



# Viticulture, enology and marketing for cold-hardy grapes



## Cold Climate Winegrape Cultivar Trial

Horticulture Research Center  
South Burlington, VT

*Lorraine Berkett, Terry Bradshaw, Sarah Kingsley-Richards  
Plant and Soil Science Department, University of Vermont*

**Background and Rationale:** The University of Vermont Vineyard is a research/demonstration site with eight winegrape and eight table grape cultivars planted in 2007. The vineyard is part of a national evaluation of winegrape cultivars associated with the USDA NE1020 Project, the Northern Grapes Project, and an Agricultural Experiment Station Research Project. The Northern Grapes Project utilizes four of the winegrape cultivars.

**Treatments:** 'Frontenac', 'La Crescent', 'Marquette', and 'St. Croix' cultivars are included in the Northern Grapes Project. The winegrape vineyard is planted in a randomized complete block experimental design of six blocks with four-vine plots of each cultivar per block. Table grape cultivars are planted in two-vine plots around the perimeter of the winegrape vineyard.

**Methods:** The vines are trained to a high-wire cordon system. The soil is a well-drained Windsor loamy sand with drip irrigation installed. Shoots are thinned annually to a target range of 24-36 shoots per 6 feet of cordon. Canopy combing and leaf pulling is performed as needed throughout the growing season. IPM monitoring is used to optimize pest management decision-making in the vineyard. Harvest date for each cultivar is determined by field testing of juice chemistry, flavor development, and physical condition of berries. Data collected annually: Winter Injury, Pruning Weight, Cordon Length, Live Node Count, Phenology Development, Shoot Count, Harvest yield, Juice chemistry, and Weather. In 2012 only, a preliminary study was conducted as part of an independent project conducted by an undergraduate student to investigate sensitivity of a selection of cold climate grape varieties to copper and sulfur fungicide.

### Results:

University of Vermont Vineyard observations have been posted on the web at:

<http://pss.uvm.edu/grape/UVMvineyard/UVMvineyardhome.html>

**Weather.** Winter 2011-2012 was warm with little to no snow cover following an exceptionally wet fall. Temperatures in March 2012 were well above average, with five days above 42°F, which advanced grape bud development earlier than any year recorded at the vineyard. A three-night frost event occurred from April 28-30 with many buds at or beyond budbreak. Visible frost injury was negligible when observed on the more advanced shoots. High winds during shoot development resulted in a degree of shoot loss following shoot thinning. The remaining season experienced above normal in temperatures and below normal precipitation necessitating frequent drip irrigation.

Winter 2012-2013 was relatively mild, with an absolute low of -11°F in January and six days total below 0°F. Spring 2013 arrived slowly and steadily and budbreak came in early May. A brief, mild frost on May 15 did not appear to affect mature grapes. Beginning the final week of May and continuing through bloom, rainy weather conditions were typical, with over nineteen inches of rain measured during May, June, and July at the vineyard. By mid-July, precipitation returned to more normal levels, and temperatures were normal except for five days >88°F in mid-July. Weather at veraison in August and into harvest in September was drier, with roughly weekly rainfall of 0.5 – 0.75”.

**Table 1:** Key phenology for four winegrape cultivars grown at University of Vermont Horticulture Research Center, South Burlington, VT<sup>2</sup>.

	Bud burst	Bloom	Veraison	Harvest
2012				
Frontenac	30-Apr	6-Jun	1-Aug	10-Sep
La Crescent	24-Apr	6-Jun	3-Aug	10-Sep
Marquette	24-Apr	6-Jun	26-Jul	10-Sep
St. Croix	28-Apr	9-Jun	3-Aug	10-Sep
2013				
Frontenac	5-May	10-Jun	9-Aug	20-Sep
La Crescent	4-May	12-Jun	9-Aug	20-Sep
Marquette	5-May	12-Jun	1-Aug	20-Sep
St. Croix	5-May	14-Jun	12-Aug	20-Sep

<sup>2</sup>Data represents estimate for mean day of year that 50% of buds for each cultivar reached bud stages. Data are descriptive and not replicated.

**Fruit Observations.** Russetting of fruit was notable in 2012 on La Crescent, Frontenac, and St. Croix. Bunch stem necrosis appeared to be prevalent in 2013 in Frontenac, La Crescent, and Marquette. The number of harvested clusters per vine in 2013 was nearly double that of 2012. Weight of fruit per vine in 2013 was slightly higher than in 2012, although cluster weights were lower. Cluster weights in both years were near average for the vineyard although still smaller than average for the cultivars.

**Pest Management.** IPM monitoring, including insect and disease monitoring, used to optimize pest management decision-making in the vineyard, was incorporated and distributed to growers in Vermont and beyond through outreach. Twenty-one issues of the Vermont Grape IPM Update newsletter were sent out to approximately 250 stakeholders per issue since January 2012. <http://pss.uvm.edu/grape/newsletters/>

In 2012 only, a preliminary study was conducted as part of an independent project conducted by an undergraduate student to investigate sensitivity of a selection of cold climate grape varieties to copper and sulfur fungicide. Because of flaws in assessment methods, no conclusions on potential phytotoxicity could be based on this study.

**Analysis.** Weather data and vine phenology, productivity, and maturity data is sent to Cornell University for analysis. Berry samples at veraison and at harvest are sent to Iowa State University for fruit chemistry analysis. Harvested fruit is sent to Cornell University for winemaking.

**What the results mean:**

- No data analysis is performed at the University of Vermont for the Northern Grapes Project.
- No conclusions on potential copper and sulfur sensitivity could be based on the 2012 preliminary study.