scaffolds

Update on Pest Management and Crop Development

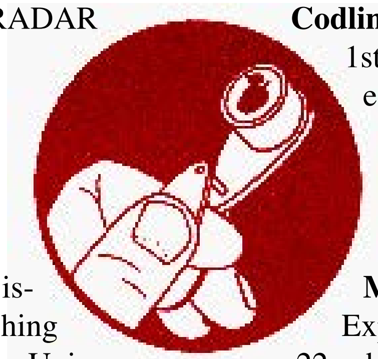
F R U I T   J O U R N A L

May 5, 2014 | VOLUME 23, No. 7 | Geneva, NY

INSECTS

EYE ON THE SKY

ORCHARD RADAR DIGEST



❖❖ Beginning with today's issue, we will once again be publishing pest predictions generated by the Univ. of Maine's Orchard Radar model estimation service, provided to us by Glen Koehler. This pest management tool uses commercially available weather data as an input for apple pest occurrence and development models taken from many established university and practitioner sources. It's offered as another perspective on what's happening in the orchard to compare against our own record-generated advisories and, of course, personal observations from the field. We'll be printing only some of the short-term arthropod events; the full Orchard Radar product range covers disease and horticultural events as well. The public New England sites available for anyone to use are located at: http://pronewengland.org/AllModels/DecisionModels.htm. Growers interested in exploring this service for their specific site may wish to contact Glen personally (glen.koehler@maine.edu).

Geneva Predictions:

Roundheaded Appletree Borer
RAB egglaying begins: June 11. Peak egglaying period roughly: June 30 to July 14.

Dogwood Borer
First DWB egg hatch roughly: June 30.

Codling Moth
1st generation 3% egg hatch expected: June 14.

Lesser Appleworm
1st LAW trap catch: May 20.

Mullein Plant Bug
Expected 50% egg hatch date: May 22, which is 5 days before rough estimate of Red Delicious petal fall date

Obliquebanded Leafroller
1st generation OBLR flight, first trap catch expected: June 13.

Oriental Fruit Moth
1st generation OFM flight starts: May 10.

Redbanded Leafroller
1st generation RBLR peak trap catch: May 11.

continued...

IN THIS ISSUE...

San Jose Scale
First adult SJS caught on trap: May 27.
1st generation SJS crawlers appear: June 23.

Spotted Tentiform Leafminer
1st STLM flight peak trap catch: May 18.
❖❖

MAYDAY

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

❖❖ The forecast for the end of the week promises some early summer weather, so most areas should be within hailing distance of pink bud by the weekend. It's therefore not too early to be thinking of pink bud insect management needs now, so as not to be caught off guard in case we get into one of our famous 'let's floor it' scenarios.

First, if **San Jose scale** is a concern and you have yet to do anything to head it off, there is still a limited window of suitable management tactics available before foliar development progresses too far to permit effective coverage. If you are intending to use oil, a 1% spray through tight cluster can be quite effective provided you're able to thoroughly cover the wood surfaces. Insecticidal options include Centaur (34.5 oz/A), Esteem (4-5 oz/A), Lorsban (4EC or Advanced at 1.5-4 pt/A; or 50WP at 3 lb/A) or Supracide 2EC at 3 pt/A). Remember that you are limited to only 1 application of Lorsban in apples per season, whether prebloom as a foliar or trunk spray, or as a postbloom trunk application.

The pests of greatest concern at pink bud are usually **rosy apple aphid** (RAA), **oriental fruit moth** (OFM), and **tarnished plant bug** (TPB), with **European apple sawfly** and **plum curculio** waiting in the wings. OFM just made its entrance in the Hudson Valley last week, so it will not be too long before biofix is established in a number of plantings statewide. In blocks with a history of OFM infestation, 1 or 2 traps checked at least weekly will help indicate the timing and relative size of the first generation population this year. What should be the response when the numbers start building?

In a normal year, the average temperature ranges tend to result in very little egg hatch during pink and bloom, as this usually holds off until petal fall. If we end up with sufficient egg hatch before actual bloom, a pink application of an internal worm material like Altacor, Belt or Delegate would be an option; although this is earlier than we would normally expect to need them, these products would also address codling moth, which would not be far behind an early OFM hatch. For growers wishing to save these A-list products until after petal fall, a B.t. product would be another option from pink to bloom. Regardless, these "what-if" scenarios underscore the value of using (and frequently checking) pheromone traps to set the clock on OFM and CM development in specific blocks. These first

continued...

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 pm Monday to:

scaffolds FRUIT JOURNAL
Dept. of Entomology
NYSAES, Barton Laboratory
Geneva, NY 14456-1371
Phone: 315-787-2341 FAX: 315-787-2326
E-mail: ama4@cornell.edu

Editors: A. Agnello, D. Kain

This newsletter available online at:
http://www.scaffolds.entomology.cornell.edu/index.html

flights of the season give us the best opportunity to get on top of internal worm control, because timing and development of the different stages only gets more complicated (i.e., less synchronized) as the season progresses.

Depending on block history and personal philosophy, RAA and TPB can be either annual challenges, puzzling but token annoyances, or else a complete flip of the coin. Do they occur, do they need to be treated, are they able to be controlled adequately, and does it matter if they're just ignored? These pests also have yet to indicate their potential for problems this season, although it's likely that rosies can be found already in some orchards, given enough inspection. It's possible to scout for RAA at pink, but this is often not practical, considering all the other things demanding your attention at this time. TPB is not a good candidate for scouting, and if the bloom period continues to be prolonged by cool, wet weather, a pink spray is of little use. You'll need to decide for yourself whether this bug is of sufficient concern to you to justify treating.

We have seen few orchards in western NY (and only slightly more in the Hudson Valley) where TPB control is warranted, simply because the most effective treatment has been to use a pyrethroid, which: a) kills predator mites, and b) still rarely lowers TPB damage enough to be economically justified. If you elect a spray of Ambush, Asana, Baythroid, Danitol, Pounce, Warrior or Voliam Xpress at pink for plant bug, you'll take care of rosy apple aphid (plus mullein plant bug and STLM) at the same time. If RAA is your main concern, you could elect a pink spray (non-pyrethroid options include Actara, Assail, Beleaf, Calypso, Esteem, Lannate, Lorsban, Thionex, Vydate, Warrior, or Voliam Xpress) if you have the luxury of a suitable application window. Once again, be sure to consider potential impacts on non-target species such as beneficials, and be aware of your bee supplier's concerns about effects on pollinating bees. For more perspective on this issue, see the article from Penn State, below.

Leafrollers are also out there, but only a portion of the population will be active at this time, so although you might get good control of any larvae you spray now, don't forget that the rest of the population won't be out (and susceptible to sprays) until bloom or petal fall, so it's probably better to wait until then to address this pest.

Finally, if **mites** normally need attention in a given block, and you haven't elected (or been able to use) a delayed-dormant oil application as a part of your early season mite management program, you'll be needing to rely on either: one of the ovicidal acaricides (Apollo, Savey/Onager, Zeal) available for use, whether before or after bloom; a rescue-type product after bloom (add Acramite, Kanemite, Nexter, and Portal to the above list) that can reduce motile numbers later on if they should begin to approach the threshold; or Agri-Mek, which falls somewhere between these two strategies. Like the true ovicides, Agri-Mek should also be considered a preventive spray, as it needs to be applied early (before there are very many motiles) to be most effective, generally within the first 2 weeks after petal fall. Recall that Proclaim is related to Agri-Mek, and also has some miticidal activity, if you expect to use it at petal fall for leafrollers. For any of the rescue products, the operational threshold (through June) is an average of 2.5 motiles per leaf (see the chart on p. 73 of the Recommends). ❖❖

HORTICULTURE

NEW BMSB SURVEY

❖❖ Got stink bugs? We need your help! We're surveying growers to assess the impact of BMSB on crops and gather information that will help us defeat this pest. Receive a free Guide to Stink Bugs* if you complete the 10-minute BMSB survey (https://cornell.qualtrics.com/SE/?SID=SV_5ssnjXLNhvp6v1H). Your participation will help us to help you Stop BMSB! The survey will be available until June 30th.

—The Outreach Team for "StopBMSB," a project focused on the biology, ecology, and management of the brown marmorated stink bug. For more info: StopBMSB.org

[* see it at https://pubs.ext.vt.edu/444/444-356/444-356_pdf.pdf]

BEE DEVIL

[D. Biddinger (djb134@psu.edu), E. Rajotte, N. Joshi, Dept. of Entomology; K. Demchak (efz@psu.edu), Dept. of Plant Science; and T. Baugher, Penn State Extension]

[*Ed. note: We are excerpting portions of this recent Fruit Times article from Penn State, to help shed some light on the current concerns of pesticide spray impacts on pollinators*.]

❖❖ Recently, there has been a lot of press related to pollinator health, and some troubling information indicates that certain fungicides, when used during bloom, can negatively affect the health of honey bees. This is a complicated problem with the solutions relying on understanding the detailed relationships among chemicals, pollinators and pest management needs. It is not prudent to treat this topic with a broad brush with statements such as "All neonicotinoid insecticides are bad for all pollinator species," or "No fungicides should be sprayed during bloom." Research is on-going, and we do not know all of the details yet.

We do know that there are another 4,000 species of bees in the US in addition to the honey bee and they also play an important role in pollinating many crops. In Pennsylvania fruit plantings, many growers large and small, have forgone the use of honey bees completely and rely solely on about 50 species of solitary bees, bumble bees and feral honey bees. It has been shown that the susceptibility of the honey bee, the most tested type of bee, is not a very accurate predictor of the responses of wild bees like the mason bees (*Osmia*), leafcutter bees or bumble bees to pesticides and that susceptibility varies by bee species and pesticide. For example, one of our recent trials showed that our Japanese orchard bee was 26 times less susceptible to contact by Provado than the honey bee, but 12 times more susceptible to Assail. Both products are neonicotinoid insecticides and in the same pesticide class.

The purpose of fungicide sprays applied during bloom has been to protect plants from diseases that can infect future fruit tissue through the blossom; thus, fungicide sprays during bloom can decrease or negate the need for fungicides closer to or during harvest. The period from just prior to bloom to just after petal fall are critical times during the disease cycles of pathogens such as apple scab, botrytis, powdery mildew, cherry leafspot, brown rot and cedar apple rust. These are major disease problems, which if left untreated during this time, will devastate the quality of a tree fruit or strawberry (for botrytis and powdery mildew) crop. Some can cause the decline and eventual death of trees. In the case of apple scab, controlling the early season form called primary scab, which attacks foliage mostly until just after bloom, prevents the buildup of secondary scab, which attacks the fruit during the summer. The need to control secondary scab would require 3 to 4 times more fungicide sprays (and cost) than if the disease was stopped as pri-

continued...

mary scab. Now it turns out that practices long utilized to minimize fungicide residues on the fruit are being questioned. So, what is a grower (or field researcher, for that matter) to do?

It might help to understand why this shift in thinking came about, especially since fungicides had previously been thought to be quite safe for bees. For decades, we've known not to apply most insecticides during bloom – except for a very few with unique modes of action – and fungicides alone still appear to be safe, but now it's feared that the combination of some fungicides in special cases with other materials may synergize their toxicity. The first of the situations are with the neonicotinoid insecticides such as Assail, Calypso, Actara and Belay [*Ed. note: Belay is not labeled in NYS*] that can be used pre-bloom in some crops. Because they are to varying degrees systemic and move through the plant tissues, we have found them in apple pollen and nectar at low levels where they can be ingested along with fungicides, even though these insecticides were not sprayed during bloom. This systemic movement can also be found in some fungicides to varying degrees, which helps their efficacy against pathogens. We have had many other systemic insecticides in the past (e.g., Orthene, Mitac, Swat, Lannate,Vydate, etc.) that were not neonics, but they were usually used much later in the season and not a problem to pollinators. Spraying at night may help with many pesticides as they are less toxic when dried, but not with systemic pesticides that are ingested in the nectar and pollen. So much for the "do not spray when bees are actively foraging" clause of many pesticide labels.

Our work at the Penn State Fruit Research and Extension Center has measured the movement of most registered neonicotinoid insecticides into the pollen and nectar of apple from pink sprays (i.e., closed blossom) and has shown that Assail and Calypso, which are also much less toxic to bees than the other compounds of the same class, are also much less systemic with little movement into the nectar and pollen. We did find, however, higher levels of the fungicide Nova/Rally in the nectar and pollen from the same pink application. When we say "higher," it is relative. A typical application of a neonicotionid insecticide would be applied at 100–150 parts per million in the spray tank. Pollen and nectar samples taken 5 days later at about 25% bloom, however, were at the 1–5 parts per billion level. This is up to 100,000 times less than what was in the spray tank. While in most cases, we know that these levels are below what is toxic to the honey bee when exposed to this pesticide alone, it is not well understood how combinations of pesticides affect the long term health of bees, especially the 4,000 other species of bees in the US besides the honey bee. So why use neonicotinoids pre-bloom? With apples, the intent is to control the Rosy Apple Aphid, which has resistance to organophosphate and pyrethroid sprays and can only be controlled by these pesticides at this critical time. Sprays after bloom are "revenge" sprays that may kill the aphids, but don't prevent the stunting of the fruit that happens from feeding during bloom.

The second special situation where spraying fungicides during bloom can cause problems is where the honey bee keepers are using the insecticide/miticide amitraz for control of varroa mites in the hive. Most tree fruit growers will remember amitraz as Mitac, which was used heavily for pear psylla control in the past. This product was routinely used for synergizing organophosphate and pyrethroid insecticides in crops like cotton, where key pests had developed resistance, because it shut down the enzymes insects used to detoxify pesticides. This raises concerns about amitraz being used to treat mites in honey bee hives. While it may be effective in controlling varroa mites now that they have quickly developed resistance to the organophosphate coumophos and the pyrethroid fluvalinate, adding this synergist to a hive basically shuts off a bee's immune system to pretty much any pesticide with which it later comes into contact. In addition, work presented by Dr. Jeff Pettis, from USDA-ARS in Beltsville, MD indicates that amitraz interferes with mating in honey bees. Find-

continued...

ing a replacement for amitraz in controlling varroa mites should be another research priority.

A key point is that most fungicides are still considered pretty safe to bees, even in combination with other pesticides. We refuted a previous lab study with technical product dissolved in acetone that implied synergism of over 1,000-fold when a sterol inhibitor fungicide such as Rally or Indar was mixed with a neonicotinoid insecticide. When we tested formulated product of Assail and Provado with field rates of the sterol inhibitor fungicide Indar in water, we found synergism to be barely significant at a 5-fold level with Assail and non-significant for Provado. We now consider almost all fungicides with the exceptions of captan (Captan, Captec, Captevate), chlorothalonil (Bravo) and mancozeb (Penncozeb, Dithane, etc.) to be safe, even in combinations, until we see further data showing otherwise.

What about Captan, Bravo and Penncozeb? All are old products that are still the mainstays of disease control and resistance management in many crops because they have multiple modes of action. They are also not systemic, so the chances of the bees coming in contact with them from pre-bloom sprays are nil and spraying at night to give the residues time to dry also helps reduce short-term toxic effects. All of these products are suspected to be synergists for other pesticides, and both captan and mancozeb are somewhat insecticidal by themselves at the highest rates (this is typically 6 lb/acre, depending on the formulation). This toxicity is thought to be from chronic long term ingestion exposure of bees of all types feeding on contaminated pollen during their development. The best solution until we know more about the effects of these compounds on bees, is to restrict their use to the half rate that is used in combination with other fungicides, rather than the full rates or the extensive use of the combination of both Captan and Penncozeb, commonly referred to by growers as "Captozeb."

Also, since captan, chlorothalonil and mancozeb seem to be the fungicides most implicated, at least for the time being, their use should be avoided when bees are actively flying. Instead, they should only be used when contact with pollinators is avoidable. Other fungicides that might be used during bloom appear to be relatively safe, though any of this information could change as we learn more. Thus, if possible, fungicides other than captan, chlorothalonil, and mancozeb should be utilized in bloom sprays, remembering to alternate among modes of action. One additional restriction relating to fungicides is the use of sulfur and lime sulfur around or during bloom, as the odor is repellent to bees for up to 48 hours, depending on the rate and formulation. Most growers would not use lime sulfur during bloom anyway, as it is caustic to the flowers.

Fortunately, we now have a new table that was put together for tree fruit growers that lists toxicities of primarily insecticides and miticides to bees, and also provides useful guidelines to follow to protect all pollinators in general. All growers should follow these guidelines, and avoid the materials that are toxic to bees during bloom or when blooming weeds that bees visit are present in the field. The table can be found here:
http://extension.psu.edu/plants/tree-fruit/commercial-tree-fruit-production/honeybees
❖❖

PHENOLOGIES

Geneva:

	5/12, predicted
Apple (McIntosh, Empire): tight cluster	pink
Apple (Red Delicious): early tight cluster	pink
Sweet cherry (early): early white bud	bloom
Sweet cherry (late): bud burst	
Peach: quarter-inch green	bloom
Plum (early): green cluster	bloom
Plum (late): half-inch green	

Highland:
Apple(McIntosh, Red Delicious , Ginger Gold, Empire): early pink
Pear (Bartlett, Bosc): early white bud
Apricot (early): petal fall
Cherry (early): 50% bloom
Cherry (late): bud burst
Peach (early): 50% bloom
Peach late): 10% bloom

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–5/5/14):	215	98
(Geneva 1/1–5/5/2013):	249	124
(Geneva "Normal"):	327	153
(Geneva 1/1–5/12/14, predicted):	311	155
(Highland 1/1–5/5/14):	338	159

Coming Events:	Ranges (Normal ±StDev):	
Green fruitworm flight peak	97–213	36–100
Green fruitworm flight subsides	255–457	117–243
Spotted tentiform leafminer 1st catch	113–213	41–101
Spotted tentiform leafminer 1st oviposition	143–273	58–130
Pear thrips in pear buds	118–214	50–98
Rosy apple aphid nymphs present	134–244	56–116
Obliquebanded leafroller larvae active	158–314	64–160
Oriental fruit moth 1st catch	226–328	98–166
Redbanded leafroller 1st flight peak	228–366	103–187
Comstock mealybug crawlers in pear buds	215–441	80–254
European red mite egg hatch	231–337	100–168
Pear psylla 1st egg hatch	174–328	60–166
Rose leafhopper nymphs on multiflora rose	239–397	96–198
McIntosh at pink	273–317	126–160

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.