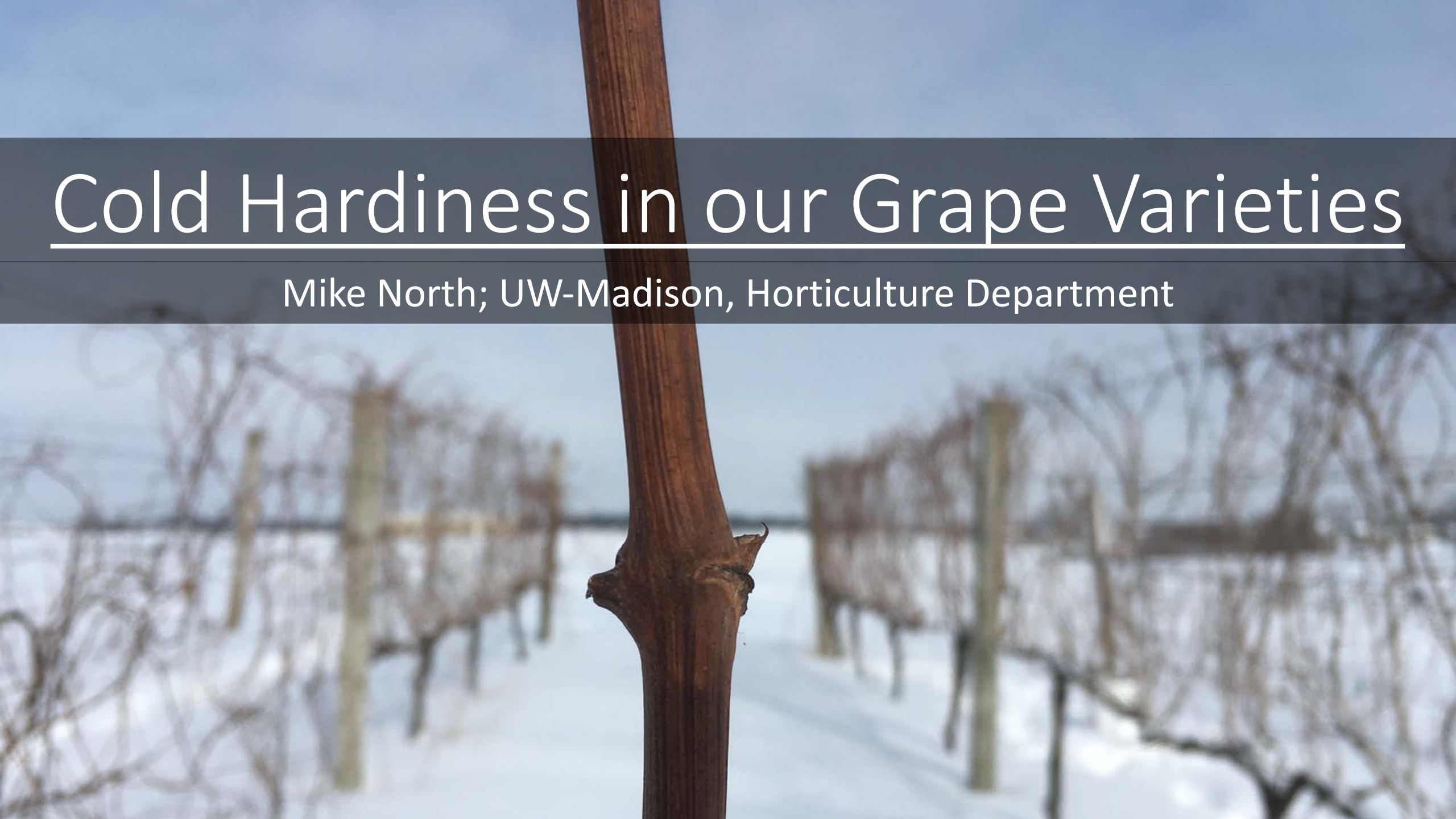


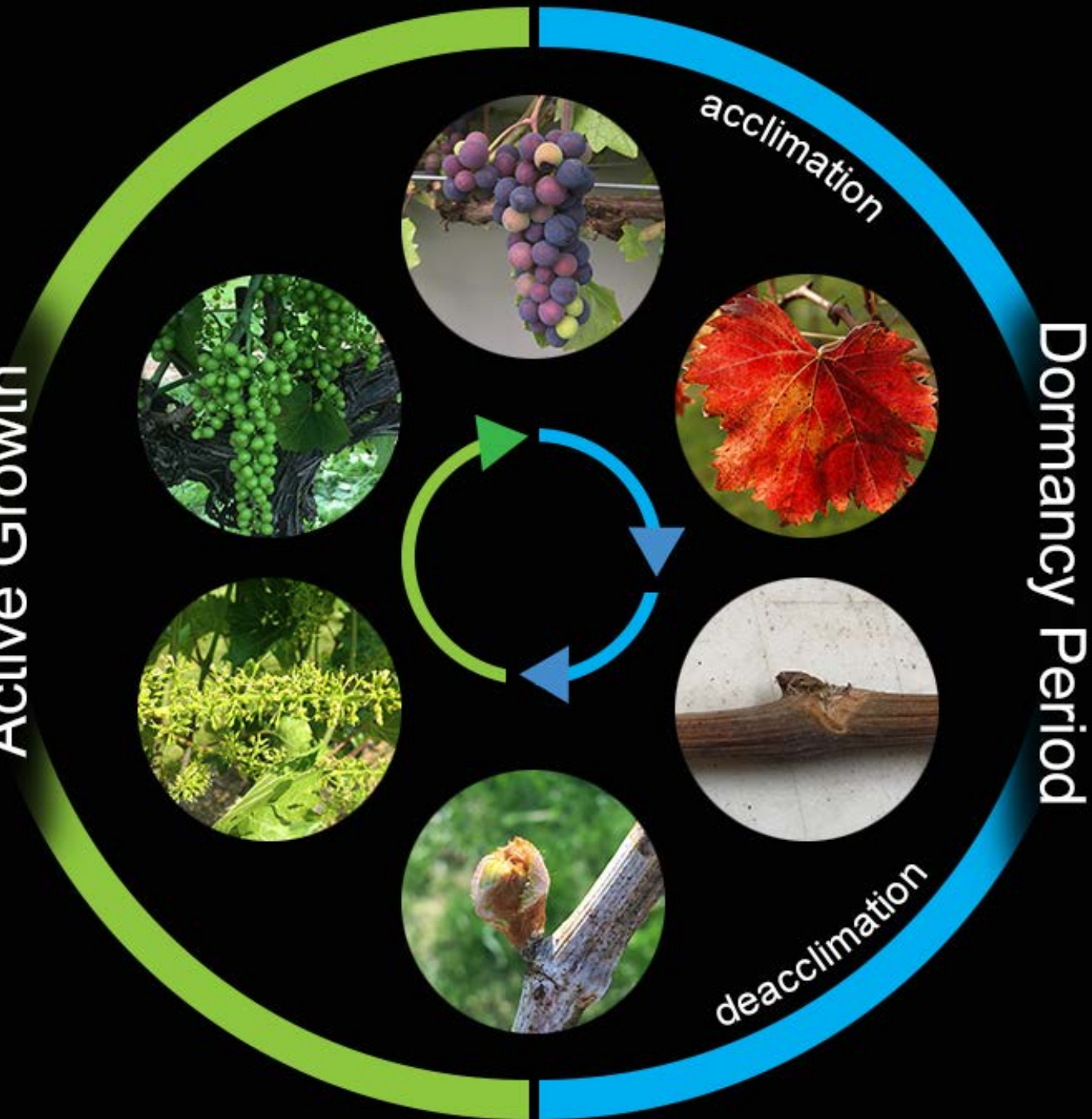


Cold Hardiness in our Grape Varieties

Mike North; UW-Madison, Horticulture Department



Active Growth



**Surviving winter
is hard!**





What does cold damage look like?

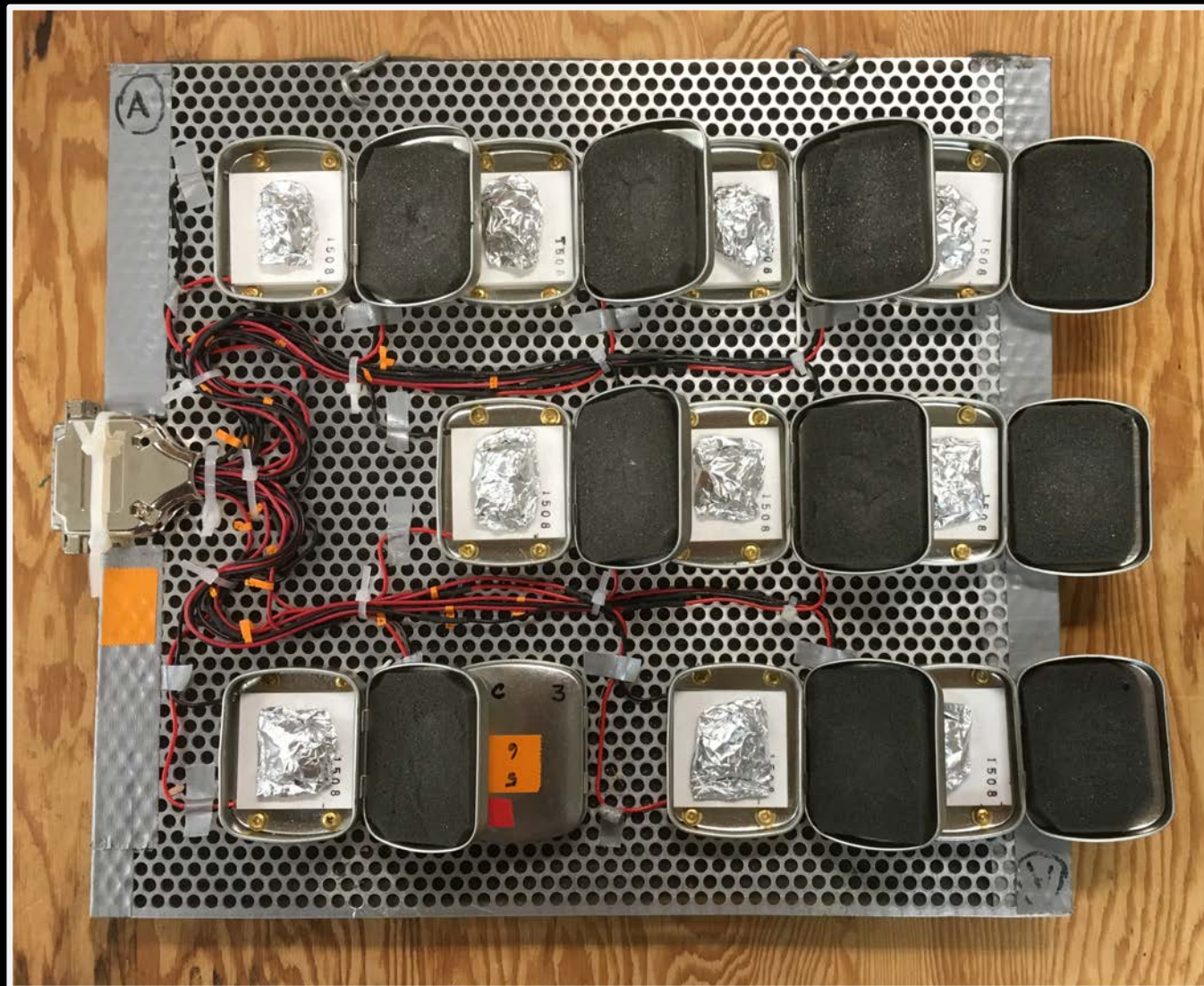


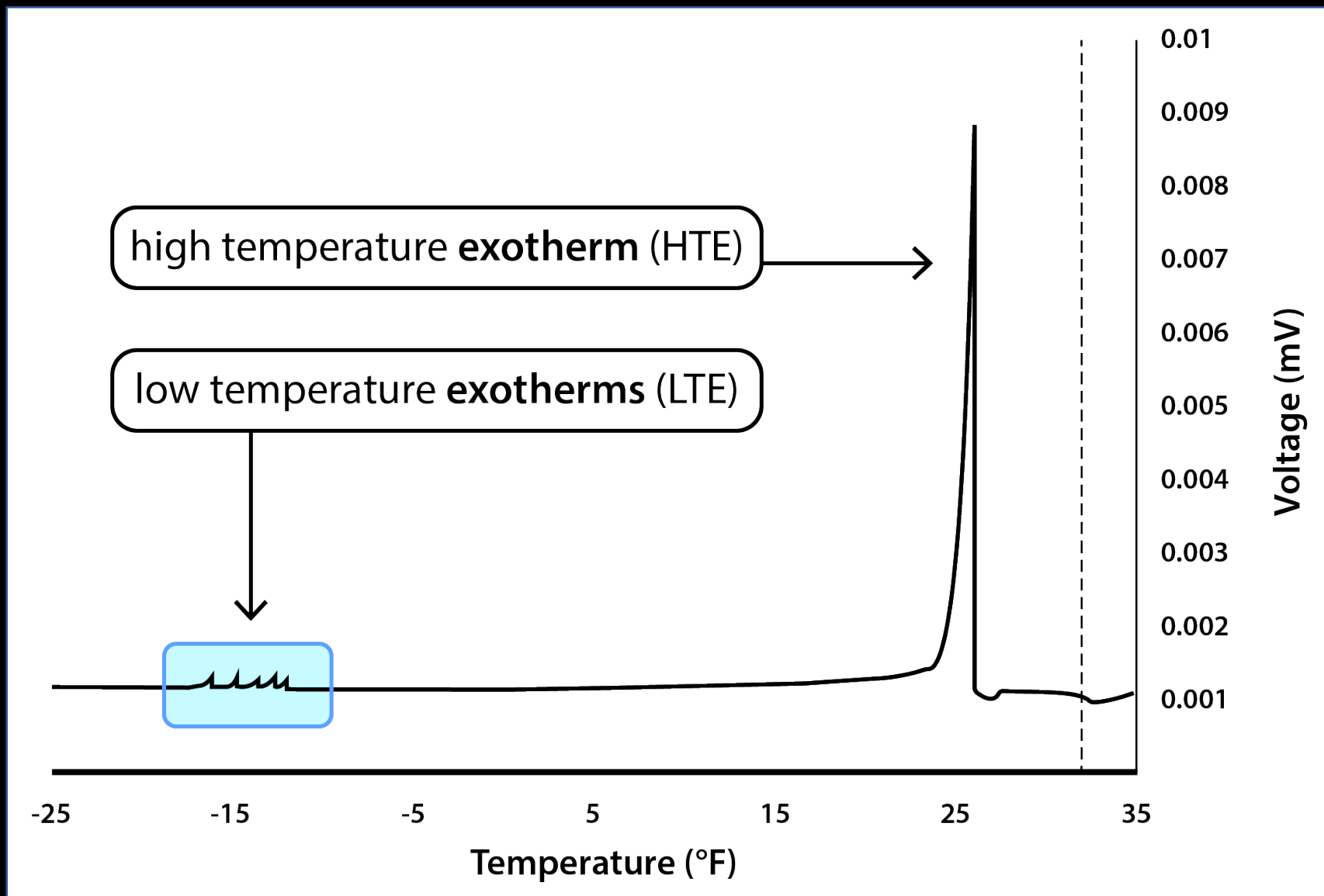
In a grapevine: **bud freezing = bud death**

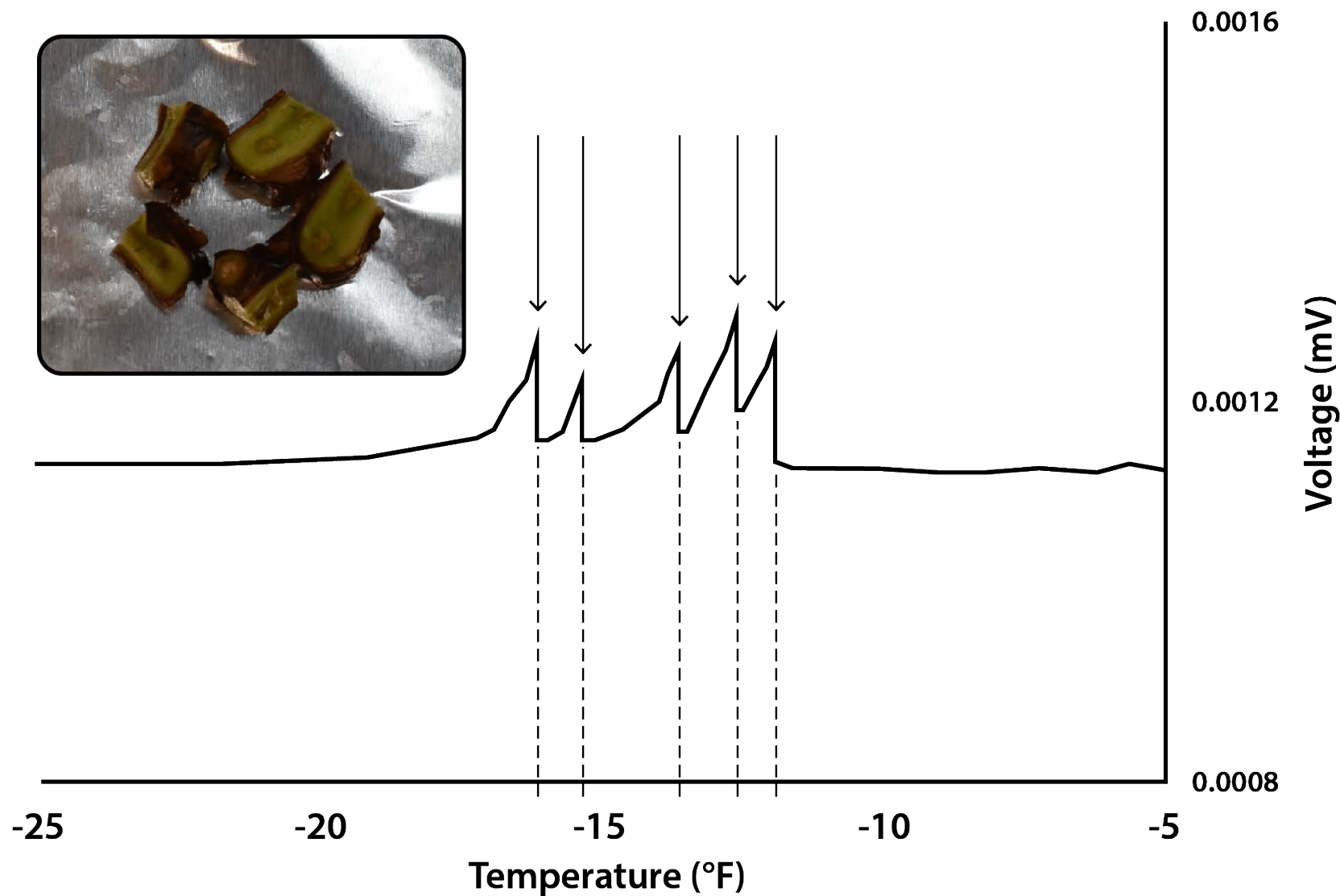
We can measure when a bud freezes using Differential Thermal Analysis

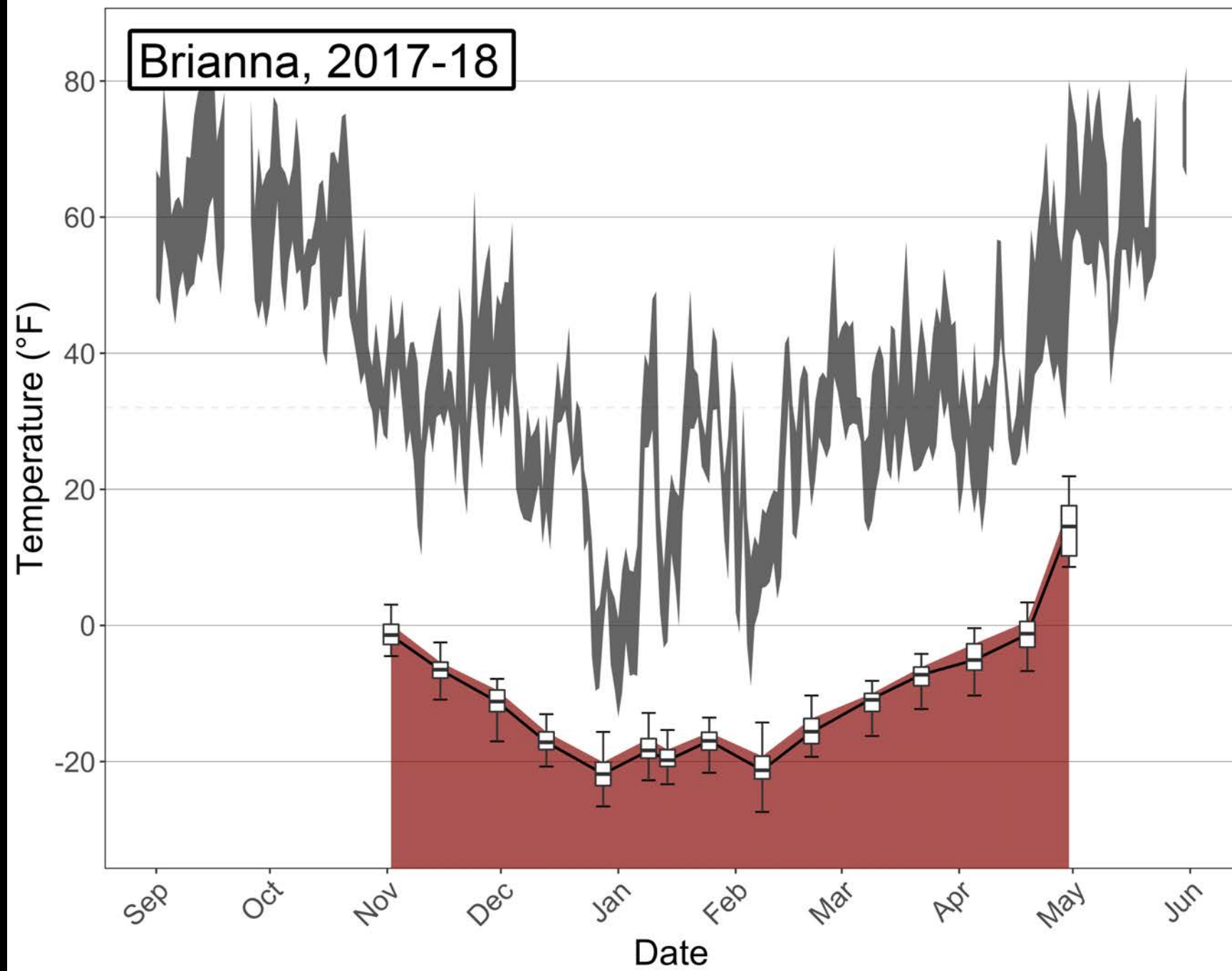


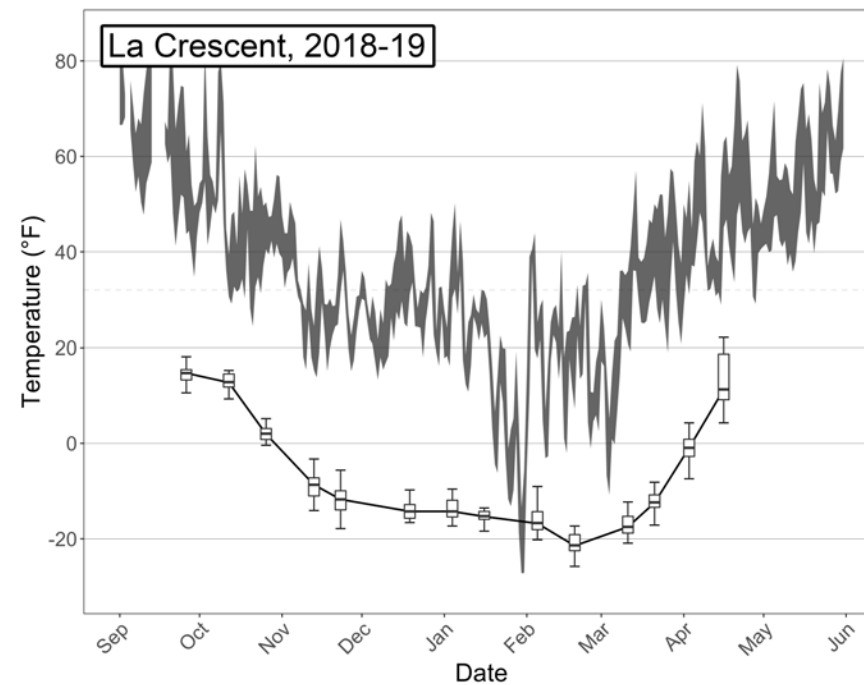
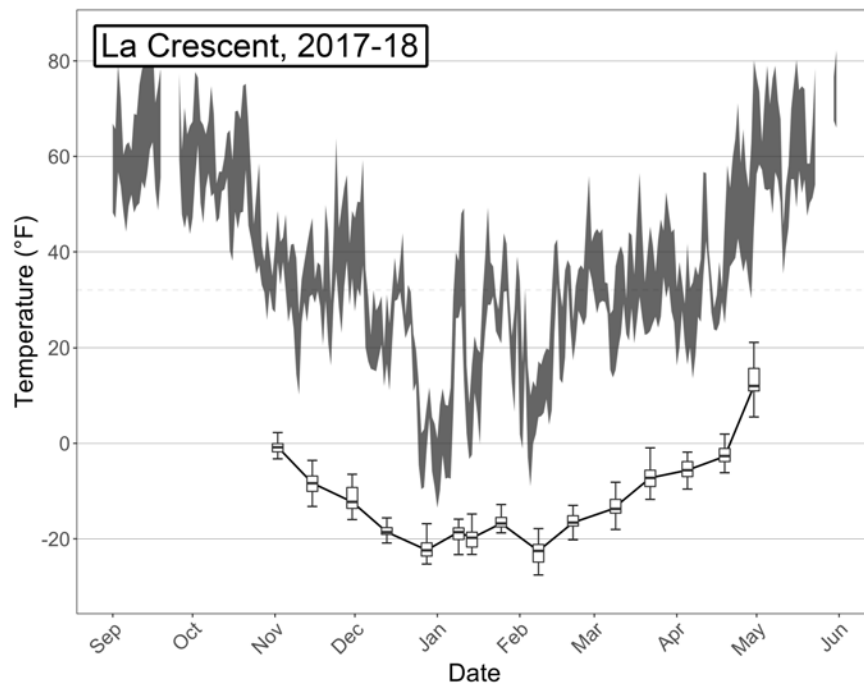
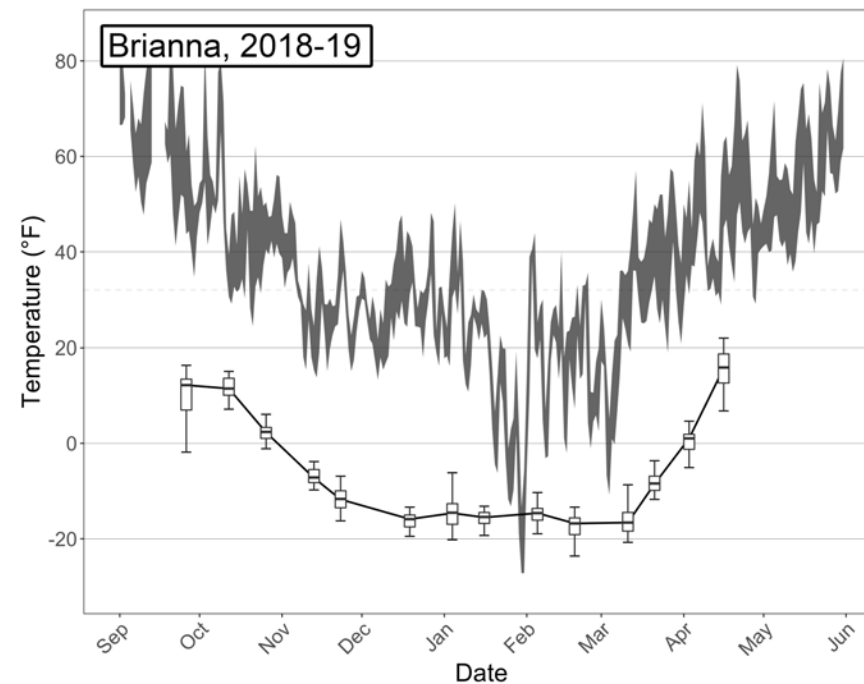
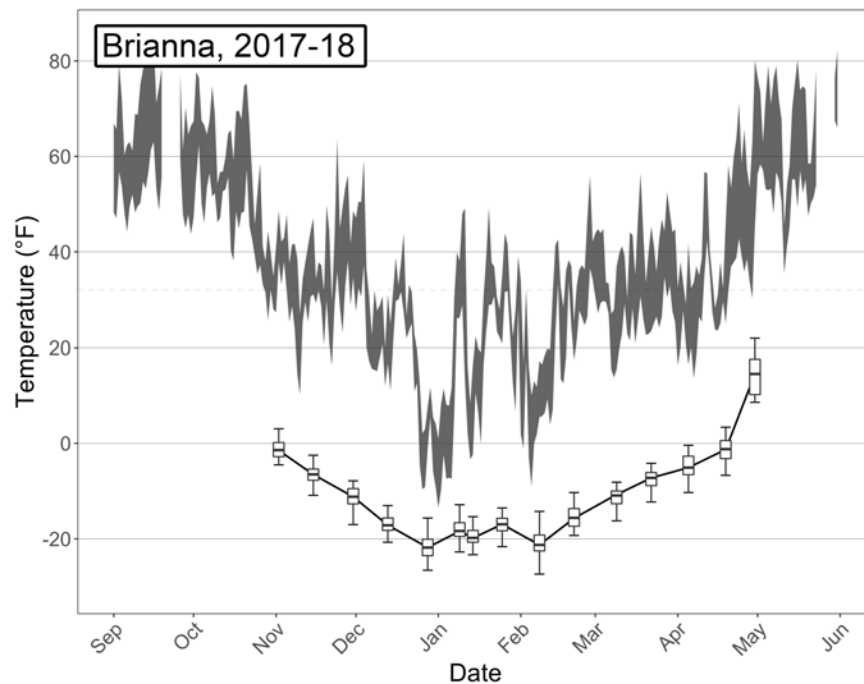
Differential Thermal Analysis

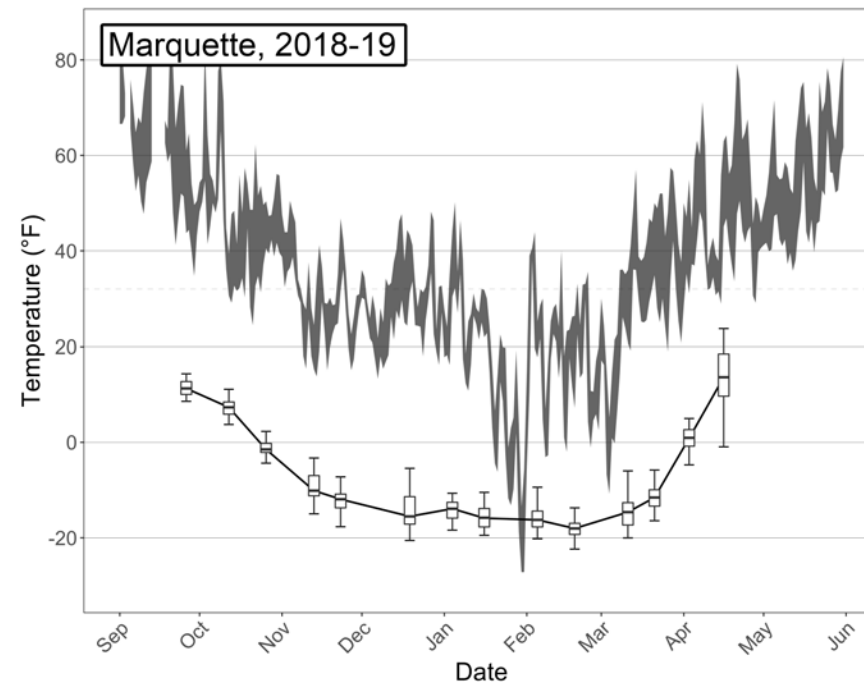
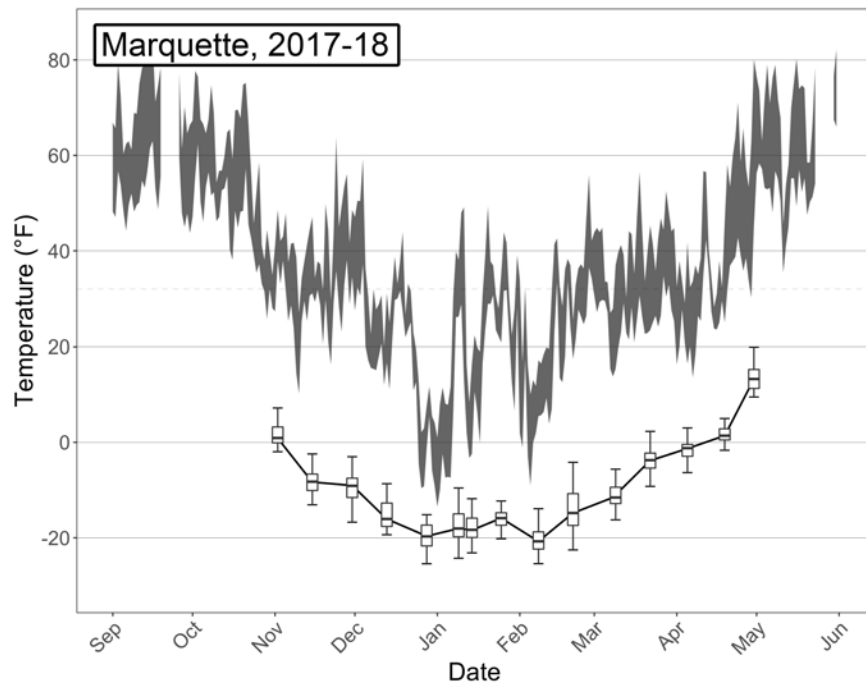
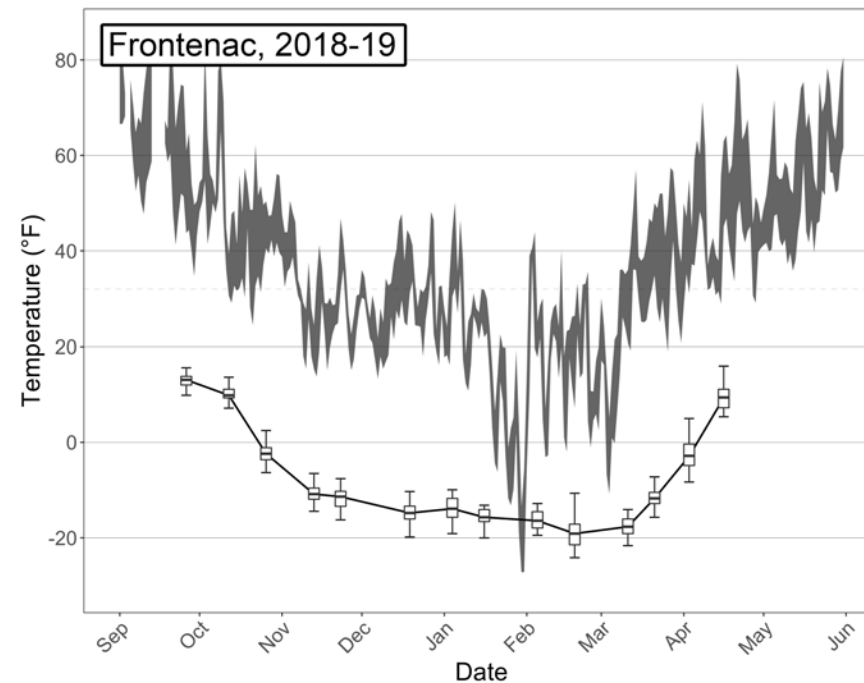
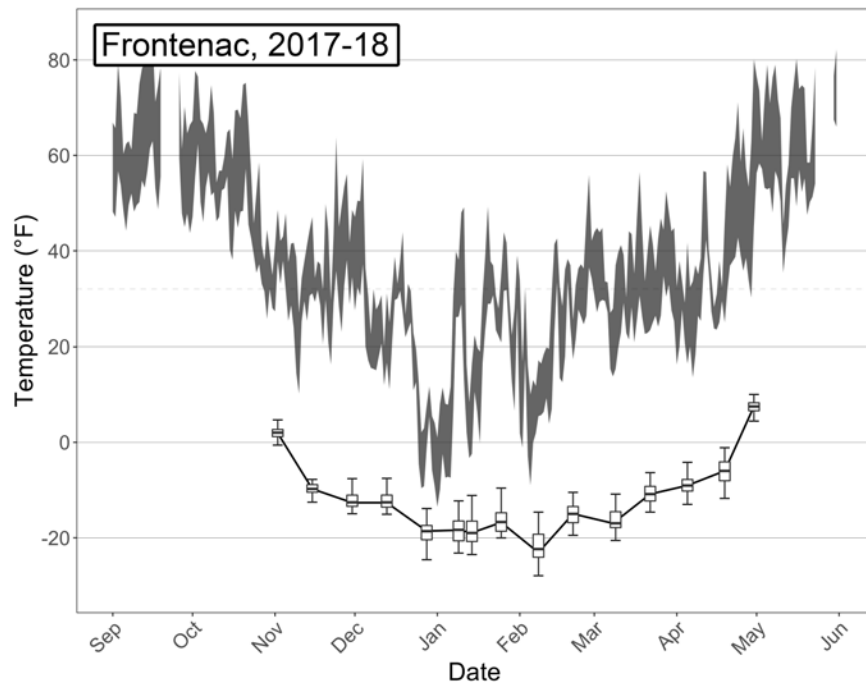


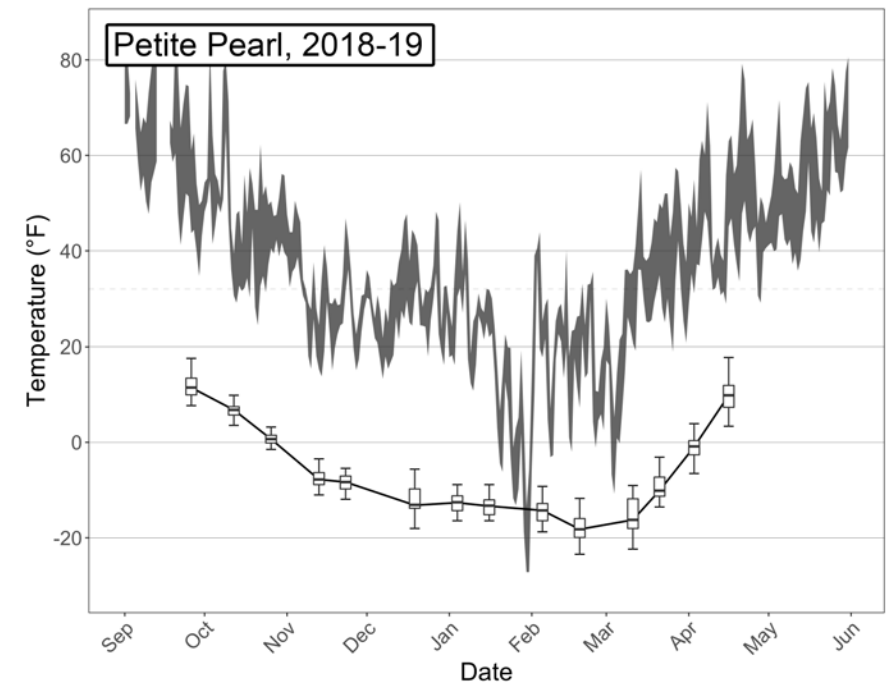
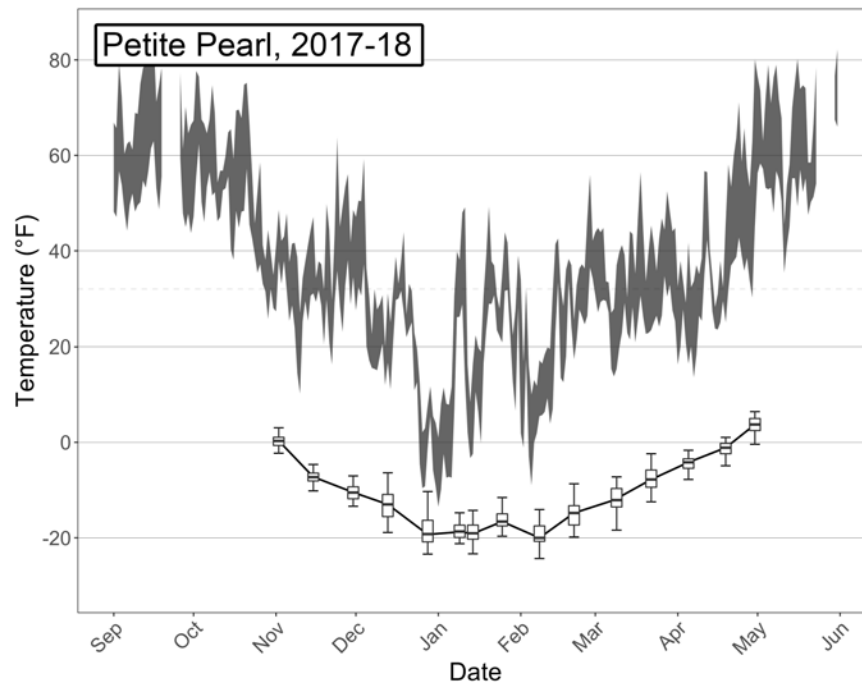








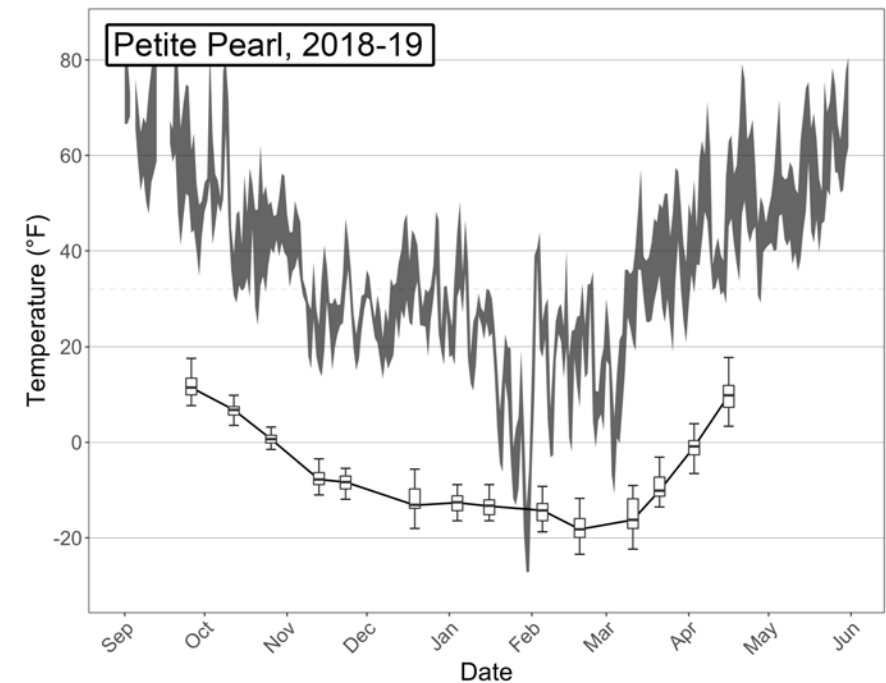
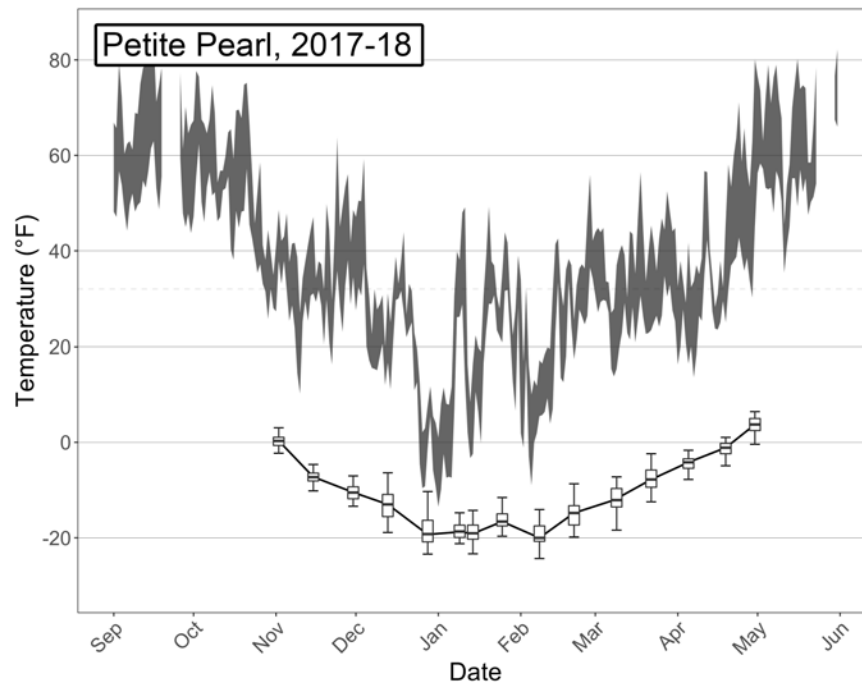




What can we do we do with this?

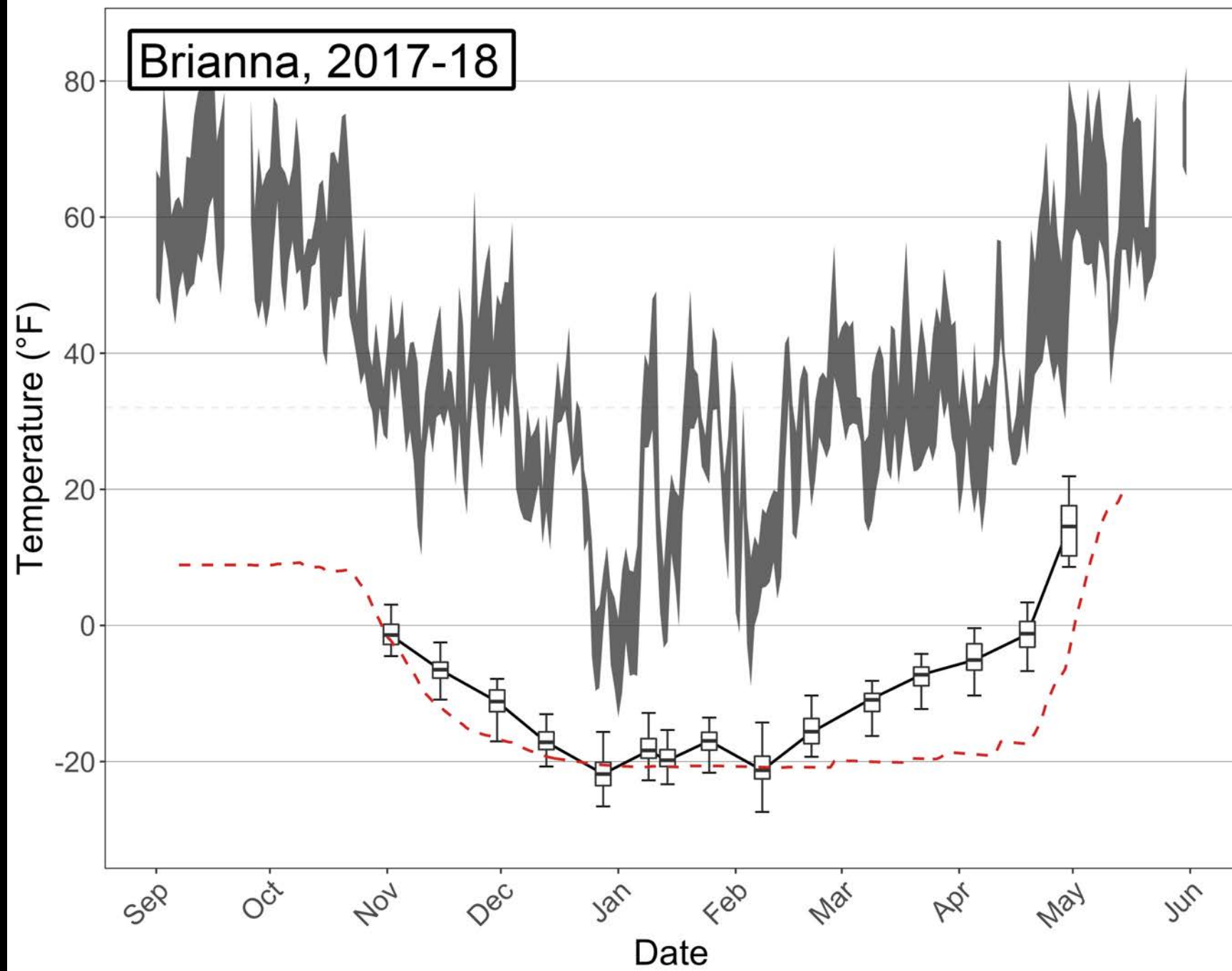
Characterize hardiness for each cultivar, including:

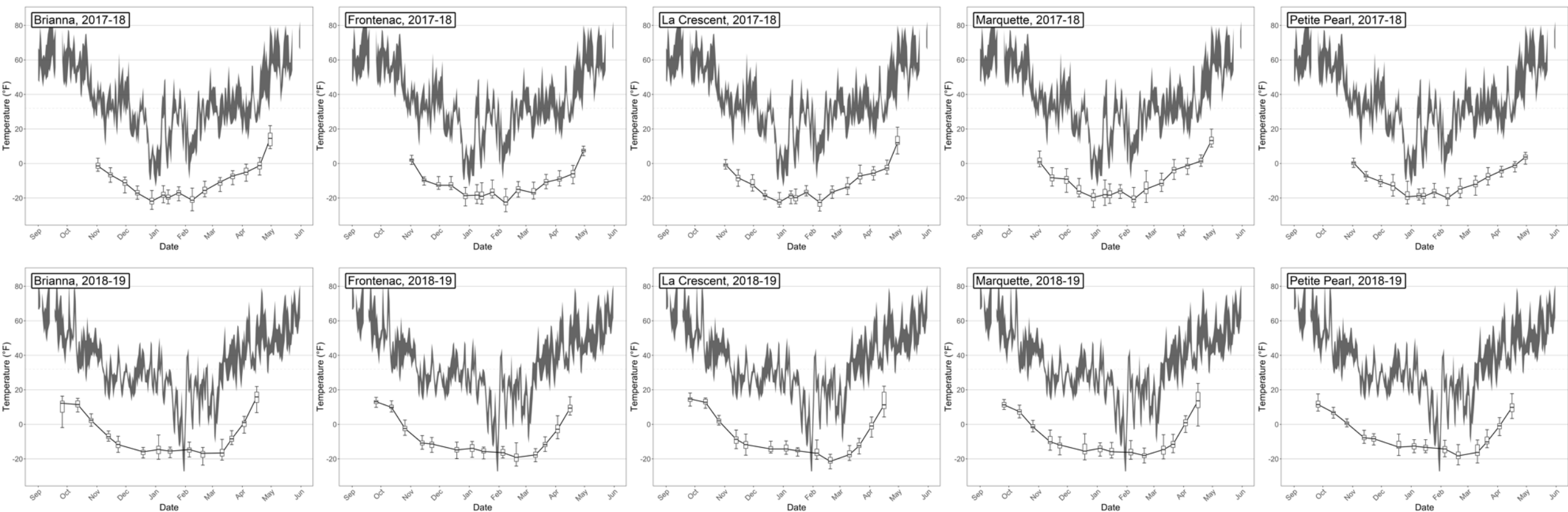
- acclimation in the fall
- maintenance of hardiness in midwinter
- deacclimation in the spring



What can we do we do with this?

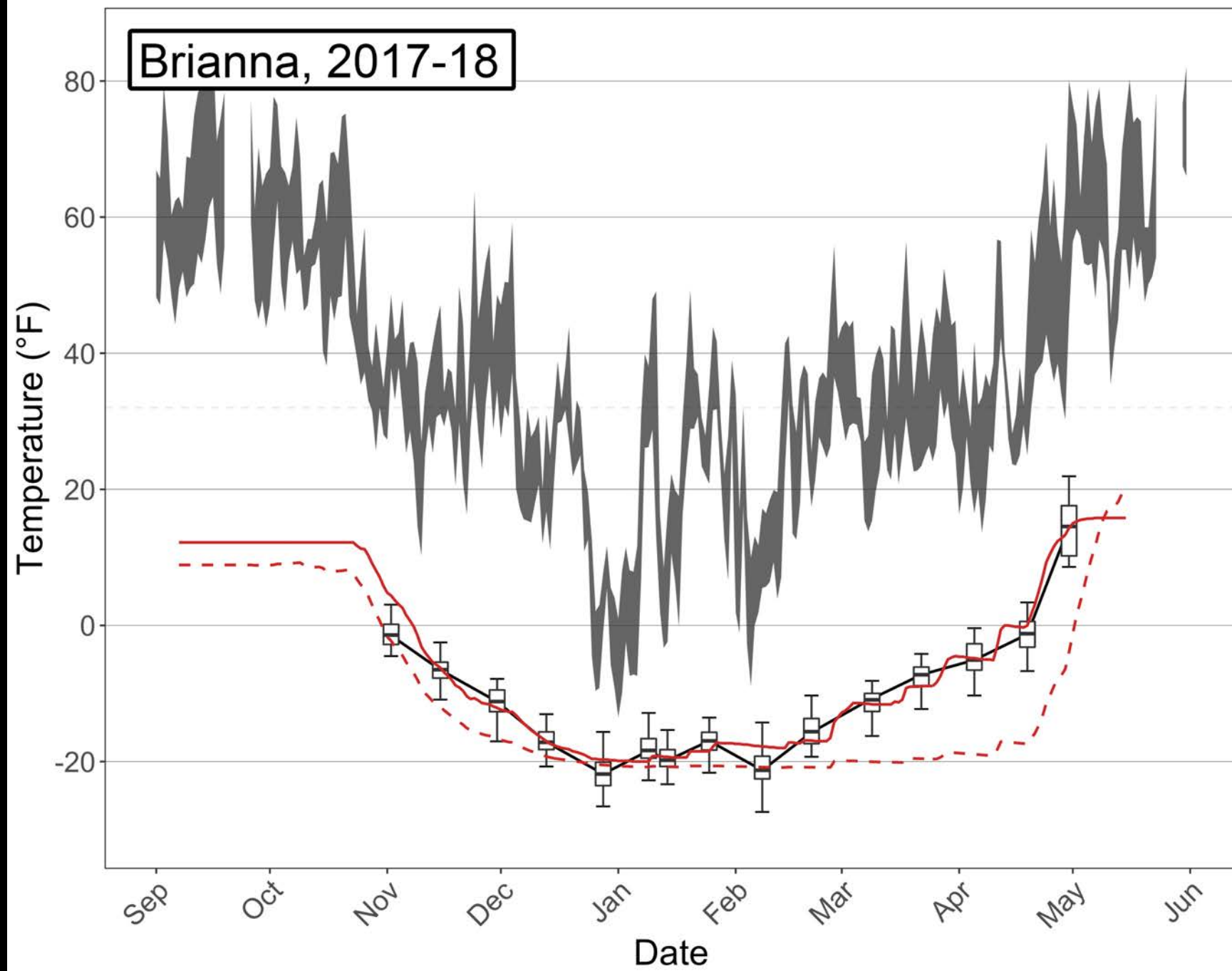
Calculate cold hardiness in Wisconsin using a model developed in Washington



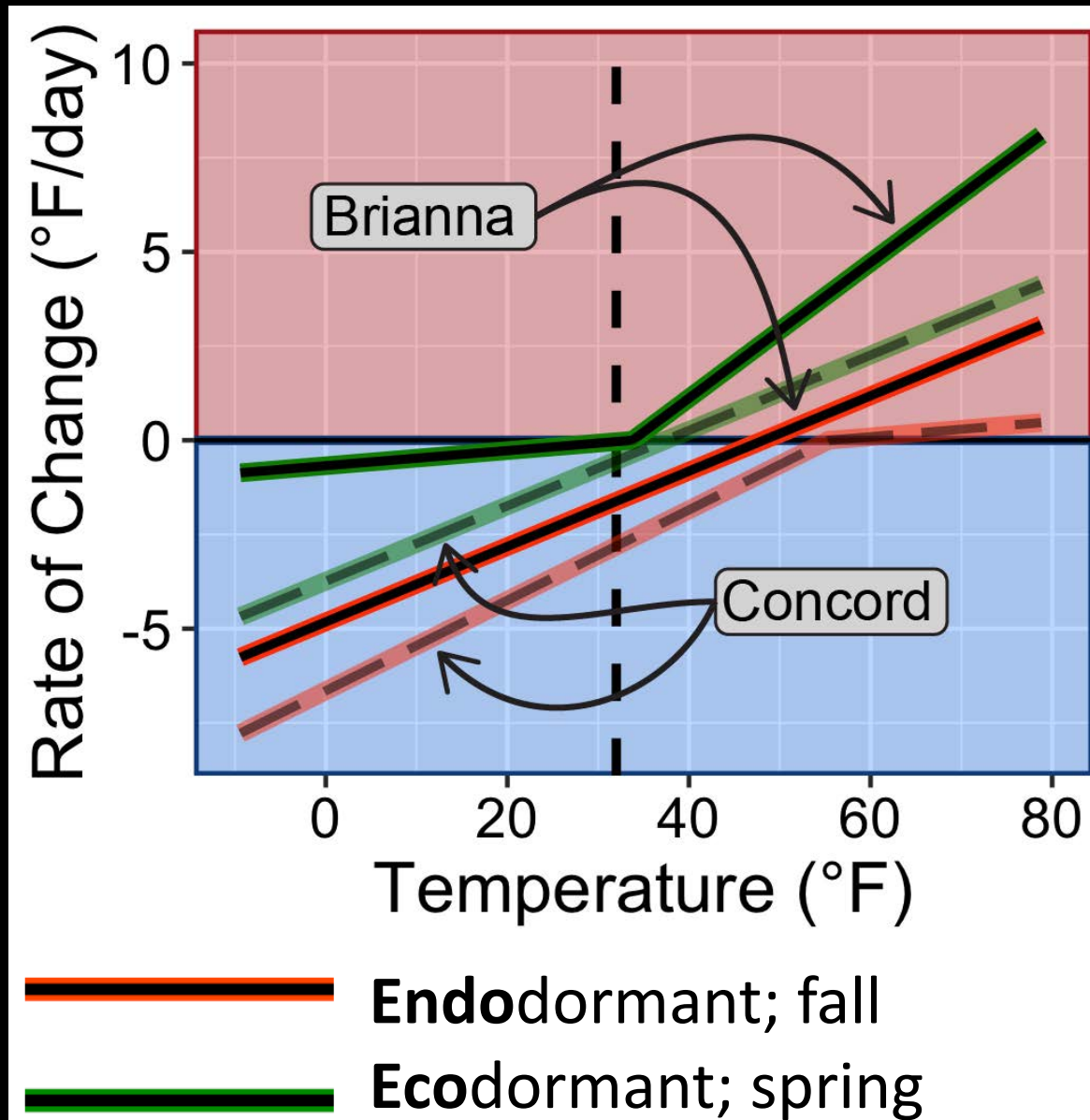
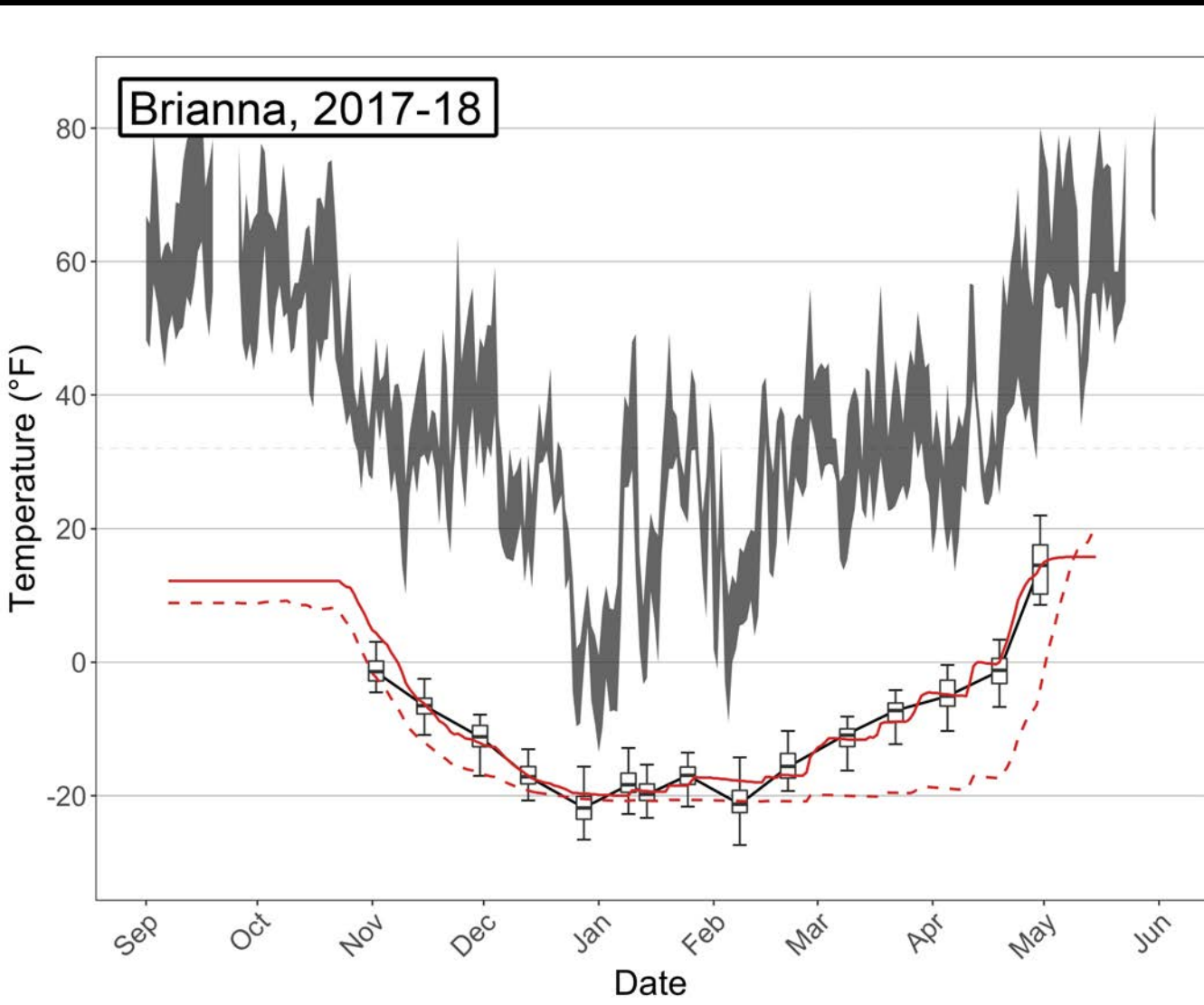


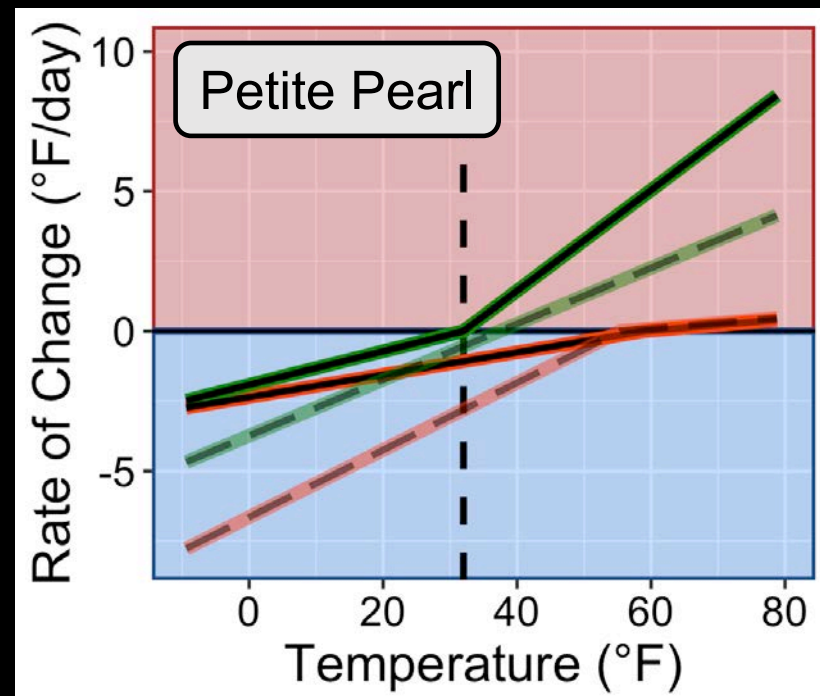
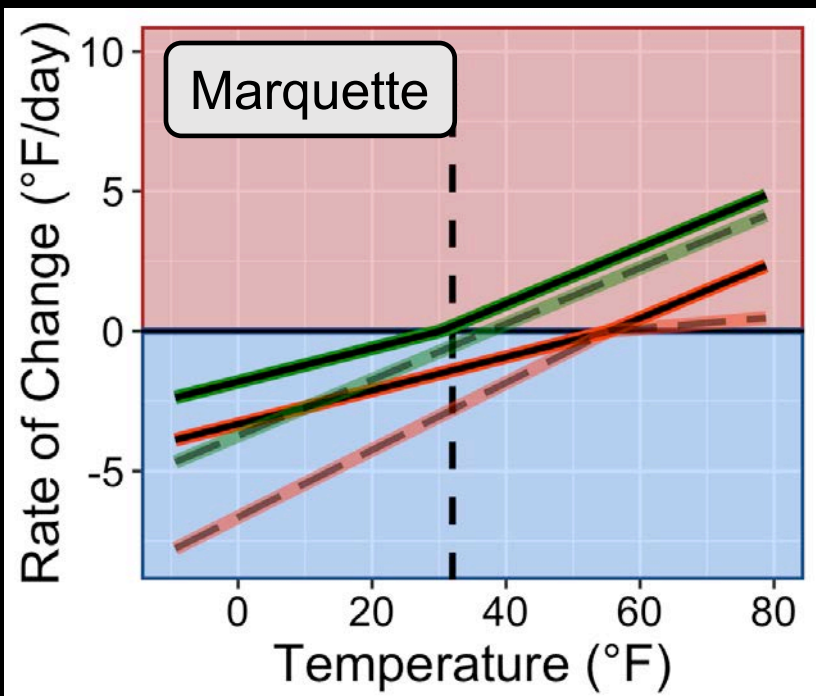
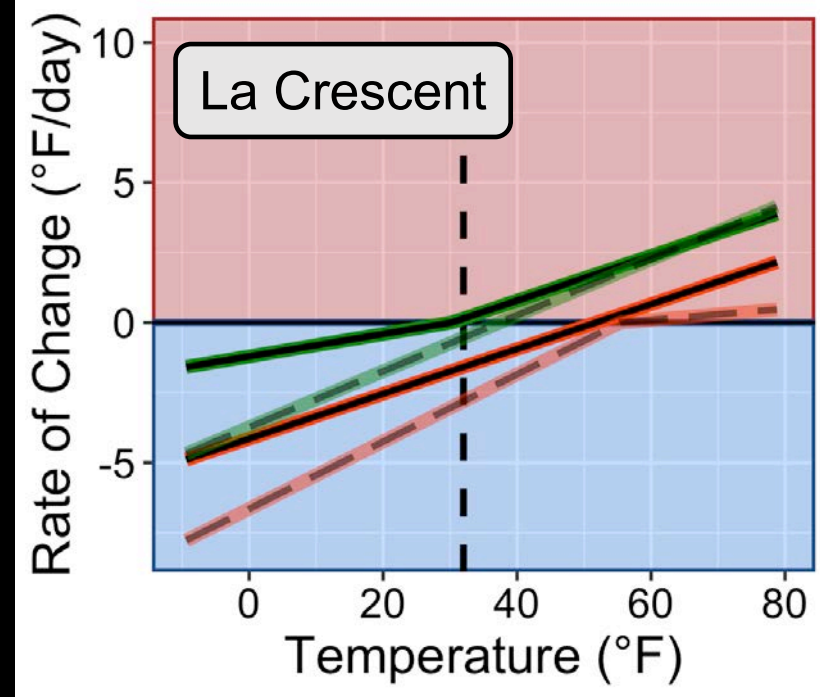
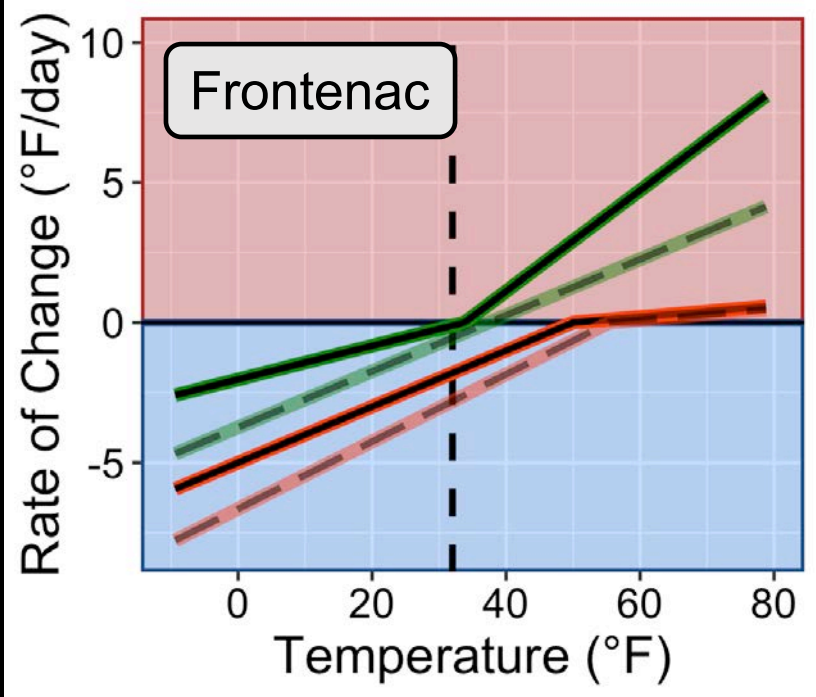
What can we do with this?

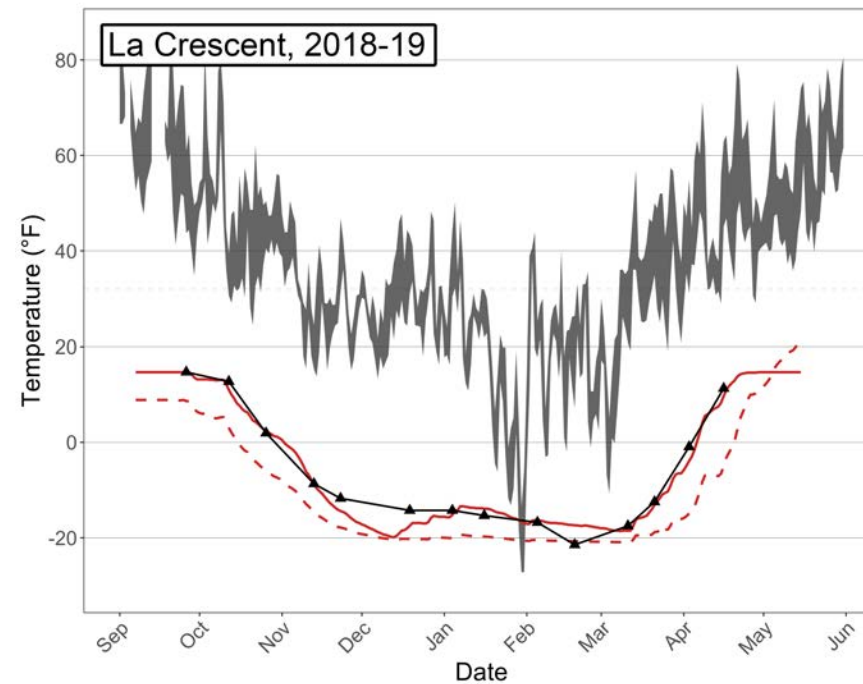
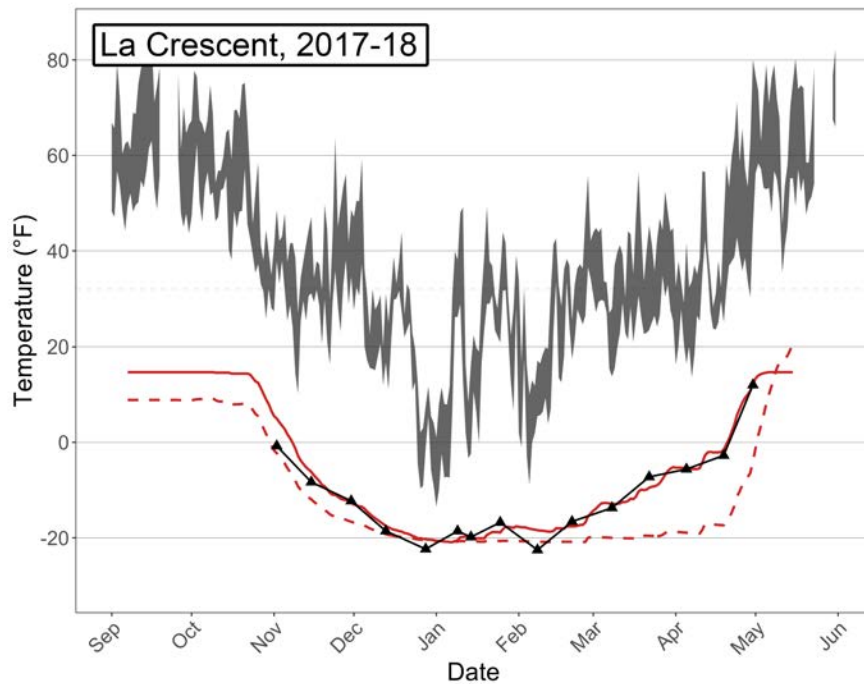
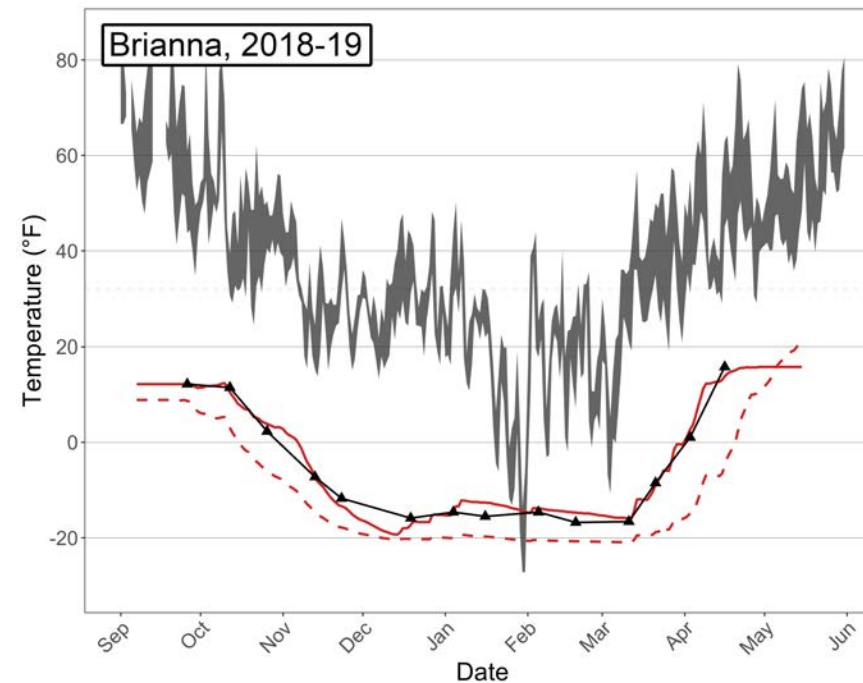
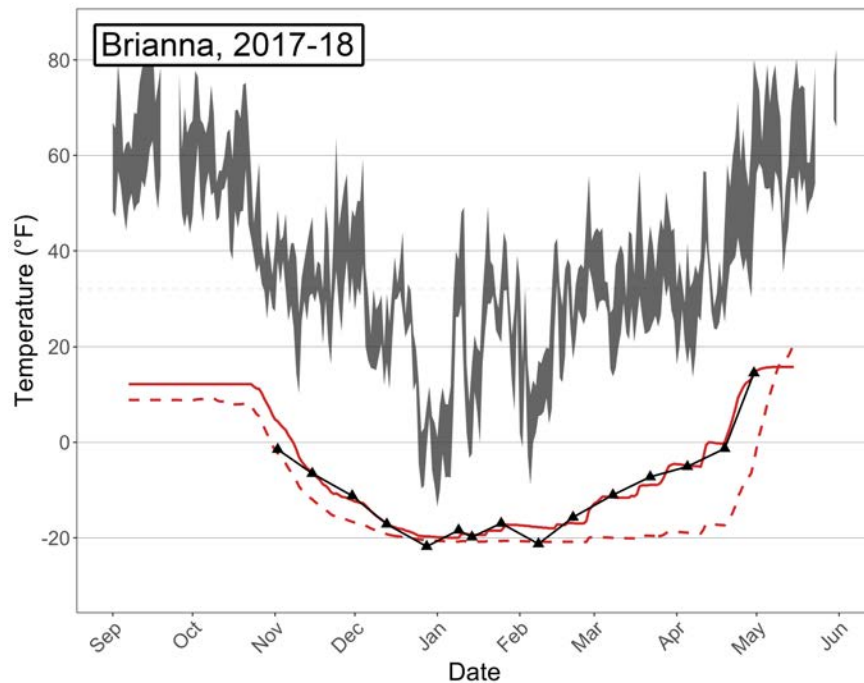
We can adjust the model using data from vines grown in Wisconsin as a reference.

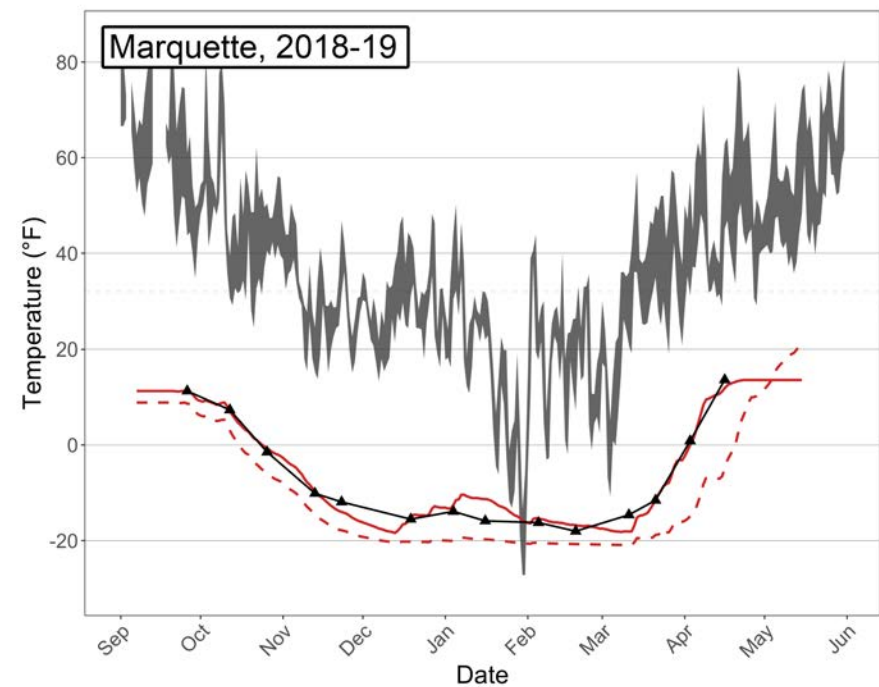
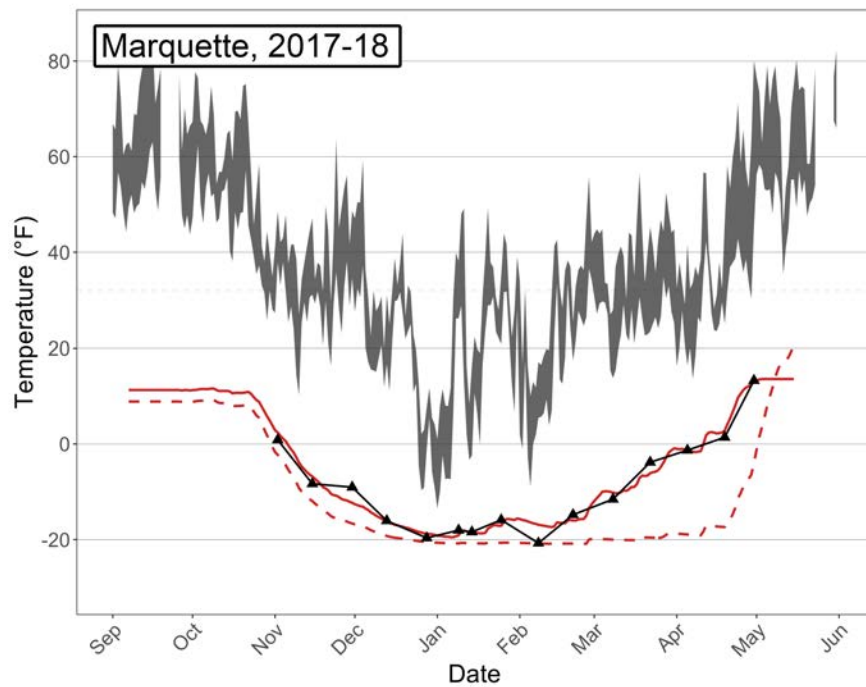
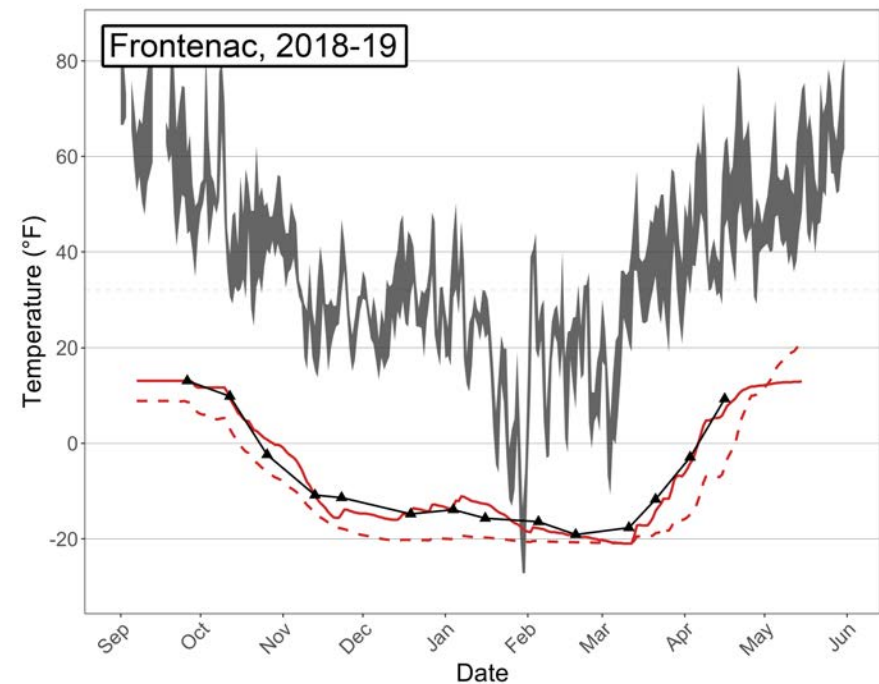
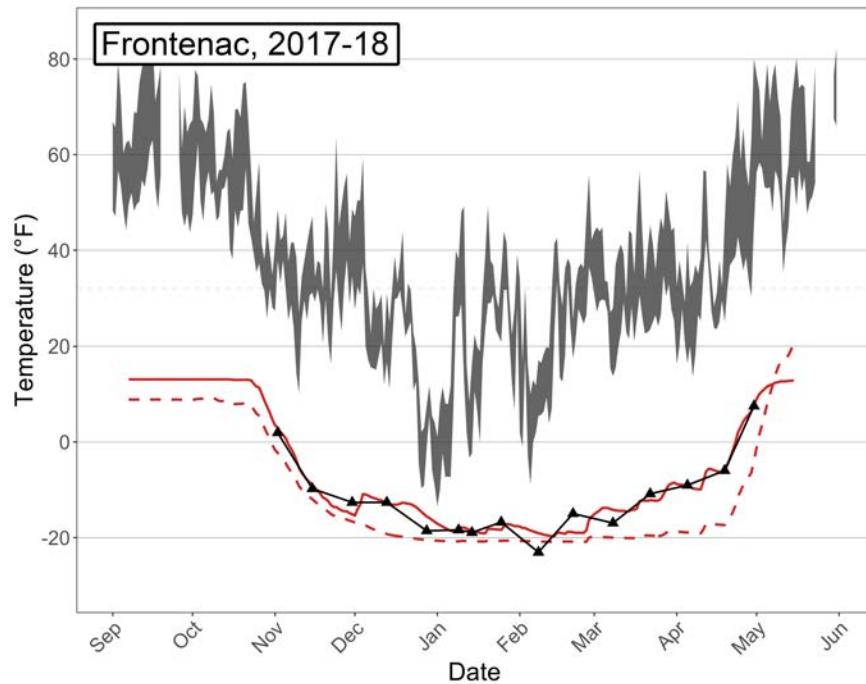


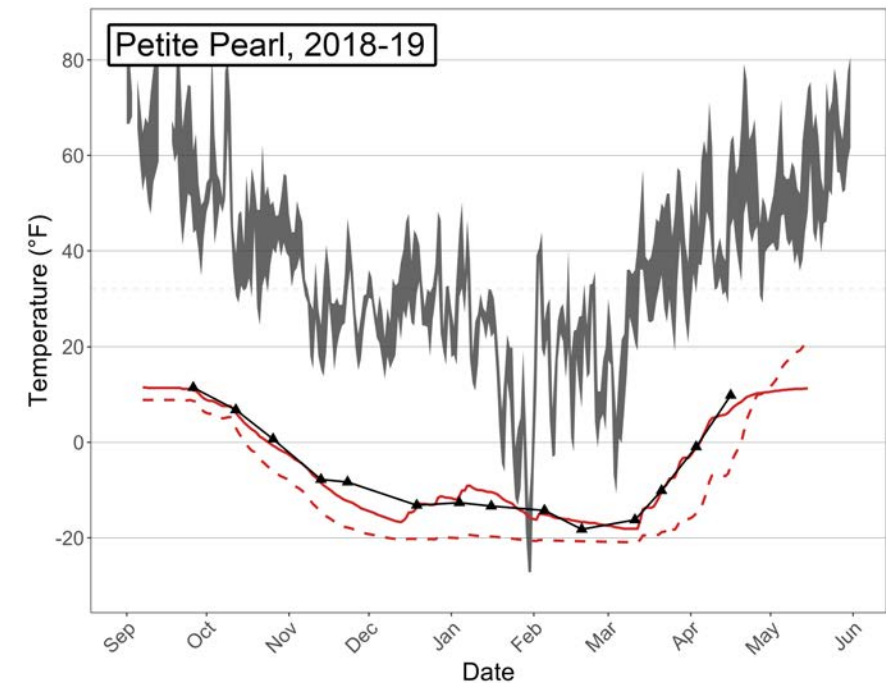
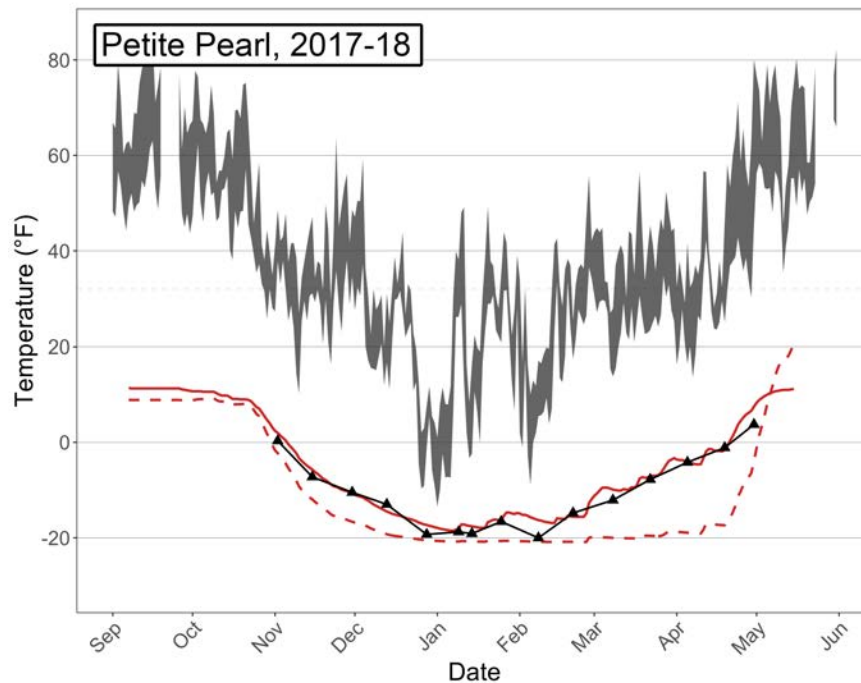
What is changing in the model?





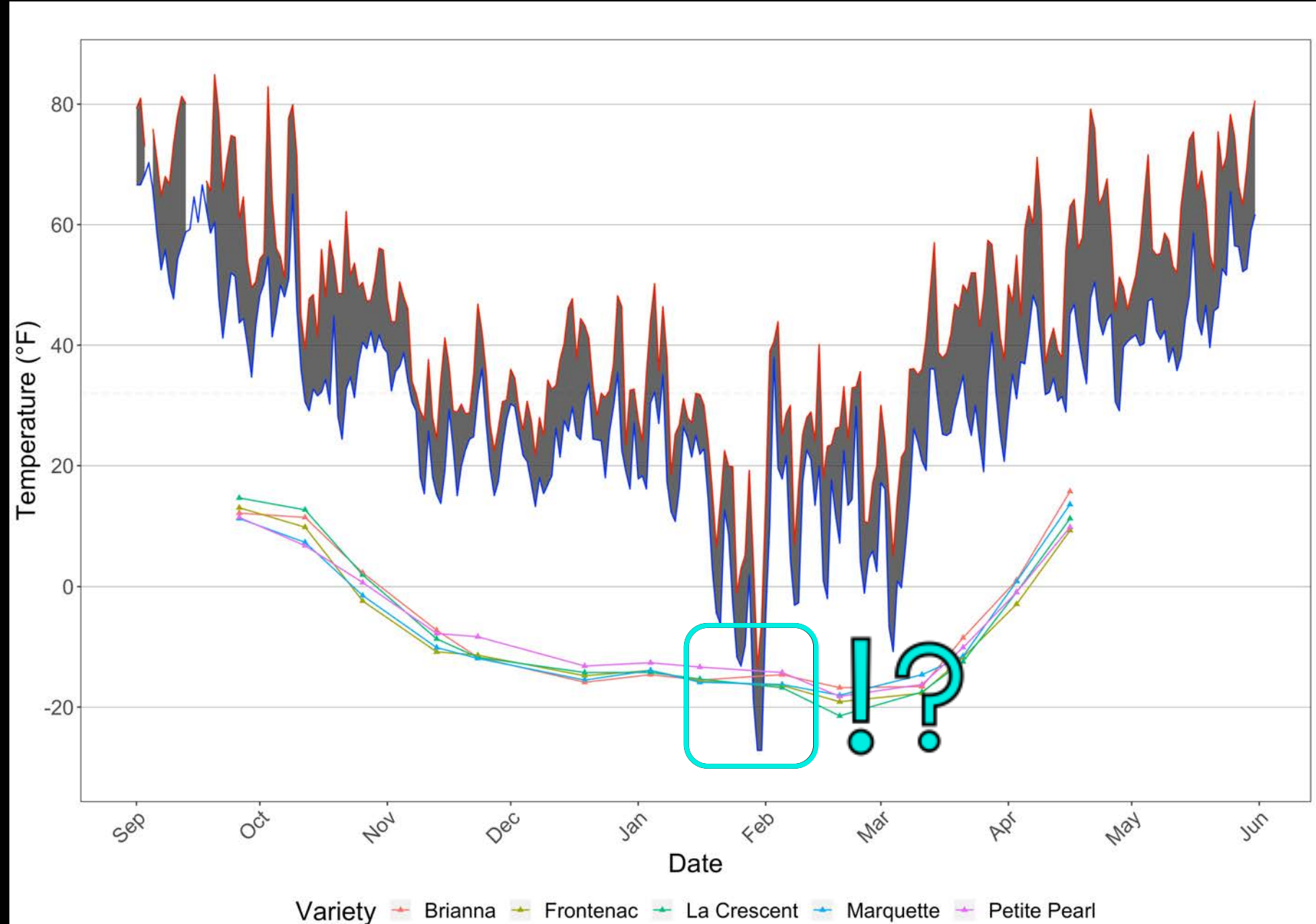




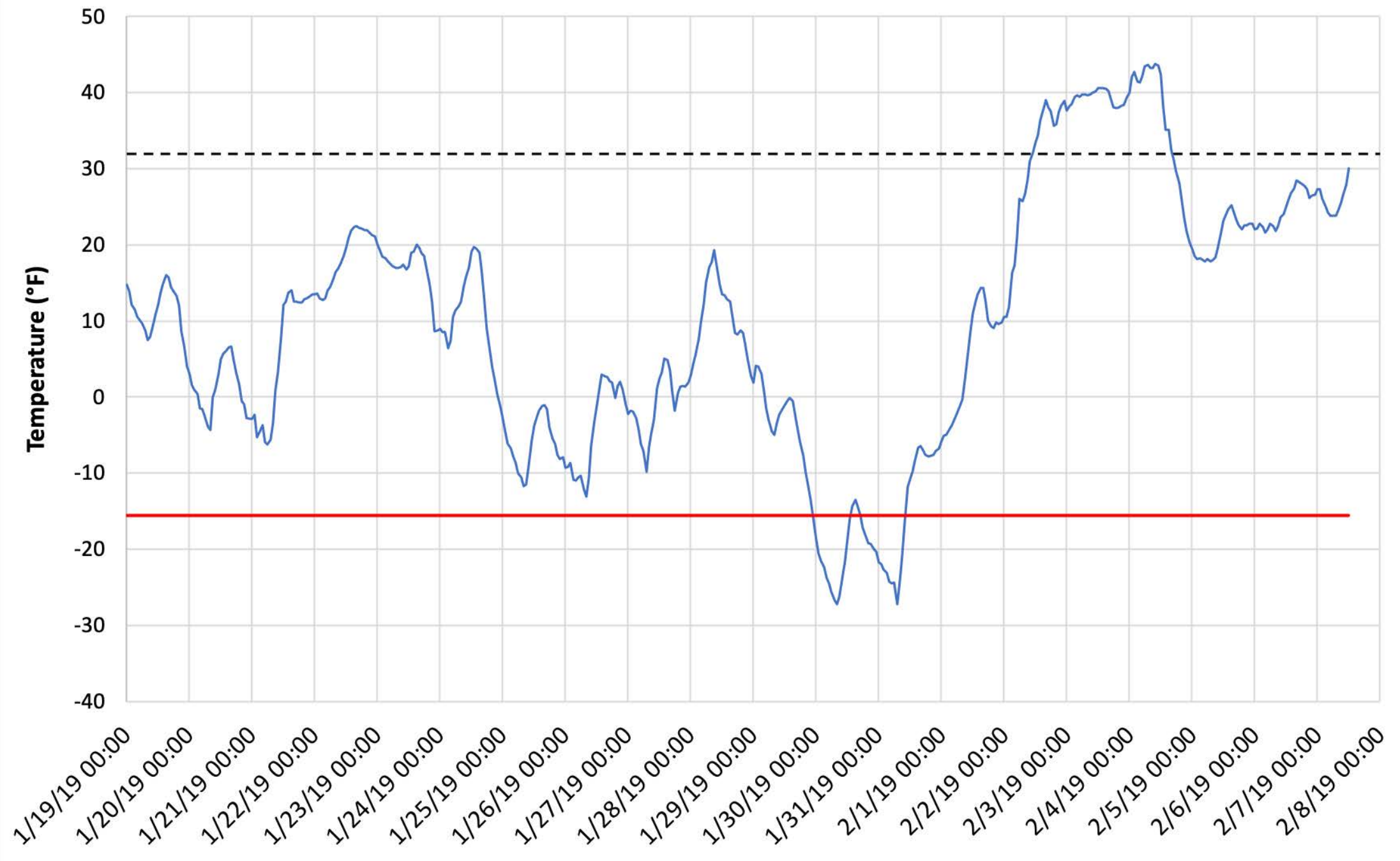


- The adjusted model calculates bud cold hardiness very well.
- But more data collected during varying winter conditions will improve its predictions in future winters.

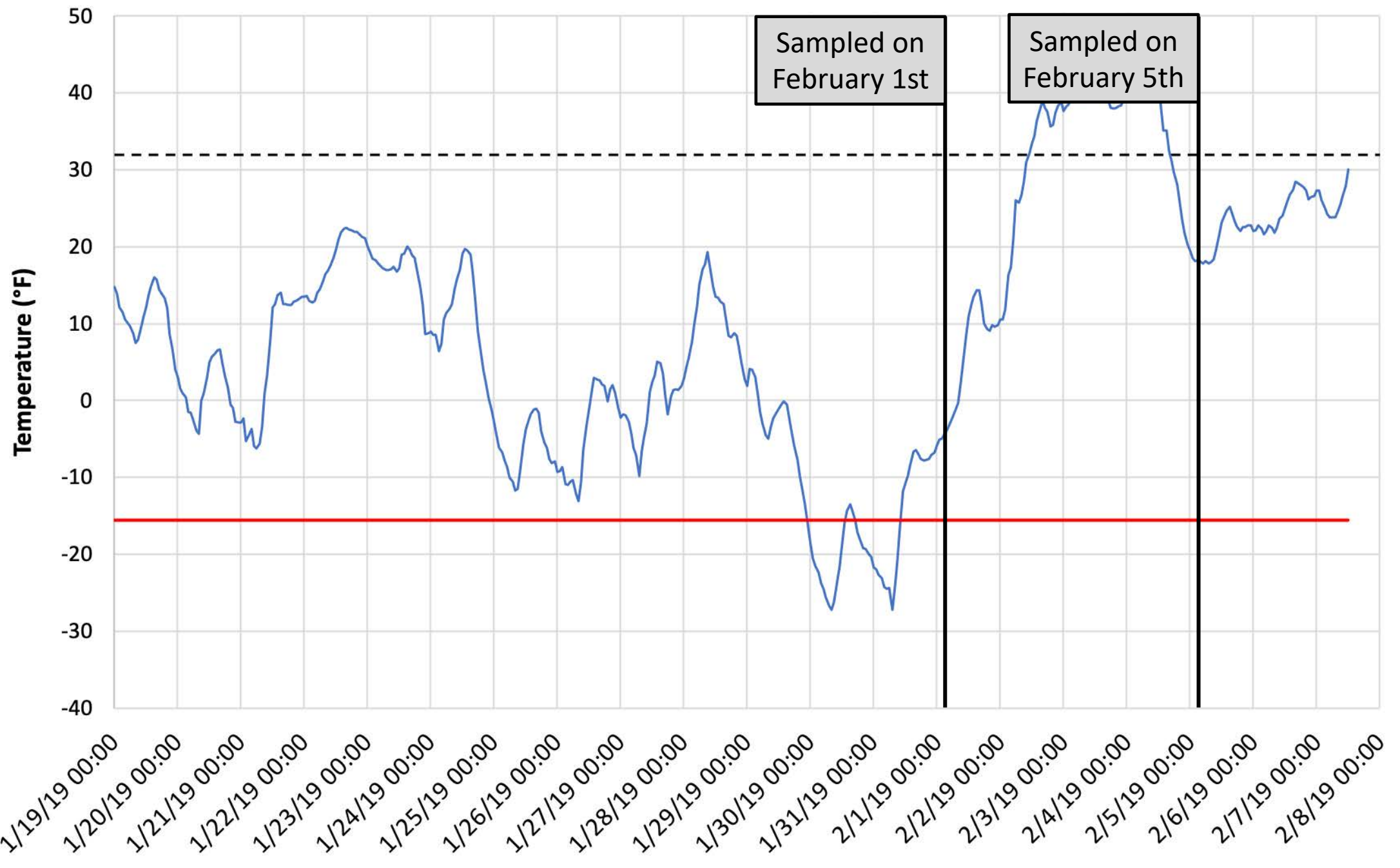
LT50 and Daily Maximum/Minimum Temperatures in 2018-19



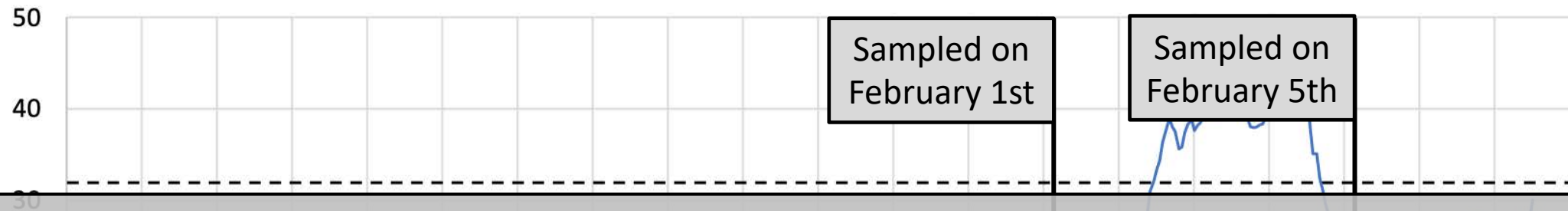
Hourly Temperature at WMARS from 1/19/19 to 2/7/19



Hourly Temperature at WMARS from 1/19/19 to 2/7/19



Hourly Temperature at WMARS from 1/19/19 to 2/7/19



Sample on 2/1:

- No LTE in DTA, worried there was severe damage
- Dissection showed 5-20% damage depending on cultivar

Sample on 2/5:

- LTE visible in DTA, things looked “normal”
- Dissection showed similar damage as on 2/1

Hypothesis: Cold air dehydrated buds to the point that DTA couldn't detect LTEs. This dehydration might have protected the buds from intracellular ice forming during the polar vortex temperatures.





Summary

1. Continuing to measure seasonal variation in grapevine bud cold hardiness with DTA
2. Adapting the cold hardiness model for use with hybrids in Wisconsin's climate
3. Grapevines are resilient!
*Future work will target deacclimation and dormancy requirements for better predicting

Acknowledgments

TO THE MARVELOUS ATUCHA LAB!



Dr. Amaya Atucha



Dr. Beth Ann Workmaster



Camilo Villouta



Pedro Rojas



Hanna McIntosh



Becca Honeyball



Gus Sinclair



Lily Zander



Andi Nelson

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Thank you for your attention! Questions?

LT50 and Daily Maximum/Minimum Temperatures in 2019-20

