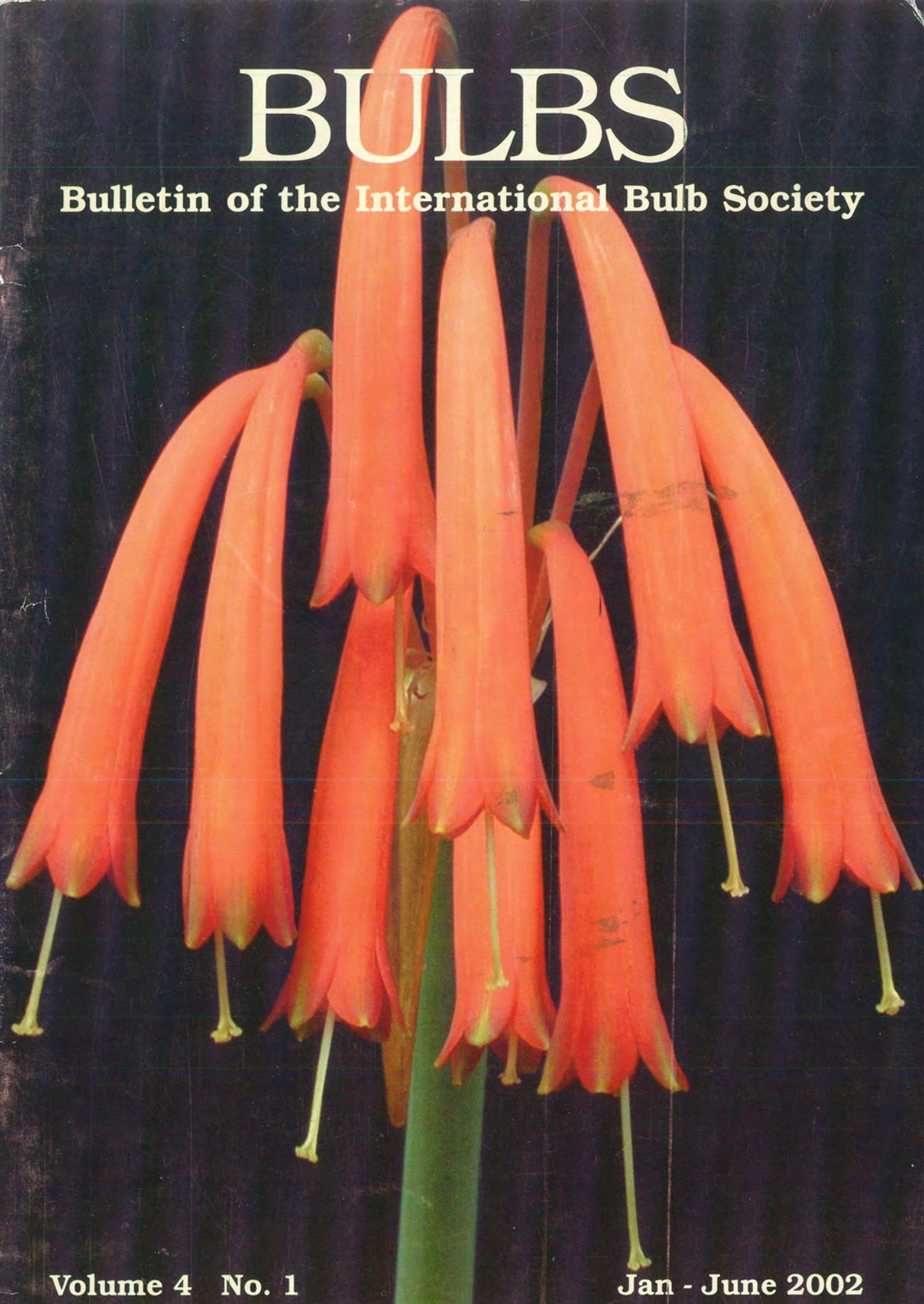


BULBS

Bulletin of the International Bulb Society



Volume 4 No. 1

Jan - June 2002

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Bulbs

The Bulletin of the International Bulb Society

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Join the International Bulb Society! Member benefits: annual *Herbertia*, semi-annual *BULBS*, semi-annual Seed Exchange (SX), educational website, email Bulb Forum, and the Bulb Exchange (BX) (for members of the email Bulb Forum).

1 Year US	\$40.00
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BULBS

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COVER PHOTO
Cyrtanthus tuckii var. *viridilobus* by Bill Dijk

First Words

Tony Palmer - Editor

I've been a member of the IBS since 1997. What an experience. So much learnt from your collective wisdom and knowledge. So many friends made around the world, most of whom I've never met, but yet feel I know so well. Some I have met in person and it has always been a most pleasant experience. My wife and I would love to travel and meet more of you and of course any of you who choose to visit New Zealand can be assured of a warm welcome. Unfortunately a fairy godmother will be required to pay the air fares!

That's one of the disadvantages, of course, of living so far away from the rest of the globe, but we mustn't complain as we are blessed with a climate that varies so much from one end of the country to the other, that we can grow almost any bulb somewhere. In that regard one of the other great benefits of IBS membership is, of course, the exchange of seed and plants. As a result I have acquired seed of species that I might otherwise never have had the excitement of growing. A couple of other long standing New Zealand members who have contributed to, and benefited from these exchanges, are Bill and Willy Dijk. I hope you will enjoy the article I have written about them and their nursery, Daffodil Acre.

Then there are the joys of the online forum and images list. Mary Sue Ittner is a master at distilling from her amazing archives the essence of a subject that has been discussed. I am so pleased to have her writing again, this time about getting bulbs in sync when they are sent between hemispheres.

To add to the New Zealand flavour of this issue we have a comprehensive article on *Clivias* by our own Dr Keith Hammett. Long promised, finally delivered, and well worth waiting for. Indeed, if it had been written earlier we would not have had the 'scoop' of being able to include a newly described species, *C. mirabilis*.

To coincide with the publication of his new book *Grow Nerines*, Graham Duncan has written an authoritative article on *Nerines* and Lisa Flaum includes a review of his book in her column.

From South Africa, Rhoda McMaster has contributed an interesting article on Stutterheim's *Grandiflora Moraeas* and she has more fascinating topics in the pipeline.

Robert Turley, Rachel Saunders, Bill Richardson, and I have compiled some World News items. I would like contributions from as many countries as possible for this feature in future issues.

The last but not least major benefit of being an IBS member is access to the Societies Publications *Herbertia* and *Bulbs*. Not much benefit if you hardly ever get them though. I pledge to do my utmost to see that *Bulbs* will in future be received by you twice yearly and on time. To achieve this I need plenty of copy. So far your response has been great and I already have enough for the next issue. Thanks.

Email Tony at: adpal@ihug.co.nz

NEW PROCEDURES FOR DONATING TO THE SEED EXCHANGE AND BX

From now on, non-US donors please send donations to:

Gerrit Oskam
Plantsoensteeg 6
3961 CB Wijk bij Duurstede
The Netherlands

Gerrit will then obtain a phytosanitary certificate for them and send them on to the United States. Please post in mailing envelopes only, not boxes. Please do not send anything other than clean SEED, no bulbs etc. Donors from the US should continue to send donations of seed or bulbs to:

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Hillsdale NJ 07642 USA
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World News, Views and Events

From America . . .

The Magic of Bulbs

Robert M. Turley

Lake Charles, Louisiana USA

It is hard to believe how the seasons have moved forward so fast that summer is already here. I was just enjoying the daffodils and tulips in containers on the patio, it seems yesterday, and now it is the end of May with crinums and rainlilies in full bloom. I have one of the most beautiful sights in my garden this year: three years ago I planted three large bulbs of *Crinum x herbertii* 'Carroll Abbott.' Now the three bulbs have grown into clumps forming one large clump, which is in bloom with 22 magnificent stalks of white and burgundy striped flowers. Repeating scapes make for a long season of bloom. The fragrance is marvelous!

Another bulb that is really making a show in the garden is *Habranthus robustus*. The bulbs have increased and with their prolific seed setting habit, I have planted it in the garden in different places. This precious little bulb is really making a show. To this I can add *Zephyranthes macrosiphon*. The pink color is brighter and the flowers are larger when these bulbs are grown in outdoor pots and in the garden, than when they are grown in the greenhouse. This is another one that increases well both in bulbs and seeds. I will use this bulb a lot more, too.



Habranthus robustus. Tony Palmer

May and early June is *Hemerocallis* season along the Gulf Coast States. This particular geophyte has always been a perennial favorite and many beds are devoted to its culture. The garden is ablaze with *Hemerocallis*.

"The Magic of Bulbs" was the theme of the IBS Symposium, held in the Huntington Botanical Garden, San Marino, California, April 27 & 28, 2002. Those in attendance were well pleased with the program. Fascinating bulbous topics with great presenters, and a wonderful bulb auction providing plenty of bulbs for everyone to take home and enjoy.

To our hosts Michael Vassar and Jim Folsom at the Huntington Botanical Garden: thank you for being so gracious and what a wonderful place to have a Bulb Symposium. The IBS Bulb Symposium 2002 was the work of Herb Kelly, Jr. of Sanger, California. Herb Kelly is to be commended for the fine job he did in making the Symposium a reality!

The Symposium began with a presentation on those rare and elusive blue Amaryllids by noted author and IBS editor, Dr. Alan Meerow, from the USDA-ARS-SHRS in Miami, Florida, entitled "I'm So Lonely I'm Blue: Brazil's Endangered Blue Amaryllis".

Charles Hardman, noted southern California *Hippeastrum* grower and immediate past President of IBS, provided us with an informative presentation on "Hippeastrum, Early Hybrids & Species".

Crinum enthusiast and breeder, Dave Lehmiller of Beaumont, Texas updated us on "New Developments in Crinum Hybrids".

Michael Vassar, Director of Floristic Gardens, Huntington Botanical Garden, gave a fascinating look at "South African Winter Growing Oxalis". After seeing and hearing Michael's slide presentation on *Oxalis*, his auction of *Oxalis* items went like hot cakes.

What followed next was, to me, one of the most interesting presentations I have had the privilege of hearing, and that was Phillip Adams' program on "Lycoris: Jewels of the Bulb World, Species, Culture and selected Hybrids." Phillip is from Mississippi but lives and works in the Los Angeles area.

James Baum, Botanist at the Los Angeles

County Arboretum, took us on a fascinating trip to Mexico with "Hymenocallis and other Bulbs of Mexico."

Ending the Symposium presentations on Sunday morning was distinguished author and *Clivia* enthusiast, Harold Koopowitz on "Modern Clivias and Future Trends." Harold has just written his latest book on CLIVIAS with photographs by James Comstock and the Forward by Sir Peter Smithers. This is a must have for those interested in this South African amaryllid. Timber Press is the publisher of the book.

The bulb auction was a great success thanks to the talents of auctioneer Charles Hardman. I do not know of anyone who went home without something new and exciting to grow!

The International Bulb Society recognized two outstanding individuals in its 2002 awards presentation: Herbert Medalist, Dr. Marcel Le Nard of France, and Hamilton P. Traub Award, Mr. Michael Vassar of California, USA.

Special thanks to the following people for their cooperation, generosity and kindness, which helped to make this symposium a success: Phillip Adams, Jerry Ainsworth, Kathy Andersen, James Bauml, Patty Colville, Mike Craib, Dan Davids, Jim Folsom, Catherine Ghan, Charles Hardman, Molly Hitchcock, Kelly Irvin, Herb Kelly, Kent Kelly, Pam Kelly, Harold Koopowitz, Dave Lehmler, Laura Lyons, Alan Meerow, Joyce Miller, Cynthia Mueller, Pacific Horticulture, Dell

Sherk, Jim Shields, Russell Stafford, Claude Sweet, Boyce Tankersley, Arnold Trachtenberg, Michael Vassar and Doug Westfall.

Local meeting of the Pacific Bulb Society

Saturday, August 10, 2002, 10:00 am. Jane McGary will host the next local meeting of the Pacific Bulb Society in Portland, Oregon. Please contact Jane McGary for details. Phone: 503-630-3399 E-mail: JaneMcGary@earthlink.net



L to R: Herbert Kelly Jr, Director of IBS Awards & Recognition; Michael Vassar, recipient; and Robert M. Turley, President of IBS. Photo Arnold Trachtenberg



As many of the participants who could be rounded up on the last day of the Symposium.

Photo Bill Dijk

From New Zealand . . .

Tony Palmer

The item below about a well-known IBS Life Member, Terry Hatch, is reproduced by kind permission of the New Zealand *Commercial Horticulture* magazine:

"The Royal New Zealand Institute of Horticulture has created three new Associates of Honour - Terry Hatch (Auckland), David Shillito (Christchurch) and Gordon Collier (Taihape).

Associates of Honour are awarded "to persons who have given distinguished service to horticulture in New Zealand." Here are extracts from the citations:

Terence Charles Hatch

An industry character, Terry was born in Hackney, London, claims Huguenots, flower growers and plantsmen are ancestors and boasts the plant growing gene is deeply embedded in his makeup.

His initial horticultural achievements included mustard cress (aged 2-3), a fascination for his aunt's alstroemerias (5) and by eight, was flowering dodecatheons and swapping auriculas with relations.

When his attention switched to cacti, his father built him several glasshouses to accommodate his collection. Aged 11 Terry worked after school in several nurseries and at 15 became an apprentice to the local parks department and became a 1st Class Certificated Gardener in 1962.

National service with the Royal Air Force in Cyprus interrupted his training but in his spare time he collected wild cyclamen and tulip seed.

In 1963, Terry and his wife Pam emigrated to New Zealand where he worked for Pettit's Nursery (Otahuhu) then set up on his own producing rock and alpine plants, perennials, bulbs and groundcovers. The nursery shifted to Runciman Road, Pukekohe East and Joy Plants became Mecca for serious Auckland gardeners.

Terry travelled widely, collecting plants and seed throughout the world and has bred *Alstroemeria* 'Pink Joy', *Osteospermum* 'Whirlygig' and 'Whirly Pink', and *Cheiranthus* 'Joy Gold' and 'Winter Joy' and was awarded the Institute's Plant Raiser's Award in 1992. He

has developed a wonderful series of nerines including a tall sparkling white (Peace Dove), is developing clivias and has returned to one of his first and greatest loves, *Helleborus*.

Terry is committed to conservation, has helped eradicate cats from Little Barrier Island and has raised and planted over 110,000 mixed natives and 25,000 to 30,000 pohutukawa on Great Mercury Island.



Pam and Terry Hatch. Tony Palmer

He was a foundation member of the New Zealand International Plant Propagators' Society, was RNZIH regional chairman (1981/2), and is currently president of the Friends, Auckland Regional Botanic Gardens. He lectures and has written extensively. He co-authored *Bulbs for New Zealand Gardeners and Collectors* with Jack Hobbs. His recent work, *Grandad Went to Africa*, has a serious message and profits go to South African's Green Trust to help create a sustainable ecological future for the black communities of the Cape."

Inaugural New Zealand Clivia Show

A steering committee has been formed to organise the inaugural New Zealand Clivia Show which is scheduled to be held at the Auckland Botanic Garden on the weekend of 12 - 13 October 2002.

The format will be:

- A display illustrating as far as possible *Clivia* species and their development in cultivation. Plants will be lent by those of us with collections and will be staged by staff of the botanic garden. Clivias will be displayed in association with other plants hopefully representative of plants which grow in association with *Clivia* in natural habitat.

- A display of specimen potted plants illustrating the variation which exists especially within *C. miniata*.

- Provision to display cut blooms.

- A display of *Clivia* flowers and leaves used in floral arrangements. [No competitive element is envisaged for this inaugural show.]

- Individual stalls where exhibitors can sell plants. Exhibitors to pay 10% of their takings to the show.

- Information sheets will be prepared on

- A. Background of the genus.

- B. Growing guide

- C. A questionnaire seeking interest in the possible formation of a New Zealand Clivia Club.

- Practical workshops and slide shows will be held throughout the weekend

- Admission to the show will be by way of gold (coloured) coin donation.

From South Africa . . .

Autumn in South Africa

Rachel Saunders

We have just returned to Cape Town from a three-week trip around South Africa. In the majority of the country, which receives summer rain, all the flora is preparing for winter. The grasses are in seed and turning brown, the deciduous trees are dropping their leaves, and the bulbous/cormous plants are going dormant. The nights are cold and in some areas, frosty, and the ground is beginning to dry out.

However, the Western Cape flora is just

waking up after a long, hot, dry summer, and the first autumn rains have fallen in Cape Town and further north. We came home via Namaqualand where we hoped to see the flowers commonly called "Maartblomme" or "March flowers" - the autumn flowering Amaryllids. Although it wasn't the best display we had ever seen, we had 3 lovely days of flower and seed hunting.

Up in the arid north, close to the Namibian border, we found *Haemanthus namaquensis* in full seed. The flower stalks are about 25cm long, topped by huge bunches of bright red fleshy seeds similar to cherries. For some reason they had flowered extremely well and they were easy to find amongst the sparse desert vegetation. We then moved southwards to Springbok, which was very dry, and apart from some scattered *Brunsvigia bosmaniae*, we found nothing in flower or seed. Moving south again to Kamieskroon, we found *Haemanthus amarylloides* subsp. *polyanthus* in seed, with their glistening white fleshy coverings. Normally the SW Cape, a Mediterranean area, receives a small amount of summer rain, but this last January (mid-summer) was one of the wettest on record, and obviously some of that rain moved as far north as Namaqualand.

The next day we spent at Nieuwoudtville where we found Amaryllids both in flower and seed. Seed-bearers were *Crossyne flava*, *Brunsvigia bosmaniae*, *Haemanthus barkerae* and *H. amarylloides* subsp. *amarylloides*. In flower were some late *Crossyne flava* with their strange yellow flowers, scattered *Brunsvigia bosmaniae* and several species of *Hessea* and *Strumaria*, those small Amaryllids with white or pink flowers. Some are beautiful on their own, for example *Hessea breviflora* and *stellaris* with their 15cm umbels of dark pink flowers, while others are small and are really only striking when flowering en masse, eg *Strumaria tenella* and *S. discifera*. *Strumaria watermeyeri* and *salteri* were both in bud and the first pale pink flowers were opening.

Apart from the Amaryllids, the first of the polyxenas and syringodeas were flowering in the area. Syringodeas are similar to romuleas with small, star-shaped, mauve flowers. They normally form huge colonies and, when in flower, make huge mauve sheets across the ground. They have an unusual characteristic in that their seed capsules are borne just below the soil surface, which makes them extremely difficult to harvest,

and this probably explains the large tightly packed colonies as well.

As we drove south to Cape Town, the vegetation became greener and greener as the rainfall increased. It is raining again now, so hopefully this winter and spring will bring a good flower display again.

From Australia . . .

Growing Bulbs in Australia

Bill Richardson

Every year I await eagerly for autumn to arrive as this is the time to sow winter growing bulbous seeds. Many of them flower early during the winter months to add color to this dreary time of the year. This experience of growing from seed and following the cycles through to flowering stage can be time consuming but quite fascinating. It is well worth the effort and experience. As the winter approaches, the newly sown seeds flourish and grow while the previous years sowings hopefully will give you the reward of beautiful flowers.

Although many of my bulbous plants are grown in pots, I have recently ventured out into the garden and planted out a bulbous garden bed using many bulbs I have grown from seed. These I have mixed with other plants that grow too large for pots.



Ferraria crispa. Tony Palmer

Here are a few examples of what I have planted out: *Crinum*, *Haemanthus*, *Albuca*, *Ferraria*, *Tulbaghia*, plus others mixed with *Canna*, *Arum*, *Chasmanthe*, *Dianella*, *Lachenalia* and *Doryanthes*.

I have made some observations regarding these plantings which may be of interest.

Haemanthus coccineus: flowered earlier when grown in pots and produced seed, whereas the garden plants flowered later and produced no seed.

Ferraria crispa: put on the most beautiful display of green growth but not one flower. I have left them in the ground during the dry spell to see what results will be achieved next season.

Albuca spiralis (I think): thrived and produced massive leaves and flowers spikes up to 5 or 6 feet high. Most impressive.

Crinum moorei: multiplied by sending offshoots up but did not flower. Potted plants achieved the same results but leaves are in better condition.

Tulbaghia violacea: I used this as a border planting along the edge and it gives a constant display of flowers. My two Yorkshire Terriers love sitting on it and it emits a very strong garlic perfume throughout the garden.

Also in this garden is the lovely *Dianella tasmanica* which spreads quite rapidly and even emerges under the garden path. All the *Chasmanthe* species make a good display and are one of the early flowerers here with the exception of *C. var. ducketii*, which flowers late.

Doryanthes palmerii is also in the garden but doesn't seem to do so well here, although I saw a huge clump of this in the Adelaide Botanical Gardens which gave me a scare as I envisaged my own plants getting that big and taking over the garden. I've got my eye on it now!

Many of my plants are in pots as they are not suitable for the garden because of the danger of frosts and the wet weather we have. One of these is *Whiteheadia bifolia*, which is one of my favorite unusual species with its two large leaves and long green flower spikes. My *Haemanthus albiflos*, which I have been splitting up and repotting for about ten years so that I now have dozens of pots, give me the most remarkable flowering display every year and are a real talking point here. I must keep them in a protected area here from the frost.

A few years ago, a pot of *Lachenalia rubida* got left in the shed here for a long period of time. It was flowering beautifully when I found it, with no light, no water and no attention. This year, as an experiment, I repeat the exercise with the same result. Quite a remarkable achievement, it is also one of the first to flower here each winter.



Lachenalia rubida. Tony Palmer

Polyxena is usually the second species to flower in Gippsland, with the sweetest and strongest perfume that fills the air around you.

These are but a few of the species that I grow which take up most of my spare time, but in the last few years I have become interested in *Hippeastrum* and have quite a lot of lovely seedlings coming along.

Some other species worth growing that flower during the winter in Australia are *Anemone*, *Bulbine*, *Bulbinella*, *Crocus*, *Cyclamen*, *Freesia*, *Hesperantha*, *Iris*, and of course my favorite, *Ixia*.

In August you can start planting your summer flowering bulbs in Australia. September is the time to deadhead bulbous plants as the flowers finish to ensure they produce flowers next season and not seeds. In October you can plant out your Dahlia tubers.

Bulb growers interested in growing South African species from seed should consider joining two Societies. One is the "Botanical Society of South Africa" and the second is the "Indigenous Bulb Growers of S.A", who both put out yearly seed lists of stock available. They can also provide suitable books on bulbs, which are hard to obtain in Australia. Currently available is the "*Eastern Cape, South African Wildflower Guide 11*", by John Manning, plus many other interesting titles.

If you would like to contribute either some interesting notes and news from your part of the world, or a more substantial feature article, please contact the Editor, Tony Palmer at adpal@ihug.co.nz. Alternatively you can write me at 12 Kelly Road, Oratia, Auckland, New Zealand. I would also welcome feedback on any articles in the current issue. Maybe your experiences are different from those of the authors. If so, let us know and we will all learn something new.

The Genus Nerine

Graham Duncan

All photographs by the author

I have always had a strong fascination with nerines and have been growing them for much longer than I care to remember! Endemic to southern Africa, the genus is widely distributed here and centred in the eastern and northern parts of South Africa. It comprises approximately twenty-five species, very few of which are in general cultivation. However, three species, *N. bowdenii*, *N. sarniensis* and the plant previously very well known as *N. flexuosa* but now included under *N. undulata*, are important commercially produced crops. Most of the remaining twenty-two species are poorly known even to bulb enthusiasts, and several of these have become extremely rare in the wild over the past few decades. The genus is in urgent need of revision as some species are very variable, with intergradations between species making identification difficult. With a view to popularising *Nerine* species, I have recently

that *N. sarniensis* originated in Japan almost certainly stems from confusion with the superficial resemblance it has to the rose-red or scarlet flowers, and similar strap-shaped foliage, of the amaryllid *Lycoris radiata*. The latter is endemic to Japan, and is known to have occurred on surrounding hills above the port city of Nagasaki, overlooking its famous harbour.

Whatever the truth may be regarding how *N. sarniensis* came to be grown on Guernsey, the fact remains it has been cultivated there for more than three centuries, and continues to be grown there for its cut flowers. In fact, the Guernsey lily became such a familiar sight on the island that in 1958, a 3d. postage stamp depicting it was issued there. Similarly, *Amaryllis belladonna*, a native of the Western Cape Province of South Africa, has become naturalised on neighbouring Jersey, where it is today boldly depicted on postcards, and is resolutely referred to as the Jersey lily!

It was the Rev. William Herbert, cleric and amaryllid expert, after whom the International Bulb Society's official journal *Herbertia* takes its name, who established the genus *Nerine* in 1820. It is unclear whether he named it for Nerine, the Greek mythological sea nymph and daughter of sea God Nereis and Doris, or for Nereide, the daughter of Nereus, son of Oceanus. The plant takes its specific name from Sarnia, the Roman name for Guernsey. Herbert was also one of the first to work in the field of hybridising nerines.



Nerine sarniensis.

completed a cultivation guide to the genus, with colour illustrations of all but four of the species.

Nerine sarniensis, widely considered the most beautiful of all the nerines, has had quite a colourful history. The often-told but unlikely tale of how boxes of bulbs of this plant washed up on the shores of Guernsey in the Channel Islands in 1659, as a result of a Dutch or English shipwreck, and flourished there, has become something of a botanical legend.

Actually, it was originally thought to have been a native of Japan! The mistaken assumption



Nerine sarniensis 'Kirstenbosch White'.

Over the past three hundred years, more than a thousand man-made hybrids as well as cultivars, principally of *N. sarniensis*, have been raised in various parts of the world. More recently, Sir Peter Smithers began an extensive *N. sarniensis* breeding programme in the 1960s and 1970s in England and Switzerland, and produced numerous magnificent new hybrids, notably in the purple colour range. In 1995 his superb collection was acquired by Exbury Gardens, where the tradition of *Nerine* breeding, started by Lionel de Rothschild after World War One, is once again being continued by Nicholas de Rothschild.

Cultivation

Success with the cultivation of nerines begins with a sound knowledge of which growth cycle the species in question falls under, and to this end nerines can be placed into three distinct groups: exclusively winter-growing, exclusively summer-growing, and evergreen species. The winter-growing group require an absolutely dry summer dormant period; the summer-growing species require an absolutely dry winter dormant period; and the evergreens, although almost all summer-growing and winter-dormant in their wild habitats, usually continue to maintain leaf growth during the winter months when grown in temperate climates, or under greenhouse



Nerine bowdenii

protection. The only reliably hardy species is *N. bowdenii*, but the white form of *N. undulata* (previously known as *N. flexuosa* 'Alba') is fairly hardy out of doors in the United Kingdom and in The Netherlands.

Most nerines require a very sunny aspect for healthy growth and flowering to take place. Species from montane habitats like *N. bowdenii*,

N. humilis, and *N. sarniensis* prefer a situation receiving morning sun and afternoon shade, whereas grassland species like *N. filifolia* and *N. krigel*, and those from arid areas like *N. buttoniae* and *N. laticoma*, thrive on full sun all day, or for as much of the day as possible. The evergreen forms of *N. undulata* prefer light shade, including the plant previously known as *N. flexuosa*, now included under *N. undulata*.



Nerine undulata

The four winter-growing species: *N. humilis*, *N. pudica*, *N. ridleyi*, and *N. sarniensis*, do not grow well in very humid climates, whereas most of the other species can be grown successfully either in humid areas or where dry summer heat is experienced. Whereas all *Nerine* species can be successfully cultivated in containers, only certain species are suited to general garden cultivation, depending mainly on climatic conditions and the irrigation regime of the garden in question. In mild climate areas, such as coastal parts of southern California and the winter rainfall region of the Western Cape in South Africa, tough species like *N. filifolia*, *N. krigel*, and *N. masoniorum* can be grown out in the open. They easily withstand heavy winter rainfall during their winter dormant period, provided that the soil is well drained. Bulbs of species from arid



Nerine masoniorum.

habitats, like *N. buttoniae* and *N. laticoma*, will soon rot under wet winter conditions and must be grown in pots which can be stored dry over the winter dormant period. In many instances, container cultivation is the only feasible manner in which to grow the more delicate dwarf species like *N. gaberonensis* and *N. rehmannii*. In the Northern Hemisphere, terracotta pots are highly recommended for nerines but in Southern Hemisphere countries they tend to dry out far too quickly and need much more frequent watering.

Perfect drainage of the growing medium is one of the most important factors when cultivating nerines, particularly in containers. Nerines are tolerant of a wide range of soils, but it is important to note that they should never be grown in very rich soil, as under these conditions they tend to produce luxuriant foliage at the expense of flowers. Similarly, liquid and granular fertilizers should not be used at all. Ideally, the soil pH should be slightly acid to neutral. Every grower will discover his/her own ideal growing medium, and at Kirstenbosch I use a mix of washed river sand or silica sand (swimming pool sand), mixed in varying quantities with finely sifted compost. In the United Kingdom, John Innes number 2 compost is recommended for nerines. I grow easily cultivated species like *N. filifolia* and *N. krigei* in a mix of equal parts of sand and compost, whereas for more tricky species like *N. laticoma*, the amount of compost is reduced considerably. *Nerine* bulbs, like all other amaryllids, have perennial fleshy roots that resent disturbance. Once bulbs have been planted, they should be left in the same position

for many years until they become too overcrowded and flowering performance diminishes.

The bulbs of most *Nerine* species grow very close to the surface, but it is important that the various species are planted at the correct depth. The winter-growing species, like *N. sarniensis* and *N. humilis*, prefer to have their necks partially exposed, whereas the exclusively summer-growing species, like *N. krigei* and *N. buttoniae*, should be planted so that the top of the neck rests just below soil level. The bulbs belonging to the evergreen group of species, which have thread-like leaves, can be planted with their necks at, just below, or just above soil level. Watering procedure is very important, and for actively growing nerines I have found it best to water heavily at well spaced, regular intervals.



Nerine humilis.

During the active growing period, a heavy watering every two weeks is suggested for both winter- and summer-growing species, allowing the soil medium to dry out almost completely in between.

The *Nerine* species: Winter-Growing

The four exclusively winter-growing species are *N. humilis*, *N. pudica*, *N. ridleyi*, and *N. sarniensis*. They all occur naturally on mineral-poor, acid sandstone soils and flower in autumn, just before, or as the new leaves begin to appear. Having very high ornamental value, *N. sarniensis* is by far the most widely cultivated of these, followed by the very variable and widespread *N. humilis*. *N. pudica* is grown to a very limited extent in South Africa and the United Kingdom,



Nerine ridleyi.

and as far as I know, *N. ridleyi* is only in cultivation at Kirstenbosch. The latter is a most beautiful species, strongly reminiscent of *N. sarniensis*, but even more notorious for erratic flowering performance.

Summer-Growing

The five exclusively summer-growing species are *N. bowdenii*, *N. huttoniae*, *N. krigel*, *N. laticoma*, and *N. marincowitzii*. From a horticultural viewpoint, by far the most important of all the nerines is *N. bowdenii*, several cultivars of which are grown on a very large scale in The Netherlands, primarily for the cutflower industry. It is the only reliably hardy member of the genus and in its natural habitat grows in leaf litter on

steep, south facing slopes. Like *N. sarniensis*, it is notoriously erratic in its flowering performance. *N. huttoniae* and *N. laticoma*, which look very similar and in certain respects resemble the genus *Brunsvigia*, differ in minor taxonomic details although the two species are widely separated geographically. *N. huttoniae* is restricted to the Eastern Cape Province of South Africa, whereas *N. laticoma* occurs across a vast area of southern Africa stretching from northern Namibia to Botswana, and throughout most of the eastern and northern parts of South Africa. *N. krigel* is



Nerine krigel.



Nerine laticoma.

one of the most under-rated of all the species and it is an easily grown subject with medium-sized, dark pink flower heads and ornamental, spirally twisted leaves. It thrives in almost any soil provided that it is well drained, receives full sun or very high light intensity during summer, and is kept as dry as possible during winter. *N. marincowitzii* is the most recent discovery, restricted to just one known locality in the dry Western Cape interior. It is a highly attractive dwarf species, with pale pink flowers with white throats, and is extremely rare in cultivation.

Evergreen

The evergreen group of nerines is by far the largest, comprising sixteen species, which occur mainly in the eastern and northern parts of South Africa. These are *N. angustifolia*, *N. appendiculata*, *N. filamentosa*, *N. filifolia*, *N. fritthii*, *N. gaberonsensis*, *N. gibsonii*, *N. gracilis*, *N. hesseoides*, *N. masoniorum*, *N. pancratioides*, *N. platypetala*, *N. pusilla*, *N. rebmannii*, *N. transvaalensis*, and *N. undulata*. Almost all of them have numerous very narrow, thread-like leaves. The most easily and widely cultivated of these species is undoubtedly *N. filifolia*, that gregarious and most reliably floriferous species from the Eastern Cape, which just thrives on



Nerine filifolia.

neglect and never stops multiplying. *N. angustifolia* and *N. appendiculata*, two pink-flowered species with very long flower stems, look very similar indeed and are separated mainly on the grounds that *N. appendiculata* has appendages at the base of its stamens, whereas these are absent in *N. angustifolia*.

N. filamentosa, *N. gibsonii*, and *N. masoniorum*, all from the Eastern Cape, are the three rarest members of the genus. *N. gibsonii* has long broad perianth segments ranging in colour from pure white to dark purple, but unfortunately it is shy to flower in cultivation. *N. masoniorum*, on the other hand, is probably the most floriferous of all the species, producing its dainty small flower heads in late summer and early autumn. *N. filamentosa* produces such



Nerine gibsonii.

elegant flowers with prominent long straight stamens and heavily rolled back perianth segments. It really deserves to be widely cultivated and does wonderfully well in pots. Both *N. gibsonii* and *N. masoniorum* are close to extinction in nature due to habitat degradation caused by encroaching informal settlements and overgrazing, but fortunately *N. filamentosa* still survives on private farmland.

N. fritthii is a most beautiful dwarf species with very narrow, spirally twisted leaves and white or pale pink flowers with maroon markings to its perianth segments. It occurs in depressions of dolomitic limestone outcrops which are seasonally inundated. It resembles the rare and



Nerine filamentosa.

truly dwarf *N. hesseoides* in flower colour, but its perianth segments are arranged irregularly whereas those of *N. hesseoides* are regular and have long appendages at the base of its stamens. The distribution of these two species overlaps in the western and northern parts of the North West Province.

N. gaberonensis, a bright pink-flowered plant from the dry southern parts of Botswana, the Northern Cape, and western parts of the Northern Province, has great potential as a container subject as it is very floriferous and multiplies well.

Very little is known about the seldom seen *N. pusilla* from arid eastern Namibia. It resembles *N. filifolia* in its pink flowers and thread-like leaves, but as far as I'm aware it is not in cultivation anywhere.

Several nerines are stimulated into profuse flowering due to the effect of natural bush fires in their wild habitats, notably the four winter-growing species, but they are not dependent on fire for flowering. *N. pancratioides* however, a most unusual white-flowered plant from KwaZulu-Natal Province of South Africa, only produces flowers following summer bush fires.

N. platypetala, another unusual species, has broad, flat perianth segments, and occurs in perennial marshes in acidic, black fibrous soil. It hasn't been in cultivation for very long, but it flowers regularly every year and makes a charming container subject.



Nerine platypetala.

I have never seen *N. gracilis* in the living state, but it has very distinctive pale to dark pink, cup-shaped flowers, each perianth segment with a distinct green keel on the lower surface. I suspect this plant has been lost in cultivation and I have not yet managed to obtain material from the wild.

N. rebmannii is a dwarf species from Gauteng and Mpumalanga Provinces, with prominent stamens and pure white, heavily reflexed perianth segments flushed with pink on the undersides. Its leaves are exceptionally narrow, ranging from 0.5 – 1.0 mm wide.

N. transvaalensis has proved to be the most elusive of all the nerines. It was described and illustrated in 1928 from a specimen whose wild origin somewhere in the erstwhile Transvaal Province was not recorded, and has never been seen since. It has pale pink flowers with distinctive appendages forming a tight circle at the base of the stamens.

N. undulata from the Eastern Cape is a very variable species as regards perianth segment length and width, degree of waviness of perianth segment margins, length of peduncle and habitat preference. Certain forms occur in wetland marshes in full sun, whereas others occur on semi-shaded slopes of forest verges. Certainly the latter form is one of the most outstanding of all nerines, flowering in mid-winter in South Africa, and producing strong, long flower stems suitable for the cutflower industry.

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Graham Duncan with Herbert Medal.

Biography

I joined the horticultural staff at Kirstenbosch in 1979, where I am specialist horticulturist and Curator of the South African indigenous bulbous plants collection. My particular taxonomic interest is the genus Lachenalia, and in 1988 I wrote 'The Lachenalia Handbook', which is Vol. 17 in the Annals of Kirstenbosch Botanic Gardens. In 1989 I collaborated with Prof. Niel Du Plessis and botanical artist Elise Bodley to produce the book 'Bulbous Plants of Southern Africa'.

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Bill and Willy Dijk of Daffodil Acre

Tony Palmer

All photographs by Bill Dijk except where noted

It had been a wet and windy Easter holiday in Auckland and I was glad that I had the rest of the week off work, as better weather was forecast. On April 3rd my wife Jenny and I set off to drive the 200 km to Tauranga, a very pleasant, rapidly developing port town in the Bay of Plenty, on the east coast of the North Island of New Zealand. The purpose of our trip was to visit Bill and Willy Dijk, bulb growers par excellence, and to interview them for this article.

There were still a few showers around as we left Auckland, but when we arrived in Tauranga around lunchtime it was a beautiful sunny, if somewhat cool day. Willy welcomed us to their home, Daffodil Acre. Bill was hard at work in the nursery, she said, re-potting as many bulbs as possible before his overseas trip, which would include attending the IBS Symposium in the States and a visit back to Holland.

Looking down from their wooden deck we could see Bill working away in the distance in his shorts. He was lugging heavy polystyrene trays full of *Oxalis* around and arranging them in neat rows on wooden runners to keep them off the ground and away from the occasional flash floods they've experienced in previous years. Willy made some coffee and asked me to go down and fetch Bill in for it. Now I'm not particularly partial to cold coffee, but it was stone cold by the time I was able to drag Bill inside! In the meantime he had already shown me all his many species of *Oxalis*, as well as much of the

rest of the nursery, enthusing about his treasures in his typical animated way.

As always, Bill and Willy, a likeable, straight talking couple, quickly made us feel at home as lunch was served and the chat really got under way. After lunch Bill suggested a visit to Jim Forrest who lives not far away. Jim is a retired headmaster with a passion for plants, especially his collection of rare bulbs, many of which he keeps at Daffodil Acre now. His garden is quite small, but he manages to cram in an amazing array of plants, from cacti and succulents to bulbs, with many rampant climbers over trellises as well. We saw quite a few plants I've never even heard of before!



Some of you lucky ones will be growing this *Brunsvigia* seed by now. Tony Palmer

Back to Daffodil Acre and a nursery tour for all of us this time. I was hoping to get some photos but the light was already fading fast. Still we got around just about everything, marvelling at sights as diverse as the huge flower heads of their many *Brunsvigia gregaria*, to the strong, healthy new shoots of the many trilliums that Bill grows so well. However, the most amazing sight had to be the trays full of fat, rudely healthy *Tecophilaea* bulbs. Mind you Bill got a bit grumpy when he noticed a bird had been fossicking around in them, throwing some under the wooden benches. Another find under those



Wall to wall polystyrene!

benches was an *Oxalis* species with the biggest foliage I've ever seen on one. It's called *O. triangularis* and its leaves are very dark purple with a lighter mauve central area.

We were finally persuaded to go back to the house, but only because it was just about dark and getting quite chilly. We were treated to a lovely dinner, after which we got down to talking about the Dijks and how they came to start a nursery.

Bill and Willy emigrated to New Zealand 40 years ago from Holland. They were married on a Saturday and flew out on the following Thursday! Sounds straightforward, but it wasn't and New Zealand nearly missed out on their considerable talents. Bill was keen to emigrate; having friends already in New Zealand who could arrange work and accommodation for them. Unfortunately Willy never wanted to emigrate and they even broke off their relationship for a while. However, at the time they were both doing evening classes and kept attending them together, even though they weren't 'going out' any more. Willy's mother eventually told them to make a choice one way or the other and they drifted together again, but Willy was still not keen to emigrate. Bill then suggested he go first to set things up and then she could follow. "If you do that, I'll never come" she said. Fortunately for us they finally sorted themselves out, but Willy's mother would not allow them to go as an engaged couple so they got married just before they left. "A shotgun wedding" joked Bill.

The assisted passage cost £40 for the 2 of them, and when they arrived they were given £36 for expenses, so for £2 each they were flown from Holland to New Zealand in a DC8. (£1 in those days would equal approximately 1 US dollar today). They were supposed to go to an orchard in Central Otago, where Bill was to work full time for £5 a week and accommodation, and Willy was expected to cook for all the fruit pickers. People in Invercargill (on the south coast of the South Island) told them it was in the middle of nowhere, so they refused to go and stayed in Invercargill instead!

Bill worked at first at the Freezing Works for £20 a week, a much healthier sum than he would have got at the orchard. Mind you a couple of his tasks, extracting gall bladders and packing sweetbreads, had to be well paid to make them bearable I would have thought. Willy, who lost her job after a few months when she became pregnant with the first of their five

children, was very homesick for the first couple of years. She was not helped by the fact that they lived in a street where there were a lot of other Dutch people who tended to get together and moan about the New Zealand way of life, comparing it unfavourably to what they had left behind in Holland.

In their spare time Bill and Willy started growing daffodils. When they moved to Tauranga they planted daffodils too. Bill worked in orchards there, doing contract pruning of kiwifruit, but as their bulb collection grew in size and scope it soon became too big to keep just as a hobby. They were on the slippery slope and eventually decided to start a bulb nursery. I wonder how many similar businesses have started in the same way.

Although the collection was only half what they have now it was starting to become a disease - everything became a "must have". Every time Bill went to a Show, often in the South Island, he took the van packed with a trade display of flowers and came back with a van full of trilliums as a result of swapping! About 15 years ago Bill started some serious breeding work, mainly of miniature daffodils at that stage. His very first one was 'Tweety Bird' which is nearly lost now. Then came 'Little Becky' and 'Little Emma' which were popular and nice for showing. The most popular so far, 'Little Flick', was the result of an unusual cross between *N. calcicola* and *N. gaditanus* which Bill never thought would take.



The popular 'Little Flick'.

It's very dwarf, very miniature, and vigorous with 3-4 flowers per stem. They started with 2 or 3 bulbs and now have over a thousand. At first it looked as though they would never flower. They just kept multiplying, which Bill thought that was the fault of *N. gaditanus*, with its reputation for being a very shy flowerer. Then one year, all of a sudden, they burst into a profusion of flowers which just about hid the foliage.

Talk of the shy flowering of *N. gaditanus* turned our thoughts to another species that so many people find difficult to flower, *N. canaliculatus*. Bill's recipe is to treat

it rough, as he reckons it thrives on abuse. Plant just about on the top of the ground in the poorest, hottest possible spot in the garden. Even jump on it a few times, but never coddle it, he advises.

I asked Bill what his favourite bulbs are, which he thought at first was a bit of a silly question and he went unusually quiet and thoughtful. Then suddenly he said, "No, hang on a minute, it's *Tecophilaea*, *Cyrtanthus* and miniature daffodils, in that order". He enjoys the



Cyrtanthus obliquus.

and he makes up his own mixes. For the likes of moraeas, lapeirousias and romuleas he does a mix with plenty of pumice whereas for trilliums he puts in more composted bark or peat. He thinks the composted bark is better than peat - and cheaper too!

He remarked that what worries him more than the mix is the elements of Nature, such as rain and frost. He covers every bed with special frost cloth when conditions are conducive to a frost. This takes him about half an hour morning and night, and sometimes he has to leave it on until lunchtime if the plants are very cold and wet. If another frost is forecast for the following night, he will leave it on all the time. A constant worry, as failure to protect leads to damage, particularly on the young growth of bulbs like lachenalias and freesias, even with a light frost. Later on as they mature they will stand a few degrees more frost without damage. One night last year there was no frost forecast, but everywhere was white in the morning and Bill had to quickly get out with the hoses. Still a lot of damage was done. If you do get caught you can minimise the risk to a certain extent by watering the plants before the sun comes up. When the sun hits the foliage whilst frozen, it's too late, and 24 hours later they turn to black mush.

Their worst pest is the Narcissus fly, both the greater and lesser flies, especially in things like *Hippeastrun papilio*, *Brunsvigia*, *Zephyranthes* and, of course, the miniature daffodils in which they sometimes have serious



**L to R *Tecophilaea cyanocrocus* var. *violacea*
T. cyanocrocus *T. cyanocrocus* var. *leichtlinii*.**

challenge of getting *Cyrtanthus* to flower well. They need to be grown in the right environment and the right potting mix. They really need looking after, as do *Tecophilaea* of course.

As for potting mixes: was getting the right one just trial and error, I asked. Bill has access to plenty of cheap pumice to provide the free draining mix that he reckons so many bulbs need



Cyrtanthus clavatus.

losses of up to 50%, even after dipping (in a 1% solution of Lorsban). They don't use hot water treatment, for which quite sophisticated equipment is needed, as a difference of 2 degrees above or below the recommended temperature can make the difference between not treating them properly and cooking them.

Asked what was the best thing about having a bulb nursery, they said that what really gets the adrenaline going for them is when a new seedling flowers for the first time after waiting for it for 4 or 5 years, especially when it's that one in a hundred that is worth keeping.

What a day! It was getting late but fortunately, even though we were supposed to be driving back to Auckland that night, Bill wouldn't allow us to leave until we'd seen many of his stunning bulb photographs, some of which adorn this article.



Cyrtanthus capensis.

Calochortus splendens

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Can you help? . . .

I have received an inquiry from a professional gardener in the UK who is hoping to attain National Collection status with his bulb collection of Ipheion. He is attempting to find suppliers/bulb merchants/enthusiasts who may possibly be a source for bulbs for this genus. He provided a mailing address only:

Ian Hunt
7 Evelyn Devonshire Cottages
Hardstoft, Pilsley
Chesterfield
Derbyshire, S45 8AD
United Kingdom

Anyone interested please do not hesitate to contact him.

Dave Lehmilller
IBS Membership

CLIVIA *Keith Hammett*

Auckland, New Zealand

All photographs by the author

The growing of ornamental plants is subject to fashion, as are other forms of aesthetic activity. Undoubtedly such changes reflect broader collective ideas and conditions within a society.

Until relatively recently fashions might vary widely between cultures, whether it be with regard to the types of clothing worn or plants grown. However, we live in an era that has been termed the communication revolution. This is certainly having as much influence on the decorative plants that we cultivate, as did the industrial revolution of the eighteenth and nineteenth centuries.

The Internet enables rapid exchange of information, ideas and images worldwide and today there is a plethora of special interest groups discussing a bewildering range of topics. Judging by the ever-increasing flow of messages in the group devoted to the genus *Clivia*, it looks set to become a fashionable plant of the twenty-first century.

The genus *Clivia* is a relatively small genus found only in Southern Africa, and although it is not strictly a bulbous plant it is normally treated as such for literary purposes. The first species to be described was *C. nobilis* in 1828. This was followed in 1854 by *C. miniata*, originally named *Imantophyllum miniatum* but changed 10 years later. *Clivia gardenii* came shortly afterwards in 1856. Eighty-seven years elapsed before *C. caulescens* was named in 1943 and at the time



In *Clivia* flower colour is reflected in the colour of the ripe berries. Orange & red flowered plants produce red berries while yellow forms have yellow berries.

of writing, May 2002, the discovery of a remarkable new species *C. mirabilis* has just been published (Rourke 2002). With the exception of *C. miniata*, which has upright flowers, the other four named species have pendulous flowers and have often been confused in cultivation.

Today wild populations of species occur in relatively small pockets, often widely separated from each other, and in reality the genus appears to be in retreat. As all previously known species of *Clivia* are unable to tolerate full sunlight, its current distribution reflects the progressive destruction of forest vegetation which was formerly much more extensive than it is today.

Clivia caulescens is found in the North East of South Africa from approximately Nelspruit northwards to the Zimbabwe border.



Distinct accessions of *C. gardenii*.



In the wild *C. caulescens* can produce stems several metres long. Such stems could be very old.

C. nobilis occurs in a coastal strip from Port Elizabeth in Eastern Cape reaching into Transkei. *C. miniata* is distributed from Transkei through Natal and into Kwa Zulu. *C. gardenii* has an apparently similar distribution, although it exploits different ecological niches. Just discovered *C. mirabilis* is remarkable, as its name suggests, in being found 800 km to the west of its nearest neighbour, *C. nobilis*, in an arid, Mediterranean type climate and apparently able to withstand full sun.

Traditionally botanical classification has been based on the morphology or shape of plants, with particular emphasis on the flowers. It is important to remember that a great deal of taxonomic work (classifying) has been carried out on dried specimens mounted on sheets of paper (herbarium specimens) and that for many species the botanist will not have had the opportunity to see living plants. This came about because our ideas on botanical classification are European or Western in origin, and much of the work was carried out at one or other of the great botanical institutes in Europe after specimens had been collected from around the

world. Only *C. caulescens* and *C. mirabilis* have been named in their country of origin.

It has to be said that until recently it was difficult to identify the pendulous species from the inadequate descriptions that were available in horticultural texts. This has been remedied by enthusiasts working with living plants both in collections and in the wild. Such work has been encouraged by the formation of a Clivia Club, lately Society, in South Africa.

Clivias are slow growing plants, especially *C. nobilis*, which in cultivation takes many years before it will flower when raised from seed. In general fruits of *C. miniata*, the most commonly cultivated species, take nine months to mature following pollination. Within populations raised from seed there can be considerable variation in how old a plant may be before it will flower. Some individuals may flower within two to two and a half years from sowing, while others may take ten or more years.

It is important to remember that some characteristics are not fully expressed until a plant has achieved some maturity. First blooms are often poorer than those produced in second and third seasons of flowering. With *C. caulescens*



Very broad-leaved form of *Clivia miniata* developed in Belgium during late nineteenth and early twentieth centuries. Forerunner of Japanese Daruma and modern Chinese forms.

the caulescent stems, which can reach several meters in length in the wild, are seldom seen in cultivation simply because the species has not been widely cultivated for any length of time. It is a matter of conjecture how old plants with very long trailing stems seen in the wild might be. Individual Clivia plants are long lived and some specimens of *C. miniata* have been maintained within a family for several generations. It is therefore feasible that individual plants of *C. caulescens* with very long stems could be a hundred or more years old.

Clivia miniata

C. miniata is the Clivia most commonly encountered in cultivation. Its large upright flowers are showier than the other species and from the time of its introduction to Europe in the 1850s it has been the subject of "improvement" both with regard to flowers and leaves. Its upright flowers alone are normally sufficient for identification. Leaf shape has been greatly modified in cultivation. German and Belgian breeders started to develop broader leaved forms in the late nineteenth century and this trend has been further developed in the Far East. In Japan the squat, broad-leaved Daruma forms have been developed. Much emphasis has been placed on a strict distichous habit, broad downward curving leaves, and perfect precise interlacing of the leaf bases. These characteristics have been further developed in China following



Belgian forms of *C. miniata* often have tulip-shaped flowers, broad leaves and red flowers.

the introduction of this form of Clivia during the 1930s.

The city of Changchun, despite an unlikely climate, has become the center of development of Clivia in China. This occurred historically because the Japanese installed the last Emperor of China as a token leader following their invasion of Manchuria. Changchun was the seat of power for the Emperor and the Japanese Emperor presented the Chinese Emperor with plants of Clivia for use by his court.

After the Second World War the plant slowly became available to more people and in the early 1960s an enthusiasts' organization was established. The plant has, however retained its position as a status symbol. Good quality plants are still considered to be an investment despite a period of grossly inflated prices during the 1980s.

There is a strong body of Clivia breeders in China and competitive shows are held. Detailed criteria of perceived excellence have been developed and interestingly 99% of points are allocated to plant and leaf characteristics, with only 1% for flowers. Leaf width, shape, and surface features are important in determining the value of a plant. This reflects the fact that the plants are always grown in pots and are treated like individual works of art. While the Japanese favour a downward curving leaf, the Chinese prefer them to be more upright.



Unlike many cultivated plants, wild accessions of *C. miniata* can have striking showy flowers.

Almost without exception, whenever a plant has developed a “following” and enthusiasts have formed organizations, the plant has been exotic, and this is the case with the Chinese Clivia Association. Although not formalized until 1992, it is significant that the now international Clivia Society was formed in South Africa where the plant is indigenous and the people concerned had little knowledge at the time of any developments outside Western Culture.

When a plant develops a following, an interest is taken in tracing the history of the development of the plant in cultivation, as well as the botany of the genus. Inevitably such histories can only be as good as the fragments of information that were recorded. In Britain, Australia and New Zealand a narrow leaved form of *C. miniata* has been referred to as “species” *miniata*. This is widely distributed in frost-free areas of Australasia. It seems likely that this is a single accession, probably from Natal, with moderate sized mid-orange flowers. It is easy to fall into the trap of assuming that the broader leaved forms have been developed from this form, possibly initially unconsciously as larger

flowers were sought. However, since the advent of the Clivia Club much interest has been taken in viewing the plant in the wild, especially in previously inaccessible regions such as the Transkei. Unlike many cultivated plants, some of these new “wild” accessions have been more spectacular than many plants already in cultivation.

As broader leaved forms of *C. miniata* occur in the wild, it is entirely likely that quite a number of unrecorded distinct accessions found their way to Europe and formed the basis of European breeding. In fact coloured illustrations from horticultural publications from the 1880s clearly suggest that breeders were using accessions distinct from the common form. These were often given names such as *Maxima*, *Robusta*, *Splendens* and *Grandiflora*.

At this time, more work is required to distinguish between the early work of breeders in Germany and Belgium. However, large flowered broad-leaved forms were developed which became known as “Belgium Hybrids” [albeit intra-specific hybrids]. Often the flowers of these had stronger red colouration and tulip



Walter's Yellow. Good quality clone of yellow *Clivia* raised in Australia.

shaped flowers. Such plants were grown as houseplants like aspidistras and could become very large and take many years to flower when raised from seed.

After the Second World War the emphasis of European commercial breeding changed to produce a plant with the ability to flower within two to two and a half years from seed. Such plants are sold in relatively large numbers as a commodity and are shipped before the flowers are fully open. These plants are smaller, may have narrower leaves, and flower form can be variable.

It is enthusiasts, primarily hobbyists, who have explored the possibilities of different flower shapes and colourings. Often they have worked in relative isolation from each other, even if located in the same area. Today considerable variation exists with regard to flower shape, colour combinations, leaf form, and leaf variegation, but it is only since the advent of the Clivia Club and its offshoot the Clivia Net Group that there has been an explosion in the exchange of information and plant material. With the bringing together of ideas and material developed separately in Europe, USA, Australasia, Japan and China the next few years will be very exciting.

Much mystique has been associated with yellow or cream flowered forms of *C. miniata*. The "wild type" orange colour results from water-soluble anthocyanin pigments superimposed over a yellow background of carotenoid pigment



Variegation occurs regularly in some seed-lines of *C. miniata*, but specimens with stable well balanced markings such as this one are rare.

contained in discrete plastids. Mutations occur where the formation of the anthocyanins is blocked, resulting in cream or yellow flowers.

Such plants have been found both in the wild and in cultivation. Plants found in the wild have sometimes been maintained in cultivation by several generations of the same family as a living heirloom. Until relatively recently little breeding has been carried out on the yellows and they were most commonly propagated vegetatively. As this is a slow process yellow Clivias remained rare, and if they became available for sale they often fetched high prices, especially in the USA and Japan.

While there is the suggestion that two distinct forms of yellow Clivia exist, with different breeding systems, the most commonly available yellows will produce 100% yellow offspring if crossed together. If crossed with an orange or red the offspring are 100% orange or salmon. If individuals in the F_1 population are sib-crossed approximately 25% of the F_2 population will be yellow/cream. If individuals are backcrossed to a yellow approximately 50% will be yellow. This all clearly points to a single or the same mutation. As forms with broader leaves and larger flowers have resulted from one and a half centuries of breeding orange and red forms there is a lot of merit in following this route of development.



Commercial production of yellow-flowered *C. miniata* at Cape Seed and Bulb in South Africa.

Variation of the leaves occurs in some seed lines and superior clones with stable aesthetically pleasing variegation have been established, although these remain rare. In addition to longitudinal variegation the Akebono form, where variegation is horizontal, has been developed in Japan. The development of this form of variegation appears to be temperature related.

Clivia gardenii

The pendulous species of *Clivia* are not widely grown in comparison with *C. miniata*. *C. gardenii* is grown in frost-free areas where it can be naturalized under trees. It is a relatively variable species in nature and only a few accessions have been widely introduced to cultivation. The species is most easily recognized by the fact that it flowers during the winter, whereas the other species flower in succession from early spring to early summer. The most commonly encountered form of *C. gardenii* has lax leaves with a pronounced central groove and sharply pointed leaf tips. Good diagnostic features are that the undersides of the leaves tend to be a pale whitish green, and both the stigma and stamens protrude well clear of the flower tubes, unlike the other pendulous species. The flowers are somewhat curved and are pale orange, sometimes near yellow, tipped with green.

C. nobilis

Although gardening books have tended to identify any pendulous *Clivia* as *C. nobilis* it is in fact rare in collections. Almost invariably plants claimed to be *C. nobilis* turn out to be *C. gardenii*.

The species is easily recognized, as the leaves are stiff with a scabrous, cutting leaf margin. The leaf tips are blunt, often with a concave indentation [retuse – emarginate]. Plants are very slow to establish from seed and even when mature they flower only erratically. Inflorescences contain more flowers than other species. Accessions vary in flower colour and, in my experience, coastal accessions

tend to be red while those from further inland tend more to pink.

The identification of plants as *C. nobilis* is further complicated as a hybrid between *C. nobilis* and *C. miniata* was created in Belgium in the second half of the nineteenth century. This was styled *C. cyrtanthiflora* and has been vegetatively propagated; quite large plantings are found in some Australian Botanic Gardens. Leaves, even on the same plant, can vary markedly with some closely resembling leaves of *C. nobilis*. However, flowers are flared and are much less pendulous than those of *C. nobilis*. It is likely that seedlings have been produced from this F₁ hybrid, which exhibit combinations of characteristics that make them difficult to assign to either parental species.

C. caulescens

Mature stands of *C. caulescens* in the wild are perhaps the most spectacular of the genus, not for floral display, but for their very long sinuous stems. These can reach several metres in length and trail over rock outcrops. This species is now finding its way into collections. It is a robust species, which establishes itself quite quickly.

C. mirabilis

This species is currently known only to its discoverers and is barely into cultivation. "It is apparently confined to the Oorlogskloof Nature Reserve in Northern Cape where small groups



Pendulous species from opposite ends of *Clivia*'s geographic range. *C. caulescens* (left) and *C. nobilis* (right).

of plants grow rooted in humus between cracks in the sandstone talus of the rock scree". The plant has an extensive root system that is large in relation to its aerial parts. This appears to be an adaptation to its habitat. *C. mirabilis* has pendulous flowers that are most likely pollinated by sunbirds, although there is a good likelihood that the plant is self-pollinating.



The swamp clivia growing in a stream at Umtamzuna, South Africa. Such plants can reach nearly 2 m in height and can develop a distinct stem.

The fact that the plant is reported to be able to bear full sun will be of interest to gardeners and plant breeders and it will be interesting to discover whether it is able also to grow in shade. With the current interest in the genus it is very important that wild populations of this newly discovered plant are protected.

Swamp Clivia

Over time different pieces of information in addition to plant shape have been taken into consideration when delineating a species. For instance chromosome numbers and biochemical data have been used for various genera. Increasingly DNA data are being used.

Recently Dr Yidong Ran completed a cytogenetic analysis of the genus *Clivia* as a PhD. study here in Auckland, jointly supervised by

Professor Brian Murray and myself. As shown in our scientific paper (Ran *et al.* 1999) it is possible to identify the different named species of *Clivia* on the basis of banding patterns that develop when the chromosomes are stained in various ways.

In my collection were some plants originally given to me as seed by Graham Duncan at Kirstenbosch in 1994. These plants were referred to as a robust form of *C. gardenii*. Initially the seedlings looked pretty much like those of any other *Clivia* except *C. nobilis*, but as they became older the plants stood out from anything else. They were very vigorous and with a tall stiff habit and rounded leaf tips quite distinct from the very pointed lax leaves of *C. gardenii*, although they did have the pale green almost white lower leaf surface that one associates with *C. gardenii*.

When Yidong looked at the chromosomes of the "Robust" *gardenii* he found that while the banding pattern was closer to *C. miniata* and *C. gardenii* than to *C. nobilis* or *C. caulescens*, it was distinct from either.

We hear much about DNA analyses and fingerprinting in connection with forensic work and criminal trials. Similar techniques are available to plant scientists and Yidong used two distinct methods, namely random amplified polymorphic DNA analysis (RAPD) and DNA sequencing. Two regions were sequenced, the internal transcribed spacers (ITS1 & ITS2) of nuclear ribosomal 45S DNA and the non-transcribed spacers between the 5S RNA genes. When these methods are combined with



F1 hybrid between *C. gardenii* and *C. miniata*. Note flared flower form and bloom angle.



F2 generation hybrid from a cross between *C. gardenii* and a yellow flowered *C. miniata*.

appropriate statistical models, it is possible to estimate how closely related different species and varieties may be. Our DNA analyses showed that Robust *gardenii* was distinct from the four species already named but most closely related to *C. gardenii* and *C. miniata*.

Additional collections have been made in an area between Port St Johns and Umtamvuna at Port Edward and a site in Natal. These have proven to have the same distinctive karyotype as the original accession of Robust *gardenii*.

Ecologically the species is very distinct from the named species of *Clivia*. It is found in patches of *Syzigium* forest that occur in grassland. These are situated in depressions that fill with water during summer. It also occurs along river banks and small streams. The other species are almost invariably found associated with rock outcrops on well-drained soil. Flowering takes place in June and July in South Africa but occurs in April and May here in New Zealand. The flowers are pendulous, tubular and orange-red, and the inflorescences tend to have relatively few flowers. In contrast to *C. gardenii* the stigma and stamens are retained within the flower tube, barely protruding at most.

With all the species it is important to realise that different populations of a species growing in the wild will vary from each other. The longer populations are separated from each other the greater the differences; eventually the differences may be so great that they are considered to be

different species. All too often plants in cultivation have all been derived from a single collection or accession.

Interspecific Hybrids

Despite the production of *C. cyrtanthiflora* a century and a half ago very little further interest seems to have been taken in crossing the other species until relatively recently. Probably because *C. miniata* has the showiest flowers it has attracted the most attention from breeders. Indeed the so-called Belgium Hybrids are intra-specific hybrids between variants of *C. miniata*. There appear to be no breeding barriers between *Clivia* species and crosses have now been produced between all the previously known species in every permutation. Many hybrids are primary hybrids at the F1 stage, but breeders in South Africa and Japan are now flowering plants of more advanced generations.

Primary hybrids between the pendulous species and *C. miniata* tend to exhibit characteristics which are intermediate between the parents. Typically flowers tend to be flared and born at "half mast" in the inflorescences. The use of winter flowering *C. gardenii* has the potential to greatly extend the flowering season, while *C. caulescens* and the swamp *Clivia* are producing seedlings of considerable vigour.

The combination *C. gardenii* x *C. caulescens* has produced populations that have grown quickly and have demonstrated an ability to naturalise, readily suppressing competing weeds. Flowers are produced over an extended season and it is common to have flowers and fruit at all stages of development in a planting. It is possible that such hybrids have potential for the florist trade, where both foliage and fruits are currently in demand in addition to flowers.

Considerable scope exists to develop quite new forms of *Clivia* by sib-crossing, backcrossing and further out-crossing. Already hybrids exist which have input from three and four species.

Propagation

Clivia plants are most commonly propagated from seed. Mature plants produce additional shoots from below soil level and these can be removed and potted individually. Different plants vary considerably in their propensity to produce side shoots. Because *Clivias* are slow growing, named clones produced by division are relatively uncommon; the original 'van Houtte' form of *C. cyrtanthiflora* and the *C.*

miniata yellows 'Vico Yellow' and 'Sir John Thouron' are examples.

Clivias can be propagated by tissue culture, but cultures are difficult to establish from somatic tissue despite extensive research in various countries. Growth in culture is slow and the explants are small compared to seedlings, where the residual seed provides a reservoir of food.

Summary

Clivia is a genus that is currently gaining an enthusiastic following around the world. They make an ideal house and conservatory plant in areas that experience frosts. In frost-free locations they can be naturalised to produce impressive drifts under trees where few other plants will flower. They are a surprisingly tough plant that can survive a degree of neglect both in pots and the garden. This is an important factor in determining a plant's popularity in today's fast moving world.

From a breeding point of view they are an exciting plant with enormous scope for further development both as a pot and garden plant. They also have many characteristics which could make them a good florist flower. I am confident that we are, in reality, only at the beginning of the development of a major ornamental plant.

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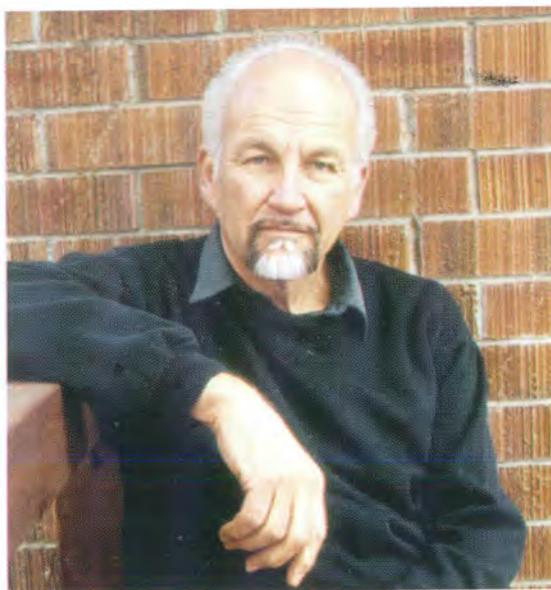
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Keith Hammett was born and educated in England. He emigrated to New Zealand thirty five years ago. For twenty-six years he worked as a government scientist, first as a plant pathologist, and later as a pomologist and plant



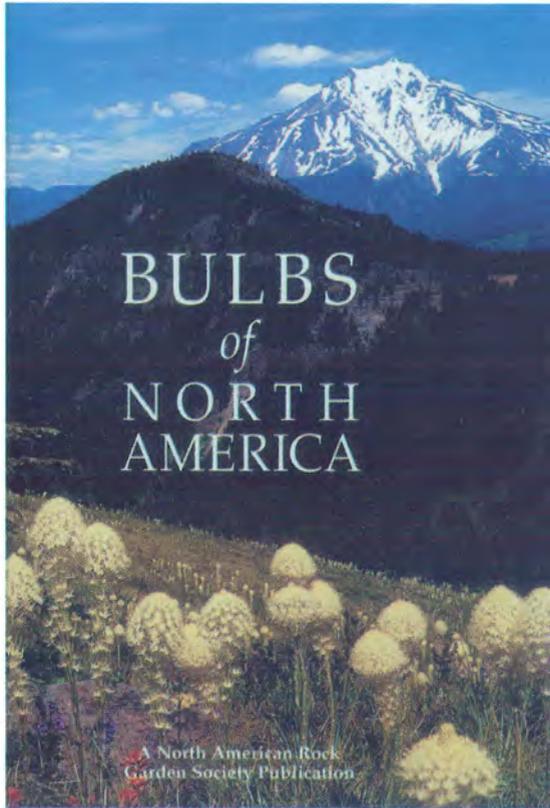
breeder. For the last nine years he has operated as a private breeder of ornamental plants and has maintained his research interests in association with several New Zealand Universities. He has worked in depth with various widely divergent genera, namely: *Clivia*, *Dahlia*, *Dianthus*, *Lathyrus*, *Nemesia* and *Primula*.

Book Reviews

Lisa Flaum

Bulbs of North America. North American Rock Garden Society, Jane McGary, Ed. Timber Press, 2001, ISBN 0-88192-511-X \$35.95 US

A six-year love affair with alliums led to a similar interest in Brodiaea. Large bulb merchants were quickly stripped of new species to try. Seed exchanges were plundered. Then came the



problem. Many of these plants had no descriptions. Where were they from? What kind of soil, water, temperature? What color, how big, invasive? At last, the North American Rock Garden Society has come to the rescue. *Bulbs of North America* is a comprehensive work on North American geophytes, edited by Jane McGary, and written by a group of experienced gardeners.

First, the scope. This book covers monocotyledonous genera, excluding trilliums and iris. Large genera or alliances (alliums, the various brodiaea relatives) have their own chapters, while smaller genera are grouped by region (Irids of the Southeast). The authors have

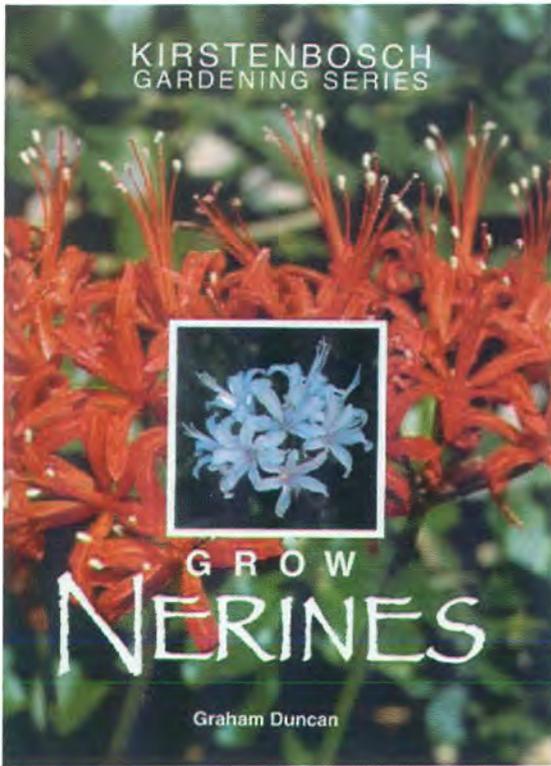
obviously spent a great deal of time both observing the plants in the wild, and growing them. Descriptions are detailed, and the reader should have a familiarity with botanical terms. Genera with specialized terminology have explanatory drawings. There are 101 photographs, almost all of fine quality. The cover shot, of *Xerophyllum tenax*, is breathtaking. One of the goals of this book is to enable gardeners to identify seed grown plants. While I have not yet had a chance to test this, as my North American alliums are not yet in bloom, I am very hopeful.

The variety of authors means a range of writing styles as well as different approaches to the subject. For instance, Frank Callahan, writing about *Calochortus*, is fairly specific about the locations of wild populations and his descriptions are quite detailed. This chapter is most useful to someone wishing to see and identify the plants in the wild. Alliums, written by Mark McDonough, Jim Robinett and Georgie Robinett, contains details of growing and propagating, or not propagating, as the need may be. Edward Austin McRae has had the opportunity to grow large quantities of lilies from seed and observe the variations. He also discusses hybridizing. Other authors include Michael Chelednik (Irids of the Southeast), Alan Meerow (Amaryllidaceae) and Mary Irish (Bulbs of the Southwest).

In all, this book is 11 chapters packed with knowledge, enthusiasm and experience. This is going to become one of the basics of any bulb grower's library.

Grow Nerines. Graham Duncan, Kirstenbosch Gardening Series 2002 \$10.00 US, ISBN 1-919684-33-6 Available from The Kirstenbosch Bookshop, PO Box 53445, Kenilworth 7745, South Africa

Grow Nerines, part of the Kirstenbosch Gardening Series, is a little gem of a book. Volumes in the series are intended to provide practical advice on the propagation and cultivation of South African plants, and this one does a fine job. It covers history, habitat, conservation, growth cycle, pests and diseases, and propagation, followed by descriptions of all 25 species and how to grow them. Rarely does a



page go by without a color photo, most of good quality, though a few are blurry.

Graham Duncan, a specialist in bulbous plants at Kirstenbosch, divides the species based on growth cycle: winter growing, summer growing and evergreen in cultivation. This is not a taxonomic grouping, but a convenience to the gardener. Each species then has its own section, complete with distribution, identification notes, and a solid cultivation guide. For instance, for *Nerine pancratioides*, which flowers only after fire, Mr Duncan states, "Ideally, this species should be grown in terracotta pots which can be plunged to ground level and have some straw grass or twigs burnt over the top once during the winter season." Wow, a plant that requires burnt offerings to flower! It's good to know what you're up against. Most species have simpler requirements, though details such as level of moisture in the dormant season, and the need for an exceptionally deep pot, are consistently mentioned. Mr. Duncan's experience is impressive, and he leaves the reader confident that a plant's needs can be met.

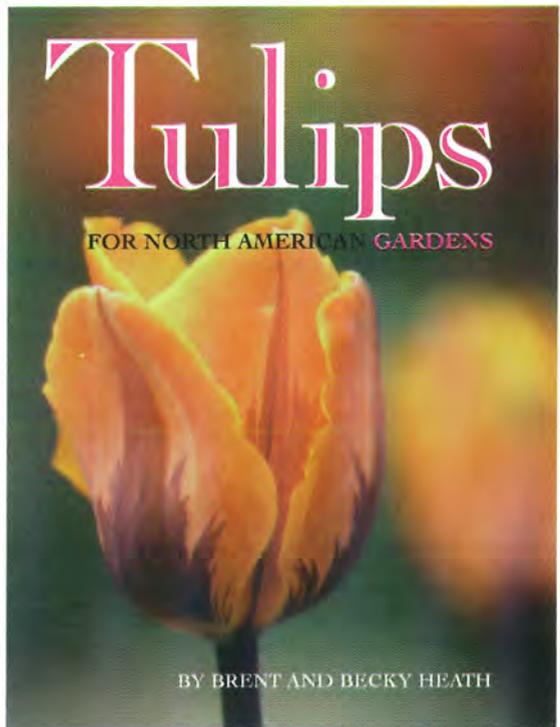
This brief book packs a tremendous wallop. If you would like to expand your Nerine collection, this book will be very helpful. If you don't yet grow any Nerines, get this book first so you'll know which species to start with.

Tulips for North American Gardens.

Brent and Becky Heath, Bright Sky Press, \$24.95
US ISBN 0-9704729-6-X

This companion volume to *Daffodils for American Gardens* is a general introduction to tulips in the garden. It covers the basics of history, description of divisions, and culture, as well as forcing and even flower arranging. I particularly liked the section on starting a spring bulb festival. There is a chapter of cultural recommendations by region, which is most useful for the novice gardener who has not yet acquired a bone-deep familiarity with her climate.

There is a large section of recommended tulips, separated by division and illustrated with generally good photographs. The strength of this book is the photos, which promote both plenty of planting ideas and a strong desire to spend the entire household budget on tulips.



Lisa Flaum lives outside of Waterloo, IL, with her husband, children, dogs, cats, and assorted plant-eating wildlife. Present enthusiasms include Crocus, Allium, Crinum and Zephyranthes, as well as many perennials. A 3 acre garden provides lots of room to experiment.

Stutterheim's *Grandiflora* *Moraeas*

Rhoda McMaster

Photographs by the author except where noted

The northern end of the Amatola Mountains (alt. 1200-2000 m) is like a garden wall to one side of Stutterheim (alt. 850-950 m), easily accessible for a hike of anything from an hour to a full day, and a place to revive your soul. The indigenous forests are magical, and the montane grassland above them a treasure trove of a great many plant species.



From early spring to late autumn there are usually some large yellow *Moraea* flowers to be seen, any one of five species depending on the season - *M. buttonii*, *muddii*, *spatulata*, *graminicola* and *reticulata*. They belong to the *Moraea* subgenus *Grandiflora*, which includes 15 species (Goldblatt 1986) mostly with large yellow flowers, from the summer rainfall region. The subgenus *Grandiflora* is characterized by having a single leaf, usually channelled, fairly leathery and often very long. They are mostly evergreen, but *M. muddii* and *M. graminicola* are deciduous. The flowers are more long-lived than those in the Western Cape, often up to three days, and flowering takes place over a number of weeks as many flowers are produced from the single stem.

Moraea is an African genus found south of the Sahara, with a concentration in the Western Cape where they are winter growing, mostly with colourful flowers. The spelling is easier to remember if you know the name *Moraea* commemorates Dr. Moraeus, the father-in-law of Linnaeus – all three names contain 'ae'! There

is a cluster of the summer growing yellow *Grandiflora* group in the highland areas of the Eastern Cape, mostly at altitudes ranging from 1000-2500 metres. For an excellent overview of the climatic conditions, see BULBS vol. 2 no. 3, pages 9-10.

There are several common names for *Moraea* in South Africa. 'Peacock Flower' refers mainly to the Western Cape ones with 'eyes' on the tepals, while the yellows are often referred to as 'flappies' when the connotation is 'iris-like'. 'Uintjie' is for the edible ones especially of the Western Cape, and 'tulip' for those poisonous to stock. The *Grandiflora* group is mostly poisonous to stock and so should not be planted where grazing animals could get to them. However, Pearse (1978), reports that moles and porcupines seem to be immune to the poison, and the plant called 'ihlamvu elincane' (*M. spatulata*) is used as a traditional medicinal remedy for women who fail to conceive. One corm is ground up and mixed with some maize, and three small cakes are made, of which two are for the woman to eat and one for the man. "It isn't long before the patter of little feet is heard!" It never fails to amaze me how many



Moraea buttonii.



Moraea muddii.

poisonous bulbous plants are used in traditional medicine – the topic for another article!

For us mere mortals who are not botanists and who need to distinguish between the five species, the simpler characteristics to look for are in the combination of: flowering time, (un)branched stem, clump-forming or solitary plants, leaf width, and for final confirmation if necessary, tepal shape and colouring.

Description of the species

The first flowers to be seen in early spring are of *M. buttonii*, most often growing in prolific clumps on the banks of mountain streams. An earlier rather apt name for this species in KwaZulu-Natal was *M. rivularis*. When it was first described by Baker in 1875, it was named *Dietes buttonii*, because the plants sent to Kew (by Henry Hutton) seemed to him to have a woody rootstock. What a pity the 'rivularis' name wasn't first. The plants occur in a broad band from the Amatola Mountains in the south, along the Drakensberg Mountains and into southern Mpumalanga.

It is easy to distinguish *M. buttonii* from the others by the branched stem, often hidden in the sheathing bracts. The other four species have unbranched stems. The flowering stem is about 80 cm tall and the leaf, up to 2.5 cm wide, can reach 150 cm in length. The scented flowers are a clear bright yellow with yellow-brown nectar guides that are edged with darker veins on the outer tepals, which are up to 5.5 cm long. A constant succession of flowers ensures a bright

show for many weeks when the surroundings are often still clad in shades of brown from the dry winter cold.

From the end of September to October, the locally rare *M. muddii* can occasionally be seen. There are unfortunately some stray cattle that like eating off the flowers, so seeds are scarce. And then when seed does get a chance to form, the porcupines ignore the tops and go for the corms, despite the name *muddii*! It appears that the plants are much less toxic later in the growing season. The name is in honour of Christopher Mudd who collected plants in 1877.

M. muddii occurs in the higher grassland parts of the Amatola Mountains, and then there is a puzzling gap until it is again found in the northern parts of KwaZulu-Natal and up into Mozambique and eastern Zimbabwe. It is smaller than the other four species, being seldom taller than 40 cm, does not form clumps and has a narrow leaf 3-6 cm wide, so channelled that it appears cylindrical. The flowers are pale yellow marked with darker yellow nectar guides and a few darker veins on the outer tepals, which are up to 5 cm long.

M. spathulata is very sparsely distributed here, but in the Drakensberg, Pearse (1978) notes "it is not unusual to find great masses of yellow colour against the dark grey of the basalt". They occur from the edge of the winter rainfall area near Port Elizabeth all the way up the eastern parts of South Africa, and far into Mozambique and eastern Zimbabwe, at altitudes ranging from low coastal regions to mountains over 2000 m. The flowers appear at different times of the year, depending on the locality. In the south with some winter rain, or along the coast where there is no frost, flowering can be any time during winter and spring. Here in the mountain grasslands of the Stutterheim district, it flowers around October and November and in the Drakensberg in midsummer. Further north the flowers appear in late summer. A variable and adaptable species indeed!

The inner tepals are spatula-shaped - broadest towards the ends - hence the name *M. spathulata*. It has also been known under the names *Iris spathulata* (when first described by Linnaeus the younger in 1782), *Iris spathacea*, and *M. spathacea*. *M. longispatha*, described by Klatt in 1866, now also falls under *M. spathulata*.

The plants of *M. spathulata* are usually in clumps, about 80 cm tall, each plant having a very long leaf 1.5+ cm wide and easily up to 2



***Moraea spatbulata*.** Tony Palmer

m, or even longer in cultivation. The leaf is persistent, i.e. the same leaf continues to grow each season, with the end drying off. These long tough leaves are used by the local people to make rope, and the corms for the traditional remedy mentioned above. The flowers are a good yellow with deep yellow nectar guides on the outer tepals, which are up to 5 cm long.

As the season progresses, the next to be seen around here is *M. graminicola* subsp. *notata*, flowering in a few localities from November to January. According to Goldblatt (1986) the distribution is "along the coast and near interior Transkei between Port St Johns in the north and East London in the south". The specimens we have found in the Amatola Mountains are therefore an extension of the range by about 100 km, and at higher altitudes – to about 1600 m. 'Graminicola' refers to the grassland habitat, and 'notata' means 'southern' – the more northerly species in Kwazulu-Natal is *M. graminicola* subsp. *graminicola*. Apart from the north-south division, the main differences between the two subspecies are: 3 sheathing bracts and dark blotches at the base of the crests in subsp. *notata*, and only 1-2 sheathing bracts and no blotches on the crests in subsp. *graminicola*.

M. graminicola subsp. *notata* flowers are dramatic, having unusual grey-yellow tones with deep yellow nectar guides surrounded by a dark mauve band from which mauve veins radiate out. These outer tepals are about 7 cm long. The leaf is stiff and relatively broad, usually about 1 cm wide and 50 cm long. The tip is folded into a point. Obermeyer (1968) notes that a new leaf is formed each year, in contrast to the persistent leaf of *M. spatbulata*. Apparently there

may be branching in the stem, but it is rare – we haven't seen branching yet. The plants are up to 60 cm tall. The outer tepals are about 7 cm long.

The last to flower is *M. reticulata*, from February to May. The name is derived from the fibrous network (reticulate) like a fishnet enclosing the base of the stem and bracts for 10-20 cm. It is separated from *M. spatbulata* by its solitary habit (not clump-forming as in the latter), by the pronounced fibrous network (sometimes there is a weakly developed network in *M. spatbulata*), and by the different flowering time in this region. *M. reticulata* occurs only here, from Bedford to Queenstown on steep grassy slopes, with the Amatola Mountains as its centre point. It seems to have been missed by early collectors – it was only described in 1973.

M. reticulata is about 60 cm tall, with a long leaf, 1.5+ m in length and 1.5 cm wide. The flowers are bright yellow with orange nectar guides and a few darker veins on the outer tepals, which are about 7 cm long.

In the garden

I would classify these *Moraea* species as easy-care, low maintenance garden plants. The flowers are always beautiful and eye-catching, and the extra long leaves of some species are a curiosity. Jim Shields will hopefully give us information some time in the future about the extent of their cold-hardiness. They survive in our garden with -5C during some winter nights, and like to remain undisturbed for a number of years.

They are planted in the same general soil mix we use for most of our bulbs – a mixture of good loam, a bit of milled composted pine bark, well-matured garden compost and a bit of coarse



***Moraea graminicola*.**



Moraea reticulata.

river sand. To this we add general fertilizer (2:3:2) and bone meal. The main soil requirement for these plants is excellent drainage so most are grown in slightly raised beds. We have almost dry winters, with good rains in summer, about 900 mm per year. They like full sun and breezy conditions. Although in nature

M. buttonii grows on stream banks in full sun, in our garden they are not given any more water than the other species (all rely on natural rainfall) and thrive in semi-shade. I doubt that they would grow well in a greenhouse – any comments from the readers?

If they are to be grown in containers, these species will need to be in 25-35 cm pots, the larger size especially for the clump-forming ones. Remember to keep the containers cool by shading them from the sun – in nature the corms are in permanently cool to cold mountain soil. They need to be well watered from spring to autumn, and not allowed to dry out in winter.

Seeds germinate readily, any time from spring to late summer. Seedlings stay evergreen during their first year or two (in a seed tray out of the frost), and in the garden thereafter they are usually evergreen except for *M. graminicola* and *M. muddii*, which are deciduous.

They don't seem to be particularly susceptible to pests and diseases – so far we haven't needed to treat them for any ailments.

A quick guide to the Stutterheim yellow *Moraea* species

Moraea	flower time	solitary plant	branched stem	leaf width	other features
<i>buttonii</i>	Aug – Sep	clump forming	mostly branched	10-25 mm	stream banks
<i>muddii</i>	Sep – Oct	yes	no	3-6 mm	40 cm tall rare
<i>spathulata</i>	Oct – Nov	clump forming	no	1.5 cm (w) 2+ m long	rare
<i>graminicola</i> <i>subsp.</i> <i>notata</i>	Nov – Jan	yes	very rarely	10-12 mm	Greyish flw rare
<i>reticulata</i>	Feb - May	yes, with basal net	no	1.5 cm (w) 2+ m long	Mt slopes, endemic

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Switching Hemispheres:

How to change a bulb from one hemisphere to another

Mary Sue Ittner

It is sometimes possible to obtain bulbs (used in this article to include all geophytes) that have been growing in another hemisphere. There is very little written about what to do to get them growing at the correct time. IBS Internet forum members have shared their formulas for success over a three-year period and this article will summarize the strategies different members have found that either worked or didn't work for them.

What to do often depends on what you are converting. Some bulbs replace themselves each year. This is true of most corms. If their growing season is limited, they may only last the first season or be smaller at the end of their growing period than when they were planted. It may be a few seasons before they bloom again. Therefore keeping them growing as long as possible is essential. This can be achieved by prolonging dormancy so they can be planted closer to a time when conditions are to their liking, or by planting them immediately and boosting the growing conditions by altering the temperatures, providing more fertilizer, etc.

If the bulb will not be replacing itself as is the case for many true bulbs, it may be able to tolerate interruptions more easily, but still may be unhappy with certain temperatures and not grow roots.

It is helpful to know what conditions the bulb requires, including information about habitat and climatic conditions. For instance, does it need a warm dormancy or an extended cool period for roots to form? What to do will be decided by what you know about its needs, as well as by what conditions you are able to provide.

Experience has shown that potting up when the bulb is received and giving it no special treatment has often resulted in losses. Winter growing bulbs planted right away in spring instead of fall, may cease growth when it gets hot and before roots are formed or new corms produced. Continued watering under those conditions may just ensure the bulb or corm will

rot. If, on the other hand, the bulb is very small and is held to plant at a later date, it may shrivel during dry storage and never come up at all. People who can provide cool temperatures in summer for winter growing bulbs that are being converted have a definite advantage.

It appears that growing in a container or, if you have the luxury and space, a large crate, is essential. This way you can control the temperature, amount of moisture, ventilation, light, etc. that you cannot so easily control if you plant in the ground. If it will be necessary for the bulb to be growing in a warmer time of the year than usual, using a fungicide will give added protection. Most people recommended growing in a container at least through a second season before planting out. Bulbs being grown in temperatures higher than they might want were usually grown in the shade.

Some of the points listed above also apply to short-lived seeds obtained from another hemisphere, as it is important to keep seedlings growing for a long enough time for them to grow big enough to survive their first dormancy.

Below I have summarized the experiences the members shared about the different bulbs they attempted to convert.

Narcissus

Many members converted this genus successfully both in the Southern and Northern Hemispheres. Steve Vinisky in Oregon, found that it was best to try to expedite when you got them so they could be started in late winter rather than spring, to extend the cool growing season. This also avoided summer blooming when heat would stress the plants and there would be more possibilities of rot. Bill Dijk in New Zealand found that he could rarely get bulbs that early, so advised potting in deep crates with good ventilation, watering, and placing the crate in cool storage, sometimes for several months or until shoots were well up. This promoted the development of good roots. When moved outside, the bulbs were grown in shady cool places.

Kirby Fong from Northern California, who received bulbs in late winter and spring, planted his right away or stored them in a refrigerator. He used a deep pulp pot, a pinch of superphosphate in the lower part of a mix that would drain very freely, and placed the bulbs on a layer of bulb dust before adding more of the mix and bulb fertilizer. He watered frequently with cold water to keep them cool. If bulbs arrived later in spring he would plant them, water them, and place them in the refrigerator, noting that in nature they would be making roots in the cool, damp winter. If no foliage appeared, watering was stopped. Water was withheld as the foliage dried some time in summer. Bulbs were smaller after this treatment and could skip the next blooming season, but often came back into growth a bit earlier or at the right time.

Narcissus in the bulbocodium group that begin growth in fall and bloom early winter were given to the bulb exchange in spring. Jim Waddick from Missouri gave them a short dry summer baking after starting them right away, and even got them to bloom the following winter at about the right time. Lee Poulsen from Southern California found his never went completely dormant when grown in a cool part of his garden, so he continued to water them. They bloomed the following winter. Arnold Trachtenberg in New Jersey grew his in a cool basement under lights, moving them outside to a shady spot when they were in growth. They bloomed briefly, were fed regularly and in spite of being grown in a small container all seemed healthy (and some had offsets) when he checked them at dormancy. Dell Sherk in Pennsylvania found his did not completely go dormant in spite of two months of withholding water in the summer. They too went on to bloom. How they all fared in later years is not known, except Dell reported his had not bloomed again and were dwindling.

Narcissus species I received in Northern California in spring and summer have all survived, but most have not bloomed even several seasons later. Interestingly the only two of the bulbocodiums that I have gotten to bloom again were the only two that bloomed that first summer following the spring planting, *Narcissus bulbocodium* var. *monophyllus* and *Narcissus romieuxii* var. *zaianicus*. Whether they are still adjusting or just not happy in my climate I do not know.

Fritillaries and Iris

Bill Dijk reported good success with *Fritillaria* species and *reticulata* irises using the same method he did with *Narcissus*. He planted in spring in a deep crate, watered, and put them in cool storage for two months before moving them to the coolest spot in the garden once in growth. Jim Waddick kept Siberian iris as cool as possible in spring to early summer, before withholding water for a short summer so they would naturally go dormant in the fall. Lee Poulsen told of a friend who forgot some bearded iris for a year where they were kept moderately cool, dry, and dark, and they all grew once planted and bloomed. This implied that they could be converted relatively easily by prolonging dormancy and starting them back into growth at the correct time.

South African winter-growing and summer-growing irids

This group was one of the more difficult to convert. Since many of them can be grown from seed to flowering in a number of years, raising from seed may be a more efficient way to grow them. Having a cool climate in summer is a definite advantage as plants can be kept in growth longer and more of them will survive. They will still need a warm dormancy later, so will take a few years to get back in sync however.

In climates where temperatures get hot in late spring/early summer, planting in spring did not give most of them a long enough time to grow and produce a new corm before hot temperatures set in and growth halted. Lauw de Jager in France reported only 30% survived and these were small. Leaving them unwatered in sand and planting in fall improved the survival rate to 50%. Jana Ulmer tried keeping a couple of species cool and dry in the refrigerator to prolong dormancy and planted them late summer. This was not clearly helpful although the sample was very small, as were the corms. Two of us with cool summer temperatures, Diana Chapman and I, were able to extend dormancy by storing corms dry in paper bags, and then planting at the right time in early fall. This seemed to work, but probably would only work if the corms were big enough to survive being dormant for an extended period and the temperatures were not too hot. Having cool summers I was able to plant *Ixia paniculata* in spring and keep it growing, but the following year it did not

emerge until mid winter, whereas *Moraea tripetala* kept dry until fall planting, emerged at the normal time.

Jim Shields in Indiana tried to convert summer-growing irids. They arrived in spring and were potted up, but not watered, kept in shade and somewhat protected from the elements until in growth. Once in growth they were given more light, but still not a lot of water. He lost some of the things he tried, but had success with two *Moraea* species, *Moraea huttonii* and *Moraea spatbulata*. The former grows in a semi-aquatic habitat and might be expected to be easier to plant right away.

South African winter-growing amaryllids

Tom Glavich in Southern California was able to arrange to have these sent so they would arrive in mid fall. They were potted immediately and left outside unless there was an extended period of rain (unusual in Southern California). When there were signs of growth, they were watered, and they were dried off when growth stopped. If leaves were green, but growth was slow they were still given a good soaking occasionally. It usually took a couple of cycles for them to be growing in the proper season. He watched the growth and let the bulbs take the lead.

Diana Chapman reported losses of about 50% when bulbs arrived in late spring, were watered once after potting, placed in the shade and watered when they started growing. If they were able to produce adequate roots before temperatures stopped growth they survived, otherwise not.

Mike Mace in Northern California had tried storing bulbs dry as well as planting and hoping they would adjust. What he found to work better was putting them in a closed plastic bag, with a paper towel to absorb moisture, and placing them on the top shelf of the refrigerator. He checked them monthly for disease or signs of growth and then planted in late summer. Following this advice Jana Ulmer had success with 8 out of 10 *brunsvigias*.

Forum members had always been advised to plant amaryllid seed immediately and then try to keep it going for as long as possible. If it could be in growth for a year, it would then go dormant at the correct time. Andrew Wilson in

Southern California found that it was difficult to keep the seed growing in the warm summer months. So he experimented with putting seed in closed plastic bags in the vegetable tray when he received them in early summer. In fall he found they had all sprouted and were easily planted. His best results were with *Haemanthus* and *Brunsvigia* seeds, which were large and fleshy. *Gethyllis* seed that was smaller and drier became desiccated, and he concluded might need more packing or to be planted sooner.

South African summer growing amaryllids

Jim Shields tried these as well. Nerines arriving spring to summer were planted and watered if they had foliage. Otherwise they were kept dry until in growth. All were kept out of the sun. They all produced new foliage and *Nerine flexuosa* bloomed in winter. Crinum arriving in summer were planted and placed outside. All were large bulbs and started growing at different times. Some even bloomed that first summer.

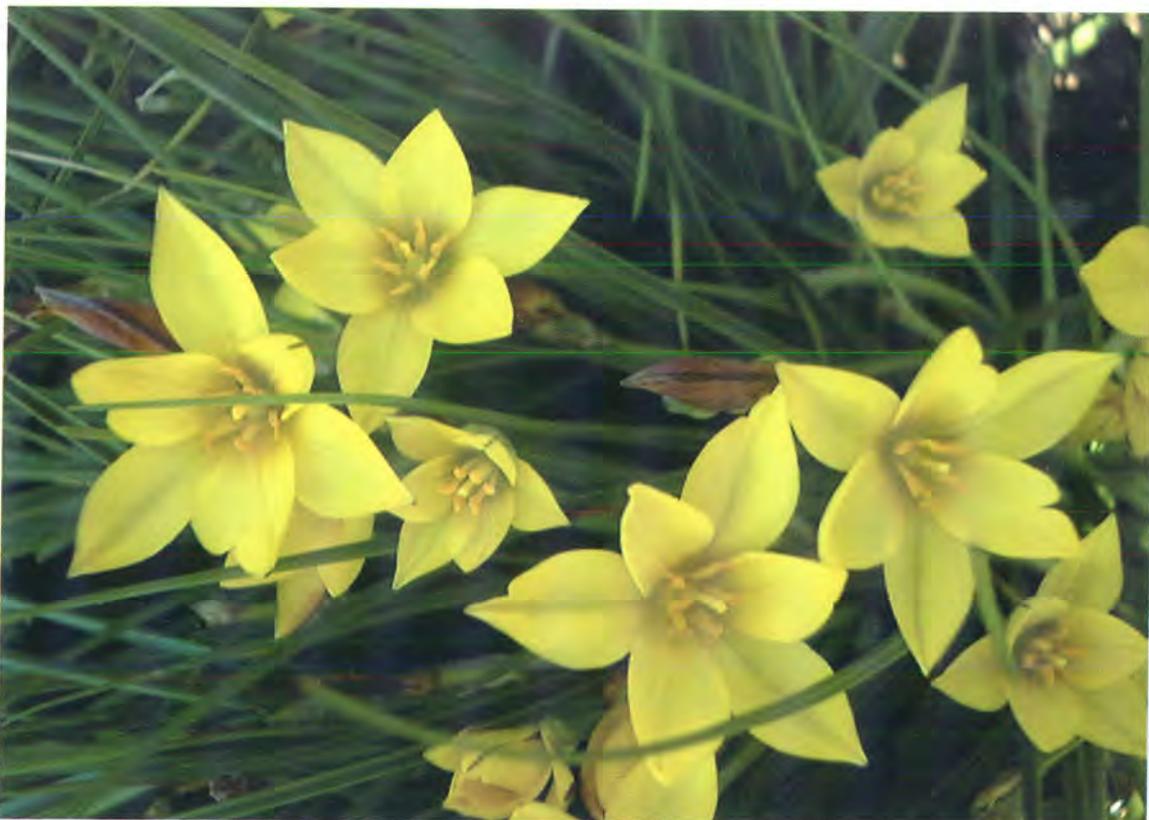
Oxalis

Diana Chapman reported that winter growing *Oxalis* from South Africa, arriving in late winter to early spring, could be started into growth fairly quickly. Although the new bulbs produced were small, they could be replanted after a short summer dormancy and be on track rather quickly. She speculated that in a climate like hers where they were almost evergreen, South American *Oxalis* would show little setback when changing hemispheres.

Nothoscordums/Ipheions

Ipheion uniflorum cultivars that I received in spring and planted immediately, came up quickly, grew, and bloomed in a few months. After a short dormancy, they bloomed the following winter-spring without any apparent setback at all, and have continued to thrive. They are very adaptable plants in my climate, surviving with or without summer water, and that may be why they were so easy to change over.

Nothoscordum sellowianum (*Ipheion sellowianum*) and *N. dialystemon* (*I. dialystemon*) gifts from Bill Dijk in New Zealand, arrived in the Northern Hemisphere in late winter. Diana Chapman advised to treat them with fungicide, plant them immediately, and try to keep them growing as long as possible by



Notthoscordum sellowianum (Ipheion sellowianum). Tony Palmer

providing regular fertilizer and cool temperatures. Where late spring and summer night-time temperatures were high, she suggested putting them in the refrigerator each night. Once they started to show signs of the leaves drying up, watering was to be reduced, but not stopped. Warmer temperatures were then to be provided if possible for about a four month dormancy, before moving them to a cooler spot and resuming regular watering.

This was a successful strategy for many of us. Lee Poulsen waited until fall to plant and found most of the bulbs had shriveled and did not recover. Marguerite English had blooms in one species the following winter. Most of mine were blooming the year after. Smaller bulbs of *N. dialystemon* received from another source did not break dormancy the next season, after growing initially, but after being given a warm summer in my greenhouse at Diana's suggestion (as they would have in South America where they grow) they came up the following year and bloomed.

Sandersonia aurantiaca

This one was quite easy for me to turn around. It arrived late summer, was potted right away, but moved inside in order to provide warmer temperatures. It bloomed in November. Given a short dry dormancy afterwards, it bloomed at the normal time the following summer and has continued to be on track. Cut flower growers have found that it can be manipulated to flower at different times of the year, which makes it a good candidate for changing hemispheres.

Lachenalia

There were only two reports. Bulbs received by Diana Chapman in spring were inadvertently buried in a pile of papers in a crumpled paper bag in temperatures not usually greater than 65 ° F. (18 ° C.). They had shoots in fall when discovered, and were doing fine once planted. The one species that Jana Ulmer placed dry in a plastic bag and refrigerated until fall grew briefly when planted before disappearing.

Leucocoryne

Leucocoryne purpurea and *L. coquimbensis*, also gifts from Bill Dijk to the BX, arrived in summer, 1999. It was suggested that these would benefit from cool storage so they were planted right away and placed in the refrigerator. Instead of delaying growth, the cool temperatures seemed to encourage them into growth. They came up quickly and were therefore growing in the middle of the summer. They didn't stay in growth very long, did not bloom, and were dormant in the fall. When to start them back into growth was a puzzle, but an article in *Herbertia* indicated they needed extended warm temperatures in dormancy to bloom properly. Therefore I kept mine dry for almost a year, first in moderate temperatures, and then in warmer temperatures. Planted the following fall, they were back on schedule and bloomed the following spring (2001). On the other hand, Jana Ulmer gave hers a short dormancy and they too survived and are now blooming for the first time in 2002.

Terrestrial orchids

Finally, Malcolm Thomas of Australia reported that terrestrial orchids he sent to the northern hemisphere, packaged in small sealed

bags with a little dry vermiculite, were returned unclaimed four months later. Unable to plant them as he was leaving on a long trip, he stored them in the refrigerator for three months. Many of them had started to shoot in the cool, and seven of eight potted up after seven months in storage were growing on a northern hemisphere schedule, now back home in the southern hemisphere!

In conclusion

There were more successes than failures getting bulbs to survive switching hemispheres. Some things were turned around in one season and even bloomed at the expected time. Others did not bloom for several years as they adjusted. Others grew the first year, but I do not have data on how they did in future years. Obtaining plants from your own hemisphere would still seem to be the easiest approach. Growing from seed, especially when it only takes a few years for flowering, may be almost as quick and less trouble. If, however, there are very special plants that may not be easily obtained otherwise, it is possible that by studying their needs and analyzing how you can meet them, they can eventually be turned around.



Leucocoryne coquimbensis. Bill Dijk

A Sneak Preview . . .

Just to whet your appetite a little, here is a taste of some of what you can look forward to in the next issue of BULBS.

Don Journet will be waxing lyrical about Lachenalias, those charming little South African bulbs that are generally quite amenable to cultivation. Don is one of our Australian members and lives about 32 miles (50km) west of Melbourne at the base of the Great Dividing Range. He has grown up to 90 different species, hybrids, cultivars and varieties. He will describe some of them and also give us useful information on their cultivation. Just as an example of how rewarding they can be he records *Lachenalia reflexa* as having flowered for a period of 16 - 17 weeks.

Mark McDonough recounts his unfolding adventure with *Allium flavum subsp. tauricum* which he started growing in the mid 1980s. From several different colour forms he has now ended up with what he describes as a remarkable palette of colours. He firmly believes that almost any colour is now possible, to add to an equally astonishing range of floral and foliar characteristics. You will believe it as well when you see his beautiful photos that richly illustrate the article.



***Allium flavum subsp. tauricum* - unnamed pink form.** Mark McDonough

Back to South African bulbs and Robin Attrill from the UK will beguile you with his feature article on Romuleas. Robin is originally from the Isle of Wight, but now gardens in Essex. He hopes that the day will come when *Romulea*, with its remarkable range of flower colour, is regarded as being on a par with *Crocus* which, as he points out, are not without their weedy species as well.



Romulea tabularis. Tony Palmer

In addition Roy Sachs will hopefully shed some light on viruses and the nasties that help to spread them around. Lisa Flaum reviews John Bryan's latest addition to the libraries of the lucky ones and Dirk Wallace smokes a variety of seeds, but swears that he doesn't inhale! Rachel Saunders pulls together people's experiences with growing bulbs in raised beds and last but not least I hope to finally have something on regulations around the world for seed/bulb imports. We will find out whether the new ones in the US are an over-hyped fizzer, or a serious impediment to your enjoyment of our great hobby. Other bits and pieces you'll have to wait to find out about when you receive your copy.

Hope it all adds up to a great reason to renew your sub!

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