

# *Ohio Grape-Wine Electronic Newsletter*

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Disease ALERT: Downey Mildew

**Know your OSU Grape and Wine Experts**

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## **DISEASE ALERT:**

### **Perfect Weather Conditions for Disease Development**

by *Dave Scurlock, OSU/OARDC Viticulture Outreach Specialist and Dr. Mike Ellis, OSU/OARDC Plant Pathology*

I do not want to reinvent the wheel and I know that you know or should know that the past couple of weeks have been as ideal of conditions for disease development that we could have possibly ordered. I know we did not order these conditions but we must try to adapt to what is dealt in farming. I have not had too many calls or seen any disease in the last week or two in vineyards I have visited and that is a credit to you and the spray programs that Dr. Mike Ellis has outlined for us in Ohio. That having been said I would like to ENCOURAGE you to shorten up your spray programs to maybe every 7 days until we get out of this cycle of continuous wetness and high temperatures. DOWNEY MILDEW is the one disease that worries me more than the others at this point. Infection periods can start when temperatures are as low as 43<sup>0</sup>F with only 9 hours of a wetness period but infections periods can be as short as 2 hours when the temperature is around 77<sup>0</sup>F. If you do not have the newly formed growth covered with a Downy Mildew specific fungicide.....you will get a Downy mildew infection. Downy mildew can cause a crop failure through promoting fruit rots as well as weaken the vine through early defoliation.

I have excerpted a couple of articles on Downy mildew from Dr. Mike Ellis's previous articles in OGEN and handouts from his presentations in hopes that you will read them again and apply the recommendations that he has made for us.

#### **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 Gol 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.**

## **Fungicides for Downy Mildew**

### **Protectant Fungicides**

**Mancozeb, Captan, and Copper fungicides** (fixed coppers and Bordeaux mixture) are highly effective for control of downy mildew. Ziram is moderately effective. All of these fungicides are effective only when used in a protectant spray program. They will not provide post-infection or curative activity and will not eradicate or burn out the fungus after symptoms appear.

Of the protectant fungicides currently available, **Mancozeb** is an excellent choice. Mancozeb is highly effective against downy mildew, black rot, and Phomopsis cane and leaf spot. One problem with Mancozeb is that it cannot be applied within 66 days of harvest. Even with this restriction, Mancozeb is an excellent protectant fungicide for early-season disease control and can also be used on later-maturing cultivars for post-bloom disease control (prior to 66 days of harvest).

**Captan** is also excellent for downy mildew and Phomopsis cane and leaf spot but is weak for controlling black rot. A good approach to using Mancozeb and Captan for downy mildew control is to use Mancozeb early in the season then switch to Captan within the 66-day preharvest interval for Mancozeb. Currently Captan does not have a preharvest interval for grapes.

**Note:** Although Captan has no preharvest interval on grapes, it does have a four-day reentry restriction. The following information is taken from the Captan label: “Do not allow persons to enter treated areas within four days following application unless a long-sleeved shirt and long pants or a coverall that covers all parts of the body except the head, hands, and feet, and chemically resistant gloves are worn. Conspicuously post reentry information at site of application.” Remember, always read the label.

**Ziram** is similar in efficacy to Ferbam. It provides only moderate control of downy mildew, and excellent control of black rot and Phomopsis cane and leaf spot. Under heavy disease pressure, Ziram may not provide adequate control of downy mildew.

### **Locally Systemic Fungicides with Curative Properties**

**Ridomil Gold MZ and Ridomil Gold/Copper** are by far the most efficacious fungicides available for control of downy mildew. Ridomil is locally systemic and has good post-infection or curative activity. If used in post-infection control programs, it should be applied as soon as possible, *but within* two to three days after the initiation of an infection period. Ridomil **should not be** applied after symptom development (sporulating lesions). Use of Ridomil in this manner (as an eradicant) will probably lead to a rapid buildup of Ridomil-resistant strains of the downy mildew fungus in your vineyard. If resistance develops in the vineyard, the use of Ridomil as a tool for downy mildew control is lost.

Ridomil also has excellent protectant activity against downy mildew. It should provide at least two weeks of protection, and in some tests in Ohio, it has provided up to three weeks of protection.

As mentioned previously, Ridomil Gold has a strong potential for fungicide resistance development by the downy mildew fungus. For this reason, the manufacturer (Syngenta) has registered its use only as a **Package Mix** with a protectant fungicide. The two formulations available for use on grapes are Ridomil Gold MZ (4% Ridomil and 64% Mancozeb) and Ridomil Gold/Copper (5% Ridomil and 60% Copper hydroxide). The purpose of the package mix (at least in theory) is to delay the development of strains of the downy mildew fungus with resistance to Ridomil. Both formulations are equally effective for controlling downy mildew. The Ridomil Gold MZ formulation should be used on copper sensitive cultivars. Although Ridomil is very effective, the current label use recommendations restrict the timing of its use on grapes. Ridomil Gold MZ cannot be applied within 66 days of harvest. Ridomil Gold Copper has a 42-day PHI (can be applied up to 42 days of harvest). Based on the 42 and 66-day preharvest interval, Ridomil will be of limited use for late season downy mildew control in the Midwest.

In seasons when downy mildew is a problem and on highly susceptible cultivars, pre-bloom and post-bloom applications of Ridomil will aid greatly in disease control. However, additional fungicide protection may be required within the 42 and 66-day preharvest interval on late-harvested, highly susceptible cultivars. The alternative fungicides for use during this period are Captan, copper fungicides, phosphorus acid fungicides, or the strobilurin fungicides Abound or Pristine.

**Strobilurin fungicides** are also locally systemic, and some have had good to excellent activity against downy mildew (see note on fungicide resistance development on page 6). Whereas the strobilurins (Abound, Pristine, Sovran, and Flint) all have good to excellent activity against black rot and powdery mildew, they vary greatly in their efficacy against downy mildew. Abound and Pristine have excellent activity and are the most effective for downy mildew control. Sovran is moderately effective if used at the highest labeled rate, and Flint is registered for “suppression” of downy mildew, not control.

### **Phosphorous Acid**

**(Agri-Fos, ProPhyt, Phostrol, Rampart, Topas, Aliette , there are many others)**  
Several products containing phosphorous acid (PA, also called phosphite or phosphonate) are sold as nutritional supplements and plant conditioners. Recently several of these materials have been registered in the United States as fungicides for control of downy mildew on grape. In multiple New York trials, PA has provided excellent control of downy mildew but has not controlled any other grape disease. Australian experience suggests that PA provides most control on *foliage* when it is applied within a few days after the start of an infection period, providing only a few days of additional residual (protective) activity. Experience in New York suggests that spray timing is less critical for control of downy mildew on *fruit*, perhaps because this highly mobile chemical (which is exempt from residue tolerances) accumulates in these organs. When applied on a seven to 10-day protectant program, they appear to provide good to excellent control of downy mildew.

**Copper fungicides** are highly effective against downy mildew and are moderately effective against powdery mildew. Copper fungicides are weak for controlling black rot. A major concern with the use of copper fungicides is the potential they have for phytotoxicity or vine damage. Grape cultivars differ in their sensitivity to copper fungicides.

**Note:** Certain food processors, such as the National Grape Cooperative, will not accept grapes treated with Mancozeb past the initiation of bloom, and the use of Captan is not permitted at any time. If growers cannot use Mancozeb or Captan, Ridomil Gold/Copper, copper fungicides, a phosphorus acid fungicide, or a strobilurin fungicide are the other alternatives for downy mildew control. Thus, copper may be an important fungicide for producers of processing grapes that have these fungicide use restrictions.

## **Four new fungicides were recently registered for control of downy Mildew. They are: Revus , Presidio, Ranman and Forum**

All of these fungicides have good to excellent activity against downy mildew and all have different modes of action against the downy mildew pathogen. This is an important point for fungicide resistance management. They can be used in alternating (two block) spray programs with each other and any of the previously mentioned fungicides that are at risk for resistance development in the downy mildew fungus.

Revus (mandipropamid) is used at the rate of 8 fl oz/A and has a PHI of 14 days, Presidio (fluopicolide) is used at the rate of 3to 4 fl oz/A and has a PHI of 21 days, RANMAN (cyazofamid) is used at the rate of 2.1 to 2.75 fl oz/A and has a PHI of 30 days, and Forum (dimethamorph) is used at the rate of 6 oz/A and has a PHI of 28 days.. The 14 day PHI for Revus makes it an attractive option if downy mildew control is required close to harvest. It is very important to remember that these materials will need to be tank mixed with other fungicides because they will not provide adequate control of powdery mildew, black rot or any other grape diseases (Table 1).

### **Revus Top**

**Note:** Revus Top is a package mix containg two fungicide (difenoconazole, which is an excellent sterol-inhibiting fungicide and Revus, which is for control of Downy mildew only). Revus Top will provide excellent control of Black rot, powdery mildew, downy mildew and anthracnose.

### **Final Note:** *Thank you for reading this far*

We have a tremendous grape crop out there this year and so far you have been doing a great job but, we really need to be especially vigilant right now if we are going to succeed in producing a high quality disease free crop. We can do it if we keep our crop protected even if it means going into the vineyard in less than ideal conditions. Please contact Dr. Mike Ellis at [ellis.7@osu.edu](mailto:ellis.7@osu.edu) or phone 330-263-3849

## Know Your OSU Grape & Wine Research & Outreach Specialist

By Imed Dami, HCS-OARDC

Many of the OGEN subscribers are new producers and are not familiar with OSU Specialists who provide expertise and assistance in the field of grape growing and wine making. The information below may be redundant for some readers, but it is good to remind/inform our new producers of the resources available at OSU and will be included in all future issues of OGEN. Please contact the following Research, Extension/Outreach Specialists, and Educators if you have any questions relating to their respective field of expertise.

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Dr. Imed Dami, Associate Professor & Viticulture State Specialist Dept. Horticulture & Crop Science 216 Gourley Hall – OARDC 1680 Madison Avenue Wooster, OH 44691	330-263-3882	E-mail: <a href="mailto:dami.1@osu.edu">dami.1@osu.edu</a>  Website: <a href="http://oardc.osu.edu/grapeweb/">oardc.osu.edu/grapeweb/</a>	Viticulture research and statewide extension & outreach programs. Recommendation on variety selection. Imed is the primary research contact of the viticulture program.

	Contact Information		Area of Expertise & Assistance Provided
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David Scurlock, Viticulture Outreach Specialist 118 Gourley Hall – OARDC 1680 Madison Avenue Wooster, OH 44691	330-263-3825	E-mail: <a href="mailto:scurlock.2@osu.edu">scurlock.2@osu.edu</a> Website: <a href="http://oardc.osu.edu/grapeweb/">oardc.osu.edu/grapeweb/</a>	Evaluation of site suitability for vineyard establishment and all aspects of grape production practices in northern Ohio. David is the primary extension contact of the viticulture program
Todd Steiner, Enology Program Manager & Outreach Specialist Dept. Horticulture & Crop Science 118 Gourley Hall – OARDC 1680 Madison Avenue Wooster, OH 44691	330-263-3881	E-mail: <a href="mailto:steiner.4@osu.edu">steiner.4@osu.edu</a> Website: <a href="http://oardc.osu.edu/grapeweb/">oardc.osu.edu/grapeweb/</a>	Commercial wine production, sensory evaluation, laboratory analysis/setup and winery establishment. Todd is the primary research and extension contact of the enology program
Dr. Gary Gao , Small Fruit Specialist and Associate Professor, OSU South Centers 1864 Shyville Road, Piketon, OH 45661  OSU Campus in Columbus Room 256B, Howlett Hall, 2001 Fyffe Ct Columbus, OH 43201	740-289-2071 ext.123  Fax:740-289-4591	E-mail: <a href="mailto:gao.2@cfaes.osu.edu">gao.2@cfaes.osu.edu</a>  Website: <a href="http://southcenters.osu.edu/">http://southcenters.osu.edu/</a>	Viticulture Research and Outreach, VEAP visits in southern Ohio, vineyard management practices, soil fertility and plant nutrition, fruit quality improvement, variety evaluation, table and wine grape production
Greg Johns, Station Manager Ashtabula Agricultural Research Station 2625 South Ridge Road Kingsville, OH 44048	440-224-0273	E-mail: <a href="mailto:johns.1@osu.edu">johns.1@osu.edu</a>  Website: <a href="http://www.oardc.ohio-state.edu/branches/branchinfo.asp?id=1">www.oardc.ohio-state.edu/branches/branchinfo.asp?id=1</a>	Winegrape production in Northeast Ohio, especially <i>vinifera</i> varieties

		<b>Contact Information</b>		<b>Area of Expertise &amp; Assistance Provided</b>
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