2014

NE-1020 Cold Hardy Wine Grape Cultivar Trial

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Abstract
In conjunction with the Northeast Regional Research project NE-1020 "Multi-state Evaluation of Wine Grape Cultivars and Clones," Iowa State University established a cold hardy wine grape cultivar trial in 2008 at the ISU Horticulture Research Station (HRS), Ames, Iowa, and Tabor Home Vineyards and Winery (THV), Baldwin, Iowa. The Iowa trial evaluates the performance of Corot noir, La Crescent, Marquette, Petit Ami™, NY95.0301- 01 (Arandell), MN1189, MN1200, MN1220, MN1235, MN1258, with Frontenac and St. Croix serving as controls. Selection NY95.0300-01 was shipped by mistake and was planted in the guard rows and as end-ofrow guard vines. This report summarizes the results for the 2013 growing season.

Keywords
Horticulture

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RFR-A1345

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Introduction

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Materials and Methods

The vines were spaced 8 × 10 ft apart (545 vines/acre) with three vines/replication. Treatments were replicated six times (18 vines/cultivar) in a randomized complete block design. Vines were trained to the high-wire bilateral cordon with the trellis wire 6 ft above the ground.

Results and Discussion

Beginning in 2012 and persisting into the winter, vines were exposed to drought conditions rated "severe" at HRS and "moderate" at THV. Minimum winter temperatures of -8°F at THV, and -9°F at HRS were recorded on February 1. At HRS, a soil temperature of 13°F was recorded at 4-in. depth on the same date.

Based on cumulated mortality and established cordon length, vines continue to perform better at HRS than THV (Table 1). Winter bud injury was low at HRS. With the 2012 drought conditions, there was considerable cane die-back and pruning weights were low at both sites.

Following bud break at HRS, stunted shoot development was evident in portions of the plot where winds could blow off any snow cover (Figure 1A). At bloom, the stunted shoots were most evident on MN1200 vines followed by NY95.0301.01 (Table 1). Roots were examined under selected vines and often the shallow roots were dead (Figure 2). Post-bloom cluster counts per shoot were lower than normal and could be attributed to the 2012 drought and abortion of clusters associated with the winter root injury.

The 2013 growing season was characterized by a cooler than normal spring that delayed bud break (Table 2), excessive rainfall in May and June, and transitioning to drought conditions in July that persisted for the remainder of the growing season. Petiole analysis at veraison on selected cultivars showed potassium (K) deficiency at HRS with visible symptoms evident on MN1189 vines. Potassium deficiency was attributed to a combination of drought, winter root injury, and excessive soil. Mg. MN1189 and Petit Ami™ vines exhibited pre-mature defoliation, and prior to the first killing freeze, a rating of cane lignification conducted on October 20 showed that Petit Ami™ canes were the least lignified followed by MN1235, MN1258, Corot noir, and MN1189 (Table 1).

With the late spring and cooler-than-normal growing season, bloom, veraison, and harvest were later than normal (Table 2). With the exception of St. Croix, yield per vine was below normal and could be attributed to lower cluster counts per shoot and rain on three occasions during bloom that reduced berry set (Figure 1B) and average cluster weight.

Acknowledgements

Funding for the vines and partial funding for annual expenses has come through grants from the USDA Viticulture Consortium-East and from the multi-state USDA-SCRI Northern Grapes Project. Thanks to the ISU Horticulture Research Station staff and employees of Tabor Home Vineyards for their assistance in maintaining the plantings.

Table 1. Performance of wine grape cultivars in the NE-1020 cold hardy cultivar trial at two Iowa locations.

	Horticulture Research Station							Tabor Home Vineyards		
Rootstock	Vine mort. (cum)	Estab. cordon length (ft)	% Primary bud injury	Pruning weight /vine (lb)	Shoot length @ bloom (in)	Clusters per shoot	% Cane lignifi-cation (Oct. 20)	Vine mortality (cum)	Estab. cordon length (ft)	Pruning weight /vine (lb)
Corot noir	2	5.4	13	0.9	13.0	1.6	40	5	0.0	0.1
La Crescent	0	5.3	0	1.7	12.8	1.9	79	1	3.6	0.3
Marquette	0	5.6	1	1.3	18.1	2.2	83	1	4.0	0.5
Petit Ami™	0	5.4	6	0.6	12.8	2.9	12	2	0.9	0.1
MN1189	0	5.3	10	0.7	12.6	2.2	43	4	1.8	0.3
MN1200	0	5.5	5	0.9	6.5	1.0	78	1	5.8	0.5
MN1220	0	5.7	0	0.9	17.2	2.0	60	0	5.2	0.3
MN1235	0	5.8	1	0.8	11.9	1.9	36	0	6.2	0.3
MN1258 [z]	0	5.6	1	0.7	14.5	1.9	39	2	2.9	0.2
NY95.0301.01[z]	1	3.4	5	0.3	8.3	1.0	54	8	0.0	0.1
Frontenac	0	6.8	0	0.7	12.0	1.8	78	1	6.0	0.3
St. Croix	0	6.8	3	1.5	14.0	2.3	75	0	6.4	0.4
LSD .05		1.0	5	0.2	1.4	0.3	7		1.6	0.2
NY95.0300.01[z,y]	0	7.4	2	1.9	14.6	1.8	72	0	7.7	0.9

[z]Planted in 2009.

[y]Vines were shipped by mistake. Planted in guard rows and as end-of-row guard vines.

Table 2. Fruit development and harvest characteristics of wine grape cultivars in the NE-1020 cold hardy cultivar trial at the ISU Horticulture Research Station.

	Phenology (mo/day)				Indices at harvest[x]			Yield/ vine	Average cluster
Rootstock	50% Bud burst	50% Bloom	50% Veraison	Harvest	°Brix	pH	TA (g/liter)	(lb)	wt (lb)
Corot noir	5/14	6/16	8/16	9/13	18.4	3.38	6.3	10.9	.21
La Crescent	5/10	6/11	8/4	9/6	25.4	3.32	11.4	7.2	.10
Marquette	5/11	6/12	7/30	9/12	28.2	3.37	10.2	8.8	.12
Petit Ami™	5/14	6/13	8/4	9/5	19.8	3.28	7.8	12.8	.14
MN1189	5/14	6/14	7/31	9/12	18.4	3.26	7.7	10.6	.17
MN1200	5/13	6/10	8/2	9/27	23.2	3.24	8.3	1.2	.03
MN1220	5/12	6/14	8/4	9/12	26.2	3.40	8.4	7.6	.11
MN1235	5/10	6/8	8/5	9/26	23.8	3.31	9.3	9.5	.16
MN1258 [z]	5/14	6/11	8/8	9/26	27.8	3.31	9.0	6.8	.12
NY95.0301.01[z]	5/15	6/18	8/15	9/13	20.2	3.55	7.1	2.1	.09
Frontenac	5/13	6/10	8/6	9/25	27.4	3.32	11.6	8.3	.14
St. Croix	5/12	6/12	8/7	9/5	20.2	3.38	7.4	17.0	.21
LSD .05	.5	.6	.7					2.3	.02
NY95.0300.01[z,y]	5/15	6/14	8/14	9/27	21.8	3.20	11.5	12.5	.17

[z]Planted in 2009.
[y]Vines were shipped by mistake. Planted in guard rows and as end-of-row guard vines.
[x]Parameters are non-replicated values obtained during maturity testing for determining when to harvest.

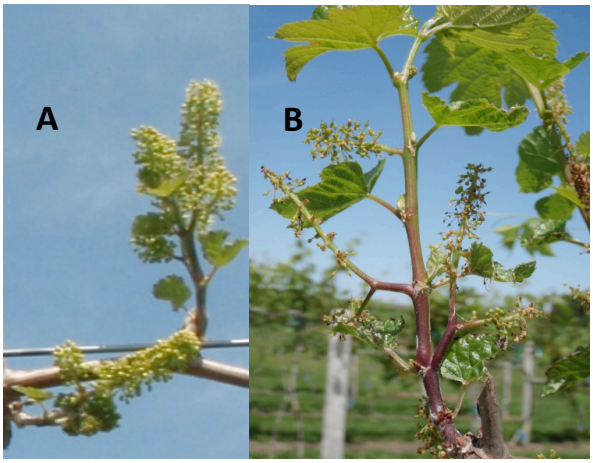

Figure 1. Poor shoot and leaf development (A) exhibited by a MN1200 vine associated with winter root injury, and poor berry set (B) associated with the combination of winter root injury and three rains during bloom.

Figure 2. Roots collected at different depths from a MN1200 vine that exhibited symptoms of stress at bloom. Shallower roots were dead with phloem tissue sloughing off and absence of finer roots.