! Some of this increase is due to the tendency for these authors to treat my varietal names as full species but they have also described many new species de novo. They, as well as Gerhard Marx, who recently also entered the fray with some very harsh words for me, have my considerable respect for their talents and enthusiasm, but I am unable to accept all of their proposed taxa in the context of my extensive field knowledge of the genus and my practical experience of patterns of variation among wild populations.

Species concepts in the genus have always been idiosyncratic, driven primarily by a propensity to recognize variation over similarity and fostered by a general ignorance of the extent of intra-population variability in the wild. The recent almost exponential proliferation of names has succeeded in surrounded the genus with a thicket of nomenclatural twigs that is almost impossible to penetrate and which obscures rather than illuminates any real understanding of the genus. The very appeal of the genus is its almost infinite capacity to vary, and it is a tragedy that they are no longer appreciated for their individuality, but are instead pushed into or pulled out of taxonomic boxes almost willy-nilly. It is very difficult not to suspect the motivation behind some of this bedlam.

While we in no way wish to proscribe anybody from expressing their opinions, we issue an urgent plea for restraint. The nomenclatural flood that has all but submerged the genus will only be exacerbated by floating additional formal names and combinations on the turbulent waters. In fact, we go so far as to recommend a moratorium on the publication of any new taxa in the genus that are proposed without an extensive survey of relevant variation patterns in the wild. Scientific journals reduce the chances that inadequately researched papers will see the light of day by sending all submissions to competent referees for comment and evaluation. Popular journals that transgress into the scientific arena by accepting descriptions of new taxa should do the same and the responsibility for this lies firmly with the editors.

Every scientific name that enters currency has to be accounted for by botanists in their lists and publications. To remove them from circulation requires a separate, formal act for each and every name. Dealing with the many dubious names in *Haworthia* is a taxing task that can be ill afforded. Numerous invalidly published or illegitimate names have also entered circulation through non-adherence to the International Code of Botanical Nomenclature, which aims to regulate scientific names. This adds to the confusion and to the work.

What in fact is the primary purpose of these scientific names?

Among botanical circles, species names carry a great deal of weight. In most instances they imply that individuals that share a name also share a common ancestry and can interbreed to produce viable seeds. Species with different names will not. Is this philosophy applied in *Haworthia*? The process of recognising species in botanical circles is generally top-down, with genera being first split into component species and the species then into subspecies or varieties according to the particular patterns of variation shown by the constituent populations. This does not seem to apply in *Haworthia*. Here the process is largely bottom-up, with individuals or populations being given names and then shuffled into or among species. This is patently absurd.

In general terms, botanical names largely reflect similarities whereas horticultural names highlight differences. This is most evident in the extensive use of varietal names among horticulturally interested groups. This level is relatively infrequent in purely botanical circles. The two systems are thus not always congruent and little is to be served by confusing them. We therefore recommend that growers exploit the advantages of the International Code of Nomenclature for Cultivated Plants, which is aimed at specially selected or human-altered plants. Here the level of cultivar is appropriately employed. We also urge the Editors of popular journals to encourage the use of this system among their contributors. The great advantage of this system is that it removes the hierarchical constraints that are inherent in the Linnaean system and that have already created problems with the placement of varieties and forms of *Haworthia*.

Professional botanist in general together with the majority of amateur botanists seem intent on reducing or increasing species in accordance with the ICBN in the light of their own species concepts which results in diverse classifications with vastly different numbers of species. In general they pay little attention to the ICNCP which does provide for species names to be recycled and for habitat plants to be given cultivar names under appropriate circumstances e.g. i) species names no longer regarded as being justified may be converted to cultivar names when those species are absorbed into another species, ii) for newly discovered population to be absorbed into an existing species but given a cultivar name to recognise any distinctive features that population has, iii) that individual clones or groups of clones with horticultural merit can be selected from a variable population and brought into cultivation with a cultivar name. This would help to reduce the number of new species names being published and recycle existing species names when they are no longer considered acceptable for scientific purposes.

## THE LIST.

All taxa that we accept are indicated in **bold**. Taxa that are not accepted at any rank are included as synonyms. Where possible we formally synonymise such names that have not yet been formally synonymised, but many others (indicated with an asterisk \*) do not appear in the International Plant Names Index ([www.ipni.org](http://www.ipni.org)) as of 20 January 2012 and are thus evidently unpublished or manuscript name. The publication of such names in the literature is irresponsible. Names that are separated by a full stop (.) are based on different types (heterotypic or taxonomic synonyms) whereas those separated by a colon (:) are based on the same type (homotypic or nomenclatural synonyms).

**Haworthia** Duval Pl. Succ. Horto. Alenc.: 7pp (1809). Baker in Jl. S. Afr. Bot. 18: 197(1880). Baker in Fl. cap. 6: 332 (1896). Berger in Das. Pfl. 4: 74 (1908). Bayer, New Haworthia Handb. (1982). Scott, The genus *Haworthia* (1985). Type species: *H. arachnoidea* (L.) Duval. [Typification largely by Breuer & Metzger in Taxon (1996)]. = *Catevala* Medik. (1786). *Apicra* Willd. (1811).

± 60 species, very variable and complex. The taxonomy of the genus is still unresolved. Species concepts used here largely follow Bayer's (1976, 1982, 1997 and subsequent Haworthia Update volumes) treatments and are based on geographical distribution and co-occurrence.

NOTE: Recent phylogenetic analyses of nuclear and plastid DNA sequence data supports the view that the three subgenera comprise quite distinct lineages not immediately related to one another. They are thus as distinct as some of the other smaller genera and should thus logically be treated as separate genera. A more useful option is probably to include all of the alooid genera within *Aloe*.

### Key to the subgenera

1. Flowers triangular or rounded-triangular at base; tube obclavate-curved; outer tepals free; style upcurved; seeds irregularly angled . . . subg. *Haworthia*
2. Flowers hexangular at base, gradually narrowing to junction with pedicel (substipitate); tube obcapitate-curved; outer tepals partly fused to inner; style straight; seeds irregularly angled . . . . . subg. *Hexangulares*
3. Flowers rounded at base and abruptly joined to pedicel (non-stipitate); petals partly fused; tube obcapitate-straight; style straight; seeds flattish . . subg. *Robustipedunculatae*

**I. Subgenus *Haworthia***. Type species: as for genus. ± 41 spp.

***H. angustifolia*** Haw. in Philos. Mag. J. 66: 283 (1825). Neotype, designated by Breuer & Metzger (1997): Grahamstown to Alicedale, *Bruyns 1653* (NBG).

= *Aloe stenophylla* Schult. & Schult.f. (1829). *H. albanensis* Shonl. (1912). *H. angustifolia* var. *grandis* Smith (1943).

*H. angustifolia* var. ***angustifolia***

*H. angustifolia* var. ***altissima*** Bayer in Haw. Revis.: 26 (1999): *H. altissima* (Bayer) M.Hayashi in Haworthia Study 3: 13 (2000). Type: Riebeeck East to Carlisle Bridge, *Smith 5220* (NBG).

*H. angustifolia* var. ***baylissii*** (Scott) Bayer in Haw. Revis.: 27 (1999): *H. baylissii* Scott (1968). Type: Oudekraal, Zuurberg, *Bayliss sub Scott 796* (PRE).

*H. angustifolia* var. ***paucifolia*** Smith in Jl. S. Afr. Bot. 14: 48 (1948): *H. paucifolia* (Smith) M.Hayashi in Haworthia Study 22: 11 (2010). Type: Frazers Camp, *Smith 6819* (NBG).

***H. arachnoidea*** (L.) Duval in Pl. Succ. Hort. Alenc.: 7 (1809): *Aloe pumila* var. *arachnoidea* L. (1753): *Catevala arachnoidea* (L.) Medik. (1786): *Apicra arachnoidea* (L.) Willd. (1811). Lectotype, designated by Scott (1977): Commelin, Praeludia Bot.: t. 27 (1703). Epitype, designated by Breuer & Metzger (1997): Buitenstekloof, Langvlei, *Bayer 153* (NBG).

= *H. arachnoidea* var. *minor* Haw. (1819).

*H. arachnoidea* var. ***arachnoidea***

= *H. joubertii* M.Hayashi in Haworthia Study 14: 16 (2005), nom. inval. *H. laxa* M.Hayashi in Haworthia Study 14: 14 (2005), nom. inval. *H. limbata* M.Hayashi in Haworthia Study 14: 16 (2005), nom. inval. \**H. isomorpha* \**H. gilva*

*H. arachnoidea* var. ***aranea*** (Berger) Bayer in Haw. Revis.: 30 (1999): *H. bolusii* var. *aranea* Berger (1908): *H. aranea* (Berger) Bayer (1976). Lectotype: Engler, Pflanzenz. 33: 114, f. 39 A–E (1908). Epitype, designated by Breuer & Metzger (1997): Robinson Pass, Moeras River Drift, *Bolus 12372* (BOL).

*H. arachnoidea* var. ***namaquensis*** Bayer in Haw. Revis.: 31 (1999): *H. namaquensis* (Bayer) Breuer in Gen. Haworthia 1: 7 (2010). Type: Karrachabpoort, Richtersveld, *Bayer 1674* (NBG).

*H. arachnoidea* var. ***nigricans*** (Haw.) Bayer in Haw. Revis.: 32 (1999): *H. setata* var. *nigricans* Haw. (1821). Neotype, designated by Bayer (1997): SW Vanwyksdorp, *Bayer 2419* (NBG).

= *H. helmiae* V.Poelln. (1937): *H. unicolor* var. *helmiae* (V.Poelln.) Bayer (1976). *H. venterii* V.Poelln. (1939): *H. unicolor* var. *venterii* (V.Poelln.) Bayer (1976). *H. scottii* Breuer in Avonia 21: 55 (2003), **syn. nov.** *H. nigrata* M.Hayashi in Haworthia Study 15: 14 (2006), **syn. nov.** \**H. apata* \**H. regens* \**H. formosa* \**H. kuromisa*

*H. arachnoidea* var. ***scabrispina*** Bayer in Haw. Revis.: 34 (1999): *H. scabrispina* (Bayer) Breuer in Gen. Haworthia 1: 8 (2010). Type: Bavians, *Bayer 2105* (NBG) \**H. matjiesta*

*H. arachnoidea* var. ***setata*** (Haw.) Bayer in Haw. Revis.: 34 (1999): *H. setata* Haw. (1819). Iconotype: artist unknown, specimen received from Dr Mackrill ex Cape (K).

= *H. setata* var. *media* Haw. (1821). *H. setata* var. *major* Haw. (1821). *Aloe setosa* Schult. & Schult.f. (1829). *H. gigas* V.Poelln. (1932): *H. setata* var. *gigas* (V.Poelln.) V.Poelln. (1938). *H. minima* var. *major* V. Poelln. (1938): *H. tenera* var. *major* (V.Poelln.) Uitew. (1948). *H. pectinis* M.Hayashi in Haworthia Study 10: 13 (2003), **syn. nov.** *H. tretiensis* Breuer in Avonia 21: 58 (2003), **syn. nov.** *H. candida* M.Hayashi in Haworthia Study 16: 16 (2006), **syn. nov.** *H. cangoensis* M.Hayashi in Haworthia Study 14: 13 (2005), nom. inval. *H. angiras* M.Hayashi in Haworthia Study 14: 13 (2005), nom. inval. *H. kogmansensis* M.Hayashi in Haworthia Study 14: 14 (2005), nom. inval.

***H. aristata*** Haw. in Suppl. Pl. Succ.: 51 (1819). Iconotype: (K). Epitype: Deadman's Gulch (Soutkloof), *Smith 3550* (NBG).

= *H. denticulata* Haw. (1821). *H. lapis* Breuer & M.Hayashi in Alsterworthia Int. Special Issue 7: 6 (2004), **syn. nov.** *H. rava* M.Hayashi in Haworthia Study 14: 11 (2005), nom. inval.

***H. bayeri*** Hammer & Venter in Cact. Succ. J (US) 69: 75 (1997). Type: S Uniondale, *Stayner in KG164/69* (NBG).

= *H. hayashii* M.Hayashi in Haworthia Study 7: 14 (2002), **syn. nov.** *H. laeta* M.Hayashi in Haworthia Study 12: 13 (2004), **syn. nov.** *H. indigoa* M.Hayashi in Haworthia Study 12: 13 (2004), **syn. nov.** *H. truterorum* Breuer & Marx in Aloe 48: 54 (2011), **syn. nov.**

***H. blackburniae*** Barker in J. S. Afr. Bot. 3:93 (1937). Type: Calitzdorp, *Reynolds 1842* (NBG).



- H. blackburniae* var. **blackburniae**  
*H. blackburniae* var. **graminifolia** (Smith) Bayer in Haw. Revis.: 42 (1999): *H. graminifolia* Smith (1942). Type: Schoemanspoort, *M. Courtenay* □ *Latimer in Smith 5222* (NBG).  
*H. blackburniae* var. **derustensis** Bayer in Haw. Revis.: 41 (1997): *H. derustensis* (Bayer) M.Hayashi in *Haworthia Study* 3: 13 (2000). Type: W. De Rust, *Vlok sub Venter 93/24* (NBG).
- H. bolusii** Baker in J. Linn. Soc. Bot.:215 (1880). Type: Graaff-Reinet, *Bolus 158* (K).  
= *H. odetteae* Breuer in *Avonia* 21: 51 (2003), **syn. nov.** *H. odysssei* M.Hayashi in *Haworthia Study* 14: 11 (2005), nom. inval. *H. capillaris* M.Hayashi in *Haworthia Study* 16: 16 (2006), **syn. nov.**  
*H. bolusii* var. **bolusii**  
*H. bolusii* var. **blackbeardiana** (V. Poelln.) Bayer in Haw. Hand.: 31 (1976): *H. blackbeardiana* V.Poelln. (1932). Lectotype, designated by Breuer & Metzger (1997): ex cult. V.Poelln. 1932 (B).  
= *H. blackbeardiana* var. *major* V.Poelln. (1937). *H. inermis* V.Poelln. (1932): *H. altilinea* var. *inermis* (V.Poelln.) V.Poelln. (1937): *H. altilinea* var. *limpida* f. *inermis* (V.Poelln.) V.Poelln. (1940). *H. batteniae* Scott (1979). *H. calaensis* Breuer in *Alsterworthia Int. Special Issue* 7: 5 (2004), **syn. nov.** *H. specksii* Breuer in *Alsterworthia Int. Special Issue* 7: 8 (2004), **syn. nov.** \**H. hogsia* \**H. speciosa* \**H. malvina*  
*H. bolusii* var. **pringlei** (Scott) Bayer in *Haworthiad* 16: 62 (2002). *H. decipiens* var. *pringlei* (Scott) Bayer in Haw. Revis.: 67 (1999): *H. pringlei* Scott (Bradleya 12:103,1994). Type: Adelaide district, *Scott s.n. PRE 8970* (PRE). *H. hisui* M.Hayashi in *Haworthia Study* 12: 10 (2004), **syn. nov.** *H. lazulis* M.Hayashi in *Haworthia Study* 14: 11 (2005), nom. inval. *H. aquamarina* M.Hayashi in *Haworthia Study* 10: 13 (2003), **syn. nov.** *H. hastata* M.Hayashi in *Haworthia Study* 12: 9 (2004), **syn. nov.**
- H. chloracantha** Haw. in Revis.:57 (1821): *Aloe chloracantha* (Haw.) Scult. & Schult.f. (1829). Neotype, designated by Breuer & Metzger (1997): N Herberdsdale, *Bayer KG411/75* (NBG).  
*H. chloracantha* var. **chloracantha**  
*H. chloracantha* var. **denticulifera** (V.Poelln.) Bayer in Haw. Hand.: 112 (1976): *H. angustifolia* var. *denticulifera* V.Poelln. (1937): *H. denticulifera* (V.Poelln.) M.Hayashi in *Haworthia Study* 3: 13 (2000). Type (icono.): (B).  
= *H. angustifolia* var. *lilliputana* Uitew. (1953).  
*H. chloracantha* var. **subglauca** V.Poelln. in *Kakteenkunde* 9:135 (1937): *H. subglauca* (V.Poelln.) M.Hayashi in *Haworthia Study* 3: 13 (2000). Neotype, designated by Breuer & Metzger (1997): Great Brak, *Hurling & Neil* (BOL).
- H. cooperi** Baker in *Refug. Bot.* 4: 233 (1871). Type: Cape, *Cooper* (K).  
= *H. vittata* Baker (1871).  
*H. cooperi* var. **cooperi**  
= *H. pallens* Breuer & M.Hayashi in *Alsterworthia Int. Special Issue* 7: 7 (2004), **syn. nov.** \**H. turcosa* \**H. elegans* \**H. foeda* \**H. yocans*  
*H. cooperi* var. **dielsiana** (V.Poelln.) Bayer in Haw. Revis.: 51 (1999): *H. dielsiana* V.Poelln. (1930): *H. pilifera* var. *dielsiana* (V.Poelln.) V.Poelln. (1940): *H. obtusa* var. *dielsiana* (V.Poelln.) Uitew. (1948). Neotype, designated by Bayer (1999): Sheldon, *A.J. van der Merwe in Smith 1140* (NBG).  
= *H. joeyae* Scott (1975).  
*H. cooperi* var. **doldii** Bayer in *Haworthiad* 16: 65 (2002): *H. doldii* (Bayer) M.Hayashi in *Haworthia Study* 14: 11 (2005). Type: Chalumna, *Dold 3961* (GRA).  
*H. cooperi* var. **gordoniana** (V.Poelln.) Bayer in Haw. Revis.: 52 (1999): *H. gordoniana* V.Poelln. (1937): *H. pilifera* var. *gordoniana* (V.Poelln.) V.Poelln. (1938): *H. obtusa* var. *gordoniana* (V.Poelln.) Uitew. (1948). Neotype, designated by Bayer (1999): Patensie, *Smith 3028* (NBG).  
= *H. harryi* M.Hayashi in *Haworthia Study* 12: 9 (2004), **syn. nov.** *H. jeffreys* M.Hayashi in *Haworthia Study* 12: 10 (2004), **syn. nov.** *H. pusilla* M.Hayashi in *Haworthia Study* 12: 10 (2004), **syn. nov.** *H. ligulata* M.Hayashi in *Haworthia Study* 12: 6 (2004), **syn. nov.** *H. venetia* M.Hayashi in *Haworthia Study* 12: 6 (2004), **syn. nov.** \**H. brandea* \**H. cineraria* \**H. compressa* \**H. gelatina* \**H. ionandra* \**H. neritica* \**H. silvicola* \**H. tomentosa*  
*H. cooperi* var. **gracilis** (V.Poelln.) Bayer in *Haworthiad* 16: 64 (2002): *H. gracilis* V.Poelln. (1929). Neotype, designated by Bayer (1999): Hellsport, *Britten* (PRE).  
= *H. caerulea* M.Hayashi & Breuer in *Haworthia Study* 12: 7 (2004), **syn. nov.**  
*H. cooperi* var. **isabellae** (V.Poelln.) Bayer in *Haworthiad* 16: 62 (2002): *H. gracilis* var. *isabellae* (V.Poelln.) Bayer in Haw. Revis.: 77 (1999): *H. isabellae* V.Poelln. (1938). Neotype, designated by Bayer: Humansdorp, Gamtoos bridge, *H. Hall sub NBG 68799* (NBG).  
= *H. azurea* M.Hayashi in *Haworthia Study* 9: 12 (2003), **syn. nov.** *H. arabesqua* M.Hayashi in *Haworthia Study* 12: 7 (2004), **syn. nov.** *H. bella* M.Hayashi in *Haworthia Study* 12: 8 (2004), **syn. nov.** *H. florens* M.Hayashi in *Haworthia Study* 12: 11 (2004), **syn. nov.** *H. pilosa* M.Hayashi in *Haworthia Study* 12: 7 (2004), **syn. nov.** *H. bathylis* M.Hayashi in *Haworthia Study* 15: 116 (2006), **syn. nov.** *H. lachnosa* M.Hayashi in *Haworthia Study* 16: 16 (2006), **syn. nov.** *H. ciliata* M.Hayashi in *Haworthia Study* 14: 11(2005), nom. inval. \**H. kromia*. \**H. patriae* \**H. cuprina* \**H. dasyilis*  
*H. cooperi* var. **leightonii** (Smith) Bayer in Haw. Hand.: 128 (1976): *H. leightonii* Smith (1950). Type: Kayser's Beach, *Smith 6938* (NBG).  
= *Haworthia leightonii* var. *davidii* Breuer in *Avonia* 21: 49 (2003), **syn. nov.**: *Haworthia davidii* (Breuer) M.Hayashi & Breuer (2005). Type: SW East London, *Breuer 6970* (TUAT). \**H. sabita*?  
*H. cooperi* var. **minima** (Bayer) Bayer [as (Baker) Bayer], comb. et stat. nov.: *H. minima* Baker (1880) hom. illegit. non (Aiton) Haw. (1812): *H. gracilis* var. *minima* Bayer [as (Baker) Bayer] (1999). Iconotype: (K).  
= *H. tenera* V.Poelln. (1932): *H. translucens* subsp. *tenera* (V.Poelln.) Bayer (1976): *H. gracilis* var. *tenera* (V.Poelln.) Bayer (1999): *H. cooperi* var. *tenera* (V.Poelln.) Bayer (2002). *H. cummingii* Breuer & M.Hayashi in *Haworthia Study* 10: 4 (2003), **syn. nov.**  
*H. cooperi* var. **picturata** (Bayer) Bayer in *Haworthiad* 16: 65 (2002): *H. gracilis* var. *picturata* Bayer (1999): *H. picturata* M.Hayashi (2000). Type: Enon, *Thode 21507* (NBG).  
= *H. oculata* M.Hayashi in *Haworthia Study* 12: 10 (2004), **syn. nov.** \**H. florida* \**H. imperialis* \**H. kubusie*  
*H. cooperi* var. **pilifera** (Baker) Bayer in Haw. Revis.: 54 (1999): *H. pilifera* Baker (1871): *H. obtusa* var. *pilifera* (Baker) Uitew. (1948). Iconotype: *Refug. Bot.*: 234 (1871).  
= *H. stayneri* V.Poelln. (1937): *H. pilifera* var. *stayneri* (V.Poelln.) V.Poelln. (1938): *H. obtusa* var. *stayneri* (V.Poelln.) Uitew. (1948). *H. stayneri* var. *salina* V.Poelln. (1937): *H. pilifera* var. *salina* (V.Poelln.) V.Poelln. (1938): *H. obtusa* var. *salina* (V.Poelln.) Uitew. (1948): *H. salina* (V.Poelln.) M.Hayashi (2010). *H. pilifera* var. *dielsiana* f. *acuminata* V.Poelln. (1940): *H. obtusa* var. *dielsiana* f. *acuminata* (V.Poelln.) Uitew. (1948). *H. luri* M.Hayashi in *Haworthia Study* 14:11 (2005), nom. inval. \**H. sabrina*  
*H. cooperi* var. **truncata** (Jacobs.) Bayer in Haw. Rev.: 55 (1999): *H. obtusa* var. *pilifera* f. *truncata* Jacobs in *Nat. Cact.*

Succ. J. 10: 81 (1955): *H. ikra* Breuer (2010). Neotype, designated by Bayer (1999): Runlets, Mgwali, *Smith 5295* (NBG).

*H. cooperi* var. **venusta** (Scott) Bayer in *Haw. Revis.* (1999): *H. venusta* Scott in *Bradleya* 14:87 (1996). Type: NE Alexandria, *Britten 781* (GRA).

*H. cooperi* var. **viridis** (Bayer) Bayer in *Haworthiad* 16: 65 (2002): *H. gracilis* var. *viridis* Bayer (1999). Type: Perdepoort, *Smith 6867* (NBG).

= *H. hamata* M.Hayashi in *Haworthia Study* 10: 12 (2003), **syn. nov.** *H. emerald* M.Hayashi in *Haworthia Study* 12: 11 (2004), **syn. nov.** *H. subhamata* M.Hayashi in *Haworthia Study* 12: 11 (2004), **syn. nov.** *H. ieres* M.Hayashi in *Haworthia Study* 12: 7 (2004), **syn. nov.** \**H. swannea*

**H. cymbiformis** (Haw.) Duv. in *Pl. Succ. Hort. Elenc.*:7 (1809): *Aloe cymbiformis* Haw. (1804): *H. concava* Haw., nom. illegit. superfl. (1821). Neotype, designated by Breuer & Metzger (1997): Port Elizabeth, Walmer, *Smith 2844* (NBG).

= *H. planifolia* Haw. (1825): *H. cymbiformis* var. *planifolia* (Haw.) Baker (1880): *Aloe planifolia* (Haw.) Salm-Dyck (1840). *H. cymbiformis* var. *angustata* V.Poelln. (1938): *H. angustata* (V.Poelln.) Breuer in *Gen. Haw.* 1: 7 (2010). *H. cymbiformis* var. *angustata* f. *subarmata* V.Poelln. (1938). *H. cymbiformis* var. *compacta* Triebn. (1938): *H. compacta* (Triebn.) Breuer in *Gen. Haw.* 1: 7 (2010). *H. planifolia* var. *exulata* V.Poelln. (1938). *H. planifolia* var. *planifolia* f. *agavoides* Triebn. & V.Poelln. (1938), et f. *olivacea* Triebn. & V.Poelln. (1938), et f. *robusta* Triebn. & V.Poelln. (1938), et var. *incrassata* V.Poelln. (1938), et var. *sublaevis* V.Poelln. (1938), et var. *longifolia* Triebn. et V.Poelln. (1938), et var. *longifolia* f. *calochlora* Triebn. et V.Poelln. (1938). *H. planifolia* var. *poellnitziana* Resende (1943). *H. lepida* Smith (1944). \**H. cana* \**H. ingens* \**H. plena* \**H. rosea*

*H. cymbiformis* var. **cymbiformis**

*H. cymbiformis* var. **incurvula** (V.Poelln.) Bayer in *Haw. Hand.*: 124 (1976): *H. incurvula* V.Poelln. (1932). Neotype, designated by Breuer & Metzger (1997): Pluto's Vale, *Britten s.n. BOL71307* (BOL).

*H. cymbiformis* var. **obtusa** (Haw.) Baker in *J. Linn. Soc. Bot.* 18: 209 (1880). *H. obtusa* Haw. in *Phil.Mag.* 46: 282 (1825). Iconotype: (K).

= *H. umbraticola* V.Poelln. (1937): *H. cymbiformis* var. *umbraticola* (V.Poelln.) Bayer (1976). *H. hilliana* V.Poelln. (1937): *H. umbraticola* var. *hilliana* V.Poelln. (1938). *H. obtusa* var. *pilifera* f. *truncata* Jacobs. (1960). \**H. blinkia* *H. cymbiformis* var. **ramosa** (Smith) Bayer in *Haw. Revis.*: 60 (1999): *H. ramosa* Smith (1940): *H. cymbiformis* f. *ramosa* (Smith) Bayer (1976). Type: Wooldridge, *Smith 3168* (NBG). *H. cymbiformis* var. **setulifera** (V.Poelln.) Bayer in *Haw. Revis.*: 62 (1999): *H. planifolia* var. *setulifera* V.Poelln. (1938): *H. setulifera* (V.Poelln.) Breuer (2010). Neotype, designated by Bayer (1999): Kwelegha Bridge, *Smith 5257* (NBG). *H. cymbiformis* var. *obesa* V.Poelln. (1938): *H. obesa* (V.Poelln.) Breuer. \**H. sarcoidea*

**H. decipiens** V.Poelln. in *Repert. Spec. Nov. Regni. Veg.* 28: 103 (1930). Neotype, designated by Breuer & Metzger (1997): Prince Albert, Kleinsleutelfontein, *Bayer 5157* (NBG).

= *H. exilis* M.Hayashi in *Haworthia Study* 10: 12 (2003), **syn. nov.** *H. incrassa* M.Hayashi in *Haworthia Study* 14: 12 (2005), nom. inval. \**H. tooris*

*H. decipiens* var. **decipiens**

*H. decipiens* var. **cyanea** Bayer in *Haw. Revis.*: 65 (1999): *H. cyanea* (Bayer) Hayashi (2000). Type: Fairview, W Jansenville, *Bayer 4180* (NBG).

= *H. amethysta* M.Hayashi in *Haworthia Study* 10: 1 (2003), **syn. nov.** *H. succinea* M.Hayashi in *Haworthia Study* 10:

14 (2003), **syn. nov.** *H. ianthina* M.Hayashi in *Haworthia Study* 14: 12 (2005), nom. inval. \**H. virginea*

*H. decipiens* var. **minor** Bayer in *Haw. Revis.*: 66 (1999). Type: Kleinpoort, *Smith 3588* (NBG). \**H. tenmari*

*H. decipiens* var. **virella** Bayer in *Haworthiad* 16: 63 (2002).

Type: Ebenezer, *Bayer 2070* (NBG).

= *H. crinita* M.Hayashi in *Haworthia Study* 10: 13 (2003), **syn. nov.** *H. eminens* M.Hayashi in *Haworthia Study* 10: 13 (2003), **syn. nov.** *H. floccosa* M.Hayashi in *Haworthia Study* 10: 13 (2003), **syn. nov.** *H. kemari* M.Hayashi in *Haworthia Study* 9: 11 (2003), **syn. nov.** *H. fluffa* M.Hayashi in *Haworthia Study* 12: 9 (2004), **syn. nov.** *H. jansenvillensis* Breuer in *Alsterworthia Inst.* 4: 16 (2004), **syn. nov.** *H. pellucida* M.Hayashi in *Haworthia Study* 14: 12 (2005), nom. inval. \**H. delicata* \**H. ionides* \**H. lanceata* \**H. stewartia*

*H. decipiens* var. **xiphiophylla** (Baker) Bayer in *Haworthiad* 16: 63 (2002). *H. arachnoidea* var. *xiphiophylla* (Baker) Bayer in *Haw. Revis.*: 36 (1999). *Haworthia xiphiophylla* Baker, *Curtis' Bot.Mag.*: t. 7505 (1896). *H. setata* var. *xiphiophylla* (Baker) V. Poelln. (1938). Type: Uitenhage, *Howlett* (K).

= *H. longiaristata* V. Poelln. (1937). *H. flavida* M.Hayashi in *Haworthia Study* 10: 13 (2003), **syn. nov.** \**H. kammaensis*

**H. emelyae** V.Poelln. in *Repert. Spec. Nov. Regni. Veg.* 42: 271 (1937). Lectotype, designated by Breuer & Metzger (1997): [unpublished image] (B).

= *H. blackburniae* V.Poelln. (1937). *H. correct* V.Poelln. (1938). *H. picta* V.Poelln. (1938). *H. picta* var. *janvlokii* Breuer in *Avonia* 21: 52 (2003), **syn. nov.**: *H. janvlokii* (Breuer) Breuer (2010). *H. breueri* M.Hayashi in *Haworthia Study* 7: 14 (2002), **syn. nov.** *H. picta* var. *tricolor* Breuer in *Avonia* 21: 53 (2003), **syn. nov.**: *H. tricolor* (Breuer) M.Hayashi (2010). *H. marxii* Gildenh. in *Aloe* 44: 4 (2007), **syn. nov.**

*H. emelyae* var. **emelyae**

*H. emelyae* var. **comptoniana** (Smith) Hammer and Venter in *Cact. Succ. J. (US)* 69: 77 (1997): *H. comptoniana* Smith (1945). Type: Georgida, *Malherbe sub Smith 3433* (NBG).

*H. emelyae* var. **major** (Smith) Bayer in *Haw. Revis.*: 70 (1999): *H. schuldiana* var. *major* Smith (1946): *H. maraisii* var. *major* (Smith) Bayer (1976): *H. magnifica* var. *major* (Smith) Bayer (1977). Type: Garcia's Pass, *Smith 5370* (NBG).

= *H. wimii* M.Hayashi in *Haworthia Study* 3: 13 (2000), **syn. nov.**

*H. emelyae* var. **multifolia** Bayer in *Nat. Cact. Succ. J.* 34:31 (1979): *H. multifolia* (Bayer) M.Hayashi (2000). Type: Riversdale, Springfontein, *Bayer 1558* (NBG).

**H. floribunda** V.Poelln. in *Repert. Spec. Nov. Regni. Veg.* 40: 149 (1936). Neotype, designated by Bayer (1982): [unpublished image] (B). Epitype, designated by Breuer & Metzger (1997): Blackdown, NE Heidelberg, *Bayer 158* (NBG). \**H. henda*

*H. floribunda* var. **floribunda**

*H. floribunda* var. **dentata** Bayer in *Haw. Revis.*: 73 (1999): *H. dentata* (Bayer) M.Hayashi (2000), hom. illegit. non H.Jacobsen (1935). Type: W Riversdale, *Dekenah 90 sub Smith 5502* (NBG).

*H. floribunda* var. **major** Bayer in *Haw. Revis.*: 74 (1999). Type: S Swellendam, *De Kok* (NBG).

= *H. kondoi* M.Hayashi in *Haworthia Study* 3: 13 (2000), **syn. nov.**

**H. herbacea** (Mill.) Stearn in *Cactus J.* 7: 40 (1938): *Aloe herbacea* Mill. (1768). Lectotype, designated by Bayer (1972): Illustration in Boerhaave, *Index Alter Hort. Lugd.-Bat.* 2: 130: t. 131 (1720). Epitype, designated by Breuer & Metzger (1997): N Ribbokkop, *Bayer 161* (NBG).

- = *Aloe atrovirens* DC. (1799): *H. atrovirens* (DC.) Haw. (1821). *H. pumila* (Willd.) Duval (1809). *Aloe translucens* Haw. (1804): *H. translucens* (Haw.) Haw. (1819): *Aloe arachnoidea* var. *translucens* (Haw.) Ker-G. (1811). *H. pellucens* Haw. (1812). *H. pallida* Haw. (1821). *H. paynei* V.Poelln. in Feddes Repert. 41: 206 (1937), **syn. nov.**: *H. herbacea* var. *paynei* (V.Poelln.) Bayer (1999). *H. aegrota* V.Poelln. (1939). *H. submaculata* V.Poelln. (1939). *H. luteorosea* Uitew. (1939).  
*H. herbacea* var. **herbacea**  
*H. herbacea* var. **flaccida** Bayer in Haw. Revis.: 86 (1999): *H. flaccida* (Bayer) Breuer (2010). Type: Worcester, Rooiberg, Bruyns (NBG).  
*H. herbacea* var. **lupula** Bayer in Haw. Revis.: 86 (1999): *H. lupula* (Bayer) M.Hayashi (2000). Type: Villiersdorp, Boscheveld Mt., Wolfkloof, *Esterhuysen* (NBG).
- H. lockwoodii** Archibald in Fl. Pl. Africa 20: f. 792 (1940). Type: near Laingsburg, *Lockwood-Hill 215* (GRA).
- H. maculata** (V.Poelln.) Bayer in Haw. Hand.: 130 (1976): *H. schuldtiana* var. *maculata* V.Poelln. (1940). Lectotype, designated by Breuer & Metzger (1997): Worcester, *Venter 6* (BOL). \**H. audens*
- H. marumiana** Uitew. in Cact. Vete. 6: 33 (1940). Type: Cape, Ladismith, *ex hort. Stellenbosch sub 6610* (AMD). = *H. borealis* M.Hayashi in *Haworthia Study 15*: 14 (2006), **syn. nov.** *H. marmorata* M.Hayashi in *Haworthia Study 15*: 14 (2006), **syn. nov.** *H. tarkasia* M.Hayashi in *Haworthia Study 15*: 14 (2006), **syn. nov.** \**H. euchlora*  
*H. marumiana* var. **marumiana**  
*H. marumiana* var. **archeri** (W.F.Barker ex Bayer) Bayer in Haw. Revis.: 104 (1999): *H. archeri* W.F.Barker ex Bayer (1981). Type: Whitehill, *Archer s.n. NBG 68145* (NBG). \**H. chibita* \**H. frazeri* \**H. nudata*  
*H. marumiana* var. **batesiana** (Uitew.) Bayer in Haw. Revis.: 105 (1999): *H. batesiana* Uitew. (1948). Type: Graaff-Reinet, *Ferguson* (AMD).  
*H. marumiana* var. **dimorpha** (Bayer) Bayer in Haw. Revis.: 106 (1999): *H. archeri* var. *dimorpha* Bayer (1981): *H. dimorpha* (Bayer) M.Hayashi (2000). Type: Constable Station, W Laingsburg, *Hall sub Smith 7418* (NBG).  
*H. marumiana* var. **reddii** (Scott) Bayer, **comb. nov.**: *H. cymbiformis* var. *reddii* (Scott) Bayer (1999): *H. reddii* Scott in Cact. Succ. J. (US) 66:182 (1994). Type: Cathcart, Waterdown Dam, *Scott 8968* (PRE). \**H. boloensis* \**H. fatreddii*  
*H. marumiana* var. **viridis** Bayer in Haw. Revis.: 107 (1999). Type: S Prince Albert, *Bayer 3620* (NBG). \**H. viridis*
- H. mirabilis** (Haw.) Haw. in Syn. Pl. Succ.: 95 (1812): *Aloe mirabilis* Haw. (1804). Neotype, designated by Bayer (1977): Illustration in Curtis' Bot. Mag.: t. 1354 (1811). Epitype, designated by Breuer & Metzger (1997): Skuitsberg, between Caledon and Greyton, *Bayer 2453* (NBG).  
*H. mirabilis* var. **mirabilis**  
*H. mirabilis* var. **atrofusca** (Smith) Bayer, **comb. nov.**: *H. atrofusca* Smith in Jl. S. Afr. Bot. 14:41 (1948): *H. magnifica* var. *atrofusca* (Smith) Bayer (1977). Type: *Dekenah 225 sub Smith 6169* (NBG). = *H. enigma* M.Hayashi in *Haworthia Study 7*: 14 (2002), **syn. nov.**  
*H. mirabilis* var. **badia** (V.Poelln.) Bayer in Haw. Revis.: 109 (1999): *H. badia* V.Poelln. (1938): *Haworthia mirabilis* subsp. *badia* (V.Poelln.) Bayer (1976). Lectotype, designated by Bayer (1977): Illustration in *Kakteenk. en Kakteenfr.*: 76 (1938).  
*H. mirabilis* var. **beukmannii** (V.Poelln.) Bayer in Haw. Revis.: 110 (1999): *H. emelyae* var. *beukmannii* V.Poelln. (1940): *H. beukmannii* (V.Poelln.) M.Hayashi (2000). Type: [unpublished image] (B). Epitype, designated by Bayer (1999): Caledon, Skuitsberg, *Smith 3969* (NBG).  
*H. mirabilis* var. **consanguinea** Bayer in Haw. Revis.: 111 (1999): *H. consanguinea* (Bayer) M.Hayashi (2000). Type: Die Galg, *Bayer* (NBG).  
*H. mirabilis* var. **heidelbergensis** (Smith) Bayer, **comb. nov.**: *H. heidelbergensis* Smith in Jl. S. Afr. Bot. 14:42 (1948). Type: W Heidelberg, *J. Dekenah 230 in Smith 6566* (NBG). \**H. obscura*?  
*H. mirabilis* var. **magnifica** (V.Poelln.) Bayer, **comb. nov.**: *Haworthia magnifica* V.Poelln. in Repert. Spec. Nov. Regni Veg. 33: 240 (1933): *H. maraisii* var. *magnifica* (V.Poelln.) Bayer : 131 (1976). Lectotype, designated by Breuer & Metzger (1997): Riversdale, *Ferguson* (BOL). \**H. vernalis*  
*H. mirabilis* var. **maraisii** (V.Poelln.) Bayer, **comb. nov.**: *Haworthia maraisii* V.Poelln. in Feddes Repert. 38:194 (1935): *H. magnifica* var. *maraisii* (V.Poelln.) Bayer (1977). Type (icono.): Swellendam, *Marais in Swellendam 6410* (B). = *H. schuldtiana* V.Poelln. (1937). *H. schuldtiana* var. *robertsonensis* V.Poelln. (1940). *H. schuldtiana* var. *minor* Triebn. et V.Poelln. (1940). *H. schuldtiana* var. *subtuberculata* V.Poelln. (1940). *H. whitesloaneana* V.Poelln. (1937): *H. schuldtiana* var. *whitesloaneana* (V.Poelln.) V.Poelln. (1940). *H. schuldtiana* var. *sublaevis* V.Poelln. (1940). *H. schuldtiana* var. *simplicior* V.Poelln. (1940). *H. schuldtiana* var. *unilineata* V.Poelln. (1940). *H. sublimpidula* V.Poelln. (1936). *H. triebneriana* var. *diversicolor* Triebn. et V.Poelln. (1939). *H. angustifolia* var. *subfalcata* V.Poelln. (1951), nom. inval. \**H. calliantha*  
*H. mirabilis* var. **meiringii** (Bayer) Bayer, **comb. nov.**: *H. maraisii* var. *meiringii* Bayer in Haw. Hand.:134 (1976): *H. magnifica* var. *meiringii* (Bayer) Bayer (1977). Type: E of Bonnievale, *Bayer in KG 224/70* (NBG). \**H. meiringii*  
*H. mirabilis* var. **mundula** (Smith) Bayer, stat. nov.: *H. mundula* Smith in S. Afr. J. Bot. 12: 8 (1946): *H. mirabilis* subsp. *mundula* (Smith) Bayer (1976). Type: on Elim road, *Smith 5479* (NBG).  
*H. mirabilis* var. **notabilis** (V.Poelln.) Bayer, **comb. nov.**: *H. notabilis* V.Poelln. in Repert. Spec. Nov. Regni. Veg. 44: 134 (1938): *H. maraisii* var. *notabilis* (V.Poelln.) Bayer (1976): *H. magnifica* var. *notabilis* Bayer (1977). Lectotype, designated by Breuer & Metzger (1997): [unpublished image] (B).. = *H. intermedia* V.Poelln. in *Kakteenk.* 9: 133 (1937), **syn. nov.**: *H. maculata* var. *intermedia* (V.Poelln.) Bayer (1999). *H. schuldtiana* var. *erecta* Triebn. & V.Poelln. (1940). *H. nitidula* var. *opaca* V.Poelln., nom. nud. (1948).  
*H. mirabilis* var. **paradoxa** (V.Poelln.) Bayer in Haw. Revis.: 112 (1999): *H. paradoxa* V.Poelln. (1933): *H. maraisii* var. *paradoxa* (V.Poelln.) Bayer (1976): *H. magnifica* var. *paradoxa* (V.Poelln.) Bayer (1977). Neotype, designated by Breuer & Metzger (1997): Riversdale, *Ferguson s.n.* (BOL). = *H. jakubii* Breuer in *Alsterworthia Int. Sp. Is.* 7: 10 (2004), **syn. nov.** \**H. bobii*  
*H. mirabilis* var. **scabra** (Bayer) Bayer, **comb. nov.**: *H. heidelbergensis* var. *scabra* Bayer in Haw. Revis.: 82 (1999): *H. scabrata* Breuer (2010). Type: Drew, Leeurivier, *Bayer 1700* (NBG).  
*H. mirabilis* var. **splendens** (Hammer & Venter) Bayer, **comb. nov.**: *H. magnifica* var. *splendens* Hammer and Venter in Cact. Succ. J. (US) 70: 180 (1998): *H. splendens* (Hammer & Venter) M.Hayashi (2000). Type: W Albertinia, *Venter* (NBG).  
*H. mirabilis* var. **sublineata** (V.Poelln.) Bayer in Haw. Revis.: 113 (1999): *H. triebneriana* var. *sublineata* V.Poelln. (1938): *H. sublineata* (V.Poelln.) Bayer (2010). Neotype, designated by Bayer (1999): S Bredasdorp, *Smith 3966* (NBG).  
*H. mirabilis* var. **toonensis** (Bayer) Bayer, **comb. nov.**: *H. heidelbergensis* var. *toonensis* Bayer in Haw. Revis.: 83

(1999): *H. toonensis* (Bayer) Breuer (2010). Type: Heidelberg, Matjestoon, *Smith 6797* (NBG).

*H. mirabilis* var. **triebneriana** (V.Poelln.) Bayer in Haw. Revis.: 113 (1999): *H. triebneriana* V.Poelln. (1936). Lectotype, designated by Bayer (1999): [unpublished illustration] (B).

= *H. willowmorensis* V.Poelln. (1937). *H. triebneriana* var. *depauperata* V.Poelln. (1938): *H. depauperata* (V.Poelln.) Breuer (2010). *H. triebneriana* var. *multituberculata* V.Poelln. (1938). *H. triebneriana* var. *rubrodentata* Triebn. et V.Poelln. (1939). *H. triebneriana* var. *napiensis* Triebn. et V.Poelln. (1939). *H. triebneriana* var. *turgida* Triebn. (1939). *H. triebneriana* var. *subtuberculata* V.Poelln. (1939). *H. triebneriana* var. *pulchra* V.Poelln. (1940). *H. rossouwii* V.Poelln. (1938). *H. nitidula* V.Poelln. (1939). *H. triebneriana* var. *diversicolor* Triebner & V.Poelln. in Feddes Repert. 47: 9 (1939), **syn. nov.**: *H. diversicolor* (Triebner & V.Poelln.) M.Hayashi (2010).

**H. monticola** Fourcade in Trans. Roy. Soc. S. Africa 21:78 (1937). Type: George and Uniondale districts, *Fourcade 2498* (K).

= *H. divergens* Bayer (1976).

*H. monticola* var. **monticola**

= *H. bronkhorstii* M.Hayashi in Haworthiad 15: 16 (2001), **syn. nov.** \**H. baviensis* \**H. glabella*

*H. monticola* var. **asema** Bayer in Haw. Revis.: 117 (1999): *H. asema* (Bayer) M.Hayashi (2000). Type: Calitzdorp, Besemkop, *Venter 12* (NBG).

**H. mucronata** Haw. in Suppl. Pl. Succ.: 50 (1819). Lectotype, designated by Bayer (1999): [unpublished illustration] (K).

= *H. unicolor* V.Poelln. (1937): *H. unicolor* var. *unicolor* (V.Poelln.) Bayer (1982). *H. mclarenii* V.Poelln. (1939). *H. tradouwensis* Breuer in Avonia 21: 57 (2003), **syn. nov.** \**H. armata* \**H. confluens* \**H. montagua*

*H. mucronata* var. **mucronata**

*H. mucronata* var. **habdomadis** (V.Poelln.) Bayer in Haw. Revis.: 120 (1999): *H. habdomadis* V.Poelln. (1938): *H. inconfluens* var. *habdomadis* (V.Poelln.) Bayer (1976). Neotype, designated by Breuer & Metzger (1997): Seweweekspoort, *Barker & Lewis s.n NBG2764/32* (BOL).

*H. mucronata* var. **inconfluens** (V.Poelln.) Bayer in Haw. Revis.: 121 (1999): *H. altilinea* var. *limpida* f. *inconfluens* V.Poelln. (1938): *H. mucronata* var. *limpida* f. *inconfluens* (V.Poelln.) V.Poelln. (1940): *H. inconfluens* (V.Poelln.) Bayer (1976): *H. habdomadis* var. *inconfluens* (V.Poelln.) Bayer (1977). Lectotype, designated by Breuer & Metzger (1997): [unpublished image] *Triebner 1031* (B).

= *H. bijliana* var. *joubertii* V.Poelln. (1936). *H. setata* var. *bijliana* sv. *joubertii* (V.Poelln.) V.Poelln. (1938): *H. setata* var. *joubertii* (V.Poelln.) Jacobsen (1960). *H. integra* var. *standeri* Esterhuizen in Hawarhiad 14: 21 (2000), **syn. nov.**: *H. standeri* (Esterhuizen) M.Hayashi (2010). *H. crystallina* M.Hayashi in Haworthia Study 15: 116 (2006), **syn. nov.** \**H. allomadis* \**H. calitzensis* \**H. rooibergensis* \**H. horrida* \**H. kotei*

*H. mucronata* var. **rycroftiana** Bayer in Haw. Hand.: 54 (1976). Gouritz River between Vanwyksdorp and Herbetsdale, *Bayer 1701* (NBG).

= *H. integra* V.Poelln. in Feddes Repert. 33: 239 (1933), **syn. nov.**

*H. mucronata* var. **morrissiae** (V.Poelln.) V.Poelln. in Feddes Repert. 49: 29 (1940): *H. altilinea* var. *morrissiae* V.Poelln. (1938): *H. inconfluens* var. *morrissiae* (V.Poelln.) Bayer (1976): *H. habdomadis* var. *morrissiae* (V.Poelln.) Bayer (1977). Lectotype, designated by Breuer & Metzger (1997): [unpublished image] (B).

= *H. sakai* M.Hayashi in Haworthia Study 3: 13 (2000), **syn. nov.**

**H. mutica** Haw. in Revis.:55 (1821). Lectotype, designated by Bayer (1978): [image] (K; later published in *Excelsa* 8: 50 (1978). Epitype, designated by Breuer & Metzger (1997): NE Soetriver Bridge, *Bayer KG623/69* (NBG).

= *H. otzenii* Smith (1945). *H. groenewaldii* Breuer in *Alsterworthia* Int. 11: 15 (2011), **syn. nov.**

**H. nortieri** Smith in Jl. S. Afr. Bot. 12: 13 (1946). Type: Vanrhynsdorp, *Smith 1676a* (NBG).

= *H. nortieri* var. *montana* Smith (1950). *H. nortieri* var. *giftbergensis* Smith (1950): *H. giftbergensis* (Smith) Breuer (2010). *H. agnis* Battista in *Alsterworthia* Int. 2: 9 (2002), **syn. nov.** *H. montana* M.Hayashi in *Haworthia* Study 14: 14 (2005), nom. inval.

*H. nortieri* var. **nortieri**

*H. nortieri* var. **albispina** (M.Hayashi) Bayer, **comb. nov.**: *H. albispina* M.Hayashi in *Haworthia* Study 8: 1 (2002). Type: E Laingsburg, *Hayashi 02-48* (TUAT).

*H. nortieri* var. **devriesii** (Breuer) Bayer, **comb. nov.**: *H. devriesii* Breuer in *Avonia* 21: 47 (2003). Type: Prince Albert, *Breuer 6930* (TUAT).

*H. nortieri* var. **globosiflora** (Smith) Bayer (1976): *H. globosiflora* Smith (1950). Type: Doornbosch, N Doorn River Bridge, *Smith 7198* (NBG).

*H. nortieri* var. **pehlemanniae** (Scott) Bayer in Haw. Revis.: 129 (1999): *H. pehlemanniae* Scott (1982). Type: W Laingsburg, *Scott 7450* (PRE).

**H. outeniquensis** Bayer in Haw. Revis.: 130 (1999). Type: Moerasriver, *Venter 94/61* (NBG). \**H. heroldia*

**H. parksiana** V.Poelln. in *Cactus* J. 5: 34 (1936). Lectotype, designated by Breuer & Metzger (1997): [image, later published in *Desert Pl. Life* 10: 48 (1938)] (B).

**H. pubescens** Bayer in J. S. Afr. Bot. 38: 129 (1973). Type: Worcester, Sandberg Hills, *Bayer 163* (NBG).

*H. pubescens* var. **pubescens**

*H. pubescens* var. **livida** Bayer in Haw. Revis.: 134 (1999). Type: Worcester, Lemoenpoort, *Bayer 1128* (NBG). \**H. livida*

**H. pulchella** Bayer in J. S. Afr. Bot. 39: 232 (1973). Type: Touws River, Avondrust, *Bayer 163* (NBG).

*H. pulchella* var. **pulchella**

*H. pulchella* var. **globifera** Bayer in Haw. Revis.: 136 (1999): *H. globifera* (Bayer) M.Hayashi (2000). Type: SE Anysberg, *Bruyns 7338* (NBG).

**H. pygmaea** V.Poelln. in *Repert. Spec. Nov. Regni Veg.* 27: 132 (1930). Neotype, designated by Breuer & Metzger (1997): hills E Great Brak, *Fourcade 4759* (BOL).

= *H. esterhuizenii* M.Hayashi in *Haworthia* Study 7: 14 (2002), **syn. nov.** \**H. asperata*

*H. pygmaea* var. **pygmaea**

*H. pygmaea* var. **acuminata** (Bayer) Bayer, **comb. nov.**: *H. retusa* f. *acuminata* Bayer in *Haw. Handb.*: 53 (1976): *H. retusa* var. *acuminata* (Bayer) Bayer (1982): *H. magnifica* var. *acuminata* (Bayer) Bayer (1999). Type: N of Gouritzmond, *Bayer in KG 311/7* (NBG). \**H. acuminata*.

*H. pygmaea* var. **argenteo-maculosa** (Smith) Bayer in Haw. Revis.: 138 (1999): *H. dekenahii* var. *argenteo-maculosa* Smith (1945): *H. retusa* f. *argenteo-maculosa* (Smith) Bayer (1976). Type: between Gouritz Bridge and Mossel Bay, *Emett s.n. NBG68037* (NBG).

= *H. silviae* M.Hayashi in *Haworthia* Study 3: 13 (2000), **syn. nov.**

*H. pygmaea* var. **dekenahii** (Smith) Bayer, **comb. nov.**: *H. dekenahii* Smith in Jl. S. Afr. Bot. 10: 140 (1944); *H. retusa* var. *dekenahii* (Smith) Bayer (1982); *H. magnifica* var. *dekenahii* (Smith) Bayer (1999). Type: Farm Draaihoek, *J. Dekenah 86 sub Smith 5489* (NBG).

*H. pygmaea* var. **fusca** (Breuer) Bayer, **stat. nov.**: *H. fusca* Breuer in Alsterworthia Int. Special Issue 7: 9 (2004). Type: W Albertinia, *Breuer 8971* (GRA).

*H. pygmaea* var. **vincentii** (Breuer) Bayer, **stat. nov.**: *H. vincentii* Breuer in Alsterworthia Int. Special Issue 7: 11 (2004). Type: NE Albertinia, *De Vries 071* (GRA).

**H. reticulata** (Haw.) Haw. in Syn. Pl. Succ.: 94 (1812); *Aloe reticulata* Haw. (1804). Neotype, designated by Bayer (1972): Illustration in Curtis' Bot. Mag.: t. 1314 (1811). Epitype, designated by Breuer & Metzger (1997): SW Worcester, Ribokkop, *Bayer 160* (NBG).

= *Aloe pumilio* Jacq. (1804). *H. reticulata* var. *acuminata* (1938). *H. hurlingii* var. *ambigua* Triebn. & V.Poelln. (1938). *H. guttata* Uitew. (1947). *H. intermedia* V.Poelln. (1937), **syn. nov.**: *H. magnifica* var. *intermedia* (V.Poelln.) Bayer (1999).

*H. reticulata* var. **reticulata**

*H. reticulata* var. **attenuata** Bayer in Haw. Revis.: 140 (1999). Type: S Bonnievale, *Smith 3979* (NBG). \**H. oxygona*?

*H. reticulata* var. **hurlingii** (V.Poelln.) Bayer in New. Haw. Hand.: 52 (1982); *H. hurlingii* V.Poelln. (1936). Lectotype, designated by Breuer & Metzger (1997): [image, later published in Desert Pl. Life 10: 125 (1938)] (B).

*H. reticulata* var. **subregularis** (Baker) Bayer in Haw. Revis.: 141 (1999); *H. subregularis* Baker (1870). Lectotype, designated by Bayer (1999): Illustration in Saund. Ref. Bot.: t. 232 (1870).

= *H. haageana* V.Poelln. (1930). *H. haageana* var. *subreticulata* V.Poelln. (1937).

**H. retusa** (L.) Duval in Pl. Succ. Hort. Alenc.: 7 (1809); *Aloe retusa* L. (1753). Lectotype, designated by Scott (1985): Illustration in Commelin, Horti Med. Amstelod. 2: t. 6 (1701). Epitype, designated by Breuer & Metzger (1997): Blikbonnie, E Riversdale, *Dekenah s.n. NBG144772* (NBG).

= *H. foucheii* V.Poelln. (1940). *H. retusa* var. *multilineata* Smith (1946); *H. multilineata* (Smith) Scott (1985). *H. retusa* var. *solitaria* Smith (1946); *H. solitaria* (Smith) Scott (1973). *H. retusa* var. *densiflora* Smith (1946). *H. geraldii* Scott (1965). \**H. subretusa*

*H. retusa* var. **retusa**

*H. retusa* var. **longibracteata** (Smith) Bayer, **comb. nov.**: *H. longibracteata* Smith in Jl. S. Afr. Bot. 11: 75 (1945); *H. turgida* var. *longibracteata* (Smith) Bayer (1999). Type: near Stilbaai, *Dekenah 18 sub Smith 5378* (NBG).

*H. retusa* var. **nigra** (Bayer) Bayer, **comb. nov.**: *H. mutica* var. *nigra* Bayer in Haw. Revis.: 126 (1999). Type: Kransriviermond, *Smith 5753* (NBG). \**H. quimutica* \**H. chromutica*

*H. retusa* var. **suberecta** (V.Poelln.) Bayer, **comb. nov.**: *H. turgida* var. *suberecta* V.Poelln. in Repert. Spec. Nov. Regni Veg. 44: 134 (1938); *H. suberecta* (V.Poelln.) Breuer (2010). Neotype, designated by Bayer (1999): Brandwacht, *Bayer s.n. KG631/69* (NBG).

= *H. turgida* var. *subtuberculata* V.Poelln. (1938). *H. turgida* var. *pallidifolia* Smith (1946); *H. pallidifolia* (Smith) Breuer (2010). \**H. rodinii*

*H. retusa* var. **turgida** (Haw) Bayer, **comb. nov.**: *H. turgida* Haw. in Suppl. Pl. Succ.: 52 (1819). Neotype, designated by Breuer & Metzger (1997): Swellendam, Breede River Bridge, *Bayer 2420* (NBG).

= *H. laetivirens* Haw. (1819). *H. caespitosa* V.Poelln. (1936). *H. caespitosa* f. *subplana* V.Poelln. (1938). *H. caespitosa* f. *subproliferans* V.Poelln. \**H. pseudo* \**H. reflexa*

**H. rossouwii** V.Poelln. in Kakteenk. 7: 75 (1938). Lectotype, designated here: [unpublished image] (B).

= *H. serrata* Bayer in Jl. S. Afr. Bot. 39: 249 (1973), **syn. nov.** Type: Heidelberg, Oudekraalkop, *Bayer 166* (NBG).

*H. rossouwii* var. **rossouwii**

*H. rossouwii* var. **calcareia** (Bayer) Bayer, **comb. nov.**: *H. mirabilis* var. *calcareia* Bayer in Haw. Revis.: 110 (1999); *H. calcareia* (Bayer) M.Hayashi (2000). Type: Bredasdorp, De Hoop, *Burgers 1648* (NBG).

*H. rossouwii* var. **minor** (Bayer) Bayer, **comb. nov.**: *H. heidelbergensis* var. *minor* Bayer in Haw. Revis.: 82 (1999); *H. rooivleiensis* Breuer (2010). Type: Bredasdorp, Rooivlei, *Bayer sub KG 36/70* (NBG).

*H. rossouwii* var. **petrophila** (Bayer) Bayer, **comb. nov.**: *H. variegata* var. *petrophila* Bayer in Haw. Revis.: 159 (1999); *H. petrophila* (Bayer) M.Hayashi (2000). Type: Renosterfontein, *Burgers 2158* (NBG).

*H. rossouwii* var. **elizeae** (Breuer) Bayer in Haworthia Update 2.2: 153 (2006); *H. elizeae* Breuer (2003). Type: W Swellendam, *Breuer 6936* (TUAT).

**H. semiviva** (V.Poelln.) Bayer in Haw. Handb.: 153 (1976); *H. bolusii* var. *semiviva* V.Poelln. (1938). Lectotype, designated by Breuer & Metzger (1997): [image, later published in Succulenta (Netherlands) 22: 25 (1940)] (B). \**H. sphaeroidea* \**H. victoria*

**H. springbokvlakensis** Scott in Jl. S. Afr. Bot. 36: 287 (1970). Type: Springbokvlakte, *Scott 245* (PRE).

**H. transiens** (V.Poelln) Bayer in Haworthiad 16: 66 (2002); *H. cymbiformis* var. *transiens* (V.Poelln.) Bayer (1976); *H. planifolia* var. *transiens* V.Poelln. (1938). Lectotype, designated by Breuer & Metzger (1997): [unpublished image] (B).

= *H. cymbiformis* var. *translucens* Triebn. et V.Poelln. (1938). *H. cymbiformis* var. *multifolia* Triebn. (1938). *H. cymbiformis* var. *brevifolia* Triebn. et V.Poelln. (1938). \**H. klipensis*

**H. truncata** Schonland in Trans. Roy. Soc. S. Afr. 1: 391 (1910). Type: near Oudtshoorn, *Britten* (K).

= *H. truncata* f. *tenuis* V.Poelln. (1938); *H. truncata* var. *tenuis* (V.Poelln.) Bayer (1976). *H. truncata* f. *crassa* V.Poelln. (1938). *H. truncata* f. *normalis* V.Poelln. (1938). *H. truncata* var. *minor* Breuer in Avonia 21: 59 (2003), **syn. nov.**: *H. papillaris* Breuer (2010).

*H. truncata* var. **truncata**

*H. truncata* var. **maughanii** (V.Poelln.) Bayer in Haw. Revis.: 151 (1999). *H. maughanii* V.Poelln. (1932). Neotype, designated by Breuer & Metzger (1997): Calitzdorp, *Malherbe s.n. NBG307/40* (NBG).

**H. variegata** Bolus in J. Bot. Soc. S. Afr.: 137 (1929). Type: Botterkloof, *Mrs. E. Ferguson s.n. BOL18900* (BOL).

*H. variegata* var. **variegata**

*H. variegata* var. **hemicrypta** Bayer in Haw. Revis.: 158 (1999); *H. hemicrypta* (Bayer) M.Hayashi (2000). Type: NE lower slopes of Potberg, *Burgers 2582* (NBG).

*H. variegata* var. **modesta** Bayer in Haw. Revis.: 159 (1999); *H. modesta* (Bayer) Hayashi (2000). Type: SW Kathoek, *Bayer 2551* (NBG).

**H. vlokii** Bayer in Haw. Revis.: 160 (1999). Type: Swartberg Mts., *Vlok sub Venter 91/2* (NBG).

**H. wittebergensis** Barker in Jl. S. Afr. Bot. 8: 245 (1942). Type: Witteberg, *Pieterse sub NBG 68214* (NBG).

**H. zantneriana** V.Poelln. in *Cactus J.* 5: 35 (1936). Lectotype, designated by Breuer & Metzger (1997): [image, later published in *Desert Pl. Life* 9: 90 (1937)] (B).

*H. zantneriana* var. **zantneriana**

*H. zantneriana* var. **minor** Bayer in *Haw. Revis.*: 164 (1999): *H. insipida* Breuer (2010). Type: near Miller Station, *Bayer 1702* (NBG).

**II.** Subgenus **Hexangulares** (Uitewaal) M.B.Bayer [as *Uitewaal* ex M.B.Bayer] in *Haw. Handb.*: 14 (1976). Type species: *Haworthia coarctata* Haw. [Lectotype, designated by Bayer (1976)]. ± 15 spp.

**H. attenuata** (Haw.) Haw. in *Syn. Pl. Succ.*: 92 (1812): *Aloe attenuata* Haw. (1804). Neotype, designated by Breuer & Metzger (1997): 20 km E Patensie, Sandland. *Perry 660* (NBG).

= *H. clariperla* Haw. (1928): *Aloe attenuata* var. *clariperla* (Haw.) Salm-Dyck (1834): *H. attenuata* var. *clariperla* (Haw.) Baker (1880): *H. attenuata* f. *clariperla* (Haw.) Bayer (1976). *H. fasciata* var. *caespitosa* Berger (1908). *H. britteniana* V.Poelln. (1937): *H. attenuata* var. *britteniana* (V.Poelln.) V.Poelln. (1937): *H. attenuata* f. *britteniana* [as *britteniae*] (V.Poelln.) Bayer (1976). *H. attenuata* var. *odonoghueana* et vars. *linearis*, *uitewaaliana*, *deltoidea*, *minissima*, *inusitata* Farden (1939).

*H. attenuata* var. **attenuata**

*H. attenuata* var. **glabrata** (Salm Dyck) Bayer, **comb. nov.**: *Aloe glabrata* Salm Dyck in *Hort.Dyck*: 325 (1834): *H. glabrata* (Salm Dyck) Baker (1880). Neotype, designated by Smith & Greyling (1990): Illustration in Salm Dyck, *Aloes Mesembr.* 3: *Aloe t. 7* [sect. 6: 13] (1840).

*H. attenuata* var. **radula** (Jacq.) Bayer in *Haw. Revis.*: 167 (1999): *Aloe radula* Jacq. (1804): *H. radula* (Jacq.) Haw. (1812). Type: Illustration in Jacq., *Pl. Hort.Schoenbr.* 4: t. 422 (1804). Epitype, designated by Breuer & Metzger (1997): 1.6 km from Hankey to Thornhill, *Smith 3190* (NBG).

**H. bruynsii** Bayer in *J. S. Afr. Bot.* 47:789 (1981). Type: SE Steytlerville, *Rossouw 456* (NBG).

**H. coarctata** Haw. in *Philos.Mag.* 64: 301 (1824). Neotype, designated by Breyer & Metzger (1997): 16 km from Grahamstown to Bathurst, *Smith 7092* (NBG).

= *H. chalwinii* Marl.et Berg. (1906). *H. reinwardtii* var. *conspicua* V.Poelln. (1937). *H. fallax* V.Poelln. (1932): *H. reinwardtii* var. *fallax* V.Poelln. (1937). *H. reinwardtii* var. *pseudocoarctata* V.Poelln. (1940): *H. coarctata* var. *haworthii* f. *pseudocoarctata* (V.Poelln.) Resende (1943). *H. coarctata* var. *haworthii* Resende (1943). *H. coarctata* var. *kraussii* Resende (1943). *H. reinwardtii* var. *commiteesensis* Smith (1943). *H. reinwardtii* var. *huntsdriftensis* Smith (1944). *H. fulva* Smith (1943). *H. musculina* Smith (1948). *H. greenii* var. *silvicola* Smith (1943).

*H. coarctata* var. **coarctata**

*H. coarctata* var. *coarctata* f. **coarctata**

*H. coarctata* var. *coarctata* f. **greenii** (Baker) Bayer in *Haw. Revis.*: 172 (1999): *H. greenii* Baker (1880): *H. greenii* subsp. *coarctata* var. *greenii* (Baker) Bayer (1973). Type: Cape, *Cooper 1860* (K).

= *H. peacockii* Baker (1880). *H. greenii* f. *bakeri* Resende (1943). *H. greenii* f. *minor* Resende (1943).

*H. coarctata* var. **adelaidensis** (V.Poelln.) Bayer in *Haw. Revis.*: 172 (1999): *H. reinwardtii* var. *adelaidensis* V.Poelln. (1940): *H. coarctata* subsp. *adelaidensis* (V.Poelln.) Bayer (1973): *H. adelaidensis* (V.Poelln.) Breuer in *Gen. Haw.* 1: 7 (2010). Lectotype, designated by Breuer & Metzger (1997): [unpublished image] (B).

= *H. reinwardtii* var. *riebeeckensis* Smith (1944). *H.*

*reinwardtii* var. *bellula* Smith (1945).

*H. coarctata* var. **tenuis** (Smith) Bayer in *Haw. Revis.*: 173 (1999): *H. reinwardtii* var. *tenuis* Smith (1948): *H. coarctata* ssp. *coarctata* var. *tenuis* (Smith) Bayer (1973): *H. tenuis* (Smith) Breuer (2010). Type: Cape, Alexandria Dist. *Smith 3420* (NBG).

**H. fasciata** (Willd.) Haw. in *Suppl. Pl. Succ.*: 57 (1819): *Apicra fasciata* Willd. (1811): *Aloe fasciata* (Willd.) Salm Dyck (1937). Neotype, designated by Breuer & Metzger (1997): Hankey, *Stayner s.n. NBG110360* (NBG).

= *H. fasciata* var. *major* Haw. (1819). *Aloe fasciata* var. *major* Salm Dyck (1837): *H. fasciata* var. *major* (Salm Dyck) V.Poelln. (1938). *H. fasciata* var. *subconfluens* V.Poelln. (1937): *H. fasciata* f. *subconfluens* (V.Poelln.) V.Poelln. (1938). *H. fasciata* f. *ovatolanceolata* V.Poelln. (1938). *H. fasciata* f. *sparsa* V.Poelln. (1938). *H. fasciata* f. *variabilis* V.Poelln. (1938). *H. fasciata* f. *vanstaadenensis* V.Poelln. (1938). *H. browniana* V.Poelln. (1937): *H. fasciata* f. *browniana* (V.Poelln.) Bayer (1976).

**H. glauca** Baker in *J. Linn. Soc. Bot.* 18:203 (1880). Type: Zuurberg Pass, *Cooper* (K).

= *H. carrissoi* Resende (1941).

*H. glauca* var. **glauca**

*H. glauca* var. **herrei** (V.Poelln.) Bayer in *Haw. Handb.*: 122 (1976): *H. herrei* V. Poelln. (1929). Neotype, designated by Breuer & Metzger (1997): Campherspoort, *Barker 5069* (NBG).

= *H. herrei* var. *depauperata* V.Poelln. (1932). *H. jacobseniana* V.Poelln. (1937). *H. eilyae* V.Poelln. (1937). *H. jonesiae* V.Poelln. (1937). *H. herrei* var. *poellnitzii* Resende (1943). *H. eilyae* var. *poellnitziana* Resende (1943). *H. eilyae* var. *zantneriana* Resende (1943). *H. armstrongii* V.Poelln. (1937): *H. glauca* var. *herrei* f. *armstrongii* (V.Poelln.) Bayer (1976).

**H. granulata** Marloth in *Trans. Ror. Soc. S. Afr.* 2:39 (1910): *H. venosa* subsp. *granulata* (Marloth) Bayer (1976). Type: Verlatenkloof, *Marloth 4217* (BOL).

= *H. schoemanii* M.Hayashi in *Haworthia Study* 9: 14 (2003), **syn. nov.**

**H. koelmaniorum** Oberm. & Hardy in *Fl. Pl. Africa* :f. 1502 (1967). Type: Groblersdal, *Hardy & Mauve 2267* (PRE).

*H. koelmaniorum* var. **koelmaniorum**

*H. koelmaniorum* var. **mcmurtryi** (Scott) Bayer in *Haw. Revis.*: 181 (1999): *Haworthia mcmurtryi* Scott (1984). Type: Loskop, SW Dam, *McMurtry 5247* (PRE).

**H. limifolia** Marloth in *Trans. Roy. Soc. S. Africa* 1: 409 (1908). Type: W Delagoa Bay, *Marloth 4678* (PRE).

= *H. limifolia* var. *diploidea* Resende (1940). *H. limifolia* var. *tetraploidea* Resende (1940). *H. limifolia* f. *marlothiana* Resende (1941): *H. limifolia* var. *marlothiana* (Resende) Resende (1943). *H. limifolia* var. *schuldtiana* Resende (1940). *H. limifolia* var. *stolonifera* Resende (1940). *H. limifolia* var. *stolonifera* f. *pimentelli* Resende (1943). *H. limifolia* var. *stolonifera* f. *major* Resende (1943). *H. limifolia* var. *keithii* Smith (1950). \**H. gideonii*

*H. limifolia* var. **limifolia**

*H. limifolia* var. **arcana** G.F.Smith & N.R.Crouch in *Bradleya* 19: 119 (2001): *H. arcana* (G.F.Smith & N.R.Crouch) Breuer in *Gen. Haw.* 1: 7 (2010). Type: Crouch, N;Smith G.F. #7 (PRE)

*H. limifolia* var. **gigantea** Bayer in *Jl. S. Afr. Bot.* 28: 215 (1962): *H. gigantea* (Bayer) M.Hayashi (2000). Type: Nongoma, *Bayer 112* (PRE).

*H. limifolia* var. **glaucophylla** Bayer in *Haworthia Update* 2: 1

(2006): *H. glaucophylla* (Bayer) Breuer (2010). Type: Mpumalanga, Three Sisters, *F. Venter 13700* (NBG).  
*H. limifolia* var. **ubomboensis** (Verdoorn) Smith in Jl. S. Afr. Bot. 16: 3 (1950); *H. ubomboensis* Verdoorn (1941). Type: 16km S Stegi, *Keith s.n. PRE26392* (PRE).

**H. longiana** V.Poelln. in Feddes Repert. 41: 203 (1937). Neotype, designated by Breuer & Metzger (1997): [unpublished image] (B).  
= *H. longiana* var. *albinota* Smith (1948).

**H. nigra** (Haw.) Baker in J. Linn. Soc. Bot. 18: 203 (1880): *Apicra nigra* Haw. (1825). Neotype, designated by Breuer & Metzger (1997): Campherspoort, *Barker 5099* (NBG).  
= *H. schmidtiana* V.Poelln. (1929); *H. nigra* var. *schmidtiana* (V.Poelln.) Uitew. (1948). *H. schmidtiana* var. *angustata* V.Poelln. (1937); *H. nigra* var. *angustata* (V.Poelln.) Uitew. (1948). *H. schmidtiana* var. *suberecta* V.Poelln. (1937); *H. nigra* var. *suberecta* (V.Poelln.) Uitew. (1948). *H. schmidtiana* var. *pusilla* V.Poelln. (1938); *H. nigra* var. *pusilla* (V.Poelln.) Uitew. (1948). *H. ryneveldii* V.Poelln. (1939). \**H. eonigra*  
*H. nigra* var. **nigra**  
*H. nigra* var. **diversifolia** (V.Poelln.) Uitew. in Succulenta: 51 (1948); *H. diversifolia* V.Poelln. (1937); *H. schmidtiana* var. *diversifolia* (V.Poelln.) V.Poelln. (1938). Neotype, designated by Bayer (1999): Kruidfontein, *Bruyns in KG435/75* (NBG).  
= *H. schmidtiana* var. *diversifolia* f. *nana* V.Poelln. (1938); *H. nigra* var. *diversifolia* f. *nana* (V.Poelln.) Uitew. (1948).  
*H. nigra* var. **elongata** (V.Poelln.) Uitew. in Succulenta: 51 (1948); *H. schmidtiana* var. *elongata* V.Poelln. (1938). Neotype, designated here: Slagtersnek, *Van Jaarsveld & Marthinus 7913* (NBG).

**H. pungens** Bayer in Haw. Revis.:188 (1999). Type: Braamriver. *Bruyns 7090* (NBG).

**H. reinwardtii** (Salm Dyck) Haw. in Saxifrag. Enum. 2: 53 (1821): *Aloe reinwardtii* Salm Dyck (1821). Neotype, designated by Scott (1981): Illustration in Salm Dyck, Aloes Mesembr. 1: *Aloe* t. 12 [sect. 6: 16] (1836). Epitype, designated by Breuer & Metzger (1997): hill above Ncera River Bridge, *Smith 3563* (NBG).  
= *H. reinwardtii* var. *major* Baker (1880). *H. reinwardtii* var. *pulchra* V.Poelln. (1937). *H. reinwardtii* var. *archibaldiae* V.Poelln. (1937). *H. reinwardtii* var. *peddiensis* Smith (1943). *H. reinwardtii* var. *valida* Smith (1943). *H. reinwardtii* var. *grandicula* Smith (1944). *H. reinwardtii* var. *haworthii* Resende (1943). *H. reinwardtii* var. *triebneri* Resende (1943).  
*H. reinwardtii* var. **reinwardtii**  
*H. reinwardtii* f. **reinwardtii**  
*H. reinwardtii* f. **chalumensis** (Smith) Bayer (1976); *H. reinwardtii* var. *chalumensis* Smith (1943). Type: Chalumna, *Smith 513* (NBG).  
*H. reinwardtii* f. **kaffirdriftensis** (Smith) Bayer (1976); *H. reinwardtii* var. *kaffirdriftensis* Smith (1943). Type: Kaffirdrift, *Smith 3364* (NBG).  
*H. reinwardtii* f. **olivacea** (Smith) Bayer (1976); *H. reinwardtii* var. *olivacea* Smith (1944); *H. olivacea* (Smith) Breuer (2010). Type: Kaffirdrift, *Smith 5260* (NBG).  
*H. reinwardtii* f. **zebrina** (Smith) Bayer (1976); *H. reinwardtii* var. *zebrina* Smith (1944). Type: Kaffirdrift, *Smith 5258* (NBG).  
*H. reinwardtii* var. **brevicula** Smith in Jl. S. Afr. Bot. 10: 11 (1944); *H. brevicula* (Smith) Breuer in Gen. Haw. 1: 7 (2010). Type: Frazers Camp, *Smith 3138* (NBG).  
= *H. reinwardtii* var. *diminuta* Smith (1948).

**H. scabra** Haw. in Suppl. Pl. Succ.: 58 (1819). Lectotype, designated by Scott (1980): [illustration, later published in

Cact. Succ. J. (Los Angeles) 52: 274 (1980)] (K).

= *H. tuberculata* V.Poelln. (1931). *H. tuberculata* var. *acuminata* V.Poelln. (1938). *H. tuberculata* var. *sublaevis* V.Poelln. (1938). *H. tuberculata* var. *subexpansa* V.Poelln. (1938). *H. tuberculata* var. *angustata* V.Poelln. (1940). *H. scabra* var. *johanii* M.Hayashi in Haworthiad 15: 16 (2001), **syn. nov.**: *H. johanii* (M.Hayashi) Breuer (2010).

*H. scabra* var. **scabra**

*H. scabra* var. **lateganiae** (V.Poelln.) Bayer in Haw. Revis.: 195 (1999); *H. starkiana* var. *lateganiae* (V.Poelln.) Bayer (1976); *H. lateganiae* V.Poelln. (1937). Lectotype, designated by Breuer & Metzger (1997): [image, later published in Desert Pl. Life 9: 103 (1937)] (B).

*H. scabra* var. **morrisiae** (V.Poelln.) Bayer in Haw. Hand.: 137 (1976); *H. morrisiae* V.Poelln. (1937). Lectotype, designated by Breuer & Metzger (1997): [image, later published in Kakteenk. & Kakteenfr. 1937: 132 (1937)] (B).  
\**H. plettens*

*H. scabra* var. **starkiana** (V.Poelln.) Bayer in Haw. Revis.: 197 (1999); *H. starkiana* V.Poelln. (1933). Lectotype, designated by Breuer & Metzger (1997): [unpublished image] (B).  
= *H. smitii* V.Poelln. (1938).

**H. sordida** Haw. in Revis.: 51 (1821): *Aloe sordida* Schult. & Schult.f. (1829). Neotype, designated by Scott (1985): Illustration in Salm Dyck, Aloes Mesembr. 7: *Aloe* t. 1 [sect 7: 2] (1863).

= *H. sordida* var. *agavoides* (Zant. & V.Poelln.) Smith (1950); *H. agavoides* Zant. & V.Poelln. (1938).

*H. sordida* var. **sordida**

*H. sordida* var. **lavranii** Scott in Cact. Succ. J. (US) 53: 70 (1981); *H. lavranii* (Scott) Breuer (2010). Type: Perdehoek, Little Karoo, *Hechter s.n. PRE61124* (PRE).

**H. tessellata** Haw. in Phil. Mag. 44: 300 (1824): *Aloe tessellata* (Haw.) Schult. & Schult.f. (1829); *H. venosa* subsp. *tessellata* (Haw.) Bayer (1976). Lectotype, designated by Scott (1978): [illustration, later published in Cact. Succ. J. (Los Angeles) 50: 75 (1978)] (K).

= *H. parva* Haw. (1824): *Aloe parva* (Haw.) Schult. & Schult.f. (1829); *H. tessellata* var. *parva* (Haw.) Baker (1880). *H. tessellata* var. *inflexa* Baker (1880). *H. engleri* Dint. (1914); *H. tessellata* var. *engleri* (Dint.) V.Poelln. (1938). *H. pseudotessellata* V.Poelln. (1929). *H. tessellata* var. *tuberculata* V.Poelln. (1936). *H. minutissima* V.Poelln. (1939); *H. tessellata* var. *minutissima* (V.Poelln.) Viveiros (1947?). *H. tessellata* var. *elongata* Van Woerden (1940). *H. tessellata* var. *simplex* Resende & V.Poelln. (1942). *H. tessellata* var. *stepheneana* Resende & V.Poelln. (1942). *H. tessellata* var. *luisierii* Resende & V.Poelln. (1942). *H. tessellata* var. *palmhinhae* Resende & V.Poelln. (1942). *H. tessellata* var. *velutina* Resende & V.Poelln. (1942). *H. tessellata* var. *coriacea* Resende & V.Poelln. (1942); *H. coriacea* (Resende & V.Poelln.) Breuer (2010). *H. tessellata* var. *coriacea* f. *longior* Resende & V.Poelln. (1942). *H. tessellata* var. *coriacea* f. *brevior* Resende & V.Poelln. (1942). *H. tessellata* var. *obesa* Resende & V.Poelln. (1942). *H. venosa* ssp. *recurva* sensu Bayer (1976). *H. crousii* [spahlm. *crausii*] M.Hayashi in Haworthiad 15: 16 (2001), **syn. nov.** \**H. helensis* \**H. mediata*

**H. venosa** (Lam.) Haw. in Saxifrag. Enum: 51 (1821): *Aloe venosa* Lam. (1873). Lectotype, designated by Scott (1978): Illustration in Commelin, Praecludia Bot.: t. 29 (1703). Epitype, designated by Breuer & Metzger (1997): Swellendam, W of Breede River Bridge, *Bayer 168* (NBG).

= *Aloe tricolor* Haw. (1804). = *Aloe recurva* Haw. (1804); *H. recurva* (Haw.) Haw. (1812). = *H. distincta* Brown (1876). = *H. venosa* var. *oertendahlia* Hjelmquist (1943). \**H. irmia*

**H. viscosa** (L.) Haw. in Syn. Pl. Succ.: 90 (1812): *Aloe viscosa* L. (1753). Lectotype, designated by Scott (1981): Illustration in Commelin, Praeludia Bot.: t. 31 (1703). Epitype, designated by Breuer & Metzinger (1997): Calitzdorp, Blackburn Valley, *Barker 5073* (NBG).  
 = *Aloe pseudotortuosa* Salm Dyck (1817): *H. pseudotortuosa* (Salm Dyck) Haw. (1819): *H. viscosa* var. *pseudotortuosa* (Salm Dyck) Baker (1880). *Aloe subtortuosa* Salm Dyck (1836). *Aloe tortuosa* Haw. (1804): *H. tortuosa* (Haw.) Haw. (1812). *H. concinna* Haw. (1819): *Aloe concinna* (Haw.) Haw. (1829): *H. viscosa* var. *concinna* (Haw.) Baker (1880). *Aloe tortuosa* var. *major* Salm Dyck (1817). *H. asperiuscula* Haw. (1819): *Aloe asperiuscula* (Haw.) Salm Dyck (1836). *H. cordifolia* Haw. (1819): *Aloe cordifolia* (Haw.) Salm Dyck (1836). *H. indurata* Haw. (1821): *Aloe viscosa* var. *indurata* (Haw.) Salm Dyck (1836): *H. viscosa* var. *indurata* (Haw.) Baker (1880). *H. viscosa* var. *major* Haw. (1821). = *H. viscosa* var. *minor* Haw. (1821). *H. viscosa* var. *parvifolia* Haw. (1821). *H. torquata* Haw. (1827): *Aloe torquata* (Haw.) Salm Dyck (1836): *H. viscosa* var. *torquata* (Haw.) Baker (1880). *H. viscosa* var. *subobtusa* V.Poelln. (1938). *H. viscosa* var. *caespitosa* V.Poelln. (1938). *H. beanii* Smith (1945). *H. beanii* var. *minor* Smith (1945). *H. viscosa* var. *cougaensis* Smith (1945). *H. viscosa* var. *viridissima* Smith (1945). *H. asperiuscula* var. *subintegra* Smith (1945). *H. asperiuscula* var. *patagiata* Smith (1946). *H. viscosa* var. *quaggaensis* Smith (1948). *H. viscosa* var. *variabilis* Breuer in Avonia 21: 61 (2003), **syn. nov.**: *H. variabilis* (Breuer) Breuer (2010).

**H. woolleyi** V.Poelln. in Repert. Spec. Nov. Regni Veg. 42: 269 (1937): *H. venosa* subsp. *woolleyi* (V.Poelln.) Bayer (1999). Lectotype, designated by Breuer & Metzinger (1997): [image, later published in Cact. J. (Croydon) 7: 3 (1938) (B)].

**III. Subgenus Robustipedunculatae** (Uitewaal) M.B.Bayer [as *Robustipedunculatae* Uitewaal ex M.B.Bayer] in Haw. Handb.: 14 (1976). Type species: *Haworthia margaritifera* (L.) Haw. [lecto., designated by Bayer in Haw. Handb.: 14 (1976)]. 4 spp.

**H. kingiana** V.Poelln. in Cact. J. 5:31 (1936): *H. subfasciata* var. *kingiana* V.Poelln. (1938). Neotype, designated by Breuer & Metzinger (1997): Great Brak, *Dekenah 201* (NBG).  
 = *H. zenigata* M.Hayashi in Haworthiad 15: 20 (2001), **syn. nov.**

**H. marginata** (Lam.) Stearn in Cactus J. 12: 34 (1938): *Aloe marginata* Lam. (1783). Lectotype, designated by Scott (1985): Illustration in Commelin, Praeludia Bot.: t. 30 (1703).  
 = *Aloe albicans* Haw. (1804). *H. albicans* (Haw.) Haw. (1812). *H. laevis* Haw. (1821): *H. marginata* var. *laevis* (Haw.) Jacobson (1960). *H. virescens* Haw. (1821): *H. albicans* var. *virescens* (Haw.) Baker (1896): *H. marginata* var. *virescens* (Haw.) Uitew. (1939). *H. ramifera* Haw. (1821): *H. marginata* var. *ramifera* (Haw.) Jacobson (1960).

**H. minima** (Aiton) Haw. in Syn. Pl. Succ.: 92 (1812): *A. margaritifera* var. *minima* Ait. (1789). Lectotype, designated by Scott (1985): Illustration in Dillenius, Hort. Eltham: t. 16, f. 18 (1732).  
 = *A. pumila* var. *margaritifera* gamma L. (1753). *Aloe margaritifera* var. *minor* Ait. (1789): *Haworthia minor* (Haw.) Duv. (1809). *Apicra granata* Willd. (1811): *H. granata* (Willd.) Haw. (1819): *A. granata* (Willd.) Schult. & Schult.f. (1829): *H. margaritifera* var. *granata* (Willd.) Baker (1880). *A. margaritifera* var. *minor* Ker & G. (1811). *A. erecta* var. *laetivirens* Salm Dyck (1824). *Aloe erecta* Salm Dyck (1836). *Aloe margaritifera* var. *major* Ait. (1789): *H. major* (Ait.) Duv. (1809). *A. margaritifera* var. *media* DC. (1799). *H. brevis* Haw.

(1819): *A. brevis* (Haw.) Schult. & Schult.f. (1829). *H. erecta* Haw. (1819): *A. erecta* (Haw.) Schult. & Schult.f. (1829) [non *A. erecta* Salm Dyck (1836)]: *H. margaritifera* var. *erecta* (Haw.) Baker (1880). *H. margaritifera* var. *corallina* Baker (1880). *H. mutabilis* V.Poelln. (1938). *H. opalina* M.Hayashi in Haworthiad 15: 17 (2001), **syn. nov.** \**H. flavens* \**H. obrata* *H. minima* var. **minima**  
*H. minima* var. **poellnitziana** (Uitew.) Bayer in Haw. Revis.: 213 (1999): *H. poellnitziana* Uitew. (1939). Type: Drew, Meiring (AMD).

**H. pumila** (L.) Duval. (1809): *Aloe pumila* L. (1753): *Aloe pumila* var. *margaritifera* L. (1753): *Aloe margaritifera* (L.) Burm.f (1768): *H. margaritifera* (L.) Haw. (1819). Lectotype, designated by Scott (1985): Illustration in Commelin, Horti Med. Amstelod.: t. 10 (1701).  
 = *Aloe arachnoidea* var. *pumila* Ait. (1789): *A. pumila* (Ait.) Haw. (1804), hom. illegit. non *A. pumila* L. (1753). *Aloe margaritifera* var. *maxima* Haw. (1804): *H. maxima* (Haw.) Duv. (1809): *A. semimargaritifera* var. *maxima* (Haw.) Salm Dyck (1817). *H. margaritifera* var. *semimargaritifera* (Salm Dyck) Baker (1880). *A. papillosa* Salm Dyck (1817): *H. papillosa* (Salm Dyck) Haw. (1819). \**H. sparsa*.

### Hybrids

\**H. mertonii* Breuer in Alsterworthia Int. 7: 22 (2007). (*H. minima*X*marginata*).  
 \**H. hammeri* Breuer nn. (*H. mutica*X*mirabilis*).

### Acknowledgement:

Bruce Bayer would like to personally acknowledge the enormous amount of time and effort my co-author, Dr John Manning of S.A.N.B.I., put into organising and correcting this manuscript to a formal botanical statement. Any residual omissions and errors he happily concedes will be his.



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**Bruce Bayer's Haworthia Update No. 7.....**

..... is in preparation and will be available shortly. The results of more extensive field work are fully discussed and illustrated. The photographs on the front and back covers of this journal, taken from Update 7, show two species with quite different growth forms in two quite different habitats. More information will be in the July journal.

## Seed List 2012

Joel Lode's seed list, which supplies seed to three societies, has expanded considerably and new additions are made to it at various times as seed comes in from various sources. It is no longer practical for the list to be printed and kept up-to-date.

From 2012 the seed list will be available only on line.

**One of the benefits of this change is that the entire list is now available to Alsterworthia International members, thus increasing the number of genera and species available to them**

The seed list is in three languages – English, French and Spanish.

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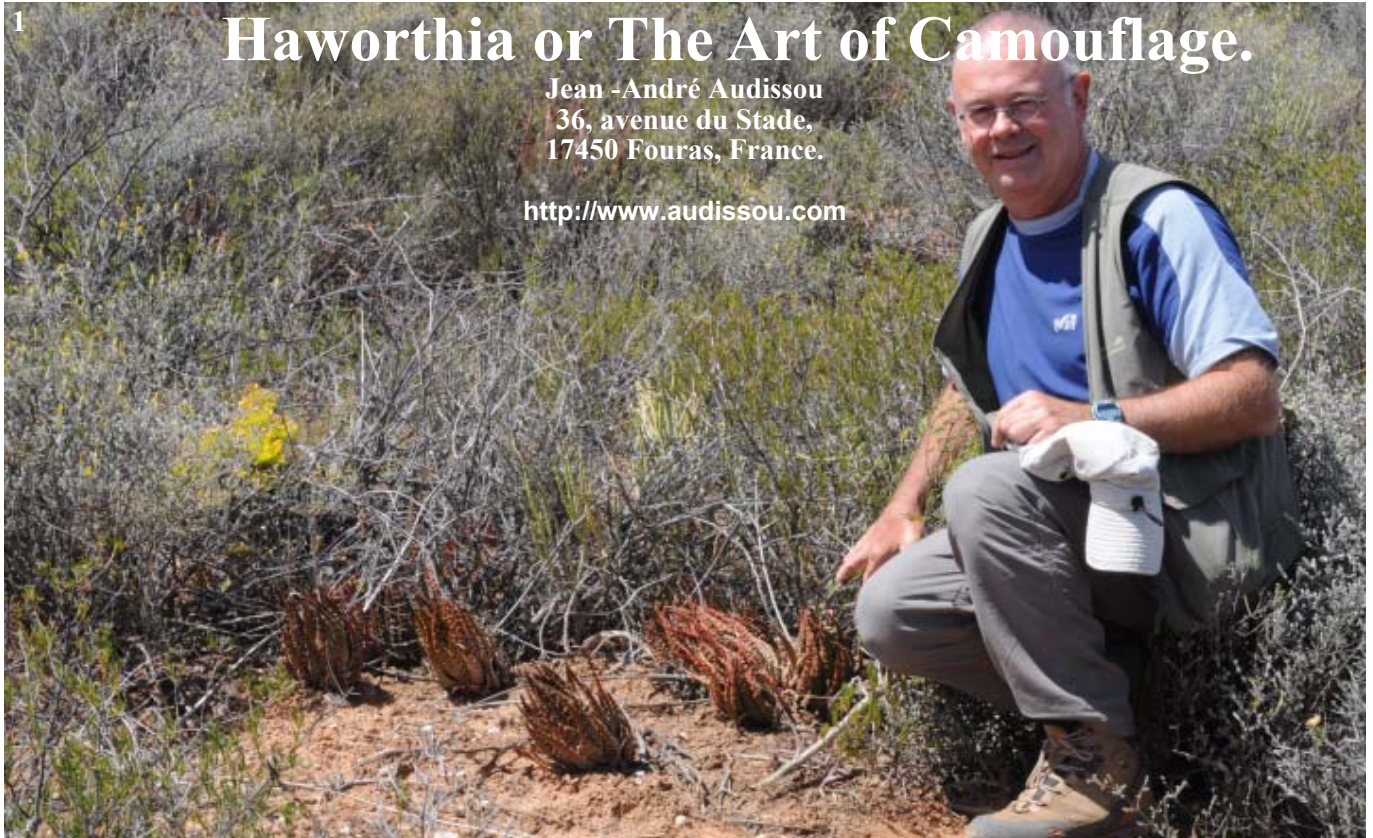
Harry Mays.  
Editor Alsterworthia International  
[hmays@freenetname.co.uk](mailto:hmays@freenetname.co.uk)  
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1

# Haworthia or The Art of Camouflage.

Jean -André Audissou  
36, avenue du Stade,  
17450 Fouras, France.

<http://www.audissou.com>



Haworthias are difficult plants to find in nature because they protect themselves from the sun's heat by growing under bushes or even under stones, as we shall see farther on. Only some species grow in full sun such as *Haworthia maxima* (Fig.1) *H. fasciata*, *H. longiana* and *H. marginata* (Fig.2).

Certain species are prominent and can be located simply by moving vegetation aside (Fig. 3). This method can be tedious if the plants are few in number. On more stony ground with fewer bushes other species find protection under the stones and are not easier to find.

I recall having to search a long time for *H. archeri* (*Haworthia marumiana* var. *archeri* sensu Bayer) in September 2007 on very stony, dry ground east of Mtjiesfontein. It was only after one hour and when renewing the laces in my boots that I saw a unique individual under a rock. It was



2

Fig. 1. *Haworthia maxima* Worcester & Jean-André Audissou.  
Fig. 2. *Haworthia marginata*, North of Ashton.  
Fig. 3. *Haworthia herbacea*, Sandberg.  
Fig. 4. *Haworthia archeri*. East of Matjiesfontein



3

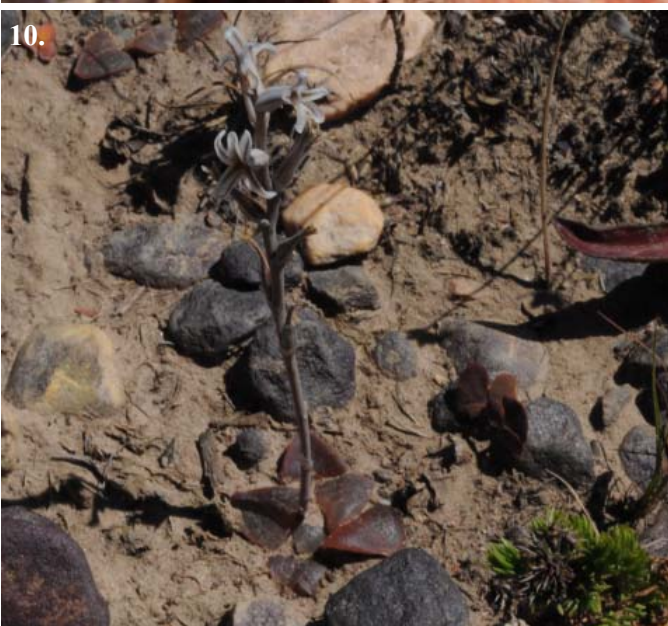


4

Rock removed from here for photo then carefully replaced.



**Fig. 5. *Haworthia bayeri* with fruits. De Rust.**  
**Fig. 6. *Haworthia bayeri* De Rust**  
**Fig. 7. *Haworthia bayeri*. S. of Willowmore**  
**Fig. 8. *Haworthia bayeri* (cleaned) De Rust.**  
**Fig. 9. *Haworthia pygmaea*. Mosselbay.**  
**Fig. 10. *Haworthia pygmaea*. Mosselbay.**



impossible to take a photo without raising the rock (Fig. 4). The rock was put back in its original place.

Meeting Gerhard Marx a little later, I gave him directions to the site, which he visited a month later. He did not find any plants. He waited until the end of January the following year to return there because he knew the plants would be in flower and exposed by them. This is what happened and he thus found several plants from which flower stems rose between the rocks.

Locating species by their flower stems implies visiting the site at the appropriate flowering season, but all do not flower at the same time. In all cases it is the most efficacious method for locating species which grow level with the ground, like *H. bayeri* (Figs. 5-8), *H. pygmaea* (Photos 9-10), *H. bruynsii* (Fig. 11.) or *H. springbokvlakensis* (Figs. 12-13). It is these which are covered with sandy soil and small pebbles in the dry season and cannot be found without flower stems. In September 2010, I easily found to the west of Mosselbay a group of *H. pygmaea* once again by their flower stems. I returned to the same place in the following year at the same time and it took more than one hour to find some individuals because their flowering was late and flowering stems had hardly begun to grow.

Other species also requires the presence of flowers if they are to be found in their natural environments of bushy herbaceous plants. Plants concerned are *H. graminifolia*

(*H. graminifolia* v. *graminifolia* sensu Bayer), figs. 14.-15 It was the presence of flowers that allowed the discovery of the plants in 1982.



Fig. 11. *Haworthia bruynsii*. Langveld.  
 Fig. 12 & 13. *Haworthia springbokvlakensis*. Springbokvlakte (greyish-brown). 13 cleaned.  
 Fig. 14. *Haworthia graminifolia* Schoemanspoort



Other species grow in dry soils which provides protection during the dry season when they are drawn into the ground e.g. *H. cooperi* v. *pilifera* (Fig. 17), *H. pubescens* (Fig. 16), *H. maculata* and *H. devriesii* (Figs. 18-19). The outer leaves of the last dry out after the rainy season and form protection against dehydration. It is sufficient for the wind to cover the plant with sand for it to become invisible. Again, the presence of flower stalks is a significant sign for finding plants.

During a visit with Gerhard Marx to De Rust at a site of *Haworthia bayeri* in September 2008, I commented that certain plants were reddish (Fig. 20) because of too much exposure to the sun. The reason for this was that the inhabitants of the near by township came to cut the plants to supplement their cooking. In these conditions the plants had little chance of surviving to the end of the dry season.

I sincerely believe (and practice) that a plant's protection should be restored in its original position after it has been photographed.

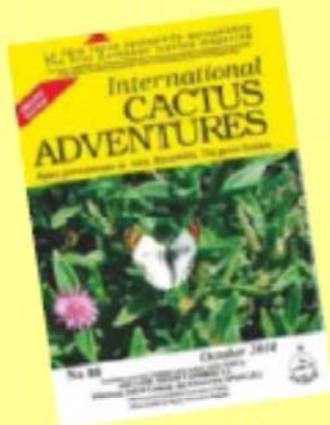
It is naturally frustrating for an author of an article to publish photos of plants hidden by sand or branches, because their beauty is obscured. But it is useful for people who do not have, or have little, experience of the terrain to enable them to experience the difficulties of locating certain species in situ.

Photographs: Jean -André Audissou





Fig. 15. *Haworthia graminifolia* Schoemanspoort  
 Fig. 16. *Haworthia pubescens* Sandberg Hills.  
 Fig. 17. *Haworthia cooperi* v. *pilifera*. S. of Cradock  
 Fig. 18 - 19. *Haworthia devriesii*. N. of Prince Albert  
 Fig. 20. *Haworthia bayeri*, Uniondale



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