

Controlling Grape Black Rot in Home Fruit Plantings

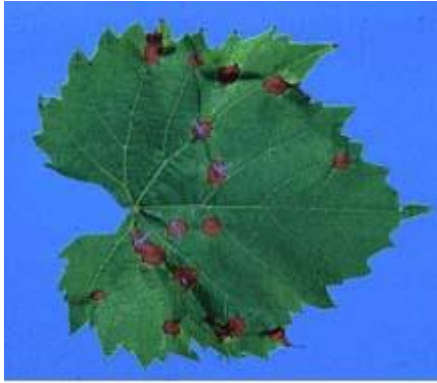
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In order to control any plant disease you must become familiar with the disease and the pathogen in order to control it. It is difficult or even impossible to control most pests and diseases effectively if you do not know any thing about them. The following information is taken from The Ohio Sate University Extension Fact sheet “Grape Black Rot – HYG-3004-08”. It contains a great deal of information that will help you to better understand and control this destructive disease.

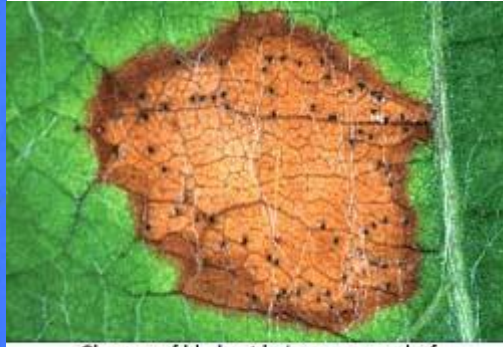
Black rot is one of the most damaging grape diseases in Ohio. All cultivated varieties of grapes are susceptible to infection by the black rot fungus. If not controlled, some or all of the grapes within a cluster will be rotted. The disease is favored by warm, humid weather as is found during the summer throughout most of Ohio. Before good control measures were devised, vineyards along the Ohio River often were hard hit. Grape growers commonly lost most of their crop, and the grape industry was literally driven out of the area.

Symptoms

Symptoms of black rot first appear as small yellowish spots on leaves. As the spots (lesions) enlarge, a dark border forms around the margins. The centers of the lesions become reddish brown. By the time the lesions reach 1/8 to 1/4 inch in diameter (approximately two weeks after infection), minute black dots appear. These are fungal fruiting bodies (pycnidia) and contain thousands of summer spores (conidia). Pycnidia are often arranged in a ring pattern, just inside the margin of the lesions. Lesions may also appear on young shoots, cluster stems, and tendrils. The lesions are purple to black, oval in outline, and sunken. Pycnidia also form in these lesions. Fruit symptoms often do not appear until the berries are about half grown. Small, round, light-brownish spots form on the fruit. The rotted tissue in the spot softens, and becomes sunken. The spot enlarges quickly, rotting the entire berry in a few days. The diseased fruit shrivels, becoming small, hard, black and wrinkled (mummies). Tiny black pycnidia are also formed on the fruit mummies. The mummies usually remain attached to the cluster.



Black rot lesion on grape leaf.



Close-up of black rot lesion on grape leaf. Note the tiny black dots (fungal fruiting bodies) in the lesion.



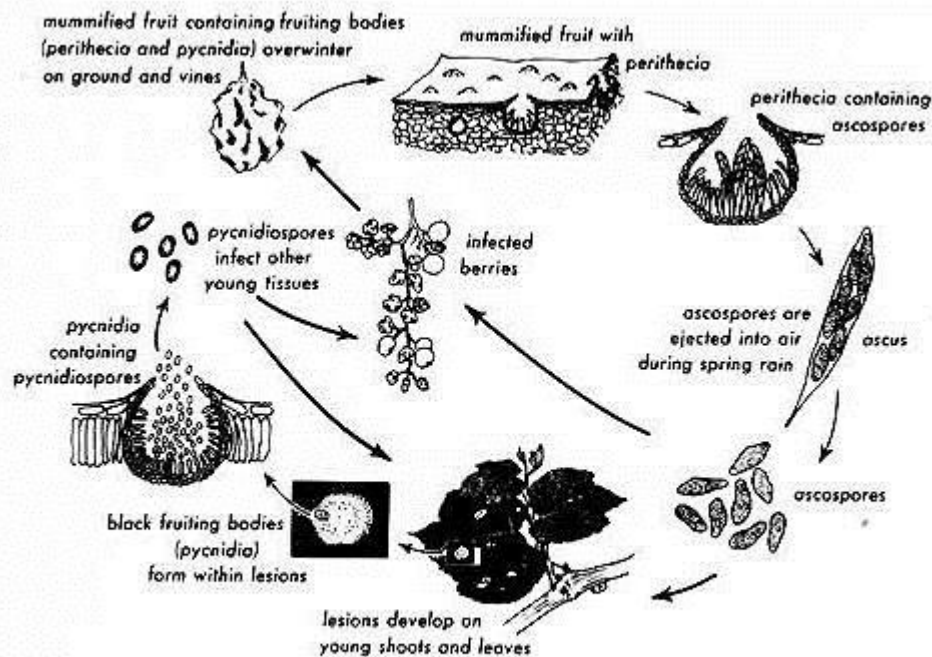
Close-up of grape black rot mummies.



Grape berries infected with black rot. Note the shriveled mummies.

Causal Organism

Grape black rot is caused by the fungus, *Guignardia bidwellii*. Black rot survives the winter in cane and tendril lesions and fruit mummies. In the spring during wet weather, the pycnidia on infected tissues absorb water and conidia are squeezed out. Conidia are splashed about randomly by rain and can infect any young tissue in less than 12 hours at temperatures between 60-90 degrees F. A film of water on the vine surface is necessary for infection (Table 1). A second type of spore, an ascospore, may also be produced in over wintered fruit mummies. Ascospores are forcibly discharged into the air and can travel considerable distances. Research has shown that ascospores are an important source of primary infections in the spring.



Disease cycle of grape black rot.

Control

Black rot can be very difficult to control and there is no one method, including the use of fungicides, that will control it alone. You need to develop and use an integrated disease control program that uses some very important cultural practices combined with the application of effective fungicides. If you think that fungicides alone will provide complete control without the use of cultural practices, you will probably not be successful in controlling this disease. For example, if your vines are located in the shade where they do not dry rapidly, and you do not remove mummies and other infected tissues from the vines during the dormant season, your chances of effectively controlling black rot are not good, even with the use of effective fungicides.

Cultural Practices for control of Grape black Rot

1. Sanitation is extremely important. Destroy mummies, remove diseased tendrils from the wires, and select fruiting canes without lesions. It is very important not to leave mummies attached to the vine. Research has shown that mummies on the ground release most or all of their ascospores before the end of bloom. Mummies left up in the trellis can produce ascospores and conidia throughout the growing season, thus making control of this disease much more difficult. If only a few leaf lesions appear in the spring, remove these infected leaves.
2. Plant grapes in sunny open areas that allow good air movement. If your vines are planted under trees in the shade where they do not get all day sunlight, black rot will be much more difficult to control. Shaded areas keep the leaves and fruits

from drying and provide excellent conditions for black rot infection and disease development.

Using Fungicides to Control Grape Black Rot in Backyard Plantings

Black rot is generally controlled very effectively in commercial grape vineyards largely due to the fact that there are several very effective fungicides that are readily available to commercial growers. For homeowners in certain urban areas it may be difficult to find these fungicides or to find a dealer that will sell you a small quantity of the fungicide. Home owners should realize that there are no “Restricted use Fungicides” and therefore commercial fungicides can be purchased by any one if you can find a place to buy them. This differs from many insecticides and herbicides that are “Restricted Use”, meaning you must have a pesticide applicator's license in order to purchase and apply them. My main point here is that if you are serious about growing black rot free grapes, you may want to consider the use of some of these commercial fungicides.

There are several fungicide products that are marketed specifically for home owners. There are actually very few fungicides in this category that are effective for controlling black rot. In addition, you are not supposed to use a fungicide on grape unless it says “For use on grapes” on the pesticide label. Most homeowner products I have seen do not list grapes on the label. They are mostly for ornamentals, vegetables, lawns or fruit trees. I will mention a couple of home owner products that should be fairly easy to obtain and should do a good job of controlling black rot. Of these products, IMMUNOX FUNGIGIDE” does have grapes on its label. Having said that, I am not aware of any programs or enforcement agencies that are checking to see what home owners are spraying on fruit crops in their back yards.

What Fungicides Are Effective for Controlling Black Rot?

Some Common Fungicides Used by Commercial Grape Growers for Black Rot Control

Protectant Fungicides

Mancozeb, and **Ziram** are all highly effective against black rot. Because these fungicides are strictly protectants, they must be applied before the fungus infects or enters the plant. They protect fruit and foliage by preventing spore germination. They will not arrest lesion development after infection has occurred.

Mancozeb provides an excellent foundation for a protectant spray program for grapes in Ohio. It is a good protectant fungicide that will provide good to excellent control of downy mildew and Phomopsis cane and leaf spot in addition to black rot. The major problem with Mancozeb is a 66-day pre harvest interval (PHI) on grapes. It cannot be applied within 66 days of harvest. Mancozeb is available under many trade names and formulations. Mancozeb would be my protectant fungicide of choice for controlling black rot in the backyard. It is a very common fungicide used a great deal in commercial fruit and vegetable production and should not be that difficult to find. Some common trade names are Manzate 200, Manzate Prostick, Penncozeb, Dithane M45, Dithane F45, and Dithane Rainshield DF.

Ziram is similar in efficacy to Mancozeb. It is highly effective against black rot and provides moderate control of downy mildew and Phomopsis cane and leaf spot.

Sterol Inhibiting (SI) Fungicides

The locally systemic fungicides, Nova (Rally), Elite, and Procure, are highly effective against black rot and will provide some post-infection (curative) activity of the disease if applied at the higher labeled rates within 72 to 96 hours after the initiation of an infection period. Post-infection or curative control must be achieved prior to symptom development on leaves or fruit. Once the symptoms are present, these fungicides will not eradicate or burn out the fungus. Nova (Rally), Elite, and Procure also appear to provide good protectant activity against black rot if applied at the lower labeled rates in a protectant program. These fungicides also have had excellent activity against powdery mildew as well.

Of these materials Nova, also called Rally, is the most commonly used and is very effective for control of black rot. The active ingredient in Nova is myclobutanil. This is the same active ingredient that is in the home owner fungicide product "IMMUNOX FUNGICIDE".

Some Home Owner Products that Should be Effective for Black Rot Control

Mancozeb is available as BONIDE MANCOZEB FLOWABLE fungicide. It contains 37% Mancozeb and should be very effective for controlling black rot.

Nova (myclobutanil) is available in IMMUNOX FUNGICIDE. It is 1.55 % myclobutanil and should be effective for controlling black rot.

I have not seen other home owner products that I would recommend for black rot control.

Many home owner products contain various types of oils, sulfur, or copper, all of which are not effective for controlling black rot.

Captan is also in some home owner products and Fruit tree spray mixes, but is only slightly to moderately effective against black rot and will probably not provide adequate control under heavy disease pressure.

Where to buy Fungicides

Commercial fungicides can be obtained at locations that provide materials mainly for commercial farmers such as farmer coops, grain elevators, and similar locations. Especially in more rural areas, you should be able to find these. If you have trouble finding them, contact your local county Ohio State University Extension Agent to see if they can help you.

As an example, Tylers Grain and Fertilizer co. near Wooster ,Ohio has all of the commercial materials I have mentioned above and would sell you a 10 pound bag of

mancozeb or a 20 ounce bag of Nova or Rally. This will probably be more than you need, but it would last a long time if you store in a dry location.

Home owner products are available at garden centers, nurseries, and locations such as Lowe's. There are many locations that deal with home owner pest control products, but generally, there are not many fungicides and very few if any that are effective for control of black rot. I have found IMMUNOX FUNGICIDE in most Lowe's locations where I have looked.

When to Apply Fungicides for Black Rot Control

When combined with good cultural practices a good fungicide spray program is extremely important. Early season control (bud break through bloom) is important to keep the disease from getting established on the leaves and the spreading to the fruit. Fungicide application should begin when new cane are 3 to 5 inches long and should be repeated on a 7 to 10 day interval through 3 to 4 weeks after bloom.

VERY IMPORTANT NOTE: The period from immediate pre bloom through 3 to 4 weeks after bloom is the **MOST CRITICAL PERIOD** for controlling fruit infection by black rot. During this period the fruit are formed and are highly susceptible to infection. Around 3-4 weeks after bloom, the fruit become resistant to infection and no further sprays for black rot should be required. In my research vineyards at Wooster, we consistently get near complete black rot control on fruit with three fungicide application starting at very early bloom and two more applications on a 10 day interval.

If sprays are not made (missed) or an improper rate of fungicide is used (too low), especially in the critical period for disease control, you cannot expect to get satisfactory disease control.

What to Apply and How Much

Commercial Mancozeb 75% fungicide is used at 2 tablespoons per gallon of water.

Commercial Nova or Rally (myclobutanil) 40% fungicide is used at ½ teaspoon per gallon of water.

Homeowner product IMMUNOX FUNGICIDE (myclobutanil) is used at 2 fluid ounces per gallon of water. Grapes are included on the label with the use recommendations.

Homeowner product BONIDE MANCOZEB 37% Flowable fungicide is used at 5 teaspoon per gallon of water.

Table 1. Leaf wetness duration and temperature necessary for infection by the black rot fungus.

| Temperature (degrees F) | Hours of leaf wetness required for infection |
|------------------------------------|---|
| | |
| 45 | No infection |
| 50 | 24 |
| 55 | 12 |
| 60 | 9 |
| 65 | 8 |
| 70 | 7 |
| 75 | 7 |
| 80 | 6 |
| 85 | 9 |
| 90 | 12 |
