



Growing Tomatoes for Seed Saving

Tomatoes are easy to grow if you provide them with what they need: water, light (sun), nutrients, heat and good drainage. Plants should be kept continually moist and watered as evenly as possible. Uneven watering promotes blossom-end rot and cracking in the fruit. Insufficient water reduces production. It is especially important to make sure plants in containers are watered, as the top growth will quickly deplete the moisture in the soil. To set fruit, tomatoes need temperatures above 10°C and below 32°C. Tomatoes have very few pests, but watch for flea beetles, slugs, voles, and deer. A variety of diseases caused by fungi, bacteria, and viruses can affect tomato plants.

Tomatoes are self-pollinating. This means fruit will form even if you have only one plant. Some varieties will cross-pollinate, however. Seeds of cross-pollinated plants will produce hybrid varieties when they are planted the next growing season. Fruit from accidental hybrids are usually inferior to those from the parent plants. For saving seeds, varieties of tomatoes must be separated by 15 m (45 feet). Most home gardeners do not have the space for this isolation distance, so flower clusters can be “bagged” with small organza gift bags to prevent bees from transferring pollen from one variety to another.

Heirloom tomatoes are varieties that have been in existence since the 1940s or earlier. They are always open pollinated, but not all open-pollinated varieties are heirlooms. Family heirlooms have been passed down through families for generations. Commercial heirlooms were introduced by seed companies in the 1930s.



Starting from Seed

Plant tomato seeds indoors about the last week in March or first week in April. If you start them earlier, they might flower and set fruit before you can plant them. This will set them back and production will be reduced.

- Wash any seeding containers you have used before with strong solution of dish soap and water (or a 10% solution of bleach in water) to prevent “damping off,” a fungal disease that could kill your new seedlings overnight.
- Fill small containers (like 6-cell plastic containers, “6-pack”) with organic seeding mix, with or without added fertilizer. Water them thoroughly.
- Label each cell in a 6-pack or container. Popsicle sticks work great if you are doing lots of plants – use a permanent non-fading marker, and put the variety name on both sides of the stick.
- *Sometimes the names on sticks get hard to read. If the name is on both sides, you double the chance of knowing the plant’s identity. You can use a code for long names, but make a list of the varieties and their code names. Example: SURE for Surrender’s Indian Curry tomato.*
- Put 2-3 seeds of one variety into each cell or container, about 0.5 cm ($\frac{1}{4}$ ”) deep. Gently tamp the soil down over the seeds. Make sure the variety corresponds to the stick label.
- Cover the containers with plastic wrap or a tray cover to keep them moist.
- Check the seed trays daily to make sure the soil stays moist, but let the surface dry before you water again to help prevent damping off.
- Sprouts should appear from 3 to 7 days after planting.
- As soon as you see them coming up, remove the cover and put the new seedlings into bright light. They will need 10-12 hours of light a day.

The first leaves are “seed leaves” or cotyledons. They will grow from the energy in the seed, so don’t fertilize them. If you started seeds in starting mix with fertilizer, don’t add more until they are transplanted. The following information pertains to seedlings started in mix without fertilizer:

- When the first set of true leaves start to form, give them liquid organic tomato or fish fertilizer. Dilute it to about $\frac{1}{4}$ of the recommended strength - any stronger could kill the seedlings.
- *Tomatoes need relatively high concentrations of potassium, the third of the 3 numbers representing chemical nutrients in fertilizer: N – Nitrogen, P – phosphorus, K – potassium. Any fertilizer with numbers that are similar will work fine, like 4-4-4, and of course, those that are labeled for tomatoes.*
- Let the top of the soil dry out before watering
- Continue to give your new plants dilute organic fertilizer every couple of days.
- Transplant the seedlings to larger pots when they get their second set of leaves.

Damping off is a fungal disease that causes the stem of a new seedling to rot. Seedlings can look healthy one day and be dead the next. To help ward off this disease, clean used containers and allow the surface of the soil to dry before watering again. You can also use a spray of strong chamomile tea to kill the damping-off fungus. Let it cool before applying.



Tomato Seedlings with First Set of True Leaves

Transplanting and Hardening Off

You can either 1) transplant into regular potting soil and fertilize with liquid organic fertilizer every few days, or 2) use an organic potting soil that contains fertilizer, or 3) mix a dry organic fertilizer into the potting soil. One of the best dry fertilizers is Gaia Green 4-4-4. It's expensive, but a little goes a long way. Here is how to use it:

- Mix fertilizer into potting mix at a rate of 30 mL (2 tablespoons) Gaia Green to 4 L (1 gallon) of potting soil and fill 15 cm (5-6") pots.
- If you use this size pot, there is no need to fertilize or transplant again before the tomatoes go into the garden, greenhouse, or container.
- Put the stick label for each seedling into their pot – make more stick labels as needed.

Start hardening off the plants about 4-5 days before they go outside.

- Put them out for a couple of hours in the afternoon, then bring them indoors.
- Gradually increase the time they are outside, until they stay out overnight.
- Check the weather forecast to make sure the temperature will be no lower than 5°C. Don't leave them outside on a cold night.

Preparing the Ground or Containers

For outdoor gardens, dig the soil and remove any weeds. Dig in manure or other organic fertilizer and rake the bed smooth. Before planting water the soil, but not soaking wet.

For containers, you can use ordinary garden soil, but it might harbour disease organisms and pests.

- If possible, use organic potting soil.

- For large containers (40 L/10 gal. or more), mix Gaia Green into the container soil at the same rate as for pots (for a 40 L container you would use 300 mL or just over a cup).
- Mix the soil and fertilizer thoroughly so you won't have "hot spots" that may damage your plants. This fertilizer will last until the end of the season.

Planting

If the plants have flowers or buds, remove them. This will promote root development rather than fruit and the plants will be stronger. If plants are allowed to form fruit before they are transplanted, they could be set back for weeks.

In the Garden.

- Thoroughly water the plants in pots.
- Dig a hole at least twice as deep as the pot. If your plants are very tall, you can dig a trench and lay the root ball on its side.
- Add about 125 mL (1/2 cup) of Gaia Green to the hole, add a shovel-full of soil, and mix. Add a little water.
- Remove side stems and leaves from the plant below what will be ground level.
- Turn the pot over, hold the plant and pot with one hand, and hit the bottom with the other hand to dislodge the root ball. Remove the plant from the pot and massage the root ball a little. If it doesn't come out easily, it is too dry.
- Put the plant into the hole, add soil and tamp it down. Water.
- Put a new variety name label in front of the plant. Don't use the popsicle stick label as it won't last the season.
- On paper, make a map of the location of each variety.

In Containers.

- Containers must have one or more drainage holes in the bottom.
- Fill the container with potting or garden soil mixed with dry fertilizer; water.
- Dig a hole in the centre and remove the plant from its pot (see above).
- Massage the root ball a little, put the plant in, and tamp the soil around it.
- Water the plant.
- Put a new variety name label in the container or on the outside. Don't use the popsicle stick label, as it rots quickly.
- If you have several containers, make a map of the locations of each variety.

Caging and Staking

Tomatoes grow best with a support system, but if you have lots of room you can let them sprawl. Fruit are easier to find and harvest when the plants are supported. As well, slugs, voles, and other pests are less of a problem if the fruit are off of the ground.

There are two main types of growth patterns in tomato plants. One is *determinate*. These are bush types of plants. They are compact and set fruit over a 2 to 3 week period. Many commercially grown varieties are determinate so the fruit can be harvested over a short time.



Tomato Plants Supported by Cages

When the top flower cluster sets fruit, the plant stops growing. They don't need to be caged, but they benefit from support for the reasons given above. They are excellent for containers.

The other type is *indeterminate* or staking. These grow like a vine, produce fruit until frost, and form suckers between leaf stems and the main branch. The suckers grow into more branches, so the plant can get very dense. They also grow very tall – up to 2 m or more. Support systems include large tomato cages, heavy stakes, wire fencing, trellises, or wires between posts.

Pruning

Don't prune determinate types of plants except to: 1) put them in the ground deeper because they have become tall and leggy in their transplant pot (just prune the branches that would go into the soil), 2) remove damaged or diseased parts.

Pruning indeterminate tomato plants mostly means removing suckers to keep the plant from getting dense. You can prune to your support structure, for example, horizontal trellises or wires, cages, or single stakes. Most expert tomato gardeners believe tomatoes should not be pruned heavily because production is decreased with pruning. Leaves produce energy for growing fruit. Over the summer, tomato diseases can reduce the amount of foliage. This can be offset by retaining lots of leaves. Leaves also protect fruit from sunscald.

Watering

Tomatoes need a consistent supply of water. They should have a total of 25 mm (1") per week from rain or irrigation. If possible, use drip irrigation. If you water by hand, water the base of the plant until water starts to pool up around the plant. Overhead sprinklers waste water and can promote fungal diseases. During hot weather, containers may need to be watered twice a day.

Problems

Heirloom and open-pollinated varieties are no more disease-prone than commercial hybrid varieties. But with any tomato plant, if you see one or more branches wilting or notice spots, holes, or discoloration, you will need to figure out the problem. Infections caused by viruses, bacteria, and fungi can be devastating to a tomato plant. Some infections can be cured by cutting off the infected branches, but others will need treatment. Don't do anything until you know what the issue is.

Inspect your plants frequently to look for "bugs." If caught early, pests like aphids, whiteflies, flea beetles, or thrips can be conquered. Suspend a yellow sticky trap over the plant or treat it with an organic pesticide (lots are on the market these days).

Blossom end rot is a common problem with some varieties of tomato, particularly "roma" types. It is caused by a calcium deficiency from stress, especially from lack of water. The plant diverts calcium from the fruit to foliage and a dark rotten patch forms on the bottom of the tomato. The best way to prevent blossom-end rot is to maintain even moisture from the time that fruit form until harvest. Soils usually have enough calcium, so according to tomato expert Carolyn Male, adding it when planting or during growth won't prevent blossom end rot.

Vine-ripened tomatoes taste best, so leave your fruit on the vine as long as possible. If a frost is predicted be sure to cover the plants with sheets, blankets, or row cover. Not plastic – it has very little insulation value. If the weather is predicted to be colder than a couple of degrees below zero, take off the mature fruit and bring them inside. But cover the plants anyway, just in case it is warmer than predicted and they survive.

Preventing Cross-pollination

Cross-pollination means that one variety receives pollen from another variety. For example, you grow a Brandywine tomato plant next to a plant of Cherokee Purple tomato. Bees pick up pollen from flowers of Brandywine and then visit Cherokee Purple. The fruit that formed from the flowers on Cherokee Purple would be typical for the variety. But if you saved seeds from these fruit and planted them the following year, you would have hybrid plants. The fruit would likely be inferior – they wouldn't look or taste like Cherokee Purple. Commercial hybrid varieties are carefully bred and maintained, but seeds from the accidental hybrid would likely produce plants with inferior fruit.

Seed bank seeds are *open-pollinated*. When you save seeds from these and grow them the following year, the plant and fruit are identical to the ones you saved seeds from – as long as you protect them from cross-pollination. Varieties must be separated by a distance of 15 m (45'), which is difficult in many home gardens. Alternatively, you can put small organza bags on flower clusters to prevent bees from transferring pollen from one plant to another. Then you can grow different varieties next to each other.

- Obtain organza gift bags (13 x 18 cm - 5"x 7" - work the best).

- Make sure you know the variety name of the plant – make a map on paper of each variety location.
- Find a cluster of buds without open flowers. Put the bag over it and pull the drawstring so pollinators can't get in.
- Put a piece of bright coloured yarn, ribbon, or flagging tape loosely around the stem of the cluster, below the bag. Make sure it won't blow off.
- Try to tap the bag every day to promote fruit set.
- Sometimes growing leaves fill the bag – take it off and re-position it.
- When you see fruit in the bag, take the bag off and also remove any open flowers or buds.
- Harvest each marked fruit when ripe and put it in a paper bag with the variety name marked on it.



Flowers in Bag



Fruit in Bag

Harvesting

For seed-saving, tomatoes must be very ripe. If necessary before a frost, you can pick fruit that are coloured but not fully ripe. Put them somewhere to ripen before you take out the seeds. The seeds from green fruit will not sprout. Even if you bring in green fruit and let them ripen so they look mature, the seeds will not sprout. The seeds need to mature in fruit on the vine.

Make sure you separate and label each variety of fruit as you harvest. A small paper bag works well for this. Don't assume you will remember the variety name, even by the time you get into the house with the tomato.

Saving Seeds

To save seeds from tomatoes, the pulp containing the seeds should be fermented. This process will eliminate the gel coat surrounding the seeds. Although this is not strictly necessary to get viable seeds, it does eliminate pathogens and remove the germination inhibitor within the gel coat. Success in sprouting the seeds definitely improves if they are processed in this way. See the instructions below on how to do this.

Record Keeping

Fill out an evaluation form for each variety. This information – taste, problems, productivity, etc. – will help in deciding which varieties should continue to be grown for the seed bank. And it will help determine whether the seeds you planted were “true”, not a hybrid. If you keep a journal with notes on gardening activities, in November you won't have to try to remember when you planted which variety and how it grew. Photographs of your plants and fruit are always helpful.

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Photos by P. Huet

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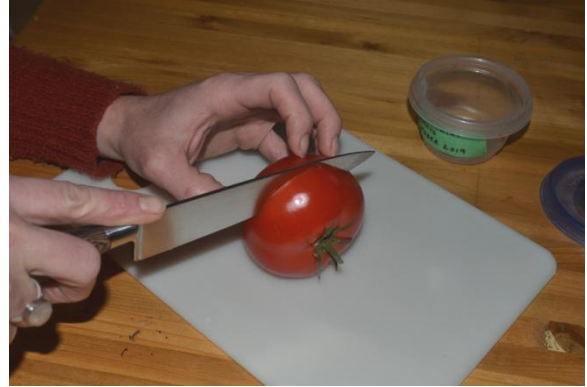
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Processing Tomatoes for Seeds



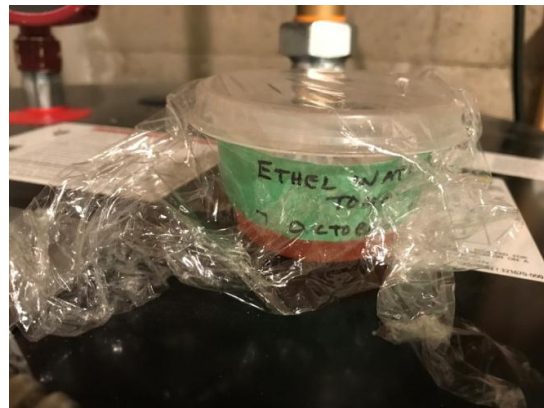
1. Write variety name on masking tape. Attach it to a small container.



2. Cut tomato in half around its width.



3. Squeeze pulp and seeds from fruit into the container. Add as much water as there is pulp.



4. Cover with plastic wrap (not a lid) and allow the container to sit in a warm spot for 3 or 4 days (no more than 5 days).



5. Remove cover. Note mold on top of pulp.



6. Pour pulp into a strainer. Rinse container into strainer.



7. Gently push and wash pulp through strainer.



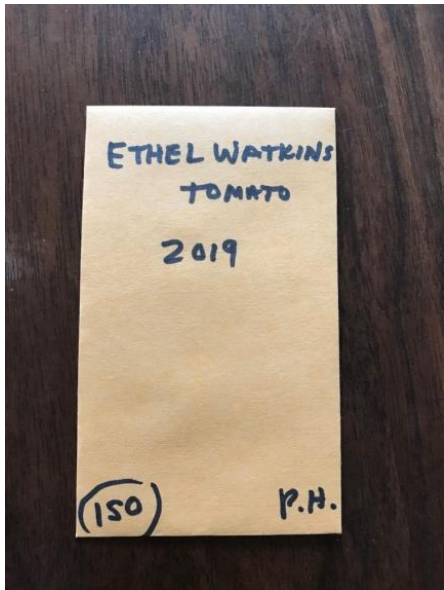
8. Rinse until seeds are clean.



9. Put the label from the container on a plate. Tap seeds onto the plate. Wick up excess water with a paper towel.



10. Allow to dry for a week or two.



11. Put dry seeds in a paper envelope. Label with variety, year, your initials, and method of isolation.