

BULBS

Bulletin of the International Bulb Society



Volume 3, Nos. 2 - 4

July - December, 2001

\$5.00

International Bulb Society

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BULBS

The Bulletin of the International Bulb Society

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COVER PHOTO

Muscari latifolium by Brian Mathew

THE EDITOR'S DESKTOP

Alan W. Meerow

Change is good. The circumstances of life mirror the cycles of the natural world. In its sixty-eight year history the International Bulb Society has weathered many - changes in name, changes in scope, but always with its major goal intact: the dissemination of information about bulbous plants, scientific and horticultural. One of the greatest challenges the IBS faced was extending the breadth of its publications, surely the greatest incentive for membership in the Society. BULBS was begun several years ago as a forum and a stage for our membership. Your own experiences with bulbs, in the garden or in the field were conceived as the fodder of BULBS, a lively, colorful share-space. Let me set your mind at ease; this is not an obituary for BULBS, but a renaissance.

Cathy Craig took on BULBS when none of the IBS Board knew if we could make the eagle fly. Getting HERBERTIA out in a timely manner seemed difficult enough. Cathy brought several wonderful issues to fruition and brought color to the magazine. With this larger-sized issue, we re-christen Bulbs as "the Bulletin of the International Bulb Society," and beg your forbearance on a retreat from the overly ambitious goal of four issues each year. Henceforth, BULBS will be issued semi-annually, a January - June issue and again in July - December. Quarterly publication right now is too daunting a challenge for a volunteer organization such as ours. Editorship will rotate among the board during the next few issues.

We also toss a challenge to you, loyal readers and IBS members. If you would like to try your hand at stewardship of BULBS, we invite your participation as an editor. You need only make your interests known to me or any other member of the IBS Board.

We are fortunate indeed to have the Dean of hardy bulbs inaugurate this final issue of volume 3. Brian Mathew is probably the most recognizable name in the bulb world, and Brian has gifted us with a marvelous survey of those blue harbingers of spring, the Hyacinthaceae.. Derrick Donnison-Morgan surveys the fall-flowering *Narcissus* of the Mediterranean. Kevin Preuss writes on his pursuit of the perfect *Griffinia*. Michael Vassar whets our appetite for 2002's Symposium with a short history of the Huntington. Welland Crowley introduces the newest *Cyrtanthus* species, *C. wellandii*. Last but not least, our columnists Roy Sachs, Carol Wallace and book reviewer Lisa Flaum provide some nitty-gritty on bulb horticulture and literature.

Finally, on behalf of the Board of Directors of the International Bulb Society, I cordially invite you to join us for what assuredly will be a magnificent 2002 Symposium at the Huntington Botanic Garden. The time of year is perfect, and the setting is inspiring. Please join us in San Marino.



Join us in San Marino!

IBS International Symposium 2002

"The Magic of Bulbs"

April 27 - 28, 2002 at the prestigious Huntington Botanic Garden, San Marino,
California

Program and Registration Form on pages 26-27 of this issue.

IBS NEWS

Pam Kelly became Treasurer of the International Bulb Society in February, 2002. We thank Cathy Craig for her many years of service in this position.

The **IBS Bulb Collection**, which includes the material collected by Len Doran in South America during the 1950's and 60's has been transferred from former curator



Marvin Ellenbecker to the USDA, National Germplasm repository in Miami, FL. A complete inventory is underway. The USDA site has a walk-in humidified cooler, three environmental growth chambers and two greenhouses with which to accommodate this important germplasm collection.

The **bulb auction** at the **2002 Symposium** should prove extremely exciting for attendees as it will be rich in material from the IBS bulb collection.

HERBERTIA 56 (2001) is shaping up nicely with articles from Dr. Mark Bridgen on a non-destructive harvesting technique for the collection of native geophyte plant species, Dr. Reinhard Fritsch on *Allium* phylogeny and taxonomy, as well as 2 *Griffinia* papers by Preuss & Meerow, *Narcissus* reproductive biology by Koopowitz et al., Madagascar *Crinum* taxonomy by Lehmillier, 3 short articles by Charles Craib on South African bulbs, 2 (poss. 4 if space allows) articles on *Fritillaria* by Bakshi Khaniki, an *Allium* and *Hymenocallis* paper by

Thad Howard, plant hunting in the Republic of Georgia by Boyce Tankersley, Hyacinthaceae by John Manning, Graham Duncan biography and the usual annual geophyte science bibliography.

Boyce Tankersley reports that he has completed a survey of the national databases and extracted scientific names of geophytes of conservation concern for North America. He has sent the list to Jim Shields for further input. This project is an ongoing one of the IBS Conservation Committee.

The rescue of *Narcissus* species in Spain by Derrick Donnison-Morgan is proceeding after all of the necessary paperwork was successfully completed. Bulbs will be sent to the Ohio State University Ornamental Crop Germplasm Center in Columbus, Ohio, the Missouri Botanical Garden and the University of California Irvine Arboretum.

ID of Renosterveld bulbs on Page 43:
Top row, left to right: *Babiana villosa*, *Moraea tricolor*, *M. villosa*; 2nd row, l-r: *Moraea* (formerly *Homeria*) sp., *Gladiolus alatus*, *Oxalis* sp. (top), *Romulea* sp. (bottom); 3rd row, l-r: *Geissorhiza tulbaghiensis*, *Sparaxis grandiflora*, *Moraea tulbaghiensis*; bottom row, l-r: *Geissorhiza inflexa*, *Moraea papilionacea*.



DEADLINE FOR BULBS volume 4, number 1 is April 30, 2002.
Tony Palmer, Editor.
adpal@ihug.co.nz

Blue Bulbs

Squills, Grape Hyacinths, and Their Kin

Brian Mathew

All photographs by Brian Mathew except where noted.

In the showy world of the spring bulbs when golden daffodils and extrovert tulips tend to dominate the scene, those more modest little bulbs, the squills and their relatives, can get overlooked. They do, however, have a lot going for them, and provide a window into the blue end of the spectrum that is not so common in the world of bulbous plants. So spare a thought, and definitely some garden space, for those small, often blue-flowered frost hardy bulbs belonging to the *Hyacinthaceae*. The genera *Muscari* and *Scilla* immediately come to mind for these are the most often seen in gardens and catalogues, but there are others that are worthy of consideration. A selection of species and cultivars of these two genera alone can provide much pleasure and a fine display of a subtle nature.

Muscari

Dealing first with *Muscari*, the grape hyacinths, these can be instantly recognized by the dense racemes of globose (globe-like) to bell-shaped flowers which have their mouths crimped to leave just a small orifice for pollinating insects. Many gardeners will have cursed the common species (or species complex) of the Mediterranean region, *M. neglectum* ("M. racemosum"), since it can increase by seed and offsets at an alarming rate and can be very difficult to eradicate when lodged in a rock

garden. However, it is an extremely variable plant throughout its range and some of the really blackish-blue variants are well worth having. Very similar, but a strong mid-blue color, is the equally common *M. armeniacum* from farther east in Asia Minor and



Muscari aucheri

the Caucasus. This has become very popular and several cultivars have been named, among them 'Blue Spike', a curiosity with dense heads of malformed flowers. Here again, it has its value, especially for naturalizing beneath deciduous shrubs. The *Muscari* cultivars 'Valerie Finnis', 'Baby's Breath' and 'Trehanensis' probably all belong here as forms of *M. armeniacum*.

Much less well known are some of the Balkan and Turkish species, and foremost on my list comes *M. aucheri*. This is a mountain meadow plant which produces a pair of slightly greyish-green leaves and a short raceme of brilliant blue flowers, topped with a cluster of pale (sometimes nearly white) sterile ones. There is a tendency for all *Muscari* to have this 'top-knot' of sterile blooms. In this one it is particularly noticeable and appealing. It is also quite well developed in the western Turkish species *M. latifolium*. As its name informs us this has wide leaves, the widest in the genus, and only one per bulb, so it is a very distinctive grape hyacinth and a very showy one. The main part of the spike is densely clothed with inky blue fertile flowers and there is a contrasting group of pale sterile ones at the apex. The Balkan *M. botryoides* was at one time offered frequently in catalogues but the true plant seems to be less often seen now. It has very globular flowers (rather than oblong or obovoid as in most species) of a good bright blue, and the slightly glaucous leaves increase in width towards the apex. There is also a good white form of it. All of those mentioned so far have a paler rim around the constricted mouth of the flower - in fact the 'rim' is formed by the six very small perianth lobes, or 'teeth' to which they are often referred. However, one of the Balkan species, *M. commutatum*, lacks this feature and has wholly blackish-violet flowers, a fascinating color. Unfortunately the plant is rarely seen in cultivation. There is a similarly colored species from Cyprus and western Asia, *M.*

inconstrictum, which some say is inseparable from *M. commutatum* but the jury is still out, weighing up the evidence. The epithet 'inconstrictum' refers to the fact that the bell-like flowers are not as crimped in at the mouth as they are in most of the 'true' *Muscari* species. This factor has led to a group of species being split off from them as 'false muscari', or *Pseudomuscari*, either as a genus in its own right or as a subgenus of *Muscari*. The best known of these is *M. azureum*, a mountain meadow plant from eastern Turkey with brilliant mid-blue flowers, and there is also an albino. Even better in the clarity of blue of its flowers, and altogether larger, is a plant from the Caspian region of Iran, which was introduced to cultivation in the 1960s as *M. chalusicum*. However, it appears that there is an earlier name for this, *M. pseudomuscari*. The one area in which it does not surpass *M. azureum* is in its freedom of increase so it is still, after more than three decades, an unusual plant.

Although for garden value the tassel hyacinths – *Muscari comosum* and its allies (sometimes referred to as the genus *Leopoldia*) – are not spectacular (in fact most are fairly dowdy), they do have an unusual feature which gives them interest value. The very widespread Mediterranean *M. comosum* is the only one likely to be encountered in cultivation although a few others are around in specialist bulb collections. This has long racemes of brown flowers which on their own would rule this plant out altogether for ornamental value, but at the summit there is a bright violet tuft of sterile

flowers, each carried on a slender violet pedicel up to an inch or more long. Presumably this acts as a beacon to attract incoming pollinating insects that are then diverted to the fragrant, but dull, fertile flowers. The garden selection known as 'Plumosum' is a monstrous form in which all the flowers have aborted and become converted into slender purple threads so that the whole inflorescence is a feathery purple mass. In fact, an alternative name is 'Monstrosum'. It is a very easy garden plant in any of its forms, requiring only a sunny spot.

The final group of *Muscari* consists of only two species, *M. muscarimi* (*moschatum*) and *M. macrocarpum* that are by some authorities split off into a separate genus, *Muscarimia*. These, the musk hyacinths, are noteworthy for their intense fragrance rather than beauty, although the latter is a showy plant with bright yellow flowers. These are from southwestern Turkey and the adjacent east Aegean islands where they grow in hot, rocky situations and in cultivation need similar treatment. The features that distinguish them from other groups of *Muscari* are the roots and the flower shape. In these two species the thick white roots are perennial, delving deep between the rocks for moisture, while the tubular or egg-shaped flowers have a 'corona' surrounding the very constricted mouth. This is not a corona in the sense of *Amaryllidaceae* but a ring of swellings or bumps on the outside of the perianth lobes that are usually colored brown. In the case of *M. muscarimi* the flowers vary from cream to greenish or pearly white,

sometimes with a hint of blue. One form with this translucent blue coloration has been named as a separate species, *M. ambrosiacum*. The striking yellow *M. macrocarpum* has rather longer flowers that have a strong fruity fragrance and, from its name, large fruits. In fact both species produce large, papery capsules that are shed in their



Scilla greilhuberi

entirety to be blown as 'tumbleweeds' to distribute their spherical seeds.

Scilla

The squills (*Scilla* spp.) are an equally interesting group of plants and some of them are among our most-loved spring bulbs. Who, for instance, could possibly be without *S. siberica* in one of its forms? The

cultivar 'Spring Beauty' may be a very common plant, and therefore somewhat dismissed by the bulb specialists, but it is among the most intensely blue-colored of all. If it were an ungrowable rarity from the heights of the Andes it would be one of the most sought after! Much the same applies to *S. mischtschenkoana*, which most of us will know through the selection 'Tubergeniana', pale blue with a darker line along the center of each perianth segment. They have pendent bell-shaped flowers at first, but opening out more widely as they age. Both of these are plants of cool mountain areas in Turkey, Iran, Georgia, Armenia, Russia and neighboring countries. They need a position in dappled shade where their bulbs will not become too sun-baked in summer. There are many variations on the *S. siberica* theme, some described as separate species. They are all interesting to have and study, but none can surpass *S. siberica* as a garden plant. However, for those who garden in cold areas it might be worth trying the Caucasian *S. rosenii*. It has fewer flowers per stem than *S. siberica*, but they are paler blue, larger, and reflex their segments right back in *Erythronium* fashion, a most attractive feature. To perform as it should it is a plant that needs to be frozen in, or buried in snow, for the winter and then given a 'proper' warm spring. In regions with relatively mild winters – this applies to much of Britain – it starts to grow too early and the flowers try to open as it pushes through the soil, so it seldom looks at its best. Also having flowers with reflexed perianth

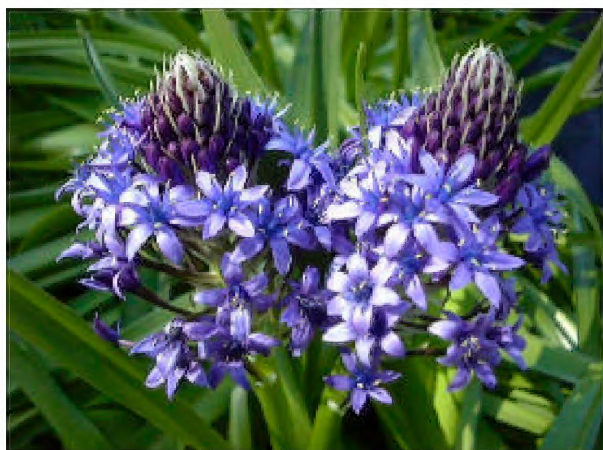
segments, but much easier to grow are *S. greilhuberi*, *S. hohenackeri* and *S. cilicica*, all very similar plants with loose racemes of mid-blue flowers. The first of these, a woodland plant from Iran, is the showiest but has untidy habits; it produces its long trailing leaves in the autumn so that by flowering time in spring they are beginning to look very tatty. Its close relative *S. hohenackeri*, also from the Caspian woodlands, is much neater and sends up its narrow leaves in spring.



Scilla siberica subs p. *armena*.

It is unlikely that the similar *S. cilicica* will survive outside in areas with very frosty winters for it is a plant of mild Mediterranean climes in southern Turkey, Lebanon, and Cyprus and, like *S. greilhuberi*, has vulnerable winter foliage. Another for the dappled shade is the very common and widespread European *S. bifolia* that produces from between a pair of oblanceolate basal leaves a 1-sided raceme of flat, starry, deep violet-blue flowers. As with *S. siberica*, there are many local variations, some of which have been named as separate species. From a garden viewpoint none surpasses the

cultivar 'Praecox', which has larger, showier flowers; there is also a good pink and a white form. While dealing with those scillas that prefer shade, mention must be made of the curious Pyrenean *S. lilio-hyacinthus* which has a yellowish bulb more like that of a lily consisting of large, loose scales and basal tufts of broad glossy bright green leaves. Although the flowers are not a splendid blue – rather more lavender blue – and individually quite small, they are freely produced and the bulbs naturally build up into sizable clumps. It can be quite a showy plant for a 'woody' area. This



Scilla peruviana. Tony Palmer.

too has a white form, 'Alba'.

For naturalizing beneath deciduous shrubs there is really no better squill than *S. bithynica*, a native of northwestern Turkey. This produces its small mid-blue flowers with such profusion that it can form a blue haze when settled in and seeding freely. This is often confused in gardens with a close relative, *S. messeniaca* from southern Greece, flowering at about the same time and having long linear basal leaves overtopped by racemes of flattish flowers. However, the shape of the inflorescence can

distinguish the two most readily; in *S. bithynica* the lower-most pedicels are the longest, so the overall shape of the raceme is broadly conical, whereas in *S. messeniaca* it is more cylindrical due to the more or less equal pedicels.

For sunny places there are several very good scillas, although most are fairly low altitude Mediterranean plants suited for milder regions without seriously frosty winters. To my mind the best is *S. litardierei* (*S. pratensis*) from Dalmatia and adjacent parts of the former Yugoslavia, and is one of the hardiest. This flowers rather later than those mentioned above, in early summer, and has very dense 6-9 in (15-23 cm) racemes of violet-blue flowers. Each starry flower is very small but they are so numerous that the massed effect is striking, and the bulbs readily produce offsets to build up into clumps. By comparison *S. verna*, an uncommon British native, is of low horticultural merit. Some of the southern European forms are rather better and will be of interest to bulb enthusiasts. A variant of this, probably rightly described as a separate species *S. ramburei* from Spain, is a valuable addition to a rock garden or raised sunny bed. It is low growing, with long-tapering grey-green leaves amid which sit wide heads of rich violet-blue flowers, larger and more colorful than in *S. verna*. The widespread Mediterranean *S. peruviana* (and nothing to do with South America!) is a much more robust squill for a warm sunny place if it is to flower freely. In northern climes such as Britain we need to place it near a warm wall where its large bulbs, planted with

their tips just at the soil surface, will get as near to a baking as possible. The rosettes of wide leaves appear in the autumn, followed in late spring by huge widely conical heads of steely dark blue (there is also a white form) flowers, quite spectacular when flowering freely. Although a



big, chunky plant, its overall height is usually less than a foot (30 cm) when in flower. If a tall one is required, then *S. hyacinthoides* is the species to go for, also a widespread plant around the Mediterranean. This has many-leaved basal rosettes as well, but the inflorescence can reach up to four or five feet (140-150 cm) with masses of small, mid-blue flowers. In this respect it is very like the southern African *S. natalensis* although it is doubtful whether the two have any connection with each other. The latter is also a good plant for mild areas, but even here in southern England it can be grown

only in a frost-free conservatory. I doubt very much whether it should be regarded as a *Scilla* for it has completely different fruits with papery, elongated seeds that are more or less viviparous, germinating soon after they are shed. It, unlike the northern hemisphere squills, which are all autumn-winter-spring growers, is a summer-grower and dormant in winter.

One needs to be a real bulb fanatic to appreciate *S. autumnalis* and its relatives, a group of Mediterranean species that flower in late summer or early fall. Their slender racemes of tiny lilac to violet flowers have little ornamental value and quickly pass, so they hardly bear comparison with their spring cousins. However, the autumnal *S. scilloides* (*S. chinensis*, *S. japonica*) from eastern Asia is worthy of consideration for it has larger spikes of rich pink flowers, reaching about 6-8 in (15-20 cm) in height. Both need sunny positions. Their hardiness must be in doubt, certainly in the case of *S. autumnalis*, as it often grows at very low altitudes near the sea.

Hyacinthoides

The bluebells are dealt with separately since it is usual now to regard them as constituting a distinct genus, *Hyacinthoides* (syn. *Endymion*). The most obvious feature is that each flower is subtended by two bracts rather than one as in *Scilla*. The bulb too has a different structure, being solid instead of consisting of concentric scales and is replaced each year by a new one, although I am not certain that this happens in all species

attributed to *Hyacinthoides*. The English bluebell, *H. non-scripta*, which is such a delight of British woodlands in the mid-spring period, is rather taken for granted and seldom planted in gardens. In fact it can become a bit of a weed in places where it does well, while others do not find it easy to establish. It may even prove impossible to grow in hotter, dryer climates. The bigger, stouter Spanish bluebell and the inter-specific hybrids between the two are much more tolerant and are often cultivated in a range of color variants. The two species are easily distinguished in their true form but the hybrids obscure these differences. In *H. non-scripta* the rich deep blue flowers are tubular and produced in a 1-sided raceme that bends over at its tip (hence *nutans*, a synonym). In the case of *H. hispanica* (syn. *Scilla campanulata*) the flowers are of a wider bell-shape. They are arranged all around the axis of the raceme and the tip of this is not nutant. Of both species and their hybrids there are blue, pink and white forms. There are other species of *Hyacinthoides*, some of them looking very like species of *Scilla*. The most 'squill-like' is *H. italica*, a plant that is frequently mistaken for *S. bithynica* in gardens since it is similar in overall aspect and has the characteristic of seeding itself freely to form drifts in some British gardens. Like *S. bithynica*, the inflorescence is widely conical, or even flat-topped (corymbose), due to the lower pedicels being longer than the upper. If there is doubt about the identity of a particular plant, a quick check on the number of bracts per pedicel will identify which of the two

species it is. Another species in this group worthy of cultivation is *H. reverchonii* from Spain. It is slightly taller and more robust than *H. italica*, up to about 9 in (23 cm) tall with racemes of mid-blue saucer-shaped flowers.

Chionodoxa

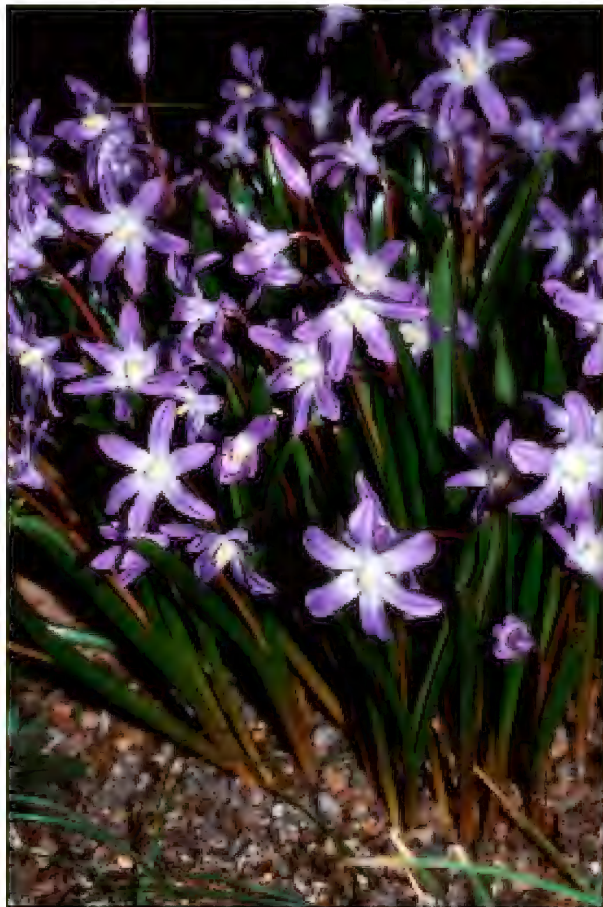
Although this short survey is aimed at the grape hyacinths and squills, there are other genera in the same group of the *Hyacinthaceae* that have garden-worthy species,



Chionodoxa lucillae

such as *Chionodoxa*. These, known the glory of the snow since they are snow melt plants, constitute a fascinating little genus of about 6 or 7 species. All are very local endemics, each confined to its own small area in western Turkey, Crete and Cyprus. The bluest are *C. sardensis* and *C. forbesii*. The first is a vigorous plant with several outward facing flowers in intense deep blue with almost no white eye in the center. *C. forbesii*, from one mountain in the southwest of Turkey, has fewer, smaller flowers, just as blue but with a white eye and facing upwards. The best known is *C. siehei*, a species that has unfortunately been the subject of much nomenclatural confusion. For

many years it was known incorrectly as "*C. luciliae*" and more recently has been merged (also incorrectly in my opinion) with *C. forbesii*. It has larger and more numerous flowers than either *C. sardensis* and *C. forbesii*. These face outwards and, when compared alongside these two, are of a more violet shade of blue with a very large, conspicuous white eye in the center. The true *C. luciliae* is also very distinctive, with a few even larger flowers facing upwards, in a paler more lavender shade, also with a large white eye; it was for a time known by its synonym *C. gigantea*. All of these are Turkish



Chionodoxa siehei

plants. The one species from Cyprus, *C. lochiaie*, has mid-purplish-blue flowers that are rather more

funnel-shaped than flat, and they have no white eye in the center. On Crete there are probably two species, although the situation is not clear since there is much variation that is difficult to assess. Both are smaller flowered than their Turkish counterparts but nevertheless attractive. One of them (*C. albescens*) has whitish, funnel-shaped flowers with a blue tint at the tips, the other with flatter flowers in varying shades of blue. Variants of the latter have been named *C. nana* and *C. cretica* but should probably be merged under the earlier name *C. nana*. The latest published work on the Cretan flora (Turland et al., *Flora of the Cretan Area*, 1993) merges all three species together and, following the opinion of Austrian botanist Franz Speta, sinks the whole genus into *Scilla*. I have always taken the view that taxonomy and its associated nomenclature should never lose sight of practicality (for communication purposes). Such 'lumping' serves no really useful purpose. Those who sink genera into others usually continue to recognize, at some subordinate level, the group that has been absorbed, often as a subgenus. Thus it is not a case of saying 'this assemblage of species does not exist'. Perhaps the most useful approach would be to go over to a trinomial system of nomenclature in such cases, so that we could, for example, refer to *Chionodoxa (Scilla) nana* or (rather reluctantly!) to *Scilla (Chionodoxa) nana*. That these two genera are closely allied is, however, not in question. *Scilla bifolia* will hybridize with *Chionodoxa* in gardens to produce very ornamental

vigorous intermediates. Or perhaps one should be more precise and say that this indicates a close relationship between *Chionodoxa* and *Scilla bifolia*, for no hybrids are known between *Chionodoxa* and any other species *Scilla*.

The type genus of the Hyacinthaceae has not been mentioned since only one species, *H. orientalis*, is in general cultivation. It scarcely requires any further promotion, having been 'tamed' and

domesticated to a very advanced degree long ago by the Ottoman Turks before being adopted by European horticulturists.

Brian Matthew was a lead scientist at the Royal Botanic Garden, Kew for many years, where he completed taxonomic treatments of many of the world's hardy bulbs. He is the author of numerous books on bulbs.

Autumn Flowering *Narcissus*

Derrick Donnison-Morgan

Cocentaina, Alicante, Spain

All photographs by *Derrick Donnison-Morgan*

'Daffodils that come before the swallow dares and take the winds of March with beauty.' William Shakespeare (Winters Tale).

We all see daffodils as harbingers of spring but there are several species that flower in the autumn. As the temperatures drop and the autumnal rains arrive, giving us that most Mediterranean of climates, so the autumn flowering daffodils pop their heads out of the ground.

The first to be seen is *Narcissus serotinus* L. This species is widespread throughout the Mediterranean from the Algarve and Coastal areas of Morocco in the west and as far east as Israel. Its distribution is never more than about 30 kilometers inland and includes all of the islands. Its northern limit is north eastern Spain and it is absent from France, most of the northern Adriatic coastline, and from the southern Mediterranean coast from Benghazi eastwards. The small globose bulb prefers dry calcareous soil or maquis and can sometimes be found in vast

populations covering acres of ground. Botanically it is the only *Narcissus* in the section *Serotini* Parlatores, although it resembles *N. poeticus* L. in appearance and is often called the 'Autumn Poet'. *Serotinus* means late flowering, but for me its appearance marks the beginning of the daffodil season.

Growth seems to be triggered by a drop in night temperatures. In the Valencia region the flowers can be seen in early to mid-September before the rains arrive and at a time when day time temperatures are still in the region of the high twenties or low thirties (°C). As with any flower of such wide distribution, flowering times differ greatly throughout its range. The plants are hysteroanthous, producing leaves after flowering, if at all, in which circumstances the stem takes on the role of photosynthesis, elongating as the seed pod ripens. The flower itself also differs



Narcissus serotinus

throughout its distribution range. Those in Morocco, North Africa and the extreme south of Spain have a ochre/yellow corona, whereas in northern Spain, the flowers have a bright orange corona. Eastern Mediterranean plants also differ, giving rise to what some authorities suggest are at least three subspecies. The petals are pristine white, sometimes wide and overlapping, while in others they can be narrow and twisted. First growth to seed dispersal can take as little as six weeks. Seed is copiously produced and germinates readily if sown when ripe.

Also: *N. serotinus* var. *deficiens* (Herbert) Baker = corona almost entirely absent.

N. serotinus var. *emarginatus* Chabert. = possibly from Algeria where the petals are deeply emarginate rather than apiculate.

Narcissus cavanillesii Barra & Lopez has only been included in the genus *Narcissus* since 1969. Prior to this date it was known by a variety of names: *Tapeinanthus humilis*, *Carregnoa humilis*; *C. lutea* and even earlier as *Braxireon humile*. Again, it is the sole representative of its section *Tapeinanthus*. Distribution is confined to southern Spain and Morocco where it grows in grassland and on roadside verges. The Spanish plants rarely have more

than a single flower 2-2.5 cm



Narcissus cavanillesii

diameter on a short and weak stem 5 - 8 cm tall. The Moroccan forms are much stronger plants with up to three flowers (2.5-3.5 cm diam.) on stout and much taller (10-15 cm) stems. Flowering time is October/November and appears to be dependent on autumn rainfall. This plant does not have the distinctive daffodil corona, but rather six small scale-like projections. The bulbs tend to produce offsets in preference to seed, although some seed is set and is viable if sown when immediately ripe. Leaves are rarely produced on flowering sized bulbs, the scape of which elongates in seed to two or even three times its flowering length, taking over the task of photosynthesis. The flowers are a uniform bright yellow, the six petals forming more or less a cup when young, then becoming patent as the flower ages.

The green daffodil, *N. viridiflorus* Schousboe, belongs to the *Jonquillae* Section and is the only one of the Jonquils to flower during the autumn months. This unique and unmistakable daffodil has a European distribution that is limited

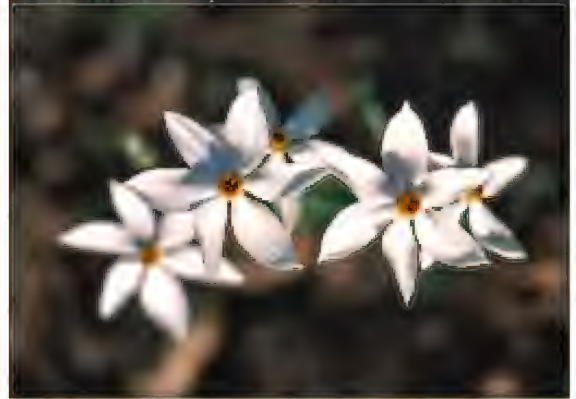
to the very southern tip of Spain, but



Narcissus viridiflorus

that is widespread throughout the coastal areas of Morocco from the eastern side of the Tangier peninsula to Agadir on the Atlantic coast. In my experience individual populations are small and scattered. The whole flower with the exception of the pollen is a dull green. The petals are narrow and twisted. Although I am sure that broad, flat petalled flowers have been found, these are a rare occurrence. Growth is triggered by the autumnal rains and, as with the previously mentioned species, no leaves are produced on flowering sized bulbs. One to three flowers are produced per stem, rarely as many as five. Each flower is 2.5 cm in diameter with a 1 mm high corona. The flower is sweetly scented like any daffodil of the section *Jonquillae*. Seed is produced in quantity and is highly fertile.

Narcissus elegans (Haworth) Spach belongs to the *Tazattae* Section and is said to be widespread along the coasts of Corsica, Sardinia, Italy and the North African



Narcissus elegans

coast from Morocco to Libya. I have recently received reports that it has been found in southern Spain. It is distinct among tazettas in having an orange/red corona that is a dull greenish-brown upon opening. The corona is narrower at the mouth than at the base, giving it a conical appearance. The plant has the typical form of a tazetta daffodil, with arching leaves and multi-flowered stems. The petals are white, narrow and twisted. Populations seen in Morocco are large and differ greatly from one site to another. Plants seen near Tangier have 4 - 8 flowers to a stem; others seen near Rabat on a sloped semi-wooded area had a minimum of ten, some fine forms with as many as seventeen.

Also: *N. elegans* var. *elegans* f. *auranticoronatus* Maire = From Cyrenaica (Libyan Desert) with a cylindrical orange corona.

N. elegans var. *fallax* Font Quer = From Morocco and Algeria with greenish white petals.

N. elegans var. *flavescens* Maire = From Algeria with cream colored petals.

N. elegans var. *intermedius* Gay
= From Morocco and Algeria with broader and more obtuse petals.

N. elegans var. *oxypetalus* (Boissier) Maire = has larger flowers with a yellow corona.

Narcissus broussonetii Lagasca & Segura. (Section *Aurelia*) is the third autumn flowering species to be the sole representative of its section. Its distribution is confined solely to coastal Morocco. It closely resembles *N. papyraceus* Ker-Gawler, but has no corona and has exerted bright yellow anthers. Growth is triggered by the autumnal rains. In fact, in cultivation it is recommended that the bulbs be kept completely dry until October, at which time a bucket of water is poured over it. It will then immediately start into growth. This is a tall plant growing up to 45 cm with strap-like wide arching leaves. The flowers are pure white with 6 - 8 per stem, each 3.5 - 4 cm diameter.

Also: *N. broussonetii* f. *grandiflorus* (Battandier & Trabut) Maire = A tetraploid form ($2n = 44$) that has larger flowers 3.5 cm in diameter and a longer tube. Distribution is the same as for the type.

Narcissus papyraceus Ker-Gawler is included as an autumn flowering daffodil since its flowering time is quite extensive. Plants from North Africa and southern Spain are often in flower during November or earlier, although other populations in its European distribution will not flower until March or even April. The plant can be found throughout the Mediterranean area, from southern Portugal through southern Spain and France, to Italy, Sicily, the Balkans and in North Africa from Morocco to

Algeria. It seems to prefer grassy or rocky places in full sun that are wet during the spring. The leaves are broad, arching and glaucous, appearing before the flowers. The flowers are white, about 3 cm in diameter, with as many as twenty or



Narcissus papyraceus

more to a flowering stem. They have a wonderful scent that has made the clonal selection 'Paper White' so popular in the Christmas cut flower trade.

Hybrids occur wherever two or more species share the same habitat:

Narcissus x *perezlarae* Font Quer. (*N. cavanillesii* Barra & Lopez x *N. serotinus* L). This is a charming plant which while young has the coloring and poise of *N. cavanillesii*, gradually changing, as the flower ages, to that of *N. serotinus*. Flowers are solitary or in pairs and form large clumps among both parents.

Narcissus x *alleniae* Donnison-Morgan (*N. serotinus* L x *N. viridiflorus* Schousboe). This plant has all the attributes of *N. viridiflorus*, but with flowers that have greenish, or off-white petals and a green corona.

Narcissus x *obsoletus* Haworth. (*N. elegans* Haworth. x *N. serotinus* L). The parentage for this hybrid is

often wrongly given as *N. viridiflorus* Schousboe x *N. elegans* Haworth. The plants have the size and shape of *N. serotinus* with the coloring and conical corona of *N. elegans*.

Narcissus x georgemawii. Fernandez Casas (*N. viridiflorus* Schousboe x *N. elegans* Haworth) The form, size and color of the hybrid is intermediate between both parents. It has 2-3 flowers on a long stem with the flowers held at right angles to it.

Habitat degradation due to road widening and, to a lesser extent, urbanization and tourism, has put the Spanish *Narcissus* populations under threat, especially those in Andalusia. Those bulbs which enjoy the conditions of roadside verges and grassy places are most at risk, although hillside urbanization is becoming more commonplace as the beaches and sea views have reached saturation point. The central government is unable to police environmental laws that are shunned or downright ignored in autonomous regions such as Andalusia (coastal provinces of Cadiz, Malaga and Almeria) and Valencia (coastal provinces of Alicante, Valencia and Castellon), that form much of the Mediterranean coast.

The attitude of the Spanish authorities to wildlife habitat degradation can be summed up by the headlines in a prominent Spanish national newspaper: "Only 50 kilometers of undeveloped coast left within the Generalitat of Valencia." It went on to say: "but don't worry, it's sufficient to complete the scheduled building program."

The law in Spain allows for building permission to be granted if the land is not sustaining anything else. The developers quickly burn any farmland, forest or national park to get planning permission for the urbanization which will profit them by many millions of pesetas. The fines for deliberately starting a fire are very low by comparison. Many developers build it into their plans. The local "alcaldí" is often the building contractor or his cousin.

Mont'go is a small isolated mountain behind the thriving tourist coastal town of Denia in Alicante Province. It rises to 753 metres above sea level and has 100 hectares of wilderness designated as a National Park. In August 1999, 500 hectares of national park land were destroyed in three separate arson attacks. The fires were started at three separate points surrounding the mountain at the same time. The blaze, started on Friday the 13th, was only finally subdued on the following Monday. Several hundred people were evacuated from their homes on the lower slopes. The provincial government (The Generalitat of Valencia) promised a thorough investigation. At the time it was estimated that the regeneration of the national park would take at least 15 years. The mountain is home to many unique plants which include *Narcissus assoanus* and *N. dubius*.

<i>N. serotinus</i> subsp <i>serotinus</i> Salmon	<i>N. serotinus</i> subsp <i>grandiflorus</i> Salmon	<i>N. serotinus</i> subsp <i>orientalis</i> Salmon
Distribution: North Africa and the extreme southern tip of Spain.	Distribution: Iberian peninsula.	Distribution: Italy, Malta, Greece, Turkey, Crete, Cyprus and the Near East.
Flowering stems without leaves.	Flowering stem with one leaf	Flowering stem with one leaf
Leaf on immature bulbs, round in section, slender.	Leaf hemispherical, deeply channeled on inner face.	Leaf hemispherical, deeply channeled on inner face.
Stem: 1 - 8 cm	Stem: 4 - 20 cm	Stem: 10 - 35 cm
Flowers solitary, very rarely 2 to 4 cm diameter, with broad oblong apiculate segments.	Flowers: 1 - 6 to 3.7 cm diameter, segments narrow, sometimes acute.	Flowers: 1 - 5 to 3.6 cm diameter, segments oblong, apiculate.
Corona very small, green or pale yellow.	Corona larger, green at first soon becoming bright orange.	Corona prominent, green at first soon becoming bright orange.
Seed capsule: round, small.	Seed capsule: larger, oblong.	Seed capsule: oblong.

By the spring of 2000 work was already underway in constructing new developments further up the mountain in areas that were once designated as National Park. The "alcaldi" of Denia is reported to have given building permission to "reputable" contractors who would build "sympathetically" with the mountain in mind. By the autumn of 2001, several dozen homes in at least four new developments were completed.

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- Derrick Donnison-Morgan studied horticulture at Somerset College, Bridgwater, England and at Chelsea Physic Garden, London. He worked for the late King Hussein of Jordan as a nurseryman and for Zeneca Seeds in their Genetic and Modified Plants research program. He now farms 2.5 hectares of olives and almonds in Eastern Spain.*

Growing Griffinias in Florida

Kevin D. Preuss

Photos by Kevin D. Preuss except where noted.

Origins of *Griffinia*

Strictly Brazilian in origin, the genus *Griffinia* Ker Gawler has about

15 species, most of which are fine candidates for containerized growing in the shade garden in USDA zones 9 through 11, or greenhouses else-

where. The horticultural potential of these endangered amaryllids is great, in particular the blue-flowered species of *Griffinia* subg. *Griffinia*. Even in Brazil, these plants are not commonly cultivated. The white-



Griffinia hyacinthina

flowered *Griffinia* of subgenus *Hyline* seem to have evaded cultivation (at least outside of Brazil). The small, blue-flowered *Griffinia* are elements of the primary rainforests of eastern Brazil, where they grow in deep shade provided by the multiple layers of the canopy. Humidity levels are generally high and temperatures typically in the range of 15-35° C (60-95° F). Flowering periods are variable among species; plants flower freely from spring through autumn.

Cultivation Tips

Working with the plants since 1995, I have made these general observations. *Griffinia* are easily grown, given the proper conditions. *Griffinias* have proven to grow well in peninsular Florida (USDA zones 8, 9 and 10). The warm, humid tropical climate of Florida is remotely similar to that of its native habitat. They grow well under about 95% shade cloth. Ideally, plants should be protected from winds and temperatures below 10° C (50° F). Temperatures falling

below 10° C and/or exposure to cold winds result in plants quickly losing their turgidity, with the exception of *G.*



Griffinia parviflora

hyacinthina. On several occasions, my collection was exposed to temperatures around 5° C (40° F), and a few nights even close to 0° C (32° F) without long-term damage. When growing the bulbs in containers a loose, well draining, but moist soil mix should be used. The bulbs should be planted with the neck just below the surface. Plastic pots retain moisture better than do terra cotta pots, which, even here in Florida, can dry out in just hours.

Propagation

Bulbs offset by the production of daughter bulbs arising from the basal plate (e.g. *G. parviflora*, *G. hyacinthina*, and *G. liboniana*) or by the production of several bulbils on rhizome-like structures (e.g. *G. espiritisensis*). Offsets require about 3-5 years to reach flowering size. With the exception of one form of *G. aracensis* from Bahia, *Griffinia* is not self-compatible (will not produce seed when pollinated using the same bulb [clone] as both parents). Once a flower has been fertilized, seed production takes about 6-8 weeks.

Once the capsule splits and the seeds



Griffinia liboniana

drop, they are usually fully mature and ready to plant. It is most common for a capsule to have only 1-3 seeds. Place seeds on top of the soil; do not cover them. Germination takes about 6-8 weeks. Plants require 3-6 years to reach flowering size from seed (perhaps longer for *G.hyacinthina*). The small, blue-flowered plants do not experience a dormant period. However, leaf senescence (die back) may occur. The large, blue-flowered *Griffinia* from Rio de Janeiro and São Paulo experience cooler temperatures in the winter and can undergo a brief dormancy period in the summer heat.

Commonly Grown Species

The largest species, *G. hyacinthina* (*G. dryades*), prized for its large blue/lilac and white flowers, has 10-17 flowers that are comparable in size to the flowers of the *Hippeastrum gracilis* forms. The plant typically bears 2-4 long petioled leaves (like hostas) with thick, broad, ribbed elliptical blades. This late summer/early autumn flowering species hails from Southern Brazil and experiences slightly cooler and drier winters than most species from the north. Growing (and flowering) *G. hyacinthina* is, in some ways, similar to cultivating *Worsleya*. Patience is a requirement; like *Worsleya*, it takes years to bring the bulb to flowering size and may not flower regularly once mature. The cool winters of Gaines-winters of Gainesville, Florida, coupled with withholding water for about 6 weeks mid summer seemed to help induce flowering last August and my plant bloomed for almost five weeks.

Closely related to *G. hyacinthina*, *G. parviflora* is a smaller *Griffinia*. This species is also late summer/early autumn flowering, but is one of the lesser-cultivated species. However, it is an elegant plant with 4-6 prominently ribbed, oval leaves and produces a variable number of flowers. Like *G. hyacinthina*, the tepals fuse into a tube. The lilac flowers remain open for 3-5 days. The bulbs are slow to offset and do not reliably bloom each year here in Florida.

The *Griffinia liboniana* complex includes the small, blue-flowered taxa, some of which have the desirable trait of spotted leaves. The tepals are fused at the base and form a very short tube. With the exception of *G.*

rochae from the state of Rio de Janeiro, these species occur in either Espirito Santo or Bahia.

Griffinia rochae from Rio de Janeiro is the smallest species of the genus and does not flower with any regularity here in Florida. Also, the bulbs are slow to offset. This little gem is also one of the lesser-cultivated species and little is known about its behavior in cultivation or the wild.

The type locality (i.e. location from which the original specimen collected was described) for *G. aracensis* is in



Griffinia espiritensis

the state of Minas Geras; the species also occurs in Bahia where it can be found grown in gardens and containers. The locals call it *carícia*. Unlike the type (material collected from the original collection site), the form from Bahia lacks spots on the leaf blades and has uncharacteristic undulate (waved) leaves. Not unlike the type, it has the narrowest tepals and most open form of flowers of the genus. Many small daughter bulbs arise from the basal plate, allowing a pot to fill up in just a few years. This

species is the most easily grown and it can be pollinated successfully with pollen from its own flowers (self-compatible). Additionally it produces



Griffinia aracensis

several offsets per year. *G. aracensis* flowers freely from June through November, sometimes producing up to four spikes per bulb, twice a year.

Griffinia liboniana, the spotted-leaf *Griffinia* is most desirable for its profusely white speckled leaves. Both diploid and triploid forms of this species have been located in cultivation in Brazil. Oddly, the diploid form is more robust. The triploid forms are more freely flowering than the diploid. In the three forms of *G. liboniana* investigated, daughter bulbs arise from the basal plate. Traub reported that this species was introduced into cultivation in Florida, USA, in the earlier part of the last century. In more recent years, a form of this species has been reproduced using tissue culture and marketed as *Griffinia* 'Zaiza Supreme'. Another variety brought to the University of Florida in 1984 and determined as *G. aff. liboniana* has seeped into cultivation. A form most similar to that was tissue cultured and produced as *Griffinia* 'Zaiza Mega'. This form has surfaced commercially in South Florida at a few nurseries and may be

sold under the name of *Griffinia* sp. as well

Griffinia espiritensis is the most variable species of the genus. Populations are diverse from one



Griffinia garnerdiana. Julie Dutilh.

another in the *Griffinia espiritensis* group. Six natural forms are currently being grown here in Florida and it is thought that more naturally occur in their native habitat. The two forms of *G. espiritensis* var. *itubera* look like different species upon first glance. The large form was triploid and the small form was diploid. The triploid forms of *G. espiritensis* are vigorous plants and are considerably larger than the diploid forms.

Based upon the localities and descriptions, Ravenna's newly described species, *G. paubrasilica*, *G. mucurina*, and *G. colatinensis* are most likely merely subspecies or varieties *G. espiritensis* because all three species are found growing within the range of *G. espiritensis*. Ravenna himself states that the leaves of *G. paubrasilica* are indistinguishable from *G. espiritensis*, but that *G. paubrasilica* has a smaller perigone (i.e., perianth), a character that varies

even within a population. The tissue cultured cv. *Griffinia* 'Zaiza' appears to be a form of *G. espiritensis*.

Hybridizing Griffinions

As far as *Griffinia* hybrids go, they are more difficult to locate than true species. I am unaware of any other *Griffinia* hybridizers outside of a few Brazilians who may attempt a few crosses here and there. My breeding efforts have been focused on the *G. liboniana* and *G. espiritensis* groups. The diversity amongst populations and varieties of *G. espiritensis* provides a deep genepool for breeding within this species as well as breeding with other species.

The characteristic of the spotted-leaf is highly variable in *G. espiritensis*, ranging from completely unspotted to profusely spotted. The flowers range in color from a soft lilac to dark lilac. A highly spotted-leaf F1 of *Griffinia espiritensis* var. *itubera* with 11-12 deep lilac flowers has been selected and incorporated into my breeding program. Some infra- and interspecific crosses I have made this year involve this selection. Another F1 selection of *G. espiritensis* var. *itubera* ($2n = 20$) x *G. aff. liboniana* "andromeda" ($2n = 30$) shows profuse speckling on the leaves, but has not flowered. So far, wide crosses in the genus (e.g. *G. hyacinthina* x *G. liboniana* and *G. parviflora* x *G. espiritensis*) have failed. My breeding efforts have been focused on the taxa of the *G. liboniana* complex to develop hybrids that are more robust, more floriferous, bearing increased number of flowers, more deeply colored lilac flowers, and have increased spotting of the foliage. Interestingly, diploid and triploids have been successfully

crossed at both the infraspecific and interspecific levels.

So far, I have produced a few selections that are being considered for commercial production. However the future is bright as this year's crop has yielded many new crosses and many others have yet to flower.

Less Common Species

The following taxa are unfamiliar in cultivation. *Griffinia intermedia* does not seem to be cultivated. Since it was described in 1826, there have not been many collections documented, at least under the name *G. intermedia*. *Griffinia hyacinthina* var. *micrantha* and Ravenna's new taxon *G. ilheusiana* both closely resemble *G. intermedia*, and could possibly all be one in the same. It would be a lovely species to grow, as it is larger than *G. parviflora* but not as large as *G. hyacinthina* (the two species between which it is "intermediate"). A collection from Espirito Santo at the Marie Selby Botanical Gardens may very well be this elusive species. *G. arifolia* is very rare, known only from the type specimen collected in southern Bahia more than 30 years ago. When visiting that locality, I observed that the land had been modified such that the forest was all but gone. Perhaps this species, equal in size to *G. hyacinthina* but with larger, aroid-like leaves that are distinctively lobed at the base, is already extinct. *G. alba*, another rare species also known only from the type locality, has not been seen in cultivation. The large, white-flowered *Griffinia* of subgenus *Hyline* occur in the semi-arid regions of northeastern and interior portions of

Brazil. Little is known about these rare species (*G. gardneriana* and *G. nocturna*). They are nocturnal bloomers. The fragrant flowers, which can be up to 17-18 cm (7") long, are ephemeral, opening in the evening and closing the next day.

Outside of Brazil, the popularity of *Griffinia* has waned for almost one hundred years. Today, the popularity of this charming, but critically endangered genus is growing once again. Sources are very limited. Last May, a small quantity of seed was dispersed via the IBS BX (the seeds are too ephemeral to endure storage for the SX). As my breeding program expands and develops, bulbs and seeds will become more readily available. Introductions of new selections and hybrids should take into consideration the germplasm rights of Brazil.

Sources:

Twin Oaks Nursery, 145 Spiritcreek Lane,
Windsor, South Carolina 29853-4931.
ph: 803-266-5900

twinoaks@twinoaksnursery.com

Agristarts (Wholesale only) 1728 Kelly Park
Road, Apopka, Florida 32712, ph:
407.889.8055, Fax: 407.889.2523.
sales@agristarts.com

Kevin D. Preuss, a husband and father to a 2-1/2 year old son, is a horticulturist/botanist. Plant systematics is his passion that drew him into the Amaryllidaceae, and, in turn, the tribe Griffinieae and other New World amaryllids, too. Kevin has a BS in botany and MS in horticulture, both from the University of Florida. Having worked as a lab tech in the fields of botany and, briefly, nephrology, he has embarked on a new journey in St. Petersburg, FL accepting an adjunct biology teaching position at St. Petersburg College. Additionally, he is in the process of starting up a small-scale bulb production company (Amaryllis Plus), offering *Griffinia* and *Hippeastrum* species and hybrids, along with many other exotic, tropical American amaryllids.

Come Visit The Huntington

Join us for the International Bulb Society Bulb Symposium Los Angeles 2002 San Marino, California

Michael Vassar

Mr. Huntington purchased the 600-acre ranch that was to become The Huntington in 1903. Huntington was one of the country's most prominent collectors of rare books and manuscripts. In 1919 Mr. and Mrs. Huntington signed the indenture which transferred their San Marino property and collections to a non-profit educational trust, creating The Huntington Library, Art Collections and Botanical Gardens, about 12 miles east of downtown Los Angeles, today hosts over 500,000 visitors, 1,800 scholars and 25,000 school children annually.

Nestled amidst a setting of 207 acres of rolling lawns and woodlands, the Huntington has a wide array of gardens, three art galleries, and, of course, our world-renowned Library. Participants in the Bulb Symposium will have the opportunity to tour the newly completed Botanical Center. Our new conservatory is nearing completion and plans are well underway for the construction of a Children's Garden as well as the largest Chinese Garden to be built outside of Mainland China, both scheduled to start in April 2002.



The desert garden at the Huntington.

The library has a rich collection of rare books, manuscripts, prints, photographs, maps and other materials in the fields of British and American history and literature, totaling about 5 million items. The greatest strengths are in the English Renaissance, about 1500 to 1641, medieval manuscripts, and books printed before 1501. Many items are on public display, including the Ellesmere manuscript of Chaucer's *Canterbury Tales*, a vellum copy of the Gutenberg Bible printed about 1450-1455 and Audubon's *The Birds of America* double elephant folio. During the Bulb Symposium you can enjoy a new exhibit: *Stamped With a National Character*:

Nineteenth Century American Color Plate Books, starting with the first U.S.-produced book to employ color, the show traces the various processes used to bring this expensive feature to American publishing.

A large collection of British art primarily of the eighteenth and early nineteenth centuries is found in The Huntington Art Gallery, formerly the home of Mr. and Mrs. Huntington. There are paintings by Sir Joshua Reynolds, Allan Ramsey, George Romney, John Constable, Thomas Lawrence's Pinkie, and many paintings by Thomas Gainsborough, including The Blue Boy. Many other artists are represented. The rooms are furnished with furniture of the period. In the changing exhibit wing of the gallery will be: William Morris: Creating The Useful And The Beautiful, based on the Huntington's recently acquired collection of Morris material.

The Virginia Steele Scott Gallery of American Art was opened in 1984 and features a large collection of art from the 18th to the early 20th century. The third gallery, the MaryLou and George Boone Gallery is a venue for changing exhibitions of American and English art, rare books and manuscripts, was recently opened to the public. During the Bulb Symposium you can enjoy: Great British Paintings From American Collections, organized by the Yale Center for British Art, which brings together about 70 of the best British paintings in American collections.

The 207-acre grounds have 150 acres of gardens open to the public, including the Water Lily Ponds, the Rose Garden, the Palm Garden, the Desert Garden, the Japanese Garden, the Australian Garden, the Jungle Garden, the Subtropical Garden, the Shakespeare Garden, and the Herb Garden. Presently about 22,000 taxa including over 13,000 species from 263 plant families are growing in the grounds. The *Camellia* collection includes over 1,800 cultivars with fragrant *Camellia sasanqua* flowers from October through February. *Camellia japonica* cultivars flower from January through March and *Camellia reticulata* cultivars flower February through April. The Rose Garden has over 2,000 cultivars and should be at peak flowering during the Bulb Symposium.



The rose garden at the Huntington

The nine acre Japanese Garden, began in 1912, has a Japanese house, a moon bridge, ponds with koi, a Zen garden, bonsai collection, and many trees and shrubs flowering from January through April. The 4-acre Subtropical Garden features plants that tolerate occasional light frost from around the world and something interesting and unusual is always in flower. The 10-acre Desert Garden is the largest outdoor collection of

succulents in the U.S. Over 5,000 species are represented, including over 200 species of *Aloe*, many at peak flowering from winter to spring. The 5-acre Palm Garden has about 115 species of mature palms, some from the first planting when the garden was created in 1905. The Jungle Garden has over 100 species of shade-loving palms and philodendrons, begonias, bananas, gingers, ferns, bromeliads, cycads and lots more.

April weather can be somewhat unpredictable, with cool, foggy mornings and warm, often hot, sunny afternoon. Please plan for a wide variety of conditions,

comfortable shoes and cool clothes are essential, a sweater is advisable, and if you feel so inclined, bring a raincoat and/or an umbrella. Dress is casual and comfortable.

For more information, map, and programs go to The Huntington's website at www.huntington.org

Donations to Bulb Symposium Los Angeles 2002

Starting on February 1, 2002, all persons wishing to donate books, bulbs, corms, rhizomes, tubers, etc., will send:

An inventory of items for donation to:

Herbert Kelly Jr.
Director IBS Symposium 2002
10266 E. Princeton
Sanger, CA 93657-9313
Phone 559-294-7676
Fax 559-294-7626
Email hkellyjr2@aol.com

Then send all donations to:

Michael Vassar/Bulb Symposium
Huntington Botanical Gardens
1151 Oxford Road
San Marino, CA 91108
Email mvassar@huntington.org

All bulbs should be insect and disease free, and should be washed free of any soil. Please include a label with each bulb, or at least the name and any information on the bulb, preferably sealed in plastic, so any moisture will not decompose the paper information it is written on. Please do not ship plants in plastic bags, use shredded paper, newspaper, etc.

On behalf of the International Bulb Society, we wish to thank all those who will be donating items for the Bulb Symposium 2002, in San Marino, on April 27th and 28th, 2002.



The Japanese Garden at the Huntington.

INTERNATIONAL BULB SOCIETY
Bulb Symposium Los Angeles 2002
Huntington Library, Art Collections, and Botanical Gardens
San Marino, California, April 27th and 28th
“THE MAGIC OF BULBS”

PROGRAM

Saturday April 27, 2002

Casual Dress

1. 8:00 – 8:45 Continental Breakfast
2. 8:45 – 9:00 Welcome to Huntington Botanical Gardens by Dr. Jim Folsom, Director.
3. 9:00 – 9:15 Call to Order & Welcome by Robert Turley, IBS President.

SESSION CHAIR – ROBERT TURLEY.

4. 9:15 – 10:20 Dr. Alan Meerow: **I’m So Lonely I’m Blue: Brazil’s Endangered Blue Amaryllids – *Griffinia* & *Worsleya***
5. 10:20 – 10:40 Break/Refreshments
6. 10:40 – 12:00 Charles Hardman: ***Hippeastrum*, Early Hybrids and Species**
7. 12:00 – 1:00 Lunch

SESSION CHAIR – CHARLES HARDMAN.

8. 1:00 – 2:00 Dr. David Lehmillier: **New Developments in *Crinum* Hybrids**
9. 2:00 – 2:15 Break/Refreshments
10. 2:15 – 3:15 Michael Vassar: **South African Winter Growing *Oxalis***
11. 3:15 – 3:30 Break/Refreshments
12. 3:30 – 5:00 Philip Adams: ***Lycoris*: Jewels of the Bulb World, Species, Culture and selected Hybrids.**
12. 5:00 – 5:15 Break
13. 5:15 – 6:00 Awards Presentation: Herbert Medal & Hamilton P. Traub Award Presented by Director H. Kelly Jr. & President Turley
14. 6:00 – 7:00 BANQUET - Mediterranean Buffet
15. 7:00 - Until BULB AUCTION - Charles Hardman: Auctioneer

Sunday April 28, 2002

1. 8:00 – 9:00 Continental Breakfast

SESSION CHAIR – CHARLES HARDMAN

2. 9:00 – 10:00 Dr. James (Jim) Bauml: ***Hymenocallis* and Other Bulbs of Mexico**
3. 10:00 – 10:15 Break/Refreshments
4. 10:15 – 11:15 Dr. Harold Koopowitz: **Modern Clivias and Future Trends**
5. 11:15 – 12:00 Closing comments: Robert Turley, IBS President.

Bulb Symposium Los Angeles 2002 Registration Form

San Marino, California, April 27th & 28th

Registration for the Symposium includes all meals for Saturday and breakfast on Sunday at the Huntington Library, Art Collections, and Botanical Gardens in San Marino, California. Registrants are to arrange their own transportation and accommodations.

Please fill out this form and return to the IBS address below.

Registration received by 4/15 is \$125. Late registration, received after 4/15 is \$150. Registration at the door will be \$175.

_____ in my party. I am paying \$125 each (by 4/15) -or- \$150 (after 4/15) = \$ _____
TOTAL = \$ _____

MAILING ADDRESS

Name: _____
Address (line 1): _____
Address (line 2): _____
City: _____
State: _____
Zip Code: _____

Telephone: _____
E-mail Address: _____

My method of payment is (circle one): check money order MasterCard VISA

BILLING ADDRESS FOR CREDIT CARD PURCHASES (if different from mailing)

Name (as appears on card): _____
Address (line 1): _____
Address (line 2): _____
City: _____
State: _____
Zip Code: _____

CREDIT CARD INFORMATION

Credit Card Number: _____
Expiration Date (MM/YY): _____

I authorize IBS to charge my credit card for the full sum detailed above.

Signature: _____



After completing this form, please attach check or money order (US funds only, please), if not using a credit card, and send to:

Pam Kelly
Symposium Registrar
10266 E. Princeton
Sanger, CA 93657

For further inquiry contact Pam Kelly: Ph (559) 294-7676, or via e-mail at PKelly1668@aol.com, or register online at [HTTP://www.bulbsociety.org](http://www.bulbsociety.org). You may FAX this registration to Pam at: (559) 294-7626

Bulb Symposium Los Angeles 2002
San Marino, California
OUTSIDE VENDOR TABLES AVAILABLE

Saturday, April 27: 8:00 am – 5:00 pm & Sunday, April 28: 8:00 am – 12:00 Noon.

Outside vendors may now reserve tables for plant sales

\$100 per table for payments received by March 31, 2002

\$125 per table for payments received on or after April 1, 2002

CONTACT: Herb Kelly, Chairman Outside Vendor Sales

Email: HKellyJr2@aol.com Phone: (559) 294-7676; Fax: (559) 294-7626

LIMITED TO 10 TABLES (TOTAL) FOR SYMPOSIUM PLANT SALES!

The information below applies to outside vendors selling plants, at the IBS Symposium, to be held, at the Huntington Library, Art Collections, and Botanical Gardens in San Marino.

1. Tables are approximately 3'x 8' and 10 are available.
2. Cost is \$100.00 per table. As of April 1, 2002 cost is \$125.00.
3. No security will be supplied. Vendors are responsible for their property. Must set up and tear down each day, themselves.
4. April 27, 2002, Saturday: Vendors may set up at 7:00 am. Arrangements will be made for vendors to get in parking lot without paying. Symposium starts at 8:00 am, lunch at 12:00. Symposium closes at approximately 5:30, 15 minute break every hour.
5. April 28, 2002, Sunday: ½ day Symposium starts at 8:00 am, ends at 12:00 noon.
6. Vendor charges do not permit entry to the Symposium. A registration fee is required to attend Symposium. \$125.00 by April 15, 2002, \$150.00 after April 15, 2002, \$175.00 at the door.

Illegally collected, endangered, or protected plants cannot be offered for sale, trade, etc. at the IBS Bulb Symposium to be held at the Huntington Library, Art Collections, and Botanical Gardens in San Marino April 27 & 28, 2002. The International Bulb Society (IBS) will not sanction nor be involved in any operation where these plants are offered. This policy will be strictly enforced, no exceptions. Signature below constitutes compliance with all terms set forth above. If anyone does not accept the above terms, they will not be allowed to participate.

Name _____

Phone _____

Address _____

City, State, ZIP _____

***Cyrtanthus wellandii*, A Morning`s Hike Leads to an Exciting New *Cyrtanthus* Find**

Welland Cowley

Cape Flora Nursery, Port Elizabeth, South Africa

On an early-morning excursion to study pelargoniums and do a bit of botanizing along the upper reaches of the Kabeljous River I came across what seemed a very interesting area.

The landscape, a gently-sloping tableland dotted with *Aloe ferox* dropped suddenly towards a bushy ravine, the sides of which were steeply-sloping and rocky. It was the rugged nature of the terrain that attracted me to the spot. I decided immediately that it was worth exploring, knowing from past experience that rocky slopes sometimes harbor the most interesting plants.

As I walked towards the edge of the ravine I noticed that my bootlace had come loose. I put my foot up onto a convenient rock to tie my lace. When I looked up I was surprised to see a beautiful *Cyrtanthus* species growing on the other side of the rock. The color was a bright vermillion. Further exploration revealed a healthy population in full flower on the crest of the hill with some plants growing in rock crevices along the edge of the ravine under bushes.

I realized that I had stumbled onto something interesting and as I was not able to identify the species, I sent a specimen to Dr. Dee Snijman of the Compton Herbarium in Kirstenbosch. It was a few months later that I heard from her. She told me that she believed this was a new *Cyrtanthus* species. She also asked me if it was possible to visit the locality at

flowering time and collect some specimens for research purposes.



Cyrtanthus wellandii. Colin Patterson-Jones.

In February 1997 I revisited the site with Dee Snijman and Colin Patterson-Jones. Permission had already been obtained from the owner of the property to collect a few specimens as well as seed. We were hoping that we would once more find the population in flower as Dee and Colin had come a long way from Cape Town to see this species. We were not to be disappointed. The new species put on a fine display, and Colin was able to take excellent photographs.

We speculated about the pollinating agent necessary to fertilize this species when we saw a number of butterflies in the area. The species is unique in the genus *Cyrtanthus* by having a style that is included in the lower half of the perigone tube. The pollinating agent remains a mystery and further research needs to be done in this area.

The outcome of this visit was that Dee Snijman completed the description of *Cyrtanthus wellandii* and it was formally published Bothalia in 1999.

Seeds of the species collected in 1997 germinated freely and we now have a number of healthy seedlings in the nursery. It has also been found that the species flowers readily in cultivation if similar conditions pertaining to the habitat are observed.

Cyrtanthus wellandii grows in typical Hankey Coastal Renosterveld in association with *Bobartia gracijs*, *Anapalina caffra*, *Lobelia caerulea*, *Pelargonium candicans* and *Podalyria burchellii*. On the edges of the ravine it is associated with succulent species such as *Euphorbia horrida*, *Crassula falcata*, *Crassula corymbulosa* and *Kalanchoe crenata*.

The stony soil of the habitat is typical of that associated with Table Mountain sandstone and tends towards the acid side. This area was

swept by a very hot fire late in 1999 with the result that re-growth and flowering of this population has been very poor this year. It should also be noted that the veld had been burnt two years prior to the discovery of this species. It would therefore appear that veld fires actually have a negative effect on the flowering of this *Cyrtanthus*, unlike some other species in the genus.

Cyrtanthus wellandii is confined to a single population on a hillside overlooking the Kabeljous River Valley and although neighbouring hillsides have been studied no evidence of this species has been found. The species does not readily set seed in cultivation, even when hand-pollinated. Further research has to be done in this area, as this is a highly ornamental plant with much horticultural potential as a container specimen.

Cyrtanthus wellandii is a rare species that has been assessed as belonging to the IUCN Category: Vulnerable D2 and every effort should be made to ensure its future continuity.

Acknowledgements. Colin Patterson-Jones for use of photographic material.

Further Reading. Reid, C. and R. Allen Dyer. 1984. A Review of the Southern African Species of *Cyrtanthus*. American Plant Life Society, La Jolla, California, USA.

En Garde! Control of Snails and Slugs

Roy Sachs

It is a cool, overcast November morning at our Monte Rio mini-nursery, along the Russian River in North-central California. I'm harvesting the last of the *Alstroemeria* flowers and seed... a bucolic scene, no? Now



picture 100s of snails and slugs among the florets, seed pods, under the foliage with black frass (excrement from snails and slugs) littering the leaves.



Unfortunately this is not an uncommon experience. My fingers are often slimy with crushed snails,

and the slugs are impossible to get a grip on.

Manual squashing is environmentally benign, yet relatively inefficient and disgusting (I no longer order escargots, no matter how reputable the restaurant). There are better methods of controlling gastropods in the garden and nursery. This article is about the better ways.

Who are the major offenders?

Snails and slugs come in many forms, but the most common garden varieties are: *Deroceras reticulatum* (the gray field slug), *Deroceras caruanae* and *Helix aspersa* (the brown garden snail). They are hermaphrodites, meaning it only takes one of them to create children. They appear to feast on all kinds of vegetation. In my nursery they are found on *Alstroemeria*, calla lilies, *Crocoshmia*, *Acidanthera*, and can decimate seedlings in one night. Snail eggs, no more than 6 mm long, are laid in clusters in depressions in the soil surface, where they perhaps double in size before the baby snails climb up into the foliage.

Habitat

In all climates snails and slugs can be found in ground covers (ivies, fragarias, vincas, e.g.), calla petioles, leaf litter, under seed flats, discarded wood, between pots, etc. - in other words wherever moisture is conserved on hot days. In humid climates,

particularly in the evening and early morning hours, they venture up into plants; snails in particular can be arboreal or even climb screen doors. Slugs live at the base of some of the most prized geophytes, just under the raised soil where the shoots protrude.

Monitoring

If you are of a scientific bent, and want numbers to estimate just how serious your gastropod problem is, place a one foot square flat, with one inch high runners acting as ground spacers, in the areas of interest. Every so often lift the flat and count the snails and slugs, kill the latter, replace the flat, and repeat the process until you are bored. At which time you will have a fairly reliable gauge of what you are facing, how many traps you will need and how often you will have to bait the traps.



Trapping with beer and other lures

Many useful hours have been spent studying the best traps for snails and slugs. Experience shows that the least expensive (essentially undrinkable) beer, placed in a buried container (7.5 cm deep) with no more than 0.5 cm lip above the soil surface, and replaced every 3 days, catches a satisfactory number of the beasts. In rainy climates or wherever one is irrigating, these containers must be covered, say with an inverted container cut so that it has legs (spaces for the snails and slugs to gain access to the trap).

As an alternative to beer in the above traps, I have made baits of yeast, flour and molasses, the doughy mixture aged so that a yeasty aroma emerges, and placed a dollop or two of the mix in water. This is less expensive than beer and appeared equally effective (I did not do comparison counting).

Snail/Slug Barriers

The gastropods do not cross copper, hence thin copper strips that surround plants will protect them from snails and slugs outside the strip (those that are within the barrier are of course still active and some sort of poison will be required for them). The copper strips, with periodic cleaning, are said to last for years

Snail/Slug Poisons

Molluscicides are available. Metaldehyde in 2%, 4%, or 7.5% formulations, sold as pellets or ground meal, is widely used and effective. Unfortunately metaldehyde is toxic to mammals (it is a neuromuscular poison) and that can cause a problem with some pets who, like snails and slugs, are attracted to the aroma. A colleague's dog died from metaldehyde poisoning, so it does happen. A 10 kg dog would have to ingest 1 kg of the pure stuff to die, so it is difficult to imagine how a pet would eat enough of the 2 to 7% commercial formulations to kill them outright. Metaldehyde causes rapid death.

As luck would have it, our dog steers completely clear of the stuff. A nurseryman can't afford to have a pet that is attracted to useful pesticides!

Another drawback to metaldehyde is that in some formulations it rapidly loses effectiveness with irrigation or rainfall. I can turn off the irrigation system and, the morning following a single application of pellets, will observe the carcasses of thousands of slugs and snails...very satisfying! Five pounds of granules, enough to treat 1/4 acre, is available for \$35 (on-line).

Iron phosphate, however, is an excellent, if somewhat expensive, molluscicide that has low mammalian toxicity (it sounds like a good food supplement) and low solubility in water. In the U.S. it is sold as Sluggo (ouch!), and I've heard that, Escar-Go, is used abroad (I imagine that francophones cringe). For gastropods iron phosphate causes indigestion and the poor things stop feeding, with death ensuing in 3 to 6 days. Ten pounds of granules, enough to treat 1/4 acre, is available for \$60 (on-line)



Biological Control, the present and future

Natural enemies of snails and slugs include pathogens, snakes, birds, ground beetles and flies. My nursery has at least 2 active garter snakes, and large bird and beetle populations...I must presume that they do not have an appetite for our snails and slugs. The predatory decollate snail, *Rumina decollata* can be purchased at some garden supply stores, but it has reputation for feeding on some seedlings and succulent young plants.

However, there is a promising development with a nematode,

Phasmarhabditis hermaphrodita that is a parasite of slugs and snails. It has been commercialized in the UK as a biological molluscicide. Unfortunately this nematode is not yet available in the U.S., nor (so I've been informed) in Australia or New Zealand. My U.S. colleagues say that it must be found naturally occurring here before any U.K. introductions will be allowed. Why? I don't know.

Good web sites:

<http://www.harmonyfarm.com/>

<http://www.groworganic.com/>

<http://www.montereylawngarden.com/>

<http://www.nysaes.cornell.edu/ent/biocontrol/>

Roy M. Sachs is Professor Emeritus of Environmental Horticulture at UC Davis. He operates the business "Flowers & Greens" which produces alstroemeria, watsonia and other geophytes.



BULB BASICS: Propagation, Above Ground

Carol Wallace

Gardeners are a greedy bunch. Once the hunt is over and the prized plant captured one would think that they'd be satisfied. But they're not. Having one specimen of some lusted over plant is just the beginning. Now they want more! Luckily, bulbs (and corms, tubers, tuberous roots and rhizomes) are easy to propagate.

Most of us are aware of the fact that bulbs and other plants with swollen roots (corms, tubers, etc.) can be divided - although sometimes it's hard to tell by just looking at them exactly how to accomplish that. Many people don't realize that most bulbs can be propagated by other methods as well. Many plants give you as many as three or four ways to make more plants - they are really eager to perpetuate themselves!

Propagating from seed

Propagating from seed is the most familiar method for creating new plants, although few of us stop to think about bulbs as having seeds. They do - and seed is the only way hybridizers can create new varieties of plants.

Crossing plants. Normally we are advised to deadhead our plants - to pick off the faded and withered blooms. This means that all of the plant's energy is then directed back to the bulb, getting it nourished and ready to bloom again next year.

If we don't deadhead, flowers that have been pollinated will form a seedpod at the place on the stem where the flower was. It somewhat resembles a swollen flower bud.

A word of caution - if you want an exact duplicate of a plant already growing in your garden this may not be your best approach. Species plants come true from seed, but the many hybrids that we have in our gardens generally don't. This could be an advantage, as you may get some wonderful surprises - plants that are unlike any that have come before it.

Hybridizers plan for this. They may simply cross two tulips, or allium because they think a combination of the two might produce something better - much as we produce children that we hope are a blend of the best of both mother and father. As with

children, this sometimes happens and sometimes we are a bit disappointed.

Some hybridizers go about it scientifically by crossing two specially selected plants, one or both having some specific and desired trait. They now have a good chance of producing one new plant with the particularly sought after trait(s). Unless you have a good scientific background though, your attempts to create a new plant will probably be much like mine; crossing pretty with pretty.

Creating new plants from seed means making a *cross* when the flowers you select as parents are in bloom. Choose two that you think will make great parents. Naturally you want to choose two of the same type plant - do not try to create a new plant form by crossing tulips with daffodils or you will be doomed to disappointment.

A cross simply means that you are deliberately moving pollen from the anther of one plant onto the pistil of another. The bees usually do this for us, but then we are at the mercy of their choices.

The anther is the part of the plant at the top of the stamens (male organ) protruding from the center of the flower that is covered with pollen. The pistil is a long green stem that sticks out a bit higher than the pollen-covered stamens.

Take a cotton swab and use it to collect the pollen from the anthers of one plant and transfer that pollen to the sticky end of the pistil (which is called the stigma) onto the other plant. The pollen will stick to the stigma, then travel down the pistil's tube and down to the ovary of the plant. If all goes well, you will see the seedpod

begin to swell within the next 3-5 days.

The biggest trick you face here is beating the bees to the job. Hybridizers prevent that from happening by waiting until the flower is almost but not quite open and then forcing the petals apart just enough to make the cross. They then slip a small paper bag over the flower for a day or so to make sure that wind, bees, and moths don't come in to do some dabbling of their own.

When the seedpod starts to swell you know you were successful. Leave the seedpods on the plants until the pod begins to split. That means you have ripe seeds, ready for planting. Many of the smaller bulbs have seedpods so small you may not even notice them. The tiny, light seeds of scilla, muscari, and crocus, for instance, are often carried on the wind and will germinate where they fall.

Seed planting techniques. Take your cue from nature with these seeds. If they are tender and you live in a temperate climate you will need to sow them indoors. Seeds of hardy bulbs and corms can be direct sown outdoors - just like the plants themselves do. Or you can pot them up so that you can keep a close eye on them.

Use small pots labeled with the names of the parents of the seed you created. If you have left the work to the bees, at least label the small pot with the mother plant's name. A 3" pot is fine. Your seeds will call that pot home for two years, so make sure your pots are clean and have been washed in a solution of one part bleach to 10 parts water.

Fill the pots with fresh soilless potting mix. Sow your seeds thinly

over the mix and then cover with a layer of grit or sand. Water lightly. The potting mix should not be allowed to dry out, but it shouldn't be wet or soggy either.

Put your seed pots outdoors, preferably in a cold frame, so they become accustomed to outdoor conditions. Hardy bulb seeds will remain there all winter. Tender ones must come inside before the first frost date and will continue to germinate under grow lights.

Germination can be very, very slow but by spring you should see seedlings starting to emerge. You'll start to see little green shoots emerging about the time the parents are emerging in the garden.

Be warned – when your mature bulbs start to go dormant their offspring will do the same. Don't panic when you see them start to turn yellow. What you are seeing is quite natural. Continue to water to keep the soil moist. When they are actively growing you might want to give them a light feeding – something like half strength Miracle-Gro.

Once the seedlings are pretty well dormant in the second year, you can finally remove them from their little pots. You should see little tiny bulbs inside. Pea-sized or larger are ready for their very own pots. Smaller bulblings should be given some fresh soil and replaced in the original pot. In year three all of your babies should be big enough for homes of their own.

If you don't plan to plant your seeds immediately store them carefully so that they don't dry out. Old film canisters are great for this, or place seeds into little envelopes (labeled, please!) and then store in a

zip-lock bag in the refrigerator. Do not freeze your seeds.

Bulbils are 'sort of' seeds

One plant that seems particularly anxious to reproduce itself is the lily, at least some varieties of lilies. Not only do *Lilium lancifolium* (tiger lilies), *L. sargentia*, *L. sulphureum* and *L. bulbiferum* form seedpods and also multiply underground, but they also form something called a bulbil under leaf axils along the stems. Unlike seeds, bulbils produce a plant that is identical to the parent.

A bulbil looks a bit like a large seed but if you look closely it also bears a close resemblance to a tiny bulb. Bulbils can drop off the plant unnoticed and fall to the ground where they sometimes germinate. They have a better chance of surviving if you remove them from the stems when they will detach easily and plant them in pots or flats until they have grown a bit larger. When they reach 2-3 inches tall place them in a nursery bed.

A nursery bed is a small bed for baby plants that need special conditions and care until they are ready to duke it out with the big guys in the regular garden. It's a lot like a nursery for babies; specially furnished for those special needs that infants have in their first year or two.

Real bulb enthusiast needs nursery beds, not just for bulbils but also other immature cormlets, bulblets, cuttings, and proliferations you may want to grow on.

The nursery bed doesn't need to be large since all of its occupants are pretty tiny. It just needs good soil and sunshine, and to be free of weeds.

Proliferations

Hemerocallis (daylilies) has a special way of reproducing themselves and that is through proliferations. They look exactly like daylily seedlings but instead of growing from seeds in the soil they are actually growing from leaf axils along the scape (leafless flowering stalk) of plants that are through flowering.

Wait until the scape has turned brown right up to the proliferations, then using sharp pruners cut above and below the proliferation, liberating the tiny thing. Look closely and you'll see tiny roots.

Some people cut the foliage back to an inch or two if the proliferation is large. You want the plant to use its energy making roots, not supporting greenery. Dip the rooted end into a rooting hormone powder and then plant in a small pot with soilless potting mix. Don't let the potting medium dry out.

In cold areas let the proliferations overwinter in a cold frame. In warm areas you can plant the babies right into the garden after they have spent a month developing roots. Soon your proliferations will grow into flowering plants that are identical to the parent plant.

Cuttings

One more means of vegetative propagation is from cuttings. This won't work with all bulbs, but rhizomatous and tuberous begonias, dahlias, alstroemeria, and lilies can all be propagated this way.

Plant dahlia and begonia tubers in well-drained soil in a warm location and wait until a few green shoots emerge. Slice these from the tuber

and place in sharply draining potting mix in a sunny window. Keep the medium moist and the little shoots will start to develop roots. Give the cutting a very slight tug. Once the cutting resists that tug you know that roots have formed. With begonias you go from rooting to cutting in about four weeks. Give them time to develop a bit and then give each rooted cutting its own pot.

Rhizomatous begonias are propagated from leaf vein cuttings. Take a healthy leaf from a mature plant, turn it over, and, with a very sharp knife, make several sharp small cuts through the veins on the undersides of the leaves. A new plant will grow from each cut. Turn the leaf over so the cut side is in contact with the soil (make sure you use a sterile, soilless potting mix that drains well) and then weight the leaf down (or pin it down) so that it remains in contact with the soil.

Mist the leaves occasionally to keep the soil surface moist. It will take several weeks but then you will see small, new plants rising from the cut portions of the leaf. Scoop these babies carefully out of the soil and pot them in separate shallow containers of potting soil. Water them with a diluted water-soluble fertilizer – about half strength. In about four months your new plants should be blooming.

With regale and most Asiatic lilies you can use a stem to propagate new plants. The stem will have one set of roots that forms just above the bulb. Cut the stem below those roots and plant it at the same level it was before the cut. Cut the stalk down to about 3-4 inches and keep watered. It will begin to form a bulb of its own. This may not flower the first year, but will

by year two. And if you ended up digging up the original bulb to do this, don't forget to replant it as well.

With begonias and dahlias you can cut off a stem having two or more leaves, dip the cut end in a rooting hormone and stick them, base down, about 3 inches into a flat filled with a mix of moist perlite and vermiculite. Cover with a plastic lid or with plastic wrap, place in a sunny location, and keep them moist. Keep misting for 3-4

weeks at which time your new babies will have roots of their own.

These are some of the less traditional ways to make more bulbs from ones you already have. Next time I'll discuss the propagating techniques that occur underground.

Carol Wallace gardens on three acres in northeast Pennsylvania. Her weekly column, Virtually Gardening, can be seen at http://www.suite101.com/welcome.cfm/virtually_gardening.

Twin Scaling of Tunicate Bulbs

Alan W. Meerow

All members of the Amaryllidaceae that produce bulbs

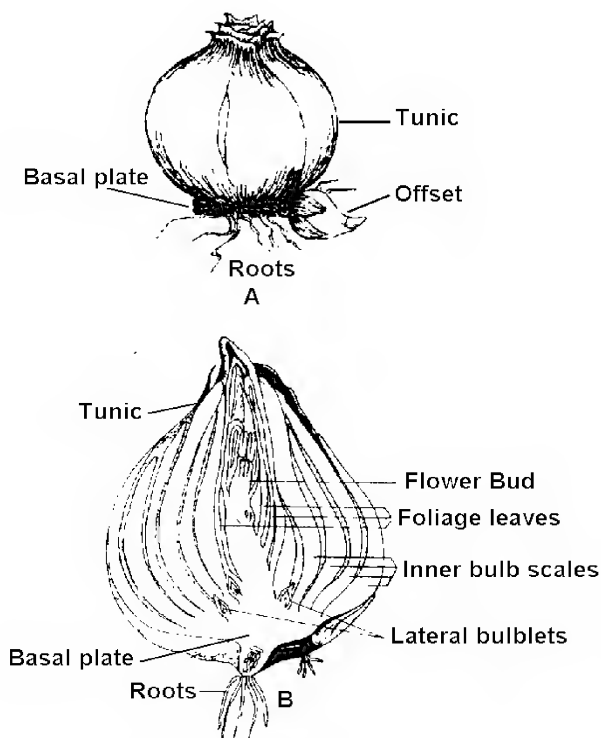


Figure 1. A tunicate bulb. A. Entire. B. Dissected.

have *tunicate* bulbs, as do many members of the Hyacinthaceae and Alliaceae. This type of bulb consists of tightly overlapping modified leaves

called *scales* and, at the bottom of

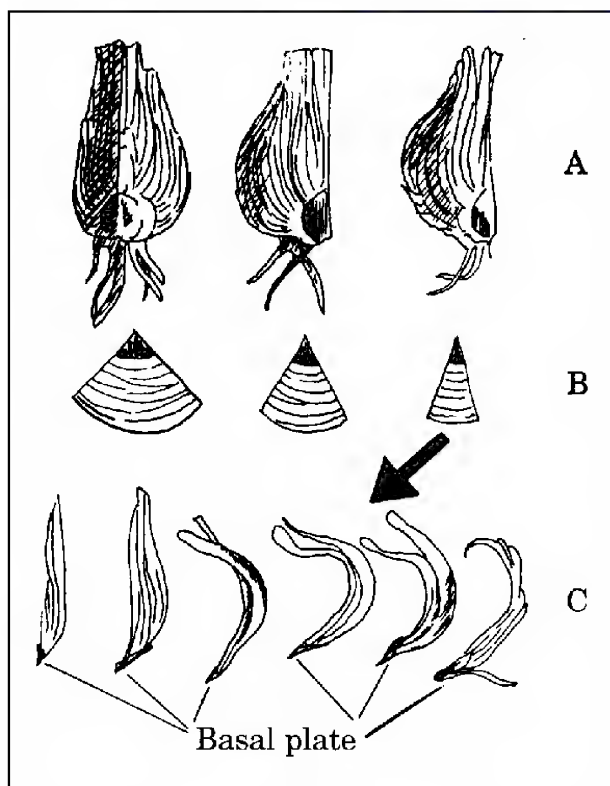


Figure 2. Twin scaling.

each bulb, a specialized structure called the *basal plate* (Fig. 1). Many species with tunicate bulbs may be propagated asexually using offsets formed at the base of the parent bulb. Some species and cultivars do not

readily form such offsets. Offset production can sometimes be stimulated by cutting small wedge-shaped sections from the base of the bulb, wounding both the basal plate and the base of the bulb scales. However, the most common type of bulb propagation for tunicate types is bulb scale cuttage or twin-scaling.

To propagate a tunicate bulb by the twin-scale method:

1. Cut off all leaves and the lower

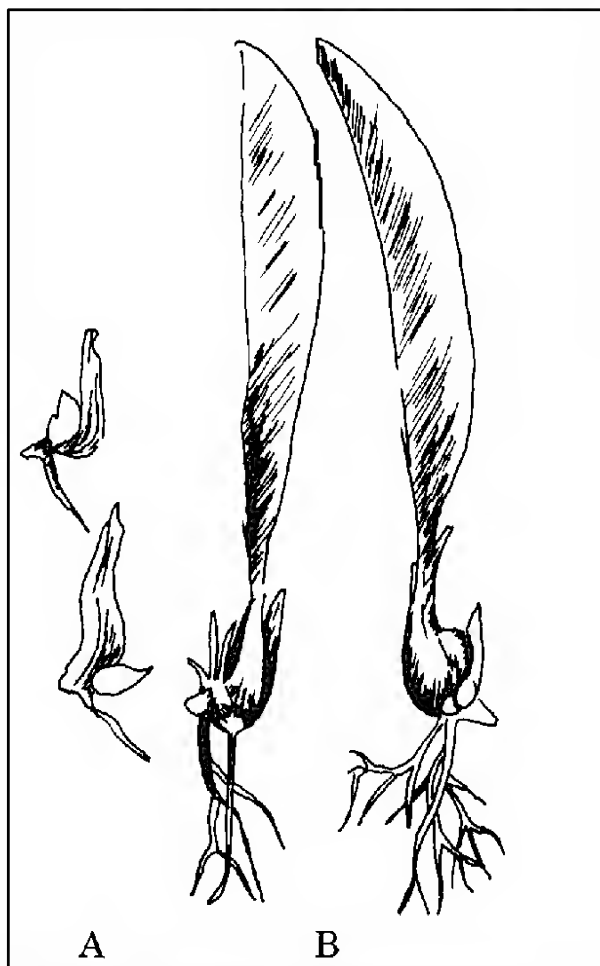


Figure 3. Bulblet forming on twin-scale cutting.

portion of the basal plate (from where the roots originate). It is important to leave some of the basal plate intact.

2. Divide the bulb into longitudinal, wedge-shaped sections (Fig. 2A & B). One bulb can be divided into 4 to 16 sections depending on its size.

3. Carefully divide each wedge into sections consisting of two leaf scales and a piece of the basal plate (Fig. 2C). The scales can be shortened by cutting away some of the top growth.

4. Disinfect the twin-scale cuttings with a ten to twenty minute soak in any broad-spectrum fungicide.

5. Cuttings should be inserted on a slant with the concave side facing down into flats of moist propagating medium (1:1 by volume perlite and vermiculite or sterile sand) deep enough so that the attached portion of the basal plate is just covered.

6. Place flats under 80% shade, and maintain even moisture in the propagating medium. The medium should be maintained at 75-80° F if possible. Periodic drenches with fungicide may be beneficial, particularly if temperatures are less than 70° F or more than 85°.

7. Bulblets should form at the base of the scale cutting 2 to 3 months after scales are stuck (Fig. 3A). These may be detached after the first leaf forms, and individually potted in small containers (Fig. 3B). The scales, if not damaged during these operations, can often be used again for additional bulblet production.

The regenerative powers of the basal plate can also sometimes be invoked by cutting the plate off just below the bulb scales. The damaged bulb is then stored in sterile medium and kept in shade. A ring of bulblets will usually form around the base in response to the damage. Similarly, making wedge-shaped cuts around the basal plate will often stimulate bulblet production.



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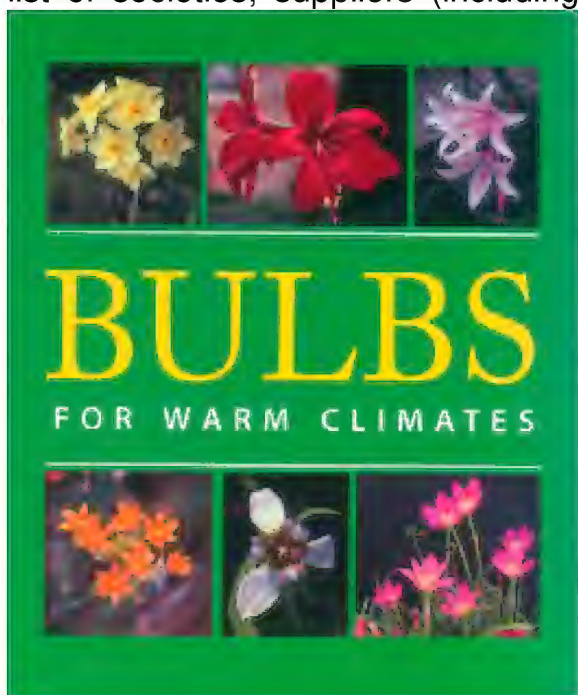
Book Reviews

Three Books Whose Only Common Theme Is Horticulture

Lisa Flaum

Bulbs for Warm Climates. Thad Howard. University of Texas Press, Austin. ISBN 0-292-73125-6 (cloth), ISBN 0-292-73126-4 (paper).

Bulbs for Warm Climates, by Thad Howard, is an encyclopedic look at geophytic plants for USDA zones 8 and 9. Plants are arranged by family, with a handy index in case the reader is in a hurry or not sure of the family of a particular bulb. Also included are a glossary, a resource list of societies, suppliers (including



some in Australia, South Africa and the UK) and a 4 page bibliography. The color photographs are small and lovely. The nomenclature is up to date, with some species named within a few months of publication. Mr. Howard, a Herbert Medallist who has collected and grown bulbs for over 40 years, emphasizes bulbs native to the Americas, but does not

neglect plants from other continents. There, that's the basics of this book.

The basics, however, don't cover either how useful this book is, or how much fun. Browsing provides many obscure species to look for. Mr. Howard's descriptions, though not always as complete as I would like, are gardener friendly. For instance, the description of *Crinum amoenum* does not include its height, but does mention that the flowers open in the evening and close before morning. The listing for *C. asiaticum* mentions that its red-leaved forms are more tender than the type and, by the way, the coloring is passed on to its hybrids.

Hybrids and their creation figure prominently in this book. There are listings for intergeneric hybrids such as *xCoobranthus* and *xCooperanthes*. Cultivars and interspecific hybrids are discussed as well, particularly under *Crinum*. Parentage is mentioned, where known. A fair number of listings mention pollen fertility, as well as seed or offset production. There is an extensive listing of *Crinum* hybrids to lust after.

Speaking of lust, grouping the plants by family means that the unknown cousin of the plant you love is just a couple of pages away. Right there next to the 16 pages of *Allium* are some 30 species of *Nothoscordum*, the South American *Allium*. *Nothoscordum* is known for its invasive species and Mr. Howard is not afraid to call a weed a weed, but finds many species behave

themselves. I have long been an *Allium* fan, and while I look for some of the American *Alliums*, I will keep an eye out for their cousins. Then there are rhodophialas and pyrolirions, relatives of the rain lilies of which I am fond.

Although aimed at experienced gardeners living in an area that is too cold for tender bulbs, but too warm to provide a winter chill, I think this book has a wider audience. Growers interested in South and Central American bulbs will find it an excellent resource. Lovers of the undeservedly obscure will find many treasures. Cold climate gardeners with room to winter plants indoors will also find many new things to try. All in all, a wonderful addition to the bulb grower's library.

Naturalizing Bulbs. Rob Proctor. Henry Holt (1997). ISBN 0-8050-4631-3 (hardcover).

Henry Mitchell called it "zone denial", the desire every gardener feels to grow certain plants that won't thrive in her climate. In trying to cover the entire United States, Rob Proctor has provided enough information and pictures to ensure that, no matter what it's like where you live, you're going to want to grow something else!

More about design and gardening attitude than about culture, *Naturalizing Bulbs* is broken into seasons, then into different U.S. climatic areas. Within this framework, Mr. Proctor provides introductions to many genera, and to some of the lesser known species. Many enticing photos illustrate the text. Consequently, whatever your growing conditions are like, you will

find frustratingly lovely ideas that cannot be duplicated in your garden. For instance, cold climate gardeners may look with envy on a winter combination of *Gladiolus tristis* and *Lachenalia pallida*. Those in warmer areas may lust after *Iris reticulata* interplanted with cacti.

Cultural information is somewhat spotty, not surprising in a book trying to cover geophytes for the entire United States in 200 pages. Sometimes the preferences cited make the plant's culture even more confusing. For instance, "*Eranthus hyemalis* does best in moist climates, while *E. cilicica* performs best where summers are dry." Well, ok, summers in my garden are dry, except that I irrigate the shady areas where *E. hyemalis* is planted. Should I be growing *E. cilicica* or would it rot in a similar situation? Does it want dry conditions, or just better drainage than *E. hyemalis*? I will need another book to find out.

On the other hand, there are many stories here about the strange names or behavior of bulbs. For instance, Mr. Proctor grows *Scilla numidica* (hort.) which cannot possibly be the real thing. *S. numidica* is native to N. Africa and is not hardy much below freezing. Yet, in the US, a hardy bulb resembling *S. scilloides* goes by that name. He tracked down the origin of the true *S. numidica*, the introducer of the false *S. numidica* and provides a comparison between the imposter and its probable parent, *S. scilloides*. I grow the imposter, and am pleased as punch to finally know more about it than what it isn't.

Then there is *Iris danfordiae*, notorious for rapidly splitting into

small, non-blooming bulbs. The *I. danfordiae* in commerce is a triploid, selected for its rapid multiplication, not its ability to rebloom. He suggests treating it as a self-renewing biennial, and feeding it well.

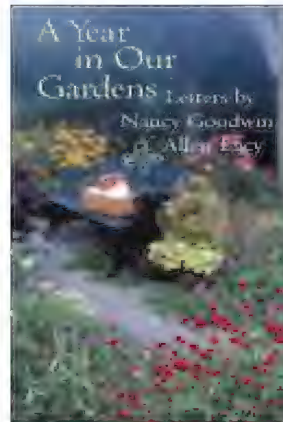
This is a pleasant book, rather like having a conversation with another bulb lover. The idea of growing bulbs permanently in the ground is not a new idea, but the author has gardened for a long time, travels all over the US, and has a sense of humor into the bargain, so that even if you're one of the converted, you will enjoy listening to the preacher. Passionate bulb growers will have heard of most of these geophytes and probably tried many of them, but there are interesting design ideas, intriguing stories and fine photographs to lure the reader.

A Year in Our Gardens. Nancy Goodwin and Allen Lacy. University of North Carolina Press, Chapel Hill (2001). Cloth \$27.50. ISBN 0-8078-2603-0.

Boy, was I looking forward to this book! Allen Lacy writes delightful essays and Nancy Goodwin's Montrose was one of the first nurseries to raise cyclamen from seed. Both live in the same USDA zone, but with wildly different climates, so garden comparisons promised to be intriguing. The introductions, one each by Ms. Goodwin and Mr. Lacy, provided a brief background of the two gardens in question and really got my hopes up.

So, I was sorry to find that things went downhill from the introduction.

During the year of these letters, Mr. Lacy had thoracic surgery, with complications; Ms. Goodwin's husband had a misdiagnosed eye infection, and her father passed away after a long battle with Alzheimers Disease. There was a



great deal about music, mutual friends, art, vacations and medical conditions. The letters were so filled with other things that the bits about plants and gardens

seemed forced, as if the writers (who were writing with an eye to eventual publication), knew that something had to be written about growing things. It was not until near the end of the book, late fall and winter, that the writers' gardens felt like the primary focus of the exchange.

Very few people are exclusively gardeners, without friends, family or other interests. However, a gardening book should be about gardening. This is fine writing, but doesn't live up to its title.

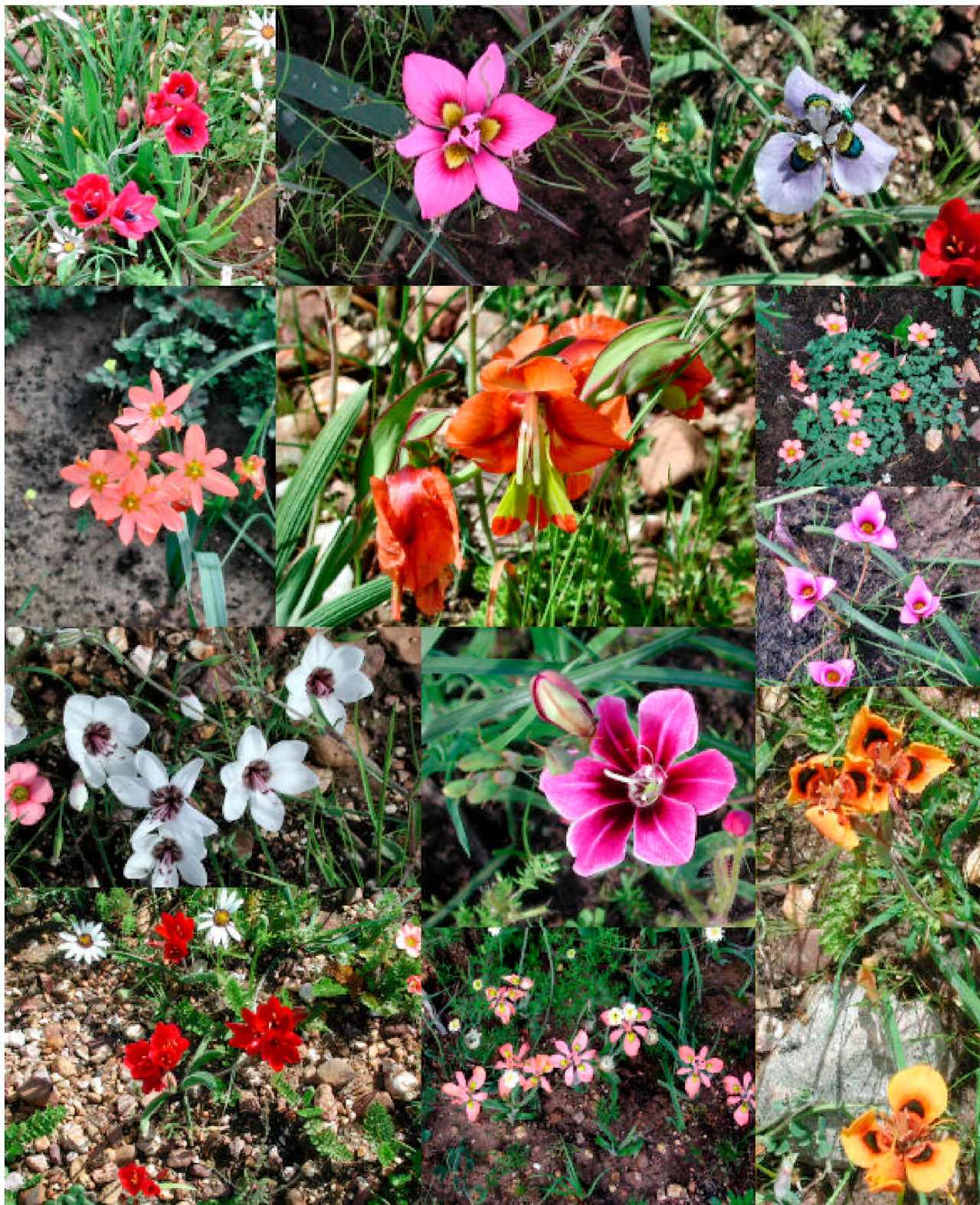
Lisa Flaum lives outside of Waterloo, IL, with her husband, children, dogs, cats, and assorted plant-eating wildlife. Present enthusiasms include Crocus, Allium Crinum and Zephyranthes, as well as many perennials. A 3 acre garden provides lots of room to experiment.



Flowering of the Renosterveld

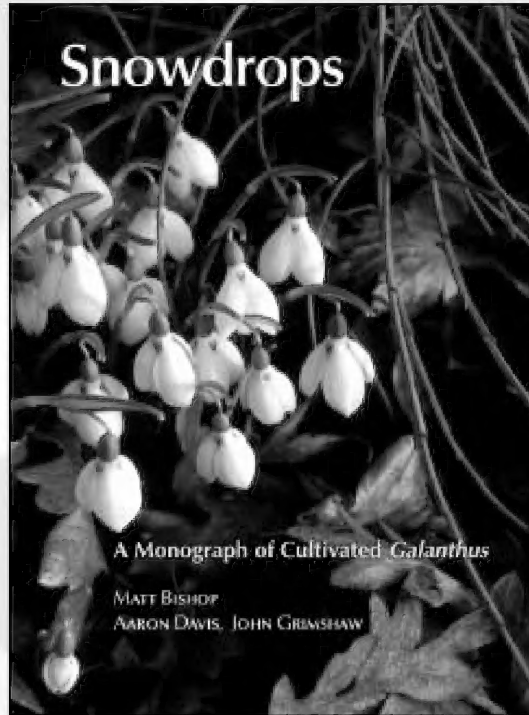
Alan W. Meerow. All photos by the author. See page 3 for identifications.

The *renosterveld* areas near Tulbagh in Cape Province, South Africa have been almost completely eliminated by agriculture, despite an incredible degree of geophyte endemism (i.e., bulbs found nowhere else in the world). The sheer number (and density) of species I witnessed in flower in September 2000 was an awe-inspiring spectacle that I will never forget.



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