Kentville Research & Development Centre (KRDC) – Nova Scotia wine grape bud hardiness

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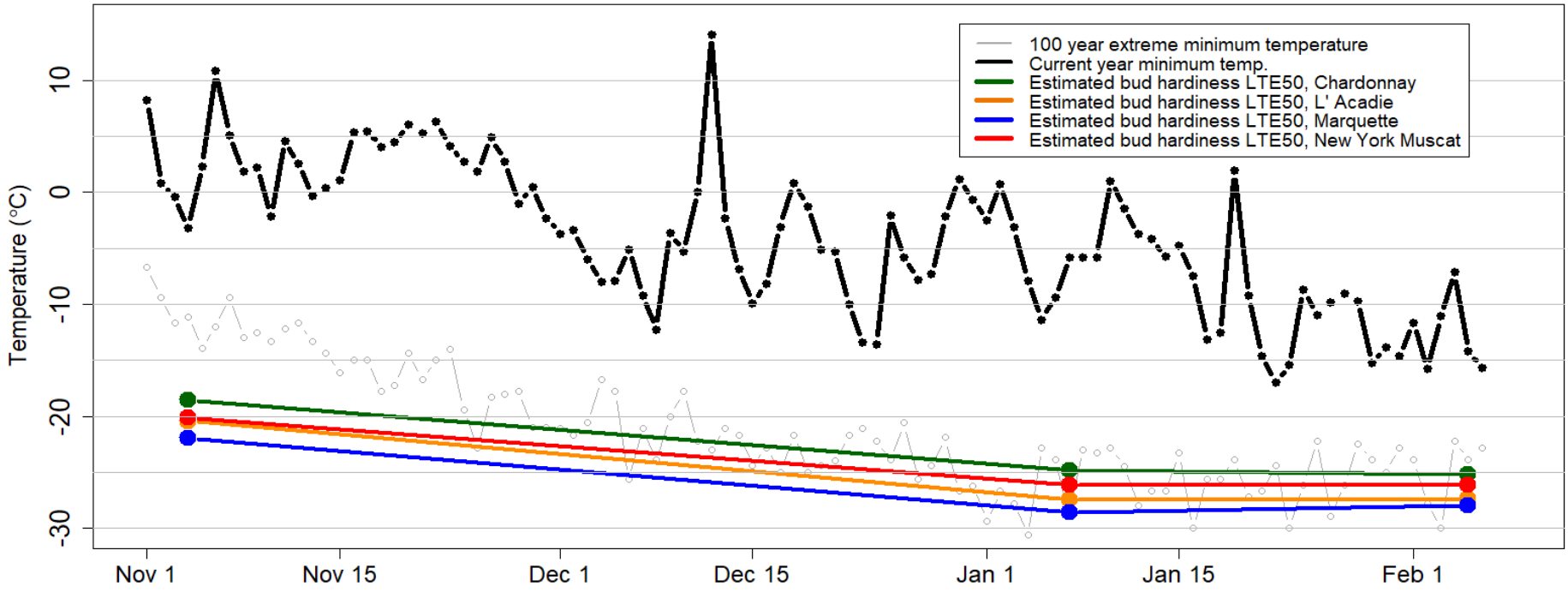

Figure 1. Plot showing the LTE50 values (coloured lines) for five wine grape varieties taken from Nova Scotia vineyards, as well as recent and historical temperature trends. Current observed minimum temperatures (black line) as well as the 100-year minimum temperatures (grey line) were recorded at the Environment and Climate Change Canada (ECCC) weather station located at the Kentville Research and Development Centre.

Current report

Bud hardiness values since our last survey have showed little change. The variety with the largest survey-to-survey difference is Marquette with a deacclimation of -0.6 °C, which is likely a reflection of sample variation. Three varieties in the survey have reached deep winter hardiness levels consistent with levels seen in previous winters with similar temperatures. The exception to this is Marquette which in the past has had hardiness values of -30 °C or below. So far, this winter has been colder than average. The mean daily temperature for the period from January 1 to February 6 is -5.24 °C, which is almost 2 °C colder than the 10-year average of -3.43 °C for this same period. The Environment and Climate Change Canada 30-day forecast for Nova Scotia predicts below average temperatures for the remainder of February which may cause further deepening of winter hardiness values.

Table 1. LTE10, LTE50 and LTE90 average values (°C) for core wine grape cultivars for the current and previous reporting periods

	Nov. 4 - 5			Jan. 7 - 8			Feb. 4 - 5								
Core cultivars and sites	LTE10	LTE50	LTE90	LTE10	LTE50	LTE90	LTE10	LTE50	LTE90	LTE10	LTE50	LTE90	LTE10	LTE50	LTE90
Chardonnay (5 sites)	-17.0	-18.6	-20.4	-22.7	-24.8	-26.5	-23.7	-25.2	-27.0						
L'Acadie (5 sites)	-17.4	-20.4	-22.4	-24.7	-27.4	-30.1	-24.7	-27.4	-30.4						
Marquette (5 sites)	-19.5	-21.9	-26.6	-26.0	-28.6	-30.5	-24.9	-28.0	-30.0						
New York Muscat (5 sites)	-17.1	-20.1	-21.9	-24.1	-26.1	-28.2	-24.3	-26.2	-28.7						
NYUS.2.1 LTE50 prediction*															
Chardonnay (Kentville)		-17.9			-23.9			NA							
L'Acadie (Kentville)		-18.5			-28.2			NA							
Marquette (Kentville)		-20.2			-28.5			NA							

* Wang et al., 2024. *Horticulture Research*, 11, 2: uhad286. Follow predicted bud hardiness values in real time at a weather site near you in the US or Canada via the following website: https://cornell-tree-fruit-physiology.shinyapps.io/North_America_Grape_Freezing_Tolerance/ .

Research report description

The Nova Scotia wine grape bud hardiness survey generates reports detailing the low temperature exotherm (LTE) values over the dormant period (roughly from November to April). The LTE is the temperature (°C) at which a bud freezes and is killed: LTE10, LTE50 and LTE90 values denote the temperatures at which 10%, 50% and 90% of the viable buds freeze. The LTE values for a given variety and site are generated using eight canes obtained from eight vines; the compound buds from nodes 3 through 7 from each cane are measured via differential thermal analysis (DTA). It is important to note that the LTE value denotes a bud's susceptibility to acute, cold temperature damage; it does *not* necessarily reflect the bud's susceptibility to dehydration, poor vine health and other more chronic forms of stress that can result in bud mortality at temperatures above the LTE values.

Each report includes: (1) a plot showing the median LTE50 values for a group of hybrid and vinifera wine grape cultivars averaged over several sites located in Kings county as well as recent and historical minimum temperature trends (Figure 1); (2) comments on the current reporting period; (3) a table of LTE10, LTE50 and LTE90 values for the same cultivars shown in Figure (Table 1); (4) A computer-model generated approximation of the LTE50 value based on temperatures obtained from the Kentville Environment and Climate Change Canada (ECCC) weather station and the NYUS.2 machine learning model. This report is produced by the KRDC Plant Physiology Program and is supported by Grape and Wine Cluster Activity #18: Growing More Resilient and Hardy Wine Grapes in the Face of Climate Change in an Eastern Canadian Environment. If you have any questions or comments, please feel free to reach out to the KRDC Plant Physiology Program using the contact information listed above.