



Nebraska VineLines

UNIVERSITY OF
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University of Nebraska Viticulture Program

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Bud Break is an Exciting Time

The following comments from Ohio State University's Michael Ellis are worth noting. (Quoted from the Ohio Grape-Wine Electronic Newsletter.) Mike has been a speaker at our Annual Nebraska Winery Grape Growers Forum and I rate him as one of the best grape plant pathologists in the country. Of particular note are his comments on fungicide resistance, while his "Critical Periods for Fungicide Applications on Grapes" provides insights into the same serious diseases that Midwest growers can encounter and mirror what you will find in the Midwest Small Fruit and Grape Spray Guide. Let's hope for no late cold temperature events. Take good care of your vines for a great 2015 Vintage!

Cheers, Paul

Developing an Effective Fungicide Spray Program for Wine Grapes in Ohio 2015

By Michael A. Ellis, OARDC

The following information is intended to be "food for thought" in relation to developing a fungicide spray program for wine grapes in Ohio. This spray schedule presents various fungicide options that can be considered by growers. It is important to note that the schedule is intended to provide simultaneous control of black rot, powdery mildew, downy mildew, anthracnose and Phomopsis cane and leaf spot. The schedule is also intended to provide some level fungicide resistance management, primarily against the powdery mildew and downy mildew pathogens. Note that

at any specific application timing, there are usually several fungicide options that can be selected. This schedule does not contain all of the fungicides currently registered for use on grapes. Remember, these are only "**Suggested Guidelines**" for use in developing a fungicide program. The final program that you develop will depend upon the diseases present in your vineyard as well as economic considerations.

Please pay special attention to the notes and special comments.

IMPORTANT NOTE on POWDERY and DOWNY MILDEW FUNGICIDE RESISTANCE

Powdery Mildew

In some locations the powdery mildew fungus has developed resistance to the sterol-inhibiting fungicides (Rally, Mettle, Inspire Super, Tebuzole (Generic Elite)) and the strobilurin fungicides (Abound, Sovran and Flint). All of these materials were highly effective for control of powdery mildew when they were first introduced. In vineyards where these materials have been used for several years, reduced sensitivity or resistance may be present. In some vineyards, all of these materials may still be effective; however, at present there is no way to know the level of resistance that is in your vineyard. Having a control failure and crop loss due to fungicide resistance is a hard way to discover you have resistance. Reports from Virginia suggest that resistance may develop after as few as 10 applications of the material over the life of the vineyard. If these materials have

been used in a vineyard on a regular basis for several years, growers should consider not using these materials alone for powdery mildew control. If resistance is a concern, they should be replaced or mixed with a sulfur fungicide, JMS Stylet Oil, Quintec, Endura, Torino, Vivando, or potassium salts (table 1). Pristine is a combination of a strobilurin fungicide plus Endura; therefore, it should be safe to use alone for powdery mildew control. Sulfur fungicides are very effective for control of powdery mildew, relatively inexpensive, and are not at risk for resistance development. On sulfur tolerant varieties, the use of sulfur should be considered.

Downy Mildew

The strobilurin fungicides (Abound, Sovran and Pristine) provided good to excellent control of downy mildew when they were first introduced. Several reports from various areas in Europe and, most recently from Virginia indicate that the downy mildew pathogen has developed resistance, or is at least less sensitive, to the strobilurin fungicides.

Growers that have used strobilurin fungicides for several years and have made several applications per year need to consider the possibility of not using strobilurin fungicides for downy mildew control. If resistance to downy mildew is present in your vineyard and you are using strobilurins to control other diseases, they should be tank mixed with another fungicide with activity against downy mildew. Alternative downy mildew fungicides include: Mancozeb, Captan, Ridomil Gold MZ, Ridomil Gold Copper, Revus, Presidio, Ranman, Forum, a copper fungicide or a phosphorous acid (phosphite) fungicide. Pristine still provides good control of powdery mildew when used alone and was the only material that would control almost all of our major disease when used alone. Unfortunately, if resistance to downy mildew is present, it should be combined with an effective downy mildew fungicide.

How Do I Know If I Have Fungicide Resistance In My Vineyard?

As mentioned above, if you have been using a

fungicide in your vineyard that is at high risk for fungicide resistance development (see Tables 1 and 2) for several years and you make several applications of that fungicide per season, there is a good chance that you have fungicide resistant pathogens, or at least reduced sensitivity in your vineyard. The powdery mildew, downy mildew and Botrytis bunch rot fungi are the most problematic in relation to fungicide resistance problems on grapes. At present there is no place to send the pathogen to have it checked for resistance. Usually, the first sign of resistance is when the fungicide does not appear to be providing the level of control you have gotten in the past. The worst case scenario is if the material does not work at all and you get a control failure in the vineyard. Under the right circumstances, this can be very costly. If the materials continue to provide a good level of control in your vineyard, you evidently do not have a resistance problem. In some vineyards where materials have not been used extensively, they are still very effective. An example of this would be the use of Abound in many 'Concord' vineyards. Abound is fairly expensive and the relatively low value of 'Concord' grapes prevents its extensive use in most 'Concord' vineyards. Often it is used only once and rarely more than twice per season. Therefore, Abound is still very effective in most Concord vineyards compared to some wine grape vineyards where it has been used 2 to 4 times per season for several years. If you have recently planted a new vineyard in an area where there are no other vineyards in close proximity, you probably do not have resistance problem and it may take many years to develop, if ever. This is especially true if you develop a fungicide spray program that will aid in reducing or delaying the development of resistance. If you establish a new vineyard next to older vineyards that have fungicide resistance present, you can expect it to be a problem in the new vineyard as well. About the only thing that I can recommend is that you use fungicides wisely with fungicide resistance management as a part of your overall fungicide program. In addition, it is important to continually monitor (scout) your vineyards for signs of reduced disease control and the possible presence of fungicide resistance.

To Aid in Resistance Management

Do not apply more than two sequential sprays of any material that is at risk for resistance development, before alternating to a fungicide with a different mode of action (see table 2). In addition, the less a specific fungicide or class of fungicide is used in a vineyard, the less likely for resistance to develop to it. Most of the fungicides that are at risk for resistance development have a limited number of applications that can be made per season listed on the label (table 2).

Always read the label.

For Suggested Guidelines for Developing a Fungicide Spray Program for Wine Grapes in Ohio and for Tables 1 and 2 see:

http://ohiograpeweb.cfaes.ohio-state.edu/sites/grapeweb/files/imce/pdf_newsletters/OGEN20150331%2810%29.pdf

Critical Periods for Fungicide Applications on Grapes

By Mike Ellis, OARDC

There are five major grape diseases that need to be dealt with on an annual basis in the upper Midwest and eastern United States. All of them have the capability of causing serious damage to the crop and even destroying it under the right environmental condition. They are **Phomopsis Cane and Leaf Spot, Black Rot, Downy Mildew, Powdery Mildew and anthracnose**. These diseases need to be controlled simultaneously in the vineyard and will probably require some level of fungicide use annually in order to provide sufficient control. Another important fungal disease on tight clustered varieties is Botrytis Bunch Rot.

Fungicides are a major component of the integrated disease management program. I wish it were not so, but I strongly believe that most vineyards in the Midwest and upper Midwest will not be successful unless they have an effective fungicide program and use good cultural practices for disease control. There are many things to consider in developing an effective fungicide program. Most currently used fungicides do not have a spectrum of activity that will control all of the diseases simultaneously. Therefore tank mixes using more than one fungicide are often required.

Growers need to know what diseases a fungicide will control in order to select the appropriate materials. You also need to learn when to apply the fungicide in order to get effective control. This is called fungicide timing. I cannot over emphasize the importance of early season fungicide applications for effective disease control.

It is important to realize that all four major diseases (Phomopsis Cane and Leaf Spot, Black Rot, Downy Mildew and Powdery Mildew) can get established in the vineyard very early in the growing season. Therefore, early season disease control is **absolutely critical**. At times, less experienced growers may not see powdery mildew, downy mildew or black rot until later in the growing season (post bloom). There is tendency to think that these are summer diseases that develop later in the growing season; however, infections by all of the pathogens can become established in the vineyard very early (pre bloom). Often when you see the disease post bloom, it may be too late to get it under control. I will discuss the environmental conditions required for infection in my presentation. Research in New York has shown that primary infections by the powdery mildew fungus can occur with .01 inch of rain at 50 Fahrenheit and downy mildew infections can occur after 4 inches of new cane growth with 0.4 inches of rain and 50 Fahrenheit.

Obviously, these conditions can occur very early in the growing season. This allows the diseases to get established. You may not see them because they are there at low levels. Under the proper environmental conditions later in the growing season, these low levels of disease can blow up into full scale epidemics before you can react to them. For this reason, it is important to maintain an effective fungicide program throughout the entire season with emphasis on early season disease control. The most destructive phase for all of these diseases is fruit infection.

Research in New York has shown that the most critical period for fruit (cluster) infection by powdery mildew, downy mildew and black rot is the period from **immediate pre bloom through 4 - 5 weeks after bloom**.

At 4 to 5 weeks after bloom (probably earlier on some varieties) the fruit develops resistance

(ontogenic resistance) to infection by all of these diseases.

Thus, fungicide protection for the fruits and rachises (the cluster) is absolutely critical during this period. If you go out into the vineyard post bloom and see that your clusters are covered with downy or powdery mildew, there is little or nothing you can do at that point. Under the proper environmental conditions you may have lost the entire crop. If you do a good job of controlling the diseases through the **critical period**, the crop is set and the fruit is now resistant to infection.

It is important to remember that the rachises (cluster stems) remain susceptible to infection through out the growing season. In addition, leaves and young cane tissues remain susceptible.

Therefore, it is important to maintain a good fungicide program throughout the season. The amount of fungicide protection required throughout the remainder of the season (past the critical period) will depend largely upon environmental conditions. If it is dry, less fungicide will be required and you can focus on powdery mildew control.

Powdery mildew is a dry weather disease that requires high relative humidity to infect and does not require free water. If it is wet, the threat of late season downy mildew infection (which can defoliate the vine) will probably require a more intensive fungicide program through harvest. One of the main points I want to make is that if you do not control fruit (cluster) infections during the critical period (early in the season), the late season fungicide application are not going to save you. A sad fact is that if you do lose your crop to early season cluster infections, you will probably still have to spray the vines later in the season to control the build up of powdery and downy mildew in the vineyard.

In wetter growing seasons, late season downy mildew epidemics can rapidly become very severe resulting in premature defoliation of the vines. If vines are prematurely defoliated, they will not harden off (become winter hardy) as they normally would and serious winter injury can occur leading

to long term damage to the vine. This probably applies to the more winter hardy varieties as well.

Growers need to develop a fungicide program that controls all of the major diseases during three main periods of the growing season: the pre bloom period

(1 to 3 inch shoot growth through immediate pre bloom), immediate pre bloom through 4 to 5 weeks after bloom (the most critical period for fruit infection) and the late season period (4 to 5 weeks after bloom through harvest). I have a handout titled "developing an effective fungicide program for Wine grapes in Ohio" that summarizes my fungicide recommendations.

As mentioned previously, selection of the proper fungicides for use during these periods is extremely important. Most currently used fungicides do not have a spectrum of activity that will control all of the diseases simultaneously. Therefore, tank mixes using more than one fungicide are often needed. It is important to know what diseases a fungicide will control in order to select the appropriate materials. Recently, I was in a 7-acre'

Chardonnay' vineyard that had 100% cluster infection from powdery mildew. The fruit were a total loss. In reviewing the growers spray program, applications were made at appropriate times, yet disease destroyed the fruit. The reason for the control failure was that the grower was using only Mancozeb fungicide in the tank through all of the early season sprays.

Mancozeb provides excellent control of Phomopsis, downy mildew and black rot, but provides no control of powdery mildew. Thus powdery mildew came in and wiped out the crop. Had the grower tank mixed Mancozeb with a fungicide that would control powdery mildew (such as sulfur or several other materials) the crop would probably have been saved. I also have a handout describing the currently available fungicides for grape disease control.

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Reminder Calendar:

- April 20, 2015** Spotted Winged Drosophila Training, Iowa City, IA
<http://www.extension.iastate.edu/article/don%E2%80%99t-let-invasive-fruit-fly-ruin-fruit-harvest>
- April 27, 2015** Spotted Winged Drosophila Training, Clarion, IA
<http://www.extension.iastate.edu/article/don%E2%80%99t-let-invasive-fruit-fly-ruin-fruit-harvest>
- May 3, 2015** MGGA Winemaking Seminar Alexandria, MN
http://www.mngrapes.org/events/event_details.asp?id=625545
- June 15 – 18, 2015** 2015 ASEV National Conference, Portland Marriott Downtown Waterfront Hotel, Portland, OR <http://www.asev.org/2015-national-conference>
- July 23-25, 2015**, 40th ASEV – Eastern Section Annual Meeting, Clarion Hotel, Dunkirk, NY
<http://www.asev-es.org/>
- July 26-29, 2015** ISHS International Workshop on Vineyard Mechanization and Grape and Wine Quality, Fredonia, NY <http://www.ishs.org/symposium/428>
- October 17, 2015** Fall University of Nebraska Viticulture Program Workshop, Lincoln, NE
- November 11-14, 2015** 2015 VitiNord International Conference, Lied Lodge & Conference Center, Nebraska City, NE <http://www.vitinord2015.org/>
- November 13-15, 2015** Wine Tourism Conference, Portland, OR
- November 13, 2015** Grand Harvest Awards, **entry deadline**
<http://www.winecompetitions.com/#nav=enteronline>
- November 17-18, 2015, Grand Harvest Awards Judging**
<http://www.winecompetitions.com/#nav=grand-harvest>
- November 18-20, 2015** Wine Tourism Conference, Leesburg, VA,
www.WineTourismconference.org
- January 26 – 28, 2016**, Unified Wine and Grape Symposium, Sacramento Conv. Ctr., Sacramento, CA
<http://www.unifiedsymposium.org/>

Save the Date

March 3 to 5, 2016 19th Annual Winery and Grape Growers Forum and Trade Show, Omaha Marriott



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