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2002 Leopold Grape Cultivar by Management System 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 a grant from the Leopold Center for Sustainable Agriculture, a grape cultivar by management system trial was established in 2002 at the ISU Horticulture Research Station (Hort Station), and at the ISU Armstrong Research and Demonstration (Armstrong) Farm.

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Introduction

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Materials and Methods

The trial was designed to evaluate 15 cultivars under three management systems. In 2002, 10 wine cultivars [Maréchal Foch (Foch), Frontenac, Cynthiana (Norton), St.Croix, Chambourcin, Seyval Blanc (Seyval), La Crosse, Vignole, Traminette, Edelweiss], and four seedless table cultivars (Marquis, Vanessa, Reliance, Mars) were planted at the two locations, with the seedless cultivar Jupiter to be added in 2003. The three management systems being evaluated are: 1) a conventional system that relies on herbicides for weed control, and the application of insecticides and fungicides on a regular basis; 2) an IPM/best management system that uses herbicides as needed, and relies on monitoring to determine the need for insecticides and fungicides; and 3) an organically-approved system, that relies on alternative methods of weed control and the use of organically-approved insect and disease control strategies. The vines were planted mid-May. At each site, the vines were spaced 8 × 10 ft apart in agrid(545 vines/acre) with three vines/replication. Treatments were replicated five times at the Hort Station and three times at the Armstrong Farm.

The vines will be trained to the bilateral cordon system on a 2-wire trellis with wires at 3.5 and 6.0 feet, and posts spaced 24 feet 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 (Chambourcin, La Crosse, Seyval, Traminettee, and Vignole) will be trained to the mid-level wire with catch wires added above. No insecticides or fungicides were applied in 2002. In the conventional and IPM/best management treatments, weed control was accomplished by a combination of hoeing and an application of oryzalin herbicide. Only hoeing was used to control weeds in the organically-approved treatment.

Results and Discussion

Precipitation at the two sites was quite different. Drought conditions persisted for much of the season at the Armstrong Farm with an accumulation of 8.1 inches of rainfall from June through September. Rainfall at the Hort Station was more frequent with an accumulation of 13.6 inches during the same time period. In addition to watering at planting, supplemental irrigation was applied five times at the Armstrong Farm on a water conservation basis, and four times at the Hort Station. By September, most vines at the Armstrong Farm had reached the mid-level wire (Figure 1), whereas most vines in the Hort Station planting had reached the top wire (Figure 2).

In early September, vines at the Hort Station were exposed to phenoxy (2,4-D) herbicide drift from an unknown source. When rated, 'Cynthiana,' 'Vanessa,' 'Reliance,' and 'Traminette' vines exhibited the greatest injury, whereas 'Seyval,' 'Frontenac,' 'La Crosse,' and 'Chambourcin' vines exhibited little or no injury (Table 1).

Vines at the Hort Station were exposed to radiation freezes on September 24 (34° F recorded), October 7 (31° F), and October 13 (28° F). After each freeze, the vine foliage was rated for injury (Table 1). Based on these ratings, 'Marquis' vines, followed by 'Vignole' were the most sensitive to fall freezes, whereas 'St. Croix,' 'Seyval,' and 'Edelwiess' vines tended to be the most tolerant.

Acknowledgments

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Table 1. Rating of 14 grape cultivars for phenoxy herbicide injury, and frost injury following radiation freezes on September 24 (34° F), October 7 (31° F), and October 13, 2002 (28° F).[z]

	Herbicide	Frost Injury Rating[x]		
Cultivar	Injury Rating[y]	September 24	October 7	October 13
Foch	3.11 c	1.11 c	3.29 def	4.44 bc
Frontenac	1.09 ef	1.16 bc	3.09 ef	4.98 a
Cynthiana	4.46 a	1.29 bc	3.73 cd	4.41 c
St. Croix	2.26 d	1.13 c	2.28 h	4.23 c
Chambourcin	1.33 ef	1.11 c	3.76 cd	4.82 a
Seyval	1.00 f	1.07 c	2.49 gh	3.70 d
La Crosse	1.11 ef	1.09 c	2.84 fg	4.33 c
Vignole	1.62 e	1.49 b	4.65 ab	5.00 a
Traminette	3.91 ab	1.14 bc	3.45 de	4.93 a
Edelweiss	3.38 bc	1.01 c	2.47 gh	4.40 c
Marquis	3.49 bc	2.07 a	5.00 a	5.00 a
Vanessa	4.22 a	1.04 c	4.11 c	4.98 a
Reliance	3.91 ab	1.00 c	3.08 ef	4.74 ab
Mars	3.58 bc	1.20 bc	4.20 bc	4.85 a

[z] Mean separation by Tukey's HSD (*P*=0.05).

[y] Herbicide injury scale 1 -5: 1 = no apparent injury; 2 = slight symptoms of abnormal venation; 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.

Figure 1. Vines in the ISU Armstrong R&D Farm grape planting.

Figure 2. Vines in the ISU Horticulture Station grape planting.