

# National Pleione Report

incorporating  
Hardy Orchids

1998





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HARDY ORCHIDS

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Cover Artwork by Brian Whyer

Cover picture Pleione Vesuvius 'Leopard'

Report compiled and produced by Peter Bradbury. Publication date 01:06:98

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## PLEIONE GROWING THE WAY FORWARD

Following my decision to commercialize my pleione growing in 1991, it became necessary to grow a wide range of varieties in individual pots to take to the various shows for sale. These were set in carrying trays 40 - 45 pots per tray, using pot sizes  $7\frac{1}{2}$ cm -  $8\frac{1}{2}$ cm depending on the vigour of each variety.

Suddenly, my growing space had disappeared and I was struggling to where I would grow these during the Spring through to Autumn. I had only one suitable option and that was to grow them out of doors, the aspect south/south east, in full sun from early morning to around 5 p.m. in mid Summer. They were protected from the west by the house and greenhouse.

It was with some trepidation that the first trays were put out in full sun - "Would they survive?". No previous writings had recommended it, only to grow in partial shade or protect from the direct rays of the sun.

The indoor plants were well ahead regarding the height of the foliage, the outdoor plants were much slower. However, the noticeable thing between the two methods of cultivation, is that the foliage is much harder when grown outside and the hard foliage is less prone to the serious disorder known as leaf tip dieback which some years can damage large areas of the leaf which in turn results in smaller bulbs and possible loss of flower the following Spring. As the first season came to a close I was delighted with the results, good size pseudo bulbs which did not fully mature until the end of October.

The subsequent years of 1995, 1996 and this year 1997 really put this method to the test. 1995 was one of the hottest Summers since 1976 when temperatures reached 90°F plus on many occasions, the sun shone for weeks on end, the plants showing no sign of leaf damage. Watering was only carried out in the evening.

1996 will be remembered for being one of the latest Springs on record, with pleiones still in flower in early June, which delayed the plants going outside until the first week in June. By contrast 1997 was a very early Spring with mild temperatures throughout February and March followed by a miserable June which was not only wet but very cold. On one or two occasions I sought the shelter of the greenhouse when I thought the plants were too wet. As the season progressed it turned out to be one of the wettest for many years despite record temperatures for August. This years crop are still outside in the third week of October.

I repot all the plants during the dormant season, new compost, clean pots, good hygiene is essential in maintaining a healthy stock. By growing in individual pots one can keep an eye on the stock that it is true to type and each plant is able to reach its full potential. There are some risks involved but the benefits easily out-weigh these.

Late or early frosts are the most serious or freak weather conditions.

I am so pleased with the results of this method that I am now growing 90% of my sale plants this way.

**John Craven, DONCASTER.**

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## **A TERRESTRIAL EXPERIMENT PART II**

Six months after completing my last notes in 1996, I found myself moving house. This gave me the opportunity to rebuild from scratch, and see what I could achieve in a new location. My collection of tubers had been washed, dried and dusted with yellow sulphur and stored in plastic trays with 2" depth of sand.

The tubers being planted with their growing points level with the sand, sprayed with water only to prevent dehydration and placed in the cool under the kitchen sink. Over the years I have found this method practical so that when the growing season started in August I am able to observe when the top of the tuber splits and growth starts. I can then pot up or plant out as required. Before I adopted this system, I have potted up tubers only to find one failed to grow and on examination by cutting down vertically through the tuber I found the growing point rotted - the rest of the tuber was perfectly sound - by observing the tuber producing a growth indicates no rot problems. Second point on small tubers it is difficult to identify the growing point and this procedure eliminates planting upside down, the tuber will still grow but let's not make it difficult.

The first requirement was a growing frame, standing on 2'6" legs. A 6'X3' rectangular wooden box 1' deep was constructed, slatted wooden bottom, lined internally with 1" thick expanded polystyrene, and this covered with polythene sheet. The top was glass, triangular in shape with bubblewrap covering the glass. Warmth was provided in the form of a 75 watt heating cable which was laid on the bottom of the box, plants standing between the lines of cable. Power to this cable was fed via a electrical protection trip, a rod type thermostat set at 45°F minimum completes the set up. So far with 3 or 4 degrees of frost I can still maintain 40°F.

Tubers are planted in clay pots, one to each pot. I'm still using a fine textured compost with plenty of sand for drainage. I've given up sowing grass on the surface of the pot having by now had more experience of watering. I still scrape a channel around the edge of the pot and on fine days give a small amount of warm rain water and this is run around the channel, but the roots find the water. One helpful indicator is if the soil is scraped back from the



edge of the pot and I can see a water mark I then withhold water until the next visit. It must be remembered the roots, in this case *O. apifera* grow outwards at a depth of approximately 1" and saturating the compost with our variable damp climate is asking for rot problems. Prevention is better than cure, for if rot does start the end is swift. I do however have an advantage, being self employed and working from home I am able to deal quickly with any watering or climatic conditions. One further point, disturb the top surface of the pot to prevent any green algae from growing.

On a walking holiday on the Island of Crete I came across a fine plant of the european *O apifera* which was growing at the bottom of a steep bank. On examination the plant was found to be growing in fine sand, being fed by moisture running down from above. The requirement of this plant in the way of nutrient which could only be obtained from the water was very little, but this was still enough to produce exceptional growth. I must admit I do give the apiferas a dose of paphiopedilum feed. I haven't noticed any sign of detriment to the plants which continue to grow steadily, and when watering I carry a small artists paint brush and a bottle of methylated spirit to take care of the greenfly. These I've found are the worst pest, it's amazing how quickly they multiply if not attended to. Slugs on the other hand ... a midnight inspection with a torch takes care of them.

The next consideration was the outdoor site. From previous experience *O apifera* is perfectly hardy but I did notice the leaf tips turned to a light green after a frost. Also last year I lost the flowers of my bletilla due to late frosts therefore protection by covering had to be considered and for this I again used bubblewrap laid over a detachable wooden frame. Using breeze blocks obtained from a builders merchant, one course of blocks was laid on a concrete foundation 8'X 4' the centre then dug out to a depth of 18". Old house bricks

broken up were then added to a depth of 12" then 2" of coarse sand that took care of the drainage. Now for the important bit. I had brought with me all the conifers, rocks, even the top soil all bagged up from the previous site, as the top soil had taken time and finance to prepare and the Ophries had grown well in it. To leave it behind was out of the question.

Wishing to proceed further I decided that more care had to be taken with the materials and their lay-out. The experts call this micro climate, but to me it's what happens in the space two foot above ground level. I had good results from planting *O apifera* near rocks with the soil sloping away thereby limiting the amount of water in the area of the tuber. The next consideration, the site faces south, so by placing the slow growing conifers ie *Picea Alberta Conica* which produces that nice bright green foliage as the spring growths open I was able to control the amount of light each plant received during the day. All plants were subject to the evening sun.

The top soil was as I described in my 1996 notes, but I have since added charcoal. When I repot the *Paphiopedilum* collection the charcoal from the old compost is recovered and I reuse this. The top soil is then distributed with various run offs and slopes as I had observed in the wild, the whole area was then sown with a fine grass seed which germinated nicely in time for August. By this time the *O apifera* tubers that were in the storage trays had started to produce a growing shoot and were duly planted by removing a small plug of soil 1" diameter, inserting the tuber and then filling the hole up with sand. As I conclude these notes all eight tubers are growing well, this includes two seedling tubers which I had grown from flasks some three years previous. Out of a sowing of two flasks with good germination only two seedlings resulted, a poor return from such a good start, but that's another story.

Other orchids growing on this site include *Anacamptis pyramidalis* which I find

are not so delicate as **O apifera**. My stock has now risen to five tubers and if plants grow well, two tubers from one plant are possible. This year I scattered them around different locations on the site to obtain a better understanding of their requirements. Bletilla grows and multiplies without difficulty but as previously mentioned, protection for the soft spring growths from late frosts is a necessity.

My own thoughts on the experiment over the last seven years without the procedure of removing and storing the tubers annually, the backup of splitting tubers, growing in the greenhouse plus the introduction of flasks seedlings to create an artificial garden for growing **O apifera** on a permanent basis would be extremely difficult. Therefore the final stage would be to remove all mature tubers for greenhouse culture and then try sowing seed for a limited time. If this failed, the outside site would be discontinued.

Future projects in mind ---- having now a small nucleus of **O apifera** I should now attempt hybridisation using other ophrys. I've had encouraging results with sowing seed and am able to replate seedlings but the transference to compost has resulted in heavy losses. I've had one or two tubers grow and that's a start so this is one area to be explored.

Having had other problems to deal with, seed sowing over the past two years has been placed on the back burner. But now, having resolved these the equipment is being dusted off and I've got plenty of seed to play with.

Running along side the hardy orchids I have taken an interest in assembling a collection of hybrid pleiones. I use the same open compost as the ophrys with good results. Last year I added the pale yellow **P Shantung 'Gerry Munday'** and this year **P Shantung 'Golden Plover'** I'm impressed with the yellows, and as these plants increase quickly I had better keep my tools handy, as another greenhouse might be required.



In conclusion, I hope my notes might be of interest and until we meet again through these pages may I bid you all good growing.

G C King.

Amateur.

Oxfordshire.

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### CLAY POTS - A CAUTIONARY TALE

It is generally accepted that clay pots are porous and plastic pots are not. Unfortunately, as far as clay pots are concerned, this is not always true. Plants which are kept in my alpine house are planted in clay pots and plunged in sand which is kept moist by a siphonic watering system. Water reaches the compost through the wall of the pot and as this is the only source of water it is imperative that the pots are indeed porous. Last summer during the long spell of hot weather, when the water loss due to evaporation and transpiration was at its maximum, several plants died. The postmortem revealed the compost was bone dry and that the water flow through the pot wall was insufficient in these conditions.

I then decided to check the porosity of all unused clay pots which I had in stock. The following test was devised and is now used to check the porosity of all pots before use. First the drainage hole is sealed. This is not easy to do for the older hand-thrown pots where the drainage holes are often irregular in shape. By using one of the conical grinding stones mounted on  $\frac{1}{4}$ " shafts (available from DIY outlets) in a hand drill, it is easy to make the hole circular. The holes vary considerably in size, so it is not always possible to find a suitable stopper to seal the hole. The flattened rubber cones sold in garden



centres for fitting to canes to prevent eye damage are useful for this purpose. If a cone shaped piece of wood is inserted in the flattened cone to make it a true cone, it forms a resilient stopper which will seal a wide range of hole sizes. When the hole has been sealed, the pot is filled with water and the time taken for the outside surface to become moist is measured. Pots which are truly porous will be moist on the outside in less than ten minutes. This is usually obvious by a change in the surface colour. If you have not been watching the pot during the test and the colour change is slight, a convenient test is to mark the surface with a water-proof pen. If the surface is moist, the mark is easily wiped off with the finger; if the surface is dry the mark is permanent. Some of the pots tested, which were only slightly porous or non-porous were completely dry after many hours.

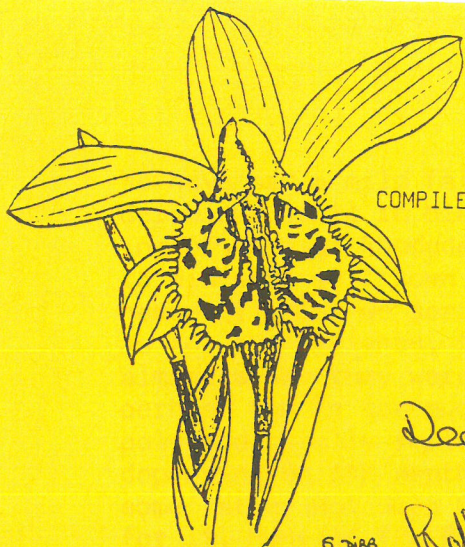
The results of the tests were interesting. A large proportion of the older hand thrown pots were non porous, while the majority, but not all, of the small machine-moulded pots now available at garden centres are very porous. The explanation for this difference is probably to be found in the way the pots were fired. The old hand thrown pots were fired in kilns heated with solid fuels, where it is difficult to control the firing temperature. If the temperature is high, the pot shrinks and reaches a maximum density and low porosity. Modern pots are fired in kilns where the temperature and hence the porosity can be closely controlled. Low temperature firing gives a porous pot suitable for plunging, while higher temperatures give a low or zero porosity making them frost resistant.

If pots are to be plunged and the porosity of the pots is vital, it is strongly advised that the pots are tested before use. If a pot is very porous and the compost becomes too moist, it is easy to control the water transfer rate by changing the depth to which the pot is plunged. The wall of the pot above the

sand surface loses water by evaporation, while that below the surface transmits water to the compost by capillarity.

Peter Kent.

Buckinghamshire.



THE NATIONAL PLEIONE REPORT INCORPORATING HARDY ORCHIDS  
COMPILED BY PETER BRADBURY, 72 BLIND LANE, BOURNE END, BUCKS. SL8 5LA

*With Compliments*

*Dear Paul*

*Thank you for your contribution which has  
helped make another interesting report.*

*Peter*

6.2.88

I had a yellow *Scopulorum* which I had not before it had flowered. We used the pollen off of it and now have seedlings. Richard Harding, the fellow that grows my seed, went crazy the past two years making crosses. Fifty some in '96 and about 60 this year. About 50%

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### I'M STILL LEARNING

We have had a mild fall so far. Only light frosts to date with Fuchias and Geraniums still in bloom in sheltered spots. I need to do a lot of transplanting of lots of Rhododendron seedlings overgrown in small pots. I was delighted to discover self sown Dactylorhiza seedlings in with small Azaleas in the poly house. I think we sorted 40 or 50 this summer.

As for the Pleiones, they seem to be doing well despite being on "Automatic" almost since they were divided last January. I have had a couple of problems, perhaps due to too much sun in late April early May. I have them all under poly and usually replace the poly with 50% shade cloth about that time, depending on the weather. We were out of town the first week of May and had some rather hot days while we were gone. *P forrestii* and *P scopulorum* suffered for it. Many of the *P forrestii* did not make roots and the *P scopulorum* almost dried up. I will try both in moss and the *P scopulorum* in a cooler and shadier spot next time.

I had a yellow *P scopulorum* which unfortunately did not make roots and died but not before it had flowered. We used the pollen off of it and now have seedlings. Richard Harding, the fellow that grows my seed, went crazy the past two years making crosses. Fifty some in '96 and about 60 this year. About 50%



success last year and probably 75 or 80% this year. I am going to have pleione running out of my ears if they all grow. He has made most of the old crosses again as I need hybrids to sell. I have asked him to do as many 2nd. and 3rd. generation crosses as possible with things that have **P confusa** in their parentage. With several nice pods on **P Shantung 'Ridgeway'** and finally a couple developing on **P aurita** (chunii), think he may have made **X kohlsii** again. I have about three bulbs of that having almost lost it a couple of years ago.

I have been having a notable lack of luck sending pleione to American Orchid Society judgments. The comment was made that they are just too easy to grow here in Oregon. In April, out of frustration, I sent an entire flat, about 120 bulbs in bloom, of **P aurita** to the judging. A friend goes every month. They picked out one for a HCC, 77points, and I named it 'Karen'. Just got all the paper work back the other day. I can't see two cents worth of difference myself but who am I to argue with the experts.

I am still learning to grow pleione and am relearning some lessons. I planted **P maculata** and **P praecox** in moss on the soil and they have done very well. Last spring I planted several flats without moss and they didn't like it. A lesson relearned. I have been looking for a long term fertiliser that can be added to soil in January - when we replant everything - that will last all summer. I have tried Osmacote in several formulations but have not been pleased with the results. It seems to run out before the new bulbs begin to form. Last year I tried Woodace 20-5-10. It is coated but does not look like Osmacote and I had my doubts but it seems to have done the trick. While I have not started to clean and divide the pseudobulbs yet, it looks like everything has made very good sized bulbs. We filled the flats about half full, mixed in about half a cup of Woodace in each flat, and then filled with compost to the top. For **P maculata** and **P praecox** that I didn't want to divide, I placed a large tray

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over the flat, flipped it over, added new soil and fertiliser and flipped it back. The results have been good and it's a lot less work.

The poly house is already jammed, you can barely walk down the isle, and that's an area 14' X 45'. That's in the neighbourhood of 250 flats. Perhaps at this point I should describe a 'flat'. A flat is a shallow growing tray which I use in two sizes, 17" X 17" X 2" deep and 12½" X 18" X 2½" deep. The 17" X 17" come in two styles, solid bottom with drainage holes and mesh bottom with 1" x 1" diamond shaped holes. The former are filled with soil and planted, the latter is to hold pots, 49 X 2½" or 36 X 2¾". The 12½" X 18" has a heavy mesh bottom with about ¼" square holes. Most of my stock plants are grown in this type of flat. It allows great drainage and the roots often grow through the holes and into the soil below. It takes three to four people about a month to re-do them every year. Birds are a problem sometimes. Moss will grow on the flats of small seedlings and the birds love to get in and scratch for bugs. I don't mind them eating the bugs but they can really tear up a flat and its contents.

I have been fortunate in not having insect problems. I hear some growers in your area (UK) are, with a false spider mite *Brevipalpus oncidium*. We have this genus - not sure of the species - in this country but I have never had a problem on pleione. Occasional aphids on buds, but nothing serious. I don't recall the last time I had to spray but it has been several years. Soap spray works well if needed.

I noted your experiments with various soil mixes. I have always used 50% bark (not orchid bark but the type we get for garden mulch which is from very fine to some 1" chunks), 30% peat (again a mixture of fine and coarse) and 20% pumice. This is a very popular mix in this area with large nurseries and I purchase it by the 10 yard truck load. They do incorporate some fertiliser to offset the decomposition but you must add your own for growth. The only thing



I change is that I apply a layer of tree moss to the top of the soil for **P maculata**, **praecox** and **humilis** and will try for **P forrestii** and **scopulorum**. I guess I got lucky the first time and haven't changed. As for watering, mine is all automatic. I start in the poly house about the first of April as **Pf oriental Splendor** starts to bud. Maybe once or twice a week, depending on the weather, then every day for 15 minutes until the leaves start to turn in fall. I have never had a problem under these conditions. The flats are  $\frac{1}{4}$ " mesh bottom, so they are well drained and the doors are open unless we expect a hard frost. The poly is replaced with 50% shade cloth about May 1st and poly again about mid to late October. No water all winter. The place I have had problems with wet is in my warmer greenhouse, 40°F minimum and covered all year. The sprouts rotted off bulbs of various **P formosana** and **bulbocodioides** that were watered prior to rooting. It seems cold and wet is O.K. but not warm and wet. I do not do anything for bulbs in the garden. I grow everything but **P maculata** and **praecox** in these conditions. I grow these two in the warmer greenhouse. There, watering is also automatic. 20 minutes a day from about April to October decreasing with cooler rainy weather, 20 - 30 minutes two or three times a week until the really dark days of winter, then possibly once every ten days to two weeks. I really don't pay as much attention to the pleiones as I do the Vireya Rhododendrons as this is their schedule. Fertilised as mentioned before **P praecox** seems to love this, making big bulbs and lots of them, and many flowers, probably a 100 as I write this. **Maculata** not quite so happy but still growing and a few flowers. Temperature in this greenhouse may exceed 100°F quite a few days in summer, although I do put 50% shade cloth over the roof. I keep a fan running all winter to circulate the air and have large exhaust fans that run when the temperatures exceed 80°F. One thing I notice under these conditions is that flowers tend to mold rather quickly. More air circulation



may help.

I noticed Carl Hardwick's comment about *P humilis* bulbuls drying out and will try something different with them this year. I seem to have a lot of them but not many grow. He may have put his finger on the problem. I think I will try mixing them with moist moss and perhaps storing in the refrig for a couple of months. I also have a bed of living sphagnum on a cable bench in the greenhouse and will sprinkle some on that. My cable bench is 4' wide and 20' long. The cables are buried in sand about 1½" deep to protect them and flats or pots are set directly on for rooting cuttings, etc. that require bottom heat. My bench has a demand watering system as well. A "leaf" controls an electric valve. The "leaf" looks like a fly swatter, 18" of copper wire with a 4 X 4 inch piece of screen on one end and a counter weight on the other. This sits on a knife-edge and has a mercury switch to control the power. As the screen dries out, it rises, turns on the water, is wetted, sinks and shuts it off. The screen dries at about the same rate as a leaf so watering is only as needed depending on the weather. It can be adjusted by moving the balance weight and the knife-edge. Mine is home made but has worked well for over twenty years. The power is low voltage, 28V. as I recall, so there is no real shock hazard.

I am writing a piece for the American Orchid Society Bulletin. It is to appear in the April '98 issue and is a how to grow piece. I heard from a grower in Alberta, Canada, that she is growing them outdoors but with a heavy winter mulch. I was surprised to hear they would survive there.

**Dick Cavender.** 15920 S.W. Oberst Lane, Sherwood, Oregon 97140. U.S.A.

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## PROPAGATION FOR CONSERVATION

### UPDATE ON SAINSBURY ORCHID CONSERVATION PROJECT

The Sainsbury Orchid Conservation Project was initiated in 1983 at the Royal Botanic Gardens Kew, with funding from Sir Robert and Lady Sainsbury to investigate the propagation of rare and endangered British and European orchids in vitro using symbiotic and asymbiotic techniques. Over the years methods have been devised for the development of seedlings in the laboratory, glasshouse and garden. Some seed is collected from the Living Collections, the majority from the wild and this is sown and also stored in the laboratory for future research. A collection of mycorrhizal fungi essential for the symbiotic methods used is also maintained and added to and has now been stored in liquid nitrogen.

#### ***Liparis loeslii*** (Fen Orchid)

A number of organisations, including RBG Kew, English Nature, Norfolk Naturalists Trust and the Broads Authority are working in collaboration on a recovery project to save the Fen Orchid, ***Liparis loeselii***. This species is threatened throughout Europe as a result of habitat destruction and drainage.

Found in only a handful of sites in England and Wales, there has been a reduction in numbers in Norfolk due to overstabilisation of sites with succession brought about by drainage of peatlands and water extraction from aquifers.

The major objectives are to safeguard the existing populations by appropriate management of the sites (turf stripping, scrub clearance, rotational mowing of sedges etc.) and to increase the potential habitat by the creation of shallow ponds in adjacent fens. Re-establishment of the species using material produced

ex-situ is also an objective and the Project has been involved in the propagation from seed.

Twelve plants of *Liparis loeslii* raised symbiotically from seed in the laboratory were planted out in the fens in June 1995. Five were introduced at a former site and seven at two extant sites. At one of these, the plants were placed on the margins of an orchid grouping while at the other the seedlings were placed some distance from the other orchids. Unfortunately although seen two months later, they have not been seen since.

Although the *Liparis* plants produced using symbiotic techniques are vigorous and healthy, the germination of seed is actually superior on asymbiotic media, (TGZ with pineapple juice). However these asymbiotic protocorms remain very tiny. It has been quite a challenge to try new techniques and change the media to increase their size.

So far trials to inoculate asymbiotic protocorms with the symbiotic fungi have had limited success. However adding liquid media supplements to established cultures seems to be working quite well, imitating how the seedlings are covered with liquid in nature, with up to ten fold proliferation and increased size of the original pseudobulbs.

Problems have been encountered with poor levels of seed set and viability. Natural pollination is thought to be achieved through transfer of pollen by fine raindrops. In 1996 a fine mist spray was used on one population and resulted in higher levels of seed set than previously achieved. In 1997 with heavy rainfall at the right time of year intervention was not required! Viability is tested with the Tetrazolium Test and pre-treatment for this involves a three hour soak in Calcium hypochlorite. Germination of seed sown after this pre-treatment as a comparison has been very good with ten year old seed from an extinct site germinating. The development of plants has taken more

time than expected - it takes three years from seed to size ready for translocation. The environmental conditions required for planting out are still unknown so we were given permission to carry out an experimental planting trial with plants raised from continental European seeds.

The planting location has a visitors centre and nature trail on the site (thus in the future having the potential for display, publicity and interpretation). However the experimental plot itself is on an island requiring access by boat thus lending security and reducing the chance of spread of foreign material. Seventy five plants were removed from culture and placed in vessels in Perlite with a minimal salt medium (no sucrose). Over a period of three weeks, aeration was gradually increased by punching holes in the vessel, allowing the plants to acclimatize.

These were then planted directly in turf placed in six seed trays sunk into the ground (allowing inundation). The turfs were taken from two extant sites for *Liparis* and the trial plot. Plants were still found some weeks after planting but monitoring this year will show whether it has been successful.

#### ***Orchis militaris*** (Military Orchid)

In 1994, seeds collected from the Chilterns site were sent to Svante Malmgren in Sweden to attempt germination using the techniques he had developed. He was successful and a planting trial was carried out in 1996 at existing site and former site with these plants (a mixture of one and two year old tubers). At existing site 37% of two year old tubers were observed in 1997 and 8% of one year old. The best performance (78%) was of seedlings planted between existing clumps where there is a strong possibility that a mycorrhizal fungus is present. One seedling will be removed to assess for fungal inoculation. 15% of the tubers planted at the former site have been observed in 1997.



Further seed samples will be sent to Svante Mamgren. In addition, research will continue on germination requirements for this species.

**Ophrys holoserica** (Late Spider Orchid)

**Ophrys sphegodes** (Early Spider Orchid)

Techniques for the germination of both these species have been successfully investigated :- seedlings of **O.sphegodes** have flowered in the glasshouse. It is thought unlikely that seed raised material of **O.sphegodes** would be required in the near future for re-establishment as this species is best conserved at present through site management.

Seed collection and germination trials are concentrated on **O.holoserica** which is far more restricted in its distribution. Some have been weaned to the glasshouse.

A range of Ophrys species have also been grown for the LCD collection along with **Orchis boryii** grown symbiotically.

**Cephalanthera longifolia** (Sword Leaved Helleborine)

Plantlife is taking the lead on this species, with RBG Kew germinating seed if required. Seed viability tests have been carried out on seed and has been found to be low as for **C.rubra**. Despite low viability a few seeds have germinated on a range of asymbiotic media - just a few a plate, resulting in this flowering seedlings raised from Hampshire seed.

**Himantoglossum hircinum** (Lizard Orchid)

Some plants raised from seed from the Kent site have been planted out in collaboration with John Mc Allister. The main conservation initiative is in

monitoring the sites but seed is being collected and germination trials are taking place in the event that re-establishment proves necessary. A few seed raised plants of UK origin are in the glasshouse.

#### **Epipactis youngiana** (Youngs Helleborine)

SNH are taking the lead on this species which is the subject of taxonomic debate. Seed has been collected from three sites where it occurs in the UK but so far with very poor success in germination. *Epipactis* is a recalcitrant genus and although **E.palustris** and **E.gigantea** have been grown, in general these methods have not been successful for **E.helleborine** (very few seeds have germinated) or **E.youngiana**. Steve Davison (Glasgow University) is also attempting germination, and has succeeded.

#### **Spiranthes romanzoffiana, Spiranthes aestivalis**

Many *Spiranthes* species can be grown relatively easily with a symbiotic fungus in our collection. **S.romanzoffiana** and **S.aestivalis** (extinct in UK) could probably be germinated in the same way but seed has been difficult to obtain. **S.romanzoffiana** is the subject of a research project at Reading University and seed may be obtained through this. Some seed of **S.romanzoffiana** of Canadian origin has germinated symbiotically and seeds of **S.aestivalis** of cultivated origin have germinated on TGZ. Contacts are still sought for this species - the seed has proved difficult to obtain.

#### **Cypripedium calceolus** (Lady's Slipper Orchid)

**Cypripedium calceolus** is Britain's rarest orchid, its decline due to over-collection by botanists for herbarium specimens and by gardeners. Found now on a single natural site, it is listed as critically endangered on the GB Red List

and protected under a range of UK and European legislation.

This orchid has been subject to EN Species Recovery Programme since 1992 (now in Phase 2). The Lead Partner for the UK Biodiversity Action Plan for this species is the 'Cypripedium Committee' with representatives from a wide range of organisations. Royal Botanic Gardens Kew, has been involved in ex situ conservation of this species since 1983.

A combination of careful habitat management and wardening together with vegetative propagation and re-establishment of material from ex situ propagation has led to a steady increase in the size of the colony.

Natural pollination has not been observed. Hand pollination is carried out to ensure seed set and some seed is allowed to mature and then scattered on site, the remaining capsules are sent to Kew.

Some plants of native origin are held in cultivation with co-ordination between English Nature and Kew on the best pollination strategy to increase genetic diversity and time interval post-pollination to achieve maximum germination. Molecular techniques are being used at Kew to determine the genetic diversity of these clones.

It is propagated in the laboratory using immature green capsules and a number of asymbiotic media developed specifically for this species (no mycorrhizal fungus having been isolated).

Techniques of establishing seedlings in compost in glasshouses have been learnt through collaboration with researchers in Sweden and Germany. Environmental conditions are not appropriate at Kew and so transfer to compost is now carried out by English Nature close to the wild site. Plants are kept in pots for two years or more before planting out on sites. The main objective is to increase the number of localities where it occurs through re-establishment. As its decline is due to overcollection rather than habitat loss, many of the



sites where it was once found have changed very little. However, observation of continental populations has been very important in making decisions on possible re-establishment sites and assessment has utilised local expertise. Delicate negotiations with landowners etc. - implications for long term security of plants require commitment to management practices. Over 1500 seedlings have been planted out at sixteen different locations. Survival very variable, particularly on sites where monitoring has not been possible.

A public viewing area has been planted with seedlings and a division derived from wild stock in cultivation, but unfortunately none came up so this is being repeated!

In 1997, 3000 surplus seedlings for which there were inadequate facilities were distributed to members of the Alpine Garden Society. The agreement made was for members to hold the plants for three years with two thirds of surviving plants to be returned to the 'Cypripedium Committee' for planting, a third to be retained by the grower. This will be repeated on a smaller scale this year with involvement also of members of the Hardy Orchid Society.

We are reducing the number of seedlings produced, aiming to produce about 500 plants per year for planting out although may scale up production moderately in order to be able to distribute further seedlings.

Mature seed is now being collected for storage in the Millennium Seed Bank with an associated programme on microscopic seed.

Featured on First Class Stamp of Endangered Species set - information provided for pack.

**Margaret Ramsay.** Sainsbury Project, Royal Botanic Gardens, Kew.



*Cypripedium Reginae*

LCD Collection :- Living Collection Department RBG Kew.

SNH :- Scottish National Heritage.

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## THE PLEIONE BUG

### 1 First Bites

Don't panic! I'm not describing some terrible new pest, just the new bug that I've caught myself: growing Pleiones. This is almost a tale that never was, as my first pseudobulbs were bought at the beginning of 1996, never really grew and then died. I later learned that 1996 was a bad year for many Pleione growers - but not knowing this at the time it would have been easy to give up and write them off as too tricky. Fortunately, I didn't and my initial interest was further stimulated by meeting someone with an interest in alpine plants and subsequently Pleiones with whom I could share the developing bug (and who is now my partner, so watch out - you don't know where your hobby might lead you!). Then I saw Ian Butterfield's wonderful display at Chelsea. The bug really bit hard!

### 2 The Bug Develops

Just two years on and the bug is firmly entrenched. Mind you, the Pleiones have to compete for space and attention among a more general collection of alpiners in a garden which (don't they always?) seems too small. Still, I have



managed to assemble a modest collection of about twenty five different ones, all bought as single pseudobulbs. Most are hybrids as I did not want to risk killing some of the trickier species until I gained more experience. Well..... OK, I confess, I did succumb and buy **P.forrestii** to try. Who wouldn't?

I have just one 10' X 8' alpine house which was decidedly not planned with Pleiones in mind - in full sun and with no heating. However, since I have only a few plants at present, they are easy enough to bring indoors if frost threatens and they are outside in a shaded spot for summer, so their only real residency in the alpine house is during flowering and initial growth and while dormant.

### 3 The Oscars

I'm writing this in the week that Titanic swept the board at the Oscars and the acceptance speeches all took care to include thanks to everyone who had contributed to the successes. Many other beginners with Pleiones have written in past Reports with their thanks to those who have helped. I wish to be no exception. I am indebted to several people, and in particular to Ian Butterfield, for their kindness and generosity in spending much time patiently pointing me in the right direction and sharing their expertise, not to mention their enthusiasm. Thank you!!

### 4 Growing Pleiones

Like most beginners I had all kinds of questions about compost, feeding, shading etc. (On a recent visit to Ian's, I had written out a list of eighteen further questions I wanted to ask him. "You have enough for a book there" he

quipped, but still proceeded to answer all of them!). Some of the most useful articles for me in past Reports have been where people simply say how they grow their plants. More sharing of this sort please! Newcomers will always need such basic information so I think the Report should carry articles on basic cultivation quite regularly. So it is without apology that what follows is a summary of basic Pleione cultivation as I have come to understand it. I hope newcomers will find this useful and the more experienced at least a reminder (just in case you've forgotten anything!). After this I will go on to describe some experimentation I am playing with. So what have I learned so far? :-

### **a) Compost**

The basic requirement is for a very 'open', spongy, rapidly draining medium which is well aerated. This can be achieved by mixing ingredients such as bark, peat (lumps or coarse fibers), Perlite (preferably coarse grade), live chopped moss or various other similar substances in varying proportions. I learned early that there are as many different mixes used as there are growers! But to give an idea of what is required, here is a list of just some of the recommendations I have come across (and where I can remember, the source of the recommendation). All "parts" are by volume:

i) 10 parts bark chips, 2 parts fibrous or lumpy peat (with the finer particles sieved out). 1 part coarse Perlite (Ian Butterfield in his 1997/98 catalogue.) For bark chips, Ian uses "Cambark Mini Chip Bark" (See 'Sources of Materials' at the end of this article).

ii) 15 parts bark chips, 2 parts fibrous or lumpy peat, 2 parts chopped wood

moss (Ian Butterfield's latest recommendation. Ian used to include moss in his mix (see iii below) and is now doing so again, believing it does confer advantages. But he no longer uses Sphagnum, believing this holds too much water, but rather wood moss or even moss out of the lawn. The only reason he no longer adds Perlite is that it blunts his knife too often when he is trimming back dead roots! He still otherwise believes it a useful additive).

iii) 5 parts bark chips, 3 parts chopped sphagnum moss, 2 parts composted bark, 2 parts fibrous peat, 2 parts shredded Oak or Beech leaves, one part coarse Perlite. (An older recommendation from Ian again).

iv) Equal parts composted bark, coarse Perlite and moss. (Kath Dryden).

v) Equal parts rough peat (or leafmould), moss, bark, plus a little loam and sand AGS Encyclopedia).

vi) Equal parts coarse Perlite and fibrous peat or bark.

vii) Equal parts coarse moss peat, chopped live sphagnum moss, coarse Perlite and composted bark (sieved). (R. Kretz, Locking Stumps Pleiones).

viii) Equal parts Ericaceous compost, Perlite (or grit) and chopped moss. (Potterton and Martin).

Some growers top dress their pots with moss or coir. Recently Ian Butterfield has experimented with putting a thin layer of half decayed oak or beech leaf litter over the top of his normal mix. (The leaves are first rubbed through a

$\frac{1}{2}$ " sieve and what goes through is then put through a  $\frac{3}{16}$  inch sieve. What's left in the sieve is used on the pots). He believes this helps keep the surface roots from drying out and may provide some nutrient or something else the plants may need. Initial results seem to suggest better growth results, particularly with some of the more difficult plants, but this is an ongoing experiment that needs confirming. He also adds a few sulphur chips to each pot in the hope they will help prevent them becoming infested with the pest *Brevipalpus* (*Brevipalpus* is susceptible to sulphur).

## **b) Containers**

Clay or plastic can be used both have their devotees. Clays may need watering more frequently but the evaporation from their surface helps to keep the roots cool and provides humidity around the plants. Plastics need less frequent watering, are easier to clean and lighter to use. Many growers use half pots, pans or seed trays, as *Pleiones* are shallow rooting in the wild, while a few use deeper pots. Kew says they find that they are not especially shallow rooting and suggests they will adapt themselves to whatever depth of container is provided, so long as the compost structure and watering are correct. It is probably wise to thoroughly clean and disinfect pots (with for e.g. Jeyes Fluid) before use.

## **c) Planting**

Pseudobulbs may be potted up while dormant, or as late as first signs of root growth as long as great care is taken not to damage newly emerging roots. In practice, most seem to pot up some time in January, some in December and some



in early February. Very early flowerers may need potting sooner. Most should be planted with about the top third of the pseudobulb above the compost. A few seem to prefer being completely buried (*P.bulbocodioides*, *yunnanensis*, *limprichtii* and *scopulorum*).

#### d) Watering

Overwatering at the start of the season is probably one of the major causes of failure. How annoying therefore to find the advice on packeted pseudobulbs at the Garden Center telling the purchaser to "plant in normal Garden soil and water well"! I wonder how many potential new enthusiasts have been put off after killing pseudobulbs by following this advice?

The better advice I received was to start watering once signs of growth became evident but to give only a little - just enough to dampen the compost and encourage newly emerging roots to go searching for moisture. Only when a good root system is established and leaf growth is active should watering be increased. Through summer they can take quite liberal amounts of water as long as the compost structure is correct.

The aim whilst they are in growth is to keep the compost moist but never soggy and never totally dried out. Soft water or rain water is preferred. At the first signs of foliage yellowing in early autumn, watering should be reduced then stopped and the pots allowed to dry out as the pseudobulbs become dormant.

#### e) Feeding

In an old AGS Journal an answer on Pleione culture given by one of the panel of experts advised that feeding Pleiones was at best counter productive and at

worst positively harmful! This does certainly not seem to be the view of enthusiasts today. The most common approach seems to be to liquid feed, at about half the normal recommended strength, approximately once a week. Feeding should commence once the leaves are actively in growth and at first should be either a balanced feed (e.g. Chempak No3) or a high Nitrogen feed (e.g. Chempak No2). This should be changed in late July to a high Potash feed (e.g. Chempak No4), continuing until first signs of leaf yellowing in early autumn. Whatever brand of fertilizer is chosen, it should also contain trace elements. Occasional sprays with seaweed extract are also beneficial.

Some growers also mix a little granular or powdered fertilizer in with the compost before potting the pseudobulbs, but I found more varied opinions on this. Does it help? Is it necessary? I'd be happy to hear more views on this please.

#### f) Light

Pleione leaves can easily scorch in bright sunlight, so a shady position is essential. In a greenhouse, 'whitewash' type shading can be applied to the outside of the glass, or shade netting used. Outside, a position out of direct sun or in dappled shade is enjoyed. The overall aim is for a position which is bright but not in direct sunshine.

#### g) Temperature

Through winter keep them cold but not frozen i.e. just frost free, between 1°C and 5°C is ideal. In summer they prefer not to be too hot and enjoy a cool, buoyant and humid atmosphere with plenty of ventilation. Misting in the evening and damping down the greenhouse floor is beneficial.

## h) Dormancy

Once the plants are fully dormant (usually by December) the pseudobulbs can be unpotted, cleaned of old compost and the old roots trimmed back. Some trim very short to about  $\frac{1}{4}$  inch, others prefer to leave them rather longer to help anchor the bulb in the new compost when repotting. Pseudobulbs can also be left undisturbed in the pot for several years to build up into natural looking colonies if desired. Either way, they can be stored dry until repotting time. The above covers culture of most of the hybrids and easier species - I haven't covered the autumn or winter flowerers or the more tricky species - I'll leave that for someone else another time!

Thus endeth the culture lesson. Now for:-

## 5. Experimenting

I guess everyone likes to experiment with different composts and cultural methods and I am no exception. The majority of my plants are potted in the mix recommended by Ian Butterfield in his 1997/98 catalogue. But I decided to play with composts too this season. So I bought ten bulbs of *P. formosana* and devised ten different composts to grow them in. I won't bore you with all the reasons for choosing the mixes I've used, but these are what I have ended up with:-

1. Pure Seramis
2. Equal parts Seramis and chopped Sphagnum moss
3. Equal parts Cambark 100, coarse Perlite and chopped Sphagnum moss
4. Four parts of the above (compost No 3) and one part John Innes No 2

5. Ten parts Cambark Minichips, two parts peat lumps and one part coarse Perlite
6. As above (compost No 5) plus three parts John Innes No 2
7. Five parts Cambark Minichips, three parts chopped Sphagnum moss, two parts peat lumps, two parts Cambark Fine and one part coarse Perlite
8. Equal parts peat (medium/coarse grade but unsieved) and Cornish grit
9. Equal parts Ericaceous compost (Westland) Cornish grit and coarse Perlite
10. Peat lumps only(as per Eric Humphreys method - see the 1995 Report

Notes: "Seramis" is an expanded clay aggregate material sold in some Garden Centers, mainly intended for houseplants. Cambark is a composted bark with the "100" grade being coarser than the "Fine". The Perlite is not as coarse as I would like. You used to be able to get "Supercoarse" grade which had particles of 6mm to 10mm size. Recent supplies bought as "Supercoarse" from Chempak have been getting progressively finer - the last lot I got had particles of which more than 50% went through a 3mm sieve! (and none of the particles were 6mm or larger!). Chempak say this is what their suppliers are now supplying them with and they can't do anything about it. DOES ANYONE KNOW WHERE YOU CAN GET GENUINELY COARSE PERLITE? PLEASE LET ME KNOW.

In next year's Report, I will write and let you know how I ran the experiment and what the results were. With only one replicate of each compost this is hardly a scientific trial of course, but it is fun nevertheless! My guess is I will confirm Peter Bradbury's results of a similar experiment (see page 37 of the 1997 Report) - that Pleiones can be grown in a wide variety of mixes as long as you water them correctly!

## 6. Looking forward too...



It's March 1998 and we have just been to Ian's nursery at Bourne End. He had warned us before we went that we may see things we liked but which would not be available for some time: his latest hybrids! What an exciting, beautiful collection!! The newly emerging colours in the reddy-orange part of the spectrum were much in evidence. My eye also caught sight of a pan showing large, white flowers with gold in the lips - it was **P.grandiflora** - the real thing - in full flower! Ian has fertilized this with itself in the hope of propagating it for the future. But I can't end without mentioning a new hybrid flowering for the first time. It was **P.chunii x forrestii** cross (grex name Edgcombe). The petals and sepals were a marvelous bronzy colour setting off perfectly a glowing deep amber lip. Stunning! If Ian ever offers this on his list I volunteer to be first in the queue to buy it.

**Paul Cumbleton**, 881 Oxford Road, Tilehurst, Reading, Berkshire. RG30 6TR.  
Tel. 01189 427676 Feel free to call or write to me - I would love to make contact with other growers.

### **Appendix: Sources of materials**

Iv'e always found it annoying when recommended to use items not easily available from Garden Centers, or only available to commercial growers. With some perseverance it is sometimes possible to find a source of supply - this is information we should share more frequently! So here is at least a little information I've managed to discover:

**Cambark Mini Chip Bark:** Stocked by a few (but not many) Garden Centers. I managed to find out Cambark's phone number - it is: 01254 35660. You can phone

them and ask who your nearest stockist is. I did, and was pleased to be told of two nearby stockists. I subsequently purchased a 70 liter bag for £4-99. with the few plants I have at present, this should last several years!

**Cambark 100 and Cambark Fine:** These grades are more difficult to get as they are usually sold only to professionals and not stocked by Garden Centers. You can however obtain them mail order from: LBS Horticulture, Standroyd Mill, Cottontree, Nr. Colne, Lancashire. BB8 7BW Tel. 01282 873311. The price depends on where you live for carriage charges and how many bags you buy, but for a single bag delivered by carrier the current price (March 1998) is £8-86 plus VAT. (LBS is useful for all kinds of horticultural supplies - get their catalogue).

**Fibrous or Lumpy Peat:** Tricky! All kinds of grades are available to nurserymen, but for some reason the Producers seem to think that the general public only want the one grade of ground and milled useless powder sold as Peat in Garden Centers! However, a good range is offered by a company called Monro and they are willing to supply the general public - with a snag or two. The first is that for their own delivery service to operate, they will only accept a minimum order of £75. If you can collect however, they have no minimum order value. They have three locations as listed below. The other snag is that certain types of peat they will only supply as full pallet loads. However, this still leaves enough grades they can supply as individual bags to satisfy most requirements. Monro can be found at:

- i) Goodwood, Chichester, West Sussex, PO18 0PJ Tel. 01243 533700
- ii) Sandyland Street, Wisbech, Cambs. PE13 1TA Tel. 01945 463999

iii) Unit 1, Quarrywood Ind.Est., Burntash Road, Aylesford, Maidstone, Kent.  
ME20 7AD Tel. 01622 716339

**Coarse Perlite:** Anyone know? (See previous comments about supply from Chempak). Actually the normal Medium grade which is sold in any Garden Center will do, I'd just prefer something coarser.

**Sphagnum Moss:** Most Garden Centers have this, though often only during the bedding season for lining hanging baskets.

**Other moss and leaves:** Wherever you can gather them! but if its not your land, get the landowners permission first. The law regards taking even fallen leaves as stealing if it is not your land.

**Cornish grit:** Much beloved by alpine gardeners for use in mixes for many plants. This is now becoming more available again, sold under the Roffey Brothers brand name in some Garden Centers. To find your nearest stockist contact: Roffey Brothers Ltd. Throop Road, Bournemouth, BH8 0DF. Tel. 01202 537777

**Sulphur Chips and Chempak Fertilizers:** Both produced by Chempak. Many Garden Centers stock them but you can also buy direct from Chempak by mail order. Garden Direct (Chempak) Ltd. Geddings Road, Hoddesdon, Herts. EN11 0LR Tel. 01992 446699.

**Seramis:** Sold in many Garden Centers, but in case of difficulty you can find your nearest stockist by contacting: Consumer Services Dept. Pedigree Pet Foods FREEPOST, Melton Mowbray, Leics. LE13 0BR

**Plastic pans:** Shallow, round plastic pans of 6 inch to 10 inch diameters and made of very strong plastic that will last for years (these are the ex - BEF pots for those that remember them), being newly manufactured by: TIH Industries Ltd. Lion House, 98 Southfield Road, Downley, High Wycombe, Bucks. HP13 5LD Tel. 01494 440855 for a price list.

If you know other sources of these or other useful products/ingredients please do let me know.

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### LEAF TIP DIEBACK AND CALCIUM BALANCE

I have found the articles in the last few editions of the NPR inc. HO on Leaf Tip Dieback extremely interesting as I also have this problem in varying degrees from season to season.

According to the State of Victoria Department of Agriculture to whom I sent plants for analysis a few years ago, LTD is definitely caused by a calcium deficiency and they advised me to apply 'Limil Water'. Limil is a Victorian firms brand name for 'Calcium Hydroxide' which is used as bricklayers lime. The Victorian Department of Agriculture suggests soaking the 'Limil' in water and after allowing the sediment to settle for a couple of days this should be applied at the rate of one part of 'Limil Water' to twelve parts of tap water. Regarding the quantities - I don't think it matters how much Hydrated or Slaked Lime you use in a bucket of water providing you mix it up about three days before its intended use. Once the sediment settles to the bottom of the container the remaining clear water is only able to support a given quantity of



lime and this prevents the possibility of overdosing. The 'Lime Water' must be prepared so as to be ready to apply it on the day prior to your weather forecasters prediction of a much warmer day. Water it on in the evening so as to raise the humidity on these dry nights.

I have been using this on my Pleiones for the past three years with a significant reduction in LTD although I still get some.

I find myself in agreement with the article in the 1995 Report by Ken Redshaw wherein he notes the onset of LTD in late May or early June whereas in Melbourne I have noted each year LTD strikes in late October or early November. At this time following a period of mild spring temperatures of 18°C (64.4F) to 25°C (77F) during which time Pleiones are producing good leaf growth, a sudden jump in temperature to 31°C (87.8F) or even higher for one or two days seems to induce LTD. These warmer days are often followed by warm nights with a low humidity. I always mist water at nights to raise the humidity.

Once LTD starts, Lime Water treatment does not seem able to prevent its further spread down the leaf on affected plants. The question is - to prevent its occurrence, should this Lime Water be applied on the first warm evening or should we apply it a day or two before.

I have also noted that boxes of Pleiones placed on the ground do not get affected by LTD and also pots placed on trays of moist gravel seem to escape.

As Mr Redshaw indicates that calcium is taken up by the root tips and as by late October early November the root tips would be very well extended down towards the bottom of the pots it may be that plants grown on the ground or on gravel trays helps to keep the root tips functioning well during these sudden hot spells.

It also seems significant that LTD does not occur in the wild (personal comment by P J Cribb) once again root tips are in the cool soil.

I watched earlier this season one grower who dusted lime lightly over a large number of Paphiopedilum orchids to control LTD in those plants. I have seen this dusting method also used on a large collection of Cymbidiums in a commercial nursery to control LTD with apparent great success. I intend to try this broadcasting of lime powder on some boxes of my own plants next season. It would be a good idea to keep an eye on the pH of the compost when using these methods of control.

**Max Akam**, 4 Koala Court, Frankston 3199, Melbourne, Australia.

Don't forget to allow six months on Max's season.

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### CALCIUM

Calcium is essential to plants and is most important for pot plants grown in moist acid potting soils. Calcium is essential not only for plant cell division but it also reduces the chance of harmful fungal and bacterial damage which proliferate in acid potting mix conditions.

The level of calcium required will be regulated by the potting mixture pH level and each person's growing conditions therefore no standard dosage can be calculated.

For precise Calcium control it is desirable that a pH meter be used regularly to check pH levels in soil or potting mix and Calcium supplied according to the pH level.

The pH scale, which ranges from 0 to 14, indicates whether a solution or

substance is either Acid (pH 0.0 to pH 6.9), Neutral (pH 7.0) or Alkaline (pH 7.1 to pH 14). Vinegar is acid, water is (or should be) neutral and caustic substances (e.g. caustic soda, calcium compounds) are alkaline.

Calcium is best supplied separately to prevent other fertiliser chemicals precipitating and becoming insoluble. If Calcium must be mixed with other ingredients, always add the Calcium last to an already highly diluted solution, and, expect some precipitation. Residual chemical deposits indicate that some of the chemicals have been precipitated or become "bound" to the Calcium and have become insoluble.

Calcium is a problem element. It is an alkali metal and is highly reactive with other elements such as sulfur, carbonate and phosphorous and it forms compounds with them that are only soluble in an acid solution. One form, Calcium Nitrate is soluble and it contains nitrate but it is difficult to re-balance a fertilizer program around it because it is hygroscopic and its structure contains a high percentage of Oxygen (60%) and Hydrogen.

The most suitable and readily available form of Calcium to use is Calcium Hydroxide which is sold as Hydrated Lime, Slaked Lime or Bricklayers Lime. A Victorian brand name is "Limil".

The average application rate is one level teaspoonful per five litres of water and it should be watered into the soil or potting mix as often as is necessary to maintain a soil acidity level between pH 6.0 and pH 7.0

Plants prefer slightly acid soils (between pH 5.0 and pH 6.5), but should acidity be lower than pH 4.5 plants may die or the growth quality reduced. For safety the minimum should be pH 5.8.

Alkaline substances such as "lime" are used to reduce the acidity by increasing alkalinity. Hydrogen causes acidity. Excess alkalinity is corrected with an acid (e.g. vinegar).

Hydrated lime is not very soluble, but it is sufficient to mix it with water and let the undissolved material settle on the bottom of the container then pour the liquid onto the soil or surface of the potting mixture. Calcium is especially important in the colder wetter weather when potting mixtures can't dry out so quickly. Constantly wet potting mixtures become very acid and acid potting mixtures kill orchid roots. Being alkaline, hydrated lime reduces acidity (i.e. raises the pH level). Excess Calcium can cause a deficiency of certain elements such as Iron, Phosphorous and some trace elements. Symptoms of this will appear in the foliage first. Our research has shown that a regular regime of pH control using Calcium induces flowering and produces thicker, more rigid flower racemes in various orchid genera.

#### IMPORTANT

If the potting mixture pH is above pH 7.0 Calcium may still be supplied. Before applying the Calcium solution adjust its pH with an acid. The cheapest, safest and simplest acid to use is Vinegar. Vinegar is acetic acid AND remember very little is required. In small volumes of water just a few drops may be adequate.

W Johnson. Glenwood Orchids, Melbourne, Australia.

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## ROUNDUP

My Pleiones have flowered well this season so I must have done something better in my cultivation last year. I've had some outstanding greenfly on my flowers. I have been told that the greenfly probably overwinter on the bulbs and that spraying bulbs and compost with insecticide before growth begins will sort them out. I think this is a maybe because reference was made to killing the greenfly eggs and I'm sure all aphids are born and not hatched. But I shall spray them never the less.

With the very wet season we are having moulds must be watched for. I shall spray my plants at least a couple of times during the season with 'Systhane'. It's a systemic fungicide which I am reliably informed appears to be a good treatment against the black pits some of us experience on pseudobulbs. Another year gone by, another Report produced. I hope you agree that it is a good read and also a good source of reference. Did you know that a lot of clay pots are not porous? So the terrible old plastic pots do have advantages like easy to clean and sterilise, they are light, have better drainage and are comparatively inexpensive compared with clays. Peter's article was just one among many that increases our knowledge and ultimately our pleasure. So a big thankyou to all our contributors for giving us an insight into their experience. When you read the Report remember that we all have experience in growing our plants and if we have a generous nature then we should all want to share our experiences. I have had some problems over the past twelve months that have made it more difficult for me to do the Report. It is often not realised that we can learn a great deal from our mistakes. I don't care how good a grower there is, there is no one who has not killed their fair share of plants. If we kill something it reflects no shame on our ability and sharing the problem

can often come up with a remedy. Another point in sharing our disappointments is that it will help other growers avoid making the same mistakes. So don't be shy, share your failures with us as well as your successes. You do not need to be a professional writer as I have said before - If you talk to one another you can write down what you say for us all to share. From what you tell me you enjoy the Report so please lighten the load for me and send in your contributions for the 1999 NPR inc HO.

You know where to send them but just to remind you it is to the address below.

**Peter Bradbury**, 72 Blind Lane, BOURNE END, Bucks. SL8 5LA.

