May 2017 Newsletter

**President’s Message**

Well, the growing season is on us full force now, with shoot thinning proceeding as threat of frost disappears for the rest of the spring. Thankfully we have not endured the same kind of devastating frosts the European wine industry had in April. Our forecast (see Greg Jones’ current climate report at rvwinegrowers.org) is for continued cooler than normal conditions, and our GDD have been right on the mark for average in the 1980-2010 time period. Sure seems like a huge change from what we have experienced for the last few years. In my vineyard, we are about 3 weeks behind the phenology of 2014, ’15, ’16. I just hope we are not on track for a harvest as late as we had in 2010 and ’11.

RVWA will host our first technical forum (**Vineyard Pest and Disease Management**) organized by Alex Levin on June 6 at Dancin Vineyard. More details below. We will have wine and appetizers after the meeting, so please come and learn from the great group of speakers that Alex has arranged.

We have a number of grape sale announcements below in this newsletter and also listed on our web page. I am hoping that our organization becomes much more active in disseminating information of this kind in the future. Please feel free to send me (kjohnpratt@gmail.com) a note if you want anything listed.

Oregon Wine Experience is looking for donations of grapes and wine for the Barrel Auction. Keep it in mind: if you have some extra fruit on the vine late in the season that doesn’t have a home, consider paring up with a winery who would be willing to make the wine, and then donate it to the Asante Foundation. Last year we raised over $700,000 for this very good cause, and the Barrel Auction is a crucial part of the process.

I hope you are all off to a good start of the growing season, even if it is a little later than what we have become spoiled to. Paz—John

**Upcoming Events**

*Vineyard Pest and Disease Management: Floor to Canopy*

RVWA Spring Viticulture Technical Forum

For our first technical forum of the 2017 vintage, we will feature a panel of experts in the broad field of vineyard pest and disease management. During the forum, we will discuss emerging pest and disease issues in the Rogue Valley, with particular attention paid to hot-button issues such as management of insect vectors of viral disease, and purported fungicide resistance of powdery mildew. In addition, we are proud to introduce the new Oregon State University weed science extension specialist, Marcelo Moretti, who will introduce himself and his research on weed management in perennial cropping systems. Generously hosted by Dancin Vineyards, the format of the forum will be informal, with three speakers presenting followed by an open discussion of topics covered. Following the forum, we will have refreshments on the piazza.

**Agenda:**

*Cultural and chemical control of insect pests:* Rick Hilton, Entomologist, OSU-SOREC

*Fungicide Resistance in Powdery Mildew*: TBA, Mahaffee Lab, USDA-ARS Corvallis

*Weed science research and extension at OSU:* Marcelo Moretti, Assistant Professor and Weed Science Extension Specialist, OSU

**Date:** Tuesday, June 6th, 2017

**Time:** 2-4 PM with refreshments afterwards. Feel free to bring a bottle of wine to share.

**Location:** Dancin Vineyards

2017 SOWI Summer Seminar Series

When: **Friday, May 19, 2017, 8am - 4:30pm**

**Where: Southern Oregon Wine Institute**, Lang Event Center
1140 Umpqua College Rd, Roseburg, OR 97470

## Cost: $25

Price includes seminar and lunch.

**Lunch Sponsored by BAHCO Tools - Tour the BAHCO Truck!**

### Program: Morning Session

* Bill Briskey - Aerial Imaging for Precision Agriculture
* Bryan Hosford, Mountain High Aviation - Multi-Spectral Drone and Airplane-based Imaging - Current and Future Applications.
* Achala N. KC, OSU SOREC - Grapevine Disease Detection and Research Priorities
* Rick Hilton, OSU SOREC - Red Blotch Update and Research Priorities
* Alexander Levin, OSU SOREC - Vine Water Relations and Future Research Priorities

### Afternoon Session

* **Rich DeScenzo, ETS Laboratories - Wine Spoilage, Analysis, and Management**
* Alex Farren, Blue Morph UV - UV Winery Sanitation Technologies
* Andy Swan, Joel Mann, Charlie Kidd, SOWI - Showcase of Vineyard and Winery Technologies

### To register, please go to <https://www.umpqua.edu/southern-oregon-wine-institute-events/sowi-seminar-series> . Pay at the door.

Or register by phone at 541-440-4709.

**Grapes for sale:**

10-11 tons of Tempranillo and about 3-4 tons of Cabernet Sauvignon. Contact Chip Buxton at chip.buxton@gmail.com

4 tons of Vermentino and 1.5 tons of Early Muscat. Contact John at kjohnpratt@gmail.com

2017 Cabernet Sauvignon Grapes:  Established grapes, hand harvested from a professionally managed vineyard (TYK Vineyard in the Applegate) with well drained south facing slope with sun into the evening hours through the summer. Price does not include delivery.  5-TON MINIMUM - $2,300 per ton.  Contact:  Mark VonHolle via email: markv@golighthouse.com / 541-941-7892

2017 Pinot Noir Grapes:  Established grapes, hand harvested from a professionally managed vineyard (TYK Vineyard in the Applegate). Price does not include delivery.
3-TON MINIMUM - $2,400 per ton.  Contact:  Mark VonHolle via email: markv@golighthouse.com / 541-941-7892

Survey Help Needed

Jason Beck from the SOU Nursing Program is very interested in making sure our vineyard worker population is well served by the health care opportunities available. He has devised a very short survey that he would like vineyard owners to fill out. You can find it at <https://www.surveymonkey.com/r/ZS7GCD8>

This survey takes just two or three minutes and participation will really help him as he tries to make sure our workers have the best health care possible.

Immigration Reform Proposal

California's two Democratic senators filed legislation Wednesday that would shield farmworkers who are in the country illegally from deportation and create a path to citizenship.

“Everywhere I travel in California, I hear from farmers, growers and producers from all industries — wine, citrus, fruit and tree nuts, dairy — that there aren’t enough workers,” Sen. Dianne Feinstein said in a statement. “Farm labor is performed almost exclusively by undocumented immigrants — a fact that should surprise no one."

Nine in 10 agriculture workers in California are foreign-born, and more than half are undocumented, according to federal numbers. Despite rising wages, [California farmers have said they cannot hire enough native-born workers](http://www.latimes.com/projects/la-fi-farms-immigration/).

The bill is also backed by senators from Colorado, Vermont and Hawaii, but there's been no broad talk in Congress of reforming immigration laws this year. With Democrats in the minority and unable to direct when legislation may be considered, the proposed Agricultural Worker Program Act faces an uphill battle.

It would allow undocumented farmworkers who have worked in agriculture for at least 100 days in each of the previous two years to earn a “blue card," which would allow them to work legally.

They would eventually be eligible for a green card or legal permanent residency, which opens the door to earning citizenship.

“It’s past time and smart for our economy that we provide them a pathway to citizenship, decent working conditions, and the opportunity to come out of the shadows and more fully contribute to our state and national economy,” Sen. Kamala Harris said in a statement.

Shoot Thinning, by Stan Grant

If shoot thinning were a book or movie it might be entitled Pruning: The Final Chapter.  Quite simply, shoot thinning, which is the selective removal of shoots, enhances the viticultural effects of pruning and in some ways, finishes the pruning job.  Here we will explore the benefits of careful shoot thinning and how to achieve them.

Shoot thinning conserves and often, improves the shoot spacing established while spur pruning cordons (Fig 1) or arms on head trained vines.  It similarly sets the shoot density along canes retained as fruit bearing units (Fig 2).  In this way, shoot thinning lays the foundation for the fruit zone microclimate during ripening, especially with regard to air and light movement.  It also aids the penetration of foliar sprays.

Shoot thinning refines the ratio of fruit to leaves that was roughly set during pruning.  Usually, all sterile (unfruitful) shoots are removed during thinning.  This lessens the shoot density with a minimum impact on crop level. Sometimes, however, it may be desirable to also remove shoots bearing clusters if they are too crowded or too numerous for timely ripening.  As such, shoot thinning is a practice for achieving growth balance.

Careful annual shoot thinning can promote uniformity among spur positions.  By removing higher shoots on spurs and arms while retaining lower shoots, shoot thinning keeps spur positions close to cordons, increasing their uniformity with regard to shoot growth vigor and fruit development.  Where arms have crept far away from cordons, retaining a shoot (water sprout) arising from a latent bud on old wood low on an arm sets the stage for arm shorting and spur repositioning next winter (Fig 3).  Using these techniques, shoot thinning maintains vine form, facilitates other vineyard operations, and enables consistency in fruit production and quality.

Shoot thinning can also enhance uniformity among shoots within the growing season in which it is applied.  To do so, remove the shortest and longest shoots, and retain those of average length.  The effect of thinning to an average shoot length is improved synchronization of fruit development and correspondingly, enhanced grape quality.

Shoot thinning compliments pruning in one other very important way.  Removing shoots during the spring leaves fewer shoots to be pruned the following winter.  This has two outcomes.  First, operational costs are reduced because properly timed shoot thinning is a faster operation than dormant pruning.  Second, the risk of canker disease is reduced because, with fewer pruning cuts during the winter, there are fewer wounds exposed to infection.

Importantly, shoot thinning also reduces water and mineral nutrient requirements and accordingly, their costs.  Further, it makes other, subsequent hand operations easier, like cluster thinning and hand harvest, making them less expensive.  Typically, by diminishing canopy densities, shoot thinning eliminates the need for basal leaf removal.  The exceptions may be varieties with large leaves, such as Chardonnay and Malbec.

Like all cultural practices the most critical questions for shoot thinning are “when?” and “how much?” (i.e. timing and severity).  Early shoot thinning (shoot lengths ≤ 6 to 10 inches) is easier and less costly than later shoot thinning, but later shoot thinning often lessens the risk of leaf and crop loss from springtime environmental hazards such as wind and frost.  Sometimes the decision to thin depends on forecasted weather and other site factors compared to the current shoot length, rate of elongation, and susceptibility of the variety to damage.  Other times it is simply a matter of labor availability and other operational logistics.

A shoot density of about 5 to 6 shoots per foot of cordon normally achieves the benefits stated above.  This frequently corresponds to removal of all shoots except those originating from count buds on spurs.  For cane pruned vines, retain 1 shoot per cane node and 1 or 2 well placed renewal shoots per cane on the head of the vine.  Less severe thinning reduces viticultural benefits.  More severe thinning provides negligible additional benefit with a cost of lowered fruit yields (Fig 4).

In conclusion, shoot thinning is a viticultural practice that compliments pruning and like pruning, shoot thinning is simultaneously both a canopy and crop management practice.  The objectives of shoot thinning are to attain a favorable ratio or balance between fruit and foliage, to promote light and air penetration into the fruit zone, to encourage uniformity in shoot and crop development along the length of a cordon or cane, to avoid canker disease, and to facilitate vineyard operations and control costs.

BOTRYTIS BUNCH ROT: A COMPLEX DISEASE REQUIRING INTEGRATED CONTROL

Wayne F. Wilcox

Plant Pathology & Plant-Microbe Biology Section, SIPS, Cornell University, NY State Agricultural Experiment Station; Geneva, NY 14456 USA Botrytis bunch rot (BBR), caused by the fungus Botrytis cinerea, causes damage to ripening grape clusters throughout the temperate regions of the world where pre-harvest rains occur. Although pure Botrytis infections free of secondary contaminants can sometimes produce the so-called "noble rot" integral to the production of certain prized dessert wines, a far more common result is a disease that reduces both yield and fruit quality (Fig. 1), as infected grapes typically produce wines with substandard flavors and appearance. BBR is an amazingly complex disease. Its development is governed by multiple 3-way interactions between the grapevine, the environment, and the Botrytis fungus itself, many of which are poorly understood. This article will attempt to summarize the work that our research group has undertaken in an effort to better understand the fundamental principles underlying BBR development and apply this knowledge to its management.

DISEASE BIOLOGY

Botrytis a “weak” pathogen that primarily attacks highly succulent, dead, or injured tissues, or those that are slowly breaking down through senescence. Feeding sites of grape berry moth larvae, powdery mildew scarring of the grape epidermis, and pre-harvest splitting caused by overcrowding within tight clusters and/or excessive rain are common berry injury sites attacked by Botrytis. Withering blossom parts, aborted fruitlets, and ripening berries as they near maturity are important senescing tissues with respect to BBR development. The fungus thrives in high humidity and still air, hence the well-known value of cultural practices such as leaf pulling and canopy management to minimize these conditions within the fruit zone. Although the fungus does not grow well in berries until they start to ripen, it can gain entrance into young fruit through senescing blossom parts, old blossom tissues ("trash") sticking to berries within the cluster, and scars left by the fallen blossom caps (calyptra). Such infections remain latent and unseen while berries are green. However, some of them can resume activity and rot the berries as they start to ripen (senesce) if the conditions are favorable, after which further spread can occur as new infections expand from these sites into additional ripening berries. This raises the practical question: When are damaging infections most likely to occur? And relatedly, when are fungicide sprays directed at this disease most important and valuable?

We began investigating this question some years ago in a block of different Pinot noir clones. Because it is well known that BBR is more severe in cultivars and clones with compacted fruit clusters, we chose to work with tight-clustered clone 29 (PN29) and the loose-clustered Mariafeld clone, which commonly develops less Botrytis than most other clones. We also added a third “clone” to these experiments--PN29 vines whose clusters were thinned (individual berries removed) by hand after fruit set so that their architecture resembled that of Mariafeld. This was to help determine whether Mariafeld’s relative resistance to BBR in the vineyard results from some chemical or physiological factor specific to this clone or is simply due to the fact that its clusters are looser than most other Pinot noir clones.

For two consecutive years, clusters of the three clonal treatments were inoculated with spores of the Botrytis fungus and kept wet overnight to promote infection, at four different growth stages: (i) late bloom; (ii) pea-sized berries; (iii) bunch closure; and (iv) veraison. Selected clusters were taken to the laboratory 10 days post-inoculation in order to determine the percentage of berries with invisible latent infections, whereas the remainder were allowed to mature on the vine; these were rated at harvest to determine the percentage of the berries that had become rotten by Botrytis.

The results from these experiments are presented in Figures 2 through 5. There was no consistent effect of inoculation timing on the establishment of latent infections, although a greater percentage of berries did become infected from the late bloom inoculation in Year 2. Similarly, there was no effect of the clonal treatment on latent infection establishment in either of the two years (Figs. 2 and 4). In contrast, both the time of inoculation and clonal treatment had a pronounced effect on the percentage of berries that actually became diseased after they matured. That is, the highest levels of disease resulted from inoculations at veraison, consistent with the preference of the Botrytis fungus to colonize senescing tissues. Also, the greatest number of rotten berries always developed in the naturally compacted clusters of PN29, whereas there were significantly fewer in the naturally looser clusters of the Mariafeld clone or in clusters of PN29 that had been thinned to a degree of looseness resembling Mariafeld (Figs. 3 and 5). Furthermore, it was clear that latent infections often failed to become active and cause berry rot, particularly in the clusters with less compaction. In Year 2 for example, 64 and 76% of the berries developed latent infections when clusters were inoculated at late bloom in the PN29/thinned and Mariafeld treatments, respectively, yet only 2 and 1% of the berries in those same respective treatments actually became diseased by harvest (Collectively, these results led us to hypothesize that the high levels of disease that developed in the tight-clustered PN29 clone resulted from a relative few latent infections that became active during the post-veraison period and then spread to a much greater degree than when such clusters were thinned, or in the naturally-loose Mariafeld clusters. To examine this possibility, 10 days after veraison we inoculated either 1, 3, or 5 berries on various PN29 clusters, which were either naturally compacted or had been thinned by hand at fruit set as before. To do so, we used a hypodermic needle to inject the designated berries with Botrytis spores, thereby producing individual rotten berries within clusters about 1 week later.

These served as initial “point sources” of the disease from which it could spread, and were meant to simulate the occasional post-veraison activation of latent infections. As Fig. 6 shows, the disease spread extensively throughout the natural, unthinned PN29 clusters: from a single rotten berry that first developed 2.5weeks after veraison, the disease subsequently spread to an average of 50 additional berries by harvest. In contrast, disease spread was minimal within the thinned clusters in which a single berry was inoculated and was only modestly greater when three or five berries were inoculated.

In a related experiment the following year, bunches of a tight-clustered Chardonnay clone were similarly thinned (or not) and inoculated. Additionally, based upon a phenomenon we had observed years ago with Botrytis infections of strawberries, some vines received four weekly sprays of urea (9 kg/ha) beginning at veraison, to see if high berry N content would affect disease spread. (Note that due to its late application, this treatment increased assimilable N in the must without increasing canopy growth.) Once again, little disease spread occurred in the thinned clusters regardless of nitrogen treatment, whereas significant spread did occur in the naturally compacted clusters.

Furthermore, elevated berry N also increased spread within these clusters when the system was not “saturated” with the maximum number of inoculated berries. For example, when three berries per cluster were inoculated, the disease spread to three additional berries in the thinned clusters with or without post-veraison urea sprays; in contrast, it spread to 31 and 11 additional berries in the compacted clusters on vines that did or did not receive the urea applications, respectively (Fig. 7).

Thus, it appears that latent infections that occur during the bloom and immediate post-bloom period probably result in relatively few rotten berries, directly. But of greater importance, they appear toserve the role of primary infections, providing a “base” for the pathogen to establish itself, from which damaging levels of secondary spread can occur should any of the latent infections become active pre-harvest and conditions be favorable for furtherdisease development. Conditions favoring pre-harvest spread include not only climatic factors but physiological factorsas well, including high berry nitrogen levels and compacted clusters, as shown above. Cluster compaction appears to be extremely influential, since the fungus can spread through tight clusters from just a single initial rotten fruit, via berry-to-berry contact (Fig. 8).

Thus, finding a means to reduce cluster compaction safely and reliably is something of a “Holy Grail” in terms of Botrytis management. Several techniques have been tried, two of the more successful being well-timed applications of gibberellic acid and cluster-zone leaf removal at the very beginning of bloom. However, these and other techniques have their own limitations and potential negative side effects, and deserve far more discussion than this article will allow.

Fig. 8. Spread of Botrytis via berry-to-berry contact within a compacted cluster of Chardonnay grapes

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Because most latent infections initiated during and after bloom do not become active and rot berries before harvest, it would be helpful to predict when pre-harvest activation might occur and potentially start an epidemic. Although the factors that stimulate activation are not well understood, we have identified three that appear to be involved: high berry nitrogen content, high atmospheric relative humidity (RH), and high plant water content.

Since we had already determined that increasing berry nitrogen levels could increase secondary spread of the disease, we decided to investigate whether it might also promote the activation of latent infections. Chardonnay vines were inoculated with Botrytis spores at bloom to initiate latent infections, some were sprayed with urea (9 kg/ha) five times at weekly intervals beginning 1 week before veraison, and the effect was evaluated at harvest in two different ways. In the first, we determined the percentage of clusters that had at least one diseased berry, presumably the result of a latent infection initiated at bloom that eventually became active. While doing so, we separately evaluated both the inoculated clusters and uninoculated neighboring clusters that were subject only to natural infection, and in both cases the incidence of diseased clusters was nearly 50% greater on vines receiving the urea sprays versus those that did not (Fig. 9). We also determined the percentage of the cluster area that was diseased on these bunches (essentially, the percentage of diseased berries), which integrates the effect of N on both the activation of latent infections and their subsequent spread through the affected bunches. This measure of disease severity was doubled and tripled on the inoculated and uninoculated clusters, respectively, for vines treated with urea versus those that were not (Fig. 10).

To examine the effects of high RH, we utilized potted Chardonnay vines. These were inoculated with Botrytis spores at bloom in order to initiate latent infections and then were maintained in a covered screen house, where they were subject to ambient environmental conditions while being protected from rain. At either veraison or 10 days pre-harvest, 25 plants were moved to a large humid chamber (95% RH), and five of these were removed either 1, 3, 5, 7, or 9 days later and returned to the screen house. At harvest, we then determined the percentage of clusters that had at least one diseased berry, presumably the result of a latent infection initiated at bloom that became active. As shown in Fig. 11, imposing high RH for as long as 9 consecutive days had no effect on latent infection activation if the treatment began at veraison. However, prolonged humid conditions during the pre-harvest period substantially increased the frequency of clusters with active infections by harvest, from 10% with 0 or 1 day of exposure to30 and 80% after 3 and 9 days of highly humid conditions, respectively.

Although latent infections usually do not become active until after veraison, we occasionally see pea-sized berries with Botrytis symptoms when extensive rainfall occurs during the early post-bloom period. Again, based upon what is known about the interaction of the Botrytis fungus with other crop plants such as strawberries, it seemed possible that this might be due in part to berries becoming more susceptible to colonization by the pathogen (latent infections becoming active) when vines are provided unrestricted access to water in the soil. To examine this, we again inoculated potted Chardonnay vines with Botrytis spores at bloom and maintained them in a covered screen house. The vines were watered regularly until veraison, then the pots were split into two groups, which were:(i) similarly watered (with a hose) almost daily in order to keep the soil wet (WET), or (ii) watered only when the shoot tips began to wilt (DRY). The percentage of clusters with at least one diseased berry was determined at harvest, after which the harvested clusters were incubated at 95% RH for an additional 4 days to see whether additional latent infections might become active. As shown in Fig. 12, latent infections had become active by harvest in approximately three times as many clusters in the WET treatment as in the DRY, although the only difference between the two was the amount of water added directly to the soil (the foliage and berries did not get wet in either treatment). When the harvested clusters were then incubated under high RH conditions, the percentage of diseased clusters more than doubled in the DRY treatment, whereas it was virtually unchanged in the WET (Fig. 12). These results suggest that in the former treatment, a significant number of viable latent infections had failed to become active by harvest but did so once conditions became more favorable during high-RH incubation subsequently. In contrast, the pre-harvest conditions were much more favorable for latent infection activation when vines were provided high amounts of water in the soil, so subsequent incubation under high RH conditions had little additional effect.

MANAGEMENT

Cultural practices to improve air flow around the clusters, such as canopy management and leaf pulling, are well known and widely practiced. Removal or destruction of vineyard debris, particularly old cluster stems which serve as a major source of overwintering inoculum, is useful as well and worth employing to whatever extent is practical. Minimizing cluster compaction through cultivar and clone selection at planting, and perhaps by utilizing some experimental techniques such as gibberellic acid application and trace bloom leaf removal, can have a major positive impact. Excessive levels of nitrogen application (and pre-harvest irrigation, where that is practiced) should be avoided. Fungicide sprays targeted specifically at BBR also can be beneficial on susceptible cultivars and/or clones, particularly in a wet year. However, it’s important to remember that unlike some of our other common fungal diseases, it is very difficult to control Botrytis primarily through a good spray program. Integrating fungicide applications with cultural control techniques is a necessity for managing this disease consistently and effectively.

The fundamental questions regarding fungicidal control are which materials and when? Traditional BBR spray programs call for possible applications at bloom (or late bloom); just as bunches are closing; veraison; and pre-harvest. The earlier timings are designed to prevent the initial establishment of infections through susceptible blossom parts and blossom trash, whereas the later sprays are designed to prevent both initial infections through injured ripening berries and the spread of active infections throughout the ripening clusters. Despite some pronouncements to the contrary, none of these timings are necessarily better than the others since either, both, or neither ends of the seasonal spectrum can be important, depending on

This concept is nicely illustrated by data that we have gathered over 12 different seasons since 1996.Figure 13 shows the control provided by two Botrytis sprays applied either early (late bloom plus bunch closure) or late (veraison plus 2 weeks pre-harvest) or sprays applied at all four of those stages, expressed as a percent reduction in disease severity relative to vines in the same trial that received no Botrytis sprays. Note that in some years (i.e., 1998, 1999, 2007, 2015), either two early sprays or two late sprays provided as much or nearly as much control as all four. In 2002, the two early sprays alone provided nearly as much control as the full program, whereas the two late sprays alone provided very little. In contrast, the two late sprays were as effective as the full program in2011, whereas the two early sprays provided only half as much control. And in the remaining 6 years, the full program was superior to those confined to either the first or last two applications, with the relative contributions of the early and late timings varying among years.

The activities of the fungicides used against Botrytis could be the topic of another full article, which space does not allow. However, it should be noted that these materials can vary not only in their general efficacy but also in their physical mode of action. That is, whereas most provide fair to excellent protective activity, only some have the capacity to enter flowers and berries and fight the fungus after infection has occurred. Generally speaking, this activity is relatively common (but not universal) among the newer synthetic fungicides but is not common among the biological and biologically-derived products. It is also important to remember that the Botrytis fungus can develop resistance to virtually all of the new, highly effective synthetic compounds, so the need to rotate among the various fungicide groups cannot be overemphasized.