College of Agriculture, Food and Environment
Cooperative Extension Service

Plant Pathology Fact Sheet **PPFS-VG-27**

Cucurbit Downy Mildew in Kentucky

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Importance

Cucurbit downy mildew is the most economically important disease of cucurbits in Kentucky. All cucurbits, including cucumber, cantaloupe, summer and winter squashes, pumpkin, and watermelon are susceptible to downy mildew. This foliar disease can affect homegrown cucurbits, as well as commercial field plantings and greenhouse plants.

The cucurbit downy mildew pathogen does not survive Kentucky's harsh winter conditions, so this organism moves into the Commonwealth each growing season from its overwintering sites in southeastern states. The date of this arrival and weather conditions favorable for disease development determine the extent of economic impact. If disease occurs early in the season, risks for yield loss are higher.

Symptoms

Cucurbit downy mildew is a foliar disease. Symptoms first appear as pale or bright yellow spots on upper leaf surfaces (Figure 1A), particularly older leaves. Over time, spots become irregular, angular, or "blocky" in appearance, delimited by leaf veins. Spots spread throughout the plant and quickly develop into necrotic (dead) lesions (Figure 1B).

On the undersides of leaves, lesions may exhibit a slightly water-soaked appearance directly under the symptoms present on upper leaf surfaces. During periods of high humidity, lesions on the underside of leaves may develop a dark gray to purple, downy like appearance (Figure 2).

Under optimal conditions for disease, cucurbit downy mildew results in defoliation and complete plant death in a matter of days (Figure 3). Cucurbit fruit are not infected by the pathogen, but yield will decline due to leaf loss and the resulting reduction in photosynthesis. Risk for sunscald is also increased. Weak and damaged fruit have shortened shelf-life.

Figure 1. Symptoms of cucurbit downy mildew begin as pale to bright-colored yellow spots that become irregular and blocky (**A**). Spots spread throughout the plant and develop into necrotic lesions (**B**).

Figure 2. Under humid conditions, dark gray or purple sporulation may be observed on the undersides of leaves.
Figure 3. Cucurbit downy mildew can quickly advance through a planting, resulting in defoliation and plant death.

Cause & Development

Cucurbit downy mildew is caused by the water mold (fungus-like) pathogen, *Pseudoperonospora cubensis*. Living plant material is required for the pathogen to complete its life cycle, and since cucurbit host plants cannot survive Kentucky winters, neither can the pathogen. The downy mildew organism, therefore, can only overwinter in warmer locations in southeastern states. In summer months, spores are blown northward on wind currents or in storms.

Arrival of these spores can vary greatly from year to year, depending upon frequency and intensity of storms and other wind patterns. Winds coming from directions with confirmed reports of the disease can aid in spread. Disease is favored by rainy, humid conditions (relative humidity greater than 85%) and cool temperatures (between 60°F and 70°F). Cucurbit downy mildew can spread extremely rapidly during optimal conditions.

Disease Management

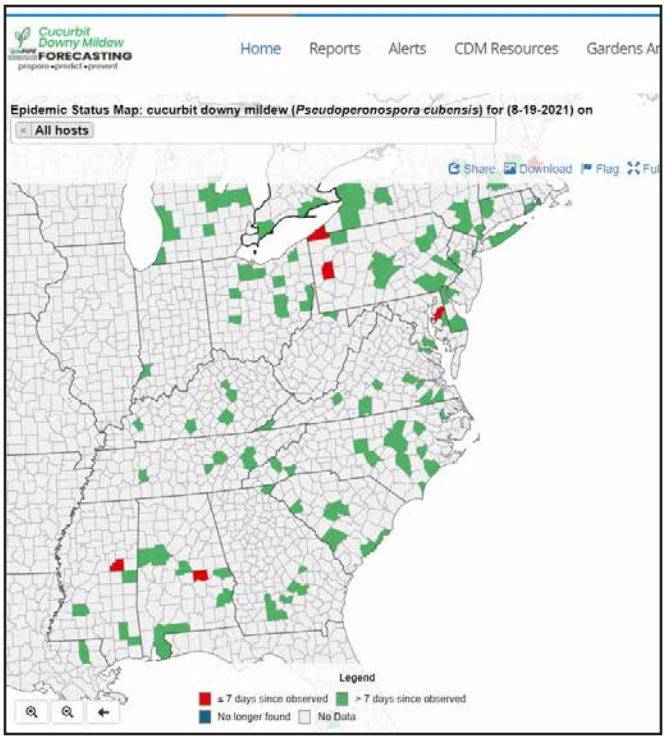
Disease Tolerance

Currently, only certain varieties of cucumber carry resistance to cucurbit downy mildew. Residential and commercial growers should plant cultivars that have high or partial resistance (tolerance) to the disease when possible. Consult the latest version of the *Vegetable Production Guide for Commercial Growers* (ID-36) or a local county Extension agent for information on cultivar selection.

Figure 4. The ipmPIPE Forecast Center website provides current information regarding the risk and spread of cucurbit downy mildew. Growers can sign up for free alerts to aid in making management decisions.

Disease Monitoring

Incidence of cucurbit downy mildew is documented and monitored by the ipmPIPE Forecast Center. The Cucurbit Downy Mildew Forecasting page of the IPM pipe website (https://cdm.ipmpipe.org/) provides information to growers regarding the spread and risk of cucurbit downy mildew (Figure 4). Cucurbit growers can sign up for free e-mail or text alerts to keep up-to-date on the proximity of downy mildew to their individual farm. After receiving an alert, growers can determine their farm's forecasted risk for the pathogen's arrival. Management decisions should be based on the risk for disease development as provided by these alerts.



Cultural Practices

- Plant in sunny areas with good airflow to promote leaf drying.
- Use recommended plant spacing to facilitate air movement and leaf drying.
- Manage weeds to increase air circulation.
- Avoid overhead watering to reduce leaf wetness.

Sanitation

Scout plants for the presence of disease when infection risk is high. If cucurbit downy mildew is found, remove and destroy all aboveground portions of infected plants as soon as possible to limit additional spread.

Chemical Management

Fungicides typically work best when applied preventatively, before infection by the pathogen. Maintaining a preventative fungicide spray schedule will help reduce incidence of disease. Chemical application schedules are based on disease risk. Growers can identify individual risk levels by using the Cucurbit Downy Mildew Forecasting page and/or contacting their local Extension agent for further assistance. Commercial growers should consult the *Vegetable Production Guide for Commercial Growers* (ID-36) for additional information on fungicides.

Follow all label directions when applying fungicides to crops. In particular, pay close attention to pre-harvest intervals.

Additional Resources

- Cucurbit Downy Mildew Forecasting IPM PIPE Website
https://cdm.ipmpipe.org/

- Home Vegetable Gardening in Kentucky (ID-128)
http://www2.ca.uky.edu/agcomm/pubs/id/id128/id128.pdf

- IPM Scouting Guide for Common Problems of Cucurbit Crops in Kentucky (ID-91)
http://www2.ca.uky.edu/agcomm/pubs/id/id91/id91.pdf

- Post-harvest Disease Losses in Fruit & Vegetable Crops (PPFS-GEN-24)
https://plantpathology.ca.uky.edu/files/ppfs-gen-24.pdf

- Sustainable Disease Management of Cucurbit Crops in the Home Garden (PPFS-VG-19)
https://plantpathology.ca.uky.edu/files/ppfs-vg-19.pdf

- Vegetable Integrated Pest Management Scouting Guides Website
https://veggiescout.ca.uky.edu/

- Vegetable Production Guide for Commercial Growers (ID-36)
http://www2.ca.uky.edu/agcomm/pubs/id/id36/id36.pdf

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