SCAFFOLDS Fruit Journal, Geneva, NY
Volume 25, No. 5

# Update on Pest Management and Crop Development

April 18, 2016

---

## COMING EVENTS

| | 43°F | 50°F |
|---|---|---|
| Current DD* accumulations | | |
| (Geneva 1/1-4/18): | 183.7 | 75.5 |
| (Geneva 1/1-4/18/2015): | 89.8 | 43.7 |
| (Geneva "Normal"): | 160.1 | 72.2 |
| (Geneva 1/1-4/25, predicted): | 229.6 | 93.0 |
| (Highland 1/1-4/18): | 350.5 | 157.3 |

Upcoming Pest Events – Ranges (Normal +/- Std Dev):

| | 43°F | 50°F |
|---|---|---|
| Apple grain aphid | | |
| nymphs present | 128-488 | 63-247 |
| Comstock mealybug | | |
| 1st gen crawlers in pear buds | 215-441 | 80-254 |
| European red mite egg hatch | 231-337 | 100-168 |
| Green apple aphid present | 111-265 | 38-134 |
| Green fruitworm peak flight | 97-209 | 37-97 |
| Obliquebanded leafroller | | |
| larvae active | 158-314 | 64-160 |
| Oriental fruit moth 1st catch | 222-326 | 96-164 |
| Pear psylla 1st egg hatch | 174-328 | 60-166 |

| | | |
|---|---|---|
| Pear thrips in pear buds............. | 118-214 | 50-98 |
| Rosy apple aphid nymphs present ....................... | 134-244 | 56-116 |
| Spotted tentiform leafminer 1st oviposition.......................... | 143-273 | 58-130 |
| McIntosh tight cluster................. | 206-258 | 90-126 |

*[all DDs Baskerville-Emin, B.E.]

Phenologies

| Geneva: | Current | 4/25, Predicted |
|---|---|---|
| Apple (McIntosh): | 1/2" green | tight cluster |
| Apple (Empire/Red Delicious): | 1/2" green | tight cluster |
| Pear (Bartlett/Bosc): | bud burst | green cluster |
| Sweet Cherry: | bud burst | white bud |
| Tart Cherry: | swollen bud-bud burst | bud burst |
| Peach: | 1/2" green | pink |
| Plum: | bud burst | green cluster |

Highland:

Apple

(McIntosh): pink

(Red Delicious, Ginger Gold, Empire): pink

Pear

(Bartlett, Bosc): white bud

Peach

(early): 1/2" green
(late): 1/2" green

Pest Focus

Geneva: 1st Redbanded Leafroller trap catch 4/15.
1st Spotted Tentiform Leafminer trap catch today, 4/18.

TRAP CATCHES (Number/trap/day)

Geneva

| | 4/7 | 4/11 | 4/15 | 4/18 |
|---|---|---|---|---|
| Green Fruitworm | 14.0 | 16.0 | 11.5 | 9.5 |
| Redbanded Leafroller | 0.0 | 0.0 | 0.5* | 23.0 |
| Spotted Tentiform Leafminer | 0.0 | 0.0 | 0.0 | 1.0* |

Highland (Peter Jentsch)

| | 3/28 | 4/4 | 4/11 | 4/18 |
|---|---|---|---|---|
| Green Fruitworm | 1.0 | 0.0 | 0.1 | <0.1 |
| Redbanded Leafroller | 3.7 | 0.6 | 1.8 | 8.4 |
| Spotted Tentiform Leafminer | - | 5.1* | 0.9 | 19.5 |

* 1st catch

**[Section: INSECTS]**

PRE-BLOOM MANAGEMENT OF INSECT PESTS IN THE HUDSON VALLEY

(Peter Jentsch, Entomology, Highland; pjj5@cornell.edu)
**[Box text: EAST SIDE STORY]**

The most effective window for control of San Jose scale is during pre-bloom. Less foliage provides the best opportunity for greater application coverage to the limbs and trunk where overwinering scales reside. The previous year's harvest pack-out will be a good indicator of SJS presence in the orchard, as per specific bin location and percent damage from SJS culls. Multiple approaches for SJS will be needed if multiple blocks suffered injury over successive years. (See SJS Management: http://blogs.cornell.edu/jentsch/2015/04/24/dogwood-borer-and-scale-not-to-be-taken-lightly/)

San Jose Scale aside, is there a need to make insecticide applications to your pome fruit during the pre-bloom period in Eastern NY this season? To begin, the winter freeze on February 14 combined with the recent cold snap on April 5 caused severe bud injury across the region, reducing this year's potential crop load. The remaining fruit will need to be assessed to determine the level of management required for this season. In mid-Hudson Valley orchards in which bud assessments were made during the past two weeks, we have seen dramatic variability in bud survival across a number of varieties. (See

Bud Assessments of Hudson Valley Apple: http://blogs.cornell.edu/jentsch/2016/04/09/flower-bud-damage-assessments-of-hudson-valley-apple-april-8th-2016/).

During the tight cluster through pink bud period, insects begin to emerge from overwintering sites. They overwinter in, or make their way to, tree fruit orchards beginning at tight cluster. As each orchard may have dramatically different insect pest pressure during the pre-petal fall period, your orchard should be assessed during this period to determine the need for insect pest management prior to bloom.

Some factors that play into pre-bloom management decision making:

- Influence of the orchard edge in small blocks harboring overwintering insect pest populations, as small blocks exhibit greater edge effect for insect pests.
- Historical insect pest species that have caused injury to developing flowers and fruitlets.
- Considerations for native bee conservation or commercial beekeeper contract constraints.
- The uncertainty of timely honey bee hive removal by the beekeeper.

• Successful pollination and importance of preserving the king blosom and fruitlet at petal fall.

**Pre-bloom insect species causing injury to developing flowers and fruitlets**

Of the insect pest populations causing injury to fruit, San Jose scale, tarnished plant bug, the green fruitworm complex, redbanded leafroller, obliquebanded leafroller, and possibly early plum curculio have the greatest potential for damaging fruit during the pre-bloom period. A reduced crop load in the Hudson Valley this season is likely to result from loss of the king blossom in many varieties, necessitating the need for preserving the remaining laterial fruitlets. Given the reduced crop load, we may not be able to afford additional losses from insects and diseases this season, making timely management all the more critical.

One insect that can cause fruit loss is the tarnished plant bug, *Lygus lineolaris* (TPB). This insect infests over half of the cultivated plant species grown in the United States. It has piercing-sucking mouthparts and is a serious pest of fruits and vegetables in the Eastern US. Tarnished plant bug overwinters in the adult stage under leaf litter, stone walls, tree bark and other protected places along the edge of orchards. At the end of April, the adults become active and begin laying eggs in crop and weed hosts. The overwintering adult population peaks at about the pink stage of apple, sometime in early May in New York State.

Adults are 0.25" long, oval, and somewhat flattened. They are greenish brown in color, with reddish brown markings on the wings. A distinguishing characteristic is a small but distinct yellow-tipped triangle in the center of the back, behind the head. Scout for these insects on days when temperatures exceed 70$^{o}$F along the orchard edge where broadleaf weeds are present. Look for the adult and droplets of sap that indicate feeding sites.

Tarnished plant bug will move to buds and developing clusters as temperatures increase, moving back to suitable ground cover as temperatures fall. Maintaining the area beneath tree canopies as 'weed-free' and keeping the fescue-based sod in alleyways mowed will prevent buildup of flowering plants and will reduce TPB activity. The tarnished plant bug causes injury to tree fruits when it feeds and lays eggs. Damage occurs primarily in the spring on flower buds, blossoms, and young fruit, although bleeding of sap may result from twig and shoot injury. On apple trees, some early egg laying may take place in the buds. However, most eggs are laid in the developing fruit starting at bloom.

TPB nymphs begin feeding first on buds and later on developing fruit. Small droplets of sap may be present on the surface of injured buds. Within 1 or 2 weeks after feeding, the flower clusters may appear dried and the leaves distorted, with a distinct hole where the insect fed. Generally, later damage to developing fruit is more important than earlier feeding on flower buds. In apples, feeding can cause punctures or deep dimples to form as the fruit develops, and in peaches various deformities known as "catfacing" occur. The damage to apples caused by egg laying is usually deeper, resulting in more distorted fruit, often with blemishes or "scabs". Damage early in the season tends to be near the calyx end of the fruit, and later injuries tend to be elsewhere. Cultivars differ in their susceptibility to damage, with depressions or scabs in some being less pronounced. Proximity of tree fruit to broadleaf weed hosts, edges of ponds, or hedgerows also influences the likelihood of injury from TPB.

The use of unbaited, nonreflective, white sticky boards hung low in the trees to effectively monitor TPB can help in determining TPB activity. The best places to set the traps are in lower areas such as ditch banks and in hedgerows, which are favorable overwintering sites of the adults. White sticky traps are available commercially. A biological control parasite introduced into the Northeast from Europe has contributed to reduced TPB populations in both apple and alfalfa. This wasp parasite of the TPB, *Peristenus digoneutis* (Hymenoptera: Braconidae) is believed to have reduced both damage and occurrence of the pest.

**TPB Management:**

- If your pack-out had more than 4% culls from TPB damage, an application is warranted.
- In varieties such as Honeycrisp in high density systems, lower injury levels may equate to economic injury.
- Target for application: sustained temps >70°F for 3 days or more beginning at tight cluster.
- Applications at both tight cluster and pink have been found to be most effective in years when TPB feeding is early and severe; however, we have not had consistent results in reducing TPB using pre-bloom applications to control this pest.
- Pyrethroids have been shown to be very effective against TPB during the pre-bloom period.
- Neonicotinoid insecticide use at pre-bloom is less effective, and may NOT be acceptable to beekeepers, given the present perception in the industry that this group of insecticides represents an unacceptable hazard to bees.
- In years where the king fruit set and development is followed by cooler conditions causing delayed set of the laterals, the king becomes susceptible to plum curculio (PC)

injury. A protectant insecticide that is effective at controling plum curculio will protect fruit by reducing early PC migration during late pink and early bloom.

- In years when late removal of bee hives from the orchard causes a delay in a timely petal fall application, a pink application will help reduce European sawfly and plum curculio injury to sizing fruit.

So, to answer the question "To spray or not to spray at pink?" for TPB: If economic injury has been observed in the past few years in high-value varieties that exceeds the cost of an application, then treatment is warranted. Important to note: The phytoseiid mite, *Typhlodromus pyri*, is a very effective predator that has been shown to manage European red mite (ERM), *Panonychus ulmi*. ERM feeds on leaves of apple trees and interferes with photosynthesis and production of carbohydrates, reducing yield, fruit color, overall quality and subsequent fruit bud development. The use of pyrethroids and multiple applications of manzate can dramatically reduce or eliminate *T. pyri* populations. Reduced predation can contribute to mite flare-ups during the growing season. See: Achieving Biological Control of European Red Mite in Northeast Apples: An Implementation Guide for Growers (http://nysipm.cornell.edu/factsheets/treefruit/pests/erm/erm.asp)

GLUGS FROM THE JUG

(Art Agnello, Entomology, Geneva; ama4@cornell.edu)

**[Box text: MIXOLOGY]**

[NOTE: The following is a reprint of a previous article on pre-mixes]

With the increasing number of insecticide products available to growers comes increasing complexity in selecting the most effective and economical product to use for a given management decision. This has always involved weighing the traditional factors such as efficacy, chemical class, pest spectrum, impact on non-target species, and of course, cost. Added to this in recent years have been the more challenging considerations involving pesticide resistance, mode of action, seasonal maximums and, as companies have begun marketing pre-mixes that are combinations of two (for the time being) different active ingredients, the need to compare benefits vs. drawbacks of going with a pre-mix as opposed to a single-a.i. product for a given spray.

Like most extension entomologists, I have expressed concern in the past over the proliferation of these pre-mixes in the marketplace, as I feel that growers are better off deciding for themselves what products should be mixed in their tanks, and when. Furthermore, I think that pre-mixed product combinations make it too easy to abuse the active ingredients by overusing them when both may not be strictly necessary. This not only promotes a higher risk of resistance development in the pest population, but adds to the complexity of juggling rates to achieve equivalent levels of pest control, since a spray of a pre-mix product containing A + B may not be the same as the amount of either A or B contained in their respective single-a.i. products. Moreover, the added challenge of having to observe different seasonal maximum uses for each product is enough to cause a grower to start seeing double and inadvertently making mistakes.

Naturally, agrichemical companies love pre-mixes because they seem to make sense from a sales point of view, and I have yet to see sound biological arguments ever win out against the forces of marketing, so it's a sure bet that there will continue to be more of these products introduced into the market as time goes on. Some university specialists have chosen to ignore the pre-mixes altogether in their crop guidelines, but this doesn't seem very realistic, as the products do exist and there are admittedly some management decisions when they may be the optimal choice, so growers do use them. For the time being, I have chosen to keep them in the NY "Recommends", although I've taken pains to segregate them from the single-a.i. products, and have preceded each of their listings with the following advisory: "For best effectiveness and insecticide resistance management, the use of pre-mixes should be reserved for situations when multiple pest species are present and are appropriately matched to the combination of active ingredients and modes of action contained in the product." This is advice that I hope growers take seriously, because the long-term utility and effectiveness of these active ingredients depends on our responsible stewardship in using them, and the short-term convenience and economy of having them available will not compensate for burning them out prematurely if they are applied needlessly or overused. (you've probably heard this argument before...)

All this being said, I am often as confused as anyone else when confronted with the choice between a pre-mix and the single-a.i. alternative. I'm waiting for someone who is a lot more clever than I am to develop some sort of expert-system app that will take into account all of the factors one should keep in mind when making such a deliberation. For the moment, however, I've made up the following table of "A.I. Equivalences", which might be of use in comparing the levels of actual insect control you might expect to achieve from different formulations of a given a.i. More details might have been included, but I hesitated to make this any more complicated, because the main intent is to provide a basis of comparison for some of the more likely decisions that could be made in choosing a pesticide product. Just to give an idea of how this table might be used, note that the amount of chlorantraniliprole a.i. in a high-rate application of Voliam Xpress (0.078 lb) is lower than a comparable application of Altacor (0.099 lb); also, you can see the difference in thiamethoxam a.i. between the use rates of Endigo (0.046-0.055 lb) and Actara (0.070-0.086 lb). Additionally, note that thiamethoxam is limited to a maximum seasonal total of 0.172 lb/A, regardless of the formulation, which can complicate mixing & matching of products during the season. Many comparisons are possible, of course, and the information in this table is only a start, but it may help make things a bit simpler than trying to reference a bunch of individual labels. We'll see what we can do to improve on how this information is presented over time.

## Active ingredient equivalents between pre-mix and single-a.i. insecticide products

| Product | Labeled amt/Acre | a.i. #1 | lb a.i. per application | a.i. #2 | lb a.i. per application | Max seasonal use/A |
|---|---|---|---|---|---|---|
| **Pre-mixes** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Voliam Xpress | 6-12 fl oz | CTPL | 0.039-0.078 | LAMB | 0.0195-0.039 | 31 fl oz (0.2 lb CTPL) |
| Voliam Flexi | 4-7 oz | CTPL | 0.063-0.109 | TMX | 0.063-0.109 | 11 oz (0.172 lb of each) |
| Leverage | 2.4-2.8 fl oz | IMID | 0.038-0.044 | BETA | 0.019-0.022 | 2.8 fl oz (0.044 lb IMID) |
| Endigo | 5-6 fl oz | TMX | 0.046-0.055 | LAMB | 0.034-0.041 | 19 fl oz (0.172 lb TMX) |
| Agriflex | 5.5-8.5 fl oz | TMX | 0.055-0.084 | ABA | 0.012-0.018 | 17 fl oz (0.169 lb TMX) |
| Gladiator | 14-19 fl oz | CYP | 0.019-0.026 | ABA* | 0.009-0.012 | 38 fl oz (0.024 lb ABA) |
| **Single-a.i. products** | | | | | | |
| Altacor | 2.5-4.5 oz | CTPL | 0.055-0.099 | | | 9 oz (0.2 lb CTPL) |
| Actara | 4.5-5.5 oz | TMX | 0.070-0.086 | | | 11 oz (0.172 lb TMX) |
| Admire Pro | 1.4-7.0 fl oz | IMID | 0.05-0.25 | | | 14 fl oz (0.5 lb IMID) |
| Agri-Mek SC | 2.25-4.25 fl oz | ABA | 0.012-0.023 | | | 8.5 fl oz (0.047 lb ABA) |

CTPL = chlorantraniliprole; IMID = imidacloprid; TMX = thiamethoxam; ABA = abamectin; LAMB = lambda-cyhalothrin; BETA = beta-cyfluthrin; CYP = zeta-cypermethrin; ABA* = label gives a.i. as "avermectin B1" (abamectin, the a.i. in Agri-Mek, is a mixture of >80% avermectin B1a and <20% avermectin B1b, so a strict comparison is not possible according to the information provided).

# [Section: GENERAL INFO]

## EVENT ANNOUNCEMENTS

Mark your calendars for the Cornell Fruit Field Day, to be held in Geneva on Wednesday, July 20. The 2016 version of this triennial event will feature ongoing research in berries, hops, grapes, and tree fruit, and is being organized by Cornell University, the NYS Agricultural Experiment Station, CALS Fruit Program Work Team and Cornell Cooperative Extension. All interested persons are invited to learn about the fruit research under way at Cornell University. Attendees will be able to select from tours of different fruit commodities. Details of the program presentations are still being finalized, but the event will feature a number of topics, including:

**Berries**

Spotted wing drosophila research update in berry crops; hummingbird use, monitoring network

Use of exclusion netting for managing spotted wing drosophila in fall raspberries

Monitoring spotted wing drosophila for management decisions in summer raspberry and blueberry

Behavioral control of spotted wing drosophila using repellents and attract & kill stations

Effect of habitat diversity on ecosystem services for strawberries

High tunnel production of black and red raspberries

Day-neutral strawberries/low tunnel production

**Tree Fruits**

Apple breeding and genetic studies

Research updates on fire blight, apple scab, mildew

Bitter pit in Honeycrisp

3D camera canopy imaging (2 presentations)

Ambrosia beetle management trials

*Malus* selections for potential use in cider production

NC-140 rootstock trials on Honeycrisp and Snap Dragon

Role of insects in spreading fire blight in apples

Bacterial canker of sweet cherries

Precision spraying in orchards

**Grapes**

Sour rot of grapes

VitisGen grape breeding project

Precision spraying in grapes

Managing the spread of leafroll virus in *Vinifera* grape using insecticides and vine removal

**Hops**

Overview of NYSAES hops planting

Powdery and downy mildew management in hops

Hops weed mgt; mite biocontrol

Update on malting barley research

*also*

FSMA/food safety considerations

The event will be based at the NYSAES Fruit and Vegetable Research Farm South, 1097 County Road No. 4, 1 mile west of Pre-emption Rd. in Geneva, NY. Registration will begin at 8:00 AM and tours will begin at 8:30 and run until 11:30. Lunch will be served at the exhibit tent area between 11:30-12:30 PM. Tours will resume at 1:30 and run until 5:00 PM. Admission fee will be $50/person ($40 for additional attendees from the same farm or business). Pre-registration is required; walk-in registration may be available for a $10 surcharge on the day of the event. Please use the registration link below to register via credit

card.
https://app.certain.com/profile/web/index.cfm?PKwebID=0x831574809f&varPage=home
To participate as a sponsor, see the website page or contact Shelly Cowles (315-787-2274; mw69@cornell.edu).

---

This material is based upon work supported by Smith Lever funds from the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.

Scaffolds is published weekly from March to September by Cornell University -- NYS Agricultural Experiment Station (Geneva), and Ithaca -- with the assistance of Cornell Cooperative Extension. New York field reports welcomed. Send submissions by 2 p.m. Monday to:

Scaffolds Fruit Journal
Editor: A. Agnello
Dept. of Entomology, NYSAES
630 W. North St.
Geneva, NY 14456-1371
Phone: 315-787-2341   FAX: 315-787-2326

E-mail: ama4@cornell.edu
Online at
<**http://www.scaffolds.entomology.cornell.edu/index.html**>