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

2024/2025 Report no. 4: February 19 & 20, 2025

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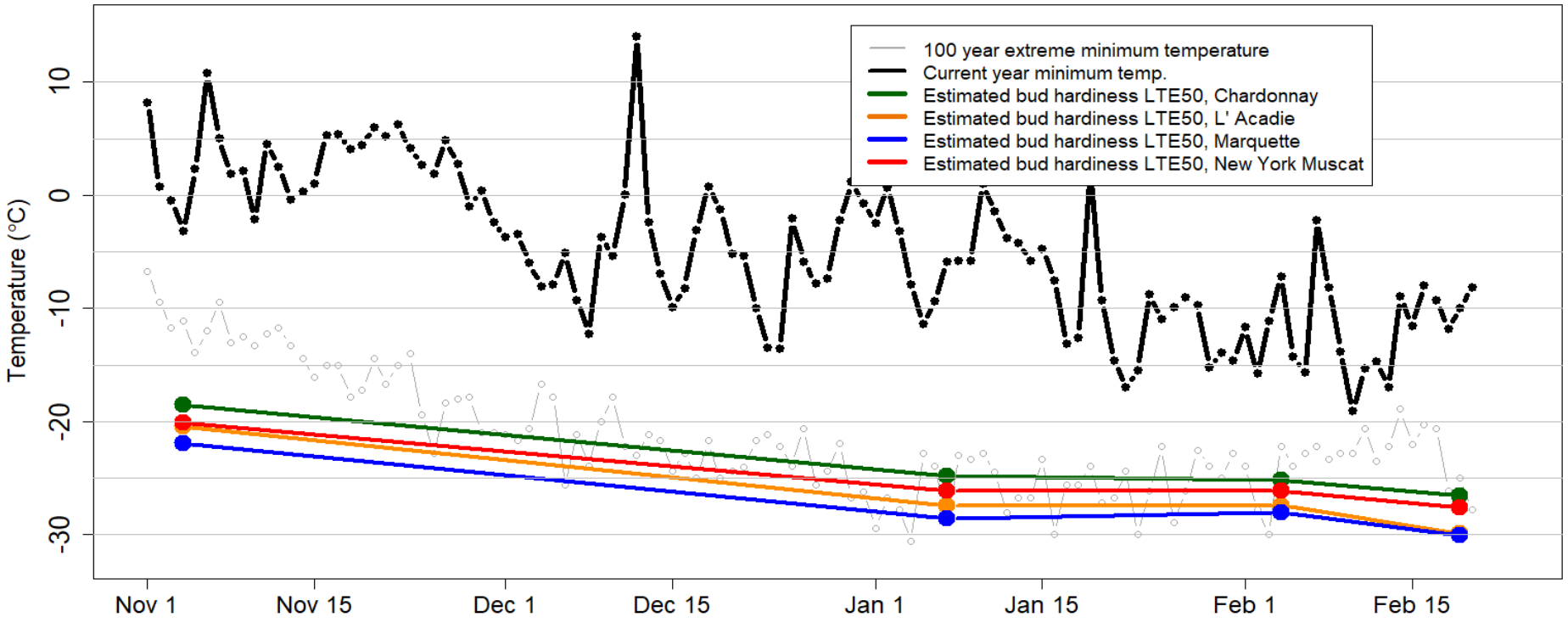

Figure 1. Plot showing the LTE50 values (coloured lines) for four wine grape varieties taken from Nova Scotia vineyards, as well as recent and historical temperature trends. Current observed minimum temperatures (black line) as well as the 100-year minimum temperatures (grey line) were recorded at the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

Current report

All varieties in the current round of the survey have deepened their bud hardiness values relative to the last survey in early February as a result of sustained cold temperatures in recent weeks. L'Acadie has shown the greatest change to its LTE50 value, which decreased by 2.5 °C, followed by Marquette at 2.1 °C, with New York Muscat and Chardonnay showing the lowest level of additional acclimation, with both cultivars gaining an additional 1.4 °C of hardiness. Currently, all varieties are at hardiness levels that we would expect in a typical winter with average temperatures. The average temperature for the period from December 1 to February 24 of this year was -3.95 °C compared to the 25-year average for the same period of -3.14 °C. Even with the below average temperatures in recent weeks, there is a wide margin between LTE50 values and observed low temperatures. The 30-day forecast from Environment and Climate Change Canada predicts that, overall, temperatures will be normal or slightly above up to the third week of March.

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			Feb 19 - 20					
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	-24.4	-26.6	-29.0			
L'Acadie (5 sites)	-17.4	-20.4	-22.4	-24.7	-27.4	-30.1	-24.7	-27.4	-30.4	-23.6	-29.9	-33.2			
Marquette (5 sites)	-19.5	-21.9	-26.6	-26.0	-28.6	-30.5	-24.9	-28.0	-30.0	-26.6	-30.1	-32.1			
New York Muscat (5 sites)	-17.1	-20.1	-21.9	-24.1	-26.1	-28.2	-24.3	-26.2	-28.7	-24.2	-27.6	-30.5			
NYUS.2.1 LTE50 prediction*															
Chardonnay (Kentville)		-17.9			-23.9			-24.7			-25.1				
L'Acadie (Kentville)		-18.5			-28.2			-28.4			-28.6				
Marquette (Kentville)		-20.2			-28.5			-28.4			-28.7				

* 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.