

Bud cold hardiness monitoring in Québec. Summary of the 2020-2021 winter season

Bulletin 4

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Temperatures over the last week have risen significantly since the cold that was experienced at the end of the month of November. During the past week, daily mean temperatures were above normal values. Between the 10th and 17th of December 2021, mean daily temperature at the CRAM experimental vineyard in Oka, Quebec, was 1.5 °C whereas recorded values for the same dates in 2020 and 2019 were -4.7 °C and -1.5 °C respectively. Grapevines are affected by this change in temperature and consequently they lost acclimation over that same time period (Figures 1 & 2). Though acclimation loss at this time of year is not favorable for grapevines, it is not unexpected with a rise in mean temperatures and reflects what we understand from theory. We can therefore assume that grapevines are currently ecodormant and so very responsive to any changes in mean daily temperatures. If vines were to be exposed to a sudden decrease in temperature to values below -20 °C for example, we would expect to see some primary bud mortality. Bud survival analyses that we've completed so far on Marquette, Frontenac and Petite Pearl indicate that some sites have already experienced up to 10% primary bud mortality. This however is not a generalised observation, mean primary bud mortality still falls below 5% on most evaluated sites and so should not be worrisome at this point in time. Furthermore, the buffer zone between observed minimal temperatures and LT50s persists and so indicates that grapevines are still well acclimated. Predicted daily temperatures for the remainder of the month of December, for the time being at least, remain below the freezing point which should incite grapevines to regain what little acclimation they may have lost over the past 10 days.

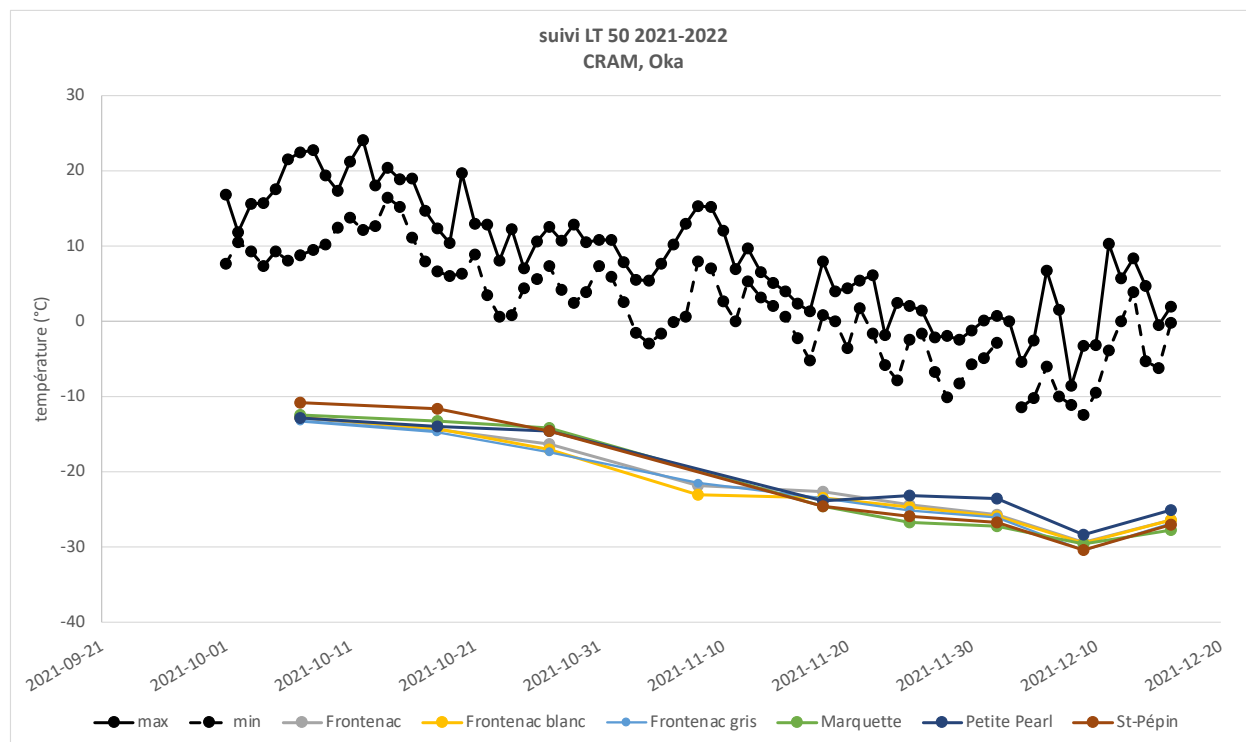


Figure 1 : Monitoring of bud cold hardiness (LT 50) for some of the cultivars at the CRAM experimental vineyard in Oka, Quebec.

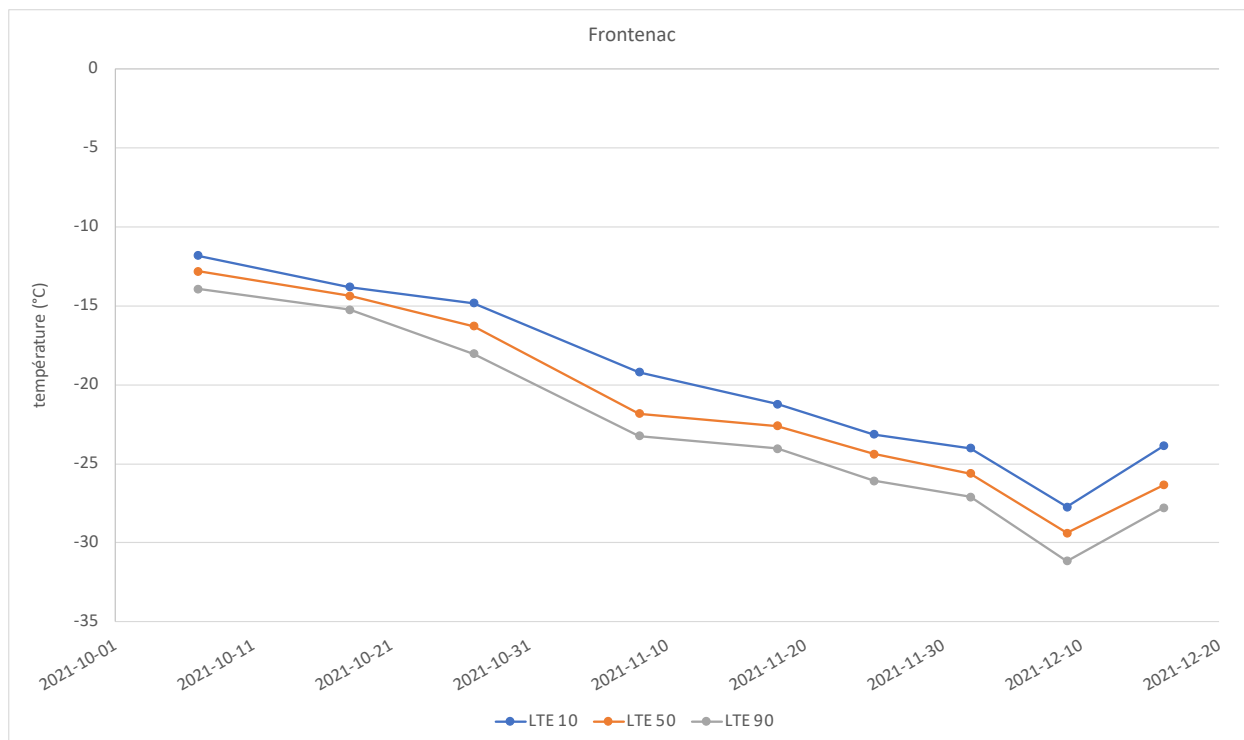


Figure 2 : Evolution of the lethal temperatures for Frontenac at the CRAM experimental vineyard in Oka, Quebec.

Acknowledgements

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Table I : Lethal temperatures for 10, 50, and 90% of grapevine buds (LT10, LT50, and LT90) for many Québec regions.

région	MRC	cépage	LTE 10	LTE 50	LTE 90	LTE 10	LTE 50	LTE 90	LTE 10	LTE 50	LTE 90	LTE 10	LTE 50	LTE 90	LTE 10	LTE 50	LTE 90
Estrie	Memphrémagog		2021-10-27			2021-11-10						2021-11-23			2021-12-07		
		Frontenac	-16.04	-17.11	-20.98	-21.06	-23.11	-24.75				-22.41	-25	-27.06	-23.68	-25.87	-27.45
		Frontenac blanc	-15.88	-17.09	-19.19	-21.21	-22.75	-23.81				-22.66	-24.6	-26.53	-22.41	-25.62	-26.87
Lanaudière	Joliette					2021-11-02			2021-11-16			2021-11-30			2021-12-15		
		Frontenac				-18.77	-21.86	-23.71	-21.13	-22.85	-24.73	données manquantes			données manquantes		
		Marquette				-17.58	-20.66	-22.45	-22.73	-25.09	-26.25	-26.61	-28.58	-30.02	-28.46	-30.07	-31.78
Lanaudière	D'Autray					2021-11-02			2021-11-16			2021-11-30			2021-12-15		
		Frontenac				-19.86	-21.02	-23.21	-18.8	-22.82	-24.39	-24.43	-28.11	-29.09	-26.33	-29.22	-31.58
		Frontenac blanc				-17.84	-20.9	-23.34	-21.84	-23.38	-24.69	-25.66	-28.11	-29.17	-27.36	-28.95	-30.97
		Frontenac gris				-17.11	-18.2	-22.65	-22.38	-24.02	-25.11	-25.6	-27.57	-28.79	-26.51	-28.58	-29.52
		Marquette				-20.55	-23.01	-25.64	-22.04	-24.52	-25.57	-25.86	-28.34	-29.72	-26.62	-28.02	-30.05
		Petite Pearl				-16.33	-18.65	-20.11	-20.36	-21.66	-23.25	-21.51	-25.34	-27.99	-24.56	-27.29	-29.06
Laurentides	Deux-Montagnes		2021-11-18			2021-11-25			2021-12-02			2021-12-09			2021-12-16		
		Frontenac	-21.22	-22.6	-24.04	-23.13	-24.38	-26.08	-24.01	-25.63	-27.11	-27.72	-29.38	-31.16	-23.87	-26.35	-27.77
		Frontenac blanc	-22.04	-23.48	-24.45	-22.34	-24.7	-26.12	-24.22	-25.85	-27.06	-22.65	-29.44	-31.33	-23.19	-26.38	-27.91
		Frontenac gris	-16.64	-23.53	-24.59	-23.71	-25.08	-26.49	-23.26	-26.03	-27.89	-28.63	-30.43	-32.45	-25.59	-26.89	-28.89
		Marquette	-23.16	-24.53	-26.05	-23.55	-26.66	-28.61	-25.86	-27.24	-28.66	-26.53	-29.59	-31.38	-25.64	-27.67	-29.02
		Petite Pearl	-20.45	-23.84	-25.1	-19.06	-23.16	-25.46	-22.18	-23.53	-25.69	-25.4	-28.38	-30.63	-19.01	-25.05	-27.2
		St-Pépin	-22.61	-24.54	-25.64	-23.71	-25.84	-27.57	-24.04	-26.71	-27.71	-28.71	-30.4	-31.9	-24.06	-27	-28.9
		Seyval	sous toile			sous toile			sous toile			sous toile			sous toile		
		Vidal	sous toile			sous toile			sous toile			sous toile			sous toile		
Laurentides	Deux-Montagnes (Site 2)					2021-11-08						2021-11-24			2021-12-08		
		Frontenac				-21.69	-23.06	-24.56				-24.18	-26.37	-27.46	-23.85	-29.16	-30.62
		Marquette				-22.38	-24.36	-25.87									
		St-Pépin				-23.13	-25.12	-26.93				-27.08	-27.92	-29.28	-27.47	-29.96	-31.59
Montérégie	Brome-Missisquoi		2021-10-27			2021-11-10						2021-11-23			2021-12-07		
		Frontenac	-15.54	-16.95	-19.27	-22.71	-24.73	-26				-24.82	-26.56	-27.61	-27.23	-27.98	-29.09
		Frontenac blanc	-17.62	-19.41	-22	-20.87	-23.86	-24.98				-26.3	-28.07	-29.41	-26.32	-27.93	-29.02
		Frontenac gris	-13.63	-15.34	-18.65	-22.99	-24.1	-25.2				-24.86	-26.44	-27.65	-25.18	-28.02	-29.16
		Petite Pearl	-15.03	-15.92	-20.72	-18.09	-21.42	-24.47				-22.26	-23.95	-25.74	-25.24	-28.51	-29.42
Montérégie	Les Jardins-de-Napierville					2021-11-01			2021-11-17			2021-12-01			2021-12-14		
		Frontenac				-18.37	-20.62	-23.66	-21.92	-26.01	-27.33	-24.13	-27.25	-29.24	-20.91	-27.01	-29.52
		Frontenac blanc				-18.98	-20.89	-23.98	-23.62	-25.33	-26.7	-25.07	-27.53	-28.68	-25.11	-27.79	-29.6
		Marquette				-17.92	-21.23	-23.9	-23.99	-25.44	-27.09	-25.68	-27.89	-29.34	-26.94	-29.5	-30.84
		Petite Pearl				-17.45	-19.4	-21.48	-23.28	-24.53	-26.37	-22.05	-24.6	-26.11	-24.48	-26.58	-28.87
		Chardonnay				-13.57	-14.71	-17.21	sous toile			sous toile			sous toile		
Montérégie	Les Jardins-de-Napierville (site 2)		2021-10-26														
		Chardonnay	-12.23	-14.15	-15.64	sous toile			sous toile			sous toile			sous toile		
		Pinot noir	-13.84	-16.13	-16.92												
		Pinot gris	-10.62	-13.59	-15.19												
		Vidal	-12.6	-13.55	-15.05												
		Seyval	-12.98	-14.36	-15.57												
		Gamay	-13.65	-14.89	-16.17												

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région	MRC	cépage	LTE 10	LTE 50	LTE 90	LTE 10	LTE 50	LTE 90	LTE 10	LTE 50	LTE 90	LTE 10	LTE 50	LTE 90	LTE 10	LTE 50	LTE 90
Montérégie	Le Haut-Richelieu	Marquette				2021-11-01			2021-11-17			2021-12-01			2021-12-14		
		St-Pépin				-16.17	-18.39	-20.46	-21.25	-23.5	-24.79	-24.86	-26.66	-28.12	-26.07	-28.11	-28.77
						-17.77	-20.46	-22.65	-22.8	-24.47	-26.58	-26.08	-27.42	-29.02	-22.98	-27.42	-29.65
Montérégie	Le Haut-St-Laurent (site 2)	Frontenac				2021-11-01			2021-11-17			2021-12-01			2021-12-14		
		Frontenac blanc				-16.14	-18.08	-20.99	-22.17	-23.42	-25.43	-22.52	-25.24	-26.9	-22.31	-26.31	-29.13
		Marquette				-16.28	-17.08	-19.07	-21.41	-23.53	-25.18	-22.72	-24.95	-26.64	-24.44	-26.1	-27.36
		Petite Pearl				-15.99	-17.51	-18.84	-22.57	-23.68	-24.89	-24.32	-26.93	-28.02	-25.43	-27.35	-29.33
		St-Pépin				-14.34	-16.08	-17.32	-22.29	-24.82	-26.5	-25.99	-28.53	-29.82	-28.28	-29.5	-31.18
						-15.54	-16.41	-18.21	-20.57	-21.87	-23.3	-22.41	-23.95	-26.53	-22.91	-24.42	-26.19
Montérégie	Les Maskoutains		2021-11-03														
		Pinot noir	-17.29	-18.39	-19.41	sous toile			sous toile			sous toile			sous toile		
		Gamaret	-15.05	-16.26	-17.85												
		Gamay	-15.04	-16.34	-17.16												
		Vidal	-13.15	-15.22	-18.15												
Montérégie	Marguerite d'Youville		2021-10-28			2021-11-11						2021-11-24			2021-12-08		
		Chardonnay	-15.68	-17.75	-18.78	-17.67	-20.28	-22.43	sous toile			sous toile			sous toile		
		Frontenac	-15.02	-16.2	-17.54	-20.95	-22.73	-24.59				-24.24	-26.28	-27.42	-26.23	-28.47	-29.51
		Frontenac gris										-23.46	-25.01	-26.71	-25.25	-28.2	-30.51
		Marquette	-13.25	-15.18	-17.7	-21.87	-24.12	-26.22				-25.34	-27.37	-29.17	-27.2	-28.75	-30.29
		Pinot noir	-13.54	-15.09	-16.17	-18.46	-20.76	-22.23	sous toile			sous toile			sous toile		
		St-Pépin	-12.86	-15.02	-16.07	-18.92	-24.06	-25.45				-26	-27.39	-28.66	-26.12	-28.51	-30.21
		Vidal	-12.59	-14.12	-14.89	-16.15	-18.13	-19.73	sous toile			sous toile			sous toile		
Montérégie	Rouville		2021-10-27			2021-11-10						2021-11-23			2021-12-07		
		Chardonnay	-12.68	-13.62	-14.74	sous toile			sous toile			sous toile			sous toile		
		Frontenac	-12.94	-14.26	-16.09	-20.85	-22.16	-22.89				-22.02	-23.98	-25.95	-24.45	-26.28	-27.61
		Frontenac blanc	-12.84	-14.26	-16.16	-19.05	-21.34	-23.04				-23.99	-25.17	-26.76	-22.86	-26.52	-27.91
		Frontenac gris	-12.78	-14.6	-15.62	-21.05	-22.44	-23.88				-23.01	-24.34	-26.69	-23.49	-26.14	-27.96
		Marquette	-13.99	-15.3	-16.61	-21.23	-22.84	-24.24				-23.08	-24.87	-26.87	-26.84	-28.31	-29.66
		Vidal	-11.95	-12.89	-14.04	sous toile			sous toile			sous toile			sous toile		
Montérégie	Vaudreuil-Soulanges	Frontenac				2021-11-02			2021-11-18			2021-11-25			2021-12-09		
		Frontenac blanc				-17.14	-19.48	-20.35	-21.86	-23.81	-25.93	-22.92	-25.09	-26.59	données manquantes		
		Frontenac gris				-17.39	-18.16	-20.38	-21.32	-23.69	-25.76	-21.4	-24.89	-26.87			
		Marquette							-21.15	-23.85	-25.37	-21.29	-24.26	-26.1			
		Petite Pearl				-18.33	-20.36	-22.25	-22.94	-24.61	-26.06	-26.72	-27.97	-29.27			
		St-Pépin				-17.01	-17.62	-19.72	-19.22	-21.97	-24.27	-18.51	-22.66	-23.79			
						-15.59	-17.22	-18.81	-24.66	-26.34	-27.75	-25.94	-26.81	-28.77			