Beginner's Series — Part 2
Media Mania Revisited

By judywhite

An assortment of potting media. From top right: tree fern, lava rock, Aliflor, sphagnum moss, osmunda and rockwool.

Potting materials. These two words can strike terror into a beginning orchidist's heart. Back in those scary days, I hadn't the faintest idea what a potting material was, much less what it was supposed to do. The first orchid plant I bought was growing in what looked like bits of wood; the second was potted in what looked like thin black sticks; the third pot was filled with rocks and charcoal; the fourth had.. .well, you get the picture. As Roseann Roseannadanna would have said, "What is this stuff?!" Fear in turn produced paranoia; I became convinced that everyone was using something different just to drive me crazy. I didn't know then that all these different potting materials were the result of a terrible disease plaguing orchidists everywhere. For all this stuff, you see, is the result of (gasp) Media Mania.

If you can identify at least three of the potting ingredients in the picture above, you, too, are a victim of Media Mania — the endless quest

to find the perfect potting material for your orchids. Orchidists will try virtually anything — or any combination of virtually anything — that seems likely to make their precious plants grow and bloom better. Media Mania was first described in the May 1986 AOS Bulletin ("Media Mania: Surveying the Mixed-up World of Orchid Potting Materials"), but the understanding of orchid potting materials is an ongoing process against a plague of rampant proportions. It makes sense, therefore, to attack it again in the light of new fads, fashions and scientific information that have surfaced in the almost five years since that survey was conducted. A look at potting materials is also perfect for this article, the second in "The-Stuff-They-Never-Tell-You" Series. Part I gave us endless information about pots, and Part II will give us seemingly endless information about what to fill those pots with.

What exactly is a potting material, anyway? At its very basic, a potting material is simply a way to get an orchid plant to stand upright in a pot so that we can grow it in the house (or greenhouse, if we're lucky). That's all we're really talking about here — a support system.

So why are there so many different potting materials? All these seemingly endless media are simply refinements on a couple of themes that are also important. The two things a potting material must do after giving an orchid support in a pot is to 1) allow plenty of air to the roots, and 2) allow water to run past the roots freely rather than letting it stand around them so they suffocate and rot, while still retaining enough moisture for the plant's needs. Remember, no orchid of its own volition would grow in a pot, for a pot is a much stuffier environment than on the side of a tree where orchid roots can wave lazily in the air. Notice that the key to understanding what orchids want is to realize they generally grow on things in nature, rather than in them. Sophisticated growers with excellent humidity available often grow orchids on slabs rather than in pots, but usually this is too difficult for a beginner to achieve with success. I know I've murdered my share of mounted orchids.

Because of their physical makeup, different potting materials give different amounts of drainage and air movement. For example, some absorb water at astonishing rates, while others don't hold any moisture at all. So orchidists fiddle with their mixes trying endlessly to arrive at a (sorry) happy medium. Such a happy medium would take into account the entire environment around the roots — the amount of humidity in the room, the light, amount of watering likely, type of orchid, even the material of the pot. As we've said before, first

Fine Charcoal

and foremost we are trying to grow roots. If you can learn to concentrate on getting the orchid to produce good healthy roots, you are probably 90% of the way to growing good orchids in general. If all this is already beginning to sound overwhelming, don't panic, for there are easy potting materials that make good general basic media for growing orchids (fir bark is a prime example) and that can be used without too much need for sophisticated potting material background. But understanding the different ingredients can help in fine-tuning a mix, as well as in allaying some of the fear generated by the beginner's panicky need for knowledge.

There are some basic rules of thumb that go with potting materials. The thickness of the plant's roots is a major guide in choosing what kind — or rather, what size — of potting material to use. As a general rule, the thicker the root, the larger the particle size of potting material. For example, the orchid growers at the Eric Young Orchid Foundation in England recommend using potting materials in the following manner: For seedlings (very young plants with correspondingly thin young roots) and orchids having roots that remain thin no matter how big the plants get (such as Miltoniopsis), use 1/4" diameter ("seedling-grade") particle sizes. For medium-sized plants (which make up the vast majority), select 1/2" ("medium-grade") particles. Large orchids (such as mature cattleyas) get 3/4"-sized ("coarse" or "large") potting materials. Places that sell orchid supplies will often conveniently label potting materials according to size, usually as "seedling" or "fine," "medium" and "coarse." Even with those designations, however, most materials will still have debris and/or other sizes mixed in; a sieve can help sort out sizes and miscellaneous stuff that might clog the medium. Soaking new material overnight in a bucket of warm water also helps debris to rise to the surface. Soaking

new medium overnight is a good idea in general, because many potting materials (especially bark) are processed in some way that excessively dries them out, and soaking makes them better able to take up water at first use. New potting mix can be so dry that it can almost work like a desiccant in the pot, actually extracting water from the plant's roots if it has not been soaked before use.

Probably the easiest way to divide potting materials into categories is by whether they are "organic" materials or "inorganic" ones. It's tempting to leap to somewhat snobby conclusions and say, "Well, organic must be best," without really knowing why, because, frankly, the word "organic" has become a meaningless catch phrase. Organic simply means the potting material originates from something living, whether it be a tree, a fern, a moss — usually some sort of plant — versus being made of materials like rocks or minerals, perhaps even (horrors) man-made. Actually, some inorganic materials, even some man-made ones, are not necessarily "bad" things for potting orchids; some are actually excellent.

Classifying potting materials as organic or inorganic does several informative things for an orchidist. Because they were once (or still are, in some cases) living things, organic potting materials break down and deteriorate. In the process they release minor nutrients to the plant — minerals, trace elements — aiding in plant nutrition. Inorganic materials, such as rocks, Styrofoam and perlite, usually don't deteriorate and don't release anything of nutritional value to the plant. This means that any orchid potted in an inorganic material must be supplied by you with all the nutrients necessary for their needs, requiring a full, balanced fertilizer with trace elements and other minor minerals. If you tend to neglect plants, perhaps an organic material might be better. But the fact that inorganics don't deteriorate is also a bonus in a potting mix because materials that don't break down into little bits will keep the mix open, airy and well-drained. Most organic materials deteriorate over time, and roots that stay too long in an organic mix have ultimate danger of root rot as the pieces of mix get smaller and smaller, closing out air and holding too much water. Obviously, there are trade-offs between organic and inorganic. Often the solution is to add inorganic materials to an otherwise organic mix — perlite to fir bark, for instance — to get the best of both worlds.

There is an unusual aspect to the breakdown of bark in a potting mix that should be explained. Bark is the reason orchidists suggest using fertilizers with a 30-10-10 ratio of nitrogen-phosphorus-potassium. Bark deteriorates over time because a common wood-

Perlite

eating fungus breaks it down, and this fungus also devours an aston ishing amount of nitrogen. Orchids normally like a balanced fertilizer ratio, such as 20-20-20, so the extra nitrogen in a 30-10-10 ratio is simply to feed this fungus, which otherwise will rob the nitrogen it needs from the orchid plant itself. Many people tend to think a 30-10-10 ratio of fertilizer is necessary for orchids whatever they're potted in, which is totally wrong. It's just for orchids in bark.

Getting back to the organic versus inorganic materials: Another fact to consider is that organic materials used for potting orchids often come to us via destruction of the living plant from which they originate. Tropical tree ferns, for example, are totally cut down to harvest the hard aerial rootlets around their trunks. Osmunda ferns are ripped up and destroyed to get their roots. And a dwindling natural resource of sequoia trees is relentlessly lumbered, with redwood bark a byproduct of that destruction. On the other hand, some inorganic materials — Styro-foam and some plastics are a prime example — not only deplete our energy sources in their manufacture, but then are ridiculously difficult to eradicate once created, causing ozone, landfill and incinerator problems. It helps to recognize the problems inherent with each material, as well as its benefits, and choose accordingly.

Organic materials available for orchid potting include barks, tree fern, sphagnum moss, peat moss, osmunda, cork, coconut fiber, Styrofoam, sugar cane, charcoal. Inorganic, naturally occurring materials include gravel rock and volcanic lava rock. Inorganic, man-made (or man-manipulated) materials include Rockwool, expanded shale or clay. Oasis, perlite and vermiculite.

Fads and fashions are ever present in our society and are no less apparent in the world of orchid growing. Lately New Zealand sphag-

num moss and the increasingly popular Rockwool have been leading the fashion crest, both remarkably similar in properties even though one is a living plant and the other a synthetic material. But fads create controversies as people sort out the truths from the rumors and the unknowns. Sphagnum moss has proved itself an excellent medium, but can harbor a fungus that poses a potential chronic infection to humans through cuts in the skin, and possibly hosts other pathogens that can enter our systems through inhalation, especially dangerous to people with diabetes, on steroids, or with other immunosuppressing conditions. These dangers reinforce the need for wise practice of using rubber gloves and a face mask when using most potting materials, even something seemingly innocuous like bark, which can have irritating dusts and molds mixed in during manufacture, not to mention splinters.

But for the past 40 years, despite the fads, the reigning king of potting materials has been fir bark. Since the majority of commercial growers in this country use bark as their main potting material, chances are six out of 10 that any plant you buy will arrive in a pot filled with bark chips. Why is it so popular? Several reasons are immediately apparent.

Fir bark is relatively inexpensive, drains inordinately well, is easy to use and fairly easy to obtain, since it comes from firs found in many places in this country. An organic material, bark probably simulates the surface area of a tree more closely than anything else you might put into a pot. And until something comes along to topple fir bark from its throne, there it will stay as the most popular orchid potting material.

For specifics on the differing potting ingredients themselves, take a look at the rundown list of common potting materials and make some choices to suit your own environment, or even faster, check the "Quick Guide to Using Potting Materials" for thumbnail help. Remember it is not really necessary to make a mix of ingredients; many growers choose a basic main ingredient and just stick with that alone. Medium fir bark is a quite standard potting material all by itself, particularly in a plastic pot. But as one commercial grower observed in response to the potting survey, making a mix of potting materials is very much like spaghetti sauce recipes: everybody's got a different blend of favorite ingredients. Mixes will always remain intriguing; the combinations seemingly endless, the results always a tad different.

Peatmoss

For the truly amazing list of different potting mix combinations, see The Orchid Doctor: Remedies, Recipes, Recommendations and Referrals, compiled and published by Robert M. Hamilton.

If you don't like mixing up media yourself, or are worried about proportions, orchid supply houses often offer up to a dozen premixed media types, using any combination of fir bark, tree fern, redwood, Perlite, cork, sphagnum moss, expanded shale, charcoal, lava rock, vermiculite, sugar cane, gravel rock, depending on what they ve found useful and popular. As mentioned before, whatever combination you may end up with, soak it first to help it break that initial water barrier, then drain it. Always stir the mix up before using it, for the various ingredients will settle differently over time, depending on weight and volume.

One way to make life a bit easier as an orchid grower is to try to use basically the same mix for the vast majority of your orchids. This will make watering infinitely simpler, for one thing, because that same mix will tend to dry out at the same rate in the same-sized pots. If you are seized with a mad desire to try an amazing new product that someone at the orchid society has simply raved about for his own orchids, realize you are an easy prey for an attack of Media Mania. Resist that overwhelming urge to repot everything you've got into it. I probably should repeat that, or maybe put it in Capital Letters. Too many collections have been murdered by such mass migrations into something that worked for someone else's conditions. Experiment gently; offer up but a few victims at a time to the new mix god, then assess the results after at least six months, preferably a full year, experiencing all four seasons. Even then your experience may not be complete. It's a great temptation to want to reuse potting materials when repotting orchids. If the material is still in good shape, it can be

reused with no problem for the same plant in a different pot. But never transfer a used potting material from one plant to a pot of another orchid. This is one sure way to transfer possible viruses and other pathogens from one plant to another. Most materials are best disposed of in some way rather than reused.

I personally resign all used potting materials to the garbage or the compost heap or as mulch, but if you insist on reuse, it is possible to sanitize potting materials by steaming or heating or other methods of decontamination, but such sterilizing usually works best on inorganic materials rather than organic ones (don't heat plastics or Styrofoam, however). Heating materials to 160 degrees F and holding them at that temperature for 30 minutes will kill most plant viruses and pathogenic bacteria. Try not to overheat organic media, for heating above 160 degrees can release dissolved salts that can be toxic to plants. Research has also shown that overheating of organic mixes, particularly by microwaving, can change pH, cation exchange capacity and mineral content; use a temperature probe. By the way, boiling water poured over the mix will not sterilize it, but it will kill many microorganisms.

Most orchids grow naturally in a somewhat acidic environment, one in which the pH is below 7.0, and some growers may like to measure the pH of their own particular blend of ingredients. Media pH can be determined using plastic strips with pH-sensitive dyes (ColorpHast brand, made by MCB Reagents, 480 Democrat Road, Gibbstown, NJ 08027, often found at drugstores, works well), and the results are close to what you'd get using an expensive pH meter. Use distilled water to make the readings. Those $25 pH meters with two metal wires sticking out from the bottom (probe-type) have been tested at the University of Maryland recently and found to be extremely inaccurate. The researchers recommend purchasing a portable digital pH meter instead, at a cost of around $40, for excellent results.

How can you tell if a potting material is working for your orchid plant? Let the plant's roots be your guide. Once the orchid has been in the mix for a few months, check the roots, either by turning the pot on its side and tapping the plant out a bit or by brushing away the top two inches for closer inspection. At repotting time as well, pay close attention to the state of those roots. If they are healthy, white and/or green, the mix is excellent. If the roots are soggy, mushy or even black, the mix is not draining well enough nor is aerated enough for your watering technique and environmental conditions (you may also have waited too long between repottings). Remedy errors by fine-

Medium Fir Bark

tuning the mix — adding a material or a mix of materials that will help with more drainage and less moisture retention (charcoal, expanded shale, coarser bark, Styrofoam, etc.), or that will keep more water in the mix (such as by using sphagnum moss). Get into the habit of checking the roots periodically; they are your most sensitive barometer to the changing environment within the pot. Remember that the potting mix is in a constant state of change as it ages and decays and breaks into finer pieces, and/or is subjected to fertilizer salts and impurities from watering.

So now, finally, we've put something into our pot. And if you didn't have Media Mania when you started reading this article, don't worry; it will get you sooner or later. In the next article we'll actually start to choose which plants to stick into our pots and our media, moving on to another dreadful craze —the Where-Did-You-Get-That-and-How-Can-I-Find-One-Too syndrome.

A Rundown of the Commercially Available Potting Materials

FIR BARK: Organic. Native to this country. Most widely used potting material. Holds 80% its weight in water. Drains freely. Relatively inexpensive, easy to use. Three sizes. Soak overnight before use. Water once a week on average. Use 30-10-10 fertilizer. pH = 5.0.

REDWOOD BARK: Organic. Native to this country, becoming endangered. Widely used as media additive. Holds 50% of its weight in water. Drains freely. Expensive. Available as "wool," fibrous and more absorptive. Water once a week on average. Use 20-10-10 or balanced fertilizer. pH = 3.5.

TREE FERN: Organic. Central America. Second most widely used potting material. Drains exceedingly freely; holds little water. Water twice a week on average. Expensive. Very decay-resistant; deterioration is very slow. Use balanced fertilizer.

SPHAGNUM MOSS: Organic. Native to this country and others in bogs. Increasingly popular medium. Holds over 1,000 times its weight in water, extremely sponge-like. Water once to twice a week on average. Available live (green) or dried; sometimes rejuvenates from dried state. Soak before using; often difficult to rewet once it dries; keep evenly moist. Many species of mosses exist; longer-fibered species such as New Zealand moss more desirable for its body and resilience. Expensive. Controversial material due to occasional presence of pathogenic fungi that can infect humans through cuts in the skin and cause chronic infections that are difficult to eradicate. Use rubber gloves when handling, and possibly also face mask to avoid inhalation. Excellent additive to mix to help retain moisture without standing water, but do not use in very wet environments. Do not pack tightly in pot, or aeration is markedly reduced. Use balanced fertilizer. pH = 3.5.

OSMUNDA: Organic. Native to this country (roots of ferns). Two types, brown and black. Brown is the less decayed and more suitable for epiphytes; black for terrestrial types. Used to be medium of choice 50 years ago, but cost and difficulty in handling it (stiff and unyielding) basically phased osmunda out on any large-scale basis. Chemical makeup similar to orchids; releases nutrients to plants, requiring less fertilizing. Repotting only necessary after three years. Expensive. Holds 140% its weight in water. pH = 4.3.

CORK: Organic. Mediterranean areas. Bark of an evergreen oak that is stripped without destroying tree. Does not hold much water. Drains well, well aerated. Tends to become infested by millipedes and is reduced to slush; pesticide required to keep medium intact, which makes it undesirable.

PEAT MOSS: Organic. Native to this country, much from Canada. Forms when sphagnum moss falls through bog water to bottom and stays there for centuries in a state of arrested decay. Has been called "coal that never got hard." Holds 1,000%-its weight in water; physical cell structure much like sphagnum without the body. Widely used additive to a mix (usually bark) for better water retention. Fine horticul

Sphagnum Moss

tural grade can pack down a bit and cut air; chunkier grades better for orchids if they can be found. Acidic pH between 3.5 and 5.0.

CHARCOAL: Organic. Usually produced from wood when heated in a vacuum, producing pure carbon (and perhaps some impurities such as potash and phosphoric acid). Second-most popular additive to a mix. Does not absorb water, but gathers and holds it on its surface. Also very absorbent of impurities and fertilizer residues and used to "sweeten' mixes by absorbing unwanted materials; the down side is it can retain a lot of salts as well, which are not good for roots. Leaching with plain water helps flush charcoal immensely. Does not break down.

STYROFOAM: Organic. Man-made plastic (polystyrene) foam available in virtually every packing container that exists. Non-porous; does not absorb water at all. Used to aerate and open the mix. Does not bi-odegrade; creates problems with ozone layer. Some users report root dieback when foam is in the mix; possibly some types of plastic foam are chemically treated for some reason and release toxic fumes or chemicals into pot. Often confused with other foams, some of which are porous types. Porous foams, such as polyethylene and polyurethane, tend to absorb and retain salt, eventually leading to plant damage. Does not break down. Often used as an alternative to perlite, especially when broken up.

ROCKWOOL: Inorganic. Volcanic rock melted by man at 3,000

degrees F, then spun into fibers and bound into soft, cottony material of two forms — water-absorptive and water-repellent. Grower mixes the two kinds in a proportion that suits needs; 80/20% is suggested for Pha-lacnopsis; 60/40 for Cattleya. Originally developed as insulation; some concern as to inhalation of fibers has been expressed (wear mask when using). Available in medium and coarse "pellets." Very water-retentive in absorbtive forms, very much like sphagnum moss. Difficult to rewet once it dries out so must be kept evenly moist. Do not pack too tightly in pot. Insect pests dislike being in Rock-wool. Supposedly inert; supply full fertilizer. Recently been found to supply iron to plants as well as manganese and copper, so may not have to worry about adding trace elements if using Rock-wool. Does not break down. pH = 5.5.

PERLITE: Inorganic. A form of natural volcanic ash mineral that has been manipulated by heating and popping like popcorn (expanded) at high temperatures. It is not a plastic. Lightweight, holds some water, but not much. Inert. Inexpensive, making it the most popular additive to a mix, creating aeration. Chunkier sizes best for orchids (rather than fine horticultural grade), helping to keep mix open as organic parts decay. pH = 4.8.

STONES: Inorganic. Naturally occurring aggregates that serve to keep mix open. No water is absorbed, requiring constant watering. Full fertilizers must be used to supply necessary nutrients to plant. Tears roots when repotting. Heavy.

LAVA ROCK (Pumice, volcanic rock): Inorganic. Naturally occurring igneous rock formed by volcanic flow, mostly silica and metallic oxides. Porous, holds some water, so can water only once a week. Does not break down. Can absorb salts.

EXPANDED SHALE: Inorganic. Manipulated shale clay heated and expanded so that it becomes porous and holds water. Water one to two times a week. Well aerated. Brands include Turface, Haydite, EZ-Pot-N-Gro. Does not break down.

VERMICULITE: Inorganic. A form of mica mineral, man-manipulated by heating and expanding at 1,400 degrees F, which makes it pop like popcorn. Thus becomes very light and porous, holding lots of water, much more than perlite, for which it is often confused. Also holds nutrients from fertilizers, releasing them gradually.