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2003 Wine Grape Cultivar Trial

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Abstract

Iowa has experienced a tremendous increase in commercial grape plantings in recent years, and the interest in establishing additional plantings continues to increase. However, as new plantings are planned, new cultivars can only be recommended with reservation until they are thoroughly tested under Iowa's climatic conditions. Through an Iowa Department of Agriculture and Land Stewardship (IDALS) specialty crops grant awarded to the Iowa Grape Growers Association (IGGA) and contracted to the ISU Department of Horticulture, a wine grape cultivar trial was established in 2003 to evaluate the adaptability, productivity, and wine making quality of 20 new cultivars.

Keywords

Horticulture

Disciplines

Agricultural Science | Agriculture | Horticulture

2003 Wine Grape Cultivar Trial

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Introduction

Iowa has experienced a tremendous increase in commercial grape plantings in recent years, and the interest in establishing additional plantings continues to increase. However, as new plantings are planned, new cultivars can only be recommended with reservation until they are thoroughly tested under Iowa's climatic conditions. Through an Iowa Department of Agriculture and Land Stewardship (IDALS) specialty crops grant awarded to the Iowa Grape Growers Association (IGGA) and contracted to the ISU Department of Horticulture, a wine grape cultivar trial was established in 2003 to evaluate the adaptability, productivity, and wine making quality of 20 new cultivars. These advanced selections were planted at the ISU Horticulture Research Station, Ames; the Armstrong Research and Demonstration Farm, Lewis; the Southeast Research and Demonstration Farm, Crawfordsville; and the Northeast Research and Demonstration Farm, Nashua, and represent three climatic and four soil conditions. Cultivars and selections planted in 2003 include 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 six cultivars (NT76.0844.24, Frontenac Gris, Swenson White, Briana, MN-1211, and MN-1198) will be added to the trial in 2004.

Materials and Methods

The vines were planted 8 × 10 ft apart (545 vines/acre) with three vines/replication. The Southeast and Northeast Farm plantings also

included 15 cultivars being evaluated in the 2002 Leopold grape cultivar by management trial. Treatments were replicated four times at each site (12 vines/cultivar). Vines are being trained to the bi-lateral cordon system on a 2-wire trellis with wires at 3.5 and 6.0 ft, and posts spaced 24 ft apart. Vines with a procumbent (trailing) growth habit will be trained to the top wire, whereas those with a semi-upright to upright growth habit will be trained to the mid-level wire with catch wires added above. This report summarizes results for the first growing season.

With the wet spring conditions that prevailed across all sites beginning in late April (Table 1), planting of the vines was delayed. Planting dates for the sites were: Horticulture Station, May 21; Armstrong Farm, May 22; Southeast Farm, May 28; and Northeast Farm, May 29. By the end of the growing season, differences in vine growth between sites and cultivars were evident (Table 2). Differences in total shoot growth between sites tended to correspond with the amount of precipitation received from July through September (Table 1) with vines at the Armstrong Farm, which received the least precipitation, producing the least growth. By cultivar, Esprit was the most vigorous at each site. It seems that De Chaunac, Chancellor and NY73.136.17 will be low vigor cultivars. Some cultivar differences between sites were evident for NY84.0101.04, Landot 4511, Leon Millot, and St. Vincent. Among the 15 cultivars from the Leopold cultivar by management system trial planted at Southeast and Northeast Farms, differences in shoot growth between cultivars was evident with a similar pattern existing at each site (Table 5).

Results and Discussion

In August and September, the sites were visited to evaluate the vines for 2,4-D herbicide drift injury, and other observed symptoms. No 2,4-D

injury was observed in the plantings at the Armstrong and Southeast Farms. At the Horticulture Station and Northeast Farm, 2,4-D injury was minimal, and was confined to two ‘GR-7’ vines at the Horticulture Station, and one ‘NY73.136.17’ vine at the Northeast Farm (data not shown). At the Horticulture, Armstrong, and Southeast Farms, the vines exhibited a “crinkly” leaf pattern that seemed to have been caused by leafhopper feeding (Table 3). When rated on a scale of 1 (no apparent injury) to 5 (very severe symptoms), ‘NY84.0101.04’ exhibited the severest symptoms at the Horticulture Station and Armstrong Farm, whereas ‘La Crescent’ exhibited the severest symptoms at the Southeast Farm. The pattern of injury observed has often been associated with potato leafhoppers, which were evident in apple and Persian walnut plantings at the Horticulture Station, and probably caused the injury to the grape vines there and at the Armstrong Farm. Another leafhopper species may have caused the injury in the Southeast Farm planting. Among the 15 cultivars from the Leopold cultivar by management system trial planted at the Southeast Farm, ‘La Crosse’ vines exhibited more injury than ‘Marechal Foch,’ ‘St. Croix,’ or ‘Jupiter’ (Table 5).

Vines in the planting were exposed to early season frosts and freezes in late September

and/or early October (Table 4). At the Horticulture Station, the vines were rated for frost injury on October 2 when it dropped to 26°F before the leaves had thawed (Table 3). ‘GR-7,’ ‘Prairie Star,’ ‘Chancellor,’ and ‘NY70.0809.10’ exhibited the best tolerance to fall frost injury. At the Armstrong Farm, ‘NY70.0809.10,’ ‘Chancellor,’ and ‘St. Vincent’ exhibited the greatest fall frost tolerance. Rating for frost injury could not be taken at the Southeast and Northeast Farms before it dropped to 21°F on October 2. At the Armstrong Farm where the vines were not exposed to a severe freeze on October 2 and no frosts or freezes occurred afterwards, a rating was taken on leaf senescence and drop on October 25 (Table 3). For cultivars that experienced slight frost injury on October 2, these results would seem to indicate the ability of the cultivars to acclimate for the winter.

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Table 1. Monthly precipitation (in inches) recorded at the four research farm sites for the ISU 2003 wine grape cultivar trial.

Month	Horticulture	Armstrong	Southeast	Northeast
April	4.17	3.78	2.59	3.84
May	4.11	4.68	6.48	3.89
June	5.16	2.43	4.30	6.09
July	4.97	2.15	1.77	2.99
August	1.10	.68	.87	.49
September	3.38	1.93	4.34	1.94

Table 2. Total shoot growth (ft) of the three longest canes during the first year for 14 cultivars in the ISU 2003 wine grape cultivar trial being conducted at four research farm sites in Iowa. ^z

Cultivar	Horticulture		Armstrong		Southeast		Northeast	
GR-7	9.2	bc	5.5	cd	10.0	bcd	12.4	bcde
NY73.136.17	7.7	c	4.8	d	6.5	d	10.5	cde
NY84.0101.04	9.8	bc	5.5	cd	9.4	bcd	12.2	bcde
NY70.0809.10	9.6	bc	7.0	bcd	7.9	bcd	10.3	cde
La Crescent	10.2	abc	10.1	ab	10.7	abc	11.8	bcde
Prairie Star	10.0	bc	8.2	bc	8.4	bcd	11.9	bcde
Cayuga White	8.2	c	6.5	cd	9.1	bcd	10.5	cde
Chancellor	7.4	c	7.2	bcd	7.1	cd	7.5	e
De Chaunac	6.8	c	5.2	cd	6.9	cd	8.0	e
Esprit	14.0	a	13.2	a	14.4	a	19.4	a
Landot 4511	9.1	bc	4.8	d	11.1	ab	13.9	bcd
Leon Millot	8.7	c	5.5	cd	10.5	abcd	14.3	bc
St. Vincent	13.0	ab	6.0	cd	11.3	ab	16.1	ab
Vidal Blanc	8.8	bc	6.9	cd	11.4	ab	11.1	cde

^z Mean separation by Tukey's HSD ($P=0.05$).

Table 3. Leaf crinkle, frost injury, and leaf senescence ratings during the first growing season for 14 cultivars in the ISU 2003 wine grape cultivar trial being conducted at four research farm sites in Iowa. ^z

Cultivar	Leaf crinkle rating ^y			Frost injury rating ^x		Senescence ^u						
	Horticulture	Armstrong	Southeast	Horticulture ^w	Armstrong ^v	Armstrong						
GR-7	1.8	bcd	3.0	bc	1.6	bc	3.0	e	2.0	bcd	1.5	bc
NY73.136.17	1.8	bcd	1.3	e	1.2	bc	4.0	abcde	1.5	cd	2.3	b
NY84.0101.04	3.8	a	5.0	a	1.6	bc	4.3	abc	2.8	ab	1.0	c
NY70.0809.10	2.0	bc	1.1	e	1.2	bc	3.3	cde	1.3	d	1.8	bc
La Crescent	1.3	cd	1.2	e	3.2	a	4.7	ab	2.3	bcd	4.0	a
Prairie Star	1.1	d	1.1	e	1.0	c	3.0	e	3.5	a	3.9	ab
Cayuga White	2.0	bc	1.0	e	1.8	bc	4.1	abcd	1.5	cd	4.5	a
Chancellor	2.0	bc	2.3	d	1.0	c	3.2	de	1.3	d	2.3	b
De Chaunac	1.3	cd	1.1	e	1.3	bc	3.6	bcde	1.8	bcd	2.3	b
Esprit	1.0	d	1.1	e	1.0	c	4.3	abc	2.5	abc	4.5	a
Landot 4511	1.0	d	3.3	b	1.0	c	4.9	a	2.8	ab	3.8	a
Leon Millot	1.3	cd	3.8	b	1.9	bc	4.0	abcd	2.8	ab	2.3	b
St. Vincent	1.0	d	1.5	de	1.9	bc	3.8	bcde	1.3	d	1.8	bc
Vidal Blanc	2.4	b	1.8	de	1.4	bc	4.1	abc	2.5	bcd	2.3	b

^z Mean separation by Tukey's HSD ($P=0.05$).

^y Leaf crinkle rating scale 1–5: 1 = no apparent injury; 2 = slight symptoms of abnormal crinkling; 3 = moderate; 4 = severe; 5 = very severe.

^x Frost injury scale 1–5: 1 = no apparent injury; 2 = slight, injury confined to youngest leaves; 3 = moderate, some older leaves exhibiting injury; 4 = severe, over 50% of the leaves injured; 5 = very severe, over 90% of the leaves injured.

^w Following successive freezes on September 29, 30 and October 1, 2003; recorded on the morning of October 2 before the leaf tissue had thawed.

^v Following a freeze on October 2, 2003; recorded on October 5.

^u Leaf senescence recorded on October 25. Rating scale 1–6: 1 = completely green; 2 = beginning to show a color change but mostly green; 3 = half or more of the leaves have turned color; 4 = leaves turned color and beginning to drop; 5 = over half of the leaves have dropped; 6 = all the leaves have dropped.

Table 4. Minimum temperatures recorded at the four research farm sites for the 2003 wine grape cultivar trial.

Date	Temperature (°F)			
	Horticulture	Armstrong	Southeast	Northeast
Sept. 29	32	36	30	32
Sept. 30	32	37	33	29
Oct. 1	31	33	26	27
Oct. 2	26	30	21	21

Table 5. Total shoot growth of the three longest canes, and leaf crinkle rating for 15 cultivars from the Leopold cultivar by management trial planted at two research farm sites in Iowa.^z

Cultivar	Total shoot growth (ft)		Leaf crinkle rating ^y
	Southeast	Northeast	Southeast
Marechal Foch	7.6 bcd	10.0 de	1.0 c
Frontenac	11.4 ab	14.9 abc	1.2 bc
Cynthiana (Norton)	7.8 bcd	9.6 de	1.5 bc
St. Croix	9.9 bcd	13.9 bcd	1.0 c
Chamroucin	11.2 ab	13.9 bcd	1.6 bc
Seyval Blanc	10.1 bcd	11.8 bcde	1.3 bc
La Crosse	11.2 ab	11.2 bcde	2.0 b
Vignole	8.6 bcd	9.1 de	1.3 bc
Traminette	6.6 d	9.0 de	1.6 bc
Edelweiss	9.7 bcd	13.5 bcd	1.1 bc
Marquis	8.1 bcd	10.7 cde	1.6 bc
Vanessa	9.2 bcd	11.2 bcde	1.3 bc
Reliance	7.6 bcd	11.1 cde	1.8 bc
Mars	9.0 bcd	9.1 de	1.7 bc
Jupiter	10.3 bcd	12.3 bcde	1.0 c

^z Mean separation by Tukey's HSD ($P=0.05$). Means for a site are comparable to those in Tables 2 and 3.

^y Leaf crinkle rating scale 1–5: 1 = no apparent injury; 2 = slight symptoms of abnormal crinkling; 3 = moderate; 4 = severe; 5 = very severe.