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## **How To Grow Delicious Tomatoes**

Absolutely nothing tastes better than a warm, home grown, vine-ripened tomato on fresh-baked bread! Easily raised in the home garden, or even on the patio, tomatoes produce heavy crops in small areas.

### **Tomato Varieties:**

With dozens of varieties of tomatoes available to the home gardener, your choice will depend on what you want from your plants, as well as on which varieties grow best in your region. In localities with a relatively early fall frost and short growing season, pick tomatoes developed for early maturation. As well, there are tomato varieties available for slicing, special ones for canning and freezing, small tomatoes for patio and container planting, late maturing tomatoes, and yet others which make good ketchups and sauces. So if you have enough room, choose a selection of tomato varieties and then decide which is your favourite.

### **Planting & Culture:**

The tomato is a warm-season plant which can require a fairly long growing season, depending on the variety selected. Plants may be bought from a greenhouse, or grown from seeds started indoors approx. 4 - 6 weeks before you plan to set them out into the garden. Tomatoes are very sensitive to frost, however, so they must not be put outside until the weather is reliably warm, or they are protected from sudden chills.

### **Germinating Tomato Seeds:**

Tomato plants can be started in almost any type of container that has holes in the bottom of it for drainage. Fill the container with a mixture of two parts sterilized garden soil with one part pasteurized compost and one part vermiculite or perlite. Tomato seeds germinate best when soil temperatures are 24 - 32C (75 - 90F).

Space the seed evenly in holes 2 - 3 inches apart with three to four seeds to each hole, planted 1/2 inch deep. Keep warm and dark until the seedlings appear. The top of the refrigerator is a handy place to start your plants, as light isn't crucial until the seedlings have popped out of the soil. Expect to see sprouts in 6 - 14 days.

As soon as the tomato sprouts appear, move the plants to a bright, but cooler location, and grow your tomato seedlings at about 15C (60F) during the day, and no lower than 4C (40F) at night. This prevents the tomatoes from growing tall and straggly, and promotes strong root development. Watering your new plants from the bottom by placing the seed flat in a pan containing shallow water and allowing the flat to absorb the moisture it requires while at the same time keeping the surface of the soil on the dry side helps to prevent damping-off.

As your tomatoes continue to grow, transplant them to larger pots containing a richer soil when they have 1 or 2 true leaves - each time burying them a bit lower into the ground. Allow the surface of the soil to dry between waterings, but don't let the plants wilt. Every 10 days or so, add some organic balanced formula fertilizer, manure tea or fish emulsion to the water.

Begin hardening the plants off (getting them used to living outdoors) about two weeks before you plan to transplant them into the garden. By this time your tomato plants should have formed 2 or more sets of true leaves. Set the pots outside in the shade by day, and bring them back inside at night, gradually acclimatizing them to outdoor conditions. **You need to harden all tomato plants before setting them outside in your garden - even those purchased from a nursery.**

### **Growing Tomato Plants:**

Tomato plants can be put into your garden as soon as the nighttime temperature is above 7C (45F) all the time. Remember, it only takes one frost to kill your plants.

- **Soil:**

Because they are warm weather plants, tomatoes require an open, sunny, well-drained location in the garden. Avoid poorly drained spots where rainwater tends to form a pool. Many tomato diseases are associated with poor drainage.

The soil should be fairly light and porous, and contain a generous amount of humus. If the soil is heavy and contains a large percentage of clay, you can improve the soil's texture by adding peat moss or sand. For plant nutrients, turn under a green manure crop or fertilize well with compost.

Tomatoes should be mulched, if possible, once the soil has warmed. Mulches keep the soil moist and help keep fruit off the ground, preventing rotting.

- **Transplanting:**

Once your tomato plants have been hardened, or acclimated to outdoor conditions, and all chances of cold night-time temperatures have passed, it is time to set your plants out into your garden or patio containers. If paper or peat containers have been used, simply set the plants in place without removing the containers. Bury the stems up to the first true leaf. Also, make sure that all parts of the peat pot is completely submerged, since if any part of the pot is exposed, it will draw water away from the roots.

Space bush varieties 45 - 60 cm (18 - 24") apart, and vine varieties 50 - 75 cm (20 - 30") apart, working 1/4 - 1/2 cup of complete organic fertilizer into the soil where the transplant is to go. If the soil is acidic or there is a history of blossom end rot, work in a handful of bonemeal and dolomite lime for each plant.

Your tomato plants will overcome the shock of transplanting more quickly if supplied with a starter solution. Mix two parts water with one part sifted compost. Allow the mixture to settle. Apply this solution to the hole in which the plant is to be set and again after the plant has been firmed and settled in place. "Seaspray" or a high phosphate fertilizer may also be used.

Since eager gardeners sometimes set their plants out too soon in order to hurry their growth, it may be necessary to protect them against late frost damage. Cover them with some of the commercial products designed specifically for this purpose, or use inverted baskets, paper bags, or milk cartons.

- **Staking & Pruning:**

**Indeterminate vines** continue to grow and produce fruit until killed by frost. They need to be staked or trellised for best production. Drive a 5' stake into the ground alongside each planting spot. Plant seedlings deeply so that they send out side roots from the stem. This will help to anchor the plant as well as to feed it. Tie the plant to the stake with soft yarn or strips of cotton cloth by placing the cloth underneath a leaf node (where the leaf joins the main stem) and securing it loosely to the stake. This also helps prevent injury to the tomato plant during rapid growing, where heavy fruit can break the stems.

If your tomatoes are the kind that require staking, be sure to pinch out the side shoots so that the plant produces only 2 main stems which are tied to the stake. Remove all suckers (stems growing from the leaf crotch) except the first one. This is allowed to develop into a second stem, which is tied to the stake like the first one. Other suckers should be allowed to grow 6 inches long before they are cut off with a sharp knife. To limit the height of the plant, pinch back the top when it reaches the desired height. By removing the suckers and keeping the foliage under control your tomatoes will set a later crop of larger fruit.

**Determinate Bush** varieties of tomatoes normally set fruit in a concentrated time period. These types do not need staking, but some kind of support (cages or netting) is useful to keep plants from sprawling on wet ground. The "suckers" are not normally removed, though some trimming helps air circulation. If you remove some of the flowers, you will get larger-sized fruit.

- **Watering:**

When watering tomato plants, avoid wetting the leaves. Try not to water towards the end of August so that the plants can be stressed enough to ripen the fruit faster. If it is a wet summer, use a plastic cover over the plants to keep them dry, help prevent fungus diseases, and hasten ripening.

- **Harvesting:**

During the summer, tomato vines should provide a steady supply of fresh fruit for family use. Later, when the crop reaches its peak, you will probably want to preserve much of it for future use. Tomatoes and tomato juice can be frozen, canned, or preserved in recipes in a number of different ways.

After most of the tomatoes have been gathered, and before the first killing frost, you will find a large number of green tomatoes on the vines. This crop should be gathered and stored. Larger tomatoes may be wrapped individually in newspaper and placed about 3 layers deep in open boxes or crates and keeping them at a cool room temperature until they mature.

## **Tomato Plant Pests & Diseases:**

Tomatoes have a built-in insect repellent called solanine that will repel many insect pests. The tomato hornworm is probably the most serious pest of tomatoes, although Japanese beetles, cutworms and other insects will also bother the plants. Many of these can be controlled by interplanting with flowers or other crops. Nematodes can be discouraged by planting marigolds, or even planting tomatoes where marigolds grew the year before. Virus-free nasturtiums will trap aphids.

The hornworm, a green worm with white stripes, is also attracted to dill, and is easier to spot on those plants than on the tomato. It can be hand-picked and dropped into a can of kerosene. Some easy-to-make sprays such as red pepper or onion and garlic also serve as insect repellents.

Cutworm damage can be prevented by placing a paper collar around the stem, about an inch above and below ground level.

Many diseases plague tomatoes, but only a few are of major importance.

- **Blossom drop:**

Tomato plants often fail to set a normal crop of fruit because the blossoms drop off just when the flowers have matured. This may occur wherever tomatoes are grown, but the trouble seems to be especially prevalent where soil moisture is low and plants are subjected to hot, drying winds. Such conditions prevent blossoms from setting fruit, as do sudden periods of cool weather or beating rains. Loss of blossoms also results from infection by parasitic bacteria or fungi.

Since large-fruited varieties of the Ponderosa type are very susceptible, do not grow these where summers are going to be hot and dry. Instead grow resistant varieties in hot climates, especially in the Southwest. Irrigate, if possible, and avoid excessive applications of nitrogen, especially during early growth. To help pollination and fruit-set, shake the flower trusses on a warm, sunny day to help distribute the pollen.

- **Blossom-end rot:**

This is a common, nonparasitic disorder of tomatoes. A water-soaked spot first appears near the blossom end of the tomato when the fruit is about 1/3 of the way to maturity. The spot enlarges and browns until it covers up to half the surface, and gets dark and leathery, flat, or even concave as it continues to grow. No soft rot of the tomato occurs unless it also has been attacked by bacteria or fungi.

Blossom-end rot characteristically strikes during a long, dry spell after the plants have grown quickly and well during the earlier part of the season. Sometimes it appears after rainy periods. A deficiency of calcium is the basic cause of the trouble, but that condition is aggravated by excessive water or nitrogen. An excessive amount of total salts also causes blossom-end rot because the effective amount of calcium salts available to the plant is reduced.

Control should begin with a soil test very early in the spring or fall to find out whether there is already a shortage of lime in your soil. To raise the pH value of the soil by one unit, use about 1/2 lb of finely ground limestone for each 10 sq. ft. If soil pH needs to be raised more than one unit because it tests below 6, apply more lime. Add a little at a time and expect effects to last about 3 years. In a dry climate, be especially careful not to make your soil too alkaline.



- **Curly Top:**

Also called Western Yellow Blight, curly top is destructive to both tomatoes and sugar beets, and can trouble beans, spinach, squash, peppers, and table beets. It is carried by beet leafhoppers from weedy, abandoned lands. Attacks may occur at any stage of the tomato's growth, causing leaflets to roll and turn over to expose their undersurfaces. Foliage becomes stiff and leathery. The petioles of the leaves curl downward. Branches and stems become very erect and the veins get purple in places. The plants are stunted and very few fruits ripen normally. Early tomatoes probably suffer more from curly top than late varieties, but both are affected.

Control is difficult because the range of the leafhoppers is very wide. Set out transplants after the heaviest leafhopper infestation has passed. Plant more closely than usual. You can also plant in double-hill plantings, with 2 plants set 6 inches apart in hills planted in 42 inch rows. Yield is increased and damage decreased in this type of planting situation.

If you have only a small area of tomatoes, shading of the entire area with slats or by using a muslin-covered frame will repel a fair number of the insects, as well as arrest the effect of the disease if it has already started.

- **Damping-off:**

This wilt is caused by a fungus that attacks the stems at the ground level. The plants soon fall over and die. The disease can be combated by sterilizing planting soil and controlling excess moisture. Avoid overfeeding your seedlings and place them close to a lighted window or overhead fluorescent light.

- **Early blight** (*Alternaria tomatophila*) :

Symptoms of early blight may appear first on the stems as dark, slightly sunken areas with concentric markings. Small, irregular, brown dead spots appear early in the season on the older leaves and enlarge until they are 1/4 to 1/2 inch in diameter. The spots are usually surrounded by yellow, and if there are many spots on the leaf, the entire leaf might be discolored.



Most early blight injury occurs just as fruit begins to mature. High temperatures and humidity will cause much of the foliage to die and the fruit to be exposed to sunscald. This disease is easily spread. To avoid problems with early blight, sterilize soil for starting seedlings, use commercially grown seed or clean seed from your own plants, and do not crowd plants in a flat. If seedlings show signs of this disease, do not plant them in the garden.



- **Growth Cracks:**

Cracks radiating from the stem or extending more or less concentrically around the shoulders of the fruit may seem normal, but in reality they invite infection and detract from the appearance of the fruits. Cracking often appears during rainy spells that are hot and conducive to rapid growth. Another kind of cracking comes when there is a dry period followed by a rainy period during the ripening season.

To control this condition, refrain from applying water at crucial periods of the plant's growth. Sometimes the cracks heal before harm is done.

- **Late Blight** (*Phytophthora infestans* ):

A fairly common disease in certain parts of the East and on the Pacific coast, late blight occurs sporadically elsewhere. The older leaves of infected plants develop irregular, black, water-soaked patches. Eventually, leaves drop and the disease destroys the fruit. Sometimes there is a white, downy growth of the fungus on the lower surfaces of the leaves, and if the weather is warm and moist, the plant will look as if it had been enveloped by frost. Damage to the fruit is likely to occur on the upper half. The first sign is a green-gray spot which becomes brown and hard. Infected plants must be dug up and destroyed or the blight will spread to other plants.



- **Leaf Roll:**

During very wet seasons, tomato plants frequently show an upward rolling of the leaflets of the older leaves. At first this rolling gives the leaflet a cupped appearance. Later, the margins of the leaflets touch or overlap. The rolled leaves are firm and leathery to the touch. One half to three-fourths of the foliage may be affected. Plant growth is not noticeably checked, and a normal crop of fruit is produced. Frequently leaf roll occurs when tomato plants are pruned severely, and it is very common when unusually heavy rains cause the soil to remain moist for long periods of time.

To prevent leaf roll, keep tomato plants on well-drained, well-aerated soil, and protect them from prolonged periods of heavy rainfall if you can.

- **Root Knot** (Root knot nematode - *Meloidogyne*):

Nearly invisible nematodes which attack the roots of various plants are found wherever tomatoes are grown - especially in areas where crop rotation is not practiced. The attack results in the formation of root knots or galls that range in diameter from a pin-head to a full inch or more. Soon the whole outer area of the root is discolored, and may rot.



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The results are not apparent above ground except that plant growth and yield are retarded. Infected plants wilt very easily on a hot day, and they may be stunted in appearance and somewhat yellowish. Some tomato plants are almost killed.

The best control for nematodes is the planting of marigolds along with tomatoes, or, even better, put tomatoes in parts of the garden where marigolds grew during previous years. The root exudate from marigolds has a powerful inhibiting effect on nematodes, and remains effective in the soil for 3 years. Interplanting of marigolds and tomatoes is effective the same year.

To control root knot, examine the roots of tomato plants, and discard any with root knots or rotten roots. Never use soil known to have had a nematode infestation the previous season. Plant marigolds instead. Burn infected plants.

- **Septoria Leaf Spot** (*Septoria lycopersici* ):

Not common in the South or on the Pacific coast, septoria leaf spot occurs in the mid-Atlantic and central states, and as far south as Arkansas and Tennessee, flourishing when temperatures are moderate and rainfall abundant. The disease destroys so much foliage that plants fail to make enough food to support an abundant crop of fruit. Absence of leaves exposes the fruit to sunscald. Fungus is most evident on plants that are just beginning to set fruit.

The first symptom of septoria leaf spot is the appearance of water-soaked spots on the older leaves. Spots are rough and circular, with gray centers and dark margins. Later, dark dots are evident in the centers where spores are produced. Eventually all the leaves are affected and drop off, leaving only a few at the stem top. Fruits are rarely attacked.



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To control septoria leaf spot in tomatoes, plow under all crop and weed refuse; the fungus will not over-winter on plant remains that are buried deep in the soil.

- **Soil Rot (Rhizoctonia solani ):**

This disease can attack your tomato plants no matter where you have your garden. It is caused by the same organism that causes damping-off. The first symptom is a brown, slightly sunken spot on the fruit, with sharply outlined (not smooth) concentric markings close together. It enlarges and often breaks open.



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Soil rot can invade either through wounds in the tomato or through uninjured skin. It usually occurs during wet periods and on moist soils where plants cover the ground; or when the fruit has been splashed by rain. Avoid poorly drained soil, use a good mulch, and use varieties of tomatoes suitable for staking.

- **Sunscald:**

During hot, dry weather, green tomatoes may develop sunscald. It is especially common on plants that have lost their foliage from other diseases. Symptoms, especially on young fruits, include a yellow or white patch on the side of the fruit toward the sun, which may remain yellow or turn blistery and later flatten to a large, gray-white spot with a very thin, paperlike surface. It is very likely that this spot will later become the site of a fungus infection.

To control sun scald in tomatoes, protect plants from defoliation and from wilt diseases and leaf spot. If excessive loss of protective foliage occurs, put a light covering of straw over the fruit clusters.

- **Tobacco Mosaic Virus:**

Also called tomato virus, it is found everywhere and infects many members of the Nightshade family. The green strain causes light and dark green mottling of the foliage, curling, and slight malformation of the leaflets. If seedlings or young plants are infected, mature plants may be stunted; but later attacks do not reduce the size of the plant,

especially if they do not occur until the fruiting stage. Yellow strains cause yellow mottling of the leaves and sometimes of stems and fruit, as well as curling, distortion and dwarfing of the foliage. Control is advisable, especially since an infected plant is susceptible to attack by a second virus.

The tobacco mosaic virus is usually transmitted by first handling an infected plant and then a healthy one, or even by brushing against first one and then the other. Careful handling is important. Wash your hands in soap and water or milk if you are handling more than one plant. Greenhouse tomato plants are most susceptible to the virus, since they are so frequently handled. A few insects, such as the potato aphid, also transmit the virus from plant to plant. The virus will live for several years in dried stems and leaves, in greenhouses as well as in the soil, especially when one tomato crop is planted right after another in a warm climate. Garden soil does not seem to be the source of much infection, but seedlings intended for garden planting are often infected if grown in or near a greenhouse where the disease is present. The carry-over may be due to aphids. Eliminate jimsonweed, nightshade, bittersweet, matrimony vine, ground cherry, and horse nettle growing near your tomato patch. Mosaic virus is present to some extent in practically all cigar, cigarette and pipe tobaccos, so smokers are very likely to carry the virus on their hands.



To control or at least reduce losses from tobacco mosaic virus, remove all infected plants among the seedlings and spray with milk any tomato seedlings suspected of contracting the disease. For full protection, repeat at least once. Burn infected plants or place in a good, hot compost heap. Sterilize soil in which seedlings are grown, especially when a new crop is put in where an old crop has recently been dug up.

- **Verticillium Wilt:**

Verticillium wilt is a problem in the West, some of the north-central states, and in the Northeast. Unless the soil is pasteurized regularly, it can also invade greenhouses.

Infected plants show a slight wilting at the shoot tips during the day and yellowing of the older leaves. Eventually, the crown of the plant loses all its leaves, the higher stem leaves look dull and the leaflets curl. Finally, only the leaves



near the tips of the branches are alive. If the plant fruits, the tomatoes are very small and unattractive. When the leaves have been infected, they show yellow areas at their margins in a "V" design. Eventually, this tissue dies and the leaves drop off, but the fungus may have already invaded the vascular system and traveling through the whole plant. As with fusarium wilt, the best control is to locate seedbeds on soil that is free from the fungus. Use clean, pasteurized soil in flats, hotbeds, cold frames, and peat pots.

[All Tomato disease photos courtesy of T.A. Zitter, Cornell University, Ithaca, NY](#)

**Tomato Disease information** is courtesy of [The Encyclopedia of Organic Gardening](#)

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