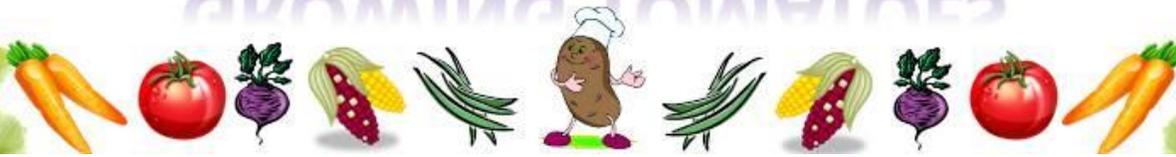


GROWING TOMATOES



TOMATO VITAL STATISTICS

Family: Solanaceae

Species: *Lycopersicon esculentum*

Soil: sandy loam; good drainage important

pH: 6.0-6.8 or 5.8-7.0

Soil temperature for germination: 70-90F

Soil temperature for growing on: 70-75F during the day and 60-65F at night is ideal

Air temperature for best growth: 70-75F daytime; 50-55F nighttime; lower than 32F kills

Seed germination: 5-14 days at 70-90F

Seed planting depth: 1 / 4 inch

Seed viability: 3-5 years

Seeds per ounce: 10,000

Final spacing: Determinate varieties 12-24 inches apart; Indeterminate varieties 14-24 inches apart if staked, 24-36 inches apart if unstaked

Row spacing: 36 inches apart

WHY TOMATOES?

It's a phenomenon that happens every summer across the United States – gardeners wait eagerly to savor the first ripe tomato of the season. For tomato lovers, juiciness, tender meaty interiors, little or no inner cores, and above all, that full, rich tomato flavor are best had by tending a crop at home.

Number one when it comes to popularity, tomatoes are grown by almost every gardener. Even those who do not have a garden will grow tomatoes, planting in containers on patios and decks or along a fence or in any sunny spot available. You don't need a big backyard to grow a crop of tomatoes.

But why bother? Because the flavor of a homegrown tomato so far surpasses anything you could hope to buy in a store that it's worth the time and the little effort and space needed to "grow your own".

Historically speaking, the tomato is a native of South America in the Peru/Ecuador area. It was brought from Mexico to Europe in 1523 and presented as a novelty known as the "pomme d'amour" or "love apple"

Culinary speaking, tomatoes are a fairly current event. The nutritious, juicy, tasty red fruit was not

even cultivated as a food crop until well into the 19th century. People used to believe they were poisonous because of their resemblance to Nightshade (a highly poisonous relative) and because animals would not go near the plants. Many important garden plants also belong to this family including potatoes, peppers, eggplants and even petunias!

Today tomatoes are the most popular home-grown vegetable in America and the gardener's supreme delight. They are a staple of many cuisines and offer the ultimate in versatility, whether used raw or cooked.

HOW TO GROW TOMATOES

WHEN TO START SEEDS

Start seeds 6-8 weeks before the last average frost date in your area. Timing determines the quality of your seedlings. Seedlings started too early will become leggy and may become stunted in your containers and will have a difficult time adjusting to conditions in the garden. Seedlings started too late will delay your harvest.

CHOOSING VARIETIES FOR YOUR CLIMATE

To grow tomatoes successfully you should know two very important dates, your average last frost date and your average first frost date. These dates can help you determine when to plant as well as when to protect your tomatoes from frost. They also help determine the length of your growing season, which is very helpful for planning a planting and harvesting schedule. This is especially important for gardeners with a short growing season. If a variety takes longer to mature than the length of your growing season you have a problem. The plants will probably be killed by frost before the fruit matures.

NOTE: to determine the length of your growing season, count the number of days between your average date of the last frost in spring and the average date of the first frost in fall. The length of the growing season can range from less than 100 days in northern climates to 365 days in southern climates.

DAYS TO MATURITY

Ripening time varies with location and growing season and is influenced by soil and weather conditions, but the days to maturity cited here gives the approximate number of days from transplanting until the first fruits should ripen. Add 30-35 days if direct seeding.

Keep in mind that the maturity date is an estimate of when the first tomatoes will be ready to

harvest. Variations in your garden can be due to differences in grown season, soil fertility and other conditions where they were tested.

WHICH TOMATO TYPE FOR YOU?

DETERMINATES, also known as bush varieties. These plants have limited vine growth and their fruits ripen over a short period, sometimes within as few as 10 days. This gives you a large enough batch of ripe tomatoes to work with at one time, making them an ideal processing tomato. Determinate plants are perfect for gardens with limited space or container growing and they work well in northern gardens with short growing seasons.

INDETERMINATES, also known as vining varieties. These plants have unlimited growth and they keep growing and continue to flower and set fruit until frost. Because of this you will have less mature fruits available for picking at any one time, but you can harvest over an extended period of time.

STARTING SEED INDOORS

Follow these easy steps if you want quick germination of seeds and smooth healthy growth of your tomato transplants:

- 1. Measure the amount of sterile soil less peat starting mix you think you'll need and wet it thoroughly. Put it into a large plastic bag, add water (4 cups mix to 1 cup warm water) and knead until water is absorbed. The medium should be very damp but not so wet that water can be squeezed out.*
- Next fill your containers. You can use cell-packs, peat pots or plastic or clay pots. Gently press the mix into them leaving 1 / 4 inch space at the top to allow for air circulation.
 - Now you can sow your seeds. Using a dibble (pointed stick or pencil), make a hole in the center of the potting mix about 1 / 4 inch deep, drop in 2-3 seeds and cover with potting mix. Or you can use Jiffy Peat Pellets – drop the seeds in the center opening and moisten well. If sowing in flats, sow seeds sparingly in rows or scatter thinly across the soil surface, cover with 1 / 4 inch of potting mix and firm lightly.
 - Mark your containers with variety names and planting dates. Water lightly with a fine spray. Once the seeds are planted, cover the containers with plastic domes or plastic wrap. This creates a miniature greenhouse, which keeps the medium from drying out and you shouldn't need to do any watering until the seed germinates.

- Place containers in a warm spot out of direct sunlight and away from drafts. On top the refrigerator is ideal, or you can apply bottom heat with a heating cable or electric heat mat. Seed germination will occur in about 5-14 days at 70-90F.
- Be sure to check your flats every day. When the first green shoots appear, move the containers into direct sunlight. Remove the plastic covering and water or mist as needed at least twice a day. Turn the plants daily to keep them from bending to the light.

GROWING ON

As soon as the seedlings emerge, place them in a very sunny window or under grow lights. If you use grow lights, position the plants 2-4 inches below the light source, and light for 12-18 hours a day, turning the lights off at night. Growing the seedlings at temperatures of 60-70F will help prevent legginess. Water carefully, allowing the soil to dry on the surface between watering, but don't let the plants wilt.

Once seedlings have developed their first set of true leaves transplant to individual 2-3 inch peat pots or other containers. For large, stocky transplants use 4 inch pots. Plant them deeper than they originally grew to check any tendency toward legginess. If you've sown directly into pots, thin to the strongest single seedling by pinching off weaker ones at the soil level.

After the seedlings are 3-4 weeks old, it's time to begin fertilizing. Use seaweed or fish emulsion or dilute 20-20-20 water-soluble plant food at 1/3 to 1/2 regular strength. Fertilize every 10-14 days.

CAUTION: When fertilizing, please keep this in mind – **MORE IS NOT BETTER** – boosting the amount of fertilizer can damage your plants. Too much fertilizer can burn plant roots and leaves thereby stunting their growth and significantly setting back your harvest.

HARDENING OFF

All seedlings need to spend a week or so outside before being transplanted into the garden. About 7-10 days before planting your tomato seedlings into the garden begin adapting them to outside conditions. Called "hardening off" this process is the way to gradually introduce an indoor plant to an outdoor environment. Even plants you buy at a garden center require this step before planting them out into your garden.

- 1-2 weeks before setting plants out in the garden, cut back on their water and fertilizer.
- Move them outdoors on a relatively mild day. Place them in a sheltered location where they will get partial shade and are protected from the wind. On the first day for just a few hours

and give them a little more time each day after. It takes 3-4 days to accustom them to direct sunlight.

- After a week the plants can stay out all night. But if there are frost warnings, move them back indoors temporarily.

TRANSPLANTING OUTDOORS

If possible, avoid setting out unprotected plants until night temperatures are 50F. Any frost will cause severe damage to the transplants at this stage. Transplant hardened-off tomato plants to the garden in the late afternoon or evening, or choose a cloudy, mild, wind-free day. The young plants don't react well to the hot sun or a strong wind their first few days in the garden.

Water plants thoroughly about 30 minutes prior to planting using a full-strength solution of 5-10-10 fertilizer. Dig planting holes about 5-6 inches deep. Add a handful of compost or a teaspoon of 5-10-10 fertilizer mixing it well with the soil at the bottom of the hole. This will help the young tomato plants get off to a good start.

Plant the seedlings deep, burying the stems up to the leaves to encourage root growth. The plants will root freely from any portion of the stems buried beneath the soil. If your seedlings have become leggy, remove some of the lower leaves and bury even more of the stem. Always bury leggy stems at an angle as this encourages the development of a strong root system near the surface of the soil.

Partially fill the hole with soil to within about 3 inches of the surface and water in thoroughly, being careful to settle soil around roots, eliminating air pockets. Finish filling the hole with soil and firm soil around stem. SPACING

Plant determinate varieties 12-24 inches apart. Plant indeterminate varieties 14-24 inches apart if staked or 24-36 inches apart if unstaked. Rows should be spaced 36 inches apart.

SOIL PREPARATION

Tomatoes thrive in any reasonably good garden soil that is well drained and gets full sun. The plants do best in soil with a pH ranging from 6.0-6.8. We recommend testing your soil in the fall and adjusting the pH range, if needed, at that time. Fall is also a good time for deep spading or double digging (to a depth of 8-12 inches) and for incorporating organic matter into your soil. The addition of compost, leaf mold or peat moss provides organic matter which lightens and aerates heavy soils as well as increasing the moisture holding capacity of sandy soils.

In the early spring, till or spade the surface again, and rake to break up clods and remove stones. Fertilize as recommended by your soil test results.

FERTILIZING

Tomatoes need quite a large food supply. Phosphorus is very important, but too much nitrogen will result in lots of leaves and few fruit. Manure should be used, if at all, with caution.

We highly recommend foliar spraying every two weeks with fish emulsion, liquid seaweed extract, or water soluble 5-10-10 fertilizer (diluted to 1/2 strength). Foliar fertilizing gets the nutrients to the plant faster than by adding them to the soil and waiting for the roots to take them up. Spray in the morning while it's still cool and the dew lingers on the leaves. This way all the fertilizer is absorbed. Once the plants are in full bloom and you notice fruits developing, stop foliar spraying as it may result in harm to the developing fruits.

Alternatively, use a granular fertilizer high in phosphorus and potassium and low in nitrogen content, such as 5-10-10. In all but the most fertile gardens side-dress at regular intervals (every 14-21 days) during the growing season.

CAUTION: When fertilizing, please keep this in mind – MORE IS NOT BETTER – boosting the amount of fertilizer can damage your plants. An overdose of fertilizer causes plants to grow too rapidly and damage new roots thereby stunting plant growth and significantly setting back your harvest.

WATER

Tomatoes need an even supply of water throughout the growing season. Erratic watering can result in problems such as blossom end rot or cracking. Plants need at least 1 inch of water per week for steady growth. In hotter, drier parts of the country, 2 inches of water per week are needed during the summer months. The soil should be soaked to a depth of at least 6 inches. If you don't get enough rain, water every 4-5 days on light sandy soil and every 7-10 days on heavy soil.

MULCHING

Tomatoes need a steady supply of moisture and a thick mulch will help retain soil moisture which in turn, helps guard against blossom-end rot. Apply the mulch (3-6 inches deep) after the transplants have been in the garden 5-6 weeks. The mulch also controls weeds, minimizes soil compaction and moderates soil temperature.

If you choose not to mulch, you must keep your tomatoes weed-free. This is important since the

weeds compete with the plants for water, food and space. To keep weeds in check cultivate the soil to a depth of 1 inch every 7-10 days until the plants are well established.

STAKING/CAGING

Support systems for tomatoes offer definite advantages. Plants grow upright, making them easy to work around and the fruits don't touch the ground, making them easier to harvest.

In large plantings of tomatoes, rows of staked or caged tomatoes should be spaced 30-42 inches apart and the plants should be spaced 24-30 inches apart in the rows. If you do not stake or cage indeterminate plants, rows should be spaced 6 feet apart and plants 4 feet apart for proper air movement and plant development. Staking is the preferred method of growing tomatoes where space is limited. It's easier to harvest from neatly staked plants and the ripe fruits are easy to spot.

To stake a tomato, drive a strong 5-7 foot wooden or metal stake into the ground about 1 foot from each plant. Plants will need tying at regular intervals throughout the summer. Use soft string, strips of old sheeting or other soft, stretchable materials – old pantyhose make excellent ties. Do not tie stems so tightly that they are likely to be strangled by the ties as the stems grow and thicken.

You will also need to prune your plants regularly. The classic method of pruning removes all but the main stem, but this leaves fruits exposed to the sun, which can result in sunscald or cracking. We prefer allowing the first sucker, or side shoot, and the main stem to grow which results in two stems, both of which need to be tied to the stake. This double-stem technique results in more leaves to protect the fruit and also in more fruits per plant. After you have decided which method you will use, be diligent in removing all excess suckers.

If this sounds too labor intensive, then another effective measure is to cage the plants. Simply set one cage over each plant and rest the branches on the horizontal wires. There's no need to prune your plants when you use cages.

HOW TO EXTEND YOUR GROWING SEASON

SHORT GROWING SEASON AREAS

The best way to get the most tomatoes from your garden is to use season stretching strategies and devices. These ideas and products can enable you to get an earlier start in spring and help to protect your tomatoes from killing frosts in fall. Keep in mind when going for the earliest tomatoes in your neighborhood that sometimes the plants don't do well when planted out early and sometimes they do great. In any case, experimentation is the answer when determining what will work in your garden.

VARIETIES

If you have a short growing season, choose early varieties. Some mid-season varieties can also be grown but stay away from the huge beefsteak-types as they may not have time to ripen.

LOCATION

Where you plant your tomatoes has as much to do with avoiding frosts and cold weather as when you plant. Every yard has pockets or areas that warm up earlier in spring and stay warmer later into the fall. Find these niches in your yard and enjoy harvesting earlier and later than anyone else in your neighborhood. Good places to consider:

The south side of any building - especially if it's protected from the wind Courtyards

Near paved surfaces such as driveways - especially if the pavement is dark colored

ROW COVERS

Also known as floating row covers because the lightweight fabric literally "floats" on top of the plants. They protect from frost, enable you to plant sooner and thus enable you to harvest sooner and you can expect to harvest your first fruits 10-14 days earlier. They don't overheat easily and they let in light, air and water so they can be left on until you need to weed, or stake your plants. Row covers also help to deter insects, but must be removed when blossoms appear or when daytime temperatures reach 80F.

WALLS O' WATER

Double-walled, clear plastic cylinders that hold water Allow you to plant out very early and protects seedlings from frost by using solar heat to warm tubes filled with water. Have been reported to protect tomatoes in temperatures as low as 16F. They need to be removed after a few weeks, but give a great jump on the growing season.

PLASTIC WRAPPED CAGES

Wire tomato cages wrapped with 6 mil clear plastic act as miniature green houses allowing you to plant out earlier and protects the seedlings from frost and wind. Make certain to cover the tops when frost threatens.

HOT CAPS

A great way to protect plants from the cold. You can purchase these at garden centers or create your own by cutting the bottoms out of clear plastic milk jugs. Be sure to leave the top off during the day to vent out hot air on sunny days.

BLACK PLASTIC MULCH

Plastic mulch conserves moisture, increases soil temperatures, protects the fruits from rot and enhances earliness and yields. In addition black plastic mulch suppresses weeds and helps retain moisture, thus improving the growth of tomato plants and improving yields.

RED PLASTIC MULCH

Developed by the USDA and Clemson University this mulch is called Selective Reflecting Mulch or SRM-Red. Studies have shown it increases tomato yields up to 20% (do not use in hot-summer areas). It warms the soil and reflects far-red light wavelengths which triggers the release of a natural plant protein that stimulates more rapid growth and development. It also helps retain moisture, but does not suppress weeds.

WARM GROWING SEASON AREAS

Very high, sustained heat in the south makes it necessary to grow two crops each year. This way, the summer heat that hinders good pollination can be avoided. Transplant your first crop to the garden in late January to early February. Transplant your second crop August to September.

WHITE PLASTIC MULCH

Use for summer plantings to reflect light and keep the soil cool.

ORGANIC MULCH

Using a 2-4" layer of grass clippings, straw or other organic material can help keep the soil from getting too hot and thus extend your harvest season.

SHADE

If you want to try growing tomatoes in the hottest part of summer, partial shade may be an

answer, but keep in mind the plants require at least 6 hours of sunlight for growth and to ripen fruit.

TOMATO TROUBLES

Tomatoes are susceptible to many diseases and a few insects, but rarely do such problems become serious for the home gardener.

BLOSSOM END ROT is a blackening of the fruit on the blossom end due to a calcium deficiency often related to water uptake. Keep plants well-watered during the growing season, particularly during periods of drought, to help ensure better yields and help control problems such as blossom end-rot. Proper soil testing, lime applications and foliar treatment with calcium solutions will also help avoid this problem.

EARLY BLIGHT or *alternaria* is a fungal disease and one of the most common. Early determinate varieties are most susceptible. This disease causes brown spots surrounded by yellow that spreads outwards on the older leaves, eventually browning and killing the leaves. Plants are most susceptible in moist weather after they have set a lot of fruit. To prevent early blight, use young, healthy transplants and fertile soil for strong growth, and try to keep foliage dry. Clean up tomato plant refuse in the fall and rotate crops. Use copper fungicide to reduce infections.

INSECT PESTS are best prevented by keeping a close eye on your plants throughout the growing season. Use Neem oil or crop row covers to discourage flea beetles early in the season, when they can be the most destructive. Damaged or stripped foliage is almost a sure sign of tomato hornworms. They can be controlled by hand-picking or with *Bacillus thuringiensis* (Bt), sold as Dipel. Pick off Colorado potato beetles or use Colorado Potato Beetle Beater (Bt var. *tenenbrionis*), Neem oil, or pyrethrum products. **HARVESTING**

The very best tasting tomato is one that is vine-ripened and picked when the fruit has reached its full color. Harvest the fruits as they ripen. When there is a slight give to the fruit gently lift by hand until the fruit stem snaps. A fully ripe tomato will come off the vine easily when you tug it gently.

Use ripe tomatoes immediately, or hold them at room temperature. Do not refrigerate unless necessary. Cold temperatures below 55F can slow down and even prevent the ripening process. If you have overripe tomatoes you need to hold for a day or so, refrigerate them, but realize that the flavor will suffer. Bring back to room temperature before eating.

At the end of the season, all sizeable green fruits should be picked before the first hard frost. The greenest fruits may be used for making pickles and those of ripening size may be stored in shallow boxes or trays in a cool spot (like the floor of your garage) where they will ripen gradually and

provide usable (though not of vine-ripened quality) fruits for many weeks.

Green tomatoes do not ripen well on a windowsill. The sun reddens the tomatoes' skin without allowing it to ripen from the inside out. If you want your tomatoes to ripen slowly, keep them between 54F and 61F. For rapid ripening the ideal temperature is between 61F and 86F. If you want to extend the ripening period, put some tomatoes in a cool, dark area and keep others at room temperature.

HINTS FOR USING GARDEN FRESH TOMATOES

Once you get started growing tomatoes you eventually find yourself with more than you know what to do with. You can always give them to friends and unlike zucchini, tomatoes will never be turned down. Of course there are loads of recipes to try, from homemade Italian marinara sauce to salsa to gazpacho or you can prepare them for your own use during the winter by putting them up in various ways. Following are some of our favorite hints, tips and recipe books for using bumper crops of garden fresh tomatoes.

YIELDS

2 large 3-3 ½" tomatoes = approximately 1 pound
3 medium 2-2 ½" tomatoes = approximately 1 pound
8-9 paste tomatoes = approximately 1 pound
24 cherry tomatoes = approximately 1 pound
1 pound fresh tomatoes = 2 cups quartered or cubed
1 ¾ cups diced
1 ½ cups peeled and seeded pulp

COOKING

Tomatoes' acidity reacts with certain metals, such as aluminum, and you can end up with an off-taste. Cook in stainless or enamel to avoid this problem.

PEELING

We prefer peeling tomatoes for most cooked dishes. It takes very little effort, simply bring water to boil in a deep saucepan. Once the water is boiling, add a few tomatoes at a time and blanch for 15-30 seconds, then remove them and plunge them into cold water and drain. The skins will slip right off.

SEEDING

To seed, cut in half and gently squeeze and shake out the seeds.

CANNING

The very best way to get flavorful cooking tomatoes throughout the winter is to can them, and nothing compares to the homemade flavor. Paste-type tomatoes make the richest, heartiest flavored purees and sauces.

FREEZING

Simply put whole or peeled tomatoes into plastic bags in the freezer and use them for cooking during the winter.

SUNDRIED

They're so good but they cost a fortune in the store – and you can easily make them with the use of a dehydrator. Use paste tomatoes because they are meatier and dry faster, cut them lengthwise in half or thirds and place cut side up on the dehydrator's trays. Drying takes about 24 hours at 120°F. When they are ready they will be leathery, but pliable. Store in glass jars with tight lids or plastic bags in the freezer.

NOTE: *We highly recommend the following cookbooks for tomato recipes:*

The Victory Garden Cookbook by Marian Morash

Too Many Tomatoes, Squash, Beans and Other Good Things by Lois M. Landau & Laura G. Myers

Ball Blue Book – Guide to Home Canning, Freezing and Dehydration

Stocking Up III by Carol Huppig

Joy of Gardening Cookbook by Janet Ballantyne

Putting Food by Greene, Hertzberg & Vaughan