Dr. Yonghao Li
Department of Plant Pathology and Ecology
The Connecticut Agricultural Experiment Station
123 Huntington Street, P. O. Box 1106
New Haven, CT 06504

Phone: (203) 974-8601
Fax: (203) 974-8502
Email: Yonghao.Li@ct.gov
Website: www.ct.gov/caes

Founded in 1875
Putting science to work for society

POWDERY MILDEW OF CUCURBITS

Powdery mildew is a common fungal disease of cucurbits. Most cucurbit crops including cucumber, squash, zucchini, pumpkin, and watermelon are susceptible to this disease. Impacts of powdery mildew on crop production include reduced photosynthesis, impaired growth, premature senescence, and yield loss. Yields are reduced due to the decline in size or number of fruit. Early death of leaves lowers market quality because fruit become sunburned, do not store well, or lose flavor.

SYMPTOMS AND DIAGNOSTICS

Plants in the field often do not become affected by powdery mildew until fruit initiation. The disease usually starts on the older leaves. First symptoms of powdery mildew are small, circular, white, powdery fungal colonies (mycelia and conidia) on upper leaf surfaces (Figure 1). White colonies can be seen occasionally on the lower surface of leaves and stems. With fungal growth and reproduction, white colonies merge together and cover most of the leaf surface (Figure 2). Severely infected leaves gradually turn yellow, then wither, die, and finally become dry and brittle. Cucurbit fruit are not directly attacked by the pathogen; however, they may be malformed or become sunburned due to early loss of foliage. Severe epidemics of powdery mildew may reduce

Figure 1. Individual white spots (arrow) on the upper leaf surface at early stages of powdery mildew development.

Figure 2. Heavy white powdery growth covering the leaf surface after individual colonies merged together.

both the size and number of fruit.

DISEASE DEVELOPMENT

Powdery mildew of cucurbits is caused by two common fungal pathogens, *Podosphaera xanthii* and *Erysiphe cichoracearum*. The primary inoculum of the disease is believed to be airborne conidia dispersed from southern states, or from local areas that have greenhouse-grown cucurbits. Conidia are produced profusely in the white mold and dispersed by wind or air movement to adjacent leaves and plants, as well as to those farther away.

Powdery mildew develops quickly under favorable conditions such as dense plant growth, low light intensity, warm temperatures, and high relative humidity. However, free water on leaf surfaces is not required for spore germination and disease development can occur in the presence or absence of dew. Unlike other fungal diseases, dry weather conditions will not necessarily stop the spread of this disease.

MANAGEMENT

An effective strategy for powdery mildew management should include resistant varieties, proper cultural practices, and applications of traditional fungicides, biorational products, or biological agents.

Resistant varieties: Using genetic resistance is the best and simplest method to control powdery mildew. However, because there are several fungal races of powdery mildew, some resistant cultivars might be susceptible to a specific fungal race or races. Resistant cucumber varieties are 'Alibi,' 'Supremo,' 'Eureka,' and 'Marketmore.' Resistant varieties of squash are 'Sunray,' 'Soleil,' 'Sebring,' 'Payroll,' 'Royal Ace,' and 'Tay Bell PM.'

Cultural practices: Plant cucurbits in a sunny location with good air circulation. Avoid planting new crops next to those that are already infected by powdery mildew. Remove old and heavily diseased leaves to improve air circulation and reduce inoculum.

Fungicide applications: A scouting program is helpful to detect the beginning of the disease so that a fungicide program can be initiated. Since most of the fungicides to control powdery mildew are primarily preventive, they must be applied at very early stages of an epidemic. The fungicides that are registered for use on cucurbits to control powdery mildew in Connecticut include the systemic fungicides trifloxystrobin, azoxystrobin, and myclobutanil, and the contact fungicide chlorothalonil. To avoid developing resistance to fungicides in pathogens and maintaining effectiveness, rotate fungicides in the application program. Since trifloxystrobin and azoxystrobin are in the same mode of action, do not use these two fungicides in the same rotation program. The options for organic vegetable production include products containing potassium bicarbonate, copper, or wettable sulfur, and a biological product containing *Bacillus subtilis* strain QST 713. The fungicide label will contain information on dosage rates, application intervals, days-to-harvest intervals, and safety precautions.

October 2012