Is There a Perfect Orchid Mix?

Text and pictures by Wayne Roberts

AT A SHOW in Pittsburgh, Sandra Tillisch Svoboda, now past AOS president, suggested that I write an article on the perfect orchid mix. I have been making and selling potting mix for over 25 years, as well as receiving customer feedback and plants brought to me for repotting advice. This idea has been intriguing to me as I ponder the idea of making a perfect mix for a particular type of orchid, growing under specific conditions in a particular part of the country and factoring in water quality. There is no one complete answer.

The rule of thumb I use is that most orchids grow "on" things, not "in" things. I have seen orchids growing on dozens of things from chunky peat and bark to ground up tires and foam rubber to volcanic rock and rockwool. All of these growing media require different conditions and each tolerates water quality differently.

When deciding what mix to use, first look at the orchids you want to grow. Many plants will grow well in one or two mixes depending on the size of the plant. Small plants, seedlings and thinner-rooted plants need a finer mix and larger plants and thicker-rooted plants need a coarser mix. The next concern is how often do you want to or need to water? Some orchids want to dry out somewhat, others need to dry out completely and some want to be wet all the time, so choose your mix accordingly.

Do not forget you can water some plants individually more than once a week, if needed. If you put your plants outside during part of the year, how often are they going to get water? Unusually wet or dry conditions will alter your watering frequency.

The first thing to decide is what potting material you are going to use. For this article, I will consider some of the historical, major and newer materials. The earliest listing of a growing medium I have found from the 1800s listed chunky peat, which is still used today. It holds water well, making it more popular in dry areas. However, it changes pH over time so it does need monitoring. One of the best oncidium growers I know still uses a peat-based mix.

Superseding chunky peat until the 1960s, osmunda and tree fern were the main potting media. Osmunda is the root of the osmunda fern, and is a more difficult material to work with in potting, but it lasted well and was one of the few media that had natural fertilizer released by the slow decomposition of the medium. If it were not for the exotic snakes that people have released into the southern swamps, making it dangerous to harvest, many would still be using it. Presently I am testing hapu'u (an Hawaiian tree fern) as a replacement.

Tree fern chunks and fiber work well but require frequent watering. Their reduction in use came about due to the introduction of fir bark in the 1960s and many wild tree fern plants were decimated by overharvesting, placing it on the

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[1] Chunky peat, although less common now, has been in use since the 1890s.

[2] Medium fir bark is the staple in most potting mixes for mature plants.

[3] This mixture of medium grade fir bark, charcoal and Perlite makes a good medium for larger plants.

[4] Differing only is the size of the components, this mix of smaller grade fir bark, charcoal and Perlite would be good for smaller plants in pots up to about 5 inches (12.5-cm) in diameter.

[5] Aliflor, or similar material made from expanded clay, makes a good potting mix in very wet, humid conditions.

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endangered species list in some countries. Supplies have been unreliable so I do not recommend this medium now.

Fir bark presented an advantage over other barks. First, it was readily available with large numbers of trees being cut down. It held up well in the pot without quickly decomposing and, unlike a lot of other barks, did not contain pitch that suffocated the roots.

The George Off mix also introduced combination of fir bark with other materials, making it a true mix; many other mixes followed. Additives like charcoal and sponge rock (extra-coarse Perlite) were used extensively to make a good general purpose mix that is widely used today. Today, some bark mixes contain many other additives.

Fir bark is an easy to use material lasting one to three years in the pot. It is still one of the most widely used potting materials. Its quality varies by supplier and type of fir tree. Douglas fir remains the best quality, but is not really more readily available than white fir from California and red fir from Oregon, Washington and Idaho.

A mix of eight parts fir bark and one part each of charcoal and sponge rock is still the most used mix. Fir bark uses up nitrogen as it decomposes so higher nitrogen fertilizers are recommended by some, and if fir bark is allowed to become too dry too long, it may be difficult to rewet. Stay away from fir bark full of wood shreds as it decays quickly and causes problems.

In the 1970s and 1980s, as good quality fir bark became less readily available, other materials were also used. Sphagnum moss is still widely used, especially for phalaenopsis, bulbophyllums and other moisture loving genera. It must be clean and long-fibered. It does not dry evenly so it is hard to learn how to water plants potted in it. I tell people they can learn best how often to water in sphagnum moss by picking up the pot to feel its weight. If you can learn how to water plants potted in sphagnum moss, the results are some of the best and it is definitely one of the best for phalaenopsis.

Aliflor (an expanded clay medium) also arrived on the scene about this time and was used as a hydroponic-type growing medium. The clay pellets were originally developed as a cement additive, but we orchid growers will use anything that works. Many home growers like it for ease of watering but for shows and commercial growers, it has not worked well due to its weight and, if the pot is knocked

over, the medium rolls out. Despite these drawbacks, one major advantage is that it can be sterilized and reused, much like clay pots. I also like to use it in the bottom of pots for drainage, as Styrofoam peanuts used by many others seem to make good bug homes for me, as I tend to grow with limited pesticides. They can hollow out protective caves in the peanuts to hide from the spray.

Less commonly encountered media include rockwool (a man-made spun mineral fiber originally developed as an alternative to spun glass house insulation). Rockwool comes in two grades, a water-retentive and a hydrophobic grade; the two are mixed to produce the final orchid potting medium. Watering frequency is determined by the amount of the water-retentive grade incorporated in the final mix. Rockwool has been used heavily in Europe but not much here. Watering can be reduced to two times a month with the right mix. Another medium used in limited areas is volcanic rock. It works well in Hawaii and wet areas of Florida. Like Aliflor, it does not break down but needs watering almost daily. Foam rubber chunks also seems like an odd medium but I have seen a lot of orchid plugs grown in it. Like many specialty mixes, it is probably not suitable for the casual home grower.

Some failed items at this time are cork nuggets (ground cork) and crumb rubber (ground up rubber tires). In theory both should work but in actuality, they are difficult at best. Cork nuggets, especially in the southern United States, are susceptible to an insect that turns the ground cork to mush, along with the roots of your plants, seemingly overnight. Crumb rubber worked if the original tires were cured properly; if not, it could kill plants. Still, in the spring of 2014, I saw a plant awarded in Cincinnati that was growing in cut-up rubber pieces that I think the grower cut up himself.

In the 1990s more media appeared, namely coconut husk chips (CHC), coir (coconut dust), coconut fiber and diatomite. Coconut husk chips come, as the name implies, from the outside husk of a coconut, a pure byproduct that is considered eco-friendly. The process of removing the coconut from the husk involves soaking the nut in water to crack the outer husk. The first CHC products in the marketplace were variable, because some used sea water in the cracking process, greatly increasing the salt content of the husk chips. Using CHC, either alone or as an additive, required extending soaking and flushing to remove the salt. This has been corrected by good suppliers and CHC is now used as a direct replacement for fir bark in many mixes. It has the advantage in that it does not consume much nitrogen during decomposition, lasts longer, rewets easily and holds more water. The last is a double-edged sword. If you water the same as bark, you will be watering too much and may rot the roots. It lasts about 50 percent longer than fir bark. If you learn to water correctly, it works well with the added advantage of being lighter than bark and thus less costly to ship. The best dendrobium grower I know uses coconut-based products and a major paphiopedilum grower highlighted it on their web page.

Coir (coconut dust) has for many been very good for plants that need even moisture all the time and great for many seedlings out of flask. I like growing bulbophyllums and masdevallias in it. If you are unsure whether a given orchid is an epiphyte or a terrestrial, coir is very good

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[6] Hardwood charcoal chips are often added to orchid potting mixes to help remove metabolic byproducts and extend the life of the medium. It is often used without additives for vandas in baskets.

[7] Coconut husk chips, rinsed and free of salt, are used by many growers, with or without other added materials, for potting a wide range of orchid genera.

[8] Coir, also a byproduct of coconut processing, is used by many as a peat substitute.

[9] Perlite of various grades is used by many as an additive in potting mixes to increase drainage while at the same time providing increased water retention.

[10] Long-fiber sphagnum moss can be used as a potting additive to increase water retention or used alone. When used alone, care must be given not to overwater or overfertilize.

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option. After talking to a Brazilian speaker on rupicolous laelias (now classified as cattleyas), I am trying it on some of the smaller species with promising results.

Diatomite is a sedimentary rock composed of the skeletal remains of diatoms coming from fossilized freshwater lake areas. It was a real hit for phragmipediums and similar plants that could stand in water, as it does not decay. However, I have been told the main product of the mine was opals and when opals ran out, the mine was not profitable for diatomite only, so it shut down. Aussie Gold, a blend of diatomite and coir, was used by many. If you liked Aussie Gold, coir and large Perlite works similarly.

New Zealand bark appeared on the market around 2000, with two companies producing it with the brand names Orchiata and Kiwi. These products are pine bark that is chemically treated. Orchiata is also aged prior to use. Claims of five-year pot life have been made but most well-grown plants outgrow the pot before this time so it is difficult to substantiate the claim. Among the chemicals used to treat the bark are fertilizers and lime. Because of this, newly potted plants appear to get a big boost. These products are more expensive than other potting materials and somewhat heavier to ship. Most growers using them do so straight (with no other additives) or with simply adding Perlite. Many growers have switched to New Zealand bark and like it, especially those that tend to overwater, as the mixes hold less water. I have been told by some growers that plants such as phragmipediums, some paphiopedilums and others that are sensitive to salts in the potting mix may not do well, but I know of a great complex hybrid paphiopedilum grower who loves it. Perhaps the problem either lies more with learning the ins and outs of the medium or that these types of paphiopedilums aren't as sensitive as others. After a year or two, as the medium ages, the pH may need monitoring.

Growstone is a new eco-friendly material made from recycled glass that was originally pushed as a substitute for Perlite. It compares to diatomite well. I provided samples to several growers with good results but, with only a little over a year in practical use, more time is needed to evaluate its benefits.

Fleximix is another recent introduction. It is a mix of foam rubber chunks and peat that holds water very well. I know several people who love it but have had plants in it only for a few months, I can only relate the experience of others.

Additives like hardwood charcoal,

Snow Mold

Snow mold grows on the potting medium and envelops the roots so they are cut off from water and air. Repot affected plants and destroy all mold and potting medium. Immerse the pot half way in Physan at 1.5 teaspoon (7.4 ml) per gallon (3.785 L). Repeat if necessary.

An Adequate Leach

Six inches (15 cm) of water will leach 50% of the built-up salts in potting medium. When watering with water with high total dissolved salts (TDS) or in pots that show tell-tale white salt deposits around the rim and on the bottom of the pot, do not allow them to dry out completely.

[11] Aged New Zealand pine bark (medium grade on the left and fine grade on the right) is becoming increasingly popular as a potting medium.

sponge rock, limestone, oyster shell and forest humus, to name a few, should also be mentioned here. Hardwood charcoal (*not* charcoal briquettes used for cooking — they are made from coal dust!) increases some aeration but also helps remove some impurities from the water. Sponge rock or extra-coarse Perlite lightens the mix and adds much needed air to the roots. Oyster shell helps the mix from becoming too acidic as the mix ages.

In summary, no potting mix is going to be perfect for all orchids all the time and some plants simply have to be mounted. How often you water affects the mix greatly, as do your other growing conditions. The most popular mix in Texas is different from that in Ohio or Hawaii. What works well for a greenhouse grower may not work for a windowsill grower. The information above will hopefully help you determine from your water quality and schedule what will work for you. Do not change everything at once, in case the mix turns out to be a poor choice for your conditions. You are the best judge of what medium works well for your unique situation (if it's not broken, don't fix it!). — *Wayne Roberts, Roberts Flower Supply, Columbia Station, Ohio. Wayne and his wife Nancy have been growing orchids for over 40 years, buying three plants on their Florida honeymoon at The Orchid Jungle, and still have one of them (*Miltonia spectabilis.*) (email rfs@orchidmix.com).*

Potting Recipes

Frank Fordyce's Regular Cattleya Mix (Fall 1999)
1 part lava rock
1 part No. 3 perlite
4 parts fine fir bark, No. 4 screen

Paolo D'candia's cymbidium mix
10 gallons (37.9 L) small fir bark
5 gallons (18.9 L) medium fir bark
2 gallons (7.6 L) Canadian peat moss
1 gallon (3.8 L) No. 3 perlite
1/2 gallon (1.9 L) silver sand water to dampen

Texas A&M Medium — Dr. Wang's Mud
Equal parts of:
Horticultural charcoal
No. 2 or No. 3 perlite
Peat-lite medium (such as Metro Mix 700)
(or chunky Canadian peat moss)
Consider adding:
Superphosphate
Powdered limestone
Micronutrients
Wetting agent

Steve Gettel's Paper Pot Method:
2/3 coarse blond peat moss
1/3 No. 3 perlite
To form a light airy potting mix.
Note: This is not mud! Use ONLY with the third part of the method: Paper pots!
See: *Orchid Digest* 61(1).