Potting Soil and Mixes: Properties and Priorities

by Rita Pelczar

A GROWING MEDIUM that provides a healthy environment for roots is essential for successful container gardening, and for propagating many plants from seed or cuttings. Good drainage and adequate water-holding capacity are important characteristics to consider. Weight is another; your medium should have enough weight to support the plant without its toppling over, but should not be too heavy if you plan to lug the container from place to place. How easily the medium accepts water, how much it shrinks when it dries, its pH, its lack of weed seeds, insects, and disease, and how well it holds up over time are further factors influenced by the specific make up of the mix. Although some potting mixes contain soil, many do not. If soil is part of the potting mix, it should be pasteurized (see "Pasteurizing Soil," page 53).

Another point for environmentally conscious gardeners to consider is this: How sustainable are the practices involved in producing and distributing your potting soil?

ORGANIC COMPONENTS

Organic ingredients such as peat moss, coconut coir, compost, and tree bark make up a significant portion of most potting mixes. Peat is the lightweight remains of certain plants—most commonly sphagnum moss—that have been preserved in a high acid environment such as bogs. Peat moss retains a lot of water and is extremely stable—it decomposes very slowly. It is also acidic and has no nutrient value. Although relatively inexpensive to harvest and package, there are concerns about its environmental sustainability (see "The Issue of Peat Moss,"page 51).

In recent years, several renewable alternatives to peat moss have emerged on the market. A processed by-product of the dairy industry called **RePeet**™ is produced by Organix, Inc., in anaerobic digesters at regional facilities located near large dairy operations. Sold as a soil amendment, its primary component is dairy cow manure. When processed, it shares many traits with peat moss, including water retentiveness and porosity.

A high-quality potting mix is essential to successful container gardening.

With a pH of 6.5, it is closer to neutral than peat moss, which has a pH around 4.0. "We are just now moving to our first full-scale production facility near Stephenville, Texas," says Organix President Russell V. Davis. "RePeet cannot be found in any off-the-shelf potting mixes as of now, but should start showing up in stores later this year."

An alternative to peat moss, Organix's RePeet™ is produced from dairy cow manure.

Coir is the pith that surrounds a coconut; it is fibrous, lightweight, resistant to decay, and it adds significant porosity to a potting mix. "Coir is much easier to remoisten than peat, and not nearly as acidic. It does not last in a container forever, but I would guess about three times longer than peat moss," says Brooklyn-based garden writer and photographer Ken Druse.

A natural by-product of processing coconuts, coir is renewable and would seem to be ideal for a potting mix except that, unless you live where coconuts grow, the material has to be shipped, often long distances. Many manufacturers, however, feel that coir is still a better choice, environmentally, than peat.

Gardens Alive's **Natural Beginnings Seed Starting Mix** is one coir-based mix enhanced with worm castings and mealworm guano as nutrient sources. It's great for starting seeds where maintaining balanced moisture is critical.

Compost is frequently included in potting mixes, and local sources are available no matter where you live. It is a major component of the **Organic Mechanics** mixes. "We use locally made compost to replace peat," says Mark Highland, president of the Organic Mechanics Soil Company, which distributes its peat-free products to the Mid-Atlantic region. "To further reduce the energy consumed in the manufacturing process, we've begun replacing perlite with rice hulls in some of our blends."

TOP: MARY YEE. BOTTOM: COURTESY OF ORGANIX, INC.

Fafard's "3 B" Professional Formula mix contains sphagnum peat moss, processed pine bark, perlite, vermiculite, nutrients, limestone, and a wetting agent.

RITA PELCZAR

THE ISSUE OF PEAT MOSS

About 90 percent of the peat used in this country is harvested from bogs in Canada. According to the Canadian Sphagnum Peat Moss Association (CSPMA), of the 279 million acres of Canadian peatland, less than .02 percent (42,000 acres) is being used for harvesting approximately 1.4 million tons of sphagnum peat each year. According to CSPMA President Paul Short, this amount "is well within the sustainable allocation limits of natural resource availability." Furthermore, CSPMA has adopted a preservation and reclamation policy to help restore bogs to a functional wetland ecosystem.

Yet many still question the sustainability of peat moss harvesting. The harvesting process involves draining the bogs by digging a network of ditches and basins. This may have long term effects on local water tables.

Although the Canadian bogs are extensive, and peat moss often starts to re-grow within five years after it is harvested, it grows at an extremely slow rate, about one millimeter per year. And according to the North American Wetlands Conservation Council, it may simply be impractical to return some harvested bogs to peatlands. In these cases, they recommend converting the area to farmland, wetland, or planting trees. The result is a significant disruption of a highly specialized ecosystem and endangerment of the many organisms that inhabit it. —R.P.

White Oak Farm Premium Organics also uses compost from local sources, including food processing residuals such as Ocean Spray's cranberry pulp, as the basis of their soil mixes. "We manufacture all of our own compost at two southeastern Wisconsin compost facilities," says owner Sandy Syburg. The company distributes their products in the Midwest. "The mission of White Oak Farm," says Syburg, "is to return the organic resources as close to their origin as possible."

Other companies that manufacture and market their potting soils regionally include **Coast of Maine** in the Northeast, **Lady Bug Natural Brand** in the South, and **Sun-Gro** in the West. Locally produced and distributed potting soils reduce transportation costs, both monetarily and environmentally.

Some companies with a wider distribution eliminate the need for long-

Resources

Canadian Sphagnum Peat Moss Association, *www.peatmoss.com.*

"The Dirt on Potting Soil" by Craig Idlebrook. *Maine Organic Farmer and Gardener,* Summer, 2006. *www.mofga.org/tabid/477/default.aspx.*

"Is Peat P.C.?" by Chris Bright. *American Horticulturist,* Vol. 72, No. 12, American Horticultural Society, December, 1993.

Potting Mixes for Certified Organic Production by George Kuepper. National Sustainable Agriculture Information Service, 2004. *http://attra.ncat.org/attra-pub/potmix.html#making.*

Sources

Coast of Maine, Portland, ME. *www.coastofmaine.com.*

Fafard, Greensboro, NC. *www.fafard.com.*

Gardener's Supply, Burlington, VT. *www.gardeners.com.*

Gardens Alive, Lawrenceburg, IN. *www.gardensalive.com.*

Lady Bug Natural Blend, Austin, TX. *www.ladybugbrand.com.*

Monrovia, Azusa, CA. *www.monrovia.com/learn/soil_story/soils_and_amendments.php.*

Organic Mechanics, West Chester, PA. *www.organicmechanicsoil.com.*

Organix, Inc., Walla Walla, WA. *www.organix.us.*

Sun Gro, Belleview, WA. *www.sungro.com.*

White Oak Farm Organics, Oconomowoc, WI. *www.whiteoakfarmorganics.com.*

range shipping by maintaining multiple manufacturing facilities that serve specific regions. For example, **Monrovia** produces potting soils at eight different facilities in the United States.

Fafard has three U.S. production facilities, in South Carolina, Florida, and Texas, and three more in Canada. "Fafard's premium retail potting soils are sold only in independent garden centers. Because of our plant locations, retailers

Fafard sells several different potting mixes.

that carry Fafard soil tend to be up and down the East Coast," says Ann Bryan, Fafard's marketing services manager. Bark is included in many of Fafard's U.S. mixes. "All bark is southern yellow pine and comes from vendors within a 100-mile radius of our plants," says Bryan.

INORGANIC INGREDIENTS

Inorganic components commonly included in potting soils are sand, perlite, and vermiculite. Coarse sand, also called builder's sand, adds both porosity and weight to a mix. For top heavy plants its weight provides stability.

Perlite is a volcanic rock and vermiculite is a micaceous mineral. Both are mined materials that are heated until they expand, adding significant porosity to a mix. Much of the perlite and vermiculite used in potting soil is imported. For example, although Fafard obtains its perlite from several southeastern suppliers, it is originally mined in Greece.

Vermiculite is mined in many locations, including a few sites in North America. In the 1980s, asbestos, a material that has proven carcinogenic if the

Perlite is added to mixes to provide porosity.

fibers are inhaled, was found in vermiculite mined in Libby, Montana; the mine was closed in 1990. According to the National Sustainable Agricultural Information Service, all sources of natural vermiculite apparently contain some asbestos, although levels may be very low.

No safety labeling is required on vermiculite products, however, the U.S. Environmental Protection Agency suggests that if vermiculite is used, it should be handled outdoors or in a well-ventilated area and moistened to reduce the potential release of asbestos fibers. When vermiculite is included in a moist growing mix, the likelihood of problems is lessened.

PRE-MIXED OR HOMEMADE?

For occasional use, it's probably easiest to purchase a good commercial mix. There are many available, but because little label information is required, you take your chances with an unknown brand. Ask for recommendations at local garden centers or from neighbors who have container gar-

Pro-Mix is a popular soil-less media often used by professional growers.

LEFT: COURTESY OF FAFARD. TOP RIGHT: MARY YEE; BOTTOM RIGHT: CHARLOTTE ALBERS / AHS ARCHIVES

dens. Finding a good local—or at least regional—source of high-quality potting soil will go a long way to help your container plants thrive and minimize the energy used in its distribution.

Premixed potting soils often contain fertilizer. While this may be desirable for outdoor container plants that are in active growth, it may not be appropriate for many houseplants and seedlings. "In my experience, the fertilizers are released to house plants when they want to be dormant and burn their roots," says Druse.

If you do use a lot of potting soil, consider making your own—it affords you the option of tweaking the recipe for specific plants—more or less acidic, more or less water retentive, etc. Local sources of sand and municipal composting sites can provide those ingredients inexpensively. You can also make high-quality compost in your own backyard—the ultimate local ingredient.

"My general medium is coir and perlite—only," says Druse. "Sometimes I use compost as well for outdoor containers. Depending on the drainage requirements, I use a ratio of one to three to one to five perlite to coir—and I try to use finely chopped coir that is neither too stringy nor 'coir dust', which it is sometimes sold as." (For additional potting mix recipes and recommendations from experts around the country, see a web special linked to this article on the AHS website, *www.ahs.org.)*

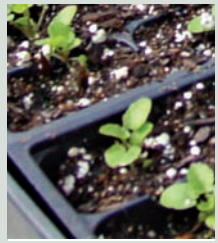
Another standard potting mix recipe that I like to use for outdoor containers is equal parts garden loam, coarse sand, and good quality compost. It's a heavy mix, so it's not for large pots that you plan to move around, but it retains moisture well, and the compost provides the nutrients my plants need. Furthermore, at least two-thirds of the ingredients only have to travel a few yards in my wheelbarrow to reach their destination.

Rita Pelczar is a contributing editor for The American Gardener.

RITA PELCZAR

PASTEURIZING SOIL

If you want to use soil in your potting mix, it should be pasteurized to kill diseases, weeds, and insects, particularly if you are using it for indoor plants or starting seeds or cuttings. The object is to heat the soil to 180 degrees and maintain that temperature for 30 minutes. You can do this in your kitchen by following the steps below:



- Spread slightly moistened soil in a pan, no more than four inches deep.
- Cover the pan with aluminum foil. Place the pan of soil and an oven thermometer in the oven; set the temperature to 250 degrees.
- When the thermometer indicates the temperature has reached 180 degrees, reduce the oven temperature to 180 degrees and set your timer for 30 minutes.
- After 30 minutes, remove the soil from the oven. Allow it to cool thoroughly before using it for planting.

—R.P.