

Book Review

A Feast of African Monocots

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The Amaryllidaceae of Southern Africa

Graham Duncan, Barbara Jeppe, Leigh Voigt (2016)

Umdaus Press, Hatfield, Pretoria, South Africa

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With the most recent ordinal and familial classification of the angiosperms, the Angiosperm Phylogeny Group (2016) (APG IV) places 14 families in the Asparagales; together they comprise c. 35,513 species of global distribution. Orchidaceae (26,460 species) dwarfs all other Asparagoid families and makes the order the far most speciose of all monocot orders.

Amaryllidaceae (Christenhusz *et al.* 2017) is largely warm-temperate and tropical in distribution with representatives on all the habitable continents. The amaryllids, with c. 2,140 species constitute the fourth largest family in Asparagales after Orchidaceae (25,000 species), Asparagaceae (3,220 species) and Iridaceae (2,244 species), followed by Asphodelaceae (1,200 species). All other families are considerably smaller (Christenhusz *et al.* 2017). Three subfamilies are recognised in Amaryllidaceae: *Amaryllidoideae* (c. 1,000 species), *Allioideae* (1,134 species) and *Agapanthoideae* (7 species). A major radiation of *Amaryllidoideae* has occurred in southern Africa, with c. 250 species (11.6% of global total of *Amaryllidoideae*). The greatest radiation of Amaryllidaceae is in the Neotropics with 375 species (17.5% of global total) with a lesser centre of distribution in the Mediterranean basin. Australia has a very depauperate amaryllid flora – only c. 21 species (Hewson 1987; Lang 2008; Lehmillier

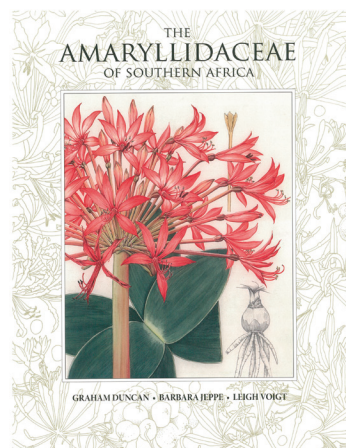


Figure 1. Cover art for *The Amaryllidaceae of Southern Africa*.

et al. 2012 a, b; Barrett and Barrett 2015), 0.98% of the global total of amaryllids.

In this splendid book Duncan, Jeppe and Voigt treat 263 amaryllid taxa (250 species, as well as subspecies and varieties), but exclude six species undescribed at that time (e.g. *Gethyllis* species). Also excluded from the book are the former Agapanthaceae (*Agapanthus* – 7 species) (Agapanthoideae) and Alliaceae (*Allium* – 1 species, *Tulbaghia* c. 20 species in southern Africa) (Allioideae) which were not recognised as families in Amaryllidaceae by APG III when the book was in preparation. Their area of geographic interest takes in all or part of seven countries from about 17–35° south in latitude, that is southward of the Kunene, Okavango, Zambesi and Limpopo rivers: Botswana, Lesotho, southern Mozambique, Namibia, South Africa, Swaziland and Zimbabwe.

Four of the thirteen tribes of Amaryllidaceae are covered in the book: *Amaryllidoideae*, *Cyrtantheae*, *Haemantheae* and *Pancrateae*. Almost all tribes, genera and species are endemic to southern Africa.

The Amaryllidaceae of Southern Africa is a taxonomic account and a picture gallery of the amaryllids. Graham Duncan authored the text and the late Barbara Jeppe, and her daughter Leigh Voigt, provided the superb watercolour portraits of the plants in 262 colour plates. Duncan has made a reputation for himself as a great authority on the taxonomy and horticulture of petaloid monocots in South Africa, evidenced by the citation of many of his publications in this work (under their respective generic entries). His hitherto most notable and recent contribution is the excellent monograph *The Genus Lachenalia* (Duncan 2012), a landmark in botanical publication. *The Amaryllidaceae of Southern Africa* will cement this reputation. No new names or combinations are published in the book.

As stated in the *Introduction* there are four primary aims of the book: ‘to stimulate greater appreciation of the diversity of southern African Amaryllidaceae through the medium of botanical art; to draw attention to the conservation plight and the urgent need to conserve habitats; assist readers with plant identification; and encourage cultivation and propagation of plants acquired through reputable sources’. Four brief introductory chapters establish the context and provide background information before the meat of the book

– the generic and species accounts and keys spanning 666 pages. This introductory text (of nine pages) comprises an *Introduction*, *Brief History* (of discovery by Europeans and taxonomic history), *Biogeography* and *Survival Strategies* (of these bulbous, rarely rhizomatous, seasonally-dormant geophytes). Each chapter is comprehensively referenced.

The generic and species accounts deal with 18 genera and 263 species, subspecies and varieties. The genera, arranged alphabetically, are *Amaryllis*, *Ammocharis*, *Apodolirion*, *Boophone*, *Brunsvigia*, *Clivia*, *Crinum*, *Crossogyne*, *Cryptostephanus*, *Cyrtanthus*, *Gethyllis*, *Haemanthus*, *Hessea*, *Namaquanula* (placed in *Hessea* in Mabberley 2017), *Nerine*, *Pancratium*, *Scadoxus* and *Strumaria*. Each genus is introduced over three to six pages before the alphabetically arranged species accounts, and each is given a generic description; etymology; brief history; distinguishing features and affinities; distribution; habitat and life cycle; pollination; medicinal uses and poisonous properties; and references. Numerous high-quality colour photographs (see below) illustrate representative species, often of *in-situ* plants in habitat; they provide a wealth of information and delight. Photo credits accompany photo captions.

The accounts of the species and infraspecific taxa are each given two (rarely three) facing pages, the text on the left and the paintings on the right; 13 taxa are not illustrated because of lack of material. The text gives the botanical name with author(s), common names (in various languages) and a detailed description before the subheads: major synonyms; etymology; flowering period; brief history; distinguishing features and affinities; distribution; habitat and life cycle; conservation status; and cultivation. The distribution of each taxon is shown by dots on a small monochrome map of the region, shaded to show altitude in 500 m increments; the small scale and lack of colour sometimes render altitudinal information difficult to read.

Keys to genera and species within genera follow the species accounts over 17 pages. Infraspecific taxa are keyed in the species accounts. Then follows a detailed 10- page chapter on cultivation, propagation, ‘feeding’, pests and diseases, useful addresses (of bulb societies), and South African sources of plant material. A glossary then follows and three indices: botanical and common

names; artists, botanists, authors and other contributors; and medicinal and other uses. Finally, lists are given of people involved in supporting the Sponsors', Collectors', and Subscribers' editions (what these are is unexplained).

The text, as we would expect from Duncan, is comprehensive, authoritative, lively, well-written and abundantly referenced. The references constitute as good a bibliography on the subject as we are likely to find. Throughout there is a beautiful integration of text and illustrations, the result of very high-class design and production values.

The glory of this book lies of course in its illustrations – the faultless, vivid and elegant watercolours of Barbara Jeppe (1921–1999), to whom the book is dedicated and who conceived the book in 1971 – and her daughter Leigh Voigt. Both are very highly accomplished artists and together they illustrate 262 taxa (Jeppe 167 taxa and Voigt 95). Thirteen species are not illustrated in the book and five illustrations are reproduced from *Curtis's Botanical Magazine* and *The Flowering Plants of South Africa*.

Individual plates are usually reduced to 50–90% (mostly 85%) of the original life size. A scattering of plates are life size (*Apodolirion*, *Hessea*, *Strumaria*). The provenance of the material used for illustration is given where known. It is interesting that for some paintings the artists relied on photographs and herbarium specimens only (you would never guess this). A few of Jeppe's paintings were reworked or modified by Voigt.

The design of the plates by Jeppe and Voigt is very beautiful and almost all show the vegetative and floral parts – the bulb or rhizome, leaves, and the inflorescence and infructescence. Enlarged floral details are not depicted, but this hardly matters in a group with large flowers as in the amaryllids. For species with unusually small flowers (e.g. *Nerine frithii*, *N. rehmannii*, *Strumaria tenella* and *S. bidentata*) enlarged floral details, revealing the range of floral morphological variation in the genera, would have been welcome, as given in several plates originally published in *The Flowering Plants of South Africa* (e.g. *N. hessioides*).

Because so many of the species are large, robust herbs, they must be depicted showing partial or truncated leaves and inflorescences but this is in no way a limitation; the artists' outstanding design sensibilities result in no loss of information or aesthetic compromise.

South Africa has a very fine tradition of botanical artistic practice (Arnold 2001; Hickman *et al.* 2017) in the service of taxonomy and horticulture, as well as for more purely aesthetic motives. This book is and will remain a landmark publication to the glory of that tradition. The first of the four primary aims of the book, 'to stimulate a greater appreciation of diversity among the southern African [...] Amaryllidaceae through the medium of botanical art', has been nobly achieved, but also achieved is a superb marriage in the book of botanical art and of photography. The 143 photographs of plants, most *in situ*, and of paintings works remarkably well – because of the quality of both, and because each mode conveys information not available in the other, particularly so in the invaluable ecological information of plants viewed in habitat. To integrate these into the whole is also a triumph of book design and very high-quality production, the exceptional work of the designer Tersia van Rensen and editor Emsie du Plessis. This is as good as it gets in publishing.

Conservation Status, if it has been assessed, is given for each species according to the South African National Biodiversity Institute Red List of South African Plants (www.redlist.sanbi.org) and for a few species the assessments of the National Botanical Research Institute, Namibia (www.nbri.org.na) (but without criteria given) and in the text conservation threats are given only fairly cursory treatment if mentioned at all. One can't help feeling that there is much more to be said about threats and conservation status of species. This information is all the reader is given despite conservation being identified in the *Introduction* as one of the four primary aims of the book, 'to draw attention to the perilous position of an increasing number of [...] species in the wild and [...] the urgent need to conserve ever-dwindling habitats'. Nothing in the texts actually conveys this and the reader has to go to the individual SANBI Red List evaluations on the SANBI and NBRIN websites to see how each conservation status is derived, i.e. what constitutes the threats for the amaryllid flora. The reader would not unreasonably expect a separate chapter (among the introductory chapters) presenting an overview of conservation issues for Amaryllidaceae in southern Africa and indicating the classes of natural and anthropogenic threats that prevail, and *in situ* and *ex situ* measures to ensure conservation of the

taxa. One species, *Cyrtanthus striatus* is extinct, and *C. rhododactylis*, collected once in the wild, has never been found again and many species are rare, vulnerable or endangered.

The fourth aim of the book is 'To encourage amaryllid cultivation and propagation through plant material acquired from reputable sources'. The paintings and photographs in this book will have horticulturists salivating, but apart from a few genera and species in common cultivation world-wide, most species are never or rarely encountered in general horticulture. In Australia we are very familiar with *Amaryllis belladonna*, a few *Clivia*, *Cyrtanthus*, *Haemanthus* and *Nerine* species. Remarkably, only 15 of the amaryllid species of southern Africa are included in the *Horticultural Flora of South-eastern Australia* (Spencer *et al.* 2005) and these are all easily cultivated. A chapter in the book is devoted to cultivation, and notes are given for almost all species in the individual species accounts. Many are grown in South Africa in specialist collections in botanic gardens, notably Kirstenbosch, and privately, but some are apparently difficult subjects in horticulture, such as those that occur in very arid climates, on low-nutrient soils or that are pyrophytes, flowering only after fire. While some of the pyrophytes are easily grown, they rarely or never flower in cultivation. From the cultivation notes given many are extremely sensitive to overwatering or 'wet feet'. How many are amenable to general horticulture in Africa and around the world remains to be seen.

The chapter *Survival Strategies* outlines the morphology and phenology of the plants in the wild and is crucial in understanding the horticultural management of amaryllids. Of the taxa, 12 (*Clivia*, *Cryptostephanus* and *Scadoxus* species), are rhizomatus, all other species are bulbous. A primary division with few exceptions in the amaryllid flora exists between summer rainfall-winter dormant species, and winter rainfall-summer dormant species; dormancy is characterised by deciduousness, i.e. death of leaves. For each species the information given in *Distribution, Habitat and Life Cycle* provides essential information relevant to horticultural management, along with cultivation notes (in species accounts) and the chapter *Cultivation*. Management of southern African amaryllids in cultivation demands a watering regime that reflects the climate in the species' geographic distribution. Most species strictly

adhere to these climactically programmed growth/dormancy responses and must be treated accordingly in cultivation, then if not with lethal consequences for many species.

The book is bound to be a big stimulus to would-be commercial and non-commercial growers world-wide but a note of caution should be sounded and that is the weed potential of species in similar climates outside southern Africa. There is no mention by Duncan of any species naturalised anywhere in the world or of potential weediness. In Australia only *Amaryllis belladonna* appears to be naturalised, but it is only weakly invasive, unlike the highly invasive *Agapanthus praecox* subsp. *orientalis*. But what about other African amaryllids (including *Agapanthoideae* and *Allioideae*)? Duncan should have mentioned this issue but it seems to be ignored in the botanical literature of South Africa generally, including Duncan's (2012) excellent monograph on *Lachenalia*. More particularly, the problem potentially assumes frightening dimensions in the explicit horticultural promotion of South African Iridaceae by Manning *et al.* (2002), a family that is spectacularly invasive, at least in Australia. That these authors and Duncan can ignore the weed potential of the species they promote is puzzling and unfortunate, if not reprehensible, given the catastrophic invasion of South African biomes by weed species that have 'escaped' cultivation, a conservation threat that Duncan identifies for a number of amaryllids.

We are reminded throughout the book of the crucial role that horticulture has historically played and currently plays in taxonomy, given in the *Brief History* chapter and in species accounts. Many species have been described from cultivated material in Europe and South Africa, while many of Jeppe's and Voigt's lovely paintings were executed using cultivated material (sources or provenance identified in Duncan's text where known).

Several caveats concerning the text are noted here as a personal preference and they concern nomenclature and etymology. The first thing I usually look for in a serious taxonomic botanical publication is the full citation of a taxon's name: the binomial or trinomial citing the author(s), where published, as well as the date. Here Duncan only gives us the taxon name and the author(s). This also applies to the major synonyms

given, for which we might have expected at least a date. This kind of ready information which Duncan would have had at his fingertips provides a *de facto* potted taxonomic history of the taxa and the family overall and would add to the interest of each account of the species, subspecies and varieties. The *Brief History* given under each taxon only indirectly and always incompletely provides the above information.

There is one unexplained and curious exception to the citing of authors for botanical names in the book, namely for *Clivia robusta*, described in the treatment by Murray *et al.* (2004), in which this species and two varieties are described. These names are relegated to synonymy under *C. gardenii* var. *gardenii* and *C. gardenii* var. *citrina* by Duncan with a convincing justification. The full citation is given (under the subheading *Synonym*), including details of the type collection, herbarium etc. The citation of full details for *C. robusta* is a stand-alone inconsistent departure in the book; the species is recognised by others, for example in the SANBI Red List (www.redlist.sanbi.org).

Etymology, as given for each genus, species, subspecies and variety, is often not etymology, rather it is what the overall meaning of the name is without its etymological derivation. 'Etymology' as given in the book usually says, 'descriptive of the ... [attribute alluded to]' and not the expected breakdown of its parts, its Latin or Greek derivations etc. Again, this information must have been at Duncan's fingertips and would have enhanced the book.

Does *The Amaryllidaceae of Southern Africa* live up to its four stated primary aims? The answer to the first aim – 'to stimulate a greater appreciation of the diversity among southern African [...] Amaryllidaceae through botanical art' – is yes with bells on! The book falls short on its stated conservation aim (the second aim) in drawing attention to the perilous conservation status of species and urgent need to conserve ever-dwindling habitats. This I think is the book's most significant limitation because, apart from very scant textual information, all further accessing of conservation information depends on the reader viewing online SANBI Red List data; additionally there is no overview of conservation issues as they apply to Amaryllidaceae in the text – the reader has to go mining in other territory. The book likely fulfils very well its stated third aim 'to assist readers

with identification of plants'. Because of the time of year (autumn) I have attempted to identify only one amaryllid using the generic key and description and images (ie. *Nerine bowdenii* subsp. *bowdenii*). I got the answer quickly and easily. The fourth aim, 'to encourage their cultivation and propagation...' probably succeeds very well, but with such self-proclaimed botanical and horticultural glories as most amaryllids are, no hard-sell is needed, they are their own promoters. For many species the success of horticultural aspirations is likely to be contingent on how amenable they are to cultivation in southern Africa.

Every once-in-a-while a book is published that leaves the reader reaching for superlatives; this is such a book. The authors, Graham Duncan, Barbara Jeppe and Leigh Voigt and all involved in the production of this book are to be warmly congratulated. It is sad that Barbara Jeppe did not live to see the results of her labours but she has earned an enduring place in the pantheon of South African botanical artists, as has her daughter, Leigh Voigt.

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