BLOSSOM-END ROT IN TOMATOES

Dry conditions increase the likelihood of **Blossom End Rot** in tomato and pepper. Causes are similar in both crops.

Symptoms: Blossom-end rot is a physiological disorder that sometimes causes serious losses. The early symptoms, which often go unnoticed, appear as water-soaked lesions on the blossom end or bottom of the fruit. The affected tissue breaks down and the area becomes sunken, dark brown or black, and leathery. This can happen at any stage during fruit development.

Causes Of Blossom End Rot: Blossom End Rot is caused by a lack of sufficient calcium in the fruit tissues. The disorder begins when the demand for calcium in the fruit exceeds the supply. This can occur even when there is an ample supply of calcium in the soil, stems, and leaves of the plant. Calcium is an immobile element, which means that once it is located in one part of the plant, it cannot move to another. Actively growing parts of the plant such as developing fruit must have a continuous supply.

Field Conditions that can bring about Blossom End Rot include the following:

- **Drought Stress**. Moisture supply plays a critical part in calcium uptake and distribution within the plant. Calcium dissolves in water and moves from the soil into the roots and up the stems into the leaves and fruits. This water and calcium solution replaces moisture as it transpires (evaporates) from the leaves and fruits. The fruits have a high demand for calcium, but the leaves receive more because they have a higher transpiration rate. Supplying water to plants after they come under drought stress only partially relieves the situation since most of the calcium moves into the leaves rather than the fruit. In order to avoid this condition, adequate levels of soil moisture must be maintained consistently during the growing season.

- **Root Damage**. Cultivating too close to plants or burning them with fertilizer can reduce nutrient and water uptake. Waterlogged soils also interfere with the proper functioning of roots and increase Blossom End Rot.

- **Staking and Pruning**. Staking or trellising and pruning of plants increase stress and can result in increased blossom-end rot.

- **Calcium (Ca) Deficiency**. The soil may have low levels of calcium. This can be determined by soil testing and can be corrected over a period of time by liming. Use limestone with a sufficiently high calcium content, as explained in the section on prevention.

- **Nutrient Imbalance**. The soil may be reasonably high in calcium but plant uptake may be inhibited by interactions with certain elements in the soil. Calcium is one of a group of elements called "cations" (positively charged ions). Competition from other cations such as K (potassium), Mg (magnesium), Na (sodium) and NH4 (ammonium) can substantially depress calcium uptake by the plant.

Of these cations, ammonium tends to depress calcium uptake the most. Ammonium is sometimes used at side dressing. This can be a cause of Blossom End Rot.

Preventing Blossom End Rot: Blossom End Rot can best be reduced or prevented by advance planning and close attention to details:

- Adjust soil pH to 6.5 to 7.0.

- Lime not only to control pH, but choose liming materials that will achieve a proper balance of calcium and magnesium in the soil. In Massachusetts where the use of "hi mag" and dolomitic lime is popular, it is not uncommon to find that soils are high in magnesium and low to medium in calcium. The condition can be corrected by using "hi cal" or calcitic lime. Follow soil test recommendations.

- Maintain potassium levels in balance with calcium and magnesium. The proper balance of these elements is determined by measuring the base saturation of the soil. A balanced soil will fall into the following ranges: potassium (K) 1 to 5 percent; magnesium (Mg) 10 to 15 percent; calcium (Ca) 60 to 80 percent. Percent saturation is measured in soil tests performed by the University of Massachusetts Soil Testing Laboratory. When potassium levels exceed 5 percent, calcium or magnesium will probably be recommended to insure adequate uptake of calcium or magnesium by the plant.

- When side-dressing nitrogen, avoid using ammonium which can interfere with calcium uptake. Urea converts to ammonium and should be avoided as well. Nitrate forms do not interfere with calcium uptake. Calcium nitrate supplies a small amount of calcium as well as nitrogen.

- Maintain adequate soil moisture levels uniformly during the growing season. Be careful to avoid wet-dry cycles.

- Use mulches to conserve moisture and reduce moisture stress.

- Foliar applications of calcium chloride are of little value because most of the calcium is absorbed by the leaves and stays there. Only that which is absorbed through the fruit epidermis will be of value. Growing fruit needs a constant supply of calcium, which would require frequent applications.

- Growing tomatoes on the ground creates less stress than staking or trellising. The basket weave system probably creates an intermediate stress level.

- Fruit with Blossom End Rot should be removed when first noticed so the plant's energy is not wasted on culls.

John Howell