

POWDERY MILDEW OF CUCURBITS

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Powdery mildew, caused primarily by the fungus *Erysiphe cichoracearum*, may attack all vine crops or cucurbits. The vegetable crops most commonly affected are cucumber, gourds, muskmelon (cantaloupe), pumpkin, and squash. At times watermelon fruit, citron, vegetable marrow, West Indian gherkin, and other seldom-grown vegetables may become infected.

Other strains of the causal fungus infect about 300 other plants. Fortunately, the fungus strain that attacks cucurbits does not attack other crops.

The strain of *Erysiphe cichoracearum* that attacks cucurbits is further subdivided into physiological races. Plant breeders have successfully bred powdery mildew-resistant muskmelons only to have new races of the fungus develop that are capable of producing disease on these new varieties. The battle to "keep ahead" of this fungus is an ever-continuing one.



Figure 1. Powdery mildew on cucumber leaf in greenhouse (Courtesy R.C. Rowe).

Powdery mildew in Illinois is most common and destructive near harvest in commercial pumpkin and squash fields and on greenhouse-grown cucumbers. 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 may approach 10 to 20 percent where control measures are not practiced.

Symptoms

Powdery mildew appears first in midsummer on the leaves as small, circular, talcum-like spots that later expand and may merge. A superficial, powdery, white to dirty-gray fungus growth later covers part or all of the upper leaf surface, petioles, and young stems (Figure 1). The powdery to mealy growth may also appear on the underleaf surface and uncommonly on the fruit. Leaves 16 to 23 days after unfolding are more susceptible to infection than younger or older leaves. Severely infected leaves gradually turn yellow, then wither, die, and finally become dry and brittle. Vines are weakened and generally yellowish. Premature killing of the foliage results in fruit of poor quality and unfit for processing. Such fruit may be malformed, sunburned, may ripen prematurely, have poor flavor and texture, and low-soluble solid levels. Under favorable conditions the causal fungus may reproduce so rapidly that an entire field may

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appear white within a week to ten days.

Disease Cycle

During warm, humid weather the powdery mildew fungus may produce over 2 million microscopic spores (conidia) on a square inch of leaf surface within a week or ten days (Figure 2). These spores, which are borne in chains, may be blown many miles in mild, moist air to infect vine crops. Thrips and other insects and farm equipment may disseminate the spores locally from leaf to leaf and from plant to plant.

The normal period between infection and the appearance of symptoms is from 3 to 7 days, or longer if weather conditions are unfavorable for the fungus. Infection and production of conidia occur most readily at about 81°F (27°C). The minimum and maximum temperatures are 50° and 90°F (10° and 32°C), respectively. The powdery mildew fungus is influenced greatly by plant age, humidity, and temperature. The fungus can reproduce under quite dry conditions with infections taking place with a relative humidity as low as 46 percent. The incidence of infection increases as the humidity rises to 90 percent or more, but does not occur when the leaf surface is wet.

In Illinois, the causal fungus is presumed to overwinter in crop and weed refuse. More important sources of infection may be spores produced on greenhouse vine crops or on cucurbits and perennial or other hosts grown in the field in frost-free areas of the far south during the winter. The spores are believed to be blown northward during the spring and early summer.

Control

The principal control measures are the use of fungicides and the growing of resistant varieties.

1. Apply a recommended fungicide starting when powdery mildew is **first** seen, often on the shaded undersurface of crown leaves. Repeat the spray application in 7 to 14 days. Several sprays may be needed. Thorough coverage of the foliage is essential. Spray programs for vine crops are given in Report on Plant Diseases No. 900, Controlling Diseases in the Home Vegetable Garden (currently being revised), and University of Illinois Extension Circular C1356 (revised annually). Follow the manufacturer's directions regarding amounts to use, the interval between the last spray and harvest, and compatibility between fungicides and insecticides.
2. Where practical and possible, plant tolerant or resistant varieties of vine crops recommended for growing in Illinois. For more information refer to Illinois Circular C1356, Midwest Vegetable Production Guide '98 for Commercial Growers, Illinois Agricultural Pest Management Handbook (both revised annually), Illinois Circular 1331, Vegetable Gardening in the Midwest, and the latest Illinois Fruit and Vegetable Research Report. Also consult current seed catalogs and trade publications.
3. Keep plantings free of weeds as long as is practical. Refer to Illinois Circular C1356 (listed above) for current recommendations.
4. Seed treatments and crop rotation have **no** effect on powdery mildew infection.

For information on how and where to obtain the publications mentioned above, contact your nearest Extension adviser.