Tomato Diseases, Part One: Fungi

"What is wrong with my tomato plants?! I looked at them a couple days ago and they were looking so healthy, and then today…"

Something happened. That "something" could have been fungi, bacteria, a virus, nematodes, or a non-infectious disease…but what should a gardener do? First, *pause* before implementing a "one size fits all" solution. The most effective countermeasure targets the specific agent. In other words, identify and understand the enemy *then* design the proper approach.

This is the first of a three-part series on tomato diseases designed to equip tomato growers with knowledge and strategies to recognize, control and possibly prevent the most common diseases affecting tomato plants in the home garden. This first installment will cover disease caused by fungi, the most common and destructive cause of tomato disease.

Cultural and Chemical Controls

"An ounce of prevention is worth a pound of cure." This proverb holds true when considering cultural practices to prevent tomato diseases. Cultural practices involve selecting disease resistant varieties and disease-free transplants, a proper growing site, irrigation and maintenance techniques, crop rotation and sanitation…all for the purposes of providing optimal growing conditions and disease prevention. OSU Fact Sheet HLA-6431, Cultural Control Practices, explains these recommended techniques.

Not every common disease can be prevented and may require chemical treatment to control. Your OSU Extension Office educators can be a source of recommendation. Please remember to always read the label when using chemicals.

Common Tomato Diseases Caused By Fungi

The diseases caused by fungal infection generally fall into one of three categories: ***Wilts, Blights and Foliar Diseases (Foliar)***, ***Fruit Rots (Fruit)*** and ***Soil Rots (Fruit)***.

Wilts & Blights

Fusarium Wilt ***(Fusarium oxysporum f.sp. lycopersici)***

- Attacks the water-delivery tissue (xylem) of the plant
- Soilborne and seedborne fungus spread by infected transplants and soil movement
- Symptoms start with yellowing and death of lower leaves, progressing up the stem until all foliage dies. May impact just one side of the plant first.
- Grow resistant varieties, rotate crops and seek new varieties to prevent susceptibility to new races of the fungus

Southern Blight *(Sclerotium rolfsii)*

- Over 200 host species of plants, including tomatoes, are affected by southern blight.
- Entire plant wilts quickly and soil-line lesions turn brown then grow white mold (mycelium)
- Seedy-brown, round fruiting structures (sclerotia) accompany white mold and are strong identifiers of southern blight.
- High numbers of sclerotia can develop in soil with repeated cropping
- Rotate crops and replace with non-susceptible crops to reduce numbers of sclerotia
- Fruit contacting infested soil can develop a yellowish lesion, causing the fruit to collapse with a mass of similar evidence of white mold and sclerotia present
- Difficult to control, so fungicide may be necessary

Southern blight (Athelia rolfsii) by University of Georgia Plant Pathology, Bugwood.org is licensed under CC 3.0.

Early Blight *(Alternaria solani)*

- All parts of the plant are affected; leaves, stems and fruit
- Spores live in the soil and are spread by irrigation splash and supported in high humidity conditions
- Older leaves infect first with large brown concentric circle spots, then continue to turn brown and drop from plant
- On younger plants, look for brown cankers girdling stems and lesions on one side of stem in older plants
- Defoliation exposes fruit to sunscald and rot; target-like lesions on stem end of fruit
- Crop rotation (non-nightshade family), drip irrigation and fungicide spray program recommended

Early blight (Alternaria solani) by Yuan-Min Shen, National Taiwan University, Bugwood.org is licensed under CC BY-NC 3.0

Late Blight *(Phytophthora infestans)*

"tomato_late_blight_leaf_sporulating_lesions_1" by Plant pests and diseases is marked with CC0 1.0.

- All parts of the plant are affected; leaves, stems and fruit
- Occurs in cooler, wet conditions on early or late tomato crops; cool nights and warm days <86℉.
- Upper surfaces of leaves exhibit greasy gray spotting, fruit spots are brown.
- Look for white mold on edges of spotted areas as leaves wilt and die and fruit rot.
- Fungus spreads from infected potato seed tubers and dead vines by wind and affects tomato transplants
- Grow tomatoes and potatoes separately and clear or destroy previous crop waste
- Use only certified disease-free transplants and potato seed
- Drip irrigation and fungicide spray program is recommended.

Other Foliar Diseases

Septoria Leaf Spot *(Septoria lycopersici)*

"Tomato (Solanum lycopersicum): Prob. Septoria leaf spot caused by Septoria lycopersici" by Plant pests and diseases is marked with CC0 1.0.

- Common foliage disease in Oklahoma spread by splashing rain and supported by high humidity and moderate temperatures
- Disease affects leaves and stems only
- Look for progress from small yellow leaf spots on lower leaves, growing circular, no larger than ⅛", with gray centers, dark borders and a yellow halo
- Plant defoliation from bottom up, exposing fruit to sunscald
- Proper sanitation necessary to clear previous infested crop waste
- Symptoms occur spring through fall due to multiple generations
- Crop rotation, weed control to clear other hosts helps control spread
- Drip irrigation and fungicide spray program is recommended.

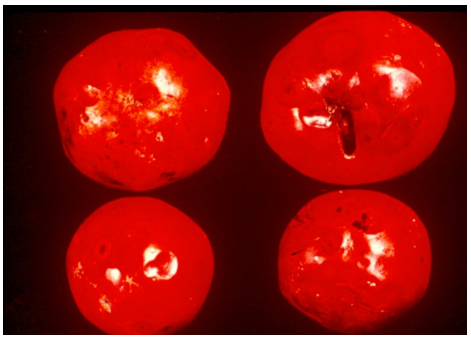
Gray Leaf Spot *(Stemphyllium solani)*

- Disease affects leaves only, oldest leaves first
- This common foliage disease in Oklahoma is encouraged by high humidity, warm temperatures and heavy fruit loads.
- Look for brownish-black leaf flecks that develop larger and on both sides of the leaf.
- As the spots grow, the centers disintegrate leaving a holey appearance, then turn yellow and drop.
- Symptoms very similar to Septoria leaf spot.
- Utilize resistant varieties, proper sanitation, drip irrigation and fungicide recommended for control

Fruit Rots

Anthracnose ***(Colletotrichum phomoides)***

- Small circular spots on ripe fruit appear, grow up to ½" in diameter, and blacken
- Symptoms show only on ripened fruit, although green fruit are already infected
- Fruiting structures (sclerotia) develop in the centers of spots and survive in soil up to three years
- High numbers of sclerotia can develop in soil with repeated cropping, so rotate crops at least every three years to reduce continued infection risk
- Harvest fruit timely, dispose of plant waste and use drip irrigation to avoid splash spread
- Regular fungicide fruit application may be necessary



"Tomato: Anthracnose (Colletotrichum phomoides)" by Plant pests and diseases is marked with CC0 1.0.

Soil Rots

When fruit is close or in contact with the soil in warm, humid or in soil-splashing situations, fruit rot may occur when the below listed fungi are prevalent in the soil.

Controls for the below fungal infections include:

1. Staking or trellising tomatoes to avoid fruit-to-soil contact
2. Planting tomatoes in well drained soil
3. Using plastic or organic matter mulch to provide fruit-to-soil barrier
4. Drip irrigation (avoid overhead watering to control splash)
5. Fungicide program with full fruit coverage

Buckeye Rot ***(Phytophthora nicotianae)***

- Gray, greenish or brownish water-soaked spots occur with fruit-to-soil contact, quickly enveloping the fruit with a brown concentric circular rot pattern, similar to a buckeye chestnut. Green and ripe fruit are affected.

Southern Blight ***(Sclerotium rolfsii)***

- Lesions from fruit-to-soil contact are yellow and sunken. Fruit collapses after 72 hours, when white mold becomes apparent where the fruit contacted the soil.

Pythium Rot (*Pythium* spp.)

- A water-soaked lesion appears where soil and fruit contact, and progresses to rot the fruit within 72 hours. Look for cottony growth in rotted areas.

Rhizoctonia Soil Rot ***(Rhizoctonia solani)***

- Light and dark brown banding on fruit is the symptom of rhizoctonia soil rot. Firm fruit eventually becomes mushy as the rot progresses.

Until Next Time...

Until next month's installment, observe your tomatoes often for foliar and fruit disease, and consider the control strategies discussed, including:

- Using disease resistant and certified disease-free seeds and transplants
- Drip irrigation vs. overhead watering
- Proper or alternative mulching products to prevent fruit-to-soil contact
- Trellising and caging to lift fruit from soil
- Crop rotation to lower risk of spread and perpetuating disease
- Fungicide treatment programs: foliar and/or fruit coverage, depending on agent

Knowing which agents are affecting your tomatoes will dictate the treatment program. Your OSU Extension Office is always available for diagnostic guidance. More information and photographs for each of these diseases can be found at the links at the end of this article.

This concludes **Tomato Diseases, Part 1: Fungi**, but this is just the beginning of our three-part tomato disease series. Come back next month for **Part 2: Bacteria, viruses, and nematodes**!

Part 1 Resources:

OSU Fact Sheet EPP-7625: Common Diseases of Tomatoes: Part 1 Fungi
OSU Fact Sheet L-492: 2021 Tomato Variety Suggestions
OSU Fact Sheet HLA-6431, Cultural Control Practices
Cornell University: Disease-Resistant Tomato Varieties
OSU Fact Sheet HLA-6032: Vegetable Varieties for the Home Garden in Oklahoma
OSU Plant Disease and Insect Diagnostic Laboratory