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Viticulture Notes..... May 2021

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I. Current Situation:

The monthly "sentinel vineyard" meeting early this week provided a lively, and generally upbeat synopsis of grape growing conditions around the state. First, the bad news: some vineyards, principally in the southern piedmont, did get hit by frost around the 22nd and 23rd of April. Temperatures of 30 – 32°F were common, and one vineyard saw temps as low as 20 – 23°F, possibly low enough to cause some cold injury to the vascular tissues of spurs. The affected vineyards appear to be rebounding, but the clock was definitely reset for the season, and the lost crop can not be wished back on the vines for this year. It really hurts when it has happened two years in a row. Pests and diseases have been "light" for the most part, matching what I've seen in the handful of vineyards that I've been in during the past couple of weeks. We discussed the occurrence of grape cane girdler injury that is usually visible at this time of the year at minor levels, and often confined to vineyard edges near wooded habitat. **Photo 1** shows the injury to a shoot caused by the egg-laying habits of this small insect. A more in-depth article on grape cane girdler was provided last year, and can be found here: https://virginiafruitinsectupdates.blogspot.com/2020/05/?m=0 Writes Dr. Pfeiffer: The damage may be seen frequently but is minor on established vines because the girdles are usually beyond the clusters. However, this injury is of greater importance in new blocks because it may make training of the young vine difficult. Growers may wish to spray for grape cane girdler when greater than 10% of the shoots are injured. Several insecticides are included in our Grape Pest Management guide, under New Shoot Sprays.

Photo 1. Shoot breakage caused by grape cane girdler egg-laying.

Note: in my experience, I've seldom -- if ever -- seen a situation where a spray would have been warranted for grape cane girdler for the reasons that Dr. Pfeiffer mentions here.

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Climbing cutworms and an isolated case of early-season European red mites were observed by a few growers, but likewise did not warrant spraying. Some phomopsis has been reported in vineyards that are prone to phomopsis, and some early-season downy mildew was observed on unsprayed vines here at the AREC.

Weather-wise, we've all been on a temperature roller-coaster as illustrated by the sinuous accumulation of growing degree days (Figure 1). Whether we're looking at southern Virginia or the northern part of the state, heat has been slow to build, and night temperatures have been particularly low, with temperatures in the low to mid-30s as late as this past weekend (15 May). That will likely change as this week's forecast is for much warmer temperatures. Compared to the previous two years, we've accumulated more heat than the same time in 2020, but less than the warm 2019 spring (Figure 2). Bloom might be expected to be relatively advanced or retarded, respectively, compared to those previous years. Phenologically, Chardonnay was anticipated to be at early bloom next week in central Virginia; Chardonel was just now beginning to flower at a vineyard in Mecklenburg County (close to the NC state line).

Precipitation has been spotty, but generally very low across the state over the past few weeks. Typical of this pattern is the AREC here in Frederick County where we recorded 1.2" of rain in March, 3.1" in April, and 0.7" thus far in May. Vines and cover crops are generally well supplied with soil moisture at this point in the season, and considering the relatively low transpirational demand for soil moisture with cool days. As with temperatures, I suspect that rainfall patterns will soon change, but the dry days are nice while they last.

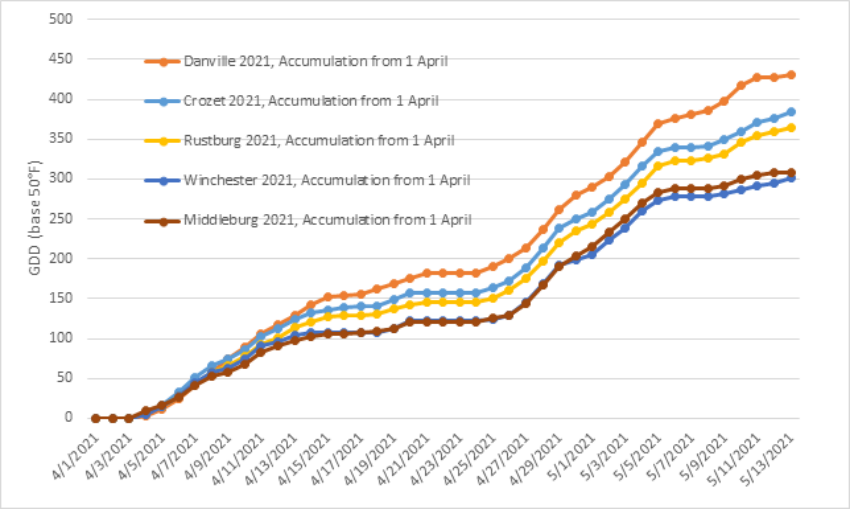

Figure 1. Accumulated heat units (Growing degree days, base of 50F) for 5 Virginia locations since 1 April 2021.

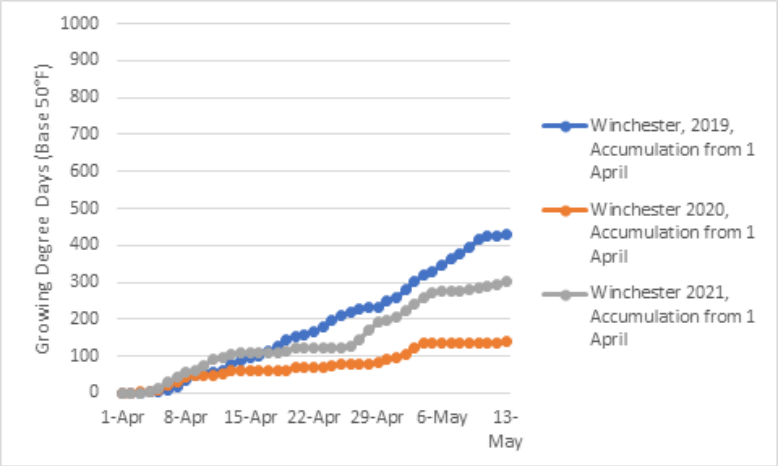

Figure 2. Accumulated growing degree day comparison through mid-May, for 3 years at the AHS Jr. AREC in Winchester.

Canopy management: We've just finished shoot-thinning Petit Manseng and Cabernet Sauvignon at the Winchester AREC and will be going back in now for shoot positioning to catch wires and "Tapnering" where necessary to maintain upright shoot orientation on the VSP-trained vines. Shoot-thinning is always easier when done before the shoots are more than about 6 – 8 inches long. It's a dash to complete in most seasons, but the cool weather has given us more time this spring. We aim for 3 to 4 shoots per foot of cordon with the shoot-thinning, and we usually repeat the process at least once due to the propensity of vigorous vines to continue to push basal buds up to bloom. Although it is time-consuming (and difficult to accurately mechanize), shoot-thinning has the dual benefit of establishing a more desirable crop level on the vine, and promoting a more open fruitzone in the canopy. The more porous canopy greatly improves the odds of ripening high quality fruit, free of diseases.

The need to establish a desirable shoot density early in the season is obvious to experienced growers, but if the advice registers with just one new grower, it's worth repeating that keeping a relatively open fruit zone with good ventilation and dappled sunlight exposure will do more than anything else to aid disease management in our typically humid, often wet climate. Much of our standard canopy management is aimed at this goal. See the Wine Grape Production Guide for Eastern North America (https://ecommons.cornell.edu/handle/1813/67189) for the basics of canopy assessment and management. In essence, the sequence of canopy management practices that we follow (and recommend is as follows:

Table 1. Basic canopy management practices and timing.

Procedure or practice	**Perform when**
Dormant pruning	Before bud burst, unless double-pruning for spring frost mitigation
Shoot thinning	Shoots 4 to 6 inches long; may require 2 passes
Shoot tucking w/in training wires (with VSP)	Ongoing, starting when shoots are ~ 10" long
Shoot combing (with Smart-Dyson or other systems with downward-oriented shoots)	Ongoing, but before tendrils "latch"; may require several passes
Basal leaf and lateral shoot thinning (only if needed)	Typically, immediately post-bloom or fruit set; early onset of bloom if reduction in crop desired

Shoot hedging, VSP	Typically, before upright shoots begin to arch over, 3 or more weeks post-bloom
Late-season fruitzone leaf thinning (if needed)	Post-veraison, if needed or desired to increase canopy ventilation, remove senescing leaves, and create an environment less conducive to spotted-wing drosophila infestation

As we are approaching bloom in most areas, and with most varieties, here are some reminders for selective leaf and lateral shoot thinning:

- Timing is critical. Done too early/severely (pre-bloom) and it can impact fruit set; done too late (pea-sized fruit) and you can cause sunburn of the suddenly exposed fruit. You can always take more leaves/leaf area off the vine as the season progresses, but shaded fruit that is suddenly exposed to sunlight is exceptionally sensitive to sunburning (see my July 2018 Viticulture Notes: https://www.arec.vaes.vt.edu/arec/alson-h-smith/grapes/viticulture/VN_options_index/vn-cms-archive.html
- Generally done at "fruit set" or immediate post-fruit set. Very labor-intensive if done by hand, but we are seeing more vineyards making the investment in machinery to speed this important operation.
- Selectively removing 1 or 2 leaves per shoot as well as small lateral shoots in the fruit zone is an excellent [think *most important*] means of assisting with disease control, especially for botrytis bunch rot and powdery mildew.
- In addition to disease management, the seasonal maintenance of a relatively thin, light-and air-porous canopy also aids fruit fly management in the preharvest period.
- I prefer not to "over-expose" fruit, even though some of our own research shows increased total phenolics and a modest increase in wine aroma precursors in Cab franc and Petit Verdot that are leaf-thinned prior to bloom or heavily leaf-thinned post-fruit set. My reasons for a more modest leafing rest with our recent observations (supported by field trials in 2018) that "full" fruit exposure can have the unintended consequence of increasing certain fungal diseases such as Macrophoma rot (*Neofusioccum ribis*). Ideally, about 1 leaf layer (on average) in the fruit zone or elsewhere in the canopy is a good target (see the "before" and "after" photos below).
- If your canopy exceeds this, think about additional shoot-thinning or selective leaf pulling. See figures 3 and 4 for examples.

Disease management: Pre-bloom and up to 6 weeks post-bloom is a hyper-critical period for fungal disease management due in part to the susceptibility of developing grapes to many of our fungal diseases. Dr. Mizuho Nita's disease blog is a great way to review management options for our principal diseases (http://grapepathology.blogspot.com/). Take advantage of this information and apply his recommendations as part of your overall disease management program. Dr. Nita also has a link to the 2021 Grape Pest Management recommendations, which can be found here: https://grapepathology.blogspot.com/2021/03/2021-pest-management-guides-for-grapes.html

Figure 3. Cab Sauvignon, immediately post-bloom, prior to leaf-thinning.

Figure 4. Cab Sauvignon, same cordon as Fig. 3, after basal leaf and basal shoot removal. Approximately one leaf layer retained.

***Nutrition*:**

We use the "VSP" approach to assessing vine nutrition; Visual examination of vine size and canopy condition (V); soil tests done every 2 or 3 years primarily to follow soil pH (S); and plant tissue sampling to corroborate what we see with our visual assessment (P).

Small rates (10 to 20 pounds actual N/acre) of nitrogen can be applied prior to bloom if petiole tests from previous year(s) indicate low, early season levels of N. However, we often see adequate N levels at bloom (> 1.2%), followed by deficient levels at veraison (<0.70%). Therefore, our recommendations have been to delay N application until bloom, and then do a split application wherein 50% of total rate is applied at fruit set, and the other 50% applied about 6 weeks later. The latter application can help ensure adequate N availability during the critical ripening period of the grapes. It also helps ensure adequate Yeast-assimilible Nitrogen (YAN) levels in fruit at harvest.

- Although either bloom-time or veraison tissue sampling can be done, we have seen somewhat better reflection of actual nitrogen plant levels by using veraison sampling. Veraison is also satisfactory for other nutrients, so if you only sample at one time per year, I'd recommend the veraison sampling.
- While there is some evidence that whole leaves (blades+petioles) provide a better index of nitrogen status of the vine, we have a greater (and acceptable) database of research experience with using petioles alone as the sample tissue. Furthermore, you can collect, dry and submit a larger, more representative sample (e.g., 50 – 75 petioles) using petioles alone, compared to blades+petioles.
- Under-trellis cover crops for vigor control will in time, reduce nitrogen availability to vines to a point where additional N is required unless soil organic matter levels are relatively high (e.g., > 3-4%). You can "burn down" a 12- to 18-inch wide strip of the under-trellis cover crop with a

contact herbicide to temporarily reduce the sequestration of applied nitrogen fertilizer to this zone.

- Make sure that applied nutrients are incorporated, as by cultivation or rainfall. Soil-applied nutrients will be unavailable to the plant unless there's sufficient incorporation and soil moisture to get the nutrients to the roots.
- Common nitrogen sources are compost (variable % N), urea (46% N) (probably cheapest and easiest to apply), and calcium nitrate (15% N). There are also proprietary products that can be applied as foliar fertilizers, although these tend to be a bit pricy for the amount of N supplied.
- Every 1% increase in soil organic matter translates to 5 – 20 lbs N/acre/year, depending on soil conditions.
- N demand: American spp. > own-rooted hybrids > grafted hybrids > vinifera
- Apply under-trellis (banded) not to sodded row middles.
- Soil-applied N is effective at increasing vine capacity; foliar applied N (urea), very effective at increasing YAN levels when applied just before to just after veraison. Use about 5 lbs of urea per acre for increasing YAN – has minimal or no impact on vine vigor, vine capacity, or cold acclimation to winter temperatures.
- Don't apply what's not needed. Use plant tissue analysis, soil testing, and visual observation to determine nutrient needs. Other nutrients occasionally found in low/inadequate range in Virginia vineyards are phosphorus (esp. under low soil pH conditions), magnesium, and boron. Rarely are other nutrients needed. See Wine Grape Production Guide for details on materials and rates for these nutrients. DO NOT use soil test results as a basis for potassium fertilizer application.
- **Analytic labs:** We continue to recommend either the Penn State plant analysis lab or Waypoint Analytics for submission of plant tissue analyses. IMPORTANT: You can submit plant tissue samples directly to these labs with the appropriate submission forms: Penn State plant analysis forms are available at: http://agsci.psu.edu/aasl. Click on "Plant Analysis" on the menu on the left-hand side of screen. Waypoint Analytics (formerly A&L Eastern Laboratories" also has submittal forms for plant tissue samples at their website (http://www.waypointanalytical.com/) Go to "Agriculture" to review options and "Resources" to find submission form(s). Note that the Richmond VA address is where you want to send samples. We will provide feedback to you on tissue analysis results if desired, but you will need to contact us (vitis@vt.edu) and request the recommendation once you receive your lab results.

***Crop estimation*:**

Basic methodology is detailed in the Wine Grape Production Guide. However, we covered this topic in some detail, including the experiences from a panel of three industry members, in our 18 June 2020 "Virtual Vineyard Video-conference". I suggest that you take some time to review that recorded workshop if you wish to forecast how much crop potential your vineyard has. Here is the link to that recording:
https://video.vt.edu/media/Virtual+Vineyard+Meeting_18-June-2020/1_m7ipwpuf

III. Upcoming meetings:

A. Upcoming virtual vineyard meetings

The viticulture group at the AHS Jr. AREC will be hosting a series of four monthly, on-line viticulture meetings starting Thursday, 22 April 2021. The content of each meeting will vary somewhat and will involve extension specialists who will provide seasonal updates on vineyard management, pest management topics, and emerging weather, pest or disease issues. An initial topic of each of the 4 planned meetings will be a statewide grape development roundup gathered from our "sentinel vineyard" cooperators located around the state. Each meeting will last about 2+ hours, starting at noon. At this point, the meetings will be on-line, but stay tuned for at least one on-site meeting which we plan to host at the AREC in late-July.

The meeting dates (noon start) are (the next meeting is highlighted)

1) April 22, 2021 12:00 PM (EDT)

2) May 20, 2021 (12:00 PM): (speakers include Tony Wolf (viticulture updates), Doug Pfeiffer (early season insect pest management), and Mizuho Nita (early season disease management).

3) June 24, 2021 (12:00 PM)

4) July 22, 2021 (12:00 PM)

Here is the registration link for the May, June and July virtual meetings (use the same link for all three meetings).
You are invited to a Zoom meeting.
When: May 20, 2021 12:00 PM Eastern Time (US and Canada)

> Register in advance for this meeting:
> https://virginiatech.zoom.us/meeting/register/tZYqf-6uqDwtGNHtL-cA6v4_0oOTVq6SsVv-
>
> After registering, you will receive a confirmation email containing information about joining the meeting.

If you are a person with a disability and desire any assistive devices, services or other accommodations to participate in these meetings, please contact Tremain Hatch, AHS Jr. AREC at (540) 232-6032 during business hours of 9 a.m. and 5 p.m. to discuss accommodations 3 days prior to the event.

B. Virginia Vineyards Association/Virginia Tech Summer Technical meeting

Virginia Tech's AHS Jr. Agricultural Research and Extension Center is pleased to host the Virginia Vineyards Association and others to a viticulture/enology field day on Wednesday 28 July 2021. This will be largely outdoors, in-person, and in the heat of late-July: plan accordingly. The plans for the meeting are still being finalized, but program elements include:

- Hands-on canopy assessment and ideal canopy metrics
- Review of viticulture research projects at the AREC (Wolf and Nita)
- Invited speaker on ripe rot and other late-season rots of grape
- Demonstration of under-trellis vegetation management options
- Catered lunch
- Wine sensory evaluations
- Responsible socializing!

Stay tuned. We will provide registration information here and on the Virginia Vineyards Association's website.

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