How To Grow Big Tomato Seedlings Quickly

When it comes to growing vegetables, most gardeners want to maximize their growing season so they can start harvesting food as soon as possible. When it comes to tomatoes, a tropical plant, this means you need to get your plants into the ground early, yet after your last frost date. And to do that, you either need to purchase your plants or grow them from seed yourself beforehand.

1.

Tomato plants that are of decent size, roughly 6-12″ tall, often cost $4 or more per plant. And if one is planning on canning or preserving their crops, this cost can add up quickly. The easiest way to avoid that cost is to grow tomatoes on your own from seed.

This article is going to cover how I start all my tomato and pepper plants, and grow them to a nice transplant size in roughly six weeks. I do this with minimal expense, and am able to safely produce plants that are often more than 10″ (25 cm) tall in six weeks from sprouted seeds. So, bigger than garden center plants for less cost.

If you're tight on money and time, this strategy can work great. Your only investment will be a tray with tall dome, a temperature monitor, and some pots with soil. In this article I will show you exactly what I do, and why it works.

What makes tomatoes grow?

Tomatoes, like most other plants, like to grow in warm temperatures in full sun with well-draining soil. The optimum temperature for growing tomatoes can be anywhere between 59-95F (15-35C) depending on the variety and humidity.[1] If one wishes to utilize the maximum amount of the growing season, then you must get mature plants into the ground early after the last frost date (& depending on the forecast).

So, if we want to grow our own plants from seed, and transplant them into the ground not long after the last frost date, that means we need to start them earlier – when temperatures are cold and frost is possible. Well, it turns out that tomatoes don't grow much (if at all) when temperatures are below 50F (10 C). [2] While you could grow plants windowsills for sunlight, they won't get as much as they would outside. But the outdoor temperatures are too cold, so what can we do?

Grow lights and heat mats.

Many people who are very serious about gardening have extensive set-ups in their homes consisting of grow-lights and heat-mats to germinate and grow tomatoes. The artificial light when combined with the warmth from the heat mat ensures photosynthesis will take place.

Seedlings under grow lights. Credit – stcomgen.com

This allows those gardeners to start all of their own plants. With these tools, they are able to grow large tomato plants that can be transplanted outdoors very early. Overtime, the expense of the grow-lights and heat-mats are offset by not spending money on purchased plants from a garden center.

How to grow large tomato seedlings quickly, without grow lights or heat mats

I'm a frugal person, and through experimentation I discovered a method to rapidly grow tomato and pepper seedlings without the use of grow lights or heat mats. I have developed a process to grow them in a high-temperature & high-humidity environment by simply putting them outside in direct sunlight under a dome. So, a miniature greenhouse if you will. This miniature greenhouse, when placed in direct sunlight will reach temperatures higher than the normal optimum recommendations – but it will still allow your plants to grow very fast.

What research says

I've been doing this method for years, but in researching this article I actually found some literature that validated my experience. Researchers found that tomatoes can grow very well in temperatures beyond the typically published optimum as long as they are in a high humidity environment.

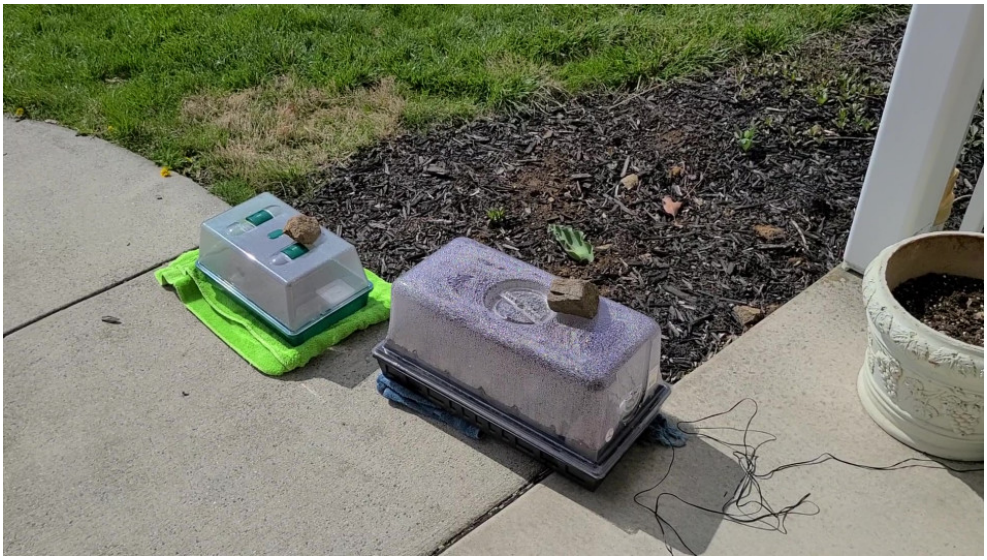
They tested tomatoes up to 106F (41C) and 70-90% relative humidity, and found them to grow nearly as well as tomatoes growing at 28C and 50% relative humidity (more traditional climatic conditions). Specifically, tomato seedlings grown at 100F and at least 70% humidity maintained pace with a control sample until the last few days of the study. But they found no statistical difference in height, leaf area, or stem diameter at all. And it was only at the end of the study that they found the control sample to have a higher dry-weight than the high-temperature samples.[3]

So, when tomatoes are stressed, they produced varying levels of sugars and amino acids that helped them grow well despite the high temperatures. The exact mechanisms aren't certain, but their study indicated that it was the higher humidity that allowed the plants to thrive.

For those who don't wish to have grow lights but need to start their seedlings when the outdoor temperatures are cool, then the mini-greenhouse method can work. The main concern is not letting the temperature inside the mini-greenhouse exceed 100F.

Keeping your plants safe, but hot!

But still, there is a bit more to it. Since the temperature within a mini-greenhouse can get significantly hotter than the outdoor temperature, we must take some precautions to ensure we don't cook our plants, inadvertently killing them. In fact even if we don't kill them, just getting them too hot can damage them or arrest their growth.



These are tall 5″ & 7″ domes to accommodate large seedlings

So, we need to make sure the air temperature within our greenhouse doesn't go above 100F (38C), and that it stays humid. I've always treated the 100F as a sort of limit, figuring that while they can survive and grow above that temperature, I don't want to push my luck and have to start over.

Materials

You will need the following materials.

- Pots. I prefer 4″ diameter or square pots.
- Two large seedling trays, one with drain holes, the other without (for watering from the bottom).
- One large dome with venting
- A remote temperature/humidity sensor
- Potting mix
- Paper towel
- Zip-lock bags
- An indoor location that receives plenty of sunlight

Step by step to grow tall veggie seedlings quickly

1 – Germinate seeds on a paper towel.

We can germinate our seeds using a moist paper towel, zip lock bag, and a warm location. If you are unfamiliar germinating seeds on a paper towel, you can see my detailed guide here. But I will briefly relay the method below:

- Start by making sure you have a clean surface to work from, and that your hands are clean. This will help prevent any mold.
- Take a full sheet paper towel and get it moist. It should be wet enough so that when you squeeze it a couple of drops of water fall out, but not much more.
- Fold the paper towel in half lengthwise
- Place seeds on the towel. Double the number of seeds for the number of plants you want. So, if you want 4 plants, use at least 8 seeds.
- Fold the paper towel in half again, resulting in a small square, with the seeds in the middle of the sheets.
- Place this into a zip-lock bag. Seal the bag and write down the date and species.
- Place the bag somewhere warm. You need a surface that is at least 80 degrees Fahrenheit (27 degrees Celsius), but not hotter than 103F (40 Celsius).

2 – Check the seeds every 24 hours.

The seeds may start to germinate in as little as a day. In general they should mostly be sprouted in 3 days for tomatoes, and up to 5 days for peppers. The warmer the location, the sooner they will germinate.

3 – Transplant seeds into a container

Fill your containers with moist potting soil. Leave a 1/2″ (12 mm) gap to the top of the pot. Then, carefully transfer seeds from the paper towel to the pot. Do this by carefully picking up the seed (try not to touch the root) and gently setting it on the moist potting soil.

Next, apply a 1/8″-1/4″ (3-6 mm) layer of moist potting soil on top. Spread this layer gently, there is no need to compact it. The sprouted seeds will be able to push through in another day or two.

I generally place 2-3 seeds per container, just in case I accidentally damage or inadvertently kill one when transferring. If you wish to separate seedlings later, you can do so.

4 – Grow the seedlings to a large size

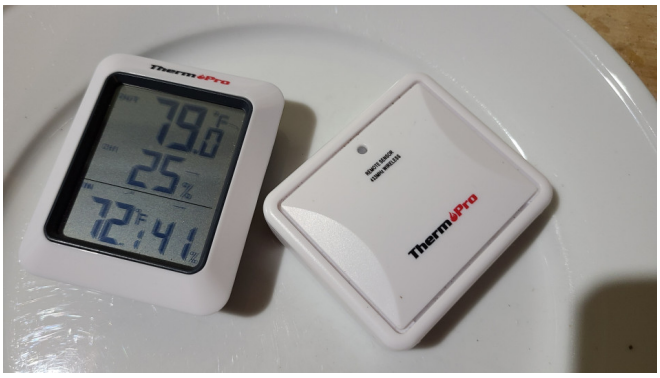
Now, in order to quickly grow our seedlings, the secret is a tall dome to trap heat and humidity. We are going to do this with a tall, clear plastic dome that fits over our seedling tray, effectively creating a mini-greenhouse that can be left outside.

During cool, cloudy days we will leave our seedlings under dome indoors, near a window that receives plenty of sunlight. Even though it is cloudy, there is some solar radiation that will come through and provide some photosynthesis. Also, the inside of our home is likely going to be warmer than cool spring days!

But on sunny days, I'm going to place my tray/dome outdoors in direct sun. Since the ground temperatures are often cold in Spring, I will set the tray on top of a dry towel to provide some insulation to the bottom.

Monitor the mini-greenhouse temperature!

Place your remote temperature sensor inside the tray under the dome, but out of direct sunlight, as direct sunlight will give you inaccurate temperature readings. Monitor the temperature, as we need to keep the temperature inside the dome less than 100F (38C).



This is one of my sensors. It is wireless, and works great. It is capable of monitoring both humidity and temperature.

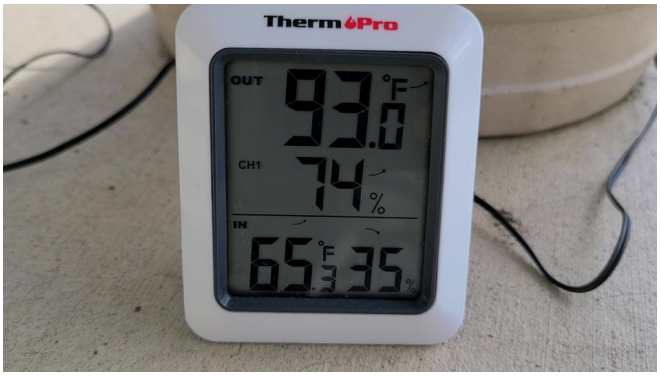
Also, note the relationship between the outdoor temperature, and the temperature inside your mini-greenhouse during full-sun days.

You need to find the limit outdoor temperature, when combined with clear direct sunlight that will cause your mini-greenhouse to rise above 100F. This will be your temperature limit. If the forecast calls for a sunny day with temperatures that approach that limit, then you must remove the dome unless you can be home to monitor the temperature.

Maintaining a healthy growing environment

Now, please read the following sections carefully. This is what I have documented in my location for several years. My local area (Southern Pennsylvania) will have a certain solar flux (light intensity) based on my elevation and geographic location, etc. Your location will be different. So, you must learn your own outdoor/full sun temperature limits to keep the greenhouse temperature at or below 100F (38C).

But for me, if the outdoor temperature is less than 68F, then I can leave my dome on without fear of it 'cooking' my seedlings. And I will happily leave my tray/dome outside and go off to work for the day.



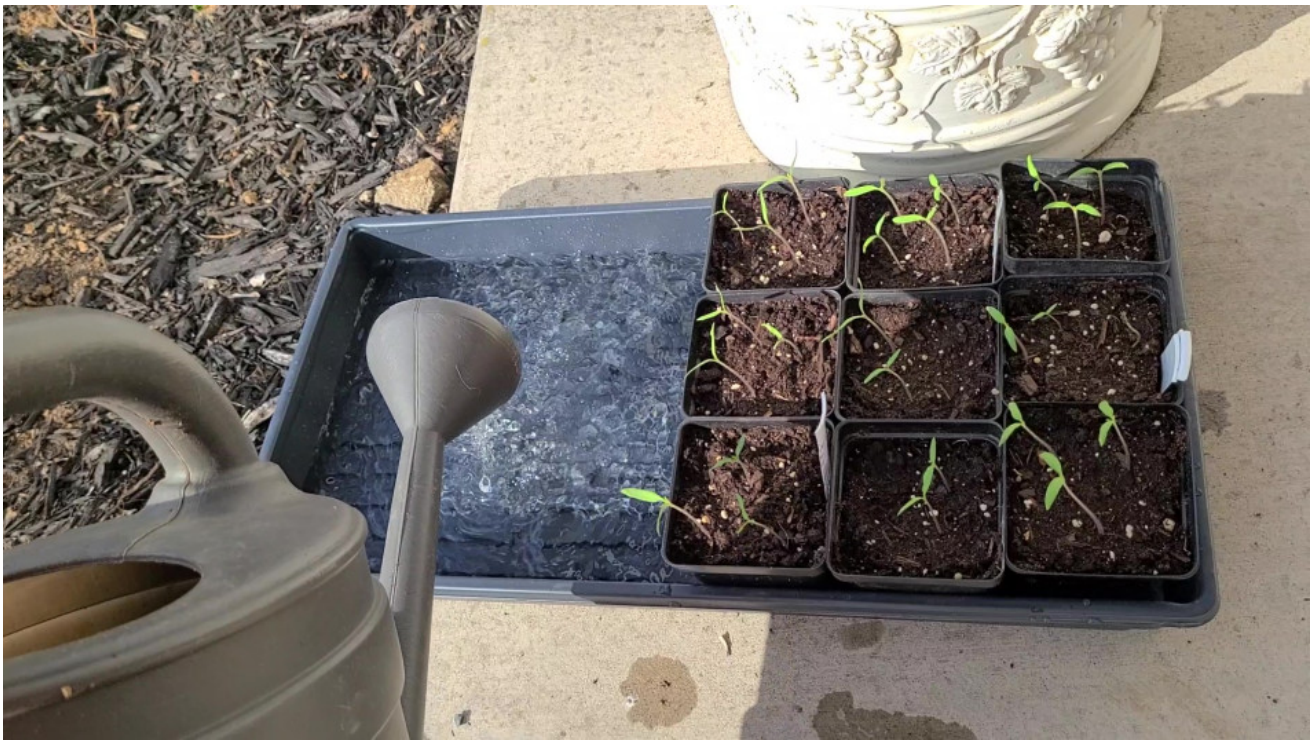
As you can see, I'm approaching the limit! Also 93F is approximately 34C

But if the outdoor temperature is forecasted to be above 68F (20C), than I will remove the dome, as I have learned through experience that this can result in too high temperatures for my plants. *Again – this is what I've found to work for my location*. The solar intensity or other physical factors may be different for your location. So it is important for you to learn what outdoor temperatures (in full direct sun) will cause your mini-greenhouse to reach 100F (38C), and then treat those outdoor temperatures as limits. This is your responsibility. I am not responsible if you kill your plants by letting them get too hot in the greenhouse.

Watering your seedlings

It should go without saying that we must keep our seedlings moist. You can do this by spraying/misting, using a watering can, or watering from the bottom. For me, watering from the bottom is by far the best method as it minimizes the chance of fungus (damp-off disease).

To water from the bottom, simply take a container or large tray without drainage holes and fill it with water. Then, place your tray (with drainage holes) inside this container. The water will naturally enter your tray via the drainage holes, and the potting soil in your containers will absorb the water via osmosis. Once your containers are saturated, simply remove your tray and set it somewhere to drain.



Watering some seedlings from the bottom. After about 20 minutes, the container soil will have absorbed a significant amount of water.

Transplant your seedlings

In general, I like to plant my tomatoes about 3-4 weeks after the last frost date. This is usually about 6-7 weeks after I start sprouting seeds on a paper towel.

By planting a few weeks after the last frost date allows me some margin to know that I won't have to protect young plants from a hard frost. However, should that occur, simply covering them at night with large pots or buckets seems to do the trick.

Here are my tomato seedlings. This is 45 days from germination, and they are 10-12″ tall.

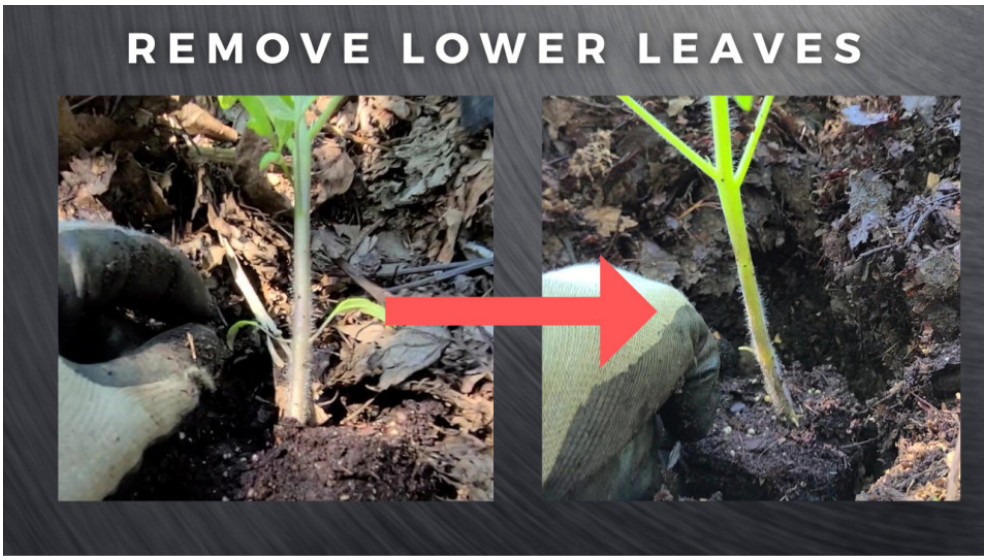
While you can simply plant your young tomato seedlings to the same depth as the pot you grew them in, there is a better way assuming you were able to grow tall plants (10″ or more). You see, the stems of tomato plants can generate more roots when in contact with soil. So, if you plant your seedlings deeper, than you can effectively give your plants a deeper start, helping the roots be able to reach more water/nutrients.

If your plants are shorter, 5-6″ tall, then it is probably best to just plant them at the same soil level as the container. Add some compost to the bottom of the hole to help give it a good start.

- If you have never made compost before, you can't go wrong with our backyard composting guide

To plant tomatoes deep for extra roots

To make deeper roots on your tomato plants, tear-off the bottom pair of leaves on your plant. Then, bury the plant to just above this location. New roots will form along the stem, and the existing roots will get a nice 'depth' bonus.



Video Guide

Here is a video I made documenting the whole process. I hope you enjoy it!

Final Thoughts

Ok, this was actually a really difficult article to write. It has several concepts that sort of 'go against the grain' so to speak. But, it is nonetheless a great method to quickly grow your tomato and pepper seedlings quickly. In the past I would start seeds, grow them on a windowsill and then outdoors, and after two months I would normally have 5-6″ tall plants.

And while I was ok with those plant sizes, I wanted larger plants to start with but didn't want to invest in grow lights or deal with the hassle of setting up an area specifically for lights/heat mats. So I just sort of started experimenting. I figured since these plants grow so close to the

equator, they probably can take higher temperatures, and I was right. What I didn't know was that high humidity was also key to that success, but I was providing it in the form of a greenhouse.

Alright – in closing, the key to this success is getting your plants hot, humid, but not cooking them. Take some time to learn what your temperature limits are, and respect them. You don't want to set your tray out in the morning before you go to work, only to return at the end of the day to wilted, dead plants. Ok – good luck!