

2021 Season Recap and 3<sup>rd</sup> Sentinel Vineyards “state of the grape in the state” report  
23 December 2021

*Contributors:*

*Tremain Hatch, Viticulture Research and Extension Associate,  
Mizuho Nita, PhD, Associate Professor and Extension Specialist for Grape Disease Management,  
and Beth Chang, PhD, Enology Extension Specialist*

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## **SENTINEL VINEYARDS GENERAL INFORMATION**

*This report is part of the Virginia Wine Board-funded Sentinel Vineyard Program that Virginia Tech Extension Specialists (Chang, Hatch, Nita, and Wolf) initiated in 2020 with ~20 vineyard managers, winemakers, and consultants throughout the Commonwealth of Virginia. Our aim is to collect information from partner sites, then deliver it at VCE vineyard meetings, blogs ([ext.grapepathology.org](http://ext.grapepathology.org), [VTEenology.com](http://VTEenology.com), [www.ares.vaes.vt.edu/ares/olson-h-smith/Blogs.html](http://www.ares.vaes.vt.edu/ares/olson-h-smith/Blogs.html)), other social media, and newsletters. In 2021, we held seven monthly meetings with “core” sentinel group members, which resulted in four “virtual vineyard” meetings, three newsletters (including this one), and 28 blog posts. Data are stored in grapeIPM.org and another database so that we can refer to it in the future.*

*In addition, we are installing the NEWA weather stations (<https://newa.cornell.edu/>) at key locations so that we can use meteorological information as you have seen on this report. Currently, Virginia Tech operates six active weather stations, two to be installed early next year, and three to be installed in 2022-23, if the funding is approved by the Wine Board for the next fiscal year.*

***Information we provided throughout the past two years is based on inputs from our Sentinel Vineyard partners, who participated in monthly meetings despite their busy schedules. We really appreciate their time and effort to make it happen, and hope you see the value of our partners’ effort as much as we (Extension specialists) do. And many thanks to the Virginia Wine Board for their continued support.***

## **2021 SEASON SUMMARY**

- Relatively dry spring, some locations with frost damage
- Very low disease development during the early part of the season
- Central and South-central VA continued to be dry for the season (thus, low disease development). Northern Virginia was modestly dry in mid-summer.
- Wet conditions in September and October resulted in late-season downy mildew, ripe rot, and Botrytis, as well as some stalled fruit development.

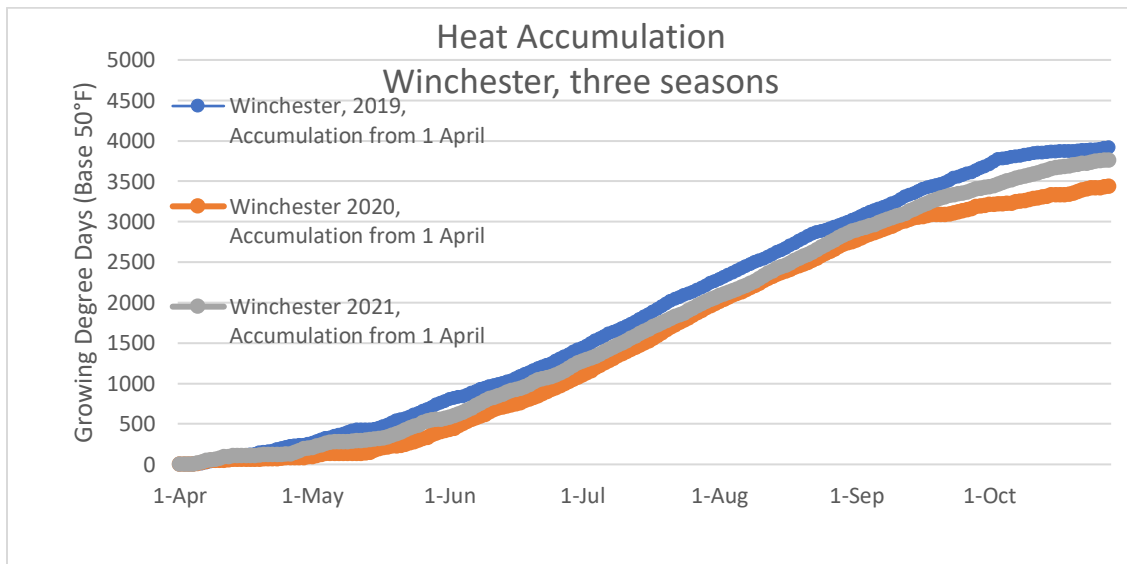
Overall, our Sentinel Vineyards partners were optimistic about the season's fruit -- and resulting wine -- quality. It was not a vintage without challenges, but many growers managed well. Due to the late-season rainfall, downy mildew and rots, and the ceiling on fruit maturity, the loose consensus of the group was that the season earned a letter grade of a "B+ to A-".

### FIELD CONDITIONS

Let's start at the beginning. Last winter was relatively mild in terms of injury-causing temperatures. For example, at Winchester, the average temperature of January and February was 34.0 and 31.6F, respectively. The lowest temperature recorded was on February 21st (13.4F), but it was only one day. Around the Charlottesville area, the average temperature of January and February was 37.4 and 37.7F.

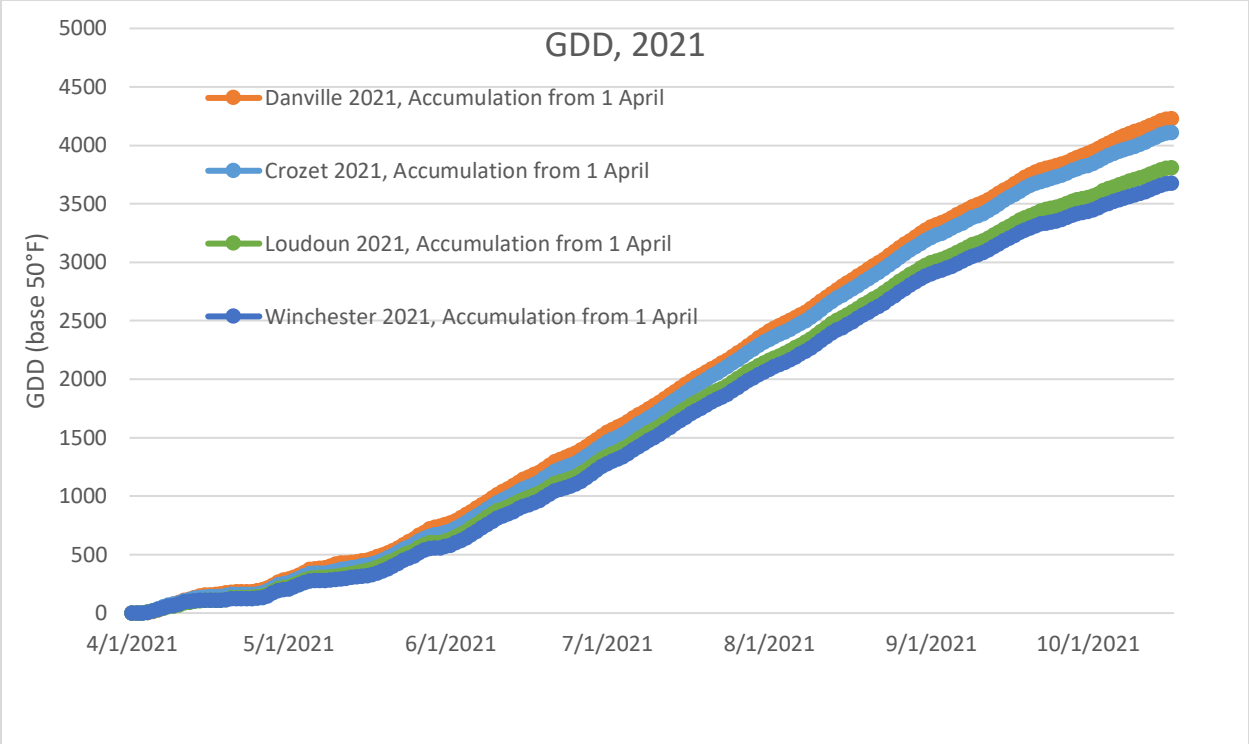
Most of the state had a benign spring. Unfortunately, the south and the southwest corner of the state saw damaging frost extents due to low temperature recorded on April 2<sup>nd</sup> and 3<sup>rd</sup>. At Bristol, the daily low temperature recorded was 23F on the April 3<sup>rd</sup>.

The two common indexes that are used to characterize the growing season are heat and rainfall. Heat was relatively moderate. The 2021 season falls almost right between a warmer than average year (2019) and a cooler than average year (2020).



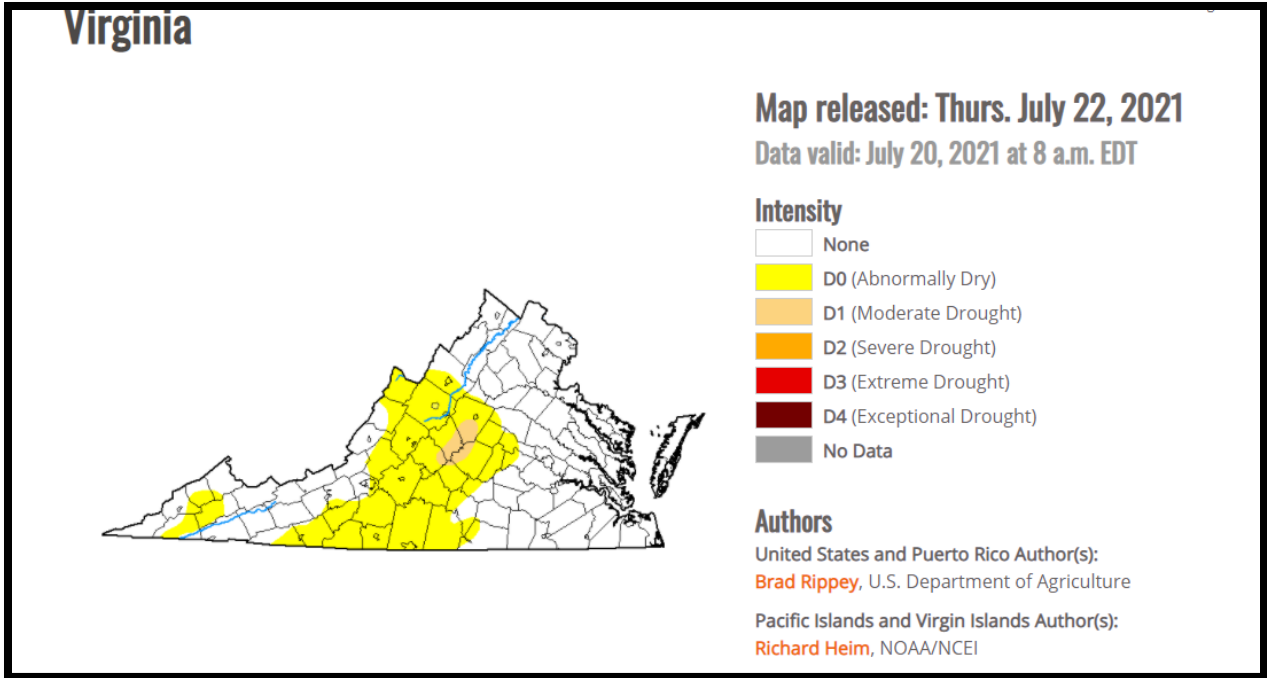
**Growing Degree Days (GDD) at AHS AREC in Winchester in 2019-2021.** The top blue line is 2019, the middle gray line is 2021, and the bottom orange line is 2020.

Across the state, we saw what we would expect for heat accumulation. The growing degree day (GDD) accumulated faster in the southern and central parts of the state, and slower in northern Virginia and the Shenandoah Valley.

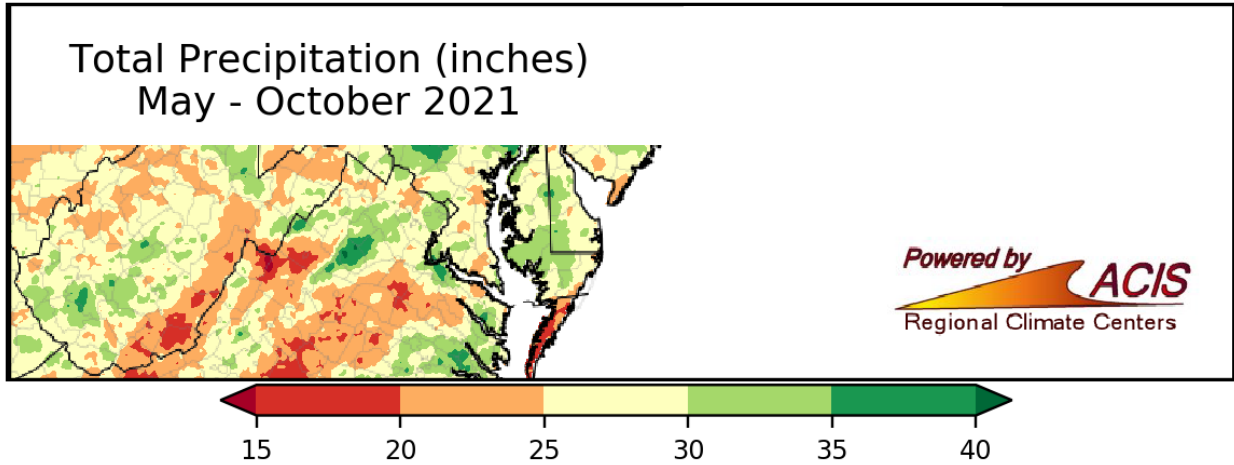


**Growing Degree Days (GDD) at Danville, Crozet, Loudoun, and Winchester in 2021.** From the top, orange is Danville, blue is Crozet, green is Loudoun, and blue is Winchester.

As the season progressed, we experienced relatively dry April, May, and June. The dry trend continued for the southcentral and central VA throughout the season.

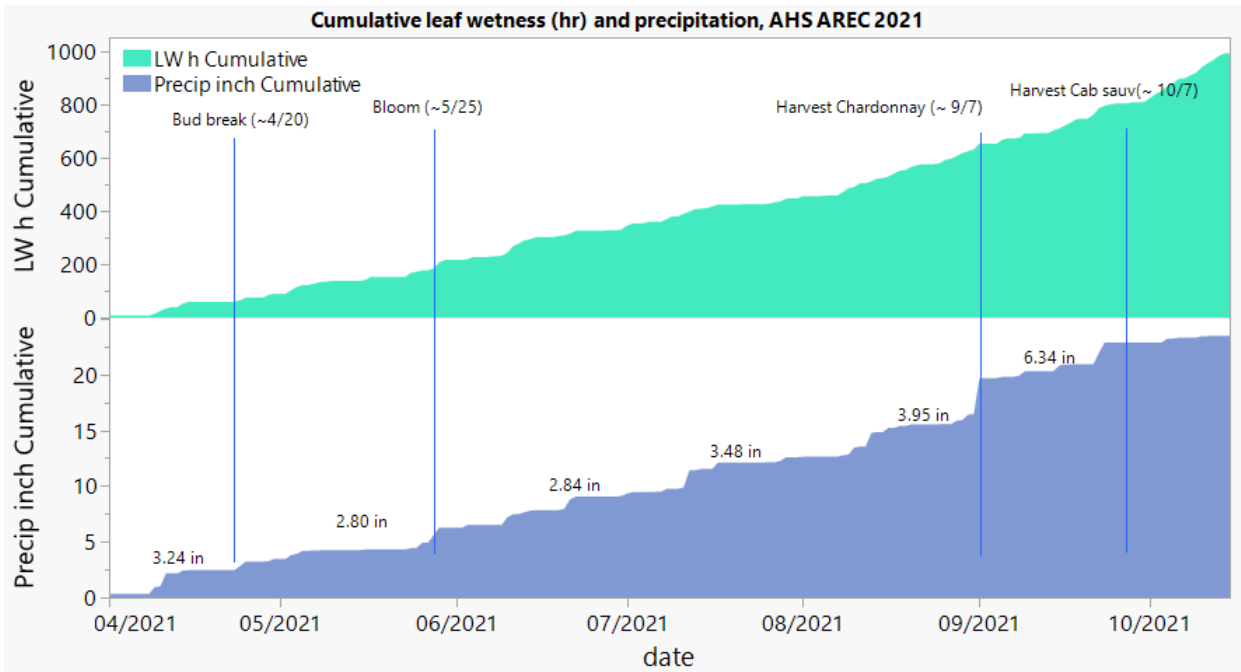


**A drought map of Virginia from July 2021.** Note the yellow and pink area in south central and central Virginia. Most of Virginia is currently abnormally dry, more information available here: <https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?VA>



**A precipitation map of Virginia from May to October 2021.** Precipitation was higher in green areas and lower in red area.

Most sites were quite dry during July, but we had some big rain events. Like the remnants of hurricane Ida; for example, 6.3 inches of rain was recorded at Winchester.



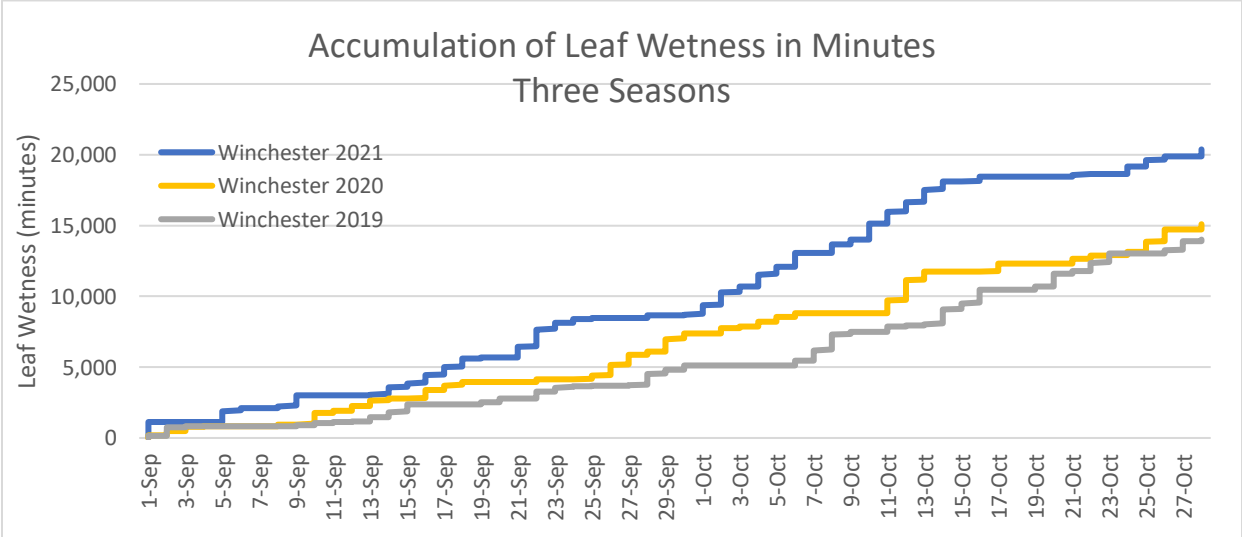
**Cumulative leaf wetness and precipitation at AHS AREC in Winchester in 2021.** The top panel of the figure below indicates leaf wetness in hours, which is a sensor-based measurement of how long the leaves were wet after a precipitation or dew event, and the lower panel shows the accumulation of precipitation in inches. Each number on the precipitation panel is a total amount of precipitation per month.

During August we had favorable conditions for downy mildew. Although this disease can cause severe damage on clusters when we do not protect our clusters during the critical period, leaves are susceptible throughout the season. Often time, we observe development of downy mildew on leaves in August, and if not properly protect, can result in defoliation that impacts the vines' crop ripening ability.



**Downy mildew on Chardonnay.** Downy mildew tends to show up at the top of the canopy during the latter part of the season.

After Ida, we continued to receive rains. Winchester's accumulated leaf wetness hour was more elevated than the last two years during September (please see the fig. below). We accumulated 157 hours of leaf wetness in the first half of October; meaning the foliage was damp for about half the time during that 15-day period. The results of this moisture were outbreaks of ripe rot and Botrytis in some locations. Some of our sentinel growers referred to the “ceiling” for fruit maturity in the late season. Maturity numbers just didn’t rise to a great extent in the later part of the season.



**Cumulative leaf wetness in minutes at Winchester in 2019-2021.** The top blue line is 2021, the middle yellow line is 2020, and the bottom gray line is 2019. The flat horizontal lines are desirable “dry spells” the vertical stair-steps up are “wet spells”.





**Ripe rot symptoms on Cabernet Sauvignon.** Note the pink-orange spots on the surface, which are masses of spores from the pathogen.



**Botrytis symptoms on Cabernet Sauvignon.**

#### OTHER CRITICAL EVENTS

##### ***Spotted lanternfly***

We saw our first Spotted Lanternfly Adults this past fall in our research vineyards in Winchester, and unfortunately, we saw egg depositions in the property and surrounding areas. We anticipate seeing them in our vineyards for the 2022 season. We will keep you posted.





**Spotted lanternflies on Mizuho's backyard Concord grape, 2021.**

***Periodic cicada***

Periodic cicadas were a feature in northern Virginia. For those of you who missed this brood, it looks like the next brood of widespread interest will be in 2030. For those of you who experienced the brood this past year, during upcoming pruning, we'd recommend not retaining injured canes for trunks, cordons, etc.



**Damage from periodical cicada oviposition injury on Cabernet Sauvignon, AHS AREC, Winchester, 2021.**



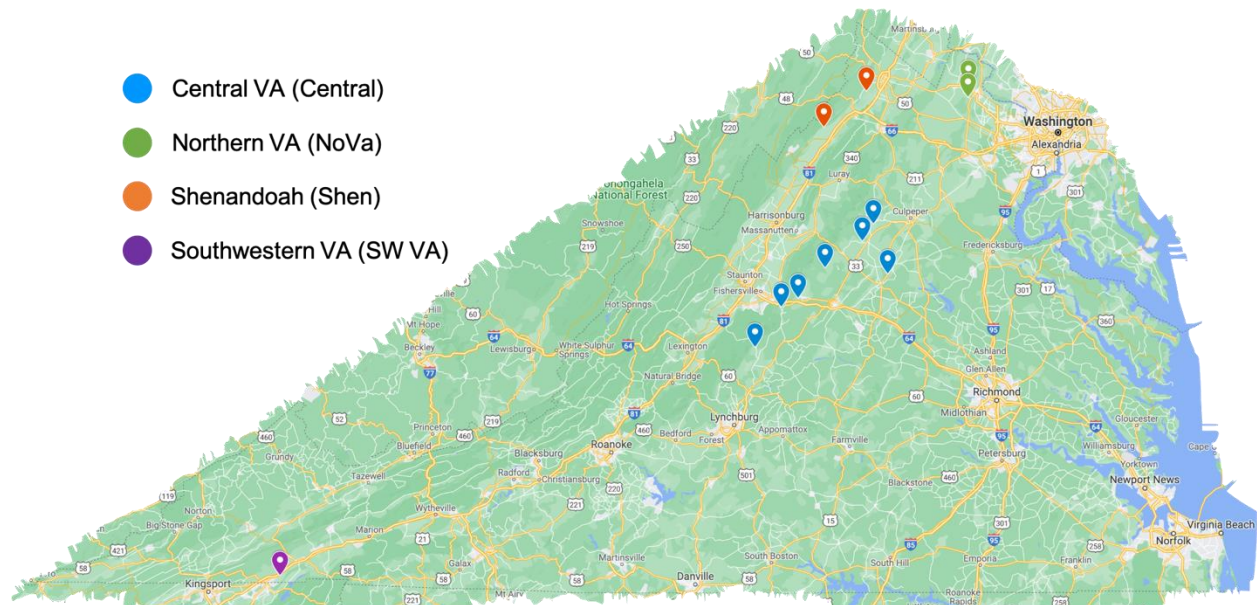


**Insect netting to prevent periodical cicada.** The mesh size of less than  $\frac{1}{4}$  inch is recommended.

The next cicada brood to affect majority of the state will occur in 2030 (more information: <http://virginiafruitinsectupdates.blogspot.com/2021/06/cicada-aftermath-and-birdcicada.html>) The insect netting with less than  $\frac{1}{4}$  inch mesh (fig above) provided excellent protection for young vines, which are more susceptible to the injury. The net is reusable for several years, but it adds another cost to the operation.

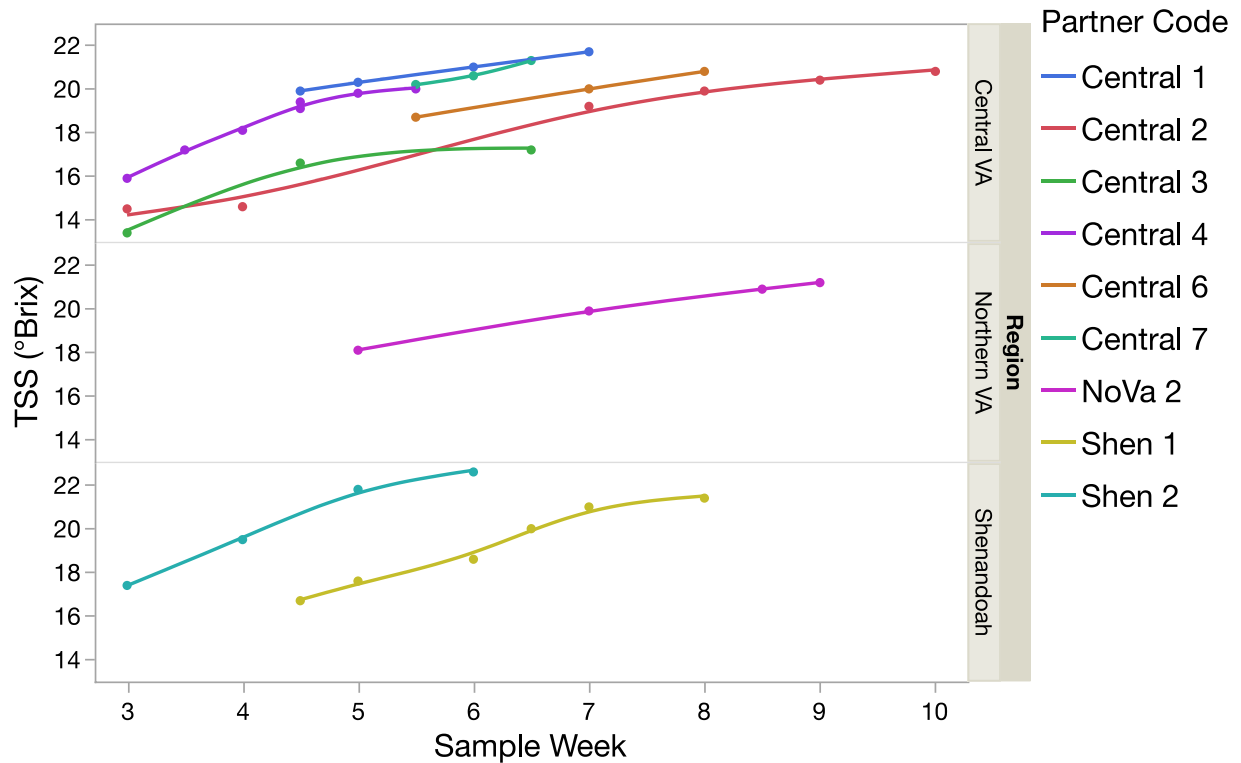
## FRUIT CHEMISTRY

Since our last report, a little more data has been collected on the status of red and late-harvest wine grapes for the season. Information on white wine grapes, notably **Chardonnay**, our Sentinel Vineyards sentinel variety, can be found in Reports 1 and 2. Updated fruit chemistry for **Cabernet Franc**, sentinel variety for red wine grapes, is detailed below. In total, for both varieties, ~87 time points from 12 different sites were compiled. The sites are approximated on this map and are color-coded by region (coding abbreviation is shown in parentheses). For subsequent figures, note that Sample Week 1 corresponded to the 1<sup>st</sup> week of August. Only Chardonnay was collected in weeks 1 and 2, which is why the x-axis starts at week 3. Week 10, the final sampling week, occurred on October 4th.



### Map of Sentinel Vineyards partner sites throughout the Commonwealth

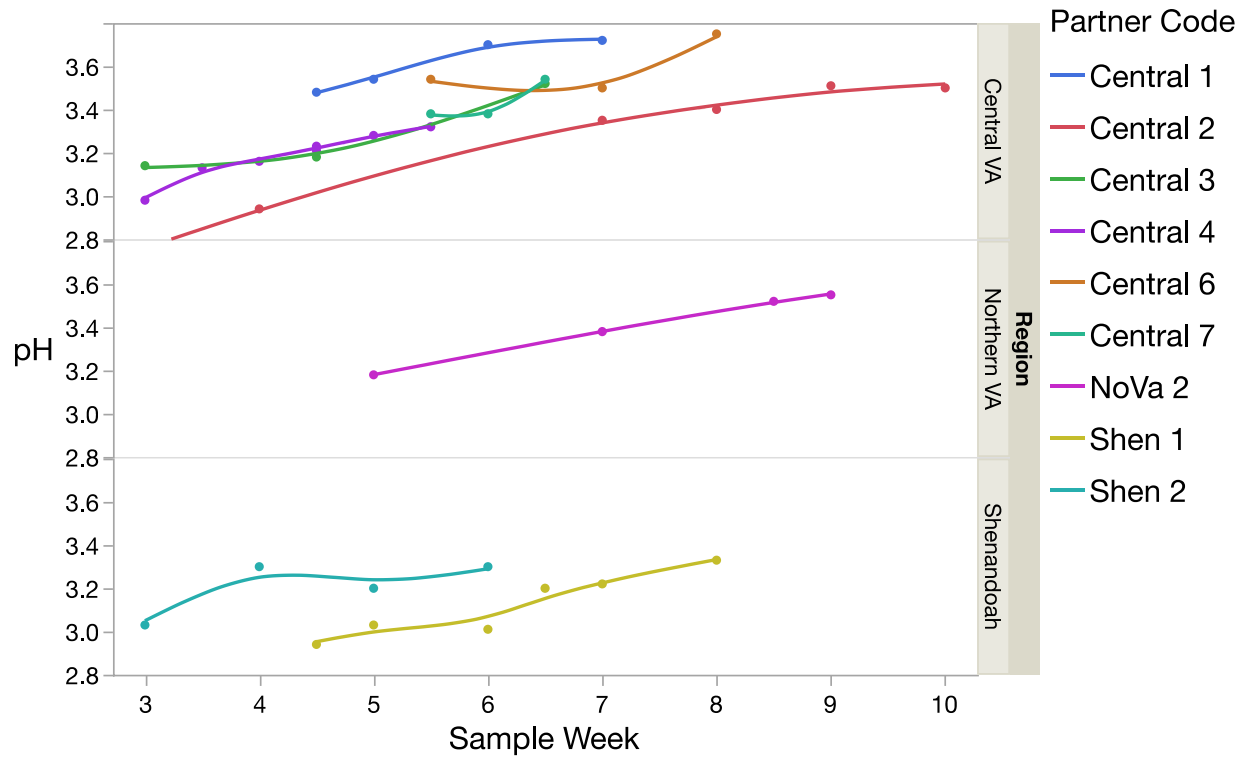
In report 2, total soluble solids (TSS) in Cabernet Franc were hovering around 20-21 °Brix. Even after waiting another week and adding some backlogged data, this remains consistent, and tracks with the GDD described above, in which we were a little ahead of 2020 (average = 20 °Brix) and a little behind 2019 (estimating based on non-Sentinel Vineyards data to be ~21-22 °Brix). During our final meeting with Sentinel Vineyards partners, several individuals described sugar accumulation in reds and late-harvest whites as “stagnating”, “hitting a ceiling”, “fairly low”, and “lower than expected” [given the strong start to the season].



**Total soluble solids (TSS; measured in °Brix) by sample week for Cabernet Franc.**

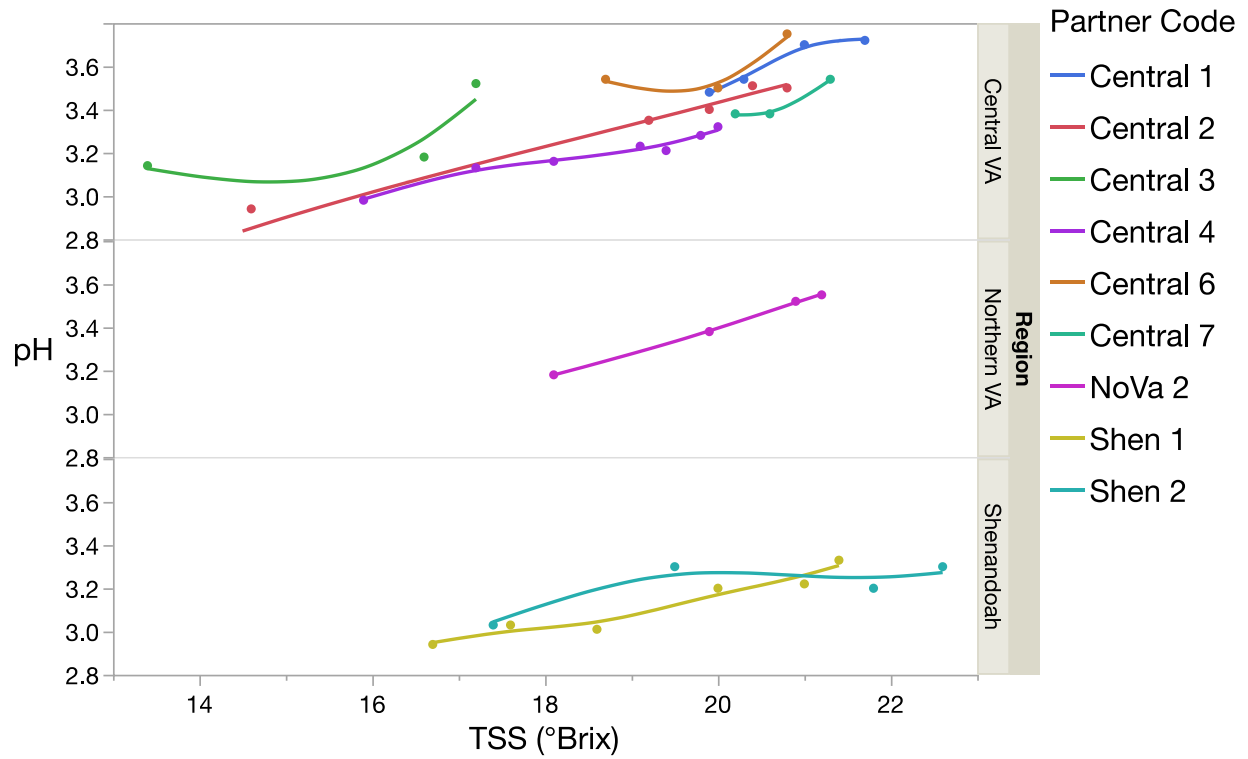
However(!), our partners also reflected on the steady low pHs and “good phenolics” for this vintage, and leaned into picking on those parameters. As winemaking commenced, the lower pHs also helped with color retention (one partner described as “better than he’d ever seen” [in Cab Franc]). This is because lower pHs result in a higher percentage of anthocyanins remaining in the red-pigmented “flavylium” form versus the colorless “carbinol” form. As seen below, final pHs were mostly in the 3.5s for Central and Northern VA, and 3.3s for Shenandoah; a significant downward shift compared to both 2020 and 2019.





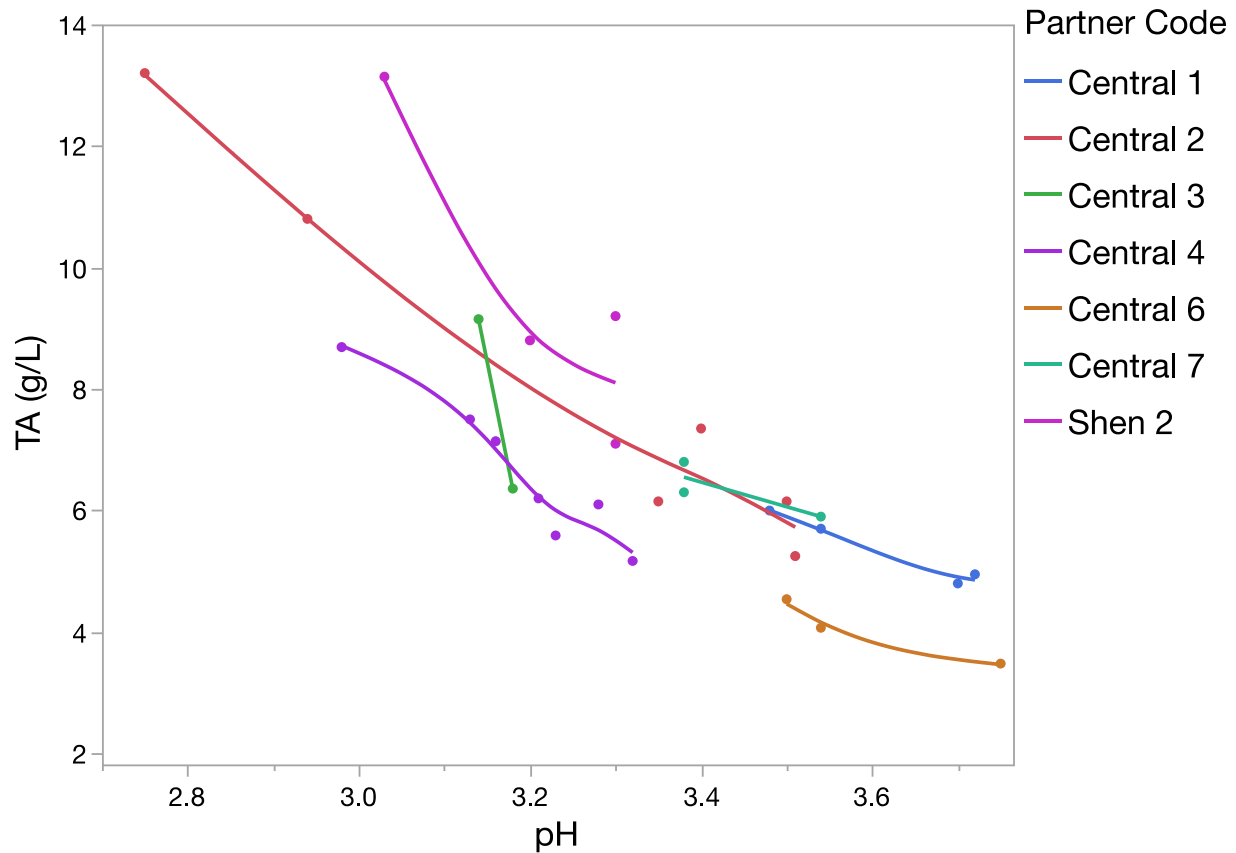
**pH by sample week for Cabernet Franc.**

Comparing pH to sugar accumulation, we see the flatlining of TSS (and occasional spiking of pH) at several sites that assisted with pick decisions. This figure also visualizes the fact that most Cabernet Franc from our sentinel sites was harvested in a tight 20-21 °Brix range. In case anyone is curious, the 22+ °Brix from “Shen 2” is here at the AREC; the Cab Franc is young and therefore reached maturity quickly.



**pH as a function of sugar accumulation for Cabernet Franc.**

Finally, we don't have too many data points for other fruit chemistry metrics, but here is a glimpse at titratable acidity (TA) from around the Commonwealth. Harvest TAs trended in the 5.5 g/L range, which (correlating to low pH observations) appears higher than both 2020 and 2019. However, again, these are small sample sizes, so bear that in mind.



**Titrateable acidity (TA; measured in g/L) as a function of pH.**

***To conclude, we wanted to keep all of you, our industry stakeholders, updated on some changes to the Virginia Tech Viticulture and Enology Extension roster, as well as alert you to upcoming events.***

EXTENSION in the NEW YEAR

If you haven't already heard "through the grapevine" (or via his Vit Notes newsletter), after 36 years, Dr. Tony Wolf will be enjoying a well-deserved retirement. We have been very fortunate to have Tony on our team; his leadership will be missed, and -- needless to say -- he leaves some big shoes to fill. If you wish to advocate for the viticulture industry, the hiring of the next viticulturalist will be an important time to be involved. We will do our best to keep you aware of the search progress, as well as seminars and other opportunities to meet the candidates for the position.

In the meantime, for the next calendar year, Tremain Hatch will be working part-time for Dr. Mizuho Nita, and both will be serving as primary vineyard extension contacts. In addition, Dana Acimovic, MS, is supporting our industry through her role as research associate and viticulture Principal Investigator on a multi-state USDA/NIFA wine grape project. On a related note, Dr. Beth Chang will be on maternity leave for the spring semester, as she and her husband are expecting their first child. She will continue in her enology extension role upon her return. As a reminder, Dr. Chang has many wine production resources

posted to VTEnergy.com ([vtenology.com](http://vtenology.com)). Additional Virginia-centric support is available on the Winemakers Research Exchange website (<http://www.winemakersresearchexchange.com/>) and in Dr. Bruce Zoecklein's Enology Notes (<https://www.apps.fst.vt.edu/extension/enology/EN/index.html>), and the Analytical Services lab continues to provide grape and wine analyses ([https://www.fst.vt.edu/extension/analytical\\_services\\_lab.html](https://www.fst.vt.edu/extension/analytical_services_lab.html)).

***Again, we wish Dr. Tony Wolf a very relaxing and enjoyable retirement. Thank you for everything!***



## UPCOMING PROGRAMMING

### ***VIRGINIA TECH PROGRAMMING\****

#### Dormant Pruning Workshop

19 January 2022 (snow date 26 January 2022)

1 pm – 3 pm

AHS Jr AREC

595 Laurel Grove Rd

Winchester VA 22602

This will be an outdoor program, dress appropriately, and bring pruning shears if you have them.

Program is free, but please register: <https://forms.gle/7QmEeQMW3hUoQ3ZA7>

#### Online meetings and workshops:

grapeIPM.org workshop -- 11 March and 15 April 2021

Vineyard IPM meeting – 17 March 2022

Disease Management Workshop (English) -- 30 March 2022

Disease Management Workshop (Spanish) -- 31 March 2022

*\*Note: Virginia Tech is also a lead partner in the Eastern Viticulture and Enology Forum listed below under Regional Programming. Dr. Mizuho Nita was a featured speaker for the inaugural session of the*

2021 – 2022 winter webinar series. A recording can be found here:  
<https://blogs.cornell.edu/grapes/home/eastern-viticulture-and-enology-forum/>

### **VIRGINIA INDUSTRY ORGANIZATIONS PROGRAMMING**

#### Virginia Vineyards Association (VVA)

Winter Technical Meeting -- 17 & 18 February 2022

For details and registration: <https://virginiavineyardsassociation.org/>

#### Virginia Winemakers Research Exchange (WRE)

WRE Sensory Sessions will be starting in late January. Keep an eye out in your email for more details. For more information or to sign up for WRE communications, contact Joy Ting ([vawrex@gmail.com](mailto:vawrex@gmail.com)).

### **MIDATLANTIC & REGIONAL PROGRAMMING**

#### Good Pruning – Pruning webinars

Marco Tessari is an international grape pruning specialist from Italy. Marco's approach of pruning focuses on vine health and longevity of vineyards. He has extensive experience teaching vineyard managers, owners and crew world-wide. He has also developed an excellent online program.

This is the second season Marco is providing his content on bunch grapevine pruning to the industry in the Southeast. The workshops we've held last year were extremely valuable to the participants. We now hope to continue this effort in bringing the best possible education to the region.

This in-depth workshop will entail four interactive classes, each 2:30-3 hrs long:

- Jan 14, 2022, 12-2:30 PM EST: Pruning Basics
- Jan 18, 2022, 12-2:30 PM EST: Spur Pruning
- Jan 25, 2022, 12-2:30 PM EST: Cane Pruning
- April (time tbd): Shoot thinning.

**Extension Agents/Specialists in VA, NC, SC and GA:** This workshop is **FREE**, sponsored by the [NC State Small Fruits Extension Program](#). We encourage all extension personnel to directly collaborate with 1-2 vineyards, vineyard managers and/or owners in their region and bring them to the program as well.

**Growers, vineyard managers and owners in VA, NC, SC and GA:** The program will cost a discount rate of \$300 for all four classes (\$75/class). The remaining fees are sponsored by [Vesco USA Inc.](#) The classes are interactive and will directly help you with pruning in your specific vineyard!

**Please use this link to sign up:**

<https://forms.gle/hDcq4HyKsgQbPW8C8>

Correct pruning is the backbone of every vineyard operation. Please take this opportunity and learn from an international pruning specialist.



# Eastern Viticulture and Enology Forum

*A Webinar Series for Eastern Growers and Winemakers*

All webinars are from 3:00 to 4:30 PM ET

Note: Each webinar has a unique registration link; for updates, click here:

<https://blogs.cornell.edu/grapes/home/eastern-viticulture-and-enology-forum/> .

## **January 11, 2022**

Viticulture

Demystifying Crop Load Effects in Pinot Noir through Academic and Industry Collaboration.

Dr. Patty Skinkis, Professor and Viticulture Extension Specialist, Oregon State University

Ted Casteel, Co-owner/Director/Vineyard Manager, Bethel Heights Vineyard

Register in advance for this meeting: <https://extension.psu.edu/pinot-noir-crop-load>

## **January 25, 2022**

Enology

Introducing a Sustainability Workbook for Winery Operations

Ken Schlafer & Eugene Park, Rochester Institute of Technology Pollution Prevention Institute

Whitney Beaman, Sustainability Program Manager, New York Wine & Grape Foundation

Registration link coming soon!

## **February 8, 2022**

Viticulture

Lesser Planted Wine Grape Cultivars in a Humid Growing Region - A Roundtable Discussion.

Nine vineyard/winery industry members from the eastern US; one industry stakeholder each from

the following states: NY, MN, OH, PA, NJ, MD, VA, NC, GA

Register in advance for this meeting: <https://extension.psu.edu/lesser-planted-wine-grapecultivars-in-a-humid-growing-region-a-roundtable-discussion>

## **February 22, 2022**

Enology

Trends in wine: Non-Saccharomyces Yeasts for BioProtection & Sensory Impact

David Spector, Technical Account Manager – Cultures and Enzymes – Wine & Fermented Beverages, Chr. Hansen

Registration link coming soon!

## **March 8, 2022**

Viticulture

NY state-certified vines will be available from NY Nurseries in 2022.

Eric Amberg, Co-owner, Amberg Grapevines

Dr. Marc Fuchs, Professor, School of Integrative Plant Science Plant Pathology and Plant-Microbe

Biology Section, Cornell AgriTech

Margaret Kelly, Assistant Director, Division of Plant Industry, New York State Department of  
Agriculture and Markets

Dennis Rak, Co-owner, Double A Vineyards

Registration link coming soon!

**March 22, 2022**

Enology

Variability in Toasting: Implications for Winemaking with Oak

Dr. Tom Collins, Washington State University

Registration link coming soon!

**April 12, 2022**

Viticulture

Practical precision viticulture tools for modest-sized vineyards.

Dr. Terry Bates, Director and Research Associate, Cornell Lake Erie Research and Extension  
Laboratory, Cornell AgriTech

Dr. Jim Meyers, Viticulture Specialist, Cornell Cooperative Extension

Registration link coming soon!