

Blossom end rot is a disorder of tomato, pepper, and eggplant that can be very damaging. It may occasionally occur in summer squash, including zucchini. 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 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 water-soaked 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, brown or black and leathery (Fig. 1). The affected area may sometimes cover the entire lower half of the fruit, causing the fruit to become flat or concave. The dry, leathery tissue may extend a short distance into the fruit. Secondary pathogens commonly invade the lesion, often resulting in white cottony growth and complete destruction of the infected fruit.



Figure 1. Blossom End Rot on tomato appears at the base of the 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

## 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. 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.

Calcium is taken up by the roots as they absorb water, and it moves through the plant in the transpiration stream, thus it moves into leaves (which are transpiring water) more readily than the fruit. Blossom end rot occurs when demand for calcium in the fruit exceeds supply. This may result from low calcium levels in the soil, or through drought stress or excessive soil moisture fluctuations, which can both reduce uptake and movement of calcium into the plant. Rapid, vegetative growth due to excessive nitrogen fertilization or high levels of competitive cations (positively charged ions, such as sodium, ammonium, potassium, or others) in the soil can also limit calcium supply to the fruit even when calcium is plentiful in the soil.

## Management

1. Provide even watering and avoid drought stress or other wide fluctuations in soil moisture. Proper growth and development can generally be met with about one inch of moisture per week from a combination of rain and irrigation. Minimize water loss by mulching around the base of the plants and extending out about two feet. Plastic mulches,

straw, dried grass clippings (avoid any from lawns sprayed with herbicide), or shredded paper all work adequately.

2. Plant indeterminate or semi-indeterminate tomato varieties rather than determinate "bush" varieties. Determinate 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. Indeterminate and semi-indeterminate 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 generally contain plentiful amounts of calcium in the form of calcium carbonate. 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. However, plants grown in an artificial (soilless) media, such as a peat:perlite potting mix, may need additional calcium.
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.



*Figure 2. Blossom end rot can extend into the fruit*



*Figure 3. Blossom End Rot on squash often has a very dark appearance, and may be confused with rots caused by diseases, but diseases generally attack the stem end first.*