Winter Survival of Vidal Blanc Vines for Ice Wine Production

Study investigates the effect of cluster thinning and pruning on crop level

By Imed Dami

Clusters left to hang for ice wine production in Vidal blanc long after leaf fall and typically picked in December when temperature drops to 18 °F.

Vidal Blanc, or Vidal (Ugni Blanc x Rayon D'Or), is a white grape variety that belongs to the group of highly productive hybrids that tend to overcrop, which results in reduced growth, fruit and wine quality. Vidal's propensity to overcrop has been attributed to its high bud fruitfulness and large clusters. Research has shown that the best way to manage this variety is with balanced pruning and cluster thinning—also referred to as "balanced cropping," a term coined by Dr. Stan Howell from Michigan State University.

Vidal has been widely planted in eastern and midwestern states due to its many positive attributes: moderate cold hardiness (more cold hardy than Vitis vinifera varieties), spring frost avoidance (due to late bud break), bunch rot resistance and especially its versatile and desirable wine style and quality. In the northeastern U.S. and Canada, Vidal acreage has expanded since the early 1990s because of its use in ice wine production. Its high yield, thick berry skin, high acidity and fruitiness make it particularly suited for ice wine. Grapes for ice wine production are left to hang in the grapevines long past their typical commercial maturity and are not harvested until they freeze on the vine at an air temperature of 18°F or lower. Unlike in warmer regions, "hang time" in the cold regions of the northeast and Canada results in ideal conditions for ice wine production.

However, Vidal growers have always been concerned about the impact of "hang time"

Wine East HIGHLIGHTS

- Vidal growers in eastern and midwestern states have always been concerned about the impact of "hang time" on vines for ice wine production.
- This article describes a study concerning the impact of different crop levels and harvest dates on yield, fruit quality and primarily the winter hardiness of Vidal grapevines.
- No adverse impact was found on bud cold-hardiness when balanced pruning was applied in tandem with cluster thinning to avoid overcropping.

for ice wine production on vine health, and particularly on winter survival. A few years ago, while speaking at a conference in Ontario, many grapegrowers asked me whether leaving grapes on the vines into the winter would impact their survival. Vidal growers along the Lake Erie shores in Ohio have asked the same thing, and it is a simple question that expects a simple answer. I realized that with the exception of an early report on optimum cropping of Vidal in Michigan, there is no published information on the impact of delayed harvest on winter hardiness of Vidal intended for ice wine production. That was the impetus for this project: to investigate the impact of different crop levels by cluster thinning and harvest date on yield, fruit quality and primarily winter hardiness of Vidal grapevines grown in northern Ohio.

Vidal blanc is typically trained on a high, bi-lateral cordon system. Picture shows nets were lifted before the first normal harvest.

Experiment description

This study used 23-year-old Vidal vines planted at a spacing of 8 feet x 10 feet and trained to a bilateral cordon at a height of 6 feet. The vines were spur-pruned, followed by shoot thinning, to maintain 40 shoots per vine at the 6- to 8-inch shoot-length stage. Shoot positioning and cluster thinning (but not leaf pulling) were also carried out at pea-size berry stage to retain either 40 or 60 clusters per vine.

Treatments were then harvested on three dates: 1) normal harvest, or the typical commercial harvest; 2) fall harvest, which

Vidal blanc is a popular variety for ice wine production in eastern U.S. and Canada

Commercial harvest of Vidal for ice wine production is possible with mechanical harvesters. Picture shows Vidal grapes in bins after mechanical harvest.

occurred after the first killing fall frost, and 3) winter harvest, which corresponded to the typical commercial harvest for ice wine when temperature dropped to 18°F.

Treatment	Yield (Tons/ acre)	Vine size (pruning Weight/ ft Cordon (lbs.)	Crop load	Total soluble Solids (Brix)	pH	Titrat-able Acidity (%)	Bud injury After -18°F (%)
CLUSTER THINNING							
60 clusters/vine	7.4	0.18	24*	22.7	3.21	0.99	49
40 clusters/vine	6.5	0.21*	18	23.4*	3.24*	0.98	39
HARVEST DATE							
Normal harvest	7.3*	0.20	23	21.4	3.14	1.03**	41
Fall harvest	6.8*	0.21	21	22.9*	3.22*	0.99*	45
Winter harvest	6.0	0.21	--	25.2**	3.38*	0.82	46

**, ** indicate statistical differences among treatments within columns.*

Results

As expected, grapevines with a high cluster count had higher yields but lower cluster weight than those with a low cluster count (see table above). However, cluster thinning did not affect berry weight in any season. It is concluded that the yield increase was the result of increased cluster number but not cluster weight. Harvest date did not affect yield except for winter harvest, when yield dropped due to berry dehydration.

Vine size was also affected by cluster thinning but not harvest date. In fact, pruning weight declined over the years in vines with high cluster count, an indication that the vines were overcropped or out of balance. However, vine size was optimum and did not decline in vines with 40 clusters. Crop-load ratio was also optimum and averaged a value of 18 over the five-year duration of the study. Based on crop weight, pruning weight and crop-load ratios, it is concluded that the 40-cluster treatment produced balanced vines.

The 40-cluster treatment had higher soluble sugars and pH values than the 60-cluster treatment in three of five years. The changes in fruit composition associated with cluster thinning have been reported in other grape varieties and are a typical response of advancing fruit maturity by reducing the crop level and vice versa. Additionally and expectedly, as harvest was delayed, the soluble sugars and pH increased and titratable acidity decreased. These responses were also generally attributed to more ripe fruit with delayed harvest, which typically produces fruit with high Brix and pH and low titratable acidity.

Freezing tests were conducted in the laboratory to determine the effect of cluster thinning and harvest date on bud cold hardiness. Over three years, we found no negative impact of the treatments on cold hardiness. We confirmed our lab findings following two actual freezing events during the study period. The coldest temperatures recorded in the Vidal block were -8° F in 2004 and -18° F in 2009. Bud injury was assessed following both cold events and ranged between 34% and 57%; however, we found no differences among treatments.

In summary, the yield and fruit composition responses to cluster thinning and harvest date were typical of those observed in other grape varieties. We concluded that the 40- but not the 60-cluster treatment produced optimum vine size and crop load thus balanced vines. Furthermore, hang time in Vidal for ice wine production in the northeastern United States and Canada improves fruit composition but has no adverse impact on bud cold hardiness as long as recommended practices of balanced

pruning in tandem with cluster thinning to avoid overcropping are applied. WE

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