

Orchard Outlook



Vol. 17, No. 5

May 10, 2017

Bud Development	Diseases	Insects
Horticulture		Events and Notices

Warm weather has pushed 2017 into the category of a very early season with the first bloom on apples and pears occurring this week. We are more than week ahead of last year in development.

Bud Development

Bud development advanced rapidly again this past week. Early developing apples and pears in warm sites are starting into first bloom shortly (Figure 1). Stone fruits are generally at or near full bloom.



Apple: Tight Cluster to Late Pink



Pear: White Bud to Early Bloom



Peach: Pink to Bloom



Plum: Bloom



Sweet Cherry: Bloom

Figure 1: Tree fruit buds observed on May 9th, 2017 in the Kentville/Greenwich area.

Degree Day Accumulations

Degree day accumulations from March 1st to May 9th show that 2017 to date is now well ahead of the 5- and 10-year averages (Figure 2).

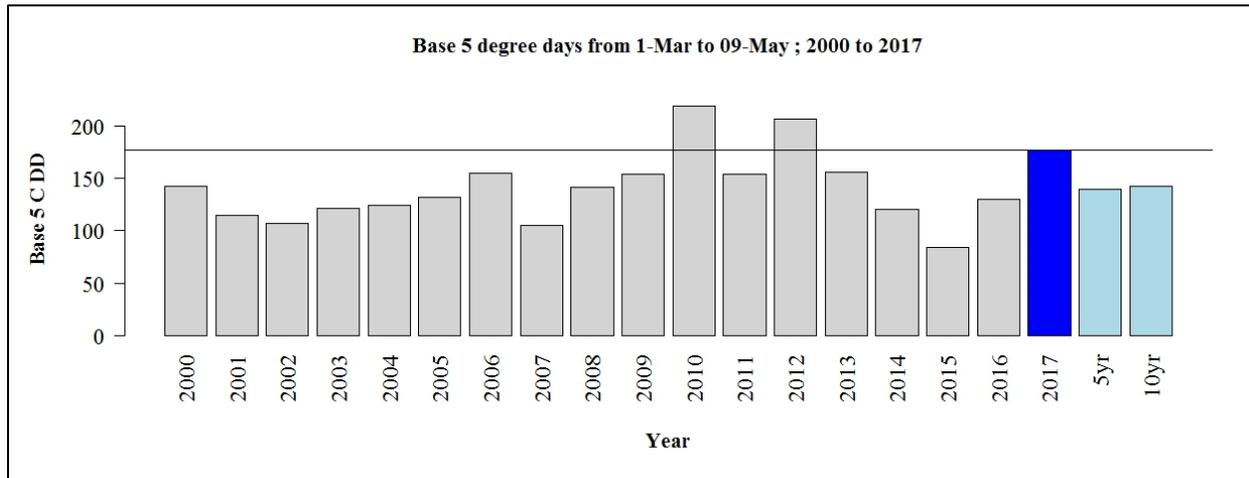


Figure 2: Degree day accumulations from March 1st for the past 18 seasons. Provided by Jeff Franklin (AAFC).

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

- About 27% more plant development heat units compared to the 5-year average.
- About 36% more plant development heat units compared to 2016.
- About 44% more insect development heat units compared to the 5-year average.

Diseases

Apple & Pear Scab

Difficult weather conditions continue to occur for apple scab control with another 3 infection periods recorded this week at Kentville AAFC. The first event began at 6:00 am on Saturday, May 6th and lasted until 10:00 am on Sunday, May 7th for a duration of 28 hours at an average temperature of 16.0°C resulting in a heavy primary infection. After a dry period of about 10 hours, a second event began at 8:00 pm on Sunday, May 7th and lasted until 8:00 am on Monday, May 8th for a duration of 12 hours at an average temperature of 14.3°C resulting in another light primary infection. A third infection period is ongoing currently.

About 47% of the seasonal ascospore load has matured as of today and most of the mature spores would have released with recent wetting. There are plenty of ascospores still to come yet.

Growers that used a fungicide for apple scab and powdery mildew last week should make another application of a suitable material about 7 days later in these difficult scab conditions.

Pears should also be covered for pear scab regularly at this point in the season. Note EBDC's such as Manzate are not registered for pear scab. Captan as well as other single-site fungicides are effective on pear scab. 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 & Fungicides

If you haven't yet used a fungicide for powdery mildew, most blocks are at tight cluster to pink and are at a development stage where protection from powdery mildew is recommended. If you haven't already, include a fungicide for powdery mildew as part of your next apple scab spray. As a bonus, these are all mostly systemic products that provide good rainfastness and move into new tissue. See last week's Orchard Outlook from May 3rd for a discussion of powdery mildew biology, products, rates, fungicide groups and resistance issues in Nova Scotia.

Fire Blight

Copper application for overwintering fire blight cankers is now past the recommended growth stage in most areas.

After the application of copper, 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.

The first blooms on pears and apples will be open this week, meaning it's time to start monitoring your orchard for blossom blight. The Maryblyt model developed by the University of Maryland has been used for several years in Nova Scotia to manage fire blight and has become a standard management tool.

Maryblyt 7.1 provides an estimate 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 and run 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.

As the first bloom has opened on pears, a quick check of the Maryblyt forecast on AgWeather Atlantic indicates no risk for the coming week due to cool temperatures. However, things can change quickly with warmer weather.

Brown Rot

With peaches, plums, and cherries now in bloom, fungicide protection from brown rot blossom infection is now required. Brown rot infection of the flowers during bloom provides secondary inoculum for fruit infections later on. Fungicide protection from brown rot should begin just prior to bloom and be maintained during periods favourable to infection. Warm, wet weather is particularly conducive for brown rot infection. Two to three fungicide applications may be required from pink/white bud to petal fall if weather remains warm and wet.

There are 8 different fungicide groups and over a dozen products registered for brown rot control. See the 2017 Stone Fruit Management Guide for more information at <http://www.perennia.ca/wp-content/uploads/2015/09/2017-Stone-Fruit-Management-Guide-small.pdf>.

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

European Red Mite

Some blocks have received oil applications for ERM in the past week. Erika Bent (APM) notes that egg hatch for ERM egg hatch has started Monday and early areas are out of the oil window. Oil application in the later areas may still be possible with little hatch. Dry weather forecast for the weekend with temperatures above freezing should allow for some additional oil applications to be made in these areas.

Never apply captan and oil together or captan within 7 days (preferably 14) prior to or following an oil treatment. Sulphur applications (e.g. Kumulus) are also not compatible with oil and should not be used within 30 days of oil. For European Red Mite control, use either Superior Oil 70 or Purespray Green Spray Oil at 60 L/ha or 20 L of oil per 1000 L of spray. Oil will not affect two-spotted spider mite or apple rust mite as they overwinter as adults.

Spring Caterpillar Complex

With apples at tight cluster to pink it is time for management of the spring caterpillar complex (Figure 3). There are several caterpillar larval insects present on apples from tight cluster through calyx on both fruit clusters and vegetative buds.

Winter moth (WM) is the most common spring caterpillar observed in Nova Scotia. It is difficult to distinguish from the green pug moth (GPM) larvae (the other inch-worm type) at early instars. GPM larvae develop a dark dot which may form into a stripe down the middle of their back which can be used to distinguish them from WM. Other caterpillars that could be found at this stage of development are speckled green fruitworm (SGFW), and obliquebanded leafroller (OBLR).

Overwintering egg hatch for both WM and GPM coincide closely with bud break. Larvae cause economic damage from chewing on young leaves and blossoms. Feeding can be observed at tight cluster as tiny holes in new leaves and flower buds and black specks (i.e. frass). Scouting procedures are described in Perennia's **Best Management Practices for Nova Scotia Apple Production**. See http://www.perennia.ca/wp-content/uploads/2015/09/REV_Best-Management-Practices-for-Nova-Scotia-Apple-Production.pdf. Check your scouting reports for notes on WM, GPM, and other caterpillars for those with scouting services.

Thresholds for WM are lower than those of GPM. WM is of greater concern than GPM as larvae of GPM mature before calyx and don't feed directly on developing fruitlets. Instances of orchards where treatable populations of only GPM occur are rare.

If a treatment for just WM is required, than a Bt product (e.g. Dipel [280 g/ha] or Bioprotec) with a 1/10th rate of Mako (12.5 mL/ha) applied at bud separation has been very effective with a minimum

impact on beneficial insects. If treatments for OBLR (e.g. Twinguard, Delegate, Success, Confirm, Altacor, or Exirel) are required at pink, they should also have some activity on WM and GPM. Similarly, if a pyrethroid is applied for tarnished plant bug (TPB) at pink, it will also have activity on WM and GPM. When possible, full-rate pyrethroids should be avoided because of their negative impact on beneficial insects and predator mites. Anecdotally, it has been observed that orchards receiving full-rate pyrethroids at pink have less problems with European apple sawfly (EAS) later on. Note however, EAS catches have not yet occurred in the valley.

Treatments for spring caterpillars should not be applied until bud separation so product can enter the developing flower clusters where the larvae like to feed.



Figure 3: Eye spotted budmoth (left) and winter moth or green pug moth (centre and right) are caterpillar larvae that are active prior to bloom. These were observed on May 17th, 2016.

Aphids

Rosy apple aphid females called stem mothers will start to feed on cluster leaves prior to bloom causing leaf curling and begin producing live young. Cortland, Gravenstein, and Idared are more susceptible to injury from RAA. Scouting requires examining clusters for the presence of RAA colonies from tight cluster to pink and is described in **Best Management Practices for Nova Scotia Apple Production**.

Insecticide treatment for RAA is most effective when aphids are fully exposed and before they curl the leaves. Therefore, pre-bloom treatment does offer an advantage over calyx application. Blocks with a history of rosy apple aphid infestation may benefit from an insecticide application at pink for this insect.

Pre-bloom product choices include neonicotinoids: Actara (160 g/ha), Assail (80-120 g/ha), Calypso (145-290 mL/ha); the Group 4 subclass insecticides: Closer (100-200 mL/ha), Sivanto Prime (500-750 mL/ha); Group 4C, 5 premix product: Twinguard (250 g/ha), diamide: Exirel (1.5 L/ha) and Group 9: Beleaf (120-160 g/ha).

The use of Assail, Calypso, or Exirel will also have activity on European apple sawfly. Use of Exirel or Twinguard will also have activity on the spring caterpillar complex. Observe all bee toxicity information noted on the label. Note even products with a low bee toxicity recommend spraying during times of low bee activity such as later evenings.

Treatments for black cherry aphid are best timed to petal fall on sweet cherries.

European Apple Sawfly

Jeff Frankling (AAFC) notes European apple sawfly (EAS) adults have not yet been caught in the valley. However, EAS will likely be around by bloom. This pest lays eggs during and directly after bloom on flowers and small developing fruitlets. Larvae damage fruitlets by directly tunneling into the young fruitlet or creating a feeding scar that is very visible at harvest resulting in culls (Figure 4).



Figure 4: Damage from European apple sawfly on Gingergold fruits in 2015. Primary damage leaves a tunneling scar present at harvest (left and right) where secondary damage causes the fruitlet to abort (centre).

In blocks with low to moderate pressure, control of EAS has been recommended at petal fall with Altacor (215 g/ha), Assail (140-240 g/ha), Calypso (290-440 mL/ha), or Exirel (0.5-1 L/ha). However, in orchards with a history of damage and greater numbers of EAS catches, an application of the above products at pink is recommended to control the adults prior to egg laying. Delegate (420 g/ha) has also received a registration for the control of European apple sawfly in the past year.

An application of Assail, Calypso, or Exirel at pink will also control rosy apple aphid whereas Altacor, Exirel, or Delegate will also have activity on the spring caterpillar complex.

Tarnished Plant Bug

The overwintering adult population of tarnished plant bug (TPB) peaks during pink and bloom and adults have been caught now for a couple of weeks. If history of tarnished plant bug damage indicates that pressure is moderate to high, an application of insecticide a pink can be beneficial.

Pyrethroids have the strongest activity on TPB and are the only products currently registered for control of TPB. Pyrethroid application at pink will also reduce any spring caterpillars, some rosy apple aphid, and European apple sawfly if they are present. If Assail, Calypso, or Exirel are applied for RAA, they will also have moderate activity on TPB, but shouldn't be relied upon for control in high pressure, high value orchards. As a reminder, pyrethroids are best used at moderate temperatures (20°C or less) and are harsh on beneficial insects and predator mites and should only be used where potential losses justify their application. It is noted that pyrethroid application prior to bloom for TPB does not affect the other stinging bugs (i.e. apple brown bug and mullein bug) which appear later in the season at petal fall.

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 over the next week as bloom approaches.
- **Grafting**
 - Topworking with bark grafting can begin where bark is slipping.
- **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**
 - Herbicide application should be made to orchards as soon as possible to maximize the weed free window.
- **Tree Planting**
 - Wet weather has delayed tree planting for now. However, planting should resume over the next week when feasible to maximize the growing season of the young orchard.
- **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**
 - Several orchards have had their first mowing in the past week. Keeping the orchard floor cover mowed at this point will minimize dandelion flowers that attract bees prior to bloom which increases the safety of pre-bloom insecticide applications.

Events & Notices

Additional Training Session: AgWeather Atlantic & Fire Blight Management

For the 2017 season, AgWeather Atlantic (<http://atl.agrometeo.org/weather/local/>) will become the primary source of disease model information available to you for fire blight management in apples and pears. AgWeather Atlantic is an online tool developed by Agriculture & Agri-Food Canada and Solutions Mesonet to integrate real time weather data and forecasts with disease & pest modelling for agriculture. The University of Maryland's Maryblyt fire blight model has been incorporated into AgWeather Atlantic this year in addition to a lot of other features currently live. AgWeather Atlantic is available free of charge and 24/7 to anyone with an internet connection.

Perennia Food & Agriculture will be offering a 1.5-hour training session in order to familiarize producers with using AgWeather Atlantic and understanding the fire blight disease model.

An additional training session is being held in Perennia's training room at the Kentville Agriculture Centre on:

Thursday, May 11th @ 1:30 PM

Producers are encouraged to bring any browser-enabled device (laptop, smartphone, tablet etc.) to follow along though this is not essential.

Capacity in this room is limited to 20 people and **PRE-REGISTRATION IS REQUIRED TO CONFIRM A SPOT**. Please contact Gail Walsh @ 902-678-7722 or gwalsh@perennia.ca to confirm number of people attending.

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