PRELIMINARY RESULTS OF 2011 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 Dow AgroSciences, DuPont Agricultural Enterprise, Nichino, Syngenta, United Phosphorus, NESARE, New York State Apple Research and Development Program (ARDP).

Formulation	Materials Tested	Company
	Apple	
Actara 25WDG		Syngenta
Assail 30SG		UPI
Avaunt 30DG		Cerexagri
Baythroid XL 1L		Bayer
Belt SC		Bayer
BioCover (NIS)		Crop Protection Services
Calypso 4F		Bayer
Centaur 0.7WG		Nichino America Inc.
CurveBall (Entrust 80WP baited red sphere)		USDA
Danitol 2.4 EC		Valent
Delegate WG		Dow AgroSciences
Endigo ZC		Syngenta
Endigo ZCX		Syngenta
Esteem 35WP		Dow AgroSciences
Imidan 70WP		Gowan
Lambda-CY 1EC		Nichino America Inc.
Lannate 2.4LV		E.I. DuPont De Nemours & Co.
Leverage 2.7SE		Bayer
Movento 240SC		Bayer
Perm-up 3.2EC		UPI
Provado 1.6F		Bayer
Sevin XLR		Bayer
Surround WP		BASF
Tolfenpyrad 15 EC		Nichino America Inc.
Warrior II 2.08CS		Syngenta
	Pear	
Actara 25WDG		Syngenta
AgriMek 0.15EC		Syngenta
Assail 30SG		UPI
BioCover (NIS)		Crop Protection Services
Calypso 4F		Bayer
Centaur 0.7WG		Nichino America Inc.
Delegate WG		Dow AgroSciences
Esteem 35WP		Dow AgroSciences
HGW86 10SE		E.I. DuPont De Nemours & Co.
Movento 240SC		Bayer

Factors Contributing To The 2011 Hudson Valley Pest Management Anomalies.

The start to the 2011 season saw temperatures and tree advancement that most growers would have called average with green tip (4 April) occurring a day earlier than the mean for the past 25 years (see McIntosh phenology). The 2011 petal fall date of 16th of May was 3 days later than the mean date at the Hudson Valley Laboratory (13th of May). However, it was 3 weeks later than in 2010, which occurred on 28th of April, the earliest PF date on record at the HVL (25 years). The degree-day accumulations were higher than the average with petal fall accumulations of 526 degree days base$_{43}$; 44 Degree Days higher than the mean. Generally wet during the pre-bloom period with drought conditions mid-season, followed by record rainfall during late August through early September.

April saw significant rainfall during the pre-bloom period, accumulating 5.5 inches of rain over the month. The majority of rain fell between ½" green (11 April) and pink (1 May). At the onset of bloom we saw 0.88 inches of rain, which reduced insecticide residual for managing Plum curculio (PC) and Tarnished Plant Bug (TPB). Both PC and TPB had ample opportunity to damage fruit between PF and 1C as daily rainfall kept growers from re-entering orchards for 7 days during which time 2.78" of rain fell. This led to severe rut formation in orchards while other blocks were inaccessible during the days that followed, leading to increased PC injury. PC movement into orchards and oviposition was predicted to end on 2 June using predictive modeling of 308 DD$_{50}$ from petal fall of McIntosh.

European apple sawfly activity occurred in moderate numbers this season in early blooming varieties with 9.7% and 4.2% injury, PC injury was also moderate with 17.7% and 21.0% injury and TPB injury with 4.7 and 0.7% injury observed in Ginger Gold and McIntosh respectively on 1 June in untreated plots at the Hudson Valley research orchard. Harvest evaluations saw increases in PC injury of 32.5% and 49.0% observed in Ginger Gold and McIntosh harvested on 4 August and 26 August respectively.

The 1st generation codling moth larval emergence was predicted for 30 May using 220 DD$_{50}$. The internal lepidopteran complex (OFM and CM) showed moderate to low levels of damage to apple, with CM frass appearing during mid June through July. Relatively low levels of damage from the internal lepidopteran complex was observed with 2.5% and 3.6% combined damage from 1st and 2nd generation evaluated at harvest on Ginger Gold and McIntosh, harvested on 4 August and 26 August respectively.

San Jose scale (SJS) crawler emergence was predicted to occur on 1 June using the 1 March 500 DD$_{50}$ model. However, it was observed to occur more than two weeks after the predicted date. Growers using Movento at the 10 post PF timing were successful at managing this insect, however, low residuals using pyrethroid insecticides may not have been sufficient to control SJS using the model date. In general SJS scale levels were modest in infested trees.

Growers again monitored Obliquebanded leafroller closely this season, managing the insect using primarily Delegate or Altacor in Hudson Valley orchards. Most applications were made using insect phenology predictions for early emergence, using 340 DD$_{50}$ from 1 June to manage the 1st emergence of OBLR, which corresponded to the 21st June. In general, very low damage levels of OBLR observed again this season. Trap captures were low for the 2nd generation of OBLR. Apple maggot density was moderate to high throughout the region with hurricane rains falling too late to promote significantly higher late emergence. Moderate populations of adults were noted in the mid-Hudson Valley with seasonal accumulations near 70 flies per trap where rainfall provided ideal emergence conditions.

Brown Marmorated Stink Bug, *Halyomorpha halys,* was first confirmed in NY in December of 2008 and observed throughout the southern Hudson Valley for the past 3 years. Increasing populations have been documented in urban environments from homeowner specimens sent to the HVL. BMSB was present throughout the 2011 growing season, however it remained in deciduous trees, observed in all life stages in August on Sugar Maple, *Acer saccharum*, White Ash, *Fraxinus americana*, and Tree of Heaven, *Ailanthus altissima*. Late season nymphs and adult trap captures of BMSB using Tedders traps and the *Plaudi stali* aggregation kerimone lure, methyl *(E,E,Z)-2,4,6*-decatrienoate, was observed in pepper in Marlboro, NY. Apple in research blocks showed very late SB feeding damage to red delicious with BMSB observed in harvest bins in September. Yet all three species including BMSB, brown stink bug, *Euschistus servus* (Say), and green stink bug, *Acrosternum hilare* have been noted on fruit throughout the latter part of what was a very wet late season. Hail damaged apple maggot damaged fruit were confused with SB injury.

Table 1 Treatment Schedule For Seasonal Apple Insecticide Screen.
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y. - 2011.

Treatment / Formulation	Rate	Timing	Application Dates
1 Actara 25WDG	4.5 oz/A	PF-1C	12,20 May
Belt	5.0 oz/A	1st CM-3C	31 May, 18 June
Danitol	21.33 fl.oz/A	4-6C	9,26 July, 16 Aug
2 Actara 25WDG	4.5 oz/A	PF, 1-2C	12, 20 May, 4 June,
Belt	5.0 oz/A	4-6C	9, 26 July, 16 Aug
3 Warrior II 2.08CS	2.56 fl.oz/A	TC, 2C	21 April, 4 June
Actara 25WDG	5.5 oz/A	PF-1C	12, 20 May
Lannate 2.4LV	3.0 pts/A	3-4, 6-7C	18, 28 June, 26 July, 16 Aug
Danitol	21.33 fl.oz/A	5C	9 July
4 Danitol 2.4EC	21.33 oz/A	TC	21 April
Endigo ZC	6.0 oz/A	PF,1C,2C	12, 20 May, 4 June
Lannate 2.4LV	3.0 pts/A	3-4, 6-7C	18, 28 June, 26 July, 16 Aug
Danitol	21.33 fl.oz/A	5C	9 July
5 Danitol 2.4EC	21.33 oz/A	TC	21 April
Endigo ZCX	6.0 oz/A	PF,1C,2C	12, 20 May, 4 June
Lannate 2.4LV	3.0 pts/A	3-4C, 6-7C	18 ,28 June, 26 July, 16 Aug
Danitol	21.33 fl.oz/A	5C	9 July
6 Baythroid XL 1L	2.4 fl.oz/A	TC	21 April
Calypso 4F	6.0 fl.oz/A	PF-2C	12, 20, 31 May
Movento + 1%oil	9.0 fl.oz/A	1st CM (2C)	31 May
7 Baythroid XL 1L	2.4 fl.oz/A	TC	21 April
Calypso 4F	6.0 fl.oz/A	PF-2C	12, 20, 31 May
Movento + 1%oil	6.0 fl.oz/A	1st CM (2C)	31 May
8 Baythroid XL 1L	2.4 fl.oz/A	TC	21 April
Calypso 4F	6.0 fl.oz/A	PF-1C, 1st CM	12, 20, 31 May
Centaur 0.7WG + 1%oil	46 oz/A	2C-3C ($500DD_{50}$)	4, 18 June
Danitol	21.33 fl.oz/A	4-7C	28 June, 9, 26 July, 16 Aug
9 Baythroid XL 1L	2.4 fl.oz/A	TC	21 April
Calypso 4F	6.0 fl.oz/A	PF-1C, 1st CM	12, 20, 31 May
Esteem 35W + 1%oil	5.0 oz/A	2-3C ($500DD_{50}$)	4,18 June
Danitol	21.33 fl.oz/A	4-7C	28 June, 9, 26 July, 16 Aug

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

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

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

EVALUATION OF INSECTICIDES FOR CONTROLLING THE EARLY FRUIT FEEDING INSECT COMPLEX ON APPLE, 2011 – Cornell University's Hudson Valley Lab: Treatments were applied to four-tree plots, replicated four times in a randomized complete block design. All applications were applied concentrate using a tractor mounted John Bean® Airblast sprayer delivering 200 psi. and 148.8 GPA, traveling an average of 2.86 mph. Trees on the M.26 rootstock were 16 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, increased insect distribution and insect 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 20 March, 1/2" green on 19 April, tight cluster (TC) on 21 April**,** pink on 30 April**,** King Bloom on 6 May, PF on 12 May, 1st cover on 20 May, 1st CM and 2C on 31 May, 3C on 4 June, 1st CM +14 and 4C days on 18 June, 5C on 28 June, 2nd CM and 6C on 9 July,2nd CM + 14d and 7C on 26 July, 8C on 16 August.

Treatments applied season long over the entire block for crop size management and disease control included: COCS at 1lb/A on 20 March, Manzate at 1.5lbs/A on 6 April, Manzate at 2lbs/A on 15 and 19 April, Vanguard at 4oz/A on 19 April, Manzate at 2.25lbs/A and Vanguard at 4oz/A on 26 April, Manzate at 2.25lbs/A, Ralley at 4oz/A, and Firewall at 16oz/A on 1 May, Manzate at 2.25oz/A and Ralley at 4oz/A on 6 May, Manzate at 2.25 lbs/A and Firewall and Regulaid at 4oz/A on 12 May, Manzate at 2.25lbs/A and Ralley at 4oz/A on 18 May, Manzate at 2.25lbs/A on 24 May, NNA at 3oz/100 on 26 May.

Early season rainfall and cool temperatures contributed to higher incidence of early season damage in commercial orchards as daily rainfall kept growers from re-entering orchards for 7 days prior to 1C during which time 2.78" of rain fell. This led to severe rut formation in orchards while other blocks were inaccessible during the days that followed, leading to increased PC injury. PC movement into orchards and oviposition was predicted to end on 2 June (1 day post 2C) using predictive modeling of 308 DD_{50} from petal fall of McIntosh. Reports from New England States indicate higher levels of PC injury where 2C applications were not made against this insect. In early season data taken from Ginger Gold and McIntosh fruit clusters on 1 June, relatively low levels of PC injury were observed, with 17.7% PC injury noted in untreated plot trees, yet considerably higher levels of PC damage was found at harvest (32% in untreated plots), suggesting increased PC activity after the emergence completion model indicated no further need of insecticide residue.

All treatments were effective at controlling the early season pest complex on both Ginger Gold and McIntosh fruit clusters as of 1 June. No significant differences in efficacy was observed between the Endigo ZC and ZCX formulations

Table 2a Evaluations Of Insecticide Schedules For Controlling Early Season Insect Complex On Apple [A]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2011.

				Incidence (%) of insect damaged cluster fruit				
	Treatment / Formulation	Rate	Timing	TPB	PC	EAS	E. LEP	Clean
1	Actara 25WDG Belt Danitol	4.5 oz/A 5.0 oz/A 21.33 fl.oz/A	PF-1C 1st CM-3C 4-6C	2.4 a	1.3 a	0.8 a	0.5 a	94.9 a
2	Actara 25WDG Belt	4.5 oz/A 5.0 oz/A	PF, 1-2C 4-6C	1.5 a	2.5 a	0.0 a	1.0 a	95.0 a
3	Actara 25WDG Warrior II 2.08CS Lannate 2.4LV Danitol	5.5 oz/A 2.56 fl.oz/A 3.0 pts/A 21.33 fl.oz/A	TC, 2C PF-1C 3-4, 6-7C 5C	1.4 a	1.3 a	0.9 a	0.0 a	96.5 a
4	Danitol 2.4EC Endigo ZC Lannate 2.4LV Danitol	21.33 oz/A 6.0 oz/A 3.0 pts/A 21.33 fl.oz/A	TC PF,1C,2C 3-4, 6-7C 5C	2.0 a	0.5 a	0.0 a	0.3 a	97.3 a
5	Danitol 2.4EC Endigo ZCX Lannate 2.4LV Danitol	21.33 oz/A 6 oz/A 3.0 pts/A 21.33 fl.oz/A	TC PF,1C,2C 3-4C, 6-7C 5C	1.3 a	0.5 a	0.3 a	0.0 a	98.0 a
6	Baythroil XL 1L Calypso 4F Movento + 1%oil	2.4 fl.oz/A 6.0 fl.oz/A 9.0 fl.oz/A	TC PF-2C 1st CM	3.0 a	0.3 a	0.5 a	0.3 a	96.0 a
7	Baythroid XL 1L Calypso 4F Movento + 1%oil	2.4 fl.oz/A 6.0 fl.oz/A 6.0 fl.oz/A	TC PF-2C 1st CM	1.3 a	1.0 a	1.0 a	0.3 a	96.5 a
8	Baythroid XL 1L Calypso 4F Centaur 0.7WG + 1%oil Danitol	2.4 fl.oz/A 6.0 fl.oz/A 46.0 oz/A 21.33 fl.oz/A	TC PF-1C, 1st CM 2C-3C ($500DD_{50}$) 4-7C	1.8 a	0.5 a	0.8 a	0.3 a	96.8 a
9	Baythroid XL 1L Calypso 4F Esteem 35W + 1%oil Danitol	2.4 fl.oz/A 6.0 fl.oz/A 5.0 oz/A 21.33 fl.oz/A	TC PF-1C, 1st CM 2-3C ($500DD_{50}$) 4-7C	3.3 a	0.5 a	0.3 a	0.0 a	96.0 a
10	Untreated			4.7 a	17.7 b	9.7 b	4.0 b	66.0 b
P value for transformed data				0.744	0.010	0.005	0.030	0.000

[a] Evaluation made on June 1 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. All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph.

Table 2b Evaluations of insecticide schedules for controlling early season insect complex on apple [a]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2010.

				Incidence (%) of insect damaged cluster fruit				
	Treatment / Formulation	Rate	Timing	TPB	PC	EAS	E. LEP	Clean
1	Actara 25WDG Belt Danitol	4.5 oz/A 5.0 oz/A 21.33 fl.oz/A	PF-1C 1st CM-3C 4-6C	0.8 a	1.3 a	1.0 a	0.8 a	96.3 a
2	Actara 25WDG Belt	4.5 oz/A 5.0 oz/A	PF, 1-2C 4-6C	1.0 a	1.8 a	1.0 a	0.3 a	96.0 a
3	Actara 25WDG Warrior II 2.08CS Lannate 2.4LV Danitol	5.5 oz/A 2.56 fl.oz/A 3.0 pts/A 21.33 fl.oz/A	TC, 2C PF-1C 3-4, 6-7C 5C	0.5 a	0.3 a	1.8 a	0.3 a	97.3 a
4	Danitol 2.4EC Endigo ZC Lannate 2.4LV Danitol	21.33 oz/A 6.0 oz/A 3.0 pts/A 21.33 fl.oz/A	TC PF,1C,2C 3-4, 6-7C 5C	1.3 a	2.3 a	1.3 a	0.3 a	95.0 a
5	Danitol 2.4EC Endigo ZCX Lannate 2.4LV Danitol	21.33 oz/A 6 oz/A 3.0 pts/A 21.33 fl.oz/A	TC PF,1C,2C 3-4C, 6-7C 5C	1.0a	2.3 a	2.3 a	0.0 a	94.5 a
6	Baythroil XL 1L Calypso 4F Movento + 1%oil	2.4 fl.oz/A 6.0 fl.oz/A 9.0 fl.oz/A	TC PF-2C 1st CM	1.3a	0.5 a	1.8 a	0.3 a	96.3 a
7	Baythroid XL 1L Calypso 4F Movento + 1%oil	2.4 fl.oz/A 6.0 fl.oz/A 6.0 fl.oz/A	TC PF-2C 1st CM	1.8a	0.3 a	1.5 a	0.3 a	96.3 a
8	Baythroid XL 1L Calypso 4F Centaur 0.7WG + 1%oil Danitol	2.4 fl.oz/A 6.0 fl.oz/A 56.0 oz/A 21.33 fl.oz/A	TC PF-1C, 1st CM 2C-3C ($500DD_{50}$) 4-7C	1.3 a	0.3 a	0.8 a	0.0 a	97.7 a
9	Baythroid XL 1L Calypso 4F Esteem 35W + 1%oil Danitol	2.4 fl.oz/A 6.0 fl.oz/A 5.0 oz/A 21.33 fl.oz/A	TC PF-1C, 1st CM 2-3C ($500DD_{50}$) 4-7C	1.5 a	1.3 a	0.8 a	0.3 a	96.0 a
10	Untreated			0.7 a	21.0 a	4.8 b	4.3 b	70.0 b
P value for transformed data				0.895	0.000	0.232	0.038	0.000

[a] Evaluation made on June 1 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. All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph.

APPLE: Malus domestica 'Red Delicious'

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)

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Treatments were applied on various schedules as shown in Table 1. Dates corresponding to tree phenology for McIntosh occurred for green tip (GT) on 20 March, 1/2" green on 19 April, tight cluster (TC) on 21 April**,** pink on 30 April**,** King Bloom on 6 May, PF on 12 May, 1st cover on 20 May, 1st CM and 2C on 31 May, 3C on 4 June, 1st CM +14 and 4C days on 18 June, 5C on 28 June, 2nd CM and 6C on 9 July,2nd CM + 14d and 7C on 26 July, 8C on 16 August.

Treatments applied season long over the entire block for crop size management and disease control included: COCS at 1lb/A on 20 March, Manzate at 1.5lbs/A on 6 April, Manzate at 2lbs/A on 15 and 19 April, Vanguard at 4oz/A on 19 April, Manzate at 2.25lbs/A and Vanguard at 4oz/A on 26 April, Manzate at 2.25lbs/A, Ralley at 4oz/A, and Firewall at 16oz/A on 1 May, Manzate at 2.25oz/A and Ralley at 4oz/A on 6 May, Manzate at 2.25 lbs/A and Firewall and Regulaid at 4oz/A on 12 May, Manzate at 2.25lbs/A and Ralley at 4oz/A on 18 May, Manzate at 2.25lbs/A on 24 May, NNA at 3oz/100 on 26 May.

Phytophagous and predacious mite populations were evaluated by sampling 25 leaves from Red Delicious on 28 June. Leaves were removed to the laboratory where they were brushed using a mite-brushing machine onto glass plates and the mites and eggs examined using a binocular scope ($\geq$18X). To stabilize variance in these evaluations, transformation using the Log_{10} (X + 1) was conducted prior to analysis using Fisher's Protected LSD (P=<0.05). Untransformed data are presented in each table.

Cool and wet spring conditions with above average rainfall prior to the 28 June sampling of phytophagous mite held populations to low levels with the exception of the apple rust mite (ARM). No significant differences were observed in the adult or egg forms of ERM or TSM. However, PF-2C applications of Endigo ZC / ZCX followed by a 3C of Lannate showed significantly higher ARM populations compared to other pyrethroids and more dramatically compared to the neonicotinoid treatments, Actara and Calypso. Conversely, the Endigo ZCX and Lannate program had lower levels of beneficial mite predators. Exceptionally wet late season weather showed very low mite numbers, precluding further data collection.

Table 3a Evaluations of insecticide schedules for controlling mite complex on apple [a]
N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2011.

	Treatment / Formulation	Rate	Timing	Incidence of adult mite per leaf of 25 leaf sample ERM	TSM	ZM	AMB	ARM
1	Actara 25WDG Belt Danitol	4.5 oz/A 5.0 oz/A 21.33 fl.oz/A	PF-1C 1st CM-3C 4-6C	0.4 a	0.2 ab	0.3 cd	0.2 ab	59.4 a
2	Actara 25WDG Belt	4.5 oz/A 5.0 oz/A	PF, 1-2C 4-6C	0.2 a	0.1 ab	0.1 ab	0.3 ab	49.2 a
3	Actara 25WDG Warrior II 2.08CS Lannate 2.4LV Danitol	5.5 oz/A 2.56 fl.oz/A 3.0 pts/A 21.33 fl.oz/A	TC, 2C PF-1C 3-4, 6-7C 5C	0.3 a	0.2 ab	0.1 ab	0.1 a	151.4 abc
4	Danitol 2.4EC Endigo ZC Lannate 2.4LV Danitol	21.33 oz/A 6.0 oz/A 3.0 pts/A 21.33 fl.oz/A	TC PF,1C,2C 3-4, 6-7C 5C	0.2 a	0.0 a	0.1 ab	0.2 ab	244.5 bc
5	Danitol 2.4EC Endigo ZCX Lannate 2.4LV Danitol	21.33 oz/A 6 oz/A 3.0 pts/A 21.33 fl.oz/A	TC PF,1C,2C 3-4C, 6-7C 5C	0.1 a	0.0 a	0.0 a	0.1 a	410.2 c
6	Baythroil XL 1L Calypso 4F Movento + 1%oil	2.4 fl.oz/A 6.0 fl.oz/A 9.0 fl.oz/A	TC PF-2C 1st CM	0.3 a	0.1 ab	0.1 ab	0.3 ab	49.2 a
7	Baythroid XL 1L Calypso 4F Movento + 1%oil	2.4 fl.oz/A 6.0 fl.oz/A 6.0 fl.oz/A	TC PF-2C 1st CM	0.1 a	0.0 a	0.0 ab	0.1 ab	41.6 a
8	Baythroid XL 1L Calypso 4F Centaur 0.7WG + 1%oil Danitol	2.4 fl.oz/A 6.0 fl.oz/A 56.0 oz/A 21.33 fl.oz/A	TC PF-1C, 1st CM 2C-3C ($500DD_{50}$) 4-7C	0.4 a	0.3 b	0.2 bc	0.2 ab	112.8 ab
9	Baythroid XL 1L Calypso 4F Esteem 35W + 1%oil Danitol	2.4 fl.oz/A 6.0 fl.oz/A 5.0 oz/A 21.33 fl.oz/A	TC PF-1C, 1st CM 2-3C ($500DD_{50}$) 4-7C	0.4 a	0.3 ab	0.3 cd	0.5 b	158.4 abc
10	Untreated			0.5 a	0.1 ab	0.4 d	0.3 ab	164.6 abc
P value for transformed data				0.492	0.289	0.000	0.267	0.009

[a] Evaluation made on 28 June from Red Delicious cultivar. Mean separation by Fishers Protected LSD ($P \leq 0.05$). Treatment means followed by the same letter are not significantly different. The log (n + 1) transformation was used for analyses with the arithmetic means reported. Untransformed data are presented in each table. All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph.

Table 3b Evaluations of insecticide schedules for controlling mite complex on apple [a].
N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2011.

				Incidence of mite egg per leaf of 25 leaf sample			
Treatment / Formulation	Rate	Timing	ERME	TSME	ZME	AMBE
1 Actara 25WDG	4.5 oz/A	PF-1C	0.4 ab	0.1 a	1.0 d	0.1 a
Belt	5.0 oz/A	1st CM-3C				
Danitol	21.33 fl.oz/A	4-6C				
2 Actara 25WDG	4.5 oz/A	PF, 1-2C	0.2 ab	0.1 a	0.2 ab	0.2 ab
Belt	5.0 oz/A	4-6C				
3 Actara 25WDG	5.5 oz/A	TC, 2C	0.8 b	0.2 a	0.2 ab	0.1 a
Warrior II 2.08CS	2.56 fl.oz/A	PF-1C				
Lannate 2.4LV	3.0 pts/A	3-4, 6-7C				
Danitol	21.33 fl.oz/A	5C				
4 Danitol 2.4EC	21.33 oz/A	TC	0.1 ab	0.0 a	0.0 a	0.1 a
Endigo ZC	6.0 oz/A	PF,1C,2C				
Lannate 2.4LV	3.0 pts/A	3-4, 6-7C				
Danitol	21.33 fl.oz/A	5C				
5 Danitol 2.4EC	21.33 oz/A	TC	0.1 ab	0.0 a	0.0 a	0.0 a
Endigo ZCX	6 oz/A	PF,1C,2C				
Lannate 2.4LV	3.0 pts/A	3-4C, 6-7C				
Danitol	21.33 fl.oz/A	5C				
6 Baythroil XL 1L	2.4 fl.oz/A	TC	0.0 a	0.4 a	0.0 a	0.2 ab
Calypso 4F	6.0 fl.oz/A	PF-2C				
Movento + 1%oil	9.0 fl.oz/A	1st CM				
7 Baythroid XL 1L	2.4 fl.oz/A	TC	0.1 ab	0.1 a	0.1 ab	0.0 a
Calypso 4F	6.0 fl.oz/A	PF-2C				
Movento + 1%oil	6.0 fl.oz/A	1st CM				
8 Baythroid XL 1L	2.4 fl.oz/A	TC	0.8 b	0.3 a	0.3 abc	0.1 a
Calypso 4F	6.0 fl.oz/A	PF-1C, 1st CM				
Centaur 0.7WG + 1%oil	56.0 oz/A	2C-3C ($500DD_{50}$)				
Danitol	21.33 fl.oz/A	4-7C				
9 Baythroid XL 1L	2.4 fl.oz/A	TC	0.2 ab	0.5 a	1.2 cd	0.7 b
Calypso 4F	6.0 fl.oz/A	PF-1C, 1st CM				
Esteem 35W + 1%oil	5.0 oz/A	2-3C ($500DD_{50}$)				
Danitol	21.33 fl.oz/A	4-7C				
10 Untreated			0.0 a	0.2 a	0.6 bcd	0.1 a
P value for transformed data			0.189	0.440	0.002	0.239

[a] Evaluation made on 28 June from Red Delicious cultivar.

Mean separation by Fishers Protected LSD ($P \leq 0.05$). Treatment means followed by the same letter are not significantly different. The log(n + 1) transformation was used for analyses with the arithmetic means reported. Untransformed data are presented in each table.

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

APPLE: Malus domestica, cv. 'Red Delicious'

Potato leafhopper (PLH): *Empoasca fabae* (Harris)
Rose leafhopper (RLH): *Edwardsiana rosae* (Linnaeus)
Rosy apple aphid (RAA): *Dysaphis plantaginea* (Passerini)
Spotted tentiform leafminer (STLM) *Phyllonorycter blancardellaata* (Fabricus).
White apple leafhopper (WALH): *Typhlocyba pomaria* McAtee

EVALUATION OF INSECTICIDES FOR CONTROLLING THE EARLY FOLIAR FEEDING INSECT COMPLEX ON APPLE, 2011 – Cornell University's Hudson Valley Lab: Treatments were applied to four-tree plots, replicated four times in a randomized complete block design. All applications were applied concentrate using a tractor mounted John Bean® Airblast sprayer delivering 200 psi. and 148.8 GPA, traveling an average of 2.86 mph. Trees on the M.26 rootstock were 16 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, increased insect distribution and insect 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 20 March, 1/2" green on 19 April, tight cluster (TC) on 21 April**,** pink on 30 April**,** King Bloom on 6 May, PF on 12 May, 1st cover on 20 May, 1st CM and 2C on 31 May, 3C on 4 June, 1st CM +14 and 4C days on 18 June, 5C on 28 June, 2nd CM and 6C on 9 July,2nd CM + 14d and 7C on 26 July, 8C on 16 August.

Treatments applied season long over the entire block for crop size management and disease control included: COCS at 1lb/A on 20 March, Manzate at 1.5lbs/A on 6 April, Manzate at 2lbs/A on 15 and 19 April, Vanguard at 4oz/A on 19 April, Manzate at 2.25lbs/A and Vanguard at 4oz/A on 26 April, Manzate at 2.25lbs/A, Ralley at 4oz/A, and Firewall at 16oz/A on 1 May, Manzate at 2.25oz/A and Ralley at 4oz/A on 6 May, Manzate at 2.25 lbs/A and Firewall and Regulaid at 4oz/A on 12 May, Manzate at 2.25lbs/A and Ralley at 4oz/A on 18 May, Manzate at 2.25lbs/A on 24 May, NNA at 3oz/100 on 26 May.

The spotted tentiform leafminer (STLM) populations have been well below threshold levels in research blocks and commercial orchards over the past ten years, beginning shortly after the advent and use of the neonicotinoid class of insecticides. This coincided with the adoption of size limiting rootstock significantly reducing tree size and tree canopy density. 'Red Delicious' was used for foliar insect evaluations of both presence and density of STLM and Rosy apple aphid (RAA) in 3 min. visual perimeter examination of tree canopy for mines or discoloration and leaf curl respectively. Insecticidal efficacy assessment to manage the WALH and RLH leafhopper complex was rated by evaluating foliar stippling injury and necrosis discoloring of foliage for PLH. Evaluations of stippling damage to foliage from the WALH and RLH complex was assessed using the rating scale of 0 = 0% damage; 1 = 1-10% of the surface with stippling damage; 2 = 11-25% damage; 3 = 26-50% damage; and 4 = >50% on 25 mid-terminal leaves at the end of the season.

Pre-bloom combination applications of pyrethroids and chloronicotinyl insecticides demonstrated effective control of the RAA, foliar feeding and suppression of the leafhopper complex feeding by adults and nymphs. As in the past, low levels of STLM were present this season with no significant differences between treatments. All treatments for the LH complex showed significant differences compared to the untreated controls. Treatments including Calypso and the Endigo ZC and ZCX formulations provided excellent control of the RAA.

Table 5 Harvest evaluations of insecticide schedules for controlling insect complex on apple [a]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2011.

	Treatment / Formulation	Rate	Timing	Incidence (%) of insect damaged leaves LH Complex	PLH	RAA	STLM
1	Actara 25WDG	4.5 oz/A	PF-1C	4.5 a	3.3 a	1.8 ab	0.3 ab
	Belt	5.0 oz/A	1st CM-3C				
	Danitol	21.33 fl.oz/A	4-6C				
2	Actara 25WDG	4.5 oz/A	PF, 1-2C	2.3 a	7.0 a	1.5 ab	0.0 a
	Belt	5.0 oz/A	4-6C				
3	Actara 25WDG	5.5 oz/A	TC, 2C	0.5 a	0.8 a	1.5 ab	0.3 ab
	Warrior II 2.08CS	2.56 fl.oz/A	PF-1C				
	Lannate 2.4LV	3.0 pts/A	3-4, 6-7C				
	Danitol	21.33 fl.oz/A	5C				
4	Danitol 2.4EC	21.33 oz/A	TC	4.0 a	2.0 a	0.3 a	0.0 a
	Endigo ZC	6.0 oz/A	PF,1C,2C				
	Lannate 2.4LV	3.0 pts/A	3-4, 6-7C				
	Danitol	21.33 fl.oz/A	5C				
5	Danitol 2.4EC	21.33 oz/A	TC	2.0 a	2.5 a	1.0 a	0.5 ab
	Endigo ZCX	6 oz/A	PF,1C,2C				
	Lannate 2.4LV	3.0 pts/A	3-4C, 6-7C				
	Danitol	21.33 fl.oz/A	5C				
6	Baythroil XL 1L	2.4 fl.oz/A	TC	3.0 a	1.3 a	1.3 a	0.0 a
	Calypso 4F	6.0 fl.oz/A	PF-2C				
	Movento + 1%oil	9.0 fl.oz/A	1st CM				
7	Baythroid XL 1L	2.4 fl.oz/A	TC	3.5 a	2.5 a	0.8 a	0.0 a
	Calypso 4F	6.0 fl.oz/A	PF-2C				
	Movento + 1%oil	6.0 fl.oz/A	1st CM				
8	Baythroid XL 1L	2.4 fl.oz/A	TC	1.3 a	2.8 a	0.3 a	0.0 a
	Calypso 4F	6.0 fl.oz/A	PF-1C, 1st CM				
	Centaur 0.7WG + 1%oil	56.0 oz/A	2C-3C ($500DD_{50}$)				
	Danitol	21.33 fl.oz/A	4-7C				
9	Baythroid XL 1L	2.4 fl.oz/A	TC	0.0 a	1.3 a	0.5 a	0.3 ab
	Calypso 4F	6.0 fl.oz/A	PF-1C, 1st CM				
	Esteem 35W + 1%oil	5.0 oz/A	2-3C ($500DD_{50}$)				
	Danitol	21.33 fl.oz/A	4-7C				
10	Untreated			14.3 b	21.5 b	3.8 b	1.3 b
P value for transformed data				0.031	0.000	0.087	0.429

[a] Evaluation made on October 3 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. All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph.

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

San Jose scale (SJS): *Quadraspidiotus perniciosus* (Comstock)

EVALUATION OF INSECTICIDES FOR CONTROLLING THE EARLY FRUIT FEEDING INSECT COMPLEX ON APPLE, 2011 – Cornell University's Hudson Valley Lab: Treatments were applied to four-tree plots, replicated four times in a randomized complete block design. All applications were applied concentrate using a tractor mounted John Bean® Airblast sprayer delivering 200 psi. and 148.8 GPA, traveling an average of 2.86 mph. Trees on the M.26 rootstock were 16 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, increased insect distribution and insect 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 20 March, 1/2" green on 19 April, tight cluster (TC) on 21 April**,** pink on 30 April**,** King Bloom on 6 May, PF on 12 May, 1st cover on 20 May, 1st CM and 2C on 31 May, 3C on 4 June, 1st CM +14 and 4C days on 18 June, 5C on 28 June, 2nd CM and 6C on 9 July,2nd CM + 14d and 7C on 26 July, 8C on 16 August.

Treatments applied season long over the entire block for crop size management and disease control included: COCS at 1lb/A on 20 March, Manzate at 1.5lbs/A on 6 April, Manzate at 2lbs/A on 15 and 19 April, Vanguard at 4oz/A on 19 April, Manzate at 2.25lbs/A and Vanguard at 4oz/A on 26 April, Manzate at 2.25lbs/A, Ralley at 4oz/A, and Firewall at 16oz/A on 1 May, Manzate at 2.25oz/A and Ralley at 4oz/A on 6 May, Manzate at 2.25 lbs/A and Firewall and Regulaid at 4oz/A on 12 May, Manzate at 2.25lbs/A and Ralley at 4oz/A on 18 May, Manzate at 2.25lbs/A on 24 May, NNA at 3oz/100 on 26 May.

Fruit harvest evaluations were made on 4 August of 'Ginger Gold' and 'McIntosh and 26 September of 'Red Delicious' by randomly selecting 100 fruits from each tree and scoring for external damage or adult presence. Evaluations of three varieties showed high levels of disparity between cultivars within the treatment plots with regards to SJS infected fruit. Generally, SJS infest orchards in 'hot spots' that make evaluations of efficacious insecticides difficult at best. Thus, insecticide treatments that appear to be performing well may not have been predisposed to infestations. However, it is safe to say that treatments showing high infestation levels most likely have poor efficacy against SJS. Applications made at the 2-3C period had the greatest opportunity to impact the crawler populations. Data is intended to represent the efficacy of seasonal insecticide programs in reducing the incidence of SJS crawler establishment on fruit after the first of two emergence periods. Data representing the 1st and second generation is shown in Table 6. Infestation pressure from SJS was sporadically distributed throughout the block, leading to inconclusive results in efficacy, as few trends in control are evident. As infestations are established during the previous year, low damage levels can be due to low overwintering levels in plot trees. As such low levels are not compelling predictors for high degrees of efficacy. However, plots with very high infestation levels are likely to be relatively ineffective against the SJS. One hundred fruit were harvested from three cultivars within each plot, evaluated at harvest for SJS presence or absence and rated as percent damaged fruit. To stabilize variance, percentage data were transformed by arcsine *(square root of x) prior to analysis using Fisher's Protected LSD (P = < 0.05). Untransformed data are presented in each table.

San Jose Scale (SJS) emergence prediction model using accumulated degree-day 500 DD_{50} for the 1st generation crawlers was predicted to emerge on the 31 May, however emergence was notably delayed by 15 days in 2011 with crawlers observed by mid-June. Plots differ in infestation levels, however, plots with high levels in one or more cultivars suggests low levels of program management as it relates to timing, insecticide efficacy or the combination of each for SJS. The two Movento treatments at the 6 and 9 oz./A rate timed at 2C well before emergence of the SJS 1st generation crawlers performed as well as the Esteem treatment applied on 4, 18 June beginning at the predictive emergence model of 500 DD_{50} from 1 March.

Table 6 Harvest evaluations of insecticide schedules for controlling San Jose Scale on apple [a]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2011.

	Treatment / Formulation	Rate	Timing	Incidence (%) of insect damaged fruit		
				Ginger Gold	McIntosh	Red Delicious
1	Actara 25WDG	4.5 oz/A	PF-1C	22.5a	47.3 c	35.8 c
	Belt	5.0 oz/A	1st CM-3C			
	Danitol	21.33 fl.oz/A	4-6C			
2	Actara 25WDG	4.5 oz/A	PF, 1-2C	0.5 a	44.8 c	9.3 ab
	Belt	5.0 oz/A	4-6C			
3	Actara 25WDG	5.5 oz/A	TC, 2C	4.5 a	30.0 bc	9.1 ab
	Warrior II 2.08CS	2.56 fl.oz/A	PF-1C			
	Lannate 2.4LV	3.0 pts/A	3-4, 6-7C			
	Danitol	21.33 fl.oz/A	5C			
4	Danitol 2.4EC	21.33 oz/A	TC	2.0 a	25.6 bc	27.8 bc
	Endigo ZC	6.0 oz/A	PF,1C,2C			
	Lannate 2.4LV	3.0 pts/A	3-4, 6-7C			
	Danitol	21.33 fl.oz/A	5C			
5	Danitol 2.4EC	21.33 oz/A	TC	0.8 a	17.5 abc	8.0 ab
	Endigo ZCX	6 oz/A	PF,1C,2C			
	Lannate 2.4LV	3.0 pts/A	3-4C, 6-7C			
	Danitol	21.33 fl.oz/A	5C			
6	Baythroil XL 1L	2.4 fl.oz/A	TC	0.0 a	7.0 ab	1.5 a
	Calypso 4F	6.0 fl.oz/A	PF-2C			
	Movento + 1%oil	9.0 fl.oz/A	1st CM			
7	Baythroid XL 1L	2.4 fl.oz/A	TC	0.0 a	4.5 ab	0.0 a
	Calypso 4F	6.0 fl.oz/A	PF-2C			
	Movento + 1%oil	6.0 fl.oz/A	1st CM			
8	Baythroid XL 1L	2.4 fl.oz/A	TC	11.5 a	53.0 c	27.1 bc
	Calypso 4F	6.0 fl.oz/A	PF-1C, 1st CM			
	Centaur 0.7WG + 1%oil	56.0 oz/A	2C-3C ($500DD_{50}$)			
	Danitol	21.33 fl.oz/A	4-7C			
9	Baythroid XL 1L	2.4 fl.oz/A	TC	2.5 a	1.5 a	0.3 a
	Calypso 4F	6.0 fl.oz/A	PF-1C, 1st CM			
	Esteem 35W + 1%oil	5.0 oz/A	2-3C ($500DD_{50}$)			
	Danitol	21.33 fl.oz/A	4-7C			
10	Untreated			0.0 a	21.5 bc	1.2 a
P value for transformed data				0.568	0.005	0.003

[a] Evaluation made on Ginger Gold, McIntosh, and Red Delicious cultivars.

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

APPLE: Malus domestica, cv. 'Ginger Gold', 'McIntosh'

Codling moth (CM): *Cydia pomonella* (Linnaeus)
European apple sawfly (EAS): *Hoplocampa testudinea* (Klug)
Green fruitworm (GFW*): Lithophane antennata* (Walker)
Lesser apple worm (LAW): *Grapholita prunivora* Walsh
Obliquebanded leafroller (OBLR): *Choristoneura rosaceana* (Harris)
Oriental fruit moth (OFM): *Grapholitha molesta* (Busck)
Plum curculio (PC): *Conotrachelus nenuphar* (Herbst)
Redbanded leafroller (RBLR): *Argyrotaenia velutinana* (Walker)
Tarnished plant bug (TPB): *Lygus lineolaris* (P. de B.)

HARVEST EVALUATION OF INSECTICIDES FOR CONTROLLING THE FRUIT FEEDING INSECT COMPLEX ON APPLE, 2011 – Cornell University's Hudson Valley Lab: Treatments were applied to four-tree plots, replicated four times in a randomized complete block design. All applications were applied concentrate using a tractor mounted John Bean® Airblast sprayer delivering 200 psi. and 148.8 GPA, traveling an average of 2.86 mph. Trees on the M.26 rootstock were 16 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, increased insect distribution and insect 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 20 March, 1/2" green on 19 April, tight cluster (TC) on 21 April**,** pink on 30 April**,** King Bloom on 6 May, PF on 12 May, 1st cover on 20 May, 1st CM and 2C on 31 May, 3C on 4 June, 1st CM +14 and 4C days on 18 June, 5C on 28 June, 2nd CM and 6C on 9 July,2nd CM + 14d and 7C on 26 July, 8C on 16 August.

Treatments applied season long over the entire block for crop size management and disease control included: COCS at 1lb/A on 20 March, Manzate at 1.5lbs/A on 6 April, Manzate at 2lbs/A on 15 and 19 April, Vanguard at 4oz/A on 19 April, Manzate at 2.25lbs/A and Vanguard at 4oz/A on 26 April, Manzate at 2.25lbs/A, Ralley at 4oz/A, and Firewall at 16oz/A on 1 May, Manzate at 2.25oz/A and Ralley at 4oz/A on 6 May, Manzate at 2.25 lbs/A and Firewall and Regulaid at 4oz/A on 12 May, Manzate at 2.25lbs/A and Ralley at 4oz/A on 18 May, Manzate at 2.25lbs/A on 24 May, NNA at 3oz/100 on 26 May.

Early season rainfall and cool temperatures contributed to higher incidence of early season damage in commercial orchards. Daily rainfall kept growers from re-entering orchards for 7 days during which time 2.78" of rain fell. This led to severe rut formation in orchards while other blocks were inaccessible during the days that followed, leading to increased PC injury. PC movement into orchards and oviposition was predicted to end on 2 June using predictive modeling of 308 DD_{50} from petal fall of McIntosh. Reports from New England States indicate higher levels of PC injury where 2C applications were not made against this insect. In early season data taken from Ginger Gold and McIntosh fruit clusters on 1 June, relatively low levels of PC injury were observed, with 17.7% PC injury noted in untreated plot trees, yet considerably higher levels of PC damage was found at harvest (32% in untreated plots), suggesting the possibility of PC activity after emergence model completion indicating no further need of insecticide residue.

Fruit harvest evaluations were made on 4 August of 'Ginger Gold' and 'McIntosh and 26 September of 'Red Delicious' by randomly selecting 100 fruits from each tree and scoring for damage. Where Actara was omitted and Belt SC applied for the 2C application in treatment 1, we observed higher levels of PC injury compared to treatment 2 that received the 2C Actara application. No significant differences were observed in TPB or EAS on Ginger Gold, however, all treatments observed lower TPB compared to the untreated in McIntosh. Between the two formulations of Endigo, the ZCX appeared to have had residual impact on apple maggot in both Ginger Gold and McIntosh compared to the ZC formulation, with both varieties expressing lower overall damage levels in the ZCX than the ZC formulation.

Table 4a Harvest evaluations of insecticide schedules for controlling early insect complex on apple [a].
N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2011.

	Treatment / Formulation	Rate	Application Timing	Incidence (%) of insect damaged fruit								
				TPB	EAS	Early Lep	PC	In. Lep	Ext. Lep	AMP	AMT	Clean
1	Actara 25WDG	4.5 oz/A	PF-1C	1.5 a	1.0 a	0.3 a	9.5 a	0.8 ab	1.0 ab	5.8 c	4.8 b	76.8 bc
	Belt	5.0 oz/A	1st CM-3C									
	Danitol	21.33 fl.oz/A	4-6C									
2	Actara 25WDG	4.5 oz/A	PF, 1-2C	1.8 a	0.0 a	0.3 a	1.5 a	0.5 ab	0.5 ab	2.3 bc	1.0 ab	93.5 ab
	Belt	5.0 oz/A	4-6C									
3	Actara 25WDG	5.5 oz/A	TC, 2C	1.5 a	0.5 a	0.3 a	1.0 a	0.3 ab	0.8 a	2.3 bc	1.8 ab	93.3 ab
	Warrior II 2.08CS	2.56 fl.oz/A	PF-1C									
	Lannate 2.4LV	3.0 pts/A	3-4, 6-7C									
	Danitol	21.33 fl.oz/A	5C									
4	Danitol 2.4EC	21.33 oz/A	TC	3.5 a	0.0 a	0.3 a	1.3 a	0.3 ab	0.5 ab	4.5 c	3.5 b	90.5 ab
	Endigo ZC	6.0 oz/A	PF,1C,2C									
	Lannate 2.4LV	3.0 pts/A	3-4, 6-7C									
	Danitol	21.33 fl.oz/A	5C									
5	Danitol 2.4EC	21.33 oz/A	TC	1.8 a	0.3 a	0.0 a	1.5 a	0.0 a	0.3 a	0.0 a	0.0 a	96.3 a
	Endigo ZCX	6 oz/A	PF,1C,2C									
	Lannate 2.4LV	3.0 pts/A	3-4C, 6-7C									
	Danitol	21.33 fl.oz/A	5C									
6	Baythroil XL 1L	2.4 fl.oz/A	TC	1.8 a	0.8 a	0.0 a	1.8 a	0.8 ab	0.8 ab	0.8 ab	0.5 a	94.0 ab
	Calypso 4F	6.0 fl.oz/A	PF-2C									
	Movento + 1%oil	9.0 fl.oz/A	1st CM									
7	Baythroid XL 1L	2.4 fl.oz/A	TC	0.8 a	0.3 a	0.8 ab	3.5 a	1.5 ab	1.5 ab	1.5 abc	1.0 ab	90.5 ab
	Calypso 4F	6.0 fl.oz/A	PF-2C									
	Movento + 1%oil	6.0 fl.oz/A	1st CM									
8	Baythroid XL 1L	2.4 fl.oz/A	TC	1.8 a	0.8 a	0.5 ab	1.8 a	2.0 ab	2.8 ab	1.8 abc	1.3 ab	90.3 ab
	Calypso 4F	6.0 fl.oz/A	PF-1C, 1st CM									
	Centaur 0.7WG + 1%oil	56.0 oz/A	2C-3C ($500DD_{50}$)									
	Danitol	21.33 fl.oz/A	4-7C									
9	Baythroid XL 1L	2.4 fl.oz/A	TC	1.3 a	0.0 a	0.8 ab	2.3 a	0.8 ab	0.8 ab	0.5 ab	0.3 a	94.3 a
	Calypso 4F	6.0 fl.oz/A	PF-1C, 1st CM									
	Esteem 35W + 1%oil	5.0 oz/A	2-3C ($500DD_{50}$)									
	Danitol	21.33 fl.oz/A	4-7C									
10	Untreated			2.3 a	1.0 a	1.8 b	32.5 b	2.5 b	3.3 b	2.3 bc	1.8 ab	60.0 c
P value for transformed data				0.764	0.779	0.225	0.039	0.522	0.341	0.034	0.112	0.042

[a] Fruit were harvested on August 4 from 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. All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph.

Table 4b Harvest evaluations of insecticide schedules for controlling early insect complex on apple [a]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2011.

Treatment / Formulation	Rate	Application Timing	Incidence (%) of insect damaged fruit								
			TPB	EAS	Early Lep	PC	In. Lep	Ext. Lep	AMP	AMT	Clean
1 Actara 25WDG	4.5 oz/A	PF-1C	0.0 a	0.3 a	0.3 ab	2.8 ab	0.0 a	0.0 a	3.3 ab	2.8 ab	93.5 a
Belt	5.0 oz/A	1st CM-3C									
Danitol	21.33 fl.oz/A	4-6C									
2 Actara 25WDG	4.5 oz/A	PF, 1-2C	0.0 a	0.0 a	0.0 a	0.3 a	0.3 a	0.0 a	4.8 ab	4.0 ab	94.8 a
Belt	5.0 oz/A	4-6C									
3 Actara 25WDG	5.5 oz/A	TC, 2C	0.0 a	0.0 a	0.0 a	1.0 ab	0.0 a	0.3 a	7.0 ab	7.0 ab	92.5 a
Warrior II 2.08CS	2.56 fl.oz/A	PF-1C									
Lannate 2.4LV	3.0 pts/A	3-4, 6-7C									
Danitol	21.33 fl.oz/A	5C									
4 Danitol 2.4EC	21.33 oz/A	TC	0.0 a	0.3 a	0.5 ab	1.1 ab	0.0 a	0.0 a	2.8 ab	2.8 ab	94.6 a
Endigo ZC	6.0 oz/A	PF,1C,2C									
Lannate 2.4LV	3.0 pts/A	3-4, 6-7C									
Danitol	21.33 fl.oz/A	5C									
5 Danitol 2.4EC	21.33 oz/A	TC	0.0 a	0.0 a	0.0 a	1.8 ab	0.0 a	0.0 a	2.3 a	2.3 a	96.0 a
Endigo ZCX	6 oz/A	PF,1C,2C									
Lannate 2.4LV	3.0 pts/A	3-4C, 6-7C									
Danitol	21.33 fl.oz/A	5C									
6 Baythroil XL 1L	2.4 fl.oz/A	TC	0.0 a	0.0 a	0.8 ab	1.5 ab	0.5 a	0.0 a	1.8 a	1.8 a	95.5 a
Calypso 4F	6.0 fl.oz/A	PF-2C									
Movento + 1%oil	9.0 fl.oz/A	1st CM									
7 Baythroid XL 1L	2.4 fl.oz/A	TC	0.0 a	0.3 a	0.5 ab	3.3 b	0.3 a	0.0 a	3.8 ab	3.5 ab	91.8 a
Calypso 4F	6.0 fl.oz/A	PF-2C									
Movento + 1%oil	6.0 fl.oz/A	1st CM									
8 Baythroid XL 1L	2.4 fl.oz/A	TC	0.0 a	0.0 a	0.3 ab	1.0 ab	1.0 ab	0.0 a	2.0 a	2.0 ab	95.8 a
Calypso 4F	6.0 fl.oz/A	PF-1C, 1st CM									
Centaur 0.7WG + 1%oil	56.0 oz/A	2C-3C ($500DD_{50}$)									
Danitol	21.33 fl.oz/A	4-7C									
9 Baythroid XL 1L	2.4 fl.oz/A	TC	0.0 a	0.0 a	0.3 ab	2.3 ab	0.3 a	0.0 a	3.8 ab	3.5 a	93.3 a
Calypso 4F	6.0 fl.oz/A	PF-1C, 1st CM									
Esteem 35W + 1%oil	5.0 oz/A	2-3C ($500DD_{50}$)									
Danitol	21.33 fl.oz/A	4-7C									
10 Untreated			1.2 b	0.0 a	1.1 b	49.0 c	3.6 b	3.5 b	9.8 b	8.9 b	42.4 b
P value for transformed data			0.464	0.622	0.340	0.000	0.034	0.000	0.447	0.461	0.000

[a] Fruit were harvested on August 4 from 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. All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph.

Table 4c Evaluations of insecticide schedules for controlling mite complex on apple [a].
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y. - 2011.

	Treatment / Formulation	Rate	Application Timing	Incidence (%) of insect damaged fruit								
				TPB	EAS	Early Lep	PC	In. Lep	Ext. Lep	AMP	AMT	Clean
1	Actara 25WDG	4.5 oz/A	PF-1C	0.0 a	0.0 a	0.0 a	1.7 a	10.0 bc	0.5 a	11.7 bc	11.7 bc	77.0 c
	Belt	5.0 oz/A	1st CM+14d									
	Danitol	21.33 fl.oz/A	6-8C									
2	Actara 25WDG	4.5 oz/A	PF-1C	0.0 a	0.0 a	0.0 a	1.1 a	4.8 ab	0.8 a	16.8 bc	16.8 bc	76.6 c
	Belt	5.0 oz/A	2nd CM+14d,3C									
3	Actara 25WDG	5.5 oz/A	PF-1C	0.0 a	0.0 a	0.0 a	1.4 a	33.0 ab	1.3 a	8.5 abc	8.1 abc	86.0 bc
	Warrior II 2.08CS	2.56 fl.oz/A	TC,3C									
	Lannate 2.4LV	3.0 pts/A	4-8C									
	Danitol	21.33 fl.oz/A	6C									
4	Danitol 2.4EC	21.33 oz/A	TC	0.5 a	0.0 a	0.0 a	3.8 a	0.3 a	0.0 a	6.5 ab	6.5 ab	89.2 abc
	Endigo ZC	6.0 oz/A	PF,1C,3C									
	Lannate 2.4LV	3.0 pts/A	4-8C									
	Danitol	21.33 fl.oz/A	6C									
5	Danitol 2.4EC	21.33 oz/A	TC	0.0 a	0.0 a	0.0 a	2.0 a	0.5 a	0.3 a	7.3 abc	6.8 ab	90.0 ab
	Endigo ZCX	6 oz/A	PF,1C,3C									
	Lannate 2.4LV	3.0 pts/A	4-8C									
	Danitol	21.33 fl.oz/A	6C									
6	Baythroil XL 1L	2.4 fl.oz/A	TC	0.3 a	0.0 a	0.3 a	0.5 a	1.4 a	0.0 a	0.0 a	0.0 a	97.9 a
	Calypso 4F	6.0 fl.oz/A	PF-2C									
	Movento + 1%oil	9.0 fl.oz/A	2C									
7	Baythroid XL 1L	2.4 fl.oz/A	TC	6.1 a	0.0 a	0.0 a	1.7 a	0.4 a	0.3 a	3.5 ab	3.5 ab	93.5 ab
	Calypso 4F	6.0 fl.oz/A	PF-2C									
	Movento + 1%oil	6.0 fl.oz/A	2C									
8	Baythroid XL 1L	2.4 fl.oz/A	TC	0.0 a	0.0 a	0.0 a	1.9 a	1.9 a	0.7 a	5.0 ab	5.0 ab	90.6 abc
	Calypso 4F	6.0 fl.oz/A	PF-2C									
	Centaur 0.7WG + 1%oil	9.0 oz/A	3C ($500DD_{50}$)									
	Danitol	21.33 fl.oz/A	5-8C									
9	Baythroid XL 1L	2.4 fl.oz/A	TC	0.8 a	0.0 a	0.8 ab	2.3 a	0.3 a	0.3 a	4.4 ab	3.9 ab	91.6 ab
	Calypso 4F	6.0 fl.oz/A	PF-1C									
	Esteem 35W + 1%oil	5.0 oz/A	3C ($500DD_{50}$)									
	Danitol	21.33 fl.oz/A	5-8C									
10	Untreated			0.0 a	1.1 b	2.0 b	59.1 b	16.4 c	7.8 b	18.4 c	18.4 c	24.4 d
P value for transformed data				0.612	<0.001	0.021	<0.001	0.001	0.005	0.157	0.158	<0.001

[a] Fruit were harvested on September 26 from Red Delicious cultivar. Several trees had no or less that 100 fruit. 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 7 Treatment schedule for insecticide screen on apple.
N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2011.

	Treatment	Formulation	Timing	Application Dates
1	Tolfenpyrad 15SC	17.0 fl.oz/A	PF-EOS	12, 20 May, 4, 20 June, 8, 18 28 July, 17 Aug
	+ NIS	0.25% v/v	PF-EOS	
2	Tolfenpyrad 15SC	24.0 fl.oz/A	PF-EOS	12, 20 May, 4, 20 June, 8, 18, 28 July 17 Aug
	+ NIS	0.25% v/v	PF-EOS	
3	Tolfenpyrad 15SC	17.0 fl.oz/A	1C-EOS	20 May, 4, 20 June, 8,18, 28 July, 17 Aug
	+ NIS	0.25% v/v	1C-EOS	
4	Tolfenpyrad 15SC	24.0 fl.oz/A	1C-EOS	20 May, 4, 20 June 8, 18, 28 July 17 Aug
	+ NIS	0.25% v/v	1C-EOS	
5	Tolfenpyrad 15SC	17.0 fl.oz/A	2C-EOS	4, 20 June 8, 18, 28 July 17 Aug
	+ NIS	0.25% v/v	2C-EOS	
6	Tolfenpyrad 15SC	24.0 fl.oz/A	2C-EOS	4, 20 June 8, 18, 28 July 17 Aug
	+ NIS	0.25% v/v	2C-EOS	
7	Imidan 70WP	3.0 lbs/A	PF-3C, 7C	20 May, 4, 20 June 17 Aug, 17 Aug
	+ NIS	0.25% v/v	PF-3C, 7C	
	Seven XLR	96 oz/A	4-6C	8, 18, 28 July
8	Avaunt	6.0 oz/A	PF-EOS	12, 20 May, 4, 20 June, 8, 18 28 July, 17 Aug
	+ NIS	0.25% v/v	PF-EOS	
9	Closer 2SC	3.0 fl.oz/A	TC	21 April
	Imidan 70WP	3.0 lbs/A	PF	12 May
	Delegate WG	5.2 oz/A	1C-4C	20 May, 4, 20 June 8 July
	Closer 2SC	1.5 fl.oz/A	2-3C	21 April
	Intrepid 2F	12.0fl.oz/A	5-7C	18, 28 July 17 Aug
	Assail 30SG	4.0 oz/A	5-7C	18, 28 July 17 Aug

APPLE: Malus domestica, cv. 'Ginger Gold', 'McIntosh', 'Red Delicious'
Tarnished plant bug (TPB): *Lygus lineolaris* (P. de B.)
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)

EVALUATION OF INSECTICIDES FOR CONTROLLING THE EARLY FRUIT FEEDING INSECT COMPLEX ON APPLE, 2011 – Cornell University's Hudson Valley Lab: Treatments were applied to four-tree plots, replicated four times in a randomized complete block design. All applications were applied concentrate using a tractor mounted John Bean® Airblast sprayer delivering 200 psi. and 148.8 GPA, traveling an average of 2.86 mph. Trees on the M.26 rootstock were 16 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, increased insect distribution and insect pressure.

Treatments were applied on various schedules as shown in Table 7. Dates corresponding to tree phenology for McIntosh occurred for green tip (GT) on 20 March, 1/2" green on 19 April, tight cluster (TC) on 21 April**,** pink on 30 April**,** King Bloom on 6 May, PF on 12 May, 1st cover on 20 May, 1st CM and 2C on 31 May, 3C on 4 June, 1st CM +14 and 4C days on 18 June, 5C on 28 June, 2nd CM and 6C on 9 July,2nd CM + 14d and 7C on 26 July, 8C on 16 August.

Treatments applied season long over the entire block for crop size management and disease control included: COCS at 1lb/A on 20 March, Manzate at 1.5lbs/A on 6 April, Manzate at 2lbs/A on 15 and 19 April, Vanguard at 4oz/A on 19 April, Manzate at 2.25lbs/A and Vanguard at 4oz/A on 26 April, Manzate at 2.25lbs/A, Ralley at 4oz/A, and Firewall at 16oz/A on 1 May, Manzate at 2.25oz/A and Ralley at 4oz/A on 6 May, Manzate at 2.25 lbs/A and Firewall and Regulaid at 4oz/A on 12 May, Manzate at 2.25lbs/A and Ralley at 4oz/A on 18 May, Manzate at 2.25lbs/A on 24 May, NNA at 3oz/100 on 26 May.

Fruit damage was assessed prior to 'June drop' by randomly selecting 100 fruits from each tree and scoring for external damage. The 'E. LEP' category includes combined damage from green fruit worm, red-banded and oblique-banded leaf rollers. To stabilize variance, percentage data were transformed by arcsine *(square root of x) prior to analysis using Fisher's Protected LSD (P = < 0.05). Infestation pressure from PC was moderate (39.5% damage in untreated cluster fruit of 'Ginger Gold' and 28.0% in 'McIntosh'), while EAS (6.5% and 5.0%) and E. LEP (0.8% and 1.8%) damage was relatively low during early season in 'Ginger Gold' and 'McIntosh' respectively. Treatments ranged from 91.5% to 94.3% clean fruit in the controls of the two varieties while efficacy ranged equal to or lower than what was observed in the grower standard (Trmt. 7; Imidan 70WP / Sevin XLR).

All treatments applied at the PF and 1C timings provided very good control of the early insect pest complex, notably the plum curculio, on both 'Ginger Gold and 'McIntosh' in 'June Drop' evaluations. Tolfenpyrad 15SC showed a strong rate response between the 17.0 and 24.0 fl.oz/A rates, the higher rate outperforming the lower in all timings on the earlier developing 'Ginger Gold' with more variability in rate responsiveness on 'McIntosh'. Tolfenpyrad applications begin at PF or 1C showed no statistical difference in efficacy on 'Ginger Gold' and they statistically outperformed the 2C application start date in that variety. However on 'McIntosh' only the PF applications of Tolfenpyrad were statistically better than the applications timed to begin at 2C. Avaunt in combination with 0.25% NIS performed very well in small plots against the early season insect complex compared to the OP Imidan 70WP.

Table 8a Evaluations Of Insecticide Schedules For Controlling Early Season Insect Complex On Apple [A]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2011.

	Treatment	Formulation	Application Date	Incidence (%) of insect damaged cluster fruit TPB	PC	EAS	E. LEP	Clean
1	Tolfenpyrad 15SC	17.0 fl.oz/A	PF-EOS	0.8 a	7.0 ab	2.9 ab	0.0 a	89.4 a
	+ NIS	0.25% v/v	PF-EOS					
2	Tolfenpyrad 15SC	24.0 fl.oz/A	PF-EOS	2.5 ab	4.8 ab	4.0 ab	0.0 a	88.8 a
	+ NIS	0.25% v/v	PF-EOS					
3	Tolfenpyrad 15SC	17.0 fl.oz/A	1C-EOS	0.8 a	10.8 bc	4.5 ab	0.3 a	83.8 a
	+ NIS	0.25% v/v	1C-EOS					
4	Tolfenpyrad 15SC	24.0 fl.oz/A	1C-EOS	0.8 a	5.5 ab	2.5 ab	0.0 a	91.3 a
	+ NIS	0.25% v/v	1C-EOS					
5	Tolfenpyrad 15SC	17.0 fl.oz/A	2C-EOS	4.3 b	22.3 cd	5.0 ab	0.8 a	68.3 b
	+ NIS	0.25% v/v	2C-EOS					
6	Tolfenpyrad 15SC	24.0 fl.oz/A	2C-EOS	3.5 ab	29.0 de	6.8 b	2.0 b	59.8 bc
	+ NIS	0.25% v/v	2C-EOS					
7	Imidan 70WP	3.0 lbs/A	PF-EOS	2.5 ab	6.8 ab	3.0 a	0.0 a	88.0 a
	+ NIS	0.25% v/v	PF-EOS					
	Seven XLR	96 oz/A	4-6C					
8	Avaunt	6.0 oz/A	PF-EOS	1.5 ab	5.5 ab	2.3 a	0.3 a	90.8 a
	+ NIS	0.25% v/v	PF-EOS					
9	Closer 2SC	3.0 fl.oz/A	TC	3.3 ab	2.5 a	2.0 a	0.8 a	91.5 a
	Imidan 70WP	3.0 lbs/A	PF					
	Delegate WG	5.2 oz/A	1C-4C					
	+ Closer 2SC	1.5 fl.oz/A	2-3C					
	Intrepid 2F	12.0fl.oz/A	5-7C					
	+ Assail 30SG	4.0 oz/A	5-7C					
10	Untreated			4.0 ab	39.5 e	6.5 b	0.8 b	54.0 c
P value for transformed data				0.160	0.000	0.143	0.003	0.000

[a] Evaluation made on June 1 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. All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph.

Table 8b Evaluations Of Insecticide Schedules For Controlling Early Season Insect Complex On Apple[A] N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2011.

	Treatment	Formulation	Application Date	Incidence (%) of insect damaged cluster fruit TPB	PC	EAS	E. LEP	Clean
1	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	PF-EOS PF-EOS	0.8 ab	3.8 ab	1.0 ab	1.0 ab	93.5 a
2	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	PF-EOS PF-EOS	3.5 b	6.0 ab	1.8 abc	0.8 ab	90.3 ab
3	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	1C-EOS 1C-EOS	0.0 a	8.3 bc	3.8 bcd	1.3 b	86.8 ab
4	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	1C-EOS 1C-EOS	1.3 ab	7.5 abc	0.8 ab	0.0 a	90.5 ab
5	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	2C-EOS 2C-EOS	0.3 a	15.4 c	2.3 abcd	0.8 ab	81.3 b
6	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	2C-EOS 2C-EOS	1.5 ab	27.3 d	4.0 cd	1.5 b	67.8 c
7	Imidan 70WP + NIS Seven XLR	3.0 lbs/A 0.25% v/v 96 oz/A	PF-EOS PF-EOS 4-6C	1.5 ab	3.8 ab	1.5 ab	0.0 a	93.3 a
8	Avaunt + NIS	6.0 oz/A 0.25% v/v	PF-EOS PF-EOS	1.3 ab	4.0 a	0.5 a	0.0 a	94.3 a
9	Closer 2SC Imidan 70WP Delegate WG + Closer 2SC Intrepid 2F + Assail 30SG	3.0 fl.oz/A 3.0 lbs/A 5.2 oz/A 1.5 fl.oz/A 12.0 fl.oz/A 4.0 oz/A	TC PF 1C-4C 2-3C 5-7C 5-7C	1.3 ab	6.3 ab	1.0 ab	0.3 a	91.3 a
10	Untreated			1.3 ab	28.0 d	5.0 d	1.8 b	64.8 c
P value for transformed data				0.359	0.000	0.016	0.003	0.000

[a] Evaluation made on June 1 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. All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph.

APPLE: Malus domestica 'Red Delicious'

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, 2011 – Cornell University's Hudson Valley Lab: Treatments were applied to four-tree plots, replicated four times in a randomized complete block design. All applications were applied concentrate using a tractor mounted John Bean® Airblast sprayer delivering 200 psi. and 148.8 GPA, traveling an average of 2.86 mph. Trees on the M.26 rootstock were 16 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, increased insect distribution and insect pressure.

Treatments were applied on various schedules as shown in Table 7. Dates corresponding to tree phenology for McIntosh occurred for green tip (GT) on 20 March, 1/2" green on 19 April, tight cluster (TC) on 21 April**,** pink on 30 April**,** King Bloom on 6 May, PF on 12 May, 1st cover on 20 May, 1st CM and 2C on 31 May, 3C on 4 June, 1st CM +14 and 4C days on 18 June, 5C on 28 June, 2nd CM and 6C on 9 July,2nd CM + 14d and 7C on 26 July, 8C on 16 August.

Treatments applied season long over the entire block for crop size management and disease control included: COCS at 1lb/A on 20 March, Manzate at 1.5lbs/A on 6 April, Manzate at 2lbs/A on 15 and 19 April, Vanguard at 4oz/A on 19 April, Manzate at 2.25lbs/A and Vanguard at 4oz/A on 26 April, Manzate at 2.25lbs/A, Ralley at 4oz/A, and Firewall at 16oz/A on 1 May, Manzate at 2.25oz/A and Ralley at 4oz/A on 6 May, Manzate at 2.25 lbs/A and Firewall and Regulaid at 4oz/A on 12 May, Manzate at 2.25lbs/A and Ralley at 4oz/A on 18 May, Manzate at 2.25lbs/A on 24 May, NNA at 3oz/100 on 26 May.

Phytophagous and predacious mite populations were evaluated by sampling 25 leaves from each plot on 28 June. Leaves were removed to the laboratory where they were brushed with a mite-brushing machine and the mites and eggs examined using a binocular scope (≥18X). To stabilize variance in these evaluations, transformation using the Log_{10} (X + 1) was conducted prior to analysis using Fisher's Protected LSD (P=<0.05). Untransformed data are presented in each table.

European red mite populations were low this season and did not reach action threshold in the research plots. Moderate populations of phytoseiid and stigmaeid mite predators were present throughout the season, maintaining biological control of the ERM throughout most of the block. However, we observed statistically reduced ZM populations in seasonal applications of Tolfenpyrad 15SC compared to the Avaunt treatment and control. These reductions did not, however, lead to higher levels of ERM, TSM or ARM by the 28 June evaluation. Delegate may have promoted increased levels of ARM, observed in previous years in both apple and pear rust mite (PRM) evaluations of this insecticide in pear.

Table 9a Evaluations Of Insecticide Schedules For Controlling Mite Complex On Apple [A].
N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2011.

	Treatment	Formulation	Application Date	Incidence (%) of adult mite per leaf of 25 leaf sample ERM	TSM	ZM	AMB	ARM
1	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	PF-EOS PF-EOS	0.0 a	0.2 ab	0.0 a	0.0 a	7.1 a
2	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	PF-EOS PF-EOS	0.1 a	0.1 ab	0.0 a	0.2 ab	6.8 a
3	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	1C-EOS 1C-EOS	0.0 a	0.0 a	0.0 a	0.1 ab	9.4 a
4	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	1C-EOS 1C-EOS	0.1 a	0.1 ab	0.0 a	0.1 ab	5.4 a
5	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	2C-EOS 2C-EOS	0.1 a	0.1 a	0.0 a	0.2 b	4.8 a
6	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	2C-EOS 2C-EOS	0.0 a	0.0 a	0.0 a	0.0 a	6.2 a
7	Imidan 70WP + NIS Seven XLR	3.0 lbs/A 0.25% v/v 96 oz/A	PF-EOS PF-EOS 4-6C	0.0 a	0.0 a	0.0 ab	0.0 a	6.4 a
8	Avaunt + NIS	6.0 oz/A 0.25% v/v	PF-EOS PF-EOS	0.3 b	0.1 ab	0.3 bc	0.1 ab	6.5 a
9	Closer 2SC Imidan 70WP Delegate WG + Closer 2SC Intrepid 2F + Assail 30SG	3.0 fl.oz/A 3.0 lbs/A 5.2 oz/A 1.5 fl.oz/A 12.0fl.oz/A 4.0 oz/A	TC PF 1C-4C 2-3C 5-7C 5-7C	0.1 a	0.0 a	0.2 ab	0.2 ab	98.6 b
10	Untreated			0.4 b	0.3 b	0.5 c	0.1 ab	119.6 b
P value for transformed data				0.000	0.266	0.009	0.243	0.00

[a] Evaluation made on 28 June from 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. All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph.

Table 9b Evaluations Of Insecticide Schedules For Controlling Mite Complex On Apple [A]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2011.

	Treatment	Formulation	Application Date	Incidence (%) of mite egg per leaf on 25 leaf sample ERM	TSM	ZM	AMB
1	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	PF-EOS PF-EOS	0.0 a	0.4 b	0.0 a	0.1 a
2	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	PF-EOS PF-EOS	0.0 a	0.1 ab	0.0 a	0.0 a
3	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	1C-EOS 1C-EOS	0.0 a	0.0 ab	0.0 a	0.0 a
4	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	1C-EOS 1C-EOS	0.0 a	0.1 ab	0.0 a	0.0 a
5	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	2C-EOS 2C-EOS	0.2 b	0.2 ab	0.0 a	0.4 b
6	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	2C-EOS 2C-EOS	0.0 ab	0.1 ab	0.0 a	0.1 a
7	Imidan 70WP + NIS Seven XLR	3.0 lbs/A 0.25% v/v 96 oz/A	PF-EOS PF-EOS 4-6C	0.0 a	0.0 a	0.1 ab	0.0 a
8	Avaunt + NIS	6.0 oz/A 0.25% v/v	PF-EOS PF-EOS	0.1 bc	0.1 ab	0.4 b	0.1 a
9	Closer 2SC Imidan 70WP Delegate WG + Closer 2SC Intrepid 2F + Assail 30SG	3.0 fl.oz/A 3.0 lbs/A 5.2 oz/A 1.5 fl.oz/A 12.0fl.oz/A 4.0 oz/A	TC PF 1C-4C 2-3C 5-7C 5-7C	0.0 ab	0.1 ab	0.2 ab	0.2 ab
10	Untreated			0.1 abc	0.2 ab	1.0 c	0.1 ab
P value for transformed data				0.092	0.589	0.001	0.058

[a] Evaluation made on 28 June from 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. All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph.

APPLE: Malus domestica, cv. 'Red Delicious'

Potato leafhopper (PLH): *Empoasca fabae* (Harris)
Rose leafhopper (RLH): *Edwardsiana rosae* (Linnaeus)
Rosy apple aphid (RAA): *Dysaphis plantaginea* (Passerini)
Spotted tentiform leafminer (STLM) *Phyllonorycter blancardellaata* (Fabricus).
White apple leafhopper (WALH): *Typhlocyba pomaria* McAtee

EVALUATION OF INSECTICIDES FOR CONTROLLING FOLIARSACII FEEDING INSECT COMPLEX ON APPLE, 2011 – Cornell University's Hudson Valley Lab: Treatments were applied to four-tree plots, replicated four times in a randomized complete block design. All applications were applied concentrate using a tractor mounted John Bean® Airblast sprayer delivering 200 psi. and 148.8 GPA, traveling an average of 2.86 mph. Trees on the M.26 rootstock were 16 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, increased insect distribution and insect pressure.

Treatments were applied on various schedules as shown in Table 7. Dates corresponding to tree phenology for McIntosh occurred for green tip (GT) on 20 March, 1/2" green on 19 April, tight cluster (TC) on 21 April**,** pink on 30 April**,** King Bloom on 6 May, PF on 12 May, 1st cover on 20 May, 1st CM and 2C on 31 May, 3C on 4 June, 1st CM +14 and 4C days on 18 June, 5C on 28 June, 2nd CM and 6C on 9 July,2nd CM + 14d and 7C on 26 July, 8C on 16 August.

Treatments applied season long over the entire block for crop size management and disease control included: COCS at 1lb/A on 20 March, Manzate at 1.5lbs/A on 6 April, Manzate at 2lbs/A on 15 and 19 April, Vanguard at 4oz/A on 19 April, Manzate at 2.25lbs/A and Vanguard at 4oz/A on 26 April, Manzate at 2.25lbs/A, Ralley at 4oz/A, and Firewall at 16oz/A on 1 May, Manzate at 2.25oz/A and Ralley at 4oz/A on 6 May, Manzate at 2.25 lbs/A and Firewall and Regulaid at 4oz/A on 12 May, Manzate at 2.25lbs/A and Ralley at 4oz/A on 18 May, Manzate at 2.25lbs/A on 24 May, NNA at 3oz/100 on 26 May.

The damage from the foliar feed complex of STLM, RAA and the leafhopper complex has been dramatically reduced over the past ten years by the season long presence of the neonicotinoid class of chemistries used in pome fruit management. The leafhopper complex is comprised of overwintering WALH nymph during the pre-bloom period with WALH and RLH adult populations present on apple the 1st week of June as RLH migration from multiflora rose into the orchard begins and resides during the growing season. The 1st PLH arrives on storm thermals in late spring, often commingling with the adults of WALH and RLH. PLH adult feeding damage occurring shortly there after and nymphs emerging within the first two week of adult migration into apple. WALH and RLH stippling leaf damage was evaluated by rating leaves on a 0-5 scale per 5 mid-terminal leaves of 5 terminals of 'Red Delicious' in each plot (N=25). PLH terminal damage was evaluated by observing the # of leaves with zonal chlorosis on 5 apical terminal leaves of 5 terminals of 'Red Delicious' (N=25). RAA leaf damage evaluation was conducted by rating curled leaves in a 3 min. observation period per 'Red Delicious' per plot. STLM damage was rated by counting the total number of mines in a 3 min. observation period on 'Red Delicious' per plot.

The Tolfenpyrad 15SC did not exhibit a strong rate response against the foliar feeding complex of leaf hopper, rosy apple aphid and leaf miner, yet was more efficacious against this complex compared to Avaunt, but not as strong as the grower standard of Imidan 70WP and Sevin XLR or the neonicotinoid Assail and Intrepid combination with Closer 2SC and Delegate WG..

Table 11 Evaluations Of Insecticide Schedules For Controlling Insect Complex On Apple [A]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2011.

	Treatment	Formulation	Application Date	Incidence of insect damage on leaves[a-d] WALH / RLH[a]	PLH[b]	RAA[c]	STLM[d]
1	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	PF-EOS PF-EOS	2.0 abc	1.0 a	2.3 bc	4.5 bc
2	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	PF-EOS PF-EOS	7.8 c	2.8 ab	2.3 bcd	4.3 bc
3	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	1C-EOS 1C-EOS	4.5 abc	2.5 ab	2.3 bcd	5.5 bc
4	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	1C-EOS 1C-EOS	2.5 abc	1.8 ab	1.0 ab	1.8 ab
5	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	2C-EOS 2C-EOS	1.5 abc	5.3 bc	2.5 bcd	4.0 b
6	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	2C-EOS 2C-EOS	6.8 c	3.0 ab	4.3 cd	3.5 b
7	Imidan 70WP + NIS Seven XLR	3.0 lbs/A 0.25% v/v 96 oz/A	PF-EOS PF-EOS 4-6C	0.8 ab	2.3 ab	0.3 a	4.3 bc
8	Avaunt + NIS	6.0 oz/A 0.25% v/v	PF-EOS PF-EOS	5.0 bc	1.5 ab	1.0 ab	3.3 b
9	Closer 2SC Imidan 70WP Delegate WG + Closer 2SC Intrepid 2F + Assail 30SG	3.0 fl.oz/A 3.0 lbs/A 5.2 oz/A 1.5 fl.oz/A 12.0fl.oz/A 4.0 oz/A	TC PF 1C-4C 2-3C 5-7C 5-7C	0.0 a	3.0 ab	0.5 a	0.0 a
10	Untreated			20.8 d	10.3 c	5.5 d	10.3 c
P value for transformed data				0.000	0.042	0.000	0.022

[a] Evaluation made on 28 June from 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. All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph.

a. WALH and RLH stippling leaf damage evaluation rating the mean value on 0-5 scale/ 5 mid-terminal leaves of 5 terminals of 'Red Delicious'.

b. PLH terminal damage evaluated by observing # of leaves with zonal chlorosis on 5 mid-terminal leaves of 5 terminals of 'Red Delicious'.

c. RAA leaf damage evaluation rating curled leaves in a 3 min. observation period per 'Red Delicious' per plot.

d. STLM total number of mines in a 3 min. observation period on 'Red Delicious' per plot.

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

San Jose scale (SJS): *Quadraspidiotus perniciosus* (Comstock)

EVALUATION OF INSECTICIDES FOR CONTROLLING THE EARLY FRUIT FEEDING INSECT COMPLEX ON APPLE, 2011 – Cornell University's Hudson Valley Lab: Treatments were applied to four-tree plots, replicated four times in a randomized complete block design. All applications were applied concentrate using a tractor mounted John Bean® Airblast sprayer delivering 200 psi. and 148.8 GPA, traveling an average of 2.86 mph. Trees on the M.26 rootstock were 16 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, increased insect distribution and insect pressure.

Treatments were applied on various schedules as shown in Table 7. Dates corresponding to tree phenology for McIntosh occurred for green tip (GT) on 20 March, 1/2" green on 19 April, tight cluster (TC) on 21 April**,** pink on 30 April**,** King Bloom on 6 May, PF on 12 May, 1st cover on 20 May, 1st CM and 2C on 31 May, 3C on 4 June, 1st CM +14 and 4C days on 18 June, 5C on 28 June, 2nd CM and 6C on 9 July,2nd CM + 14d and 7C on 26 July, 8C on 16 August.

Treatments applied season long over the entire block for crop size management and disease control included: COCS at 1lb/A on 20 March, Manzate at 1.5lbs/A on 6 April, Manzate at 2lbs/A on 15 and 19 April, Vanguard at 4oz/A on 19 April, Manzate at 2.25lbs/A and Vanguard at 4oz/A on 26 April, Manzate at 2.25lbs/A, Ralley at 4oz/A, and Firewall at 16oz/A on 1 May, Manzate at 2.25oz/A and Ralley at 4oz/A on 6 May, Manzate at 2.25 lbs/A and Firewall and Regulaid at 4oz/A on 12 May, Manzate at 2.25lbs/A and Ralley at 4oz/A on 18 May, Manzate at 2.25lbs/A on 24 May, NNA at 3oz/100 on 26 May.

San Jose scale overwinter in the adult form, well protected beneath a wax covering. Adults emerge from scale during early to mid-May to mate with females still beneath waxy coverings. Nymphs emerge live from the female, move out from under waxy coverings to crawl along limbs, infesting branches, foliage and fruit. We typically recommend 500 DD_{50} as the beginning of the treatment timing for 1st generation using 2 contact insecticide applications (mean emergence observed at 688 DD_{50}).

Fruit harvest evaluations were made on 4 August of 'Ginger Gold' and 'McIntosh and 26 September of 'Red Delicious' by randomly selecting 100 fruits from each tree and scoring for external damage or adult presence. Evaluations of three varieties showed high levels of disparity between cultivars within the treatment plots with regards to SJS infected fruit. Generally, SJS infest orchards in 'hot spots' that make evaluations of efficacious insecticides difficult at best. Thus, insecticide treatments that appear to be performing well may not have been predisposed to infestations. However, it is safe to say that treatments showing high infestation levels most likely have poor efficacy against SJS. Applications made at the 2-3C period had the greatest opportunity to impact the crawler populations. Closer applications at the 2-3C timing appears to have efficacy against SJS while it appears less conclusive that other insecticide formulations have superior control of this insect.

Table 12 Evaluations Of Insecticide Schedules For Controlling San Jose Scale On Apple [A]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2011.

	Treatment	Formulation	Application Date	Incidence (%) of San Jose Scale on fruit Ginger Gold	McIntosh	Red Delicious
1	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	PF-EOS PF-EOS	5.8 a	12.8 b	15.0 ab
2	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	PF-EOS PF-EOS	0.8 a	9.3 ab	33.7 ab
3	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	1C-EOS 1C-EOS	2.3 a	20.0 b	50.3 b
4	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	1C-EOS 1C-EOS	1.0 a	14.5 b	71.9 b
5	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	2C-EOS 2C-EOS	0.0 a	17.2 b	8.5 a
6	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	2C-EOS 2C-EOS	0.0 a	2.3 a	0.0 a
7	Imidan 70WP + NIS Seven XLR	3.0 lbs/A 0.25% v/v 96 oz/A	PF-EOS PF-EOS 4-6C	0.0 a	1.0 a	8.5 a
8	Avaunt + NIS	6.0 oz/A 0.25% v/v	PF-EOS PF-EOS	0.0 a	15.0 b	24.3 ab
9	Closer 2SC Imidan 70WP Delegate WG + Closer 2SC Intrepid 2F + Assail 30SG	3.0 fl.oz/A 3.0 lbs/A 5.2 oz/A 1.5 fl.oz/A 12.0fl.oz/A 4.0 oz/A	TC PF 1C-4C 2-3C 5-7C 5-7C	0.0 a	2.0 a	0.5 a
10	Untreated			0.3 b	2.3 a	7.5 a
P value for transformed data				0.432	0.002	0.006

[a] Evaluation made on 28 June from 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. All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph

APPLE: Malus domestica, cv. 'Ginger Gold', 'McIntosh'
Apple maggot (AM): *Rhagoletis pomonella* (Walsh)
Codling moth (CM): *Cydia pomonella* (Linnaeus)
European apple sawfly (EAS): *Hoplocampa testudinea* (Klug)
Green fruitworm (GFW*): Lithophane antennata* (Walker)
Lesser apple worm (LAW): *Grapholita prunivora* Walsh
Obliquebanded leafroller (OBLR): *Choristoneura rosaceana* (Harris)
Oriental fruit moth (OFM): *Grapholitha molesta* (Busck)
Plum curculio (PC): *Conotrachelus nenuphar* (Herbst)
Redbanded leafroller (RBLR): *Argyrotaenia velutinana* (Walker)
Tarnished plant bug (TPB): *Lygus lineolaris* (P. de B.)
Stink bug complex (SB): Green stink bug, *Acrosternum hilare* (Say); brown stink bug, *Euschistus servus* (Say); *Halyomorpha Halys* (Stål)

HARVEST EVALUATION OF INSECTICIDES FOR CONTROLLING THE FRUIT FEEDING INSECT COMPLEX ON APPLE, 2011 – Cornell University's Hudson Valley Lab: Treatments were applied to four-tree plots, replicated four times in a randomized complete block design. All applications were applied concentrate using a tractor mounted John Bean® Airblast sprayer delivering 200 psi. and 148.8 GPA, traveling an average of 2.86 mph. Trees on the M.26 rootstock were 16 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, increased insect distribution and insect pressure.

Treatments were applied on various schedules as shown in Table 7. Dates corresponding to tree phenology for McIntosh occurred for green tip (GT) on 20 March, 1/2" green on 19 April, tight cluster (TC) on 21 April**,** pink on 30 April**,** King Bloom on 6 May, PF on 12 May, 1st cover on 20 May, 1st CM and 2C on 31 May, 3C on 4 June, 1st CM +14 and 4C days on 18 June, 5C on 28 June, 2nd CM and 6C on 9 July,2nd CM + 14d and 7C on 26 July, 8C on 16 August.

Treatments applied season long over the entire block for crop size management and disease control included: COCS at 1lb/A on 20 March, Manzate at 1.5lbs/A on 6 April, Manzate at 2lbs/A on 15 and 19 April, Vanguard at 4oz/A on 19 April, Manzate at 2.25lbs/A and Vanguard at 4oz/A on 26 April, Manzate at 2.25lbs/A, Ralley at 4oz/A, and Firewall at 16oz/A on 1 May, Manzate at 2.25oz/A and Ralley at 4oz/A on 6 May, Manzate at 2.25 lbs/A and Firewall and Regulaid at 4oz/A on 12 May, Manzate at 2.25lbs/A and Ralley at 4oz/A on 18 May, Manzate at 2.25lbs/A on 24 May, NNA at 3oz/100 on 26 May.

Damage to fruit was assessed by randomly selecting 100 fruit at harvest, removing to the laboratory, and scoring for external damage by each pest; subsequently, fruits were dissected to detect internal damage. Early PC damage is characterized by the typical crescent-shaped scar resulting from the flap of apple epidermis made by an ovipositing female combined with late PC damage is characterized by a feeding or oviposition cavity that lacks the typical crescent-shaped scar. Damage caused by early Lepidoptera (E. LEP.) includes the GFW, OBLR and RBLR, while external Lepidoptera (EXT. LEP.) includes OBLR and/or RBLR. Damage caused by a complex of internal Lepidoptera (INT. LEP.) including the CM, OFM and LAW. Few larvae from fruit were recovered and the relative proportions of each species could not be determined, however, the predominant species was CM. To stabilize variance in these evaluations, transformation using the arcsinee *(square root of x) was conducted prior to analysis using Fisher's Protected LSD (P=<0.05). Untransformed data are presented in each table. Data from 'Ginger Gold', 'McIntosh' and 'Red Delicious' is presented in **Table 10a-c** respectively. The data set demonstrates the necessity for evaluating multiple cultivars. For example, the data reaffirm that 'Ginger Gold' and 'Red Delicious' are much more attractive to maggot than is 'McIntosh'.

No statistical differences were observed in efficacy of these programs against TPB, EAS and E.Lep on Ginger Gold' with only slight difference between the 2C application of Tolfenpyrad 15SC and the grower standard on 'McIntosh'. The Tolfenpyrad 15SC performed well against PC and internal lepidoptera on 'Ginger Gold' and 'McIntosh' when applied at PF, comparable to the grower standard, with no statistical differences between programs at that timing. However, Tolfenpyrad was comparable to Avaunt but did not appear to be as strong as the Assail / Intrepid combination or the grower standard against high AM pressure.

Table 10a Harvest Evaluations Of Insecticide Schedules For Controlling Early Season Insect Complex On Apple [A].
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y. - 2011.

	Treatment	Formulation	Application Date	Incidence (%) of insect damaged cluster fruit TPB	EAS	E.Lep	PC	InLep	ExLep	AMP	AMT	Clean
1	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	PF-EOS PF-EOS	4.4 a	1.0 a	2.7 a	11.9 a	1.0 abc	1.2 a	1.5 abc	1.0 abc	77.3 ab
2	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	PF-EOS PF-EOS	3.6 a	1.5 a	3.3 a	10.4 a	1.7 bc	1.3 a	2.6 bc	2.1 bc	79.3 a
3	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	1C-EOS 1C-EOS	1.3 a	1.3 a	3.3 a	22.8 b	3.6 cd	1.9 a	2.6 bc	2.6 cd	66.1 b
4	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	1C-EOS 1C-EOS	4.0 a	1.5 a	3.2 a	14.3 ab	2.0 bc	1.5 a	3.2 c	2.5 cd	74.2 ab
5	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	2C-EOS 2C-EOS	3.1 a	1.3 a	5.9 a	40.8 c	7.6 de	2.7 a	4.3 cd	7.3 de	49.1 c
6	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	2C-EOS 2C-EOS	5.4 a	3.1 a	5.6 a	48.9 cd	6.3 de	2.0 a	8.7 d	8.0 e	42.6 c
7	Imidan 70WP + NIS Seven XLR	3.0 lbs/A 0.25% v/v 96 oz/A	PF-EOS PF-EOS 4-6C	2.4 a	1.2 a	3.2 a	10.9 a	0.6 ab	0.2 a	0.5 a	0.3 a	83.6 a
8	Avaunt + NIS	6.0 oz/A 0.25% v/v	PF-EOS PF-EOS	3.9 a	2.3 a	5.1 a	9.9 a	0.0 a	0.3 a	2.4 abc	1.9 abc	79.3 ab
9	Closer 2SC Imidan 70WP Delegate WG + Closer 2SC Intrepid 2F + Assail 30SG	3.0 fl.oz/A 3.0 lbs/A 5.2 oz/A 1.5 fl.oz/A 12.0fl.oz/A 4.0 oz/A	TC PF 1C-4C 2-3C 5-7C 5-7C	3.8 a	2.5 a	3.3 a	11.4 a	0.2 ab	0.8 a	0.8 ab	0.5 ab	77.6 ab
10	Untreated			4.0 a	2.8 a	14.1 b	58.6 d	8.1 e	15.3 b	17.8 e	15.5 f	22.0 d
P value for transformed data				0.666	0.424	0.017	0.000	0.000	0.000	0.000	0.000	0.000

[a] Evaluation made 4 August 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. All applications made using John Bean Airblast delivering 148.8 GPA at 200 psi. traveling at an average of 2.86 mph.

Table 10b Harvest Evaluations Of Insecticide Schedules For Controlling Early Season Insect Complex On Apple [A].
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y. - 2011.

	Treatment	Formulation	Application Date	Incidence (%) of insect damaged cluster fruit TPB	EAS	E.Lep	PC	InLep	ExLep	AMP	AMT	Clean
1	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	PF-EOS PF-EOS	0.0 a	1.0 a	1.0 a	9.5 a	0.0 a	2.3 b	0.5 ab	0.3 ab	86.8 a
2	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	PF-EOS PF-EOS	0.0 a	0.3 ab	0.5 a	16.0 a	1.5 a	1.0 ab	0.8 ab	0.5 ab	79.8 ab
3	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	1C-EOS 1C-EOS	0.0 a	0.0 a	0.3 a	17.3 ab	0.5 a	1.5 ab	0.8 ab	0.3 ab	80.0 ab
4	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	1C-EOS 1C-EOS	0.3 ab	0.5 ab	0.8 a	19.3 ab	0.0 a	0.5 ab	1.5 ab	0.8 ab	78.3 ab
5	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	2C-EOS 2C-EOS	0.0 a	0.0 a	0.0 a	33.3 bc	1.9 a	3.0 b	1.9 ab	1.5 ab	62.8 bc
6	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	2C-EOS 2C-EOS	0.0 a	1.1 b	0.5 a	42.0 cd	0.5 a	0.8 ab	1.5 ab	1.5 b	55.9 cd
7	Imidan 70WP + NIS Seven XLR	3.0 lbs/A 0.25% v/v 96 oz/A	PF-EOS PF-EOS 4-6C	0.3 ab	0.0 a	0.0 a	8.0 a	0.0 a	0.5 ab	0.3 a	0.3 ab	91.3 a
8	Avaunt + NIS	6.0 oz/A 0.25% v/v	PF-EOS PF-EOS	0.3 ab	0.0 a	1.3 a	9.3 a	0.0 a	0.0 a	0.5 ab	0.0 a	88.5 a
9	Closer 2SC Imidan 70WP Delegate WG + Closer 2SC Intrepid 2F + Assail 30SG	3.0 fl.oz/A 3.0 lbs/A 5.2 oz/A 1.5 fl.oz/A 12.0fl.oz/A 4.0 oz/A	TC PF 1C-4C 2-3C 5-7C 5-7C	0.3 ab	0.3 ab	0.3 a	9.5 a	0.3 a	0.0 a	0.5 ab	0.5 ab	89.0 a
10	Untreated			0.8 b	0.5 ab	0.5 a	54.3 d	0.5 a	2.3 b	2.5 b	2.0 b	42.3 d
P value for transformed data				0.126	0.201	0.570	0.000	0.405	0.088	0.428	0.262	0.000

[a] Evaluation made September 1 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 ≤ 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 10c Evaluations of insecticide schedules for controlling early season insect complex on apple [a].
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y. - 2011.

	Treatment	Application Formulation	Date	Incidence (%) of insect damaged cluster fruit TPB	EAS	E.Lep	PC	InLep	ExLep	AMP	AMT	Clean
1	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	PF-EOS PF-EOS	1.0 a	0.0 a	0.0 a	24.0 abc	11.0 bc	6.0 ab	1.0 ab	1.0 ab	50.0 bc
2	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	PF-EOS PF-EOS	0.0 a	0.0 a	0.7 a	12.8 abc	9.1 b	10.5 b	10.0 ab	9.4 ab	61.3 b
3	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	1C-EOS 1C-EOS	0.0 a	0.0 a	0.0 a	18.3 ab	22.5 c	10.7 ab	7.9 ab	7.9 ab	51.5 b
4	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	1C-EOS 1C-EOS	0.0 a	0.0 a	0.0 a	4.9 a	10.1 b	18.6 b	11.9 ab	6.3 ab	63.4 b
5	Tolfenpyrad 15SC + NIS	17.0 fl.oz/A 0.25% v/v	2C-EOS 2C-EOS	0.3 a	0.0 a	1.5 a	9.8 ab	9.0 b	5.9 ab	6.9 ab	6.6 ab	65.1 b
6	Tolfenpyrad 15SC + NIS	24.0 fl.oz/A 0.25% v/v	2C-EOS 2C-EOS	-	-	-	-	-	-	-	-	-
7	Imidan 70WP + NIS Seven XLR	3.0 lbs/A 0.25% v/v 96 oz/A	PF-EOS PF-EOS 4-6C	0.0 a	0.6 a	1.2 a	6.2 ab	0.7 a	1.2 ab	1.3 a	1.3 a	86.1 a
8	Avaunt + NIS	6.0 oz/A 0.25% v/v	PF-EOS PF-EOS	0.0 a	0.7 a	0.0 a	3.1 a	7.8 b	5.7 ab	9.1 ab	6.5 ab	76.4 ab
9	Closer 2SC Imidan 70WP Delegate WG + Closer 2SC Intrepid 2F + Assail 30SG	3.0 fl.oz/A 3.0 lbs/A 5.2 oz/A 1.5 fl.oz/A 12.0 fl.oz/A 4.0 oz/A	P PF4C 1-3C 2-3C 5-7C 5-7C	0.0 a	0.3 a	0.0 a	6.3 ab	0.8 a	0.6 a	0.8 a	0.8 a	91.1 a
10	Untreated			0.0 a	0.4 a	3.8 a	43.4 c	16.5 bc	10.8 b	22.8 b	22.8 b	27.4 c
P value for transformed data				0.099	0.829	0.594	0.133	<0.001	0.243	0.214	0.124	<0.001

[a] Evaluations made 27 September on Red Delicious.
Several trees were missing fruit and many trees had less than 100 fruit. 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 ≤ 0.05). Treatment means followed by the same letter are not significantly different. Trmt 6 data unavailable as fruit yield was insufficient to evaluate.

Table 11 Treatment Schedule For Pear Psylla On Pear.
N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2011.

	Treatment/Formulation	Rate	Timing	Application Dates
1.	BioCover Hort. oil	1.0% v/v	WB, PF-EOS	15 April; 19 May; 5, 17, 24 June
	Damoil	1.0% v/v	BB	7 April
2.	Surround WP	50.0 lbs/A	D, WB, PF	7, 15 April; 19 May
	BioCover Hort. oil	1% v/v	2C-EOS	5, 17, 24 June
3.	Centaur 0.7WDG + 0.25%oil	46.0 oz/A	WB	15 April
	AgriMek 0.15EC + 0.25%oil	16.0 fl.oz/A	PF	19 May; 17 June
4.	Esteem 35WP	5.0 oz/A	BB	9 Apirl
	Centaur 0.7WDG + 0.25%oil	46.0 oz/A	WB	15 April
	AgriMek 0.15EC + 0.25%oil	16.0 fl.oz/A	PF	19 May
	HGW86 10SE + 0.25% oil	10.1 fl.oz/A	14, 28dp PF	5, 17 June
5.	Esteem 35WP	5.0 oz/A	BB	9 April
	Centaur 0.7WDG + 0.25%oil	46.0 oz/A	WB	15 April
	AgriMek 0.15EC + 0.25%oil	16.0 fl.oz/A	PF	19 April
	HGW86 10SE + 0.25% oil	13.5 fl.oz/A	14, 28, dpPF	5, 17 June
6.	Esteem 35WP	5.0 oz/A	BB	9 April
	Centaur 0.7WDG + 0.25%oil	46.0 oz/A	WB	15 April
	AgriMek 0.15EC + 0.25%oil	16.0 fl.oz/A	PF	19 April
	HGW86 10SE + 0.25% oil	16.9 fl.oz/A	14, 28, dpPF	5, 17 June
7.	Esteem 35WP	5.0 oz/A	BB	9 April
	Centaur 0.7WDG + 0.25%oil	46.0 oz/A	WB	15 April
	AgriMek 0.15EC + 0.25%oil	16.0 fl.oz/A	PF	19 April
	Delegate 25WG + 0.25%oil	7.0 oz/A	14, 28, dpPF	5, 17 June
8.	Esteem 35WP	5.0 oz/A	BB	9 April
	Calypso 4F + 0.25%oil	8.0 oz/A	WB,PF	15 April; 19 May
	Movento 240SC + 0.25%oil	9.0 fl.oz/A	14, 28, dpPF	5, 17 June
9.	Esteem 35WP	5.0 oz/A	BB	9 April
	Actara 25WDG + 0.25%oil	5.5 oz/A	W,BPF	15 April; 19 May
	Delegate WG + 0.25%oil	7.0 oz/A	14, 28, dpPF	5, 17 June
10.	Esteem 35WP	5.0 oz/A	BB	9 April
	Assail 30SG + 0.25%oil	5.5 oz/A	WB,PF	15 April; 19 May
	Delegate WG + 0.25%oil	7.0 oz/A	14, 28, dpPF	5, 17 June
11.	Esteem 35WP	5.0 oz/A	BB	9 April
	Calypso 4F + 0.25%oil	8.0 oz/A	WB,PF	15 April; 19 May
	Delegate WG + 0.25%oil	7.0 oz/A	14, 28, dpPF	5, 17 June

Firewall + Regulade applied at 1 & 2C on12 and 24 May for fireblight control.

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, 2011: – 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 31 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 $\geq$350 GPA.

Treatments were applied on various schedules as shown in Table 14. Application dates corresponding to tree phenology of 'Bartlett' beginning at delayed dormant (D) on 7 April, onset of 1st egg or bud burst (BB) on 9 April; white bud (WB) on 15 April; 1C/PF 10 day post petalfall on 19 May; 1C application on 18 May; 2C on 5 June; 3C on 17 June; 4C on 24 June. Treatments applied season long over the entire block for crop size management and disease control included: Manzate at 1lb/A on 15 April, NAA at 32oz/A on 24 April, Manzate at 1lb/A and Imidan at 5.33lb/A on 30 April.

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. 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 11 April, 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. Adult numbers were assessed on 3, 26 June using 3-minute vacuum sweeps of perimeter apical shoot foliage employing a handheld vacuum to which was connected 500 mL screened nalgene bottles. 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 May, 3, 22 June. Samples were removed to the laboratory where target pests were counted using a binocular scope. Defoliation ratings were conducted using 2 Bosc trees per plot, assessing (6) 1st year terminal shoot foliage for the presence of foliar *Fabraea* and absence or presence of foliage on each shoot on 20 July. Fifty Bartlett fruit were harvested per treatment on 18 August and scored for insect damage. The transformation using the Log_{10} (X + 1) was applied for adult and 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.

Against early-season pear psylla, Surround WP at D, WB and PF performed well as an ovipositional deterrent early in the season, statistically superior to the untreated. It was equivalent in reducing adult presence and in controlling nymph populations to the standard 3% oil application, which were better at managing nymph populations than WB applications of Movento 240SC, BB and WB applications of Esteem 35WP and Centaur
(**Tables 14).** All products significantly reduced nymph populations compared to the UTC. Applications beginning at 1C, 18 May, directed against 1st generation pear psylla nymph and adult population resulted in varying degrees of control in all treatments. Surround, 1% oil alone, Movento and Delegate provided excellent pear psylla nymph management 9 days after 1C applications (**Table 35**). All treatments provided excellent suppression of PRM with elevated mite numbers observed in treatment 5; 1C & 3C applications of Delegate.

Oil alone throughout the season does not manage fruit feeding insects as observed in **Table 38**, This treatment exhibited approximately 30% fruit injury from the pest complex, principally plum curculio, lepidopteran internal and leafroller complexes. However, the combination of early season Surround up to the

1st Cover spray followed thereafter with by-weekly summer oil applications produced >94% clean fruit from insect injury. The combination of these two materials may prove to be an effective solution to both insect and disease for organic pear production in the Northeast. The use of oil alone beyond the 77 to day harvest interval for mancozeb use may provide acceptable late season commercial pear management of both psylla and Fabraea leaf spot. This use of HMO's provide less fruit residue at harvest compared to ziram or ferbam, with a low day to harvest requirement in mixed plantings of early and late season fruit.

Table 14a Evaluations Of Insecticide Schedules For Controlling Early Season Insect Complex On Pear [A]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2011.

Treatment / Formulation	Rate	Application Timing	Mean number of Pear Psylla eggs present on buds or foliage 11 Apr	2 May	3 Jun	22Jun
1. BioCover Hort. oil Damoil	1.0% v/v	WB, PF-EOS BB	0.2 a	0.1 a	2.9 a.b	0.9 ab ----
2. Surround WP BioCover Hort. oil	50.0 lbs/A 1% v/v	D, WB, PF 2C-EOS	0.0 a	0.1 a	3.8 ab	1.4 abc
3. Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A	BB WB PF	0.0 a	0.1a	4.0 ab	1.5 abc
4. Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil HGW86 10SE + 0.25% oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A 10.1 fl.oz/A	BB WB PF 14, 28 dpPF	----	----	2.8 ab	5.2 d
5. Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil HGW86 10SE + 0.25% oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A 13.5 fl.oz/A	BB WB PF 14, 28 dpPF	----	----	2.3 ab	2.2 bc
6. Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil HGW86 10SE + 0.25% oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A 16.9 fl.oz/A	BB WB PF 14, 28 dpPF	----	----	1.2 a	2.8 c
7. Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil Delegate 25WG + 0.25%oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A 7.0 oz/A	BB WB PF 14, 28 dpPF	----	----	2.5 ab	1.4 abc
8. Esteem 35WP Calypso 4F + 0.25%oil Movento 240SC + 0.25%oil	5.0 oz/A 8.0 oz/A 9.0 fl.oz/A	BB WB,PF 14, 28 dpPF	----	0.1 a	3.0 ab	0.7 a
9. Esteem 35WP Actara 25WDG + 0.25%oil Delegate WG + 0.25%oil	5.0 oz/A 5.5 oz/A 7.0 oz/A	BB WB,PF 14, 28 dpPF	----	0.2 a	2.0 ab	0.9 a
10. Esteem 35WP Assail 30SG + 0.25%oil Delegate WG + 0.25%oil	5.0 oz/A 5.5 oz/A 7.0 oz/A	DD WB,PF 14, 28 dpPF	----	0.5 a	4.2 b	0.8 ab
11. Esteem 35WP Calypso 4F + 0.25%oil Delegate WG + 0.25%oil	5.0 oz/A 8.0 oz/A 7.0 oz/A	BB WB,PF 14, 28 dpPF	----	0.3 a	2.5 ab	0.6 a
12. Untreated			0.0 a	1.8 b	6.1	2.3 bc
P value for transformed data			0.582	0.002	0.506	0.000

Data taken on Bartlett. 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. All applications made using tractor mounted dilute sprayer using a pecan handgun at 300 psi at 300-400 GPA.

Table 14b Evaluations Of Insecticide Schedules For Controlling Early Season Insect Complex On Pear [A]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2011.

Treatment / Formulation	Rate	Application Timing	Mean number of Pear Psylla nymphs present 2 May	3 Jun	22 Jun
1. BioCover Hort. oil Damoil	1.0% v/v	WB, PF-EOS BB	0.0 a	0.0 ab	0.4 ab
2. Surround WP BioCover Hort. oil	50.0 lbs/A 1% v/v	D, WB, PF 2C-EOS	0.0 a	0.1 ab	0.5 abc
3. Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A	BB WB PF	0.0 a	0.2 ab	0.9 bcd
4. Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil HGW86 10SE + 0.25% oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A 10.1 fl.oz/A	BB WB PF 14, 28 dpPF	----	0.2 ab	1.2 cd
5. Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil HGW86 10SE + 0.25% oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A 13.5 fl.oz/A	BB WB PF 14, 28 dpPF	----	0.2 ab	0.9 bcd
6. Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil HGW86 10SE + 0.25% oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A 16.9 fl.oz/A	BB WB PF 14, 28 dpPF	----	0.1 ab	1.3 d
7. Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil Delegate 25WG + 0.25%oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A 7.0 oz/A	BB WB PF 14, 28 dpPF	----	0.1 ab	0.5 abc
8. Esteem 35WP Calypso 4F + 0.25%oil Movento 240SC + 0.25%oil	5.0 oz/A 8.0 oz/A 9.0 fl.oz/A	BB WB, PF 14 28 dpPF	0.1 ab	0.0 a	0.4ab
9. Esteem 35WP Actara 25WDG + 0.25%oil Delegate WG + 0.25%oil	5.0 oz/A 5.5 oz/A 7.0 oz/A	BB WB, PF 14 28 dpPF	0.0 a	0.2 ab	0.1 a
10. Esteem 35WP Assail 30SG + 0.25%oil Delegate WG + 0.25%oil	5.0 oz/A 5.5 oz/A 7.0 oz/A	BB WB, PF 14, 28 dpPF	0.0 a	0.2 ab	0.2 a
11. Esteem 35WP Calypso 4F + 0.25%oil Delegate WG + 0.25%oil	5.0 oz/A 8.0 oz/A 7.0 oz/A	BB WB,PF 14, 28 dpPF	0.0 a	0.4 b	0.1 a
12. Untreated			0.2 b	0.4 ab	0.5 abc
P value for transformed data			0.028	0.429	0.002

Data taken on Bartlett. 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 ≤ 0.05). Treatment means followed by the same letter are not significantly different. All applications made using tractor mounted dilute sprayer using a pecan handgun at 300 psi at 300-400 GPA.

Table 14c Evaluations Of Insecticide Schedules For Controlling Early Season Insect Complex On Pear. N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y. - 2011.

	Treatment	Formulation	Application Date	Mean number of Pear Psylla adults present 3 Jun	26 Jun
1.	BioCover Hort. oil BioCover Hort. oil	3.0% v/v 1.0% v/v	D WB,PF-EOS	0.1 ab	0.0 abc
2.	Surround WP BioCover Hort. oil	50.0 lbs/A 1% v/v	D,WB,PF 2C-EOS	0.2 c	0.0 a
3.	Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A	BB WB PF	0.1 abc	0.0 a
4.	Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil HGW86 10SE + 0.25% oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A 10.1 fl.oz/A	BB WB PF 14,28dpPF	0.1 abc	0.1 cd
5.	Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil HGW86 10SE + 0.25% oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A 13.5 fl.oz/A	BB WB PF 14,28dpPF	0.0 a	0.1 bcd
6.	Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil HGW86 10SE + 0.25% oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A 16.9 fl.oz/A	BB WB PF 14,28dpPF	0.1 abc	0.1 cd
7.	Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil Delegate 25WG + 0.25%oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A 7.0 oz/A	BB WB PF 14,28dpPF	0.1 abc	0.0 ab
8.	Esteem 35WP Calypso 4F + 0.25%oil Movento 240SC + 0.25%oil	5.0 oz/A 8.0 oz/A 9.0 fl.oz/A	BB WB,PF	0.1 abc	0.0 ab
9.	Esteem 35WP Actara 25WDG + 0.25%oil Delegate WG + 0.25%oil	5.0 oz/A 5.5 oz/A 7.0 oz/A	BB WB,PF 14,28dpPF	0.1 ab	0.0 ab
10.	Esteem 35WP Assail 30SG + 0.25%oil Delegate WG + 0.25%oil	5.0 oz/A 5.5 oz/A 7.0 oz/A	BB WB,P 14,28dpPF	0.2 bc	0.0 ab
11.	Esteem 35WP Calypso 4F + 0.25%oil Delegate WG + 0.25%oil	5.0 oz/A 8.0 oz/A 7.0 oz/A	BB WB,PF 14,28dppf	0.1 ab	0.0 ab
12.	Untreated			0.4 d	0.1 d
P value for transformed data				0.001	0.012

Data taken on Bartlett. 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. All applications made using tractor mounted dilute sprayer using a pecan handgun at 300 psi at 300-400 GPA.

Table 15 Evaluations Of Insecticide Schedules For Controlling Early Season Insect Complex On Pear [A]. N.Y.S.A.E.S. Hudson Valley Lab. Highland N.Y. - 2011.

Treatment / Formulation	Rate	Application Timing	Mean number of missing leaves and presence of Fabraea	
			Defoliation	Fabraea
1. BioCover Hort. oil Damoil	1.0% v/v	WB, PF-EOS BB	5.7 a	0.0 ab
2. Surround WP BioCover Hort. oil	50.0 lbs/A 1% v/v	D, WB, PF 2C-EOS	5.7 a	0.1 ab
3. Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A	BB WB PF	54.4 cd	0.2 ab
4. Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil HGW86 10SE + 0.25% oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A 10.1 fl.oz/A	BB WB PF 14, 28 dpPF	53.5 c	0.2 ab
5. Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil HGW86 10SE + 0.25% oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A 13.5 fl.oz/A	BB WB PF 14, 28 dpPF	41.8 bc	0.2 ab
6. Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil HGW86 10SE + 0.25% oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A 16.9 fl.oz/A	BB WB PF 14, 28 dpPF	44.7 bc	0.1 ab
7. Esteem 35WP Centaur 0.7WDG + 0.25%oil AgriMek 0.15EC + 0.25%oil Delegate 25WG + 0.25%oil	5.0 oz/A 46.0 oz/A 16.0 fl.oz/A 7.0 oz/A	BB WB PF 14, 28 dpPF	42.5 bc	0.1 ab
8. Esteem 35WP Calypso 4F + 0.25%oil Movento 240SC + 0.25%oil	5.0 oz/A 8.0 oz/A 9.0 fl.oz/A	BB WB, PF 14 28 dpPF	36.6 b	0.0 a
9. Esteem 35WP Actara 25WDG + 0.25%oil Delegate WG + 0.25%oil	5.0 oz/A 5.5 oz/A 7.0 oz/A	BB WB, PF 14 28 dpPF	48.2 bc	0.2 ab
10. Esteem 35WP Assail 30SG + 0.25%oil Delegate WG + 0.25%oil	5.0 oz/A 5.5 oz/A 7.0 oz/A	BB WB, PF 14, 28 dpPF	48.9 bc	0.2 ab
11. Esteem 35WP Calypso 4F + 0.25%oil Delegate WG + 0.25%oil	5.0 oz/A 8.0 oz/A 7.0 oz/A	BB WB,PF 14, 28 dpPF	41.4 bc	0.4 b
12. Untreated			67.02 d	0.4 ab
P value for transformed data			0.001	0.429

Data taken on Bosc. 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. All applications made using tractor mounted dilute sprayer using a pecan handgun at 300 psi at 300-400 GPA.

Table 16 EVALUATIONS OF DIFFERING SPRAYING METHODS FOR CONTROLLING PEAR PSYLLA ON BOSC PEARS. Clarkes Farm Milton, N.Y. - 2011.

	Treatment	Rate	Gallonage	Speed	Nozzle type	#of nozzles	Date
1	Surround	50 lb/A	148.9 GPA	2.5mph	HC	8	25 Apr, 20 May
	Biocover	1%	148.9 GPA	2.5mph	HC	8	15,29 Jun
2	Surround	50 lb/A	250 GPA	1.25mph	HC	8	25 Apr, 20 May
	Biocover	1%	250 GPA	1.25mph	HC	8	15,29 Jun
3	Surround	50 lb/A	75 GPA	2.5mph	HC	4	25 Apr, 20 May
	Biocover	1%	75 GPA	2.5mph	HC	4	15,29 Jun
4	Surround	50 lb/A	148.9 GPA	3.5mph	HC	4	25 Apr, 20 May
	Biocover	1%	148.9 GPA	3.5mph	HC	4	15,29 Jun
5	Surround	50 lb/A	148.9 GPA	2.5mph	AI	8	25 Apr, 20 May
	Biocover	1%	148.9 GPA	2.5mph	AI	8	15,29 Jun
6	Surround	50 lb/A	250 GPA	1.25mph	AI	8	25 Apr, 20 May
	Biocover	1%	250 GPA	1.25mph	AI	8	15,29 Jun
7	Surround	50 lb/A	148.9 GPA	2.5mph	AI	4	25 Apr, 20 May
	Biocover	1%	148.9 GPA	2.5mph	AI	4	15,29 Jun
8	Surround	50 lb/A	148.9 GPA	3.5mph	AI	4	25 Apr, 20 May
	Biocover	1%	148.9 GPA	3.5mph	AI	4	15,29 Jun
Grower's Standards							
9	Asana XL	15 oz/A	150 GPA	2.86mph			25 Apr
	AgriMek	20 oz/A	150 GPA	2.86mph			20 May, 14Jun
	Movento +0.25% oil	8 oz/A	150 GPA	2.86mph			15 Jun
10	Asana XL	15 oz/A	150 GPA	2.86mph			25 Apr
	Delgate WG25 +0.25% oil	7 oz/A	150 GPA	2.86mph			20 May, 14 Jun
	Movento +0.25% oil	8 oz/A	150 GPA	2.86mph			15 Jun
11	Untreated						

PEAR: *Pyrus communis* L. '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, 2011: – Clarks farm Milton NY: Treatments were applied to a single row of 15 trees within a block. 'Bosc' cultivars were spaced 12 x 18 ft, 12 ft in height. Evaluation was conducted on the effectiveness of varying different aspects of the application method. This included the speed of application, nozzle type and numbers, and the gallonage. Treatment and formulation were kept constant and compared to the grower's standards

Treatments were applied on various schedules as shown in Table 16. Application dates corresponding to tree phenology of "Bosc" pears beginning at white bud (WB) on 25 April; 2C/14 day post petalfall on 20 May; 3C application on 15 June; 4C on 29 June.

Treatments applied to the Growers Standards included: Asana XL at 15oz/A on 25 April, AgriMek at 20oz/A+0.25%oil and Delgate WG25+0/25% oil on 20 May and 14 June, Movento+0.25% oil at 8oz/A on 15 June.

Table 17a EVALUATIONS OF DIFFERING SPRAYING METHODS FOR CONTROLLING PEAR PSYLLA ON BOSC PEARS. Clarkes Farm Milton, N.Y. - 2011.

	Treatment 11Jul	Rate	Gallonage	Speed	Nozzle type	Number of nozzles	Date	Number of pear psylla eggs present per leaf/bud 14Apr	25Apr	2May	13May	26May	8Jun	20Jun	
1	Surround	50 lb/A	148.9 GPA	2.5mph	HC	8	25 Apr, 20 May	0.64	1.25	0.43	0.32	1.48	30.76	65.40	0.84
	Biocover	1%	148.9 GPA	2.5mph	HC	8	15,29 Jun								
2	Surround	50 lb/A	250 GPA	1.25mph	HC	8	25 Apr, 20 May	1.87	0.76	1.53	0.64	3.20	17.48	62.92	0.68
	Biocover	1%	250 GPA	1.25mph	HC	8	15,29 Jun								
3	Surround	50 lb/A	75 GPA	2.5mph	HC	4	25 Apr, 20 May	0.67	0.92	2.49	0.48	7.20	20.28	89.00	2.60
	Biocover	1%	75 GPA	2.5mph	HC	4	15,29 Jun								
4	Surround	50 lb/A	148.9 GPA	3.5mph	HC	4	25 Apr, 20 May	2.40	2.89	1.56	1.08	9.88	34.32	52.96	0.60
	Biocover	1%	148.9 GPA	3.5mph	HC	4	15,29 Jun								
5	Surround	50 lb/A	148.9 GPA	2.5mph	AI	8	25 Apr, 20 May	1.11	2.30	5.22	2.80	10.8	31.60	50.68	0.56
	Biocover	1%	148.9 GPA	2.5mph	AI	8	15,29 Jun								
6	Surround	50 lb/A	250 GPA	1.25mph	AI	8	25 Apr, 20 May	1.72	3.95	3.97	0.92	9.64	26.68	56.72	2.36
	Biocover	1%	250 GPA	1.25mph	AI	8	15,29 Jun								
7	Surround	50 lb/A	148.9 GPA	2.5mph	AI	4	25 Apr, 20 May	---	1.25	4.34	0.24	5.60	19.88	60.00	0.56
	Biocover	1%	148.9 GPA	2.5mph	AI	4	15,29 Jun								
8	Surround	50 lb/A	148.9 GPA	3.5mph	AI	4	25 Apr, 20 May	---	1.57	4.06	1.68	3.72	21.84	14.72	1.76
	Biocover	1%	148.9 GPA	3.5mph	AI	4	15,29 Jun								
Grower's Standards															
9	Asana XL	15 oz/A	150 GPA	2.86mph			25 Apr	3.91	2.08	2.78	2.40	3.12	10.4	39.00	0.64
	AgriMek	20 oz/A	150 GPA	2.86mph			20 May, 14Jun								
	Movento +0.25% oil	8 oz/A	150 GPA	2.86mph			15 Jun								
10	Asana XL	15 oz/A	150 GPA	2.86mph			25 Apr	0.50	2.67	2.67	0.44	3.36	55.68	54.64	20.16
	Delgate WG25 +0.25% oil	7 oz/A	150 GPA	2.86mph			20 May, 14 Jun								
	Movento +0.25% oil	8 oz/A	150 GPA	2.86mph			15 Jun								
11	Untreated							3.40	7.38	18.16	3.56	19.2	114.64	97.80	0.80

Evaluations were made several times throughout the growing season by collecting leaf or bud samples. Samples were brushed, then pear psylla were evaluated. Not all developmental stages were present during various evaluation periods. This is indicated by (---) if there were none present on a single sample. Numbers were obtained by dividing the total number of pear psylla found by the number of leaves or buds harvested (pp/total). Evaluation was conducted on the effectiveness of varying different aspects of the application method. This included the speed of application, nozzle type and numbers, and the gallonage. Treatment and formulation were kept constant and compared to the grower's standards and four untreated replicates. Nozzle type category HC(HC) AI(AI).

Table 17b EVALUATIONS OF DIFFERING SPRAYING METHODS FOR CONTROLLING PEAR PSYLLA ON BOSC PEARS. Clarkes Farm Milton, N.Y. - 2011.

	Treatment 11Jul	Rate	Gallonage	Speed	Nozzle type	Number of nozzles	Date	Number of pear psylla nymphs present per leaf/bud 14Apr	25Apr	2May	13May	26May	8Jun	20Jun	
1	Surround	50 lb/A	148.9 GPA	2.5mph	HC	8	25 Apr, 20 May	0.00	0.01	0.20	0.32	0.36	2.52	2.96	0.40
	Biocover	1%	148.9 GPA	2.5mph	HC	8	15,29 Jun								
2	Surround	50 lb/A	250 GPA	1.25mph	HC	8	25 Apr, 20 May	0.00	0.00	0.17	0.20	0.04	2.16	6.72	0.32
	Biocover	1%	250 GPA	1.25mph	HC	8	15,29 Jun								
3	Surround	50 lb/A	75 GPA	2.5mph	HC	4	25 Apr, 20 May	0.00	0.00	0.19	0.12	0.04	1.28	6.84	0.08
	Biocover	1%	75 GPA	2.5mph	HC	4	15,29 Jun								
4	Surround	50 lb/A	148.9 GPA	3.5mph	HC	4	25 Apr, 20 May	0.00	0.02	0.07	0.24	1.08	8.12	4.44	0.08
	Biocover	1%	148.9 GPA	3.5mph	HC	4	15,29 Jun								
5	Surround	50 lb/A	148.9 GPA	2.5mph	AI	8	25 Apr, 20 May	0.00	0.05	0.51	0.68	0.20	8.12	2.88	1.08
	Biocover	1%	148.9 GPA	2.5mph	AI	8	15,29 Jun								
6	Surround	50 lb/A	250 GPA	1.25mph	AI	8	25 Apr, 20 May	0.00	0.05	0.27	0.28	0.40	4.64	3.88	1.60
	Biocover	1%	250 GPA	1.25mph	AI	8	15,29 Jun								
7	Surround	50 lb/A	148.9 GPA	2.5mph	AI	4	25 Apr, 20 May	---	0.00	0.18	0.04	0.12	2.20	3.44	0.12
	Biocover	1%	148.9 GPA	2.5mph	AI	4	15,29 Jun								
8	Surround	50 lb/A	148.9 GPA	3.5mph	AI	4	25 Apr, 20 May	---	0.03	0.28	0.08	0.48	3.40	2.04	0.32
	Biocover	1%	148.9 GPA	3.5mph	AI	4	15,29 Jun								
Grower's Standards															
9	Asana XL	15 oz/A	150 GPA	2.86mph			25 Apr	0.00	0.01	0.14	0.00	0.08	0.64	3.68	0.88
	AgriMek	20 oz/A	150 GPA	2.86mph			20 May, 14Jun								
	Movento +0.25% oil	8 oz/A	150 GPA	2.86mph			15 Jun								
10	Asana XL	15 oz/A	150 GPA	2.86mph			25 Apr	0.00	0.04	0.08	0.24	0.12	19.52	4.52	4.52
	Delgate WG25 +0.25% oil	7 oz/A	150 GPA	2.86mph			20 May, 14 Jun								
	Movento +0.25% oil	8 oz/A	150 GPA	2.86mph			15 Jun								
11	Untreated							0.00	0.01	1.18	1.84	1.72	9.32	3.64	0.04

Evaluations were made several times throughout the growing season by collecting leaf or bud samples. Samples were brushed, then pear psylla were evaluated. Not all developmental stages were present during various evaluation periods. This is indicated by (---) if there were none present on a single sample. Numbers were obtained by dividing the total number of pear psylla found by the number of leaves or buds harvested (pp/total). Evaluation was conducted on the effectiveness of varying different aspects of the application method. This included the speed of application, nozzle type and numbers, and the gallonage. Treatment and formulation were kept constant and compared to the grower's standards and four untreated replicates. Nozzle type category HC(HC) AI(AI).

Table 17c EVALUATIONS OF DIFFERING SPRAYING METHODS FOR CONTROLLING PEAR PSYLLA ON BOSC PEARS. Clarkes Farm Milton, N.Y. - 2011.

	Treatment 11Jul	Rate	Gallonage	Speed	Nozzle type	Number of nozzles	Date	Number of pear psylla adults present per leaf/bud 14Apr	25Apr	2May	13May	26May	8Jun	20Jun	
1	Surround	50 lb/A	148.9 GPA	2.5mph	HC	8	25 Apr, 20 May	0.00	0.03	0.01	---	0.72	0.92	1.28	0.12
	Biocover	1%	148.9 GPA	2.5mph	HC	8	15,29 Jun								
2	Surround	50 lb/A	250 GPA	1.25mph	HC	8	25 Apr, 20 May	0.00	0.01	0.03	---	0.96	1.08	1.92	0.24
	Biocover	1%	250 GPA	1.25mph	HC	8	15,29 Jun								
3	Surround	50 lb/A	75 GPA	2.5mph	HC	4	25 Apr, 20 May	0.00	0.04	0.04	---	0.88	0.80	1.60	0.12
	Biocover	1%	75 GPA	2.5mph	HC	4	15,29 Jun								
4	Surround	50 lb/A	148.9 GPA	3.5mph	HC	4	25 Apr, 20 May	0.00	0.09	0.07	---	3.24	1.20	1.32	0.24
	Biocover	1%	148.9 GPA	3.5mph	HC	4	15,29 Jun								
5	Surround	50 lb/A	148.9 GPA	2.5mph	AI	8	25 Apr, 20 May	0.00	0.17	0.05	---	2.36	1.28	0.96	0.08
	Biocover	1%	148.9 GPA	2.5mph	AI	8	15,29 Jun								
6	Surround	50 lb/A	250 GPA	1.25mph	AI	8	25 Apr, 20 May	0.00	0.11	0.03	---	1.80	0.92	1.24	0.08
	Biocover	1%	250 GPA	1.25mph	AI	8	15,29 Jun								
7	Surround	50 lb/A	148.9 GPA	2.5mph	AI	4	25 Apr, 20 May	---	0.04	0.04	---	1.04	0.96	2.52	0.04
	Biocover	1%	148.9 GPA	2.5mph	AI	4	15,29 Jun								
8	Surround	50 lb/A	148.9 GPA	3.5mph	AI	4	25 Apr, 20 May	---	0.09	0.06	---	1.52	1.36	0.88	0.28
	Biocover	1%	148.9 GPA	3.5mph	AI	4	15,29 Jun								
Grower's Standards															
9	Asana XL	15 oz/A	150 GPA	2.86mph			25 Apr	0.00	0.13	0.07	---	0.80	0.44	0.72	0.04
	AgriMek	20 oz/A	150 GPA	2.86mph			20 May, 14Jun								
	Movento +0.25% oil	8 oz/A	150 GPA	2.86mph			15 Jun								
10	Asana XL	15 oz/A	150 GPA	2.86mph			25 Apr	0.00	0.13	0.05	---	1.28	0.56	0.44	0.48
	Delgate WG25 +0.25% oil	7 oz/A	150 GPA	2.86mph			20 May, 14 Jun								
	Movento +0.25% oil	8 oz/A	150 GPA	2.86mph			15 Jun								
11	Untreated							0.00	0.19	0.14	---	3.68	2.44	3.64	0.28

Evaluations were made several times throughout the growing season by collecting leaf or bud samples. Samples were brushed, then pear psylla were evaluated. Not all developmental stages were present during various evaluation periods. This is indicated by (---) if there were none present on a single sample. Numbers were obtained by dividing the total number of pear psylla found by the number of leaves or buds harvested (pp/total). Evaluation was conducted on the effectiveness of varying different aspects of the application method. This included the speed of application, nozzle type and numbers, and the gallonage. Treatment and formulation were kept constant and compared to the grower's standards and four untreated replicates. Nozzle type category HC(HC) AI(AI).

Table 18 EVALUATIONS OF DIFFERING SPRAYING METHODS FOR CONTROLLING PEAR PSYLLA ON BOSC PEARS. Clarkes Farm Milton, N.Y. - 2011.

								% of leaves present on 5 shoots per tree of 5 trees	
	Treatment	Rate	Gallonage	Speed	Nozzle type	#of nozzles	Date	Outer leaves	Inner leaves
1	Surround	50 lb/A	148.9 GPA	2.5mph	HC	8	25 Apr, 20 May	88.6 cde	71.3 bc
	Biocover	1%	148.9 GPA	2.5mph	HC	8	15,29 Jun		
2	Surround	50 lb/A	250 GPA	1.25mph	HC	8	25 Apr, 20 May	94.4 abcd	93.5 a
	Biocover	1%	250 GPA	1.25mph	HC	8	15,29 Jun		
3	Surround	50 lb/A	75 GPA	2.5mph	HC	4	25 Apr, 20 May	86.3 bcd	67.2 cd
	Biocover	1%	75 GPA	2.5mph	HC	4	15,29 Jun		
4	Surround	50 lb/A	148.9 GPA	3.5mph	HC	4	25 Apr, 20 May	100.0 a	96.7 a
	Biocover	1%	148.9 GPA	3.5mph	HC	4	15,29 Jun		
5	Surround	50 lb/A	148.9 GPA	2.5mph	AI	8	25 Apr, 20 May	93.4 abcd	75.4 bc
	Biocover	1%	148.9 GPA	2.5mph	AI	8	15,29 Jun		
6	Surround	50 lb/A	250 GPA	1.25mph	AI	8	25 Apr, 20 May	96.7 abc	88.6 ab
	Biocover	1%	250 GPA	1.25mph	AI	8	15,29 Jun		
7	Surround	50 lb/A	148.9 GPA	2.5mph	AI	4	25 Apr, 20 May	97.6 ab	86.5 ab
	Biocover	1%	148.9 GPA	2.5mph	AI	4	15,29 Jun		
8	Surround	50 lb/A	148.9 GPA	3.5mph	AI	4	25 Apr, 20 May	96.8 abcd	89.8 ab
	Biocover	1%	148.9 GPA	3.5mph	AI	4	15,29 Jun		
Grower's Standards									
9	Asana XL	15 oz/A	150 GPA	2.86mph			25 Apr	100.0 a	90.0 a
	AgriMek	20 oz/A	150 GPA	2.86mph			20 May, 14Jun		
	Movento +0.25% oil	8 oz/A	150 GPA	2.86mph			15 Jun		
10	Asana XL	15 oz/A	150 GPA	2.86mph			25 Apr	88.5 de	45.0 d
	Delgate WG25 +0.25% oil	7 oz/A	150 GPA	2.86mph			20 May, 14 Jun		
	Movento +0.25% oil	8 oz/A	150 GPA	2.86mph			15 Jun		
11	Untreated							73.5 e	44.3 d
P value for transformed data								0.001	0.000

Evaluation made on 26 August. Percent data were transformed using Arcsin(sqrt(x)) prior to analysis. Five replicates per treatment were placed linearly within a single block and were not randomized. Evaluation was conducted on the effectiveness of varying different aspects of the application method. This included the speed of application, nozzle type and numbers, and the gallonage. Treatment and formulation were kept constant and compared to the grower's standards and four untreated replicates. Half of the leaves were taken from the inside of the tree and half from the outer perimeter. Nozzle type category HC(Hollow Cone) AI(Air Induction).

Table 19 Evaluations Of Differing Spraying Methods For Controlling Pear Psylla On Bosc Pears. Clarkes Farm Milton, N.Y. - 2011.

	Treatment	Rate	Gallonage	Speed	Nozzle type	#of nozzles	Date	Avg Wt/Pear(lb)	% occurance of differing levels of fabraea 0	1	2	3
1	Surround	50 lb/A	148.9 GPA	2.5mph	HC	8	25 Apr, 20 May	0.25	74.0	10.6	12.5	2.9
	Biocover	1%	148.9 GPA	2.5mph	HC	8	15,29 Jun					
2	Surround	50 lb/A	250 GPA	1.25mph	HC	8	25 Apr, 20 May	0.28	76.5	12.7	6.9	3.9
	Biocover	1%	250 GPA	1.25mph	HC	8	15,29 Jun					
3	Surround	50 lb/A	75 GPA	2.5mph	HC	4	25 Apr, 20 May	0.30	85.1	8.9	5.0	5.9
	Biocover	1%	75 GPA	2.5mph	HC	4	15,29 Jun					
4	Surround	50 lb/A	148.9 GPA	3.5mph	HC	4	25 Apr, 20 May	0.34	71.3	15.8	7.9	5.0
	Biocover	1%	148.9 GPA	3.5mph	HC	4	15,29 Jun					
5	Surround	50 lb/A	148.9 GPA	2.5mph	AI	8	25 Apr, 20 May	0.27	31.4	18.6	28.4	21.6
	Biocover	1%	148.9 GPA	2.5mph	AI	8	15,29 Jun					
6	Surround	50 lb/A	250 GPA	1.25mph	AI	8	25 Apr, 20 May	0.31	31.7	17.8	17.8	32.7
	Biocover	1%	250 GPA	1.25mph	AI	8	15,29 Jun					
7	Surround	50 lb/A	148.9 GPA	2.5mph	AI	4	25 Apr, 20 May	0.29	29.0	12.0	28.0	31.0
	Biocover	1%	148.9 GPA	2.5mph	AI	4	15,29 Jun					
8	Surround	50 lb/A	148.9 GPA	3.5mph	AI	4	25 Apr, 20 May	0.28	33.0	7.0	19.0	41.0
	Biocover	1%	148.9 GPA	3.5mph	AI	4	15,29 Jun					
Grower's Standards												
9	Asana XL	15 oz/A	150 GPA	2.86mph			25 Apr	0.28	97.1	1.9	1.0	0.0
	AgriMek	20 oz/A	150 GPA	2.86mph			20 May, 14Jun					
	Movento +0.25% oil	8 oz/A	150 GPA	2.86mph			15 Jun					
10	Asana XL	15 oz/A	150 GPA	2.86mph			25 Apr	0.25	52.7	22.7	13.6	10.9
	Delgate WG25 +0.25% oil	7 oz/A	150 GPA	2.86mph			20 May, 14 Jun					
	Movento +0.25% oil	8 oz/A	150 GPA	2.86mph			15 Jun					
11	Untreated							0.20	94.0	2.0	4.0	0.0

Evaluations made on 26 August. Fabraea evaluated on 4 levels; 0=No Occurrence, 1=1-3 occurrences, 2=3-10 occurrences, 3= >10 occurrences. Ten fruit were taken from 10 trees within a row. No replicates were produced. Untreated samples were taken from a portion of the orchard that is no longer farmed. Growers Standard 2 (Treatment 10) is known to have a pear psylla infestation in 2010. Nozzle type category HC(Hollow Cone) AI(Air Induction).

Table 20 Evaluations Of Differing Spraying Methods For Controlling Pear Psylla On Bosc Pears. Clarkes Farm Milton, N.Y. - 2011.

	Treatment	Rate	Gallonage	Speed	Nozzle type	#of nozzles	Date	Avg Wt/Pear(lb)	% occurance of differing levels of sooty mold as an indicator for pear psylla 0	1	2
1	Surround	50 lb/A	148.9 GPA	2.5mph	HC	8	25 Apr, 20 May	0.25	95.2	1.9	2.9
	Biocover	1%	148.9 GPA	2.5mph	HC	8	15,29 Jun				
2	Surround	50 lb/A	250 GPA	1.25mph	HC	8	25 Apr, 20 May	0.28	100.0	0.0	0.0
	Biocover	1%	250 GPA	1.25mph	HC	8	15,29 Jun				
3	Surround	50 lb/A	75 GPA	2.5mph	HC	4	25 Apr, 20 May	0.30	93.1	4.0	3.0
	Biocover	1%	75 GPA	2.5mph	HC	4	15,29 Jun				
4	Surround	50 lb/A	148.9 GPA	3.5mph	HC	4	25 Apr, 20 May	0.34	97.0	0.0	3.0
	Biocover	1%	148.9 GPA	3.5mph	HC	4	15,29 Jun				
5	Surround	50 lb/A	148.9 GPA	2.5mph	AI	8	25 Apr, 20 May	0.27	82.4	3.9	13.7
	Biocover	1%	148.9 GPA	2.5mph	AI	8	15,29 Jun				
6	Surround	50 lb/A	250 GPA	1.25mph	AI	8	25 Apr, 20 May	0.31	100.0	0.0	0.0
	Biocover	1%	250 GPA	1.25mph	AI	8	15,29 Jun				
7	Surround	50 lb/A	148.9 GPA	2.5mph	AI	4	25 Apr, 20 May	0.29	98.0	0.0	2.0
	Biocover	1%	148.9 GPA	2.5mph	AI	4	15,29 Jun				
8	Surround	50 lb/A	148.9 GPA	3.5mph	AI	4	25 Apr, 20 May	0.28	76.0	5.0	19.0
	Biocover	1%	148.9 GPA	3.5mph	AI	4	15,29 Jun				
Grower's Standards											
9	Asana XL	15 oz/A	150 GPA	2.86mph			25 Apr	0.28	93.3	1.9	4.8
	AgriMek	20 oz/A	150 GPA	2.86mph			20 May, 14Jun				
	Movento +0.25% oil	8 oz/A	150 GPA	2.86mph			15 Jun				
10	Asana XL	15 oz/A	150 GPA	2.86mph			25 Apr	0.25	42.7	20.9	36.4
	Delgate WG25 +0.25% oil	7 oz/A	150 GPA	2.86mph			20 May, 14 Jun				
	Movento +0.25% oil	8 oz/A	150 GPA	2.86mph			15 Jun				
11	Untreated							0.20	72.0	8.0	20.0

Evaluations made on 26 August. Pear psylla were evaluated by noting the presences of sooty mold. Evaluations were made on 3 levels; 0=No Occurrence, 1=occurrence only on calyx end, 2=occurrence on calyx and stem end or only stem end. Ten fruit were taken from 10 trees within a row. No replicates were produced. Untreated samples were taken from a portion of the orchard that is no longer farmed. Growers Standard 2 (Treatment 10) is known to have a pear psylla infestation in 2010. Nozzle type category HC(Hollow Cone) AI(Air Induction).

McIntosh Tree Phenology

Year	GT	HIG	T.C.	Pink	Bloom	P.F.	PF DD_{43}	PF DD_{50}	
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	**3/20**	**3/29**	**4/1**	**4/10**	**4/16**	**4/28**	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	21 April	27 April	3 May	13 May	482.2	272.28	

Midrange: **4/2** (+/-13D)
4/12 (+/-15D)
4/17 (+/-17D)
4/23 (+/-14D)
5/1 (+/-15D)
5/11 (+/-13D)

2011 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	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip
1	39	22		37	30	0.35	69	44		86	66		77	54		88	64	0.01	79	60	
2	43	17		51	34		64	45		72	54		82	60		87	64		76	59	
3	26	9		53	35		76	53		73	49		70	65		82	61	0.11	83	62	
4	36	11		53	37	0.06	60	46	0.88	77	50	2C	83	66	0.01	82	66		82	70	
5	53	31		55	36	0.39	61	44		66	52		85	60	0.53	84	60		73	62	1.23
6	51	30	1.54	50	30	0.02	68	44		80	57		87	61		77	68	1.08			
7	39	23	0.33	54	35	0.03	65	51	0.02	85	57		83	65		85	68	0.25			
8	38	16		52	34		65	42		91	65		77	65	0.66	83	64	0.03			
9	39	18		62	33		66	50		90	66	0.13	84	63	4C*	78	64	0.47			
10	45	31	0.59	58	41		69	47		79	65		81	58		83	63	0.40			
11	49	33	0.84	80	49		70	49		68	58	0.13	87	66		79	59				
12	49	30		69	47	0.20	76	52	PF	68	56	0.24	90	73		83	53	0.27			
13	42	34		47	43	0.71	65	49		70	57	0.14	84	66	0.19	81	58	0.02			
14	37	28		65	44		62	56		63	53	0.04	78	58		69	61	0.42			
15	47	21		56	37		60	53	0.32	79	49		83	59		70	64	1.81			
16	51	32	0.37	48	36	0.93	56	52	0.34	77	54		85	60		74	61	6C*			
17	60	31		57	44	0.75	61	51	0.70	75	60	2.11	87	65		84	59				
18	68	46		59	40	0.03	66	56	0.92	82	60	3C*	85	71		80	63	0.23			
19	45	29		44	40	0.33	72	58	0.50	75	60		85	68		82	64	0.27			
20	46	22	0.30	56	40	0.01	70	56	1C	79	54		88	63		83	59				
21	36	30		52	38	TC	75	52		83	58		93	72		79	65	0.70			
22	44	32	0.03	51	30		60	55	0.15	72	67	0.49	100	78		76	59				
23	34	23	0.11	56	37	0.67	62	52	0.19	69	65	1.39	94	71		77	53				
24	42	23		71	53	0.03	78	61		69	63	0.53	85	72	0.08	78	58				
25	38	21		58	51	0.12	79	57		78	61	0.26	74	65	0.69	74	67	1.42			
26	37	16		82	54		81	59		78	60		84	64	5C	82	64				
27	40	17		77	61	0.23	84	61		83	59	0.01	84	60		77	66	0.30			
28	45	15		70	62	0.68	82	64		81	63		83	61		72	66	5.87			
29	43	20		66	44		82	65		78	63	0.61	80	71	0.10	75	60				
30	53	25		64	46		86	66	0.49	81	57		85	69		79	53				
31	43	32					85	65	1st CM				86	61		84	56				
Avg/	44	25	4.1	58	41	5.5	70	53	4.5	77	59	6.1	84	65	2.3	80	62	14.0			
total																					

Rainfall events for (3C) 0.01; (4C) 0.02, (5C) 0.04” (6C) 0.08” prior to application*