SCAFFOLDS Fruit Journal, Geneva, NY
Volume 21, No. 4
Update on Pest Management and Crop Development
April 2, 2012

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COMING EVENTS

| | 43°F | 50°F |
|---|---|---|
| Current DD accumulations | | |
| (Geneva 1/1-4/2): | 259 | 138 |
| (Geneva 1/1-4/2/2011): | 45 | 10 |
| (Geneva "Normal"): | 88 | 34 |
| (Geneva 1/1-4/9 predicted): | 289 | 149 |
| (Highland 1/1-4/2/12): | 301 | 151 |
| (Highland 1/1-4/2/11): | 59 | 19 |

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

| | | |
|---|---|---|
| Comstock mealybug 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 flight subsides . | 247-451 | 111-239 |
| Obliquebanded leafroller | | |
| larvae active ..... | 158-314 | 64-160 |
| Oriental fruit moth 1st catch ..... | 224-328 | 95-165 |
| Pear psylla 1st egg hatch ..... | 174-328 | 60-166 |
| Redbanded leafroller | | |

| | | |
|---|---|---|
| 1st flight peak | 231-363 | 105-185 |
| Rose leafhopper nymphs | | |
| on multiflora rose | 239-397 | 96-198 |
| Spotted tentiform leafminer | | |
| 1st oviposition | 143-273 | 58-130 |
| Spotted tentiform leafminer | | |
| 1st flight peak | 266-402 | 123-207 |
| McIntosh pink | 274-316 | 125-159 |

Phenologies - Current / Predicted April 9

(Geneva):

Apple (McIntosh, Red Del., Empire): tight cluster / pink

Pear (Bartlett): green cluster / white bud

Peach: pink (1st bloom) / bloom

Sweet cherry: bud burst / bloom

Plum: white bud-bloom / bloom

(Highland):

Apple: tight cluster

Pear (Bartlett): white bud

Apricot (early): petal fall

Sweet cherry (Danube, Hudson): 1st bloom

Sweet cherry (Balaton): early white bud

Sweet cherry (Attica): early white bud

Peach (early): bloom

Peach (late): bloom

Plum (Stanley): 1st bloom

PEST FOCUS
Mexico (Oswego Co., submitted by Jim Eve):
Tarnished plant bug feeding causing significant bud damage to apples, especially McIntosh.
Highland: 1st Spotted tentiform leafminer trap catch, 3/27.
1st Oriental fruit moth trap catch today, 4/2.

**[Section: INSECTS]**

PINK EYE
(Art Agnello, Entomology, Geneva; ama4@cornell.edu)
**[Box text: SEEING RED?]**

We may not be quite there yet, as the return to more seasonable temperatures has slowed bud development to a relatively normal pace, but we're still far ahead of normal, and highs are expected to reach the 60s by Easter, so growers should be thinking of pink bud insect management needs now, so as not to be caught off guard in case this also comes around at a gallop.

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** not much further off. OFM has just made its entrance in the Hudson Valley, so it might 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. However, with everything so advanced, we're less certain that the normal relationships between tree growth and insect development will hold true this season, so it may be too early to advise when the newly emerged 1st brood larvae will be best handled. If there is 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 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 hectic activity at this time. TPB is not a good candidate for scouting, and if the bloom period is prolonged by cool, wet weather, a pink spray is of little use. You'll have to decide for yourself whether this bug is of sufficient concern to you to justify treating (see Peter Jentsch's article in the April 5,

2010 issue for a discussion of the factors to take into account: http://www.scaffolds.entomology.cornell.edu/2010/100405.pdf).

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, Proaxis or Warrior 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, and Vydate) 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.

What else could be happening at pink? **Spotted tentiform leafminer** is laying eggs, but most orchards don't seem to suffer too greatly from 1st brood

leafminer these days, and a sequential sampling plan can be used to classify STLM egg density at pink or of sap-feeding mines immediately after petal fall (see pages 69 and 71 in the Recommends). Treatment is recommended if eggs average 2 or more per leaf on the young fruit cluster leaves at pink, or if sap-feeding mines average 1 or more per leaf on these leaves at petal fall. Sampling can be completed in approximately 10 minutes.

**Leafrollers** are also out there, but only a portion of the population is active at this time, so while 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, Carzol, 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. Also, as a reminder, Carzol is restricted to no later than petal fall, so it may be of limited use in most programs. For any of the rescue products, the operational threshold (in June, normally - which could end up meaning May this year) is an *average* of 2.5 motiles per leaf (see the chart on p. 72 of the Recommends).

**[Section: DISEASES]**

CONTROLLING APPLE MILDEW

(Dave Rosenberger, Plant Pathology, Highland; dar22@cornell.edu)

**[Box text: KEEP YOUR POWDER DRY]**

In the northeastern United States, controlling apple powdery mildew may be more challenging in 2012 than in previous seasons because the mild winter of 2011-12

favored survival of mildew in buds and because DMI fungicides are losing effectiveness against mildew in many orchards.

Powdery mildew overwinters in infected buds, but mildew-infected buds are more sensitive to winterkill than are healthy buds. When infected buds are killed during winter, the overwintering mildew also dies. Winterkill of mildew-infected buds begins as winter temperatures drop below 10°F, but suppression of mildew by winter cold is more noticeable after temperatures drop below 0 or –5°F. If temperatures drop to –11°F, then 95 percent of infected buds may be killed, although the timing and duration of the cold periods probably impact the degree of mildew suppression. The bottom line is that the mild winter we just experienced will have allowed excellent survival of mildew throughout most of the northeastern United States.

The DMI fungicides, a class that now includes Vintage, Rally, Procure, Indar, Inspire Super, and Topguard, were exceptionally effective for controlling powdery mildew when the first products in this class were introduced more than 25 years ago. However, observations from both commercial orchards and research plots indicate

that many populations of mildew have gradually become less sensitive to these fungicides. As noted in a previous *Scaffolds* article (see *Scaffolds* 20[3]:5-7, online at: http://www.scaffolds.entomology.cornell.edu/2011/110404.pdf), notable problems developed in some orchards in 2010 when growers switched from Rally or Vintage to Inspire Super. Although Inspire Super has better activity against apple scab than older DMIs like Rally and Vintage, it is somewhat less effective against mildew. That difference allows mildew to explode when Inspire Super is applied in orchards where the mildew population has already shifted toward DMI resistance.

In the absence of resistance, DMI fungicides control mildew not only by protecting new foliage, but also by eradicating incubating infections before they can appear on leaves and by suppressing sporulation of older infections. Because of their post-infection and anti-sporulant activity, DMI fungicides provided effective control of powdery mildew even when the first mildewcide spray was delayed until petal fall. None of the other mildew fungicides provide an equivalent level of post-infection activity against mildew. Therefore, they must be applied earlier in the

season, beginning at tight cluster or pink, so as to protect new leaves against secondary infections. Primary infections are infections that develop from infected buds, and these infections usually begin producing spores by the time trees are at tight cluster.

Because DMI-resistant mildew is emerging in many orchards, a non-DMI mildewcide should now be included in sprays applied at tight cluster and pink. This is true even where DMI fungicides are still working against mildew because including a non-DMI mildewcide at tight cluster and pink will reduce further selection pressure for DMI-resistance. Except for orchards where oil is being applied at tight cluster or pink, the best approach for controlling mildew before bloom might be to include 3 to 5 lb of sulfur per acre with prebloom scab fungicides. This low rate of sulfur will suppress mildew and provide some assistance with scab control, but higher rates of sulfur (e.g., 15 to 20 lb/A) are required if sulfur alone is being used to control scab.

Sulfur can be especially useful in programs where captan or captan-mancozeb mixtures are being used for scab control. Neither captan nor mancozeb will control mildew. Sulfur fungicides that are formulated with

bentonite clay generally provide better residual activity than other sulfur products. One advantage of sulfur is that mildew will not develop resistance to it. A second advantage of using sulfur in prebloom sprays is that, at this application timing, temperatures are usually low enough to eliminate concerns about sulfur phytotoxicity. Sulfur will sometimes burn leaves and even fruit if temperatures exceed 80°F during the three to five days after sulfur has been applied. Sulfur can also be used for mildew control in petal fall and cover sprays, but the high temperatures that contribute to sulfur burn are more likely to occur after bloom.

The strobilurins (Flint, Sovran, Cabrio) provide very effective protection against powdery mildew so long as mildewcide programs are initiated before bloom. The strobilurin fungicides can be used for both prebloom and post-bloom control of mildew, but they may provide suboptimal mildew control if they are applied at petal fall in orchards where no mildewcides were applied prior to the petal fall spray. Unlike DMI fungicides, the strobilurins cannot eradicate pre-existing infections, so they must be used in programs that include prebloom applications of mildewcides.

Label restrictions allow only four applications per year for any combination of strobilurin fungicides. Those wishing to use Flint or Pristine in late summer to control summer diseases will need to preserve one or two of those four applications for the late-summer timing.

Luna Sensation is an excellent option for prebloom mildew control in states where it is registered and available. (This new fungicide is NOT yet registered in New York.) Luna Sensation is a packaged mixture of Flint plus the new SDHI fungicide fluopyram. This mixture provides two modes of action against both scab and mildew, and it therefore provides excellent protection against both of these diseases. However, both components of Luna Sensation can be compromised by fungicide resistance, so Luna Sensation should still be tank-mixed with either captan or mancozeb to slow selection for fungicide-resistant apple scab. As noted, one component of Luna Sensation is a strobilurin fungicide. Thus, any applications of Luna Sensation will also count against the four permitted applications of strobilurin fungicides within any given year.

Where DMI fungicides are still working, they are especially useful during the period immediately after

bloom because they will provide both post-infection and protectant activity, not only against mildew, but also against rust diseases. Among the DMI fungicides, Rally and Topguard are the best choices for mildew control. If Inspire Super will be used for scab control after bloom, then it should probably be supplemented with sulfur at 3 to 5 lb/A to ensure that mildew will be controlled during this critical period.

Protection against powdery mildew is especially important from petal fall through the second cover spray because the rapid growth of terminal leaves during this period provides a constant supply of new mildew-susceptible tissue. Failure to control mildew during this critical period can result in devastating levels of mildew by late June and an abundance of inoculum for infecting the buds that will carry mildew through winter into the next growing season. By the time mildew appears on terminal leaves in mid- to late June, it will be too late to implement effective control measures. Thus, mildew control must be integrated into scab sprays during the entire period from tight cluster through second cover. Mildew protection may be required all the way through midsummer on non-bearing trees, where terminal growth continues long after bearing trees have set terminal buds. The mildew

season ends when trees stop producing new leaves (i.e., when terminal shoots stop growing).

Most fungal spores require water for germination, but powdery mildew spores can germinate and infect tissue anytime that relative humidity is between 70 and 100 percent with temperatures between 50 and 80°F. Optimum infection conditions are 96 to 100 percent relative humidity and 68 to 72°F. Rain actually deters mildew by washing spores off of primary infections and by slowing spore germination. Because mildew thrives in dry weather, mildew problems are often more severe in years that have extended periods with little or no rain between tight cluster and second cover. Thus, mildew sprays may still be required during dry periods when there is little risk from apple scab.

**[Section: GENERAL INFO]**

NEONICS AND BEES

(David Biddinger, Entomology, Pennsylvania State University, Biglerville; djb134@psu.edu)

**[Box text: NO SMOKE]**

In response to a request from a grower for an update on the issue regarding bee colony decline and possible

connections to neonicotinoid use, our colleague Dave Biddinger at Penn State has provided some information from a recent white paper on this topic he co-authored with the Xerces Society. Here is a capsule summary of what appears in this report:

'A possible link between neonicotinoids and honey bee die-offs has led to controversy across the United States and Europe. Beekeepers and environmentalists have expressed growing concern about the impact of neonicotinoids, concern based on the fact that neonicotinoids are absorbed into plant tissue and can be present in pollen and nectar, making them toxic to pollinators.

**Some of the major findings of the report include:**

- Several of these insecticides are highly toxic to honey bees and bumblebees.
- Neonicotinoid residues are found in pollen and nectar consumed by pollinators such as bees and butterflies. The residues can reach lethal concentrations in some situations.
- Neonicotinoids can persist in soil for months or years after a single application. Measurable amounts of residues were found in woody plants up to six years after application.

• Untreated plants may absorb chemical residues left over in the soil from the previous year.

• Products approved for homeowners to use in gardens, lawns, and on ornamental trees have manufacturer-recommended application rates up to 120 times higher than rates approved for agricultural crops.

• There is no direct link demonstrated between neonicotinoids and the honey bee syndrome known as Colony Collapse Disorder (CCD). However, recent research suggests that neonicotinoids may make honey bees more susceptible to parasites and pathogens, including the intestinal parasite Nosema, which has been implicated as one causative factor in CCD.

• Many neonicotinoid pesticides that are sold to homeowners for use on lawns and gardens do not have any mention of the risks of these products to bees, and the label guidance for products used in agriculture is not always clear or consistent.'

Dave adds the following comments:

Note that most of these studies were done on honey bees and most from seed treating crops that are not bee pollinated. As expected, neonics as insecticides can kill bees, but not all are the same, with Assail and Calypso being safer. We have a study we are

submitting soon showing significant synergism of neonics on bees when they are tank mixed with SI fungicides like Nova that can complicate the situation in fruit. Most of the problems are centered around the seed treatments, injections and homeowner uses at rates much higher than allowed in orchards.

For tree fruit, I would summarize in never using clothianidin (Clutch – not labeled in NY) or thiamethoxam (Actara) prebloom, or post-bloom until all the blossoms are gone. 80% petal fall still means 20% bloom, and for growers relying on wild bees, this can really wipe them out. Prebloom, I would only recommend Assail or Calypso at pink and early pink, if possible. Clothianidin is a more toxic breakdown product of thiamethoxam.

Never recommend Assail at bloom, even though it is legal. Synergism with Nova can make it 15X more toxic than by itself. One other lab study shows up to 1,000X synergism of Calypso with an SI funigicide tank-mixed. Other fungicides do not appear to synergize, although mancozeb and captan to a lesser extent can be toxic to wild bee larvae that feed on the pollen. Imidacloprid can only be used post-bloom, but that means when all

petals are off, not just when the honey bee hives have been moved out.

The full report can be accessed online at: http://www.xerces.org/wp-content/uploads/2012/03/Are-Neonicotinoids-Killing-Bees_Xerces-Society1.pdf

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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 3 p.m. Monday to:

Scaffolds Fruit Journal
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