

MU Guide

Growing Home Garden Tomatoes

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Tomatoes are a popular home garden crop. They require a small area, bear repeatedly, are widely adapted and easy to grow, and have many culinary uses. Tomatoes are rich in vitamins A and C and low in calories. They are an excellent source of lycopene, the pigment that makes tomatoes red and has been linked to prevention of many forms of cancer.

Varieties

There are many excellent tomato varieties available to home gardeners, ranging from new hybrids to tasty heirloom varieties. Selection should consider productivity, freedom from fruit splitting and disease resistance. Fusarium wilt and verticillium wilt are two common problems that can be overcome by selecting wilt-resistant varieties and rotating the planting so that these organisms are not able to build up in the soil. Leaf diseases such as early blight cause substantial leaf damage in many home gardens. Although high-quality fruit varieties with resistance to this disease are not generally available, they exist and may soon become more common.

The hybrid tomato varieties listed here have been selected for quality fruit and good disease tolerance or resistance and have performed well under Missouri conditions. Resistance to various diseases is indicated by the following letters:

- V = verticillium wilt resistance
- F = Fusarium wilt resistance
- N = nematode resistance
- T = tobacco mosaic resistance
- B = Bacterial speck

Beefmaster (VFN) This beefsteak-type of tomato has maintained popularity for many years. The firm, meaty red fruits may weigh up to 2 pounds. Plants are extremely vigorous and productive. Production begins about 80 days from planting into the garden.

Better Boy (VFN) A variety with vigorous plants that have gained and maintained popularity for many years. Fruits are bright red and may weigh up to about one pound. Fruits are firm, round and produced abundantly with first production about 75 days from transplants.

Big Beef (VFFNA) This variety has a greater



Well-grown tomatoes produce an abundance of fruit.

range of disease resistance than many others and won an All-America Selections award in 1994. Fruits may range from 10 to 12 ounces and are produced abundantly. They are smooth, red and produced about 73 days from planting into the garden.

Celebrity (VFFNTA) This variety was an All-America Selections winner in 1984 but continues to be popular. Plants are determinate, which indicates that vines are short, and bushy, not lending themselves to staking. Fruits are firm, red and range from 7 to 8 ounces. Plants are highly productive and can usually have first harvest 70 days after planting.

Pik Rite (VFN) This hybrid, determinate tomato matures in approximately 75 days. The globe-shaped fruit has a concentrated set with both good size and good external appearance. Pik Rite performs well when grown either as a staked tomato or in cages.

Jet Star (VF) A variety that has maintained popularity and continues to be a favorite of home gardeners. Fruits are abundantly produced and range close

to 8 ounces. Fruits are crack resistant, meaty and flavorful. Jet Star is a variety considered relatively low in acidity.

Lemon Boy (VFN) For gardeners interested in yellow tomatoes, Lemon Boy is a newer variety that is productive and attractive. Fruits are not a golden color as varieties such as Husky Gold, but are lighter yellow. Fruits are firm and weigh about 6 to 7 ounces. Plants are vigorous and productive.

Pink Girl (VF) The number of pink tomato varieties available is limited, but Pink Girl is a vigorous variety that will continue to produce throughout the summer. Fruits are about 8 ounces and have crack resistance and good flavor.

Producing tomato plants

Earliness of production and quantity of fruit produced may be influenced by quality of the plant at the time it is set in the garden.

The ideal tomato plant should be 8 to 10 inches tall and dark green with a stocky stem and a well-developed, healthy root system. Three to five weeks are usually required to produce a transplant of this size.

A family interested in having only fresh fruit should plant three to five plants per person. If enough fruit is wanted for processing, then five to 10 plants per person should be planted.

To get best results with only a few plants, and to minimize trouble, purchase them from your local plant grower at the proper planting time.

If a fairly large number of plants are needed, they may be started from seeds in a good seeding mix that has been sterilized. After seed has germinated, plant seedlings at least 2 inches apart for stocky development, and give them plenty of light.

If kept in the house, expose them to a south window, and rotate them regularly to give uniform light. Daily temperatures should be kept below 80 degrees F but not lower than 50 degrees.

For best results, use either a pasteurized potting soil or a seed starting mix for growing your tomato seedlings. Plants may be grown in hotbeds where they can be kept sufficiently warm. Then shift them to cold frames late in the season.

Selecting growing area

Tomatoes grow best when they receive full sunshine. Plant them away from trees and buildings to get highest yield. A tomato plant needs a lot of water, so arrange for easy watering. Select a well-drained area because poor soil aeration leads to root loss and physiological problems such as blossom-end rot.

Preparing soil for planting

Tomato plants grow well in many types of soil. Work the soil only when it is dry enough so it will not stick to tools. Improve garden soil by adding peat

moss, leaf mold, well-rotted manure or compost. Add lime in late fall for the garden area you plan for tomatoes the following spring.

Tomatoes grow best in nearly neutral soil with pH of 6.5 to 7.0. You seldom need to add more than 1 pound of agricultural limestone to an area of 100 square feet. Apply lime in late fall or early spring.

Fertilizing

Add a complete garden fertilizer at the time the soil is prepared. For tomatoes, use a fertilizer low in nitrogen (N), high in phosphorous (P) and medium to high in potassium (K). Among the best analyses for tomatoes are 8-32-16 and 6-24-24. Avoid using ammonia fertilizers such as urea or ammonium nitrate for tomato fertilization.

Proper spacing and staking are essential for healthy plants and good fruit production.

Use a maintenance rate of 1 pound per 100 square feet after the proper fertility level has been developed from previous soil tests and fertilizations. If only 5-10-5, 5-10-10, or similar analyses are available, apply 2 pounds per 100 square feet.

All fertilizer should be well worked into the upper 6 inches of soil. Additional details of soil preparation and fertilization are in MU publication G 6950, *Steps in Fertilizing Garden Soil: Vegetables and Annual Flowers*.

Setting out plants

Set tomatoes in the garden when the weather has warmed and soil temperatures are above 60 degrees F. Tomato growth is impaired by temperatures below 50 degrees.

In southern Missouri, plant tomatoes outside from April 20 to May 15. In central Missouri, May 5 to 20 is the approximate planting time, and in northern Missouri and the Ozark area, planting from May 10 to 20 is usually best.

Before planting, remove all clay pots, plastic pots or wood bands from the soil ball. Peat pots may remain. Set plants a little deeper than they were originally growing so lower leaves are next to the ground. If only "leggy" plants are available, plant them at about a 30-degree angle in a trench long enough to leave only the top 5 or 6 inches of the plant exposed. Roots will develop along the buried portion of the stem. If the plant is in a peat pot, make sure the entire pot is covered. Exposed portions of the pot will act as a wick and rapidly dry the root ball.

Apply 1 cup of a fertilizer solution around the roots after placing the plant in the hole. Use a completely soluble fertilizer such as 10-52-17 or 15-30-15 at the rate of 2 level tablespoons per gallon of water. Guard the plant base from cutworms with a wax paper collar about 3 inches high (2 inches above the ground and 1 inch below).

Planting distances

Tomato planting distance depends on the type of tomato grown. Generally speaking, 24 to 36 inches between plants is the ideal spacing for most home garden tomatoes. Planting closer than 24 inches reduces air circulation around the plants and can trigger disease outbreaks. Large vine tomatoes should be spaced 36 inches apart. Rows should be 4 to 5 feet apart.

Staking

Staking improves marketable yield, fruit set and fruit quality and also makes the tomatoes easier to harvest. Staked plants are less likely than unstaked plants to get diseases. Stakes can be made from a 1 x 2 inch piece of wood 6 feet long, pointed at one end. Place it firmly about 4 inches from the plant at time of transplanting. Use soft cord for tying plants to the stake, and allow at least ½ inch of slack for stem enlargement. Many gardeners prefer to support tomato plants in cylindrical wire cages. Mesh should be large enough so it can be reached through to pick fruits inside. This method saves time required for staking, pruning and tying.

Pruning

Early-season varieties (maturity less than 70 days) typically do not require pruning. However, late-season or large vine varieties (indeterminates) need some of their side shoots removed or to be topped to prevent them from getting too bushy and tall.

When plants are grown in cages, less pruning is required. Break out only enough shoots to allow good light and air movement through the cage. Details of pruning are available in MU publication G 6460, *Pruning and Training Tomatoes*.

Watering

A tomato fruit is 95 percent water, so tomatoes need a lot of water to grow and develop fruit. Tomatoes should have about 2 quarts of water per day per plant until first harvest. Plants that are yielding fruit will need 2 to 4 quarts of water per plant.

Soak the soil thoroughly when watering. Frequent light waterings will encourage a weak root system. Mulching with straw, clean hay, compost, paper or plastic will reduce soil water evaporation. Plants growing in small containers may need daily waterings.

Side-dressing

Fertilizer applied at the time of planting will not supply enough nutrients for the entire season. Too much nitrogen in the beginning brings heavy vegetative growth and poor fruit set.

Apply the first side-dressing when the first fruits are about one-third grown. Apply 0.5 pound of actual nitrogen per 100 feet of row. This is equivalent to 5

pounds of 10-10-10 fertilizer. Calcium nitrate is an excellent fertilizer to apply as a side dress. About 3.5 pounds of calcium nitrate can be side-dressed per 100 feet of row. Mix the fertilizer carefully into the top inch of soil. Don't get fertilizer on the foliage.

Apply the second side-dressing two weeks after picking the first ripe fruit. Make a third application a month later. Water in the nitrogen if rain is unlikely.

Cultivating and controlling weeds

Many weeds are carriers of diseases that can seriously affect tomato plants when transmitted by insects or man. Weeds also compete for soil moisture and nutrients.

Use mulches to avoid a lot of hoeing and hand weeding. Hay, straw, grass clippings, paper, compost or plastic can be used as mulches for tomatoes. Black plastic warms the soil and is very beneficial for early plantings. Some growers have used red plastic mulch with success. Apply organic materials 2 to 4 inches thick to prevent weeds from developing.

Harvesting

Tomato color and flavor are optimal when average daily temperatures are about 75 degrees F. High temperatures (greater than 92 degrees) during ripening reduce fruit flavor, texture and color. Fruit exposed to high temperatures develops internal white tissue and yellow color on the fruit surface. Thus it is important to have good vine growth, which partially shades the fruit from intense sunlight. Do not refrigerate tomatoes after harvest. Flavor and quality are preserved by holding the fruit at room temperature.

Mature green fruits can be harvested in the fall and held for later use. Select fruits free of disease, wrap them in paper and store them at about 60 to 65 degrees. They will ripen slowly and provide good tomatoes for several weeks.

Physiological problems

Many of these disorders are quite common and should be readily recognized. Little can be done for most of them, but the fruit may be eaten if affected portions are removed. These problems are not caused by insects or disease.

Flower drop — especially noticeable on early flowers when the grower is anxious for fruit to set for an early harvest. The problem occurs when night temperatures are lower than 55 degrees F; when day temperatures are higher than 95 degrees; or when night temperatures remain above 75 degrees. Hot drying winds may intensify the problem.

Varieties also will differ in their temperature response. Fruit-setting hormones may be used to help set fruit early in the season when the weather is cool. The problem usually disappears and fruits set normally after the weather improves.

Leaf roll — most common on plants that have been pruned and on early-season varieties. Older and lower leaves of some tomato varieties may roll and become stiff and leathery. It is not a disease and is most common on plants that are trained and pruned. Fruiting is not affected by this condition.

Blossom-end rot — very common problem on homegrown tomatoes. It appears as a depressed brownish, rather dry rot the size of a dime to a half dollar on the blossom end of the fruit. It is caused by a calcium deficiency coupled with wide fluctuations in available moisture. Training and pruning may increase blossom-end rot. Remove the affected fruit so others on the plant will develop normally and keep the plants well watered. Provide good soil drainage. Mulch to maintain a more uniform moisture supply. Avoid cultivating (hoeing) near the roots of tomato plants. Do not use ammonia fertilizers.

Sunscauld, poor color — high temperatures retard the development of good color. Fruits exposed to high temperatures will scald and develop uneven color. Good foliage cover is helpful.

Cracking — fruit cracking varies by the variety. Cracking is usually a problem when there is a fluctuation in soil moisture. Tomatoes exposed directly to sunlight are highly susceptible to cracking. Select varieties that are crack resistant.

Catfacing — badly formed tomatoes on the blossom end, usually rough with scar tissue. Cold weather at time of blossom set intensifies the deformities. Catfacing is usually most common in the large-fruited beefsteak-type tomatoes.

Cloudy spots — irregular whitish spots just under the skin. This is the result of stink bugs feeding on the fruit at some stage in its development.

Chemical problems

Chemical injury — drift from 2,4-D and similar chemicals commonly used on lawns and in fields may cause distorted leaves, twisted stems, dropping of flowers and fruit abnormalities. The drift may originate half a mile or more away. Sprayers that have been used for herbicide and then used for disease and insect control on tomatoes may also be a source of contamination.

Walnut toxicity — plants growing near black walnut trees may wilt and die. Avoid growing tomatoes within 50 feet of these trees or where they may come into contact with walnut roots.

Insects

A variety of insects may attack tomatoes, although they can be controlled with a regular spray schedule. The following insects are a few that commonly attack tomatoes.

Aphids — small, pear-shaped insects that congregate on the top growth or undersides of leaves. Aphids damage tomatoes by sucking plant sap and excreting a sticky substance on the foliage and fruit, making the fruit unattractive. Besides rain, insecticidal soaps and certain chemicals, controls include removing weeds, which may serve as hosts for aphids.

Cutworms — fat, gray, brown or black worms up to 1¼ inches long. They cut off plants close to the soil surface. They are most destructive early in the season. Use a wax paper collar as described in the "Setting out plants" section of this publication.

Flea beetles — black or brown jumping bugs ¼ inch long attack young transplants and leave them looking as if they have been shot full of small holes.

Hornworms — large green worms up to 4 inches long eat foliage and fruit. Handpick them if only a few; sprays can be used for large infestations.

Leaf miners — larvae that make long, slender white tunnels in the leaves. Start sprays early.

Stalk borer — larvae are creamy-white to light purple and eat tunnels in the stem, causing the plant to wither and die. Remove and destroy weeds where the insect may breed. Locate hole in stem where the borer entered. Split stem lengthwise above the hole and kill the borer. Bind the split stem and keep the plant well watered. Spray to prevent further infestations.

Stink bugs — brown, green, or black shield-shaped bugs that give off a foul odor. They suck juices from the plant and cause hard, whitish spots just under the skin of the fruit. Sprays are effective.

Tomato fruitworm — green, brown or pink worm that eats holes in fruit and buds. Sprays during June help control this insect. Make several applications.

Spider mite — tiny, tannish mite, barely visible to the naked eye; causes many small yellow specks and fine webs. Forceful water sprays, insecticidal soaps or chemical sprays may be used for control.

Diseases

Tomatoes are attacked by bacterial speck and spot, early blight, fusarium wilt, anthracnose, septoria leaf spot, tobacco mosaic virus, curly top virus and verticillium wilt. For description and control of these diseases, see MU publication G 6202, *Disease Prevention in Home Vegetable Gardens*.