



# ORCHARD NETWORK

For Commercial Apple Producers

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## Orchard Management

### Ready for Apple Harvest?

Leslie Huffman, Apple Specialist, OMAFRA

Summer apple harvest has started – new crop Sunrise, Paulared and Quinte's are on the market, a signal to gear up for the main fall harvest. Are you ready?

Here are a few suggestions to get ready for a smooth harvest season:

- Refresh your maturity test kit. Stop by the pharmacy to get a fresh batch of iodine solution. Remember that this solution is poisonous and sensitive to light, so store it in a dark bottle with a proper label. See the recipe in the next article.
- Check over your pressure tester and your refractometer to measure firmness and sugars. Obtain starch-iodine charts and protect them from rain. Prepare record sheets to record results on harvest maturity.
- Apply stop-drop materials at the correct time. Apply ReTain 4 weeks before the anticipated harvest– and it's better to be early than late! Apply

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Ministry of Agriculture,  
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**This Newsletter is brought to you by the Ontario Apple Team:**

Leslie Huffman, Harrow  
ONNL Editor  
Apple Specialist  
(519) 738-1256

Dr. Jennifer DeEll, Simcoe  
Fresh Market Quality Program Lead  
(519) 426-1408

Dr. John Cline  
University of Guelph, Simcoe  
(519) 426-7127, ext. 331

John Henderson, Brighton  
Risk Identification Specialist  
(613) 475-5175

Kathryn Carter, Simcoe  
Pome Fruit IPM Specialist  
(519) 426-4322

Margaret Appleby, Brighton  
IPM Systems Specialist  
(613) 475-5850

Hannah Fraser, Vineland  
Horticultural Crops Entomology Program Lead  
(905) 562-1674

Michael Celetti, Guelph  
Plant Pathologist, Horticultural Crops Program Lead  
(519) 824-4120 ext. 58910

Christoph Kessel, Guelph  
Horticulture Crop Nutrition  
(519) 824-4120 ext. 52480

Anne Verhallen, Ridgetown,  
Soil Management Specialist  
(519) 674-1614

For complete list of OMAFRA Crops Staff, visit the OMAFRA website at:  
<http://www.ontario.ca/crops>

OMAFRA Contact Call Centre,  
1-877-424-1300

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(Continued from page 1)

Fruitone-N (NAA) when the first sound apples drop (not push-offs), to hold apples for 7-10 days (allow 1-2 days to take effect). Coverage is important for both products, and moderate (20°-24°C) temperatures are preferred.

- Do you have enough bins? It takes 2000 apples of 3 1/8" (100-count) to fill a bin. To fill the same bin with 2 3/4" (138-count) fruit, it will require 2760 apples. Read more in "How to Estimate Bin Requirements: Harvesting Efficiently by Having the Right Number of Bins Ready", online at [www.omafra.gov.on.ca/english/crops/facts/bin\\_requirements.htm](http://www.omafra.gov.on.ca/english/crops/facts/bin_requirements.htm)
- Reflective mulch may help colour fruit, especially in the interior of the trees. Growers using this mulch report that harvest labour is more efficient because most of the fruit can be picked in one pass. Read more in "Using Reflective Mulch for Light Management in Orchards", online at [www.omafra.gov.on.ca/english/crops/facts/orchard\\_mulch.htm](http://www.omafra.gov.on.ca/english/crops/facts/orchard_mulch.htm)
- Be ready for traceability! Order your bin tags and assemble markers, stapler, staples, and staple pullers. Prepare your daily record book to mark down what is harvested when, by who, and where it goes. Many packers are requiring these records, so it's good to get in the habit.
- Be ready for labour. Order your harvest labour, and ready their supplies, like boots, rain gear, insect repellants and toilet facilities. Check over picking buckets and ladders, and have extra repair parts on hand. Provide hand washing facilities and records of training.
- Smooth out laneways and loading ramps – rainy conditions have been hard on some of these surfaces, but it's important to prevent bruising in the bins from "rut" damage.
- Finish up your summer pruning as soon as possible. Late pruning may cause fruit drop, and/or promote winter injury.

A few preparations now could save precious time during harvest. Good luck!

## When Will Apples Be Ready to Harvest?

*Leslie Huffman, Apple Specialist, OMAFRA; and Jennifer DeEll, Fresh Market Quality Program Lead, OMAFRA*

Will wet soils bring the crop on sooner? What effect will cloudy skies have on maturity? Are we ahead or behind last year? One way to monitor the maturity development and answer these questions is using the starch-iodine test.

**What you need:** Assemble a testing kit to carry with you to evaluate your apples. You will need:

- A shallow dish to hold the iodine solution
- A sharp knife to cut apples
- A squirt bottle of water to rinse off treated apples
- Starch-sugar conversion charts for each cultivar (see below)
- Paper towels and garbage bag
- Paper and pen to record dates and results

**Prepare the iodine solution:** Contact your pharmacy to prepare a fresh batch – it's best to make fresh solution each harvest season. Store the solution in a dark coloured (or foil-wrapped) bottle, away from light.

**Caution:** Remember that iodine is poisonous. Correctly label the bottle and keep away from children and pets. Consider treated apples poisonous - do not feed to animals or use in composting. Prevent pets from licking the treated fruit.

**Recipe to give to the pharmacist:**

1. Dissolve 8.8 grams of potassium iodide in approximately 30 ml of warm water. Gently stir the solution until the potassium iodide is dissolved.
2. When it is properly dissolved, add 2.2 grams of iodine crystals. Shake the mixture until the crystals are thoroughly dissolved.
3. Dilute this mixture with water to make 1.0 litre of test solution. Mix well.

(Continued on page 3)

**Starch-iodine chart:** The most useful starch chart is the **Generic Starch-Iodine Index Chart for Apples** from Cornell University. This chart uses 1 to 8 values, as follows –

- 1 = 100% core stain and 100% flesh stain
- 2 = 50% core stain and 100% flesh stain
- 3 = 0% core stain and 100% flesh stain
- 4 = 0% core stain and 80% flesh stain
- 5 = 0% core stain and 60% flesh stain
- 6 = 0% core stain and 40% flesh stain
- 7 = 0% core stain and 20% flesh stain
- 8 = 0% core stain and 0% flesh stain

It can be used for all apple cultivars and it is important to note that this starch chart is the one that all maturity recommendations for the use of SmartFresh (1-MCP) are based on. Copies may be obtained from AgroFresh directly, or through Jennifer DeEll at [Jennifer.DeEll@ontario.ca](mailto:Jennifer.DeEll@ontario.ca).

The original chart can be found online on p. 9 to 11: <http://ecommons.library.cornell.edu/bitstream/1813/3299/2/Predicting%20Harvest%20Date%20Window%20for%20Apples.pdf>

**How to do the test:** Select representative trees in crop load and vigour, and avoid the use of end trees and outer rows. Sample from different sides of the trees and select apples of typical size and color. Test apples soon after collection and no longer than 12 hours after collection. Cut apples in half through the equator, dip the cut edges in the iodine solution, wait at least one minute, rinse with water, and compare to the chart.

This is a simple test to determine how much starch has changed to sugar – and if the apples are ready to harvest. In general, values just over 2-3 are optimum for harvesting apples destined for long-term storage, whereas slightly higher values are optimum for short-term storage or immediate consumption. Honeycrisp is unique, in that starch index values of 6+ are best.

## Leaf Testing - Making the Soil Connections

*Christoph Kessel, Horticulture Crop Nutrition, OMAFRA*

Many fruit growers completed leaf analyses this past summer. And now when you get a moment, you may look over your reports and start scratching your head wondering why the report shows a potassium deficiency but your soil test indicates adequate potassium levels.

At times it can be difficult to make a clear connection between soil and tissue analyses. So it is important to remember that both are snapshots taken at the time of sampling. Leaf nutrient concentrations can change over a short period of time during the growing season due to

soil, environmental and cultural factors. But soil nutrient levels, like potassium and phosphorus, don't change quite so quickly.

When reviewing your analyses, consider the following two points. First of all, soil and environmental conditions affect potassium uptake. Secondly, the potassium concentrations in the leaves and in the plant will change over the season. Potassium moves to the root by diffusion; moving in the soil solution from higher concentrations to lower concentrations. Diffusion and uptake can be hampered by damaged roots, low soil temperature and moisture, poor aeration, and low clay and organic matter content. Several studies, looking at in season leaf nutrient levels, have shown that potassium concentrations are higher prior to flowering; while after harvest, they are lower.

The interesting thing is this: even though foliar potassium concentrations increased with increasing soil applied potassium, the leaf levels still decreased between flowering and post-harvest. While the foliar potassium seems to indicate declining potassium levels, the overall plant potassium concentration increased.

So, the connection between soil and foliar testing may not always be clear at times, however used together, they can help you manage a perennial crop's nutrition

## Reducing Soil Compaction at Harvest

*Anne Verhallen, Soil Management Specialist (Hort), OMAFRA*

Rainfall has been an off and on thing this year – more on than off for some areas of the province. Many soils are quite moist as we head into apple harvest for 2009. As we saw a few years ago, even apple orchards can have some severe soil compaction. Let's take a look at how we can avoid or at least reduce the impact of compaction.

1. Stay off wet fields – great in principle but often difficult in reality. However, consider soil conditions during harvest – give land a chance to drain after a heavy rain, even a few hours can make a difference in soil strength and its ability to carry a load. Target lighter soils for harvest under wet conditions – if possible of course based on variety and field arrangement.
2. Keep tractor and load weight as low as possible but the trade-off here is the number of trips down a row. See #3.
3. Reduce the number of trips down a row – we have seen soil failure in the past and a large amount of rutting where there are numerous trips in the same row.
4. If you haven't switched to radial tires do so - reducing tire pressure will reduce the force on the surface of the soil. This will only be effective with radial tires, and with large enough tires to carry the equipment at

the reduced pressures. Check with the manufacturer to ensure that the tires are rated to operate at low pressures.

Take a good look this fall at how water moves and drains in your orchard. Tile, catch basins and graded surfaces for laneways may be able to help manage water better in the future. Happy Harvesting!

## Bitter Pit and Honeycrisp: How Much Calcium Are you Getting?

Christoph Kessel, Horticulture Crop Nutrition, OMAFRA

Reducing bitter pit in Honey Crisp and other sensitive apple cultivars continues to be a challenge. Effective bitter pit management requires integrating cultural, soil, water, and crop nutrition practices. Applying calcium (Ca) sprays every two weeks during the growing season, often beginning in mid-June, for a total of 4-8 applications is one management tool.

There are many calcium products available, but the product used is not as important as the total amount of actual calcium applied over the season. To maximize the potential benefits up to a total of 12 kg actual calcium/ha per season is often required. This is usually applied in four or more sprays.

Regardless of which calcium product you may choose, it is important to know how much actual calcium the product selected provides over the season.

### Example 1: Dry calcium product

Calcium chloride (78% technical grade) contains 27.8% calcium, and is applied at of 5 kg/ha per application. Maximum 8 applications (from label).

Total calcium applied per season = (% calcium in product ÷ 100) X product application rate/ha X number of applications

$$(27.8 \div 100) \times 5 \text{ kg/ha} \times 8 = \mathbf{11.1 \text{ kg}}$$

### Example 2: Liquid calcium product

Product with 6% calcium, applied at 6 L/ha per application. You also need to know the product's container weight (24 kg) and its volume (20L). Maximum 8 applications (from label).

Total calcium applied per season = (% calcium in product ÷ 100) X (Product container weight ÷ product container volume) X product application rate/ha X number of applications per season

$$(6 \div 100) \times (24\text{kg} \div 20 \text{ L}) \times 6 \text{ L/ha} \times 8 = \mathbf{3.5 \text{ kg}}$$

These simple calculations allow you to compare how

close to the desired 12 kg actual calcium per ha per season each product applies. Deciding on which calcium product best suits your bitter pit management program also depends on how effectively it integrates with your other strategies. But it is important to know how much actual calcium you are applying over the season."

More information on managing bitter pit can be found in OMAFRA Factsheet, Bitter Control in Apples , Order No. 00-009 or online at:

[www.omafra.gov.on.ca/english/crops/facts/00-009.htm](http://www.omafra.gov.on.ca/english/crops/facts/00-009.htm)

## Best Practices for the Production of Apple Cider

John Henderson, Risk Identification Specialist, OMAFRA

Low quality apples have been identified as a major source of biological and chemical hazards in apple cider.

A 2003 United States Department of Agriculture (USDA) study found elevated aerobic bacterial populations on ground-harvested apples. Similar bacterial levels were present in the apple cider pressed from these grounders. Tree-picked apples and the cider pressed from them had significantly lower bacterial levels. Tree-picked apples sorted prior to pressing and the cider produced from them had the lowest bacterial levels.

Biological contaminants on apples include *Escherichia coli* (*E. coli*) O157:H7, *Salmonella* spp., *Listeria monocytogenes*, and *Shigella* spp. bacteria and *Cryptosporidium* spp., a parasite. Each of these pathogens can cause serious illness in humans, especially the young, the elderly and those with weakened immune systems. These pathogens can penetrate damaged areas of apples (e.g. puncture holes and bruises) where they are inaccessible to disinfection treatments. While some cultivars are more susceptible to bacterial penetration than others, bacterial internalization is mostly dependent upon the condition and handling of individual apples.

Chemical contaminants in apples may include patulin, a mycotoxin produced by *Aspergillus* and *Penicillium* moulds.

### RECOMMENDED PRACTICES

- Use only tree-harvested apples; never use apples that have dropped to the orchard floor or that remain attached to lower branches but have contacted the ground.
- Reject apples with visible dirt, animal or bird excrement, bruising, damage, mould or disease.
- Handle apples carefully. Damaged areas create opportunities for entry and growth of microbial contaminants. Wet or frozen apples are most easily damaged.
- Clean apple containers before each use; plastic

containers are more easily cleaned than those constructed of wood. Food grade plastic bin liners may also be used.

- Provide general sanitation and good personal hygiene training to all personnel handling apples and/or cider. Ensure good personal hygiene practices are followed, particularly hand washing, prior to, and during apple/cider handling.
- Provide an adequate number of clean, well-stocked toilet and hand washing facilities within easy access for the harvest crew.
- To prevent contamination of pickers hands from dirty footwear, train harvest personnel to grasp side rails when climbing ladders.
- Use closed or covered vehicles for road transportation of apples.
- When apples are not pressed immediately after harvest, refrigerate at temperatures between 0° and 4°C to slow or stop microbial and/or mould growth and apple deterioration.
- Inspect apples before pressing. Remove apples that are mouldy, wormy, internally or externally decayed, soiled, bruised, punctured, cut, or otherwise damaged.
- Custom pressers or those purchasing apples for pressing should enter into an agreement with the grower which stipulates that only tree-picked apples will be accepted.

## ADDITIONAL RESOURCES

Food Safety Practices in the Production of Unpasteurized Apple Cider

[http://www.omafra.gov.on.ca/english/food/inspection/juice/cider\\_producer\\_manual.pdf](http://www.omafra.gov.on.ca/english/food/inspection/juice/cider_producer_manual.pdf)

Code of Practice for the Production and Distribution of Unpasteurized Apple and Other Fruit Juice/Cider in Canada <http://www.inspection.gc.ca/english/fssa/protra/codee.shtml>

Contact John Henderson, OMAFRA Risk Identification Specialist at 613-475-5175 or [john.henderson@ontario.ca](mailto:john.henderson@ontario.ca)

## Postharvest

### Advanced Maturity of “Empire” at Harvest Increases Flesh Browning in Storage

*Dr. Jennifer DeEll, Fresh Market Quality Program Lead, OMAFRA*

‘Empire’ apples are very susceptible to flesh browning (a.k.a. internal browning). This usually occurs after mid- to long-term controlled atmosphere (CA) storage and has recently been the cause for substantial fruit losses.

During the past few years, within various projects, research results in Ontario have shown that later harvested ‘Empire’ fruit are much more prone to developing flesh browning. Harvest maturity was a major factor in the incidence and severity of this disorder.

In one study, the maturity of ‘Empire’ at harvest was trace internal ethylene (<0.5 ppm), 4.3 starch, 15.7 lb firmness, and 10.8% soluble solids. Similar fruit harvested 7 days later also had trace internal ethylene (<0.5 ppm) and 15.7 lb firmness, but starch was 5.8 and soluble solids 11.6%. After 6 months in CA (2.5% O<sub>2</sub> + 2% CO<sub>2</sub> at 3°C), ‘Empire’ apples from the first harvest had 4.5% incidence of flesh browning, whereas those from the later harvest had 17.7%. Treatment with SmartFresh (1-MCP) increased the incidence to 8.0% and 35.7%, respectively. It is important to note the small difference in harvest maturity in relation to the substantial increase in the amount of flesh browning.

In another study, the maturity of ‘Empire’ at first harvest was trace internal ethylene (<0.5 ppm), 3.7 starch, 16.4 lb firmness, and 12.4% soluble solids, while fruit maturity at second harvest (7 days later) was 0.7 ppm internal ethylene, 4.0 starch, 15.5 lb firmness, and 13.0% soluble solids. After 9 months in standard CA at 1-3°C, fresh-cut apple slices made from fruit from the first harvest exhibited much less browning than those made from the second harvest (72.5% good-excellent ratings vs. 31.2%)

Similar results showing the importance of harvest maturity in relation to flesh browning have been found by Drs. Chris Watkins and Hannah James at Cornell University. The effects of harvest maturity, delayed cooling, stepwise cooling, diphenylamine (DPA) drench, calcium application, Smart Fresh (1-MCP) treatment and timing, delayed CA, CO<sub>2</sub> concentration, low humidity storage, and fruit nutrient levels were all studied. Results showed that harvest maturity was the most important factor and that earlier harvested ‘Empire’ developed less flesh browning during storage.

Based on the above information, **it is recommended that harvesting ‘Empire’ apples destined for mid- to long-term storage occur when the starch index is close to 3 and there is only trace amounts of internal ethylene (<0.5 ppm).** Apples harvested later will have a substantial increased risk of developing flesh browning.

## Maturity and Storage of “Ambrosia” Apples

*Dr. Jennifer DeEll, Fresh Market Quality Program Lead, OMAFRA*

The past year was the final season of a 3-year collaborative project that focused on the maturity and storage of ‘Ambrosia’ apples. This project was supported by the Ontario apple industry as well as British Columbia. The following is a brief summary of the 2008-09 results and some final project conclusions.

‘Ambrosia’ produces very little ethylene during maturation on the tree. As starch is degraded and color changes, there continues to be only trace amounts of internal ethylene present (<1 ppm). This makes internal ethylene a difficult indicator of fruit maturity for ‘Ambrosia’ (but at the same time makes ‘Ambrosia’ an ideal candidate for SmartFresh (1-MCP) treatment). Overall, the starch index has been the most consistent indicator of ‘Ambrosia’ fruit maturity, with **starch values of 2.5 – 4.0 optimal for fruit storage.** It is **important not to wait until the background color is yellow to start harvest,** as the fruit will be over-mature for storage. Background color has more to do with nitrogen levels in the fruit than maturity and background color usually changes in storage.

Optimum harvest of ‘Ambrosia’ (from Norfolk County, ON) for storage in 2008 occurred within the last week of September. At this time, fruit firmness was ~17-19 lb, starch index ~2 to 4, and ground color yellow 2 to 3 on the BC color chart. Apples harvested later than this were softer and developed significantly more disorders and greasiness during storage.

‘Ambrosia’ apples treated with 1-MCP were firmer and had less internal ethylene than those not treated after 3 months of air storage at 0°C. In addition, 1-MCP-treated fruit had higher malic acid content and reduced greasiness after an additional 7 days at 21°C. Controlled atmosphere (CA) storage also improved fruit firmness and acidity retention, with no greasiness development.

**Soft scald and hard skin bronzing** developed in ‘Ambrosia’ during storage (Photo 1). However, **DPA dramatically reduced the incidence of these two disorders.** Soft scald was also reduced by warmer storage temperatures (3°C vs. 0°C) and CA with ultra-low

O<sub>2</sub> (0.7% O<sub>2</sub> + 1.0% CO<sub>2</sub>). Otherwise there was no consistent pattern of soft scald development among various CA regimes and 1-MCP treatment. Storing ‘Ambrosia’ in CA with no CO<sub>2</sub> did not reduce the incidence of hard skin bronzing, suggesting it is not a true type of external CO<sub>2</sub> injury. Higher incidence of storage rots tended to develop in regimes with more soft scald and/or hard skin bronzing. Therefore, it is likely that many of the rots were due to secondary infections into damaged skin tissue.

Some vascular breakdown, internal browning, and senescent breakdown developed in fruit held in air storage at 0.5°C for 3 months this past season, but the latter two disorders only appeared after an additional 7 days at 21°C. No vascular or senescent breakdown developed in CA-stored apples, but large amounts of internal browning were observed after 6 months. The 2008-09 storage season was a high risk year for chilling-related disorders, as noted in the Orchard Network Newsletter in Dec. 2008 (DeEll, p. 3).

### General Conclusions

- Starch index around 2 to 4 consistently related to optimum harvest maturity.
- IEC was not a good indicator of fruit maturity and determining optimum harvest time.
- Later harvested fruit developed more storage disorders and rots, and softened faster.
- ‘Ambrosia’ is a low producer of ethylene, making it very responsive to 1-MCP treatment.
- CA storage was beneficial for maintaining ‘Ambrosia’ fruit quality.
- 1-MCP treatment delayed fruit ripening
- ‘Ambrosia’ is susceptible to soft scald, but incidence can vary with orchard.
- Air storage at 3°C vs. 0°C reduced soft scald incidence.
- Hard skin bronzing may develop and this is not a type of external CO<sub>2</sub> injury.
- DPA drench substantially reduced soft scald incidence and hard skin bronzing.



**Photo 1: Soft scald with secondary rot (left) and hard skin bronzing (right) in “Ambrosia”**

## Crop Protection

### Late Season Apple Scab in 2009

*Kathryn Carter, Apple IPM Specialist, OMAFRA and Wendy McFadden-Smith, Tender Fruit and Grape IPM Specialist, OMAFRA*

For many Ontario apple growers 2009 has been a very challenging year with high levels of inoculum, heavy rains, and frequent rainfall resulting in apple scab infections on fruit in many orchards.

As fruit matures, it becomes increasingly resistant to scab. However, infection can occur at any time up until harvest during prolonged wet weather. Late season infections may not become visible until the apples are in storage. They appear as either pin-point sized lesions, or jet black spots. Fortunately, **scab will not spread from diseased to healthy apples in storage.**

Growers who have scab in their orchard should be aware there is potential for developing pinpoint scab or storage scab on fruit. In orchards with late season scab, it is likely that more infections will develop on the undersides of leaves during September as fungicide residues are depleted. These infections can spread to fruit prior to harvest as well as increase the overwintering scab populations.

The best way of preventing under-leaf scab infections is by continuing fungicides into early September. Pinpoint scab can develop in orchards where there is abundant scab pressure, and where a wetting period of more than 24 for 48 hours occurs after the fungicide residues on the fruit are fully depleted during the pre-harvest interval.

Keeping a tight fungicide program into the fall can help reduce pin point scab, and reduce inoculum into the fall. **Do not use eradicant fungicides as protectants for pin-point scab, and observe pre-harvest intervals for all late-season sprays.**

Another option for growers looking at reducing inoculum for next spring is the use of fall or spring urea sprays. In research trials conducted by Dr. Bill MacHardy's lab at the University of New Hampshire, urea (45 kg of agricultural urea per 1000 L of water/ha) was applied to the orchard floor after about 95% of the leaves had fallen (November) or in the spring (April) before bud break.

The urea works in two ways: it directly inhibits the development of ascospores and it stimulates the growth of naturally occurring organisms that are antagonistic against *V. inaequalis*. Both treatments reduced the number of ascospores, but the spring treatment was more effective and resulted in fewer leaf and fruit infections in most years. In the years when it didn't work, the snow cover remained almost until bud break so there was not a lot of time for the urea to work.

Shredding the leaf litter in November or April will also reduce the risk of scab by 80 to 90% if all of the leaf litter is shredded. If 10 to 35% of the leaf litter cannot be shredded because of the limited offset of the flail mower and spread of the tree canopy, then the risk of scab is reduced by 50 to 65%.

In summary for growers with late season apple scab, continuing fungicides programs into September is important to avoid pinpoint scab at harvest and reduce inoculum for next year. Use urea ground sprays in fall or spring to reduce inoculum in orchards with high scab pressure. Growers with orchards with high levels of scab in 2009, should be very conservative with their fungicide programs in 2010, and always apply fungicides preventatively.

### Harvest Assessments - Your Pest Management Report Card

*Margaret Appleby, IPM System Specialist, OMAFRA*

Before the busy time of harvest, take the time to assess your crop pest-wise. We all take mental notes of the damage observed as the apples are picked, but often there is no time to write it down. By the time harvest is over, the specifics of the damage may be forgotten.

Publication 310, Integrated Pest Management for Apples, includes a sample Harvest Assessment form (see page 215, Appendix H) for growers and scouts to use. This chart lists the major insects and diseases, the number of apples to pick per tree (based on the tree size), with space to record the level of pest damage. Make a copy of this form for each block to be assessed, and add the completed page to your scouting records for future reference.

Ideally, apples should be taken from the upper, inner and lower part of the tree. Information in Publication 310 can help to identify damage, using the pictures and descriptions of the damage.

Of special interest to OMAFRA specialists will be damage from European apple sawfly (page 73) and codling moth (page 90).

Also, anything else that you might find, or pest management strategies that didn't work for you this season are of interest. Please contact Kathryn Carter, Margaret Appleby or Leslie Huffman for help, as we continue to tackle the ever-changing pest complex in apples.

## Announcements

### Upcoming Events for Apple Growers

Essex County Association Growers Convention  
Leamington, Sherk Complex  
November 24-25, 2009  
(Tree Fruit - Nov. 25 followed by District 1 OAG meeting)

Ontario Fruit and Vegetable Growers Convention  
St. Catharines, Brock University  
February 24-25, 2010  
(Apple Day – Feb. 25; Apple Scab Workshop – Feb 24 pm)  
[www.ofvc.ca](http://www.ofvc.ca)

Ontario Fruit & Vegetable Growers Association Convention  
Niagara Falls, Crowne Plaza  
Jan. 11-13, 2010  
[www.ofvga.org](http://www.ofvga.org)

International Fruit Tree Association Annual Meeting  
Grand Rapids, Michigan, Amway Grand Plaza  
Feb. 28-Mar. 3, 2010  
<http://ifruittree.org>

Great Lakes Fruit & Vegetable Expo  
Grand Rapids, Michigan, Amway Grand Plaza  
December 8-10, 2009  
[www.glexpo.com](http://www.glexpo.com)

Empire State Fruit & Vegetable Expo  
Syracuse, NY [www.nysaes.cornell.edu/hort/expo/](http://www.nysaes.cornell.edu/hort/expo/)  
Jan. 27-29, 2010  
[www.nysaes.cornell.edu/hort/expo/](http://www.nysaes.cornell.edu/hort/expo/)

### Apple Cost of Production Survey

Every grower knows that input costs have risen since 2005, some more drastically than others. Certainly labour costs, pesticides and fertilizers have had significant increases.

For this reason, I'm working with the Ontario Apple Growers to update their Cost of Production information, which was done most recently in 2005.

We are looking for 25 growers across the province, at least 5 from each district, to provide basic information on what it costs them to produce apples. Our co-operators realize that the work involved to dig up this information, while not easy, is important to support our industry.

Thanks to those brave souls who agreed to help with this survey. We are still looking for a few co-operators, so give me a call or email if you would like to participate : 519-738-1256  
[leslie.huffman@ontario.ca](mailto:leslie.huffman@ontario.ca).

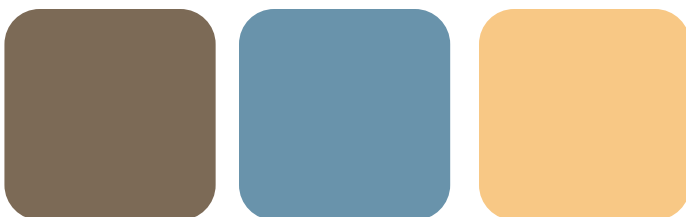
### Food Safety Tips

Wondering what food safety practice will keep your harvest safe for consumers? One thing is to make sure there is an adequate supply of hand sanitizer. Pickers, sorters and handlers should have ready access to hand sanitizer at all times during harvest. And remember – hand sanitizer is most effective when hands are not too dirty.

Remember to visit the OMAFRA website for new Food Safety and Traceability information for Ontario's farmers. Please visit [www.ontario.ca/foodsafety](http://www.ontario.ca/foodsafety) to learn about:

- the [Advantage Good Agricultural Practices](#) food safety program
- [food safety for the agriculture sector](#)
- [traceability in the agri-food industry](#)

For questions on the content posted in this web area, please email [advantage@ontario.ca](mailto:advantage@ontario.ca) or call our toll-free food safety and traceability help line at 1-866-641-3663



**Agricultural Information Contact Centre: 1-877-424-1300**  
**E-mail: [ag.info.omafra@ontario.ca](mailto:ag.info.omafra@ontario.ca)**  
**Northern Ontario Regional Office: 1-800-461-6132**

[www.ontario.ca/omafra](http://www.ontario.ca/omafra)