Eastern NY Entomology Update: Materials and Invasive Species

Northeast New York Commercial Tree Fruit School
Fort William Henry Hotel and Conference Center
Lake George, NY
February 9th, 2015

Peter Jentsch
Senior Extension Associate – Entomology
2014 HVRL FUND DRIVE

HV GROWERS $200,266.00
AG BUSINESS $10,000.00
MEMORIAL GIFTS $ 6,765.00
FOUNDATIONS $100,000.00

Filled positions: Tree fruit extension specialists (ENY Hort. Team)
Anna Wallis & Dan Donahue

Interview for plant pathologist (Cornell)
Interviews for post-doc horticulturalist (ARDP)

2015 Membership Drive: 200 farms @ $500
Annual Member Meeting: March 10th, 2015
New Chemistries for Fruit Production

Sivanto 200SL

- EPA Reg. No. 246-1141
- Active Ingredient: Flupyradifurone 17.1% A.I.
- Butenolide class of insecticides (IRAC Group 4D)
- Targets insect nicotinic acetylcholine receptors (nAChR)
- Derived from the Asian medicinal plant Stemona japonica
New Chemistries for Fruit Production

Sivanto 200SL

• Pome Fruit

<table>
<thead>
<tr>
<th>Pests Controlled</th>
<th>Product Rate (fl oz/A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aphids (except Woolly apple aphid) Leafhoppers</td>
<td>7.0 – 10.5</td>
</tr>
<tr>
<td>Oystershell scale</td>
<td>10.5 – 14.0</td>
</tr>
<tr>
<td>Pear psylla</td>
<td></td>
</tr>
<tr>
<td>San Jose Scale</td>
<td></td>
</tr>
</tbody>
</table>

Foliar Application Restrictions:
Pre-Harvest Interval (PHI): **14 day**
Minimum interval between applications: **10 days**
Minimum application volumes: 25 gallons/Acre (Ground); 10 gallons/Acre (Aerial)
Maximum SIVANTO 200 SL allowed per year: **28.0 fluid ounces/Acre** (0.365 lb Al/Acre).

Foliar Application Notes:
Combine SIVANTO 200 SL with a horticultural oil for early-season applications targeting San Jose scale and pear psylla.
# Evaluations Of Insecticide Schedules For Controlling San Jose Scale On Apple

N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. 2014

<table>
<thead>
<tr>
<th>Trmt.</th>
<th>Rate / Timing</th>
<th>R. Delicious (6/24)</th>
<th>McIntosh (8/27)</th>
</tr>
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<tbody>
<tr>
<td>Actara</td>
<td>5.5 oz./A PF-1C</td>
<td>9.1 a</td>
<td>18.8 abc</td>
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<tr>
<td>Movento</td>
<td>9.0 oz./A 1C</td>
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<tr>
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<td>11.4 ab</td>
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<td>Sivanto</td>
<td>14.0 oz./A Bloom</td>
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<td></td>
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<tr>
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<td>0.5 a</td>
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<tr>
<td>Lorsban 4E</td>
<td>64.0 oz./A DD</td>
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<td></td>
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<tr>
<td>Actara</td>
<td>5.5 oz./A PF-1C</td>
<td>2.0 a</td>
<td>1.3 a</td>
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<tr>
<td>Centaur</td>
<td>46.0 oz./A DD</td>
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<td></td>
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<tr>
<td>Actara</td>
<td>5.5 oz./A PF-1C</td>
<td>30.1 a</td>
<td>39.0 bc</td>
</tr>
<tr>
<td>UTC</td>
<td></td>
<td>14.3 a</td>
<td>10.0 ab</td>
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</tbody>
</table>
New Chemistries for Fruit Production

Exirel

- EPA Reg No. 352-859
- Active Ingredient: Cyazypyr (Cyantraniliprole) 10.2%
- IRAC Group 28 (Diamide group; same group as Altacor)
## New Chemistries for Fruit Production

### Exirel

<table>
<thead>
<tr>
<th>Target Pest</th>
<th>DUPONT™ EXIREL™ RATE</th>
<th>PHI (pre-harvest interval) (days)</th>
<th>REI (re-entry interval) (hours)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Lb. ai per acre</td>
<td>fluid ounces product per acre</td>
<td></td>
</tr>
<tr>
<td>Codling moth†</td>
<td>East of the Rockies:</td>
<td>0.055 - 0.11</td>
<td>3</td>
</tr>
<tr>
<td>European apple sawfly</td>
<td>0.065 - 0.11</td>
<td>East of the Rockies:</td>
<td>12</td>
</tr>
<tr>
<td>Green fruitworm</td>
<td>West of the Rockies:</td>
<td>8.5 - 17</td>
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<tr>
<td>Obliquebanded leafroller††</td>
<td>10 - 17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Redbanded leafroller</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spotted teniform leafminer</td>
<td></td>
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</tr>
<tr>
<td>Tufted apple budmoth</td>
<td></td>
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<tr>
<td>Variegated leafroller</td>
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<tr>
<td>White apple leafhopper</td>
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<tr>
<td>Oriental fruit moth</td>
<td>0.065 - 0.11</td>
<td>10 - 17</td>
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<tr>
<td>Apple maggot* §</td>
<td>0.088 - 0.133</td>
<td>13.5 - 20.5</td>
<td></td>
</tr>
<tr>
<td>Pear psylla*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plum curculio*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rosy apple aphid*††††</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thrips* §</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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*Cornell University

College of Agriculture and Life Sciences

Hudson Valley Research Laboratory
Exirel

- Minimum application interval: 7d
- Max. 0.4 lb ai/A per season
- Max. of 3 apps of Group 28 insecticides / generation
- Codling moth – 1st application at first hatch @ 10-14d
- Summer OBLR - 1st application at first hatch
- Overwintering OBLR at pink to petal fall
- RAA beginning at GT to pink
New Chemistries for Fruit Production

Evaluations Of Insecticide Schedules For Controlling Codling Moth On Apple.
N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. 2014 (24 June)

<table>
<thead>
<tr>
<th>Trmt.</th>
<th>Rate / Timing</th>
<th>Ginger Gold</th>
<th>Red Delicious</th>
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</thead>
<tbody>
<tr>
<td>Actara</td>
<td>5.5 oz./A PF-1C</td>
<td>0.0 a</td>
<td>0.0 a</td>
</tr>
<tr>
<td>Delegate WG</td>
<td>6.0 oz./A 1st gCM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actara</td>
<td>5.5 oz./A PF-1C</td>
<td>0.0 a</td>
<td>0.0 a</td>
</tr>
<tr>
<td>Exirel</td>
<td>13.5 oz./A 1st gCM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actara</td>
<td>5.5 oz./A PF-1C</td>
<td>0.0 a</td>
<td>0.0 a</td>
</tr>
<tr>
<td>Belt</td>
<td>5.0 fl.oz./A 1st gCM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actara</td>
<td>5.5 oz./A PF-1C</td>
<td>2.6 c</td>
<td>3.0 b</td>
</tr>
<tr>
<td>Lorsban 4E</td>
<td>64.0 oz./A 1st gCM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actara</td>
<td>5.5 oz./A PF-1C</td>
<td>5.2 d</td>
<td>2.5 b</td>
</tr>
<tr>
<td>Centaur</td>
<td>46.0 oz./A 1st gCM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UTC</td>
<td>6.0 a</td>
<td>4.0 ab</td>
<td></td>
</tr>
</tbody>
</table>
Eastern U.S. Invasive Species Complex
Apple maggot, *Rhagoletis pomonella* (Wash, 1867)  
Tephritidae; Diptera

European red mite, *Panonychus ulmi*,  
*Acari*: Tetranychidae

Grape berry moth, *Lobesia botrana* ([Dennis & Schiffermuller])  
Tortricidae; Lepidoptera

Japanese beetle, *Popillia japonica*  
Newman,  
Scarabaeidae; Coleoptera

Oriental fruit moth, *Grapholita molesta* (Busck)  
Tortricidae; Lepidoptera

Oystershell scale, *Lepidosaphes ulmi* (Linnaeus)  
Diaspididae; Hemiptera

Pear psylla, *Cacopsylla pyricola* Foerster,  
Homoptera: Psyllidae

Rose leafhopper, *Edwardsiana rosae* (Linnaeus)  
Cicadellidae; Homoptera

San Jose scale, *Quadraspidiotus perniciosus* (Comstock)  
Diaspididae; Hemiptera
Factors Contributing to Invasive Insect Success

- Size of the **introduced population** (the larger the number, the higher the probability of establishment).
- **Aggressiveness** (how well it out competes native species)
- **Many generations** (producing high populations)
- Rapid dispersal and **overwintering success**
- Ecological niche with **suitable climate** and **available food**
- **Absence of natural enemies** (parasites and predators)
Emerging Insect Problems On Tree Fruit In Eastern New York

Newly Invasive Insects Presently Causing Damage to Fruit in E.NY

- Brown Marmorated Stink Bug (BMSB) 2008
- Spotted Wing Drosophila (SWD) 2011
- Black Stem Borer (BSB) 1932 L.I.

- Very aggressive
- non-competitive niche
- Many hosts
- Multiple generations / season
- Flight and or human transport distribution to hosts
Emerging Insect Problems On Tree Fruit In Eastern New York

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- Spotted Wing Drosophila (SWD) 2011
- Black Stem Borer (BSB) 1932

- Very aggressive
- non-competitive niche
- Many hosts
- Multiple generations / season
- Flight and or human transport distribution to hosts

- Spotted Lanternfly (SLF) 2013
- Very aggressive
- non-competitive niche
- Many hosts
- Single generations / season
- Human transport distribution to hosts
The **Spotted Lanternfly**, *Lycorma delicatula* (White), is a [planthopper](#) originating from China, Korea, India, Vietnam, and parts of eastern Asia.

**On Sept. 22, 2014, the Pennsylvania Department of Agriculture**, in cooperation with the Pennsylvania Game Commission, confirmed the presence the Spotted Lanternfly in **Berks County, PA**.

It is an invasive insect in **Korea** where it was introduced in **2006** and since has **attacked 25 plant species** which also grow in Pennsylvania. In the U.S. it has the potential to greatly impact **>70 plant host species including grape, apple, pine and stone fruit**.

**Adults** appear in July & moves to **Tree of Heaven** (*Ailanthus altissima*)

**Uses** Tree of heaven for **egg laying** beginning in October.
New Pest Update: Spotted Lanternfly. Hemiptera: Fulgoridae

- Nymphs hatch from Late April to early May egg masses laid on smooth bark, stone, and other vertical surfaces. Nymphs **climb, feed and fall** repeatedly onto host plants.

- Nymphs complete **four immature stages**. The first stage is black with white spots and wingless.

- As it grows, the Spotted Lanternfly will start to develop red patches in addition to the white spots. Nymphs spread from the initial site by crawling and feeding on woody and non-woody plants.
Distribution in PA
7 Townships in Berks County
Lycorma Detection Survey
Results Through 15 December 2014

Survey Grids
- Red: Surveyed - Positive
- Blue: Surveyed - Not Found


Pennsylvania Department of Agriculture
6 Township self assessment for all life stages of SLF using PA Dept of Ag. Form below.
Target adults in mid-late September prior to egg laying & nymphs as they hatch

- Removal of egg masses from bark
- Trunk applications of Dinotefuran (Safari, Scorpion, Venom)
  - Systemic insecticide activity kills insects as they feed on sap

New Pest Update: Spotted Lanternfly: Management

SLF Eggs
Crops at Highest Risk

- **Raspberries, blackberries, and blueberries**
- Fall-bearing and late maturing varieties
- **Day-neutral strawberry** varieties
- Late season tart and sweet cherries
- **Thin-skinned grapes** (*Pinot Noir: Dejon Clones*)
- Cracked or damaged fruit.
Alternate hosts for SWD

*Lonicera sp* - Tartarian Honeysuckle
Alternate hosts for SWD

*Rubus allegheniensis* - Blackberry
SEASONAL PHENOLOGY

<table>
<thead>
<tr>
<th>Plant</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strawberry</td>
<td></td>
<td></td>
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<tr>
<td>Summer Raspberry</td>
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<tr>
<td>Blueberry</td>
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<tr>
<td>Fall Raspberry</td>
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<td></td>
</tr>
<tr>
<td>Black Raspberry</td>
<td></td>
<td></td>
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<tr>
<td>Bush Honeysuckle</td>
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<tr>
<td>Blackberry</td>
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<td></td>
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<tr>
<td>Pokeweed</td>
<td></td>
<td></td>
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<tr>
<td>Buckthorn</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Black Cherry</td>
<td></td>
<td></td>
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<tr>
<td>Viburnum</td>
<td></td>
<td></td>
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<tr>
<td>Dogwood spp.</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Red Raspberry</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bittersweet Nightshade</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Choke Cherry</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Dates:
- Strawberry: 26 May - 13 Oct
- Summer Raspberry: 2 Jun - 13 Oct
- Blueberry: 16 Jun - 23 Jul
- Fall Raspberry: 24 Jul - 15 Aug
- Black Raspberry: 16 Jun - 13 Aug
- Bush Honeysuckle: 26 May - 25 Aug
- Blackberry: 30 Jun - 13 Aug
- Pokeweed: 9 Jun - 13 Aug
- Buckthorn: 16 Jun - 13 Aug
- Black Cherry: 23 Jul - 25 Aug
- Viburnum: 26 May - 25 Aug
- Dogwood spp.: 26 May - 25 Aug
- Bittersweet Nightshade: 23 Jul - 25 Aug
- Choke Cherry: 7 Jul - 13 Aug
SWD SEASONAL DYNAMICS IN THE NORTHEAST

Credit: Greg Loeb Lab, NYSAES Geneva, NY
Life Cycle of the Spotted Wing Drosophila

*Drosophila suzukii* (Matsumura)

- Eggs: 12-72 hours, *350+ eggs in a lifetime*
- Pupation: 4-15 days, *inside or outside of fruit*
- Three Larval Instars: 5-7 days
- Adults: 20-30 days

Development Range: 10d – 4 weeks
Female Drosophila species

UC Berkeley & UC Cooperative Extension  Photos: M. Hauser, CDFA

Spotted Wing Drosophila (D. suzukii)

SWD has a large, saw-like, serrated ovipositor with two even rows of teeth that are much darker than rest of ovipositor
Male Spotted Wing Drosophila (SWD)

Double stripes on tarsi of front legs

Leading edge of wing has dark spot

Unbroken abdominal bands

UC Berkeley & UC Cooperative Extension

Photos: M. Hauser, CDFA
Monitoring

- Whole wheat bread dough (fermenting bait) - water, sugar, yeast, whole wheat, apple cider vinegar (ACV)

- Drowning solution of ACV
Comparison of Monitoring Trap Captures and Fruit Infestation Levels
Raspberry - Site SQ

Credit: Greg Loeb Lab, NYSAES Geneva, NY
Comparison of Monitoring Trap Captures and Fruit Infestation Levels
Blueberry - Site RPE

- SWD/Berry
- Male SWD
- Female SWD

Credit: Greg Loeb Lab, NYSAES Geneva, NY
## CLASSES OF SWD INSECTICIDES

<table>
<thead>
<tr>
<th>Class</th>
<th>IRAC Code</th>
<th>Examples</th>
<th>SWD Efficacy</th>
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<tbody>
<tr>
<td>Organophosphates</td>
<td>1B</td>
<td>Malathion</td>
<td>Excellent to good</td>
</tr>
<tr>
<td>Pyrethroids</td>
<td>3A</td>
<td>Brigade, Danitol, Mustang Max</td>
<td>Excellent</td>
</tr>
<tr>
<td>Spinosyns</td>
<td>5</td>
<td>Delegate, Entrust</td>
<td>Excellent to good</td>
</tr>
<tr>
<td>Neonicotinoids</td>
<td>4A</td>
<td>Assail</td>
<td>Good to poor</td>
</tr>
<tr>
<td>Carbamates</td>
<td>1A</td>
<td>Sevin</td>
<td>Good to poor</td>
</tr>
<tr>
<td>Diamide</td>
<td>28</td>
<td>Exirel*</td>
<td>Excellent to good</td>
</tr>
</tbody>
</table>

*Just received EPA label for blueberries, not raspberries*

Credit: Greg Loeb Lab, NYSAES Geneva, NY
Survey on insecticide efficacy against SWD, collated by Rufus Isaacs, MSU - November, 2013
<table>
<thead>
<tr>
<th>Insecticide</th>
<th>3 DAT</th>
<th>5 DAT</th>
<th>7 DAT</th>
<th>No Rain</th>
<th>Rain</th>
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<tbody>
<tr>
<td>Delegate 25WG 4.5oz</td>
<td>90%</td>
<td>90%</td>
<td>90%</td>
<td>90%</td>
<td>75%</td>
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<tr>
<td>Imidan 70WP 1.33lb</td>
<td>80%</td>
<td>80%</td>
<td>80%</td>
<td>70%</td>
<td>55%</td>
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<tr>
<td>Lannate 90SP 1lb</td>
<td>70%</td>
<td>70%</td>
<td>70%</td>
<td>60%</td>
<td>45%</td>
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<tr>
<td>Malathion 8F 2pt</td>
<td>60%</td>
<td>60%</td>
<td>60%</td>
<td>50%</td>
<td>35%</td>
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<tr>
<td>Mustang Max 4oz</td>
<td>50%</td>
<td>50%</td>
<td>50%</td>
<td>40%</td>
<td>25%</td>
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<tr>
<td>Assail 30SG 5.3oz</td>
<td>40%</td>
<td>40%</td>
<td>40%</td>
<td>30%</td>
<td>15%</td>
</tr>
</tbody>
</table>

0.8 inches of rain on treated bushes 1 day after application
Cultivar: ‘Bluecrop’

Treatments: 4 wk spray program
- Alternate Delegate & Assail
- Delegate & Assail plus sugar

Plot size: 2 rows, 32 bushes

Replicates: 4

2 lbs. sugar / 100 gal. water

Enhancing Mortality with Sugar

SWD infestation, Blueberries, 2013
(data from Rodriguez-Saona, Cowles et al, in press)

Credit: Greg Loeb Lab, NYSAES Geneva, NY
Effect of Rain on Some Common Insecticides

From Rufus Isaacs, MSU

African Fig Fly, *Zaprionus indianus* Gupta
• **Introduction:** The fig fruit fly is native to tropical Africa, but has been found in South America, including Brazil in 1999 (Vilela 1999).

• Central Florida on 26 July, 2005, Virginia and Mississippi in 2012.

• In apple cider baited traps *Zaprionus indianus* Gupta were found in Milton, NY on 4 September, 2012 and August 2014.
• **Description:** A striking pair of white stripes from the antennae, dorsally along distinctive red eyes to the end of the thorax with two black lines bordering each white stripe.

• The body is yellow in color approximately 3.5 mm in length

• Development time is approximately 19 days from egg to adult.

• The African fig fruit fly are capable of producing numerous generations in a season.
African Fig Fly: Crops at Risk

• Damage: Predominately to citrus and grape

• Hudson Valley:
  • 4 AFF in 2012
  • 0 AFF in 2013
  • 3 AFF in 2014

• Reports from Rutgers, NJ of wine grape injury independent of SWD injury.

• Not yet a threat in NY
Insecticides are presently the primary method of control for SWD

Consider rotating insecticide IRAC classes every 10-14 days to maintain insecticide susceptibility

Consider the weather forecasts and insecticide to maintain residual activity

Sugar may increases efficacy of some insecticides
Managing the Brown Marmorated Stink Bug, *Halyomorpha halys* (Stål) in New York State
Brown Marmorated Stink Bug, *Halyomorpha halys*

Overview


• First NY BMSB confirmed in 2007 Hudson Valley in *December of 2008*.

• Economic injury caused by BMSB in the mid-Atlantic occurred in commercial apple in 2009

• Extensive injury in 2010 causing 37 million dollars in pome fruit damage.

• Economic damage to apple on three Hudson Valley Farms in Ulster and Orange Counties in 2012.
Eggs: Average 28/cluster; light green to white

1st instar: black & red; cluster near eggs

2nd instar: striped antennae

3rd instar: striped antennae and legs

4th instar: thoracic spur; striped antennae & legs

5th instar: wing pads; striped antennae & legs

BMSB Adults: red eyes, 4 cream colored dots on shoulders; banding on legs and antenna, smooth blunt shoulders. Banded abdomen; 14 -17 mm in length.
Key features of the brown marmorated stink bug
_Halyomorpha halys_

**Antenna:**
- light & dark banding

**2 sets of 4**
- Cream colored dots on thorax

**Wing pads & Legs:**
- light & dark banding
BMSB Presence
December 2014
Brown Marmorated Stink Bug: Host Plants - Food for Success

**Figure 1:** Risk maps displaying the relative density of field, vegetable, and fruit crop hosts plants of BMSB throughout the United States.
Evaluation of var. ‘Pink Lady’
Trees @ 3’ x 12’ spacing

- 10 fruit / tree = 100 fruit / 30’
- 9 sections; 240’ row
Degrees of stink bug feeding injury and corking beneath the skin.
Elongate depression with two feeding punctures
Developing Pest Thresholds for Managing the Invasive Brown Marmorated Stink Bug, 
*Halyomorpha halys* (Stål): (Pentatomidae) In NY Tree Fruit.

- Conduct State-wide Trap Monitoring of BMSB in NY
- 12 Cooperators
  - NYSAES
  - WNY LOFT
  - ENY Hort.
  - HVRL Staff
- 40 Traps
- 20 Farms
- 14 Counties
State-wide Trap Monitoring of BMSB in NY

<table>
<thead>
<tr>
<th>BMSB Trap Site</th>
<th>Lat</th>
<th>Long.</th>
<th>County</th>
<th>Crop</th>
<th>BMSB Total</th>
</tr>
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- 20 Trap Sites in 14 NYS counties
- 7 Sites @ Threshold
- In 3 NY Counties
Partnered with EEDMaps to extend outreach

- Early Detection & Distribution Mapping of Invasive Insects
- Provide regional and national invasive species tracking
- Provide customized data outputs for threshold development

By County: Weekly update
Trap data per county
Presence in degrees of risk
Threshold levels
BMSB Management Threshold: Communication

• Employed a 10 Adult / Trap Threshold

• Subscribed growers to receive email Internet based link for BMSB mgt. recommendations weekly

• Worked with CCE to broaden outreach to apple and vegetable growers with threshold recommendations

• Data was entered into a NYS map to disseminate BMSB data using county-wide thresholds
BMSB Management Threshold

BMSB Pheromone Trap Captures
Milton West, NY 2014

Adult Threshold: 10 / trap / week
Welcome to the Jentsch Lab

Our research and extension outreach program is directed by Cornell University’s Department of Entomology and located on the Hudson Valley Laboratory in Highland, NY. It is part of the New York State Antioxidant Extension Stations in Geneva, NY, with the mission of developing and disseminating new pest management tools and crop protectants through pest management research, extension, and education. Research-based information continues to be provided to New York farmers through educational programs organized by Cornell Cooperative Extension and participating universities. Insect and plant protection programs at the Hudson Valley Laboratory are especially important for sustaining the viability of agriculture in the Hudson Valley and Northeast as agricultural production is ultimately the best way to preserve open space and economic stability in the rapidly developing region between Albany and New York City.

Welcome to the Cornell University Jentsch Lab.

Jentsch Lab Site: Developed 2014

Insect Alerts & Recommendations
BMSB Management Threshold: Communication

Brown Marmorated Stink Bug: August 15th Update
by PJIS@CORNELL.EDU posted on AUGUST 14, 2014

Brown Marmorated Stink Bug (BMSB) numbers last week show continued increase of last instar nymph movement to pheromone baited Yeddel traps. The late start to the season may have pushed forward the emergence of the

BMSB Update: August 20. Confirmed Late Season Feeding to Apple, Peach and Pepper
by PJIS@CORNELL.EDU posted on AUGUST 20, 2014

Extensive damage from BMSB Observed On Peach in Highland, NY: August 25th
by PJIS@CORNELL.EDU posted on AUGUST 25, 2014

Cornell University
Hudson Valley Research Laboratory
Partnered with EEDMaps to extend outreach

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Dan Donahue: Weekly Publication ENYHP: Blog Site Alerts

Eastern NY Commercial Horticulture Program

Tree Fruit News

Vol. 2 Issue 15
October 10, 2014

Report by: Anna Ballew and Dan Donahue, CCE ENYCHP

In this issue of Tree Fruit News:

- Harvest Update for the Eastern NY Region
- BMSB Update: Increasing Damage to Pink Lady Apple in Columbia County
- Ciderene Scouting: Research Horticultural Position
- Buffalo CRP Insects First in Nation Invasive Pest
- NYS Fruit & Vegetable EXPO
- Agribusiness Strategic Marketing Conference

# Harvest Update for the Eastern NY Region

In the Champagne Valley, harvest has all but wrapped up. After the cooler temperatures experienced over the weekend, we returned to a brief spell of summer weather early this week. A change in weather is expected over the weekend with a return to cooler temperatures and some precipitation. It is possible we will see 0.5” of rain and wind gusts up to 15 mph. Most fruit is expected to be on the tree by the end of the week, the exception being a couple of late varieties for our region such as NY-2 and some Red Delicious pollinizers. With warm weather and wind, be on the lookout for drops.

Apple harvest in the Hudson Valley is coming to a close. Typically variable October weather, such as early morning mists, has slowed harvest from the breakdown point that has characterized this year. Empire, Red Delicious, and Golden Delicious are being wrapped up this week. Mauve harvest is well underway, but has been slowed by recent wet weather. "Yellow" varieties are particularly difficult to pick without bruising when conditions are wet. Canoe is currently being harvested. The PPO business appears to be brisk this year, with some farms noting completion of the PPV process.

# BMSB Update: Increasing Damage to Pink Lady Apple in Columbia County

By Peter Jendrisak, Cornell University Dept. of Entomology, posted online Blog December 18, 2014 available at http://blog.cornell.edu/dan/hist

Warning temperatures (30-32% in the Hudson Valley today) are predicted over the course of the next few days. The mild temps today prompted yet another wave of BMSB movement to urban structures and orchard fruit remaining on the tree. Adults are likely to continue feeding on late season varieties such as Pink Lady through the end of harvest. We continue to recommend maintaining a tight program in orchards where populations of adult BMSB are present.

In previous years we have seen increasing levels of fruit feeding injury within the first 90’ from the orchard edge near windbreaks through the harvest of our later variety, ‘Pink Lady’ in early November. Today we observed BMSB injury from a commercial block in Columbia County, NY of Pink Lady along the orchard watered edge. Many fruit going into storage have seen dramatic increases in BMSB damage expression coming out of storage. As with earlier harvest dates, it’s likely that fruit injury will increase while it hangs on the tree and if BMSB keeps feeding through harvest, once the fruit is out of storage along the packing line.

We continue to use a "Provisional Trap Threshold" of 10 adults per trap per week was developed by Tracy Leaky’s team at USDA ARS-WV. The threshold provides growers with a scientific basis for management, one that we will continue to test as an action threshold this season.

Since the adults will be moving in and out of orchards, scouting will need to be retained to confirm their presence in late season fruit. The insect will seek host food sources to stock up on reserves to make it through the winter while seeking and moving to urban structures and forest trees (upper canopy of dead trees with "falling" leaves) as overwintering sites. Lack of substantial rainfall leading to dry conditions will likely increasing fruit injury from BMSB as the insect seeks out a source for water.

Trap Capture and Scouting Threshold: Throughout the Hudson Valley there is a large disparity between orchards of both presence and abundance of BMSB. In some sites management will need to intensify until the last variety is completely harvested, while in other sites BMSB will not be found in traps in numbers that warrant control measures. In all sites scouting should also continue through the remainder of harvest.

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# Agribusiness Strategic Marketing Conference

Continued next page

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Tree Fruit News

BMSB Damage of Pink Lady Apple: 10:14:14
SUMMARY

• Insecticides are the primary method of control for BMSB

• Trap thresholds and grower communication to initiate control

• Rainfastness is serious challenge to residual activity & spray intervals

• Efforts to use Attract and Kill
Black Stem Borer: *Xylosandrus germanus*
Introduction

• History

• Life History

• Trapping and monitoring

• Control

Slide Credits to:
• Deborah Breth – CCE-LOF
• Art Agnello – Cornell
• Kerik Cox – Cornell
• Elizabeth Tee – CCE-LOF
• Hannah Rae Warren – Cornell Intern
Xylosandrus germanus (Blandford 1894) (introduced)

- Introduced from eastern Asia - first found in NY in ’32

- Ambrosia beetle, a general wood boring insect

- Attacks many ornamental/forest species

- American beech, maple, dogwood, black walnut, oak, magnolia.

- BSB observed in apple and sweet cherry in 1982

- Cornell research and extension have not seen this pest before in apple orchards over the past 30 years in NY.
Black Stem Borer, *Xylosandrus germanus* (Blandford 1894) (introduced) – NE Recorded findings

http://www.barkbeetles.info
History

- Reported by Deb Breth in WNY:

- Growers complained of trees dying or oozing from holes or fire blight from oozing rootstocks with no history of FB in the planting in 2013 growing season.

- Issued an APB at winter and spring meetings

- Identified 25 sites with trees dying 2013-14.

- 1 to 15 year old plantings.
Grower sent this picture on May 1, ‘13 Fuji/M9(Pajam 2) in 4th leaf.
Found in 6 sites in 2013 associated with fire blight. Which came first? Fire blight or borers?
A second site 90 miles away in 2013.
Also found in apple nurseries, commercial and on-farm.
• Adults overwinter in galleries at the base of infested trees

• Females emerge from overwintering sites to infest new sites after 2-3 days with max temperatures $\geq 68^\circ$F

• Literature: “4 days after first bloom on Norway maple, and full bloom on border Forsythia.”
Adult female drills a hole ~1mm in diameter, and hollows out a channel into the heartwood of small trees (2-50 cm diameter).
The female starts to culture a fungal food source, *Ambrosiella hartigii*, *Fusarium*?

Food for the larvae and adults

She lays her eggs (tiny, ~1mm white, football shaped) in the chamber.

Larvae also white with 3 instars
Biology

- It takes ~ 30 days for development from egg to adult producing 2 generations per year.
- The ratio of females to males is about 10:1.
- Late summer the beetles migrate to a hole lower in the trunk to overwinter - as many as 100 in one chamber.
- The beetles go into diapause - not active again until the next spring.
Gallery with eggs, larvae and pupae for first generation BSB

Liz Tee 2013
Monitoring

- Toothpick frass after calm, rainfree days.
- Symptoms include blistering of bark.
- Sometimes just oozing sap or FB ooze from hole.
• Monitor for discoloration and blistering of bark.
• Monitor for bleeding sites on bark.
• Monitor for dying trees.
Monitor: Trapping BSB  
Re: Peter Schultz

- Inverted “Simply” OJ traps with rectangular openings cut in side panels
- Agbio: ethanol lures (agbio@agbio-inc.com)
- Hung 2-3 feet off the ground
- A drop of low toxicity anti-freeze in lid
- Hung on edge of woods next to orchard.
- Hung in interior of orchard.
- Checked traps weekly
BSB weekly trap catch.

**Edge BSB trap counts**

- Bates Rd
- Hill
- R1H
- N 13
- S 14
- C13

**Interior BSB trap counts**

- Bates Rd
- Hill
- R1H
- N 13
- S 14
- W31
- SF4
- C13
Chemical control:

**Ornamental Nurseries**
- permethrin on a 2-week schedule
- neonicotinoids, anthranilic diamides (cyazypyr, acelepryn), and tolfenpyrad, **not effective**

**Apples?**
- Warrior II or Grizzly, *lambda-cyhalothrin*, labeled for tree borer species
- **DECLARE**: gamma-cyhalothrin.
- **Lorsban**: chlorpyrifos trunk sprays for borers may be effective
Thank You

Technical staff and assistants
Support: NYS Ag & Mkts, ARDP, NEIPM, EDDMaps, HATCH, Bayer, Dow, Nichino, Syngenta, Gowan

Hudson Valley Research Laboratory