

RESULTS OF 2013 INSECTICIDE AND ACARICIDE STUDIES IN EASTERN NEW YORK

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Formulation	Materials Tested	Company
	Apple	
Actara 25WDG	Syngenta
Assail 30SG	United Phosphorus Inc.
Baythroid XL 1L	Bayer CropScience
Beleaf 50SG	FMC Corporation
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.
Danitol 2.4 EC	Valent
Delegate WG	Dow AgroSciences
Endigo ZCX	Syngenta
Esteem 35WP	Valent
HGW86 10SE (Cyazypyr)	E.I. DuPont De Nemours & Co.
Imidan 70WP	Gowan Co.
LI700 (NIS)	Crop Protection Services
Leverage 360	Bayer CropScience
Lorsban 4E	Dow AgroSciences
Movento 240SC	Bayer CropScience
Perm-up 3.2EC	United Phosphorus Inc.
Sivanto	Bayer CropScience
Sniper 25% (Bifenthrin)	Loveland Products
Thionex 50WP	Makhteshim Agan of North America
Warrior II	Syngenta
	Pear	
AgriMek 0.15EC	Syngenta
BioCover (NIS)	Crop Protection Services
Centaur 0.7WG	Nichino America Inc.
Centaur 40SC	Nichino America Inc.
Delegate WG	Dow AgroSciences
Esteem 35WP	Dow AgroSciences
HGW86 10SE (Cyazypyr)	E.I. DuPont De Nemours & Co.
Nexter	Gowan Co.
Rimon 10EC	Chemtura Corporation
	Raspberry	
Malathion 5.....	Loveland Products
AzaGuard	BioSafe Systems
Oxidate 2	BioSafe Systems
	Pepper	
Mycotrol-O (<i>B. bassiana</i>)	Laverlam International Corporation
Pyganic 1.4EC	MGK

Factors Contributing To The 2013 Hudson Valley Insect Pest Management Anomalies.

The start of the 2013 season the driest spring season in recent history (March-April) with rainfall accumulations of 2.54" in March (3.6" Ave.), 1.85" in April (3.8" Ave.), and 2.90" in May (4.4" Ave.), requiring irrigation for newly planted trees. The month of June saw a dramatic increase in rain events totaling 9.14" (4.4" Ave.), with 4 of those days producing 6.7" of rainfall scattered throughout the month. The first week of July had over 2" of rain with only two weeks of relatively dry conditions requiring irrigation during the mid and latter half of the month, amounting to a near average rainfall of 4.21" (4.7" Ave.). August also had higher than average rainfall accumulating 6.33" (4.2" Ave.). Total rainfall for the March 1st through September 1st growing season totaled 24.7" of rain, slightly below the seasonal average of 25.1".

Hudson Valley mean temperatures and tree advancement was later during the early season and 'normal' in development stages by bloom with green tip (13 April) occurring 8 days later than the mean for the past 25 years (see McIntosh phenology). The 2013 petal fall date of the 13th of May is the mean PF date for McIntosh at the Hudson Valley Laboratory. The degree-day accumulations were about 17.1 DD higher than the average with petal fall accumulations of 510 degree-days₄₃. Bloom lasted 6 days in McIntosh, 3 days less than the mean, with ample sunlight and good pollination conditions. By the 20th of May, McIntosh king fruit had sized to 9.5mm.

The onset of bloom saw temperatures ranging between 63 and 80°F followed by 10 days of mean highs of 58 to 88°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 4th of June using predictive modeling of 308 DD₅₀ from petal fall of McIntosh.

European apple sawfly activity occurred in very low numbers due to the early bloom this season with early varieties showing 2.5% injury in untreated Ginger Gold and 1.5% in McIntosh cluster fruit evaluations. PC injury was also moderate with 9.8% and 8.0% injury in untreated Ginger Gold and McIntosh respectively, in early 'June Drop' evaluations. TPB injury with 2.5 and 0.0% 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 adult flight occurred on 20 May with larval emergence predicted for 2 June using 220 DD₅₀. The internal lepidopteran complex (OFM and CM) showed low levels of damage to apple, with CM frass appearing during mid June through early July. Relatively low levels of damage from the internal lepidopteran complex was observed with 7.5% and 6.5% damage from 1st generation evaluated on 9 July.

San Jose scale (SJS) crawler emergence was predicted to occur on 5 June using the 1 March 500 DD₅₀ model. However, first crawler was observed to occur 20 June, more than two weeks after the predicted date. In general SJS scale levels were modest in infested trees with less than 5% injury observed in research plots.

Growers again monitored Obliquebanded leafroller closely this season, successfully managing the insect using Altacor Belt, or Delegate in Hudson Valley orchards. Most applications were made using insect phenology predictions for early emergence, using 340 DD₅₀ from 3rd of June biofix to manage the 1st emergence of OBLR, predicted to occur on 19th of June. In general, moderate damage levels of external lepidopteran injury, including OBLR were observed this season during the pre-bloom and fruit set periods from the overwintering OBLR populations. Trap captures were moderate for 1st generation averaging 2.7 / day during the peak periods while the 2nd generation flight was quite low of OBLR during August and September. For the second year, very high levels of RBLR were observed during the season and may have contributed significantly to the overall leafroller damage this season.

Apple maggot (AM) emergence was later this season than in the past 5 years with first emergence on 8 July. AM density was moderate throughout the region with significantly higher late emergence due to late season rainfall. Low populations of adults were noted in the mid-Hudson Valley with seasonal accumulation totals near 21 flies per trap (mean $n=4$) where rainfall provided ideal emergence conditions.

The brown marmorated stink (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 mid-Hudson Valley with increasing northern observations and fruit injury in Columbia County. 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.

Spotted wing drosophila (SWD), *Drosophila suzukii*, (Matsumura) (Diptera: Drosophilidae) were first observed in NY in late August, 2011. We monitored SWD throughout the lower to mid-Hudson Valley this season using apple cider vinegar and brewers or baking yeast-baited traps in 15 locations across small fruit, grape and tree fruit. The first SWD trap captures were found in Warwick, Orange County, NY on 17 June (1st capture on 3 August in 2012). By 9 July, evaluations of sweet cherry in Orange and Dutchess Counties showed 70% injury with treated raspberry fruit in Ulster County with 8% SWD ovipositional injury and confirmed SWD adult emergence. By late late July small fruit growers of blackberry and raspberry had abandoned berry patches as attempts to control the SWD were ineffective using commercial insecticide materials, rates and timings. Growers who harvested daily, keeping berries on a 3-7 day spray program were able to maintain % infestations levels to 18-20%. During weeks in which applications could not be made, levels of injury increased to over 40%.

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

Codling Moth (CM):

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)

Oriental Fruit Moth (OFM): *Grapholita molesta* (Busck)

Plum curculio (PC): *Conotrachelus nenuphar* (Herbst)

Redbanded leafroller (RBLR): *Argyrotaenia velutinana* (Walker)

San Jose scale (SJS):

Tarnished plant bug (TPB): *Lygus lineolaris* (P. de B.)

Apple rust mite (ARM): *Aculus schlechtendali* (Nalepa)

European red mite (ERM): *Panonychus ulmi* (Koch)

Two spotted spider mite (TSM): *Tetranychus urticae* Koch

A predatory stigmatid (ZM): *Zetzellia mali* (Ewing)

A predatory phytoseiid (AMB): *Neoseiulus (=Amblyseius) fallacies* (Garman)

EVALUATION OF INSECTICIDES FOR CONTROLLING THE INSECT COMPLEX ON APPLE, 2013 – Cornell University's Hudson Valley Lab: Treatments were applied to four-tree plots, replicated four times in a randomized complete block design. Applications were applied concentrate using a tractor mounted John Bean® Airblast sprayer delivering 200 psi. and 148.8 GPA, traveling an average of 2.8 mph. Trees on the M.26 rootstock were 18 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 for reduction of drift and increased insect distribution and insect pressure.

Treatments applied season long over the entire block for crop size management and disease control included: COCS at 48 oz./A and 0.24% Biocover oil on 10 April; Manzate at 3 lbs/A, Flint at 2.5 oz./A on 18 April; Firewall 17WP at 16.0 oz./A and Regulaid at 16 oz./A, and Ralley at 4oz./A and Manzate at 3 lbs./A on 7 & 10 May; Captan 80 at 3 lbs/A, Ralley at 6 oz./A and Pristine at 15.0 oz./A on 6 August.

Treatments were applied on various schedules as shown in Table 1. Dates corresponding to tree phenology for McIntosh occurred for green tip (GT) on 13 April, 1/2" green on 18 April, tight cluster (TC) on 24 April, pink on 30 April, bloom on 7 May, petal fall on 13 May. The pink application was made on 2 May, petal fall on 15 May, 1st cover on 29 May, 1st generation CM emergence corresponding to 2C on 8 June, 3C on 17 June, 1st CM +14 and 4C days on 4 July, 5C on 24 July, 2nd CM and 6C on 12 August.

Seasonal fruit evaluations of early fruit injury made 8d post 1C application to McIntosh Ginger Gold cultivars on 6 June showed low levels of PC (9.8% in UTC), TPB (2.5%) and E.Lep injury comprising GFW, OBLT, RBLR and OFM (7.8%) with very low levels of EAS (2.5%) damage. Programs with pre-bloom Lorsban 4E, neonicotinoid, pyrethroid or IGR insecticides followed by standard PF materials at petal fall all provided commercially acceptable levels of control with statistically lower levels of insect injury. Evaluations on 9 July for the lepidopteran complex had 7.5% and 6.5% calyx end frass indicating injury from the 1st generation CM. SJS injury rating on 2 July using a 0-2 scale with 0=0, 1=1-3 scale, 2= \geq 4 or more SJS demonstrated very good control of all programs employing SJS management tools. Relatively low levels of ERM were observed in the research block, however, flare-up of the TSSM was observed by early August. Harvested fruit assessments rating of surface insect damage or presence with fruit quartered for internal evaluation.

Table 1 Treatment Schedule For Seasonal Apple Insecticide Screen.
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y. - 2013.

Treatment / Formulation	Rate	Timing	Application Dates
1 Calypso	4.0 oz/A	P	2 May
Calypso	6.0 oz/A	PF-1C	15 May, 29 May
Movento	9.0 oz/A	PF	15 May
+ Oil	1.%	PF	15 May
Belt	5.0 oz/A	2-3C	8 June, 17 June
Lannate	3 pts./A	4, 6C	4 July, 12 August
Leverage 360	2.8 oz./A	5C	24 July
2 Calypso	4.0 oz/A	P	2 May
Calypso	6.0 oz/A	PF-1C	15 May, 29 May
Movento	6.0 oz/A	PF, 2C	15 May, 8 June
+ Oil	1.%	PF, 2C	15 May, 8 June
Belt	5.0 oz/A	3-4C	17 June, 4 July
Leverage 360	2.8 oz./A	5C	24 July
Lannate	3 pts./A	6C	12 August
3 Sivanto	14.0 oz/A	DD	21 April
+ Oil	1%	DD	21 April
Calypso	4.0 oz/A	P	2 May
Calypso	6.0 oz/A	PF-1C	15 May, 29 May
Belt	5.0 oz/A	2-3C	8 June, 17 June
Lannate	3 pts/A	4, 6C	4 July, 12 August
Baythroid XL	2.8 oz/A	5C	24 July
4 Centaur WDG	46.0 oz/A	DD	21 April
+ Oil	1%	DD	21 April
Imidan 70 WP	5.5 lbs/A	PF, 1C, 5-6C	15 May, 29 May, 24 July, 12 August
Calypso	6.0 oz/A	2C	8 June
Belt	5.0 oz/A	3-4C	17 June, 4 July
5 Lorsban 4E	64.0 oz/A	DD	21 April
+ Oil	1%	DD	21 April
Imidan 70 WP	5.5 lbs/A	PF-6C	15 May, 29 May, 8 June, 4 July, 24 July, 12 August
Actara	5.0 oz./A	2C	8 June
6 Esteem	10.0 oz/A	DD	21 April
+ Oil	1%	DD	21 April
Imidan 70 WP	5.5 lbs/A	PF-6C	15 May, 29 May, 8 June, 17 June, 4 July, 24 July, 12 August
7 Lorsban 4E	64.0 oz/A	DD	21 April
Perm-Up	10 oz/A	P	2 May
Actara	5.5 oz/A	PF	15 May
Calypso	6.0 oz/A	1, 2, 5C	29 May, 8 June, 24 July
Belt	5.0 oz/A	3-4C	17 June, 4 July
Lannate	3 pts./A	1, 2, 6C	29 May, 8 June, 12 August
8 Lorsban 4E	64.0 oz/A	P	2 May
Actara	5.5 oz/A	PF	15 May
Endigo ZC	6.0 oz/A	1C	29 May
Thionex 50WP	4.0 lb/A	2-3C	8 June, 17 June
Danitol	21.3 oz/A	4-5C	4 July, 24 July
Lannate	3 pts./A	6C	12 August
9 Beleaf 50SG	2.8 oz/A	P, PF-1C	2 May, 15 May, 29 May
Imidan 70WP	5.5 lbs/A	PF-2, 5-6C	15 May, 29 May, 8 June, 24 July, 12 August
Delegate WG	7.0 oz/A	3-4C	17 June, 4 July
10 Untreated	-	-	

All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi., traveling at an average of 2.86 mph.

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. - 2013

			Incidence (%) of insect damaged cluster fruit					
Treatment / Formulation		Rate	Timing	PC	EAS	TPB	LEP	Clean
1	Calypso	4.0 oz/A	P	0.8 a	0.0 a	0.0 a	0.0 a	99.3
	Calypso	6.0 oz/A	PF-1C					
	Movento	9.0 oz/A	PF					
	+ Oil	1.0%	PF					
	Belt	5.0 oz/A	2-3C					
	Lannate	3 pts./A	4, 6C					
	Leverage 360	2.8 oz./A	5C					
2	Calypso	4.0 oz/A	P	0.0 a	0.3 a	0.8 a	0.0 a	99.0 b
	Calypso	6.0 oz/A	PF-1C					
	Movento	6.0 oz/A	PF, 2C					
	+ Oil	1.0%	PF, 2C					
	Belt	5.0 oz/A	3-4C					
	Leverage 360	2.8 oz./A	5C					
	Lannate	3 pts./A	6C					
3	Sivanto	14.0 oz/A	DD	0.3 a	0.0 a	1.0 a	0.0 a	98.8 b
	+ Oil	1%	DD					
	Calypso	4.0 oz/A	P					
	Calypso	6.0 oz/A	PF-1C					
	Belt	5.0 oz/A	2-3C					
	Lannate	3 pts/A	4, 6C					
	Baythroid XL	2.8 oz/A	5C					
4	Centaur WDG	46 oz/A	DD	1.5 a	0.0 a	0.8	0.3 a	97.5 b
	+ Oil	1%	DD					
	Imidan 70WP	5.5 lbs/A	PF-1C, 5-6C					
	Calypso	6.0 oz/A	2C					
	Belt	5.0 oz/A	3-4C					
5	Lorsban 4E	64 oz/A	DD	0.3 a	0.3 a	0.5 a	0.0 a	99.0 b
	+ Oil	1%	DD					
	Imidan 70 WP	5.5 lbs/A	PF-6C					
	Actara	5.0 oz./A	2C					
6	Esteem	10.0 oz/A	DD	2.0 a	0.5 a	0.3 a	0.3 a	96.9 b
	+ Oil	1%	DD					
	Imidan 70 WP	5.5 lbs/A	PF-6C					
7	Lorsban 4E	64 oz/A	DD	0.8 a	0.0 a	0.0 a	0.0 a	99.3 b
	Perm-Up	10 oz/A	P					
	Actara	5.5 oz/A	PF					
	Calypso	6.0 oz/A	1, 2, 5C					
	Belt	5.0 oz/A	3-4C					
	Lannate	3 pts./A	1, 2, 6C					
8	Lorsban 4E	64 oz/A	P	1.3 a	0.0 a	1.0 a	0.0 a	97.8 b
	Actara	5.5 oz/A	PF					
	Endigo ZC	6.0 oz/A	1C					
	Thionex 50WP	4.0 lb/A	2-3C					
	Danitol	21.3 oz/A	4-5C					
	Lannate	3 pts /A	6C					
9	Beleaf 50SG	2.8 oz/A	P, PF-1C	4.0 a	0.8 a	1.3 a	0.3 a	94.2 b
	Imidan 70WP	5.5 lbs/A	PF-2, 5-6C					
	Delegate WG	7.0 oz/A	3-4C					
10	Untreated			9.8 b	2.5 b	2.5 b	7.8 b	79.3 a
P value for transformed data				0.038	0.001	0.0288	< 0.001	< 0.001

^a Evaluation made on June 6 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. - 2013

			Incidence (%) of insect damaged cluster fruit				
Treatment / Formulation	Rate	Timing	PC	EAS	TPB	LEP	Clean
1 Calypso	4.0 oz/A	P	0.0 a	0.0 a	0.0 a	0.0 a	99.75 b
Calypso	6.0 oz/A	PF-1C					
Movento	9.0 oz/A	PF					
+ Oil	1.%	PF					
Belt	5.0 oz/A	2-3C					
Lannate	3 pts./A	4, 6C					
Leverage 360	2.8 oz./A	5C					
2 Calypso	4.0 oz/A	P	0.25 a	0.0 a	0.25 a	0.0 a	99.5 b
Calypso	6.0 oz/A	PF-1C					
Movento	6.0 oz/A	PF, 2C					
+ Oil	1.%	PF, 2C					
Belt	5.0 oz/A	3-4C					
Leverage 360	2.8 oz./A	5C					
Lannate	3 pts./A	6C					
3 Sivanto	14.0 oz/A	DD	0.25 a	0.25 a	0.0 a	0.0 a	96.5 b
+ Oil	1%	DD					
Calypso	4.0 oz/A	P					
Calypso	6.0 oz/A	PF-1C					
Belt	5.0 oz/A	2-3C					
Lannate	3 pts/A	4, 6C					
Baythroid XL	2.8 oz/A	5C					
4 Centaur WDG	46 oz/A	DD	0.25 a	0.0 a	0.25 a	0.0 a	99.5 b
+ Oil	1%	DD					
Imidan 70WP	5.5 lbs/A	PF-1C, 5-6C					
Calypso	6.0 oz/A	2C					
Belt	5.0 oz/A	3-4C					
5 Lorsban 4E	64 oz/A	DD	0.0 a	0.25 a	0.0 a	0.0 a	99.75 b
+ Oil	1%	DD					
Imidan 70 WP	5.5 lbs/A	PF-6C					
Actara	5.0 oz./A	2C					
6 Esteem	10.0 oz/A	DD	0.5 a	0.0 a	0.5 a	0.0 a	99.0 b
+ Oil	1%	DD					
Imidan 70 WP	5.5 lbs/A	PF-6C					
7 Lorsban 4E	64 oz/A	DD	0.0 a	0.0 a	0.0 a	0.0 a	100.0 b
Perm-Up	10 oz/A	P					
Actara	5.5 oz/A	PF					
Calypso	6.0 oz/A	1, 2, 5C					
Belt	5.0 oz/A	3-4C					
Lannate	3 pts./A	1, 2, 6C					
8 Lorsban 4E	64 oz/A	P	0.0 a	0.25 a	0.0 a	0.0 a	99.75 b
Actara	5.5 oz/A	PF-					
Endigo ZC	6.0 oz/A	1C					
Thionex 50WP	4.0 lb/A	2-3C					
Danitol	21.3 oz/A	4-5C					
Lannate	3 pts /A	6C					
9 Beleaf 50SG	2.8 oz/A	P, PF-1C	0.75 a	0.25 a	1.0 a	0.00 a	98.0 b
Imidan 70WP	5.5 lbs/A	PF-2, 5-6C					
Delegate WG	7.0 oz/A	3-4C					
10 Untreated			8.0 b	1.5 a	0.0 a	4.0 b	86.5 a
P value for transformed data			0.0035	0.319	0.5897	0.0007	0.0026

^a Evaluation made on June 6 on McIntosh 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 Rosy Apple Aphid On Leaves ^a.
N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2013.

Treatment /		Mean # of Rosy Apple Aphid colonies / 25 Damaged Leaves	
Formulation	Rate	Timing	Ginger Gold
1 Calypso	4.0 oz/A	P	0.0 a
Calypso	6.0 oz/A	PF-1C	
Movento	9.0 oz/A	PF	
+ Oil	1.0%	PF	
Belt	5.0 oz/A	2-3C	
Lannate	3 pts./A	4, 6C	
Leverage 360	2.8 oz./A	5C	
2 Calypso	4.0 oz/A	P	0.0 a
Calypso	6.0 oz/A	PF-1C	
Movento	6.0 oz/A	PF, 2C	
+ Oil	1.0%	PF, 2C	
Belt	5.0 oz/A	3-4C	
Leverage 360	2.8 oz./A	5C	
Lannate	3 pts./A	6C	
3 Sivanto	14.0 oz/A	DD	0.0 a
+ Oil	1%	DD	
Calypso	4.0 oz/A	P	
Calypso	6.0 oz/A	PF-1C	
Belt	5.0 oz/A	2-3C	
Lannate	3 pts/A	4, 6C	
Baythroid XL	2.8 oz/A	5C	
4 Centaur WDG	46 oz/A	DD	0.25 a
+ Oil	1%	DD	
Imidan 70WP	5.5 lbs/A	PF-1C, 5-6C	
Calypso	6.0 oz/A	2C	
Belt	5.0 oz/A	3-4C	
5 Lorsban 4E	64 oz/A	DD	0.0 a
+ Oil	1%	DD	
Imidan 70 WP	5.5 lbs/A	PF-6C	
Actara	5.0 oz./A	2C	
6 Esteem	10.0 oz/A	DD	0.0 a
+ Oil	1%	DD	
Imidan 70 WP	5.5 lbs/A	PF-6C	
7 Lorsban 4E	64 oz/A	DD	0.0 a
Perm-Up	10 oz/A	P	
Actara	5.5 oz/A	PF	
Calypso	6.0 oz/A	1, 2, 5C	
Belt	5.0 oz/A	3-4C	
Lannate	3 pts./A	1, 2, 6C	
8 Lorsban 4E	64 oz/A	P	0.0 a
Actara	5.5 oz/A	PF-	
Endigo ZC	6.0 oz/A	1C	
Thionex 50WP	4.0 lb/A	2-3C	
Danitol	21.3 oz/A	4-5C	
Lannate	3 pts /A	6C	
9 Beleaf 50SG	2.8 oz/A	P, PF-1C	0.0 a
Imidan 70WP	5.5 lbs/A	PF-2, 5-6C	
Delegate WG	7.0 oz/A	3-4C	
10 Untreated			2.5 b
P value for transformed data			< 0.001

^a Evaluation made on May 24 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.

Table 5 Evaluations Of Insecticide Schedules For Controlling Codling Moth On Apple ^a.
N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2013.

Treatment / Formulation	Rate	Timing	Incidence (%) Of Codling Moth Damaged Cluster Fruit	
			Ginger Gold	Red Delicious
1 Calypso	4.0 oz/A	P	0.0 a	0.0 a
Calypso	6.0 oz/A	PF-1C		
Movento + oil	9.0 oz/A	PF		
+ Oil	1.0%	PF		
Belt	5.0 oz/A	2-3C		
Lannate	3 pts./A	4, 6C		
Leverage 360	2.8 oz./A	5C		
2 Calypso	4.0 oz/A	P	0.0 a	0.0 a
Calypso	6.0 oz/A	PF-1C		
Movento	6.0 oz/A	PF, 2C		
+ Oil	1.0%	PF, 2C		
Belt	5.0 oz/A	3-4C		
Leverage 360	2.8 oz./A	5C		
Lannate	3 pts./A	6C		
3 Sivanto	14.0 oz/A	DD	0.0 a	0.0 a
+ Oil	1%	DD		
Calypso	4.0 oz/A	P		
Calypso	6.0 oz/A	PF-1C		
Belt	5.0 oz/A	2-3C		
Lannate	3 pts/A	4, 6C		
Baythroid XL	2.8 oz/A	5C		
4 Centaur WDG	46 oz/A	DD	0.0 a	0.0 a
+ Oil	1%	DD		
Imidan 70WP	5.5 lbs/A	PF-1C, 5-6C		
Calypso	6.0 oz/A	2C		
Belt	5.0 oz/A	3-4C		
5 Lorsban 4E	64 oz/A	DD	0.0 a	0.0 a
+ Oil	1%	DD		
Imidan 70 WP	5.5 lbs/A	PF-6C		
Actara	5.0 oz./A	2C		
6 Esteem	10.0 oz/A	DD	0.0 a	0.0 a
+ Oil	1%	DD		
Imidan 70 WP	3.0 lbs/A	PF-7C		
7 Lorsban 4E	64 oz/A	DD	0.0 a	0.0 a
Perm-Up	10 oz/A	P		
Actara	5.5 oz/A	PF		
Calypso	6.0 oz/A	1, 2, 5C		
Belt	5.0 oz/A	3-4C		
Lannate	3 pts./A	1, 2, 6C		
8 Lorsban 4E	64 oz/A	P	0.0 a	0.0 a
Actara	5.5 oz/A	PF		
Endigo ZC	6.0 oz/A	1C		
Thionex 50WP	4.0 lb/A	2-3C		
Danitol	21.3 oz/A	4-5C		
Lannate	3 pts /A	6C		
9 Beleaf 50SG	2.8 oz/A	P, PF-1C	0.0 a	0.0 a
Imidan 70WP	5.5 lbs/A	PF-2, 5-6C		
Delegate WG	7.0 oz/A	3-4C		
10 Untreated			7.5 b	6.5 b

^a Evaluation made on 9 July. 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. All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph.

Table 6 Evaluations Of Insecticide Schedules For Controlling San Jose Scale On Apple ^a.
N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2013.

Treatment / Formulation	Rate	Timing	% Damage Rating of SJS Infested Cluster Fruit (0-2)		
			0	1	2
1 Calypso	4.0 oz/A	P	98.3	1.3	0.5
Calypso	6.0 oz/A	PF-1C			
Movento + oil	9.0 oz/A	PF			
+ Oil	1.0%	PF			
Belt	5.0 oz/A	2-3C			
Lannate	3 pts./A	4, 6C			
Leverage 360	2.8 oz./A	5C			
2 Calypso	4.0 oz/A	P	97.5	0.5	2.0
Calypso	6.0 oz/A	PF-1C			
Movento	6.0 oz/A	PF, 2C			
+ Oil	1.0%	PF, 2C			
Belt	5.0 oz/A	3-4C			
Leverage 360	2.8 oz./A	5C			
Lannate	3 pts./A	6C			
3 Sivanto	14.0 oz/A	DD	98.0	2.0	0.0
+ Oil	1.0%	DD			
Calypso	4.0 oz/A	P			
Calypso	6.0 oz/A	PF-1C			
Belt	5.0 oz/A	2-3C			
Lannate	3 pts/A	4, 6C			
Baythroid XL	2.8 oz/A	5C			
4 Centaur WDG	46 oz/A	DD	100.0	0.0	0.0
+ Oil	1.0%	DD			
Imidan 70WP	5.5 lbs/A	PF-1C, 5-6C			
Calypso	6.0 oz/A	2C			
Belt	5.0 oz/A	3-4C			
5 Lorsban 4E	64 oz/A	DD	91.7	4.2	4.2
+ Oil	1.0%	DD			
Imidan 70 WP	5.5 lbs/A	PF-6C			
Actara	5.0 oz./A	2C			
6 Esteem	10.0 oz/A	DD	95.5	2.3	2.3
+ Oil	1.0%	DD			
Imidan 70 WP	5.5 lbs/A	PF-6C			
7 Lorsban 4E	64 oz/A	DD	99.8	0.0	0.3
Perm-Up	10 oz/A	P			
Actara	5.5 oz/A	PF			
Calypso	6.0 oz/A	1, 2, 5C			
Belt	5.0 oz/A	3-4C			
Lannate	3 pts./A	1, 2, 6C			
8 Lorsban 4E	64 oz/A	P	99.8	0.0	0.3
Actara	5.5 oz/A	PF-			
Endigo ZC	6.0 oz/A	1C			
Thionex 50WP	4.0 lb/A	2-3C			
Danitol	21.3 oz/A	4-5C			
Lannate	3 pts /A	6C			
9 Beleaf 50SG	2.8 oz/A	P, PF-1C	99.8	0.3	0.0
Imidan 70WP	5.5 lbs/A	PF-2, 5-6C			
Delegate WG	7.0 oz/A	3-4C			
10 Untreated			26.8	39.8	33.5

^a Evaluation made on July 2 on of 100 McIntosh fruit per treatment using a SJS rating in which 0 = clean, 1 = ≤ 3 San Jose scale blackcaps; 2 = > 3 SJS blackcap San Jose scale.

Arithmetic means reported. All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph.

Table 7 Evaluations Of Insecticide Schedules For Managing the Mite Complex On Apple ^A.
N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2013.

Treatment / Formulation	Rate	Timing	Number of Adult Mite / Leaf			AMB	ARM
			ERM	TSM	ZM		
1 Calypso	4.0 oz./A	P	< 0.1 a	0.3 a	< 0.1 a	0.5 a	7.2 a
Calypso	6.0 oz./A	PF-1C					
Movento	9.0 oz./A	PF					
+ Oil	0.5%	PF					
Belt	5.0 oz./A	2-3C					
Lannate	3 pts./A	4, 6C					
Leverage 360	2.8 oz./A	5C					
2 Calypso	4.0 oz./A	P	< 0.1 a	0.2 a	0.0 a	0.4 a	3.8 a
Calypso	6.0 oz./A	PF-1C					
Movento	6.0 oz./A	PF, 2C					
+ Oil	0.5%	PF, 2C					
Belt	5.0 oz./A	3-4C					
Leverage 360	2.8 oz./A	5C					
Lannate	3 pts./A	6C					
3 Sivanto	14.0 oz./A	DD	< 0.1 a	0.3 a	0.3 a	0.3 a	199.5 a
+ Oil	0.5%	DD					
Calypso	4.0 oz./A	P					
Calypso	6.0 oz./A	PF-1C					
Belt	5.0 oz./A	2-3C					
Lannate	3 pts./A	4, 6C					
Baythroid XL	2.8 oz./A	5C					
4 Centaur WDG	46 oz./A	DD	< 0.1 a	0.2 a	0.2 a	0.5 a	56.0 a
+ Oil	0.5%	DD					
Imidan 70WP	5.5 lbs/A	PF-1C, 5-6C					
Calypso	6.0 oz./A	2C					
Belt	5.0 oz./A	3-4C					
5 Lorsban 4E	64 oz./A	DD	0.2 a	0.3 a	0.1 a	0.4 a	21.9 a
+ Oil	0.5%	DD					
Imidan 70WP	5.5 lbs/A	PF-6C					
Actara	5.0 oz./A	2C					
6 Esteem	5.0 oz./A	DD	1.6 a	0.4 a	0.3 a	0.5 a	48.6 a
+ Oil	0.5%	DD					
Imidan 70WP	5.5 lbs/A	PF-6C					
7 Lorsban 4E	64 oz./A	DD	0.1 a	0.2 a	0.0 a	0.3 a	56.5 a
Perm-Up	10 oz./A	P					
Actara	5.5 oz./A	PF					
Calypso	6.0 oz./A	1, 2, 5C					
Belt SC	5.0 oz./A	3-4C					
Lannate	3 pts./A	1, 2, 6C					
8 Lorsban 4E	64.0 oz./A	P	0.2 a	0.4 a	< 0.1 a	0.3 a	12.6 a
Actara	5.5 oz./A	PF					
Endigo ZC	6.0 oz./A	1C					
Thionex 50WP	4.0 lb./A	2-3C					
Danitol	21.3oz./A	4-5C					
Lannate	3 pts./A	6C					
9 Beleaf 50SG	2.8 oz./A	P, PF-1C	0.9 a	2.2 a	0.2 a	0.2 a	249.4 a
Imidan 70WP	5.5 lbs/A	PF-2, 5-6C					
Delegate WG	7.0 oz./A	3-4C					
10 Untreated			0.2 a	0.4 a	0.5 a	0.6 a	21.4 a
P value for transformed data			0.1661	0.395	0.1849	0.9351	0.5192

^a Evaluation made on Red Delicious cultivar on July 2.

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. All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph.

Table 8 Evaluations Of Insecticides For Managing the Mite Complex On Apple ^A.
N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. – 2013.

Treatment / Formulation	Rate	Timing	Mite Eggs / Leaf			
			ERME	TSME	ZME	AMBE
1 Calypso	4.0 oz./A	P	0.2 a	0.1	< 0.1 a	0.1 a
Calypso	6.0 oz./A	PF-1C				
Movento	9.0 oz./A	PF				
+ Oil	0.5%	PF				
Belt	5.0 oz./A	2-3C				
Lannate	3 pts./A	4, 6C				
Leverage 360	2.8 oz./A	5C				
2 Calypso	4.0 oz./A	P	0.3 a	0.2 a	0.0 a	0.2 a
Calypso	6.0 oz./A	PF-1C				
Movento	6.0 oz./A	PF, 2C				
+ Oil	0.5%	PF, 2C				
Belt	5.0 oz./A	3-4C				
Leverage 360	2.8 oz./A	5C				
Lannate	3 pts./A	6C				
3 Sivanto	14.0 oz./A	DD	< 0.1 a	0.3 a	0.4 a	0.1 a
+ Oil	0.5%	DD				
Calypso	4.0 oz./A	P				
Calypso	6.0 oz./A	PF-1C				
Belt	5.0 oz./A	2-3C				
Lannate	3 pts./A	4, 6C				
Baythroid XL	2.8 oz./A	5C				
4 Centaur WDG	46 oz./A	DD	0.1 a	0.2 a	0.4 a	< 0.1 a
+ Oil	0.5%	DD				
Imidan 70WP	5.5 lbs/A	PF-1C, 5-6C				
Calypso	6.0 oz./A	2C				
Belt	5.0 oz./A	3-4C				
5 Lorsban 4E	64 oz./A	DD	0.3 a	0.2 a	0.1 a	< 0.1 a
+ Oil	0.5%	DD				
Imidan 70WP	5.5 lbs/A	PF-6C				
Actara	5.0 oz./A	2C				
6 Esteem	5.0 oz./A	DD	2.5 a	0.1 a	0.8 a	0.1 a
+ Oil	0.5%	DD				
Imidan 70WP	5.5 lbs/A	PF-6C				
7 Lorsban 4E	64 oz./A	DD	< 0.1 a	0.1 a	< 0.1 a	0.1 a
Perm-Up	10 oz./A	P				
Actara	5.5 oz./A	PF				
Calypso	6.0 oz./A	1, 2, 5C				
Belt SC	5.0 oz./A	3-4C				
Lannate	3 pts./A	1, 2, 6C				
8 Lorsban 4E	64.0 oz./A	P	0.6 a	0.1 a	< 0.1 a	< 0.1 a
Actara	5.5 oz./A	PF				
Endigo ZC	6.0 oz./A	1C				
Thionex 50WP	4.0 lb./A	2-3C				
Danitol	21.3oz./A	4-5C				
Lannate	3 pts./A	6C				
9 Beleaf 50SG	2.8 oz./A	P, PF-1C	1.1 a	< 0.1 a	0.3 a	0.0 a
Imidan 70WP	5.5 lbs/A	PF-2, 5-6C				
Delegate WG	7.0 oz./A	3-4C				
10 Untreated			0.6 a	0.1 a	0.5 a	< 0.1 a
P value for transformed data			0.1209	0.5214	0.1577	0.3793

^a Evaluation made on July 2 on Red Delicious cultivar.

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. All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph.

Table 9 Evaluations Of Insecticide Schedules For Managing the Mite Complex On Apple^A.
N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2013.

Treatment / Formulation	Rate	Timing	Number of Mite / Leaf				
			ERM	TSM	ZM	AMB	ARM
1 Calypso	4.0 oz./A	P	0.4 a	5.1 a	0.4 a	0.7 a	40.5 a
Calypso	6.0 oz./A	PF-1C					
Movento	9.0 oz./A	PF					
+ Oil	0.5%	PF					
Belt	5.0 oz./A	2-3C					
Lannate	3 pts./A	4, 6C					
Leverage 360	2.8 oz./A	5C					
2 Calypso	4.0 oz./A	P	0.1 a	2.1 a	0.3 a	0.4 a	100.6 a
Calypso	6.0 oz./A	PF-1C					
Movento	6.0 oz./A	PF, 2C					
+ Oil	0.5%	PF, 2C					
Belt	5.0 oz./A	3-4C					
Leverage 360	2.8 oz./A	5C					
Lannate	3 pts./A	6C					
3 Sivanto	14.0 oz./A	DD	0.8 a	43.8 a	0.8 a	2.4 a	58.7 a
+ Oil	0.5%	DD					
Calypso	4.0 oz./A	P					
Calypso	6.0 oz./A	PF-1C					
Belt	5.0 oz./A	2-3C					
Lannate	3 pts./A	4, 6C					
Baythroid XL	2.8 oz./A	5C					
4 Centaur WDG	46 oz./A	DD	< 0.1 a	2.7 a	0.8 a	0.6 a	47.7 a
+ Oil	0.5%	DD					
Imidan 70WP	5.5 lbs/A	PF-1C, 5-6C					
Calypso	6.0 oz./A	2C					
Belt	5.0 oz./A	3C					
5 Lorsban 4E	64 oz./A	DD	0.2 a	4.2 a	0.8 a	1.3 a	51.0 a
+ Oil	0.5%	DD					
Imidan 70WP	5.5 lbs/A	PF-6C					
Actara	5.0 oz./A	2C					
6 Esteem	5.0 oz./A	DD	0.4 a	17.3 a	1.6 a	1.1 a	66.7 a
+ Oil	0.5%	DD					
Imidan 70WP	5.5 lbs/A	PF-6C					
7 Lorsban 4E	64 oz./A	DD	0.9 a	22.2 a	0.7 a	1.4 a	83.4 a
Perm-Up	10 oz./A	P					
Actara	5.5 oz./A	PF					
Calypso	6.0 oz./A	1, 2, 5C					
Belt SC	5.0 oz./A	3-4C					
Lannate	3 pts./A	1, 2, 6C					
8 Lorsban 4E	64.0 oz./A	P	< 0.1 a	0.1 a	< 0.1 a	0.7 a	6.9 a
Actara	5.5 oz./A	PF					
Endigo ZC	6.0 oz./A	1C					
Thionex 50WP	4.0 lb./A	2-3C					
Danitol	21.3oz./A	4-5C					
Lannate	3 pts./A	6C					
9 Beleaf 50SG	2.8 oz./A	P, PF-1C	2.5 a	19.4 a	3.0 a	1.7 a	54.1 a
Imidan 70WP	5.5 lbs/A	PF-2, 5-6C					
Delegate WG	7.0 oz./A	3-4C					
10 Untreated	-		0.1 a	0.8 a	0.4 a	0.45 a	18.4 a
P value for transformed data			0.0529	0.1443	0.0874	0.1830	0.4057

^a Evaluation made on August 8 on Red Delicious cultivar.

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. All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph.

Table 10 Evaluations Of Insecticide Schedules For Managing the Mite Complex Complex On Apple^A.
N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. – 2013.

Treatment / Formulation	Rate	Timing	Mite Eggs / Leaf			
			ERME	TSME	ZME	AMBE
1 Calypso	4.0 oz./A	P	0.7 a	5.4 a	0.2 ab	0.1 a
Calypso	6.0 oz./A	PF-1C				
Movento	9.0 oz./A	PF				
+ Oil	0.5%	PF				
Belt	5.0 oz./A	2-3C				
Lannate	3 pts./A	4, 6, 8C				
Leverage 360	2.8 oz./A	5, 7, 9C				
2 Calypso	4.0 oz./A	P	0.6 a	3.3 a	0.4 ab	< 0.1 a
Calypso	6.0 oz./A	PF-1C				
Movento	6.0 oz./A	PF, 2C				
+ Oil	0.5%	PF, 2C				
Belt	5.0 oz./A	3-4C				
Leverage 360	2.8 oz./A	5, 7, 9C				
Lannate	3 pts./A	6, 8C				
3 Sivanto	14.0 oz./A	DD	0.2 a	41.3 b	0.3 ab	0.4 a
+ Oil	0.5%	DD				
Calypso	4.0 oz./A	P				
Calypso	6.0 oz./A	PF-1C				
Belt	5.0 oz./A	2-3C				
Lannate	3 pts./A	4, 6, 8				
Baythroid XL	2.8 oz./A	5, 7, 9				
4 Centaur WDG	46 oz./A	DD	0.3 a	4.0 a	0.4 ab	0.1 a
+ Oil	0.5%	DD				
Imidan 70WP	5.5 lbs/A	PF-1C, 5-7C				
Calypso	6.0 oz./A	2C				
Belt	5.0 oz./A	3C				
5 Lorsban 4E	64 oz./A	DD	1.1 a	4.3 a	1.2 abc	0.3 a
+ Oil	0.5%	DD				
Imidan 70WP	5.5 lbs/A	PF-7C				
Actara	5.0 oz./A	2C				
6 Esteem	5.0 oz./A	DD	0.4 a	8.8 a	1.3 bc	0.2 a
+ Oil	0.5%	DD				
Imidan 70WP	5.5 lbs/A	PF-7C				
7 Lorsban 4E	64 oz./A	DD	1.4 a	19.3 a	0.5 ab	0.2 a
Perm-Up	10 oz./A	P				
Actara	5.5 oz./A	PF				
Calypso	6.0 oz./A	1, 2, 5C				
Belt SC	5.0 oz./A	3-4C				
Lannate	3 pts./A	1,2,6,7C				
Leverage 360	2.8 oz./A	8C				
8 Lorsban 4E	64.0 oz./A	P	< 0.1 a	0.2 a	< 0.1 a	0.1 a
Actara	5.5 oz./A	PF				
Endigo ZC	6.0 oz./A	1C				
Thionex 50WP	4.0 lb./A	2-3C				
Danitol	21.3oz./A	4-5C				
Lannate	3 pts./A	6-7C				
9 Beleaf 50SG	2.8 oz./A	P, PF-1C	3.1 a	13.1 b	2.1 c	0.2 a
Imidan 70WP	5.5 lbs/A	PF-2,5-7C				
Delegate WG	7.0 oz./A	3-4C				
10 Untreated			0.2 a	1.2 a	0.5 ab	0.2 a
P value for transformed data			0.2704	0.0129	0.0346	0.8321

^a Evaluation made on August 8 on Red Delicious cultivar.

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. All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph.

**Table 11 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										CLEAN
			TPB	EAS	E Lep.	E PC	PC	SJS	Int Lep.	Ext Lep.	AMP	AMT	
1 Calypso	4.0 oz/A	P	1.5 a	0.0 a	0.0 a	1.0 a	2.5 ab	0.0 a	2.5 b	0.5 a	0.5 a	0.5 a	84.1 b
Calypso	6.0 oz/A	PF-1C											
Movento	9.0 oz/A	PF											
Belt	5.0 oz/A	2-3C											
Lannate	3 pts./A	4, 6, 8C											
Leverage 360	2.8 oz./A	5, 7, 9C											
2 Calypso	4.0 oz/A	P	0.0 a	0.0 a	0.0 a	2.0 a	0.0 a	0.0 a	1.0 ab	1.5 a	0.0 a	0.0 a	95.5 b
Calypso	6.0 oz/A	PF-1C											
Movento	6.0 oz/A	PF, 2C											
Belt	5.0 oz/A	3-4C											
Leverage 360	2.8 oz./A	5, 7, 9C											
Lannate	3 pts./A	6, 8C											
3 Sivanto	14.0 oz/A	DD	0.0 a	0.0 a	0.0 a	2.0 a	0.0 a	0.0 a	0.5 a	1.5 a	1.0 ab	0.5 a	95.5 b
Calypso	4.0 oz/A	P											
Calypso	6.0 oz/A	PF-1C											
Belt	5.0 oz/A	2-3C											
Lannate	3 pts/A	4, 6, 8											
Baythroid XL	2.8 oz/A	5, 7, 9											
4 Centaur WDG	46 oz/A	DD	0.0 a	0.0 a	0.0 a	4.5 a	0.0 a	0.0 a	1.0 ab	0.5 a	0.5 a	0.5 a	94.0 b
Imidan 70 WP	3.0 lbs/A	PF-7C											
5 Lorsban 4E	64 oz/A	TC	0.0 a	0.0 a	0.0 a	2.0 a	0.0 a	0.0 a	0.5 a	0.5 a	0.0 a	0.0 a	95.8 b
Imidan 70 WP	3.0 lbs/A	PF-7C											
6 Esteem	10.0 oz/A	TC	0.0 a	0.0 a	0.0 a	11.5 a	0.0 a	0.0 a	0.0 a	0.5 a	0.5 a	0.5 a	87.5 b
Imidan 70 WP	3.0 lbs/A	PF-7C											
7 Lorsban 4E	64 oz/A	TC	0.0 a	0.0 a	0.0 a	1.5 a	0.0 a	0.0 a	0.5 a	0.5 a	0.0 a	0.0 a	97.5 b
Perm-Up	10 oz/A	P											
Actara	5.5 oz/A	PF											
Calypso	6.0 oz/A	2, 5C											
Belt	5.0 oz/A	3-4C											
Lannate	3 pts /A	6-7C											
Leverage 360	2.8 oz/A	8C											
8 Lorsban 4E	64 oz/A	TC	0.5 a	0.0 a	1.0 a	2.5 a	0.0 a	0.0 a	4.5 c	4.5 a	3.0 ab	2.5 ab	86.0 b
Actara	5.5 oz/A	PF-											
Endigo ZC	6.0 oz/A	1C											
Thionex 50WP	4.0 lb/A	2-3C											
Danitol	21.3 oz/A	4-5C											
Lannate	3 pts /A	6-7C											
Leverage 360	2.8 oz/A	8C											
9 Beleaf 50SG	2.8 oz/A	P, PF-1C	1.5 a	0.0 a	0.0 a	8.5 a	0.5 a	0.5 a	0.0 a	2.0 a	0.0 a	0.0 a	77.5 b
Imidan 70WP	5.5 lbs/A	PF-2, 5-7C											
Delegate WG	7.0 oz/A	3-4C											
10 Untreated			1.0 a	0.5 a	0.0 a	19.0 a	16.0 b	13.0 b	18.5 d	14.0 b	9.0 b	9.0 b	43.5 a

Evaluation made on September 2 on Ginger Gold cultivar. Mean separation by Fishers Protected LSD ($P \leq 0.05$).

Treatment means followed by the same letter are not significantly different. 1% BioCover oil applications to treatments 1@PF, 2@PF,1C, 3@DD, 4@DD, 5@TC and 6@TC.

Table 12 Evaluations Of Insecticide Schedules For Controlling The 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										CLEAN
			TPB	EAS	E Lep.	E PC	PC	SJS	Int Lep	Ext Lep.	AMP	AMT	
1 Calypso	4.0 oz/A	P	0.0 a	0.0 a	0.3 a	1.3 a	0.3 a	10.3 a	0.0 a	0.5 ab	0.0 a	0.0 a	87.8 b
Calypso	6.0 oz/A	PF-1C											
Movento	9.0 oz/A	PF											
Belt	5.0 oz/A	2-3C											
Lannate	3 pts./A	4, 6C											
Leverage 360	2.8 oz./A	5, 7C											
2 Calypso	4.0 oz/A	P	0.0 a	0.5 a	1.3 a	1.0 a	0.0 a	0.8 a	0.0 a	3.3 bc	0.3 a	0.3 a	93.3 b
Calypso	6.0 oz/A	PF-1C											
Movento	6.0 oz/A	PF, 2C											
Belt	5.0 oz/A	3-4C											
Leverage 360	2.8 oz./A	5, 7,											
Lannate	3 pts./A	6C											
3 Sivanto	14.0 oz/A	DD	0.0 a	0.0 a	0.0 a	0.8 a	1.0 a	2.3 a	2.5 a	1.0 ab	0.5 a	0.5 a	80.3 b
Calypso	4.0 oz/A	P											
Calypso	6.0 oz/A	PF-1C											
Belt	5.0 oz/A	2-3C											
Lannate	3 pts/A	4, 6C											
Baythroid XL	2.8 oz/A	5, 7C											
4 Centaur WDG	46 oz/A	DD	0.0 a	0.0 a	0.0 a	1.0 a	0.3 a	0.8 a	0.0 a	0.0 a	0.0 a	0.0 a	98.3 b
Imidan 70 WP	3.0 lbs/A	PF-7C											
5 Lorsban 4E	64 oz/A	TC	0.3 a	0.0 a	0.0 a	0.8 a	0.3 a	0.5 a	0.0 a	0.3 ab	0.3 a	0.0 a	97.3 b
Imidan 70 WP	3.0 lbs/A	PF-7C											
6 Esteem	10.0 oz/A	TC	0.3 a	0.3 a	0.0 a	0.5 a	0.5 a	3.5 a	0.0 a	0.5 ab	0.3 a	0.0 a	94.5 b
Imidan 70 WP	3.0 lbs/A	PF-7C											
7 Lorsban 4E	64 oz/A	TC	0.8 ab	0.0 a	0.0 a	0.3 a	0.5 a	1.0 a	0.0 a	0.0 a	0.5 a	0.5 a	93.8 b
Perm-Up	10 oz/A	P											
Actara	5.5 oz/A	PF											
Calypso	6.0 oz/A	2, 5C											
Belt	5.0 oz/A	3-4C											
Lannate	3 pts /A	6-7C											
8 Lorsban 4E	64 oz/A	TC	0.5 a	0.3 a	0.3 a	1.8 a	0.0 a	1.0 a	0.8 a	4.3 c	0.8 a	0.8 a	91.5 b
Actara	5.5 oz/A	PF-											
Endigo ZC	6.0 oz/A	1C											
Thionex 50WP	4.0 lb/A	2-3C											
Danitol	21.3 oz/A	4-5C											
Lannate	3 pts /A	6-7C											
9 Beleaf 50SG	2.8 oz/A	P, PF-1C	1.8 b	0.3 a	0.0 a	3.3 a	1.0 a	63.5 c	0.0 a	0.0 a	0.3 a	0.3 a	33.8 a
Imidan 70WP	5.5 lbs/A	PF-2, 5-7C											
Delegate WG	7.0 oz/A	3-4C											
10 Untreated			0.0 a	0.3 a	1.5 a	14.5 b	10.0 b	39.0 bc	9.3 b	7.8 d	6.0 b	4.8 b	20.8 a

Evaluation on September 26 of McIntosh. Mean separation using Fishers Protected LSD ($P \leq 0.05$). Treatment means followed by the same letter are not significantly different. 1% BioCover oil applications to treatments 1@PF, 2@PF,1C, 3@DD, 4@DD, 5@TC and 6@TC.

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,

2013: – Cornell University's Hudson Valley Lab: Treatments were applied to four-tree plots replicated four 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 33 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 11. Application dates corresponding to tree phenology of 'Bartlett' beginning at delayed dormant (D) on 18 March, onset of 1st egg on 25 March; bud burst (BB) on 21 April, green cluster and 1st observed nymph on 28 April, white bud (WB) on 3 May; bloom on 6 May, 9mm fruit set on 13 May, 10 day post petal fall (PF) on 14 May; crop load reduction using NAA and 0.25% oil on 16 May.

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 $\text{Log}_{10}(X + 1)$ 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 11 Treatment Schedule For Seasonal Pear Insecticide Screen.
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y. - 2013.

Treatment / Formulation		Rate	Timing	Application Dates
1	Centaur 0.7 WDG + BioCover Hort. oil	46.0 oz/A 0.5% v/v	CB CB	21 April 21 April
2.	Centaur 40SC + oil + BioCover Hort. oil	71.5 oz/A 0.5% v/v	CB CB	21 April 21 April
3.	Nexter + BioCover Hort. oil	5.0 oz/A 0.5% v/v	CB CB	21 April 21 April
4.	Rimon + BioCover Hort. oil	32.0 oz/A 0.5% v/v	CB CB	21 April 21 April
5.	Esteem 35 WP + BioCover Hort. oil	5.0 oz/A 0.5% v/v	CB CB	21 April 21 April
6.	Esteem 35 WP Centaur 0.7 WDG+ oil HGW86 10SE + oil AgriMek 0.15EC+ oil + BioCover Hort. oil Delegate 25WG+ oil	5.0 oz/A 46.0 oz/A 16.5 fl oz/A 16.0 fl oz/A 0.5% v/v 7.0 oz/A	CB WB WB, PF PF WB, PF, 14d, 28dpPF 14d, 28dpPF	21 April 28 April 28 April 28 April, 14 May, 5 June 5 June,
7.	Esteem 35 WP HGW86 10SE + oil Delegate 25WG+ oil + BioCover Hort. oil	5.0 oz/A 16.5 fl oz/A 7.0 oz/A 0.5% v/v	CB WB, PF 14d, 28dpPF WB, PF, 14d, 28dpPF	21 April 28 April, 14 May 5 June, 17 June 28 April, 14 May
8.	Centaur 0.7 WDG+ oil + BioCover Hort. oil	46.0 oz/A 0.5% v/v	WB, 28dpPF WB, 28dpPF	28 April, 17 June 28 April, 17 June
9.	Centaur 40SC + oil + BioCover Hort. oil	71.5 oz/A 0.5% v/v	WB, 28dpPF WB, 28dpPF.	28 April, 17 June 28 April, 17 June
10.	Nexter 75% + BioCover Hort. oil	5.0 / 10.67 oz/A 0.5% v/v	WB, 28dpPF. WB, 28dpPF.	28 April, 17 June 28 April, 17 June
11.	Rimon 0.83EC + BioCover Hort. oil	32.0 / 96.0 oz/A 0.5% v/v	WB, 28dpPF WB, 28dpPF	28 April, 17 June 28 April, 17 June
12.	Esteem 35 WP + BioCover Hort. oil	5.0 oz/A 0.5% v/v	WB, 28dpPF WB, 28dpPF	28 April, 17 June 28 April, 17 June
13.	Esteem 35 WP Centaur 0.7 WDG+ oil AgriMek 0.15EC+ oil + BioCover Hort. oil	5.0 oz/A 46.0 oz/A 16.0 fl oz/A 0.5% v/v	CB WB PF WB, PF, 14d, 28dpPF	21 April 28 April 14 May 28 April, 14 May, 5 June,
17 June	Delegate 25WG+ oil	7.0 oz/A	14d, 28dpPF	5 June, 17 June
14.	Untreated control			

All applications made using a three-point hitch tractor mounted 'Pack Tank' sprayer and pecan handgun applied at 300 psi. dilute to runoff.

Table 12 Evaluations Of Insecticide Schedules For Controlling Insect Complex On Pear^A.
N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. -2013.

				Pear psylla nymphs per bud/leaf						
Treatment / Formulation		Rate	Timing	May 2	May 6	May 21	Jun 4	Jun 17	July 2	July 16
1	Centaur 0.7 WDG + BioCover Hort. oil	46.0 oz/A 0.5% v/v	CB, PF, 14d, 28d CB, PF, 14d, 28d	< 0.1 a	0.1 a	< 0.1 a	0.2 ab	2.6 a	3.8 ab	0.6 ab
2	Centaur 40SC + oil + BioCover Hort. oil	71.5 oz/A 0.5% v/v	CB CB	< 0.1 a	0.2 a	0.0 a	0.2 ab	2.4 a	9.5 c	1.3 b
3	Nexter + BioCover Hort. oil	5.0 oz/A 0.5% v/v	CB CB	< 0.1 a	< 0.1 a	< 0.1 a	< 0.1 a	1.3 a	5.9 bc	0.6 ab
4	Rimon + BioCover Hort. oil	32.0 oz/A 0.5% v/v	CB CB	< 0.1 a	0.1 a	< 0.1 a	< 0.1 a	1.8 a	2.2 ab	0.6 ab
5	Esteem 35 WP + BioCover Hort. oil	5.0 oz/A 0.5% v/v	CB CB	< 0.1 a	< 0.1 a	0.0 a	0.2 a	3.5 b	4.1 ab	1.2 b
6	Esteem 35 WP Centaur 0.7 WDG+ oil HGW86 10SE + oil AgriMek 0.15EC+ oil + BioCover Hort. oil Delegate 25WG+ oil	5.0 oz/A 46.0 oz/A 16.5 fl oz/A 16.0 fl oz/A 0.5% v/v 7.0 oz/A	CB WB WB, PF PF WB, PF, 14d, 28d 14d, 28d	< 0.1 a	0.2 a	0.0 a	0.1 a	0.8 a	3.7 ab	0.3 a
7	Esteem 35 WP HGW86 10SE + oil Delegate 25WG+ oil + BioCover Hort. oil	5.0 oz/A 16.5 fl oz/A 7.0 oz/A 0.5% v/v	CB WB, PF 14, 28dpPF WB, PF, 14d, 28d	< 0.1 a	< 0.1 a	< 0.1 a	< 0.1 a	1.1 a	2.3 ab	0.2 a
8	Centaur 0.7 WDG + BioCover Hort. oil	46.0 oz/A 0.5% v/v	WB WB	< 0.1 a	0.3 a	< 0.1 a	0.2 ab	3.0 a	1.4 a	0.3 a
9	Centaur 40SC + oil + BioCover Hort. oil	71.5 oz/A 0.5% v/v	WB WB	< 0.1 a	0.2 a	< 0.1 a	0.6 c	2.9 a	3.5 ab	0.8 ab
10	Nexter + BioCover Hort. oil	5.0 oz/A 0.5% v/v	WB WB	< 0.1 a	0.2 a	< 0.1 a	0.2 a	1.7 a	2.2 ab	0.2 a
11	Rimon + BioCover Hort. oil	32.0 oz/A 0.5% v/v	WB WB	0.0 a	0.2 a	< 0.1 a	0.1 a	2.5 a	1.6 a	0.2 a
12	Esteem 35 WP + BioCover Hort. oil	5.0 oz/A 0.5% v/v	WB WB	< 0.1 a	0.2 a	< 0.1 a	0.3 abc	1.4 a	1.3 a	0.1 a
13	Esteem 35 WP Centaur 0.7 WDG AgriMek 0.15EC+ oil + BioCover Hort. oil Delegate 25WG+ oil	5.0 oz/A 46.0 oz/A 16.0 fl oz/A 0.5% v/v 7.0 oz/A	CB WB PF WB, PF, 14d, 28d 14, 28dp	0.1 a	0.2 a	0.02 a	< 0.1 a	1.0 a	1.3 a	0.2 a
14 UNTREATED				0.0 a	0.3 a	0.21 b	0.6 bc	2.5 a	3.7 ab	0.3 a
P value for transformed data				0.5734	0.8387	0.0038	0.0681	0.3819	0.0253	0.0401

^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. All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph.

Table 13 Evaluations Of Insecticide Schedules For Controlling Seasonal Insect Complex On Pear ^A.
N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2013.

				Pear psylla eggs per bud/leaf						
Treatment / Formulation		Rate	Timing	May 2	May 6	May 21	Jun 4	Jun 17	Jul 2	Jul 16
1	Centaur 0.7 WDG + BioCover Hort. oil	46.0 oz/A 0.5% v/v	CB, PF, 14, 28dpPF CB, PF, 14, 28dpPF	1.6 a	0.4 a	< 0.1 a	4.2 a	8.2 a	3.7 a	1.0 a
2	Centaur 40SC + oil + BioCover Hort. oil	71.5 oz/A 0.5% v/v	CB CB	1.1 a	0.5 a	0.3 a	6.6 a	8.8 a	13.0 b	1.5 a
3	Nexter + BioCover Hort. oil	5.0 oz/A 0.5% v/v	CB CB	0.8 a	0.2 a	0.0 a	5.7 a	5.4 a	3.7 a	2.0 a
4	Rimon + BioCover Hort. oil	32.0 oz/A 0.5% v/v	CB CB	0.8 a	1.9 b	0.2 a	4.4 a	3.6 a	4.1 a	1.0 a
5	Esteem 35 WP + BioCover Hort. oil	5.0 oz/A 0.5% v/v	CB CB	1.0 a	0.3 a	< 0.1 a	5.8 a	8.1 a	5.5 a	1.5 a
6	Esteem 35 WP Centaur 0.7 WDG+ oil HGW86 10SE + oil AgriMek 0.15EC+ oil + BioCover Hort. oil Delegate 25WG+ oil	5.0 oz/A 46.0 oz/A 16.5 fl oz/A 16.0 fl oz/A 0.5% v/v 7.0 oz/A	CB WB WB, PF PF WB, PF, 14, 28 14, 28dpPF	1.1 a	0.2 a	< 0.1 a	3.6 a	1.4 a	5.9 a	0.3 a
7	Esteem 35 WP HGW86 10SE + oil Delegate 25WG+ oil + BioCover Hort. oil	5.0 oz/A 16.5 fl oz/A 7.0 oz/A 0.5% v/v	CB WB, PF 14, 28dpPF WB, PF, 14, 28	0.8 a	0.1 a	0.0 a	7.4 a	1.9 a	1.2 a	0.3 a
8	Centaur 0.7 WDG + BioCover Hort. oil	46.0 oz/A 0.5% v/v	WB WB	2.0 a	0.1 a	0.0 a	6.0 a	6.0 a	0.6 a	0.5 a
9	Centaur 40SC + oil + BioCover Hort. oil	71.5 oz/A 0.5% v/v	WB WB	1.1 a	0.4 a	< 0.1 a	7.7 a	8.5 a	6.4 a	1.4 a
10	Nexter + BioCover Hort. oil	5.0 oz/A 0.5% v/v	WB WB	1.7 a	0.3 a	0.3 a	6.2 a	6.1 a	0.8 a	0.9 a
11	Rimon + BioCover Hort. oil	32.0 oz/A 0.5% v/v	WB WB	1.1 a	0.6 a	0.4 a	11.3 a	8.8 a	2.6 a	0.7 a
12	Esteem 35 WP + BioCover Hort. oil	5.0 oz/A 0.5% v/v	WB WB	1.0 a	0.8 a	0.3 a	7.5 a	3.9 a	1.8 a	0.5 a
13	Esteem 35 WP Centaur 0.7 WDG AgriMek 0.15EC+ oil + BioCover Hort. oil Delegate 25WG+ oil	5.0 oz/A 46.0 oz/A 16.0 fl oz/A 0.5% v/v 7.0 oz/A	CB WB PF WB, PF, 14, 28 14, 28dpPF	1.2 a	0.1 a	0.1 a	3.1 a	1.9 a	0.4 a	0.5 a
14 White Flag (WF) UNTREATED				2.2 a	0.8 a	0.5 a	6.3 a	7.6 a	1.6 a	1.3 a
P value for transformed data				0.9271	0.3876	0.5885	0.4964	0.198	0.0302	0.1882

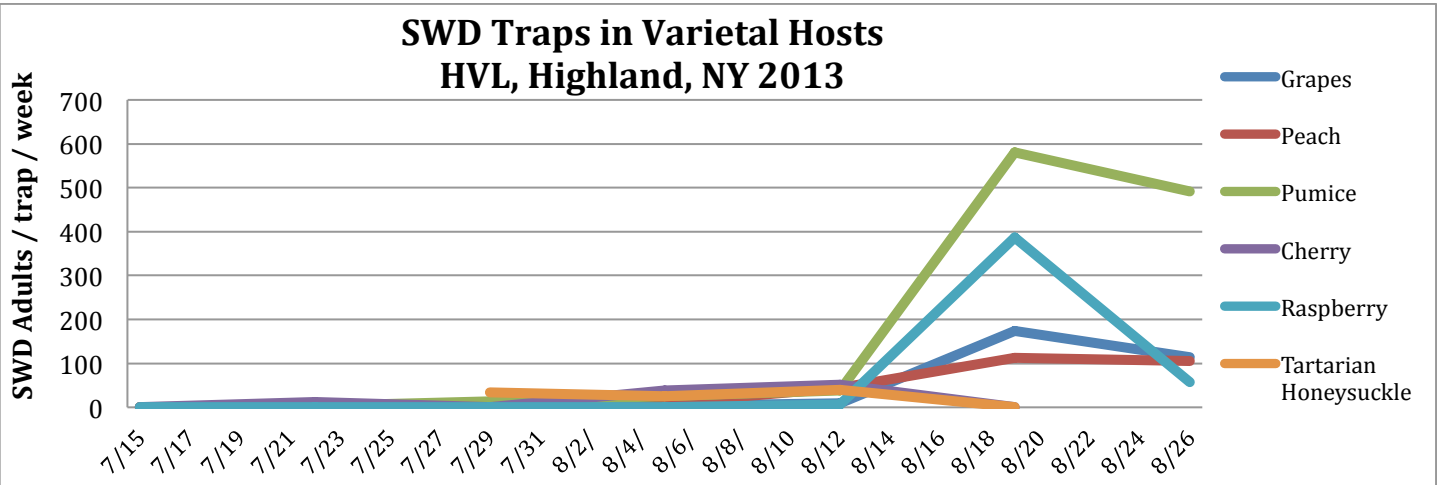
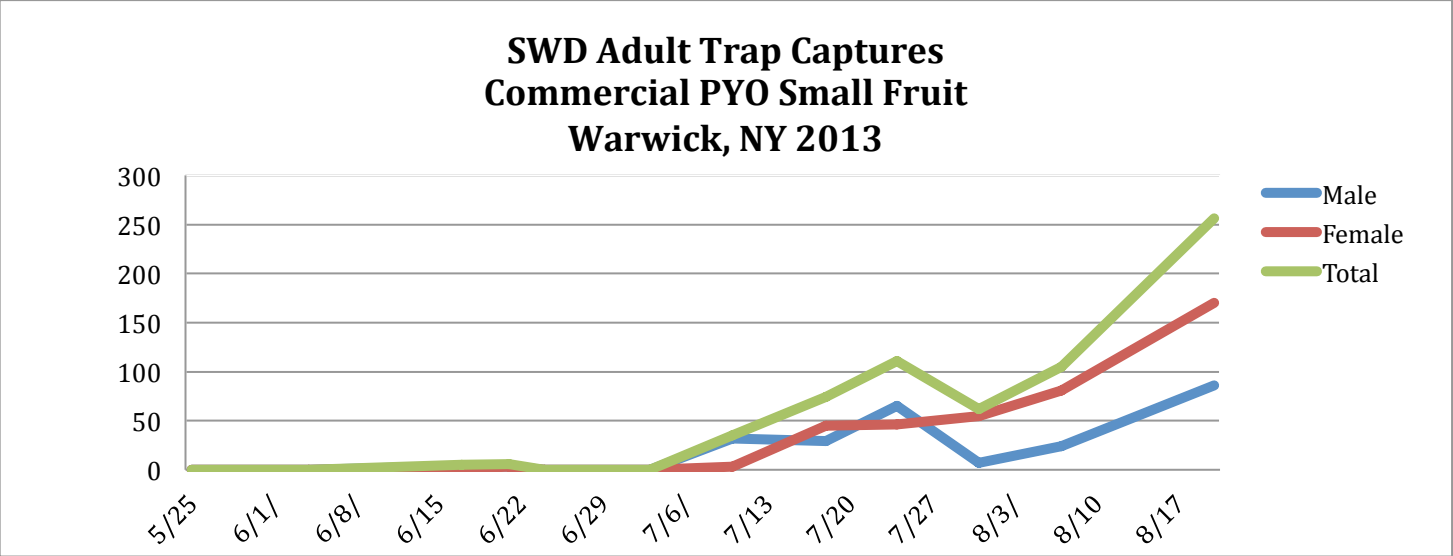
^a Seasonal evaluations made on 'Bartlett'.

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. All applications made using a three-point hitch tractor mounted 'Pack Tank' sprayer and pecan handgun applied dilute to runoff.

Spotted wing drosophila monitoring and program evaluation:

Small fruit grower is on a 3-4 day rotational program using conventional insecticides labeled for SWD including Delegate, Malathion 57, Assail including 2 lbs./100 gal. of sugar. Fruit were evaluated weekly beginning in mid-June.

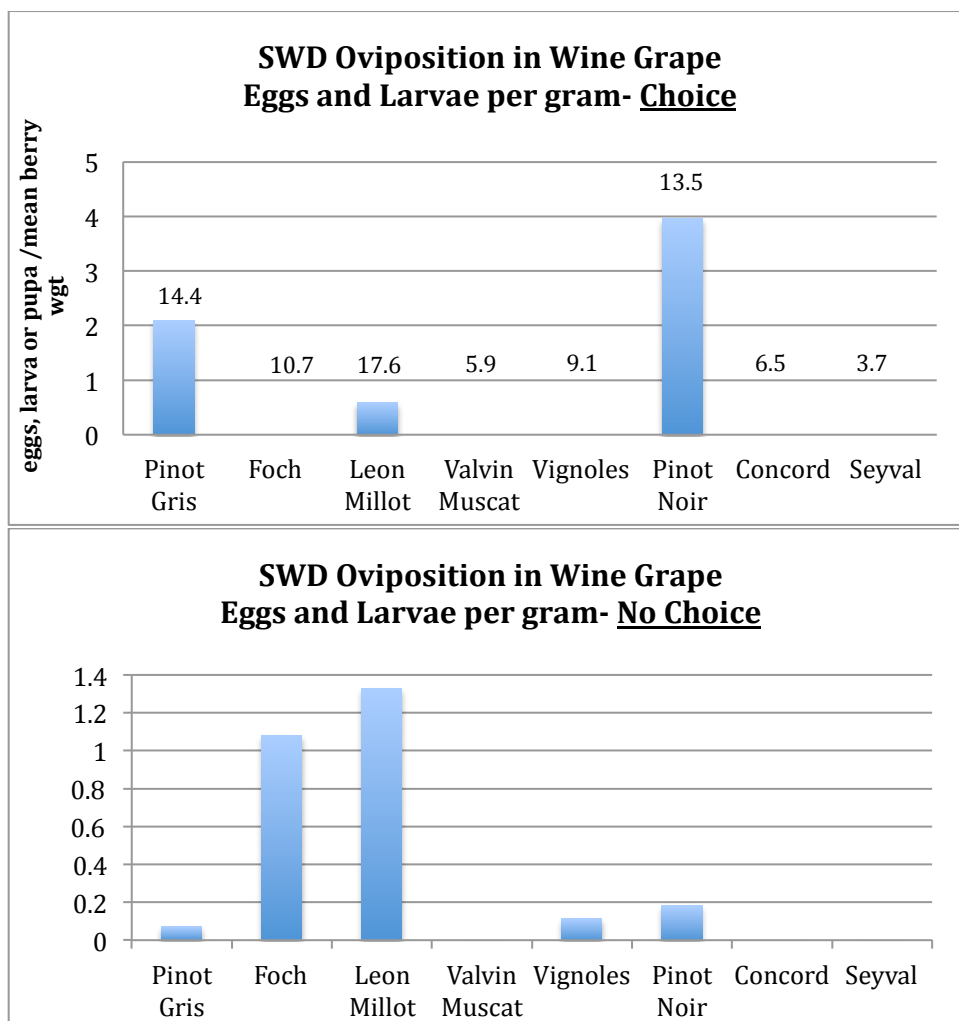
Weekly assessments of raspberry and blackberry showed 100% clean fruit sustained until 8-9 August. On Thursday and Friday, 0.42” and 4.84” of rainfall preceded a PYO weekend, preventing management to 8 days from the prior application. The following Monday, the grower made a follow-up application with fruit sampled the following Wednesday. Upon evaluation of fruit on the 14th of August in a 25 fruit sample, 45% damaged blackberry and 25% damaged raspberry fruit were found to be infested. However, blueberry samples remained clean. Of the 196 sampled raspberry from across the patch, 58 fruit were found to have oviposition by SWD (30%) containing 159 eggs with no larva found (representing newly laid eggs).



Seasonal trap captures of the SWD showing higher degree of presence in traps placed in Tartarian Honeysuckle early in the fruiting cycle of the host with dramatic increases in numbers of the adult in grape, raspberry and apple pumice into late August.

Spotted wing drosophila studies to determine ovipositional preference for Hudson Valley grape varieties: Grape clusters were selected from the Hudson Valley Laboratory ‘cold hardiness’ vineyard on 16 August with preference to varieties nearing harvest. Selected berries were removed from the cluster, subsampled and analyzed for Brix value, with 4 berries of each variety, weighed with stems and checked for damage before being introduced to paired SWD. In choice and non choice tests, 10 adult SWD (5 M/ 5F) were anesthetized, using 5-minute exposure to cold temperatures (45 F), and placed in containers with moisture wicks and 4 berries / variety. Flies were sealed with berries for 48 hours, after which time fruit was inspected for ovipositional sites for eggs and larva with time allowance made for larval development to include pupal stage. Numbers above bars represent the mean brix of a 2 berry juice analysis.

From this initial study it appears that SWD oviposition can occur in HV grape varieties, which may require preventative control measures if adults are present in the vineyard. However, it is important to note that only field samples of Leon Millot and the 144 strain of Pinot Noir were we able to find *Drosophila* oviposition and able to rear SWD adults in 2013.



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

McIntosh Phenology

Year	GT	HIG	T.C.	Pink	Bloom	P.F.	PF DD ₄₃	PF DD ₅₀
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 3/163/18		3/25	4/8	4/16	4/21	305.0	168.5	Low
Latest day 4/154/27		5/4	5/7	5/16	5/24	595.0	382.0	High

Mean **5 April** **13 April** **21 April** **27 April** **3 May** **13 May** **493.7** **262.2**

Midrange: 3/31 (+/-15D)

Mean days in bloom 9.9 days

4/7 (+/-20D)

4/14 (+/-20D)

4/22 (+/-14D)

5/1 (+/-15D)

5/7 (+/-17D)

2013 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

Date	MARCH			APRIL			MAY			JUNE			JULY			AUGUST			SEPTEMBER		
	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip
1	39.0	27.0		53.0	29.0	0.02	73.2	44.4		88.1	64.9		74.8	67.9	1.87	75.5	63.6	0.31	79.5	67.8	0.01
2	33.0	23.0		34.0	23.0		78.0	46.6		84.0	70.5		82.3	71.0	0.18	80.4	63.2	0.01	81.0	66.1	2.83
3	29.0	20.0		43.0	24.0		71.1	51.0		73.9	60.2	0.42	84.6	72.1		80.6	62.4		77.3	60.0	0.21
4	37.0	20.0		48.0	23.0		74.4	44.6		74.7	51.2		86.6	71.6		78.6	55.8	0.19			
5	40.0	24.0		58.0	32.0		72.6	40.3		73.7	48.0		87.3	73.5		76.6	53.0				
6	35.0	29.0	0.01	47.0	25.0		73.3	41.2		69.8	52.9	0.12	90.5	73.6		79.9	52.1				
7	35.0	26.0	0.12	57.0	34.0		77.3	49.8		59.1	55.8	1.46	90.0	71.8		73.8	60.3				
8	44.0	24.0	0.31	69.0	42.0		65.0	57.5	0.48	75.3	55.3	0.27	86.0	68.6	0.33	81.6	68.8				
9	53.0	24.0		78.0	56.0		63.6	51.7	0.18	78.7	55.8		85.4	66.9	0.01	79.6	71.0	3.6			
10	51.0	31.0		70.0	46.0	0.39	80.0	49.8	0.07	65.4	58.9	1.26	81.2	70.9	0.12	83.3	63.0				
11	47.0	30.0		59.0	33.0	0.01	70.0	60.1	0.25	74.8	59.9	0.42	84.4	67.9		78.2	54.0				
12	57.0	35.0	1.22	36.0	32.0	0.36	65.9	46.7		71.8	59.6		79.6	66.7		80.9	60.4				
13	40.0	29.0		53.0	35.0		53.0	39.2		57.8	53.9	1.22	77.1	63.9	0.03	74.1	65.1	0.85			
14	33.0	19.0		49.0	36.0		60.1	32.7		73.7	51.9	0.50	87.7	70.1		74.0	51.8				
15	42.0	21.0		58.0	35.0		65.8	36.1	0.07	79.6	54.9		88.6	73.6		79.1	50.8				
16	37.0	23.0		63.0	40.0	0.01	81.9	51.1		74.6	52.7		90.0	68.7		79.5	53.4				
17	30.0	17.0	0.10	69.0	45.0	0.01	68.6	53.9		84.4	60.8		93.2	69.6		81.4	54.2				
18	30.0	17.0		55.0	40.0		68.8	46.8		74.0	59.4	0.12	95.3	73.6		76.1	58.9				
19	36.0	23.0	0.44	75.0	47.0	0.80	58.0	53.9	0.20	72.9	54.8		91.8	74.5		78.2	59.8				
20	41.0	23.0		51.0	35.0	0.15	81.3	56.4		78.5	50.3		88.8	73.6		85.1	60.0				
21	33.0	21.0		48.0	27.0		88.3	63.0		80.1	60.1		87.3	66.2		86.6	59.9				
22	34.0	20.0		50.0	30.0		76.7	63.9	0.04	82.2	61.5		82.9	67.4	0.16	82.5	66.1	0.01			
23	37.0	26.0		43.0	30.0		72.6	64.5	0.29	87.5	65.5		85.4	70.7	0.86	76.6	62.9				
24	40.0	23.0		72.0	33.0		65.3	43.8	0.61	90.2	68.4	0.04	78.4	60.6		77.7	56.5				
25	38.0	28.0		63.0	36.0	0.04	50.9	43.3	0.53	86.8	65.5	0.22	69.8	57.7		79.8	52.8				
26	49.0	28.0		58.0	36.0		61.4	45.6		80.7	68.9		78.9	62.8		75.4	63.0	0.22			
27	45.0	27.0		70.0	38.0		75.4	43.3		85.4	65.0	0.35	82.3	59.4		82.1	67.5	0.87			
28	42.0	29.0		66.0	43.0		67.4	47.4	0.13	81.9	66.9	0.96	75.3	63.8	0.65	85.0	64.8				
29	45.0	33.0		55.0	45.0	0.19	80.8	56.9	0.05	81.5	64.2	0.01	80.5	66.0		79.1	65.8	0.17			
30	51.0	29.0		67.0	45.0		90.0	64.0		82.7	64.9	1.76	81.6	57.2		84.0	65.8				
31	51.0	32.0	0.21				90.0	65.1					79.9	57.6		81.4	68.5	0.1			
High / Low / Total																					
	57.0	17.0	2.42	78.0	23.0	1.99	90.0	32.7	2.90	90.2	48.0	9.14	95.3	57.2	4.21	86.6	50.8	6.33	81.0	60.0	0.91

