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

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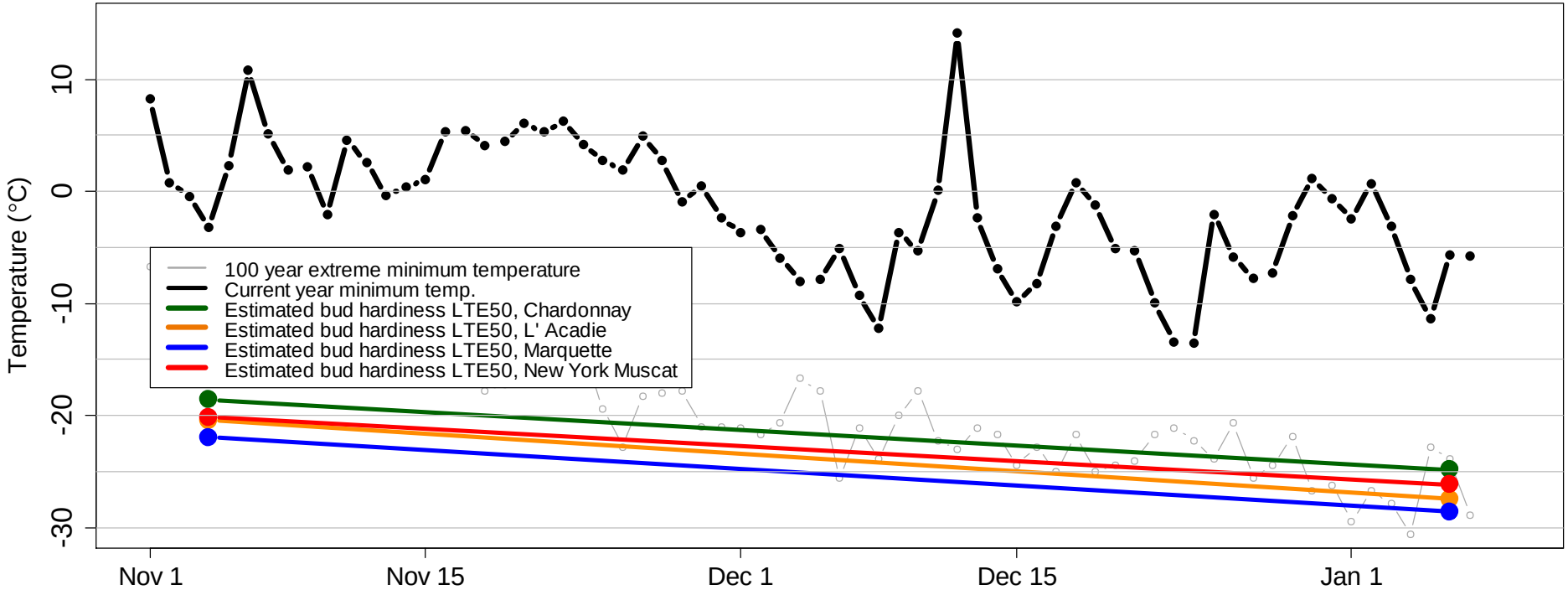

Figure 1. Plot showing the LTE50 values (coloured lines) for five wine grape varieties taken from Nova Scotia vineyards, as well as recent and historical temperature trends. Current observed minimum temperatures (black line) as well as the 100-year minimum temperatures (grey line) were recorded at the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

Current report

Bud hardiness values have dropped considerably since our last survey in early November, coinciding with the cooler temperatures that we received in December. LTE50 values have dropped by 6 to 7 °C for all varieties in the survey thereby maintaining a wide margin of safety between observed temperatures and bud hardiness levels. The average temperature in Kentville for November was 5.68 °C compared to the 10-year average of 4.59 °C. This trend reversed in December with an average temperature of -1.14 °C compared to the 10-year average of -0.03 °C. The seasonal forecast from Environment and Climate Change Canada for Nova Scotia predicts only a moderate probability of above average temperatures for the rest of the winter. If temperatures remain close to seasonal, we should see current hardiness values continue to deepen by a few degrees before our next report in early February.

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											
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									
L'Acadie (5 sites)	-17.4	-20.4	-22.4	-24.7	-27.4	-30.1									
Marquette (5 sites)	-19.5	-21.9	-26.6	-26.0	-28.6	-30.5									
New York Muscat (5 sites)	-17.1	-20.1	-21.9	-24.1	-26.1	-28.2									
NYUS.2.1 LTE50 prediction*															
Chardonnay (Kentville)		-17.9			-23.9										
L'Acadie (Kentville)		-18.5			-28.2										
Marquette (Kentville)		-20.2			-28.5										

* 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.

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