

Consumer Horticulture

Container and Raised Bed Gardening

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Gardening in containers or raised beds can be just the answer for would-be gardeners who would love to grow their own vegetables and flowers, but lack the space or physical ability for a traditional garden.

**EXPERT
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Growing plants in containers provides an opportunity to garden on patios, porches, balconies, and even windowsills. Raised beds can be used to overcome poor soil conditions and bring the garden to an easier to reach height. While container gardens can be very productive, they do require some special attention.

Containers

Containers that can be used for gardening are limited only by your imagination. Clay, wood, plastic, cement, and metal are all suitable materials for growing plants. Many items around the house can be modified for use as plant containers such as pots, tubs, crates, buckets, bushel baskets, whiskey barrels, tires, wheelbarrows, and hanging baskets. Whatever the material, however, a good container must allow excess water to drain out and provide sufficient space for roots to grow.

When excess water cannot escape the container, soil pores that should hold air will be filled with water and roots will die from lack of oxygen. To provide drainage, drill three or four small (1/4 inch) holes in the bottom of the container. Holes larger than 1/4 inch in diameter will allow too much soil to escape. Placing a layer of gravel or broken pottery pieces on the bottom of the container, below the soil, can help stop the flow of soil through larger holes.

Wood containers should be made of a naturally water-resistant wood (such as redwood or cedar) or synthetic lumber (such as recycled plastic). If using chemically preserved wood, choose lumber that has been pressure treated with a copper-containing product such as alkaline copper quaternary (ACQ). Copper and zinc preservatives that are painted onto the wood are less effective in preventing decay. Do not treat wood with creosote or pentachlorophenol (Penta) because they are potentially toxic to plants, particularly when grown in small, enclosed areas. See *More About Treated Lumber* for details.

Most vegetables and flowers have roots that go 2 to 3 feet deep in good quality soil, but can be grown in shallower soils. Plants that have restricted roots will be smaller, less productive, and may produce smaller-sized fruits. Small containers dry out more quickly, requiring frequent watering. A container with a minimum depth of 10 to 12 inches is recommended for most plants exposed to drying wind and sun.

Growing Media

Lightweight, well-drained and well-aerated media is best for growing plants in containers. Garden soil alone will soon become compacted in a container garden, leading to poor aeration and water drainage. Many garden supply stores offer premixed potting soil or soilless mixes and are ideal for small containers. For large-scale container gardening, mixing your own media may be more economical.



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Recipes for Growing Media

To make 1 bushel of soil mix, combine:

- 1/3 bushel of soil
- 1/3 bushel of organic matter
(compost, peat moss, well-rotted manure)
- 1/3 bushel of vermiculite or perlite
- 1/2 cup of fertilizer
(5-10-5, 6-10-4, or a similar fertilizer formulation)

To make 1 bushel of soilless mix, combine:

- 1/2 bushel of peat moss
- 1/2 bushel of vermiculite
- 1/2 cup of ground limestone
- 1/2 cup of superphosphate
- 1 cup of fertilizer
(5-10-5, 6-10-4, or a similar formulation)

Planting

Planting a container garden is much like planting a traditional garden bed. Seeds can be planted in rows or in clusters, depending on the size and shape of the container. Planting transplants rather than seeds, give plants a head start on the growing season.

Naturally smaller plants are better adapted to the confines of a container garden. But even large plants such as tomatoes, melons, and squash can be productive if given a large enough container. Many garden catalogs feature compact flower and vegetable cultivars that are more suitable for growing in containers or other small spaces. See Table 1 for suggested container sizes for selected plants.

Vegetables and flowers can be combined to create attractive planter displays. But when mixing different plants, keep in mind the light requirements of each. Most vegetables require a minimum of 6 to 8 hours of direct sunlight each day for good production. Many flower species will also thrive in full sun, but there are a number of flowers that must have partial or total shade.

Watering

Because container gardens have greater exposure to sun, wind, and heat, they need to be watered more frequently than a garden bed. Smaller containers may need to be watered as often as once or twice a day, depending on weather.

However, overwatering can be a problem if the soil is kept too wet too often. Feel the soil with your fingers, and then water when the top inch of soil feels dry. Be sure to use enough water so some excess runs out of the drainage holes. This will help ensure the entire root area is moistened. Peat moss is very difficult to wet once it becomes dry, so frequently check soilless media.

Table 1. Suggested Container Sizes

Crop	Minimum Container Size Per Plant (diameter at top in inches)
beans (bush)	6
beet	5
broccoli	8
brussel sprouts	8
cabbage	8
carrot	5
cucumber	10
eggplant	10
flowers, annual	6
greens	4
lettuce	4
okra	10
onion	4
parsley	5
pea	5
peppers (sweet or hot)	10
radish	4
spinach	4
squash	14
tomato (dwarf)	8
tomato (large)	12
turnip	8

Controlling Pests

Container garden plants are as susceptible to most insects and diseases as those grown in garden beds. However, using clean, pasteurized soil can avoid some soilborne disease and insect problems. You can pasteurize your garden soil by heating a pan of soil to 180°F and holding that temperature for 30 minutes. Semi-moist soil will heat more efficiently due to the production of steam. If your soil is dry, add one cup of water per gallon of soil and mix thoroughly before heating. Allow the soil to cool thoroughly before planting.

Inspect plants frequently for insects and disease symptoms on the leaves. Picking off insects as they are noticed is effective in controlling small-pest populations. Removing dead leaves, flowers, and overripe fruits will help discourage pests. In some cases, pesticides may be necessary to control or prevent pests from beating you to the harvest. If you use chemicals, be sure it is labeled for use on all plants in the container. Always read and follow pesticide labels.

Although they are not as much of a problem for container gardens as they are for garden beds, weeds can quickly take

over a container and compete with crops for light, water, nutrients, and space. Before planting, refrain from using soil from weed-infested areas. If weeds do appear in the container, carefully pull them while they are still small and shallow-rooted. Cut overgrown weeds rather than pull them to avoid injuring the surrounding desirable plants. Herbicides are not practical in container gardens.

Raised Beds

Raised beds help improve water drainage in heavy clay soils or low-lying areas. Raised beds also bring the garden to a height that is more workable for physically disabled or elderly gardeners who cannot stoop or bend over to a flat garden bed. Other advantages of raised beds include that they tend to warm up earlier in the spring, which allows earlier planting. And once the bed is constructed, foot traffic should not be necessary in the bed, so the soil does not become compacted, and soil preparation in the coming years is minimized.

Raising the soil just a few inches may be enough for some gardens. No side support is needed for shallow beds less than 6 inches tall. For these smaller beds, prevent soil erosion from water and wind by gently sloping the sides, making the top of the bed slightly narrower than the base.

Deeper beds need wall supports to keep the bed intact. Rot-resistant lumber, cinder blocks, bricks, or rock layers can be used to support the sides of the bed. Beds deeper than 18 inches, particularly those built on poorly drained sites, may require layers of drainage material at the bottom to ensure good water drainage and to avoid compaction. Use crushed rock, pea gravel, sand, or drainage tile if needed.

There is no standard size for a raised bed, but keep in mind that you will want to reach everything in the bed without stepping into it. A bed that will only be accessible from one side should be no more than 2 feet wide, while a bed that can be reached from both sides could be up to 4 feet wide.

As with container gardens, raised beds must have light, well-drained growing media to provide proper aeration. Raised beds can be improved by incorporating manure, compost, or other organic materials as well as vermiculite or perlite. Commercial potting soils or homemade mixes are ideal.

More About Treated Lumber

Chemical wood-preservation treatments have left many gardeners wondering about the safety of treated lumber.

Chromated Copper Arsenate

Lumber treated with chromated copper arsenate (CCA) treated lumber was phased out of consumer/residential products as of December 31, 2003. This was a voluntary decision by industry to move away from treated wood containing arsenic to new alternative preservatives.

The U.S. Environmental Protection Agency (EPA) does not require or recommend replacing existing CCA-treated structures at this time. Although the EPA does say that any reduction in arsenic exposure is desirable, it has not concluded that there is unreasonable risk associated with CCA-treated products. Those concerned about existing structures in their yards or gardens can either seal the treated wood every two years with an oil-based stain, or insert plastic liners into the containers to eliminate contact with soil.

CCA Alternatives

So what will gardeners have to choose from for landscape projects?

The EPA has approved alkaline copper quaternary (ACQ) for use in garden structures. This product is higher in copper than CCA, but is free of arsenic. No doubt, additional, environmentally friendly products will be developed in the next few years.

Treated lumber alternatives include synthetic wood, made from recycled plastic, vinyl fencing, and naturally rot-resistant woods such as cedar and redwood. All of these will likely be considerably more expensive than CCA-treated lumber was.

Non-lumber alternatives for building garden structures include stone, concrete block, and brick.

The EPA offers more alternatives to CCA-treated woods at www.epa.gov/oppad001/reregistration/cca/.

Another good resource is Penn State University Extension publication CAT UC173, *Garden Use of Treated Lumber*, www.agronomy.psu.edu/Extension/Facts/Treated_Lumber.pdf.

More information on CCA is available from Purdue Extension publication HENV-100-W, *Avoiding Arsenic Exposure from Treated Lumber Around the Home*, www.extension.purdue.edu/extmedia/HENV/HENV-100-W.pdf.

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