

Summer vegetables and flowers: the season is nigh!

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For best results, we plant tomatoes in April, peppers and eggplant in May.

We repeat this simple mantra over and over in March every year as sunny days spur gardeners to clear out their vegetable beds and start prepping for this year's summer garden. A few days in the 60s get people anxious to get tomato plants in the ground. We counsel patience, but often to little avail. So, here's the explanation.

Direct injury to the plant.

Early in March we can have frost. Indeed, as I prepare this column there is a frost warning for the morning of Wednesday, March 19. Low temperatures are expected to get to 38 on Tuesday morning, 37 on Wednesday, with temperatures of open surfaces (including plant leaves) likely to get to 32.

Visible frost, and damage to plants, can occur when night temperatures are in the 30s, even if the recorded air temperature is a few degrees above freezing.

Frost injury blackens leaves and causes the plant to appear wilted.

How often do we get frost in March or April?

More often than not.

At least 19 times since 2001

3/27/2023:	30.3 degrees F.
3/6/2022:	32.6
3/13 – 16/2021:	frost each morning.
3/27/2020:	34
3/18/2018:	33
3/2/2017:	35.6
4/6/2015:	35
3/10/2013:	34.8
4/6/2012:	32.5
4/9/2011:	34.4
4/6/2010:	33
4/16/2009:	32.8
4/28/2008:	32 (that was memorable!)
4/18/2007:	35.9
3/11/2006:	29 (yikes!)
4/13/2005:	32
4/05/2003:	33.9
4/25/2002:	32
4/08/2001:	31.4

Ice crystals on a leaf cause direct injury to the tissue. Seedlings may recover from this, but it sets their growth back by several days. If there is direct injury that kills the growing point, the plant must form a new one which takes several more days.

Less visible injury from cold: why we worry about low night and soil temperatures for summer vegetables.

Tomatoes, peppers, and eggplants, as well as sweet basil, originated in the subtropics and tropics. All are technically perennial plants, meaning they could live from year to year, but have been domesticated in regions with much colder winters. We grow them as annuals because frost kills them at the end of the season.

Plants which didn't evolve with colder seasonal change go through adverse internal changes when exposed to temperatures lower than their ancestors experienced.

There's a data point that got stuck in my brain many years ago: subtropical plants begin to show harm when temperatures drop below about 45 degrees F.

I should note that truly tropical plants may show damage below 55 degrees.

Tomatoes, peppers, and eggplants are subtropical plants. The progenitors of our modern hybrids of those plants came from regions where it was not merely frost-free, but rarely even in the 40's.

What happens to plants that are exposed to lower-than-optimal temperatures is a reduction in the efficiency of photosynthesis, meaning that the plant is making less of the starch and other storage forms of energy that are used to sustain growth and keep it alive.

When a plant has less energy to store, growth may slow. Depending on how long the cold continues, it may begin to shed organs, and for young plants those organs are leaves and roots. Roots will die back, and older leaves may yellow and drop. The plant's ability to move nutrients internally will decline, so it is common to see apparent deficiencies of phosphorus (purplish leaves) and nitrogen (yellowing of the newest growth). Feeding won't really help because root loss is one of the causes of the apparent deficiencies.

Weakened plants also have thinner cuticles on the leaves, making them more vulnerable to infection by diseases caused by fungus and bacteria.

Overall, it has been found that each exposure to cold temperatures can set back tomato plants by 7 to 10 days. Peppers and eggplants may be stunted all season.

Another effect of cold exposure appears to be increased likelihood of blossom end rot (BER). This is a physiological condition in the plant which leads to softening and spoilage of the bottom of the fruit as it ripens. While some varieties, such as Roma, show a strong predisposition to BER, the strongest correlation appears to be cold temperatures with excess soil moisture during the period of fruit expansion. People are often planting early hoping for early fruit harvest, but much of that fruit can be spoiled by BER. We rarely see it on plants that were planted at the right time.

When is the right time?

Night temperatures above 50 degrees consistently for tomatoes and basil, above 55 consistently for peppers and eggplant.

Soil temperatures of 60 to 70 degrees. You can measure soil temperatures with a soil thermometer, or just check the daily records at the California Irrigation Management Information System (<https://cimis.water.ca.gov/>).

When we've had daytime high temperatures at 80 degrees a couple of times, we're typically getting to optimal planting weather. By the calendar that's usually late April for tomatoes and basil, mid-May for peppers and eggplant.

“With the climate warming, can't we plant earlier?”

Climate is the average of weather over time. Average night-time March low temperature for Davis has increased by about 2.1 degrees F in the last fifty years (36.9F to 39F, 30-year rolling average). That's significant and the trend is accelerating, but it's not enough to make a meaningful difference in optimal summer vegetable planting dates here. And it's the extremes that concern us.

But of course, you *can* plant earlier if you wish! Gardeners everywhere have adopted strategies to protect young tender seedlings. My grandmother, who gardened in New York state, owned a fascinating device called a bell jar: a dome of very thick glass, with a knob on top used as a handle, which you could set over a plant to create a miniature greenhouse when frost threatened. You can adapt a clear plastic soda bottle for the same purpose by cutting off the bottom. Just be sure to remove it on the next sunny day or you may have a poached tomato plant.

What to do if you already have summer vegetable plants?

Keep them moving. Literally and figuratively.

Move them out during the day, in again at night.

This has been my key to success and reduced stress for years. Like many gardeners, I start a lot of tomato seedlings in late winter. Indoors is not optimal for growth of seedlings as your low light status and lack of air movement leads to stretchy, spindly seedlings. So, it's optimal to get them outdoors as soon as possible, even if that means moving the seedling trays back indoors each night. It's my daily shuttle: seedling trays out on the front porch in the morning, back indoors at dusk.

Move them up into bigger pots so they aren't rootbound.

Rootbound seedlings aren't optimal. If it's going to be more than a couple of weeks before soil temperatures and your schedule allow for them to go in the ground, transplant them up to the next size container.

At the beginning of the summer gardening season, I set up a table for transplanting. Each new seedling that comes home or outgrows the indoor seed zone gets transplanted immediately into a quart-size or, better, one-gallon size pot. I use the richest available potting soil, meaning the premium blend that contains organic fertilizers.

I have found that these plants, grown along in one-gallon pots in enriched soil, are quite vigorous when I finally do plant them out anytime from late April through May. And that special potting soil typically provides all the nutrients the plant needs through the season.

This two-step process works well for tomatoes, peppers, eggplants, basil, and cucumbers and squash. It also is great for heat-loving summer flowers such as celosia, cosmos, and zinnias.

Make use of microclimates

If they need to stay outdoors, set them in a place where the house traps heat at night. An east- or south-facing wall, under an overhang, is ideal. Night temperatures there will be at least a few degrees warmer than out in the open.

What can we do now?

Keep those seedlings you grew or bought in a warm location.

Mow or cut weeds. Cover weedy areas with a tarp: 4 to 5 weeks without sunlight will kill most annual weeds. Spread compost or manure. Check your irrigation system for leaks and coverage.

Some vegetable plants and flowers can be planted now.

Mid to late March you can plant beans, beets, carrots, green onions, potatoes, radishes, turnips. Flowers to plant near your vegetables can include borage, sweet alyssum, nasturtiums, marigolds, and sunflowers.

Plant an herb garden!

Basil is a cold-tender exception. Most culinary herbs are hardy plants you can plant right now. Herbs are easy to grow in full sun, and many are very drought tolerant. Some can be grown in containers, but they are easier to maintain in your garden or landscape and have no special requirements.

Rosemary and sage are long-lived shrubs. Oregano, marjoram, mint, lemon balm, sorrel, chives, and catnip are herbaceous perennials that grow and spread for many years. Flowers of our common kitchen herbs are very attractive to beneficial insects, hummingbirds, and butterflies.

Sunny days in late winter can create a sense of urgency. We have plenty of time to plant, with a very long growing season here.



Frost in March (shown here in 2021) is not uncommon in our area. Recorded temperature at a weather station may be in the mid-30s but surfaces, including leaves, can get to freezing.



Blossom end rot is a frustrating disorder primarily affecting tomatoes, peppers, and squash. The bottom of the fruit softens and spoils as it ripens. Contrary to popular belief, BER is not caused by a calcium deficiency. It's an internal metabolic disorder that cannot be corrected. It correlates strongly with cold soil and excess moisture, so it's most common on plants that were planted too early. Later fruit on the same plant will be fine.



If your goal is early fruit, select varieties that ripen quickly. This Early Girl tomato was planted in the first week of May and the first fruit were nearly ripe in late June.



Easy weed control! The tarp that was installed six weeks prior has just been removed for this photograph. All the winter-growing weeds have essentially been composted in place.

