Wine Grape Cultivar Trial Performance in 2007

Paul Domoto, professor
Gail Nonnecke, professor
Dennis Portz and Lisa Smiley, graduate students
Department of Horticulture
Bernie Havlovic, Nick Howell, Ken Pecinovsky, and Kevin Van Dee, farm superintendents
Joe Hannan, ag specialist

Introduction

To assess the regional adaptation of wine grape cultivars in 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 (IWGA). The trial was designed to evaluate up to 20 cultivars or advanced selections at four Iowa State University (ISU) farms representing different geographic, climatic, and soil conditions: Horticulture Research Station (HRS), Ames; the Armstrong Research Farm (ARF), Lewis; the Southeast Research Farm (SERF), Crawfordsville; and the Northeast Research Farm (NERF), Nashua. The SERF and NERF plantings also included the 15 cultivars being evaluated in the 2002 grape cultivar by management system trial. This report summarizes the results for the 2007 growing season.

Materials and Methods

The vines were spaced 8 × 10 ft apart (545 vines/A) with three vines/replication. Treatments were replicated four times at each site (12 vines/cultivar). Vines were 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 growth habit were being trained to the top wire, while those with a semi-upright to upright growth habit were trained to the mid-level wire with vertical shoot positioning (VSP) being practiced.

In mid-March, five proximal (basal) buds on two to three canes per replication (10 to 15 buds) were dissected and examined for injury to determine if adjustments in pruning were needed. Following an April 7 freeze (Table 1) that occurred when bud developed ranged from "dormant" to "full swell," the procedure was repeated. Vines were pruned and the 1-year-old trimmings were weighed. Bud retention was based on pruning weight, and adjusted for primary bud mortality when injury exceeded 15% for American cultivars and 20% for French-American hybrid cultivars. The length of established 2-year-old cordon was measured. Following bud break, shoots originating from primary buds were counted. During the growing season, vines at all the sites were exposed to volatile (growth regulator) herbicide drift and were rated for severity of injury. Following *veraison* (when the grape berry changes color), berry samples were collected from the mid-cluster position to test for maturity based on percentage soluble solids (%SS), initial pH, and titratable acids (TA). Time of harvest was based on these measurements and fruit condition. At harvest, the number of clusters per vine were counted and weighed.

Results and Discussion

During the 2006–07 winter and spring, vines were exposed to three significant freezes (Table 1). Prior to the April freeze, vines at SERF exhibited very little bud injury while injury at the other sites was similar (data not shown). Generally, the injury at HRS, ARF, and NERF was greatest on cultivars classified as "moderately hardy," while those classified as being "very hardy" exhibited little or no injury. Following the April freeze, greater injury was generally evident at ARF and SERF (Table 2), which had accumulated more growing degree days since March 1 than at HRS and NERF (Table 1). Injury was most severe on those cultivars that broke bud early. At NERF, where bud development was the furthest behind, injury recorded after the April freeze was often similar

to that recorded before the freeze. The number of primary shoots per foot of cordon, for which the optimum range is 4 to 6, generally reflected the extent of primary bud injury recorded at the sites (Table 2).

Based on pruning weights, vines grew best in 2006 at ARF and the poorest at NERF (Table 3). Cultivars that tended to have high pruning weights across all sites included La Crescent, Prairie Star, Leon Millot, and GR-7. Marquette (MN-1211) continues to grow well at HRS, but not at the other sites. Among the 15 cultivars from the cultivar by management study, Mars, La Crosse, St. Croix, and Edelweiss had higher pruning weights than the other cultivars at SERF. After four growing seasons, the amount of established cordon per vine reflected the growing conditions at the sites, cultivar cold tolerance, and differences in exposure to freezing events (Table 3). Vines at ARF experienced some of the latest first fall frosts, mildest freezing events, and most frequently had the greatest amount of established cordon per vine.

Vines at each of the sites were exposed to growth regulator herbicide drift during the growing season with vines at NERF being exposed on two occasions (Table 4). Vines at ARF, SERF, and NERF exhibited the severest injury. At these sites, the exposure occurred much earlier in the growing season than in 2006 and other years. The injury symptoms observed at NERF were classic of dicamba and were also observed at ARF. La Crescent and Frontenac Gris vines at NERF and ARF, and Frontenac, Seyval Blanc, and La Crosse from the Leopold trial that had exhibited good tolerance to mid- and late-summer exposures to growth regulator herbicides in the past were severely affected. Among cultivars, NY76, Swenson White, and Esprit appeared to be very susceptible to any of the growth regulator herbicides.

The 2007 growing season was the second year vines in this study were allowed to carry a crop. The growing season was characterized by above normal temperatures and frequent rains during the harvest period. The SERF site accumulated the most growing degree days and number of days when the temperature was above 86^{o}F and was followed by ARF and HRS (Table 1). With differences in temperatures and condition of the grapes, harvest dates varied considerably between sites (Tables 5 and 6). Grape cultivars were typically harvested earlier at SERF and ARF than at HRS and NERF, and often the determining factor was the high initial pH of the juice. Yields per vine and average cluster weight were generally lower than recorded in 2006, and reflected the bud injury associated with the January and April freezes. La Crescent and NY 76 clusters exhibited a very high incidence of berry drop just prior to harvest that affected yield and average cluster weight.

Acknowledgements

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Table 1. Significant minimum temperatures (°F) recorded during the 2006-07 winter and spring at the ISU research farms and accumulated growing degree days prior to the April 7 (Julian day 97) freeze and for the growing season.

Date	HRS	ARF	SERF	NERF
Minimum temperatures (°F):				
Jan. 16–17	-13.5	-12.0	-4.5	-12.0
Feb. 4–14	-10.9	-8.5	-9.3	-16.6
April 7	12.0	14.5	17.2	14.4
Growing Degree Days (base 50°F, cap. 86°F):				
Mar. 1 to Apr. 7	131	183	184	69
May 1 to Oct 1 [z]	3086	3148	3202	2831
Departure from avg.	+255	+293	+198	+156
Days above 86°F	33	37	59	19

[z]From the ISU Ag Climate Network.

Table 2. Primary bud injury recorded before pruning and subsequent primary shoot development following exposure to mid-January, February, and April 7, 2007 freezes for 20 cultivars in the ISU 2003 wine grape cultivar trial planted at the Horticulture Research Station (HRS) and the Armstrong Research Farm (ARF), and 35 cultivars at the Southeast (SERF) and Northeast (NERF) Research Farms.

	% Primary bud injury				Bud break	Primary shoots per ft of cordon			
Treatment	HRS	ARF	SERF	NERF	at HRS[z]	HRS	ARF	SERF	NERF
GR-7	75	75	53	14	114	1.8	2.3	4.3	3.1
Noiret[v]	30	66	46	41	119	1.2	2.5	2.5	1.7
NY76.0844.24[y]	.	.	67	14	117	2.0	1.3	2.2	3.5
NY84.0101.04	.	74	34	13	120	.8	1.9	2.2	2.3
Corot noir[v]	24	56	51	12	118	1.7	2.8	2.5	1.8
La Crescent	63	73	57	23	113	3.5	2.7	4.3	4.2
Prairie Star	18	32	6	7	116	2.8	3.5	3.1	2.4
Frontenac Gris[x]	3	15	.	.	116	3.9	1.7	.	2.4
Swenson White [w]	.	60	.	.	118	1.9	1.9	2.2	2.0
Brianna[y]	8	48	43	5	116	3.1	2.8	2.7	2.7
Marquette[y, v]	68	100	10	6	115	1.6	1.6	1.8	2.6
MN-1198[y]	48	92	81	6	112	2.9	1.4	2.1	3.8
Cayuga White	60	100	68	76	120	.5	1.8	1.9	1.3
Chancellor	43	54	73	14	118	2.6	3.5	3.4	3.4
De Chaunac	20	53	76	13	116	2.6	2.7	2.9	3.3
Esprit	38	70	45	26	116	2.7	2.6	3.0	3.0
Landot 4511	42	36	28	56	122	1.1	3.2	3.7	.3
Leon Millot	60	83	30	23	116	3.1	3.4	3.5	3.8
St. Vincent	25	15	20	22	120	1.9	3.2	3.5	1.9
Vidal Blanc	.	40	28	65	122	.4	2.5	2.2	1.4
Maréchal Foch			50	26				2.4	3.1
Frontenac			15	5				4.1	4.3
Cynthiana			54	9				3.3	4.1
St. Croix			23	5				4.2	3.6
Chambourcin			62	84				1.4	.2
Seyval Blanc			75	30				2.8	2.4
La Crosse			31	10				3.7	3.4
Vignole			22	33				2.8	1.3
Traminette			29	19				2.8	1.8
Edelweiss			56	17				2.1	3.1
Marquis			80	60				.9	2.1
Vanessa			54	52				1.7	1.2
Reliance			28	65				2.5	1.7
Mars			28	34				3.1	2.1
Jupiter			26	32				3.0	1.5
LSD, P < .05	28	27	36	22	1.2	.7	.6	.7	1.2

[z]Julian date; 112 = April 22, 2007

[y]Planted in 2004.

[x]Planted in 2004 at the Horticulture Research Farm and in 2006 at the other sites.

[w]Planted in 2005.

[v]Named and released in 2006: Noiret (NY73.136.17); Corot noir (NY70.0809.10); and Marquette (MN-1211).

Table 3. Pruning weight and feet of established cordon in 2007 for 20 cultivars in the ISU 2003 wine grape cultivar trial planted at the Horticulture Research Station (HRS) and the Armstrong Research Farm (ARF), and 35 cultivars at the Southeast (SERF) and Northeast (NERF) Research Farms.

	Pruning weight (lb)				Feet of cordon per vine			
Treatment	HRS	ARF	SERF	NERF	HRS	ARF	SERF	NERF
GR-7	1.9	2.1	2.1	.4	5.0	6.9	5.4	3.0
Noiret[w]	1.8	2.8	2.6	.4	1.6	7.5	4.5	4.0
NY76.0844.24[z]	.6	.5	.3	.1	.0	.9	.0	.0
NY84.0101.04	1.2	1.4	1.0	.2	.0	5.8	.5	.4
Corot noir[w]	1.3	2.3	1.3	.3	3.3	7.8	4.8	1.2
La Crescent	1.7	2.2	2.7	1.1	7.2	7.8	6.8	7.5
Prairie Star	2.4	2.6	2.8	.7	6.1	7.7	6.3	6.1
Frontenac Gris[y]	1.4	.2	.1	.1	5.0	.0	.0	.7
Swenson White [x]	1.0	1.1	.6	.1	.0	1.1	.0	.0
Brianna[z]	1.8	1.9	.8	.4	4.9	4.7	1.8	.8
Marquette[z,w]	1.9	1.0	.2	.1	6.4	4.7	.0	.7
MN-1198[y]	.8	.8	.6	.2	3.3	1.3	.8	.8
Cayuga White	1.6	1.9	1.0	.2	.9	7.8	6.8	1.5
Chancellor	1.2	2.7	1.5	.2	1.8	7.8	2.8	1.6
De Chaunac	2.5	3.5	1.7	.5	3.6	7.5	3.7	4.2
Esprit	1.8	2.0	1.7	.3	5.9	7.9	5.3	2.6
Landot 4511	1.3	2.6	2.2	.4	1.1	7.9	6.0	.4
Leon Millot	2.1	2.4	2.3	.5	6.6	8.0	7.3	5.2
St. Vincent	2.2	3.0	1.9	.3	4.0	6.3	6.8	.9
Vidal Blanc	1.1	2.1	1.9	.1	.0	7.8	2.3	.2
Maréchal Foch			.5	.2			4.4	3.2
Frontenac			1.3	.5			7.6	6.2
Cynthiana			1.5	.1			3.1	.3
St. Croix			2.2	.7			7.6	6.0
Chambourcin			1.1	.2			3.1	.6
Seyval Blanc			1.2	.3			5.9	2.3
La Crosse			2.5	.5			6.5	6.2
Vignole			1.4	.3			6.3	2.1
Traminette			.8	.2			3.3	.0
Edelweiss			2.1	.2			5.4	2.8
Marquis			1.0	.1			7.3	.3
Vanessa			1.3	.1			2.1	.0
Reliance			1.2	.2			6.3	2.2
Mars			3.0	.3			6.9	2.4
Jupiter			1.1	.1			1.4	.4
LSD, P <. 05	.7	.6	.7	.2	1.9	1.3	1.7	1.7

[z]Planted in 2004.
[y]Planted in 2004 at the Horticulture Research Farm and in 2006 at the other sites.
[x]Planted in 2005.
[w]Named and released in 2006: Noiret (NY73.136.17); Corot noir (NY70.0809.10); and Marquette (MN-1211).

Table 4. Herbicide drift injury rating in 2006 and 2007 for 20 cultivars in the ISU 2003 wine grape cultivar trial planted at the Horticulture Research Station (HRS) and the Armstrong Research Farm (ARF), and 35 cultivars at the Southeast (SERF) and Northeast (NERF) Research Farms.[z]

	HRS		ARF		SERF		NERF		
Year/(date recorded)	2006	2007	2006	2007	2006	2007	2006	2007[y]	
Treatment	(7/20)	(7/14)	(7/28)	(6/12)	(8/3)	(5/30)	(8/2)	(6/6)	(7/19)
GR-7	1.1	1.0	1.7	2.7	1.1	2.8	1.2	3.6	1.7
Noiret	1.2	1.0	1.4	3.0	1.0	2.5	1.3	2.3	2.4
NY76.0844.24	3.4	3.7	4.7	5.0	2.9	4.8	4.5	4.8	4.9
NY84.0101.04	1.1	3.1	2.8	3.9	1.3	4.5	3.2	2.7	4.2
Corot noir	1.1	1.0	1.5	3.5	1.0	2.5	1.7	2.3	3.7
La Crescent	1.0	1.0	2.4	3.6	1.0	2.8	1.1	4.7	2.8
Prairie Star	1.8	1.1	2.9	3.9	1.3	2.5	2.3	3.0	3.9
Frontenac Gris	1.0	1.0	1.1	3.2	1.0	2.3	1.0	3.3	1.4
Swenson White	3.1	1.7	4.6	4.8	1.6	3.8	4.1	4.0	4.6
Brianna	1.0	1.0	1.5	3.2	1.1	2.9	1.7	3.0	1.7
Marquette	1.7	1.0	3.0	2.8	1.3	3.0	2.1	3.7	4.0
MN-1198	1.0	1.0	2.9	2.4	1.2	1.9	1.5	3.9	3.1
Cayuga White	1.0	1.0	1.8	2.1	1.0	1.8	1.3	1.8	2.4
Chancellor	1.0	1.0	1.0	2.6	1.0	2.2	1.2	3.5	3.0
De Chaunac	1.0	1.0	1.1	2.0	1.1	1.8	1.0	1.9	1.0
Esprit	3.9	2.2	3.1	3.8	2.2	3.8	3.7	2.9	4.0
Landot 4511	2.5	2.3	2.9	3.9	1.0	2.9	2.6	2.1	4.4
Leon Millot	2.8	2.8	3.8	4.3	1.6	4.3	3.3	3.3	4.2
St. Vincent	1.0	1.0	1.0	2.6	1.0	2.0	1.0	4.5	3.1
Vidal Blanc	1.0	1.0	1.4	2.5	1.0	2.5	1.4	2.4	2.3
Maréchal Foch					2.6	4.3	3.0	4.2	4.3
Frontenac					1.0	2.3	1.0	4.2	1.8
Cynthiana					2.8	4.9	3.8	4.6	4.9
St. Croix					1.1	2.3	1.3	2.9	2.4
Chambourcin					1.0	1.5	1.0	2.2	1.7
Seyval Blanc					1.0	1.8	1.1	4.6	2.6
La Crosse					1.0	1.7	1.0	4.3	3.5
Vignole					1.0	2.1	1.3	1.8	1.8
Traminette					1.3	3.7	1.9	4.5	3.0
Edelweiss					1.6	2.6	3.2	3.1	3.5
Marquis					1.6	3.9	2.8	3.5	4.6
Vanessa					2.9	4.3	4.1	4.3	4.7
Reliance					1.8	2.9	2.1	2.2	3.7
Mars					1.5	2.3	2.3	2.8	4.7
Jupiter					2.3	2.9	3.0	3.4	4.4
LSD, P <. 05	.4	.3	.4	.4	.4	.5	.6	.7	.7

[z]Herbicide injury scale 1–6: 1=no apparent injury; 2=slight symptoms of abnormal venation; 3=moderate; 4=severe; 5=very severe; 6=extremely severe.

[y]Grapes at the Northeast Research Farm were exposed to herbicide drift on two occasions. An attempt was made to only rate portions of shoots not exposed to the earlier episode.

Table 5. Fruit yield and harvest characteristics in 2007 for 20 cultivars in the ISU 2003 wine grape cultivar trial planted at the Horticulture Research Station and the Armstrong Research Farm.

	Horticulture Research Station						Armstrong Research Farm					
Treatment	Harvest date	% SS	pH[y]	TA[z]	Yield /vine (lb)	Cluster wt. (lb)	Harvest date	% SS	pH	TA[z]	Yield /vine (lb)	Cluster wt. (lb)
GR-7	9/11	21.0	3.76	8.7	16.1	.24	9/7	20.4	3.70	9.0	10.1	.20
Noiret[u]	9/27	18.3	.	6.3	6.1	.31	9/7	17.3	3.58	8.4	14.8	.35
NY76.0844.24[x]	9/4	17.5	.	8.7	5.8	.19	8/28	17.5	3.53	8.3	1.1	.
NY84.0101.04	9/4	19.8	.	6.4	4.6	.30	8/24	20.0	3.65	7.1	8.3	.22
Corot noir[u]	9/27	18.9	.	5.7	9.9	.29	9/5	17.0	3.55	6.5	22.0	.30
La Crescent	9/4	23.8	.	7.5	7.9	.15	8/18	21.0	3.52	11.9	8.0	.16
Prairie Star	8/21	16.0	3.20	10.4	12.6	.18	8/15	18.1	3.66	9.5	13.5	.17
Frontenac Gris[w]	9/4	25.6	.	10.6	14.2	.22	.	.	.	.	.	.
Swenson White[v]	9/4	20.0	.	6.1	10.7	.45	8/21	18.0	3.60	5.3	5.6	.27
Brianna[x]	8/21	19.8	3.51	8.0	18.3	.26	8/15	18.2	3.69	7.8	12.3	.19
Marquette[x,u]	9/11	26.0	3.73	7.8	8.8	.17	8/30	24.7	3.62	9.0	5.8	.12
MN-1198[y]	9/11	23.6	3.60	9.6	6.2	.22	8/30	20.5	3.50	8.3	4.7	.18
Cayuga White	9/11	20.8	3.58	7.0	6.1	.40	8/28	19.5	3.62	7.2	13.5	.54
Chancellor	9/11	20.1	3.50	8.0	12.3	.23	9/7	19.5	3.56	8.6	22.0	.27
De Chaunac	9/11	17.0	3.56	8.0	21.4	.22	9/5	18.5	3.64	8.3	10.3	.13
Esprit	9/11	18.6	3.75	7.2	18.7	.58	8/28	17.3	3.60	9.0	13.7	.42
Landot 4511	9/4	21.0	.	6.8	9.1	.21	9/5	20.4	3.62	6.5	18.5	.16
Leon Millot	8/21	21.0	3.57	7.3	16.3	.18	8/14	18.7	3.75	8.1	14.2	.14
St. Vincent	9/27	18.5	.	8.5	12.4	.56	9/29	19.2	3.36	9.9	22.7	.38
Vidal Blanc	9/27	20.5	.	7.8	2.1	.58	9/17	17.9	3.48	7.8	18.0	.50
LSD, P <. 05					4.5	.05					3.8	.05

[z]Titratable acids reported in grams/liter.
[y]Missing data occurred when the auto temperature compensator on the pH meter malfunctioned.
[x]Planted in 2004.
[w]Planted in 2004 at the Horticulture Research Farm and in 2006 at the other sites.
[v]Planted in 2005.
[u]Named and released in 2006: Noiret (NY73.136.17); Corot noir (NY70.0809.10); and Marquette (MN-1211).

Table 6. Fruit yield and harvest characteristics in 2007 for 35 cultivars in the ISU 2003 wine grape cultivar trial planted at the Southeast and Northeast Research Farms.

	Southeast Research Farm						Northeast Research Farm					
Treatment	Date	% SS	pH	TA[z]	Yield /vine (lb)	Cluster wt. (lb)	Date	% SS	pH	TA[z]	Yield /vine (lb)	Cluster wt. (lb)
GR-7	8/23	19.3	3.68	7.0	11.6	.19	9/12	20.0	3.55	6.6	7.5	.19
Noiret[w]	9/4	16.6	3.60	6.9	15.7	.38	9/24	18.0	3.48	8.0	7.1	.27
NY76.0844.24[y]	8/28	19.6	3.30	8.1	.4	.14	9/17	8.0	3.24	8.3	.1	.09
NY84.0101.04	8/23	19.7	3.51	6.8	7.2	.30	9/17	19.0	3.28	7.2	3.1	.25
Corot noir[w]	9/4	18.0	3.76	5.8	16.8	.45	9/12	16.0	3.50	6.8	4.2	.26
La Crescent	8/27	22.5	3.21	8.3	6.4	.17	9/11	22.1	3.40	10.0	7.1	.13
Prairie Star	8/23	19.1	3.93	5.6	15.7	.25	8/29	17.0	3.85	5.3	10.6	.22
Swenson White[x]	8/23	22.8	3.65	6.0	3.8	.39	9/17	21.6	3.60	4.2	.2	.15
Brianna[y]	8/23	20.9	3.88	4.2	6.0	.24	8/29	17.6	3.50	6.0	5.5	.28
Marquette[y, w]	.	.	.	.	.0	.	9/6	18.8	3.61	6.3	1.0	.16
MN-1198[y]	8/28	21.7	3.56	8.6	.6	.12	9/11	23.0	3.33	9.8	2.3	.18
Cayuga White	8/23	19.2	3.35	7.2	15.7	.55	9/6	19.0	3.39	6.5	5.2	.32
Chancellor	8/27	21.4	3.62	7.4	10.1	.28	9/12	17.0	3.33	8.1	1.0	.11
De Chaunac	8/27	19.9	3.51	6.8	5.9	.18	9/12	18.0	3.47	6.6	6.4	.12
Esprit	8/27	19.7	3.41	8.9	18.5	.59	9/6	17.6	3.51	6.0	7.9	.37
Landot 4511	8/27	18.7	3.58	5.7	12.3	.23	9/12	18.6	3.47	5.7	2.0	.16
Leon Millot	8/22	19.2	3.69	5.3	14.6	.15	8/27	17.2	3.67	5.9	12.3	.14
St. Vincent	9/26	18.2	3.36	7.4	15.1	.50	10/2	18.0	3.33	10.4	1.5	.18
Vidal Blanc	9/4	20.1	3.44	7.2	10.4	.40	9/24	20.8	3.44	7.7	1.2	.37
Maréchal Foch	8/22	20.5	3.56	5.7	2.3	.10	8/27	19.1	3.52	7.4	3.5	.11
Frontenac	8/22	20.4	3.30	10.7	10.9	.20	9/17	22.0	3.26	10.5	8.6	.16
Cynthiana	9/26	20.4	3.46	9.4	9.5	.16	10/3	.	3.42	7.7	.2	.07
St. Croix	8/22	18.0	3.61	6.2	14.0	.23	8/30	17.0	3.56	7.4	11.9	.21
Chambourcin	9/4	19.5	3.39	8.2	7.6	.55	10/2	18.0	3.33	11.1	2.8	.34
Seyval Blanc	8/22	19.6	3.60	4.8	13.8	.58	9/6	20.5	3.54	6.6	4.0	.18
La Crosse	8/22	17.6	3.36	6.7	15.9	.23	8/30	17.0	3.33	7.8	7.4	.17
Vignole	8/27	20.2	3.21	9.3	8.0	.20	9/17	22.0	3.17	9.6	2.7	.17
Traminette	8/28	18.2	3.50	6.0	5.5	.23	9/17	22.0	3.15	7.5	.2	.11
Edelweiss	8/22	18.5	3.91	4.6	4.8	.32	8/15	14.7	3.40	7.7	6.1	.26
Marquis	8/16	18.1	3.49	4.9	3.0	.44	9/5	17.2	3.51	4.5	1.1	.23
Vanessa	8/2	17.7	3.34	7.8	4.0	.24	8/24	17.0	3.58	3.8	.3	.17
Reliance	8/16	22.0	3.43	6.3	10.4	.53	8/15	17.8	3.40	6.6	6.6	.37
Mars	8/8	19.2	3.24	10.1	20.0	.44	9/6	16.0	3.39	7.7	8.4	.35
Jupiter	8/8	19.7	3.62	5.6	8.5	.34	8/24	17.7	3.59	10.8	2.1	.40
LSD, P <. 05					3.7	.06					2.7	.73

[z]Titratable acids reported in grams/liter.
[y]Planted in 2004.
[x]Planted in 2005.
[w]Named and released in 2006: Noiret (NY73.136.17); Corot noir (NY70.0809.10); and Marquette (MN-1211).