

## **Fifty Shades of Gray Mold-Managing Tomato Diseases in High Tunnels**

Ann Hazelrigg

Plant and Soil Science Dept., Jeffords Hall, 63 Carrigan Drive, University of Vermont  
Burlington, VT 05405

[ann.hazelrigg@uvm.edu](mailto:ann.hazelrigg@uvm.edu) 802.656.0493

Specific and current pesticide recommendations can be found <https://nevegetable.org/>

**Early season issues:** Most early season problems are abiotic (non-living and non-infectious).

- **Root diseases (several different soil borne fungi). Symptoms-wilting, poor vigor, brown scorching around leaf edges**

Rotation is a cornerstone of IPM and helps keep root and foliar diseases to a minimum, yet growers are reluctant to replace tomatoes in high tunnels with a less lucrative crop. Although the several soil borne fungi that cause root rots can build up in soils, the widespread use of vigorous rootstocks has helped eliminate most root rot issues in soils planted with tomatoes for several years. Planting when soils are too cold or wet, however, can still result in root rots and should be avoided.

- **Ethylene damage (Abiotic). Symptoms-curling and twisting or downward bending of foliage (epinasty), flower abortion**

Tomatoes are **very** sensitive to ethylene damage. Ethylene is a naturally occurring plant hormone but can be produced when heaters are not functioning properly or venting is inadequate. Other sources include: leaky gas lines, propane heaters and exhaust from combustion engines. The damage is typically seen in late winter or early spring when temperatures drop and the heat is turned on. Once the source of the leak is fixed, the plants will grow out of the disorder although sometimes the damage can be so severe, the plants never fully recover. The damage occurs very fast and can be present on all the tomatoes in the house or it may be worst on plants nearest the heater. If you suspect ethylene injury or any other abiotic damage (cold, heat, over-fertilization, etc.) check the newest growth on the tomatoes after a day or two to see if it looks symptom-free. If so, then the damage was typically an abiotic (non-living) disorder and the plants should recover. Proper heating system maintenance before the heating season is critical.

- **Cold temperature damage/transplant shock (Abiotic). Symptoms-Overall purpling of foliage or browning/flecking on affected leaves, often limited to leaves that were emerging at the time of the event.**

Tomato foliage can look really bad early in the season and most of the damage is caused by cold temperatures (resulting in slow transport of nutrients) or transplant shock. Symptoms include “purplish leaves”, browning of leaf edges and brown spotting on foliage. Often affects only one age of leaves-the ones that were most vulnerable at the time of the damage. Check new growth. Don’t worry about the bad looking older leaves as long as new growth looks good and vigorous.

- **Edema (Abiotic). Symptoms-Bubbling, corkiness on leaf undersides, often along veins**

Tomatoes can be susceptible to this abiotic disorder. It typically occurs in late winter/spring when temperatures are cool. Plants get watered and don't transpire the water due to cloudy cold conditions. The water builds up in the cells and then bursts. Plants will grow out of edema. Adjust watering and watch weather conditions. Check newest growth to make sure it looks good and symptom-free.

- **Tomato pith necrosis (several soil borne *Pseudomonas* species). Symptoms-Yellowing of young leaves, wilt in tops, split, collapsed or swollen stems often hollow with a ladder or chambered appearance when split in half, often accompanied by lots of adventitious roots. Can resemble bacterial canker. Rule out bacterial canker with a diagnostic lab to be sure.**

This disease is random in the greenhouse and is usually limited to a few plants. Occurs with cool nights, cloudy weather, high humidity and excessive N. Plants often grow out of it as temperatures become warmer.

#### Midseason/late season issues-These are typically infectious diseases and can spread.

Minimizing leaf diseases in high tunnels is all about moisture management. Although sometimes common field fungal diseases (*Septoria* and *Alternaria*/early blight) are found in outer rows exposed to driving rain, these diseases are rare in high tunnels since leaf wetness can be minimized. Although growers avoid some of the field diseases that require leaf wetness, several diseases can become an issue **when humidity is over 85%**, such as gray mold (*Botrytis*), leaf mold (*Fulvia*), powdery mildew (*Oidium*) and late blight, (*Phytophthora*). These fungal diseases are fairly easy to identify:

- **Gray mold (*Botrytis cinerea*) symptoms-Look for brownish/grayish spores covering any part of the plant including leaves, dying flower blossoms or stems. Should be easy to see with the naked eye. On fruit look for white circles called "ghost spots." Can also cause cankers on stems when there is prolonged high humidity and lots of inoculum (spores).**

Gray mold is typically a weak pathogen that attacks dead or dying tissue. This pathogen is ALWAYS present in a high tunnel and can become aggressive if humidity is high and air circulation is poor. Manage by decreasing humidity through venting, opening end walls, rolling up sides, using fans and if necessary, by heating and venting to reduce humidity and condensation at night. Remove infected tissue from the greenhouse. With lower humidity, fungicides should not be necessary and should not be substituted for managing humidity.

- **Leaf mold (*Fulvia fulva*) symptoms-Looks like yellow polka dots on the upper side of the leaf with gray/purplish spores on the leaf undersides. Does not affect fruit.**

This disease typically starts low in the plant where air circulation is poorest. Choose resistant cultivars, prune off lower foliage and remove from the greenhouse and decrease humidity through venting, opening end walls, rolling up sides, fans and if necessary, by heating and venting to reduce

humidity. With lower humidity, fungicides should not be necessary as long as the cultivar is not extremely susceptible to the disease.

- **Powdery mildew (*Oidium neolycopersici*). Symptoms-White coating of spores in patches on leaves. Can also cover stems.**

PM is becoming a more important greenhouse tomato disease. Favored by low light and high humidity. Decrease humidity through venting, opening end walls, rolling up sides, fans and if necessary, by heating and venting to reduce humidity. There is one resistant cultivar, Grace, from DeRuiter's seeds. Fungicides may be necessary to help manage the disease.

- **Late Blight (*Phytophthora infestans*). Symptoms starts as a water-soaked spot, usually higher in the plant. When humidity is high, there will be a white band of spores around the outer edge of the spot on the underside of the leaf. Can attack stems and fruit.**

Very aggressive. Keep humidity low through venting, opening end walls, rolling up sides, fans and if necessary by heating and venting to reduce humidity. When the disease is known to be in the area, fungicides and thorough coverage are necessary to protect crops. Choose resistant varieties. Destroy infected crops.

- **Blossom end rot (Abiotic). Symptoms-Dry brown rot at the blossom end of the fruit**  
Caused by insufficient uptake and translocation of calcium to the fruit. Maintain uniform soil moisture.

**Canker Diseases-Symptoms-if you notice a wilting plant in the greenhouse or scorching (browning on leaf edges) on foliage or on one side of the plant, eliminate the possibility of root rots and look for cankers (dead areas on the stem) that would interrupt the flow of water upwards in the plant.**

- **Bacterial canker (*Clavibacter*)-Typically shows up once there is a fruit load on the plant as wilting or scorching on half a leaf or one side of plant. Look for dark streaking in the vascular system. Contact Diagnostic Lab for confirmation.**

Very destructive, can be easily moved around by pruning, tools. Destroy plants. Buy or hot water treat seeds to kill the bacteria at 122 F for 25 minutes.

- **White mold (*Sclerotinia*)-Fluffy white mold or brown woody dry cankers on stem. Black hardened sclerotia (overwintering structures-looks like mouse droppings) are present when stems are split open.**

May be more likely in wetter spots in greenhouse. Usually very hit or miss in a greenhouse. Cut stem off at soil line and remove and destroy plants so sclerotia are not allowed to drop into the soil.

- **Other canker problems-Gray mold (*Botrytis*) can cause stem cankers when relative humidity and inoculum is high. Late blight (*Phytophthora*) can cause stem cankers.**