



St. Augustine Orchid Society

www.staugorchidsociety.org

Orchid Potting Media

by Sue Bottom, sbottom15@gmail.com



1. Many different materials can be used to pot orchids, either individually or blended into a mix.

There are no orchid pots dangling from trees in the wild. They naturally grow mounted to some surface where they get the amount of light, air, and water they need to thrive. Some people can mimic these situations and grow beautiful plants on orchid mounts. I have better results growing orchids in pots rather than mounts, so a lot of time is spent creating the 'perfect' potting mix. In addition to supporting the orchid in its pot, your potting mix has to do several things well:

- ✦ The mix should hold some moisture while being well drained and providing ample air around the roots
- ✦ The mix should hold and supply some nutrients, usually accomplished by having some organic material
- ✦ It should maintain its physical structure for two or more years

Orchid growers are always creating and recreating the potting mixes they use for their orchids. Some people use a purely inorganic mix while others use a purely organic mix. We use a blend of organic and inert substances in our mixes. These are the basic components used and why.



St. Augustine Orchid Society

www.staugorchidsociety.org

Orchid Potting Media

by Sue Bottom, sbottom15@gmail.com



2. Inert materials like lava rock, sponge rok, charcoal, clay pebbles and Styrofoam are used primarily for drainage, and the coarser the particle size the airier the mix.

Inert Materials used in orchid potting mixes include substances like charcoal, clay pebbles (Hydroton, Aliflor, LECA), lava rock, perlite/sponge rok and Styrofoam. They are sold in various grades and sizes. The coarser the material, the more pockets of air there will be around the roots. The basic purpose of the inert materials is to improve drainage in the pot.

- ★ Water Retention. These materials are not particularly water retentive so more frequently irrigations are required, although lava rock holds more water than the other materials.
- ★ Longevity. These inert materials tend to be stable over time. They don't contain biodegradable constituents so they will not decompose, compact and suffocate the roots. They often have large surface areas on which salts can be adsorbed so it is important to flush the excess salts from the pots once or twice a month, or by routinely watering and then watering a second time an hour later.
- ★ Acidity. These materials do not impart acidity or alkalinity.

There are many ways to use these inert materials, either alone or as a component in your potting mixes.

- ★ Charcoal can be used as a potting mix. Fine grades are often used in very small pots for Tolumnias, while large chunks can be used in pots or baskets for vandaceous orchids.



St. Augustine Orchid Society

www.staugorchidsociety.org

Orchid Potting Media

by Sue Bottom, sbottom15@gmail.com

- ✦ Lava rock can be used for many types of orchids, usually alone in the pot with a top dressing of cypress mulch or sphagnum moss for more moisture retention. You have to grade the lava rock as it is removed from the bag and use smaller pieces with seedlings and young plants and the larger chunks for larger plants.
- ✦ Clay pebbles are often used in semihydroponic culture for a wide variety of orchids. Outdoor growers often elect to use clay pebbles with no organic matter to prevent the mix from breaking down during extended rainy periods.
- ✦ Sponge rock is most commonly used as additive to potting mixes to open the mix and promote drainage.
- ✦ Styrofoam in the form of Styrofoam packing peanuts is often used for drainage in the bottom of the pot. The softer Styrofoam from packing materials can also be used this way, or it can be broken into smaller pieces and used as a component in your potting mix to promote drainage, as is often done in Australia.

Organic Components. While the inert components tend to have similar properties, the organic components often used in mixes are highly variable. The primary purpose of the organic material is to increase moisture and nutrient holding capacity. You have to balance the water holding ability of a mix with its aeration capacity to ensure the roots can breathe.

Tree Fern and Redwood Bark. There was a time when you could buy a tree fern and redwood bark potting mix that was perfect for those orchids that enjoy a coarse, freely draining mix that allows orchid roots to be bathed with air. It was resistant to degradation, so it would last 4 or 5 years in the pot before having to disturb the roots. The redwood bark imparted a little acidity so the root zone pH was in the slightly acidic range, best for nutrient uptake. Now redwood bark is simply not available, and the quality of the tree fern has declined to the point that you can find snow mold in pots less than 2 years after repotting.

Coco Husks. For several years we experimented with coco husk. We found we had to give it three 24 hour soakings to remove salts, let it dry and sift out the fines before blending into the potting mixes. It was not stable, breaking down after about 6 months so its use was discontinued. Sphagnum moss, bark and peat based Pro-Mix are the organic components of our potting mixes.

Bark. Bark, a waste product from the timber industry, became a popular orchid media when Osmunda fiber became rare. There are a variety of barks made from Monterrey pine (Orchiata, Kiwi Bark), Douglas fir (Rexius), Sequoia, etc. that undergo various levels of heat treatment, chemical addition and sorting. The current darling is Orchiata bark made from Monterrey Pine (*Pinus radiata*), which is supplemented with dolomite to stabilize the pH and provide calcium and magnesium. Bark tends to be difficult to wet at first, and you may see recommendations to presoak the bark. However, a newly repotted orchid requires less water while the root system recovers from the transplant shock. This initial period of dryness actually encourages the growth of new roots that are seeking out moisture. Keeping the root mass drier until the repotting wounds seal over also prevents water borne pathogens from entering the plant.

- ✦ **Water Retention.** After a few weeks, the bark will hold a little moisture around the roots. As the bark starts to slowly break down, it will begin to retain more and more moisture.



St. Augustine Orchid Society

www.staugorchidsociety.org

Orchid Potting Media

by Sue Bottom, sbottom15@gmail.com

until it ultimately becomes spongy at which point the roots are at risk of becoming sodden.

- ✦ Longevity. Most barks will resist degradation for at least 18 to 24 months. Fred Clarke says his Kiwi bark lasts for 3 to 4 years under his growing conditions.
- ✦ Acidity. Bark has a natural pH in the 4 to 5 range, unless it has been treated with lime or dolomite. Growers with a pure water source having little buffering capacity report the bark can become very acidic after 6 months or so, and they have to top dress with dolomite periodically. Irrigation water high in alkalinity will normally prevent the mix from becoming too acidic.

Some orchid growers have had success growing in a pure bark mixture, but I am not among their ranks. Bark is usually about 30% of the SAOS coarse mix used to grow cattleyas, dendrobiums, etc. The other 70% is clay pebbles, sponge rock and charcoal. This mix is very open and freely draining so the environment around the roots is airy. The bark helps retain some moisture, and being a serial overwaterer, the plants get plenty of water and nutrients. For those that water less frequently, more bark or perhaps some shredded sphagnum moss would increase the mix's water holding capacity.



3. Only buy the long fibered New Zealand sphagnum moss, preferably the Premier or AAA grade like the one in the pot to the left. The others are a poor substitute.

Sphagnum Moss. There is only one kind of sphagnum moss you should ever consider buying or using for your orchids, and that is long fibered New Zealand sphagnum moss. If it does not say those magic words, do not buy it. Besgrow is the largest purveyor of this high-grade sphagnum moss. Unless you are doing Japanese Fukuran, search for the Premier Besgrow moss (AAA grade), rather than the more widely available and minimally acceptable Classic Besgrow moss (AA grade). Fluff the compressed moss and wet it before repotting.



St. Augustine Orchid Society

www.staugorchidsociety.org

Orchid Potting Media

by Sue Bottom, sbottom15@gmail.com

- ✦ Water Retention. Sphagnum moss is very water retentive. If packed loosely, it will hold more water than when it is tightly packed.
- ✦ Longevity. The higher the quality of the moss and the purer the water, the longer the life of the moss, typically 2 to 4 years for AAA moss.
- ✦ Acidity. Sphagnum moss tends to be very acidic, with a pH between 3 and 4. This makes the material a natural antifungal/antibacterial agent because many of the organisms harmful to orchids cannot grow in this pH. If your water is hard with a high alkalinity, the liming effect from the dissolved bicarbonates in the water will cause the pH to rise closer to the neutral range over time.

Sphagnum moss has good moisture and nutrient availability encouraging good plant growth. Watering does not have to be as frequent because the moss does not dry out quickly. Lower fertilization rates may be used because the moss retains nutrients. Long fibered New Zealand Sphagnum Moss is an ideal potting material in certain situations and for certain types of orchids.

- ✦ Deflasking Seedlings. Seedlings out of the flask are exposed to the big harsh world for the first time. Being wrapped in a small bundle of moss and placed in a thumb pot or plug tray will help provide moisture to the plants and give some disease protection to the tender plantlets.
- ✦ Compromised Root Systems. Orchids with a damaged root system cannot take up moisture and are at risk of dehydration. Wrapping the plant in sphagnum moss and placing it in a small pot will encourage new root growth and keep the plant hydrated.
- ✦ Catasetums and Other Winter Dormant Orchids. The winter dormant orchids have to do all their growing in a 7 or 8 month growing period, so they typically require copious amounts of water and fertilizer. Sphagnum is ideally suited for this purpose because of its water and nutrient holding capacities.
- ✦ Phalaenopsis. The majority of the phalaenopsis offered in commerce are grown in sphagnum moss. Phal roots in sphagnum can be very fat and happy, as long as they are watered only as they approach dryness.
- ✦ Smaller Pots. Sphagnum moss seems to work best when used with smaller pots, typically those 4 inches in diameter and less, rarely used with pots having a diameter greater than 6 inches.
- ✦ Top Dressing. A top dressing with sphagnum moss after repotting is a great way to provide a little extra moisture for the new tender roots as well as protect the roots from chewing insects.

Pro-Mix. Peat based soilless mixtures like Pro-Mix are a blend of chunky peat moss and perlite. Pro-Mix HP is a high porosity peat-based growing medium that has high air capacity and extra drainage. Some blends contain beneficial mycorrhizal inoculum (*Glomus intraradices*) and/or biofungicide (*Bacillus pumilus* - strain GHA-180). When dry, Pro-Mix is difficult to wet properly, but with several waterings, it can hold large amounts of water. For those looking for an alternative to growing phals in sphagnum moss, Pro-Mix is a good choice. It is water retentive, but not as water retentive as sphagnum moss so the potential danger of overwatering is lessened. Roots adapted to sphagnum moss can transition easily

to a Pro-Mix blend. We create a custom blend of half Pro-Mix and half coarse sponge rok to improve aeration and drainage. Water as the Pro-Mix approaches dryness. Top dressing with sphagnum moss or cypress mulch will help prevent its tendency to wash out of the pot.



4. Pro-Mix HP is blended 50/50 with coarse sponge rok to make a potting mix suitable for phals, zygos and plenty of your house plants.

- ✦ **Water Retention.** Pro-Mix is initially hydrophobic, but has a large water holding capacity after it is wetted. It can be difficult to flush, with a high potential for accumulating salts, so regular flushing of the pot is recommended.
- ✦ **Longevity.** The Pro-Mix should last for several years in the pot. Most likely the phal will be top heavy and ready for a new pot by the time the Pro-Mix is spent.
- ✦ **Acidity.** The manufacturer adjusts to a pH of about 5.7, after which the combination of your water and fertilize will determine the pH.

Cypress Mulch. Cypress mulch is enjoying a renaissance. Some commercial and hobby growers have enjoyed great success while others have found the material rots in about 6 months. The most likely explanation is the people that have success with cypress mulch have secured a high quality, consistent cypress mulch. My experience is limited to using cypress mulch in containers holding the terete vandias. They grow well, but must be repotted annually because the cypress mulch is fully degraded in a year.



St. Augustine Orchid Society

www.staugorchidsociety.org

Orchid Potting Media

by Sue Bottom, sbottom15@gmail.com

In "At the Root of Growing Healthy Orchids." Xavier Garreau de Loubresse compares the roots of phalaenopsis grown in different media, comparing one in coarse charcoal to one in Sphagnum moss:

As an example, charcoal does not retain water well, therefore irrigation will need to be more frequent to provide both water and nutrients to the roots. The plant may end up producing more roots to provide a higher amount of surface area on which to absorb water and nutrients required. Both the leaves and the roots will become tougher which helps prevent water loss. Phalaenopsis will also grow tougher aerial roots in other potting types too, these roots allow the plant to survive well and cope with extremely dry conditions. However, under stress the plant will not grow to its optimum. Many growers also believe that charcoal can 'freshen' the medium but it has been shown that over time charcoal may absorb salts and water impurities. This may have a detrimental effect on plant growth after six months.

For plants grown in Sphagnum moss and rockwool where there is good moisture and nutrient availability, the roots do not have to go far in search of water. The roots will be softer and able to take up nutrients and water more easily as it becomes available. The roots will not require fat 'skin layers', technically known as 'velamen' as the water is constantly available. Overall growth will be fast and the plant is likely to produce fewer roots in a 'lazy' manner. Irrigation will not need to be as frequent as the medium does not dry out as quickly. However these roots are not protected from dry conditions as they are soft so the plant must never dry out or the roots will shrivel. Plants such as this are not able to withstand small amounts of stress e.g. in the orchid growing industry these plants may not transport well and not last as well if not looked after properly by the consumer.

Root health is the ultimate test of how well your mix performs. Media that is fresh in the pot may encourage glorious root growth initially, but its characteristics can change over time depending on salt accumulation, organic material degradation, pathogen growth, etc. If your orchid looks like it is taking a turn for the worse, knock it out of the pot and inspect the roots. Then you can make an informed decision on whether it needs to be repotted, put into a different kind of mix or some other aspect of your orchid culture modified.

Citations and Additional Reading

Garreau de Loubresse X. Orchid Growing Substrates, 2012. Select Orchids. (Part of a presentation given by Xavier Garreau de Loubresse at the Australian Orchid Conference Perth 2012)
Accessed online 5/3/19: <https://www.yumpu.com/en/document/view/24938725/orchid-growing-substrates/31>

Garreau de Loubresse X. At the Root of Growing Healthy Orchids.

Accessed online 5/3/2019:

<http://www.mekealohaorchids.com/orchiata/At%20the%20Root%20of%20Growing%20Healthy%20Orchids.pdf>



St. Augustine Orchid Society

www.staugorchidsociety.org

Orchid Potting Media

by Sue Bottom, sbottom15@gmail.com

Sheehan, T.J.. Orchid Potting Mixes – An Abridged Historical View. In *Orchid Biology: Reviews and Perspectives*, Vol. VII, eds. J. Arditti. and A.M. Pridgeon Cornell University Press, Ithaca, New York, pp. 317-362.

Accessed online 5/3/19: <https://link.springer.com/content/pdf/bbm%3A978-94-017-2498-2%2F1.pdf>