

Assessing and Managing Winter-Damaged Grapevines

Part II: Early Spring

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The low temperature episodes of 2014 were not record cold events but the devastating impact from the Polar Vortex is one of the worst weather events that grapevines experienced in the past 20 years. Typically, we are worried about the grape crop loss, but this year we are concerned about vine loss as well. This article is a follow up to previous publications (posted in OGEN) on assessing and managing winter-damaged vines. The OSU Grape Team assumes grape growers followed the guidelines below of how to prune vines after winter injury based on percent primary bud damage in their own vineyards. These guidelines are included in this article as a reminder and because subsequent decisions will be based on the outcome of your bud and trunk damage assessment. First, identify the level of bud damage for your varieties; then follow the recommendations. If you still have additional questions, please contact any of our Team members (contact information at the end of this document).

- If primary bud damage is less than 15%, then no adjustment of pruning is needed. Follow the cultural practices conducted in previous years. Many of the very cold hardy (LT50 < -20F) hybrid varieties from Minnesota fall in this category. Examples include Frontenac, Frontenac gris, LaCrescent, and Marquette.
- If primary bud damage is 15 to 34%, then leave about 35% extra buds. For example if you prune to leave 30 buds/vine, and bud damage is 20% then leave an extra 35% (10 more) or 40 buds/vine. Some American type varieties like Concord and cold hardy hybrids (LT50 = -15 to -20F) fall in this range. With pruning adjustment, a normal crop is expected and no further adjustment of cultural practices is required.
- If primary bud damage is 35 to 50%, then double the number of buds retained. Based on the assessment in the OSU research vineyards, many of the old and new hybrids sustained this range of damage. Moderately hardy hybrids (LT50 = -10 to -15F) fall in this category including Vidal, Chambourcin, Traminette, Noiret, and the American variety Niagara. Again, if you have varieties with this level of primary bud damage, adjusting pruning should suffice to have a near normal crop.
- If primary bud damage is 50-75%, then it is best to minimally prune vines by hedging. Research from our program showed that hedging to 5-bud spurs leaving all spurs is the best method to have a partial crop, and keep vines balanced for this year and next. Many growers in Ohio used this approach and hedge-pruned. Some delayed pruning until budbreak to assess die-back. At this level of injury, vascular tissue damage (cane, cordon, or trunk) may also occur. Most vinifera varieties which are the most cold tender (LT50 > -10F) grapes grown in Ohio and some hybrids sustained this level of bud damage. Since this is the most common situation this year and most difficult to handle, it is discussed further below.

Field Assessment of Vines with Extensive Bud Damage:

- If bud damage is near or just above 75%, and you hedge-pruned, you will likely see sporadic bud break and shoot growth this spring. The vascular system of trunks will recover and vines will produce a low to moderate crop. Many old and new hybrids fall under this category depending on the location of the vineyard and minimum temperatures experienced. Examples of varieties include Vidal, Chambourcin, Traminette, Noiret, Chardonnay, and Aromella.
- If bud damage is near 100%, then vines likely sustained severe vascular tissue injury as well, and cordon, trunk, or even vine replacement is recommended. Almost all varieties of *Vitis vinifera* sustained this level of injury across the state. Examples include Chardonnay, Riesling, Pinot gris, Cabernet franc, Merlot, Cabernet Sauvignon to list a few. All (26 varieties) vinifera varieties sustained 100% primary bud damage

in our trials in Wooster and Kingsville.

Recommendations:

- If there is poor or no shoot growth along the cordon, then cut dead cordons back to the head of the vine (joint point between cordon and trunk). Observe the surface cut of the cordon cross section whether the phloem and xylem are green or cream (live) or brown (injured). If the xylem is injured, keep cutting trunk down until you see live tissue.
- If sucker growth is limited to the base of the vine and not on the trunk, then the trunk is also damaged. Remove the trunk(s) by cutting about 8 inches above the ground level for own-rooted vines and the same height above the graft union for grafted vines. Replace damaged trunks by training new suckers.
- If there is no sign of sucker growth even at the base of the vine, then the vine is dead and needs replacement. Remember not to remove any vine until an FSA representative visits your vineyard to document the damage.
- If sucker growth is observed near the graft union, but you are not sure if it is originating from the scion or the rootstock, then contact Dave Scurlock for assistance.
- If suckers originate from the rootstock, then the scion is dead and vines need to be replaced as well.

Sucker Management:

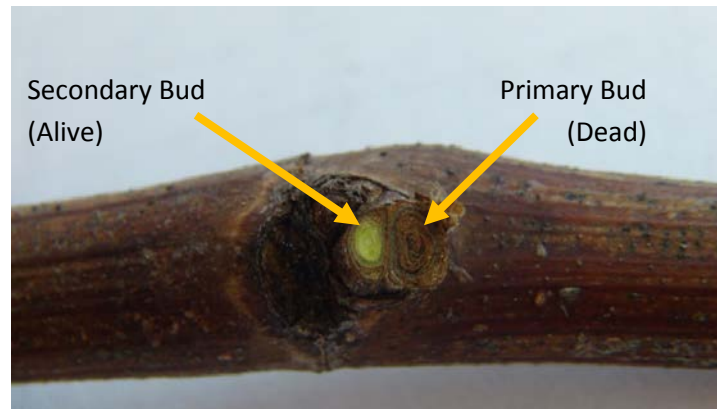
- Train multiple suckers (4 or more). The high number of suckers is recommended to devigorate the vines, especially older vines.
- Train suckers emerging near the ground on own-rooted vines and just above the graft union on grafted vines. Doing this will minimize the impact of crown gall (discussed below).
- Train suckers vertically then lay them down horizontally to cordon and foliage wires and tip once they extend beyond 2 feet. This will produce lateral shoots this season. Next season, these lateral shoots will be pruned to one-bud spurs.

Special Notes:

- Some hybrids have fruitful secondary and base buds. They will produce a normal crop even with relatively high % primary bud damage. Examples include Chancellor, DeChaunac, Seyval, and Vidal.
- Crown gall, a bacterial disease caused by *Agrobacterium vitis*, can be a major problem in varieties with cordon and trunk damage. Typically, we observe tumor-like galls near the graft union, trunks, or even cordons. Galls may appear this season or the following year or two. Any plant part above the galls will eventually die the same year of the freezing event or in subsequent years.
- Bud and cane damage are relatively easy to assess as demonstrated at the workshops we held this winter. However, cordon and trunk injury are not easy to assess. In fact, the discoloration of the phloem is not necessarily a good indicator of trunk loss. The best indicator is observing sucker growth. Photos are appended to assist with assessing damage in the vineyard.
- Young vines: 1-year old: prune back to 3-4 buds from the base of the trunk. If shoot growth does not resume this spring then vines are dead. For 2-year old: similar approach if poor growth in previous year. If vines had vigorous growth and made the fruiting wire, then assess and proceed as above.

Photos of Assessing Winter Damage in the Vineyard

1. Bud damage assessment. Dead (brown) primary bud and live (green) secondary bud.



2. Cane damage assessment.

A. Green phloem (under bark) and xylem (next to phloem) indicates live cane.

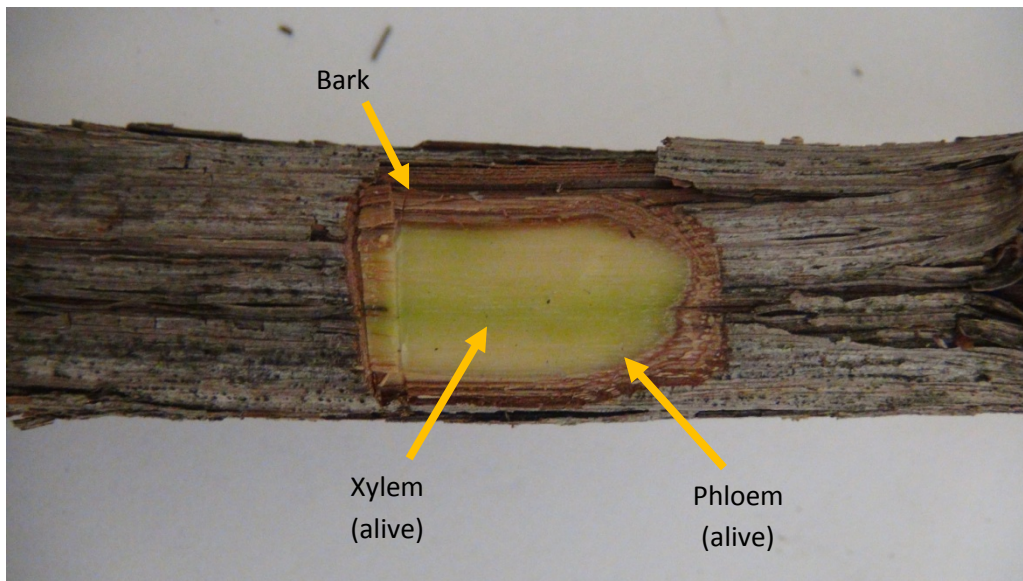


B. Brown phloem indicates cane injury.

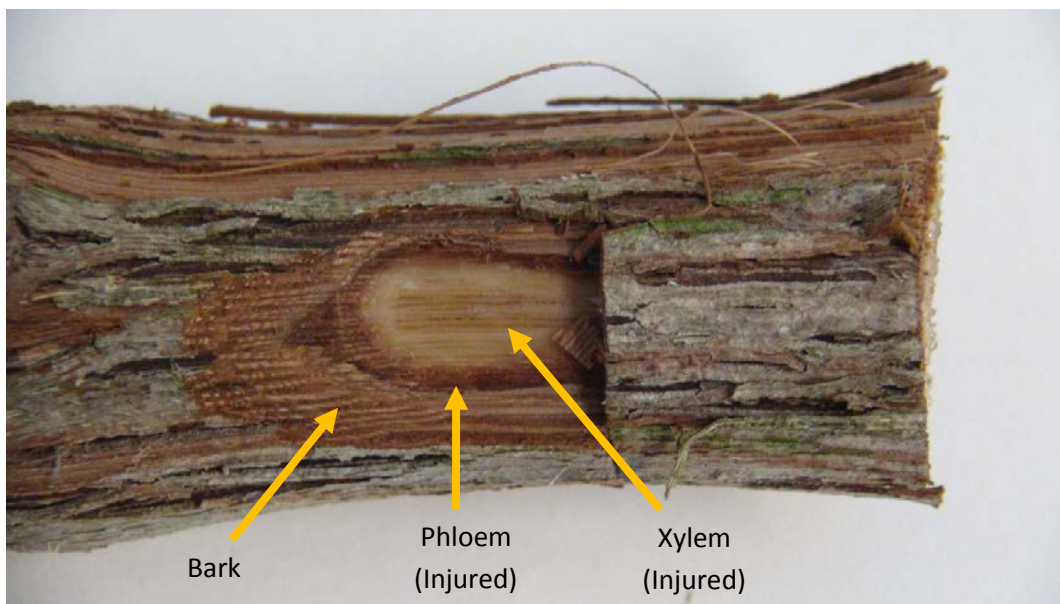


3. Cordon injury assessment.

A. Green phloem (under bark) and xylem (next to phloem) indicates live cordon.



B. Brown phloem and xylem indicates cordon injury.



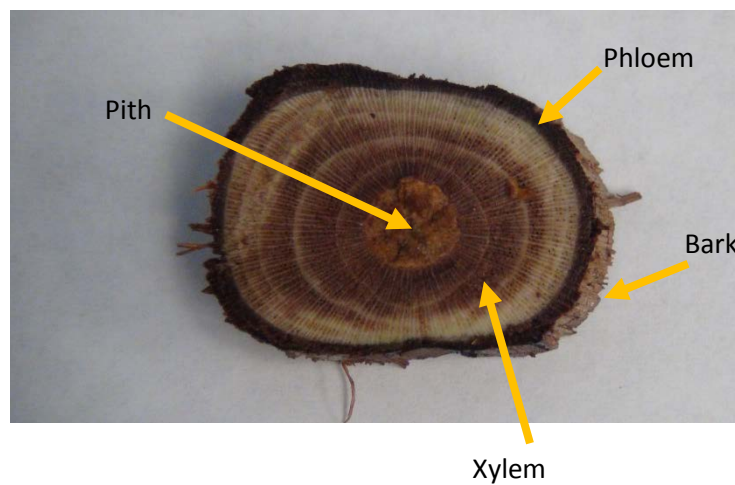
4. Trunk injury assessment. Brown phloem indicates injury, but vine may still be alive.



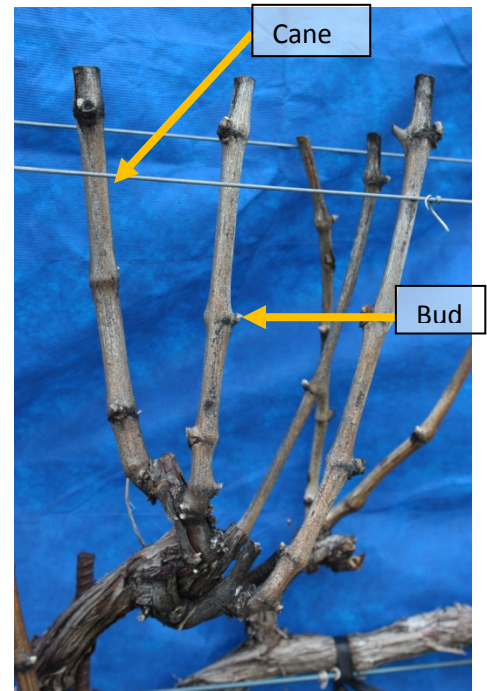
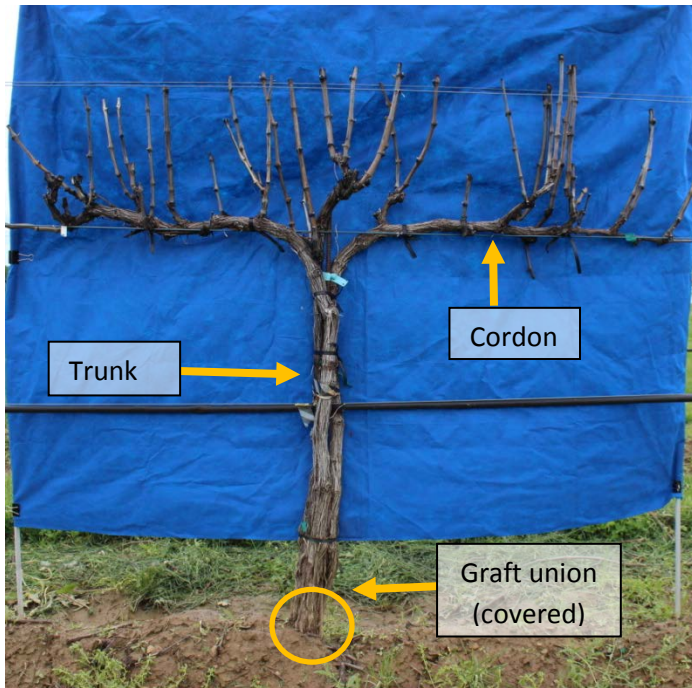
5. Trunk on the right shows cream color of phloem and xylem indicating the trunk is alive. Brown phloem indicates injury, but xylem injury is not obvious with a longitudinal cut.



6. Cross section cut shows brown circle (phloem injury) just under the bark and brown streaking around the pith indicating xylem injury. Cordons or trunks will not recover from phloem and xylem injuries.



7. Dead vinifera vine at the research vineyard in Wooster. Note no sign of bud growth on trunks, cordons, or canes. (photo taken 5/16/14).



8. If canes, cordons, and trunks are dead, check for signs of growth above the graft union.
A. Cut the trunk back to 8" above the graft union (horizontal arrow).



9. Injured cordons and trunks, but vine is not dead. Note sucker growth just above graft union.



10. Double trunks cut back to 8" above graft union (left). Cross section of the surface cut shows vascular damage (phloem and xylem)(right).



11. Sporadic budbreak and shoot growth in 'Regent'. Early assessment of bud damage showed: 100% damage to primary buds, 99% damage to secondary buds, and 93% to tertiary buds.



12. Cold hardy varieties like Minnesota varieties fared well after the multiple freezing events in January-February. Note fruitful shoot growth from basal buds.



Resources:

Polar Vortex and Its Impact on Grapes: [www.oardc.ohio-state.edu/grapeweb/images/OGEN_Special_Issue_10_Jan_2014\(3\).pdf](http://www.oardc.ohio-state.edu/grapeweb/images/OGEN_Special_Issue_10_Jan_2014(3).pdf)

Update on the Freeze and Grape Injury:

http://www.oardc.ohio-state.edu/grapeweb/images/OGEN_17_Jan_2014_Dami.pdf

Grape Winter Damage – Update 5: [www.oardc.ohio-](http://www.oardc.ohio-state.edu/grapeweb/images/OGEN_28_FEBRUARY_2014(10).pdf)

[state.edu/grapeweb/images/OGEN_28_FEBRUARY_2014\(10\).pdf](http://www.oardc.ohio-state.edu/grapeweb/images/OGEN_28_FEBRUARY_2014(10).pdf)

Pruning Grapevines after Winter Injury:

www.winesandvines.com/template.cfm?section=features&content=98678

Winter Injury to Grapevines and Protection Methods: MSU E2930:

web2.msue.msu.edu/bulletins2/product/winter-injury-to-grapevines-and-methods-of-protection-1173.cfm

Crown Gall: wine.wsu.edu/research-extension/files/2013/05/2013-CrownGallWhiteSheet.pdf

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