

BULBS

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Bulbs

The Bulletin of the International Bulb Society

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COVER PHOTO

Trillium erectum by John Lonsdale

First Words

Tony Palmer – Editor

I don't know what the weather has been like in your part of the world but where I live in Auckland, New Zealand it has been absolutely atrocious and its supposed to be Spring! It certainly hasn't been conducive to bulb growing and with nearly 300mm (almost 12 inches) of rain in September alone I am fearful of how many bulbs will have been affected by rot by the time I come to lift them. There have been some major disappointments as well. We have several large containers with *Arum palaestinum* in and a week or so ago there were 30 to 40 buds developing and promising a spectacular display. Now, several storms with gale force winds mixed with a bit of hail and heaps of rain later, they are looking very sorry indeed.

Ah well, maybe its just as well we have the alternative of staying inside, lighting the wood fire and settling down to a good read about our favourite subjects. Kicking us off this time is Graham Duncan describing an exciting new species of *Lachenalia* from Namaqualand – *L. valeriae*. I had my own bit of excitement a couple of years ago when a pure yellow *Lachenalia rubida* came up in a batch of seed from Silverhill Seeds. I thought it was something completely new as I could find no reference to a *rubida* of this colour but Graham tells me he had seen a yellow form once before and that was at Saldanha where he grew up. He said it must have been at least 30 years ago and that he transplanted the clump from the wild into his garden but after 2 seasons it didn't appear again and he has never seen a yellow form since.

Next we have a feature article by John Lonsdale – a tour de force on Trilliums, illustrated with some of his superb photos. His love of the subject shines through and you will almost certainly end up wanting to try growing them if you don't already do so. Not bulbs in the true botanical sense they are nevertheless undoubtedly geophytes and therefore earn a place in 'Bulbs'.

If you're interested in *Haemanthus* you'll enjoy the piece by Cameron and Rhoda McMaster on interesting forms of *Haemanthus* in the Eastern Cape district of South Africa.

David Fenwick writes a fascinating history of *Crocsmias* and would I am sure welcome any help that readers might be able to give him in far flung corners of the world tracing some of the older varieties that have seemingly disappeared. David holds the NCCPG National Plant Heritage Collection of *Crocsmia* in the UK.

Continuing the *Lachenalia* theme we have a feature article by Don Journet from Australia on growing and enjoying these beautiful bulbs. In 1988 Don's collection of *Lachenalias* was registered with the Ornamental Plant Conservation Association of Australia, and here he shares with us the trials and tribulations of their cultivation with illustrated descriptions of some of his favourite species.

Getting even more exotic we have a short article on growing the Peruvian daffodil, *Paramongaia weberbaueri*, by Graham Duncan. Hope you enjoy all our offerings.

If you have a favourite tool/implement/device that helps you in your bulb growing hobby I'd love you to share it with us. I'm particularly interested of course in the more wacky yet useful tools that you are more likely to buy from a specialist mail order company rather than the sort of things you find in your local hardware store. One that I acquired recently and now find indispensable is a bright light worn on the head rather like a miner's lamp. It has 3 different settings: two sets of LEDs for low or high light and a beam. It leaves both hands free for squashing those pesky slugs, snails and caterpillars and I can now potter around the garden for half the night as well as all day!

Any contributions you have for the next issue, no matter how small, should be e-mailed to me at adpal@ihug.co.nz

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Lachenalia rubida yellow form

Lachenalia valeriae

an exciting new species from Namaqualand, South Africa

Graham Duncan

Photographs by the author

Owing to the erratic rainfall patterns experienced in the arid northwestern parts of Namaqualand, several bulbous species from this region are seldom collected, as is the case with the recently described *Lachenalia valeriae*. It was collected for the first time in July 1970 by former Kirstenbosch horticulturist in charge of succulent plants, Walter Wisura. He collected leafing specimens at two coastal localities north of Port Nolloth that were cultivated in the bulb nursery at Kirstenbosch, where they flowered shortly afterwards. Miss W.F. Barker, former Curator of the Compton Herbarium at Kirstenbosch, recognising the species as undescribed, photographed it in colour and pressed a few flowering specimens for the herbarium collection, but the species was never formally described and the remaining bulbs must subsequently have perished as there was no sign of them when I took charge of the nursery collection in 1979.

Then in the summer of 1993, dormant bulbs of an unidentified *Lachenalia* species were collected by naturalist John Lavranos south of Kleinzee and donated to the nursery collection, where they flowered in July. They matched the colour photographs taken by Miss Barker more than 20 years earlier. Subsequently, my colleague Ernst van Jaarsveld, who is the present horticulturist in charge of succulent plants, collected a few leafing specimens of the species from the Kleinzee Nature Reserve at the Namaqualand Diamond Mine there, while doing a survey of succulent species in that reserve in 2001. As a result of the widespread winter rains that fell over the whole of Namaqualand that year and resulted in an excellent winter and spring flowering season, I travelled to Kleinzee to study the plants in habitat and formally described the species as new last year.

Like its close allies *Lachenalia framesii* and *L. carnosa*, *L. valeriae* forms part of a group of species having sessile, urceolate (urn-shaped) flowers with included, declinate stamens (bent downwards). Reaching 100-350 mm high in full flower, the striking bright magenta lower inner tepals are deeply channelled and distinctly longer than the pale to dark greenish yellow upper inner tepals, and the outer tepals have attractive bright

green gibbositities (swellings) at their tips. The two lanceolate, somewhat fleshy leaves have distinct depressed longitudinal veins on the upper surface and are densely covered with minute, dome-shaped pustules. The plant has a medium sized, subglobose bulb and ovoid, shiny black seeds with a smooth seed



Lachenalia valeriae

coat. The dwarf species *L. framesii*, which *L. valeriae* most closely resembles, differs mainly in its much shorter, suberect flowers with all three inner tepals bright magenta; its two narrow lanceolate, deeply channelled leaves with smooth surfaces and undulate margins; as well as its small globose bulb and minute globose seeds with netted seed coats. *L. framesii* is a common, gregarious species on quartzite flats throughout

in the Kleinsee Nature Reserve, it occurs on west-facing granite slopes in brownish red sand amongst low succulent vegetation including *Aloe framesii*, *Pelargonium fulgidum* and several *Crassula* and *Euphorbia* species. The plants usually grow in colonies in rock depressions and between rock cracks, either in full sun or in partial shade of surrounding vegetation. The distribution of *L. valeriae* needs to be further investigated north of Kleinsee, as it is likely that it extends all the way up the coast to an area north of Port Nolloth, which is currently its northernmost limit.



Lachenalia valeriae in habitat

Namaqualand and the Knersvlakte, and although its distribution extends close to that of *L. valeriae* in one area, it does not overlap as far as is known.

With a restricted known distribution in the sandy coastal plain of the Succulent Karoo Biome in northwestern Namaqualand, *L. valeriae* is at present recorded from just five localities. The region is subject to highly irregular rainfall patterns, with frequent below average rainfall, and experiences extended periods of drought, during which the bulbs are adapted to remain completely dormant for one or more growing seasons. At its type locality near the mouth of the Buffels River

The species name honours Valerie Fay Anderson, who is one of South Africa's most accomplished contemporary botanical artists, in recognition of the wonderful contribution she has made to the knowledge of the flora of southern Africa through the medium of watercolour paintings. In addition to illustrating numerous important monographs, popular books and journals, she has contributed no fewer than 59 plates to the botanical magazine *Flowering Plants of Africa*, published every alternate year by the National Botanical Institute of South Africa. *L. valeriae* was beautifully depicted in volume 58 (2003).

Lachenalia valeriae holds great horticultural potential as a mid to late winter-flowering pot and window box subject, due to the appealing colour contrast of its blooms as well as its interestingly textured upper leaf surfaces. In cultivation it flowers from mid to late June until mid July in the Southern Hemisphere, although flowering in the wild occurs up to a month later. I recommend a sharply drained growing medium of equal parts of coarse river or silica sand and finely sifted compost or finely milled bark, preferably with the bulbs placed in a layer of pure river/silica sand, topped up with a 1 cm layer of growing medium. Fresh seeds germinate readily within four weeks, and under ideal conditions flower for the first time during their third winter season.

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 Duncan, G.D. & Edwards, T.J. 2002. Notes on African Plants. Hyacinthaceae: Massonieae. A new species of *Lachenalia* from Namaqualand, South Africa. *Bothalia* 32(2): 190-192.

Trillium

John Lonsdale

All photographs by the author

The genus *Trillium* contains members native to both North America and Asia but this article focuses very much on those species found in eastern North America. It could just as easily have been entitled 'Some of my Favorite Trilliums', and is intended as an introduction to some of the *Trillium* treasures rather than a comprehensive survey of the genus. Two books have recently been published which do exactly the latter, and details of them can be found at the end of the article.

My first experience with trilliums came in the UK when I tried to grow some of the more common species in pots, but since moving to Pennsylvania in the north-eastern USA in 1995, I have concentrated on growing them in the open garden, and studying them in the wild. As with any other group of plants, they have their likes and dislikes, and there are certain tricks to be learnt if one wishes to cultivate and propagate them successfully. In the following pages I hope to share these experiences with you and pass on some of the excitement that goes along with growing trilliums.

You may be wondering exactly what an article about trilliums is doing in 'Bulbs'! Although not bulbs in the true botanical sense, trilliums are undoubtedly geophytes in as much as they possess a storage structure (the rhizome) to see them through seasons which are unsuitable for, or hostile to, growth above ground. Depending upon species this can be as long as from June to the following March. Rhizome size, shape and degree of branching can vary dramatically from species to species, and can be a useful aid in identification and a source of propagules, if treated correctly.

Trillium is far from unique in that the taxonomic status and nomenclature of many species is somewhat controversial and in a state of flux. Depending upon your preferences for lumping or splitting, a good number of species and sub-species could be reduced to synonymy. Often known by the common names of 'Wake Robin' or 'Toadshade', all species have horizontal subterranean or surface rhizomes, three leaves, three sepals, six stamens, three stigmas and the American ones all have three petals. The fruit is always a berry-like multi-seeded capsule, which falls from the stem when ripe. Presently between forty and forty-five species can be recognized. However, it is quite clear that all trilliums can be conveniently described as either sessile or pedicellate, i.e. the flower either sits directly on top

of the leaves (sessile, subgenus *Phyllantherum*) or has a pedicel (pedicellate, subgenus *Trillium*). In the latter, the flower may be erect or held below the leaves. This makes for a reasonable starting point in attempting to sub-divide the genus into more manageable groups. The sessile and pedicellate trilliums are dissimilar in a number of ways pertaining to the leaf form and coloring, and especially the flower structure. Both groups are indispensable elements of the woodland flora, providing superbly attractive foliage and flowers over several months in the spring. The sessiles generally flower earlier than the pedicellates, often starting in late February or early March, depending upon location.

Trilliums make wonderful associations with other native and exotic woodland bulbs and herbaceous perennials. In the garden they mix particularly well with *Corydalis*, *Dicentra*, *Disporum*, *Erythronium*, *Hepatica*, *Iris*, *Jeffersonia*, *Mertensia* and *Sanguinaria*.



Trillium flexipes

Three spectacular wild locations I especially remember were one in north-central Alabama in which *Trillium flexipes* grew with *Phlox divaricata*, huge patches of *Jeffersonia diphylla* and white *Dodecatheon media*; a second in north-western Illinois where tens of thousands of the Snow Trillium (*Trillium nivale*) grew with *Dicentra cucularia*, *Dodecatheon amethystina* and the most wonderful clumps of *Hepatica acutiloba* in fabulous color forms; and a third in northern Georgia in which *Trillium decumbens* cohabited a steep hillside and ravine with yet more superb color forms of *Hepatica acutiloba*, *Disporum maculatum*, *Phlox divaricata*, *Disporum lanuginosum* and *Iris cristata*.

Erythroniums are rarely absent in trillium country and all three of the above locations had their quota.

In the wild most species are found associated with mature deciduous forests – generally in vernal moist habitats which dry out somewhat during the summer months. Trilliums are frequently found on the cooler slopes and terraces leading down to creeks and rivers. Some species are also very happy in areas which are seasonally flooded. Conditions in the wild, most importantly, favor seedling establishment as well as meeting the needs of mature plants. In contrast, in cultivation, adult plants of most species are highly adaptable and will often thrive for long periods in seemingly unsuitable conditions. Like many woodland plants, as long as there is plenty of moisture when in active growth, trilliums will take quite a lot of sun, although under such conditions seedlings are unlikely to establish. Generally speaking, seedling establishment needs correct soil temperatures, pH, drainage and moisture and freedom from plant competition. Specific habitats will be discussed in the context of descriptions of the species and general cultivation requirements will be discussed in the section on cultivation and propagation, as will the relatively few pests and diseases which affect trilliums.

Selected Species

Most, but by no means all, of the species are briefly described below. One of the main aims of this article is to increase awareness of the beauty and garden value of trilliums, especially some of the lesser known species, so the descriptions will focus on garden worthiness rather than botanical considerations. Where possible, photographs of most of the species have been included. Although a number of cultivars have been described (many with the 'Eco' prefix from Eco Gardens, Atlanta, Georgia), none of those will be discussed here. The main reason for this is that, at present, there is no reliable method available for the clonal production of trilliums on a large scale. Thus, even though cultivars have been named, they are effectively unavailable. Where plants have been grouped together below, this is for reasons of convenience rather than any taxonomic affinity.

Sessile species -

subgenus *Phyllantherum*

Trillium decipiens, *Trillium reliquum* and *Trillium underwoodii*

These three species have a great deal in common,

inhabiting typical trillium habitat in the deep south of the USA, particularly parts of southern Alabama and Georgia. They are especially worth growing for their stunningly beautiful leaves blotched in every shade of green overlaid with streaks of cream and silver. This description does them a woeful injustice. Only a photograph can adequately demonstrate their beauty. Of particular note is the fact that the leaf markings remain fresh and bright from unfurling to dormancy. This is in sharp contrast to species such as *T. cuneatum*, whose beautifully marked fresh leaves rapidly fade to muted greens and browns. Their flowers are also very similar, being erect and colored from a dark brown-maroon to a rich red-maroon. This description,



Trillium underwoodii



again, does them little justice so I'll defer to the photographs. As is the case with flowers of all sessile species, the colors fade

with time but they are exceptionally long-lived, lasting until the seed is ripe.

It is virtually impossible to distinguish between non-flowering plants of *T. decipiens* and *T. underwoodii*. The major difference is one of stature of flowering plants, and the ratio of leaf length to stem height. In *T. underwoodii* the stems are 3" to 8" tall and 1 to 1.5 times the leaf length, whereas in *T. decipiens* the ratio increases to over 3 with the leaf size remaining similar. The latter is a truly elegant plant. Until a spring 2003 trip to Alabama I wasn't convinced I had ever seen true *decipiens*, but I certainly have now! After scrambling up a mini cliff into the woods above the bank of a suitable looking creek I was thrilled to see odd scattered plants but was literally stunned to see the sight that unfolded in front of me. Spread over the slope, in an area perhaps 30 yards by 400 yards, was an unbroken sea of at least 20,000 plants of classical *T. decipiens*. The majority were flowering to perfection. They were 12-18" tall, with the leaf span in perfect proportion. The flowers ranged in color from 'normal' dark maroon through paler bronzy-maroons to olives,



Trillium reliquum

varied a lot, some being very dark. It was one of the most incredible sights I have ever seen.

T. reliquum is an almost decumbent plant, the leaves sitting on or just above the forest floor. It is superficially like *T. decumbens* at first sight but differs in a number of features, particularly its non-pubescent stem. An S-curve in the stem is often quoted as being diagnostic but in my experience this character is not reliable.

Trillium decumbens

Probably
my favorite
sessile



Trillium decumbens

trillium, *T. decumbens* lies flat on the forest floor and possesses a character all of its own. It is found in northern Alabama and northeastern Georgia. A memorable

day in spring 2002 found us looking for it in the area of the Black Warrior River in Alabama. We had parked on the nearest roadside and headed off towards likely habitat, only to find the river was a lot further away

bicolors, muddy yellows to a beautiful clear lime green. In the latter case they were also devoid of all dark pigmentation in the stems. Sepal colors also

than we thought. Finding a few plants in a small side valley gave us hope but it was getting dark and the severe weather that had been promised was on the way. Suffice to say that we scrambled across creeks, through woods and brush and across fields and ended up nowhere we should have been and not sure where we were (and the GPS was in the car). It was getting very dark and raining heavily when we stumbled into another steep ravine to find it full of tens of thousands of plants of *T. decumbens* - 'locally abundant' as the books would have it. It was quite bizarre to see these plants, in full bud, and some the size of an outstretched mans hand, eerily lit by the bright pink lightning that was being generated by the mother of all storms that was now nearly overhead. We headed out and eventually found the car in pitch blackness and soaked to the skin but vowed to try to find them again the next morning. Without doubt they had never been found previously - unseen except maybe through a hunter's scope. The creeks were seriously flooded following the storm but we did find the plants again and were amazed by them all. Most were in tight bud but some just starting to open. A very few plants had almost pure silver leaves and the markings on others were fabulous. The open flowers are a glossy red-maroon and the petals are attractively twisted at the tips.

Trillium discolor

Another favorite, this time hailing from the upper drainage of the Savannah River on the border between S. Carolina and Georgia. In comparison with the other

yellow sessile trillium, *T. luteum*, this is a truly refined species and quite distinct. Although generally dwarfer in all proportions than *T. luteum*, very robust individuals can exist in the rich flood plains it inhabits. It can also be incredibly abundant; I have seen it on the banks of small creeks in areas so dense it is impossible to walk through them



T. discolor

without damaging the plants. Unlike the acid yellow of *T. luteum*, the petals of *T. discolor* are a soft creamy yellow and upon seeing large colonies of them, the effect is one of seeing thousands of candles. The petal shape is unique in that they are quite spatulate, much broader at the tip than the base, and the stamens are purple. They can be delightfully but not strongly fragrant of lemons and particularly nice forms may have strong red flares extending up from the base of the petals.

Trillium foetidissimum

Found in Louisiana, in rich ancient woods east of the Mississippi River, this species is relatively invariant in flower and leaf, although as is the



Trillium foetidissimum

case with many red-maroon flowered sessile species, pure yellow forms can very occasionally be found. Similarly, forms can also be rarely found with all-over silver leaves. In size and proportion it is similar to *T. discolor* and quite charming. With dark red-maroon flowers, it has strongly mottled leaves, in flavors of green and bronze, but without the silver patterns of *T. underwoodii*. It is true to name as the flowers emit a fetid odor which is especially noticeable on warm still days. Of all the trilliums discussed, this species suffered the most in the garden here during the very hard N American winter of 2002-2003. It was the first to emerge in mid-March and a number of shoots were badly damaged by freezing in more exposed raised beds. However, plants in more sheltered spots were fine.

Trillium maculatum

Another special sessile species, this plant grows over a wide range across central Alabama, Georgia and S. Carolina. The 'maculatum' refers to the leaves, which can be strongly and darkly mottled. The flowers are



Trillium maculatum

usually relatively tall and a very clear red-maroon, lacking the brown overtones that flowers of many sessile species can have.

Yellow forms exist, and if you are incredibly lucky you might find the incredible *T. maculatum* f. *simulans* with



T. maculatum f. *simulans*

yellow and maroon bicolored petals. Plants can be very robust and possibly confused with *T. cuneatum*, although the ranges of the two plants do not overlap.

Many sessile trillium species can be mis-identified if one is not familiar with them, particularly when isolated in cultivation.



Trillium maculatum form

Even trillium experts are often heard asking 'where in the wild did you find it' when asked for an identification of a garden plant! Having the benefit of seeing many species in

the wild certainly allows one to get a feel for the true differences between the species.

Trillium lancifolium*, *Trillium recurvatum* and *Trillium stamineum

Although these three species are related they are very easily distinguished from each other and from other species. None can be described as showy but each makes a unique contribution to the genus. They are also interesting because they have a natural propensity to branch and form clumps, something that most trilliums will not normally do.

T. stamineum is a medium sized species with relatively small flowers, the fragrance of which can be rather unpleasant. However, the thin dark maroon petals are horizontally inclined and uniquely twisted along their length. Less clump forming than its two relatives, it is found in central and western Alabama, eastern Mississippi and west-



T. stamineum

central Tennessee.

T. lancifolium also has twisted petals in many forms, but these are very long, thin and erect. It also has a unique look, taking its name from the lance-shaped leaves. The stems can be very tall, easily up to 18", and 2.5 to 3 times longer than the leaves. Flower color appears very variable, from dark maroon, through bicolors to almost green. The rhizome is also very

unusual, being long and thin, and very brittle. It also tends to branch and form tight clumps more frequently than most other trilliums. In



Trillium lancifolium



habitat it is more often found closer to small creeks, usually on the flood

plain and in areas that can be totally inundated for several days or weeks in particularly wet springs. However, it doesn't have an obligate need for such damp conditions, behaving perfectly well in cultivation in much less wet spots. *T. lancifolium* is unusual in its disjunct distribution. In addition to the 'normal' populations in central Georgia and Alabama, there are populations in the Florida panhandle near the Chattahoochee River which flower very early, before the end of February in many years.

T. recurvatum is also easily identified with its petiolate leaves, recurved sepals and relatively short petals. It has a similar color range to *T. lancifolium*, although is normally a brownish-maroon to red-maroon. It has a very wide range for a sessile trillium and can be quite variable in size, petal color and leaf marking. *T. recurvatum* f. *shayi* is a yellow flowered form which occurs with a relatively high frequency in certain populations and when compared with equivalent forms of other sessile species with yellow variants.

***Trillium cuneatum*,
Trillium ludovicianum
and *Trillium gracile***

T. cuneatum grows over a vast



Trillium ludovicianum

area and is easily the largest of any eastern sessile trillium. Growing mainly in upland slopes and woods, it could be described as coarse when compared with the smaller species but it is particularly spectacular when seen *en masse*. Very many different forms occur over this range and these can be confused in cultivation with other species. Petal color varies from yellow through green to brown and deep maroon; leaves can be pure silver, green or strongly mottled.

T. ludovicianum and *T. gracile* definitely fall into the category of hard to distinguish between if you don't know their origin! Originally thought to be confined to the state of Louisiana, it appears that *T. ludovicianum* may well grow as far north as Chattanooga, Tennessee, where it co-exists with *T. cuneatum*. It is a more refined plant with a clearly distinct



Trillium gracile

narrower petal shape but may well intergrade with *T. cuneatum* over some of its range. The range of petal colors is similar to that of *T. cuneatum* and the leaves are very attractively mottled. *T. gracile* is geographically distinct, with a narrow distribution in western Louisiana and eastern Texas, but is morphologically not particularly easy to distinguish from its nearest neighbors, *T. ludovicianum* and *T. foetidissimum*. There seems to be less variation in flower color which is generally a brownish-maroon, but, highly characteristically, it does flower several weeks later than these species, often coming into flower when they are already well past their best. I saw *T. ludovicianum* and *T. foetidissimum* in full flower in the wild in the first week of March in 2002, but *T. gracile* was still in im-

mature and very tight bud at the same time. It is the last sessile species to flower here in SE Pennsylvania.



Trillium sessile

Other sessile species

Of the eastern sessile species, only *T. luteum*, *T. sessile*, *T. viride* and *T. viridescens* have not been specifically discussed above. *T. luteum* is a large relatively invariant, yellow-flowered species, whose distribution is centered in eastern Tennessee, particularly in and around the Smoky Mountains. It is probably the most common trillium in cultivation and widely recognized. *T. viride* and *T. viridescens* are both green flowered, sometimes with a purple base to the petals in the latter case. The latter two are frequently confused in cultivation and are not particularly showy, although they are large plants. *T. sessile* is also frequently misrepresented in cultivation; most of the plants bought or seen under this name actually correspond to *T. cuneatum* or one of the western sessiles, although the true plant is of much smaller stature than any of these. It can be a charming plant and very fine forms with excellent leaf mottling and petal color can be found. In particular I have seen yellow plants, and those with yellow flowers edged with purple, creating a very attractive picotee effect.

With profuse apologies to the western US sessile flowered species, I won't discuss them in this article. There are a number of very attractive species (some with white flowers), generally very large of stature, but the few plants of *T. chloropetalum* I have tried to grow here have fared relatively badly and I have little or no practical experience of the others, which include *T. albidum*, *T. angustipetalum*, *T. kurabayashii*, *T. parviflorum* and *T. petiolatum*. They are, however, at least as confused, taxonomically and in cultivation, as the eastern sessiles!

Pedicellates - subgenus *Trillium*

Trillium catesbaei

T. catesbaei is an exceptionally classy plant, so what



Trillium catesbaei

better one to start with? Growing widely in northern Georgia and north western parts of the Carolinas it is often found with *T. luteum* and *T. rugelii* or with *T. discolor*. It is a relative loner in the wild, with individuals often widely scattered, and it does not form clumps in cultivation. The leaves appear distinctly petiolate and are plain green and unmarked, as is the case for all of the eastern pedicellate species. The flower can be held above (rarely) or below the leaves and is quite variable in size. The petals can be white or pink and any shade in between, and some forms have superb deep rose pink petals which are strongly reflexed and perfectly compliment the prominent yellow stamens. The pedicellate species generally flower a month or so later than the sessiles and *T. catesbaei* is at its best from early April to June, depending upon location.

Trillium cernuum and *Trillium rugelii*

These two species are very similar and have been considered as northern and southern 'forms', respectively, of a single species. *T. cernuum* has white, strongly recurved petals in a flower held tightly below the leaves and is the most northern of American



Trillium rugelii

trilliums, growing from northern Maryland northwards. Its habit of hiding its flowers beneath a large leafy canopy makes it not particularly showy and the plant also performs poorly in cultivation in lowland areas south of its natural distribution. It will often form small clumps of 3-5 stems, as will *T. rugelii*, which has a distribution centered on the southern Appalachian mountains of Virginia and the Carolinas. The white stamens of *T. cernuum* are purple in *T. rugelii* and the ovary is also purple or white with a purple stigma. The flowers of *T. rugelii* can be much larger, as can the plants generally, but they remain relatively non-showy because the flowers are similarly hidden by the leaves.

The sessile flowered trilliums described above do not appear to hybridize widely in the wild (or in cultivation) but the same can hardly be said for the pedicellate species, especially those related to *Trillium*



Trillium rugelii x vaseyi

erectum. *T. rugelii* falls into the latter category and hybrids are well known in the wild and cultivation, and can be very attractive plants. In Brevard, N Carolina, in a filthy ditch behind a strip mall, I have found both *T. rugelii* and *T. vaseyi* and every possible variant in between. The mixture of the large deep red-purple flower of the latter, with the white flower of *T. rugelii* makes for some lovely combinations, including true bicolors and white flowers with red veins.



Trillium pusillum var. *pusillum*

Trillium pusillum

T. pusillum is a beautiful species which tends to flower rather early for a pedicellate trillium. Unfortunately it is a rather confused little fellow, or at least it has managed to confuse a large number of botanists. It occurs in several widely disjunct populations: west from eastern Maryland to the Ozarks of Missouri; south to western Texas and then back east through Alabama and Georgia into S Carolina. There are currently 6 or 7 published varieties, but the distinctions between many are blurred and this is not the place to go into a discussion of them. Suffice to say it is



Trillium pusillum var. *georgianum*
– aging bloom

always very charming, dwarf (3” - 12”) and has an upwards facing white flower. The flower often has ruffled margins and, in the manner of *Trillium grandiflorum*, fades to rose pink as it ages. The foliage of some forms is almost purple in color until it matures to a deeper green. In the wild it is frequently found in seasonally boggy or even swampy areas, but doesn’t require such conditions in cultivation.

Trillium grandiflorum

If *T. luteum* is the best known and mostly commonly encountered sessile trillium in cultivation then *T. grandiflorum* is certainly its pedicellate bedfellow. It surely needs little description and is widespread in the wild north from Tennessee to the Canadian border. Although very common, it is a superb garden species,



Trillium grandiflorum dwarf form



Trillium grandiflorum ‘Snowbunting’

robustly growing to 15” or so with pure white flowers which fade to rose pink as they age. As might be expected for such a widespread and much grown species, a number of forms have been selected. These include several distinct double white forms which are very beautiful, ‘Snowbunting’ is perhaps the best known, although it has to be searched for, and commands very high prices! Also much in demand are the pink

forms (forma *roseum*) which occur infrequently in the wild, but especially in the mountains of Virginia. There has been much discussion about what constitutes a true pink form, and it can be confusing as all *T. grandiflorum* eventually age to deep pink. True *f. roseum* opens pink or, if it opens pale pink, shades to deeper pink within a matter of a day or so. Also available is a dwarf form of *T. grandiflorum*, perhaps only half the height of the normal plant but with quite large flowers. This appears genetically stable and common in certain locations, but it has not been formally recognized.

Trillium erectum, *Trillium flexipes*,
Trillium simile, *Trillium sulcatum* and
Trillium vaseyi

This is the section that could get me into real trouble! I'm probably on safe ground starting with the



Trillium sulcatum

descriptions of the 'true' plants, but you'll soon get the message that you may have more chance of winning the lottery than correctly identifying your pedicellate trillium from this group. All of the species have large plain green leaves. *T. erectum* can be anything from 8 - 24" tall, with flowers, flat and wide-spreading in profile, of white, red, maroon, yellow-green or red-brown, with the petals frequently tending to be lanceolate in shape. The flowers can be erect, straight out sideways or declining. *T. flexipes* is usually 15 - 18" tall and traditionally white flowered with broader petals on erect flowers, although red forms have been described, as have forms with declining flowers. I haven't mentioned ovary color yet - but this can vary from white through cream to pink-purple. *T. simile* is a very attractive large species, often forming small clumps, with erect creamy-white flowers (normally) with a



Trillium simile

Trillium nivale

The Snow Trillium is by far the earliest flowering trillium here and a wonderful showy plant. Absolutely hardy, as might be expected because in its heartland in the wild centers of Indiana, Illinois and Iowa, it frequently gets



Trillium nivale



covered in snow whilst flowering and seems immune to being frozen solid. Here in SE Pennsylvania it flowers

in early to mid-March, long before most trilliums are even through the ground. The flowers are pure white to creamy-white, of heavy texture and prominently veined, and replete with beautiful golden yellow anthers. Although it is typical of the pedicellate trilliums in that its leaves are unmarked, they are unique in that the best forms have leaves which are a wonderful shade of blue-green, overlaid with a pewter caste and often with the veins picked out with silver speckles. All of this at a height from 2-6", at most, making *T. nivale* one of the most desirable trilliums for the garden.

purple ovary. The flower is characteristically more funnel-shaped with the ends of the petals flaring sideways. *T. sulcatum* is of similar stature and equally showy but has dark red-maroon to purple flowers with broad petals that are slightly flatter than those of *T. simile*. Of course occasional white, pink cream and yellow forms can be found together with beautiful bicolors and picotees. Last but not least is *T. vaseyi*, a spectacular species with huge (up to 3" across) flowers of deep red-maroon nodding below the leaves. White flowered forms are known and it is the last species to flower here.

All of these subjects make superb garden specimens and it is important not to get too hung up on nomenclature. The difficulty in identifying these species in the wild, because they are so naturally and extremely variable, is compounded by the fact that they hybridize in cultivation, and in the wild where their distributions overlap. Photographs of a number of these species and forms are included to exemplify their variability and beauty.

Other pedicellate species

Of the eastern pedicellate species, only *T. persistens* and *T. undulatum* have not been described. The former is federally endangered and also the least showy of all the species in this group, whereas the latter is the probably the most difficult trillium to grow outside of its native range. The western USA and Asia have their share of pedicellate species, but, as is the case with the sessiles from the west, they do not generally perform well in cultivation in the eastern USA, for reasons which are briefly discussed below. Other species include *T. ovatum*, *T. hibbersonii* and *T. rivale* (included by some in the new genus *Pseudotrillium*) from the USA, and *T. apetalon*, *T. camschatcense*, *T. hague*, *T. smallii* and *T. tschonoskii* from Asia.

Cultivation and Propagation

Cultivation

As alluded to above, the cultivation of many trilliums is generally not problematic and they are actually very adaptable plants that are quite difficult to kill! They do, however, resent disturbance and will take a year or more to settle down after being moved. Most are well served by moisture retentive but very well drained compost (in pots or in the garden) which is vernal moist but allowed to dry significantly in the

summer when the annual growth cycle ends and the plants go dormant. There are numerous ways to accomplish such a soil mix, naturally or artificially. Any are likely to work that effectively mimic the conditions in the wild.

Although they are essentially woodland plants, many trilliums are exposed to quite strong sun in early spring whilst they are leafing out and the flower buds are maturing, and before the tree canopy has expanded. The species from the deep south, especially, will encounter temperatures well above 70F during this period, but the shade of the trees brings welcome relief when the temperatures become searing later on in the summer. The majority of species will have completed growth, set seed and gone dormant by early-mid August in SE Pennsylvania, although this is very much dependent upon the local climate. In the deep south



Trillium erectum var. *album*

they are gone much earlier. Those immature plants which don't flower, and mature ones which don't set seed, tend to go dormant as many as 4 - 6 weeks before those that have set seeds. Presumably the maturing seeds capsules produce inhibitors to prevent onset of dormancy until they are ripe and the seeds dispersed. Although not proven, I suspect that the deep south sessile species are well adapted to hot and relatively dry summers and they benefit from these conditions in cultivation. Thus they are possibly not the best candidates for more regularly moist shade beds in areas such as the UK, which have generally cooler and moister summers. On the other hand, the pedicellate species from the Appalachian Mountains and northwards will probably flourish better in such conditions which are closer to those they encounter in the mountains and coves they inhabit, and certainly seedling establishment

will be favored. Trilliums from the western USA and Asia will certainly grow better in such maritime climates than they will in the eastern half of the USA.

Some trilliums, particularly *T. nivale*, grow in limestone areas in the wild, but neither an alkaline pH nor the addition of limestone are generally necessary in cultivation as long as the plants other requirements are met.

As mentioned above, *T. undulatum* is almost impossible to please when conditions do not mimic those of its home range. It is essentially a northern plant, deigning only to come south at the highest elevations, and therein lies the solution to keeping it

nights they despise effectively 'choke' the plants by inhibiting the physiological processes which occur at night. Whilst *T. undulatum*, is an extreme example, a number of the more northern species such as *T. cernuum* and *T. nivale*, will not generally fare well in lowland areas in the southern half of the USA, for much the same reasons.

Propagation

Trilliums, unfortunately, have so far not made good candidates for rapid vegetative propagation, either by division or tissue culture, and this effectively limits larger scale production. However, they do set copious



A selection of *Trillium erectum* forms

happy. It appears to be one of those species that is a cause of extreme frustration to growers who inhabit warmer lowland locations, albeit ones which can get very cold in winter. Absolute temperatures are not the key but rather the ability to provide a significant diurnal temperature variation. Here the summer time temperatures average the high 80s and 90s F during the day, and maybe 10F lower at night, whereas places in which *T. undulatum* does well will have similar, if slightly lower, highs, but the nighttime temperatures will drop to the high 50s or low 60s F. The hot muggy

seed, and this affords the best means of increase. The down-side is that most species will take 1 - 3 years to germinate and a further 5 - 7 years to flower! Hand-pollination certainly helps maintain fidelity and increase seed set but most species will set seed naturally in the garden. I have never seen a specific pollinating insect but the sessiles in particular seem attractive to small flies. The 'berries' ripen naturally by mid-summer in most species, although *T. nivale* is much earlier. When they are ripe the pods start to go very soft and they

naturally fall from the stem and disappear rapidly once on the ground. Just before they are ripe they are frequently attacked by wasps attempting to get at the seeds, which have a fatty elaiosome to which they are attracted. In order to ensure I get to the seeds first and to try to keep the collection process as clean and effective as possible I collect the capsules up to a couple of weeks before they are fully ripe. At this stage the pods are still fairly firm and the seeds are a light brown color. I store the pods in plastic bags whilst they finish their disintegration process, and then rub the whole gooey mess through a flour sieve under running water, leaving only the seeds behind. At this stage various seed treatments have been recommended to reduce rot and germination time or increase germination percentage. Undoubtedly some work but all are time-consuming and I generally prefer to let nature take her course.

Germination of seeds is best if they don't dry out, so sow the seeds immediately onto any suitable seed compost which meets the same criteria as described for mature plants, cover them with grit, and place the pots outside in a shady area and keep them moist. Alternatively, if you have the right conditions, you can sow the seeds directly in the garden. In my experience, only *T. rivale* germinates well from dried seed.

If all has gone well you can expect some germination the second spring after sowing, although this is frequently a relatively low percentage of the seed that was sown. Leave the seedlings in their pots to allow for further germination in subsequent years, and to allow the tiny seedlings to develop. They can be successfully moved into the garden or further potted on after 3 years or so, depending upon the species involved. I suspect you are starting to understand why seed raised trilliums are very expensive to buy - there's an awful lot that can and does go wrong in the time it takes from sowing the seed to selling the plant! Whilst seedlings are growing on they will benefit from regular weak feeding with a suitable fertilizer.

Some trilliums will form clumps naturally, as mentioned above. In the case of those that prefer to remain solitary, it is always worth seeking out individual clones that are genetically predisposed to clumping. Individual plants which are particularly attractive can be vegetatively propagated by disbudding the rhizome by either gouging out the terminal bud or cutting the rhizome into two an inch or so behind the terminal growth bud. I prefer the latter since the newly separated terminal bud with accompanying portion of rhizome will go on to make new roots and a shoot, and frequently also flower. In both cases, the loss of apical dominance causes dormant buds to sprout along the length of the remaining 'headless' rhizome, and with time these will develop into small plants which

can be separated after a couple of years, if so desired. The timing of this exercise is important and it is best done shortly after flowering and certainly before dormancy - trilliums initiate growth of the roots that will support next years growth at this time and later disturbance will certainly set them back.

Pests and Diseases

Trilliums, like all plants, suffer from their fair share of pests and diseases. However, well grown plants are extremely tough and serious issues are relatively few. Seedlings of trilliums are no different to seedlings of other plants and similar care should be taken to ensure they don't damp off. Mature plants are generally trouble free but *Botrytis* fungal infections of the leaves and flowers can be a problem in very damp springs. Infection usually causes disfigurement of the leaves through the appearance of brown spots which can spread and coalesce, in severe cases causing defoliation and premature dormancy. The rhizome is not affected but obviously early dormancy robs the rhizome of the ability to build up reserves to support the following year's growth and flowering. Chemical treatments are available but not really practical for plants grown in the garden, I prefer to suffer the occasional damage and find no long term harm.

Cultivation in poorly drained composts and soils will certainly lead to bacterial and fungal rots of the rhizomes, which can cause loss of the entire plant. Interestingly, the rhizome of some species, such as *T. sulcatum*, can rot naturally in a controlled manner limited to the end distal to the terminal bud. Presumably this happens because that end of the rhizome can be many years old and is allowed to degrade naturally in a self-limiting manner which doesn't affect the rest of the rhizome, as long as other conditions are correct.

Mycoplasma (bacterial) infections can be serious, causing distortion and deformity of flower parts, and green streaking of petals. Without doubt this condition exists in the wild and is most often seen in *T. grandiflorum* and *T. erectum*, but it is relatively rare in the garden. It would be wise to not grow (and destroy) any plants which show these symptoms, as there are no treatments available and mycoplasmas have the potential to be transmitted, especially by sap sucking insects. However, the discovery of the odd small green streak in the flower of an otherwise healthy plant is not justification for digging up the whole lot and burning them!

In certain damp climates slugs can be a problem and they will browse the emerging growing points in the spring, potentially causing serious damage. The usual preventative measures should be taken.

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Biography

John Lonsdale was born in 1959 and raised in Sheffield, England – the home of the world’s finest silver cutlery, Sheffield Wednesday, and “The Full Monty”. He went to University in Newcastle upon Tyne and gained a Double First Class Honors BSc in Biochemistry & Microbiology and a PhD in Microbiology and has spent the past 18 years attempting to discover novel antibiotics in the pharmaceutical industry. Whilst in the UK he was a very active member of the Alpine Garden Society and enjoyed growing and showing plants in pots at many of the AGS national and local shows. He was awarded the Gold Merit Medal in 1995. In the UK he specialized in Primulaceae, particularly *Dionysia*, *Primula* and *Androsace*, also cushion saxifrages, and had an interest in hardy bulbs, including a representative collection of *Cyclamen*. All plants were grown in pots because it facilitated showing them, and greenhouse or cold frame cultivation gave an element of control over growing conditions. In this way it was possible to grow a large number of exciting and challenging plants in a relatively small area, whilst mitigating against a climate generally unsuited to outdoor cultivation of many choice ‘alpine’ plants.

The family moved to the USA in 1995 and purchased a property of a little over 1.5 acres in Exton, SE Pennsylvania. The new house and garden came with an added bonus – a wonderful climate

for growing in-character hardy plants, especially bulbs, and many other flowering trees and shrubs. Focus switched to ‘proper’ gardening and the only plants grown in pots in the two greenhouses are seedlings and a few tender plants such as certain *Cyclamen* species. *Cyclamen*, *Corydalis*, *Narcissus*, *Crocus*, *Fritillaria*, *Iris* and *Erythronium* are favorite bulbs, together with extensive plantings of woodlanders, especially *Helleborus*, *Cypripedium*, *Hepatica*, *Epimedium* and *Trillium*. There is also a large and actively propagated collection of *Daphne*. Propagation is vital to the well-being of any successful garden and John sows in the order of 450 pots of seed each year, mainly from bulbs.

John is an active member of a number of horticultural groups, including the Daphne Society, Alpine Garden Society, Cyclamen Society, North American Rock Garden Society, Scottish Rock Garden Club, AGS Fritillaria Group, The Crocus Group, Aril Society International, the Species Iris Group of North America and several internet-based discussion groups such as Alpine-L. He has contributed articles to the publications of a number of these Societies and also lectured widely about many of the plants mentioned above. Over 2500 photographs of the Lonsdale garden and plants grown therein can be found at John’s web site at <http://www.edgewoodgardens.net>.

Donations during 2002

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The Interesting Forms of *Haemanthus* in the Eastern Cape

Cameron and Rhoda McMaster

At least five species of this fascinating genus, each with a number of forms and varieties, occur in the Eastern Cape.

The most widespread is *H. albiflos*, which is a m a z i n g l y adaptive and versatile in its habitat. It is a particularly desirable and easy to grow garden subject and is also



Haemanthus albiflos
normal form from forest habitats

suitable as a ground cover in areas of semi-shade. It is equally at home in deep shade on forest floors; on rocky sea shores exposed to salt spray; in coastal dune forest; on cliff faces in hot river valleys where it clings in large clumps to crevasses in full sun; and in shady places on high altitude inland mountain ranges. It is evergreen and multiplies vegetatively, as well as from seed. The attractive white flowers appear in May and the ripe seeds are carried in equally attractive clusters of scarlet fruit.

When new telephone lines were being put in at the coast, we picked up a number of *H. albiflos* that had been uprooted. We planted them under a tree, where the leaves were frosted off in the first winter, but subsequently they retained their leaves even at -5C overnight. Seedlings keep their leaves even at -2C overnight. It seems that they are more frost-hardy when the leaves have grown out in situ under cold conditions. Once when we picked some stems with green seeds and left them in a box for a few weeks to ripen, some bulbils formed at the flower ends of the stems amongst the seed stalks.

An interesting dwarf form with oval leaves occurs

as single individual plants on bush clad hillsides in the Keiskamma River valley. Another form with greyish oval leaves, which we took for *H. humilis* before it flowered, occurs in thicket vegetation on steep north facing slopes in the Kei River valley, where it grows in rock crevices.

Haemanthus montanus is much more localised in its distribution. It occurs from the Eastern Cape northwards and a population in the Bedford district is probably its most southern extremity. *H. montanus* prefers small areas of poorly drained shallow soil with an impervious substratum. It completes its annual cycle in four months – the period during which its fairly hostile habitat remains moist. It occurs in dense stands with the large cream flowers appearing in early January, quickly followed by two upright leaves. The seed ripens by mid-February and germinates rapidly around the parent plants. The leaves dry off



Haemanthus albiflos,
greyish oval leaves from dry north
slopes in full sun on the farm
Antelope, Stutterheim.

and blow away by the end of May when all signs of the bulb population have vanished. It adapts well to gardens and containers, and despite its long dormancy is an attractive subject.

H. humilis subsp. *humilis* has fairly round flat leaves, flowers in January and is deciduous. New leaves appear with the flowers and persist through to late spring. It occurs in isolated populations always between rocks on steep cliff faces. The different populations are



Haemanthus montanus from Thomas River, Cathcart. This species occurs in large populations confined to shallow soils with an impervious underlay.

extremely variable with regard to size, the degree of hairiness and the colour of leaves and flowers. The most widespread is a medium sized pink form which is very common on steep north facing kranztes along the Thomas River in the Cathcart district. It was always a puzzle to us how many young plants became established on almost vertical places between the rock strata on cliffs. When handling ripe seed, we soon realised that this was due to the fact that the seed is very sticky with filaments that enable it to cling to virtually any surface and under favourable conditions to become rooted seedlings.

An isolated population of *H. humilis* which have small grey hairy leaves and cream flowers, occurs on the farm Keibolo – district Stutterheim - in the Kei River Valley growing under acacia trees in semi shade. Another amazing giant form grows in full shade on a south-facing cliff on the north bank of the Kei River less than 10km distant. It has massive dark green almost hairless leaves as large as dinner plates, and gorgeous large deep pink flowers. It occurs here together with other shade loving bulbs such as *Haemanthus albiflos* and *Veltheimia bracteata* – probably the furthest inland occurrence of the latter species, which normally grows in dune forest along the East Cape coasts. A leaf of this giant form that we put in a plant press surprised us after a month or two with a few (flattish!) bulbils that developed in the press, having some space created by the thickness of the leaf.

Another particularly dark pink form of *H. humilis* occurs in the Central Karoo in a region with a rainfall of less than 300mm per annum and night temperatures that can drop to -10°C in the winter. We found them growing under the shelter of rocks near New Bethesda between Graaff Reinet and Middelburg. A diminutive form of *H. humilis* has been observed between King Williams Town and Debe Neck, and also in the Grahamstown district

The rare *H. carneus*, which also flowers in January, is very closely related to *H. humilis*. The differences are a rather looser, widely spreading umbel and stamens included well within the perianth – the only known *Haemanthus* with this feature. It has the same growth pattern as *H. humilis*, with leaves emerging just after the flowers and persisting to late spring. It occurs in thicket and grassland on the Bosberg mountain near Somerset East. Even within the contiguous population here, which extends from acacia thicket near the bottom of the mountain to grassland near the summit, there is considerable variation. The lower altitude plants have lighter flowers and are distinctly more hairy than those that occur in the open grassland near the top of the mountain.

One wonders whether *H. carneus* should be



The very localised *Haemanthus carneus* which has so far only been found in the Bosberg near Somerset East.

It is distinguished from *H. humilis* by the fact that stamens are included well within the perianth, the only *Haemanthus* with this feature.

considered separate from *H. humilis* on the basis of the small difference mentioned above. What confuses the issue is a further form which occurs some 40km further west on Bruintjieshoogte which has stamens the same length as the perianth tube, as do the cream form of *H. humilis* from Keibolo mentioned above.

It is very surprising to find the West Cape species,



Haemanthus humilis

from Thomas River in the district of Cathcart grows on steep cliffs between rocks

H. coccineus, which flowers in autumn, occurring as far east as the Keiskamma River valley near Hamburg. It grows here in valley thicket vegetation together with the dwarf form of *H. albiflos* mentioned above which flowers in winter, so they don't hybridize. *H. coccineus*

occurs from here in a summer rainfall region, through the winter rainfall region of the W. Cape and up to the arid regions of Namaqualand and Namibia - an enormous range of 2000+ kilometres! The flower stems can be reddish, or blotched with red, and the leaves have varying degrees of stripes on the underside.

There must be many more populations of *Haemanthus* in the Eastern Cape - a region so botanically exciting and so rich in bio diversity. This brief introduction to the genus in this region should spur intrepid wild flower enthusiasts to further exploration.



The Giant form of *Haemanthus humilis* which occurs on steep cliffs along the Great Kei River. The leaves of this form can be as large 30 to 40 cm in diam.

Haemanthus humilis
- a white form from the Kei Valley which occurs in valley thicket vegetation



A particularly dark pink form of *Haemanthus humilis* from the Compassberg in the arid Central Karoo. This form flowers in December - much earlier than most other forms of *H. humilis*

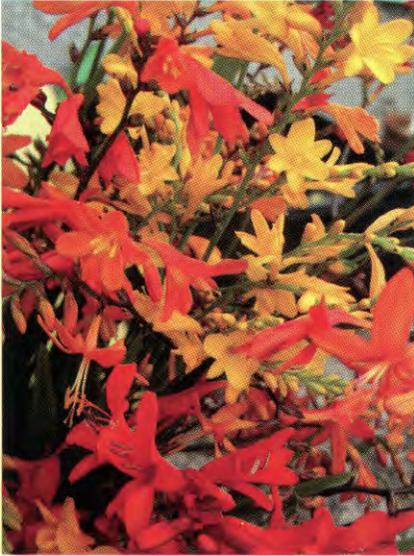


Crocoscemia

– a Brief History

David Fenwick

The genus *Crocoscemia* is a small genus of South African iridaceous plants and contains eight species.



Crocoscemia
Mixed

Its members throughout its history have sometimes been referred to as *Montbretia*, *Chasmanthe*, *Curtonus*, *Antholyza*

and *Tritonia*. The species include *mathewsiana*, *pearsei*, *aurea*, *paniculata*, *pottsii*, *masoniorum*, *fucata* and *Crocoscemia ambongensis* from Madagascar, which has



Crocoscemia aurea

recently been transferred from the genus *Geissorhiza*, by Dr. Peter Goldblatt. It is a genus of significant horticultural merit due to its long horticultural development as both a cut flower and landscape plant.

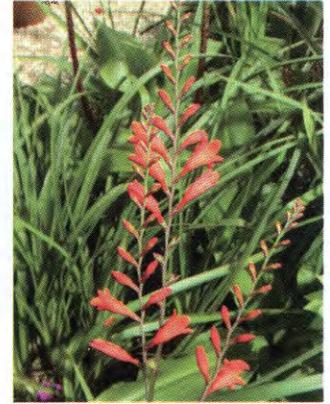
The common name Montbretia, to which most *Crocoscemia* are commonly referred, originates from the generic name given to *Crocoscemia pottsii* and its first hybrids in the late 19th Century. Here, and for purposes of conservation,

Montbretia are those *Crocoscemia* having smooth and unpleated leaves, and include *C. pottsii*; hybrids between *Crocoscemia pottsii* and *Crocoscemia aurea*; and *Crocoscemia x crocosmiiflora*, but exclude *C. fucata*.

Species and cultivars with pleated leaves that exist in cultivation are mainly those derived from two other important species used in horticulture: *Crocoscemia masoniorum* and *Crocoscemia paniculata*. These should be referred to as *Crocoscemia*, and not Montbretia, as this distinction will aid horticultural conservation. Crosses between both of these species, of which many exist including the hybrid *Crocoscemia* 'Lucifer', are commonly referred to as maspans, and these usually have the distinct benefit of being the hardiest hybrid *Crocoscemia*.

Crocoscemia paniculata, and its recently named red form from KwaZulu-

Natal, South Africa, *Crocoscemia paniculata* 'Natal' (Goldblatt / Fenwick) were once commonly referred to as Aunt Liza, a corruption of the genus *Antholyza*.



Crocoscemia pottsii



Crocoscemia paniculata 'Natal'

The Montbretia

The major single horticultural development in relation to the Montbretia occurred in France in 1879. Victor Lemoine of Nancy crossed *C. aurea* (then *Tritonia aurea*) with *C. pottsii* (*Montbretia pottsii*) and produced the commonly known interspecific hybrid *Crocasmia x crocosmiiflora* (*Montbretia crocosmiaeflora*), the common montbretia, which has



Crocasmia x crocosmiiflora
- *pottsii x aurea* - Lemoine

become a persistent alien in many countries around the world. and at temperatures below 17 degrees centigrade – hence its ‘often’ maritime spread. From 1879 – 1908 Victor Lemoine produced 55 varieties that he sold and exported from his nursery in France. These include two completely double varieties, ‘Globe d’Or’ and *C. x crocosmiiflora* ‘Flore-Plena’, and the commonly grown *Crocasmia x crocosmiiflora* ‘Solfatare’ bred in 1886, and erroneously named ‘Solfaterre’ since 1887.

Lemoine’s work was noticed by other Europeans, and plantsmen such as Wilhelm Pfitzer, Leonard Lille, Jacques Welker and Francois-Valerie Gerbeaux also



Crocasmia x crocosmiiflora
‘Solfatare’

bred them, but to a lesser degree. Hybridisation began in Britain as early as 1895 with the interest of George Davison, head gardener for Col. Petre of Westwick Hall, Norfolk. His first hybrid called ‘George Davison’, RHS Award of Merit 1902, was of Lemoine parentage but Davison was not happy with the Lemoine hybrids for breeding purposes as he wanted to produce larger flowered hybrids that were more suitable for growing



Crocasmia x crocosmiiflora ‘Star of the East’

in British gardens and that had the quality of hardiness. Usually the larger the flower, the more closely the hybrid is related to *Crocasmia aurea*, or its forms, which are probably the least cold hardy members of this genus. Davison produced eleven hybrids from 1895-1912, including the popular and available hybrids of ‘George Davison’, ‘Lady Hamilton’ and ‘Star of the East.’

Sadly, like a great many other hybrids the majority have been lost to cultivation. George Davison had to give up Montbretias and raise apples from 1908, but fortunately

stocks of Montbretias were donated to Sydney Morris for further development. It was this donation that gave rise to the largest, brightest and most popular strain of Montbretias ever created – the Earlham Giant Strain.



Earlham Hybrid *Crocasmia x crocosmiiflora* ‘Nimbus’

None knows what attracted Sydney Morris to Montbretias – whether it was his head gardener George Henley or the popularity of George Davison’s hybrids. One thing is sure though: the story of the Earlham Strain puts the icing on the cake with regards to the story of the development of the genus. Early breeding work was done at Wretham



Crocosmia 'David Fitt'

In 1913 Sydney Morris moved to Earlham Hall, Norwich, and commissioned Wallace and Co. to design and landscape the grounds. Jack Fitt was chosen by Wallace and Co. to supervise this work.

According to the Fitt family, Sydney Morris was so pleased with the work of this young horticulturalist that he was asked to stay on and assist George Henley, as his own head gardener was reaching retirement. Jack finally took over from George Henley in 1916/17 and became Morris's head gardener at Earlham Hall, where he worked until Morris's death in 1924. On Morris's death Jack was bequeathed all the Montbretia. Earlham Hall was then sold to Norwich Municipal Council and is now part of the University of East Anglia, but before its sale Jack was asked to become the head gardener for the Honary Mrs. Edwin Montagu of Breccles Hall of Attleborough, Norfolk, and the breeding and showing continued. All new hybrids were still called Earlham hybrids, in memory of the late Sydney Morris, and many new forms were shown and given RHS Awards of Merit like the ones that were originally raised at Earlham Hall.

Sir Winston Churchill and Lady Churchill were frequent visitors to Breccles Hall as Beatrice Venetia Montagu was the cousin of Clementine Churchill. Indeed, like the well-known wall that Sir Winston built at Chartwell, he similarly built a wall at Breccles. As well as this Jack's assistant Albert Hill, who was in charge of Montbretias, was asked to become head gardener

Hall, Norfolk. Documentation is very limited regarding this early work but we know that the first hybrid was developed in 1909 and was named after its breeder 'George Henley', and this was awarded a RHS Award of Merit later that year.

for the Churchill's at Chartwell in 1928; and he indeed went on to breed a number of Montbretia there. Very sadly none of them are represented in cultivation today.

Earlham Hybrids were sold from both Earlham Hall and Breccles Hall, and because of their size and beauty they became extremely fashionable and commanded very high prices. For example the hybrid called 'His Majesty', RHS Award of Merit 1919, was sold by Sydney Morris in 1920 for £2 (3\$US) per corm; a price probably only bettered by Tulips in a previous century.



Crocosmia x crocosmiiflora 'Debutante'
(A Modern Hybrid)

From 1909 to 1939 over seventy-five Earlham Giant Montbretias were produced and quite surprisingly these 3- 4 inch flowered hybrids were raised from seed, to flower in only nine months. Their selection was so rigorous that only the best hybrids were commercially released and it would seem that both interest and devotion to the plants was indeed more important to their breeders than any potential commercial gain. Jack's

ambition was to produce a pure pink and a pure white form, but sadly he did not succeed and died in 1964 leaving others to carry on this work. One can only hope that a truly magnificent pink, and a white form, will be bred from Earlham parentage in the future, and be named in his honour.

In 2002 Peter Fitt, Jack's son, donated all his fathers possessions relating to Earlham Montbretia to Norwich City Council. This includes original RHS Gold, Silver Gilt and Silver Medals, Award of Merit Certificates and more importantly Jack Fitt's notebooks, which date back to the 1920s. These contain vital information about his plants, their naming and parentage. Still to be studied in detail,

a first reading shows potential crosses made with both Tritonia and Gladioli. All these records will be on permanent display at the Assembly House, Norwich, which has adopted the *Crocoscopia* as the city flower.

Nearly 40 percent of all *Crocoscopia* hybrids were once bred in Norfolk, England, and by Davison, Morris, Henley, Fitt and Bloom. Indeed it was Alan Bloom who, in the late 1960s, single-handedly resurrected the genus from its post war decline with the hybrid all of us know as *Crocoscopia* 'Lucifer'. This hybrid has become the most popular and most propagated *Crocoscopia* ever and thus has promoted the breeding of hundreds more cultivars since. One of the latest is *Crocoscopia* 'David Fitt', a hybrid of 'Zeal Giant' and 'Lucifer', bred by this author and named after David Fitt, the only son of breeder Jack Fitt not to have a *Crocoscopia* named after him.

The horticultural future of the Montbretia belongs somewhat in the past and their horticultural conservation is not just about looking after and cultivating the forms which presently exist. Finding and preserving many of those hybrids that are lost to cultivation is as important, if not more important. More than three-quarters of all pre-World War II hybrids are lost in, or lost to, cultivation. Whether it's because of fashion trends, hardiness, pest or disease,



Crocoscopia x crocosmiiflora
Coleton Seedling

change of garden ownership, loss of plant labels or 'The Dig for Victory Campaign'; one has to be optimistic that with both dedication and commitment some of them at least will one day be found. However, it is the 'The Dig for Victory Campaign' during the Second World War, where flower beds had to be compulsorily turned into vegetable gardens, and the subsequent harsh UK winter of 1941, one of the hardest in living memory, that has made finding many of these hybrids so difficult, and finding them with provenance and of correct name, even more so.

Crocoscopia have indeed become very fashionable bulbs once

more, and in general terms this has

been very good for conservation as it makes their conservation much easier to promote. However, mass production from seed, lack of plant material with provenance on which to base a correct identification, and the 'commercial' need to name plants often hampers any real progress. It would often seem that 'the more you know', the more questions and problems arise that have to be solved, and the less the term 'expert' means. All one can ever ask is to have patience, be optimistic, promote the problems that exist and become a catalyst to further both the study and culture of a valuable garden plant. Who knows how many of the older Montbretia may still exist in France, Australia, New Zealand, California or South Carolina, and whilst so many people cannot positively identify what grows in their gardens, this gives me hope.

NCCPG National Plant Heritage Collections
of *Crocoscopia* with Chasmanthe and Tulbaghia
The African Garden
Plymouth, Devon, England

E-mail: bulbs@theafricangarden.com
Website: theafricangarden.com

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Growing And Enjoying Lachenalia

Don Journet

There are many cultivated plant genera whose species are poorly represented in the commercial world of garden plants. In some cases this is well justified, as not all species would be considered worthy of inclusion in the garden. In other genera the species have been crossbred to such an extent as to render the species quite rare in gardens e.g. *Rosa*. The hybrids and cultivars have been altered to such an extent that on a cursory glance they hardly resemble the distant parents. In the case of the many genera of South African bulbous, cormous and tuberous plants the neglect of the species can hardly be justified. I might be heavily biased as a grower of these plants but I consider many of them are quite charming and a delight to the eye. One such genus is *Lachenalia*, which is probably only represented commercially by at most ten species, especially here in Australia.

Graham Duncan, Horticulturist at Kirstenbosch National Botanic Gardens, South Africa now lists 117 species in the genus *Lachenalia*. This includes the small genus *Polyxena* that, as a result of genetic investigations, is likely to be absorbed into *Lachenalia* in the not too distant future.

History

First we will start with the formal citation. *Lachenalia* Jacq. f. Murray. Liliaceae (Hyacinthaceae). This tells us that the name *Lachenalia* was first used by Joseph Franz Jacquin but was actually first published by J. A. Murray. For many years *Lachenalia* was included in the Family Liliaceae but has relatively recently been placed in a new family Hyacinthaceae. Jacquin used the name *Lachenalia* in honour of Werner de Lachenal – an eminent Swiss botanist and a professor at Basel in Switzerland.

For a more detailed discussion of the historical background of the genus see G.D. Duncan's *The Lachenalia Handbook* published by the National Botanic Gardens at Kirstenbosch

Culture

In their native southern Africa *Lachenalia* are to be found growing in a range of climatic conditions and soils from almost pure sand to heavy clay; from humus rich to mineral rich; and from dry to seasonally

inundated (see Duncan 1988). As a result one might imagine that growing these delightful bulbs could be a nightmare, but fortunately they seem to be quite accommodating provided certain rules are observed. Those that grow in dry sandy areas do not like to be kept very wet and those from heavy moist soils do not like to completely dry out mid season. The answer seems to be to maintain a happy medium and perhaps to give one or two species special attention. If a well-drained growing medium is used and regular watering carried out during the growing season most species will reward the grower with delightful flowers and either seed or small bulbs or both.

As I have a collection of some 90 different species, hybrids, cultivars and variations I find it necessary to keep the majority in pots. This enables me to keep the bulbs dry in summer when other plants need watering and to place them in suitably protected areas of the garden in winter when they require good growing conditions.

I live in south-eastern Australia in the state of Victoria about 32 miles (50km) west of Melbourne at the base of the Great Dividing Range. The grid reference is 144° 25' E and 37° 40' S and the USDA hardiness rating would be probably closest to 9b. We occasionally get winter temperatures down to -5°C (23°F) and summer temperatures can exceed 40°C (104°F) for several consecutive days. I must emphasise that the minimum temperature is only sustained for a short period, usually just before dawn, but we can get sub zero temperatures for the best part of the night. We certainly do not suffer from frozen ground and the ice on puddles lasts for a short time only as the temperature soon rises above freezing. To protect my *Lachenalia* I position them under the north-eastern and northern overhang of *Eucalyptus* trees where they will get full winter sunlight, but ice crystals formed in the air will not fall on their leaves. There is no question that the plants experience temperatures below freezing but they all seem to survive. I do try to avoid watering the pots in the evening when there is a forecast of frost.

The growing medium that I use for mature bulbs is based upon a soil-less potting mix obtained locally consisting of aged ground pine bark to which has been added coarse sand. To 6 parts of the basic mix I add 6 parts of coarse sand, 2 parts of clay loam and 2 parts of well-rotted cow manure. A small quantity of a

mixture of about one quarter of a part each of dolomite and blood and bone is added. The intention here is to add material that will tend to stop the mixture becoming too acid and add slow release fertilizer to sustain healthy growth over the long season. For species that require better drainage I double or in some cases treble the amount of coarse sand. Another technique I have used for bulbs that seem prone to rotting is to place the bulbs in pure sand above the regular potting mix. The roots find their way through the sand and into the more nutrient rich mix below. This way the proportion of air around the bulbs is increased and risk of rotting reduced. A potentially serious problem arising after the dormant period is the difficulty experienced re-wetting the soil-less potting mixes. The clay loam is added in an attempt to buffer the mix against low pH values and to enable the potting mix to re-wet after the dormant period. In particularly dry years I am suspicious that I have lost collection material simply because the bulbs have never received enough moisture to begin growth or sustain growth for a long enough period.

Propagation

The methods available for the propagation of *Lachenalia* are probably as varied as almost any other bulbous plant. These include seed, bulbils, offsets, division, leaf cuttings, scaling, micro propagation and tissue culture.

Sexual Propagation

Seed

The principle means by which *Lachenalia* are propagated would have to be from seed. It is, after all, the chief mechanism by which plants spread and practically the only way they can adapt to changing environmental conditions. For collectors, growers, hybridists etc this usually small, but occasionally large, change in morphology can be cause for joy or disappointment depending upon whether you are looking for new hybrids or trying to maintain species integrity. In order to maintain unaltered species or hybrid characteristics one needs to use a vegetative means of reproduction such as separating offsets, bulbils, division, scaling, micro-propagation and taking cuttings.

Growing from seed has the advantage that it maintains the small variations that exist within a species and which are responsible for hybrid vigour. These variations are found quite naturally in plants within a community that have propagated by sexual means, that is by seed. A number of growers have noticed that

their specimens of *Lachenalia* lose vigour over time and this is thought to be due to virus which may invade the plant but not cause dramatic visual effects. To maintain integrity of species when propagating from seed one might try housing groups of the same species in cages made of a fly proof netting as this will almost guarantee no crossing outside the cage. However there will be few if any pollinators in the cage and hand pollination will have to be carried out.

Seed of *Lachenalia* seems moderately easy to grow. The germination process has no hidden requirements such as stratification and if planted in autumn (fall) in cool conditions germination will follow. The main aim should be to provide as long a growing season as possible. The seedling bulbs have a much greater chance of surviving the first dormant period if they are as large and plump as possible without being too 'soft' i.e. not forced with too much nitrogenous fertilizer. In the southern hemisphere I have successfully grown bulbs from seed planted at times from February through to July. During this time I keep them frost free and perhaps just as important when spring arrives, keep them cool and out of hot midday sun.

In my first few years growing this genus from seed I made my own growing media from coarse sand, peat and a little loam as a pH buffer. Later I tried some proprietary seed raising mix and found the results seemed no better or worse, only easier. I have continued to use this mix. The main criterion seems to be to try to keep the compost moist but not wet. After watering I leave the containers to become almost dry before giving further water.

I sow small quantities of seed in half pots with seed separated by about 1 to 2 cm ($\frac{1}{2}$ to 1 inch) and just covered with compost or sand. The ideal time to sow seed here is March to May. If I sow seed later I find it advisable to try to extend the growing season by being very vigilant in keeping the environment cool and with enough moisture as we progress into spring. Allowing the seedlings to become excessively hot or dry will induce premature dormancy or death. Very small bulbs are difficult to store dry through summer to autumn. When the plants become dormant and the leaves have died back I try to find out how large the bulbs have become. Bulbs over about 4mm (0.2ins.) are lifted and stored being replanted next autumn. If the bulbs are small to very small, say around 2mm (0.1ins.), I tend to leave them in the same pot for a further season. The small plants will need feeding and I use a liquid that is relatively low in nitrogen, as I do not wish to encourage high growth rate at the expense of good bulb structure.

Seed seems to store fairly well and will stay viable for at least five years at room temperature (Duncan 1988). I have also heard of seed being viable after eight

years. I am just trying seed stored for nine years and will have to report back on the Bulb Forum.

Asexual Propagation

This includes all vegetative methods of propagation. All these methods except perhaps the use of tissue culture have the disadvantage that any virus contained in the parent is almost certain to be passed to the progeny.

Bulbils, Offsets and Division

Through the 110 species of *Lachenalia* there is wide variation in inclination to produce offsets. Some like the *L. aloides* group produce a profusion of bulbils that look similar to grains of rice. Other species have a



Lachenalia unicolor bulbils

tendency to produce offsets or side bulbils that can vary greatly in size, and yet others divide into two or more relatively similar sized bulbils. Some seem to not reproduce by these means at all but compensate by being prolific seed producers.

Bulbils may be produced in relative profusion around the parent bulb or may result from damage to the leaf bases or bulb scales. A number of species may occasionally produce bulbils on the top of an inflorescence (very top of the rachis) or on the edge of a leaf. *L. bulbifera*, as its name suggests, can produce bulbils at or above ground and others like *L. namaquensis* and *L. moniliformis* produce long stolons or underground stems to push the bulbils away from the parent.

The small bulbils are treated much like seed and will produce year old bulbils that will be similar in size

to one-year-old seedlings that have had a full season to develop.

Depending upon size, offsets may flower in the first year of separation from the parent bulb, or may require a further year of growing on to achieve a first flowering.

Division seems to occur when the bulbs reach a certain size and may result in the bulb dividing into two or more bulbs of roughly equal size. Frequently the resulting bulbs are sufficiently large to flower in the first season after separation.

Leaf Cuttings

An interesting method of propagation is the use of leaf cuttings in a similar fashion to those taken in the genus *Veltheimia*. The simplest method is to take a mature leaf at about the climax of its growth and well before it becomes senescent. For proteranthous species, i.e. those that flower after the leaves have matured, the leaf cutting is taken just before flowering commences. The leaf is cut off near the base and placed upright in sharp sand with the base at a depth of between 2 and 5 cm (1 to 2 ins.). Variations on the striking medium can include vermiculite and/or peat moss mixed with sharp sand at a ratio of about 1 part vermiculite or peat to 3 parts sand. The containers are then placed in a cool spot out of direct sunlight. The number of bulbils formed and their size will depend upon the length of cut surface and the size of leaf material used. This method most suits the broad-leaved species and cultivars with the grass-like leaved species being less successful. To obtain a greater number of small bulbils the leaf may be cut into a number of cross-sections although the sections farthest from the base of the leaf seem to be more reluctant to produce bulbils. Personally I do not subdivide the leaf in the hope that the bulbils produced will be larger and reach flowering size sooner. With a leaf cutting taken at the optimum time some of the resulting bulbils may be large enough to flower in the next season. Thus by using this technique, flowering size bulbils may be produced one year ahead of seed produced plants.

I have also noticed bulbils being formed at points where leaves have been damaged – usually below soil level. This may be a technique worth trying with species that do not readily produce bulbils or do not divide readily. The stress produced on the parent bulb is far less and one has little to lose but something to gain.

Chipping

Propagation by such techniques as chipping has been carried out successfully on some horticulturally significant species that are shy of division or bulbil production. Although I have not tried this technique I have noticed bulbils being produced upon damaged

bulbs. Pest damage sometimes removes substantial amounts of the bulb either from the outside or sometimes in the bulbs centre. In these cases I have noticed small bulbs being produced at the damaged surfaces sometimes while still in the pots during the dormant period or while in storage.

Micro-propagation

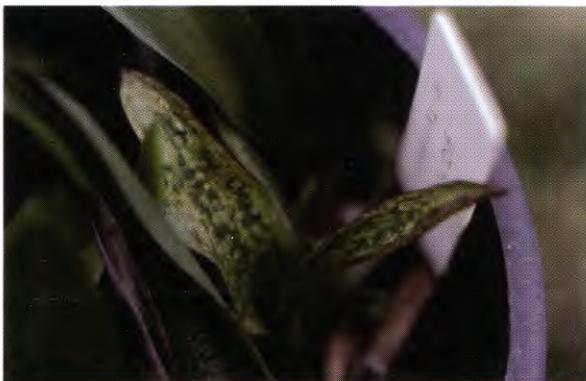
In this method of propagation very small portions of the growing tip of plants are cultured under sterile conditions in a test tube. This is known as tissue culture and for the genus *Lachenalia* in which leaves can be induced to produce the required growth tip it is possible for the whole procedure to be carried out by using a small section of leaf. Nel 1983 (see references) described a process whereby 2000 plants were produced in 8 months from a single leaf using 1cm² pieces.

This procedure is clearly out side the scope of many amateur propagators but for the sake of completeness I thought it worth mentioning. Having said this I have read of amateurs setting up a system in the home that has been partially successful although I cannot find the reference.

Pest and Diseases

Virus

The genus seems reasonably free from most problems except the dreaded ornithogalum mosaic virus. The vector for transmitting this virus is probably sap sucking insects such as aphids. As these pests are very difficult to completely control it follows that once



the virus is in the neighbourhood it is only a matter of time before outbreaks will occur in a collection kept outside. The best hope for control is to remove all suspect material as soon as suspicion is aroused or at very least isolate the plants at great distance or place them in insect proof cages and hope to be able to collect seed from which to start fresh uncontaminated populations. It is believed that the virus is not carried in the non-fleshy seeds of *Lachenalia*. The virus can be

recognised by a mosaic pattern or yellowish-brown streaking produced in the leaves and distorted stems and flowers in badly affected plants.

Bulb Mites

My next most dreaded problem is the bulb mite *Rhizoglyphus echinopus*. I am not quite sure if this pest attacks damaged plants or healthy bulbs. Generally where the bulb mite is found there is also evidence of rot. The question is which came first. The bulbs are in pots and therefore a little more isolated than in neighbouring patches of dirt, but none-the-less it is difficult to see how the mite is spread if not over land. However the problem seems to strike at individual pots

somewhat at random. My suspicion is that the bulb mites strike first and that the damaged areas become



susceptible to rotting. Some bulbs seem to end up as a cellulose skeleton (see illustration).

Mealy Bugs

One advantage of growing the plants outside in winter is the discouragement of mealy bugs. I cannot say that I have noticed these creatures in any of the pots of *Lachenalia* although I have noticed them on other plants in more protected spots.

Slugs and Snails

It is surprising just what a nuisance these pests can be in such an arid area. With long dry summers how do the slugs and snails do so well? They can quite easily totally defoliate some of the smaller species and seedlings in the collection and need controlling with suitable baits.

Fungi

Lachenalia are reportedly susceptible to fungal disease but I have fortunately not experienced or been aware of such attacks in my collection.

General Discussion

Some species start to grow new roots soon after Christmas (southern hemisphere) particularly if the atmosphere is a little moist and the potting mix becomes a little damp. The first growing tips of the new shoots usually appear about mid March with the first flowers appearing on *L. rubida* from the first week in April. *L. pusilla* follows soon after with *L. aloides* var. *quadricolor* not far behind in late April. An unusual characteristic

of *L. rubida* is that the flowers develop before the leaves similar in some ways to forced hyacinths.

In my collection the last to flower are *L. peersii*, *L. purpureo-caerulea*, *L. contaminata*, and *L. unicolor* that still had their last flowers as late as the first week in December. This gives the genus a flowering period of eight months. The largest number of species flowering at any one time was 38 species or cultivars during September with 29 in August and 31 in October.

The period for which a particular species population stays in flower varies from species to species or cultivar to cultivar. Looking at collected data *L. reflexa* holds the record for the species with the longest flowering season being recorded as commencing flowering at the beginning of June and continuing until October – a total time span of some 16 or 17 weeks. Others to cover fairly extended periods are *L. aloides* var. *quadricolor* 12 weeks. *L. aloides* var. *vanzyliae*, *L. arbutnotiae*, *L. bachmannii*, *L. bulbifera*, *L. pustulata*, all flowered for 10 weeks, with others like *L. rubida* not far behind. Those that appear to be quickly over are *L. algoensis*, *L. aloides* 'Nelsonii', *L. fistulosa*, *L. liliflora*, *L. margaretae*, *L. peersii*, *L. purpureo-caerulea*, *L. pusilla*, *L. stayneri*, *L. trichophylla* and others flowering for only 4 weeks. The extreme seems to be *L. orchioides* var. *parviflora* and *L. ventricosa* which were in flower for only 3 weeks.

Some Less Well Known Species

With so many delightful and varied forms to be found within the genus *Lachenalia* it is quite difficult to make the choice of a few to mention here. I have selected some of the less well-known species that I have been able to photograph over the years and which have a variety of attributes. I will not make a detailed description but rather comment on points of interest in a number of species and varieties.



L. algoensis

L. algoensis Schonl.

Possibly a species for the collector as the flowers would not be considered by most as very outstanding being largely green shading to almost white at the base. The flowers are erect and have very short pedicels making a fairly tight flower spike. For me the flowering period only lasts from late

September through August, which is short by comparison with many other species. For the collector it certainly has a charm that makes it worth growing.

L. arbutnotiae W. F. Barker

Unlike *algoensis* this species flowered from late August through to early November with showy yellow flowers that turn a dull red as they age. The spike is quite dense and generally longer than many. The flowers are upwards of horizontal with a pedicel that is so short the flowers almost clasp the rachis. With the added attraction of scented flowers this species would have to be regarded as one of the most desirable in collections. As well as the yellow flowered form I have one that has almost cream flowers which also turn dull red on aging.



L. arbutnotiae

L. bulbifera (Cyrillo) Engl.

Once sold under the synonym *L. pendula* Ait., this species has been the main commercial competitor of *L. aloides* species and cultivars. Its bright red pendulous flowers making a striking display particularly when planted in mass. The colour of the flowers varies from orange through scarlet to crimson. They also vary in flower length and the amount of purple and green on the tips of the outer perianth segments and on the slightly longer inner segments. The leaves also generally have dark green or purple



L. bulbifera

marking on their broad surface. The bulbs of this species tend to be among the largest in the genera. Flowering for me has been from early June to early September over a number of plants and years.

***L. juncifolia* var. *campanulata* W. F. Barker**

In my collection this variety of *L. juncifolia* flowers for a relatively short period in late September and early October. Unlike *L. juncifolia* var. *juncifolia* this variety



L. juncifolia var. *campanulata*

has open bell shaped flowers that although rather small are nevertheless very attractive. The flowers are much paler than *juncifolia* being almost white with the main colour being in the rose purple gibbosities and keel on the inner perianth segments. The bulbs are generally very small, being only a few millimetres in diameter, and are easily overlooked when sorting

through the potting mix at the end of the season. The leaves are semi-terete and can be mistaken for grass by the less experienced collector.

***L. capensis* W. F. Barker**

With its almost white scented flowers this species is certainly worthy of inclusion in a collection. During the life of the inflorescence there are a number of other pale colours that can be distinguished from the pale purple tips of the juvenile flowers to the very pale blue bases of the outer perianth segments and pale yellow of the



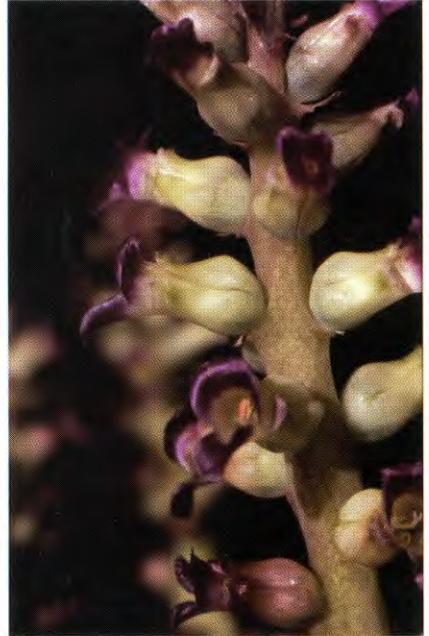
L. capensis

gibbosities and aging outer perianth segments. The flowers become brown as they reach senescence. For me the flowering time has been quite short and late in the season, being right at the end of October and the first three weeks of November.

***L. carnosa* Bak.**

Once known as *L. ovatifolia* L. Guthrie, this species has attractive small flowers in which the inner perianth segments are tipped with a broad magenta band. The

outer segments are a sort of dirty white with a tinge of pale blue at the base and the gibbosities are green. The leaves are different from many *Lachenalia* in that they are broader and have pronounced depressed veins running their whole length. This is one of the



L. carnosa

species that I give extra drainage to by increasing the quantity of sharp sand in the potting mix. Flowering times extend from mid July to the end of September.



L. framesii

***L. framesii* W. F. Barker**

This is a delightful small species with a quite striking inflorescence consisting of greenish yellow outer perianth segments and protruding inner segments that have recurved magenta tips. The one photographed had a brilliant electric blue tip to the rachis and to the bases of the sterile top flowers. It flowers in

the period between the third week in August and the second week in October.

***L. orchioides* (L.) Ait. var. *glaucina* (Jacq.)
W. F. Barker**

For many years this variety was known as *Lachenalia glaucina* but due to botanical naming precedence eventually settled as *L. orchioides* var. *glaucina*. The purple flowers make this variety a striking specimen and well worthy of inclusion in a collection. For me this variety flowers between the third week in September and the first week in November, putting it towards the end of the flowering season for *Lachenalia*.



L. orchioides var. *glaucina*

***L. hirta* (Thunb.) Thunb.**

Generally the flowers do not make this species stand out in a collection as the colours are not vivid but it is none-the-less quite charming. The flowers have outer perianth segments that are pale blue at their base shading to yellow with brown gibbosities. The single narrow leaf of this species is striking in the strong purple horizontal banding towards the base and the hairs on the margins and reverse of the side (hence the name *hirta*). My examples have displayed a short flowering season from the third week in October to the first week in November.

L. juncifolia* Bak. var. *juncifolia



L. hirta

PHOTOGRAPH BY TONY PALMER

This variety of *L. juncifolia* has proven itself more robust than *L. j.* var. *campanulata* in my collection. As a result of its tendency to multiply freely over the years I have ended up with many more pots of this variety. The flowers consist of outer perianth segments which have a blush tinge at their base grading to pink and finally a rose-purple tip and gibbosities. The inner segments, which are largely hidden, have the same dark rose-purple tips showing between the outer segments. The flowering season has been fairly short for me being the third week in September to the second week in October.



L. juncifolia var. *juncifolia*

***L. liliflora* Jacq.**

The form that I am growing displays almost white



L. liliflora

flowers with greenish brown gibbosities on the outer perianth segments, and purplish tips on the inner segments. It is one of the later flowering

species producing flowers for me from the third week in October to the second week in November.

***L. namaquensis*
Schltr. Ex W. F. Barker**

This species produces striking magenta flowers which are quite eye catching. The outer perianth segments have a tinge of blue at the base but then shade through a pink magenta to a deep magenta at the tips. The gibbosities are magenta and



L. namaquensis

green. The magenta inner segments protrude beyond the outer segments and flare out adding to the colour mass. Flowering occurs from the third week in September until the first week in November.

L. orthopetala Jacq.

Another white flowered species with very distinctive dark brown gibbositities adding contrast. The peduncle is also a contrasting deep maroon which helps set off the white flowers. This seems quite a tolerant species having been reliable for some years in the collection. The leaves are grass like but fleshy with a deep central channel. It flowers at a similar time to *L. namaquensis*, that is, the third week in September to the first week in November.



L. orthopetala

L. pusilla Jacq.

Leaf pattern is somewhat uncharacteristic in this species. Four to six leaves are produced in a prostrate rosette and may



L. pusilla

vary in shape from linear to lanceolate. The peduncle or main flower stem is very short resulting in flowers opening at ground level. This appearance is probably why the species was at one stage included in the genus *Polyxena*. As the seed mature the peduncle extends raising the seed capsules above the plant to presumably aid in seed dispersal. My specimens have flowered from the third week in April to the third week in May. Due to its geometry this species is probably best suited to cultivation in pots or raised containers.

L. reflexa Thunb.

If yellow is your colour this species might be for you. Unlike most *Lachenalia* the flowers are born upright on a peduncle that only pushes the flowers just above the foliage. The plants are also smaller than most other *Lachenalia* making it ideal for pot culture or in an area where the competition is not too fierce. For me this species has flowered over an extended period, on different plants, stretching from the first week in June to the second week in October. This is somewhat longer than claimed in other texts and I have no record as to whether the phenomenon was caused by other influences such as late planting.



L. reflexa

L. rubida Jacq.

For those who wish to have the first *Lachenalia* to flower this is probably the one. It is certainly the first to flower with me having appeared as early as the first week in April and extending through to the fourth week in June. The two photographs show how the flowers may vary in the colouring of the tips of the inner perianth segments. The photographs show the bright pink spotted version as opposed to the solid pink or ruby-red colouring also found in this



L. rubida

species. This is one of the most common species and has been available for many years in the bulb trade. It is well worth including in any collection and is relatively easy to cultivate.

***L. schelpei* W. F. Barker**

Probably not likely to be grown by other than the most ardent *Lachenalia* enthusiasts. The flower colour is probably as close to a camouflage as one could get being mottled in various greens along with maroon to brown markings on the gibbosities and tips of the inner segments. My records are rather incomplete in terms of flowering time with just a mention of flowers in August.



L. schelpei

(urn-shaped) flowers. The colouring in the varieties differs quite markedly, with *L. elegans* var. *suaveolens* being the most colourful as it is largely pink with deep maroon towards the tips of the perianth segments and in the gibbosities. The margins of the inner segments are pale pink to white. My specimens flower from the second week in August to the second week in October.



L. elegans var. *suaveolens*

***L. trichophylla* Bak.**

A most unusual *Lachenalia* and quite a curiosity. This species would be quite difficult to mistake as it has one or possibly two leaves that are covered with stellate hairs. Two forms have been identified with one having both short and long hairs and the other only having very

***L. splendida* Diels**

At one time known as *L. roodeae* Phillips this species has quite striking flowers of purple or dark lilac colour. A group of plants growing together in a pot are quite an eye-catching spectacle. My plants flower at the end of July and during August.



L. splendida

***L. elegans* W. F. Barker var. *suaveolens* W. F. Barke**

Four varieties of *L. elegans* have been identified all with characteristic urceolate

short hairs. The leaves tend to lie on or just above the surface of the soil. The flowers on my plants are all well spaced on the peduncle and have distinct pedicels (stalks). The flower colour starts as pink near the base and then white and finally yellow with green gibbosities. Flowering occurs from the fourth week in July to the third week in August.

***L. aloides* (L.f.) Engl. var. *vanzyliae* W. F. Barker**

This member of the *aloides* group is unusual in having flowers of a most



PHOTOGRAPHS BY TONY PALMER



L. viridiflora

unusual colour combination. The outer perianth segments are graded from pale blue at the base to a yellowish green at the tips with green gibbositities. The protruding inner segments are also yellowish green but have white margins. It certainly causes visitors to comment. Cultivation requirements are similar to the rest of the *aloides* group. If it is not repotted and fed every few years I find the plants become crowded and stunted and produce small flower spikes. Flowering times for me have been in the range from the fourth in August to the first week in November.

L. viridiflora W. F. Barker

This is another species that surprises visitors by its unusual flower colour. Although its name suggests a green flower one would be quite wrong to expect any ordinary green. The books describe the green as viridian green and looking at the photograph one can see that there is a good deal of blue included. Compared with other *Lachenalia* the colouring is remarkably uniform over the entire flower with just the



L. aloides var. *vanzylliae*

tips of both inner and outer segments being markedly darker. It flowers relatively early in the season and for me appears around the second week in May and finishes at the end of June.

— ALL PHOTOGRAPHS BY THE AUTHOR EXCEPT WHERE NOTED —

Biography

A member of the International Bulb Society since 1985 Don has been collecting 'bulbous' plants for over thirty years both in his native Britain and for the last 23 years in Australia. His initial interest was focused on the Amaryllidaceae family but as a result of the availability of seed of *Lachenalia* a collection of this genus grew. In 1988 Don's collection of *Lachenalia* was registered with the Ornamental Plant Conservation Association of Australia. Don is currently chairman of the Scientific and Collections Subcommittee of the OPCA. Since his semi retirement Don has been trying to devote more time to revitalising his collection of *Lachenalia* which in recent years suffered from the competition created by the need to keep up to date in a career teaching electronics and computer systems.



L. trichophylla



Growing The Peruvian Daffodil

Graham Duncan

Paramongaia weberbaueri is the somewhat jaw-breaking scientific name by which this extraordinarily beautiful amaryllid is known, but it should not deter enthusiasts from growing it as under suitable conditions it is a most rewarding subject. Resembling a gigantic daffodil, the flower has an attractively green-striped corona and is intensely sweet-scented. Its flowering period is not particularly consistent but it is generally in autumn, shortly after the appealing bluish-grey foliage has emerged, and it produces a single flower (rarely two) per stem that lasts 6-7 days.

Paramongaia is a winter-growing genus endemic to western Peru and Bolivia. The literature reports it as occurring on steep mountain slopes in rather harsh, dry conditions in full sun. It was introduced into cultivation as a result of bulbs sent from Peru to Dr Hamilton P. Traub in 1949, following which seeds made available by him to specialist bulb growers responded favourably.

It is most suitably grown as a container subject, but being cold tender it requires a heated glasshouse in susceptible parts of the Northern Hemisphere, while in temperate zones of the Southern Hemisphere a position receiving morning sun or very bright light throughout the day is needed. A deep, 15-20 cm diameter pot is best and the growing medium must be well aerated and sharply drained. A suggested mix is equal parts of coarse river sand, finely crushed stone chips, and finely sifted compost or vermiculite. The bulb should be placed with the top of the neck resting at or just below soil level. Watering procedure is of critical importance. A heavy drench should be applied as soon as the new leaf shoots emerge in early autumn, after which the soil medium should be allowed to dry out almost completely before the next drench is given. This alternating process of heavy drenching followed by near total desiccation is followed until early

summer, and works well for most deciduous, winter-growing amaryllids. The bulbs undergo a long summer rest of about six months during which no watering is given at all.

Propagation is achieved either by freshly harvested seeds or by separation of offsets, although offset formation is highly erratic in certain clones. The large

black, winged seeds should be sown as soon as possible after ripening in deep seed trays or pots, in the same medium recommended for adult bulbs. Like several other amaryllids producing dormant, dry papery seeds such as *Cyrtanthus* and *Pancretium*, viability in *P. weberbaueri* seeds decreases rapidly after a few months unless stored at low temperature. The seeds should be sown thinly to prevent overcrowding and be well covered with a 3-4 mm layer of sowing medium as seeds sown too shallow tend to 'float' to the surface where they dry out and fail to germinate. Germination of fresh seeds occurs within 3 weeks and under ideal conditions,

seedlings reach maturity within 5 years.

P. weberbaueri is remarkably disease and pest-free, although fungal rotting of the bulbs would no doubt result from over-watering during the growing season or failure to maintain a dry environment in dormancy, and a close watch should be kept on mealy bug infestation.

The critical requirements this species has of an absolutely dry dormant period and high light intensity, as well as its cold tenderness and frequent reluctance to multiply vegetatively precludes it from becoming a widely cultivated garden plant, but it remains a treasured subject for the specialist grower.

Reference

Mathew, B. 1997. *Paramongaia weberbaueri*. *Curtis's Botanical Magazine* 14(3): 142-147.



Making a Soaproot Brush

Diana Chapman

California is home to many plants that grow from an underground bulb. *Chlorogalum pomeridianum* is the Latin name for the Soaproot bulb or plant that has been used by Native Americans for centuries. Soaproot grows throughout California, usually in the lower foothill areas of the various mountain ranges. Although other bulbous species have been severely reduced due to cattle grazing, Soaproot is still widespread as all

parts of the plant contain chemicals called saponins that have an unpleasant taste, thereby protecting it from being eaten by grazing animals.



This is a large bulb, and the flowering stem can reach as much as seven feet in a mature plant. The plant blooms in late spring, and the small white lily-like flowers open in early evening, stay open all night and then close with the dawn. The tall blooming stem looks like a feathery plume, and although these plants are often present in grassy areas they are sometimes overlooked, since the flowers are closed in the daytime. As with most night blooming plants, Soaproot is pollinated by moths.

The Soaproot bulb was (and still is) used by Native Americans for a variety of purposes. The crushed raw bulb was used as a soap to wash hair, skin or anything that needed cleaning, giving this plant its common name of Soap Plant or Soaproot. The crushed bulbs could also be used to catch fish by tossing it in the water where it would clog the gills of fish, making them rise to the surface where they were scooped out. The bulb also had medicinal uses, especially for skin rashes or poison oak. The thick outer fiber that covers the bulb can be used to make brushes that were useful for brushing acorn meal from the mortar where it had been ground or from baskets. The inner bulb is also used in the making of the brush, since when it is cooked it makes a glue that hardens to make the handle of the brush.

Making the Brush

It is only legal to gather Soaproot bulbs for Native American purposes, but even then caution should be used so that wild populations are not destroyed.

It takes three or four mature bulbs to provide enough fiber for a brush, but can take about five or six to make enough glue to coat the handle. The bulbs are usually dug while dormant, and they can be used immediately. The fiber is carefully divided and peeled from the inner bulb in one piece. Any solid membrane from the bulb is removed along with any clumps of dirt or decayed fiber from the outer bulb. This should leave a neat fan-shaped layer of fiber with a distinct curl to the end that had been originally attached to the bottom of the bulb. Three or four such layers of fiber are arranged to make a fan shape, with the curly edge



of each layer fitting into each other. The straight narrow end of the fan is then bound tightly with twine. Traditionally, this twine would be made

with the fiber of Dogbane (*Apocynum cannabinum*). This will look like too much fiber for one brush, but the next stage will remove much fiber.

The next step is to comb the fibers of the brush to remove any loose or short hairs, to make sure all the fibers lie parallel to each other, and to remove any dirt. If the fiber is extremely dirty it can be soaked in water for a short time to wash off some of the dirt. The combing was usually done with an awl, but an ordinary wide toothed comb or a knitting needle works well too. A great deal of fiber is lost at this stage, and if the brush looks too skimpy after combing it should be undone and another layer of fiber added.

The combing is complete when no fiber comes

away in the comb, and at this stage the brush should look clean and neat. The handle can then be trimmed to form a compact shape.

Meanwhile, the inner bulbs can be prepared to make the handle. The bulbs are peeled and any brown parts trimmed off. They can be baked in an oven, or boiled or steamed to cook them completely. Steaming takes about an hour to cook the bulbs all the way through. The softened bulbs are then pressed against a sieve or colander, and a white paste will collect on the underside of the colander that is then scraped off and placed in a container. In the past the cooked bulbs were pressed against an openwork basket that functioned in the same way as a colander. You want a paste in which you can

dip the handle of the bulb without it being too thick or lumpy or too thin. The consistency that works best is a bit like thick pancake batter. If the paste is too thick it can be thinned with water.

When the handle is trimmed the brush handle should be dipped in the glue making sure not to get any glue on the bristles of the brush itself, since it can



be difficult to remove. Each coating of the handle of the brush should be allowed to dry completely – usually over a twenty-four hour period. It can take many coatings to make a satisfactory brush handle, and the finished handle should be smooth and hard, without any major irregularities. The handle is not waterproof, and will soften if it gets wet.

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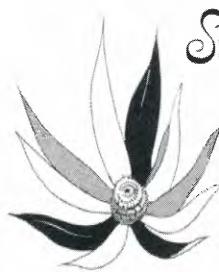
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