

Orchard Outlook



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Bud Development	Diseases	Insects
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The tough forecast is making for some very important spray decisions on managing tree fruit diseases over the coming week.

Bud Development

Bud development advanced considerably this past week. Early developing apples and pears in warm sites are approaching or are at the tight cluster stage (Figure 1). Peach buds were showing the first pink and plum and cherry buds will soon be showing the first signs of white bud.



Apple: Green Tip – Tight Cluster



Pear: Blossom Bud Exposed



Peach: First Pink



Plum: Bud Burst



Sweet Cherry: Bud Burst

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

Degree Day Accumulations

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

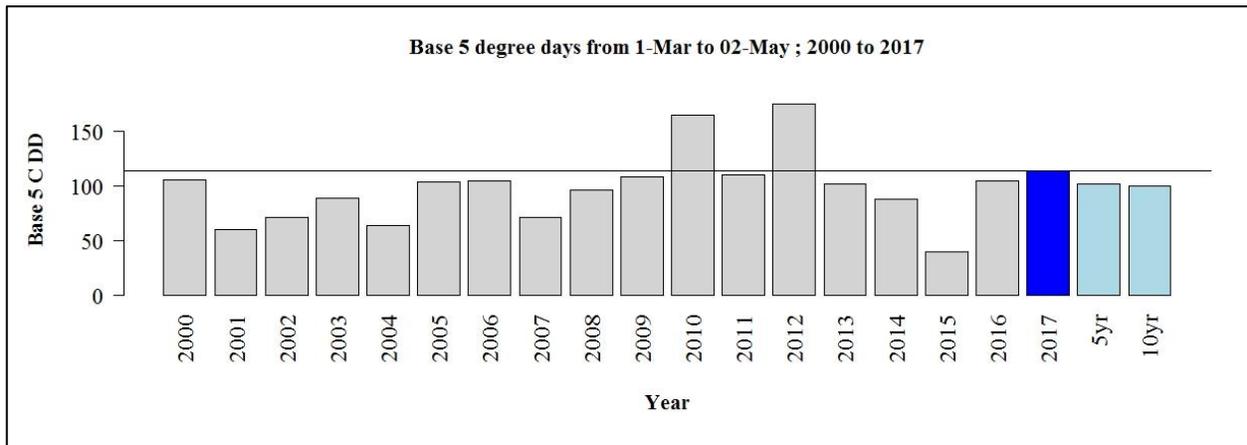


Figure 2: Degree day accumulations from March 1st for the past 18 seasons. Provided by Jeff Franklin (AAFC).

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

- About 12% more plant development heat units compared to the 5-year average.
- About 9% more plant development heat units compared to 2016.
- About 21% more insect development heat units compared to the 5-year average.

Diseases

Apple & Pear Scab

This past week was a difficult one for apple & pear scab with three different infection periods recorded at AAFC Kentville. For the first event, wetting began at 3:00 am on Wednesday, April 26th and the infection period began at daylight (6:00 am) with intermittent wetting lasting until 10:00 am on Thursday, April 27th. As the intermittent dry periods were shorter than 8-12 hours, this wetting period is considered a single infection event. Therefore, the wetness duration is a total of 28 hours at an average temperature of 12.8°C resulting in a heavy primary infection.

In the second event, wetting began at 6:00 pm on Friday, April 28th and lasted until 8:00 am on Saturday, April 29th for a duration of 14 hours at an average temperature of 12.5°C resulting in a light primary infection. In the third event, wetting began at 9:00 am on Monday, May 1st and lasted until 6:00 pm on Tuesday, May 2nd for a duration of 33 hours at an average temperature of 6.5°C resulting in a moderate primary infection.

About 17% of the seasonal ascospore load has matured as of today and most of the mature spores would have released with Monday/Tuesday's wetting. With warm temperatures in the forecast, additional spores will have matured for the wetting event predicted through the weekend and into early next week.

With the rainfall over the past couple of days and all of the new tissue growth due to the warm temperatures, any fungicide protection made at the end of last week or earlier should be renewed today or Thursday prior to the next wetting event.

Renew your fungicide protection for apple scab on about a 7 day interval, with a shorter interval after wet weather or rapid tissue growth. Protectant fungicide residues are washed off leaves with as little as a few mm of rainfall, are substantially lower after 25 mm of rain (1") and are generally completely depleted after about 50 mm of rain (2").

As many blocks will be coming into the period of critical control for powdery mildew in the coming week, select one of the fungicides with powdery mildew activity for the coming spray. 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. One of the Group 7 (SDHI fungicides) or Group 7 premixes would be an excellent choice. Most offer 48-72 hour post-infection activity for apple scab which would give some control over Monday/Tuesday's infection period. Their systemic activity is also useful when there is rapid tissue development as they move into the leaf and travel into new leaf tissue as leaves expand. Including at least a 3 kg/ha of a protectant fungicide is always prudent for resistance management and if the label requires a full rate, follow label directions.

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

Overwintering inoculum of powdery mildew will begin to infect flower clusters and vegetative shoots typically around the tight cluster stage of development (Figure 3).



Figure 3: Overwintering inoculum of powdery mildew on terminal shoots of Idared (left), new infection (red arrow) on underside of young leaf of expanding terminal (centre), and infected flower cluster (red arrow) – note reduced expansion compared to neighbouring healthy cluster (right).

The critical period for control of new powdery mildew infections on bearing trees is between tight cluster and petal fall. The main reason to control mildew infections on bearing trees is avoiding any potential issues with powdery mildew-induced fruit russet. However, severe infections can reduce vegetative growth, which is particularly a concern for non-bearing orchards. During the tight cluster to petal fall period, using a fungicide or a combination that provides control of both powdery mildew and apple scab would be recommended.

SDHI fungicides (Group 7) generally offer excellent control of apple scab and good control of powdery mildew. Aprovia Top (643 mL/ha), Aprovia (500 mL/ha), Fontelis (1.0-1.5 L/ha), Sercadis (333 mL/ha), Luna Tranquility (800 mL/ha), and Pristine (1.0-1.2 kg/ha) are all SDHI options which will provide control of both powdery mildew and apple scab at the listed rates. Note some SDHI's require a full or half rate of protectant on the product label for resistance management and/or to improve fruit scab control. Even if the label does not require any protectant, including at least a half rate of protectant with single-site fungicides (which are anything besides Group M) is a good practice for resistance management. The SDHI fungicides are very effective and offer little resistance at this point – their use should be managed to minimize resistance development.

Resistance testing done in 2011-2013 indicated little resistance to DMI fungicides (Group 3) in powdery mildew samples in Nova Scotia. Therefore, the use of both Nova (340 g/ha) or Fullback (950 mL/ha) will provide excellent control of powdery mildew. Fullback's active ingredient flutriafol (marketed as Topguard in the United States) is a very potent mildewcide in Cornell test trials, outperforming Nova, and is a worth a look if you have heavy powdery mildew pressure. However, as resistance to DMI fungicides has been observed in apple scab in Nova Scotia, DMI

products must be mixed with a full rate of protectant to ensure adequate protection from apple scab. Note solupacks (e.g. Nova) may not dissolve properly with the presence of oil or boron in the spray tank.

Strobilurin fungicides (Group 11) also have activity on both powdery mildew and apple scab. However, resistance testing done in Nova Scotia indicated some resistance to both Flint and Sovran in powdery mildew samples. Therefore, the strobilurins should not be your top choice for powdery mildew control. In addition, in apple scab samples from Nova Scotia, just 1 out of 18 orchards had apple scab isolates with indications of reduced sensitivity to Flint. Therefore, the strobilurins remain as excellent materials for apple scab control and also offer uniquely long post-infection activity – Flint 72-96 hours; Sovran 48-72 hours – compared to most other fungicides available. Therefore, their use is most justified prior to or following long scab infection periods with heavy rainfall when other fungicide residues may have been depleted. Strobilurins also provide activity on many of the summer diseases as a secondary benefit when used after petal fall.

Fire Blight

Delayed dormant copper application for fire blight suppression should be applied by half-inch green to avoid any issues with fruit russeting later on. The earliest cultivars/areas have passed this stage already and copper application would now be risking possible phytotoxic effects to developing fruit surfaces at petal fall. Later areas and cultivars still have an opportunity for this application but this will quickly be coming to an end in the next few days.

Brown Rot

With peaches approaching pink and white bud in plums and cherries not too far off, fungicide protection from brown rot will be required on stone fruit blocks over the coming week. 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>.

Insects

European Red Mite

Delayed-dormant oil for control of overwintering European red mite eggs will soon be required. However, with the wet weather in the forecast, apple scab protection will be the main focus for this week. ERM and other insects will be addressed further next week.

Horticulture

- **Fertilizer**
 - Bud break to bloom is the ideal time for granular fertilizer application to maximize tree growth. Where the need has been demonstrated, foliar nutrients can also improve tree growth and maximize yield and quality. Foliar zinc application to correct a deficiency is most effective early in bud development and should go on in the next week.
- **Lime**
 - Lime addition to raise pH is best applied as soon as possible to get the product working in the top layer of soil before the season. Surface applied lime will take a number of years to adjust pH of the soil profile so it is best to apply annually or biannually if you can where it is needed. Target a soil pH of 6.0-6.5.
- **Herbicide**
 - Studies have shown maintaining weed free strips from bud break to 30-days after full bloom has the greatest impact on tree growth and yield. Timely herbicide application will ensure you make the most of the weed free window. Residual herbicides such as Chateau, Alion, and others offer a much longer weed control period than post-emergent products such as Ignite, Gramoxone, and glyphosate.
- **Pruning**
 - With bud break beginning, ensure that your youngest blocks are pruned first to ensure growth is directed into desirable leader and terminal extension.
- **Grafting**
 - It is still too early to begin bark grafting methods for top working trees.
- **Nursery**
 - Check to see if buds are beginning to push in home nurseries. Once the buds begin to push the remaining rootstock above should be cut off.

Weed Control Update for Tree Fruit Nursery Production

On-farm nursery production of apple trees has substantially increased over the past several years due to a shortage of fruit tree availability from commercial nurseries in North America. A strong weed management program is essential to successful nursery tree production as new plantings of rootstock, bench grafts, or budded trees are not as competitive with weeds as are larger finished trees from a nursery. Weed control in on-farm nurseries has typically involved a combination of mulch, postemergent herbicide application, and/or hand weeding. The advantages and disadvantages of each method are outlined below (Table 1).

Table 1: Advantages and disadvantages of weed control methods for nursery tree production.

Weed Control Method	Advantages	Disadvantages
Mulch (plastic or bark)	Long term non-chemical barrier Very uniform weed control Prevents weed competition early Helps with moisture retention	Cost & time to set up/apply mulch Fertilizer application more difficult Provides rodent habitat Must remove mulch prior to digging
Herbicide application	Rapid weed control Control weeds at early stage Can be selective for certain weeds	Need to ensure crop safety Need to ensure applicator safety
Hand weeding	Safe for the crop Non-selective weed control	Requires a lot of time Costly Weeds often get controlled too late

Due to their ease of use and weed control efficacy, herbicide application remains the most common form of weed control in on-farm nursery tree production in Nova Scotia. In order to effectively manage weeds in tree fruit nurseries, both preemergent and postemergent herbicides are available.

Preemergent herbicides need to be applied to apple tree nurseries shortly after transplanting trees into the nursery. A soil-settling rainfall of 15-25 mm is advised prior to making any preemergent herbicide application to newly planted nursery trees. Following a soil-settling rainfall and prior to weed emergence, preemergent herbicides can be applied by tractor-mounted boom (or backpack sprayer in some cases) either overtop or banded along the rows of newly planted trees. If overhead application is used, the trees must not have emerged tissue or burning may occur with some products. These herbicides work by inhibiting germination and/or early growth of weeds preventing their establishment. For most preemergent herbicides, further rainfall of 15-25 mm is required within 1-2 weeks to move the herbicide into the soil. An effective preemergent program can reduce the need for postemergent herbicide application later. Preemergent herbicide options for Nova Scotia are listed below (Table 2).

Postemergent herbicides provide control of emerged and established weeds by foliar spray. The most popular herbicide of choice in tree fruit nurseries has been the postemergent herbicide Gramoxone (paraquat) due to a high degree of crop safety. **New label instructions effective November 24, 2016 prohibit the use of Gramoxone herbicide in hand-held sprayer equipment including backpacks in tree fruit nurseries.** Gramoxone may still be applied in tree fruit nurseries but must be applied by tractor-mounted spray equipment. A listing of postemergent herbicide products and their suitability by application type is provided below (Table 3).

Preemergence Herbicide Options For Apple Nurseries

The application information below refers to boom type sprayer application covering an entire treated hectare. For band applications, use proportionally less spray mixture based on the area actually sprayed so that a full rate is not concentrated into the band which may result in crop injury.

Table 2: Preemergent herbicide options for newly planted apple tree nurseries.

Product	Application Rate	Notes
<p>Sandea <i>halosulfuron</i> Group 2</p> <p>Weeds Controlled: Annual Broadleaves Some Perennials</p>	<p>35-70 g/ha in at least 140 L/ha of water</p>	<p>Pre Emergence and Post Emergence application for control of labeled broadleaf weeds: Apply uniformly with ground equipment in a minimum of 140 L of water per hectare. Apply as a broadcast application to orchard floor on each side of the tree rows. Apply a single or sequential application (minimum of 21 days between applications) of 35 – 70 g/ha based on weed pressure and size. If small weeds are present, to maximize and enhance the spectrum of broadleaf control tank mix with a post emergence broad spectrum type herbicide.</p> <p>For pre-emergence application, do not apply SANDEA WG HERBICIDE if excessive weed growth prevents contact with the ground.</p>
<p>Princep Nine-T <i>simazine</i> Group 5</p> <p>Weeds Controlled: Annual Grasses Annual Broadleaves Some Perennials</p>	<p>1.2-2.2 kg/ha in 300 L/ha of water</p>	<p>Apply once per season. Avoid contact with trunk and leaves of trees. Do not use on sandy soils with organic matter less than 2%. Apply post planting, pre-emergent to weeds, preferably after rain has settled the soil around the trees. Backpack sprayer or tractor mounted boom may be used for application. Late season emerging fall panicum and crabgrass may escape treatment.</p>
<p>Dual II Magnum <i>s-metolachlor</i> Group 15 + (Tank Mix) Princep Nine-T <i>simazine</i> Group 5</p> <p>Weeds Controlled: Annual Grasses Annual Broadleaves Some Perennials</p>	<p>Dual II Magnum Herbicide 1.25-1.75 L/ha plus Pricep Nine-T 1.1-2.2 kg/ha in at least 150 L/ha of water</p>	<p>Apply once per year. Avoid contact with trunk and leaves of trees. Do not use on sandy soils with less than 2% organic matter. Best results are obtained with applications made after rain has settled the soil around trees. Use only a tractor-mounted boom sprayer to apply.</p>
<p>Sinbar <i>terbacil</i> Group 5</p> <p>Weeds Controlled: Annual Grasses Annual Broadleaves Some Perennials</p>	<p>1.25 kg/ha in 150-300 L/ha of water</p>	<p>For control of annual weeds in first year fruit trees, apply SINBAR® Herbicide WDG at 1.25 kg/ha by field sprayer. Use 150 - 300 L of water per hectare. Make one application per season. DO NOT use on soils coarser than sandy loams with less than 3% organic matter. NOTE: control of pigweed may be inconsistent with this treatment.</p>

Postemergence Herbicide Options For Apple Nurseries

For postemergent herbicide treatments in tree fruit nurseries, it is strongly recommended that equipment be fitted with an appropriate drift shroud or shield around the nozzle to prevent herbicide contact with green tissue and immature bark. This includes hand-held equipment such as backpack sprayers.

Table 3: Postemergent herbicide options for newly planted apple tree nurseries.

Product	Application Rate*	Application Notes
<p>Basagran bentazon Group 6</p> <p>Application By: Backpack – Yes Tractor – Yes</p> <p>Weeds Controlled: Annual Broadleaves Some Perennials</p>	<p>2.25 L/ha + ASSIST or XA Oil Concentrate at 1-2 L/ha in 100-400 L/ha water</p>	<p>Tolerant as a directed spray only. Do not overspray.</p>
<p>Ignite 15 SN <i>glufosinate</i> Group 10</p> <p>Application By: Backpack – Yes Tractor – Yes</p> <p>Weeds Controlled: Annual Grasses Annual Broadleaves Some Perennials</p>	<p>2.7-5 L/ha in 330-1100 L/ha water or 27-50 mL/10 L in backpack</p>	<p>IGNITE 15 SN is recommended for the control of weeds in established orchards and vineyards.</p> <p>POWER AND/OR TRACTOR OPERATED SPRAYERS Apply IGNITE 15 SN at 2.7-5 L/ha for the control of annual grass and broadleaf weeds. Use as a directed spray around the base of the trees or vines.</p> <p>HAND HELD PUMPTYPE AND BACKPACK SPRAYERS Mix IGNITE 15 SN at 27-50 mL of product per 10 litres of spray solution for the control of annual grass and broadleaf weeds. Use as a directed spray around the base of the trees or vines.</p> <p>Avoid contact of IGNITE 15 SN solution, spray, drift or mist with green bark, stems, or foliage, as injury may occur to trees, vines or canes. Only trunks with callused, mature brown bark should be sprayed unless protected from spray contact by nonpourous wraps, tree/bark guards, grow tubes or waxed containers. Contact of IGNITE 15 SN with parts of trees, vines or canes other than mature brown bark can result in serious damage.</p>
<p>Aim EC <i>carfentrazone-ethyl</i> Group 14</p> <p>Application By: Backpack – Yes Tractor – Yes</p>	<p>37-117 mL/ha in at least 100 L/ha water</p>	<p>AIM EC HERBICIDE USE RATES FOR HOODED SPRAYER APPLICATIONS</p> <p>Aim EC Herbicide must be applied with hooded sprayers to control labelled weeds between the rows. This treatment must be made to crops grown in rows, and includes crops grown in rows where mulch or plastic barriers are used as a weed control tool in the drill or plant line.</p>

<p>Weeds Controlled: Annual Broadleaves</p>		<p>Aim EC Herbicide may be applied at use rates 37-117 mL in a minimum of 100 litres per hectare of spray solution. Hooded sprayers must be designed, adjusted and operated in such a manner as to totally enclose the spray nozzles, tips and pattern and to prevent any spray deposition to green stem tissue, foliage, blooms or fruit of the crop being treated.</p> <p>ADJUVANT RECOMMENDATIONS FOR HOODED SPRAYER APPLICATIONS Use Agral 90 or Ag-Surf at 0.25% v/v (0.25 litres per 100 litres of spray solution) or use Merge at 1% v/v (1 litre per 100 litres of spray solution).</p>
<p>Gramoxone <i>paraquat</i> Group 22</p> <p>Application By: Backpack – No Tractor – Yes</p> <p>Weeds Controlled: Annual Grasses Annual Broadleaves Some Perennials</p>	<p>5.5 L/ha in 1100 L/ha water</p>	<p>Rate and Method of Application: Apply 5.5 L GRAMOXONE LIQUID HERBICIDE with WETTING AGENT in 1100 L of water per sprayed hectare. Applications of this product in fruit crops and shelterbelts must be made using low boom sprayers fitted with drift-reducing shrouds or shields. <u>DO NOT APPLY using hand-held equipment (including backback sprayers).</u></p> <p>Follow manufacturer's recommendations for use of shrouds or shields with particular attention to maintaining the minimum allowable boom height. Use flat fan nozzles with the highest flow rate and lowest pressure that will provide good coverage, within the manufacturer's recommended range.</p>

Events & Notices

Spanish/English Pesticide Applicator Courses

A one day Spanish/English applicators' course will be held in Truro (Douglas St. Recreation Centre) on **May 18** and in Berwick (Berwick Fire Hall) on **May 19** by Jim Jotcham and translator Marcella Meier.

This one-day course will provide formal training to Spanish-speaking agricultural pesticide applicators operating under the direct supervision of a certified applicator in Nova Scotia. The course is not preparation for the provincial pesticide applicator examination. A Certificate of Completion detailing course material will be awarded to participants.

Instruction starts at 9:00 and should be complete by about 4:00.

The fee is \$80 plus HST for a total of \$92 per participant. Lunch and breaks are on your own.

For further information and to pre-register, please contact Jim Jotcham at marbicon@eastlink.ca.

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

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