



ORCHARD NETWORK

For Commercial Apple Producers

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February, 2009

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Orchard Management

From the Editor

Leslie Huffman, Apple Specialist, OMAFRA, Harrow

Winter is a time for pruning, planning and learning, and we've brought some of each of these in this newsletter.

Don't miss the great learning opportunity next week at the Ontario Fruit & Vegetable Convention. Note that the Apple Day has moved to Thursday, February 19, starting at 9:30 am in Room 204. Speakers will talk about orchard mechanization, cost savings, fertigation, storage, pest management, and our grower panel will share how they are "Ready for the Weather". The full Apple Program was in your last newsletter, and can be found on the website at www.ofvc.ca

If you missed the Pre-registration, you can still register at the door – although lunch is not included. Come early – you will need time to browse the Poster exhibit, take in a Workshop or Demonstration, and visit the Trade Show. If you come on Wednesday, you can also enjoy the Feature Speaker at 4 pm, and the Fine Wood and Food Event at 5:30. Susan Sweeney is our Feature Speaker this year, speaking on "Not Your Dad's Farm – Current Trends of Farm Use of the Internet," a review of the latest trends in the farm use of technology. Also the Wednesday morning session on China will give you a profile of this fruit and vegetable producing giant.

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Ministry of Agriculture,
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ORCHARD NETWORK

February 2009

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

Thoughts on Pruning

*Leslie Huffman, Apple Specialist,
OMAFRA, Harrow*

Pruning apple trees is all about **sunlight** – shaping the tree to expose all of the wood to enough sunlight to produce strong fruitful spurs, which will set as many seeds as possible, to produce large, well-shaped and well-coloured apples. A Christmas tree shape is best to achieve this goal, narrow at the top and slightly wider at the bottom. As a tree ages, it tends to reverse this shape, growing strong wood at the top, which shades out the bottom. Removing entire upper branches instead of making many small cuts allows sunlight to the lower areas of the tree.

Pruning apple trees is also about **balance**. Each tree needs to grow enough new wood each year to renew the fruiting spurs, but excessive growth reduces fruiting and fruit quality. The trend is to let apple trees grow taller, without pruning the leader, and allowing the weight of fruit on the leader to slow the upward growth down, and gradually bend over. Trees that are allowed to grow like this tend to grow more fruiting wood and require less pruning.

Pruning apple trees is about **moderation**. Annual moderate pruning is much preferable to pruning more severely every 2 to 3 years. Removing a few large branches each year may seem drastic, but after several years, the tree will be calmer and produce fewer strong branches. There should be a good reason to

make each pruning cut. Remember that leaves are the food-manufacturing organs, and if the leaf area is reduced unnecessarily, the tree will be reduced in growth and/or fruitfulness.

Pruning apple trees is about **dwarfing** the tree, and about **local response**. We know that each pruning cut will dwarf a tree – a pruned tree is always smaller than an unpruned tree – but we also know that each pruning cut will stimulate growth in the local area. Prune that part of the tree where more growth is required, particularly in older trees. New growth will be stimulated only in those parts of the tree that were pruned. Where growth is excessive, reduce pruning to an absolute minimum.

Pruning young apples trees will **delay fruiting**. In most cases, a good nursery tree needs to be trained rather than pruned, and many growers are seeing the benefit of tying branches rather than pruning. However, any side branch that is larger than 50% of the main leader should always be removed on young trees – this restores the balance in the tree.

These are **basic principles of pruning** – sunlight, balance, moderation, branch removal, dwarfing and local response. A good pruner needs to keep these principles in mind to make the important pruning decisions that will influence this year's crop – and for years to come.

Cold Hardiness and Fruit Trees

Leslie Huffman, Apple Specialist, OMAFRA, Harrow

Recent extremes in cold temperatures have caused concerns for fruit growers, and much speculation about how much cold before fruit crops are damaged. Cold hardiness is an amazing process and understanding what it is and how it works may help explain why it varies so much.

What is cold hardiness: It is the ability of plant tissues to withstand extremes in cold temperatures. It is a complex physiological process that begins in early fall, and progresses until bud break in the spring.

How does it happen: Progressively cooler temperatures in the fall signal the plant tissue to move water from inside their cells into the spaces between cells. Some of this water is lost through transpiration, but what remains in the intercellular space eventually freezes into ice crystals. However, crystals formed in this space do not damage the cell, but crystals forming inside the cell kills it by destroying the cell membranes.

How fast does it happen: Accumulation of cold hardiness is a slow process, and as temperatures get colder, tissues become more cold hardy. The maximum hardiness is reached in mid-January. The temperatures in the previous weeks dictate the maximum level of hardiness reached. For 2009, the cold weather that preceded this cold snap has provided good incentive for trees to reach their maximum levels.

How does it reverse: Trees move into their **dormancy** through the fall, but still respire at a much slower rate. The first phase is called **quiescence**, when outside factors can “wake them up” which reduces their level of hardiness. This is why fall pruning, fertilization or cultivation should be avoided. By January, trees are in the **rest phase**, and require many days of cold before they re-enter spring quiescence. Warm temperatures signal cells to re-hydrate, making them vulnerable to late cold snaps.

What temperature causes damage: This depends on many factors, and will vary between species and cultivars. Mid-January is the best time for a deep freeze, and constant cold temperatures beforehand is the best scenario. Luckily, trees do not experience wind chill like we do, and healthy trees achieved through best management practices, show maximum hardiness. Also, snow cover helps protect lower trunks and roots, which have less hardiness. It's early to assess if damage occurred, and the winter is not yet over, but for now, it is important to understand the process of cold hardiness.

Rootstock Choices for Ontario Apple Growers

Dr. John A. Cline and Debbie Norton, University of Guelph, Simcoe Campus

When establishing new apple orchards, producers must not only consider the cultivar to grow when purchasing trees, but also the rootstock onto which the scion has been grafted. The decision is important as it has economic and orchard management consequences, and there are currently a great number of rootstocks available. However, many are not suitable for our climate, cultivars, or orchard systems.

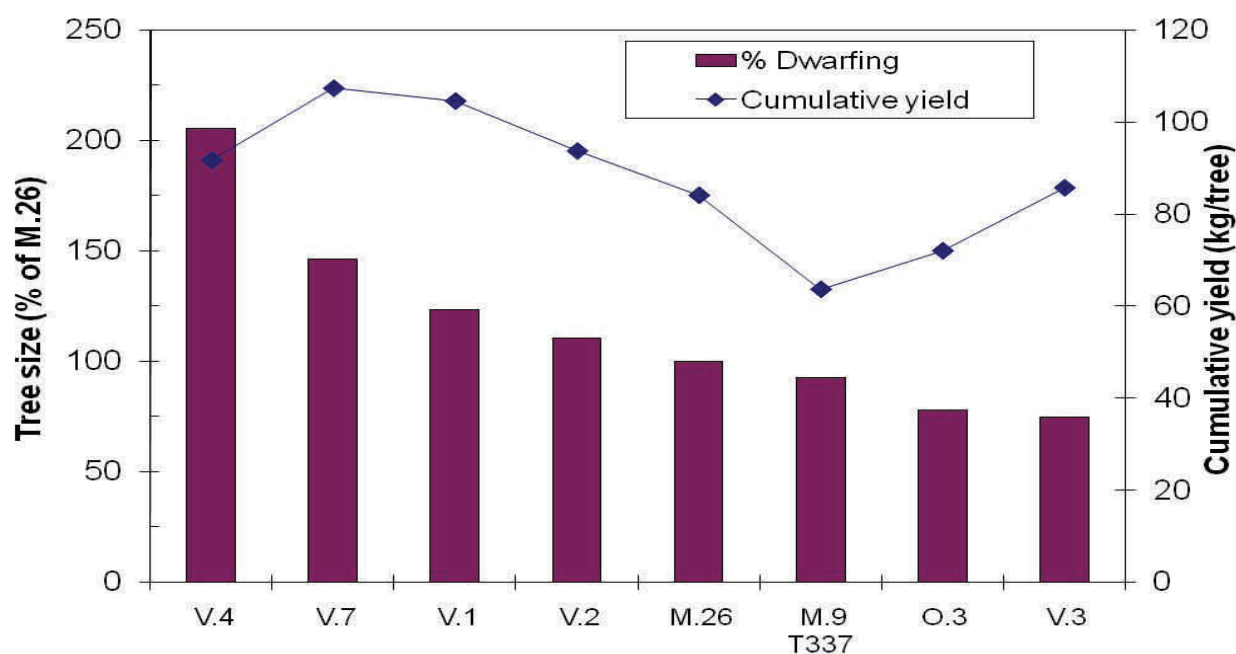
The Tree Fruit Research program at the University of Guelph, Vineland and Simcoe campuses has been actively involved in rootstock research for apple, peach, nectarine, plum, and cherry production in Ontario. This long term research is to assess size controlling characteristics of a number of rootstocks from around the world. The information gathered from these experiments is extremely useful in determining the environment-genetic interactions rootstocks have on yield, precocity, tree performance, longevity, resistance to disease and winter injury, and tendency to sucker. This article will provide an update on some of our most recent results from studies conducted in Simcoe on apples.

Experiment 1 : Performance of Northern Spy, Jonagold and Empire on Commercial and New (Vineland Series) Size Controlling Apple Rootstocks

Eight trees each of Northern Spy, Jonagold (DeCoster), and Empire on eight rootstocks (V.1, V.2, V.3, V.4, V.7, M.26, M.9 T337, O.3) were planted in a silt-loam soil in 1997 at the Horticultural Experiment Station, Simcoe, Ontario, at a spacing of 3.0 m within and 4.5 m between rows (741 trees/hectare;300 trees/acre). Trees were trained to a slender spindle with a 2.5 m support post and were trickle irrigated. Results after nine years of production indicate the following (Figure 1):

- Two rootstocks (O.3 and V.3) were significantly smaller, and two rootstocks (V.4, and V.7) were significantly larger than M.26 EMLA.
 - Tree size (trunk cross-sectional area) ranged from 74 to 205% relative to M.26E with V.3 being the smallest and V.4 the largest. V.1, V.2, and M.9 T337 were statistical similar in size to M.26EMLA.
 - Significant interactions in performance (yield and tree size) exist between the cultivars and rootstocks
 - Trees of Northern Spy have had the lowest cumulative yield and largest tree size; Jonagold has been the most productive cultivar while Empire the weakest in vigour
 - Cumulative yields after 9 years of fruiting indicated that V.7, V.1, and V.3 ranked as the most productive. Cumulative yields of M.9 T337 and O.3 have been the least of those tested.
 - Suckering has been significantly greater for V.4, particularly for the Northern Spy and Empire scion cultivars
 - V.3 has been the most yield efficient rootstock followed by M.9 T337, V.2 and V.1
- There was no significant rootstocks effect on mean fruit size

Figure 1. Tree size and fruit cumulative yield for eight semi-dwarf rootstocks (average of three cultivars) after 8 growing seasons



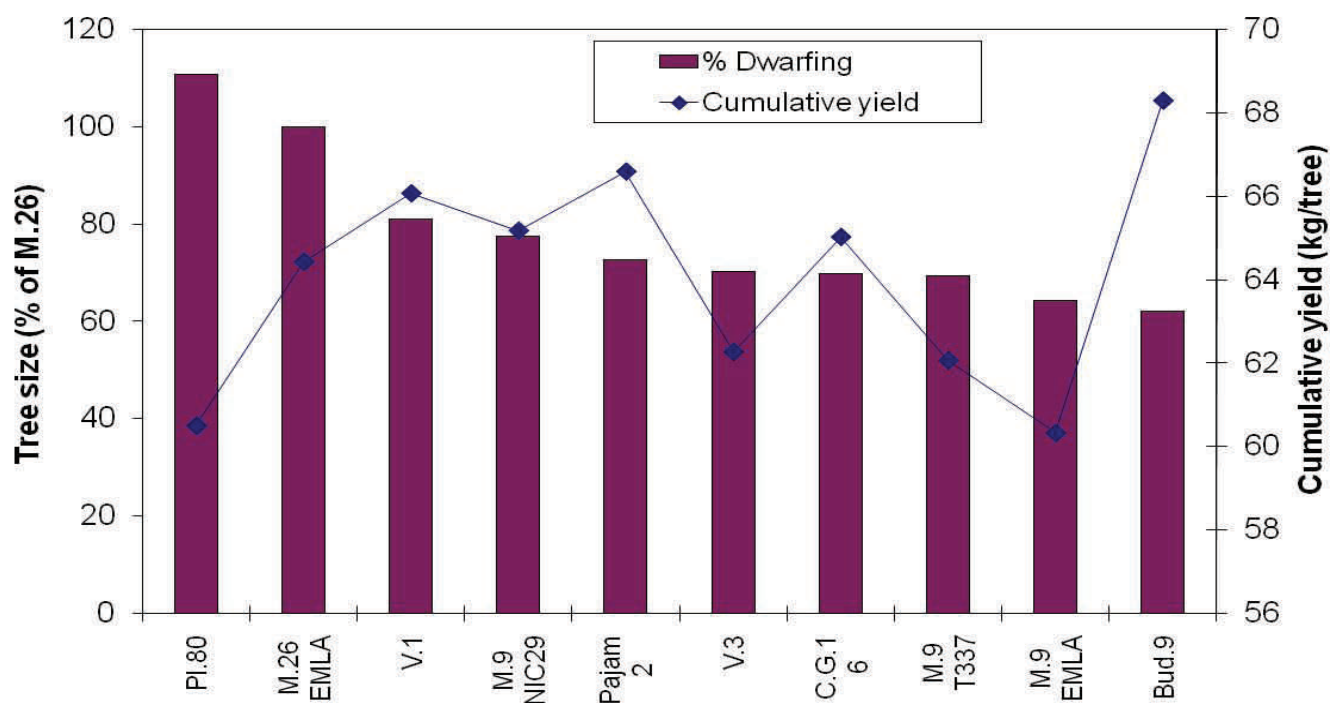
Experiment 2 : Performance of Honeycrisp and Royal Gala on the Commercial and New (Vineland Series) Size Controlling Apple Rootstocks

Ten trees each of Royal Gala and Honeycrisp on eight rootstocks (PI.80, M.26 EMLA, V.1, V.3, M.9 Nic. 29, Pajam 2, CG.16, M.9 T337, M.9 EMLA, Bud.9) were planted in a sandy silt-loam soil in 2002 at the Horticultural Experiment Station, Simcoe, Ontario. Trees were spaced 2.5 m within and 5.0 m between rows (800 trees/hectare; 323 trees/acre). Trees were trained to a vertical axe central leader system and were trickle irrigated. Results after seven years of production indicate the following:

Honeycrisp (Figure 2)

- Eight rootstocks (Bud.9, M.9 EMLA, M.9 T337, CG.16, V.3, Pajam 2, and M.9 Nic29) were significantly smaller than M.26 EMLA. PI.80, also known as Supporter 4, and V.1 were statistically similar in size to M.26 EMLA.
- Tree size (trunk cross-sectional area) ranged from 62 to 110% relative to M.26E with Bud.9 being the smallest
- Cumulative yields after 7 years were not statistically different among rootstocks. However, Bud.9, M.9 EMLA, and CG.16 were among the most yield efficient while PI.80 significantly less yield efficient.
- Cumulative yield efficiency has been significantly lower on PI.80 and M.26 EMLA in comparison with the other rootstocks
- In other Honeycrisp research conducted at the Horticultural Experiment Station, Simcoe, trees on M.26 or equivalent vigour have been preferred over M.9 because Honeycrisp is a very weak grown cultivar. However, when grafted on M.26, Honeycrisp grafted unions have had a tendency to break.

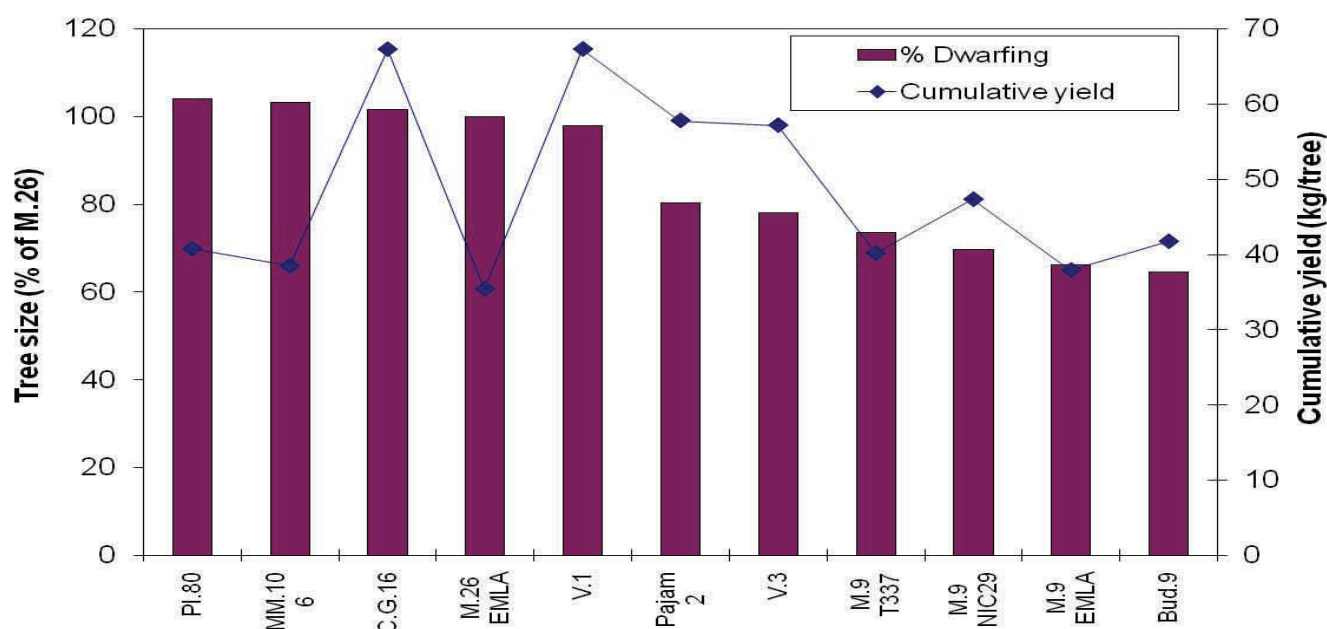
Figure 2. Tree size and fruit cumulative yield of Honeycrisp on 10 size-controlling rootstocks after 7 growing seasons



Royal Gala (Figure 3):

- Eight rootstocks (Bud.9, M.9 EMLA, M.9 T337, M.9 Nic.29, V.3) were significantly smaller than M.26 EMLA. PI.80, CG.16, V.1 Pajam 2, and MM.106 were all statistically similar in size to M.26 EMLA.
 - Tree size (trunk cross-sectional area) ranged from 64 to 104% relative to M.26E with Bud.9 being the smallest
 - Cumulative yields after 7 years were statistically different among rootstocks. V.1, CG.16, Pajam 2, and V.3 had the highest cumulative yields. The following rootstocks had statistically lower yield efficiencies over five years of production: M.9 EMLA, M.26 EMLA, PI.80, MM.106
- M.9 T337 had 30% tree mortality over the life of the experiment. This was higher than any other rootstock.

Figure 3. Tree size and fruit cumulative yield of Royal Gala on 10 size-controlling rootstocks after 7 growing seasons



Concluding Remarks

Apple producers have a wide selection of rootstocks to choose from. The decision of rootstock selection should be based on a number of factors including growing region (hardiness zone), soil fertility, orchard system, cultivar, tree spacing, and prevalence of disease. Our results indicate that M.9 and M.26 remain very productive size-controlling stocks with many positive attributes. Their primary weakness however is their high susceptibility to fire blight and lack of cold hardiness. Furthermore, M.9 T337, a common Dutch M.9 rootstock clone sold in North America over the past decade appears to be inferior to other M.9 clones based on the three studies above. The Vineland series rootstocks and Bud. 9, in particular, may help to address these concerns. When more vigour is required for weak growing cultivars such as Honeycrisp, consider a more vigorous rootstock than M.9, particularly in less fertile or sandy soils. More Information on the Vineland rootstocks can be obtained at www.plant.uoguelph.ca/treefruit.

Acknowledgements

The research was supported, in part, by the University of Guelph and the Ontario Ministry of Agriculture, Food and Rural Affairs Sustainable Production Systems and the Ontario Apple Growers' Association. The mission of the Sustainable Production Systems Program is to enhance the long-term global competitiveness and sustainability of Ontario's agriculture and food system through excellence in research

Postharvest

Storage Disorders in 'Honeycrisp' Apples

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

'Honeycrisp' is extremely sensitive to cold temperatures in storage and will readily develop soft scald and low temperature breakdown (a.k.a. soggy breakdown) when held at the low temperatures recommended for most other apple cultivars.

Soft scald is characterized as sharply defined, irregularly shaped, smooth brown lesions of the peel (Photo 1). It may also damage some of the underlying hypodermal tissue. Lesions are often invaded by secondary infections, such as *Alternaria* or *Cladosporium*, resulting in diffuse black rots. Higher incidence of soft scald is usually associated with large apples, light crops, over-mature fruit, and dull cool wet summers. The disorder is induced by low temperature, so apples subjected to rapid cooling or placed closer to the colder air of the evaporator coils are more susceptible. Development of soft scald stops when apples are removed from cold storage.



Photo 1: Soft scald in 'Honeycrisp'

Low temperature breakdown is well-defined diffuse browning of the outer cortex, which is usually moist and separated from the skin by healthy tissue (Photo 2). In 'Honeycrisp' the damaged flesh tissue is extremely soft and spongy and therefore, the term soggy breakdown is also used. This disorder is augmented with advanced fruit maturity, cool weather late in the growing season, and controlled atmosphere storage. The conditions listed above that promote soft scald will also exacerbate soggy breakdown in 'Honeycrisp'.



Photo2: Soggy Breakdown in Honeycrisp'

The 2008 apple season produced fruit very susceptible to chilling-related disorders. As such, there was a lot of soft scald and soggy breakdown observed in 'Honeycrisp' apples this year. To reduce the incidence of these disorders, **'Honeycrisp' must be stored at 3-5°C**. In addition, a cooling delay consisting of 5 days at 10°C prior to colder storage will help reduce the incidence.

Crop Protection

“Cuddlemone”- Pheromone-based Attraction in Codling Moth Larvae

Hannah Fraser, Entomology Program Lead- Horticulture, OMAFRA, Vineland

Pheromones are airborne signals used by insects to communicate with other members of the same species. *Codlemone* is the main component of the sex pheromone blend of codling moth, emitted by calling females to attract males. It would seem, however, in the case of codling moth, that cocoon-spinning larvae also emit pheromones which are attractive to other larvae seeking sites in which to pupate.

Both male and female larvae produce and respond to this aggregation pheromone. They respond to it over distances of at least 20 cm. (This may not sound like much, but larvae seeking pupation sites are very mobile and move repeatedly over the trunk of the tree.) These aggregation pheromones result in clumps of several codling moth pupae in the field.

There may be a cost associated with larval aggregations. The cocoon-derived aggregation pheromone of codling moth also attracts a parasitoid, which essentially “eavesdrops” on the communication system of its host.

Why would these insects have adapted this behaviour and what is the potential significance from a management standpoint? Female codling moth pupae release their sex pheromone precociously, before they even emerge as adults, and male moths are attracted to them. Researchers have proposed that larval pheromones are part of the insect’s reproductive strategy, in that aggregated individuals are able to find mates more quickly when they complete their development and emerge as adults.

From a management standpoint, the biology offers some potential opportunities for enhanced control in some management systems. In BC, for example, many organic producers place cardboard bands around the trunks of trees. The codling moth larvae find these bands irresistible as pupation sites, so growers can reduce numbers in the field by removing them in the spring or late fall. By adding a synthetic blend of the aggregation pheromone to the bands, researchers demonstrated a tactic with potential to increase the efficacy of this tactic. While there is no commercial product available at present, the technique would provide an intriguing management tool.

I’d like to propose that this pheromone blend be dubbed “cuddlemone”, since it doesn’t appear anyone else has done so yet!

Duthie, B. et al. 2003. Does pheromone-based aggregation of codling moth larvae help procure future mates? *J. Chem Ecol.* 29:425-436

Jumean, Z. et al 2005. Identification of the larval aggregation pheromone of codling moth, *Cydia pomonella*. *J Chem Ecol.* 31(4):911-924

Jumean, Z. et al. 2006. Pheromone-based trapping of larval codling moth, *Cydia pomonella*, in apple orchards. *Entomoogio Experimentalis et Applicata* 122:87-91

Z. Jumean et al. 2008. Does larval aggregation pheromone of codling moth, *Cydia pomonella*, induce attraction or arrestment of receivers? *Bull. Entomol. Res.* 98:425-429.

Evaluating the Effectiveness of GF-120 against Apple Maggot in Apple Orchards

Dr. Julia Reekie, AAFC Nova Scotia; Kathryn Carter, Margaret Appleby and Hannah Fraser of OMAFRA,; Lindsay Pink and Ken Wilson

The apple maggot (*Rhagoletis pomonella*) is indigenous to North America and has been found in all Canadian provinces with the exception of Newfoundland. It is a quarantine pest in Canada, especially widespread throughout eastern Canada, causing fruit damage and significant economic losses. Organic apple growers have a very limited control material list to select from; premature drop and fruit injuries caused by apple maggots can reduce saleable crop by as much as 75 %. To date, the only apple maggot control product registered is Surround WP. Surround WP is a particle film kaolin clay product, very dusty to work with and creating an unpleasant work environment.

Our research on apple maggot control first received funding from the Pest Management Centre in 2007. Six research trials, two in Ontario and four in Nova Scotia, were conducted in 2007 to test the efficacy of an organic product, GF-120 Naturalyte Fruit Fly Bait (active ingredient: spinosad). This project has shown positive results. The Ontario Ministry of Agriculture, Food and Rural Affairs and Agriculture and Agri-Food Canada in Nova Scotia have prepared a rationale leading to an emergency use registration of GF-120 in 2008 for the suppression of apple maggot in organic apples in Nova Scotia, New Brunswick, Prince Edward Island, Ontario and Saskatchewan. In addition, a complete minor use label expansion has been submitted to the Pest Management Regulatory Agency to seek eventual, full registration of GF-120 for apple maggot control on apples in Canada.

Funding obtained in 2008 from the Pest Management Centre has allowed research to continue; the objective was to optimize the delivery of this control product to suppress apple maggots in organic orchards.

In Ontario, a trial was carried out in a commercial 'McIntosh' orchard to refine application methods for the maximum distribution of GF-120 within tree canopies and to prune large-sized trees for better penetration of GF-120 into inner tree canopies. In Nova Scotia, three trials were carried out in research orchards. The effectiveness of applying GF-120 at two different application intervals (7-day and 14-day), was evaluated in a seedling orchard; The potential for using perimeter sprays or alternate row spraying with GF-120 was tested in 'Cortland' and 'McIntosh' orchards.

The goal of this research is to reduce apple maggot pest populations yet at the same time minimize the amount of control product used. Apple maggot pest pressure was between 31 - 42 % in all the orchards in this study with the exception of the seedling orchard, where infestation reached 69 %.

Results suggested that in orchards of very large trees with dense canopies, uniform distribution and good penetration of GF-120 into tree canopies are extremely important to attain effective apple maggot control. In orchards with severe pest pressure and resident infestations throughout the orchard, GF-120 should be applied every 7-10 days following label recommendations for adequate apple maggot control. If the apple maggot is not a resident pest, it may be possible to apply spray to alternate tree rows or only to the perimeter of the orchard to control a fly-in pest situation.

Effects of New Insecticides on Adult Codling Moth

Hannah Fraser, Entomology Program Lead,- Horticulture; Kathryn Carter, Pome Fruit IPM Specialist, OMAFRA

There are many new insecticides available to manage codling moth. Researchers continue to learn how these products work in the field, and how they can be best used in an IPM program. Many of the new insecticides registered for use on codling moth are potent ovicides (active against eggs) and/or larvicides (active against larvae). They also have sublethal activity on adults that may contribute to the overall reduction of pest pressure (and damage) in the orchard over the course of the season.

Rimon (novaluron), a chitin synthesis inhibitor (insect growth regulator), is considered an ovicide. The timing for application of this product is considerably earlier than conventional products such as OPs, before eggs are laid or shortly thereafter. Eggs laid on treated leaves/fruit are affected by the insecticide residues. Rimon will also kill eggs when it is applied directly to the eggs.

Rimon also has significant sublethal activity on the adults of codling moth. Treatment of adults with Rimon, either through contact with treated surfaces, ingestion or direct topical applications, does not affect the number of eggs laid by a female (fecundity), but it does reduce her egg's viability (hatch) quite significantly. Fruit protection results from a combination of direct ovicidal activity and indirect sublethal effects on female reproduction. Rimon can provide excellent control of internal fruit feeders and leafroller neonates for up to 17 days.

Intrepid (methoxyfenozide), a moult accelerating compound (insect growth regulator), is highly toxic to larvae through ingestion and also has ovicidal properties. The timing of application for an internal feeder such as codling moth is just prior to egg hatch. Unlike OPs that kill larvae as they crawl over treated surfaces, Intrepid works against codling moth larvae through ingestion.

When larvae hatch, they chew their way through the eggshell and receive a lethal dose.

Adult codling moths exposed to Intrepid have reduced fecundity and fertility (proportion of eggs that hatch). Sexual behaviours are also affected. Males exposed to treated surfaces are less responsive to sex pheromones, thus affecting the moth's communication system. If males cannot find females in the field, the females will not lay fertilized eggs.

Altacor (chlorantraniliprole) belongs to a new class of insecticides that disrupt muscle action, affecting the insect heart muscles as well as those required for locomotion. It is toxic to codling moth larvae primarily through ingestion, but also has ovicidal properties. When exposed to surfaces treated with Altacor, female codling moths are less likely to mate. Prolonged exposure to Altacor reduces behaviours related to mating, such as male response to sex pheromone and female "calling". However, of the females that do mate, fecundity and fertility are not affected. Longevity of adults is not affected.

Applying this information on the sublethal impacts of insecticides to the timing of insecticide applications for codling moth can help us to improve the effectiveness of insecticide treatments. By applying the products at the optimal time, growers can get the best bang for their buck using these new products. For more information on the timing of products for codling moth refer to Publication 310 Apple IPM Manual, and Publication 360 Fruit Production Recommendations and supplement.

Insecticide-resistance monitoring in Ontario codling moth: 2nd year study plan

Dr. Ian Scott, Agriculture Agri Food Canada, London

A codling moth (CM) insecticide-resistance survey initiated in southwestern Ontario apple orchards last summer will be continued in 2009. Orchards in Essex/Kent and Norfolk/Elgin counties will again be surveyed.

Testing will be conducted by trapping male CM during their June and August flight periods using pheromone lure-containing traps. Live moths will then be tested for their level of tolerance to either a dose of the active ingredient in the organophosphate (OP) insecticide, Guthion, or the neonicotinoid insecticide, Calypso. The dose is based on the concentration of each insecticide that causes greater than 90-95% mortality with an insecticide-susceptible CM strain. A control dose for these trials will be a dose of the solvent (acetone) used to dissolve the active ingredient. Mortality of the moths is assessed after 2 days.

In 2008, increased tolerance to OP and neonicotinoid insecticides was observed with the previously described tests. The tolerance of CM to Guthion was highest in Norfolk County moths collected during the first flight in June. In 3 of 5 orchards the Guthion dose caused less than 10% mortality within 2 days, whereas insecticide-susceptible lab CM and abandoned orchard-collected CM had greater than 90% mortality. Calypso was also less effective against the Norfolk moths collected in June. In 4 out of 5 orchards the mortality was less than 35%.

In contrast, Essex County collected moths from 6 orchards were more susceptible to Guthion (32 to 57% mortality), but the range of response to Calypso was the same as that observed in Norfolk County CM populations (14 to 31% mortality).

Fall 2008 collections of the over-wintering stage of CM found very few at all Norfolk/Elgin and Essex County orchards where surveys had been conducted, except for the abandoned orchard in Kent County. This may be good news for those growers as one may expect low numbers of moths within the orchards in the spring. Two factors may have been responsible for reducing the CM over-wintering population: the use of new insecticide classes (Assail, Delegate and Altacor) by the majority of growers and the cool, wet weather conditions during the spring and summer.

In summer 2009, male and female moths from orchards where high insecticide-tolerance is observed will be collected with live traps in order to start a colony for continued testing in the lab. These are considered to be necessary follow-up studies to confirm the level of tolerance observed with the adults and to test for cross-resistance to newly registered products. Currently, populations of CM collected from orchards outside of Ontario (Quebec and Michigan) are being tested in the laboratory using the larval or neonate stage.

Announcements

Meet Your Ontario Apple Team



**Leslie Huffman,
Apple team leader**

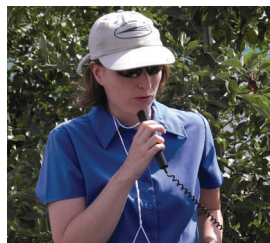
- Orchard Network newsletter, editor
- OMAFRA Apple website
- New cultivars & improved nursery trees
- Cost reduction, orchard mechanization, Improved fruit quality



**Margaret Appleby,
IPM Systems**

- New pests eg. European Apple Sawfly
- New pesticides eg. GF-120*
- Fruit Tracker software development
- IPM scout training
- International IPM Symposium (program co-chair)

**Funded by the Ontario Apple Growers*



**Kathryn Carter,
Pome Fruit Specialist**

- IPM information & scout training
- Pub 310, Apple IPM manual & workshops
- Models for PC, OBLR, other new pests
- New pesticides eg. GF-120*
- CM resistance testing*

**Funded by the Ontario Apple Growers*



**Michael Celetti,
Plant Pathologist**

- Black rot and chemical thinners in Gala
- Blister spot in Mutsu
- IPM scout training, Apple IPM Manual & workshop
- OFVC Fire blight workshop
- Scab resistance management



**John Cline,
U. of Guelph Pomologist**

- Management of new cultivars eg. Ambrosia, Honeycrisp*
- Plant growth regulators eg. ReTain, Apogee, Maxcel*
- High density orchard systems*
- Apple replant management
- Production system for N. Spy
- Trickle irrigation, soil management, plant nutrition

**Funded by the Ontario Apple Growers*



**Jennifer DeEll,
Fresh Market Quality**

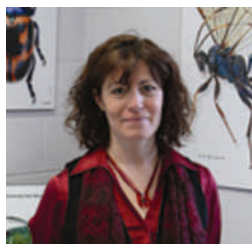
- Develop SmartFresh (1-MCP) use recommendations*
- Evaluating 1-MCP orchard spray (Harvista)*
- Optimizing storage/ handling of new cultivars*
- Collaboration with researchers and universities across Canada and the United States

**Funded by the Ontario Apple Growers*



**Jason Deveau,
Application Technology**

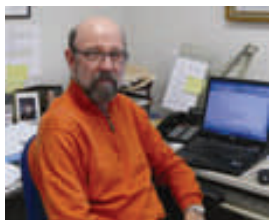
- Improved sprayer performance
- Anti-drift technologies / strategies
- Innovative delivery systems
- Sprayer calibration and set-up
- Informing buffer zone legislation
- Reducing non-target exposure



**Hannah Fraser,
Entomologist**

- Apple clearwing moth monitoring (invasive pest)
- Pub. 310 Apple IPM manual & workshops
- IPM scout training
- PC & OBLR trapping & modelling
- Editor of Hort Matters

Meet Your Ontario Apple Team



John Henderson, Risk Management (Cider)

- Food safety/inspection/sampling
- Safe production of sweet cider
- Prepares seminars, workshops and infosheets
- Cleaning and Sanitation Program reviews



Marilyn Sewell, Market Regulations

- Works with the Farm Products Marketing Commission (enabling legislation for regulated marketing)
- Direct link to the Ontario Apple Growers
- Facilitated creating the OAG in 2004



Christoph Kessel, Crop Nutrition & Fertility

- Nutritional information
- Soil Fertility workshop, OFVC 2009
- Soil Quality workshops
- Soil Phosphorus planting treatments
- Leaf analysis and soil test recommendations



Anne Verhallen, Soil Management

- Orchard soil management systems
- Avoiding soil compaction
- Assessing soil damage from wet harvest
- Soil Quality workshops
- Cover Crop BMP Manual



Helga McDonald, Business Development

- Works with food and beverage processors
- Identify business opportunities and challenges
- Help accessing business incentives programs
- Navigating government regulations



Deborah Oliver, Export Assistance

- Primary focus is fruit, vegetable and horticulture sectors
- Works with prepared and dry ingredients, and grocery and snack foods
- Identifying and maximizing food company's export opportunities
- Export market information to expand their sales base

Grower Workshops: Introducing the New and Improved Apple IPM Manual

Kathryn Carter, Pome Fruit IPM Specialist

The Ontario apple IPM team including OMAFRA specialists, University of Guelph and Agriculture and Agri-Food Canada researchers have spent the last few months rewriting the OMAFRA publication 310, Apple IPM guide. Highlights of some of the new content in the publication include information on:

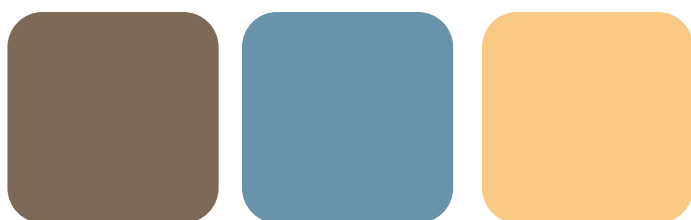
- monitoring
- thresholds for new products
- activity of beneficial insects in orchards,
- integrated weed management,
- soil compaction,
- new and emerging pests such as apple leafcurling midge
- using models to time the application of different insecticides for oriental fruit moth and codling moth

The new manual will be available in late March at a cost of \$50. The Ontario Apple Growers Association is working on finding funding to support the purchase of a copy of the manual for each of its members (stay tuned to the OAG website for more information). A series of grower workshops across the province will provide growers with an introduction to where to find information in the guide, as well as an update on new IPM strategies in apple. The workshops will also provide information that is complimentary to the guide including tables on the toxicity of various pesticides to beneficial insects, and the efficacy of different insecticides against different pests. Growers will also be introduced to several new technologies that may play a role in the future of apple IPM. Tentative dates for the workshops are as follows:

April 7	Ruthven, Mastronadi Winery, 1193 Road 3 East, Kingsville
April 8	Simcoe, OMAFRA office, 1283 Blueline Rd, Simcoe
April 9	Vineland, OAG office, 1634 South Service Road, St. Catharines.
April 15	Clarksburg, Marsh Street Community Centre, 187 Marsh Street, Clarksburg, Ontario
April 16	Colbourne, Keeler Centre

Growers are encouraged to bring a copy of the new Apple IPM Guide to the meeting. There may be a cost associated with the meetings. More information on these workshops will be posted in March on the OMAFRA website at: <http://www.omafra.gov.on.ca/english/crops/conferences/index.html>. Or growers can contact the Agricultural Information Contact Centre at 1-877-424-1300.

Funding is also being sought for demonstration trials to be conducted in summer 2009, along with summer twilight tours.



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