Apple maggot

Apple maggot emergence is beginning. The females do not start active egglaying until feeding, finding a mate, and maturing a clutch of eggs. Those steps require about 10 days. As females switch from feeding mode to egglaying mode, they become attracted to red ball traps that mimic a big ripe apple as an ideal oviposition site. In the Sanford area, the first AM flies could begin showing on traps any day now. For Highmoor Farm in Monmouth, and as far north as Newport and Old Town, the first AM captures are expected around July 13.

While border row sprays can effectively prevent damage if the border is established before AM immigrate into the orchard, at least one full block insecticide during mid-July to August helps to prevent leafroller and codling moth larvae and other potential pests from getting too much momentum. We will be hanging red ball traps in the Scouting Co-op orchards next week.

The recommended treatment threshold for unbaited traps is an average of 1 apple maggot fly per trap per week using at least three traps per block. Adding an odor bait increases the attractiveness of the trap and thus higher trap counts. The threshold for baited traps is an average of 5 AM per trap per week. Trap placement is important. The traps should be visible from outside the tree, yet with foliage and fruit in proximity to the trap, especially underneath the trap. Traps hanging from a low branch with no foliage or fruit below will catch fewer AM.

White apple leafhopper

Adult 1st generation white apple leafhopper were abundant in one orchard last week before being controlled by a Lannate application. This pest is usually not very noticeable until 2nd generation nymphs hatch in August. Feeding causes white stippling on leaves that decreases photosynthesis. Leaf damage is not likely to have a significant impact on vigorous trees, but does add stress to trees weakened by other issues. A more important consequence of WAL feeding is dark spots on the apples where sooty mold grows on their sugary excrement.
The most common impact of a WAL infestation is annoyance of pickers as the adults fly about when canopy is disturb during harvest operations. In the recent, the 1\textsuperscript{st} generation population was sufficiently high that the risk of having them increase to a potentially even more numerous 2\textsuperscript{nd} generation was not acceptable.

**Codling Moth**

1\textsuperscript{st} generation codling moth adult flight is about 94\% complete, and egg hatch about 67\% complete, in the Highmoor Farm – Monmouth area. Codling moth traps using standard pheromones only catch male moths and are poor indicators of the female moth population. They do serve as a rough guide to population level and as an indicator for timing of second-generation flight increase. However, this too is complicated by overlap between generations, and by variation between individual traps. Unless there is a history of problems with codling moth infestation, pheromone trap captures of less than 10 adult male CM per week probably do not require specific treatment where multiple insecticide applications were made against plum curculio in the weeks following Petal Fall, and where insecticide applications in response to apple maggot trap captures will begin over the next few weeks.

**European red mite**

Third generation ERM nymphs have hatched and have already begun laying eggs for a 4\textsuperscript{th} generation in the Sanford area, and will do so starting around July 14-17 in Monmouth and Newport. Mite counts have been low in Scouting Co-op blocks so far. The 4\textsuperscript{th} generation is typically the peak for the year, then populations start declining as females start laying overwintering eggs that will not hatch until next spring. However, both ERM and Two spotted spider mites can increase in late summer. The current mite treatment threshold is 60\% of leaves infested, or an average of 2.5 mites per leaf.

**Obliquebanded leafroller**

The optimum timing to check for OBLR larvae feeding on terminal shoots or in fruit clusters underneath a leaf tied to an apple is July 8 in Sanford, July 15 in Monmouth, July 14 in Newport, and July 24 in Presque Isle. The treatment threshold is 3\% of shoots with OBLR feeding. A second check about 4 days after the first is recommended to confirm the first inspection and to account for differences in development timing. OBLR feeding damage to fruit is rarely found in Maine orchards. Incidental control by apple maggot insecticides may contribute to OBLR control. However, note that Imidan and Assail which are both very effective against apple maggot, have “Poor” and “Not effective” ratings for OBLR. Effective options for OBLR include Altacor, Exirel, Bt, Delegate, Entrust, Intrepid, Rimon, and Proclaim. Sevin has a “Fair” rating and pyrethroid insecticides have a “Fair-Good” rating.
Fire blight strikes have become apparent in several orchards over the past week. Except for one outbreak situation, the damage is light and scattered. In the most severely affected orchard, strikes were first noticed on Wednesday, June 27, but may have started appearing as early as June 22. More strikes became noticeable with more focused looking on June 28-29.

Blossom blight Strikes from a High risk infection period on May 26 were estimated to appear around June 13, with shoot blight by June 26 at this location. The strikes being found are associated with dead blossom clusters and thus appear to be blossom blight not secondary shoot blight. The timing of fire blight symptoms are only a rough guide. An experiment conducted at the Hudson Valley Lab by Dr. David Rosenberger in 2009 found that inoculated trees showed signs of infection in only 5 days. The estimated appearance dates are for when strikes are likely to be noticed as dead branches to a grower or scout walking through an orchard. That date is later than first detectable sign of infection with close up inspection.

In the Hudson Valley Lab experiment, cutting branches 6 inches below the visible affected tissue was able to shut down further spread. But Dr. Rosenberger noted that because those trees were closely monitored in a research setting, the affected branches were cut out earlier in the infection process than would be the case in a grower orchard. Thus, the recommendation to cut 18 inches below (if possible) and into older wood still stands because by the time a grower notices fire blight strikes they have had more time to spread.

As for the perennial question about sterilizing blades between cuts, Dr. Rosenberger thought it more important to remove strikes as soon as possible, thus the recommendation to not bother with sterilizing blades after each cut if that will slow down the removal process. But he also noted that in their experiment they frequently did sterilize between cuts. A Maine grower reports that having spray bottle of dilute bleach solution makes blade sterilizing much quicker.

Fire blight strikes from a single event do not all become apparent on the same day. While a majority of strikes will become apparent in the first “wave”, growers with experience cutting out strikes report that new strikes keep appearing over many weeks. Even later strikes appear if fire blight spreads as shoot blight. Susceptibility to new shoot blight infections strikes continues at least until terminal bud set, which is usually in late July for most Maine locations.

Because of the prolonged appearance of new strikes, fire blight sanitation requires vigilance after the initial pass to remove affected tissue. The following year, new strikes may become apparent. Beating back a bad fire blight outbreak is doable, but it takes rapid response and persistent effort.
The pattern of strikes in the heavily affected orchard last week follows the usual pattern of young (in this case ca. 10-12 years old) being more affected than older trees, and Honeycrisp and Paula Red being hit harder than McIntosh. There were scattered strikes on Cortland.

Cougarblight heat units were estimated at 307 on May 26, which was a hot day that pushed McIntosh trees past 95% petal fall. Bloom progression on Honeycrisp trees was a day or so behind, and so still had an appreciable number of open blossoms at time of the rain. Cortland trees likely had scattered secondary blossoms still open. Multiple infection days are more serious than a single event.

Another possibility is that the infections started with two days of high risk blossom infection potential on June 3-4 (with Cougarblight heat unit totals of 400 and 200 on those days). This seems improbable though because by then even the later blooming cultivars had lost all their main crop flowers. However, trees that still had numerous secondary /straggler bloom would have been vulnerable. Streptomycin was not applied to protect against these later infection events at the affected orchard. But virtually no other orchard applied strep for those later infection days either and they don't have fire blight. So my best guess is that even though streptomycin was applied in the affected orchard on May 26, inadequate water volume prevented full efficacy.

Another observation from this case is that Paula Red trees that are more vigorous because of growing in more fertile ground seemed to have less damage than less vigorous trees of the same scion/rootstock growing nearby on less fertile soil. On the more vigorous trees, a higher portion of blossom infections stopped at the blossom cluster without killing tissue farther down the branch. This could be due to the vigor of these trees allowing them to more successfully curtail development of the infection. It could be also be due to the more vigorous trees being a day or so ahead in reaching petal fall by the time of infection and thus less susceptible to the initial infection conditions. This is only speculation, and the original observation may be a false impression that would not hold up to numerical scrutiny. But observations like this can highlight factors that affect infection potential and disease function.

It is not clear what led to the extensive infection at the most affected site. The orchard did have a previous serious fire blight outbreak, but that was about 20 years ago. There have be no problems with fire blight in recent years. Streptomycin was applied prior to the infection, but I do not have information on timing or dose. The application was made with 30 gallons per acre on the larger full-grown semi-dwarf trees, and less water per acre on the smaller and most affected trees for which top nozzles were shut off. Low spray water volume could be a contributing factor. High volume sprays are more effective when using streptomycin to prevent blossom blight.

A nearby orchard that received streptomycin on the same day, but at a higher spray volume of 100 gallons per acre does not show fire blight strikes except on one tree that was left unsprayed. Thus, that orchard appears to have also had fire blight potential that was controlled by the streptomycin application in 100 gallons of water per acre.

In the affected orchard, roughly 1800-2000 infected branches have already been removed. Some new strikes have appeared on trees examined and pruned just a few days earlier. In the Hudson Valley Lab study noted above, new strikes appeared at a diminishing rate for about four weeks.
Apple Scab

At even the latest developing Maine site all of the 1st generation primary scab infections, and most of the potential 2nd generation infections have had time to become visible as spots on the leaves by now. Most of the Scouting Co-op orchards have very little scab.

Where scab is present but not abundant, applications of captan at two week intervals over the next month is likely to prevent spread of infections while the existing crop of lesions exhaust their supply of conidia. Where scab is intense, locally systemic / translaminar fungicides in the DMI/QoI-strobilurin/SDHI classes that, unlike captan, can kill scab within the leaf are recommended to more aggressively reduce the supply of conidial spores. Those materials all work by a single biochemical mechanism in the scab fungus (different mechanism for each group, but only one per group), and thus are susceptible to the scab fungus developing resistance rendering those materials either partially or wholly ineffective as long as the genetically selected scab population persists. To help prevent that from happening, combine captan with any application of the single-site fungicides.

Phytotoxicity, Sunburn, and Honeycrisp Yellows

There were two cases of phytotoxicity, “spray burn”, to apples in the past week. One case was due to use of Mural fungicide on nursery trees. Mural contains the fungicide azoxystrobin, which is a QoI strobilurin in the same class as Pristine, Sovran and Flint. But azoxystrobin is highly phytotoxic to apples fruit and foliage. Even a small amount remaining in a spray tank from a previous application can be enough to cause serious damage.

The other case of spray burn is harder to diagnose. It involves captan and Epsom salts applied together. The captan dose was fine, but I do not have details on the Epsom salts dose. There may have been a problem with old captan product in which the active ingredient had settled out of the formulation.

Spraying when the temperature is over 80F can result in phytotoxicity. More hot weather in the 80s is forecast for Sunday – Tuesday July 8-10.

Temperatures over 86F can lead to sunburn damage, though the risk is not severe until temperatures approach 90F. Keep trees well watered makes them more resistant to sunburn. Do not summer prune just before a heat wave. Sudden exposure to direct sunlight after summer pruning increases risk. With a few days acclimation, fruit is more resistant to sunburn.

Honeycrisp foliage is beginning to turn yellow. This is not a disease or a problem, it is just the natural pattern for Honeycrisp.
Details on the July 18 Maine State Pomological Society summer meeting at Doles Orchard are in the June previous newsletter. The meeting has been approved for two pesticide applicator recertification credits.

**Apple Calendar**

Dates are for Highmoor Farm in Monmouth. For other locations see [https://extension.umaine.edu/ipm/ag-radar-apple-sites/](https://extension.umaine.edu/ipm/ag-radar-apple-sites/)

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### Green text is for horticultural events and management activities.

**Red** is for insect pest events.

**Brown** is for mite pest events.

**Blue** is for disease events.

Highest priority growing season activities are highlighted in yellow boxes.

Blank boxes at bottom are for events for which it is too early to estimate dates.

<table>
<thead>
<tr>
<th>Date</th>
<th>Late Season Biological Events and Management Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>July 1, Sun</strong></td>
<td><strong>Japanese beetle adults</strong> begin feeding on foliage (rough guess). Honeycrisp apples seem to be one of their favorite foods.</td>
</tr>
<tr>
<td><strong>July 3, Tue</strong></td>
<td>If using pheromone traps to estimate populations and time treatment for <strong>Oriental fruit moth</strong> larvae, time to set traps. First trap capture expected in 7 days.</td>
</tr>
<tr>
<td><strong>July 4, Wed</strong></td>
<td><strong>Glyphosate (Roundup) herbicide</strong> application more than 45 days after full bloom to soil around apple trees with root suckers, especially young trees, poses increased risk of damage from systemic uptake through root suckers into the trunk and root system. Apple trees without root suckers may also become more sensitive to trunk contact by glyphosate with late season application, especially trees under drought or other stress.</td>
</tr>
<tr>
<td><strong>July 5, Thu</strong></td>
<td>Where preventive control of small <strong>Obliquebanded leafroller</strong> larvae is needed, date for first application of Assail, Calypso, Intrepid, SpinTor, a Bt product, or other insecticide effective against OBLR.</td>
</tr>
<tr>
<td><strong>July 5, Thu</strong></td>
<td>Early 3rd generation European red mite nymphs appear. Between now and July 14 is an important monitoring period to detect for above threshold population before 4th generation eggs are laid.</td>
</tr>
<tr>
<td><strong>July 6, Fri</strong></td>
<td>Dogwood borer egg hatch begins. Peak egg hatch is roughly August 10. Trunk insecticide (chlorpyrifos offers best protection) needs to be in place by this date, especially on young trees with burr knots and not receiving insecticide for other pests.</td>
</tr>
</tbody>
</table>
**July 7, Sat**  
Plum curculio egglaying begins natural decline. If using Surround repellence instead of insecticide mortality to prevent PC damage, coverage should be maintained from Petal fall until at least this date.

**July 7, Sat**  
Roundheaded apple tree borer peak egglaying period is approximately July 7 to July 22. Unprotected young trees at risk of borer infestation.

**July 10, Tue**  
Date by which 2nd generation Flyspeck spores start becoming available, increasing risk of infections that will show by harvest. In low-flyspeck-risk blocks, continuous protection may not be needed prior to this date. See Flyspeck tables for optimum spray intervals and definition of low-risk blocks.

**July 13, Fri**  
Apple maggot adults start appearing on traps (rough guess, rain factor not included in estimate). Time to set traps or risk missing early emerging flies.

**July 13, Fri**  
Date by which 2nd generation lesions from the final primary scab infection period have had time to begin appearing. Finding fewer than 5 leaves with fresh lesions per 100 fruit clusters and vegetative shoots after this date indicates that scab control has been successful. Finding more than 5 leaves with fresh scab lesions per 100 clusters/shoots at this time in a commercial orchard suggests that fungicide selection and spray intervals need to be adjusted to suppress spore production, and to protect fruit and foliage for at least 4 weeks until active scab lesions exhaust their supply of spores.

**July 14, Sat**  
Rough guess of terminal bud set on bearing trees, but actual date is highly variable by cultivar, tree age, tree vigor, and weather. Vertical shoots may have new foliar growth beyond this date as they set terminal buds later. Summer pruning to open tree canopies for better fruit color and to increase number of flower buds next year should only begin after terminal bud set. Summer pruning before terminal bud set has undesirable effects on fruit quality and vegetative regrowth. Lack of succulent new growth after terminal bud set slows progress of new apple scab infections, powdery mildew, and fire blight shoot blight. But both scab and fire blight infections can spread with suitable conditions and lack of protection. In orchards with active fire blight, delay hand thinning and bud pinching until after terminal bud set. Summer pruning also lowers canopy humidity and allows better spray coverage to suppress flyspeck, scab, and bitter rot diseases, and removes water sprouts that are favored aphid habitat.

**July 14, Sat**  
Early 3rd generation European red mite adults begin laying 4th generation eggs. Fourth generation is typically the peak ERM population of the year.

**July 15, Sun**  
First sample date for late instar summer generation Obliquebanded leafroller larvae. Threshold is 4 or more larvae per 100 shoot terminals.

**mid-July through September**  
Regular close mowing helps lower canopy humidity, conserves soil moisture, and can help suppress orchard vole populations. Late-season herbicide application can prevent desirable ground cover regrowth to help protect roots from low winter temperatures.
I am very sad to report the death of Tom Gyger. It is shocking and sad to even type the words. Tom died unexpectedly on July 4th. Among his many endeavors and public service, Tom was a major bulwark supporting the Maine apple industry. In addition to all that he was a generous, good spirited and wonderful person to have the privilege to know. He will be fondly remembered and painfully missed.

The late Peter Wallingford and Tom Gyger showing off their license plates after a Maine State Pomological Society Executive Committee meeting at Highmoor Farm.