Agronomic Spotlight

Seminis grow forward

Tomato Fruit Disorders

- Environmental and genetic conditions can disrupt tomato fruit formation resulting in damage that affects the marketability of the fruit.
- Temperature, light, and moisture conditions are often associated with fruit disorders in tomato.
- Managing environmental conditions, selecting tolerant varieties, and providing proper nutrition can help minimize problems with fruit disorders.

Blossom-end rot (BER)

Symptoms: The initial symptoms of BER include light-tan, water-soaked lesions that form mostly on the blossom ends of green, developing fruit (Figure 1). With time, the lesions become sunken, circular to oblong in shape, and dark brown to black in color with a firm texture. The necrotic tissue is often colonized by black, secondary mold growth.

Figure 1. Symptoms of blossom-end rot. M.E. Bartolo, Bugwood.org.

Causes: BER is the result of a localized calcium deficiency in the tissue at the blossom end of developing fruit. The low calcium levels do not allow growing cells to form properly. The condition often develops as a result of water stress or uneven water availability, especially dry periods that slow growth followed by wet periods with rapid growth. Contributing factors include high temperatures and humidity levels, excessive salinity, high nitrogen, potassium, or magnesium levels, and root damage.

Management: Test soils for calcium levels. Apply dolomitic lime to the soil 2 to 4 months prior to planting if calcium levels are too low. Avoid high levels of potassium, sodium, magnesium, and ammonia fertilizers that compete with calcium for uptake by the plant. Maintain an even water supply through irrigation, check for irrigation problems such as plugged emitters, and provide adequate drainage to prevent overly wet soils. Use tomato varieties that are tolerant of BER.

Fruit cracking

Symptoms: Concentric cracking (Figure 2) is the splitting of the epidermis in circular patterns around the stem scar. Radial cracking (Figure 3) is splitting that radiates outward from the stem scar. Both concentric and radial cracks occur mostly on fruit as they near maturity. More susceptible varieties start to crack in the mature-green stage. Less susceptible varieties do not start to crack until the breaker or red-ripe stage; and resistant cultivars show little to no cracking.

Figure 2. Concentric fruit cracking.

Figure 3. Radial fruit cracking. R.W. Samson. Purdue University. Bugwood.org.

Causes: Susceptibility to cracking is related to the strength and elasticity of the epidermis of the fruit. Changes in growth rates, caused by fluctuations of moisture and temperature, promote crack formation as do high levels of nitrogen and low levels of potassium.

Management: Practices that minimize cracking include proper water management to provide adequate, even soil moisture, and appropriate fertility management to prevent fruit from becoming over succulent. Proper stem pruning that minimizes fruit exposure to sunlight helps lower the severity of cracking, as does prevention of defoliation through the management of foliar diseases. Use tomato varieties that are tolerant to cracking.

Catface (catfacing)

Symptoms: Fruit with catfacing are misshapen, primarily at the blossom end, with large scars and often holes in the locules (Figure 4). Affected fruit can be kidney-shaped or otherwise severely distorted.

Figure 4, Symptoms of catfacing. Gerald Holmes, California Polytechnic State University at San Luis Obispo, Bugwood.org.

Causes: The cause of catfacing is not well understood. It is believed to be the result of disturbance or damage of flower parts. The condition occurs more frequently following periods of cold weather, especially

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when cold weather occurs a few weeks before anthesis (pollination). Other factors that may contribute to catfacing include high nitrogen levels, extreme fluctuations in day and night temperatures, temperatures that are too high or too low during fruit set, and possibly plant pruning under some conditions. Catfacing may also be the result of exposure to herbicides such as 2,4-D.

Management: Avoiding excessive pruning and excessive nitrogen fertilization may help reduce the severity of catfacing. In protected culture situations, low temperatures should be avoided during flowering and early fruit formation. Use tomato varieties that are less susceptible to catfacing.

Zippering (zipper scar, anther scar)

Symptoms: Zippering appears as one or more thin, brown, necrotic scars starting at the stem scar and extending down toward the blossom end of the fruit. Small, transverse scars along the longitudinal scar give the entire scar a zipper-like appearance (Figure 5). Occasionally a hole in the locule will form along the scar.

Figure 5. Zippering symptoms. D. Egel. Purdue University.

Cause: Zippering is caused by anthers sticking to the wall of newly forming fruit. Zippering can be caused by low temperatures and slow fruit development. Tomato varieties vary in their susceptibility to zippering.

Sunscald

Symptoms: Large, white areas of necrotic tissue develop on mature-green and breaker-stage fruit (Figure 6). These areas may be surrounded by a yellow halo. The affected tissue becomes sunken and wrinkled. The necrotic tissue can be colonized by secondary black mold fungi. The damage usually appears on the side or tops of tomato fruit.

Figure 6. Sunscald symptoms. Howard F. Schwartz, Colorado State University, Bugwood.org.

Cause: Fruit that develop in the shade of the canopy but are suddenly exposed to sunlight can develop sunscald. Sunlight can heat fruit tissue to over 104°F (40°C), which can damage tissue that is not adapted to those conditions. Fruit exposure to direct sun can result from excessive pruning and sifting of foliage during harvesting. Defoliation can also result from foliar disease and insect feeding.

Management: Take care during pruning and harvesting to keep the fruit shaded by leaves. Manage foliar diseases and insect pests to prevent defoliation. Use tomato varieties that provide good foliar cover for fruit. Exposed fruit can be sprayed with clay or diluted white paint to reduce sunscald damage.

Yellow shoulder (green shoulder)

Symptoms: Symptoms of yellow shoulder appear as areas of yellow tissue on the shoulders of ripening fruit (Figure 7). The discoloration may affect the entire shoulder of the fruit or only small, irregular patches. Discoloration usually develops on areas that have been directly exposed to the sun.

Figure 7. Symptoms of yellow shoulder. Bruce Watt, University of Maine, Bugwood.org.

Causes: Yellow shoulder is a genetic condition, and susceptibility varies by variety. However, the condition is favored by periods of high light and temperature levels. The chlorophyll in the affected areas is slow to breakdown during ripening. The physiological cause of yellow shoulder is not well understood.

Management: The primary way to avoid yellow shoulder is to use tomato varieties that are not susceptible to the condition. Avoid practices, such as excessive pruning, that expose fruit to the sun. Manage foliar diseases and provide proper nutrition.

Sources:

Babadoost, M. 2014. Physiological disorders of tomato. Report on Plant Disease No. 981. University of Illinois Extension.
Delahaut, K. and Stevenson, W. 2004. Tomato disorder: Physiological fruit problems. University of Wisconsin Extension. A3798.
Jones, J., Zitter, T., Momol, T., Miller, S. 2014. Compendium of tomato diseases and pests. American Phytopathological Society. St Paul.
Koike, S., Gladders P., and Paulus, A. 2007. Vegetable diseases: a color handbook. Academic Press. Boston.
Snyder, R. 2019. Greenhouse tomato handbook. Mississippi State University Extension Service. P1828.

For additional agronomic information, please contact your local seed representative.

Performance may vary from location to location and from year to year, as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible and should consider the impacts of these conditions on the grower's fields. The recommendations in this article are based upon information obtained from the cited sources and should be used as a quick reference for information about tomato production. The content of this article should not be substituted for the professional opinion of a producer, grower, agronomist, pathologist and similar professional dealing with this specific crop.

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