



Viticulture, enology and marketing for cold-hardy grapes



Cold Climate Winegrape Cultivar Trial

Horticulture Research Center
South Burlington, VT

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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, and Prairie Star and Corot Noir are also included in the NE1020 research vineyard. 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.

Results:

University of Vermont Vineyard observations will be posted on the web at:

http://www.uvm.edu/~fruit/?Page=grapes/gr_horticulture.html&SM=gr_submenu.html

Winter 2013-2014 was cold (but not extremely cold) and long. Absolute low temperature of -15°F occurred on January 3, with below 0°F recorded on 23 days from December through March. Spring was cool to cold, with only 33 degree days (base 50°F) by May 1. Temperature ramped up by May 7 to 'normal' levels during budbreak in the second and third weeks of May, and the summer was pleasant without temperature extremes. Bloom weather was warm but not hot, although rain showers were persistent during earlier bloom in the second week of June. No temperatures above 90°F were recorded at the UVM HREC during the summer. Precipitation was adequate and close to normal if not a bit dry for the growing season, with 3.32, 3.19, 4.31, 4.45, 2.22 and 1.74 inches of rain for each month from April through September. Weather at veraison in August and into harvest in September was cool and dry overall, with only 2346 degree days (base 50°F) accumulated by October 1 (ten-

year average is 2419). A brief light frost occurred on the morning of September 19th prior to winegrape harvest on that day.

Unusually high winter injury prompted more buds to be retained at pruning through no removal of any canes and 4-5 buds retained per cane. Prolific shoot growth on most varieties after budbreak encouraged shoot thinning back to within the target range of 24-36 shoots per 6 feet of cordon. Two passes of canopy combing throughout the season resulted in a manageable canopy. Leaf pulling in early July occurred earlier than in previous years to encourage ripening in lieu of cluster thinning.

Both foliage and clusters of all cultivars were assessed for disease incidence and severity and insect damage and data are currently being analyzed to determine any significant differences among cultivars. Powdery mildew appeared to be prevalent this year in all varieties on both foliage and clusters.

Traps for Spotted Wing Drosophila, an invasive pest in Vermont, were set mid-August and checked weekly through harvest. Adult male SWD were first identified on August 18th in the vineyard. Trap captures continued to rise through final trap date following final harvest in mid-October.

No Brown Marmorated Stinkbug were observed at the vineyard in 2014. No traps were set for Brown Marmorated Stinkbug.

Birds were a problem in the earlier-ripening table grapes, despite a tent of netting over the vineyard, but had limited impact on wine grapes. Bald-faced hornets and other vespids were not excessively active this year.

Weather data and vine phenology, productivity, and maturity data was sent to Cornell University for analysis. Berry samples at harvest were sent to Iowa State University for fruit chemistry analysis. Harvested fruit was sent to Cornell University for winemaking.

Table 1: Key phenology, vine growth, & winter injury for six winegrape cultivars grown at the University of Vermont Horticulture Research Center, South Burlington, VT in 2014.

	Budbreak (day of year)	Bloom (DOY)	Veraison (DOY)	Harvest (DOY)	Pruning Weight (kg)	Est. Cordon Length (cm)	Primary Bud Winter Injury (%)
Corot Noir	139	178	239	269	0.33	163	82%
Frontenac	137	165	221	269	0.7	177	37%
LaCrescent	135	165	232	269	0.61	168	28%
Marquette	137	165	221	269	0.82	164	32%
Prairie Star	137	167	232	269	0.55	163	50%
St Croix	137	167	226	262	0.82	179	46%

Table 2: Yield and juice quality of six winegrape cultivars in the NE-1020 cold hardy cultivar trial at the University of Vermont Horticulture Research Center, South Burlington, VT, 2014.

Cultivar	Mean Yield per Vine (kg)	Yield (tons/acre)	Mean Cluster Weight (g)	Estimated Ravaz Index	Yield per Meter of Cordon (kg)	Juice Brix	Juice pH	Juice TA (g/100ml)
Corot Noir	2.1	1.7	91	6.6	1.31	17.1	3.12	0.99
Frontenac	5.1	4.1	102	7.5	2.87	25.1	3.23	1.68
LaCrescent	3.2	2.6	80	5.6	1.93	23.1	3.09	1.6
Marquette	3.6	2.9	86	4.8	2.28	25.6	3.08	1.55
Prairie Star	4.7	3.8	84	9.4	2.89	20.7	3.41	1.06
St Croix	4.3	3.4	96	5.3	2.38	19.1	3.12	0.84

LaCrescent Had earliest budbreak of all cultivars in 2014, and Corot Noir broke bud latest, but only four days after Frontenac, Marquette, and St Croix had the greatest pruning weight of all cultivars. Cordon establishment was less than the 2 m allocated in the trellis space for each vine for all cultivars, with Corot Noir, Prairie Star, and Marquette having the lowest cordon lengths among the cultivars. All cultivars suffered from some degree of primary bud mortality from cold winter temperatures, and Corot Noir had the highest level of damage, with all other cultivars having 50% or less primary bud mortality.

Crop yield was likely affected by primary bud damage on most cultivars. Frontenac and Prairie Star produced yield at or close to the target of four tons/acre. Corot Noir had a low yield of 1.7 tons per acre. Juice brix ranged from 17.1 for Corot Noir to 25.6 for Marquette. Juice pH was within an acceptable range to support fermentation for all cultivars. TA continues to be high for Frontenac, LaCrescent, and St Croix.