
Growing Bulbophyllums

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An article on the growing of *Bulbophyllum* orchids

By Charly Hartmann

A number of members have asked me to write about my growing methods for *Bulbophyllum* orchids I am pleased to share information about the techniques and conditions I now use. Before starting, I would like to say that my growing conditions may not be perfect, nor the same as yours, and that each grower has his or her own ways and unique conditions to achieve success. In recent years, I have concentrated on *Bulbophyllum* orchids and over time have learned not to slaughter too many. In fact, over the last year my mortality rate was zero, a big improvement on previous years.

I would like to thank Bill Thoms, Ken Jones and Kirsty Bayliss for their help in enabling me to become a better *Bulbophyllum* grower. They may not be aware, but they have influenced me in many of the decisions I have made.

This article is written in the hope that the odd idea or two of mine may be of help to other members to successfully grow this beautiful genus, the *Bulbophyllum*. I am also writing this in the hope that perhaps other members will also share information about how they successfully grow other orchid genera as I know that I still have a lot to learn.

Bulbophyllum can be grown in many different ways, and all the growers I know do just that; some with excellent results and some not so good. Here is a simple example. About a year ago I was given a *Bulbophyllum* and judging by its growth, it looked like a one-year old plant. However, the label was dated 2007. So, this 10-year old plant had not progressed past one-year's growth. In comparison, I bought a *Bulbophyllum* from Bunnings in July 2016. It had two leaves, one of which was damaged as it did not fit into the tubing it came in. After just 2.5 years, it has 15 fully grown leaves, seven new leaves sprouting and one flower spike which opened before this article was published. The difference in these two orchids is that the plant from the tube was grown with my methods and under the conditions that are described in this article.

Where do I grow my *Bulbophyllum*?

I grow all my *Bulbophyllum* orchids in a small hothouse, about 9 square metres. The frame is made of patio tubing and covered with UV treated bubble wrap. The roof is covered with laser light sheeting. Inside the hothouse there are two orbital ceiling fans, a heater, an evaporative air-conditioner and a humidifier.



Air Circulation

Orchids don't like stagnant air so two orbital fans run 24/7 to prevent fungal problems.

Heating and Cooling

Bulbophyllum orchids like warm but not hot conditions. My hothouse environment is such that even on the coldest winter night the temperature will not be lower than 15°C and in summer the maximum temperature will not exceed 33°C. An evaporative cooler is installed to make sure that 33°C maximum can be maintained. It operates on a thermostat and switches on at 33°C and off again at 31°C. In addition to keeping the temperature almost constant, it introduces fresh air into the hothouse. As a simple test in summer, feel the leaves and if they are not cool to the touch then it's time to find a way to cool it down. Misting or spraying with water will do the trick.

Humidity

The optimum relative humidity for *Bulbophyllum* orchids seems to be about 70%. To achieve this, I have two humidifiers. One is installed outside the hothouse and the other is in the hothouse itself as a backup in case the external unit fails. Early in the mornings the humidity reading is about 80%, after watering 95% and then it will slowly decrease to about 70%, at which point the humidifier will switch on keeping the relative humidity between 70% and 75%. In the late afternoon it will start to slowly rise again to about 80%. On hot and dry summer days I increase the humidity to 75% to 80%. The humidifier is operated by a humidistat and thermostat.

Since most of growers do not have commercial humidifiers, I suggest placing a shallow dish under your pot filled with 1-2cm of water. *Bulbophyllum* orchids do not mind having their feet wet.

Rainwater

I have a 5,000-litre rainwater tank used for watering my orchids and humidifying my hothouse. It is quite amazing how much water the humidifier uses. My observation is that it uses at least 1/3 of my available 5,000 litres over a 6-month period; principally between October and March. I have now installed another 3,000 litre rainwater tank to ensure that I have enough water for these months.

Watering

pH of the water

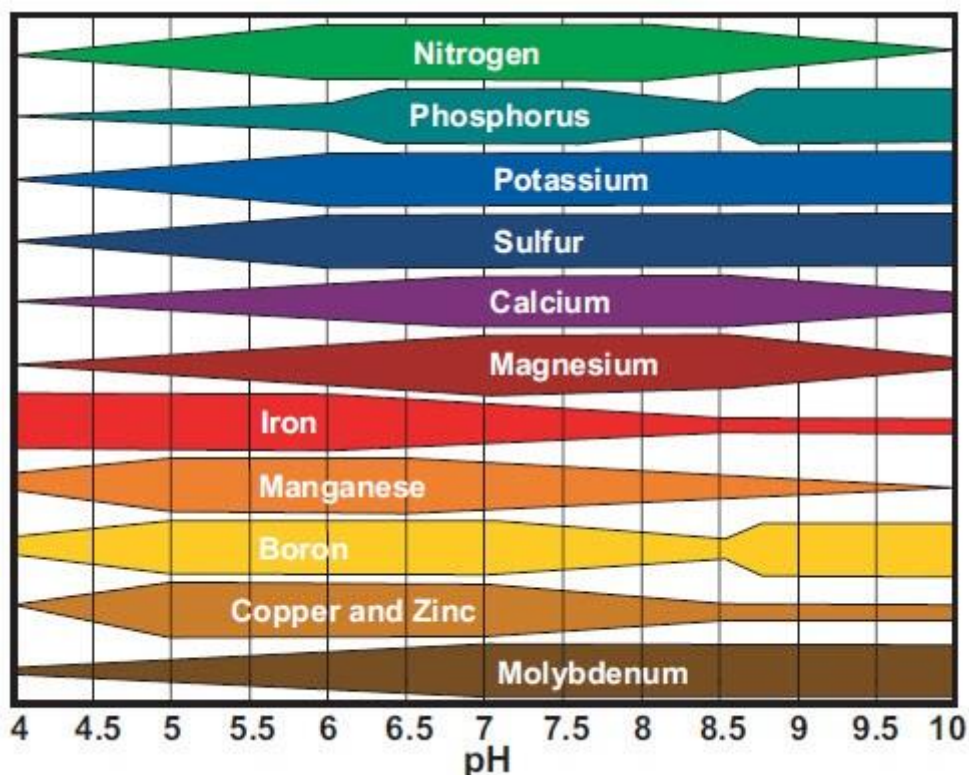
From my water tank I pump the water into two 60-litre rubbish bins. In those two bins I add enough Hydrochloric acid (HCl) to lower the pH to between 6.2 and 6.5. Only very small amounts of HCl should be added at a time, and care needs to be taken when using highly corrosive chemicals like acids. I check the pH with two different pH meters to ensure that I have the desired pH levels.

Why do I use two different pH meters, you may ask? In my experience, these electronic probes are prone to error and need re-calibrating monthly, a very annoying but necessary task.

Why do I use the HCl acid and what is it good for? Well, it has all to do with the uptake of nutrient. Every nutrient has an optimum pH at which it can be readily absorbed by my orchids (see table below). Since almost every nutrient has a different optimum pH for plant take-up, I find that a pH of between 6.2-6.5 is the most effective for a broad range of nutrients.

Applying water

For hand watering, I use a 5-litre pressure pump (from Bunnings). However, as the nozzle was too fine for my purpose, I have enlarged the opening with a 3mm drill bit. I wanted lots of water since the *Bulbophyllum lobbii* baskets (40cm x 40cm) need almost 1 litre of water.



As I water very early in the morning, (about at 6:30am) the water temperature is not very friendly for *Bulbophyllum* orchids. The optimum temperature seems to be 25°C to 30°C (no higher). To achieve this, I put about 4 litres of water in my container and then add about 1 litre of boiling water from a kettle, checking with a thermometer that the temperature is between 25°C and 30°C. This aspect of watering is very important. Cold water on a new leaf tip or flower spike can turn this very tender growth black and kill it overnight (see photo on the right).



This has happened to me more than once when I first began growing *Bulbophyllum* orchids. However, once I increased the water temperature to 25°C to 30°C it did not recur. This also applies to seedlings. Using cold water, I experienced a 90% mortality rate. Since using warm water, the mortality rate has decreased to just about zero (not perfect but close).

There is one more benefit from using warm water. Due to the water-holding capacity of the sphagnum moss that I use (see later notes on media) and the strong air circulation throughout the night, the water in the moss gets very cool. This is not a desired environment for the *Bulbophyllum* roots. So, when I water in the morning, I expel the cold water and replace it with warm water. As I am watering from the top of the basket or pot, I place my hand underneath to feel the cold water running out being replaced by warm water. It's like waking them up with a nice warm shower. You wouldn't choose to have a cold shower on a cold winter's morning!

How often do I water?

Last but not least. Salt is the enemy for all of our orchids. While I constantly try to avoid salt building up in my mix, this cannot always be avoided. Salt dissolves easier and faster in warm water than in cold water. So, to my way of thinking, having warm water may help to flush out the accumulated salt from the moss. For this reason, I water almost every day. Not because my *Bulbophyllum* orchids need water, but to keep them warm and flush out any salt at the same time.

Some believe if you water your orchids in the morning, they will dry out by evening, a requirement for growing many species of orchids. However, in my experience this does not apply to *Bulbophyllum* orchids. I have found that you can water your plants at any time. They won't hold it against you, if you have the right conditions and you use warm water. It is also a tremendous help to your *Bulbophyllum* orchids if you stand your pot into a shallow dish with 1 or 2 cm of water in it.

I do not seasonally change my watering regime - I maintain the same regime year-round.

Fertilizing

Every package or container of fertiliser includes instructions as to how much you should use. I tend to ignore most of it, because none of it gives me the information I need and that is - HOW MUCH SALT IS IN MY WATERING CONTAINER WHEN I FERTILISE MY PLANT? How do I determine that?

My EC (Electrical Conductivity) meter measures the salt content in the water. Before adding any chemicals or fertiliser, the reading is 0.22 when in a perfect world, it would be zero. When the rain runs off my roof it picks up salts. .22 is an acceptable level of impurities as the recommended maximum salt level for our orchids is 0.80.

I can therefore add fertilizer to my 5 litre container until the EC meter gives a reading of 0.80. However, some fertilisers can significantly change the pH because they are acidic or basic. My fertilizing regime for the months of November and December was:

01/11/17 Calcium Nitrate 1 level Tea Spoon/5 Litre

05/11/17 Bill's Best 1 level Tea Spoon/5 Litre

09/11/17 Omegazyme 1.5ml/L pH adjustment 6.5ml

13/11/17 Humibossta 0.5ml/L 2.5ml
 7/11/17 Ezi-Root 10ml/per 5Litre
 21/11/17 Epsom Salt 4grams/ per 5 Litre
 25/11/17 Hygenseaessentials 3ml
 29/11/17 Calcium Nitrate 1 level teaspoon/5 Litre
 03/12/17 Bill's Best 1 level teaspoon/5 Litre
 07/12/17 Omegazyme 1.5ml/L pH adjustment 6.5ml
 11/12/17 Humibossta 0.5ml/L 2.5ml
 15/12/17 Ezi-Root 10ml/per 5Litre
 19/12/17 Epsom Salt 4grams/ per 5 Litre
 23/12/17 Hygenseaessentials 3ml
 27/12/17 Calcium Nitrate 1 level teaspoon/5 Litre
 31/12/17 Bill's Best 1 level teaspoon/5 Litre



From my list of fertilisers, you can see that most of the amounts are very small but I fertilize every 4th day. Before fertilising, water first or you can risk root burn. The reason for my rotation of the fertiliser available is simple the fact that I do not trust the chemical content labelling on the containers. By rotating I even out any inconsistency in the labelling

Potting Bulbophyllums

I use 3 very distinct potting methods for Bulbophyllum orchids.

Method 1 - Deflasking

Let's start off with the deflasking mix and deflasking itself. Again, use warm water at 25°C to 30°C to clean the seedlings after removing them from the flask. After washing off the agar, I put the seedlings into a bath of warm water, with 1 teaspoon of Bravo Weatherstik Fungicide (Chlorothalonil) for about 5 mins. This is a

precautionary process in case they are infected and also protects them from any fungi they might be exposed to during the deflasking process. After the fungicide bath they go into a warm water bath with 1 teaspoon of EziRoot for about 10 min. EziRoot contains hormones to promote root growth. I compost the seedlings into a container with 50% fine (4-6mm) bark, 25% fine (5mm) perlite and 25% fine (5mm) charcoal. I soak this media in warm water for about 30 min to make sure that the bark is very well soaked (most essential). This is the only time I use bark.

The seedlings should have grown enough in 12 to 18 months to be transferred into individual pots. The following photo shows plants deflasked April 2017 with this photo taken early April 2018.

The photos on the following page show the extent of pseudobulb, leaf and root growth when the five plants were potted into individual pots.



Method 2 - Repotting

This process will be used several times in the early life of the plant, until it eventually ends up in a basket because there is simply no pot available large enough to accommodate a fully grown *Bulbophyllum*.

I put a layer of Styrofoam packing donuts in the bottom of the pot and then press moist to wet sphagnum moss to about $\frac{1}{2}$ to $\frac{3}{4}$ of the way up the pot, depending on the length of the roots. My aim is to have the finished plant above the rim of the pot so that new growth can easily spread over the edge of the pot and is not restricted by the side of the pot. With the pot $\frac{1}{2}$ to $\frac{3}{4}$ full of compressed moss the plant goes in and more moss is added to each side of the plant until the plant is stable. As the plant outgrows this pot, it will be repotted into a larger pot in the same way.



As you can see the pseudobulb on the left in the picture on the right has no more room to expand, so it had to go into a bigger pot (Photo on the right)

How to repot this *Bulbophyllum*? Add more donuts in the bottom of a bigger pot and use the same method as above. Put the plant in the middle and then just fill more moss around the sides.



Note the size of the pseudobulbs as they grow. The photo on the right shows that the pseudobulbs are about three times larger after just 12 months from repotting.

3rd method:

The last potting process is somewhat different and perhaps a bit controversial. I am talking about potting an advanced plant into a basket. I make my own baskets from cedar. Cedar is light and easy to work with and is not affected by moisture. If you have the book from Bill Thoms, you will learn how to build a cedar basket. He describes how to build one, very thoroughly, over several pages.

My method is this:

Fill the gaps between the slats tightly with moist to wet sphagnum moss. Place a thick layer of moss at the bottom. Then place a small mound of Styrofoam packing donuts in the middle and sit the Bulbo on top of it, putting more donuts on the side if required and then fill in the rest with more moss. Just to clarify this, the roots of the plant sit on top of the donut mound. Now here's the controversial part! Since when do orchids grow in Styrofoam? Well, they do and this is why!



The plant will thrive in this enclosed chamber of Styrofoam, air and lots of moisture. The roots are able to hold themselves firm and any salts are easily washed off the Styrofoam. Often the roots will not go around the donuts but right through them.

A few words on Styrofoam packing-donuts. There are 3 kinds on the market: (i) will dissolve when moist or wet; therefore completely unsuitable for our use; (ii) very hard Styrofoam, that may damage the roots; and (iii) nice and soft so that the roots are able to go right through - this is the one to use. They all look the same so be very specific when you purchase them.

What's a happy Bulbophyllum and what is a sad one?

There are 3 things to look out for to determine if the Bulbo is healthy or struggling.

- (I) The main indicator is the pseudobulb itself. If it is plump and full –it's good.
- (II) If the pseudobulb is shrivelled, take it out from the pot and look at the roots. The roots will tell you if it can be saved or not. If the roots are dark to black then they are dead or dying. You need a light coloured root.
- (III) The leaves: Are they shiny or dull looking? The front leaf should look shiny or else something could be wrong. If the back leaves are dull that could simply be aging. What are front and back leaves? The front leaves are the newly grown ones (youngest), the back leaves are the first grown or the oldest ones.



Example of a good root system

I was given this *Bulbophyllum kubahense* (shown below) with one root about 1 cm long (on the right pseudobulb), at about the end of April in 2017. As you can see the left pseudobulb was shrivelled and the roots were black indicating that this part of the plant was dying. Did it survive? Yes! The left leaf died soon after, but the right leaf did open properly. At the end of October 2017, I did a check and found that the roots had grown back to a point where I was unable to pull it out of the moss. It may take another 6 months before it is back to its normal growing cycle because *Bulbophyllum kubahense* is a slow growing plant. Never give up; even with one tiny root, your plant can be saved in the right condition.

Two leaves have grown out of the pot. What should I do? This is a typical situation where parts of the plant are happily growing in moss and others rambling out of moss. Notice the difference in root growth (Below left) You can see about 3 cm long roots on the rhizome and about 7cm long roots where the roots were in the moss. If the moss is still in good condition do not remove it, this way the plant will continue growing without pausing. A plastic pipe will be the new home. I cut a 100 mm wide pipe in half lengthwise, then take my heat-gun warm the ends and bent it up at the end and drilled some holes in the bottom. Put some moss in the bottom of the pipe, plant on top, more moss on top and done.



This plant decided to go walkabout. (Left below picture) However, what is interesting again is that different root growth, out of moss and in moss. You can see a much larger root grows in the middle of the rhizome, where the Bulbophyllum expanded into the second container, compared to the roots as it comes out of the first container, where it did not get much water being not in moss.



The photograph on the left illustrates a wrong choice of pot. The roots are coming out of the pot because they are not getting enough water. I carefully cut the roots free of the pot avoiding damaging the roots, so that I am able to remove the plant and repot in a bigger pot (see picture below). The moss also still looks ok, so put more donuts in a bigger pot and fill in the sides. Now the new leaves will have more room and the roots will get more water. This plant should improve.





If the plant is small or the roots are short then at times use old meat or sausage trays and only use larger pots when the roots have grown longer.

Moss, Bark and Mounting

While you can grow *Bulbophyllum*s in either bark or sphagnum moss I grow all of mine in only moss, as it holds water much longer than bark - up to one week. While bark is cheaper, I consider moss to be better. You will see the difference when it has been repotted in moss compared to a plant in bark. I have had a greater result growing *Bulbophyllum*s in moss. Removing moss from the fine *Bulbo* roots is a breeze while removing them from bark is almost impossible. The roots stick to the bark like s... to a blanket and getting them apart without damaging them (the roots) is impossible. The other thing which comes to my mind is the absorption of the fertilizer. With bark the plants absorb less fertilizer than with moss. Hence if I ever have to miss a watering day, then it would be always the day after fertilizing. Why? So that the roots get more food for another extra day.

When I started growing *Bulbos*, mounting them was on my mind. I collected nice driftwood pieces and they looked terrific. The only thing they didn't do was grow well. After two years I came to the conclusion something



was wrong (I must be a slow learner). I did try three on fern tree slabs. But within four months the tips of the leaves on one plant started to get yellow. So what happened? The first plant on a piece of driftwood simply did not get enough water. To make a mounted plant grow like the ones in moss, you would probably have to water them more than once a day.

A second plant on the tree fern slab did grow better, however again within four months yellow leaves started to appear. A salt build-up was the cause. The only way to rectify that was to take it off the tree fern slab, though it was a 3-hour operation.

I still have one *Bulbophyllum* on a tree fern slab, but the reason for that is, it's doing quite well, and I am afraid to take it off. It is *Bulbophyllum phalaenopsis* and in very good condition, so I don't want to disturb it. The slab is on a slight angle to hold more water. Pic above

Bill Thoms did mention to me that he is growing his *Bulbophyllum frostii* on timber mounts. However, he will make sure that the timber is horizontal, and the timber has some kind of hollow so that the timber holds some water.

At this time, it's probably appropriate to add a quote from Bill's book: 'If it's mounted on something that dries out

quickly, such as cork or hardwood, it doesn't stand a chance of reaching its true potential'. He should know, after 40 odd years of growing Bulbophyllums.

Pests and Diseases

Fortunately, so far I have not had any pests or diseases. However, should I see some bugs, I would use Neem Oil. This is a natural product from the seed of a tree from India. Neem works by being absorbed into the plant and causing insects to stop eating as they don't seem to like the taste) Mix with hot water and a drop of Palmolive detergent to form a yellow milky solution and apply to the plant. For any insects I would also use rubbing alcohol. Apply full strength to the insects (DO NOT USE ON PAPHIOPEDILUM BUDS). The other product I use to prevent fungal problems is Bravo Weather Stik fungicide.

BioGro

What is BioGro would be the first question on everybody's mind.

I have used BioGro on my Orchids since February 2018 and the results are outstanding.

Basically, BioGro is an organic microbial enzyme activator, which changes the soil or medium structure and improves the nutrient uptake. The microbes in BioGro will control the PH to maintain a better nutrition uptake by the plants so that the plants in turn will give sugars back to the microbes. This is a symbiotic relationship and the microbes in BioGro will do everything possible to ensure its own survival. It will control its own environment. That is why your PH levels will stabilise.

The microbes in BioGro also secrete plant growth enzymes that are needed by the plants. These enzymes are naturally secreted by the microbes in nature. What the manufacturer has done is put more of this type of microbes in their product. That is the reason for the vigorous growth that is seen in my Orchids.

BioGro prevents fungal diseases from cropping up by out competing the pathogens for food and space. This is called Competitive Inhibition and Exclusion.

BioGro will alter the PH and adapt itself to the PH in the medium if necessary. The PH basically controls which species of microbes are able to perform their tasks. What the manufacturer has done is to include various species of microbes into BioGro that are able to perform in a variety of PH conditions. E.g. at PH 5, species A will function for Nitrogen absorption, At PH 6, species B will perform the nitrogen absorption function because species A is now unable to perform. At PH 7, species C will perform.

The microbes in BioGro will cease to function at about 60C. Anything above 45C will severely degrade its performance. So, never use hot water when you mix or use BioGro. On the other side of the scale the microbes in BioGro will go into hibernation at 6C. So, when you use BioGro in winter expect little or no reaction.

Another requirement for the microbes to perform well is adequate moisture in the growing medium. Moist to the touch is sufficient for the microbes to perform.

Optimum temperature is anything from 16c to 40c.

BioGro is an Australian product that has been used very successfully in countries like Papua New Guinea, Indonesia, Myanmar, Cambodia, India, Germany and Nigeria. In these countries, BioGro has been used in conjunction with field expertise and advice provided to farmers, leading to better and more sustainable agricultural practices, increased crop yields and usage of natural ingredients to repel pests.

This is Bulbophyllum Elizabeth Ann 'Buckleberry'. It has flowered for me every year. Since February this year it has grown 3 new leaves. This may not be something unusual would it not be for the fact that it had already grown 4 leaves from August last year to December. With other words, it has grown 2 lots of leaves.



The old leaves are 20cm long while the new one 25cm long.



BioGro is also supposed to increase root growth, well it sure does. As can be seen on this *Bulbophyllum biflorum*.

If anybody is in need of any of the products I am using please let me know, I can advise the best place to purchase same or buy some on your behalf.