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Update on Pest Management and Crop Development
July 2, 2012

COMING EVENTS

	43°F	50°F
Current DD accumulations		
(Geneva 1/1-7/2):	1795	1184
(Geneva 1/1-7/2/2011):	1525	993
(Geneva "Normal"):	1442	902
(Geneva 1/1-7/9 predicted):	2020	1160
(Highland 1/1-7/2/12):	1956	1261
(Highland 1/1-7/2/11):	1658	1071

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

American plum borer		
2nd flight begins.....	1522-2064	1011-1363
Apple maggot		
1st oviposition punctures.....	1605-2157	1144-1544
Codling moth 2nd flight begins...	1569-2259	1023-1515
Comstock mealybug		
1st adult catch.....	1308-1554	809-1015
Comstock mealybug		
1st flight peak.....	1505-1731	931-1143
Comstock mealybug		

1st flight subsides.....1818-2132 1216-1418
Lesser appleworm
2nd flight begins.....1418-2002 918-1326
Obliquebanded leafroller
1st flight subsides.....1612-1952 1048-1302
Oriental fruit moth
2nd flight peak 1466-1996 932-1344
Redbanded leafroller
2nd flight peak 1554-2002 996-1344
San Jose scale
2nd flight begins.....1611-1965 1044-1322
Spotted tentiform leafminer
2nd flight peak 1373-1795 856-1194
STLM 2nd generation
tissue feeders present.....1378-1795 856-1194

PEST FOCUS

Geneva:

Apple Maggot flight began 6/29.

Obliquebanded Leafroller DD43 developmental model @ 882 (May 28 biofix); 100% egg hatch predicted to occur at 950 DD.

Highland:

Obliquebanded Leafroller DD43 developmental model @ 918 (May 27 biofix); 100% egg hatch predicted to occur at 950 DD.

TRAP CATCHES (Number/trap/day)

Geneva

	6/21	6/25	6/29	7/2
Redbanded Leafroller	0.0	0.1*	0.1	0.1
Spotted Tentiform Leafminer	24.3	34.1	12.6	11.8
Oriental Fruit Moth	0.2*	0.4	1.1	0.6
American Plum Borer	0.0	0.0	0.0	0.0
Lesser Appleworm	0.0	0.0	0.1	0.0
San Jose Scale	0.0	0.0	0.0	0.1
Codling Moth	0.2	0.0	0.0	0.0
Lesser Peachtree Borer	0.5	0.0	0.3	0.0
Peachtree Borer	0.0	0.3	0.3	0.0
Pandemis Leafroller	0.8	0.1	0.0	0.0
Obliquebanded Leafroller	0.5	1.8	0.8	0.1
Apple Maggot	-	0.0	0.4*	0.0

Highland (Peter Jentsch)

	6/11	6/18	6/25	7/2
Redbanded Leafroller	0.5	1.6	1.6	1.4
Spotted Tentiform Leafminer	70.2	7.6	49.4	49.4
Oriental Fruit Moth	0.5	0.0	0.0	1.6
Codling Moth	0.6	0.6	0.6	0.1
Lesser Appleworm	1.9	1.1	3.3	2.5
Tufted Apple Budmoth	0.0	4.6	5.4	2.0
Fruittree Leafroller	0.9	0.6	1.2	0.2

Variegated Leafroller	0.9	0.8	0.0	<0.1
Obliquebanded Leafroller	0.9	1.6	1.4	2.5
San Jose Scale	23.6*	0.0	0.4	0.6
Apple Maggot	-	0.0	0.5*	0.9

* = 1st catch

ORCHARD RADAR DIGEST

[Box Text: JULY KIT?]

Geneva:

Roundheaded Appletree Borer

Peak hatch roughly: June 30 to July 19.

Codling Moth

Codling moth development as of July 2: 2nd generation adult emergence at 2% and 1st generation egg hatch at 99%.

Oriental Fruit Moth

2nd generation - second treatment date, if needed: July 6.

Redbanded Leafroller

Peak catch and approximate start of egg hatch: July 1.

Spotted Tentiform Leafminer

Optimum first sample date for 2nd generation STLM sapfeeding mines: June 30.

[Section: INSECTS]

HOME TO FARM, THE BROWN MARMORATED STINK BUG SPREADS THROUGH THE HUDSON VALLEY

(Peter Jentsch, Entomology, Highland; pjj5@cornell.edu)

[Box text: MOVIN' ON UP]

Homeowners and fruit growers in the mid-Atlantic experienced a dramatic decrease in brown marmorated stink bug (BMSB) populations and damage to agricultural crops during the 2011 growing season. *Why such a shift in the life of a pest that had caused over 37 million dollars in fruit damage the previous year?* Simply put, the previous two years had culminated in a "Perfect Storm" for the insect tempest experienced in 2010. First discovered in the mid-1990s in Allentown, PA, the brown marmorated stink bug had slowly spread through the region, first becoming an urban and then garden pest, considered only as a secondary pest of agricultural commodities. However, by 2009, environmental conditions favored both tree seed development, used as a food source by the insect, and stink bug reproduction, while late season drought conditions favored high nymph survival. Then, late in the season, the pest began causing limited but economic injury to apple just prior to harvest.

Researchers believed the insect would be relegated to "late season pest" status.

This assumption caught growers off their guard during the start of the 2010 growing season, when very high populations of adult BMSB migrated in directly to feed on early season peach and apple. By mid-May, over 20% fruit injury had occurred well before producers knew what hit them. These events led to impulsive and ineffective pest management strategies, culminating in devastating harvest losses, and resulting in total crop losses on many farms plus unprecedented high overwintering populations. As the new season progressed, landscape trees were inundated with migrating adults and developing nymphs, poised to move to fruit and vegetables. Agricultural producers, having been caught unaware the year before, began the season with intensive and effective early season insect pest management programs. This proactive approach limited the damage caused by the season-long presence of this pest. A second factor that led to a dramatic decrease in BMSB populations was hurricane Irene and tropical storm Lee. Heavy winds and rain from the severe weather caused significant insect mortality throughout the mid-Atlantic. Pest reductions,

although limited, were also observed as a result of native predation from parasitic wasps and flies.

Well, we also experienced severe wind and rain from the storms last season. So why would the populations of BMSB be increasing in the Hudson Valley? To put it in perspective, the mid-Atlantic went from a peak population level under "overcrowded conditions" prior to the hurricane, to a moderate population level still present in homes and agricultural commodities, resulting in lower numbers after the storms. In NY, we experienced low populations that were most likely reduced during the storms, yet these successfully reached adulthood to overwinter in homes. In the lower and mid-Hudson Valley, there is some anecdotal evidence suggesting that BMSB numbers are on the rise. NY residents who had BMSB residing in their home sent specimens or images to the Hudson Valley Laboratory for identification over the past three years. In conducting these specimen surveys, we have observed, in general, regional homeowners reporting increases in overwintering populations over the past two years. This has provided us with zip code or coordinate locations of overwintering adults now confirmed in 31 New York State counties. Two maps of BMSB distribution in the state can be found on the

Hudson Valley Regional Fruit or the iMapInvasive websites.

In Highland, NY one homeowner submitted an unprecedented 1000 adults to us during the past winter. This level of infestation was unheard of just two years earlier. We observed BMSB adults beginning to leave urban homes in late March this year, during what is considered to be the earliest spring on record in the Hudson Valley. By the 27th of April, we captured our first adult BMSB in traps placed in Orange County orchards. By the 1st of June, we were capturing adults on landscape plants with egg laying beginning at that time. The first adults, eggs and nymphs were observed on grape and apple on the 11th of June. As of the 26th of June, we are now seeing 4th instar nymphs. If conditions are conducive for rapid development, we may see a second generation of BMSB this season. A second generation would undoubtedly increase the overwintering population, barring adverse environmental conditions.

If these insects are on landscape trees, why don't they move to crops and begin to feed straightaway? We have seen the insect in agricultural commodities in very low numbers this season, yet only a few adults and no

economic injury has been observed in tree fruits or vegetables thus far. It appears, at least from the numbers we are seeing, that they prefer "Asian host plants" to most agricultural crops. However, soybean, being of Asian origin, is very appealing to the brown marmorated stink bug, so it would most likely move directly to soybean if it were available. They have been found on over 300 landscape plants in surveys conducted in Maryland. Observers have seen highest numbers of the insect on the Asian invasive Tree of Heaven, *Ailanthus altissima*, the invasive *Paulownia tomentosa,* imported from China, northern catalpa, *Catalpa speciosa*, native to East Asia, plus ash and maple. Most of these trees flower in the early spring and by mid-season produce seeds, on which developing nymphs and adults feed. As stink bug does not feed during the winter, these food sources supply them with ample plant sugars, proteins and fats required for the long winter diapause, lasting for over 6 months. Seed clusters of *Ailanthus*, ash and maple also provide an ideal habitat with high humidity and secluded protection.

Aren't these insects just like the stink bugs I have always seen? No, these are newly introduced invasive insects that have uniquely different habits from our

native brown and green stink bugs. The adults of BMSB will lay eggs on agricultural commodities, with adults and developing nymphs found feeding throughout the entire season on a variety of crops. We don't see this season-long presence of the native stink bug complex on crops. We do, on occasion, see native stink bug laying eggs on foliage, yet the nymphs will move to weed stands along agricultural edges. And yes, we do see late-season adult feeding on fruits and vegetables, usually during drought conditions. There have been recent observations of "look-alike" eggs, nymphs and adults in pear, apple and grape over the past few weeks. These, of course, add to the confusion in pest management decision-making for brown marmorated stink bug. One such look-alike is the brown stink bug, *Euschistus servus*, which is similar in size, color and striping along the primary wings.

How do you know if the insect is in or near agricultural crops? We have been conducting visual field monitoring and pheromone lure trapping this season, and have observed the adult moving from the urban environment to landscape plants. We have seen the highest numbers of the adult BMSB in the canopy of the Tree of Heaven. Looking within the canopy of this tree, we have found greater numbers of adults in the tops

(40-50' high) when compared with a lower level (10-20') monitored using a trailer-mounted boom lift, or ground level (<10'). Most of the egg clusters we observed were also found on Tree of Heaven, followed by observations of BMSB on species of maple, ash and elm.

Success in our trapping efforts has been observed this year, with increasing numbers of adult captures in several of our trapping systems intended to monitor BMSB along the edge of agricultural commodities. We are using a series of baited and unbaited Tedders traps, as well as black light traps, to capture the insect. A newly developed lure ("Lure #10"), synthesized by USDA, has captured significantly more insects than the lure we employed last year, *methyl* (E,E,Z)-2,4,6-*decatrienoate (MDT)*. Last week, we also observed a spike in black light trap captures bordering apple. USDA is developing a combination trap incorporating both pheromone lure and light, which has shown slightly higher captures using the combination of these attractant stimuli.

So how do I best keep these insects out of crops? Well, that's the million-dollar question. Bioassay studies, conduced by USDA-ARS and PSU-FREC have provided insight into the efficacy of labeled materials

for managing this pest. In organic systems, the use of Surround WP, a barrier film of kaolin clay, has been shown to provide some mortality of the insect. The use of OMRI-approved pyrethrin formulations such as Pyganic may help to reduce and repel the population; however, the active ingredient, pyrethrum, breaks down quickly under UV light. Late day applications will have greater success in achieving efficacy, as the insects are quite active during the evening.

It may be common knowledge to agriculturists, but it should not be understated that not all insecticides, even those effective against our most difficult to control insects such as plum curculio and obliquebanded leafroller, will effectively control the BMSB. Commonly used pest management tools, often used during the middle to end of the season for the lepidopteran complex, plus apple maggot and woolly apple aphid or San Jose scale, such as phosmet (Imidan), carbaryl (Sevin), chlorantraniliprole (Altacor), indoxacarb (Avaunt), spinetoram (Delegate), and diazinon, have been shown to be relatively ineffective.

In commercial pome fruits, the judicious use of labeled insecticides that are among the most effective materials against BMSB include those in the

neonicotinoid group: thiomethoxam (Actara), dinotefuran (Scorpian and Venom; not yet labeled in NY), clothianidin (Belay; not yet labeled in NY) are the least disruptive, yet very effective. The pyrethroid group: bifenthrin (Bifenture, Brigade; labeled in pears only), permethrin (Pounce), and fenpropathrin (Danitol), have a relatively short PHI. Pre-mix combinations of a.i.s including pyrethroids, neonicotinoids and diamides, such as Voliam Flexi, Leverage and Endigo, have high degrees of efficacy. Older compounds effective against this insect include a low rate of endosulfan (Thionex), and higher rates of methomyl (Lannate) and oxamyl (Vydate). Be certain to check the labels for proper timing and use rates, re-entry and pre-harvest intervals (REI & PHI). The currently available list of products available for use against BMSB on tree fruit can be found in the "Additional Summer Sprays" sections of each of the crops in the Tree Fruit Guidelines.

We can relay some encouraging news from our findings this season. A few of the field-collected egg clusters have shown evidence of predation, while common foraging ants in the genus *Tetramorium* have been observed carrying away the eggs of BMSB to underground nests and feeding on early instar nymphs.

Researchers in Ohio and Maryland have also observed native parasitic activity by micro-hymenopteran wasps and parasitic flies. We are hopeful that the combination of native predation and releases of beneficial parasitic wasps, such as the Asian scelionid egg parasitoid, *Trissolcus halyomorphae* Yang, being held in quarantine for study by USDA, will provide significant suppression of the BMSB. Although no significant injury has yet been reported in orchards, gardeners and growers should remain diligent in their efforts to scout for this insect in regions where BMSB has been observed in the state.

SETTING UP CAMP

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

[Box Text: LITTLE SUCKERS]

Just a repeated advisory to check your apple foliage for any of the summer inhabitants that have been noted with increasing frequency around the state:

1) Colonies of woolly apple aphids are now being observed moving into the outer portions of the apple canopies to establish aerial colonies.

2) Green aphids, which are also present, will not be as difficult to control as woollies; depending on the species in question, your (or your buyers') tolerance for

the insects, their honeydew, and damage, insecticide options include Assail, Beleaf, Diazinon (woolly aphid only), Movento, Provado, Thionex, pyrethroids and others.

3) Potato leafhoppers continue to move into the state, sometimes in large numbers, posing a threat to new foliar growth, particularly in younger fruit trees. Many aphid products will similarly control leafhoppers.

4) Keep an eye out for developing mite populations; numbers of both European red mite and twospotted mites could increase rapidly with the hot, dry weather. The recommended treatment threshold during July is 5 motiles per leaf (see the sampling chart on p. 73 of the Recommends).

CORRELATING CURRENT AND HISTORICAL HONEY BEE HIVE RENTAL DATA WITH FRUIT PRODUCTION

(EJ Blitzer, Entomology, Ithaca; ejb278@cornell.edu)

[Box text: BEE NEWS?]

My research, with Bryan Danforth and Mia Park at Cornell, focuses on understanding the role of native and managed pollinators in apple orchards. For a new project, I am collecting data on effects of honey bee hive rental density (hives/acre) on fruit production. To best provide growers with information on pollination

services, we need to gather data from as many farms as possible. Please contact me if you have current and/or historical data on orchard production and numbers of hives rented and are willing to share this with me for analysis. All data would be kept confidential. Contact: ejb278@cornell.edu, 510-590-7702.

[SECTION: GENERAL INFO]

EVENT REMINDERS
[Box text: WHAT'S NEW?]

LAKE ONTARIO CORNELL COOPERATIVE EXTENSION
SUMMER FRUIT TOUR
Featuring New Technology in the Wayne Co. Fruit Industry
Tuesday, July 24, starting 8:00 am: G & S Orchards, 825 Atlantic Ave., Walworth

Highlights of the tour will include berry and odd fruit production and pest management issues, innovative CSA marketing, weed control treatment plots in young trees, alternative pollinators for fruit crops, update on strep-resistant fire blight in NY, controlling tree growth in a light crop year, climate, frost and crop protection methods, managing growth in grafted trees, using induction cones for safer pesticide mixing, using

platforms and hedgers for increased labor efficiency in tall spindle plantings. Growers, industry, and Cornell faculty and specialists will share new technology and better ways to produce fruit.

Stops: G & S Orchards, Walworth; Mason Farms, Williamson; Orbaker Fruit Farm, Pultneyville; Knapp Orchards, Sodus; and VandeWalle Fruit Farms, Alton.

Thanks to Sponsors, there is no charge to attend!
Please register by July 20: Call 585-798-4265 or email krh5@cornell.edu
For more information, visit:
http://www.fruit.cornell.edu/lof

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