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Update on Pest Management and Crop Development
July 28, 2014

COMING EVENTS

	43°F	50°F
Current DD accumulations		
(Geneva 1/1-7/28):	2110	1429
(Geneva 1/1-7/28/2013):	2194	1515
(Geneva "Normal"):	2215	1421
(Geneva 1/1-8/4/14, predicted):	2279	1549
(Highland 1/1-7/28/14):	2413	1653

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

American plum borer		
2nd flight peak	2005-2575	1351-1777
Comstock mealybug		
1st flight subsides.....	1818-2132	1216-1418
Lesser appleworm		
2nd flight begins.....	1418-2002	918-1326
Oriental fruit moth		
2nd flight subsides	2062-2556	1375-1785
San Jose scale 2nd flight peak.....	2135-2499	1440-1748
Spotted tentiform leafminer		
2nd flight subsides	1987-2365	1311-1635

Pest Focus

Geneva: Apple Maggot 1st oviposition punctures observed 7/21.
Codling Moth 2nd flight began 7/21.

Highland: Obliquebanded Leafroller 2nd flight beginning.

TRAP CATCHES (Number/trap/day)

Geneva

	7/16	7/21	7/24
Redbanded Leafroller	1.3	0.9	0.7
Spotted Tentiform Leafminer	18.3	23.8	12.0
Oriental Fruit Moth	0.8	0.2	0.3
Codling Moth	0.0	0.0	0.0
Lesser Appleworm	0.0	0.2	0.1
San Jose Scale	7.5	192	563
American Plum Borer	0.0	0.4*	0.0
Lesser Peachtree Borer	0.0	0.2	0.0
Pandemis Leafroller	0.0	0.0	0.0
Obliquebanded Leafroller	0.8	0.0	0.0
Dogwood Borer	5.0	3.0	0.5
Peachtree Borer	1.8	0.9	0.5
Apple Maggot	2.5	2.5	4.8

Highland (Peter Jentsch)

	7/7	7/14	7/21	7/28
Redbanded Leafroller	3.8	2.3	0.4	2.1
Spotted Tentiform Leafminer	62.9	48.9	11.1	26.9
Oriental Fruit Moth	4.1	2.8	4.1	2.6
Lesser Appleworm	0.5	0.2	0.5	0.8
Brown Marmorated Stink Bug	1.7	1.3	1.6	5.7
Variegated Leafroller	0.3	0.3	0.1	0.4
Tufted Apple Bud Moth	3.1	0.8	0.1	0.1
Codling Moth	0.4	1.1	2.5	10.4
Sparganothis Fruitworm	0.0	0.1	0.0	0.0
Obliquebanded Leafroller	2.9	0.4	0.0	2.1
Apple Maggot	<0.1*	0.1	0.4	0.5

* = 1st catch

ORCHARD RADAR DIGEST

[Box Text: WHITE OUT]

[H = Highland; G = Geneva]:

Roundheaded Appletree Borer

RAB peak hatch roughly: July 8 to July 25 (H)/July 12 to July 29 (G).

Dogwood Borer

Peak DWB hatch roughly: July 26 (H)/July 31 (G).

Codling Moth

Codling moth development as of July 28: 2nd generation adult emergence at 53% (H)/23% (G) and 2nd generation egg hatch at 16% (H)/3% (G).

2nd generation 7% CM egg hatch: July 24 (H)/ July 31 (G) = target date for first spray where multiple sprays needed to control 2nd generation CM.

White Apple Leafhopper

2nd generation WALH found on apple foliage: August 2 (H)/August 10 (G)

[Section: INSECTS]

MIDSUMMER ROUNDUP

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

[Box Text: GIT ALONG, LITTLE BUGGIES]

Most of the season's major arthropod pest control decisions are likely to be completed this week and next.

As you prepare to make what may be your final passes through the orchard for crop protection purposes before starting to concentrate on harvest activities, try to keep alert to any late-breaking pest developments that might be expected to round out the summer. As in most years, forecast weather trends appear to be more of what we've been having in terms of heat (it's not over yet) and rain (ditto), which will have their specific impacts on insect activity, depending on the species. Here's a quick rundown of some of the more important August pests to keep in mind during this homestretch.

Apple Maggot

Adult numbers have been increasing in the orchard sites where we're trapping for them this year. In historically high-pressure orchards, early to mid-August is the most active period for flies to be out and laying eggs. With the recent rains softening the ground and easing the task of adult emergence, we're sure to see further upticks in trap numbers during this period. As always, localized trapping can pay off in the event that some blocks are under greater pressure than others, even on the same farm, so please continue to monitor traps in representative blocks.

Internal Lepidoptera

This complex of fruit-feeding larvae continues to pose a threat in several problem sites. The second generation flights are under way, and are even heavy in some cases, so it still pays to stay on top of the situation in your specific orchard. Some spots with fruit damage have been noted, but in general, most orchards look to be in good shape.

Conditions are still favorable for good August flights, particularly for codling moth. The most advanced areas of the state will reach at least the 50% mark of 2nd generation egg hatch this week, so we're definitely in the window for control sprays against the smallest larvae. This is an appropriate time for management sprays for oriental fruit moth as well, so prudence would dictate a critical evaluation of your late-season fruit protection status, to be sure you are adequately covered until the PHI for the various respective varieties.

Recommended options in apples include Altacor, Assail, Belt, Calypso, Delegate, or Voliam Xpress. In peaches, you can use Altacor, Assail, Delegate, or Voliam Xpress. Pyrethroids and OPs may be less suitable because of locally resistant populations. This is also a suitable time for Cyd-X or Carpovirusine

granulosis virus applications against codling moth, or Madex HP against both OFM and codling moth. Alternate row middle applications will not be as effective as whole orchard sprays in high pressure blocks. Assess the pressure in your specific situations, check the pre-harvest intervals, and determine whether a full or border spray might be in order.

Comstock Mealybug

In pears especially, this begins the period of greatest migration of 2nd generation nymphs into the fruit calyx, where they will be concealed until detected as unwelcome surprises at packinghouse inspections postharvest. Blocks with mealybug "issues" should receive a protective spray of Actara, Admire Pro, Assail, Centaur, Diazinon, Movento, or Portal; Calypso applied for internal worms should also be effective. In apples, infestations tend to result in blooms of sooty mold, particularly over the bottom half of fruits; choices here are restricted to Assail, Centaur, Movento, Portal, plus whatever incidental control you might obtain from Calypso sprays for internal leps.

European Corn Borer

Recall that these moths have a final flight that extends to the middle of September, and that the offspring can

inflict last-minute fruit feeding damage to later varieties. Delegate (PHI = 7 days) is a good option for control of European corn borer. Also, one or two late sprays of a B.t. product like Dipel can go a long ways toward minimizing this injury, and the 0-day PHI is compatible with any harvest schedule.

Mites

It can't be said often enough that mites are extremely good at exploiting any high temps to pop out a few more generations before they hang it up for the winter; twospotted spider mites are also possible, including in stone fruit plantings, although probably not as likely during a wetter season such as we've been having. A frequent (weekly) inspection of your foliage can pay big dividends if they happen to build rapidly before the crop is fully mature. The 7.5 mites/leaf threshold (sampling chart on p. 75 in the Recommends) would be appropriate at this point in the season.

Obliquebanded Leafroller

The second summer flight of OBLR is due to start during the next 1–2 weeks, which means that the first larvae will be out looking for something to nibble on soon afterwards. If you struggled to manage the 1st summer brood, you might also cast a judicious eye on

your fruits while you're in there checking the leaves for mites, to determine whether a late application of Altacor, Delegate, Proclaim, Rimon or a B.t. material such as Dipel, Deliver or Biobit might be of use in heading off late-season feeding damage.

And don't forget...

Review the comments in the June 9 issue regarding management options for woolly apple aphids, which are still present and may be increasing.

[Section: DISEASES]

SANITATION FOR POSTHARVEST DISEASE MANAGEMENT

(Dave Rosenberger, Plant Pathology, Highland)

[Box text: SANITARY CLAUSE]

Managing fungal diseases that can develop on apples after harvest requires action in at least three different time frames and/or locations during the growing-harvesting season. The risks of postharvest disease development are impacted by preharvest fungicide applications, sanitation of bins and storages, and decisions concerning postharvest treatments (if any) that will be applied. Options for storage room

sanitation will be addressed in this article and options for late summer field sprays and postharvest treatments will be addressed next week.

Research over the past several decades has clearly shown that harvest bins and storage room floors are the major source of inoculum for *Penicillium expansum*, the fungus that causes most of the fruit rots during long-term storage. *P. expansum* survives from one season to the next on storage bins and/or in storage rooms. Spores can remain viable on dry surfaces for several years. In our studies in New York, we found that relatively little inoculum for *P. expansum* originates from orchard sources, but badly contaminated bins can carry more than 900 million *Penicillium* spores per bin from one season to the next.

The spores on bins create problems when filled bins are subjected to recycling drenches containing postharvest treatments because the drench solutions wash spores off of the bins and transfer the inoculum to wounded fruit. It is for this reason that a fungicide must always be included in any recycling drench treatments. However, most of the inoculum on contaminated bins is presumably on the insides of the filled bins where decayed fruit were pressed against the

bin surfaces the previous year. That inoculum is not likely to become airborne because the apples in filled bins prevent rapid air movement that would dislodge the spores from the inner bin surfaces. If bins are not run through postharvest drenchers, then the inoculum on the bin surfaces poses a risk primarily to the few wounded fruit that are in direct contact with the contaminated surfaces. No one has found a cost-effective system for sanitizing large quantities of apple bins, so this potential source of inoculum remains uncontrolled and the decay risks associated with contaminated bins is managed primarily by including a postharvest fungicide in any drench solution that is applied to fruit after harvest.

For fruit that are moved to storage without a postharvest drench treatment, the inoculum on bin surfaces will be much less important because most of it will not be dislodged. The greatest source of inoculum for fruit moved directly to storage will be airborne spores within the storage room during the time when the room is being filled. If floors are not sanitized after rooms are emptied, forklift traffic and the cooling fans will re-suspend the spores left on the storage room floors from the previous year, and some of those spores

will be deposited on apples as they are transported into the room.

Washing empty rooms with water after rooms are emptied is essential for removing debris and remnants of decayed fruit, but washing with water will not eliminate the spore load in the room. This source of inoculum is best eliminated by applying a sanitizer to the empty storage rooms. Numerous commercial sanitizers are available for applications in apple packinghouses and storage rooms.

In the past, quaternary ammonium compounds (quats) were considered the best option for hard surfaces such as bins and storage room surfaces because, unlike chlorine or peroxide-type sanitizers, the quats provided significant residual activity. However, the European Union has recently enacted a maximum residue limit of 0.5 ppm for quats (see http://www.nwhort.org/PDFs/DGSANCOBACDDAC.pdf). No one has enough data to know if a quat applied to a storage room floor could be transferred on bin runners in sufficient quantity to generate excessive residues on apples as the bins are lowered into water flotation tanks on grader lines. Because of this uncertainty, storage operators who expect to export apples to the

EU may wish to avoid using quats in their storage rooms or other fruit contact surfaces, at least until more information becomes available.

Other biocides that can be used to sanitize storage rooms include peroxides (e.g., Stor-Ox) and chlorinated water. Effectiveness of sanitizers is impacted by the following factors:

1. Product concentration.
2. Temperatures of the solution or surface to be treated.
3. Exposure time.

The limiting factor for the non-quat sanitizers is usually exposure time, because activity of these sanitizers ceases as soon as treated surfaces dry (and even before that if surfaces are still dirty). The product labels usually limit product concentrations that can be used. Sanitizers are more active at higher temperatures than at lower temperatures, so storage rooms should be as warm as possible when sanitizers are applied. Exposure time for a 5-log kill with chlorinated water may be less than a minute at 70°F but more than 10 minutes at 40°F. Exposure time of peroxide solutions such as Stor-Ox can be extended by having a service company use a fog generator to continuously supply fresh product over a multi-hour period in closed, empty storage rooms.

If rooms are not sanitized using either a quaternary ammonium treatment or via fogging with a sanitizer, then the next best option may be to treat the storage room floor with chlorinated water. We are testing effectiveness of this procedure in several storage rooms right now, but results will not be available in time to make decisions for this season. In the absence of better information, I suggest the following method for storage rooms that will be sanitized by applying chlorine to the floor:

1. The storage room should be at ambient temperature.
2. The door should be closed with the fan off for at least 24 hours before treatment, to ensure that all airborne spores will settle to the floor.
3. A labeled chlorine-based sanitizer should be mixed according to label directions, most of which allow for a solution containing 200 ppm of free chlorine.
4. The pH of the chlorine solution should be adjusted to 6.5 since high pH will make the chlorine solution less active and low pH will result in off-gassing of chlorine that can be harmful to the applicator.
5. The chlorine solution should be applied to the storage room floor using a low-pressure sprayer (e.g., a

3-gal backpack sprayer) while taking care to avoid any air turbulence that would cause spores to become airborne. Thus, begin spraying near the door and progress to the rear of the storage while spraying enough chlorine to wet the floor. Walking only on surfaces that have already been wetted will minimize the possibility that walking through the room will cause spores on the floor to disperse into the air.

6. Allow the room to dry slowly (or remain wet) for 24 hours before opening the door and turning on the fans to dry the room and dissipate any chlorine odor.

Applying chlorinated water to the floor will NOT eliminate inoculum on the storage room walls, but we know from previous trials that most inoculum settles to the floors in still air.

Sanitizing storage room floors is probably not essential where postharvest fungicides (Penbotec or Scholar) will be applied to fruit. Nevertheless, any reduction in the inoculum load will reduce selection pressure for resistance to the fungicides that are used in postharvest treatments.

Remember that all sanitizers are somewhat corrosive, so allowing a sanitizer to pool on upper surfaces of fan

boxes or other metal components within storage rooms may lead to increased rusting over time. Much more research is needed to document effective sanitation practices, but there are currently very few scientists investigating storage and packinghouse sanitation.

Literature cited

Rosenberger, D.A., Meyer, F.W., Rugh, A.L., Feldman, P.M., and Kostina, J. 2014. Post-infection efficacy of fungicides for controlling summer diseases on apples, 2013. Plant Disease Management Reports 8:PF013. Online publication. DOI:10.1094/PDMR08.

[Section: GENERAL INFO]

EVENT ANNOUNCEMENTS

[Box text: FRUIT TOUR]

WAYNE COUNTY FRUITGROWER TOUR
Wednesday, August 6, from 9:00 am
Registration and 1st stop at Wafler Nursery & Orchards, 10748 Slaght Rd, Wolcott, NY

Sponsored by agr.assistance, this large, informative and entertaining tour is in its 16th year, and will feature presentations on new club varieties, advances in

automated fruit harvest systems, fire blight and apple scab management, PGR use, dealing with biennial bearing, orchard weed control, and internal worm management options, plus much more. Door prizes, lunch, some levity, a BBQ/clambake dinner with a live band, growers and industry representatives from NY and surrounding states — tough to beat on a midsummer day. Free attendance. Contact Lindsay LaMora (585-734-8904; lindsaylamora@agrassistance.com) for RSVP pre-registration and tour information.

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