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The Connecticut Agricultural Experiment Station
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Grape Powdery Mildew

Pathogen: *Erysiphe necator* a.k.a. *Uncinula necator* (Schw.) Burr

Grape powdery mildew is a major problem on grapevines (*Vitis* spp.) grown in Connecticut. The disease can infect all green tissue of the plant including leaves, young stems, flowers and young developing berries (Figure 1). The fungus grows over the surface of the host tissue, periodically producing special penetrating cells (haustoria or appresoria) through which it extracts nutrients. The infection on leaves reduces photosynthesis and results in yellowing of leaves and eventual defoliation. On stems, the result is reddish brown lesions. Infected berries crack and eventually dry. Serious infection can result in disastrous reduction in fruit yield and quality.

Figure 1. Powdery mildew affects all green parts of the grapevine.

Symptoms. The fungus causes white or off-white colonies on host tissue which expand and eventually cover all tissue (Figure 2).

Figure 2. Powdery mildew colonies spread over grape leaves.

When infection spreads to fruit, the berries at first appear to be dusted with white powder. However, after 5-10 days, the berries turn dark gray, crack and eventually dry out. The cracking of fruit encourages the secondary infection of bunches by other pathogens (Figure 3).

Figure 3. Infected berries crack and dry.

Disease Development. The fungus exhibits two distinct methods of reproduction. Dense colonies form spherical structures (chasmothecia) about 1/250th of an inch in diameter. These structures start off clear but as they mature they become black (Figure 4).

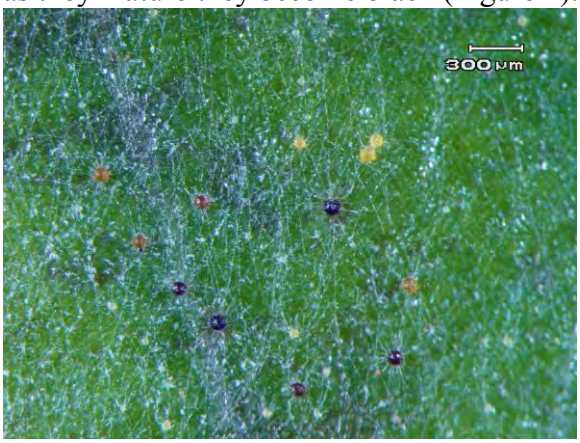

Figure 4. Chasmothecia formed on leaves color as they mature.

As leaves senesce, the chasmothecia fall off infected leaves where they formed. Mature chasmothecia can overwinter on woody plant material such as canes and bark (Figure 5). In the spring, as buds swell and start to grow, a rainfall event of as little as 0.1 inch causes the chasmothecia to release

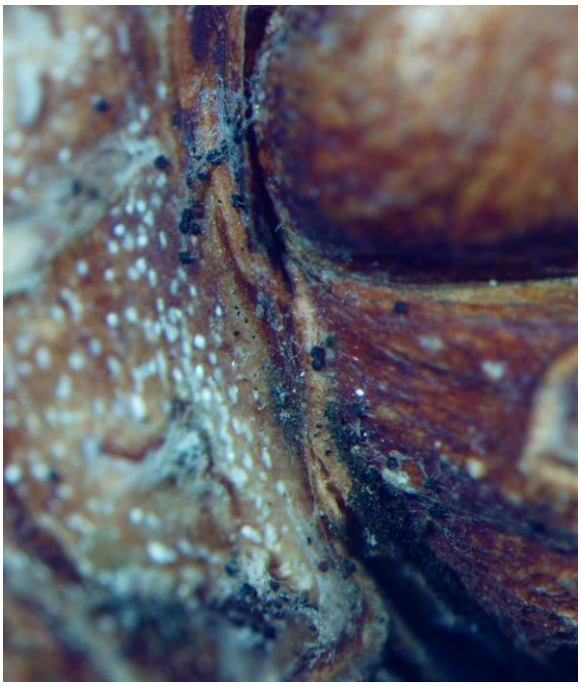

Figure 5. Chasmothecia overwinter on stems.

infective ascospores (Figure 6) that are spread by rain- splash and wind to the new shoots and leaves.

Figure 6. Ascospores are released when mature chasmothecia become wet.

The ascospores germinate and become new circular colonies of the fungus on emerging plant tissue. The fungus spreads over the surface of the plant material and produces conidia in long chains. These asexual spores are easily spread by wind. Many generations of the fungus are produced as the time between infection and conidial production is

between 5-7 days for temperatures between 60F and 80F.

Disease Management.

Cultivar Selection

European cultivars (*Vitis vinifera*) and hybrids bred from this old world stock are particularly susceptible to powdery mildew. American labrusca and riparian hybrids are less prone to injury. This should be kept in mind when choosing varieties to be planted.

Sanitation and Canopy Management

Since the primary infection is carried on last year's wood, it is important to remove all prunings from the vineyard. This reduces the amount of primary inoculum available in the spring. Any practice that improves the health and vigor of the grapevine will reduce the impact of disease. This includes fertilization, removal of dead wood and appropriate weed control. Proper canopy management by cane training and leaf thinning encourages proper air flow and reduces humidity. This practice also allows sprays to penetrate to the developing berries.

Fungicide Application

Fungicide sprays should start when new shoots are 1-2 inches in length and continue every 7-10 days until berries are the size of a small pea. This practice is particularly important for vinifera cultivars. At this point, the berries are immune to further infection, however occasional applications may be necessary throughout the season to protect the foliage. If leaves are attacked later in the season, there can be a substantial reduction in photosynthesis resulting in low sugar content of the harvested fruit.

Fungicides

1. Wettable Sulfur – very effective but can cause phytotoxicity on some cultivars if temperature is above 80F.
2. Potassium Bicarbonate- somewhat effective for light infections.
3. Fenarimol
4. Myclobutanil

The last two chemicals are systemic and highly effective. However, populations of the fungus can become resistant to one or the other fungicide, so alternate spray schemes are recommended.

CAREFULLY READ THE LABEL ON EACH PESTICIDE BEFORE USE !!!