Frost Damage Update in Northeast Ohio

By Andy Kirk, Research Specialist and Manager, AARS-Kingsville

Many vineyards in Northeast Ohio experienced damaging frosts on the mornings of May 8th and 9th. At the Ashtabula Agricultural Research Station (AARS), temperatures reached 30.4 degrees and 30.8 degrees on the mornings of the 8th and 9th, respectively. Most growers I've spoken to observed that the Monday morning frost did more damage than the Tuesday frost. Frost damage at AARS was limited to instances where early varieties, such as Chardonnay, were located in colder, low-lying areas. At the time of the frost, Chardonnay had two to three leaves unfolded. In the worst hit sections of that vineyard, I estimate that 50 per cent of primary shoots were damaged. On a property-wide basis, I estimate that *2%* of our primary shoots were injured due to this frost.

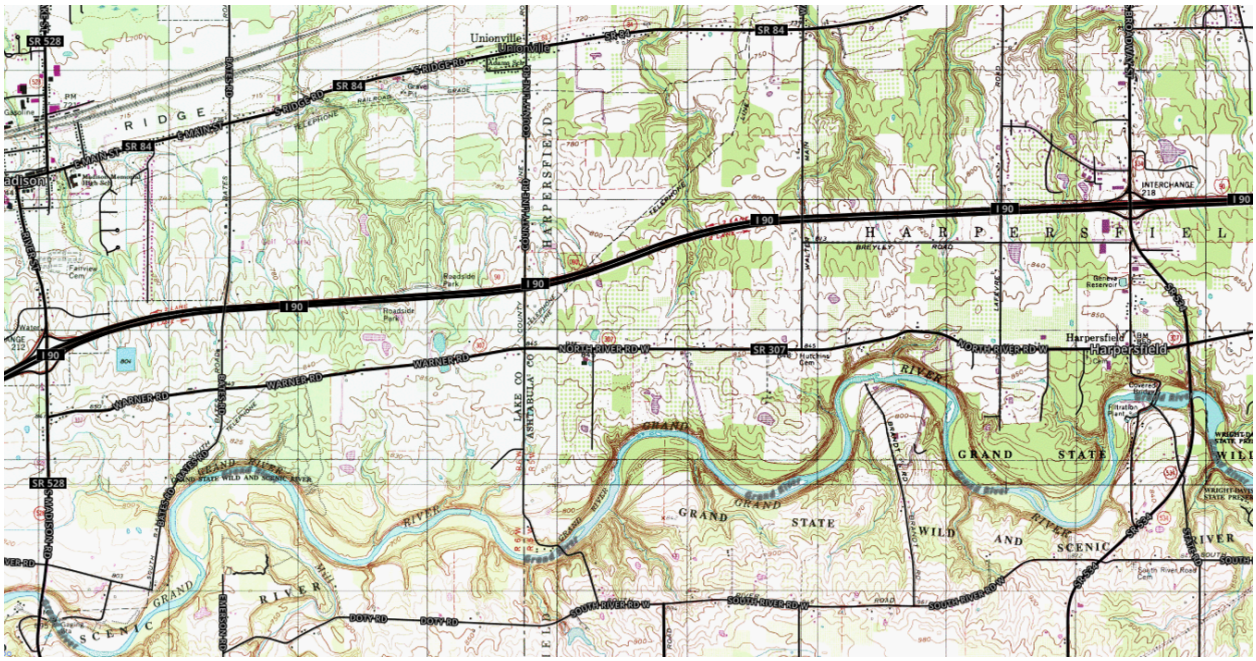
As has been observed in previous local frost events, it appears that the key factors determining which local sites experienced damage were:

1) Elevation above sea level: the higher the less frost damage
2) Distance from Lake Erie: the closer the less frost damage
3) Stage of shoot development: the less development the less frost damage

Some vineyards suffered severe losses. Among the worst hit appear to be those *Vitis Labrusca* vineyards along State Route 307 and relatively low-lying areas of South River Road. It should be said that other vineyards along these roads were undamaged or had minimal damage. *Vitis Labrusca* varieties are earlier to bud-break, and therefore had shoots as long as 6" at the time of the frost. While during the onset of bud-break, a bud may be tolerant of temperatures as low as 28F, the critical temperature approaches 30F as new leaves and shoots develop (See link for more detail). Thus, more advanced varieties were especially vulnerable.

I've heard from several growers with vineyards at higher elevation sites, such as those on Routes 528 and 534, south of the Grand River. Temperatures did not go below freezing at several of these sites, and not low enough to damage young shoots at others. Likewise, higher elevation sites on South River Road,

and its intersecting roads, appear to have sustained less frost damage. Vineyard sites further north on the beach ridges, including those at AARS, experienced minimal damage.



On a more practical note, many growers remarked that the inversion layer was relatively weak during this frost event. When I ran the wind machine last October, I noted that it took roughly 20 minutes at full speed to achieve a 6 degree swing in temperature. I ran the wind machine for several hours on Monday the 8th, and raised the temperature by no more than 4 degrees before the sun came out. The previous day was very cool, and it stands to reason that there was not a lot of warm air to mix around.

That said, four degrees may have made all the difference in this case. A few days later, I spoke to a local grower who is considering the purchase of a wind machine. I crunched the numbers for a 15 acre vineyard, as to whether this machine would have paid for itself on Monday morning. Let's assume it took a 50 per cent loss away from a typical yield of 5 tons/acre, and that the value of the grapes, whether through selling them or avoiding the outside purchase of them, is $2000/ton. That difference in revenue would have paid for two Orchard-Rite wind machines in one night.