3-1-2002

Blossom End Rot of Tomatoes and Other Vegetables

Martin A. Draper
South Dakota State University

Rhoda Burrows

PLANT DISEASE MANAGEMENT IN SOUTH DAKOTA

Blossom End Rot

of Tomatoes and Other Vegetables

South Dakota Extension Fact Sheet 909
March 2002

Martin A. Draper
Extension Plant Pathologist
Plant Science Department

Rhoda Burrows
Extension Horticulturist
Horticulture, Forestry, Landscape and Parks Department

Steven Munk
County Extension Educator, Horticulture
Minnehaha County

Blossom end rot is a disorder of tomato, pepper, and eggplant that can be very damaging. It may also occasionally occur in cucurbits. At first glance, damage from this disorder may not be obvious. However, home gardeners can be frustrated and distressed when they notice dry sunken decay developing on the bottom, or blossom end (opposite the stem), of the picked fruit of affected plants. Fruit may be affected throughout the season, but the first fruit produced in a season are often most severely affected.

Symptoms

On tomato and eggplant, blossom end rot usually begins as a small watersoaked area at the blossom end (bottom) of the fruit. However, the damage is typically far more severe by the time it is noticed. Initial injury may appear when the fruit is still green or during the ripening process. Lesions develop, enlarging and becoming sunken, black and leathery (Fig. 1). The affected area may sometimes cover the entire lower half of the fruit, causing the fruit to becoming flat or concave. The dry, leathery tissue may extend a short distance into the fruit (Fig. 2). Secondary pathogens commonly invade the lesion, often resulting in white cottony growth and complete destruction of the infected fruit.

On peppers, the affected area may be mistaken for sunscald. Sunscald develops as a white discoloration, but it occurs on the upper portions of the fruit, often the shoulders. Blossom end rot may also occur on the sides of the pepper fruit near the blossom end. Molds often colonize the damaged area of affected fruit, resulting in a dark brown or black appearance.

Figure 1. Typical dry, leathery rot on the bottom of tomato fruits with blossom end rot.

Cause

Blossom end rot is not a disease caused by parasitic organisms, such as fungi or bacteria. Blossom end rot is actually a physiological disorder associated with calcium deficiency in the fruit. Calcium is a major component in the "cement" that holds cells together. It is also important in nutrient uptake. Relatively large concentrations of calcium are needed for normal cell growth. The tissue of rapidly growing fruit deficient in necessary calcium breaks down into a characteristic dry, sunken lesion on the blossom end.

Blossom end rot is induced when demand for calcium exceeds supply. This may result from low calcium levels or high amounts of competitive cations (positively charged ions, such as sodium, ammonium, potassium, or others) in the soil, drought stress, or excessive soil moisture fluctuations that reduce uptake and movement of calcium into the plant, or rapid, vegetative growth due to excessive nitrogen fertilization.

SDSU
SOUTH DAKOTA STATE UNIVERSITY
College of Agriculture & Biological Sciences
Cooperative Extension Service
USDA

Management

1. Provide even watering and avoid drought stress or other wide fluctuations in soil moisture. Use mulches and/or irrigation. Balance irrigation and rainfall, delaying irrigation after heavy rains. Proper growth and development can generally be met with about one inch of moisture per week from a combination of rain and irrigation. Water loss can be minimized with mulch around the base of the plants and extending out about two feet. Plastic mulches, straw, dried grass clippings, or shredded paper all work adequately.

2. Plant indeterminant or semi-indeterminant tomato varieties rather than determinant "bush" varieties. Determinant varieties produce large flushes of fruit late in the season. This heavy fruit set requires large quantities of calcium that are very difficult for the plant to supply on a steady basis. Indeterminant and semi-indeterminant varieties set fruit over a longer period of time and it is easier for the plant to supply enough calcium to fewer fruit at any given time.

3. Use nitrate nitrogen as the fertilizer nitrogen source. Ammonium and/or amino forms of nitrogen may increase blossom end rot as excess ammonium ions reduce calcium uptake. Avoid over-fertilization as side dressings during early fruiting, especially with nitrogen forms other than nitrate nitrogen.

4. South Dakota soils contain calcium in the calcium carbonate composition form. Liming, the addition of hydrated or dolomitic lime to soils, can increase the amount of calcium in the root zone, but is rarely necessary in South Dakota.

5. Foliar applications of calcium may be recommended by some, but are of little value because of poor absorption and movement to fruit where the nutrient is needed.

The greatest success in managing blossom end rot will involve multiple tactics, but the most important approach is water management to assure an even supply of calcium to the plant.

(Photo credits: H.A. Lamey, North Dakota State University)

Figure 2. Blossom end rot damage can penetrate a short distance into the developing fruit.

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the USDA. Larry Tidemann, Director of Extension, Associate Dean, College of Agriculture & Biological Sciences, South Dakota State University, Brookings. Educational programs and materials offered without regard for race, color, creed, religion, national origin, ancestry, citizenship, age, gender, sexual orientation, disability, or Vietnam Era Veteran status.

5000 printed by CES at a cost of ? each. FS 909. March 2002.