

scaffolds

Update on Pest Management
and Crop Development

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

July 22, 2013

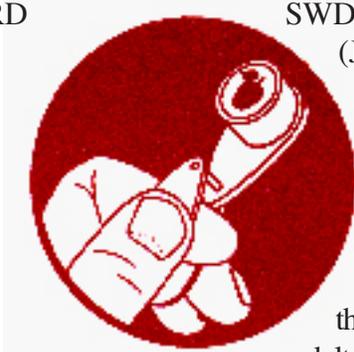
VOLUME 22, No. 18

Geneva, NY

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**BLIP OF
THE
WEEK**

**ORCHARD
RADAR
DIGEST**



SWD UPDATE

(Julie Carroll,
NYS IPM
Program,
Geneva;
jec3@cornell.edu)

**ON THE
SPOT**

Geneva Predictions:

Roundheaded Appletree Borer

Peak hatch roughly: July 10-28

Dogwood Borer

Peak DWB egg hatch roughly: July 28.

Codling Moth

Codling moth development as of July 22: 2nd generation adult emergence at 26% and 2nd generation egg hatch at 3%.

2nd generation 7% CM egg hatch: July 25 (= target date for first spray where multiple sprays needed to control 2nd generation CM).

White Apple Leafhopper

2nd generation WAL found on apple foliage: August 4.



PEST FOCUS

Geneva: **Codling moth** and **Oriental fruit moth** and **San Jose scale** 2nd flights beginning.

Highland: **San Jose scale** 2nd flight increasing.

❖❖ There has been an upswing in the number of spotted wing *Drosophila* adults captured in traps in Ontario County being monitored by Greg Loeb's lab, as of July 16; all of these have been in small fruit. In a raspberry planting, 4 traps caught a total of 1 male and 4 female SWD. In woods next to a strawberry planting, 3 traps caught a total of 3 male and 6 female SWD. In a blueberry planting, 3 traps caught a total of 3 female SWD. Overall, this is a likely trend toward an upswing to peak problems in August in western NY. We (Loeb, Agnello, and Carroll) have not yet caught any SWD in traps set in the Lake Ontario region. For continued...

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INSECTS

- ❖ Orchard Radar Digest
- ❖ Spotted wing *Drosophila* update
- ❖ Dock sawfly
- ❖ Hudson Valley pest update

CHEM NEWS

- ❖ Bifenthrin Sec. 18 for Hudson Valley

GENERAL INFO

- ❖ Event announcements and registration forms

PEST FOCUS

INSECT TRAP CATCHES

UPCOMING PEST EVENTS

your reference, a quick guide to the insecticides labeled and available for use against SWD in the following crops have been posted on the Cornell Fruit website:

Stone Fruits and Grapes

<http://www.fruit.cornell.edu/spottedwing/pdfs/TreeFruit-GrapeSWDinsecticides2013.pdf>

Berry Crops

<http://www.fruit.cornell.edu/spottedwing/pdfs/Updated-Labeled InsecticidesNY-SWD-Final.pdf>

UN-
HOLEY

IT CAME FROM THE DOCK
SIDE

(Art Agnello, Entomology,
Geneva)

❖❖ The dock sawfly always creeps in during the waning days of summer. Following is a repeat of our annual write-up on this pest:

Before and during apple harvest in recent years, a number of growers and fieldmen have been unpleasantly surprised by the appearance of neat little (2 mm) holes bored into the side of their fruit, similar in appearance to those caused by a stem puncture. Although graders sometimes attribute this damage to apple maggot or European corn borer, cutting open these apples reveals a bright green worm with a light brown head, 3 pairs of true legs and 7 pairs of prolegs, not feeding but lying inactive, in the burrow extending in from each hole. These are larvae of the dock sawfly, *Ametastegia glabrata*, a highly sporadic but nonetheless well documented apple pest that has been known to show up in our area since 1908.

Dock sawfly probably confines its feeding almost entirely to plants belonging to the buckwheat family (Polygonaceae), including numerous docks and sorrels, the knotweeds and bindweeds, or else wild buckwheat or alfalfa. In feeding on any of these plants, the larvae devour the leaf tissue and the smaller veins, eating out irregular holes in the leaves. Ordinarily, the midribs and the larger veins are untouched. This insect should not be confused with the related European apple sawfly, *Hoplocampa testudinea*, which has a whitish larva that lives and feeds in

young apples, particularly prevalent in the eastern apple regions of N.Y.

Injury to apples by the dock sawfly is known to occur generally in the late summer and early fall, when the fruit is approaching maturity and the sawfly is searching for an overwintering site. The greater hardness of immature apples probably deters the larvae from burrowing into these, so although 4 generations per year have been identified, only the last one or two are of concern to apple growers. The injury to apples consists externally of the small round holes bored by the larvae, which after a few days show a slightly sunken, brownish ring around them and occasionally may be surrounded by a larger discolored halo. These holes may occur anywhere on the surface, but are most numerous around the calyx and stem ends, or at a point where the apple touches a leaf or another apple, since it is easier for the larva to obtain a foothold here. Inside, the injury is usually more serious, since the larva often burrows to the core and usually hollows out a pupal cell somewhat larger than itself. Apples may have three or four, or sometimes even eight, holes in them of varying depths, but contain only one or two worms.

Since the dock sawfly does not feed upon any part of the apple tree, but must live on the above-mentioned succulent weeds, it becomes an apple pest only where these

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Geneva, NY 14456-1371
Phone: 315-787-2341 FAX: 315-787-2326
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Editors: A. Agnello, D. Kain

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

plants are growing in or around the orchard. There is little danger from this insect in orchards where the food plants don't exist. Likewise, the possibility of the larvae coming into the orchard from neighboring meadows, ditch banks, or roadsides is slight, for the larvae are incapable of finding their way over any extent of bare soil. The adults, though active, are not strong fliers, and it is not possible for the insect to travel far in this stage. Now would be a good time to assess the weed situation in your orchard and make plans for such selective herbicide applications as may be appropriate regarding this insect. Even though common wisdom says this sawfly is a pest only every 10-12 years, this is only an average estimation, and it's not a bad idea to anticipate the unexpected when hardly any season is considered to be "average". ❖❖

(Information adapted from Newcomer, E. J. 1916. The dock false-worm: An apple pest. USDA Bull. 265, 40 pp.)

HUDSON VALLEY FIELD NOTES

HUDSON VALLEY
UPDATE: A MIGHTY HOT
WEEK, AND GETTING
HOTTER
(Peter Jentsch, Highland,
pjj5@cornell.edu)

❖❖ Brown Marmorated Stink Bug (BMSB) Update: We've seen increasing numbers of BMSB in our pheromone traps in monitored sites in the lower and Mid-Hudson Valley over the past two weeks. Nymph captures are steadily on the rise in Orange, Ulster, Dutchess and, to a lesser extent, Columbia Counties. The last, or 5th, instar was first observed last week in Orange and Ulster, indicating the onset of the 1st adult generation maturing this week. With emerging adults, the development of the 2nd generation, and significant increases in BMSB population, it is very likely that we will begin to see movement of this insect into tree fruit over the next three weeks.

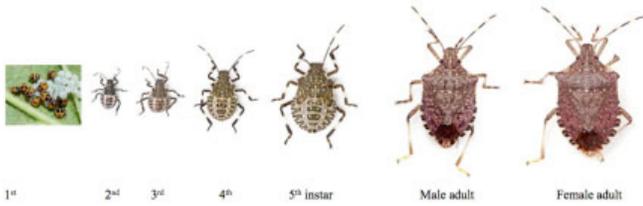
In 2012 we observed the native green stink bug present throughout much of the season while the

1st generation of BMSB adults first appeared in orchards during their migration into tree fruit in early to mid-August. As stink bug feeding injury does not express on fruit for 2-3 weeks, fruit damage last year did not appear until early September. By mid-October, injury levels had exceeded 21% in three orchards in Ulster and Orange Counties. The majority of the damage occurred along the orchard perimeter, within 90ft of tree fruit bordering woodlands. For example, 85% fruit injury occurred in the first 30ft of orchards bordering deciduous trees, with a lessening of injury in toward the orchard center.

The documentation of 2012 injury was brought collectively to the EPA by the Mid-Atlantic States and New York to request and subsequently receive a 2013 Section 18 use of the active ingredient bifenthrin (See CHEM NEWS) in the formulations Brigade WSB (10% bifenthrin, EPA Reg. No. 279-3108), Bifenture 10DF (10% bifenthrin, EPA Reg. No. 70506-57) and Bifenture EC (25% bifenthrin, EPA Reg. No. 70506-227). Label restrictions include that applications be made by ground only at a rate of 0.08 to 0.2 lb. per acre with a yearly maximum of 0.5 lb. per acre; with a minimum application interval of 30 days, REI of 12 hours and PHI of 14 days. Bifenthrin is the most effective pyrethroid available for BMSB management. A second request, submitted to the EPA for the neonicotinoid, Dinotefuran (Scorpion and Venom), the most efficacious of the neonicotinoid group for BMSB management, has not yet been approved.

Strategies for BMSB management should begin with perimeter applications in rows where BMSB nymphs or adults have been observed. Determining the presence of the BMSB can be difficult as the life stage color and form are uniquely different. The 1st instar, with black head and red thorax and abdomen with small black stripes, remains on or near the white egg cluster. The 2nd instar has no leg banding while the third through fifth instars do, with adults exhibiting both antennal and leg band-

continued...



ing. Beginning this week, scouting should be conducted along the perimeter of the orchard within 30ft of bordering deciduous woodland or hedge-row. The first sighting of BMSB along the perimeter should trigger the initial perimeter application. Subsequent scouting should begin on day 4 following the application to determine management effectiveness. Upon next BMSB detection, a follow up perimeter application should be made. Continue scouting at a 4-day interval, making applications as BMSB are detected. The third and fourth applications should begin an alternate row program (ARM), again triggered by observations of adults or nymphs within the 30ft perimeter. The fifth application should be a whole orchard application to clean up stink bug within the center of the orchard. The sequence should then be repeated through the remainder of the season beginning with 2 perimeter applications, followed by ARM applications and, as needed, a whole orchard application through the remainder of the season. As this insect is an arboreal, or deciduous tree pest, which remains close to the orchard perimeter along the woodland edge, the use of perimeter applications will place the insecticide where it will have the greatest impact.

For the initial perimeter application, bifenthrin at the highest labeled rate should be considered due to the 30-day interval for subsequent applications, and a 3 application limit. Insecticide efficacy is based on laboratory residual efficacy, not field residual efficacy. Field trials have shown significant reductions in efficacy after 24-hour exposure to environmental conditions. Another factor to consider is the generational and life stage susceptibility of BMSB to insecticides. The overwintering adult is much more susceptible to insecticides than are the 1st and 2nd generation adults, with young nymphs being more susceptible to treatments than are the adults.

Mites: During the past three weeks soils have dried out in most Hudson Valley orchard sites with only 0.67in of rainfall recorded in Highland since the 2nd of July. The lack of rain, coupled with temperatures exceeding 90°F through most of the past week, provided the European red mite (ERM) and two spotted spider mite populations optimum conditions to build up in tree fruit orchards. Under last week's environmental scenario, the time it takes for a mite egg to develop, and for immature mites to become adults can occur rapidly, in as little as 7 days. These shortened intervals of development, relative to higher average temperature, typically leads to rapid mite development that may require management at this time.

The use of conventional fungicide and insecticide tools in pome fruit management all too often contributes to mite flare-ups. We have observed the use of multiple post-bloom applications of manzate substantially reduce populations of phytoseiid mites (the predatory mites that can keep European red mite (ERM) and two spotted spider mite (TSSM) in check). The use of pyrethroids this season, especially in controlling the 17-year cicada and brown marmorated stink bug, will certainly contribute to the reductions of mite predators, including the phytoseiids and *Zetzellia mali*, a yellow predatory mite. If ERM and TSSM economic thresholds are exceeded, foliar feeding will reduce leaf photosynthesis, leading to reduced fruit size, color, return bloom and set.

Early season mite injury (before July 1) is more severe on trees than late-season injury. Apple trees "increase in tolerance" as the season progresses, so to speak, and continue to create more leaf surface area for carbohydrate production, so progressively higher mite populations can be tolerated later into the season. So, now as we approach August, the European red mite threshold increases from 5 to 7.5 mites per leaf. Research conducted by Nyrop and Reissig found that cumulative mite day values of 750 to 1000, which accumulated after June 15,

continued...

were observed to produce no measurable effect on yield or fruit quality during the year damage occurred or during the following year. (A mite day is the cumulative measure of mite density through time; one mite on a leaf for ten days yields ten mite days as does ten mites on a leaf for one day). Furthermore, no effect of mite injury was found when this level of mite feeding was sustained for two years on the same trees. A cumulative mite day measurement of 750 CMD through the season produced slight but noticeable leaf damage or bronzing. It also corresponds to a peak mite density of approximately 30 mites per leaf. In other words, trees can tolerate noticeable bronzing and relatively high populations, especially during in the later part of the season, with little to no impact on yield, return bloom, or fruit quality.

If management is required, then the choice of miticides becomes the issue as mites begin to build. We've had a few new miticide registrations in NYS over the past 10 years, such as Kanemite 15SC and Portal 0.4EC. Both of these materials target the mitochondrial electron transport system (METI) that inhibits cellular respiration (as does Nexter). This new chemistry should be limited to one application/year to reduce the potential for the development of resistance to this group. These products have activity against all motile stages of mites (larvae, nymphs, and adults) but lack activity against the egg. In field observations, it has become apparent that the efficacy of these miticides relies heavily on contact exposure with building populations,



a difficult task given the amount of foliage on the trees by late July.

We often see a shift in mite populations this time of year, from ERM to TSSM. Remember that TSSM causes higher levels of damage than ERM and the use of more conservative threshold levels should be employed. We presently have no less than 10 miticides plus a number of highly refined horticultural oils to work with on apple. However, Kanemite, Nexter, and Portal, only one of which should be used one time during a season, are METI based modes of action. Onager and Savey have the same active ingredient, and are limited to one application per season. So realistically, we only have the option of 6 miticides for mite management if we adhere to resistance management guidelines.



In a study conducted on a running ERM population, we trialed 10 miticides 5-days after petal fall on 16-year old Red Delicious. Pre-treatment populations averaged 4.7 ERM adults/leaf on 19 May. Single application handgun treatments delivering approximately 400 GPA were applied to drip. Shown in the graph are Cumulative Mite Days. Given the results of this study, Onager 1EC, Zeal 72WS, Savey 50DF and Agri-Mek + oil performed well, maintaining low CMDs up to mid July. The lackluster performance of Nexter was attributed to high water pH, measured post-application to be 8.2, obviously critical to Nexter's efficacy. Enviodor, followed by Acramite, Danitol and 1% Damoil reduced populations compared with the untreated controls. Carzol, not labeled post-petal fall, performed poorly. ❖❖

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YSECTION 18 BIFENTHRIN
LABEL FOR BMSB IN
HUDSON VALLEY

❖❖ The US Environmental Protection Agency has granted New York State a FIFRA Section 18 specific exemption for the use of Bifenture EC Agricultural Insecticide (EPA Reg. No. 70506-57), Bifenture 10DF Insecticide/Miticide (EPA Reg. No. 70506-227), and Brigade WSB (EPA Reg. No. 279-3108) to control brown marmorated stink bug on apples in Dutchess, Orange, and Ulster counties.

Please note the following:

- The Section 18 labels restrict use to Dutchess, Orange, and Ulster Counties. Use in any other counties is prohibited.
- The exemption is valid through October 15, 2013.
- Bifenture EC, Bifenture 10DF, and Brigade WSB are restricted-use pesticides.
- Aerial application is prohibited.

Users must have a copy of the appropriate Section 18 exemption in their possession at the time of use. Users must also follow all applicable directions, restrictions, and precautions on the primary product label. Copies of the Section 18 authorization letter and the approved labels are available in the regulatory section of our website at: <http://pmep.cce.cornell.edu/regulation/sec18/2013/index.html>. Copies of the approved labels should be posted to PIMS (<http://pims.psur.cornell.edu>) shortly.❖❖

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ANNOUNCEMENTS

CORNELL FRUIT FIELD DAY

❖❖ Cornell University will host the 2013 Fruit Field Day at the New York State Agricultural Experiment Station in Geneva, NY, on Thursday, August 1, from 8:00 a.m. to 5:00 p.m. The field day will be composed of two concurrent day-long tours, one of tree fruit presentations and another tour of grapes, hops and small fruit presentations. Fruit growers, consultants, and industry personnel are invited to tour field plots and learn about the latest research and extension efforts being carried out by Cornell researchers in Geneva and Ithaca and on commercial farms around the state. The event will focus on all commodities of key importance to New York's \$350 million fruit industry: apples, grapes, cherries, raspberries, strawberries, blueberries and other berry crops, plus hops.

The lunch hour will feature an address by CALS Dean Kathryn Boor, NYSAES Director Tom Burr, and an announcement of the new names for Cornell's recently released NY1 and NY2 apple varieties. Also, there will be a FREE beer sampling to spotlight the newly initiated hops research taking place at the Station. After lunch, equipment dealers and representatives from various companies will showcase their latest products and technologies to improve fruit crop production and protection.

The list of presentations will include the following topics:

Tree Fruit Tour

- Apple breeding at Cornell and new varieties in the pipeline
- Precision apple thinning
- Apple mechanization

continued...

- Tall Spindle management in years 1-6
- Spray volume for Tall Spindles
- Precision spraying in the orchard
- Fruit russet control on NY1
- CG rootstocks
- Nutrient removal by fruit harvest and maintenance application of fertilizers
- Impacts of glyphosate on apple tree health
- Evaluation of bactericide programs for fire blight management
- Persistent NY nematodes for plum curculio biocontrol
- Peach rootstocks
- Rain protection in cherries
- Pear systems and rootstocks
- Apple scab management in a fungicide-resistant orchard
- Impact of glyphosate on apple tree health
- Development of functional markers for apple fruit quality breeding

Berries/Grapes/Hops Tour

- Soil and root factors in improved blueberry productivity
- Mass trapping and exclusion tactics to control Spotted Wing Drosophila in organic blueberries
 - Limiting bird damage to small fruit crops
 - SWD trap network in NY
 - Day-neutral strawberries and low tunnel production
 - SWD, a new threat to strawberries and raspberries in NY
 - Enhancing pollination and biological control in strawberries
 - Training systems for Arandell
 - New hops variety trial and pest management trials
 - Biology and control of sour rot in grapes
 - Precision spraying in the vineyard
 - High tunnel raspberry and blackberry production

- A fixed-spray system for SWD control in high tunnel raspberries

The event will be held on the Experiment Station's Fruit and Vegetable Research Farm South, 1097 County Road No. 4, one mile west of Pre-emption Road in Geneva, NY. Signs will be posted. Attendees will travel by bus to the research plots to hear presentations by researchers on the work being conducted. The cost of registration is \$30 per person (\$40 for walk-ins) for all-day attendance. Lunch will be provided.

Pre-registration is required for the \$30 rate, register online at: <http://is.gd/ffd2013>

For sponsorship and exhibitor information, contact Debbie Breth at 585-798-4265 or dib1@cornell.edu.

Use the paper registration form, below, only if online registration is not an option.

CORNELL UNIVERSITY STORAGE WORKSHOP

This year's workshop, slated for August 6 in Ithaca, will feature an international, national and statewide cast. Our guest speakers include Dr. Angelo Zanella, who heads the post-harvest research group at Laimburg Agriculture Research Centre in Italy, and who will be presenting their work on DCA and ILOS, as well as their experiences with DPA. Other presentations will include Honeycrisp, and Empire and Gala browning by Jim Mattheis (USDA, Washington), Jennifer DeEll (Ontario Ministry of Agriculture and Food, Canada), as well as the Cornell team of Chris Watkins and David Rosenberger. Industry presentations include DECCO, PACE and Storage Control Systems. See below for program and registration form.



Registration Form
Paper Registration Deadline: July 29, 2013
(Use this registration form only if online registration isn't an option)

Cornell Fruit Field Day at Geneva
Presented by
Cornell University, NY State Agricultural Experiment Station,
& Cornell Cooperative Extension

Thursday, August 1, 2013
NYS Agricultural Experiment Station
Geneva, New York 14456

Name: _____

Company Name: _____

Address: _____

Phone #: _____ E-mail address: _____

Meal choice _____ Chicken _____ Lasagna (check one)

Credit card # _____ Expiration Date _____

Authorization Signature _____

MAIL or FAX registration form, AND fee of \$30
(Check payable to "Cornell University") to:

Michelle Cowles
630 W. North St.
NYS Agricultural Experiment Station, Cornell University
Geneva, NY 14456

315-787-2274 Phone
317-787-2488 Fax

STORAGE WORKSHOP – 2013
August 6th - Ithaca, NY
DEC credits pending!

PROGRAM

- 8.00-8.30: Registration
8.30-9.15: Honeycrisp-update on air & CA Storage (Watkins, Mattheis, DeEll)
9.15-9.35: DPA contamination in storages (Zanella)
9.35-9.55: Prediction of storage disorders with new technologies (Mattheis)
9.55-10.15: Updates from DECCO (Holowid)
10.15-10.40: Refreshment break
10.40-11.10: Gala and Empire browning (Mattheis, Watkins)
11.10-11.30: Carbon dioxide injury with & without DPA (Watkins)
11.30-12.00: Decay control in the absence of postharvest drenches (Rosenberger)
12.00-12.20: Updates from PACE (Felicetti)
12.20-1.20: Lunch
1.20-2.10: Dynamic CA and other new storage technologies (Zanella)
2.10-2.30: Minimizing energy and maximizing quality (Schaefer)
2.30-3.00: Impacts of glyphosate on internal browning: conclusions from four years of research (Rosenberger)
3.00-3.15: Afternoon break
3.15-3.30: NY1 and NY2 (Watkins)
3.30-4.15: Recommendations for 2013, and ask the "experts" (Watkins, Rosenberger, DeEll, Mattheis, Zanella)

REGISTRATION: Cost of the workshop is \$70/person if paid by July 30th. \$80 after July 30th and at the door. Only payments BEFORE July 30th will include lunch.

NOTE – NEW LOCATION: 146 Morrison Hall, Tower Rd. Cornell University.

GETTING TO Morrison Hall: Please check out the following web site:<http://www.cornell.edu/maps/> Morrison Hall is on the Corner of Judd Falls Rd and Tower Rd. For cheapest parking option, get permit from info booth on Tower Rd. & park behind Morrison Hall

BBQ: You are invited to attend a free BBQ on August 5th from 6 – 9PM at the Cornell Orchards. (\$15/registrant's guest or without registration before July 30.)

LODGING: A block of rooms is being held at a conference rate at the Best Western. Rooms are \$109 plus tax (free breakfast and free shuttle to CU). Phone 607/272-6100. Please state that you are attending the Storage Workshop.

FURTHER INFORMATION:

Inquiries should be addressed to Max Welcome, Department of Horticulture, 134 Plant Science Building, Cornell University, Ithaca, NY 14853, phone 607/255-5439, email: mw45@cornell.edu

REGISTRATION FORM**Storage Workshop****August 6th**

Fee:

\$70 if postmarked by July 30th

\$80 after July 30th

Name: _____

Address: _____

City: _____ State: _____

Zip code: _____

Telephone: _____

E-mail: _____

Affiliation: _____

BBQ: yes _____ no _____

Please make check payable to:

Cornell University

Please send form and check to:

Maxine Welcome/Storage Workshop

Department of Horticulture

134 Plant Science Building

Cornell University, Ithaca, NY14853

INSECT TRAP CATCHES (Number/Trap/Day)						
Geneva, NY				Highland, NY		
	<u>7/11</u>	<u>7/15</u>	<u>7/22</u>		<u>7/15</u>	<u>7/22</u>
Redbanded leafroller	0.0	0.3	0.0	Redbanded leafroller	2.1	0.6
Spotted tentiform leafminer	10.0	34.6	20.0	Spotted tentiform leafminer	10.5	28.8
Oriental fruit moth	0.8	0.6	0.2	Oriental fruit moth	1.2	1.3
San Jose scale	0.0	0.0	20.1	Lesser appleworm	0.2	0.9
Codling moth	0.0	0.0	0.8*	Codling moth	0.6	0.3
American plum borer	0.0	0.0	0.0	Obliquebanded leafroller	0.2	0.2
Lesser peachtree borer	0.0	0.0	0.1	San Jose scale	44.5	148
Obliquebanded leafroller	0.2	0.1	0.0	Apple maggot	0.1	0.5
Dogwood borer	7.0	5.0	4.3			
Apple maggot	0.0	0.1*	0.1			
* first catch						

UPCOMING PEST EVENTS		
	<u>43°F</u>	<u>50°F</u>
Current DD accumulations (Geneva 1/1–7/22/13):	2057	1421
(Geneva 1/1–7/22/2012):	2416	1664
(Geneva "Normal"):	1999	1314
(Geneva 1/1–7/29 predicted):	2248	1563
(Highland 1/1–7/22/2013):	2365	1647
<u>Coming Events:</u>	<u>Ranges (Normal ±StDev):</u>	
Apple maggot 1st oviposition punctures	1605–2157	1144–1544
American plum borer 2nd flight begins	1535–2073	1014–1378
American plum borer 2nd flight peak	2002–2586	1347–1785
Comstock mealybug 1st flight subsides	1818–2132	1216–1418
Redbanded leafroller 2nd flight peak	1554–2002	996–1344
Lesser appleworm 2nd flight begins	1418–2002	918–1326
STLM 2nd tissue feeders present	1378–2035	913–1182
Spotted tentiform leafminer 2nd flight subsides	1985–2371	1307–1639
Obliquebanded leafroller 1st flight subsides	1594–2028	1033–1361
Oriental fruit moth 2nd flight peak	1471–1989	936–1338
San Jose scale 2nd flight begins	1620–1966	1050–1324

NOTE: Every effort has been made to provide correct, complete and up-to-date pesticide recommendations. Nevertheless, changes in pesticide regulations occur constantly, and human errors are possible. These recommendations are not a substitute for pesticide labelling. Please read the label before applying any pesticide.

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