

Department of Horticulture and Crop Science

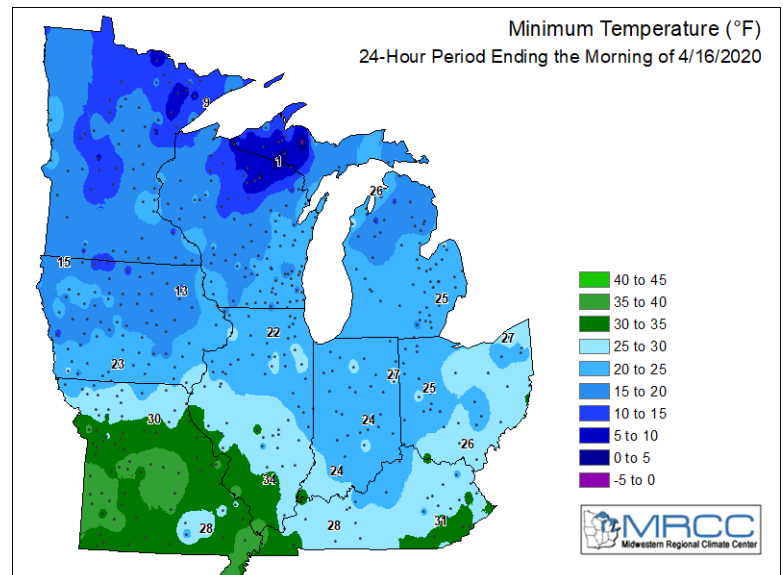
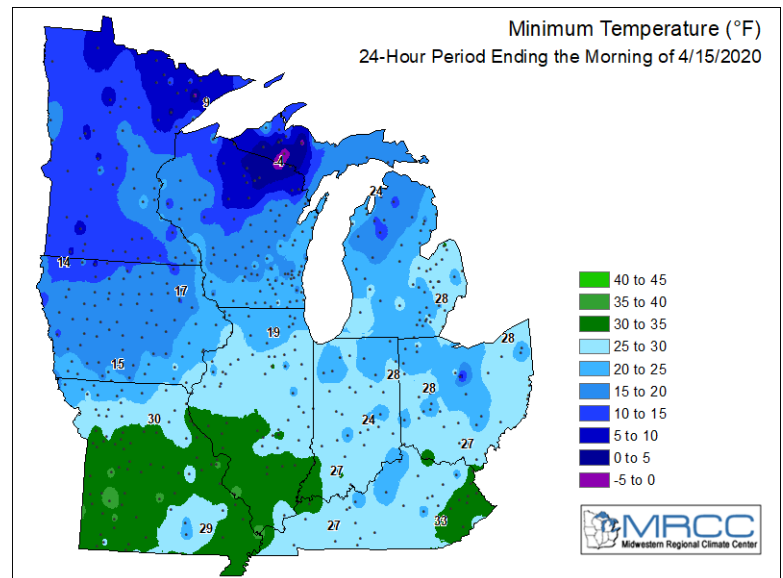
OGEN Special Issue: Spring Frost Events and Protection Measures

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I am sure many of you have heard about the frost forecast issued by the National Weather Service (NWS-NOAA) during the first week of April that predicted below normal temperature in mid-April and coming days (note: there are still frost advisories in coming days and risk of frost continues throughout the state into May). Also, due to the mild winter we had experienced, our Grape Team has been providing advance warning on how to be ready at several educational events including the 2020 OGWC (in February) and pruning workshop (in March) as well as electronic updates via OGEN and Facebook (3/25 and 4/7). Sadly, the NWS predictions have been correct and critical temperatures that are damaging to grapes occurred. Wide-spread frost has been reported over the past 48 hrs in southern Ohio, where vine growth (budbreak to 3" shoot growth) has resumed in early bud-breaking varieties. The following is a summary of low temperatures experienced on 4/15 and 4/16 in Ohio and reminders of methods of frost protection. Some are implemented prior to frost events; others are applied during a frost event.

Methods prior to frost event

- **Delayed pruning:** since we have had a mild winter, vines have more advanced phenology than normal and buds are pushing earlier as a result. Delayed pruning helps with delaying budbreak.
- **Double-pruning:** the rationale is similar to delayed pruning. With 1st pruning, you leave extra buds per vine. Due to apical dominance, apical buds push earlier than basal buds. If frost occurs, basal buds (which are delayed to grow) will not be injured. With the 2nd pruning, apical shoots (injured or not) will be pruned by retaining a final bud count per vine.
- **Row middle and cover crop:** bare ground in row middles provide more heat to keep vines warm during a frost event. Mowed grass cover crop will also do the same. So, it is crucial that you mowed your grass as short as



Recorded minimum temperatures for Ohio and neighboring Midwest states for 15 Apr 2020 and 16 Apr 2020. Figures retrieved from Midwestern Regional Climate Center: https://mrcc.illinois.edu/cliwatch/DLY_LT_MAPS.htm



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possible for added frost protection.

- **Products that delay budbreak:** Dami presented this topic at the 2020 OGWC. Some products can be effective, but it is too late to apply now if you have not already done so.
- **KDL (0-0-24) fertilizer:** Even though growers would like to use this product, research has shown that KDL does not protect shoots against frost injury once vines resume growth. Therefore, it is not recommended. Dr. Smith researched this product and can be contacted directly for more information.
- **Copper:** has been shown to protect young shoots against frost injury by killing ice forming bacteria present on vine foliage. You may start spraying as soon as budbreak and repeat every 5-7 days (washes off easily and must be reapplied after an inch or more of rain) until you're out of the frost threat period (2 – 3 weeks) in your vineyard. **Read the label for the application rate.** In CA, 0.75 actual copper per acre was used. Read the label to avoid plant injury. To avoid injury, apply when not cold or wet (slow drying) and use formulation with lime.

More info about copper is in the Midwest fruit pest management guide (p 90-91): https://ag.purdue.edu/hla/Hort/Pages/sfq_sprayguide.aspx. Sensitive varieties are listed on p. 94-95 of the same guide.

Methods during a frost event

- **Wind machines:** wind machines, although expensive, are effective against radiative spring frost events (clear, cold nights with temperature inversions).
- **Overhead irrigation (sprinklers):** None of our growers in OH has this system. Having said that, **DO NOT SPRAY YOUR VINES WITH WATER USING A SPRAYER.** You will cause more damage than doing nothing.
- **Heaters:** same as above; not a common method in Ohio. When temperature inversion exists, heaters are effective alone and best with wind machines. However, cost of fuel and pollution are main limitations.

What to do after frost injury

If you have experienced frost injury during the previous week, **the best course of action is to survey primary shoot injury and await emergence of secondary buds.** There is still cropping potential on secondary shoots in the event of frost injury, although fruitfulness of secondary shoots will vary by variety. Additional recommendations for vine management following frost events will be forthcoming in the April issue of OGEN.

As always, do not hesitate to contact Dr. Imed Dami (dami.1@osu.edu) or Dr. Maria Smith (smith.12720@osu.edu) if you have further questions about the above.