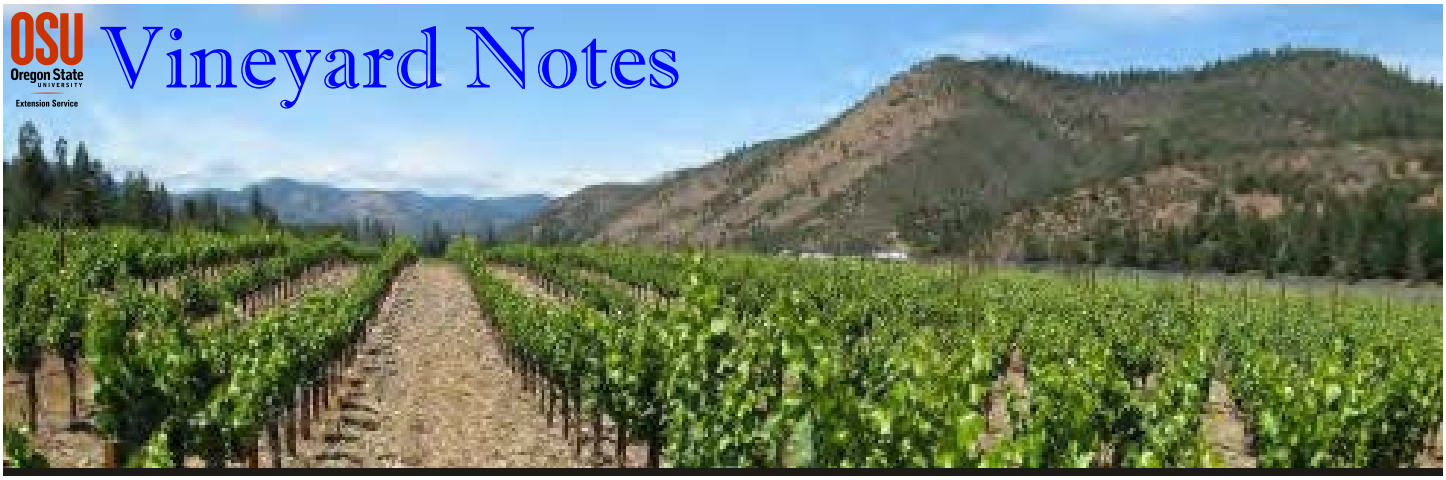
OSU Oregon State University Extension Service

Vineyard Notes



September 2010 http://wine.oregonstate.edu

Welcome to OSU Vineyard Notes

Welcome to the September 2010 edition of OSU Vineyard Notes. We take this opportunity to make you aware of pest-related problems in the vineyard. This 2010 season has been a challenge for many, and the challenges do not stop here. Jay Pscheidt, OSU Extension Plant Pathology Specialist, reports on new fungicide resistance news that you need to be aware of for effective *Botrytis* and powdery mildew control. As fruit begins to ripen, it is at risk of Spotted Wing Drosophila infestation, so Vaughn Walton, OSU Horticultural Entomologist, provides an update on monitoring. Finally, Patty Skinkis, OSU Viticulture Extension Specialist, reports on important updates to the Oregon Grape Quarantine which restricts movement of harvested fruit from out-of-state. We hope you find these articles informative, and be sure to check out the links provided for more information to help you be prepared!

Cheers!

OSU Viticulture Extension Team

Fungal Sex Could Resist Your Advances
Fungicide resistance management can be complicated--don't be tricked!

Jay W. Pscheidt, Ph.D., OSU Extension Plant Pathology Specialist

I am sure you have heard the mantra over the years with regard to pesticide resistance management – alternate and/or tank mix! Everyone knows that you should not use the same material for multiple applications since it will just encourage development of pest resistance. While attending a recent meeting of our national American Phytopathological Society (APS), I was alarmed by reports of boscalid resistance from around the world. I concluded that I had to get back on my soap box and hit the subject of fungicide resistance even harder than I have before. It is too easy to think you are doing the right thing with fungicide resistance prevention when in reality you are not.

The subject of fungicide resistance prevention can be complicated, so I provide information in two segments: 1) defining fungicide resistance and 2) new products. If you think you know the background to this topic then just jump down to the "New Products" section below.

What is fungicide resistance in the first place?

Fungi that cause powdery mildew (*Erysiphe necator*) or bunch rot (*Botrytis cinerea*) on grapes can reproduce like crazy. Just think how long it takes you to reproduce (that is a rhetorical question) or for a grape seedling to produce fruit. Mealybugs, on the other hand, might have two or three generations in a year. Powdery mildew has many more! When the conditions are perfect, as is common in the Willamette Valley, one *Erysiphe necator* spore landing on a grape leaf can infect and produce around a billion new spores in as little as five days. Although I have never counted them, the point is that these fungi can spread explosively and have many generations in one year.

In this issue:

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But we can stop them with our fungicides, right? Yes, right up to the point where the fungus becomes resistant to the effects of the chemical fungicides. Just like there are different varieties of grapes, there are different varieties (isolates, strains, biotypes, etc.) of a pathogenic fungus. Most of the *Botrytis* in your vineyard will be unable to infect your grapes if you spray a certain chemical, but there will always be a very small percentage of them that are unaffected by the chemical. Additionally, through sexual recombination, these fungi can produce new strains that are resistant to the chemical used. Those resistant *Botrytis* spores will infect grapes and produce more resistant spores. When this happens, there is a higher population of resistant spores, and maybe the next time you use that chemical, it will not work as well.

Simple you say, just change to a **different** chemical to control the pest. That will work if you actually change to a different ***group*** of fungicides. If a fungus is resistant to one chemical in the group it is often resistant to all the others in that fungicide group. This is why it is important to make note of the fungicide group you are using in your spray program.

Now in some cases, it costs the fungus (energy, survivability, etc.) to maintain the ability to resist a chemical. If you stop using that chemical, the part of the fungal population that is resistant can die out. Often this means you can use that chemical again at a later date (years) and have it work again, but this is not always the case.

Sometimes it doesn't cost the fungus anything to have the resistance ability and they may thrive. For example, I tested the *Botrytis* isolates from my 10-year-old vineyard which had never been sprayed with Benlate (or any other group 1 fungicide). Half of the isolates were resistant to that chemical family. Certainly at sometime, somewhere the *Botrytis* in the area was sprayed with benomyl and resistant strains have survived just fine.

Some fungicides are more likely to "cause" the fungi to become resistant such as Topsin (Thiophanate methyl, group 1 fungicides) and Rovral (iprodione, group 2 fungicides). Materials in these two fungicide groups interfere with a very specific biochemical pathway that makes a compound needed for fungal growth. But there are other biochemical pathways for making the same compound. Fungi with those other pathways are resistant. Organic growers can rejoice as products like sulfur, copper-based products and oils work on multiple pathways and have a low risk of fungi becoming resistant.

Many of the other products we use to manage powdery mildew (such as group 3 or 11 fungicides) or *Botrytis* bunch rot (group 9 or 12) have a medium resistance risk. Many of these materials also affect specific pathways in the fungus. Resistance is not only possible but has been found or suspected in many host/disease systems throughout the Pacific Northwest.

New Products

One of the new fads in the chemical industry is to pre-package two chemicals from different chemical groups rather than sell the chemicals one by one. This makes it easier for you to do resistance management by purchasing and using just one product. Pristine is one of many of these types of products, but it came out a few years ago and took a lot of market share. Of course, that caught the attention of many chemical companies which is why we have so many combination products on- or about to hit the market.

Pristine contains two fungicides, pyraclostrobin (group 11) and boscalid (group 7). Both materials have good activity on grape powdery mildew. This is great as both alone were thought to have a medium resistance risk. The label mandates that you use a different material after as few as two applications. This is no problem as there are group 3 or 13 materials as well as sulfurs and oils to choose from for the rotation. The problems lie within chemicals for *Botrytis* control.

Boscalid (group 7) is great for *Botrytis* control, but I have never been fond of group 11 (or group 3 for that matter) fungicides for controlling diseases caused by *Botrytis* or similar fungi. Although there are some exceptions, these materials generally only give fair or medium control of these diseases. Sometimes these products are better than nothing but not nearly as good as other products. The chemical companies use the word "suppression" to relate to the efficacy of these products. Based on my experience, the word "suppression" on a fungicide label means it doesn't work and the company does not really stand behind its product (for that disease on that crop). Products that indicate they suppress a certain disease on a certain crop do not make it into the *PNW Plant Disease Management Handbook*. You will see the word suppression used for *Botrytis* management on the Cabrio label which is pyraclostrobin (group 11) alone.

The problem with *Botrytis* is that a product like Pristine is, in essence, a single mode of action fungicide. I can easily see where salesmen and growers alike will interpret the labels incorrectly. Here is a product with two fungicide modes of action that provides both powdery mildew **and** *Botrytis* bunch rot control. This is the mistake made around the world. We are now seeing the development of *Botrytis* isolates resistant to boscalid both in North America and Europe.

What should we be doing, or in my case, recommending? Use Pristine for either powdery mildew **or** *Botrytis* bunch rot, not both. Multiple applications for powdery mildew will encourage the development of resistant *Botrytis* strains. To go after *Botrytis*, we must use fungicides from a group other than group 7. Another way to look at it this: if you are using Pristine for powdery mildew and you do not use anything else at key times for *Botrytis* control, then it is as if you have not made **any** applications for bunch rot.

For those of you in the Willamette Valley, you need to consider what your neighbors are growing: small fruits, pome fruit (such as pears and apples), stone fruit, onions, ornamentals, etc. Powdery mildew and diseases caused by *Botrytis* are a problem on a wide variety of crops, and Pristine and Pageant (the ornamental equivalent) are labeled for them all. Do not get me wrong. These are great materials for the management of plant diseases in the Pacific Northwest, but we need to be smart about how we deploy our pesticides so that we do not encourage resistance development. *Botrytis* management in this area will always be a challenge. Because of pre-packaging and wide use, we may not be able to use boscalid for *Botrytis* management.

What worries me is that there is a lot of "me too" products

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coming down the pipeline. Several companies are looking to market their pre-packaged mix of a group 11 or 3 fungicide with another fungicide that manages diseases caused by *Botrytis* and similar fungi. If we are not careful, we could burn out our current *Botrytis* materials quickly. It wasn't that long ago when we only had one or two materials to work with. With some effort and honest evaluation, we should be able to manage these diseases and ward off fungicide resistance with the materials we have.

One last side note…

Every time I write about fungicide resistance, people get upset as it is too chemically-focused. However, the first step in any chemical management is cultural management. *Botrytis* control in any crop system never starts with fungicides. Cultural control tactics are needed first, such as leaf removal and reducing canopy density. Once cultural tactics are in place, we can supplement with fungicides. Integrating several techniques is the only way to assure good management of *Botrytis*-caused diseases.

Botrytis infection in a near-ripe cluster.
Photo courtesy of Patty Skinkis, OSU.

Spotted Wing Drosophila (SWD) Risk in Grapes – Update on Monitoring and Management

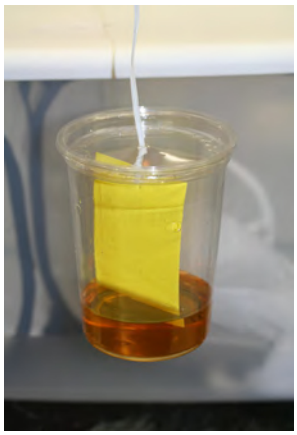
Vaughn Walton, Ph.D., Horticultural Entomologist, OSU
Amy Jo Dreves, Ph.D., Entomologist, OSU

Spotted Wing Drosophila (SWD) is a new pest in Oregon and was first detected in many small fruits including grapes during 2009. Winegrapes are a suitable host for SWD, and studies in Japan have shown that SWD prefer to feed on soft-skinned fruits including grapes. In Japan, it was found that SWD first attack cherries early in the season, move to blueberries and raspberries mid-season and then finally move to grapes during late summer and fall. This fly can lay eggs in ripening berries as opposed to overripe berries. SWD populations can increase to high numbers in unmanaged small fruit orchards, including raspberries and blueberries. Both adults and larvae have been found in ripening blackberries surrounding vineyards in Oregon at this point in the season. SWD can lay eggs and develop in damaged winegrape berries at the 10-12° Brix stage. Research in Washington indicates that SWD can oviposit into ripe, fully intact berries at 17° Brix and higher, and larvae were able to develop (WSU preliminary data). Development begins to slow with lower temperatures, and emergence from fruit takes two weeks at 65°F and four weeks at 57°F based on lab trials at OSU. Mean daily temperatures in the Willamette Valley during 2009 were 65°F in August, 62°F in September and 51°F in October. We currently do not know how important this pest will be in winegrapes in Oregon vineyards during the ripening period; however, research continues this season. In the meantime, we suggest that growers monitor their vineyards and the vineyard perimeter for the pest in order to minimize risk of damage.

Monitoring

Monitoring is conducted with traps that are easy and inexpensive to assemble. Traps can be made with clear plastic beverage cups as follows:

- Drill 3/16-3/8 inch holes. Leave 3 inch pour space for changing vinegar.
- Place optional yellow sticky card in cup.
- Add 2 inches apple cider vinegar and a drop of non-fragrant soap
- Hang near fruit level in cool area.
- Filter contents once a week in white pan for easier ID. Use 30X hand lens and record.



Holes drilled to allow SWD entry.

Place traps in a manner that targets high-risk areas such as other suitable crops close to grapes and place one trap every 1-4 acres in size during véraison. In order to help with early detection, place one trap in surrounding blackberries or other suitable SWD host-crop, one trap on the edge of the vineyard, and one trap 15-20 yards into the vineyard block.

Identifying the Pest

SWD resemble the common vinegar fly and is smaller than a housefly. The easiest way to identify SWD during the late part of the season is to find males that should be easily found in traps. Males are easy to identify with a **dark spot** on the tip or leading edge of the wing. They have red eyes and **two dark bands** on their front legs. A sure way to identify whether females are SWD is to look for the distinctive **ovipositor**. It is much longer than other Drosophila species and is **serrated**. If you press on the abdomen, the ovipositor will be easier to view.

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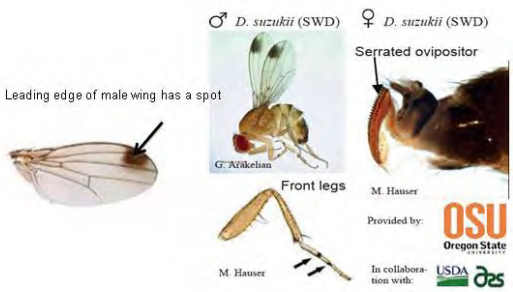
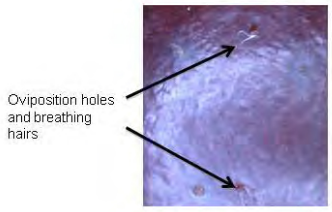
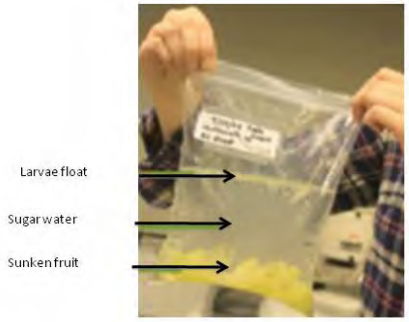
Determine infestation levels

If you find SWD in your traps, follow these guidelines to determine if you have infested fruit:

- Use information obtained from your traps in order to determine your next monitoring step.
- Go to areas where you found flies in traps and sample ripening fruit.
- Collect approx 20-40 ripening berries evenly distributed through an area where traps showed adult SWD flies.
- Berries that are infested by SWD may have hairs on the surface of the fruit, and oviposition spots may provide entry of secondary pathogens such as *Botrytis* bunch rot, thereby reducing fruit quality.
- Drop fruit into a quart *Ziplock* bag and crush lightly.
- Add ¼ cup sugar and 4 cups water.
- Larvae will float to top; use a magnifying hand lens in order to view smaller larvae.
- Alternatively leave fruit inside the *Ziplock* bag at room temperature for a few days and larvae will emerge as the sample warms.







Management

Remember that management includes monitoring and determination of sugar levels in berries. Infestation risk increases with increasing Brix. Risk may be mitigated when trap counts are positive in the vineyard and Brix have increased to higher levels.

Include sanitation in your management program.

- Manage surrounding vegetation that may serve as hosts
- Remove and destroy infested fruit
- Practice timely harvest by limiting the hang time of ripe fruit

Pesticide control should be targeted to control adults ideally before fruit damage.

- Use registered compounds with known efficacy (see the pesticide list online at http://swd.hort.oregonstate.edu/files/webfm/editor/Grape_SWD_Insecticides.pdf)
- Follow the label
- Observe IPM principles when using these compounds; rotate chemical classes to slow resistance development.

More Information

For more detailed information on this pest and winegrapes, visit the following links.

- SWD Ovipositing on grapes in laboratory; partial maggot survival inconclusive – WSU Extension
- OSU SWD Website provides details on lifecycle management and pesticide tables

Updated grape quarantine seeks to prevent pest influx into Oregon

Patty Skinkis, Ph.D., Viticulture Extension Specialist, OSU

As we come into the harvest season across the West, it is important to be aware of a new quarantine in Oregon that restricts the movement of harvested grapes into the state. With new grapevine pests such as European Grapevine Moth (EGVM, *Lobesia botrana*) and the Vine Mealybug (VMB, *Planococcus ficus*) emerging in surrounding states, we are concerned about keeping these pests out of Oregon, particularly with movement of harvested fruit. Significant efforts to monitor and document any new cases of these pests are in place by the Oregon Department of Agriculture in collaboration with Oregon State University. At this time, we have not found either the EGVM or VMB in Oregon. However, industry members are called to do their part in preventing insect pest influx and spread by abiding by the Oregon Department of Agriculture (ODA) Grape Quarantine. If you suspect that you may have either of these pests please contact Helmuth Rogg, ODA Insect Pest Prevention and Management Program Supervisor (503-986-4662) or Vaughn Walton, Horticultural Entomologist, OSU (541-737-3485). Both can provide you with traps and lures that may help identify establishing pest colonies.

In early 2010, amendments to the Oregon Grape Quarantine were put into effect by ODA and now specify VMB and EGVM as quarantined pests. Also, the quarantine restricts movement of all parts of the grapevine, including harvested fruit, coming from out-

side of Oregon. The quarantine requires that you follow these steps when importing fruit:

1. The shipment must be checked by a state-certified inspector in the state of origin who will issue a **phytosanitation certificate**. This certificate does not mean that the shipped material does not contain the quarantined pest; it indicates that the load has been inspected. If you are shipping fruit from Washington, then there is no need to obtain a phytosanitation certificate. According to Jan Hedberg of ODA Plant Division, the Washington industry has surveyed their winegrape regions and found vineyards to be free of VMB. Plan to conduct your own inspection on site and treat your imported fruit as if it were infested to help prevent any potential pest spread.
2. If fruit is being shipped from a region of known infestation of quarantined pests, the **load must be covered** in transport from vineyard to crush pad.
3. Winery waste from whole cluster press or **pomace should be stored away from the vineyard, covered and composted** prior to moving it into the vineyard.

Quarantines outside of Oregon

It is important that you are aware of quarantines that exist in other regions. California has updated quarantines that restrict movement of all plant parts according to specified pests. Quarantines are in place for EGVM in Mendocino, Sonoma, Lake, Napa, San Joaquin, Merced and Fresno counties. These quarantines restrict movement of all grapevine parts, including harvested fruit, out of the quarantined counties and require CDFA inspection certificates for shipment. There are no specific quarantines for mealybugs within California, but shipments into Oregon must be inspected for both of these pests prior to shipping. To learn more about quarantined pests and regions of enforced quarantines in California, visit the CDFA quarantine manual online: http://pi.cdfa.ca.gov/pqm/manual/htm/pqm_index.htm.

Managing Winery Waste

Both mealybugs and EGVM infest clusters and berries. This requires that winery waste from processing of infested or potentially infested fruit be managed to prevent spread of these pests, particularly when pomace is deposited in vineyards. Although the Oregon Grape Quarantine indicates that pomace must be composted, there are no criteria given in the quarantine as to how this should be done. Research in California indicates that VMB can survive in unfermented pomace (Smith and Valera, 2008). They will not survive the fermentation process. To safeguard against vineyard infestation, fresh pomace should be placed away from the vineyard and immediately covered by plastic as it decomposes. It is best to mix stemmy waste with more dense matter (skins and seeds) to ensure better heat generation and decomposition during composting. Generally, a temperature of 130-140°F maintained throughout the pile will ensure that the insects are killed, and a secure plastic covering will help ensure greater heat capture and retention. While as little as one to four weeks of composting allowed for nearly complete elimination of live VMB in the California trials conducted by Smith and Valera, it may take longer for composting in Oregon given the climatic conditions post-harvest. If you import fruit from regions within and outside of Oregon known to have mealybugs, practicing proper pomace sanitation will help you reduce the risk of pest spread. As for sanitation procedures for EGVM, the specific criteria are not yet known. However, we believe that sanitation as outlined for VMB management should be able to reduce risk of pest spread of EGVM on harvested fruit and/or pomace. If you have the resources to adequately compost your winery waste, it is a good management practice and is encouraged to prevent any potential pest spread even if you have not imported fruit from a quarantined area.

If you have any further questions or concerns about the updated Oregon Grape Quarantine, contact the Plant Division of ODA (http://www.oregon.gov/ODA/PLANT/contact_us.shtml). Full details on monitoring, managing and preventing mealybugs in vineyards can be found within several articles produced by OSU Viticulture Extension, many of which are also available in Spanish, and all are available online at http://wine.oregonstate.edu/publications.

Further Reading

Oregon grape Quarantine
http://www.oregon.gov/ODA/PLANT/docs/pdf/quar_grape.pdf?ga=t

Smith, R.J. and L.G. Valera. 2008. Pomace management reduces spread of vine mealybugs. California Agriculture. 62(4): 172-173. DOI: 10.3733/ca.v062n04p172.

Mealybugs can be found deep inside the grape cluster (as shown here on a berry pedicel). Without proper pomace management, they can be silent invaders in the winery and vineyard.