



## Phalaenopsis

### Introduction:

The following is a guideline for growing *Phalaenopsis* in Orchiata; it is aimed at helping the grower to ensure that any areas of concern have some guidance. There is also a quick guide available for ease of use. Note that pot sizes and climate conditions will change according to grower and that adjustments will have to be made depending on these conditions, especially for the different varieties grown. Remember this is just a guide.

### Pot Type:

Clear pots are used for growing *Phalaenopsis* as they are one of few plant types where the roots can actively photosynthesise. In the past both terracotta and plastic pots have been used. Terracotta pots have been used due to the use of sphagnum moss; these pot types helped to dry the media faster and allow air movement.



At present clear pots are used to allow roots to photosynthesise. Although this does not contribute too much to the overall plant growth it has been found that as the roots can still see light they are more prone to stay inside the pot. In coloured pots roots can stray outside looking for sunlight. Clear pots also allow the grower to see the health status of the plants more easily.

### Pot size used:

Generally *Phalaenopsis* are grown in a 3 – 4 step system for potted plants and those for export. Some automated growers are able to use just two step system however most growers use at least a three step system:

1. Potting from flask: tray planting, 1 inch or 2 inch pot
2. Second vegetative growth: re-potting into 3 – 4 inch pots
3. Final potting and flower initiation: 5 inch (12cm)
4. For cut flower production the final potting may be into a 6inch pot.

Plants from flask are at their most vulnerable and must be cared for to encourage strong root growth which will create strong plants later on. Some growers believe that growth in trays with up to 50 plants per tray from flask is a better option however at this stage potting singularly is widely used.

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**Grades to use:**

Initial Planting:

For initial plantings from flask direct into small pots – 1.5 – 2 inch, New Zealand Sphagnum moss can be used. Using moss will allow sterility as well as retain moisture for the more vulnerable plants. High quality moss should be used as lower quality may cause problems with pathogens and water holding leading to plant mortality.

If potting directly into 2 inch or trays Classic Orchiata can be used however irrigation may need to occur more frequently e.g. every 3<sup>rd</sup> day. It is beneficial for plants to be left 24 – 48 hours after planting before the first irrigation occurs to allow any cuts, abrasions and damage to heal or dry. This will help to prevent bacterial infections in damaged roots.

Second potting:

For younger plants being transferred from 1.5/2inch and/or trays into 3 -4 inch pots, Classic Orchiata should be used. Note that if high quality Sphagnum moss e.g. NZ Sphagnum moss was used to pot the plants initially, this does not have to be removed; the plant and sphagnum can be transplanted into Orchiata. This is because NZ sphagnum is resilient and will not cause water holding problem in partnership with the Orchiata. If Chinese or poor quality Chilean is used, this *must* be removed. In markedly warmer climates where humidity may be higher Power Orchiata can be used for 4 inch pots.

Final potting:

Depending on the climatic type either Power or Power+ Orchiata can be used. In each case the Orchiata from the previous pot can either be shaken loose and removed or used again in the next potting. In moderate climates pot into 5 inch pots with Power Orchiata. For markedly warmer climates Power+ Orchiata should be used.

The following are the approximate amounts which will be required at re-potting:

Pot Size	Previous Media retained (L)	Previous media removed (L)	Approx grams/ pot (40% moisture)	#40L bags per 1000 pots
1.5 inch-2 inch	-	0.060 – 0.100	30 – 60g	1.5 – 2.5
3 inch	0.125	0.250	100 – 125g	6.25
4 inch	0.250	0.550	180 – 200g	13.75
5 inch	0.150 – 0.200	0.750	280 – 300g	18.15

**Time at re-potting:**

Time until each potting and re-potting will depend on the climate and variety leading to leaf size. Plants which are planted from flask into 1.5 - 2 inch pots will need to be transplanted once there are two well developed leaves. This may be 5 – 6 months (20 – 25 weeks) after initial potting. From here they will be transferred into a 4 inch pot which they will stay for 5 -7 months (20 – 27weeks) or until there are 4 well developed leaves. At this time plants can be transferred into 5 inch (12 cm) pots for final growth and finishing. Once the plants have reached a leaf span of more than 20cm then flower initiation can occur.

In each stage of growth, plants with the same leaf size should be placed together so that plants are all at the same degree of growth. This will make flowering more even.

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### Spacing's at planting:

There are four aspects which can aid plant growth by the plant spacing's: humidity, disease, light and moisture. All four aspects are linked: when plants are placed too close together the humidity will be increased and air movement is reduced. This leads to increased drying time of the media and a warmer microclimate. These conditions ultimately lead to pests and diseases such as fungus gnats and root rots. Leaves are also likely to overlap as they grow ultimately competing for light.

Plants should all be placed with a slight gap in between pots as well as leaves angled so that they will not overlap. Gaps should be wider as pot sizes increase. If plants do need to be close together then consider a larger Orchiata type as well as a reduction in humidity.

The following table is approximate plants per m2 of bench space:

Pot Size	Plants/m2	Spaces between pots	Time in pot
1.5-2 inch	200 – 300	-	20 – 25 weeks
3 inch	100	2cm	
4 inch	60 - 70	4- 5cm	20 – 27 weeks
5 inch (flower initiation)	30 - 40	8 – 10cm	4 – 6 weeks
5 inch (finishing)	30 - 40	8 – 10cm	12 weeks
Total time			56 – 70 weeks

### Temperature & Humidity:

*Phalaenopsis* are temperature dependant for both growth and flowering. Humidity also takes a good part in maintaining that temperature, as well as growth and disease suppression. Generally *Phalaenopsis* are best grown in Humidity levels at 70-80% however it can be beneficial to increase the humidity to 80 – 90% in the first week after re-potting to help the plant along. Note also that this is the humidity at the plants microclimate, planting space as well as temperature and irrigation times will also affect this. If humidity levels stay over 90% for too long, it can lead to disease including soft rots as well as the media not drying out.

Temperature at all vegetative growth stages (pre flower initiation) should remain between 27 – 32°C day (>25°C night). When flowering is required, temperatures should reduce to 17 – 25°C for 4 – 6 weeks. The longer the time at cooler temperatures the more even the flowering will be. Once flower initiation has occurred then plants should remain in temperatures <26°C to encourage strong flowers, higher flower count and reduced abortion. If Temperatures increase above 26°C too long the flowers may abort or be too thin or turn into Kei Kei's. If temperature also becomes too low, flowering may not meet shipping times.

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## **Fertiliser regime and irrigation strategy:**

Two types of fertiliser can be used: a compound mix using tank mixing of the various fertilisers or a straight complete fertiliser. The type used may depend on the variety which is being grown but a complete ready to mix fertiliser can be easier to use especially on small scale. With either, it is important that Magnesium and Calcium are being applied especially if reverse osmosis water is being used. The pH of the solution needs to be above 5.5 and the EC should be maintained around 0.8 – 1.2mS/cm.

Generally growers use a complete fertiliser of mix which constitutes equal parts NPK e.g. 18:18:18 plus Ca & Mg and trace elements. Recent information shows that Phosphorus at these rates is not generally required. During Vegetative growth Plants should receive 200ppm of N at each irrigation, Phosphorus only 25 – 50ppm. Phalaenopsis are poor foliar feeders so fertiliser applications must reach the media and the roots. Note also that in cooler climates and at flower initiation Nitrogen levels need to be lower:150ppm.

There are many types of fertilisers present on the market however the Peters range is suitable for orchid growing and is used in many large scale areas:

Peters Excel CalMag NPK of 15 – 5 – 15 plus CalMag is an important orchid fertiliser which will provide a good balance of the above nutrients. A Trace element mix such as S.T.E.M from Scotts can also be applied at regular intervals to boost trace element levels.

Peters Professional All rounder with an NPK of 20 – 20 – 20 is also a general fertiliser which can be used as a compound fertilisers.

If pH is too high in the feed water, small amounts of Phosphoric acid can be applied to the tank solution to correct the pH.

Similar fertilisers can be used however it is important that they are easy to use and understand, are of good quality, there are no contaminants after application and that all nutrients required are applied and that it is easily soluble. The source of the fertiliser should be able to give guidance on its use.

### *Application:*

Application of all should be via spray nozzles situated evenly above the plants or by a boom spray. Hand held watering guns should be replaced by fixed irrigation systems to ensure that watering is even and nutrient application is steady throughout the growth stage. If there is unevenness then this will affect the amount of plant which will be ready to flower.

At each irrigation the solution should be tested for pH and EC to prevent any mishaps. Apply enough to ensure the media is wet through and that there has been some drain. Do minimise the drain as any irrigation poured through is a waste of nutrient and extra cost.

Irrigation times will depend on the pot size and the climate within the greenhouse. Smaller pots in warmer climates will require irrigation on a more frequent basis. Cooler climate will require less irrigation. In all circumstances plants must be allowed to dry out substantially to ensure that there is a good wet – dry cycle. This will prevent disease from occurring.

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Pot Size	Irrigation time warm climate	Cool climate
1.5-2 inch	1 – 2 days	2 -3 days
3 inch	3 – 5 days	5 -7 days
4 inch	5 – 7 days	7 – 10 days
5 inch	5 – 7 days	7 – 10 days

Pots can be checked for irrigation requirements by lifting or weighing a pot; over time you will build a knowledge of the weight of a dry pot, requiring irrigation. Do not let pots dry out completely 60 – 70% dry will be okay.

### General/Troubleshooting

Every 4 – 5 weeks the media of the different pots should be tested to ensure there is no salt build up. Salts will eventually build up on bark due to the exchanges sites; with Orchiata, flushing is not required at each irrigation as salt build up is minimal however it is good to check and carry out a flush approximately every 5 weeks.

*To check pH, use the pour through technique:*

Using a medium – moist pot, place a clean collection container underneath the pot and then apply clean, fertiliser free irrigation water evenly to the top of the pot (the amount will depend on pot size – 4 inch approx 250ml for bark). Collect the runoff (enough for testing – 40ml) and then test. A desirable EC is < than 1.5mS/cm. 1.5 – 2mS/cm is getting high while >2mS/cm requires a flushing cycle of pure water prior to next feeding. pH can also be tested and the infeed solution corrected to change this.

Media itself can also be tested with a 1:1.5 v/v extraction technique and the extract tested although this takes more time and is not practical in many greenhouse situations.

### Water Quality:

This is another aspect which must be checked. Water can affect the plant growth by diseases present, lack of Calcium and Magnesium, and build up of bicarbonates in the irrigation lines. If water is sterilised prior to use through UV light etc then Disease will not be a problem however if water is sourced from wells or local water then testing must be carried out 2 – 3 times a year for water borne diseases. Water is a common dispersal agent for many diseases which affect orchids.

Water should also be tested for the Ca and Mg content as well as the hardness. If Ca and Mg are not present in the water then these MUST be applied in fertiliser solution. If the water is hard and contains high amounts of bicarbonate then lime scale may build up in irrigation lines and white marks may occur on leaves of the orchids. This can be corrected by applying an acid such as Phosphoric Acid to the application water.

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## Troubleshooting with Orchiata:

Orchiata is not a sterilised media; it is in fact packed with natural beneficial organisms which will aid against pathogenic species. In some cases fungal growth may appear. If this is a concern then take good photographs of the fungi and send for ID or send media to a local laboratory for ID. In most cases it may mean that the media is not being allowed to dry out sufficiently therefore reduce irrigation rates.

Algal growth and fungus gnats: these can sometimes be seen on the tops of pots. Gnats can cause pitting on the leaves of orchids although they only feed on fungi. These are both indications that the media is too wet. Increase times between irrigations and allow the media to dry out.

White build-up on media: this is usually lime scale and is caused by the bicarbonates in the water. Check water pH and add acidifying agents if pH is too high.

Discolouration of leaves: this can be caused by many things e.g. cooler temperatures lead to purpling of leaves. High light levels lead to yellowing. Take photographs and send to a consultant for advice.

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