



ORCHARD NETWORK

For Commercial Apple Producers

VOLUME #14, ISSUE #3

August, 2010

In this issue...

Orchard Management

- Early Season — Early ReTain Timing
- A Leaf Analysis Walk-A-Bout
- Searching for Innovative Technologies for Apples
- Putting Biofumigant Cover Crops to the Test for Orchard Replant Sites
- Food Safety Snippets

Crop Protection

- Ready to Do Your Harvest Assessments?
- Managing Pin-Point Scab in Apples
- Reducing Apple Scab Inoculum
- Late Season Leps

Postharvest

- Reduction of Patulin in Apple Cider by UV Radiation
- Harvest Maturity Guidelines for Long-Term CA Storage of Apples in Ontario
- Evaluations of CA Storage for 'Honeycrisp' Apples in 2009

Announcements

- New Factsheets
- Calendar of Events
- Join The Ontario Apple Growers "Virtual" Study Group

Orchard Management

Early Season – Early ReTain Timing

Leslie Huffman, Apple Specialist, OMAFRA, Harrow

All signs indicate that apple harvest will be early, by at least one week and possibly more, unless things change drastically in the next while. This puts a crunch on harvest preparations, but it will be important to make the time to apply ReTain at the correct time.

ReTain is a plant growth regulator that is an effective preharvest drop control agent. It works by inhibiting the production of ethylene in maturing apples. It is imperative to apply ReTain **before** the fruit starts producing ethylene. Applications after ethylene production begins will have disappointing results.

ReTain should be applied 4 weeks before the anticipated harvest date. For multi-pick cultivars like Gala, time the application 4 weeks before the 2nd harvest

(Continued on page 2)

*This newsletter is made possible
by the generous support
of the following sponsors:*



Ministry of Agriculture,
Food and Rural Affairs



ORCHARD NETWORK

August, 2010

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

Dr. Jason Deveau, Simcoe,
Application Technology
(519) 426-8934

This issue of the **Orchard Network Newsletter** was compiled by Client Service Representative, Maggie Winn, OMAFRA, Lindsay

(Continued from page 1)

date. The trick is to determine when harvest will start – and that is a key question this year. However, it is better to be too early with ReTain rather than late.

Only healthy trees should be treated with ReTain as leaves need to absorb the product. Experience has shown that ReTain will delay maturity, and allow better scheduling of harvest. However, remember that the harvest window is shortened once the treated apples are mature. Most growers treat only enough trees to spread out their harvest. Treated trees should be monitored for maturity to determine the correct time to harvest.

For more information on ReTain, see p. 89, Publication 360, or online at www.omafra.gov.on.ca/english/crops/pub360/4stopdrop.htm#retain. Label www.valent.ca/valentus/Data/Labels/retain_label_english.pdf

A Leaf Analysis Walk-A-Bout

Christoph Kessel, Horticulture Crop Nutrition - Program Lead, OMAFRA, Guelph

A leaf's nutrient status at sampling time is a combination of many factors: plant available nutrients, soil, water and cultural management, rootstock, cultivar, and weather. Leaf analysis, along with a soil testing, is a helpful tool to evaluate this past season's fertilizer practices and to plan for next year.

A leaf analysis report compares current nutrient concentrations to suggested critical levels. The results often make more sense when reviewed in the context of previous leaf and soil analyses for that block. Considering past trends and comparing seasons can help in making fertilizer management decisions. It is more useful to know how much they have changed relative to previous analyses, rather than if the nutrient is within the crucial ranges.

Reviewing leaf analyses is often an off-season activity but don't just depend on the printed results. Take an "orchard-walk-a-bout" with this year's reports in hand to see if the results make sense with what is happening in the orchard. This season's analyses might be explained by what you see in the orchard and how the factors listed below may have interacted to give you the reported results.

1. Sunlight, rainfall, soil and air temperatures, and relative humidity during the 30 days prior to collecting the samples will affect nutrient levels.
2. In addition to the weather, nutrient concentrations are influenced by rootstock, cultivar, the tree's age and the sampled leaves' age. All these factors interact, affecting leaf nutrient levels – not just the drier weather.
3. Low soil moisture and reduced transpiration caused by low temperature or high humidity may be reflected in lower concentrations of nitrogen, sulphur, boron, calcium and magnesium. These nutrients move through the soil primarily by mass flow. Dry soils also restrict the movement of potassium and phosphorus to the root. They move primarily by diffusion.
4. Overly wet or poorly drained soils can be indicated by lower nitrogen, calcium and potassium, while sodium may increase.
5. High levels of one nutrient may reduce levels of another, especially if it is low or deficient. For example: too much potash fertilizer may result in lower magnesium levels.
6. Maintaining good soil moisture levels between the wilting point and field capacity tends to lower the nutrient concentrations in the plant because plant growth is stimulated. As a result there is more growth, diluting nutrient content.

(Continued on page 3)

Reduced plant growth is often reflected in increased nutrient levels.

7. Shoot extension is a helpful gauge to evaluate nitrogen status: spur types should have about 15-20 cm, non-spur types 20-30 cm.
8. While lower potassium levels may delay fruit maturation, and affect fruit sizing and flavour, these are also affected by other production practices and weather.
9. Lighter than usual cropping can reduce nitrogen, calcium and magnesium, while increasing potassium concentrations; heavier than usual cropping has the opposite effect.
10. If fungicides containing copper, zinc or manganese, or specific foliar nutrients have been applied, those nutrients can increase.

Taking your leaf analysis report to the orchard connects the results on the page to what is happening in the trees. The 2010 leaf analysis does not necessarily mean an adjustment in soil fertility rates. Compare this year's results with previous reports for those blocks to determine significant changes in nutrient concentrations. If a soil sample was not done within the past 2-3 years, take the time to complete one this fall. Managing soil moisture, by using mulches or improving irrigation to ensure even soil water content, is critical to enhancing root growth and nutrient uptake.

Searching for Innovative Technologies for Apples

Michael Kauzlaric, Horticulture Technology Scout, Vineland Research and Innovation Centre, Vineland Station

Many of us are searching for new ways to reduce labour, increase yields and improve the profit picture for apples. Michael Kauzlaric is the Horticulture Technology Scout working for the Vineland Research and Innovation Centre, and has been searching the world for technologies applicable to apples.

Here are some of the areas he has been working in:

- Visits to New Zealand tree fruit industry with Dr. David Hunter, AAFC – take a look at KiwiCrunch who are exporting apples and pears around the world, www.kiwicrunch.com, as well as Heartland Fruit Company in New Zealand, www.luvyafruit.com/
- New horticulture cultivars – working with breeding programs around the world, using conventional and applied genomics to create new cultivars.
- Visits to Europe including Fruit Logistica, for new mechanization for orchards and packaging, marketing, post harvest fruit analysis machines.
- Tempwave™ System for Preventing Freezing of Crops - A Tempwave™ prototype was successfully

installed and operated in a California citrus orchard. Additional tests in a vineyard are being conducted at the Vineland Research and Innovation Centre. Perhaps this may be useful in apple orchards for freeze protection.

- Bringing in new apple cultivars for consumer sensory evaluation to see if there is interest in the fruit before any trees are brought in for propagation.

Michael encourages you to review their website www.vinelandresearch.com to gain more details and determine if your technology matches their core areas.

He can be contacted at:
Vineland Research and Innovation Centre
Box 4000, 4890 Victoria Avenue North,
Vineland Station ON L0R 2E0
Tel: 905-562-0320 ext 755
Fax: 905-562-0084

www.vinelandresearch.com
Michael.Kauzlaric@vinelandresearch.com



Putting Biofumigant Cover Crops to the Test for Orchard Replant Sites

Anne Verhallen, Soil Management Specialist, OMAFRA, Ridgetown

A new project was started this spring looking at biofumigant cover crops during apple orchard renovation for replanting (a parallel project in tomatoes is underway for vine decline problems). Because chemical fumigants are expensive, and under close environmental scrutiny, biofumigant options like cover crops and organic amendments (eg. manure or compost) offer some potential to suppress nematodes and disease complexes needed in apple and tomato production systems.

As part of the project, three apple replant sites were established in late spring/early summer. Apple orchards were removed last fall or this spring, and these sites will be replanted in Spring 2011. Two sites are in Norfolk County and the other site is near Harrow. Cover crops of

(Continued on page 4)

oriental mustard and pearl millet have been established to date with good results.

Mustard growth has been a bit variable in the plots, depending upon rainfall. The photo below shows some beautiful mustard from one of the Norfolk sites, where the field was a-buzzing with bees. Recently the spring mustard crop has been chopped and incorporated to release of the chemical biofumigant from the plants. It is critical to incorporate the mustard immediately after chopping to reduce the loss of these volatile compounds. In mid-August, a fall crop of mustard will be re-established for a late summer/fall cover for a second incorporation/fumigation.

Pearl millet is a tall grassy plant, which is a non-host for many nematodes. This warm season plant has been really enjoying our warm summer, growing over 150 mm (5 ft.) in some areas. Recently, the millet was mowed at 30 cm (12") tall to promote tillering.

These cover crops are being monitored and measured for dry matter growth. Further soil sampling for nematodes and other biological factors will be done as the project continues on through the fall and 2011. New trees will be planted next spring, and their growth in response to these treatments will be measured.

We will continue to keep you abreast of the project through updates in this newsletter. For more information on this project contact:

Anne Verhallen – Project lead anne.verhallen@ontario.ca
or Leslie Huffman – Apple specialist leslie.huffman@ontario.ca



Fig 1. Mustard in flower



Fig 2. Pearl Millet

Food Safety Snippets

Sandra Jones, Crop On-Farm Food Safety Program Lead, OMAFRA, Guelph

Food Safety Tip

Now that it is apple harvest time – take a good look at the bins you are going to use! Empty bins stored on the farm or outdoors at packing houses can contain leaves, decayed fruit or any other possible contamination, include rodents. It is important to high pressure wash all bins prior to their use for the new crop. Clean bins should be stored on designated bin pads or on gravel to minimize contamination from birds or animals. Also, remember not to let workers stand in bins during harvest. Don't undo all your hard work by having boots or shoes possibly contaminating your bins.

Crop Protection

Ready to Do Your Harvest Assessments?

Margaret Appleby, IPM Systems Specialist, OMAFRA, Brighton

The final step in your IPM program is to take stock of your results. Take some time in these few weeks before harvest to complete your harvest assessments. During the busy harvest season, neither you nor your picking crews will have a chance to make these important notes.

It is as easy as choosing a representative number of apples in each block, and rating them for insect, disease and other damage. Good pictures and descriptions of damage that you might encounter can be found in your Pub. 310, Apple IPM manual and on your Ontario AppleIPM CD (or online at www.ontario.ca/cropipm). The Often-Confused-With pictures can help sort out what the damage might be. The Apple IPM manual has a harvest assessment page to copy for recording your results. Look for Appendix H on page 215.

Which block to do? If you assess the same block every year, you can compare your results and notice trends over time.

How to do it? Choose healthy trees randomly throughout the block. For large trees, look at least 10 trees, and for dwarf trees, look at least 20 trees. Select 200-400 apples per block, turning each to see all sides of the fruit without removing it. Choose fruit from different positions on the trees: Upper, Inner and Outer. The key is to choose randomly, and select representative areas of the orchard – and write it down!

(Continued on page 5)

(Continued from page 4)

Also make notes of damage to leaves such as leaf scab, tentiform leaf mines, powdery mildew, apple leaf curling midges and other feeding. This information will be important when planning your IPM program next year.

For your interest, here are the averages from a sampling 20 Ontario orchards assessed in Fall 2009:

Apple fruit scab	2.5%
Calyx end rot	0.5%
Spring feeding caterpillar	0.5%
Oblique-banded leafroller	0.1%
Tarnished plant bug	0.2%
European apple sawfly	1.0%

European apple sawfly is gradually moving eastward across the province, reaching the Bowmanville area in 2009. This year, damage from European apple sawfly was identified in an orchard near Uxbridge. If you see this damage at harvest, contact me, Margaret Appleby at margaret.appleby@ontario.ca or 613-475-5850 or Kathryn Carter at kathryn.carter@ontario.ca or 519-426-4322.



Fig 1. Damage to fruitlets from frost (left) and European apple sawfly (right).

Managing Pin-Point Scab in Apples

Kathryn Carter, Pome Fruit IPM Specialist, OMAFRA, Simcoe

As harvest begins to move into full swing in apple regions in Ontario, it is time to assess this year's apple crop for disease pressure. Late season decisions on orchard disease management can have a profound effect on the quality of fruit after it leaves storage.

Scab infections that occur late in the growing season are often numerous and relatively small in size, and are referred to as pin-point scab. Pin-point scab appears as small black dots on the skin of the apple. In some cases, fruit infections that occur late in the summer may not be visible on the fruit at harvest, but may enlarge during

storage, forming storage scab.

Orchards with actively sporulating lesions are at the greatest risk of developing pin-point and storage scab. Risks are also reduced where foliar lesions are exposed to hot, dry summer conditions or where a strict fungicide program is followed. However, during extended periods of cool damp weather, lesions that appeared during the summer continue to produce conidia into the fall. The optimum temperature for scab development (20°C), and the minimum wetting period for light fruit infections is about 30 hours with high inoculum pressure (although significant economic damage may not occur until wetting periods exceed 48 hours). Pin-point scab infections, unlike foliar infections, are substantially reduced by the presence of a dry period between wetting events. Research has shown that a 24 hour dry period commencing 24, 48, or 72 hours after inoculation (20°C) can reduce the amount of scab by 67, 87, and 36%, respectively.

So what can growers do to prevent late season scab infections? Scab infections occurring two weeks prior to harvest have a low probability of developing in storage. Therefore there is little reason to apply fungicides to trees that will be harvested within several weeks. For late season fruit, remember that both the presence of active lesions and long wetting periods are required to provide optimal conditions for fruit infection. As a result orchards with low scab inoculum are a low risk for pin-point or storage scab unless weather conditions are favourable (4 to 5 days of continuous wetting). In orchards with high levels of scab, growers should apply Captan prior to any wetting event on a protective schedule until 2 weeks before harvest. Keep in mind that sterol inhibitors (Nova and Nustar) are considered to be ineffective against fruit scab.

Be aware that infections that occur just before harvest may be symptomless at picking yet develop into storage scab lesions after harvest. Also keep in mind that delays in cooling fruit after harvest may increase the possibility that late season infections will develop symptoms during storage. Therefore cooling fruit quickly after harvest may help to reduce late season scab in storage.

Reducing Apple Scab Inoculum

Kathryn Carter, Pome Fruit IPM Specialist, OMAFRA, Simcoe

The optimum time to reduce apple scab with cultural controls is quickly approaching. As we heard from Dr. Bill McHardy at the OFVC last February, using urea applications or mowing will reduce ascospores by 90%, which will reduce the number of apple scab lesions by 90%. This is particularly important in high inoculum

(Continued on page 6)

orchards.

So what are the key points to effectively use urea and mowing to reduce inoculum?

Applying urea:

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*.

Feed grade urea dissolves more readily in water than granular (fertilizer grade) urea, and therefore it is preferred (although it is more expensive). The nitrogen content is the same for both products, so those cutting costs by choosing granular urea will need to put more effort into ensuring that it dissolves.

- Apply 45 kg of agricultural urea (feed grade urea) per 1000 L of water/ha to the orchard floor. Spray the ground surface at a rate of 100 gal. per acre. The preferred method is to use a small boom sprayer rather than the bottom two nozzles on an airblast sprayer. This will allow you to use flatfan nozzles with a coarse droplet size to ensure even coverage.
- Applications should occur after 95% leaf drop (November) or in the spring (April) before bud break. Spring applications are usually more effective, but require two to four weeks before bud break. However, if snow cover remains until bud break, the time for the urea to work is reduced, and the effectiveness of the treatment.
- Alternatively a foliar application of 5% solution of urea (46-0-0) can be applied to trees as leaves begin to fall in the autumn. This application should be done as close as possible to leaf fall (within one week); otherwise, too much of the nitrogen will be translocated out of the leaves, resulting in reduced scab suppression. Sprays can be applied with an airblast sprayer, but watch for plugged nozzles if using the granular form. Trees sprayed with urea may defoliate earlier than unsprayed trees.
- These treatments can introduce as much as 20 lbs. actual nitrogen per acre, so N fertilizer rates need to be adjusted. In orchards requiring lower rates of N, a fall application may be preferred, to reduce the impact. For more information on the impact of urea on fertilizer budgets refer to www.omafra.gov.on.ca/english/crops/hort/news/orchnews/2010/on-0210a4.htm
- Research by McSmith Agricultural Research Services (W. McFadden-Smith) determined that the fall urea application does not have a negative impact on winter hardiness or on fruitfulness for subsequent years.

Shredding overwintering leaves:

- Shred or rake all the leaves on the orchard floor to reduce inoculum.
- Leaves can be blown or swept from under trees and shredded using a flail mower to encourage leaf decay.
- Small leaf pieces break down more quickly and are more readily consumed by earthworms.
- Shredding can be done in November or April.
- Spring mowing may also re-orient the leaves to prevent the fungus from effectively discharging spores.

In summary, urea applications can be very effective to reduce apple scab inoculum. Combining the urea with leaf shredding provides the greatest reductions in ascospores. These cultural controls help to reduce apple scab pressure in orchards in 2011.

Late Season Leps

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

This year's harvest is quickly approaching so there are a few pests that we need to be aware of. The unseasonable warm weather this year has caused insect flight and development to be earlier than expected. So which worms should growers worry about this late in the season?

Oblique-banded leafroller (OBLR)

Although both larvae and damage will be found in orchards now and up to harvest, we have passed the point where managing this pest is worthwhile. Late season OBLR development is not synchronized, and sprays affect only the small portion of the population that is active at this time. Instead of spraying, keep an eye out for late season damage during harvest (Fig 1). If damage is found at harvest, consider applying a petal fall spray targeting OBLR next spring.



Fig. 1 Oblique-banded leafroller damage on fruit

(Continued on page 7)

(Continued from page 6)

Codling moth (CM)

This year we have seen very high trap counts for CM, and the 2nd generation emerged earlier than normal. There are usually two generations of CM in most of Ontario (except near Georgian Bay), but in warm seasons, it is possible to see a third generation of CM (often known as a suicide generation) in some orchards. CM larvae normally diapause during the third week of August. However in warm years and locations, some CM pupate instead, and adults then emerge to produce a third generation. If this occurs, use pheromone traps to establish a third biofix when flight activity increases (around 611 to 666 DDC after the second biofix) and apply a spray when 111 to 138 degree days accumulate from the third biofix.

Oriental fruit moth (OFM)

While OFM has been less of an issue in recent years due to increased adoption of mating disruption and timing of sprays to manage this pest, it is still an important pest in orchards. Adult flight of OFM can last into early October, and damage can occur up to harvest. Monitor pheromone traps in orchards into September to keep an eye on populations. Remember that late season sprays may be needed especially on light skinned varieties. For growers using mating disruption, the Rosso product should take care of OFM through harvest. However the combined CM/OFM mating disruption ties do not last as long for OFM and late season sprays may be needed.

In summary, codling moth and oriental fruit moth are the main late season lepidopteran pests to keep an eye out for before harvest. Following these tips will ensure that a worm-free harvest.

Postharvest

Reduction of Patulin in Apple Cider by UV Radiation

*John Henderson, Risk Management Specialist,
OMAFRA, Brighton*

The presence of the mycotoxin patulin in apple cider and apple juice is an on-going product quality and food safety issue. Research is being undertaken to determine easily implemented methods to reduce or eliminate patulin in cider. A recently published research paper in the Journal of Food Protection reviewed the effect of UV radiation in reducing patulin levels while still maintaining quality attributes of the cider.

The research paper, *Reduction of Patulin in Apple Cider by UV Radiation*, provides a detailed reference listing of early toxicological studies, mycotoxin production, current

methods of patulin removal and other related information. Background rationale is provided for the current patulin tolerance level of 50 ppb in cider and juices set by Health Canada.

The historical focus of food safety has been preventing contamination of the raw products used. Control of mould growth and overall fruit quality continues to be of prime importance for preventing patulin contamination in cider. However, when preventative practices are not successful, a viable alternate means to degrade the mycotoxin in the food product is required. To this point, methods for elimination of patulin from food products, including cider, have been very limited and largely unsuccessful.

In this scientific study, a Cidersure 3500 UV unit was used to process all cider in the experiment. The Cidersure 3500 is one of the approved cider treatment methods in Canada and is being utilized by several Ontario cider producers. The researchers found that a single pass of less than 1 minute through the UV unit resulted in a 9.4 percent reduction in patulin. Each subsequent pass also provided nearly the same percentage decrease. After the seventh pass, patulin had been reduced by 43.4 percent.

The patulin level was significantly reduced using the UV radiation without altering basic measurements of quality. Initial sensory tests by a taste panel indicated no significant difference between the single-pass cider product and the seven-pass cider product. There were also no significant differences in the levels of ascorbic acid, pH, Brix or titratable acidity between the two test products.

The researchers point out that some preservatives such as potassium sorbate can absorb UV radiation which neutralizes both the germicidal and patulin-reducing effects of UV. Producers using this procedure must take care to ensure that chemical substances that interfere with UV activity aren't added to the cider prior to treatment. The researchers also note that by-products resulting from patulin degradation by UV radiation are unknown and further work is required in this area. The current study does suggest that UV radiation of contaminated apple cider assists in reducing patulin levels and may provide an effective treatment option. Health Canada has been contacted to determine if approval is required before Ontario cider producers use their UV units for patulin removal.

For detailed report information and supporting documentation refer to the Journal of Food Protection, Vol. 73, No.1, 2010, Pages 69 - 74 "Reduction of Patulin in Apple Cider by UV Radiation" by Qingfang Dong, David C. Manns, Guoping Feng, Tianli Yue, John J. Churey and Randy W. Worobo.

(Continued on page 8)

Harvest Maturity Guidelines for Long-Term CA Storage of Apples in Ontario

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

The following chart represents harvest guidelines for apples destined for long-term CA storage. Extreme weather during the growing season can influence fruit maturity, so actual values may vary during such seasons.

Internal ethylene concentration is also an important measurement to aid in determining optimum apple maturity (<1 ppm for long-term storage) and therefore, it should be monitored whenever possible.

Cultivar	Starch Index (1-8)*	Firmness (lb)
Ambrosia	2.5 – 4.0	>17
Cortland	2.5 – 3.5	>15
Crispin	3.5 – 4.5	>17
Delicious (Red)	2.5 – 3.5	>17
Empire	2.5 – 4.0	>17
Gala	3.0 – 4.0	>16
Golden Delicious	3.0 – 4.0	>16
Honeycrisp	>6.0	>14
Idared	3.0 – 4.0	>15
McIntosh	2.5 – 4.0	>15
Northern Spy	2.5 – 3.5	>18
Spartan	2.5 – 3.5	>15

* Cornell Starch Iodine Index Chart

Evaluations of CA Storage for 'Honeycrisp' Apples in 2009

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

'Honeycrisp' apples were harvested from a commercial orchard on Sept. 17th (2009) in Norfolk County. Fruit maturity at the time of harvest was 1.1 ppm internal ethylene, 5.5 starch index, 15.6 lb firmness, 13.9% soluble solids, and 721 mg malic acid (per 100 ml of juice). Average size was 8.2 cm diameter and blush coverage was ~80%.

Apples were divided and treated with or without diphenylamine (DPA, 1100 ppm), and then held at 10°C

for 5 days (pre-conditioning). Afterwards, apples were divided again and then treated with or without SmartFresh (1 ppm 1-MCP) for 24 hours at 3°C.

After 4 months of air or CA (2% O₂ + 2% CO₂) storage at 3°C (following 5 days at 10°C), 'Honeycrisp' apples treated with SmartFresh had lower internal ethylene concentration, higher soluble solids and acidity, and less greasiness, than fruit not treated with SmartFresh. Treatment with DPA also resulted in slightly lower internal ethylene concentration, and higher soluble solids and acidity, compared to fruit with no DPA. DPA-treated fruit developed more greasiness and less soft scald and soggy breakdown. Apples from CA storage had slightly less internal ethylene concentration, greater acidity, less greasiness, and reduced incidence of soft scald, compared to 'Honeycrisp' stored in ambient air at 3°C.

After 8 months of CA storage, 'Honeycrisp' apples treated with SmartFresh continued to have lower internal ethylene concentration and higher soluble solids. SmartFresh-treated fruit were also firmer after 8 months, compared to those not treated. Apples treated with DPA continued to have slightly lower internal ethylene concentration and lower incidence of soggy breakdown. However, there was no longer any effect of DPA on soluble solids, acidity, or soft scald incidence after 8 months of storage.

Apples from CA storage with low CO₂ (2% O₂ + <0.5% CO₂) had slightly higher soluble solids than fruit from CA with 2% CO₂. There was also higher incidence of soft scald with low CO₂.

After 8 months of CA storage, amino acid profiles of the fruit appeared to be altered by treatment with SmartFresh or DPA (Shelp and Bozzo, Univ. of Guelph). This suggests some sort of stress response in the apples. The presence of CO₂ in the CA regime seemed to have little effect on amino acid content.

Sensory panelists detected differences between air and CA-stored SmartFresh-treated fruit after 4 months of storage (Lesschaeve and Mathieu, VRIC). Apples from CA storage were perceived sweeter. After 8 months of CA storage, sensory panelists noted differences between SmartFresh-treated and non-SmartFresh apples, DPA-treated and non-DPA apples, and fruit with 2% or <0.5% CO₂. 'Honeycrisp' without SmartFresh or DPA were perceived as the most astringent, while those with SmartFresh were perceived the least astringent. Fruit treated with DPA were perceived the least sweet and least lemony. Apples from CA with low CO₂ were perceived sweeter, which corresponds to the higher soluble solids content in those fruit.

The author wishes to thank the following organizations for their support: Ontario Apple Growers, Apple Marketers' Association of Ontario, AgroFresh Inc., Norfolk Fruit Growers' Association, Lingwood Farms, and the Agricultural Adaptation Council.

(Continued on page 9)

Announcements

New Factsheets

Jason Deveau, OMAFRA Application Technology Specialist is preparing a series of factsheets to improve the performance of your sprayer, and assist you with completing food safety requirements. Here's an excerpt from the latest one:

"Calibration is one of the most important aspects of spray application and yet it remains neglected and misunderstood by most operators". Read more in "Calibrating Airblast Sprayers (Order No. 10-047)", now online at

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

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

Look for Jason's next factsheet in later this fall on "Adjusting, Maintaining and Cleaning Airblast Sprayers"

Previous titles include:

Six Elements of Effective Spraying in Orchards and Vineyards

www.omafra.gov.on.ca/english/crops/facts/09-039.htm

www.omafra.gov.on.ca/english/crops/facts/09-039.pdf

How Weather Conditions Affect Spray Applications

www.omafra.gov.on.ca/english/crops/facts/09-037w.htm

www.omafra.gov.on.ca/english/crops/facts/09-037w.pdf

Calendar of Events

Dates to Remember for Apple Growers 2010-2011	
Great Lakes Fruit, Vegetable and Farm Market Expo www.glexpo.com Grand Rapids, MI (Roger Brook, 517-281-9370 brookr@glexpo.com)	Dec. 7-9, 2010
Ontario Fruit & Vegetable Growers Association Convention www.ofvga.org Niagara Falls (Deanna Hutton 519-763-6160-ext 116)	Jan. 10-12, 2011
Ohio Produce Growers & Marketers Congress www.ohiofruit.org Sandusky, OH (opgma@ofa.org , 614-487-1117)	Jan. 17-19, 2011
Guelph Organic Conference www.guelphorganicconf.ca Guelph, ON (705) 444-0923 organix@georgian.net	Jan. 27-31, 2011
N.A. Farm Direct Marketing Conference www.nafdma.com Baltimore (Charlie Touchette 888-884-9270)	Feb 4-10, 2011
Ontario Fruit & Vegetable Convention www.ofvc.ca St. Catharines, ON (Glenna Carnie 905-688-0990)	Feb. 23-24, 2011
International Fruit Tree Association http://ifruittree.org/ Pasco, Washington	Feb. 26-Mar. 5, 2011

JOIN THE ONTARIO APPLE GROWERS “VIRTUAL” STUDY GROUP

Hosted by: Ontario Apple Growers (OAG)

Moderated by: Leslie Huffman, Apple Production, OMAFRA, Harrow

Growing new cultivars like Honeycrisp and Ambrosia requires new information on pruning, thinning and harvest management. Planting supported, high density orchards presents new challenges along with the potential for better fruit quality and orchard efficiency. As our industry moves to new cultivars and new planting systems, growers need to access new sources of information.

So here's your opportunity to learn from your fellow growers, along with the Ontario Apple Team. We invite you to call in the first “virtual” meeting of the OAG Study Group.

Here's the details:

- Conference call on Thursday, August 19, 2010
- Grab your lunch and call in from 12:15 to 1:00 p.m.
- Call toll-free 1-888-289-4573
- Passcode is 3010744

What you should “bring”:

- Your experiences growing Honeycrisp, Ambrosia and other new cultivars
- Your questions about managing these cultivars
- Your ideas about information the OAG staff and OMAFRA Apple Team should find for future calls
- A willingness to learn and share with fellow growers

This pilot project is funded by the Ontario Apple Growers, and if interest indicates, we will plan for a series of conference calls over the winter.



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