



ORCHARD NETWORK

For Commercial Apple Producers

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In this issue...

Orchard Management

- Selecting Rootstocks to Your Soil Conditions
- Do You Want to Increase Your Crop Yields by 10-15%? Plant a Windbreak!
- Soil Moisture Monitoring for More Informed Irrigations
- Software Program Helps Ontario Farmers Prevent Soil Erosion

Crop Protection

- Found! Ambrosia Beetles Identified in Ontario
- San Jose Scale: Past, Present, Predictions
- New Rot Products
- Publication 360 Coming Soon!
- Airblast 101 Handbook

Postharvest

- Risk of Chilling Disorders in Apples for 2015-16 Storage Season

Announcements

- Ontario Fruit & Vegetable Convention
- Sweet and Hard Apple Cider Workshop
- Apple Program
- Frost Protection Session
- 3rd Annual Ontario Craft Cider Competition and Entry Form
- Sweet Apple Cider Competition Entry Form

Orchard Management

Selecting Rootstocks to Your Soil Conditions

Amanda Green, Tree Fruit Specialist, OMAFRA

You do your best to select a site that is optimum for growing apples by looking for land that has an ideal soil type with good drainage, a gentle slope for air flow to prevent against frost and is located in an ideal climate zone. Quite often, it is difficult to find a site that has all of these qualities and the soil type can be variable within an orchard block. The M.9 is the most common rootstock in new high density plantings in Ontario but it may not perform as well in certain types of soil. When selecting your rootstocks keep in mind the soil type. In Table 1 are examples of some apple rootstocks and the characteristics of soil that they are suitable for.

In an experiment in pots by Fazio et al., Golden Delicious Smoothee trees were grafted onto over 30 different rootstocks and planted in sandy loam and clay loam apple replant soil that were either pasteurized (enough to kill soil borne diseases like apple replant disease) and unpasteurized. Over the first growing season, growth parameters were

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measured. Overall, most rootstocks performed better in clay loam than in sandy loam, except for B.9, G.214 and G.890 which performed similarly in both soil types. B.9 was more tolerant to apple replant disease in clay soil than in sandy soil. G.16 was the opposite, where it was more tolerant to apple replant disease in sandy soil than in clay soil.

Table 1. Commercial rootstocks and their soil suitability.

Adapted from Domoto, P. 2004. Characteristics of Apple Rootstocks.

Rootstock	Size	Soil suitability
M.26	55-60%	-Intermediate to heavy well drained soil -Not recommended for light, coarse textured soils -It is fairly sensitive to wet soils -Not drought tolerant -May be too large for high density plantings on deep fertile soil
G.935	50-60%	-Well adapted to most soils
Ottawa 3	50-55%	-Well adapted to most well-drained soil
G.202	45-55%	-Well adapted to most soils
M.9	40-50%	-Intermediate to heavy loam, well-drained soil -Not drought tolerant
G.11	40-50%	-Well adapted to most soils
G.16	35-45%	-Well adapted to most soils
G.41	30-45%	-Well adapted to most soils
Mark	35-40%	-Well drained soil -Drought susceptible
Bud.9	25-40%	-Well drained soil -No tolerance to wet soils

Soil pH

In the previously mentioned experiment by Fazio et al., where one year's growth of Golden Delicious was evaluated on different rootstocks grown in pots, it was found that some rootstocks perform better in a certain pH range. The optimum pH for most rootstocks was 7.5. Nutrient uptake at varying pH was better in some rootstocks than others. In general, molybdenum, calcium and phosphorus uptake increased as pH increased. Iron, manganese and nickel uptake decreased as pH increased. G.41 had an unusually high iron uptake at a high pH; optimum pH for iron uptake in most rootstocks is between 4.5 and 6.5. G.41 also had higher phosphorus uptake, at pH 5.5 to 8.5, compared to other rootstocks. G.969 had the highest uptake of phosphorus at 4.5

Soil Compaction

It was demonstrated in an experiment by Ferree et al. that some rootstocks can tolerate higher bulk densities better than other rootstocks. 'Red Gala' grafted on to different rootstocks were grown in pots from April to November in a greenhouse with soil at bulk densities of 1.0 and 1.5 g/cm³. At a bulk density of 1.5 g/cm³, the total dry weight of M.26 was reduced. Total dry weight of B.9, G.16 and G.30 were not affected by the bulk density of 1.5 g/cm³.

It is important to note that these potted rootstock experiments may not extrapolate to field conditions but they do indicate that rootstocks do

perform differently under different soil types, pH and compaction. This information may be one more piece of the puzzle to consider when selecting your rootstocks.

References

- Domoto, P. 2004. [Characteristics of Apple Rootstocks](#).
- Fazio, G., D. Kviklys, M.A. Grusak and T. Robinson. 2012. Soil pH, soil type and replant disease affect growth and nutrient absorption of apple rootstocks. *NY Fruit Quarterly* 20(1):22-28.
- Ferree D.C., J.G. Streeter, and Y. Yuncong. 2004. Response of container grown apple trees to soil compaction. *HortScience* 39(1):40-48.
- Ward, D., W.P. Cowgill Jr., J.L. Frecon, G.C. Hamilton, J.R. Heckman, L.S. Katz, N. Lalancette, B.A. Majek, D. Polk. 2014. "New Jersey Commercial Tree Fruit Production Guide." Rutgers Cooperative Extension Bulletin E002. 229 pp

Do You Want to Increase Your Crop Yields by 10-15%? Plant a Windbreak!

Did you know that windbreaks:

- increase crop yield, improve soil moisture distribution over fields and reduce soil loss?
- provide shade and shelter for livestock?
- minimize spray drift and odours?
- decrease the amount of snow drift onto driveways and roads?
- enhance biodiversity and wildlife habitat
- can generate alternative income?

Windbreaks have many benefits for farmers and rural landowners, and more than make up for the loss of land they use. Fall is the perfect time to start planning for a spring planting. Here are some things you need to do to get started:

- **Do a site assessment** where the windbreak will be planted.
- **Decide on the tree species** you would like to plant based on why you're planting a windbreak and your site's characteristics.
- **Develop a planting plan.**
- **Confirm the number of trees** you'll need and **place your tree order.** You can order trees through nurseries and some conservation authorities.

- **Prepare the site** by marking out in-row and between-row tree spacing, tilling, mulching, mowing and/or band or spot spraying, and placing black plastic mulch over the area to control weeds.

The Ministry of Agriculture, Food and Rural Affairs (OMAFRA) has many resources to help you with windbreak planning. Visit [our website](#) to watch our four windbreak videos on planning, planting, maintenance and windbreak successes. Our free Best Management Practices book, "[Establishing Tree Cover](#)," provides a step-by-step guide for planning and planting a windbreak.

For more information about windbreaks and for help with planning a windbreak, contact your local [conservation authority](#).

For more information about OMAFRA's resources, contact OMAFRA's Agricultural Information Contact Centre at 1-877-424-1300 or ag.info.omafra@ontario.ca.



Soil Moisture Monitoring for More Informed Irrigations

Rebecca Shortt, Engineer, Water Quantity, OMAFRA

(Report of the 2013-15 demonstration projects)

Fruit Tracker now has the capability to automatically and wirelessly capture and display soil moisture data. In addition, there is a section to record irrigation applications.

This is what the data can look like (see image at right).

This shows the soil moisture from June 1st to Sept 16th. The blue line is at 12" deep and the orange line is at 24" deep. In the 2013-2015 demonstrations, we have been using the Decacon EC5 probes (~\$150 from Hoskin Scientific) but it could be possible to use any probe which measures the soil moisture as % water by volume and is compatible with the remote sending devices. There are currently three sending options which connect with Fruit Tracker: the Lincoln Hubs (by Dave Hipple, tender fruit grower), Decagon EM 50G, WIN (Weather INnovations).



Comparison of sending devices

	Lincoln Hub	Decagon EM50G	Weather INnovations
Rainfall measurements	Included	Extra, but possible (5 ports total)	Included
Power source	Solar panels	5 AA batteries	Solar panel
Portability	Large solar panels and large battery, requires 2 people to set up	Hold in one hand	Small solar panel, portable by 1 person
Installation	By grower	By grower	By WIN technician, requires advanced notice for scheduling installation
Reliability	Challenges with cell service, on-going improvements to data transmission reliability	Good	Good
Ownership	Purchase	Purchase	Rental
Cost	\$1600	\$1125	\$800/year
Cell costs	Included for first 3yrs	Included for first year \$160/yr after	None
Option for sub-stations	Yes (\$300/sender)	No	No (but multiple stations may reduce cost/unit)
Note: costs are negotiable with each provider depending on location and number of instruments purchased. Costs in this table represent cost for 2013-15 demonstration trials.			

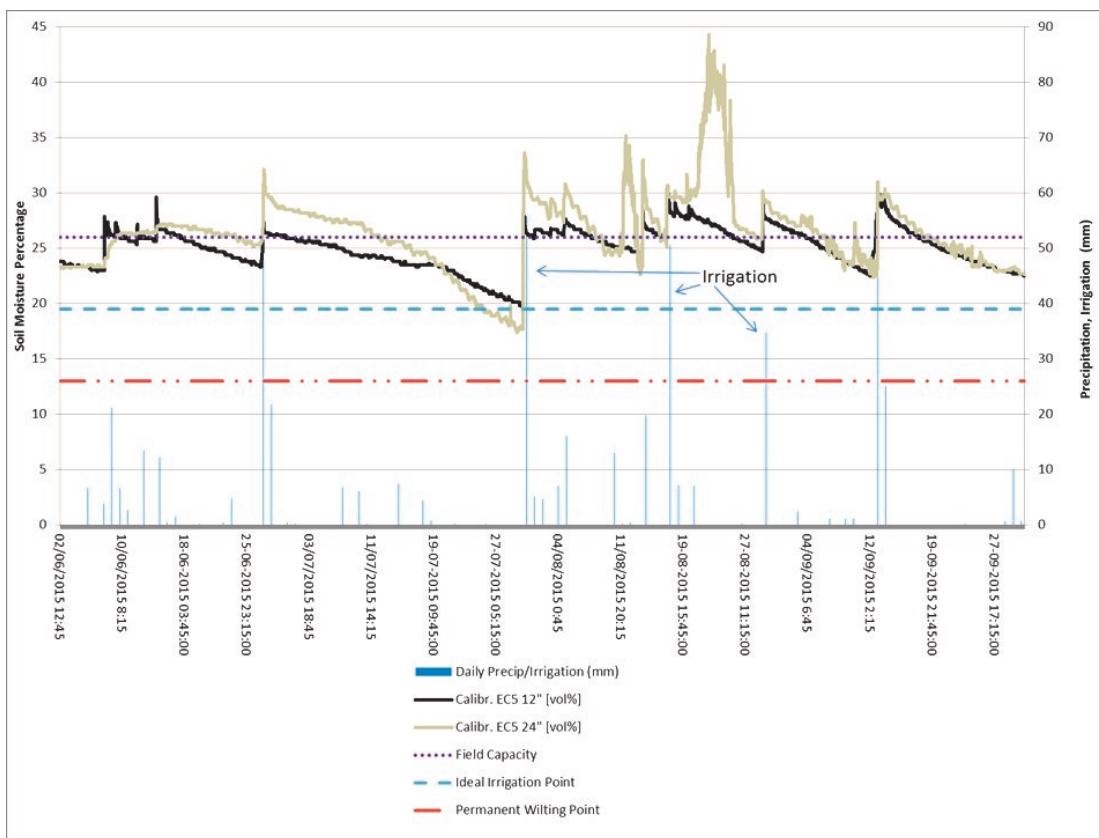
What is the value of this information?

Looking at the following graph we can see the soil moisture decreasing during dry periods and increasing with each rainfall or irrigation. The grower decided to irrigate July 30, Aug 17 and Aug 29, see arrows to blue vertical bars.

Looking back at the data at the end of the year we can see that the timing of the irrigations could potentially be optimized. Because this information is in Fruit Tracker and is updated every hour we could be using it to make irrigation decisions during the season.

The first irrigation on July 30th could have been done a few days earlier. Although the soil moisture at 12" is just reaching the irrigation trigger point, we can see that the trees were actually aggressively taking water from the 24" depth (the slope of the grey line starts to decrease more rapidly) and it crosses the irrigation trigger point around July 24. The second irrigation on Aug 17 was likely not needed and it significantly

increased the soil moisture beyond what is necessary in the deeper depths (24" grey line going above 40%). In the fall many growers were wondering if the soil was too dry heading into the winter season. For this field we can see that at the end of the monitoring on Sept 30th there is still enough moisture in the soil for the trees to enter dormancy.



For more information about soil moisture monitoring see OMAFRA Fact Sheet [Monitoring Soil Moisture to Improve Irrigation Decisions](#) (IOrder no. 11-037). For more information about the demonstration of Fruit Tracker and soil moisture monitoring contact Rebecca Shortt at OMAFRA in Simcoe (Rebecca.shortt@ontario.ca).

Software Program Helps Ontario Farmers Prevent Soil Erosion

The Revised Universal Soil Loss Equation (RUSLE2) is a software program designed to help farmers estimate the potential for soil erosion under different land management and cropping practices. The software overcomes many of the limitations of the previous USLE equation.

Ministry of Agriculture, Food and Rural Affairs (OMAFRA) staff has adapted the RUSLE2 for Ontario farmers by incorporating climate, soil and management practices common to the province.

We have created five interactive tutorials to help you use RUSLE2 for Ontario. The easy-to-follow audio/visual guides give step-by-step instructions on using RUSLE2 to help you assess the cropping and tillage practices you use on your farm.

Find out how you can prevent soil erosion from your fields! Visit the [OMAFRA website](#) to watch the tutorials and to download RUSLE2.

Do you have questions about RUSLE2? Contact the Agricultural Information Contact Centre at 1-877-424-1300 or ag.info.omafra@ontario.ca.



Crop Protection

Found! Ambrosia Beetles Identified in Ontario

Erica Pate, Pome Fruit IPM Specialist, OMAFRA

Ambrosia beetles have been identified in Ontario apple orchards. This pest first hit our radar last year after hearing about the damage these beetles were causing in orchards in New York. Reports of borers attacking healthy trees have arisen in the state with dying trees and oozing sap being identified in multiple orchards. We identified these beetles this past season in an Ontario orchard. There have also been suspected infestations in other orchards in different areas of the province. Although ambrosia beetles have been present in apple growing regions for years they have only recently begun to be a pest in apple orchards.

Ambrosia beetles are a group of insects which includes the granulate ambrosia beetle (GAB), *Xylosandrus crassiusculus*, and the black stem borer (BSB), *Xylosandrus germanus*. Most of these beetles were introduced to North America and have since been expanding their ranges. The BSB is currently raising concern in the Northeastern US. We identified GAB this year in Ontario orchards, which is still a concern and a serious pest of nursery and fruit trees in the US.

Ambrosia beetles, such as the BSB and the GAB, are approximately 2 mm long and will bore 1.5 mm wide tunnels through the bark and into the heartwood of trees. While related bark beetles will tunnel through the bark and form shallow galleries running parallel to the wood grain, ambrosia beetles tunnel straight into the bark, leaving a series of shotholes in the wood (Figure 1).



Figure 1. Brood chamber where eggs are laid.
Photo credit: L. Hyche, Auburn University

Branches and stems of affected trees may wilt and die, and larger branches can become riddled with galleries, creating weakened branches subject to breakage. Look for small tubes of sawdust coming out of large branches or trunks to identify ambrosia beetle tunneling. Heartwood infested by ambrosia beetle is usually stained brown along gallery walls. Direct damage from females boring into the heartwood is not the only damage; the females introduce and cultivate an ambrosia fungus for the developing larvae to feed on. This fungus signals to the tree that it is under attack. In response to this attack, trees will wall off their vascular systems, resulting in the decline and death of the tree. Additionally, there is a concern that these beetles could be a vector for pathogens. Affected trees have had sap or fire blight ooze issuing from beetle entry holes, leading researchers to consider the possibility that these borers are also spreading disease.

Studies suggest ambrosia beetles move into orchards from surrounding wooded areas. While these beetles typically attack stressed trees, they have been known to attack apparently healthy trees as well. Flooding, drought, and extreme winter temperatures can all result in physiological stresses that can attract ambrosia beetles. Stressed trees produce different types of volatiles, including ethanol, which attracts these beetles. Ethanol can therefore be an effective tool to monitor for this beetle. Using ethanol-baited bottle traps has been successful at trapping the insects and monitoring population trends.



Figure 2. Black stem borer. Photo credit: Pennsylvania Dept. of Cons. & Natural Resources

There are limited options available for the control of ambrosia beetles. Maintaining tree vigour, using latex paint on trunks, and removal of infested trees and branches can reduce infestations. Trap logs can also be used, by placing fresh cut pieces of hardwood logs along the orchard edges. These logs must be removed and destroyed before any new adults emerge.

Correctly identifying these beetles is very difficult, as they are very similar to other beetles present in Ontario apple orchards (Figure 2). We do not know the extent of this insect's presence in Ontario orchards. Ambrosia beetles have the potential to cause serious damage to apple trees as well as other fruit trees, therefore general awareness is important. If you think you are seeing ambrosia beetle damage in your orchard, please contact us.

References:

- Agnello, A., D. Breth, E. Tee, K. Cox, & H.R. Warren. 2015. **Ambrosia Beetle- An Emergent Apple Pest**. New York Fruit Quarterly. 23(1): 25-28.
- Reding, M.E., C.M. Ranger, J.B. Oliver and P.B. Schultz. 2013. **Monitoring attack and flight activity of *Xylosandrus* spp. (Co-leoptera: Curculionidae: Scolytinae): The influence of temperature on activity**. J. Econ. Entomol. 106 (4): 1780–1787.

San Jose Scale Past, Present, Predictions

Erica Pate, Pome Fruit IPM Specialist, OMAFRA

For the past few years OMAFRA specialists have been monitoring San Jose scale (SJS), a pest in Ontario apple orchards. We have been monitoring the lifecycle and population trends of this insect to determine optimal spray timings, as there is a small window to effectively apply insecticides.

San Jose scale is very difficult to eradicate once it has become established in an orchard. This pest was not an issue in Ontario for a number of years, but perhaps with an increase in warmer weather and a changing IPM program, scale is once again a pest to be reckoned with in Ontario orchards. We have begun to monitor for this insect and investigate any effective models that predict emergence and lead to better management.

Female scales spend their lives immobile and protected under a waxy scale, which is very effective at protecting them from predators, desiccation, and

pesticides. Male scales are small flying insects. Young scales emerge from underneath the female's scale as crawlers, and will be active for up to a day before finding a suitable place on bark or fruit to feed (Figure 1). The crawler will settle in this spot, building a protective, waxy, scale covering. Because of the short time that the crawlers are active there is a small window when crawlers are unprotected and insecticides will be effective. It is therefore vital to know when crawlers have emerged. Since this pest is so small, monitoring and scouting for this pest can be difficult and time consuming. Using degree day models to predict crawler emergence are attractive alternatives to constant scouting for these tiny insects.



Figure 1. San Jose scale damage on developing fruit.

We have been comparing two different models that predict SJS emergence against our own observations to assess how effective these models can be in Ontario. Using the data that we have collected in previous years and this year's data, we can compare our monitoring results to the predictions and determine how accurate these models are at predicting crawler emergence.

Cornell DD model

- Biofix: March 1st
- Base temperature: 10°C
- 1st generation crawler emergence: 278 DD, or approx. 29 ± 12.5 days from McIntosh petal fall
- 2nd generation crawler emergence: 806 DD, or approx. mid-July

Washington DD model

- Biofix: first adult male catch
- Base temperature: 10.5°C
- 1st generation crawler emergence: 222-249 DD, or approx. 1st generation codling moth (CM) biofix
- 2nd generation crawler emergence: n/a

Table 1. 2014 degree day results.

Region	Predicted emergence (NY model)		Predicted emergence (WA model)		Observed emergence	
	1 st generation	2 nd generation	1 st generation	2 nd generation	1 st generation	2 nd generation
Middlesex	June 16-17	Aug 10-11	No biofix	n/a	Not observed	Aug 14
Norfolk	June 19-20	Aug 19-20	June 22-24	n/a	June 25	Aug 18
Georgian Bay	June 26-27	Aug 25-26	June 29-30	n/a	June 27	Aug 27

Table 2. 2015 Degree day results.

Region	Predicted emergence (NY model)		Predicted emergence (WA model)		Observed emergence	
	1 st generation	2 nd generation	1 st generation	2 nd generation	1 st generation	2 nd generation
Middlesex	June 13-15	Aug 9-10	No biofix	n/a	Not observed	Aug 21
Norfolk	June 10-12	Aug 3-5	June 22-24	n/a	June 22	Aug 28
Georgian Bay	June 20-22	Aug 18-20	No biofix	n/a	Not observed	Aug 21

To monitor for the adult male scales, pheromone traps were placed in orchards in mid-May, and monitored through the apple season until mid-October. Monitoring for crawlers was more difficult, as they are very small and difficult to see on the tree limbs. We found using black electrical tape to monitor for the presence of crawlers to be effective this past summer (Figure 2). Crawlers are small and yellow, and can easily be seen on black tape (Figure 3).

Table 1 & 2 summarize the findings using both the New York (NY) and Washington State (WA) models. The WA has generally been more accurate at predicting first generation crawler emergence. This model uses first adult catch as a biofix, which tends to be more accurate than using March 1st as a biofix as this is not specific to orchards and may not accurately reflect the actual development of scale in that location year to year.

There are two full generations of scale each year, and monitoring indicates that these generations overlap, as we consistently found crawlers on black electrical tape throughout the summer. However, using tape is time consuming and is not always effective; having alternative methods to determine optimal spray timing would be beneficial. Using these degree day models in addition to intensive scouting will help accurately time insecticides and control this pest.

I would like to thank Victoria Blake, OMAFRA summer student, for her help in conducting the monitoring throughout the summer.



Figure 2. Black electrical tape wrapped around the trunk for crawler monitoring.

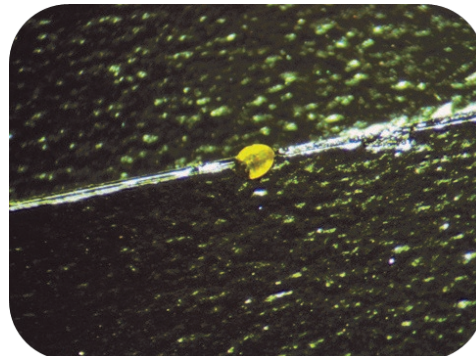


Figure 3. San Jose scale crawler trapped on black electrical tape.

New Rot Products

Erica Pate, Pome Fruit IPM Specialist, OMAFRA

Determining effective methods for bitter rot and black rot (*Botryosphaeria obtuse*) control is a priority for the apple industry. These rots are becoming bigger problems in Ontario apple orchards, and management options are limited. With the registration of new products in the past 2 years, growers now have a wider selection of products to choose from and can develop an effective rot management program.

Bitter rot (Figure 1) and black rot (Figure 2) have recently become serious pests in Ontario apple orchards. With an increase in occurrence and severity, growers are looking for more control options. Three new products are now available for either bitter rot or black rot, or both. Pristine offers control of both rots, while Allegro will control bitter rot and provide suppression of black rot. The third new product available for growers is Regalia Maxx, a biofungicide providing suppression of bitter rot.

This past season Ontario experienced perfect conditions for bitter rot development, with warm, hot weather early in the season followed by rainy periods extending into the summer. With the increased presence of bitter rot and ideal conditions for further disease development, proper management is critical. See the July 8th Hort Matters article, [Bitter rot symptoms and management in apples during 2015](#), for more information on the disease and its occurrence in Ontario.

There are a number of methods for bitter rot management, including cultural and chemical control. Until recently there have been limited options of fungicides for bitter rot. With the registration of new products growers now have more alternatives to use to develop a bitter rot management program.

Bitter rot:

- New registrations include **Pristine WG** (Group 7 + 11), **Allegro 500** (Group 29), and **Regalia Maxx**, a biofungicide registered for suppression of bitter rot.
- **Allegro** added bitter rot to its label, along with cedar apple rust and Alternaria blotch, to the label at a rate of 0.75 -1.0 L/ha. Do not mix Allegro with oil.
- **Pristine** also added new diseases to the label, including both bitter rot and black rot, at a rate of 1.0-1.2 kg/ha. Pristine should be applied

preventatively before disease development.

- **Regalia Maxx** is a new product providing suppression of bitter rot at 0.125% v/v in 1000L water/ha. Continue applications on a 10-14 day interval depending on crop growth and disease pressure.

Apply these products at petal fall, before disease development. Continue on a 7-14 day interval.

Black rot:

- **Pristine WG** and **Allegro 500 F** are also options for black rot management. Allegro 500 F is registered for suppression only.

Apply Pristine and Allegro beginning at pink, before disease occurrence.

If possible, time fungicide applications prior to a rain event to protect the fruit from splashing spores. Always rotate products to reduce the potential for resistance developing.



Figure 1. Bitter rot



Figure 2. Black rot

Publication 360 Coming Soon!

Erica Pate, Pome Fruit IPM Specialist, OMAFRA

The 2016-2017 [Publication 360, Guide to Fruit Production](#) is anticipated to be available for growers mid-March 2016. This publication will have the latest information on pest management, crop nutrition, pesticide safety, and resistance management. New this year are reference tables including mating disruption products and plant growth regulators, a section on adjuvant options, a new specialty berry calendar, and new products added to the apple, berry, grape, tender fruit and tree nut calendar. The 2015-2016 apple chapter includes updated tables for PHI/REI periods, product activity against insects, mites and disease, and toxicity of pesticides to beneficial insects. It also features additional pests or control timings in the apple calendar, such as alternaria blotch, fly speck, sooty blotch, San Jose scale, and fire blight.

The following new products for apples will be included in this publication:

Fullback 125 SC (flutriafol) is a Group 3 fungicide registered for control of scab at 950 mL/ha and powdery mildew, quince rust, and cedar apple rust at 585-877 mL/ha. For scab control begin application at half-inch green or when conditions are favourable for primary scab development. Continue application through the duration of primary scab season. Fullback should be tank-mixed with a compatible protectant fungicide to improve fruit scab control and for resistance management. For powdery mildew and rust begin application at green tip and continue through cover sprays. Do not use Fullback when sporulating lesions of the target disease are present.

Preharvest interval (PHI): 14 days;

Re-entry interval (REI): 12 hours;

Maximum applications per year: 2.05 L/ha

Sercadis (fluxapyroxad) is a Group 7 fungicide registered for control of apple and pear scab at 333 mL/ha and powdery mildew at 167-333 mL/ha. Begin coverage for these diseases at green tip and apply on a 7-14 day interval until full bloom if disease persists or weather conditions favour disease development. In conditions of rapid growth or high disease pressure use a high rate and shorten intervals between applications. For scab control, use with a non-ionic surfactant at a rate of 0.125 % v/v (1.25 L in 1,000 L). Do not use Sercadis when sporulating lesions of the target disease are present.

Preharvest interval (PHI): 0 days;

Re-entry interval (REI): 12 hours;

Maximum # of applications per year (on label): 4 (maximum 2 applications for resistance management).

Serenade OPTI (*Bacillus subtilis*) is a Group 44 biofungicide registered for the suppression of fire blight at 1.1-1.7 kg/ha and for suppression of apple and pear scab and powdery mildew at 1.7-3.3 kg/ha. For suppression of fire blight begin application at 1-5% bloom and repeat on a 7-10 day interval. For suppression of scab begin application at green tip or when conditions are favourable for primary scab development, and continue on a 7-10 day interval. For suppression of powdery mildew, begin application at tight cluster or earlier if conditions are conducive to disease development. Repeat applications on a 7-10 day interval.

Preharvest interval (PHI): 0 days

Re-entry interval (REI): when dry

Maximum # of applications per year (on label): N/A

Cueva (copper octanoate) is a Group M fungicide registered for control of fire blight and scab, using a 1% solution in 470-940 L water/ha (ex. 5L in 500 L water /ha). Cueva can be used to control fire blight through bloom and as an in-season cover spray to protect against trauma blight. For scab control begin coverage at green tip and re-apply on a 5-10 day interval as needed. Cueva may cause russetting of light coloured apple varieties. Use a 0.8% solution if fruit is present. If concerned about the sensitivity of fruit apply Cueva to individual trees or a small area and wait to determine if injury occurs prior to treatment of a larger area.

Preharvest interval (PHI): 1 day

Re-entry interval (REI): 4 hours

Maximum # of applications per year (on label): 10

Regalia Maxx (*Reynoutria sachalinensis* extract) is a biofungicide registered for suppression of powdery mildew, sooty blotch, fly speck, and bitter rot applied at 0.125% v/v in 1000L water/ha. Begin application preventatively at pink for suppression of powdery mildew and at petal fall for sooty blotch, fly speck and bitter rot, repeating applications on a 7-10 day interval. Petal fall applications can be increased to 0.125%- 0.25% v/v in 1000L water/ha. Continue applications on a 10-14 day interval depending on crop growth and disease pressure.

Preharvest interval (PHI): not specified

Re-entry interval (REI): when dry

Maximum # of applications per year (on label): not specified on the product label

Double Nickel (*Bacillus amyloliquefaciens*) is a Group 44 biofungicide registered for suppression of fire blight at 1.0-1.5 kg/ha. Apply at bloom. Under moderate to high disease pressure, or conditions that are conducive to disease development, use higher labelled rate, more frequent applications or rotate with other fungicides to improve performance. As this is a new product in Ontario little evidence of its efficacy is available. Test on a small scale before using it more broadly.

Preharvest interval (PHI): None

Re-entry interval (REI): when dry

Maximum # of applications per year (on label): not specified on the product label

Aprovia (benzovindiflupyr) is a Group 7 fungicide registered for control of scab at 300-500 mL/ha and powdery mildew and alternaria blotch at 500 mL/ha. Begin coverage for scab and powdery mildew at green tip, and petal fall for alternaria blotch control. In conditions of rapid growth or high disease pressure, use high rate and shorten intervals between applications. Tank-mix with a compatible protectant apple scab fungicide from a different group to improve control of fruit scab. Do not use Aprovia when sporulating lesions of the target disease are present. See label for suggested tank-mix products.

Preharvest interval (PHI): 30 days

Re-entry interval (REI): 12 hours

Maximum # of applications per year (on label): 2

Mako (cypermethrin) is a group 3 insecticide replacing Ripcord. Mako is registered for the same pests and timing as Ripcord.

Preharvest interval (PHI): 7 days

Re-entry interval (REI): 12 hours

Maximum # of applications per year (on label): 2

Xiameter OFX-0309 is a silicone surfactant replacing Sylgard 309. Add Xiameter to Retain at a rate of 0.05%-0.1% by volume to improve spray coverage and enhance absorption.

Reminder: due to the decision by the Pest Management Regulatory Agency (PMRA) to phase-out diazinon insecticides, Diazinon 500 E (PCP # 11889) and Diazinon 50 WSP (PCP # 29976) will no longer be permitted for use on apple after December 31, 2016. Diazinon products can be used until **December 31, 2016**, provided changes to the label are followed. Do not use in 2017.

Airblast 101 Handbook

The new **Airblast 101 Handbook** is available to airblast sprayer operators, researchers and regulators that want to apply pesticides, plant growth modifiers and foliar nutrients in an effective, economic and environmentally-responsible manner.

The full-colour 206 page handbook is written in conversational language and has more than 200 illustrations. Ring-bound with a water-resistant cover, it can be used in the office as easily as in the tractor. The handbook covers all things “airblast” from safety inspections and maintenance, to mixing and calibration, to cleaning and winterizing. It also explains techniques to improve spray coverage and reduce unnecessary waste.

Each handbook will cost \$30.00 CAD plus shipping. [It can also be downloaded for free as an e-book for portable devices](#) (both Apple and Android platforms).

If your organization is interested in receiving multiple copies at a reduced rate or are interested in promoting the guide through emails, newsletters, websites, please let us know.

To order copies of Airblast 101 – A Handbook of Best Practices in Airblast Spraying, contact Airblast101@gmail.com

There are a **limited number of printed copies**, so get your copy now while supplies last!



Postharvest

Risk of Chilling Disorders in Apples for 2015-16 Storage Season

Dr. Jennifer DeEll, Fresh Market Quality Program Lead – Hort Crops, OMAFRA

CIPRA is a computer-based program developed by the research team of Dr. Gaétan Bourgeois (AAFC-QC) that uses weather data to predict the risk of susceptibility of apples to specific storage disorders (Bourgeois, DeEll, and Plouffe). According to the CIPRA model, there is a **26-27% risk of chilling-related disorders developing this storage season**, based on weather data from Simcoe (Norfolk County), Ontario (Figure 1). In contrast, using weather data from Frelighsburg, Quebec, CIPRA predicts very little risk (< 2%) of chilling-related disorders developing this storage season (Plouffe et Bourgeois, Bulletin express, 16 septembre 2015, Volume 4 n° 6).

To reduce the risk of developing chilling-related disorders, pay close attention and use the recommended temperatures and storage regimes for specific apple cultivars. 'Empire', 'McIntosh', and 'Honeycrisp' are especially susceptible to chilling-related disorders (i.e. flesh browning, low temperature breakdown, core browning, soft scald, soggy breakdown) and symptoms that can usually be induced by using storage temperatures lower than optimum. Late harvested apples are also more prone to developing chilling-related disorders, such as flesh browning in 'Empire' or soft scald and soggy breakdown in 'Honeycrisp'. Therefore, manage your storage periods and marketing accordingly.

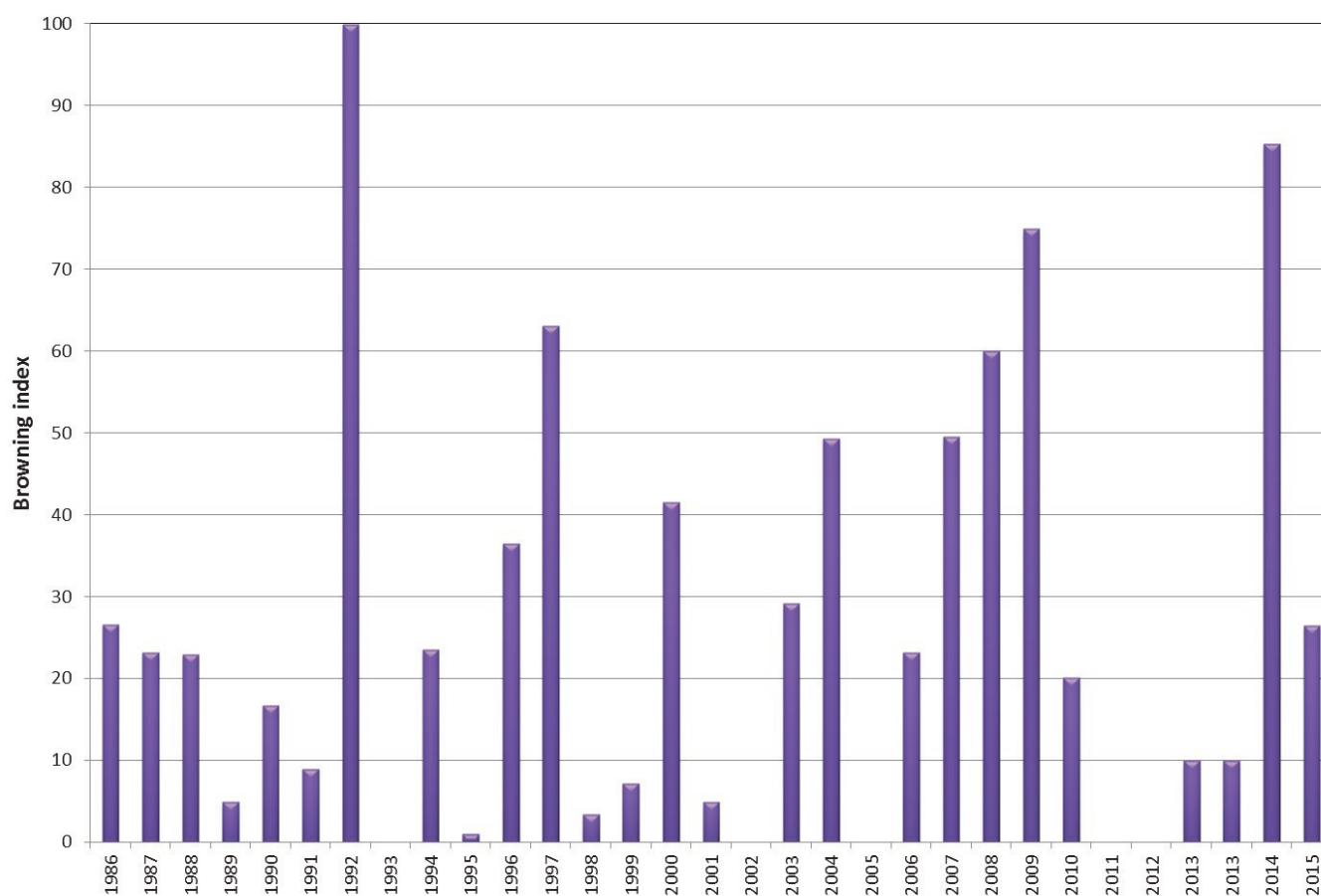


Figure 1. Risk of developing chilling-related disorders during 1986 to 2015, for the region of Simcoe (Norfolk County), Ontario.

* Graph supplied by D. Plouffe, AAFC-QC

Announcements



The Ontario Fruit and Vegetable Convention is an annual gathering of horticultural crop producers involved in the production of fruits and vegetables. The annual gathering, now entering its 14th year, is attended by a cross section of the horticultural sector including government, industry, business, consultants, producers, associations, researchers and educators. Located at the dynamic Scotiabank Convention Centre in Niagara Falls, Ontario, the 2-day convention features a great lineup of horticultural experts, educational sessions, trade show exhibitors and great networking opportunities. Learn, discover and network together with people who can help grow your knowledge and discover for yourself why OFVC is called Canada's Premier Horticultural Event.

Online Registration is Now Open

[Register online today](#) and save big during the pre-registration period! Its easy, convenient and secure. Click on the **REGISTER** button to reserve your spot at Canada's premier horticultural event! And don't forget to guarantee your spot at the Meet The Buyer event during online registration. Spots for this hugely successful event last year at limited and available on a first come, first served basis. Learn from over 120 educational sessions, browse over 80,000 sq. ft. of exhibits, enjoy the friendliness of the Farmers and Friends reception and save by registering today!



Sweet and Hard Apple Cider Workshop

February 17th, Room 206

- 9:30 Making Winning Cider at Brantview Apples and Ciders**
Jay Howell, Brantview Apples and Ciders
- 10:00 What Can the Government Do for You?**
Peter Illyckyj, Kiran Pandey and Rob Gamble, OMAFRA
- 10:30 Thoughts from the LCBO on the Ontario Cider Market: Past, Present and Future**
Mark Wilson, LCBO
- 11:00 Real Life Experiences with Exporting Globally**
Lyndsay Gardner, Flying Monkeys Brewery
Richard Liu, Sunnybrook Farm Estate Winery

Apple Program

February 18th, Ballroom A

- 9:30 Techniques to Improve Apple Quality During Storage**
Dr. Jennifer DeEll, OMAFRA
- 10:00 Mechanical Hedging Trials in Nova Scotia Orchards**
Chris Duyvelshoff, Perennia, Nova Scotia
- 10:30 Harnessing Orchard Soil Microbiology for Replant Disease and System Resilience**
Dr. Mark Mazzola, USDA-ARS, Washington State
- 11:00 Panel: Answering those Tough Questions from Customers on Apple Production and Pest Management**
Melisa Luymes, Farm and Food Care
Cathy McKay, Nature's Bounty Farm
Karen Ferri, T & K Ferri Orchards
- 2:00 The Vineland Apple Breeding Program**
Dr. Daryl Somers, Vineland Research and Innovation Centre
- 2:30 Nova Scotia's 2014 Fire Blight Epidemic- Impacts and Outcome**
Chris Duyvelshoff, Perennia, Nova Scotia
- 3:00 High Density Apple Production in the Netherlands**
Eric van der Hoeft, Fruitconsult, Netherlands
- 3:30 Crop-adapted spraying – The results of a 3-year study in orchard pesticide dosage optimization**
Dr. Jason Deveau, OMAFRA

Frost Protection

February 18th, 2015, Room 204

- 2:00 Frost Formation, Measurement and Passive Strategies to Avoid Damage**
Robert Evans, USDA (retired)
- 2:30 Using Infrared Thermography to Visualize the Freezing Process and Assess the Performance of Frost Protection Measures**
Michael Wisniewski, Scientist USDA, Appalachian Fruit Research Station
- 3:00 Airflow Machines and Heating Equipment for Frost Protection**
Hugh Fraser, Outside the Barn Farm Solutions
- 3:30 Irrigation and Row Covers for Frost Protection**
Robert Evans, USDA (retired)

3rd Annual Ontario Craft Cider Competition

Call for Entries and Entry Form

Competition and judging to be held at the Ontario Fruit and Vegetable Convention

Wednesday, February 17th, 2016 - 2:00 p.m.–4:00 p.m.

Entry Information

One entry per business entity per category.

A commercial producer for the purpose of this competition is considered a producer with a manufacturer's license issued by Alcohol and Gaming Commission of Ontario (AGCO).

Technical Specifications for entries:

carbonated (either naturally or artificially will be accepted)

Alcohol content between 4 – 7%

Residual sugar between 10 – 50 grams/litre

PH 3.3 – 3.8

Please bring your entry to the Registration Desk at the Scotiabank Convention Centre between 8:30 and 10:00 a.m. on Wed. Feb. 17th, 2016. Each entry must include an entry form (see attached, photo copies acceptable). Entry forms will also be available at the drop-off desk the day of the competition.

Each entry must include a minimum of 3 x 750 ml bottles (or equivalent). It is suggested that at least two containers are entered (regardless of size). This gives the judges the opportunity to sample your products at their freshest. The second bottle may also be used by first round judges should they perceive a problem with the contents of the first bottle.

Categories

Common Cider is defined in the Beer Judge Certification Program Inc. (BJCP) Style Guidelines (which is the definition used by GLINT) as: "A common cider is made from culinary/table apples, with wild or crab apples often used for acidity/tannin balance.

- **Aroma/Flavour:** Sweet or low-alcohol ciders may have apple aroma and flavor. Dry ciders will be more wine-like with some esters. Sugar and acidity should combine to give a refreshing character, neither cloying nor too austere. Medium to high acidity.
- **Appearance:** Clear to brilliant, pale to medium gold in colour.
- **Mouthfeel:** Medium body. Some tannin should be present for slight to moderate astringency but little bitterness.
- **Overall Impression:** Variable, but should be a medium, refreshing drink. Sweet ciders must not be cloying. Dry ciders must not be too austere. An ideal cider serves well as a "session" drink, and suitably accompanies a wide variety of food."

Specialty/Flavoured Cider

This is a cider with other fruits or fruit-juices added - for example, berry. Note that a "cider" made from a combination of apple and pear juice would be entered in this category since it is neither cider nor perry.

- **Aroma/Flavor:** The cider character must be present and must fit with the other fruits. It is a fault if the adjuncts completely dominate; a judge might ask, "Would this be different if neutral spirits replaced the cider?" A fruit cider should not be like an alco-pop. Oxidation is a fault.
- **Appearance:** Clear to brilliant. Color appropriate to added fruit, but should not show oxidation characteristics. (For example, berries should give red-to-purple color, not orange.)
- **Mouthfeel:** Substantial. May be significantly tannic depending on fruit added.
- **Overall Impression:** Like a dry wine with complex flavors. The apple character must marry with the added fruit so that neither dominates the other.

Vital Statistics:

ABV: 5 – 9%

To aid in maintaining fairness of judging commercial entries will be poured out of sight of judges and identified by a unique assigned identification number.

Awards

Gold – Craft Cider Trophy to be held by the winning entrant for one year, returned for next year's competition.
Permanent plaque awarded.
Silver – Permanent plaque awarded.
Bronze – Permanent plaque awarded.
Honourable Mention – At the discretion of the judges, plaque may be awarded.

For more information contact:

Amanda Green, OMAFRA – amanda.green@ontario.ca
Kelly Ciceran, OAG - kciceran@onapples.com
Thomas Wilson, OCCA - thomas@spirittreecider.com

3rd Annual Ontario's Finest Craft Cider Competition

Registration Form

A completed copy of this form must accompany each entry. We will have forms available when you drop off your cider. Fill in the information specific to the entry and rubber band to the entry.

Division: Commercial

Category (circle one): Common Cider Specialty Cider

Contact Information:

Contact _____

Company _____

Address _____

City _____

Province _____

Postal Code _____

Phone _____

Cell _____

E-mail _____

Website _____

Name of product, if any:

Optional Information:

Sweetness:

Carbonation:

Strength:



Cider Content Entry Form
Ontario's 6th Annual Sweet Apple Cider Competition
February 17th, 2016 – Sponsored by the Ontario Apple Growers

Owner's Name: _____

Cider Mill Name: _____

Cider Maker's Name (optional): _____

Address: _____

City: _____ Postal Code: _____

Email: _____ Website: _____

Date (approx) cider was pressed: _____

Variety Blend (optional – will not be disclosed – List approximate % of each: _____

Type and Make of Cider Press: _____

Is this cider entry pasteurized? Yes _____ No _____

Do you own a cider pasteurizer? Yes _____ No _____ New this year _____

Bring this completed entry form and two (2) 4-L jugs of cider (thawed), with labels attached with an elastic, to the **Registration Desk at the Ontario Fruit and Vegetable Convention** at Scotiabank Convention Centre between 8:30 and 10:00 a.m. on Wed., Feb. 17, 2016.

Additional information:

- Only Ontario cider producers are eligible, one entry per mill. Can be custom pressed.
- Cider judging on Wed. Feb. 17 beginning at 2 p.m. in the Port Colborne Room. Judging is open to the public, please come to learn how cider is judged.
- Winning ciders will be announced at the Farmers and Friends event Wednesday evening.
- Tasting of winning ciders, Thursday morning, Feb. 18 by the Apple Session Ballroom A
- Prizes: 1st place travelling trophy – for your display for one year + a permanent plaque. 2nd and 3rd place receive a plaque. Sponsored by the Ontario Apple Growers.

Questions? Contact Amanda Green, OMAFRA, 519-426-1102 amanda.green@ontario.ca

**Don't miss the Cider Workshop, Wednesday morning before judging,
February 17th, 2016 at 9:30 a.m. in Room 206.**



Agricultural Information Contact Centre: 1-877-424-1300

E-mail: ag.info.omafra@ontario.ca

Northern Ontario Regional Office: 1-800-461-6132

www.ontario.ca/omafra

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