



Vegetable Crops

Warm Season Crops

Topics for Today

- Cucumber
 - Summer Squash
 - Winter Squash
 - Tomatoes
-
- Warm Season Crops
 - 60 degrees needed to grow
 - 70s to 80s ideal
 - 55 degrees or less can cause plant and fruit injury



Summer Squash

- Also known as zucchini, yellow squash, scalloped squash, patty pan squash
- *Cucurbita pepo*
- Cucurbitaceae Family
- Summer squash comes in a variety of shapes and colors. Bush varieties take up relatively little space, and if kept picked will keep producing right up to frost.





Summer Squash

- **Sunlight:** full sun
- **Soil conditions:** requires well-drained soil
- requires high fertility
- Prefers well-drained, fertile, loose soil, high in organic matter with pH between 5.8 and 6.8. Plentiful and consistent moisture is needed from the time plants emerge until fruits begin to fill out.
- **Special locations:** outdoor containers - Requires large container and frequent watering.

Summer Squash

- **Lifecycle:** tender annual
- **Ease-of-care:** easy
- **Height:** 1 to 3 feet
- Most summer squash grow on compact vines, in contrast to the sprawling vines of most winter squash and pumpkins.
- **Spread:** 2 to 4 feet
- **Bloom time:**
 - mid-summer, late summer, early fall



Summer Squash

- **Flower color:** yellow
- **Foliage color:** medium green
- Some varieties have interesting "water marks" on their foliage.
- **Foliage texture:** coarse
- **Shape:**
 - cushion, mound or clump
 - climbing / vine
 - Most summer squash varieties form a compact, bushy vine.
- **Shape in flower:** same as above



Summer Squash

Special characteristics:

native to North America

Special uses:

edible flowers - Flowers are sometimes battered and fried or stuffed.

edible landscaping



Summer Squash

How to plant:

Propagate by seed

Germination temperature: 60 F to 105 F - Will not germinate in cold soil. Wait to plant until soil reaches at least 65 F -- preferably 70 F or more. Germinates best at 95 F.

Days to emergence: 5 to 10 - Should germinate in less than a week with soil temperature of 70 F and adequate moisture.

Seed can be saved 6 years.

Maintenance and care:

Squash like warm soil and are very sensitive to frost. So don't be in a rush to plant early in spring. Wait until danger of frost has passed and soil has warmed to about 70 F, or about 2 weeks after the last frost date.





Summer Squash

- Direct seed $\frac{1}{2}$ to 1 inch deep into hills (which warm and drain earlier in the season) or rows. Sow 4 to 5 seeds per hill. Space hills 3 to 4 feet apart. When the plants are 2 to 3 inches tall, thin to 2 to 3 plants per hill by snipping off unwanted plants without disturbing the roots of the remaining ones. In rows, sow seeds 4 inches apart in rows 4 to 5 feet apart. Snip off plants to thin to one plant every 12 to 24 inches.

Summer Squash



- For extra early crops, start inside in 2- to 3-inch pots or cells 3 to 4 weeks before transplanting outside. Sow 3 or 4 seeds per pot and thin to one or two plants by snipping off the weaker plants to avoid damaging the roots of those that remain. Harden off by cutting back on water and reducing temperature before transplanting. Plant transplants out in the garden about 1 to 2 feet apart after all danger of frost has passed.

Summer Squash

- To hasten first harvest by as much as 2 weeks, use black plastic mulch to warm soil before direct seeding or transplanting. Early fruits are sometimes wrinkled, turn black or rot due to poor pollination.
- At the end of the season, remove or till in vines to reduce mildew. Use row covers to protect plants early in the season and to prevent insect problems. Remove cover before flowering to allow pollination by insects or when hot weather arrives.
- Mulching plants helps retain moisture and suppress weeds. Mounding soil around the base of the plants can discourage squash borers from laying eggs.



Summer Squash

- **Pests:**

- Squash bug - Hand pick. Bury or compost plant residues after harvest.
- Squash vine borer - Remove by hand and destroy.
- Striped cucumber beetles - Construct tents of fine netting or cheesecloth or use floating row covers over young plants. Put in place at planting and remove at flowering. Control of beetles may be a factor in preventing bacteria wilt



Summer Squash

- **Diseases:**
- Bacterial wilt (*Erwinia tracheiphila*)
-
- Remove and destroy infested plants. If striped or spotted cucumber beetles appear control as soon as possible.
- Powdery mildew - Avoid wetting foliage if possible. Water early in the day so that aboveground parts will dry as quickly as possible. Avoid crowding plants and eliminate weeds around plants and garden area to improve air circulation.





Summer Squash

- Scab - Avoid wetting foliage if possible. Water early in the day so that aboveground parts will dry as quickly as possible. Avoid crowding plants and eliminate weeds around plants and garden area to improve air circulation.
- Viral disease - Remove and destroy entire infested plant along with immediately surrounding soil and soil clinging to roots. Eliminate wild cucumber and milkweed nearby. Plant variety Multipik to mask symptoms on fruit. Control aphids early in the season by washing off with water as needed early in the day. A hard stream of water can be used to remove many aphids.
- Other diseases:
- Downy mildew

Summer Squash

There are four groups of summer squash:

Yellow summer squash have long, thin fruits that can be smooth or warty, straight or crooknecked.

Zucchini types are also long and cylindrical, often dark green but some varieties are lighter, yellow or even white.

Scalloped or patty pan squash look like disc-shaped UFOs. Their edges are scalloped and colors range from greenish to yellow to white.

Mideast or Cousa varieties have fruit that is shorter and thicker than zucchini, usually with a pale green skin.



Cucumbers

- Vine, Vegetable (Warm Season) - Cucurbit
- *Cucumis sativus*
- Cucurbitaceae Family
- Whether for pickling or slicing, cucumbers are easy to grow if you give them good soil, full sun and sufficient moisture, and wait for weather to warm before planting.





Cucumbers

- **Sunlight:**
 - full sun
- **Soil conditions:**
 - requires well-drained soil
 - requires high fertility
 - Well-drained, fertile soil, high in organic matter with near-neutral pH. Consistent, plentiful moisture needed until fruit is ripening. May develop bitter taste in dry sites. Cucumbers are heavy nitrogen feeders and require fertile soil.
- **Special locations:**
 - outdoor containers - Use bush varieties and keep well watered.

Cucumbers

- **Lifecycle:** annual
- **Ease-of-care:** easy
- Cucumbers are not hard to grow if you provide good soil, plenty of moisture and full sun, wait for soil and weather to warm before planting, and use fabric row covers if pests are a problem.
- **Height:** 1 to 6 feet
- Vining varieties can climb up to 6 feet with support, or hug the ground if allowed to sprawl.
- **Spread:** 1 to 6 feet
- Bush varieties take up only 2 or 3 square feet, while unsupported vining varieties can run along the ground for 6 or more feet.





Cucumbers

- **Bloom time:**
- mid-summer
- late summer
- early fall
- **Flower color:** yellow
- **Foliage color:** medium green
- **Foliage texture:** medium
- **Shape:**
- upright
- climbing / vine
- **Shape in flower:** same as above

Cucumbers

- **Special characteristics:**
 - not native to North America - Probably originated in India before spreading to Africa and Southeast Asia.
 - bears ornamental fruit - The wide variety of size, shape and color of fruits can be used for ornamental effects. Trellised so fruits are more visible.
- **Special uses:**
 - edible landscaping - Bush and vining varieties can be incorporated into ornamental plantings.





Cucumbers

- **How to plant:**

- Propagate by seed
- Germination temperature: 60 F to 90 F - Do not plant until soil reaches 65 F.
- Days to emergence: 3 to 10 - May germinate in 3 days at 80 F to 90 F. Germination may take 10 days or longer at cooler temperatures.

- **Maintenance and care:**

- Cucumbers are very sensitive to cold. They need warm soil and air, whether direct-seeded or transplanted. Don't rush to plant too early. Seed will not germinate if soil temperature is below 50 F, and germinates only slowly at 68 F.
- Direct-seed 1 to 1 ½ inches deep, either in rows (2 inches apart in rows 5 to 6 feet apart) or in hills (3 to 6 seeds per hill, hills spaced 3 to 5 feet apart).



Cucumbers

- Thin to 8 to 15 inches apart in rows or 2 to 3 plants per hill. Snip off plants when thinning to avoid disturbing the roots of nearby plants.
- For early crops, use black plastic mulch and row covers or other protection to speed warming and protect plants. Direct seed into holes in plastic. Cucumbers seeded into black plastic usually produce larger yields, as well earlier ones.

Cucumbers

- For extra early crops, start plants inside 3 to 4 weeks before transplanting. Sow 3 seeds per pot in 2-inch pots. Thin to one or two plants per pot. Grow above 70 F during the day and above 60 F at night. Be careful when hardening-off plants not to expose them to cold temperatures.
- Plants with one or two true leaves transplant best. Transplant into black plastic mulch or warm garden soil after danger of frost has passed and weather has settled. Be careful not to damage roots when transplanting. If using peat pots, make sure they are saturated before transplanting and completely buried. If using row covers, remove when flowers begin to blossom to assure good pollination.



Cucumbers

- For a continuous harvest, make successive plantings every 2 to 3 weeks until about 3 months before first fall frost date. About 1 month before first frost, start pinching off new flowers so plants channel energy into ripening existing fruit.
- To save space, train vining cucumbers to a trellis. (Make sure the trellised plants don't shade other sun-loving plants.) This also increases air circulation (reducing disease problems), makes harvest easier and produces straighter fruit. Set up trellis before planting or transplanting to avoid root injury. Space plants about 10 inches apart. Pinch back vines that extend beyond the trellis to encourage lateral growth.



Cucumbers

Most cucumbers have both male and female flowers. The male flowers blossom first and produce pollen, but no fruit. Other varieties produce female flowers predominately or exclusively. Seed packs of these varieties include a few seeds (usually marked with dye) of another variety that produces male flowers to provide pollen. Make sure you don't remove pollinator plants when thinning.

Cucumbers are heavy feeders and require fertile soil, nitrogen fertilizer, and/or additions of high-N organic matter sources. Pale, yellowish leaves indicate nitrogen deficiency. Leaf bronzing is a sign of potassium deficiency.

To reduce pest and disease pressure, do not plant cucumbers where you've grown them in the last two years. Choose resistant varieties to prevent many diseases and/or trellis vining varieties to encourage good air circulation.



Cucumbers

- **Pests:**

- Stripped or spotted cucumber beetles - Construct tents of fine netting or cheesecloth or use floating row cover over young transplants and seedlings. Put in place at planting and remove before temperatures get too hot in midsummer. Control of beetles is important to prevent bacterial wilt in cucumbers but less important in other vine crops.

- Aphids - A hard stream of water can be used to remove aphids from plants. Wash off with water occasionally as needed early in the day. Check for evidence of natural enemies such as gray-brown or bloated parasitized aphids and the presence of alligator-like larvae of lady beetles and lacewings.

- Squash vine borer - Remove borers by hand and destroy. Destroy crop residues after harvest.



Cucumbers

- **Diseases:**

- Bacterial wilt (*Erwinia tracheiphila*) - Remove and discard or destroy infested plants. Control cucumber beetles that spread the bacteria. (See striped or spotted cucumber beetles.) Control as soon as they appear. Some varieties are less susceptible to bacterial wilt but may not be readily available.

- Powdery mildew - Avoid crowding plants. Space apart to allow air circulation. Eliminate weeds around plants and garden area to improve air circulation. In autumn, rake and dispose of all fallen or diseased leaves and fruit. Plant resistant varieties such as Marketmore 76, Slicemaster and Raider.

- Scab - Avoid wetting foliage if possible. Water early in the day so aboveground plant parts will dry as quickly as possible. Avoid crowding plants. Space apart to allow air circulation.



Cucumbers



- Cucumber mosaic virus - Remove and discard or destroy infested plants. Plant resistant varieties such as Pacer, Marketmore 76, Dasher II, Slicemaster, Spacemaster and Sweet Success. Manage aphids that spread virus. Eliminate perennial weeds such as milkweed, marshcress and yellow rocket; and avoid planting next to susceptible ornamentals.

- Other diseases:
- Anthracnose
- Leaf spot
- Downy mildew



Cucumbers

- **Pickling varieties** bear short fruit (usually 3 to 4 inches) with thin skins and spines, usually with a stippled color pattern ranging from dark green at the stem to light green at the blossom end. They are usually ready to harvest sooner than slicing varieties, but harvest only lasts about 7 to 10 days.
- **Slicing varieties** have longer fruit (usually 7 to 8 inches) with a thick skin. Their coloring is sometimes stippled but is usually a uniform dark green. They usually start to bear a week or so later than pickling varieties, but harvest may continue for 4 to 6 weeks.



Cucumbers

- **Vining varieties** produce more fruit than bush varieties, but they take up much more space. **Bush varieties** bear fruit slightly earlier than vining varieties, and are easier to care for and harvest.
- "Burpless" varieties have been selected to eliminate gas build-up that affects some people.
- Seedless European varieties bred for greenhouse production usually perform poorly in gardens.
- In the coldest areas of the state, choose early-season varieties and/or use black plastic mulch, row covers, and other season extenders to speed soil warming and protect plants. Choose disease-resistant varieties to reduce the disease problems.



Winter Squash

- Vegetable (Warm Season) - Cucurbit
- Also known as Butternut squash, Acorn squash
- *Cucurbita maxima*, *C. pepo*, *C. moschata*
- Cucurbitaceae Family
- Winter squash are easy to grow -- if you have room. In addition to the familiar butternut and acorn squash, varieties come in a staggering diversity of fruit size, shape and color. Choose bush varieties if space is tight.





Winter Squash

- **Sunlight:**
 - full sun
- **Soil conditions:**
 - requires well-drained soil
 - requires high fertility
 - Prefers well-drained, fertile, loose soil, high in organic matter with pH between 5.8 and 6.8. Plentiful and consistent moisture is needed from the time plants emerge until fruits begin to fill out.



Winter Squash

- **Lifecycle:** annual
- Tender annual
- **Ease-of-care:** easy
- **Height:** 1.5 to 3 feet
- **Spread:** 3 to 15 feet
- Most varieties grow on vines that spread 6 feet or more. If space is tight, choose smaller bush or semi-bush varieties.

Winter Squash

- **Bloom time:**
- mid-summer
- late summer
- **Flower color:** yellow
- **Foliage color:** medium green
- **Foliage texture:** coarse
- **Shape:**
- low and trailing
- climbing / vine
- **Shape in flower:** same as above



Winter Squash

- **Special characteristics:**
- native to North America
- bears ornamental fruit
- **Special uses:**
- edible flowers - Flowers are sometimes battered and fried or stuffed.





Winter Squash

- **How to plant:**
- Propagate by seed
- Germination temperature: 60 F to 105 F - Will not germinate in cold soil. Wait to plant until soil reaches at least 65 F -- preferably 70 F or more. Germinates best at 95 F.
- Days to emergence: 5 to 10 - Should germinate in less than a week with soil temperature of 70 F and adequate moisture.
- Seed can be saved 6 years.



Winter Squash

- **Maintenance and care:**

- Squash like warm soil and are very sensitive to frost. So don't be in a rush to plant early in spring. Wait until danger of frost has passed and soil has warmed to about 70 F, or about 2 weeks after the last frost date.
- Unless you are trying to grow a long-season variety in an area that gets early frosts, there's really no need to start winter squash inside. Instead, direct seed $\frac{1}{2}$ to 1 inch deep into hills (which warm and drain earlier in the season) or rows. Sow 4 to 5 seeds per hill. Space hills about 4 to 8 feet apart, depending on the size of the fruit. (The larger the expected size of the squash, the larger the vine and the farther apart you should space the hills.) When the plants are 2 to 3 inches tall, thin to 2 to 3 plants per hill by snipping off unwanted plants without disturbing the roots of the remaining ones. In rows, sow seeds 6 to 12 inches apart in rows 4 to 8 feet apart. Snip off plants to thin to one plant every 18 to 36 inches.



Winter Squash

- If you need to start plants early, plant inside in 2- to 3-inch pots or cells 3 to 4 weeks before transplanting outside. Sow 3 or 4 seeds per pot and thin to one or two plants by snipping off the weaker plants to avoid damaging the roots of those that remain. Harden off by cutting back on water and reducing temperature before transplanting. Plant transplants out in the garden at the same final spacings above after all danger of frost has passed.
- Black plastic mulch can speed growth, especially in cool, short-season areas. At the end of the season, remove or till in vines to reduce mildew. Use row covers to protect plants early in the season and to prevent insect problems. Remove before flowering to allow pollination by insects or when hot weather arrives.
- Mulching plants helps retain moisture and suppress weeds. Mounding soil around the base of the plants can discourage squash borers from laying eggs.



Winter Squash

- **Pests:**

- Squash bug - Hand pick. Bury or compost plant residues after harvest.
- Squash vine borer - Remove by hand. Butternut squash is resistant.
- Striped cucumber beetles - Construct tents of fine netting or cheesecloth or use floating row cover over young plants. Put in place at planting and remove before flowering. Control of beetles may be a factor in preventing bacterial wilt.

Winter Squash

- **Diseases:**
- Bacterial wilt (*Erwinia tracheiphila*) - Remove and destroy infested plants. Control cucumber beetles if they appear.
- Powdery mildew - Avoid wetting foliage if possible. Water early in the day so aboveground plant parts will dry as quickly as possible. Avoid crowding plants. Space apart and eliminate weeds around plants and garden area to improve air circulation.





Winter Squash

- Scab - Avoid wetting foliage if possible. Water early in the day so aboveground parts can dry as quickly as possible. Avoid crowding plants, Space apart and eliminate weeds around plants and garden area to improve air circulation. In autumn, rake and dispose of all diseased leaves and fruit. Do not save your own seed.
- Viral disease -Remove and destroy entire infested plant along with immediately surrounding soil and soil clinging to roots. Eliminate wild cucumber and milkweed nearby. Control aphids early in the season.
- Other diseases:
- Downy mildew



Winter Squash

- Whether they are *Cucurbita pepo* (the same species as summer squash) *C. moschata*, or *C. maxima*, most varieties of winter squash produce sprawling vines. If space is tight, grow bush or semi-bush varieties.
- Winter squash come in a staggering array of sizes, shapes and colors. If your season is short, avoid varieties that require a long growing season (100 or more days).
- 'Cornell's Bush Delicata' is a 2002 All-America selection that combines the flavor of an heirloom Delicata with good resistance to powdery mildew and compact growth habit.



Tomatoes

- Vegetable (Warm Season) - Tomatoes, Peppers, Eggplant
- *Lycopersicon esculentum*
- Solanaceae Family
- The most popular garden vegetable crop, tomatoes come in a wide range of sizes, shapes and colors. Choose determinate varieties for early harvest or cool conditions. Compact varieties are also good choices for containers and planting in flower beds.

Tomatoes

- **Sunlight:**

- full sun
- Tomatoes need at least 8 hours of direct sun daily.

- **Soil conditions:**

- tolerates acid soil
- requires well-drained soil
- Prefers well-drained, fertile soil, high in organic matter. Clays and loams produce the highest yields. But lighter soils that drain and warm quickly can produce earlier harvests -- particularly if they are on a slight slope to the south or southeast. Can tolerate slightly acid soils, as low as pH 5.5. But produces best when pH is 6.0 to 6.8. Consistent moisture needed to prevent blossom end rot, but does not tolerate waterlogged soils.

- **Special locations:**

- outdoor containers - Small, determinate or miniature varieties work best. Requires frequent watering.



Tomatoes

- **Lifecycle:** annual
- Tender annual
- **Ease-of-care:** moderately difficult
- Requires good soil, even moisture. Very labor intensive if you stake, prune or use plastic mulch and row covers. Easier if you purchase plants. Difficult if you start from seed.
- **Height:** 2 to 6 feet
- Staked and pruned plants can grow to well over 6 feet tall in favorable growing seasons.
- **Spread:** 2 to 6 feet
- Staked and pruned plants can be trained to narrow spreads. Plants left to sprawl can spread 6 feet or more. If space is limiting, use smaller determinate varieties.



Tomatoes

- **Bloom time:**
 - mid-summer
 - late summer
 - early fall
- **Flower color:** yellow
- **Foliage color:** medium green
- **Foliage texture:** medium
- **Shape:**
 - spreading mass, upright
 - climbing / vine
 - Unstaked determinate varieties can form an upright bushy plant. Indeterminate varieties will sprawl in a mass over the ground, or can be trained into an upright vine when tied to a stake.
- **Shape in flower:** same as above



Tomatoes



- **Special characteristics:**
- native to North America - Tomatoes were probably domesticated in Mexico and the eastern Andes in South America.
- **Special uses:**
- edible landscaping - Small determinate and semi-determinate varieties such as Super Bush work well. This early semi-determinate variety requires no staking, pruning or caging. Mature plants grow about 3 feet tall with a 3-foot spread.



Tomatoes

- **How to plant:**
- Propagate by seed
- Germination temperature: 60 F to 95 F - Germinates best at 75 F to 90 F. Germinates very slowly at cooler temperatures.
- Days to emergence: 6 to 12 - About 1 week at 75 F.
- **Maintenance and care:**
- If you purchase transplants, look for sturdy, short, dark green plants. Avoid plants that are tall, leggy, or yellowish, or have started flowering. Transplants that are too mature often stall after transplanting while younger, smaller plants pass them by, producing earlier and more fruit.



Tomatoes

- Starting your own plants from seed gives you more choices of which variety to grow. But if you start your own plants, be sure you have a place where they can get enough light. Even a sunny, south-facing window is barely adequate. Consider using a grow light to supplement sunlight.
- Don't start plants too early. Sow seeds indoors 6 to 8 weeks before transplanting outside. Plant them 1/8 inch deep in sterile seed starting mix in flats or cells. Seeds germinate best at 75 F to 90 F. Then grow transplants at about 70 F.
- Don't rush to transplant, either. Cold soil and air temperatures can stress plants. Wait at least a week or two after the last frost. Nighttime temperatures should be consistently above 45 F. Use black plastic mulch to warm soil and/or row covers, hot caps or other protection to keep plants warm early in the season. Remove covers whenever temperatures exceed 85 F.

Tomatoes

- Harden off plants before transplanting by reducing water and fertilizer, not by exposing to cold temperatures, which can stress them and stunt growth. Transplants exposed to cold temperatures (60 F to 65 F day and 50 F to 60 F night) are more prone to catfacing.
- Space transplants:
 - 12 to 24 inches apart for determinate varieties
 - 14 to 20 inches apart for staked indeterminate varieties
 - 24 to 36 inches apart for unstaked indeterminate varieties



Tomatoes



- Unlike most plants, tomatoes do better if planted deeper than they were grown in containers. Set them in the ground so that the soil level is just below the lowest leaves. Roots will form along the buried stem, establishing a stronger root system.
- To reduce root disease risk, don't plant on soils that have recently grown tomatoes, potatoes, peppers or eggplant for at least two years.
- Mulch plants after the soil has warmed up to maintain soil moisture and suppress weeds. Tomatoes need a consistent supply of moisture. If it rains less than 1 inch per week, water to make up the difference.

Tomatoes

- Many factors (in addition to your choice of variety) affect total yield, first harvest and fruit quality. Raised beds, black plastic mulch and providing consistent moisture by watering or through drip irrigation are good ways to improve all three.
- How you provide support to plants can also affect performance. Determinate varieties do not need staking. But staking and pruning indeterminate varieties can hasten first harvest by a week or more, improve fruit quality, keep fruit cleaner, and make harvest easier. Staking and pruning usually reduces total yield, but fruits will tend to be larger. Staked and pruned plants are also more susceptible to blossom end rot and sunscald. Allowing indeterminate varieties to sprawl reduces labor but takes up more space and plants are more prone to disease.



Tomatoes

- Wooden tomato stakes are typically about 6 feet long and 1 ½ inch square, but you can use similar materials. Drive stakes at least 8 to 10 inches deep at or soon after transplanting so as not to damage roots.
- Prune tomatoes to one or two vigorous stems by snapping off “suckers” (stems growing from where leaf stems meet the main stem) when they are 2 to 4 inches long. Tie stems to stake with soft string, twine or cloth, forming a figure-8 with the stem in one loop and the stake in the other. This gives the stem room to expand without being constricted. Start about 8 to 12 inches above the ground and continue to tie at similar intervals as the plant grows. As an alternative to using individual stakes, grow several plants in a row between heavy-duty stakes or posts spaced about 4 feet apart, and use twine to weave in and out around posts and plants.



Tomatoes

- Growing tomatoes in cages is a good compromise between labor-intensive staking and just letting them sprawl. You can purchase tomato cages at your local garden center, or simply bend a 6-foot-long piece of 4- to 6-inch wire mesh into a cylinder about 22 inches in diameter. (Cattle fencing or concrete reinforcing wire mesh work well for this.) Place cage around plants soon after transplanting and anchor with stakes.
- Avoid excessive N applications, which can cause excessive foliage and poor fruit set. Also avoid using fresh manure or high nitrogen fertilizers (those with three or more times nitrogen than phosphorus or potassium). Poor fruit set can also be caused by heavy rainfall or temperatures that are either too high (above 90 F) or too low (below 55 F).





Tomatoes

- On most soils, you can sidedress about 1/2 cup of 5-10-5 per plant and work shallowly into the top inch of soil when fruits are about 1 inch in diameter and again when harvest begins.
- To avoid other common tomato problems:
 - Keep soil evenly moist to prevent blossom end rot. This can also help prevent cracking when fruit absorbs water too fast after heavy rain following dry conditions.
 - Do not remove leaves that shade fruit to prevent sunscald.
 - Catfacing (misshapen, deformed fruit) is caused by incomplete pollination, usually due to cold weather. Don't rush to transplant until weather has stabilized and soil is warm.

Tomatoes

- **Pests:**

- Aphids - A hard stream of water can be used to remove aphids from plants. Wash off with water occasionally as needed early in the day. Check for evidence of natural enemies such as gray-brown or bloated parasitized aphids and the presence of alligator-like larvae of lady beetles and lacewings.
- Whiteflies - Do not purchase whitefly-infested transplants. Inspect carefully before purchasing.
- Colorado potato beetle - Handpick and destroy beetles, eggs and larvae.
- Cutworms - Control weeds. Cardboard collars around each plant give good protection.
- Flea beetles - Use row covers to help protect plants from early damage. Use in place at planting and remove before temperatures get too hot. Control weeds.



Tomatoes

- **Diseases:**

- Blossom end rot - Water during drought or mulch to keep moisture level constant. Grow on soil high in organic matter. Fertilize properly. Avoid cultivating close to plants.
- Catface - Grow locally recommended varieties and provide adequate fertilizer and water for vigorous growth.
- Early blight, Septoria leaf spot - Locate new plants in a part of the garden different from previous year's location. Avoid wetting foliage if possible. Water early in the day so aboveground plant parts will dry as quickly as possible. Avoid crowding plants. Space apart to allow air circulation. Eliminate weeds around plants and garden area to improve air circulation. Practice plant sanitation. When plants are not wet, carefully remove and destroy affected plant parts. In autumn, rake and dispose of all diseased leaves and stalks. Septoria occurs early in the season, preferring cool, wet weather. Use clean transplants and remove lower infected leaves.





Tomatoes

- Late blight - Use same cultural control strategies as above. The fungus that causes late blight has recently become a major threat to home gardens and commercial growers because of migration of new more aggressive strains (genotypes) into the United States. Verification of late blight diagnosis and implementation of prompt control measures are highly recommended. Cultural controls mentioned above may not adequately control these new strains.



Tomatoes

- Fusarium wilt - Use same cultural control strategies as above. Plant resistant varieties such as Pik-Red, Better Boy, Duke, Freedom, Supersonic, Jet Star, Springset and Floramerica.
- Verticillium wilt - Use same cultural control strategies as above. Plant resistant varieties such as Supersonic, Jackpot, Basketvee, Sunny, Jet Star and Springset.




Tomatoes

- You will find hundreds of varieties to choose from in seed catalogs and at garden centers. (It's estimated that there are 25,000 to 40,000 varieties worldwide.) When choosing what to grow from seed or when purchasing plants at the garden center, consider:
- **Days to harvest:** This is roughly how long after transplanting (not seed planting) you can expect first ripe fruit. Keep in mind that cool, cloudy weather will slow expected growth. Use days-to-maturity as a guide to distinguish varieties as early (65 days or less), mid-season (65 to 80 days) and late-season (80 days or more).

- **Determinate vs. indeterminate:** Determinate varieties produce many short branches with flowers and fruit on the ends. They are usually early varieties and produce their harvest all at once. Indeterminate varieties will continue to grow and produce flowers and fruit all season until killed by frost and are most common in gardens. Semi-determinate plants are more compact than indeterminate but keep producing until frost.
- **Use:** Some are better than others for a multitude of uses: slicing, salads, sauces, canning, juice etc.

Tomatoes





- **Appearance:** Colors range from the familiar red to orange and yellow, pink and multicolored fruits. Size and shape range from huge round beefsteaks to elongated pasters to tiny cherry and grape tomatoes and everything in between.

- **Disease tolerance:** Tomatoes were originally desert plants. So they don't naturally have strong resistance to plant diseases that thrive under our generally humid conditions. Fortunately, many hybrids have been bred specifically for disease resistance, and some open-pollinated varieties tolerate certain diseases.



Tomatoes



QUESTIONS?