

GROWING CULINARY HERBS IN TENNESSEE GARDENS

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INTRODUCTION

Herbs have been a part of gardens and culture for thousands of years. From food to health, these plants have benefited humans in a myriad of ways. While herbs have been grown for thousands of years, they are still used and enjoyed by both new and experienced gardeners and plant people alike. From enabling gardening to occur in small spaces to the benefits of a wide range of culinary attributes, herb gardening really does have something for everyone. Success with herb gardening is largely a matter of understanding what herbs can offer, what they need for proper growth, and then selecting herbs that fit your location and needs. This management publication and the [Selecting Culinary Herbs for Tennessee Gardens](#) publication will get you well on your way to success with a range of culinary herbs.



GROWING HERBS IN GROUND

A. Selecting a Site

When selecting an in-ground location for herbs, keep in mind soil drainage is a higher priority than soil fertility. For vegetable garden or even landscape beds, fertile soils that support rapid, consistent crop growth are preferred. Herbs, on the other hand, are often described as preferring average soils, or even those with lower fertility. It is probably more accurate to say they can survive in low fertility sites but prefer moderate or average fertility. Plant nutrition needs can be addressed over time with additions of organic matter and fertilizer materials.

A non-negotiable element, though, is soil drainage. Many herbs are native to Mediterranean climates with much drier winters than Tennessee generally experiences. Many herbs, such as lavender, are often more likely to be lost from high soil moisture in winter than from low temperatures. Sandy soils, as well as loamy soils with good levels of organic material, can all be well-drained enough for herbs to thrive. Heavy, clay soils will often present challenges if there is not good drainage, especially in winter. There are many excellent landscape plants that can thrive in areas with moderate to poor drainage, but most herbs will not. For more specific investigation, take a percolation test to ensure that soil drainage is rapid enough for survival and productivity of herbs.

Sites with at least six hours of sunlight are needed for most herbs to be productive and high quality. Many herbs are native to regions with high light and high summer temperatures. Few herbs can be grown successfully in shady locations. Air movement through the site is also important as a means of drying leaves more quickly and lowering disease risk.

Herbs can be integrated into the landscape and used for ornamental as well as culinary benefit. But, light and soil conditions of the ornamental and herb plants need to be well matched. Some herbs can be grown with home vegetable gardens. Basil is a warm season crop that grows and produces well with higher levels of fertility, and it can be grown similarly to garden crops, like peppers and eggplants. Likewise, parsley and cilantro are cool season leafy crops that could be grown in a similar fashion to many leafy garden crops, such as lettuce or Swiss chard. An added benefit of herbs in the vegetable garden is their support of a range of



beneficial insects and pollinators.

B. Preparing the Site

As with any new growing site, start by taking a soil test to ensure that the pH and other nutrients are in proper ranges. Most herbs prefer a near neutral site (6.5 to 7.5) pH with some actually performing better in the slightly alkaline range (around 7.5). In many areas of Tennessee, lime additions may be needed. Make these pH adjustments several months before planting to ensure there is time for pH to change. In parts of middle Tennessee with soils that are formed over limestone parent material, herbs that prefer more alkaline conditions may be a very good option.

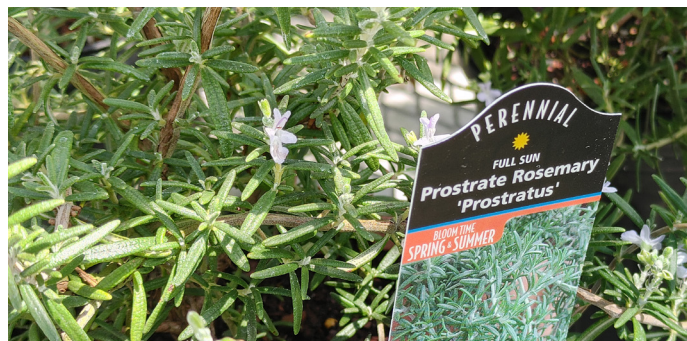


If your site has heavy or poorly drained soil, a raised bed or container may be essential for successful herb growing. Even in sites with relatively good drainage, raised beds can support drainage and provide more rapid soil warming in the spring. Raised beds can be structured with brick, block or wood, or they can be more naturalistic with stone or even temporarily constructed with mounded soil.

During preparation, organic matter can be added as a surface dressing or incorporated before planting. In soil with good drainage and tilth, it may be preferable to not practice mechanical tillage as it can reduce soil structure. In these cases, organic material added as a surface mulch can be ideal. However, if organic matter percentage is quite low or there are issues with compaction or signs of poor soil structure, then tilling to incorporate organic matter before planting may provide long-term benefits. A cover crop could even be grown over the previous winter or growing season to be tilled in to add organic matter and reduce weed growth before planting. Whether or not tillage is used, a loose friable soil that has some moisture present and is free from weeds will be best for planting.

C. Selecting Herbs

After site selection and preparation, high quality plants or seeds are the next crucial decision. Many annual herbs can be grown economically and successfully from seed. Purchase seeds from a high-quality seed supplier to ensure true-to-name cultivars. Basil, chives, cilantro, borage, parsley and others are commonly started from seed by gardeners and then transplanted. Growing your own transplants provides access to a wide range of cultivars and control over the timing and health of your crop. Conditions for growing herb transplants are very similar to growing vegetable transplants (see UT Extension publication W346-B).



Purchasing transplants from a local greenhouse or garden center is also a great option with local selections increasing as interest in herb gardening rises. Many local suppliers have good selections of annual and perennial herbs. Many herbs are best grown from vegetative propagation (cuttings, division etc.), so purchasing these as transplants is generally the simplest means of obtaining high quality plants. As with other plant purchases, always select plants that are healthy and free of insect and disease issues. Look for healthy foliage as well as healthy and actively growing root systems.

D. Establishing Herbs

Plant herbs in well-prepared (loose, friable, free from weeds) soil and water well to support the establishment of new roots. Young plants should be put in the ground at the same level as they were growing the pot but be sure to place a thin layer of soil over the potting medium to prevent rapid drying. Roots should be lightly disturbed (or more vigorously disturbed if there are indications of the planting being root-bound) to support exploration into surrounding soil. Mulch should also be initially applied after planting to moderate soil moisture and temperature as well as added over time as needed. Hardwood or pine bark mulches generally work well, but pine needles and even pea gravel can be used on some of the crops to support drainage and reduce disease issues.



E. Growing Practices

Optimal herb growth and productivity requires levels of moisture like many common garden plants—around 1 inch per week. Herbs that are well established could likely survive on around half of that level of moisture. There can be wide variations in ideal or tolerable levels of moisture for different herb crops. Basil and comfrey are reported to have higher maximum moisture tolerances while rosemary, lavender, sage, and bay laurel can survive with lower moisture levels. These variations in tolerances and optimums means that irrigation in the herb garden can be very useful, but it should be flexible in terms of plants and timing. Drip systems are preferred because of the ability to keep the leaves dry but would need to be zoned or have individually controlled emitters to enable variable rates of delivery.

Follow soil test recommendations for fertility additions both at planting and during growth (called side dressing). Controlled release fertilizers can also be a simple and useful means of delivering fertilizer throughout the season. Many organic fertilizers require microbial activity to release nutrients and can serve as a less-precise version of slow release fertilizer. While a wide range of organic fertilizers can be used in the herb garden, avoid the use of any fresh manures due to food safety risks. Only use materials containing manure after it is well composted at sufficiently high temperatures to control potential human and plant pathogens.

Crops that are frequently harvested are likely to require higher and more consistent levels of fertilizer application throughout the season. If annual herbs are grown in the vegetable garden, then fertilization practices can be similar in terms of the pre-plant fertilizers and side dressing like leafy garden crops. Monitor growth levels of higher nutrient requiring herbs, such as basil, as they are a useful indicator whether fertility is sufficient to maintain crop growth. It is common to provide more nutrition to annual herbs than perennial herbs. If perennial herbs are intermixed in landscape beds, they are often provided with similar levels of fertilizer as landscape plants.

II. GROWING HERBS IN CONTAINERS

Growing herbs in containers presents the opportunity to closely control factors of growth and enable essentially any gardener to enjoy the cultivation of herbs. Containers can be a means of enabling cultivation in small, urban or even indoor areas (with proper lighting). They also can enable gardeners with poorly drained or otherwise unsuitable sites to successfully grow herbs. One of the attractive features about container grown herbs is that small quantities are often used for culinary purposes, so a few containers can provide a good supply of herbs for cooking during the growing season. Additionally, containers on porches or patios provide very rapid access to the kitchen and enable gardeners to quickly and easily make use their herb harvests.



A. Selecting Herbs for Containers

Selection of herbs for containers is similar to in-ground, but the mature size of the herb will be more important and should be considered in terms of site and container selection. Additionally, whether an herb is an annual or perennial also will be important when selecting container herbs. Annual herbs are a great place to begin with container herbs because of their rapid growth and shorter time to production. Many perennial herbs also can be successfully grown, but care needs to be taken during the winter to prevent freeze damage (to the plant and the pot), or over- or under-watering.

B. Selecting Containers for Herbs

Selecting the best growing containers for herbs requires an understanding of the plant needs, container materials, and the attributes of plant growing substrates (discussed below). Containers serve practical purposes as well as interesting aesthetics options for the porch, patio, or windowsill.

Different types of containers have variable permeability and air exchange, so they can influence aeration to the roots as well as the speed of substrate drying. Terracotta is one of the most well-known container types for small to medium sized pots. It is a very porous clay material that provides high air exchange and rapid substrate drying. Terracotta can work well for many herbs that prefer very well drained conditions and do not tolerate overly moist soils. Many concrete containers or those that contain some concrete material (like hypertufa) would also be high in aeration and rather rapid in substrate drying. Glazed ceramic containers have less air exchange than terracotta due to the glazing, so substrates are slower to dry.

Plastic containers offer the least air exchange and slowest substrate drying, which can be a benefit in terms of management but a possible detriment to some plants if the substrate is kept too moist. Plastic containers are often lighter weight, but this can also lead to more top-heavy plants. For larger containers, a range of wood options are available where substrates would tend to dry out slower than in clay pots but likely more rapidly than in plastic. In addition to container type, drainage of the container is key. All containers for growing herbs need to be manufactured or augmented with drainage holes.

The rate of water loss through the container can influence temperature as water loss can lower the substrate temperature (potentially an asset in warm conditions). Keep in mind that large plants with many leaves will be rapidly transpiring water from their leaves. This water loss is likely to be more important than container water loss in the warmest seasons. Container color is also very important in terms of temperature management with darker containers warming up faster in the early and later season but reach higher temperature levels in the heat of the summer. It might be useful to monitor substrate temperature to ensure that temperatures do not get too high.



C. Selecting Growing Substrate for Containers

Optimum growth and health for herbs in containers will generally require them to be grown in soilless mixes rather than actual soil. High quality soil could be used for raised beds, but for containers, the best control over growing conditions will be found with a soilless substrate (material in which plant roots are grown) containing organic materials, such as peat moss, pine bark or coconut husks (coir) as well as mineral materials, such as sand, perlite, and vermiculite. Different combinations of materials with high water holding capacity (peat moss) can be combined with materials that speed drainage (composted pine bark, sand) or increase aeration (perlite) to provide a wide range of conditions for different herbs. Soilless substrates also have the benefit of being able to be largely pathogen free.

For smaller herb growing containers, a greenhouse or indoor potting mix with higher porosity could be used successfully. Often these mixes will have a majority of peat moss in them with a good amount of perlite to support aeration and drainage. However, for larger containers, it will be necessary to select a mix that does not have as high a percentage of peat moss. The small particles can break down quickly and reduce air movement and porosity in the container. Composted pine bark could be used in larger percentages, as well as sand to encourage drainage and aeration in larger containers. While these materials with larger particle sizes will drain faster and promote root aeration, they will likely need to be watered (and potentially fertilized) more often.

Container size is a final crucial element that interacts with container type and color as well as substrate type and plant size. Smaller containers heat up and dry out faster, while larger containers warm, cool, and dry out more slowly but have a great risk of poor drainage. Selecting the ideal container for your site and herb crop will depend on the location as well as your ability to manage the containers. Smaller pots require more frequent watering and hot, sunny locations may require watering once or more a day.

It is generally better to err on the side of too large than too small for containers to prevent rapid drying and plant loss under hot or dry conditions. However, there are limits to this approach. Small plants placed in large containers may have issues with root drainage as the large volume of substrate can hold more water than is ideal for the young plant. So, select containers that are a size or two larger than the plant you are placing in them and be ready to increase the container size through time as the plant grows.

D. Growing Practices for Container Herbs

As with in ground plants, plant the young herb plant in the container at the same height it was growing in the transplant container. Loosen the roots in the transplant to be ready to explore the new substrate. Be sure to fill in with substrate around the young plant and firm slightly (i.e. press down) the substrate to eliminate large air spaces that would deprive the roots in the vicinity of access to moisture. Don't firm to the point that water isn't able to easily flow through the substrate, though.

Watering properly is more complex than it appears. Underwatering will limit plant growth and lead to wilting and leaf damage while overwatering can damage or kill roots and often entire plants. Overwatering may also result in wilting, so check the substrate and the drainage as well as observing the plants. As a general statement, killing herbs by overwatering may well be more rapid and common than killing them with underwatering.

1. Quality-The small volume of growing substrate in a container may not have the ability to buffer ions and salts in the water like soil does, so water quality is important. Water softeners can be a source of high salts that can damage container plants because ions in the water are replaced with sodium. So, use water prior to softening.
2. Quantity-The amount of water needed depends on the plant size, the container volume, and the environment. As a general rule, watering should be done until water drains out of the bottom of the container. This helps prevent the build-up of salts in the substrate and keep leaves dry. But, it might also lead to salt accumulation, so periodically flush the substrate well with top watering. You can keep leaves dry when wetting the substrate carefully from the top.
3. Timing-The best way to monitor moisture content in the substrate is manually. Simply use your hand or finger to determine how moist the substrate is and how deep that moisture can be found. Over time, you will become more familiar with the rate of drying and how that changes with season to make plant growth and watering timing will become easier to predict. Larger containers enable less frequent watering and lessen the wet-dry cycle for the plants.

Most soilless substrates have a lower level of plant nutrients than soil. Roots will have access to a lower volume, so fertilization is essential for container herbs. Controlled release fertilizer can be added at planting or soluble fertilizers can be used at regular intervals throughout the growing season to provide nutrients. A weekly or bi-weekly feeding of a standard soluble fertilizer would likely be needed for many smaller containers while a longer frequency between feedings might be possible in larger containers that can hold more plant available nutrients. For container-grown herbs, many of these soluble and controlled release fertilizers will also contain micronutrients, which are more likely to be needed in container mixes than in native soils which often contain trace levels of many micronutrients. Follow the label on the fertilizer for application instructions, but visually monitor the plant through time to ensure that leaf color, growth rate, and plant habit do not indicate an excess or deficiency of key nutrients.

III. PEST AND DISEASE MANAGEMENT

Many soil-borne diseases are challenging for herb production in the ground. Proper site selection and preparation supporting good drainage and root health are the best tools to combat these diseases. For others, rotation among crop families (for annual herbs) is important to reduce the risk of pathogen build up in a site over time. Some common culinary herbs, such as basil, have cultivar options with resistance to some common diseases. Many newer basil cultivars can be found with resistance to *Fusarium* and basil downy mildew (see image on right showing late summer basil downy mildew infection), the two most common root/stem and leaf diseases of basil, respectively.



Air movement and consistent sunlight is important to keep leaves as dry as possible and reduce the chances for higher levels of infection from common leaf diseases, such as powdery and downy mildew. A number of fungicides, both organic and conventional, may be used to address leaf disease issues (see UT Extension publication W-661). Some microbial products are an option to support root health and strengthen plants with the intent of lessening damage from soil borne pathogens, but there are few fungicides available to treat root and stem diseases after infection.

Some leaf feeding insects may become an issue for herbs, but identification is essential before control steps are undertaken. Some herbs are host plants for butterfly larvae (caterpillars), so be sure that the damage is not caused by insects that herbs were planted to attract. For most pest issues, control sprays may be unnecessary, but if damage is severe, control materials may be needed. Be sure to confirm that the plant is listed on the label and follow label guidelines and use practices to protect pollinators.

IV. HARVEST AND STORAGE

A. Harvest

Proper harvest timing for herbs is dependent upon the desired use. For instance, if leaves are the primary harvested material (basil, cilantro, sage, etc.), the best time to harvest is usually when the plant is still vegetative (before flowering begins). Some herb flavors can shift after flowering as the chemical makeup of the plant changes. These guidelines are largely based on leaf quantity. There is still much research on the timing of harvest for optimum oil yield and other factors. Often multiple harvests are ideal for maintaining plant growth and maximum harvest. Annual plants can usually be harvested more aggressively than perennials, with harvests of up to 50% to 75% of growth. More frequent, smaller harvests are often preferred in terms of plant growth, aesthetics, and herb availability for fresh use. Larger, less frequent harvests may be useful if preservation is the main goal. For perennial herbs, a lower percentage of growth removal is recommended (less than 20%). It is best to stop harvesting in the late summer because fall harvests can induce young flushes of growth that can be rapidly damaged by early winter cold.

If flowers are desired (borage or chamomile), then harvesting just before the flowers are fully open is best. Herbs grown for seed production will require completion of flowering and seed formation but gathering before seeds shatter (released from the plant) will be critical.

Morning is a good time for harvest as the moisture content of the plant will be higher (less wilting), and the leaf temperature will be cooler than in the heat of the day. Use care to harvest in a sanitary manner (clean hands, clean container) and use sharp, clean tools for fast, accurate cuts. A small container of water could be used to provide a bit of water and prevent wilting in the field.

B. Storage and Preservation

For highest quality, fresh use of herbs is recommended. Quality will be lost from the time the stem of the herb is cut, but proper conditions for short-term storage will help retain quality.



Most herbs should be stored at traditional refrigerator conditions (dark and between 32 and 41) with protection from desiccation. Quality should be reasonable for a week or a little more under these conditions. Basil is the exception to this rule as prolonged temperatures below 50 will cause damage as basil is chilling sensitive. It should be stored under warmer conditions than other herbs.

Drying is the traditional method of preservation for many herbs, but even ideal drying conditions will lower the oil content and aroma of most herbs.

It is best to dry herbs in an indoor environment with warm temperatures (not more than 100°F) and low humidity to protect from damaging direct sunlight. Herbs can be dried loosely scattered over paper towels or screens to increase air flow. They can also be tied in small bundles and hung upside down. If seed collection is needed, paper bags with holes can be tied to the bundles to catch seeds as the plants dry. Air circulation is essential.

In a dehydrator, temperatures should be set between 90 and 110. Ensure no stems/leaves touch on the trays and do not dry with other fruits and or vegetables because flavors can mingle. Microwave drying is also possible, but use low heat and short durations (1 minute or less). Be careful, though, as discoloration and loss of volatile oils can be rapid in a microwave.

Even well dried, herbs are best used over the course of months rather than years. In tin or glass storage containers, two to four years is generally the longest shelf life that can be expected. Aluminum foil lined plastic bags have also been shown to maintain the shelf life of dried herbs well.

Freezing provides an excellent and often easy alternative to maintaining the fresh flavor and integrity of herbs, especially those not easy for drying (basil, mint, and dill). Frozen herbs can be used in recipes as fresh herbs. Woodier stemmed herbs like oregano, rosemary, or thyme dry better than being frozen. Freezing plants harvested before flowering is usually ideal. Trim the top sections off your plants and spread onto a cookie sheet (not touching). Cover with wax paper and freeze overnight. Then remove from the tray and place in zippered storage containers in the freezer.

Another freezing option is using ice cube trays, which are an ideal way to pre-measure herbs for individual portions. Follow the same guidance for freezing on cookie sheets, but pat dry the herbs, making sure all water is removed before freezing, and then pluck leaves from each stalk, placing into individual cubes. Fill each cube halfway with water, freeze for an hour, top with water, and freeze until ready to use.

A few months is the typical storage life of frozen herbs. Keep in mind that some strong herbal aromas can impact other foods in the freezer as well. Other common methods of herbal preservation such as storage in oils and vinegars will be covered in additional publications more focused on culinary uses rather than herb production.

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