Blossom-End Rot

The bottoms of several of your vegetables or fruit look brown and rotten. While one might first suspect this is caused by some sort of organism attacking your fruit, the cause can be environmental.

Blossom-end rot is one of the most common problems not caused by a living organism that one might encounter on tomato fruit. Other susceptible fruits and vegetables include cucumbers, eggplants, peppers, and watermelons. The problem starts with what appear to be small, bleached-yellow bruises at the end of the fruit that is furthest from the stem. These bruises can be anywhere on the lower half of the fruit but are most frequently found nearest the bottom. Eventually these bruises coalesce and create a large, leathery, brown to black region. Blossom-end rot most often occurs to the first fruit the plant produces but can appear at any time during the growing season if the conditions are right. Technically, this disorder is the result of a calcium deficiency in the fruit, but the deficiency is often not due to a lack of calcium in the soil.

1. The underside of a tomato with blossom-end rot (left image).
2. Side view of the same tomato showing a smaller blemish higher up. This blemish looks similar to the initial bruises that develop before coalescing (right image).

Photo by Taylor Klass, University of Arkansas Division of Ag

Photo by Jason Pavel, University of Arkansas Division of Ag

Inconsistent soil moisture is a major factor that can contribute to blossom-end rot. Soil that is too dry, is too wet, or fluctuates between dry and wet can have this problem. Other factors that can contribute to blossom-end rot include too much fertilizer, undesirable soil pH, cold soil, damaged roots, humid weather, and the specific plant cultivar. Excess nitrogen can encourage leafy growth which more easily uptakes calcium, diverting it away from the fruit. Too much potassium and/or magnesium can compete with calcium uptake and prevent as much calcium from being absorbed by the plant. Cold soil and undesirable pH both interfere with general nutrient uptake by the plant. Damaged roots directly harm the plant's ability to take up nutrients. Humid weather reduces water and nutrient uptake by the plant because the air is too moist to evaporate water in the leaves, which would otherwise draw more nutrients up into the plant. The humidity problem is made worse in hot weather because hot weather speeds up plant growth. Different plant cultivars have varying levels of susceptibility to blossom-end rot. Factors that influence a cultivar's susceptibility include the size and shape of the fruit.

To reduce the incidence of blossom-end rot, mulch around the plant to help conserve soil moisture. If you use hay or straw as mulch, be sure the field it came from was not sprayed with auxin herbicides such as Grazon or 2,4-D. Tomatoes and other solanaceous crops, such as peppers and eggplants, are especially sensitive to these herbicides. As fruit begin to set, it is important to make sure the plants don't dry out. If there isn't much rain, make sure to deeply water the soil at least once a week. Drip irrigation can be helpful in reducing the frequency of leaf wetness, as prolonged leaf wetness can encourage infection by some plant pathogens. Be sure not to overwater as too much water will both inhibit nutrient uptake and encourage diseases.

Do not over-fertilize plants just before fruit set. Especially avoid ammonium forms of nitrogen, such as urea. Test your soil to obtain the current pH and nutrient levels before planting. If necessary, adjust the pH to between 6.0 and 6.8 pH, with a pH of 6.5 being ideal. If the soil is low in calcium, you can amend the soil with bonemeal (calcium and phosphorus with some nitrogen that isn't in the ammonium form) or gypsum (calcium sulphate) before planting. Lime is another source of calcium, but it will increase soil pH. If you find your soil is lacking calcium after planting, there are various forms of calcium that can be applied as a soil drench as well.

Cold soil can be particularly a problem in greenhouse plants grown during the winter. If you notice blossom-end rot in a greenhouse during the winter when it wasn't a problem during the warmer seasons, increase the temperature in the greenhouse, if possible, to help warm the soil. Humid weather cannot always be avoided, but increasing the airflow around the plants can help reduce blossom-end rot from developing during

humid weather. It should be noted that increased airflow will cause the plants to dry out more quickly, especially in hot weather, so watch the plants carefully if the humidity decreases.

Once you've planted your crop, be careful not to dig within a foot of tomato, pepper, eggplants, or cucumber plants and give watermelon plants at least 3 feet of leeway to avoid injuring roots. If you plant several cultivars, take note of the ones that less frequently show blossom-end rot and favor those in future seasons. For tomatoes, cherry tomatoes rarely get blossom-end rot while plum- and pear-shaped tomatoes are particularly susceptible. Larger fruited varieties and certain heirloom varieties are also more prone to blossom-end rot than smaller fruited varieties.

Any fruit found to have blossom-end rot should be plucked and disposed of. Once the fruit has blossom-end rot, it won't heal, and the rotten end will be more prone to colonization by disease-causing fungi and bacteria.

3. Two cherry tomatoes with blossom-end rot exhibiting white fungal colonization in the rotten area.

Photo by Sherrie Smith, University of Arkansas Division of Ag

Sunscald

Instead of a darkened area at the bottom of your fruit, you find a paler area that is sunken and wrinkled on one side of the fruit. This has got to be a disease, right? Again, not necessarily.

Sunscald is another abiotic culprit of fruit damage. Both solanaceous crops (tomatoes, peppers, eggplants, etc.) and cucurbits (cucumbers, gourds, squash, melons,

watermelons, etc.) can suffer from sunscald. Sunscaled can occur whenever direct sunlight hits a ripening fruit but especially during hot, dry conditions. The scalded tissue becomes leathery and takes on a white, gray, yellow, or pale tan coloration. As the fruit grows, the scalded skin will become wrinkled and/or blister-like with a papery texture.

4. A tomato with tan, wrinkled, papery skin on one side from sunscald (left image).
5. A tomato with a large, blister-like area on the side caused by sunscald (right image).

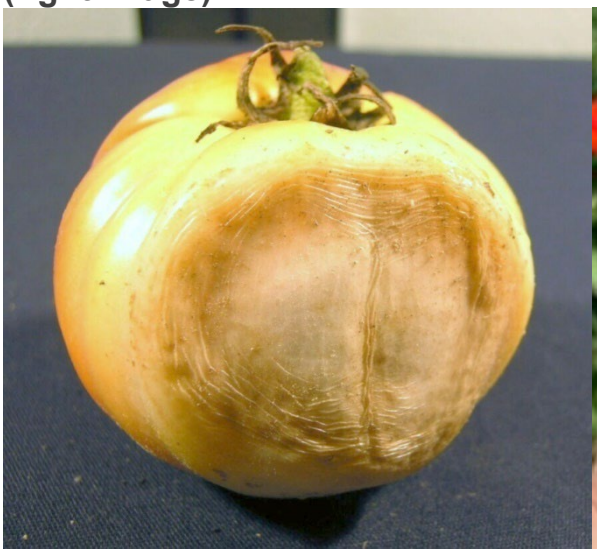

Photo by Sherrie Smith, University of Arkansas Division of Ag

Photo by Sandra Robertson, Arkansas Gardener

Over pruning or pests and diseases that cause defoliation are the most common reasons for fruit being exposed to direct sunlight while they are young and developing. Pruning out suckers in solanaceous plants to encourage more focused growth can be helpful but try to leave enough branches for foliage to adequately shade the blooms and developing fruit. Watch for holes in leaves caused by beetles, caterpillars, and other pests and watch for leaf spots that could be caused by a defoliating disease. Treat for any pests and diseases, don't over-prune, and choose cultivars that produce adequate foliage to shade your developing fruit. If fruit are exposed, they can be shaded with cheesecloth to help prevent sunscald.

Any fruit found to have sunscald should be plucked and disposed of. Once the fruit has sunscald, it won't heal, and the scalded area will be more prone to colonization by disease-causing fungi and bacteria.