



ORCHARD NETWORK

For Commercial Apple Producers

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- International Fruit Tree Association Summer Tour
July 24-30, 2011
England, Holland Belgium
- Fruit & Veg Tech X-Change
Sept 1-3, 2011 St. Williams, ON

Orchard Management

Bloom - Promise Time in the Orchard

Leslie Huffman, Apple Specialist, OMAFRA Harrow

The most important work in the orchard is just beginning, but unfortunately it's not something that any of us can do ourselves. We depend totally on another organism to make sure that this job is done properly.

This critical task is pollinating each flower, so that seeds are set and fruit grows to its maximum potential, and we are totally dependent on bees and other pollinating insects to ensure that it's done well. Each acre of apples has approximately one million blossoms, which makes pollination an enormous task.

Our beekeepers are working very hard to manage the new invasive pest, the small hive beetle, and are taking risks to provide hives within the Essex quarantine area. For more information on the small hive beetle: <http://www.omafra.gov.on.ca/english/food/inspection/bees/apicultu.html>

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This issue of the **Orchard Network Newsletter** was compiled by Client Service Representative, Patti Arts, OMAFRA, Kemptville

Under normal circumstances, it is important to protect bees, but this year it is even more important to protect them from poisoning. It is an offence under the Bees Act to apply insecticides while fruit trees are in bloom. Here are some other ways to protect bees:

- Give your beekeeper a day's notice if insecticides will be sprayed within 1 km.
- Do not spray insecticides on any crop where bees are foraging.
- Do not spray insecticides during the day. Bees return to their hives in early evening, so spraying after 7 pm is the safest. Early morning sprays should finish by 7 am.
- Spray on cooler days. Bees do not forage at temperatures below 13°C.
- Block the hive entrance with wet bags for up to 12 hours after spraying. Leave a space for bees to exit to cool the hive.
- Be aware of cover crops or weeds in bloom – this is the most common site of bee poisonings.
- Avoid spray drift by avoiding windy days.
- Remove bees ASAP when bloom is finished before applying petal fall sprays.
- Choose insecticides that are less toxic to bees. Here is a list of bee toxicity of pesticides www.omafra.gov.on.ca/english/crops/pub360/11tab3.pdf

When bloom is done, check the calyx end of your apples. The sepals will close when pollination is complete, and fruitlets will grow each day afterwards. In a couple of weeks, take a knife and slice through some fruitlets to observe how many seeds have been set.

As I tell my school tours, the **seeds** are the **Boss** of the apple.
No seeds = No apples (or at least puny and misshapen ones!).

Pre and Post Bloom Boron Applications

Christoph Kessel, Nutrition Program Lead, OMAFRA, Guelph

Pre and post bloom foliar boron applications are often promoted to improve fruit set, quality and fruit mineral content. While recommended in other apple growing regions, they may or may not be applicable to Ontario soils and growing conditions. A three year study (1995-97), completed by Dr. John Cline, University of Guelph, in 'Empire' apple orchards looked at the effect of boron on yield and quality.

The study evaluated:

- timing of soil and foliar sprays of boron (pink bud, flowering and petal fall, early and mid June, and at post harvest)
- boron source (Solubor, Botrac), and
- application method (foliar: both products, soil: Solubor only)

The project observed the following:

- Treated trees had significantly higher leaf and fruit boron levels when compared to the untreated trees. On average, fruit and leaf boron levels increased by about 3 ppm regardless of source, or application timing and method.
- Although boron levels may have increased, regardless of product, or timing and application method, all treatments showed no beneficial effects on total yield, fruit quality or fruit set.

A mid-summer leaf analysis of 20-60 ppm boron is considered adequate for apples (OMAFRA *Fruit Production Recommendation 2010-2011*). The project's results agree with this range. With leaf boron levels around 22 ppm, there was no effect of the boron applications on yield or fruit quality. Also, it supports the current recommendation for mid-June foliar applications to raise boron levels when a deficiency has been confirmed through leaf analysis.

Ruts Again?

Anne Verhallen, Soil Management Specialist,
OMAFRA Ridgetown

Spring soil conditions were less than ideal this year, especially as growers worked to get sprays on around rains. Not surprisingly we see some ruts – and ruts just don't go away.

Apple orchards are perhaps the ultimate in controlled traffic. All traffic is confined to set tracks, which generally results in a fairly narrow lane of packed soil with little rutting. The tree row retains lovely soil structure which supports good root growth. The packed traffic area will tend to shed rainfall due to the tighter soil structure, unless there is a depression or area that collects water. The other key area where a lot of rutting occurs is the access lanes throughout the orchard. The problem is not so much the weight and axles under any one load or pass. It is the sheer number of trips under wet soil conditions that eventually causes the soil structure to fail. Usually, harvest operations are more prone to rutting than spring sprays, but that's not the case this year.

Some strategies that may help to reduce rutting this spring and for the future:

1. Give the soil as much time to drain after a rain as possible before going back into the orchard, Even just waiting until after lunch to start rather than first thing in the morning after a rain will help.
2. Take a look at your tires. Compaction research in field crops has shown that if the tire pressure can be reduced to 10-15 psi, there will be less compaction. However, check your tire specifications and consult your dealer first to maintain the tire warranty.
3. Fix any ruts caused this spring – grade or scrape after soils have dried down a bit to even the surface out. You might consider adding some gravel as a back fill. Re-seeding with grass will help.
4. Consider the topography in the orchard – some ruts occur because the excess water has nowhere to go, or there may be sidehill seepage. Consider the best way to remove excess water - French drains (trenches filled with gravel) installed over or near drainage tile can help to remove excess water quickly.



Spring Checklist for Maintaining Your Food Safety Program..Keeping on track for upcoming Audits

Colleen Haskins, On-Farm Food Safety Program,
OMAFRA Guelph

The season has begun, and so have the demands of your farm operation, including **training** your employees, ensuring **Good Agricultural Practices** and proper personal **hygiene, water quality and sanitation**, and maintaining **records** for a functional **traceability** system. Whether you've already incorporated a Food Safety Program on your farm or developing one, these are the main areas of focus where documentation and records to support your practices need to be generated and maintained for your On Farm Food Safety Program.

As OAG members, you recently received the most recent version of CanadaGAP (5.1), an On Farm Food Safety Program, which many retailers are now requesting of pack-houses, small packers **and** individual producers. The requirements of the standard can be found within the information provided in the CanadaGAP manual, and further identified in the Audit Checklist, as well as on the website <http://www.canadagap.ca/>. Familiar and consistent to all Farm Food Safety programs, is the documentation and record requirements for proof of due diligence, and enhanced traceability at the farm level. Several forms are available to you through the CanadaGAP manual as well as other GAP manuals and resources, such as ADVANTAGE GAP, and the iGAP CD, offered by OMAFRA, which can help you stay on track, monitor your progress and assist you with recording the required information to fulfill the standard requirements.

Below are items that require ongoing records to be kept **throughout** the season.

- Worker Training: Food Safety & Hygiene, Worker Practices
 - ◇ Training records with date and worker signoff for verification (upon arrival, and refresher if needed before harvest)
- Agricultural Chemicals :
 - ◇ any individual in contact with or applying agriculture chemicals, needs to possess a valid Pesticide License
 - ◇ chemical application records must be maintained **throughout** season
 - ◇ chemical lot numbers need to be obtained; invoices & receipts of chemicals kept plus proper disposal of chemical containers (procedures and receipts for verification)
 - ◇ current chemical inventory list needs to be maintained (i.e. in/out system)
- Equipment Calibration, Maintenance, Cleaning &

Sanitation (sprayers, scales, spreaders, tractors etc)
◊ Procedures, schedules and verification records for detailed tasks

- Water Quality and Sanitation for human consumption (bunkhouse) and final potable rinse water needs:
 - ◊ Verified water tests (accredited laboratory ISO 17025)
- Traceability: trace product “one up, one down” (i.e. back one step from the farm and forward to the first point of sale)
 - ◊ Procedure and verification of system test (Mock Recall)
 - ◊ Detailed farm map with Block Reference that relates to chemical applications and product ID (i.e. variety, crop, etc).

It is imperative that you familiarize yourself with the requirements of the Food Safety Program you wish to follow, and use the various resources available to you to help develop, maintain and be successful with your Food Safety Practices.

In the CanadaGAP manual, a “To Do List” is provided, to assist producers with tracking their progress and providing information about areas where they still require documentation, in addition to sample recording templates .

Below are some web links that will provide you with additional information about Food Safety, Traceability, and more example templates for you to use.

Food Safety and Traceability Programs:

<http://www.ontario.ca/foodsafety>

Training and Support Tools

<http://www.omafr.gov.on.ca/english/food/foodsafety/>

[producers/gap-ts-training.htm](http://www.omafr.gov.on.ca/english/food/foodsafety/producers/gap-ts-training.htm)

<http://www.omafr.gov.on.ca/english/food/foodsafety/>

[producers/gap-ts-written.htm](http://www.omafr.gov.on.ca/english/food/foodsafety/producers/gap-ts-written.htm)

*We will be holding a conference call for all producers mid-July, during lunch hour, to discuss any Farm FoodSafety Concerns or general inquiries. A notice will be circulated when the date has been decided. Contact us for advice, copies of our resources, or to attend a training workshop
Toll Free: 1-877-424-1300 Email: advantage@ontario.ca
www.ontario.ca/foodsafety*

Plant Growth Regulators (PGRs) - Timing Critical

Leslie Huffman, Apple Specialist, OMAFRA Harrow

Plant growth regulators (PGRs) can be very effective tools in apples for several different uses. Here are some of the PGRs used through the spring season:

- **Promalin or Perlan** (contains benzyladenine and gibberellins) are used to improve the shape of Red

Delicious apples through elongation of the fruit and development of more prominent calyx lobes.

- **Apogee** (contains prohexadione-calcium) reduces terminal shoot growth by inhibiting the synthesis of gibberellins, which cause cell elongation. Treated trees have the same number of shoots, but they are thicker with shorter internodes.
Note: Apogee can also reduce fire blight infections, not by affecting the bacteria, but by reducing growth and infection sites.
- **Amid-thin** (contains NAD (naphthaleneacetamide)) is a hormone-type thinner used at petal fall. Absorbed by foliage where it induces formation of the abscission layer between the spur and the fruitlet.
- **Maxcel or Cilis Plus** (contains 6-benzyladenine (or 6-BA)) is used for both fruit thinning and improving fruit size. Applications shortly after flowering will increase fruit cell division, early in fruit development, and increase potential fruit size. Higher rates will also cause fruit thinning.
- **NAA or Fruitone-N** (contains naphthaleneacetic acid) is a hormone-type thinner used up to 12 days after petal fall. NAA affects auxin activity, and interferes with photosynthesis and proper fruit development. Affected fruitlets usually drop within 10-14 days
- **Sevin** (contains carbaryl) is an insecticide that also thins fruit after petal fall. The presence of carbaryl in the vascular system of the fruitlet interferes with biochemical processes. Certain important fruit growth processes cease and the fruitlet drops.

It is very important to apply plant growth regulators at the correct time, according to the stage of development of your trees. Note that this timing can vary by days or hours, depending on your orchard location and by cultivar.

Here is the upcoming spring “schedule” in the orchard:

- **Full bloom:** Promalin or Perlan for fruit elongation
 - **Late bloom (shoots @ 2.5-5 cm):** Apogee, first application
 - **King bloom petal fall:** Amid-thin
 - **5-15 mm fruit:** thinning with Maxcel or Cilis Plus, NAA or Fruitone-N, Sevin
 - **14 days after 1st Apogee spray:** 2nd Apogee application, if needed
 - **21 days after bloom:** final timing for Sevin, if needed
 - **28-35 days after 1st Apogee:** 3rd Apogee, if needed
 - **42-49 days after 1st Apogee:** 4th Apogee, if needed
- ReTain and Ethrel are PGRs that are useful in harvest management and applied in late summer.

Crop Protection

Glyphosate and the Health of Your Trees

Leslie Huffman, Apple Specialist, OMAFRA Harrow

Glyphosate herbicide has been widely used for 30 years for orchard growers to manage weeds under their trees. Glyphosate is sold by many companies under trade names such as Round-up, Touchdown, Glyfos, Wrangler, Vantage, etc. Recently, improved formulations for rainfastness have been registered with names like Weathermax, Ultra, Plus etc.

Concerns with injury from glyphosate have been recently reported by Dr. Hannah Mathers, Ohio State University, who documented injury on perennial nursery plants including *Malus* (apples). Mark Longstroth, Michigan State University, reported canker symptoms on trunks associated with season-long glyphosate use. Injury was also observed by Dr. Dave Rosenberger in New York orchards, especially in Macoun apples, where tree cankers may have been related to glyphosate, especially late summer applications. Recently the Cornell research team showed that fruit from trees drifted with glyphosate had storage issues.

Does this mean that we should stop spraying glyphosate under fruit trees? Glyphosate, a reduced risk herbicide has been widely used world-wide, especially in Integrated Fruit Production in Europe and other sustainable IPM programs. It provides excellent control of many different weed species, and is especially valuable to manage perennial weeds that creep into orchards. It is a good tank-mix partner with residual herbicides for weed control during the Critical Weed-Free period during bloom.

Before we throw the baby out with the bathwater, perhaps we need to focus on how to use glyphosate safely around trees. Because it moves systemically into the tree, it is important to take extra precautions to prevent penetration into the tree. Dr. Mathers recommends reducing the "SUPPLY" of bark injury:

S – Shields - always used to prevent drift into the tree.
U – Use a sucker removal system before glyphosate.
P – Preemergence herbicide reduces repeat glyphosates.
P – Prune late in the winter to allow cuts to heal rapidly.
L – Limit the amount of glyphosate used.
Y – You are the only one that can prevent glyphosate injury in your trees.

I would add these precautions:

- Only spray glyphosate when winds are low and not gusting.
- Do not apply glyphosate after terminal bud set (end of June).
- Use a maximum of two applications a year.

- Use low pressures on your sprayer (20-30 psi).
- Consider air induction nozzles to reduce fine droplets.
- Never use a Controlled Droplet Applicator (CDA) (eg. Herbi)
- Spray each side of the weed-free strip, never across the trees.
- Use glyphosate only when completely necessary.
- Use spot treatments if possible.
- Do not apply glyphosate to suckers, or to recently cut suckers.
- Consider using Ignite, Aim, or Gramoxone as alternatives for orchards.

With these precautions, glyphosate can be safely applied under your trees. Take every precaution to avoid applications on any part of the tree, and protect the health of your trees.

References:

Use Glyphosate with Caution, GoodFruit Grower, Sept. 2010
www.canr.msu.edu/vanburen/rndtrunk.htm.
Roundup Injury or Black Rot in Apples, Michigan State University, 2009
www.canr.msu.edu/vanburen/rndtrunk.htm
Current Knowledge about Bark Cracking, Great Lakes Expo 2010
<http://gllexpo.com/summaries/2010summaries/TreeFruit.pdf>
Possible non-target effects of glyphosate on apple, August 2010
<http://www.scaffolds.entomology.cornell.edu/2010/100802.pdf> p. 4-9

Managing San Jose Scale In Apple Orchards

Kathryn Carter, Pome Fruit IPM Specialist, OMAFRA Simcoe

In recent years, we have seen an increase in San Jose Scale (SJS) *Quadraspidiotus perniciosus* (Comstock) populations in some Ontario apple orchards. Population increases are likely a result of shifting oil applications to the tight cluster to pink stage for mite management, instead of using a dormant application (which controls scale). Also, changes in the products used in our IPM program (eg. reduced use of OP's) may have contributed to higher populations.

Often, SJS starts on one or two trees, and spreads quickly to surrounding trees in the orchard after a few years. Once scale has become established in orchards, it can be very difficult to eradicate. So where there was scale on fruit last year, it would be wise to manage the scale more aggressively this year. This pest can affect fruit quality, and if left unmanaged, results in poor tree health and possibly death of affected trees.

SJS overwinters as a juvenile fastened to the bark and can be easily seen on tree limbs and branches at this time of year. SJS matures by late May, when adult males emerge and mate with females. After mating, females produce live young called crawlers for a six week period from the end of June through early July. Crawlers move to limbs, fruit and foliage where they settle, produce a protective waxy coating, and begin sucking the sap from

the tree or fruit. There are two generations of scale each year in Ontario. Natural enemies include parasitic wasps and lady bird beetles, but they do not provide economic control of SJS.

There are 3 options for timing in-season scale controls:

1. Pre-bloom sprays targeting adults (known as “black caps”)
2. 1st generation sprays (early post-bloom) and
3. 2nd generation sprays which correspond to late post-bloom sprays.

Pre-bloom applications are the best time to manage scale because they are most vulnerable to sprays at this time. This is also the cheapest way of managing this pest. The most effective timing is from delayed dormant to half-inch green. Options at this timing include oils (eg. Superior Oil, Pure Spray) and diazinon. Coverage and timing is essential with the use of oils, since they smother the scale with no direct effect on the adult. Oil applications also help to reduce the selection pressure for resistance, which is important since SJS is very prone to developing insecticide resistance. Applying oil at this time can be challenging in some years due to concerns with frost (do not apply oil within 48 hours of a frost), and issues with phytotoxicity (do not apply oil within 14 days of Captan).

Early post-bloom sprays targeting crawlers include products such as Movento, and Assail. The initial application of Movento @ 585 mL/ha should be made 1-2 weeks before the emergence of first generation crawlers (generally around petal fall to first cover), with a 2nd application using lower rates 14 days later. Movento works as a system feeding toxicant with little or no direct contact activity, so it needs to be applied earlier than other products. Movento should be tank mixed with ionic surfactants to improve uptake.

There are two options for timing sprays to target crawlers:

1. Monitoring for crawlers with electrical tape
2. Use of degree-day models.

Electrical tape (sticky side out) can be wrapped around trees near scale infestations and coated with Vaseline about 7-10 days after petal fall. Once crawlers are caught on tape, insecticides can be applied.

Unfortunately, this method of monitoring is not always reliable. Alternatively, degree-day models are used to time applications for crawlers using Assail or Diazinon. Dr. Harvey Reissig from Cornell University developed a degree-day model using a base temperature of 50°F (10°C) from the 1st of March. First generation crawler emergence occurs at 500 DDF, base 50°F (278 DDC, base 10°C) (generally 29 days from the petal fall of McIntosh+/-12.5 days). This application allows a 3-5 day window for application after emergence for residual to be in place while crawlers begin to appear.

A Washington State model requires pheromone traps to detect first adult catch as the start point, then using a trigger of 400-450 DDF base 51°F (222-249 DDC, base 10.5°C), after first adult capture. A second application after 14 days is also recommended.

For those that are unable to monitor crawlers or use models, Michigan reports good success in managing scale when using sprays of Assail at 240g/ha for first generation codling moth (with a repeat application 10-14 days later).

Late post-bloom applications timed against first emergence of 2nd generation crawlers are best timed at 1451 DDF base 50°F, (806 DDC, base 10°C) from March 1, which generally occurs in mid July.

References:

- **Weighing in on Scale**, Peter Jentsch, Cornell University. Scaffolds, April 18, 2011 www.scaffolds.entomology.cornell.edu/2011/110418.pdf
- **Increased incidence of scale insect pests on tree fruits**. John Wise, Michigan State University. Fruit CAT Alerts, February 17, 2011 www.ipmnews.msu.edu/fruit/Fruit/tabid/123/articleType/ArticleView/articleId/1148/categoryId/75/Increased-incidence-of-scale-insect-pests-on-tree-fruits.aspx
- **Ontario AppleIPM: San Jose Scale** www.omafra.gov.on.ca/IPM/english/apples/insects/san-jose-scale.html

Managing Apple Scab in Orchards

*Kathryn Carter, Pome Fruit IPM Specialist,
OMAFRA Simcoe and Margaret Appleby, OMAFRA
Brighton*

This year has proven to be a challenging year for growers attempting to manage apple scab in orchards. Frequent rainfall has made it difficult to keep the leaves covered with fungicides. Now growers are keeping an eye out for the first symptoms of apple scab. Symptoms usually appear in the orchard anytime from 9 to 17 days after the first infection period. Scab lesions will show up earlier on susceptible cultivars such as McIntosh and Gingergold than on less susceptible cultivars. Initial symptoms are usually seen on the underside of emerging cluster leaves. However, symptoms may develop on the upper leaf surface in years where significant infection was delayed.

This year the Ontario Apple Growers have received funding from the Pest Management Centre, as well as Dupont, Dow, Bayer, Syngenta and BASF to conduct a national apple scab survey to test for resistance to SI and strobilurin fungicides in apple orchards. All of the sites have been set for this year, and we will begin collecting scab as soon as it appears in orchards. Growers who are not involved with this trial, but are concerned that they may have apple scab resistance in their orchards, will now have the option of submitting samples to the Pest Diagnostic Clinic at the University of Guelph for testing. Growers interested in submitting samples, please contact Kathryn Carter @ 519-426-4322 for more information.

One question for many growers is what to do if they get scab in their orchard. I spoke to Dave Rosenberger from Cornell about this and he recommends the following:

- Where SI fungicides are still working, back-to-back SI sprays are still the best option for stopping scab after it gets started. U.S. growers can use Inspire Super (a commercial combination of Inspire + Vanguard), but always tank-mixed with an EDBC. This combination is preferred for several reasons:
 - ◊ Firstly, the difenoconazole component (Inspire) is clearly our most powerful DMI against scab (although a bit weaker than myclobutanil on powdery mildew);
 - ◊ Secondly, when infection periods occurred within 72 hr of the application, the cyprodinil (Vanguard) component will control that part of the scab population, reducing pressure on the SI.

Note: If there were no infection periods within the last 72 hr, the Vanguard is not needed, and a tank-mix of Inspire with either captan or mancozeb is adequate, and are far superior to cyprodinil (Vanguard) as scab protectants.

- Equal (dodine) is another option for shutting down scab, but only when the population is not resistant. Equal should always be used in combination with mancozeb @ 3 lb/ac (3.36 kg/ha), or, when rust control is not needed with Maestro/Captan at 3 lb/ac (3.36 kg/ha) after bloom.
- In Dr. Rosenberger's opinion, Captan alone at relatively high rates (at least 4 lb/A of captan 80W) is very effective for preventing fruit scab. For stopping an epidemic when temperatures are high, Captan alone works almost as quickly as Equal or a SI fungicide. However, under cool wet conditions, captan can protect fruit and new foliage, but it does not stop spore production like the SIs and Equal. If using Captan to shut down scab, Rosenberger recommends using at least 4 lb/acre in 2 or 3 sprays at 7-10 day intervals (stretch the interval to 10 days only after 2nd cover when shoot growth has slowed). Through the summer, rates can be dropped to 3 lb/acre (3.36 kg/ha) (or reduced to 2 lb/A (2.24 kg/ha) for hot, dry weather).

New Products Registered for Ontario Apple Growers

*Kathryn Carter, Pome Fruit IPM Specialist,
OMAFRA Simcoe*

1. **Bloomtime** (*Pantoea agglomerans*, strain E325 1 x 10¹⁰ CFU/g (min.)) is a pesticide that is registered for **fire blight suppression**. Apply 375–500 g/ha at Bloom. It does not provide control of fire blight. Apply in a minimum of 1,000–2,000 L water/ha. Make first application at 15%–20% bloom, second application at full bloom to petal fall. Product has specific handling

requirements, see label for storage requirements. Preharvest Interval (PHI): 0 days, Re-entry period (REI): 4 hr, Maximum # applications per season:

2. **Clutch 50 WDG** (clothianidin 50%) is a neonicotinoid insecticide that is registered for control of **green apple aphid**, **rosy apple aphid**, **white apple leafhopper** and **tentiform leafminer** at 140-210 g/ha. For control of **plum curculio** at 210 g/ha. Suppression only for CM and OFM. PHI: 7 days, REI: 12 hr, Maximum # applications per season: .
3. **Entrust 80W** (spinosad) is a naturalyte that has been recently registered for controlling **apple clearwing moth (ACM)**. Currently ACM is only found in a localized region in southern Ontario. Special summer sprays of 75 g/ha should be applied when monitoring indicates the need (based on pheromone trap catches). Apply in 1,500 L water/ha as a directed spray to cover lower tree trunk, graft union and pruning cuts. Make the first application within 10 days of adult emergence and repeat at 7–10-day intervals while moths are active. PHI: 7 days, REI: when dried. Maximum # applications per season:
4. **Microthiol Disperss** (sulphur 80%) should be applied at a rate of 22.5 kg/ha for **powdery mildew** in regular protective schedule from green tip up to and including first cover spray. PHI: 1 day, REI: 24 hr, Maximum # applications per season:
5. **Inspire** (difenoconazole), is a SI (DMI) fungicide but is considered to be stronger than other SI's. Inspire has activity on **scab**, **rust**, **powdery mildew**, **flyspeck** and **sooty blotch**. However it is weaker on powdery mildew, compared to the other SI's. Research from Dr. Kerik Cox (Cornell University) and grower experience in New York has shown that Inspire Super (a tank-mix of Inspire and Vanguard) can control scab in DMI-resistant orchards better than any other fungicides, (especially on less scab-susceptible cultivars like Empire, Gala, Delicious, Jonamac, etc). Be aware that overuse of this material will lead to resistance and failures. Similar to other SI's (DMI's), Inspire should always be tank-mixed with an EDBC fungicide, and intervals should be reduced to 7-10 days to minimize the potential for control failures from resistance. Inspire is best used from half-inch green through petal fall. PHI:14 days, REI:12 hours, with a maximum of 2 applications per year.
6. **Assail 70 WP** (acetamiprid) is a neonicotinoid insecticide that is already registered for several apple pests. Recently the PMRA has approved a label expansion to include **apple maggot**, **European apple sawfly**, and **plum curculio** (suppression only) at a rate of 240 g/ha and **mullein bug** at a rate of 80-16- g/ha..
7. **Beleaf** (flonicamid) is a new chemistry (pyridinecarboxamide) insecticide registered for control of **aphids** in pome fruit through anti-feedant activity. Apply at 0.12-0.16 kg/ha (the higher rate provides longer residual). This product blocks

feeding quickly, so aphids will continue to be present and moving for several days but will be walking in circles and unable to feed or cause damage, as the stylet is unable to pierce the plant surface. The REI is 12 hours for most activities (except hand thinning which is 2 days), PHI is 21 days, Maximum of 3 applications per season.

8. **Spray Oil 13E** is a dormant or summer oil for managing **mites** and **scale** in apples. This product can be used as a dormant oil targeting San Jose scale, from tight cluster to pink targeting mites (at a rate of 20 L of oil per 1000 L/ha). Post bloom applications targeting mites should be applied at 10 L of oil per 1000 L/ha. Dr. Art Agnello, Cornell University, New York has extensive experience working with summer oils, and recommends making 3 applications on a preventative schedule. Apply the first application from petal fall to 1-2 weeks later, before mite populations increase. Two subsequent sprays should be applied at 10-14 day intervals. Be cautious of phytotoxicity - some varieties (eg. IdaRed) show scarf skin from summer oils (roughening of the fruit surface). Avoid using Captan, Bravo, copper, Karathane, and sulphur within 14 days of an oil spray. Avoid using oil in drought conditions, or within 48 hours of freezing temperatures. Avoid drift on susceptible crops such as bloom on grapes. REI: 2 hours, PHI zero days

Airblast Sprayer Tips

Jason Deveau, Application Technology Specialist, OMAFRA Simcoe

Over the last few months I've been delivering classroom and hands-on workshops for airblast sprayer operators, and I learned at least as much as the attendees did!

Here are a few tips for you to consider as you work with your sprayers this season. It's not too late to:

Check your tire pressure. Sounds small, but I saw a lot of sprayers with soft tires. They're all different, and the pressure is rarely indicated on the tires themselves, but most run between 20 and 35 psi. You might consider using less pressure to prevent surface compaction and spread out the weight of the sprayer in this wet spring. At least make sure both tires are reading the same pressure.

Flush those lines! Get the nozzles, strainers and filters out and run a few tanks of clean water through the system with the agitation running. This is when rust, scale, and who-knows-what-else breaks free of the sprayer tank and lines. The last thing you want right now is the nuisance of nozzles plugging every fifteen minutes, and that's what will happen if you don't flush it out completely.

Check your strainers and filters. If you don't already have three levels of filtration (including the tank-opening basket) then consider slotted or mesh filters behind the

nozzles in the nozzle body. I've heard lots of people say they don't use them because they plug up – well, that's what's supposed to happen. They're designed to handle bits of debris and prevent nozzles from plugging or distorting the spray. If your strainers are plugging up solid, then you have a problem with agitation. Pull them and clean them at the end of each spray-day, just as you do your line strainer.

Are you sure your pressure gauges are accurate? More than 10 percent of the gauges I've checked in the last two years have been off by 10 percent or more (either more or less than target pressure). In some cases, that's enough to significantly alter the nozzle output and can throw off your pesticide rates. If you can, put two gauges in series to keep them honest, or if you're suspicious and too busy to check, just replace it for less than \$20. Always buy gauges with scales that read twice your target operating pressure.

Be sure to check the pressure at your boom. Fit a pressure gauge onto the last nozzle body on each boom (there's always a fitting solution) and bring the sprayer up to operating pressure. If the test gauge isn't reading what you want, adjust your regulator or bypass until it does.

Sniff around for leaks. I saw a few agitator shafts that were leaking. Re-wind the packing to get a better seal. Look for wet areas on all hoses and connections while under pressure. Do your nozzles leak when the boom is off on outside rows? Consider new nozzle bodies with check-valves, or consider buying mesh nozzle filters that have ball-valves built right in. They'll make the job more efficient and help with the 'optics' of spraying – in other words, no one wants to see pesticide streaming out of nozzles. They'll fit in the Turobmists, but may not in the John Beans.

So, there are lots and lots of tips – more than I could include here. Reserve at least half a day per sprayer to do the job right. There's a checklist at the end of Factsheet 10-047 "Calibrating Airblast Sprayers". I laminated one and I use a dry-erase marker to use it again and again.

www.omafra.gov.on.ca/english/crops/facts/10-047.htm

For those that couldn't make the Ontario Apple Grower Advanced Airblast Workshops in April, the follow-up workshops will be sometime in late June. Contact the OAG for details.

Happy Spraying!



Figure 1 -
4193A TeeJet

Traps and Trapping In Apple Orchards

Margaret Appleby, IPM Systems Specialist, OMAFRA Brighton

Putting your finger on the right information quickly is always important to getting the job done. Publication 310, Integrated Pest Management for Apples and Ontario AppleIPM online (www.ontario.ca/cropipm) both have some quick and easy guides to make your IPM program easy and efficient.

Table 3-2, Guidelines for using insect pheromone and visual traps in orchards can be found on p. 39 on Pub. 310 or online at www.omafra.gov.on.ca/IPM/english/apples/scouting/traps.html.

This table has all the information needed on properly setting up a trap line for apple insects such as codling moth, apple maggot, oriental fruit moth, oblique banded leafroller, dogwood borer, tentiform leafminer and European apple sawfly. The table includes:

- what trap to use
- if there is a pheromone or chemical lure
- how many traps to use
- the placement of traps in the orchard block
- number of generations
- what the trap catches mean.

Here is some information showing when traps need to be in place:

Pest	Tentiform leaf-miner (optional)	Oriental fruit moth	European apple sawfly	Codling moth	Dogwood borer	Oblique-banded leafroller	Apple maggot
Type of trap	Ice-cream carton + pheromone lure + plastic sticky grid	Pheromone lure + trap	White sticky 3D trap	Pheromone lure + trap	Pheromone lure + trap	Pheromone lure + trap	5 yellow boards with essence of apple
# traps per site	2	5	3	4	4	4	5
When to place in orchards	Half inch green	Late April	Tight cluster	Bloom	Late June	Petal fall	3-4 weeks after petal fall

In the online version in Ontario AppleIPM (see above), click on the hot links for each insect to see an infosheet with more detail on each pest. Setting the traps up properly and maintaining them through each generation will provide the information needed to make informed pest management decisions.

What is New for CougarBlight in 2011?

Michael Celetti, Plant Pathologist Program Lead, OMAFRA Guelph

Fire blight is a serious disease of apples and pears. Tree infection results primarily through the colonization of the female part of blossoms called the stigma by the fire blight bacteria. Once the bacteria get onto the female part of the flower, they must reproduce rapidly to a critical number and then be washed down into the blossoms by either rain or dew within a very short period of time. In other words, warm temperatures drive the fire blight infection process but moisture triggers it. Fire blight prediction models have been developed to help growers better time the application of antibiotics and biological products to maximize disease control. However, they have not always been accurate in predicting risk under certain situations.

The CougarBlight fire blight prediction model was developed by Dr. Tim Smith from Washington State University to help apple and pear growers recognize the weather conditions that precede infection. Dr. Smith believes that growers who understand the infection process and have a tool that defines the risks of the orchard to the disease and the weather conditions that precede fire blight outbreaks are more likely to most effectively time their preventative sprays of streptomycin, and obtain better results. Keep in mind that streptomycin is effective for only about a day or so once it is applied and therefore application timing is critical for good results. Similarly the biological based products must be applied well in advance of infection by the fire blight bacteria for best results.

Dr. Smith has revised the CougarBlight model in late 2010. For the latest version of the CougarBlight model, visit: www.ncw.wsu.edu/treefruit/fireblight/documents/CougarBlight2010EZver41C.xls.

As with the older version, growers are asked by the new version to select one of three orchard fire blight histories that best describes their orchard and input the daily maximum or high temperature and the predicted daily maximum temperatures predicted for the following 4 days. The daily minimum or low temperatures are no longer required. The model assumes that if fire blight was near the orchard the previous season, some cankers were most likely missed

and not pruned out during the dormant season leaving a source of the bacteria for the current season. In such situations the model assesses the risk higher than in orchards that were not near a source of the bacteria the previous year.

A new feature in the latest version allows pear growers the option of assessing the temperature risk for five days as well as the 4 day risk assessment for apple growers. The new model also considers flower wetting either by rain or dew when assessing the risk of infection. This new version blends the reaction of the bacteria to temperatures with the physical and physiological changes that take precedence after the daily high temperatures approach and exceed 35°C resulting in a rapid decline in the risk.

The only caution I have for growers using this new version of CougarBlight 2010 is that it was developed and tested in the dry regions of Washington State that have led to severe fire blight outbreaks in the past with some consideration of eastern conditions. Therefore the model may not always provide an accurate risk prediction under certain conditions in the Great Lakes Region. Regardless, this is a simple decision support tool to help apple and pear growers target fire blight protection sprays that is worth downloading for free off the Washington State University website.

Watch for Phytophthora Diseases in Fruit Trees This Year

Michael Celetti, Plant Pathologist Horticulture Program Lead, OMAFRA Guelph

Root rots caused by soil borne *Phytophthora* spp. may be prevalent in berry crops and fruit trees this spring due to the long cool wet spring. On severely infected fruit trees, buds will break dormancy and appear to flush out; however, severely infected trees will wilt, and collapse suddenly after bud break even if the weather turns dry. Severe winter injury caused by a sudden drop in temperatures similar to what was experienced in some orchards this past January can also cause similar symptoms. Often the bark splits on cold injured trees. If the bark is not split or there is no evidence of cold injury, fruit tree growers should remove soil around the crown and roots of declining or dead trees and scrape away the bark along the trunk at the base of the tree and along the roots. Often the reddish orange canker is limited by a dark or black margin separating it from the white healthy tissue. Growers who find these symptoms in their orchards should consider sending a sample of the diseased roots or crown tissue to a qualified pest diagnostic laboratory for accurate identification.

Most actively growing trees can tolerate a certain amount of root and crown rot and may limit the advancement of the disease for a short while. However, dormant young trees or trees that are growing slowly are most vulnerable particularly when the pathogen is active, which appeared to be the situation due to all of the wet weather this spring. Infected trees may decline slowly over several years or they may die within weeks of the first symptoms depending on the size and health of the tree. Growers should monitor the growth of trees over the next few seasons since reduced shoot growth and small fruit size are symptom of *Phytophthora* crown and root rot. As the disease advances, infected trees often produce yellow, chlorotic leaves that look similar to iron deficiency symptoms. In fact, foliar symptoms as a result of crown and root rot caused by *Phytophthora* are often confused with other disorders such as nutrient deficiency.

Several *Phytophthora* spp. cause crown, collar and root rot. *Phytophthora* spp. are fungal-like organisms that are favoured by wet conditions and therefore tend to cause more problems on trees growing in heavier wet soils or soils that retain water for a long period of time or when prolonged wet weather persists resulting in prolonged wet soil conditions in orchards. These prolonged wet soil conditions are ideal for pathogens such as *Phytophthora* to continuously infect roots and crowns allowing the disease they cause to progress for an extended period of time. There is no cure once the disease has become established. Aliette and Ridomil Gold 480 EC fungicides are registered for root crown and collar rot management in many fruit crops. Consult and follow the label of these fungicides before application.

When planting a new orchard, select fields that have good drainage and light soils if possible. If the soil is heavy or retains water for prolonged periods of time, consider installing sub-surface drainage pipes. Since the pathogen infects when soil is saturated for long periods of time, managing irrigation to avoid over-watering, whether it is through drip or overhead irrigation, will reduce further spread.



Figure 1. Orange to dark reddish brown canker or streaks along the cambium of the collar or crown at ground level or just under the epidermis of the roots is a good indication of *Phytophthora* infection.



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