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This issue of *Vineyard Notes* covers four timely topics to be considered in your véraison vineyard management plans:

- Bird control
 - Powdery mildew management
 - Late season *Botrytis* prevention
 - Tissue nutrient sampling
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Vineyard Bird Control Tactics

Dr. Patty Skinkis, Viticulture Extension Specialist, OSU

The loss of grapes to bird predation in 2010 was alarming enough that many grape growers have their guard up this season, and with good reason. Bird damage last season was thought to be due in part to the late development of grapes which coincided with bird migrations. According to the Oregon Department of Fish and Wildlife, the ripening grape crop was one of the limited food sources available at the time. In some cases, whole vineyard blocks which usually remain untouched were completely consumed by flocks of birds. One of my own research sites was gobbled up in mid-September last year, shortly after the onset of véraison. The early stage of berry ripening is a key time for bird predation and is critical for implementing bird control tactics (Table 1).

There are two main categories of bird control available to grape growers: scare tactics and exclusion. Scare tactics are the most inexpensive methods for grape growers to employ but have variable efficacy. Scare tactics may be visual, such as reflective tape, or auditory such as cannons. Last season, the majority of grape growers were using auditory scare tactics in quite innovative ways, but they also created a bit of upset with neighbors. Also, auditory devices, such as cannons, often prove ineffective over time as birds adjust to the repetition. Auditory scare tactics that have been proven relatively effective are bird distress or alarm call devices, such as *Bird Gard*. These calls can provide effective control of certain bird species but must be used at the appropriate placement and frequency for a given vineyard size. Research conducted by Berge et al. 2007 showed a 7.3% reduction in bird damage when select distress calls were used for American Robins, European Starlings and House Finches, compared to the use of cannons and reflective tape alone. They also found varying responses with certain bird calls used, suggesting that more work needs to be done to identify bird distress calls best suited for given problem species. However, from my experience with bird control in the Midwest, distress call devices worked relatively well when they were placed at adequate density for the vineyard size, set to different call timings based on heaviest feeding pressure during the day, and periodically moved throughout the vineyard in exchange for other bird-scare tactics. Birds

typically feed heaviest in morning and decrease during midday, so setting such hazing devices to this schedule is a critical factor in effective control.

The best method for preventing bird damage is exclusion by bird netting. However, not all netting is created equal. There are differences in application method, length, width, weaves, mesh size, material, and color. In most cases, you get what you pay for, so it is best to consider your longer-term needs. To determine the best products and use, I consulted Alice Wise, viticulturist for Cornell [Cooperative Extension in Suffolk County, New York](#). She knows bird pressure and has been helping the Long Island winegrape growers deal with heavy and consistent bird pressure since the 1980's. Her experience with netting has been positive, but products have changed over the years and so has efficacy of bird exclusion.

Over the row netting was very common in the 1980's and 1990's; however, it had a wide mesh size (0.75") and birds could easily get inside the netting by finding holes in the seams, or birds could peck through the netting, particularly with large mesh sizes. Also, it was difficult to apply to the vineyard and shoots would grow through it, preventing it from being put on the vines in advance of véraison. Furthermore, it was easily damaged by aggressive birds trying to enter the netting or during dismantling postharvest. Over the past ten years, side netting has become more popular. Side netting can be applied to only the cluster zone or lower canopy on a VSP trellis system (Figure 1). It also comes in finer mesh sizes which effectively prevented bird pecking, which is common with some bird species such as finches. Different side net products are available, and the most robust and long-lasting products for aggressive bird predation has a small mesh size (<0.5") and is lock-stitched to prevent holes from forming. Many new product lines are also offering UV-protective products that may be hung in the vineyard and stored by catch wires year-round. Bird netting can easily last 7-15 years. The side netting is often preferred to over-the-row netting because it can be affixed to the canopy at or just prior to véraison while also allowing canopy management such as hedging to continue. It is also easier to apply and take down than over-the-row netting. In Alice's work, she has found that side netting has not decreased spray coverage, and sunlight exposure was reduced by only 10-15%. From her experience, black netting is often preferred over white netting because the clusters are easier to see; however, some research suggests birds are further deterred by the white netting.

Other lesser known or used forms of bird control include chemical repellents and predators. Repellent are on the market for birds and other wildlife; however, many of these chemical repellents have not been widely tested for vineyard bird control. Potential contamination or off-flavors in wine are of major concern. Various concoctions have been researched, including sucrose solutions (Socci et al. 1997) and dimethyl anthranilate (Hellman et al. 1989). However, it takes time for birds to develop feeding aversions based on the repellents used, and it may not be effective in a short time frame. In addition, some simple products, such as sucrose, could lead to increased potential for rots and sooty mold development. Although Socci et al. 1997 did not observe increased fungal growth with sucrose applications to blueberry fields.

The use of raptors and other predatory birds has not been widely used for vineyard bird control. It is often very difficult to establish residency of predatory birds on site, and effective control likely will require a professional to set up and establish the raptor perches.

Using a combination of methods **BEFORE damage occurs** will likely provide the best bird control. Bird netting is still the best option for small acreage of high value winegrapes, but its materials and labor costs are very high (Table 1). Adequate closure of the seams on the canopy is critical to prevent bird entry. If adequate netting is purchased and applied properly, damages can be reduced to less than a few percentages of loss. It is likely that the netting will not only protect from birds but also other potential problem pests such as turkeys and raccoons. The cost of netting for larger acreage vineyards is likely not feasible due to the cost of materials and labor to apply and remove. Instead, larger vineyards may choose to spot manage some areas with netting while using cannons, reflective tape and distress recordings across the acreage. In either case, it is best to randomize methods used to prevent habituation of birds to the tactic being used. For more information about bird or rodent control, please also read the [2011 Pest Management Guide for Wine Grapes in Oregon](#).

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Table 1. Bird control methods

Control method	Time of application	Remarks
Scare devices or hazing	Before damage occurs	Place in the vineyard: distress calls, exploder guns, cracker shells, foil, kites, eye spot balloons. The USDA-APHIS (Animal and Plant Health Inspection Service) can be a valuable resource for management of wildlife damage to agricultural crops. Contact a local or regional specialist for assistance: http://www.aphis.usda.gov/wildlife_damage/
Shooting and other direct control	Before grapes ripen	It is illegal to shoot migratory birds without a permit from the U.S. Fish and Wildlife Service. See comment above about APHIS.
Netting	Before grapes ripen	Place on each side of canopy or drape over canopy, depending on product. Remove just before harvest. Material costs can be in excess of \$800/A, depending on vine density and product. Labor to apply and take down can be costly. Net life can range from 7-15 years. Nearly 100% effective if applied appropriately.
Predators	Before grapes ripen	Raptors have been used with limited efficacy in some vineyard sites. They take a long time to establish residence in the vineyard and can be costly. Consider consulting a professional to establish and use raptor perches.



Figure 1. Side netting applied to the cluster zone of Pinot noir vines. Care must be taken to adequately tie bottom and top seams of the netting to ensure exclusion of birds.

Literature Cited

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Hellman, E.W., G.L. Yocum, and R.J. Robel. 1989. Preliminary evaluation of dimethyl anthranilate as a bird repellent on grapes. *Am. J. Enol. Vitic.* 40: 140-142.

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Powdery Mildew Rescue: Send your grapes to a spa!

Dr. Jay Pscheidt, Extension Plant Pathologist, OSU

No one really wants to "rescue" this fungus. Rather, I suspect many of you are fanatically planning ways to destroy it. It has been an excellent year for powdery mildew infections. As a result, many growers are nervous about finding even a little powdery mildew on their grape clusters. What can be done? Give them the three step "spa" treatment! Pamper your grapes with a refreshing water bath followed by a soothing mineral oil treatment and a complete cover.

Unfortunately, the mild weather we have had this summer was great for both grapevine growth and growth of this fungus. Details of why powdery mildew infection occurs and management tactics, can be found in my July 2009 newsletter article, "Got Mildew?" ([http://wine.oregonstate.edu/files/files/VitNewsletterJuly09\(1\).pdf](http://wine.oregonstate.edu/files/files/VitNewsletterJuly09(1).pdf)).

The rescue treatment I describe below works best if there is more of the growing season left (prior to véraison). It may not work well or be worth your effort at this time of the year with vineyards close to or already beginning véraison. It is not uncommon for a few **new** infections to occur this time of year. All powdery mildew treatments are meant to protect healthy grapes rather than "cure" infections that have already happened. After implementing these treatments, you may still see the development of new powdery mildew colonies, but that is from microscopic infections that have already occurred. More importantly, once berries are damaged, they remain that way no matter what you do (Figure 1).

Step 1: Bath time

Start your rescue with a heavy application of water, such as 200 to 400 gallons of water to the acre plus a wetting agent (surfactant). Please read on once you have finished laughing hysterically and have regained your composure! I know it sounds ridiculous to use this much water at this time while we are in the middle of our annual summer drought. However, this treatment will cool down the epidemic by literally washing off all the spores that might be dispersed to healthy parts of the grapevine. Powdery mildew conidia lyse (break up) when in free water. It is critical that you get good coverage of the entire vine, especially the clusters. This treatment only buys you a day or two since new conidia will develop rapidly.

Step 2: Soothing mineral oil

Ahhh, it is time for a soothing 1 to 2 percent oil treatment for the vines. Horticultural mineral oils will denature the fungus since most of its mycelia reside on the outside of grape tissues. Get this application on within 2 days of the water bath. In general, I have found that petroleum-based oils tend to work better than the botanically-based oils. Thorough coverage is essential for good results. Forget the bicarbonates; they just do not work when the powdery mildew pressure is this high. Be sure to follow labeled intervals if you use a lot of sulfur in your vineyard so as to avoid burn. You can find more about oils at the following website: http://plant-disease.ippc.orst.edu/article_index.aspx?article_id=26.

Step 3: Complete cover

Follow up your oil treatment in 5 to 7 days with a strong fungicide of your choice. Attend to the details of spray application and product selection. Again, you still need good coverage, so slow down your tractor speed and spray all portions of the vine thoroughly.

Product selection may be difficult. You should use a material that has a low resistance risk such as a horticultural mineral oil or elemental sulfur (group M2). Many of the other materials, such as those in fungicide groups 3, 7, or 11 have a much higher risk that powdery mildew will become resistant to the chemicals. Using these materials at this time with so much inoculum

around could select for resistance if it has not already developed. Therefore, select a fungicide that you have not been using this year or within the last year or two. Fungicide ratings and group numbers can be found in our pest management guide, available online at <http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/20097/em8413-2011.pdf>.

Prevention is the real key

The best powdery mildew management plan is to attend to details before and during the spray season, especially during the transition into and during bloom. Prevention is the key because when powdery mildew gets a foothold in your vineyard, it is very difficult to manage. However, even the best of us can have a little mildew infestation in a year like this one. A rescue like this is a last ditch effort and not to be relied upon. Once you have finished rescuing your grapes, maybe you will need to treat yourself to a nice spa too!



Figure 1. Infection of berries by the powdery mildew fungus results in scarring of the skin. Even if the powdery mildew colonies are eradicated, the scarring will remain. (P. Skinkis)

Preventing Late Season Botrytis Bunch Rot

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Many of you are nervous about bunch rot this year given the all-too-familiar 2010 season. This is wise given the late start to the 2011 growing season which could push harvest later into fall. The key for management of *Botrytis* bunch rot is water; this fungus likes it wet. If we have a lovely dry fall with "Indian Summer" weather, then things will be fine. However, if the autumn rains come early, it will test even the best management program.

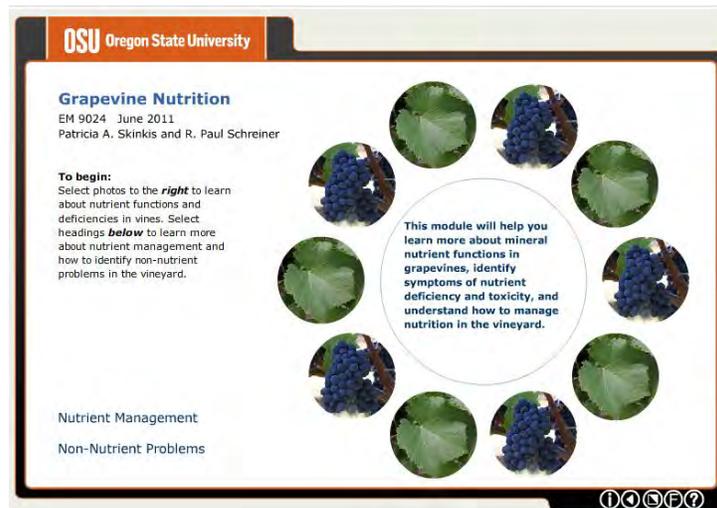
Currently, the forecast going into véraison is hot and dry--not the kind of weather *Botrytis* likes. Keep an eye out for forecasted rain. Hopefully, you have maintained your training system, managed canopy density, and exposed the grape clusters so they can dry out quickly after any precipitation. One of the key actions to take in the future includes pre-harvest fungicide sprays targeted to the fruit zone. This is best done **BEFORE** it rains.

This is easy to plan with the best intentions, but it is very hard to practice. With all due respect to Rufus of the [Weather Cafe®](#), forecasters have a notoriously hard time predicting rain in the fall. Usually the first good dust-settling, cluster-wetting rain catches us all off guard, or forecasters call for significant precipitation and none develops. The real wild card is the drenching mountain thunderstorms that generally stay away but can drift over our vineyards if conditions are right. These all make getting those preventative sprays on the vineyard very difficult!

The Bottom line: hold tight during this hot spell, **calibrate your sprayers**, and be ready to go when the conditions transition from summer drought to fall rains!

Vine Nutrition Assessment at Véraison

Véraison is one of the key time points in grape phenology to assess nutritional status. Bloom-time sampling is often more common for nutrient assessment, but sampling at véraison can be quite helpful in identifying macronutrient (N, P and K) deficiencies. Leaf blades and/or petioles are to be collected at 50% véraison. For full details on sampling procedures, see [Monitoring Grapevine Nutrition](#) or visit the [Grapevine Nutrition](#) online tool.



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