Crop Stage
Terminal buds are still setting. There has been secondary growth reported in southwestern Ontario.

Production
Apple hand-thinning is ongoing. Please make sure to pay attention to restricted entry intervals as they may be different for hand thinning.

International Fruit Tree Association Study Tour Part 1
Grand Rapids area of Michigan

Michigan has an annual apple production of 23 to 25 million bushels (approximately 3X more than Ontario) with a farm value of $220 million (2X more than Ontario). This tour included the “Ridge” area (20 000 acres of apples) and Belding area (2000 acres of apples). These two areas make 80% of the fresh market apples in Michigan and boast the highest concentration of on-the-farm apple storages of the world. On this tour, we got to see many different training systems of growing apple, peach and cherry trees where growers weren’t afraid to try new techniques. The co-ordinators of the tour did a great job of providing a variety of topics that were discussed at each stop. Quite a number of growers were growing managed varieties of EverCrisp™, Smitten™ and SweeTango™. The ‘Honeycrisp’ strains of Premier™ and Royal Red™ and the Brookfield™ Gala were also popular plantings.

The planting systems that we viewed included tall spindle, multi-leaders and V-systems. Tall spindle orchards were planted 2.75 ft to 5 ft apart within the row, 11- 14 ft row spacing, many of the tall spindle orchards were moving towards a fruiting wall and using a hedger to maintain the shape or “box” at dormant and summer pruning.

In the multi-leader systems we saw some established plantings of bi-axis and two leader trees and new plantings of 2, 3, 8 and 10 leader systems. Only 2 rows had the 8 to 10 leader systems in the one orchard on a trial basis. At one orchard the 3 leader spacing was 1 leader/ft (Figure 1) at another orchard the 3 leader system was planted at 5-6 ft/ trunk. In the 8 to 10 leader systems, leaders were spaced tighter, about every 6 inches (Figure 2). The 10 leader system had alternate leaders spread out in a V perpendicular to the row. The one grower had the young multi-leader trees planted as ‘Honeycrisp’ on G 935. These growers were inspired to plant these systems when they had seen multi-leader systems
while travelling to Italy or listened to a presentation from Italy at a past IFTA conference. Trying to maintain equal vigour wasn’t as big of a concern as getting the leaders to the top wire. Once at the top wire vigour would be managed by cropping the strong leaders or scoring them.

The established two leader systems were either a bi-axis tree, where two buds were grafted onto one rootstock (Figure 3) or trained using a heading cut and training up two leaders. These were planted at a 4 X 14 ft spacing.

A V-trellis was planted extensively at one orchard where they had 220 acres of newly-planted orchard of this system (Figure 4). Trees were spaced 2 ft apart (4 ft spacing on each side of the trellis). Trellises were spaced 12 ft apart at the base. The section that we saw was ‘Honeycrisp’ planted on M 9 Nic 29. On the trellises they used 7 wires, evenly spaced on each side of the trellis and the posts were steel. To ensure the leader gets to the top wire, they removed all of their flowers in the second year and in the third year
they only removed the flowers above the third wire and kept 15 – 20 apples per tree below the third wire. They would tie branches to every wire with the goal of filling the trellis space quickly. The cost to establish the V-trellis system was $27 000-$30 000. This can be broken down to $10/tree, $2000/ acre for irrigation, $2000/ acre for excavation and trellis installation, $3000/ acre for planting and training.

![Figure 4: ‘Honeycrisp’ planted on a V-trellis at Riveridge Land Company](image)

Stay tuned for the next updates when I will discuss the research projects, new technology, weather mitigation, tree training and crop load management discussed on the tour.

**Pests**

Overall, pest activity has remained relatively quiet since the last update.

**Bitter rot** lesions have begun to develop in several orchards across the province. The initial fruit infections are appearing as small brown spots - with or without a red halo - that quickly enlarge into sunken lesions (Figure 5). A diagnostic V-shaped rot may progress towards the core (Figure 6), but this does not always occur and may not be the most reliable symptom for disease diagnosis.

During humid conditions, cream to salmon-coloured masses of spores are produced on the surface of more advanced rotting fruit which is very diagnostic. These spores can then be rain splashed to other fruit resulting in further infections. If the spores land on fruit just before or during harvest, small lesions will develop slowly while in cold storage.

In periods of high heat and humidity followed by a rain storm, there is the risk of bitter rot infection. While Allegro (PHI 28 days), Pristine (PHI 5 days) and Granuflo T (PHI 28 days) are registered for control of bitter rot, some other scab fungicides may also provide protection. Summer applications should be made every 10-14 days if there is a history of rot in the orchard, but shortened to 7 days if frequent rain is experienced. If possible, time an effective fungicide application just prior to a rain to prevent fruit from rain-splashed spores. Always rotate products to reduce the potential for resistance development.
**Apple maggot** trap catch continues, including females on red spheres in some areas. Emergence has been low considering the water-logged, loose soils providing good conditions for development. Nonetheless, they are now flying and since there is zero tolerance for fruit infestation from this pest, controls are needed. Many growers make use of an Imidan border spray at this point in the year when the longer re-entry restrictions won’t interfere as much with work that needs to be done. Border sprays are not recommended for other registered apple maggot products.

John Wise from Michigan State University posted a recent [summary table](#) of the characteristics of apple maggot products. Table 1 below has been adapted for Ontario growers. Organophosphates (Imidan) and neonicotinoids (Assail, Calypso) are the only insecticide groups that have activity on the adults as well as a curative effect on the eggs and larvae due to their ability to penetrate into the flesh of the fruit.

Orchards that still have not seen terminal set or are experiencing secondary growth may be noticing more **apple leafcurling midge** damage on the newest leaves. While pressure is still lower than previous years, this second generation is resulting in more terminal damage than what was observed during the first generation. So long as there is new growth on either shoots or root suckers, leafcurling midge activity will continue into the fall. Watch young trees as this damage will impact growth and tree vigour.

The second generation adult flight for **San Jose scale** is on the upswing in the early regions of the province. In previous years, crawler emergence has generally begun late July to early August. This year, activity seems to be approximately one week behind average in some monitoring orchards. Crawlers are expected early to mid August.

Fruit damage from San Jose scale has been relatively low to date this year (with exception of some orchards), especially compared to the high pressure in many blocks last year. Those that have a history of damage from this pest may want to consider managing this generation to prevent fruit damage close to harvest. Registered products include Movento, Sivanto Prime, Closer and TwinGuard. For good resistance management, rotate to a different chemical group than what was used for the first
Table 1. Summary of Insecticides Used to Control Apple Maggot (Adapted from John Wise, MSU: [http://msue.anr.msu.edu/news/managing_apple_maggots_using_insecticides](http://msue.anr.msu.edu/news/managing_apple_maggots_using_insecticides))

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Chemical Group</th>
<th>Life-Stage Activity</th>
<th>Efficacy</th>
<th>Residual Activity</th>
<th>Mite Flaring Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imidan</td>
<td>Organophosphate</td>
<td>Eggs, larvae, adults</td>
<td>Excellent</td>
<td>14+ days</td>
<td>Low</td>
</tr>
<tr>
<td>Ambush, Mako, Perm-Up, Pounce, Up-Cyde</td>
<td>Pyrethroid</td>
<td>Adults</td>
<td>Fair-Good</td>
<td>7-10 days</td>
<td>High</td>
</tr>
<tr>
<td>Delegate, TwinGuard, GF 120 Fruit Fly Bait</td>
<td>Spinosyn</td>
<td>Adults</td>
<td>Fair</td>
<td>7-10 days</td>
<td>Moderate</td>
</tr>
<tr>
<td>Assail, Calypso</td>
<td>Neonicotinoid</td>
<td>Eggs, larvae, adults</td>
<td>Good-Excellent</td>
<td>10-14 days</td>
<td>Low – moderate</td>
</tr>
<tr>
<td>Altacor, Exirel</td>
<td>Diamide</td>
<td>Adults</td>
<td>Good</td>
<td>10-14 days</td>
<td>Low</td>
</tr>
</tbody>
</table>

generation. If using two consecutive sprays applied 14-days apart, be aware of the preharvest interval particularly on any early varieties.

With lush new growth continuing, green apple aphid colonies are still thriving in many orchards. At this point in the season, some foliar aphid pressure is not cause for concern and will drop off as terminals set into August. Honeydew excretions may encourage sooty mould, which can be an issue if fruit is affected but washing fruit will remove mould.

Growers should continue to watch for signs of hopperburn caused by potato leafhopper on young trees. Pressure continues to be quite high in some orchards. Vigour and shoot growth in young trees can be significantly impacted by leafhopper damage. Fruit spotting (Figure 7) caused by white apple leafhopper excrement often becomes prevalent with the second generation, which some early areas are beginning to see. White stippling on the leaves caused by nymph and adult feeding will also continue (Figure 8). This generation will remain active throughout August until the first hard frost. Adult activity can often be a nuisance for workers during harvest.

Japanese beetle damage can be easily found in most regions now. The characteristic leaf skeletonization is quite distinct (Figure 9). Look for damage and congregations of this pest at the top of the canopy as damage often moves down the tree. Japanese beetle emit an aggregation pheromone drawing in others to feed in the same area. So, where there is one, there will be others. Fruit damage by this pest is often thought to be secondary, feeding on pre-existing damage such as holes from bird damage (Figure 10). Interestingly, there have been some reports from growers in recent years of Japanese beetle suspected of causing initial damage. Be sure to look at any fruit developing around areas of leaf feeding.
Figure 7. Fruit spotting caused by white apple leafhopper excrement.

Figure 8. Leaf stippling caused by white apple leafhopper.

Figure 9. Japanese beetle feeding skeletonize the apple leaf.

Figure 10. Japanese beetle feeding on fruit. Photo: Margaret Appleby, consultant