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Culture of Phragmipedium Hybrids by Leo Schordje

Phragmipedium Orchids (Phrags for short) are my favorite group of Slipper Orchids. There are some 20 or so species of Phragmipedium, which come from Central and South America. They form a distinct group within the Alliance of Slipper Orchids, distinct from the Asiatic Paphiopedilum (Paphs) and the north temperate Cypripedium (Cyps). I felt the need to write this because the older literature generally makes the mistake of lumping Phrags with Paphs in their discussions of cultural techniques. The Phragmipedium are very different in cultural requirements from the Paphs, and really need to be treated differently. I believe the Phragmipedium hybrids are the easiest group of Slipper Orchids to grow in the home. They grow a lot faster than Paphs and are much more forgiving of less than ideal conditions. Hybrid Phrags have great vigor, and when happy can grow incredibly fast and bloom year round. You can't ask for an easier group of orchids to grow. Phrag species are not generally difficult to grow, but I want to emphasize that the hybrids are even easier to grow. These culture tips are pointed more at letting you know what you can get away with while also pointing you toward the ideal cultural practices.

Light, Temperature and Air Movement: These three topics are interrelated. One influences the other.

Phragmipedium hybrids will grow at any light level, from the deep shade that ferns like, to the bright light that cacti prefer. They really do best somewhere between bright enough for a Cattleya and bright enough for a Vanda. In other words, half sun to three quarters sun, or 2500 to 7000 foot candles. They really should be thought of as sun loving plants. You can bloom them in bright shade without direct sun. From actual experience I can say Phrag hybrids will hang on and grow in fairly deep shade, but they will grow much more slowly. In low light new growth will tend to climb more, making repotting more difficult. In low light it may take 2 years or more to mature and bloom a growth and in low light the blooms may be less intensely colored. In bright light it may take less than a year to mature and bloom a growth and the blooms will have more intense color. One can successfully get away with growing Phrags in low light, but they definitely will perform better in brighter light. They do quite well under artificial lights, where longer day length can compensate for lower light intensities. I use 40 watt florescent shop light fixtures with an 18 hour day length all year long. There is no need to change day length with the season, Phrags are not sensitive to photoperiod.

Temperature and Air Movement Air movement and temperature interact with the topic of light in that you can give your plants much more light with good air movement or at cooler temperatures. The air movement cools the leaves and prevents burning, the more air movement you have the more sun the plants can tolerate. With more sun you will have more frequent blooming and better quality flowers. At 90F in direct sun and still air leaves will burn to a crisp in minutes. At 90F in direct sun with good air movement your plant will be fine. On really hot days, over 95 F, especially if there is a chance the breeze may stop due to weather or power failure, it would be best to put the plant in the shade. Phrags are very forgiving of extreme temperatures. They generally are intermediate growers, ideally 55 to 68 F at night and 10 to 25 degrees warmer in the day. They will tolerate nights down into the mid 40's, but they are not frost tolerant at all, so if you put your Phrags outside in summer, bring them in when night temps go to the middle 40's. Daytime temperatures into the low 100's are tolerated. Protect the plants from direct sun during the heat of the day if temperatures are above 98 F. There should be enough air movement at all times that the leaves are moving a little in the breeze. This will be enough to keep the leaves from cooking in the sun. I do know a Vanda grower who raises Phrag. besseae hybrids under his Vanda hybrids. His night temps never drop below 70 F. His coolers do not kick on until 95 F. He has a number of fans going at all times in the greenhouse. He gets good growth and blooming. Because he has good light, the color of his flowers is intense. Phragmipedium hybrids, even P. besseae hybrids do tolerate heat fairly well. It is true that cooler night temperatures will give better red color development in the flowers, but even in warm temperatures you can get good flowers. Air movement also helps dry water off the leaves and the crowns of the plants. This keeps fungi and bacterial diseases down. If the leaves and crowns of your plants are dry in less than 4 hours after watering the risk of fungi, water mold or bacteria getting a rot growing in your plant is greatly reduced. Air movement also keeps the roots healthier by getting air to penetrate into the potting mix. Most growers solve the air movement problem with fans that are usually left on 24 hours, 7 days a week. Windowsill growers might get away with doing nothing about air movement, as the household environment may be airy enough that this may not be a problem. **Trick:** Feel the leaves of your plant when the sun is bright. If the leaves are cool to the touch, you have enough air movement for the place where you are growing your plant. If they are warm to the touch you need more air movement. Also check to see if your leaves are dry within 4 hours of watering your plant. If they are dry, then you have enough air movement. If you need more air movement, a cheap \$10 clip on fan or a box fan from your local Lowes or Walmart may do the trick. Generally a cheap fan will last about 18 months, so I keep a stash of several fans stored in the attic, because most stores only stock fans in the summer. I stock up at the close out sales. As one fan wears out I simply replace it with a new one.

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Windowsill Growing. This is a little trick for windowsill growing. One of the problems of windowsill growing is that the sun beats directly on the pot the plant is in. Plastic pots in particular heat up in the sun. This can quickly cook your roots. Put the pot inside a larger clay pot that is deeper than the plastic pot the Phrag is growing in. The air space between the clay pot and the plastic pot will keep the roots cool. Don't put any potting mix in the air space between the two pots. The air space provides the insulation. Direct sun on a plastic pot can cook the roots in no time. The larger clay pot will shade the roots. If you are standing your Phrags in water, the clay pot will wick up water and provide additional evaporative cooling. If you like, you can use a wicker basket or other Jardinière will also provide the shade. This will keep the roots cool while allowing you to get some sun on the leaves.

Water & Water Quality. Phrags like to be wet,

Allot has been written about water quality, and these discussions often get very complicated very quickly. It is true that in the ideal world Phrags enjoy very pure water. If you are raising the species this can become important. Fortunately Phrag hybrids are very forgiving of water quality. Remember you can to some degree make up for poor water quality by keeping the plants wet. Water quality becomes an issue as you dry a plant out. The wetter you grow the less critical the water quality. The nattering nabobs of orchid punditry will tell you that black leaf tips are a sign that the water you are using is not pure enough. I will tell you that black leaf tips are a sign you let the plants get too dry between watering. Across the country, most municipal tap water is acceptable for raising hybrids. I would not worry about water quality if your other plants are not showing obvious signs of stress. Anything less than 1000 ppm total dissolved solids can be made to work for the Phrag hybrids. Phragmipedium species come from very wet environments such as the splash zones of waterfalls, stream banks, and the tropical equivalents of wet sedge meadows. The hybrids like to keep their roots moist to wet. The crown of the plant will be up on a grassy hummock with the roots running down into the water. Stick your finger into the potting mix up to the first knuckle, If your finger feels dry, you should have watered yesterday. Damp enough to still be dark colored, and cool to the touch is about as dry as you would want to let the Phrags get. In a bark mix I tend to water every 3rd day. In warmer weather (night temperatures above 55 F), you may if you like stand the Phrags in a tray of water about an inch deep. Change this water once a week to avoid a salt build up. Even though the Phrag may be standing in water, still water the plant at least once or twice a week. When you water, flush water through the pot, wetting all the media, again this is to avoid any salt build up. This way, even with water that has fairly high dissolved solids, you can keep salts from accumulating. When I was growing on windowsills, I would plunge the plants into a 5 gallon bucket of water up to the pot's rim to water them. This is not an ideal technique because there is a small risk of transmitting fungi, bacteria, or possibly virus from one plant to another, but it is something you can get away with in a small collection. I did this for many years until I was able to switch to using a hose to drench my plants.

Humidity. Phrags enjoy humidity when they get it. The hybrids will get by at any humidity above 35%. You get better root growth and flower development at 60% to 80% humidity, but you can do a nice job at lower humidity.

Potting Media. You can grow Phragmipedium orchids well in just about anything if you understand how to use the media. My recommendation is that you repot the Phrags into the same mix that you use for most of your orchids. That way you will know about how long it will take for the mix to begin to dry under your conditions. My personal favorite mix is a bark mix. I use a seedling size, 1/8 inch, for plants in 3 1/2 inch pots and smaller. I use a medium size (1/4 to 1/2 inch) bark mix for plants in larger pots. The key is to use a mix that holds water well and yet has good porosity for air movement to the roots. My mix is about 4 parts bark, 1 part charcoal, 1 part sponge rock, 1/2 part coarse vermiculite, for a total of 6 1/2 parts. I have also grown Phrags in straight New Zealand Sphagnum moss with excellent results. I believe Phrags will do well in what First Rays Orchids calls semi-hydroponic growing. I have never tried semi-hydro myself, but from what I have heard Phrags are well suited for it. Repot once a year, or sooner if the media breaks down. If the new growth climbs up above the mix, turn the plant on its side a bit as you repot so the base of the new growth is in the media. That way new roots will grow right into the mix. The new growth will straighten out after a while after doing this. The best time to repot is when you see new root buds developing on the base of the new growth, but any time you have time will work. Phrags grow year round and can be repotted at anytime.

A couple comments about pH of the potting medium. In general Phrags will tolerate a fairly wide range, though the best is between 6.0 and 7.0, with pH 6.5 being the ideal. This means the average bark based mix and long fiber New Zealand sphagnum are perfect. There are a couple exceptions.

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All members of the *Phrag caudatum* group do better in a somewhat coarser potting mix than the rest of the Phrags. They need good airmovement at the roots. I set my caudatums at the edge of the potting bench, right in the path of a fan, so they are always in a breeze. I still stand them in trays of water. I do not hold back on water, they need to be wet, but they really need air movement too. This includes *caudatum*, *extaminodium*, *warscewiczianum* (aka *popowii*, aka *humboldtii*), *wallisii* (now called *warscewiczianum* by RHS) and *lindenii*.

Phrag extaminodianum really prefers a more acidic mix, below 6.5 down to maybe 5.5. Add a little chunky Canadian peat moss. Not alot, but say maybe 10 % by volume to the mix. Make sure the mix is coarse enough to allow good air movement to the roots.

Phrag kovachii prefers a slightly alkaline mix, add a topdressing of oyster shell or use limestone chips (coarse limestone gravel) as part of the potting mix. I use a blend of fir bark, radiata pine bark, coconut husk chunks, charcoal, coarse sponge rock and top dress with oyster shell. I and many others have had very poor results with straight New Zealand sphagnum. Interestingly the hybrids with *kovachii* do not share this problem. I grow them in the same mix I use for all the rest of my Phrags and they do well.

Fertilizer. Phragmipedium prefer a dilute fertilizer solution applied fairly often. Use high nitrogen, low phosphorous fertilizer at about 1/2 teaspoon per gallon (about 75 ppm as N) every second or third watering, about twice a month more or less. You can fertilize continuously if you drop back to 1/4 (about 35 ppm as N) teaspoon per gallon every watering. This rate is dilute enough that there is no need for a clear water flush of the potting mix. Use the high nitrogen fertilizer year round. Do not switch to a high phosphorous "Blossom Booster" formulation in the fall as many articles in the older literature suggest. The recommendation for use of a high phosphorous "Blossom Booster" fertilizer was based on 18th & 19th century science for growing vegetables outdoors in an area with high amounts of acid rain, smog and coal soot. (London) The high phosphorous formulations may be harmful to your plants. This "Blossom Booster" urban legend actually comes from 1920's British gardening practices (which at the time were okay for vegetable gardens in London) and was not really scientifically tested for potted plants until the last decade or so. So stick to high nitrogen fertilizer, the brand of high nitrogen fertilizer is not very important, the plants can't read the labels. Nitrogen labeled for African Violets or Tomatoes is indistinguishable from nitrogen labeled for Orchids. Do use a fertilizer with trace elements, good ones are made by Green Care, Peter's, Dynagrow, Sterns, & others. The Michigan State University formula fertilizer seems to be excellent. The MSU product is a 13:1:13:7:2:2 respectively nitrogen, phosphorous, potassium, calcium, magnesium and sulfur. I realize I was trying to tell you what the minimum is you can get away with, but my trials with this fertilizer have been so good I thought I would tell you what I am actually doing, rather than what you can get away with. I have used Green Care's MSU formulation exclusively for the last ten years. Several companies make the MSU formula, and they usually will advertise it as such. One is Green Care, Kankakee, IL. Blackmore is another. If you see it give it a try. You can get reasonable results with just about any fertilizer on sale. If you are getting leaf tip burn on newer leaves you are either fertilizing too heavy or running your plants too dry between watering. More often than not, black leaf tips are due to lack of water, rather than excess fertilizer.

The 2013 revision to my fertilizer comments: use the **K-Lite** variation of the MSU formulation. This is the same MSU formula with the potassium (K) level lowered to a percentage more in line with what plants actually use. The 'regular' MSU Orchid fertilizer contains an excess of potassium for formulation reasons, potassium salts are extremely soluble, allowing one to make concentrated stock solutions for proportioners and other automated fertilizer dosing equipment. Greencare reformulated their MSU Orchid Special, to contain only 2% potassium, written as 1% K₂O, in order to make the K-Lite formulation as recommended by Richard Lockwood. One of the complaints about the old MSU was that at the higher dose rates, 'stalling' was observed. It turns out this was due to excess potassium. The new formulation has all the macro & micro nutrients of the old MSU formulation, plus, when using higher doses to get faster growth, you do not experience stalling, also do not get the red leaf edges that also indicated excess potassium. I am now promoting K-Lite as the finest fertilizer available. The performance is excellent.

Displaying your blooming Phrag. When in bloom and looking beautiful it is best to move the plant to the center of your dining room table, or other place of honor in your home where you can see it and enjoy it. A few days or weeks away from where you grow it won't hurt it. We grow them to enjoy them. Put your plant on display. It is tough, it will survive a spell on the coffee table in the living room. Don't be afraid to move your plant around. Enjoy the fruits of your labors.

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These are the basics of culture. Phrags really are easy to grow. A little water, sun and time and you will have flowers. For a different perspective I recommend another culture sheet, written by my friend Marilyn LeDoux. Her sheet will give you more tips on growing species to perfection. I respect her growing skills, she is a magnificent grower and has several cultural awards to her name. Please visit her website at:
<http://www.orchidmall.com/windy.hill/index.htm>