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POWDERY MILDEW OF CHERRY

Powdery mildew of cherry is a potentially destructive disease in eastern Washington. Outbreaks have been reported in California, Oregon, Utah, Michigan, New York, Missouri and Illinois. Severe outbreaks occurred in Washington in 1987 and 1988, resulting in severe financial losses for many growers. The disease is common on cherry foliage, but can also attack developing fruit if rains occur late in fruit development. Although all commonly grown sweet cherry cultivars are susceptible to powdery mildew, in Washington the disease is most severe on Bings. The disease also affects tart cherries.

Pathogen and Symptoms

Cherry powdery mildew is caused by the fungus *Podosphaera oxyacantha*. This fungus most commonly infects young, expanding leaves. The initial symptom of foliar powdery mildew is a light green, roughly circular lesion on either leaf surface. As the infection progresses, a white cotton-like growth develops on the infected area. This white growth consists of fungal threads (hyphae) and numerous asexual spores called conidia. Severe leaf infections can result in leaf curling and/or blistering (Fig. 1), and the leaves become covered with the white, cottony growth (Fig. 2). As the infected leaves and mildew colonies age, minute, black fruiting bodies (cleistothecia) form (Fig. 3). Cleistothecia represent the sexual phase of the fungus life cycle; they are first found on leaves in mid- to late June.

On ripe fruit, powdery mildew appears as a roughly circular, slightly depressed area on the fruit surface, which may or may not contain hyphae as visual evidence of the fungus (Fig. 4). The fungus can be present in small restricted areas, or can cover the entire fruit (Fig. 5). The disease does not spread in storage.

Disease Cycle

The fungus overwinters as cleistothecia either on dead leaves on the orchard floor or in tree crotches, or as cleistothecia trapped in bark crevices. Each viable cleistothecium typically contains eight spores (ascospores) (Fig. 6). In response to moisture provided by irrigation or rain, ascospores are released in early spring beginning at bud burst and are spread by wind to young leaves, where germination and infection can occur. As they represent inoculum originating from the overwintering stage, ascospores are termed primary inoculum. Infections resulting from them are primary infections.

In north central Washington the first mildew colonies generally occur in late April on leaves of sucker shoots (Fig. 7) close to the ground, or on leaves produced on
Fig. 4. Mildew appears as a round, slightly depressed area on fruit, left. Fig. 5. Fungus may cover small areas, or entire fruit, center.

main scaffold branches near tree crotches. The primary mildew colonies eventually produce numerous wind-borne spores (conidia) that infect leaves and developing fruit. Infections from conidia are termed secondary infections. Conidia are produced in the orchard from early May throughout the summer. As mildew colonies on leaves age, numerous cleistothecia form, ensuring a source of primary inoculum for the next growing season.

Control

It is important to realize that infected leaves contain the inoculum that infects and ruins a fruit crop. The key to keeping powdery mildew from fruit is keeping it off the leaves. There is no totally effective prevention or cure, but a number of precautions can be taken to avoid destructive epidemics. First, follow a recommended fungicide spray program. Reports from California indicate that one sulfur application at shuck fall, followed by a second application later, can offer good protection to developing fruit. During rainy years when disease pressure is high, more than two applications will probably be needed. Workers in states that have more effective fungicides registered for use typically make the initial fungicide application when foliar mildew symptoms are evident. However, it is not advisable to use sulfur in this fashion. Sulfur is only a protective fungicide and must be applied before the mildew spores reach the leaves or fruit. Follow cultural practices that promote good air circulation and lower orchard humidities. Keep water from sprinkler systems off developing fruit. Remove diseased sucker shoots (where most of the secondary inoculum is produced during fruit development) about 1 month before harvest.

Consult the current *Pacific Northwest Disease Control Handbook* for specific control recommendations.


**Warning** The law requires that pesticides be used as the label directs. Uses against pests not named on the label and low application rates are permissible exceptions. If there is any apparent conflict between label directions and the pesticide uses suggested in this publication, consult your county Extension agent.

Use pesticides with care. Apply them only to plants, animals, or sites listed on the label. When mixing and applying pesticides, follow all label precautions to protect yourself and others around you. It is a violation of the law to disregard label directions. If pesticides are spilled on skin or clothing, remove clothing and wash skin thoroughly. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock.

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