Research Update Meeting 2009 - Frost Tolerance

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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 32ºF (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 °F to 29.5 °F

- **Fall**
  - Color of the fruit
  - 28 °F to as low as 20 °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