

Black Rot of Grapes



Fig. 1. Typical leaf spot symptom from black rot on grape leaves. (Clemson University - USDA Cooperative Extension Slide Series, www.Bugwood.org)



Fig. 2. A black rot lesion on a grape stem. Notice the tiny black pycnidia that have formed in the lesion. (Clemson University - USDA Cooperative Extension Slide Series, www.Bugwood.org)

Introduction: Black rot of grape, *Guignardia bidwellii* (Ellis) Viala and Ravaz, is an important fungal disease in home vineyards on Long Island. It can cause complete crop loss. There is a wide variation in susceptibility to this disease among native American and hybrid cultivars, whereas all common cultivars of *Vitis vinifera* appear to be highly susceptible.

Symptoms and Signs: All green tissues of the vine are susceptible to infection. Relatively small, brown circular lesions develop on infected leaves (**Fig. 1**), and within a few days black spherical fruiting bodies (pycnidia) form within the lesions. Elongated black lesions on the petiole (**Fig. 2**) may eventually girdle these organs, causing the affected leaves to wilt. These lesions may contribute to breakage of shoots by wind, or in severe cases may girdle and kill young shoots altogether.

Infection of the fruit is by far the most serious phase of the disease and may result in substantial economic loss. Infected berries (**Fig. 3**) first appear light or chocolate brown, but quickly turn darker brown, with masses of black pycnidia developing on the surface. Finally, infected berries shrivel and turn into hard black raisin-like bodies that are called mummies.

Disease Cycle and Conditions for Development: The black rot fungus overwinters primarily in mummies within the vine and on the ground, although it also can overwinter for at least 2 years within lesions of infected shoots that are retained as canes or spurs. Spring rains trigger release of airborne spores (ascospores) that form within mummies on the ground and in the trellis, and these can be blown for moderate distances by wind. Spores of a second type (conidia) can also form, both within cane lesions or on mummies that have remained within the trellis, and these are dispersed short distances (inches to feet) by splashing rain drops. Infection occurs when either spore type lands on susceptible green tissue that remains wet for a sufficient length of time, which depends on the temperature. The period during which these

overwintering spores are available to cause infections depends on their source. From mummies on the ground, significant discharge of ascospores begins about 2 to 3 weeks after bud break and is virtually complete within 1 to 2 weeks after the start of bloom. In contrast, mummies within the trellis can continue to release both conidia and ascospores from the early prebloom period through veraison. From overwintering cane lesions, conidia can be dispersed from bud break through mid-summer.

The period of time required for symptoms to appear after the occurrence of an infection period depends on both the temperature and the age of the tissue at the time it's infected. In New York vineyards, young leaves and fruit generally start showing symptoms about 2 weeks after they become infected and the small black pycnidia form within them after another few days. The splash-dispersed spores (conidia) that form within these structures can cause substantial spread of the disease under warm rainy conditions, particularly if berries are still susceptible to infection after conidia develop (see next section below). Most berries that become infected near the end of their period of susceptibility do not show

symptoms until at least 3 weeks later, and the majority do not begin to rot until 4 to 5 weeks after the infection event. These incubation periods should be considered when trying to determine the origin of the unexpected disease problems.

Period of Susceptibility: Young leaves are highly susceptible to the disease as they unfold, but become resistant about the time that they finish expanding. Berries do not become infected while the caps remain attached, but in New York they are extremely susceptible for the first 2 to 3 weeks after cap fall. Susceptibility begins to decline progressively after that time, with Concord berries becoming highly resistant about 4 to 5 weeks after bloom and immune 1 week later. Berries of *V. vinifera* cultivars maintain a reduced level of susceptibility until 6 or 7 weeks after bloom, depending on the season, i.e., age-related resistance develops more quickly in warm seasons.



Fig. 3. Various symptoms of black rot on infected berries. Note the shriveled berries referred to as mummies. (Clemson University - USDA Cooperative Extension Slide Series, www.Bugwood.org)

Management: Black rot should be managed through a combination of cultural and fungicide methods. The success of any fungicide program will be greatly enhanced by sanitation practices designed to reduce inoculum of the black rot fungus, and these may be essential for avoiding losses in vineyards where the disease is a perennial problem.

- It is critical to remove all mummies from the canopy during the dormant pruning process; because such mummies produce spores immediately next to susceptible grapevine tissues through the season, even relatively few can cause significant damage.
- Cultivating beneath the vines near bud break in order to bury mummies will also greatly reduce the number of spores that are released from them, which could otherwise cause infection. This is a very important practice if you have trouble controlling the disease and for those choosing to severely limit or avoid the use of highly effective fungicides.
- As with all fungal diseases, control also is improved by canopy management practices that promote air circulation, speed drying of the leaves and fruit, and improve spray penetration.

In New York research has shown that excellent control can be obtained in most vineyards when fungicides are applied from the immediate prebloom stage through 4 weeks postbloom. However, sprays should start at least 2 weeks prebloom if disease was severe the previous year. Because fruit are most susceptible during the first few weeks after the start of bloom, this is when the fungicidal component of black rot management programs should be focused most strongly.

Contact your local Cooperative Extension for specific fungicide recommendations.

Resource: *Black Rot* (Disease Identification Sheet 102GFSG-DR 2003) by Wayne F. Wilcox, Professor Plant Pathology, Cornell University, NYAES, Geneva, NY. Pesticide recommendations obtained from: *Cornell Pesticide Guidelines for Managing Pests Around the Home*, Cornell University Cooperative Extension, 2014.

The New York State Department of Environmental Conservation (NYSDEC) Bureau of Pest Management maintains a web site with a searchable database for pesticide products currently registered in New York State. Individuals who have Internet access can locate currently registered products at <http://www.dec.ny.gov/nyspad/products?0>.

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