



## POWDERY MILDEW OF CUCURBITS

Powdery mildew, caused by the fungi *Podosphaera xanthii* (syn. *Sphaerotheca fuliginea*) and *Erysiphe cichoracearum*, is one of the important diseases of cucurbits in the Midwest. It occurs in greenhouse and field in most areas of the world. All cucurbits are susceptible to powdery mildew, but symptoms are less common on some crops (e.g., cucumber and melon) because many commercial cultivars have resistance. Premature senescence of infected leaves can result in reduced market quality because fruit become sunburnt or ripen prematurely or incompletely. Powdery mildew infection predisposes plants to other diseases. Physiological races of the pathogens have been identified.



Figure 1. Powdery mildew on a pumpkin vine and fruit stem.

Powdery mildew in Illinois is most common and destructive toward end of the season (August and September) in commercial pumpkin and squash fields. The greatest loss occurs when day temperatures and humidity are relatively high, nights are cool, air circulation is poor, and moisture occurs as heavy dews instead of moderate to heavy rains. Yield losses up to 40% have been recorded in experimental plots.

### Symptoms

Powdery mildew is diagnosed by white, powdery mold on plant tissues. Powdery fungal growth develops on both leaf surfaces, petioles, and stems. The disease first appears on lower stems and petioles (Figure 1). As the disease continues to develop, the white, moldy spots occur on the underside of leaves (Figure 2), then on the upper leaf surfaces (Figure 3). Yellow spots may form on the upper leaf surfaces opposite to powdery mildew colonies on the underside of leaves. Severely infected leaves gradually turn yellow, then wither, die, and finally become dry and brittle. Under favorable conditions the causal fungus may reproduce so rapidly that an entire field may appear white within a week to ten days.

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## Disease Cycle

The primary inoculum is believed to be airborne conidia dispersed over long distances, from greenhouse grown cucurbits, or alternate hosts. Conidia are believed to be blown northward from southern states during the spring and early summer. Also, the primary inoculum could come from cleistothecia. Cleistothecia, produced in the late growing season, are small, dark structures with thick wall and contain sexual spores (ascospores). The causal fungi are obligate parasites and therefore cannot survive in the absence of living host plants, except as cleistothecia.

Powdery mildew develops quickly under favorable conditions (dense plant growth, low-intensity light, high relative humidity). High relative humidity is favorable for infection and conidial survival; however, infection can take place in as low as 50% relative humidity. Dryness is favorable for colonization, sporulation, and dispersal of conidia. Rain and free moisture on the plant surface are unfavorable for these fungi. However, disease development occurs in the presence or absence of dew. The time between infection and symptom appearance is usually 3-7 days, and a large number of spores can be produced in this time. Infection can occur at 50–90°F (10–32°C).



*Figure 2. Powdery mildew lesions on underside of a pumpkin leaf.*

## Control

Powdery mildew can be managed effectively by planting resistant cultivars and application of fungicides. Resistance in the plants is usually partial and may require additional complementary control practices. Fungicide application is a common control practice of powdery mildew. Plants should be inspected weekly beginning fruit set initiation and sprayed with fungicides at the first sign of disease. To accomplish effective control of powdery mildew, good fungicide coverage is needed on the undersides of leaves and inside the canopy. Spray volume of 50 gallons or more, applied with a pressurized sprayer, should provide a good coverage of the canopy. To minimize the potential of resistant development in the pathogens, systemic fungicides should be applied with contact fungicides and application of systemic fungicides with different modes of action should be alternated. There are several contact and systemic fungicides available that effectively control powdery mildew in Illinois. For the update information on control of cucurbit powdery mildew, especially fungicide applications, refer to the Midwest Vegetable Production Guide for Commercial Growers, publication C1373 (<http://www.btny.purdue.edu/pubs/id/id-56/>).



*Figure 3. Powdery mildew on upper surfaces of pumpkin leaves.*