CFAES OHIO AGRICULTURAL RESEARCH AND DEVELOPMENT CENTER

Ohio Grape-Wine Electronic Newsletter

Edited by: Dr. Maria Smith

April | 2019

Photos: Hedge-pruned vines and bud break following winter injury in *V. vinifera* Cabernet Franc (4/19/2019), photo credit: Neal Dix, Shade Winery in Shade, OH.

IN THIS ISSUE:

The wait is over, budburst is here

At long last, spring is here. While parts of the Northeast watch as buds swell, the rest of the state is well on its way into the growing season.

In this issue of OGEN, we address timely spring issues of vineyard water drainage and tile installation, April OARDC vineyard updates, and the current status of spring frost across the state.

Our best to all as the season swings into full gear over the next few weeks. If you have questions during this critical management period, please do not hesitate to contact us.

-Maria and the V&E Team

2018 Ohio grape pricing survey

By: Dr. Maria Smith, HCS-OSU

Reasons to establish a grape price index for the Ohio wine grape industry

Generating an aggregated pricing index for Ohio-grown wine grape varieties can help towards guiding profitability, and here's how:

- **Ensure growers are not missing out on profits compared to regional and national pricing trends**
- **Provide accurately estimated revenue loss for vineyard insurance claims**
- **Understand long-term trends in Ohio grape prices**
- **More precisely estimate how grape prices might change with various vineyard management practice use**

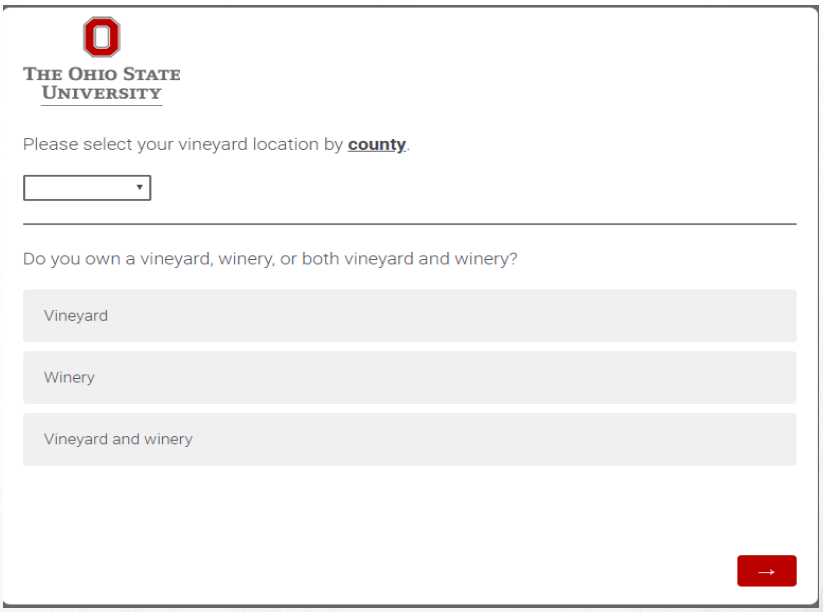
Towards understanding trends in Ohio grape production and pricing

A major initiative of the OSU viticulture extension team, in collaboration with the Ohio Grape Industries Committee (OGIC), is to establish a grape pricing index for the state of Ohio. This effort will help us understand multi-year trends of annual production, availability, and value of Ohio-grown wine grapes beginning with the 2018 season. So even if you do not sell your grapes, you are encouraged to take the survey!

As mentioned in the September 2018 newsletter, the wine industry in Ohio continues to grow, however the grape supply must rise in order to meet winery demands. One of the major challenges towards achieving this is ensuring profitability for wine grape production. Generating an aggregated pricing index for Ohio-grown wine grape varieties can help towards guiding profitability.

Currently, Ohio does not have a pricing index that helps growers determine the value of their grapes and may also be beneficial in valuing wine products from Ohio-grown fruit.

On April 22, 2019, OSU viticulture extension put forth a survey seeking industry responses to derive grape production and average grape prices by variety and region (Northeast, Northwest, Southwest, Southeast, and Central). Specific grower data will be kept confidential, with summarized results published for Ohio industry use. The survey only takes 5 to 10 minutes, so if you grow grapes in Ohio and have not filled it out, we would appreciate your time to do so! For a copy of the survey, email Maria Smith at smith.12720@osu.edu. Periodic reminders will be emailed until the survey closes on May 31, 2019.



Please respond to the survey by May 31, 2019!

Drain Tile Installation at AARS

By: Andy Kirk AARS-OSU

In contrast to drought-prone conditions found in much of the grape-growing world, Ohio's vineyards typically receive excess rain during the growing season. In addition to high rainfall, vineyard soils in many parts of the state have slow water infiltration due to soil type and structure. This results in poor soil water drainage, soil erosion, and delayed equipment operation in the spring. To combat these issues, Ohio farmers have relied on subsurface drainage systems, referred to as "drain tile" (**Fig. 1**), to expedite the discharge of water from their fields. In addition to the logistical benefits of drier fields, drainage systems have been demonstrated to improve vine survival and productivity, as well as the resulting juice chemistry of vines in Ohio **[1]**.

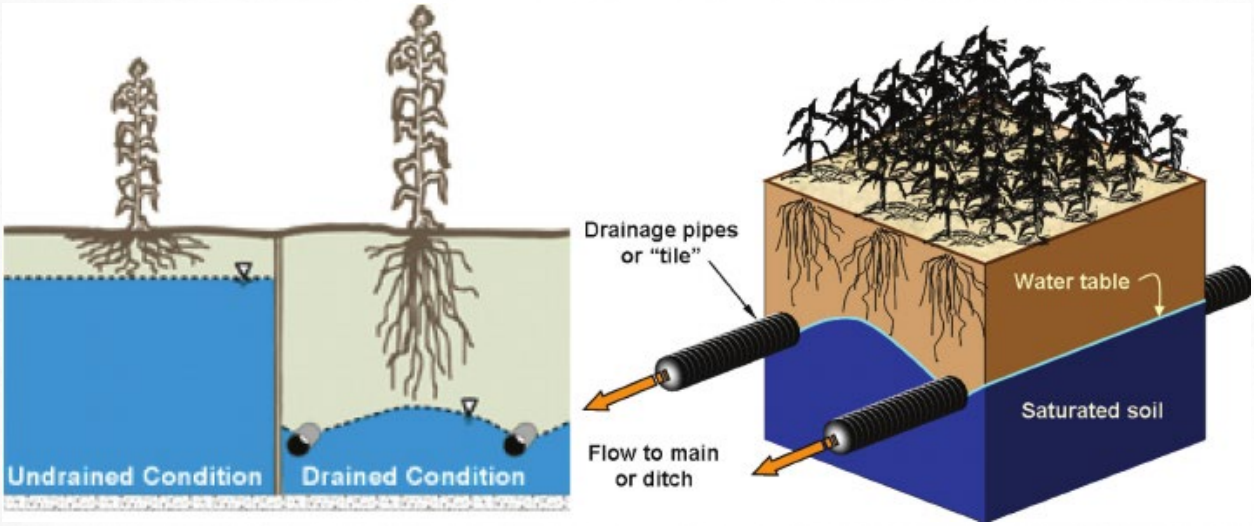


***Figure 1**: Subsurface Drainage Encourages Rooting Depth (Image from University of Minnesota Extension Service)*

Installation Tools:

- Rental mini-excavator
- Bosch self-leveling laser
- Square shovel
- 4" corrugated, HDPE perforated tube
- 6" corrugated, HDPE perforated tube
- 6" PVC tube
- Various joints and fittings
- Yard stick

Recently, AARS staff embarked on a project to lay drain tile for a new vineyard installation. Although official recommendations favor hiring an experienced contractor, many farmers take this task on themselves due to several factors. First, the cost of tile installation for a vineyard can range from $2000-$5000 per acre with a contractor. If a farm has access to the required machinery and the skills necessary to undertake the job, significant savings are possible. Second, many contractors who install subsurface drainage have minimum job size requirements to make the endeavor worth their time and attention. Given the many vineyards in Ohio that start with small acreage, we at AARS wanted to describe our recent experience to benefit new or small-scale growers. **Regardless of whether you hire a contractor or do it yourself, please contact your local soil and water conservation district for expert advice, a free and public service, when installing drain tile.**

Drain Tile (continued)

A critical step in the tile installation process is **deciding on the orientation of the tile drains**. This decision relates to the orientation of rows and the topography of the site in question. In the Lake Erie AVA, much of our terrain slopes northwards towards Lake Erie at grades of 2-6 percent. Thus, many vineyards have been installed with North-South rows, matching the natural topography and drainage of the terrain. A successful model locally has been to run perforated lateral lines (often 4" corrugated polyethylene) down these North-South rows, thus following the existing grade of the site and rows. The lateral lines then feed into a "main" line (often 6" corrugated polyethylene or PVC), which then moves the water towards its ultimate outlet point. There are, of course, many orientations possible for a drainage system, but this is one commonly seen in Northeast Ohio vineyards (**Fig. 2**).

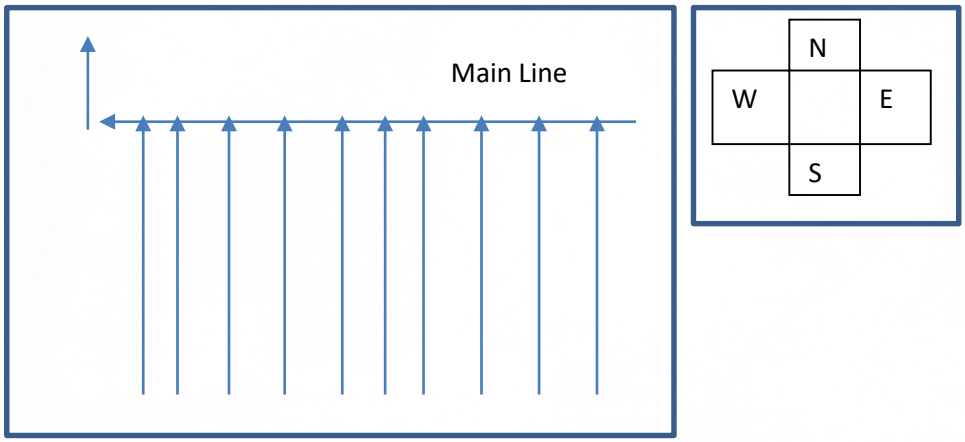


***Figure 2**: Diagram of potential drainage system*

Recommendations vary, but we sought to achieve 2% grade on all of our lateral lines, 2% grade for our main line, and at least 1% grade for our outlet line. We reviewed these specifications with our public soil and water conservation officials in the county, who deemed them to be commercially acceptable. Some drainage literature reports that acceptable performance of drains can exist with as little as 0.1 % grade **[2]**. After establishing target numbers for the grade of the various lines, an important question is whether that grade already exists in the topography of the field. To measure this, we used a Bosch Self Levelling Laser to measure height at various points throughout our field (**Fig. 3**). In our case, we were fortunate to have the required grade naturally in our field, which meant that we could set our trenches at a consistent depth below ground level. This made the trenching process easier, as it allowed us to focus on digging to one depth, which in this case was 30 inches below sod level.

***Figure 3**: Checking Trench Depth with Laser*

Drain Tile (continued)

Perhaps most importantly, any field drainage system must have an adequate outlet point. The type of outlet point can vary, but may include a ditch, stream, pond, or other water feature. In the case of AARS, we utilized a ditch system that eventually filters into a local stream. This particular ditch had to be deepened in order to have sufficient height change from the pipe to the ditch. For this reason, some experts recommend viewing the outlet selection as the starting point for any drainage project.

If you are interested in having drainage installed in your vineyard, a great first step would be to reach out to your local soil & water conservation district and OSU viticulture extension team. Soil and water conservation districts are an excellent resource due to their technical expertise, knowledge of local soil types, and familiarity with local contractors. If you live in a county with few vineyards, it would also be wise to engage your OSU viticulture extension team, as drainage systems installed for vineyards are often more intensive than those recommended for other crops.

References

[1] Brown, M. V., Ferree, D. C., Scurlock, D. M., & Sigel, G. (2001). Impact of Soil Drainage on Growth, Productivity, Cane Dieback, and Fruit Composition of 'Chambourcin' and 'Pinot Gris' Grapevines. *HortTechnology*, *11*(2), 272-276.

[2] Scherer, T. F., Sands, G. R., Kandel, H., & Hay, C. H. (2014). *Frequently asked questions about subsurface (tile) drainage*. NDSU Extension Service.

OARDC-Wooster April Vineyard Update

By: Diane Kinney and Dr. Imed Dami (HCS-OSU); photos by Diane Kinney

Winter Bud Injury:

The year 2019 did not treat us with a good start thus far. In January, our research vineyard at OARDC-Wooster was exposed to -7 °F. Cold sensitive *vinifera* varieties sustained the most injury. What has puzzled us was the increased extent of bud injury in March vs. January. Bud injury ranged between less than 5% in the Minnesota (MN) varieties to 100% in the usual suspects (Dolcetto, Merlot, and Syrah). Even though it is a head scratcher, we speculate it has to do with the warming trend and fewer cumulative cooling units than grapevines normally get in Ohio. Nevertheless, the bottom line is **we have conducted pruning adjustments to all our *vinifera* and the majority of hybrids except the super hardy varieties from MN.** So, bud adjustment during pruning is an absolute **MUST** this year. This topic was covered in an early OGEN issue and at the recent 2019 OGWC. As always, please, do not hesitate to contact Dr. Dami for any questions regarding pruning adjustment.

Grape Phenology:

In Wooster, and as of April 25th, 136 GDD have accumulated. Since grapevines usually begin bud break in the neighborhood of 100 to 200 GDD, several varieties have broken bud already. We are on a more normal track compared to last year's progress (see photos below).

***Photos**: Cabernet Franc on 25 Apr 2018 (left) and 25 Apr 2019 (right)*

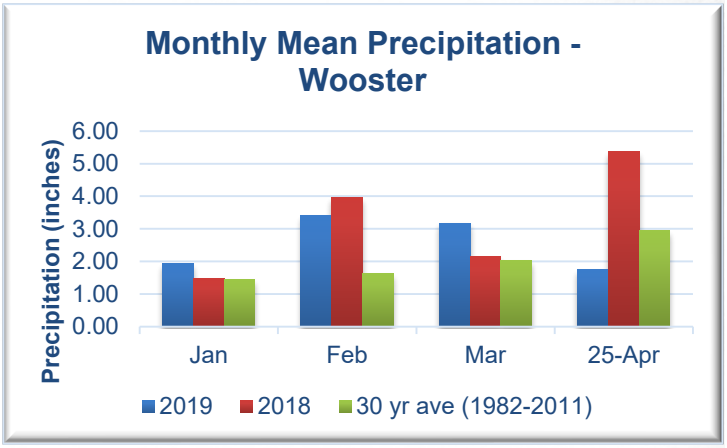
***Photos**: Chardonnay (left), Riesling (center), Chambourcin (right) on 25 Apr 2019*

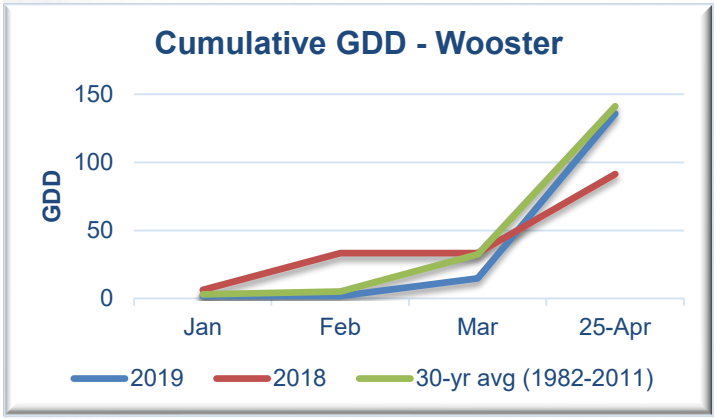
OARDC Update (continued)

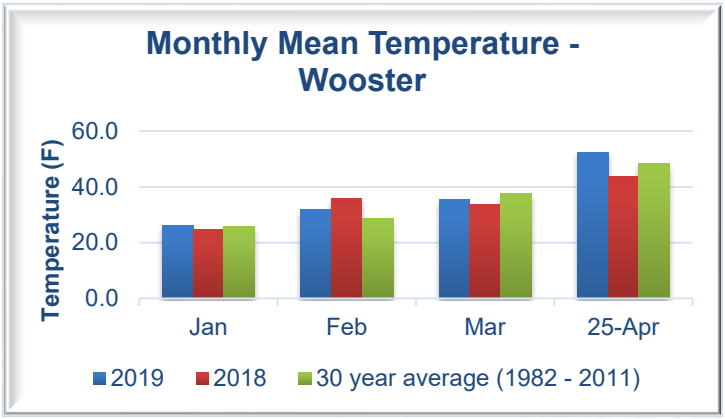
***Photos** (bottom): Marquette (left) and Frontenac (right) on 25 Apr 2019.*

Weather Conditions:

In Wooster, precipitation for April is actually below the long-term average, but due to the three preceding months being wet, the cumulative average is at 10.28" which is already +2" over the norm. Temperatures are slightly ahead of the average for this time of year, even with a cooler March, partly due to April being slightly warmer. This resulted, as mentioned above, in our GDD falling close to the norm at 136 vs 141.







Cultural Practices:

We have nearly completed all of our initial pruning throughout the vineyard and will follow up with the final bud adjustment in the coming weeks, following recommendations found in the Winter Injury to Grapevines and Methods of Protection. We will also be conducting de-hilling of our grafted vines soon depending on soil conditions. As of April 25th, we have not applied any dormant sprays, but the plan is to apply Sulforix (lime sulfur or calcium polysufide). This dormant application is aimed at reducing overwintering inoculum on canes/cordons/trunks. Dormant sprays are useful for management against diseases (especially anthracnose) that overwinter on the grapevine. Lime sulfur is also effective against many insect pests that overwinter on the plant.

April 2019 Spring Freeze Report

By: Dr. Maria Smith, HCS-OSU

Once budburst has occurred, the biggest production threat is spring frost.

For much of the state, the onset of budburst, and therefore the growing season, has begun. Keep in mind, the last average last date of frost is in May, with some colder areas prone to potential frost events until early June (**Fig. 1**). Thus far, Ohio has faired well, with limited reports of freezing temperature (< 32F) events occurring over the past several weeks (**Fig. 2**).

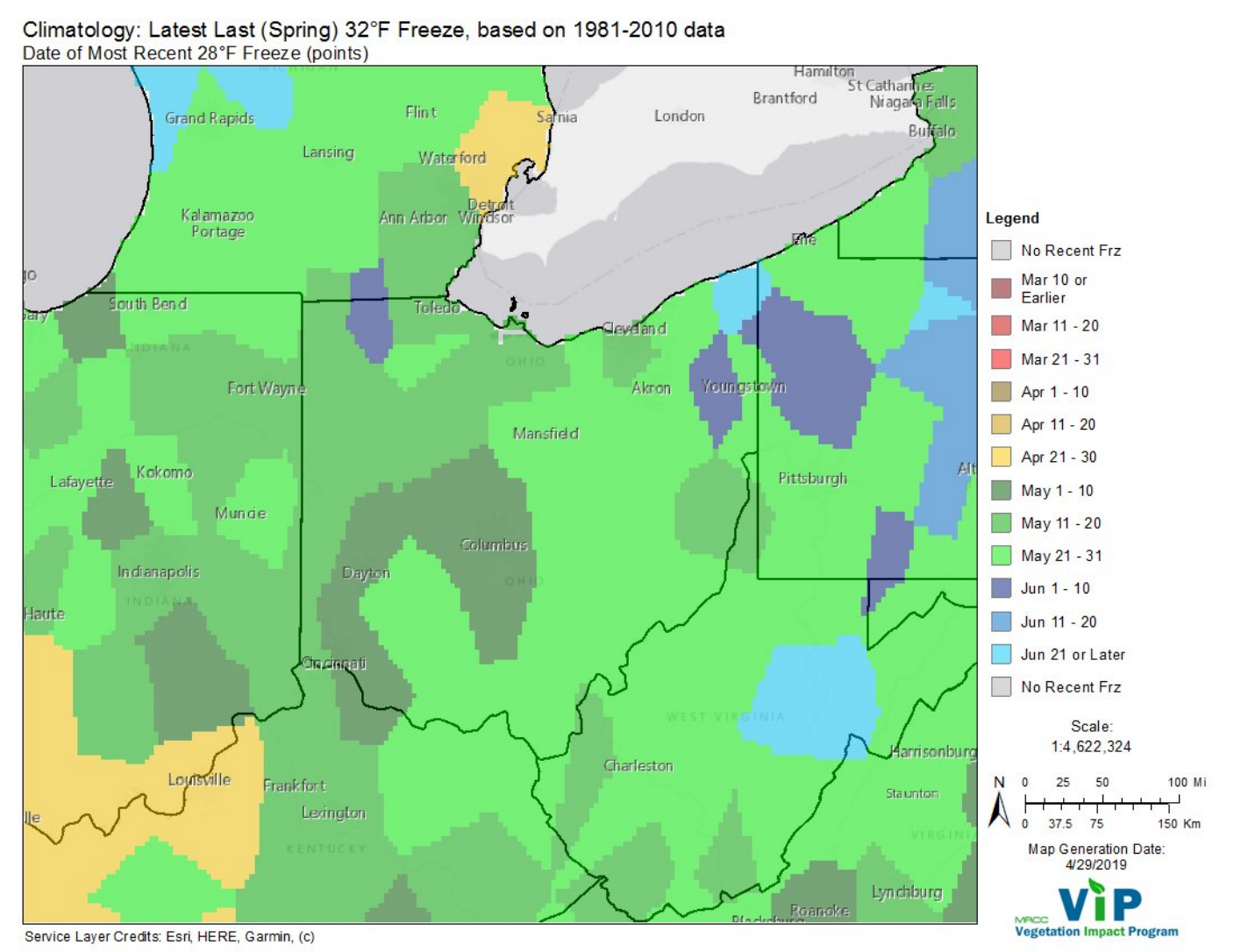


***Figure 1**. Average date of last 32F freeze from 1981-2010 (data from Midwest Regional Climate Center)*

Spring Freeze (continued)

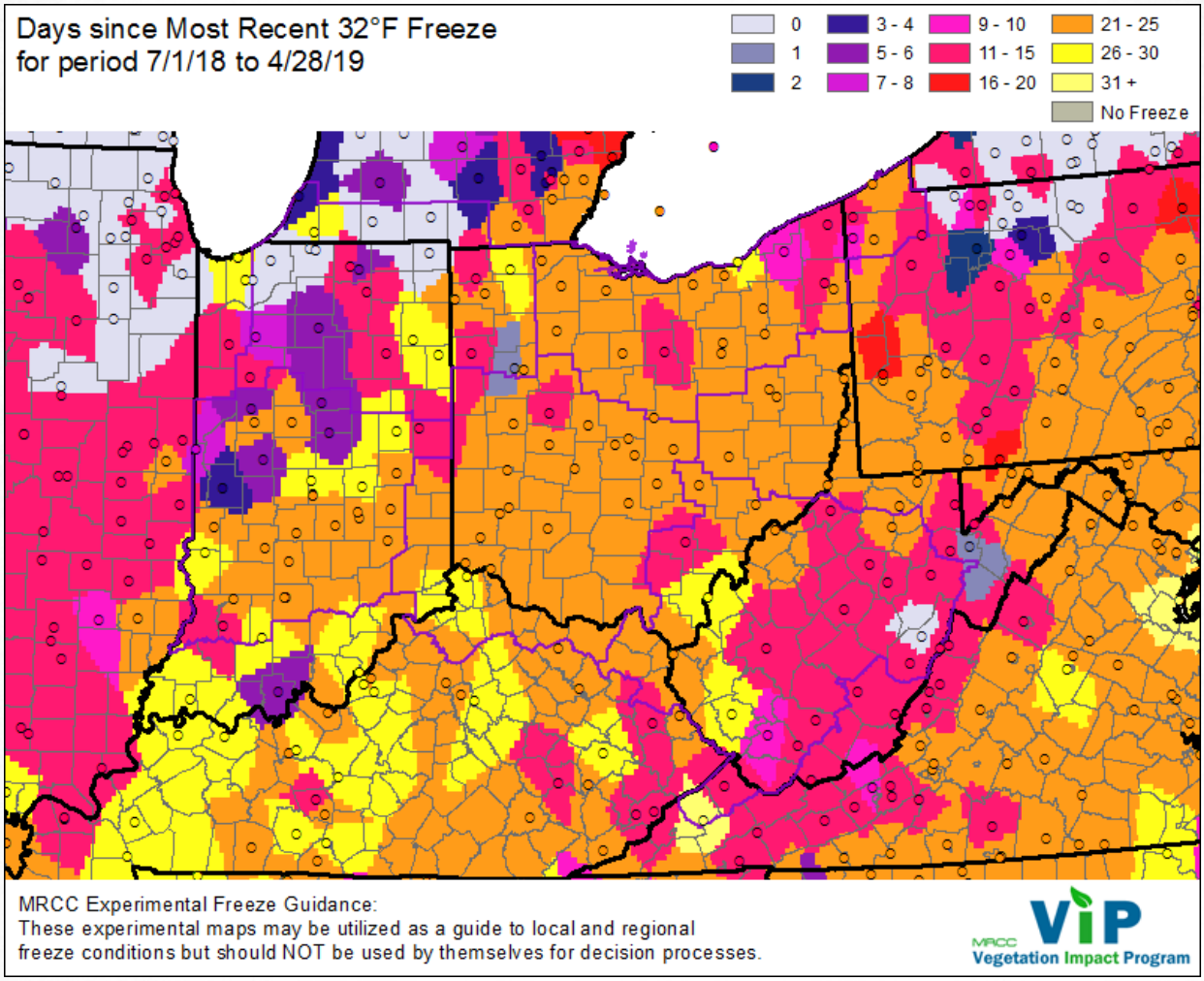


***Figure 2**. Number of days since last freezing temperature (data from Midwest Regional Climate Center)*

What happens during a frost event at temperatures < 32F that makes it so problematic?

Just because a frost event occurs does not necessarily mean that freeze injury will always result. **Freeze injury** occurs when water in the plant tissue freezes (i.e. water structure changes state from liquid to solid ice) **[1]. However, the temperature required to cause freeze injury (critical temperature) may depend on a number of factors, including the phenological stage of bud development, surface moisture, and the likelihood of ice nucleation [2, 3].** A summary explaining the current theory of how freeze injury occurs in plants during a frost event can be found at https://extension.psu.edu/understanding-and-preventing-spring-frost-and-freeze-damage.

Ultimately, though, freeze injury often results in partial or complete shoot loss, and most importantly, the loss of primary shoot inflorescences responsible for the season's crop. While some varieties produce fruitful secondary shoots following freeze injury of primary shoots, the quality of that fruit may be lower due to delayed phenological development and fruit maturation and reduced shoot growth.

Spring Freeze (continued)

What measures can you can take to prevent spring freeze injury?

Several management techniques are available for avoiding and tolerating frost events, including passive and active measures. These techniques range in cost and efficacy. The cheapest and most effective means for preventing spring freeze injury are passive measures of **site** and **variety selection (Fig. 3 and 4)**. Choosing sites with good air flow and drainage and matching variety characteristics to site characteristics can help minimize the need for expensive active measures later. In some cases, however, the purchase and deployment of active measures such as wind machines, heaters, or overhead irrigation may warrant the trade-offs in cost. When considering the use of active measures, keep in mind the purchase, maintenance and use costs, required resources, the likelihood of frost occurrences, and the typical type of frost events that occur (radiative vs. advective).

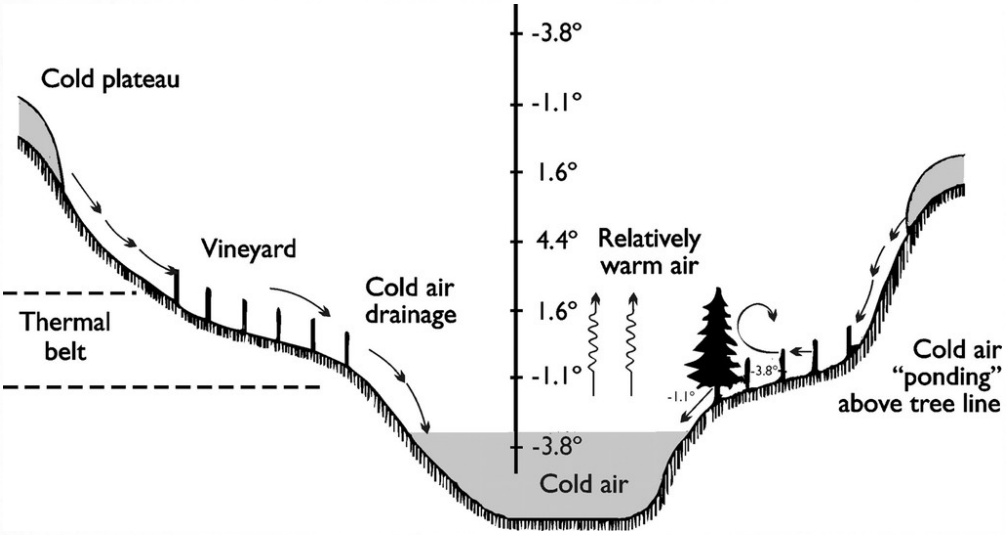


***Figure 3**. During radiative frost events, cold air pools in low spots and around obstructions to cold air drainage, for example tree lines (figure from **[4]**).*

***Figure 4**. Early budburst variety Frontenac (left) vs. late budburst variety Cabernet Franc (right). Although very tolerant to extreme winter temperatures, early budburst Minnesota varieties such as Frontenac are not well suited to highly frost-prone sites. Photos from 25 Apr 2019; credit: Diane Kinney*

Spring Freeze (continued)

What about some of unconventional chemical applications?

Several commercially available chemicals exist with claims of reducing spring freeze injury, including dormant oil sprays and temporary green tissue protectants. The major appeal of these products is the cost effectiveness relative to traditional active protection methods, especially for small to medium size vineyards. These products include vegetable oil-based sprays that may delay budburst, such as Amigo Oil (Loveland Industries), and products intended to increase freeze-resistance of tissues, such as Potassium Dextrose Lac (KDL; Agro-K).

But do they work?

Several studies in grapes have shown dormant applications of vegetable oil sprays can significantly reduce bud respiration, thereby delaying the onset of budburst by one to three weeks **[5, 6].** While the delayed budburst decreases the risks of spring freeze damage, several issues arise when considering the use of vegetable oil products, including:

- Predicting developmental delays and its effects on fruit quality
- Appropriate concentrations to provide delayed budburst while minimizing potential phytotoxic effects
- Weather condition (rainfall, heat accumulation) impacts on product efficacy and need for repeated applications

To date, the most promising vegetable oil product for delaying budburst is Amigo Oil between an 8 to 10% concentration. However, additional testing needs to be done to understand variable and unintended outcomes of product use prior to recommendation.

In the case of KDL, a potassium salt-based fertilizer, there is limited evidence for efficacy in grapes in either controlled freezing studies or natural frost events **[3, 6].** Among 4 tested single-bud varietal cuttings (Albarino, Cabernet Franc, Cabernet Sauvignon, and Pinot Grigio) in a controlled (25.7F) environment, KDL (1% v/v/) applied at 24 hrs before applied freeze stress resulted in 16% lower individual shoot mortality but did not have an effect when applied 48-hrs prior to freeze stress. When tested on whole potted Noiret vines exposed to 25.7F, KDL applied 24 hrs prior to freezing temperatures had no effect on shoot mortality. Of course, neither of these situations replicate mature vine response to natural frost conditions. When tested in commercial vineyard in 2015, KDL (1% v/v) applied 24 hrs before a frost event on Traminette and Noiret did not reduce incidence of shoot mortality compared to an untreated control **[6]**. Because of the limited efficacy of KDL, **it is not currently a recommended product for frost protection.**.

References:

[1] FAO. 2005. Frost protection: fundamentals, practice, and economics. Vol. 1.
[2] Keller M. 2010. The Science of Grapevines: Anatomy and Physiology. Academic Press, Cambridge, MA
[3] Centinari M et al. 2016. HortSci 51:856-860
[4] Poling EB. 2008. HortSci 43:1652-1662.
[5] Dami and Beam. 2004. AJEV. 55:269-275
[6] Centinari et al. 2017. AJEV. 69:77-88.

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Early Leaf Removal Workshop and Demo

Monday, June 10, 2019 | 1 to 4pm

Hosted by: Dr. Maria Smith and Andrew Kirk

Early leaf removal (ELR) is a novel canopy management practice for yield and late-season fruit rot control. However, care must be taken in order to achieve desired outcomes. To address commercial use of ELR, topics during this workshop will cover:

- Timing, intensity, and suitability of early leaf removal
- Mechanization versus hand-defoliation
- Demonstration of equipment for mechanical defoliation

Locations:

M Cellars Winery • 6193 South River Road West, Geneva, OH 44041

Cost: Free • **Details:** Handouts provided

Pre-register: Yvonne Woodworth | Woodworth.21@osu.edu or 440-224-0273

ohiograpeweb.cfaes.ohio-state.edu/events

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