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Container and Raised-Bed Gardening

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Container gardening allows you to have and enjoy many ornamental and food-supplying plants that, for whatever reason, you do not want to grow in ground beds. You can use container-grown plants in entryways, patios, decks, rooftops, gardens, indoors, or anywhere you have a need to add a living component to enhance the appeal of an area. Each planted container will have its own personality; you can create container scenes. They can range from dramatic to subtle, and from grand to petite. Plants and containers offer limitless combinations of size, color, form, and texture that can give your inside and outside environments a more aesthetically pleasing appearance.

Photo 1: A typical container garden

Containers and Plants

Containers come in myriad sizes, shapes, and styles. They are made of many materials, including clay, ceramic, metal, wood, and plastic. You can use practically anything as a container; occasionally, one will see an old bathtub or boot used as a planter.

Unless you are creating a bog-type planting, a container will need to have at least one drainage hole, and preferably more. Place a piece of screen or mesh material over the drainage hole(s) to keep the soil in the container. You do not need gravel or stones on the bottom of the container. If you have a container without holes, either drill holes in the bottom, or place the plant in a growing container with bottom holes inside the first container. In the latter case, to avoid blocking the drainage holes of the growing container, insert a "spacer" (e.g., small pieces of brick) in the bottom of the container without holes. Be prepared to remove the growing container from the decorative pot during periods of high rainfall to avoid flooding the pot.

The size of the container depends on the size of the plants you are growing. A small container (a half-gallon or less) will accommodate a few small plants such as herbs, whereas a large container (three-gallon or more) will accommodate large plants such as tomatoes or even small trees.

Most any type of plant can be grown in a container to showcase foliage, flowers, and fruits (see photos 1 through 5). You can grow vegetables such as cherry tomatoes or herbs; annuals such as begonias or ornamental peppers; herbaceous perennials such as hosta or ornamental grasses; or shrubs and small trees such as butterfly bush or Japanese maple. Tropical plants, conventionally used as indoor plants, are becoming quite popular for outdoor use as annuals. These very showy plants, such as banana and mandevilla vine, offer an attractive and lush presentation. When using more than one species in a container, remember to vary their size, form, color, and texture to maximize the plant combination appeal. Taller plants are usually placed in the center of the container, with shorter or trailing plants placed near the sides. Also remember to match plants based on their cultural needs (light and water requirements). Your container composition is limited only by your imagination, available growing conditions, and the size and maneuverability of the container.

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Planting Instructions

Fill the container with potting soil to within about two inches of the top of the rim. Make a hole in the soil large enough to accommodate the root ball of the plant you are placing in the container. Take the purchased plant out of its container and inspect it for circling roots, those roots which wrap around the soil ball. A small degree of circling is acceptable, but if you have a plant with a lot of circling, then tease these circling roots from the root ball. Insert the plant into the hole, firm the potting soil around the root ball, making sure that the top of the root ball and surface of the potting soil are at the same level. Water the plant and surrounding potting soil thoroughly.

Watering and Potting Soil

A main issue with growing plants in containers is that the potting soil (usually a peat or bark-based soil) holds only a short-term water supply (one to several days). Its reservoir capacity (days of water supply) is affected by the plant species, number of plants, and the location (sun vs. shade). Thus, relatively frequent watering is necessary. Shallow containers drain less (proportionally) than tall containers. Thus, seedlings grown in a flat (shallow tray) or any other shallow container will require less frequent watering than plants in a tall container. A well-drained potting soil can be used in shallow containers to avoid the problem of staying too wet. Porous containers such as terra cotta will dry out faster than glazed or plastic containers.

There are a variety of commercial potting soils that vary from dense and very moisture-retentive to light and well-drained. Your choice of potting soil will depend on the type and size of plants you use and the location of the container. You can use a commercially available soil water-content monitoring device to determine when to water your plants; or you can easily determine water content by probing the soil with your finger or by lifting the container and judging soil water content by the relative weight of the container. In most cases, you will want your soil to be moist/wet immediately after watering and then become partly dry before you water again. Roots need air (oxygen). If a potting soil is kept too moist, then the pore spaces in the soil will be filled with water and roots will suffer from a lack of oxygen. Most mineral soils (the soil native to your garden) are not suitable for containers since they retain too much water. An exception to this is a sandy soil.

Photos 2 – 5 are examples of the many plant combinations for container gardening.

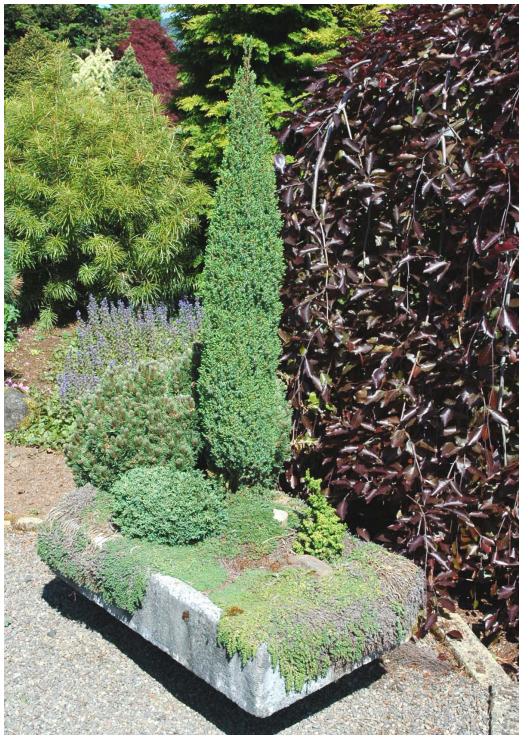
Water-absorbing polymer products are marketed for container-grown plants that claim to reduce watering frequency. These highly water-absorbent products are mixed in the potting soil at planting. Most research has shown limited benefits, if any, of using these products in container soil mixes.

Fertilizing Plants

Container-grown plants need fertilizer. The easiest way to fertilize is to use a "slow-release" fertilizer. In this type of fertilizer, nutrients are encased in small bead-like capsules (or sometimes in sticks), which release fertilizer to the potting soil slowly over time. Alternatively, you can use soluble fertilizers, which usually come in a dry form and then are dissolved in water and applied to the potting soil. For both types of fertilizer, follow product recommendations for the amount and frequency of application. With any fertilizer, especially soluble fertilizers that are applied frequently, there is a risk of fertilizer build-up in the soil, which can be toxic to plant roots. To avoid this, make sure to water your plants thoroughly between every other fertilization.

Trough gardens

Trough gardens are becoming a very popular type of container gardening. Animal feeding troughs of long ago consisted of stone basins. These basins were discarded when more modern materials became available. Gardeners, being the resourceful people they are, recycled these to use as container gardens, often for alpine plants, dwarf conifers, or other rock-garden plants. Most of these plants require good drainage, so a potting soil that drains well (is not too water-retentive) is required. Old troughs are quite expensive. Manufactured look-alikes are much less expensive and more available. They are relatively easy to make using a mixture of cement, peat moss, and perlite; these are referred to as "hypertufa" troughs. There are many web sites that offer hypertufa trough-making instructions. You can create interesting mini-landscapes by using a combination of plants, rocks, and moss (see photos 6 and 7). In addition to being beautiful, these are low maintenance.



Photos 6 and 7 are examples of trough garden containers and plantings.

Overwintering Container-grown Plants

The main issue with having container-grown herbaceous or woody plants outside all yearlong is their hardiness (tolerance to low winter temperatures). There are two things to know about container-grown plants staying outside during the winter. 1) Since the container is above ground, the container temperature (and hence plant temperature) will be the same as the ambient temperature. 2) The least hardy portion of a plant is the roots. So, if it is 10˚F outside, then the container and its contents will most likely be 10˚F. A landscape plant may easily tolerate this degree of cold when grown in the ground. But its roots are not nearly as hardy as its shoot system (above-ground portion) and they may be damaged or killed by low winter temperatures. Thus, if one wants to have a plant survive outside exposed to the minimum winter temperatures, then the rule of thumb is to select a species that is two USDA hardiness zones lower than the zone in which you live. For example, if you live in zone 7, then you will want to choose a zone 5 species. You may also overwinter your plants by putting them in a garage or some other structure that is cold but not below freezing (32˚F). Of course, annuals, tender perennials, or tropical plants are not suited to low-temperature exposure and these will have to have an inside sunny location to survive the winter.

Terra cotta containers and other such porous materials exposed to freezing conditions will have a relatively short life since they will crack and shatter. To avoid this problem, use fiberglass, plastic, stone, or other nonporous containers.

Container gardening offers many advantages to gardeners. Perhaps the biggest advantage is allowing us to have plants of any type wherever we choose. Remember to address the planting, potting soil, watering, and overwintering issues mentioned above.

Raised Beds

Raised beds are used for plants that 1) require well-drained soil, 2) are to be spatially separated from the surrounding area/plants, or 3) are more accessible to the gardener. You can make raised beds simply by mounding the soil into a growing bed or by constructing them with sides made of wood or other materials. Raised beds offer several advantages to the gardener. 1) Soil in raised beds is better drained than soil outside the bed. This increased drainage is especially helpful when growing plants in low-lying or poorly drained areas. If your native garden soil has a high clay content, then the soil will take a long time to drain and may stay too wet for those species that require good drainage. Either import "good" garden soil for the raised bed or amend the existing soil by adding organic matter that will improve the soil structure, and thereby increase drainage. Landscape plants that characteristically require good drainage include azaleas and rhododendrons (*Rhododendron* spp.), mountain laurel (*Kalmia latifolia*), yews (*Taxus* sp.), and cherry laurel (*Prunus laurocerasus*). 2) The soil in raised beds will warm up faster in the spring (since they are better drained) than that at level ground. This will allow for earlier planting in the spring, effectively extending the growing season. 3) The soil in raised beds does not become compacted since no one walks in a raised bed. 4) There is no need for pathways between rows, as there is for level-ground gardening, thus you can achieve a higher plant density. An increased density usually results in higher yields. 5) Beds are more easily maintained than ground beds since the increased height of the bed reduces bending distance.

The height of the bed will depend on the amount of drainage needed or access issues. In most situations, a 6- to 8-inch height will suffice. Side supports for the soil will not be necessary if beds are less than 6-inches tall. You can construct raised beds so that the soil level is at a height in which plants are easily accessible to individuals who use ambulatory devices, are sight impaired, or can not easily bend down. Relatively narrow raised beds, 4 feet wide (or an arm's length from either side), allow easy access to the center of the bed.

There has been concern as to whether the use of pressure-treated lumber is toxic in vegetable gardens since it contains copper arsenate compounds. Research at Texas A&M found that arsenate compound movement in soils was insignificant. However, in 2003, the lumber industry voluntarily adopted a resolution to use an arsenic-free preservative. Consumers should buy alkaline copper quarternary (ACQ) treated lumber in lieu of chromated copper arsenate (CCA) or ammoniacal copper arsenate (ACA).

Raised beds, while requiring a high initial labor input, offer improved growing conditions and advantages compared to the existing soil. Improved plant growth, increased yields, and better accessibility are reasons to construct raised beds.

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Photos by Alex Niemiera

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