# Freeze Injury to Apples in Northern New Jersey, New York, and New England

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This article is a review of the freeze injury of May 18, 2023 and the long term effects on apple and blueberry crops in NJ and New England this season. Note: this follows the February freeze in NY and New England that effectively took out the entire peach crop in February with temperatures ranging from minus 15 to minus 20 degrees F. NJ was spared these low extremes and overall NJ has had a great fruit crop. The exception was western New York in peach orchards along lake Ontario, they have a peach crop in 2023.

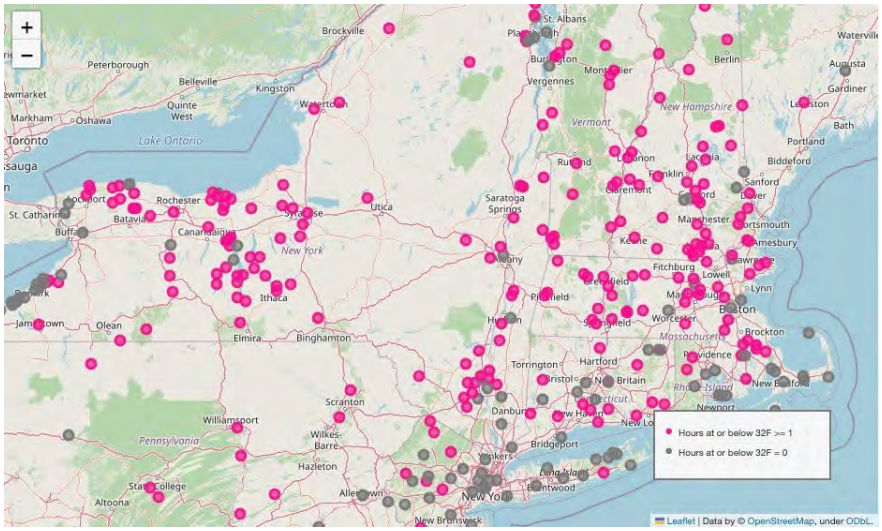


**Photo 1.** Frost Freeze Map -Dan Olmstead- NEWA.

There was extensive freeze Injury in NY and New England and some injury in northern NJ counties including Warren, Sussex, Morris, Hunterdon. Several orchards in these NJ counties sustained temperatures of 25F to 33 F with injury ranging from 10-90% overall depending on location and cultivar. See photos 2-5 for examples of the visual freeze damage.

There was no injury to blueberries in north Jersey based on my observations and telephone surveys.

Note this was an unprecedented cold event for this late date with apple fruitlets ranging in NJ from 8-15MM. Apple fruitlets (meaning post bloom) are actually more sensitive to cold temperatures than flowers in bloom- apples will take 28F in bloom- see Critical Spring Temperatures for Tree Fruit Bud Development Stages In general damage in Northern NJ is spotty and not extensive depending on location, site, variety. In the Hudson Valley, NY there was significantly more apple fruitlet damage, less in the southern valley and more in the Northern Valley. Western NY and the Champlain Valley NY fared better. Massachusetts, Connecticut, New Hampshire had significant apple damage up to

**Photos 2-5**. Apple injury. Photo credits: Trevor Hardy (2), Peter Jentsch (3-5)

80-90% depending on site, topography and cultivar and tree size. Maine had some damage depending on location, fruit development were further behind.

In New England high bush blueberries were injured with the same cold event on May 18. Injury ranged from 40 to 60 % crop loss.

Low temperatures observed across MA (and a few other New England locations) from NEWA weather stations the morning of May 18. Amherst and Northbridge get the prize in Massachusetts at 26 degrees F with many MA locations at 28F.
Some general common-sense guidance. Plant only on the best sites, clearly orchards located at lower elevations or in cold pockets had the most freeze damage. At the UMass Orchard in Belchertown, if ALL our apples were on the hill east of Sabin Street we would have a full crop. To the west, below Sabin Street in the "flats," exceeds 50%. I (Jon Clements) have 9 weather stations (well actually there are 12, but not including those here) the low temperature up on the hill was 31F, but at the lowest elevation down the hill it was 28F. A difference of 3 degrees F. a critical difference.

**Observations**

- Dwarf trees hi-density/tall spindle in shorter, narrow canopy orchards had more freeze damage that large full size trees across the Northeast.

- There were major differences by location and cultivar, but across the board Gala strains had the least amount of injury.

- As the fruit matured this summer, significant external injury continues to show on the remaining apple fruit

even as it sizes See Photos 6-8 throughout northern NJ, NY and New England.

•Peter Jenstch from Poma Tech Fruit Consulting in NY said that he is seeing significantly more internal injury from moldy core, from potential injury to the calyx from the freeze- see photos 9-10.

**Photo 6**. Gala freeze cracking: Picture: Peter Jentsch

**Photos 7 and 8**. External injury. Pictures: Peter Jentsch

• Dan Donahue reports more callus core on Fuji see photo 11

**Potential Solutions:**

This weather event was a freeze not a frost. Tradition frost control practices such as wind machines, fans, helicopters, open burning/smudge pots (NJ via statewide permit form NJDEP/ND Department of Agriculture ONLY work if there is a cloud layer inversion that traps warm air from open burning or can be mixed with the cold air close to ground level.

Covered production: Becoming more widespread worldwide. While visiting a cherry orchard in Michigan last February (Clements) covers (Anti-Frost Voen) were being used to prevent both rain cracking and frost protection. https://www.voen-coveringsystems.com/solutions In fact, they had little self-feeding pellet heaters under the covers. Interesting, and for high value apple crops (like ours) needs further consideration. Also presumably used for hail protection. Valente makes cement post trellis and covering systems for anti hail, bird protection, rain cracking and could be used for warming if heat installed (see Valente Systems at https://www.brookdalefruitfarm.com/Irrigation/BFS_2023_catalog.pd)

**Photo 9**. Honeycrisp Internal Injury from freeze. Picture: Peter Jentsch.

**Photo 10**. Cortland internal injury from freeze- calyx injured more moldy core. Picture: Peter Jentsch.

**Photo 11.** Callus core internal. Picture: Dan Donahue.

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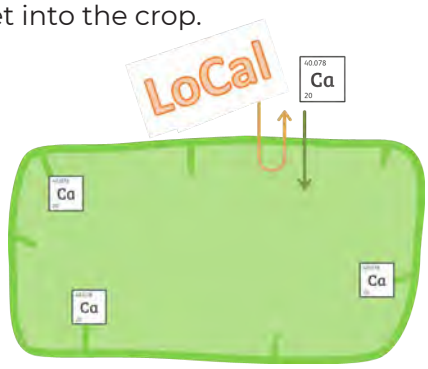


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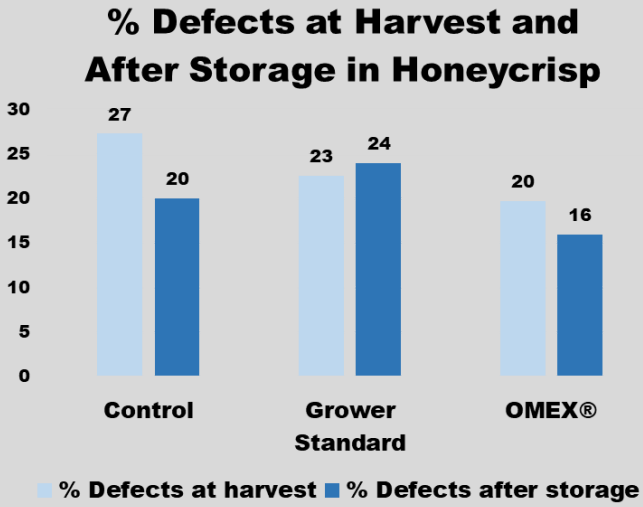


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Note: Whenever tank mixes of pesticides and/or fertilizers are used, be sure to test compatibility prior to use with a jar test.

*Spring 2023*