

Orchard Outlook



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Bud Development	Diseases	Insects
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Moderate temperatures slowed bud advancement this week, however, the forecast warmth over the coming few days will push many apple blocks into early bloom with full bloom likely by early next week.

Bud Development

Early developing apples are starting into king bloom (Figure 1). Pears in warm sites are now close to full bloom. Stone fruits with the exception of later peaches are at full bloom to petal fall.



Apple: Tight Cluster to King Bloom



Pear: Early Bloom to Full Bloom



Peach: Pink to Late Bloom



Plum: Late Bloom to Petal Fall



Sweet Cherry: Full Bloom to Petal Fall

Figure 1: Tree fruit buds observed on May 16th, 2017 in the Kentville/Greenwich area.

Degree Day Accumulations

Degree day accumulations from March 1st to May 16th have fallen slightly towards the 5- and 10-year averages but this is probably short lived with the warmth in the forecast (Figure 2).

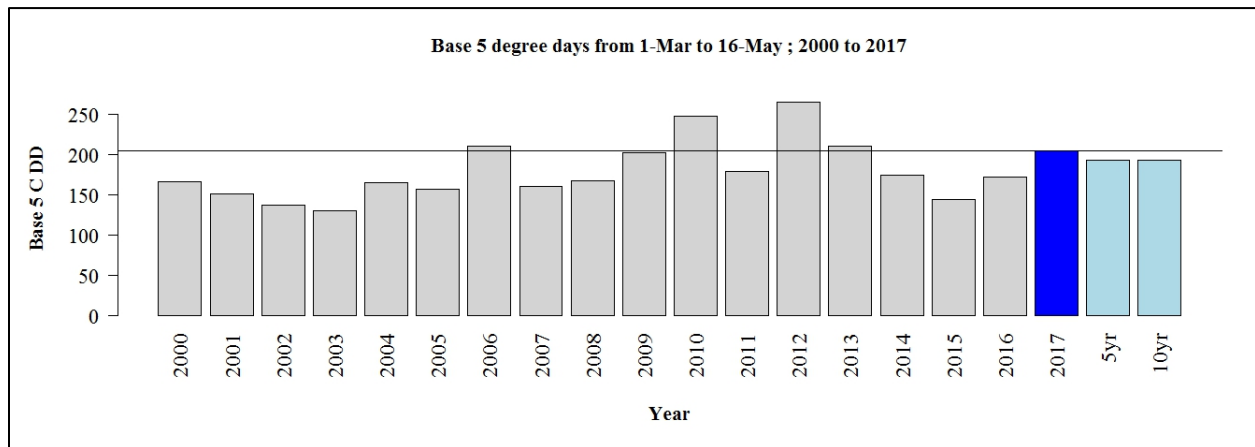


Figure 2: Degree day accumulations from March 1st for the past 18 seasons. Provided by Jeff Franklin (AAFC).

To date heat accumulation since March 1st is (Figure 2):

- About 6% more plant development heat units compared to the 5-year average.
- About 19% more plant development heat units compared to 2016.
- About 3% more insect development heat units compared to the 5-year average.

Diseases

Apple & Pear Scab

A further two scab infection periods were recorded this past week at Kentville AAFC. The first event began at 6:00 am on Tuesday, May 9th and lasted until 8:00 am on Wednesday, May 10th for a duration of 26 hours at an average temperature of 6.7°C resulting in a light primary infection. A second event began at 8:00 pm on Sunday, May 14th and lasted until 3:00 am on Tuesday, May 16th for a duration of 31 hours at an average temperature of 8.7°C resulting in a heavy primary infection.

Approximately 70% of the seasonal ascospore load has matured to date and most of the mature spores would have released with the previous infection period. However, there is still a third of the ascospores yet to come and with trees approaching full bloom, they are at the most susceptible period of the season for apple scab with lots of new tissue development. The next fungicide application will be a very important one for apple scab control with the warm temperatures pushing tree development. Growers should consider using a fungicide for both scab control and powdery mildew in this week's fungicide application, unless one has already applied 2 sprays for powdery mildew, in which case a third application can wait until petal fall.

See the 2017 Pome Fruit Management Guide for a complete list of products at http://www.perennia.ca/wp-content/uploads/2015/09/2017-Pome-Fruit-Management-Guide-Final_s.pdf.

Powdery Mildew

If you haven't already, include a fungicide for powdery mildew as part of your next apple scab spray. See Orchard Outlook from May 3rd for a discussion of powdery mildew biology, products, rates, fungicide groups and resistance issues in Nova Scotia. Don't forget to treat young trees, as powdery mildew infections can rapidly shut down terminal growth in young orchards trying to fill space.

Fire Blight

With bloom approaching on apple and pear already in bloom, management of the blossom blight phase of fire blight is beginning. After delayed-dormant copper application, the next phase in the management of fire blight occurs during bloom. Fire blight bacteria are transported from overwintering canker sites to open blooms by the action of insects and rain. These bacteria then reproduce on the surface of flower and are washed down into the base of the flower by a wetting event – a minimum of just 0.25 mm of rain or heavy dew – which then initiates an infection. Bacterial reproduction, and therefore blossom blight risk, increases with warmer temperatures with ideal conditions between 23 and 27°C, especially when occurring over consecutive days.

Warm temperatures in the forecast over the next few days combined with the start of bloom will mean that infection risk will begin to build for blossom blight in apple and pear. The Maryblyt model developed by the University of Maryland has been used for several years in Nova Scotia to help manage fire blight by estimating of blossom blight risk which can be used to time management decisions. Maryblyt can be downloaded free here: <http://www.caf.wvu.edu/kearneysville/Maryblyt/>.

For 2017, Maryblyt has been incorporated into the online weather and disease modelling website AgWeather Atlantic: <http://atl.agrometeo.org/indices/maryblyt/000F>. By using AgWeather Atlantic, you are able to select from 6 weather stations in the Annapolis Valley: Greenwood, Morristown, Grafton, Kentville, Port Williams, and Medford. To use the model then you need to select an approximate green tip date and enter your first bloom date of your earliest blooming variety and click Apply. Then AgWeather Atlantic will retrieve the weather data from that station and integrate the current weather forecast from Environment Canada to provide you with a Maryblyt model output for that location. Select 'Spray' to indicate which days to consider spraying in order to manage the Epiphytic Infection Potential (EIP) and control blossom blight infection events. The data is fully editable on AgWeather Atlantic if you wish to enter your own numbers then click Apply and rerun the model.

The most effective prevention for blossom blight is the use of antibiotics prior to wetting events during high risk periods. High risk periods are defined by Maryblyt as having an Epiphytic Infection Potential (EIP) greater than 100. This article by Dr. George Sundin of Michigan State University was written in 2015 but remains a great review of blossom blight, available materials, and control strategies. Note oxytetracycline is not available for use in Canada.

http://msue.anr.msu.edu/news/three_antibiotics_available_for_fire_blight_management_during_bloom

Both Streptomycin 17 and Kasumin are highly effective antibiotics registered for blossom blight control. Streptomycin 17 is the preferred product in NS due to lower cost and slight advantage in being partially systemic. No streptomycin resistance issues were detected in NS fire blight samples collected in 2015 or 2016.

Streptomycin 17 will provide excellent efficacy on blossom blight but is best used up to 24 hours prior to an infection event and 18-24 hours after infection. Therefore, time sprays to periods of high risk – use Maryblyt and weather forecasts. Streptomycin 17 should be used at a 100 ppm solution which is equivalent to 600 g of product in 1000 L of water. Agral 90 surfactant at 500 mL per 1000 L may be included as a spreader/sticker to improve efficacy. Do not use more Agral 90 than 500 mL per 1000 L to avoid foliar burn problems.

Summary for blossom blight control:

- Use Maryblyt forecasting either as the standalone program or through AgWeather Atlantic and check regularly
- Enter your information on first bloom
- When Maryblyt EIP is at or exceeding 100, apply an antibiotic to all blocks with open bloom prior to a wetting event

Fire Blight – Shoot Blight Management & Apogee

The third chemical approach to fire blight management is the use of Apogee to suppress shoot blight. The material Apogee itself is not an antibiotic and has no direct activity on the fire blight organism. However, microscopy has revealed that application of Apogee also results in cell walls of treated shoots becoming much thicker. This secondary effect makes these shoots difficult or even impossible for the fire blight pathogen to infect and treated shoots becoming much more resistant to fire blight infection. In addition

to shoot blight suppression, the application of Apogee at the correct timing also results in a reduction of terminal growth in apples by 30-40%.

The “Apogee effect” begins 10-14 days after the first application. Therefore, the timing of the first application becomes critical to make sure the product contacts the shoots before rapid extension growth takes place. It is critical that Apogee be in contact with extension shoots when they are at about 2.0-5.0 cm of new shoot growth (1-2”) (Figure 3). This typically happens around king bloom petal fall to petal fall. The first Apogee application should be made at this stage. This may be later this week or early next week in the advanced blocks. A second application should be made approximately 14 days later.



Figure 3: Early timing of Apogee application is about 2 cm (1 inch) of new extension shoot growth.

Ideally, Apogee should be put on with higher water volumes to sufficiently cover all new leaves and growing tips. However, lower volume applications have worked also well in some situations.

Apogee can be used at 450 g per 1000 L of water for fire blight suppression or 1,350 g/ha if using 3000 L/ha of water. Include Agral 90 at 500 mL per 1000 L of water. Do not exceed this amount of surfactant. Apogee should also be applied with spray grade ammonium sulphate (AMS) in an equal 1:1 ratio with the amount of Apogee used (e.g. 500 g Apogee = 500 g or 0.5 L of ammonium sulphate). This is not the same as the blossom thinning product ammonium thiosulphate (ATS)! If using high water volumes during high risk events for blossom blight, do not spray without including an antibiotic. Lower volume sprays of fungicides are not likely to trigger a blossom blight infection.

In high risk situations, Apogee can be used at lower rates on younger trees where strong shoot blight suppression is necessary. Reduced rates of Apogee such as 1 to 2 applications of 115 to 225 g per 1000 L of water have been used in Michigan. The critical application on young trees is the initial one at 2-5 cm of new growth. Apogee can have a very strong growth reduction effect on young trees and this application should be made with good reason (i.e. history of fire blight infection, nearby presence of cankers from infected orchards, highly susceptible combination such as Gala/M.9 etc.).

Brown Rot

Continue fungicide protection from brown rot blossom infections on stone fruits through petal fall.

For plums, the use of Captan/Maestro (3.75-4.5 kg/ha) or Indar (140 g/ha) for brown rot during the white bud stage through fruit set will also give some control of new black knot infections.

Insects

If pre-bloom treatments for any insects are required, they need to be made ASAP as this warm weather will rapidly push trees into bloom and begin the start of the pollination process, at which time insecticides should not be used in the orchard. Be cautious of early varieties such as Gravenstein and Idared which already have some open bloom and should not be treated. Insects being managed prior to bloom include: spring caterpillars and leafrollers, rosy apple aphid, European apple sawfly, and tarnished plant bug. See last week's Orchard Outlook for more information about each of these pests and suggested products for control.

However, once bloom begins shortly:

BE RESPONSIBLE FOR POLLINATORS – DO NOT SPRAY INSECTICIDES DURING BLOOM!

Protecting Pollinators During Bloom

No insecticides should be applied during bloom and precautions should be taken before and at the tail end of bloom. Be aware of bee toxicity warnings on pesticide labels. These products should not be applied with any open blossoms or when flowering weeds are present. Fungicide, antibiotic, and growth regulator sprays are best applied early morning or late evening when bees are not actively foraging. Be aware that dandelion blooms are open until about dusk.

Pollinators, Pollenizers and Pollination (OMAF)

<http://www.omafra.gov.on.ca/english/crops/hort/news/orchnews/2014/on-0314a3.htm>

Pollinators and Pesticide Sprays During Bloom in Fruit Plantings (Penn State University)

<http://extension.psu.edu/plants/tree-fruit/news/2014/pollinators-and-pesticide-sprays-during-bloom-in-fruit-plantings>

Horticulture

- **Pollination**
 - Be prepared to move honeybees into the orchard for pollination purposes shortly as bloom approaches.
- **Grafting**
 - Topworking with bark grafting is being done now in many areas.
- **Fertilizer**
 - Granular fertilizer applications should be completed before bloom for best results. Apply nitrate to nurseries on a dry day just prior to rain to avoid burning buds.
- **Herbicides**

- Tree fruits are still in the critical period of weed control and weeds should be controlled under the tree row.
- **Tree Planting**
 - Tree planting has resumed and will accelerate with warm dry weather coming. Prune and support newly planted trees as early as possible after planting to ensure maximum first year growth.
- **Foliar Sprays**
 - Where deficiencies indicate foliar boron is required, application at pink is the recommended time for improving fruit set. Remember the incompatibility with boron and solupacks and not to tankmix zinc and boron.
- **Mowing**
 - Regular mowing of the orchard floor will help minimize dandelion competition with tree fruit flowers during bloom and also minimize insect flushes from the ground cover after mowing.
- **ATS (Ammonium Thiosulphate) Blossom Thinning**
 - The caustic thinner ammonium thiosulphate (ATS) can be applied during full bloom as the first chemical thinning opportunity of the growing season. ATS physically damages the flower parts and prevents pollination from occurring. This strategy always produces variable results but has been effective in the past on some varieties. The advantages of blossom thinning with ATS are potentially increased fruit size and return bloom compared to later fruitlet thinning. ATS would be good consideration for early thinning of small fruited cultivars (e.g. Ambrosia, Gala, SweeTango) or cultivars that can be more difficult to adequately thin such as Honeycrisp in heavy bloom. The disadvantages of ATS are thinning with an unknown crop load and the potential for foliar spray injury. Overthinning and phytotoxicity with ATS have not been observed much in NS in the previous few seasons, possible due to the reduced rate of ATS compared to some other areas which recommend higher rates of 20 L per 1000 L of water.
 - ATS should be applied towards the later part of full bloom (80-100% FB) when adequate pollination has occurred. The goal is to apply ATS when the king flower has been opened for 24-48 hours and has been fertilized but prior to the lateral flowers from being fertilized.
 - It is expected that conditions which delay drying, such as high relative humidity and cool temperatures, would increase thinning activity.
 - The following rates of ATS for blossom thinning have been trialed in NS by Douglas Nichols and Charlie Embree:
 - Dilute rate: 12.5 L of ATS (Oligo-S) per 1000 L of water

Events & Notices

2017 International Fruit Tree Association Study Tour in Michigan – Registration Open

Considering joining IFTA in Michigan this summer from July 16-July 18th for the 2017 IFTA Summer Study Tour. Our theme for the 2017 IFTA Summer Tour is:

Tree Fruit Excellence – Innovation and Success

The 2017 IFTA Summer Tour offers another fantastic educational opportunity and provides quality networking time with colleagues old and new. With visits to prime fruit-growing areas of Belding, the South Ridge, the North Ridge and Michigan State University, you'll be able to see and experience all aspects of tree-fruit production.

You'll learn how Michigan tree fruit growers are investing in new ways to remain competitive and deliver high-quality fruit to consumers at home and around the world. Discussions will touch on tree training, chemical thinning, precision thinning, frost protection, vigor management and managed varieties, among many other topics.

Network with fellow growers as you discover why Michigan is one of the world's leading tree-fruit growing areas and a seat of tree-fruit innovation.

See <http://www.ifruittree.org/Events/2017-Study-Tour> for more information.

This Orchard Outlook has been published with the input of the Orchard Outlook Committee.