Orchard Outlook

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Meeting Rapid Change Head-On

Canadians like to talk about the weather, and this year was certainly no exception for growers. But in this final newsletter for the season, I'd like to open with a topic that has not been as widely discussed. During a remarkably challenging season, this industry's determination and collective achievements were impressive.

Few changes are as rapid as losing a crop. In response to this change, growers embraced many different points of view to find solutions and carry on. Many learned to assess frost damage. And by sharing points of view, reasonable solutions were found for thinning and pest management programs. Growers chose to ask questions and reached-out for answers to make informed decisions, and I thank them for being so open-minded.

My next point about being forward-thinking is perhaps so engrained in the industry that it is not normally viewed as an achievement. Innovative growers experimented with on-farm trials in pest control, frost response, soil health, tree branching, and planting density to name a few. Some went as far as making valuable connections in the international community. And locally, participation was impressive during the orchard tour when new ideas and practices were shared. Growers chose not to focus on what was beyond their control but instead on the topics that would keep this industry competitive.

Luckily growers share a strong will and capacity for hard work to take on the responsibility of growing food. My message is not meant to underrate the challenges that many endured this season, but to bring to light the spirit of this industry. Whether freeze, drought, rain, or wind – take good notes. We will emerge wiser from any setbacks.

Sincerely,

Michelle

2018 Degree Day Accumulations

Considering how atypical this season was, the accumulated degree days might come as a surprise by being close to the 5- and 10-year averages. To avoid being misleading, please note that plant development was below average during the cool spring and fall temperatures and above average during the warm summer temperatures. When taken together, degree days accumulated to average levels.

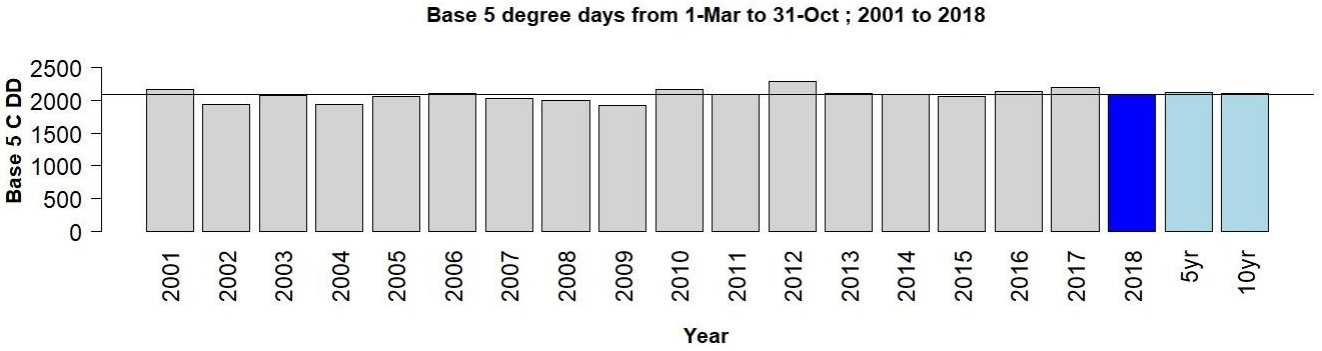

Figure 1: Heating degree day accumulations for plant development (above 5°C) from March 1st to October 31st for the past 17 seasons. Provided by Jeff Franklin (AAFC).

2018 Season Summary

Crop Load

Full bloom of apples occurred around the week of May 23rd. Cold weather prolonged bloom and discouraged pollinator activity, eventually culminating in several frost/freeze events. The most damage resulted from the morning of June 4th when the temperature stayed below zero for several hours, reaching minimums of -3.0°C. Gravenstein was already well-advanced in development at 10-12 mm and McIntosh and Honeycrisp were around 6-7 mm, while later trees in the Valley were still at petal fall. Stone fruit were at the shuck to shuck fall. Consequently, many orchards in the Valley reported losses to yield and fruit quality. The late timing of the freeze complicated crop load management and harvest labour decisions.

Where the freeze did not interfere significantly, fruit set was high. This is not surprising given the weather was sunny and cool, enabling carbohydrates to accumulate and supply the growth of many fruit. These strongly growing fruit were difficult to thin with chemical thinners. In other cases, a partial or low fruit set that was unequally distributed on the tree was also difficult to chemical thin as the tree had mostly strong fruit remaining and weak fruit had fallen off.

Weather & Tree Health

The freeze appeared to have affected nursery trees as well. Early in the season it became clear that nursery trees were underperforming and had succumbed to disease at the graft union. The culprits were a mixture of secondary diseases – not simply one. Trees had to have been wounded or weakened to become susceptible to a range of opportunistic organisms. The exact reason(s) for the poor tree health are unknown but most of the affected bench grafts were planted prior to the freeze event and might have suffered tissue damage. Freeze damage was even reported on grafts that were top-worked onto a mature tree. Resources from BC and Washington warn that callus tissue is susceptible to frost injury. Regardless of the cause, we have identified a need for more recommendations in nursery production.

Moving into summer, temperatures were above average in July and August. The heat in July was coupled with lower than average precipitation for most of the Valley. For example, Kentville received 44% less rainfall than average in July. Trees under moisture stress shut down early and had less extension shoot growth than expected, particularly in new plantings. The rain arrived in August, September and October in high volumes that created challenging conditions at harvest.

An early frost at the end of October damaged some fruit by producing brown marks. In October, a wind storm with gusts recorded up to 82 km/hr reduced yields of late varieties by causing fruit drop and bruising. Some tree supports and trees were also damaged. High winds have continued into November.

Disease and Insect Pressure

Pressure from apple scab was similar to last year with 12 primary infections and 4 recorded secondary infections. Cool weather slowed the development of ascospore maturity and lengthened the time needed for protection from primary infections. A fire blight infection period occurred in regions during full bloom but adequate protection prevented widespread outbreaks of the disease. However, some fire blight blossom infections did occur. Powdery mildew pressure was high this year, likely because mildew thrives in dry weather and some trees arrived from nurseries already infected. Furthermore, some cases of tree decline were attributed to replant disease, including nematodes, which are especially harmful during dry weather. Apple decline can arise from many factors and this issue will continue to be explored. Finally, mites thrived this year in the heat and given a flush of tissue growth.

Harvest and Fruit Quality

The freeze resulted in russet and frost rings on the fruit surface that often restricted fruit growth. Fruit maturity was on schedule this year compared to average, but some picking was delayed by the need to sort fruit and also challenges with weather conditions. Cool nights during autumn brought excellent colour on marketable fruit.

Conclusion

Without a doubt, the weather this season was sporadic and it had consequences for fruit quality, yield and tree growth. Disease and insect pressure continued in spite of the reduced crop load and it was recommended that growers continue to prevent the buildup of resident pest populations, even in a modified spray program.

Lessons from the Field

What can we take away from the challenges this year? Consider the following thoughts.

Frost/Freeze

- **A degree can make a difference** – The freeze damage varied within and between orchards, due to only minor differences in temperature.
- **If cold air is trapped, it accumulates** – Orchard landscapes can affect the flow of cold, dense air, and create frost pockets. The buildup of cold air next to woodland can be avoided by designing pathways through woodland that let cold air escape.
- **The diverse landscape of the Annapolis Valley is an advantage** – Many regions outside of Nova Scotia that have experienced frost have had a complete crop loss, but in the Valley the extra elevation has worked in favour of many fortunate orchards. Also, owning orchards in different landscapes makes an orchard more resilient to change.
- **Varieties respond differently to freeze** – Red and golden delicious were less likely to have russet. Honeycrisp was very prone to frost rings. These responses could have been related to their stages of development.
- **Callus tissue is tender** – We can now agree that (when possible) bench grafts should be transplanted after the risk of frost is past. Also, nurseries should not be planted in frost pockets. Nobody could have predicted there was a chance of a hard freeze in June but it highlighted that grafts are tender.
- **Apogee is a tool to reduce shoot growth** – Growers who used Apogee reduced shoot growth and had good light penetration in the canopy, which is expected but this served as a reminder. Too much apogee on young trees can cause them to shut down.

- **Currently, a freeze is a 'one in one hundred year' event** – A frost event like this has not occurred in the Valley in recent history. An event that happens once in every hundred years is given a statistical 1% chance of occurring in any year and it seems unlikely to recur anytime soon. In recent years, the average spring weather is warmer and trees tend to be in bloom and at risk sooner. However, the overall risk of a damaging frost is still low.

Heat

- **Risk of spray injury in hot weather** – Spray injury underscores the importance of heeding the warnings on product labels. Just because no damage was caused by a product in the past, doesn't mean the product is safe in abnormally hot weather.
- **Mites love the heat** – Keep a close eye on mites during hot weather or excessive feeding will lead to leaf bronzing and low tree vitality.

Moisture

- **Powdery mildew loves dry weather** – Outbreaks tend to happen when early-season spray programs are inadequate or when spray intervals are extended during dry weather.
- **Moisture stress is damaging** – Extended hot and dry weather is especially stressful to nurseries and young trees. They do not have an extensive root system established and therefore trees can desiccate from the growing tip downward.
- **Soil crests retain water** – Plant trees in a soil crest to retain moisture as opposed to a trough that will funnel water to the bottom of the row. Water will seep into a crest, which is especially important in historically dry soils. Avoiding funneling will also prevent waterlogging at the bottom of the row.
- **Drainage is only as good as designed** – When designing drainage, consider the worst case scenario and heavy rainfall events that happened this fall. Tile drainage could be installed with tighter spacing to prevent waterlogging.

Wind

- **Extreme wind tests support systems** – Sturdy support systems are an investment that support high yields. Did your support systems withstand the extreme wind? Would you make any changes in future plantings (depth, quality of materials, anchor system)?

Events & Notices

Now Receiving AIGEP Applications for 2018!

The Apple Industry Growth and Efficiency Program (AIGEP) application and guidelines have been emailed to the Orchard Outlook contact list. Fully completed Applications for 2018 planting **must** be received by the **Nova Scotia Fruit Growers' Association on or before November 30, 2017**. If dropping off in person, please call the office (902-678-1093) to ensure someone is there to receive your application.

Nova Scotia Crop and Livestock Insurance Commission News

Crop Insurance Fall Application Deadlines for the 2019 Crop Year:

Grape	November 14
Strawberry	November 14 (June bearing)
	March 30 (Day neutral)
Lowbush blueberry	November 30
Tree Fruit	November 30

Biobeds, an effective technology for reducing pesticide contamination - A Canadian Perspective

Runoff from pesticide handling areas on farms is considered a major potential point source for contamination due to high concentration of chemicals in formulated products and rinsate. On-farm pesticide rinsate biobeds are designed for the removal and neutralization of residual pesticides from equipment through an active bio-filtering process. Over many years of research AAFC has adapted this technology for use in the Canadian climate.

Although widely used in Europe for decades, the adoption of biobeds in Canada is currently low. To increase awareness and encourage uptake of biobeds by Canadian farm managers, the Pest Management Centre is pleased to host a webinar on this topic. Participants will learn about the basics of biobeds from an AAFC scientist, gain an understanding of regional perspectives from provincial experts, and hear about cases of adoption of this technology in Canada. It is anticipated that using biobeds in commercial and research farms will lead to significant reduction in water and soil contamination from agricultural pesticides.

WHEN?
Monday, November 26th 1:30 – 3:30 pm Eastern Standard Time

HOW TO PARTICIPATE?
Registration is required to participate. To register, go to WebEx. If you require any assistance with registration please contact Kathryn Makela.

Mark These Events in Your Calendar

December 4-6, 2018	**Great Lakes Fruit, Vegetable and Farm Market Expo** www.glexpo.com	Grand Rapids, Michigan
January 29-31, 2019	**NSFGA Annual Convention** http://www.nsfga.com/	Old Orchard Inn
January 29-31, 2019	**Mid-Atlantic Fruit and Vegetable Convention** http://www.mafvc.org/	Hershey, PA
February 24-28, 2019	**International Fruit Tree Association** https://www.ifruittree.org/	Rochester, NY
February 20-21, 2019	**Ontario Fruit & Vegetable Convention** http://www.ofvc.ca/	Niagara Falls, Ontario

Edited by Michelle Cortens, Tree Fruit Specialist, Perennia Food and Agriculture Inc.