

Reviewed June 2010

# Tomatoes in the Garden

Dan Drost, Vegetable Specialist

## Summary

Tomatoes prefer a sunny location and fertile, well drained soils. Incorporate plenty of organic matter and a complete fertilizer into the area before planting. Plant tomato seeds directly in the garden 10-14 days before the last frost date. Most gardeners transplant tomatoes through black plastic for earlier maturity. Use row covers or hot caps to protect the plants when transplanting before the frost-free period. Side dress with additional nitrogen fertilizer to help grow a large vine. Irrigation should be deep and infrequent. Plastic and organic mulches help conserve water and reduce weeding. Do not apply organic mulches until soils have warmed to 75 degrees F. Control insect and diseases throughout the year. Harvest tomatoes when the fruits are fully colored but still firm. At the end of the season, gather all mature green and slightly colored fruits and store at 55 degrees F. There are more than 4,000 tomato varieties world wide. Select varieties based on use, fruit size, earliness, soluble solids, growth habit or disease resistance. Many varieties are hybrids but heirloom tomatoes are becoming very popular. Consult with your local nursery or garden center, seed salesman or any seed catalog for detailed information on characteristics of each variety.



## Recommended Varieties

Tomatoes can be categorized by maturity class (early, mid-season or late), fruit size (cherry, pear, plum or large), plant size (determinate, semi-determinate or indeterminate), fruit color (red, pink, yellow, orange), or use (fresh, process or dual use). When selecting varieties, consider your growing environment, primary use, and how much space you have available to grow the plants. Most varieties will grow in Utah but not all are available. Most garden centers and nurseries carry varieties that have been proven to grow well and produce high quality, flavorful fruits for local conditions.

## How to Grow

**Soils:** Tomatoes prefer organic, rich, well-drained, sandy soils for best growth. Most soils in Utah will grow tomatoes provided they are well drained.

**Soil Preparation:** Before planting, incorporate up to 4 inches of well-composted organic matter. Apply 4-6 cups of all-purpose fertilizer (16-16-8 or 10-10-10) per 100 square feet before planting.

**Plants:** Tomatoes can be grown from seed or transplants. Seed should be planted 2 weeks before the last frost. Transplants should have 5-7 mature leaves and a well developed root system. Transplants mature about 4 weeks before seeded tomatoes and are recommended for most growing areas of Utah. When growing transplants, allow 6-8 weeks to grow the plant. Germinate the seeds at 80 degrees F until the seed root emerges from the seedcoat. Then transfer seeds to sterile seeding mix and grow out at 65-70 degrees F. Adequate light is essential to produce a quality plant. Cool white fluorescent tubes placed 2 to 3 inches above the plants, lit for 14-16 hours per day will ensure plants grow big and healthy. Water regularly and feed weekly with ½ strength soluble complete fertilizer.

**Planting and Spacing:** Tomatoes should be transplanted when soils are 60 degrees F or after all frost danger has past. Plant 4-6 seeds ½ inch deep, and 18 inches apart in the row. After the seedlings have two leaves, thin to 1-2 plants per clump. Transplants should be planted 2 feet apart in row, with rows 2-3 feet apart. Transplants that are

stocky, dark green, have 5-7 leaves and are 6-10 inches tall, grow most rapidly. Plants with flowers or fruits establish slowly and yield poorly. If plants are quite tall, they can be planted deeper as tomatoes form roots from their stems.

**Mulches:** Black plastic mulch warms the soil, conserves water and helps control weeds. Plastic mulches allow earlier planting and maturity, especially with transplants. Lay down the plastic, secure the edges with soil, and cut holes for the seeds or transplants. When using plastic mulches and row covers, seeds or plants can be set out several weeks before the last frost date. Do not apply organic mulches until soils are warmer than 75 degrees F. Grass clippings, straw, newspapers, etc. also conserve water and control weeds.

**Row covers:** Hotcaps, plastic tunnels, fabric covers, and other devices protect seedlings and transplants from cool air temperatures. Row covers enhance growth and earliness. Plants grown under row covers require ventilation when air temperatures exceed 80 degrees F. Tomato flowers are sensitive to high temperatures during flower development and early fruit growth.

**Water:** Water tomatoes deeply and infrequently, applying 1-2 inches per week. Use drip irrigation if possible. Mulch around the plant will conserve soil moisture and reduce weed growth. Irrigate so that moisture goes deeply into the soil. Irregular watering (over or under) can cause blossom-end rot, a dark leathery spot on the bottom of the fruit.

**Fertilization:** Avoid heavy fertilization of tomato plants. It encourages excessive foliage growth and delays fruit maturity. Side dress with nitrogen (21-0-0) using 1/2 tablespoon per plant at 4 and 8 weeks after transplanting.

**Support:** Wooden stakes or wire cages are regularly used to support the plants and keep ripening fruits off the ground. Stakes should be driven 18 inches in the soil, 3-4 inches from the stem. Indeterminate varieties require more support and vine pruning to keep plant size manageable. Continue to tie up plants as they grow. Determinate vine types are generally grown on the ground.

## Problems

**Weeds:** Plastic and organic mulches effectively control weeds. Vigorous vine growth by tomatoes will also smother weeds. Cultivate shallowly to avoid root damage.

### Insects and Diseases:

Insect	Identification	Control
Aphids	Green or black soft-bodied insects that feed on underside of leaves. Leaves become crinkled and curled. May transmit virus diseases. Secreted honeydew makes plants appear shiny, wet or sticky.	Use insecticidal soaps or strong water stream to dislodge insects.
Flea Beetles	Small black beetles that feed on seedlings. Adults chew tiny holes in cotyledons and leaves. Beetles can reduce plant vigor or may kill seedlings.	Control beetles with insecticide dust at seeding or transplanting.
Hornworms and Fruit worms	Larvae feed on leaves and fruits causing defoliation and fruit damage. Look for bare areas and black fecal matter.	Hand removal is an easy control method. Use Bt or other insecticides for heavy infestations.
Disease	Symptom	Control
Leaf Blights or Spots	Dark spots on stem, leaves or fruits. The diseases eventually spread to all plant parts. The foliage eventually dies, exposing fruits to the sun, which causes premature ripening.	Diseases promoted by cool, wet conditions. Don't overhead irrigate late in the day; let soil dry between waterings. Apply appropriate fungicide once disease identified.
Wilt Diseases	Leaves wilt on one or more vines. Plants often die. Streaking, slime formation, or gummy exudates visible on or in stems. Diseases are caused by different pathogens.	Identify causal disease. Plant resistant varieties that have V, F or N designated in their name.
Viruses	Leaves are light green, mottled, malformed, dwarfed and curled. Early infection affects fruit shape and flavor. Viruses can be transmitted by aphids and leafhoppers, brushing against infected plants, or from tobacco products.	Control aphids. Destroy infected plants and weeds. Don't use tobacco products when handling plants.
Fruit Disorders: Blossom-end rot, cat-facing, and sunscald	Blossom-end-rot is caused by a localized calcium deficiency brought on by poor water management, excessive nitrogen, root pruning and drought. Catfacing is associated with cold weather during fruit set. Sunscald is caused by fruit exposure to direct sunlight during hot, dry weather.	Better water and nutrient management can reduce all of these disorders. Early plantings often have cat-faced fruits on early trusses. Support structures, moist soils and warm weather help reduce these disorders.

## Harvest and Storage

Tomato fruits requires 25-35 days to mature from flowering depending on the temperature and variety. Pick fruit when they are fully colored but firm, for the best flavor and quality. Pick fruits as they ripen. At the end of the season, harvest all fruits that are mature, green or colored slightly. Store at 55 degrees F and use as they ripen. Individual fruits do not need to be wrapped. Ripe tomatoes will store for 1-2 weeks if held at 50-55 degrees F. Fruits are subject to chilling injury so do not store for long periods in the refrigerator.

## Productivity

Plant 3-4 tomato plants per person for fresh use and an additional 5-10 plants for juicing, canning or freezing. Expect 100 lbs of fruit per 100 feet of row.

## Nutrition

Tomatoes are very nutritious and low in calories. One medium fruit has about 35 calories, is low in fat and is an excellent source of vitamins A and C.

## Frequently Asked Questions

- ***What causes the flowers to drop off my tomato plants?*** During unfavorable weather (night temperatures lower than 55 degrees F, or day temperatures above 95 degrees F), tomatoes do not set and flowers abort. The problem usually disappears as the weather improves.
- ***What can I do to prevent my tomatoes from cracking?*** Some varieties are more prone to cracking than others. Many of the newer hybrid varieties are quite resistant. Severe root or vine pruning increases cracking. Keep soil moisture uniform as the tomatoes develop, and plant resistant varieties to minimize this problem.
- ***I sometimes see small, cloudy white spots just under the skin of my tomatoes. What causes this?*** These spots on green or ripe fruits are caused by the feeding of stink bugs.
- ***Why are the new leaves on my tomato pointed, cupped, twisted, and irregular in shape?*** It seems likely that your tomatoes have been injured by 2,4-D or a similar growth regulator weed killer. Never use the same sprayer in your vegetable garden that you use for weed control in your lawn. Use caution when applying lawn care chemicals near vegetable or fruit plantings. If applying grass clippings to the garden, make sure the herbicides used are safe for food plants. Consult with your lawn care professional to ensure the chemicals applied to your lawn will not affect your edible garden plants.
- ***On some of my tomato plants, the leaves are turning yellow and the plants are no longer growing. Also, the fruits are ripening prematurely, and are leathery and bitter. What is wrong?*** Tomatoes with these symptoms are infected with the curly top virus, a disease transmitted by the beet leaf hopper. Once infected there is very little you can do. Since the severity of curly top varies from year to year, planting a few more plants than required will compensate for potential losses. In high risk areas plant Roza, Columbia, Rowpac, or Saladmaster, varieties resistant to curly top.

Utah State University is committed to providing an environment free from harassment and other forms of illegal discrimination based on race, color, religion, sex, national origin, age (40 and older), disability, and veteran's status. USU's policy also prohibits discrimination on the basis of sexual orientation in employment and academic related practices and decisions.

Utah State University employees and students cannot, because of race, color, religion, sex, national origin, age, disability, or veteran's status, refuse to hire; discharge; promote; demote; terminate; discriminate in compensation; or discriminate regarding terms, privileges, or conditions of employment, against any person otherwise qualified. Employees and students also cannot discriminate in the classroom, residence halls, or in on/off campus, USU-sponsored events and activities.

This publication is issued in furtherance of Cooperative Extension work. Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Noelle E. Cockett, Vice President for Extension and Agriculture, Utah State University. (HG/2004-05pr)