

What Causes Blossom Drop in Tomatoes?

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Tomato Blossom Drop (Picture taken by Monica Ozores-Hampton)

Blossom drop is the loss of flowers. This is usually preceded by the yellowing of the pedicel. A tomato flower has both male (stamens) and female (pistil) parts within the same flower. The yellow stamens wrap around the greenish pistil in the center of the flower. Under proper conditions, pollen from the stamens transfers to the sticky stigma or tip of the pistil. This transfer requires a jarring wind or a flick of the finger or insects such as bumble bees and other native bees.

Tomato blossoms are self fertile, and a certain amount of self pollination of tomato flowers does occur. But pollen does not move well by itself from anther to stigma, as evidenced by the really poor pollination seen in greenhouses when no pollination aid is given. But shaking by wind or mechanical means can cause the release of the pollen, which drops down (the blossoms normally hanging downward) through the stamen tube to the stigma.

The best possible motion to release this pollen is from a bee that "sonicates" Sonication is the vibration of the wing muscles without flight, causing the whole flower to vibrate, and a cloud of pollen to be released onto the bee's body and at the same time, onto the stigma.

Without pollination, which stimulates fruit set, the flower withers and dies.

Blossom-Drop is a condition suffered by tomatoes, peppers, snap beans, and some other fruiting vegetables where the plant blooms but fails to set fruit, the blooms die and fall off. Tomato plants lose their blossoms for several different reasons usually related to some kind of stress. The stress may be either nutritional, environmental or some combination of the two. Anything which interferes with the pollination-fertilization process may result in abortion of flowers.

Potential Causes

Blossom drop can be attributed to several causes, most often related to either temperature and / or stress.

Environmental causes:

1. **Temperature:** Extreme temperature such as high daytime temperatures (above 85° F/29° C), or high nighttime temperatures (above 70° F/21° C), or low nighttime temperatures (Below 55° F/13° C) tomato plants will drop the flowers. Tomatoes grow best if daytime temperatures range between 70° F/21° C and 85° F/29° C. While tomato plants can tolerate more extreme temperatures for short periods, several days or nights with temps outside the ideal range will cause the plant to abort fruit set and focus on survival (Mills, 1988). Temperatures over 104° F/40° C for only four hours can cause the flowers to abort. If the night temps fall below 55° F or rise above 75° F or if the day temps are above 85° F, the pollen becomes tacky and non-viable. Pollination cannot occur. If the bloom isn't pollinated, the bloom dies and falls off. Chemical growth regulators can sometimes help overcome low temperature effects, but the resulting fruit is usually seedless and of poor quality.
2. **Humidity:** The ideal humidity range is between 40 - 70%. If humidity is either too high or too low, it interferes with the release of pollen and with pollen's ability to stick to the stigma. So pollination will not occur. If humidity is too low, hose the foliage during the day. This will both cool the plant and raise the humidity. This is not recommended in areas with high humidity or when fungus diseases are present.

Other potential sources of blossom drop:

1. **Lack of pollination:** Tomatoes need some help to pollinate. Insects, wind or hand shaking of the flowers is necessary to carry the pollen from the anthers to the stigma. During extremes weather conditions, there are often no insect pollinators.
2. **Nitrogen:** High or low application rates of N fertilizer can cause blossom drop. High rates of nitrogen fertilization encourage lush vegetative growth and inhibit flower production and/or pollination, resulting in poor fruit set. Low N produces spindly vines with low food reserves that cannot support a crop.
3. **Lack of water:** Tomatoes have very deep roots, and can sometimes reach down up to 5 feet. Shallow watering will stress and weaken the plants. The root zone should be uniformly moist throughout the growing season to develop a large, healthy root system.
4. **Insect damage or disease:** Use good cultural practices and treat for disease as soon as symptoms appear. Fungal diseases such as botrytis or heavy bacterial spot or speck pressure can often cause flowers to abort.
5. **Heavy fruit set:** When a tomato plant has too many blossoms, the resulting fruits are all competing for the limited food supplied by the crop. The plant will automatically abort some flowers. Once the initial crop is harvested, the problem should subside.

Controlling Tomato Blossom Drop

1. **Grow varieties suited to your climate**
2. **Ensure pollination**
3. **Used recommended N rates**
4. **Water deeply during dry weather**
5. **Control insect and diseases**

In conclusion, extreme temperatures and humidity are out of the grower control. Sometimes you have to wait for favorable weather conditions. Under extreme weather conditions, no amount of chemical, fertilizer, or snake oil is liable to assist with fruit set and can result in a large cash expenditure for little or no return.

If weather conditions are optimal and other growers are not having fruit set problems, you should consider the cultural causes of tomato blossom drop. Selecting a suitable variety, ensuring adequate fertility and water and controlling insect and diseases will potentially insure good yields. In Florida, under early fall growing conditions growers can get around the heat issue by choosing heat tolerant varieties.

References

- Mills, L.1988. Common tomato disorders under desert conditions. University of Nevada. Cooperative Extension. FS-88-60.
- Picken, A.J.F 1914. A Review of Pollination and Fruit Set in the Tomato (*Lycopersicon esculentum* Mill), Journal of Horticultural Science. 59(1) 1-13.