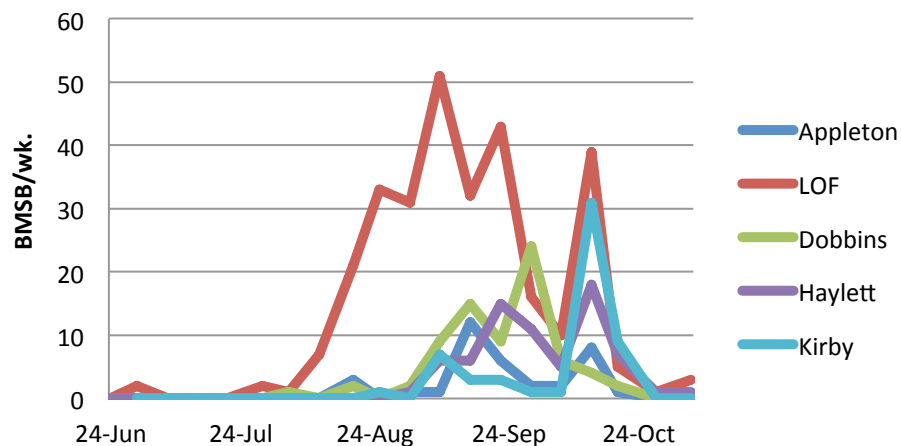
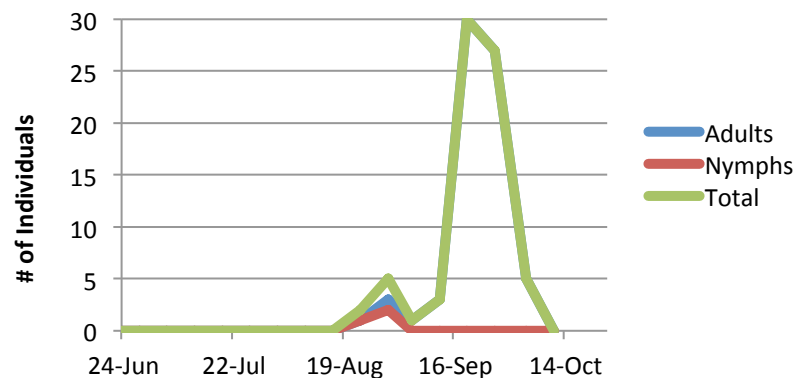


# BMSB Feeding and Mortality Comparison of Sulfoxaflor and Bifenthrin Treated Apple.

## Total BMSB; WNY-2016



## BMSB; HV-2016 Clintondale



# BMSB Management Tools for Pome Fruit Production in NYS

Product	Active ingredient	Rate / A	REI Hrs.	PHI Days	Efficacy (USDA)
Actara 25WDG	Thiamethoxam	2.0-5.5 oz/A	12	35	+++
Asana XL 0.66EC	Esfenvalerate	4.8-14.5 fl oz/A	12	21	++
Baythroid XL 1EC	Beta-Cyfluthrin	1.4-2.8 fl oz/A	12	7	++
Bifenture EC	Bifenthrin	5.2-12.8 fl oz/A	12	14	++++
Bifenture 10DF	Bifenthrin	12.8-32.0 oz/A	12	14	++++
Brigade WSB	Bifenthrin	12.8-32.0 oz/A	12	14	++++
Danitol 2.4EC	Fenpropathrin	10.66-21.33 fl oz/A	24	14	+++
Endigo ZC	Thiamethoxam / Lambda-cyhalothrin	5-6 fl fl oz/A	24	35	++++
Lannate 2.4LV*	Methomyl	2.25 pt/A	72	14	++++
Lannate 90SP*	Methomyl	8-16 oz/A	72	14	++++
Leverage 360	Beta-Cyfluthrin / Imidacloprid	2.4-2.8 fl oz/A	12	7	+++
Surround 95WP	Kaolin	25-50 lb/A	4	0	+
Voliam Xpress EC	Chlorantraniliprole / Lambda-cyhalothrin	6-12 fl oz/A	24	21	+++
Vydate 2L*	Oxamyl	4-8 pt/A	48	14	++
Warrior 1CS	Lambda-cyhalothrin	2.56-5.12 fl oz/A	24	21	++
Warrior II 2.08CS	Lambda-cyhalothrin	1.28-2.56 fl oz/A	24	21	++

10 A.I. ; 6 highly effective & 3 moderately effective insecticides

\*NYS DEC has not allowed Section 18 for Dinotefuran (Scorpion / Venom) for BMSB Mgt.



## 2016 Objectives

Majority of injury from BMSB occurs near harvest of late season apple varieties (Mid-August-November).

- Pre-harvest intervals of effective insecticides  $\geq 14$ d

**Sulfoxaflor** has been re-registered as of Oct. 14, 2016

- 7d PHI; 4 applications / season

- 1. To determine if 'Confined Field Population' of BMSB can be used as indicators of insecticide efficacy.***
- 2. Test Sulfoxaflor to determine its efficacy as an anti-feedant near harvest of apple.***

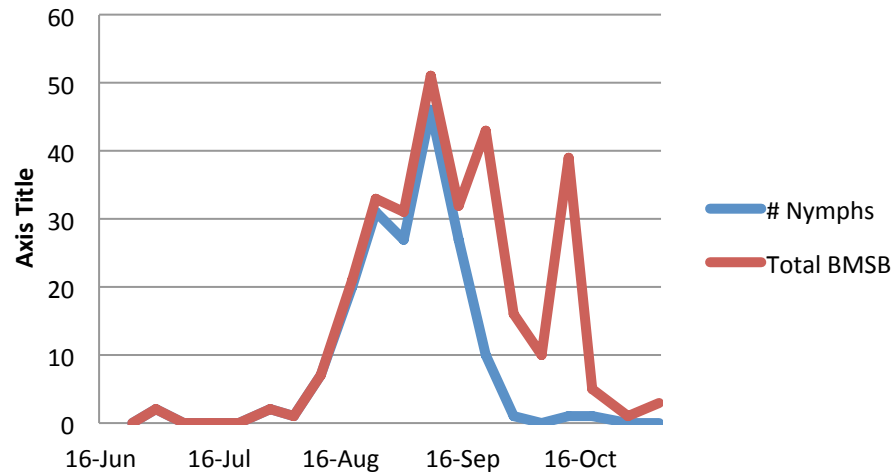


[illegible]

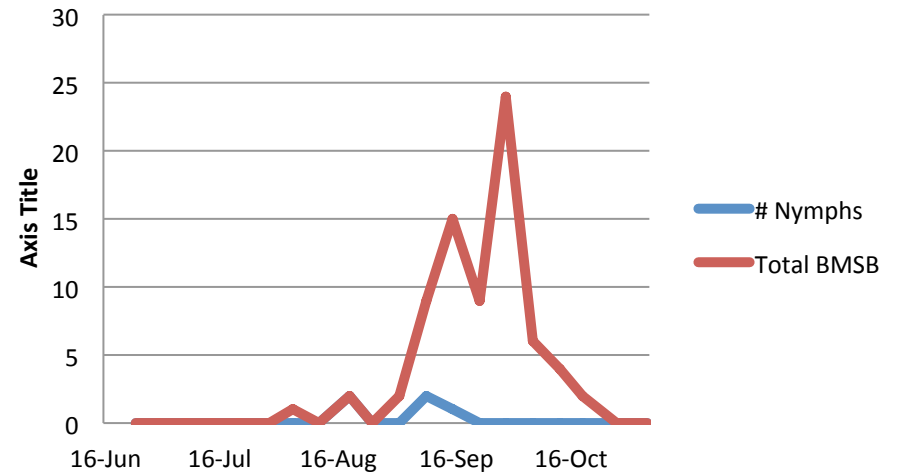
Regional BMSB submissions  
2010 – Present: [EDDMaps.org](http://EDDMaps.org)

# Lake Ontario Fruit Growing Region - 2016

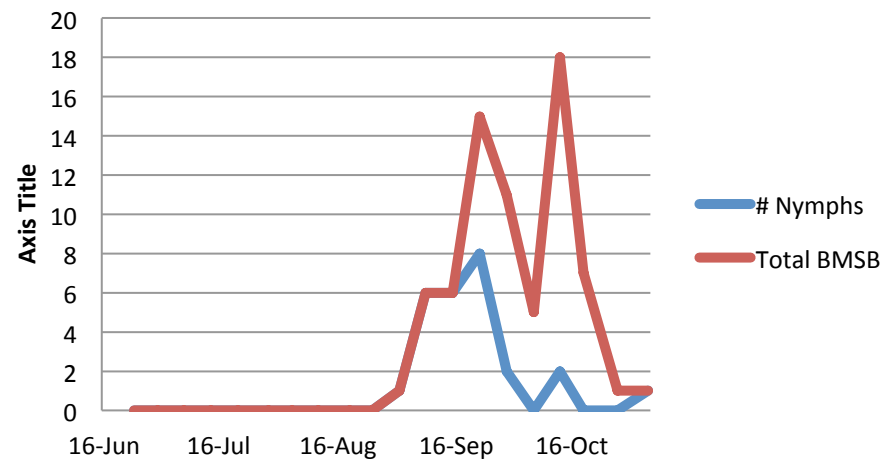
## Albion.1, WNY (Orleans)



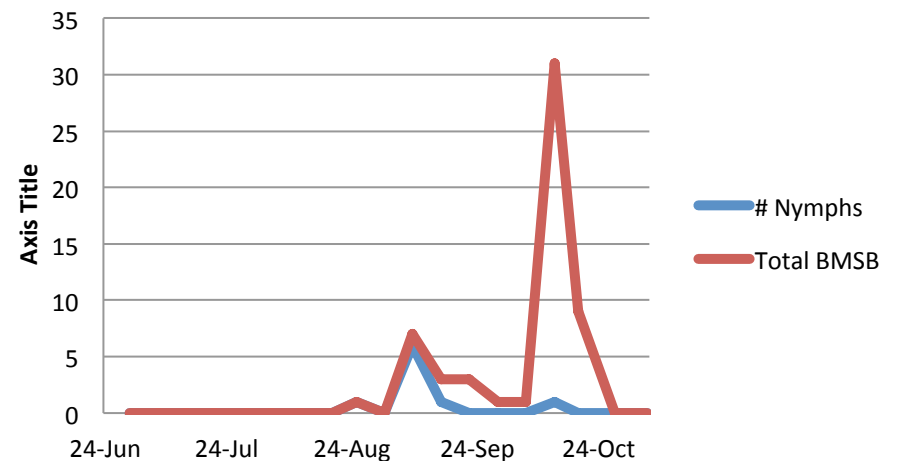
## Lockport, WNY (Niagara)



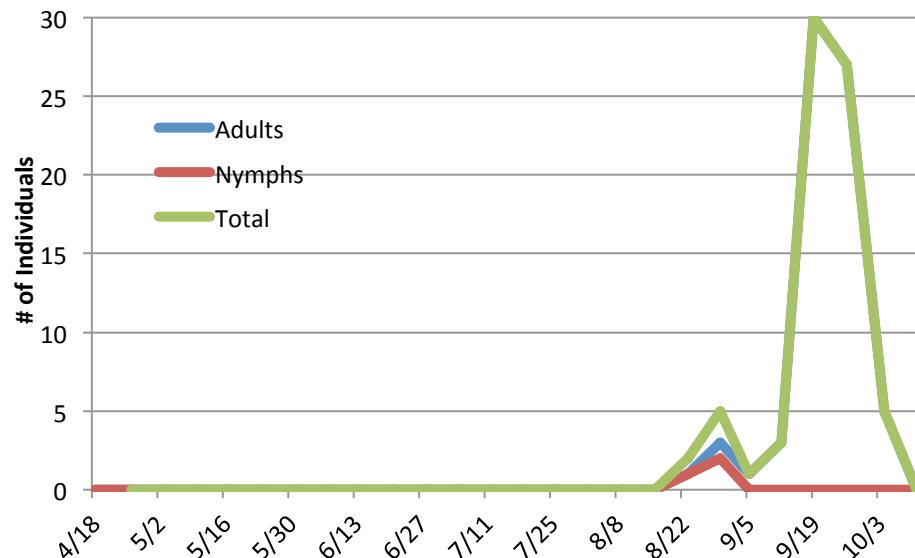
## Albion.2, WNY (Orleans)



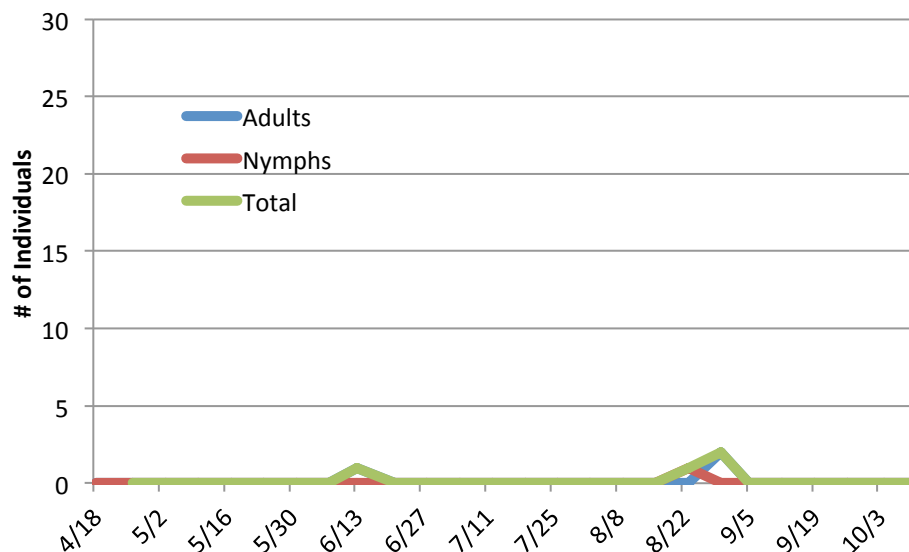
## Brockport, WNY (Orleans)



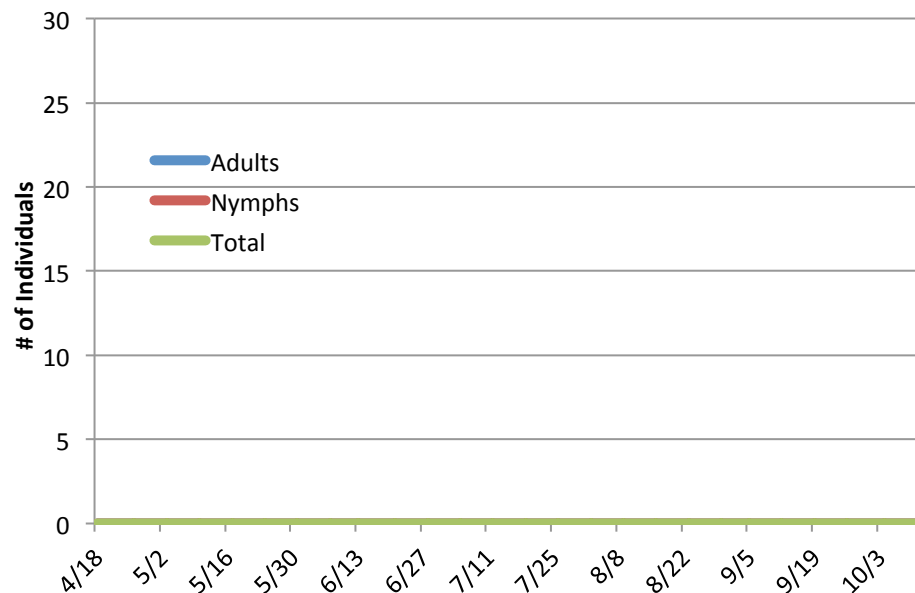
### HVRL BMSB Trapping 2016 Clintondale - Coy North



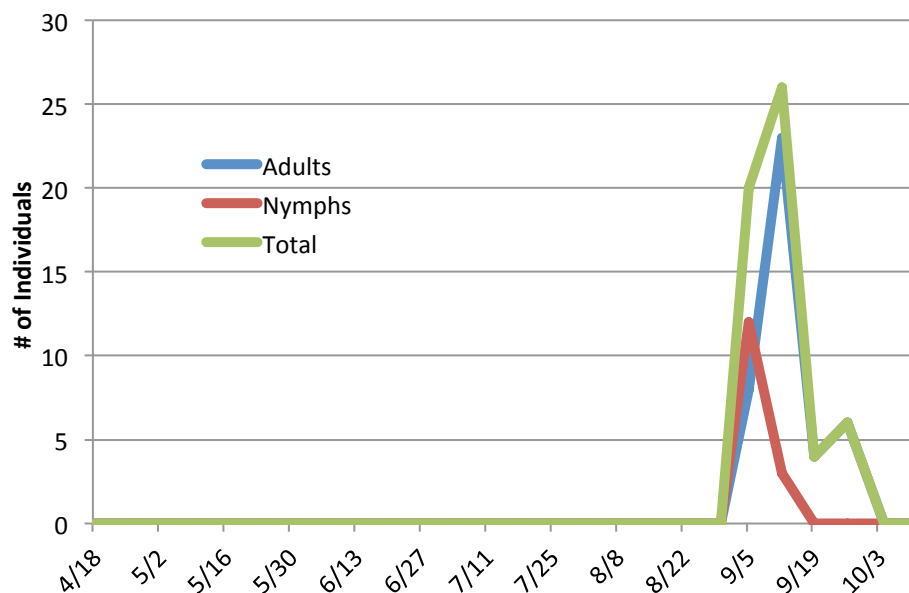
### HVRL BMSB Trapping 2016 Clintondale - Coy South



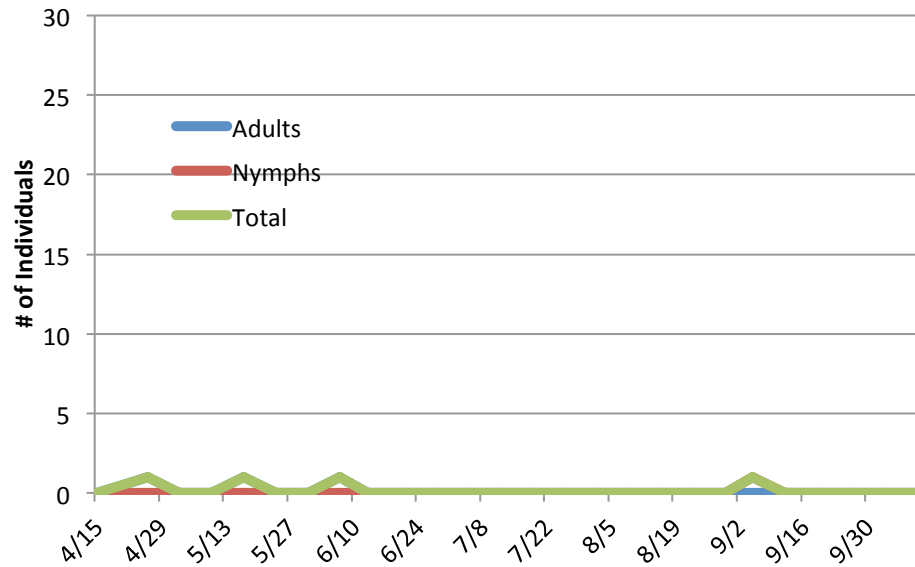
### HVRL BMSB Trapping 2016 Clintondale - Hurds



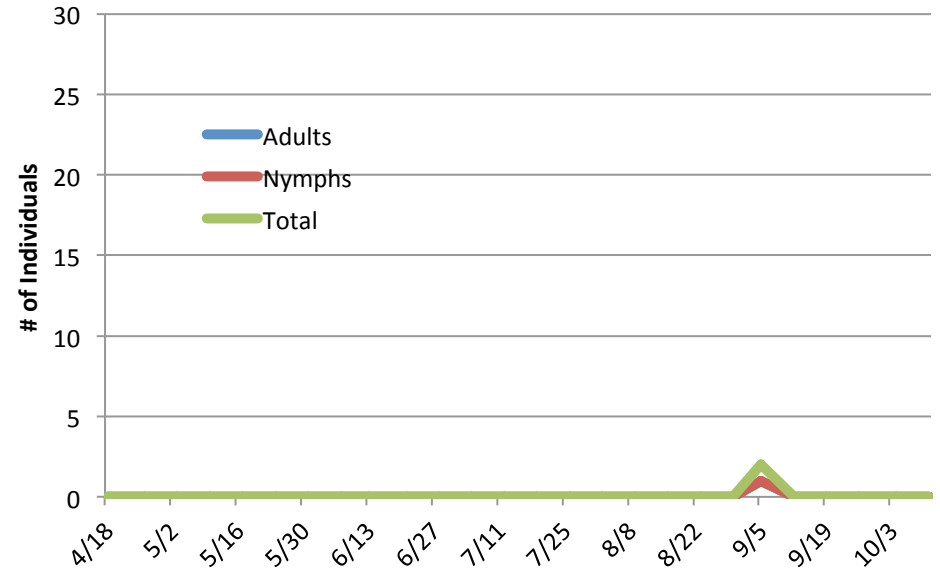
### HVRL BMSB Trapping 2016 Clintondale - MInard



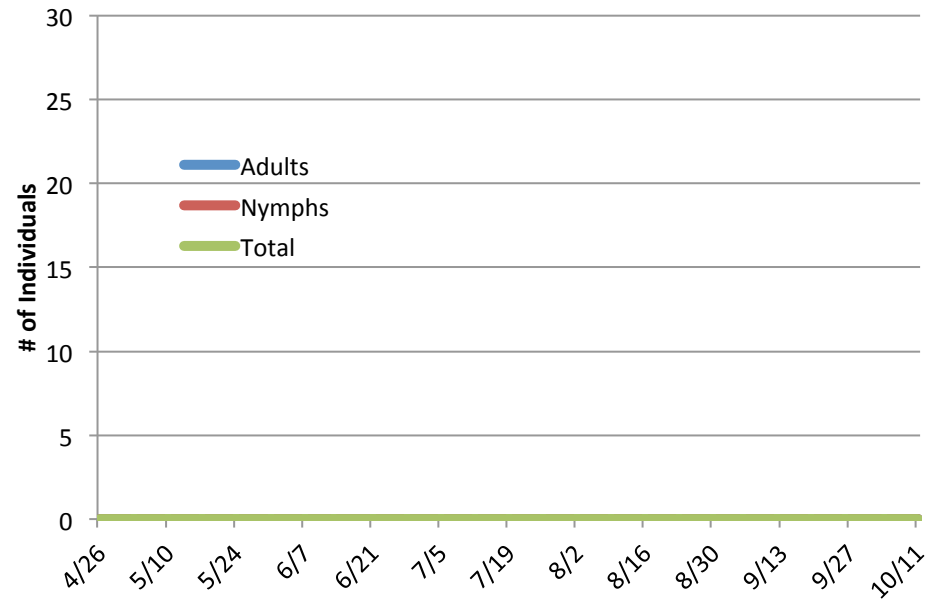
### HVRL BMSB Trapping 2016 New Paltz - Dressels West



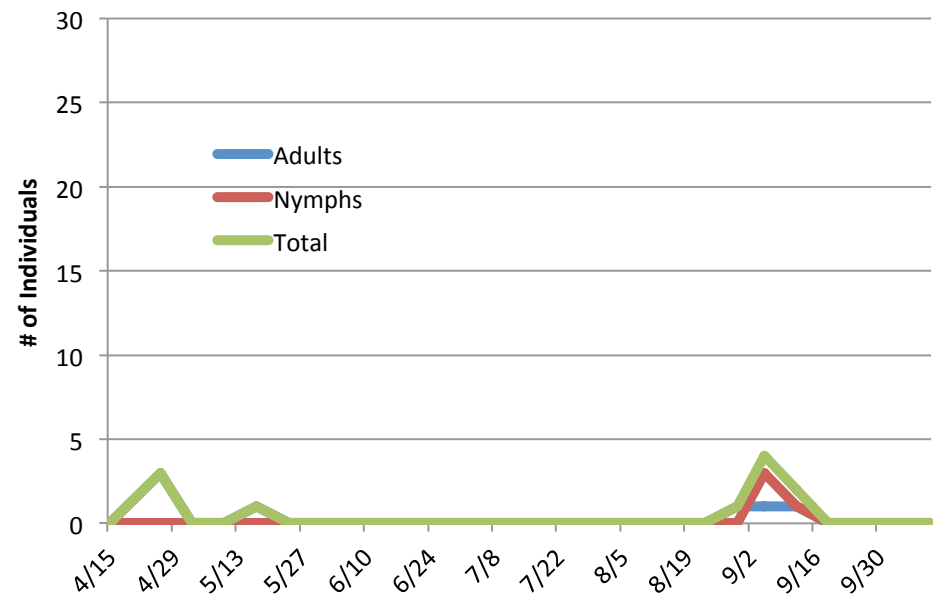
### HVRL BMSB Trapping 2016 New Paltz - Dressels East



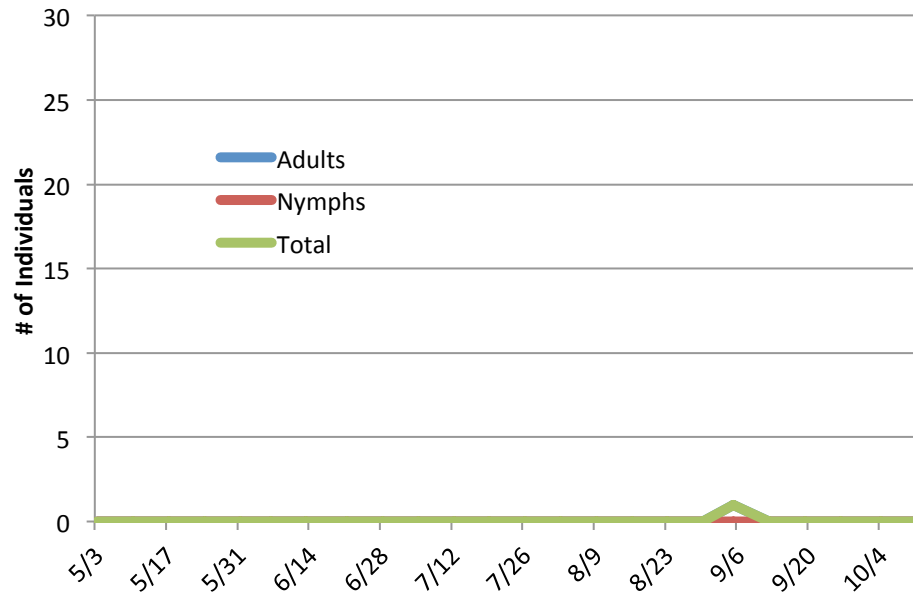
### HVRL BMSB Trapping 2016 Walden - Crist Home West



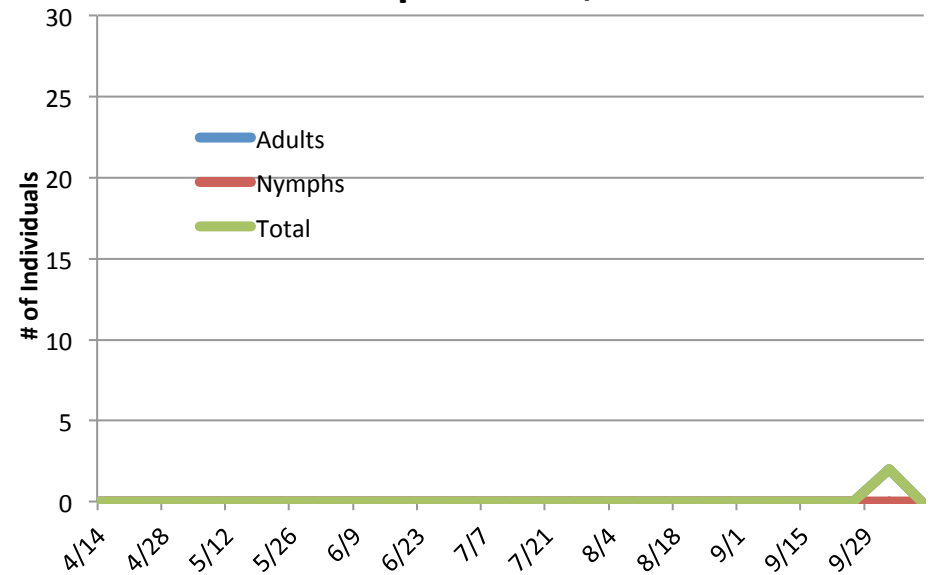
### HVRL BMSB Trapping 2016 Walden - Crist Home East



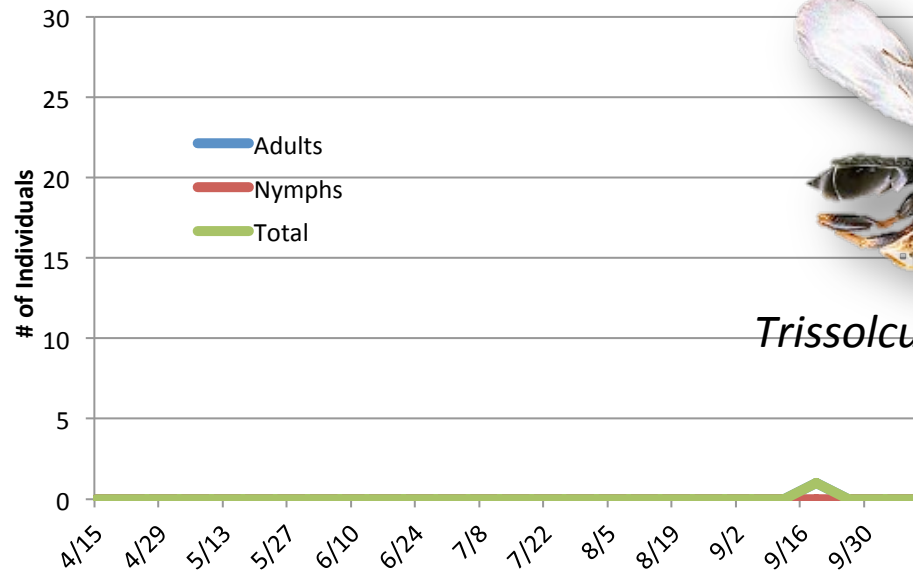
## HVRL BMSB Trapping 2016 East Poughkeepsie, NY



## HVRL BMSB Trapping 2016 Campbell Hall, NY



## HVRL BMSB Trapping 2016 Marlboro, NY



*Trissolcus japonicus*



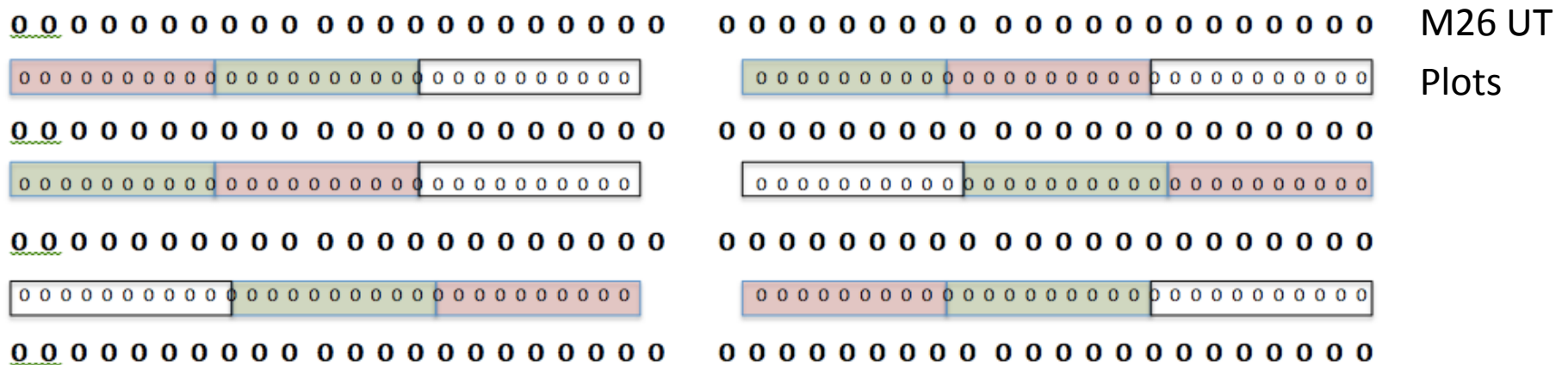
# Using 'Confined Field Population' of BMSB as Indicators of Insecticide Efficacy



- Seven year old Red Delicious fruit trees on variety dwarfing rootstock strains were used in a complete block design.

3 rows between 4 untreated rows of M26 apple varieties

- 3 Trmts. 10 trees per plot; 8 center trees used for study
- 6 fruit per BMSB life stage per replicate (N=36)
- 6 replicates



# Using 'Confined Field Population' of BMSB as Indicators of Insecticide Efficacy



- **Closer SC @ 5.75 fl.oz./A and Bifenthrin EC at 12.8 fl.oz.**  
Appl. **2<sup>nd</sup> August**; dilute using handgun  $\geq$  250psi @ 75 GPA.
- BMSB **3rd instar nymphs** and **adults** @ 24hr, 48hr and 72hr post application onto **shaded side** of fruit, **north side** of each tree.
- Over top of each insect was placed a **1 oz. screened cup**.
- Insects were **removed after 7d** with container perimeter circled using black marker to isolate BMSB feeding site.



# Using 'Confined Field Population' of BMSB as Indicators of Insecticide Efficacy



- Fruit were harvest on August 14<sup>th</sup>
- Fruit assessed for :
  - Feeding sites
  - Discoloration & depression (dimples)
  - Peeled to observe corking
  - Overall % Damage
- BMSB nymphs and adult observations:
  - Longevity upon removal from fruit



# Using 'Confined Field Population' of BMSB as Indicators of Insecticide Efficacy



**Company: Dart**  
**Stock Number: 100PC**

**Description: 1 oz.**  
**Diameter of Top (in): 1.7**  
**Diameter of Base (in): 1.2**  
**Height (in): 1.3**



**$\frac{3}{4}$ " spade bit to bore cup base**

**Hot glue PAK no-see-um insect netting to cup base**



# Adult and Nymph BMSB Feeding Comparison of Sulfoxaflor and Bifenthrin Treated Apple.



Hr.post			# Feeding		Green					
Appl.	Trmt	Stage	Sites		Dimples		Corking		Clean	
24hr	Closer	Adults	0.0	a	0.3	a	0.0	a	0.86	b
		Nymphs	0.4	ab	0.3	a	0.6	abc	0.57	ab
	Bifenthrin	Adults	0.3	ab	0.6	a	0.4	ab	0.50	ab
		Nymphs	0.1	ab	0.3	a	0.1	a	0.71	b
	UTC	Adults	1.6	c	0.9	a	1.6	c	0.14	a
		Nymphs	1.1	bc	1.4	a	1.1	bc	0.38	ab

Type III Sums of Squares

Treatment 0.0018  
Fisher's Protected LSD

0.2691

0.0036

0.0367

Significance level: .05



Cornell University

Hudson Valley Research Laboratory

# Adult and Nymph BMSB Feeding Comparison of Sulfoxaflor and Bifenthrin Treated Apple.



Hr.post Appl.	Treatment	Stage	# Feeding Sites		Green Dimples		Corking		Clean	
48hr	Closer	Adults	0.7	ab	0.0	a	0.7	a	0.7	b
		Nymphs	0.0	a	0.3	ab	0.1	a	0.7	b
	Bifenthrin	Adults	0.3	a	0.3	ab	0.7	a	0.7	ab
		Nymphs	0.3	a	1.4	ab	0.3	a	0.6	ab
	UTC	Adults	0.9	ab	1.4	ab	1.1	a	0.1	a
		Nymphs	1.8	b	2.0	b	2.8	b	0.3	ab
Type III Sums of Squares		Treatment	0.036		0.052		0.0098		0.0142	



# Adult and Nymph BMSB Feeding Comparison of Sulfoxaflor and Bifenthrin Treated Apple.



Hr.post	Trmt	Stage	# Feeding Sites		Green Dimples		Corking		Clean	
Appl.										
72hr	Closer	Adults	0.0	a	0.3	a	0.2	ab	0.5	ab
		Nymphs	0.9	a	0.4	a	1.1	ab	0.6	ab
	Bifenthrin	Adults	0.0	a	0.7	a	0.0	a	0.9	b
		Nymphs	0.0	a	0.4	a	0.3	ab	0.4	ab
	UTC	Adults	1.2	a	2.8	a	2.4	b	0.2	a
		Nymphs	1.1	a	0.8	b	1.8	ab	0.3	a
Type III Sums of Squares			Treatment		0.0819		0.021		0.0364	
									0.0932	

Fisher's Protected LSD

Significance level: .05



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## Comparison of Adult BMSB Mortality Of Closer and Bifenthrin Treated Apple.



Day after Exposure	Treatment	Alive (%)	Dead (%)
2	Closer	76.2 a	23.8 a
	Bifenthrin	16.7 a	83.3 a
	UTC	70.4 a	29.6 a
	P-Value	0.0947	0.0947
10	Closer	38.1 a	61.9 a
	Bifenthrin	0.0 a	100.0 a
	UTC	51.9 a	48.1 a
	P-Value	0.0895	
14	Closer	76.2 a	23.8 a
	Bifenthrin	-	-
	UTC	70.4 a	29.6 a
	P-Value	0.3787	

Fisher's Protected LSD

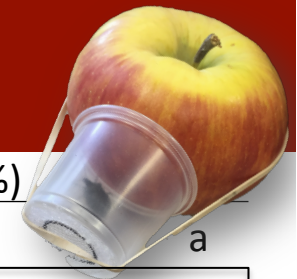
Significance level: .05



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## Comparison of Nymph BMSB Mortality Of Closer and Bifenthrin Treated Apple.



Day after Exposure	Treatment	Alive (%)		Dead (%)	
2	Closer	86.3	b	13.7	a
	Bifenthrin	44.3	a	55.7	b
	UTC	90.5	b	9.5	a
	P-Value	0.0086			
10	Closer	28.0	a	72.0	a
	Bifenthrin	8.9	a	91.1	a
	UTC	39.9	a	60.1	a
	P-Value	0.3023			
15	Closer	18.5	a	81.5	a
	Bifenthrin	4.7	a	95.2	a
	UTC	35.7	a	64.3	a
	P-Value	0.2239			
21	Closer	18.5	a	81.5	a
	Bifenthrin	4.8	a	95.2	a
	UTC	26.8	a	73.2	a
	P-Value	0.2756			

Fisher's Protected LSD

Significance level: .05



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# BMSB Feeding Comparison of Closer and Bifenthrin Treated Apple.



## Harvest Field Means

Trmt	Hr. Post Application	Life Stage	# Feeding Sites	# / fruit Green Dimples	Corking	% Clean
Closer	24h	adult & nymph	0.2	0.3	0.3	71.4
Bifenthrin	24h	adult & nymph	0.2	0.5	0.3	60.0
UTC	24h	adult & nymph	1.4	1.2	1.4	26.7
Closer	48h	adult & nymph	0.4	0.1	0.4	71.4
Bifenthrin	48h	adult & nymph	0.3	0.9	0.4	61.5
UTC	48h	adult & nymph	1.4	1.9	2.1	20.0
Closer	72h	adult & nymph	0.4	0.4	0.6	53.8
Bifenthrin	72h	adult & nymph	0.0	0.6	0.1	64.3
UTC	72h	adult & nymph	1.1	1.4	1.9	23.1



# Conclusion



- Sulfoxaflor (Group 4C), is a sulfoximine insecticide with a distinct mode of action, acting as an agonist at insect nicotinic acetylcholine receptors (nAChRs) and functions in a manner distinct from other insecticides in Group 4.
- During late season infestations of BMSB, Closer SC applications made prior to the 7 DTH label constraint have been shown to reduce feeding to apple.
- For growers, Sulfoxaflor may provide an option to reduce late season feeding near harvest.

