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2003 Wine Grape Cultivar Trial

Paul A. Domoto

Iowa State University, domoto@iastate.edu

Gail R. Nonnecke

Iowa State University, nonnecke@iastate.edu

Bernard J. Havlovic

Iowa State University, bhavlovi@iastate.edu

Kenneth T. Pecinovsky

Iowa State University, kennethp@iastate.edu

Kevin Van Dee

Iowa State University

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Abstract

To assess the regional adaptation of wine grape cultivars to Iowa, a trial was established in 2003 through an Iowa Department of Agriculture and Land Stewardship (IDALS) specialty crops grant awarded to the Iowa Wine Growers Association and contracted to the ISU Department of Horticulture. The trial was designed to evaluate up to 20 cultivars or advanced selections and was established on four ISU farms representing different geographic, climatic, and soil conditions: Horticulture (Hort) Station, Ames; the Armstrong Research Farm, Lewis; the Southeast Research Farm, Crawfordsville; and the Northeast Research Farm, Nashua. Cultivars and selections planted in 2003 included Rubiana (GR-7), NY73.136.17, NY84.0101.04, NY70.0809.10, La Crescent, Prairie Star, Cayuga White, Chancellor, De Chaunac, Esprit, Landot 4511, Leon Millot, St. Vincent, and Vidal Blanc. An additional five cultivars (NY76.0844.24, Frontenac Gris, Briana, MN-1211, and MN-1198) were added to the trial in 2004, and Swenson White was added in 2005.

Keywords

Horticulture

Disciplines

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2003 Wine Grape Cultivar Trial

Paul Domoto, professor
Gail Nonnecke, professor
Department of Horticulture
Bernie Havlovic, Ken Pecinovsky, and
Kevin Van Dee, farm superintendents

Introduction

To assess the regional adaptation of wine grape cultivars to Iowa, a trial was established in 2003 through an Iowa Department of Agriculture and Land Stewardship (IDALS) specialty crops grant awarded to the Iowa Wine Growers Association and contracted to the ISU Department of Horticulture. The trial was designed to evaluate up to 20 cultivars or advanced selections and was established on four ISU farms representing different geographic, climatic, and soil conditions: Horticulture (Hort) Station, Ames; the Armstrong Research Farm, Lewis; the Southeast Research Farm, Crawfordsville; and the Northeast Research Farm, Nashua. Cultivars and selections planted in 2003 included Rubiana (GR-7), NY73.136.17, NY84.0101.04, NY70.0809.10, La Crescent, Prairie Star, Cayuga White, Chancellor, De Chaunac, Esprit, Landot 4511, Leon Millot, St. Vincent, and Vidal Blanc. An additional five cultivars (NY76.0844.24, Frontenac Gris, Briana, MN-1211, and MN-1198) were added to the trial in 2004, and Swenson White was added in 2005.

Materials and Methods

The vines were spaced 8 ft × 10 ft apart (545 vines/acre) with 3 vines/replication. The Southeast and Northeast Research Farm plantings also included 15 of the 2002 cultivars that are being evaluated by management system trial: Maréchal Foch, Frontenac, Cynthiana, St. Croix, Chambourcin, Seyval Blanc, La Crosse, Vignole, Traminette, Edelweiss, Marquis, Vanessa, Reliance, Mars, and Jupiter. Treatments were replicated four times at each site (12 vines/cultivar). Vines are being trained

to the bilateral cordon system on a two-wire trellis with wires at 3.5 ft and 6.0 ft above the ground. Vines with a procumbent or trailing growth habit are being trained to the top wire, while those with a semi-upright to upright growth habit, Prairie Star, De Chaunac, and St. Vincent; and Chambourcin, La Crosse, Seyval, Traminette, and Vignole from the 2002 trial are being trained to the midlevel wire with three sets of catch wires added above. This report summarizes results for the 2005 growing season.

Results and Discussion

During the 2004–05 dormant period and at bud break, three freezing events occurred that influenced the results for 2005 (Table 1).

The vines were pruned in the spring to either 1/4-in.-diameter canes or to what appeared to be live tissue, and the 1-year-old trimmings were weighed (Table 2). Among cultivars, La Crescent exhibited relatively high vigor across all sites, while other cultivars exhibited variations in vigor across the sites. Among the 15 cultivars from the 2002 trial planted at the Southeast and Northeast Farms, Frontenac and St. Croix were the most vigorous (Table 4). However, with the early October frost and mid-January freeze, many cultivars exhibited cane dieback, which can significantly alter pruning weight. Since very few of the vines had an established 2-year-old cordon, the amount of dieback is reflected by the percentage of trunk establishment (Tables 2 and 4). Vines at the Hort Station and the Northeast Farm, which were exposed to the coldest temperatures, exhibited the greatest dieback. Among the cultivars planted in 2003 and across all sites, La Crescent, Prairie Star, Esprit, Leon Millot, and Rubiana had the least dieback, while NY84 and Vidal Blanc exhibited a high incidence of dieback. Among the 15 cultivars from the 2002 trial, Frontenac Gris, St. Croix, and La Crosse

exhibited the least dieback, while Jupiter, Marquis, and Traminette had the greatest dieback.

The severity of injury from an early May freeze during bud break is rated in Table 3 and Table 4. Generally, cultivars that exhibited greatest injury were those that emerged earliest. The highest temperature was recorded at the Armstrong Farm, and vines at that site exhibited the least injury. However, MN-1198 exhibited severe injury, and MN-1211 exhibited moderate injury at that site. Although the lowest temperature was recorded at the Northeast Farm, vines at that location exhibited less injury than at the Hort Station or at the Southeast Farm because the buds were less advanced at the time of the freeze. After the frost, the live shoots derived from the primary buds were counted and are recorded (Tables 3 and 4). Low survival rates were a reflection of the frost injury and injury sustained during the mid-January frost. Among late-emerging cultivars, the mid-January freeze was probably the major contributor to the low primary bud survival rates.

Exposure to the mid-January freeze contributed to the development of crown gall at each of the sites (Table 5). However, because many vines were reestablished from suckers, the numbers may not reflect actual sensitivity to the disease. Among the sites, the Hort Station had the greatest number of vines exhibiting crown gall. Among cultivars at that farm, Chancellor, Prairie Star, and Leon Millot had the most vines

exhibiting symptoms. Across all sites, Chancellor vines exhibited the highest incidence of crown gall and were followed by Leon Millot. Among the 15 cultivars from the 2002 trial planted at the Southeast and Northeast Farms, Chambourcin vines exhibited the most crown gall at both farms (data not shown).

Vines at the Hort Station and at the Armstrong and Northeast Farms were exposed to 2,4-D drift, with the least severe injury evident at the Hort Station (Table 5). Esprit, NY76, and NY84 vines exhibited symptom at all three sites, while Leon Millot, Landot 4511, and Prairie Star vines exhibited slight to moderate symptoms at the Armstrong and Northeast Farms. Cultivars from the 2002 trial planted at the Northeast Farm exhibited 2,4-D symptoms that followed the trend reported in previous years for that study (data not shown).

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Table 1. Significant minimum temperatures (°F) recorded during the 2004–2005 dormant period and 2005 growing season at the ISU research farms where grape research is being conducted.

Date	Hort Station	Armstrong	Southeast	Northeast
October 2–5, 2004	29	28	28	27
January 15–17, 2005	-19	-11	-6	-19
May 3–4, 2005	24	30	24	20

Table 2. Pruning weight and percentage of trunk establishment for 19 cultivars in the ISU 2003 wine grape cultivar trial planted in 2003 at the Horticulture Station and the Armstrong, Southeast, and Northeast Research Farms for 2005.

Treatment	Pruning weight (lb)				% Trunk establishment ^z			
	Hort	Armst.	SE	NE	Hort	Armst.	SE	NE
Rubiana (GR-7)	.59	.76	.71	.21	60	100	51	43
NY73.136.17	.36	1.01	.47	.34	17	94	66	27
NY76.0844.24 ^y	.07	.11	<.06	<.06	3	18	2	6
NY84.0101.04	.21	.42	.07	.14	4	74	26	3
NY70.0809.10	.39	.72	.32	.11	55	95	69	22
La Crescent	.71	1.35	.98	.52	64	100	78	79
Prairie Star	.88	.96	.26	.43	61	99	81	93
Frontenac Gris ^y	<.06	.-	.-	.-	30	.-	.-	.-
Briana ^y	.15	.10	.07	<.06	11	37	8	8
MN-1211 ^y	.13	.11	<.06	<.06	5	58	5	7
MN-1198 ^y	<.06	.08	<.06	<.06	4	11	15	9
Cayuga White	.10	.92	.39	.09	21	99	92	12
Chancellor	.11	.89	.14	.18	39	93	35	29
De Chaunac	.30	1.11	.23	.20	19	99	22	37
Esprit	.56	1.16	.47	.21	83	100	63	41
Landot 4511	.38	.58	.43	.27	30	86	72	23
Leon Millot	.47	1.13	.82	.65	66	93	87	64
St. Vincent	.71	1.61	.21	.18	15	93	72	18
Vidal Blanc	.35	1.01	.40	<.06	1	97	11	2
LSD, P<.05	.23	.30	.31	.17	19	14	20	21

^zPercentage of distance to the cordon wire.^yPlanted in 2004.

Table 3. Spring frost rating and primary bud survival for 19 cultivars in the ISU 2003 wine grape cultivar trial planted in 2003 at the Horticulture Station and the Armstrong, Southeast, and Northeast Research Farms for 2005.

Treatment	Spring frost rating ^z				Primary buds/vine			
	Hort	Armst.	SE	NE	Hort	Armst.	SE	NE
Rubiana (GR-7)	4.1	1.7	3.5	2.6	1.1	41.4	7.5	7.8
NY73.136.17	2.6	1.4	4.3	.4	.0	30.0	7.6	3.6
NY76.0844.24 ^y	.9	1.2	3.8	.4	.0	5.1	.0	.1
NY84.0101.04	.7	1.4	3.3	.0	.0	18.1	4.0	.8
NY70.0809.10	2.6	1.1	2.8	.8	2.1	34.9	11.5	4.0
La Crescent	4.9	1.8	4.3	2.3	1.9	38.8	8.0	18.5
Prairie Star	4.5	1.3	4.6	.6	.7	25.7	8.8	19.8
Frontenac Gris ^y	3.9	-.	-.	-.	1.2	-.	-.	-.
Briana ^y	3.0	2.0	4.8	3.6	.6	10.5	.5	2.6
MN-1211 ^y	4.9	3.1	4.9	3.8	.0	17.9	.0	3.7
MN-1198 ^y	3.1	4.2	4.9	3.5	.2	3.9	2.3	3.3
Cayuga White	2.3	1.1	2.2	.4	.1	32.4	11.3	.7
Chancellor	5.0	1.4	4.8	1.8	.2	41.2	2.3	1.8
De Chaunac	4.5	2.0	5.0	2.0	.1	35.6	.6	2.6
Esprit	3.6	1.2	2.8	.0	1.7	29.8	10.3	3.9
Landot 4511	.0	.0	2.0	.0	.0	31.1	14.5	3.2
Leon Millot	4.3	1.4	3.1	1.2	1.7	37.4	14.8	8.7
St. Vincent	1.3	.9	2.9	.0	.1	22.6	4.6	1.0
Vidal Blanc	.0	.1	1.5	.0	.0	30.3	.5	.0
LSD, P<.05	1.1	.5	.8	1.1	.7	6.7	3.5	4.2

^zFrost injury scale 0–5: 0=no shoot emergence; 1=shoots emerged, no apparent injury; 2=slight symptoms; 3=moderate; 4=severe; 5=very severe.

^yPlanted in 2004.

Table 4. Pruning weight, percentage trunk establishment, spring frost rating, and primary bud survival for 15 cultivars from the Leopold Center grape cultivar by management system trial that were included in the Southeast and Northeast Research Farm plantings of the ISU 2003 wine grape cultivar trial for 2005. ^z

Treatment	Pruning weight (lb)		% Trunk establishment ^y		Spring frost rating ^x		Primary buds/vine	
	SE	NE	SE	NE	SE	NE	SE	NE
Maréchal Foch	.46	.40	71	51	4.3	2.6	7.9	8.8
Frontenac	1.60	.89	99	87	2.2	1.1	29.0	23.1
Cynthiana	.24	.08	37	7	3.8	1.3	4.3	2.0
St. Croix	1.59	.49	95	81	3.8	1.5	10.6	24.3
Chambourcin	.46	.21	52	13	1.4	.0	5.5	.0
Seyval Blanc	.31	.09	29	12	3.4	.4	1.8	1.0
La Crosse	.27	.31	81	72	4.5	2.0	11.8	10.9
Vignole	.14	.13	69	27	1.9	.6	8.6	2.3
Traminette	.10	<.06	11	2	1.8	.0	.2	.0
Edelweiss	.53	.33	79	48	4.8	3.2	4.7	9.3
Marquis	.33	.09	8	3	2.2	.6	.3	.1
Vanessa	.35	.11	45	13	3.9	.3	3.8	1.2
Reliance	.52	.21	84	27	3.2	.0	9.7	2.3
Mars	.55	.16	79	27	4.0	2.2	15.8	5.8
Jupiter	.31	.09	3	9	3.7	.0	.2	.0
LSD, P<.05	.31	.17	20	21	.8	1.1	3.5	4.2

^zRespective means are comparable to those in Tables 3 and 4.

^yPercentage of distance to the cordon wire.

^xFrost injury scale 0–5: 0=no shoot emergence; 1=shoots emerged, no apparent injury; 2=slight symptoms; 3=moderate; 4=severe; 5=very severe.

Table 5. Percentage of vines with crown gall, and 2,4-D herbicide injury rating for 20 cultivars in the ISU 2003 wine grape cultivar trial planted in 2003 at the Horticulture Station and the Armstrong, Southeast, and Northeast Research Farms for 2005.

Treatment	Vines with crown gall				2,4-D injury rating ^z			
	Hort	Armst.	SE	NE	Hort	Armst.	SE	NE
Rubiana (GR-7)	2	1	0	1	1.0	1.3	1.0	1.2
NY73.136.17	0	0	3	0	1.0	1.2	1.0	1.8
NY76.0844.24 ^y	0	0	0	0	1.2	2.7	1.0	1.9
NY84.0101.04	0	0	0	0	1.1	2.8	1.0	2.3
NY70.0809.10	3	0	0	1	1.0	1.7	1.0	1.6
La Crescent	1	0	1	0	1.0	1.7	1.0	1.7
Prairie Star	6	0	0	0	1.0	2.7	1.0	1.8
Frontenac Gris ^y	0	-	-	-	1.0	--	--	--
Swenson White ^x	-	-	-	-	1.0	1.1	1.0	1.4
Briana ^y	0	0	0	0	1.0	1.2	1.0	1.0
MN-1211 ^y	0	0	0	0	1.0	1.6	1.0	1.2
MN-1198 ^y	0	0	1	0	1.0	2.2	1.0	1.0
Cayuga White	0	0	0	0	1.0	1.1	1.0	1.3
Chancellor	6	0	2	4	1.0	1.0	1.0	1.0
De Chaunac	2	0	0	0	1.0	1.3	1.0	1.0
Esprit	1	0	0	0	1.5	2.8	1.0	2.6
Landot 4511	0	0	0	0	1.0	2.3	1.0	1.6
Leon Millot	6	0	0	3	1.0	2.8	1.0	1.8
St. Vincent	0	1	1	0	1.0	1.0	1.0	1.0
Vidal Blanc	0	0	0	0	1.0	1.1	1.0	1.1
LSD, P<.05					.2	.5	ns	.5

^zHerbicide injury scale 1–5: 1=no apparent injury; 2=slight symptoms of abnormal venation; 3=moderate; 4=severe; 5=very severe.

^yPlanted in 2004.

^xPlanted in 2005.