



**EXTENSION**

College of Agriculture,  
Biotechnology & Natural Resources

**FS-88-60**

## **Common Tomato Disorders Under Desert Conditions**

**Linn Mills, Area Specialist—Emeritus**

**Wayne Johnson, State Horticulture Specialist**

**Plant Science Department**

Whether you call it a fruit or vegetable, the tomato is the most popular of all home-grown foods in the United States. Southern Nevada is no exception. A survey by the National Garden Association found 93 percent of the American gardeners surveyed grew tomatoes. The main reason for the popularity of this nutritious vegetable is its excellent flavor and yield. Unfortunately, there are more production problems growing tomatoes than growing many other garden vegetables.

Harsh climatic conditions, nutrient deficiencies, poor cultural practices and disease all bring on disorders that limit tomato production. Common problems include blossom drop, blossom end rot, curling leaves, sunscald, herbicide damage, cracking and poor overall growth. Gardeners can minimize these problems by using good cultural practices and common sense. Here's how.

### **BLOSSOM DROP**

The most often asked question by southern Nevada tomato growers is, "Why do tomato blossoms drop?" Blossom drop may be caused by one or more of the following:

- 1) Too low or too high temperatures.**
- 2) Low humidity.**
- 3) Unusually heavy fruit set.**
- 4) Improper watering.**
- 5) Poor fertility practices.**

Tomatoes grow best if temperatures range between 70- and 90-degrees Fahrenheit, but can tolerate temperatures lower than 55°F and higher than 100°F for short periods. However, extended periods lower or higher than these temperatures abort the blossoms.

Temperatures lower than 55°F for four or more consecutive nights cause blossoms to drop. Chemical growth regulators can overcome low temperature effects, but the resulting fruit is usually seedless and of poor quality.

Temperatures that are higher than 90° during the day (southern Nevada averages 150 such days a year) are the main cause of blossom drop. In fact, temperatures over 104°F for four hours or more cause the flowers to abort. Night temperatures higher than 75°F will also cause blossom abortion. These sustained, hot temperatures at night burn up the food reserves the tomato produced during the day and the flowers abort. Here is no chemical growth regulator that will help under these conditions.

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 stamens transfers to the sticky stigma or tip of the pistil. This transfer requires a jarring wind or a flick of the finger. Without pollination, which stimulates fruit set, the flower withers and dies.

Relative humidity plays a major role in pollen transfer. Tomatoes set best when humidity is between 40 and 70 percent. Southern Nevada has long, dry periods with the humidity below 20 percent. As a result, pollen does not stick to the dry stigma. Calm, windless summer days also contribute to lower drop.

Directing a strong jet of water at the blossoms twice during the heat of the day will improve blossom set when daytime temperatures range between 90° and 100°F and below 75°F at night. The evaporating moisture lowers the temperature, raises the humidity and jars the pollen loose, improving set. If daytime temperatures exceed 100 F and night temperatures stay above 75°F, this technique is not effective.

Many gardeners give up on tomatoes when the plants stop setting. Tomatoes will produce again in the fall when temperatures cool. Gardeners should continue to fertilize and water during the period of no fruit set to ensure well developed and productive plants for the fall.

An unusually heavy fruit set on young plants is another reason for blossom drop. Strong competition by developing fruits for existing food reserves within small or weak plants limits the energy available to the new flowers. Although the plant may set blossoms initially, its poor condition may not withstand the increased competition for food and many blossoms and fruit will abort. Those left will not develop or grow properly. Once fruit is picked, the plant can redirect its energy and grow. A sufficient supply of food will be directed to the flowers and blossoms will then set again.

Excessive irrigations and water stress also cause blossom drop. Proper watering is important. The root zone should be kept uniformly moist throughout the growing season to develop a large, healthy root system. Tomato roots have a potential to grow to a depth of 3 to 5 feet. However, shallow watering, heavy, wet, poorly-drained soils, caliche or hard pan interfere with deep rooting. Every effort should be made to avoid or remedy these adverse conditions.

Two or three deep irrigations during the first month after planting will help establish the plants. After that, deep irrigations should be continued throughout the growing season.

High or low application rates of fertilizer will also cause blossom drop. Overfertilization may cause water stress resulting in tissue damage inside the tomatoes. Under fertilization leads to spindly vines with low food reserves that cannot support a crop.

To determine the tomatoes' nitrogen needs, stems should be examined 6 inches back from the end of the major branches. Ideally, the stems should be the thickness of your small finger. If smaller, nitrogen fertilizer should be applied. If stems are larger and growth is rank, fertilizer, especially nitrogen, should not be added.

## **BLOSSOM-END ROT**

**Blossom end rot** is a large, dark, sunken, leathery spot found on the bottom or blossom end of tomato fruits. Disfigured fruits usually appear in late spring and early summer, particularly following a heavy fruit set or a sustained dry period. To avoid continued development of blossom end rot, fruit should be thinned and adequate irrigation provided.

A lack of calcium also contributes to blossom end rot. Calcium is required for proper cell wall development. However, calcium moves slowly in water stressed plants. Light, infrequent irrigations cause more blossom end rot than the lack of calcium in the soil. Light, frequent irrigations also

contribute to blossom end rot because an adequate root system is not developed to allow enough calcium to be removed from the soil. Deep, infrequent irrigations are best.

Blossom end rot can be controlled by continuously providing ample water and good drainage. The soil around the tomato should be heavily mulched during the summer to reduce moisture fluctuation. A calcium fertilizer such as calcium nitrate should be applied if needed

### **CURLING LEAVES**

Curling leaves on healthy tomatoes is very common. Some varieties naturally curl more than others. Bright, sunny days, staking and excessive pruning also can cause curl. If leaves build up excessive carbohydrate (food) levels, curling results.

A virus disease called curly top also causes leaves to curl. Leaves of infected plants roll upward with some twisting. Veins on the underside of the leaf turn purple and the foliage becomes dull yellow. The plant stops growing. The fruit on the vine ripens prematurely without increasing in size and the plant eventually dies.

Sugar beet leafhoppers transmit the curly top virus to the tomatoes. It will not spread from plant to plant within the garden without the insects present. However, infected plants should be removed as a sanitary measure in order to avoid spread of the disease.

### **SUNSCALD**

Large green and near-ripe tomatoes sunscald easily when exposed to extreme heat and bright sun. The tissue develops a blistered, water-soaked appearance. Rapid desiccation leads to sunken areas that are white or gray in green fruits and have a yellow cast in red fruits.

To prevent sunscald, heavy foliage tomato varieties—Patio, Better Bush, etc.—should be used or fruit should be shaded. Staking and selectively pruning can encourage more foliage which further shades the fruit.

### **HERBICIDE DAMAGE**

Gardeners use the herbicide 2,4-D to control broad-leaf weeds like dandelion. This chemical may drift to tomatoes, particularly those planted near lawns.

Tomatoes that are herbicide damaged have bent, twisted leaves and growing points. New leaves do not expand normally and are often narrow and elongated, twisted at the margin, and have abnormally pointed tips. Leaf veins are prominent, light colored, and appear parallel to each other. Plants exposed to small amounts of herbicide should outgrow the injury.

Always read the label when using chemicals and carefully follow instructions to avoid this and other problems associated with herbicide use. When spraying insecticides, etc., do not use a sprayer which previously had 2,4-D in it.

### **FRUIT CRACKING**

Cracking occurs when temperatures climb above 90°F and irrigation, rain or high relative humidity follows a long, dry period. The moisture promotes extremely rapid growth and excessive cell enlargement within the fruit and cracks result. An even supply of moisture to the plant should prevent the problem. One way to maintain **uniform** soil moisture is to cover the ground under the tomatoes with 2 to 4-inches of mulch.

It helps gardeners if they understand symptoms and causes of common disorders associated with growing tomatoes in southern Nevada. Taking appropriate actions to avoid problems, makes growing the most popular vegetable in the American garden a rewarding, productive experience.

### BIBLIOGRAPHY

1. Adams, P., and L. Ho, 1985. Two Disorders but One Cause, *Grower* (1985) 103 (12) 17-127
2. Borkowski, J. 1984, Study on the Calcium Uptake Dynamic by Tomati Fruits and Blossom-end Rot Control, *Acta Horticulture*, No. 145, 222-229
3. Dinar, M. and L. Rudich. 1985, Effect of Heat Stress on Assimilate Partition on Tomato. *Annals of Botany*, 56:239-248
4. Guttridge, C. 1884. Blossom-end Rot of Tomato Fruits, *Garden UK* 109(6) 251-252
5. Kup, C.A. and C.T. Tsai, 1984. Ateration by High Temperature of Auxin and Gibbereflin Concentrations in the Floral Buds, Flowers and Young Fruit of Tomato. *HortScience* 19(6): 870-872
6. Mullins, C.A. and J. D. Wolf, 1983. Quality and Elemental Uptake of Tomato, *Journal of American Science* 108(5): 850-854
7. Picken, A. J. F 1914. A Review of Pollination and Fruit Set in the Tomato (*Lu copersicon exculentum*, Mill) *Journal of Horticultural Science* 59(1) 1-13
8. Tan, C.S. and BAN, 1985. Dhanvantari, Effect of Irrigation and Plant Population on Yeild, Fruit Speck and Blossom-End of Processing Tomatoes. *Canadian Journal of Plant Science* 65:1011-1013
9. Witter, S.H. and S. Honma, 1979, *Greenhouse Tomatoes- Guidelines for Successful Production*. Michigan State University Press, East Lansing Michigan
10. *Integrated Pest Management for Tomatoes*. Bulletin 3274. University of California Press. Berkeley, California 1985

For more information:  
Master Gardener Help Line  
702-257-5555 or  
702-222-3130 or  
Extension.unr.edu or  
University of Nevada Reno Extension  
8050 Paradise Road, Suite 100  
Las Vegas, Nevada 89123

The University of Nevada, Reno is an equal opportunity affirmative action employer and does not discriminate on the basis of race, color, religion, sex, age, creed, national origin, veteran status, physical or mental disability, or sexual orientation, in any program or activity it operates. The University of Nevada employs only United States citizens and aliens lawfully authorized to work in the United States.