2010

# 2002 Grape Cultivar Trial Performance in 2009

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**Abstract**
To identify grape cultivars adapted to Iowa, a cultivar by management system trial was established in 2002 at the Iowa State University (ISU) Horticulture Research Station (HRS) and the ISU Armstrong Research Farm (ARF) with a grant from the Leopold Center of Sustainable Agriculture. Fifteen cultivars, including ten wine and five seedless table cultivars, were being evaluated under three management systems that were discontinued in 2008. This report summarizes the cultivar performance for the 2009 growing season.

**Keywords**
RFR A9078, Horticulture

**Disciplines**
Agricultural Science | Agriculture | Fruit Science | Horticulture

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**RFR-A9078**

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## Introduction

To identify grape cultivars adapted to Iowa, a cultivar by management system trial was established in 2002 at the Iowa State University (ISU) Horticulture Research Station (HRS) and the ISU Armstrong Research Farm (ARF) with a grant from the Leopold Center of Sustainable Agriculture. Fifteen cultivars, including ten wine and five seedless table cultivars, were being evaluated under three management systems that were discontinued in 2008. This report summarizes the cultivar performance for the 2009 growing season.

## Materials and Methods

The vines were spaced 8 × 10 ft apart (545 vines/A) with three vines/replication. Treatments were replicated 15 times at HRS and nine times at ARF (previous 5 and 3 replications × 3 management systems, respectively). Vines were trained to a 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.

A mid-January freeze severely affected grapevines at each of the planting sites (Table 1). In mid-March, five proximal (basal) buds on two canes/vine (30 buds/replication) were dissected and evaluated for primary bud injury. 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. Date of bud break was recorded at both sites. Following bud break, trunks killed to the ground were counted, and the length of established 2-year-old cordon was measured. During the growing season, vines at both sites were exposed to growth regulator herbicide drift and were rated for the severity of injury. Following *veraison*, 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 upon these measurements, and fruit condition. At harvest, the number of clusters/vine were counted and weighed.

## Results and Discussion

During the 2008–09 winter, vines were exposed to four significant freezes with HRS recording the lowest temperatures (Table 1). When cane buds were examined for injury prior to pruning, greater injury was found at HRS than at ARF (Table 2). At both sites, the injury was generally greatest on cultivars classified as being “slightly hardy” to “moderately hardy,” while those classified as being “very hardy” exhibited the least bud injury. There was also a higher incidence of trunks killed to the ground at HRS than at ARF, particularly on the less hardy cultivars (Table 2).

Based on pruning weights and feet of established cordon, less hardy cultivars generally grew better at ARF than at HRS, while hardy cultivars had similar pruning weights and feet of established cordon at each site (Table 2).

Vines at both sites were again exposed to growth regulator herbicide drift during the growing season (Table 2). At both sites, Maréchal Foch and Vanessa exhibited the greatest injury. Chambourcin, Seyval blanc, Vignole, La Crosse, and Frontenac did not exhibit injury at either site.

The 2009 growing season was characterized by cooler than normal growing conditions with the departure from normal for growing degree days being the greater at HRS than at ARF (Table 1). As a result, harvest was delayed compared with previous years with several late maturing cultivars being harvested after the first killing frost and before they obtained proper maturity (Table 3). Cultivars at ARF generally matured earlier than at HRS. Yield/vine and average cluster weights were lower than in previous years, particularly on the less hardy cultivars, which suffered the greatest bud injury and had a greater percentage of trunks killed to the ground. Generally, yields per vine were higher on cold hardy cultivars than on moderately hardy cultivars.

**Acknowledgements**

Thanks to the Leopold Center for Sustainable Agriculture for providing the initial grant to establish these plantings and the Iowa Grape and Wine Commission for previous funding. Thanks to the staff at the ISU Horticulture Station and the ISU Armstrong Farm for their assistance in maintaining the plantings.

**Table 1. Significant minimum temperatures (°F) recorded during the 2008–09 winter and 2009 fall and accumulated growing degree days from May 1 to October 1, 2009.**

| Date | ARF | HRS |
|---|---|---|
| Minimum temperatures (°F): | | |
| Dec. 22 | -11 | -14 |
| Jan. 15, 16 | -20 | -25 |
| Jan. 24 | -3 | -9 |
| Jan. 28 | -6 | -11 |
| Oct. 10 | 25 | 24 |
| | | |
| Growing Degree Days (base 50°F, cap. 86°F): | | |
| May 1 to Oct. 1[z] | 2,605 | 2,498 |
| Departure from avg. | -250 | -333 |
| Days above 86°F | 11 | 8 |

[z]From the ISU Ag Climate Network.

**Table 2. Primary bud injury and percentage of trunks killed following exposure to freezes during the 2008–09 winter, pruning weight, feet of established cordon, and herbicide drift injury recorded during the 2009 growing season for 15 grape cultivars in the ISU 2002 grape cultivar by management system trial planted at the Armstrong Research Farm (ARF) and Horticulture Research Station (HRS).**

| | | % Primary bud injury | | % of Trunks killed | | Pruning wt (lb) | | Feet of cordon per vine | | Herbicide drift injury[y] | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cultivar | Relative hardiness[z] | ARF | HRS | ARF | HRS | ARF | HRS | ARF | HRS | ARF | HRS |
| Chambourcin[x] | 3 | 41 | 92 | 9 | 84 | 3.1 | 2.7 | 6.3 | .7 | 1.0 | 1.0 |
| Traminette[x] | 4 | 32 | 65 | 2 | 62 | 3.0 | 2.0 | 7.5 | 1.8 | 2.2 | 1.2 |
| Seyval blanc[x] | 4 | 38 | 90 | 2 | 7 | 2.2 | 2.1 | 7.8 | 5.8 | 1.0 | 1.0 |
| Vignole[x] | 4 | 30 | 77 | 0 | 9 | 3.6 | 2.8 | 8.0 | 6.5 | 1.0 | 1.0 |
| Cynthiana | 4 | 29 | 67 | 0 | 3 | 2.4 | 2.3 | 8.0 | 6.6 | 3.2 | 2.3 |
| Maréchal Foch | 5 | 23 | 32 | 0 | 3 | 1.8 | 1.7 | 8.0 | 6.8 | 3.7 | 3.3 |
| Edelweiss | 5 | 16 | 30 | 0 | 0 | 2.1 | 3.0 | 7.9 | 7.3 | 2.2 | 2.9 |
| La Crosse[x] | 5 | 24 | 39 | 0 | 0 | 3.6 | 3.5 | 7.9 | 7.9 | 1.0 | 1.0 |
| St. Croix | 6 | 33 | 25 | 0 | 0 | 2.1 | 2.8 | 8.0 | 8.0 | 1.0 | 1.4 |
| Frontenac | 6 | 17 | 11 | 0 | 0 | 2.0 | 1.7 | 8.0 | 7.9 | 1.0 | 1.0 |
| Marquis | 4 | 42 | 88 | 12 | 58 | 1.8 | 2.0 | 6.5 | 2.2 | 2.5 | 1.4 |
| Vanessa | 4 | 36 | 89 | 2 | 20 | 2.0 | 2.3 | 6.2 | 4.0 | 3.8 | 3.0 |
| Jupiter[w] | 4 | 42 | 93 | 0 | 59 | 2.5 | 1.6 | 7.9 | 1.9 | 3.0 | 1.3 |
| Reliance | 4 | 39 | 91 | 2 | 2 | 1.8 | 3.0 | 7.0 | 7.5 | 2.0 | 1.2 |
| Mars | 4 | 42 | 68 | 0 | 0 | 2.9 | 4.1 | 8.0 | 7.8 | 1.4 | 1.2 |
| LSD, P < .05 | | 10 | 9 | | | .4 | .6 | .8 | 1.1 | .3 | .3 |

[z]Relative cold hardiness (temperature range at which injury begins to occur): 3 = cold tender/slightly hardy (-5°F); 4 = moderately hardy (-10°F); 5 = hardy (-15°F); 6 = very hardy (-20°F).

[y]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.

[x]Trained to a mid-wire cordon with catch wires.

[w]Planted in 2003.

**Table 3. Fruit yield and harvest characteristics in 2009 for 15 grape cultivars in the ISU 2002 grape cultivar by management system trial planted at the Armstrong Research Farm and Horticulture Research Station.**

| | ISU Armstrong Research Farm | | | | | | ISU Horticulture Research Station | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cultivar | Harvest Date | % SS | pH | TA[z] | Yield (lb) | Cluster wt (lb) | Harvest date | % SS | pH | TA[z] | Yield (lb) | Cluster wt (lb) |
| Maréchal Foch | 8/24 | 19.1 | 3.36 | 10.8 | 12.3 | .17 | 9/8[x] | . | . | . | 14.2 | .17 |
| Seyval blanc | 8/28 | 16.5 | 3.26 | 10.4 | 14.5 | .55 | 9/11 | 19.7 | 3.30 | 7.6 | 7.2 | .37 |
| Edelweiss | 8/29 | 13.3 | 3.46 | 10.4 | 12.5 | .56 | 8/28[x] | . | . | . | 23.7 | .28 |
| La Crosse | 9/4 | 15.6 | 3.30 | 11.0 | 17.3 | .24 | 9/11[x] | . | . | . | 20.4 | .17 |
| St. Croix | 9/8 | 16.6 | 3.53 | 9.7 | 8.2 | .24 | 9/10[x] | . | . | . | 21.3 | .19 |
| Frontenac | 9/17[w] | 21.8 | 3.23 | 14.1 | 15.3 | .24 | 9/22[x] | . | . | . | 19.1 | .21 |
| Vignole | 9/21[w] | 20.8 | 3.16 | 12.3 | 6.2 | .21 | 10/7[x] | . | . | . | 1.6 | .10 |
| Traminette | 9/22 | 20.0 | 3.33 | 9.7 | 5.4 | .26 | 10/7 | 20.4 | 3.19 | 8.5 | .1 | .18 |
| Chambourcin | 10/13[w] | 21.2 | 3.18 | 12.0 | 3.6 | .46 | 10/12[w] | 20.3 | 2.98 | 13.0 | .2 | .26 |
| Cynthiana | 10/13[w] | 19.7 | 2.93 | 22.7 | 6.5 | .16 | 10/12[w] | 20.9 | 3.01 | 23.7 | 3.8 | .09 |
| Vanessa | 8/25 | 17.8 | 3.27 | 8.0 | 1.0 | .21 | 9/1 | 17.3 | 3.33 | 6.2 | 1.4 | .15 |
| Reliance | 8/25 | 18.5 | 3.23 | 9.4 | 5.7 | .48 | 9/1 | 18.9 | 3.31 | 8.3 | 9.2 | .46 |
| Jupiter[y] | 8/31 | 21.6 | 3.58 | 6.0 | 12.8 | .53 | 9/1 | 17.0 | 3.5 | 5.1 | 2.8 | .34 |
| Mars | 9/10[v] | 17.7 | 3.40 | 6.6 | 10.0 | .49 | 9/11[x] | . | . | . | 13.3 | .23 |
| Marquis | 9/10 | 17.6 | 3.48 | 4.9 | 6.9 | .51 | 9/23 | 16.1 | 3.32 | 4.5 | 2.0 | .39 |
| LSD, P < .05 | | | | | 2.6 | .06 | | | | | 2.6 | .05 |

[z]Titratable acids reported in grams/liter.
[y]Planted in 2003.
[x]Cultivar was included in student projects.
[w]Harvested early or after the killing frost.
[v]Harvested from September 10 to 25.