National Pleione Report

incorporating

Hardy Orchids

1995

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HARDY ORCHIDS

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CUMBRIAN CHAT

Firstly, I would like to thank those people who contacted me after last years report and offered plants. Due to their generosity and other good fortune I have now obtained all the plants that I listed at the end of my last contribution and more besides.

My wife bought me some greenhouse benching for my birthday last summer and I now have most of the greenhouse for my orchids and other plants (Fritillaria and Arisaema mostly). This means that I need not be as selective with new aquisitions as I had predicted, consequently I have been poring over the winter lists with great interest.

This year saw my first Cypripedium flowers **(C.pubescens)** and the flowering of Bee and Marsh orchids as collected in '93 (se last years report). **Bletilla striata** and my Calanthes have still not flowered - I now know why in the case of the Bletilla but am open to suggestions as to the Calanthes - maybe next year? One newly aquired **Bletilla formosana** started into growth very late in June and is now showing two flower spikes in February! I am a little concerned that this plant may not get a dormancy if it stays green much longer...

Epipactis palustris flowered for me in '94, it had three flowering shoots where there was only one vegetative shoot in '93 - a vigorous plant.

Pleione had a mixed year - my own favourite, **P.yunnanensis**, grew and multiplied well but did not flower, nor did **P.speciosa** or **P.aurita** (P.chunii)but **P.limprichtii** and **P.bulbocodioides** did. Hybrids flowering for me the first time this year included **P.Irazu 'Cheryl'** (very large flowers) and **P.Tolima 'Nightingale'.**

The installation of a solar powered fan over the Pleione bench paid dividends with the vegetative growth of many plants being noticeably enhanced. Out of laziness I have been using a commercial bark based orchid compost this year (94)

some plants seemed to like it (Eiger) but others hated it - **P.bulbocodioides** and its hybrids with **P.yunnanensis** both sulked to the point where it will take a couple of years to get them back to flowering size. I will return to the Butterfield recipe next year and have learned my lesson!
P.praecox and **humilis** did very well in a mixture of coarsely chopped bracken fronds and sphagnum moss - I shall continue with this for this year. Recently I obtained plants of **P.hookeriana** and **maculata** along with more **praecox** and **humilis** and may try these in this mix also.
Some of the hardier Australian orchids are also new to my collection, they seem to be doing very well and were undamaged by one, unexpected frosting. I look forward to flowers in the spring.
I think that my favourite new flowers of last year were the yellow form of **Dactylorhiza sambucina** - exquisitely pretty. This, and many other plants in my collection were supplied by Kath Dryden - I never cease to be delighted with the quality of the plants received from this source. Speaking of Mrs Dryden, she may be pleased to hear that her book 'Alpines in Pots' inspired me to join the A.G.S. this year.
Some readers may be wondering about the collected Dactylorhiza hybrid of exceptional size which I mentioned last year. Well, its still a big plant but it has very unremarkable flowers - you win some, you lose some.

Darren Sleep, Barrow-in-Furness, Cumbria.

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RAMBLINGS AMONG PLEIONES

As ever controversially, these thoughts are written more by persuasion than natural inclination. It is said that a good piece of writing, within the realms of horticulture, is always out of date by the time it appears in print. As growing a plant to perfection is my ultimate aim in life, the writing takes second place. By the time I get to writing I have proved myself right or, more often wrong, so desist.

This missive will have a very distinct alpine flavour as you would expect. What is an alpine? - I am no purist so my interpretation is that, if at least one of the group examining the plant in its native habitat is suffering from altitude sickness,that is alpine enough for me. Further endorsed by growing conditions that consist of a winter rest plus snow cover in a mountainous region. The ins and outs of growing these plants with a warm duvet of snow in a bitterly, windy eastern garden, is another story.

Here, on the Essex/Herts border we try to grow any hardy terrestrial orchid, including Pleione, that we can legally obtain and have done so for some thirty years. The first to come were the pleiones. My first job within the A.G.S. was in the Show Department. Large, colourful pans of pleiones graced the early show benches. The main exhibitors included the late Connie Greenfield, Roy Elliott, VMH and the Rev. Richard Blakeway Phillips - with Roy known to reiterate that "it wasn't fair" because the latter "had God on his side to start with" - Sorry Richard. Any query as to how to grow the plants was met with "Oh, well-drained John Innes and peat" - that didn't work for me. Opinions raged on the Judging lines as more and more pleiones swept the board - too showy to ignore- and the inevitable bugbear "they are not hardy". As the years have gone by this has proved to be rubbish - always bearing in mind that any bulb, rhizome or

tuber, grown in a pot will not tolerate being frozen through and thus I think that we all accept that pleiones must have a dry, rather cold winter, but not be a ball of ice. Thus Judges who for several years gave pleiones first prize against allcomers, suddenly passed them over. Pleiones and then Orchids were removed from the bulb classes to a class of their own as it was unfair competition to a mere daffodil - despite the fact that it is a much greater challenge to grow and maintain many narcissus than most pleiones. Then we had the very few people growing Ophrys, Orchis etc, usually one in a pot and a triumph of growing skill, being outclassed by a showy, large pan of Pleione. The Ophrys and Orchis took over and so came the decline of Pleiones on the AGS Showbench, which is inspiration for many Alpine Gardeners. Enter **Pleione shantung** which turned the alpine gardeners with a leaning towards hardy orchidacea, on their heads. It won immediate acclaim and we were back to square one - if you had, at enormous expence, acquired one **Pleione shantung** in a 3" pot you expected and often got first prize and that was another death knell for the genus as a whole. Moreover they certainly were not growing them in well-drained John Innes plus a bit of peat. Fortunately there were some devoted enthusiasts who continued to experiment and in came shredded bark and an emmulation of the composts used by the non-hardy orchids fraternity, most of whom by this time had thrown the pleiones out with the bathwater and they were firmly in the lap of the alpine lot, including the RHS Joint Rock Plant Committee. I was more fortunate than most - in my job as Director of Shows I had to visit all of the shows and pleiones still held their popularity in the north, where most of them were grown in cold-frames, covered in very extreme temperatures with old rugs, evergreen branches etc. but above all, that magic ingredient, a warm duvet of snow. In the south it was almost only Richard Blakeway Phillips and Ian Butterfield that plodded away and kept the genus ticking over although a great many alpine

houses were greatly enhanced in early spring with pans of **P.formosana** as were those of R.B.G.Kew and R.H.S.Wisley. R.B.G.Kew of course had the advantage (as ever) of the plants of the great collectors and kept them going. Then came the garden centres and Sunday Paper mail order gimmicks - "Window Sill Orchids". The number that were killed with the totally inadequate cultural information, although collosal, was nothing compared to the horrific losses once the eastern countries got in on the act and started sending poor peasants out into the mountains to uproot pleiones by the thousand thousand, in flower, to start their 6-8 month journey to the States and Europe. I have seen this trade at the closest quarters - it is just as sickening as a cage of dead wild birds at an airport. However it is by this trade that many unknown, often un-named species have been rescued and introduced. Pleione growers can't resist as they call "rescuing some" - I have rescued many discarded in nurserymans' bins as unsaleable. The tiniest slither cut from a dying ps. bulb plus a tiny piece of base plate, painted with Meths, dried and dusted with fungicide will invariably grow a new pseudobulb - increase eventually and live to fight another day. If only the third-world countries would allow correctly collected ps. bulbs to be exported for propagation - or do it themselves - how much better it would be. After all, the only way to truly conserve a plant is to grow it!
Modern composts vary a great deal as do the ingredients. As for all alpines, to know how to water is to know how to grow. I would go further than that and say - how to water and manage your own compost is to know how to grow. I grow all pleiones now in shallow plastic containers, planting ½"-1" apart according to size, in the case of mature bulbs size 3-2-1 and flg. bulbils and small bulbs are literally sown like seed and covered. I plant deeper than most of the literature advises with only the tip above the soil. As the compost settles and the vigorous roots push the ps. bulbs up the bulbs come to the correct

level for early autumn ripening.
Some coarse material, grit, pumice or whatever is available plus some coarse horticultural grade charcoal (not bar-b-que) is put in the bottom of the container.
The very open bark composts didn't work for me in a very busy life.. Last year I added the young Finnish peat to coarse bark, very fine propagation grade bark, Perlite and a little lime-free sand. This year I may add some home-made leaf mould - quantities I mix till it looks and feels right. Feeding here is erratic to say the least but when applied it is by a fine mist sprayer as a folia feed. The compost is not drenched. The feed is low nitrogen. No phosphate or as little as possible and high potash. The pots sit on wire racks on a north facing wall in a covered but open ended sideway - very windy, full light, no direct sunlight. Results this year were very good - but one must not get blaze in any respect of growing. The plants detect this attitude with alacrity. As I write in December - you are reading this in mid-summer - another season has come and gone. I may have lost the lot or decided on a different method for next year. The scientists will have sorted out a few mysteries although can anybody tell me why a plant that is given a CV name - to get an award must be absolutely, immediately distinct from its kind - whereas a taxonomist/botanist can give or change the name of a specie on the evidence of a minute detail often invisible to the naked eye or the untrained eye of a 'greenhorn ' such as me!

K.N. Dryden, Hertfordshire.

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SYMBIOTIC CULTURE of HARDY ORCHID SEEDLINGS

It is now possible to grow many orchids from seed using sterile asymbiotic techniques. Although many tropical orchids have been grown from seed using these techniques, until recently culture of many of the temperate terrestrial orchids using the same technique has proved to be very difficult.
Orchid seeds are characterised by having little or no food reserves and are unable to develop without some external source of suitable nutrients. Sterile laboratory methods of seed raising aim at supplying the nutrients necessary to see the orchid seedling through their early stages of developments. The soluble sugars and other substances used in the laboratory are not readily available in the wild. These needs are invariably provided in the wild by a suitable symbiotic fungus partner. The fungus may not be necessary always for germination of the seed but is crcial for the early development of the seedling. Only a limited number of fungal species are suitable symbionts and a fungus which is a successful symbiont with one orchid may not be suitable for all others. Orchids can be raised from seed in the laboratory using the correct symbiotic fungus. Different media from those used in sterile methods of culture have to be used. The medium must support the growth of the fungus but not to be so nutritious that the fungus grows too rapidly. The standard orchid seed media such as Knudsons etc. cannot be used. Mark Clements in 1982 showed that Australian terrestrial orchids could be germinated and grown in the presence of a suitable fungus on a medium containing agar and rolled oats. He later showed at Kew that very similar methods can be used with many of our European terrestrial orchids. The real difficulty with these symbiotic methods of raising orchids from seed is in isolating the active fungal symbiont. Robert Mitchell described the methods used at Kew (R.B. Mitchell, 1989 Growing Hardy Orchids from Seed at Kew,

The Plantsman, Vol. 11 part 3 pp. 152-169). The fungus associated with the orchid is usually found as hyphal masses (pelotons) in cells in the orchid roots. With a suitable microscope, a very steady hand and a sterile room or laminar flow hood it is possible to do, as the professionals do, to tease out these hyphal masses and subculture them on suitable media. If you are suffering too much from the night before or your hands are not too steady for other reasons and you do not have a microscope or a laminar flow hood it would appear to be impossible for you to separate fungi active in sustaining orchid seedlings. The purpose of this article is to describe a way in which most orchid growers can isolate active fungal symbionts without the need for the expensive techniques and equipment used by the professionals.

Equipment needed.

A container which is big enough to work in with ones hands. This need be nothing more than a large clear polythene bag or better still a cardboard box constructed to form a glove box. The cardboard box is lined with aluminium foil with two holes in the front, large enough for hands to be placed through, and with the open top covered with cling film or other clear plastic.

Sterilisable glass jars with metal or polypropylene lids. Many jars used in the kitchen are suitable. I use Sainsburys coffee jars (polypropylene caps) or Sainsburys Sandwhich Spread jars (metal tops). Any other similar jar could be tried. I use a pressure cooker for sterilising media and equipment and the jar and lid must stand up to this treatment.

Scalpel or craft knife or razor blade or any other very sharp small knife.

Tweezers, small scissors etc.

Measuring equipment. If you have not got laboratory measuring cylinders any graduated measure such as kitchen measuring spoons or the graduated measures

supplied with some washing powders are suitable.
Sprayer (the sort used for some kitchen cleaners or window cleaner etc.)
Pressure cooker for sterilising media and tools. A microwave oven can also be used with care and provided suitable safety rules are followed. Failing these chemichal sterilisation with domestic bleach is also possible.
Rubber gloves to wear while working in your sterile area.

Materials

Rolled oats (from most grocers)
Agar (try your Health Food shop or maybe your local pharmacist might be able to help).
Salt free powdered yeast extract (try your Health Food shop).
Domestic bleach (available from your supermarket). The thin cheapest sort, not the thickened variety.
Purified or distilled water (garage, car maintenance shop or pharmacist)

Method

Prepare the medium you will use. A medium similar to that described by Emments contains 3.5g rolled oats (Sainsburys or similar), 100mg salt free powdered yeast extract and 8g agar in 1 litre of purified water. The medium is prepared and the agar disolved by heating to boiling and poured into sterile jars. I use 50ml per jar. The jars and their lids are sterilised, preferably in a pressure cooker at maximum pressure for 15 minutes or in boiling water for the same time. Boiling water is not as effective. After I pour my medium into the jars I prefer to resterilise the lot in my pressure cooker. Remember that containers with screwed on lids can explode on heating. **Make certain the lids are loose while heating. Remember also that if you use a microwave oven metal lids cannot be**

used and that plastic lids must be very loose. Remove your jars, screw down the lids tight and allow to cool and set. I leave my jars for several days to ensure that they are not contaminated and are still sterile.
Prepare a 10% solution of domestic bleach (1 part bleach to 9 parts purified water). This should be prepared on the day of use. Remember this will bleach many clothes, carpets etc. Use with care and in an area where spillages will not matter.
Spray some of this solution inside your glove box, polythene bag or other area you will use as your sterile work space.
Swab your rubber gloves with this bleach solution and wear these gloves when handling your sterilised tools and tissues.
Sterilise your tweezers, scalpels or razor blades either in a pressure cooker at top pressure (15 p.s.i. preferred) for more than 5 minutes at full pressure or with undiluted bleach for 15 minutes or by heating in a gas or spirit lamp flame. Keep tools sterile until used.
Sterilise the purified water you will be using either in a container in a pressure cooker or by boiling for 10 minutes. Keep any screw on lids loose while heating but screw tight before cooling.
The fungus occurs within the roots of actively growing orchids, usually in a region slightly away from the root tip and then extending for a short distance up the root. Select a healthy looking root from an active growing terrestrial orchid, preferably during the pre-flowering stages of growth, and remove from the plant. Wash with cold or tepid water with a few drops of washing up liquid and rinse. Sterilise by placing root in a 10% solution of domestic bleach and leave for 15 minutes. Remove with sterile tweezers and rinse with sterile purified water. Place on a sterile surface (e.g. a bleach swabbed and rinsed tile) in your sterile enclosure and slice the first 2 or 3 cm of root from the root

tip into thin cross-sections. Discard the first 2 to 3 mm from the tip. Place the sections on the surface of your prepared medium, screw down the lid and leave at room temperature in the dark.

Within a few days a thin fungal film may appear on your medium which may or may not be symbiotically active.

Prepare some more medium as above. Sterilise some orchid seed of the same or related species to the one whose roots you used (place seed in 10% bleach for 15 min, filter and wash seed with sterile purified water, filter). Using a sterile loop of wire (ordinary thin garden wire, copper wire or other wire sterilised by heating in a flame) to transfer a small piece of your fungus infected agar on to new medium. Seal the jar and place in the dark. Depending on the species of orchid and whether your fungal isolate is active, the orchid seed will germinate within 2 weeks to several months. If no germination occurs try placing in your refrigerator for 2 to 3 months and return to the dark. If your seeds do germinate and grow well you have probably isolated an active fungal symbiont for your orchid. Keep pure by subculturing on to fresh medium and try with seed from other orchid species.

Your seedlings can be treated as any other orchid seedling and can be replated when big enough onto new medium. Move to the light when leaves show and pot on later into a compost suitable for your orchid species.

Often symbiotically grown orchid seedlings grow more strongly than similar seedlings raised in sterile conditions. Enjoy your growing and let others know how you succeed. If you do have an active culture do not keep it to yourself, let the Sainsbury Orchid Unit at Kew know and if they wish, let them have a sample.

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LEAF TIP BURN OF PLEIONES

Like most pleione growers I have, at times, been plagued with the dreaded browning and eventual dying back of what is sometimes quite a large part of the leaf blade. Everyone recognises the symptons, I am sure; the small brown lesions which appear near the leaf tip and gradually enlarge until they merge, reducing the viable area of leaf by up to one half of its original. The usual explanation of this condition is root-rotting and, I do not deny, for reasons to be explained later, that this is one cause. However, following a rather severe onset of symptons in my Pleiones two or three years ago, I realised upon investigation that these particular plants had healthy and normal root systems. This then kicked the previous theory into touch and I began to develop headaches!

Sometime later in the season, whatever knowledge I had acquired as a professional horticulturist and Pleione grower was put to the test by a friend who was concerned by the high incidence of blossom end rot on his tomato crop. I duly expounded the theory of this condition and its implication for calcium transport in a plant and obliged by doing a literature search for him and supplying photocopies. During this execise it occured to me that the growing conditions conductive to BER which I was describing to him were, in fact, very similar to those I was experiencing with my own Pleiones. The bulk of leaf damage had occured in my small propagating house. This was a metal-framed structure which I had insulated, internally, with green bubble polythene. The temperature was maintained at a minimum of 12°C. Consequently, I was creating a warm humid atmosphere for 24hrs. a day, despite having constant air movement from a circulation fan. On reflection I realised that the compost remained quite damp, requiring very little watering and that, generally, I had a very stagnant environment. The only real change in conditions was in the temperature,

which rose significantly on sunny days, despite the house having an auto-vent. It became quite obvious, also, on further reflection, that the most excessive damage had taken place during late May early June in two consecutive years, following spells of hot, sunny weather preceded by a few days of cool, dull and wet weather. Very quickly I became convinced that I was coming up with another answer to the leaf browning problem.

A colleague and senior lecturer in the Department of Pure and Applied Biology at the University of Leeds, Mr Ernest Kirkby, an internationally recognised authority on calcium in plants, was the most obvious person to consult on this point. On presenting him with a badly affected plant without explanation, his immediate reaction was "Calcium deficiency"! To back up this statement a postgraduate student was allocated the task of performing an atomic absorption spectrophotometry (!) analysis of the damaged leaves. The consequent results showed quite clearly that the calcium concentration in healthy leaves was almost double that in affected leaves; whereas the potassium and magnesium levels remained approximately the same in both.

So what do we do; throw a handful of ground chalk in with our potting compost? Regrettably, no!. Calcium transport within a plant is quite a complex matter and not simply a case of supply at root level. Let us begin by looking at the implications of calcium deficiency in crops. BER in tomatoes is one of the most well known effects, but calcium deficiency is also responsible for the same condition in peppers and water-melons, for blackheart in chicory and celery and for leaf tip burn of strawberries, lettuce and chinese cabbage, to name but a few. It must, at this point, be stressed that these problems are physiological and not pathological, I.E., they are disorders not diseases. Any fungal infection is secondry and usually takes the form of botrytis.

Of all chemical elements available to plants, calcium is the one which is moved

about within the plant with most difficulty, however freely available it may be in feeds or potting media. Hence, most deficiency symptoms occur at the plant's upper extremities. The answer to the problem, therefore, lies within the environmental growth conditions created and not, normally, in the supply of calcium to the roots. The flow of calcium from root to shoot must be maintained throughout the plant and it should be remembered that most of the calcium taken up by roots (unlike other nutrients) is taken up mainly by the root tips. Any interruption in this flow can result in localised shortages. In tomatoes, for example, the sap flow is diverted into the leaves during periods of excessive transpiration such as occur at high temperatures. This can result in a hiccup to the supply of calcium in some of the newly-forming fruits, with an incidence of BER on those fruits when they mature.

Probably the most important factor in maintaining an adequate sap flow within the plant is root pressure at night. If environmental conditions are created which result in a high root pressure, this will force the sap,which contains a high concentration of mineral solutions, all the way up to the plant's tips. Conversely, if a plant is transpiring excessively, the sap is sucked through the plant rather than pushed, because the rate of water loss exceeds the osmotic absorption of solutions through the roots, resulting in calcium supply interruptions. The majority of plants readily wilt during these conditions, showing that they are under stress. In Pleiones, of course, this does not happen so obviously. Careful observation, however, will show that during periods of stress the Pleione leaf loses its shine and takes on a much duller appearance than when unstressed. It is no gardener's myth that, with skill, it is possible to tell when a plant needs watering before it reaches the obvious flagging stage, by studying its leaves.

To increase this root pressure, in order to create a favourable sap flow, it is

essential that, during the spring, in particular,when new leaves are being produced, the relative humidity during the night be kept high. Dry nights increase evaporation, thereby reducing root pressure. Too dry a compost will, of course, also have an adverse effect on this. In my experience over the years, leaf browning has often occurred with a sudden change from prolonged dull wet weather to sunny, hot spells. This is due to the sudden change increasing the rate of growth to a degree with which the root pressure cannot keep pace. In this situation it is helpful to temporarily reduce the temperature, by increasing ventilation or shading, until the calcium demand can meet the requirements of rapid cell developement.

To summarise, other than the unlikely event of a direct calcium deficiency at the roots, the main factors affecting the incidence of leaf browning and the appropriate ameliorative steps are as follows:-

a) Relative humidity at nights: This must be kept high to increase root pressure; damp down and spray plants all over with water on every suitable evening. If Pleiones could be encouraged to guttate this would be highly desirable as this phenomenon is a sure sign of satisfactory root pressure. I have never, knowingly seen guttation on Pleiones. Has anyone?.

b) Supply of water to the roots: This must be adequate but not excessive, to compliment point (a) above. Water during the evening only.

c) Relative humidity during the day: If this is too high and the root pressure is by then too low, the result is still inefficient calcium movement. In this situation ventilate well to ensure good air circulation.

d) Concentration of nutrient solution in the compost too high: This will have an adverse effect on the osmotic process. Do not overfeed.

e) Root damage caused by mishandling, overwatering or soil pests: This will prevent adequate water and mineral uptake into the plant in any case. Leaf

browning, therefore, would indicate this.
Potting composts, naturally, play quite an important role. One man's compost is another man's poison. I would wager that most Pleione growers have at some stage, derived as much pleasure from experimenting with growing media as from actually growing the plants. Therefore, consideration to the water retaining/ drying abilities of a compost must be borne in mind along with all the other environmental situations.
I have experimented with growing Pleiones in all the adverse situations discussed and, believe me, it is quite easy to induce leaf browning. Fortunately, it does not normally mean the total loss of the plant but inevitably the size of the resultant pseudo-bulb and, with it, the chance of flowers the following spring are greatly reduced, as one would expect in any crop harvest following leaf damage. Since reaching my conclusions on this problem I have adopted the watering and cultivation procedures outlined, and have consequently experienced very few symptoms of leaf browning as a result. I am totally convinced that inadequate calcium distribution is the basic cause of this disorder, and suggest that in future the condition be officially recognised as PLEIONE TIP BURN.
Most of the research and observations concerning tip burn and assiciated disorders has been done on crop plants as opposed to ornamentals. I believe that there is lots of scope for research into the latter. In my limited experience of Cymbidium cultivation, for example, I have observed a similar problem and suggest that this may also occur in other pot plants such as Chlorophytum and Palm, to name but two. I await comments with interest!.

ACKNOWLEDGEMENTS
I am grateful to Mr Ernest Kirkby and Dr Jacques le Bot for their patience with

my Pleione enthusiasm, and their time and trouble in performing the necessary analysis.

K. Redshaw. January 1995.

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THE GENUS BLETILLA

I look back with interest to an article in the January 1975 edition of the ORCHID REVIEW by Ian Butterfield on the lost Genus Pleione and believe we are in the same position as he was twenty years ago with another obscure genus that has been neglected.
In some ways the neglect is even worse as **Bletilla striata** was first described by P.Thumberg at the end of the eighteenth century and, according to Philip Cribb, has been used by the Chinese in their medicines. Therefore one can assume it has been known to them for many centuries.
Information on the genus is very sparse as it appears that most of the species are found in Japan, Taiwan, China and possibly northern Burma. Apart from Hayata's description of formosana in 1911, the remainder of the descriptions were made by R.Schlechter in 1913 and 1922. The more that I learn of the history of plant collecting the more I realise that the natural area of habitation of the Bletilla has been closed to the western world and when it was open shrubs etc. were of greater importance than hardy orchids.

The Species
Bletilla striata

This is the most common form, obtainable from many sources, with colour variations from the standard deep rose purple with white markings in the throat, through to pure white forms. I have found it to be hardy here in south Lincolnshire where I grow some in the garden under a west-facing fence with no shade from mid morning onwards.

Bletilla formosana
Originating from Taiwan where it is found from 100 to 3300 mts. altitude in open grassland, it is one of the later emerging species and consequently does not start into growth until May. It will then rapidly develop producing light pink flowers that continue until October.

Bletilla szetschuanica
This Chinese specie comes from the mountainous region of Szechuan Province and again is late to come into growth, producing its light rose purple flowers with yellow and deep purple lip markings in May and June. It is the smallest of the species that I have but has shown some good characteristics when used in hybridising.

Bletilla yunnanensis
Originating from the same area as **szetschuanica** it is very similar in growth but the flowers have a wider lip marked with white and the reverse of the petals and sepals are a deeper colour than the front.

Bletilla ochracea
This has been described by Philip Cribb as the Pleione forrestii of the Bletillas with its yellow sepals and petals and deep red markings in the throat.

It again comes from the Szechuan and Yunnan provinces of China. Coming into flower in May and June, it can be very variable, but it will not be until cytology work has been done on the genus that we can be certain whether it is a pure specie or if there are natural hybrids occuring.

Culture

I have tried many forms of compost of either rockwool, peat or loam. I do not believe that there is a right or wrong medium as I have had good growth in all so long as two criteria are maintained. One - free draining and moisture retentive, Two - pH of at least 6.5. I have now settled on using basic medium grade peat that is turned light grey with Dolomite Lime which gives me a pH of 8.0+. If you treat them like Pleiones with regard to temperature they will respond well - cold and reasonably dry in the winter, cool in the summer. Little shade is required if they have good air movement around the leaves. Problems of sun scorch will occur under glass if not shaded purely because lack of air movement prevents the leaf from keeping itself cool. Too much shade will reduce flowering in the following year.

If planting bare root dormant rhizomes, just cover them with compost. Do not bury them as they do not produce new roots until they have grown the majority of their leaves. It is advisable to repot or divide plants when they are in full growth, just before the first flowers open, as this is when the new roots will begin to grow.

I hate dividing plants and prefer to grow them into specimen size before splitting them. Constant division only weakens the plant.

Halfpots or pans are ideal, although I have grown successfuly in up to 10 ltr. pots. Be aware of the plant's development as they soon hit the side of the pot and can damage the new growth as they produce next year's buds.

Hybrids

The first to be registered was Yokohama back in 1956 being a cross of formosana and striata. I am now doing what I suppose is the normal thing of crossing everything to see which species give which characteristics.

The results have been most rewarding, with all of them showing the hybrid vigour that one would expect from primary hybrids, but with greater variations than I expected. This is possibly due to the parent stocks not being as pure as one could expect, especially with ochracea.

Being a novice in growing orchids from seed I tried all sorts of medium but have found Bob Dad's mix the best. Replating occurs about six weeks after sowing and deflasking at about six months after sowing when I prick them out into seed trays containing 50% potting compost and 50% coarse peat and Dolomite Lime. If the plants are kept at 55°F+ they will keep growing twelve months of the year. With a little bit of luck first flowers appear two years out of flask.

In conclusion I hope that this will shed some light onto the genus for you and let you know of another showy orchid that will grace your glasshouse/coldframe when the Pleiones have finished. I look forward to the day when I read a report of someone's plant hunting trips to China in this or other publications where they go into raptures over Bletillas they have seen (hopefully new species). They must be out there but no one appears to see them.

Richard Evendon, South Lincolnshire.

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THE PLEIONE CURSE - or BREVIPALPUS

SOME PEOPLE CAN GROW PLEIONES - and SOME CAN'T

This is by far the most important article I have ever written on the subject of Pleiones. And without in any way boasting I venture to suggest that it may well prove to be a most important article for Pleione enthusiasts, and possibly for other hardy orchid growers too. Quite simply I am convinced that it contains the answer to the age old riddle contained in the quote.

I knew of the Pleione reputation long before I tried to grow them myself. So I was relieved to find when my time came that I was one of the favoured few. Indeed I found them so easy to grow that I was puzzled as to how anyone with a modicum of intelligence could have any problem. Yet try as I might I could not pass on the simple rules of successful culture to many of their admirers. The explanation of the Pleione reputation baffled me.

I have a very clear memory of an incident that happened nearly twenty years ago at the height of my highly successful Pleione showing career. I don't remember the exact words of the venerable soothsayer but the gist of the message that he passed onto me at one of the London shows has haunted me ever since. It was to the effect "You have some beautiful plants and a great skill, but it will pass from you. Slowly over a period of time you will be less satisfied with your results and though you try to modify your procedures to regain your triumphs you will fail. Gradually your collection will become a source of shame to you. It is the curse of the Pleiones". Scarcely had I got the message than I began to see the truth of it. I realised that I knew of several one-time eminent growers whose collections now had a distinctly "run down" air. Had they lost interest? - no, they were baffled. What had gone wrong? So far as

they knew they did everything just as they used to but their efforts drew scarcely any reward.
About this time too I collected another "truth" which is expressed in the statement that many important Pleione clones exist in two forms: a flourishing free flowering form and a miserable stunted form that could scarcely keep alive from one year to the next. This instantly suggested to me that we have a virus problem. Like the fool that I am I went out of my way to aquire some of the sick Pleiones to investigate further. All of my readers will recognise the sort of pot I wanted and got - non flowering with lots of very small bulbs. I took care of course that the 'virus' wouldn't affect any of my healthy stock - no greenfly and no compost-contact for possible eelworm transfer. As I had expected I found that the problem was not cultural, it was some sort of systemic infection. Taking a few of the bulbs and growing them well spaced in a good new compost made no difference to their vigour or survival rate so soon, without regrets, I'd lost that stock. There was however one more observation which rather upset my virus theory. I was at the time paranoid on the subject of virus in my Pleiones. I was well aware that all my best plants were ones that I had raised myself from seed - and it is common knowledge that very few viruses are seed transmitted. In other words one can raise virus free seedlings from virus infected plants. I thought I could see symptons of virus in several of my standard parental plants. The surprise observation was that bulbils from these old stock plants grown in fresh compost soon produced fine bulbs, and that these plants were apparently often more vigorous than the original stock. It seemed as though rejuvination had taken place, but this could not be anything to do with virus since bulbils from a virus stock would also have virus.
About fifteen years ago I first realised that some of my own seed raised hybrids were beginning to decline. Nothing seemed to thrive. My rejuvination via bulbils

still gave an improvement, but not a cure. Every year I had fewer flowers than the previous year, and indeed fewer bulbs. Every year I tried modifications of compost, shading, watering, wintering, fertilising, fungicide treatment, etc, etc, to try to regain my skills. Some years I thought I had a slight improvement and had turned the corner, but the next year the hopes were dashed. 1993 was one such improvement - so much so that I expected to start showing again in 1994, and pots were planted up ready for my re-entry to the show bench. But by March 1994 it was obvious that my problem was worse than ever and that by now (i.e. February 1995), short of a miracle, my Pleione collection would be no more.

At the Harrogate Spring Flower Show in 1994 I had no pots fit to exhibit. John Craven wanted to know where was this Harberd revival that I had promised. We had a long chat and John insisted that I took one of my worst pots to the Ministry of Agriculture. I thought what nonsence, but he was persuasive. Fortunately for me the local substation of the Ministry is within walking distance of my house so I went along with a sick pot - one of the ones that I had potted up for showing but which was still not sprouting. It was exactly as I had anticipated: they couldn't find anything wrong with it, no creepy crawlies of any significance. They had of course no experience of the plant and no idea what to look for. They weren't really convinced that there was anything wrong - here was a pot of good looking bulbs that weren't growing; I was just being impatient. Would a wait put it right? I think I managed to convince them that I did know something about Pleione growing so they played their trump card. They could send the plant to Head Office for investigation and this would cost me Fifty Pounds. I jumped at the offer - £50 is nothing to the value that I put on my collection and it had every appearance of being valueless if I didn't do something drastic.

Within days the Ministry was back with a solution. They phoned me and I went weak at the knees as the story unfolded. Everything they said fitted so exactly with my experiences that I knew the problem had been cracked. And so it proved to be.

The pest is called **Brevipalpus oncidii,** a 'false spider mite', which only attacks orchids. It is very small, flattened, and it lives on the underside of the pseudobulbs in small numbers. It injects a toxic saliva into the host as it feeds and the effects of this saliva on plant growth are far greater than might be expected from the small number of pests present. It can be controlled by the chemical Dicofol (as contained in Childion) which is not available to the general public. I was able to get some and to make use of it - and the results are little short of miraculous.

That was as far as the Ministry were able to take me. The rest of this article is my interpretation of how this fits in with Pleiones and Pleione growers. **Brevipalpus** is reputedly rare, but in my opinion it is common among Pleiones. I venture to suggest that no Pleione grower is without it. It occurs in very small numbers and it is tiny and easily missed (I've never seen one). Its numbers build up very slowly over many years. It moves only slowly from pot to pot so that a sizeable collection of Pleiones may include both healthy and infected pots, and very gradually the proportion infected increases. All collections are doomed in the absence of control measures. Note how precisely this fits with my venerable soothsayer and note also how my virus like interpretation is much more fully explained by **Brevipalpus.**

So friendly Pleione growers, I am telling you that you have got **Brevipalpus.** Prove it for yourself as I try to list the symptons:

1. A normal Pleione pseudobulb softens and shrivels in late midsummer so that come autumn the pot contains only new pseudobulbs, the old ones having virtually

disappeared. If in the autumn the pot contains any fleshy old bulbs, or any shrivelled but still sizeable old woody dead bulbs, then you've got **Brevipalpus** in that pot. What's more the stock has had **Brevipalpus** for perhaps ten years and its years to the future are numbered.

2. I'm quite sure that a tiny proportion of good healthy bulbs fail to sprout in the spring because the main bud has died for reasons other than **Brevipalpus.** But in that case a secondry bud has usually started to grow before you realise that the main bud is dead. Most failures of bud burst are due to **Brevipalpus.** If it is a flowering bud that is lost then it is probably a new infection because heavily infected plants don't produce flower buds.

3. If a flower bud swells and comes to within days of flowering before aborting or does flower but withers before fully expanding then **Brevipalpus** has just struck.

4. Wholesale failure of bud burst in spring is **Brevipalpus.**

5. I've no doubt that a few cases of abnormal shoot growth need not be **Brevipalpus,** but **Brevipalpus** does cause abnormal shoot growth, so if it is prevalent then so is **Brevipalpus.** As you will know good shoots on Pleiones are neatly and beautifully folded so that the breadth of the leaf is contracted into a small cylinder that slides out of its sheath with ease. Any frequency of buckling in the shoot, or folding across the grain,is suspicious.

6. Infected bulbs do eventually produce shoots, frequently more than might be expected for that size of bulb. These are late and yield small bulbs. Pans packed with tiny non flowering bulbs, both this years and last, have **Brevipalpus.**

7. The mite is not a great traveller so that a large pan may have a new infection confined to a small area.

Childion is remarkably effective. Last year I had twelve flowers and I was

expecting to have no flowering bulbs this year. In the event I have just finished potting 3,000 bulbs, over 500 of them have flower buds.
Unfortunately as I have said Childion is not available to the general public. However it is not a cause for despair. The pest moves slowly from pot to pot and you can maintain a collection for years before it builds up to disastrous proportions. Having been warned you can take action. Throw away any sickly pots that aren't precious to you. Isolate any sickly plants you can't bear to lose. Use bulbils that have never come into contact with the compost to start off new rejuvenated stocks. I don't know how effective thorough cleaning of bulbs in winter would be in controlling the problem, but it must help. Now that we know what the enemy is the future is rosy.

David Harberd, Leeds.

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PARADISE LOST ?

My friend and I spent several vacations in Belanske Tatry (Slovakia) in the late seventies and eighties. It is a very interesting part of the Tatra Mountains, the calcareous area "hidden behind" - on the north side of - the granitic High Tatras. Thanks to the limestone this part of the Natural Park is rich in flora and as it was not so much known as the popular High Tatras there were less tourists - until the invasion of smelling two-stroke-engined Trabant cars of (former) East Germany citizens who were not allowed to go to the Alps in those times.
We chose for the visit regularly the third week of June when in "lowland"

(at about 1000m. above sea level) the "summer" flowers were already in bloom while at higher elevations charming alpine plants - e.g. **Primula minima** in all shades, even pure white, **Gentiana verna**, and **Campanula alpina** - were still retained. In meadows under hills bloomed many spotted-leafed **Gymnadenia conopsea** and **Orchis majalis**, in less humid places **Spiranthes spiralis**, **Plantanthera bifolia** and **P.chlorantha**, in spruce woods was **Cephalanthera rubra**, **Listera ovata** and the minute **L.cordata** - one we found proudly looking down from the upper edge of a 2m. high earthy plate held upright by the roots of an uprooted spruce - and, on half decayed logs, pale saprophyte **Corallorhiza trifida** was not rare. **Cypripedium calceolus** we found only twice, under deciduous woody vegetation. One plant grew among shrubs in the valley at an altitude of about 900m. not far from a stream but well above the water level for all the year. I saw several other plants they were on the southern side and at the base of a high calcareous wall, on deep scree filled with beech leaf debris. (Later I was informed that in the lowlands it prefers mostly eastern or even northern slopes). This place is covered by at least 1.5m. of snow in winter, thus no danger of frost damage for the plants exists. As it was prohibited to step outside the roads in the National Park, it is most possible that more cypripediums remained hidden to us.

The greatest surprise awaited us on the almost horizontal main east-west oriented ridge of Belanske Tatry, reaching little more than 2000m. and in parts only a few feet wide. There the wind blows so strongly that mats of **Festuca ovina** were torn off and rolled like carpets when not protected by stones, and showers fall ten times a day at least. Shielded by stones, among grass there grew the gem: **Chamaeorchis alpina**, the 10-12cm. high modest plant with the rosette of plain green leaves and brownish green-yellow rounded flowers, not larger than 8-10mm. across. It has grown here since the Ice Age in never ending wind and

showers in summer and little snow cover in winter.
Wind was the enemy No1 when I was trying to take some pictures of the orchid. It shook the relatively sturdy small plant all the time and it took many minutes to catch one moment between two blows - minutes when I half knelt, half laid with my head leant against a stone by the camera's tripod, growing slowly stiff in the cold whizzing gale (8°C. at noon on sunny 20th June). No wonder that after more than thirty minutes of waiting I perhaps surprised a sole group of tourists staring at my bizzare position and asking innocently "What have you got there?" with a not very gentlemanlike deep mutter "Chamaeorchis", which clearly reassured them that I could not be safe in any case. Later on, only swifts seeking flies blown up along the southern side of the ridge gave me company, cracking their wings like whips.
Chamaeorchis alpina was the only orchid on the ridge accompanied by the tiny beautiful bulb **Lloydia serrotina** together with some **Primula minima.** All the plants grew in rather heavy limy soil, Lloydia and the orchid in festuca mats, primula in the open ground. Most numerous was the bulbous plant, less so the primula and the Chamaeorchis was present only in a few specimens, all single and all blooming, no young plants - I cannot exclude that more plants would be present on steep pecipices, of course, but I do not believe this to be the case as all the plants found grew in flat ground, never on a slope. I am sure that it would be extremely difficult to cultivate this glacial relict at home in the lowlands. We did not try it - furthermore Chamaeorchis is protected by law as are all other orchids in the former Czechoslovakia and the Czech Republic today.
We visited "our" Chamaeorchis - the same plants - four or five times in several years. Obviously they were not multiplying much but were long-lived. It was a real pleasure to see them again, live and undamaged.

Then the idyll suddenly ended: the ridge was closed to the public ("tourists chased the chamois", it was said) and guards were hard, no discussions! So I can only hope that "our" plants are still growing up there - but acid rains are taking toll on so many plants.... Is the mentioned paradise lost already too?

Dr Vl. Chaloupecky, Praha, Czech Republic.

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FROM 26° TO 55°

It all started with two small envelopes containing **Pleione priceii** and **Pleione limprichtii** purchased for 2/6d. at our local Alpine Garden Society meeting in the late 1960's. With my total knowledge regarding cultivation amounting to half depth planting, open free draining compost and frost free but no heat, they were duly planted. Over the years they grew, flowered and reproduced to a point of embarrassment.
Somewhere along the way I listened to a radio programme entitled "In Search of the Golden Pleione" with Roy Lancaster and resolved to obtain one if any became available. In 1977 Will Ingwersen had some, in his words "at a price" and I was fortunate enough to obtain **Pleione forrestii**, later to become **P.X confusa.** This natural hybrid proved to be a strong grower which never failed to flower, produced 80/90% increase in flowering sized pseudobulbs plus two or three bulbils. The latter grew on very easily and flowered in three or four years, themselves producing bulbils in the process. Production on this scale eventually presented quantity problems and a number of outlets were found.

Deatailed information on the growing of Pleiones was hard to obtain until the spring of 1989 when the journal "Plants and Gardens" published notes by Philip Cribb and some time later I was presented with the Kew Monograph "The Genus Pleione" by Cribb and Butterfield. Here at last, were many new targets and the guidance to hit a few. It was also heartening to find that my method of growing, was very little different from that recommended.
With the disposal of my excess stock I was now in a position to obtain a much more exciting range of species and hybrids. **Pleione X confusa,** being such a vigourous grower, biased my choise towards hybrids with this as one parent. My final selection was **Brigadoon, Paracutin** and **Vesuvius** with **Barcena** and **Tarawara** for early flowering. They all flowered well and even as I write in December, the buds of **Barcena** are just opening.
Thanks to Peter's efforts in compiling this annual collection of reports and his organisation of the exchange or sale scheme, I now have a selection of Pleiones which make each season more and more interesting.
So much for history, but before going into details of my methods I would like to pass on the results of a few observations and pose a few questions on the very foundations of the successful growing of Pleiones i.e. Roots.
Much skill and care is lavished on Pleiones in an effort to establish a good root system, the failure of which, can ruin a whole season of growth.
We all talk about roots as though we know what they are and how they work; but do we? Do we ever stop to consider, or find out, by what means the very dilute solution of the breakdown products of organic materials, or the cocktail of inorganic chemicals we call feed, are absorbed into the root system and then by what means it is transferred to the main system of the plant?
Rightly or wrongly, I have always considered the primary absorption to be a process of osmosis and the subsequent process of transmission to one of capillary

action. I have also always considered both of these processes to be disproportionately impeded by variation in liquid supply.
An extreme example of this is the loss of capillary action in dry peat. This consideration is one of the basic reasons for my method of moisture control (described later).
A very close look at the root of a Pleione can be very enlightening. It is in essence a thin, strong elastic strand surrounded by a relatively fragile cellular structure about twice its thickness. This is encased in a thin outer membrane surrounded by a layer of very fine short hairs giving the appearance of cotton wool. Thus we have a root possessing cosiderable tensile strength with an outer layer susceptible to damage by crushing, bruising, abrasion and probably having a poor ability to recover after dehydration. The collapse of this hairy layer on lengths of root above compost level does not appear to be a problem, provided there are sufficient fluids being supplied from lower down the root to prevent dehydration.
There is a further interesting observation when the physical function of the root is cosidered in both the live state and after drying out. The live roots of essentially epiphytic plants such as Pleiones, are required to hold the pseudobulb to the host plant during growth. This requires both adhesion and strength; the former being demonstrated by the way the root hairs adhere to pot and compost, while the latter can be seen in the strong but quite elastic central strand. In the live state this strand is so strong and flexible it can be tied into a single knot and tightened to a point where it is barely visible. At the end of the season, when the roots dry out, this central core loses its flexibility and becomes like a piece of quite strong wire, resisting attempts to straighten it out. The root thus maintains the grip required to hold the dormant bulb in position ready for next season when new roots can take over.

Further consideration of root growth leads me into a description of my compost and the underlying reasons behind it. For a long time I have been convinced that Pleiones, given the option, would both utilise and benefit from deeper compost. By option I mean the correct combination of phsical structure, air content and moisture retention of the compost at the increased depth. A few experiments have proved this method of growing and after two seasons of its application I need no further convincing. It works for me, I cannot say it will work for everybody but if you are in difficulty, it is worth a try.

My compost consists of hard peat walling blocks broken into sizes from one inch down and then graded through ¾", ½", ¼" and one eighth sieves.

Although time consuming, peat blocks are easily broken down if first sawn into slices from ½" to 1" thick. To further improve the structure of the +¼" grade, 5 to 10% by volume of the clay bonded aggregate Hortag is added. The fines passing the one eighth inch sieve are discarded and all grades are used separately. (see under Planting). After use the compost is reused subject to the following treatment. (1) Regrading and addition of replacement broken peat to to make good losses due to breakdown. (2) As a safeguard against possible accumulation of salts from feed all grades are washed. A five gallon drum, the bottom of which has been well drilled, is filled with compost, flooded and allowed to drain for half an hour. This is repeated five times before storage in clean plastic bags. (3) Sterilization is carried out in a 6.25 litre vegetable steamer, each batch being brought up to at least 98°C. with steam flowing freely through the top layer. If you value your family harmony this process is not one for the kitchen gas stove, an external gas ring is essential. Each batch is cooled on a metal tray by turning three or four times during the cooking of the next batch. Before each turn a small quantity of BHC powder is added from a puffer pack. This is an easy method of obtaining even distribution of a

powder into a coarse damp material. The cooled compost is then stored for as short a time as possible in plastic sacks.

Planting:

Containers:

All clay pots are used, and, as far as possible they are 5 to 6 inches minimum depth. The quality of root growth and size of pseudobulb which I regularly obtain, have convinced me beyond doubt, that deep clay containers are superior under my spcific conditions of growth.

Spacing:

When planting, the space allowed on the shooting side of the bulb must be sufficient for each shoot to develop into a full sized new bulb free from restriction. This will prevent distorted bulbs and shoots resulting from overcrowding. An example of my planting would be three double shooters in a 6 inch diameter pot forming a fairly close triangle with all shoots outward facing. Even this can sometimes be tight when growing such vigorous hybrids as **Rakata, Vesuvius, Eiger, Shantung or X confusa.**

Compost: use of grades:

Taking a six inch deep half pot the drainage hole is covered with a piece of 1-2mm. stainless steel mesh to prevent entry of slugs etc. This is covered with a three inch layer of +$\frac{3}{4}$inch grade compost followed by a two inch layer

of + ½ inch grade. The pseudobulbs are placed on top of this layer and the space is filled in with + ¼ inch grade containing the Hortag addition, to a depth of approximately ¾ the height of the bulbs. If the compost settles a slight topping up may be necessary.
The Hortag in this last grade is both absorbent and heavier than the peat, so it helps to counteract any upward pressure of the roots.
For smaller bulbs in their first or second year, all grades are moved down one i.e. + ½ inch onto metal mesh followed by + ¼ to plant on and filling in with + 1/8.
After planting all pots are placed in trays covered with capillary matting which is at first flooded and then just kept wet.
When first placed in the trays, in order to establish the free passage of water from pot to compost a fine jet of water is sprayed round the inner edge of the pot. From this point the matting is kept just wet until after flowering, when initial development of leaves allows top watering and feeding to start.
After planting, the trays are placed on staging under glass, in one case a lean to facing S.W. with glass on only two sides and top and containing a small central heating boiler. In the other case, an 8ft. X 8ft. cold greenhouse with bubble film insulation capable of maintaining 3° above outside temperature in the region of 0°C. depending, of course, on the heat absorbed the day before. Emergency heating in case of prolonged day and night frost consists of a 300w. tube heater placed, when required, at ground level down the centre of the greenhouse. This small ammount of heat, combined with the insulation, has proved capable of preventing damage during periods of -3°C. during daylight and -5°C. at night.
At the other end of the temperature range during sunny days shading from direct sunlight plus maximum ventilation is essential. Plastic mesh shading is fixed

to the outside and if hot weather persists white plastic sheet is used inside.

Feeding:

As soon as the leaves develop they can utilise liquid feed. A 1/3rd. strength 2-1-1 NPK (Chempak No.2) is watered to the compost on a weekly basis with extra water on to the mats if required. Feeding continues until the leaves are considered to be full size, about early July. Feed is then changed to a 1-2-2 NPK (Chempak No.8) again at 1/3rd. strength. About the middle of August a change is made to a 1-1-2 NPK (Chempak No.4) feed which continues at 1/3rd. strength weekly until first sign of leaf colour change. Regrouping may be necessary in order to continue feeding the late finishers. Since the compost is virtually inert all feeds contain trace elements.
About the end of May when the danger of frost has passed, all pots are placed outside in a frame covered only with 2 inch square plastic mesh for protection against foxes and cats.
It is from this point on that environmental control plays such an important part in the successful development of Pleione pseudobulbs, so I must enlarge on the reasoning behind my methods. Environment can here be divided into two main headings: (1) light value and (2) continuity of supply of moisture requirements including atmosperic humidity.

Light values:

We are all aware of the importance of adequate light in the process of photosynthesis, the very heart of plant growth, particularly when building up the store for next years initial growth. In relation to light values, it should be

remembered that the majority of Pleiones grow around 24-28° latitude, only 300 miles from the tropic of Cancer (the sun overhead at midsummer) while we in the U.K. try to grow them at 50-59° latitude, some 1800 miles further north. What relative difference that makes to light values I do not know (any boffins about?) but what I do know is, it is not advantageous. The temperature increase due to latitude is, of course, largely compensated by the altitude at which they grow, 1,500-13,000 ft.
At these heights light values are further increased, hardly surprising then that we hear of Pleiones usually growing in varying degrees of shade. With our naturally reduced light values, can we afford further reductions by the use of glass and shading? Unfortunately, our climate demands the use of glass and shading during early growth and flowering but as soon as frosts become unlikely, their use becomes unnecessary and sometimes, I feel, detrimental. Correctly structured compost will remove any danger of problems caused by prolonged periods of heavy rain.
Once outside, shade from direct sunlight is necessary but only by the use of vertical shading, adjusted in height to just cover at maximum elevation of the sun in mid June. By this means all reflected light from sky and cloud is utilised and is, I am sure in my case, a contributory factor to my success. Given the option, I would grow my Pleiones just within the shade line of 30ft. high trees. Years ago, before I grew Pleiones and much to my disgust, my neighbour grew a line of Poplars casting unwanted shade; I now wish they had not been lopped.

Continuity of moisture supply:

My philosophy that, if anything can be automated, it should be, has been the driving force in evolving my method of easy maintenance of growing conditions.

The concrete floor of my 3'6" X 7'0" frame is covered by eight 2" deep plastic trays with a few small holes drilled at 1" depth on two sides. Two inch high supports in each tray hold ¼" metal mesh at tray top level and approximately ¾" wide strips of capillary matting are placed across the mesh at 5" intervals, with the ends dropping into the tray. Water is maintained at 1" depth by the side holes and the wicks or strips are kept permanently wet.
All pots are placed on the mesh making sure that there is contact with at least one capillary strip. I thus have a self regulating system of watering capable of supplying, at a constant rate, essential demands of all the plants plus other consequential benefits. It is here that the advantages of clay pots become obvious. As well as their primary function of being the final link in lifting water from tray to compost, their high surface area provides evaporation, self regulated by temperature and relative humidity, more than sufficient to provide effective atmospheric humidity around each plant. The evaporation has the added benefit of reducing root temperature well below that which would otherwise prevail, especially during a hot period or if using plastic containers. Under normal weather conditions the level of water in the trays is maintained by rainfall but during a dry spell the volume available will last about three weeks without attention. Feed is applied at the rate of one and a half gallons spread evenly over the frame using a fine rose. It is thus a combined leaf and root feed plus a much weaker feed from any solution reaching the trays beneath. If rainfall has been insufficient to maintain water level in the trays precautions are taken to prevent the remote possibility of chemical accumulation by flushing each tray with a one and a half gallon can of water.
We now come to the end of season system of shutdown. As mentioned, feeding ceases at the first sign of leaf colour change and at the same time access to water is also stopped by removal of the wicks from the trays. Regrouping is

necessary in order to be able to feed the late finishers. This regrouping puts the early finishers to one end of the frame where a glass cover is applied to allow drying off. This is an ongoing process till the whole frame is covered in glass. At the first sign of frost all pots are moved into the cold greenhouse to complete the drying cycle. When all the leaves have fallen and the compost is dry, bulbils are first of all removed to avoid loss and then the pseudobulbs are removed, roots trimmed and then stored in cardboard or ventilated plastic containers. There is a periodic inspection to check initially for any possible mould growth due to incomplete drying out and later for the first signs of new growth in the early starters such as **Eiger**, when the new season starts.

Summary.

This method of growing Pleiones has been developed with the following main aims in view:-

(1) Minimum number of components in the compost, each being highly absorbent and capable of being processed to give complete control of texture.

(2) Controlled water supply, not subject to the variability of drip feeds, and capable of being left for up to three weeks without attention.

(3) Clay pots providing high atmospheric humidity and a cool deep root environment

(4) After flowering, maximum available light removing only the direct radiation of the sun.

In closing I must, even at the risk of my next season being a failure, qualify the success of my method of growing. Its chief success appears to be with

hybrids which regularly grow up to 1¾" in diametr and above, in one case **Rakata** has reached almost 2¼" diameter. With pseudobulbs of this size they are usually capable of producing three flowering shoots with the subsequent full sized pseudobulbs at the end of the season. With one or two exceptions species grow very well but not with the same vigour as hybrids. The so called difficult **X confusa,** once up to flowering size, never fails to flower and produce at least two similarly sized pseudobulbs plus at least two bulbils; it does not like being grown under glass.
As an amateur grower who has had the good fortune to be successful in the application of empirical methods, I would welcome the coments of anyone, particularly on the subjects of root function and light value relating to height, latitude and wavelength

E. Humphreys, Sutton Coldfield, West Midlands.

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THE HARDY ORCHID SOCIETY

Another year has passed by in the life of the Society, in many ways quite eventful and worth noting. Our membership at the end of 1994 was one hundred and forty seven members, and since our A.G.M. at Pershore, we have had a very successful meeting at Knowle attended by about fifty members, with talks on selected subjects, Orchid Photography by Paul Harcourt-Davies, Bletilla culture and breeding by Richard Evendon and Dactylorhiza culture from seed by Norman Heywood with much discussion from the floor on these subjects.

We followed this with which has become an annual event. The Royal Botanic Gardens Kew and Hardy Orchid Society Joint Terrestrial Orchid Symposium. We are indebted to the Gardens for the use of the Jodrell Lecture Theatre and the invaluable time given by their staff showing our members around the Hardy Orchid Collection.

This was followed in April 1995 by our Annual General Meeting, taking place at Birmingham Botanic Gardens, where we joined The Birmingham & Midland Orchid Society at their Annual Show. The mornings business of the A.G.M. was followed by lunch, and then (eat your hearts out cyp. growers) a joint lecture by Tony Cox from R.G.B. Kew and Holger Perner from Germany. Tony is spending a lot of time sorting out the DNA relationship within the genus Cypripedium, and explained some of these and then Holger gave us a superb showing of all the known Cyp. species on slides. Questions paticularly on culture were still taking place an hour after the presentation was finished. The table show was not supported by many members, but those that were there were superb.

For those who were unable to attend the A.G.M. some sad news. Our Chairman, Mrs Joyce Stewart has resigned owing to other business pressures. We all thank her for her guiding hand through the first two years of the Society's life, our Vice Chairman has taken over the position of Chairman.

We have arranged our first field trip for early July this year, to take place in Dorset.

It was decided by the members at the A.G.M. that we should revert to Pershore for our A.G.M. in 1996, and hold it later in the year, mid to late May, to have more plants in flower for the Table Show.

Norman Heywood, Hon. Sec. The Hardy Orchid Society.

ROUNDUP

A couple of articles in this report concern cultural problems. First thoughts might well be that problems in pleione culture are on the increase but I don't think this is so.

Brevipalpus oncidii has it would seem been around unknown to us for years and is gradually spreading through our collections. This is not a new problem but a problem brought to light by the enquiring mind of Dr Harberd.

I went to Miracle Garden Care Ltd. (used to be ICI) for their advice on the control of Brevipalpus and with their permission am reproducing their reply.

"The control of Brevipalpus oncidii is not readily achieved with insecticides available for amateur use. To my knowledge there are not liquid insecticide products that can be used as a drench to remove this pest from roots and compost. The best advice is to apply an insecticide powder around roots and on the compost surface such as 'Sybol' dust which will give some fumigant activity and persistency to help reduce this problem. With continued use the pest should be brought under control. Unfortunately there has been very little work carried out on the control of this pest with insecticides available to amateur growers. I regret that the information and products for the control of this pest are inadequate but hope the enclosed information will enable you to give some recommendations to your readers".

P.W. Patton, Technical Services Manager,Miracle Garden Care.

'Sybol' powder is available from Garden Centres but you may have to order it.

Each and every contribution is valuable freely given by people who want to share their knowledge and experience. A big thankyou to all contributors. Thank them again by sending in your articles for the 1996 NPR inc HO. Let's hear from you on any subject concerning pleiones and hardy orchids.

PB