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PRUNING, TRAINING, AND SUPPORTING TOMATOES

The intrinsic vigor and hardiness of tomatoes almost always guarantees a successful harvest. However, the rapid growth of a healthy tomato plant can also lead to problems.

A tomato is a solar-powered sugar factory. For the first month or so, all of the sugar it produces is directed towards new leaf growth. During this stage, tomato plants grow very rapidly, doubling their size every 12 to 15 days. Eventually, the plants make more sugar than the single growing tip can use, which signals the plant to make new branches and to flower. This usually happens after 10 to 13 leaves have expanded, at which time the plant is 12 to 18 inches tall. In the next few weeks, the entire character of the tomato plant changes. If unsupported, the increasing weight of filling fruit and multiple side branches forces the plant to lie on the ground. Once the main stem is horizontal, there is an increased tendency to branch. Left to its own devices, a vigorous indeterminate tomato plant can easily cover a 4- by 4-foot area, with as many as 10 stems, each 3 to 5 feet long. By season's end, it will be an unsightly, impenetrable, disease-wracked tangle.

In order to maximize the efficiency of photosynthesis and minimize the risk of

disease, each tomato leaf must have plenty of room and be supported up off the ground. When a tomato plant lies on the ground, or when its growth is extremely dense, many of its leaves are forced into permanent shade, which greatly reduces the amount of sugar they produce. If a leaf uses more sugar than it makes, eventually it will yellow and drop off. A pruned and staked plant will produce larger fruit two to three weeks earlier than a prostrate one.

A properly pruned and supported single-stem tomato plant presents all of its leaves to the sun. Most of the sugar produced is directed to the developing fruit, since the only competition is a single growing tip. The result is large fruit that are steadily produced until frost. If more stems are allowed to develop, some of the precious sugar production is diverted from fruit to multiple growing tips. Fruit production, although slowed, never stops. The result is a nearly continuous supply of fruits throughout the season. In general, more stems means more but smaller fruits, which are produced increasingly later in the season. (This is much less applicable to determinate plants, due to their shortened growing season and better-defined fruiting period. Therefore, determinate plants require

little pruning (see Indeterminate vs. Determinate below).

Pruning also affects plant health. The leaves of a pruned and supported plant dry off faster, so bacterial and fungal pathogens have less opportunity to spread. Soil is less liable to splash up onto staked plants. The bottom line: Upright plants have fewer problems with leaf spots and fruit rots because their leaves stay drier and free from pathogen-laden soil.

The way you choose to train and prune your tomato plants will affect how you space the plants, as well as the best method of support. There is no one right way to do this. Instead, there are a few rules that are helpful:

- 1. Keep tomato plants off the ground.**
- 2. Give plants plenty of room.**
- 3. Avoid pruning or tying plants when the leaves are wet.**

As a tomato grows, side shoots, or suckers, form in the crotches, or axils, between the leaves and the main stem. If left alone, these suckers will grow just like the main stem, producing flowers and fruit. Suckers appear sequentially, from the bottom of the plant up. The farther up on the plant a sucker develops, the weaker it is, because the sugar concentration gets lower as you move up the plant. On the other hand, side stems arising from below the first flower cluster, although stronger, compromise the strength of the main stem. For a multi-stemmed plant, your aim is to have all stems roughly the same size, although the main stem should always be stronger, because it has to feed the entire plant for the next two months.

When removing suckers avoid the top 10 inches of the stem so that you do not remove the apical growing tip from the plant!

Indeterminate vs. Determinate

Indeterminate tomatoes can have from one to as many as four stems. The fewer the stems, the fewer but larger the fruit, and the less room the plant needs in the garden. For a multi-stemmed plant, let a second stem grow from the first node above the first fruit. Allow a third stem to develop from the second node above the first set fruit, and so forth. Try to keep the branching as close to the first fruit as possible so that side stems will be vigorous but will not overpower the main stem.

Determinate tomatoes need no pruning other than removing all suckers below the first flower cluster, because pruning won't affect their fruit size or plant vigor. If you do any pruning above the first flower cluster on determinate tomatoes, you will be throwing away potential fruit!

Semi-determinate plants, as the name implies, are somewhere between these two other types. Although there aren't many semi-determinate tomatoes, one of the most popular hybrids, 'Celebrity,' falls into this category. Semi-determinate plants are best grown with three or four stems.

PRUNING

It is best to keep tomatoes free of side stems below the first fruit cluster. When trained to one vine and left free-standing, tomato plants develop strong main stems. To encourage a strong stem, trim all suckers and don't tie plants to their supports until the first flowers appear.

There are two ways to deal with a sucker that isn't destined to become a stem. The simplest is to pinch it off entirely; not surprisingly, this is called "simple pruning" (Figure 1). This should be done when the

sucker is still small and succulent. Grab the base of it between your thumb and index finger and bend it back and forth. The sucker should snap off, producing a small wound that will heal quickly. Avoid cutting the sucker with a knife or scissors, because the resulting stump can become easily infected. Once a sucker becomes too tough and leathery to snap off, however, it will be necessary to use a blade.

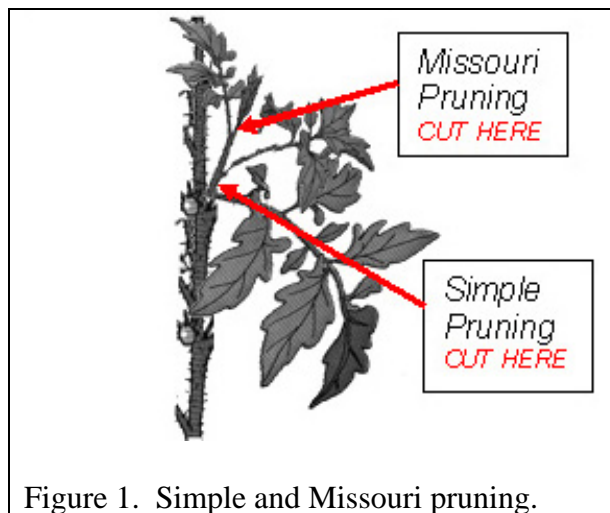


Figure 1. Simple and Missouri pruning.

In Missouri pruning (Figure 1), you pinch out just the tip of the sucker, letting one or two leaves remain. The advantage is that the plant has more leaf area for photosynthesis and to protect developing fruit from sunscald. The disadvantage is that new suckers inevitably develop along the side stems, adding to your future pruning chores. Missouri pruning is necessary when things have gotten out of hand. When you are dealing with large suckers, it is better to pinch off just the tip than to cut off the whole thing close to the main stem. For one thing, if disease hits, it's farther away from the main stem. And for another, removing just the growing tip is less of a shock to the plant than removing a foot or so of side stem. Suckers grow very quickly during the hot summer months. This is indeed a situation that tests one's resolve. It helps to

know that side stems started this late in the season will always be spindly and produce inferior fruit. You must be heartless and tip them all.

SUPPORT SYSTEMS

Once flowering commences, all tomato vines must be tied to their supports. Although vigorous, the plants are also easily damaged, so take care in how you tie them and what you use. Cloth strips work well as long as they're not too old and threadbare. Pieces of panty hose cause the least damage to plants, but they are not biodegradable. Twine should be at least 1/8 inch thick, or else it can cut into the tomato stems. There are two types of ties. Training ties direct plant growth upward, and supporting ties keep it there. The top 12 inches of a tomato stem is very succulent and easily snapped; it needs to be directed upwards, gently. Wrap a short piece of twine around the middle of the leader, cross it over on itself, and loosely tie it to the support. The resulting figure-eight tie reduces the chance the tender stem will rub against the support and get bruised.

Fruit will form along this stem. If left to the devices of the loose training ties, the weight of the fruit will pull the ties down the stake. Eventually, the stem will bend over and crease. Luckily, as the stem matures, it toughens; by the time fruit develops, the stem can tolerate a tighter tie. To support a fruit cluster as it fills and gains weight, loop a longer piece of twine, 12 to 18 inches, around the stem just above the fruit cluster, creating a sling. Then gently pull it up to take the weight off the stem. Wrap the twine twice around the stake, and firmly tie it to the stake 6 to 10 inches higher than the point of attachment to the vine. To keep the tie from slipping, knot it underneath the point where the sling meets the stake (Figure 2).

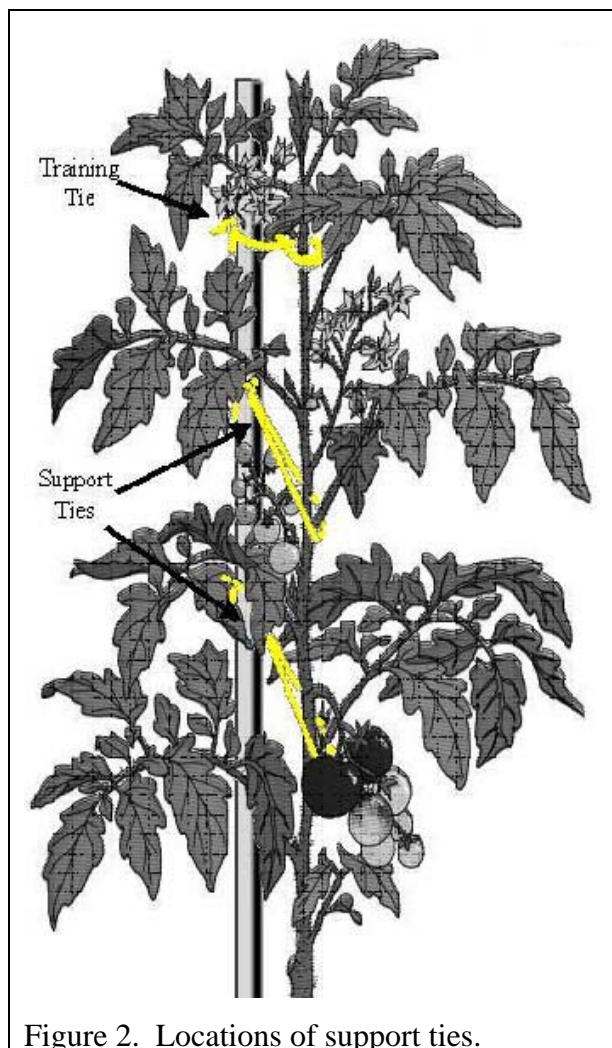


Figure 2. Locations of support ties.

Staking and Spacing Options: Cages, Fences, or Stakes

The method of support you use and how far apart you set tomato plants depends on the number of stems you allow to grow.

Cages work well for plants with three to five stems and are especially useful for determinate tomatoes. Ready-made tomato cages are too small for all but the smallest determinate cultivars. A tomato cage can be made from 5-foot-tall galvanized fencing with openings at least 4 inches square, so one can reach in and pick the fruit. A 4-foot section makes a cylinder about 15 inches in diameter. Secure it with baling wire, and

stabilize it with two stakes, one of which is at least 6 feet long. Drive the stakes into the ground within a week of planting, but wait to set cages over the plants until the first fruits form, to simplify weeding and pruning. Space caged plants about two-thirds of their final height in all directions.

Use the same type of fencing to make a tomato **fence** or **trellis**, which works best for plants with one or two stems. To get a good, solid fence, you need a helper. Secure the fencing with 6-foot stakes every 4 feet. Set single-stemmed plants 18 inches apart, and double-stemmed plants 24 inches apart. If you stagger the planting (successive plants on opposite sides of the fence), you can reduce plant spacing by 6 inches. Erect the fence before you plant your tomatoes.

Stakes work well for plants of one to four stems. Untreated oak or cedar stakes (1 inch x 1 inch x 6-foot lengths) sharpened on one end are ideal for the task. Drive the stakes 8 to 12 inches into the ground, depending on your soil (deeper for loose, sandy ground). To avoid damaging roots, drive your stakes into the ground within a week of planting. Space staked plants at 18 inches for a single stem, 24 inches for two stems, and 36 inches for three or four stems.

January 2010