

GRAPE PRESS

Summer 2020

The Quarterly Newsletter of the VIRGINIA VINEYARDS ASSOCIATION

Vol. 36 No. 2

QUICK LINKS YOU CAN USE

Here are resources intended to help Virginia grape growers navigate issues arising from the pandemic and spring frost.



VIRTUAL MEETINGS: With in-person gatherings a no-go, VCE Zoom meetings offer advice and updates.

COVID-19 Response

During this crisis, if you're in the wine industry and need services or items, or if you're able to offer assistance, you can now place a Free Exchange ad in our COVID-19 Response section.

VVA Exchange

The VVA is working to bring our grape growers information and resources they can use on our COVID-19 Response page. We'll continue to update the site.

COVID-19 Response

PANDEMIC: The VVA has compiled guidance, tools and links to assist growers.



SPRING FROSTS: Research and observations available on the VVA website.

ALSO INSIDE

Disease Prevention
Mizuho Nita looks ahead to summer pressures.

PAGE 10

Redox Review

Bruce Zoecklein on oxidation-reduction and wine quality.

PAGE 11

Elevation Plays Key Role In Spring Frost Outcome

By Bill Tonkins

Veritas Vineyard and Winery

When Patricia and Andrew Hodson purchased Saddleback Farm in 1999, they did so with the intention of setting up a small vineyard and winery. They did not have any site selection criteria such as elevation, slope, or soil type in mind when they settled on Saddleback Farm, but chose the location because of its beauty and the fact that there were other vineyards in the area.

Afton Mountain and Cardinal Point were close by, so, you must be able to grow grapes; right? A big assumption, but they struck lucky as with few exceptions, they have had little frost damage over the past 20 years.

For more on how weather has affected vineyards, see our Regional Reports starting on Page 3.

This good fortune owes much to the property's elevation. It ranges from 850 feet to 1,175 feet, with good south-facing

aspects and 2 to 30 percent slopes with soil ranging from loam to well-drained degenerated granite. The vineyard also sits in the Rockfish Gap, which is a low point in the Appalachian Mountain range and a source of strong winds that are funneled through the gap.

Well, as good as the site may have been for the last 20 years, this year was different. We got hit by two hard

See FROST on page 8



Photos courtesy of Bill Tonkins

Like a number of Virginia vineyards, Veritas is dealing with the after effects of late frosts. Figure 1, above, shows some damage to vines at 950 feet, the start of the frost line.

President's Corner

Responding to Trying Times for Growers

By Nate Walsh

Walsh Family Wine

From a cultural perspective, the difficulties growers encountered at the onset of the 2020 season are new to us all. The coronavirus pandemic gave rise to a number of concerns: the health of our workers, the financial struggles of wineries caused by the business shutdowns, the resulting uncertainty of the grape market, and the general uncertainty of when things will return to normal.

In Virginia, unfortunately, this has been exacerbated by significant crop loss due to multiple frosts throughout the state.

The Virginia Vineyards Association has provided resources that we hope are helping our members navigate through these difficult times. For growers and producers concerned with fruit sales and availability, I would encourage you to access the VVA's "Exchange" page online, where many buyers and sellers list fruit for sale or fruit that is being sought.

See PRESIDENT on page 2



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PRESIDENT'S CORNER (cont.)

PRESIDENT, from page 1

We also created a "Crisis Response" category in our Exchange listings that growers, wineries and workers can use to let each other know what help they may need during this crisis (such as labor and equipment) to keep their vineyards operating and what they may be able to offer others. To meet the industry's needs during this crisis, all membership requirements and fees are waived for posts in this category.

With so many unusual influences on the grape and wine market this year, it is harder than ever to predict availability. The best we can do is be aware of our own needs at this time, and to communicate with growers.

I would encourage producers to source fruit as early as possible this year, if you have not already, and to utilize the Exchange page.

Additionally, Virginia Cooperative Extension (VCE) has been hosting virtual Seasonal Update meetings in cooperation with the VVA, offering a convenient way to stay abreast of vineyard updates as well as a way to stay connected to other growers at a time when we are still not meeting in person.

These virtual meetings have focused on subjects like frost damage management and pest and disease management and will continue to focus on topical subjects of the season.

Links and information on these virtual events can be found through VCE, as well as on the VVA website and in this issue of Grape Press (see below).

While we will not be able to offer a Summer Technical Meeting this year, the Seasonal Update meetings offer a chance to stay connected and up to date.

Regarding the frost, the VVA has added a page to our website with resources and information that will be helpful for growers who have lost crop and are looking for management guidelines for damaged vines.

Finally, the VVA is always looking for feedback on ways we can provide more and more resources and information for members. More than ever, we are interested in what we can do for you and your operation during this unprecedented time. I encourage you to reach out to me or any of the VVA Board members with any input into how the VVA can be of assistance.

Vineyard Meetings Go Virtual

Seasonal update meetings have been held for vineyard growers as an alternative to in-person meetings typically conducted around the state. The Zoom calls have been a joint effort of Virginia Cooperative Extension, Virginia Tech and the Virginia Vineyards Association (VVA).

Four meetings were held in May and June. Here are some of the highlights of each meeting (click on each for a link to the full video).

► **May 7:** An update on the spring frost situation from Tony Wolf, information on pest management from Doug Pfeiffer and disease management from Mizuho Nita, and answers to questions from the field from Tremain Hatch.

► **May 21:** Updates on the frost situation, disease management, weed management and the Worker Protection Standard, as well as answers to questions from the field.

► **June 4:** Seasonal vineyard updates and pest updates, as well as disease management reminders, and a panel moderated by VVA President Nate Walsh that included five growers from around the state who described their experiences with frost this spring and discussed what they're seeing in the vineyard now.

► **June 18:** A growers' panel moderated by Nate that focused on crop estimations, as well as seasonal updates, fungicides and grape disease management.

► A fifth meeting is tentatively planned as a pre-harvest workshop for later this summer. Details will be publicized as they become available.

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▶ CENTRAL VA: “... Vineyards that were spur-pruned fared a bit better ...”

By Grayson Poats
Valley Road Vineyards

Devastation. That is the word that best describes the one-two punch delivered by Mother Nature with the frosts and freezes that struck Central Virginia in the early morning hours of April 19 and May 10.

The frost of April 19 caused widespread damage in many vineyards, especially those that are low-lying. Vineyards below 850-foot elevation saw real damage to primary shoots. Anywhere from 20 to 60 percent were damaged, with vinifera generally suffering more damage than hybrids.

Our vineyards in Afton have an elevation of about 840 feet at the lowest point. The temperatures there on the morning of April 19 reached a low of 29.8 degrees at 5:45 and stayed there for 30 minutes. The wind, which had been blowing at 5-12 mph, became calm at that point.

At 6:15 a.m., the temperature rose to 32 degrees where it stayed for another hour, and the breeze also picked up a bit. At 7:15, the temperature rose sharply to 40 degrees and the event was over.

We suffered very minimal damage from that frost event. I had to look at multiple vines to find a scorched leaf or two. As I climbed several rows up the slope, the damage was completely absent. Our Mountain Glen vineyards in Lovingston, which have elevations ranging from 830 feet to just over 900 feet, had minor damage in the lower half of the range.

The hardest hit was the Viognier, which suffered about 50 percent damage to the primary shoots.

Damage to other varieties was more in the 10 percent range, and above about 850 feet in elevation, damage was well under 10 percent. From talking with several growers, it seemed that the pattern of damage that I saw in our vineyards was typical for this event.

Mother's Day Freeze

As we all now know, the arrival of May did not bring relief from the threat of frosts. The weather reports as we approached the Mother's Day weekend were ominous, and I was fearful that we might be in for a repeat of what happened on April 19.

I was wrong; it was far worse.

Heat loss from the day happened quite rapidly on the evening of May 9. The temperature stood at 37 degrees at midnight, and with a wind speed of zero, there was no chance of mixing any warmer air that might

be aloft.

By 1:45 a.m., the temperature had dropped to 32 degrees, and by 3 a.m. it reached 30.6 degrees where it stayed for over three hours. While this caused significant damage to our vineyards below 925 feet (about two-thirds of our Chardonnay and Cab Franc were damaged), we were far luckier than many.

Two grape growers in Central Virginia with decades of experience with spring frosts have characterized this freeze as most probably the worst they have experienced. Tim Gorman at Cardinal Point Vineyard & Winery said, “In 34-plus years of working my vineyard, this is the single biggest loss of fruit attributable to one event.”

Phil Ponton, who has been growing grapes at Oakencroft since 1982, said much the same thing, noting that the temperature sat at 28 degrees for hours and caused a total loss. It should be noted that both these gentlemen have wind machines in their vineyards which were running that morning. There was simply no warm air aloft to mix in with the surface level cold air.

This situation was repeated throughout the region. Jeff Sanders at Glass House Winery had set fires the night of May 9-10, but with the exception of a block of Cab Franc that has about 35 percent of its crop remaining, he suffered a near 100 percent loss of his vinifera. Temperatures at his location dropped to the 23-25 degree range. This was not a frost event but a freeze event.

In past events, the severity of the damage has proven to be less dire than it seemed to be on initial inspection. Let's hope that proves to be the case here, but even if it is, this will turn out to be a tremendous loss for many growers in the area.

Recovery from such devastation will take multiple years for those growers hardest hit. From what I have been told, vineyards that were spur-pruned fared a bit better than those that were cane-pruned.

Spur-pruned vineyards often had mixed damage with a portion of the shoots surviving while cane-pruned vineyards saw all shoots eliminated, whether from primary or secondary buds.

In either case, renewal shoots from either the trunk or from the head area will have to be utilized to establish a new cordon for the 2021 season. If this renewal is from the trunk

it may not be until 2022 that a significant crop is again realized.

Labor Issues

Another problem made worse by these events — and one that I had not thought of as I surveyed the damage in the days following May 10 — was the drain on the available labor pool for the canopy work that still needs to be done.

Because of the freeze, the work of shoot thinning and positioning came to a standstill. As a result, workers turned elsewhere to find a paycheck and work crews lost members. The crew that I employ has gone from eleven members to five, which will make it that much harder to get jobs done on a timely basis when their services are again needed — which would be now.

At this writing at the beginning of June, the crew chief tells me they have only had enough work for two to three days a week, but now are getting calls to schedule work which will be difficult to accomplish with a reduced staff.

Vineyards that employ H2A workers have also been caught in a pinch, in some cases being forced to send guest workers back to their home countries because they had no work for them.

How this plays out over the course of the season — as well as how it will affect next season — remains to be seen. Will workers be willing to travel here to work if there is a possibility that they may be sent home without earning the wages that they were counting on?

Virtual Meetings a Plus

In an effort to end this on a more positive note: a shoutout of appreciation is again due to Tony Wolf and his staff for the Virginia Cooperative Extension virtual vineyard meetings that they have conducted over the last several weeks.

These meetings have offered much needed practical advice on how best to react to the devastation caused by the events of April 19 and May 10, from the perspective of both canopy management and spray programs.

Everyone's vineyard was impacted in a slightly different way by these events, and the advice offered by Tony and his staff will be of great help in sorting through the hard choices ahead.

“The frost of April 19 caused widespread damage in many vineyards especially, those that are low-lying.”

► **SOUTHERN VA.:** “As we feared, budbreak began about 10 days earlier than last year.”

By Rachel Lagergren
Stanburn Winery

As shared by many vineyards all over the state, last year we were very excited to harvest quality grapes that could hang until it really was time to pick and not because we had to pick. 2019 was a great year to see the grapes develop and ripen. This inspired the crew to tackle improvement and repair projects over the winter, including a third set of catch wires for our Chambourcin and Vidal Blanc blocks, new posts to replace rotten ones and the tightening of trellis wires.

As early as January, we experienced highs in the 60s and 70s and many nights above freezing. They were lovely temperatures for working outside (at times without a jacket) but a little stressful as pruning continued through March.

What happened next was more unpredictable weather. As we feared, budbreak began about 10 days earlier than last year. Budbreak was followed by three frosts by April 20 and four more frosts in May with a freeze on May 9. Heartbreaking!

The surprising aspect of the frost/freeze events was the frequency in combination with the earlier budbreak and the “late”

cold snap in May.

Our first frost/freeze occurred on April 11. The temperatures got down to 28 degrees. We were down to 31 degrees on April 16, 17, 19.

Then, in early May, we had a couple of frosts with temperatures down to about 33 degrees. We recorded 30 degrees on May 10 as the polar vortex passed through.

Surprisingly, the range has been no visible damage to obvious damage to primary and secondary shoots across all our varieties with the exception of the Vidal Blanc — I see no visible damage at that location.

We’ve decided to wait until after fruit set to determine how much crop we could still bring to harvest.

Looking ahead, we expanded the vineyard last year with new blocks of Petit Verdot and Barbera and this year we replaced declining Cabernet Franc, Chardonnay and Vidal Blanc vines with the same varieties on different rootstock. All these vines

were tucked safely into grow tubes before periodical cicadas Brood IX began their 17-year periodic emergence.

The planting and grow tube installation occurred as we experienced over 8 inches of rain just in May. (Our weather station has recorded over 25 inches for the year as of the end of May.)

I’ll let you know if frogs start falling from the sky. I believe it’s going to be that kind of year.

Editor’s Note: Rachel Lagergren is a new regional reporter for Grape Press, covering the southern part of the state. We hope to feature more news about Southern Virginia’s vineyards and wineries in future columns. Please contact Rachel at lager0862@gmail.com if you’d like to provide information for upcoming columns about growing conditions, new plantings or anything else you think would be of interest to other growers.

From the Author:

Thank you for including the vineyards of the Southern Region in Grape Press. We are very glad to be sharing what’s going on down here.

Stanburn Winery is located in Patrick County, very nearly at the border with North Carolina. We have about 16 acres established in the late 1990s consisting of Cabernet Franc, Chardonnay, Traminette, Chambourcin, Barbera and Petit Verdot.

Our other site is a 2-acre planting of Vidal Blanc located in Dry Pond, Va. The main vineyard in Patrick Springs is at 1,250 feet while the Vidal Blanc grown in Dry Pond is at our highest elevation of approximately 1,450 feet.

— Rachel Lagergren
Vineyard co-manager
Stanburn Winery



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NORTHERN VA.: "Chardonnay seems to be hit the hardest, region-wide."

By Dean Triplett
Greenstone Vineyard

What can I say about the spring of 2020? Can we go back to January and have a do over?

The last three months have been a blur for me, and I'm sure for many others. First, March was warmer than normal for the entire northern region. The warm temperatures caused the buds on our vines to push so early that many of us thought we'd be picking everything by the end of August.

My first spray of the season was April 11, the earliest I've ever put one down. And while March was warmer than average, April and May were cooler than average. Consequently the buds that started to push in March then slowed to a crawl — to the point that many people feel that vine growth is one to two weeks behind what's usually considered normal.

As of May 20, 40 of the previous 48 days were below average temperatures. And while March saw slightly above-average precipitation, April and May were about normal. To add injury to insult, we had two pretty devastating frost events in April and May.

The first was over the days of April 16-19 and the second May 9-10. If you have a vineyard below about 550 feet in elevation, you more than likely saw some frost damage. One grower along the Potomac River reported 80 percent loss overall in some varieties.

Chardonnay seems to be hit the hardest, region-wide. Some Chardonnay vineyards at higher elevations near Waterford saw only 10 percent damage. Another grower in western Loudoun got hit for the first time in 13 years, with an estimated 10 percent damage, mostly to distal tips and leaves in his Merlot.

Another western Loudoun grower at a higher elevation saw only spotty damage with maybe 5 percent damage to leaves with less damage to flower clusters.

I was very fortunate to miss the April event completely, but the May frost did roughly 2 percent leaf damage to about 64 vines that are planted in a swale that runs downhill on the northern side of my Merlot vineyard.

Even though this section of vines is higher in overall elevation than the lowest section of my vineyard, vines at the lower elevation were undamaged. The vines at the lower elevation are also Albarino and some varieties are definitely more susceptible to



Courtesy of Dean Triplett

New plantings at Greenstone Vineyard are off to a good start with normal to slightly above-average rainfall.

frost damage than others.

But the cold air must act like a creek, flowing down the swale and away from the lower vines.

Overall damage in our region seems to be between less than 1 percent to more than 80 percent. From what I can gather through Tony Wolf's emails and webinars, we seem to have come through better overall than some of the other regions of the state.

On top of all of this, Covid-19 hit. Because of the self-quarantining going on, I have had minimal contact with other growers. As is the case worldwide, with restaurants, hotels, and the travel industry, wineries have been hit hard and stretched to the breaking point.

Many wineries in our region have gotten very creative in their attempt to keep some cash flow coming in and follow state guidelines at the same time. Independent growers like me have just been plodding along like normal for the most part.

After contacting my winery clients expecting the worse, they all say they want the same amount of fruit this year as in the past. I'm very grateful to them for their loyalty and friendship over the years, now more than ever.

I'm also fortunate to have my shared crew still working and my vines look great. As I write this report in the first week of June, my vines are showing signs of getting ready to bust out into bloom in my early varieties.

My pre-bloom spray last year was June 1. Even though I thought vine growth might be behind other years, now I'm thinking maybe not so much.

I replanted my Traminette vines with Albarino and Valvin Muscat. I know a number of other growers did some substantial replanting as well. At Catocin Ridge Chateau, Andrea and Josh Richter got 2,500 Cabernet Sauvignon vines in during May.

I'm also planning on finishing up planting a small final section of my property to Albarino, hopefully next year. With the normal to slightly above-average rainfall this spring, new plantings and replants have gotten off to a good start.

The weather forecast for summer calls for higher than average temperatures, especially in the July and August time frame, and a slightly greater chance of precipitation. It's a little hard to know exactly how to handle leaf pulling this year. I'm tempted to pull leaves in the fruit zone a bit more aggressively than I have in the past so as to really open it up to sun, wind and sprays.

On the other hand, if it's not done at the correct time, I run the risk of potentially severe fruit burning. A lot will depend on the crew's availability. And unfortunately, I have a bad track record of trying to outwit Mother Nature! As everything we've experienced this past spring makes abundantly clear, she always has the upper hand.

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Elevation's Role in Spring Frosts

FROST, from page 1

frosts, first in mid-April and again in mid-May.

After the second hottest March on record, featuring temperatures in the 80s, bud break arrived at the beginning of April. Growth stages on April 11, when we experienced the first of April's six freeze warning events, ranged from 2 to 3 leaves separated in the Petit Verdot to 6 or 7 leaves separated in the Chardonnay.

Two of the predicted frosts failed to materialize, but temperatures went down to 27 degrees at dawn, the lowest temperature of the night. The sky was clear and there was no wind. So, the conditions were ideal for a radiation event, and true to form, there was a hard frost on the ground outside my house at 900-foot elevation at sunrise.

On April 19, however, temperatures dropped to 26 degrees at dawn, the lowest temperature of the night. The sky was clear and there was no wind. So, the conditions were ideal for a radiation event, and true to form, there was a hard frost on the ground outside my house at 900-foot elevation at sunrise.

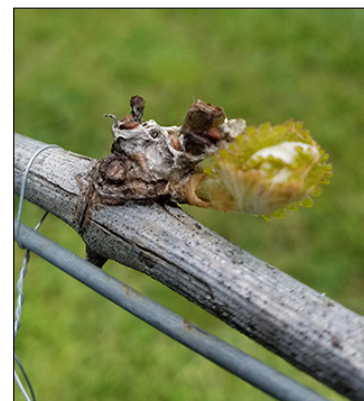
An inspection some three hours later showed much damage to the vineyards below me, where my hi-lo temperature gauge showed a low reading of 28 degrees. This is two degrees warmer than at the higher elevation, which makes me think that the gauge outside my house is slightly off. There was, however, little to no frost damage above my house.

Dr. Tony Wolf came to visit, and he saw that the Chardonnay on the lower levels was hard hit, and yet the Cabernet Franc growing alongside it had received nothing more than a good shoot thinning, while the Vidal was relatively unscathed. We were, nonetheless, hurting, with some 50 percent of our vineyards suffering over 80 percent frost damage. April 22 brought another freeze event, but no frost and no additional apparent damage.

If we thought things could not get worse, we were wrong. They did.

In May, just as our secondary shoots were pushing, a chunk of the polar vortex decided to break away and sit firmly over Central Virginia, making it colder here than in Alaska.

On Mother's Day, we had another radiation event and everything below 950-foot elevation suffered frost damage. Temperatures at 900 feet got down to 26 degrees at dawn, and the temperatures at



Clockwise from above: Figure 2 shows Veritas vines at 850-foot elevation, which were hit hard by the frost; Figure 3 is a tertiary bud on cane-pruned Viognier that's part of an experiment set up by Veritas; and Figure 4 is an untreated vine pushing out shoots everywhere.

higher elevations were equally cold but the vines were unaffected. I can only assume they did not get frosted and that the air circulation/drainage kept them dry and saved them.

So that is the background. We had two frost events one month apart that impacted the vines in three ways.

- Above 950 feet there was relatively little to no damage;
- Below 900 feet there was significant damage;
- Between 900 and 950 feet there was moderate to severe damage.

My challenge is dealing with the damage between the May frost line at 950 feet down to the April frost line at 900 feet. The vines between these two lines were hit with moderate to severe damage just the once, and therefore they have a mix of primary and secondary growth. On top of this, summer laterals and axillary shoots are growing like crazy. Disease management, extended bloom, canopy management and

imbalance of fruit ripening are a challenge.

Figure 1 (on Page 1) is a picture of the vines at 950 feet, the start of the frost line. Note the shoot tip damage and damage floral inflorescence. Note also just how brown it is below these vines as the frost hit harder and harder the further down the slope you go.

Below 900 feet the vines got hit hard by both frosts, as you can see in figure 2 (above), which shows the vineyard at 850 feet. These vines lost their primary and secondary buds and with a few varietal exceptions there is little or no fruit on the tertiary shoots, which have now emerged. I have, therefore, mothballed these vineyards and will be spraying just Manzate/Captan and sulfur for the rest of the season to keep the vines healthy for next year.

Figure 3 (above) shows a tertiary bud bursting on the cane-pruned Viognier vines from the vineyard where we have set up an experiment. We have chosen four blocks

See FROST on page 9

Varied Elevations Lead to Mixed Results

FROST, from page 8

of Viognier for this experiment as we understand that the secondary shoots on Viognier are invariably fruitful.

One of the blocks is a control. We plan to shoot thin another so that we retain the secondary buds only (easier said than done) and have rubbed out all the frosted shoots on another block, so that only replacement shoots can push through.

This was labor intensive and scary as many of the shoots had lignified and there was a danger of destroying the node entirely.

In theory we hoped to obtain a uniform crop but sadly it is already apparent that there is no secondary shoot and we are

likely to get nothing from the tertiary shoot.

On the final block we are spraying a biostimulant to promote growth and yield. Once again, the biostimulant is not likely to produce any yield from tertiary shoots but it may make the vigor worse. See Figure 4 (page 10), which shows an untreated vine which is literally pushing out shoots everywhere, even from 15-year-old trunks.

This will be the second time this year that we have done sucker and shoot removal from the trunks. It's a labor-intensive activity, especially when there will be nothing to show for it. I suspect that we will end this experiment soon once there is no fruit to be seen. In hindsight

we should perhaps have chosen the Vidal, which still has fruit.

The bottom line is that we have probably lost 50 to 60 percent of our fruit due to frost damage. Nearly all this loss is from the lower elevations where there was damage to both the primary and secondary shoots from the April and May frosts. I hope I am wrong.

I am, however, cautiously optimistic that we will have some fruit from the vines in between the two frost lines, which received moderate to severe damage on their primary shoots only. As for the higher elevations above 950 feet, we can but pray for a good summer and harvest so that this year with Covid-19 is not a total disaster.

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More Time to Apply for Vineyard Grants in So. Va.

The Virginia Tobacco Region Revitalization Commission (TRRC) has extended the Vineyard Development and Expansion Program and has approved continued program management by the Institute for Advanced Learning and Research (IALR). The program promotes the state's wine economy and agritourism growth by providing growers throughout TRRC's 34-county footprint incentives to expand vineyard acreage.

"We look forward to continuing our partnership with the Virginia Tobacco Region Revitalization Commission to foster the development and expansion of Virginia's vineyards, an important contributor to regional agritourism efforts and the Virginia wine industry," said Mark Gignac, IALR executive director. "We encourage growers to take advantage of this cost-share program and are available to offer assistance throughout the application period."

Through the cost-share program, IALR will continue to work with the Virginia Cooperative Extension, TRRC and the Virginia Vineyards Association to increase vineyard acreage and address the shortage of Virginia-grown grapes. A costshare award of up to \$3,000 per acre is available for qualified vineyard growers, reimbursing 33 percent of eligible expenditures. Vineyards with up to nine acres may receive a maximum award of up to \$15,000, and those with 10 or more acres may receive a maximum award of up to \$20,000.

Funding is awarded through a competitive process and may be sought by qualified existing growers who wish to expand their current acreage and by new growers developing their first vineyard. To be considered, new growers must establish at least three acres of new vines, and existing growers must be willing to plant a minimum of one new acre. Eligible cost-share items include, but are not limited to, grapevines, hardware for trellis systems, fencing and irrigation systems.

For more information, including a detailed map of eligible counties and the application, go to <http://trrcgrape.com>. Applications are now being accepted; the deadline to apply is Dec. 31, 2020. For additional information and questions, contact Program Manager Amy Turner at Amy.Turner@ialr.org.

— Institute for Advanced Learning and Research

Disease Pressure: Looking Ahead

By Mizuho Nita
Grape Pathologist, Virginia Tech

As you are probably aware, the critical period when grape clusters are susceptible to powdery mildew, downy mildew, and black rot starts from bloom and lasts about 4-6 weeks. The length depends on the cultivar, but in general, it is shorter with American grapes (*Vitis labrusca*) and longer with *V. vinifera*. Thus, in a typical season, the risk of cluster infection by these three diseases decreases by mid-July for many of us.

The next key stages are around bunch closure and veraison. The time of bunch closure is often the last opportunity for us to spray inside of grape clusters, and important timing for Botrytis and ripe rot management. For both, make sure to mix materials because of the fungicide resistance concerns.

Veraison is another spray timing for both diseases. For more details, please visit my blog (grapepathology.blogspot.com). I have posted past presentation slides where I discuss spray materials for Botrytis and ripe rot.

Powdery mildew is probably one of the most common diseases among our vineyards. As the temperature goes up, the risk of powdery mildew decreases, since the pathogen of powdery mildew slows down as the temperature approaches the 90s. Of course, we do not often see days where the temperature stays above 90 all day long (knock on wood!).

Therefore, the risk won't be zero, but in general, powdery mildew slows down in late July to early August. Protective application is recommended, but you may not need to spray as frequently as you do for the critical period, especially if you grow cultivars that are less prone to powdery mildew.

Downy mildew is a tricky one for many reasons. The pathogen of this disease requires

rain for dissemination and infection, thus, we often talk about its association with rains. However, when the night temperature goes down, in mid-August or so, downy mildew starts to appear even without rain. The dark and humid conditions help the downy mildew pathogen to produce spores. Thus, humid nights followed by morning dew or an evening thunderstorm are ideal for downy mildew activities. So, make sure to keep your vines protected against downy mildew so that you won't be surprised.

Unfortunately, some of you have experienced severe frost damage this spring. Even if you decide not to crop this year, you still need to spray to keep vines clean so that you will have healthy vines next year. You can rotate mancozeb plus sulfur, fixed copper, or captan plus sulfur.

You cannot keep using mancozeb all season long, not because of the PHI (pre-harvest interval), but because of the limit of the amount that you can use. It is typically 19.2 pounds of active ingredient per acre per year, but please check your label.

You probably do not want to rely only on captan or copper, because you need to take care of black rot, which cannot be controlled by either one. If you prefer to use captan or copper as your main spray material, be sure to either rotate to mancozeb or add a QoI or DMI fungicide every once in a while.

Free Virus Testing

One last item: We are once again offering free virus testing. The Plant Disease Clinic at Virginia Tech and I have a new sampling kit that allows you to test two samples for grapevine leafroll-associated virus-2 and -3, and grapevine red blotch virus. If you are interested, please contact me at nita24@vt.edu so that I can send the kit to you.



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Using Oxidation-Reduction To Enhance the Quality of Wine

By Dr. Bruce Zoecklein
Professor Emeritus, Virginia Tech

Successfully competing in the wine industry requires integrated marketing, terroir differentiation, and continued progress toward lowering the cost of production while increasing quality. Each of these suggests the need for careful review of new technologies, when appropriate. Progressive industry members are fully aware that they must look ahead — after all, nothing goes faster than the future. A universal question asked: What is the next big thing?

Industry experts (defined as anyone who guesses correctly more than once) continuously come up with their speculations regarding upcoming marketing and production trends. At times, their conjectures appear to be the result of either providential revolutions or some brand of theophany, however, only occasionally derived from science.

The holy grail of science is to have one overarching theory that unifies all scientific disciplines from biology to musicology to economics. Currently, no such theory exists, and perhaps that is not a surprise. After all, the more we know about light, the more in the dark we are.

For most, the lack of a unifying system is not a problem. Indeed, some ask how the world is improving when what we once called heaven we now call space?

Regardless, if we desire to distill winemaking to a singularity, one unifying and governing system, what would it be? The answer: oxidation reduction potential. Soon, we will be using the measurement and manipulation of this to impact most aspects of winemaking.

The following is a brief overview of oxidation-reduction (Redox) potential and how it can be used by winemakers to enhance quality. A more detailed explanation is provided at www.fst.vt.edu/extension/enology. Click Enology Notes, then the index under oxidation-reduction.

How resistant a wine is to the detrimental impacts of oxygen is referred to as reductive strength or its antioxidative vigor. According to Randall Grahm of Bonny Doon Vineyards, reductive strength or the ability to withstand the negative effects of oxygen is analogous

“Grape growers have an important role to play in the longevity of wine. For example, red fruit that hangs too long can undergo what is referred to as field oxidation.”

to a wine’s chi, or life-force. When a wine is young, it can share its chi with the world; when old, it must guard it so the wine does not diminish too quickly.

Grape growers have an important role to play in the longevity of wine. For example, red fruit that hangs too long can undergo what is referred to as field oxidation. This results in a change in the chemistry of anthocyanin pigments, rendering them less capable of positively contributing to color stability and mouthfeel.

Field oxidation also can result in a precipitous drop in the reductive strength of the resultant wine (see Enology Notes #160 for additional information).

The Redox Processes

To understand reductive strength and how oxygen impacts wine, it is important to understand redox potential:

► When compounds in wine combine with oxygen, they can pick up one or more oxygen atoms and become “oxidized.” These new compounds are different from the originals and can have very different sensory characteristics.

► The various components in wine exist as mixtures of their oxidized and reduced forms (called redox pairs). Redox reactions cause various wine components to transition from oxidized to reduced forms, or conversely from reduced to oxidized forms.

► The redox process involves a transfer of electrons from one compound to another. These reactions are always coupled; for oxidation to occur, reduction must also occur.

► A component is oxidized when it loses electrons (or gains oxygen atoms and/or loses hydrogen atoms); it is reduced when it

gains electrons (or loses oxygen atoms and/or gains hydrogen atoms).

► The reduction of one wine component causes oxidation of another until a final equilibrium point is reached.

► Redox reactions, with their transfer of electrons between various chemical components, occur throughout fermentation and beyond. These reactions transpire when one compound with a relatively greater affinity for electrons attracts one or more electrons from another compound, which has a lower affinity for its own electrons.

► Redox reactions are always coupled; for oxidation to occur, a corresponding reduction must also occur

► Redox potential can be used as indicators of a wine’s evolution, stability and may permit the winemaker to make better-informed processing decisions.

Monitoring Redox Potential During Fermentation

Since fermentation is an anaerobic process, occurring in the general absence of oxygen, several reduced compounds are produced. Reduced sulfur and nitrogen compounds, in the form of hydrogen sulfide and mercaptans, for example, are known for the negative, so-called “reduced,” characters they impart to wines.

Management of these off-odors is a problem we have experienced in Virginia, although new yeast species and strains, and management strategies have helped to abate this issue.

Traditionally, a common treatment of wines has been to add copper to bind these sulfur-containing compounds making them less volatile. As discussed in several editions of Enology Notes, the addition of copper either directly or via late-season vineyard sprays of Bordeaux mix can have a significant and deleterious impact on a wine’s longevity.

Off odor sulfur compounds such as H₂S are generally produced during fermentation when the redox potential is quite low. Because of this relationship, raising the potential during fermentation can provide a means of controlling hydrogen sulfide production.

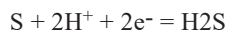
The nearby figure illustrates the effect of

See REDOX on page 12

How Oxidation-Reduction Affects Quality

REDOX, from page 11

fermentation on redox potential, expressed in millivolt values (rH). The redox potential drops somewhat during yeast stationary growth phase but significantly drops to very low levels during exponential yeast growth. It is at this very low level, occurring somewhere between 20-12 Brix, that hydrogen sulfide can be produced by yeast via the following:



By raising the redox potential with air/oxygen during fermentation the reaction is limited and, therefore, hydrogen sulfide production is limited (Killeen et al (2018)). By so doing there can also be an increase in the fermentation rate, yeast cell viability, and biomass. The questions of how much oxygen/air to add and exactly when can be determined by monitoring the redox potential.

At the end of fermentation, the redox potential begins to rise and will increase with any oxygen exposure such as would occur during racking. Yeast lees can bind oxygen and, therefore, can lower the redox potential.

Measuring and adjusting redox by air or oxygen exposure has the added benefit in red winemaking of allowing winemakers to also dial in how much air/oxygen is needed to aid in phenol polymerization or binding of tannins and anthocyanins.

As anthocyanin molecules bind with tannins they become more stable, positively impact mouthfeel, and help to provide the reductive strength outlined above. Soon, we will have the ability to regulate this degree of binding as a result of measuring and controlling the redox potential via the

addition of air or oxygen.

Oxygen management during aging is an important wine quality feature. Currently, decisions are based mainly on empirical knowledge of the multifaceted relationships

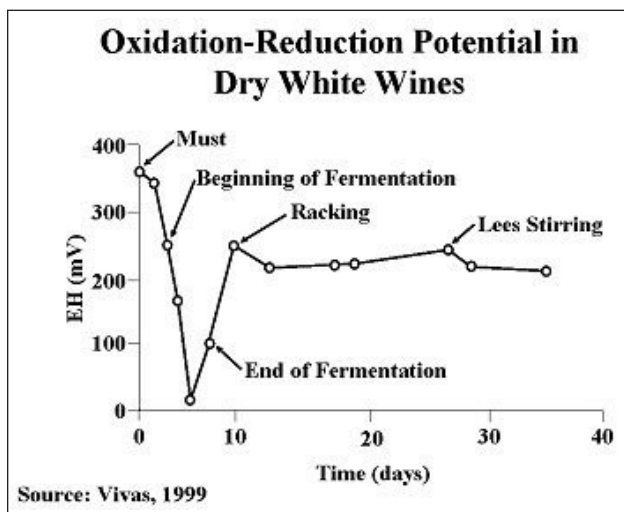
Measurement and manipulation of redox potential will change how we manage winemaking. Some believe that such advancements move winemaking away from artistry; I disagree. While fools with tools are still fools, new technologies can enhance our knowledge of the natural world. In the future, measuring redox potential may provide additional clarity to the understanding of capstone issues such as terroir and what defines terroir variations, for example, while providing added focus to winegrowing.

Regardless, technical advancements do not always stimulate rapid change. Most New World winegrowers generally categorize themselves as rational human beings, making judgments based upon sound logic and science to supplement their craft.

However, in reality many are somewhat reluctant to make changes, particularly in a tradition-based industry such as ours.

According to social scientists, the majority of our decisions are derived from emotion, not logic or science. As the 17th-century philosopher, Blaise Pascal reminded us, the heart has reasons that reason does not know. Much of what we do, in the wine industry and life, stems from interaction with our peers, what social scientists call conformational bias.

Regardless, as Wayne Gretzky the hockey player stated, We should skate to where the puck is going — not to where it has been.



between oxygen adsorption and the nature of the wine and factors such as wood, wood age, vessel size, humidity, temperature, lees, sulfur dioxide levels, etc. Measuring redox potential will allow for clearer decision making.

Measuring Redox

Measuring the redox potential of wine or juice is analogous to measuring its pH, but traditionally the measurements have not been as straightforward. Redox electrodes are usually made of polished platinum, although gold and graphite are sometimes used (Zoecklein et al., 1999). Recent advances in electrodes make redox determinations, particularly during fermentation, much easier.

References

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- Vivas, N.1999. *Les Oxidation et les Reductions dans les Mouts et les Vins.*
- Zoecklein, B.W., K.C. Fugelsang, B.H. Gump, and F.S. Nury. 1999. *Wine Analysis and Production*, Chapman & Hall, N.Y., p. 217.

2019 Commercial Grape Report Available

The 2019 Virginia Commercial Grape Report is available on the [VirginiaWine.org website](http://VirginiaWine.org).

Results in the 2019 report are based on production information provided by Virginia vineyards and wineries.

VWA Advocates to Protect Harvest

By George Hodson
and James S. Turpin

These past few months have been hard for all of us. COVID 19 continues to impact everyone in extraordinary ways as we all work through the extensive changes to our ways of life and doing business under the “new normal.” The Virginia wine industry depends upon the work of both vineyards and wineries, so we wanted to provide an overview of the work that’s been done to support both parts of the industry.

On behalf of and in partnership with the Virginia Vineyards Association (VVA), the Virginia Wineries Association (VWA) made extensive efforts to protect the production and eventual sale of the 2020 harvest. Our efforts to support vineyards have focused on two main areas: collecting and sharing information and advocating for the protection of the wine grape supply chain.

Specialty Crop Grant Funding

The VVA and our executive director, Laurie Aldrich, collected and shared all of the relevant information about federal programs aimed at addressing the Covid-19 crisis for both VVA members and non-members alike, including the Coronavirus Aid, Relief and Economic Security Act and two loan funds created under this law, the Economic Injury Disaster Loan program and the Payroll Protection Program.

Additionally, the VWA focused on protecting the ability of vineyards to manage and sell the fruit of the 2020 vintage. In communications with Virginia Secretary of Agriculture and Forestry Bettina Ring and U.S. Secretary of Agriculture Sonny Perdue, we asked for specialty crop grant funding for grape contracts in the 2020 harvest.

In answer to our request, Jewel H. Bronaugh, Commissioner of the Virginia Department of Agriculture and Consumer Services, set aside specialty crop funding, although the funds had to meet the grant guidelines. As part of the Specialty Crop block grant allotted to Virginia, it has been sent on to USDA for review.

Our goal has been to ensure that grape growers have confidence in their ability to sell their harvest in the fall. In order to have a viable vineyard industry, there must be buyers for the product.

As a result of the COVID-19 crisis, Virginia wineries have not been able to sell wine in their tasting rooms, which has devastated the operational income used to manage their own vineyards and to purchase fruit during harvest.

VVA has also been able to secure reusable cloth masks for industry employees from FEMA. If your employees are in need of reusable cloth masks, complete this survey and we will work on getting them for you: <https://vawine.site-ym.com/surveys/default.asp?id=ClothMasks>.

Of course, we’ll continue to monitor the

problems faced by vineyards and wineries as the Covid-19 crisis evolves.

General Assembly Update

Finally, we’d like to report on the 2020 General Assembly session. The Virginia General Assembly convened for its 60-day session on Jan. 7 and adjourned March 8. It was a session dominated by change — new majorities and leadership, as well as a more aggressive approach to traditional issues.

During the session, over 4,000 bills and resolutions were considered. The Assembly reconvened for its Veto Session on April 22 in the midst of the coronavirus pandemic. The General Assembly is expected to hold a special session in August to address Virginia’s financial situation. They will return again to Richmond for the regular session on Jan. 6, 2021.

Among the items of importance to the wine industry that passed were a much anticipated updating of ABC’s licensing structure, changes to workforce laws including the minimum wage, increased regulation surrounding the Chesapeake Bay, a local option tax on plastic bags, and increased taxing authority for certain local governments.

As important as what passed is what failed. These included efforts to expand the privileges accorded to farm wineries to other types of businesses, expansion of Family and Medical and sick leave to more employees, increased local regulation of agriculture, and expanding local lobbying regulation.

A number of issues were also carried over to the next session for additional consideration including regulation of workforce heat injuries, above ground storage tanks, as well as regulation of fertilizer applicators. It should also be noted that the administration is studying how to expand Family and Medical Leave as well as sick leave. New legislation is expected next year.

Overall, the 2020 session of the Virginia General Assembly was a successful one for the Virginia wine industry. However, given that there is much work ahead, assistance to support these efforts for the industry is important. Please consider making any size donation here: <https://vawine.site-ym.com/donations/donate.asp?id=15762>. Thank you in advance for your consideration.

George Hodson, chief executive officer of Veritas Vineyard and Winery, is president of the Virginia Wineries Association. Jim Turpin is a lobbyist for the VWA.

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Support the VVA!

The Virginia Vineyards Association represents all growers, from the largest to the smallest. We recognize that growers of different sizes have different needs, and we continually evaluate whether our programs are meeting those needs. But we can't do it without your help. Volunteers are the lifeblood of the VVA, so please consider offering your time to advance viticulture in Virginia.

Serving on the Board

Being a member of the VVA Board is an ideal way to make a vital contribution and to get to know your fellow growers and others who support the Virginia winegrape industry.

Later this year, we'll be looking for candidates for President and Treasurer, as well as an at-large member. Please contact the VVA with any questions or to express your interest.

Have a Story Idea?

Grape Press is the quarterly publication of the VVA, and we're always looking for story ideas and writers.

If there are areas of interest you think should be covered, please let us know. And if you'd like to write for Grape Press, let us know that, too! Contact us at editor@virginiavineyardsassociation.org.