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Many home gardeners are trying to keep down grocery bills by growing their own vegetables. But if produce is consumed by pests before it reaches the table, there will be no relief from high food prices and a lot of frustration.

Several vegetable gardeners have recently contacted our office with a tomato problem. They report that their plants are growing well, with healthy green leaves. But the fruit seem to ripen early, and when picked, the bottoms of the fruit have a large brown to black rotten spot.

Welcome to the wonderful world of “blossom end rot”, the subject of this week’s horticulture column. It will cover what we know about why this occurs and what does and doesn’t work to avoid this issue of several fruiting vegetables found in your Florida Yard.
Typical Blossom End rot symptoms occur on Tomatoes, both on and off the plant. Photos: LSU

A Deficiency - Not a Disease

It turns out that Blossom-end rot (BER) is not caused by a disease organism, but is actually caused by a localized calcium deficiency and water stress in the developing fruit. So fungicides will not help with this “rot.” But please read on – it’s not cured by just simply adding more water or calcium to the soil.

Blossom end rot occurs on many different vegetables that produce edible fruits. Tomatoes are the most common victims of this disorder, as are the related peppers and eggplant. Other fruiting vegetables are the cucurbitis, so it’s possible to see this same affliction on watermelons and occasionally summer squash.

Eggplant and peppers are tomato relatives that show blossom end rot. Above Photos: Wesley Kline, Rutgers University.

Members of the squash family, including watermelon can also show BER. Photo Clemson University

Symptoms appear first as light tan, water-soaked areas. As the fruit ripen these damaged areas enlarge and turn black and leathery in appearance. Most often this problem occurs at the blossom end of the fruit, but can sometimes be seen on the side of the fruit. It may also occur inside the vegetable so it may not be seen outside the fruit.
The browning and shriveling at the blossom end can be followed by a secondary decay from dark-colored fungi. Remember these are not the cause of blossom end rot, but these decay organisms merely colonize damaged fruit tissue.

**Water without Calcium = BER**

Calcium and all other plant nutrients must be dissolved in water to get into the plant. They move from the roots to the leaves. Leaves are the primary spot where water is used before it is lost through transpiration. Under high moisture stress, water containing calcium and other minerals moves rapidly to the leaves.

However, fruit do not transpire as much as leaves. Nutrients can bypass the fruit resulting in a localized deficiency. So BER is a calcium deficiency in an area of rapid growth - the end of the fruit. This lack of nutrients causes cells to collapse and produce the sunken-lesion symptom of blossom end rot.

**Good Gardening Reduces Fruit Loss**

Experts have identified a number of the factors that contribute to this problem. Included below are suggestions that will reduce blossom end rot (BER) in your garden.

* Improper soil preparation and planting: Transplants that are grown too quickly or too old can experience root damage that limits nutrient uptake. Include a lot of organic soil amendments to help absorb and hold water.

* Poorly drained soil: this will encourage root rot, and damaged roots won’t work correctly to absorb nutrients.

* Inadequate or excessive soil moisture: Tomatoes need one inch of water per week, and more when the fruit are developing. If rainfall is not enough, thoroughly water plants once a week. Heavy soakings are better than light sprinklings. More frequent watering may be needed in sandy soils and during the first week after transplanting.

* Low soil pH levels (below 5.5): Ideal calcium solubility occurs when soils have a pH 6.5 to 6.7. If you have not tested your soil pH in the past 2 to 3 years, bring in a sample to our office to see if any adjustment is needed.

* Inadequate calcium in the soil: In Florida, adequate soil calcium is considered to be 300 ppm or higher. Low calcium levels rarely happen here, so if you suspect this is a problem, have a soil test done. If the test results show a soil calcium deficiency, add calcium sulfate (gypsum) to the soil during garden soil preparation.

* Applying the wrong form of calcium: Foliar applications of calcium chloride sprays are often suggested. Some garden centers sell these products as the “cure” for BER, but
these products has not proven to reduce BER. Calcium that is taken up by the leaves can not be moved into to the fruit.

* Applying too much nitrogen or using the wrong form of nitrogen: using ammoniacal sources of N will often increase BER symptoms as excess ammonium ions reduce calcium uptake. Use nitrate nitrogen as the fertilizer nitrogen source.

* High salinity or excess levels of soluble potassium and magnesium: A low calcium level in the plant may be a result of competition from high levels of ions such as magnesium.

* Excessive pruning or other mechanical damage: Hoeing weeds closer than one foot from the plants may cause root damage.

* Using plastic mulch instead of organic mulch may increase BER if plants are not watered. Use organic mulches like composted yard waste, grass clippings or wood chips which conserve moisture and reduce BER.

* High soil temperatures contribute greater needs of water and can add to BER problems. The calls about this problem came when it is hot and dry, not when the weather is cool and moist.

* Nematode damage to root system reduces the ability of roots to work. Consider nematode resistant varieties, practice crop rotation and have plenty of soil organic matter to discourage these microscopic soil worms.

* Certain plant diseases such as **curly-top virus** are said to increase blossom-end rot problems. Whiteflies can transmit this disease – use control measures for these insects.

* Cultivars can differ in their susceptibility to the problem: Cornell reports that the tomato varieties Jet Star, Burpee VF, Better Boy, Early Girl, Flora-Dade, Floramerica and Walter seem to have some tolerance to BER.

I’ve placed more information on our Okeechobee web page, [http://okeechobee.ifas.ufl.edu](http://okeechobee.ifas.ufl.edu). If you need additional information on blossom end rot, please email us at [okeechobee@ifas.ufl.edu](mailto:okeechobee@ifas.ufl.edu) or call us at 863-763-6469. Local residents can stop by our office at 458 Hwy 98 North in Okeechobee, and visit our Okeechobee County Master Gardeners from 1 to 3 PM on Tuesday afternoons. **GO GATORS!**

**References**


Olson, Stephen M. Physiological, Nutritional, and Other Disorders of Tomato Fruit [HS-954]. Gainesville: UF/IFAS Extension Service, February 2004  http://edis.ifas.ufl.edu/HS200


Sanders, Douglas C. Blossom-End Rot of Tomatoes [HIL-28-D]. Raleigh: North Carolina State University, Revised 1/01 http://www.ces.ncsu.edu/depts/hort/hil/hil-28-d.html

