2009

Research Update Meeting 2009 - Frost Tolerance

Carolyn J. DeMoranville

University of Massachusetts - Amherst, carolynd@umext.umass.edu

Follow this and additional works at: https://scholarworks.umass.edu/cranberry_extension

Part of the Horticulture Commons

Recommended Citation
Retrieved from https://scholarworks.umass.edu/cranberry_extension/36

This Article is brought to you for free and open access by the Cranberry Station Outreach and Public Service Activities at ScholarWorks@UMass Amherst. It has been accepted for inclusion in Cranberry Station Extension meetings by an authorized administrator of ScholarWorks@UMass Amherst. For more information, please contact scholarworks@library.umass.edu.
Frost Tolerance

Carolyn DeMoranville
UMass Amherst
Cranberry Station
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\(^\circ\) 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 ºF 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
Questions?