

May 18th, 2023 Frost/Freeze Damage Assessment Notes

Submitted by Jeremy DeLisle, Field Specialist, Food and Agriculture, UNH Extension, Merrimack County

The frost event occurring on the night of May 18th and into the morning hours of May 19th caused significant damage to fruit crops throughout New Hampshire. Reports received from growers state the low temperatures ranged from 22F in Lebanon to 31F in Farmington. Hollis reported a low of 27.9 degrees F at 5:00 a.m. on the morning of May 19th, while Lebanon reports a low of 23F. There was great variation in temperatures, even on the same farm. One farm in Concord reported 27F at the weather station at the top of the hill on the farm, and 22F at the lower fields where strawberries are grown.

For reference, the chart linked below gives critical temperatures causing bud/flower damage in tree fruit at various stages of development. Most of our NH orchards were in some stage of bloom during the event.

<https://www.canr.msu.edu/fruit/uploads/files/PictureTableofFruitFreezeDamageThresholds.pdf>

To summarize the damage, which is not easy to do given the variation from one site to another, I would estimate that losses to apples, pears European plums and sweet cherries in Hillsborough, Merrimack and Belknap Counties ranged from 50% to nearly 100% as a result of the frost event. There are a couple of orchards in Merrimack County at higher elevations that fared better than most others in the area. Those orchards hovered around 33F while others were several degrees colder.

I have spoken recently with apple growers in Merrimack, Belknap, Sullivan, Cheshire and Grafton Counties who anticipate a **total apple crop loss** this year. My site visits and assessments align with their estimates.

Another example of the variation comes from Hollis, where a grower there reports on his 8 various orchards at slightly different elevations. He explained that his apples in the blocks at higher elevations there fared better, while those in lower elevations were damaged more severely. **In general, I estimate that the crop loss to apples and pears in Hollis and nearby surrounding areas was 75-90%.**

In Rockingham County, orchards I visited or spoke with experienced losses to apples ranging from **85 – 90%**. In areas where wind machines were run in an attempt to combat the frost, damage was somewhat reduced on some farms, but not all.

Strafford County seemed to fare slightly better overall, with low temperatures from weather stations on farms in Farmington and Milton reporting lows of 33F and 32F respectively. Please keep in mind that is the temperature at the height of the weather station, typically positioned 5–10 feet above ground level. The temperatures at ground level could be 5 degrees or so colder. This becomes important for crops such as blueberries, strawberries and grapes. Strafford County apple growers that I have spoken with have actually moved ahead with thinning their crop, as damage was low enough that they still need to remove some fruit to help ensure return bloom for 2024.

Grapes in Strafford County in particular were hit hard with growers reporting a **total crop loss**. The crop was particularly vulnerable to the frost event due to the stage of development, with tender new shoots and emerging flower clusters too tender to withstand the temperatures experienced.

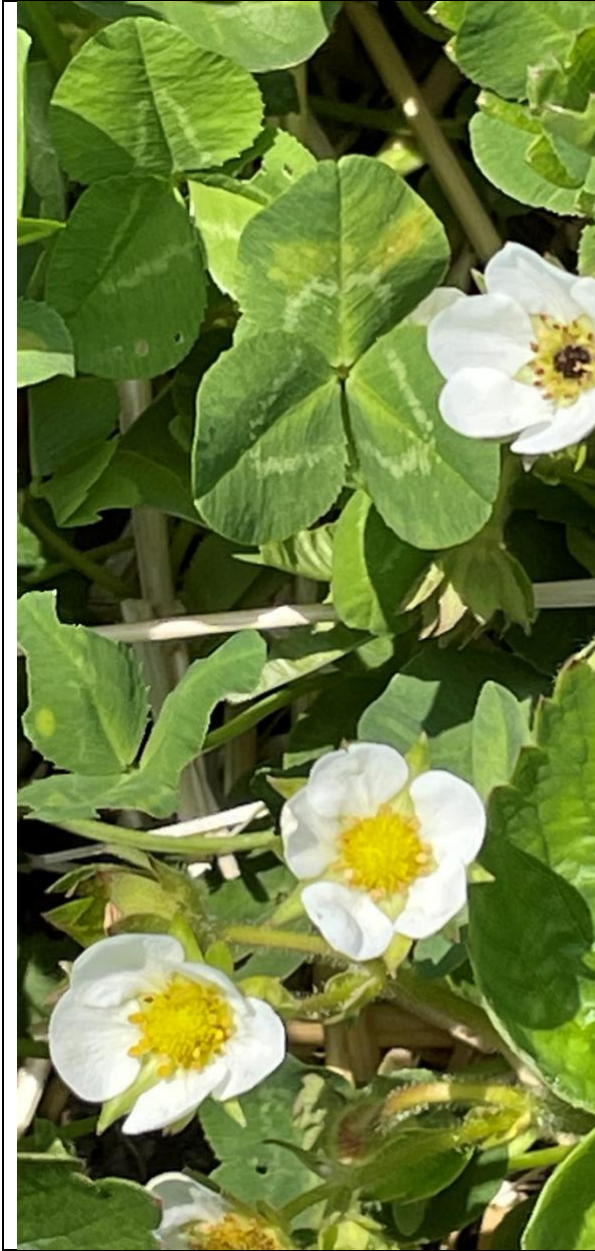
Stone fruits including peaches, sweet cherries and European plums had already been lost in the February cold snap. This most recent frost event made sure there will be no crop to speak of for these fruits this year in New Hampshire. Sour cherries should have fared much better, and we anticipate a partial crop in those same locations where reduced apple damage occurred in eastern and southern parts of the state. I would estimate damage to sour cherries at 50%.

Highbush blueberries were extremely variable in their tolerance to this event. Growers are reporting losses across the state ranging from 20% to 75%. The earlier varieties were farther along in the bloom stage, with open flowers in many cases. These experienced more damage generally than later varieties which were in the “pink” stage of bloom with unopened flowers.

Strawberries that were protected with either overhead irrigation or floating row covers made it through the event fairly well. I would estimate damage to protected plantings at 15–20% in the worst cases. Unprotected plantings that were in full bloom would likely have been a total loss in many locations.

The photos below show damage to some of the crops discussed above, including internal damage to apple fruitlets, healthy versus damaged strawberry and blueberry blossoms, and healthy versus damaged apple/pear fruitlets.







Reports of damage to forage and vegetable crops have been quite varied as well. I have heard reports of significant damage to grain crops in Merrimack County. Additionally, I have spoken with one large vegetable grower in Merrimack County reporting total loss of his cucurbits in low tunnels. Early corn was damaged in many locations in the state. Reports suggest that much if it will survive, but will be delayed and impact on yield remains to be seen.

Additional reports from county agents throughout NH are included below:

Zorvino vinyards in Sandown says 90% primary shoot loss.

<https://www.facebook.com/zorvino/posts/pfbid023gZXdXSPHj1HhBruNqBYkjqABfVRBkA3fNxYAhdsotnszVTW5i1b6EQZtFwVatJdI>

Sweet Baby Vineyard in Hampstead says 99% loss!

https://www.facebook.com/permalink.php?story_fbid=pfbid0FZtyMzDzbJPYbtuiBXuc23Pc7tysC61c24Rnf3wGbhyymi5m8i2rZ2mGJyDJTF7zl&id=100039790644570

Appolo Vineyards in Derry has shoot damage, but feels confident that they will re-grow.

Oliver Merrill & Sons in Londonderry says “It is becoming clear that Thursday mornings' frost/freeze has done damage in the orchard and gardens. The developing pears are turning black and dying. Some of apple blocks are showing damage. If you cut a developing apple, some are black inside and spongy. The early vegetables, especially tomatoes, being grown in the hoop house were killed.”

<https://www.facebook.com/Olivermerrillandsons/posts/pfbid0TWHgufc2cgzxdUoXFjuZSVybSk9x9ist4u4gjsBAGmw2Qkr5UtC6mmgDHAF6WFhI>

Applecrest's strawberry patch got to 25F, but they irrigated, so things look promising. They didn't mention how the apples fared.

<https://www.facebook.com/watch/?ref=saved&v=781110590188912>



From and Strafford County blueberry grower:

“May 25th, 2023: I had the pleasure of meeting with Jonathon Ebba yesterday (May 24) and we walked the blueberry fields at Berrybogg Farm. He forwarded your email so that I could send you several photos documenting the frost damage received last week. I have attached six photos from our farm which is located in Strafford, NH. These photos were taken the morning after we suffered a frost on May 18, 2023. We received significant damage to the blossoms of our early varieties (Bluetta and Earlyblue) and a fair amount of damage to our early midseason variety called Northlands. I have attached a photo of one of our varieties, Blueray, which had minimal damage because most of the blossoms were still in the tight bud phase.

We usually open our farm with pick-your-own blueberries between July 4th and July 12th. The early varieties take us through the first week to 10 days of picking and then gradually the mid-season fruit carries us through most of the summer. Our late varieties were not impacted.

Out of the approximately 5500 plants that are producing blueberries, we have 750 Bluettas and 200 Earlyblues. Due to the frost damage, we are expecting a reduction of this early crop between 50 to 75% but we won't know for sure until green fruit has appeared. We also expect a milder reduction in the mid-season fruit due to partial full bloom on the day of the frost with the exception of the Northlands which were about 50% in full bloom when the frost hit.

For reference, my family started planting highbush blueberries in 1976 and opened to the public for pick-your-own in 1981. My husband and I have been running the farm for the last 16 years and have never experienced or documented this amount of loss due to frost and prior to that, my father and mother (Nathan and Anne Lake) never experienced a blossom loss that I'm aware of.”

Good morning Donna,

I hope this email finds you well. I'm sure you have received several reports of last week's freeze event and I wanted to add a brief report on behalf of UNH cooperative extension in Hillsborough county.

Hillsborough county growers reported significant damage to perennial and annual crops.

Reports of loss in apple ranged from 10–60 percent depending on variety. Highbush blueberries received significant damage, with reports of over 60 percent with early varieties such as Duke. The majority of growers who were able to provide frost protection to strawberries survived the event with minimal losses. Growers used either row cover or overhead irrigation for frost protection. I did receive one report

of a strawberry grower who shut down their irrigation too early within a strawberry field and received 50+ percent damage. The damaged buds and newly formed fruits that were not entirely killed off will be at greater risk of disease and pest damage as the season progresses. From the reports I received, raspberry plants were minimally affected. Table and wine grapes received damage as well. The green grape varieties like marquee were hit especially hard.

Some annual vegetable crops were affected as well. Early brassica transplants were heavily burned back, which will delay harvest and possibly lead to uneven ripening and high disease potential. Sweet corn was damaged in some locations but not entirely killed. Again, this will delay harvest and likely increase pest and disease susceptibility.

It is important to note that damaged received was extremely variable from one location to the next. Even within the context of one individual farm, several microclimates could have been present with a range of percent loss. This makes estimating losses rather difficult, but UNH Extension will continue to gather information in the coming weeks. This report certainly does not reflect all the crops affected but serves to provide a little more context of the damage that occurred. Loss percentages could be higher on farms that I have not been in direct communication with. Attached are several photos of damage that I observed in strawberry, apple, blueberry, and broccoli. Please let me know if there is specific information that you are looking for and I can try and track it down. This season is starting off rather rough for our growers but I'm certain that they will continue to provide quality crops for our state and beyond.

Kyle Quigley

Field Specialist – Food and Agriculture, Fruit and Vegetable Team, Hillsborough County

Please let me know if you have any questions or need additional information from me or others in UNH Extension. We are happy to help however we can.

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