

Fall Vineyard Management: Diseases, Rots, and the Need to Sort

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Our very wet summer in Minnesota has brought with it some challenges for the grower which will ultimately effect the winemaker. Fungal (and fungal like) pests have been prevalent in vineyards throughout the state. Infections of downy mildew (*Plasmopora viticola*), black rot (*Guidnardia bidwellii*), and powdery mildew (*Uncinula necator*) are perennial problems in the region, but can have devastating effects when environmental conditions are favorable to their growth and dispersal. Although powdery mildew favors 'dry' conditions, its dispersal depends on rain events and wet leaf surfaces to create an infection site. At the Horticultural Research Center, we have also seen infections of anthracnose (*Elsinoe ampelina*) in some of the seedling vineyards.

Most of these diseases can be controlled with interventions early in the year from pre-bloom through bloom. Properly timed fungicide applications and cultural methods that improve air circulation and leaf drying will help prevent infections. Some cultivars are more susceptible to the fungal pests. For example, 'La Crescent' often can have significant leaf infections of downy mildew, but will not demonstrate fruit infections on the same vines. In general, as fruit develop they become less susceptible to the fungal pests because their tissues have become less hospitable for harboring an infection site, something termed ontological resistance.

Cultural control and fungicide applications should persist through the growing season, and growers can turn to the [Midwest Fruit Pest Management Guide 2016](#) for information on the best practices for controlling these and other pests. This booklet is the ultimate guide for growers across the region. The development of resistance to fungicides is problematic and is related to the over use (repeated use) of the same pesticide or different products with the same mode of action within a season and across years. Fungicides are categorized by their mode of action and assigned a FRAC (Fungicide Resistance Action Committee) grouping number. The FRAC guidelines can inform the vineyard manager on combinations of fungicides to be used in tandem and also restrictions on the amount of product or number of times per season a fungicide should be used. Because downy and powdery mildew can persist through the fall, reduce photosynthesis, and may even defoliate a plant, the vineyard manager should continue to control for these fungal pests into the late season. Furthermore, control now can have a major impact on the disease pressure in the following year due to the reduction of over wintering fungal structures. Vines that are stressed in the fall are also more likely to suffer winter damage.

Cultural control practices are necessary in the winter and early spring to remove infected fruiting structures that would otherwise create new infections in the upcoming growing season. One advantage of grape growing is the annual removal of ~90% of plant tissues and the plasticity in selecting new, clean canes. Dried infected berries, called "mummies", should be removed from the vineyard, in fact all infected tissues should be removed and destroyed including diseased material from the vineyard floor when feasible.



Figure 1. Mummy berries are dried, highly infected fruit that are a good source of inoculum in the following spring for disease. In this case the likely culprit is downy mildew. These should be removed from the vines and destroyed.

The final push of the season is to protect the berries post-veraison when they are at risk to a new set of problems. These are vertebrate, invertebrate, and fungal issues that take advantage of the high amounts of sugar available in the maturing fruit. Bird netting is the most effective control against feeding and damage. Birds “sampling” and not eating entire fruits will wound the berries which will lead to secondary infestations of fruit flies, bees, wasps, Asian lady beetles, and fruit rots. Control of raccoons through trapping (make sure to follow any local regulations) and electric fencing can be very effective. The control of insect pests should be considered with an integrated pest management (IPM) approach and University of Minnesota Extension offers guidelines for multicolored [Asian lady beetle](#). Another insect that can cause damage rapidly through the vineyard is the [grape berry moth](#)

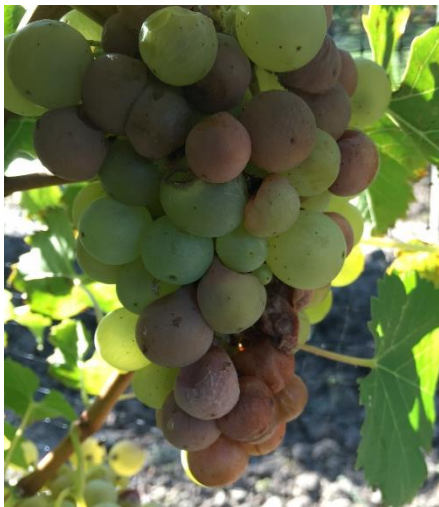


Figure 2. Bunch rot shown here likely caused by berries splitting from too much rain. Rots can also occur from bird feeding, insect damage, and fungal infection. This sour rot has the indicative signature of smelling like vinegar.

The [bunch rots](#) that we are seeing this time of year are likely from *Botrytis*, bitter rot (*Collectotrichum*) or sour rots. Bunch rots are more prevalent on cultivars with tight clusters, but also can result from berries that have mechanical damage from birds or insects. Fungicides can be employed to control the rapid spread of these pests. Bryan Hed from [Penn State](#) offers additional information and a proposed schedule for disease control with different FRAC chemistries on his blog or you can turn to the “Midwest Fruit Pest Management Guide”. The [Botrytis bunch rot](#) bulletin gives a very good summary of this organism including the noble form of the disease which can be favored in some wine making. Sour rot lacks the common signs of mycelia seen in botrytis, but is usually accompanied by the smell of vinegar (ethyl acetate) where it gets its name and fruit flies.



Figure 3. Botrytis infection of ‘Siegerrebe’ berries showing the classic fuzzy, grey-brown mycelia, typical signs of infection.

The importance of sorting

The computer science adage “garbage in, garbage out” is a mantra that we should be sharing in the wine world. Grapes infected with rots, mildews, or are otherwise unsound (already fermenting) are going to contribute to a wine product that is also faulty. Ethyl acetate is a common wine fault that is easily detected by wine drinkers, so there is very little tolerance for this in the juice or must going into wine making. Experiments have shown that wine made from infected berries with powdery mildew could be distinguished due off aromas, flavors, and textures. These included flavors described as moldy, bitter, dusty, plastic, and rotten (Conterno et al. 2006). Sorting by hand is labor intensive, but can be accomplished in the field with proper training (even with volunteer staff) or on a sorting table after mechanical harvest.

Reference

Conterno, L., D. Gadoury, V. Gerbi, L. Rolle et al. (2006). Grape fungal infection and wine quality. New York Wine Industry Workshop. [Available Online:](#)