

## **Soils and Pots**

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Dirt is what you sweep up from under the furniture. Soil is what plants grow in.

Plants need something for their roots. Soil serves as an anchor, a food source, a water source, and sometimes as protection, in those plants that shrink beneath the ground during dry periods.

Looking around the world, we see different plants growing in different soils. At a given level of light, heat, and water, members of genus Begonia grow better in soil high in organic components rather than sand. Lithops usually die quickly in rich soils. Paying attention to soils makes a big difference in your plants.

Some people try to grow plants in soil duplicating the natural environment. This isn't necessary, for pot growth is already unnatural. Despite differences in soils in nature, most plants can be grown in almost any soil mix if attention is given to water retention, nutrients, and pest avoidance. Another consideration is weight: We move our plants around, and a five gallon pot full of desert soil weighs a lot. We want a soil that has good drainage, retains some water but not too much, is composed of inexpensive, readily-available materials, and does not break down too fast.

Desert plants are adapted to living in poor soils that often are dry for long periods. Many grow better with more water and nutrients than they receive in nature. The ideal for most of our desert plants is to stay moist for 5-7 days after watering during periods of active growth. Few like being wet for very long. Most desert plants require soils with a fairly high air content, as well. Roots need oxygen too.

The type of pot used makes a difference as well. Clay pots dry out faster than do plastic, glazed, or high-fired pots of the same size because water can evaporate through the clay, but not through plastic, glazing, or high-fired finishes. Larger pots stay moist longer than small pots. Evaporation depends on the surface area exposed, and a deeper pot will take longer to dry out than a shallower pot of the same diameter. A hole in the bottom is imperative unless you are growing water lilies.

When people talk about soils with good drainage, they refer to soils through which water drains rapidly, leaving the soil moist. One can be fooled. When one waters a pot of completely dry peat moss, the water pours out the drainage holes fast. Because peat moss once dry won't take up water without prolonged soaking, the water will not reach any roots growing in the peat moss. If peat moss stays too wet, it turns into a black mushy culture medium for fungus. These are some reasons why I don't use peat moss in my soil mixes. Many people do so very successfully; I think it requires more attention to your plants and more time spent watering. Commercial bagged cactus mixes are mostly peat moss, and I think these are just about the worst soils for beginners to use. Once dry (and they dry fast in our climate) the soil will never get wet again, and the plant will dry up even though the owner is watering regularly.

Many commercial growers use "Cactus mix" soils. They are light, important when considering how many trays need to be moved around, and composed of inexpensive materials. These growers buy the components in bulk and mix the soils themselves, which is much cheaper than buying bagged "cactus mix." These growers look at their plants daily and they never let their plants dry completely.

Good drainage is promoted by larger particles in the soil mix. Smaller particles retain more water. When you water a pot filled with silt, the water stays pooled on the surface for minutes to hours, and the silt stays moist a long time, at least days to a week. A pot of fine sand drains much faster and stays moist quite a while, but not as long as the silt. Coarse sand drains even faster and dries fast. A pot of large gravel retains almost no water and is dry within minutes to hours.

Most succulent hobbyists use soil mixes composed of some commercial potting soil, some gravel or pumice, and some garden soil. There are no magic mixes. Here in Phoenix plants in pots will do just fine in soil dug up from your garden. Another good approach is mixing coarse sand from a wash with commercial potting soil, in a ratio around 3/4 mineral material to 1/4 potting soil. I grow all my Ariocarpus, Ferocactus, Mammillaria and allies, and most Opuntia in pure wash sand. I use a little added potting soil for some cacti and many succulents. If I didn't have immediate access to a wash, I'd probably use pumice instead, or keep a five gallon bucket and a small shovel in my truck for digging my own.