Emerging Insect Problems On Tree Fruit In Eastern New York

Long Island Agricultural Forum
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Suffolk County Community College; Eastern Campus
Riverhead, New York Peconic Building.

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Historical Invasive Insect Pests Of Fruit In Eastern New York

Grape berry moth, *Lobesia botrana* ([Dennis & Schiffermuller])	Tortricidae; Lepidoptera
Oriental fruit moth, *Grapholita molesta* (Busck)	Tortricidae; Lepidoptera
Apple maggot, *Rhagoletis pomonella* (Wash, 1867)	Tephritidae; Diptera
Oystershell scale, *Lepidosaphes ulmi* (Linnaeus)	Diaspididae; Hemiptera
San Jose scale, *Quadraspidiotus perniciosus* (Comstock)	Diaspididae; Hemiptera
Rose leafhopper, *Edwardsiana rosae* (Linnaeus)	Cicadellidae; Homoptera
Japanese beetle, *Popillia japonica* Newman,	Scarabaeidae; Coleoptera
Pear psylla, *Cacopsylla pyricola* Foerster,	Homoptera: Psyllidae
European red mite, *Panonychus ulmi,*	*Acari*: Tetranychidae

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

Spotted Wing Drosophila (SWD) 2011

- Very aggressive
- non-competitive niche
- Many hosts
- 6-13 generations / season
- Flight distribution

Brown Marmorated Stink Bug (BMSB) 2008

- Very aggressive
- Low-competitive niche
- Many hosts (arboreal)
- 1-2 generations
- Flight distribution to hosts

Black Stem Borer (BSB) 1932

- Opportunistic to tree stress; intermittant pest
- Low-competitive niche
- Many hosts (arboreal)
- 2 generations
- Flight distribution to hosts

Emerging Insect Problems On Tree Fruit In Eastern New York

Newly Invasive Insects Presently Causing Damage to Fruit

Spotted Wing Drosophila (SWD)
2011

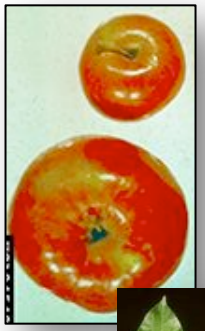
Brown Marmorated Stink Bug (BMSB)
2008

Black Stem Borer (BSB)
1932

Newly Invasive Insects & Disease with High Potential to Damage Tree Fruit

Spotted Lanternfly (SLF)
E.PA 2013

High Potential to Become Invasive

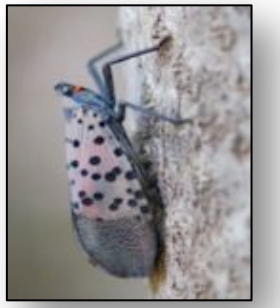


Apple Proliferation Phytoplasma (APP)
Candidatus Phytoplasma mali
Europe 2012

Leafhopper or psyllid vector of APP

New Pest Update: Spotted Lanterfly. Hemiptera: Fulgoridae

- The **Spotted Lanternfly,** *Lycorma delicatula* (White), is a planthopper from Asia, specifically found in 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 SLF egg mass

New Pest Update: Spotted Lanterfly. Hemiptera: Fulgoridae

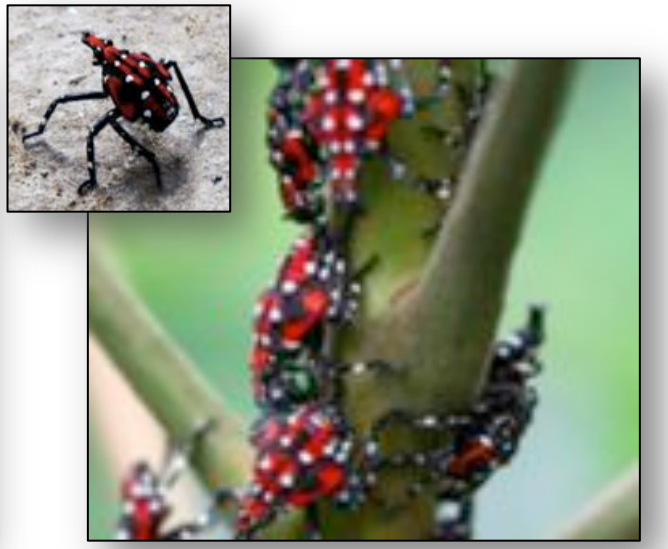
- Nymphs hatch from Late April to early May egg masses laid on smooth bark, stone, and other vertical surfaces. They **climb, feed and fall** repeatedly onto host plants.

- 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

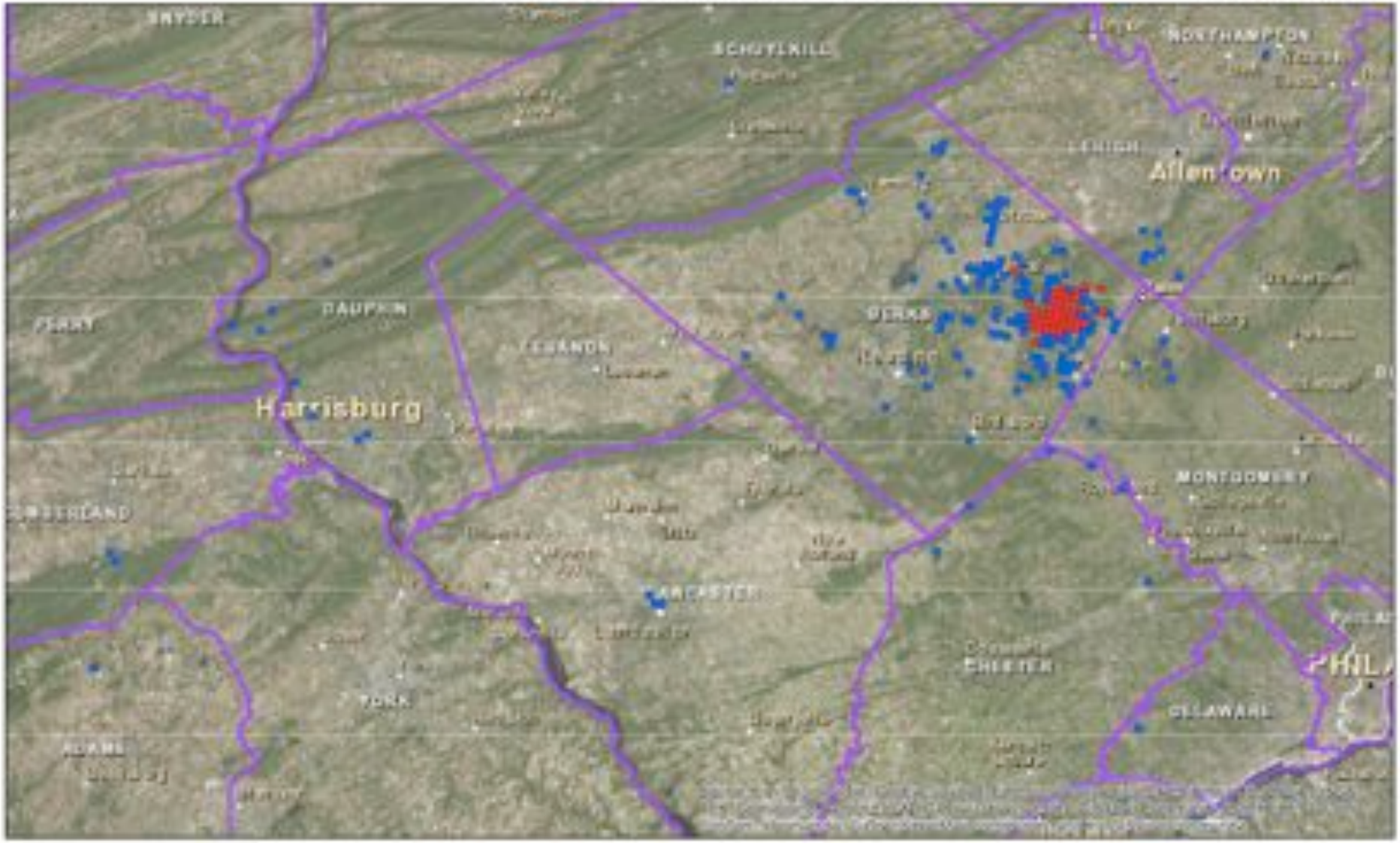
Lycorma Detection Survey

Results Through 15 December 2014

Distribution in PA
7 Townships in Berks County

Lycorma Detection Survey

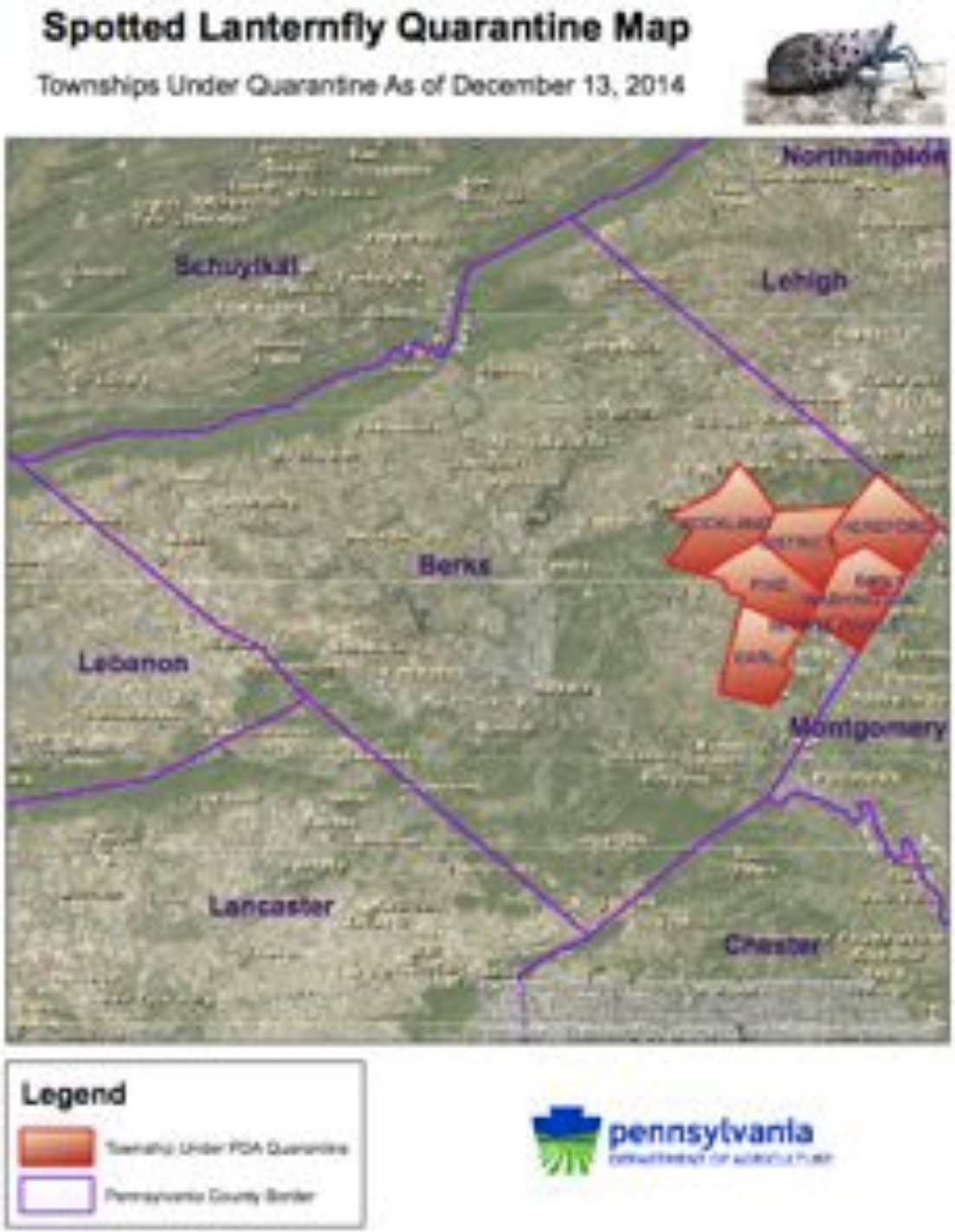
Results Through 15 December 2014



Survey Grids

- Surveyed - Positive
- Surveyed - Not Found

pennsylvania
DEPARTMENT OF AGRICULTURE



Self assessment for all life stages of SLF using PA Dept of Ag. Form below.

Checklist for Residents
Living in Spotted Lanternfly Quarantine Areas

IMPORTANT: Before you move outdoor items from the quarantine area, check for spotted lanternfly egg masses, adults, and nymphs. Make sure all items are pest free before you move them. Help keep this pest from spreading.

Check before you move

Recreational or Camping Items

- ☐ Backpacks
- ☐ Basketball backboards
- ☐ Bicycles
- ☐ Boats/Boat trailers
- ☐ Campers
- ☐ Ice chests
- ☐ Motorcycles
- ☐ Motor homes
- ☐ Recreational vehicles
- ☐ Snowmobiles
- ☐ Tarps
- ☐ Tents
- ☐ Other

Outdoor Household Items

- ☐ Barrels
- ☐ Cardboard or wooden boxes
- ☐ Outdoor poles
- ☐ Plant containers
- ☐ Firewood
- ☐ Propane or oil tanks
- ☐ Trash cans
- ☐ Refrigerators/Freezers
- ☐ Storage sheds
- ☐ Shutters
- ☐ Storm/Screen doors and windows
- ☐ Window awnings
- ☐ Outdoor furniture
- ☐ Other

Checklist for Residents
Living in Spotted Lanternfly Quarantine Areas

IMPORTANT: Before you move outdoor items from the quarantine area, check for spotted lanternfly egg masses, adults, and nymphs. Make sure all items are pest free before you move them. Help keep this pest from spreading.

Building Materials

- ☐ Bricks/Cinder blocks
- ☐ Cement mixing tubs
- ☐ Lumber
- ☐ Roofing materials
- ☐ Tools and toolboxes
- ☐ Workbenches
- ☐ Skidsters/Forklifts
- ☐ Pipes
- ☐ Other

Yard and Garden Items

- ☐ Dog houses, rabbit sheds, chicken coops, etc
- ☐ Barbecue grills
- ☐ Carts
- ☐ Cold frames
- ☐ Fencing
- ☐ Garden tillers
- ☐ Yard decorations
- ☐ Garden tools
- ☐ Backhoes
- ☐ Lawnmowers
- ☐ Signs and posts
- ☐ Storage sheds
- ☐ Tractors and trailers
- ☐ Trees, shrubs and plants
- ☐ Other

Children's Playthings

- ☐ Play houses
- ☐ Kiddie pools
- ☐ Bicycles, scooters
- ☐ Sandboxes
- ☐ Other

Adult Spotted Lanternfly, present in autumn months.

Spotted Lanternfly nymphs, present in spring and summer months. (Images from Park et al. 2009)

Fresh Spotted Lanternfly egg mass (outlined in red). Egg masses are present in autumn and winter months, blending in with their surroundings.

By signing this checklist, I am confirming that I have inspected my vehicle and those items I am moving from the Spotted Lanternfly quarantine area, and do not see any egg masses or insects in or on anything I am moving.

Signature _____ Address _____ Date _____

Please sign, date, and keep this checklist in your vehicle with you – use it each time you need it.

New Pest Update: Apple Proliferation Phytoplasm

- ***Phytoplasma mali*** (Apple Proliferation Phytoplasm) is present throughout the apple growing region northwestern Italy.

- The **phytoplasma is transmitted by insects** causing serious damage and economic losses to apple orchards.

- The apple psyllid ***Cacopsylla melanoneura*** (Forster)

- The presence of the apple proliferation phytoplasmas was documented in both **overwintering and offspring psylla** as well as in symptomatic apple plants.

- Natural root 'bridge' grafts in neighbouring trees found to transmit disease.

New Pest Update: Apple Proliferation Phytoplasm

Phytoplasma mali (Apple Proliferation Phytoplasm)
Symptoms of foliage and fruit

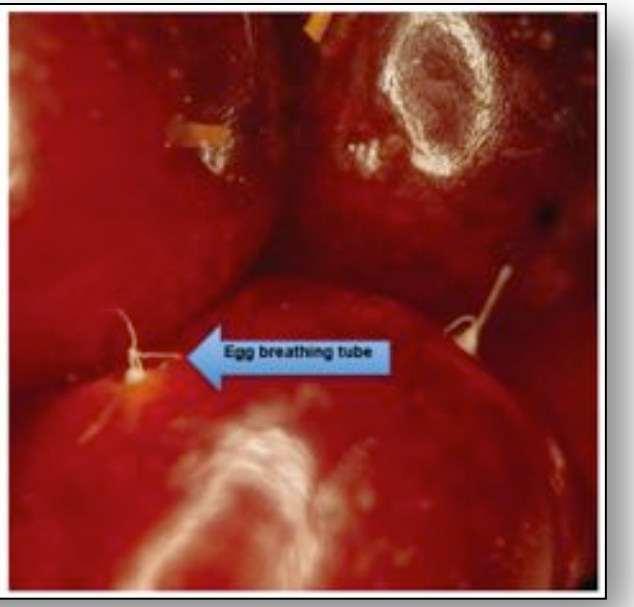
Potential Spread of *Phytoplasma mali* & Control:

- Movement of the **infected insect** life stages on live trees
  - Sumer or Winter-form infected adults
  - Summerform eggs (nymphs)
  - Hawthorn imports with **infected insect** life stages
- Import of **infected rootstock or scion** to the US carrying APP
- Seasonal IPM programs against leafhopper and psyllid populations
- Timely removal of **infected trees**

Spotted Wing Drosophila

SWD Adult Male

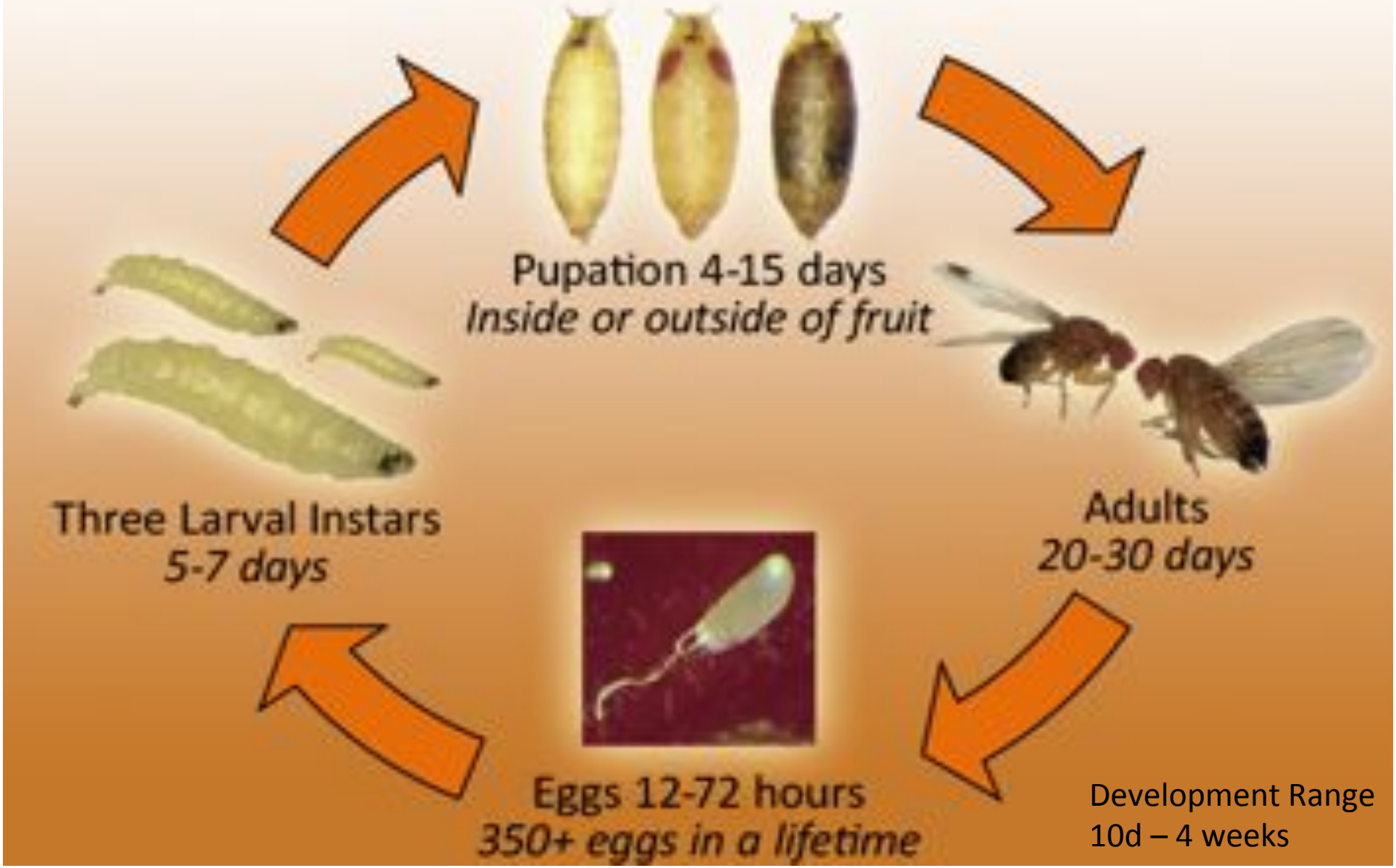
Infected Blackberry



Fruit Fly 'Respitory Horns' (breathing tubes) from eggs beneath the skin

Life Cycle of the Spotted Wing Drosophila

Drosophila suzukii (Matsumura)



Development Range
10d – 4 weeks

Female Drosophila species

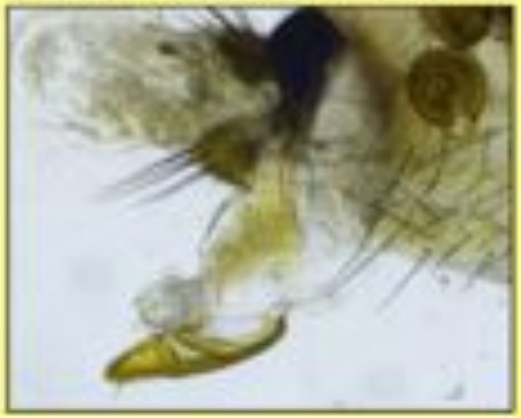
UC Berkeley & UC Cooperative Extension *Photos:* M. Hauser, CDFA

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

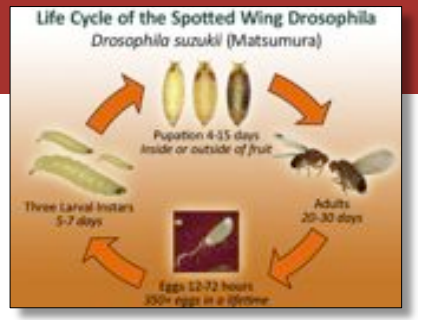
Photos: M. Hauser, CDFA

Double stripes on tarsi of front legs

Leading edge of wing has dark spot

Unbroken abdominal bands

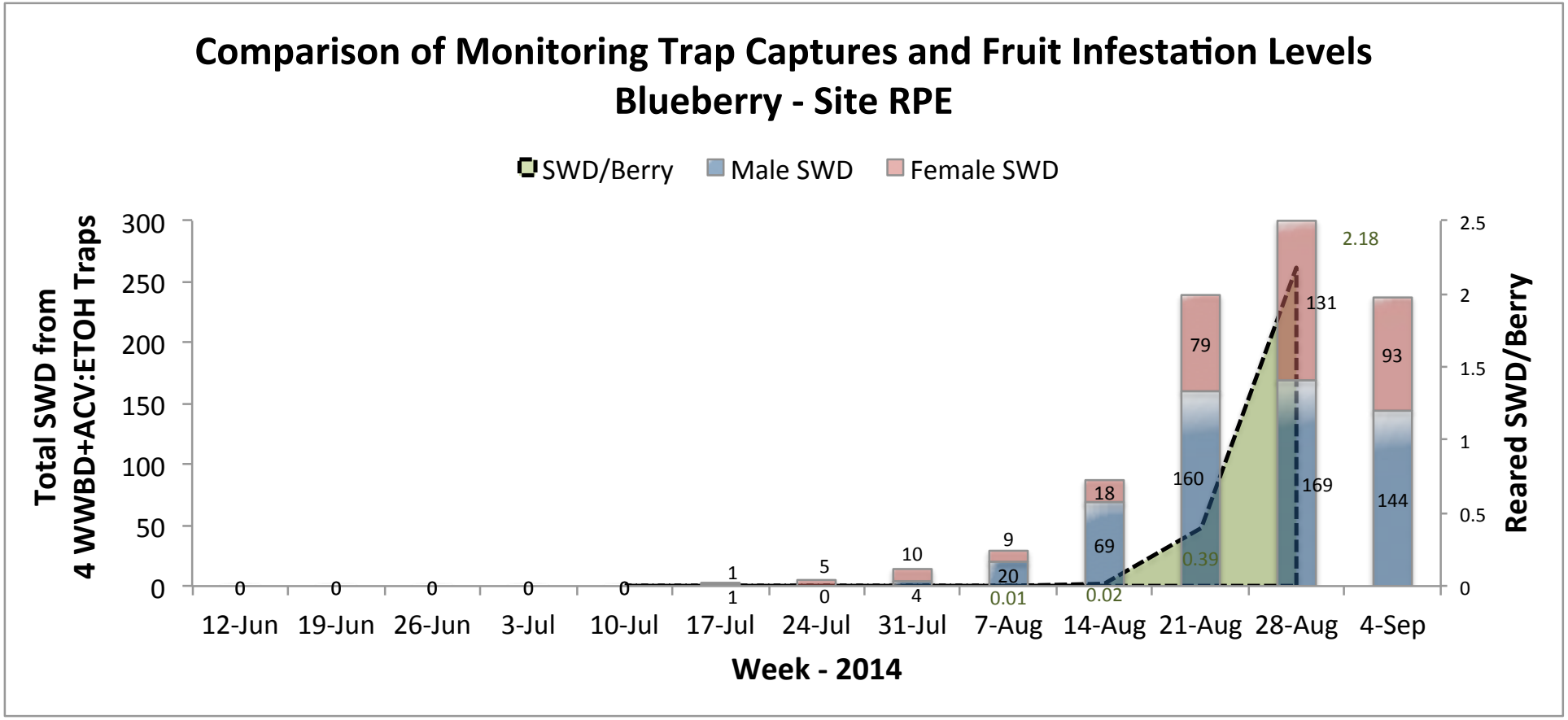
Factors Contributing to Insecticide Resistance



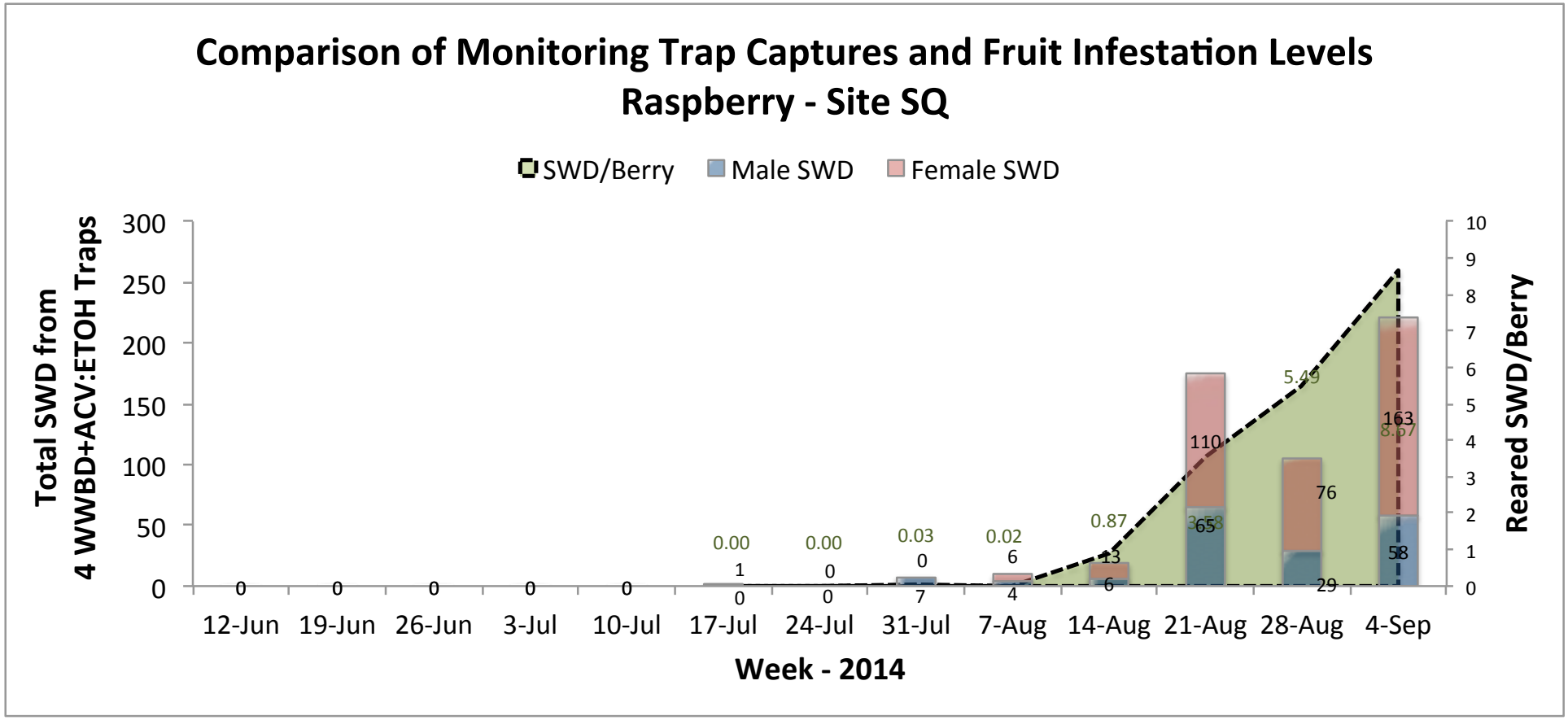
- **Single cycle in 10d to 4 weeks**
- **13 generations / year (Japan)**
- **Range of 3-10 generations in NY**
- **SWD has a very high probability of insecticide resistance development.**

Monitoring

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

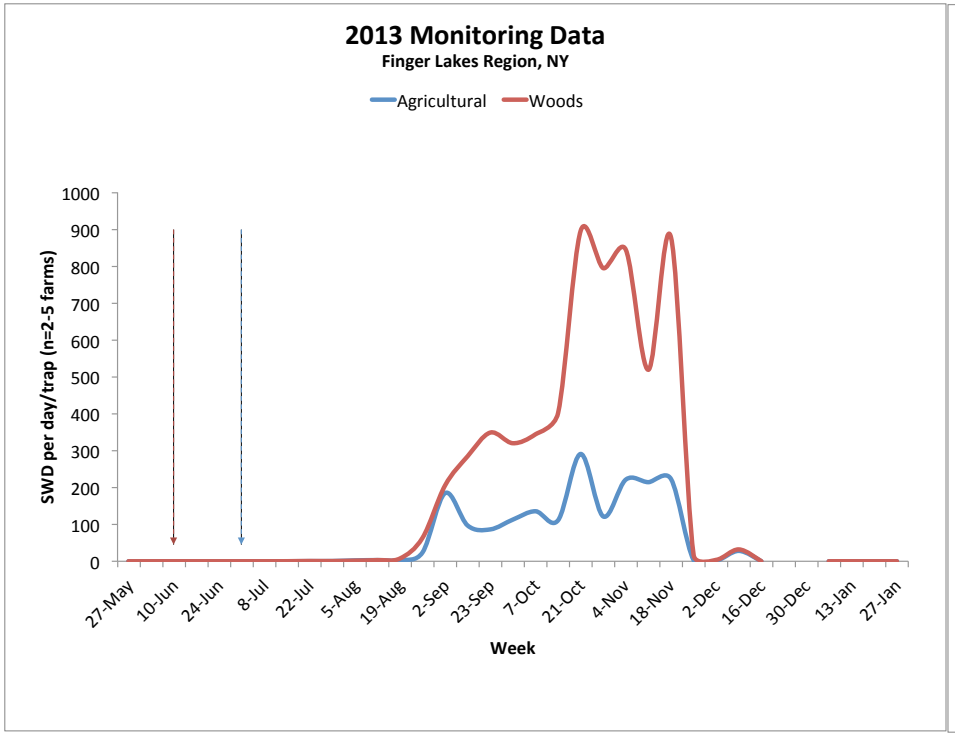


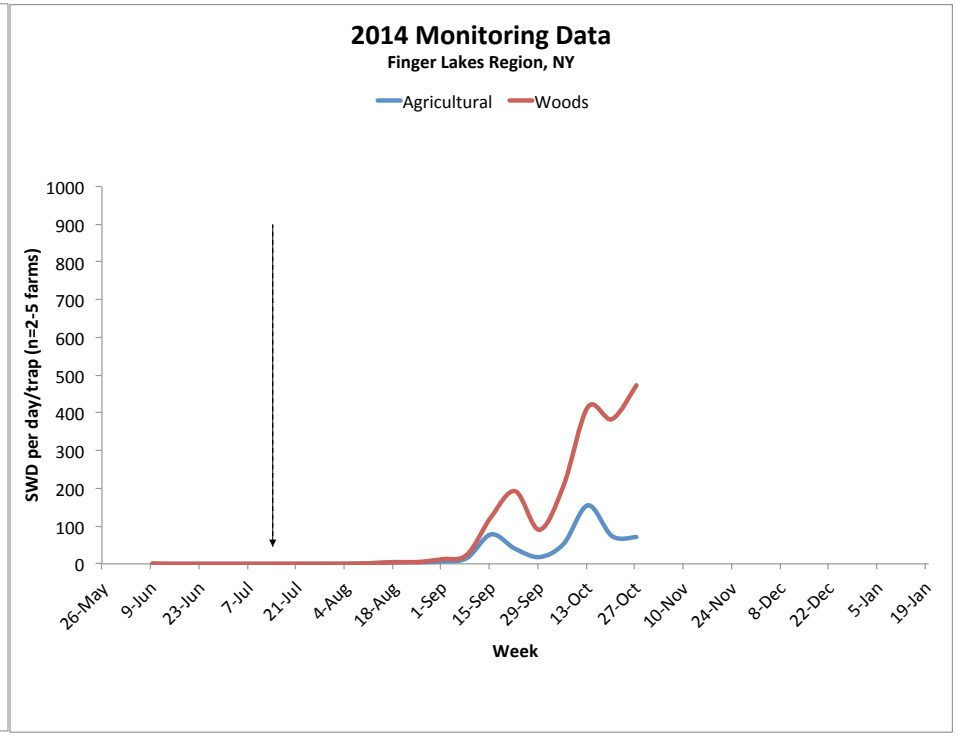
Credit: Greg Loeb Lab, NYSAES Geneva, NY



Credit: Greg Loeb Lab, NYSAES Geneva, NY

SWD SEASONAL DYNAMICS IN THE NORTHEAST





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

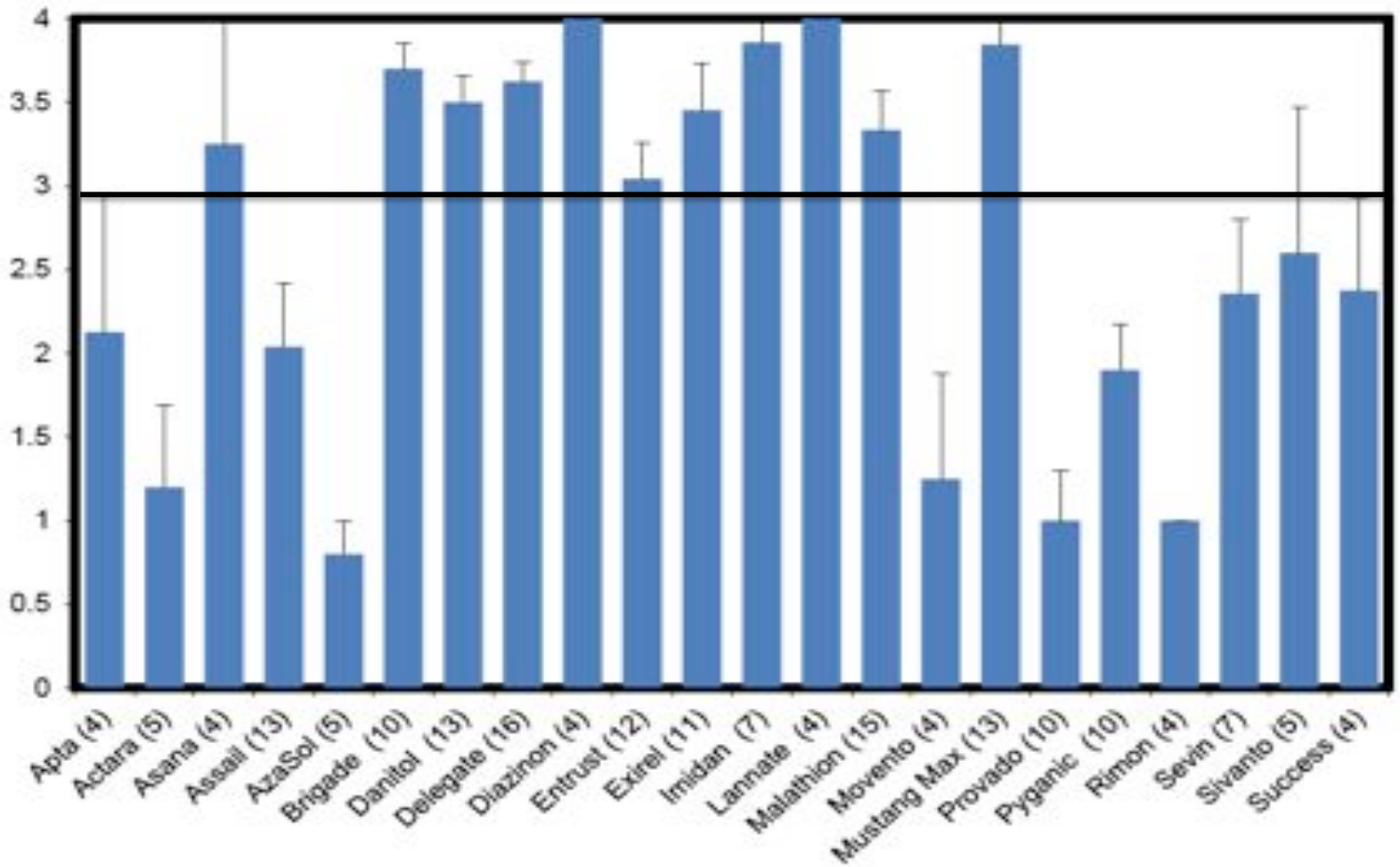
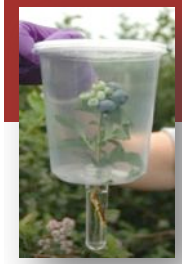
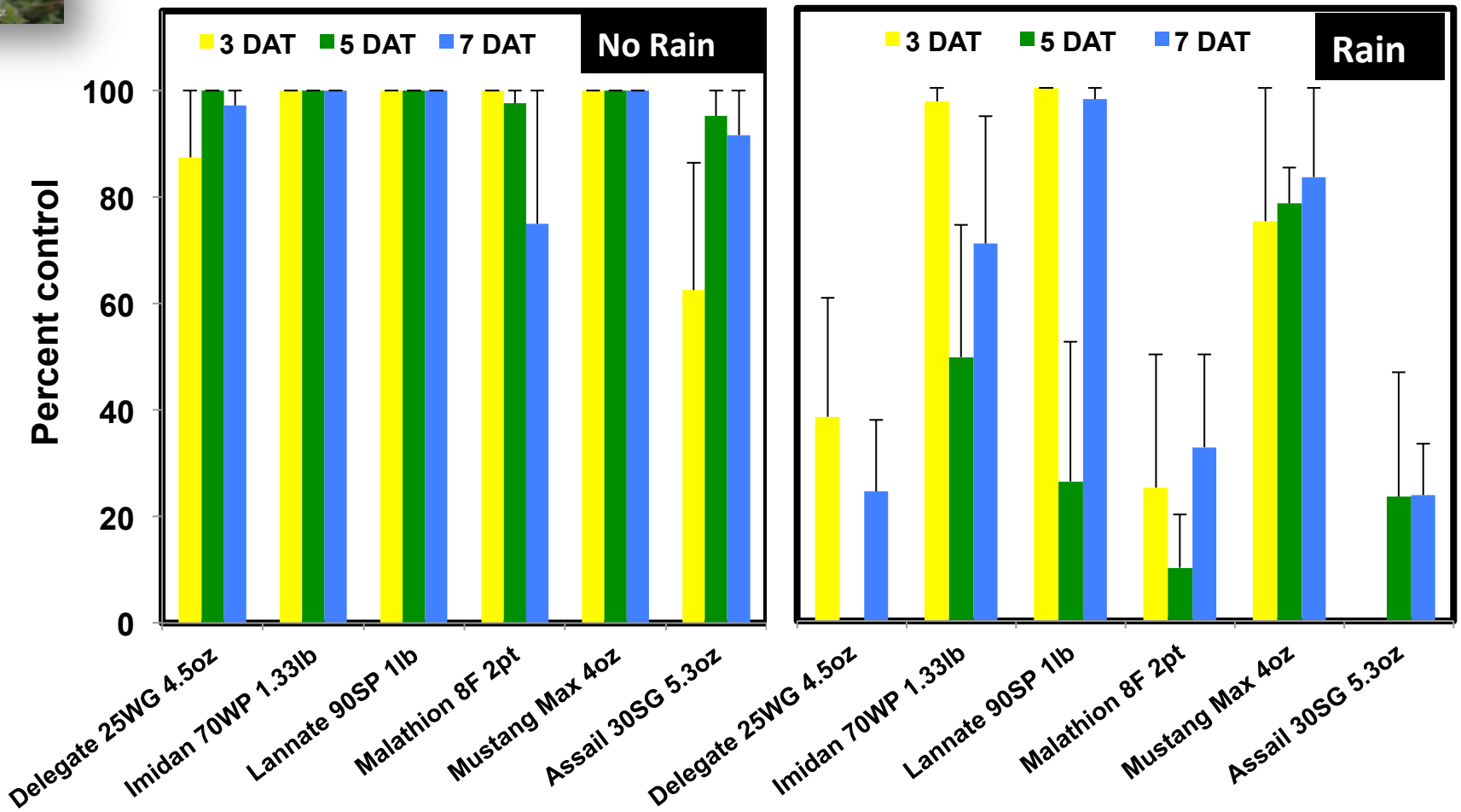


Figure 1. Average ± S.E. efficacy rankings for 22 insecticides that have been tested against SWD in various fruit crops. Insecticides were ranked as not effective (score = 0), weakly active (1), fair (2), good (3), or excellent (4). Only insecticides that had 4 or more submitted are included in the figure, and the number of entries is shown in parentheses below the bars.

Effect of Rain on Some Common Insecticides

From Rufus Isaacs, MSU

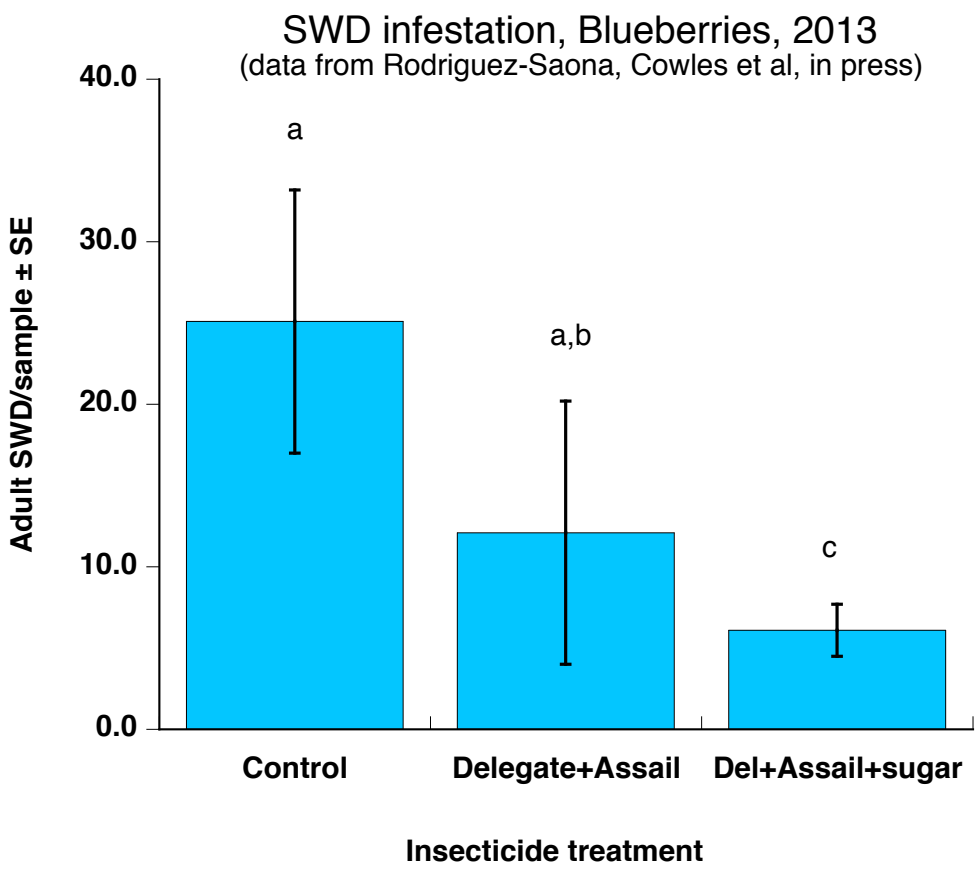




0.8 inches of rain on treated bushes
1 day after application

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

Credit: Greg Loeb Lab, NYSAES Geneva, NY

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.

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
- Survive an average of 82 (male) to 93 (female) days, with offspring averaging 58 per female (Setta and Carrereto 2005).
- Development time is approximately 19 days from egg to adult.
- The African fig fruit fly are capable of producing numerous generations in a season.

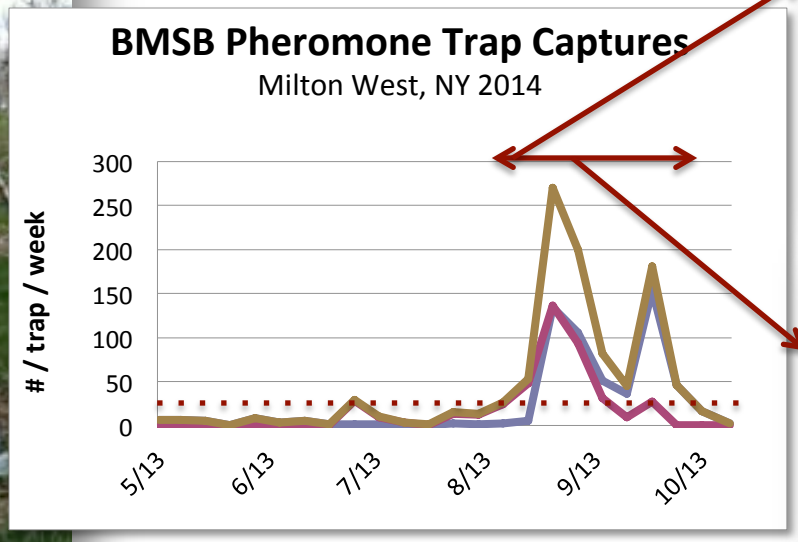
African Fig Fly, *Zaprionus indianus* Gupta

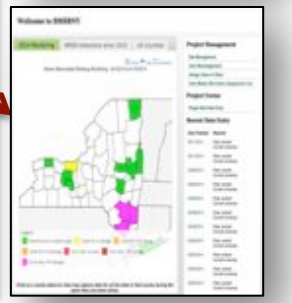
- **Damage: Predominately to citrus and grape**
- **No AFF in 2013; 3 adults in 2014**
- **Reports from Rutgers, NJ of wine grape injury independent of SWD injury.**

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

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





Brown Marmorated Stink Bug, *Halyomorpha halys* Overview

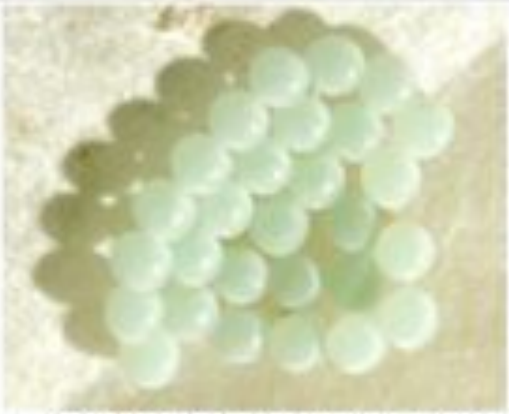
- Brown Marmorated Stink Bug first detected in Allentown, PA
in 1998, confirmed in 2001.

- 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

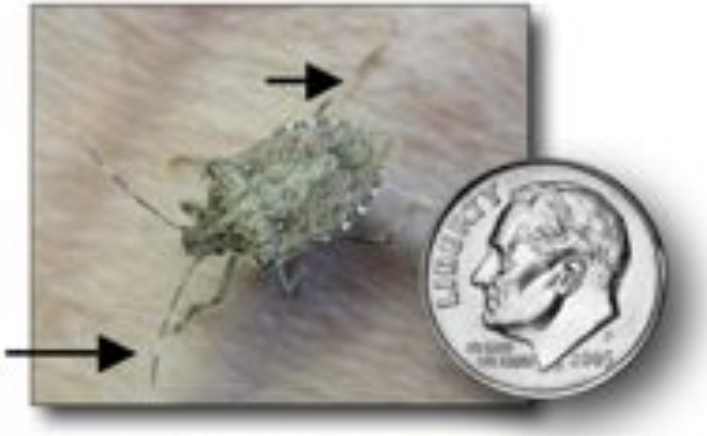
1st instar: black & red; cluster near eggs

2nd instar: striped antennae

3rd instar: striped antennae and legs

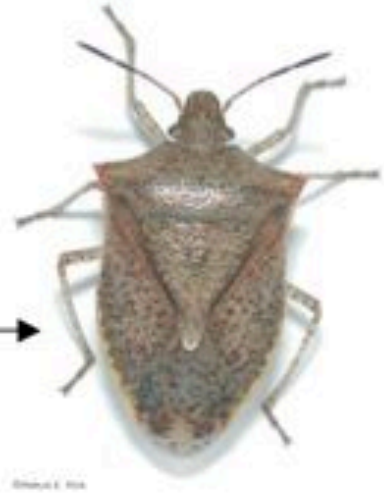
4th instar: thoratic spur striped antennae & legs

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

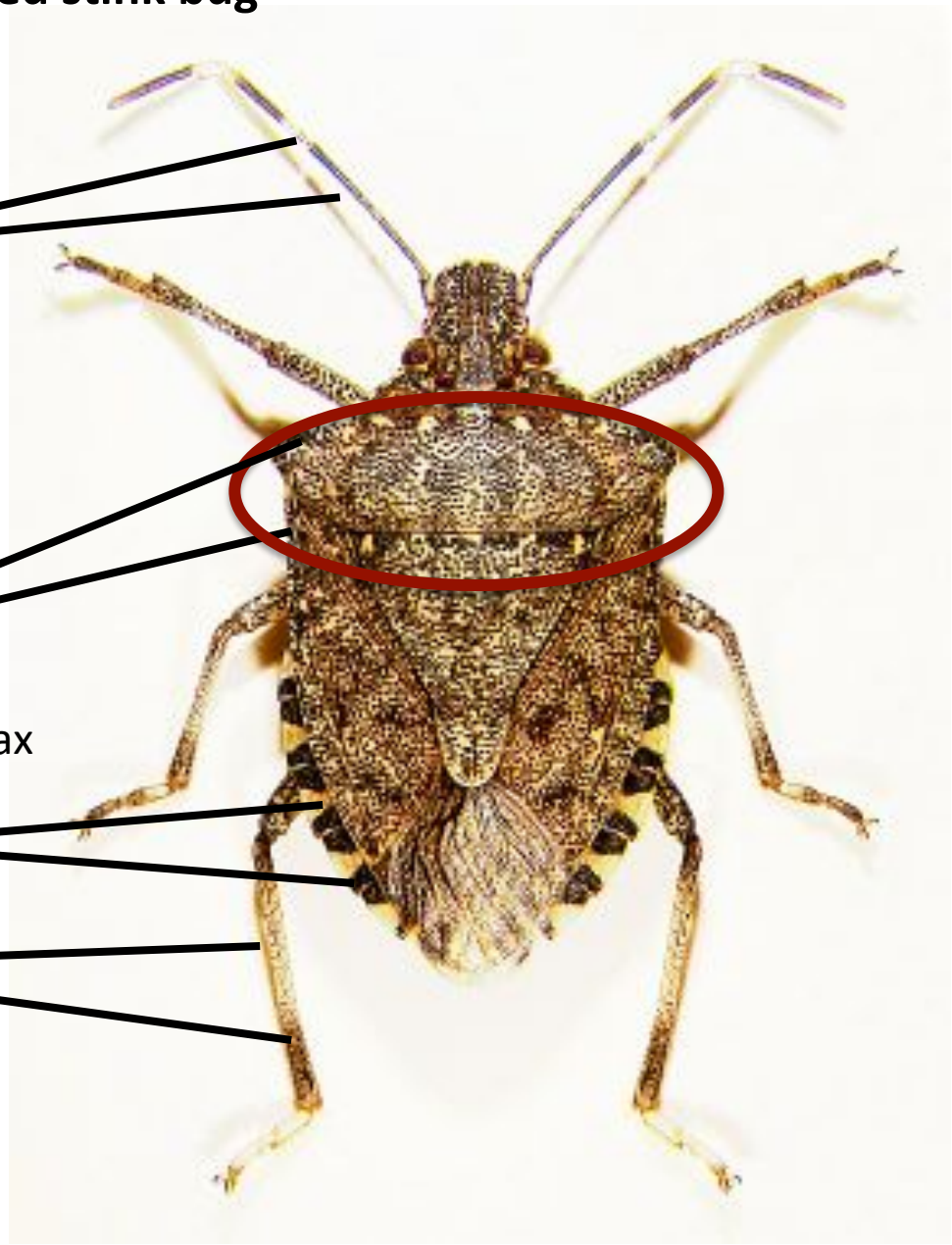
Rough Stink Bug
'Teeth' along shoulders

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



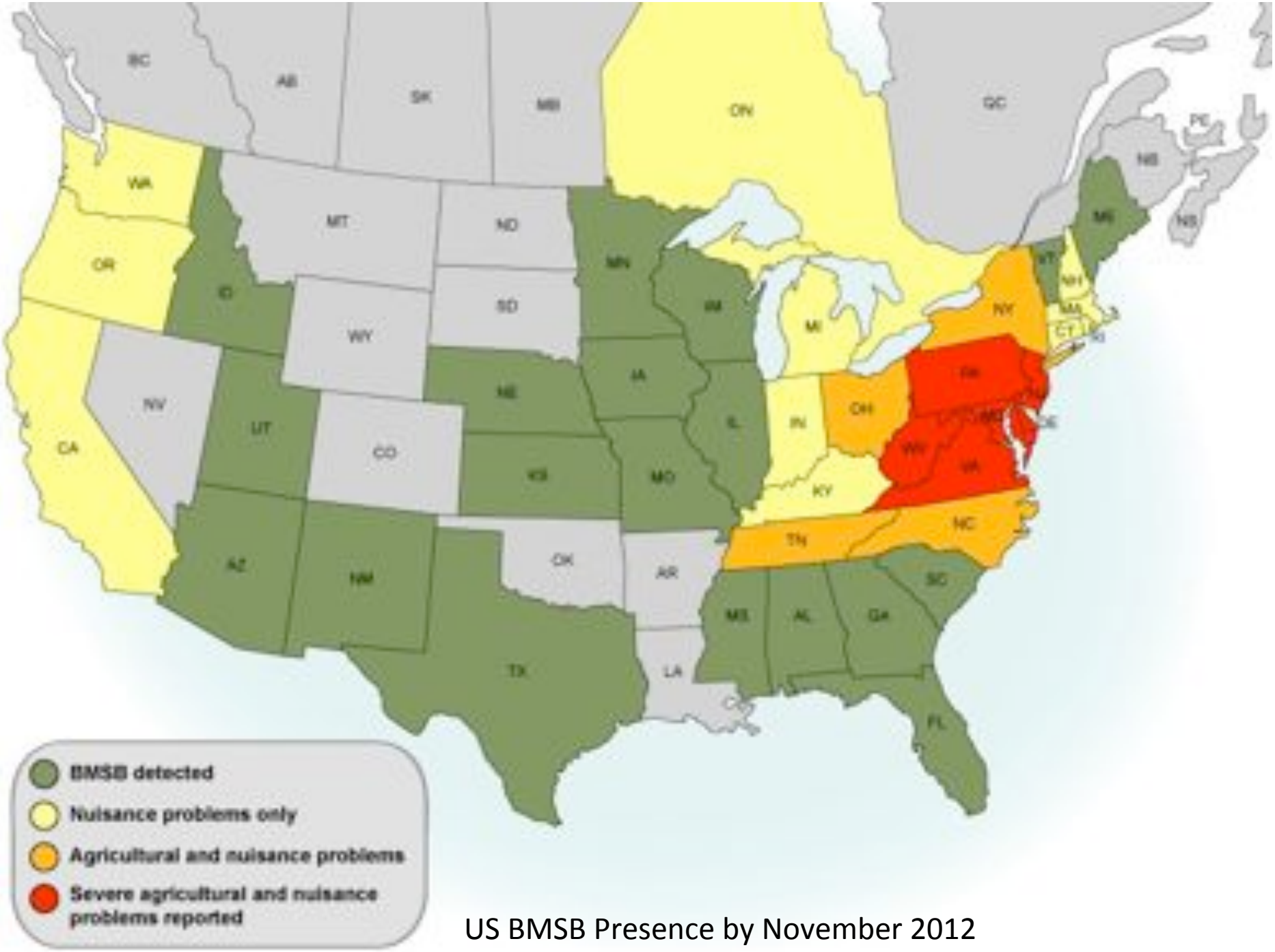
Antenna:
light & dark
banding

2 sets of 4

Cream colored dots on thorax

Wing pads &
Legs:
light & dark banding

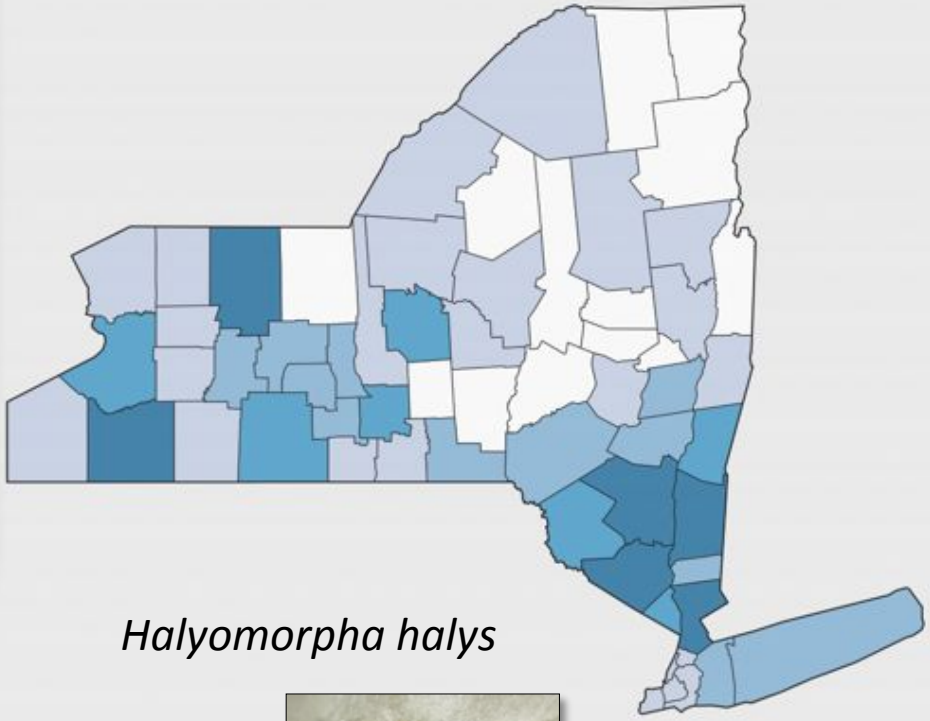
Photo by David J. Shetlar
Ohio State University



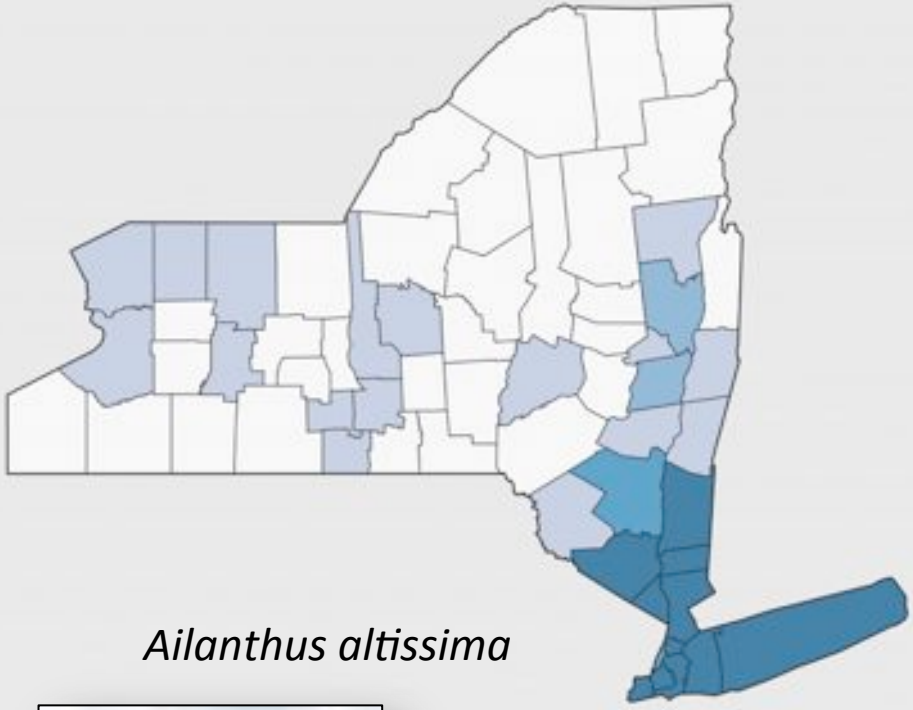
US BMSB Presence by November 2012

iMapinvasive

New York Invasive Species Public Map



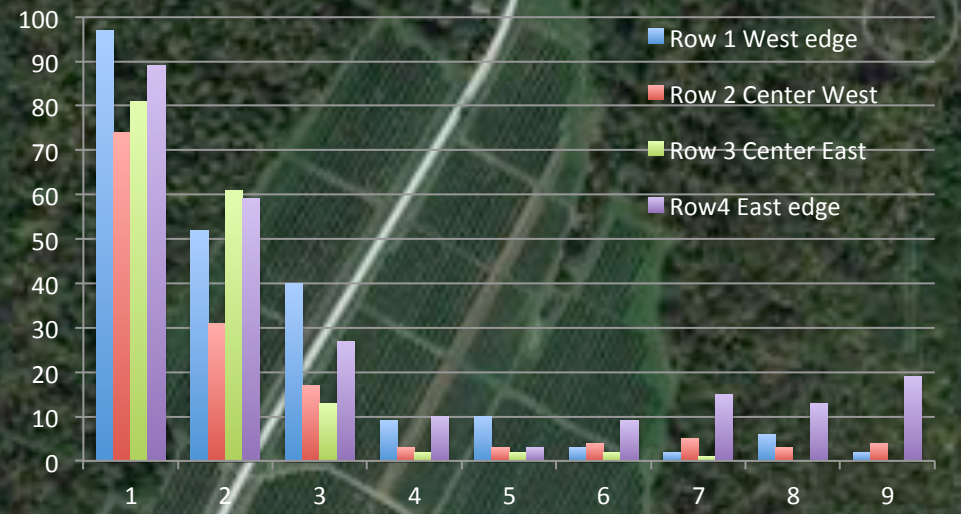
Halyomorpha halys



Ailanthus altissima

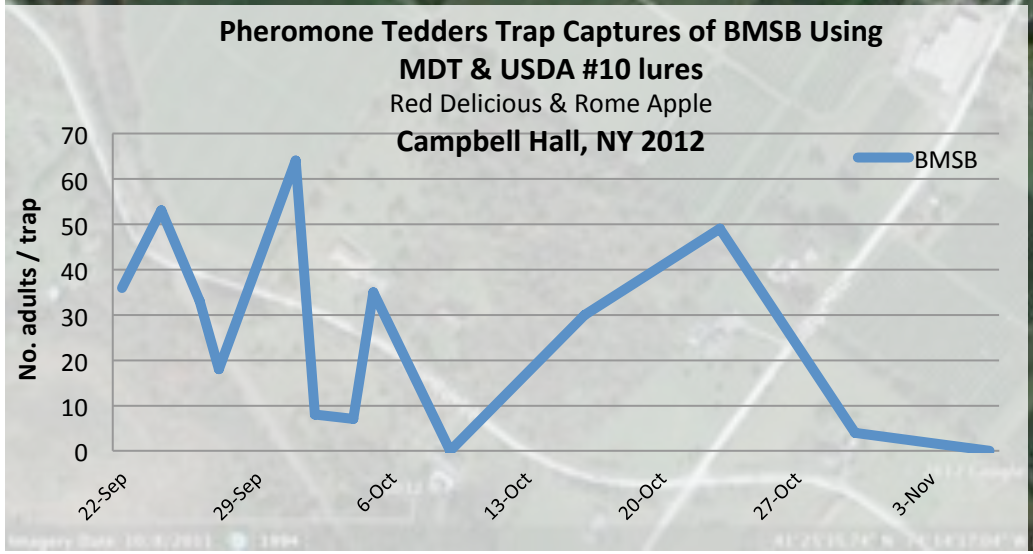
http://imapinvasives.org/nyimi/map/

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

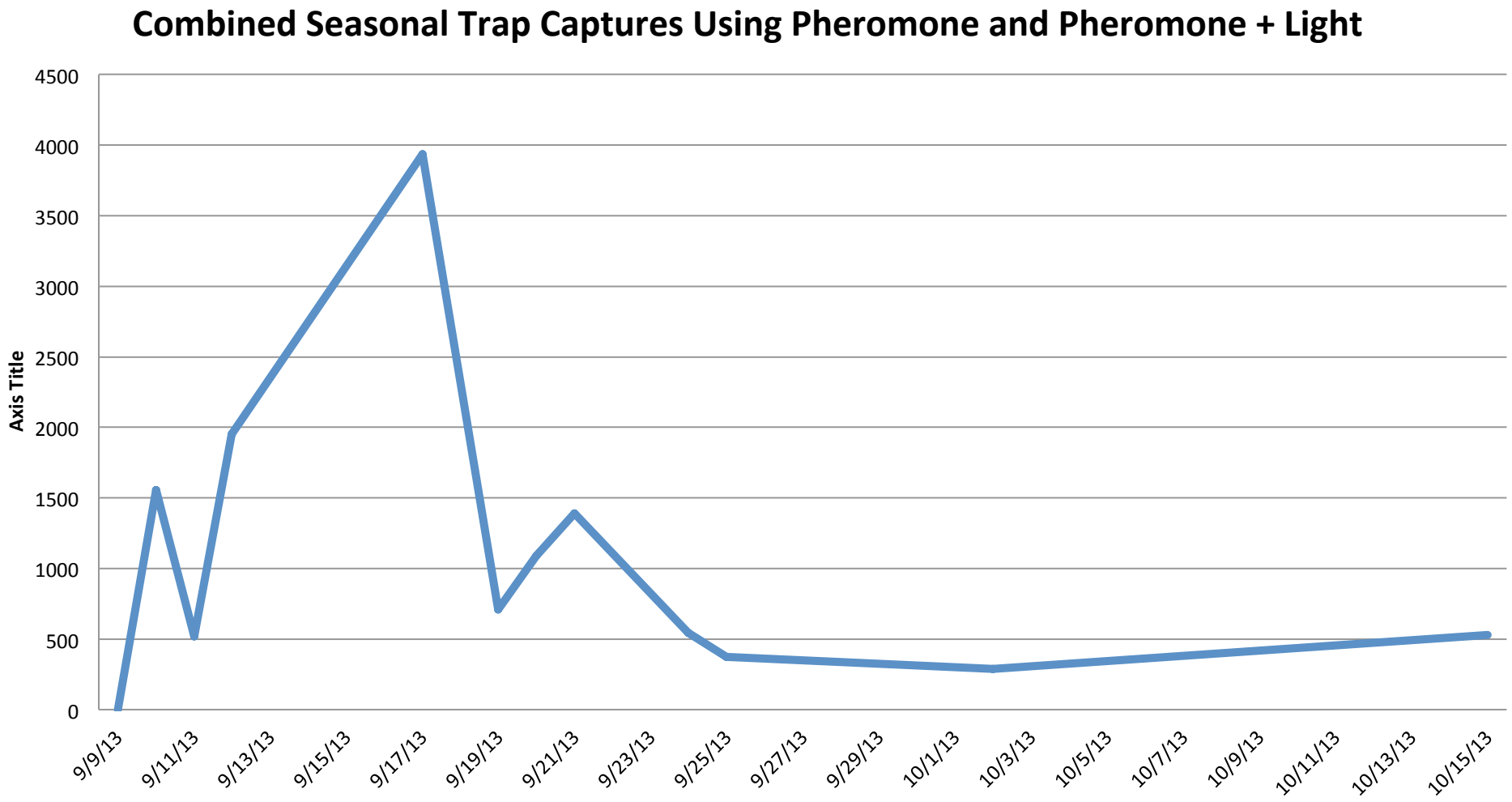
- 10 fruit / tree = 100 fruit /30'
- 9 sections; 240' row



Attract & Kill Systems
Active Pheromone Baited Trap
Insecticide Treated Netting

Active Pheromone Baited Trap
& Halogen Lighting
Insecticide Treated Netting

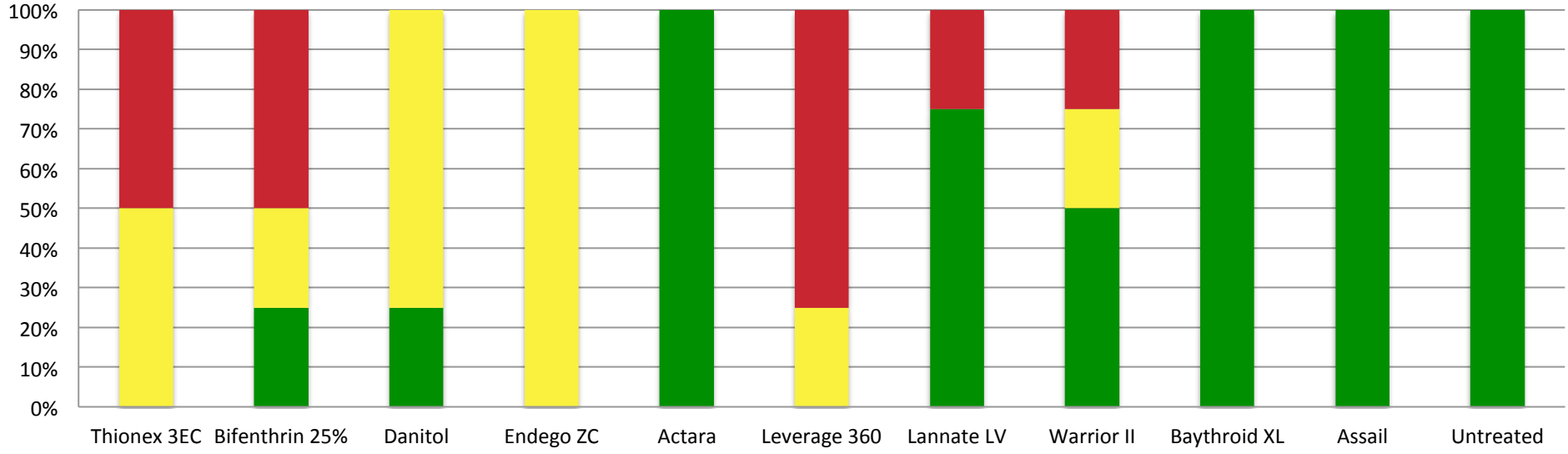
Studies of the Brown Marmorated Stink Bug, *Halyomorpha halys* (Stål), in New York State



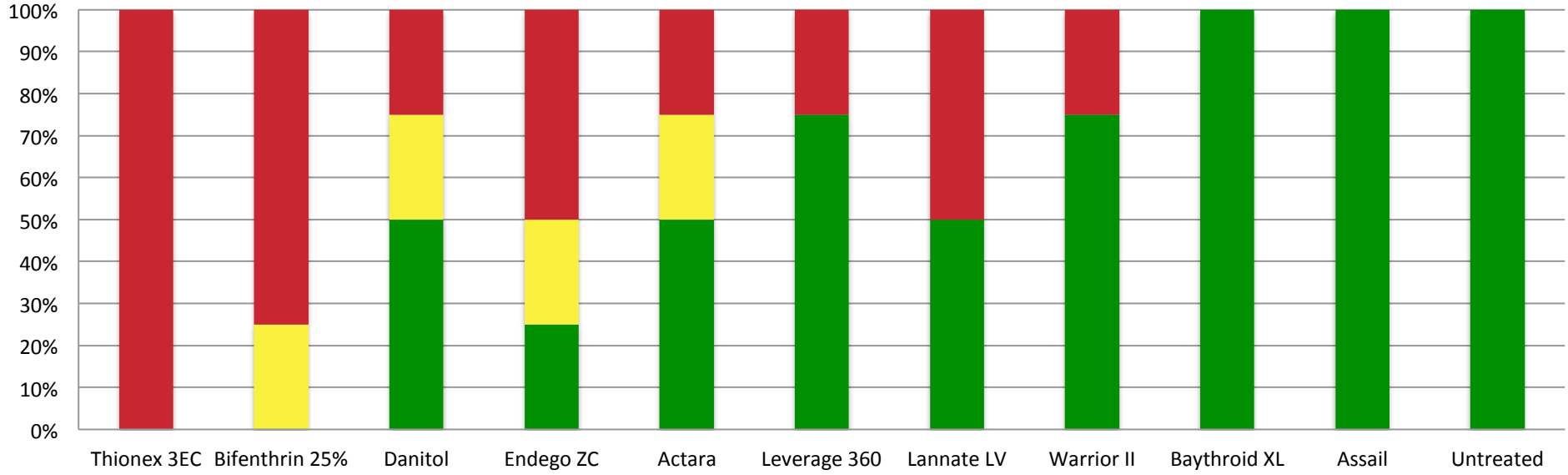
Total BMSB = 12,894

Hudson Valley Research Laboratory

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



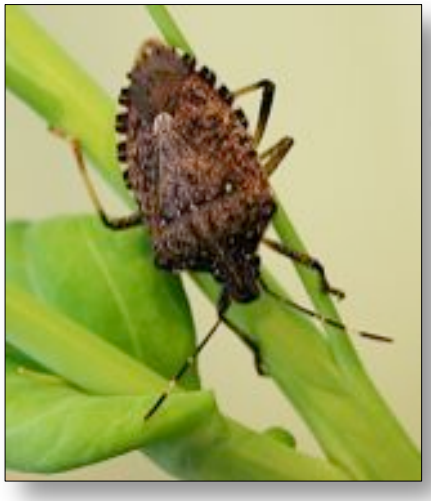
BMSB Adult Exposure to Insecticide Residue of Apple Foliage
72h Old Residue @ 3 d



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 Fruit Team**
    - **ENY Hort. Team**
    - **HVRL Staff**
  - **40 Traps**
  - **20 Farms**
  - **14 Counties**



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

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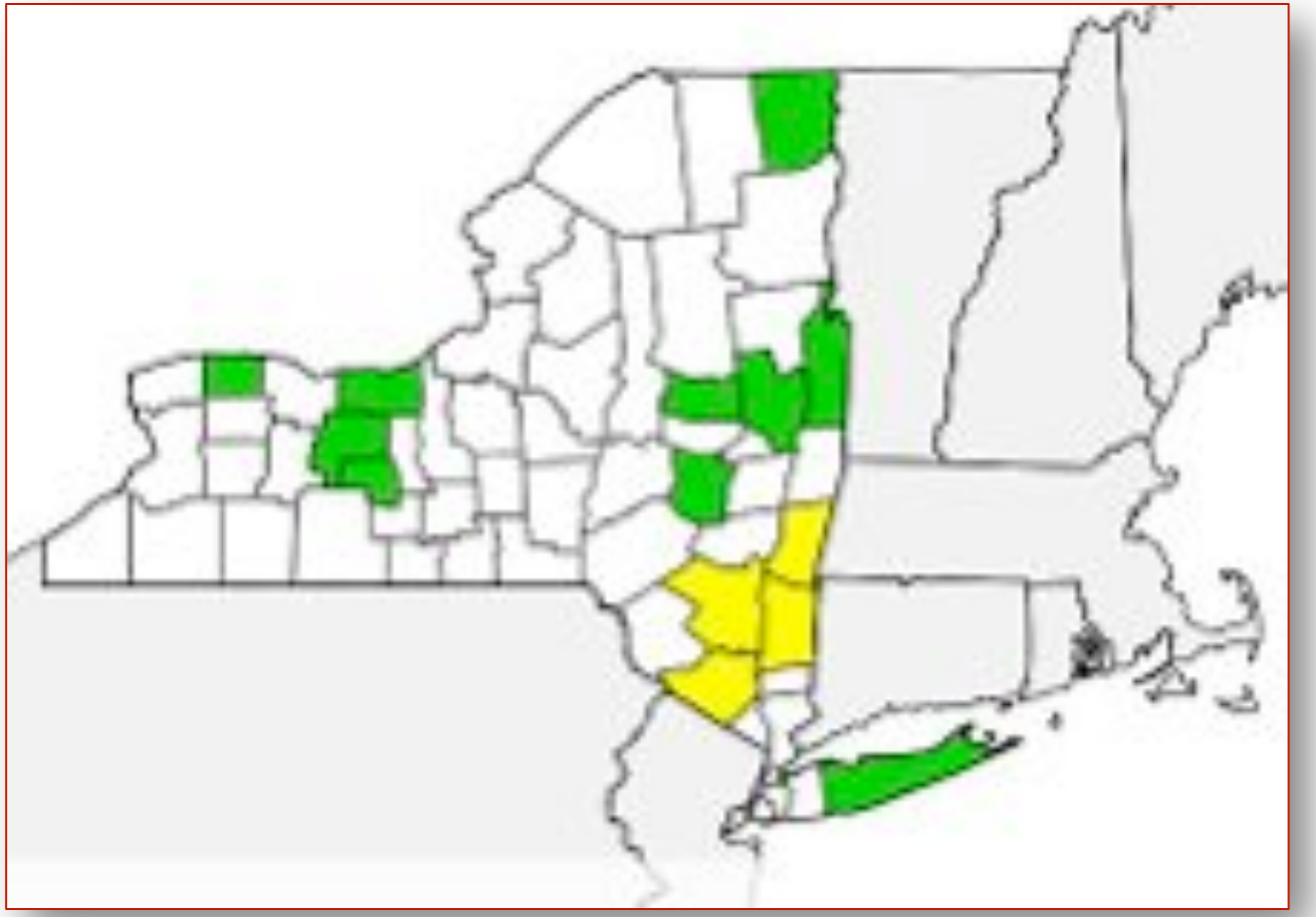


State-wide Trap Monitoring of BMSB in NY

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

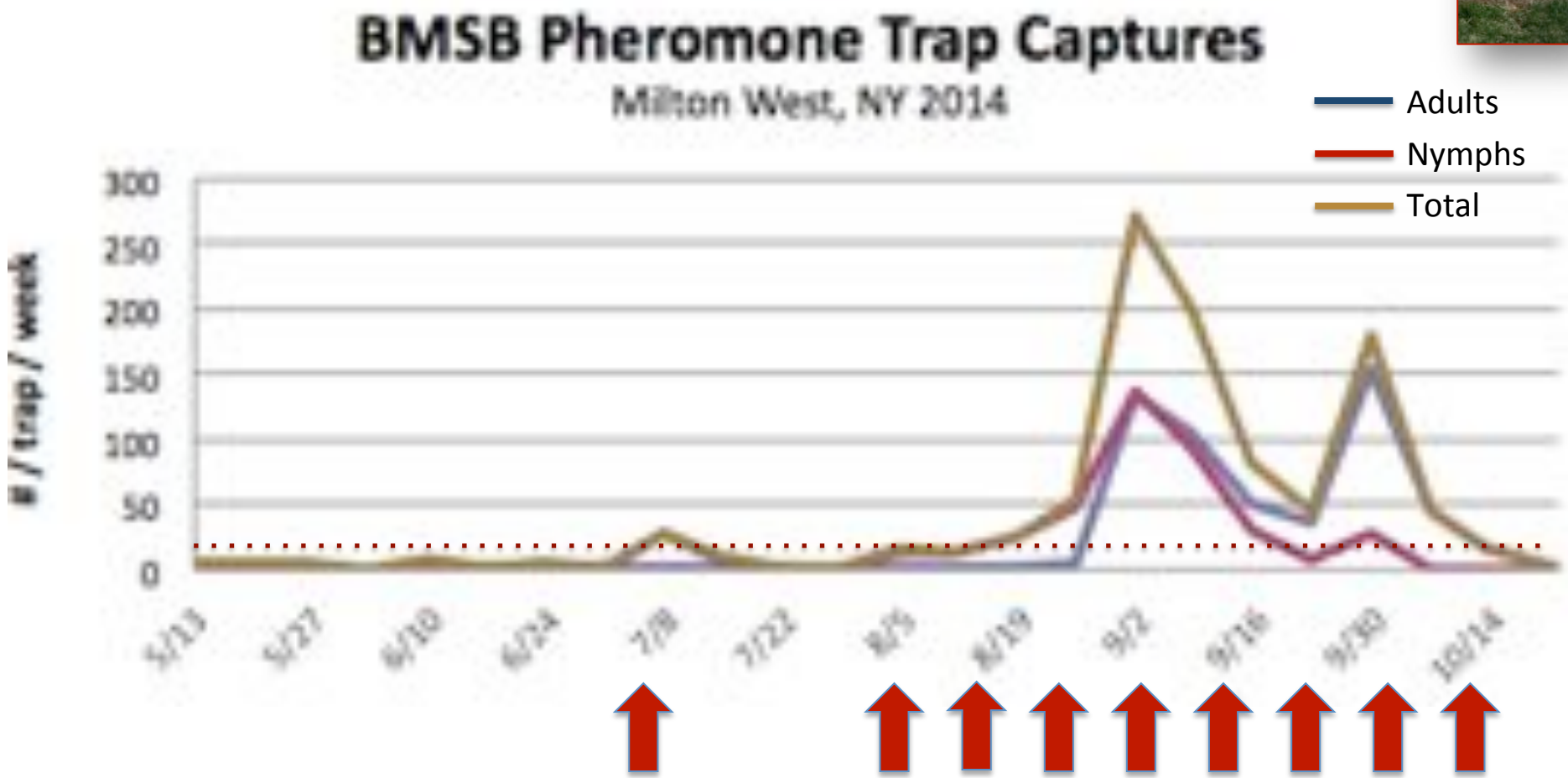
7 Sites above Season Threshold
In 3 NY Counties

Employing Trap Based Threshold for Regional Treatment

		Warwick			Campb. Hall			Milton-West			Milton-East			Tivoli			Highland-HVL			Fishkill	
Date:	Adults	Nymphs	Total	Adults	Nymphs	Total	Adults	Nymphs	Total	Adults	Nymphs	Total	Adults	Nymphs	Total	Adults	Nymphs	Total	Adults	Nymphs	Total
5/13	4	0	**4**	4	0	**4**	6	0	**6**	31	0	**31**	0	0	0	7	0	**7**	0	0	0
5/19	4	0	**4**	3	0	**3**	6	0	**6**	13	0	**13**	11	0	**11**	0	0	**0**	0	0	0
5/26	5	0	**5**	2	0	**2**	5	0	**5**	14	0	**14**	5	0	**5**	3	0	**3**	0	0	0
6/2	0	0	**0**	1	0	**1**	0	0	**0**	4	0	**4**	0	0	**0**	2	0	**2**	0	0	0
6/9	3	0	**3**	4	0	**4**	8	0	**8**	4	0	**4**	0	0	**0**	3	0	**3**	0	0	0
6/16	2	0	**2**	3	0	**3**	3	0	**3**	2	0	**2**	0	0	**0**	1	0	**1**	0	0	0
6/23	2	0	**2**	1	0	**1**	5	0	**5**	3	0	**3**	1	0	**1**	1	0	**1**	0	0	0
6/30	0	1	**1**	0	0	**0**	1	0	**1**	0	0	**0**	0	0	**0**	1	6	**7**	0	0	0
7/7	1	12	**13**	0	2	**2**	1	28	**29**	1	11	**12**	0	0	**0**	1	11	**12**	1	2	**3**
7/14	4	11	**15**	0	4	**4**	1	9	**10**	1	4	**5**	0	0	**0**	1	8	**9**	1	3	**4**
7/21	1	8	**9**	1	0	**1**	0	3	**3**	0	5	**5**	1	1	**2**	0	11	**11**	0	2	**2**
7/28	0	0	**1**	0	0	**0**	0	0	**1**	0	0	**6**	0	0	**3**	3	37	**40**	0	2	**2**
8/4	0	1	**1**	0	1	**1**	2	13	**15**	3	57	**60**	0	0	**0**	0	6	**6**	0	3	**3**
8/11	0	4	**4**	1	7	**8**	1	12	**13**	3	35	**38**	2	1	**3**	1	8	**9**	4	2	**6**
8/18	0	5	**5**	1	6	**7**	2	24	**26**	1	68	**69**	2	2	**4**	12	186	**198**	2	2	**4**
8/25	1	3	**4**	2	2	**4**	5	48	**53**	8	98	**106**	0	4	**4**	38	97	**135**	15	19	**34**
9/1	8	7	**15**	90	40	**130**	134	136	**270**	33	143	**176**	5	2	**7**	18	0	**18**	11	10	**21**
9/8	14	22	**36**	52	33	**85**	106	94	**200**	45	101	**146**	31	22	**53**	39	4	**43**	16	14	**30**
9/15	11	7	**18**	19	2	**21**	51	31	**82**	15	27	**42**	24	9	**33**	3	2	**5**	7	0	**7**
9/22	13	4	**17**	12	1	**13**	36	9	**45**	15	10	**25**	32	14	**46**	0	0	**0**	3	3	**6**
9/29	59	9	**68**	76	0	**76**	154	27	**181**	26	13	**39**	35	4	**39**	0	0	**0**	68	2	**70**
10/6				4	0	**4**	46	0	**46**	82	16	**98**				125	4	**129**	58	5	**63**
10/13				7	0	**7**	16	0	**16**	6	1	**7**				39	3	**33**			
10/21				1	0	**1**	2	0	**2**	0	0	**0**				8	0	**8**			

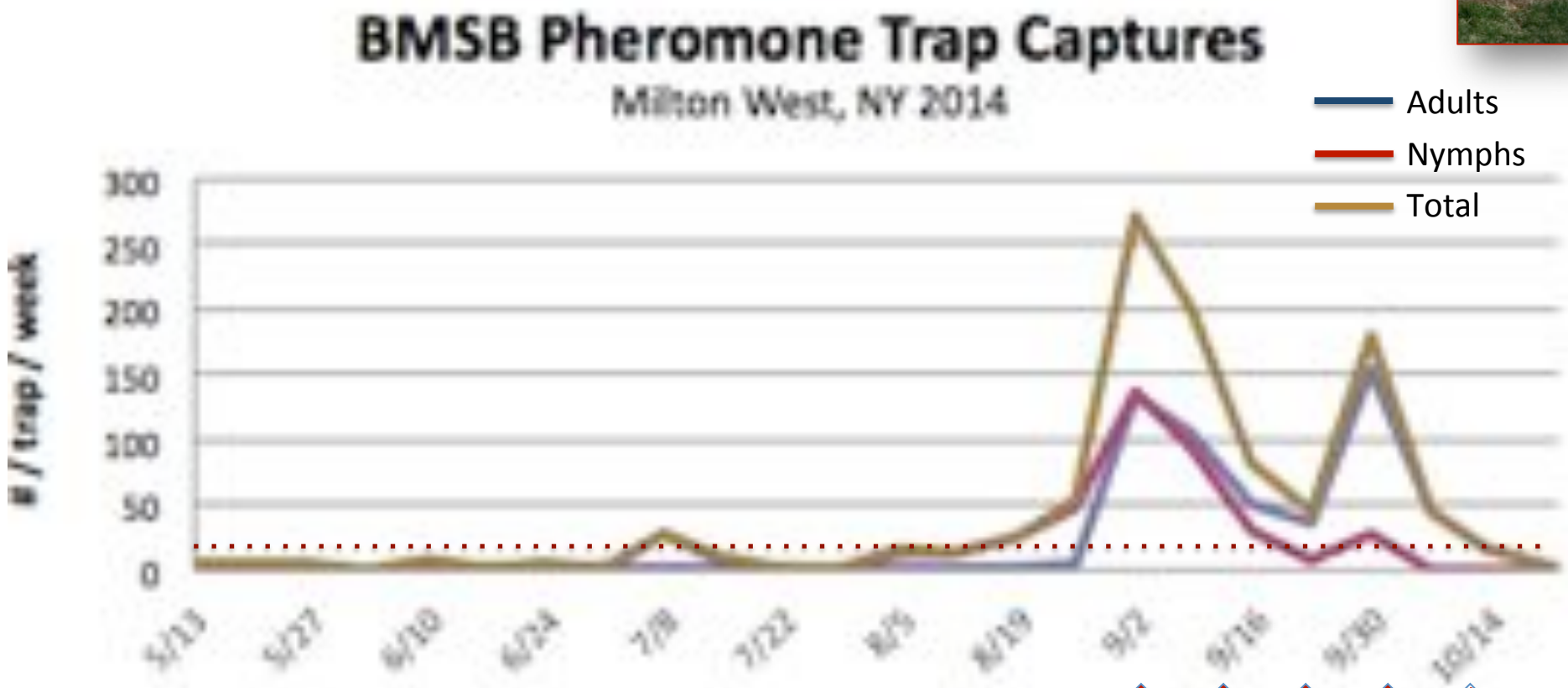
Nymphs
Adults

BMSB Management Threshold



Nymph & Adult Threshold: 10 / trap / week

BMSB Management Threshold



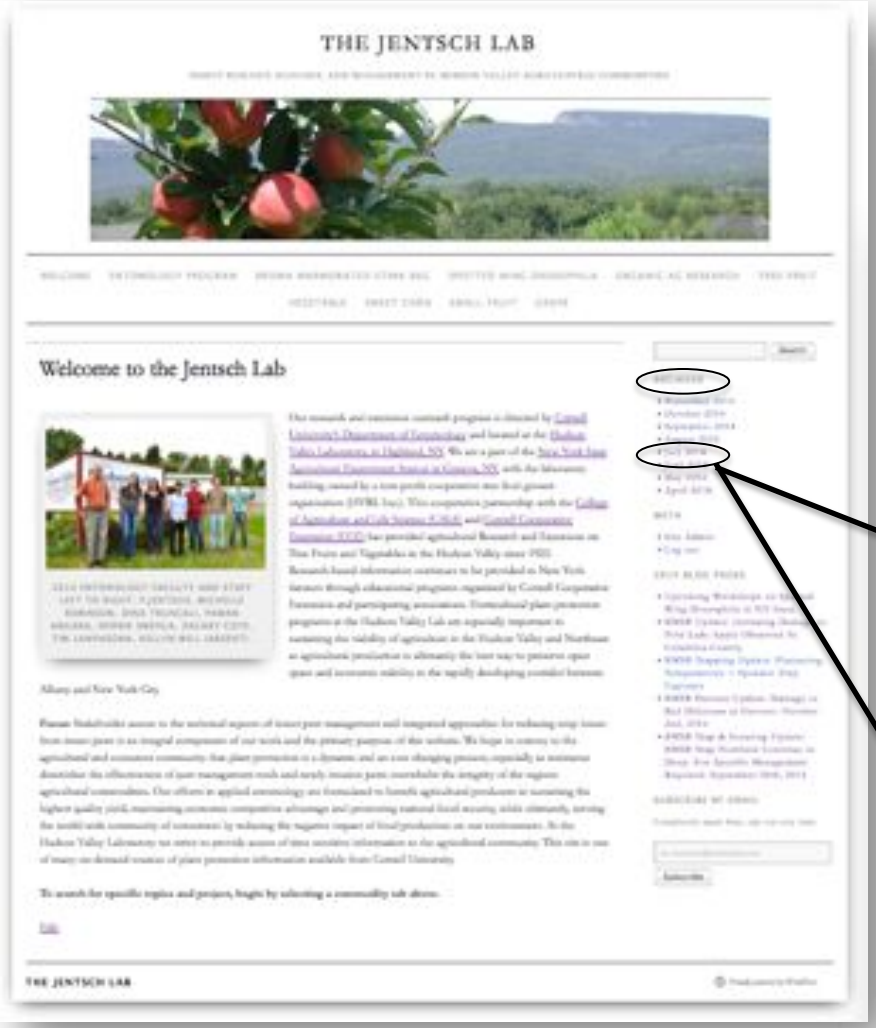
Adult Threshold: 10 / trap / week

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: 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

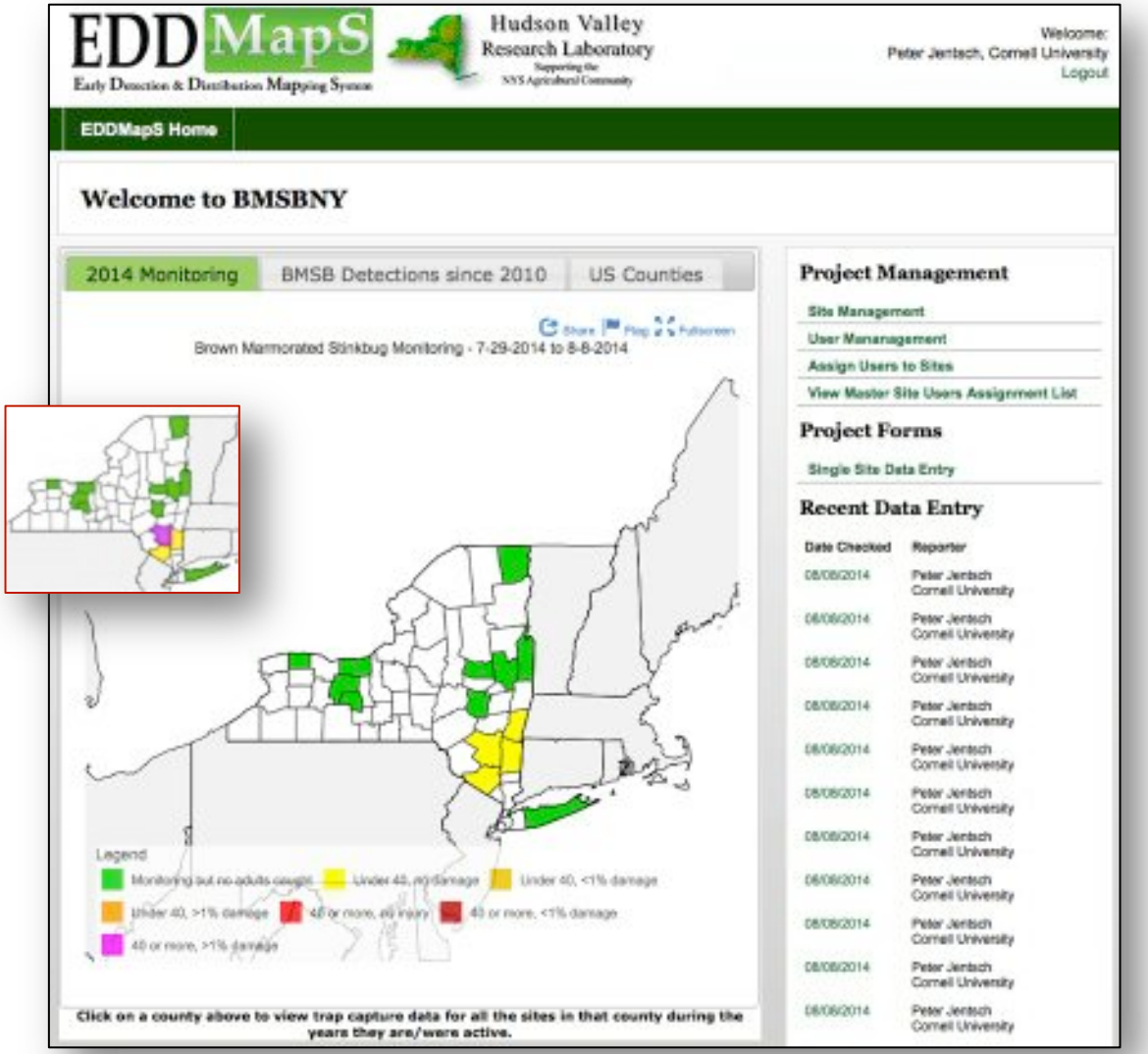
BMSB Update: August 20. Confirmed Late Season Feeding to Apple, Peach and Pepper

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



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

Dan Donahue: Weekly Publication ENYHP: Blog Site Alerts

Cornell University Cooperative Extension

Eastern NY Commercial Horticulture Program

Vol. 2 Issue 15
October 16, 2014

Tree Fruit News

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Dan Donahue

Weather Data

Degree Day Accumulations
(01/01 through 10/13/2014, via NEWA)

Location	Base 43	Base 50
Pare	3557.3	2347.1
Watervail	3743.8	2467.5
Clifton Park	3751.6	2501.4
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 NY Region
- BMSB Update: Increasing Damage to Pink Lady Apple in Columbia County
- Candidate Search: Research Horticulturalist Position
- Buffalo CBP Intercepts First in Nation Invasive Pest
- NYS Fruit & Vegetable EXPO
- Agribusiness Strategic Marketing Conference

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 "Mielin" strain of Pink Lady is ready for spot picking. While some Low 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 tree fruit, vegetable and small fruit industries in Albany, Columbia, Columbia, Dutchess, Essex, Fulton, Greene, Montgomery, Orange, Rensselaer, Saratoga, Schoharie, Schenectady, Ulster, Warren and Washington Counties

VOLUME 2, ISSUE 15 PAGE 2

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/

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.

Tedders trap using pheromone combination lures in peach.

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.

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.

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

continued on next page

BMSB Damage of Pink Lady Apple. 10.14.14

TREE FRUIT NEWS

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

Cornell University
College of Agriculture and Life Sciences

Hudson Valley Research Laboratory

History

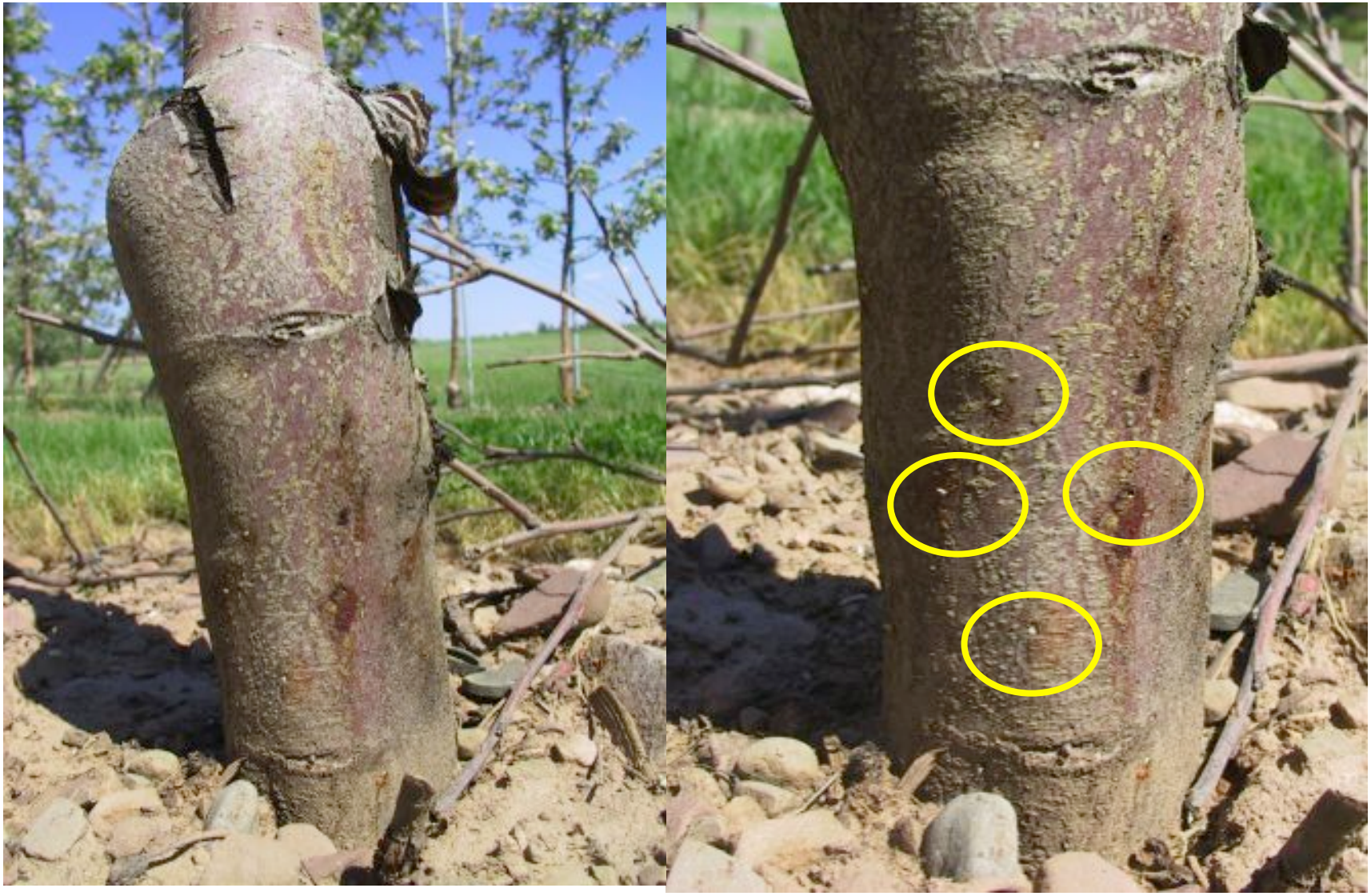
- **Reported by Deb Breth in WNY:**

- **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 ≥ 68°F**
- **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

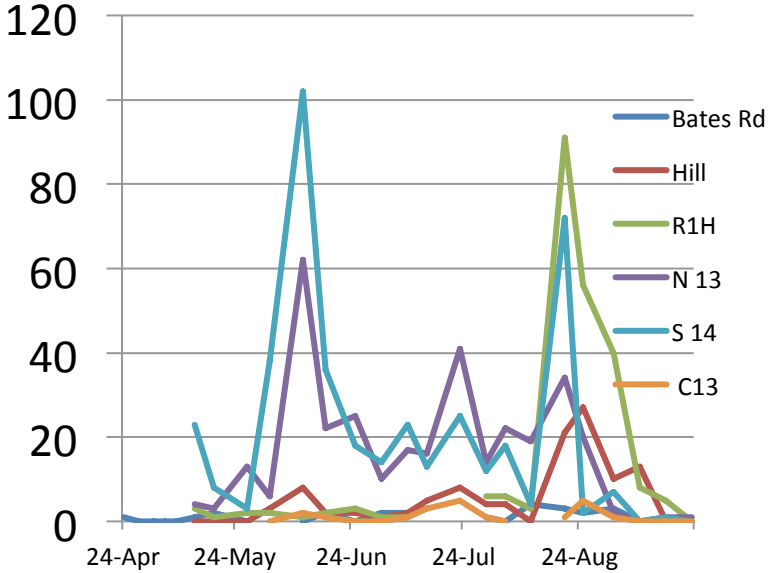
Re: **Peter Schultz**

- **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**

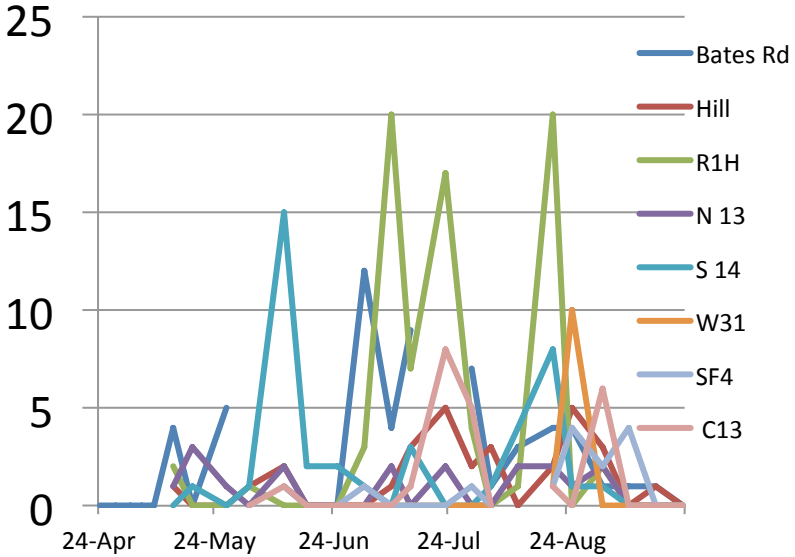
Trap placement on edge of woods between orchard and woods

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