National Pleione Report

incorporating

Hardy Orchids

1996

NATIONAL PLEIONE REPORT 1996

incorporating

HARDY ORCHIDS

Cover Artwork by Brian Whyer. Cover picture Pleione Erebus

Cover Production by Trevor Jones of J&J Photographic.

Cover acrylic donated by Imperial Litho.

Report compiled and produced by Peter Bradbury. Publication date 03:06:96

GROWING DISAS in a FROST FREE GREENHOUSE

If there was one thing those mythical kings enjoyed, it was a good riddle. Take the King of the Sveas for example. He commanded Queen Disa of Sweden to come before him neither naked or clothed. Queen Disa had the measure of him however, and arrived wearing a fishing net. History does not relate how the conversation went after that, but this act of riddlemanship resulted in botanical immortality for the queen by the naming in her honour of the genus of African terrestrial orchids whose type species, **Disa uniflora**, has net-like veining on its dorsal sepal.

I had long admired the beauty of Disa flowers with their glowing pinks, reds, oranges and yellows. As I always saw them growing with tropical orchids on the stands of orchid nurserymen, I assumed they required similar treatment and, lacking a sufficiently heated greenhouse, left them alone. It was nurseryman Keith Andrew, I think, who made a splash with this genus at a Chelsea show 10 years ago and who recommended that they should be grown in conditions that would suit pelargoniums. This sounded more promising!

Since then I have grown a small collection of Disas in what are essentially alpine house conditions, with artificial heat only being used to exclude frost. Under these conditions they multiply steadily and flower regularly. They are not hardy orchids in the sense that they may be grown outdoors in a typical British garden. Needless to say, many of our favourite 'hardy' orchids wouldn't pass that test! They are, however, good complements for genera such as Pleione, Serapias ans Pterostylis (which share the greenhouse with my disas) and have the definite advantage, under my conditions at least, of flowering in mid Summer when the flowers of these other orchids are over, with the flowers lasting in good condition for 3 or 4 weeks.

Compost. Composts, eh? Who can resist the temptation to adjust, customise and tweak? I have experimented mercilessly on my long-suffering Disas. I have tried peat and perlite. I have tried moss. I have even, under the influence of Dr L. Vogelpoel, tried pure grit. It says something for the constitution of Disas that they have survived relatively unscathed - my oldest plants are coming up to their 10th birthday. The one thing these different composts have in common I suppose is that they are 'open' and therefore allow air to reach the roots. I would not recommend the pure grit unless you are prepared to put in more time with a watering can than I am, or to grow them in a hydroculture system as many of the best growers in South Africa do. Under my growing conditions the best plants have been grown in sphagnum moss and perlite, and if you can find a commercial source of supply of suitable moss, this is what I would recommend. Failing this, a compost of 2 parts sphagnum peat to 1 part perlite is readily mixed and produces almost as good results as moss.

Cultivation. My Disa year starts after flowering has finished, say August or early September. This is when the plants are divided and repotted. At this time the old leaves are dying, the new tubers formed during the previous growing season are starting to produce roots and the new rosette of leaves is starting to grow. Disa roots are fairly brittle, and I think that it is important not to leave the repotting job too late or it will be difficult to avoid significant damage to the new root system. A good show may be had by planting 3 or4 tubers (depending on size) in a 5" or 6" pot. The pots are watered and then the plants are left alone to settle in. I always water with rainwater - there is a fair bit of evidence that Disas are intolerant of hard or treated water. On the other hand, Stoutamire (1990b), found no problems in using rainwater of pH 3.5 to 4 which was acid enough to perforate downspouts!

Repotting every year is not necessary if the compost remains in good condition. If left for more than a couple of years without being repotted, however, in my experience the plants tend to produce large numbers of non-flowering rosettes. Disentangling the roots is also more difficult under these circumstances.

Between repotting and early spring, when temperatures start to rise, the plants don't seem to need much water under my conditions, but it is important that the compost is kept damp (dryness at the roots seems to be strongly resented by Disas). During the autumn and winter the plants continue to grow slowly, building a rosette of leaves from the centre of which, it is hoped, the flower spike will extend in spring and summer. During these cold months the plants get whatever sun is going. Due to an imperfect heating control system (i.e.me) temperatures in the greenhouse do occasionally dip below freezing, with no ill effects. I'm not recommending this though!

As the weather warms in the spring and the plants respond by quickening their growth and, if of flowering size, produce flower spikes. More water is given. From about April or May to August I stand my plants in a tray which is kept filled with rainwater to a depth of 2 or 3cm. During this period the greenhouse is shaded with paint-on shading (mainly to reduce greenhouse temperatures - I have no evidence that Disas need the shade). All greenhouse doors and windows are kept fully open, so the plants get plenty of fresh air during the warmer months. The plants flower from June to August.

Disas don't seem to have an obvious rest period and so very dilute plant food (whatever I have to hand) is given occasionally throughout the year.

So far I have not suffered any serious pest or disease problems, although there is an often quoted view that the plants are susceptible to rot. Perhaps my 'hard' growing conditions discourage this? As the rosettes increase in size the smaller outer leaves occasionally turn yellow and start to die. If this happens I pull them away from the rosette.

These growing conditions are not too dissimilar from those in the plants' natural habitat described by Stoutamire (1990a) who in passing mentions that temperatures can drop below freezing ('Disa uniflora plants....hardly visible between icicles and drifted snow'). The plants of Disa uniflora are commonly found near streams. I have noticed when repotting that the new tubers are often found at the bottom of the pots, and have therefore been submerged under water for several months without harm.

Needless to say, the above is not the only way to grow Disas and many expert growers (e,g, Cribb and Bailes, 1989 and Owen, 1990) recommend higher minimum temperatures in Winter of between 40 and 55F. It would seem that these temperatures are not needed, however.

Selection of plants

There are more than 100 species of Disa found in Africa; of these only half a dozen or so have been used to any extent in hybridisation programmes, and only one, **Disa uniflora**, is commonly seen for sale. There are however, many hybrids available: for an expert and comprehensive review of Disa hybridisation in South Africa, the 11 part series by Dr L Vogelpoel in the Orchid Review between June 1987 and July 1989 is required reading (Vogelpoel, 1987-1989).

It is, to me, a curious feature of much Disa hybridisation that considerable skill and effort has been expended in the pursuit of an 'ideal' flower shape, large, full and symmetrical. In the process the individual charms and characteristics of the component species seem to have been submerged. The result is a large number of hybrids of great beauty in a wide range of colours, but in a surprisingly narrow range of flower shapes and characters. Because of this there is little point in listing the plants I would recommend from my own, limited, experience - just dip in ; every one is a winner! As is the case with any complex hybrid the colour and form can vary significantly, so it avoids surprises if you buy your plants in flower, or go for named grexes. (You may, of course, enjoy surprises.) The one 'must have', perhaps, is **Disa uniflora** itself in one or more of its colour forms.

In summary Disas used to have a reputation for being difficult to grow. I find that they perform well if grown in a greenhouse kept just frost free in Winter, and given plenty of fresh air and water in the Summer. Perhaps the two most important cultural points to remember are to use rainwater rather than tap water, and never to let the plants get dry at the roots. Following these basic principles should ensure a good display of flowers and, who knows, perhaps a glimpse of the Queen of Sweden's clothes.

References

Cribb, P. and Bailes, C. 1989, Hardy Orchids, Christoper Helm.

Owen, M.S., 1990, Growing Disas at Longwood Gardens, Amer. Orchid Soc. Bull., 59p 797.

Stoutamire, W., 1990a, Disas in South Africa, Amer.Orchid Soc. Bull., 59 p782.

Stoutamire, W., 1990b, Disa Cultivation in Ohio, Amer. Orchid Soc. Bull., 59 p803

Vogelpoel, L., 1987-1989, New Horizons in Disa breeding, Orchid Review 95 pp176-181, 229-235, 262-269, 96 pp4-10, 54-58, 108-110, 155-157, 244-248, 97 pp105-112, 176-181, 213-218.

Ian Rodgers, Wiltshire.

****

ON THE PARENTAGE OF PLEIONE X CONFUSA

When I first dreampt up this article all that I wanted to do was to bring up to date my views on the possible/probable parentage of **P X Confusa.** But as will become apparent, once I started raking up my half forgotten knowledge I generated a hornets nest of conclusions.
As is already known I was the first person to realise that the only yellow flowered clone of Pleione in cultivation prior to 1980 was not **P.forrestii** as had been widely assumed. My breeding studies had shown me quite clearly that it was a species hybrid between the true **forrestii** which nobody had seen and a second species which likewise nobody knew. This second species was larger flowered, white or pink, and with a saccate nectary pouch to the lip. **Grandiflora** was the only species published at that time that remotely matched this description so I tentatively suggested that **grandiflora** was the second species. So much I published in 1980. Kew was very soon off the mark to confirm

my conclusions and to name the hybrid as **X confusa**, but in the meantime they moved the goalposts. The hitherto single species **grandiflora** was split into two parts - **grandiflora** and **albiflora** - with **albiflora** identified as the missing parent rather than **grandiflora**. I am no taxonomist and I have until now happily agreed with their modification of my thesis. But today the worm turns and I will suggest that **grandiflora** is after all the proper name for the missing parent.

Incidentally before pushing on with my main argument I should clear up one point about **albiflora**. The only clone available reputedly of that species is **'Pinchbeck Diamond'**. However **'Pinchbeck Diamond'** is not an **albiflora** - it is not any species. It is a sterile species hybrid, almost certainly an **Eiger**, i.e. **formosana x humilis**.

Looking back 1980 must have been a very exciting year for me. It was the year of my first visit to China when I visited the herbaria of Peking, Chengtu and Kunming. I went of course to look at sheets of Pleione and I learnt much. For instance there were only six sheets of **forrestii** altogether and two of these were white flowered so it was no surprise to me when white flowered **forrestii** started to appear in Britain. There were no sheets of **grandiflora** in China (nor of course any of **albiflora**) in contrast to the several we had of that name in Britain at that time. However it was obvious to me that though they had no sheets called **grandiflora**, they did have several sheets which looked to me as though they were **grandiflora**, but pink flowered instead of white, stored under other names, mostly as **hookeriana** but also sometimes as **bulbocodioides**. I concluded that **grandiflora** is a pink flowered species with rarer white forms and that somehow all **grandiflora** sheets in Britain were of the white form. Once again an aside is of interest - Forrest sent bulbs of **grandiflora** to Edinburgh at the same time as he sent **forrestii** (now **X confusa**). But the **grandiflora** on

flowering was magenta instead of the expected white and therefore was not **grandiflora.**
Now to come up to date, Phillip Cribb (Orchid Review, Sept.'94) has recently seen this **hookeriana** material in Peking and recognised some true **hookeriana** with small flowers and also some larger flowered specimens which he claims are **aurita.** At the same time by prior publication **aurita** has to change its name to **chunii.** Obviously we are talking about the same sheets of plants - Cribb's **chunii** and my **grandiflora** - and the matter must be discussed. Obviously too I shall give way (officially) to taxanomic opinion and I am not a taxonomist, but I know unofficially that I am right.
The first point concerns the flower colour, which is well known to be of little taxanomic value. There are albino forms of bluebells, heather,thrift, **P.formosana, P.forrestii** - and these do not merit specific recognition. Why should white forms of **chunii** be called **albiflora**?
Secondly, callus hairs/callus lamellae. This distinction is not nearly so clear cut as it first appears. **P.humilis** has hairs but looking at lots of flowers you find many in which a few hairs are confluent to give a vestige of a lamella fragment. **P.coronaria** with lamellae instead of hairs is identical to **humilis** in all other respects. In my opinion these two are the same species with a minor genetic variation. By the same token I doubt whether the distinction between **grandiflora** and **albiflora** holds.
Thus I regard **grandiflora, albiflora, aurita** and **chunii** as conspecific. By priority **grandiflora** named in 1903 is the name for the whole lot. Therefore I claim that X **confusa** is after all **forrestii X grandiflora.** Incidentally this also means that **confusa** is the proper name for **kohlsii.**
While sticking my head in the fire I might as well end with two other convictions of mine:

1. There is no species **limprichtii.** We have two clones under that name (incidentally why no more?). The so called pink **limprichtii** or 'Primrose Peach' is a diploid **bulbocodioides.** The 'common' **limprichtii** is a **speciosa.** All **speciosa** are tetraploid and come from a wetter habitat than other Pleiones. All other wild gathered Pleiones are either diploid (the commoner condition) or hexaploid with the single exception of the 'common' **limprichtii** (a tetraploid) which likewise comes from a wetter habitat. The hybrid between **speciosa** and 'common' **limprichtii** - Etna - is fully fertile just as we should expect in a cross between two members of the same species.
Incidentally I am not convinced that **formosana** is sufficiently different from **bulbocodioides** to merit a specific name. The two are different of course but so are Zulus and Chinamen and we call them the same species.

2. All naturally occurring hexaploids are **bulbocodioides** but these are specificly different from the diploid forms of **bulbocodioides** and the two need separate latin names. The diploid has normal shaped pseudobulbs with the main bud at the bottom and it grows naturally as an epiphyte/epilith. The hexaploid has a broad flat pseudobulb with the main bud at the side just like **yunnanensis,** and like **yunnanensis** it grows in China under the soil.

David Harberd, Leeds.

****

TERRESTRIAL EXPERIMENT

The idea of a long term project was not originally intended, but developed over

a number of years as my ideas changed and experience grew.
My background comes from thirty years of growing the warm hybrid Paphiopedilums of which the collection continues to grow. In 1989 on a chance visit to a nursery in Newbury I made my first acquaintance with **Dactylorhiza fuchsii.** Since then steady progress has been made with other hardy orchids notably **Orchis morio.** These were obtained from a farmer in whose field they grew. Experiments started as to the compost I should use. I reflected back to a holiday I had taken previously when I had hired a motor home and made a journey from Calgary along the Trans Canada Highway to Jasper through the Rocky Mountains. While visiting Lake Louise I detoured into the Yoho National Park. I was interested in Emerald Lake. Walking along the western shore we then turned east and came upon a large alluvial flow. These were established some 6000 years ago by meltwater surges as the earths climate warmed rapidly. The material flowing down from the mountains was a coarse sand or gravel. This material is gradually filling up the lake in the Emerald basin. Where the coniferous and gravel coverage is, is where **Cypripedium calceolus** grows. The thought struck me that the gravel was not suitable without the humus from the conifers and yet must have contained minerals from the rocks. I therefore concentrated on good drainage of 75% fine sand taken from just under the surface of the grass. This was no problem as there is an old sand quarry nearby - the remaining 25% was John Innes No3. This potting mixture being so open was unstable so grass seed was sown on the surface. When the grass seed germinated a small $\frac{3}{4}$" plug of soil was removed and the Morio tubers, three to a four inch clay pot were inserted, the idea being that the roots of the grass would bind the soil together. At this stage a small channel was scraped around the rim of the pot, water only being given in this channel keeping the centre crown dry. This worked well, for in the cold damp days of November no water was required as condensation

that settled on the tips of the grass ran down into the soil, this being enough to sustain the plants over this period until weather conditions improved to water normally.
During that year the **Morio's** took harsh treatment with soil removal to see how roots had progressed and development of the new tuber. In late February the new tuber was about 3/8" long and was removed and potted up in moist sand, all cuts were treated with yellow sulphur. The Mother tuber was grown on without root disturbance and on removal in May after flowering, had produced another new tuber. That year I made a profit.
Now to get to **Ophrys apifera.** In 1992 five tubers came my way, I treated them the same as **O.morio** with the addition of chalk to the compost and had similar results. Growing in pots was successful but I had become dissatisfied you see. While on holiday in Crete, I had accidentally stumbled on the Spelii Plateau. The sight of hundreds of **Orchis pauciflora** was a sight I will not forget. On my return how could I create this effect? Quite clearly **pauciflora** was out of the question as were the hills but I do have an interest in bonsai and much admire the Japanese who are successful in creating gardens in small confined spaces.
Being a small town house land at the rear is at a premium and my 20'X8' greenhouse dosen't help but I did find an area of 10'X6'. This area was dug out and sand was added to increase drainage. I then made use of the slow growing and dwarf conifers chosen for their colour of foliage and growth habit and these could be trimmed to keep the height about 2'. From a nearby quarry, suitably shaped rocks were acquired and sunk into the ground and that was pleasing to my eye. Top soil, the same as I had used for potting was prepared and worked around the conifers and rocks with slopes added. Completed in the autumn, fine grass was sown, after germination, 3/4" plugs were removed and each **apifera**

tuber inserted. Another advantage of the stones was that I could step from one to the other, thereby avoiding trampling the grass and then cutting the grass with hand shears. This produced a nice springy surface with very good drainage. The practice of walking on the stones would have been much frowned upon in Japanese circles at the Ryoanji Temple, but in this case served a dual purpose. Throughout the winter and spring they grew steadily until in late June, when the first one flowered I must admit, growth was better than when I had grown them in pots. Stems of 15" with seven flowers on several tubers, but as good as they were - I had planted them in small groups - I noticed that the best results had been obtained alongside a path. This path of concrete slabs had been laid some ten years previously with six inches of hardcore and the slabs bedded down in cement. I concluded the drainage beneath was to their liking for on removal after flowering, not only had the size of the tuber increased but they had produced many tiny tubers about 1/8" diameter. But not all was going to plan, in a separate experiment the **Orchis morio** tubers were also planted outside and this was their second year in a similar bed. Three tubers out of eight were slow to surface. Investigating the cause, I found three tubers had made a good half inch of top growth only to find the inside of the tuber eaten out and then rot had set in. This failure caused much 'Railway Esperanto' for not realising what could damage potatoes, a **morio** tuber was a mere snack.

Not wishing this to happen to the **apifera** stock an area of three feet around where I wished to plant them was dug out, sieved and cleaned to a depth of six inches with slug pellets adequately distributed, the grass then being sown as the previous year. The **apifera** tubers were planted in larger groups and in due course in June 95 produced the result I wanted. The very tiny tubers were put into a separate bed and when removed the following autumn, produced more than

one tuber although none had flowered. This surprised me, I had assumed that a tuber would grow to maturity and flower before dividing.
As the **apifera** flowers opened, their pollens were removed and the experiment was taken a step further, for pollinia of other ophrys had been stored in household silver foil - a method passed on by an orchid friend now deceased who used to keep his paphiopedilum pollen this way. The flowers were then pollinated. So far I have observed that the seed pods were smaller from these crosses compared with the selfing and when harvested contained only a small amount of seed.
Another hardy orchid which also enjoys these conditions is **Anacamptis pyramidalis** but suggest using only the smaller tubers. They will still flower, but when the tubers become mature, two foot stems put the plants out of scale against the conifers.
This also applies to **Bletilla** which were planted into a separate bed, with leaves two foot long are used as background plants and are grown among the rocks with apifers in front.
Before closing these notes I should like to give my appreciation to Dr Tom Norman who in the true amateur spirit gave his time, knowlege and material from his own greenhouse. I hope these notes will be taken in that spirit and one last thought - so far I have only had experience in a small number of hardy orchids. I wish I could get my **paphiopedilums** to divide as quickly.

G. King, Oxfordshire. Amateur.

****

GROWING AUSTRALIAN TERRESTRIAL ORCHIDS

There is near 700 species of terrestrial orchids growing in Australia and more are being added regularly as new species are discovered, named or split from named sub-species. I think that's happening everywhere but more so in Australia at present as botanists are gearing up for the publication of the Orchidaceae section of Plants of Australia due sometime in the next few years. One good thing about that is the new books that have been published over the last few years. Another new one, Orchids of Victoria is due to hit the bookshelves in about June of this year (1995) and it will be a beauty - I have seen a proof copy. The photography and detail are superb.

Anyway, I have been growing species terrestrials for the past 15 years and have around 400 Australian species and varieties at present. Thankfully, many are colony formers and most of these are easy to grow and multiply quite rapidly, even in U.K. & Europe according to several friends over there.

I am fortunate to have tubers of a number of European terrestrial species but find them far more difficult to maintain, especially flower, than their Australian counterparts. I'm sure it's more because I know the growing conditions of our species here far better than I do European species. In the main, Mix C as described in Cribb and Bailes "Hardy Orchids" has proven best for the European species grown here, but I find the articles in N.P.R. by so many growers in U.K. and Europe, most helpful.

As far as Australian terrestrials are concerned, I guess the first thing to talk about is the potting mix that forms the basis of the mix for almost all the species that I grow. Let's call it the "Basic Mix".

BASIC MIX:

1 part friable rich loam, not sand with little or no clay content.

1 part Eucalypt leaf mould about 50% rotted down. Eucalypt (Gum Tree) leaf mould because that is the main leaf litter here in our forests. Eucalyptus leaves are slow to decompose unlike Oak or Beech leaves and provides the food chain over a longer period. (But use Oak or Beech if you don't have access to a gum tree.
1 part buzzer chips. This causes the most problems when I try to describe buzzer chips to anyone outside Australia. A buzz saw or planer is the machine that timber merchants use to smooth timber, especially Joinery factories who make window frames etc. The resulting discarded buzzer chips are what is used. They can be very thin or even up to a millimetre or so thick, and quite chunky, each piece may be the size of your thumbnail down to say 3 millimetres' square. Not the long slithers from a hand plane and definitely not saw dust so any fines should be sieved out. The timber can be either soft or hardwood or a mixture of both. Buzzer chips provide the longer term food chain as it takes around a full year to completely break down.
2 parts coarse gravel. I have access to two sizes of washed and graded quartz gravel, the larger size up to 1/8th inch round, the smaller size about 1/16th inch round. Half of each is used in the basic mix.

To each 10 litres of mix, add one dessertspoonful of Blood and Bone fertilizer. Actually this is the only fertilizer my plants receive for the year although some people are now experimenting with weak liquid sprays over the growing season.
The Basic Mix is a very open gritty mix that allows water to flow through the pot after sitting on the surface for no more than a second or two after watering. Use the Basic Mix for species of most genera but some changes are needed for the following:
Corybas (Helmet Orchids): add an extra part of leafmould to the mix.

Caladenia (Spider Orchids) - except the colony forming species - and **Thelymitra** (Sun Orchids): add an extra part of coarse gravel to the Basic Mix.

Much has been written about the pros and cons of using 50% of new mix and 50% of old mix when repotting terrestrials. I do this with every species of every genus. A tuber planted in totally fresh mix, i.e. the first year received seems to do so much better in the second year once the mycorrhiza has had a chance to increase.

Pots

Full size six-inch and 5½ inch squat pots in black plastic are universally used here with preference for pots that have several holes in the bottom as well as around the edges. A square of shade cloth is put in the bottom to stop the gritty mix from washing out.

Planting

Plant the tubers about an inch deep, leaving the surface of the mix about a half inch below the top of the pot. Cover the surface then, with a thin layer of pine needles. In Australia we us **Casuarina** (She Oak) needles but they probably won't be available anywhere else. Growers in South Australia use pine needles with good effect. (Actually I find pine needles excellent as a topping in my Pleione pots and a small ammount of pine needles is included in the Pleione Mix as well). When planting, make sure the mix is just a little damp and then plunge the pot in a bucket of water for some minutes. This settles the mix around the tubers very well. I don't water them again until the dates specified under "Watering".

Pests and diseases

The main nasties are aphids and red spider mite for which I use Malathion. Because the pots are benched high off the ground, I rarely have slug and snail attacks but during winter and spring I scatter snail pellets under the benches as a preventative measure.
Virus does attack from time to time and the only safe way is to remove and dispose of the affected plants. Thankfully we don't get "Black Plague" that some have talked about in England.

pH Characteristics of Australian Species
There is still a lot of work to be done in this area and there are certainly some species that require an alkaline soil mix, but these are the minority. Of the 200 odd pH tests I have conducted in the field in the past year, only one species showed a higher pH reading than 6.25 with the vast majority in the range of 4.5 to 6.0 i.e. very acidic. A few were even recorded at 3.5 to 4.0 but again these are the exception. So as a rule of thumb use an acid mix between 5.0 to 6.0 for best results.

Housing
My shade house consists of a solid fibreglass roof, almost clear in colour, with three sides of white 50% shade cloth, and the western wall, which receives all the weather, of solid fibro cement sheeting, (one panel though is opaque poly carbonate sheet to let in more light). The benches are weldmesh to give as much air circulation as possible. The floor is crushed bluestone rock which helps the water to escape without getting your feet too wet.
Those that don't have the luxury of a shade house use an easterly facing verandah or house eaves quite effectively.

Watering

This is one of the crucial ares for succeeding. Whether it's Australian or European terrestrials, they all rot if kept too wet. I use a soft rose-spray fitting on the hose and water every pot by hand, during the warmer months, every 1-2 weeks and over the colder months, every 2-4 weeks. The top of the pot being dry doesn't mean the pot needs water, for as long as the area where the tubers are growing is damp they will be alright. Lift the pot tag and if there is reasonable moisture showing, they can wait a further few days before the next drink.

Over the summer dormancy, I do give the pots a swish with the hose on hot days to stop any dehydration but full watering ceases from late October/early November and restarts again as follows:

Autumn and early winter flowering species get their first watering on Boxing Day.

Caladenia and **Thelymitra** spacies on 28th February.

All other species on 15th February.

NOTE. Remember, this is late summer in the Southern Hemisphere.

What Species to Grow first?

Start first with the colony forming species, especially **Pterostylis** (Greenhoods) of which there are over 100 species to choose from. Also **Chiloglottis** (Bird Orchids), **Corybas** (Helmet Orchids that grow no taller than one inch), **Acianthus** (Gnat Orchids) and a few species of **Diuris** (Donkey Orchids) and **Caladenia** (Spider Orchids, the latter two being only the colony forming species.

This group is regarded as the easiest and are recommended here for the beginers. Actually some are very easy indeed with many increasing 3 to 4 fold each year. Most have good flowering rates as well.

Recommended species are: **Pterostylis nutans, Pst.curta, Pst.concinna, Pst. baptistii, Chiloglottis trapezieformis, Chil.formicifera, Corybas dilatatus, Cory.fimbriatus, Cory.hispidus, Acianthus pusillus, Diuris corymbosa, Diu. longifolia, Caladenia latifolia, Leptoceras** (syn. Caladenia) **menziesii.**

Then What?

The brightly coloured **Diuris** are many people's choice. They are mostly bright yellow, mottled with brown or purple and white with the occasional pure white plant. A few species multiply well, especially the **Diuris corymbosa** complex that have spaghetti-like tubers that can grow to 6-8 inches long in a single year and multiply at the rate of at least 2 to 1. Plant the tuber flat on the pot and they can shoot from each end next year. A number of new species have been split from the original species that we all knew as **Diuris longifolia** when I first started growing them. **Diuris longifolia** is just one of the many species in the **Diuris corymbosa** complex now.

Many **Diuris** species have elongated or 'tooth' shaped tubers i.e. several points like the roots on a large tooth and while they only rarely multiply, tuber removal works very well with this genus. I have seen it mentioned in earlier NPR editions and we do it the same as that - twist the newly formed tuber off at about flowering time and replace the plant with old tuber attached so that by the time the plant goes dormant, a second or even a third new tuber has formed.

Thelymitra species can also be multiplied this way although there are several types that multiply quite well. Called Sun Orchids for they need warm sun for the flowers to open, they have from 1 to 20 or more star shaped flowers, ranging in colour from mainly blue to pink, yellow and white. These plants tend to grow in drier areas, hence the need for a drier mix (see my note under potting mixes). Probably **Thelymitra nuda** is the more spectacular of the available species.

Caladenia, my favourite genus,- the Spider Orchids, whose flowers range from the size of a 5 cent coin to over 12 inches from top to bottom. As you would expect, the best is also the most difficult and many growers find they can't keep them alive for long at all. The big secret is to keep them absolutely dry during summer dormancy, use a dry mix where the water just won't overflow in the pot because it flows through just as fast as you can hose it onto the surface. Very few species are colony forming although some of the more spectacular species from Western Australia do produce extra tubers and form a clump over a number of years. I only repot this genus if the plant has had a bad year, usually as a result of poor drainage or disease. Otherwise, they remain un-repotted for 5 or 6 years without any additional fertilizer throughout this time.
Probably the two "easiest" species would be **Caladenia dilatata**, the Green Comb Spider Orchid and **Caladenia carnea**, Pink Fingers.
Many **Caladenia** species can be raised from seed sown around the base of the parent plant in April. Then comes the fine line between needing to keep the seedlings moist enough to survive yet the parent plants dry enough not to rot.
There is a lot of work going on with flasking terrestrial seed in Australia (both Aust. & overseas species) and I'm sure we'll see a larger range accessible this way in the near future - it's quite exciting. If you do grow Australian Species, I can recommend the 96 page cultivation book published by Australasian Native Orchid Society Victorian Group Inc. "Cultivation of Australian Native Orchids". The cost is around $10 AUD but I'm not sure what postage and packing would cost - maybe $4 AUD. Half of the book is devoted to terrestrials, the other half, to epiphytes.
I would be interested to hear from anyone in the UK or Europe with problems growing Australian terrestrials.
Good growing and many thanks, Peter for this great publication.

Malcolm Thomas, 23 Outlook Drive, Berwick Vic. 3806, Australia. February 1995.

(I suspect Malcolm might get a number of requests for help, so when you write don't forget to include a reply coupon. P.B.)

****

GOOD OR BAD EXPERIENCES?

First some background information to put my views and experiences into perspective. I bought my first Pleione in March 1995, the usual garden centre **formosana**, this was the start of the story. The following month I bought another eight, the next month I owned a further twenty made up of various **formosana** clones, **speciosa** and **Shantung**. What had I done in the first two months is moved from a controlled single bulb owner to an obsessive mass bulb collector. Fortunately I had flowers off all but one of the **formosana's**, this in retrospect was the reason for my downfall, how can any rational human resist them.

For many years I have kept obscure tropical fish, this in itslf may seem easy, however the ones I keep require specific water pH, food, filtration and tank lighting. The specialist fish hobbist was what my precepts of orchid keepers was based upon, where a similar level of knowledge, regarding the environment of a specimen is to be kept, is needed. The specialist fish hobbist and top showman may well have exactly the same fish and keep it superbly, however they will tell you absolutely nothing of their methods and have been known to go as far as giving almost fatal advice. It was with this baggage that I entered the world of Pleione keeping.

That's the basic background, now to deal with my experiences. My third set of

bulbs were from Mr Redshaw at Springwood Pleione's in Leeds I got his phone number from the RHS. I very apprehensively rang him not wanting to appear stupid. What followed was a great surprise to me, once I had introduced myself and asked for a catalogue we got talking and tentatively I asked if it would be possible to come and see how he grew his Pleione's. To my surprise he seemed pleased that I was so interested and gave me directions and a time when he would be in. The appointment was kept and I picked up yet more bulbs what was more important was the amount of knowledge and time that Mr Redshaw gave me, in the space of two hours or so I learned of the composts, bowls, positions, feeding and also watering that he found worked best. The result being I realised my first bulbs were in completely the wrong medium. (This was confirmed in November by the small size of those bulbs.)

This was only my first experience of someone of great knowledge being so patient understanding and giving up time to talk to me. I rang the gentleman at Hardy Orchids who, even though he could not supply Pleione's, gave me the phone number of Mr Butterfield. By this time I had the Genus Pleione so I knew who this gentleman was. It was daunting to say the least, how could I, a complete new-comer ring the man who wrote the book. I finally worked up the courage and did it. I set out to waste as little of his time as possible, again what followed was a great surprise. We talked for about half an hour, the conversation was two way, he seemed genuinely interested in how my bulbs were doing, said my treatment of them was right and I should have some good bulbs next year. We then talked about how his bulbs were and then how I should keep **forrestii** even though I was not buying one from him. This was of great relief to me that I was able to eliminate problems before they arose, there was no element of "if you want knowledge you will have to pay for it" or "find out the hard way by making mistakes like I did" from either of these nurserymen.

My next move was to obtain Peter Bradbury's list of Pleione's for sale by keepers rather than trade. Being new to this I made the mistake of waiting till evening to contact people. Though it was a mistake from the point of view of extending my collection it was a valuable experience in another respect, in that my view of other keepers was strengthened further. Initially I rang Carl Hardwick, who as others will know, had sold everything by about five minutes after the post arrived, rather than just telling me he had not got what I wanted we talked, he told me how he grew certain bulbs that I am getting next year and what his success rate was. He also told me of his problems this year and asked me where I had obtained some species which made me feel better as this was the first time I had been able to give some help to anyone. My second contact from the list was John Walker, with whom my father once worked we later found out, again someone who had sold out. However, John made the offer of ringing him or to go and see him should I have any problems. He also extended an offer to go and see his Pleione's in flower next year which I shall certainly take up. The last person I contacted was Eric Humphreys from whom I got what I wanted. Even more importantly Eric like all the others talked to me about what medium he used and asked what I used and offered advise.
These are the experiences of a novice keeper who has gained a great deal of theoretical knowledge which I hope will help me produce great bulbs next year. Has my introduction to Pleione's been a good one? Most definitely **YES** and the reason for this is those people with whom I have come into contact, who I hope will read this. The whole ethos is very giving, everone is willing to help, which when you are in my position is greatly appreciated. I would like to finish by saying **THANK YOU** to all those who have helped me.

Lucas R Kelly. Warrington, Cheshire.

CYPRIPEDIUM CALCEOLUS IN NATURAL HABITATS AND IN A GARDEN

C.calceolus, thanks to its size, shape and colour of its flowers, enjoys the highest attention of all our orchids. The interest is further increased by the relative scarcity of the plant.
Lady's slipper is the perenial herb which has a knotty, shortly articulate rhizome with many wiry roots spreading radially out of the plant, shallowly under the soil surface. From the rhizome sprouts an upright, pubescent stem 15-50cm. high, scaly in the lower part, which bears 2-5 broad lanceolate leaves and at the top, in axils of bracts, it carries 2-3, only exceptionally three, flowers. Their slipper like lip is yellow, red spotted inside, petals are more or less screw like twisted, and sepals are rusty brown. Plants with brown spotted, yellow, green or plain yellow or green sepals can be rarely found too.
Vegetation cycle of the cypripedium corresponds to the year's seasons. The adverse winter time overcomes the orchid, underground the perennial rhizome bears several buds. Stem sprouts in April. Flowers open from the second half of May to the end of June, according to the elevation. From June to August it develops fruits and in September or October the surface parts die back.
Pollination is allogamouse, mediated by insects - in this case by bees of the genus Andrena. Fruit is a capsule containing myriads of minute, endospermless seed without differentiated embryos. Dissemination is done by wind. Under favourable conditions seeds fallen into crevices in the ground germinate and in this stage mycorrhiza have to take place if development shall continue.
In **C.calceolus** the cycle takes three years underground and only in the fourth year the first green leaf appears. As soon as an assimilation starts, the mycorrhiza is repressed and the plant becomes fully autotrophic and dependant only on climatic and soil conditions as other green plants. The life cycle from seed

germination to flowering takes nine years at least, in most cases even more. Under favourable conditions the plant grows away and forms a group with several stems.

C.calceolus is the species with the largest appeal of the whole genus Cypripedium. Its distribution is Euro-asiatic: it can be found in most of Europe from England in the northwest and Scandinavia on the north, to evergreen woods in a Mediterranean area. In Alps it ascends up to 1950m. it does not occur in the west of Europe and as a rule avoids coastal regions. In the east its distribution spreads over the Caucasus into the temperate zone of Asia and reaches as far as the Far East. Northern limit of the area represents the southern part of Siberia.

Similar species of Cypripediums, **C.parviflorum** and **C.pubescens**, are growing in North America. In the past they were taken as varieties of **C.calceolus.**

In the Czech Republic, Ladies Slipper occurs in various places, both in Bohemia and Moravia but it is always rather scarce. It grows mostly in warm spots of deciduous woods - Oak, Oak-Hornbeam and Beech. Thin populations can be found under conifers too. Altitudinal range of its distribution is rather broad, from lowlands (about 200m. above sea level) to the uplands. Most frequently it is on northeastern or northern slopes, usually in semi-shade in clearings or at the edges of light woods. Only seldom can we find it deeper in the woods and in this case never in deep shade. Out of woods it grows on shrubby slopes where vegetation is rather dense. Accordingly, the best place for Ladies Slipper is in semi shade or light shade. Under unsatisfactory light conditions the orchid does not flower well, if at all. In sunny places **C.calceolus** disappears as it cannot compete with the lush vegetation, as after all, is a habit of all our orchids. Other plants in its natural habitats are, most often not numerous herbs.

Ladies Slipper grows in rich humous alcalic soil, i.e. on clay slate, limestone,

dolomite or marl, in the society of other neutro or alkalifilic plant species. Present humus is in the form of fine or very fine leaf-mould. The soil acidity is almost neutral or slightly alkaline (pH 6.8 - 7.2).
Humidity in **C.calceolus** localities changes according to precipitation, the only source of water which soaks into the soil and does not prevent its airation. No capillary elevation occurs from underlay or streams and springs. The orchid does not grow in poorly aerated places, e.g. repeatedly overflowed or flat ones where rainwater soaks slowly and makes long lasting wet spots in depressions. Its habitats we can find only on slopes or elevations shielded against winds as a rule.
Thanks to the fully autotrophic way of life, this orchid is easy to transplant and grow on. In garden culture we shall try to imitate its natural habitats as much as possible. Good conditions are in places lying in its natural area of distribution, which is large and gives evidence of adaptability of the plant. Problems may occur only in places with extreme climatic or soil conditions (long periods of too little or too much rain or permanent winds), but it can be mostly corrected by a grower. To prepare a suitable soil mixture is more complicated but, as it is not recmmendable to grow **C.calceolus** in "common" garden soil, it is necessary. The best way is to remove some original soil from the place of planting and replace it with a bottom layer 25-30cm. of limy soil covered by an upper layer of 15-20cm. humus mixture. For the under layer we can use limy soil arisen out of clay-slate, dolomite or limestone (suitable is the low, biologically inert layer) containing 30-40% of clay particles (smaller than 0.01mm.) and 10-20% of gravel with stones up to 50mm. in diameter. The humus upper layer we obtain by mixing one part of limy soil (the same as for the under layer but with chipping only 10mm. large) and one part of leaf-mould, best of all collected from under beeches. Putting the prepared soil in layers

just on the soil surface, not in the hole made by excavation, we obtain a very suitable elevated place with excellent drainage. Any place on a slight slope is good too. For one plant we prepare a place of about 1M. in diameter, for more specimens, we plant with a space of 30cm. between them. The best way is to prepare the place in the autumn and to plant the orchid in the spring, before growth starts.

For successful culture it is necessary to offer the orchid a suitable woodland plant community too. Devoid of it, **C.calceolus**, as a woodland plant, cannot grow well. The place for planting shall be chosen either in a vicinity of trees and shrubs or it will be necessary to plant them at the same time as the orchid. They offer it the needed shade and influence water regimen and aeration in the rhizosphere. As far light is concerned, the most suitable places are where the orchid gets morning sun until about 11 A.M., later it will be shaded by trees or shrubs. The shade is *conditio sine qua non* for it. If there is no suitable vegetation in the neighbourhood, shades made of wickers or reed can be used instead. A plant community consists not only of trees and shrubs but of herbacous plants as well. When you have **C.calceolus** in the garden leave a bare place about a foot wide around it and cover it partially (approx. 30%) by loose placed limestone or clay-slater stones. Suitable herbs are planted only behind this zone. As a shade giving plant I used Pinus ponderosa. When it grew too large and had to be cut - the stump stayed in the ground of course. A Rowan with sweet berries, Sorbus aucuparia var. dulcis, has been planted in the vicinity. For two years, until the tree has become large enough , I have shaded the orchid with the wicker screen. Now the shade is given by the Rowan from south and later in the afternoon by, Picea omorica.

Around **C.calceolus** I grow Adoxa moschatelina, Asperula odorata, Anemone nemerosa, A.ranunculoides, Corydalis cava, Schweigg and Paris quadrifolia.

Further away are Dictamnus albus, Digitalis grandiflora, Mellitis melissophyllum, Lilium martagon and Hepatica nobilis.
Plantations of **C.calceolus** have to be cared for all the time. On the other hand the care is not very demanding.The place has to be weeded by hand as often as possible, as only young weed in its early stages can be extracted without disturbing the orchid's rhizosphere and roots. Surrounding woody plants have to be kept in proportion, and trimmed.
From the start of vegetative growth till the end of June I feed the orchid with liquid mineral fertilizer. I use Herbapon, obtainable in the Czech Republic, in concentration of 0.5g. per 1 litre of water, applicated every two weeks. Herbapon is a mixture of kalium nitrate and ammonium dihydrogen and hydrogen phosphates. It contains (in percentage) N 15, P 3, K 25, Mg 2, Fe 0.05, Mn 0.02, B 0.02 and Cu, Cr and Mo 0.002. After-watering (flushing through) with plain water is not necessary unless long lasting dry weather takes place.
When surface parts of the plant have died back in autumn, they are removed and the whole plant is covered by a 2cm. thick layer of a mixture of leaf mould and fine-ground limestone (20g. of limestone in 1 litre of leafmould, well mixed). Even if winter protection of the plants is not so good in a garden as in nature (fallen leaves), it is not necessary to use any winter cover, under our climatic conditions. Ladies slipper is quite frost hardy here.
Having taken into account the above mentioned principles, I planted two plants of **C.calceolus** twenty five years ago. Until now I have grown them with satisfying results. My garden is located in central Bohemia, 500m. above sea level, on granite. Both plants have already made colonies - one has 18 stems (9 with two flowers, 6 single flowered and 3 without flowers), the other one 21 stems (10/2, 6/1, 5/0). The plants differ both in the start of flowering (3 to 4 days) and the lip colour - one has lemon yellow, the other cadmium yellow.

Natural pollination by insects and fruit development are very sporadic, at most only about 10% of the flowers. Artificial pollination is by far more productive - almost 90%. I let the seed fall out spontaneously and in the last years some seedlings regularly appear in the vicinity of the mother plants - two in the first year, five in the second and three in the third.

We very rarely encounter **C.calceolus** in the wild today. It is caused not only by its rarity but by its inconspicuousness among woodland plants, as well. Only in localities where it occurs in higher numbers, does the orchid attract our attention. Unfortunately, **C.calceolus** disappears more and more from our woods. The main reason being both direct and indirect influence of man. Natural reproduction of it is very low and slow and it is not sufficient to replace the losses that have already happened for many decades. An effort to reverse this tendency is so far unsuccessful.

A solution of the problem lays in increasing the number of plants in culture and reintroducing them back in natural localities, both old and new.

In garden practice **C.calceolus** is multiplied vegetatively, by cutting the rhizomes, or by a generative way, sowing seed to mother plants. Alas, both ways are not productive enough. The most effective is a combination of both methods. Protocorms obtained aseptic in vitro are cut and grown on special media for plant tissue cultures and when suitable numbers are at hand, they undergo tissue differenciation when roots and the first leaves appear. At this stage the plants are transplanted in non-sterile substrate and grown on to maturity. This method is not used on the larger scale, so far, but it represents a real way for reintroduction in natural localities.

Ing. A. Sotola, Prague, Czech Republic

THE CULTIVATION OF PLEIONE HOOKERIANA

Being new to the growing of pleiones I have studied Dr. Cribb's "The Genus Pleione" until it looks extremely scruffy. I have dreamed, schemed and saved to try and grow all the species of Pleione. Last year I was able to acquire a few pseudobulbs of **Pleione hookeriana** and what follows are the results of my experimental growing methods.

After reading that **Pleione hookeriana** grows epiphitically in moss round the trunks and branches of Rhododendrons and Tsuga, I decided to grow them in conditions that simulated these conditions.

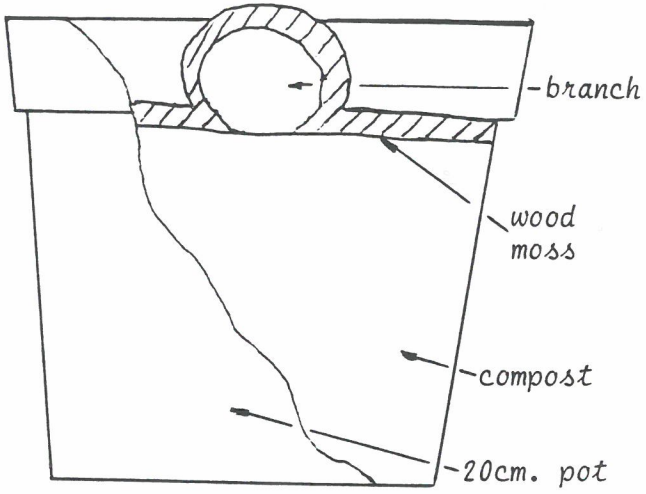
This was done by filling a 20cm. deep clay pot with an open mixture of bark, Perlite, pine needles, oak leaf mould and chopped wood moss to within 4cm. of the rim. At the top of the pot I then wedged a cut moss covered branch (3cm dia) across the top surface of the compost. The remaining surface of the compost was covered with sheets of wood moss.

Hookeriana pseudobulbs were then inserted into the moss on the branch. The moss grew very well on the branch and on the compost.

After flowering the pot was watered daily and fed very weak plant food once every two weeks. The pot was placed on an old piece of carpet (an idea adapted from Eric Humphries successful methods) which created a humid atmosphere around round the plants.

The **hookeriana** have grown well and have proliferated, numbers reaching thirteen from an original eight. Their size has not increased however, but **hookeriana** have small flowering size pseudobulbs and these have reached it.

The **hookeriana** grown by standard methods have also remained the same size however their numbers have only gone from ten to twelve. This year (1996) this method will be tried again and also some are going to be grown suspended on a



corkbase hanging outside. In conclusion it seems the plants grown on the branch benefited from very good drainage with a moist, humid atmosphere provided by the moss, old carpet and frequent waterings. The extra air circulation enhanced by the raised point of growth on the branch possibly helped as well.

Carl Hardwick, Wolverhampton.

****

PLEIONE BREEDING

Having grown pleiones since 1955 I started hybridising in 1974. The first crosses were made at random, in fact just to see what sort of flowers would

appear. The original hybrid, **P.Versailles**, was remade with interesting results. **P.Versailles 'Swallow'** was the most unusual as it had small, pale lavender pink flowers with darker spotting on the lip.
After a while I started to hybridise with definite objectives in mind. One such objective was to breed pleiones to flower through the winter. As **P.praecox** flowers in the autumn it is the obvious species to use to extend the flowering season through the winter. Pollen of **P.praecox** was kept in the refrigerator until **P.Versailles** was in bloom. These flowers were then crossed with the **P.praecox** pollen and eventually **P.Tarawera** flowered in 1982. It is very veriable in the time of flowering - mid October until mid January. The flowers vary in colour from pale to dark mauve pink with the lips heavily spotted with shades of red.
P.Barcena (P.formosana X P.praecox) is also a variable hybrid depending on which clone of **P.formosana** is used. Medium lavender pink flowers with orange markings on the lips are produced when **P.formosana 'Avalanche'** is the seed parent. When **P.formosana 'Cairngorm'** is the seed parent the flowers are much paler with almost white lips which have heavy reddish brown blotching. This hybrid flowers in November and December.
P.Sangay (P.limprichtii X P.praecox) usually flowers at the end of October and has very delicate mauve pink flowers with small red and brown spots on the lip.
P.Lassen Peak (P.praecox X P.lagenaria) flowers during November. The flowers are amethyst violet with the inside of the lip almost white and having purple violet blotches around the edge. The flowers are fragrant.
As **P.humils** is very early to flower (in January or February) this species was used to produce some early flowering hybrids. **P.Eiger** (P.formosana X P.humilis) is the first one to flower in February. The flowers are mostly white or pale mauve with red or red and yellow markings on the lips. It is very floriferous

and can give three flowers a bulb. **P.Eiger 'Leslie Frank'** is the result of a sibling cross and can give three flowers per stem, and very often two flowering stems to a bulb.
Flowering about the same time is **P.Orinoco** (P.Tongariro X P.Eiger) which has pale purple flowers with red spotting on the lips. **P.Orinoco 'Gemini'** almost has too many flowers as it can produce three flowering stems per bulb each carrying two or more flowers.
P.Helgafell (P.Eiger X P.yunnanensis) also flowers early and has mostly pale lavender flowers with brownish spotting in the lips. **P.Helgafell 'Siskin'** also has a little spotting on the petals.
P.Danan (P.limprichtii X P.humilis) is slightly later to flower than **P.Eiger.** The flowers are various shades of amethyst violet and have lips heavily spotted with purplish red. **P.Danan 'Chaffinch'** is a particularly fine clone having a dark flower with a large well spotted lip.
P.Hekla flowers around the same time as **P.Danan** and has large flowers in shades of petunia purple with the lips heavily spotted with dark red.
P.Hekla 'Partridge' has slightly paler flowers than most with very heavy red markings on the lip.
P.Kilauea (P.Eiger X P.formosana) flowers at the more normal time of March. It is a very variable cross giving flowers from almost white to dark lavender pink with all sorts of lip markings from pale yellow to dark red. **P.Kilauea 'Hoopoe'** has a dark purplish pink flower with an almost solid red lip.
To try and extend the flowering season into May **P.hookeriana** was used as a parent as it is the last species to flower. **P.Sorea** (P.bulbocodioides X P.hookeriana) needs to make large bulbs to flower well but does give small dark purplish pink flowers during May.
P.Sajama (P.limprichtii X P.hookeriana) is slightly earlier to flower but gives

lovely open spotted lips rather like **P.hookeriana.** I do not think it very advisable to extend the flowering season into June as this would reduce the time the plants had for growth.

Breeding for orange flowers

P.bulbocodioides 'Yunnan' being the nearest clone to red was crossed with pollen from **P.confusa.** This cross produced **P.Vesuvius** which is a very variable hybrid with mostly large flowers of various shades of mauve pink. However there were a few hybrids with distinct orangey lips and heavy red spotting.
P.Vesuvius 'Leopard' is the best although **P.Vesuvius 'Phoenix'** is very nearly as good.
As **P.speciosa** also has a dark flower it was crossed with **P.confusa** pollen to produce **P.Brigadoon.** This cross only produced two seedlings whose flowers contained any orange. **P.Brigadoon 'Stonechat'** has a reddish mauve flower with a little orange on the lip. **P.Brigadoon 'Woodcock'** also has reddish flowers but the lip is a definite orange brown.
P.Rakata (P.speciosa X P.Shantung) gave several clones which have flowers containing apricot and orange, but they also have a mauve sheen over the top.
P.Rakata 'Shot Silk' has the largest flower while **P.Rakata 'Skylark'** and **P.Rakata 'Nuthatch'** have the most orange.
P.Keith Rattray (P.bulbocodioides X P.forrestii) is a colourful hybrid with smaller flowers than usual. They vary from deep bishops violet to cyclamen purple with mostly reddish lips, which have yellow keels and red spotting.
P.Keith Rattray 'Kelty' is reddish orange with a mauve sheen. This particular clone has given even better orange seedlings.
P.Marion Johnson 'Bubs' (P.Keith Rattray X P.forrestii) is deep orange red with

hardly any mauve sheen.
P.Kenya (P.Brigadoon X P.Keith Rattray) produced one clone with flowers of pale reddish orange with some yellow on the lips.
Although **P.Toba 'Woodlark'** (P.Brigadoon X P.Vesuvius) only has flowers which are pale mauve shaded orange it is a very interesting colour. Most of the other clones of **P.Toba** were mauve pink.

In search of flowers with yellow lips

P.Soufriere (P.Versailles X P.confusa) was the first cross to produce flowers which had mostly yellow lips although these were fairly pale.
P.Soufriere 'Little Owl' also had creamy yellow tips to the sepals and petals, while **P.Soufriere 'Cirl Bunting'** had petals and sepals of a salmony shade.
P.Irazu (P.Etna X P.Shantung) proved to be a very variable cross with flowers varying from dark purplish pink to almost white. However there were a few which had yellow lips, the best being **P.Irazu 'Mallard'** which is a very vigorous grower.
P.Surtsey (P.Shantung X P.Versailles) and **P.Matupi** (P.limprichtii X P.Shantung) were both made in search of flowers with yellow lips. Both crosses did produce a few flowers with yellow lips but no clones were outstanding.
P.Novarupta (P.Versailles X P.Soufriere) was made hoping for something better. Altogether the cross produced some very nice flowers, mostly with dark petals and sepals and a paler lip. **P.Novarupta 'Goshawk'** was outstanding with dark mauve purple petals and sepals and a pale yellow lip. It is proving to be a large flower and vigorous grower.
P.Zeus Weinstein (P.formosana X P.forrestii) has been produced several times, using different clones. All the progeny have yellow lips but the petals and

sepals can be pink, or brownish pink or pinkish salmon. **P.Zeus Weinstein 'Desert Sands'** is also fragrant.
P.Pavlof (P.limprichtii X P.forrestii) produces smaller flowers which have the petals and sepals in shades of mauve with yellow lips.
P.Kituro (Matupi X P.forrestii) has brownish orange petals and sepals and yellow lips which are spotted with red.
P.Orizaba (P.Novarupta X P.Matupi) gave much more variation in the colour of the flowers. The sepals and petals can be brownish pink, brownish orange or even slightly salmon with yellow lips.
P.Deriba (P.Versailles X P.forrestii) has pale yellow flowers which can be shaded mauve with yellow lips.
P.Krakatoa (P.forrestii X P.yunnanensis) is a superb hybrid which is very variable. This has also been made with several different clones. The flowers vary through pale to dark yellow and apricot and even amethyst violet. Most have lips of various shades of yellow although just a few have white ones.

Yellow flowers

There are not too many pleione hybrids with all yellow flowers. **P.Shantung 'Ducat'** (P.formosana X P.confusa) is the best colour and also the best known at present.
P.Iris Butterfield (P.forrestii X P.confusa) did not produce many seedlings and some some have a faint reddish sheen over the yellow.However **P.Iris Butterfield 'Yaffles'** has a large pure yellow flower carried on a long stem.
P.Burrator (P.forrestii X P.coronaria) has paler yellow flowers and the red markings are only at the tip of the lips.

Dark flowered hybrids

As **P.speciosa** and **P.bulbocodioides 'Yunnan'** had dark flowers there appeared the possibility of producing even darker flowers by hybridising these species. **P.limprichtii** was also used but this species tended to give spotted lips and not darker flowers.
P.Etna (P.speciosa X P.limprichtii) gave free flowering progeny of nice dark mauve pinks with spotted lips but only one was oustanding. **P.Etna 'Bullfinch'** is darker than normal with wider petals and sepals.
P.Tolima (P.speciosa X P.formosana) produced progeny which were only a little darker than **P.speciosa.** There were two clones which had much darker flowers than normal. **P.Tolima 'Moorhen'** had a lip which is the same colour as the rest of the flower and has orange keels in the lip. **P.Tolima 'Waxwing'** has a slightly paler lip with a white splash on the end and yellow spotting.
P.Stromboli (P.speciosa X P.bulbocodioides) surprisingly did not produce seedlings which were much darker than the previous hybrids.
P.Stromboli 'Fireball' has flowers of glowing magenta with rich red lip markings.
P.El Pico (P.Versailles X P.bulbocodioides) proved to be a much more variable grex as one parent was a hybrid. The flowers varied from pale mauve pink to dark purple pink. The darkest flowers were produced by **P.El Pico 'Pheasant'** and **P.El Pico 'Starling'** both having heavily spotted lips. **P.El Pico 'Goldcrest'** has a much smaller flower with red blotches on the lip and yellow lamellae.
P.Tongariro (P.Versailles X P.speciosa) was the next cross to be registered. All the clones in the grex surprisingly proved to be very uniform, especially as one parent is a hybrid. They are all good growers and flower freely.
P.Tongariro 'Jackdaw' is much darker and has wider sepals and petals.
All the flowers of **P.Jorullo** (P.limprichtii X P.bulbocodioides) are dark and

nearly all have good spotted lips, which was the expected result. The best clone from this cross is **P.Jorullo 'Long-tailed Tit'.** It is a lovely dark flower with white as well as darker blotching on the lip and is held on a tall stem.

P.Berapi (P.Tongariro X P.bulbocodioides) produced a lot of good dark flowers on tall stems. There were also a few flowers which were almost purple.

P.Berapi 'Purple Sandpiper' is the best so far.

P.Berapi 'Spruce Grouse' has a nice dark flower with a large lip heavily spotted with crimson.

P.Keith Rattray 'Blackcap' is another dark flower with an even darker purplish crimson lip.

P.Gerry Mundey (P.forrestii X P.Tongariro) is a variable hybrid producing mostly purplish violet flowers overlaid brownish orange. The lips are usually reddish or yellowish orange.

P.Gerry Mundey 'Tinneys Firs' when it first opens is very much like the other clones, but it very rapidly gets much darker and is eventually a vibrant purplish crimson.

The first flowers of **P.Taal** (P.Etna X P.El Pico) were small and mauve pink with red spotting but in the second year of flowering one clone had an almost solid red lip. This clone has been named **P.Taal 'Red-tailed Hawk'**

P.Katmai (P.Etna X P.Matupi) was another hybrid with variable flowers. These range from lilac purple to bishops violet with lips which are heavily marked with yellow, orange-red or red. **P.Katmai 'Crossbill'** was a much darker clone with sepals and petals of purplish cerise.

P.chunii and P.hookeriana hybrids

This line of breeding has produced flowers with hairs in the lip instead of the usual keels, taking after the parents.
P.El Misti (P.bulbocodioides X P.chunii) has delicate pale lavender pink flowers while **P.Tibesti** (P.speciosa X P.chunii) has purplish pink flowers and bright yellow hairs in the lip.
P.Santa Maria (P.Volcanello X P.chunii) has mostly mauve pink flowers with orange in the lips. The size of the flowers vary quite considerably.
The flowers of **Captain Hook** (P.hookeriana X P.formosana) are pale and look very much like **P.hookeriana,** but the plants are much easier to grow than the parent.
P.Littondale (P.hookeriana X P.Irazu) has flowers which vary from almost white to mauve pink with almost white lips, which are spotted with yellow and red and also have yellow keels.

Lavender coloured hybrids

When **P.yunnanensis** first flowered the possibility of lavender coloured hybrids emerged, and also flowers on longer stems than normal. Very little breeding has been done so far but there are some hybrids with lovely pale lavender flowers and others with much longer stems.
P.Piton (P.formosana X P.yunnanensis) produced a very uniform selection of seedlings, which are pale lavender with lip markings of lavender purple or reddish purple. Some had petals faintly striped with violet and there were some clones which were fragrant.
P.Wunzen (P.Erebus X P.yunnanensis) was a little more variable in the lip markings but the flower colour is lavender pink. **P.Wunzen 'Oystercatcher'** has extra tall stems and a large lip heavily blotched with violet.

Breeding also has its surprises

Some experimental crosses have been made just to see what flowers would be produced but not with any specific intention.
Occasionally an outstanding clone will appear, but it is also possible to produce clones which have to be rejected.
P.Alishan produced one exceptional clone - **'Merlin'** which has distinct white tips to the petals and sepals.
P.Erebus (P.Versailles X P.Vesuvius) has produced seven clones with superb lips. **'Redpoll'** has an almost solid ginger orange lip, **'Quail'** has very pale mauve pink petals and sepals and orange on the lip, while **'Redshank'** has a darker flower with red and orange on the lip.
P.Fujiyama (P.El Pico X P.Shantung) did not produce very many seedlings but all had lips which had some yellow on tham. **P.Fujiyama 'Teal'** was the most outstanding with an almost salmon pink flower. Inside the lip is yellow, heavily marked with red.
P.Volcanello (P.Soufriere X P.bulbocodioides) produced quite a variation of flowers from pale pink to reddish purple. **P.Volcanello 'Honey Buzzard'** has large flowers of reddish mauve with an orange red lip which is carried on tall stems, it also has a strong fragrance.
In twenty years of hybridising, the pleione flower has changed a lot in colour, size and shape. As we get more species from the wild to use together with more complex hybrids it is almost certain that the future will bring even more changes.

Ian Butterfield, Bourne End, Bucks.

DISAS FROM SEEDS

Disa uniflora and its hybrids make ideal plants for the hobbyist as they possess all those extravagant characteristics of abundant flowers of good size and flamboyant colours for which the family is well-known. They have another very interesting characteristic in that they can be raised from seeds easily on the windowsill or in the greenhouse. Most orchids produce seeds which are difficult for the hobbyist to germinate since they are extremely small and contain no food reserve. In nature, the seeds are reliant upon the invasion of a symbiotic fungus for germination. In cultivation, fungi can be used to germinate the seeds or nutrient media formulated to supply those foods normally provided by the fungus. Seed raising is usually carried out in the laboratory although it can be done in the home requiring standards of cleanliness roughly camparable to those needed for winemaking. **Disa uniflora** and its hybrids have comparatively large seeds and no special facilities are needed in order for them to germinate.

Curiously in a genus containing well over 100 species, only a handful are cultivated outside their native South Africa. **D.uniflora** is the most spectacular and can be grown in the same way as **D.cardinalis, D.racemosa** and **D.tripetaloides.** The ease with which they can be grown from seeds makes it easy and enjoyable for the hobbyist to produce their own hybrids. Whether the intention is to grow more species or to produce a hybrid, the first step will be that of hand pollination. In orchid flowers the stigma is usually tucked away on the underside of the column and can be difficult to find especially if the flowers are small. No such difficulty will be experienced with disas. The stigma is the three-lobed structure at the centre of the flower, facing the viewer. The pollinia are protected inside sleeves but the sticky discs protrude

and the pollinia are easily picked up by brushing a cocktail stick past the sticky discs. The pollen is very loose and easily lodged on the stigma of the chosen pod parent. It is always worth labelling the cross made and staking the spike which will bear the capsule to protect it from accidental breakage. Capsule ripening is very dependant upon the weather and colour is not a reliable guide since **D.uniflora** particularly tends to dehisce while still green. Daily inspection of capsules five weeks after pollination is needed in order to prevent any loss of seeds. A tell-tale trickle of yellow seeds from the side of a capsule is a certain indicator that the seeds are ready for harvest. Viability in disa is very short and sowing within a week of harvest is advisable for good germination. We normally keep a stock of pots of media ready for sowing so that the seeds can be sown straight after harvest with a minimum of effort.

We routinely use two media for sowing: finely chopped sphagnum moss or a fifty: fifty mixture of coir and sharp sand. Both are tamped down to within 1cm. of the rim of a 3" half pot and watered. The seeds are sown thinly over the surface, misted over gently then each pot is put inside a clear polythene bag until the seeds germinate which may be in as little time as a week. Subsequent growth is not quite as rapid but with gradual hardening off by opening the bag, then removing it altogether, daily misting and moving to a fresh pot of medium every few months or so, flowering-sized plants can be expected in two years and full maturity a year after that.

Sandra Bell, Royal Botanic Gardens, Kew. May 1996

****

POSTCRIPT on BREVIPALPUS

I feel that I owe it to the readers of the National Pleione Report to write a postcript to last year's article on Brevipalpus.
Incidentally many thanks to the readers who have contacted me with thanks, queries and gifts following that article. You are a very generous crowd and it is nice to be numbered among you.
Re-reading my article I see that it is euphoric - which reflects exactly how I felt at the time. The elation stayed with me throughout February and March with exciting buds so slowly expanding towards glory; and the earliest clones flowered to perfection. What a glorious Eater was in prospect. Sudenly early in April I noticed one shoot with the crumpled leaf condition that I had thought was symptomatic of Brevipalpus. Obviously, as I was convinced that my collection was Brevipalpus-free, that condition could arise in other ways. But no - it was Brevipalpus true enough. Within days beautiful swelling buds collapsed all around me. The devastation was far worse than anything I had experienced before. It was as though a huge healthy collection of plants had become infected overnight. Tentatively my explanation, with no evidence other than guesswork, is that the pest lays eggs early in the season ready for the next year, and that the eggs resist chemical treatment. I went into the Winter with no living mites and the Winter dip, that everything was given to be certain that I'd cleared the infection, had no effect on those eggs. Early in April with Spring warmth hundreds of eggs hatched and found a thriving crop to attack. So I was back to square one.
In the meantime my Childion had perished. The plastic container was collapsed and air rushed in when I unscrewed the cap. The liquid in the bottom was clear and contained lots of crystals. Presumably Childion oxidises in contact with

air. I got a new supply and I am trying to protect it from oxidisation by squeezing out the air before screwing on the cap. Even more drastic treatment was called for. I chose 24 of my clones that are represented by two or more pots and from each I selected one pot for drastic treatment and one for control - the controls having the same spray treatment as I was using for the whole collection. The drastic treatment consisted of submerging the whole pot under Childion for several minutes until air bubbles stopped rising so that no Brevipalpus could have found anywhere to hide. The object of the experiment was to see whether Pleiones could survive that exposure. I was pleased to see that my drastic treatment did not appear to have any adverse effect on the subsequent growth of Pleiones so the whole collection had total submersion three times during the Summer.

Sometime during the Summer I decided to hunt for Brevipalpus to see if I could find it. None of the symptoms by which I recognise it can be seen after Spring and it shouldn't be beyond my abilities, armed with a binoccular microscope, to see the pest if I still had it. With horror I found it. I also found a way of spotting it. Infected pots have a very slight gossamer webbing loosely connecting the pseudobulbs. I think I can detect a sour smell too. Finding it meant of course that the pest had survived three drownings. All infected pots (which weren't many) had a fourth drenching - and that appeared to work, which begs the question as to what had gone wrong with the earlier soakings. I am convinced now that the point is that Childion needs to be freshly mixed to be effective - it goes off quite quickly if you spend most of a day dipping into the same bath.

I haven't repotted this Winter. I have just brought out my pots from their Winter storage and arranged them in the greenhouse ready to start the new season. Again I have a lovely colloection of shooting buds. But I was horrified

to see gossamer in six pots, so Brevipalpus is still with me. However there is an interesting tale to tell of those six - all of them were among the controls of the original drastic treatment.

David Harberd, Leeds.

ROUNDUP

It's the 9th. of May today and I have some pleiones still in short flower bud. I would think this year must be a record for late flowering. I expect the cold weather has had a lot to do with it but perhaps even more important was the very low light levels early in the year. Any experts on the subject of light levels on plants please offer suggestions. Now the pleiones have begun to grow they are growing so fast they are pushing themselves up out of the compost. There are always one or two that do this but this year exceeds any previous occasion.

I hope you find this year's report interesting and that my efforts have not been in vain. Next year will be the Tenth Year of the report so how about writing that piece you always had in mind but didn't do, it would save me a lot of hard work.

Many thanks to all our contributors without whom there would be no report. Their generosity in sharing their knowledge with us is another aspect of the enjoyment of plants.

P.B.

In Nature there are neither rewards or punishments; there are consequences.
Robert G Ingersoll 1833-1899