

Growing Tomatoes in the Home Garden

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This NebGuide provides information on planting, caring for, and growing tomatoes in the home garden.

Tomatoes are the most popular garden crop grown across Nebraska and the United States. They are adaptable to growing in containers, home gardens, high tunnels, and traditional greenhouses. This versatile plant has a variety of uses, from fresh eating to freezing or canning, even green tomatoes can be used, if desired. Tomatoes from your own garden offer freshness at its best plus excellent nutrition.

Planting Sites

Tomatoes should be planted in full sun for optimum fruit development and production. Fertile, well-drained soil is best. Wind protection provided by slatted wooden or plastic fencing, shrubs, trees or taller crops such as corn will enhance tomato growth and yield. Individual plants may be grown in large containers, but will need more attention as the soil tends to dry out quickly.

Avoid planting tomatoes near black walnut trees to prevent development of “walnut wilt.” This condition is caused by the chemical juglone, which is exuded by the roots of walnut trees. Initially, affected plants are stunted, may wilt, and the lower portions of stems brown internally. At about the time of plant death a root rot occurs. The injury may not occur every season, but caution needs to be taken. To minimize the problem, locate tomato plants at a greater distance from the base of black walnut trees than the tree height.

It also is advisable to rotate tomatoes in the garden so they are not planted in the same place where tomatoes, potatoes, eggplant, and peppers were grown the previous year.

Soil Preparation and Fertilization

Till or spade the planting area in fall after harvest or in spring before planting. However, soil should not be worked while it is wet to prevent compaction.

Tomato plants benefit from fertilization. A soil test may be necessary to determine the fertility level of your soil. Instructions on how to collect and submit soil for testing

are available from your local UNL Extension office. When planting in soils with high nutrient values, some or all of the fertilizer may be omitted at planting. If soil nutrients are low, apply 2 to 3 pounds of a complete fertilizer (e.g., 5-10-10, 6-12-12 or 8-16-16) per 100 square feet of garden area when preparing the soil.

When the first fruit is about the size of a half-dollar, scatter one teaspoon of 5-10-5 fertilizer uniformly around each plant 8 to 10 inches from the stem. Mix the fertilizer into the top 1/2 inch of soil and water thoroughly. Repeat this once or twice a month through the rest of the season.

Do not over-fertilize. Excessive nitrogen fertilizer tends to force plants to produce excess foliage at the expense of fruit production.

Selecting Cultivars and Types of Tomatoes

There are many types and cultivars (cultivated varieties) of tomatoes to choose from. The type and cultivar selected will depend on the intended use and personal preference. Taste is usually the first trait of interest to gardeners, and varies with tomato cultivars. Some gardeners feel heirloom and older cultivars have more flavor, but this does not always hold true. However, heirloom cultivars are a favorite of many home gardeners. The smaller cherry type tomatoes are excellent for taste.

Tomato types may be small (1 inch in diameter) to large (over 4 inches in diameter), with a variety of skin colors including yellow, orange, pink, maroon, green, white, striped, and red. Tomato shape is also quite variable, ranging from pear shaped to oblong, flat or round.

There is also great variability between cultivars for disease susceptibility. Many cultivars have been developed with resistance to Fusarium (F) and Verticillium (V), as well as common tomato virus diseases such as Tomato Mosaic Virus (TMV). Recently, several new cultivars have been released with improved resistant to early and late blight. Choosing tomato cultivars with high levels of disease resistance will minimize disease in the home garden and improve yield. Look for a listing of disease resistance for each tomato cultivar on seed packets and in seed catalogs.

Another trait that is important to consider when selecting a tomato type for the home garden is plant habit. Some tomato cultivars have an indeterminate growth habit, while others are determinate.

- Determinate types grow to a genetically pre-determined height, then stop and set one large flush of fruits. Look for dwarf or small bush determinate cultivars, such as 'Patio Hybrid', for use in containers.
- Indeterminate types continue to grow all season, developing long vines, and produce fruit until killed by frost. Most heirloom tomato cultivars are indeterminate.

See NebGuide G1896, *Selected Vegetable Cultivars for Nebraska*, for a recommended list of tomato cultivars.

Growing Transplants

Home gardeners may either purchase tomato transplants or grow their own. When growing your own transplants, sow the tomato seeds four to six weeks before transplanting outdoors. The seeds may be planted individually into small pots and growing containers, or they may be broadcast seeded into flats and later transplanted into individual growing containers.

Various commercially prepared potting mixtures for starting seeds are available. Usually, the home gardeners will be more satisfied with the use of commercial growing mixes instead of soil mixes created from scratch for starting their transplants; they are easy to use and free of insects and weed seeds. However, a soil mixture developed by Pennsylvania State University consisting of one part clay loam, two parts sphagnum peat, and two parts perlite (by volume) can be used if gardeners want to blend their own soil medium. If potting mix is created at home, it is highly recommended to pasteurize the potting mix before using.

Pasteurize both the container and soil mix before use to destroy harmful disease organisms. Place the moistened soil mixture in a container, cover the container tightly with aluminum foil and heat the soil to 180°F for 30 minutes. A meat thermometer can be used to check the temperature of the soil in the center of the container. Use only oven-proof containers for this step.

Be sure your transplant flats or small pots are clean before planting. Disinfect previously used containers by soaking them for 20 minutes in a 5 percent solution of standard household chlorine bleach and water (most household bleach is 5.25 percent sodium hypochlorite). To make a 5 percent solution to disinfect containers, add 3/4 cup of household liquid chlorine bleach to a gallon container, then add water to make a full gallon. Allow the containers to air dry before adding the planting mix.

Fill the containers with potting mixture. If seeding into small pots, place 2-3 seeds in each container. If seeding into a flat, scatter the seeds evenly over the surface. Cover the seeds with a shallow layer of vermiculite. For good germination, keep the soil media moist and warm — between 70°F and 80°F. Cover the flats or pots with a sheet of plastic or piece of glass to help maintain the proper moisture and temperature. Remove the cover when seedlings break through the soil surface and water just enough to keep the soil slightly moist to the touch.

If necessary, transplant young tomato seedlings into larger growing containers when the stems have straightened and the first true leaves have opened, usually 10 to 14 days after sowing. When transplanting young tomato seedlings, hold the plant by a leaf since pressure on the stem can cause permanent damage. Plants seeded directly into individual containers should be thinned after germination, by cutting the tops from the extra seedlings, allowing only the most vigorous seedling to develop. Don't pull excess seedlings out of the pot; this can injure the roots of the remaining seedling.

Expose young plants to full sunlight if possible. Short days in March, coupled with frequently cloudy conditions, often result in low natural light levels during the normal growing period for vegetable transplants. Supplemental light is usually necessary if adequate sunlight is not available. Standard fluorescent light tubes are a good light source. Use one cool and one warm fluorescent light bulb in the fixture to promote even growth that is not too leggy or too compact. Provide plants with supplemental light for 12 to 16 hours each day, keeping the light no further than 4-6 inches above the tops of the plants. The best temperatures for growing transplants are 70 to 75°F during the day and 60 to 65°F at night.

Transplants may become too tall and "leggy" due to insufficient light, high daytime air temperatures, excessive fertilization, lack of air movement or seeding more than eight weeks before field planting can begin. If adverse weather prevents a planned transplanting, the seedlings' growth rate can be slowed by reducing the amount of water applied so the transplants wilt slightly between applications. Brushing the tops of the plants 15-20 strokes once a day with your hand or a small stick or having a small fan blow gently across the seedlings for a few hours a day will also slow growth.

Purchasing Transplants

Most home gardeners find it convenient to buy tomato plants. When purchasing, choose sturdy, dark green plants that have stems about the size of a pencil. Preferably, the plant should not be in bloom. Leaves should be fully expanded and free of diseases and insects.

Transplants are available in packs of four to six, in flats or in individual containers. Although plants grown in individual containers may cost more, they are generally worth it. Those in individual cells or containers are transplanted with the least amount of shock as their roots are not disturbed when plants are set out in the garden. Containers should be large enough so root growth is not restricted.

Transplanting to the Garden

Plants grown indoors should be "hardened off" before planting outdoors, which enables the plant to better withstand the shock of transplanting. The hardening process should begin 10 to 14 days before planting. Begin the hardening process by moving plants in their containers to a shady, outdoor location.

Move plants into sunlight for short periods each day, gradually increasing the length of exposure. Try not to let the plants wilt during this hardening process and do not put tender seedlings outdoors on windy days or when temperatures are below 45°F. Tomato flowers exposed to temperatures below

50°F are likely to develop into fruit with the defect called “cat facing.” If this occurs, remove the defective fruit to enhance additional flower formation and fruit set.

Transplant hardened seedlings into the garden when the risk of frost is low. The frost-free date in Nebraska varies from year to year and location to location. Protect plants with paper or plastic covers, newspapers or boxes if there is danger of frost. Research has shown plastic tubes filled with water, sold commercially as “Wall o’ Water®,” are superior to paper “hot caps” or plastic milk containers in allowing sufficient light and adequate temperature moderation for tomato growth early in the season. The average last spring frost dates in Nebraska are: eastern Nebraska, April 24; central Nebraska, May 1; and May 10 in western Nebraska. Check with your local UNL Extension office for the frost-free date in your area.

Set plants slightly deeper in the soil outdoors than they were in the container. If the plants are tall and leggy, consider trench planting. First, dig a horizontal trench instead of the hole. Remove all but the top two sets of leaves. Lay the plant stem and root ball on its side in the trench, with the remaining leaves above ground. Cover the stem and root ball with 2-3 inches of soil. Firm the soil over the plant, being careful not to press too hard, or snap the stem. New roots will form along the length of the tomato’s stem.

If the transplants are in peat pots, remove the pots before planting. If the peat pot is allowed to remain around the tomato’s root ball and the pot edges are not buried completely in the soil, it will serve as a wick by drawing water out of the plant’s root ball and allowing it to evaporate more quickly than the surrounding soil. This often results in the plant’s root ball drying out too quickly and plant death.

Once planted, press the soil firmly around the plant to form a slight depression to hold the water. Water the plants immediately.

Distance between plants depends on two things: cultivar (which influences plant size) and growing method. Set unstaked plants 3 feet apart in rows 4 to 5 feet apart. If the plants will be staked, plant them 18 to 24 inches apart in rows 3 feet apart. Caged tomatoes are best spaced 24 to 36 inches apart in rows 4 feet apart.

Seeding Outdoors

While tomato seeds can be planted directly outdoors in Nebraska, the length of the production season usually is reduced. Sow the seeds 1/2 inch deep in rows 4 to 5 feet apart. Keep soil moist until the seeds germinate. When the seedlings have developed at least one true leaf, thin them so they are spaced 3 feet apart.

Watering

Tomatoes need about 1 to 2 inches of water each week. This varies according to temperature, soil type, rainfall and mulching practices. Because sandy soils do not hold water well, tomatoes will require more frequent water applications, while those in clay soils require less-frequent applications. Heavy weekly soakings that encourage deep root development are better than frequent light soakings that tend to maintain shallow root systems. Avoid overhead watering because moisture

on the leaf surface makes plants much more susceptible to fungal leaf diseases.

Many gardeners use homemade watering devices to provide water and fertilizer to their tomato plants. For example, a 5-gallon bucket with holes drilled in the bottom and sides can be buried beside a tomato plant. The bucket can be filled when necessary, allowing water to percolate out through the holes and into the surrounding soil.

Mulching helps reduce water loss, but be sure to water tomatoes adequately during the summer to prevent wide variation in soil moisture. Although mulches reduce evaporation from the soil immediately around the plant, a large, well-established tomato plant may use several gallons of water a day.

Covering the soil with mulch also eliminates rain-splash of soil and fungal spores onto the plant’s lower leaves, where most leaf diseases begin.

Blossom end rot is a disorder common in tomatoes, and characterized by an area of dark, leathery, rotten tissue that develops on the tomato’s blossom end while the fruit is still green. Uniform soil moisture is critical to the reduction of this disorder. See NebGuide G1752, *Blossom End Rot in Tomatoes* for more information on using good watering practices to help prevent Blossom End Rot in tomatoes.

Staking and Caging

Staking or placing cages around the plants makes it easier to harvest and, in some cases, to cultivate tomatoes. When staking plants, use wooden stakes about 8 feet long and 1 1/2 inches wide. Insert the stakes about 4 inches from the plant. Do this soon after transplanting to prevent root damage. Set the stakes 1 1/2 to 2 feet deep for good support.

Tie strips of cloth, nylons, soft cord, or commercial ties around the stake and under leaflet branches about every 12 inches up the stem. You also can tie a cord to the stake 2 to 3 inches above a leaflet branch, then loop the cord loosely around the main stem and tie it to the stake below the branch.

Tomatoes also can be supported by enclosing them in cages constructed of wire or wood. Nearly indestructible cages can be made from concrete reinforcing wire mesh. The 6-inch square openings make it easy to harvest even extra-large fruit. If you use another type of wire mesh, make sure the openings are large enough for your hand to fit through while holding a large tomato fruit.

The size of the cage varies with the type of plant. A cage 4 to 5 feet tall and 14 to 18 inches wide will support most plants. For a cage 18 inches in diameter, cut the wire in 4.75 foot lengths and form each into a circle. Cut the mesh wires flush on one side, but leave the end wires on the other side. Form the mesh into a circle and bend the end wires around the wire on the opposite side to hold the cage together. To make cages of other diameters, use the formula for the circumference of a circle.

Formula for the circumference of a circle

$(2 \times 3.14 \times r)$ where r is the radius

-or-

$(3.14 \times d)$ where d is the diameter

Place the cages over the young plants and stake the cage to the ground to guard against wind damage and breakage. Electric fence posts make sturdy, inexpensive stakes. Check the plants weekly and adjust the main stem so it grows inside the cage and not through a side opening. Some gardeners wrap nylon netting around the outside and secure with clothespins or clips to eliminate the need to train the stems. The net can be removed once the plants fill the cage.

With indeterminate varieties, as the plants grow remove the “suckers” or side branches and tie the main stem to the stake (*Figure 1*). This creates a more controlled growth pattern for the vine and makes the fruits easier to harvest. Be careful to remove the suckers and not the fruiting stems or leaflet branch. Suckers appear at the point where the leaflet branch joins the main stem and should be removed when they are only 4 to 5 inches long. Some gardeners allow two main stems to develop, using the original growing point and the first side branch that develops. However, do not remove suckers from cultivars with a strongly determinate growth pattern.



Figure 1. Remove plant “suckers” as the plants grow.

Hail Protection

If your garden tends to be damaged by hail, such as in central and western Nebraska, you can reduce injury to your tomato plants by covering the top of each cage with half-inch hardware cloth. Place a square of the hardware cloth on top of each cage and bend the corners down to secure it to the sides of the cage. Using both nylon netting around the cage and hardware cloth on top greatly reduces hail damage from early summer storms.

Weed Control

Weeds compete with tomato plants for sunlight, nutrients, and water. In the average garden, weeds are best controlled when small through cultivation or mulches. Weeds can be removed by hand, with a hoe, or by cultivation. Avoid cultivating too deeply, since it may damage tomato roots and bring weed seeds to the surface for germination. In large plantings, herbicides can be used.

Mulch helps suppress weed growth, reduce water loss and stabilizes soil temperature. Inorganic mulch, such as polyethylene, paper, and newer types of fabric, is available in most garden stores or from mail-order, garden-supply companies. Inorganic plastic mulch increase soil temperature and promotes earlier growth and production. However, keep young stems from touching the plastic, as it can become hot enough to burn them on a sunny day.

Organic mulch, such as straw, leaves, or grass clippings, can also be used. Spread organic mulch at least 2 inches deep on the soil surface but not too early. Applying organic mulch too early in spring keeps the soil cool, resulting in slow growth and shallow rooting.

Harvest

Tomato flavor is created by a delicate balance between sugars, acids, and several volatile organic compounds that affect a tomato’s aroma, thereby affecting the perceived flavor. Flavor differences between varieties are common and are, in part, determined by each cultivar’s genetically predetermined sugar/acid ratio. Once a tomato begins to turn pink, few changes occur in the fruit’s flavor as it further ripens. If possible, harvest fully ripe tomatoes to get the best flavor and color. Pink tomatoes, however, may be harvested and allowed to ripen indoors at room temperature, 65°F to 70°F, with very little loss in flavor.

Ripe tomatoes should be stored at room temperature for best flavor retention. Fully ripe tomatoes may be refrigerated for several weeks, although storage temperatures below 50°F will cause a significant decline in flavor. Do not place immature tomatoes in the refrigerator as this will prevent ripening and flavor development.

In the fall, just before frost or a light freeze, pick green tomatoes for pickling.

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