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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 trials are considered as having a “very cold” dormant season and a “warm” growing season, and evaluate 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-of-row guard vines. This report summarizes the results for the 2014 growing season.

Keywords

Horticulture

Disciplines

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NE-1020 Cold Hardy Wine Grape Cultivar Trial

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Introduction

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 trials are considered as having a “very cold” dormant season and a “warm” growing season, and evaluate 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-of-row guard vines. This report summarizes the results for the 2014 growing season.

Materials and Methods

The vines were spaced 8 × 10 ft apart (545 vines/acre) with three vines per replication. Treatments were replicated six times (18 vines per 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.

To assess the potential primary bud injury, grapevine buds were examined on March 14 and 20 in the HRS vineyard and the THV vineyard, respectively. From each vine, two

canes originating from a previous year’s spur (short cane) were removed and the first five buds were sliced and examined for injury to the primary bud. Any vines that did not contain spurs from the previous year were not included.

Results and Discussion

Grapevines in the trials experienced a severe winter in 2013-2014 with low temperatures dropping below -10° to -20°F (Table 1) on several occasions, which affected grapevine bud survival (Table 2). MN 1189 and Corot Noir had high percentage death of primary buds. The low winter temperatures were colder at THV and percentage of bud mortality for most cultivars and selections grown was higher at THV than at HRS. Growth and development variables (Table 3) showed the cultivars with the highest pruning weights, and therefore the most vigor, were La Crescent, Frontenac, Marquette, and St. Croix. Selection MN 1200 was similar in pruning weight to all of these cultivars, except it differed from La Crescent, which had the highest pruning weight. In summary, in February 2014 at both HRS and THV sites, low air temperatures reached -20°F and lower and high percentages of primary buds were dead for Arandell, Corot Noir, and MN1189. These cultivars and selections also had low yields due to fewer clusters produced from secondary buds or fewer primary buds alive for production.

MN1220 grapes were harvested at the earliest date of all selections (Aug. 30) and NY951 grapes were harvested the latest date and at the same time as Frontenac (Sept. 24). Yields were affected by bud injury (Table 4). MN 1189, which had the highest percentage primary bud injury, had the lowest yield per vine. In 2014, Corot Noir grapes at harvest had the lowest sugar (°Brix) and La Crescent

had the highest TA. New selections, which show promise for commercial production based on vine growth in the vineyards, lower percentage primary bud death, and grape and wine flavor profiles, include MN 1235 and MN 1258. The named cultivars of Frontenac, La Crescent, Marquette, and St. Croix continue to be relevant for the grape and wine industry.

Acknowledgements

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Table 1. Minimum temperatures recorded in the ISU NE-1020 cold-hardy grape cultivar plots during the 2013-14 winter and early spring months. Vineyard locations in central and eastern Iowa.

ISU Horticulture Research Station (central Iowa)		Tabor Home Vineyards (eastern Iowa)	
Date	Temperature (°F)	Date	Temperature (°F)
Dec 11	-10.5	Dec 9	-17.0
Dec 24	-21.5	Dec 24	-19.7
Dec 30	-7.8	Dec 30	-14.3
Jan 3	-15.9	Jan 3	-18.8
Jan 6	-17.0	Jan 6	-19.5
Jan 28	-10.5	Jan 26	-20.6
Feb 2	-15.0	Feb 3	-18.8
Feb 10	-22.4	Feb 10	-20.6
Feb 11	-25.1	Feb 11	-21.5
March 3	-18.8	Mar 3	-14.1

Table 2. Primary bud injury observed in the ISU NE-1020, cold hardy grape cultivar plots following the 2013-14 winter.

Cultivar/selection	ISU Horticulture Research Station (central Iowa)		Tabor Home Vineyards (eastern Iowa)	
	Dead primary buds (%)	Number of vines assessed	Dead primary buds (%)	Number of vines assessed
Arandell (NY95.0301-01)	78.9	8	100.0	3
Corot noir	80.7	15	92.9	7
La Crescent	22.8	15	29.3	14
Marquette	16.1	18	40.0	13
Frontenac	8.9	18	36.5	17
St. Croix	42.8	18	51.1	18
Petit Ami TM	31.5	16	42.0	5
MN 1258	13.1	16	23.3	9
MN 1189	92.7	15	93.3	3
MN 1200	40.0	16	52.9	14
MN 1220	24.1	17	70.0	16
MN 1235	10.7	14	33.6	11
NY95.0300-01 ^z	41.1	18	50.8	13
Louise Swenson ^y	41.1	9	36.0	5
Brianna ^y	--	--	45.0	2

^zVines were shipped by mistake. Planted in guard rows and as end-of-row guard vines.

^yVines mis-identified in the original shipment.

Table 3. Growth and development of 12 wine grape cultivars and selections. ISU Horticulture Research Station, Ames. Dormant season and growing season 2014.

Cultivar	Vine mortality ^z (no.)	Established cordon length (m)	Primary bud injury (%)	Pruning weight (kg)	50 % bud burst	50 % bloom	50 % veraison	Harvest date
Corot Noir	2 ^x	0.77	80.7	0.16	5/13	6/15	8/20	9/16
Frontenac	0	1.96	11.3	0.56	5/8	6/5	8/4	9/24
La Crescent	0	1.94	25.8	0.71	5/8	6/6	8/3	9/6
Marquette	0	2.03	19.6	0.64	5/8	6/6	8/11	9/6
MN1189	0	1.01	93.2	0.12	5/11	6/10	7/31	9/6
MN1200	0	1.83	44.8	0.53	5/9	6/4	8/2	9/6
MN1220	0	1.80	27.0	0.39	5/9	6/9	8/4	8/30
MN1235	0	1.59	21.3	0.37	5/10	6/6	8/4	9/6
MN1258 ^y	0	1.85	15.0	0.20	5/11	6/7	8/6	9/6
NY951	1	1.36	78.8	0.08	5/11	6/15	8/14	9/24
Petit Ami TM	0	1.74	34.7	0.15	5/11	6/7	8/8	9/16
St. Croix	0	2.10	42.5	0.56	5/11	6/8	8/8	9/16
LSD	NS	0.25	9.00	0.11				

^zMortality of vines, which were planted in 2008.^yPlanted in 2009.^xData values represent means of six replications, with three-vine panels in each replication.**Table 4. Yield and fruit quality variables of 12 wine grape cultivars and selections at harvest, ISU Horticulture Research Station, Ames, in August and September 2014.**

Cultivar	Yield			pH ^y	Fruit quality	
	weight per vine (kg)	Cluster number per vine ^z	Weight per cluster (g) ^z		°Brix ^y	TA (g/liter) ^y
Corot noir	0.3	8.0	21.4	3.5	16.3	6.5
Frontenac	3.2	53.5	58.0	3.4	26.0	9.3
La Crescent	3.5	65.3	52.0	3.3	22.5	10.0
Marquette	3.9	66.0	57.3	3.4	23.9	7.3
MN1189	0.4	9.7	13.4	3.2	18.3	7.8
MN1200	2.1	75.8	42.6	3.5	21.2	6.5
MN1220	3.8	45.3	69.9	3.4	21.2	6.3
MN1235	3.9	63.7	52.2	3.4	20.2	6.7
MN1258	1.3	29.9	38.5	3.3	23.9	8.3
NY951	0.2	7.8	16.2	3.4	19.3	7.3
Petit Ami TM	3.1	63.3	47.8	3.5	18.8	6.9
St. Croix	4.6	73.9	62.4	3.8	19.2	5.7
LSD	0.78	10.6	16.2	0.2	1.1	1.5

^zData values represent means of six replications for yield variables, with three-vine panels in each replication.^yData values represent means of four, 100-berry samples taken from four different, 3-vine panel replications at harvest.