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

Cornell University
College of Agriculture and Life Sciences

Hudson Valley Research Laboratory

Hudson Valley Research Laboratory

Agricultural Research and Extension On Fruits and Vegetables Since 1923

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

Hudson Valley Research Laboratory

New Chemistries for Fruit Production

Sivanto 200SL

Bayer CropScience

- **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)
- Derrived from the Asian medicinal plant *Stemona japonica*

New Chemistries for Fruit Production

Sivanto 200SL

Bayer CropScience

- Pome Fruit

Pests Controlled	Product Rate (fl oz/A)
Aphids (except Woolly apple aphid) Leafhoppers	7.0 – 10.5
Oystershell scale Pear psylla San Jose Scale	10.5 – 14.0

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 AI/Acre).
Foliar Application Notes:
Combine SIVANTO 200 SL with a horticultural oil for early-season applications targeting San Jose scale and pear psylla.

New Chemistries for Fruit Production

Evaluations Of Insecticide Schedules For Controlling San Jose Scale On Apple. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. 2014

Trmt.	Rate / Timing		R. Delicious (6/24)	McIntosh (8/27)
Actara	5.5 oz./A	PF-1C	9.1 a	18.8 abc
Movento	9.0 oz./A	1C		
Actara	5.5 oz./A	PF-1C	4.8 a	11.4 ab
Sivanto	14.0 oz./A	Bloom		
Actara	5.5 oz./A	PF-1C	2.7 a	0.5 a
Lorsban 4E	64.0 oz./A	DD		
Actara	5.5 oz./A	PF-1C	2.0 a	1.3 a
Centaur	46.0 oz./A	DD		
Actara	5.5 oz./A	PF-1C	30.1 a	39.0 bc
UTC			14.3 a	10.0 ab

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

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

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)

Trmt.	Rate / Timing		Ginger Gold	Red Delicious
Actara	5.5 oz./A	PF-1C	0.0 a	0.0 a
Delegate WG	6.0 oz./A	1st gCM		
Actara	5.5 oz./A	PF-1C	0.0 a	0.0 a
Exirel	13.5.0 oz./A	1st gCM		
Actara	5.5 oz./A	PF-1C	0.0 a	0.0 a
Belt	5.0 fl.oz./A	1st gCM		
Actara	5.5 oz./A	PF-1C	2.6 c	3.0 b
Lorsban 4E	64.0 oz./A	1st gCM		
Actara	5.5 oz./A	PF-1C	5.2 d	2.5 b
Centaur	46.0 oz./A	1st gCM		
UTC			6.0 a	4.0 ab

Eastern U.S. Invasive Species Complex

Historical Invasive Insect Pests Of Fruit In Eastern New York

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

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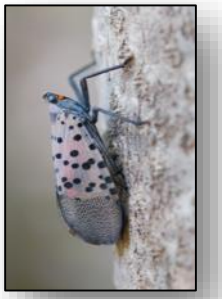


Spotted Lanternfly (SLF)
2013

- Very aggressive
- non-competitive niche
- Many hosts
- **Single generations / season**
- **Human transport distribution to hosts**

New Pest Update: Spotted Lanterfly. Hemiptera: Fulgoridae

- The **Spotted Lanternfly,** *Lycorma delicatula* (White), is a **planthopper** orinating 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.

Adult SLF

New Pest Update: Spotted Lanterfly. 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.

Fall/ Winter

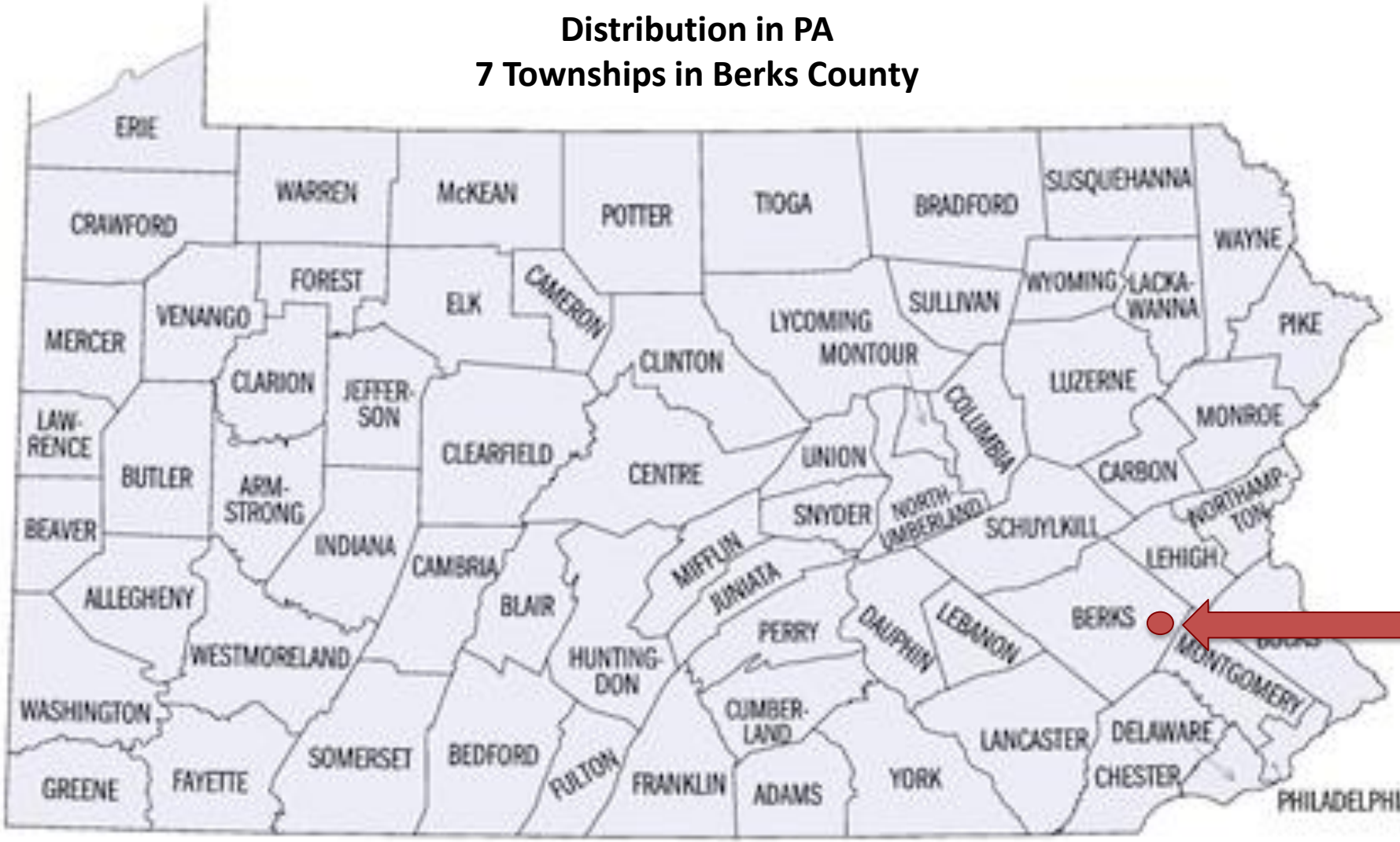
Spring

Early Summer

Lycorma Detection Survey

Results Through 15 December 2014

Distribution in PA
7 Townships in Berks County



Lycorma Detection Survey

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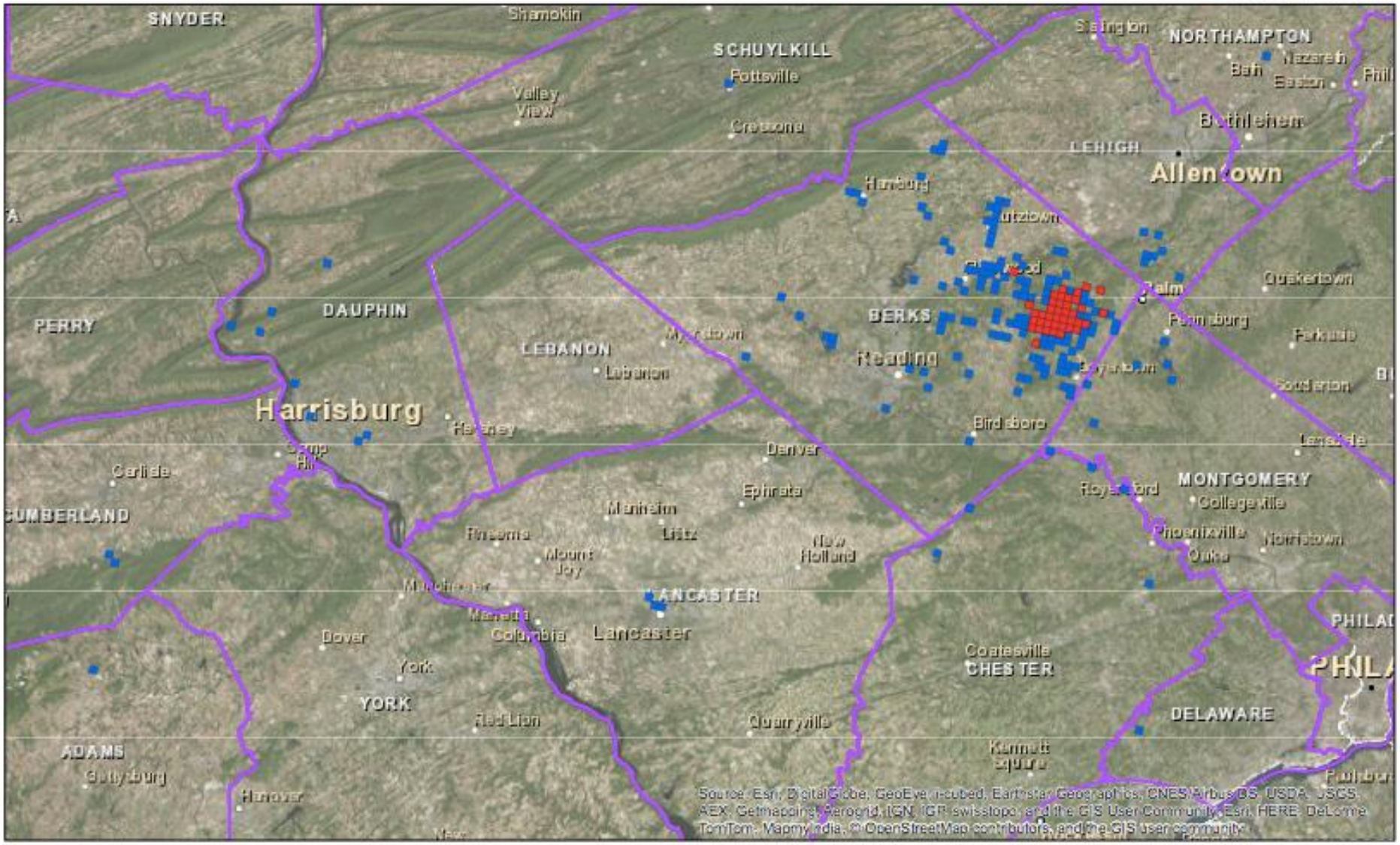


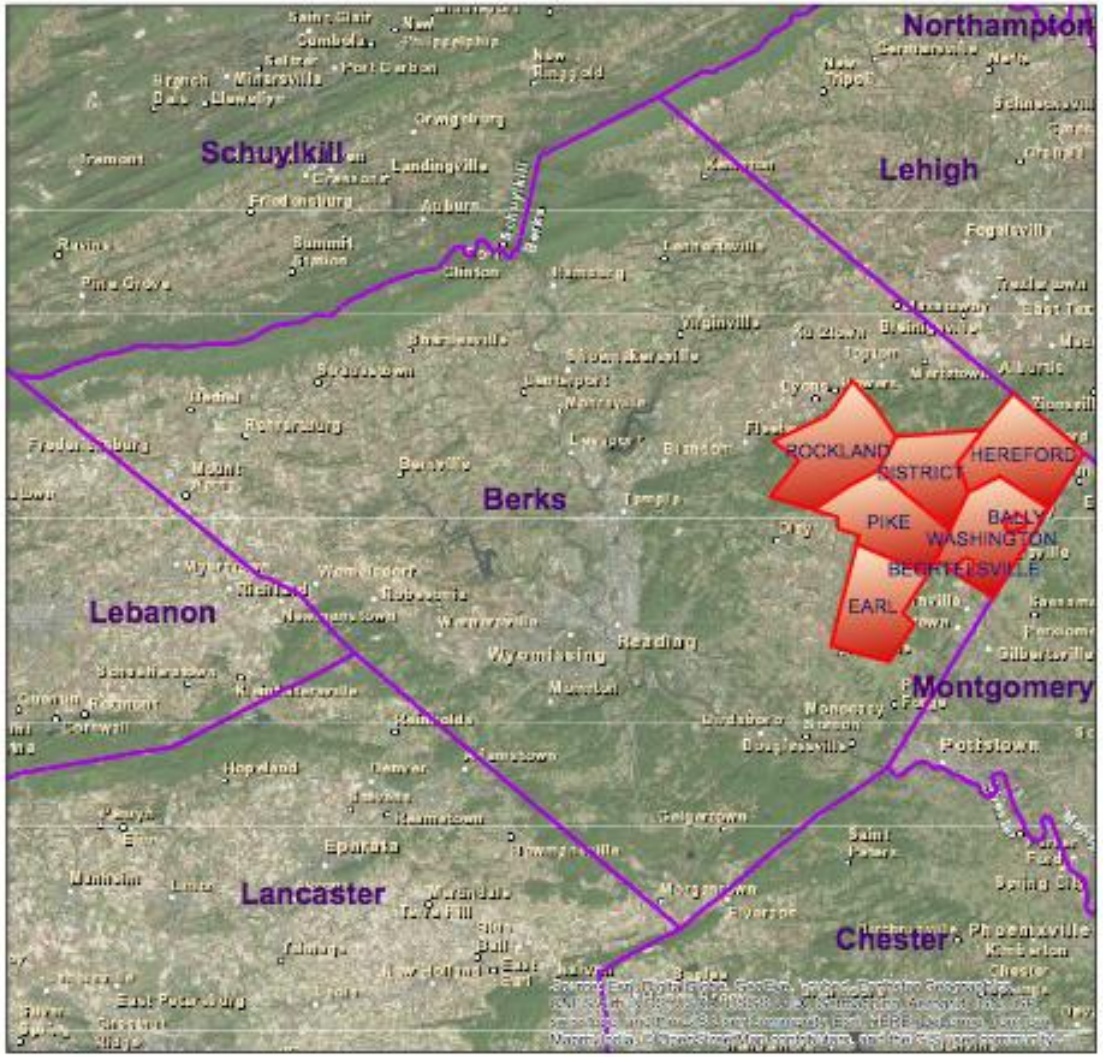
Survey Grids

- Surveyed - Positive
- Surveyed - Not Found

pennsylvania
DEPARTMENT OF AGRICULTURE

Spotted Lanternfly Quarantine Map

Townships Under Quarantine As of December 13, 2014



Legend

- Township Under PDA Quarantine
- Pennsylvania County Border

pennsylvania
DEPARTMENT OF AGRICULTURE

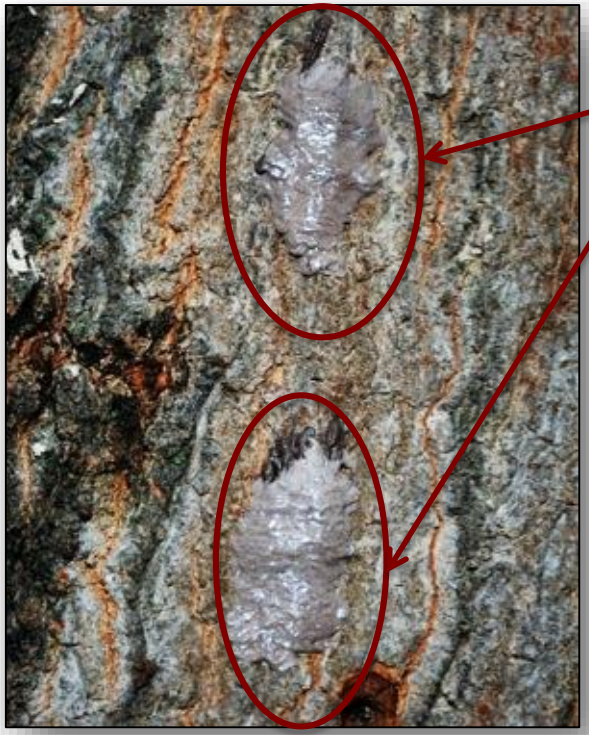
6 Township self assessment for all life stages of SLF using PA Dept of Ag. Form below.

New Pest Update: Spotted Lanterfly: Management

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 insetcicide activity kills insects as they feed on sap



Crops at Highest Risk

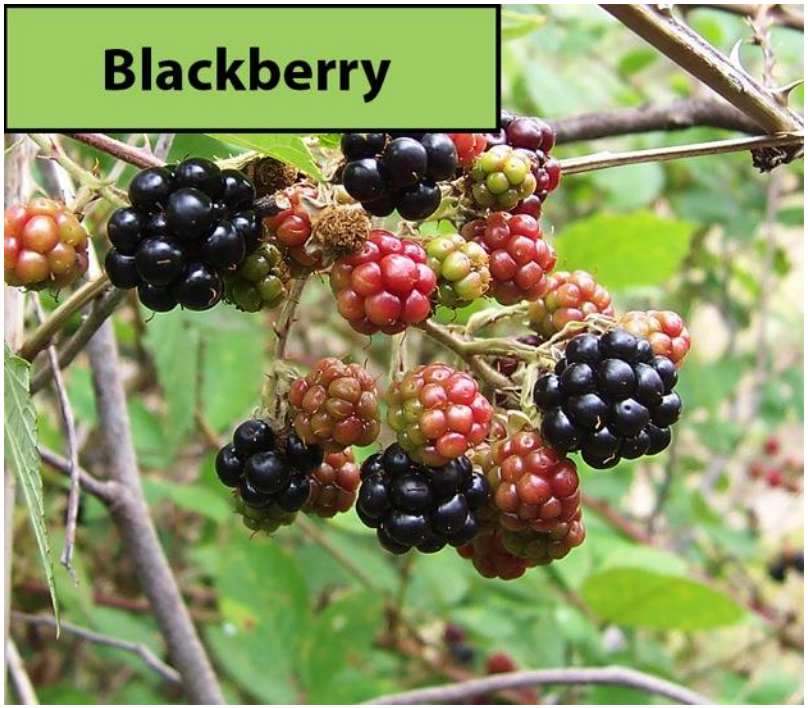
- Raspberries, blackberries, and blueberries
- Fall-bearing and late maturing varieties
- Day-neutral strawberry varieties
- Late season tart and sweet cherries
- Thin-skinned grapes (Pinot Noir: Dejon Clones)
- Cracked or damaged fruit.

Alternate hosts for SWD

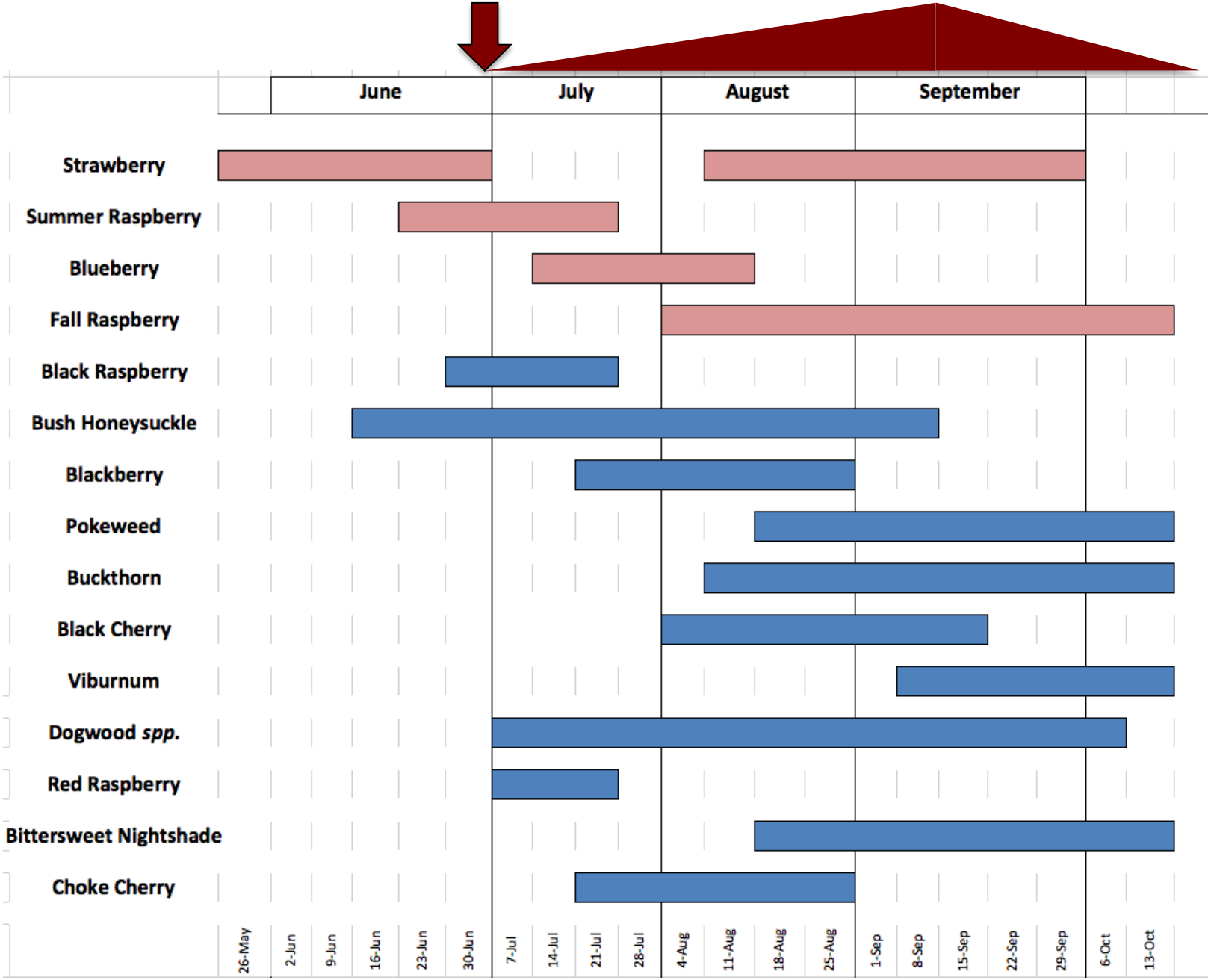
Lonicera sp -
Tartarian Honeysuckle

Alternate hosts for SWD

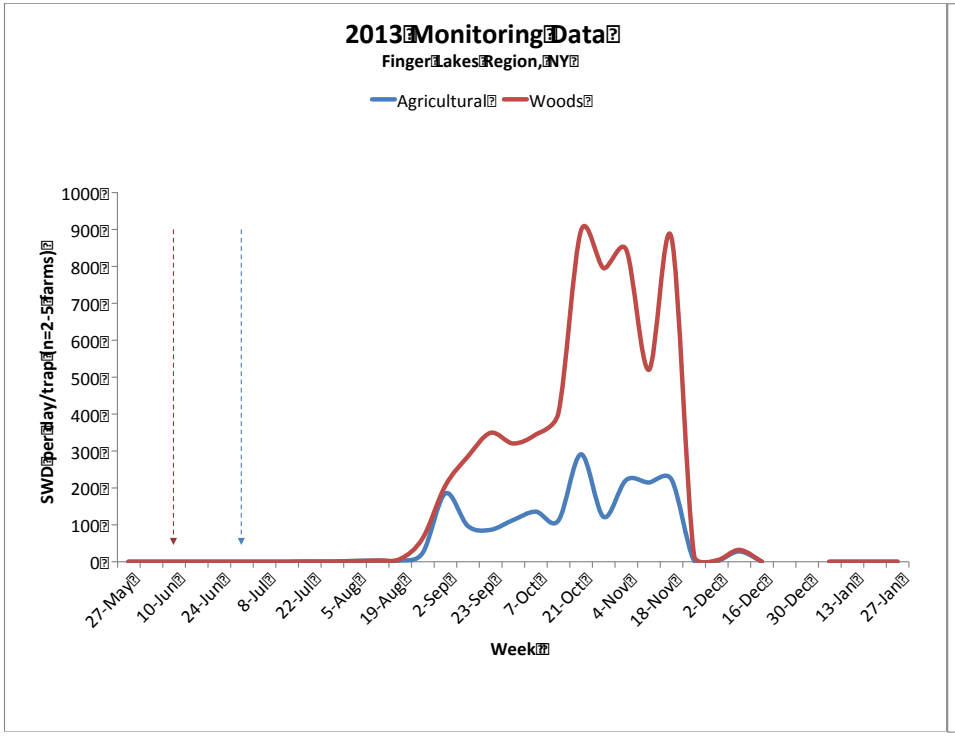
Rubus allegheniensis - Blackberry

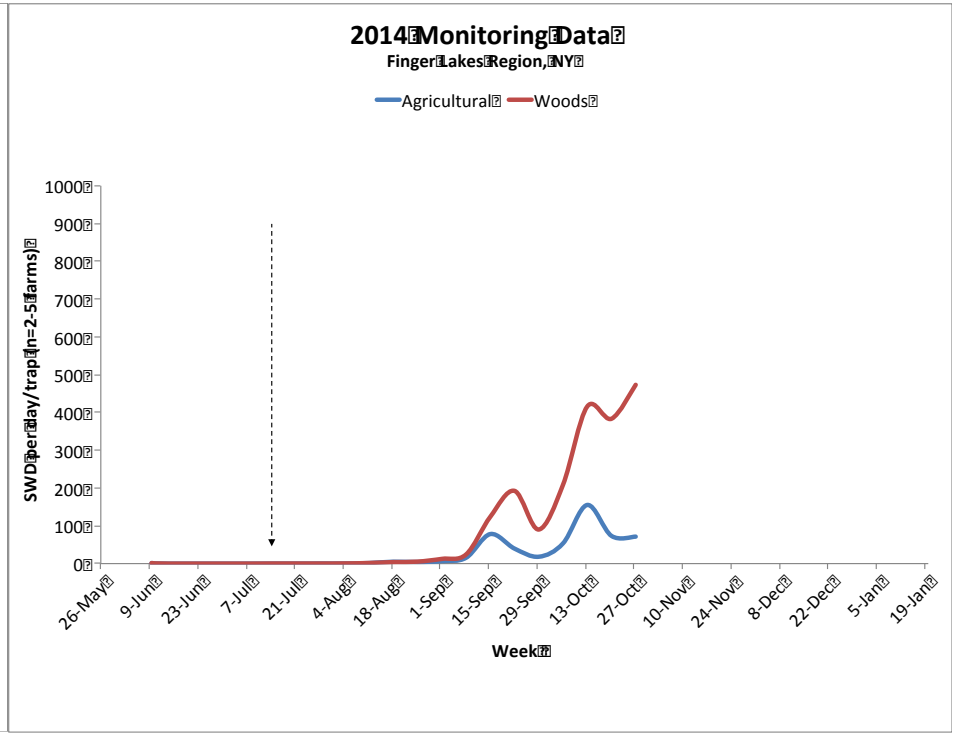


Seasonal Phenology



SWD SEASONAL DYNAMICS IN THE NORTHEAST





Credit: Greg Loeb Lab, NYSAES Geneva, NY

Life Cycle of the Spotted Wing Drosophila

Drosophila suzukii (Matsumura)

Pupation 4-15 days
Inside or outside of fruit

Adults
20-30 days

Eggs 12-72 hours
350+ eggs in a lifetime

Three Larval Instars
5-7 days

Development Range
10d – 4 weeks

Female Drosophila species

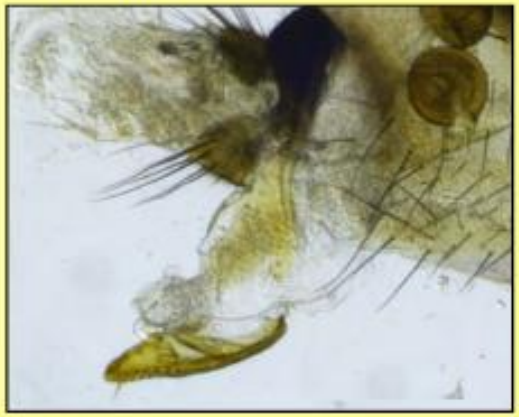
UC Berkeley & UC Cooperative Extension *Photos:* M. Hauser, CDFA

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

Other Drosophila spp.

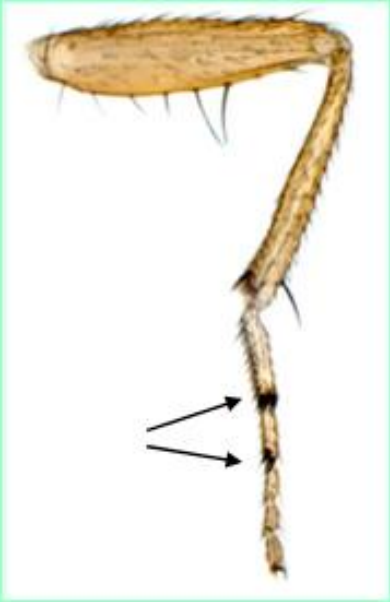
have smaller, more rounded ovipositors, sometimes with irregular, poorly defined teeth



Male Spotted Wing Drosophila (SWD)

UC Berkeley & UC Cooperative Extension

Photos: M. Hauser, CDFA



Double stripes on tarsi of front legs

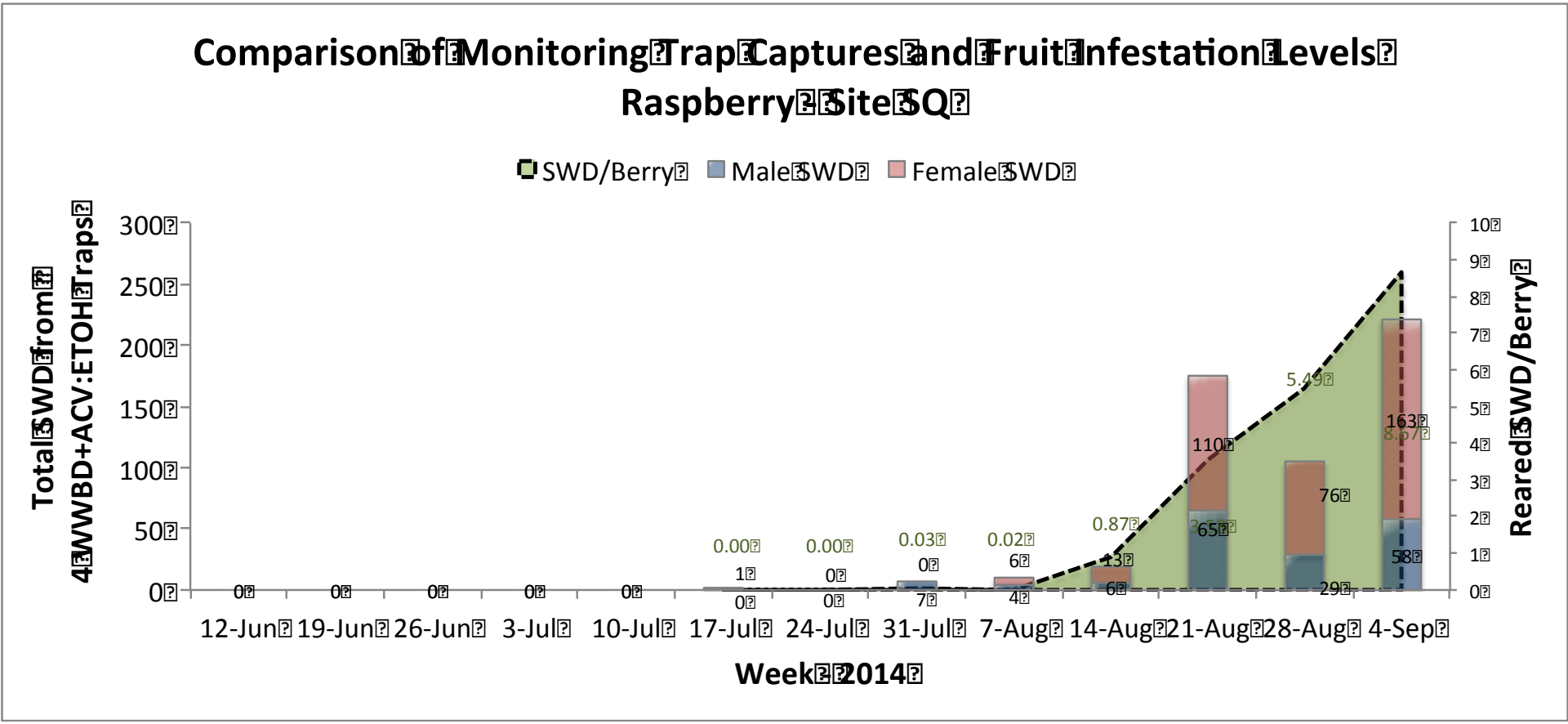
Leading edge of wing has dark spot

Unbroken abdominal bands

Monitoring

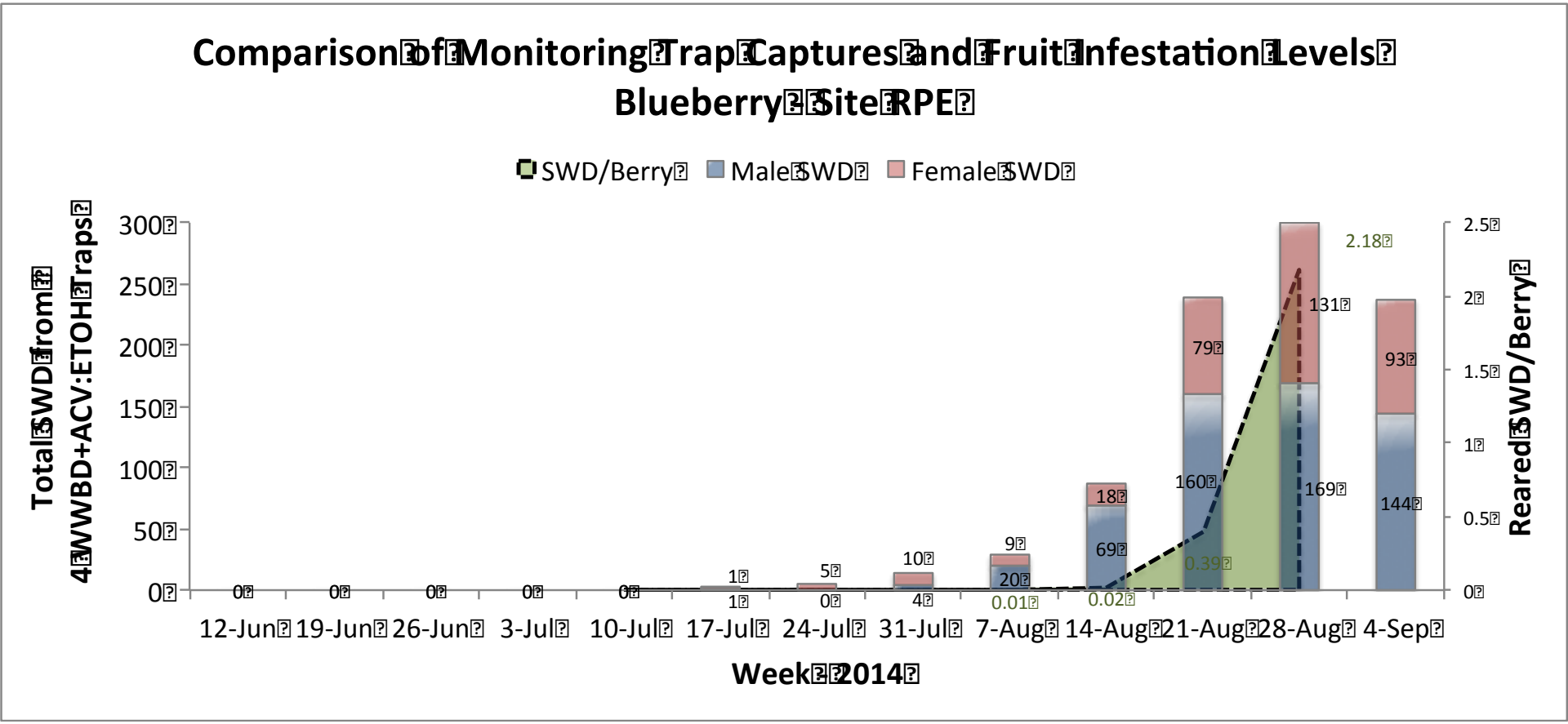
- **Whole wheat bread dough (fermenting bait) -water, sugar, yeast, whole wheat, apple cider vinegar (ACV)**
- **Drowning solution of ACV**

Trap and Fruit Assessments, WNY 2014



Credit: Greg Loeb Lab, NYSAES Geneva, NY

Trap and Fruit Assessments, WNY 2014



Credit: Greg Loeb Lab, NYSAES Geneva, NY

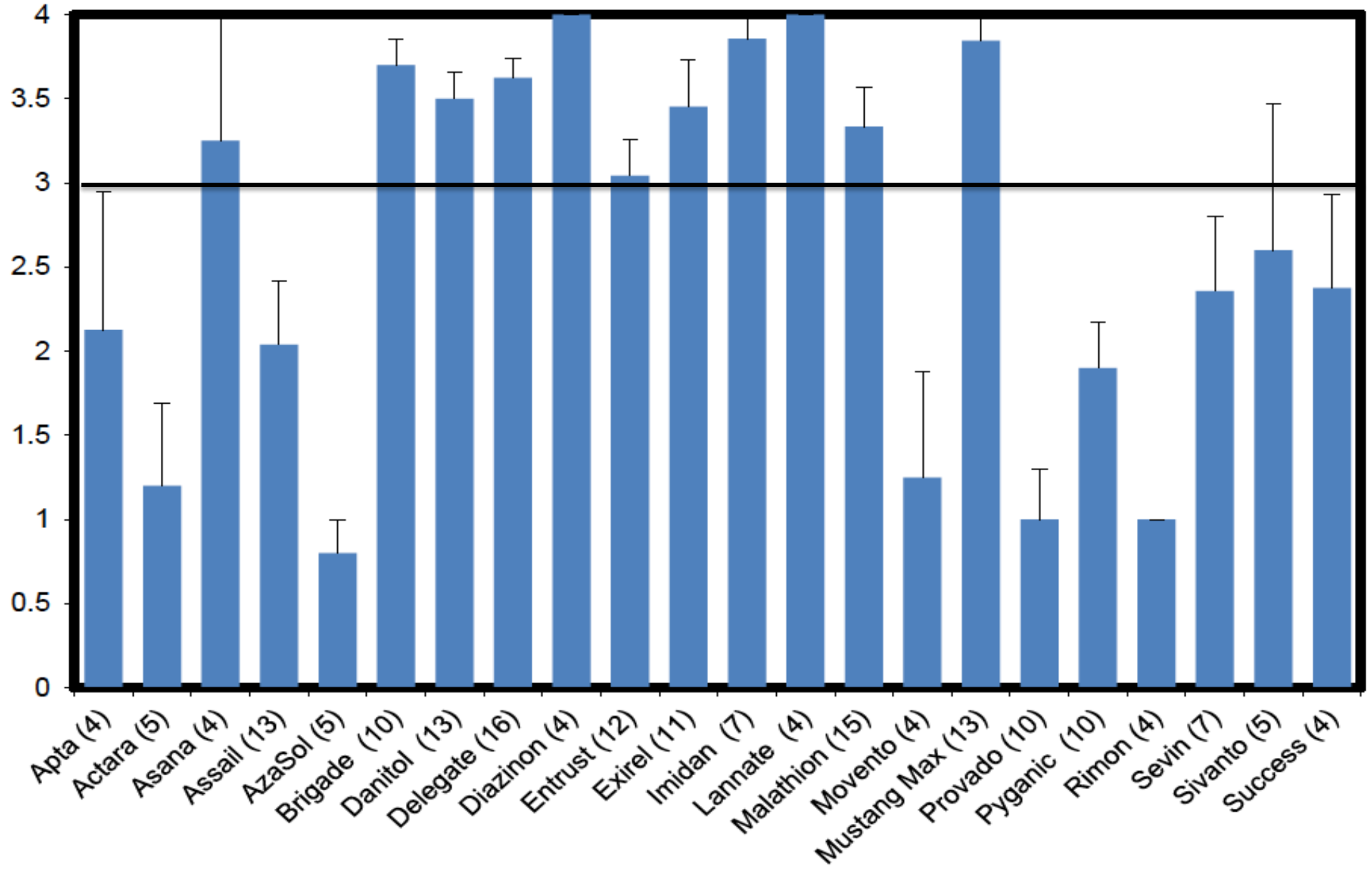
CLASSES OF SWD INSECTICIDES

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

***Just received EPA label for blueberries, not raspberries**

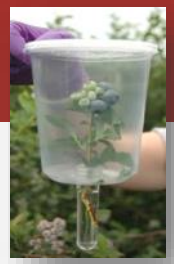
Credit: Greg Loeb Lab, NYSAES Geneva, NY

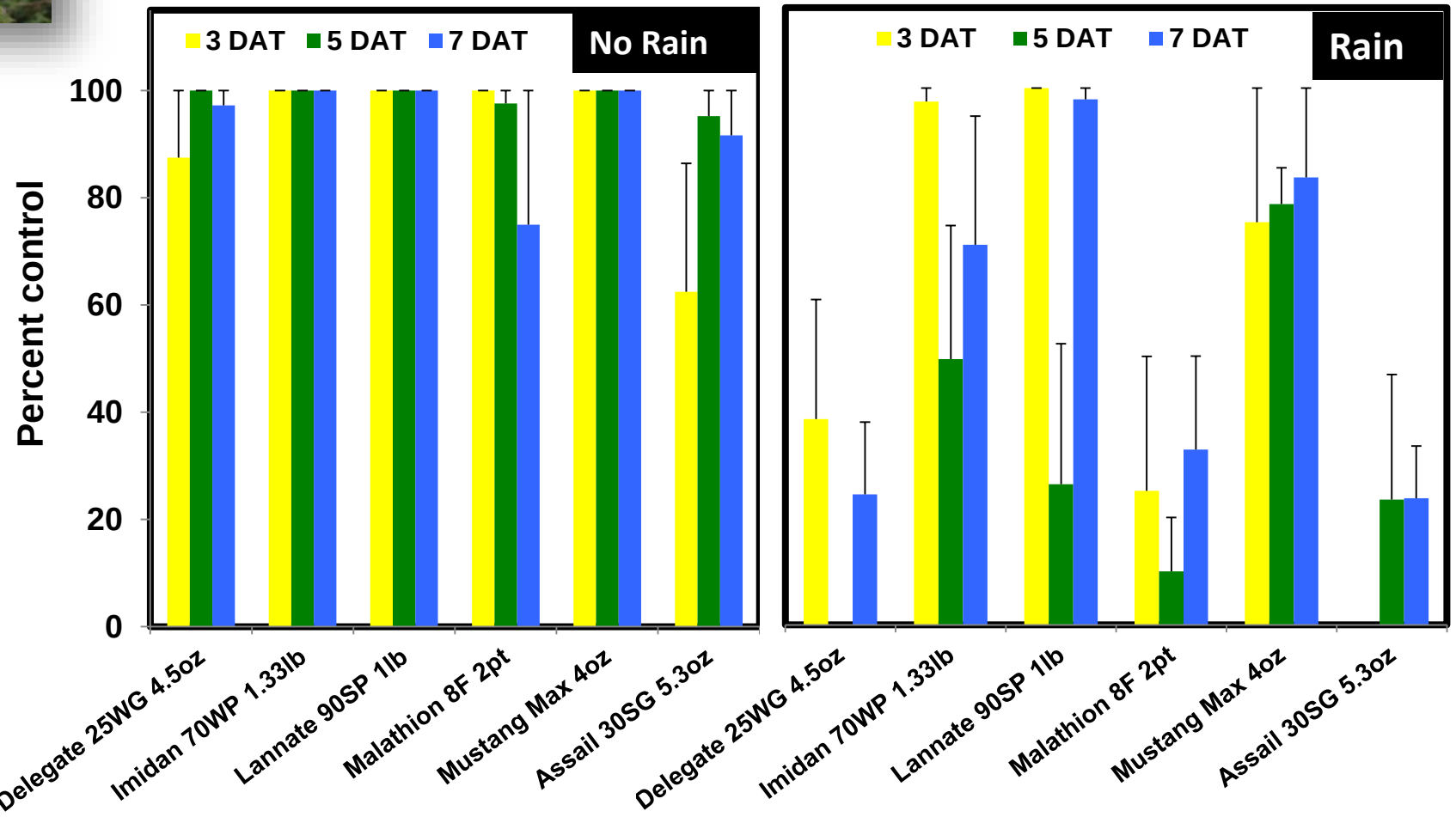
Survey on insecticide efficacy against SWD, collated by Rufus Isaacs, MSU - November, 2013



Effect of Rain on Some Common Insecticides

From Rufus Isaacs, MSU

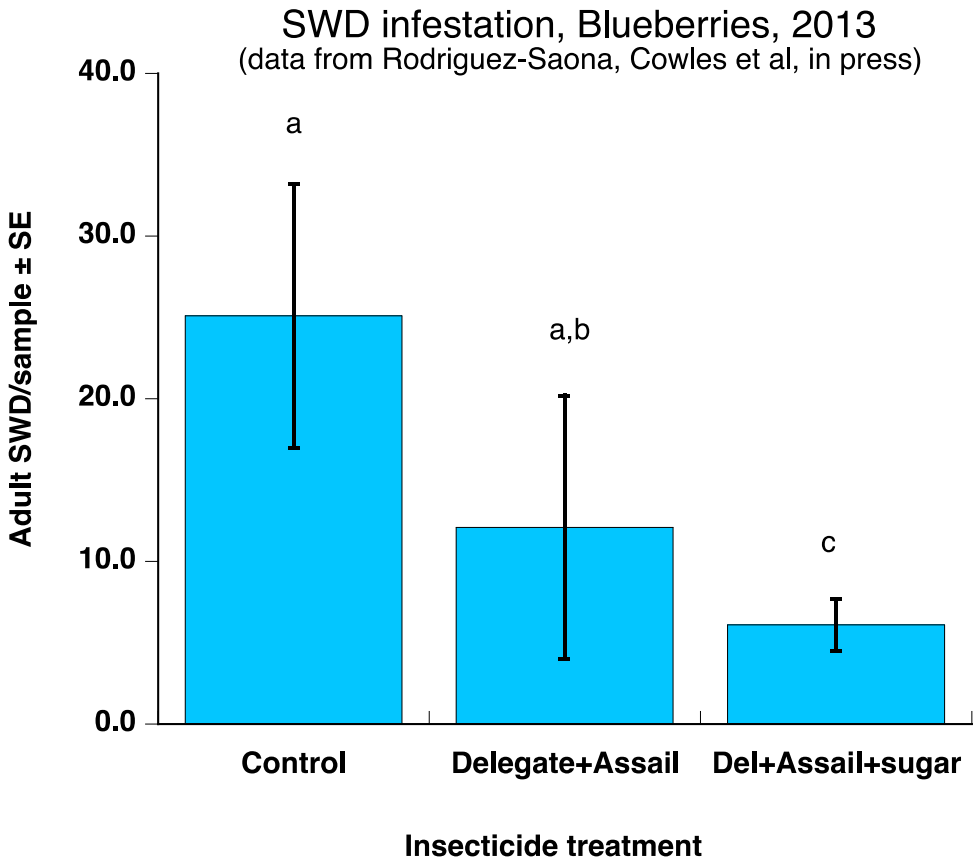




0.8 inches of rain on treated bushes
1 day after application

MICHIGAN STATE UNIVERSITY

Enhancing Mortality with Sugar



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

Credit: Greg Loeb Lab, NYSAES Geneva, NY

African Fig Fly, *Zaprionus indianus* Gupta

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.

African Fig Fly, *Zaprionus indianus* Gupta

- **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.

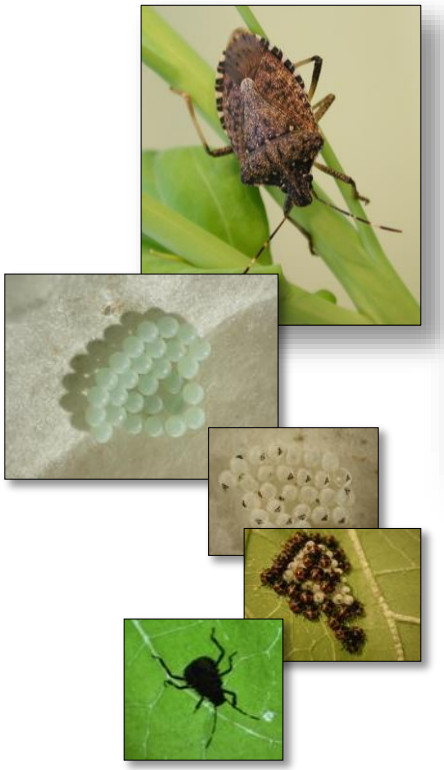
African Fig Fly: Crops at Risk

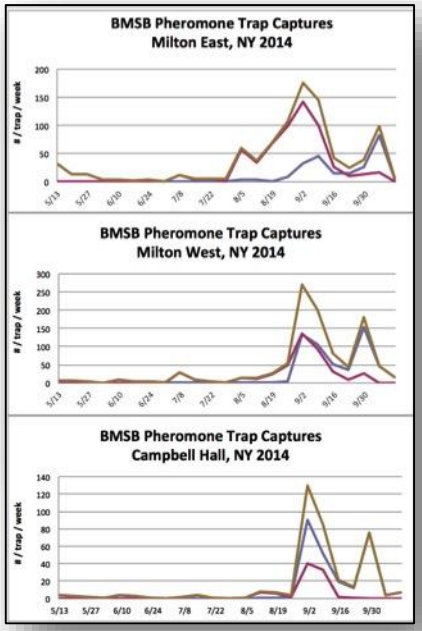
- **Damage: Predominately to citrus and grape**
- **Hudson Valley:**
  - **4 AFF in 2012**
  - **0 AFF in 2013**
  - **3 AFF in 2014**
- **Reports from Rutgers, NJ of wine grape injury independent of SWD injury.**
- **Not yet a threat in NY**

SUMMARY

- 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 forcasts 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

- Brown Marmorated Stink Bug first detected in Allentown, PA in 1998, confirmed in 2001.

- 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

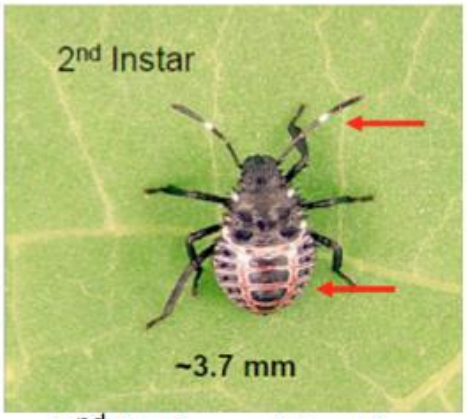
- Extensive injury in 2010 causing 37 million dollars in pome fruit damage.

- **Economic damage to apple on three Hudson Valley Farms in Ulster and Orange Counties in 2012.**

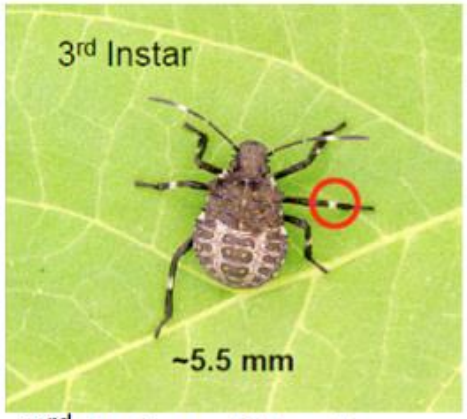
CORNELL'S Hudson Valley LABORATORY

Eggs: Average 28/cluster; light green to white

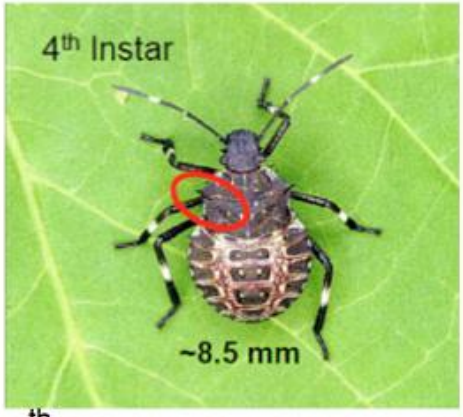
1st instar: black & red; cluster near eggs



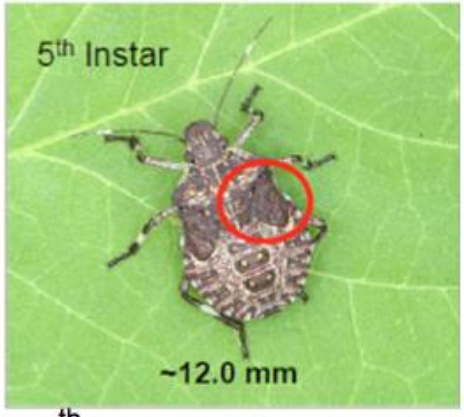
2nd instar: striped antennae



3rd instar: striped antennae and legs



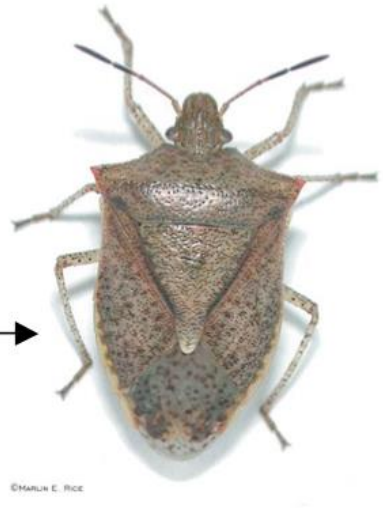
4th instar: thoratic spur striped antennae & legs



5th instar: wing pads striped antennae & legs

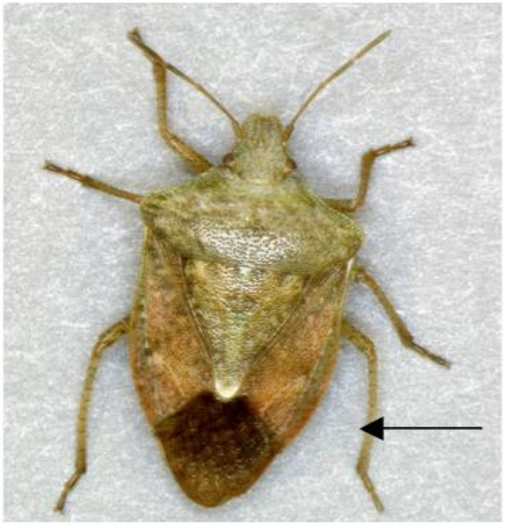
BMSB Adults: red eyes, 4 cream colored dots on shoulders; banding on legs and antenna, smooth blunt shoulders. Banded abdomen; 14 -17 mm in length.

Spined Soldier Bug
Pointed shoulders
No leg stripe

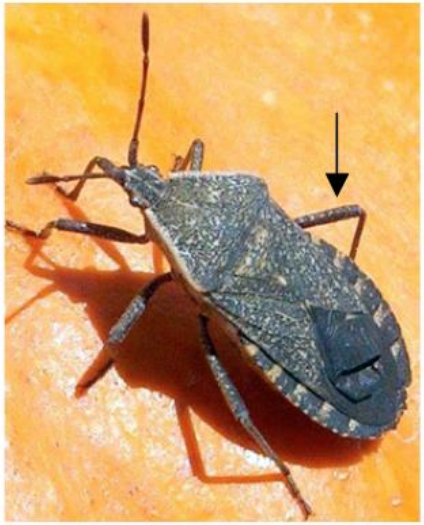


Brown stink bug
No leg stripe

Rough Stink Bug
'Teeth' along shoulders



Green Stink Bug
No leg stripe



Squash Bug
No leg stripe

Western conifer seed bug
'leaf footed'

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

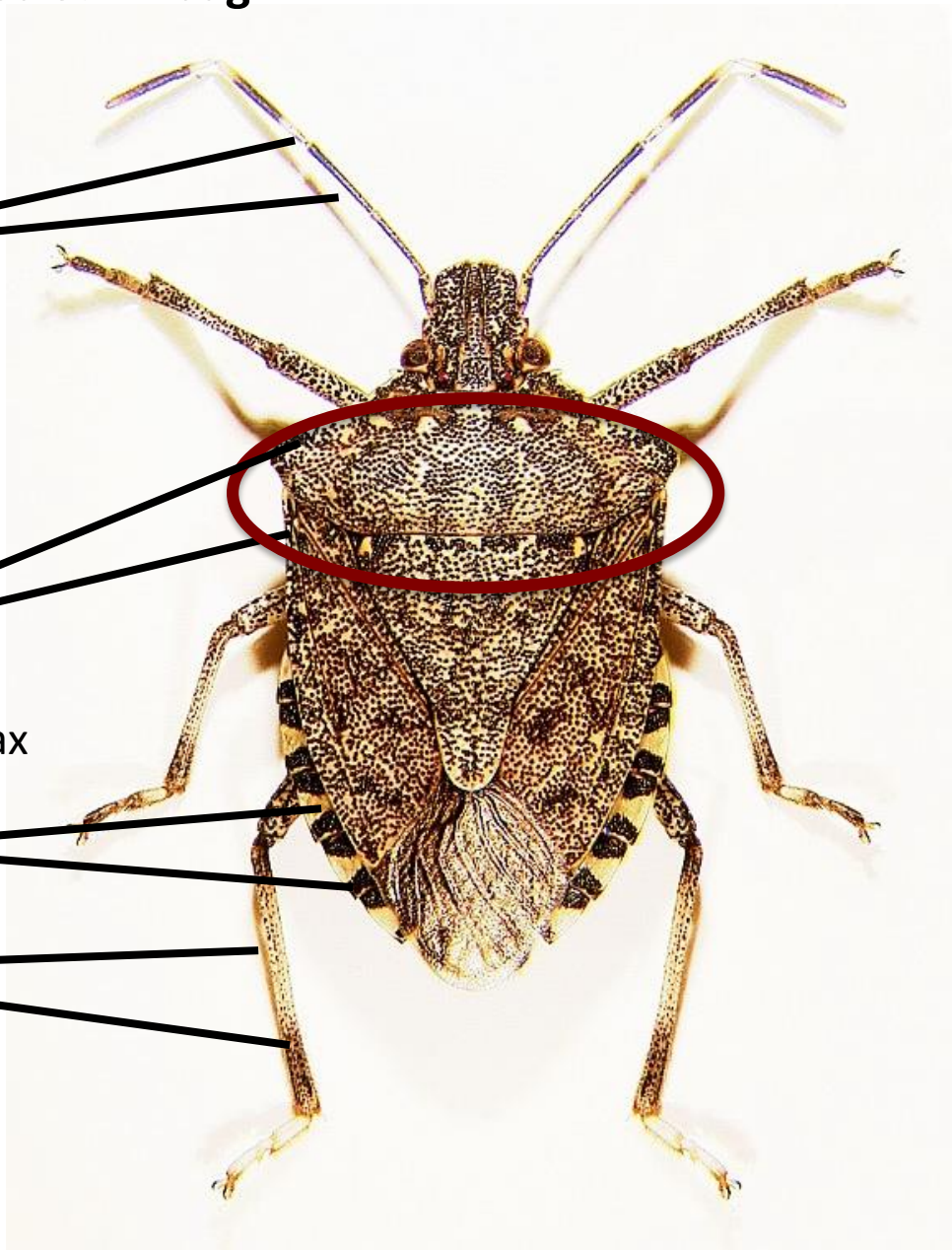
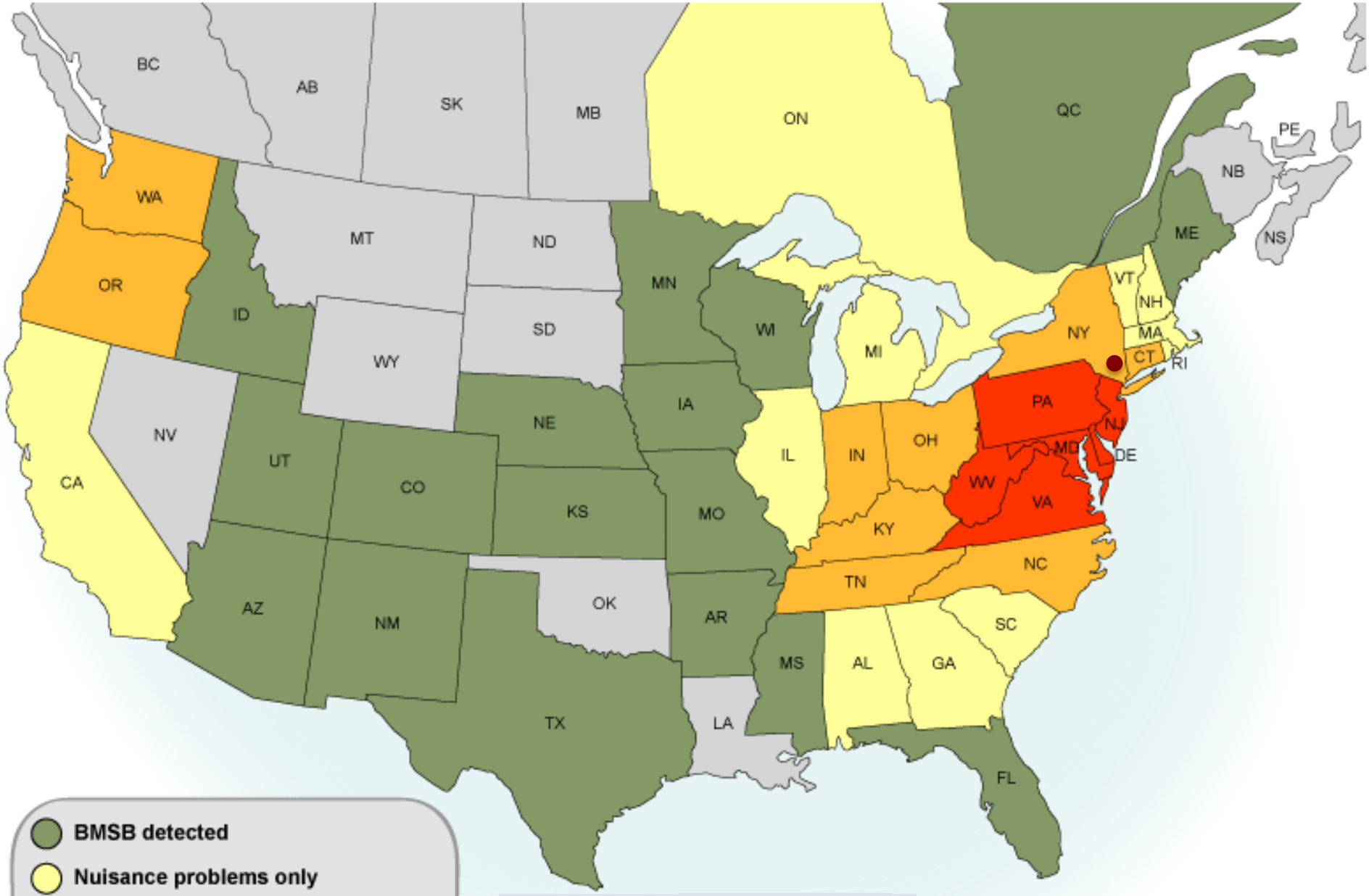


Photo by David J. Shetlar
Ohio State University



BMSB Presence
December 2014

Hudson Valley Research Laboratory

Brown Marmorated Stink Bug: Host Plants - Food for Success

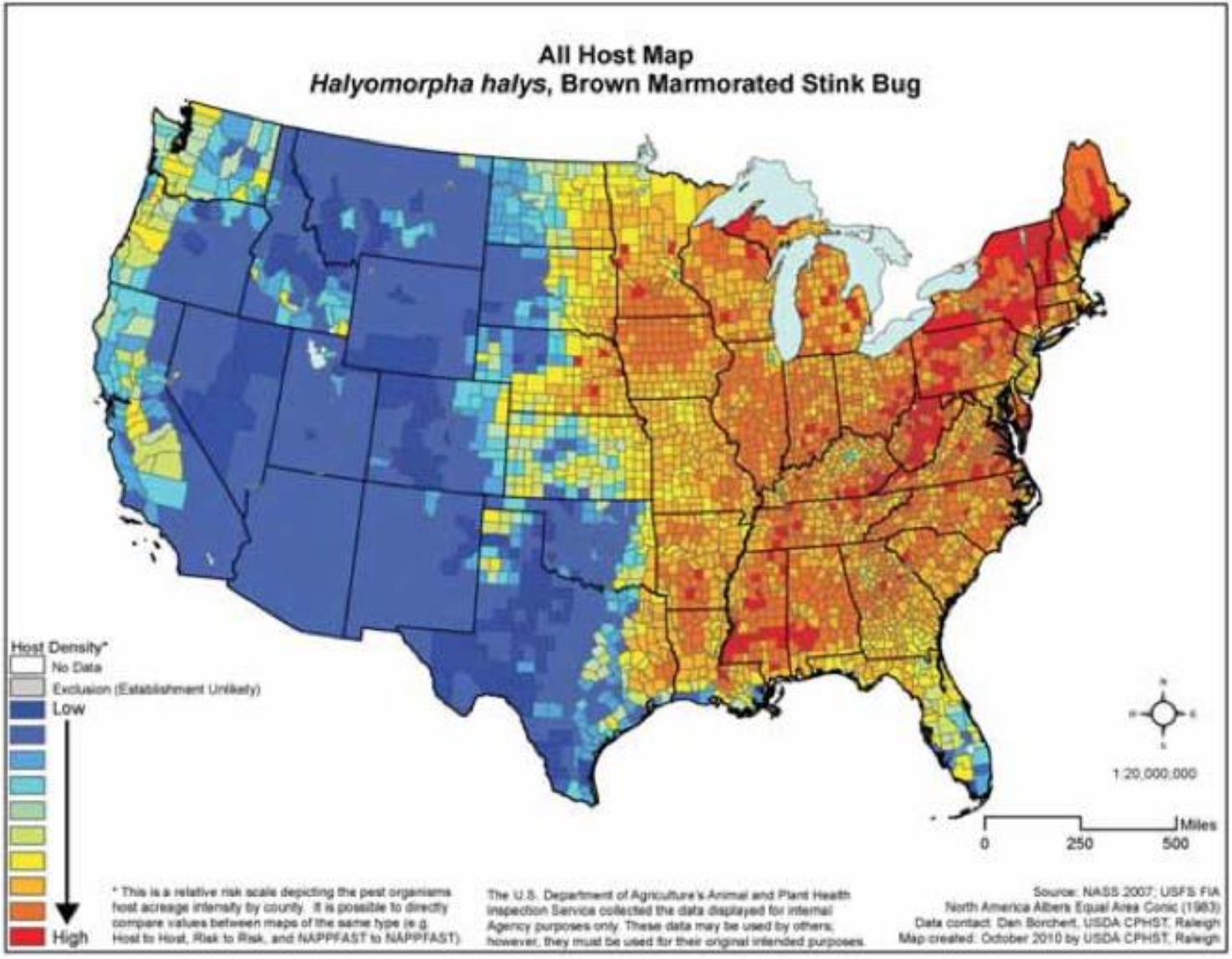
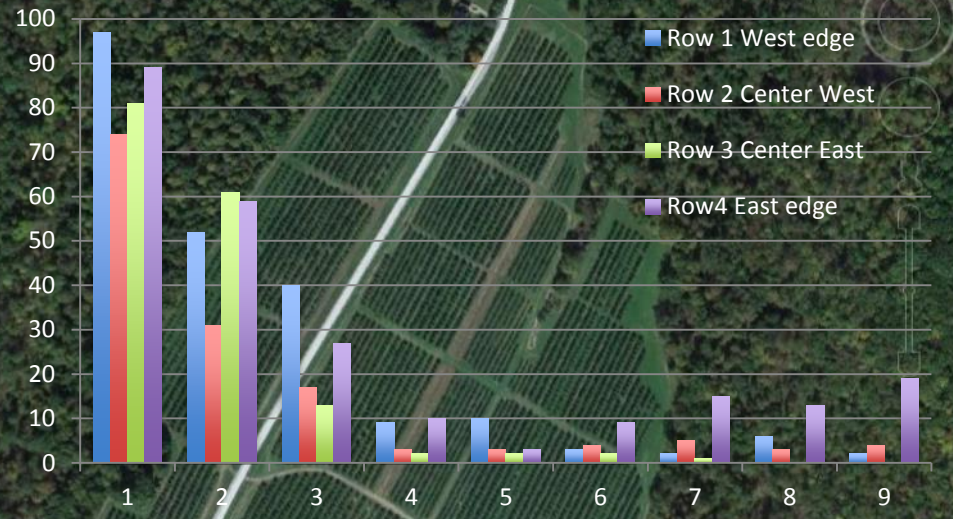


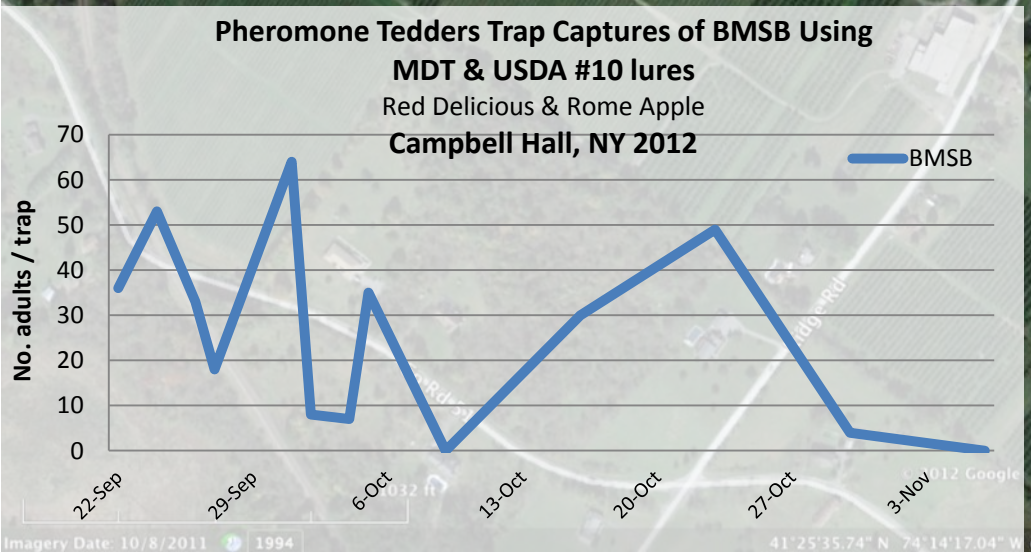
Figure 1: Risk maps displaying the relative density of field, vegetable, and fruit crop hosts plants of BMSB throughout the United States.

Stink Bug Survey: #4
100 acre Orchard;
5 acre block; Pink Lady
Fruit damage survey
September 10, 2012

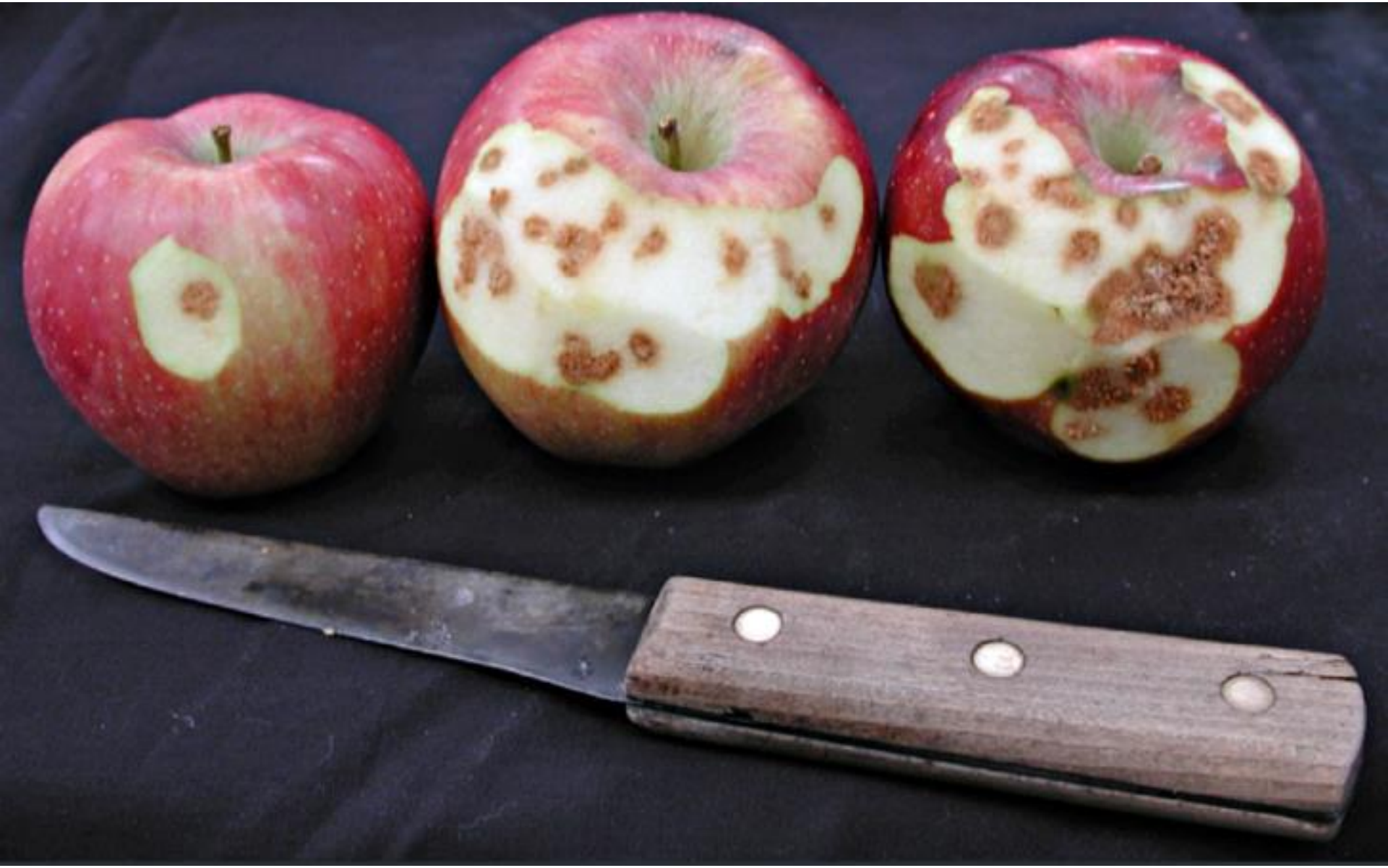


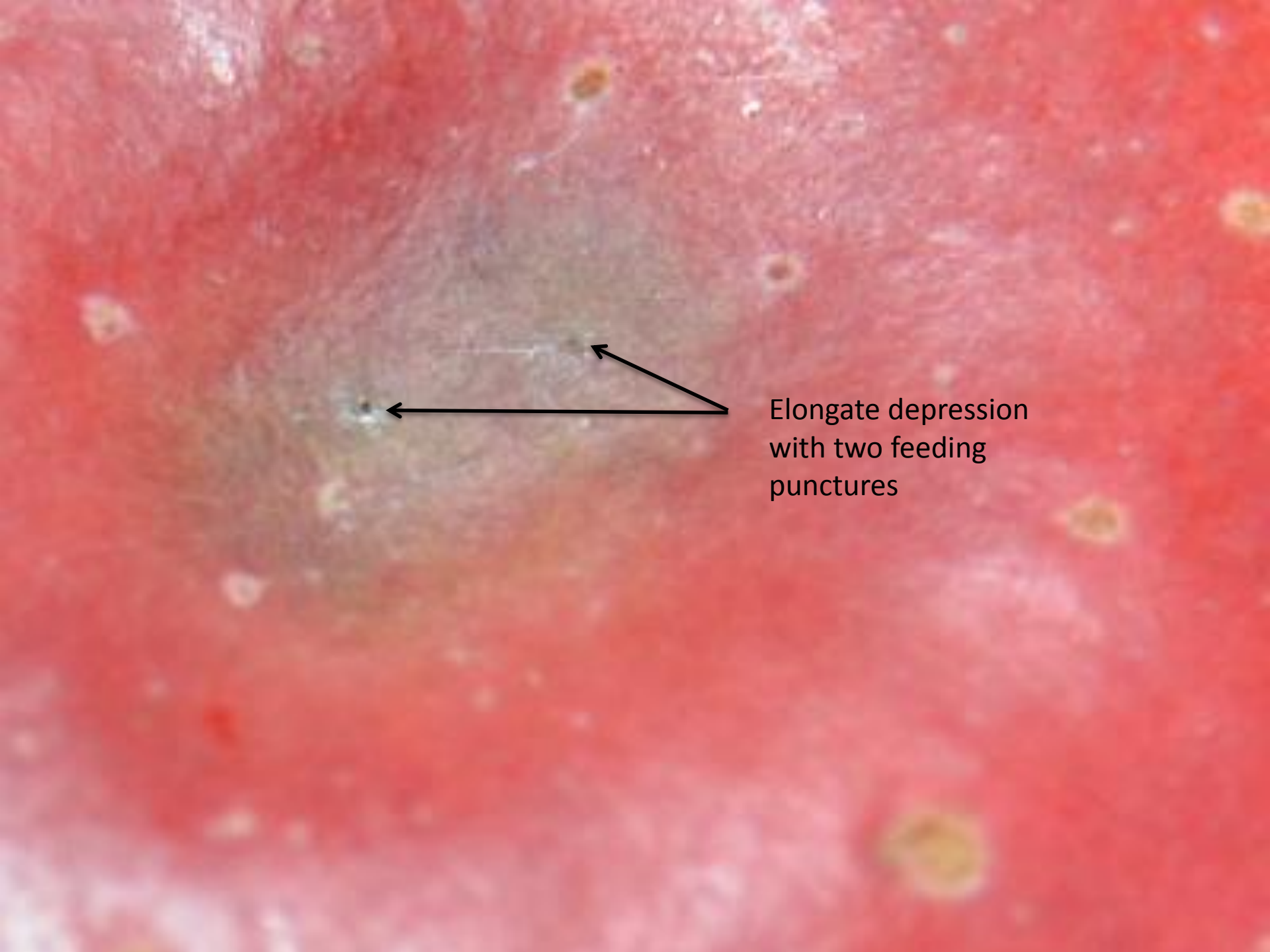
Evaluation of var. 'Pink Lady'
Trees @ 3' x 12' spacing

- 10 fruit / tree = 100 fruit /30'
- 9 sections; 240' row

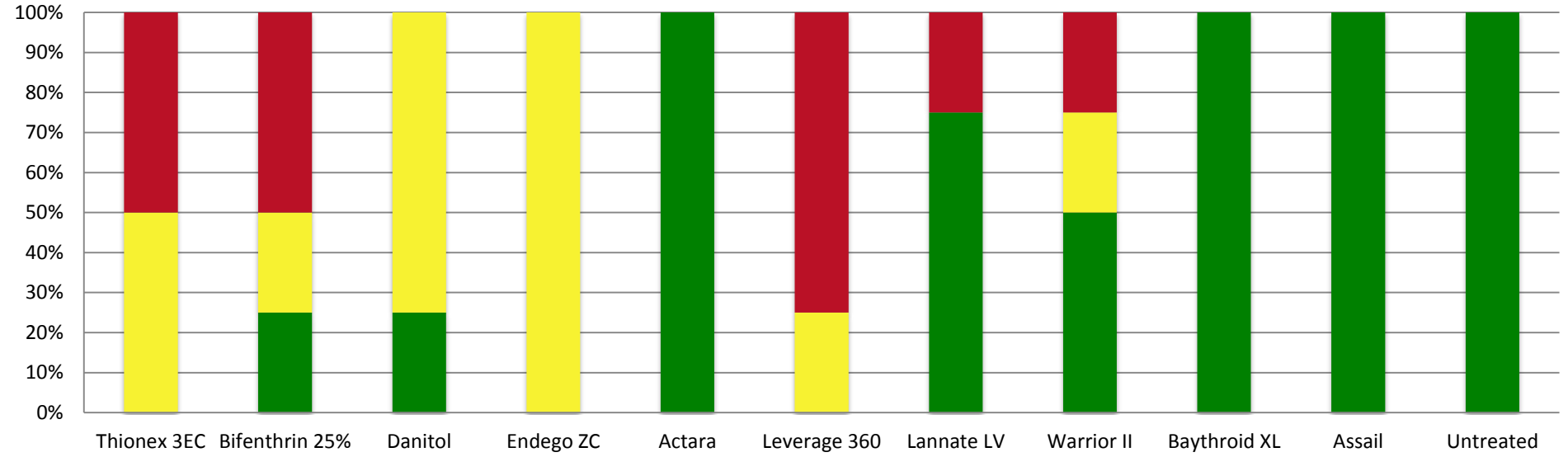


©2010 Google

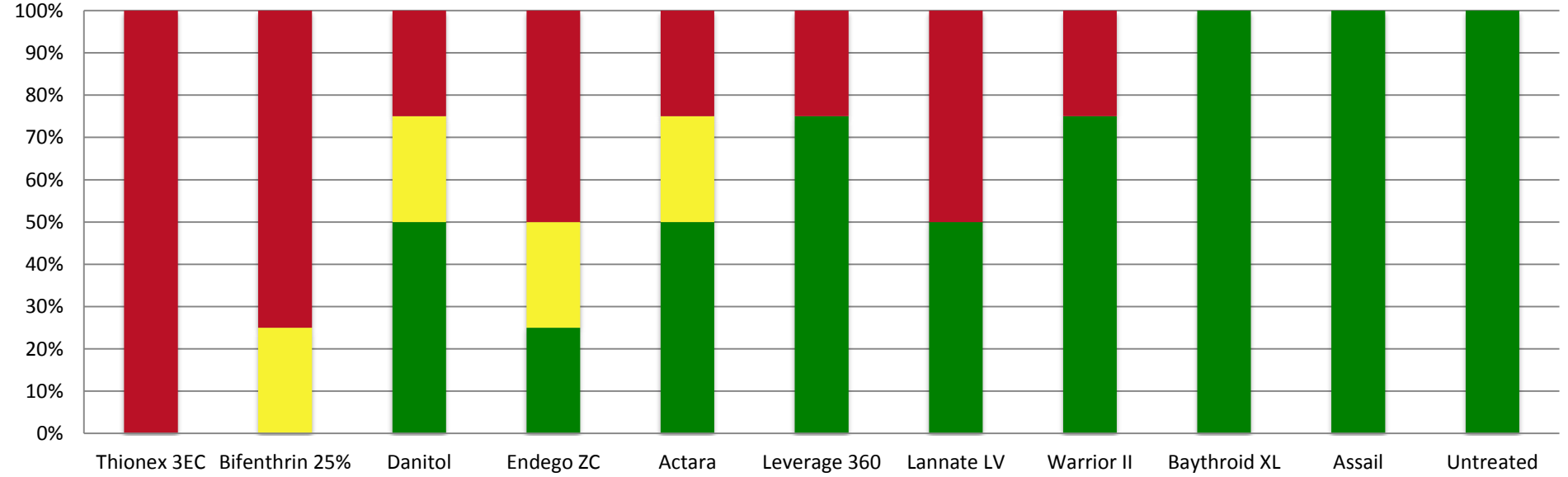



Elongate depression
with two feeding
punctures

BMSB Adult Exposure to Insecticide Residue of Apple Foliage
72h Old Residue @ 1 d



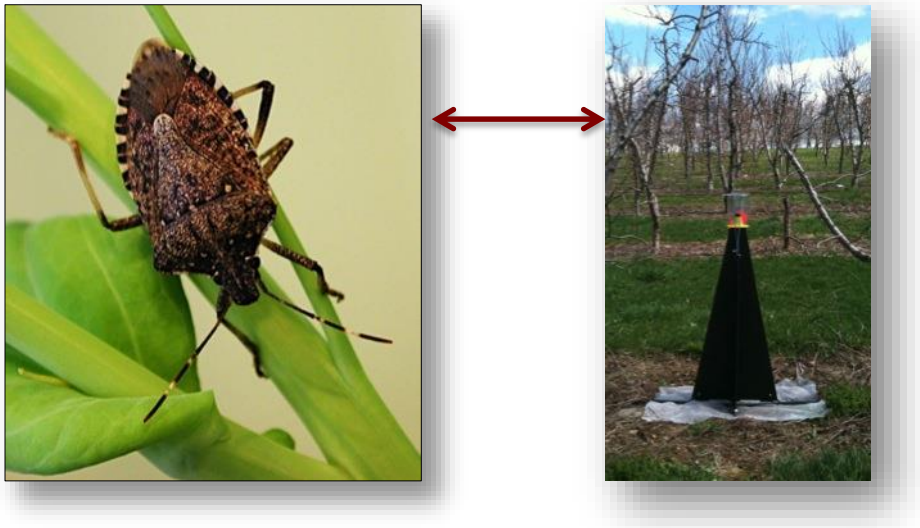
BMSB Adult Exposure to Insecticide Residue of Apple Foliage
72h Old Residue @ 3 d



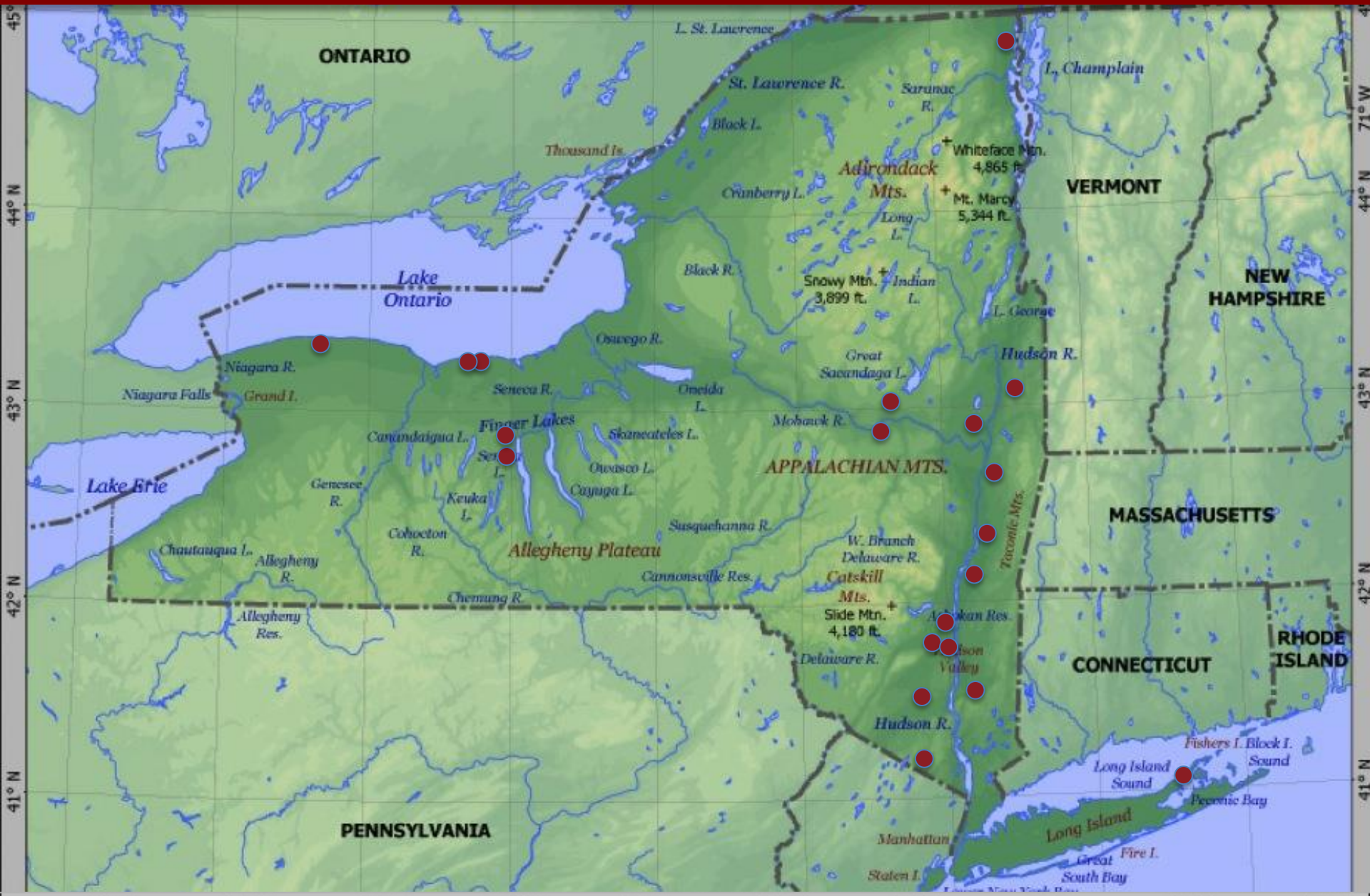
Developing Pest Thresholds for Managing the Invasive Brown Marmorated Stink Bug, *Halyomorpha halys* (Stål): (Pentatomidae) In NY Tree Fruit.

- Conduct State-wide Trap Monitoring of BMSB in NY

- **12 Cooperators**
  - **NYSAES**
  - **WNY LOFT**
  - **ENY Hort.**
  - **HVRL Staff**
- **40 Traps**
- **20 Farms**
- **14 Counties**



NYS BMSB Trap Locations: 2014
Tree Fruit, Vegetable / Sweet Corn, Grape

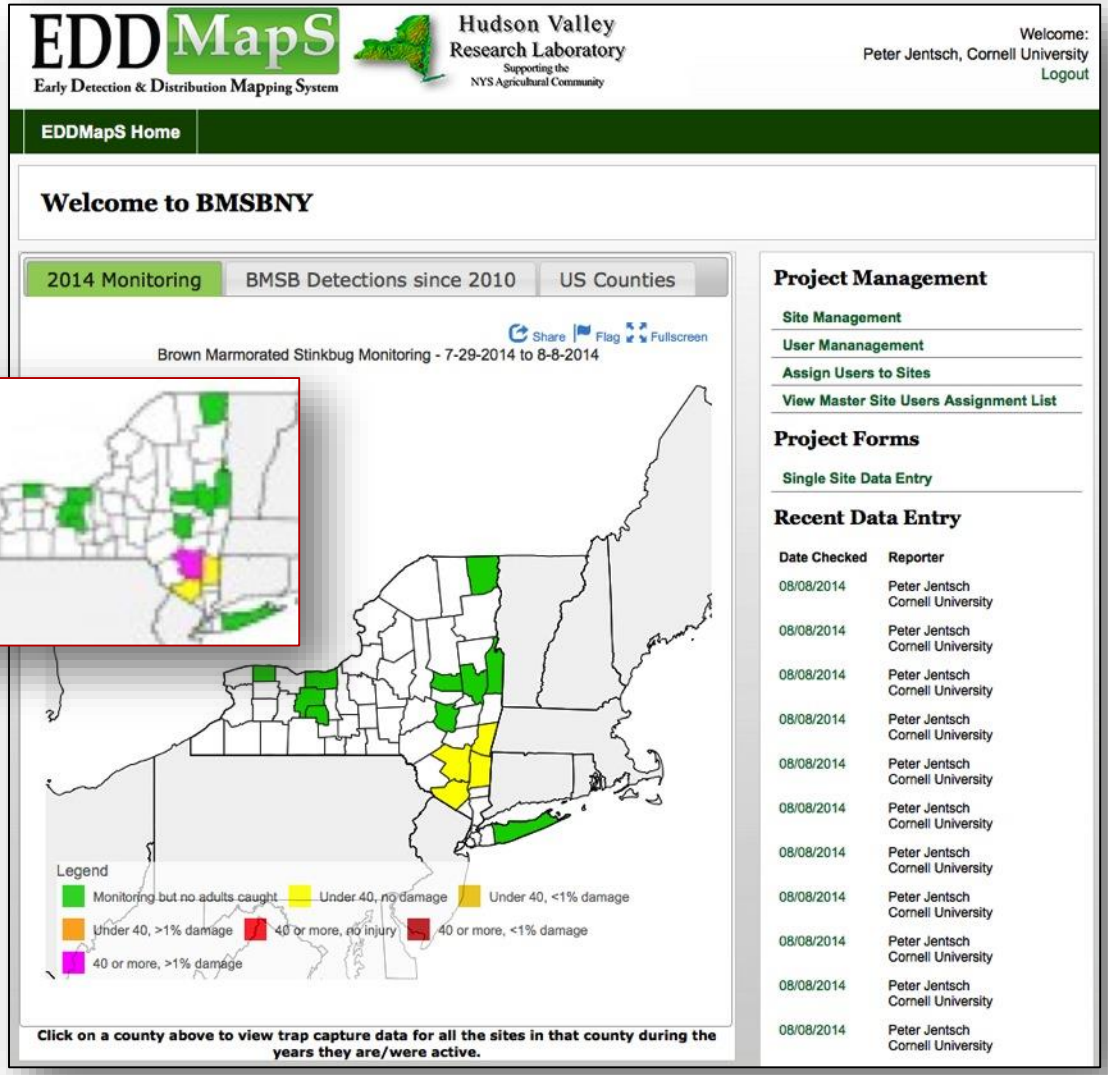


State-wide Trap Monitoring of BMSB in NY

BMSB Trap Site	Lat	Long.	County	Crop	BMSB Total
Bellona-Orchard	42.74786	-77.01583	Yates	Apple	**0**
Campbell Hall - Orchard	41.42821	-74.23972	Orange	Apple	370
Chazy-Orchard	44.90238	-73.43094	Clinton	Apple	0
Columbia-Orchard	42.19387	-73.82546	Columbia	Apple	-
Cutchogue-Peach Orchard	41.01231	-72.48331	Suffolk	Peach	8
Fishkill - Orchard	41.51773	-73.82363	Dutchess	Apple	192
Greenwich-Vegetable	43.0724	-73.5571	Washington	Corn	0
Hudson Valley Lab - Highland	41.74551	-73.96775	Ulster	Apple	510
K M Davies Co	43.23571	-77.18898	Wayne	Apple	**3**
Kinderhook-Orchard	42.39906	-73.70259	Columbia	Apple	0
Milton East - Vegetable	41.63812	-73.96396	Ulster	Organic Pepper	800
Milton West - Orchard	41.65032	-73.9931	Ulster	Apple	962
Montgomery-Veg	43.00424	-74.32636	Fulton	Bean	0
Motts	43.23399	-77.17352	Wayne	Apple	**0**
Orleans-Orchard	43.2575	-78.23857	Orleans	Apple	**0**
Red Jacket-Orchard	42.86137	-77.0256	Ontario	Apple	**2**
Rexford-Orchard	42.81575	-73.83824	Saratoga	Apple	0
Schoharie-Veg	42.75273	-74.45422	Schoharie	Apple	0
Tivoli - Orchard	42.04537	-73.85442	Dutchess	Apple	211
Warwick - Orchard	41.23259	-74.3873	Orange	Apple	227

- 20 Trap Sites in 14 NYS counties
- 7 Sites @ Threshold In 3 NY Counties

BMSB Management Threshold: Communication



Partnered with EEDMaps to extend outreach

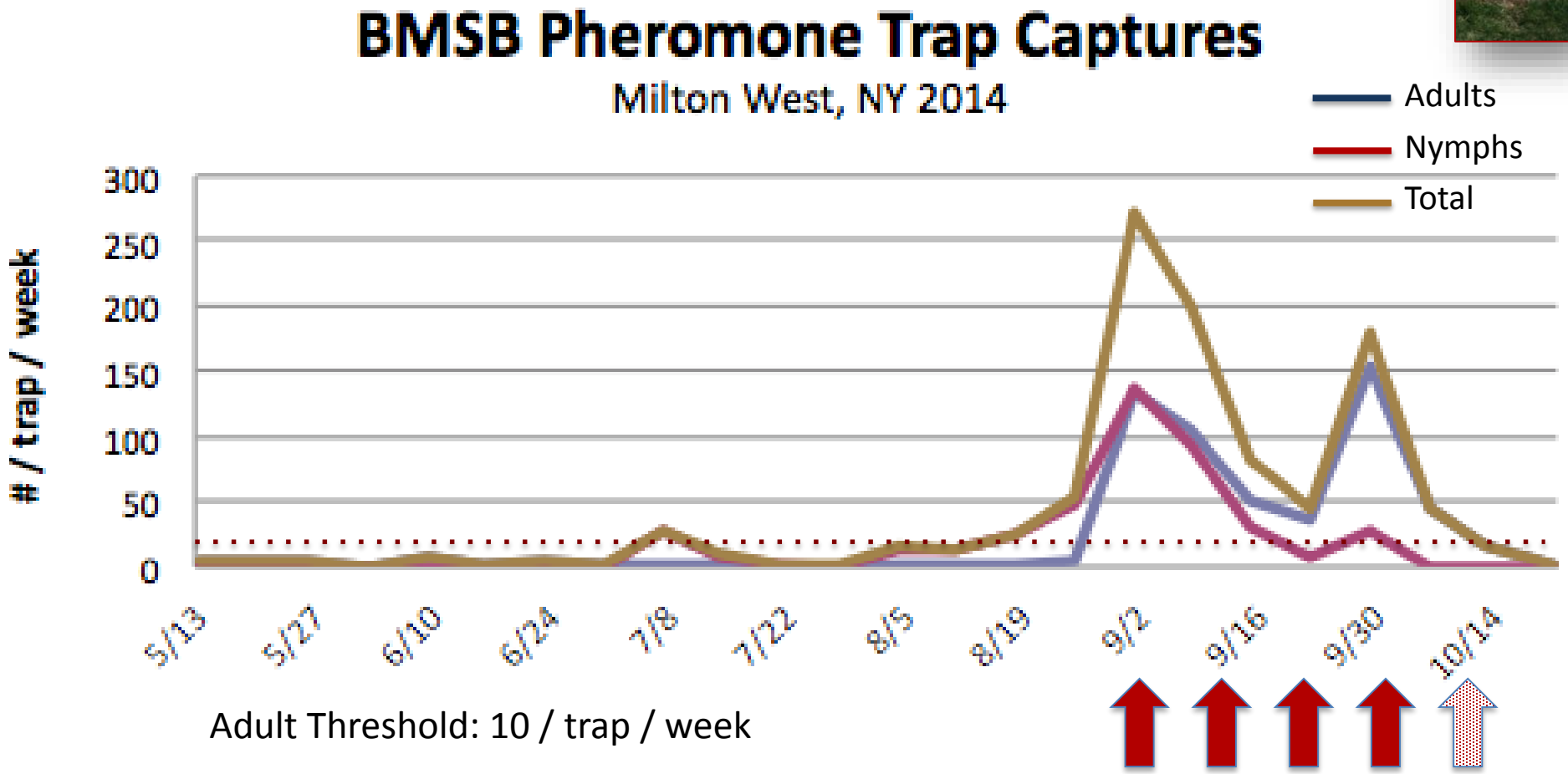
- Early Detection & Distribution Mapping of Invasive Insects
- Provide regional and nation invasive species tracking
- Provide customized data outputs for threshold development

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

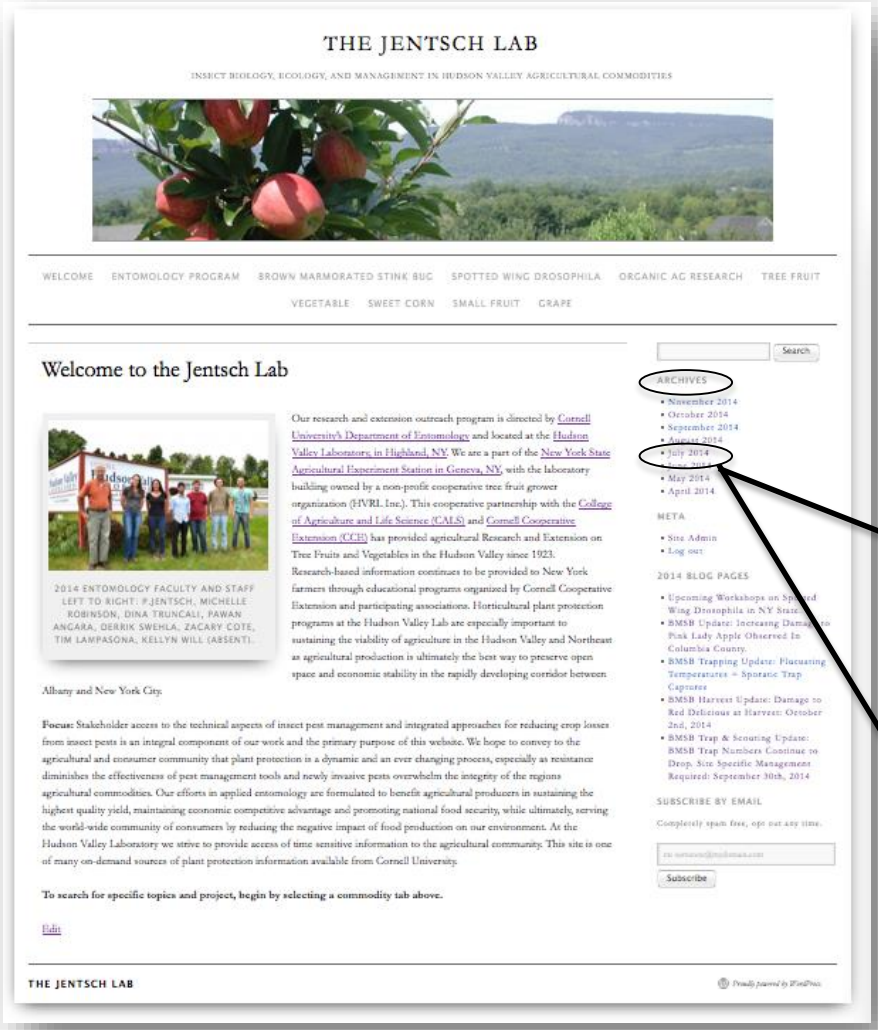
BMSB Management Threshold



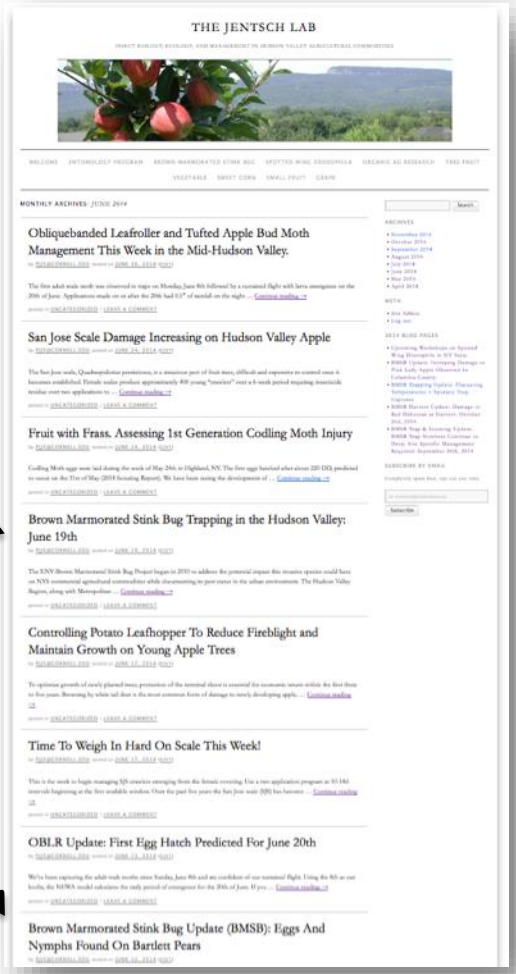
Adult Threshold: 10 / trap / week

BMSB Management Threshold: Communication

Jentsch Lab Site: Developed 2014



Insect Alerts & Recommendations



BMSB Management Threshold: Communication

Brown Marmorated Stink Bug: August 15th Update

by PJJ5@CORNELL.EDU posted on AUGUST 16, 2014

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

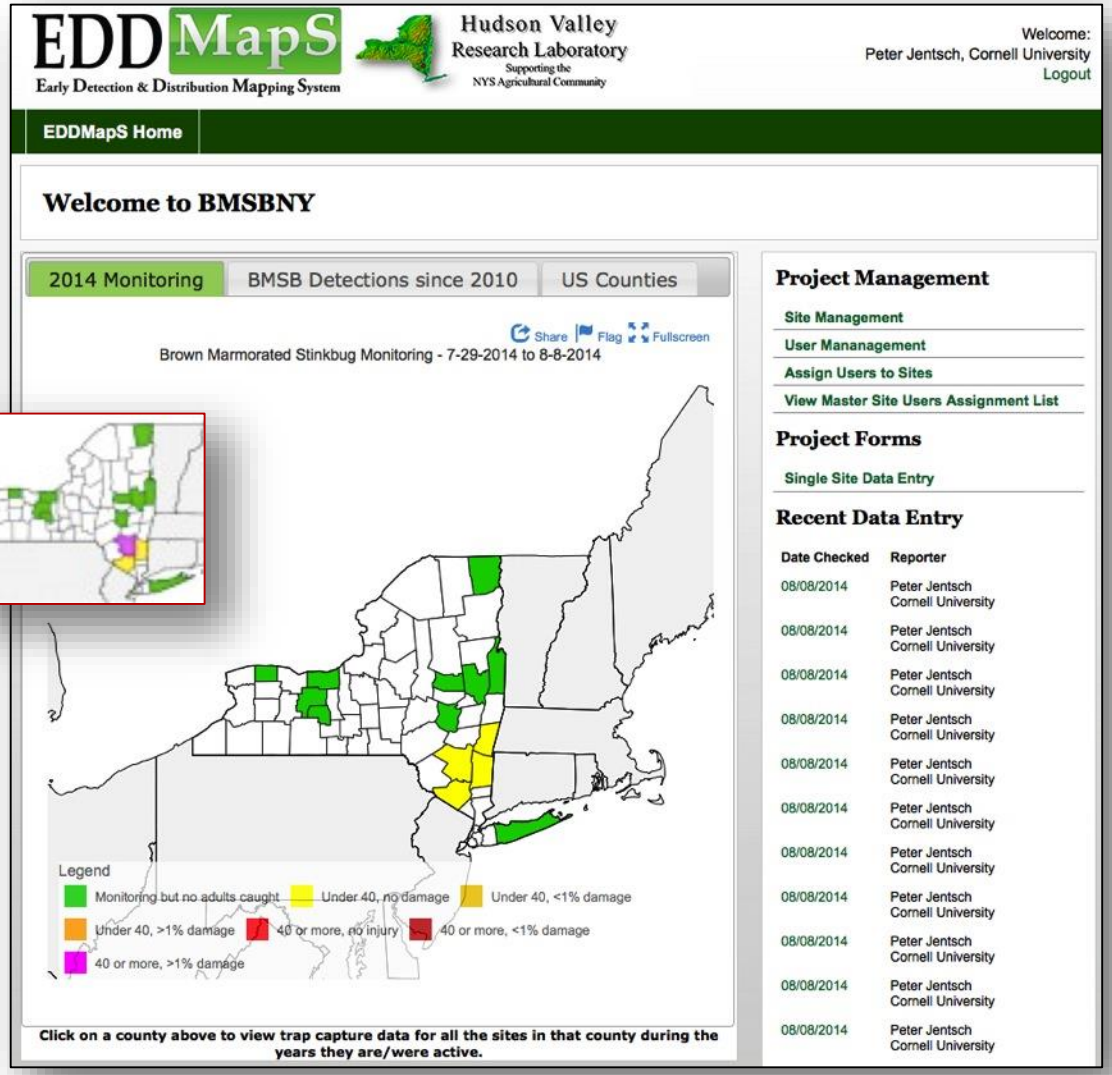
BMSB Update: August 20. Confirmed Late Season Feeding to Apple, Peach and Pepper

by PJJ5@CORNELL.EDU posted on AUGUST 20, 2014

Extensive damage from BMSB Observed On Peach in Highland, NY: August 25th

by PJJ5@CORNELL.EDU posted on AUGUST 25, 2014

BMSB Management Threshold: Communication



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- Early Detection & Distribution Mapping of Invasive Insects
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By County: Weekly update
Trap data per county
Presence in degrees of risk
Threshold levels

BMSB Management Threshold: Communication

Dan Donahue: Weekly Publication ENYHP: Blog Site Alerts

Cornell University
Cooperative Extension

Eastern NY Commercial Horticulture Program

Tree Fruit News

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October 16, 2014

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Weather Data

Degree Day Accumulations
(03/01 through 10/15/2014, via NEWA)

Location	Base 43	Base 50
Peru	3557.3	2347.1
Watermill	3743.8	2467.5
Clifton Park	3751.6	2503.4
Marlboro	4020.8	2720.6
Hudson	4135.2	2834.8
Highland	4167.6	2846.8

In this issue of Tree Fruit News:

Harvest Update for the Eastern New York Region

By Anna Wallis and Dan Donahue, CCE ENYCHP

In the Champlain 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 up to 15 mph. Most fruit is expected to be off the tree by the end of the week, the exception being a couple of late varieties for our region such as NY-2 and any 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 unstable October weather, such as early morning rainfall, has slowed harvest from the breakneck pace that has characteristic this year. Empire, Red Delicious, and Golden Delicious are being wrapped up this week. Mutsu 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. Cameo is currently being harvested. The PYO business appears to be brisk this year, with some farms nearing completion of the PYO season.

The major Hudson Valley varieties remaining to be picked are Fuji, Rome, and Pink Lady. The early "Maslin" strain of Pink Lady is ready for spot picking. While some Law Rome have been picked, eating quality will improve by next week. Volume harvest of standard Fuji will be underway next week. Rome Beauty will need a little more time on the tree, and original Pink Lady is looking like the first week in November. Overall, the crop continues to look like 80% of an expected "average" crop, varying up or down by variety and farm. Please scout for BMSB injury in these late varieties, and report damage to either Peter Jentsch or Dan Donahue at the Hudson Valley Lab. It will be helpful to future management programs if we know where this pest is becoming a problem, and to what degree.

Serving the educational and research needs of the commercial small fruit, vegetable and tree fruit industries in Albany, Clinton, Columbia, Dutchess, Essex, Fulton, Greene, Montgomery, Orange, Rensselaer, Saratoga, Schoharie, Schenectady, Ulster, Warren and Washington Counties

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

By Peter Jentsch, Cornell University Dept. of Entomology, posted to online blog October 14, 2014 available at http://blogs.cornell.edu/jentsch/

Tedders trap using pheromone combination lures in peach.

Warming temperatures (mid to low 70's in the Hudson Valley today) are predicted over the course of the next three 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 woodlands through the harvest of our latest variety, 'Pink Lady' in mid-November. Today we observed 1% BMSB injury from a commercial block in Columbia County, NY of Pink Lady along the orchards wooded edge. Clean fruit going into storage have seen dramatic increases in BMSB damage expression coming out of storage. As with earlier harvest dates, it's likely the fruit injury expression will increase while it hangs on the tree and if BMSB keep 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 Leskey's team at USDA ARS-W.V. 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 take them through the winter while seeking and moving to urban structures and forest trees (upper canopy of dead trees with 'flaking' bark) as overwintering sites. Lack of substantial rainfall leading to dry conditions will likely increasing fruit injury from BMSB as the insect seeks a source for water.

Newer feeding injury with 'invisible feeding site' with undisturbed visible feeding tube.

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.

continued on next page

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*

Keyed out by Dan Gilrein

http://www.barkbeetles.info

Xylosandrus germanus (female) (by J Hulcr, University of Florida). Hulcr, J. 2012. http://xyleborini.myspecies.info/gallery (last accessed October 22, 2012).

Introduction

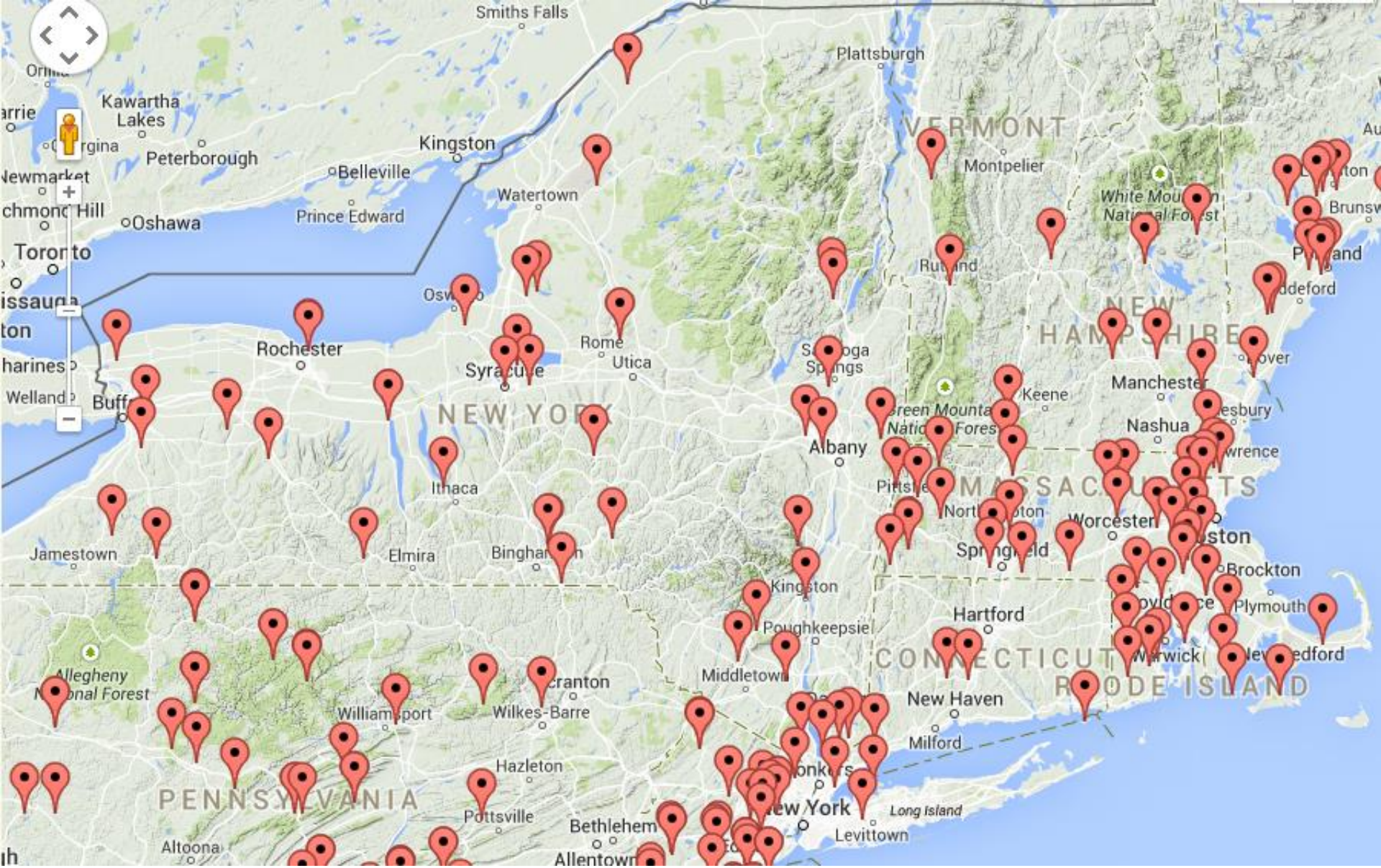
- **History**
- **Life History**
- **Trapping and monitoring**
- **Control**

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.

Biology

- **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 ≥ 68ºF**
- **Literature: “4 days after first bloom on Norway maple, and full bloom on border Forsythia.”**

Biology

Adult female drills a hole ~1mm in diameter, and hollows out a channel into the heartwood of small trees (2-50 cm diameter) .

Biology

- **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

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.**

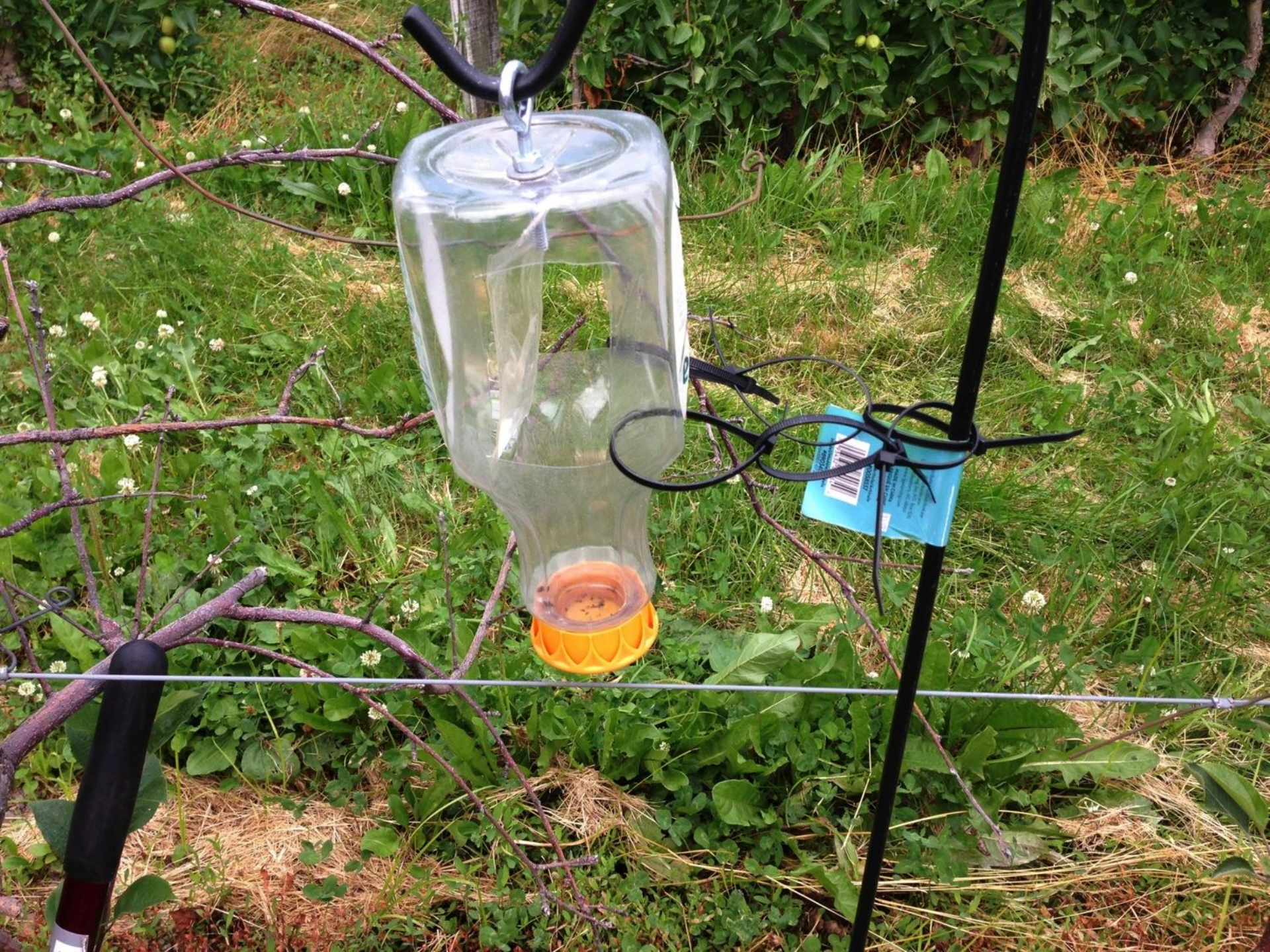
- **Monitor for bleeding sites on bark.**

- **Monitor for dying trees.**

• Monitor: Trapping BSB

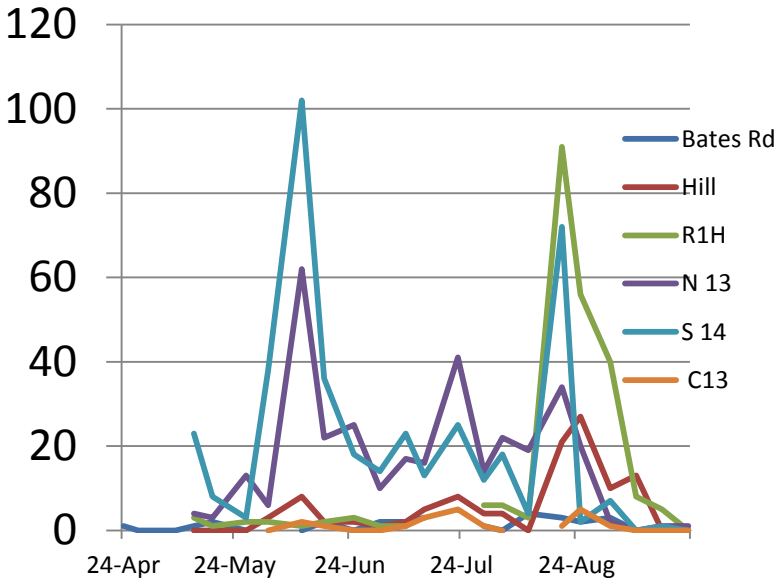
Re: **Peter Schultz**

- **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**

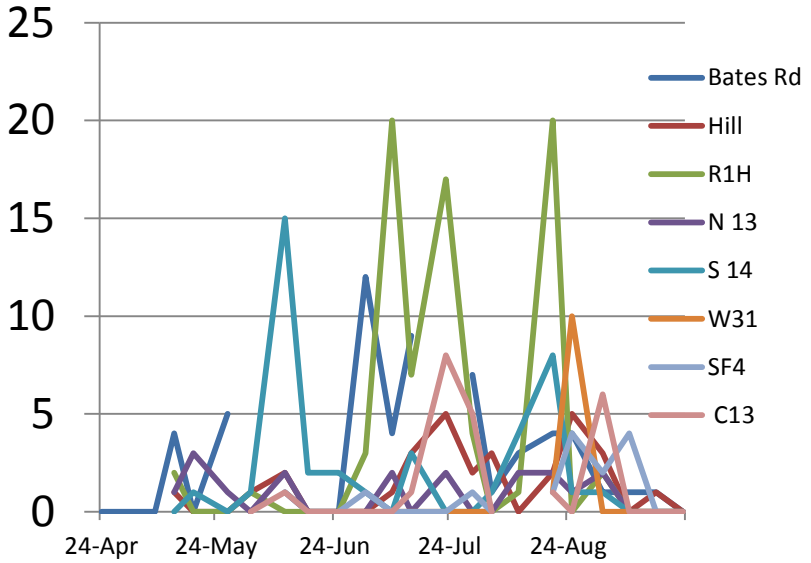


BSB weekly trap catch.

Edge BSB trap counts



Interior BSB trap counts



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