Faux Soils

There's nothing more frustrating than potting a container or starting seeds in a container only to experience poor plant growth. In many cases it may not be your lack of a "green thumb" it may be your growing media. Not all potting soils/mixes are created equally. Lois Stack, ornamental horticulture specialist with University of Maine Cooperative Extension says "that just because something is labeled "potting soil" doesn't mean it'll work in a pot. It's really hard to define what is in that container." Stack observes "The word "soil" has a very broad definition."

Soils in containers do not behave the same as soil in the field. Commercially available potting mixes and soil-less mixes are usually made up of different organic ingredients including varying proportions of peat moss, sphagnum peat moss, shredded bark, and sawdust, as well as mineral ingredients such as vermiculite, perlite, calcined clay and sand. Some alternative materials that are being used include shredded coconut husks (coir), composted yard waste and animal wastes, composted cotton gin wastes, composted hardwood bark, mushroom compost, municipal compost, rice hulls, peanut hulls, and pecan shells. Some packages even contain fertilizer. This soil-less mixes are typically lightweight and weed and disease free. Many different brands and types of mixes are offered in garden stores, and quality varies widely. There is no regulation by state or federal agencies over the content of these mixes and there are no standards that define what constitutes a good potting mix. There are requirements to label the product with the names of the ingredients in decreasing order of volume. Unfortunately there is no consistent relationship between the physical and chemical properties of a potting soil and its ingredient list. Potting mixes for organic growers will have "OMRI Listed" on their label (OMRI is Organic Materials Review Institute).

Let's first look at the physical properties of the ingredients necessary for successful container growing. The potting soil or media in which a plant grows must be; porous enough for root aeration and drainage, and capable of retaining water and nutrients. High-quality mixes generally contain slow-release fertilizers, which takes care of the plant's nutritional needs. However, many of these mixes are often misleading as to the content, and could be unsatisfactory for proper plant health.

So let's look at the properties of the ingredients you may see listed on those bags of potting soils or soil-less mixes:

Peat Moss
Peat moss is harvested from peat bogs. It is a soil amendment, and used as a bulking agent and carbon source in composting. Peat moss has a tight, fibrous structure. As it dries, it has the tendency to absorb water to its self, robbing the water from the rest of the soil, and creating a crust on the surface. Since peat is sterile it can minimize disease problems. Peat moss has an acidic ph of 3.5 to 4.5; because of this acidic nature limestone is usually added to balance the ph. Peat humus and native peat are usually too decomposed to provide necessary structure and adequate drainage.

Sphagnum peat moss
Sphagnum peat moss comes from mosses (Sphagnum hypnum, etc) and contains long fibers which resist decomposition. Most sphagnum moss is acid, with a ph ranging from 4.0 to 5.0, and usually has a very low fertility level.

Forest Products
Ground bark is cheep and is a by product of the timber industry.
Pine bark is a predominant potting component. It tends to increase moisture retention and available water content but reduces air space. On the other hand if the particle size of the pine bark is large it allows for air space, but reduces its water retention. Aged pine bark is sometimes referred to as composted bark Fir bark and other hardwood barks are also used.

Sand (course builder's sand)
Sand is generally added for weight, but it may aid in water filtration and aeration.

Vermiculite
Vermiculite is a sterile, lightweight, mica product. When it is heated to approximately 1800 degrees F, its plate-like structure expands. Vermiculite will hold large quantities of air, water and nutrients needed for plant growth. Its ph is usually between 6.5 and 7.2. Vermiculite is available in four particle sizes. For horticultural mixes, sizes two or three are generally used. If at all possible, the larger-sized particles should be used since they give much better soil aeration.

Perlite
Perlite is a granite-like volcanic material, crushed and heat treated to pop into white, hardened particles. Its principal value in soil mixture is aeration. It does not hold water and nutrients as well as vermiculite. The ph is usually between 7.0 and 7.5.

Calcined clay

Calcined clay is a rigid, odorless mineral that resembles cat litter. Succulents that require excellent drainage can be grown more successfully if one part calcined clay is added if you have very heavy clay type soil. Calcined clay particles can keep a mix loose and aerated allowing a deep, sturdy, healthy root structure.

Other ingredients

Other ingredients such as; bone meal, blood meal, chelated iron, rock phosphate, kelp meal, bat guano, worm castings, and processed poultry manure are generally added to enhance nutrients.

Soil Amendments

Soil amendments are not to be confused with potting mix. Soil amendments are generally used in field applications, and not usually recommended for containers.

It is suggested that an ideal mix should be dense enough to hold seedlings/plants and water, but porous enough to shed excess water. It must be free of weeds and plant pathogens. Peat and/or sphagnum normally provide sponge-like water retention and drainage, while sand provides plant support and drainage. Perlite and vermiculite commonly provide pore space, improving drainage while minimizing the weight of the soil. Since most of these ingredients are sterile fertilize with a time released fertilizer according to manufactures directions. If you choose not to use a commercial fertilizer you could always add other nutrients mentioned above. Quality mixes should be low in soluble salts, with a ph of 5 to 6.5. A simple test for the porosity of the mix is to add two cups of water to one quart of dry mix. After a few minutes you should be able to drain off about one cup of water. Or to test for drainage and porosity, fill a six-inch pot with mix, tapping lightly on the container while filling it. Pour one quart of water through the pot. The water should filter through in less than a minute.

Hopefully I have enlightened you as to the properties of potting soils and or soil-less mixes. There is no, one size fits all, when it comes to mixes for containers. I would suggest that you read the labels carefully, add what you feel is lacking, and try growing in it. If it does not meet your expectations, change your formula, and try again.

Linda L. Reddick, Kingman Area Master Gardener

Scheduled FREE workshops: March 7th, Spring Planting, April 4th, Alternative Gardening. Call the extension office for details (928)753-3788

CONTACT: VICKI COOMBS
ADMINISTRATIVE ASST
THE UNIVERSITY OF ARIZONA
MOHAVE COUNTY

COOPERATIVE EXTENSION
101 E BEALE ST STE A
KINGMAN AZ 86401-5808
928 753-3788/928 753-1665 (FAX)
mohavece@cals.arizona.edu