



Foliar Diseases of Cucurbits

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INTRODUCTION

Vegetables in the cucurbit family include cucumber, gourds, muskmelon (cantaloupe), summer squash, winter squash, and pumpkin. The following diseases primarily affect the foliage of these crops and can result in losses in commercial fields and home gardens.

ALTERNARIA LEAF BLIGHT

Alternaria leaf blight is found primarily on watermelon and muskmelon, but may occur on cucumber, gourds, pumpkin, and squash. This disease affects foliage and sometimes fruit.

Symptoms

Disease symptoms first appear on older leaves as small necrotic spots that may be surrounded by a yellow halo (FIGURE 1). These lesions expand to form large brown spots with a concentric ring pattern. Expanding lesions may merge to form large, blighted areas. As symptoms progress, leaves curl and die, leading eventually to plant decline.

Cause and Disease Development

Leaf blight is caused by *Alternaria cucumerina*. This fungus overwinters as a saprophyte on decaying crop debris in the soil. It is spread from plant to plant when conidia



FIGURE 1. ALTERNARIA LEAF BLIGHT ON MUSKMELON LEAVES.

are carried by wind and splashing water from diseased plants to susceptible tissues. Germinating spores can penetrate the host directly, as well as through wounds and natural openings. Wet conditions and warm temperatures favor disease development.

Disease Management

- Rotate out of cucurbits for at least 3 years.
- Follow good sanitation practices, such as cleaning up crop debris at the end of the growing season.
- Plant muskmelon cultivars that have some level of resistance; newer varieties are believed to be somewhat more resistant to *Alternaria* leaf blight than older, traditional cultivars.
- Apply fungicides that are registered for controlling this disease.

ANGULAR LEAF SPOT

This bacterial disease primarily affects cucumber, but it may occur on muskmelon, squash, pumpkin, and watermelon.

Symptoms and Signs

Infected leaves develop small, water-soaked spots (lesions) that later enlarge. The shape of older lesions tends to be angular as they enlarge and encounter veins (FIGURE 2). Under very humid conditions and warm temperatures, white bacterial ooze may be found on the undersides of lesions. Stems and fruit may develop water-soaked spots and necrosis.



FIGURE 2. ANGULAR LEAF SPOT.

Cause and Disease Development

Angular leaf spot is caused by *Pseudomonas syringae* pv. *lachrymans*. This bacterium can overwinter in seed and on diseased plant material left in the field. The pathogen is disseminated by splashing rain, wind-blown rain, windblown soil, insects, farm equipment, and field workers. Infection occurs through natural openings and wounds. The disease is favored by warm temperatures and high humidity.

Disease Management

- Purchase and plant only pathogen-free seed of resistant varieties.
- A hot water treatment can be used for cucumber seed.
- Rotate to a non-host for at least 2 years.

- Manage irrigation systems to minimize leaf wetness and soil splash.
- Avoid working in fields when plants are wet.
- Proper ventilation is important in managing this disease in greenhouse production.
- Applications of fixed copper may help protect plants when conditions are favorable for disease.

ANTHRACNOSE

Anthracnose is most common on cucumber, muskmelon, gourds, and watermelon; it may also occur on squash and pumpkin. Losses in storage or shipment can occur when freshly harvested fruit becomes infected.

Symptoms and Signs

All above-ground plant parts are susceptible. Small, circular lesions develop initially on leaves; these enlarge to form large tan-to-brown spots that may coalesce to create extensive blighting. The centers of older lesions may crack or fall out entirely. Stem lesions are tan-brown, somewhat elongated, and sunken. Leaf lesions tend to be smaller, irregularly-shaped, and darker in color on watermelon. On maturing fruit, lesions appear as small, circular, sunken areas which may grow to the size of a quarter or larger on melons. Fruit lesions on watermelon can be cracked and irregularly shaped. Under humid conditions, lesions will blacken and salmon-pink masses of spores may be seen.



FIGURE 3. ANTHRACNOSE SYMPTOMS ON CUCUMBER LEAVES.

Cause and Disease Development

The pathogen, *Colletotrichum orbiculare*, is a soil-borne fungus which survives between crops in disease residue and cucurbit seed. Spores (conidia) released in the spring infect susceptible tissues during wet, warm weather. Spores are spread from plant to plant by splashing water, cultivating equipment, field workers, and insect activity.

Disease Management

- Plant pathogen-free seed of resistant varieties (watermelon – races 1 and 3; cucumber – races 1, 2, and 3).
- Practice crop rotations with unrelated crops for at least 2 years.
- Follow good sanitation practices, such as cleaning up crop debris at the end of the growing season.
- Manage irrigation to minimize leaf wetness, avoiding overhead irrigation when possible.
- Apply fungicides registered for controlling this disease.

DOWNY MILDEW

Downy mildew is a common disease that occurs on most cucurbits. It is an aggressive, fast-moving disease that is very difficult to manage once it gets started.



FIGURE 4. DOWNY MILDEW SYMPTOMS ON THE UPPER SURFACE OF CUCUMBER LEAVES.



FIGURE 5. DOWNY MILDEW SYMPTOMS AND SIGNS ON THE UNDERSIDE OF CUCUMBER LEAVES.

Symptoms and Signs

Symptoms first appear as pale-to-bright yellow spots on the upper surface of leaves (FIGURE 4) in the crown area of the plant. Leaf spots are irregular or "blocky" in appearance and tend to be limited by leaf veins. As lesions expand and the number of lesions increases, leaves become necrotic and plants will appear scorched. On the undersides of leaves, lesions will be water-soaked and slightly sunken. A profuse sporulation (light-to-dark gray or even purple in color) will be evident as a fuzzy or "downy" growth on lower leaf surfaces when humidity is high (Figure 5). As downy mildew progresses, infected leaves will take on a scorched appearance.

Cause and Disease Development

Downy mildew is caused by the fungus-like organism, *Pseudoperonospora cubensis*. Primary infections result when spores are blown in from overwintering sites further south. Although downy mildew is more common in wet weather, fogs and heavy dews can contribute enough moisture to allow infection during "dry" weather. Secondary infections occur when spores are moved via air currents or rain splash to susceptible tissues.

Disease Management

- Use resistant cultivars when possible (primarily cucumber).
- Avoid overhead irrigation.

- Plant in sunny sites with good airflow.
- Follow a preventative spray program using fungicides registered for this disease.

POWDERY MILDEW

Powdery mildew can affect all cucurbits. This disease normally does not appear in Kentucky until near the middle of the growing season, so it generally has little impact on early cucumber production. Muskmelons and pumpkins, on the other hand, have a longer growing season and are damaged when powdery mildew infections reduce fruit quality. Powdery mildew is also an important disease of cucumbers in greenhouse culture.

Symptoms and Signs

Powdery mildew first appears as talc-like colonies on the upper (Figure 6) and lower surface of leaves that are older or on shaded portions of the plant. As the disease progresses, the entire leaf surface will be colonized by the fungus. Severely infected leaves become yellow and then necrotic; these leaves die within a short period of time and may result in large-scale defoliation. Powdery mildew is most severe after fruit-set and in densely planted fields. Symptoms and signs can also develop on stems and fruit.

Cause and Disease Development

The causal fungus, *Podosphaera xanthii* (formerly called *Sphaerotheca fuliginea*) overwinters in crop residue and perennial weeds. The fungus produces two spore types: the white powdery spores present on the plant surface are conidia and those produced in tiny round fruiting bodies (cleistothecia) are ascospores. Conidia are carried from plant to plant or field to field by air currents. Unlike many fungal diseases that require leaf wetness for infection, moisture on plant surfaces actually inhibits



FIGURE 6. POWDERY MILDEW GROWTH ON PUMPKIN FOLIAGE.

the powdery mildew fungus. High humidity, however, is required for infection.

Disease Management

- Plant resistant varieties when available (cucumber, muskmelon, and pumpkin).
- Apply fungicides at the very first sign of disease.

ADDITIONAL RESOURCES

- Home Vegetable Gardening in Kentucky, ID-128
<http://www.ca.uky.edu/agc/pubs/id/id128/id128.pdf>
- IPM Scouting Guide for Common Problems of Cucurbit Crops in Kentucky (2009)
<http://www.ca.uky.edu/agc/pubs/id/id91/id91.pdf>
- Vegetable Production Guide for Commercial Growers, ID-36
<http://www.ca.uky.edu/agc/pubs/id/id36/id36.htm>

Reviewed July 2019

Photos by : Kenny Seebold (figs. 1, 4, 5 & 6), John Hartman (fig. 3), University of Kentucky; and Clemson-USDA CES, Bugwood.org (fig. 2)