That’s a Wrap
John Gardner, Apple Specialist, OMAFRA, London

This has been one steady winter that does not seem to want to let go too quickly. One concession has been the real lack of temperature extremes this winter setting the stage for good bud survival in most of the tree fruit crops we grow in Ontario. If I was asked to describe the perfect end to a winter and the progression of the spring this would be it. Nice and slow with fruit buds held tight well into April.

No question, it has been a difficult 3 months in which to move easily through an orchard with the pruners in hand. There is not much that is more difficult than trying to get a volume of work done in deep snow with a bone chilling wind howling down the back of your neck. Somehow we seem to manage to get the job done.
It has become increasingly clear to me in the last few years how important it is to remove larger caliper limbs in higher density plantings. In fact, this point was made more than once during Terence Robinson’s talks at the Ontario Fruit and Vegetable Conference (OFVC) this past February.

Simply put, “Large limbs make large trees”. A big bold looking branch is and becomes an exporter of carbon to feed the trees wood and make bigger trunks. This is why dwarf trees that have larger limbs continually removed in favour of finer branches do not get outrageously large and unmanageable in tighter plantings.

Terence spoke on the establishment and management of the “tall spindle” in the recent Apple Program as part of the OFVC. The tall spindle system requires a very high quality tree at planting with the objective of generating some crop volume in the 2nd year. It’s the feathered trees that a grower should be looking for if they are available. If you plant a tree with a dozen feathers on it, each tree will produce so many apples in the second year. Remember that at 1000 trees per acre you only have to hang 20 apples per tree to get 10 bins of fruit if they are grown to 100 count size.

Anyway, I must report to the group that I have applied for a pension and I will be leaving the public service at the end of April this year to pursue other interests. I have now been with the Ontario Ministry of Agriculture, Food and Rural Affairs for 33 and one-half years. It has been a challenging and rewarding job in a very dynamic and changing industry. I will miss many aspects of this work especially those relationships built up over the years with growers, extension staff here and in the U.S., and associates in the industry.

This newsletter would not have been possible without the efforts of many. Appreciation goes out to my Associate Editor Dr. Jennifer DeEll and all the contributors, Apple Team members, sponsors and the Apple Growers’ for their directorship and administration over the years. Thanks to Marian Desjardine of the London Resource Centre for the signature look and finish of this product.

I feel that the industry bottomed out a couple of years ago but is now in recovery mode as we build inventories of trees that will produce higher value products. What is apparent is that consumers at the retail level are choosing to buy more apples at higher prices and this is a direct result of the efforts of the apple industry as a whole to make the changes that were necessary a few years back.

MaxCel® - A New Chemical Thinner for Apples

Dr. John A. Cline, Associate Professor, Pomology and Tree Fruit Physiology, Department of Plant Agriculture, University of Guelph, Simcoe

Valent Biosciences announced in December 2007, that the Pest Management Regulator Authority (PMRA) has approved the registration of a new formulation of 6-BA for thinning apples, called MaxCel®. The company reports that MaxCel® will replace Accel®, first registered in Canada in the spring of 1996, however both will be available for the 2008 growing season.
The active ingredient in MaxCel® is 6-benzyadenine (6-BA). 6-BA is a cytokinin, a class of growth regulator that promotes cell division. MaxCel® contains 1.9% 6-BA, which is slightly more concentrated than Accel®, and unlike Accel®, it contains no gibberellic acid (GA₄+⁷). Prior research has clearly demonstrated that GA₄+⁷, contained in the Accel® formulation, can in some instances decrease the thinning efficacy of 6-BA at higher concentrations (> ~150 ppm) and may also inhibit flowering the following season. While this was rare and very uncommon because such rates were seldom used, it was of sufficient concern that the company reformulated Accel®. One further advantage the manufacturer states is that the new Maxcel® formulation contains additives to enhance absorption and provide increased product stability and solubility of the active ingredient. Many comparisons of Maxcel® and Accel® are shown in Table 1.

**What is New**

**Rates and Number of Sprays:** MaxCel® is limited to two sprays if used for thinning, and four sprays if used for fruit size enhancement. The total amount of product applied per season cannot exceed 446 grams 6-BA/ha (22.5 L/ha), which is nearly six times more the 6-BA than was permitted under the Accel® label.

**Using Maxcel® to Increase Fruit Size:** The product label states that Maxcel® can be used to enhance fruit with mild or no thinning. Two to four applications, beginning at petal fall and repeating every 3-10 days, are required to enhance fruit size. Suggested rates are 10-50 mg/L 6-BA (ppm), but the label cautions that some easy to thin cultivars and/or environmental conditions may result in fruit thinning.

**Using Maxcel® to Thin:** The product label states that MaxCel® can be used at rates of 75 to 200 mg/L 6-BA. Our experience has shown that 6-BA at concentrations ranging from 50-75 mg/L 6-BA is a mild thinner. However, if used alone at rates up to 200 mg/L or combined with Carbaryl for harder to thin cultivars, the treatment becomes much more aggressive.

**Suggested Use Pattern:** While 6-BA is not a ideal thinning compound for all cultivars, it has exhibited effectiveness for Empire, McIntosh, Idared, and

<table>
<thead>
<tr>
<th>Table 1. Summary of selected differences between MaxCel® and Accel®</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Percent active ingredient: 6-BA</strong></td>
</tr>
<tr>
<td>6-BA: 1.9 % (w/w)</td>
</tr>
<tr>
<td><strong>GA₄+⁷</strong></td>
</tr>
<tr>
<td><strong>Amount of 6-BA per L of product</strong></td>
</tr>
<tr>
<td><strong>Cost of product (per litre)</strong></td>
</tr>
<tr>
<td><strong>Container size</strong></td>
</tr>
<tr>
<td><strong>Cost per gram of 6-BA</strong></td>
</tr>
<tr>
<td><strong>Maximum number of sprays per season</strong></td>
</tr>
<tr>
<td><strong>Amount of product/hectare per season as stated on label</strong></td>
</tr>
<tr>
<td><strong>Range in application rates stated on product label</strong></td>
</tr>
<tr>
<td><strong>Pre-harvest interval</strong></td>
</tr>
<tr>
<td><strong>Enhanced formulation to improve product absorption</strong></td>
</tr>
<tr>
<td><strong>Compatibility with Sevin and other pesticides</strong></td>
</tr>
</tbody>
</table>

[1] – Based on survey of pricing provided by supplies as of March 28, 2008 (Many did not have 2008 pricing available at the time of print). Prices may vary by supplier and purchasing volumes.

[2] – The Canadian distributor has indicated that the cost per litre for MaxCel® will be the same as Accel®.
Gala and many other varieties. MaxCel® and Accel® currently have the advantage over other chemical thinners (NAA and Carbaryl) by thinning as well as increasing fruit size. This is achieved by stimulating cell division in the early stages of fruit growth and development. One would need to carefully consider its use on Honeycrisp and other very large fruited cultivars, only for the reason that excessive fruit size can be problematic.

The thinning response to 6-BA is concentration dependent, meaning that increasing the concentration applied generally will result in increased thinning activity. MaxCel® at 100 to 150 ppm will provide a stronger thinning response than what might be expected from Accel®. While most growers considered Accel® to be a mild thinner, the MaxCel® label will permit a range of rate options from mild through aggressive thinning.

If mild thinning is desired, similar to the results obtained with Accel®, then 75 ppm MaxCel® is a good starting point. For moderate thinning with easy to moderately difficult cultivars, 75-100 ppm is acceptable, while 100-150 ppm might be used for more difficult to thin cultivars. MaxCel® can be used by itself or in combination with Sevin where more difficult to thin cultivars. MaxCel® can be used by itself or in combination with Sevin where more difficult to thin cultivars. MaxCel® at 100 to 150 ppm will provide a stronger thinning response than what might be expected from Accel®. While most growers considered Accel® to be a mild thinner, the MaxCel® label will permit a range of rate options from mild through aggressive thinning.

**Table 2. Suggested rates of MaxCel® to use with or without Sevin®**

<table>
<thead>
<tr>
<th>Desired Response[1]</th>
<th>Concentration of 6-BA (ppm)[2]</th>
<th>Concentration of Carbaryl (ppm)[2]</th>
<th>Number of Applications</th>
<th>Amount of MaxCel® per 1000 Litres water. Apply to 1 hectare</th>
<th>Amount of Sevin® XLR Plus per 1000 Litres water. Apply to 1 hectare</th>
<th>Approximate cost of single application per 1 hectare ($/ha)[3]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhance size only[4][5]</td>
<td>10 - 50</td>
<td>-</td>
<td>2 to 4</td>
<td>0.5 - 2.5 L</td>
<td>-</td>
<td>$56 - $280</td>
</tr>
<tr>
<td>Mild thinning and sizing</td>
<td>50 - 75</td>
<td>-</td>
<td>1 to 2</td>
<td>2.5 - 3.75 L</td>
<td>-</td>
<td>$280 - $420</td>
</tr>
<tr>
<td>Moderate thinning and sizing</td>
<td>75 - 100</td>
<td>-</td>
<td>1 to 2</td>
<td>3.75 - 5.0 L</td>
<td>1 - 2 Litres</td>
<td>$420 - $560</td>
</tr>
<tr>
<td>Aggressive thinning and sizing</td>
<td>75 - 100</td>
<td>500</td>
<td>1 to 2</td>
<td>2.5 - 3.75 L</td>
<td>-</td>
<td>$296 - $436</td>
</tr>
<tr>
<td>Very Aggressive thinning and sizing</td>
<td>150 - 200</td>
<td>500 - 1000</td>
<td>1 to 2</td>
<td>5.0 - 7.5 L</td>
<td>1 - 2 Litres</td>
<td>$453 - $593</td>
</tr>
</tbody>
</table>

[1] There are several factors that influence the chemical thinning outcome. Rates are generally chosen on the degree of cultivar sensitivity to chemical thinners. Consult Publication 360 for further information on cultivars sensitivity to chemical thinners.

[2] 1 ppm is equivalent to 1 mg/L.

[3] Based on April 2008 prices. May vary by supplier. Calculation based on manufacturer suggest retail price of $16.40/L Sevin® XLR Plus and $112/L MaxCel®, and excludes application costs. For comparison purposes, the estimated costs of one 10 ppm spray of NAA (Fruitone-N®) is approximately $87.60/ha, based on a suggested retail price of $209.52/kg Fruitone N and application of 1000 Litres of spray/ha.

[4] Mild thinning may occur under some conditions (weak trees, young trees, sensitive cultivars, and environmental conditions that favour the thinning response.

[5] While 6-BA has the potential to increase cell division and enhance fruit size beyond the thinning (crop load) effect alone, this is not observed in all years because the response can be affected by spray concentration, coverage, cultivar, tree health, time of application, tree stress, and environmental conditions during and following spray application.

It is important to review *Publication 360 Fruit Production Recommendations* for further information on cultivar sensitivity to fruit thinners and other information regarding the chemical thinning of apples.

Since the label is based on a per hectare basis, the maximum concentration applied depends upon the size of the tree and volume of water used to obtain good coverage. Table 3 provides the relationship between water volumes, grams active ingredient (BA) per unit area, and concentration (ppm).

**Pre-harvest Interval:** Another change on the MaxCel® label is that the pre-harvest interval (PHI) has been increased from 28 to 86 days. This means that MaxCel® may not be a good choice for very early season varieties, but apart from that, this change is minor.

**Timing:** The window of best response for MaxCel® for thinning is between 5 and 15 mm fruit size. To determine the average fruit size, select five to 10 spurs and measure fruit size of all the fruit on the spurs and then calculate an average fruit size. The label states that for enhancing fruit size, applications spray should begin at petal fall and repeated up to four times at 3-10 day intervals.
MaxCel® should be applied dilute (do not concentrate more than 2X) in 500 - 2000 litres of spray solution per hectare. Uniform and thorough coverage is essential. Research at the Simcoe Horticultural Experiment Station indicates that concentrations below 50 ppm 6-BA are ineffective for thinning and single applications of at least 50 ppm are necessary for improving fruit size. While multiple applications below 50 ppm 6-BA may be effective, no research to corroborate this recommendation has been conducted at Simcoe.

Do not apply MaxCel® in combination with NAA or NAD (either tank mix or separate sprays) during the same growing season to Delicious or Fuji, as this combination may result in the formation of pygmy fruit.

Environmental Conditions: The effectiveness of chemical thinners is influenced by the weather in several ways. MaxCel® is no exception. To optimize plant uptake of the spray solution, apply MaxCel® during periods of slow drying (for example, early morning). Best results are obtained when warm temperatures (greater than 20°C) occur during and following application.

Table 3. The relationship between spray water volumes, grams active ingredient (BA) per hectare, litres of product per hectare, and final tank concentration of MaxCel®

<table>
<thead>
<tr>
<th>Spray Volume Required (litres/ha)</th>
<th>MaxCel Rate</th>
<th>concentration of 6-BA (mg/L or ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10 25 50 75 100 200 446</td>
<td>0.5 1.3 2.5 3.8 5.0 10.1 22.4</td>
</tr>
<tr>
<td>200</td>
<td>50 125 250 375 500 1000 2230</td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>33 83 167 250 333 667 1487</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>25 63 125 188 250 500 1115</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>20 50 100 150 200 400 892</td>
<td></td>
</tr>
<tr>
<td>600</td>
<td>17 42 83 125 167 333 743</td>
<td></td>
</tr>
<tr>
<td>700</td>
<td>14 36 71 107 143 286 637</td>
<td></td>
</tr>
<tr>
<td>800</td>
<td>13 31 63 94 125 250 558</td>
<td></td>
</tr>
<tr>
<td>900</td>
<td>11 28 56 83 111 222 496</td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>10 25 50 75 100 200 446</td>
<td></td>
</tr>
<tr>
<td>1500</td>
<td>7 17 33 50 67 133 297</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>5 13 25 38 50 100 223</td>
<td></td>
</tr>
</tbody>
</table>

Conclusion: The registration of MaxCel® is important because it represents an improvement in 6-BA technology. Growers will be able to use highly effective concentrations, either as a stand-alone thinner or in combination with Carbaryl.

CrimsonCrisp™ - A New Disease Resistant Apple Recommended for Trial Planting

Dr. John Cline1 and Debbie Norton2, 4 Associate Professor, Pomology and Tree Fruit Physiology, 2Agricultural Technician, Dept. of Plant Agriculture, University of Guelph, Horticultural Experiment Station, Simcoe

There is a new fresh-market apple cultivar called ‘CrimsonCrisp™’ (Figure 1) that has caught our attention at the Simcoe Horticultural Research Station in Simcoe since we established trees in 1999. At that time, it was being tested under the name ‘Co-op 39’, but has since been trademarked ‘CrimsonCrisp™’. The cultivar is currently protected and is licensed to Adams County Nursery, Inc. (Aspers, PA). Plant patent in the United States is reported to be pending.
This cultivar displays an impressive rosy red blush that covers close to 100% of the fruit surface - even in what might be considered a poor colouring year. The fruit has a sweet, rich flavour and is sub-acidity. The flesh is crisp, yellowish white in colour (Figure 2), and moderately juicy. 'CrimsonCrisp™' matures late in September/early October, approximately 5 days after 'Empire'. Premature fruit drop has not been a concern in our observations in Simcoe. Other reports indicate that it has excellent keeping quality with storage up to 4 months. The fruit is medium in size (up to 76 mm) and oblate to round in shape. The tree is moderately vigorous, has an upright growth habit, and has a standard (nonspur) bearing habit with some biennial bearing if over cropped.

In addition to the above feature, what is quite remarkable is that 'CrimsonCrisp™' is resistant to apple scab (*Venturia inaequalis*) and moderately resistant to leaf rust. However, this cultivar is moderately susceptible to mildew and is reported to be susceptible to fireblight.

**Origin**

The original CrimsonCrisp™ seedling was derived from a cross between two breeding selections made in 1971 at the Rutgers Fruit Research and Development Center, Cream Ridge, N.J. The seedlings were screened for scab resistance at Purdue University in 1972 by E.B. Williams and planted at the Purdue University Horticultural Research Farm, West Lafayette, Ind. Fruit of this seedling was first observed on September 18, 1979.
The selection has been widely evaluated at a number of locations including Lafayette Ind., Cream Ridge, N.J., and Urbana Ill. It was also included in the NE-183 test among 20 states and three provinces (including the University of Guelph, Simcoe). The pedigree of ‘Co-op 39’ is diagrammed in Figure 3.

If you are considering the planting of new apple cultivars, CrimsonCrisp™ is worth evaluating on a trial basis, especially for those looking for ways to reduce the use of fungicides for scab control. All indications are that it should be suitable for most, if not all of Ontario, although information on its winter hardiness is lacking. Should you wish further information on this cultivar, please contact the authors.

### Strategies to Minimize the Presence of Patulin in Apple Cider and Juice

**Wendy Telfer, Risk Management Associate; John Henderson, Risk Management Specialist, Food Inspection Branch, OMAFRA**

Patulin is a mycotoxin harmful to humans that is produced by fungi (or molds) commonly found on apples. Patulin in Ontario apple cider continues to be a problem, with positive samples being found each year by the Ontario Ministry of Agriculture, Food and Rural Affairs under its Foods of Plant Origin Monitoring Program.

The following table shows patulin lab results in Ontario cider from the past four seasons. These figures indicate that it is very important for producers to monitor their fruit quality very carefully and to develop programs necessary to reduce the chance of patulin occurring in their product.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of samples collected</th>
<th>Patulin &lt;MDL or MQL* (no of samples / %)</th>
<th>Patulin &gt;MDL but &lt;50 ppb** (no of samples / %)</th>
<th>Patulin &gt;50 ppb*** (no of samples / %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>80</td>
<td>51 / 64%</td>
<td>21 / 26%</td>
<td>8 / 10%</td>
</tr>
<tr>
<td>2006</td>
<td>58</td>
<td>42 / 72.4%</td>
<td>16 / 27.6%</td>
<td>0 / 0%</td>
</tr>
<tr>
<td>2004</td>
<td>17</td>
<td>13 / 76.5%</td>
<td>1 / 5.9%</td>
<td>2 / 11.8%</td>
</tr>
<tr>
<td>2003</td>
<td>185</td>
<td>159 / 86%</td>
<td>11 / 6%</td>
<td>15 / 8.1%</td>
</tr>
</tbody>
</table>

**MDL = Method Detection Limit**  **MQL = Limit of Quantification**  
**Patulin >MDL but <50 ppb = Patulin detected but not a violation**  
**Patulin >50 ppb = Violation**  
**ppb = parts per billion**

### Strategies to minimize the presence of patulin in apple juice

The following information is an excerpt from the U.S. Juice HACCP Guidance document.

The potential for high levels of patulin to occur depends on several factors. The following is a list of the most significant factors contributing to the presence of patulin in apple juice, as well as control strategies to minimize these levels:

- **Whether the apples used include fallen fruit** — Apple juice made from apples that include fallen fruit is more likely to contain high levels of patulin.

- **The condition of apples at the time of harvest** — Juice made from apples with visible damage (for example damage from birds or insects, mold or rot) is more likely to contain high levels of patulin. Proper agricultural control practices by the grower (including insect control, anti-fungal applications when needed, etc.) can assist in minimizing mold growth and rot on apples.

- **Handling of apples prior to storage** — Patulin production can occur during the storage of apples, particularly in apples that are bruised in handling prior to and during storage.

- **Storage conditions for apples** — Apples stored without proper temperature and atmospheric control of the storage environment are more likely to contain high levels of patulin than apples stored under controlled conditions.

- **Monitoring for core rot during storage** — Patulin production in stored apples can be caused by core rot that is not visible by observation of the exterior of the apple. Lots of apples that develop core rot may be identified by cutting and cross-sectional examination. Eliminating lots of apples with high levels of core rot from the juice production stream will reduce patulin levels in the juice.
• **Culling or trimming apples prior to juice production** — Growth of patulin producing molds is evidenced frequently by the appearance of visible mycelia (fungi filaments) or rot on the apple. Culling or trimming apples just prior to juice production to eliminate damaged, bruised, moldy, and rotting apples will reduce patulin levels in the juice.

Not all apples are equally affected by these factors. Recently published research indicates that different apple varieties (for example, Red Rome, Granny Smith, and Red Delicious) may differ in how patulin levels in their juices are affected by factors such as whether fallen fruit is used or whether apples are culled prior to juice production.

There are many good reference articles on how to develop an apple management program to reduce the likelihood of patulin in cider or juice. Several articles have been presented in past editions of the Orchard Network News. For additional information on material presented in this article, please contact the Food Inspection Branch or refer to:

OMAFRA Fact Sheet: Patulin- A Chemical Concern for Apple Producers and Processors
http://www.омаfra.gov.on.ca/english/crops/facts/04-043.htm

U.S. Juice HACCP Guidance Document
http://www.cfsan.fda.gov/~dms/juicgu10.html

Code of Practice for the Prevention and Reduction of Patulin Contamination in Apple Juice and Apple Juice Ingredients in Other Beverages
http://www.codexalimentarius.net/download/standards/405/CXC_050e.pdf

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**Removing Orchards? Be Aware of Herbicide Residues**

*Leslie Huffman, Weed Management Specialist (Horticultural Crops), OMAFRA, Harrow*

Apple growers may be planning to remove orchards, and need to consider the risk of carryover herbicides that may harm subsequent crops. Of particular interest are these commonly used apple herbicides:
- simazine (Princep, Simadex, Simazine)
- terbacil (Sinbar)
- diclofenil (Casoron)
- napropamide (Devrinol) (mostly of concern for cover or cereal crops)
- clopyralid (Lontrel) (mostly of concern for vegetables and soybeans)

Most other soil applied herbicides (Dual II Magnum, Treflan, Sencor, Lorox, Kerb) would likely be degraded in a year, when applied at labeled rates.

Here are some general factors that affect the amount of residue:
- rate applied – lower rates cause less problems
- length of time since application – best to avoid applications in the year of removal, although some products may persist for several years
- soil pH – prefer 6.0 to 7.2 to promote herbicide degradation
- soil organic matter – higher OM encourages microbial activity and breakdown
- soil moisture – more herbicide degradation with good moisture, but saturated soil may also reduce activity
- soil management after removal (see tips below)

If you suspect your site may have herbicide residue problems, a chemical analysis may indicate if problems are present. However, the test is specific for each herbicide, and may be expensive. Contact the Pest Diagnostic Clinic www.labservices.uoguelph.ca/units/pdc/ about test availability and prices.

A greenhouse bioassay may give some helpful information, although the results may be difficult to interpret. Sample soil where the herbicide was applied e.g. under trees/vines and/or where overlap may have occurred. Include a sample of soil with no known herbicide residues for comparison. Grow at least four test crops – tomatoes, cucumbers, oats, lettuce or sugar beets may be sensitive. Allow at least 4-6 weeks for complete results. If injury is present, future cropping may be affected. However, this test is not a guarantee that no problems will result in future crops.

A few cultural tips to reduce problems with herbicide residues:
- Plowing may dilute the residue through a greater volume of soil – although avoid creating a zone of concentrated herbicide where future roots grow. Adjust the plough for a good shear with mixing action.
- Adjust soil pH to a more neutral level (pH of 6.0 to 7.2 is preferred).
- Improve organic matter by cover crops, mulch, manure, etc.
- Avoid application of any long-residual herbicides at least one, and preferably 2 years before removal of planting if possible.
• Note the location of tree rows to avoid in future plantings. If possible, changing row alignment (e.g. N-S to E-W) may be helpful although sunlight interception needs to be considered.

• Avoid high value crops in the year after removing. Cover crops may also be injured but can still be beneficial in renovating old orchard sites.

Efficient Orchard Management

John Gardner, Apple Specialist, OMAFRA, London

Anyone in the world can design a complicated and costly planting system but it does take some genius and years of experience to simplify what appears to be very complex. I would like to summarize some of the information presented by Dr. Terence Robinson of Cornell University in his second talk in the Apple Program at the Ontario Fruit and Vegetable Conference held this past February in Niagara.

Dr. Robinson quickly reviewed cost factors in apple growing. Everyone in the apple business is well aware of the cost increases they have been dealt in the last few years. By this, we are talking about labour, fuel, fertilizer and the like. Added to this is the reality that requirements are increasing for fruit quality, as are establishment costs and the general competitive nature of the business. So how do we combat this?

According to Terence, yield plays a huge role in combating and making the expense work for you. All the better if that yield is with a good price. Fruit that is returning $4.50/bu will not be profitable in any system of growing. As a starting point we want at least a 50 tonne/ha or 50 bin per acre yield on a sustained basis. Terence explained that the sooner we capture 70% of incoming sunlight the better and this is best achieved with plantings that are considered to be higher density as you would find in a tall spindle setup where trees are set out at around 1200 per acre.

It goes without saying that a moderately dense orchard of a higher paying cultivar is as good as a higher density planting with a poor paying cultivar. One of the keys to making this whole thing work is the way in which the feathered nursery tree performs immediately after planting.

The performance of the canopy of newly planted feathered trees is integrally related to the performance of the root system. With this in mind both irrigation and fertigation can have huge roles to play.

Newly planted trees are living pretty much on stored nitrogen. Experimental work has revealed that trees in years 1-3 can perform 50% better when treated with both water and nutrients in a fertigation system when compared to no irrigation at all. Feathered trees will struggle without irrigation being used within 2 weeks of planting if rainfall is insufficient. The nutrients that are commonly fed through the irrigation system include nitrogen and potassium, which are the two nutrients in most demand by apples.

In looking at bearing trees, each vertical meter should have a minimum of six generative shoots ready to bear. In economic terms, if you plant a high price variety and achieve a yield of 500 bushels in the second year, this is better than cost cutting on a lower priced cultivar in a low density system.

Certain economies can be achieved by growing your own trees if you can, according to Terence. The tall spindle system goes as far as it can before you leave the realm of “moderation of investment”. Furthermore, if you could grow your own “locust” posts by establishing an agroforestry type plantation this would further moderate the investment as some growers have done and are looking at in New York State.

Using a single wire in combination with conduit pipe starts to get really costly when you increase your planting density greater than you would typically see in the tall spindle system.

One of the outstanding differences between the tall spindle and modified central leader plantings, which are commonly freestanding, is the cost of management. By changing the tree’s shape to the tall spindle, we can potentially save ½ the costs for operations like pruning. Indeed if you incorporate mobile platform operations, you need a simple looking tree. The platforms will further reduce cost of management by an estimated 30%, according to Terence.

My observation with pruning the tall spindle is that a worker could be trained to simply go through the planting and remove the 2 or 3 largest limbs at point of origin or just take everything off that is greater than 2 cm in diameter at point of origin on the trunk without extensive training or knowledge of pruning and training practices.
In concluding his talk, Terence gave the group some insight into mechanization. He felt that partial mechanization with platforms working in a block with narrow-walled tree rows could work.

The idea of complete robotics, where an arm reaches out and a mechanical hand plucks an apple off the tree could lead to too much bruising and would be prohibitively costly for the average grower. These machines based on robotic arms and hands could easily be $500,000 each.

In closing out the talk Terence emphasized that reducing costs in an established block might not be nearly as good as newer plantings of better priced varieties. All of this information was backed up by 20 years of research work in New York State. The Conference proceedings are available and include Terence’s talks in a PowerPoint format.

**Postharvest**

**Free Poster of Apple Storage Disorders**

To celebrate “25 years of Innovation”, Storage Control Systems Inc. (Sparta, Michigan) collaborated with Jennifer DeEll (OMAFRA) to create a poster on Storage disorders of apples. These are being distributed world-wide. Anyone wishing a copy, please contact Jennifer at Jennifer.DeEll@ontario.ca or Jim Schaefer at Jim@storecontrol.com

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**Harvest Watch™ — A Type of Dynamic Controlled Atmosphere**

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

Dynamic controlled atmosphere (DCA) storage uses technology that involves monitoring the responses of fruit to low oxygen. Fruit responses can be detected by measuring metabolic processes, such as ethanol production, fruit respiration, or chlorophyll fluorescence.

HarvestWatch is a fluorescence-based DCA technology, which has been marketed by Satlantic Inc. (Nova Scotia) for several years. Recently, however, the South African company Gas At Site Inc. became the license holder for this technology in North America. With this, there seems to be a resurgence of interest and questions about the HarvestWatch technology.

Chlorophyll fluorescence can be used to measure stress in apple fruit, such as that from low oxygen or high CO₂ atmospheres (DeEll et al., 1995). HarvestWatch monitors these fluorescence changes and indicates when the fruit is under low oxygen stress during storage (DeLong et al., 2004). The monitors (fluorescence interactive response monitor, FIRM™) used by the HarvestWatch system are connected to a computer control system and the operator adjusts oxygen levels in response to any fluctuations in the fluorescence signals. As such, more operator training is required than that for a traditional CA, in order to interpret the fluorescence information. It is recommended that a buffer of ~0.2% oxygen be added to the level of at which fluorescence changes in order to provide a safety margin against injury (Watkins, 2008).

There is limited literature investigating the fruit quality benefits from using HarvestWatch and most involves comparison to standard CA regimes (not less than 1.5% O₂). DeLong et al. (2004) evaluated several apple cultivars, comparing the use of HarvestWatch (<1% oxygen) and static CA at 1.5% oxygen. For the longest storage durations, there was no significant difference in the firmness of ‘Delicious’ (9 months) or ‘Honeycrisp’ (6 months) apples, while ‘McIntosh’ (8 months) and ‘Golden Delicious’ (9 months) were ~1 lb firmer using HarvestWatch. Other studies have shown a reduction in superficial scald incidence with HarvestWatch, such as 8 vs 17% (in standard CA) in ‘Delicious’ and 31 vs 79% in ‘Cortland’ (DeLong et
British Columbia has had extensive commercial experience using 0.5-0.7% or 1-1.2% oxygen on various apple cultivars since 1989 without any CA-induced fruit injury. After substantial testing of HarvestWatch, it was concluded there that inclusion of the system to commercial CA rooms was not justified due to the equipment cost and no additional low-oxygen benefit. Most importantly, any fruit loss under a commercial setting was to be the sole responsibility of the end-user and not the distributor of HarvestWatch, and thus the packinghouse management / CA operators were not willing to risk their fruit pushing the low limit of oxygen for little added benefit (Lau, personal communication).

The use of HarvestWatch is limited to storage operations that have high quality CA rooms with adequate air-tightness, as well as accurate gas control systems to maintain oxygen levels below 1%. These are also the same commercial factors that limit the use of known safe low oxygen regimes (0.7-1.5%) for certain apple cultivars.

Each HarvestWatch sensor monitors only six apples, so the variability in fruit behaviour within that storage room must be considered. It is well known that there are major differences in the minimal acceptable oxygen level among apple cultivars, growing seasons, and orchard blocks. Watkins (2008) concluded that there has been insufficient work in New York to show whether the variability among orchard blocks typical of our growing region will permit the safe adoption of HarvestWatch technology.

HarvestWatch is one type of DCA technology that is being marketed commercially. However, it is not the only way to utilize lower oxygen levels or programmable CA storage. The use of low oxygen by measuring the alcohol content of apples and adjusting the oxygen level accordingly is being promoted by an Italian company (Schaefer, personal communication). Others are simply using combinations of ultra-low oxygen (<1%) storage and initial low oxygen stress (~0.5%) to eliminate the use of postharvest chemicals. Research in Ontario and Québec has shown that programmed CA regimes with sequential reductions in oxygen and/or temperature can increase firmness retention (+3.6 lb) and reduce incidence of storage disorders (0 vs. 25-32%) in apples (Lévésque et al., 2006).

Whatever you choose, always be sure to evaluate the risk to your fruit in addition to the economics and potential benefits of the technology. A thorough risk-benefit analysis of any new technology is more likely to result in a better investment decision.

Literature Cited


Preharvest Sprayable 1-MCP (Harvista™) Influences Postharvest Behavior of Apples

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

Preharvest sprayable formulations of 1-MCP technology are currently being developed by AgroFresh Inc. Harvista™ appears promising for use on tree fruit and has already received registration in some South American countries. Research results during the past few years in Ontario indicate that Harvista can substantially reduce fruit drop in apple and pear orchards, as well as provide some fruit quality benefits (DeEll et al., 2005+).

In August 2007, Harvista was applied to mature ‘McIntosh’ apple trees 7 and 3 days prior to anticipated optimum harvest. Spray treatments included 60 or 120 g of 1-MCP per acre with 1% oil and 0.05% surfactant. All sprayed and non-sprayed apples were also treated postharvest with or without gaseous SmartFresh™ (1-MCP, 1 ppm for 24 hours at 3°C). Fruit were stored at 0.5°C for 4 months and then assessed for quality during 1-week at 20°C.
There was little effect of Harvista spray on fruit maturity at optimum harvest. However, if sprayed fruit remained on the trees for an additional 11 days, apples had lower internal ethylene concentration, compared to non-sprayed controls. ‘McIntosh’ apples sprayed preharvest with Harvista were firmer (+1 lb) and had lower internal ethylene concentration after 4 months cold storage. However, these effects were less evident in apples sprayed 7 days prior to harvest, compared to those sprayed 3 days before, and the effects were lost after 7 days at 20°C. It is worth noting that in previous work there were greater benefits on later and harder apple cultivars, i.e. ‘Empire’ and ‘Delicious’.

‘McIntosh’ apples treated postharvest with Smart-Fresh, regardless of Harvista application, exhibited the lowest internal ethylene (<80 ppm) and greatest firmness (10.3-11.7 lb) and acidity retention after storage. Overall, it appears that preharvest Harvista sprays offer short-term control of ‘McIntosh’ fruit maturity, while postharvest gaseous SmartFresh treatments provide superior fruit quality benefits during storage.

Postharvest Treatment of ‘Empire’ Apples Influences Quality of Fresh-Cut Slices

Jennifer DeEll (Fresh Market Quality Program Lead) and Behrouz Ehsani-Moghaddam (Research Assistant), OMAFRA, Simcoe; and Peter Toivonen, AAFC – Summerland, BC

One of the major cultivars used for apple slices is ‘Empire’. Several practices can affect whole fruit quality during long-term storage and consequently influence slice quality. ‘Empire’ apples sprayed with and without ReTain (label rate) were harvested twice (1 week apart) from a mature commercial orchard. Fruit were of optimum maturity for long-term storage. Half of the apples from each treatment were drenched with diphenylamine (DPA, ~900 ppm) and Mertect (label rate). All fruit were cooled overnight to 3°C and then half of the apples from each treatment combination were treated with SmartFresh (1-MCP, 1 ppm for 24 hours). Apples were held in controlled atmosphere (CA) storage (2.5% O₂ + 2% CO₂) at 0.5 and 3°C.

After CA storage, ‘Empire’ fruit remained in ambient air at 0.5 or 3°C for 2 or 7 days. Ten marketable apples per treatment combination were then removed from cold storage, rinsed in tap water, and sliced within 1 hour. After cutting, the slices were rinsed in running tap water, dipped in Nature Seal (label rate for 2 min), and then rinsed again in tap water, drained of excess water, and sealed in PD-900 bags (Cyrovac). Bagged slices from apples held in CA storage for 6 or 9 months were held at 3°C for 30 or 21 days, respectively. Slices were then assessed for browning and decay. After 6 months of storage, apple slices made from the second harvest had substantially more decay than those from the first harvest. Apples treated with 1-MCP also had slightly more slice decay.

ReTain and DPA had no significant effects on slice browning. After 9 months of storage, apples from the second harvest could not be used for slices because of internal/flesh browning. At this time, slices from 1-MCP-treated fruit from the first harvest had much less browning than those not treated. Similarly, slices made from DPA-treated apples exhibited less decay and better quality ratings. Consistently throughout the study, slices from apples held for 7 days in ambient air prior to slicing had less browning than those held for 2 days. Hence, a few days of holding apples in refrigerated ambient air after CA storage improves slice quality.

Photo 1: ‘Empire’ apples at the time of slicing.
Crop Protection

Key Issues for Managing Apple Scab in 2008

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

Even if your crop did not have significant scab at harvest, it is still possible to have a high inoculum load for the following spring. This is because the fungus that causes apple scab, Venturia inaequalis, continues to develop in the leaves after harvest if the postharvest period is warm and wet, resulting in inoculum build up for the following spring. At the Ontario Fruit and Vegetable Convention (OFVC), Cathy McKay, a grower/consultant from Nature’s Bounty, showed that, from the Ontario perspective, we have been seeing an increase in apple scab in recent years. Harvest assessments from the Northumberland Durham apple growers show that the amount of scab in orchards and the number of orchard blocks infected with scab at harvest have been increasing in recent years. We have also seen this trend across the province, to the extent that scab was even a problem last year in several orchards, despite the hot, dry conditions, which were not conducive to the spread of the disease. So what do growers need to remember when developing a scab management program in 2008?

Fungicide resistance

Resistance is not a concern for mancozeb, polyram, captan, ferbam, thiram, sulphur or copper. For all other apple fungicides (Nova, Nustar, Sovran, Flint, Scala) resistance has already developed or can be expected to develop. New York and Michigan have documented resistance to sterol inhibitors (SI’s) such as Nustar and Nova. Research conducted by Dr. Wolfram Koeller of Cornell University estimates that resistance to SI’s can occur after approximately 60 applications. This assumes label rates, complete coverage and no extended spray intervals. If any of these are compromised, so is the “life” of the fungicide. There is also some evidence that shows that resistance to strobilurins such as Sovran and Flint is developing in some areas. Research conducted by Dr. Wendy McFadden-Smith in 2006-2007 in Ontario found that SI resistance is starting to appear in a few Ontario orchards that have been reporting field failures in managing apple scab. Unfortunately resistance in apple scab is not reversible and the resistance to fungicides lasts forever. To prevent the development of fungicide resistance never use fungicides as eradicants, it is better to apply products preventatively. If you do get caught with an infection period, go in as soon as possible after infection: do not rely on 96-hr kick-back activity. If scab appears in your orchard, do not try to "burn it out" as that strategy will only encourage the development of scab resistance. Instead rely on the use of protectants to prevent the spread of the disease. Always use a ½ rate EBDC fungicide with SI insecticides, and do not use SI’s before tight cluster or after fruit are present on the tree.

Fungicide timing

While the majority of ascospores are released during bloom, some are present and ready to infect green tissue as soon as it emerges. Dr. David Rosenberger of the Hudson Valley Lab, Cornell University, has shown that the risk of economic loss from a scab control failure is highest at green tip. These green tip infections produce conidia at bloom when the fruit and leaves are the most susceptible to scab. If leaves and fruit are infected early in the season, there are more scab generations of scab before the summer heat shuts down the scab epidemic, resulting in increased damage to the crop. Early season scab infections (blossoms, and leaves) often cause secondary infections on fruit. As a result the crop should be covered from silver tip or green tip. In New York a green tip copper spray is considered to be just as good as a mancozeb spray (3.5 kg/ha). During or after half-inch green mancozeb-captan combinations are frequently used (avoid using captan where oil has been used) at a rate of 3.5 kg/ha mancozeb plus 1 to 2 kg/ha captan/ Maestro. The rationale behind this is that mancozeb has better rententiveness and rain-fastness than does captan. However, by virtue of that characteristic, captan may redistribute better to newly expanding leaves. In a very heavy rain, captan may disappear more quickly than mancozeb, whereas in repeated light rains the captan may provide better protection of new leaves via redistribution.

Alternate row spraying

Growers will often chose to use alternate row middle spraying as a means to reduce spray time early in the growing season. Skipping alternate rows will lead to a reduced degree of coverage but more rapid treatment of the orchard. In this case, spray the skipped middles as soon as possible after completing the first spray. Be wary of alternate row
spraying on an extended interval. For good resistance management, it is imperative that all leaves be protected every 7 days. If you have been experiencing problems with scab control, it is a good idea to spray every row to ensure good coverage and protection from early-season infections. Do not use alternate row spraying for SI's or strobilurins.

High inoculum orchards
Another important component of managing scab is reducing primary inoculum. In research trials conducted by Dr. Bill MacHardy’s lab at the University of New Hampshire, urea (45 kg of agricultural urea per 1000 L of water/ha) was applied to the orchard floor after about 95% of the leaves had fallen (November) or in the spring (April) before bud break. The urea works in two ways: it directly inhibits the development of ascospores and it stimulates the growth of naturally occurring organisms that are antagonistic against V. inaequalis. Both treatments reduced the number of ascospores, but the spring treatment was more effective and resulted in fewer leaf and fruit infections in most years. In the years when it did not work, the snow cover remained almost until bud break so there was not a lot of time for the urea to work.

Some growers have expressed concerns about applying N to trees as they are going into dormancy. Dr. Wendy McFadden-Smith did a trial in which shoots from trees treated sprayed with urea in late October and those that were not treated were frozen to temperatures as low as -40 C in a freezer. There was no difference in the cold-hardiness of buds from trees treated with urea. Donna Speranzini, Nutrient Management Planning Specialist with OMAFRA, also does not think that this small amount of N will cause excessive growth.

In summary, the best way of managing scab in your orchard is to prevent infection in the first place.
- Use urea ground sprays to reduce inoculum in orchards with high scab pressure.
- Start your spray program no later than green tip.
- Use SI (Nova, Nustar) and strobilurins (Flint, Sovran) conservatively -- no more than 2 sprays per group per year.
- Do not rely on post infection spraying
- Use full label rates and get complete coverage.
- Maintain tight spray intervals from green tip through petal fall.

Early Season Pests of Apple
Kathryn Carter, Pome Fruit IPM Specialist, OMAFRA, Simcoe

As I look out my window at the mounds of snow it is hard to consider that spring is right around the corner. But with the coming spring, will return the early season pests of apple. Most of these early season pests are not major pests, and can be easily controlled in orchards. However, monitoring, timing and choice of control measures can play important roles in managing all of these pests.

Rosy Apple Aphid (RAA)
Rosy apple aphids emerge in apple orchards from pink through early summer. RAA nymphs range in size from 0.4 to 2.0 mm and they are purple in colour and have dark cornicles. Adults can be winged or wingless. Adults feed on leaves causing them to curl and turn red in colour. Feeding stunts the growth of shoots and causes malformation on leaves and fruit. RAA exudes a honeydew that favors the growth of mold. Last year we saw high populations of rosy apple aphids in orchards earlier in the season then we usually see them. Growers should be aware of this pest and start monitoring for it starting at tight cluster to pink. Cool wet springs are favourable for RAA since the weather is harmful to the parasites and predators that attack them. Elimination of summer hosts of RAA such as narrow leaved plantain and dock can help minimize pest pressure. Lots of great products are available that have efficacy against RAA including Assail, Admire, and the application of Calypso to control other pests will also control RAA. Movento, a new insecticide that is pending registration also has activity on RAA.

Gypsy Moth
Last year we saw an increase in gypsy moth populations in orchards early in the season, and reports suggest that this year will be another excellent year for this pest. Gypsy moth larvae are black with a yellow head and long hairs with tubercles on their back. Larvae attack most species of deciduous trees. While Gypsy moths are not considered to be a major pest of apples, they can defoliate young trees. Small larvae are often blown into orchards from adjacent woodlots. Target specific insecticides such as Dipel/Foray (Bt insecticides) can be used to manage this pest. Post-bloom application of broad spectrum insecticides (Imidan) also provide subsequent control of gypsy moth larvae.
Spotted Tentiform Leafminer (TLM)
Although spotted tentiform leafminer was a considerable pest in apple orchards in the past, its prevalence in orchards has decreased greatly over the years. There are several good products available to manage this pest, and often the application of insecticides at petal fall to control other pests such as oriental fruit moth and obliquebanded leafroller also provide subsequent control of tentiform leafminers (Intrepid/Confirm, Altacor). Neonicotinoids such as Calypso and Assail are also effective in managing TLM. As a result the use of a “pyrethroid at pink to manage tentiform leafminer” is no longer necessary.

San Jose Scale (SJS)
In recent years there has been an increase in damage from San Jose Scale on fruit at harvest. Until this year we have only had access to the use of dormant oils to manage scale, but the registration in the near future of Movento will provide growers with an excellent tool for managing scale. There are two generations of SJS each year. Adult male scales usually start emerging in May through mid-June, the second generation of SJS emerges from early August through September. In orchards with a history of SJS problems a dormant oil should be used, and where necessary, Movento should be applied mid-June and/or mid-August targeting crawlers before they mate.

Powdery Mildew (PM)
As our summers become more hot and humid it is likely that we may see an increase in powdery mildew in apple orchards in the upcoming years. Often growers spend a lot of time focusing their disease management on apple scab and may forget about protecting themselves from powdery mildew. In orchards with a history of SJS problems a dormant oil should be used, and where necessary, Movento should be applied mid-June and/or mid-August targeting crawlers before they mate.

Black Rot
In recent years OMAFRA staff have seen an increase in damage from black rot in Ontario orchards. As John Gardner puts it “some growers probably have black rot, but are not even aware of what it is.” Black rot causes many different types of symptoms on trees. Symptoms on leaves are called frog eye leafspot. Lesions on leaves first appear as small purple spots. As the spots enlarge the centre turns tan color, surrounded by a purple border. Heavy infections of frog eye leaf spot can cause leaves to turn yellow and drop prematurely. Black rot symptoms on tree trunks and limbs appear as cankers, which first appear red brown in colour and slightly sunken. The following year the canker becomes black with the bark peeled off. The black rot fungus can also cause small black spots on the fruit. These spots gradually enlarge to form concentric brown rings on the fruit. Infections of black rot on fruit that occur during the 4 to 6 week period following petal fall often result in a calyx end rot, however secondary infections can occur throughout the summer. If black rot has been a problem in an orchard, growers should apply applications of fungicides (high rates of Captan, Maestro, Flint and Sovran applied for scab also control black rot) at Pink and again at petal fall. Some varieties such as Gala, Honeycrisp and Sunrise are all susceptible to black rot.

New IPM & Growth Regulator Products for Apples in 2008
Kathryn Carter, Pome Fruit IPM Specialist, OMAFRA, Simcoe

Kanemite® (acquinocyl):
A new miticide registered for managing European red mite and two-spotted spider mite. This miticide is active against all life stages (eggs, nymphs, adults). This product provides rapid knockdown of mite populations. It should be applied when there are 3-5 mites/leaf. This miticide inhibits electron transport in the mitochondria blocking cellular respiration (group 20B). It has a novel mode of action thus can be used as a rotational product to help manage mite resistance. Activity occurs primarily by contact and secondarily by ingestion. It is considered to have a 6-8 week residual control due to its activity on all life stages. As with other miticides, coverage is essential for efficacy. Only apply a single miticide each year, then rotate to a product with a different mode of action and rotate between different chemistries. PHI=14 days, REI=12 hours.

Delegate® (spinetoram):
This is a chemically modified “new and improved Success insecticide.” It is in the same chemical family as Success (Group 5) and should be rotated
accordingly. Delegate affects the nervous system of the insect and acts by ingestion (primarily) and contact (secondary) providing quick knockdown and residual. It is active against many insect growth stages. Delegate has translaminar activity. It has a longer residual (14 days+) and is a more broad spectrum insecticide then Success (spinosad) with a significantly longer residual. Delegate provides control of codling moth, oriental fruit moth, obliquebanded leafrollers, and spotted tentiform leafminers, along with suppression of apple maggot and plum curculio in pome fruit (apple and pear). As with Success the spray solution pH can affect the performance of Delegate so a pH of 6-8 is preferred for optimal performance. Apply Delegate when the threshold is reached (similar timing to Success for OBLR), and same timing as Calypso and Assail for codling moth and oriental fruit moth. PHI=7 days for pome fruit, REI=12 hours.

Altacor® (rynaxypyr):
This insecticide is not registered yet, but will hopefully be available to growers April/May 2008. It is a new chemical class (group 28) insecticide that affects the ryanodine receptors of insects. These receptors play a critical role in muscle function. Insects treated with this product rapidly stop feeding, are lethargic, experience muscle paralysis and ultimately die. This product has translaminar activity, and is active via ingestion (primary) and contact (secondary). Altacor will be registered for codling moth, oriental fruit moth, spotted tentiform leafminer, obliquebanded leafroller in pome fruit (apple and pear). The registration for this product will be a global registration, and as a result this product will be available to growers in the US, Canada and Europe at the same time. Apply Altacor when thresholds are reached. Altacor has a 14+ day residual in pome fruit. PHI=14 days, REI=12 hours.

Movento® (spirotetramat):
This insecticide is not registered yet, but registration is anticipated for spring (May) 2008. Movento is a lipid biosynthesis inhibitor (Group 23) that is active when ingested by immature insects that feed on treated plants. It also reduces the ability of females to reproduce, and decreases the survival of their offspring. The product is systemic and moves up and down through the entire plant (shoots, leaves and roots). It re-distributes to new growth, however, there is no movement to old growth. Research suggests that this product has excellent activity against rosy apple aphids, woolly apple aphid (WAA), green apple aphid, and San Jose scale. This product also has activity against pear psylla. The residual of the product depends on the amount of leaf tissue; the more leaf growth present, the longer the residual of the product. The product is considered to have a slow initial effect, but relatively long residual effect. As with other products for aphids (especially WAA) coverage is essential. It is also important to target WAA before they are covered by the waxy white protective coating. Use of a non-ionic adjuvant (Agral 90, Activate plus, Ag Surf and LI 700) adjuvant is required for this product, since it helps get the product into the plants. This will be the first product in a long time to be registered for scale. In orchards with scale, Movento can be applied in mid-June and mid-August to target crawlers before they mate. PHI=7 days, REI=12 hours.

Maxcel®:
Maxcel is a post bloom thinning and fruit sizing product that has been registered in Canada and is available for use during the 2008 growing season. The only active ingredient in Maxcel is 6BA. Unlike Accel, it contains no gibberellins. Maxcel is registered with a much higher upper limit of allowable concentration of the Cytokinin BA in the spray solution. The highest concentration of BA in Accel treatment that we can apply is 75 ppm (4 litres product per 1000 litres water) and a maximum of 4 liters of Accel per hectare. Maxcel has the potential to be more useful for hard to thin cultivars like Fuji, Golden Delicious, and Royal Gala. The maximum concentration of BA on the label of Maxcel is set at 200 ppm. While this is the upper limit of concentration of BA in a Maxcel treatment, experience has shown that thinning results with hard to thin cultivars in Ontario can be quite satisfactory with a concentration of 100 – 150 ppm of BA alone or 75-100 ppm BA in combination with Carbaryl ( see article by Dr. John Cline in the Orchard Management Section of this newsletter). Table 2 in the article by John Cline gives you the amount of Maxcel per 1000 Litres that will give you the desired concentration of BA. Typically, thinning sprays do require adequate water volumes to wet the tree canopy. As with most growth regulators, effects are only as good as the distribution uniformity of the spray.

Other new products/Uses in publication 360
The expected date for circulation of publication 360 is mid-March 2008. Many of the products listed above will not be listed in publication 360, since they
were registered after our submission review in November. The committee that reviews publications for pub 360 will be reviewing new submissions, and any new products that are accepted will be posted on an electronic supplement that is available on the OMAFRA website. If you have any questions about the post-publication additions you can contact me at 519-426-4322 or kathryn.carter@ontario.ca. A few of the new additions to publication 360 are the listings of Diazinon for control of Woolly apple aphid and Imidan for controlling Japanese beetle. Scholar was also added as a postharvest treatment for blue mold and grey mold in apple.

Announcements

Opportunity for Ontario Growers:
“Real Farmers, Real Local!”
The MyMarket, Certified Farmers’ Market Opportunity

In 2007, Farmers’ Markets Ontario (FMO) introduced MyMarket, a certified farmers’ market concept that offers Ontario producers easy access to an urban, diverse marketplace and a level playing field, where resellers are not permitted.

That’s a first in Canada! Featuring real farmers, selling only what they produce. Join close to 40 Ontario farmers selling their best fruits and vegetables. MyMarket is committed to helping consumers enjoy the benefits of eating local as well as supporting farmers from the Greenbelt and surrounding counties. Join in the 2008 season with plenty of fun, entertainment and fresh, local products!

Our first market at the Liberty Village location (near the CNE) was very successful. A roster of farmers with quality products in abundance; advertising and Special Events; regular music at market and attention to detail paid off and we quickly developed an appreciative and loyal shopper base who convinced us to extend our season for two weeks into November. They are now asking when we will return in 2008.

In 2008, we will be opening at least 3 new locations in the Greater Toronto Area (GTA), in addition to our Liberty Village operation.

Liberty Village BIA (Green P)
North of CNE
Sunday morning – 9 am to 2 pm
Opening June 1

University Avenue (Off Street)
Just South of Queen’s Park
Tuesday morning – 9 am to 2 pm
Opening June 3

Bloor/Spadina Neighbourhoods (Green P)
Near Honest Ed’s
Wednesday afternoon – 3 to 7 pm
Opening June 4

East Lynn Park (Park)
East Danforth & Woodbine
Thursday afternoon – 3 to 7 pm
Opening June 5

We are committed to working with and for the “real thing”. We certify growers that grow their own fresh/unprocessed fruit, vegetables, cut flowers, plants and nuts; honey and maple syrup; shell eggs; meat (fresh and frozen); fish (fresh and frozen); herbs; mushrooms; produce on-farm value added products, and off-farm value added products (where the 1st ingredient, or minimum 51% of product by weight prior to processing, is grown and/or produced on farm by you).

If you fit the bill and want to access the Toronto marketplace and sell your produce at fair, retail prices then consider joining the MyMarket program in 2008!

To find out more about how your business can benefit from joining the MyMarket family, please contact Bernie Solymár at 519-426-7124 or solymar@nornet.on.ca

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