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## Disease or Disorder? Common Issues in Greenhouse Tomato Production

*Greenhouse tomato production in the late winter and early spring can provide unique challenges to producing consistent, high quality fruit. Learn about four common issues and how to manage them in the greenhouse environment.*

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**Botrytis.** *Botrytis cinerea*, or gray mold, is one of the most common fungal pathogens affecting greenhouse tomatoes. Gray mold can develop on any of the aboveground parts of the plant including leaves, stems, petioles, flowers and fruit. Tan lesions often form at the site of pruning wounds or cut petioles following fruit harvest. These lesions can eventually girdle the stem when left untreated. Botrytis is easily detected by the characteristic fuzzy gray spores that primarily occur during cool, humid periods. Botrytis can also infect tomato fruit and produce “ghost spots” on the fruit surface (Figure 1). Preventive and control measures include reducing humidity levels, improving air circulation, providing proper greenhouse temperatures, and utilizing labeled fungicides.



Figure 1. Circular “ghost spots” form on a tomato fruit infected with *Botrytis cinerea* (left). Botrytis girdles a tomato stem following wounding (right).  
Photos by Beth Scheckelhoff

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**Catfacing.** Catfacing, also called corky styler scar, commonly occurs on the first fruits of greenhouse tomatoes produced in fall, winter and spring when low temperatures are prevalent. Cool temperatures (generally considered to be less than 60°F) can adversely affect the formation of flowers, pollen and fruit following pollination. Cool temperatures can also hinder the pollination process, resulting in misshapen and deformed fruits (Figure 2). Incomplete pollination may also occur when growers mechanically pollinate plants.



Figure 2. Misshapen fruit formed during the late winter in a Northern greenhouse. Plants grown with air temperatures below 55 to 60F may not set fruit or develop fruit with similar abnormalities as shown.

Growers should provide a minimum night temperature of 55-60°F to improve pollination and limit the development of deformed fruits. Placing bumblebee hives in the greenhouse when plants begin to flower also allows for more consistent pollination and fruit set.

**Oedema.** Oedema (also spelled *edema*) is a physiological condition of greenhouse tomato caused by an improper water balance within the plant. Greenhouse tomato plants grown in a cool, low-light environment with a warm, saturated root zone are prone to developing this disorder. Oedema occurs when the roots of a plant absorb water more quickly than the plant is able to release water through transpiration.

Oedema commonly appears on the lower leaf surface as small, clear watery blisters often concentrated around and between the leaf veins (Figure 3). It can also affect stems and petioles. The blisters form when cells enlarge and erupt due to increased cell pressure within the plant. Blisters can vary in size and number, but often cause leaf distortion. The upper leaf surface appears discolored and forms a necrotic spot (Figure 4).



Figure 3. Oedema blisters form on the underside of a leaf (left) and along the stem (right) on a susceptible tomato cultivar grown in a low-light environment. Photos by Beth Scheckelhoff

Not all tomato cultivars and varieties are affected by oedema. Some cultivars show little to no symptoms while others are severely affected under the same environmental conditions. Symptom severity within a cultivar may also depend upon localized conditions within the same greenhouse. Older leaves are more affected than younger leaves. Maintaining records of which cultivars exhibit oedema under their growing conditions can help growers avoid problematic cultivars in the future.

Growers can minimize oedema by choosing appropriate cultivars, limiting watering during cool, low-light conditions, and improving air circulation to increase evapotranspiration. Oedema lessens when adequate light, air temperature and moisture levels are provided.



Figure 4. Oedema blisters form necrotic spots on the upper surface of a leaf. Photo by Beth Scheckelhoff

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**Blossom end rot.** Blossom end rot (BER) is a physiological disorder of tomato fruit resulting from calcium deficiency in fruit tissues. BER commonly affects tomatoes grown in the greenhouse and outdoors, and often occurs when plants are growing rapidly, fertilized with high nitrogen levels, and/or receive inconsistent irrigation. These conditions can prevent the plant from transporting adequate calcium to the developing fruit. BER begins as one or more small, water-soaked lesions on the styler end of the fruit. Lesions enlarge to form a dark, sunken area covering the base of the fruit. BER can be avoided by providing consistent moisture and ensuring adequate calcium is provided in the irrigation water.



Figure 5. Blossom end rot forms on the styler end of the tomato fruit when not enough calcium is available during fruit development. Photo by Beth Scheckelhoff

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