TEXAS MASTER GARDENER

What's Growing On?

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Tomato Growing at Home: From Seed to Harvest

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[Editor's Note: Due to timeliness—spring seed starting begins in January—this article is presented whole, rather than the original two-part arrangement.]

It may seem an act of faith to start tomato seeds during winter, but ours is as ephemeral as daylily blooms. This "how-to" article explains the many benefits of growing your own tomato plants at home.

The Problems of Buying Starts

Seed starters can access an extensive varietal selection, including many excellent, delicious varieties that will never appear on retail benches or seed racks of the best local nursery. For example, the Seed Savers Exchange (SSE) online store offers dozens of heirloom tomatoes.[1] Members receive the annual SSE Yearbook that offers over 4,000 tomato varieties, most not commercially available.

Buying starts means you have to follow the retailer's schedule. Many commercial offerings are small starts, usually available in late February to early March, sometimes later. For your best return on investment, this is too late; you need larger plants by then.

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Retailers usually limit you to red tomatoes. There are "chocolate" tomatoes with a smoky, sweet flavor; orange, yellow, black, purple, and multi-colored varieties offer differing flavor variations. Your next favorite tomato may be one harvest away.

Benefits of Growing Your Own Starts

Besides the opportunity to expand your tomato palate—and palette—seed starting affords an opportunity to remain active during the "off season." When you welcome spring with your own large, healthy—and tasty—starts, you'll begin to love seed starting.

Seed starting gives you total quality control. Retail nurseries may fail to keep their stock disease- and insect-free. Seed starting protects against importing problems into your garden.

Have big, healthy starts when you want them. It's best to have large tomato plants ready by Spring planting time, so you can enjoy tasty tomatoes sooner, and enjoy a longer harvest before summer's heat shuts down production.[2]

You'll need some basic equipment: plant stand, lights, growing flats, heat, and seed starting mix. You decide how much you want to invest. New seed starters may decide to just "dip a toe in the water" and grow one variety.

Plant stand

I built mine from locally harvested bamboo. This invasive runner variety, planted decades ago for quick privacy screens and fishing poles, now causes neighbor problems in town; eradication efforts are now in vogue. Harvesting this bamboo was a win-win. Wired together, it has served for years. A two-tiered stand enables me to start seeds and grow up to 120 starts at the same time.

Simpler options may be a $5 coffee table from a garage sale, or a sunny kitchen counter. The latter option is easiest, but you'll probably still need supplemental light to produce healthy starts. Youtube offers do-it-yourself videos for building plant stands.[3]

Lighting Is Vital, and Not Complicated

Seedlings need lots of light. Insufficient light results in "leggy" plants (the scientific term is "etiolation"), with long stems between the soil and cotyledons, the first leaves to emerge from the seed.[4] Leggy seedlings become sickly plants with weak stems that under-perform when exposed to normal weather, forcing you to run out to find starts because it's too late to start over.

To avoid etiolation, I use 4-foot fluorescents in banks of three fixtures, containing a total of 6 bulbs (each fixture holds 2 bulbs). I found no measurable difference between expensive "grow lights" and regular fluorescents, and a 12-pack of the latter costs about as much as 1 or 2 grow lights! Each fixture gets one "daylight" and one "cool white" bulb, which slightly emphasize blue and red light spectrums, respectively, providing full spectrum light sufficient for healthy

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plant growth.

Lights need to be 2-3 inches from the soil level for newly-emerging seeds to become sturdy plants. Chain-mounted light fixtures with 'S' hooks allow you to raise or lower lights as needed. These light fixtures, available at big box stores, usually come with mounting hooks and chains.

Seedling Flats

Texas A&M says: "Any shallow wood, metal or plastic container at least 3 inches deep makes a suitable plant growing box."[5] I've built cedar flats, a water-resistant wood good for long-lasting boxes, each holding up to 100 seedlings while fitting under the lights. For smaller projects, plastic spinach tubs work great, too. Use an awl to poke small drainage holes in the bottom of a tub, then place it inside a second tub. This way, you can bottom water by soaking the starting tub in a couple inches of water inside the second tub until the soil is consistently moist. Drain and replace in the second tub as a saucer. Top watering seedlings may knock new seedlings over or expose seeds, causing them to dry out and die.

Heat

Tomato seeds need warmth to germinate and develop into healthy starts. Unless you have a warm room that remains between 75° and 80°, a heating mat is essential to start tomatoes. Bottom heat uniformly warms the soil and enhances germination, too.

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Our house cools down below 70° at night in winter, while tomatoes germinate best around 78–80°. Warmth generated by light fixtures during the day may be sufficient, but a thermostat is your best bet to maintain consistent a germinating temperature. Lights and heating mats together may generate too much heat, weakening your starts, unless you have a thermostat to turn off the heating mat when soil temperature gets too warm.

Thermostats all have the same basic functions: You can adjust target temperature up or down; the attached sensor inserts into your starting flat's soil to monitor soil temperature; the heating mat plugs into the thermostat to turn on heat when soil cools, and turn off heat when soil reaches target temperature.

Note: Heating mats can melt plastic. There's nothing more disheartening than preparing the starting mix and planting expensive heirloom seeds, and waking up in the morning to see how a plastic flat slowly flattened out overnight, like a candle left outside in July. Thermostats avoid this problem.

Proper Soil Means Healthier Starts

Lightweight seedling mixes improve seed germination and growth. Texas A&M recommends "soilless" mix for seed starting, and recommends a recipe.[6] Add enough water to lightly dampen the mixture, and mix thoroughly to evenly distribute all materials, pour into flats, and use light pressure to level and settle the mix.

Heavier mixes, or those containing garden soil, act like heavy mulch and keep seedlings from emerging into the light. They may contain disease microbes that cause your seedlings to die during or after germination, and may import insects into your home.

Seeds usually contain their own food to see them through germination. High-nutrient soils may inhibit germination, too. After filling a seedling flat to within one inch of the top, I spread about ½ inch of special germinating mix, consisting of 50% peat or coconut coir and 50% vermiculite. Tomato seeds need to be covered by no more than ¼ inch of soil. Once the radicle (baby root) emerges, it quickly enters the nutritious growing medium below the starting mix.

Selecting the Right Varieties

As noted earlier, summer heats up by late June, creating a challenging climate for tomatoes. You want to start your harvest as early as possible, and extend it into summer as long as you can maintain productive plants. I don't plant varieties listed as having over 80 days to maturity, which are the estimated number of days from the time you set out your start plant—or plant in a larger pot—until the first fruit ripens. Tomato seed packets usually list this, and it should be available at the retailer's website.

To differentiate between good and poor candidates, it's important to understand growth habit. Tomatoes are divided into two general categories: Determinate and indeterminate.

Indeterminate tomatoes can easily top eight feet. Home gardeners often grow indeterminate tomatoes

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as vertical vines, using large cages, cattle panels, or stakes to keep the plant upright. While they can be allowed to sprawl, one plant takes up a much larger area, and leaves or fruit that contact soil risk becoming diseased. To keep upright, you'll need to tie the vines to their support as they grow, one tie for every foot or so of growth. They need to have sucker shoots pruned from between the stem and leaf joints in order to keep them from turning into monstrous green shrubberies. This crowding may reduce air flow to the point that fruit will rot, assuming you can locate them in the tomato jungle. There are many short videos on YouTube, where gardeners demonstrate how to remove these side-shoots.[7] It sounds more complicated than it really is: In the time it took to read this paragraph, you could have removed 6-10 suckers with your thumb and index finger.

Determinate varieties often have a shorter yielding period, as short as 4 weeks. Their growth habit is bushier and they tend to remain under six feet tall, allowing for easier harvesting. One benefit of determinate tomatoes is that they don't need to be pruned; pruning may even reduce productivity.[8]

A third group worth consideration are Dwarf varieties. Some of them are heirlooms, such as New Big Dwarf.[9] Craig LeHoullier, longtime Seed Savers Exchange member and tomato grower, and Patrina Nuske Small of Australia, have collaborated with a grower team to cross prized indeterminate heirloom varieties with dwarf breeding stock. After stabilizing to create new, open-pollinated varieties—breeding identical plants from seed—these new varieties become commercially available. Since they exhibit traits of both indeterminate and dwarf genetics, they are called Dwarf Indeterminate, continuing to grow and produce over the season, while remaining relatively short and compact, remaining under six feet tall. They also produce larger, slicer-type fruits, even though the plants remain shorter than their larger, heirloom, indeterminate parents.[10]

German Extreme Dwarf Bush

Most heirlooms are indeterminates with over 80 days maturity. I consider them largely unsuitable for Central Texas because around the time they're beginning to produce, summer's heat and bugs shut them down. My goal is to begin harvesting as early as possible, and extend harvest season as long as possible. The reason I prefer dwarf and determinate varieties is that they yield earlier and make for easier harvesting.


Sandpoint

Early dwarves like Sandpoint and German Extreme Dwarf Bush mature in under 60 days, providing fresh tomatoes weeks before most other varieties, extending harvest season by shrinking the time to first harvest while other varieties swing into production. These two varieties are also suitable for container growing, since they are tidy, compact plants maturing under four feet tall.

Sandpoint produces 1.3-ounce fruits on average; German Extreme Dwarf Bush produces 1.8-ounce fruits. Both are suitable for suitable for salads and roasting. I like to put up containers of roasted tomatoes in the freezer. When the paste

tomatoes mature, I chop roasted tomatoes and add them to the sauce just before it's finished cooking down. It's good to have earlier varieties, so I have roasted tomatoes ready to add. Saucing is enough work at this point.

Following are a few other flavorful, productive varieties I've grown.

Chocolate Champion is a Dwarf variety that produces 5.1-ounce slicers with a smoky sweet flavor. I've grown and saved seed from this for two years, and it will be in my 2020 garden.

Tasmanian Chocolate is another dwarf variety that produces 5-ounce slicers with similar taste to Chocolate Champion. I've been growing this one for 4 years now, saving seed each year.

Both chocolate varieties are popular at our local store, which has begun selling locally-grown tomatoes.

Tasmanian Chocolate

AlleyKatz is a paste variety I'm stabilizing from a hybrid that exhibited heat resistance, currently in its sixth generation. Two plants produced over 25 pounds of 1.6-ounce fruit last year, yielding until July 24. They are excellent for sauce and roasting. AlleyKatz is likely a few more generations from

being stable, meaning that seed saved will reliably produce plants identical to the parent plant. (Tomato breeding and seed saving affords us an opportunity to create our own, Texas tough tomatoes, but that's a topic for another time.)

This list isn't exhaustive, and I have a number of open-pollinated and hybrid varieties I plan to trial in 2020. While some varieties are sold as "heat resistant," that doesn't mean they're *Texas* tough. However, determinate Tycoon is a SuperStar® that Texas AgriLife recommends for its heat and disease resistance, and may be a good beginner's variety.[11]

AlleyKatz

Proper Growing Schedule Prepares You for Spring

Start seeds 10 weeks before your planting date. To calculate your ideal starting date, collate daily high/low temperature data for at least the last 10 years; 20 years is better. I describe the process in "Tomatoes: Don't Miss the Best Tomato Season."[12] Another option is to search online for frost-free data. For example, PlantMaps has an interactive map that gives you a 10-day window for your location.[13]

You need to grow strong seedlings in your starting flat for about 3–4 weeks. Next, you'll transplant to 3-inch starting pots that will continue to grow under lights. After growing starts for 3 weeks, transplant them to #1 nursery pots, which you will plant in another 3 weeks.

Healthy seedlings need regular fertilizing to become big, strong plants that breeze through transplant shock and begin producing before your neighbors' store-bought starts. After the first true leaves appear, I water seedlings with a half-strength, water-soluble organic fertilizer mix like ALLGANIC Nitrate Plus and Maxicrop. It's vital to keep plants growing in order to have large, healthy starts to set out when March warms up.

Tip: Lightly brush your seedlings once or twice daily. This stimulates them to grow shorter, stronger stems.

Transplant seedlings into start pots when they have 2–4 true leaves. Spread a thin layer of soilless potting mix on the bottom, then set your starts deep, so that no more than ½ inch of stem remains above soil; the cotyledons should be close to soil level, but not buried. Tomatoes are a vine, producing adventitious roots from buried stem, resulting in larger root systems that absorb more water and nutrients. Plastic flats usually hold 20 starts, which I place back under lights. This is where the chains holding the

fixtures come in handy: As the starts grow, I raise the lights as needed, keeping them about 2 inches above the seedlings.

After 3 weeks, pot the 3-inch starts into #1 nursery pots (erroneously called "one-gallon pots" when their capacity is about 2¾ quarts). Plants that get root-bound tend to produce fewer fruit. As with moving from flats to starts, add just enough soil to the #1 pot so that most of the start's stem is buried after filling up the pot. At this stage, you can even bury the lowest leaves. This enables the plant to produce another 3–4 inches of adventitious roots, doubling or tripling the root ball that will get set out at planting time.

In the following sequence, Picture 1 shows healthy starts, ready to transplant. Notice how planting seedlings deep into the start pots produced stockier starts. Picture 2 shows a couple inches of potting mix in the bottom of the #1 pot. Picture 3 shows how the start looks when placed into the #1 pot. Notice how the lower leaves are below the lip. Picture 4 shows the same start after trimming off the lower leaves, which would have been buried anyway. I leave them in the pot, to decompose and return their nutrients to the plant. Picture 5 shows the #1 pot filled with mix, with two leaf nodes buried, allowing more stem to produce roots.

By this time, days are warm enough to place these pots outside. A protected, south-facing spot is perfect. Tomatoes can handle 60° days; if nights cool off below 50°, bring plants inside or cover. Plants need acclimatizing before going into their growing beds. While the indoor environment may be ideal in terms of consistent light and moderate temperature, plants need to adapt to natural sunlight and wind.

Ideally, plants should spend 3 weeks in #1 pots, and then get planted in beds. At this point, they may be flowering and even setting fruit. If you've been growing your #1 size plants in a greenhouse, begin placing them outdoors where they receive morning sun. Over 1–2 weeks, extend the time in the sun, gradually leaving them outside full-time, protecting them if nighttime temperatures fall under 45°. Plants left in #1 pots over 3 weeks begin to weaken, producing less fruit. ***Remember that this acclimatization time is part of the 3-week #1 growing period. Plants left in #1 pots more than 3 weeks get root bound, creating a less-vital plant that will underperform.***

As with previous transplanting, you can dig a hole deeper than the root ball, and bury part of the stem one last time to produce a larger root system, and also create a stocker plant that's more wind-resistant. This may include another two sets of leaves. Since the #1 root ball is 6–6.5 inches tall, a foot-deep hole enables the tomato plant to quickly double its root system again as it produces adventitious roots along the buried stem. As Texas heats up going into summer, this larger root system translates into greater ability to absorb water and nutrients, leading to enhanced production and heat tolerance.

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Endnotes

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