RESULTS OF 2014 INSECTICIDE AND ACARICIDE STUDIES IN EASTERN NEW YORK

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Acknowledgements

The following companies contributed greatly in providing support for these trials; in providing materials used in both research trials and in the maintenance of our orchards as well as grant funding for studies included in this report. Bayer CropScience, Dow AgroSciences, E.I. DuPont De Nemours & Co., Nichino America Inc. United Phosphorus Inc, Syngenta. Additional support for both research and operations was received from The New York State Apple Research and Development Program (ARDP). New York State Ag. & Markets and Federal HATCH Program.

Formulation	Materials Tested	Company
	Apple	
Actara 25WDG		Syngenta
AgriMek 0.15EC		Syngenta
Altacor 35WG		E.I. DuPont De Nemours & Co.
Assail 30SG		United Phosphorus Inc.
Belt SC		Bayer CropScience
Bifenthrin 10DF		United Phosphorus Inc
BioCover (NIS)		Crop Protection Services
Calypso 4F		Bayer Crop Science
Centaur 0.7 WDG		Nichino America Inc.
Closer		Dow AgroSciences
CYD-X		Certis USA
Danitol 2.4 EC		Valent
Dipel DF		Valent
Pyganic 1.4EC		MGK
Delegate WG		Dow AgroSciences
Entrust SC		Dow AgroSciences
Exirel (Cyazypyr)		E.I. DuPont De Nemours & Co.
Intrepid 2F		Dow AgroSciences
LI700 (NIS)		Crop Protection Services
Leverage 360		Bayer CropScience
Lorsban 4E		Dow AgroSciences
Movento 240SC		Bayer CropScience
Sivanto		Bayer CropScience
Surround WP		Tessenderlo Kerley
Thionex 50WP		Makhteshim Agan of North America
	Pear	
AgriMek 0.15EC		Syngenta
BioCover (NIS)		Crop Protection Services
Centaur 0.7WG		Nichino America Inc.
Esteem 35WP		Dow AgroSciences
M-Pede 49L		Gowan Co.
Surround WP		Tessenderlo Kerley
	Pepper	
Mycotrol-O (*B. bassiana*)		Laverlam International Corporation
Sniper 25% (Bifenthrin)		Loveland Products

Factors Contributing To The 2014 Hudson Valley Insect Pest Management Anomalies.

The start of the 2014 season began dry in March increasing above the average through April and May with **rainfall accumulations** of 3.14" in March (3.6" Ave.), 5.06" in April (3.8" Ave.), and 2.87' in May (4.4" Ave.). The month of June saw a continued decrease in rain events totaling 2.73" (4.4" Ave.), with enough rain to produce moderate levels of apple scab infection yet requiring irrigation, especially in newly planted blocks. The first week of July had over 4.7" of rain with total monthly rainfall exceeding 8.3" (4.7" Ave.). August experienced drought conditions with average rainfall accumulating only 1.22" (4.2" Ave.). Total rainfall for the March 1st through September 1st growing season totaled 24.18" of rain, slightly below the seasonal average of 25.1".

Hudson Valley **mean temperatures and tree advancement** was considerably later during the early season with a six-day delay in developmental stages by bloom. Dates for green tip (13 April) occurred 14 days later than the historical mean for the past 25 years (see McIntosh phenology), one day shy of the lowest recorded day. Full bloom on McIntosh occurred on 12 May, lasting 7 days in McIntosh, 2.5 days less then the mean, with ample sunlight and good pollination conditions. The degree-day accumulations were about 56.8 DD higher than the average by petal fall (19th May of 594 DD_{43} / 321.5 DD_{50}), By 2 June, McIntosh king fruit had sized to 18mm.

From the onset of bloom to PF we saw temperatures ranging between 40 ^{o}F and 83^{o}F followed by 10 days of mean highs of 61 to 75^{o}F after petal fall. Timely petal fall applications for managing **Plum curculio** (PC) and **Tarnished Plant Bug** (TPB) were needed by 80% PF for most varieties as PC damage began shortly after fruit set. PC movement into orchards and oviposition was predicted to end on 8th of June using predictive modeling of 308 DD_{50} from petal fall of McIntosh.

European apple sawfly (EAS) activity occurred in very low numbers this season with early varieties showing 1.8% injury in Ginger Gold and McIntosh cluster fruit evaluations. PC injury was also moderate with 44.0.% and 22.8% injury with TPB injury at 4.8% and 3.8% injury observed in Ginger Gold and McIntosh respectively on 6 June in untreated plots with increasing damage noted in these plots at harvest.

The 1st generation **codling moth** (CM) adult flight occurred on 18 May with larval emergence predicted for 4 June using 220 DD_{50} from the biofix. The internal lepidopteran complex, oriental fruit moth (OFM) and CM showed low levels of damage to apple, with internal lep. frass appearing during mid-late June through early July. Relatively low levels of damage from the internal lepidopteran complex was observed with 6.3% and 4.0% damage from 1st generation evaluated on 25 June on Ginger Gold and Red Delicious respectively. The 2nd generation CM management larval emergence using 10 July as the biofix predicted 250DD to occur on 20 July with treatments made for this insect on 18 July.

San Jose scale (SJS) crawler emergence was predicted to occur on 2 June using the 1 March 500 DD_{50} model. However, first crawler was observed to occur 16th of June, more than two weeks after the predicted calendar date. In general SJS scale levels were moderately high in infested trees with less then 5.5 and 14.3% injury observed in Ginger Gold and Red Delicious varieties respectively in research plots on 24 June. In conventionally treated orchards, this pest has become a difficult pest to manage.

Growers again monitored for **obliquebanded leafroller** (OBLR) closely this season. Successful management of the insect was achieved using rotations of Altacor, Belt, and or Delegate in Hudson Valley orchards. Most applications were made using insect phenology predictions for early emergence, using 340 DD_{50} from 8th of June biofix to manage the 1st emergence of OBLR, predicted to occur on 20th of June. In general, low levels of

leafroller feeding was observed on developing fruitlets, from spotted green fruit worm (SGFW), OBLR, and red banded leafroller (RBLR) larva during the pre-bloom and fruit set from overwintering and newly emerging populations. Trap captures were moderate for 1st generation OBLR averaging 5.9 / day during the peak periods (23 June). The 2nd generation flight was quite low of OBLR during August and September averaging 0.6 / day during the peak periods (11 August). We are seeing a trend of increasingly high levels of RBLR with mixed populations of **tufted apple bud moth** (TABM) and **sparganothis fruitworm** (SFW) during the season, contributed to the overall leafroller damage each season.

Apple maggot (AM) emergence was late this season with first emergence on 7 July, one day earlier then in 2013. Threshold of 5 flies per trap was observed on the 18th of July. AM density was low to moderate throughout the region with reduced emergence due to the lack of late season rainfall. Low populations of adults were noted in the mid-Hudson Valley with seasonal accumulation totals near 36 flies per trap (mean n=4) with highest populations occurring early with ample rainfall in July providing ideal emergence conditions.

The **brown marmorated stink bug** (BMSB), *Halyomorpha halys,* has been observed throughout the southern Hudson Valley for the past 5 years with the first BMSB confirmation in December 2008. Since that time increasing populations have been documented in urban environments and present on many farms throughout the season in the lower to mid-Hudson Valley region. It was easily found from mid-season through harvest on pome fruit in lower to mid-Hudson Valley with increasing northern observations and fruit injury occurring in Columbia County in 2013. It has been found reproducing in deciduous trees such as Sugar Maple, *Acer saccharum*, White Ash, *Fraxinus americana*, Tree of Heaven, *Ailanthus altissima*, and eastern black walnut *Juglans nigra* in high numbers with lower numbers observed in Staghorn Sumac, *Rhus typhina,* and wild grape, *V. vinifera.* Late season nymphs and adult trap captures of BMSB using Tedders traps employing traditional black light traps, the USDA #10 lure and the *Plaudi stali* aggregation pheromone lure, *methyl (E,E,Z)-2,4,6-decatrienoate,* was observed along the orchard edges in Orange, Ulster, Dutchess and Columbia Counties throughout the season. In 2014 we monitored the population throughout NYS in 20 tree fruit orchard sites, employing a trap threshold of 40 total BMSB or 10 adults per trap to recommend management timing for tree fruit production. On 11 September all 7 mid-Hudson Valley trapping sites in Orange, Dutchess Ulster and Columbia counties had populations exceeding action threshold. Assessments of BMSB fruit injury to Red Delicious found 1.5% of harvested apple exhibiting feeding tubes by October 2nd. Clusters of fruit were also found to exhibit 1-5% bitter pit damage, a calcium deficiency expressed as dark sunken lesions on the fruit surface with brown corking extending 1 cm beneath the skin, often mistaken for BMSB injury. Orchards with hail injured fruit also exhibited sunken dark lesions with corking, often confused as stink bug injury

Spotted wing drosophila (SWD), *Drosophila suzukii*, (Matsumura) (Diptera: Drosophilidae) were first observed in NY by late August, 2011. We monitored SWD in four counties throughout the lower to mid-Hudson Valley this season using apple cider vinegar and brewers yeast-baited traps across small fruit, grape and tree fruit. The first SWD trap captures were found in Warwick, Orange County, NY on 25th of July (1st capture on 17 June in 2013). By 30 July, evaluations of 'Prelude' Red Raspberry in Duthess Counties showed 15% injury with treated raspberry fruit in Ulster County with 0% SWD ovipositional injury. SWD adult emergence was later confirmed. Growers who harvested frequently and kept to a 3-7 day spray program were able to maintain low infestations levels to this season

APPLE: Malus domestica, cv. 'Ginger Gold', 'Red Delicious', 'McIntosh', 'Golden Delicious'

European apple sawfly (EAS): *Hoplocampa testudinea* (Klug)
Green fruitworm (GFW*): Lithophane antennata* (Walker)
Mullein and apple red bug; (MB): *Campylomma verbasci* (Meyer), (ARB) *Lygidea mendax* (Reuter)
Obliquebanded leafroller (OBLR): *Choristoneura rosaceana* (Harris)
Plum curculio (PC): *Conotrachelus nenuphar* (Herbst)
Redbanded leafroller (RBLR): *Argyrotaenia velutinana* (Walker)
Tarnished plant bug (TPB): *Lygus lineolaris* (P. de B.)
San Jose scale (SJS): *Quadraspidiotus perniciosus* (Comstock)
Oriental fruit moth (OFM): *Grapholitha molesta* (Busck)
Codling moth (CM): *Cydia pomonella* (Linnaeus)

Apple rust mite (ARM): *Aculus schlechtendali* (Nalepa)
European red mite (ERM): *Panonychus ulmi* (Koch)
Two spotted spider mite (TSM): *Tetranychus urticae* Koch
A predatory stigmaeid (ZM): *Zetzellia mali* (Ewing)
A predatory phytoseiid (AMB): *Neoseiulus (=Amblyseius) fallacies* (Garman)

EVALUATION OF INSECTICIDES FOR CONTROLLING THE EARLY FRUIT FEEDING INSECT COMPLEX ON APPLE, 2014 –Hudson Valley Research Laboratory: Treatments were applied to four-tree plots of four varieties replicated four times in a randomized complete block design Treatments were applied dilute to runoff using a high-pressure handgun sprayer operated at 300 psi, delivering 1.3 to 1.9 gal/tree or 130 to 190 gal/acre with the range in gallonage representing the increasing amounts of foliage as the season progressed. All insecticide dilutions (presented as amt./100 gal) are based on a standard of 300 gal/acre trees. Maintenance applications for disease control and crop load reduction were made using a John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph. Trees on the M.26 rootstock were 19 yr-old, maintained at approximately 10 ft high and planted to a research spacing of 10' x 30'. Alternate rows of unsprayed trees were adjacent to treated plots maintained for drift reduction, increased insect distribution and population pressure.

Treatments were applied on various schedules as shown in Table 1. Dates corresponding to tree phenology for McIntosh occurred for green tip GT on 14 April, 1/2" Green on 18 April, TC on 28 April, Pink on 6 May, King Bloom on 12 May, PF on 17 May @ 80% PF of 'McIntosh. PF appl. on 17 May, 1C on 27 May, 2C on 27 May, 3C on 6 June, 4C on 20 June, 5C on 18 July, 6C on 30 July. 1st gen. CM $220DD_{43}$ on 6 June; 2nd appl. 1st Gen. CM on 20 June; 2nd Gen. CM appl. on 18 July. AM threshold on 18 July. Applications for crop load management and disease control included: Dithane DF at 3 lbs./A on 22 April, Dithane DF 3 lbs./A and Firewall 17WP at 2 lbs./A, Rally 40WSP at 4.0 oz./A on 11 & 17 May, NAA at 2.0 oz./100 plus 0.25% Biocover oil on 25 May, Captan 80WDG at 3 lbs./A on 22 June, Captan 80WDG at 3 lbs./A and Rally 40WSP at 4.0 oz./A on 14 July, Captan 80WDG at 3 lbs./A and Topsin M at 14.0 oz./A on 3, 17 August. Drought conditions during late-summer reduced the need for further fungicide applications.

Cluster fruit damage (Tables 2, 3) was assessed before 'June drop' by randomly selecting 50 fruitlets from each tree and scoring for external damage. The 'LEP' category includes combined damage from the green fruitworm, redbanded and obliquebanded leafrollers. Evaluations of codling moth (CM) injury (Table 4) made on 24 June assessed 100 fruit in each of two varieties using calex end frass as evidence of CM activity. San Jose scale injury to fruit (Table 5) was assessed by scoring fruit as injured with 2 or more red hallo markings. Phytophagous and predacious mite populations were evaluated (Tables 6,7) by sampling 25 leaves from each plot on 1 July. Leaves were removed to the laboratory, brushed onto glass plates using a mite-brushing machine, and examined using a binocular scope (≥18X).

To stabilize variance, percent data were transformed using arcsine(Sqrt(x)) conducted prior to analysis. For numeric data such as foliar mite counts, $\log_{10}(x+1)$ transformation was used. Mean separation by Fishers Protected LSD ($P \leq 0.05$). Treatment means followed by the same letter are not significantly different. Arithmetic means reported.

Table 1 Treatment Schedule For Seasonal Apple Insecticide Screen.
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y. - 2014.

	Treatment / Formulation	Rate	Timing	Application Dates
1	Actara	5.5 oz./A	PF-1C	17, 27 May
	Movento	9.0 fl.oz./A	1C	27 May
	+ LI-700	0.5%	1C	27 May
	Belt	5.0 fl.oz./A	1st Gen CM + 14d	6, 20 June,
	Delegate WG	6.0 oz./A	2nd Gen CM + 14d	18, 30 July
	Leverage 360	2.8 fl.oz./A	BMSB	3 August
	Assail	8.0 oz./A	AM	17 August
2.	Sivanto	14.0 oz./A	Bloom	12 May
	Actara	5.5 oz./A	PF-1C	17, 27 May
	Delegate WG	6.0 oz./A	1st Gen CM + 14d	6, 20 June,
	Belt	5.0 fl.oz./A	2nd Gen CM + 14d	18, 30 July
	Leverage 360	2.8 fl.oz./A	BMSB	3 August
	Assail	8.0 oz./A	AM	17 August
3.	Actara	5.5 oz./A	PF-1C	17, 27 May
	CYNT	3.57 fl.oz./A	1st Gen CM + 14d	6, 20 June,
	+ LI-700	0.5%	1st Gen CM + 14d	6, 20 June,
	Assail	8.0 oz./A	AM	18, 30 July, 3, 17 August
4.	Actara	5.5 oz./A	PF-1C	17, 27 May
	AgriMek 0.70SC	2.6 fl.oz./A	PF	17 May
	CYNT	3.57 fl.oz./A	1st Gen CM + 14d	6, 20 June,
	+ LI-700	0.5%	1st Gen CM + 14d	17, 27 May, 4, 20 June,
	Assail	8.0 oz./A	AM	18, 30 July, 3, 17 August
5.	Actara	5.5 oz./A	PF-1C	17, 27 May
	AgriMek 0.70SC	2.6 fl.oz./A	PF	17 May
	CYNT +LI	4.92 fl.oz./A	1st Gen CM + 14d	6, 20 June
	+ LI-700	0.5%	1st Gen CM + 14d	17, 27 May, 4, 20 June,
	Assail	8.0 oz./A	AM	18, 30 July, 3, 17 August
6.	Actara	5.5 oz./A	PF-1C	17, 27 May
	Exirel	13.5 fl.oz./A	1st & 2nd Gen CM + 14d	6, 20 June, 30 July
	+ LI-700	0.5%	1st & 2nd Gen CM + 14d	17, 28 May, 4, 20 June,
	Assail	8.0 oz./A	AM	3, 17 August
7.	Centaur 70WDG	46.0 oz./A	DD	22 April
	Actara	5.5 oz./A	PF-1C	17, 27 May
	Assail	8.0 oz./A	CM, AM	18, 30 July, 3, 17 August
8.	Lorsban 4E	64.0 fl.oz./A	DD	22 April
	Actara	5.5 oz./A	PF-1C	17, 27 May
	Assail	8.0 oz./A	CM, AM	18, 30 July, 3, 17 August
9.	Centaur 70WDG	46.0 oz./A	PF	17 May
	Actara	5.5 oz./A	PF-1C	17, 27 May
	Assail	8.0 oz./A	CM, AM	18, 30 July, 3, 17 August
10.	Calypso	4.0 fl.oz./A	P	6 May
	Calypso	6.0 fl.oz./A	PF-2C	17, 27 May
	Altacor	4.5 oz./A	1st Gen CM @ 14d	6, 20 June,
	Danitol	21.3 fl.oz./A	BMSB, AM	30 July
	Thionex 50WP	4.0 lb./A	BMSB	3 August
	Bifenthrin EC	12.8 fl.oz./A	BMSB, AM	17 August
11.	UNTREATED			

Treatments were applied dilute to runoff using a high-pressure handgun sprayer operated at 300 psi, delivering 1.3 to 1.9 gal/tree or 130 to 190 gal/acre with the range in gallonage representing the increasing amounts of foliage as the season progressed. All insecticide dilutions (presented as amt./100 gal) are based on a standard of 300 gal/acre trees.

Table 2 Evaluations Of Insecticides For Controlling Early Season Insect Complex On Apple [a]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2014

Treatment / Formulation	Rate	Timing	Incidence (%) of insect damaged cluster fruit PC	EAS	TPB	LEP	Clean
1 Actara	5.5 oz./A	PF-1C	3.6 a	1.8 a	3.8 ab	1.8 b	95.4 b
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					
2. Sivanto	14.0 oz./A	Bloom	1.5 a	1.8 a	3.5 ab	0.3 a	93.0 b
Actara	5.5 oz./A	PF-1C					
Delegate WG	6.0 oz./A	1st Gen CM + 14d					
Belt	5.0 fl.oz./A	2nd Gen CM + 14d					
Leverage 360	2.8 fl.oz./A	BMSB					
Assail	8.0 oz./A	AM					
3. Actara	5.5 oz./A	PF-1C	5.0 a	0.0 a	4.3 ab	0.5 ab	90.0 b
CYNT	3.57 fl.oz./A	1st Gen CM + 14d					
+ LI-700	0.5%	1st Gen CM + 14d					
Assail	8.0 oz./A	AM					
4. Actara	5.5 oz./A	PF-1C	1.8 a	0.5 a	4.0 ab	1.0 ab	92.8 b
AgriMek 0.70SC	2.6 fl.oz./A	PF					
CYNT	3.57 fl.oz./A	1st Gen CM + 14d					
+ LI-700	0.5%	1st Gen CM + 14d					
Assail	8.0 oz./A	AM (5-8C)					
5. Actara	5.5 oz./A	PF-1C	2.0 a	0.8 a	1.0 ab	0.3 a	96.3 b
AgriMek 0.70SC	2.6 fl.oz./A	PF					
CYNT +LI	4.92 fl.oz./A	1st Gen CM + 14d					
+ LI-700	0.5%	1st Gen CM + 14d					
Assail	8.0 oz./A	AM (5-8C)					
6. Actara	5.5 oz./A	PF-1C					
Exirel	13.5 fl.oz./A	1st & 2nd Gen CM + 14d	2.0 a	0.8 a	4.8 b	0.3 a	92.5 b
+ LI-700	0.5%	1st & 2nd Gen CM + 14d					
Assail	8.0 oz./A	AM					
			2.3 a	0.5 a	1.5 ab	0.3 ab	95.5 b
7. Centaur 70WDG	46.0 oz./A	DD					
Actara	5.5 oz./A	PF-1C					
Assail	8.0 oz./A	CM, AM					
8. Lorsban 4E	64.0 fl.oz./A	DD	2.0 a	0.5 a	4.3 b	1.0 ab	92.3 b
Actara	5.5 oz./A	PF-1C					
Assail	8.0 oz./A	CM, AM					
9. Centaur 70WDG	46.0 oz./A	PF	1.8 a	0.3 a	0.5 a	0.3 a	97.3 b
Actara	5.5 oz./A	PF-1C					
Assail	8.0 oz./A	CM, AM					
10. Calypso	4.0 fl.oz./A	P	6.0 a	0.3 a	1.8 ab	0.8 ab	91.3 b
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			44.0 b	0.5 a	3.3 ab	1.8 b	52.5 a
P value for transformed data			0.0002	0.8122	0.1872	0.237	0.0006

[a] Evaluation made on June 11 on Ginger Gold cultivar. Percent data were transformed using arcsine(Sqrt(x)) conducted prior to analysis. Untransformed data are presented in each table. Mean separation by Fishers Protected LSD ($P \leq 0.05$). Treatment means followed by the same letter are not significantly different. Arithmetic means reported.

Table 3 Evaluations Of Insecticides For Controlling Early Season Insect Complex On Apple [a]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2014

Treatment / Formulation	Rate	Timing	Incidence (%) of insect damaged cluster fruit PC	EAS	TPB	LEP	Clean
1 Actara	5.5 oz./A	PF-1C	6.4 a	0.3 a	0.8 a	1.7 a	91.3 b
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					
2. Sivanto	14.0 oz./A	Bloom	1.3 a	0.0 a	1.3 ab	0.8 a	96.8 c
Actara	5.5 oz./A	PF-1C					
Delegate WG	6.0 oz./A	1st Gen CM + 14d					
Belt	5.0 fl.oz./A	2nd Gen CM + 14d					
Leverage 360	2.8 fl.oz./A	BMSB					
Assail	8.0 oz./A	AM					
3. Actara	5.5 oz./A	PF-1C	4.0 a	0.3 a	3.8 b	0.5 a	91.8 b
CYNT	3.57 fl.oz./A	1st Gen CM + 14d					
+ LI-700	0.5%	1st Gen CM + 14d					
Assail	8.0 oz./A	AM					
4. Actara	5.5 oz./A	PF-1C	1.8 a	1.8 a	1.8 ab	0.8 a	94.0 b
AgriMek 0.70SC	2.6 fl.oz./A	PF					
CYNT	3.57 fl.oz./A	1st Gen CM + 14d					
+ LI-700	0.5%	1st Gen CM + 14d					
Assail	8.0 oz./A	AM (5-8C)					
5. Actara	5.5 oz./A	PF-1C	7.1 a	0.0 a	0.9 a	0.0 a	92.1 b
AgriMek 0.70SC	2.6 fl.oz./A	PF					
CYNT +LI	4.92 fl.oz./A	1st Gen CM + 14d					
+ LI-700	0.5%	1st Gen CM + 14d					
Assail	8.0 oz./A	AM (5-8C)					
6. Actara	5.5 oz./A	PF-1C	0.8 a	0.0 a	2.5 ab	1.5 a	95.3 b
Exirel	13.5 fl.oz./A	1st & 2nd Gen CM + 14d					
+ LI-700	0.5%	1st & 2nd Gen CM + 14d					
Assail	8.0 oz./A	AM					
7. Centaur 70WDG	46.0 oz./A	DD	0.8 a	0.0 a	1.8 ab	0.3 a	97.3 b
Actara	5.5 oz./A	PF-1C					
Assail	8.0 oz./A	CM, AM					
8. Lorsban 4E	64.0 fl.oz./A	DD	1.0 a	1.5 a	2.0 ab	0.5 a	95.0 b
Actara	5.5 oz./A	PF-1C					
Assail	8.0 oz./A	CM, AM					
9. Centaur 70WDG	46.0 oz./A	PF	1.8 a	0.0 a	0.3 a	0.3 a	97.8 b
Actara	5.5 oz./A	PF-1C					
Assail	8.0 oz./A	CM, AM					
10. Calypso	4.0 fl.oz./A	P	1.0 a	0.0 a	2.0 ab	0.5 a	96.5 b
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			22.8 b	0.3 a	3.5 b	1.0 ab	73.5 a
P value for transformed data							

[a] Evaluation made on June 11 on Red Delicious cultivar. Percent data were transformed using arcsine (Sqrt(x)) conducted prior to analysis. Untransformed data are presented in each table. Mean separation by Fishers Protected LSD ($P \leq 0.05$). Treatment means followed by the same letter are not significantly different. Arithmetic means reported.

Table 4 Evaluations Of Insecticide Schedules For Controlling Codling Moth On Apple [a]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2014.

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		
2. Sivanto	14.0 oz./A	Bloom	0.3 a	0.3 a
Actara	5.5 oz./A	PF-1C		
Delegate WG	6.0 oz./A	1st Gen CM + 14d		
Belt	5.0 fl.oz./A	2nd Gen CM + 14d		
Leverage 360	2.8 fl.oz./A	BMSB		
Assail	8.0 oz./A	AM		
3. Actara	5.5 oz./A	PF-1C	0.0 a	0.0 a
CYNT	3.57 fl.oz./A	1st Gen CM + 14d		
+ LI-700	0.5%	1st Gen CM + 14d		
Assail	8.0 oz./A	AM		
4. Actara	5.5 oz./A	PF-1C	0.0 a	0.0 a
AgriMek 0.70SC	2.6 fl.oz./A	PF		
CYNT	3.57 fl.oz./A	1st Gen CM + 14d		
+ LI-700	0.5%	1st Gen CM + 14d		
Assail	8.0 oz./A	AM (5-8C)		
5. Actara	5.5 oz./A	PF-1C	0.0 a	0.0 a
AgriMek 0.70SC	2.6 fl.oz./A	PF		
CYNT +LI	4.92 fl.oz./A	1st Gen CM + 14d		
+ LI-700	0.5%	1st Gen CM + 14d		
Assail	8.0 oz./A	AM (5-8C)		
6. Actara	5.5 oz./A	PF-1C	0.0 a	0.0 a
Exirel	13.5 fl.oz./A	1st & 2nd Gen CM + 14d		
+ LI-700	0.5%	1st & 2nd Gen CM + 14d		
Assail	8.0 oz./A	AM		
7. Centaur 70WDG	46.0 oz./A	DD	5.2 d	2.5 b
Actara	5.5 oz./A	PF-1C		
Assail	8.0 oz./A	CM, AM		
8. Lorsban 4E	64.0 fl.oz./A	DD	2.6 c	3.0 b
Actara	5.5 oz./A	PF-1C		
Assail	8.0 oz./A	CM, AM		
9. Centaur 70WDG	46.0 oz./A	PF	1.5 bc	0.8 a
Actara	5.5 oz./A	PF-1C		
Assail	8.0 oz./A	CM, 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.

Table 5 Evaluations Of Insecticide Schedules For Controlling San Jose Scale On Apple [a]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2014.

	Treatment / Formulation	Rate	Timing	% Damaged SJS Infested Cluster Fruit: Ginger Gold	Red Delicious
1	Actara	5.5 oz./A	PF-1C	2.9 ab	9.1 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		
2.	Sivanto	14.0 oz./A	Bloom	3.6 ab	4.8 a
	Actara	5.5 oz./A	PF-1C		
	Delegate WG	6.0 oz./A	1st Gen CM + 14d		
	Belt	5.0 fl.oz./A	2nd Gen CM + 14d		
	Leverage 360	2.8 fl.oz./A	BMSB		
	Assail	8.0 oz./A	AM		
3.	Actara	5.5 oz./A	PF-1C	11.0 ab	30.0 a
	CYNT	3.57 fl.oz./A	1st Gen CM + 14d		
	+ LI-700	0.5%	1st Gen CM + 14d		
	Assail	8.0 oz./A	AM		
4.	Actara	5.5 oz./A	PF-1C	14.0 b	7.5 a
	AgriMek 0.70SC	2.6 fl.oz./A	PF		
	CYNT	3.57 fl.oz./A	1st Gen CM + 14d		
	+ LI-700	0.5%	1st Gen CM + 14d		
	Assail	8.0 oz./A	AM (5-8C)		
5.	Actara	5.5 oz./A	PF-1C	5.5 ab	7.9 a
	AgriMek 0.70SC	2.6 fl.oz./A	PF		
	CYNT +LI	4.92 fl.oz./A	1st Gen CM + 14d		
	+ LI-700	0.5%	1st Gen CM + 14d		
	Assail	8.0 oz./A	AM (5-8C)		
6.	Actara	5.5 oz./A	PF-1C	2.5 ab	8.1 a
	Exirel	13.5 fl.oz./A	1st & 2nd Gen CM + 14d		
	+ LI-700	0.5%	1st & 2nd Gen CM + 14d		
	Assail	8.0 oz./A	AM		
7.	Centaur 70WDG	46.0 oz./A	DD	1.8 ab	1.3 a
	Actara	5.5 oz./A	PF-1C		
	Assail	8.0 oz./A	CM, AM		
8.	Lorsban 4E	64.0 fl.oz./A	DD	1.8 ab	2.7 a
	Actara	5.5 oz./A	PF-1C		
	Assail	8.0 oz./A	CM, AM		
9.	Centaur 70WDG	46.0 oz./A	PF	0.8 a	2.0 a
	Actara	5.5 oz./A	PF-1C		
	Assail	8.0 oz./A	CM, AM		
10.	Calypso	4.0 fl.oz./A	P	2.1 ab	10.0 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			5.5 ab	14.3 ab

[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.

Table 6a Evaluations Of Insecticide Schedules For Managing the Mite Complex On Apple [A].
N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2014.

Treatment / Formulation	Rate	Timing	Number of Adult Mite / Leaf ERM	TSM	ZM	AMB	ARM
1 Actara	5.5 oz./A	PF-1C	0.0 a	0.2 a	0.2 ab	0.1 a	2.1 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					
2. Sivanto	14.0 oz./A	Bloom	0.0 a	0.1 a	0.3 ab	0.2 a	47.2 ab
Actara	5.5 oz./A	PF-1C					
Delegate WG	6.0 oz./A	1st Gen CM + 14d					
Belt	5.0 fl.oz./A	2nd Gen CM + 14d					
Leverage 360	2.8 fl.oz./A	BMSB					
Assail	8.0 oz./A	AM					
3. Actara	5.5 oz./A	PF-1C	0.2 b	0.2 a	0.2 ab	0.5 a	17.1 a
CYNT	3.57 fl.oz./A	1st Gen CM + 14d					
+ LI-700	0.5%	1st Gen CM + 14d					
Assail	8.0 oz./A	AM					
4. Actara	5.5 oz./A	PF-1C	0.0 a	0.2 a	0.2 a	0.2 a	10.4 a
AgriMek 0.70SC	2.6 fl.oz./A	PF					
CYNT	3.57 fl.oz./A	1st Gen CM + 14d					
+ LI-700	0.5%	1st Gen CM + 14d					
Assail	8.0 oz./A	AM (5-8C)					
5. Actara	5.5 oz./A	PF-1C	0.0 a	0.4 a	0.1 a	0.3a	5.9 a
AgriMek 0.70SC	2.6 fl.oz./A	PF					
CYNT +LI	4.92 fl.oz./A	1st Gen CM + 14d					
+ LI-700	0.5%	1st Gen CM + 14d					
Assail	8.0 oz./A	AM (5-8C)					
6. Actara	5.5 oz./A	PF-1C	0.0 a	1.8 ab	0.5 ab	0.5 a	14.2 a
Exirel	13.5 fl.oz./A	1st & 2nd Gen CM + 14d					
+ LI-700	0.5%	1st & 2nd Gen CM + 14d					
Assail	8.0 oz./A	AM					
7. Centaur 70WDG	46.0 oz./A	DD	0.1 ab	0.2 ab	0.4 bc	0.7 ab	25.0 a
Actara	5.5 oz./A	PF-1C					
Assail	8.0 oz./A	CM, AM					
8. Lorsban 4E	64.0 fl.oz./A	DD	< 0.1 a	0.9 ab	1.2 bc	0.8 ab	141.8 b
Actara	5.5 oz./A	PF-1C					
Assail	8.0 oz./A	CM, AM					
9. Centaur 70WDG	46.0 oz./A	PF	0.0 a	1.7 ab	0.4 ab	0.5 a	72.0 ab
Actara	5.5 oz./A	PF-1C					
Assail	8.0 oz./A	CM, AM					
10. Calypso	4.0 fl.oz./A	P	< 0.1 a	3.1 b	1.8 c	0.6 a	27.5 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			0.1 a	0.4 a	0.3 ab	1.6 b	34.7 a
P value for transformed data			0.0839	0.3595	0.0223	0.2722	0.0871

[a] Evaluation made on Red Delicious cultivar on July 1. 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.

Table 6b Evaluations Of Insecticide Schedules For Managing the Mite Complex On Apple [A].
N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2014.

Treatment / Formulation	Rate	Timing	Number of Adult Mite / Leaf ERME	TSME	ZME	AMBE
1 Actara	5.5 oz./A	PF-1C	< 0.1 a	1.0 ab	0.5 ab	< 0.1 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				
2. Sivanto	14.0 oz./A	Bloom	< 0.1 a	0.2 a	0.6 ab	< 0.1 a
Actara	5.5 oz./A	PF-1C				
Delegate WG	6.0 oz./A	1st Gen CM + 14d				
Belt	5.0 fl.oz./A	2nd Gen CM + 14d				
Leverage 360	2.8 fl.oz./A	BMSB				
Assail	8.0 oz./A	AM				
3. Actara	5.5 oz./A	PF-1C	0.1 a	0.6 ab	0.2 a	0.2 a
CYNT	3.57 fl.oz./A	1st Gen CM + 14d				
+ LI-700	0.5%	1st Gen CM + 14d				
Assail	8.0 oz./A	AM				
4. Actara	5.5 oz./A	PF-1C	0.1 a	1.1 ab	< 0.1 a a	0.2 a
AgriMek 0.70SC	2.6 fl.oz./A	PF				
CYNT	3.57 fl.oz./A	1st Gen CM + 14d				
+ LI-700	0.5%	1st Gen CM + 14d				
Assail	8.0 oz./A	AM (5-8C)				
5. Actara	5.5 oz./A	PF-1C	< 0.1 a	0.7 ab	0.1 a	0.1 a
AgriMek 0.70SC	2.6 fl.oz./A	PF				
CYNT +LI	4.92 fl.oz./A	1st Gen CM + 14d				
+ LI-700	0.5%	1st Gen CM + 14d				
Assail	8.0 oz./A	AM (5-8C)				
6. Actara	5.5 oz./A	PF-1C	< 0.1 a	2.4 ab	0.4 abc	< 0.1 a
Exirel	13.5 fl.oz./A	1st & 2nd Gen CM + 14d				
+ LI-700	0.5%	1st & 2nd Gen CM + 14d				
Assail	8.0 oz./A	AM				
7. Centaur 70WDG	46.0 oz./A	DD	< 0.1 a	0.2 ab	0.6 abc	< 0.1 a
Actara	5.5 oz./A	PF-1C				
Assail	8.0 oz./A	CM, AM				
8. Lorsban 4E	64.0 fl.oz./A	DD	< 0.1 a	2.1 ab	3.1 c	0.4 a
Actara	5.5 oz./A	PF-1C				
Assail	8.0 oz./A	CM, AM				
9. Centaur 70WDG	46.0 oz./A	PF	< 0.1 a	5.4 ab	0.4 a	0.1 a
Actara	5.5 oz./A	PF-1C				
Assail	8.0 oz./A	CM, AM				
10. Calypso	4.0 fl.oz./A	P	0.1 a	6.2 b	2.5 bc	0.3 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			0.4 a	0.7 ab	0.2 a	0.1 a
P value for transformed data			0.8338	0.4413	0.0469	0.6271

[a] Evaluation made on Red Delicious cultivar on July 1. 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.

Table 7a Evaluations Of Insecticide Schedules For Controlling Insect Complex On Apple During Harvest[a]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2013.

	Treatment / Formulation	Rate/Timing	Mean Incidence of insect damage [1] PC	EAS	TPB	E Lep	Int. Lep	AMp	AMt	SJS	CM 1st G.	CM 2nd G	CLEAN
1	Actara Movento Belt Delegate WG Leverage 360 Assail	5.5 oz./A 9.0 fl.oz./A 5.0 fl.oz./A 6.0 oz./A 2.8 fl.oz./A 8.0 oz./A	15.4 a	0.5 a	1.4 bc	1.8 a	1.4 a	1.4 a	1.4 a	18.8 abc	0.3 a	0.5 a	62.9 bc
2	Sivanto Actara Delegate WG Belt Leverage 360 Assail	14.0 oz./A 5.5 oz./A 6.0 oz./A 5.0 oz/A 2.8 oz./A 8.0 oz./A	12.6 a	0.5 a	0.0 a	0.0 a	0.3 a	1.0 a	1.0 a	11.4 ab	0.3 a	0.0 a	76.1 c
3	Actara CYNT Assail	5.5 oz./A 3.57 fl.oz./A 8.0 oz./A	8.6 a	0.3 a	0.6 abc	0.8 a	0.3 a	0.5 a	0.3 a	39.0 bc	0.0 a	0.0 a	50.9 b
4	Actara AgriMek 0.70SC CYNT Assail	5.5 oz./A 2.6 fl.oz./A 3.57 fl.oz./A 8.0 oz./A	10.0 a	0.0 a	0.5 ab	0.3 a	0.5 a	1.8 a	0.5 a	26.1 bc	0.0 a	0.8 ab	62.6 bc
5	Actara AgriMek 0.70SC CYNT Assail	5.5 oz./A 2.6 fl.oz./A 4.92 fl.oz./A 8.0 oz./A	14.3 a	0.0 a	0.3 ab	0.0 a	0.0 a	0.3 a	0.3 a	2.0 a	0.0 a	0.0 a	83.5 c
6	Actara Exirel Assail	5.5 oz./A 13.5 fl.oz./A 8.0 oz./A	8.2 a	0.3 a	0.0 a	1.1 a	0.0 a	1.1 a	1.1 a	11.4 abc	0.3 a	0.5 a	71.7 bc
7	Lorsban 4E Actara Assail	64 oz/A 5.5 oz./A 8.0 oz./A	11.1 a	0.0 a	0.0 a	1.3 a	4.6 a	0.0 a	0.0 a	3.6 a	1.9 a	0.9 ab	77.1 c
8	Lorsban 4E Actara Assail	64.0 fl.oz./A 5.5 oz./A 8.0 oz./A	7.5 a	0.3 a	0.0 a	1.5 a	3.2 a	1.7 a	1.0 a	0.5 a	0.5 a	0.3 a	86.8 c
9	Centaur 70WDG Actara Assail	46.0 oz./A 5.5 oz./A 8.0 oz./A	5.0 a	0.3 a	0.0 a	1.5 a	1.5 a	0.8 a	0.8 a	1.3 a	0.3 a	0.8 ab	88.9 c
10	Calypso Calypso Altacor Danitol Thionex 50WP Bifenthrin EC	4.0 fl.oz./A 6.0 fl.oz./A 4.5 oz./A 21.3 fl.oz./A 4.0 lb./A 12.8 fl.oz./A	5.0 a	0.0 a	0.3 ab	1.5 a	0.0 a	0.3 a	0.3 a	21.5 abc	0.0 a	0.0 a	73.5 bc
11	Untreated		50.3 b	0.3 a	1.9 c	16.7 b	24.1 b	6.7 b	4.4 b	10.0 ab	2.7 a	2.3 b	23.9 a

1. Evaluation of McIntosh cultivar harvested 27 August. Mean separation by Fishers Protected LSD (P≤ 0.05). Treatment means followed by the same letter are not significantly different. Trmts 1 received LI700 at 0.5% @ 1C, with trmts 3-6 at 0.5% @1st & 2nd Gen CM + 14d.

Table 7ab Evaluations Of Insecticide Schedules For Controlling Insect Complex On Apple During Harvest[a]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2013.

	Treatment / Formulation	Rate/Timing	Mean Incidence of insect damage[1] PC	EAS	TPB	E Lep	Int. Lep	AMp	AMt	SJS	CM 1st G.	CM 2nd G	CLEAN
1	Actara	5.5 oz./A	13.1 ab	1.1 a	2.1 a	6.8 a	2.8 abcd	5.9 ab	5.4 ab	0.8 a	2.3 ab	1.5 ab	64.4 bcd
	Movento	9.0 fl.oz./A											
	Belt	5.0 fl.oz./A											
	Delegate WG	6.0 oz./A											
	Leverage 360	2.8 fl.oz./A											
	Assail	8.0 oz./A											
2	Sivanto	14.0 oz./A	10.8 ab	0.0 a	3.5 a	4.8 ab	4.0 abcd	9.0 ab	8.0 ab	1.3 a	6.0 b	2.5 abc	62.3 b
	Actara	5.5 oz./A											
	Delegate WG	6.0 oz./A											
	Belt	5.0 oz/A											
	Leverage 360	2.8 oz./A											
	Assail	8.0 oz./A											
3	Actara	5.5 oz./A	10.8 ab	1.0 a	2.8 a	3.8 ab	1.0 abc	3.5 ab	3.0 ab	7.0 a	0.8 a	0.5 a	73.5 bcde
	CYNT	3.57 fl.oz./A											
	Assail	8.0 oz./A											
4	Actara	5.5 oz./A	6.1 ab	1.0 a	2.6 a	2.4 a	0.3 a	3.6 ab	3.1 ab	1.3 a	1.6 ab	0.8 ab	81.1 de
	AgriMek 0.70SC	2.6 fl.oz./A											
	CYNT	3.57 fl.oz./A											
	Assail	8.0 oz./A											
5	Actara	5.5 oz./A	4.6 ab	0.3 a	2.9 a	4.2 ab	2.6 abcd	3.5 ab	2.0 a	3.6 a	0.5 a	0.3 a	78.5 cde
	AgriMek 0.70SC	2.6 fl.oz./A											
	CYNT	4.92 fl.oz./A											
	Assail	8.0 oz./A											
6	Actara	5.5 oz./A	6.1 ab	0.8 a	2.3 a	3.6 ab	0.5 ab	1.0 ab	1.0 a	1.0 a	1.1 ab	0.5 a	82.6 e
	Exirel	13.5 fl.oz./A											
	Assail	8.0 oz./A											
7	Lorsban 4E	64 oz/A	5.9 ab	0.5 a	1.7 a	9.4 bc	6.9 bcd	6.8 ab	6.2 ab	0.3 a	3.7 ab	3.5 abc	65.9 bcd
	Actara	5.5 oz./A											
	Assail	8.0 oz./A											
8	Lorsban 4E	64.0 fl.oz./A	23.9 b	0.8 a	3.5 a	7.9 abc	7.5 cd	5.2 ab	3.9 ab	0.5 a	4.5 ab	8.0 d	59.4 b
	Actara	5.5 oz./A											
	Assail	8.0 oz./A											
9	Centaur 70WDG	46.0 oz./A	3.3 a	0.5 a	1.3 a	7.0 abc	4.5 abcd	3.8 ab	3.0 ab	0.8 a	4.8 ab	4.8 bc	72.0 bcde
	Actara	5.5 oz./A											
	Assail	8.0 oz./A											
10	Calypso	4.0 fl.oz./A	13.9 ab	0.5 a	5.8 a	7.3 abc	2.3 abcd	3.6 ab	3.4 ab	2.5 a	2.6 ab	1.6 ab	63.9 bc
	Calypso	6.0 fl.oz./A											
	Altacor	4.5 oz./A											
	Danitol	21.3 fl.oz./A											
	Thionex 50WP	4.0 lb./A											
	Bifenthrin EC	12.8 fl.oz./A											
11	Untreated		51.1 c	0.8 a	3.6 a	13.6 c	8.2 d	10.7 b	10.4 b	1.3 a	3.4 ab	6.5 cd	23.9 a

1. Evaluation made on Ginger Gold cultivar harvested XX September. Mean separation by Fishers Protected LSD (P≤ 0.05). Treatment means followed by the same letter are not significantly different. Trmts 1 received LI700 at 0.5% @ 1C, with trmts 3-6 at 0.5% @1st & 2nd Gen CM + 14d.

APPLE: Malus domestica, cv. 'Red Delicious'

Brown marmorated stink bug (BMSB) *Halyomorpha halys* (Stål, 1855)

EVALUATION OF INSECTICIDES FOR CONTROLLING BMSB ON APPLE, 2014 –Hudson Valley Research Laboratory: Treatments were applied to four-tree plots of four varieties replicated four times in a randomized complete block design Treatments were applied dilute to runoff using a high-pressure handgun sprayer operated at 300 psi, delivering 1.3 to 1.9 gal/tree or 130 to 190 gal/acre with the range in gallonage representing the increasing amounts of foliage as the season progressed. All insecticide dilutions (presented as amt./100 gal) are based on a standard of 300 gal/acre trees. Maintenance applications for disease control and crop load reduction were made using a John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph. Trees on the M.26 rootstock were 19 yr-old, maintained at approximately 10 ft high and planted to a research spacing of 10' x 30'. Alternate rows of unsprayed trees were adjacent to treated plots maintained for drift reduction, increased insect distribution and population pressure.

Season long treatments were applied on various schedules as shown in Table 7. Dates corresponding to tree phenology for McIntosh occurred for green tip GT on 14 April, 1/2" Green on 18 April, TC on 28 April, Pink on 6 May, King Bloom on 12 May, PF on 17 May @ 80% PF of 'McIntosh. PF appl. on 17 May, 1C on 27 May, 2C on 27 May, 3C on 6 June, 4C on 20 June, 5C on 18 July, 6C on 30 July. 1st gen. CM $220DD_{43}$ on 6 June; 2nd appl. 1st Gen. CM on 20 June; 2nd Gen. CM appl. on 18 July. AM threshold on 18 July, BMSB 2nd generation trap threshold 3 and 17 August.

Applications for crop load management and disease control included: Dithane DF at 3 lbs./A on 22 April, Dithane DF 3 lbs./A and Firewall 17WP at 2 lbs./A, Rally 40WSP at 4.0 oz./A on 11 & 17 May, NAA at 2.0 oz./100 plus 0.25% Biocover oil on 25 May, Captan 80WDG at 3 lbs./A on 22 June, Captan 80WDG at 3 lbs./A and Rally 40WSP at 4.0 oz./A on 14 July, Captan 80WDG at 3 lbs./A and Topsin M at 14.0 oz./A on 3, 17 August. Drought conditions during late-summer reduced the need for further fungicide applications.

We collected leaves from Red Delicious perimeter limbs in each of 8 treatments, 24 hours after the 3 and 17 August application (Table 8). One 2nd generation BMSB nymph, or one 1st generation male or female adult was introduced to 1 center 1 cm segment of 10-leaf samples layered along the edge of 8 oz. plastic containers. BMSB was assessed after 24 hours given a 1-3 rating with 1=: live (Green), 2 = Moribund (movement or flexible limbs (Blue)), 3 = dead (stiff limbs (Red)). Generally, nymph mortality was higher then adult with Danitol < Bifenthrin < Thionex having highest degree of efficacy (Graphs 1). Combined bioassay results taken from two application dates from treated foliage after 7d (Graphs 2). From red delicious harvest assessments, all programs showed significant reduction of damage compared to the UTC , where 1=low or 1 sting, 2=medium or 2-5 stings and 3=high greater then 5 stings from BMSB fruit feeding (Graph 3).

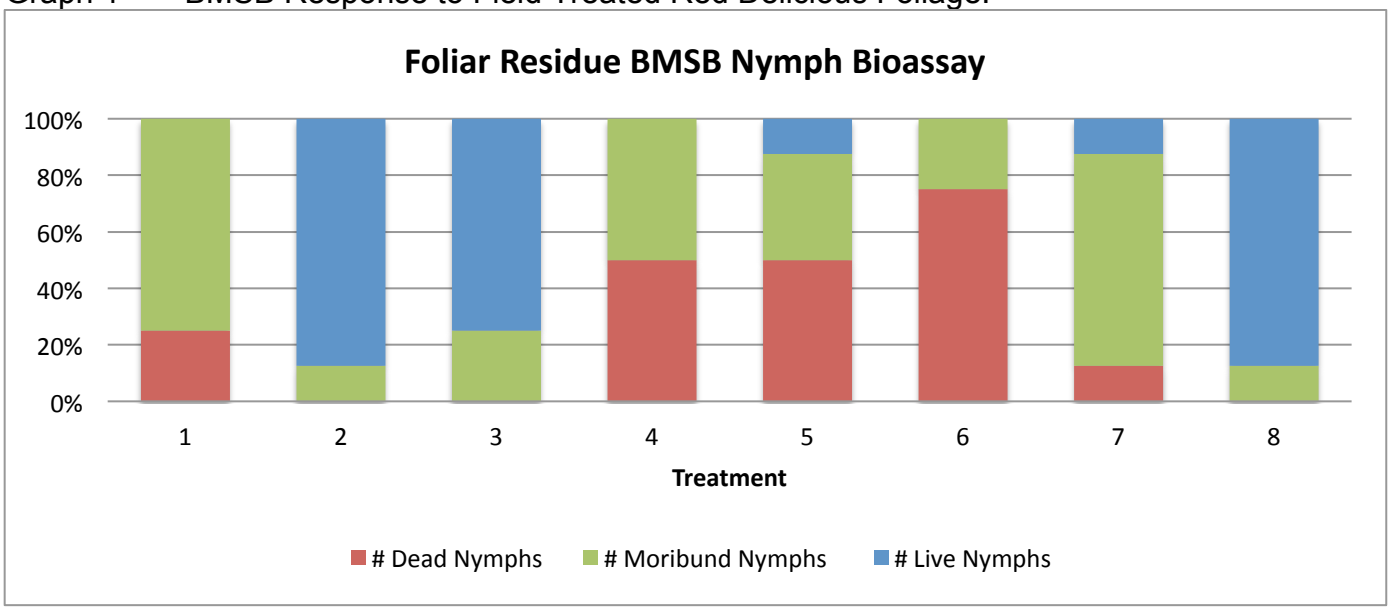
To stabilize variance, percent data were transformed using arcsine(Sqrt(x)) conducted prior to analysis. For numeric data, $\log_{10}(x+1)$ transformation was used. Mean separation by Fishers Protected LSD ($P \leq 0.05$). Treatment means followed by the same letter are not significantly different.

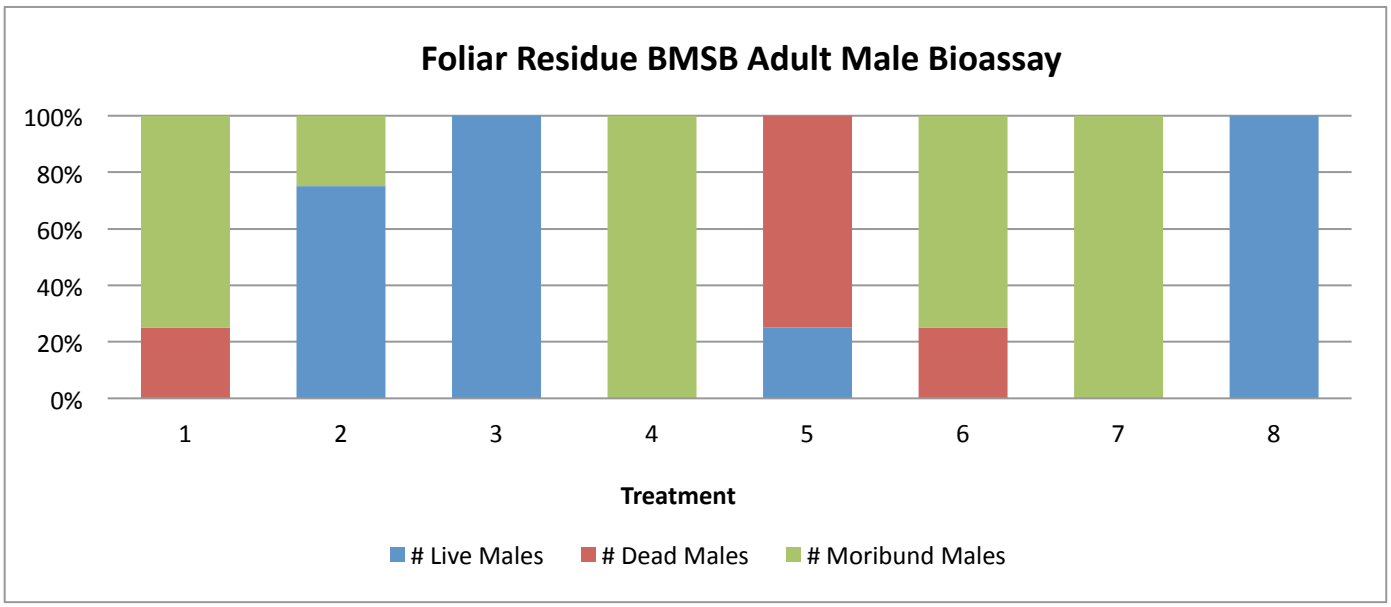
Table 8 Treatment Schedule For Seasonal Apple Insecticide Screen.
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y. - 2014.

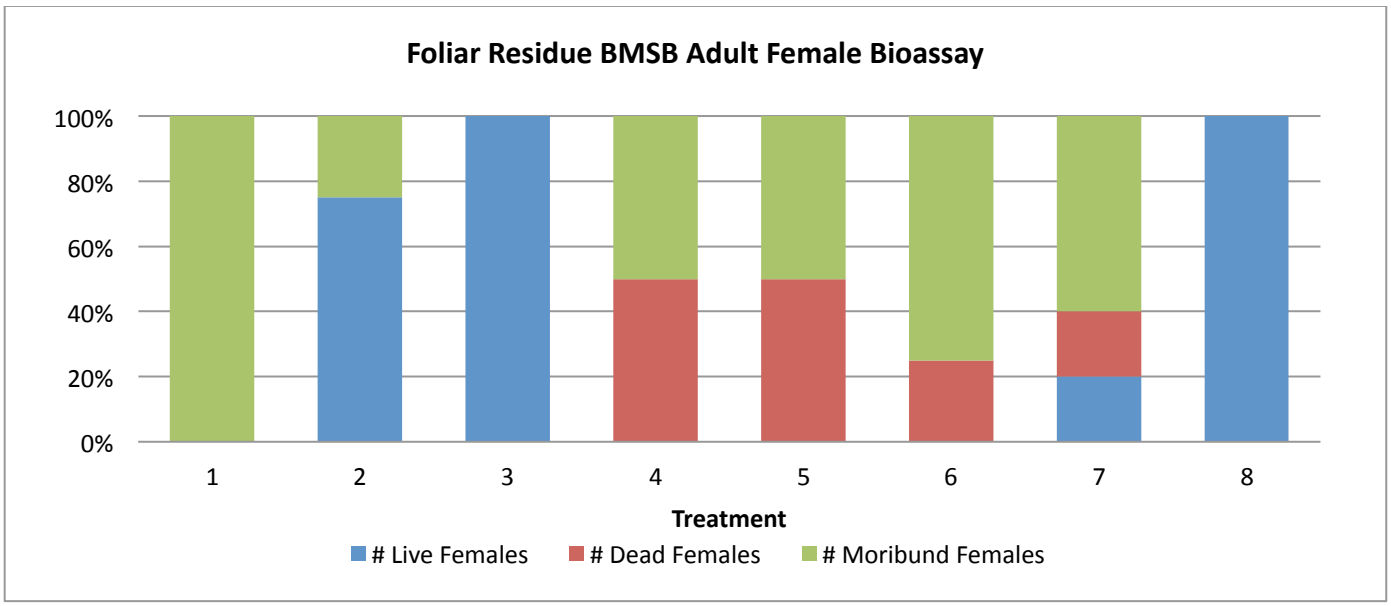
Treatment / Formulation	Rate	Timing	Application Dates
1. Lorsban-4E	64.0 oz./A	P	6 May
Actara	5.5 oz./A	PF-1C	17, 27 May
Bifenthure 10DF	32.0 oz./A	4C	20 June
Danitol 2.4EC	16.0 fl.oz./A	5,8, 9C	18 July, 3, 17 August
2. Lorsban-4E	64.0 fl.oz./A	P	6 May
Actara	5.5 oz./A	PF-1C	17, 27 May
Thionex 50W	2.0 lbs./A	4-5C	20 June, 18 July
Closer	3.0 fl.oz	8, 9C	3, 17 August
3. Lorsban-4E	64.0 oz./A	P	6 May
Actara	5.5 oz./A	PF-1C	17, 27 May
Closer	5.75 fl.oz	8, 9C	3, 17 August
4. Lorsban-4E	64.0 oz./A	P	6 May
Actara	5.5 oz./A	PF-1C	17, 27 May
Bifenthure 10DF	32.0 oz./A	8, 9C	3, 17 August
5. Lorsban-4E	64.0 oz./A	P	6 May
Actara	5.5 oz./A	PF-1C	17, 27 May
Lannate	48.0 fl.oz./A	8, 9C	3, 17 August
6. Lorsban-4E	64.0 oz./A	P	6 May
Actara	5.5 oz./A	PF-1C	17, 27 May
Thionex 50W	2.0 lbs./A	8, 9C	3, 17 August
7. Lorsban-4E	64.0 oz./A	P	6 May
Actara	5.5 oz./A	PF-1C	17, 27 May
Leverage 2.7SC	5.1 fl.oz./A	8, 9C	3, 17 August
8. UNTREATED			-

Treatments were applied dilute to runoff using a high-pressure handgun sprayer operated at 300 psi, delivering 1.3 to 1.9 gal/tree or 130 to 190 gal/acre with the range in gallonage representing the increasing amounts of foliage as the season progressed. All insecticide dilutions (presented as amt./100 gal) are based on a standard of 300 gal/acre tre

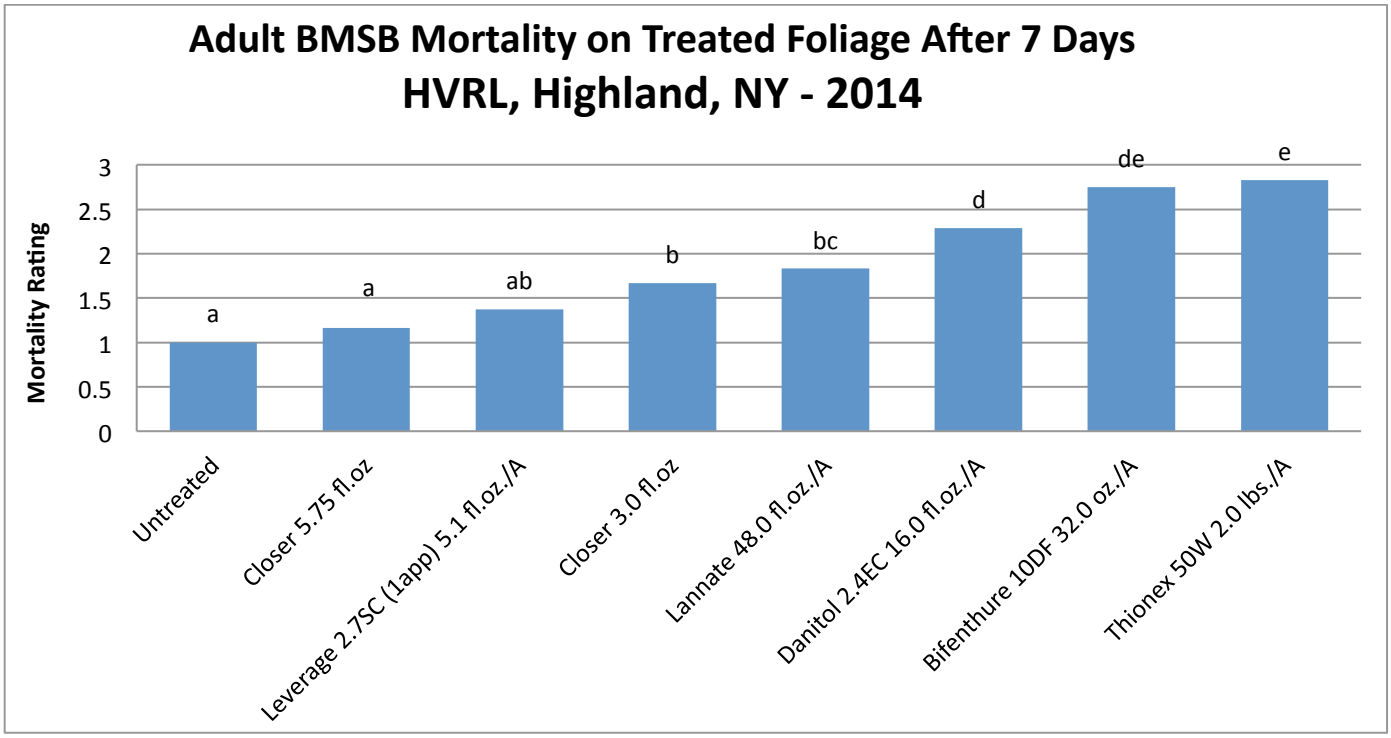
Graph 1 BMSB Response to Field Treated Red Delicious Foliage.

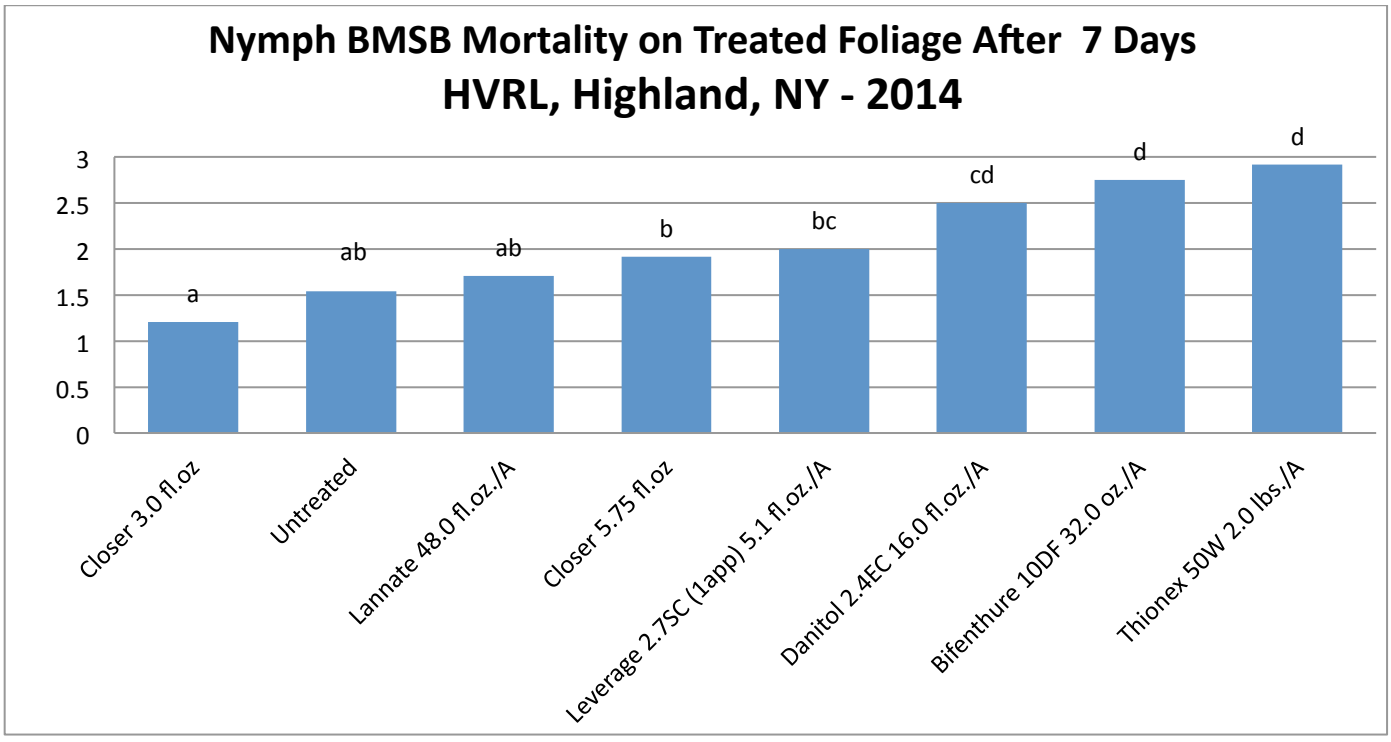




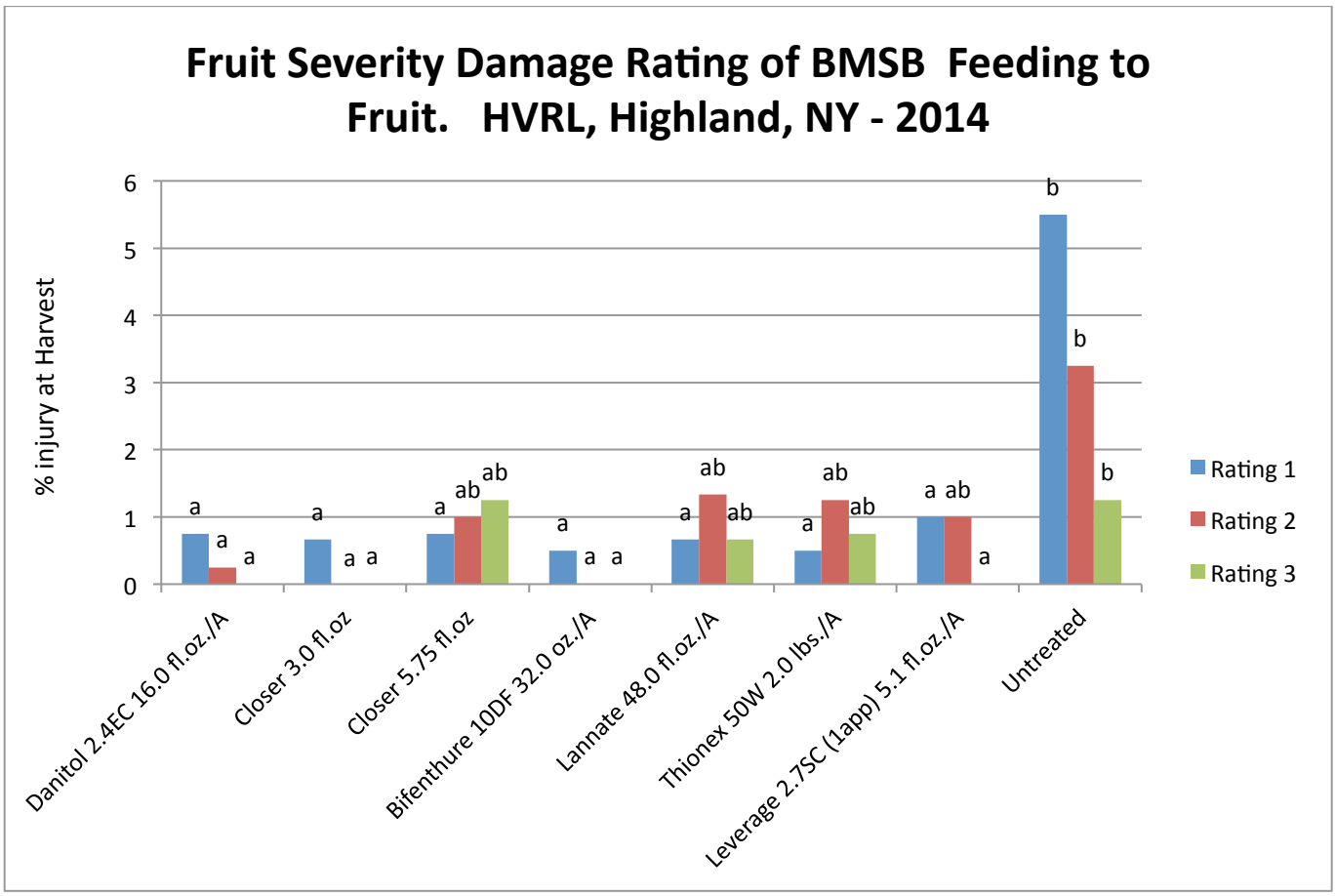


Graph 2. BMSB Adult and Nymph Cumulative Response to Field Treated Red Delicious Foliage.





Graph 3. Red Delicious Fruit Severity Damage Rating of BMSB Feeding to Fruit at Harvest.



PEAR: *Pyrus communis* L. 'Bartlett', 'Bosc'

Pear psylla: *Cacopsylla pyricola* (Foerster)
Codling moth (CM): *Cydia pomonella* (Linnaeus)
Pear rust mite (PRM): *Epitrimerus pyri*
Fabraea Leaf Spot (FLS) *Fabraea maculata*

EFFICACY OF INSECTICIDES AGAINST PEAR PSYLLA ADULTS, EGGS AND NYMPHS, 2014: – Cornell University's Hudson Valley Lab: Treatments were applied to four-tree plots replicated six times in a RCB design. Each plot contained two trees each of 'Bartlett' and 'Bosc' cultivars, spaced 12 x 18 ft, 12 ft in height, and 34 years old. All dilutions are based on 400 gallons/acre with plot requirements ranging from 20 to 50 gallons increasing seasonally with developing canopy. Treatments were applied dilute to runoff using a tractor mounted high-pressure handgun sprayer operated at 300 psi delivering >350 GPA.

Treatments were applied on various schedules as shown in Table 8. Application dates corresponding to tree phenology of 'Bartlett' beginning at onset of 1st egg on 7 April; Swollen Bud on 15 April; delayed dormant (DD) application on 25 April, Green Cluster (GC) on 28 April, 1st observed nymph on 1 May, white bud (WB) on 11 May; First Bloom on 12 May, Petal Fall application on 17 May, 9mm fruit set on 27 May, 10 day post petal fall (10d pPF) on 1 June; 20 day post petal fall (20d pPF) on 20 June.

Scheduled applications were made against the pear insect complex with early applications targeting overwintering adult and first generation of pear psylla and evaluations made to determine the treatment effects on adult, egg and nymph populations **(Tables 12-13)**. During the period from bud burst through 1st cover, evaluations to determine treatment effects on springform adult ovipositional deterrence, including subsequent 1st generation nymph emergence were conducted. Pre-bloom evaluations began on 2 & 6 May, in which 25 fruiting buds per treatment were evaluated. Subsequent application schedules were designed to evaluate treatments against the latter 1st and early 2nd generation pear psylla adult, egg, nymph and pear rust mite populations. Psylla nymph, egg and rust mite numbers were assessed by collecting leaf samples on shoots beginning with 25 basal leaves of 5 shoots on 2 May and continuing for subsequent evaluations by removing 1 distal, 1 proximal and 3 mid-shoot leaves of 5 shoots per treatment through the remainder of the season. Sampling of foliage for the presence of psylla nymphs were conducted on 2, 6, 21 May, 4, 17 June, 2, 16 July. Samples were removed to the laboratory where target pests were counted using a binocular scope. The transformation using the Log_{10} (X + 1) was applied for foliar evaluations. To stabilize variance, percentage data were transformed by arcsine *(square root of x) prior to analysis. Fisher's Protected LSD (P=<0.05) was performed on all data; untransformed data are presented in each table.

Table 8 Treatment Schedule For Seasonal Pear Insecticide Screen.
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y. - 2014.

Treatment / Formulation	Rate	Timing	Application Dates
1 BioCover Oil	128.0 fl.oz./100	DD	25 April
M-Pede 49L	256.0 fl.oz./100	WB- EOS*	11 May, 17, 21 May, 1, 20 June
2. BioCover Oil	128.0 fl.oz./100	DD,WB, PF – EOS*	25 April, 11, 17, 21 May, 1, 20 June
+ Surround	12.5 lbs. /100	DD, WB, PF	25 April, 11 May, 21 May, 1 June
3. Surround	12.5 lbs./100	DD, WB, PF	25 April, 11, 17, 21 May,
BioCover Oil	128.0 fl.oz./100	1C – EOS*	20 June
4. BioCover Oil	128.0 fl.oz./100	DD	25 April
Asana XL	12.8 lbs. /100	DD	25 April
AgriMek	20.0 fl.oz./10	10pPF + 21d	1, 20 June
5. BioCover Oil	128.0 fl.oz./100	DD	25 April
Actara	5.5 fl.oz./A	DD	25 April
AgriMek	20.0 fl.oz./100	10pPF + 21d	1, 20 June
6. Oil	32.0 fl.oz./100	DD	25 April
Centaur 0.7WDG	32.0 oz./100	DD	25 April
AgriMek	20.0 fl.oz./100	10pPF + 21d	1, 20 June
7. Oil	32.0 fl.oz./100	DD	25 April
Esteem 35WP	5.0 oz./100	DD	25 April
AgriMek	20.0 fl.oz./100	10pPF + 21d	1, 20 June
8. Untreated control			

Treatments were applied dilute to runoff using a high-pressure handgun sprayer operated at 300 psi, delivering 1.3 to 1.9 gal/tree or 130 to 190 gal/acre with the range in gallonage representing the increasing amounts of foliage as the season progressed. All insecticide dilutions (presented as amt./100 gal) are based on a standard of 300 gal/acre tree. All treatment received Avaunt @ 6.0 oz./A on 17 May for plum curculio management.

Table 9 Evaluations Of Insecticide Schedules For Controlling Insect Complex On Pear [A]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. -2014.

				Pear psylla nymphs per bud/leaf					
	Treatment / Formulation	Rate	Timing	May 19	Jun 3	Jun 9	Jun 24	July 8	July 25
1	BioCover Oil	128.0 fl.oz./100	DD	2.6 b	0.7 ab	1.5 bc	6.7 b	2.3 a	0.7 a
	M-Pede 49L	256.0 fl.oz./100	WB- EOS*						
2	BioCover Oil	128.0 fl.oz./100	DD,WB,PF – EOS*	1.2 ab	0.4 a	1.2 ab	3.1 a	2.8 a	0.6 a
	+ Surround	12.5 lbs. /100	DD, WB, PF						
3	Surround	12.5 lbs./100	DD, WB, PF	0.7 a	0.4 a	0.7 a	4.0 ab	1.4 a	0.6 a
	BioCover Oil	128.0 fl.oz./100	1C – EOS*						
4	BioCover Oil	128.0 fl.oz./100	DD	0.7 a	1.1 bc	2.2 c	5.6 ab	2.6 a	0.3 a
	Asana XL	12.8 lbs. /100	DD						
	AgriMek	20.0 fl.oz./100	10pPF + 21d						
5	BioCover Oil	128.0 fl.oz./100	DD	2.5 b	1.4 c	2.0 c	3.3 ab	1.4 a	0.2 a
	Actara	5.5 fl.oz./A	DD						
	AgriMek	20.0 fl.oz./100	10pPF + 21d						
6	Oil	32.0 fl.oz./100	DD	1.5 ab	1.3 bc	1.8 bc	3.5 ab	2.1 a	0.4 a
	Centaur 0.7WDG	32.0 oz./100	DD						
	AgriMek	20.0 fl.oz./100	10pPF + 21d						
7	Oil	32.0 fl.oz./100	DD	2.3	1.5 cd	2.0 c	5.8 ab	2.6 a	0.5 a
	Esteem 35WP	5.0 oz./100	DD						
	AgriMek	20.0 fl.oz./100	10pPF + 21d						
8	UTC			4.7 c	2.1 d	2.0 c	4.1 ab	1.6 a	0.4 a
P value for transformed data				0.0001	0.0001	0.0017	0.2884	0.3899	0.8926

[a] Seasonal evaluations made on 'Bartlett'.

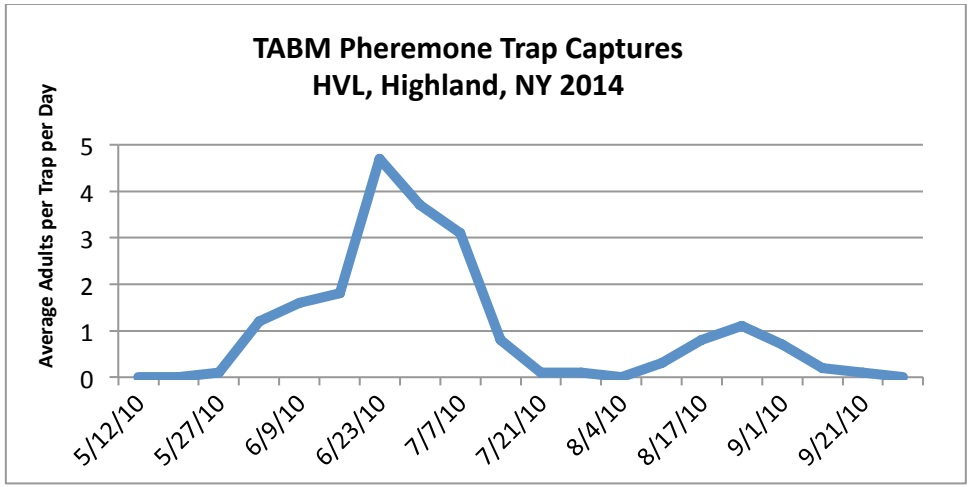
Percent data were transformed using $\log_{10}(x+1)$ conducted prior to analysis. Untransformed data are presented in each table. Mean separation by Fishers Protected LSD ($P \leq 0.05$). Treatment means followed by the same letter are not significantly different. Arithmetic means reported. Treatments were applied dilute to runoff using a high-pressure handgun sprayer operated at 300 psi, delivering 1.3 to 1.9 gal/tree or 130 to 190 gal/acre with the range in gallonage representing the increasing amounts of foliage as the season progressed. All insecticide dilutions (presented as amt./100 gal) are based on a standard of 300 gal/acre tree.

Table 10 Evaluations Of Insecticide Schedules For Controlling Seasonal Insect Complex On Pear [A]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2014.

				% Incidence of Damage using 0 – 3 scale*					
				Foliage			Fruit		
Treatment / Formulation		Rate	Timing	Sooty Mold	Scorch	Fabraea LS	Sooty Mold	Russet	Fabraea LS
1	BioCover Oil M-Pede 49L	128.0 fl.oz./100 256.0 fl.oz./100	DD WB- EOS*	0.3 b	0.2 b	0.8 a	< 0.1 a	1.4 c	< 0.1 a
2	BioCover Oil + Surround	128.0 fl.oz./100 12.5 lbs. /100	DD,WB,PF – EOS* DD, WB, PF	< 0.1 a	0.1 a	1.0 ab	< 0.1 a	0.7 a	0.1 a
3	Surround BioCover Oil	12.5 lbs./100 128.0 fl.oz./100	DD, WB, PF 1C – EOS*	0.1 a	0.1 ab	1.2 cd	< 0.1 a	0.7 a	0.1 a
4	BioCover Oil Asana XL AgriMek	128.0 fl.oz./100 12.8 lbs. /100 20.0 fl.oz./100	DD DD 10pPF + 21d	0.4 b	0.1 a	0.8 ab	< 0.1 a	1.1 b	0.1 a
5	BioCover Oil Actara AgriMek	128.0 fl.oz./100 5.5 fl.oz./A 20.0 fl.oz./100	DD DD 10pPF + 21d	0.4 b	0.1 ab	0.9 ab	< 0.1 a	1.1 b	0.1 a
6	Oil Centaur 0.7WDG AgriMek	32.0 fl.oz./100 32.0 oz./100 20.0 fl.oz./100	DD DD 10pPF + 21d	0.3 b	0.5 a	0.9 ab	< 0.1 a	1.0 b	0.1 a
7	Oil Esteem 35WP AgriMek	32.0 fl.oz./100 5.0 oz./100 20.0 fl.oz./100	DD DD 10pPF + 21d	0.4 b	0.1 ab	1.0 bc	0.5 a	1.1 b	0.3 b
8	UTC			2.0 c	0.4 c	1.4 d	0.5 b	1.8 d	0.2 b
P value for transformed data				0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

[a] Seasonal evaluations made on 'Bartlett' on July 17.

Percent data were transformed using $\log_{10}(x+1)$ conducted prior to analysis. Untransformed data are presented in each table. Mean separation by Fishers Protected LSD ($P \leq 0.05$). Treatment means followed by the same letter are not significantly different. Arithmetic means reported. Treatments were applied dilute to runoff using a high-pressure handgun sprayer operated at 300 psi, delivering 1.3 to 1.9 gal/tree or 130 to 190 gal/acre with the range in gallonage representing the increasing amounts of foliage as the season progressed. All insecticide dilutions (presented as amt./100 gal) are based on a standard of 300 gal/acre tree.


TABM Pheremone Trap Captures
HVL, Highland, NY 2014
Average Adults per Trap per Day
0
1
2
3
4
5
5/12/10
5/27/10
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6/23/10
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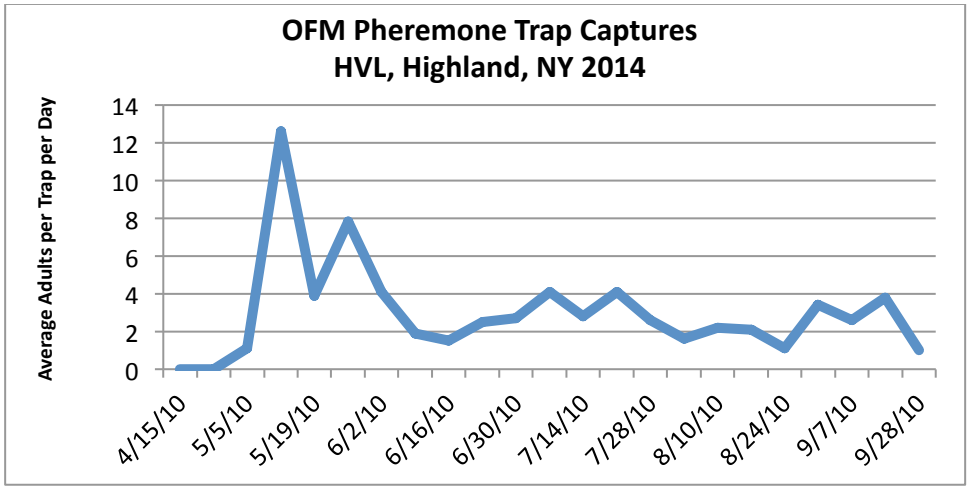
8/17/10
9/1/10
9/21/10


OFM Pheremone Trap Captures
HVL, Highland, NY 2014
Average Adults per Trap per Day
0
2
4
6
8
10
12
14
4/15/10
5/5/10
5/19/10
6/2/10
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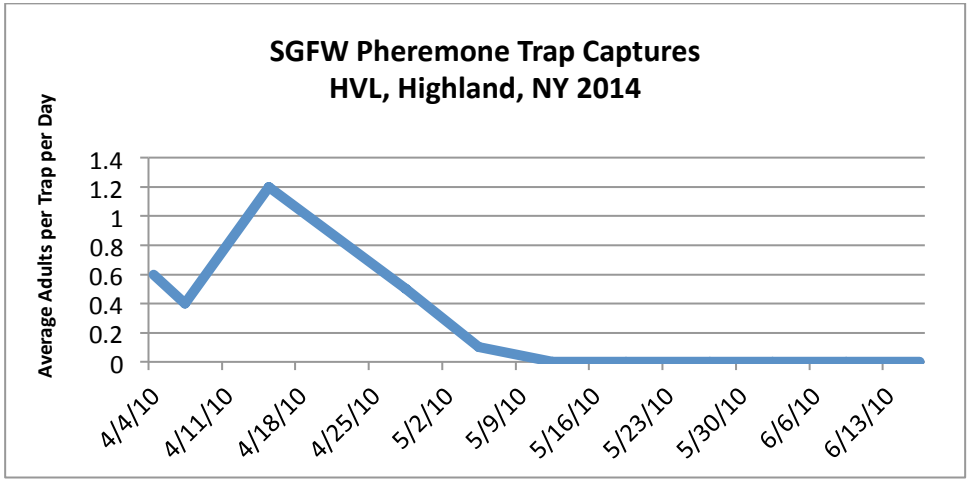
8/10/10
8/24/10
9/7/10
9/28/10


SGFW Pheremone Trap Captures
HVL, Highland, NY 2014
Average Adults per Trap per Day
0
0.2
0.4
0.6
0.8
1
1.2
1.4
4/4/10
4/11/10
4/18/10
4/25/10
5/2/10
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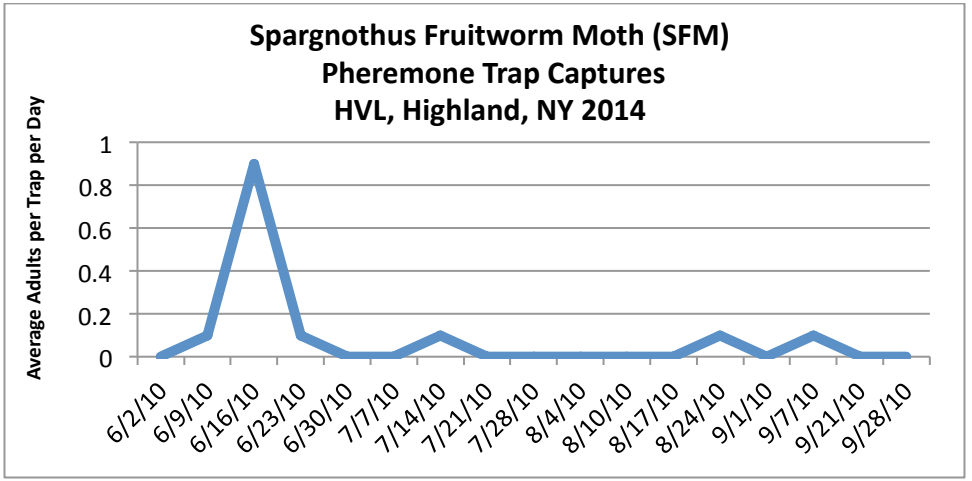
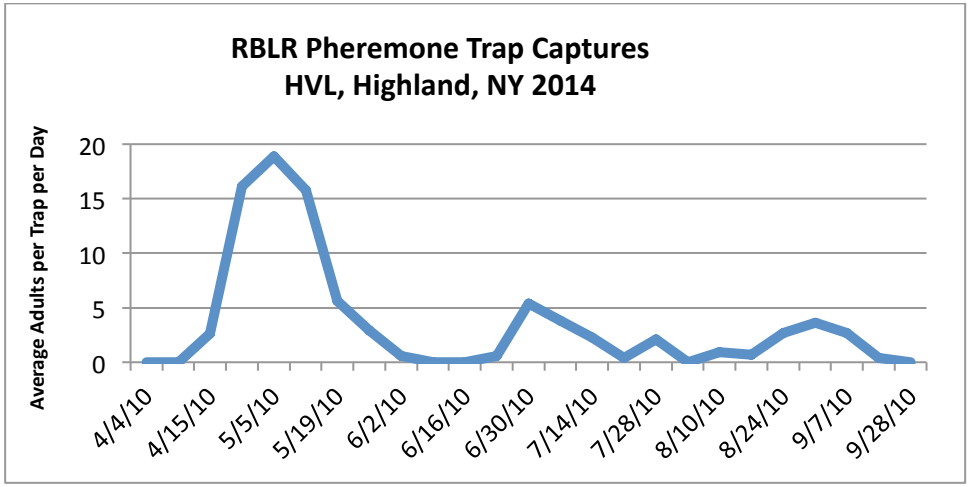
5/23/10
5/30/10
6/6/10
6/13/10


Spargnothus Fruitworm Moth (SFM)
Pheremone Trap Captures
HVL, Highland, NY 2014
Average Adults per Trap per Day
0
0.2
0.4
0.6
0.8
1
6/2/10
6/9/10
6/16/10
6/23/10
6/30/10
7/7/10
7/14/10
7/21/10
7/28/10
8/4/10
8/10/10
8/17/10
8/24/10
9/1/10
9/7/10
9/21/10
9/28/10


RBLR Pheremone Trap Captures
HVL, Highland, NY 2014
Average Adults per Trap per Day
0
5
10
15
20
4/4/10
4/15/10
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5/19/10
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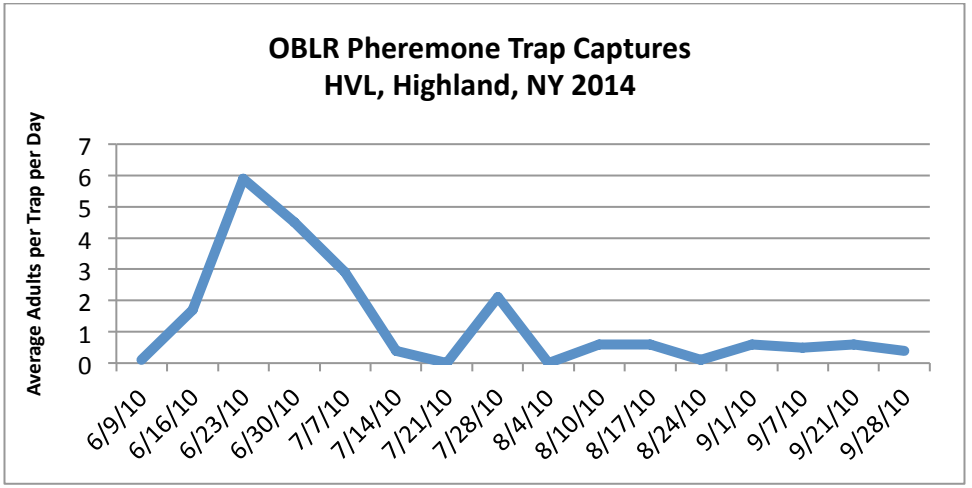
8/10/10
8/24/10
9/7/10
9/28/10


OBLR Pheremone Trap Captures
HVL, Highland, NY 2014
Average Adults per Trap per Day
0
1
2
3
4
5
6
7
6/9/10
6/16/10
6/23/10
6/30/10
7/7/10
7/14/10
7/21/10
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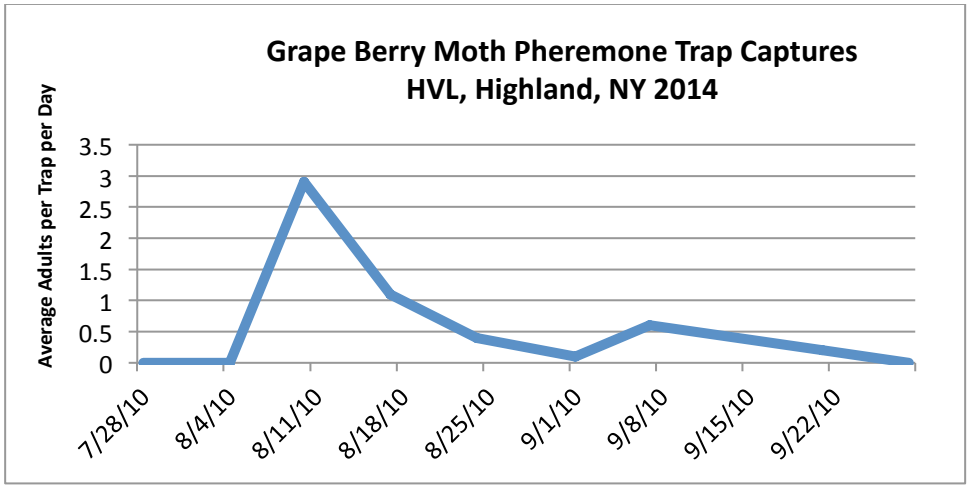
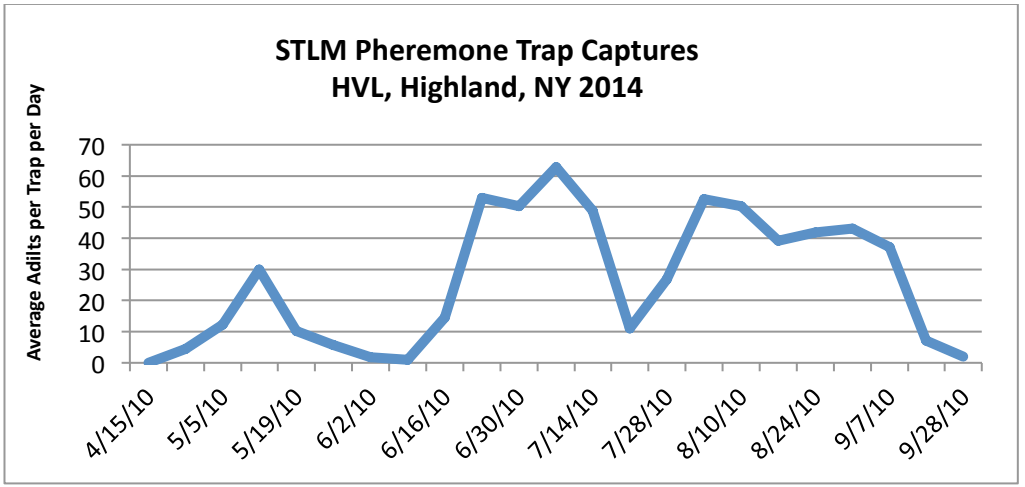
9/1/10
9/7/10
9/21/10
9/28/10


Grape Berry Moth Pheremone Trap Captures
HVL, Highland, NY 2014
Average Adults per Trap per Day
3.5
3
2.5
2
1.5
1
0.5
0
7/28/10
8/4/10
8/11/10
8/18/10
8/25/10
9/1/10
9/8/10
9/15/10
9/22/10


STLM Pheremone Trap Captures
HVL, Highland, NY 2014
Average Adilts per Trap per Day
70
60
50
40
30
20
10
0
4/15/10
5/5/10
5/19/10
6/2/10
6/16/10
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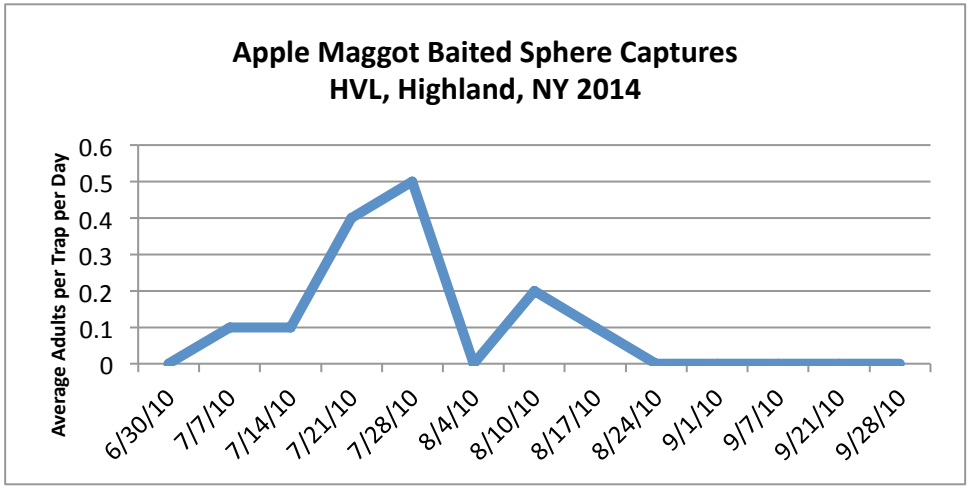
8/10/10
8/24/10
9/7/10
9/28/10


Apple Maggot Baited Sphere Captures
HVL, Highland, NY 2014
Average Adults per Trap per Day
0.6
0.5
0.4
0.3
0.2
0.1
0
6/30/10
7/7/10
7/14/10
7/21/10
7/28/10
8/4/10
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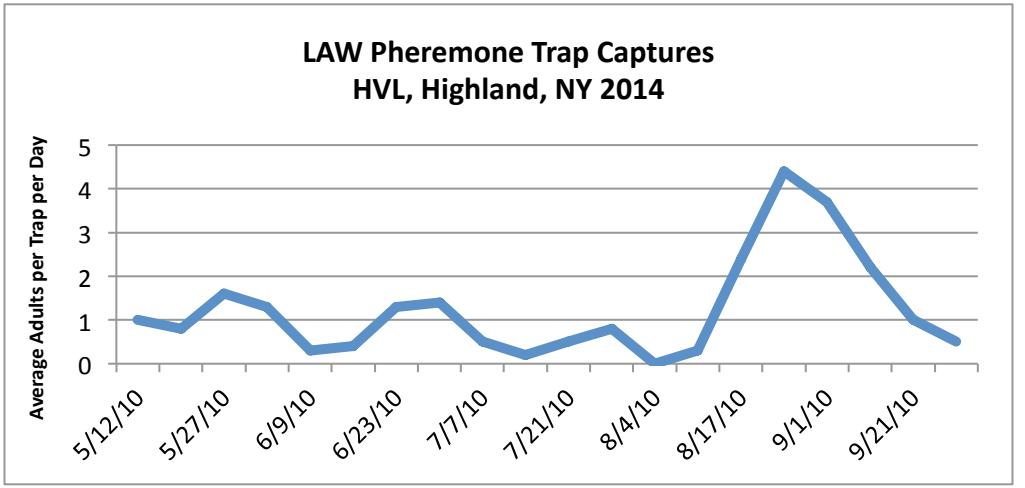
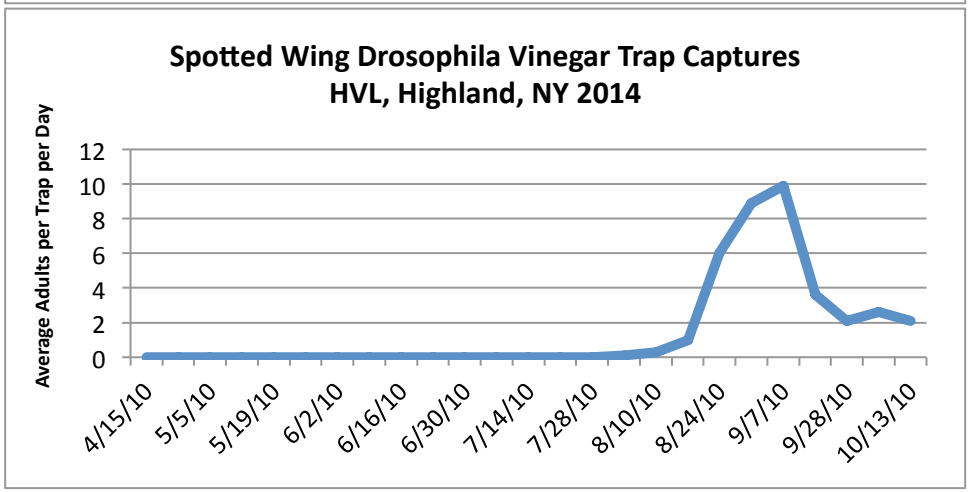
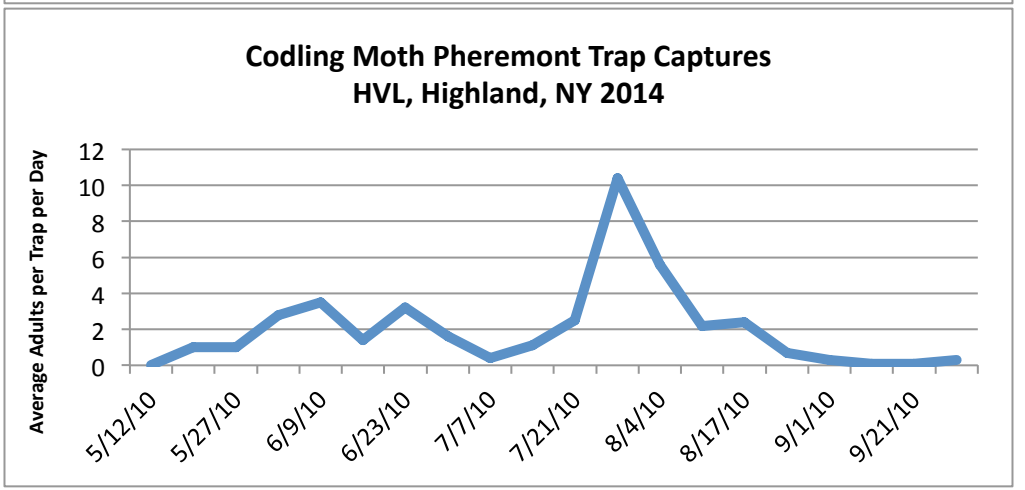
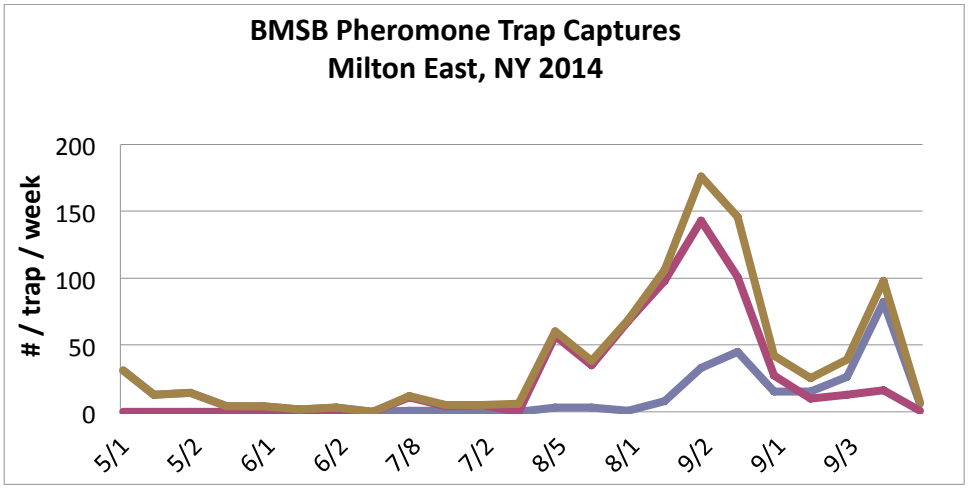
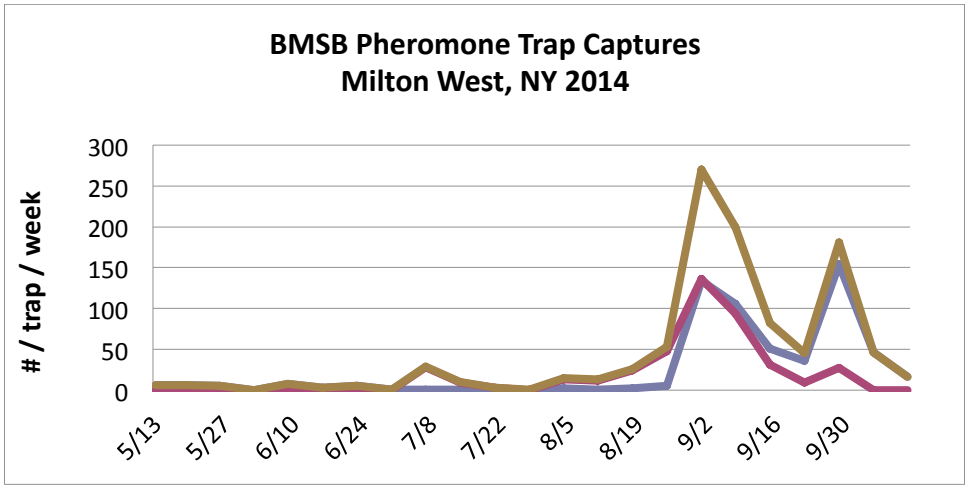
9/1/10
9/7/10
9/21/10
9/28/10

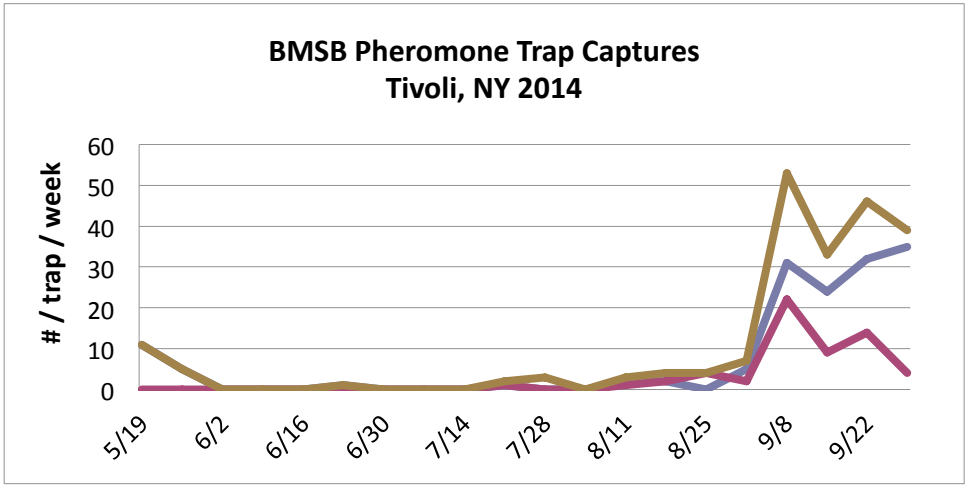

LAW Pheremone Trap Captures
HVL, Highland, NY 2014
Average Adults per Trap per Day
5
4
3
2
1
0
5/12/10
5/27/10
6/9/10
6/23/10
7/7/10
7/21/10
8/4/10
8/17/10
9/1/10
9/21/10

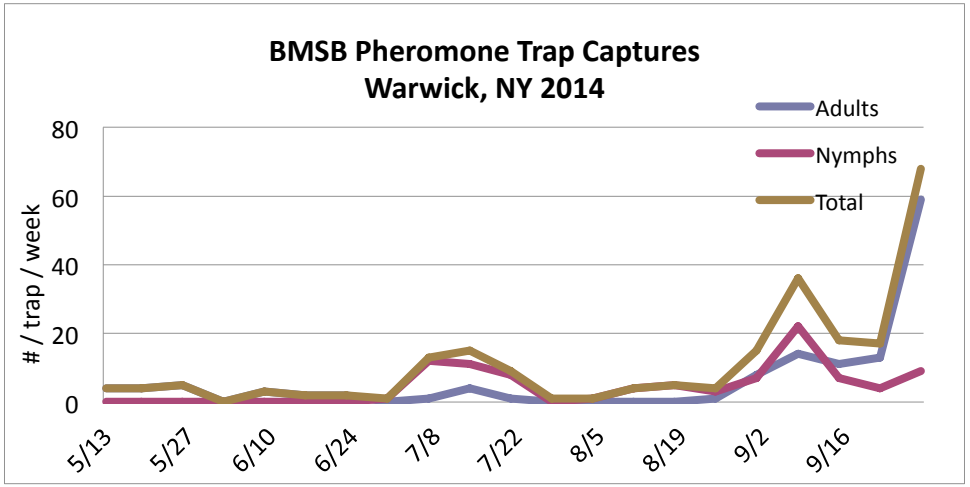

Spotted Wing Drosophila Vinegar Trap Captures
HVL, Highland, NY 2014
Average Adults per Trap per Day
12
10
8
6
4
2
0
4/15/10
5/5/10
5/19/10
6/2/10
6/16/10
6/30/10
7/14/10
7/28/10
8/10/10
8/24/10
9/7/10
9/28/10
10/13/10

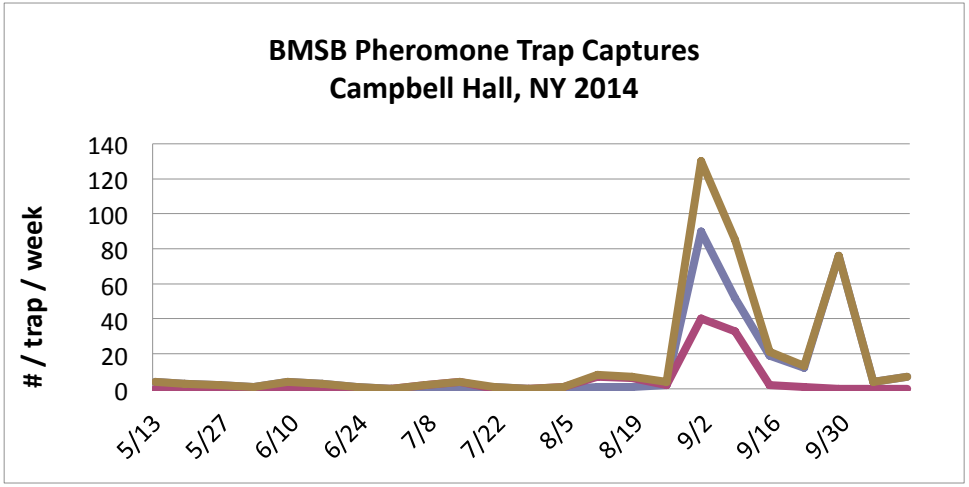

Codling Moth Pheremont Trap Captures
HVL, Highland, NY 2014
Average Adults per Trap per Day
12
10
8
6
4
2
0
5/12/10
5/27/10
6/9/10
6/23/10
7/7/10
7/21/10
8/4/10
8/17/10
9/1/10
9/21/10

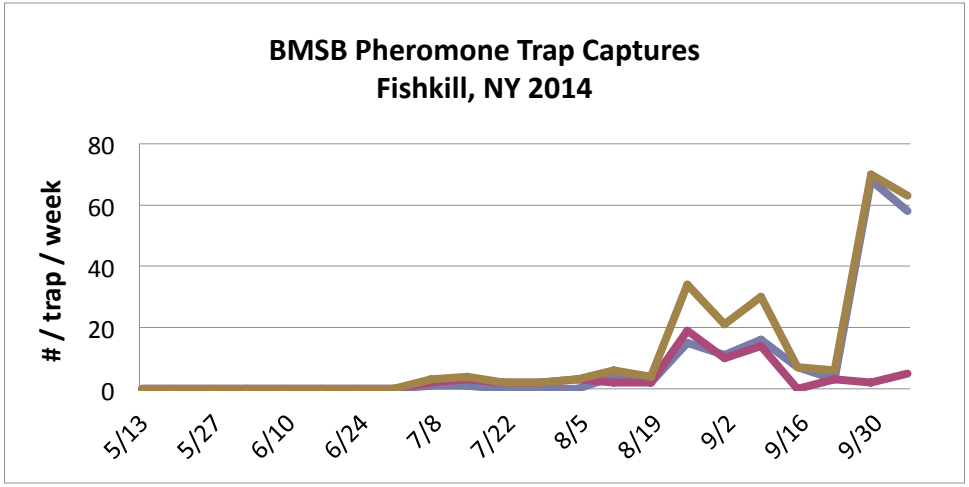

BMSB Pheromone Trap Captures
Milton East, NY 2014
/ trap / week
200
150
100
50
0
5/1
5/2
6/1
6/2
7/8
7/2
8/5
8/1
9/2
9/1
9/3

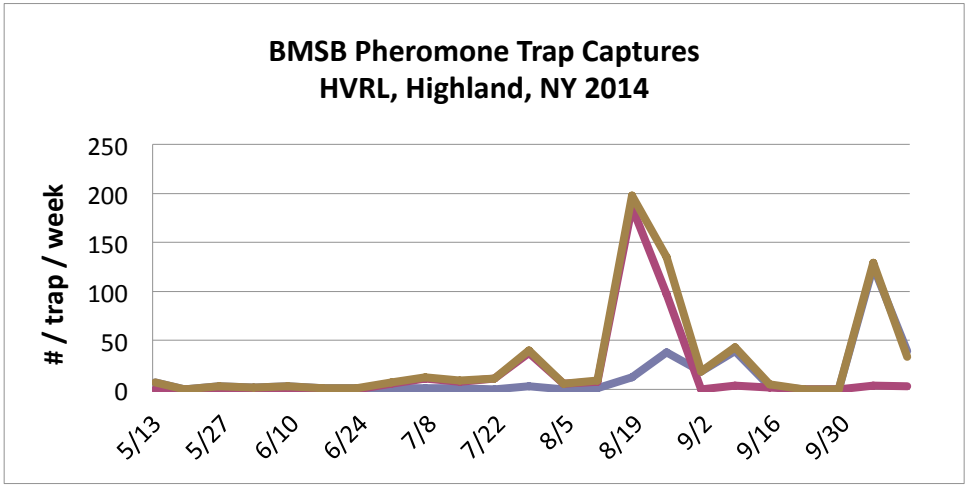

BMSB Pheromone Trap Captures
Milton West, NY 2014
/ trap / week
300
250
200
150
100
50
0
5/13
5/27
6/10
6/24
7/8
7/22
8/5
8/19
9/2
9/16
9/30

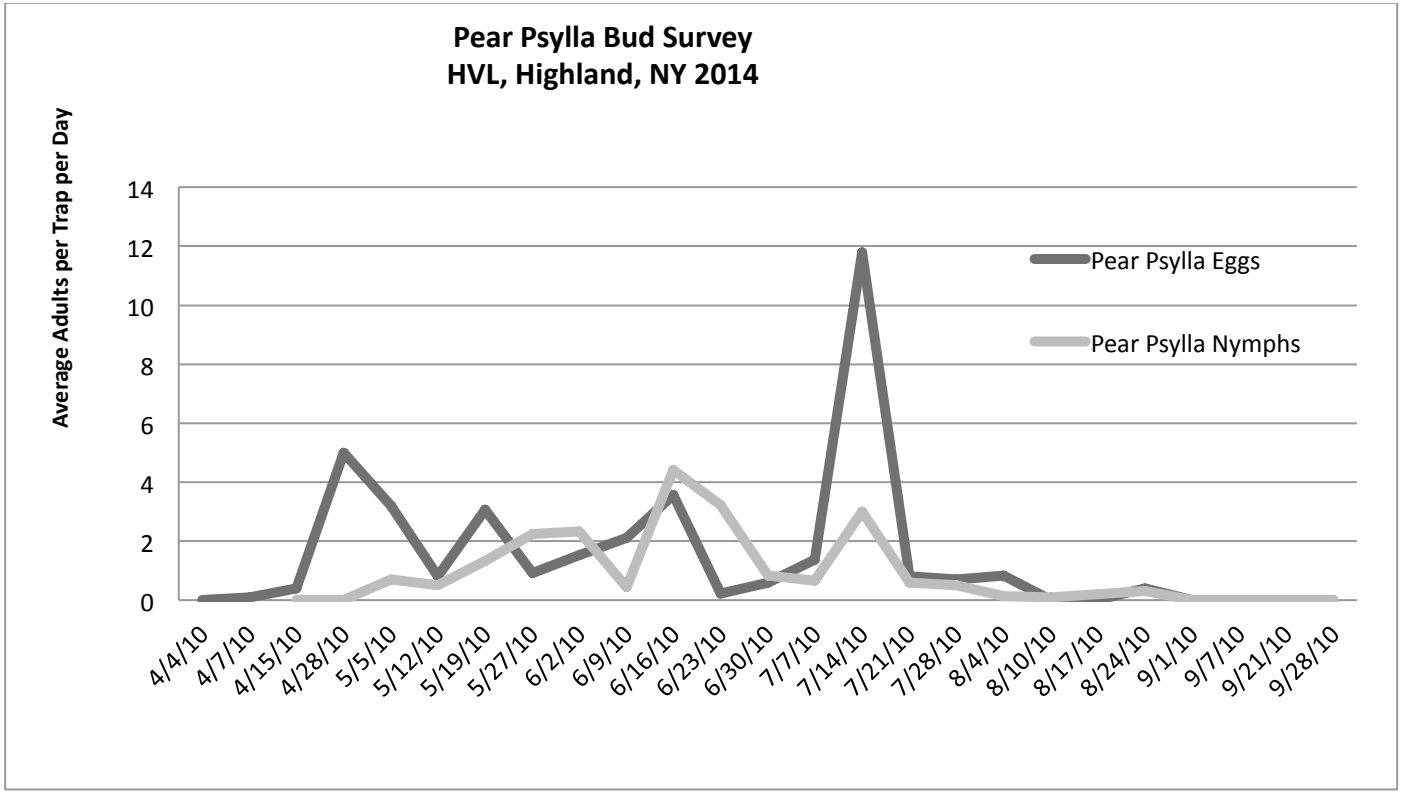

BMSB Pheromone Trap Captures
Tivoli, NY 2014
/ trap / week
60
50
40
30
20
10
0
5/19
6/2
6/16
6/30
7/14
7/28
8/11
8/25
9/8
9/22


BMSB Pheromone Trap Captures
Warwick, NY 2014
Adults
Nymphs
Total
/ trap / week
80
60
40
20
0
5/13
5/27
6/10
6/24
7/8
7/22
8/5
8/19
9/2
9/16


BMSB Pheromone Trap Captures
Campbell Hall, NY 2014
/ trap / week
140
120
100
80
60
40
20
0
5/13
5/27
6/10
6/24
7/8
7/22
8/5
8/19
9/2
9/16
9/30


BMSB Pheromone Trap Captures
Fishkill, NY 2014
/ trap / week
80
60
40
20
0
5/13
5/27
6/10
6/24
7/8
7/22
8/5
8/19
9/2
9/16
9/30


BMSB Pheromone Trap Captures
HVRL, Highland, NY 2014
/ trap / week
250
200
150
100
50
0
5/13
5/27
6/10
6/24
7/8
7/22
8/5
8/19
9/2
9/16
9/30


Pear Psylla Bud Survey
HVL, Highland, NY 2014
Average Adults per Trap per Day
14
12
10
8
6
4
2
0
Pear Psylla Eggs
Pear Psylla Nymphs
4/4/10
4/7/10
4/15/10
4/28/10
5/5/10
5/12/10
5/19/10
5/27/10
6/2/10
6/9/10
6/16/10
6/23/10
6/30/10
7/7/10
7/14/10
7/21/10
7/28/10
8/4/10
8/10/10
8/17/10
8/24/10
9/1/10
9/7/10
9/21/10
9/28/10

2014 MAXIMUM AND MINIMUM TEMPERATURES AND PRECIPITATION

Hudson Valley Laboratory, Highland, NY

All readings were taken from daily Max and Min on the dates indicated from NEWA-HVL

	MARCH			APRIL			MAY			JUNE			JULY			AUGUST			SEPTEMBER		
Date	Max	Min	Rain	Max	Min	Rain	Max	Min	Rain	Max	Min	Rain	Max	Min	Rain	Max	Min	Rain	Max	Min	Rain
1	35	5.6		56	34		75.3	48.5	0.36	76.3	50.3		88.6	66.8		82.1	63.1	0.33	84.8	69.0	0.01
2	34.2	22		62.7	35.1		64.4	48.3	0.01	81.6	54.1		88.4	70	2.26	75.3	64.1	0.01	90.5	69.5	
3	20.8	9.3		57.7	37		66.3	46.7		85.6	63.4	0.22	85.3	66.6	1.81	77.9	62.3	0.02	83.9	64.4	
4	25.4	2.0		46.3	35.9	0.14	64.1	48	0.02	77.8	60.5	0.18	68	61.5	0.59	83.7	64.4		85.7	56.8	
5	28.9	15.5		50.5	34.8	0.11	63.8	48.7		70.7	59	0.29	81.6	57.8	0.01	86.2	62.6		85.5	65.8	
6	29.7	7.9		59.2	31.1		64.8	46.2		74.3	53.3		81.4	55.3		78.4	63.3	0.19	88.3	61.8	0.31
7	38.5	11.1		52.9	36.5	0.17	66.8	43.4		79.6	53.1		85.7	68.1	0.1	78.2	56.5		75.9	57.8	0.25
8	51.7	25.6		65	39.2	0.15	65.2	51.6	0.01	82.7	56.4		86.3	65.8	0.53	79.0	54.3		75.9	53.1	
9	42.2	27.0		56.9	39.8		60.6	54.4	0.34	67.8	61.7	0.19	81.9	64.8	0.66	82.9	57.5		71.9	54.8	
10	46.3	30.5		64.1	32.5		81.9	59.9	0.52	78.6	62.3	0.01	80.3	62	0.22	84.0	58.1		77.4	54.9	
11	62.1	36.6		69.5	47.1	0.27	80.5	58.9	0.06	70.9	60.4	0.22	82	61.1		84.2	61.1		78.1	62.8	0.01
12	46.3	24.0	0.28	71.3	43.3	0.01	83.9	51.7		65.1	58.3	0.04	83.8	60.2		75.2	64.1	0.03	67.7	56.7	
13	23.7	12.8		77.8	48.1		72.6	58.2		73.5	65.2	0.93	80.5	68.2	0.48	75.8	66.5	0.12	59.3	49.9	0.18
14	40.6	14.0		76	59.3		73.9	50		70.2	55.3	0.02	80.5	68.1	0.18	76.4	56.0	0.03	65.0	48.2	
15	52.3	35.7		63.3	32.8	1.32	68.8	59.3	0.04	74.4	51.6		79	70.9	0.1	69.4	53.1	0.01	68.6	45.6	
16	36	21.1		43.1	26.8	0.04	68.3	61.6	0.09	82.1	54.6		78.3	62.4	0.76	74.9	53.4		67.2	53.5	0.16
17	29.8	13.9		52.1	29		67.9	48.2	0.06	87.1	63.5		79.4	57.8		80.4	60.5		71.1	44.7	
18	43.7	15.6		48.8	29.7		62.8	42.9	0.03	83.8	67.2		80	54.4		76.8	55.7		71.8	45.3	
19	42.5	23.5	0.59	61.3	38		69.4	40.4	0.04	80	60.6	0.17	77.7	60.1		79.9	51.8		65.2	46.2	
20	49.7	33.9	0.14	62.9	39		74.8	46.2	0.03	74.9	52.7		79.4	60.2	0.05	83.1	61.8		71.9	50.7	
21	46	31.7		71	37.3		74.4	55.9	0.02	76.5	52		82.9	59.6		78.5	63.7	0.12	77.1	61.5	
22	58.1	26.7	0.01	71.1	47.4		62.8	56.8	0.9	80.1	54.4		85.6	65.8		70.4	64.8	0.04	69.7	47.3	0.01
23	37.9	22.2		56.1	44.3	0.17	65.3	55.8	0.26	81.8	58.2		87.3	69.6	0.13	74.0	63.7		71.0	41.6	
24	34.4	15.0		59.1	37.9		66.8	54.9		79	61.7		76.9	62.2	0.08	76.8	56.6		71.3	49.0	
25	37.7	16.0		64.9	37.5	0.03	77.3	48.6	0.01	84.6	64.9	0.17	79.9	55.1		85.7	56.8		63.5	54.5	
26	32.2	20.4		62.4	41.7	0.66	85.4	58.3		80	67.6	0.29	77	59.7	0.02	86.1	60.3		74.9	53.5	
27	42.6	14.4		53.2	41.5		85	61.9		81	64.7		83.8	66	0.28	88.2	65.9		80.7	52.1	
28	46.2	34.7	0.25	62.2	40		71.8	51.7	0.04	87.3	60.1		79.4	65.6	0.1	78.9	59.7		83.4	54.5	
29	47.5	38.6	0.9	52.4	41.8	0.1	69.8	44.3		85.5	61.4		76.9	56.8		76.9	52.1		76.2	58.3	
30	41.4	37.1	0.95	47.3	39.6	1.89	74	52.5	0.03	83.1	63.4		77.4	58.6		77.9	57.1		74.6	57.7	
31	51.6	34.5	0.02				68.7	49.6					79.4	59.2	0.01	79.8	69.1	0.32			
High / Low / Total																					
	62.1	2.0	3.14	77.8	26.8	5.06	85.4	40.4	2.87	87.3	50.3	2.73	88.6	54.4	8.3	88.2	51.8	1.22	90.5	41.6	0.93

Departments of Entomology and Plant Pathology
Cornell's Hudson Valley Lab

Cornell University
College of Agriculture and Life Sciences

McIntosh Phenology

Year	GT	HIG	T.C.	Pink	Bloom	P.F.	PF DD_{43}	PF DD_{50}	
2014	4/14	4/18	4/28	5/6	5/12	5/19	594.9	321.5	
2013	4/13	4/18	4/24	4/30	5/7	5/13	510.6	262.2	
2012	3/16	3/18	3/25	4/8	4/16	4/21	506.5	267.5	
2011	4/4	4/11	4/25	5/1	5/9	5/16	526.0	268.3	
2010	3/20	4/2	4/6	4/10	4/20	4/28	305.0	168.5	
2009	4/6	4/13	4/20	4/24	4/29	5/7	452.0	219.6	
2008	4/10	4/14	4/21	4/24	4/29	5/7	404.5	207.4	
2007	4/2	4/21	4/24	5/2	5/7	5/14	397.0	228.3	
2006	4/3	4/10	4/17	4/22	4/26	5/8	419.2	220.0	
2005	4/7	4/11	4/18	4/26	5/8	5/16	493.7	258.6	
2004	4/12	4/19	4/22	4/27	5/3	5/13	558.5	304.7	
2003	4/7	4/16	4/24	4/28	5/1	5/19	595.0	324.7	
2002	3/25	4/10	4/14	4/15	4/16	5/7	498.0	283.2	
2001	4/11	4/17	4/25	4/28	5/2	5/10	481.3	288.0	
2000	3/27	4/2	4/14	4/24	5/1	5/8	488.3	346.0	
1999	4/2	4/7	4/12	4/26	5/2	5/13	530.1	174.4	
1998	3/27	3/29	4/1	4/10	4/23	5/4	498.1	382.0	
1997	4/4	4/11	4/21	4/28	5/1	5/14	422.7	250.0	
1996	4/15	4/19	4/22	4/29	5/6	5/20			
1995	4/11	4/19	4/24	4/29	5/8	5/19			
1994	4/11	4/14	4/20	4/29	5/5	5/12			
1993	4/12	4/19	4/24	5/1	5/3	5/10			
1992	4/13	4/21	5/4	5/7	5/12	5/18			
1991	4/5	4/8	4/11	4/17	4/27	5/7			
1990	3/21	4/16	4/23	4/26	4/29	5/11			
1989	3/29	4/17	4/28	5/3	5/9	5/19			
1988	4/4	4/9	4/28	5/5	5/8	5/19			
1987	3/29	4/10	4/18	4/22	4/29	5/16			
1986	3/31	4/7	4/19	4/27	5/3	5/8			
1985	3/30	4/12	4/15	4/22	5/4	5/12			
1984	4/10	4/26	4/30	5/6	5/16	5/24			
1983	4/12	4/27	4/30	5/2	5/5	5/18			
1982	4/15	4/22	4/30	5/4	5/13	5/17			
1981		4/8	4/16	4/22	5/5	5/14			
1980	4/15		4/24	5/2	5/5	5/10			
Earliest day	**3/16**	**3/18**	**3/25**	**4/8**	**4/16**	**4/21**	305.0	168.5	**Low**
Latest day	**4/15**	**4/27**	**5/4**	**5/7**	**5/16**	**5/24**	595.0	382.0	**High**
Mean	**5 April**	**13 April**	**22 April**	**28 April**	**3 May**	**13 May**	**482.3**	**265.3**	

Midrange: **3/31** (+/-15D)
4/7 (+/-20D)
4/14 (+/-20D)
4/22 (+/-14D)
5/1 (+/-15D)
5/7 (+/-17D)

Mean days in bloom 9.5 days