



# Viticulture, enology and marketing for cold-hardy grapes



## Marquette, Frontenac, St. Croix, La Crescent Training Trial

Dove Landing Vineyard  
Lincoln, NE &  
Kimmel Research Site  
Nebraska City, NE

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**Background and Rationale:** With the introduction of new cultivars bred for the colder climate conditions in the central and northern states of North America the choice of a training system is not as clear-cut as systems employed for the classic *vinifera* cultivars. The trials were set up to help determine how a trellis system can and will influence yield, quality and the amount of labor input that is required for each system. Ultimately research results will be available to help growers determine what system will produce the highest quality of grapes with the lowest input of labor to maximize the best return on investment input.

**Treatments:** Two systems were chosen that best represent what is most commonly used in the region, but also the two distinctly different treatments of either the upward or downward growth habits of the plants.

- Vertical Shoot Positioning (VSP)
  - Low or Mid cordon wire with catch wires above cordon wire
  - Upward shoot positioning, canopy hedging, leaf removal
- High Wire System
  - High (5 foot plus) cordon wire
  - Downward shoot positioning (shoot combing)

### Methods:

- Row orientation is North to South
- Vines planted in 3-vine panels in a randomized complete block design; grow tubes were used in the establishment year and removed mid-summer.
- Spacing between rows is 10ft, spacing between vines is 8ft.
- Trellis is constructed using steel Mannwerks® Vertical Line Post, 8in pressure treated Lodge Pole Pine end post and high tensile 12.5 gauge wire; mid wire at 40 inches for VSP and 60 inches for High Wire System.
- Trellis end posts are set at a 90° angle and secured with a “dead man” and anchor wires
- Soil type – Aksarben Silty Clay Loam Dove Landing Vineyard
- Soil type – Morrill Clay Loam Kimmel Orchard Research Site
- Turf type fescue grass has been retained for the row middles.
- Vines pruned in dormant season
- Standard weed, insect, disease management program used.
- Row middles mowed as needed.

Vines were pruned to shoots every 4 to 5 inches with 4 to 5 buds per shoot resulting in 20 to 25 buds per half cordon or 40 to 50 buds per plant. Shoot thinning was not necessary because of herbicide drift issues. Management of the vines was done throughout the growing season. Fruit was collected at véraison and at time of harvest. At harvest, cluster numbers and yield data were collected for each representative block of each cultivar.

Results: 2015 once again experienced slight damage from herbicide drift but was also affected by extreme cold weather events in late fall early winter of November of 2014. Temperatures reached well below the freezing point in mid-November. The temperatures in and of themselves may not have been so radical but the warm temperatures that both preceded and followed these cold spells made them more detrimental to the vines. The cold temperatures in the fall along with the residual effects from the herbicide drift and new drift problems in the spring of 2015 combined to cause death of most of the primary buds; if not the cordon or in some cases the whole plant. The stresses the plants have been under are reflected in their pruning weights which were mostly so low that they were in effect insignificant. The 2015 as with the 2014 season was spent mostly trying to retrain the vines resulting in no crop that was ultimately dropped for the health and recovery of the plants.

Dove Landing Plant Evaluation Disease and Other Problems for 2015	Insect	Herbicide Damage	Leaf Spot	Black Rot	Phylloxera
Chambourcin	NA	NA	NA	NA	NA
MN 1235	1	2	2	NA	3
St. Croix	2	2	2	NA	3
Frontenac	2	2	2	NA	3
Vidal Blanc	2	2	2	NA	3
MN 1220	2	1	2	NA	3
MN 1220	2	1	2	NA	3
Sabrevois	2	1	3	NA	3
Seyval/101-14	2	2	3	NA	3
MN 1258	2	2	2	NA	3
Valiant/101-14	1	2	1	NA	1
Marquette	1	2	3	NA	3
MN 1235	1	1	2	NA	3
MN 1189	2	1	3	NA	3

Ratings 1 thru 3 with 1 being the worst and 3 showing no signs of problems. NA = not applicable; in the case of Chambourcin, it is because all plants were dead or nearly so. In the case of Black Rot, no symptoms were observed in this trial.

For comparison, see Table 2.

**Table 2. Dove Landing Vineyard Plant Evaluation: Disease and Other Problems**

2014	Insect	Herbicide	Leaf Spot	Black Rot	Phylloxera
St. Croix	1.3	2.0	3.9	NA	1.4
Marquette	0.6	2.0	4.3	NA	3.0
La Crescent	NA	NA	NA	NA	NA
Frontenac	1.2	3.0	3.3	NA	3.0
Chambourcin	NA	NA	NA	NA	NA
Vidal Blanc	1.8	2.0	4.2	NA	1.3
Sabrevois	1.6	3.0	2.5	NA	2.0
Seyval/101-14	2.0	2.0	3.7	NA	2.2
Valiant/101-14	NA	NA	NA	NA	NA
MN 1189	1.8	2.5	3.7	NA	3.0
MN 1220	2.1	3.0	4.1	NA	2.4
MN 1235	0.5	2.0	3.9	NA	2.4
MN 1258	2.3	2.0	4.3	NA	2.0
Field Ave	<b>1.52</b>	<b>2.35</b>	<b>3.79</b>	NA	<b>2.27</b>

*Ratings 1 thru 5 with 1 being the worst and 5 showing no signs of problems*

**2015:** Rainfall for the months of April and May was recorded as the 5 wettest months on record following March that was the 2<sup>nd</sup> driest and the 8<sup>th</sup> warmest. Annual rainfall total was 12 or more inches over the annual average for the year making it one of the wettest years on record.

Because of the extreme amount of cane, trunk damage or vine mortality through all cultivars fruit was removed depending on the cultivar at some point in the growing season in hopes of reestablishing new cordons and/or trunks.

**Other observations/findings:**

- The earlier bud break cultivars are not only more susceptible to late spring freezes but also are more susceptible to herbicide drift.
- State wide vineyards suffered from the extreme 2014 Fall temperatures unless the location had good air drainage. Many vineyards throughout the state suffered anywhere from a complete die back to the ground or crop losses up to 70 or 80%.
- November recorded 6 days of single digit temperature lows in an 8 day stretch and January 4 days of negative temperature lows.

**Borer Damage:** Of the 228 plants in the research planting 179 were observed to have some level of apple twig borer infestation; so 78.5% of the research plot is infested at some level with borer damage. The main reason for this infestation is the reluctance of the vineyard owner to burn the last two years' prunings