# High Tunnel Tomato Diseases

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**January 2023**

https://www.uvm.edu/~htunnel/

## Early Season Diseases and Disorders

Early season problems are often abiotic (non-infectious) disorders. Always check the newest growth to see if the plant is "growing out" of the problem and check root systems to make sure root issues are not causing the above ground symptoms. If new growth looks good and roots look healthy consider these abiotic issues:

Cold damage from air temps or soil temperatures can cause weird leaf spotting/damage, purpling of foliage. Note the picture on the left shows one age of tissue is affected and the new growth looks green and healthy.

(L) Cold damage on older tomato foliage. Photo by A. Hazelrigg (R) Purpling of tomato foliage due to cold temperatures. Photo by A. Gordon.


Ethylene damage-Curling and twisting of foliage occurs quickly due to cracked or poorly vented heater. Plants will grow out of the damage once the heater is fixed. Tomatoes are very susceptible.

**Edema**-Corky lesions appear on leaf undersides, sometimes on upper side or along veins caused by overwatering during cloudy cool weather. New growth should appear fine once conditions have improved.


(L) Edema on leaf undersides of tomato. Photo by G. Brust, UMD (R) Edema on upper leaf surface. Photo by P. Bachi, UKY, Bugwood.org

**Damping off** can be an early season infectious disease caused by several soilborne fungi that attack roots before or after emergence causing wilt, poor vigor and death. These fungi are in all soils and prefer cold, wet conditions. If roots are brown and sloughing off, start over with clean flats and new soil. Heat mats, good sanitation and Rootshield® may help. **Crown rot** shows the same upper plant symptoms as damping off, but roots tend to look ok while the stem at the soil line is constricted or rotted from cool wet soils. Remove infected plants and check emitters for too much water.

Damping off in tomato. Photo by G. McEvoy.

**Tomato pith necrosis** can be another early season infectious disease. Pith necrosis is a bacterial disease caused by *Pseudomonas corrugata*. The disease occurs early in the season in high tunnel tomatoes when humidity is high and night temperatures are cool, and plants are growing rapidly due to excessive levels of nitrogen. The disease is often associated with periods of cloudy, cool weather. Wilting and yellowing of young leaves often appear when the first fruit clusters reach the mature green stage. When cut longitudinally, the center of the stem (pith) may be dark brown/black and hollow. Stems may be thicker with numerous adventitious roots. The bacteria may be seedborne and can survive in infected tomato debris. Prevent pith necrosis by providing good ventilation, keeping humidity levels low and avoiding excessive nitrogen levels. There is no effective treatment for this disease, although affected plants may recover when conditions become warm and sunny.


Tomato pith necrosis. Photo by R. Wick

## Mid to Late Season Diseases and Disorders

**Leafspots caused by** *Alternaria solani* (early blight) or *Septoria* are not typically found in high tunnels since leaf wetness is minimal. However, these diseases can show up in the outside rows where splashing rain enters or if there is a lot of dripping condensation on foliage.

(R) Early blight target lesions. Photo by UF IFAS (C) Alternaria canker. Photo by Texas A & M (L) Septoria leaf spot. Photo by UMD Extension.

Most leaf diseases are related to high humidity. Control by keeping humidity below 85% through fans, rolled up sides, open ends, pruning lower leaves and good plant spacing.

**Botrytis/gray mold**-Prefers high humidity and will attack any dying tissue. Gray mold spores may be visible on the affected parts. Lower humidity and remove dead tissue from the tunnel.

Botrytis/gray mold on fruit, dying stems and dead flowers. Photos by M. McGrath, Cornell.

**Leaf mold**-Prefers high humidity and causes yellow "polka dotting" on the upper leaf surface and gray/purplish spores of the fungus on the leaf undersides. Lower humidity, provide good plant spacing and select resistant cultivars to avoid the disease.

Leaf mold (*Fulvia*) on upper and lower leaf surface. Photos by University of Minnesota Extension

Tomato powdery mildew with white spores. Photo by Dollymoon.

**Powdery mildew**-Specific to tomatoes **only**. White spores of the fungus are visible on the upper leaf surface. It is hard to keep up with the disease if it occurs early in the season.. Inspect transplants so you do not introduce into the greenhouse. Keep new tissue protected with fungicides at first sign of the disease. Organic controls include sulfur, copper, oils (stylet, sesame, rosemary, thyme), plant extracts (Regalia), biocontrol microorganisms (including sp. of *Bacillus a*nd S*treptomyces*) and potassium bicarbonate (Milstop). Fungicides need to be applied weekly to maintain control. The pathogen cannot survive in dead tomato refuse.

**Late blight-** Large patches of dead tissue with spores on the edges are visible when humidity is high. The pathogen does not overwinter in VT and blows in on storm fronts from the south in some years. When disease pressure is high in area fields, high tunnels provide no protection. Subscribe to newsletters/listservs to see if the disease is in the area or go to https://usablight.org/map/ to see the latest reported incidence. Lower humidity and protect plants with copper or conventional fungicides if pathogen is in the area.

(L) Late blight lesion with spores. Photo by I. Meadows (R) Late blight on stem. Photo by M. McGrath, Cornell.

MG deficiency-The symptoms of this common abiotic disorder include interveinal foliar yellowing starting in the lower part of the plant. Common in mid/late season on most high tunnel tomatoes. Prune up to first cluster. No management necessary but Epsom salts can be used.

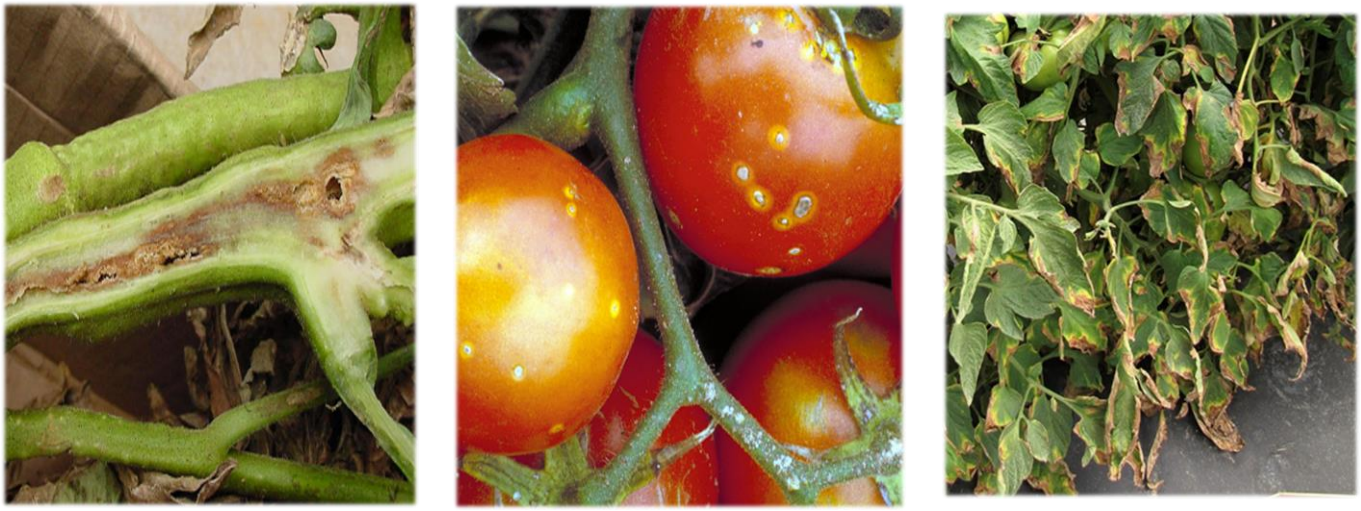
Interveinal chlorosis due to Mg deficiency. Photo by UF IFAS.

Canker Diseases-Symptoms include wilting in tops of plants that typically don't recover during the night. Leaf edge scorch/browning common. Check lower in the plant for cankers. Be aware Botrytis gray mold and Alternaria can cause cankers.

Sclerotinia white mold-Symptoms include fluffy white fungus that is visible lower in the plant, often in wet or poorly drained areas. Black hardened sclerotia able to survive in soils for many years form within or on stems. Cut off plant at base and remove from tunnel and destroy. Improve drainage/air circulation.

(R) Sclerotinia canker at the base of plant. Photo by Ohio State (C) White mold with sclerotia. Photo by R. A. Melanson, Bugwood.org (R) New canker with white mycelia and sclerotia just forming. Photo by A. Hazelrigg.

**Bacterial canker**-Symptoms become apparent usually when the plant is producing fruit unlike pith necrosis which would be early in the season. May see black lesions on the stems, wilting and leaf scorch. Fruit may have raised white spots. Cut into the vascular tissue just under the skin of stem to look for browning. Remove and destroy plant, watch those nearby for development of symptoms. Very easily spread through suckering/pruning, etc. Hot water treat seed.



(L) Brown vascular system due to bacterial canker. Photo by E. Pfeufer, UKY (C) White raised spots due to bacterial canker. Photo by E. Pfeufer, UKY (R) Leaf scorch due to bacterial canker. Photo by M. McGrath, Cornell.

For questions, please contact Ann Hazelrigg at the UVM Plant Diagnostic Clinic

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Plant Diagnostic Clinic

 This material is based upon work supported by the National Institute of Food & Agric., U.S. Dept. of Agric., through the Northeast Sustainable Agric. Research & Education program under subaward number LNE22-445 & the Univ. of VT Extension under the Crop Protection and Pest Management Program [grant no. 2021-70006-35509/project accession no. 1027204]. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agric. & other funding agencies.