

# Production Considerations after Freeze/Frost Events in 2018

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## What occurred?

A series of frost events have occurred over the past 3 weeks across much of Nova Scotia's wild blueberry production areas. These included a widespread frost on the night of June 3 and 4 with temperatures below freezing for over 9 hours with minimum temperatures of  $-4^{\circ}\text{C}$  and lower being reported in many areas. More recently, a significant frost event occurred Monday night (June 11/12) with temperatures being below freezing for approximately 7 hours in parts of eastern Nova Scotia and Cape Breton Island. The magnitude and ongoing occurrence of these frost events have not been encountered in the wild blueberry industry for over 40 years. In addition, the growing season, management practices and pest challenges have also changed and every wild blueberry field has its own unique history and environment making it impossible to provide detailed management recommendations on how to proceed. However, a range of management plans are being discussed and used and the intent of this is to provide background information on what is occurring to the flowers and developing berries and some of the next field management steps producers are contemplating and using.

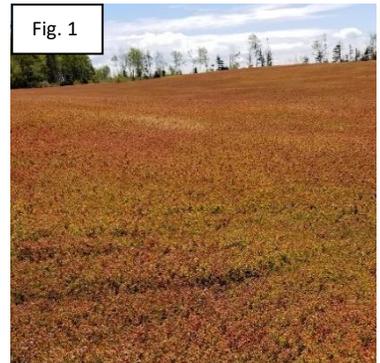
## Plant impact

Prior research conducted on wild blueberries has indicated that frost injury is a function of the minimum temperature, freeze duration, and growth stage of the flowers. Wild blueberry flowers are at their peak susceptibility at full bloom and temperatures less than  $-1.1^{\circ}\text{C}$  will cause damage. Previous research also found that damage to wild blueberry flowers will occur prior to this if flowers at the white/pink prebloom stage are exposed to temperatures less than  $-3^{\circ}\text{C}$ . Lastly, the number of fruit that will develop into marketable berries will decline by over 40% when exposed to  $-2.5^{\circ}\text{C}$  irrespective of flower stage or duration of exposure to frost.

Visual damage caused by the frost event has ranged from extensive damage to all flowers and developing leaves (Fig. 1), patches in the fields still showing good yield potential (Fig. 2), to minimal apparent damage. To obtain an accurate estimate of remaining bloom, it is very important to scout the fields and examine individual stems for the remaining amount of viable bloom. Looking down at the canopy can be deceiving with flowers on the upper portion of the stem showing a higher proportion of frost injury, and this blending in with the red leaf tissue also caused by cold temperatures (Fig. 3). The number of remaining, viable flowers on a stem can vary greatly across a field and even within a clone (Fig. 4: 60% flowers are viable on the left stem, 5% on the right stem) with later developing flowers typically found on the lower portion of the stem providing a large portion of the remaining yield potential. With adequate scouting and stem sampling across a field, a more accurate assessment of bloom viability can be obtained.

## Production options

Cropping field management options that are being explored include: (i) continuing with the production of a crop; (ii) focusing on using the cropping field for the production of a second crop; and (iii) mowing the field and transitioning into a sprout field. Given the unique situation caused by the frost event and inability to draw on specific and



pertinent previous research, there is no proven management protocol on how to transition to a double cropping field or a sprout field at this stage (mid June) of the growing season. There are important factors that can be considered when trying to decide on how to proceed consisting of the following:

### ***Crop Year***

- Be aware of what your remaining yield potential is. Some fields may have yield lower in the canopy that may make harvesting viable.
- Know the pest risks and use the predictive models to ensure efficient use of inputs. Blueberry fruit fly will still be a consideration in fields you are trying to harvest this year.
- If you are going to pick, make sure your harvester is well maintained and optimized. Getting every berry you can will be critical.

### ***Double Cropping (carrying the existing plant stand over to crop in 2019)***

- Be aware of the reductions in yield potential that come with attempting to double crop. Research to date has indicated that it is possible to establish the framework for a plant, but excessive damage to the canopy is occurring with present mechanical harvester techniques and even with hand raking fields.
- Fields with a stem height in excess of 15 to 24 cm (6 to 8") are not ideal candidates for double cropping. The number of floral buds that are obtained on tall stems is low and difficulties are encountered in trying to harvest the crop.
- At least 2 cm (1") of new shoot growth is required on the stems for the development of new floral buds. This can be facilitated with the application of soil applied granular fertilizers with nitrogen applications rates typically being 50 to 65% of those used in the sprout phase of production. Please note however that each field is unique with its own plant nutrition status and fertility needs.
- Septoria leaf spot and blueberry rust management in July will be critical for retaining leaves into the fall so viable fruit buds can be formed.
- Weedy fields will create extra competition to the wild blueberries and associated management challenges and are not ideal for this strategy.
- This strategy will create a denser canopy next crop year and as a result crop year diseases (ie., Monilinia and Botrytis) and insect management (i.e., blueberry fruit fly) will require greater vigilance.

### ***Transitioning to Sprout Fields (mowing crop fields immediately)***

- Mowing the fields at this stage is more difficult due to new growth and stems may have to be mowed in different directions to minimize "scalped" stems and achieving a desired pruning height of 1 to 2 cm.
- The start of the floral bud formation process is influenced by day length, temperature and shoot growth status (i.e., distance separating the shoot apical meristem from the roots).
- It will take at least 2 weeks for the plants to transition from being in a cropping mode to growing new shoots.
- In approximately 2 weeks, the day length will start to get shorter, and tip die-back is frequently observed in early fields by mid July. Given this, shoots may not grow very high before tip-dieback occurs.
- Weed management options will be limited. Soil applied herbicide applied at this time of year would be very risky, depending on the tightness of the mow. Some post emergent herbicides might be useful.

### ***Harvest Capacity Considerations***

- If you decide to carry a field over to next year either through a forced sprout cycle or a double cropping technique, you will need to know your harvest capacity and can all of your ground be picked in a reasonable amount of time.
- Also what are the impacts of changing your harvest rotations? It will likely lead to increased harvestable yield in 2019 but how will the change in field rotation affect your harvestable yield for 2020?

**Note:** *If you have crop insurance it is important you contact the Crop and Livestock Insurance Commission if major damage has occurred and/or you are making major production changes.*