Common Abiotic Tomato Diseases in Colorado

Quick Facts……

- Common abiotic diseases of tomato are Blossom End Rot, Sunscald, Leaf Roll, and failure to flower or fruit
- Proper watering, fertilization and mulching can help keep the plant growing vigorously and reduce potential abiotic problems.
- Crop rotation and proper plant spacing can also help alleviate some of these issues.

Tomatoes are among the most popular garden vegetables to grow in Colorado. Although tomatoes are susceptible to problems caused by deficiency of nutrients, and other environmental conditions, good cultural care and garden sanitation can alleviate many of these problems. This fact sheet will focus on the abiotic issues with tomatoes.

The ideal temperatures for tomato growth are 59-68F in the evening/nighttime and daytime temperatures of 70-86F. As we know, in Colorado, this may or may not happen. Some basic abiotic tomato issues related to temperature are:

- no fruit (relative humidity is too low, style grows too long due to excess heat and pollen is not viable because of too hot or cool temperatures);
- there are no flowers (temperatures are too hot or too cool, and it may be too dry);
- there is poor fruit set (night temps below 55F so pollen does not develop or daytime temperatures are above 90F before 10 a.m. so blossoms abort).

Nutritional Deficiencies

The three most common nutrient deficiencies in tomatoes are nitrogen, phosphorous and calcium. Nitrogen deficiencies can predispose tomatoes to Early Blight (see Fungal Diseases of Tomato). Phosphorous deficiencies can cause purpling of the underside of the leaves and plants that are generally small. The fruits may be hollow and poorly colored and older leaves may drop. Plants growing at too low temperatures, and in poorly fertilized soils can exhibit phosphorous deficiencies.

- Calcium deficiencies are associated with Blossom End Rot. Symptoms of calcium deficiency can be:
- Young leaves become distorted with tips hooked back and margins curled;
- Leaves may be irregular in shape an dragged with brown scorching or spotting;
- Terminal buds may die;
- Development of small lesions at the end of the fruits near the pistil scar that gradually turn brown and spread along the bottom of the fruits;
- Plants have poor, bare root systems.

Figure 1: Concentric rings of tomato fruit cracks

Figure 2: Yellow shoulder of tomato; can also be green shoulder

Figure 3: Catfacing of tomato fruit

Figure 4: ‘Zippering’ on tomato fruit

Calcium is key component in cell wall construction in the fruits. If there is too much nitrogen and the plants are growing fast, there may not be enough calcium transported to the fruit, therefore leaving them susceptible to BER. Blossom End Rot is generally more severe on the first fruits as they are maturing faster and earlier. Some varieties may be more prone to BER than others. Inconsistent water can also exacerbate BER because calcium is only moved through the vascular system and if there is no water to transport nutrients to the fruit, there is a deficiency. Foliar sprays of calcium have little effect on the reduction of BER. Mulching around tomatoes will help keep soil moisture levels more even and reduce the over/under-watering syndrome.

Reproductive Parts Issues

Catfacing of tomatoes is usually and early season problem. It affects the first flowers/fruits when they are subjected to low temperatures during flowering (60-65F during the day and 50-60F at night). The resulting symptoms are corky scars around the stylar end of the fruit.

Zippering is also a low temperature problem. The male flower parts (anthers) stay attached to the developing fruit and produce a corky ridge around the tomato that looks very similar to a zipper.

Seasonal Disorders

Physiological leaf roll of tomato generally happens when there has been a cool spring that suddenly turns into hot summers. This seems to be more common in indeterminate varieties vs. determinate varieties. Stresses such as water inconsistencies, transplant shock or low nitrogen can also contribute to leaf roll issues.

Sunscald can happen to any vegetables in the garden, but tomatoes at the mature green stage are the most susceptible. This happens when there is no leaf cover or some sort of shading of the fruit. The exposure to sunlight causes the reduction of lycopene production resulting in cell death. These areas are then susceptible to secondary soft rot pathogens that will degrade the fruit.

Late season fruit cracking can be a problem due to a sudden increase in fruit size or increase in moisture after the skin cells have hardened. A sudden influx of moisture does not allow the hardened cells to expand and they burst causing radial or concentric cracking of the fruits on the stem end. Higher temperatures can also increase the pressure of the pulp against the skin causing cracking. The best management for this problem is to make sure the plants have regular water and try to keep the fruit shaded.

Yellow or green shoulder is a condition where the tops of the tomato remain green or yellow-green and do not ripen. Yellow or green shoulder is a result of exposure to sunlight that heats up the tomato and reduces lycopene production so the tops of the tomato do not turn red.

Figure 5: Sunscald or sunburn on tomato fruit

Figure 6: Blossom End Rot of Tomato

Figure 7: Physiological leaf roll of tomato

Figure 8: Example of herbicide damage to tomato

Blotchy ripening can happen because some areas of the fruit fail to ripen evenly. This is due to poor fertilization and cool weather with inconsistent, erratic watering. The pale spots appear on the skin and the fruit underneath the spots remains hard. Some cultivars are more susceptible to this problem, usually heirloom varieties.

Other Problems

Herbicide issues with tomatoes are becoming more prevalent. This has to do with herbicide carryover in manures and composts as well as unintended consequences of applications elsewhere. Tomatoes are extremely susceptible to herbicides and will show symptoms within a day of any application. The best recommendations if you suspect herbicide issue is to remove the plant(s) from the garden. Be aware that herbicide symptoms can resemble other diseases and abiotic issues so proper diagnosis is key.