

Growing Tomatoes in Montana

by Cheryl Moore-Gough, MSU Extension Horticulture Specialist, R.E. Gough,
Professor of Horticulture, MSU



MontGuide

MT199217AG Reprint 8/2007

IT'S NOT EASY TO GROW TOMATOES IN MONTANA.

Extremes in temperature, dry climates, poor soil quality, water shortages and short growing seasons make the production of fine tomato fruit difficult. But therein lies the challenge, and there are plenty of things you can do to improve your chances of producing bushels of vine-ripened fruit.

Choose the right cultivar

Your neighbors know what cultivars work best in your area. Ask them for recommendations. But, until you can develop your own list of "best cultivars," here are some rules of thumb you can use to make your selections.

Early ripening cultivars—Select very early to early-mid season cultivars that ripen their fruit in 60 to 70 days. If you garden in mountain valleys and other areas with the shortest growing seasons, choose very early cultivars. If you garden in

areas at lower elevations where growing seasons are longer, choose early to early-mid season cultivars.

Determinate or indeterminate types—Determinate cultivars grow to a couple of feet in height, stop, flower and set fruit. All the fruit ripen at once. Indeterminate cultivars grow through the season, sometimes making up to 15 feet of vine growth. They set fruit as they go and continue to produce up to frost. The fruit ripen over an extended period.

Generally, determinate types form compact

plants that may not need to be supported. But both types usually benefit from some kind of support. Indeterminate types trail along the ground if they are not supported. The plant foliage keeps the soil cool and moist and can delay fruit ripening. Support your plants to help fruit ripen earlier.

Start with transplants

Our season is too short to direct-seed tomatoes into the garden, so start with transplants. If you grow them yourself, allow about eight weeks to produce a good transplant, and be sure you have enough light. Even windows that face south do not have sufficient light in early spring for good plant growth.

Garden soil is seldom satisfactory for starting tomato plants. Instead, use a sterilized or pasteurized commercial soil or soilless mixture.

Sow seeds into flats or individual containers. If you sow them into flats, transplant them once or twice as they grow. This can be time consuming, but it will force the plant to develop a more fibrous root system that will tolerate transplant shock somewhat better. Limited research suggests that light-colored containers produce stockier plants than dark-colored containers. This is probably due to greater light reflecting off the container surface.

Keep the containers well-watered and the air temperature at about 65 to 70° F until the seedlings are up. Then, let the surface of the media dry slightly to help control disease. Never let the media dry to the point that the seedlings wilt. Fertilize the plants once each week with a commercial starter solution, following directions on the package.

If you purchase your plants, select those that are stocky, about six to eight inches tall, and have no flowers or fruit. Transplants that are large enough to have set flowers or small fruit suffer excessively from transplant shock and do not make good garden plants. They'll ripen a few fruit early, then often stop production. Transplants should be certified disease-free.



Preparing the soil

Tomatoes produce best in well-drained, sandy loam soil that is high in organic matter. If your soil is poor, spread a layer of well-rotted manure or compost two to three inches deep in your garden and work it into the soil. Do this in the autumn or in the very early spring before planting.

In early spring, turn under the phosphorus equivalent of about six pounds of triple super phosphate, or mono ammonium phosphate (11-48-0), or their equivalent (25 pounds of 10-10-10) per 1000 square feet of garden area. The extra phosphorus will help the plants set and ripen fruit. Sidedress the plants once with a complete fertilizer about one month after planting.

Don't overfertilize the garden. Excess nitrogen delays fruit set and maturity so you'll be less apt to ripen your crop before frost.

Setting the plants

Set tomatoes in the garden after the danger of frost has passed. Plants of determinate cultivars and staked indeterminate cultivars need about four square feet/plant to develop normally.

Late afternoon of a calm, cloudy, humid day is the best time to set out transplants. Set the plants an inch deeper than they grew in the container and tamp the soil firmly about the roots. Water the plants well with a starter solution to eliminate air pockets about the roots, to settle the soil, and to provide water and nutrients for rapid growth. If the transplants are spindly and have long stems, lay the stems about an inch below the soil line, letting only the upper several inches of the stem protrude above the surface. Tomato stems will produce roots along their entire length and this will help the plant develop a larger root system and larger, healthier plants.

Right after transplanting, cover the new plants with hotkaps or row tunnels. These protect the plants from hot, drying winds, increase the humidity within the canopy to decrease wilting, and warm the plants during the early season when air temperatures are often cool. All of this helps the plants grow faster.

Plastic milk jugs and old tires don't substantially speed plant growth, though they can protect against wind damage.

Another way to speed plant growth in our short season is to use plastic film mulch. Organic mulches are okay in summer but they keep the soil cool in spring and slow plant growth. Red film mulches speed soil warming and thus root growth, help control weeds, speed tomato fruit ripening and conserve soil moisture. Black mulches conserve soil moisture and control weeds. If you decide to use plastic, prepare the soil as you normally would, then roll out the plastic and cover the edges with stones and soil. Punch holes where you decide to plant and set the transplants through the holes. Irrigation water will get to the plants through those same

planting holes. Be sure the soil is moist before you lay the plastic.

Lastly, you can cover the plants with spun bonded or woven geotextiles, commonly called floating row covers. These lay on the plants and hold heat in the plant canopy to speed growth. They tend to blow away where there's wind, however, unless you anchor them.

Weed control

Cultivation—Tomato feeder roots are shallow, so cultivate only the top inch or so of soil. Use a sharp hoe and scrape, don't chop, the soil's surface.

Mulching—This is a good way to control weeds. The red plastic mulches warm the soil and speed fruit ripening; organic mulches cool the soil and can delay fruit ripening, but add valuable organic matter to the soil.

Pruning and Staking—Pruning can help speed ripening but it can also increase the incidence of blossom end rot, fruit cracking, and sunburn. In general, don't prune determinate cultivars. You may prune indeterminate cultivars to up to three main stems and top the plants after the fifth hand of blossoms has set, or about August 1st. This will help speed ripening.

All indeterminate cultivars should be supported, especially in windy areas. This speeds ripening and makes cultivation easier. To stake at planting, pound strong stakes (at least 2 inch by 2 inch) into the ground, leaving about 5 feet above ground for the plant. Use soft baler twine or old nylon stockings and loose knots to tie the plants to the stakes. Trellises may also be used for indeterminate types. Determinate types often benefit from being supported in cages made specially for this purpose.

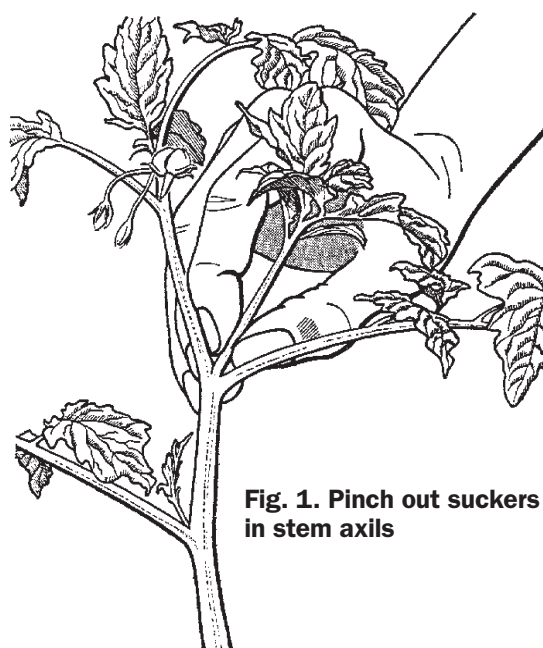


Fig. 1. Pinch out suckers growing in stem axils

Fruit and flower thinning

Tomato fruit need about eight to nine weeks to ripen after they set. If you note a cluster has set and there is not enough time remaining for it to ripen before frost, cut it off. Remove all flowers that form after 1 August. This will give the remaining fruit a greater chance to ripen.

Watering

Water the plants deeply, wetting the upper foot of soil every week. Frequent light waterings do more harm than good and waste water.

Physiological disorders

Cracking Fruit—cracking can be concentric (cracks around the diameter of the fruit) or longitudinal (cracks running from stem to blossom end). Both are caused by water applied to the fruit surface. Always water the soil and try not to get water on the fruit surface. Overwatering during fruit ripening may also cause cracking.

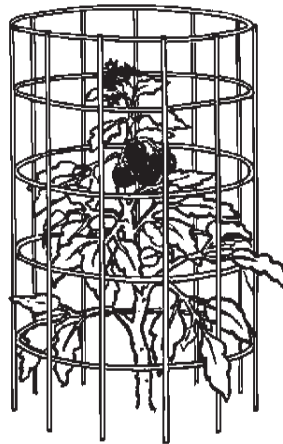
Catfacing—This abnormal fruit development, resulting in puckering and leathery-looking scars on the fruit surface, is caused by poor pollination, cool early season weather, or herbicide damage. It is common on fruit that have set before the transplants have been planted in the garden.

Leafroll—This can be caused by moisture stress or by exposure to herbicides containing 2,4-D. This chemical is common in broad-leaved lawn herbicides. Depending upon its cause leafroll may substantially affect yields. Do not consume fruit from plants contaminated with herbicide.

Blossom End Rot—The dry, sunken, leathery, brown spot near the blossom end of the fruit is not caused by a pathogen but by a calcium deficiency in that portion of the fruit. Often this is not due to an actual calcium deficiency in the soil but to fluctuating soil moisture levels. To reduce the incidence, be sure there is an even moisture supply and never let the soil dry, then overwater, dry, and then overwater. Mulching will help keep moisture levels even. Don't overfertilize and be sure there is enough phosphorus in the soil.

Poor Fruit Set—Blossoms will drop without setting fruit if the weather is cool (below 55° F) or very hot (above 90° F), the winds are dry, or if you've added too much water or fertilizer. If necessary, apply fruit setting compounds,

Fig. 2. Tomatoes can be caged, staked, or otherwise supported



especially early in the season, to improve production. These are plant hormones called auxins that help the plant set fruit artificially. Many of these fruit will be seedless and may not get as large as those set normally. Follow directions on the label.

Pest Control Insects

Cutworms—Wrap paper collars around the stems of new transplants or place a band of hydrated lime, diatomaceous earth, or wood ashes around the plant stems, keeping it at least two inches away from green tissue.

Fruitworms—Pick and destroy infested fruit.

Hornworms—Hand pick these worms and destroy them.

They feed on top of the foliage at night and hide beneath it during the day. Look for them in early morning or in twilight when they are most visible. Also, look for their pellet-like green droppings beneath the plant.

Flea beetles—These are very small beetles that eat tiny round holes in the leaves. Treat the plants with a labeled insecticide.

Leafhoppers—These suck out the chlorophyll and cause a pale green-white color to develop on the leaves. Treat with a labeled insecticide.

Diseases

Fusarium & Verticillium wilts—These diseases can become serious in hot weather. The soil-borne fungus enters the roots and blocks water and food transport, causing the leaves to roll upward and the plants to wilt at midday. Lower leaves yellow and fall. Wilting usually starts on one side of a branch or plant, then moves to the other. Remove the infected plants including roots. Plan your crop rotation so that you do not plant tomatoes or their relatives (peppers, eggplant, potatoes, petunias, etc.) on the same plot of ground for at least five years (a five-year rotation), and use resistant cultivars. These will be marked with "VF" to indicate resistance to verticillium and fusarium. Lastly, don't damage the plant when cultivating, and maintain a uniform irrigation plan to avoid plant stress.

Bacterial canker—This disease results in a temporary drooping of the upper and outer leaves, with wilting progressing from the bottom leaves upward. The leaves turn brown and die but the petioles remain green and firm and

attached to the stem. They drop off in fusarium infection. The stems begin to show yellow-gray streaks which crack open to form long cankers. Fruit set can be reduced. Use a three-year rotation, plant treated seed, and ensure good sanitation by removing and destroying infected plants.

Western Yellow Blight (Curly Top)—The leaflets roll upwards, become thick and crisp and turn a dull yellow with purpling veins. The plants appear erect and stunted and the roots may die. This virus is transmitted only by beet leafhoppers. Don't plant tomatoes near beets, watermelons, beans, spinach, squash and peppers. Dig out and destroy all infected plants.

Autumn Care

If you suspect an early frost, harvest all tomatoes that have begun to turn to at least a light white-green or blush and store them in a cool place. You may also pull the vines with intact fruit and hang them upside down in a well-aerated shed to ripen. Vines that remain in the garden should be covered with newspaper or sheets which will protect them from a light frost. There is no garden protection from a heavy frost or temperatures below about 27° F.

Green-white tomatoes ripen best where the temperature is about 65° F.

A Partial List of Tomato Cultivars for Montana

Select very early to early mid-season cultivars that ripen their fruit in 60 to 70 days.

Key: **D** Determinate (Non-Staking Cultivars)

I Indeterminate (Cultivar Needs Support)

H Heirloom variety

Very early ripening to early ripening red-fruited salad types

Coldset	D
Early Pick Hybrid	D
Gem State	D
New Yorker	D
Northern Exposure	D
Prairie Fire	D
Siberian	D/H
Springset	D
Sub Arctic Plenty	D
Whopper	I

Early to mid-season salad types

Black Sea Man	D/H
Bloody Butcher	I/H
Celebrity	D
Early Girl Hybrid	D
Fantastic	D
Oregon Spring	D
Patio Princess Hybrid	D
Stupice	I/H

Early to mid-season small-fruited

Sungold	I
Super Sweet 100	I
Sweet Baby Girl	I
Yellow Pear	I/H

Very early small-fruited

Early Sub Arctic	D
Juliet Hybrid	I
Pixie Hybrid	D
Sugary	I
Tumbler Hybrid	D



<http://www.montana.edu/wwwpb/pubs/mt199217AG.pdf>

Copyright © 2007 MSU Extension

We encourage the use of this document for nonprofit educational purposes. This document may be reprinted for nonprofit educational purposes if no endorsement of a commercial product, service or company is stated or implied, and if appropriate credit is given to the author and the MSU Extension. To use these documents in electronic formats, permission must be sought from the Extension Communications Coordinator, Communications and Public Affairs, 416 Culbertson Hall, Montana State University-Bozeman, Bozeman MT 59717; **E-mail: publications@montana.edu**. To order additional publications, please contact your county or reservation MSU Extension office, visit our online catalog at **www.montana.edu/publications**, or e-mail **orderpubs@montana.edu**



The U.S. Department of Agriculture (USDA), Montana State University and the Montana State University Extension prohibit discrimination in all of their programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital and family status. Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Douglas L. Steele, Vice Provost and Director, Extension, Montana State University, Bozeman, MT 59717.

**File under: Horticulture
C-4 (Vegetables)**

**Revised August 2007
1000 807 SA**