

Fungal Diseases of Grapevines on Long Island

Introduction: Most grapevines are very susceptible to various fungal diseases. These diseases affect leaves, shoots, and fruit. Leaf diseases can drastically reduce photosynthesis, and, in extreme cases, can cause defoliation. Fungal diseases can render fruit unusable and can very easily cause severe losses in yield.

It is important to distinguish between the three broad categories of grapevines because of differences in susceptibility to fungal diseases. "Vinifera" refers to *Vitis vinifera* varieties, also known as the classic European winegrape: Chardonnay, Riesling, Merlot, Pinot Noir, Cabernet Sauvignon, and Thompson Seedless. "American" refers to species of grapes native to North America, including Concord, Canadice, Einset, Delaware, Catawba, Niagara, and the winegrape Cayuga White. "Hybrid" refers to varieties of grapes that are crosses between vinifera and American grapes: Aurore, Chancellor, De Chaunac, Seyval, Vidal, Vignoles, Melody and the table grapes Interlaken, Himrod, Lakemont, and Romulus.

Botrytis bunch rot: Cooler temperatures, 55° -77°F, and high relative humidity (RH) and/or moisture favor development. The *Botrytis* fungus can infect senescing bloom tissue, then usually remains latent until ripening in August (this period is called veraison). More common is the infection of ripening fruit, especially where there is some type of injury to the fruit (insect sting, bird peck, split, etc.). The fungus produces a tannish gray fuzzy sporulation on berries, which eventually shrivel up into "raisins". After *Botrytis* becomes established, many other types of fungi, bacteria, and yeast can enter, hence the term "bunch rot". A small amount of bunch rot will not ruin wine; however, many growers will drop clusters that are badly infected before harvest. Generally, vinifera are much more susceptible to bunch rot, with the white varieties more susceptible than the reds. Canadice and Romulus are very susceptible. Any tight clustered variety is likely to have *Botrytis* problems. Good air circulation throughout the canopy is critical in controlling this disease.

Black rot: 65° - 85°F is optimum, however, this fungus can germinate over a wide range of temperatures. Moisture is necessary for germination. Leaves are susceptible for about 1 week after they unfold. Lesions are brown and circular; eventually, small black fungal fruiting bodies form within the lesion. Black rot is generally considered an early-season disease since all green tissue is susceptible and fruit is susceptible up until veraison.

Symptoms on fruit usually will occur prior to veraison. Infected berries turn from light brown to dark brown, then shrivel and turn hard and black. The hard black mummies remain firmly attached to the cluster. Tiny black fruiting bodies can also be seen on the shriveling berries and on the hard, black mummies. Infected fruit will contaminate wine. Vinifera are very susceptible to black rot; others generally less so, although Himrod is reportedly very sensitive.

Downy mildew: Fungal germination requires moisture, but will occur under a wide range of temperatures, with around 77°F optimum. Downy mildew infects all tissue with stomata (tiny pores which are used for air exchange). Upper leaf surfaces develop yellowish lesions, while lower surfaces develop a white, downy sporulation, especially along veins. Severe infection leads to defoliation. Infected fruit turn light brown to purple, then shrivel and detach easily. With high RH, white cottony sporulation will occur on fruit. Many grapes are susceptible to downy mildew, with Chardonnay, Riesling, Catawba, Delaware and Niagara highly susceptible.

Phomopsis cane and leaf spot: Moisture and temperatures of 50° -77°F are optimum. Lesions on shoots are most common, although leaves and fruit can become infected. Elliptical lesions develop on the lower part of the shoot. Eventually, the lesions coalesce, resulting in black crusty areas which may cause the shoot to split. On

leaves, lesions begin as light green and irregular in shape. Then they turn black and yellow margins (halos) form around them. Heavy infections cause leaves to become misshapen, turn yellow, and drop off.

Phomopsis infections seem to be less common during the hot weather of the growing season, thus the vine is susceptible primarily early and late in the season. Fruit during ripening and harvest that appears light brown with black pimples is most likely infected by Phomopsis (fruit infected with black rot would be in the small, hard, black mummy stage at this time). At harvest, an advanced infection would leave the berries hard and shriveled; however, unlike black rot mummies, Phomopsis mummies would easily detach from the cluster. Although not a major disease problem, it can potentially become a problem in the future. Many grape varieties are affected.

Powdery mildew: Optimum temperatures are 68° - 77°F with RH anywhere from 40-100%; free water actually inhibits germination. Fungal infection on leaves appears as whitish, powdery covering on upper and lower leaf surfaces. Infected green shoots have brown-black blotches; these are apparent on dormant canes as well. On fruit, the whitish powdery sporulation also appears. Infected berries ripen unevenly and will often split. The fruit is susceptible to infection until veraison. Fruit with powdery mildew should not be used for winemaking. Powdery mildew is a perennial problem on vinifera, hybrid and American grape varieties.

Fungal Disease Management: In most cases, it is impossible to completely eliminate the appearance of fungal diseases. This is especially true in rainy seasons. Vineyards must be managed to minimize the development of diseases.

Management of fungal diseases involves several key concepts:

- Understanding each disease and the conditions that favor it
- Looking for and recognizing each disease so that if it appears, corrective measures can be taken
- Canopy management plays a critical role in minimizing fungal diseases. Good air flow, especially around clusters, will reduce disease pressure.
- Removal of old, infected vine tissue will reduce the amount of overwintering inoculum. The fungus becomes dormant over the winter. It survives in a resting stage in last year's infected fruit and canes. Vineyard sanitation therefore plays an important role.
- Timely fungicide sprays.

For specific control recommendations, home gardeners should contact their local Cooperative Extension.

Prepared by Alice Wise, Viticulture Research Specialist, Cornell Cooperative Extension – Suffolk County, 12/89.

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