

Blueberry cold tolerance: What we know and what we don't know

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The sunshine state is not always warm

Below-freezing temps hurt Florida blueberries. Still, winter warmed by a degree

WUSF | By Jessica Menzies
Published March 26, 2026 at 7:00 AM EDT

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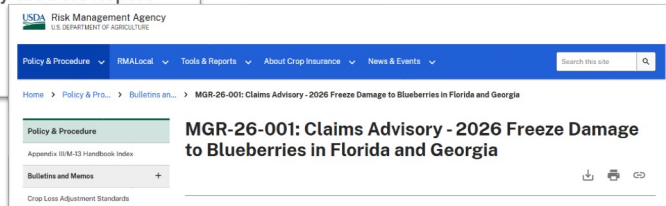


Severe Freeze Damages Florida Citrus, Blueberries
Featured - February 12, 2026

Industries Assess Damage; Some Blueberry Growers Report Devastating Losses

by PAUL CATALA

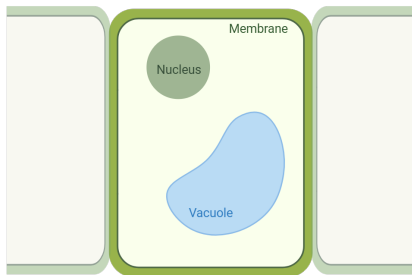
photos provided by MIKE ROBERTS, RAY ROYCE, KYLE STRAUGHN & RYAN ATWOOD



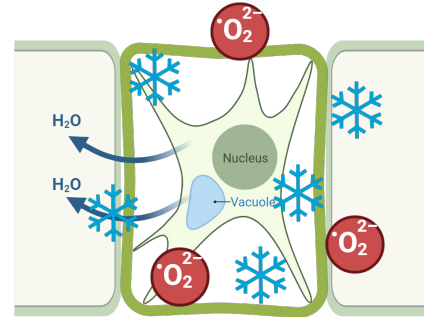
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Freezing temperatures dehydrate cells, break cell membranes, and cause oxidation

Temperature: $>0^{\circ}\text{C}$ or $>32^{\circ}\text{F}$

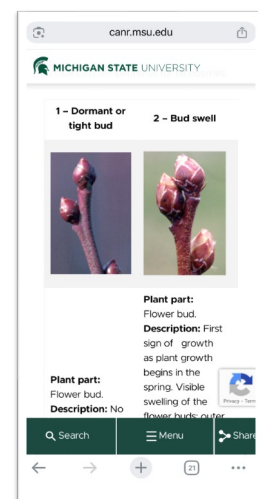
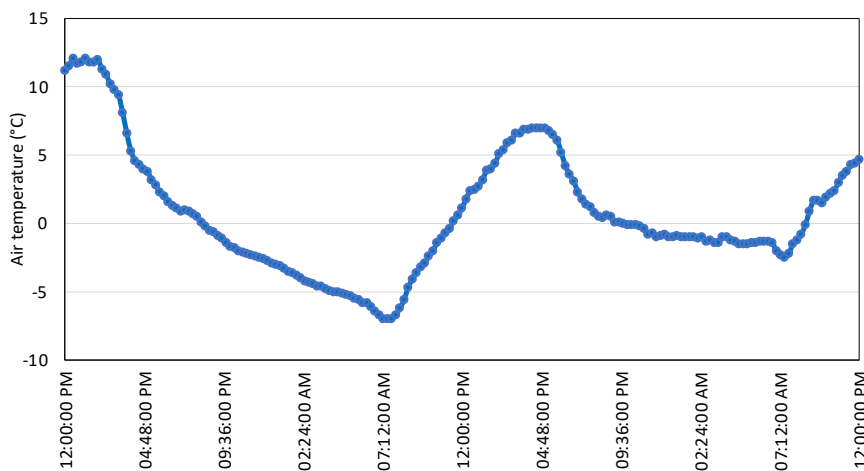


Temperature: $<0^{\circ}\text{C}$ or $<32^{\circ}\text{F}$



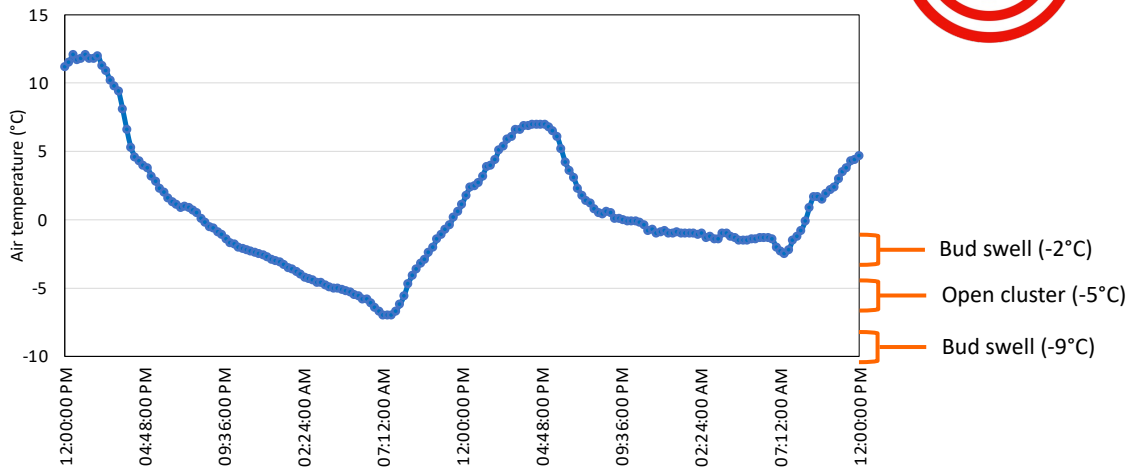
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There is an old idea out there



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There is an old idea out there



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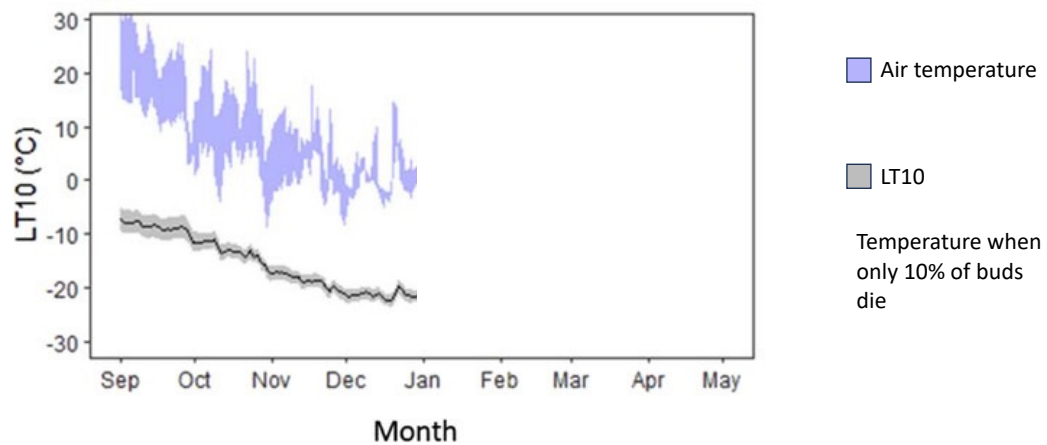
So why do critical temperatures not work?



- Cold tolerance
- Cold acclimation
- Cold deacclimation
- Phenology

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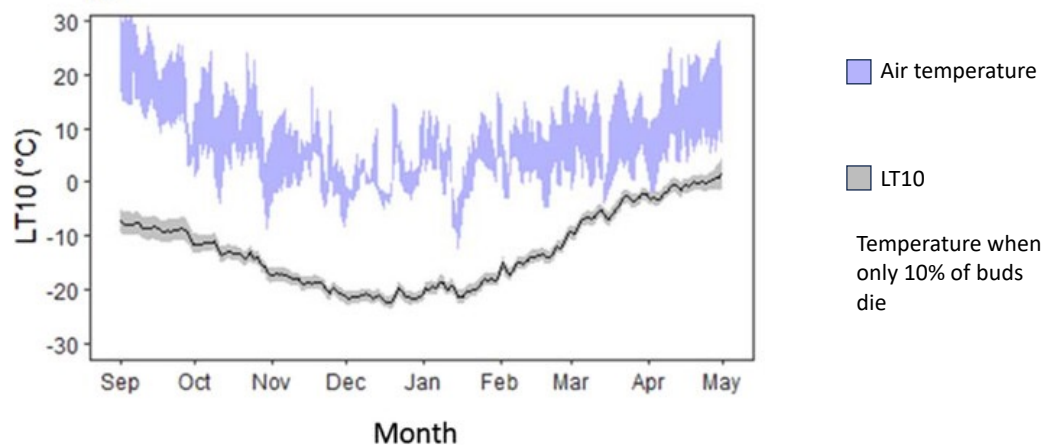
Plants acclimate to cold in the fall and winter



Kogan et al. (2023) *HortScience*

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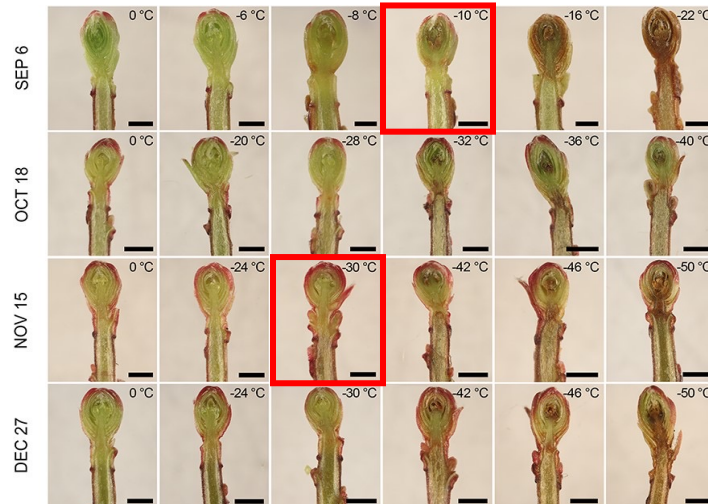
Plants deacclimate in the spring



Kogan et al. (2023) *HortScience*

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LT_{10} in September are not the same as LT_{10} in December



Villouta et al. (2020) *Tree Phys.*

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Temperatures before the freeze event affect bud survival



$$CH = -31.3 + (0.26 \times \sigma_{Tmin}) + (0.14 \times \sigma_{Tmax})$$

↓
Cold hardness

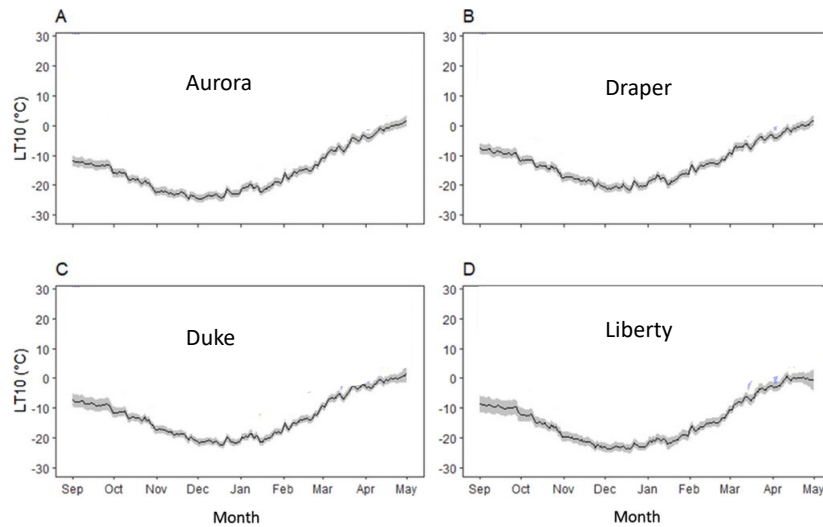
↓
Minimum
temperatures during
10 days prior to the
freeze

↓
Maximum
temperatures during
10 days prior to the
freeze

Villouta et al. (2020) *Tree Phys.*

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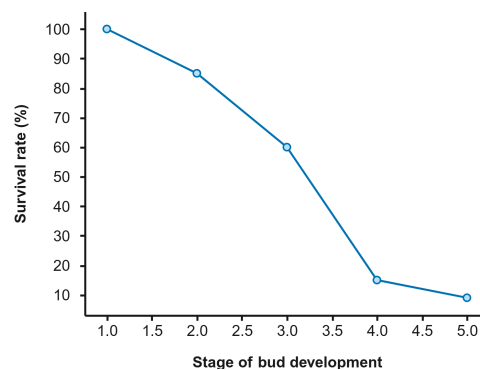
The rate of acclimation and deacclimation is *different* in each variety



Kogan et al. (2023) HortScience

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Cold tolerance also depends on phenology



Hardier $\longrightarrow$ Least hardy

Patten et al. (1991) HortScience

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Specific needs:

- 1) Crop- and phenology- specific freezing thresholds.
- 2) Pruning practices that expedite recovery.

Awarded:

- USDA AFRI Rapid Response to Weather Events

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Our workplan for the next 24 months

Activity 1

Identify critical temperatures (LT_{10}) for southern highbush blueberry 'Optimus', 'Sentinel', and 'Sharper'.

- Update information with new varieties.
- Model cold hardiness in southern highbush blueberry.

Activity 2

Evaluate pruning practices as a freeze damage recovery strategy.

- What to do after a damaging freeze.

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We set up a trial to investigate pruning practices



Plant material:

- ‘Sentinel’ SHB
- ‘Optimus’ SHB

Treatments:

- T1: Control
- T2: Mechanical hedging (70 cm)
- T3: Selective pruning (damage removal)

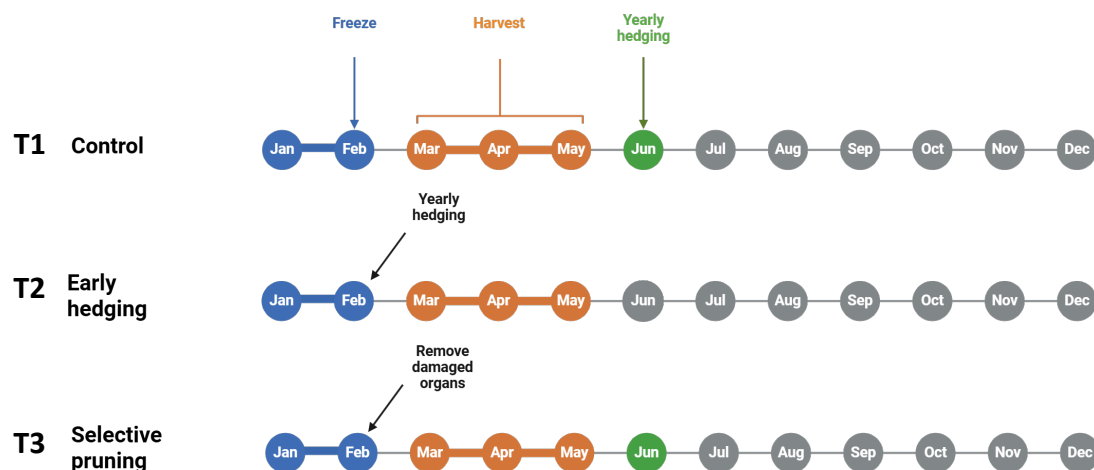


Experimental design:

- CRD

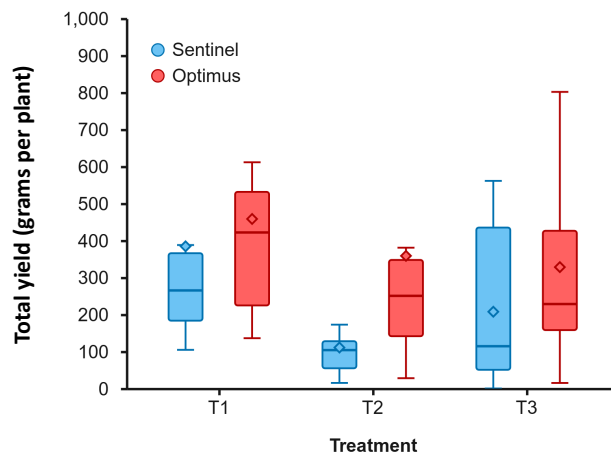
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This were the three treatments we applied



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Pruning did not have a significant effect in the same season



- T1: Control
- T2: Early hedging
- T3: Selective pruning

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