

78th Annual New England, New York and Canadian Fruit Pest Management Workshop
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2014 EXTENSION/FIELD REPORT –APPLES, BERRIES

Location: Ontario, Canada
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Pest Types: Disease, Insects, Mites

Overall Situation:

The winter and spring in Ontario had variable temperatures. For the most part, winter was very mild, but we did experience one weekend, mid-February, where temperatures dropped to below -25°C. During March, temperatures were more mild than normal and apple buds were starting to come out of dormancy mid- to late March. In early April, temperatures dropped down to -14 °C along the north shore of Lake Erie, while buds were at green tip. Luckily, this had very little impact and we experienced a full bloom.

The 2016 growing season was very hot and dry through the summer. The rainfall was 40-60% of the normal precipitation from May until early August for most of Ontario's tree fruit growing area and less than 40% of the normal precipitation for the Niagara region. This made for a record dry growing season for Niagara, and along the north shore of Lake Ontario. Birds and mammals were feeling the heat as well. Increased damage from birds, squirrels, chipmunks and deer was seen across the province in most horticulture crops.

In apples, the hot temperatures and low soil moisture caused variability in fruit size. However, yield has been estimated to be average and fruit is sweeter than normal with a nice finish. Growers along the north shore of Lake Erie and around Georgian Bay have reported boron deficiency symptoms in McIntosh and Cortland. This has likely been due to low availability of boron in the soil due to low soil moisture. Temperatures were hot enough to cause sunburn in July and August. Many growers used sun protectant products.

Unseasonably warmer days in Ontario have continued through the fall, resulting in very happy workers in the orchards. Unfortunately with these warm fall temperatures, growers have struggled with getting colour in their Honeycrisp across the province.

In berries, the high summer temperatures caused delayed harvest and/or lower yields in day-neutral strawberries and fall-fruited raspberries.

Major Problems or Unusual Events -Disease:

A significant number of orchards (approx. 75%) across the province dealt with **fire blight** this year, including orchards in traditionally less prone areas and on less susceptible varieties. Some regions will see entire orchards pulled due to infection. There were two potential infection periods during bloom. Fortunately, the first period of high risk was in the eastern regions of the province from May 13-16 when most trees were at tight cluster and not vulnerable to infection. The second period of high risk occurred across the province from May 22-June 1 when trees were in full bloom in most apple growing regions. An extended secondary, or rat-tail bloom was also an issue this year. Many growers assumed fire blight was not an issue in their orchard or that it was too dry for infection to occur and did not use a bloom spray. Growers continue to struggle with management options following hail or wind damage. A streptomycin-resistance survey was conducted this year in 64 apple and pear orchards across the province. Preliminary results suggest very low levels of resistance.

Scab and **powdery mildew** were relatively absent this season. With a dry spring, there were fewer scab infection periods experienced across most of the province. With the exception of a few growers that were chasing scab from last year, most were able to maintain good control. There is a general movement away from strobilurins and DMIs due to resistance issues.

Bitter rot continues to be an increasing problem in the province, mainly in Golden Delicious, Gala, Empire, McIntosh, Honeycrisp and Ambrosia. Pristine (boscalid +pyraclostrobin) and Allegro (fluazinam) have shown promising results in many

orchards when applied prior to rain event following petal fall. Still have many questions: When does infection actually occur and when do symptoms appear? Is this an increasing storage problem? Trials were carried out this year investigating the relationship between bitter rot and calcium.

Across the province, tree collapse (10-15%) was observed in numerous blocks of 3-6 year old trees beginning at bud break and continuing until August. Results confirmed **phomopsis canker** at graft union in majority of cases (black rot in approx. 5% of samples). This is likely a result of winter injury in 2014 and/or 2015. Growers are questioning if *phomopsis* sp. may become a pathogen of concern in apples or if this was just opportunistic infection due to injury.

Anthracnose is becoming a limiting factor in day-neutral strawberry production. A 2-year project is underway to test for resistance to group 11 fungicides, and to field test a weather-based prediction model to optimize fungicide timing. A few growers have turned to low tunnels to help manage this disease.

Virus and virus-like diseases: Strawberry viruses are still evident in strawberry fields, but yields and plant stands have been much better in 2015 and 2016 compared to 2012-2013. The main virus diseases (strawberry mottle, strawberry mild yellow edge and strawberry vein banding) are persistent or semi-persistent and spread by the strawberry aphid. Aphid control has helped reduce the incidence of virus diseases in strawberries, but constant monitoring and multiple sprays are required for control.

A preliminary survey for raspberry viruses was conducted in approx. 12 sites across Ontario, to determine which virus and virus-like diseases are common. Using ELISA tests, a few samples were positive for tomato ringspot, raspberry bush dwarf virus and poty viruses. Samples will also be tested for some of the newer viruses, using RT-PCR; this work is in progress.

Blueberry stunt seems to be on the increase in eastern Ontario.

Major Problems or Unusual Events -Insects:

With the mild weather early season, **spring feeding caterpillar** activity was quite extended. Pug moth and green fruitworm did extensive damage to blooms and fruitlets in some orchards. **Plant bug** and **plum curculio** activity was also early and extended. Damage was above 5% at harvest in some regions. Despite extremely high **mullein bug** populations being recorded (50-60 per tap in some orchards), little damage was observed.

Numerous summer pests, such as **codling moth**, **oriental fruit moth** and **obliquebanded leafroller** had long, extended generations likely due to the extreme temperatures. Multiple sprays were required for control and many growers found they needed longer residual pressure than even the hardest products could offer.

San Jose scale continues to be an increasingly problematic pest. Even with regular monitoring, damage still came as a surprise at the end of the season, especially on higher value varieties, such as Honeycrisp and Ambrosia. Unfortunately, many growers are moving away from dormant oil and would prefer a summer spray alternative. First generation crawler emergence occurred mid-June though adult and crawler trap catch was relatively low. Second generation activity spiked significantly in early August and caught many growers off guard with later season damage.

Apple leafcurling midge is also becoming an increasing issue in all regions of the province. Previously, growers assumed midge to be a problem for young trees only. However, in established orchards, infestations of up to 60-75% of shoots have been observed and some growers believe this pest has affected yield. Monitoring for adult flight and egg-laying is being used to determine appropriate spray timing. Activity was extended this year due to new growth continuing late into the season. Parasitism study continued in Ontario this year to determine native parasitoid abundance in organic and conventional orchards.

Woolly apple aphid activity started much earlier than usual in many areas this year, beginning mid- to late June and continued until harvest. Growers lose the use of diazinon in 2016 and alternative products are not as effective.

The extremely dry season kept **apple maggot** populations relatively low this year. However, late season rains did result in a slight increase in trap catch with some damage observed.

European apple sawfly has moved slowly westward and damage can now be found as far west as Toronto, Niagara region and north to Georgian Bay. This is an estimated westward movement of 100 km per year. With ideal spray timing coinciding with bloom, growers are struggling with when and what to spray for this pest. Trials with biological, *Quassia* extract continue in Ontario and Nova Scotia and indicate control comparable to conventional products.

Established populations of **brown marmorated stink bug** have been confirmed in a number of regions across the province in recent years. In general, stink bug (native stink bug species included) damage was higher than normal this year. However, BMSB damage was suspected and insects observed at a number of mixed-fruit orchards, particularly in the Niagara region. Growers are concerned with the limited control options that are available and how these products (eg., malathion, methomyl) will impact established IPM programs.

Ambrosia beetle trapping conducted this year in 14 Ontario orchards identified **granulate ambrosia beetle** and **black stem borer**. While old damage was observed on healthy trees, no new damage was detected. Growers are looking for effective management strategies as this pest is new to Ontario and difficult to control.

Despite the hot, dry summer, **mite** populations were rather varied across the province. Rust mites and associated damage was higher than normal. Some regions experienced Envidor (spirodiclofen) failure. Follow-up applications of Nealta (cyflumetofen) or Nexter (pyridaben) brought spider mite populations down.

A few day-neutral strawberry growers have turned to biological control for **western flower thrips**. This involves spraying less and choosing only IPM-friendly products for tarnished plant bug, releasing commercially produced predators (such as *Orius* and *Amblyseius cucumeris*) for thrips control, and planting banker plants (allysum) around the edge of the field. The banker plants for thrips predators seem to be also acting as trap crops for TPB. However, when SWD arrives, the biocontrol program falls apart.

Cyclamen mite is increasingly difficult to control in strawberries. Growers lose the use of endosulfan in 2016. The only other registered product is Agri-Mek (abamectin), which has not performed well in the field.

Putnam scale in blueberries caused devastating damage to fruit. This had not been reported before in Ontario.

Spotted wing drosophila continues to plague all berry growers. Blueberry growers typically lose the last two weeks of harvest (late August - early Sept). Raspberry growers have shortened harvest intervals to every day or every second day and this has improved control. A few growers have tried exclusion netting for SWD control in small plots and are pleased with the results.

