

Orchard Outlook



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Fruit Development

Earlier cultivars are sizing up to the 20 mm range while later cultivars and later areas are in the 6-12 mm range (Figure 1). Pear fruitlets are up to 20 mm, while all stone fruit are now beyond the shuck stage.



Apple: 6-20 mm



Pear: 10-20 mm



Peach: ½"-3/4"
length



Plum: ½"-3/4" length



Sweet Cherry: Marble-sized fruit

Figure 1: Tree fruit buds observed on June 13th, 2017 in the Kentville/Greenwich area.

Degree Day Accumulations

Degree day accumulations from March 1st to June 13th are slightly above the 5- and 10-year averages for this point in the season (Figure 2).

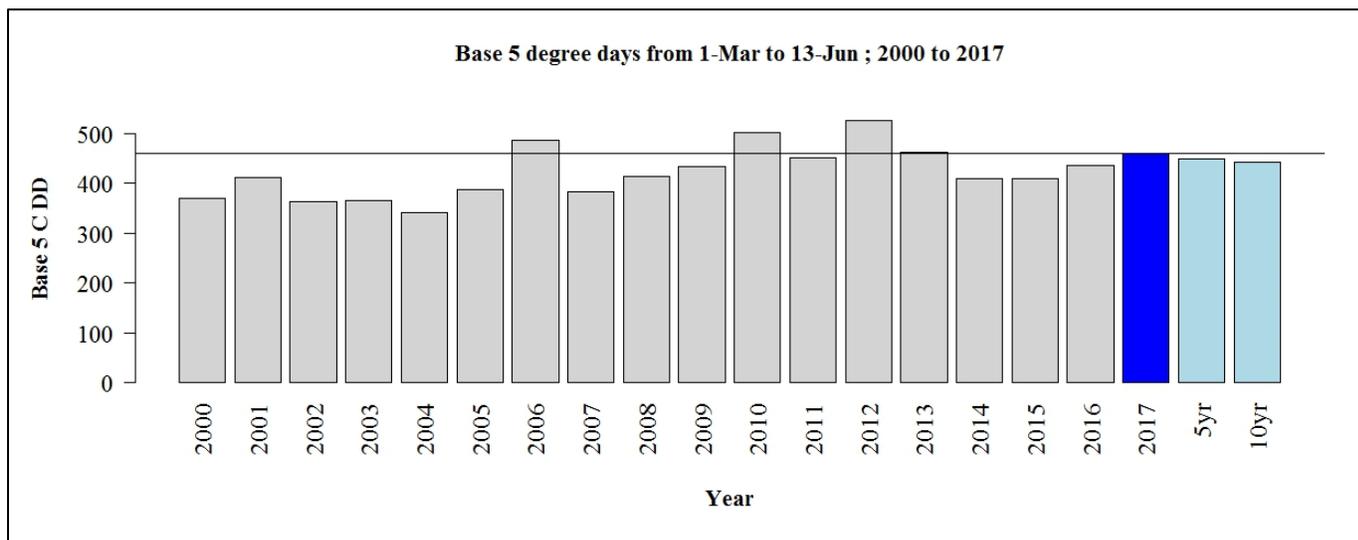


Figure 2: Degree day accumulations from March 1st for the past 18 seasons. Provided by Jeff Franklin (AAFC).

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

- About 2% more plant development heat units compared to the 5-year average.
- About 6% more plant development heat units compared to 2016.
- About equal insect development heat units compared to the 5-year average.

2017 Precipitation Accumulations

Table 1: Precipitation totals for the 2017 growing season recorded at Kentville AAFC compared with the 10 year average. The precipitation for June 2017 is based on a partial month.

	April	May	June	Totals
Rainfall 2017 (mm)	27	110	54	191
Average Rainfall (2007 -2016) (mm)	71	67	97	235

Diseases

Apple & Pear Scab

Two secondary scab infection periods were recorded this week at Kentville AAFC. The first began at 10:00 am on Friday, June 9th and lasted until 3:00 am on Saturday, June 10th for a duration of 17 hours at an average temperature of 11.7°C resulting in a secondary conidia infection where primary infections have become established. The second began at 9:00 pm on Monday, June 12th and lasted until 8:00 am on Tuesday, June 13th for a duration of 11 hours at an average temperature of 18.0°C resulting in a secondary conidia infection where primary infections have become established. There have been a total of 10 primary infection events and 3 secondary infections since the beginning of the season. Further wetting events will result in secondary infections when conditions are adequate.

The ascospore maturity model reached 100% for Kentville AAFC on June 8th, nearly a week ago, and therefore, ascospore release and primary scab infection risk should be complete for the season. The final primary infection event took place on May 31st/June 1st and any lesions from this infection period should be showing up this week if they occurred. You will know this week if your protection for primary scab infections was adequate. Further infection risk from apple scab this year will depend on the presence of primary lesions. If you do not have primary lesions showing up in the orchard this week, it would be reasonable to begin considering reduced fungicide rates (where labels allow) and longer intervals of fungicide sprays if the orchard is clean of scab.

The application of a fungicide to reduce apple scab spread after an infection event acts as a means of selection for resistance and should be avoided as much as possible. However, where an infection period has resulted in primary infections, growers may wish to consider applications for the purpose of “burning out” scab (reducing secondary spore production). Dodine can be effective as a post-symptom product to arrest scab infections – products are Syllit or Equal. These products should be mixed with a full rate of protectant, and preferably Captan for secondary diseases, for best efficacy as well as resistance management.

Syllit 400 FL – 5.3 L/ha, Equal 50 WP – 3.25 kg/ha

Note that the pre-harvest interval for EBDC fungicides (e.g. Manzate, Dithane, Polyram) for fruit destined for the United States is 77 days versus 45 days for the domestic market. An application of Manzate on June 15th would require until the 1st of September to meet pre-harvest requirements for the United States.

Powdery Mildew

There are two different powdery mildew symptoms now present in orchards. The first one are the flag shoots from the primary infections of buds which were actually infected prior to terminal set of last year’s growing season (left image) (Figure 3). Powdery mildew control products applied this season will not “clean up” the primary infections on these shoots. The second symptom of powdery mildew is new infections on the underside of the developing leaves and shoots (right image). Powdery mildew control products applied this year are intended to control the development of new infections. As apples are past petal fall, the main risk for mature trees has passed – the risk of powdery mildew russetting on fruit. Therefore, mature trees do not need further powdery mildew control at this point. However, on young trees, new infections can disrupt tree growth and hinder establishment. These new infections can occur until terminal bud set and powdery mildew control should be maintained until terminal set on orchards still filling space.



Figure 3: Primary infection of powdery mildew (left) and secondary infection of new leaves and terminals (right). Fungicides in the current season are intended to protect the new leaves and terminals, not clean up primary infections which were actually initiated last year.

Fire Blight

Continue to monitor Maryblyt models for blocks with remaining bloom and newly planted orchards which are coming into bloom. After scouting a couple of high pressure orchards yesterday, I have not observed any fresh blossom blight infections this year. Models suggest most symptoms from the May 19th infection should now be developed. It will probably be apparent by the end of the week if any blossom blight did occur this year. Shoot blight infections can often be confused with *Nectria* canker infections (see below) at this time of year.

Fire Blight – Shoot Blight Management & Apogee

Second Apogee applications should be made approximately 10-14 days after the initial application for best growth suppression and shoot blight control.

***Nectria* (European) Canker**

Fire blight strikes can often be confused with *Nectria* (European) canker infections. I have observed several *Nectria* twig blight strikes in orchards this week. *Nectria* twig blight is very often found on bourse shoots of a cluster where a fruit was picked last fall with the stem left on the tree (Figure 4).



Figure 4: Nectria twig blight (also called European canker) can resemble fire blight strikes.

Symptoms of Nectria twig blight include wilted shoots and shepherd's crooking, similar to fire blight. However, Nectria shoot blight usually begins from the base upwards, and there is never ooze present. Nectria infections also often typically have orange coloured fruiting bodies near the base of last year's clusters.

In comparison, shoot blight from fire blight usually begins from the tip down, usually bacterial ooze is present, and the midvein or petiole of the leaf appears symptomatic before the leaf blade.

Nectria infections should still be pruned and discarded where found but it is not nearly as aggressive as fire blight.

Brown Rot

After shuck fall, fungicide applications for brown rot should be maintained until June drop in cherries and pit hardening in peaches which occurs early to mid-July in Nova Scotia. Fruit again become susceptible to brown rot infections in the final 3 weeks before harvest. This means that early peaches can be susceptible to brown rot infections nearly all season. Remember to check pre-harvest intervals on these products.

Insects

European Apple Sawfly, Plum Curculio, Tarnished Plant Bug

Damage can now be observed from these pests, however, they are beyond the period for effective control. Take note of damage for next season.

Mullein Bug & Apple Brown Bug

Check your scouting reports or monitor for mullein bug and apple brown bug by limb tapping. If treatments are required for stinging bugs, they should be made as soon as possible.

Aphids

Both Rosy Apple Aphid (Figure 5) and Green Apple Aphid colonies are expanding quickly where present. The list of products for aphid control is long: Actara, Admire, Assail, Calypso, Clutch, Closer, Sivanto Prime, Twinguard, Beleaf, Movento, and Exirel.



Figure 5: Rosy apple aphid colony causing leaf curling on Gala.

Codling Moth

Two dates are being considered for biofix this season, June 7th is being used for the earlier sites while June 12th is being used for the mid to later developing areas. The treatment timing for egg hatch products (Assail, Calypso, Delegate, TwinGuard, Confirm, Intrepid, Altacor, and Exirel) is 100 degree days Celcius from biofix. The product Rimon has ovicidal activity and should be applied a bit earlier, usually around 60-80 degree days. For organic production, codling moth Granulovirus should also be timed for egg hatch around 100 degree days. A comparison of codling moth products is provided below (Table 2).

For the Kentville model (biofix June 7th), as of yesterday, approximately 60 degree days have accumulated since biofix. The 100 degree day threshold is currently expected to occur by the middle of next week based on the forecast. Therefore, egg hatch products could begin early next week in the earlier developing blocks. If you intend to use Rimon for codling moth control which has ovicidal activity, it should be applied towards the end of the week for the earlier developing sites.

For the mid to later area model (biofix June 12th), as of yesterday, approximately 20 degree days have accumulated since biofix, so the 100 degree day threshold will be a bit later. Currently estimated around June 25th.

Control of codling moth with Imidan is typically slightly later at 140 degree days after biofix. This is predicted to be the final week of June for those intending to use Imidan. Note Imidan is more costly than some of the other products available and has much stricter requirements on REI. Perennia trials have observed good efficacy of Group 28 Insecticides which also have better rainfast characteristics than Imidan with similar or lower cost (**Error! Reference source not**

found.) Consider getting experience with alternative chemistries if you have relied on organophosphates for codling moth control.

There is no need to consider obliquebanded leafroller or apple maggot activity of the first insecticide for codling moth as these pests are not at the correct stage for treatment.

Thresholds for treatment were traditionally 40 moths per trap. However, based on high value varieties, thresholds have moved towards 10-20 moths per trap. Speaking to Jeff Franklin (AAFC), trap captures for codling moth this year are very high compared to other years and this pest could be of greater concern than its relatively weak presence over the past few years.

Wondering about rainfall and insecticide activity? The following article is well worth reading from Dr. John Wise of Michigan State University on rainfastness of various insecticide classes: http://msue.anr.msu.edu/news/rainfast_characteristics_of_insecticides_on_fruit

Some highlights discussed:

- A drying time of 2-6 hours is sufficient for most insecticides to stick the product to the leaf or fruit.
- Neonicotinoids are an exception to the above and up to 24 hours is need for optimal penetration.
- Rainfall of 25 mm (1 inch) or more is generally sufficient to remove most residues required for product efficacy on codling moth including Neonicotinoids (Assail, Calypso), IGR's (Confirm, Intrepid, Rimon), and organophosphates (Imidan). This will require re-application of the insecticide to adequately protect fruit.
- Spinosyns (Delegate, TwinGuard) and Diamide (Altacor, Exirel) insecticides are more rainfast than other products, however, will require application with 50 mm (2 inches) of rainfall.

Table 2: 2017 Control Options for Codling Moth

Product	Rate & Max # Applications	REI	Application Timing	Other Pests	~ Cost (\$/ha)
Organophosphate – Group 1B Insecticides					
Imidan 70 WP	2.68 kg/ha Max 5 Apps.	7-30* days	140 Degree Days °C After Biofix	Leafrollers	150
*Additional PPE required for hand-thinning activities within 30 days of application.					
Neonicotinoid – Group 4A Insecticides					
Assail 70 WP	120-240 g/ha Max 4 Apps.	6 days (hand-thinning)	100 Degree Days °C After Biofix	Aphids	112-223
Calypso 480 EC	290-440 mL/ha Max 3 Apps.	12 Hours	100 Degree Days °C After Biofix	Aphids, Leafhoppers, Mullein Bug	88-133
Spinosyns – Group 5 Insecticides					
Delegate 25 WG	420 g/ha Max 3 Apps.	12 hours	100 Degree Days °C After Biofix	Leafrollers	190
Group 4C + Group 5 Insecticide Premix					

TwinGuard	500 g/ha Max 2 Apps.	12 Hours	100 Degree Days °C After Biofix	Leafrollers, Aphids	264
Benzoylureas – Group 15 Insecticides					
Rimon 10 EC	0.93-1.4 L/1000 L Max 4 Apps.	12 Hours	60-80 Degree Days °C After Biofix		83-124
Diacylhydrazines – Group 18 Insecticides					
Confirm 240 F	1.0 L/ha Max 4 Apps.	12 Hours	100 Degree Days °C After Biofix	Leafrollers	132
Intrepid 240 F	1.0 L/ha Max 2 Apps.	12 Hours	100 Degree Days °C After Biofix	Leafrollers	131
Diamides – Group 28 Insecticides					
Altacor 35 WG	145-215 g/ha Max 3 Apps.	12 Hours	100 Degree Days °C After Biofix	Leafrollers	79-117
Exirel 100 SU	500-750 mL/ha Max 4 Apps.	12 Hours	100 Degree Days °C After Biofix	Leafrollers, Aphids, Leafhoppers	100-150
<i>Cydia pomonella</i> Granulovirus – Not Classified					
Cyd-X SU Virosoft SU	250 mL/ha	12 Hours	80-100 Degree Days °C After Biofix		

Mites

It is generally early for miticide applications yet with the exception of Agri-Mek. Growers that would like to use Agri-Mek (170 mL/ha) plus oil (10 L/ha) for mite control have about 6 weeks after petal fall to apply the product. That being said, it has been noted that residual mite control with Agri-Mek in combination with spray oil is greater from spray deposits on newer leaves compared to older leaves, so it would be best to apply it by the end of the month. Remember to avoid Captan/Maestro in your cover sprays for a minimum period of 7-14 days before/after an Agri-Mek + oil application. Use another fungicide from the Pome Fruit Management Guide.

Check your scouting reports to see if there is a treatable population. There are a number of miticides that can be used for summer mite control including Acramite, Kanemite, Nexter, Envidor, and Nealta. Note Acramite, Kanemite, and Nealta do not control apple rust mite.

White Apple Leafhopper

Sevin applications on mature blocks will control leafhopper but monitoring non-bearing plants for leafhopper. If treatment is required, a neonicotinoid, Sivanto Prime, or Exirel would control leafhopper and also pick up aphids.

Horticulture

Apple Thinning

Most orchards requiring thinning have received applications to date of Sevin XLR, Fruitone (NAA), and/or Maxcel (6-BA). I've observed some good size differentiation and thinning effect in some blocks, while others have fruitlets all still growing pretty steadily with little thinning effect apparent. Early cultivars are generally out of the thinning window now with fruit size

approaching 20 mm. Most mid to later cultivars still have an opportunity for some follow-up thinning applications.

Charlie Embree (AAFC-retired) and Douglas Nichols (formerly of NSFGA) prepared a very useful table and tips for chemical thinning in Nova Scotia. This has not been updated since 2013 but is still very relevant and helpful as it is based on trial work done in NS. See the May 24th Orchard Outlook for the attachment. However, please note the recent changes to Sevin XLR below:

CHANGES TO SEVIN XLR MAXIMUM APPLICATION RATE:

For the 2017 season, Sevin XLR has a maximum yearly application rate of 3.22 L/ha for trellised orchards and 2.15 L/ha for non-trellised orchards. In cultivars that were typically thinned with combinations of Sevin XLR & NAA or Maxcel with a rate of Sevin exceeding these new yearly maximums, you may need to consider increasing the rate of NAA or Maxcel slightly to compensate for a lower rate of Sevin XLR.

Chemical thinning is one area where one often encounters rate suggestions in PPM. For information on how to prepare PPM sprays, see the following Perennia factsheet:

<http://www.perennia.ca/wp-content/uploads/2015/09/Spray-PPM-for-Web.pdf>

For further information on chemical thinning and thinners, see the factsheet Thinners and Growth Regulators for Fruit Trees: <http://www.perennia.ca/wp-content/uploads/2015/09/THINNERS AND GROWTH REGULATORS FOR FRUIT TREES.pdf>

To defruit young trees, a suggestion from Michigan was to use a combination of Sevin XLR at 2.5 L plus Maxcel at 5.0 L per 1000 L of water. A few litres of oil can also be added as a spreader sticker to this combination. A grower in Nova Scotia has tested Sevin XLR at 2.0 L plus Maxcel at 4.0 L plus 2 L oil plus Agral 90 at 0.5 L in 500 L/ha of water with good results to strongly thin young trees. Apply between petal fall and 8-10 mm. A second application can be done before 18 mm if additional thinning needed. NAA can also be used to defruit young trees but tree stress from NAA and reduced growth may result.

Pear Thinning

As pear size is past 14 mm in almost all areas, the window for reliable chemical fruitlet thinning has closed. Any excess fruit will have to be hand thinned at this point.

Calcium (Ca) Sprays

The goal of Ca sprays is to increase the concentration of Ca in the fruit and reduce the incidence bitter bit at harvest and during storage. Honeycrisp and Northern Spy are quite sensitive to bitter bit. Large fruit of cultivars like Cortland, Gravenstein, and Jonagold are also susceptible. Young trees typically have worse problems with bitter pit. The downsides of Ca sprays are possible advanced maturity and leaf burn resulting in reduced yield and size in some cases.

Ca sprays have traditionally been applied at two-week intervals starting in early July if you are applying four sprays or mid-June for six sprays. Where bitter pit is an annual problem and additional Ca is required, sprays can be continued up until harvest.

Newer recommendations have suggested beginning calcium sprays 1-2 weeks after petal fall (Cornell & Michigan State University Extension) using 1-2.5 kg of calcium chloride flake per 1000 L of water for 3-4 sprays before switching to higher rates of 4.5 kg per 1000 L of water for the later sprays.

Calcium chloride flake (77% Ca) is the most economical Ca material to use but also the highest risk for foliar burn and is corrosive to spray equipment. Other liquid calcium products or calcium nitrate may also be used to provide the same amount of elemental calcium per spray. The cost per unit of active ingredient will be higher with these products. If nitrogen levels are adequate, it is best not to apply additional nitrogen to the trees with calcium nitrate to avoid a reduction in colour development and possible storage issues. Do not apply calcium nitrate past July. Excessive nitrogen can also make bitter pit problems worse.

Ca has very low movement within the tree and needs to be applied directly to the fruit surface to be absorbed. Therefore, thorough coverage is important to cover developing fruit. Ca should not be applied as concentrate. Use higher volume sprays. It is recognized that ensuring adequate boron sufficiency and avoiding excess potassium can also aid in Ca uptake of the tree.

Calcium chloride is compatible with most wettable powder fungicides and pesticides including Captan when applied dilute, however, risk of leaf injury may be enhanced by Captan in some cases. Dissolve calcium chloride in a pail first and thoroughly mix in the spray tank before adding other products. Incompatibility has been observed with Polyram, Epsom salts, and liquid or emulsifiable pesticide formulations in some cases. Also it should not be applied with Apogee.

Mowing

Regular orchard mowing will help conserve soil moisture as well as discourage the buildup of rodent populations.

Young Trees

Make an effort to get young trees properly trained (single leaders, removing forking of branches, exceedingly large diameter branches) to ensure the best and most uniform growth for your future orchard. Leaders should be securely tied to encourage growth and at minimum fruit on the top 60 cm of leaders should be removed if the planting still needs to reach the top of the trellis. Consider de-fruiting first and second year trees entirely.

First and second year trees could also benefit from a second nitrogen application in many cases.

Herbicide

It is especially important to maintain good weed control during June and July on young plantings which need to develop vegetative growth. Studies have shown that weed competition during this time can have a significant negative impact on early cropping of young blocks.

Foliar Nutrients

Application of foliar urea and magnesium can continue this week to supplement tissue levels where they are low. If you are applying thinners, it is probably best to save the foliar nutrients

for another spray. Reducing the effectiveness of a thinning spray will have a much greater impact on returns compared to a small gain from improving tree nutrient status.

Peach Thinning

As peaches are now in the green fruit stage they are ready for hand thinning. Peaches should be spaced at 6 inches apart from the next peach regardless of branch for commercial sized peaches (Figure 6).



Figure 6: Unthinned peach branch (left) and hand-thinned branch (right).

Events & Notices

Apple Maggot Eradication Program

Elizabeth Nichols is the Apple Maggot Eradication Technician again this year. The apple maggot over-winters as a pupa in soil and adults emerge from late June through September, with peak flight into commercial orchards in August. Emergence is closely linked to soil moisture levels—in dry years, some pupae remain in the soil until the following growing season.

Apple Maggot flies are strong fliers and field studies indicate they fly up to 3 km from alternative hosts. Thus, controlling alternative hosts including American hawthorn or wild apple trees within 300 meters of commercial orchards helps to reduce pressure from migrating flies.

Elizabeth is here to help growers control apple maggot so if you are aware of any hawthorn or wild apple trees within that 300 m radius, please contact Elizabeth at (o) 902-678-1093; (c) 902-670-3599; or enichols@nsapples.com.

Brown Marmorated Stink Bug

Researchers are on high alert for the Brown Marmorated Stink Bug which has damaged apple crops in the US. These pesky bugs have gone from 2 or 3 states in 2010 to 43 states in 2017, wreaking \$37m worth of havoc on the apple industry in the northeastern US alone. They have been found in B.C. and parts of Ontario as well as the Montreal corridor in Quebec.

Researchers in the Atlantic provinces have been keeping an eye out for the insect since 2012. At this time, there have been no captures in Nova Scotia or New Brunswick.

Nova Scotia has one type of stink bug already and if the brown marmorated bug was to do in Canada what it did in the US, it would become a real problem for agriculture, in particular, the tree fruit industry, earning it as much of a bad reputation as the apple maggot.

This stink bug has unique characteristics: distinctive white bandings on its legs and antennae, inward-pointing white triangles between dark markings along the edge of the abdomen, and a smooth edge along the pronotum or “shoulders.”

If you think you’ve found a brown marmorated stink bug, please contact Dr. Suzanne Blatt of the Kentville Research Station, at Suzanne.blatt@AGR.GC.CA. Dr. Blatt is asking all growers to be on the lookout for this pest.

Thank you for your attention to these destructive pests. We want to stay on top of them for the sake of our industry.

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.fruittree.org/Events/2017-Study-Tour> for more information.

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