How to Create a *Container Garden for Edibles* in the North Carolina Piedmont

Edibles can be grown in containers in a variety of outdoor spaces: a small apartment balcony, a large deck space, or even a front stoop. People grow edibles for a variety of reasons. You may want to grow tomatoes for a sandwich or lettuce for a salad, or you might be providing herbs, vegetables, and fruit for a family. Regardless of the scope or size of your container garden, selecting the right containers, planting media, and plant combinations are the first steps on the road to success. In this publication you will find ideas to get you started growing your own edibles. Included are simple designs and potential settings for a single container, a small group of containers, and a larger grouping of containers. The benefits and challenges of various planting options will also be explored.

Selecting a Container

Edible plants can be grown in containers that you purchase, build, or recycle. Almost anything will work as long as it has drainage holes, such as a reclaimed galvanized metal bucket, a discarded wooden dresser drawer, or a bright glazed pot whose color contrasts with the plant's foliage, flowers, or fruit. Wood, clay, and unglazed ceramic containers will lose moisture more quickly and will therefore require more frequent watering than plastic, metal, fiberglass, or glazed pots. This is also true for small or dark-colored containers. The temperature of the planting media in a metal pot can fluctuate by as much as 30°F between day and night. However, roots can be protected from extremes of heat and cold by lining the pot with bubble wrap or 1-inch-thick foam. Plastic and wood containers can safely remain outside year round, and cedar and redwood containers will last around 10 years without staining or painting.

Select a container to provide adequate space for roots. Container size should match the plant's growth requirements to prevent restricted root growth, which can result in decreased plant growth (for more information on container size requirements for certain edibles, refer to publication AG-748, "Container Garden Planting Calendar for Edibles in the N.C. Piedmont"). The larger the pot, the less frequently it will need to be watered. If larger plants need to be moved indoors for overwintering, it may be best to have them on a rolling platform; a 20-inch-diameter container filled with growing media and lots of water can weigh up to 100 pounds. When plants become larger, they can be more difficult to move.

Selecting Planting Media

Container planting media can be purchased or homemade, but careful consideration must go into its composition. Otherwise, the media may be too dense and compacted to allow the plants to thrive. Garden soil should not be used because some soils do not drain well (i.e., red piedmont clay), which limits plant roots' access to air. In addition, garden soils may contain many pests, such as weed seed, disease, or insects. Many soilless mixes

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are commercially available. These lightweight, pH-adjusted products are free of pests and often contain a nutrient supplement that serves as a good starter fertilizer. Look for planting media certified by the Mulch and Soil Council, the national nonprofit trade association for all producers of horticultural mulches, consumer potting soils, and commercial growing media. Certification ensures that the product label accurately identifies what is in the bag.

Gardeners can make a soil mix from one part compost; one part perlite, vermiculite, or coarse builder's sand; and one part pasteurized soil or potting soil. In most situations it will be faster, easier, and more precise to purchase a commercial soilless mix. However, if specific needs are present, such as those discussed below, making a custom-made soil mix may be preferable.

- To prevent the container from blowing down in windy conditions, increase sand (more than one-third of the mixture should be soil and sand) and limit perlite.
- When growing high-water-use crops (such as tomatoes) without an automatic irrigation system to water them more than once a day, the mixture should include vermiculite and compost to increase its water-holding capacity.
- For plants that are sensitive to root rot or that prefer dry conditions, such as lavender, rosemary, oregano, and thyme, limit soil and sand to no more than one-third of the total mixture, and include perlite for a blend with more air space.

Selecting Plants

All plants placed in the same container must have similar requirements for light, water, and nutrients. Most warm-season vegetables and fruits do best in full sun, in locations that receive at least six to eight hours of sunlight a day. Some fruits and a few vegetables prefer full sun but will tolerate partial shade during the heat of the day. Most herbs and cool-season vegetables—such as beets, carrots, kale, lettuce, radishes, and spinach—tolerate partial shade, needing only three to five hours of direct sun a day. In the North Carolina piedmont, cool-season plants can be grown from late winter to early spring and again through the fall and early winter. Warm-season plants are generally grown from May through September (for more information on planting dates, refer to "Container Garden Planting Calendar for Edibles in the N.C. Piedmont"). When choosing multiple plants to group in one container, use the information in Tables 1, 2, and 3 to select plants with similar light, water, and nutrient requirements. Selecting plants with closely related needs will ensure that they all thrive in the same conditions.

Most vegetables require consistent and even watering. Apply water directly to the soil, and prevent splashing of soil onto the leaves, which can spread diseases. The majority of vegetables require a moderate amount of fertilization, but a few, including cucumbers, squash, and tomatoes, are heavy feeders that require extra nutrients in order to produce healthy fruit.

Most fruits prefer full sun, with filtered light during the heat of the day. The production of fruit on the plant uses nutrients, so moderate to heavy fertilization is required for a good crop. Many fruits require supplemental phosphorous or potassium, so refer to related extension publications for specific fertilizer recommendations.

The majority of herbs tolerate partial shade and prefer low nutrient levels. Some thrive in moist soil, but many taste best when they are allowed to go slightly dry between watering or are kept in a well-drained or dry container medium.

Selecting Pots and Plants with Design in Mind

While the first priority is similar growing requirements, there are many other variables to consider when mixing vegetables, fruits, and herbs in pots. Plants can be grouped in containers based on:

- Harvesting time—spring, summer, or fall crops
- Form—round, horizontal, oval, upright, or trailing
- Size—small plants in front and underneath and large plants above and behind
- Texture—coarse (stout stems, large leaves, big fruit), medium, or fine (dainty leaves, wispy stems, tiny flowers)
- Color—of flowers, leaves, or fruit
- Ingredients for favorite recipes to create a themed garden—Mexican, Italian, Mediterranean, or Asian

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Table 1. Light, Water, and Nutrient Requirements for Vegetables

	Light			Water			Nutrients[a]		
Vegetable	**Full Sun**	**Tolerates Partial Shade**	**Partial Shade**	**Moist**	**Slightly Dry**	**Dry**	**Light**	**Medium**	**Heavy**
Beans	X			X				X	
Beets		X		X				X	
Carrots			X	X				X	
Cucumber	X			X					X
Eggplant	X			X					X
Green garlic		X		X				X	
Kale			X	X				X	
Leeks	X			X				X	
Lettuce			X	X				X	
Peas		X		X					X
Peppers	X			X				X	
Potatoes	X			X			X		
Radishes		X		X			X		
Scallions		X		X				X	
Spinach			X	X			X		
Squash, summer	X			X					X
Squash, winter			X	X					X
Swiss chard			X	X				X	
Tomatoes	X			X				X	

[a] *Light:* Fertilize at planting; or, for established plants, fertilize once early in the growing season. *Medium:* Fertilize monthly with a liquid fertilizer or every 12 weeks with a timed-release fertilizer. *Heavy:* Fertilize every two weeks with a liquid fertilizer or every eight to 10 weeks with a timed-release fertilizer.

Table 2. Light, Water, and Nutrient Requirements for Fruits

	Light			Water			Nutrients[a]		
Fruit	**Full Sun**	**Tolerates Partial Shade**	**Partial Shade**	**Moist**	**Slightly Dry**	**Dry**	**Light**	**Medium**	**Heavy**
Apples		X		X				X	
Blueberries	X			X					X
Citrus	X			X					X
Figs		X			X			X	
Grapes		X			X			X	
Peaches		X		X				X	
Strawberries	X			X				X	

[a] Fruits should only be fertilized when they are actively growing. Plants should be fertilized to keep leaves medium to dark green in color and to produce ongoing annual growth. Fruit fertilization is crop specific, and you will need to refer to other extension publications for specific fertilization recommendations for the fruit you are growing.

Table 3. Light, Water, and Nutrient Requirements for Herbs

	Light			Water			Nutrients[a]		
Herb	Full Sun	Tolerates Partial Shade	Partial Shade	Moist	Slightly Dry	Dry	Light	Medium	Heavy
Basil		X			X		X		
Bay		X				X	X		
Borage		X			X		X		
Chamomile		X		X			X		
Chervil			X	X			X		
Chives		X		X			X		
Cilantro		X		X			X		
Dill		X		X			X		
Fennel	X					X	X		
Feverfew		X			X		X		
Lavender		X				X	X		
Lemongrass	X			X					X
Lemon verbena	X			X				X	
Marjoram	X					X		X	
Mint	X	X	X	X			X		
Monarda		X		X				X	
Oregano	X					X	X		
Parsley			X		X		X		
Rosemary	X				X		X		
Sage		X				X	X		
Salad burnet		X			X		X		
Scented geranium	X				X		X		
Stevia		X			X			X	
Tarragon	X					X			X
Thyme		X				X	X		

[a] *Light:* Fertilize at planting; or, for established plants, fertilize once early in the growing season. *Medium:* Fertilize monthly with a liquid fertilizer or every 12 weeks with a timed-release fertilizer. *Heavy:* Fertilize every two weeks with a liquid fertilizer or every eight to 10 weeks with a timed-release fertilizer.

A garden can be an area for relaxation at the end of a long day or a place that energizes and excites. Your experience will be affected by the mood you set through color combinations. Blue, green, and pastel-colored pots will give a feeling of peace and tranquility, whereas bright red, yellow, and orange containers shout energy and excitement. The finish of a container will also contribute to the overall mood. A shiny surface reflects more sunlight, and a muted finish is more subdued. Choose pots of different sizes and proportions to create a "family," and group them in odd numbers of three or five, unless you want to create a formal setting; in that case, the pots should be set out in pairs.

Many edibles have real eye appeal. Bright stalks, showy fruit, and flower buds can create a visual impact. To make the colors pop, contrast the color of the container with that of the fruit or foliage. For a smoother color transition, make the color of the pot echo that of the plant, and use green stakes instead of wire cages to blend into the living green background. In addition to sight, also include the senses of hearing, touch, and smell when planning your container garden. A wind chime or water feature will draw attention and pull you into the garden. The feeling of soft sage or wispy dill, along with the scent of rosemary, mint, or ripe strawberries, not only invites you in but makes you want to linger for a while and enjoy.

SAMPLE CONTAINER DESIGNS

Sample Single Container Design

Situation: Limited space
Setting: Apartment balcony or entrance area
Sunlight: Afternoon sun

Container size: Minimum depth of 8 inches for cilantro's large taproot
Crops: Succession—**Cilantro, basil, and chervil**

With a single container, succession planting—planning the planting of one crop so that when it is harvested, another will be planted in its place—is the most efficient use of your limited space. Place the container in an area that receives full sun to light shade. In late February to March plant **cilantro** seeds or transplants. Cilantro grows best under cool conditions and will be ready to harvest about six weeks after seeding. Cilantro bolts, or goes to seed, quickly. The best choice for leafy cilantro is to purchase a nonbolting variety. However, if the plants do bolt, you can harvest the seed, which is known as coriander.


Photo courtesy Miwako Kato

During April or early May, once nighttime temperatures are above 50°F, replace the cilantro with **basil** transplants. Try mixing in several varieties of basil; they vary in taste and color, from the large, green leaves used for pesto to ruffled, purple leaves used to make purple basil vinaigrette. The combination of foliage textures and colors will provide a beautiful display and can be highlighted by a brightly colored container. Basil loves hot weather and will grow well through the summer heat. Fertilize basil with a high-nitrogen plant food when it is planted and once again in midsummer. Fertilizers are assigned three numbers that represent the percentages of nitrogen, phosphorous, and potassium they contain, in that order. For instance, a fertilizer rated 10-5-5 has 10% nitrogen, 5% phosphorus, and 5% potassium. For basil, use a fertilizer whose first number (nitrogen) is higher than the last two numbers.

In late August to early September, harvest the rest of the basil and sow **chervil** seeds. Chervil tolerates cool weather and low light and will continue to grow into the fall. It will be ready to harvest in six to eight weeks. Both cilantro and chervil should be kept moist, but basil develops its best flavor when it becomes slightly dry between watering.

Sample Small Grouping Design

Situation: Medium-sized open space
Setting: Patio or walkway—long and narrow or corner grouping
Sunlight: Partial shade in the spring but full sun in the summer

Container size 1: At least 15 to 18 inches in diameter and 13 to 18 inches deep
Crops: Succession—**looseleaf lettuce and tomato**

Container size 2: At least 24 to 28 inches long, 7 inches wide, and 7 inches deep
Crops: **Thyme, rosemary, and oregano**

Container size 3: At least 15 inches in diameter and 12 to 16 inches deep
Crops: **Bell pepper, marjoram, parsley, and basil**

During mid- to late February, plant **looseleaf lettuce** seeds in container 1. It will be ready by early April. Most varieties of looseleaf lettuce will regrow after cutting to provide a continuous harvest. Be aware that lettuce becomes bitter when the soil is allowed to dry out or the weather becomes hot. Lettuce will benefit from a fertilizer high in nitrogen (the first number should be higher than

the last two numbers). Place the container in an area where it will receive at least three to five hours of sunlight a day.

From late March to mid-April, **thyme**, **rosemary**, and **oregano** transplants can be purchased and placed into container 2. This container should be large enough to provide for good air circulation, in order to avoid fungal disease. If you prefer an unusual variety of thyme that cannot be found locally, thyme can be started indoors from seed in early March. After several weeks these seedlings will be a few inches high and well rooted, and they can be transplanted. All three herbs prefer well-drained soil and should not be overwatered. This container will do best in full sun.

In May, once nighttime temperatures are above 55°F and daytime temperatures are above 70°F, harvest the remaining lettuce and plant a **tomato** transplant deeply into the center of container 1. In container 3, plant a **bell pepper** in the center, and plant **marjoram**, **parsley**, and **basil** around the edges. Put the marjoram on the sunniest side of the pot, and put the parsley on the shadiest side. Both tomatoes and bell peppers thrive in full sun and moist soil and require some form of support, which should be put in place at the time of planting. Do not use high-nitrogen fertilizer (i.e., the first number should be equal to or less than each of the last two numbers), which would result in lots of green foliage but fewer peppers and tomatoes.


Photo courtesy Rachel M. Arseneau

Sample Large Grouping Design

Situation: Large open space
Setting: Rooftop or deck
Sunlight: Smaller area in partial shade, extending into larger area in full sun

Container size 1: Will eventually need 2 feet × 2 feet × 2 feet
Crop: **Dwarf blueberry**

Container size 2: At least 22 to 28 inches long, 16 inches wide, and 8 inches deep
Crops: Succession—**spinach/peas and bush beans**

Container size 3: At least 12 inches long, 8 inches wide, and 8 inches deep
Crops: Succession—**lettuce and hot pepper**

Container size 4: At least 15 inches in diameter and 8 inches deep
Crops: **Swiss chard, scallions, green garlic, and chives**

Container size 5: At least 15 to 18 inches in diameter and 13 to 18 inches deep
Crop: Succession—**cilantro/parsley and tomato**

For container 1, choose a dwarf variety **blueberry** and transplant it anytime from October through the end of February. Planting is done during the cooler months so that the root system will become established before the weather gets too hot. Initially, the blueberry can be planted in a smaller container and repotted each spring, but the root system will eventually require a container that measures 2 feet by 2 feet by 2 feet. Blueberries will take several years to bear a full crop. Blueberries prefer full sun with light shade during the heat of the day and constant moisture but not standing water. Planting media pH should be 4.5 to 5.3; the pH can be checked each spring by sending a sample of media for a soilless media analysis though the North Carolina Department of Agriculture & Consumer Services. Fertilize blueberries on a monthly basis with a complete fertilizer (all three numbers


Photo courtesy D.J. Gunn

are the same or similar) through August, but do not fertilize during the fall and winter.

In container 2, sow **spinach** and **pea** seeds directly in containers during February. At the time of planting, a nitrogen-fixing inoculant should be mixed into the soil with the peas, and a trellis should be put in place. Choose garden peas, snap peas, or snow peas, and plant the seeds in the center of the pot, with the spinach around the edges. Peas and spinach tolerate light shade and prefer moist soil. Peas do best with a fertilizer that is higher in phosphorous (the ratio of the three numbers should be approximately 1:2:1).

After the spinach and peas have been harvested, the **bush beans** can be planted from mid-April until mid-July, once nighttime temperatures are above 60°F. Use the same trellis for the beans that you had in place for the peas. The first beans will be ready to harvest 50 to 55 days after planting. Beans prefer full sun and consistent, even moisture. Once the first beans begin to form, the plants require regular fertilization with a liquid or controlled-release fertilizer with similar levels of all three nutrients, such as 14-14-14.

For container 3, choose a variety of **lettuce** transplants and plant them anytime from late February through March. Lettuce tolerates partial shade and prefers moist soil. Fertilize with a high-nitrogen fertilizer (the first number is higher than the last two numbers). During May when the weather is above 80°F, the lettuce will begin to bolt and become bitter. Now is the time to replace those plants with one or more **hot pepper** transplants. Choose hot pepper plants that are dense and compact. Put the planter in full sun, keep the soil moist, and supplement with a fertilizer

high in phosphorous (the middle number is higher than the first and last numbers).

Container 4 can be planted in mid-March. The **Swiss chard** transplants should go in the center of the pot; if using seeds, they should be started indoors in mid-February. Around the chard, place **scallion** transplants or onion sets, unpeeled **garlic** cloves, and **chive** plants. This container will do best in an area that is shaded from the hot afternoon sun. The soil should be


Photo courtesy Rachel M. Arseneau

kept moist, and the plants will benefit from fertilizer that is higher in nitrogen. Both the garlic and the chives can be harvested by snipping off the amount of green foliage that is needed for a given meal. The Swiss chard and scallions should be ready to harvest after 60 to 70 days.

In container 5, the **cilantro** can be started from seed in late February throughout March. **Parsley** is slow and erratic to germinate, so use transplants if possible. They can be planted from April into mid-May. These plants both do best in partial shade and prefer cooler conditions. Once the weather gets hot and the herbs start to bolt, replace them with a **tomato** plant. The tomato plant will need to be staked or trellised at the time of planting and should be planted deeper than it was in its small pot, removing all but the top two or three sets of leaves and burring the plant up to one inch below the remaining leaves, to promote lots of root growth. Use a fertilizer that is not heavy in nitrogen (the first number is not as high as the last two numbers), do not let the soil dry out completely, and move the pot into an area that receives full sun.

Creating a Successful Container Garden

Follow these key guidelines to create a successful container garden:

- Grow edibles on a balcony, deck, or entrance area.
- Use only containers that have drainage holes.
- Avoid small or dark-colored containers.
- Use planting media, not garden soil, which is too dense and compacts too much.
- Group plants in a container with other plants that have similar requirements for light, water, and nutrients.

There are many options and opportunities for creating an edible garden that is both functional and aesthetically pleasing. Use color, texture, and differences in size for a striking display. Select plants with similar requirements for light, water, and nutrients, and plant combinations of vegetables, fruits, and herbs in the same container. Keep these principles in mind and reap the benefits that a container garden has to offer.

Resources

Cabrera, R. 1995. "Fundamentals of container media management, part 1: Physical properties." New Jersey Agricultural Experiment Station, Rutgers Cooperative Research and Extension. Publication FS 812. njaes.rutgers.edu/pubs/publication.asp?pid=FS812. Accessed January 12, 2010.

Creasy, R. 2010. *Edible Landscaping*. Sierra Club Books, San Francisco, CA.

Demboski, K., A. Swanberg, and J.C. Martin. 2000. "Container vegetable gardening." The Ohio State University Extension, Columbus. Publication HGY-1647-2000. http://ohioline.osu.edu/hyg-fact/1000/1647.html. Accessed January 12, 2010.

Durham, R.E., T. Coolong, R.T. Jones, J. Strang, M. Williams, S. Wright, R. Bessin, J. Hartman, and K. Seebold. "Home vegetable gardening in Kentucky." University of Kentucky Cooperative Extension Service, Lexington. Publication ID 128. www.ca.uky.edu/agc/pubs/id/id128/id128.pdf. Accessed January 12, 2010.

Marr, C.W. 1998. "Container gardening." Kansas State University Agricultural Experiment Station and Cooperative Extension Service. Publication EP-31. www.ksre.ksu.edu/library/hort2/ep31.pdf. Accessed January 12, 2010.

McGee, R.N. and M. Stuckey. 2002. *The Bountiful Container*. Workman Publishing Company, New York, NY.

Mugnai, S., P. Vernieri, and F. Tognoni. 2000. "Container volume effects on morphology and physiology of tomato seedlings." *Acta Hort*. 516:49–56.

Ogutu, M., N. Pollard, J. Scherer, J. Schuster, and G. Stack. "Successful container gardens." University of Illinois Extension. urbanext.illinois.edu/containergardening/default.cfm. Accessed January 31, 2010.

Schneider, M.J., H.C. Harrison, and M.K. Myers. 1990. "Container gardening." University of Wisconsin Extension. Publication A 3382.

Traunfeld, J. 2006. "Container vegetable gardening: Healthy harvests from small spaces." University of Maryland Extension, Ellicott City. Publication HG 600. http://www.hgic.umd.edu/content/documents/hg600_000.pdf. Accessed January 12, 2010.

Wisser, K. and T.A. Garwood. Successful container gardening. North Carolina Cooperative Extension Service, Surry County Center, Dobson. http://rockingham.ces.ncsu.edu/files/library/79/containergardenpub.pdf. Accessed January 12, 2010.

Prepared by

Kim Richter
Department of Horticultural Science

Lucy Bradley, Assistant Professor and Extension Specialist
Department of Horticultural Science

Mark Kistler, Assistant Professor
Department of Agricultural and Extension Education

Julie Sherk, Assistant Professor
Department of Horticultural Science

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