

# Impact of Minimum Winter Temperatures on the Growth of Winegrape Cultivars and Advanced Selections

## RFR-A1928

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### Introduction

Selection of grape cultivars adapted to Iowa's climate and soil is essential for successful vineyard and wine production. New cultivars and advanced selections with sufficient winter hardiness and quality and quantity of grapes are critical for sustained profitability. Research to evaluate new cultivars and selections provides useful information to Iowa growers for their sustainable production of winegrapes.

### Materials and Methods

A replicated research vineyard at the Iowa State University Horticulture Research Station, Ames, Iowa, was planted in spring 2018, and includes three cultivars and two advanced selections. The experimental design was a randomized complete block with four replications. The treatments included cultivars released from the University of Minnesota and a private breeder in Minnesota: Itasca, white wine grape; Crimson Pearl, red wine grape; and Petite Pearl, red wine grape. Advanced selections from Cornell University were NY06.0514.06, red wine grape, and NY81.0315.17, white wine grape. Each panel of cultivar or advanced selection contained four vines in each replication.

Grapevines were grown using standard viticultural practices for the Midwest. Flower clusters were removed since the vineyard was in its second year of a typical 3-year establishment period, and yields were not obtained. Minimum temperatures in the

winter months (October 2018 through March 2019) were summarized from data recorded by the ISU Horticulture Research Station (vineyard) weather station. Ratings of the vine growth were completed at the end of the growing season, October 1, 2019, using a rating scale of 1–5, with 1 having the least growth and 5 having the most growth (see rating system in Table 2). The result for each experimental unit was the mean for the four vines per unit (four-vine panel).

### Results and Discussion

Daily minimum temperature data showed two, 100-year record, low temperatures were recorded during the winter season of 2018–2019, one November 18, 2018 (2.9°F) and the other January 30, 2019 (-23.2°F) (Table 1 and Figure 1). Grapevine cultivars Itasca, Crimson Pearl, and Petite Pearl survived the record low and minimal temperatures of 2018–2019 with regrowth from buds on overwintered canes (Table 2). Grapevines of advanced selections of NY06.0514.06 and NY81.0315.17 died and did not regrow from the ground level or had short growth of shoots from the ground level in the current 2019 season. Ratings differed significantly and were lower from the three cultivars in the trial. The experiment will continue to evaluate cultivars in additional growing seasons.

### Acknowledgements

Appreciation is extended to staff of the ISU Horticulture Research Station for their assistance and maintenance of the vineyard. This project is part of the USDA NE1720, Multi-state Coordinated Evaluation of Winegrape Cultivars and Clones.

**Table 1. Monthly minimum temperatures during the winter season of 2018–19 for the NE 1720 cold-climate grape trial at the ISU Horticulture Research Station, Ames, Iowa.**

Month	Temp. (°F)	Date
October	24.9	10/21/18
November	2.9 <sup>z</sup>	11/18/18
December	7.97	12/7/18
January	-23.2 <sup>z</sup>	1/30/19
February	-14.0	2/19/19
March	-8.6	3/4/19

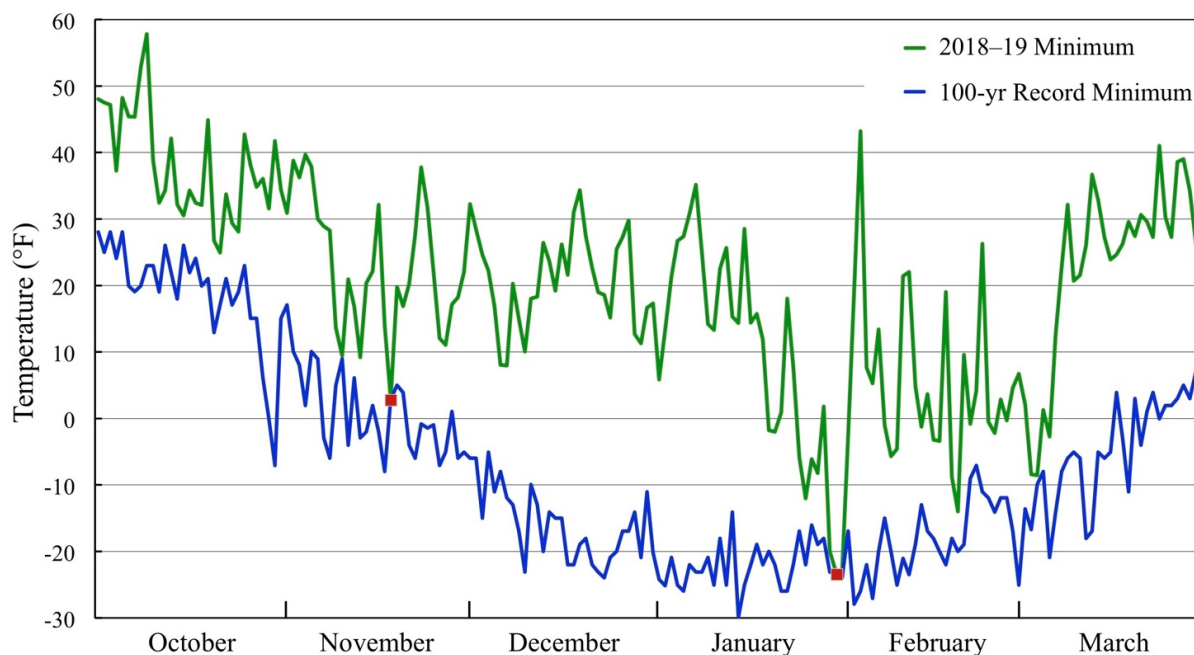
<sup>z</sup>100-year record minimum temperature.

**Table 2. Survival and growth ratings for cultivars and advanced selections in the NE 1720 cold-climate grape trial at the ISU Horticulture Research Station, Ames, Iowa.**

Cultivar	Survival and growth rating <sup>y</sup>	Rating system
Itasca	5.0 a <sup>z</sup>	1 = dead, no growth or regrowth
Crimson Pearl	4.6 a	2 = short regrowth (less than 3 ft) from ground level
Petite Pearl	4.5 a	3 = short growth (less than 3 ft) from buds on overwintered canes, which were lignified (woody)
NY06.0514.06	2.1 b	4 = growth to 4 ft from several shoots originating from buds on several overwintered canes, which were lignified (woody)
NY81.0315.17	1.4 b	5 = growth over 6 ft, many shoots, from multiple overwintered canes, which were lignified (woody)

<sup>y</sup>Survival and growth were assessed October 1, 2019, and ratings for each vine were assigned according to the rating system described below.

<sup>z</sup>Means followed by the same letter are not different according to Tukey-Kramer honestly significant difference test at  $P \leq 0.05$ .



**Figure 1. Daily minimum temperatures during winter 2018–19 (top line) and the 100-year record daily minimum temperatures (bottom line) from October 1 through March 31 for the NE 1720 cold-climate grape trial at the ISU Horticulture Research Station, Ames, Iowa. Two, 100-year record, daily minimum temperatures were recorded during the winter season of 2018–19, one November 18, 2018 (2.9°F), and the other January 30, 2019 (-23.2°F).**