UC CE Master Gardener

Healthy Garden Tips

University of California Cooperative Extension - Napa County (707) 253-4221

Soil Mixes for Container Gardening

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Qualities desired: Container gardening requires soil mixes that are light, wet thoroughly and easily and drain quickly. They should retain moisture but have plenty of air spaces for good root activity. A good container soil is light weight but dense enough to hold roots in place. It should hold about 40 per cent water by volume, retain at least 10 per cent air, and should age slowly and predictably. Container soils should be free of weeds, diseases and pest organisms.

Garden soils vary from place to place. Some have light texture, wet through quickly when watered, then drain well. However, most local garden soils make poor container soils because they wet slowly, drain poorly and retain very little air. While some soils can be amended to improve their physical properties, most local soils contain too much clay for satisfactory use in containers, no matter how amended. Frequently, a planting mix without soil will prove more satisfactory for use in containers than amended garden soil. Common ingredients and mixes are described below so you can make your own.

Make your own mix: Use a mixture of half inorganic and half organic from the examples listed below. Mix selected inorganic materials together first. Separately mix selected organic materials together. Then blend the inorganic and organic materials. Fertilizer is added last and mixed thoroughly into the final blend. It is easiest to prepare these mixes on a hard surface, such as the concrete floor of a garage. Once prepared, container mixes can be stored dry in a cool place for several years. Be sure to label the storage bin.

A. **INORGANIC PART: APPROXIMATELY 50% OF TOTAL VOLUME. USE ANY ONE OR A COMBINATION OF ANY ON THIS LIST.**

1. Perlite - Silicaceous material mined from lava flows. Furnace heat expands particles to sponge like kernels, very light, sterile, holds 3-4 times its weight in water.
2. Builders' Sand - 0.25 to 1.0 mm in diameter. Heavy. A source of micronutrients in the clay fraction.
3. Vermiculite - "expanded mica" mined from deposits found in Montana and North Carolina. A hydrated magnesium aluminum iron silicate. Furnace heat expands minerals. Light weight, neutral in acidity, can absorb large quantities of water. Use USA sources only.
4. Pumice - Volcanic origin may be white, gray, black, or red. Crushed and screened to size.
5. Dialoam – Manufactured by firing diatomaceous earth.
6. Expanded Shale – Made by firing a type of shale rock at high temperatures.

B. **ORGANIC PART: APPROXIMATELY 50% OF TOTAL VOLUME. USE ANY ONE OR A COMBINATION OF ANY ON THIS EXAMPLE LIST**

1. Peatmoss, Canadian Sphagnum - High moisture holding capacity (10 times its dry weight). High acidity (3.8-4.5 pH). About 1% nitrogen. Use only low ash content pure sphagnum peat.
2. Compost - Use locally available 'cold' or well aged compost.
3. Rice hulls - Slow to decompose, contain some potassium, light in weight.
4. Ground fir bark - lasts longer than sawdust.
5. Grape pomace - blended with other organic materials, contains potassium.
6. Nitrolized redwood or cedar sawdust. All sawdusts require the addition of nitrogen. Except for redwood or cedar sawdust, most break down too fast for long term value. Course sawdust will last longer than fine. Freshly milled sawdust must be leached before using.
7. Coir – ground coconut husks.

Fertilizers: A light application of plant fertilizer assures good plant growth in your container mix. Add a commercial, slow release fertilizer containing Nitrogen (N), Phosphorous (P) and Potassium (K) while preparing the mix. Use either 'organic' or 'manufactured' products at rates suggested on the product labels. As an example, university researchers found that 4 to 6 pounds of coated, slow release 16-16-16 fertilizer mixed into one cubic yard of soil mix gave superior growth from container plants. The balanced formula N-P-K fertilizer, with equal numbers, performed better than other coated fertilizers in container trials. Fertilizer added to the mix should be considered 'starter' and must to be supplemented with topical applications after plants are established. Other additives are not necessary or recommended. Animal manure is too salty and is not recommended for use in container mixes.

How long does a container mix last? As you grow plants in it, the organic faction of your container mix will slowly decompose over time, losing pore space and leaving the mineral faction and salts behind. You should 'renew' your container mix after two or three year's service. Replace the old mix in the container with fresh, unused mix. The used mix from your container can be added to your garden bed.

Adding soil: You can experiment with the above mix, adding small amounts of soil to get a blend which you prefer. Add soil by passing some of the above mix and then some soil through a screen. Screen this mix several times before you use it. Be careful, a little soil has a large impact on the drainage properties of the total mix. You may add up to 20 per cent soil by volume. Of course, with soil added the mix will be heavier; and you can get weeds, nematodes and soil pathogens.

June 2000

Additional Reading:

"Plants Indoors: Their Care and Feeding", U.C. ANR Leaflet 2941, 1977.
"Soil, Physical Environment and How It Affects Plant Growth", U.C. ANR Leaflet 2280, 1978.
"Organic Soil Amendments and Fertilizers", UC ANR Publication 21505, 1992.
"The U.C. System for Producing Healthy Container-Grown Plants", Manual 23, 1957.
"Cornell Peat-Lite Mixes for Commercial Plant Growing", Cornell Ext. Bull. 1104, 1967.

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