



ORCHARD NETWORK

For Commercial Apple Producers

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ORCHARD MANAGEMENT

Finishing the Ontario Apple Crop

John Gardner, Apple Specialist, OMAF, London

When the last apple goes into the bin sometime in late October or early November, growers can normally take a well-deserved breather from a seemingly endless marathon of activity. It doesn't take long before planning and routine orchard chores return for another year. The time to reflect on what happened over the last 12 months doesn't last too long but it is important to adjusting programs for next year.

After a pretty rough start this past spring with constant rain and cold and unpredictable weather that stayed with us well into August we finally got a break in September with excellent harvest conditions for around 6 weeks through the bulk of the 2004 harvest. The lack of rainfall during September did translate into some pretty dry looking fields and orchards by early October.

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**This Newsletter is brought to you by
the Ontario Apple Team:**

John Gardner, Chair, London
ONNL Editor
Apple Specialist
☎ (519) 873-4084

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

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

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

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

Leslie Huffman, Harrow
Weed Management , Horticultural
Crops, Program Lead
☎ (519) 738-2251, ext. 499

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

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

For complete list of Crop Technology
Staff with OMAF, visit the OMAF
website at:
<http://www.gov.on.ca/OMAF/english/crops/resource/stafcrop.htm>

OMAF Contact Call Centre, Guelph
☎ 1-877-424-1300

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Newsletter** was compiled by
Client Service Representatives,
Marian Desjardine, OMAF, London and
Leslie Parks, OMAF, Simcoe.

I am indeed amazed at the quality of fruit coming out of Ontario orchards this year. Granted some areas did have to wait for sugar development even though colour seemed to explode in late August with the advent of a couple weeks of very cool nights. I don't think I have ever seen the type of colour we have in some blocks of different varieties like Idared or even Honeycrisp this year.

The 2004 growing season was a classic for potential russetting disorders on fruit that should have a smooth finish. If one categorizes russetting, we could find finish problems from frost and sprays, powdery mildew russet, russet from other unknown yeast and fungi, and shoulder russet from intense UV late in the summer. If weather induced russetting was going to show up, this was the year for it. In contrast, a warm dry spring usually produces a better finish for susceptible cultivars.

The classic cultivar that gets the bulk of the russetting problems and discussion is the standard Golden Delicious. Strain differences in finish did show up this year. The Smoothee® strain is one of the most widely planted of the Golden Delicious types. Although not fully resistant to russetting, it is more tolerant than the standard strain. Where a grower has two or three strains of Golden Delicious, this was the year to test differences. New on the playing field is the 'Reinders' strain from the Netherlands. An older strain from France by way of Michigan is the 'Lys Golden', which does exhibit better tolerance to various forms of russetting.

The more I see of russetting on various cultivars, the more I believe that this problem is partially related to various types of fungi and yeast infecting the cuticle and epidermis of any given cultivar. What makes me lean in this direction is the absolute rapidity of the appearance of russetting on cultivars susceptible to the typical netted look of powdery mildew fruit infections. This condition can develop over a period of 2-3 weeks just before harvest and is associated with foliar mildew infections. Cultivars like Idared, Fuji and now Honeycrisp are particularly expressive of this disorder.

As newer strains and cultivars in the Golden Delicious category come on stream, it will be interesting to watch how they react to various types of growing seasons that we get in the Great Lakes area.

We did see our first few Auroras this year but will wait to see what fruit looks like when it's well-thinned and on mature trees before jumping to too many conclusions. This is the recently named cultivar from the selection known as 8S-69-23. If you haven't seen the 'Aurora Golden Gala' it may be worth a look. Most notable is the precocity of Aurora coupled with an extremely tight and friendly growth habit highly suitable for very close in-row spacings. What this cultivar will need for

heat is still questionable but we will watch closely as our trial plantings mature.

Not to be too quick to judge the Aurora, but the first few apples I have seen look promising as far as their ability to finish russet free. Other Golden Delicious types like 'Golden Supreme' and 'Goldrush' also finished noticeably well this year in the absence of any special treatment.

Cultivar Update

John Gardner, Apple Specialist, OMAF, London

It has been a test year for our cultivar performance trials in terms of 2004 being an atypical type of growing season, which started out cold and wet and seemed to stay that way for the bulk of the spring and summer. Many growers probably thought at one time or another in early summer that we would have a repeat of 1992 when we saw very little heat or sunshine. The 2004 growing season did have similar elements to that disastrously cold and light deficient year, but overall it wasn't as bad as 1992. The weather didn't really come around until late summer. Anyway, those late season cultivars that are in the trials were put to the test for finish.

One thing we did see was a lot more colour on everything that has the propensity to colour. This was in part a result of the cool nights in late August. We saw solid red coloured 'Honeycrisp' on M9 rootstock. 'Ambrosia' apples were striking in their appearance with a higher % of that distinct reddish-pink than last year.

'Silken' as a cultivar continues to find a fit for consumer preference as tested by cooperators. 'Silken' does have the remarkable ability to maintain good quality on the tree over a long picking window. It is not, however, an apple for long-term storage.

'Creston' has been a pleasant surprise at some of the sites in the trials. It is a fairly friendly tree to work with in the Jonagold-type class. It has superior flesh texture and storability, compared to the traditional Jonagold strains. In taste tests and consumer acceptance, it appears to have lots of potential.

Ambrosia® royalties on delivered trees were incorrectly reported in the last newsletter as

taking effect in July of 2006. The correct date is July 1st 2005, as most growers now know.

Ambrosia® is quite responsive to heat as we have found in the trials. Some of the Ontario growing regions with fewer heat units have a much higher probability of finishing a cultivar likes 'Ambrosia' if the site is exceptional with regards to elevation and airflow. There is no question in my mind about the ability of the Ontario climate to produce 'Ambrosia' with distinct and outstanding colour attributes.

In higher heat unit areas of Ontario, 'Cameo' will finish. This is a very productive and grower friendly type bearing habit with high yield potential. The 'Cameo' I have seen brought to maturity in our highest heat unit trial location have been remarkably well-coloured when compared to 'Cameo' currently showing up in retail markets in Ontario. A well-finished 'Cameo' has Gala-type shape and look, and could easily be confused. 'Cameo' will store well and has exceptional flesh characteristics.

The first sampling of both numbered selections and cultivars has been done from our trial sites for evaluation of suitability for the slice market. Dr Jennifer DeEll will be working with colleagues in B.C. and Quebec to determine some of the more promising material in our trials.

Plan to attend the apple session at the Conference in Brock on February 16th, 2005. We will have a 1-hour session on new cultivars. Grower cooperators from four of our eight sites and in distinct geographical regions in Ontario will review their findings from the trial located in their respective orchards.

There will be time for discussion and comment from the floor.

Honeycrisp Stem Clipping

John Gardner, Apple Specialist, OMAF, London

One of the more challenging aspects of growing newer cultivars is maintaining an open file on improved techniques for growing and handling. It takes years to really learn all the in and outs regarding the best ways to grow and finish a crop of any cultivar. 'Honeycrisp' has a huge market potential and payback from a well-grown crop. Stem punctures in the bin and onto the

retail shelf can reduce the % of marketable crop considerably.

Not all apple varieties can be nor should be handled in the exact same way at harvest. Obviously some varieties show or develop defects easier. Some cultivars need a lot of extra care in handling or pre-storage preparations. The potential retail value of some varieties like 'Honeycrisp' may enable growers to take extra care or precautions while picking. More expense is not what the average grower wants to hear about. However, in the end, it's the net gain in potential return on investment that determines the success or failure of any activity.

Stem clipping is something that we don't normally do here in Ontario but it may have a place with a cultivar like 'Honeycrisp' if there is a high probability of losses from stem punctures once the fruit comes off the tree. It is interesting to note how different the stems of apples can be from one cultivar to the next. Some stems are short and stubby, others are long and flexible, and some are stiff and long enough to protrude out of the stem cavity and beyond the radius of the apple. 'Fuji' is an example of a variety that has historically been stem clipped in production areas outside of Canada. Figure 1 shows the stem clipping of 'Honeycrisp' as the fruit is picked. This activity should eliminate stem punctures and the associated cullage for this high value cultivar if it becomes problematic.



Figure 1. Stem clipping of Honeycrisp during harvest.

Late Fall Applications of Manure Can Do Wonders for Your Soil and Your Pocketbook!

Donna Speranzini, Nutrient Management Horticulture Crops, OMAF, Vineland

Looking for a way to help improve both your soil and your pocketbook? Maybe it would be wise to consider a late fall application of manure. You may be surprised to know that a late fall application of manure may not only present one of the most environmentally safe times of the year to apply manure, but it is also an application time that will allow good nutrient recovery for next years crop.

Trying to get more organic matter into your soil?

Manure has many benefits, most of which everyone knows. It adds organic matter to the soil, which in turn increases soil moisture holding ability, improves internal soil drainage, builds soil structure and stability and provides a food source to maintain a diverse biological population in your soil. Any manure additions to your soil can only be considered a huge bonus!

Looking for some valuable nutrients?

When you apply manure, it is important to know the nutrient content of what is being applied. Not all manure is the same, taking a manure analysis will provide you with the information you need to decide on an appropriate application rate. Manure is made up of two main sources of nitrogen, the readily available mineral nitrogen in the ammonium form, and the more slowly available nitrogen bound to a carbon in the organic form. Organic nitrogen is available slowly over time, as a function of temperature and soil aeration. The mineral nitrogen, ammonium, is a positively charged ion that binds to soil particles. The longer ammonium remains in this form before it is converted to nitrate, the less potential for loss due to nitrogen leaching. This is the big bonus of late-fall applied manure. This is the reason late-fall applied manure is so much better than early fall applied manure. Ammonium applied into cool soils will not convert to nitrate and be lost. When does early fall become late fall? The rule of thumb is when the soil is less than 10°C. The nutrient management workbook says late fall begins Nov 10th.

Want to be a good environmental steward?

Take a look at the phosphorus index, to determine separation distances from surface water sources, in all cases when your soil test is greater than 30 ppm. The phosphorus index uses a series of five factors, including field slope, length of slope, soil drainage class, and soil texture, to determine an appropriate separation distance and application rate for manure application from surface water.

If using liquid manure, watch out for maximum liquid loading limits. These limits apply so that manure does not run down a slope and into a water source. It is important to ensure that manure applied to the soil, stays where it is applied. This ensures an even distribution of nutrients across the field. The maximum liquid loading limit for your soil type and slope can be calculated using Tables 1 and 2 in the NMAN Workbook. Just to give you an example, liquid manure should not be applied on a clay soil with a 5% slope at a rate higher than 4,450 gal/ac. within 150 m of surface water.

Be wary of when late fall becomes winter. Manure application onto frozen or snow covered ground is never a good idea. Soil can become saturated by snow, ice and melt-water, thereby reducing the soils ability to absorb and hold nutrients. Pathogens and nutrients mix easily with run-off water and can make their way into surface water sources. A good rule of thumb to use is, if you can incorporate or inject your manure you are still okay. When in doubt, leave at least 100 m separation distance to surface water sources, avoid floodplains and spring run-off areas, and choose fields with less than 3% slope.

In all cases chose the separation distance that is the greatest and affords the most protection of the watercourse.

One last word of caution, as with any field application, watch out for compaction. But if the soil is fit, and the crop is off, a late fall application of manure can improve your soil health, provide you nutrients for next years crop and when done correctly will have no negative impacts on the environment.

Notes from New York

John Gardner, Apple Specialist, OMAF, London

The most recent editions of Tree Fruit News from New York prepared by Dena Fiacchino has some interesting articles on a variety of topics. I thought I would highlight some of the take home messages from selected articles.

Sprayer Specialist Andrew Landers says....

Sprayers can retain tremendous amounts of pesticide solution when the season is done. Up to 6 US gals of spray can remain in the plumbing system of an average type of air-blast sprayer. Research on boom sprayers puts that figure up to double the amount and more. This retained solution is found in the chemical induction bowl, the booms, the tank, the pump, and its related plumbing. Andrew goes on to discuss sprayer cleaning and rinsing for winter storage. One can appreciate the complications arising from spraying over 40 liters of pesticide "x" on a crop where it is not registered the following spring. Andrew Landers is a Pesticide Application Technology Specialist, working out of the Dept of Entomology NYSAES Cornell University, Geneva, NY.

Grade Standards for Fuji....

Have recently been modified in the U.S. and Canada, and "watercore" or "honeycore" as some call it, is now not considered to be a defect. This trait is considered to be a desirable a feature of this cultivar due to the sweetness it imparts to the fruit. According to Chris Watkins, Postharvest Physiologist working with the Cornell group, mild or moderate watercore should not be a problem in storage of 'Fuji' if fruit are cooled prior to reduction of O₂ in CA storage. Severely watercored fruit will breakdown over time and should not be placed in CA storage. Watercore is characterized by an accumulation of the sugar alcohol "Sorbitol" which is 10x sweeter than fructose. Fuji was originally bred and selected in 1930 in Japan for its ability to produce a high incidence of honeycore for markets in Asia.

Rootstocks put to the test in New York....

Researchers and extension workers in New York reported that the winter of 03/04 was the "perfect freeze". Last winter took out 25,000 juvenile trees of different cultivars in the Champlain Valley. Trees were assessed in a 5

acre 3,200 tree test plot holding 16 different rootstocks overseen by Terrence Robinson of Cornell and Kevin Lungerman of Cornell's Cooperative Extension program in the northeast. They reported good survival rates of selected New York and Canadian rootstocks. The current losses in the Champlain Valley of New York represent 1.23 million dollars U.S. What was outstanding was the hardiness performance of Geneva 16 and Geneva 30 rootstocks along with Ottawa 3, Vineland 1, and Vineland 3. Vineland 1 produces the same vigour as an M26, while Vineland 3 is roughly equivalent to M9 for vigour control.

Prediction of Postharvest Rots Not Easy to Do....

According to Dr. David Rosenberger, spores of postharvest decay fungi are often present on fruit before harvest because **P. expansum** and **Botrytis cinerea** are present in orchard soils and in organic debris on the orchard floor. These spores can be blown onto fruit prior to harvest or they can be carried to fruit via soil on bin runners when bins are stacked on trucks or in storage. Spore concentrations on fruit at harvest vary from year to year, but there is currently no way of predicting "bad decay years". As a result Dr. Rosenberger goes on to say that predicting the usefulness of postharvest treatments is very tough to do. It's difficult to say when they will be beneficial and when they will not be needed.

Necrotic Leaf Blotch of Golden Delicious and Related Cultivars

John Gardner, Apple Specialist, OMAF, London

Necrotic leaf blotch (NLB) is definitely one of the most intriguing and scary looking conditions that I know of. This year, growers reported lots of defoliation occurring in Golden's by the end of August and into early September. This coincided with a dramatic change in weather from a pretty cool late August to a relatively warm and sunny early September.

Dr. David Rosenberger reports from New York State that Dr. Turner Sutton studied the disorder extensively in the early 1970's in North Carolina. He concluded that the disorder is not caused by a fungus, bacterium or air pollution and that it is not related to foliar nutrient concentrations.

The sudden death and abscission of shoot leaves after seeing a perfectly normal looking tree can send shivers down the back of the most open-minded of growers. Just after working to establish that perfect crop load and fruit growth rate, beating primary scab and several generations of various insects, you loose up to 50% of the mature foliage in the canopy more or less overnight (see Figure 2).

Some observations this year that I thought would add to our overall knowledge of this disorder included watching the experimental cultivar 'Chinook' go through an equally serious defoliation from NLB. In checking the parentage of 'Chinook', we find 'Gala', which has 'Golden Delicious' as one of its parents.

Also, the defoliation occurs almost exclusively on the mature shoot leaves of the current season's growth. These leaves do appear to finish the job of maturing their associated buds in the axil area between the leaf petiole and the woody branch on which the leaf is borne. The spur leaves and the shoot terminal leaves don't generally appear to be affected by this disorder.

In general, the disorder does not appear to affect overall tree performance or fruit size and finish unless it is very severe. It does appear to be worse when a relatively cool growing period is followed by a period of fairly intense heat and light. Tree vigour may affect response while rootstock appears to have minimal influence on the severity of the symptoms.



Figure 2. Necrotic Leaf Blotch in various stages of development.

The one factor we had throughout the 2004-growing season, even though we got off to a

cold wet start, was the intense UV light from day to day.

Michigan's Al Jones described the disorder as being related to air temperature, light intensity and soil moisture. There appears to be a relationship between certain plant hormones and the disorder. The leaf symptom is enhanced by gibberellins and inhibited by abscisic acid.

The EBDC protectant fungicides appear to help alleviate the severity of the symptom while fungicides like Captan are not effective.

Where Do Organic Standards Come From?

Hugh Martin, Organic Crop Production Program Lead, OMAF, Guelph

A consumers' assurance of organic quality comes from finding the "certified organic" name and logo on the product. Producers using the claim of certified organic (or "verified organic") have been inspected and reviewed by an organic certification body and given the right to use that claim. Certification bodies use organic standards to set the "rules" for organic certification. Certification bodies must be "third party" to the product's production and chain of custody.

Organic standards have continued to develop during the last 25 years. There were numerous organizations that set up the original standards for organic certification. One of the earliest was the International Federation of Organic Agricultural Movements (IFOAM) and their standards were used as a basis for many others. Currently over 60 countries around the world have nationally regulated standards. The most influential standards are those from the European Union, U.S.A., and Japan. Our Canadian organic standard was accepted by the Standards Council of Canada (SCC) in 1999 and is currently being updated.

Organic standards outline the permitted practices and processes for the production of various types of organic foods. Each standard includes a set of principles, required good practices for organic farms and processors, and a list of permitted substances (PSL). The PSL includes the inputs that farmers can use to grow their products and the processing ingredients

used to create the organic foods that grace the shelves of our food markets. The certification body (CB) interprets the standards and applies them to the operations they certify. The standards (and PSL) usually refer to generic substances. The certification body determines which brand name products meet the requirements after reviewing the product ingredients, including inert ingredients and other formulants. Companies supply data on their products to the CB and there are advisory groups such as the Organic Materials Review Institute (OMRI) that provide information on these products.

Some basic requirements for permitted substances in organic standards are as follows.

- They should be necessary for the production of the food product
- They should not negatively impact the environment or agroecosystem
- They should be of plant, animal, microbial, or mineral origin and may undergo physical, enzymatic or microbial processes
- They must not leave unacceptable residues in food products or soils
- For livestock production there are requirements for the humane treatment of animals
- Permitted substances must be consistent with other criteria and provisions of the organic standards
- In addition to the organic standards, permitted substances must meet the requirements of all federal, provincial and municipal regulations such as for pest management, fertilizers, feeds, etc.

Organic producers need to list their input materials in their organic production plans, which are then reviewed annually by their CB. Before using a new material on their farm they should always check with their CB to make sure it is permitted. For Ontario's organic farmers they are usually certified by either the Organic Crop Producers and Processors Inc. (OCPPI) or by Garantie-Bio Ecocert. Both of these certification bodies are accredited to various organic standards such as those in Canada, Quebec, USA, and Europe.

Over 80% of the organic food products sold in Canada are imported from other countries and 70-80% of our farm production is exported to the USA, Europe, and various other countries around the world. When we export to other

countries we are expected to meet the organic requirements of the country of destination. The certification body must be knowledgeable of organic standards around the world and they have incorporated those requirements into their standards so that when they certify your farm, the buyer of your product will accept your organic certification. The CB knows if certain materials are not allowed in some countries or if there are recent changes in requirements.

As would be expected, organic standards vary by country and by certification body, but in general they are very similar. I have sometimes compared this to the Highway Traffic Act. Each country, province and state have their own rules of the road, but many of us have been able to travel and drive in those other areas with minimal problems. There are also many efforts to minimize the differences. Countries are working together to negotiate equivalency agreements. CODEX alimentarius is working towards broader agreements on international organic standards, as is IFOAM. In the future, the organic industry hopes to have a regulated standard in Canada, which will help the Canadian organic industry to maintain access to these international markets.

Where do organic standards come from? They came from the work of many people and organizations in many countries over 25 years, to build a global organic certification system that the organic consumer can trust.

For more information see "Organic Food and Farming Certification" at <http://www.gov.on.ca/OMAFRA/english/crops/organic/certification.htm>

Does Compost Need to be Turned?

Hugh Martin, Organic Crop Production Program Lead, OMAF, Guelph

What are the advantages of good manure compost?

- Reduces/eliminates pathogens
- Reduces viable weed seeds
- Reduces insect larvae (fly problems)
- Reduces odour
- Reduces volume and moisture content
- Stabilizes organic components and nutrients
- Produces a soil amendment/fertilizer

To accomplish these advantages you need the correct carbon to nitrogen ratio (25:1 to 35:1), to maintain proper moisture levels (40-60%), and the ability for air to travel through the composting materials. Assuming you have all of the right conditions at the start, almost all the above advantages will be yours.

Turning the compost pile with a compost turner or a front-end loader can allow you more opportunities to "manage" the windrow (or pile). If your site has neighbours nearby, several turns in the first two weeks will get temperatures up to optimum, to quickly reduce odours and the potential for flies. If your site is tile drained or near watersources, turning will reduce pathogens more quickly and effectively reduce your risk of potential problems.

Windrows that are not turned can dry out at the surface and/or concentrate water near the middle. Uneven moisture content will reduce the temperatures and the overall effectiveness of the composting. Turning will make the windrow more uniform and can help to reduce moisture if it is too high or allow an opportunity to add moisture if the windrow is too dry.

Composting requires oxygen. Turning will add lots of oxygen initially to the windrow, but an active windrow will use up this oxygen within 1-2 hours. The air spaces created by the turning must be complemented by sufficient porosity of the materials to allow air to continue to diffuse naturally into the windrow. Windrows must not be too large, as this air will generally only travel 1-2 metres through the compost material. Turning too often will breakdown the compost materials excessively and reduce the ability of air to diffuse through the compost.

USDA (NOP) standards require compost to reach 131°-170°F (55-76°C) for 15 days (when in windrows) and to be turned five times during this time. The Canadian organic standards are similar. The temperatures for in-vessel composting are more uniform and need to be held at 55°C for three consecutive days. 55°C is the common temperature known to kill most pathogens when they are exposed for three days. In windrows, only the core reaches these temperatures and the compost needs to be turned five times to make sure that all materials are exposed to the high temperatures.

When using a front-end loader take care to clean fresh manure from the loader before turning the compost. When turning, try to turn the outside of the old windrow into the middle of the new windrow to make sure that all materials reach high temperatures to get good pathogen and weed seed kill.

These high temperatures will also kill most weed seeds. If the windrow is not turned the pathogen and weed kill will be variable. Solid manure that is left to decompose aerobically without turning will breakdown and most pathogens will eventually die off if the pile windrow is left for more than 1 year. Unfortunately on many sites this allows the potential for leaching and other adverse environmental and health risks. Under the Ontario Nutrient Management Act these nutrients cannot be left stored in the field more than 300 days (may be less depending on the various site conditions).

The challenge is to be able to make good compost without it costing a lot of money or time. Front-end loaders take more time and labour, compost turners do a better job, but cost more initially. In some circumstances, several farmers can get together to share a compost turner.

For more information see <http://www.gov.on.ca/OMAFRA/english/crops/organic/organic.html>

CROP PROTECTION

Powdery Mildew Can Be Added to the List of Diseases Infecting Honeycrisp

John Gardner, Apple Specialist, OMAF, London

The unique attribute of powdery mildew that is often overlooked is its ability to infect the epidermis of apples very close to harvest. This is long after a grower has decided that all major diseases in the orchard have been looked after as well as can be and in a period of time when the last orchard fungicide spray is long past and harvest is well underway. Susceptible cultivars like 'Fuji', 'Jonagold' and now 'Honeycrisp' become very susceptible to the invasive properties of this circumglobal disease organism.

What normally transpires is that the disease infection becomes very obvious on terminal growth in late August and early September on cultivars like 'Jonagold'. The cupped and whitish appearance of the leaves is a sure sign of infection. Sometimes the leaf margins show a red stippling in the absence of a mycelial mat, which normally blankets the lower side of the leaf. Some leaf abscission may have even occurred on varieties like 'Golden Delicious'.

Temperature is the most important factor affecting the development of powdery mildew. Conidia will germinate at temperatures between 10 and 25°C, the optimum temperature is between 20-22°C.



Figure 3. Powdery mildew infection of 'Honeycrisp' fruit results in a fine network of rough lines that will result in cullage of affected fruit. Just left of the fruit are terminal leaves showing the gray felt-like patches of fungal mycelia and spores.

Apart from fungicide treatments that hold the disease in check, growers can help reduce the potential destruction by mildew by using practices that promote good air movement and light penetration into the canopy.

Problem Weed of the Month: Common Mallow

Leslie Huffman, Weed Management Specialist
(Horticultural Crops), OMAF, Harrow

Problem weed: Common Mallow

Other names: *Malva neglecta*, cheeses, cheese-weed, garden mallow, malice, round dock, button weed, round-leaved mallow (a misidentification)

Growth habit: Annual, winter annual, biennial or short-lived perennial

Description: Low growing weed, with a deep fleshy tap root



Leaves: rounded or kidney-shaped leaves with a deep heart-shaped base, young leaves may be crinkled, with toothed margins; alternate on stem.

Stems: flexible stems come from the central point, often lounging on the ground.

Flowers: 5-petaled white, pinkish or lilac flowers grow in the leaf axils; 1-1.5 cm.

Fruit pod (shizocarp): 12-14 round sections in a ring, resembling cheese wheels.

Seeds: dark reddish brown to black, with a small notch.

Spreads by: seed only. Flowers from June to late autumn with seeds germinating through the summer. Broken stems can also root.

Reasons for concern: A difficult-to-control weed in orchards, raspberries and nursery crops, where competition is not great. Seeds move in from grassy areas, roadsides and in straw. Harvesting juice apples is challenging in dense masses of mallow. Plants may stay green all winter.

May be confused with: Round-leaved mallow that has smaller flowers, or with creeping Charlie with similar shaped but smaller leaves, and purple flowers.

Chemical control: Soil applied residual herbicides (eg. simazine, Sinbar, Devrinol) should control new seedlings, but a 2nd (or even 3rd) application may be needed for late germinations. Postemergent herbicides (eg. glyphosate, Amitrol, Gramoxone, Ignite) are best applied to small plants. Repeat applications over several years are needed for established populations. Postharvest applications of 2,4-D or Lontrel may weaken established plants.

Cultural control:

- Prevent seed shed by weeds on field edges by frequent mowing
- Use only weed-free straw as mulch
- Scout for new infestations, and cut weed below the soil surface
- Frequently mow infestations in weakened sod
- Band applications of fertilizer on the edge of weed-free strips

References and pictures:

- Publication 505, Ontario Weeds, p. 141
- Ontario Weed Gallery online
http://www.gov.on.ca/OMAFRA/english/crops/facts/ontweeds/common_mallow.htm

Dock Sawfly is Mystery Insect

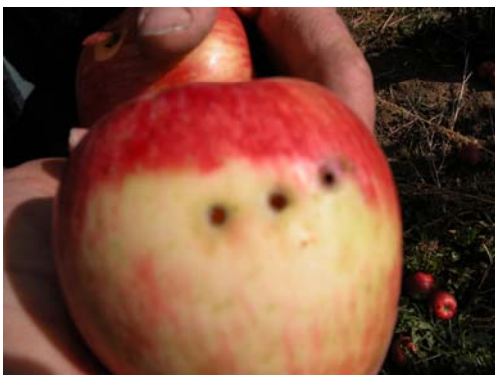
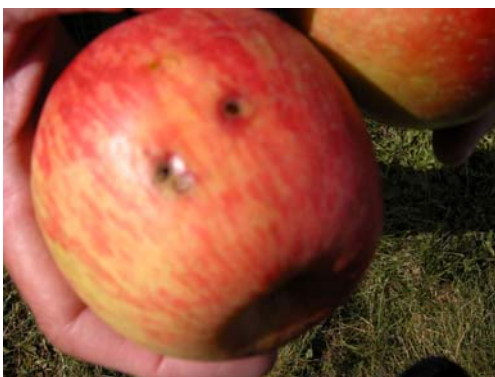
Kathryn Carter, Pome Fruit IPM Specialist,
OMAF, Simcoe

During apple harvest this year, some apple growers have noticed the presence of circular 2 mm holes in the side of the fruit (Figure 1). These holes are caused by the larvae of the dock sawfly (*Ametastegia glabrata*), a sporadic pest of apples in North America. Apparently dock sawfly likes 'Honeycrisp'.

There are four generations of dock sawfly each year. Generally the insects feed on weeds such as dock, sorrel, knotweed, and bindweed that can be commonly found in the orchard. However, the later generations of this insect begin looking for over-wintering sites in late summer, and early fall, as the fruit begins to approach maturity. The bright green larvae (black head) burrow into the apple, leaving small round holes, which usually develop a brown discolouration around the entrance to the hole.

After the larvae has tunneled into the fruit it begins to burrow out to pupate.

Since the dock sawfly requires the presence of weeds (docks, sorrels, knotweeds) to survive, the best way to manage this pest is by using selective herbicides to manage these weeds in the orchard. Fortunately the adults are not strong fliers, so these insects are not likely to move into an orchard from nearby ditches and meadowlands. Also keeping heavily fruited branches from touching the ground may help to reduce damage from this pest. See attached figures.



Assessment of Reduced Risk Pesticides in Apples: Impact on Apple Pests and Beneficial Insects

Kathryn Carter, Pome Fruit IPM Specialist,
OMAF, Simcoe

Background

Currently, the Ontario apple integrated pest management (IPM) program relies heavily on the use of organophosphorus (OP) insecticides to manage several key economic insect pests. In general, OP insecticides are toxic to beneficial insects that play an important role in managing insect pests in apple orchards (aphids,

phytophagous mites, leafminers), thereby reducing the need for pesticide use. A growing number of reduced-risk alternatives to OP insecticides are available to growers in the U.S., however, many of these new products are not registered for use in Canada.

Reduced risk materials are largely defined as those materials that could result in reduced risk to human health and the environment when compared to existing alternatives. These materials exhibit one or more of the following characteristics.

- Low risk to human health
- Low toxicity to non target organisms
- Low potential to contaminate ground water, surface water or other valued environmental resources
- Broaden the adoption and effectiveness of integrated pest management strategies

A research project was initiated by OMAF in 2004 with the objectives of:

- Assessing the efficacy of reduced-risk alternative control products in various pest management programs for insect pests of apples in Ontario;
- Evaluating the impact of these reduced-risk programs on beneficial insects and mites found in apple orchard ecosystems.

Materials and Methods

Efficacy assessment. Studies were conducted to evaluate the efficacy of new reduced-risk insecticides on several apple insect pests of economic importance in Ontario, including: plum curculio *Conotrachelus nenuphar*, codling moth *Cydia pomonella*, apple maggot *Rhagoletis pomonella*, and mullein bug *Campylomma verbasci*.

In 2004, field trials were conducted in three commercial apple orchards in the London area. Three reduced-risk insecticide programs were developed by OMAF (Table 1), using reduced-risk insecticides that are commercially available in Canada. The four treatments (three reduced-risk treatments and conventional treatment) were applied at each of the commercial orchards. Insecticide treatments were applied with airblast sprayers by the growers, based on monitoring and recommendations made by OMAF.

Table 1. Reduced-risk insect pest management programs tested in three commercial orchards in southern Ontario, 2004.

Insect Pests Controlled	Conventional Control Program	Reduced-Risk Program 1	Reduced-Risk Program 2	Reduced-Risk Program 3
plum curculio	azinphos-methyl phosmet	kaolinite	phosmet border spray	acetamiprid
mullein bug	diazinon	acetamiprid	acetamiprid	acetamiprid
codling moth	phosmet	acetamiprid	methoxyfenozide	tebufenozide
apple maggot	phosmet	phosmet border spray	acetamiprid	kaolinite

From late April to mid-May Pherocon® II (Trece® Inc.) pheromone traps and lures were placed in all three sites to monitor for codling moth. Traps were inspected and cleaned twice weekly until late August. Fruit were examined as part of a weekly monitoring program, to evaluate the levels of insect damage and provide early information on failures of the pest control program. Fruit damage assessments were conducted three times throughout the growing season (late June, late July and late August) to evaluate the efficacy of the various programs. Sampling was conducted in similar varieties in each orchard block. During assessments, 10% of the apple trees in each orchard block were randomly selected, and the number of damaged fruit on five limbs of each tree were recorded.

Toxicity to beneficial insects. The toxicity of reduced-risk insecticide programs on beneficial insects was evaluated by monitoring the presence of beneficial insects *Orius insidiosus*, green lacewings *Chrysoperla carnea* (Stephens), lady beetles *Harmonia axyridis* (Pallas), *Coccinella septempunctata*, *Coleomegilla maculata* (Mulsant), *Cycloneda munda* (Say), *Hippodamia convergens* in each of the experimental programs. Several times

during the season tapping was conducted at 25 locations in each block, and the number of beneficial insects present on a 45 cm X 45 cm tapping tray were recorded. The presence of aphid predators was monitored by inspecting 100 terminals in each block throughout the season.

Results

Efficacy against apple pests

The reduced risk programs and the conventional programs provided effective control of all of the target insects, including plum curculio, codling moth, apple maggot, and mullein bug. There were no significant differences in the efficacy of the different treatments.

Toxicity to beneficial insects

Few beneficial insects were found during terminal assessments in all of the orchard sites (Figure 1). This may be a result of the cool wet weather, which significantly reduced aphid populations, thereby minimizing the presence of their predators. In comparison, a greater number of beneficial insects were found in apple orchards during tapping (Figure 2).

Table 2. Mean % of fruit injury at harvest from plum curculio (PC), mullein bug (MB), codling moth (CM), and apple maggot (AM) in three commercial apple orchards in southwestern Ontario.

Program	Harvest assessment (August 28, 2004)			
	Mean % damage			
	PC	MB	CM	AM
Conventional	0.06 a ¹	0.31 a	0.33 a	0.35 a
Reduced-risk 1	0.21 a	0.23 a	0.48 a	0.00 a
Reduced-risk 2	0.60 a	1.96 a	0.15 a	0.07 a
Reduced-risk 3	0.41 a	0.31 a	0.23 a	0.15 a

The results of tapping suggest that beneficial insect (*Orius insidiosus*, and *Harmonia axyridis*) populations were higher in the reduced-risk programs 2 and 3, compared to the conventional block. However, it has yet to be determined if these differences are statistically significant. Evaluations of beneficial insect populations in the terminals suggest that the treatments did not appear to have a significant impact on the presence of beneficial insects.

Discussion

The results of this study suggest that the reduced-risk pest management programs provided effective control of PC, CM, AM and MB. Preliminary results indicate that reduced-risk insecticide programs may be less harmful to beneficial insects, however, further research is required to confirm the results

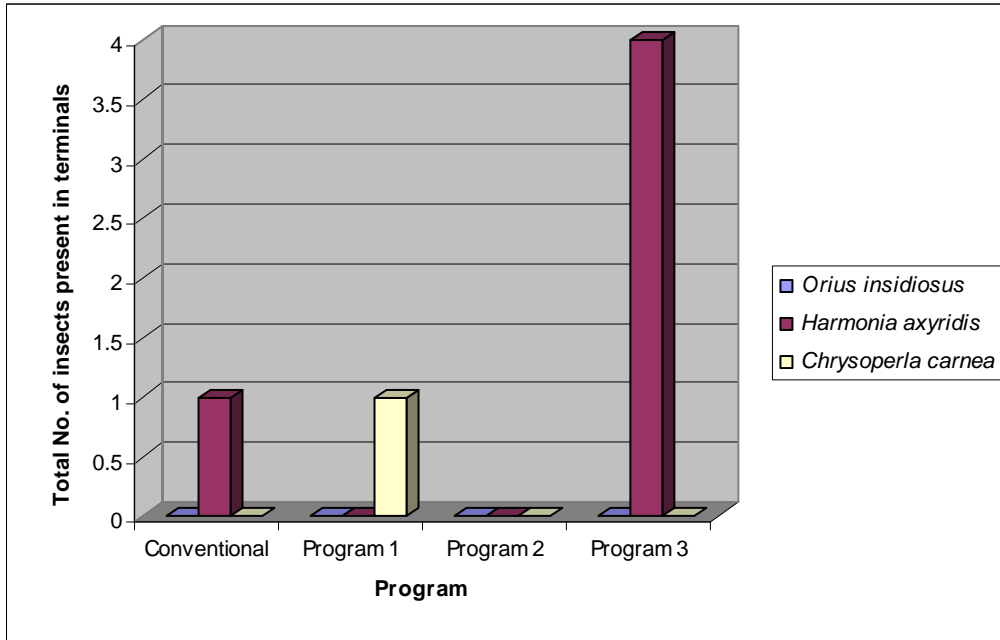


Figure 1. Total number of beneficial insects (*Orius insidiosus*, *Harmonia axyridis*, *Chrysoperla carnea*) found during weekly assessments of 100 terminals in three commercial orchards in southwestern Ontario where conventional and reduced-risk insect pest management programs were applied in 2004.

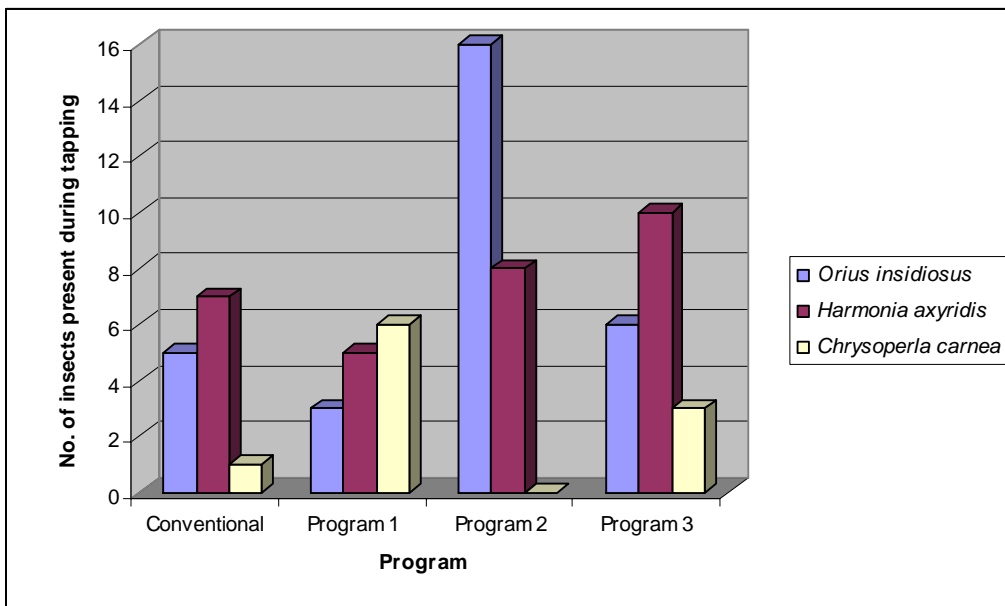


Figure 2. Total number of beneficial insects (*Orius insidiosus*, *Harmonia axyridis*, and *Chrysoperla carnea*) sampled by tapping 25 trees in three commercial orchards in southwestern Ontario where conventional and reduced-risk insect pest management programs were applied in 2004.

POSTHARVEST

Impact of SmartFresh™ on Apple Quality and its Interaction with Current Industry Practices

Jennifer DeEll, Fresh Market Quality Program Lead, OMAF, Simcoe, and Dennis Murr, University of Guelph

There are two major objectives to this work:

- 1) investigating the interactions of SmartFresh™ (1-MCP) with current postharvest commercial practices of the apple industry, and
- 2) evaluating the efficacy of SmartFresh™ when applied to apples after short-term cold storage and/or controlled atmosphere.

This is a 2-year project* and the following is a summary of results from the first year of study (2003 harvest).

Within a specific CA regime, apples treated with 1-MCP were firmer (0.5-1 kg) than comparable apples after mid- or long-term storage (120 or 240 days, respectively). Lowering the O₂ did not consistently improve firmness, as many apples treated with 1-MCP exhibited the highest firmness regardless of gas concentrations during storage. Firmness of certain cultivars in specific CA regimes was influenced by 1-MCP, gas concentrations, and storage temperature. Ethylene, CO₂, and volatile production were generally lower in apples treated with 1-MCP, held at lower temperatures, and in lower O₂, although there were some interactions of these factors. Overall, 1-MCP had variable effects on physiological disorders and interacted with the CA regimes.

More specifically for 'Gala', 1-MCP treatment resulted in reduced rates of respiration, ethylene and volatile production, regardless of storage regime, and resulted in a reduced production rate of all the major volatile compounds, including esters, alcohols, acids, aldehydes, and ketones. 1-MCP treatment inhibited post-storage volatile production in CA- and air-stored fruit by as much as 95%. However, recovery of aroma was delayed significantly in fruit that had been held at 0°C compared to 2.5°C, suggesting aroma volatile synthesis in 'Gala' is chilling sensitive.

In general, there was no beneficial interaction or apparent effects of ReTain on firmness

retention, or respiration, ethylene and volatile production. The incidence of physiological disorders was extremely variable, depending on storage duration, 1-MCP concentration, and postharvest application of ReTain.

When apples of proper maturity at harvest were put into storage, there was a positive response to post-storage 1-MCP applications. This response was better in fruit from CA storage than from air, and within CA the response was better in low oxygen than in standard CA.

* *This project is funded in part by the Apple Marketers' Association of Ontario, Canadian Horticultural Council, AgroFresh Inc. (Rohm & Haas), and the Agricultural Adaptation Council.*

Results from the 2003 Commercial SmartFresh™ (1-MCP) Trial on Apples in Canada

Jennifer DeEll, Fresh Market Quality Program Lead, OMAF, Simcoe

A research permit (66-RP-03) was granted by the Pest Management Regulatory Agency (PMRA) to allow SmartFresh treatment at five commercial apple storages in Canada for the 2003 harvest season. Treatment was limited to a maximum of 20 rooms for all sites, and a maximum total of 6500 tonnes of apples could be treated under the permit. All treated apples had to be exported. The overall purpose of this research was to demonstrate the efficacy of commercial applications of SmartFresh (1-MCP) on apples in Canada, while the research permit was specifically granted to establish a Maximum Residue Limit (MRL) for the use of 1-MCP in Canada. This summary is on the efficacy.

Selected commercial storage rooms (18 Empire, 1 McIntosh) were treated with SmartFresh (1 ppm) for 24 hours according to the AgroFresh directions for use. Corresponding control (non-treated) apple samples were held for the 24-hour period in a nearby storage room at approximately the same temperature. Following SmartFresh treatment, control samples were returned to the treated storage room and controlled atmosphere (CA) conditions were established immediately thereafter.

Overall, apples harvested at optimum maturity for long-term storage responded well to the

SmartFresh treatment, whereas apples harvested after optimum maturity responded poorly. After 14-days at room temperature, 'Empire' apples treated successfully with SmartFresh exhibited 5-6 lb greater firmness than the control non-treated fruit. Similarly, treated apples had <0.1 ppm of internal ethylene compared to more than 200-300 ppm in the control fruit. These benefits from SmartFresh treatment were still evident after mid- to long-term storage, plus 1 week at room temperature. Some fruit developed internal browning after 7-9 months of storage, but there was no significant effect of SmartFresh on the incidence. CO₂ injury was also apparent in a few fruit samples, which were mostly not treated with DPA to reduce high CO₂ sensitivity.

It important to note that most of the data collected from this commercial trial has been on Empire apples. Different cultivars respond differently to SmartFresh. Therefore, cultivars other than Empire should not be expected to necessarily respond the same to SmartFresh treatment. There will no doubt be many learning curves as this product becomes increasingly adopted by the Canadian apple industry.

2004 Risk of Low-Temperature Disorders in Apples

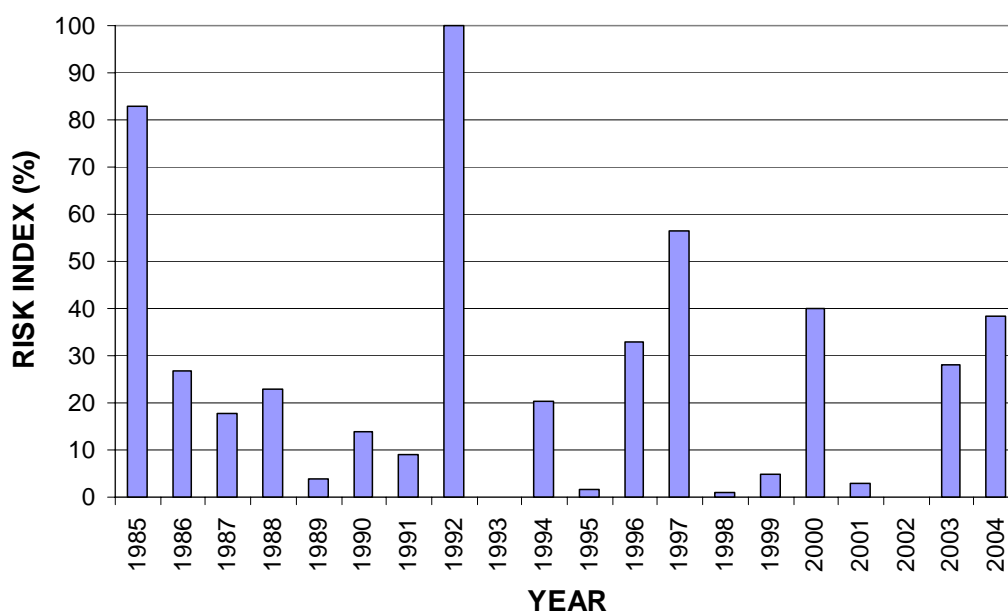
Gaétan Bourgeois, AAFC, Quebec, and Jennifer DeEll, Fresh Market Quality Program Lead, OMAF, Simcoe

CIPRA is a computer-based program used to predict disease and pests of several horticultural crops, based on weather data (Bourgeois *et al.*, AAFC, Québec). More recently, CIPRA has been expanded to predict the risk susceptibility of apples to certain storage disorders (Bourgeois, DeEll, and Plouffe). These models not only consider the weather data, but also fruit maturity at harvest. CIPRA is presently being used commercially in Quebec, while it is currently being evaluated and adapted for Ontario (Bourgeois, DeEll, and Nichols).

Low-temperature disorders develop in storage following cool and wet conditions during the months of July and August. As CA storage temperatures drop below the critical level of 3°C, the incidence and severity of these disorders increase. A risk model has been developed based on weather data observed during those months. The figure below shows the results from 1985 to 2004 using weather data from Simcoe and Delhi in Ontario.

In July 2004, degree-days and days with rainfall were close to normal. However, in August, degree-days were lower than normal and days with rainfall were higher than normal, which contributed to increase risks of low-temperature disorders in storage. According to results from the risk model, the 2004 season ranks 5th in the last 20 years for the Simcoe area. The 1992 season had the highest risk, followed by 1985, 1997 and 2000.

RISKS OF LOW-TEMPERATURE DISORDERS



Another Successful Safety Seminar for Apple Cider Producers

Sarah Holmes, Risk Management Associate, OMAF, Guelph

On August 17th, 2004 OMAF hosted its fourth Food Safety Seminar for Apple Cider Producers. These seminars have been well received by the cider industry as a time to meet other producers, have their questions answered and to learn some valuable information regarding safety and other aspects of apple cider production. The meeting was attended by approximately 15 producers and a number of officials from Local Health Units, the Canadian Food Inspection Agency and OMAF. Eckhard Lutz hosted the conference at his facility (Lutz Orchard), where a Goodnature Flash Pasteurizer was installed approximately 4 years ago. Eckhard gave a talk on pasteurization, why he chose to go that route and the effects it has had on his business. He also gave a demonstration of the pasteurization process for attendees. Other topics covered at the seminar included:

- Impact of the juice HACCP Rule on the Michigan Cider Industry
Presented by Bob Tritten, Michigan State University
- The Michigan Cider Makers Guild
Presented by Bob Tritten, Michigan State University
- Patulin – Orchard Management to Reduce Moulds
Presented by Marg Appleby, IPM Specialist, OMAF
- Nutrition Labeling – How and What
Presented by Karl Probst, Program Officer, CFIA
- GMP's in Cider Production
Presented by Paul Bailey, Project Manager, OMAF

The workshop received excellent reviews by everyone in attendance. Folders including presentations and supplementary information were mailed out to all Cider Pressers in Ontario who were unable to attend the seminar. If you are interested in receiving any information from this seminar, please contact Sarah Holmes at 519-826-5996. Stay tuned for the next seminar in our series!

ANNOUNCEMENTS

Apple Program Set for Wednesday, February 16th at Brock as Part of the Two Day Convention

John Gardner, Apple Specialist, OMAF, London

Plan to attend the Ontario Fruit and Vegetable Convention on February 16th & 17th, 2005 at Brock University in Niagara. The Apple program will be on the first day of the Convention along with sessions on fresh market vegetables, innovations in fresh market quality, tender fruit, weed management, direct farm sales, manure management/cover crops and food safety. Wednesday evening will also feature the Taste of Niagara Gala starting at 5:30 p.m. The following day will see sessions on tender fruit, grapes, berries, cole crops, Farm Markets Ontario and another session on cover crops/manure management and food safety.

The upcoming Apple Program will have speakers on several key priority issues. David Rosenberger, renowned plant pathologist from Cornell University, New York, will speak twice during the day. Once on postharvest disease management and once on orchard disease predictive models. David is very well-known for his practical no nonsense approach to management of apple diseases from the field through to the retail shelf.

Peter Toivonen from AAFC in B.C. will address the topic of Apple Slices and their market potential. Many Ontario growers have already had some experience with this market. It does have the potential to grow depending on our ability to keep the slices fresh and tasty after cutting. Peter is currently working with colleagues in various institutions across Canada to screen cultivars and numbered selections for slicing quality.

As the world of apple growing and marketing takes on a global reality with categories of fruit becoming synonymous with distinctive cultivars, growers in Ontario now have a better understanding on the variety mix and what to invest in. This is largely a result of trials that have been conducted in the Great Lakes area over the last decade. A panel comprising of four of eight cooperating growers from our provincial cultivar trials have agreed to share their findings on the most promising of the cultivars in their trial sites.

The ability to maintain that just harvested quality of apples has been the challenge of postharvest

physiologists worldwide for many decades. Recent advances in our understanding of managing the ripening process by inhibiting the action of ethylene have created a new science in the way we manage fruit crops in the postharvest period. Jennifer DeEll fresh market program lead with crop technology will review her findings on Smart Fresh™ technology and other advances like thermo-fogging in managing stored apples.

John Cline, tree fruit physiologist with The University of Guelph, has the challenge of discussing “Advances in Plant Bioregulators for Apples”. John has researched several new growth regulators and thinning materials in the last few years. Growth regulators are essential in managing apple from the perspective of crop load management through thinning and also are shown to be very helpful in controlling the infection rate and spread of diseases like fireblight.

Most growers are now familiar with the terminology “Reduced Risk”. This phrase describes the use of materials in the orchard that can be broadly defined as having reduced risk to human health and the environment when compared to existing alternatives. Kathryn Carter, apple IPM specialist, will discuss her findings from trials in 2004 where reduced risk programs were compared to a more conventional approach. Impact on populations of predatory insects and efficacy against economic pests of apple will be highlighted in the talk.

Take the opportunity to hear from some of the leading speakers on the culture of apples. There should be plenty of time to discuss topic areas and audience participation is encouraged.

Azinphos-methyl (Guthion, Sniper) Re-entry Intervals and Buffer Zones

Neil Carter, Tender Fruit and Grape IPM Specialist, OMAF, Vineland

On March 29, 2004, the Pest Management Regulatory Agency (PMRA) released Re-evaluation Decision Document RRD2004-05. According to that document, “all uses of azinphos-methyl are to be phased out”. This decision is based in part on PMRA’s findings that the use of azinphos-methyl “entails an unacceptable risk of harm to agricultural workers” and that “environmental concerns have also been identified”. During the phase out period, some changes to re-entry intervals and buffer zones are required. The information below comes directly from the re-evaluation decision document which can be viewed in its entirety at: <http://www.hc-sc.gc.ca/pmra-arla/english/pdf/rrd/rrd2004-05-e.pdf>. According to that document these changes are to take place as of August 31, 2004 and that future use on certain crops (see below) is contingent on the product being sold with amended labels (Page 2, section B).

Do not enter or allow worker entry into treated areas during the re-entry interval (REI) listed in the chart below.

Crop	REI	
apple, plum ,prune, pear, apricot, peach	14 days	The following PPE is required for early entry to treated areas that involves contact with anything that has been treated, such as plants, soil or water. <ul style="list-style-type: none"> • Chemical-resistant coveralls over long-sleeved shirt and long pants • Chemical-resistant gloves • Chemical-resistant footwear plus socks
raspberry, cranberry, blackberry	7 days	<ul style="list-style-type: none"> • Protective eyewear • Chemical-resistant headgear for overhead exposure
cherry (sweet and tart)	15 days	Following the REI and throughout the remainder of the growing season, workers must wear clean, long-sleeved shirts and protective gloves each time they perform activities that involve foliar contact.
grape	28 days	Notify workers of the pesticide application by warning them orally and by posting warning signs at entrances to treated areas. Wash stations must be available in the field for all re-entry workers. Do not apply this product in a way that will come into contact with workers or other persons, either directly or through drift. Only protected handlers may be in the area during application.

Persons other than agricultural workers, such as members of the general public involved in "Pick-your-own", "U-pick" or similar operations are not permitted to enter a treated area for 30 days after application.

The PMRA has revised the buffer zones for azinphos-methyl:

Method of application	Buffer zone (metres) required for the protection of aquatic habitat with water depth of:		
	< 1 metre	1–3 metres	> 3 metres
Field sprayer*	50	40	30
Airblast (early season)	75	60	50
Airblast (late season)	65	50	40

* With the use of shrouds or cones on field sprayers (for reducing drift), buffer zones can be reduced by 70% (shrouds) or 30% (cones).

For apples, crab apples, apricots, blackberries, cherries, cranberries, grapes, pears, peaches, plums, prunes, raspberries:

- Last date of sale by registrants: 31 August 2005
- Last date of sale by retailers: 31 August 2006
- Last date of use of product by users: 31 December 2006

APF Business Planning Programs

Carl Fletcher, Strategic Planning & Business Development Program Lead, OMAF, Guelph

Three business planning programs are available to farmers under the Renewal section of the Agricultural Policy Framework. These programs are designed to assist farmers meet the challenges and opportunities they face in their farm businesses. Farmers can access any or all three programs before March 31 2008.

Farm Business Assessment (FBA)

Through this service, eligible applicants are provided with up to five days' worth of consultative services including a Financial Assessment and developing an Action Plan. The producer pays a fee of \$100 for the consultative services valued at \$2,000.

Specialized Business Planning Services (SBPS) provides up to a 50% grant, to a maximum of \$8,000 per individual farmer, to

help cover the cost of consulting fees for planning services including the development of succession plans, diversification plans, marketing plans, human resources, and risk management plans. The maximum grant for a group of four or more farmers is \$25,000.

Planning & Assessment for Value-Added Enterprise (PAVE) provides up to a 50% grant, to a maximum of \$10,000 per individual farmer, and a maximum of \$25,000 for a group of three or more. This grant is to help cover consulting fees for planning services related to value-added business opportunities including feasibility analysis.

For more information, contact Canadian Agri-Renewal Services toll-free at **1-866-452-5558** or online at: www.agr.gc.ca/renewal Click on Canadian Farm Business Advisory Services or Planning and Assessment for Value-Added Enterprises.