

2009

## Research Update Meeting 2009 - Frost Tolerance

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### Recommended Citation

DeMoranville, Carolyn J., "Research Update Meeting 2009 - Frost Tolerance" (2009). *Cranberry Station Extension meetings*. 36.  
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# Frost Tolerance

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# Frost Protection

## Basics of sprinkler protection

- How sprinkling works
  - Heat of fusion as water freezes
  - Balance rate of application with rate of freezing
  - Must stay wet!! (ice should be CLEAR with water dripping)
  - What about when no ice forms? – cooling water releases heat even if it doesn't freeze

# Frost Protection

## Basics of sprinkler protection

- When to start
  - 1-2° above tolerance
  - If manual turn-on alarm usually is set even higher

# Frost Protection

## Basics of sprinkler protection

- When to stop
  - When ice begins to melt
    - if wind picks up and melting stops -- evaporation can be a problem (heat loss is more than with melting)
  - Sun on the plants
  - Both usually by 7:30 a.m.
  - Above tolerance by 3+ degrees

# Notice that all of this depends on knowing the TOLERANCE

- Plants freeze below 32°F (they aren't pure water)
- How much below?
- Plant tissue can supercool – how much depends on the developmental stage and how succulent the tissue is (how much water and how 'soft')

# What is the tolerance

- Temperature that the plant can cool to without ice forming in the cells
- Changes during development
- Tolerance temp increases in the spring and decreases in the fall (always 30 °F or less)

# Determine using visual cues

- Spring
  - Appearance of the bud
  - $<18^{\circ}\text{F}$  to  $29.5^{\circ}\text{F}$
- Fall
  - Color of the fruit
  - $28^{\circ}\text{F}$  to as low as  $20^{\circ}\text{F}$





# Tolerance is site specific

- You must scout
- Spring changes are dependent on accumulation of heat units – warmer locations develop faster and lose tolerance sooner
  - Look at buds frequently to recognize changes
  - Look for most advanced stage that is present in more than 3-5% of buds

# Tolerance is site specific

- Fall changes are dependent on biochemical changes during ripening – we use color as the cue
  - Look down into the canopy without moving the plants
  - Natural exposure to light plays a role

# Frost message tolerance is for one site only

- When it changes – you can use this as a reminder to check your bog
- BUT – do not use it without scouting

Bogside spring tolerance workshop will be held in April

Factsheet of tolerance available



Questions?