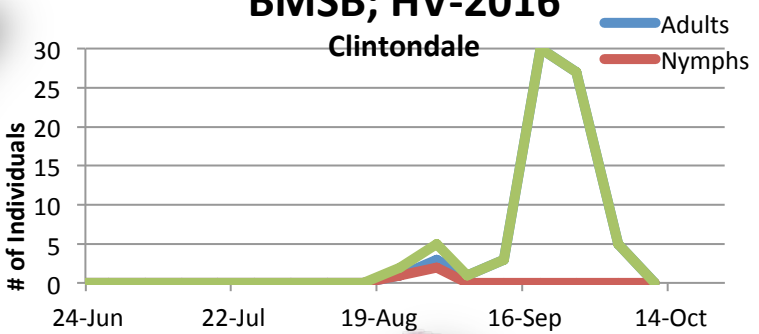
Insect Pest Management Roundup 2016



Hudson Valley Commercial Fruit Growers' School
Best Western *Plus* Hotel
February 15, 2017

Trissolcus japonicus

Peter Jentsch
Senior Extension Associate - Entomology

HVRL - Entomology Lab Site

THE JENTSCH LAB

INSECT BIOLOGY, ECOLOGY, AND MANAGEMENT IN HUDSON VALLEY AGRICULTURAL COMMODITIES

WELCOME ENTOMOLOGY BROWN MARMORATED STINK BUG INVASIVES ORGANIC AG. RESEARCH TREE FRUIT VEGETABLE SWEET CORN SMALL FRUIT GRAPE IN THE NEWS

Insecticide Tests
Scouting Reports
Tree Phenology

Welcome to the Jentsch Lab

HVRL ENTOMOLOGY STAFF

Research Our research and extension outreach program is directed by Cornell University's Department of Entomology and located at the Hudson Valley Laboratory, in Highland, NY. We are a part of the New York State Agricultural Experiment Station in Geneva, NY, with the laboratory building owned by a non-profit cooperative tree fruit grower organization (HVRL Inc.).

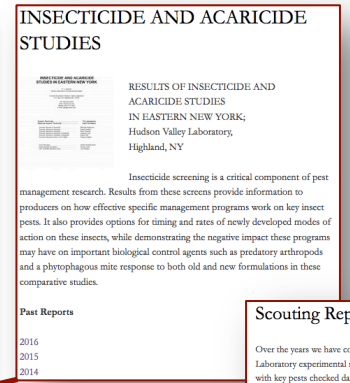
Partnership This cooperative partnership with the College of Agriculture and Life Science (CALS), Cornell Cooperative Extension (CCE) and the Eastern New York Commercial Horticultural Program (ENYCHP) providing continuous agricultural Research and Extension to the agricultural community on Tree Fruits and Vegetables in the Hudson Valley since 1923.

Education Research-based extension outreach continues to provide valuable problem solving solutions to New York farmers through educational programs organized by Cornell Cooperative Extension and participating associations. Horticultural plant protection programs at the Hudson Valley Lab are especially important to 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 corridor between Albany and New York City.

Search

2016 BLOG PAGES

- Hudson Valley Commercial Fruit School (Tree Fruit, Berries & Grapes) Tuesday-Thursday, February 14-15, 2017 Best Western, Kingston, NY (same location as last year) February 13, 2017
- Meeting Invitation: RIMpro forecasting for apple scab and fire blight Mgt. in 2017 @ HVRL, Thursday, 2nd February 2017 at 9:30 AM for Registration. February 1, 2017
- Spotted W… Today: Ja… Eastern T… January 2…
- Meeting Invitation: RIMpro forecasting for apple scab and fire blight Mgt. in 2017 @ HVRL,



INSECTICIDE AND ACARICIDE STUDIES

RESULTS OF INSECTICIDE AND ACARICIDE STUDIES IN EASTERN NEW YORK;
Hudson Valley Laboratory,
Highland, NY

Insecticide screening is a critical component of pest management research. Results from these screens provide information to producers on how effective specific management programs work on key insect pests. It also provides options for timing and rates of newly developed modes of action on these insects, while demonstrating the negative impact these programs may have on important biological control agents such as predatory arthropods and a phytophagous mite response to both old and new formulations in these comparative studies.

Past Reports

2016
2015
2014

Scouting Report

Over the years we have conducted insect pest trapping at the Hudson Valley Laboratory experimental research orchard. Traps are checked at weekly intervals with key pests checked daily for degree-day predictive modeling forecasting. Use the reports to view past year occurrence of insect pests relative to date and tree phenology to aid in determining approximate dates for pheromone trap placement in the Mid-Hudson Valley. Traps should be placed two weeks earlier then the actual emergence date, especially in the lower Hudson Valley relative to the Highland reporting date. Sustained trap capture, used for applying insect development modeling for timing insecticide applications, refers to a consistent number of insects in traps after first emergence.

2015 Hudson Valley BMSB Trap Graphs (30 0f 42 Sites with seasonal trap captures)

Entomology Scouting Reports / Weekly trap update

2016

Historical Tree Phenology

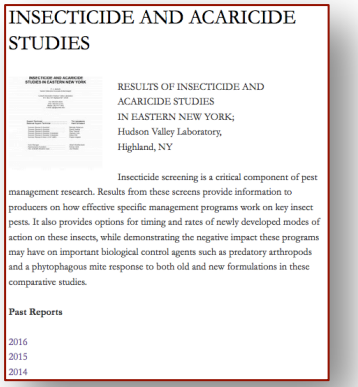
The historical tree phenology chart, representing the developmental growth stages of apple, differs from year to year. Using the McIntosh cultivar, we can measure the tree phenology to help predict the seasonal development of the early season insect pest complex relative to years past. The updated chart provides a time line reference to aid in timing pest management events from the Mid-Hudson Valley (Highland, NY).
'16 McIntosh Phenology

APPLE TREE PHENOLOGY STAGES FROM DORMANT THROUGH FRUIT SET.

PEAR PHENOLOGY STAGES

http://blogs.cornell.edu/jentsch/

Formulation	Materials Tested	Company
	Apple	
Insecticides		
Actara 25WDG		Syngenta
Agri-Flex SC		Syngenta
Altacor 35WG		E.I. DuPont De Nemours & Co.
Asana XL		E.I. DuPont De Nemours & Co.
Assail 30SG		United Phosphorus Inc.
Avaunt 30 WDG		E.I. DuPont De Nemours & Co.
Belt SC		Bayer CropScience
BioCover MLT (NIS)		Crop Protection Services
Bifenthrin DF		United Phosphorus Inc.
Carbaryl 4L		Derxel Chemical Co.
Centaur 0.7 WDG		Nichino America Inc.
Closer SC		Dow AgroSciences
Delegate WG		Dow AgroSciences
Entrust SC		Dow AgroSciences
Esteem 35WP		Dow AgroSciences
Exirel (Cyazypyr)		E.I. DuPont De Nemours & Co.
Imidan 70WP		Gowan Co.
LI700 (NIS)		Crop Protection Services
Movento 240SC		Bayer CropScience
Sivanto		Bayer CropScience
Surround WP		Tessenderlo Kerley
Voliam Flexi WDG		Syngenta
Voliam Express		Syngenta
	Pear	
Actara 25WDG		Syngenta
AgriMek 0.15EC		Syngenta
Asana XL		E.I. DuPont De Nemours & Co.
BioCover MLT (NIS)		Crop Protection Services
Centaur 0.7WG		Nichino America Inc.
Esteem 35WP		Dow AgroSciences
Surround WP		Tessenderlo Kerley
	Raspberry	
Boric Acid		Tranquility Products



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Past Reports

2016
2015
2014

Table 1 Treatment Schedule For Seasonal Apple Insecticide Screen. Hudson Valley Research Lab., Highland, N.Y. - 2015.

Trmt.	Formulation	Rate	Timing	Application Dates
1	Imidan 70WP	5.75 lbs./A	PF-1C	15th May, 29th May
	Sivanto	10.5 fl.oz./A	TC	13th April
	Belt SC	5.0 fl.oz./A	2-3C	15th June, 31st June
	Assail 30SG	8.0 fl.oz./A	4-6C	6th, 15th July, 2nd Aug.
2	Imidan 70WP	5.75 lbs./A	PF-1C	15th May, 29th May
	Sivanto	14.0 fl.oz./A	TC	20th April
	Belt SC	5.0 fl.oz./A	2-3C	15th June, 31st June
	Assail 30SG	8.0 fl.oz./A	4-6C	6th, 15th July, 2nd Aug.
3	Imidan 70WP	5.75 lbs./A	PF-1C	15th May, 29th May
	Sivanto	10.5 fl.oz./A	TC, 2C (SJS Emg.)	20th April, 15th June
	Belt SC	5.0 fl.oz./A	2-3C	15th June, 31st June
	Assail 30SG	8.0 fl.oz./A	4-6C	6th, 15th July, 2nd Aug.
4	Imidan 70WP	5.75 lbs./A	PF-1C	15th May, 29th May
	Sivanto	14.0 fl.oz./A	PF	15th May
	Movento240SC	9.0 fl.oz./A	1C	31st May
	[illegible]	0.25%	PF-3C	15th May, 31st May, 15th June, 31st June
	Belt SC	5.0 fl.oz./A	2-3C	15th June, 31st June
	Assail 30SG	8.0 fl.oz./A	4-6C	6th, 15th July, 2nd Aug.
5	Imidan 70WP	5.75 lbs./A	PF-1C	15th May, 29th May
	Movento 240SC	6.0 fl.oz./A	PF, 1C	19th, 31st May
	U700	0.25%	PF-3C	19th, 31st May, 15th June, 31st June
	Belt SC	5.0 fl.oz./A	2-3C	15th June, 31st June
	Assail 30SG	8.0 fl.oz./A	4-6C	6th, 15th July, 2nd Aug.
6	Asana XL 0.66EC	14.5 fl.oz./A	TC, P	13th, 21st April
	Imidan 70WP	5.75 lbs./A	PF-6C	15th, 29th May, 15th June, 31st June , 6th, 15th July, 2nd Aug.
7	Asana XL 0.66EC	14.5 oz./A	TC	13th April
	Imidan 70WP	5.75 lbs./A	PF-1C, 4-6C	15th May, 29th May, 6th, 15th July, 2nd Aug.
	Centaur	34.5 oz./A	1C	29th May
	Delegate WG	6.0 oz./A	2-3C	31st May
8	Asana XL 0.66EC	14.5 oz./A	P	21st April
	Imidan 70WP	5.75 lbs./A	PF-1, 4-6	15th May, 29th May, 6th, 15th July, 2nd Aug.
	Centaur 0.7WDG+	34.5 oz./A	1C	29th May
	BioCover MLT	0.25%	2C	29th May
	Delegate WG	6.0 oz./A	3C	31st May
9	UNTREATED			

Efficacy Programs

- Full season
- Specific insects
  - SJS
  - DWB
  - Codling Moth
  - OBLR

http://blogs.cornell.edu/jentsch/

Table 2b Evaluations Of Insecticides For Controlling Early Season Insect Complex On Apple [a]. Hudson Valley Research Lab. Highland N.Y. - 2016

Trmt.	Formulation	Rate	Incidence (%) of insect damaged cluster fruit SJS	Int Lep	Rosy Apple Aphid	Clean
1.	Imidan 70WP	5.75 lbs./A	13.5 ab	0.0 a	0.0 a	86.5 ab
	Sivanto	10.5 fl.oz./A				
	Belt SC	5.0 fl.oz./A				
	Assail 30SG	8.0 fl.oz./A				
2.	Imidan 70 WP	5.75lbs./A	21.0 ab	0.0 a	0.0 a	79.0 ab
	Sivanto	14.0 fl.oz./A				
	Belt SC	5.0 fl.oz./A				
	Assail 30SG	8.0 fl.oz./A				
3.	Imidan 70 WP	5.75 lbs./A	12.8 a	0.0 a	0.0 c	87.3 b
	Sivanto	10.5 fl.oz./A				
	Sivanto	10.5 fl.oz./A				
	Belt SC	5.0 fl.oz./A				
	Assail 30SG	8.0 fl.oz./A				
4.	Imidan 70 WP	5.75 lbs./A	1.0 a	0.0 a	0.0 a	99.0 b
	Sivanto	14.0 fl.oz./A				
	Movento 240SC	9.0 fl.oz./ A				
	LI700	0.25%				
	Belt SC	5.0 fl.oz./A				
	Assail 30SG	8.0 fl.oz./A				
5.	Imidan 70 WP	5.75 lbs./A	1.5 a	0.0 a	0.0 a	98.5 b
	Movento 240SC	6.0 fl.oz./A				
	LI700	0.25%				
	Belt SC	5.0 fl.oz./A				
	Assail 30SG	8.0 fl.oz./A				
6.	Asana XL 0.66 EC	14.5 fl.oz./A	9.3 a	0.0 a	0.0 a	90.8 b
	Imidan 70 WP	5.75 lbs./A				
7.	Asana XL 0.66 EC	14.5 oz./A	14.8 ab	0.0 a	0.0 a	85.3 b
	Imidan 70 WP	5.75 lbs./A				
	Centaur	34.5 oz./A				
	Delegate	6.0 oz./A				
8.	Asana XL 0.66 EC	14.5 fl.oz./A	20.8 ab	0.0 a	0.0 a	79.3 ab
	Imidan 70 WP	5.75 lbs./A				
	Centaur 0.7WDG+3	4.5 oz./A				
	BioCover	0.25%				
	Delegate	6.0 oz./A				
9.	UNTREATED		44.8 b	9.3 b	0.0 a	50.3 a
P value for transformed data			0.1157	0.0001	x	0.0478

[a] Evaluation made on June 16 on Red Delicious cultivar.

Efficacy Programs

- Full season
- Specific insects
  - SJS
  - DWB
  - Codling Moth
  - OBLR

March 31st @ HVRL

- Scouting
- Modeling
- Efficacy Studies

Insect Pest Management Roundup 2016

- **Status of Lorsban Registration**
  - Options for Dog Wood Borer & Black Stem Borer mgt.
- **Loss of Insecticides**
  - Belt
- **New Insecticides for 2016**
  - Closer
    - **Orchard efficacy study with low BMSB presence**

      Neonicotinoid antifeeding – Dow 'Closer'

Insect Pest Management Roundup 2016

Hudson Valley Parasitic wasp survey – Biological Control

- Presence of BMSB in NY
- BMSB sentinel egg development
- T. japonicus emergence in Ulster County

2016 DWB Trials:

Sprayer Demo

Mating disruption

MD + Exp. Applications

Codling Moth Injury

- Lepidopteran mgt strategies

Status of Lorsban Registration

U.S. Court of Appeals for the Ninth Circuit ordered EPA to respond to an administrative petition to ***revoke all tolerances*** for the insecticide chlorpyrifos. Petition sites drinking water concerns (August 2015).

> A "tolerance" represents the **maximum level for residues** of pesticide chemicals legally allowed in or on raw agricultural commodities and processed foods.

A period for comments was open and extended, closing Jan 17 2017, at 11:59 PM ET. 49,534 comments were received.

Final action required by March 31, 2017

Chlorpyrifos Registration Review Drinking Water Assessment.

Recent EPA studies have indicated potential exposure to chlorpyrifos or chlorpyrifos-oxon in finished drinking water across the country based on currently labeled uses.

- This is supported by both model estimated concentrations as well as **measured chlorpyrifos concentrations in surface water across the United States.**
- The assessment considers both agricultural and non-agricultural uses of chlorpyrifos.

'Chlorpyrifos: Revised Human Health Risk Assessment for Registration Review'

Chlorpyrifos found in pregnant women and cord blood of children showing'…there is a potential for neurodevelopmental effects associated with chlorpyrifos exposure to occur (at levels below 10% RBC AChE inhibition, and that EPA's existing point of departure (which is based on 10% AChE inhibition), is therefore not sufficiently health protective).'

Neurodevelopmental effects in children; from crack and crevice treatments were the most likely exposure.

https://www.regulations.gov/document?D=EPA-HQ-OPP-2015-0653-0402

Loss of Insecticides: Belt (flubendiamide)

The U.S. Environmental Protection Agency's Environmental Appeals Board (EAB) has upheld an earlier EPA decision to cancel registration for Bayer's insecticide flubendiamide, marketed in the U.S. as Belt®. Sited accumulation of the A.I. in water, posing risks to aquatic invertebrates.

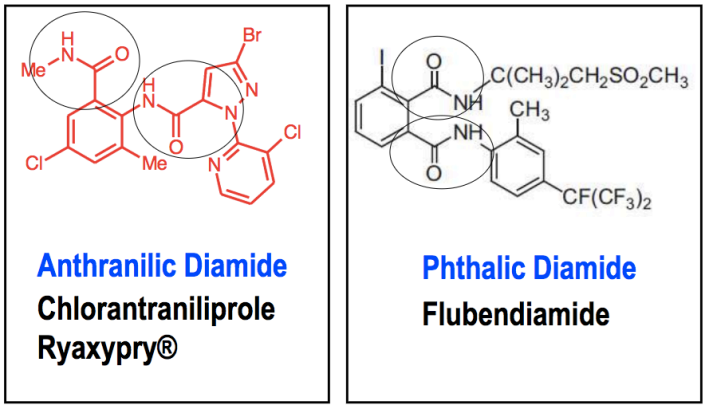
Sales of existing stocks to growers will be allowed for use.

Loss of Insecticides: Belt (flubendiamide)

flubendiamide (*IRAC* MoA. Group 28) – **Tree Fruit Diamides**

- **Altacor 35WDG** (Chlorantraniliprole)
- **Exirel** (Cyantraniliprole)
- **Voliam Flexi** (Chlorantraniliprole / Thiamethoxam)
- **Voliam Xpress** (Chlorantraniliprole / Lambda-cyhalothrin)

Diamide Chemistry:
Two Different Molecules



New Insecticides for 2016: Closer (sulfoxaflor)

ENVIRONMENT | Thu Sep 10, 2015 | 5:53pm EDT

U.S. court finds EPA was wrong to approve Dow pesticide harmful to bees

Sept. 2015: U.S. Court of Appeals for the Ninth Circuit / EPA withdrawl

New Insecticides for 2016: Closer (sulfoxaflor)

(Base label):

Closer® SC

INSECTICIDE
[Alternate Brand Name: Sequoia™]
Isoclast Active

ACCEPTED
Oct 14, 2016
Under the Federal Insecticide, Fungicide and Rodenticide Act as amended, for the pesticide registered under
EPA Reg. No. 62719-623

For control or suppression of aphids, fleahoppers, plant bugs, stink bugs, whiteflies and certain psyllids, scales, and thrips on: barley, *Brassica* (cole) leafy vegetables (crop group 5), bulb vegetables (crop group 3-07), canola (rapeseed) (subgroup 20A), fruiting vegetables (crop group 8), leafy vegetables (except *Brassica*) (crop group 4), leaves of root and tuber vegetables (crop group 2), low growing berry (except strawberry) (subgroup 13-07G), okra, ornamentals (herbaceous and woody), pistachio, pome fruits (crop group 11), root and tuber vegetables (crop groups 1A and 1B), potatoes (crop groups 1C and 1D), small fruit vine climbing (except fuzzy kiwifruit) (subgroup 13-07F), stone fruits (crop group 12), succulent, edible podded, and dry beans, tree nuts (crop group 14), triticale, turfgrass, watercress, and wheat.

Group	4C	INSECTICIDE

Active Ingredient:	
sulfoxaflor	21.8%
Other Ingredients	78.2%
Total	100.0%

October 2016: Label revisions by Dow were accepted and registration granted

New Insecticides for 2016: Closer (sulfoxaflor)

Pome Fruits (Crop Group 11)[1]

[1]Pome fruits (crop group 11) including apples, crabapple, loquat, mayhaw, pears, quince

Pests and Application Rates:

Pests	Closer SC (fl oz/acre)
Aphids (except woolly apple aphid) white apple leafhopper	1.5 – 2.75 (0.023 – 0.043 lb ai/acre)
plant bugs woolly apple aphid	2.75 – 5.75 (0.043 – 0.09 lb ai/acre)
pear psylla (suppression only) San Jose scale (suppression only)	5.75 (0.09 lb ai/acre)

- **A.I. has low BMSB mortality**
- **Inhibits feeding near harvest**
- **7 DTH interval**
- **3 Apps at high rate / season**

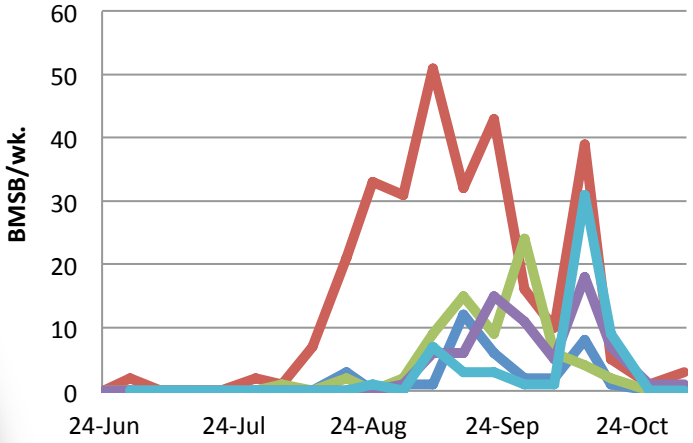
Restrictions:

- **Preharvest Interval:** Do not apply within 7 days of harvest.
- **Minimum Treatment Interval:** Do not make applications less than 7 days apart.
- Do not make more than four applications per crop.
- Do not make more than two consecutive applications per crop.
- Do not apply more than a total of 17 fl oz of Closer SC (0.266 lb ai of sulfoxaflor) per acre per year.
- Do not apply this product until after petal fall.
- If blooming vegetation is present 12 feet out from the downwind edge of the field, a downwind 12-foot on-field buffer must be observed.

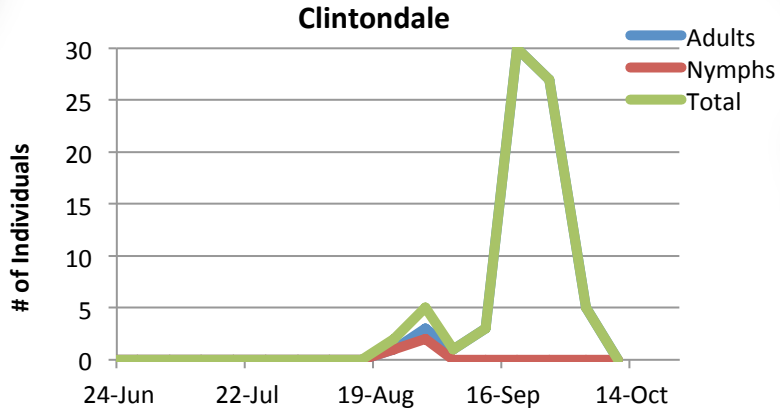
Studies of the Brown Marmorated Stink Bug in New York State, 2016

2016 Closer Study

Total BMSB; WNY-2016



BMSB; HV-2016



Biological Control Study

2 mm

Trissolcus japonicus

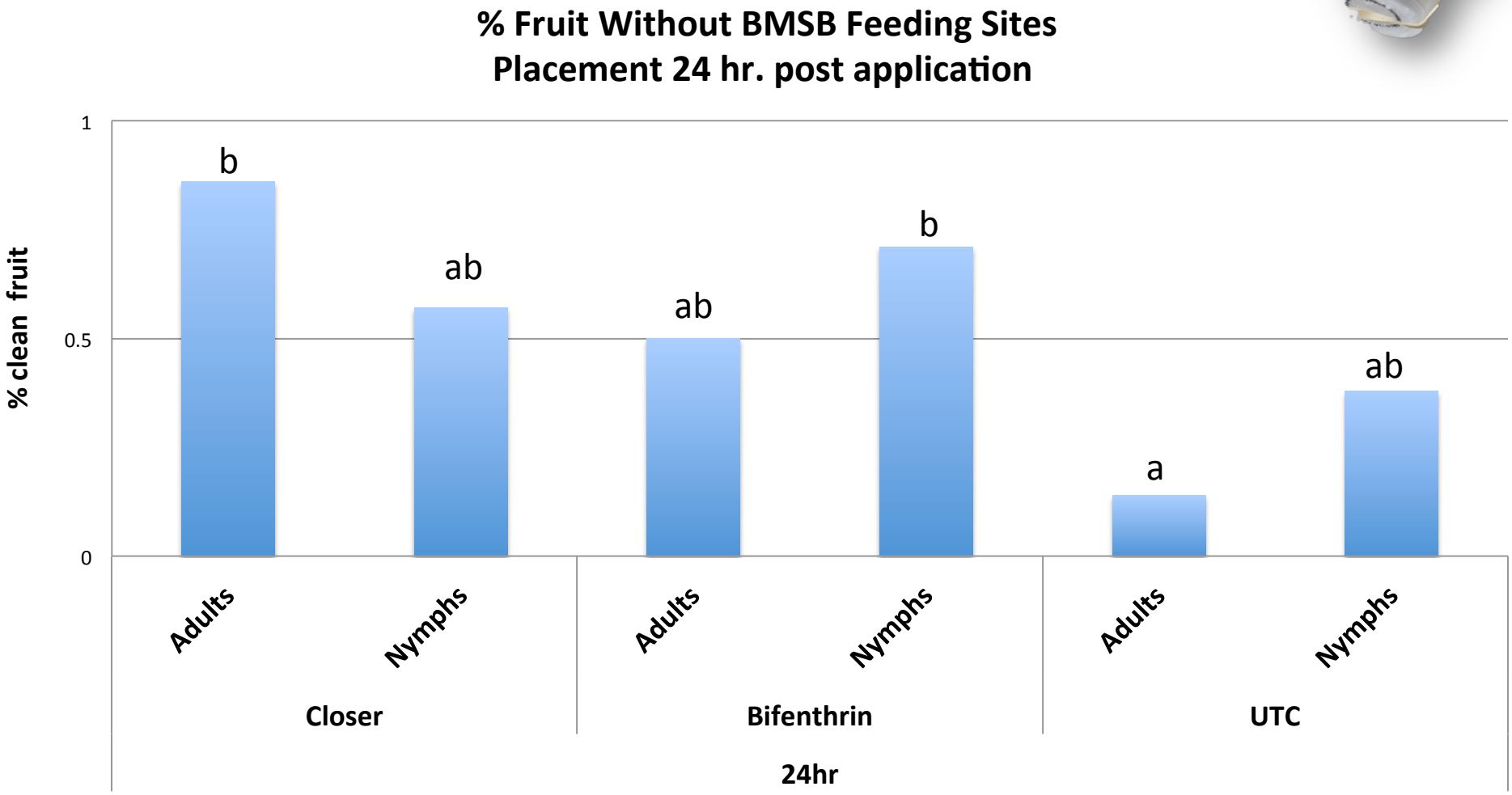
BMSB Feeding and Mortality Comparison on Closer and Bifenthrin Treated Apple.

- Five year old Red Delicious fruit trees on dwarfing rootstock strains
- Applications Closer SC (5.75 oz./A) and Bifenture EC () on the 2nd of August
- Three intervals of BMSB placement were made on the 3rd of August at 24hr , 48hr and 72 hr intervals
- (1) 3rd instar nymph and (1) adult/tree x 6 replicates
- A 1 oz. screened cup over BMSB, north side of tree, shaded side of fruit.
- Insects removed after 7d; all fruit were evaluated at harvest on August 14th.

BMSB Feeding and Mortality Comparison on Closer and Bifenthrin Treated Apple.

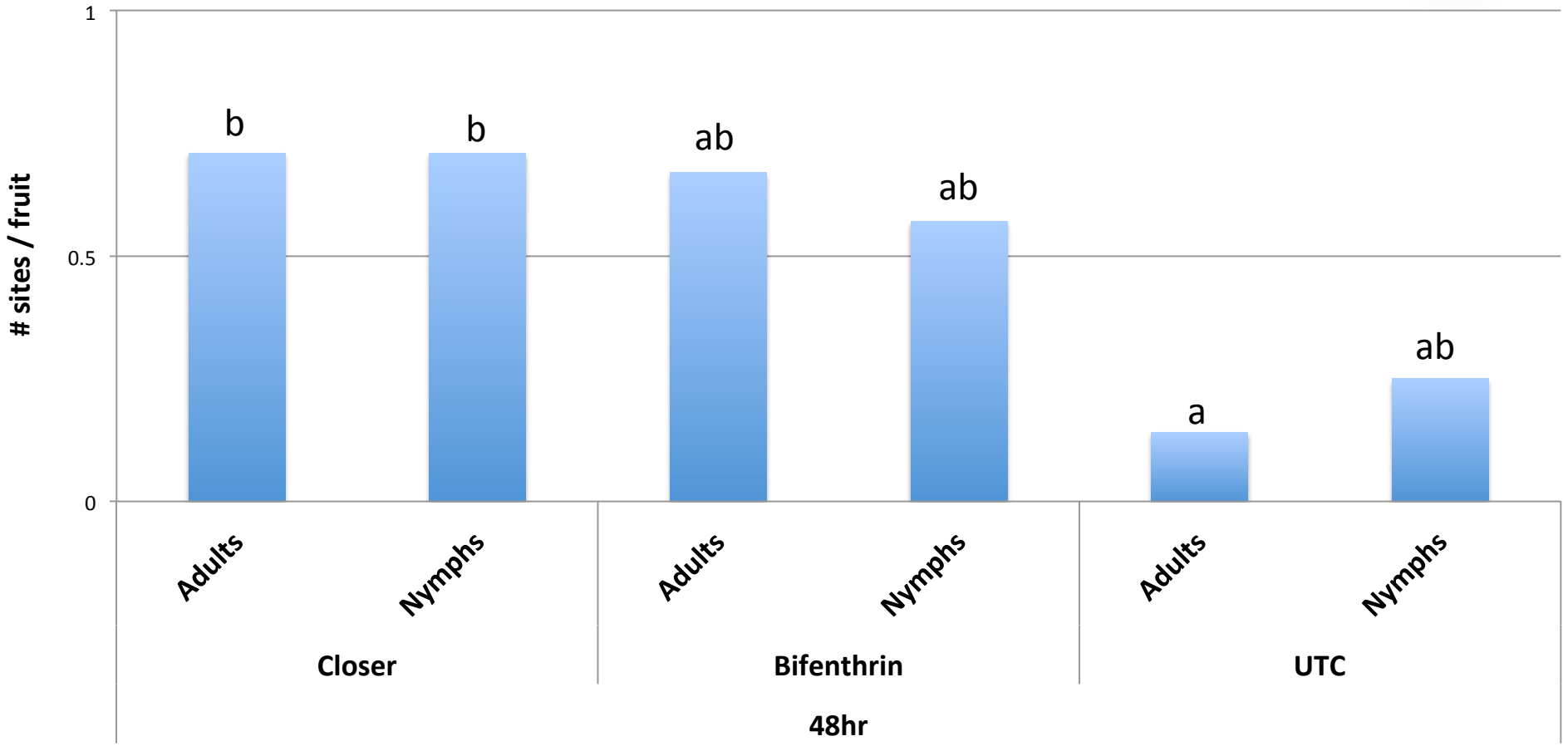
Stage	Hr.post Appl.	Treatment	# Feeding Sites	Green Dimples	Corking	Clean
Adults	24hr	Closer	0.0 a	0.3 a	0.0 a	0.1 a
		Bifenthrin	0.3 a	0.6 a	0.4 a	0.5 ab
		UTC	1.6 b	0.9 a	1.6 b	0.9 b
		P-Value	0.0079	0.6411	0.0109	0.024
	48hr	Closer	0.3 a	0.0 a	0.7 a	0.1 a
		Bifenthrin	0.7 a	0.3 a	0.7 a	0.7 ab
		UTC	0.9 a	1.4 b	1.1 a	0.7 b
		P-Value	0.6113	0.0018	0.7383	0.0641
	72hr	Closer	0.0 a	0.4 a	0.3 a	0.3 a
		Bifenthrin	0.9 a	0.4 a	1.1 a	0.4 a
		UTC	1.1 a	0.8 a	1.8 a	0.6 a
		P-Value	0.3548	0.499	0.3131	0.4854
Nymphs	24hr	Closer	0.1 a	0.3 a	0.1 a	0.4 a
		Bifenthrin	0.4 a	0.3 a	0.6 a	0.6 a
		UTC	1.1 a	1.4 a	1.1 a	0.7 a
		P-Value	0.149	0.3699	0.1649	0.4526
	48hr	Closer	0.0 a	0.3 a	0.1 a	0.3 a
		Bifenthrin	0.3 a	1.4 a	0.3 a	0.6 a
		UTC	1.8 b	2.0 a	2.8 b	0.7 a
		P-Value	0.0267	0.3394	0.007	0.2
	72hr	Closer	0.0 a	0.4 a	0.3 a	0.3 a
		Bifenthrin	0.9 a	0.4 a	1.1 a	0.4 a
		UTC	1.1 a	0.8 a	1.8 a	0.6 a
		P-Value	0.3548	0.499	0.3131	0.4854
		Fisher's Protected LSD				
		Significance level: .05				

BMSB Feeding and Mortality Comparison on Closer and Bifenthrin Treated Apple.

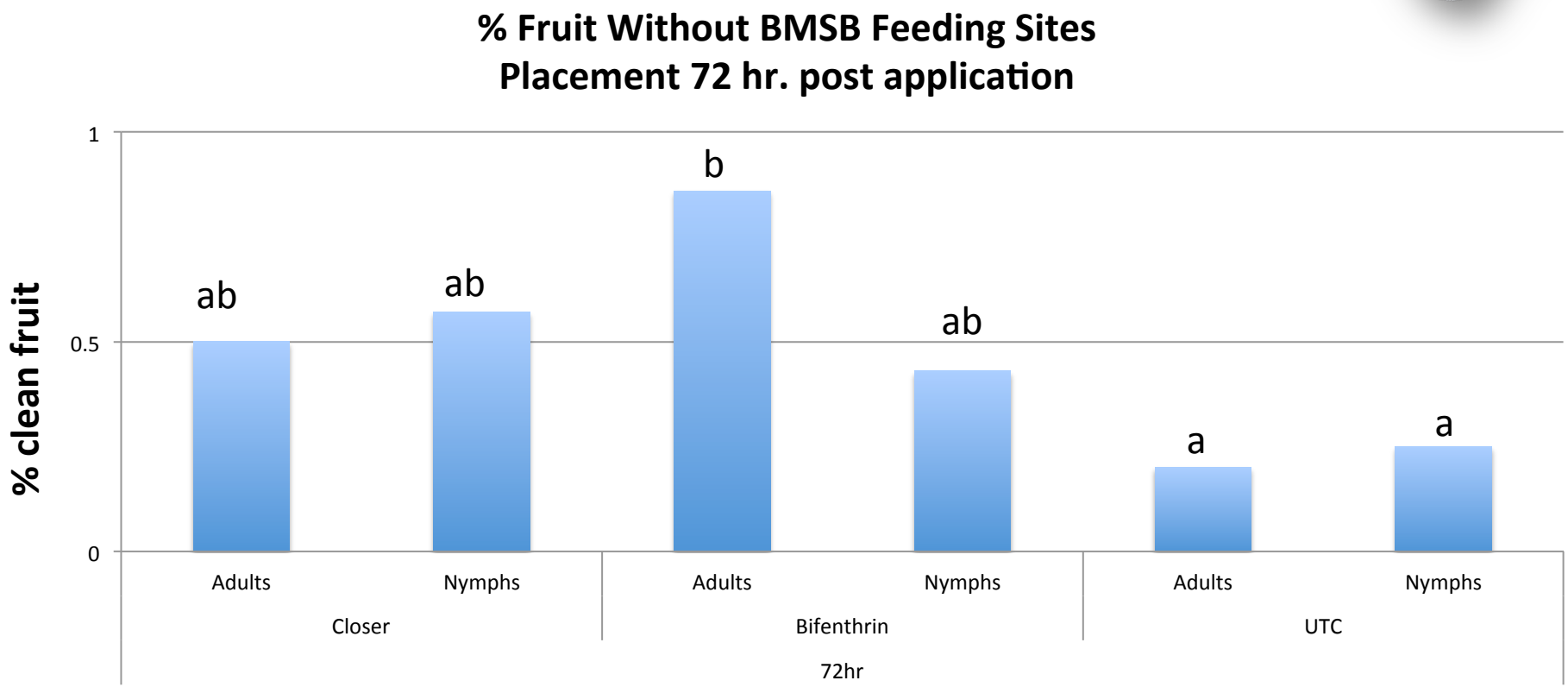


BMSB Feeding and Mortality Comparison on Closer and Bifenthrin Treated Apple.

% Fruit Without BMSB Feeding Sites
Placement 48 hr. post application



BMSB Feeding and Mortality Comparison on Closer and Bifenthrin Treated Apple.



Comparison of a Late Season BMSB Feeding and Mortality Of Closer and Bifenthrin Treated Apple.

Adult – Field Mortality

Day after Exposure	Treatment	% Alive	% Dead
3	Closer	69.4 b	30.6 a
	Bifenthrin	13.7 a	86.3 b
	UTC	83.3 b	16.7 a
	P-Value	0.0165	
10	Closer	43.1 a	56.9 a
	Bifenthrin	8.9 a	91.1 a
	UTC	50.0 a	50.0 a
	P-Value	0.3524	
14	Closer	43.1 a	56.9 a
	Bifenthrin	8.9 a	91.1 a
	UTC	37.5 a	62.5 a
	P-Value	0.4675	

Fisher's Protected LSD

Significance level: .05

Comparison of a Late Season BMSB Feeding and Mortality Of Closer and Bifenthrin Treated Apple.

- Near harvest (7d) materials for BMSB management include:

Classes	Formulation	Efficacy	Group (s)
• 3A	Baythroid XL 1EC	Moderate	(Pyrethroid)
• 4A/3A	Leverage 360	Moderate	(Cyfluthrin/Imidacloprid)
• 4C	Closer SC	Low (mortality)	Sulfoxaflor

***Closer SC, although not providing mortality of BMSB, provides feeding inhibition to reduce fruit damage, comparable to Bifenthrin at 24 & 48 hr. residual levels.**

2016 Objectives

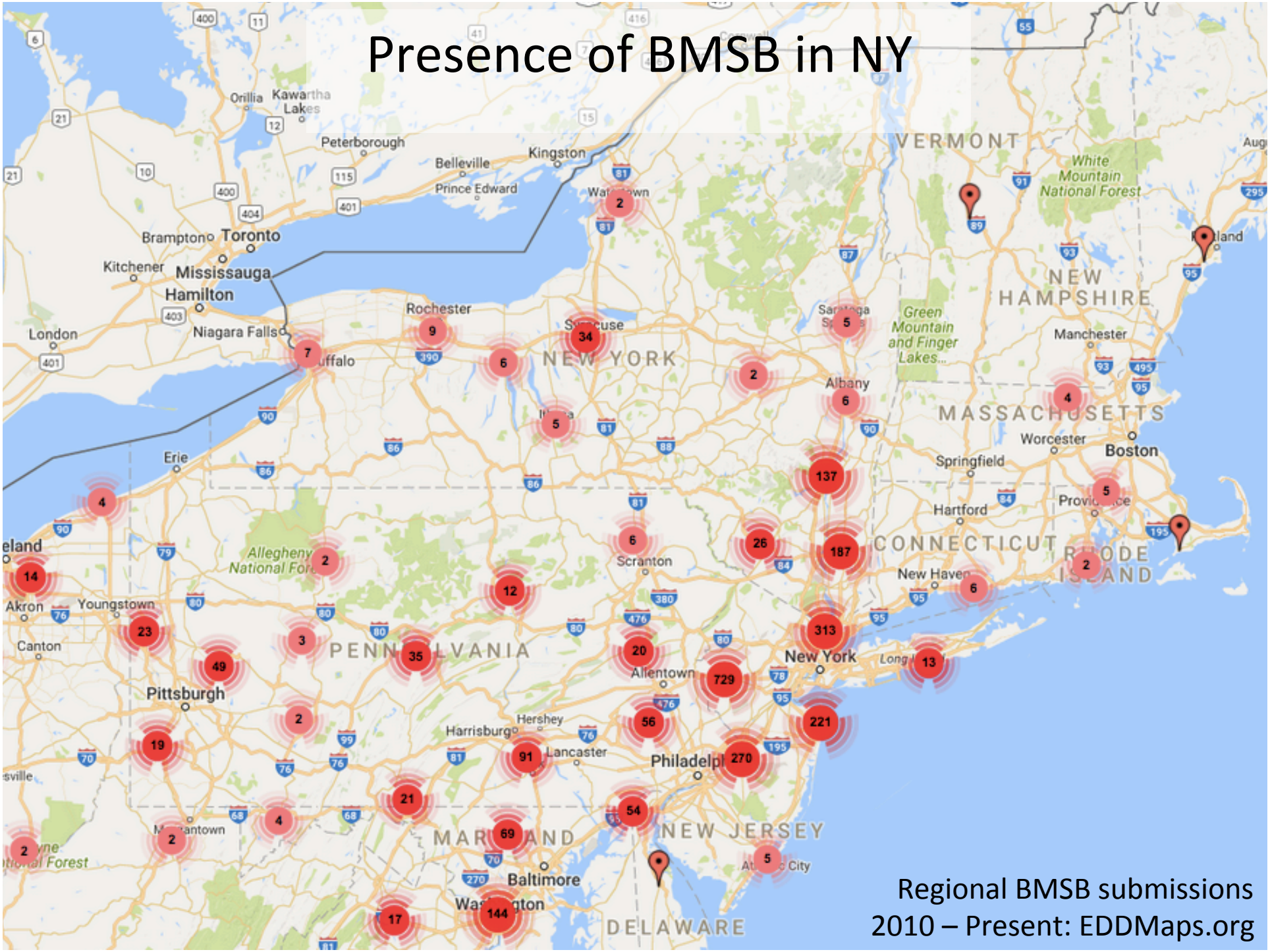
Biological Control - Hudson Valley Parasitoid Wasp Survey

- State-wide monitoring of BMSB in NY
- BMSB sentinel egg development & deployment
- *T. japonicus* emergence in Ulster County

2 mm

Trissolcus japonicus

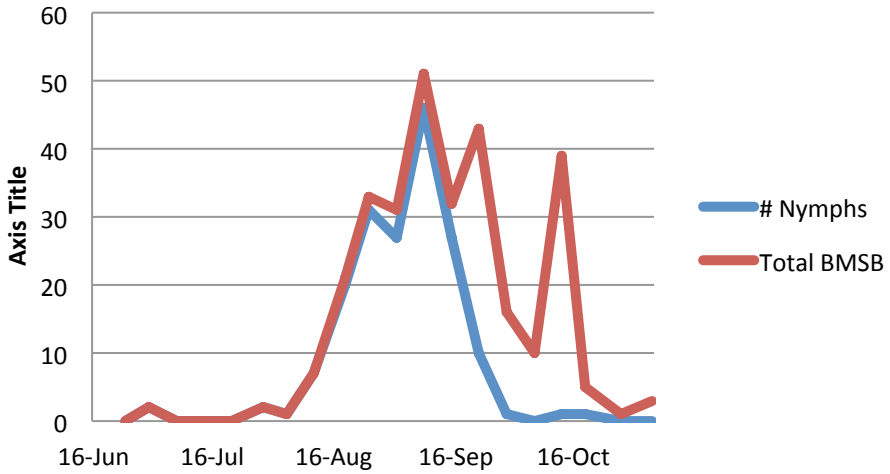
Presence of BMSB in NY



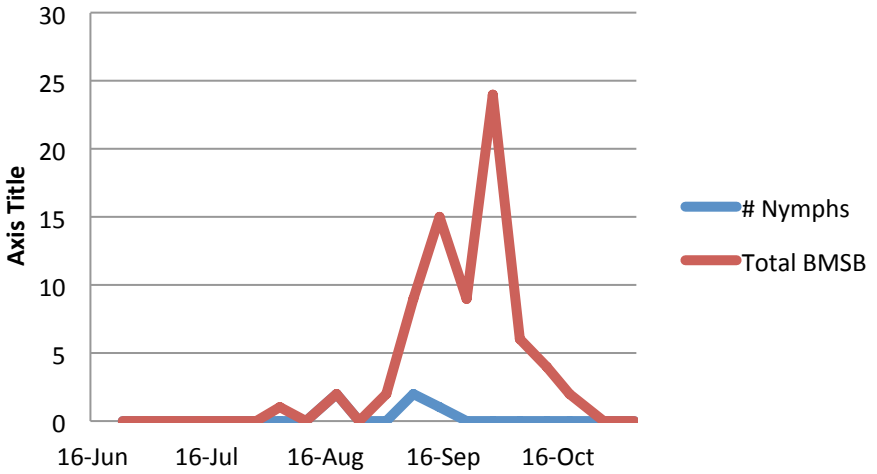
Regional BMSB submissions
2010 – Present: EDDMaps.org

Lake Ontario Fruit Growing Region - 2016

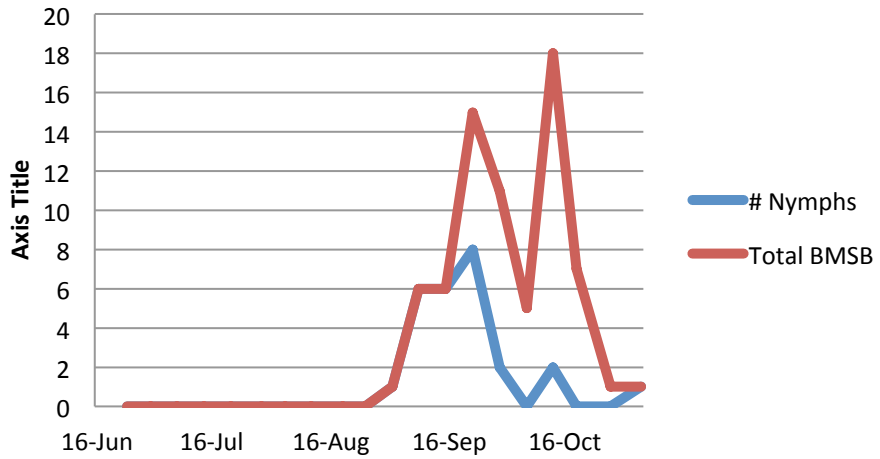
Albion.1, WNY (Orleans)



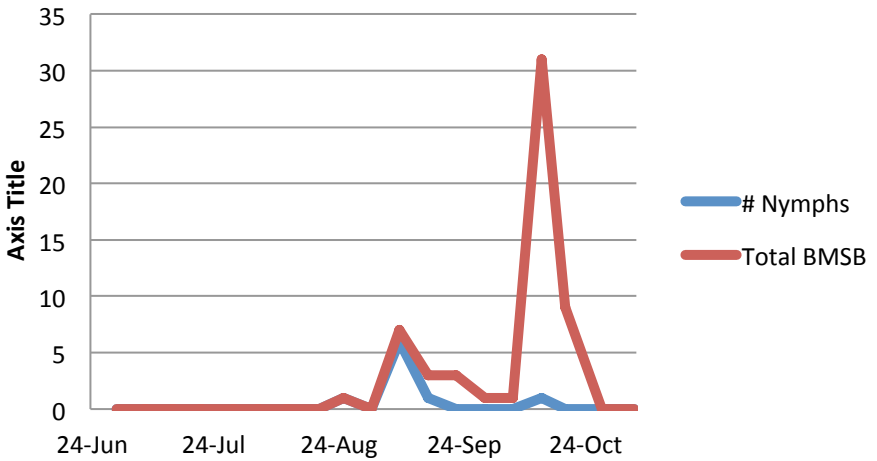
Lockport, WNY (Niagara)



Albion.2, WNY (Orleans)

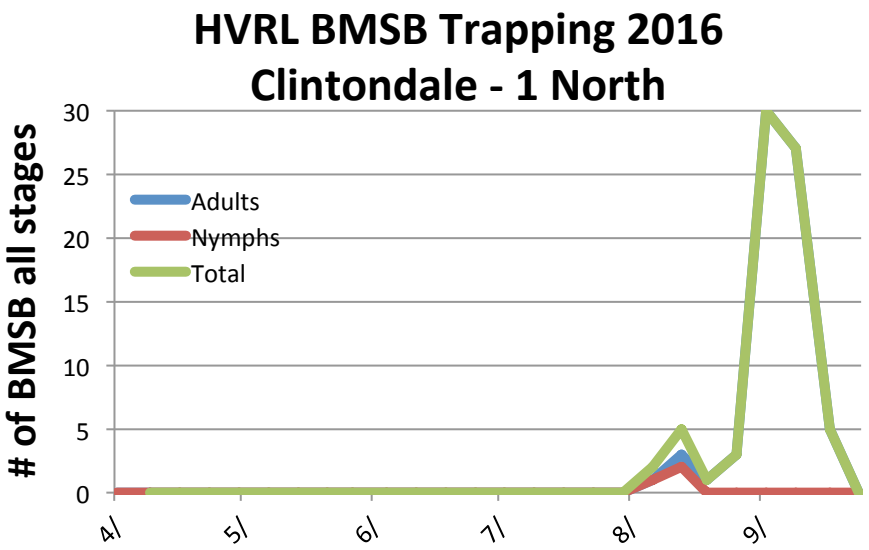


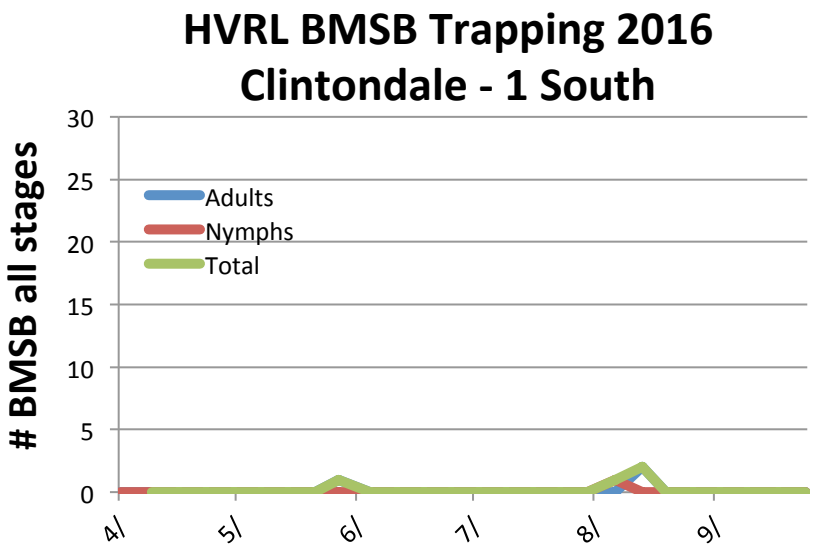
Brockport, WNY (Orleans)

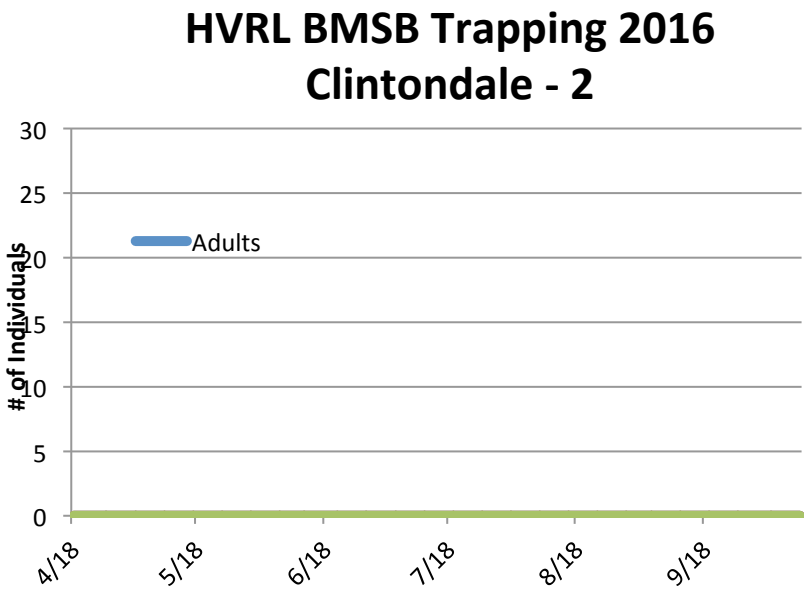


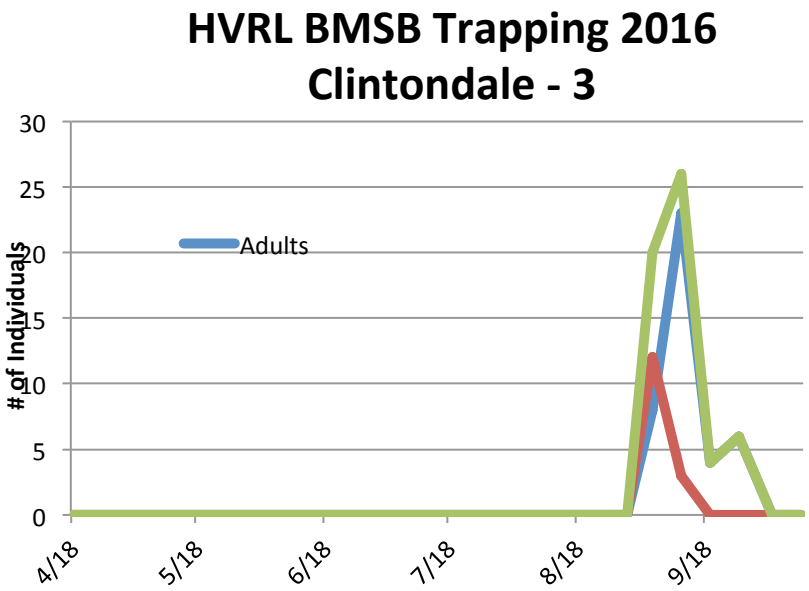
- Inceasing BMSB adult captures in WNY

Hudson Valley Fruit Growing Region - 2016

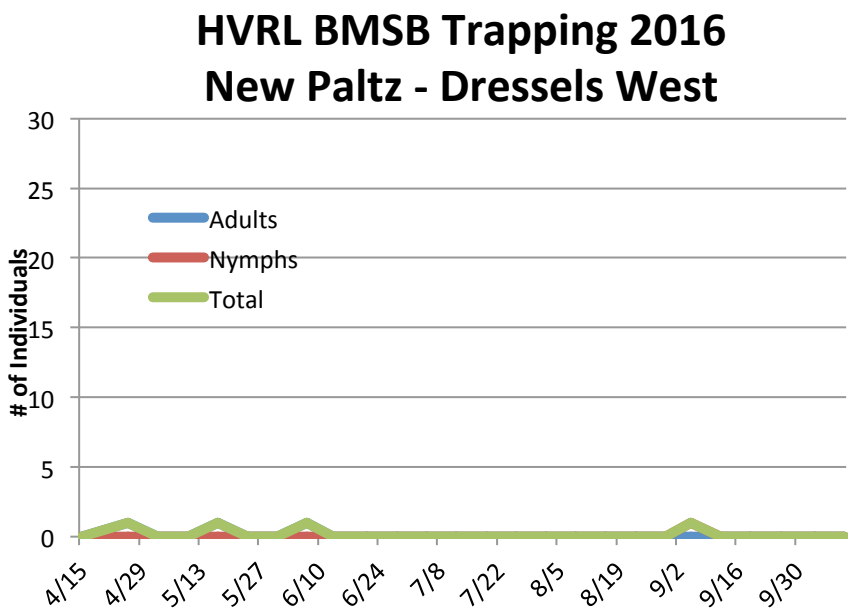


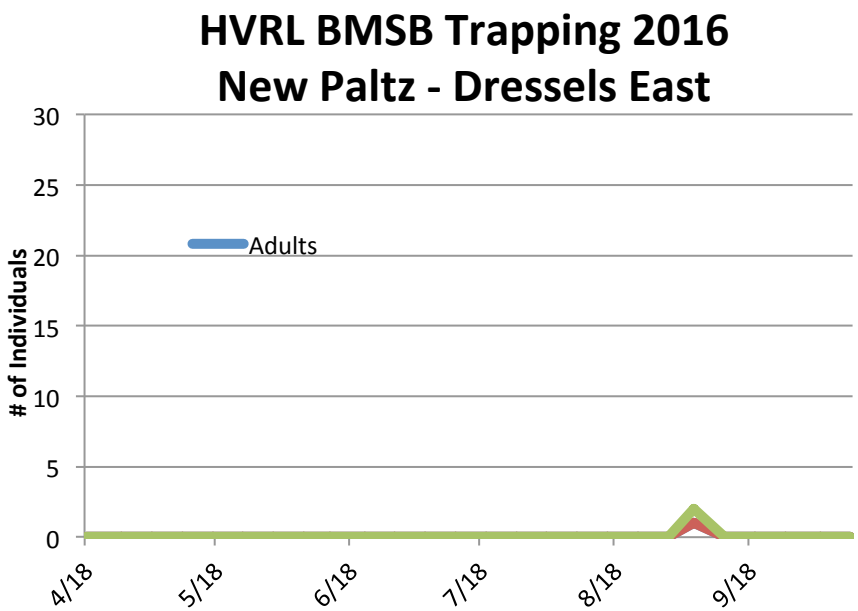


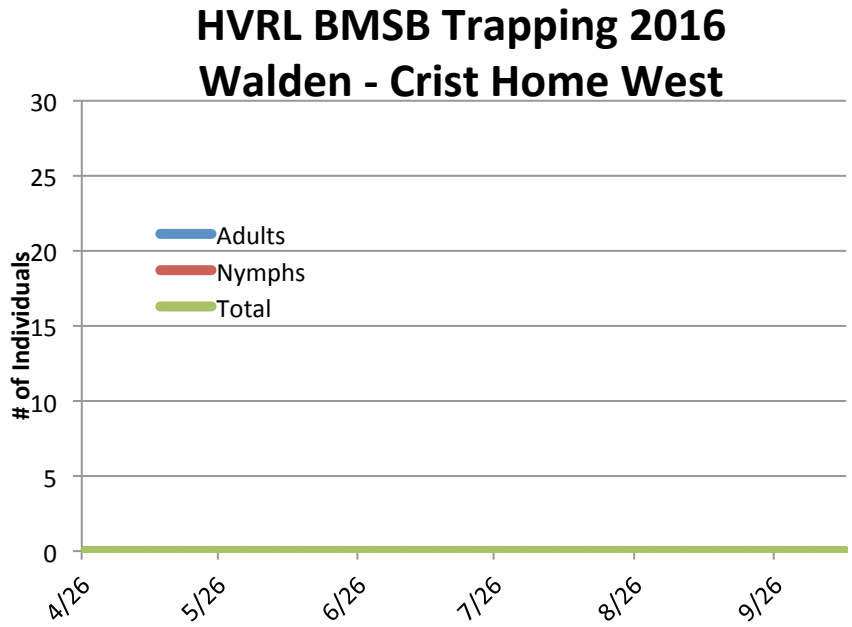


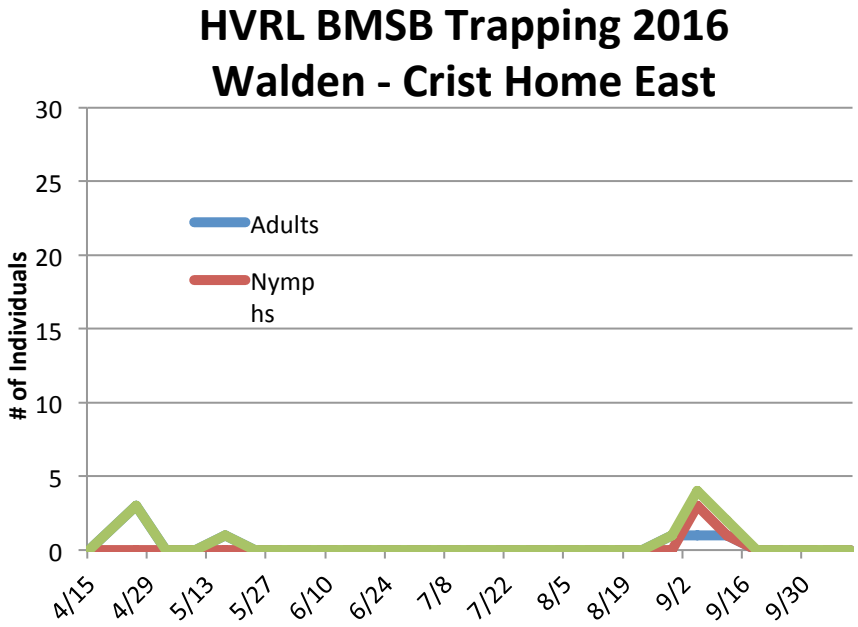


Lake Ontario Fruit Growing Region - 2016



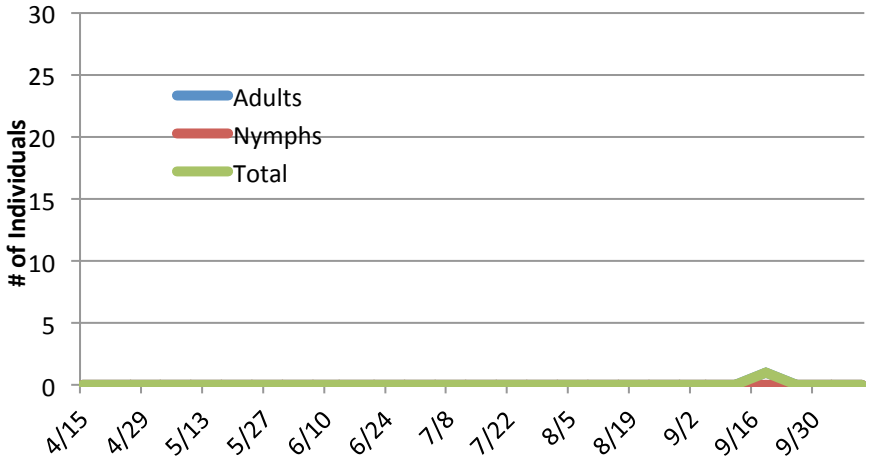




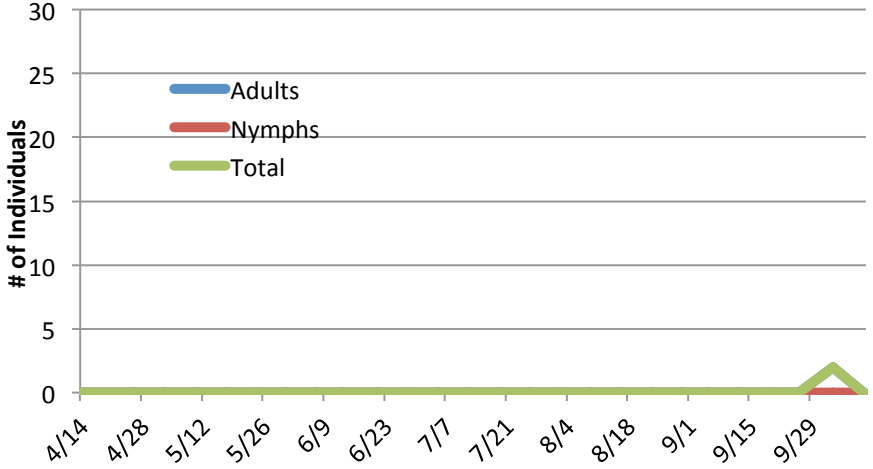


Mid-Hudson Valley Fruit Growing Region - 2016

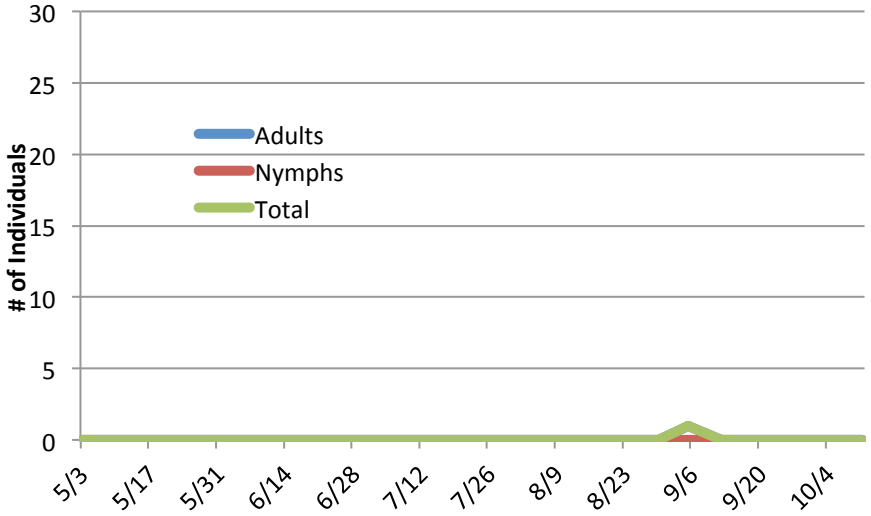
HVRL BMSB Trapping 2016
Milton, NY



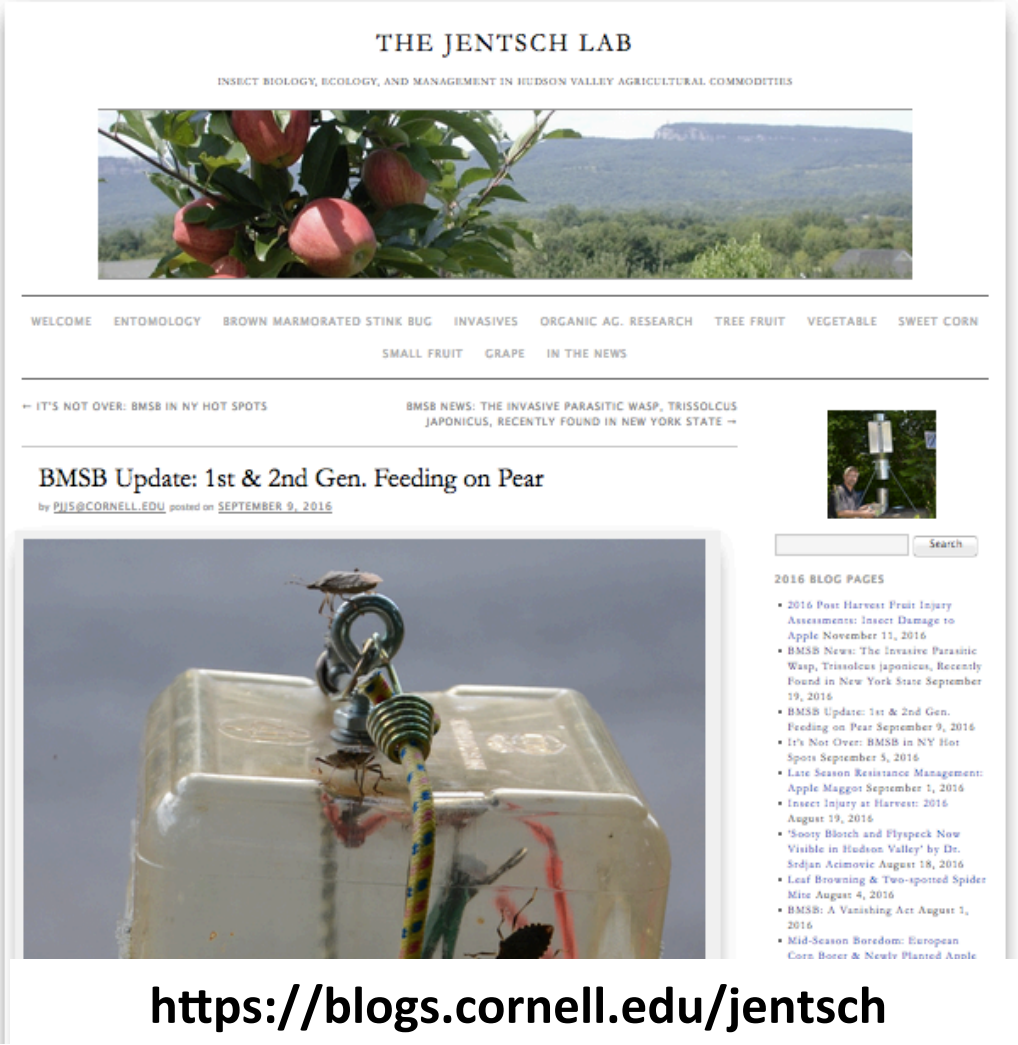
HVRL BMSB Trapping 2016
Campbell Hall, NY



HVRL BMSB Trapping 2016
East Poughkeepsie, NY



Seasonal Insect Information
Hudson Valley Research Lab / Jentsch Lab

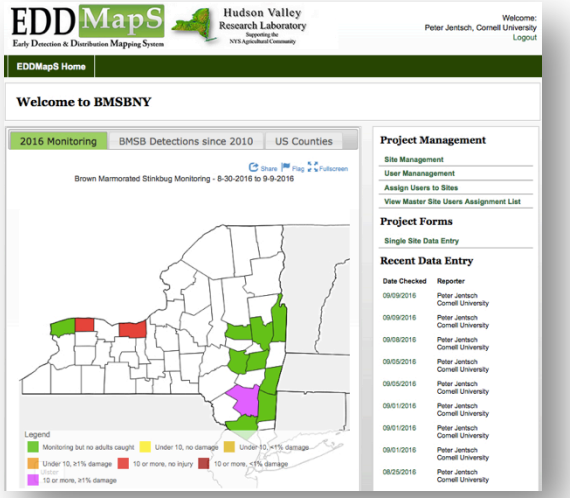


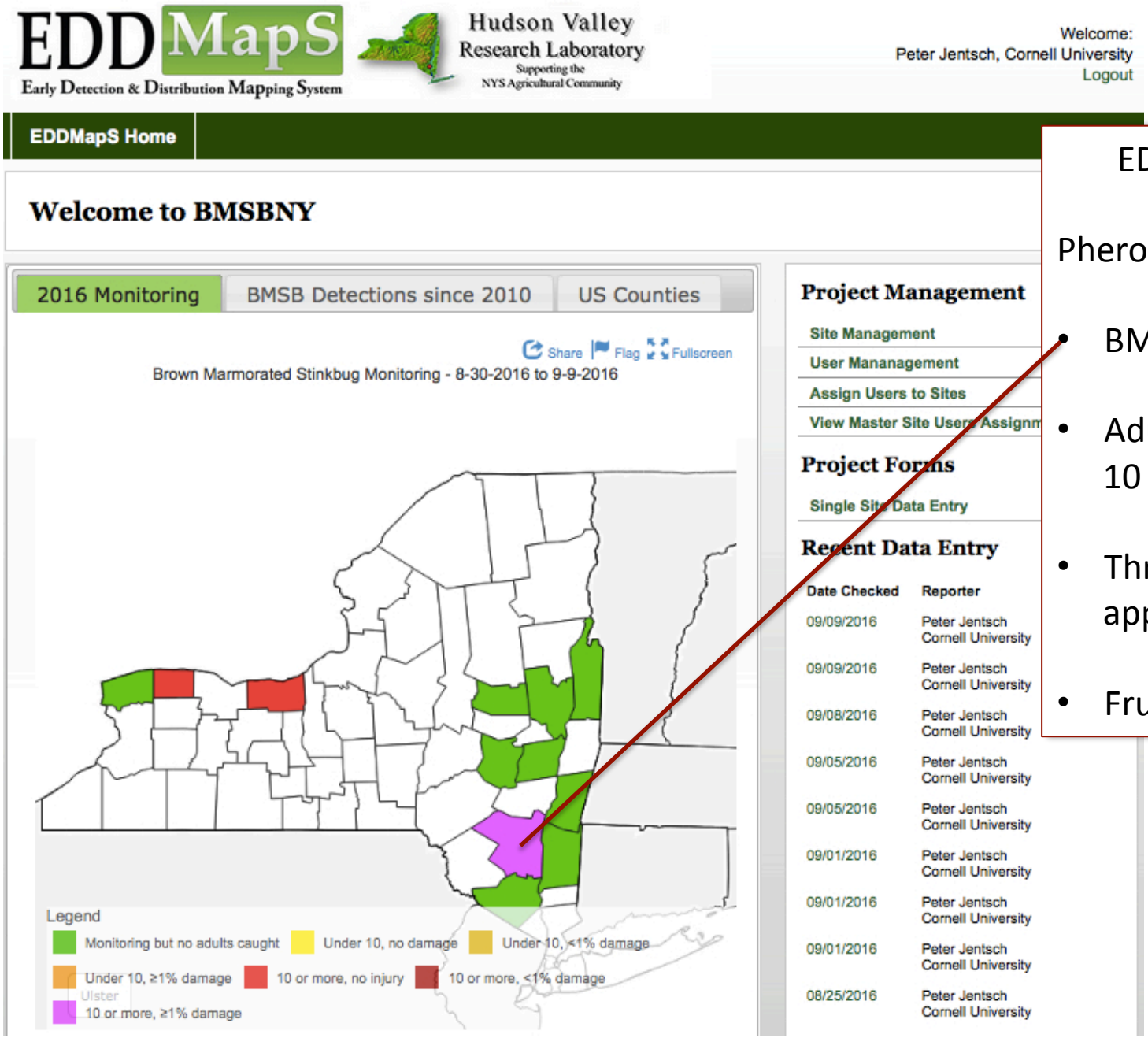
https://blogs.cornell.edu/jentsch

- Searchable via Google
- E.Mail Blog Subscription
- ENYCHP Newsletter

- On-Demand Access

http://www.eddmaps.org/bmsbny/



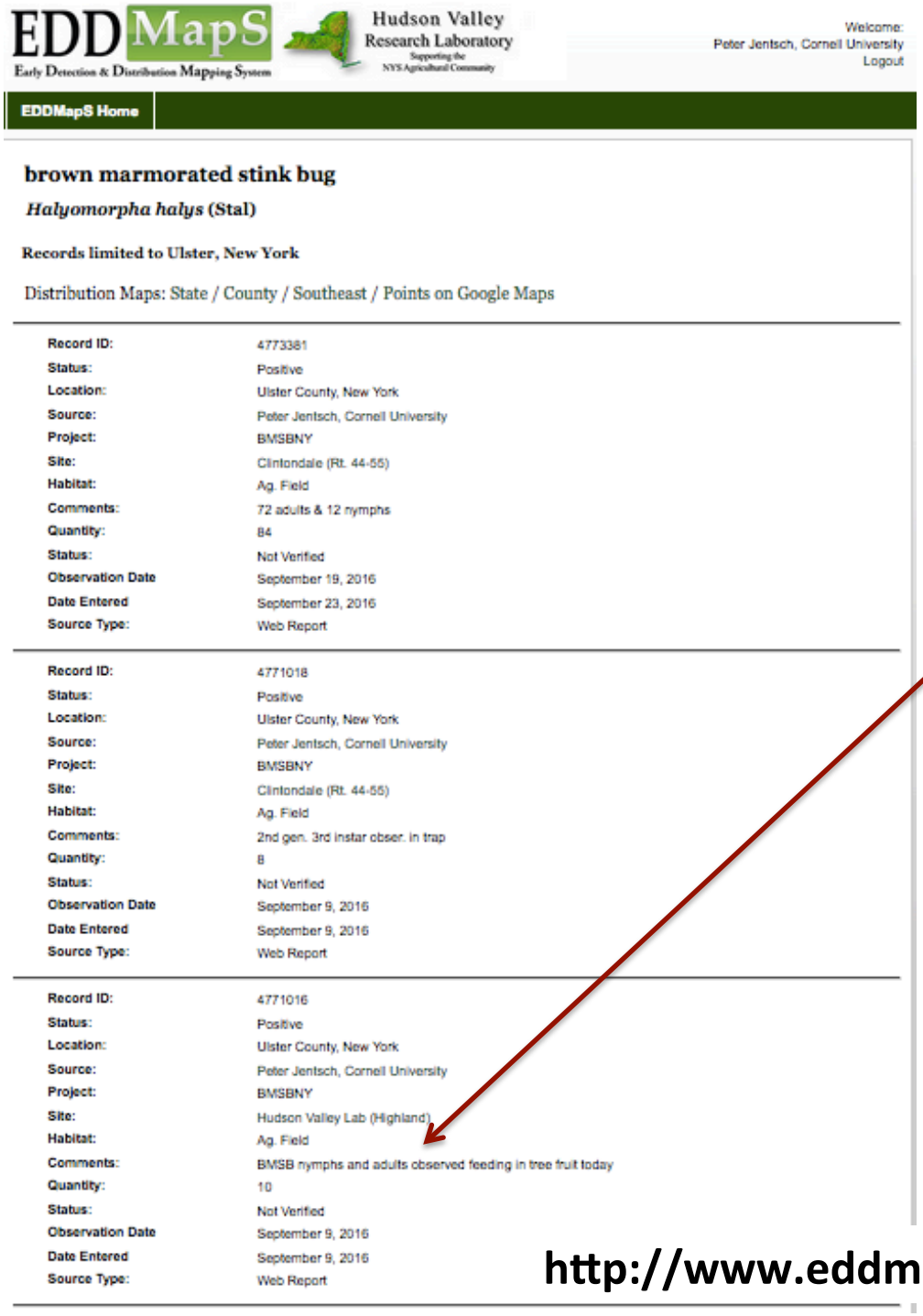


EDDMaps BMSB NY

Pheromone Trap Location

- BMSB County Presence
- Adult Threshold of 10 / trap
- Threshold to begin applications
- Fruit injury levels

http://www.eddmaps.org/bmsbny/



EDDMapS Early Detection & Distribution Mapping System
Hudson Valley Research Laboratory Supporting the NYS Agricultural Community
Welcome: Peter Jentsch, Cornell University Logout
EDDMapS Home

brown marmorated stink bug

***Halyomorpha halys* (Stal)**

Records limited to Ulster, New York

Distribution Maps: State / County / Southeast / Points on Google Maps

Record ID:	4773381
Status:	Positive
Location:	Ulster County, New York
Source:	Peter Jentsch, Cornell University
Project:	BMSBNY
Site:	Clintondale (Rt. 44-55)
Habitat:	Ag. Field
Comments:	72 adults & 12 nymphs
Quantity:	84
Status:	Not Verified
Observation Date	September 19, 2016
Date Entered	September 23, 2016
Source Type:	Web Report

Record ID:	4771018
Status:	Positive
Location:	Ulster County, New York
Source:	Peter Jentsch, Cornell University
Project:	BMSBNY
Site:	Clintondale (Rt. 44-55)
Habitat:	Ag. Field
Comments:	2nd gen. 3rd instar obser. in trap
Quantity:	8
Status:	Not Verified
Observation Date	September 9, 2016
Date Entered	September 9, 2016
Source Type:	Web Report

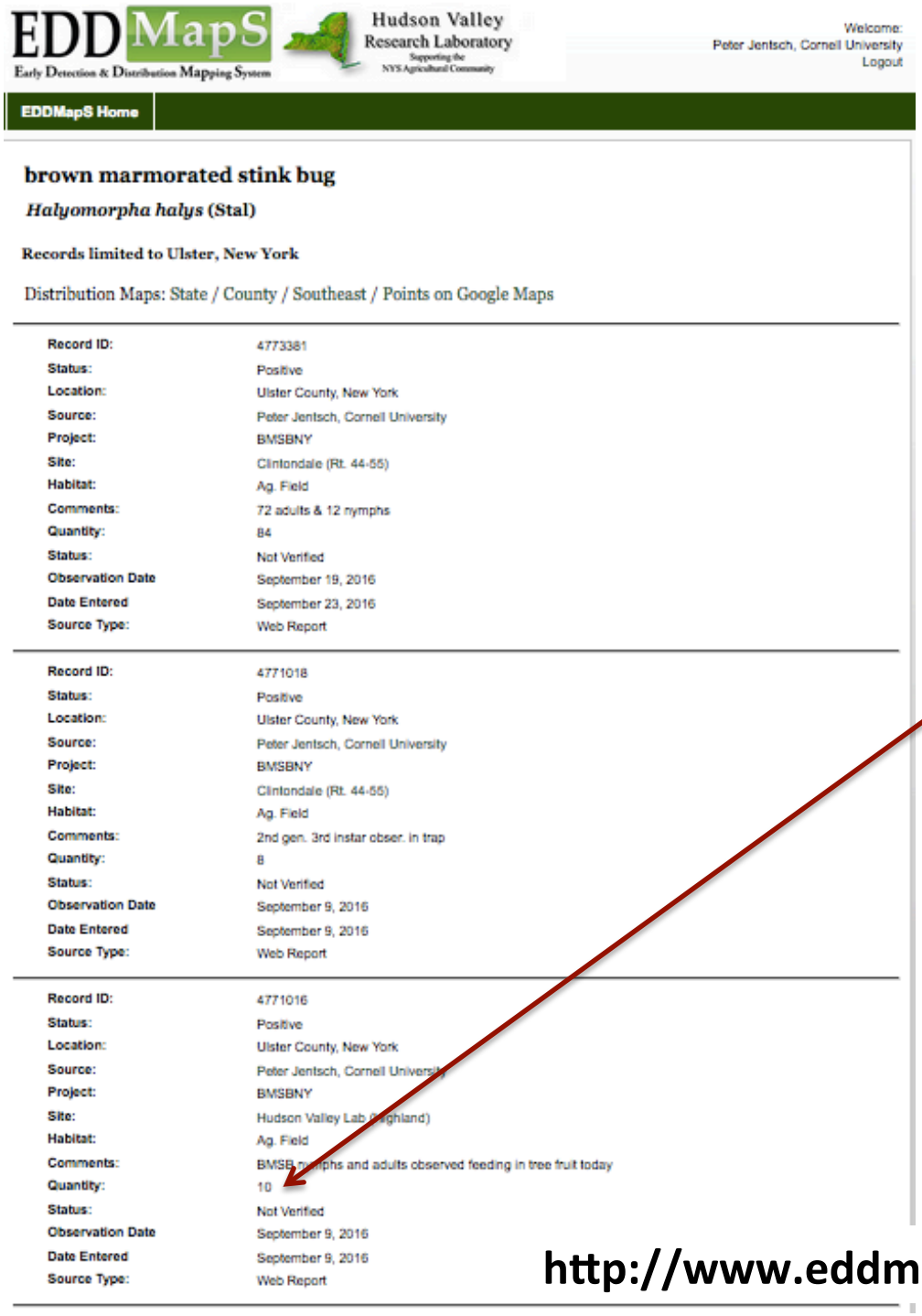
Record ID:	4771016
Status:	Positive
Location:	Ulster County, New York
Source:	Peter Jentsch, Cornell University
Project:	BMSBNY
Site:	Hudson Valley Lab (Highland)
Habitat:	Ag. Field
Comments:	BMSB nymphs and adults observed feeding in tree fruit today
Quantity:	10
Status:	Not Verified
Observation Date	September 9, 2016
Date Entered	September 9, 2016
Source Type:	Web Report

EDDMaps BMSB NY

Pheromone Trap Location

- BMSB County Presence
- Adult Threshold of 10 / trap
- Threshold to begin applications
- Fruit injury levels

http://www.eddmaps.org/bmsbny/



EDDMaps BMSB NY

Pheromone Trap Location

- BMSB County Presence
- Adult Threshold of 10 / trap
- Threshold to begin applications
- Fruit injury levels

http://www.eddmaps.org/bmsbny/

Biological Control of the Brown Marmorated Stink Bug in New York State

2 mm

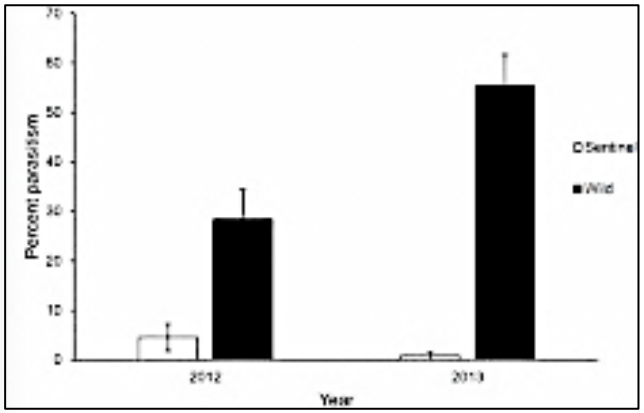
Trissolcus japonicus

Sentinel eggs underestimate rates of parasitism of the exotic brown marmorated stink bug, *Halyomorpha halys*

Biological Control; Volume 78, November 2014, Pages 61–66
Ashley L. Jones, David E. Jennings, Cerruti R.R. Hooks, Paula M. Shrewsbury,
Department of Entomology, U. of Maryland, College Park, MD 20742, USA

- Compared parasitism of wild (field-laid) and sentinel (laboratory-laid) eggs.
- Wild egg masses had higher parasitism, parasitoid abundance and species richness.
- *Anastatus reduvii* was the most common parasitoid species overall.
- Sentinel egg masses underestimate parasitoid communities and impact.
- Wild egg masses should be used for estimating biological control impacts.


Anastatus reduvii



Seasonal Insect Information
Hudson Valley Research Lab / Jentsch Lab

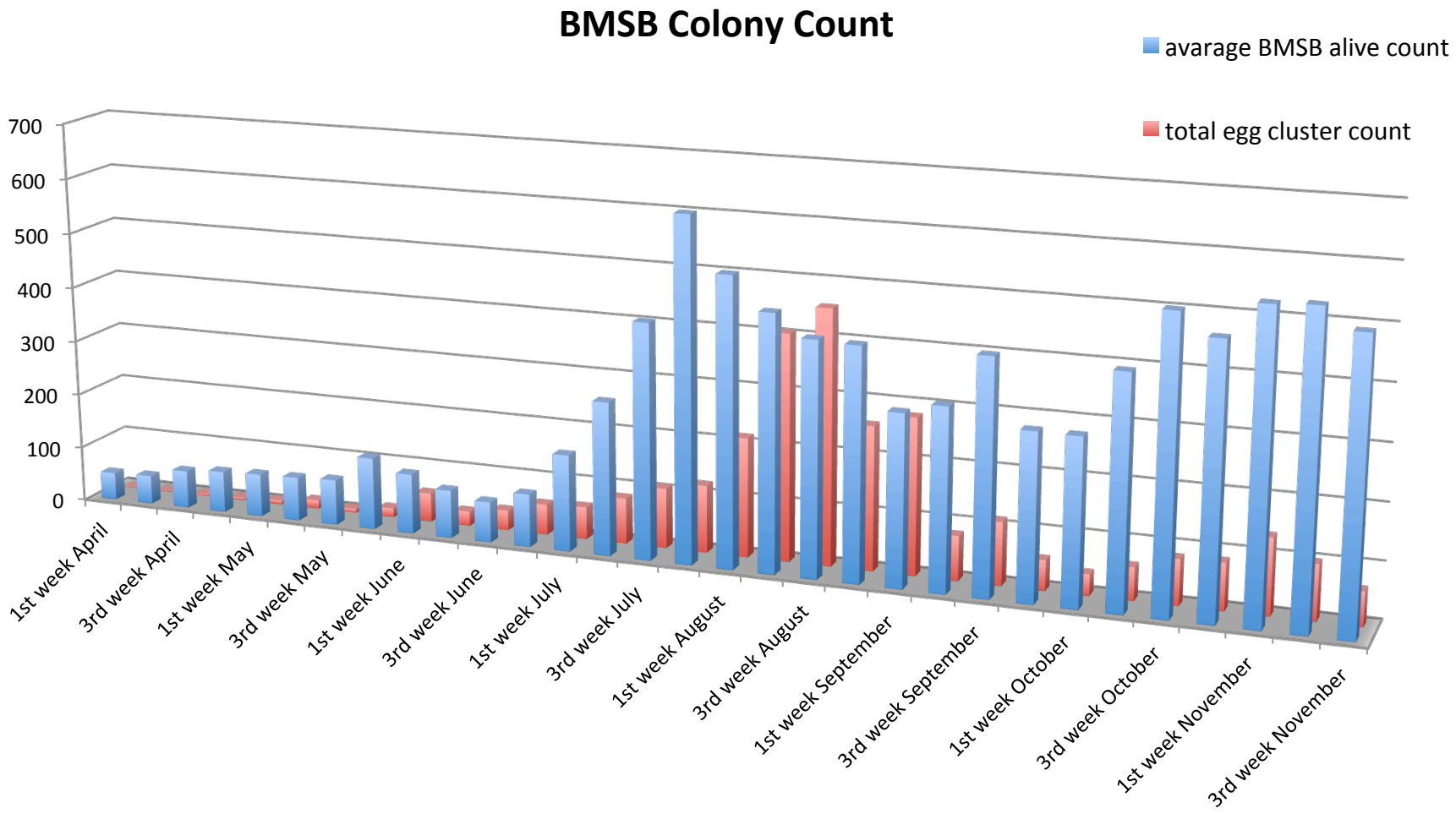
Develop BMSB Colonies for Sentinel Egg Survey's

- Greenhouse Jalapeno Pepper

Develop BMSB Colonies for Sentinel Egg Survey's

- Greenhouse Jalapeno Pepper
- BMSB colony for egg laying onto pepper leaves
- BMSB eggs on pepper foliage in -80C freezer,

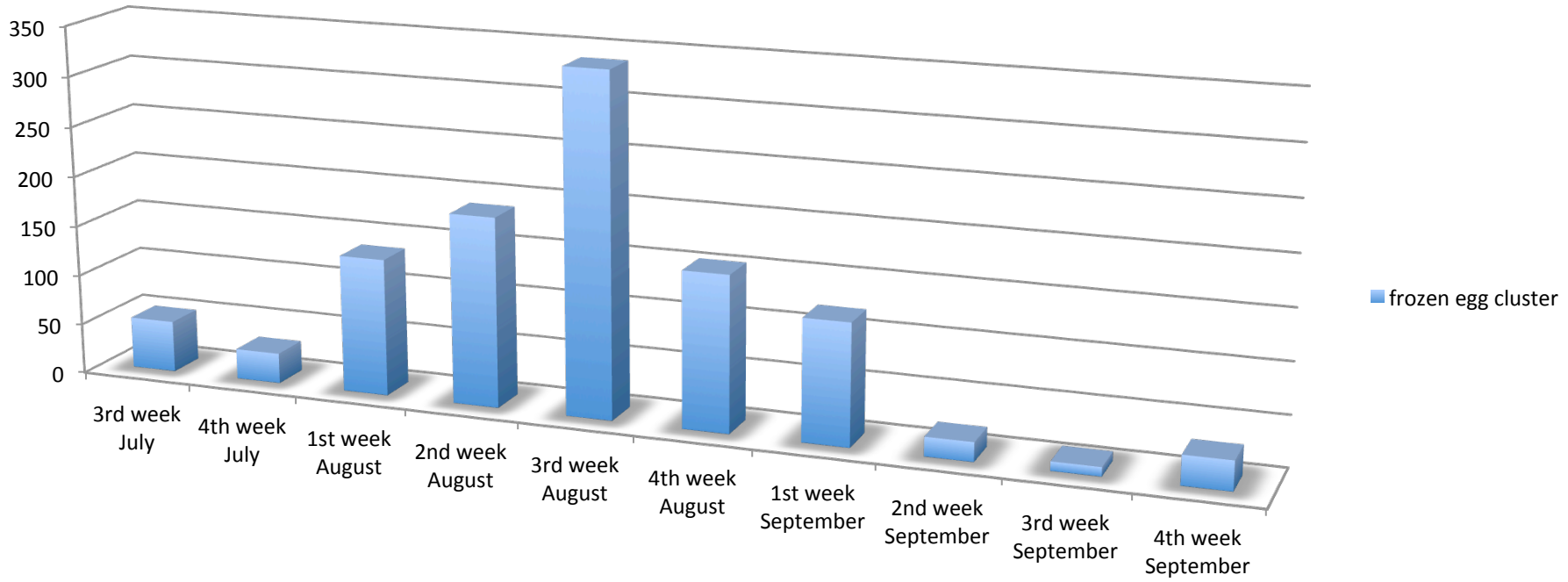
Brown Marmorated Stink Bug Colony in 2016



By 15th July >2000 BMSB throughout the remainder of the season

Brown Marmorated Stink Bug Colony in 2016

Frozen Egg Cluster Count



975 egg clusters
27,300 eggs in total

BMSB Sentinel Egg Mass Survey in NY State

Developing BMSB Colonies for Sentinel Survey's

- Storing and placing eggs weekly into the field
  - 1 orchard & 1 organic vegetable farm
  - 4 sites / orchard (8 clusters/wk).
  - July 15th - October 15th (12 weeks).
  - Field placement of 6048 eggs.

BMSB Sentinel Egg Mass Survey in NY State

BMSB Sentinel Egg Mass Survey in NY State

BMSB healthy egg cluster

Parasitism of egg

Predatory SB feeding

Predatory chewing

- Eggs were placed into the field for 3 days
- Placed into humidified petri dishes for 3-4 weeks and assessed for parasite emergence
- Specimens were keyed out to Trissolcus sp. And submitted to Elijah Talamas for species confirmation.

Marlboro, NY

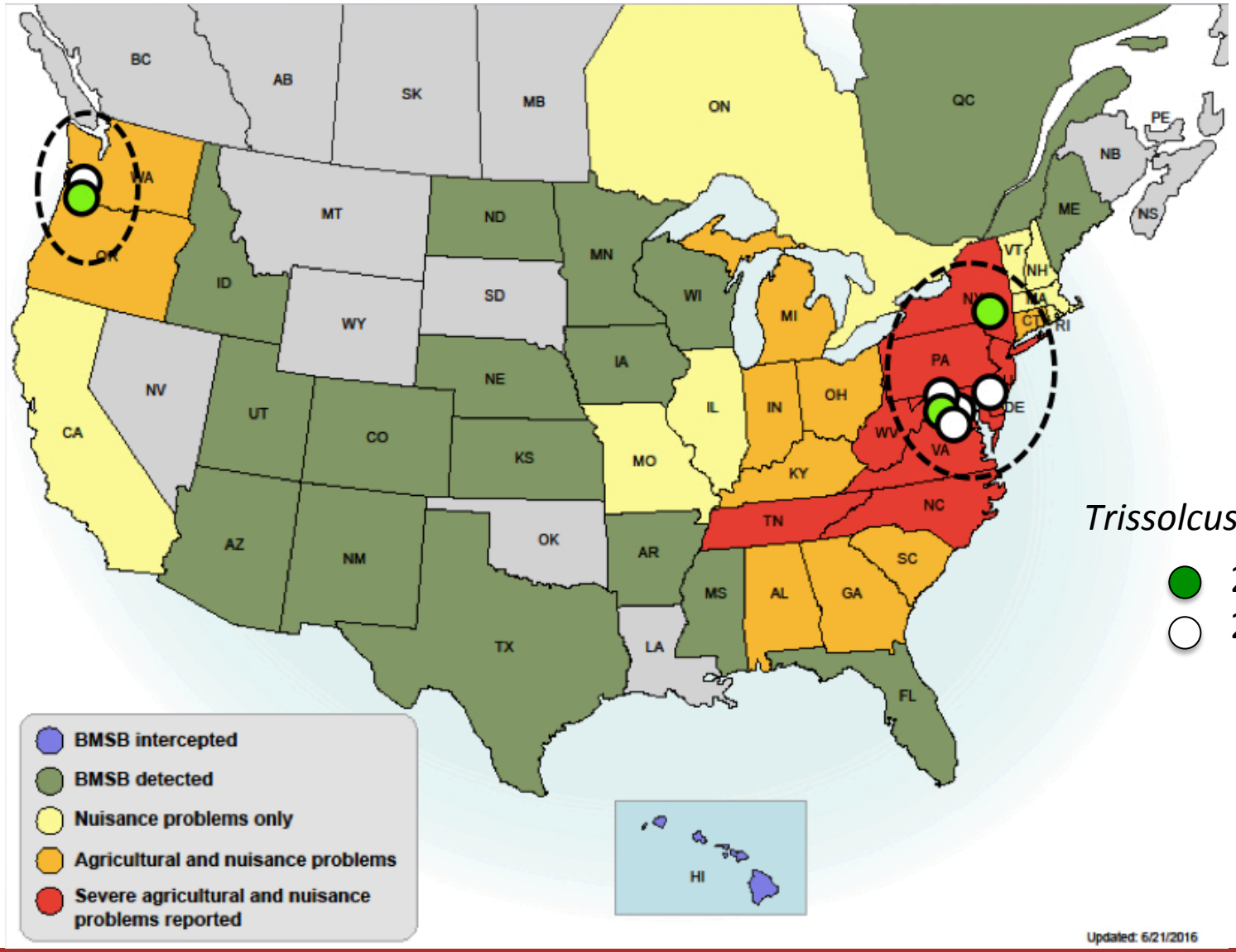
Date Deployed	Date Recovered	Total clusters/ week	Total eggs/ week	Total eggs since 22 July
22-Jul	25-Jul	24	672	6048
29-Jul	1-Aug			
5-Aug	8-Aug			
12-Aug	15-Aug			
19-Aug	22-Aug			
26-Aug	29-Aug			
2-Sep	6-Sep			
9-Sep	12-Sep			
16-Sep	19-Sep			

Warwick, NY

Site	GPS Coordinates	Elevation (M)	# Clusters/ site
Hepworth 1	N 41.640849, E -73.959207	62	3
Hepworth 2	N 41.640129, E -73.959635	70	3
Hepworth 3	N 41.638144, E -73.963799	38	3
Hepworth 4	N 41.634916, E -73.966771	87	3
Pennings 1	N 41.229827, E -74.385778	229	3
Pennings 2	N 41.230342, E -74.386460	207	3
Pennings 3	N 41.232101, E -74.386814	194	3
Pennings 4	N 41.233821, E -74.386843	174	3

Emergence Dates	Site	GPS	Parasites emerged from eggs		
8-Sep	Hepworth 3	N 41.638144, E -73.963799	17	85%	100% T. japonicus
9-Sep	Hepworth 4	N 41.634916, E -73.966771	4	80%	100% T. japonicus

BMSB Sentinel Egg Mass Survey in NY State



Trissolcus japonicus

- 2015
- 2016

2017 Biological Control Objectives

ARDP Project: Rearing and disseminating

***Trissolcus japonicus* in the NYS.**

*** Finding the presence of *Trissolcus japonicus in the Hudson Valley*** sets a precident for distribution in NYS.

1. **Monitor** for *Trissolcus japonicus* in the major apple growing regions of the state. Send specimens to USDA for confirmation.
2. **Release** *Trissolcus japonicus* along the edges of orchards in the three major New York apple growing regions where BMSB has caused frut injury.
3. **Monitor** for *Trissolcus japonicus* in apple orchard sites in which the parasitoid was released, sending specimens to USDA for confirmation.
4. **Assess fruit injury** from BMSB

Dogwood Borer Management in the Hudson Valley of New York State

Adult

Larva

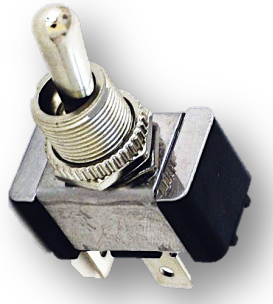
Burr Knots 0n M_9

DWB Management 2016

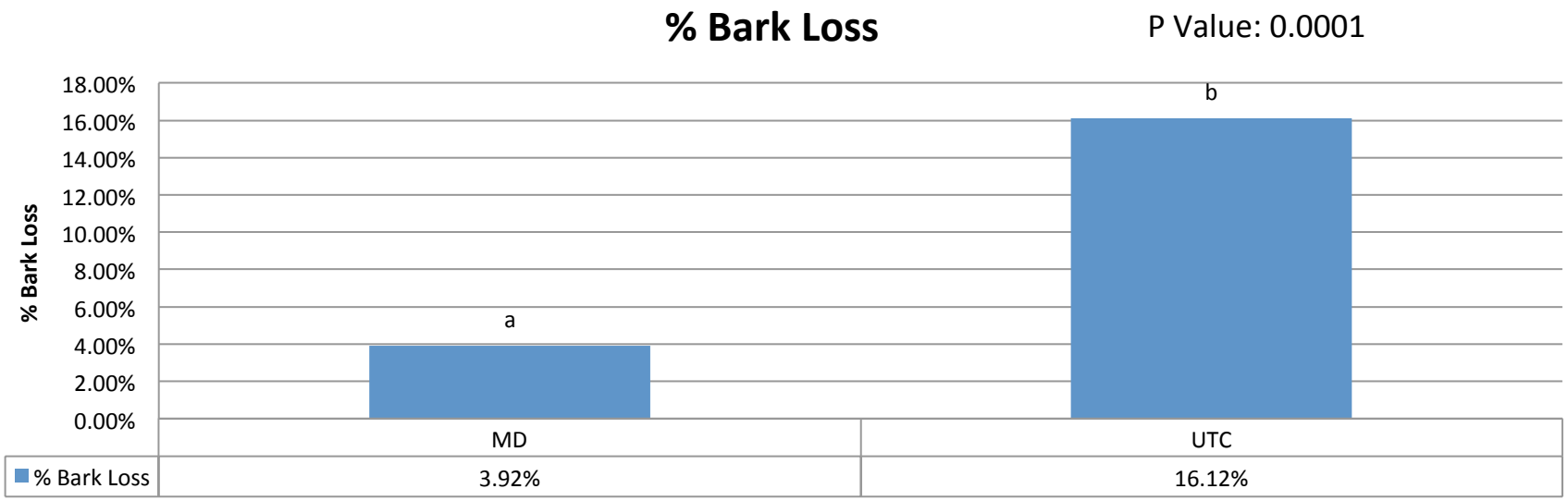
DWB Management 2016

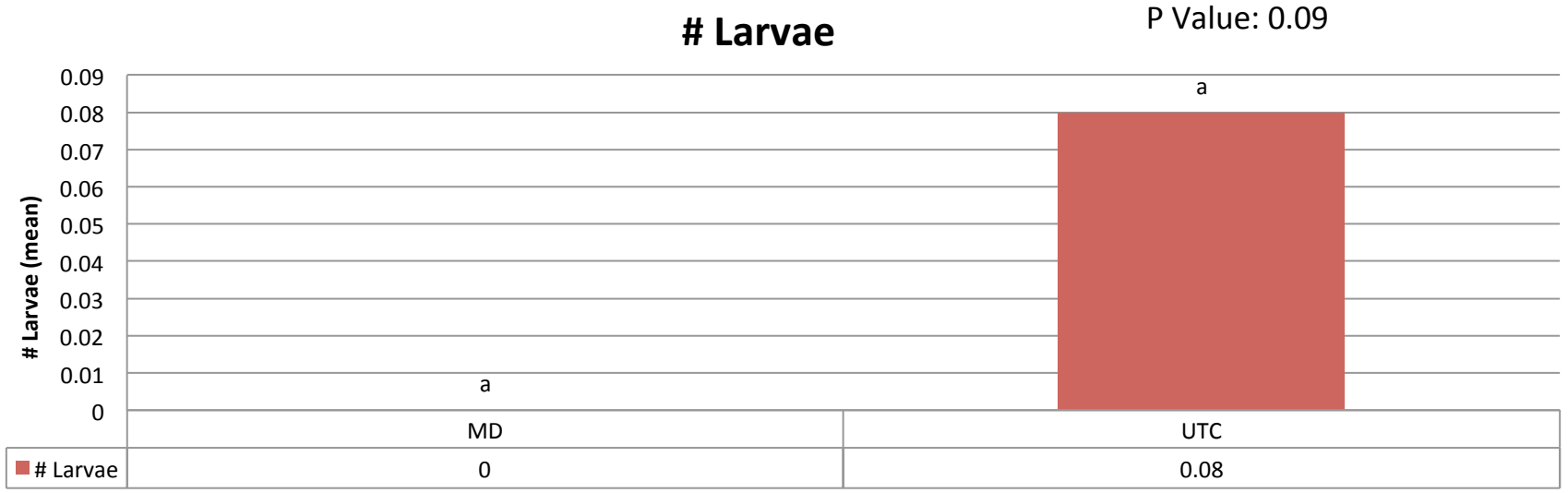
Phil Brown Sprayer

- Well built, very effective in clean orchards, covers 70% of trunk.
- 'Eye' use: 20-40%% loss of accuracy in low limb and standing weeds
- Install over-ride 'spring toggle' increases appl. efficiency
  - Allows for full on **or** micro-application to each tree
  - 60-70% material savings with toggle switch vs 'on'.
  - **Operator FOCUS**

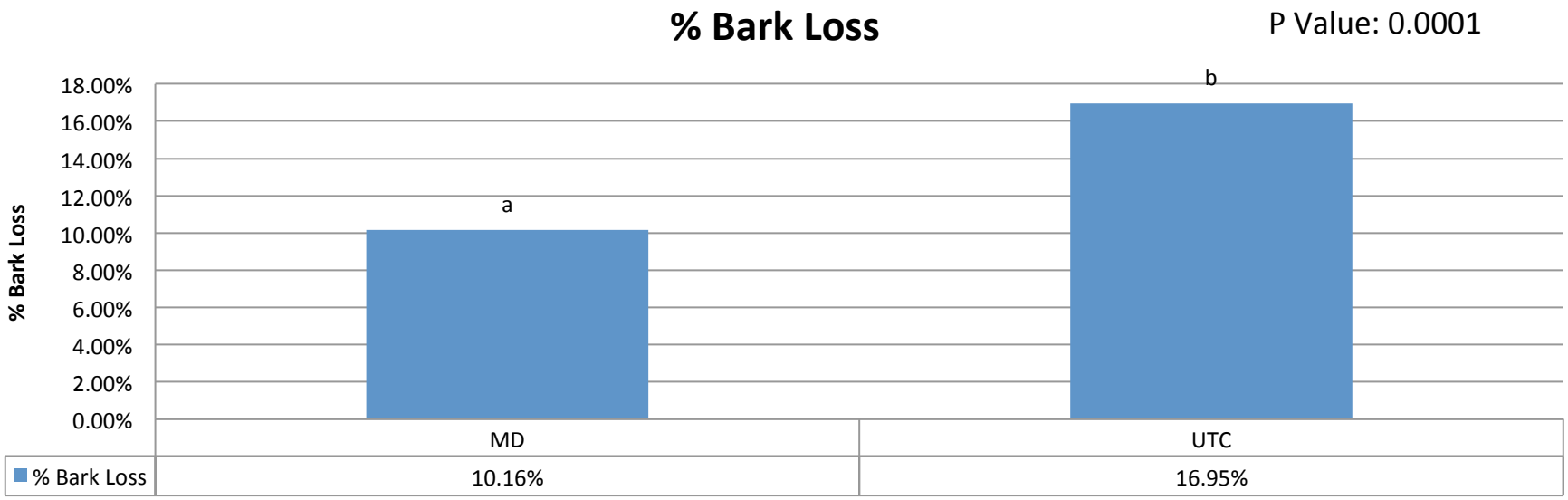


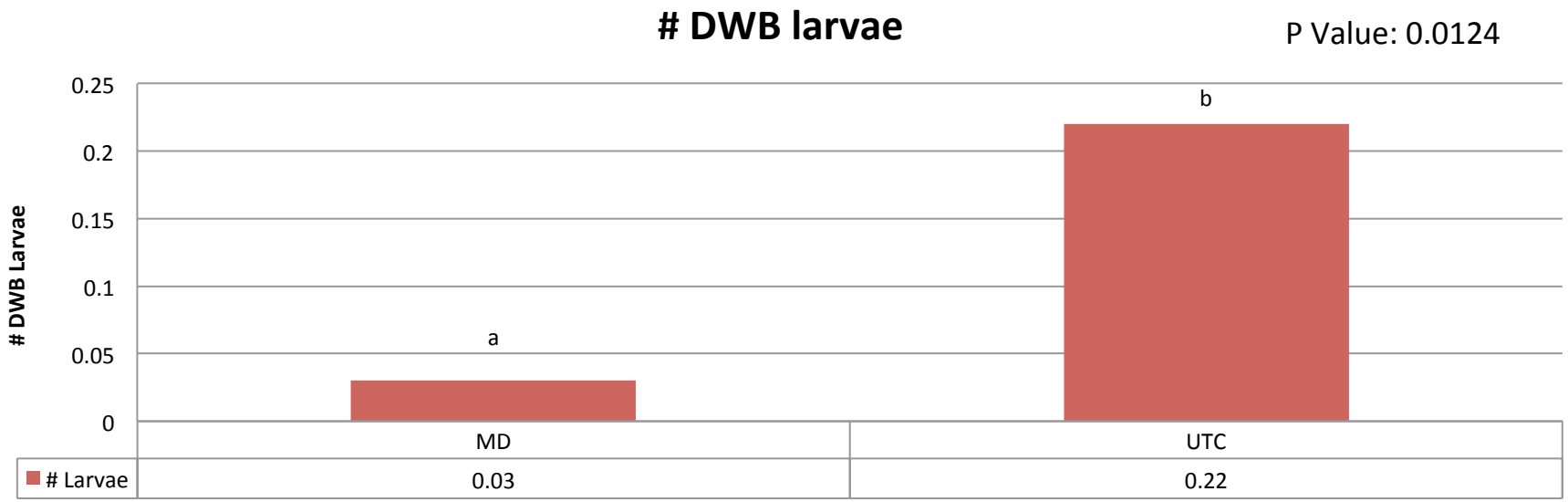
10A MD only; Ulster Park, NY



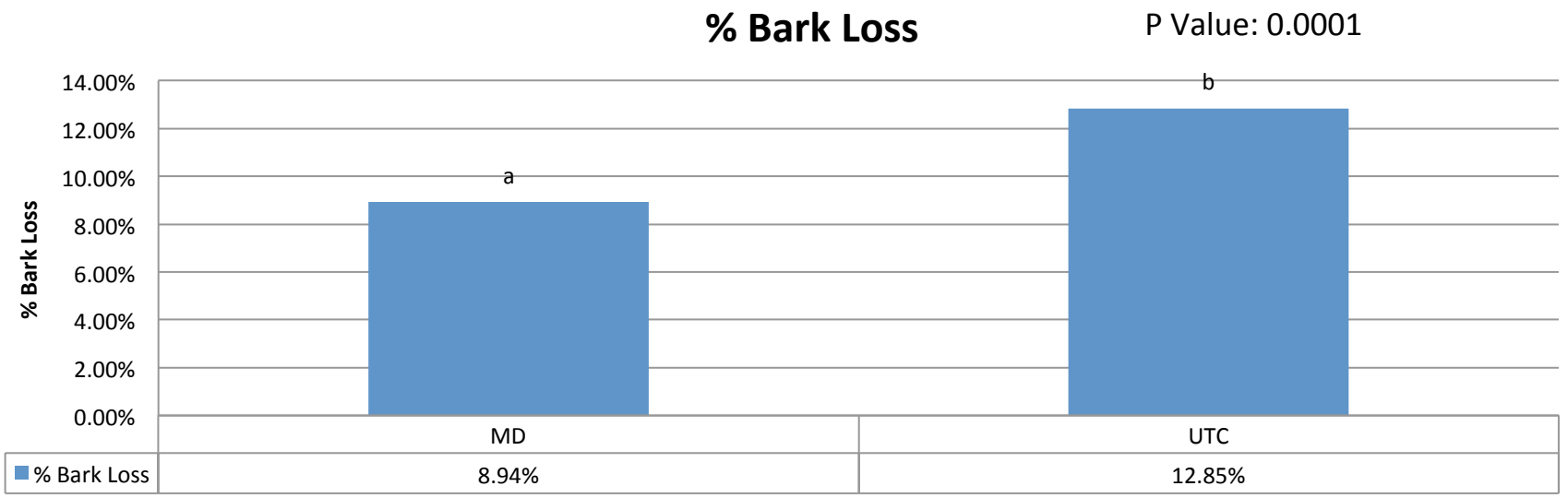


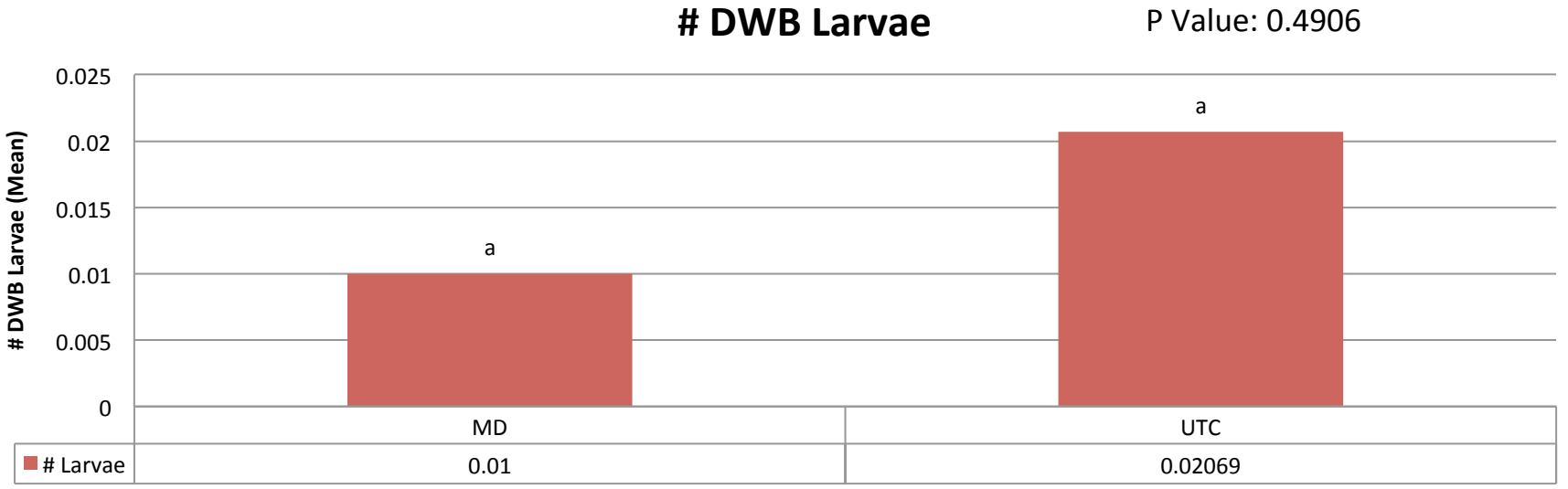
10A MD only; Marlboro, NY



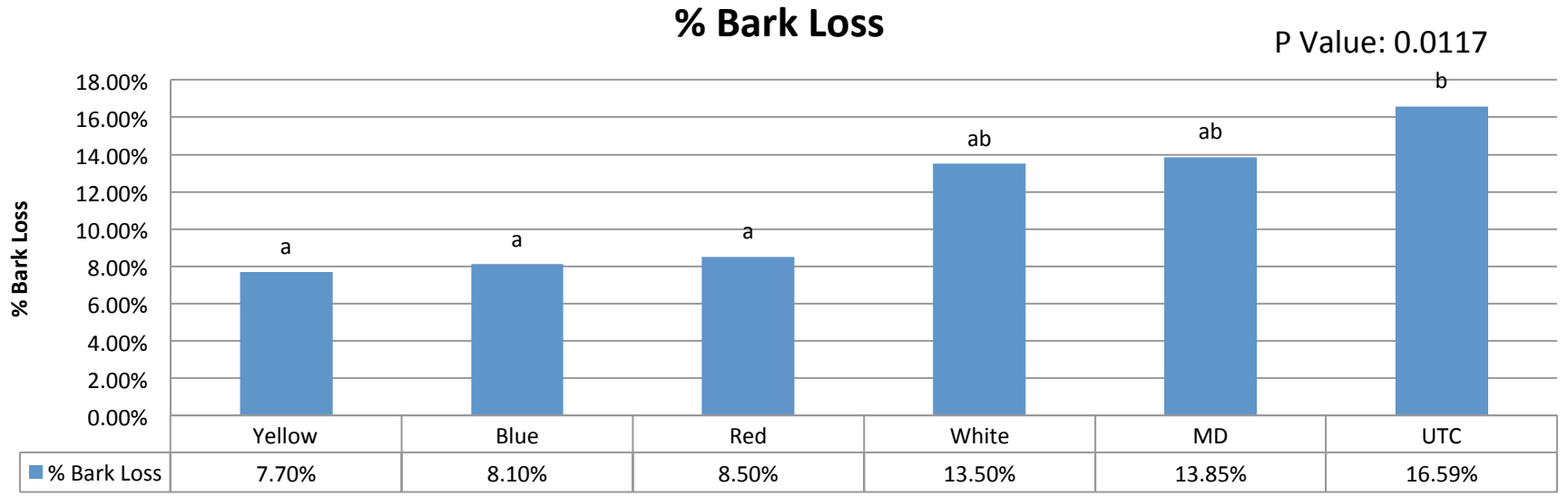


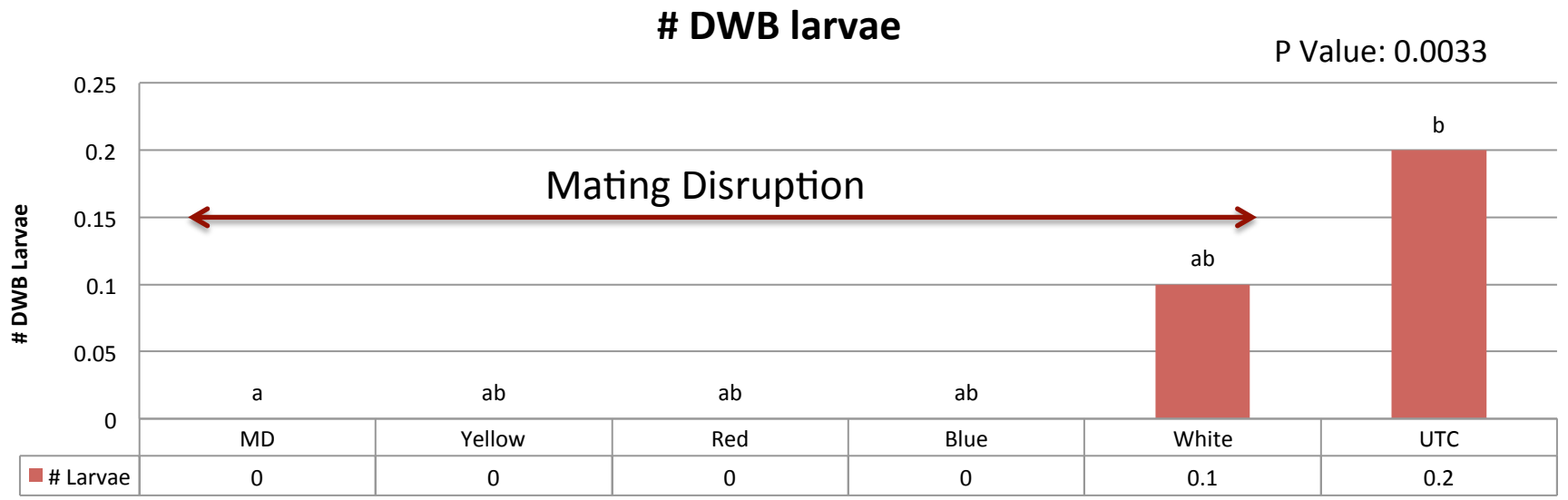
5A MD only; Marlboro, NY





5A MD + Trmts; Marlboro, NY

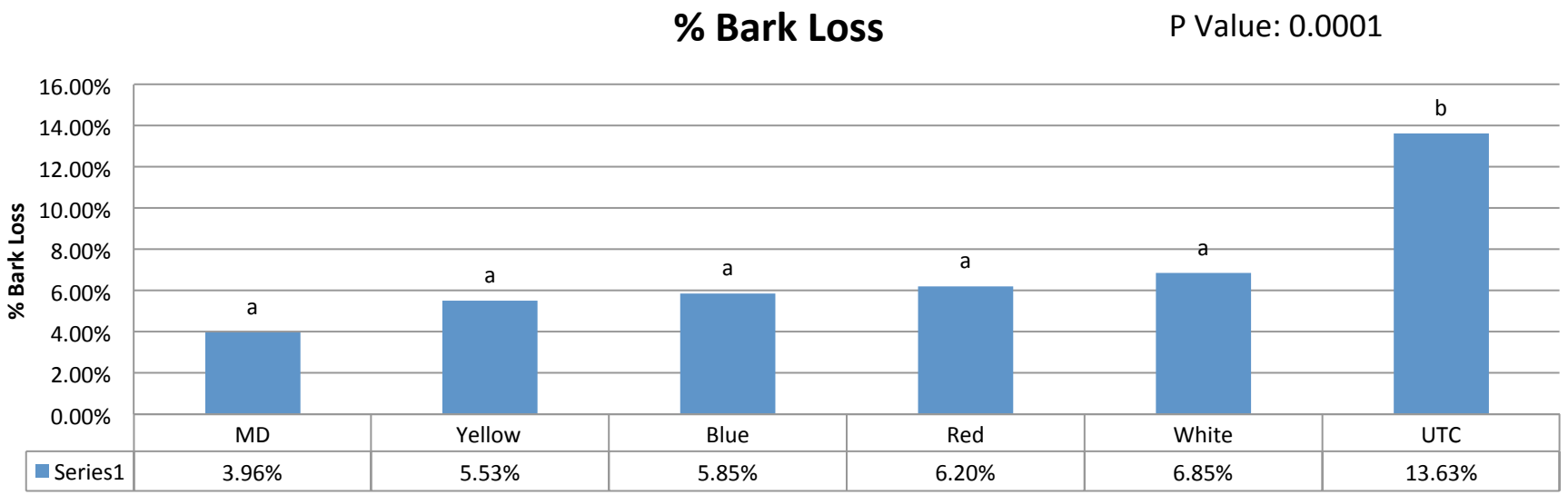


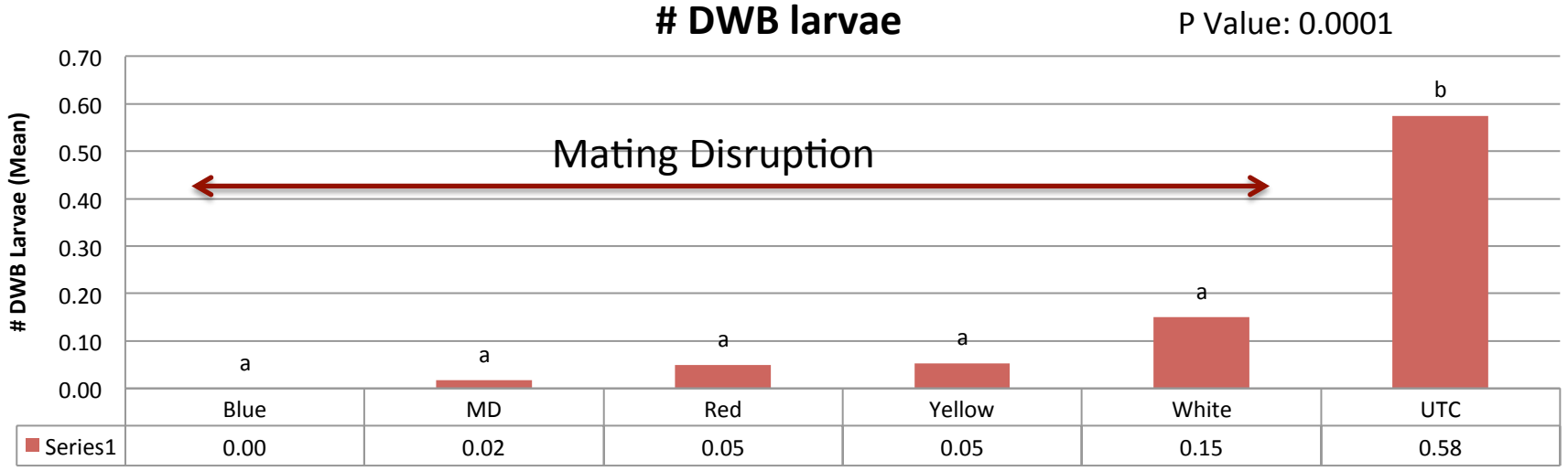


Yell

Red = Lorsban 4E Spring; Yellow = Lorsban 4E Fall; ; Blue = Assail 30WDG Spring
White = Untreated; MD = Center of MD Block; UTC = Edge Untreated Rows / No MD

Trmts alone vs MD; Peru, NY





Red = Lorsban 4E Spring; Blue = Assail 30WDG Spring ; Yellow = Delegate Spring ; White = Untreated
MD = MD Alone; UTC = Untreated block

DWB Management 2016

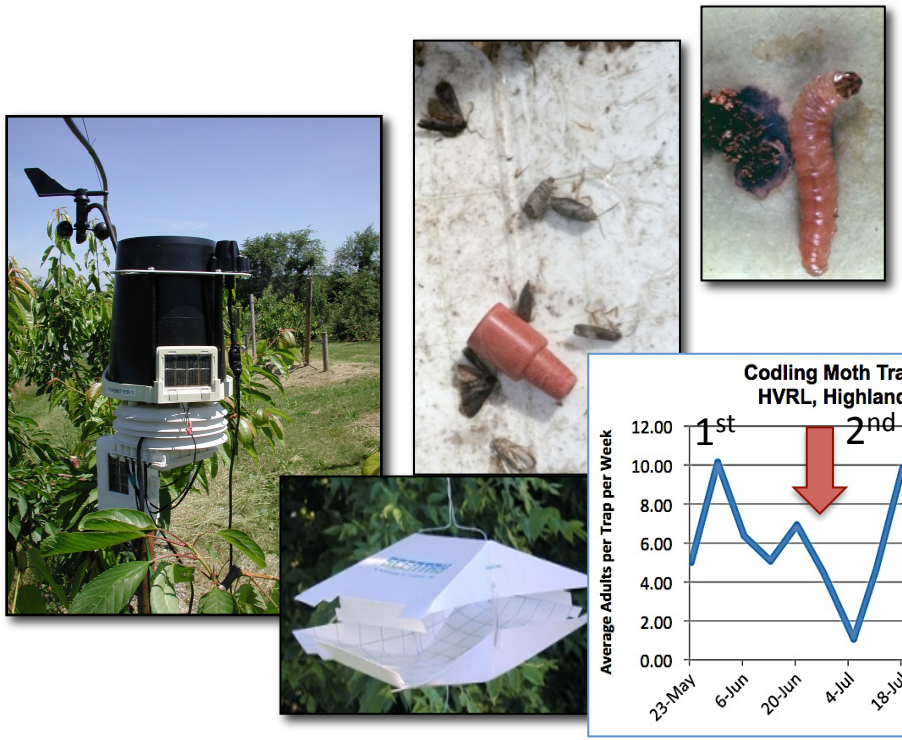
Mating disruption:

Eestimated costs of applying chlorpyrifos (Lorsban 4E) based on a plant density of 800 trees per acre, $8 per hour for labor and a price of $30 per gallon for Lorsban 4E, at approximately **$25 per acre**.

Treatment with Isomate-DWB dispensers at a rate of 150 per acre the first season, followed by 100 per acre thereafter, using the same labor rate, costs approximately **$63.60 per acre** for the first season and **$42.40 per acre** in subsequent seasons.

Year 1: 60% increase cost; may require application under high DWB
Year 2: 41% increase cost; no application needed
Year 3: May not need MD or application

Monitoring, Modeling and Managing the Lepidopteran Complex in Apple: How Complex Is It ?



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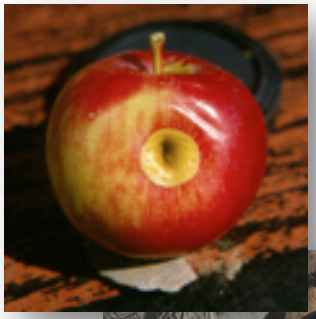
Hudson Valley Lepidopteran Pest Complex

Leafroller:

Obliquebanded leafroller, *Choristaneura rosaceana* (Harris)

Redbanded leafroller, *Argyrotaenia velutinana* (Walker)



Early-Season
Leafroller Injury

Internal Lepidopteran:

Codling moth

Oriental fruit moth

Lesser apple worm

Early & Late Codling Moth Injury

Late-Season
Leafroller Injury

Obliquebanded Leafroller Management

Obliquebanded Leafroller (OBLR) A native of North America. Larvae feed on a wide range of Rosaceae, including apple, peach, and pear.

- 2 generations each season in NY.
- Female lay single clusters containing ≥200 eggs on the upper leaf surface, hatching in 10-12 days.
- Larva live and feed within curled and webbed foliage, feed only on the fruit surface, webbing leaves to clustered fruit for protection.
- Mature larvae reach 1 inch in length
- Monitor adult flight using *pheromone trapping*.

At sustained flight of CM adults (Biofix), larval emergence is predicted after **220 DD_{50}** have been accumulated.

Codling Moth Management

Codling moth (CM) A European invasive pest

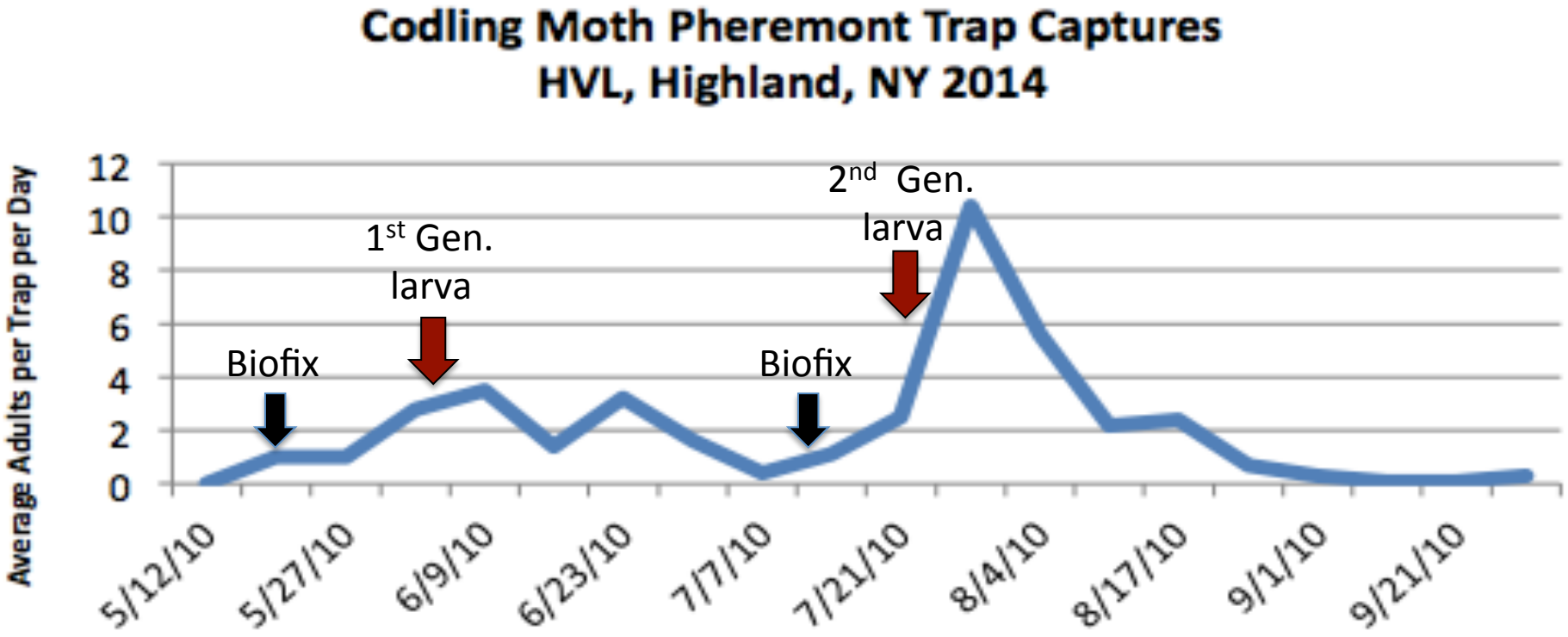
- Broad plant host range including tree fruit.
- Having 1.5 to 3.5 generations each season in NY.
- Female lay single eggs on fruit or foliage.
- Larva will remove the skin of fruit without ingestion, burrowing into the fruit to **feed on seeds.**
- Monitor adult flight using *pheromone trapping*.

- Upon the first sustained flight of CM adults (Biofix), larval emergence is predicted using 50^{o}F developmental base temperature accumulations at **220 DD_{50}**.

Codling Moth Management

- In 2014, the 1st generation **codling moth** (CM) adult flight occurred on 18 May. Larval emergence predicted for **4 June** using 220 DD_{50} from the biofix.

- The 2nd generation CM management adult emergence using 10 July Biofix predicted 250DD to occur on **20 July** with treatments made for this insect on 18 July.



2014 Hudson Valley Insecticide Efficacy

Evaluation 24 June, 2014 representing 1st generation CM injury

Treatment / Formulation	Rate	Timing	Incidence (%) Of Codling Moth Damaged Cluster Fruit [a] Ginger Gold	Red Delicious
1 Actara	5.5 oz./A	PF-1C	0.0 a	0.0 a
Movento	9.0 fl.oz./A	1C		
+ LI-700	0.5%	1C		
Belt	5.0 fl.oz./A	1st Gen CM + 14d		
Delegate WG	6.0 oz./A	2nd Gen CM + 14d		
Leverage 360	2.8 fl.oz./A	BMSB		
Assail	8.0 oz./A	AM		
10. Calypso	4.0 fl.oz./A	P	0.5 ab	0.0 a
Calypso	6.0 fl.oz./A	PF-2C		
Altacor	4.5 oz./A	1st Gen CM @ 14d		
Danitol	21.3 fl.oz./A	BMSB, AM		
Thionex 50WP	4.0 lb./A	BMSB		
Bifenthrin EC	12.8 fl.oz./A	BMSB, AM		
11. UNTREATED			6.0 d	4.0 b

[a]Evaluation was made on 24 June assessing 100 fruit in each of 4-tree plot per replicates of two varieties. Percent data were transformed using $\log_{10}(x+1)$ using Fishers Protected LSD ($P \leq 0.05$). Treatment means followed by the same letter are not significantly different. Arithmetic means reported.

Codling Moth

Classes		Formulation	Efficacy Group (s)
1A	Lannate	High	(Carbamate)
1A	Sevin	Moderate	(Carbamate)
1B	Imidan 70W	High	(Organophosphate)
3A	Baythroid XL 1EC	Moderate	(Pyrethroid)
4A	**Assail 30SG**	**High**	**(Neonicotinoid)**
5	**Delegate 25WG**	**High**	**(Spinosyn)**
5	**Entrust 2SC**	**High**	**(Spinosyn)**
6	Proclaim 5SG	Moderate	(Emamectin Benzoate
11A	Dipel 10.3DF	Moderate / low	(Bacillus thuringiensis)
15	**Rimon 0.83EC**	**High**	**(Novaluron)**
18	Intrepid 2F	Moderate	(Methoxyfenozide)
22	Avaunt 30WDG	Moderate	(Indoxacarb)
28	**Exirel**	**High**	**(Cyantraniliprole)**
28	**Altacor 35WDG**	**High**	**(Chlorantraniliprole)**
28	**Belt 4SC**	**High**	**(Flubendiamide) Reg. Revoked (2017 use)**
UN	Neemix	Moderate	(Azadirachtin)
Premix			
3A/6	Gladiator EC	High	(Zeta-Cypermethrin/Avermectin B!)
4A/3A	Endigo ZC	Moderate	(Thiamethoxam/Lambda-cyhalothrin)
4A/3A	Leverage 360	High	(Cyfluthrin/Imidacloprid
4A/28	Voliam Flexi WDG	High	Chlorantraniliprole/Thiamethoxam

Thank You…Questions??

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