ORCHIDS IN NEW ZEALAND

NOVEMBER/DECEMBER 1983

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ORCHIDS IN NEW ZEALAND

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COVER PHOTO:

Huntleya meleagris Ldl. These large waxy flowers are native to Costa-Rica, Panama, Colombia and Brazil. Photo by courtesy of Ross Bickerstaff, Napier.

Growing Media and Nutrition for Cymbidiums

by Murray Richards
Massey University

To be successful a growing medium must supply all of the plants needs for maximum potential growth.

This potential growth will be governed by two factors largely outside of our control, the amount of light available for photosynthesis and the availability of carbon dioxide in the atmosphere. If both of these are present in sufficient quantity, and the temperature is favourable, potential growth rates will be high.

Under these conditions we need a growing medium which can supply all of the plants other needs:

(a) Minerals which will be required to enable growth to proceed.

Nitrogen (at least 50% as nitrate N)
Phosphorus
Potassium
Calcium
Magnesium
Sulphur (as sulphate)

Trace elements
Manganese)
Copper)
Iron)
Zinc)
Boron)
Molybdenum)

(b) Water — Water is needed for a variety of purposes:

(i) The minerals must be in solution before they can be taken up by the plant;
(ii) the plant needs water for transpiration, without which carbon dioxide uptake ceases;
(iii) there must be enough water, at all times, to dilute the soluble material to avoid root injury (salinity).

(c) Air — The plant roots must do work in order to take up minerals, for this they need a source of energy, i.e. they must have oxygen for respiration.

(d) In addition the medium must be relatively free from pathogens, toxins, and other harmful factors, to avoid plant injury.

(e) It must provide physical support, i.e. enable the plant to remain upright.

(f) It should be reproducible, and easily mixed together to give a homogonous mass.

Plants vary in their ability to tolerate unfavourable conditions, those with high tolerance are often regarded as easy to grow, plants with low tolerance are generally regarded as difficult to grow.

Orchids in general have a relatively low tolerance to lack of aeration at the roots, for this reason growing media for orchids has generally been composed of very coarse materials, giving large air spaces. Such media frequently have low water-holding capacity. In addition such media are generally kept dry ("avoid over watering").

Orchids also have a relatively low tolerance to salinity in the growing medium, hence they have generally been grown at low nutrient levels.

Studies with other plants susceptible to poor aeration have shown that a level of 15% air filled pore space in the growing medium is adequate for such plants. Recent trials at NZNRC have confirmed this for Cymbidiums. A

medium composed of 60% coarse peat and 40% pumice, (1-5 mm cut) will provide at least 15% air filled pore space at container capacity, that is, when the medium is holding all the water it can against drainage. Such a medium will also contain about 25% (by volume) of easily available water, which the plant can use for transpiration. This relatively large volume of water can dilute equally large quantities of nutrients to safe levels, thus the plants can be supplied with higher levels of nutrients than would normally be the case.

We currently recommend the following nutrient programme for Cymbidiums per m3:

0.5kg Osmocote 14-6. 1-11. 6 (3 month)

2.5kg Osmocote 18-2. 6-10 (8-9 month)

3.0kg Dolomite lime

0.15kg Fritted Trace Elements (Frit 36).

This provides nutrition for one year, with the plants being top-dressed with an equal amount of the 3 month Osmocote at 12 week intervals. If the plants are to remain in the containers for a second season they are top-dressed with the complete fertiliser application each spring.

This high level of nutrients provides for rapid, abundant growth, and good quality flowering, and is only "safe" when the plants are at "container-capacity". If the medium is allowed to dry out, the nutrients in solution become more concentrated, and root damage may result. Consequently control of watering is vitally important. Our plants are grown with a system known as capillary watering.

The benches are solid tops, formed from asbestos board sheets 9mm thick. On this we place a thin sheet of polythene film, then a layer of felt material. We use a synthetic felt, with a long life.

The felt acts as a reservoir for water, and is kept wet by twice daily applications of water. Over the felt we use a black woven material to exclude light from the felt. The containers are stood on these benches, and watered. This creates a continuous water film through the medium and into the felt reservoir. As the plant withdraws water from the medium, the tension created on the water film causes water to be drawn from the medium into the container, thus keeping the medium at container capacity all the time. Under these watering conditions plants can withstand, and use, higher light intensities than would be the case in drier regimes. All of the water movement, however, is upward through the container, with a consequent danger of salinity build up, to remove this danger the plants are watered from above once a week, to flush out any excess salts.

A modern aproach to Cymbidium nutrition, therefore, is to use a growing medium with both high aeration, and high water holding capacity, to supply nutrients at high levels from slow release fertilisers, and to combine this with a watering technique which will maintain the plants at container capacity at all times. It must be emphasised that this constitutes a system, to work, all of the system must be used at one time.

Growing Paphiopedilums

Wellington Orchid Society

by F.R. Askin

1. To grow orchids well and to understand their needs it is necessary to know something of the conditions under which they grow in their native habitats. There are many books and other publications on this subject available from libraries and elsewhere, and their study is well worthwhile. This applies particularly to the culture of species and their first-generation — or primary — hybrids. Most modern round-petalled

paphiopedilum hybrids are far removed from their ancestral species, which usually make up a mixture ranging from the coolest growing to the warmest, and they will grow comfortably together under conditions which are more-or-less average of those enjoyed by the species from which they have been derived.

2. The paphiopedilum species grow mainly in tropical regions and are found in India, through Burma, China, Vietnam, Thailand, Malaysia, the Philippines, Indonesia to Papua-New Guinea. Some grow in cool conditions at altitudes of 5,000 feet or more, and some at much warmer locations near the sea. They grow in moist shady situations at or near ground level, usually rooted in a mixture of twigs, dead leaves and other forest-floor materials, though some are found anchored in crevices in rocky limestone slopes. Although their native habitats are so widely diverse, most of them can be cultivated together in the same glasshouse, and many make good house plants. They like warm, shady, well sheltered and moist conditions, and they dislike sudden temperature changes: they like to be cosy! The cooler growing ones such as **P. insigne, villosum** and **spicerianum** are happy with a minimum temperature of about 12°C, while those that like it warmer, many of whose leaves are mottled in light and darker shades of green, thrive in temperatures above 15 °C.

3. THE GROWING MEDIUM. The growing medium must be free draining, must not get soggy, or ever be allowed to get bone dry. Although paphs will grow in a variety of potting mixes, one comprising mainly pine bark is both simple and effective, especially if the bark is "conditioned" before use to reduce its natural acidity and to add a little nutrient to it. The procedure is to soak the bark for three or four days in a tub of water with added ingredients proportioned as follows:

Graded pine bark, 5 mm to 20 mm	10 litres
Garden lime	100 ml
Dolomite lime	100 ml
Soluble nitrogenous fertiliser (such as Lush)	10 ml

The bark tends to float while the lime sinks, so that the mix should be stirred up vigorously two or three times a day. After the soaking period the bark should be allowed to drain for a further two or three days — a good way is to hang it up in a hessian bag — by which time it is ready to use. Plain bark treated in this way is a good growing medium on its own, but some growers like to add varying proportions of other free drain-materials such as charcoal chips, polystyrene granules, scoria, or pumice. The proportions are not critical, but the bark content should not be less than three quarters.

4. POTTING. When to report depends on the reason for doing so. There are several reasons — the usual one is that the plant needs more root-room. Unflowered seedlings may outgrow their pot in a year, but adult plants will usually last two or three years before they need to be moved on. Another common reason is that the mix has deteriorated and must be renewed. Bark mixes are fairly durable and should last in good condition for two years.

The best time to report a healthy plant is in late spring, and after flowering, but if a plant is sickly — and this is the third reason for repotting — it should be repotted as soon as its poor condition is recognized.

Be careful when removing a plant from its pot, as the roots are very brittle and often attach themselves to the inside and bottom of the pot. Then completely clean away the old mix and trim back any dead roots. Choose a pot just big enough to accommodate the roots comfortably, and drill some extra holes in it. Position the plant so that its base is just below the level of the top of the pot, pour in the mix, tapping the pot to consolidate it until it is almost full and the plant is steady. If the roots are few and short the plant may need staking. It must not be wobbly! The plant can then be given its first watering and should not

need another one for at least a week.

Newly potted plants like a little extra warmth and fairly deep shade but when they are established they should have more light, though not as much as for cattleyas. On a bright summer day there should be just the ghost of a shadow when a hand is passed over them.

5. WATERING. Correct watering is the most important cultural requirement and the most difficult one to master. Almost all paph losses are due to mistakes in watering. Ideally the mix should be just moist at all times, with sufficient porosity to allow air into it. Rain water is best, and it should be at least as warm as glasshouse temperature. After watering, which should be sifficiently heavy to have water draining freely from the bottom of the pot, allow the mix to become almost dry before watering again. This condition is difficult to judge, but it is much better to let the mix get a bit too dry than to water it when it is still wet. Many factors help determine how quickly the mix dries out — one of the most important being the humidity of the atmosphere. Small pots dry out more quickly than larger ones. Old mixes degenerate and their porosity is reduced. As an approximate guide, a healthy plant in a 100 mm (4 inch) plastic pot would need watering about every three or four days in the summer and about once a week in the winter. This would be in average glasshouse conditions where the floor is damp most of the time. As a house plant, it would probably need watering a little more frequently. But have a good look at the mix before watering; if it is damp just below the surface wait another day or so.

6. FEEDING. Paphs are mostly small plants and so also is their annual increase in size. It follows that their nutrient requirements must be small. Paphs resent over-feeding more than most plants, and too much fertiliser will soon kill the roots. A newly potted plant should not be given any additional feeding during the following three to six months, depending on how quickly it gets going again. Thereafter, if the plant is firmly established and in good health, it can be given a liquid fertiliser at no more than half the recommended concentration at about monthly intervals during late spring, summer and autumn. A light topdressing of a half-and-half mixture of bone-dust and dolomite lime at the rate of a level teaspoonful per 4 inch pot can be given in early summer and again in early autumn. But don't overdo feeding — it can be fatal; and don't try to revive a sick plant with a dose of fertiliser; that would just hasten its demise!

7. PESTS AND DISEASES. Careful attention to glasshouse and plant hygiene is essential to healthy growth. Provided this is assured paphs are remarkably free from disease, and the occasional treatment of bud or leaf rot is all that is likely to be required. For this purpose a freely-available combined fungicide-pesticide dust is very effective.

8. SUMMARY. The cultural requirements of paphs can be summarised as follows:

Growing medium	Graded bark 5mm to 20 mm treated to reduce acidity and add some nutrient.
Pots	Just big enough to hold the roots, and with some extra drain holes.
Temperatures	Medium to warm. Not below 10 °C for a few cool-growing species, but 5°C warmer for most. Not above 30°C.
Watering	Tepid — and rain-water if possible. Water only when the mix is nearly dry. Try to keep it just moist at all times.
Air Humidity	Moist atmosphere is ideal. Keep benches and floor wet.

Light and
Shade ..... Fairly deep shading in summer, light in winter.
Feeding ..... Just very little: dilute applications in the summer.
Pests and
Diseases ..... With good plant hygiene and a clean glasshouse there should be none.

International Centenary Orchid Conference

In March 1985 The Royal Horticultural Society is organising an International Orchid Conference and Exhibition to mark the 100th Anniversary of the Conference, held in 1885 at the Society's Exhibition Garden in Kensington Gore under the Chairmanship of the then President Sir Trevor Lawrence.

Exhibits are invited from Orchid Nurseries, Private Collections and National Orchid Societies. Copies of the exhibition space application forms may be obtained from the Secretary, Conzed Inc., Mrs D. Cooper, 14 Avalon Crescent, Lower Hutt. Staging may commence on Sunday 17th March and must be completed by 2.00 p.m. on Tuesday 19th March. The exhibition will be open to members of the Society and the public from Wednesday 20th March to Saturday 23rd March, and exhibits may be cleared on Sunday 24th March.

Applications for exhibit space must be in the hands of the R.H.S. Show Manager not later than the 1st December.

This International Centenary Orchid Conference will incorporate the British and the 7th European Orchid Conferences and the British Orchid Growers Association's Show.

For those who plan to travel to Europe in 1985 this event should prove a focal point of a visit to Britain.

Society News

By the time this is published all affiliated Orchid Societies will have received a copy of the first brochure advertising the Second International Orchid Conference.

Societies will receive all future-conference circulars automatically; later this year both societies and commercial growers will be offered space in the Conference venue.

The brochure incorporates a reply slip inviting people to register their interest in attending the conference and in receiving further information.

If your society is not affiliated you may not have received the brochure; if you are a commercial grower who has not advertised in this magazine over the last twelve months or so, we may not have your address. If this is the case —

or if you are an individual grower who wishes to be on the conference mailing list — please write to P.O.Box 5133, Wellington and get your own copy of the brochure.

Please pass the word — especially to any organisation or individual who we may not know of or consider as a possible participant. Your assistance will ensure the success of the Conference.

John S. Addison
Conference Secretary

Building a Hotbed

by Bob McCulloch

Wellington Orchid Society

The simple hotbed to be described is a development of an idea in **A Book for Orchid Lovers**, published by the Orchid Club of South Australia, Inc.

It provides an area which will hold half-a-dozen community pots comfortably, and costs about the same as a mini-flask to build. The heat source is light bulbs — Edison didn't mention it, but a light bulb is a very inefficient device, converting only six per cent of the electrical energy used into light. The remainder of the energy is converted into, yes, you've guessed it, heat.

Construction is as follows: Obtain two tomato boxes, and carefully dismantle one of them. Saw a bit off each side and the bottom, so that they fit snugly inside the other box. Saw each side in half lengthways, then saw two of these halves in half again. Use woodscrews to join the bottom to the ends again, then nail one of the halves on each side, level with the bottom of the ends. Nail two quarters to the top of the ends, one on each side.

Paint the bottom of your container matt black to help with heat absorption, then line the inside with thick polythene and fill it with sand or some other moisture and heat absorbing material. (Let the paint dry first though).

Take the other box, and mount a light fitting on each end after wiring the fittings to each other and the power cord. Feed the cord through the slot between side and bottom, after tying a knot in it to prevent strain on the connections, and connect to the power plug.

It is now time to make your heating box as airtight and as light reflecting as possible. Shorten one of the remaining quarters to avoid damaging the power cord, then glue the quarters in the gaps between the sides and the bottom.

Glue aluminium cooking foil, shiny side out, inside the box sides, bottom and ends, keeping it well clear of the light fittings. Put draught excluder strip along the top of the sides, fit the light bulbs, and test that your wiring is correct. Once everything is O.K., moisten the sand, fit the container on top of the heating box, and switch on.

A sheet of polythene over the container top and sides will help to maintain heat and humidity, and with two 25 watt bulbs a minimum temperature of 18°C should be maintained even if there is a frost outside.

The sand should be watered as necessary, always removing the container from the box for safety reasons (water and electricity don't mix!) and also to check the light bulbs. Ventilation can be given during the day by folding back or removing the polythene, and a fungicide should be used regularly to prevent damping off.

The basic principle of heating by light bulbs can be extended as necessary, and an aquarium thermostat can be used to limit the maximum temperature and save on power. You could even paint your hot-box to make it a little more appealing — after all two tomato boxes aren't the nicest thing you've seen today!

Some notes on Ploidy

by Dr Bjeleski

South Auckland Orchid Society

The normal situation in higher plants and higher animals is that each and every cell contain two sets of chromosomes. Thus it is said to be diploid (2N, 'two-ploid'). Every time a cell divides, the nucleus inside it (which contains the chromosomes) divides too, so that each daughter cell still lands up having two sets of chromosomes. However, when the sex cells are formed (the pollen grain and ovule, or the sperm and egg) a special type of cell division occurs in which the number of sets of chromosomes is halved, so that the sex cells end up having only one set of chromosomes. Thus the pollen grain and ovule are said to be haploid, (1N, 'single-ploid'). When the pollen grain fertilizes the ovule in the process called fertilization, the two cells fuse together to form a single new cell, the zygote. Thus this new cell once again contains two sets of chromosomes (one coming from each parent); it is therefore diploid again; and when this zygote cell multiplies by cell division, to form a new plant, the product is a hybrid of the two parents and is a DIPLOID HYBRID. If it ultimately produces pollen grains or ovules, they will be haploid. In this way, sexual reproduction can take place, generation after generation, without the number of chromosomes increasing. The plant is always diploid, the sex cells haploid.

Very occasionally, there can be a mistake in the system. The first type of mistake can occur when the growing shoot of the plant is disturbed severely in some way, particularly by being exposed to the drug colchicine. What happens is that there is a mix-up when the cells are dividing, and the nucleus (which contains the chromosomes) goes ahead and starts to divide but the cell doesn't. The result is that one cell now contains twice as many chromosomes as it should — that is, four sets instead of two. This cell is said to be tetraploid (4N, four ploid). If that cell should go on to produce a new shoot system of its own, the whole shoot will be tetraploid (4N). This is said to be a **TETRAPLOID FORM** of the first plant. Because it is exactly the same genetic makeup as the rest of the plant, but only twice as many of each sort of gene, it will be very similar to it. The main difference is that the shoot will sometimes be more vigorous, with bigger cells and fewer, bigger flowers than the normal shoot.

A second type of mistake can occur when the plant 'forgets' to reduce the numbers of sets of chromosomes from two to one when it is making the pollen grains or ovules. The resulting six cells have two sets of chromosomes, not one as they should do, and so they are diploid instead of haploid. If one of these abnormal pollen grains fertilizes a normal ovule (or if a normal pollen grain fertilizes one of our abnormal ovules) the resulting zygote will have **TWO** sets of chromosomes from one parent and **ONE** set from the other; that is, each cell of the new hybrid will have three sets of chromosomes, and so it will be **TRIPLOID HYBRID** (3N 'three-ploid').

Formation of a triploid can come about in another way. If the tetraploid shoot created by colchicine treatment forms tetraploid flowers, then very often the sex cells in it will be formed in just the same way as in the normal flower, except that there will now be four sets of chromosomes, so that when their number is halved, there will be **TWO** sets in the pollen grains and ovules. Once again, these sex cells will be diploid, and when fertilized by normal sex cells they will give a triploid zygote and a triploid hybrid. Finally, if one of these unusual (diploid) sex cells is

fertilized by another diploid one, the resulting zygote has four sets of chromosomes, and the plant that comes from it is a **TETRAPLOID HYBRID**. It can form diploid sex cells and new hybrids in the same way as did its original tetraploid parents. In other words, tetraploids and tetraploid hybrids are quite often fully fertile.

A major problem comes, however, if the triploid flowers on a triploid plant try to form sex cells. When the plant attempts to halve the number of sets of chromosomes it is trying to halve an odd number of sets (3) instead of an even number (2 or 4). The machinery cannot cope with this situation, just as a carpenter's vice will not hold a triangular piece of wood. The sex cells land up having all sorts of mixtures of chromosomes, and only one in a thousand or so will be lucky enough to have exactly one complete set or two complete sets of chromosomes, with no interfering extras or absences. Only these few cells, as a rule, can give viable zygotes and produce sound seeds when the flower is crossed with another. Instead of getting more than 100,000 good seeds from an orchid flower, we get less than 100. Thus, the triploid is said to be **INFERTILE**. Only one thing could be worse — if it produced no good seeds at all, it would be sterile. This quite often happens when we try to make intergeneric crosses — but that is another story.

For Sale

Cymbidium Mericlones

Well grown plants approximately two years old. Mostly ex Valley Orchids. I have been restricted to hobby type growing, so must reduce my stock of plants.

For full list and prices, please write to:

Graham Burr,
P.O.Box 162,
KAWERAU.

SOCIETY NEWS

"Planning is now well under way for the Second International Orchid Conference 1985 to be staged jointly by the Wellington and Golden Coast Societies, acting for the Orchid Council of New Zealand.

An organising committee has been appointed and each member has been given specific areas of responsibility.

Already the first brochure promoting the Conference has been printed and has been circulated throughout New Zealand and around the world.

Naturally all this sort of work is expensive and the organising committee is most appreciative of the response it has received from kindred clubs from around the country.

Nevertheless a continuing cash flow is required over the next two years as various promotional and planning programmes are undertaken to ensure a massive turnout in Wellington in October 1985.

One thought that the organising committee has had is for Societies around New Zealand to conduct individual raffles with the specific purpose of raising funds for the conference.

If each Society ran a Christmas raffle this year and donated the proceeds to the Conference Committee, the early cash flow would make the task just that much easier for the organisers.

I hope that all Societies will give this suggestion their favourable consideration.

W. Ross-Taylor
Chairman
Conference Committee

Illustrations from the North Shore Orchid Society 10th Anniversary Show.

Further to the photographs published in the July/August issue of Orchids in New Zealand are the two below. They are the second and third placegetters in the Society Display Section 1.

First in the Society Displays was the Whangarei Orchid Society, followed by the N.Z. Orchid Society in second place and the Auckland Orchid Club following in third.

Second Place in the Society Displays at the North Shore Orchid Society Show was won by N.Z. Orchid Society. It was the first time they had used this particular stand — it was most effective.

Third placing was gained by the newly formed Auckland Orchid Club exhibiting as a society for the first time.

The North Shore Orchid Society Show and Seminar was held over the Queens Birthday weekend in June this year.

Around the World

from J. Braddley

Keith Andrews Orchids Limited.

I called to see Keith Andrews on Friday 8th July. The nursery is situated in Plush, near Dorchester, right in the heart of thatched cottage England. I was taken to the nursery by car through narrow lanes lined with elderberry trees in full bloom. In such quaint countryside, I was not surprised to find the staff warm and friendly and the glass houses many years old. The age of the establishment, however, mean't that many years experience was involved, consequently the standard of breeding was of the highest quality.

A variety of genera is grown in the nursery, from cymbidiums, odontoglossums, phalaenopsis, miltonia and a few paphiopedilium to an exciting array of disas. Keith sees prospects of the Disa being a widely accepted cut flower and is presently investigating the breeding possibilities with this aim in mind.

As mentioned the glasshouses were small with low roofs, this being an advantage for reducing heat costs — essential in an area that experiences 10°-20°F. frosts. Being there in the midst of a very warm summer, I found the house well shaded with a sarlon type material over the glass to reduce internal heat as well as light. An abundance of water was also to be found in each house thus producing high humidity.

The houses had three quarter concrete walls which act as insulation, also evidence of double lining of polythene, again to reduce heating costs.

Keith has an interesting method of growing his young seedling cymbidiums and odontoglossums, they are planted out into beds filled with a peat/perlite 50-50 media of three inches depth which induces uniform growth and is a much more efficient use of area than conventional community pots. He also completely trims roots at each replant stage. Later the plants are individually potted and stood on a gravel covered bed.

The Phalaenopsis plants were very lush with new growths grown in a manner to make the most of favourable environmental conditions. In the winter months when gas is used to fuel water heat exchangers to maintain a minimum of 65°F. the plants are kept in a dry state as growth is minimal. This gives them a rest or slight stress period which when relieved as the sun is more plentiful induces rapid growth and uniform flowering — almost as a grateful thank-you.

A very heavied texture bloom was out in full display at the time — a Barbara Moller x Temple Cloud — also some interesting spotted varieties.

We discussed the problem of bacterial disorders with phalaenopsis and Keith said that he had found Benlate to affect the growth of the plant, however, he had successfully used Bordeaux without damage to the plants.

There seems to be general concern for specimens of original breeding lines and species, 'being lost' in an age where hybridizing is rampant and resulting cultivars being very unnatural in that they have lost many of the original desireable qualities. Importation of species lines from their natural habitat in the Asian and South American regions is also becoming more prohibitive to the U.K., as well as New Zealand — so the word is out — look after those special plants — don't hide them behind the latest awarded hybrids.

STEWARTS
1212 East Las Tunas Drive,
San Gabriel,
California 91778.

3rd June 1983.

I visited the Stewart Nursery at San Gabriel on a warm, late spring day. As we travelled from the airport area of Los Angeles towards the hills where the nursery is situated in the valley, the smog and haze intensified increasing until it almost became difficult to breath; that is for a New Zealander who is used to clean air. One then begins to understand the difficulties under which the nursery operates, as the pollutants affect the senescence cycle of the blooms due to the high ethylene levels and "chemical air additives". I was therefore not surprised at the extensive breeding that has had to take place so that the texture of blooms is such to withstand the conditions, especially with phalaenopsis. The blooms are of strong substance giving them longer life.

A little history — the nursery was originally used for cut flower production of carnations, however, over the last 35 years orchid growth has gradually taken over. Consequently, the glasshouses are old in design with many small houses concentrated on the section with a joining centre hall used for sales. Orientation is completely towards plant production for hobbyist and commercial growers with virtually no cut flower sales.

As I was given full guided tour of the nursery I will describe growing methods from the beginning. As they breed most of their own lines in the cattleya, paphiopedilium, phalaenopsis and cymbidium genera, the stock houses are rather a sight to see, especially the phalaenopsis which were in bloom while I was there. All seed is germinated at the nursery in their own laboratory which also contains a highly sterile section for mericloning. High levels of hygiene are maintained in every way with the use of rubber gloves, gowns, even sockets in the mericlone section. Laminar flow cabinets also have an extended front so that hands are able to move freely in the cabinet but the breathing of the operator does not enter the operating area due to a perspex face screen. All the autoclaving facilities are present in the laboratory for media production and replating for the wide variety required with the different genera. Over the years it has been determined, through experience, which species respond best to a given media so that now both liquid and solid media is utilized with a wide range of media menu, depending on the cultivar. Understandably the bottle holding area was well stocked with plants at all stages of growth.

From there they are transferred into the main nursery for growth into saleable plants. Conditions are generally as follows. Media — osmunda fibre and bark. Watering — hand and overplant misting — the spotting effect on the blooms is irrelevent as bloom production is not the aim, however, the occurrence of Botrytis Cineiaria 'the spotting agent' is not frequent under their warm summer conditions. Being in the Californian sunshine area, maintenance of temperature optimums are no major problems, however, ventilation is important, some heat is applied in the winter to maintain optimum growth. Light intensity is good in summer, but reduced with the smog levels, therefore, bloom colour is affected with 'Strengthening' of the colour. There are also tests underway which have shown that colour qualities may be affected by atmospheric pH levels specifically with blue and red pigmentations — rather an exciting 'twist' if it can be used to manipulate the overall colour. Limited problems are experienced in the pest and disease area, however, being interested in the possible methods of arresting bacterial disorder of phalaenopsis they suggested spraying with Kocide R or in situations where the survival of a breeding plant is essential it may be slathered in an antibacterial hand/skin lotion! Which has been found to work effectively in curing the problem even if growth is reduced.

As for plant sales, for the New Zealand hobbyist it is difficult to obtain the prize blooms available as they are not prepared to deal with flasks for

sales, however, for superb quality one may consider it worth the costs of importing live plants. One could go on for hours, however, instead I suggest that more people save to travel and visit such high class nurseries.

As a footnote, the selection of bloom colours I found to be rather incredible, especially the selection of yellow (George Sanders hybrids) and red phalaenopsis.

Cymbidium Culture Notes

by Gordon Maney of Palmerston North

The Shows are all over now, and we should have already started on our potting, cutting up plants that need it, and repotting those young plants into the next size pot. It is important to remember not to overpot, for there is nothing that causes more problems, and this goes for all orchids. Choose a pot that will give two years before next potting. Be sure to cut away all the dead roots and thoroughly wash the plant before repotting. I usually dip the roots in a solution of Jeyes, 1 teaspoon to 1 gallon of water.

When the plants have been repotted find a shady spot, and for the next three weeks just spray over the top of them to encourage the new roots.

More than slight shrivelling of the bulbs means often that the plant has been overwatered and the roots have rotted.

Never pot on a plant bigger than a 10cm pot, for by then the mix is breaking down, and it is of little use to mix new with old; you only run the risk of root fungus, and a mass of rotten roots in the middle of the plant.

It is a good idea to knock each plant out of its pot to inspect the roots. Remember a plant often looks alright on top, but not necessarily the root system. This can result in poor flowering the following season.

Where collections are quite large, plants tend to get left year after year, instead of being repotted every two years. It is not necessary to break up a plant if you don't want to. Take it out of the pot, thoroughly hose the old mix away, break off any old back bulbs and dead roots, and if necessary pot back into the original pot. If this is not possible, only pot into next size. Because the sun is getting stronger now, small plants just out of flask, and young ones generally will need more shade.

Feeding is extremely important too, you should be putting a dry feed on, these months of November and December, 4 parts of dried blood, 4 parts Super, and one part Potash. Approximately 15ml to a 2 gallon bucket of 25cm pot. Liquid feed once a week with Lush or any high nitrogen feed. Don't forget it is vital to water thoroughly the day before feeding.

Because Cymbidiums are gross feeders and we fertilize so frequently, leaching thoroughly three days after feeding is a must to get rid of any build up of salts.

Keep an eye out for Red Spider, particularly at this time of the year; with the advent of warm weather the plants dry out more quickly, and Red Spider thrive in dry conditions. I have seen quite large collections literally alive with Red Spiders. The damage these little insects do is far worse than many growers realise.

A spray of Kelthane, followed by a repeat ten days later; this gets rid of the ones that have hatched out of the eggs.

If any scale is showing, clean the plants with a mixture of all seasons oil and wettable powder Malathion mixed.

Clarisse Carlton 'Tia Maria'

or

How Lucky Can You Get?

Twenty-two years ago, an unknown orchid grower bought five Cymbidium seedlings from a man who was giving up his collection. They had been imported from McBean's in England. They were Cambria 'Brilliant' x Babylon 'Castlehill'

This was the late Mr Harold Willetts, a horticulturist who had been growing chrysanthemums and was starting to grow orchids.

These seedlings flourished and one seemed to have more potential, and was given preferential treatment. His wife Edna tells me that she had been away to the Sydney Show and when she came home, the plant was in full bloom on the table in the house and she remembers her husband saying "we have a little champion here," and little did he know how great a champion it was to become.

Pieces of this plant have gone to America and Australia and are in most good collections in New Zealand, and all this before meristeming came into it. The plant was shown in the NZOS show and awarded an "Award of Distinction" and HCC, it was the Reserve Champion of the Show in 1962. Of these five seedlings, two received "Award of Distinction".

After the awards, the plants had to be given Varietal names. Mr Willetts was a connoisseur of fine wines and liqueurs and the quality, excellence and colour of the bloom and the excellence and colour of the liqueur seemed synonymous and so Clarisse Carlton "Tia Maria" came about. The other seedling — a pink — was called Clarisse Carlton "Shot Silk", and indeed it does have that look.

From these beginnings this now internationally famous and sought after plant — a must in any Cymbidium collection was born. The good spike habit, of CCTM the outstanding, contrasting wine lip, in the clear smoky-grey gloom has rarely, if ever, been superseded to this day. Mr Willetts, an unknown grower had established his claim to fame, he became known and his plants sought after, he had his stand in the Town Hall shows, also the Dos Pueblos Orchid Agency.

Because of the success of these two outstanding seedlings, a cup was donated to the NZOS for competition for "The Best Flowering Seedling" in NZOS Spring Show, namely, the Willetts Cup.

The last seedling crossing made before his death was Volcano Menehune x Suva. This won the Willetts Cup in 1979. This crossing was registered by his wife as Memoria Harold Willetts and has been subsequently used for further breeding hoping for similar excellence. Another of his last crosses was Volcano Menehune x Babylon 'Castle Hill' also awarded "Best Seedling of the Show" 1980. A truly great memorial to a dedicated orchid grower.

The above article was published in the N.Z.O.S. Review. Since then Mrs Edna Willetts has told me of the following coincedence which makes it all the more incredible!

Mrs Willetts started the family orchid growing hobby when she bought at Palmers an enormous Cymbidium plant of Edward Marshall. It was to be

used as a display in the entrance hall of her nursing home. It was so large that it was delivered in a truck, to the great dismay of her husband Harold.

Her next venture into orchid culture, was to buy, after some heavy sales talk by one of the Palmer sons, namely "some trays of back-bulbs, take them before someone pinches them". They were grown on and with this interest and Edward Marshall, the Willetts went to an Orchid Show held by the NZOS in Milne and Choyce, where she bought a plant of Edna Cobb, because she likened the name to her own.

They visited the nurseries of Mr Hepburn at Whakatane, and as they were walking through Edna brushed a plant off the shelf. It was a bulb and growth of Cymbidium Royal Stewart 'Tartan' and it was for sale. This was considered a 'meant to be omen' by Edna and she bought it. This was in 1962 and in 1963 the plant was flowering and shown in the NZOS Show in the Town Hall and judged "Champion of the Show". The Tia Maria was awarded the year before.

Because of all this success the Willetts were offered, and accepted the agency, of the Dos Pueblos Orchids, and their name was established in the orchid world.

I think I should have called this article "How NOT to start an orchid collection" unless you are used to having a great deal of luck.

M. Reidy,
Editor,
NZOS Review.

GREEN FROGS, STEAMING TOBACCO JUICE AND MANGOLD WURZELS!

The following information was extracted from **The Orchid Review** of 1903, and should be invaluable to those interested in alternative technological methods of exterminating pests:-

"Mangold wurzel 'traps' can be used with great effect against woodlice. A mangold wurzel should be cut in half, the centre scooped out somewhat, and the pieces laid about in likely places in the house. If examined carefully every morning, the ranks of the marauders may soon be thinned."

For cockroach control:- (from the **Trinidad Botanical Gardens' Bulletin** 1902) "Pitchers of various species of Nepenthes have proved very effective traps, as the insects are attracted by the liquid which they contain, and falling in, are drowned and ultimately digested."

Some Cautions on Use of Agricultural Chemicals

* The recommendations set out in Tables 1, 2 and 3 are made in good faith. The phytotoxicity of a number of the listed chemicals on orchids is unknown; always test a new spray on a few plants first; check with Chemical Company representatives and experienced growers.
* Seedlings, explants, and flowers are particularly susceptible to damage.
* Damage is more likely with emulsifiable concentrates (E.C's) than wettable powders (W.P's), because of the solvents used to obtain mixing with water.
* Spray under good drying conditions but avoid application during hot conditions or when growing media is dry.
* Use surfactants very sparingly.
* Read the labels carefully and follow directions precisely.

K. S. Milne,
Department of Horticulture & Plant Health,
MASSEY UNIVERSITY.

3rd June 1983.

TABLE 1: ORCHID DISE

FUNGI

DISEASE (Pathogen)	SYMPTOMS	SURVIVAL O PATHOGEN
Black Rot *Phytophthora* *Pythium*	Initial water soaking leaves; root and pseudo-bulbs.	Soil-borne fungi spread in water.
Root Rot *Rhizoctonia solani*	Damping-off of seedlings or explants; rotting of roots, rhizomes and leaf bases of older plants. Gradual decline.	Soil-borne fungu
Anthracnose leaf spots *Gloeosporium* *Glomerella*	Well defined, reddish-brown spots which may merge	Infected plants Spores are water-
Flower blight *Botrytis cinerea*	Initial small water soaked spots turn brown, often with pink margin; spots may merge and grey mould develop	On infected debr Spores are air-b

BACTERIA

DISEASE (Pathogen)	SYMPTOMS	SURVIVAL O PATHOGEN
Bacterial Soft Rot *Erwinia carotovora*	Progressive soft rot of pseudobulb-advancing margin water-soaked. Leaves may develop dark spotting and streaking.	Infected plants, and media. Bacteria are spr water.

VIRUSES

VIRUS DISEASE	SYMPTOMS	NATURAL SPRE
Mosaic (Cymbidium mosaic virus - CyMV)	Variable Small pale areas on young leaves which may extend into streaks; spots or streaks can become dark. May cause flower blotch	No natural vecto known; spread on equipment, by ha and vegetative propagation
Flower Break or Leaf Mottle (Odontoglossum ringspot virus - a strain of tobacco mosaic virus - TMV-O)	Variable Elongate or patchy pale areas which may become dark in older leaves May cause flower blotch, necrosis and distortion.	

ASE CONTROL

	EFFECT OF ENVIRONMENT	CONTROL
ipores	Favored by: poor drainage and aeration; water fluctuations; excess sales; cool conditions	Cultural: Use well aerated mix; maintain regular water supply and hygiene; Chemical: Terrazole^{R} or Ridomil MZ 72^{R}
	Warm temperatures favour	Cultural practices as for black rot. Chemical: Benlate^{R} + Captan drench
orne	High humidity and unfavourable growing conditions favor; can infect through injuries	Cultural: Keep foliage dry and vigorous; avoid injury to foliage, e.g. sunscald, chemical burn. Chemical: Dithane M-45^{R}, Benlate^{R} sprays
ne	Favoured by cool, damp weather and poor air movement	Cultural: Keep humidity below 90%; remove old flowers and debris. Chemical: Saprol^{R}, Benlate^{R}, Sumisclex^{R}, Rovral^{R} sprays

	EFFECT OF ENVIRONMENT	CONTROL
iebris	Favored by warm moist conditions.	Cultural: Avoid overhead watering. Good hygiene is important. Chemical: Drench or spray with Chinosol WR. Spray with oxychloride or cupric hydroxide. Disinfect knives with heat or sodium hypochlorite.
id in		

D	NOTES	CONTROL
	Detected by sap inoculation to: *Cassia occidentalis, Datura stramonium, Chenopodium amaranticolor;* serology; electron microscopy	All plant viruses are propagated with the plant because the virus is systemic. Tissue culture does not guarantee freedom from virus. Destroy infected plants. Disinfect cutting equipment with sodium hypochlorite, or heat sterilise in a flame.
cutting illing	Detected by sap inoculation to: *Chenopodium amaranticolor, Gomphrena globosa, Nicotiana glutinosa;* serology; electron microscopy	

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TABLE 2: ORCHID PEST CONTROL

INSECT	DAMAGE
Aphids green fly	Suck sap. Can distort buds and flowers. Sooty mold can develop on excreta.
Caterpillars leaf rollers	Chewing Tie leaves together; bore into terminal shoot and flower buds
Mealy bugs	Suck sap Sooty mold fungi grow on honeydew excreta
Mites two spotted spider mite *Tetranychus urticae*	Suck sap Speckling and silvering of leaf browning. May injure developing buds. Webbing evident with heavy infestations.
false spider mites	Pitting and silvering of upper leaf surface. No webbing.
Scale	Suck sap Usually introduced on plants. Soft scales secrete honeydew - sooty mold can develop on this.
Slugs and Snails	Can cause serious chewing injury.
Soil Insects springtails (collembola) fungus gnats (sciarid flies)	Mainly feed on dead organic matter but sometimes can damage roots.
Thrips	Occasionally cause damage due to rasping and sucking and deposits of 'frass'; may distort flowers or cause puncture marks.

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NOTES	CONTROL
	In-spike: acephate, omethoate, oxy demeton, Attack^{R} sprays Out-of spike: can also use diazinon, and maldison sprays.
Very important to control, particularly on exports to N. America. Damage caused by the larvae (caterpillars) of tartricid moths	acephate, carbaryl sprays; azinphos - methyl sprays every 2 weeks Spr. - Aut. but check there is no phytotoxicity
Soft-bodied insects with white, powdery wax and white filaments around body	Maldison or methomyl sprays at 2 - 3 week intervals; diazinon, dimethoate or acephate drenches
Favored by warm - hot, dry conditions. This mite is pale green or yellowish with prominent dark spot on either side. Biological control using predatory mites is being tested overseas.	In-spike: naled, dicofol sprays at temperatures above 15°C. Out-of spike: diazinon, dicofol, dimethoate sprays, 2 - 3 times at 7 - 10 day intervals.
Varely visible with naked eye - whitish, yellowish or reddish-colored.	Diazinon very effective; dicofol.
Several species have been identified from orchids.	Diazinon and maldison sprays very effective but have short residual action. Thorough spray coverage is essential.
	Apply baits containing metaldehyde or methiocarb regularly. Removal of groundcover and good hygiene is important.
Tiny white insects in growing media. Small black flies which produce small white maggots with black heads.	Diazinon drench or granules - effective for several weeks; maldison effective but less persistent. Can use these chemicals as sprays.
	Sprays of acephate, diazinon, dimethoate, maldison.

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TABLE 3: CHEMICALS FOR USE

COMMON OR GENERIC NAME	TRADE NAME
1. FUNGICIDES	
benomyl	Benlate
captan	Captan Orthocide
copper oxychloride	Cuprox
cupric hydroxide	Kocide 101
etradiazole	Terrazole
iprodione	Rovral
mancozeb	Dithane M45 Manzate 200
metalaxyl plus mancozeb	Ridomil MZ72
procymidone	Sumisclex
triforine	Saprol
2. INSECTICIDES/MITICIDES	
acephate plus triforine	Orthene Saprene Shield
azinphos-methyl	Gusathion
carbaryl	Septan 80W
diazinon	Basudin 50 Dysol 50
dichlorvos	Dyvos Vapona*
dicofol	Kelthane 35
dimethoate	Rogor
maldison	Maldison
methomyl	Lannate
naled	Ortho Dibrom
omethoate	Folimat
oxamyl	Vydate L
permethrin plus pirimiphosmethyl	Attack
3. OTHER	
8-hydroxyquinoline sulphate	Chinosol W
metaldehyde	Blitzem, Slugit
methiocarb	Mesurol
sodium hypochlorite	Janola

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ON ORCHIDS

	CONTROL
Botrytis, Gloeosporium, Glomerella	
As above	
bacterial soft rot, foliar fungus diseases	
As above	
Pythium, Phytophthora	
Botrytis	
foliar fungus diseases	
Pythium, Phytophthora, leafspots	
Botrytis, foliar fungus diseases	
Botrytis	
aphids, caterpillars, mealy bug, scale, thrips	
As above plus *Botrytis*	
caterpillars - effect on orchids unknown	
leaf roller, mealy bug, thrips	
Aphids, mealy bug, mites, scale soil insects, thrips	
Aphids, caterpillars, mealy bug, mites *Particularly useful in small houses which can be sealed to maximise vapour effect	
Mites (can damage young plants)	
Aphids, mealy bug, mites, scale, thrips	
Aphids, mealy bug, mites, scales, soil insects	
Aphids	
Mites	
Aphids, mealy bug, mites, scales	
Aphids, mealy bug, mites	
Broad spectrum insecticide worthy of testing on orchids	
Bacteria; *Botrytis*, fungal foliar diseases	
Slugs, snails	
Slugs, snails	
Decontaminate pruning/cutting equipment from viruses and bacteria (use 3 - 5% solution)	

K.S. Milne,
Department of Horticulture & Plant Health,
MASSEY UNIVERSITY.

PUKEKURA CORNER

By George Fuller, N.D.H. [N.Z.],
Curator Pukekura Park, New Plymouth.

UPDATE ON DISA

SEED RAISING BREAKTHROUGH

From my youth, when collecting cigarette cards was one of the innocent pastimes, I recall a series on Victorian proverbs. Notable amongst these was one of a shivering man huddled in warm clothing eyeing the consequences of the strong wind having whipped up the skirt of a passing shapely lass. Needless to say the proverb was - "IT's an ill wind that blows no-one a little good". Judging from what I regularly see from my sojourns into the park the subject matter would have to be changed to have any impact in this day and age but I can see the sugnificance of the proverb fitting a recent experience on another emotional wavelength.

As a park administrator conservationist I have viewed with concern the introduction of those thin-walled non-returnable plastic containers of 2 litres and 125ml for the more popular makes of beverages — the black-bottomed revolution in packaging fizz. Being a rare consumer of the contents and plagued with the problem of disposal of the empties I have been quite "anti" the whole scheme but just recently, Les Taylor, one of our local successful disa enthusiasts presented me with the need to make an awesome moral judgment. He brought along for my inspection on of these hitherto objectionable objects containing one of the most successfully germinated batches of **Disa uniflora** seed that I have seen and I had to accept that I was looking at the finest, simplest, and cheapest method possible and one that is available to everyone! Oh, that cruel wind!

Not only did his success oblige me to concede that perhaps these plastic monstosities might have a use as terrariums for disa but it also meant that my previous warnings that a moving air supply was necessary to avoid stagnation and fungus problems was acutely contradicted. We live and learn!

Les Tayor's method was so successful and so much within the reach of everyone that it deserves detailed des cription though it will not be applicable for seed sowing until the next harvest of March - May 1984. It is significant however that Les has also used these containers for pricking out and though seedlings tend to be drawn and soft, the method would suit anyone with limited facilities, at least during the seedling phase.

The seedlings I inspected were from seed sown on 12th May 1982. They had been pricked out (transplanted) into the plastic container on the 7th February 1983 and on the 15th August 1983 had a spread of 50mm (2"). Though more drawn than seedlongs grown in less confined conditions they were quite healthy and would gladden the heart of any enthusiast.

PREPARTION OF PLASTIC FLASK

obtainable anywhere. The cheapest and most reliable source in my experience would be your nearest park or recreational area. I found the larger 2 litre size much more satisfactory as some makes of the smaller size have a shape which does not work out so well.

Don't worry about dents. Screw down tops, immerse in warm water and rejoice as dents pop out. Clean off labels, rinse out those aromatic dregs and wipe dry. Don't immerse in hot water for too long or the black base will fall off.

Note that there is a "shoulder" of slightly greater diameter that the barrel of the flask — a godsend for our purposes. If you are true of eye and steady of hand (and unaffected by the sight of blood, especially your own) skip the next bit but I recommend taking a strip of 12mm (½) adhesive tape and running it accurately around the circumference immediately below the shoulder i.e. at the upper limit of the cylindrical section with the upper edge of the top located in an imaginery line where the sides begin to flare out into the shoulder. This helps to strengthen the flimsy flask and provides an accurate line for cutting off the upper portion of the flask. If you are unable to "freehand" a true line around the flask, fill it with water to the desired level and use this as a guide. Exercising care, as it is difficult to hold the flask securely, insert the point of a thin sharp blade in the middel of the tape and cut around, seperating the flask into two pieces. With the top removed, take a fine pair of scissors and cut a clean top to the lower half by carefully following the lower edge of the tape, working from the "inside".

To obtain a snug over-lap take the top portion and carefully make a cut about 4mm above the edge of the tape. Hopefully this will be near the widest diameter of the flare. Don't cut too recklessly for the tolerances are quite fine and if one cuts a fraction too far the top will not overlap the bottom. If you have been careful and accurate the top will overlap the bottom by about 8-10mm and you will have in your hands a perfect terrarium —, no, sorry, there is one thing we have forgotten — holes in the bottom for movement of water.

I found that the easiest way of making holes was to heat a poker and sizzle about four, working from the inside but this wasn't before almost doing myself a mischief by attempting to drive a sharp object through the holes in the black base with the bottom inverted — definitely not to be recommended. I didn't have any success with a drill either. Once the holes are made, the vessel is ready for use.

UTILISATION

The black base forms a very convenient guide for adding the growing medium which in Les Taylor's case is 60% peat moss and 40% fine pumice, unsterilised. It should be thoroughly watered before sowing of seed or transplanting of seedlings and the flask should then be stood in a tray containing approximately 20mm (¾") of water to maintain moisture availablitity.

As the seedlings develop or those transplanted settle down the top can first be offset to allow more air and then taken off to achieve hardening off. With this facility and the possibility of shifting the flask into various locations with such ease, one has tremendous control over the growing conditions.

So now is the time to start guzzling or searching your local park to ensure a store of these useful blimps and in the meantime I'm contemplating investing in shares of fizz factories!

FALLACIES — OR NOT

"It has been considered good culture to maintain a moist atmosphere in daytime and a dry one at night, but is this right? The process and rhythm of growth of the plants in as much as the leaves absorb atmosphere moisture, at night; transpiring through the effect of light and warmth in daytime. The implications, therefore, are that the plants require moisture at night and a warm dry atmosphere in daytime to assist the rhythm of their organic functions called photosynthesis."

Taken from "Orchids", a complete guide to cultivation", by O.E. Eigeldinger and L.S. Murphy.
Contributed by E. Paaymans.

Society Information

MEETINGS

AUCKLAND ORCHID CLUB
Meet 1st Tuesday of month. Secretary: D.K. Lilly, P.O. Box 21141, Henderson. Phone: 836-8900.

BAY OF PLENTY
Meet 2nd Sunday of month. Secretary: Mrs Dorothy Dennis, 1A Randall Place, Te Puke.

CANTERBURY
Meet 1st Monday of month. Secretary: Mr J.G. Marshall, 6 Gamblins Rd, ChCh. 2. Phone 326-533 Ch Ch.

CAPITAL CITY
Meet 3rd Monday of month. See Mrs P. Elms, 'Wynmead' Ohariu Valley Road, R.D., Wellington. Phone 788-918.

DANNEVIRKE & DISTRICT
Meet 2nd Monday of month. Secretary: Mr L.N. Feck, 10 Trafalgar St, Dannevirke. Phone 7914.

GOLDEN COAST
Meet 2nd Monday of month. Secretary: Mrs Betty Norman, 60 The Esplanade, Raumati South. Phone 86-959 Paraparaumu.

HAWKES BAY
Meet 1st Monday of month. Secretary: Mrs N.F. Allen, R.D.3, Napier. Phone 83-050.

HUTT VALLEY CIRCLE
Meet 4th Monday of month. Secretary: Mr Jack Francis, 17 Ranfurly St, Trentham. Phone 287-829 Wellington.

HOWICK
Meets 2nd Saturday morning of month. Secretary: Mrs E. Frost, 73 Ridge Road, Howick. Phone 534-4823.

MANAWATU
Meet 2nd Thursday of month. Secretary: Mr J.G. Jackson, 18 Hurley Place, Palmerston North. Phone 83-348.

MARLBOROUGH
Meet 4th Sunday of month, June, July and August. 4th Thursday from September to May. Secretary: Mrs J. Bottom, 24 Snowden Cres, Blenheim. Phone 87-918.

NELSON
Meet 3rd Tuesday of month. Secretary: Mr T.H. Wells, 5 Browning Cres, Stoke. Phone 79980.

NEW ZEALAND
Meet 3rd Wednesday of month. Secretary: Mr C.H. Brindle, 24 McIntyre Rd, Mangere Bridge. Phone 689-001, Auckland.

NORTH SHORE
Meet 1st Sunday of month. Secretary: Mrs Eden Campbell, 52 Lynbrooke Avenue, Auckland 7. Phone 679-804.

SOCIETY OF SOUTHLAND
Meet 1st Tuesday of month. Secretary: Mr Ray Dodd, Taiepa Rd, R.D.9, Otatara. Phone 80-067 Invercargill.

STRATFORD ORCHID CLUB
Meet 1st Tuesday of month. Secretary: Mrs Sylvia Voss, 24 Pembroke Road, Stratford. Phone 7715.

OTAGO
Meet 4th Wednesday of month. Secretary: Mr M.L. Young, 61 Argyle St, Mosgiel. Phone 6550.

POVERTY BAY EAST COAST
Meet 2nd Monday of month. Secretary: Mrs L. Fitzgerald, Box 795, Gisborne. Phone 76872.

ROTORUA
Meet 1st Sunday of month. Secretary: Naere Short, 41 Koutu Road, Rotorua. Phone 87-391.

SOUTH AUCKLAND
Meet 1st Tuesday of month. Secretary: Valerie Burnside, 74 Red Hill Rd, Papakura. Phone 298-3205.

SOUTH CANTERBURY
Meet 1st Tuesday of month. Secretary Mrs D. Brocket, 16 Baker St, Timaru. Phone 47-136.

SOUTH TARANAKI
Meet 3rd Thursday of month. Secretary: Mrs Una McCormick, PO Box 275, Hawera. Phone 85-755.

TARANAKI
Meet 2nd Tuesday of month. Secretary:Mr A.D. Gray, 24b Alberta Road, New Plymouth. Phone 88836.

TAUPO
Meet 3rd Tuesday of month. Secretary: Mrs L. Galloway, 12 Rimu St, Taupo. Phone 86-481.

TAURANGA
Meet 3rd Tuesday of month. Secretary: Mrs B. Burgess, Box 2107, Tauranga South. Phone 25-819.

THAMES VALLEY
Meet last Sunday of month. Secretary: Mr Gordon McKenzie, PO Box 60, Thames. Phone 86-720.

WAIRARAPA
Meet 1st Sunday of month. Secretary: Pam Shaw, 47 Iorns St, Masterton. Phone 84483.

WAIKATO
Meet 4th Tuesday of month. Secretary: Mrs Rachel Haggle. PO Box 7101, Claudelands, Hamilton. Phone 494-612.

WAIROA
Secretary: Mrs R. Gasson. PO Box 191, Wairoa.

WANGANUI CLUB
Meet 1st Wednesday of month. Secretary: Mrs Frances Harvey, 46 College St, Wanganui. Phone 55-607.

WELLINGTON
Meet 1st Monday of month. Secretary: Mrs LG. Cosnett, 35 Clyma St. Upper Hutt. Phone 288-429, Wellington.

WHANGAREI
Meet 1st Wednesday of month. Secretary: Janice Shayler, P.O. Box 4115, Kamo. Phone 50219.

The Hightae Plant Nursery

ADDRESS: 16 Coronation Street, Takapuna, Auckland 9, New Zealand.

TELEPHONE: Auckland : 497-585. After 4.30 p.m.

Below is out first listing of top quality orchid crosses offered for your perusal.

B/1983 PUPPYLOVE 'JUBILEE' X WINTER WONDER 'IVY YATES' 4N

WHITE, CREAM, GREEN AND SOME YELLOWS POSSIBLE.
JULY/AUGUST flowering. Upright spikes with large, well spaced blooms. Long lasting as cut flowers. 10-12 flowers per spike. Both parents first flower on their third bulb. Free flowering. Excellent cut flower material. This Winter Wonder first flowered 2½ years ex flask.

C/1983. PUPPYLOVE 'JUBILEE' X ZUMA BOYD 'JOHN'S PRIDE'4N

WHITE, GREEN AND SOME YELLOWS
AUGUST flowering. Two years flowering from the same bulb. Upright spikes, award shaped flowers, well spaced on the stem and long lasting as cut flowers. 10-12 flowers per spike. Ideal for the cut flower market, show bence specialist and hobbyist alike. No spotting or furl.

D/1983. ZUMA BOYD 'JOHN'S PRIDE' X PUPPYLOVE' JUBILEE 4N

This is the reverse of the previous cross. A flask of each is highly recommended as both parents are superb breeding material and top flight orchids are expected.

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