Editorial

South Africa's flora is under a greater threat today than at any other time in our history. Not only are individual species threatened with extinction, but entire habitats with hundreds of species, are being destroyed. If one examines South Africa, from one end to the other, there are very few areas outside proclaimed nature reserves, where the vegetation is protected and "safe" from destruction.

Let us start with the SW Cape, an area that many of us know well. During the previous two summers huge areas of the SW Cape burned, with fires raging from east of the Outeniqua mountains all the way westwards to the Cape Peninsula. There is virtually no mountain range that did not burn, at least in part. Some areas had not burned previously for many years, for example one portion of the Swartberg, but others such as Jonkershoek at Stellenbosch, Montagu Pass behind George, and Kogelberg near Betty's Bay, had only burned two to six years previously. While this may not necessarily be detrimental to the bulbous/cormous flora, it has a huge effect on the longer living fynbos species such as the Proteaceae and Ericaceae. What has had an even more disastrous effect, was the lack of rain after these fires so that regeneration of the flora was delayed. Another important factor was the time of the fires. Normally the fynbos burns in late summer or autumn, just before the rains start. This last year an area of Fernkloof at Hermanus burned in mid-winter when all the geophytes were in full growth. What effect does this have on them, and do the plants have sufficient reserves to sprout again, particularly when there has been no rain? I am not sure that anyone knows the answers to these questions.

Apart from the fires, which in many cases may favour the bulbous flora, there is wide-spread destruction due to development – new and wider roads, industrial parks, housing estates and shopping malls. Everyone of us has seen undeveloped land changed almost overnight into building sites. And some of those areas were simply covered in bulbs and corms, with the area around Potsdam on the west coast a prime example. Farmers too, play an enormous role in changing the landscape – more wheat, more fruit, more grapes, more sheep, all resulting in less natural vegetation. Think of the area between Bot River and Swellendam – we call it the great wheat desert and that is literally all that there is. Think of Dreyton Siding near Caledon, in spring, and that will give you some idea of what this area used to look like. All that now remains are a few road verges, and the odd "island" – areas of non-arable land that cannot be ploughed, with the remnants of our flora clinging on for dear life. But even these areas are not "safe" – widespread spraying with herbicides and insecticides kills indigenous plants and pollinators as well as weeds and crop pests. Even in the dry areas of Namaqualand and around Nieuwoudtville, areas that should never be farmed are being ploughed and planted with wheat. An area that comes to mind is a bog on the top of the Kamiesberg which burned a few years ago. A local farmer immediately moved in and ploughed the area, destabilising and destroying it plus all of its rich geophytic flora, for a very mediocre crop of wheat perhaps every third or fourth year.

Along the coast both east and north from Cape Town is one holiday resort after another, and very little undisturbed vegetation remains. What hasn't been built on is either grazed, or covered in huge stands of alien vegetation, and neither situation is conducive to bulb or corm development. Each time one goes up the west coast, the bulldozers seem to have progressed further and further, and all those wonderful populations of *Lachenalia rubida, L bulbifera, L viridiflora, Babiana nana, B thunbergii, Gladiolus carinatus* become more and more difficult to find.

Probably the biggest threat to the Eastern Cape bulbous/cormous flora is forestation with pine and eucalyptus trees. Most of the forests are in prime undisturbed high altitude grassland – all those magnificent areas where *Brunsvigias, Nerines, Gladioli, Watsonias, Zantedeschias, Dieramas* and *Kniphofias* once grew in profusion, are now covered in a monoculture of pine trees. The three big forest companies are buying up more and more land, the destruction covers thousands and thousands of hectares, all for paper pulp which is exported. The same is happening in much of Mpumalanga and Swaziland, and this, together with population pressures, is resulting in environmental destruction on a huge scale.

One area where perhaps the situation is not as bleak is the old Western and North Western Transvaal, now North West Province. Here many of the previously marginal cattle ranches have been turned into game farms, and where game in conserved, the vegetation is generally conserved as well. Unfortunately this area does not have a rich bulbous flora, with only various *Ledebouria* and *Gladiolus* species being commonly found.

All of this means that IBSA, with its motto "Conservation through Cultivation" is going to play an ever more important role in the preservation of our bulbous and cormous flora. Our bulb collections may be all that remain of an ever increasing number of species, and it is therefore very important that we all keep accurate records of what bulbs we have, and where they come from. Every plant should be well labeled so that the original localities are known, as often species collected from different localities may vary considerably. These plant collections are extremely important not only as repositories of a gene pool, but also for re-vegetation of disturbed sites, re-establishment of flora on road verges and around building sites, and for plant breeding. Collections of unlabelled plants are worthless, both to you and to everyone else. It is also extremely important that pollination of flowers is carefully controlled. Big collections of plants means that inevitably, several species of *Gladiolus* or *Babiana* flower at the same time. Does one want to simply allow the "birds and the bees" to do their thing, resulting in uncontrolled pollination and seed which is of no use to anyone? Or should one rather try to control the pollination, so that the resultant seed is pure and can be used to increase the plant population? Uncontrolled hybrid seed is undesirable and simply causes contamination of pure populations, so if we are serious about our collections, we should all make sure that the seed that is produced is true to type and valuable to other members of the society.

Our bulb collections are our love and our hobby, but with a small amount of additional effort, they can also become invaluable in conserving our endangered flora. ❁

Letters to the Editor

The following letter was received in response to the article "Time to Hybridise" by G. Pettit in Bulletin 48, 1999:

Dear Editor,
Greg Pettit's reference to our "bland" bulbs is strange when one considers that he is comparing them with crosses in general and the products of the commercial breeder in particular. Some of our wild-type bulbs may have small flowers, but bland? Greg, if you can look a cultivated glad or iris in the eye, scentless, patternless, eviscerated of every functional adaptation bar size and easy propagation, and still call our exquisitely shaped, patterned and adapted "pypies" or *Moraeas* bland, then one of us is not speaking English! Perhaps the word that you groping for is unspectacular? Or just small? Unlike those marvelous modern plastic and fabric jobs that one sees everywhere nowadays? Those really are excellent, aren't they? Even at close quarters they fool over ninety percent of the public and that is what matters. They are more economical, last well, don't produce smelly vase water, can be obtained in quantity on demand, have no unreasonable requirement for water, light, soil or temperature, and what is more, if you want to hybridise a cactus with an orchid to produce an orctus unknown to man or nature, you don't have to consult with geneticists or molecular biologists; you don't have to mess around for years in lab or garden. You don't even have to make them bland; you can give them any psychedelic pattern or colour or size you like, with long-lasting concentrated scents as well.

Trust me, if improving on mother nature is what you want, that is the way to do it, not jiggery-poking with hybridisation of a lot of balky insignificant weeds.
Also that way you don't get into arguments with cranks who see as vandalism the smearing out of sophisticated function into the boring pointlesness of run-of-the-mill garden cultivars. Have a read of John Manning's article on pollinators, or Andries de Villiers' on evolution in glads, and you will see the sort of partisan zealotry you can avoid so easily by going factory instead of field.

So don't waste your time on the flowers of the field with all their tedious detail of colour, scent, texture, shape, size, history and pattern, and the still more tedious problems of why they are that way and how they live. To see those you would have to look closely and think deeply, and it really would be futile, because they won't be with us long anyway, nor will the other organisms in their environment, with which they interact so breathtakingly, The environment will not be there anymore and land will be much too precious to waste on growing so-called "ornamentals". It will be needed for the factories to turn out those nice artificial plants.

Yours sincerely,
J. Richfield.

Two further comments on articles in the last Bulletin were received:

Dear Editor,
Firstly I would like to comment on Alan Horstmann's article "The Concept of Speciation".

We cannot do without the species concept of course, and there are many examples where it is for all practical purposes, usable. However, I strongly urge Alan and everyone else to adopt Hugh Patterson's version which is far more comprehensible in evolutionary terms and more usable in logical terms. It is the species recognition concept and states more or less that a species is a community that shares a common fertilisation pool. To this we can add all the usual caveats and reservations concerning sub-populations and geographical barriers and so on. To understand the point, first of all remember that when a speciation event occurs, development of barriers to mating isn't the first step. That may come later, sometimes as a result of selection, sometimes incidentally, sometimes as a result of sufficient chromosomal divergence, and often not at all (not over any period we are in a position to experiment with at any rate). The burden of adaptive selection is heavy enough anyway, without an organism undertaking to be unnecessarily inter-sterile with its cousins.
So our biological species concept changes from inter-fertility to using "recognition" of the same mating channel. For instance, if two orchids are inter-fertile, but never cross because they are fertilised by different moths or wasps, they would thereby be separate species. Similarly, if two lines of animals were inter-fertile, but never "fancied" each other, for example if two moths do not react to each other's sexual attractants, that would qualify them as different species.
And in the wild this recognition concept is a far more useful criterion than that they could be inter-fertile if only some breeder happened along, who wanted to see whether he could cross them.

And secondly, a comment on the short paragraph on page 4 "A plant finds itself in a new habitat, whether by reason of geographical upheaval or migratory radiation. It needs to mutate a characteristic to exploit that new habitat. Characteristics are engineered by genes in the DNA. Which comes first: the need or the gene? Two plants of (at present) different families enter the habitat independently. They both need the characteristic. They both mutate and presumably, the same gene is affected. Does this make them taxonomically related? Which came first: the chicken or the egg?"

A relevant gene could show-up at any time, probably repeatedly, before, during or after the need is encountered. If the gene arrives late, the population of plants would be lucky to survive at all. To show up exactly on time, ad hoc, is asking too much of a *deus ex machina*, so I'll neglect that option. If the mutation were unfavourable in the previous niche and showed up too soon as a dominant, the plants would perish rapidly, but if the gene were recessive, the plants may hang on for long enough. Most organisms carry a burden of not-so-useful recessives, so a pioneer population may already have a useful allele ready to throw up as a basis for adaptation in response to new selection pressures.

Remember too, that this view is simplistic. Most adaptations are not single mutations, but begin either as shifts in the frequencies of polygenes or in the relationships between modifier genes. Then adaptation continues under the influence of continued selection, often producing remarkable results in a comparatively short time. This makes it unrealistic to answer the question in terms of a single gene. But in terms of more complex genetic mechanisms, most of the genes are there to start with, though not at first in a condition to produce the necessary result.

As for the second part of the question, if two plants do have the same gene, they probably got it from a common ancestor. If it is a gene for say, cytochromes or ribosomal components, they probably got it from ancestors they have in common with you and me as well! And that already makes them related. The fact that they then proceed to mutate in synchrony as it were, does not make them any more related that they were before. Notice too, that though similar genes in different organisms are likely to undergo similar changes under similar selection pressures, there are many ways to achieve most mutational effects. The fact that say, two different plants both produce the same change to the same scent under the same changed selection, neither proves that the same gene has been affected, nor if it was the same gene, that it was affected by the same change in the gene's DNA.

In general, I suppose you could say that the egg came first, but well scrambled, needing to be unscrambled in the new environment.

Yours sincerely,
Jon Richfield

In praise of *Oxalis* by Diana Chapman, an IBS member

One of the great thrills for me, this time of year, is watching my *Oxalis* re-emerging from dormancy. I have about two hundred species and varieties now, and the variation in foliage forms is really amazing. I personally think they simply can't be beaten for a container plant for the greenhouse (or patio in mild climates) during the winter months. First you have the emergence of the leaves, which punch through like a tiny fist, then unfold like an open hand to show their various forms. Some have leaves like ferns, some have leaves that are succulent, some are purple, silver, blue and many combinations of these, some are like velvet. One species I have has a leaf that is divided into only two segments, both very long and narrow, giving the common name of "Rabbit's Ears", (*O. fabaefolia*) – and that's exactly what they look like. Some species have undivided leaves, and there are some that grow like tiny palm trees. The typical shamrock shape of the leaf is only one of many dozens of different forms, and all are lovely. For those of us smitten with this lovely genus, we have the double delights of first watching the foliage develop, then later being dazzled by the enormous color range - pink, purple, peach, orange, yellow, white, red, and even blue of the species from Patagonia and the Falkland Isles. The neat growth habits of most species give them the appearance of the cushion plants so loved by rock gardeners, but most (not all) are much easier to grow.

Brunsvigia radula - or is it?

Terry Smale

In the second half of March 1988, my wife Jennifer and I had the good fortune to accompany Steven Hammer on a *Conophytum* foray in the Western and Northern Cape. One of the species that none of us had previously seen in the wild was *C. blandum* and so we explored the hills south-west of Goodhouse on the Orange River. These are isolated quartz-strewn hills sitting in a sea of sand and harbour a typically xerophytic flora. Steve and I saw the cono growing in rock crevices at the top of a hill along with other succulent plants such as *Lavrania* species and *Adromischus nanus*, but in the meantime Jennifer had found a few seeds of something that we thought was a geophyte nearer the base of the hill. At the time I knew little about the South African bulbous flora, but the seeds were sown on return to England and they germinated and grew on.

I had no idea what the plants were, but they had attractive bristly leaves and were true bulbs. My cultivation techniques for South African bulbs improved through reading and experience and so the plants eventually started to grow better. About six years after the seeds had been sown, I had a visit from Graham Williamson who was in the UK to give lectures on the succulent plants of the Richtersveld and he was immediately able to identify the plants as *Brunsvigia radula*. With a name now on the label, there was a further wait until 1999 when two of the plants flowered for the first time and Graham's diagnosis seemed to be confirmed. The temperature in my greenhouse often gets up to 40^{o}C during the summer, but starts to cool off at the end of August (early autumn here). This was when I first watered my bulb collection after the dry summer rest and within one week, two of the *Brunsvigias* were in flower. I have not seen much written on this species and so I have prepared the description given below.

Plants flowered in Surrey U.K. on 3/9/99; peduncle flattened, 40mm long, 4 x 2 mm across, pinkish-brown in colour; 4 - 5 flowers in an umbel subtended by 2 pale pink translucent spathe valves, which are tapering and 20 mm long by 6mm across at the base; pedicels 25 - 40 mm long at anthesis, same colour as peduncle; flowers very zygomorphic, ovary declined at 90^{o} angle to pedicel with lowest petals pointing forward and upper petals recurved to a point parallel with the pedicel; petals strap-shaped, 22 mm long by 3 mm across, light magenta-pink with darker longitudinal striations and a pale greenish-white central stripe at base; style 30 mm long, curved upwards in distal third, slightly broadened at tip and white to very pale pink in colour; filaments of various lengths, 20 - 25 mm long, all upwards-curved in distal third, white; stamens centrally fixed, 4 x 1 mm, dark maroon before dehiscence, pollen white. The flowers were hand pollinated and the pedicels elongated to 70 mm to produce 3 - 5 ripe seeds per capsule by 21st September; an abscission layer had formed on the peduncle five days later. The prostrate leaves that follow are 2 - 3 in number, lanceolate, obtuse, up to 70 x 20 mm, olive green, fringed with 1 - 2 mm long bristles on the margins; top surface covered with pustules each of which has a bristle up to 3 mm long on its tip, pustules are unevenly scattered and about 3 - 5 mm apart.

I also have some commercially obtained material that I presume to be this species, so far unflowered, in which the leaves are more elliptical, 35 x 18 mm, and more densely covered with pustules at a 2 - 3 mm spacing. This was said to originate from the same general area to the north-east of Steinkopf. Several friends have seen flowers or leaves of what seems to be this species in the area to the east and north of Springbok and my general impression is that it is fairly widespread but sporadic in occurrence. The two forms that I am growing also tend to indicate that there is some variability. The only reasonable description of *B. radula* that I have found is in Dyer's review of the genus (Plant Life, 1950, **6**, 63 - 83). This differs from the data for my specimens in that the peduncle is 10cm long and the petal colour flesh-pink. The perianth is stated to be often asymmetric with spreading recurved undulate lobes; this does not quite fit the extreme zygomorphy of my plant. The leaf armature is described as "rough papillae" - a term whose meaning could be debated. The original publication dates from 1811 and there is no type locality. Dyer presumes the distribution to be Calvinia, Clanwilliam up to Steinkopf.

In the literature, e.g. Pauline Perry's *Eriospermum* revision under *E. arachnoideum*, there are references to *B. radula* growing on limestone reefs on the Knersvlakte. Thus there are two very disjunct areas of distribution in which the plants grow on rocks of quite different pH. Unfortunately, I have not observed the Knersvlakte plants either in the wild or in cultivation, but there must be a strong suspicion that there are two different taxa involved. A plant description published in 1811 is very early for a species from the far northern Cape and the type of *B. radula* is more likely to have originated on the Knersvlakte. In IBSA Bulletin no. 44, Andries de Villiers reported that the Muller-Doblies had published *B. namaquana* from Spitskop, just south of Steinkopf, with the comment that "there seems to be some doubt even in their (the M-D's) minds whether *B. namaquana* differs essentially from *B. radula*". I have not seen the description of *B. namaquana*, but it might be that this is the priority name for the whole of the Northern Cape element.

Whatever its correct name, this little *Brunsvigia* from the Northern Cape is attractive and quite growable in greenhouses far from its native land. Friends in Italy and Pennsylvania have also flowered it in their collections. It does not need large amounts of space like some of its relatives and now that we can produce our own seed, more Europeans should be able to grow it. The only other truly dwarf *Brunsvigia* is *B. comptonii* which is reported from the Middelpos - Laingsburg area, but this is readily distinguished by its smooth leaves. I hope that my little plants of this species, which were grown from seed collected by IBSA members in 1997, will not require eleven years to produce their first flowers!

Footnote

In April this year, I had the opportunity to survey the plants on many of the hills in Bushmanland and can now add further confusion to the above article. There had been exceptionally heavy rains in February and the area was covered in a dense growth of grass. It was found that miniature *Brunsvigias* are very common in the area; almost every quartzite-capped hill from Springbok to Pofadder has plants of this genus growing on it. They had obviously flowered soon after the rains because there were only dry inflorescences

to be seen and the plants were already well into leaf. In the western part of the area, the leaves of the plants were covered with bristles and were similar to the specimens described above. However, in the east, the leaves were quite smooth and free of bristles; one hill in the middle of the area had plants with both smooth and bristly leaves. The question then arises as to whether this is one variable taxon or are there two involved. If one tries to key out the smooth-leafed plants, the only available name is *B. comptonii*, but that was described from Laingsburg and a substantial disjunction would be involved.

There is a third less-common *Brunsvigia* that can be found in the area, the main population being on the Gamsberg, right in the area that is about to become the largest zinc mine in the world. This has a dried inflorescence that is two or three times the size of the miniature one, with more flowers. It may be that this is in need of description.

I have not yet seen the flowers of the small *Brunsvigia* that grows on the Knersvlakte limestone, but I was able to see it in fruit. The size of the umbel and number of flowers is similar to the northern element, but there are seed differences. The Knersvlakte plants *(B. radula*?) have red-brown seeds whereas the Bushmanland plants (*B. namaquana*?) have green-black seeds.

Orgy inside a pajama flower

Derick McKenzie

Even before *Cyrtanthus tuckii, Crinum graminicola* starts to flower. In September shortly after the leaves have broken through the thirsty earth, the large flower stalk quickly emerges. Within days the air is filled with a strong sweet perfume as the first flowers open. Follow your nose and you will find the deep pink urn shaped flowers amongst the tall dry grass. The scent also attracts small brown beetles which have very long hind legs covered in spines (relatives of the rose chafer, and the size of the potato beetle). The hind legs are three times longer than the front two pairs, and they certainly weren't created for walking! They remind one of those American roadsters with the large back wheels. The beetles don't seem to be attracted to the other *Crinums*, but one occasionally finds a few in *Ammocharis coranica*. Even before the buds have opened they have been invaded. When one opens the flowers, each one is filled with a dozen or more frenzied beetles. The anthers of the flowers are eaten, but the style resists damage. As the flowers droop, something drives the beetles even deeper. The tube is too narrow for them to reach the ovary, but they seem to try! If one looks inside the flower and observes the wriggling mass, it becomes clear why they have such ungainly spiny legs. Almost all the beetles will be paired and competitors are kept at bay with the legs of both partners. It is generally known that *Crinum graminicola* sets seed reluctantly – whether these beetles aid pollination or not, I cannot say.

A practical morphological revision of the genus *Crinum*

Les Hannibal

Back in 1888 J.G. Baker listed some 79 named *Crinum* species in his Handbook of the Amaryllidaceae, placing them into three subgenera. Recently I tabulated some 140 named forms and I encountered the growing confusion over the progressive lumping of many older named forms as mere variants or subspecies. I had been well aware of an obvious close interrelationship amongst the various *Crinum asiaticum* forms, as well as the many *C. americanum*. But encountering such relationships amongst the tropical forms like *C. scabrum* and *C. kirkii* was relatively new. And switching the name of *C. zeylanicum* (L.) from the well known Asian species to a little known tropical West African form as the basionym, and then adding some 16 named forms as variants or subspecies, including the above *C. scabrum* and *C. kirkii*, has raised some questions: just what is a species and what are the delimitations?

I was well aware that a portion of these above *Crinum* species had sessile blossoms, like *C. jagus* (ex *C. giganteum*) and *C. americanum*, while most of the others had pedicellated blossoms which flowered sequentially. The distinction, morphologically, was involved in the umbel structure, which in the pedicellated was a spiral cyme arangement explained by the Muller-Doblies, while the sessile had a lumped branch structure. This accounted for the latter's group flowering.

So basically there are four distinct morphological forms of *Crinum*: erect actinomorphic trumpets vs curved bilateral zygomorphic trumpets, and independently, pedicellated sequentially flowering blossoms vs sessile group flowering ones. These features give four morphologically distinct groups entitled to subgeneric distinctions:

1. Baker's subgenera Stenaster: erect actinomorphic trumpets on pedicellated blossoms, sequentially flowering. Some 36 forms are named, and the bulk are in the *C. asiaticum* superspecies.
2. Subgenus Crinum (ex Platyaster): erect actinomorphic trumpets on sessile blossoms, group flowering. Some 39 forms are named, with a good portion being *C. americanum* superspecies.
3. Subgenus Codonocrinum: curved bilateral zygomorphic trumpets on pedicellated blossoms, sequentially flowering. Some 36 named forms, scattered from the tropics to the Cape Province. Examples are *C. bulbispermum* and *C. moorei*.
4. Subgenus Codonocrinum var. Ornata subgenus nov.: curved bilateral zygomorphic trumpest on sesslie blossoms, group flowering. 58 forms in two distinct superspecies:
   A) Superspecies *C. jagus* (ex *C. giganteum*) 16 or more forms around the Congo Basin, with escapes in South America.
   B) Superspecies *C. zeylanicum* consisting of 40 odd species and subspecies. 15 or more multiflowered forms in the tropics, the remainder bi- or tri- flowered, scattered from north of the tropics to the tropics to the south.

The following is a tabulation of *Crinum* species noted by Verdoorn in Bothalia and several reports which have appeared in Herbertia. Some confusion exists as numerous *Crinum* have had synonym names, and not all have been described as sessile or pedicellated.

Central – south and South African *Crinum*:

Subgenus Stenaster:	
C. subcernum Baker	
C. crassicaule	Erect actinomorphic trumpets,
C. buphanoides	pedicellated blossoms
C. baumii	
C. hildebrandt	
Subgenus Crinum	Erect actinomorphic trumpets,
C. firmifolium	sessile blossoms
Subgenus Codonocrinum:	
C. campanulatum	
C. lugardiae	
C. carolo-schmidtii	
C. moorei	
C. lineare	Curved bilateral trumpets,
C. variabile	pedicellated blossoms
C. parvibulbosum	
C. crassicaule	
C. foetidum	
C. graminicola	
C. macowanii	
C. bulbispermum	
C. forbesii	
Subgenus Codonocrinum var. Ornata:	
C. rautenanianum	
C. euchrophyllum	Curved bilateral trumpets,
C. zeylanicum (L.) L. sensu Nordal:	sessile blossoms
C. kirkii Verdoorn	
C. verdoorniae Lehmiller	
C. fimbriatulum Baker	

References:

Muller-Doblies, D. (1977) Ramifications of Helicoid Cymes in Liliaceous flowers. Berlin Deurch Bot. Ges. Bd. 90: S.351–362.

Verdoorn I.C. (1973) The Genus *Crinum* in Southern Africa. Bothalia 11: 27-52.

A Taxonomic trail in the Autumn

Andries de Villiers

I was invited to attend an excursion of overseas botanical photographers from the 30th March to the 7th April. The furthest east that we would travel was Potberg, and the furthest west, the hills north-west of Springbok. I thought that such an excursion was unlikely to be very successful. We, who have dutifully trekked to the Middelpos Hotel year after year in September for the past 7 or 8 years, know exactly where to go and what we will see there. At best we may spot a species we have missed in previous years, but there is always a wealth of Irids flowering and no risk of disappointment. An autumnal excursion with air and accommodation booked is a different proposition altogether. Amaryllids are not predictable flowerers. They can vary by as much as a month from year to year dependent mainly on the rain. We would risk seeing nothing along the route from one target to the next, one place where accommodation was booked, to the next.

Having met the plane at Cape Town airport, we headed first for Strand to see *Crossyne gutata*, not perhaps very exciting, but at least a certain starter. Then to the N1 and onto the old road over the Du Toits Kloof Pass. This gave us *Brunsvigia marginata* in full bloom, and introduced the visitors to scrambling up a cliff face, something they were to become accustomed to in the next week! From there we drove towards Swellendam to try the Suurbraak road for *Cyrtanthus leptosiphon* and *Gladiolus engysiphon*. We found neither - the grass had grown very long and thick. Rain was threatening and the water lilies (*Nymphaea capensis*) had closed up, so we returned to Swellendam where we were to spend two nights. The following morning we set off for Potberg finding a fine stand of *Brunsvigia orientalis* just short of Bredasdorp and then a low ridge bright with *Nerine humilis*. We dragged the photographers away and made Potberg in time for a sandwich lunch before tackling the mount which is steep and very heavily grown with a great variety of plants. We found *Gladiolus stefaniae* in full flower and, an even better sign for the future, many young plants in first leaf. The *G. stefaniae* of Potberg has a marked pink tinge which explains why, at one time, it was thought that *G. carmineus* grew on the mount. It makes it perhaps more attractive than the plain red version at Montague. We returned to the Swellendam area but tried once more the lower slopes of the Langeberg and found, to our great excitement, *Gladiolus engysiphon* in bloom, *G. emiliae* mainly in seed and, most unexpectedly, the very rare and intersting *Cyrtanthus odorus* which is one of the very few scented *Cyrtanthus* species. We saw only two specimens which gives some measure of its rarity. The sloping evening sun shining on the *G. emiliae* turned it to burnished gold with spots of blood: quite the most beautiful of the smaller *Gladiolus* species. The painting in the *Gladiolus* revision is but a pale approximation to the glory of the plants as we saw them.

On the morning of the third day we left for Hermanus to photograph *Gladiolus carmineus*, passing Dreyton Siding where we saw the usual mix: *G. subcaeruleus, G. vaginatus*, *Bulbinella trinervis, Empodium gloriosum* and some spectacular fruiting heads of *Haemanthus sanguineus*. After photographing the last two *G. carmineus* on the cliff, we returned to Cape Town to search the Table Mountain complex for *Nerine sarniensis*. As

with *G. stefaniae* on Potberg, so with *Nerine sarniensis*: a very distinct and most attractive pink overlay. I have never seen this in cultivated specimens, nor in illustrations, but it certainly improves on the flat red colour normally seen. Finally we moved to Chapman's Peak to see *Amaryllis belladonna* flowering about 100 meters above the road.

Is an autumn excursion on dates pre-selected without regard to, or knowledge of, what the weather will be, a feasible proposition? Yes, but with certain reservations. Firstly, the principal target plants must be identified (selected) and be mutually compatible as to the timing. The excursion may throw up unexpected species as well, but its success depends on careful planning. Secondly a lot of motoring is involved moving from target to target or, at least, target area to target area so time becomes a major factor and targets must be limited to what is particularly rare or beautiful. Thirdly it is vital to bear in mind alternative targets from the same accommodation base to cope with unexpected failure due to weather. It is important to have access to reliable flowering news as a week one way or the other can make an area valueless. The record of major successes in the three days in the Overberg general area show that such as excursion can be successful and should be if properly planned. There will be some blank days and some very full days.

On the 2nd April we set off for the west, stopping briefly to photograph *Haemanthus pubescens* in sand patches along the coast road. The plants tended to be solitary and obviously affected by the hot dry weather. At Langebaan we found both *Strumaria chaplinii* and *Watsonia hysterantha* in bloom. The latter is often overlooked because of being autumn flowering but it is an elegant form. At Saldanha the Cape Steel ground was notable principally for masses of *Bulbine cepacea*. At Vredenburg in the usual parking spot by the granite boulders both *Haemanthus pubescens* and a few *Amaryllis belladonna* were flowering, but after that we saw no more at either Paternoster or Stompneusbaai, so we moved on to Hopefield and to Kersefontein, the family home of the Melks. *Amaryllis belladonna* was growing in amazing profusion near the river. Some delicate pink, some pure white, some with white tepals fringed in pink, some with pink throats fading to white. To us this was definitely Belladonna Sunday and, indeed, on the Monday morning before breakfast we rafted across the river between the floating islands of brilliantly flowering Water Hyacinth (an exotic and an encroacher but, oh, so beautiful) to photograph again masses of *A. belladonna* in the dawn light.

The next target area was Springbok and Okiep. Having regard to the heat, the brightness of the sun, the weight of the bus and trailer, and the distance involved, this leg was unpleasantly tiring but it gave two splendid sights: *Brunsvigia bosmaniae*, mainly on the right of the road just before Klawer, and *B. orientalis* just beyond Klawer on the left of the road, where it filled the spaces between the bushes with vast splashed of red. One plant was found with only pink tepals - no sign of red. The phenomenon of a species being found only on one side of a road has always been intriguing. The road is inanimate, it can have no direct influence, but indirectly it may affect soil, water run off, wind, light, pollination or predators. One explanation offered was that where an unsuitable soil met another unsuitable, but different, soil, the interaction would give a more stable bed to the road

builder, and the two soils would support disparate species. This sounds convincing until one notices that there is no appreciable differences in the soils, so some other factor is involved.

On the 4th April we were hardly clear of the Okiep Country Hotel when we found a colony of *Haemanthus crispus*, each little group of about 20 plants occupying its own patch, each patch being circular with a diameter of about 30cm, and each patch separated from the next by 15 – 20 meters like status-conscious suburbanites. Thereafter many of the *Haemanthus* we encountered were in seed. This made identification very difficult – the keys are excellent when the plant is in full flower or in full leaf, but in between, when the flowers shrivel and fall and the leaves have not yet emerged, essentially all we have to go on are the fruit bodies; their size, colour, shape, placement etc and we could well do with a special key for this stage. We pressed on to the Gamoep Nature Reserve and there, while looking at other plants, we saw two *Haemanthus* in seed. One had very tightly packed fruit bodies forming a solid pincushion-like effect in a bright magenta-purple. Leaving the Reserve we soon encountered more *Haemanthus* including one specimen in leaf and fruit, which conformed very well to *H graniticus*. We then wound our way into the hills to the north west on roads some of which were horribly corrugated. We saw *Haemanthus* and *Brunsvigia* all along our route. *B. bosmaniae* was mainly in flower but *B. pulchra* was in seed, hundreds, perhaps thousands of plants strong. A week earlier it had been in flower (and seen by Colin Paterson-Jones) and must have been an overwhelming sight. We also found, in seed, a specimen which seemed to conform to *Haemanthus namaquensis* and we have taken steps to have this checked. We found one, and one only, specimen of *Brunsvigia herrei*. It was in flower and presumably the first of a colony to show, It is a pale creamy flower, delicate and elegant. The last of the *Haemanthus/Brunsvigia* sightings was *H. amarylloides* ssp. *polyanthus* in seed. But we did have a bonus: a strong colony of *Strumaria truncata* of the form which stands upright on a sturdy stem and whose flowers are turned up to the sky, a form described but not illustrated in D Snijman's Revision of the genus. Growing with them were a few *S. merxmuelleriana*, also in flower.

There remained two days of the excursion, but these were in areas very well known to IBSA members, so I shall not describe them in detail. The first was from Okiep to Vanrhynsdorp via the Kamiesberg and the N7. A colony of *Crinum variabile* in flower, small and rather scorched. The second day, at Nieuwoudtville in the morning, provided a much better colony of *C. variabile*. A visit to the Gifberg in the afternoon disclosed a *Brunsvigia minor* and the "new" *Tritoniopsis*, still being described and named. It is a slender, elegant pink flowering form with red nectar guides.

It only remains to record the splendid fields of *Brunsvigia bosmaniae* at the foot of the Gifberg and that this species dogged our travels from Vanrhynsdorp to Vredendal to Klawer and beyond. A good *B. bosmaniae* year (when is it not?) and, yes, an autumn excursion, properly planned, is feasible. It can concentrate on the hysteranthus Irids of the Overberg, on the large-bulbed Amaryllids of the north western Namaqualand, on the mixed genera of the Vanrhynsdorp region but, whatever the target area, a properly planned three day excursion is fully feasible and rewarding. ❁

The Germination Habits of *Crinum campanulatum*

Cameron McMaster

Crinum campanulatum is endemic to the Eastern Cape, occurring in widely scattered seasonal pans or vleis between Bathurst and East London and as far inland as Peddie. Its dependence upon seasonal standing water to flower means that the reproductive cycle of this Crinum is opportunistic and is completed only if and when sufficient rains fall to fill the vleis. During most of the summer and all winter, the vleis are dry and heavily grazed by livestock, and there is little visible trace of the plants. If sufficient rain falls to fill the vleis to a depth of 30 –50cm, the plants are protected against livestock, which are reluctant to enter the water, and within a few weeks successful flowering and seed production is achieved. The bulbs are rooted very deeply in the mud of the vleis – often 20cm or more. This affords them protection through the periods when the vleis are dry and also prevents them from being uprooted by grazing livestock.

Growth, flowering and seed production can occur any time when it rains during the summer. We have collected seed at various times between November and July. When conditions are suitable, dense stands of flowers occur, making a spectacular display. Fresh flowers are mainly light pink, darkening to deep carmine as they get older. Only in one vlei have we observed pure white plants. In this particular vlei there is a wide colour variation, from light to deep pink, with approximately 5% of the population being pure white. The white plants also tend to have green stems and fruit, in comparison with the normal plants which are red and purple.

As the fruit matures, the stems fall and float on the water. After some time the membranous seed capsules disintegrate and the seeds float. The seeds remain dormant while floating in the water. Apparently they will only germinate when they dry off, which occurs as the water in the vlei evaporates and the seeds come to rest on the mud. We have observed that seeds germinate almost immediately after being removed from the water.

To test this I did a simple trial with seed I collected near Peddie on 8 July this year. On 10 July I took a random sample of 20 seeds that had not started germinating. I placed ten in a glass of water and ten on a dry punnet. Within four days 9 of the ten dry seeds had germinated and had roots up to 2 cm long. At this stage I removed the ten seeds that had remained floating in water (with no sign of germination) and left them to dry. On 18 July, just four days later, they all started to germinate. It is clear that while the seeds of *Crinum campanulatum* remain wet, germination is inhibited, but is stimulated as soon as they dry. To delay germination after collecting seeds, keeping them wet is clearly a solution. Once they dry, germination and rapid development of the radicle is inevitable, even if kept in a fridge. We have found *Crinum campanulatum* very easy to germinate and grow, even in normal outdoor seedbeds. In cultivation it seems not to be necessary for the plants to be submerged in water to develop, and normal nursery or garden conditions are fine to produce bulbs. In cultivation they tend to remain evergreen. We are not yet sure how long plants

take to reach flowering size and if they will flower without the stimulation of submersion in water. Perhaps there are IBSA members who can enlighten me.

I do know that they make excellent water features and grow very well if planted in containers in a pond. I grew them successfully for many years in mud retained by bricks in my fish pool – the mud being kept just at water level. I grew them together with *Cyrtanthus mackenii* under these conditions – the bulbs of both species being continually below water level. They both thrived and flowered well. In its natural habitat along the streams in coastal bush, *C. mackenii* grows like this at the waters edge with bulbs often permanently immersed.

Spiloxene/*Empodium*/*Saniella occidentalis*

Andries de Villiers

Members will remember that for some seven years we agitated to be told the name of the white flowering species in Hypoxidaceae which we found in the Roggeveld and the Komsberg. In 1999 we were eventually told that it is *Empodium occidentalis* originally collected by Hans Meyer on the Hantam in 1914 and named by Nel as *Forbesia occidentale*. Later it was accepted that the correct generic name of *Forbesia* was *Empodium*. In 1989 Dr Auriol Batten collected the same species on the Hantam and, finding it difficult to place, referred it to Dr Burtt of Edinburgh. He remarked that at least two of its characteristics were closer to the genus *Saniella*, which he had separated from *Empodium* when he completed the transfer of *Forbesia* to *Empodium* in 1973. Thus he felt that although *Empodium occidentalis* was the official name of Auriol Batten's collection, this was not taxonomically correct. Now Burtt has placed it in *Saniella* (Edin. J. Bot. (2000) **57** (1): 63 – 70). All botanists realise that the whole question of genera in Hypoxidaceae is unsatisfactory and difficult. Just to make confusion even more confounded, there is a horrible thought that *Pauridia* is actually a *Spiloxene* - horrible, because *Pauridia* is the older (1838) of the two names (*Spiloxene* 1866). It is far from clear whether there are several closely related genera or one large all-embracing genus. Burtt ends his paper with the very honest statement that "…….the interim decision must therefore be to retain, for the time being, all three genera *Spiloxene, Saniella* and *Pauridia*" but he goes on to write "Even if it is eventually decided that *Saniella* is not worth retention, I very much doubt if the continued separation of *Pauridia* and *Spiloxene* will be found to be justified".
Nevertheless, for us in IBSA the story does not end quite there. Although Thompson, in her thesis on *Spiloxene* (unfortunately cut short by her death) rejected our plant as a *Spiloxene*, the name remains in the background. Dr Snijman is currently working on *Spiloxene* and it would not surprise me if, in the 2001 Bulb Book, it will be described as *Spiloxene* sp, not because it is necessarily a *Spiloxene*, but because until the whole problem of the Hypoxidaceae genera is sorted in the years to come it is convenient to keep it in the forefront of Cape bulbous thought, with all options open.

Trust IBSA to choose, as its logo, so confused a genus!

Some Bulbous Oxymoronaceae

Rhoda McMaster

The name Oxymoronaceae *McMaster* is derived from the Greek, *oxumoron*, meaning 'pointed foolishness'. In the Stutterheim district, the bulbs that fall into this group have a winter-related growth habit, while the rainfall occurs mainly in summer. So they are winter growing, summer dormant bulbs, acclimatised to a warm wet summer and a dryish frosty winter. Oxymorons, all of them, I say. They must have missed the botanical trek to the Wet Winter West, and got left behind - to The Eastern Cape's benefit!

Somehow they thrive. The good late summer rains usually leave the soil damp for many months. The occasional light showers in autumn and early winter are just enough to keep them going, and then the mountain mists must also help. July and August can be a bit tricky, often no rain at all, with many freezing nights, but sunny days. And then, just when the weather has warmed up and some showers have fallen again to stimulate *Eucomis, Scilla, Cyrtanthus, Nerine, Crinum, Hypoxis* and many others, the Oxymoronaceae decide to take a rest and go dormant. In cultivation they respond well to being treated like other winter-growing bulbs, just add a little more well rotted compost to the lower half of the pot, and remember to keep the sun off the pot itself – winter growers need a cold growing medium.

On the edges of the Kologha Forest, the delightful red flowered *Freesia laxa* flourishes. Occasionally a white form occurs. They sprout in autumn and flower from late spring to early summer. The blue form is found further north, and flowers in midwinter. *F. laxa* will often flower in the first season from seed, which makes it very rewarding, especially for the newcomer to bulbous seed propagation. The plants grow in the shade, so a potful can be grown and brought indoors for a few days at a time to enjoy the bright (unscented) blooms. An indication of their winter-growing habit is that I have not been able to germinate the local red or white forms in spring/summer, only in autumn. But the blue form from Natal will germinate in early summer. Some other oxymoronic Iridaceae that occur in the district are: *Ixia orientalis* and *Moraea unguiculata*. And recently on an outing to see rock art about 50km away from here, we were surprised to see *Hesperantha sp*, possibly *H. falcata*, in full flower. It grows on a steep south facing rocky slope at about 1400m, a very cold and frosty spot in July! We also found an *Androcymbium sp* at the same site, in seed.

Another small beauty but this time from the top of the mountain (1200m) above the forest, occurring in thick grassland, is *Massonia jasminiflora*. It also makes a very pleasing pot plant about 2-3 cm high, with two decorative textured dark leaves, about 6 cm long and 2-3 cm wide, and flat. The grower is in for a treat in mid-winter when the beautiful white flowers appear – there is the added delicious bonus of a strong jasmine scent! This *Massonia* is also recommended for the beginner, as it germinates readily and then also multiplies vegetatively, crowding the pot after about three years. The plants should not be exposed to harsh afternoon sun.

On the next mountain range to the west, *Lachenalia campanulata* flourishes at the top of the wet eastern slopes of the Katberg, growing through the icy winter, flowering in November and drying up by the end of December. In February there is absolutely no trace of it anywhere, yet not 50 metres away, the following summer bulbs, amongst others, can be found in full growth, flowering or setting seeds: *Cyrtanthus huttonii, C. brevifolius, Tritonia disticha, Kniphofia sp. (uvaria?), K. triangularis, Wurmbia elatior* and several orchids. *L. campanulata* responds well to pot culture. It is one of the smaller species, about 10-12 cm high, with long fairly narrow leaves. In nature it is smaller, probably due to the very cold and very windy Katberg summit. If watered lightly through summer, in semi-shade, it stays evergreen. A mature bulb in cultivation will send out up to three pink-flowering spikes in a season, from August to December. This year the first flowers were out by the end of July. And the bulbs multiply as well. Some other winter-growing *Hyacinthaceae* in the district are *Veltheimia bracteata* and *Ornithogalum thyrsoides.*

There is a group of plants in the Amaryllidaceae that have not quite made up their minds whether they want to belong to the Oxymoronaceae or not. For cultivation purposes it is good to know about these three: *Brunsvigia gregaria, B. grandiflora* and *Haemanthus montanus*. In this district, they have a definite pattern – new leaves appear in January, halfway between spring and autumn! The two *Brunsvigia spp* flower between January and March, and their leaves persist into late winter. By spring they have died off. *Haemanthus montanus* flowers in January/February, and the leaves die off in May. These three species insist on staying dormant for the rest of the year. They will not be enticed to start sprouting earlier. They sit solemnly through some very heavy showers all that time. So if you have them in cultivation, do not be unduly worried by no leaves for the first half of summer, but give them an occasional light sprinkling at this time. Other winter growing Amaryllidaceae occurring in the district west of Stutterheim that are certainly 'pointedly foolish', are *Haemanthus coccineus* and *Strumaria gemmata*. These two must have been stragglers that couldn't keep up with the trek, and so became parted from those that made it to the Far West. *Haemanthus albiflos* is widespread, but it at least has the sense to be evergreen to take some advantage of the climate. It is always in shade, often on rocky cliffs or under bushes, flowering mainly in June/July, but occasionally at other times as well.

Thank goodness for these Oxymoronaceae to brighten up the dull colours of our winter and early spring months! ❁

It pays members who pollinate their pot plants to produce seed, to begin by studying the flowers. The stigmas are at their most receptive when they first spread open. Similarly the first pollen to be extruded from the anthers is the most fertile. Plan your pollinating to take advantage of this rather than waiting until all the sexual elements of a single flower are fully exserted. By that time the fertility potential is much reduced. Similarly in most of our species the flowers open from the bottom of the spike and progress upwards. Ideally you should pollinate the stigmas of the bottom flower by pollen from the bottom flower of

another specimen and progress up the two spikes. Pollen, if fresh and new, can be stored on cotton buds in the refrigerator for several days if the spikes are not in flower together.

Bulb Exploration in the Eastern Great Karoo

Charles Craib

The eastern Great Karoo is a summer rainfall region with most rainfall recorded in the later summer and autumn months, February to April. Rainfall in the winter is occasional and snowfalls on the mountain tops occur from time to time between May and August. Most geophytic plants from this area grow in the winter with a peak of leaf production in the autumn (April to May). This is particularly so if there have been good late rains and temperatures do not dip below 0°C too often at night.

The Murraysburg area is yielding some particularly interesting records of rare bulbous flora and detailed research on the ecology of these plants will appear in future issues of Herbertia. One of the most interesting bulbs, and also one of South Africa's rarest, is *Gethyllis longistyla*. This distinctive species with a large strongly scented lilac flower is found sparingly in elevated mountain foothills. It is apparently absent from much suitable habitat but when it is encountered, is found on long ridges covered in dolerite boulders of varying size. The plants grow in between boulders, out in the open in stony patches and in tufts of short grass. The growing season starts in late April and by the end of May a full crown of leaves has developed. This is often a mere 2 –3 cm across making detection of the plants almost impossible. The species is much more conspicuous in early summer when flowers are visible amongst the brown surroundings for the entire flowering period. This lasts from 3 to 10 days in a given locality. The fruit appears in February and March with a strong perfume reminiscent of mangos. Seed distribution takes place at the height of the rainy period in cool autumn weather when it is most likely to germinate. There is evidence that *G. longistyla* does not break dormancy during droughts and it is probable that recruitment of new individuals to the population is very low.

Lachenalia karooica is a newly described species that also grows in the winter despite being from a summer rainfall area. It grows in the same habitat as *Gethyllis longistyla* and is usually found in very small numbers. The single channeled leaf is rather attractive lending the plants to pot culture. Like most *Lachenalias*, the seeds germinate easily and the plants are easy to grow.

Amongst the bulbous flora from the Murraysburg area are several undescribed species. One of them is a most unusual *Ornithogalum* species. The single leaf is flat and prostrate with a viscous secretion to which sand and dust particles adhere, much in the same manner as *Haemanthus nortieri*. This species produces its leaf between the last week of April and the first two weeks of May but apparently does not break dormancy during dry years.
In the area there are also several common widespread and beautiful species. One of them is *Romulea macowanii*. This species with its large golden strongly scented flowers blooms in early to mid-May, often in low lying mountain foothills where severe frost may occur at

flowering time. The flowers are particularly attractive and impressive amongst the yellowing grass tufts.

Bulb Stories of the Bushveld – 5th Series

Alice Biemond

Ornithogalum prasinum

The warm spring midday sun was glittering on the leaf fronds of the giant *Washingtonia robusta* palm, making them slightly silver in the soft quiet breeze. The pair of Palm Swifts had come back home, to fly joyfully in wide circles around their nest hanging between the old dry persistent palm leaves. Once more the cold but sunny winter sky turned into that miracle of nature: springtime! At last we could walk barefoot on the warm sand again. My footsteps came to an abrupt halt: right there in the red sandy soil was a tiny white shiny bunch of flowers: a beauty of a wild *Ornithogalum* that I had never seen before. Along a short sturdy stalk of 7mm grew a compact raceme of white bullet-shaped buds with brown stripes, and a few opened flowers. Each of the flowers had six pearl white petals with a light brown centre streak. Stiff white pollen threads with light yellow pollen extended the petal lengths. Where did that underground bulb ever find the vigour to push the fragile flower heads through the dry red soil?

As I was busy drawing this rare *Ornithogalum*, a sudden roaring red dust cloud came out of the thorn bushes from the direction of our herd of goats. In panic the whole herd ran along the road with thundering hooves back to the kraal. Behind them the herdsman's loud voice shouted at something. Threateningly he swung his knobkierie in the air – an old cheetah was clinging onto the back of a galloping screaming goat amidst the dense red dust cloud! It was a fighting consternation of "being" or "not-to-be anymore". The cheetah finally let go and disappeared, it's teeth probably blunt from old age. With care we treated the goat's bleeding tail. I then went back to my white and brown flower drawing with a beating heart.

A month later this tiny *Ornithogalum prasinum* plant produced four seed capsules of an enormous size in comparison to the plant's tiny size. There were 21 flat black papery seeds measuring an average of 1cm in diameter. Was this nature's secret of propagation so that this tiny bulb does not go extinct?

Urginea altissima

I turn my new millenium calendar leaves back to the dry summer of 1999. The sun's rays heated the bushveld so much that no humidity was felt, no rain had fallen since the beginning of the year. The great Limpopo River, our life-giving stream, was empty. Even the occasional waterholes had dried up. The crocodiles moved downstream in search of a

leftover muddy pool. I wondered how the many wild flower bulbs could survive under the sun-heated black soil surface of the riverbank or waterhole edge. The saying "Nature knows the great secret, and smiles" teaches us patience and survival above all. Our thirsty red Afrikaner cattle, impala antelope, warthogs and wildebeest knew of a refreshing waterhole between huge rocks in the sandy riverbed. On a higher silty part of the riverbank I saw them: some solitary sturdy shoulder-high flower stems, each one covered with a lace-like frill on the upper part of these "sticks". Was it one of nature's smiling secrets? No leaves to be seen. What kind of bulb dares to bloom hopefully in this killing bushveld heat of over 52°C? The half-transparent racemes bore tiny white cup-shaped lily-like flowers on their upright stalks. Looking closer at the fragrant single little flowers of this *Urginea altissima*, each of the six white petals are curved backwards exposing longish stiff pollen threads in a circle.

Whilst still admiring these beautiful flowers, I was frightened by a sudden roaring noise at the waterhole in the dry echoing riverbed, and by a terrified call of one of our cows. A hungry crocodile must have emerged from the silent waters of the pool, snatching at a drinking Impala, but missing it. The Impala herd scattered, and the nearby cattle, in their panic, ran between the rocks in all directions. During this violence, one of the hooves of the screaming cow got hooked in a V-shaped crack between two huge rocks, and the further she pulled with her strong body, the more the hoof was gripped between the colossal boulders. I dashed back home to fetch some farm helpers to release the cow's hoof with ox-riems and strong heaving. But it was too late as the cow had torn some ligaments in the thigh / pelvic area and was unable to walk. Slowly the poor animal died. The long white twisted horns of the cow reminded me of the flowering stalks of the white *Urgineas* in bloom, not far from that waterhole where death lurked, day and night.

Pancratium maritimum (native to SW Europe,
Slowly 1999, the last year of the old millenium, came to an end. Of the many bulbs planted in my bushveld garden, one in particular gave me much pleasure. In 1990 Danny Gildenhuys sent me 5 young bulbs of *Pancratium maritimum,* which soon multiplied to 15. Carefully I replanted each bulb into it's own space in the lily flower bed. Patiently I waited for 9 years, when finally a miracle happened: the most mature and healthiest of these bulbs grew a peduncle of 25cm to bear seven flowers. It is possible that in other countries like Greece, or in bulb grower's hothouses all over the world, this white flower is common? But here, in the arid savannah Bushveld climate, in a farm garden under the open sky, the first flower of this plant was a joyous occasion. Each of the six pearly white long crown petals, slightly curled outwards, protected the inner "daffodil-like" tube, consisting of 12 inner petals. Compared to our own indigenous *Pancratium tenuifolium*, which grows wild in sandy patches in our cattle camp, the former has flowers with a much shorter wider lily-like

trumpet of 7cm, while the latter has a long tubulous calyx cup of about 10cm. On each outer petal is a pale-green lancet stripe which shows up a darker green colour on unopened flowerbuds. The white stamen filaments, each with a large light yellow pollen sack, protrude from the flower with the white needle-like style with stigma. Fully opened blooms were a delight to see in the very early morning before they closed for the day.

That same night on the 18th November 1999, the radio announced that the magnificent Leonids meteor shower would be visible in our southern sky at 4am. But there was little chance of seeing any of it as the sky was cloudy. Upon rising early, I looked in the north western sky, and there, like a wonder between the clouds, was an open piece of sky filled with the usual glittering stars together with Orion, Taurus and the Greater Lion constellations. Slowly my eyes got used to the darkness, and first one, then two, three and many more shooting stars became visible. I counted twenty beams of light per minute, but scientists counted up to a hundred thousand per night! These Leonids came from the comet "Shuttle" in the star "Denebola" in the tail of the Loe Major constellation. The fluorescent flashing rays were of immense lengths, reaching over the whole of Orion, from the star Rigel in his foot to Betelgeuse in his shoulder. The glow from the meteors lasted longer than that of an ordinary falling star. What a spectacular sight in the dark starry eternity of the universe! I watched them until the morning dawn weakened the glowing glory. Somehow I thought that this nightly wonder was a passing symbol to the silky-white nocturnal flower of the *Pancratium maritimum*.

Tall fragrant yellow *Albuca*

Finally it was summer 1999. African eagle owls called with barn owls answering in the tranquil moonless nights. The white 4m high Ipomoea climber's sweet fragrance spread through the hot dark air. Later, waxed moonlight filtered into the vastness of our Milky Way's starry universe with the Southern Cross flickering through spiky *Phoenix dactylifera* leaves. True palm enthusiasts know the strong refreshing scent of these palm flowers. Mixed into this summer night's daze is the faint lemon fragrance of the tall yellow *Albuca* flower, a local endemic from the Kalahari sand region. Dark green 50cm long strap-like leaves enclose the 1.5m tall peduncle. Single lemon-yellow cup shaped flowers on 3cm flower stalks open one by one, each lasting about 5 days. Each petal shows a light green streak on the outside, and cadmium-yellow pollen sacks open inside the flower cavity. The thin slightly arched peduncle likes the hot summer weather and it flowers for about three months. Little did we know that in the next few months, great changes would occur in the weather.

Suddenly our sunny days turned gloomy. The radio announced the cyclone Eileen which was roaring across the Indian Ocean towards south east Africa and our country. For three days our usual north east winds changed into sudden rustling wind squalls swirling only in the leaves of this higher Marula or Jacaranda trees. Unusual dark swollen clouds covered our sun-filtered skies, but no rain fell.

One evening the furious storm burst. Continual flashes of lightning set in, unceasing thunder shook the clouds, the sky and the earth. We stood on the farm house verandah in astonishment with wide open eyes, watching fearfully the pouring rain gushing and sweeping against the protective gauze wire frames on the doors and windows. In a second our telephone was hit by a red hot lightning flash, and it stayed out of order for 9 weeks. No word could we hear in the loud clatter of raindrops on the tin roof

.

Again the radio warned of more rain, then floods. Our mighty, otherwise bone-dry Limpopo river rose across its banks. Innumerable thunder storms followed on many days, drenching our once thirsty countryside. Smaller rivers turned into torrents, tributaries into raging streams. Cyclone "Eileen" brought still more rain and the whole environment slowly drowned.
During all of these storms the tough yellow *Albuca* flower stem got a little bent but did not break, and it flowered beautifully without pause. Swollen green seed capsules developed on the lower stems. (These were finally harvested in March 2000).

The meandering Limpopo Valley filled with mirror-like surfaces covering the surrounding bushveld, shrubs and lower trees in brown muddy water. I found a tiny baby tortoise, hurriedly creeping onto higher sand hills, and I carried it to safety. Areas that once were lush green patches with hundreds of flowering *Ledebouria* bulbs, were now knee deep in water, slowly flowing in a downstream direction. Even our historic "Livingstone road" from Cape to Cairo, an age-old junction road on hard red soil along the western Limpopo river bank was shoulder deep under flood water. Border gates into Botswana were closed, all the communication bridges were washed away. In Tzaneen, 9 inches of rain fell in one night. All of this water flooded into Mozambique before reaching the Indian Ocean, sweeping through settlements, agricultural lands, villages and plains. People and animals drowned. Was an Armageddon to be realised?
Soon air help was sent and finally international disaster assistance appeared for flood victims. A month later cyclone "Gloria" struck, again with warm rustling winds high in the crowns of the trees. Cyclone "Huda" followed, bringing more rains on ground nut and mealie lands. We had more rain in the summer of 2000 than ever before, and we wait to see how the bulbous plants respond this next summer.

A new *Romulea* species

Andries de Villiers

The new *Romulea* species discovered by Dr and Mrs Stobie at the beginning of June presented us with a number of puzzling features when we went to see it on the 12th June. We believe it will be described and named in the *Romulea* review expected in 2001, and that will no doubt explain some of our difficulties. The plant grows in apparently pure (no humus visible) soft sand slopes from the high sandstone ridges overlooking the valley of the Riet River in the Koue Bokkeveld. The sand is deep and loose, a fairly unusual habitat for *Romuleas*. The plants were found in a fairly limited area but growing scattered, not in clumps, and the sand had a pH of 4.9.
Mary Stobie took us directly to where there had been some 60 to 80 flowering specimens, but for some time we found nothing. Then we found a few thin filiform leaves and eventually we found one flowering specimen. The first mystery was "where had they gone to without a trace?", and our first thought was "under the sand". We excavated a few leaves and found signs of expired flowers and, in one instance, apparently a capsule in its early state. There was nothing to suggest that the plants had retracted, so we were forced to assume that they had been overlaid by sand shifted by recent rain and wind. Later it was established that as the seed capsules form, the peduncles bend and the seed capsules bury themselves in the sand, thereby pulling a certain amount of the stalk and leaf with them. The plants have very small corms and slender minimal vegetative features. If we assume that the seeds are distributed under the sand by sand shift, then should we not expect a clump configuration of the resultant plants?

The small flower, similar in size to *R. flava var minor*, is a delightful lilac with red nectar guides but, from photos taken by the Stobies, they eventually fade to almost white. There were no other plants (dicot or monocot) of the same colour, although there are, in the general area, dicots of purple or a purple-magenta colour. This raises questions of pollination. At best the flower is close to the sand surface: bees (blue attraction) or beetles (we saw none)? Growth in cultivation may resolve some of these questions and the addition of some nutrients, if they do not kill the plant, may result in striking improvement in size and robustness.

How limited is its distribution? It was found in an area that has not, we think, been much botanised, but not entirely neglected.

There is never a dull moment in IBSA and always some new beautiful species to find. And particularly with *Romuleas*, some new problem for the botanists to explain! ❁

The genus name *Lapeirousia* commemorates J.F.G. de la Peyrouse, a French naturalist of the 18th century. *Ixia* (Greek) is the name of a plant noted for its variability of colour. *Romulea* is named after Romulus, the founder of Rome.

The *Daubenya* Project

Rachel Saunders

In the last IBSA Bulletin (no. 48, August 1999), an article on the launch of *Daubenya aurea* onto the South African market by the bulb company Hadeco was published. This related one way of rescuing an endangered plant from extinction, viz, growing the plants in tissue culture and releasing them onto the mass market. In this article, I will relate another approach which was taken by IBSA – that of protecting the plants in their habitat.

Over the last few years, members of IBSA who visited Middelpos regularly had noticed that the population of yellow *Daubenya aurea* plants was endangered. The owner of the land had ploughed very close to the plants, and sheep, which grazed the area at various times of the year, were damaging the plants with their hooves. In 1997 the committee decided that a possible solution to the problem might be to fence off at least a portion of the population, thereby protecting them from further degradation. Thus in April 1997 members of the committee approached the landowner, Adriaan "Holhoed" Nel and his father C.J. Nel, and discussed the idea with them. They both expressed enthusiasm for the proposal and in January 1998 the committee allocated an amount of R3 500 for the project. Henry Pauw then approached the World Wildlife Fund for financial assistance and presented them with a list of the expected costs. The committee decided that the proposed "reserve" would be in commemoration of Barbara Norton, a past chairperson of IBSA, and someone who had done a great deal for the Society and for the cultivation of bulbous plants over the years.

In September 1998 while the plants were flowering, an area of 50 x 100 meters was marked around them, and an order was placed with the Farmers Co-Op in Sutherland for fencing requisites to the value of R2 324.92. Early in 1999 Adriaan Nel collected the materials and the fence and gate were erected by him and his farm labourers in March. A commemorative plaque was designed and made, ready for the opening of the reserve to be held in September.

After lunch on Saturday the 4th September a number of IBSA members as well as Barbara Norton's daughter and son-in-law drove to the farm Danielskuil arriving in time for the opening ceremony at 3pm. We were all concerned in case the *Daubenyas* were not in flower, but we were in luck. Due to the dry weather, they were not flowering en masse, but there were certainly enough flowers to see that the fence had been put around the correct area! There were also many *Romulea subfistulosa* plants in flower, and a number of these were inside the fence as well.
At 3pm C.J. Nel and his wife, and Adriaan Nel and his son arrived, and the ceremony began. At midday Gordon Summerfield and Alan Horstmann had erected the plaques at the entrance of the reserve, and these were covered with a cloth. Gordon made a short speech in which he thanked the Nels for the use of the land, and the WWF for financial assistance. He emphasized the importance of conservation projects of this type and made it clear that the land was merely enclosed to protect the plants, but it still belonged to the Nel family. He then removed the cloth and displayed the two plaques, one in English and one in Afrikaans. The wording on the plaques reads as follows:

The yellow Daubenya aurea reserve
established by IBSA with WWF assistance
on land allocated by C.J. and A. Nel
in memory of Barbara Norton
"May what is rare and beautiful
survive for ever"
4 September 1999

Die geel Daubenya aurea reservaat
daargestel deur IBSA met WWF hulp
op grond toegewys deur C.J. en A. Nel
ter nagedagtenis aan Barbara Norton
"Mag die wat seldsaam en pragtig is
bly voortbestaan."
4 September 1999

Finally he commented that the land enclosed by the fence will still need to be grazed by sheep, probably once a year, a couple of months after flowering, both to ensure that the plants do not become overgrown, and also to trample the ripe seeds into the soil. After inspecting the magnificent plants inside the fence, the Nels departed, and the IBSA members scattered over the hills and plains, flower and photograph hunting.

That night at dinner at the Middelpos Hotel, Joan Treasure (Barbara Norton's daughter) thanked IBSA for the day and said how much it had meant to her. She added that she was sure that her mother would have been delighted with and honoured by the project. The dinner was the usual Middelpos feast, and everyone finally went to bed, replete and tired after a very pleasant day.

The committee feels that with small reserves of this type, endangered populations of plants can be protected in situ. There are a number of other species which would benefit from this approach, and in the years to come, we hope that we will be able to protect several more rare and endangered populations of bulbous/cormous plants ❁

In "The genus *Watsonia*" by Peter Goldblatt an "unusual population" of *Watsonia aletroides* is mentioned. These plants, in the Bredasdorp area, produce bulbils in the axils of the flower bracts instead of flower buds or seed capsules. Last year one of these plant populations was found . The plants flowered very well with attractive pink flowers and as the population was quite large, it was earmarked for seed collection. On our return 6 weeks later, we were astonished to see not a single seed capsule, but instead, hundreds of small bulbils in the axils. None of the flowers had set seed, and obviously the whole colony was derived from one initial "unusual" plant. Peter Goldblatt speculates that the sterility is no doubt due to meiotic disturbances caused by abnormal pairing of the chromosomes.

"False pregnancies" sometimes occur in our pot lines. We have experienced this particularly in *Gladiolus priorii*, and it is the result of incompatible self-pollination. The ovary wall (the seed pod) continues to grow but the ovules within are not fertilised and wither away. Since most of us only grow limited numbers of any one potted species, it is important to draw material from disparate sources. In a pot of, say five specimens, it is advantageous if each specimen comes from a different colony. If for instance, you know of three separate colonies A, B and C, and you collect three corms from each, it is advisable to make three pots, each with ABC planted together, and not AAA, BBB and CCC.

Tritonia florentiae in seed in 2000

Johan Loubser

It must be about 15 years ago that Peter Goldblatt gave me a few seeds of *Tritonia florentiae* which he collected in the Ceres Karoo. He later told me that he had lost his plants, and it seemed that I was the only one who had it in cultivation. Later an Australian member of IBSA asked me for seed of this plant as he thought that I was the only one likely to have it!

Unfortunately, as a result of the strange behaviour of one of the two plants, I could never produce any seed. Although number one flowered fairly regularly, number two was always retarded and never flowered. Special feeding brought no improvement and I was always afraid of number one rotting if number two was kept going by continued watering. I still have no explanation why two plants of the same species kept in the same pot behaved so differently. A 15cm pot should be big enough for several plants of this size. It is also remarkable that a species from a very arid area survived so well in the SW Cape with its wet winters.

Last year I decided to separate the two plants. When number 1 died down, I carefully took it out and kept number 2 going for another month. This year they started off in separate pots. Number 2 broke dormancy not long after number 1, and it was obvious that it had benefited from the longer growing season. Number 1 also showed improvement – the lower tepals had always been lacerated, but this year they were entire. It was soon obvious that number 2 was also going to flower, and I put some of the pollen from number 1 into the fridge. Finally, after so many years, a seed capsule has developed! Unfortunately, interested IBSA members will have to wait until I have more than two plants established in my garden before seed will be available! However, now that I know the procedure, there is every hope of more seed in the future.

A plant breeder also took some of the pollen from my *Tritonia* to put onto *Tritonia chrysantha* in the hope of getting a large flowered yellow *Tritonia*. It will be interesting to see the result because *T. florentiae* is exceptional in that the flowers are each produced on a separate peduncle from the stem. Apart from this species, this arrangement is unusual in the Iridaceae, and is seen only in the genus *Xenoscapa*. It will also be interesting to observe how much of the fragrance is retained in the hybrid.

Editors note: *A short description of the plant above: the small plants with hidden stems have falcate leaves, and each inflorescence has 2 to 4 flowers. The flowers are strongly zygomorphic, bright golden yellow and reddish in the throat. The stamens and style are curved and the pollen is either mauve or pale.*

Superficial Tact and Competition from the Depths

Jon Richfield

Rather than complain about my tactlessness, people should regard it with the respect due to a venerable product of tradition and genetics. It is not so much rudeness or insensitivity, as a temporal dislocation between utterances and the evaluation of the probable effect of one's words. The problem is not that those of my line think slowly; I am sure that we think as fast as most people -- it is just that we think in retrospect. These talents have been honed within the family, preparing us to give our spontaneous best when least expected. For example, having acquired a book: Insects as Human Food, I fascinatedly told my parents of how among certain central African tribes, it was customary when friends met, to search each other's heads for lice, eating each catch as it came to fingernail. My father was an engineer, not a biologist, and it was only when he inexplicably exploded that I reflected that perhaps the supper table was not the best time and place for discussing such items of functional anthropology. Nor was that the worst. My edifying explanations of the process of honey making went unappreciated as well.

Well, I was qualifying as an entomologist, dammit! Why should knowing what the bee does to the nectar make your breakfast toast taste any different?

Not that my father was a model of tact himself, but the real homozygous recessive was my mother. She was for many years the owner of Bloemerf Nurseries near Stellenbosch and those of you who are bulb growers in the Western Cape will not be surprised to hear that her views on our local mole rats were jaundiced and emphatic. She waged perpetual, largely unsuccessful war and had lost untold choice, rare specimens to the enemy.

One day two ladies turned up to buy some indigenous plants and my mother was showing them around when one of them exclaimed: "Oh, look at this sweet little thing!" My mother turned and saw to her surprise an immature mole rat out on the surface to inspect the brave new world! Without hesitation she stamped on it, saying with satisfaction: "That ought to put it out of its misery!" Bloemerf's soil was hard clay and stone, so her diagnosis was certainly correct, and her satisfaction survived the long, breathless pause that followed. It was only the snapping of icicles in the overtones of the prospective customer's response that first suggested to her that perhaps in retrospect…….... All the lady finally said, was: "Well... How KIND of you!" But my mother's nose was frostbitten for weeks. She did briefly toy with the idea of explanations and apologies, but some things simply do not lend themselves to explanation. If you were a local bulb grower, no explanation would be necessary, and if not, no explanation would be possible. Personally I have a rather soft spot for mole rats, but the only soft spot most bulb growers have for them is in the compost heap, helping to raise the nitrogen and phosphate content. Those ladies left soon afterwards and I don't remember that they finally bought anything, so perhaps they were not TRUE bulb enthusiasts anyway.

For the stock farmer mole rats can actually be useful in reducing the population of some bulbs that are poisonous to cattle, such as *Homeria*. Whether *Homeria* corms are less poisonous than the leaves or whether the mole rats simply are insensitive to the poison, I have no idea, but there it is. I suspect that predation by mole rats explains the freedom with which some such species produce hundreds of bulblets. When the enemy strikes, some bulblets are sure to survive, even if the mole rat destroys the parent plant before it has time to flower and propagate by seed. On the other hand, mole rats do not attack Amaryllids nearly so freely, and Amaryllids do not as a rule make nearly so many bulblets.

Conversely, many a mole rat tunnel has started a leak in a contour furrow or dam wall, so a stock farmer's attitude tends to reflect his personal experience and problems.

In fairness to the mole rats, even the enmity of the bulb grower might be tempered by the thought that however disastrous they may be to sparse rows of bulbs, they are often beneficial to stands of vigorously growing, freely propagating stands of plants such as some of the *Watsonias*. Similarly, early alarm at the threat of bush pigs to wild stands of *Vallota* (*Cyrtanthus elatus*) turned out to be misplaced. Attempts to protect them with fences were disastrous; the *Vallota* needed those snouts so badly that they could afford to sacrifice a few bulbs. The pigs cultivated the soil and scattered surviving root bases and bulblets. Stands "protected" from the pigs stagnated, choked and finally languished. God's ploughs should be treated with respect as well as reserve!

I doubt that the following observation is of real ecological importance, but you may be interested to know that the big dune mole rat also attacks some of the Australian acacias in the dunes on the Cape Flats. Sitting quietly, if one is very lucky, one may see a well-grown seedling begin to vibrate gently, then to vanish gradually into the sand, and good riddance! So there are grounds for ambivalence towards the furry little beasts. Farmers of root crops of course, have no ambivalence towards rodents at all, and least of all to mole rats!

In their own right mole rats really are interesting animals. They do not have the powerful build of true moles or golden moles, because they do not dig with their paws. Mole rats dig with their front teeth, the incisors, and when they open their mouths, they can close their lips vertically behind those incisors so that they do not choke on the earth that they loosen. From the hardness and stoniness of some of the soils that they dig in, you would guess that they need to have dramatically powerful jaws and you would be quite right. The lower jawbone looks like the toothed scoop of a front-end loader. If a mole rat bites you, the teeth will meet in your flesh and they are not shy of standing up for themselves if you catch them above ground!

Those chisel-like incisors grow continuously and need to get worn down accordingly, or else! Part of the required wear is from digging and eating; the rest is from constant honing by grinding them against each other. If a tooth breaks or a grain of sand gets wedged between the paired incisors so that top no longer meets matching bottom, the tooth keeps growing out in an arc till the poor beast cannot eat or dig, and it starves. A really nasty death. Pest or not, if I found one in such a state, I'd probably take it to the vet.

As a lazy gardener, I rather wish a few mole rats would come and thin out some of my bastardised *Babianas* and a nasty aggressive *Gladiolus* and that vile invader called wild garlic (however fragrant its flowers), but as a bulb-grower, I'd be more comfortable with golden moles to get rid of my weevil, chafer and cutworm larvae. But in a garden, nature is nothing if not perverse and moles no more come to my call than they heed my distinctions between the bulbs they are welcome to and those that I cherish! ❁

Moraea - A Topic of the IBS Forum

Mary Sue Ittner

The International Bulb Society has an on-line Internet Forum that allows members who have access to a computer and an Internet connection and who wish to participate, to send messages to each other. For the years 1999 and 2000 participants voted on specific topics (usually a genus) that would be discussed each week in addition to the ongoing questions and comments that come up. In the year 2000 the topic that got the most votes was *Moraea*. The following is an attempt to summarize what the participants in this discussion shared with each other about their experiences growing this genus.

There were mixed experiences growing *Moraea* from seed. Some people had trouble getting seed to germinate, but found that leaving the pot until the second year was helpful as seeds came up then. Others had really good success with seeds. Will Ashburner (Australia) reported on 12 species he had recently grown that were sown outside in a shaded area in the fall and subjected to normal day and night changes in temperature. All germinated. Most came up 3-6 weeks after he sowed them; two that did not were from summer rainfall areas. One of those appeared in 10 weeks and the other in 29. In past discussions on the forum Rachel Saunders (South Africa) had explained that the fluctuation in temperatures between warm days and cool nights in the fall was probably what was needed for germination of the winter growing species.

Once seed germinated, experiences again differed in growing them to flowering. A few species were vigorous and quick to flower and others dwindled each year. Will reported that all 12 of his species bloomed in two to two and a half years. Others wrote it sometimes took 3-4 years before their seedlings flowered.

Moraea seems to be one of those genera that choose to skip a season (or more.) No one seems to know why or what exactly is going on under the ground when this happens. More than one person has dumped the contents out of an "empty" container, expecting the worse, only to find healthy corms. From the same lot of seeds, some corms will appear while some of their siblings sit the year out. Dirk Wallace (Australia) observed that this genus does not like to be transplanted and therefore the practice of repotting every year might be a possible explanation. Mike Mace (Northern California) accidentally discovered that some of the species he grows seem to appreciate being watered in late summer and having a short dormancy so he now begins to water in late summer.

A number of people reported greater success, especially in the second year, growing this genus in the ground instead of in containers. Lauw de Jager, who grows 50 different species in France in lattice pots plunged in the ground, believes that the cooler soil temperatures and the more constant humidity promotes better flowering. Tony Palmer (New Zealand), on the other hand, related good results both from growing his in containers in a peat, sand pumice, and pine bark mix and repotting every year. Lauw theorized that Tony must have a very efficient watering system and a way to avoid too high soil temperatures.
Although corms need to be planted in soils with good drainage, it also seems crucial that they get regular water during their growing season and adequate fertilizer. Jim Duggan (Southern California) found that he sometimes had to water twice a week if there was no rain. He was finding improved vigor from a new experiment of lightly fertilizing with each watering. Others add fertilizer formulated for bulbs to their mix when repotting with perhaps some supplemental feeding later in the season. Dirk fertilizes at the start of the season with "bone and blood" and adds a good dose of wood ash either in the potting mix or as a top dressing.

It was observed that some corms are found close to the surface and others pull themselves down very deep. Dirk usually plants 2-3 times the height of the corm when planting in the ground, but a little higher in pots. Since they can pull themselves down, but not push themselves up, he felt planting higher is better than lower.

A few species were of particular interest. A number of people found *Moraea ramosissima* difficult to flower and after flowering, it sometimes split into smaller corms. Will's plants flower reliably and he had not noticed that his *Moraeas* missed a season either. He admitted he wasn't counting every corm however! Someone else reported the best flowering of many *Moraeas* was their first flowering from seed.

Moraea polystachya was the subject of much discussion. Because of its long blooming season and large flowers that last for days it is particularly desirable. Several people had managed to flower it in two years from seed. Members from colder climates were having success with it in greenhouses. On the other hand, several of us found it was one of the species that could skip one or more seasons. It has only bloomed twice for me in Northern California in ten years, but my bulbs were purchased, not grown from seed. The experiences in Southern California were mixed. In a coastal garden that receives year round water it has become a garden weed. Southern California member Lee Poulsen had not got his to bloom and Jim Duggan had seedlings yet to bloom in 4-5 years from seed.
Watering may be the key. Peter Smithers is very successful growing it in the ground in Switzerland where it receives year round water, warm summers, and where last year it bloomed through six weeks of frost every night. Robert Archer (South Africa) reported that he had been asked to photograph *M. polystachya* in the wild and found it in bloom in various habitats from pure clay to deep red sand. It was blooming in winter, which was the dry time of the year for the areas where he found it. Since there are some populations that grow in parts of South Africa with winter rainfall, it was expected that requirements for success might be different for seed obtained from those areas.

A few people shared which species grew the best for them. The ones that are easiest for me that I have growing in the ground are *M. aristata*, *M. gigandra*, *M. tripetala*, *M. vegeta*, and *M. bellendenii*. I grow others, but they do not bloom every year. *M. tricuspidata* bloomed this year after many years absence. Lauw has regular success with all of the ones I grow and also *M. polystachya*, *M. bipartita*, and *M. polyanthos*. *M. bipartita* looks like a smaller *M. polystachya* and blooms later in the spring. Several of us in Northern California found that until the days got warm the flowers on this species would not open properly. *M. polyanthos* is the last winter growing species to bloom for Lauw with many pale blue *Homeria* type flowers. Lee Poulsen has had good luck with *M. aristata*, *M. neopavonia*, and *M. villosa,* but like me has not seen *M. loubseri* after a few blooming years. Mike Mace does well with *M. polystachya*, *M. neopavonia*, *M. loubseri*, *M. aristata*, *M. villosa*, *M. atropunctata*, and *M. barnardii*. He grows his in 8" (20 cm.) pots in full sun in a mix of 50% peat and sand and waters every 5-6 days. In years with high rainfall he has more blooms, but adding extra water in those years without rain does not seem to increase the bloom.

One happy theme is that many gardeners around the world were finding *Moraea aristata* to be easy, especially in the ground. Since it is on the verge of extinction in the wild, it was very satisfying to hear this.

Jim Shields from Indiana was very eager to find *Moraea* species that can be grown in the ground in his colder climate. He has been acquiring seed from the coldest areas of South Africa, mostly summer rainfall, to trial in his garden and had questions about them. Jack Elliott who gardens in Kent, United Kingdom found the easiest one for him in the garden was *Moraea spathulata*. It lasted 20 years in the garden including 1987 when it was frozen a foot deep for three weeks and he thought it would be the hardiest. In the garden it flowers in summer and never goes completely dormant. Rachel Saunders suggested that Jim use deep containers and to keep these summer growers semi-dormant in winter.

In spite of all the varied experiences a few conclusions can be made based on the discussion. Growing from seed is advised, as is attention to soil requirements and regular watering and fertilization. Planting in the ground may be helpful or at least leaving corms in the same containers for more than one season. Finally, if corms do not show up, they may be still alive and waiting for conditions more to their liking, so do not discard the pots! ❁

Monsonia speciosa, a member of the family Geraniaceae which behaves geophytically, has an interesting name derivation. Lady Anne Vane was the great grand-daughter of Charles II, who after a divorce in 1757, married Col. George Monson. She was a keen naturalist and in 1774, while *en route* to Calcutta to join her husband, went walking to collect wild flowers at the Cape with Thunberg and Masson. Linnaeus in 1764 wrote her a most interesting "Love Letter" claiming to have been infatuated with her for a long time, although he had never met her, and asking if he could name this genus after her "so that your name may be commemorated in the Kingdom of Flora".

The Main Genera of Iridaceae in the Cape Region
A simplified vegetative key

1. Rootstock a rhizome; leaves without a midrib: **Group 1**
   Aristea, Bobartia, Klattia, Nivenia, Witsenia
1'. Rootstock a corm:
   2. Corm naked, potato-like; leaves usually without a midrib: **Group 2**
      Ferraria
   2'. Corm covered with tunics; leaves usually with a midrib but if not, then channeled or grooved:
      3. Leaves channelled or gutter-like, with hard yellow or white conical tips; corm tunics coarsely netted in a fish-bone pattern; underground part of stem white or yellow: **Group 3**
         Moraea
      3'. Leaves not channelled; corm tunics various:
         4. Corms asymmetrical or bell-shaped, the tunics hard and woody: **Group 4**
            Geissorhiza, Hesperantha, Lapeirousia, Melaspherula, Romulea, Syringodea
         4'. Corms symmetrical:
            5. Leaves with several equally developed veins and no midrib, either flat or pleated; corms usually deeply buried with tough, fibrous tunics extending in a neck: **Group 5**
               Babiana, Tritoniopsis
            5'. Leaves usually with a midrib or if not, then grooved or cylindrical:
               6. Tunics evenly and finely netted; leaves always sword-shaped and in a distinct fan: **Group 6**
                  Freesia, Ixia, Sparaxis, Tritonia
               6'. Tunics not evenly and finely netted; leaves various: **Group 7**
                  Chasmanthe, Gladiolus, Micranthus, Thereianthus, Watsonia, Xenoscapa

Genera excluded: *Devia, Dietes, Pillansia*

Diagnostic Descriptions
Group 1

ARISTEA 50 species, sub-Saharan Africa and Madagascar
Rhizomatous evergreen perennials. Leaves in loose fans, often tough and fibrous, without a midrib. Inflorescence a spathe-enclosed cluster, often many aggregated in large compound structures. Flowers blue, lasting less than a day, wilting in the early afternoon, tepals almost free; style curving away from the centre, not divided above but notched or lobed at the tip, the lobes fringed.

KLATTIA 3 species, Western Cape
Woody evergreen shrubs. Leaves in tight fans, fairly tough and fibrous, without a midrib. Inflorescence of paired flowers, clustered in a tight head. Flowers yellow, red or purple; tepals linear and united into a short tube; style 3-notched at the tip.

NIVENIA 10 species, Western Cape
Woody evergreen shrubs. Leaves in tight fans, fairly tough and fibrous, without a midrib. Inflorescence of paired or single flowers, often arranged in compound flat-topped clusters. Flowers blue; tepals united into a slender tube; style usually divided above into three slender branches.

WITSENIA 1 species, Western Cape
Woody evergreen shrub. Leaves in tight fans, fibrous, without a midrib. Inflorescence of paired or single flowers arranged in racemes. Flowers blackish-green with yellow velvety tepals united into a long tube and remaining closed; stamens enclosed in the flower; style minutely notched at the apex.

BOBARTIA 14 species, Western to Eastern Cape
Rhizomatous evergreen perennials. Leaves in a basal tuft, tough and fibrous, mostly long and cylindrical. Inflorescence a spathe-enclosed cluster, usually aggregated in heads. Flowers on hairy pedicels, yellow, lasting less than a day; tepals free or united into a short tube style divided into 3 thread-like branches extending between the stamens.

Group 2

FERRARIA 10 species, Western Cape through Namibia to south tropical Africa
Cormous perennials. Leaves sword-shaped, usually without a midrib. Inflorescence a spathe-enclosed cluster, spathes large and fleshy. Flowers shades of yellow to brown, irregularly speckled, mostly lasting less than a day; tepals free, the margins curled; stamen filaments united into a column; style branches fringed, concealing the anthers.

Group 3

MORAEA about 195 species, sub-Saharan Africa and Mediterranean to Middle East
Cormous perennials. Leaves channelled or round in cross-section. Inflorescence in a spathe-enclosed cluster. Flowers mostly blue or yellow, often lasting less than a day; stamen filaments united into a column; style branches mostly flattened and petal-like, topped by paired crests and a transverse stigma lobe. The genus now includes *Galaxia, Gynandriris, Hexaglottis, Barnardiella* and *Homeria*.

Group 4

GEISSORHIZA about 85 species, mainly Western Cape, also Namaqualand and western Karoo.

Cormous perennials, corm coats woody and overlapping as if tiled or in concentric layers. Leaves mostly sword-shaped, sometimes ridged or rounded in cross section. Inflorescence a spike, with flowers spirally arranged, bracts green. Flowers mostly blue to purple, white or yellow, usually actinomorphic; style slender; divided into three short recurved branches, sometimes curving downward.

HESPERANTHA about 55 species, sub-Saharan Africa
Cormous perennials, corms often bell-shaped with woody coats. Leaves sword-shaped. Inflorescence a spike with flowers spirally arranged, bracts green. Flowers mostly white or pink, actinomorphic, often opening in the late afternoon or evening; style dividing at the top of the tube, the branches thread-like and spreading.

LAPEIROUSIA 40 species, sub-Saharan Africa, mainly western South Africa and Namibia
Cormous perennials, corms bell-shaped with woody coats, the stems often compressed and angled or winged. Leaves few, often ridged or sickle-shaped with curled margins. Inflorescence a 2-ranked spike or flat-topped panicle, bracts green. Flowers variously coloured, cup-shaped or 2-lipped, the tepals united into a long or short tube; stamens symmetrical or arched together; style dividing into three deeply divided branches.

MELASPHERULA 1 species, southern Namibia to Western Cape
Cormous perennial, corm bell-shaped with woody coat. Leaves sword-shaped, soft. Inflorescence a panicle with delicate wiry branches, bracts green. Flowers white to yellow, 2- lipped, tepals united into a short tube; stamens arched together; style dividing into three short branches.

ROMULEA about 95 species, southern Africa to southern Europe and Middle East, but mainly western Karoo and Western Cape
Cormous perennials, corm mostly asymmetric with woody coats. Leaves thread-like with narrow longitudinal grooves. Inflorescence single-flowered, the flowers often borne at ground level, bracts green, firm, often with transparent margins. Flowers mostly cup-shaped, variously coloured, often white or yellow in the cup, the tepals united into a short or long tube; style divided into three short deeply forked branches.

SYRINGODEA about 8 species, Western and Eastern Cape
Cormous perennials, the corm asymmetric, with woody coats. Leaves flat or channeled. Inflorescence single-flowered, the flowers often borne at ground level, bracts membranous, transparent, tubular below. Flowers actinomorphic, blue, the tepals united into a slender tube; style divided into three short deeply forked branches.

Group 5

BABIANA about 65 species, southern Africa and Socotra
Cormous perennials. Leaves sword-shaped, pleated, usually hairy. Inflorescence a spike with flowers arranged in 2-ranks or a spiral, bracts green with dry tips, mostly hairy. Flowers variously coloured, frequently blue, often 2-lipped, tepals united into a short or long

tube; stamens arched together or symmetrically arranged; style dividing into three short branches.

TRITONIOPSIS 21 species, Western to Eastern Cape
Cormous perennials. Leaves sword-shaped to strap-like, with 2-6 main veins, often dry at flowering. Inflorescence a spike, with flowers spirally arranged, bracts short, mostly dry and chaffy, the inner longer than the outer. Flowers cream, pink or yellow to red, mostly 2-lipped, the tepals united into a tube; stamens arched together, soon curling apart; style dividing into three short branches.

Group 6

FREESIA 14 species, Western Cape and Karoo to tropical Africa
Cormous perennials, corms conical with fibrous netted coats. Leaves sword-shaped, often with rounded tips, soft-textured. Inflorescence a horizontal and scalloped spike, the bracts green, sometimes with dry tips. Flowers mostly cream to yellow, strongly scented, tepals united into a long, usually deeply cupped tube; stamens arching together; style dividing into three deeply forked branches.

IXIA 48 species, Namaqualand to Eastern Cape
Cormous perennials, corms with fibrous, netted coats. Leaves sword-shaped, sometimes blunt. Inflorescence a spike with flowers spirally arranged, flower stalk wiry, bracts membranous, the outer bracts 3-pointed. Flowers variously coloured, often dark in the centre, actinomorphic, tepals united into a slender tube; style dividing near the top of the tube, branches simple, short.

SPARAXIS 15 species, Western Cape to western Karoo
Cormous perennials, corms with netted, often finely fibrous coats. Leaves sword-shaped. Inflorescence a spike with the flowers spirally arranged or in 2-ranks, bracts dry, crinkled, translucent flecked with brown. Flowers variously coloured, cup-shaped or 2-lipped; tepals joined into a short or long tube; stamens arched together or symmetrically arranged; style dividing into three short to long branches.

TRITONIA 28 species, southern Africa, mainly winter rainfall
Cormous perennials, corms with netted fibrous coats. Leaves sword-shaped, sometimes the margins crisped, inrolled or winged. Inflorescence a spike with the flowers usually in 1 rank; bracts green or dry and membranous or papery, the outer bracts 3-pointed. Flowers usually zygomorphic, variously coloured; tepals joined into a short or long tube; stamens usually arched together; style dividing into three short branches.

Group 7

CHASMANTHE 3 species, Northern to Eastern Cape
Cormous perennials. Leaves sword-shaped. Inflorescence a spike, with flowers in one or two ranks, bracts green with dry tips. Flowers orange, 2-lipped, tepals united into a long

tube which is very narrow at the base and tubular above; stamens arched together; style dividing into three short branches; seeds orange.

GLADIOLUS about 250 species, Africa and Madagascar, Eurasia
Cormous perennials, Leaves sword-shaped or round in cross section and longitudinally grooved, sometimes hairy. Inflorescence mostly a 1-ranked spike, bracts green. Flowers variously coloured, mostly 2-lipped, often scented, tepals united below into a tube; stamens mostly arched together; style dividing into three short branches; seeds flattened with a broad wing.

MICRANTHUS 3 species, Western Cape
Cormous perennials. Leaves sword-shaped and flat or hollow and cylindrical. Inflorescence a spike, with the flowers crowded into 2-ranks, the bracts often dry and with transparent edges. Flowers zygomorphic, small, mostly blue, stamens arched together; style dividing into three deeply forked branches.

THEREIANTHUS 8 species, Western Cape
Cormous perennials. Leaves sword-shaped or terete. Inflorescnce a spike, with the flowers spirally arranged or more or less crowded together in two ranks, the bracts firm, green below and dry above. Flowers zygomorphic, small, mostly blue, stamens arched together; style dividing into three deeply forked branches,

WATSONIA 51 species, Namaqualand to Northern Province, mainly Western Cape
Cormous perennials. Leaves sword-shaped, tough and leathery. Inflorescence a spike with the flowers in 2 ranks, the bracts firm and green or dry. Flowers mostly zygomorphic and red or pink; tepals united into a long tube; stamens mostly arched together; style dividing into three deeply forked branches.

XENOSCAPA 2 species, Namaqualand and Western Cape
Cormous perennials. Leaves sword-shaped, prostrate, blunt, soft-textured. Inflorescence branched with solitary flowers, the bracts firm and green. Flowers zygomorphic, white to pink; tepals united into a long tube; stamens arched together; style dividing into three deeply forked branches.

"The outstanding objection to botany has always been that it is a pursuit that amuses the fancy and exercises the memory without improving the mind or advancing any real knowledge and where the science is carried no further than a mere systematic classification the charge is but too true. But the botanist should be by no means content with a list of names: he should study plants, should investigate the laws of vegetation, should promote their cultivation, and graft the gardener, the planter and the husbandman on the phytologist. Not that system is to be thrown aside; without system the field of Nature would be a pathless wilderness, but system should be subservient to, not the main object of, pursuit."

Gilbert White (1778) Letter no. 40 to Barrington

Effects of the weather on flower pollination and seed set

Rod Saunders

After three years of desperately hot dry summers, abnormally dry winters and a number of disastrous fires, those of us living in the SW Cape are beginning to realise that global warming is no myth. One of the predictions of global warming is that climates will become more extreme – hotter summers, colder winters and drier or wetter periods than usual, and all of these symptoms were seen in Africa this year. Floods in the summer rainfall areas of Southern Africa, droughts in the Mediterranean areas of the Western Cape and Morocco, abnormal droughts in Kenya. How do these changes in weather influence the flora and can the plants cope?

After the fires in the SW Cape, we were treated to some spectacular displays of bulbs in flower – Franschoek Pass had successive flowerings of first *Watsonia distans*, then *Watsonia borbonica*, followed by the bright red *Watsonia angusta*. These flushes of *Watsonias* were punctuated by wonderful sweeps of *Moraeas, Wachendorfias, Geissorhizas* and *Hesperanthas, Kniphofias* and *Gladioli*. The bulbous plants did well and most set good seed. Prior to this latest fire, the area had last burned about 5 years previously. This favoured the bulbous plants, but has proved disastrous for the serotinous seeded Proteaceae, as they had not yet reached maturity. As a result the entire floral composition has been altered in this area with an almost total extinction of *Protea* species relying on seeds for regeneration, and only re-sprouters persisting.

On some of the higher mountains of the Cape, we saw magnificent displays of *Brunsvigia marginata* with hundreds of plants in flower during March. But such was the fickleness of the wind, that almost the whole time that they were in flower the south easter blew strongly, thereby preventing them from being pollinated by *Aeropetes tulbaghia*, the Mountain Pride butterfly. On visiting the area in April and May, we found that perhaps a third of the plants had set seed, and those only in very sheltered areas away from the incessant wind. The original plants had done well and looked healthy, but seed set per plant was poor, and those seeds that had formed were now shrivelling in the hot dry conditions. So overall, the plant population probably did not increase at all, despite the many flowers.

In Namaqualand tourism has fared badly in the last few years, and this year may be no better. Last year the first rains fell in July, too late for the spring display in August/September. September came and went with not a sign of flowers. And then, six weeks later than usual, parts of Namaqualand erupted into spectacular flower with beautiful displays of *Pelargonium incrassatum, Hesperantha pauciflora* and *Bulbinella* species, and alas, not a tourist in sight! The irregularities of the rain resulted in the best displays of *Pelargonium incrassatum* that I have ever seen. With their big underground storage organs the plants are well able to make use of the indifferent rain and can flower successfully. They could easily out-compete the annuals and grasses which require more regular rainfall to reach full maturity. However, at the time of flowering, the temperature suddenly changed from a nice warm 20 – 25° C to a blistering 38° C, and this resulted in all the plants aborting

their flowers and going prematurely dormant within a couple of days with no seed setting. Such high temperatures so early in the season are most unusual for the Cape, and the only way that the plants can cope, is by going dormant early at the expense of seed production.

Further south in Nieuwoudtville, the low rainfall also favoured the flowering of bulbous plants at the expense of the more weedy annuals which require a more regular rainfall to germinate and complete their life cycles. The displays there were more specialised with a whole succession of bulbous plants flowering over a five week period. The rainfall was sufficiently regular that most bulbous species in this area set good seed. Those that fared worst were the late flowering species such as *Gynandriris pritzellii* (now *Moraea pritzellii*) and some of the *Babiana* species, as when they were in flower, the rains had stopped and the temperatures soared.

Further west on the coast, *Babiana thunbergii* flowered en masse with a display covering several hectacres – the best display in that area for years. A visit to the site six weeks later revealed that not a single plant had set seed. I can only assume that the cause was either drought and that the flowers aborted, or that once again the pollinators, sunbirds, were blown around by the strong winds that sweep off the sea.

In the summer rainfall area which enjoyed unusually heavy rain this last summer, there were similar oddities – *Gladiolus saundersii* set hardly any seed at all at higher elevation, although seed set was fine at lower localities. I suspect that because of the long periods of cold cloudy conditions at the time of flowering, the pollinator, once again *Aeropetes tulbaghia*, was unable to visit the flowers.

So on the whole, the flora is not really coping with the changes in weather, and nor are the pollinators.
In the Western Cape we are waiting to see if the dry spell we are experiencing is a hiccup in the weather, or a more long term trend associated with global warming. I desperately hope it is merely a hiccup, although who knows. With the incidence of fires becoming ever more frequent, it may be "adieus fynbos" and the Cape may become well known for its bulb displays instead of its annuals! However, if the bulbs are to survive, both they and their pollinators may have to go through some very rapid evolutionary changes to cope with lower rainfall, stronger earlier winds, hot instead of warm springs, and intensely hot dry summers with no mid-summer showers to relieve the drought.

Mealy bug infestations are a problem in bulb collections. The small, oval, flat, sucking insects, usually coated with a loose mass of white waxy threads, like tiny tufts of cotton wool, get down in between the bulb scales, into the roots, under the corm tunics, etc. They are difficult to treat because of their waxy covering, and because the eggs can remain dormant for 8 months so re-infections occur constantly. Treatments vary from synthetic pyrethroids, to nicotine sprays, to organophosphates, to "mealybug destroyers" – 4mm black ladybugs originally from Australia, and available commercially from several companies in

the USA. Apparently 2-5 "destroyers" per plant will clear all mealy bugs within hours as they have large appetites! Normal ladybugs will also eat young mealy bugs.

Ornamental Container Landscaping with Indigenous Bulbs

Charles Craib

South African bulbs have enormous potential for container landscaping. This has not been realised as yet owing to the limited amount of pottery available suited to this purpose and the small number of people with interest and expertise in this area.

In the last five years a number of specialist potters have been offering their attractive and unique hand made containers for sale. These range from sculptured stoneware to containers with a richly coloured rough earthy texture ideally suited to our indigenous flora.

In recent years I have been involved with the presentation of several bulbous species in containers and the techniques used are discussed below with examples.

Some bulbs are most attractively and ornamentally displayed in containers where the pot surface and finish is able to mimic the natural colours and textures of the plant's natural habitat. Anne Sole a craftsman potter on the Crocodile Ramble (1) produces moss pots. These are large rough textured hand made pots which attract moss growth to their surfaces. I use *Ledebouria galpini*i in these pots with a rough gritty pinkish coloured sand finish. The mauve pustulate *L. galpinii* leaves are particularly suited to display amongst sand and moss. This replicates the natural beauty of the sand patches with moss and pebbles where the plants grow. Two to four bowls of different heights and size, planted with *L. galpinii* usually create the right effect in a medium sized mixed bowl landscaping project.

Interesting foliage lends itself to container landscaping. Amongst the spotted leaved plants *Eucomis vandermerwei* takes pride of place for landscaping with terracotta pots. I use large terracotta pots with a gritty texture and deep pinkish red tinge made by Keith Hamilton. The bulbs are planted in the centre of the pot surrounded by a carefully placed rim of shale fragments. These vary in colour and are mainly buff, sienna-brown, reddish-brown and a rich slate blue. All the colours of the pot and shale decoration are found in the variable dark spotting on the *E. vandermerwei* leaves as well as the unusual and interesting burgundy flowers.

Leaf texture is provided by a range of South African bulbs. One of the most interesting subjects is *Massonia jasminiflora*. This dwarf species has prostrate lime green leaves and also occurs in populations with rich ruby red and dark brown pustulates. I use both forms of this species for planting in simple bowls made at the Serobe Pottery near Rustenburg in the North West Province. The pots are mostly a pinkish buff but none in a batch are exactly the same colour. The pustulate leaved bulbs are displayed in a central circle planting in the pot

amongst dark coarse basalt gravel, with a few angular pebbles with a dull Naples Yellow colour. The lime green bulbs look attractive when planted in a similar manner but displayed with an olive brown irregular gravel unique to the Wolmaransstad area of the North West Province. *M. jasminiflora* flowers smell strongly of cooking apples and are very ornamental. This is an added attraction for container landscaping.

Bulbs which grow partly exposed above the surface of the soil are particularly interesting for landscaping. *Scilla natalensis* is one such example. I use these large bulbs with big terracotta Keith Hamilton pots. Bulbs with different sizes are planted and surrounded by very large buff coloured pebbles. The pots are attractive in dormancy with the rough bulb scales prominent amongst the pebbles. When the pastel blue flowers emerge they contrast nicely with the ochres, browns and pinks of the bulbs, pot and its decoration.

A significant dimension to ornamental container planting is the interplay of sunlight and shadow. An awareness of how this works as well as the ability to appreciate light and shadow is an integral part of container planting. Equally important is a well developed perception of which kinds of containers work with different architecture and garden layout. Mistakes can easily be made if the transition from a micro to a macro scale is inappropriate.

One of my challenges is to explore the perceptions of depth that can be created on the surface of containers planted with indigenous bulbs. In this instance three ingredients work closely together; light and shadow, different heights of bulbs and leaves and different colour gravel and pebble finishes.

Container landscaping with indigenous bulbs is only possible when plants can be produced in nurseries in sufficient quantities. Fortunately even very rare bulbs such as *L. galpinii* can be produced from seed, in cultivation.

1.The Crocodile Ramble comprises a number of varied artists and craftsmen based between the northern outskirts of Johannesburg and Hartebeestpoort Dam. Some of South Africa's most talented craftsmen potters live and work here. ❁

IBSA is spending money and energy on creating mini-reserves of endangered species. The yellow Daubenya Reserve was the first one. This is a laudable conservation effort, BUT it carries an inherent danger. If the plants are self-incompatible, i.e. cannot produce viable seed by self-pollination, a small protected area tends to fill up with specimens which are closely inbred. Cross pollination between "brother/sister, father/son" etc specimens is as much incompatibility as self-pollination. So long as the bulbs survive, which may even be for centuries, they will flower but the seed will be less and less both in quantity and in viability. We suspect this is already the case with *Haemanthus nortieri*, and any conservation project for that species should include the transfer of pollen between the two or three known colonies. Specimens treated in this way should then be tagged for seed

collection. This explains the error of those conservationists who insist that any re-introduced material should come only from the same locality. They are encouraging sterile in-breeding.

South African Botany – how it all started

Andries de Villiers

Charles John Andersson explored "Greater Namaqualand" from the Richtersveld to Lake Ngami near the Okavango Delta, and from the Atlantic to the Orange River, between the years 1850 and 1854. He was an anthropologist and, to some extent, a zoologist with little interest in flowers, but he wrote one short passage about a flower, "I ascended the rock where I discovered a most beautiful air-plant in full blossom, of a bright scarlet colour, with the lower part of the interior of the corolla tinged with yellow…..". What was it? What did he mean by "air-plant"? This small mystery set me to work. I am satisfied that the plant was *Cyrtanthus herrei*, first collected in seed by Marloth in 1925, and eventually named from the next collection in 1932. "Air-plant" in this context meaning that most of the bulb grew above the ground. Andersson is not one of the figures in our botanical history. Nobody, not even the encyclopedic Gunn and Codd thinks of him as one, but this little riddle made me think about the earliest collectors, two and a half centuries before Andersson, most of whom are even more anonymous, but who laid the foundations of Cape floral history. We are inclined to write off the period before the arrival of Sparrman, Thunberg and Masson in 1772, but the story starts very much earlier in, or even before, 1590.

It starts with anonymous sailors who collected plants and seeds at places where ships called to water and replenish wood and meat stocks. The plants were carried to Europe, mainly to Amsterdam and from there trickled into botanical gardens on the Continent and in England. The first whose name has come down to us was Govarus de Keyser who brought *Haemanthus coccineus* and *H. sanguineus* in 1603 to his brother in Weibaden, and bulbs were distributed among botanists. Mathias de l'Obel saw one in flower in 1605, but these were by no means the first bulbs brought from the Cape. Clusius (Charles de l'Ecluse) in 1605 saw *Ornithogalum* which had been grown and flowered in Amsterdam. The first Cape flowers brought to Europe were mainly bulbs or xerophytes because only bulbs in dormancy and xerophytes could survive the long voyage. The Dutch East India Company did in fact encourage ship's captains to bring such material, not only from the East, but also from the Cape. The story is told of how sailors, sent ashore with a cask cut in half to collect soil and plants, were surrounded by a party of locals who attacked them to obtain iron, and who succeeded in highjacking the iron spade, but not the cask with its iron hoops!

By 1612 Emanuel Sweert, a nurseryman, produced a catalogue of Cape bulbs for sale at the Frankfurt Fair. It included, in addition to the larger Amaryllids, species of *Gladiolus*. Our problem is that the names of the sailor collectors were seldom given, but only those of the botanists who named and described the specimens. In 1629 Parkinson was growing more than a thousand species of "exotics" in London, including Clusius' *Ornithogalum*. Giovanni

Ferrari of Sienna published a book in 1633 with illustrations of *Amaryllis belladonna*, *Ferraria crispa* and *Haemanthus* species.

The second named collector was Justus Heurnius who collected in 1624 at the Cape on his way to Batavia. He not only collected specimens, but drew and described them. He sent his material to his brother Otto who had succeeded their father as Professor of Medicine at Leiden University. He then passed them on to Johannes van Stapel, and thus started the family of Stapeliea - Heurnius is commemorated in the genus Huernia (somebody got the spelling wrong!). His drawing of *Stapelia variegata* (now *Orbea variegata*) is still one of the best ever made.

Thus, when Jan van Riebeeck set up the victualling station at the Cape in 1652, not only were many Cape bulbs currently in cultivation in Europe, but collecting points from Mosselbaai to Saldanha Bay were well known to the mariners of many nations. The effect of van Riebeeck's settlement was that plants which flowered, and were therefore known, at times other than the bi-annual sailing season, could be assembled for despatch to Amsterdam. Van Riebeeck himself was keenly interested in plants and though his primary concern was with those which might be of value to the settlement, he did urge his staff to bring in "interesting" plants. He also reserved a section of the Company Garden for indigenous species. The most important effect of the Settlement was to extend the collecting area, not for the purpose of botanising , but for trading (or raiding) for cattle and sheep. The names of the Master Gardeners now begin to appear in our botanical history. Boom, who laid out a new garden at Rondebosch and the almond hedge at Kirstenbosch. He was followed by Martin Jacobsz and then Jacob van Roosendael and, in 1662, by Harman Gresnick. Better known Masters of the Garden were Hendrick Oldeland (1688-1697) and Jan Hartog who succeeded him until 1715. They belonged to the van der Stel period and were both trained botanists. During these early years exploratory excursions were despatched under van Meerhoff who penetrated to Namaqualand. In 1669 Johan Schreyer was left at Cape Town because of scurvy and he accompanied several expeditions. He had flowers painted, sending the paintings and boxes of bulbs back to Holland. In 1679 Simon van der Stel became the 8th Commander and 3rd Governor of the Cape. He features strongly in our botanical history. He clawed his way up the social and political ladder both by his considerable talents and by a careful cultivation of the noble families which controlled the Dutch East India Company. One of these was Hendrik Adriaan van Reede tot Drakenstein, Lord of Mijdrecht. He was a competent botanist, who later, as Governor of Malabar, published the 12 volume Hortus Malabaricus. Another Director of the Company was Nicolaas Corneliszoon Witsen whose family made almost a hereditary matter of the Burgermasterskip of Amsterdam. Van der Stel was anxious to explore the possibility of exploiting the copper deposits at Springbok. The Directors approved an expedition and he set off with a major caravan which included Hendrik Claudius as botanical artist. The expedition lasted from August 1785 to January 1786, the botanical record of which was a Codex presented to Nicolaas Witsen. It is one of the most famous pieces of botanical literature in the world - much has been written about it, and much is still being written. There were by then numerous codices and paintings of South African plants in Europe. There is no doubt that the Witsen Codex passed through many hands and may have been

split up and re-assembled more than once and copied, perhaps in Cape Town and in Europe. It is now fairly generally accepted that the most complete original is the one in Dublin, but folios in Cape Town and elsewhere may contain some of the original paintings and drawings. Contemporary with the Witsen Codex there were publications of collections made in 1672 by Paul Hermann on his way to Ceylon and by Willem ten Rhyne on his way to Java in 1673.

Although collections and publications continued after the van der Stel expedition and, indeed, the volume of plant exports increased, nearly 90 years were to pass before international botanists, or specifically botanical expeditions, were to come to the Cape, this despite international pressure on the Company. The reasons for this were manifold. The Company was feeling the effects of international competition in its spice trade and feared for the safety of its hold on the Cape if foreign vessels and foreign exploration were allowed easy access. Maladministration was driving the Company into bankruptcy and internal politics in Holland was undermining its power and authority. The wars in Europe were causing alliances to form and break up, each leaving the Netherlands more vulnerable. Even botany itself was going through a period of confusion and controversy as it gradually rationalised itself as a scientific discipline. Botanists, and perhaps most particularly, taxonomists, were by debate and even bitter argument, establishing a canon which would replace the old Naturalist by the new Botanist. Carolus Linnaeus (Karl Linne), 1707-1778, was imposing himself and his philosophy on the botanical world starting with his Systema Naturae (1735) and his Species Plantarum (1753).

In all those years only five men can be said to have been individually significant in Cape botany. George Bell collected between March and May of 1730 on his way to Canton. His contribution was significant in that what he collected was sent to Chelsea Garden and had its effect on the rise of Kew. The Abbé de la Caille who was a French astronomer was at the Cape from 1751 to 1753. Carl Gustaf Ekeberg was a ship's captain in the Swedish East India Company. He visited the Cape 10 times between 1742 and 1778 supplying specimens to Linnaeus, and was chiefly instrumental in arranging for Sparrman to come to the Cape in 1772. Rijk Tulbagh, Governor from 1751 to 1771 and finally Johann Andreas Ange, Rijk Tulbagh's Superintendent of the Garden, who came to the Cape in 1747. He accompanied several expeditions including one to the Karas Mountains in 1761, but his chief importance lies in his support of the Thunberg/Sparrman/Masson explorations of 1772 and later.

That is where all our botany started – from the 1590s. It came of age from 1772 with Thunberg and Masson, but not that egregious liar Sparrman – but that is another story! ❁

We tend to think that the pollinator's "reward" is nectar or pollen (bees in particular) but this is not solely the case. Some beetles which retain their chewing mouth parts, make a "salad" of chewed up petals or surplus stamens soaked in nectar from the nectar wells, drawing extra substance from the "mixed" vegetable matter. While doing this they still fulfill their pollination function as they move from plant to plant. Beetle predation of tepals may in fact

be a sign of efficient cross-pollination and not the danger to the colony which we usually think it is.

Lachenalia: the grower's teaser

Andries de Villiers

Lachenalia are extraordinarily easy to grow. Indeed, they grow themselves without help and a species comfortable with your garden soil soon spreads. Since they grow so easily we tend to ignore the very mysterious features of the different species. There is no comprehensive monograph about the genus (because no botanist has really got to grips with it!) and we are content to grow it for the floral end product.

Some species have "included" stamens, i.e. hidden within the perianth. Some have well exserted stamens. Why? And what is the effect? Obviously included stamen species must be pollinated by an actual pollinator, an insect which can enter the perianth tube or at least project sufficient of itself to contact the stamens. The only alternative would be to assume self-pollination, but this would imply no genetic contribution from other specimens. This is not unknown in nature, but it offends our perception of our bulbous flora. So we postulate insect pollination and we do indeed see insects thrusting into them, notably the universal pollinators like the honey bee. But if we open the flowers we find the stigmas and stamens in close proximity and so we may speculate disparate timing of receptability, and/or chemical rejection of self pollination. Then there are the species with long exserted stamens with equally long exserted styles. This also suggests disparate acceptance periods. This is supported by the fact that the styles are more in evidence lower in the spike after the anthers have shed their pollen or been broken off. But it also suggests that whereas "included" specimens depend on penetration, "exserted" specimens need only depend on insects crawling over the spike and even possibly, wind pollination, although the nature of the anthers does not seem to support the latter.

All species have gibbosities at the lips of the tepals. Why? There appears to be no mechanical or structural need for this. Some plants, notably *Calycanthus occidentalis* in California, have edible "pimples" on the stamens as a reward for the pollinators and some plants have oil glands. We have not seen "predated" gibbosities, nor have we the equipment to check for oil. Yet there must be a purpose.

Some specimens have pustules on the leaves, either quite large "blisters" or a mass of very small pimples. Why? This feature is not peculiar to *Lachenalia*. It occurs in other genera of Hyacinthaceae, notably *Massonia*. It has been used to identify the species *Lachenalia pustulata*, but even in this species, it is not present in all specimens. Like gibbosities, there is no structural need for pustules and, not being part of the sexual (flower) element of the plant, is unlikely to be concerned with pollination. Yet nature does not waste energy on the useless. Morphological features without present purpose do occur, like our appendix, as degenerate traces of past use. Are *Lachenalia* pustules residues of a primitive ancestor?

Some species have terminal sterile undeveloped flowers (*L. mutabilis*). These may function in pollinator attraction. At least a use can be suggested, but what of species which frequently produce long and virtually useless bracts at the top of the rachis? Is it a coincidence that *Eucomis* with its large bracts is also in the Hyacinthaceae? Most forms of the complex *L. aloides* also have terminal sterile vestigal flowers not strikingly differently coloured like *L. mutabilis*.

So many unexplained mysteries. But should IBSA really care? The plants are attractive and easy to grow. So many "new" forms and varieties are constantly being found to excite the more botanically inclined members who can each be proud of his/her own "new" species. Good luck to them!

The early history of IBSA

Johan Loubser

The initiative to establish an organisation for individuals interested in growing South African bulbous plants was entirely that of Mrs Margaret Thomas. She invited Mrs L. Richfield, Mr Harry Goemans, Mr J.E. Retief (snr), Mr J.D. Retief (jr) and me to establish a society. A meeting was convened, but as Mrs Richfield and Mr Goemans could not attend, only four persons came together on the 15th April 1961 at the home of Mr J.E. Retief in Lincoln Street, Bellville. It was decided to go ahead with the establishment of the society, which was named the Indigenous Bulb Growers Association of South Africa (Die Inheemse Bolkwekersvereniging van Suid-Afrika).

As a matter of course, Mrs Thomas became the first chairperson and I was asked to take on the job of secretary – a position in which I continued for 24 years until I declined further nomination. The constitution was a combined effort by the first members and the committee was extended as more suitable members became available. It was decided to make the Cape the permanent headquarters of the Association and with that in view, it was written into the constitution that the Annual General Meeting had to be either in or near Cape Town. That did not exclude meetings elsewhere, but to my knowledge, only one meeting, convened by the secretary, took place in Pretoria. Initially there were restrictions on membership. A new member had to pay an entry fee and membership was subject to approval by the committee. It was, however, soon realised that these restrictions served no useful purpose and membership was thrown open to everybody. Due to the small membership, meetings were held at the homes of members.

After two years an annual newsletter was started. A list of members was published in the newsletter for the first time after five years. There were 26 members at this time, 4 of whom were from overseas. Some of these members played such an important role in botany and horticulture that they are worth mentioning here:

- Col. H.A. Baker is famous for his work on the genus *Erica*. It was never clear which bulbous plants he grew or was interested in, but he attended meetings regularly and took great interest in the proceedings.
- Dr M.C. Botha is best remembered as a member of Prof Chris Barnard's team who did the world's first heart transplant. He grew *Lachenalias* and ground orchids. It was reported recently that he is studying the medicinal properties of certain South African plants.
- Mrs Cynthia Giddy did not stick to bulbous plants for long. She turned to *Aloes*, and still later, to Cycads on which she produced a magnificent book.
- Mr Gordon Mac Neil farmed with tropical fruit in the Northern Transvaal but was also well known for his collection of Amaryllids, said to be amongst the biggest in the world. He was particularly interested in *Cyrtanthus* species. His discovery of *Cyrtanthus eucallis* was related in the IBSA newsletter. It is believed that he was the first to cross *C. sanguineus* and *C. elatus*. He also described and published *Nerine platypetala* as a new species. He was however commemorated by Obermeyer who named *Gladiolus macneilii* after him.
- Mrs L. Richfield took over the farm "Bloemerf" from Kay Stanford. The book "A garden of South African Flowers" by Stanford gives a good idea of what bulbous plants were grown in what was probably the first nursery to concentrate on South African plants. Unfortunately there is no indication of when the book was written and even the publishers were unaware of it's existence!
- Mr Wally Stevens of Bastia Hill, New Zealand, was one of the very first overseas horticulturists who concentrated on South African plants – Proteaceae, Ericaeae and South African bulbs in "bulb-less" New Zealand. He claimed that he had 10 000 *Romulea sabulosa* in flower at one stage! He also grew *Moraea gigandra* in large numbers and considered *Gladiolus bullatus* "no problem". He and his wife visited the Cape in 1964 and attended an IBSA meeting.
- Mrs Margaret Thomas first got involved with South African bulbous plants when she went to work at Kirstenbosch in 1935. Here she also got acquainted with two famous botanists who specialised in bulbous plants: Joyce Lewis and Buddy Barker (the first names are given as she used them). She frequently accompanied them on their field trips and took an active part in the search for rare or new species. So it is no wonder that there are several plants bearing her name – *Lachenalia thomasiae, Ixia thomasiae* and *Moraea thomasiae*. The last two were named by Peter Goldblatt, so it was not all for friendship for which she was honoured. At a ripe age when she went back to work at Kirstenbosch again, she was not in the bulbous plant section, but she made quite a name for herself with the success she had with growing shrubs and trees from cuttings.

After the first five years the membership continued to grow slowly but steadily, both locally and overseas. It created a wide correspondence which was enjoyed very much, covering most of the globe from Chile and California to Japan and New Zealand. It was inevitable that overseas visitors also started to arrive at my home in Bellville. They came from the USA, England, Holland, France, Germany, Japan and Australia.

For health reasons I practically abandoned IBSA and my bulbs when I retired and moved to the Strand. ❁

Bibliography of articles on SA bulbous genera (continued)

Members of IBSA often ask where they can find the latest revision of a genus, so we have compiled a bibliography of the latest literature relating to genera of bulbous plants. In the last two issues of the Bulletin we covered Amaryllidaceae, Colchicaceae, Eriospermaceae, Asphodelaceae, Anthericaceae, Iridaceae and Alliaceae. In this Bulletin we include Araceae, Haemodoracae, Hyacinthaceae, Hypoxidaceae, Lanariaceae, Tecophilaceae, and Velloziaceae.

Aracaea

Amorphophallus Verdoorn, I. (1957/8) Flowering Plants of Africa 32: t.1251.

Gonatopus Brown, N. (1902) Flora of tropical Africa 8: 196-197.

Stylochiton Obermeyer, A. (1972) Flowering Plants of Africa 42: t. 1648.

Zamioculcas Obermeyer, A. & Strey, R. (1969) Flowering Plants of Africa 40: t. 1562.

Zantedeschia Letty, C. (1973) The genus *Zantedeschia*. Bothalia 11: 5-26.
Perry, P. (1989) A new species of *Zantedeschia* from the western Cape. SA Journal of Botany 55: 447-451.
Singh, Y. et al (1995) Know your Arums: an easy guide to identify members of the genus *Zantedeschia*. Veld and Flora 81: 54-55.

Haemodoraceae

Barberetta Hilliard, O. & Burtt, B. (1971) Notes from the Royal Botanic Garden Edinburgh 31: 1-31.

Dilatris Barker, W. (1940) The genus *Dilatris* with the description of a new species. Journal of SA Botany 6: 147-164.

Wachendorfia Barker, W. (1949) Journal of SA Botany 15: 39-42

Hyacinthaceae

Albuca Baker, J. (1897) Flora capensis 6: 451-462.
Muller-Doblies, U. Feddes Repertorium 105: 365-368.
Stedje, B. (1996) Flora of tropical east Africa 21-24.

Amphisiphon Jessop, J. (1976) Studies in the bulbous Liliaceae in SA. Journal of SA Botany 42: 401-437.

Androsiphon Jessop, J. (1976) See *Amphisiphon* above.

Bowiea van Jaarsveld, E. (1983) Journal of SA Botany 49: 343-346.
Stedje, B. (1996) Flora of tropical east Africa 28.

Daubenya Jessop, J. (1976) See *Amphisiphon* above.

Dipcadi Obermeyer, A. (1963) The SA species of *Dipcadi*. Bothalia 8: 117-137.
Stedje, B. (1996) Flora of tropical east Africa 2-6.

Drimia Jessop, J. (1977) The taxonomy of *Drimia* and certain allied genera. Journal of SA Botany 43: 265-319.

Stedje, B. (1996) Flora of tropical east Africa 15-21.

Drimiopsis Jessop, J. (1972) *Drimiopsis* and *Resnova*. Journal of SA Botany 38: 151-162.
Stedje, B. (1996) Flora of tropical east Africa 6-10.

Eucomis Reyneke, W. (1972) Unpublished M.Sc. thesis, University of Pretoria.
Reyneke, W. (1980) Three subspecies of *E. autumnalis*. Bothalia 13: 140-142.

Galtonia Hilliard,O & Burtt, B. (1988) A revision of *Galtonia*. Notes from the Royal Botanic Gardens Edinburgh 45: 95-104.

Lachenalia Duncan, G. (1996) The *Lachenalia* handbook. Annals of the Kirstenbosch Botanic Garden 17: 1-71.
Dold, A. & Phillipson, P. (1998) A revision of *Lachenalia* in the Eastern Cape. Bothalia 28: 141-149.
Numerous new species have been published by W. Barker and G. Duncan as follows:
Barker, W. (1979) Journal of SA Botany 45: 193-219.
Barker, W. (1983) Journal of SA Botany 49: 423-444.
Barker, W. (1989) SA Journal of Botany 55: 630-646.
Duncan, G. (1996) Bothalia 26: 1-9.
Duncan, G. (1997) Bothalia 27: 7-15.
Duncan, G. (1998) Bothalia 28: 131-139.

Ledebouria Jessop, J. (1970) *Scilla, Schizocarpus* and *Ledebouria*. Journal of SA Botany 36: 233-266.
Stedje, B. (1996) Flora of tropical east Africa 10-15.

Lindneria Speta, L. (1985) Botanische Jahrbucher 106: 123.

Litanthus Baker, J. (1897) Flora capensis 6: 444-445.

Massonia Jessop, J. (1976) See *Amphisiphon* above.

Neobakeria Jessop, J. (1976) See *Amphisiphon* above.

Neopatersonia Lewis, G. (1952) Annals of the SA Museum 40: 6-9.

Ornithogalum Obermeyer, A. (1978) *Ornithogalum*: a revision of the southern African species. Bothalia 12: 323-376.
Stedje, B. (1996) Flora of tropical east Africa 24-28.

Polyxena Jessop, J. (1976) See *Amphisiphon* above.

Rhadamanthus Nordenstam, B. (1970) Botaniska Notiser 123: 155-182.

Schizobasis Baker, J. (1896) Flora capensis 6: 367-369.
Stedje, B. (1996) Flora of tropical east Africa 28.

Scilla Jessop, J. (1970) See *Ledebouria* above.
Stedje, B. (1996) Flora of tropical east Africa 10.

Tenicroa Obermeyer, A. (1980) Bothalia 13: 111-114.
Obermeyer, A. (1981) Journal of SA Botany 47: 577.

Thuranthos Stirton,C. (1976) Bothalia 12: 161-165.
Jessop, J. (1977) Journal of SA Botany 43: 265-319.
Obermeyer, A. (1980) Bothalia 13: 139.

Urginea Jessop, J. (1977) See *Drimia* above.
Stedje, B. (1996) Flora of tropical east Africa 15-21.

Veltheimia Baker, J. (1897) Flora capensis 6: 470-471.

Whiteheadia Jessop, J. (1976) See *Amphisiphon* above.

Hypoxidaceae

Empodium Hilliard, O. & Burtt, B. (1973) Notes from the Royal Botanic Garden Edinburgh 32: 308-314.

Hypoxis Baker. J. (1896) Flora capensis 6: 174-189.

Pauridia Thompson, M. (1972) Studies in the Hypoxidaceae. 3. The genus *Pauridia*. Bothalia 12: 621-625.

Spiloxene Garside, S. (1936) The SA species of *Spiloxene*. Journal of Botany 74: 267-269.

Rhodohypoxis Hilliard, O. & Burtt, B. (1978) Notes from the Royal Botanic Garden Edinburgh 36: 43-76.

Saniella Hilliard, O. & Burtt, B. (1978) Notes from the Royal Botanic Garden Edinburgh 36: 70-72.

Lanariaceae

Lanaria Dahlgren R. & Van Wyk, A. (1988) Monographs in Systematic Botany from the Missouri Botanical Garden 25: 1-94.

Tecophilaceae

Cyanella Scott, G. (1991) A revision of *Cyanella* excluding *C. amboensis*. SA Journal of Botany 57: 34-54.

Walleria Carter, S. (1962) Revision of *Walleria* and *Cyanastrum*. Kew Bulletin 16: 185-195.

Velloziaceae

Talbotia Smith, L. & Ayensu, E. (1974) Classification of old world Velloziaceae. Kew Bulletin 29: 181-205.

Xerophyta Smith, L. & Ayensu, E. (1974) As above.

Cyrtanthus ventricosus flowered 12 days after Constantiaberg on the Cape Peninsula went up in flames, an interval that has been noted before. There was a mass of flowering on the burnt ground and a few specimens on unburnt ground within a few meters of the edge of the burn. The latter plants with flowers can be ascribed to the smoke-borne regulators, but if that was the sole factor there would have been more, and they would have fringed the burn in a diminishing ring. Some other factor must have been present in the burnt area, a factor which was limited very strictly to the burnt area. We know that one of the factors which influences flowering of all plants is light. There would be a greater intensity of light reaching the surface of the burnt soil but also there would be a difference in wavelength because on the unburnt area, the groundcover vegetation would have had some filtering effect. It would be interesting to grow *C. ventricosus* under a series of filters to test whether wavelength is a factor.

C.ventricosus normally has two leaves produced after the flowers. The flowers number 3 to 7, are in an umbel, and are red and tubular. The bright red is particularly spectacular against the newly blackened soil after a fire.

New species in the genus *Moraea*

In the latest issue of Novon (Novon (2000) 10: 14-21), Peter Goldblatt and John Manning have published four new *Moraea* species.

Moraea vespertina: The plants are 70-100cm in height, and the corm tunics consist of coarse red-brown fibers in a herring-bone pattern. There are 4-6 channeled leaves, coming off an erect viscous stem. The inflorescence consists of several white almost translucent lemon-scented flowers – the outer tepals have yellow nectar guides streaked with darker veins and the inner tepals are smaller and unmarked. Flowering occurs during October and November, and flowers open between 4 and 8 pm – hence the specific name which means "early evening". This species was found in seasonally waterlogged areas near Nieuwoudtville in heavy red doleritic clay in dolerite outcrops.

Moraea deltoidea: This species, from the Klein River Mountains near Hermanus, is found on well-watered south facing rocky sandstone slopes. The plants are 30-40cm high and the globose corms are covered with light brown finely textured fibers. The single channeled leaf is longer than the stem. The flowers are pale creamy yellow, and the outer tepals have dark speckles at the base of the limb and on the claw, resembling *Moraea unguiculata*. The plants flower in October and November, particularly after fires.

Moraea vigilans: 50-70cm in height with one channeled leaf as long as the stem but bent and trailing. The flowers are usually white, sometimes faintly tinged with mauve, and are lightly sweetly scented. The outer tepal limbs have bluish bands or spots towards the base and are speckled with mauve on the lower third. The flowers last about two days and are found in January and February. Plants are common on steep moist slopes in basalt outcrops in the high Drakensberg, and often occur in peaty loam.

Moraea melanops: These tiny plants are only 4cm high and the leaves are not clearly distinguished from the floral bracts. Each inflorescence is a loose cluster of 2-5 flowers, each with a leaf-like bract. The flowers are light to dark purple with a dark purple-black in the centre. Plants flower well in August and September after disturbance to the ground. They are found in the Bredasdorp area and are difficult to see as they are small and they are often mistaken for *Romulea rosea* and various *Oxalis* species which they resemble. The species was originally described and named as *Galaxia barnardii*. ❁

Bulb growers were always under the impression that *Cyrtanthus* seeds have a very short viability. "Always sow *Cyrtanthus* seeds within a month or two" was the golden rule. Recently, a paper bag full of *Cyrtanthus elatus* seeds dated February 1999 was found at the back of the fridge. Instead of throwing the seed away, it was sown on the surface of potting soil and was kept moist. Within 10 days the seed tray looked like a lush lawn – almost every one of those 13 month old seeds had germinated! So perhaps *Cyrtanthus* seed doesn't have to be as fresh as we believed, as long as it is stored in the fridge.

Book Review

Growing Bulbs Indoors

by P.J.M. Knippels

Publisher: A.A.Balkema, Rotterdam (1999) IBSN 90 5410 467 8
Distributed in South Africa by Balkema Marketing, PO Box 317, Claremont 7735

At last, at long long last, a thoroughly good and practical book on growing bulbs, corms and rhizomes indoors (including glasshouses) in the northern hemisphere (particularly western Europe and the UK). Written in curt, direct and simple language, the book starts with chapters on the main growing areas and the factors of cultivation. Amazingly, all this is covered exhaustively in a mere 16 pages of practical advice and explanation more than sufficient for amateur growers. Although intended for the northern hemisphere, it is so explicit that there is not a member in the temperate zones (the Cape, Chile, California, the Mediterranean, SW and SE Australia) who will not benefit from it however experienced in field collecting of indigenous species.

Then follow 61 pages of specific advice on 51 genera with an easy to interpret table for each, plotting growth phases, watering requirements, planting depth, etc. Naturally the month of the year cursor will need to be shifted to conform to southern hemisphere conditions, but the phase sequencing remains the same.

The genera covered tend to be biased towards bulbs rather than corms, but it is interesting to see that some genera which we tend to ignore are fully and usefully covered, eg. *Dipcadi, Drimia, Homeria, Whiteheadia*, etc. At the end of the book there are appendices, one of which is a bibliography. This is important because it indicates the names used for species. Where names have changed subsequent to the authority listed, the reader must, from personal knowledge, update the name. Of rather less value to local members, but not to northern hemisphere members, is a classification of genera in terms of cultivation difficulty. For instance, *Lachenalia* is allocated to very experienced growers, whereas our local members rather have difficulty in controlling the proliferation of some members of this genus! Similarly *Gethyllis*, which presents no difficulty to us, requires great experience in the northern hemisphere. Interspersed in the book there are nearly 70 large colour photos not merely illustrating flowers but also germination, pests and growth phases.

It is such a good book that it seems almost invidious to mention any adverse opinion. But there are two things which should perhaps be noted. I am utterly inefficient at proofreading, so I have every sympathy with the occasional typographical error (never in the specific names). The other is one about which I have written before. The photographs are very clear, well enlarged and show precisely what they are intended to illustrate, BUT, like virtually all botanical photographs, they do not have a size referral. I cannot understand what difficulty prevents the inclusion, in one corner, of a scale appropriate to that particular photograph. For example there is a beautiful illustration of *Ledebouria socialis* in which the

flowers appear to be the same size as those of *Nerine bowdenii* on the same page. Anyone growing *L. socialis* that size would be delighted!

A good and outstandingly useful book, and a great credit to IBSA member, P. Knippels.

A.T. de Villiers

P.S. One would like to give the price of the book, but who knows what the exchange rate will be by the time it gets here! The basic price appears to be Euro 25. ❁

Seed Germination by Jim Shields, an IBS member

Seed germination is a fascinating topic. Most seeds have a dormant state they can enter, and many have an obligate dormancy requirement. Others seeds will germinate at once if planted while still fresh, i.e. not dried out thoroughly yet; but they can go dormant if dried. Almost all seeds will go into a dormant state if desiccated, as the alternative might be to die. The fleshy seeds of Amaryllidaceae are an exception, and even the flat papery seeds of Amaryllids have a limited shelf-life.

Breaking dormancy in seeds, once established, can be tricky. The conditions necessary for breaking dormancy are likely to vary wildly from genus to genus. Even within a genus, it can vary from species to species. Some of the complex sequences of cold vs heat or wet vs dry that have been described for breaking dormancy in some seeds is quite intimidating. If you don't already know from the observations of others what germination requirements are for a seed new to you, start by considering the climate where it grew naturally.

My "default" treatment for seeds from temperate climates where there is a cold winter, is stratification. This is treatment of seeds with a period of damp cold. Note that dry cold will not break the dormancy of some species; dry cold storage is not stratification. Dryness is an environmental signal to most seeds that they dare not germinate, and might prolong dormancy. To break dormancy in dry seeds, I store them slightly moist in the refrigerator (at 4°C) for 30 to 90 days. To maintain the humid atmosphere, I put the seeds in a small zip-top plastic bag and close it tightly.

In general, there are really only three variables that you need to manipulate to break dormancy and induce germination: moisture, temperature, and sometimes light. Diurnal temperature cycling may also play a role, as can photoperiod. I usually try germination of stratified seeds at constant temperature of about 21°C under fluorescent lights (16 hrs/day) and this often works. Where it fails, I next try moving the pots into the cool greenhouse (in winter) or outside into the lath house (in summer). Here they experience temperature fluctuations of up to +/- 5 to 10°C degrees between day and night. This gets most seeds to germinate for me.

There are still some seeds which resist germination, and I try following Jack Elliott's advice to leave the pots of un-germinated seeds outdoors in a protected spot year round for a few years. I'm mostly waiting for results on those trials!

Book Review

Cederberg , Clanwilliam & Biedouw Valley South African Wild Flower Guide No. 10

By G. van Rooyen, H Steyn & R de Villiers
Published by The Botanical Society of South Africa (1999)

This guide covers a strip of country, mostly mountainous, 90km long stretching from the Gifberg and Matsikamma in the north to Citrusdal in the south, from the Heerenlogement in the west to the Biedouw Valley in the east. It also takes in both the Sneeuberg and the Sneeukop, areas of higher altitude. Thus within a fairly small area it includes a variety of soils and rock types. Inevitably in an area of so many diverse and specialised habitats, the 97 bulbous plants described in the book (pages 44 to 84) cannot hope to cover the full range of interesting and beautiful species, but the selection is suitable to the aim declared in the Introduction: for "holidaymakers and hikers". Naturally, for the same reason, it concentrates on the traditional tourist periods: Easter and late August.
What is not suitable to the aim is the text written by two members of the Botany Department of Pretoria University. One can hardly blame them for knowing little about the area though it passes all understanding why the Botanical Society imported authors from 1 500km away when there is such a wealth of experience and knowledge here. The authors were led around by officials of the Dept. of Nature Conservation, who, on the whole, did a good job.

The text is haphazard in arrangement: flowering times sometimes shown and sometimes not; plant heights usually given, but flower sizes not; the data sequence is variable which makes it difficult to compare species; some very odd stylistic writing. On page 56 clearly headed AMARYLLIDACEAE, there are 4 species. From top to bottom the texts start "A geophyte", "A bulbous geophyte", "A geophyte", "A bulbous geophyte" which is quite unnecessary. The texts are all too often mere precis of monographs using terms (such as "fused stamens", "winged styles", etc) which holidaymakers generally are unlikely to find useful, and identifying features of bulb tunics which one trusts that "holidaymakers and hikers" will never see! In contrast the photography is generally excellent except in some instances where the identifying floral feature is hidden in the interests of full face flower beauty (the long tube of *Babiana geniculata* and the rings of fringing cataphylls of *Gethyllis verticillata*). The *Nerine sarniensis* selected for photography was quite the scruffiest and least typical specimen that can be imagined. In a very few cases the photograph differs from the species name, for instance the *Spiloxene* on page 63 is not *S. capensis*.

If you want to complete the series of Botanical Society Field Guides, then buy the book - otherwise wait for the Bulb Book in 2001!

A.T. de Villiers

The IBSA Annual General Meeting 2000

The AGM was held on Saturday the 26th February 2000 at the lecture hall at Kirstenbosch Botanic Garden. About 51 members attended the meeting, there were 2 visitors, and apologies were received from 7 people.

The minutes of the previous meeting were approved and matters arising discussed. The financial report was discussed by Gordon Summerfield. He explained that funds that were donated to IBSA for conservation were earmarked for that purpose and would not simply disappear into running expenses. The bank statement dated 31/12/99 showed that IBSA had R7041 in the account.

Gordon Summerfield gave the Chairman's report:

- IBSA is continuing to grow in membership and meeting attendance. The plants exhibited by members at the meetings have increased in species and number, and the quality is excellent.
- Two most successful mini-shows were held during the year – one at Paarl and one at Kirstenbosch. Everyone who helped at these shows was thanked. The show at Paarl was particularly successful, with many people admiring the large range of bulbs on show. These mini-shows are extremely important in giving members an opportunity to display their pots, and to show the public what a wealth of geophytes we have in this country and in cultivation.
- The Daubenya conservation project was completed in September 1999 when a "commemorative" ceremony was held at Middelpos. Everyone involved in the project was thanked for his/her assistance.
- IBSA enjoyed a good deal of media exposure during the year, and Ernst van Jaarsveld was thanked for his help in this regard.
- Finally, thanks were extended to the members who organise refreshments at each meeting, and to the outgoing committee members.

Election of office bearers: The following members were re-elected:
Chairman: Gordon Summerfield
Vice-chairman: Henry Pauw
Secretary and treasurer: Paul von Stein
Additional members: Andries de Villiers, Alan Horstmann, Rachel Saunders, Carol Turnley-Jones.

The meeting ended as usual on a high note – the sale of corms and bulbs. A total of R2 137 was raised from the sale of seeds, and R453 from book sales. The selection of seeds and corms/bulbs was poorer than usual, and the number of packets for sale was far less than in previous years. It is possible that this was due to the drought which we had experienced, or it could simply have been due to lack of time – time to pollinate the flowers and time to collect, package and label the seeds.