

# RESULTS OF 2007 INSECTICIDE AND ACARICIDE STUDIES IN EASTERN NEW YORK

P. J. Jentsch - Extension Associate Entomologist

Cornell University's Hudson Valley Laboratory  
P.O. Box 727, Highland, NY 12528

Tel: 845-691-6516  
FAX: 845-691-2719  
e-mail: [pjj5@cornell.edu](mailto:pjj5@cornell.edu)

Dr. Richard W. Straub  
*Professor Emeritus*

<i>Technical Assistant.....</i>	Henry Grimsland
<i>Field Research Assistant .....</i>	Richard Christiana Sr.
<i>Summer Research Assistant .....</i>	Sarah Harrison
<i>Summer Research Assistant .....</i>	Sarah Roth
<i>Summer Research Assistant .....</i>	Amanda Moyer
<i>Summer Research Assistant .....</i>	Elizabeth Silliman

<i>Farm Manager .....</i>	Albert Woelfersheim
<i>Administrative Assistant .....</i>	Donna Clark
<i>Weather Data.....</i>	Frederick Meyer

NOT FOR PUBLICATION OR DISTRIBUTION  
OUTSIDE RESEARCH OR DEVELOPMENT GROUPS

## TABLE OF CONTENTS

	<u>Page Number</u>
• Materials Tested.....	2
• Apple, Evaluation of Insecticides Against Early-Season Insect Complex (East block).....	3-6
• Apple, Evaluation of Insecticides Against Foliar Feeding Complex.....	7-9
• Apple, Evaluation of Insecticides Against Mite Complex.....	10-12
• Apple, Harvest Evaluation of Insecticides Against Season-Long Insect Complex .....	13-17
• Apple, Evaluation of Insecticides Against Early-Season Insect Complex (West block).....	18-19
• Apple, Harvest Evaluation of Insecticides Against Season-Long Insect Complex .....	20-22
• Apple, Evaluation of Insecticides Against the Green Aphid Complex.....	23-24
• Apple, Evaluation of Altacor™ Against the Summer Lepidopteran Complex, Clarke Farms, Milton, NY	25
• Pear, Insect Control.....	26-38
• Factors Contributing To The 2007 Hudson Valley Pest Management Anomalies .....	39
• APPENDIX I – Yearly McIntosh Phenology, HVL.....	40
• APPENDIX II – 2007 Insect Pheromone Trap and Adult Vacuum Graphs, HVL .....	41-42
• APPENDIX III – 2007 Weather Data, HVL.....	43

**- Materials Tested -**

Formulation		Company
<b>Apple</b>		
A15894 SC	.....	Syngenta
A15365 SC	.....	Syngenta
A15397 SC	.....	Syngenta
Acramite 50W	.....	Chemtura
AgriMek 0.15EC	.....	Syngenta
Actara 25WDG	.....	Syngenta
Altacor	.....E.I. DuPont De Nemours & Co.	
Asana XL 0.66EC	.....E.I. DuPont De Nemours & Co.	
Assail 30SG	.....	Cerexagri
Avaunt	.....E.I. DuPont De Nemours & Co.	
Baythroid 2E	.....	Bayer
Belt – NNI 0001	.....	Bayer
Calypso SC 480	.....	Bayer
Delegate WG	.....	Dow AgroSciences
Danitol 2.4EC	.....	Valent
Entrust 80WP	.....	Dow AgroSciences
Envidor 2SC	.....	Bayer
Imidan 70WP	.....	Gowan
LI700 (NIS)	.....	UAP Loveland Inc.
Lorsban 75WDG	.....	Gowan
Nexter	.....	BASF
Onager 1E	.....	Gowan
Proclaim 5WG	.....	Syngenta
Provado 1.6F	.....	Bayer
QRD400	.....	AgriQuest
Sevin XLR	.....	Bayer
SpinTor 2SC	.....	Dow AgroSciences
Spirotetramat 150SC	.....	Bayer
Supracide 2E	.....	Gowan
Surround WP	.....	BASF
Thionex 50W	.....	Makhteshim-Agan of N.America, Inc.
Warrior 1CS w/Zeon	.....	Syngenta
Zeal 72WSP	.....	Syngenta
<b>Pear</b>		
AgriMek 0.15EC	.....	Syngenta
Assail 30SG	.....	Cerexagri
Altacor WG (DPX-E2Y45)	.....	E.I. DuPont De Nemours & Co.
Damoil	.....	Drexel
Delegate WG	.....	Dow AgroSciences
Surround WP	.....	BASF
<b>Onion</b>		
Entrust 80 (seed treatment)	.....	Dow AgroSciences
Lorsban 4E (Drench)	.....	Gowan
Poncho 600 (seed treatment)	.....	Bayer
Mundial 500 (seed treatment)	.....	BASF
Trigard 75WP (seed treatment)	.....	Syngenta

---

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

P. J. Jentsch

**European apple sawfly (EAS):** *Hoplocampa testudinea* (Klug)

Hudson Valley Laboratory

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

N.Y.S. Ag. Exp. Station

**Green fruitworm (GFW):** *Lithophane antennata* (Walker)

Highland, NY 12528

**Obliquebanded leafroller (OBLR):** *Choristoneura rosaceana* (Harris)

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

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

**Codling moth (CM):** *Cydia pomonella* (Linnaeus)

**Lesser apple worm (LAW):** *Grapholita prunivora* Walsh

**Oriental fruit moth (OFM):** *Grapholitha molesta* (Busck)

**Plant bug complex (PB):** *Campylomma verbasci* (Meyer), *Lygidea mendax* (Reuter)

**EVALUATION OF INSECTICIDES AGAINST EARLY-SEASON INSECT PESTS OF APPLE, 2007 – 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 John Bean® Airblast sprayer at 300 psi. that delivered 134 GPA, traveling at 2.9 mph. Trees on the M.26 rootstock were 12 yr-old, 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 pressure and distribution.

Treatments were applied on various schedules as shown in **Tables 1-7**. Developmental phenology corresponding to application dates beginning at green tip (GT) on 2 April; 1/2" green on 21 April; tight-cluster (TC) on 30 April; pink (P) on 2 May; bloom on 4 May; petal fall (PF) on 14 May @ 80% PF of McIntosh; first cover (1C) on 22 May; second cover (2C) on 7 June; third cover (3C) on 21 June; forth cover (4C) on 13 July; 2<sup>nd</sup> generation CM application using biofix + 1260 DD<sub>50</sub> on 17 July; fifth cover (5C) on 25 July; and sixth cover (6C) on 8 August. Evaluations were made on 8 & 14 June after 'June-drop' for 'Ginger Gold' and 'McIntosh' (**Tables 1 & 2**), respectively. Evaluations were made on clustered fruit on 8 June of 'Golden Delicious' (**Table 3**). Treatments applied over the entire block for crop size management and disease control included: Dithane DF 3 lbs./A on 25 April, 9, 14, and 22 May; Nova 40WP 4.0 oz./A on 9, 14, and 22 May; Firewall on 22 May; NAA 2.0 ppm + Damoil 32.0 oz./A on 22 May; and Flint 2.0 oz./A on 26 June.

Fruit damage was assessed prior to 'June drop' by randomly selecting 50 fruits from each tree and scoring for external damage. Damage to 'dropped fruit' was assessed by randomly selecting 50 fruits from under the tree canopy and scoring fruit for external damage. The 'E. LEP' category includes combined damage from green fruitworm, 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 (21.6% damage in untreated cluster fruit of 'Ginger Gold'), while EAS and E. LEP damage was relatively low during early season. Treatments ranged from 98% clean fruit to 56.5% clean in the control while efficacy ranged equal to or lower in statistical difference from the standard (Trmt.11; Warrior, Lorsban, Imidan).

All treatments, with the exception of QRD400, provided very good early season control of the insect pest complex, notably the European apple sawfly, on both apple varieties in 'dropped fruit' evaluations. Most fruit damaged by EAS falls during the 'June Drop' period, making fallen fruit an essential part in early season insect evaluations. The standard, Assail / Silwet, Assail / Avaunt combinations and Calypso gave excellent overall early season insect fruit feeding management, most notably against plum curculio and the internal lepidopteran (CM\*).



Table 1 Evaluation of insecticides for controlling early season insect complex on apple <sup>1</sup>,  
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2007

Treatment	Formulation amt./A.	Timing	% Damaged <sup>2</sup> dropped fruit				% Clean	# drop fruit
			EAS	PC	TPB	E. LEP		
1. Assail 30SG	5.5 oz.	Bloom	0.0 a	1.0 a	3.5	0.8 a	94.3 b	196.3
Avaunt	6.0 oz.	PF-2C, AM + 14d						
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d						
2. Assail 30SG	5.5 oz.	Bloom, 1-2C	0.5 a	1.8 a	7.5	4.0 bc	87.0 b	262.3
Silwet	3.0 oz./100	Bloom, 1-2C						
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d						
Avaunt	6.0 oz.	PF-2C, 2 <sup>nd</sup> Gen. CM biofix+14d						
9. Actara 25WDG	5.5 oz.	PF-PC DD Model	0.5 a	2.5 a	2.3	1.5 ab	93.0 b	266.3
AgriMek 0.15EC	13.7 oz.	PF(5d post PF)						
AltaCor 35WG	3.0 oz./A	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix+14d						
10. Actara 25WDG	5.5 oz.	PF-2C	1.5 a	3.3 a	4.3	2.0 ab	88.3 b	262.7
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix+14d						
11. Supracide 2E	3.0 pts./A	Delayed dormant	1.8 a	1.3 a	2.3	0.3 a	94.5 b	196.5
Damoil	2%	Delayed dormant						
Warrior 1CS	5.0 oz./A	Pink						
Lorsban 75WDG	32 oz./A	Petal Fall						
Imidan 70W	48 oz./A	1-2C, OBLR 1 <sup>st</sup> hatch						
Imidan 70W	36 oz./A	AM threshold						
Provado 1.6F	4.0 oz./A	2C						
Assail 30SG	6.0 oz./A	AM threshold						
NIS (LI700)	0.25	AM threshold						
12. Calypso 480SC	6.0 oz./A	PF-1C	1.8 a	2.0 a	5.8	2.8 ab	88.8 b	183.0
Calypso 480SC	4.0 oz./A	2C						
Baythroid	2.8 oz.	OBLR DD Model 1x						
Sevin XLR	3.0 qts./A	2 <sup>nd</sup> OBLR, AM threshold						
13. QRD400	4.0 qts./A	P, PF-EOS	15.3 b	14.3 b	2.3	3.7 ab	65.7 a	208.7
14. QRD400	2.0 qts./A	P, PF-EOS	11.8 b	14.5 bc	3.5	11.8 c	62.3 a	108.6
15. Untreated			10.8 b	26.0 c	5.5	9.0 c	51.5 a	135.4

Data from 'Ginger Gold' evaluation on 8 June after "June drop". Green tip (GT) on 2 April; 1/2" green on 21 April; tight-cluster (TC) on 30 April; pink (P) on 2 May; bloom on 4 May; petal fall (PF) on 14 May @ 80% PF of McIntosh, first cover (1C) on 22 May, second cover (2C) on 7 June, , third cover (3C) on 21 June, forth cover (4C) on 13 July, 2nd generation CM application using biofix + 1260 DD50 on 17 July, fifth cover (5C) on 25 July, sixth cover (6C) on 8 August.

<sup>1</sup> Mean separation by Fishers Protected LSD ( $P \leq 0.05$ ). Treatment means followed by the same letter are not significantly different. Percent data were transformed using the arcsine transformation. Untransformed data presented.

Table 2 Evaluation of insecticides for controlling early season insect complex on apple <sup>1</sup>,  
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2007

Treatment	Formulation amt./A.	Timing	% Damaged <sup>2</sup> fruit					% Clean
			EAS	PC	TPB	E. LEP	CM*	
1. Assail 30SG	5.5 oz.	Bloom	0.5 a	0.5 a	0.3 a	0.8 a	0.0 a	96.0 b
Avaunt	6.0 oz.	PF-2C, AM + 14d						
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d						
2. Assail 30SG	5.5 oz.	Bloom, 1-2C	0.5 a	0.3 a	0.8 a	0.0 a	0.0 a	97.0 b
Silwet	3.0 oz./100	Bloom, 1-2C						
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d						
Avaunt	6.0 oz.	PF-2C, 2 <sup>nd</sup> Gen. CM biofix+14d						
9. Actara 25WDG	5.5 oz.	PF-PC DD Model	1.0 a	1.5 a	0.3 a	0.5 a	1.3 bc	91.0 b
AgriMek 0.15EC	13.7 oz.	PF(5d post PF)						
AltaCor 35WG	3.0 oz./A	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix+14d						
10. Actara 25WDG	5.5 oz.	PF-2C	1.5 a	0.8 a	0.3 a	1.3 ab	0.3 ab	92.0 b
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix+14d						
11. Supracide 2E	3.0 pts./A	Delayed dormant	0.5 a	2.0 a	0.0 a	0.3 a	0.0 a	94.5 b
Damoil	2%	Delayed dormant						
Warrior 1CS	5.0 oz./A	Pink						
Lorsban 75WDG	32 oz./A	Petal Fall						
Imidan 70W	48 oz./A	1-2C, OBLR 1 <sup>st</sup> hatch						
Imidan 70W	36 oz./A	AM threshold						
Provado 1.6F	4.0 oz./A	2C						
Assail 30SG	6.0 oz./A	AM threshold						
NIS (LI700)	0.25	AM threshold						
12. Calypso 480SC	6.0 oz./A	PF-1C	2.5 a	1.3 a	1.0 a	1.0 ab	0.0 a	89.0 b
Calypso 480SC	4.0 oz./A	2C						
Baythroid	2.8 oz.	OBLR DD Model 1x						
Sevin XLR	3.0 qts./A	2 <sup>nd</sup> OBLR, AM threshold						
13. QRD400	4.0 qts./A	P, PF-EOS	0.3 a	12.8 b	0.3 a	3.8 bc	2.8 c	64.5 a
14. QRD400	2.0 qts./A	P, PF-EOS	0.8 a	21.0 b	0.8 a	5.3 c	2.0 c	43.5 a
15. Untreated			1.0 a	19.5 b	1.8 a	3.5 bc	3.5 c	43.0 a

Data from 'McIntosh' evaluation on 14 June after "June drop". Green tip (GT) on 2 April; 1/2" green on 21 April; tight-cluster (TC) on 30 April; pink (P) on 2 May; bloom on 4 May; petal fall (PF) on 14 May @ 80% PF of McIntosh, first cover (1C) on 22 May, second cover (2C) on 7 June, , third cover (3C) on 21 June, forth cover (4C) on 13 July, 2nd generation CM application using biofix + 1260 DD50 on 17 July, fifth cover (5C) on 25 July, sixth cover (6C) on 8 August.

\*CM = fruit with calyx end frass, associated with OFM, LAW and CM.  $\geq 91\%$  CM using dissecting microscope to inspect for comb in last abdominal segment of live larvae (N=11).

Mean separation by Fishers Protected LSD ( $P < 0.05$ ). Treatment means followed by the same letter are not significantly different. Percent data were transformed using the arcsine transformation. Untransformed data presented.

Table 3 Evaluation of insecticides for controlling early season insect complex on apple<sup>1</sup>,  
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2007

Treatment	Formulation amt./A.	Timing	% Damaged fruit <sup>2</sup>					% Clean
			EAS	PC	TPB	E. LEP	CM*	
1. Assail 30SG	5.5 oz.	Bloom	0.0 a	0.0 a	3.5 ab	1.0 ab	0.0 a	95.5 bc
Avaunt	6.0 oz.	PF-2C, AM + 14d						
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d						
2. Assail 30SG	5.5 oz.	Bloom, 1-2C	0.5 a	0.5 a	1.5 a	0.5 ab	0.0 a	97.0 c
Silwet	3.0 oz./100	Bloom, 1-2C						
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d						
Avaunt	6.0 oz.	PF-2C, 2 <sup>nd</sup> Gen. CM biofix+14d						
9. Actara 25WDG	5.5 oz.	PF-PC DD Model	0.0 a	0.5 a	1.0 a	0.5 ab	0.5 a	97.5 c
AgriMek 0.15EC	13.7 oz.	PF(5d post PF)						
AltaCor 35WG	3.0 oz./A	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix+14d						
10. Actara 25WDG	5.5 oz.	PF-2C	0.5 a	3.0 a	1.5 a	1.0 ab	0.5 a	92.5 ab
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix+14d						
11. Supracide 2E	3.0 pts./A	Delayed dormant	0.0 a	0.5 a	1.5 a	0.0 a	0.0 a	98.0 c
Damoil	2%	Delayed dormant						
Warrior 1CS	5.0 oz./A	Pink						
Lorsban 75WDG	32 oz./A	Petal Fall						
Imidan 70W	48 oz./A	1-2C, OBLR 1 <sup>st</sup> hatch						
Imidan 70W	36 oz./A	AM threshold						
Provado 1.6F	4.0 oz./A	2C						
Assail 30SG	6.0 oz./A	AM threshold						
NIS (LI700)	0.25	AM threshold						
12. Calypso 480SC	6.0 oz./A	PF-1C	0.0 a	1.0 a	3.5 a	0.0 a	0.0 a	95.5 c
Calypso 480SC	4.0 oz./A	2C						
Baythroid XL	2.8 oz.	OBLR DD Model 1x						
Sevin XLR	3.0 qts./A	2 <sup>nd</sup> OBLR, AM threshold						
13. QRD400	4.0 qts./A	P, PF-EOS	3.0 b	15.5 b	7.5 b	3.5 bc	6.0 b	63.5 a
14. QRD400	2.0 qts./A	P, PF-EOS	1.0 ab	19.5 b	7.8 b	11.8 d	4.8 b	58.1 a
15. Untreated			2.0 b	21.6 b	5.0 ab	6.5 cd	12.5 c	56.5 a

Data from 'Golden Delicious' evaluation on 14 June after "June drop". Green tip (GT) on 2 April; 1/2" green on 21 April; tight-cluster (TC) on 30 April; pink (P) on 2 May; bloom on 4 May; petal fall (PF) on 14 May @ 80% PF of McIntosh, first cover (1C) on 22 May, second cover (2C) on 7 June, , third cover (3C) on 21 June, forth cover (4C) on 13 July, 2nd generation CM application using biofix + 1260 DD50 on 17 July, fifth cover (5C) on 25 July, sixth cover (6C) on 8 August.

\*CM = fruit with calyx end frass, associated with OFM, LAW and CM. > 91% CM using dissecting microscope to inspect for comb in last abdominal segment of live larvae (N=11).

Mean separation by Fishers Protected LSD (P=<0.05). Treatment means followed by the same letter are not significantly different. Percent data were transformed using the arcsine transformation. Untransformed data presented.

**Japanese beetle : *Popillia japonica* (Newman)****Potato leafhopper (PLH): *Empoasca fabae* Harris****Rose leafhopper (RLH): *Edwardsina rosae* (L)****White apple leafhopper (WALH): *Typhlocyba pomaria* McAtee****EVALUATION OF INSECTICIDES AGAINST FOLIAR-FEEDING INSECT PESTS OF**

**APPLE, 2007 – 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 John Bean® Airblast sprayer at 300 psi. that delivered 134 GPA, traveling at 2.9 mph. Trees on the M.26 rootstock were 12 yr-old, 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 drift reduction, increased insect pressure and distribution.

Treatments were applied on various schedules as shown in **Tables 4-5**. Developmental phenology corresponding to application dates beginning at green tip (GT) on 2 April; 1/2" green on 21 April; tight-cluster (TC) on 30 April; pink (P) on 2 May; bloom on 4 May; petal fall (PF) on 14 May @ 80% PF of McIntosh; first cover (1C) on 22 May; second cover (2C) on 7 June; third cover (3C) on 21 June; forth cover (4C) on 13 July; 2<sup>nd</sup> generation CM application using biofix + 1260 DD<sub>50</sub> on 17 July; fifth cover (5C) on 25 July; and sixth cover (6C) on 8 August. Treatments applied over the entire block for crop size management and disease control included: Dithane DF 3 lbs./A on 25 April, 9, 14, and 22 May; Nova 40WP 4.0 oz./A on 9, 14, and 22 May; Firewall on 22 May; NAA 2.0 ppm + Damoil 32.0 oz./A on 22 May; and Flint 2.0 oz./A on 26 June.

Evaluation of Japanese beetle damage to 'Red Delicious' was made on 18 July (**Table 4**). Evaluation of damage by potato leafhopper (PLH), rose leafhopper and white apple leafhopper (LH complex) and spotted tentiform leafminer (STLM) were made on 19-20 September in (**Table 5**).

Foliar damage by Japanese beetle (JB) was assessed across all replicates on 18 July (**Table 4**). Mean Japanese beetle severity leaf damage rating was scored using 5 individual mid-terminal leaves in each of 5 terminals / treatment, in which 0 is clean and 3 is severe skeletonizing displayed as mean number of damaged leaves in each category. Presence of adult JB was assessed by the examination of apical terminal leaves in 3-minute surveys. PLH foliar damage is displayed as the presence/absence of feeding chlorosis to 25 terminal leaves per tree. Leaf damage by the 'LH Complex' (stippling) assessments were made on a single 'Red Delicious' where: 0 = 0% damage; 1 = 1-10% damage; 2 = 11-25% damage; 3 = 26-50% damage; and 4 = >50% damage. To stabilize variance in these evaluations, transformation using the Log<sub>10</sub> (X + 1) was performed prior to analysis using Fisher's Protected LSD (P=<0.05). Untransformed data are presented in each table.

Efficacious treatments applied during the 3-5th cover period had greatest impact on the LH complex and Japanese beetle presence and feeding damage. The neonicotinoids Calypso SC 480, Assail 30SG, Provado 1.6F and Actara 25WDG provided superior control of foliar feeding and adult populations.

Populations of wooly, rosy, green apple and spiria aphid, as well as white and rose leafhopper nymph populations were very low this season, and sufficient data could not be collected.

Table 4 Evaluation of insecticides for controlling foliar feeding insect complex on apple<sup>1</sup>,  
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2007

Treatment	Formulation amt./A.	Timing	Foliar feeding damage / 50 lvs <sup>2</sup>				Japanese beetle adult / 3 min.
			0-3 leaf rating				
			0	1	2	3	
1. Assail 30SG	5.5 oz.	Bloom	18.3 bcd	18.3a	7.8 abcd	5.8 abcd	1.3 abc
Avaunt	6.0 oz.	PF-2C, AM + 14d					
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d					
2. Assail 30SG	5.5 oz.	Bloom, 1-2C	25.8 cd	17.0 a	3.8 ab	3.5 ab	1.3 abc
Silwet	3.0 oz./100	Bloom, 1-2C					
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d					
Avaunt	6.0 oz.	PF-2C, 2 <sup>nd</sup> Gen. CM biofix+14d					
3 Actara 25WDG	5.5 oz.	PF-PC DD Model	7.8 ab	17.3 a	12.3 d	12.8 cd	3.3 ab
A15894 SC	7.6 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d					
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d					
4 Actara 25WDG	5.5 oz.	PF-PC DD Model	12.8 abc	16.0 a	10.5 d	12.0 cd	21.5 de
A15894 SC	11.4 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d					
LI700	0.25 v/v%	PF-2C, 2nd Gen. CM biofix + 14d					
5 Actara 25WDG	5.5 oz.	PF-PC DD Model	8.8 ab	12.8 a	10.3 d	18.3 d	6.0 bcde
A15894 SC	15.2 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d					
LI700	0.25 v/v%	2 <sup>nd</sup> Gen. CM biofix + 14d					
6 Actara 25WDG	5.5 oz.	PF-PC DD Model	6.8 a	13.0 a	12.5 d	17.5 cd	5.0 bcde
A15365 SC	2.74.4 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d					
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d					
7 Actara 25WDG	5.5 oz.	PF-PC DD Model	13.5 abcd	17.0 a	9.0 cd	10.3 cd	4.3 abcde
A15365 SC	4.1 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d					
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d					
8 Actara 25WDG	5.5 oz.	PF-PC DD Model	11.0 ab	17.5 a	12.5 d	9.0 bcd	9.5 cde
A15365 SC	5.5 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d					
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d					
9 Actara 25WDG	5.5 oz.	PF-PC DD Model	16.8 abcd	14.0 a	8.3 bcd	9.8 cd	21.8 e
AgriMek 0.15EC	13.7 oz.	PF(5d post PF)					
AltaCor	3.0 oz./A	2 <sup>nd</sup> Gen. CM biofix + 14d					
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d					
10 Actara 25WDG	5.5 oz.	PF-6C	17.3 abcd	17.0 a	10.8 d	5.3 abc	1.3 abc
LI700	0.25 v/v%	2 <sup>nd</sup> Gen. CM biofix + 14d					
11 Supracide 2E	3.0 pts./A	Delayed dormant	27.0 d	17.5 a	3.8 abc	1.5 ab	0.3 a
Damoil	2%	Delayed dormant					
Warrior 1CS	5.0 oz./A	Pink					
Lorsban 75WDG	32 oz./A	Petal Fall					
Imidan 70W	48 oz./A	1-2C, OBLR 1 <sup>st</sup> hatch					
Imidan 70W	36 oz./A	AM threshold					
Provado1.6F	4.0 oz./A	2C					
Assail 30SG	6.0 oz./A	AM threshold					
NIS (LI700)	0.25	AM threshold					
12 Calypso	6.0 oz./A	PF-1C	30.3 d	15.5 a	3.3 abc	1.0 a	0.3 a
Calypso	4.0 oz./A	2C					
Baythroid	2.8 oz.	OBLR DD Model 1x					
Sevin XLR	3.0 qts./A	2 <sup>nd</sup> OBLR, AM threshold					
13 QRD400	4.0 qts./A	P, PF-EOS	17.5 abcd	17.3 a	9.5 cd	7.0 bcd	2.5 abcd
14 QRD400	2.0 qts./A	P, PF-EOS	15.5 abcd	12.8 a	8.8 cd	10.8 cd	2.0 abc
15 Untreated	-	-	14.3 abcd	15.3 a	12.3 d	8.3 bcd	8.8 bcde

<sup>1</sup> Data from 'Red Delicious' evaluation on 18 July. green tip (GT) on 2 April; 1/2" green on 21 April; tight-cluster (TC) on 30 April; pink (P) on 2 May; bloom on 4 May; petal fall (PF) on 14 May @ 80% PF of McIntosh, first cover (1C) on 22 May, second cover (2C) on 7 June, third cover (3C) on 21 June, fourth cover (4C) on 13 July, 2<sup>nd</sup> generation CM application using biofix + 1260 DD<sub>50</sub> on 17 July, fifth cover (5C) on 25 July, sixth cover (6C) on 8 August. 2 Mean separation by Fishers Protected LSD (P<0.05). Treatment means followed by the same letter are not significantly different. Data were transformed using the Log<sub>10</sub> (X + 1) transformation. Untransformed data presented. Feeding damage on 5 lvs. / term. @ 10 term. tree where 0 = no JB feeding damage; 1 = 10%; 2 = 25%; 3 = ≥ 50%

Table 4 (con't) Evaluation of insecticides for controlling foliar feeding insect complex on apple<sup>1</sup>,  
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2007

Treatment	Formulation amt./100 gal.	Timing	WALH /RLH leaf rating 0-5 stippling damage	PLH # / 25 mid-term lvs w/ chlorosis damage.	STLM mines / 3 min. observation
1. Assail 30SG	5.5 oz.	Bloom	0.2 abc	1.8 ab	11.0 a
Avaunt	6.0 oz.	PF-2C, AM + 14d			
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d			
2. Assail 30SG	5.5 oz.	Bloom, 1-2C	0.4 de	4.3 abc	13.0 a
Silwet	3.0 oz./100	Bloom, 1-2C			
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d			
Avaunt	6.0 oz.	PF-2C, 2 <sup>nd</sup> Gen. CM biofix+14d			
3 Actara 25WDG	5.5 oz.	PF-PC DD Model	0.1 a	8.3 bcd	8.8 a
A15894 SC	7.6 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d			
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d			
4 Actara 25WDG	5.5 oz.	PF-PC DD Model	0.3 cd	10.0 cde	12.8 a
A15894 SC	11.4 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d			
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d			
5 Actara 25WDG	5.5 oz.	PF-PC DD Model	0.2 abc	13.8 de	12.8 a
A15894 SC	15.2 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d			
LI700	0.25 v/v%	2 <sup>nd</sup> Gen. CM biofix + 14d			
6 Actara 25WDG	5.5 oz.	PF-PC DD Model	0.2 abc	8.0 cde	6.3 a
A15365 SC	2.74.4 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d			
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d			
7 Actara 25WDG	5.5 oz.	PF-PC DD Model	0.1 ab	4.5 bcd	12.8 a
A15365 SC	4.1 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d			
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d			
8 Actara 25WDG	5.5 oz.	PF-PC DD Model	0.6 ef	9.5 cde	4.5 a
A15365 SC	5.5 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d			
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d			
9 Actara 25WDG	5.5 oz.	PF-PC DD Model	0.0 a	5.0 abc	9.8 a
AgriMek 0.15EC	13.7 oz.	PF(5d post PF)			
AltaCor	3.0 oz./A	2 <sup>nd</sup> Gen. CM biofix + 14d			
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d			
10 Actara 25WDG	5.5 oz.	PF-6C	0.1 ab	6.3 bcd	15.5 a
LI700	0.25 v/v%	2 <sup>nd</sup> Gen. CM biofix + 14d			
11 Supracide 2E	3.0 pts./A	Delayed dormant	0.3 bcd	1.5 ab	15.0 a
Damoil	2%	Delayed dormant			
Warrior 1CS	5.0 oz./A	Pink			
Lorsban 75WDG	32 oz./A	Petal Fall			
Imidan 70W	48 oz./A	1-2C, OBLR 1 <sup>st</sup> hatch			
Imidan 70W	36 oz./A	AM threshold			
Provado1.6F	4.0 oz./A	2C			
Assail 30SG	6.0 oz./A	AM threshold			
NIS (LI700)	0.25	AM threshold			
12 Calypso	6.0 oz./A	PF-1C	0.3 cd	0.0 a	9.8 a
Calypso	4.0 oz./A	2C			
Baythroid	2.8 oz.	OBLR DD Model 1x			
Sevin XLR	3.0 qts./A	2 <sup>nd</sup> OBLR, AM threshold			
13 QRD400	4.0 qts./A	P, PF-EOS	0.1 abc	6.0 bcd	7.5 a
14 QRD400	2.0 qts./A	P, PF-EOS	0.6 ef	8.0 bcd	11.0 a
15 Untreated	-	-	0.7 f	21.3 e	12.8 a

<sup>1</sup> Data from 'Red Delicious' evaluation on 19 September. green tip (GT) on 2 April; 1/2" green on 21 April; tight-cluster (TC) on 30 April; pink (P) on 2 May; bloom on 4 May; petal fall (PF) on 14 May @ 80% PF of McIntosh, first cover (1C) on 22 May, second cover (2C) on 7 June, third cover (3C) on 21 June, forth cover (4C) on 13 July, 2<sup>nd</sup> generation CM application using biofix + 1260 DD<sub>50</sub> on 17 July, fifth cover (5C) on 25 July, sixth cover (6C) on 8 August.

Mean separation by Fishers Protected LSD (P<0.05). Treatment means followed by the same letter are not significantly different. Data were transformed using the Log 10 (X + 1) transformation. Untransformed data presented. Evaluation of LH complex leafhopper feeding (stippling) using the rating system where: 0 = 0% damage; 1 = 1-10% damage; 2 = 11-25% damage; 3 = 26-50% damage; and 4 = >50% damage



Table 5 Evaluation of insecticides for controlling foliar feeding mite complex on apple<sup>1</sup>,  
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2007

Treatment	Formulation amt./A.	Timing	ERM	# mite or mite egg / 25 leaf sample <sup>2</sup>					
				ERME	TSM	AMB	ZM	ZME	ARM
1. Assail 30SG	5.5 oz.	Bloom	0.5 a	7.3 a	5.8 a	3.3 cd	4.8 a	25.0 a	812 a
Avaunt	6.0 oz.	PF-2C, AM + 14d							
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d							
2. Assail 30SG	5.5 oz.	Bloom, 1-2C	0.3 a	6.3 a	1.8 a	2.5 bcd	6.5 a	27.8 a	344 a
Silwet	3.0 oz./100	Bloom, 1-2C							
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d							
Avaunt	6.0 oz.	PF-2C, 2 <sup>nd</sup> Gen. CM biofix+14d							
9 Actara 25WDG	5.5 oz.	PF-PC DD Model	0.0 a	4.5 a	1.0 a	0.8 abc	5.3 a	26.0 a	100 a
AgriMek 0.15EC	13.7 oz.	PF(5d post PF)							
AltaCor	3.0 oz./A	2 <sup>nd</sup> Gen. CM biofix + 14d							
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d							
10 Actara 25WDG	5.5 oz.	PF-2C	0.5 a	13.5 a	6.5 a	1.0 abc	7.0 a	25.3 a	804 a
LI700	0.25 v/v%	2 <sup>nd</sup> Gen. CM biofix + 14d							
11 Supracide 2E	3.0 pts./A	Delayed dormant	0.5 a	3.5 a	1.5 a	0.5 a	0.8 a	1.8 a	320 a
Damoil	2%	Delayed dormant							
Warrior 1CS	5.0 oz./A	Pink							
Lorsban 75WDG	32 oz./A	Petal Fall							
Imidan 70W	48 oz./A	1-2C, OBLR 1 <sup>st</sup> hatch							
Imidan 70W	36 oz./A	AM threshold							
Provado1.6F	4.0 oz./A	2C							
Assail 30SG	6.0 oz./A	AM threshold							
NIS (LI700)	0.25	AM threshold							
12 Calypso	6.0 oz./A	PF-1C	0.0 a	2.5 a	1.8 a	0.8 ab	4.8 a	22.3 a	84 a
Calypso	4.0 oz./A	2C							
Baythroid	2.8 oz.	OBLR DD Model 1x							
Sevin XLR	3.0 qts./A	2 <sup>nd</sup> OBLR, AM threshold							
13 QRD400	4.0 qts./A	P, PF-EOS	0.8 a	6.8 a	1.0 a	1.0 abc	5.8 a	18.0 a	296 a
14 QRD400	2.0 qts./A	P, PF-EOS	2.3 a	60.5 a	1.5 a	2.8 cd	4.8 a	20.3 a	732 a
15 Untreated	-	-	1.5 a	10.8 a	0.5 a	3.8 d	5.5 a	24.0 a	360 a

<sup>1</sup> Data from 'Red Delicious' evaluation on 20 June. GT on 2 April, 1/2" GT on 21 April, TC on 24 April, Pink on 2 May, Bloom on 7 May, PF on 14 May @ 80% PF of McIntosh. 1C on 22 May, 2C on 7 June, 3C on 21 June, 4C on 13 July, CM biofix on 17 July, 5C on 25 July, 6C on 12 August.

<sup>2</sup> Log<sub>10</sub> (X+1) transformation applied to data. Mean separation by Fishers Protected LSD (P=<0.05). Treatment means followed by the same letter are not significantly different. Mite sampled by examining 25 terminals leaves per tree using mite brushing machine to remove mite onto soaped glass plates for evaluation under dissecting scope > 18x magnification. ERM = European red mite Panonychus ulmi; TSM = Two spotted spider mite Tetranychus urticae; ZM = Zetzellia mali; (AMB): Neoseiulus (=Amblyseius) fallacies (Garman), ARM = apple rust mite Aculus schlechtendali



Table 5 (cont.) Evaluation of insecticides for controlling foliar feeding mite complex on apple<sup>1</sup>,  
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2007

Treatment	Formulation amt./A.	Timing	ERM	# mite or mite egg / 25 leaf sample <sup>2</sup>					
				ERME	TSM	AMB	ZM	ZME	ARM
1. Assail 30SG	5.5 oz.	Bloom	0.0 a	0.0 a	15.8 a	3.3 de	38.0 e	13.0 cd	68.0
Avaunt	6.0 oz.	PF-2C, AM + 14d							
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d							
2. Assail 30SG	5.5 oz.	Bloom, 1-2C	3.3 b	1.3 a	11.5 a	2.0 cde	37.3 de	12.3 cd	64.0
Silwet	3.0 oz./100	Bloom, 1-2C							
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d							
Avaunt	6.0 oz.	PF-2C, 2 <sup>nd</sup> Gen. CM biofix+14d							
3 Actara 25WDG	5.5 oz.	PF-PC DD Model	0.0 a	0.0 a	0.3 a	0.8 abc	8.0 abcd	1.0 ab	48.0
A15894 SC	7.6 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d							
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d							
4 Actara 25WDG	5.5 oz.	PF-PC DD Model	0.5 ab	0.3 a	1.3 a	0.0 a	2.8 ab	0.8 a	44.0
A15894 SC	11.4 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d							
LI700	0.25 v/v%	PF-2C, 2nd Gen. CM biofix + 14d							
5 Actara 25WDG	5.5 oz.	PF-PC DD Model	0.0 a	0.0 a	1.5 a	0.8 abc	2.5 a	0.8 a	8.0
A15894 SC	15.2 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d							
LI700	0.25 v/v%	2 <sup>nd</sup> Gen. CM biofix + 14d							
6 Actara 25WDG	5.5 oz.	PF-PC DD Model	0.0 a	0.0 a	2.3 a	1.3 abcd	11.8 abcde	4.8 abcd	16.0
A15365 SC	2.74.4 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d							
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d							
7 Actara 25WDG	5.5 oz.	PF-PC DD Model	0.8 ab	0.0 a	4.8 a	0.5 abc	32.3 cde	3.5 abc	72.0
A15365 SC	4.1 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d							
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d							
8 Actara 25WDG	5.5 oz.	PF-PC DD Model	0.0 a	0.0 a	2.0 a	1.0 abcd	16.8 bcde	1.3 ab	12.0
A15365 SC	5.5 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d							
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d							
9 Actara 25WDG	5.5 oz.	PF-PC DD Model	0.0 a	0.0 a	2.3 a	0.8 abc	13.3 abcde	2.8 abc	24.0
AgriMek 0.15EC	13.7 oz.	PF(5d post PF)							
AltaCor	3.0 oz./A	2 <sup>nd</sup> Gen. CM biofix + 14d							
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d							
10 Actara 25WDG	5.5 oz.	PF-2C	3.0 ab	2.0 a	5.8 a	2.0 cd	7.8 abcde	1.8 abc	104.0
LI700	0.25 v/v%	2 <sup>nd</sup> Gen. CM biofix + 14d							
11 Supracide 2E	3.0 pts./A	Delayed dormant	0.5 ab	0.0 a	3.3 a	8.3 e	23.5 cde	13.3 d	152.0
Damoil	2%	Delayed dormant							
Warrior 1CS	5.0 oz./A	Pink							
Lorsban 75WDG	32 oz./A	Petal Fall							
Imidan 70W	48 oz./A	1-2C, OBLR 1 <sup>st</sup> hatch							
Imidan 70W	36 oz./A	AM threshold							
Provado1.6F	4.0 oz./A	2C							
Assail 30SG	6.0 oz./A	AM threshold							
NIS (LI700)	0.25	AM threshold							
12 Calypso	6.0 oz./A	PF-1C	6.8 c	12.0 b	18.3 a	3.8 de	4.8 abc	1.5 ab	252.0
Calypso	4.0 oz./A	2C							
Baythroid	2.8 oz.	OBLR DD Model 1x							
Sevin XLR	3.0 qts./A	2 <sup>nd</sup> OBLR, AM threshold							
13 QRD400	4.0 qts./A	P, PF-EOS	0.0 a	0.3 a	1.0 a	0.8 abc	15.8 abcde	4.8 bcd	48
14 QRD400	2.0 qts./A	P, PF-EOS	0.0 a	0.0 a	0.0 a	1.8 bcd	10.3 abcd	3.0 abc	120
15 Untreated	-	-	0.0 a	0.8 a	1.8 a	0.3 ab	19.3 cde	6.5 cd	108

<sup>1</sup> Data from 'Red Delicious' evaluation on 30 July. GT on 2 April, 1/2" GT on 21 April, TC on 24 April, Pink on 2 May, Bloom on 7 May, PF on 14 May @ 80% PF of McIntosh. 1C on 22 May, 2C on 7 June, 3C on 21 June, 4C on 13 July, CM biofix on 17 July, 5C on 25 July, 6C on 12 August.

<sup>2</sup> Log<sub>10</sub>(X+1) transformation applied to data. Mean separation by Fishers Protected LSD (P=<0.05). Treatment means followed by the same letter are not significantly different. Mite sampled by examining 25 terminals leaves per tree using mite brushing machine to remove mite onto soaped glass plates for evaluation under dissecting scope > 18x magnification. ERM = European red mite Panonychus ulmi; TSM = Two spotted spider mite Tetranychus urticae; ZM = Zetzellia mali; (AMB): Neoseiulus (=Amblyseius) fallacies (Garman), ARM = apple rust mite Aculus schlechtendali

---

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

P. J. Jentsch

**European apple sawfly (EAS):** *Hoplocampa testudinea* (Klug)

Hudson Valley Laboratory

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

N.Y.S. Ag. Exp. Station

**Green fruitworm (GFW):** *Lithophane antennata* (Walker)

Highland, NY 12528

**Obliquebanded leafroller (OBLR):** *Choristoneura rosaceana* (Harris)

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

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

**Codling moth (CM):** *Cydia pomonella* (Linnaeus)

**Lesser apple worm (LAW):** *Grapholita prunivora* Walsh

**Oriental fruit moth (OFM):** *Grapholitha molesta* (Busck)

**Plant bug complex (PB):** *Campylomma verbasci* (Meyer), *Lygidea mendax* (Reuter)

**EVALUATION OF INSECTICIDES AGAINST SEASONAL INSECT PESTS OF APPLE, 2007 – 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 John Bean® Airblast sprayer at 300 psi. that delivered 134 GPA, traveling at 2.9 mph. Trees on the M.26 rootstock were 12 yr-old, 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 drift reduction, increased insect pressure and distribution.

Treatments were applied on various schedules as shown in **Tables 6-8**. Developmental phenology corresponding to application dates beginning at green tip (GT) on 2 April; 1/2" green on 21 April; tight-cluster (TC) on 30 April; pink (P) on 2 May; bloom on 4 May; petal fall (PF) on 14 May @ 80% PF of McIntosh; first cover (1C) on 22 May; second cover (2C) on 7 June; third cover (3C) on 21 June; forth cover (4C) on 13 July; 2<sup>nd</sup> generation CM application using biofix + 1260 DD<sub>50</sub> on 17 July; fifth cover (5C) on 25 July; and sixth cover (6C) on 8 August. Treatments applied over the entire block for crop size management and disease control included: Dithane DF 3 lbs./A on 25 April; and 9, 14, and 22 May; Nova 40WP 4.0 oz./A on 9, 14, and 22 May; Firewall on 22 May; NAA 2.0 ppm + Damoil 32.0 oz./A on 22 May; and Flint 2.0 oz./A on 26 June. Fruit were harvested on 14 August for 'Ginger Gold', 17 September for 'Red Delicious' and 'McIntosh' and data are shown in **Tables 6, 7, & 8**, respectively.

Damage to fruit was assessed by randomly selecting 50 fruits from each tree and scoring for internal and external damage. Damage by plum curculio occurring during the PF – 2C periods causes callousing from ovipositional scars designated as 'E. PC'. Fruit damaged by mid-season PC adult feeding is designated as 'L. PC'. The 'E. LEP' category includes combined damage from green fruitworm, 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 (45.5% damage in untreated fruit of 'Ginger Gold'), while EAS and E. LEP damage was relatively low during early season. Treatments ranged from 98% clean fruit to 56.5% clean in the control while efficacy ranged equal to or lower in statistical difference from the standard (Trmt.11; Warrior, Lorsban, Imidan).

All treatments, with the exception of QRD400, provided very good early season control of the insect pest complex - notably against the European apple sawfly, on both apple varieties in 'dropped fruit' evaluations. Most fruit damaged by EAS falls during the 'June drop' period, making fallen fruit an essential part in early season insect evaluations. The standard treatment, Assail / Silwet, Assail / Avaunt combinations and Calypso gave excellent overall early season insect fruit feeding management - most notably on plum curculio and the internal lepidopteran (CM\*).

Table 6 Evaluation of insecticides for controlling foliar feeding insect complex on apple<sup>1</sup>,  
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2007

Treatment	Formulation amt./A.	Timing	% Damaged fruit <sup>2</sup>					
			TPB	EAS	E. LEP	E. PC	L.PC	SJS
1. Assail 30SG	5.5 oz.	Bloom	10.5 a	0.0 a	1.0 a	1.5 a	0.5 abc	1.0 a
Avaunt	6.0 oz.	PF-2C, AM + 14d						
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d						
2. Assail 30SG	5.5 oz.	Bloom, 1-2C	12.5 a	0.0 a	0.5 a	2.5 a	1.0 ab	0.5 a
Silwet	3.0 oz./100	Bloom, 1-2C						
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d						
Avaunt	6.0 oz.	PF-2C, 2 <sup>nd</sup> Gen. CM biofix+14d						
3 Actara 25WDG	5.5 oz.	PF-PC DD Model	14.3 a	0.0 a	3.0 a	3.1 a	6.1 abcde	1.0 a
A15894 SC	7.6 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
4 Actara 25WDG	5.5 oz.	PF-PC DD Model	15.3 a	1.6 a	1.0 a	5.4 a	5.9 abcde	2.3 a
A15894 SC	11.4 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
5 Actara 25WDG	5.5 oz.	PF-PC DD Model	17.5 a	1.0 a	1.0 a	6.0 a	4.5 abcd	2.0 a
A15894 SC	15.2 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	2 <sup>nd</sup> Gen. CM biofix + 14d						
6 Actara 25WDG	5.5 oz.	PF-PC DD Model	14.8 a	0.0 a	1.5 a	5.3 a	6.1 bcde	1.0 a
A15365 SC	2.74.4 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
7 Actara 25WDG	5.5 oz.	PF-PC DD Model	14.8 a	1.1 a	1.6 a	2.7 a	7.8 cde	1.1 a
A15365 SC	4.1 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
8 Actara 25WDG	5.5 oz.	PF-PC DD Model	19.0 a	0.0 a	1.5 a	4.0 a	11.0 cde	1.5 a
A15365 SC	5.5 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
9 Actara 25WDG	5.5 oz.	PF-PC DD Model	20.0 a	0.0 a	1.5 a	7.0 ab	8.5 cde	0.5 a
AgriMek 0.15EC	13.7 oz.	PF(5d post PF)						
AltaCor	3.0 oz./A	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
10 Actara 25WDG	5.5 oz.	PF-2C	9.5 a	1.0 a	4.5 a	1.0 a	3.0 abcde	0.0 a
+ LI700	0.25 v/v%	2 <sup>nd</sup> Gen. CM biofix + 14d						
11 Supracide 2E	3.0 pts./A	Delayed dormant	6.0 a	1.0 a	0.0 a	2.5 a	8.0 bcde	0.5 a
Damoil	2%	Delayed dormant						
Warrior 1CS	5.0 oz./A	Pink						
Lorsban 75WDG	32 oz./A	Petal Fall						
Imidan 70W	48 oz./A	1-2C, OBLR 1 <sup>st</sup> hatch						
Imidan 70W	36 oz./A	AM threshold						
Provado 1.6F	4.0 oz./A	2C						
Assail 30SG	6.0 oz./A	AM threshold						
NIS (LI700)	0.25	AM threshold						
12 Calypso	6.0 oz./A	PF-1C	10.1 a	1.0 a	0.6 a	5.2 a	0.0 a	0.0 a
Calypso	4.0 oz./A	2C						
Baythroid	2.8 oz.	OBLR DD Model 1x						
Sevin XLR	3.0 qts./A	2 <sup>nd</sup> OBLR, AM threshold						
13 QRD400	4.0 qts./A	P, PF-EOS	12.7 a	0.0 a	1.3 a	24.0 bc	16.7 de	0.0 a
14 QRD400	2.0 qts./A	P, PF-EOS	5.5 a	2.5 a	2.0 a	36.1 cd	20.2 ef	0.0 a
15 Untreated	-	-	13.8 a	1.5 a	2.5 a	45.5 d	31.5 f	2.0 a

<sup>1</sup> Data from 'Ginger Gold' evaluation on 14 August. GT on 2 April, 1/2" GT on 21 April, TC on 24 April, Pink on 2 May, Bloom on 7 May, PF on 14 May @ 80% PF of McIntosh. 1C on 22 May, 2C on 7 June, 3C on 21 June, 4C on 13 July, CM biofix on 17 July, 5C on 25 July, 6C on 12 August.

<sup>2</sup> Mean separation by Fishers Protected LSD (P<0.05). Treatment means followed by the same letter are not significantly different. Data were transformed using the Log 10 (X + 1) transformation. Untransformed data presented.

Table 6 (cont.). Evaluation of insecticides for controlling foliar feeding insect complex on apple<sup>1</sup>,  
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2007

Treatment	Formulation amt./A.	Timing	% Damaged fruit <sup>2</sup>					% Clean
			Int. Lep.	Ext. Lep	AM.P	AM.T	SB	
1. Assail 30SG	5.5 oz.	Bloom	0.5 a	0.5 a	0.5 a	2.1 a	0.5 ab	74.6 de
Avaunt	6.0 oz.	PF-2C, AM + 14d						
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d						
2. Assail 30SG	5.5 oz.	Bloom, 1-2C	2.5 abcd	1.0 abc	0.5 a	0.0 a	0.0 a	73.0 de
Silwet	3.0 oz./100	Bloom, 1-2C						
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d						
Avaunt	6.0 oz.	PF-2C, 2 <sup>nd</sup> Gen. CM biofix+14d						
3 Actara 25WDG	5.5 oz.	PF-PC DD Model	3.6 abcd	9.6 fg	2.1 a	1.5 a	3.1 bc	58.9 cde
A15894 SC	7.6 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
4 Actara 25WDG	5.5 oz.	PF-PC DD Model	8.9 de	7.6 ef	1.8 a	8.8 a	1.7 abc	59.2 cde
A15894 SC	11.4 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
5 Actara 25WDG	5.5 oz.	PF-PC DD Model	4.0 abcd	3.5 cde	1.0 a	2.5 a	0.5 ab	66.5 cde
A15894 SC	15.2 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	2 <sup>nd</sup> Gen. CM biofix + 14d						
6 Actara 25WDG	5.5 oz.	PF-PC DD Model	8.7 abcd	7.1 ef	1.1 a	6.0 a	3.2 abc	55.3 cd
A15365 SC	2.74.4 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
7 Actara 25WDG	5.5 oz.	PF-PC DD Model	7.2 abcd	5.2 def	3.3 a	3.3 a	1.5 abc	61.6 cde
A15365 SC	4.1 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
8 Actara 25WDG	5.5 oz.	PF-PC DD Model	6.0 bcd	6.0 def	2.5 a	4.0 a	1.5 abc	58.5 cde
A15365 SC	5.5 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
9 Actara 25WDG	5.5 oz.	PF-PC DD Model	7.5 cd	7.5 ef	2.0 a	5.5 a	5.5 c	57.0 cde
AgriMek 0.15EC	13.7 oz.	PF(5d post PF)						
AltaCor	3.0 oz./A	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
10 Actara 25WDG	5.5 oz.	PF-2C,	5.0 cd	1.0 abc	0.5 a	1.5 a	1.5 abc	71.0 cde
+ LI700	0.25 v/v%	2 <sup>nd</sup> Gen. CM biofix + 14d						
11 Supracide 2E	3.0 pts./A	Delayed dormant	1.0 abc	3.5 abcd	0.5 a	1.5 a	0.5 ab	75.0 de
Damoil	2%	Delayed dormant						
Warrior 1CS	5.0 oz./A	Pink						
Lorsban 75WDG	32 oz./A	Petal Fall						
Imidan 70W	48 oz./A	1-2C, OBLR 1 <sup>st</sup> hatch						
Imidan 70W	36 oz./A	AM threshold						
Provado 1.6F	4.0 oz./A	2C						
Assail 30SG	6.0 oz./A	AM threshold						
NIS (LI700)	0.25	AM threshold						
12 Calypso	6.0 oz./A	PF-1C	0.6 ab	0.6 a	0.6 a	0.5 a	1.2 ab	76.5 e
Calypso	4.0 oz./A	2C						
Baythroid	2.8 oz.	OBLR DD Model 1x						
Sevin XLR	3.0 qts./A	2 <sup>nd</sup> OBLR, AM threshold						
13 QRD400	4.0 qts./A	P, PF-EOS	10.7 de	5.3 bcde	1.3 a	2.0 a	1.3 ab	48.7 bc
14 QRD400	2.0 qts./A	P, PF-EOS	8.5 de	7.1 ef	2.5 a	2.5 a	4.0 abc	35.2 ab
15 Untreated	-	-	17.3 e	18.3 g	2.0 a	5.0 a	14.7 d	22.1 a

1. Data from 'Ginger Gold' evaluation on 14 August. GT on 2 April, 1/2" GT on 21 April, TC on 24 April, Pink on 2 May, Bloom on 7 May, PF on 14 May @ 80% PF of McIntosh. 1C on 22 May, 2C on 7 June, 3C on 21 June, 4C on 13 July, CM biofix on 17 July, 5C on 25 July, 6C on 12 August.

2. Mean separation by Fishers Protected LSD (P=<0.05). Treatment means followed by the same letter are not significantly different. Data were transformed using the Log 10 (X + 1) transformation. Untransformed data presented.

Table 7 Evaluation of insecticides for controlling foliar feeding insect complex on apple<sup>1</sup>,  
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2007

Treatment	Formulation amt./A.	Timing	% Damaged fruit <sup>2</sup>					
			TPB	EAS	E. LEP	E. PC	L.PC	SJS
1. Assail 30SG	5.5 oz.	Bloom	3.5 a	0.0 a	0.0 a	11.0 bc	0.0 a	39.0 a
Avaunt	6.0 oz.	PF-2C, AM + 14d						
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d						
2. Assail 30SG	5.5 oz.	Bloom, 1-2C	4.5 a	0.0 a	0.0 a	7.5 bc	0.0 a	50.0 a
Silwet	3.0 oz./100	Bloom, 1-2C						
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d						
Avaunt	6.0 oz.	PF-2C, 2 <sup>nd</sup> Gen. CM biofix+14d						
3 Actara 25WDG	5.5 oz.	PF-PC DD Model	2.0 a	0.0 a	0.5 a	6.0 abc	0.5 a	25.0 a
A15894 SC	7.6 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
4 Actara 25WDG	5.5 oz.	PF-PC DD Model	7.5 a	0.5 a	2.5 a	16.0 bc	0.0 a	25.0 a
A15894 SC	11.4 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
5 Actara 25WDG	5.5 oz.	PF-PC DD Model	6.5 a	0.0 a	0.5 a	12.5 bc	2.5 ab	18.5 a
A15894 SC	15.2 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	2 <sup>nd</sup> Gen. CM biofix + 14d						
6 Actara 25WDG	5.5 oz.	PF-PC DD Model	4.2 a	0.5 a	0.5 a	7.72 bc	0.0 a	28.8 a
A15365 SC	2.74.4 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
7 Actara 25WDG	5.5 oz.	PF-PC DD Model	4.5 a	0.0 a	1.0 a	18.6 cd	1.5 a	22.2 a
A15365 SC	4.1 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
8 Actara 25WDG	5.5 oz.	PF-PC DD Model	3.5 a	0.0 a	0.5 a	10.5 bc	1.0 ab	38.5 a
A15365 SC	5.5 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
9 Actara 25WDG	5.5 oz.	PF-PC DD Model	2.5 a	0.0 a	1.5 a	10.5 bc	2.5 abc	25.5 a
AgriMek 0.15EC	13.7 oz.	PF(5d post PF)						
AltaCor	3.0 oz./A	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
10 Actara 25WDG	5.5 oz.	PF-2C	6.2 a	1.5 a	1.5 a	10.0 bc	0.5 a	28.0 a
+ LI700	0.25 v/v%	2 <sup>nd</sup> Gen. CM biofix + 14d						
11 Supracide 2E	3.0 pts./A	Delayed dormant	2.0 a	0.0 a	0.0 a	0.0 a	0.0 a	7.0 a
Damoil	2%	Delayed dormant						
Warrior 1CS	5.0 oz./A	Pink						
Lorsban 75WDG	32 oz./A	Petal Fall						
Imidan 70W	48 oz./A	1-2C, OBLR 1 <sup>st</sup> hatch						
Imidan 70W	36 oz./A	AM threshold						
Provado 1.6F	4.0 oz./A	2C						
Assail 30SG	6.0 oz./A	AM threshold						
NIS (LI700)	0.25	AM threshold						
12 Calypso	6.0 oz./A	PF-1C	5.5 a	0.0 a	0.0 a	4.0 ab	0.0 a	40.0 a
Calypso	4.0 oz./A	2C						
Baythroid	2.8 oz.	OBLR DD Model 1x						
Sevin XLR	3.0 qts./A	2 <sup>nd</sup> OBLR, AM threshold						
13 QRD400	4.0 qts./A	P, PF-EOS	7.0 a	0.0 a	0.0 a	53.5 e	6.0 bc	25.0 a
14 QRD400	2.0 qts./A	P, PF-EOS	1.0 a	0.0 a	0.5 a	37.5 de	6.5 c	28.5 a
15 Untreated	-	-	6.6 a	0.0 a	1.0 a	44.8 e	8.5 c	18.6 a

<sup>1</sup> Data from 'Red Delicious' evaluation on 26 September. GT on 2 April, 1/2" GT on 21 April, TC on 24 April, Pink on 2 May, Bloom on 7 May, PF on 14 May @ 80% PF of McIntosh. 1C on 22 May, 2C on 7 June, 3C on 21 June, 4C on 13 July, CM biofix on 17 July, 5C on 25 July, 6C on 12 August.

<sup>2</sup> Mean separation by Fishers Protected LSD ( $P < 0.05$ ). Treatment means followed by the same letter are not significantly different. Data were transformed using the Log 10 (X + 1) transformation. Untransformed data presented.



Table 7 (cont.) Evaluation of insecticides for controlling foliar feeding insect complex on apple<sup>1</sup>,  
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2007

Treatment	Formulation amt./A.	Timing	% Damaged fruit <sup>2</sup>					% Clean (excl. SJS)
			Int. Lep.	Ext. Lep	AM.P	AM.T	SB	
1. Assail 30SG	5.5 oz.	Bloom	0.5 ab	2.5 a	1.0 a	2.0 a	0.5 a	43.0 abc
Avaunt	6.0 oz.	PF-2C, AM + 14d						
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d						
2. Assail 30SG	5.5 oz.	Bloom, 1-2C	1.0 abc	2.5 a	0.0 a	0.0 a	1.5 abc	38.5 abc
Silwet	3.0 oz./100	Bloom, 1-2C						
Delegate 25WDG	6.0 oz.	OBLR 1 <sup>st</sup> hatch + 14d						
Avaunt	6.0 oz.	PF-2C, 2 <sup>nd</sup> Gen. CM biofix+14d						
3 Actara 25WDG	5.5 oz.	PF-PC DD Model	1.5 abc	4.5 abc	0.5 a	2.5 a	0.0 a	59.5 c
A15894 SC	7.6 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
4 Actara 25WDG	5.5 oz.	PF-PC DD Model	2.0 a-f	7.5 cd	1.0 a	2.0 a	0.5 a	45.0 abc
A15894 SC	11.4 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
5 Actara 25WDG	5.5 oz.	PF-PC DD Model	3.0 b-f	10.0 cd	1.5 a	4.0 a	1.0 abc	49.0 bc
A15894 SC	15.2 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	2 <sup>nd</sup> Gen. CM biofix + 14d						
6 Actara 25WDG	5.5 oz.	PF-PC DD Model	4.1 d-g	10.1 cd	0.5 a	2.0 a	0.0 a	54.8 bc
A15365 SC	2.74.4 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
7 Actara 25WDG	5.5 oz.	PF-PC DD Model	3.5 c-g	9.1 cd	0.0 a	0.5 a	4.0 c	53.3 bc
A15365 SC	4.1 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
8 Actara 25WDG	5.5 oz.	PF-PC DD Model	3.0 c-g	10.0 cd	0.0 a	0.5 a	0.0 a	37.5 abc
A15365 SC	5.5 oz.	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
9 Actara 25WDG	5.5 oz.	PF-PC DD Model	1.5 a-e	6.5 bcd	0.0 a	1.5 a	4.0 c	53.0 bc
AgriMek 0.15EC	13.7 oz.	PF(5d post PF)						
AltaCor	3.0 oz./A	2 <sup>nd</sup> Gen. CM biofix + 14d						
LI700	0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d						
10 Actara 25WDG + LI700	5.5 oz. 0.25 v/v%	PF-2C, 2 <sup>nd</sup> Gen. CM biofix + 14d	6.0 e-g	8.0 cd	0.5 a	1.0 a	1.5 abc	49.5 bc
11 Supracide 2E	3.0 pts./A	Delayed dormant	0.0 a	2.0 a	0.0 a	0.0 a	0.5 ab	88.0 d
Damoil	2%	Delayed dormant						
Warrior 1CS	5.0 oz./A	Pink						
Lorsban 75WDG	32 oz./A	Petal Fall						
Imidan 70W	48 oz./A	1-2C, OBLR 1 <sup>st</sup> hatch						
Imidan 70W	36 oz./A	AM threshold						
Provado 1.6F	4.0 oz./A	2C						
Assail 30SG	6.0 oz./A	AM threshold						
NIS (LI700)	0.25	AM threshold						
12 Calypso	6.0 oz./A	PF-1C	2.0 a-d	3.0 ab	0.0 a	0.0 a	0.0 a	50.0 bc
Calypso	4.0 oz./A	2C						
Baythroid	2.8 oz.	OBLR DD Model 1x						
Sevin XLR	3.0 qts./A	2 <sup>nd</sup> OBLR, AM threshold						
13 QRD400	4.0 qts./A	P, PF-EOS	8.5 gh	15.5 de	0.0 a	1.0 a	1.5 abc	23.5 a
14 QRD400	2.0 qts./A	P, PF-EOS	12.5 h	13.5 de	0.0 a	2.5 a	1.5 abc	27.0 ab
15 Untreated	-	-	6.5 fgh	21.6 e	0.0 a	2.5 a	2.0 abc	24.6 ab

1. Data from 'Red Delicious' evaluation on 26 September. GT on 2 April, 1/2" GT on 21 April, TC on 24 April, Pink on 2 May, Bloom on 7 May, PF on 14 May @ 80% PF of McIntosh. 1C on 22 May, 2C on 7 June, 3C on 21 June, 4C on 13 July, CM biofix on 17 July, 5C on 25 July, 6C on 12 August.

2. Mean separation by Fishers Protected LSD (P<0.05). Treatment means followed by the same letter are not significantly different. Data were transformed using the Log 10 (X + 1) transformation. Untransformed data presented

---

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

P. J. Jentsch

**European apple sawfly (EAS):** *Hoplocampa testudinea* (Klug)

Hudson Valley Laboratory

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

N.Y.S. Ag. Exp. Station

**Green fruitworm (GFW):** *Lithophane antennata* (Walker)

Highland, NY 12528

**Obliquebanded leafroller (OBLR):** *Choristoneura rosaceana* (Harris)

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

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

**Codling moth (CM):** *Cydia pomonella* (Linnaeus)

**Lesser apple worm (LAW):** *Grapholita prunivora* Walsh

**Oriental fruit moth (OFM):** *Grapholitha molesta* (Busck)

**Plant bug complex (PB):** *Campylomma verbasci* (Meyer), *Lygidea mendax* (Reuter)

**EVALUATION OF INSECTICIDES AGAINST EARLY SEASON INSECT PESTS OF APPLE, 2007 – 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 John Bean® Airblast sprayer at 300 psi. that delivered 134 GPA, traveling at 2.9 mph. Trees on the M.26 rootstock were 12 yr-old, 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 drift reduction, increased insect pressure and insect distribution.

Treatments were applied on various schedules as shown in **Table 8**. Developmental phenology corresponding to application dates beginning at green tip (GT) on 2 April; 1/2" green on 21 April; tight-cluster (TC) on 30 April; pink (P) on 2 May; bloom on 4 May; petal fall (PF) on 14 May @ 80% PF of McIntosh; first cover (1C) on 22 May; second cover (2C) on 7 June; third cover (3C) on 26 June; forth cover (4C) on 12 July; fifth cover (5C) on 25 July; and sixth cover (6C) on 13 August. Treatments applied over the entire block for crop size management and disease control included: Dithane DF 3 lbs./A on 25 April, 9, 14, and 22 May; Nova 40WP 4.0 oz./A on 9, 14, and 22 May; Firewall on 22 May; NAA 2.0 ppm + Damoil 32.0 oz./A on 22 May; and Flint 2.0 oz./A on 26 June.

Assessment of fruit damage prior to 'June drop' was determined by randomly selecting 100 fruits from each tree and scoring for external damage. Damage to 'dropped fruit' was assessed by randomly selecting 100 fruits from under the tree canopy and scoring fruit for external damage. Cluster fruit were evaluated on 14 August for 'Ginger Gold', 15 September for 'McIntosh'.

Fruit damaged by PC that occurs during the PF – 2C periods causes callousing from ovipositional scars designated as 'E. PC'. Fruit damaged by mid-season PC adult feeding is designated as 'L. PC'. The 'E. LEP' category includes combined damage from green fruitworm, 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 ( $P = < 0.05$ ).

Fruit damage was assessed prior to 'June drop' by randomly selecting 50 fruits from each tree and scoring for external damage. Damage to 'dropped fruit' was assessed by randomly selecting 50 fruits from under the tree canopy and scoring fruit for external damage. The 'E. LEP' category includes combined damage from green fruitworm, 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 (17.1% damage in untreated dropped fruit of 'Ginger Gold'; 51.5% damage in untreated cluster fruit of 'McIntosh'), while EAS caused considerable drop (27.9% of the untreated dropped fruit of 'Ginger Gold'). E. LEP damage was relatively low during early season. Treatments ranged from 91.3% clean fruit to 31.8% clean in the control while efficacy ranged equal to or higher in statistical difference from the standard (Trmt.9).

All treatments provided very good early season control of the insect pest complex. The standard, Warrior + LI700, gave excellent overall early season insect fruit feeding management. And while not statistically superior, the Calypso / Belt combination appears to give very good management of PC.



Table 8 Evaluation of insecticides for controlling foliar feeding insect complex on apple <sup>1</sup>,  
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2007

Treatment	Formulation amt./A.	Timing	% Damaged dropped fruit <sup>2</sup>				% Clean
			EAS	PC	TPB	E. LEP	
9 Warrior w/Ze. LI700	3.88 oz. 32.0 oz.	PF-EOS PF – EOS	5.1 a	7.3 a	3.3 a	3.8 a	80.6 ab
10 Calypso	6.0 oz.	PF – EOS	3.5 a	8.1 a	3.6 a	4.1 a	80.6 ab
11 Calypso Belt NNI-0001	6.0 oz. 5.0 oz.	PF – 2C PF, 3-4C, AM	5.7 a	8.0 a	4.1 a	9.9 a	74.7 ab
12 Untreated	- -		27.9 a	17.5 a	6.1 a	19.8 b	36.6 a

1. Data from 'Ginger Gold' drops evaluation on 14 August

Treatment	Formulation amt./A.	Timing	% Damaged cluster fruit <sup>2</sup>				CM	% Clean
			EAS	PC	TPB	E. LEP		
9 Warrior w/Ze. LI700	3.88 oz. 32.0 oz.	PF-EOS PF – EOS	0.6 ab	5.9 a	2.0 a	4.4 a	0.0 a	87.4 b
10 Calypso	6.0 oz.	PF – EOS	0.5 a	9.0 a	1.6 a	5.5 ab	0.0 a	84.9 b
11 Calypso Belt NNI-0001	6.0 oz. 5.0 oz.	PF – 2C PF, 3-4C, AM	0.5 a	3.1 a	2.5 a	2.5 a	0.0 a	91.3 b
12 Untreated	- -		1.4 b	51.7 b	0.0 a	13.4 b	1.4 b	32.8 a

1. Data from 'McIntosh' evaluation on 15 August. GT on 2 April, 1/2" GT on 21 April, TC on 24 April, Pink on 2 May, Bloom on 2 May, PF on 14 May @ 80% PF of McIntosh. 1C on 22 May, 2C on 7 June, 3C on 26 June, 4C on 12 July, 5C on 25 July, 6C on 13 August.

2. Mean separation by Fishers Protected LSD ( $P < 0.05$ ). Treatment means followed by the same letter are not significantly different. Data were transformed using the Log 10 (X + 1) transformation. Untransformed data presented

---

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

P. J. Jentsch

**European apple sawfly (EAS):** *Hoplocampa testudinea* (Klug)

Hudson Valley Laboratory

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

N.Y.S. Ag. Exp. Station

**Green fruitworm (GFW):** *Lithophane antennata* (Walker)

Highland, NY 12528

**Obliquebanded leafroller (OBLR):** *Choristoneura rosaceana* (Harris)

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

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

**Codling moth (CM):** *Cydia pomonella* (Linnaeus)

**Lesser apple worm (LAW):** *Grapholita prunivora* Walsh

**Oriental fruit moth (OFM):** *Grapholitha molesta* (Busck)

**Plant bug complex (PB):** *Campylomma verbasci* (Meyer), *Lygidea mendax* (Reuter)

**EVALUATION OF INSECTICIDES AGAINST SEASONAL INSECT PESTS OF APPLE, 2007 – 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 John Bean® Airblast sprayer at 300 psi. that delivered 134 GPA, traveling at 2.9 mph. Trees on the M.26 rootstock were 12 yr-old, 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 drift reduction, increased insect pressure and distribution.

Treatments were applied on various schedules as shown in **Table 9**. Developmental phenology corresponding to application dates beginning at green tip (GT) on 2 April; 1/2" green on 21 April; tight-cluster (TC) on 30 April; pink (P) on 2 May; bloom on 4 May; petal fall (PF) on 14 May @ 80% PF of McIntosh, first cover (1C) on 22 May, second cover (2C) on 7 June, , third cover (3C) on 26 June, forth cover (4C) on 12 July, fifth cover (5C) on 25 July, sixth cover (6C) on 13 August. Applications over the entire block for crop size management and disease control included: Dithane DF 3 lbs./A on 25 April, 9, 14, 22 May. Nova 40WP 4.0 oz./A on 9, 14, 22 May, Firewall on 22 May, NAA 2.0 ppm + Damoil 32.0 oz./A on 22 May, Flint 2.0 oz./A on 26 June.

Assessment of fruit was accomplished by randomly selecting either 50 or 100 fruits from each tree and scoring for external damage. The plum curculio damage occurring during the PF – 2C period causes callousing from ovipositional scars designated as 'E. PC'. PC damaged fruit from mid-season adult feeding is designated as 'L. PC'. The 'E. LEP' category includes combined damage from green fruitworm, 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 ( $P = < 0.05$ ).

Fruit damage was assessed by randomly selecting 50 fruits from each tree and scoring for internal and external damage. Plum curculio damage occurring during the PF – 2C period causes callousing from ovipositional scars designated as 'E. PC'. PC damaged fruit from mid-season adult feeding is designated as 'L. PC'. The 'E. LEP' category includes combined damage from green fruitworm, 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 ( $> 57\%$  damage in untreated fruit of 'McIntosh'), while EAS and E. LEP damage was relatively low during early season. High levels of SJS were distributed throughout the block, damaging fruit in both 1<sup>st</sup> and 2<sup>nd</sup> generations as treatments were not timed for SJS.

All treatments provided good seasonal control of the insect pest complex with rate response in the external lepidopteran complex observed in the experimental treatments A15397 SC and A15365 SC.

Table 9 Evaluation of insecticides for controlling fruit feeding insect complex on apple<sup>1</sup>,  
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2007

Treatment	Formulation amt./A.	Timing	% Damaged fruit <sup>2</sup>					
			TPB	EAS	E. LEP	E. PC	L.PC	PB
1 Actara	5.5 oz.	PF-1C	9.6 a	0.5 a	2.0 abc	5.6 a	2.8 a	4.3 abcd
A15397 SC	5.5 oz.	2C-EOS						
LI700	32.0 oz.	PF – EOS						
2 Actara	5.5 oz.	PF-1C	3.6 a	0.0 a	1.8 abc	3.5 a	2.3 a	2.1 ab
A15397 SC	6.84 oz.	2C-EOS						
LI700	32.0 oz.	PF – EOS						
3 Actara	5.5 oz.	PF-1C	2.7 a	0.9 a	1.2 ab	18.4 a	2.0 a	4.8 bcd
A15397 SC	8.2 oz.	2C-EOS						
LI700	32.0 oz.	PF – EOS						
4 Actara	5.5 oz.	PF-1C	4.8 a	1.0 a	2.3 abc	11.2 a	2.3 a	3.5 abc
A15397 SC	9.6 oz.	2C-EOS						
LI700	32.0 oz.	PF – EOS						
5 Actara	5.5 oz.	PF-1C	4.3 a	0.8 a	1.8 abc	13.3 a	4.3 a	4.8 bcd
A15365 SC	2.2 oz.	2C-EOS						
LI700	32.0 oz.	PF – EOS						
6 Actara	5.5 oz.	PF-1C	2.8 a	0.8 a	4.0 bc	11.1 a	6.0 a	5.3 cd
A15365 SC	2.74 oz.	2C-EOS						
LI700	32.0 oz.	PF – EOS						
7 Actara	5.5 oz.	PF-1C	2.5 a	0.5 a	0.5 a	8.0 a	11.1 a	3.1 abc
A15365 SC	3.3 oz.	2C-EOS						
LI700	32.0 oz.	PF – EOS						
8 Actara	5.5 oz.	PF-1C	3.5 a	0.8 a	1.3 abc	12.3 a	2.5 a	3.0 abc
A15365 SC	3.83 oz.	2C-EOS						
LI700	32.0 oz.	PF – EOS						
9 Actara	5.5 oz.	PF-1C	3.9 a	0.8 a	0.8a	7.1 a	2.5 a	1.8 ab
Warrior w/Ze.	3.88 oz.	PF-EOS						
LI700	32.0 oz.	PF – EOS						
10 Calypso	6.0 oz.	PF – EOS	5.8 a	3.3 a	3.0 abc	6.1 a	2.0 a	2.8 abc
11 Calypso	6.0 oz.	PF – 2C	3.8 a	1.0 a	0.8 ab	6.8 a	1.0 a	1.5 a
Belt NNI-0001	5.0 oz.	PF, 3-4C, AM						
12 Untreated			2.9 a	3.6 a	4.2 c	57.2 b	9.3 a	7.9 d

1. Data from 'McIntosh' evaluation on 29-30 August. GT on 2 April, 1/2" GT on 21 April, TC on 24 April, Pink on 2 May, Bloom on 2 May, PF on 14 May @ 80% PF of McIntosh. 1C on 22 May, 2C on 7 June, 3C on 26 June, 4C on 12 July, 5C on 25 July, 6C on 13 August.

2. Mean separation by Fishers Protected LSD ( $P < 0.05$ ). Treatment means followed by the same letter are not significantly different. Data were transformed using the Log 10 ( $X + 1$ ) transformation. Untransformed data presented.

Table 9 (cont.) Evaluation of insecticides for controlling fruit feeding insect complex on apple<sup>1</sup>,  
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2007

Treatment	Formulation amt./A.	Timing	% Damaged fruit <sup>2</sup>					% Clean
			SJS	Int. Lep.	Ext. Lep	AM.P	AM.T	
1 Actara	5.5 oz.	PF-1C	27.9 a	0.5 a	5.6 abc	0.3 a	0.3 ab	57.6
A15397 SC	5.5 oz.	2C-EOS						
LI700	32.0 oz.	PF – EOS						
2 Actara	5.5 oz.	PF-1C	33.8 a	0.5 a	1.3 ab	0.3 a	0.0 a	58.
A15397 SC	6.84 oz.	2C-EOS						
LI700	32.0 oz.	PF – EOS						
3 Actara	5.5 oz.	PF-1C	35.7 a	0.0 a	3.8 abc	0.0 a	0.0 a	46.5
A15397 SC	8.2 oz.	2C-EOS						
LI700	32.0 oz.	PF – EOS						
4 Actara	5.5 oz.	PF-1C	29.7 a	0.0 a	2.3 abc	0.0 a	0.0 a	59.4
A15397 SC	9.6 oz.	2C-EOS						
LI700	32.0 oz.	PF – EOS						
5 Actara	5.5 oz.	PF-1C	36.3 a	0.8 a	9.3 cd	0.0 a	0.5 ab	39.3
A15365 SC	2.2 oz.	2C-EOS						
LI700	32.0 oz.	PF – EOS						
6 Actara	5.5 oz.	PF-1C	41.5 a	0.5 a	10.7 bc	0.5 a	1.0 bc	39.8
A15365 SC	2.74 oz.	2C-EOS						
LI700	32.0 oz.	PF – EOS						
7 Actara	5.5 oz.	PF-1C	59.7 a	1.5 a	11.4 bcd	0.0 a	0.0 a	29.6
A15365 SC	3.3 oz.	2C-EOS						
LI700	32.0 oz.	PF – EOS						
8 Actara	5.5 oz.	PF-1C	57.3 a	1.0 a	3.0 abc	0.0 a	0.0 a	35.0
A15365 SC	3.83 oz.	2C-EOS						
LI700	32.0 oz.	PF – EOS						
9 Actara	5.5 oz.	PF-1C	46.7 a	0.0 a	2.4 abc	0.0 a	0.0 a	50.5
Warrior w/Ze.	3.88 oz.	PF-EOS						
LI700	32.0 oz.	PF – EOS						
10 Calypso	6.0 oz.	PF – EOS	39.5 a	0.5 a	0.3 a	0.0 a	0.0 a	48.9
11 Calypso	6.0 oz.	PF – 2C	43.5 a	0.3 a	2.0 ab	0.3 a	0.0 a	50.8
Belt NNI-0001	5.0 oz.	PF, 3-4C, AM						
12 Untreated			23.9 a	6.4 b	19.9 d	1.8 a	1.3 c	13.9

1. Data from 'McIntosh' evaluation on 29-30 August. GT on 2 April, 1/2" GT on 21 April, TC on 24 April, Pink on 2 May, Bloom on 2 May, PF on 14 May @ 80% PF of McIntosh. 1C on 22 May, 2C on 7 June, 3C on 26 June, 4C on 12 July, 5C on 25 July, 6C on 13 August.

2 Mean separation by Fishers Protected LSD ( $P < 0.05$ ). Treatment means followed by the same letter are not significantly different. Data were transformed using the Log 10 ( $X + 1$ ) transformation. Untransformed data presented.

---

**APPLE:** *Malus domestica*, cv. 'Rogers McIntosh'

**Green apple aphid** (GAA): *Aphis pomi* De Geer  
**Spirea aphid** (SA): *Aphis spiraecola* Patch  
**Potato leafhopper** (PLH): *Empoasca fabae*  
**Rose leafhopper** (RLH): *Edwardsiana rosae* McAtee  
**Diptera larvae:** (Cecidomyiidae) *Aphidoletes aphidimyza*  
Syrphidae spp.

P. J. Jentsch  
Hudson Valley Laboratory  
N.Y.S. Ag. Exp. Station  
Highland, NY 12528

#### EVALUATION OF INSECTICIDES AGAINST FOLIAR PESTS AND BENEFICIALS ON APPLE, 2007 –

**Cornell University's Hudson Valley Lab:** Treatments were applied to single-tree plots with adjacent buffer trees replicated four times in a randomized complete block design. Trees on the M.9 rootstock were 12 yr-old, approximately 10 ft high and planted to a research spacing of 10 x 15 ft. All dilutions are presented as amt/acre (based on 400 gallons/acre). Treatments were applied by handgun (dilute to runoff) using a tractor-mounted sprayer operated at 300 psi and delivering 200 GPA.

A single treatment was applied on the schedules as shown in **Table 10**. Developmental phenology corresponding to application dates beginning at green tip (GT) on 2 April; 1/2" green on 21 April; tight-cluster (TC) on 30 April; pink (P) on 2 May; bloom on 4 May; petal fall (PF) on 14 May @ 80% PF of McIntosh; and second cover (2C) on 15 June. Treatments applied over the entire block for crop size management and disease control included: Dithane DF 3 lbs./A on 25 April, 9, 14, and 22 May; Nova 40WP 4.0 oz./A on 9, 14, and 22 May; Firewall on 22 May; NAA 2.0 ppm + Damoil 32.0 oz./A on 22 May; and Flint 2.0 oz./A on 26 June.

Population densities were assessed pretreatment (Jun 15), and treatment efficacy at 4d posttreatment (Jun 19). Forty aphid-infested terminals/replicate were tagged for pretreatment counts and subsequent evaluation. Populations of aphids were estimated by a rating system where: 0 = no aphids; 1 = 1-10 aphids/terminal leaf; 2 = 11-50 aphids/terminal leaf; and 3 = >50 aphids/terminal leaf. At the same time, treatment effects on predators were assessed on un-tagged terminals by counting the number of larvae/5 apical terminal leaves.

Leafhopper infestations and leaf damage assessments were assessed on 19 June by sampling 5 terminals per tree, evaluating 5 proximal leaves for PLH damage and 5 distal leaves for RLH damage. Leaf damage severity assessments were made using a rating system where: 0 = 0% damage; 1 = 1-10% damage; 2 = 11-25% damage; 3 = 26-50% damage; and 4 = >50% damage. Data were treated by the 'square root of X' transformation prior to analysis by Fisher's Protected LSD. To stabilize variance, percentage data were transformed by arcsine \*(square root of x) prior to analysis using Fisher's Protected LSD ( $P = < 0.05$ ).

Immigrations into research plots by PLH were first observed on 4 Jun. Populations on terminals were moderately high prior to the sampling period. WALH/RLH population densities were below normal. Relative to the Provado standard, generally good control of the aphid complex and RLH was provided by all materials. Against PLH, which reinfests new growth that has not been covered by insecticide residues, the newer chemistries were very effective – even though much of the damage had occurred prior to the application. Very low levels of predatory larvae including, cecidomyiids and syrphidae, were present.

Table 10 Evaluation of insecticides for controlling the leafhopper and aphid complex on apple foliage<sup>1</sup>,  
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2007

Treatment	Formulation amt./A.	Timing	# of leafhopper <sup>2</sup> nymphs / 5 terminals		PLH foliar damage / terminal		# of GAA/SA / terminal (0-3)		Cecidomyiidae / syrphidae larvae / GAA colony
			RLH		# lvs.	severity (0-5)	tagged	random sample	
1. Spirotetramat 150SC NIS (LI700)	10.0 oz 0.25	2C	0.0 a		3.9 a	4.3 a	0.1 a	0.3 a	0.0 a
2. Spirotetramat 150SC NIS (LI700)	14.0 oz 0.25	2C	<0.1 a		3.9 a	4.2 a	0.4 b	0.3 a	0.1 a
3. Provado 1.6F	4.8 oz.	2C	0.0 a		4.0 a	4.2 a	0.0 a	0.3 a	0.0 a
4. Assail 30SG	5.5 oz	2C	0.0 a		3.8 a	4.2 a	0.0 a	0.2 a	0.0 a
5. Untreated			2.2 b		5.0 b	5.0 b	0.0 a	1.1 b	0.0 a

<sup>1</sup> Data from 'McIntosh', evaluation on 19 June.

PF on 14 May @ 80-100% PF of McIntosh. Application at GAA threshold on 15 June (2<sup>nd</sup> cover / 2C).

<sup>2</sup> Mean separation by Fishers Protected LSD ( $P < 0.05$ ). Treatment means followed by the same letter are not significantly different.

**APPLE:** *Malus domestica*, cv. 'Empire', 'Gala', 'Red Delicious', 'Rome' P. J. Jentsch  
Hudson Valley Laboratory  
**Codling moth (CM):** *Cydia pomonella* (Linnaeus) N.Y.S. Ag. Exp. Station  
**Obliquebanded leafroller (OBLR):** *Choristoneura rosaceana* (Harris) Highland, NY 12528

**EVALUATION OF ALTACOR™ AGAINST THE SUMMER LEPIDOPTERAN COMPLEX, 2007 - CLARKE FARMS, MILTON, NY** – Treatments of Altacor were applied to two, 5 acre blocks, at the 2.0 oz./acre and 4.0 oz./acre rates. All applications were applied concentrate using a Turbomist® 30P Airblast sprayer configured with 7 nozzles (#6) at 140 psi., delivering 112.8 GPA, traveling at 3.6 mph. Trees on the M.26 rootstock were 22 yr-old, approximately 12 ft high, 15' wide, and planted to a commercial spacing of 9' x 20'.

Treatments were applied on a schedule dictated by the degree-day development model for OBLR 1<sup>st</sup> hatch. Developmental phenology corresponding to application dates beginning bloom on 4 May; petal fall (PF) on 16 May @ 80% PF of McIntosh; first cover (1C) on 22 May; second cover (2C) on 7 June; third cover (3C) and 1<sup>st</sup> hatch of OBLR summer generation on 18 June; and follow-up fourth cover application (4C) on 2 July. Fruit were evaluated on 8 August.

Fruit damage was assessed by randomly selecting 250 fruits from 25 trees at 2 locations within each block and scoring for internal and external fruit injury.

Infestation pressure from OBLR was relatively low, with 2.9% fruit damage from OBLR in the grower standard 'Rome' variety, while CM damage was very low during mid-season of the 2<sup>nd</sup> generation. Both the 2.0 and 4.0 oz./A rates were very efficacious against these two lepidopteran species, allowing less than 1% fruit injury. There was a numeric rate response, with the 2.0 oz./A rate allowing slightly greater damage from both OBLR and CM.

Table 11 Evaluation of Altacor™ Against the Summer Lepidopteran Complex on Apple<sup>1</sup>, Clarke Farm, Milton, N.Y.-2007

Treatment	Formulation amt./A.	Timing	% Damaged fruit <sup>2</sup>		
			OBLR	CM	% Clean (lep. damage)
Altacor	2.0 oz.	3-4C	0.4	<0.1	99.5
Altacor	4.0 oz.	3-4C	0.1	0.1	99.8
<b>Grower Standard</b>					
Guthion	8.0 oz.	3-4C	2.9	0.0	97.0

1. Data from 'Gala', 'Empire', 'Rome' fruit were evaluated on 8 August..

2. Bloom on 4 May, PF on 16 May @ 80% PF of McIntosh. 1C on 22 May, 2C on 7 June, 3C on 18 June, 4C on 2 July.



## EFFICACY OF INSECTICIDES AGAINST PEAR PSYLLA ADULTS, EGGS AND NYMPHS,

**2007: – Cornell University's Hudson Valley Lab:** Treatments were applied to four-tree plots replicated three 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 27 years old. All dilutions are presented as amt/100 gal. – (based on 400 gallons/acre). Treatments were applied dilute to runoff using a high-pressure handgun sprayer operated at 300 psi delivering  $\geq 350$  GPA.

'Bartlett' phenology beginning at observation of 1<sup>st</sup> egg and swollen bud (SB) on 26 March; bud burst on 23 April; white bud (WB) on 30 April; 100% bloom on 7 May; PF application on 11 May @ 80% PF of Bartlett; 10dp PF application on 22 May; 2C on 6 June; 3C on 21 June; 4C on 13 July as a 'rescue' treatment; codling moth Degree Days 1<sup>st</sup> application (5C) on 17 July; and 2<sup>nd</sup> application (6C) on 26 July. 'Bartlett' was harvested on 22 August, and 'Bosc' harvested on 7 September. Treatments applied over the entire block for crop size management included NAA 2.1 oz./A on 3 May.

Scheduled applications (**Table 12**) were made against the first generations of pear psylla, and evaluations were to determine the treatment effects on adult, egg and nymph populations. During the period from swollen bud through petal fall, evaluations were used to determine treatment effects on springform adult ovipositional deterrence, including subsequent 1<sup>st</sup> generation nymph emergence. Prebloom evaluations began on 3 April, in which 25 fruiting buds per treatment per replicate were evaluated - followed by assessments on 10 April through 1 May in which 25 fruiting cluster leaves per treatment per replicate were evaluated. Treatment schedules presented in **Table 13** were designed to evaluate plum curculio and external lepidopteran damage. Treatments to 'Bartlett' were evaluated on 22 May by random assessment of 100 fruit on two trees per treatment per replicate.

Application schedules in **Table 14** were designed to evaluate the 2<sup>nd</sup> and 3<sup>rd</sup> generation psylla adult, egg, and nymph populations as well as pear rust mite populations. Adult numbers were assessed (6 and 19 June) by 3-minute vacuum sweeps of foliage using 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 in early summer, and continuing with 1 distal, 1 proximal and 3 mid-shoot leaves of 5 shoots per treatment through the remainder of the season (16 and 30 May; 8 and 27 June; 9 July). Samples were removed to the laboratory where target pests were counted using a binocular scope as needed. Percent defoliation rating was performed (16 August) using 2 evaluators per tree in which the mean of 2 quadrants of the tree were assessed for remaining foliage. Leaf rating for Fabraea disease was conducted (17 July and 16 August) by sampling 25 leaves from five terminals per treatment to assess the percent of leaves exhibiting leaf spot lesions. Damage to fruit was assessed by randomly selecting 100 fruit to determine insect and disease damage - including Fabraea, sooty mold and fruit russet. Scoring fruit for external and internal Lepidoptera, including codling moth, was performed by assessment of surface stings and feeding, CM entry sites, internal larvae damage. Lep larvae were collected and examined for anal comb morphologh. Sooty mold was rated for absence or presence of fruit surface with sooty mold. Fruit russet severity was rated using a 0-4 scale in which: 0 = no raised and darkened lenticels; 1 = < half of lenticels raised and darkened at the calyx end of the fruit; 2 = > half raised and darkened lenticel at the calyx end of the fruit; 3 = severe russetting in the calyx end of the fruit and < 50% russetting throughout the fruit; and 4 = russetting throughout the fruit surface. To stabilize variance in % fruit damage evaluations, transformation using the arcsine  $\sqrt{x}$  was performed prior to analysis. The transformation using the  $\log_{10}(X + 1)$  was applied for adult and foliar evaluations. Fisher's Protected LSD ( $P < 0.05$ ) was performed on all data - untransformed data are presented in each table.

Against early-season adults (**Table 12**) the 50lb/A single application of Surround WP at swollen bud was equivalent in ovipositional deterrence to the standard 3% oil application - control of egg and subsequent nymph populations shortly after petal fall was similar. Applications (beginning 10 days post petal fall on 16 May) directed against 1<sup>st</sup> generation nymph and adult population (**Table 14**) resulted in comparable control in all treatments until 16 June, at which time bi-weekly applications of 1% oil with early season Surround, Delegate and the high rate of DPX-E2Y45 provided greater residual control than the AgriMek 0.15EC treatment. Imidan, Actara and Surround / oil combinations exhibited the greatest degree of control for fruit feeding insect pests (**Table 15**). Bi-weekly applications of 1% oil allowed less leaf drop, yet significantly higher levels of Fabraea leaf spot than treatments including Dithane for Fabraea management (**Table 16**). However, 1% oil bi-weekly applications allowed fewer lesions than all other treatments. This may indicate fungicidal suppression on the spread of this leaf spot disease. Rust mite correlated closely with russet ratings in the untreated yet were low in season long 1% oil, suggesting the oil influenced higher russet values not associated with PRM.

Table 12 Evaluations of insecticide schedules on pear psylla oviposition on Bartlett pear.  
Hudson Valley Lab., Highland, N.Y.-2007.

Treatment	Formulation amt./100 gal.	Application Dates	2 April eggs / 100 buds	23 April eggs / 100 buds
1. Surround WP	50.0 lbs./A	DD	18.0 a	11.7 a
3. Damoil	3 % V/V	DD	34.0 a	17.3 a
4. Untreated control	-	-	32.0 a	44.8 b

1 Data taken on Bartlett.

Treatment	Formulation amt./100 gal.	Application Dates	16 May eggs / leaf	16 May nymphs / leaf	16 May Hardshell nym. / leaf	30 May adults / 3 min. vac. sweep
1. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD PF	< 0.1 a	0.1 a	0.0 a	6.3 a
2. Surround WP	50.0 lbs./A	DD, WB, PF	0.0 a	1.0 a	0.0 a	9.5 a
3. Damoil Damoil	3 % V/V 1.0 % V/V	DD 10dp PF	0.3 a	1.0 a	< 0.1 a	5.5 a
4. Untreated control	-	-	0.2 a	2.7 b	0.2 a	41.8 b

1 Data taken on foliage of Bartlett.

DD on 28 March, WB on 1 May, PF on 11 May, 10dp PF on 22 May.

2 Percentage data were transformed by arcsine  $\sqrt{x}$  prior to analysis. Foliar data for leaf curl midge were transformed using the  $\log_{10}(X + 1)$  conducted prior to analysis. Untransformed data are presented in each table. Mean separation by Fishers Protected LSD ( $P \leq 0.05$ ). Treatment means followed by the same letter are not significantly different.

Table 13 Evaluations of insecticide schedules on early season fruit insect damage on Bartlett pear.  
Hudson Valley Lab., Highland, N.Y.-2007.

Treatment	Formulation amt./100 gal.	Application Dates	% PC injury	% Lep injury
1. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD WB, PF	8.4 c	0.0 a
2. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD, WB, PF 10dp PF	2.0 abc	0.0 a
3. Damoil Damoil	3 % V/V 1.0 % V/V	DD 10dp PF	4.5 bc	0.3 a
4. Damoil AgriMek 0.15EC + + Damoil	3.0 gal. / 100 20.0 oz./A 0.25% V/V	DD 10dp PF 10dp PF	1.3 ab	0.5 a
5. Damoil Damoil Dithane	3.0 gal. / 100 1.0 % V/V 64.0 oz./A	DD 10dp PF WB – 77 phi	2.7 abc	0.3 a
6. Damoil AgriMek 0.15EC + Damoil Dithane	3.0 gal. / 100 20.0 oz./A 0.25% V/V 64.0 oz./A	DD PF 10dp PF WB – 77 phi	2.2 abc	0.0 a
7. Damoil Thionex 50WP Imidan 70WP AgriMek 0.15EC + Damoil Dithane	3.0 gal. / 100 64.0 oz./A 64.0 oz./A 20.0 oz./A 0.25% V/V 64.0 oz./A	DD GC WB, PF PF 10dp PF WB – 77 phi	1.5 ab	0.0 a
8. Delegate + + Damoil Damoil Imidan 70WP Dithane	7.0 oz./A 0.25% V/V 3.0 gal. / 100 64.0 oz./A 64.0 oz./A	10dpPF, 6C 10dpPF. 6C DD WB, PF WB – 77 phi	0.3 a	0.5 a
9. E2Y45 Damoil Actara Dithane Imidan 70WP	2.5 oz./A 3.0 gal. / 100 5.5 oz./A 64.0 oz./A 64.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup> (6C) DD PF WB – 77 phi WB	2.0 abc	0.3 a
10. E2Y45 Damoil Actara Dithane Imidan 70WP	3.0 oz./A 3.0 gal. / 100 5.5 oz./A 64.0 oz./A 64.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup> (6C) DD PF WB – 77 phi WB	0.3 a	0.3 a
11. Untreated control	-	-	7.8 c	1.0 a

1 Data taken on Bartlett fruit damage on 22 May. DD on 28 March, WB on 1 May, PF on 11 May, 10dp PF (1C) on 22 May, 2C on 6 June, 3C on 21 June, 4C on 13 July, CM DD 1<sup>st</sup> (5C) on 17 July, 2<sup>nd</sup> (6C) on 26 July, harvest of Bartlett on 22 August, Bosc harvest on 7 September.

2 Percentage data were transformed by arcsine  $\sqrt{x}$  prior to analysis. Foliar data for leaf curl midge were transformed using the  $\text{Log}_{10}(X + 1)$  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.

Table 14 Evaluations of insecticide schedules on efficacy against adult pear psylla on Bartlett pear.  
Hudson Valley Lab., Highland, N.Y.-2007.

Treatment	Formulation amt./100 gal.	Application Dates	30 May adults / 3 min. vac. sweep	11 June adults / 3 min. vac. sweep	24 July adults / 3 min. vac. sweep
1. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD WB, PF	6.3 a	6.0 a	2.5 a
2. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD, WB, PF 10dp PF	9.5 a	4.3 a	4.8 a
3. Damoil Damoil	3 % V/V 1.0 % V/V	DD 10dp PF	5.5 a	3.3 a	1.0 a
4. Damoil AgriMek 0.15EC + + Damoil	3.0 gal. / 100 20.0 oz./A 0.25% V/V	DD 10dp PF 10dp PF	11.3 a	4.8 a	1.5 a
5. Damoil Damoil Dithane	3.0 gal. / 100 1.0 % V/V 64.0 oz./A	DD 10dp PF WB – 77 phi	5.3 a	3.0 a	2.5 a
6. Damoil AgriMek 0.15EC + Damoil Dithane	3.0 gal. / 100 20.0 oz./A 0.25% V/V 64.0 oz./A	DD PF 10dp PF WB – 77 phi	9.0 a	5.8 a	3.0 a
7. Damoil Thionex 50WP Imidan 70WP AgriMek 0.15EC + Damoil Dithane	3.0 gal. / 100 64.0 oz./A 64.0 oz./A 20.0 oz./A 0.25% V/V 64.0 oz./A	DD GC WB, PF 10dp PF 10dp PF WB – 77 phi	9.8 a	3.8 a	1.5 a
8. Delegate + + Damoil Damoil Imidan 70WP Dithane	7.0 oz./A 0.25% V/V 3.0 gal. / 100 64.0 oz./A 64.0 oz./A	10dpPF. 6C 10dpPF. 6C DD WB, PF WB – 77 phi	5.0 a	6.5 a	1.5 a
9. E2Y45 Damoil Actara Dithane Imidan 70WP	2.5 oz./A 3.0 gal. / 100 5.5 oz./A 64.0 oz./A 64.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup> DD PF WB – 77 phi WB	7.0 a	5.0 a	3.5 a
10. E2Y45 Damoil Actara Dithane Imidan 70WP	3.0 oz./A 3.0 gal. / 100 5.5 oz./A 64.0 oz./A 64.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup> DD PF WB – 77 phi WB	4.3 a	6.3 a	6.0 a
11. Untreated control	-	-	41.8 b	9.0 a	2.8 a

1 Data taken of fruit and foliar damage on 22 May on Bartlett. DD on 28 March, WB on 1 May, PF on 11 May, 10dp PF (1C) on 22 May, 2C on 6 June, 3C on 21 June, 4C on 13 July, CM DD 1<sup>st</sup> (5C) on 17 July, 2<sup>nd</sup> (6C) on 26 July.

2. Percentage data were transformed by arcsine \*(square root of x) prior to analysis. Pear psylla adult vacuum sweeps were transformed using the Log<sub>10</sub> (X + 1) 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.

Table 14( cont.) Evaluations of insecticide schedules on fruit and foliar insect damage on Bartlett pear.  
Hudson Valley Lab., Highland, N.Y.-2007.

Treatment	Formulation amt./100 gal.	Application Dates	16 May eggs / leaf	16 May nymphs / leaf	16 May Hardshell nym. / leaf
1. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD WB, PF	< 0.1 a	0.1 a	0.0 a
2. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD, WB, PF 10dp PF	0.0 a	1.0 a	0.0 a
3. Damoil Damoil	3 % V/V 1.0 % V/V	DD 10dp PF	0.3 a	1.0 a	< 0.1 a
4. Damoil AgriMek 0.15EC + + Damoil	3.0 gal. / 100 20.0 oz./A 0.25% V/V	DD 10dp PF 10dp PF	0.0 a	0.6 a	0.0 a
5. Damoil Damoil Dithane	3.0 gal. / 100 1.0 % V/V 64.0 oz./A	DD 10dp PF WB – 77 phi	0.2 a	0.3 a	< 0.1 a
6. Damoil AgriMek 0.15EC + Damoil Dithane	3.0 gal. / 100 20.0 oz./A 0.25% V/V 64.0 oz./A	DD PF 10dp PF WB – 77 phi	0.0 a	0.3 a	< 0.1 a
7. Damoil Thionex 50WP Imidan 70WP AgriMek 0.15EC + Damoil Dithane	3.0 gal. / 100 64.0 oz./A 64.0 oz./A 20.0 oz./A 0.25% V/V 64.0 oz./A	DD GC WB, PF 10dp PF 10dp PF WB – 77 phi	0.5	0.5 a	< 0.1 a
8. Delegate + + Damoil Damoil Imidan 70WP Dithane	7.0 oz./A 0.25% V/V 3.0 gal. / 100 64.0 oz./A 64.0 oz./A	10dpPF. 6C 10dpPF. 6C DD WB, PF WB – 77 phi	< 0.1 a	0.3 a	0.0 a
9. E2Y45 Damoil Actara Dithane Imidan 70WP	2.5 oz./A 3.0 gal. / 100 5.5 oz./A 64.0 oz./A 64.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup> DD PF WB – 77 phi WB	0.0 a	< 0.1 a	0.0 a
10. E2Y45 Damoil Actara Dithane Imidan 70WP	3.0 oz./A 3.0 gal. / 100 5.5 oz./A 64.0 oz./A 64.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup> DD PF WB – 77 phi WB	< 0.1 a	< 0.1 a	0.0 a
11. Untreated control	-	-	0.2 a	2.7 b	0.2 a

1. Data taken of fruit and foliar damage on 16 May on Bartlett. DD on 28 March, WB on 1 May, PF on 11 May, 10dp PF (1C) on 22 May, 2C on 6 June, 3C on 21 June, 4C on 13 July, CM DD 1<sup>st</sup> (5C) on 17 July, 2<sup>nd</sup> (6C) on 26 July

2. Percentage data were transformed by arcsine \*(square root of x) prior to analysis. Pear psylla adult vacuum sweeps were transformed using the Log<sub>10</sub> (X + 1) 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.

Table 14 (cont.) Evaluations of insecticide schedules on fruit and foliar insect damage on Bartlett pear.  
Hudson Valley Lab., Highland, N.Y.-2007.

Treatment	Formulation amt./100 gal.	Application Dates	30 May nymphs / lf.	30 May eggs / lf..	30 May hardshell nym. / lf.
1. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD WB, PF	0.0 a	0.4 a	0.0 a
2. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD, WB, PF 10dp PF	<0.1 a	0.1 a	0.0 a
3. Damoil Damoil	3 % V/V 1.0 % V/V	DD 10dp PF	0.0 a	0.4 a	0.0 a
4. Damoil AgriMek 0.15EC + + Damoil	3.0 gal. / 100 20.0 oz./A 0.25% V/V	DD 10dp PF 10dp PF	<0.1 a	1.1 a	<0.1 a
5. Damoil Damoil Dithane	3.0 gal. / 100 1.0 % V/V 64.0 oz./A	DD 10dp PF WB – 77 phi	0.1 a	0.5 a	0.0 a
6. Damoil AgriMek 0.15EC + Damoil Dithane	3.0 gal. / 100 20.0 oz./A 0.25% V/V 64.0 oz./A	DD PF 10dp PF WB – 77 phi	0.0 a	<0.1 a	0.0 a
7. Damoil Thionex 50WP Imidan 70WP AgriMek 0.15EC + Damoil Dithane	3.0 gal. / 100 64.0 oz./A 64.0 oz./A 20.0 oz./A 0.25% V/V 64.0 oz./A	DD GC WB, PF PF 10dp PF WB – 77 phi	0.0 a	0.2 a	0.0 a
8. Delegate + + Damoil Damoil Imidan 70WP Dithane	7.0 oz./A 0.25% V/V 3.0 gal. / 100 64.0 oz./A 64.0 oz./A	10dpPF. 6C 10dpPF. 6C DD WB, PF WB – 77 phi	0.0 a	<0.1 a	0.0 a
9. E2Y45 Damoil Actara Dithane Imidan 70WP	2.5 oz./A 3.0 gal. / 100 5.5 oz./A 64.0 oz./A 64.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup> DD PF WB – 77 phi WB	0.0 a	<0.1 a	0.0 a
10. E2Y45 Damoil Actara Dithane Imidan 70WP	3.0 oz./A 3.0 gal. / 100 5.5 oz./A 64.0 oz./A 64.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup> DD PF WB – 77 phi WB	0.0 a	0.2 a	0.0 a
11. Untreated control	-	-	<0.1 a	6.4 b	<0.1 a

1 Data taken of fruit and foliar damage on 30 May on Bartlett. DD on 28 March, WB on 1 May, PF on 11 May, 10dp PF (1C) on 22 May, 2C on 6 June, 3C on 21 June, 4C on 13 July, CM DD 1<sup>st</sup> (5C) on 17 July, 2<sup>nd</sup> (6C) on 26 July.

2. Percentage data were transformed by arcsine \*(square root of x) prior to analysis. Pear psylla adult vacuum sweeps were transformed using the Log<sub>10</sub> (X + 1) 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.

Table 14 con't Evaluations of insecticide schedules on fruit and foliar insect damage on Bartlett pear.  
Hudson Valley Lab., Highland, N.Y.-2007.

Treatment	Formulation amt./100 gal.	Application Dates	8 June		27 June		
			nymphs / lf.	eggs / lf.	nymphs / lf.	eggs / lf.	hardshell nym. / 25 lvs.
1. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD WB, PF, 1-4C	0.1 ab	0.2 a	0.1 a	< 0.1 a	0.0 a
2. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD, WB, PF, 1C 10dp PF-4C	< 0.1 a	1.0 a	0.7 abcd	0.6 a	0.0 a
3. Damoil Damoil	3 % V/V 1.0 % V/V	DD 10dp PF-4C	0.8 bcd	0.7 a	0.3 abc	0.3 a	0.3 ab
4. Damoil AgriMek 0.15EC + + Damoil	3.0 gal. / 100 20.0 oz./A 0.25% V/V	DD 10dp PF 10dp PF	0.7 cd	1.4 a	1.2 abcd	0.5 a	1.0 abc
5. Damoil Damoil Dithane	3.0 gal. / 100 1.0 % V/V 64.0 oz./A	DD 10dp PF-4C WB – 77 phi	0.1 abc	1.4 a	0.2 ab	0.2 a	0.0 a
6. Damoil AgriMek 0.15EC + Damoil Dithane	3.0 gal. / 100 20.0 oz./A 0.25% V/V 64.0 oz./A	DD PF 10dp PF WB – 77 phi	0.1 ab	0.6 a	0.9 abc	0.4 a	0.3 ab
7. Damoil Thionex 50WP Imidan 70WP AgriMek 0.15EC + Damoil Dithane	3.0 gal. / 100 64.0 oz./A 64.0 oz./A 20.0 oz./A 0.25% V/V 64.0 oz./A	DD GC WB, PF 10dp PF 10dp PF WB – 77 phi	< 0.1 a	1.4 a	1.3 bcd	0.9 a	1.0 abc
8. Delegate + + Damoil Damoil Imidan 70WP Dithane	7.0 oz./A 0.25% V/V 3.0 gal. / 100 64.0 oz./A 64.0 oz./A	10dpPF, 6C 10dp PF, 6C DD WB, PF WB – 77 phi	0.2 abc	1.0 a	1.6 cd	1.1 a	1.8 c
9. E2Y45 Damoil Actara Dithane Imidan 70WP	2.5 oz./A 3.0 gal. / 100 5.5 oz./A 64.0 oz./A 64.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup> DD PF WB – 77 phi WB	0.9 d	1.8 a	1.1 d	1.3 a	0.3 ab
10. E2Y45 Damoil Actara Dithane Imidan 70WP	3.0 oz./A 3.0 gal. / 100 5.5 oz./A 64.0 oz./A 64.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup> DD PF WB – 77 phi WB	0.1 abc	1.4 a	0.9 bcd	0.9 a	0.0 a
11. Untreated control	-	-	2.0 e	3.6 a	1.2 bcd	0.9 a	1.3 bc

1. Data taken of fruit and foliar damage on Bartlett. DD on 28 March, WB on 1 May, PF on 11 May, 10dp PF (1C) on 22 May, 2C on 6 June, 3C on 21 June, 4C on 13 July, CM DD 1<sup>st</sup> (5C) on 17 July, 2<sup>nd</sup> (6C) on 26 July

2. Percentage data were transformed by arcsine \*(square root of x) prior to analysis. Pear psylla adult vacuum sweeps were transformed using the Log<sub>10</sub> (X + 1) 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.



Table 15 Evaluations of insecticide schedules of pear pest populations on Bartlett pear.  
Hudson Valley Lab., Highland, N.Y.-2007.

Treatment	Formulation amt./100 gal.	Application Dates	% Bartlett damage				% clean fruit
			Plant Bug	Plum Curculio	Int. Lep	Ext Lep	
1. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD WB, PF-EOS	36.9 c	45.0 d	3.9 a	18.2 cd	26.0 ab
2. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD, WB, PF 10dp PF-EOS	14.0 a	13.0 ab	0.0 a	5.6 a	72.0 d
3. Damoil Damoil	3 % V/V 1.0 % V/V	DD 10dp PF-EOS	40.4 cd	45.8 d	1.0 a	24.4 d	22.4 ab
4. Damoil AgriMek 0.15EC +	3.0 gal. / 100 20.0 oz./A	DD 10dp PF	35.0 c	29.0 cd	3.4 a	13.3 bcd	35.0 bc
5. Damoil Damoil Dithane	3.0 gal. / 100 1.0 % V/V 64.0 oz./A	DD 10dp PF-EOS WB – 77 phi	37.7 cd	36.3 cd	0.0 a	21.5 cd	30.4 b
6. Damoil AgriMek 0.15EC Dithane	3.0 gal. / 100 20.0 oz./A 64.0 oz./A	DD 10dp PF WB – 77 phi	29.3 bc	22.8 bc	1.4 a	4.8 ab	54.1 cd
7. Damoil Thionex 50WP Imidan 70WP AgriMek 0.15EC Dithane	3.0 gal. / 100 64.0 oz./A 64.0 oz./A 20.0 oz./A 64.0 oz./A	DD GC WB, PF 10dp PF WB – 77 phi	16.8 ab	8.4 a	0.0 a	8.4 abc	70.3 d
8. Delegate + + Damoil Damoil Imidan 70WP Dithane	7.0 oz./A 0.25% V/V 3.0 gal. / 100 64.0 oz./A 64.0 oz./A	10dpPF, Thresh 10dp PF DD WB, PF WB – 77 phi	23.7 abc	10.2 ab	0.0 a	3.5 a	65.0 d
9. E2Y45 Damoil Actara Dithane Imidan 70WP	2.5 oz./A 3.0 gal. / 100 5.5 oz./A 64.0 oz./A 64.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup> DD PF WB – 77 phi WB	14.8 ab	6.8 ab	0.0 a	10.9 abc	72.1 d
10. E2Y45 Damoil Actara Dithane Imidan 70WP	3.0 oz./A 3.0 gal. / 100 5.5 oz./A 64.0 oz./A 64.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup> DD PF WB – 77 phi WB	11.8 ab	11.8 ab	0.5 a	4.5 ab	73.5 d
Untreated control	-	-	55.8 d	47.4 d	1.5 a	20.0 cd	11.6 a

1. Data taken of fruit and foliar damage on 22 May on Bartlett. DD on 28 March, WB on 1 May, PF on 11 May, 10dp PF on 22 May. All AgriMek treatments were tank mixed with 0.25% v/v oil.

2. Percentage data were transformed by arcsine  $\sqrt{x}$  prior to analysis Pear psylla adult vacuum sweeps were transformed using the  $\log_{10}(X + 1)$  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.

Table 15 (cont.) Evaluations of insecticide schedules of pear pest populations on Bosc pear.  
Hudson Valley Lab., Highland, N.Y.-2007.

Treatment	Formulation amt./100 gal.	Application Dates	% Bosc damage				% clean fruit
			Plant Bug	Plum Curculio	Int. Lep	Ext Lep	
1. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD WB, PF-EOS	2.2 a	38.2 a	21.5 c	9.9 a	41.8 a
2. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD, WB, PF 10dp PF-EOS	0.0 a	9.3 a	7.1 abc	8.5 a	76.4 bc
3. Damoil Damoil	3 % V/V 1.0 % V/V	DD 10dp PF-EOS	0.0 a	32.5 a	17.5 bc	7.5 a	42.5 a
4. Damoil AgriMek 0.15EC +	3.0 gal. / 100 20.0 oz./A	DD 10dp PF	0.7 a	13.7 a	12.0 bc	9.8 a	66.5 abc
5. Damoil Damoil Dithane	3.0 gal. / 100 1.0 % V/V 64.0 oz./A	DD 10dp PF-EOS WB – 77 phi	0.0 a	28.3 a	16.3 bc	0.0 a	51.3 ab
6. Damoil AgriMek 0.15EC Dithane	3.0 gal. / 100 20.0 oz./A 64.0 oz./A	DD 10dp PF WB – 77 phi	1.0 a	34.4 a	13.1 c	9.1 a	47.4 ab
7. Damoil Thionex 50WP Imidan 70WP AgriMek 0.15EC Dithane	3.0 gal. / 100 64.0 oz./A 64.0 oz./A 20.0 oz./A 64.0 oz./A	DD GC WB, PF 10dp PF WB – 77 phi	0.0 a	9.5 a	3.2 abc	8.6 a	80.7 bc
8. Delegate + + Damoil Damoil Imidan 70WP Dithane	7.0 oz./A 0.25% V/V 3.0 gal. / 100 64.0 oz./A 64.0 oz./A	10dpPF, Thresh 10dp PF DD WB, PF WB – 77 phi	1.6 a	18.8 a	0.0 a	0.5 a	79.2 bc
9. E2Y45 Damoil Actara Dithane Imidan 70WP	2.5 oz./A 3.0 gal. / 100 5.5 oz./A 64.0 oz./A 64.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup> DD PF WB – 77 phi WB	0.0 a	7.2 a	1.0 a	4.4 a	87.4 c
10. E2Y45 Damoil Actara Dithane Imidan 70WP	3.0 oz./A 3.0 gal. / 100 5.5 oz./A 64.0 oz./A 64.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup> DD PF WB – 77 phi WB	0.0 a	5.2 a	0.0 a	5.7 a	89.1 c
11. Untreated control	-	-	1.3 a	39.3 a	15.4 c	5.7 a	46.8 ab

1. Data taken of fruit and foliar damage on 22 May on Bartlett. DD on 28 March, WB on 1 May, PF on 11 May, 10dp PF (1C) on 22 May, 2C on 6 June, 3C on 21 June, 4C on 13 July, CM DD 1<sup>st</sup> (5C) on 17 July, 2<sup>nd</sup> (6C) on 26 July

2. Percentage data were transformed by arcsine  $\sqrt{x}$  prior to analysis Pear psylla adult vacuum sweeps were transformed using the  $\log_{10}(X + 1)$  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.

Table 16 Evaluations of insecticide schedules on foliar damage of Bosc pear.  
Hudson Valley Lab., Highland, N.Y.-2007.

Treatment	Formulation amt./100 gal.	Application Dates	% lvs with Fabreae		% lvs with Fabreae: Repeated measure <sup>y</sup>	% Defoliation 16 Aug 07
			17 Jul 07	16 Aug 07		
1. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD WB, PF	28.8 b	30.3 cde	29.5 b <sup>x</sup>	6.7 a
2. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD, WB, PF 10dp PF	30.5 b	30.8 de	30.6 bc	8.2 a
3. Damoil Damoil	3 % V/V 1.0 % V/V	DD 10dp PF	45.8 c	40.5 e	43.1 c	6.1 a
4. Damoil AgriMek 0.15EC + + Damoil	3.0 gal. / 100 20.0 oz./A 0.25% V/V	DD 10dp PF 10dp PF	68.5 d	83.0 f	75.8 d	17.0 b
5. Damoil Damoil Dithane	3.0 gal. / 100 1.0 % V/V 64.0 oz./A	DD 10dp PF WB – 77 phi	38.3 b	26.5 bcde	32.4 bc	8.3 a
6. Damoil AgriMek 0.15EC + Damoil Dithane	3.0 gal. / 100 20.0 oz./A 0.25% V/V 64.0 oz./A	DD PF 10dp PF WB – 77 phi	12.5 a	13.0 a	12.8 a	6.7 a
7. Damoil Thionex 50WP Imidan 70WP AgriMek 0.15EC + Damoil Dithane	3.0 gal. / 100 64.0 oz./A 64.0 oz./A 20.0 oz./A 0.25% V/V 64.0 oz./A	DD GC WB, PF PF 10dp PF WB – 77 phi	11.8 a	11.0 a	11.4 a	7.8 a
8. Delegate + + Damoil Damoil Imidan 70WP Dithane	7.0 oz./A 0.25% V/V 3.0 gal. / 100 64.0 oz./A 64.0 oz./A	10dpPF., 6C 10dp PF, 6C DD WB, PF WB – 77 phi	8.0 a	18.3 abcd	13.1 a	6.1 a
9. E2Y45 Damoil Actara Dithane Imidan 70WP	2.5 oz./A 3.0 gal. / 100 5.5 oz./A 64.0 oz./A 64.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup> DD PF WB – 77 phi WB	7.0 a	16.8 abc	11.9 a	6.5 a
10. E2Y45 Damoil Actara Dithane Imidan 70WP	3.0 oz./A 3.0 gal. / 100 5.5 oz./A 64.0 oz./A 64.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup> DD PF WB – 77 phi WB	5.0 a	14.8 ab	9.9 a	7.2 a
11. Untreated control	-	-	73.0 d	100.0 g	86.5 e	50.7 c

1. Data taken of fruit and foliar damage on Bartlett. DD on 28 March, WB on 1 May, PF on 11 May, 10dp PF (1C) on 22 May, 2C on 6 June, 3C on 21 June, 4C on 13 July, CM DD 1<sup>st</sup> (5C) on 17 July, 2<sup>nd</sup> (6C) on 26 July

2. Percentage data were transformed by arcsine \*(square root of x) prior to analysis. Pear psylla adult vacuum sweep data were transformed using the Log<sub>10</sub> (X + 1) 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.

<sup>y</sup> 50 random leaves per tree were rated for the presence of Fabreae leaf spot on 16 Jul and 17 Aug.

Table 16 (cont.) Evaluations of insecticide schedules on fabaera leaf spot on Bartlett pear fruit.  
Hudson Valley Lab., Highland, N.Y.-2007.

Treatment	Formulation amt./100 gal.	Application Dates	% Fabraea damage to Bartlett		
			No	Light	High
Surround WP	50.0 lbs./A	DD	73.9 a	22.5 a	3.6 ab
Damail	1.0 % V/V	WB, PF-EOS			
Surround WP	50.0 lbs./A	DD, WB, PF	76.5 a	15.4 a	7.6 ab
Damail	1.0 % V/V	10dp PF-EOS			
Damail	3 % V/V	DD	69.2 a	12.0 a	18.9 b
Damail	1.0 % V/V	10dp PF-EOS			
Damail	3.0 gal. / 100	DD	57.0 a	31.3 a	11.2 ab
AgriMek 0.15EC +	20.0 oz./A	10dp PF			
+ Damail	0.25% V/V	10dp PF			
Damail	3.0 gal. / 100	DD	65.2 a	28.4 a	7.0 ab
Damail	1.0 % V/V	10dp PF-EOS			
Dithane	64.0 oz./A	WB – 77 phi			
Damail	3.0 gal. / 100	DD	77.7 a	14.6 a	7.7 ab
AgriMek 0.15EC	20.0 oz./A	PF			
+ Damail	0.25% V/V	10dp PF			
Dithane	64.0 oz./A	WB – 77 phi			
Damail	3.0 gal. / 100	DD	63.4 a	19.8 a	16.8 ab
Thionex 50WP	64.0 oz./A	GC			
Imidan 70WP	64.0 oz./A	WB, PF			
AgriMek 0.15EC	20.0 oz./A	PF			
+ Damail	0.25% V/V	10dp PF			
Dithane	64.0 oz./A	WB – 77 phi			
8. Delegate +	7.0 oz./A	10dpPF, 6C	70.1 a	26.0 a	3.9 ab
+ Damail	0.25% V/V	10dp PF, 6C			
Damail	3.0 gal. / 100	DD			
Imidan 70WP	64.0 oz./A	WB, PF			
Dithane	64.0 oz./A	WB – 77 phi			
9. E2Y45	2.5 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup>	55.0 a	35.1 a	10.4 ab
Damail	3.0 gal. / 100	DD			
Actara	5.5 oz./A	PF			
Dithane	64.0 oz./A	WB – 77 phi			
Imidan 70WP	64.0 oz./A	WB			
10. E2Y45	3.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup>	70.2 a	27.9 a	1.4 a
Damail	3.0 gal. / 100	DD			
Actara	5.5 oz./A	PF			
Dithane	64.0 oz./A	WB – 77 phi			
Imidan 70WP	64.0 oz./A	WB			
Untreated control	-	-	26.8 a	22.3 a	50.9 c

1. Data taken on Bartlett harvested 22 August. DD on 28 March, WB on 1 May, PF on 11 May, 10dp PF (1C) on 22 May, 2C on 6 June, 3C on 21 June, 4C on 13 July, CM DD 1<sup>st</sup> (5C) on 17 July, 2<sup>nd</sup> (6C) on 26 July All AgriMek treatments were tank mixed with 0.25% v/v oil.

2. Percentage data were transformed by arcsine \*(square root of x) prior to analysis. Pear psylla adult vacuum sweep data were transformed using the Log<sub>10</sub> (X + 1) 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

Table 16 (cont) Evaluations of insecticide schedules on fabraea leaf spot on Bosc pear fruit.  
Hudson Valley Lab., Highland, N.Y.-2007.

Treatment	Formulation amt./100 gal.	Application Dates	% Fabraea damage to Bosc		
			No	Light	High
1. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD WB, PF-EOS	79.7 cd	18.5a	1.9 ab
2. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD, WB, PF 10dp PF-EOS	76.9 cd	12.2a	10.9 ab
3. Damoil Damoil	3 % V/V 1.0 % V/V	DD 10dp PF-EOS	91.7 d	8.3a	0.0 a
4. Damoil AgriMek 0.15EC + + Damoil	3.0 gal. / 100 20.0 oz./A 0.25% V/V	DD 10dp PF 10dp PF	21.2 ab	12.6a	66.1 c
5. Damoil Damoil Dithane	3.0 gal. / 100 1.0 % V/V 64.0 oz./A	DD 10dp PF-EOS WB - 77 phi	72.5 cd	19.2a	8.3 ab
6. Damoil AgriMek 0.15EC + Damoil Dithane	3.0 gal. / 100 20.0 oz./A 0.25% V/V 64.0 oz./A	DD PF 10dp PF WB - 77 phi	70.8 cd	17.1a	12.6 ab
7. Damoil Thionex 50WP Imidan 70WP AgriMek 0.15EC + Damoil Dithane	3.0 gal. / 100 64.0 oz./A 64.0 oz./A 20.0 oz./A 0.25% V/V 64.0 oz./A	DD GC WB, PF PF 10dp PF WB - 77 phi	80.5 cd	10.5a	9.0 ab
8. Delegate + + Damoil Damoil Imidan 70WP Dithane	7.0 oz./A 0.25% V/V 3.0 gal. / 100 64.0 oz./A 64.0 oz./A	10dpPF, 6C 10dp PF, 6C DD WB, PF WB - 77 phi	79.3 cd	16.7 a	4.0 ab
9. E2Y45 Damoil Actara Dithane Imidan 70WP	2.5 oz./A 3.0 gal. / 100 5.5 oz./A 64.0 oz./A 64.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup> DD PF WB - 77 phi WB	60.1 bc	18.3 a	21.7 ab
10. E2Y45 Damoil Actara Dithane Imidan 70WP	3.0 oz./A 3.0 gal. / 100 5.5 oz./A 64.0 oz./A 64.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup> DD PF WB - 77 phi WB	35.3 ab	40.2 b	24.6 b
Untreated control	-	-	3.9 a	3.6a	92.5 d

1. Data taken on Bosc harvested 7 September. DD on 28 March, WB on 1 May, PF on 11 May, 10dp PF (1C) on 22 May, 2C on 6 June, 3C on 21 June, 4C on 13 July, CM DD 1<sup>st</sup> (5C) on 17 July, 2<sup>nd</sup> (6C) on 26 July

All AgriMek treatments were tank mixed with 0.25% v/v oil.

2. Percentage data were transformed by arcsine \*(square root of x) prior to analysis. Pear psylla adult vacuum sweep data were transformed using the Log<sub>10</sub> (X + 1) 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

Table 17 Evaluations of insecticides schedules on pear rust mite, russet and sooty blotch on Bartlett pear.  
Hudson Valley Lab., Highland, N.Y.-2007.

Treatment	Formulation amt./100 gal.	Application Dates	None	Fruit Russet				PRM	Sooty Blotch	
				Slight Calyx	Severe Calyx	plus < 50%	plus > 50%		None	Graded
1. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD WB, PF-EOS	22.3 bc	20.8 a	30.8 bc	21.9 bc	4.2 bc	0.2 a	53.1 cd	46.9 ab
2. Surround WP Damoil	50.0 lbs./A 1.0 % V/V	DD, WB, PF 10dp PF-EOS	12.5 ab	25.3 a	31.3 bc	23.9 c	7.0 c	1.3 abc	62.3 cd	37.7 ab
3. Damoil Damoil	3 % V/V 1.0 % V/V	DD PF-EOS	46.6 de	21.9 a	19.0 ab	9.5 ab	3.0 abc	0.1 a	58.0 cd	42.0 ab
4. Damoil AgriMek 0.15EC + Damoil	3.0 gal. / 100 20.0 oz./A 0.25% V/V	DD 10dp PF 10dp PF	18.7 b	25.9 a	33.1 c	17.8 bc	0.0 a	2.1 bc	5.5 a	94.6 d
5. Damoil Damoil Dithane	3.0 gal. / 100 1.0 % V/V 64.0 oz./A	DD 10dp PF-EOS WB – 77 phi	60.6 de	20.7 a	13.7 a	5.5 a	0.0 a	0.3 a	68.4 d	31.6 a
6. Damoil AgriMek 0.15EC + Damoil Dithane	3.0 gal. / 100 20.0 oz./A 0.25% V/V 64.0 oz./A	DD PF 10dp PF WB – 77 phi	60.3 de	22.0 a	15.7 a	1.9 a	0.0 a	1.4 abc	50.6 bcd	49.4 abc
7. Damoil Thionex 50WP Imidan 70WP AgriMek 0.15EC + Damoil Dithane	3.0 gal. / 100 64.0 oz./A 64.0 oz./A 20.0 oz./A 0.25% V/V 64.0 oz./A	DD GC WB, PF PF 10dp PF WB – 77 phi	58.2 de	23.8 a	15.9 a	2.0 a	0.0 a	0.5 ab	41.6 bc	58.4 bc
8. Delegate + + Damoil Damoil Imidan 70WP Dithane	7.0 oz./A 0.25% V/V 3.0 gal. / 100 64.0 oz./A 64.0 oz./A	10dpPF, 6C 10dp PF, 6C DD WB, PF WB – 77 phi	67.9 e	21.2 b	9.9 a	1.0 a	0.0 a	0.5 ab	42.8 bc	57.2 bc
9. E2Y45 Damoil Actara Dithane Imidan 70WP	2.5 oz./A 3.0 gal. / 100 5.5 oz./A 64.0 oz./A 64.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup> DD PF WB – 77 phi WB	47.4 de	26.2 b	17.9 a	9.0 ab	0.5 ab	3.3 c	24.9 ab	75.1 cd
10. E2Y45 Damoil Actara Dithane Imidan 70WP	3.0 oz./A 3.0 gal. / 100 5.5 oz./A 64.0 oz./A 64.0 oz./A	CM DD 1 <sup>st</sup> 2 <sup>nd</sup> DD PF WB – 77 phi WB	42.9 cd	22.7 b	21.9 abc	12.0 abc	0.5 ab	1.4 abc	25.8 ab	74.3 cd
11. Untreated control	-	-	0.9 a	6.1 a	10.2 a	27.8 c	55.7 d	11.1 d	10.0 a	90.0 d

1. Data taken on Bartlett harvested 7 September. DD on 28 March, WB on 1 May, PF on 11 May, 10dp PF (1C) on 22 May, 2C on 6 June, 3C on 21 June, 4C on 13 July, CM DD 1<sup>st</sup> (5C) on 17 July, 2<sup>nd</sup> (6C) on 26 July. PRM = pear rust mite

All AgriMek treatments were tank mixed with 0.25% v/v oil.

2. Percentage data were transformed by arcsine  $\sqrt{x}$  prior to analysis. Pear psylla adult vacuum sweep data were transformed using the  $\log_{10}(X + 1)$  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



## Factors contributing to the 2007 Hudson Valley pest management anomalies.

The 2007 apple phenology for McIntosh in the Hudson Valley was close to the 27 yr average during the early part of the season from green-tip to petal fall. A significant percentage of the seasonal rainfall occurred between green-tip (2 April) and half-inch green (21 April) totaling 5.4", with nearly 3.9" on the 16<sup>th</sup> of April. Yet, by petal fall we had accumulated only 6.2", making it a relatively 'dry' Spring with fewer infection periods and good residual for pre-bloom insecticides.

The period marked from pink (2 May) to bloom (7 May) was equivalent to the 5-day mean, allowing ample time for timely applications. There were 7 days between bloom and petal fall, relatively short but with favorable pollination and excellent set in most varieties across the region. In general, short bloom allows for continued insecticide residual during plum curculio migration resulting in reduced ovipositional damage from PC in earlier setting king fruitlets and early varieties such as 'Ginger Gold'. The 14-day period between early pink and petal fall accumulated only 0.2" of rain, again allowing for excellent insecticide residual.

Bloom occurred on 14 May, accumulating 228 growing degree-days from 1 March, lower than the 6 year mean of 277 DD<sub>50</sub>, signifying a relatively cool pre-bloom spring. Relatively cool temperatures from tight cluster through bloom may have contributed to the low pre-bloom levels of tarnished plant bug observed on apple. However, considerably higher temperatures during fruitlet development (from 8-12 mm) brought the PB complex into this block to cause significant injury.

Year	PF Date	Growing DD <sub>50</sub>
2007	14 May	228
2006	8 May	220
2005	16 May	259
2004	14 May	309
2003	20 May	337
2002	7 May	307
Mean	14 May	277

Migration of the plum curculio ended on 1 June (308DD<sub>50</sub> from PF). Applications made on a 10-14 day schedule would have received 2.64" of rain during the time PC were ending their migration. In high-pressure blocks where a follow-up 2<sup>nd</sup> cover application was not made, ovipositional damage from PC was observed.

1st gen. codling moth (CM) hatch occurred on 29 May (250 DD<sub>50</sub>) during the PC management period. OP's are often used to control PC, thereby controlling the 1<sup>st</sup> generation of CM adult and larvae. CM resistance to the OP's has not occurred in the Hudson Valley, allowing integrated management of the 1<sup>st</sup> generation CM using the OP's during PC migration from PF to 1-2 cover. The 2nd generation of CM hatch occurred on 17 July (1260 DD<sub>50</sub>). Scoring fruit during harvest evaluations of fruit with calyx end frass is associated with OFM, LAW and CM. This year, > 91% of live larvae were CM (determined by inspection of the last abdominal segment of larvae for comb (N=11)).

OBLR biofix began on 1 June with the 2<sup>nd</sup> generation 1<sup>st</sup> hatch on 16 June (340DD<sub>43</sub> from biofix). Growers lax in their applications for 2<sup>nd</sup> generation OBLR had noticeable fruit damage exceeding 4%. In general, growers managed OBLR successfully using two to three applications at 10 to 14 day intervals aimed specifically at OBLR beginning at 1<sup>st</sup> hatch.

Sufficient rainfall during mid-June through late July provided ample soil moisture to the apple maggot during emergence. 1<sup>st</sup> emergence occurred on 25 June, while threshold on red baited spheres occurring on 9 July requiring three applications at 10 to 14 day intervals in mixed variety blocks. Damage was observed in commercial orchards that had not previously experienced injury from apple maggot.



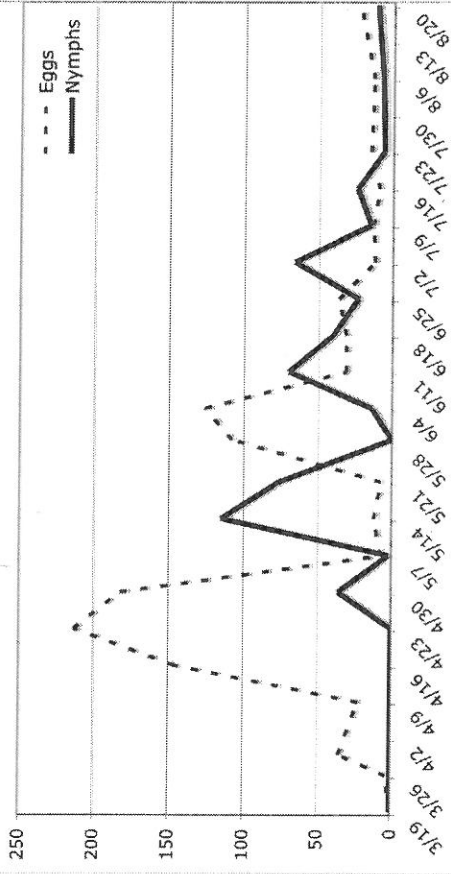
Hudson Valley McIntosh Phenology

Year	GT	HIG	T.C.	Pink	Bloom	P.F.
2007	4/2	4/21	4/24	5/2	5/7	5/14
2006	4/3	4/10	4/17	4/22	4/26	5/8
2005	4/7	4/11	4/18	4/26	5/8	5/16
2004	4/12	4/19	4/22	4/27	5/3	5/13
2003	4/7	4/16	4/24	4/28	5/1	5/19
2002	3/25	4/10	4/14	4/15	4/16	5/7
2001	4/11	4/17	4/25	4/28	5/2	5/10
2000	3/27	4/2	4/14	4/24	5/1	5/8
1999	4/2	4/7	4/12	4/26	5/2	5/13
1998	3/27	3/29	4/1	4/10	4/23	5/4
1997	4/4	4/11	4/21	4/28	5/1	5/14
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
<b>Earliest day</b>	<b>3/21</b>	<b>3/29</b>	<b>4/1</b>	<b>4/10</b>	<b>4/16</b>	<b>5/4</b>
<b>Latest day</b>	<b>4/15</b>	<b>4/27</b>	<b>5/4</b>	<b>5/7</b>	<b>5/16</b>	<b>5/24</b>

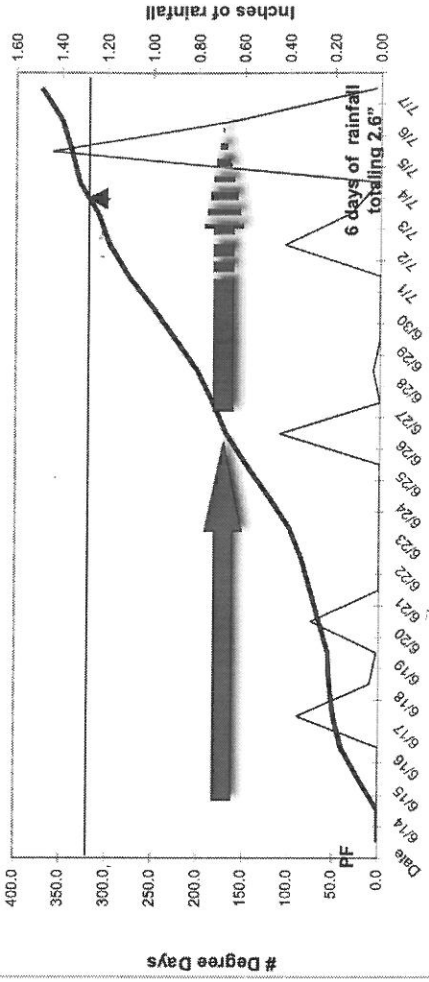
Mean                      6 April              13 April              22 April              28 April              3 May              13 May

Appox. Midrange      4/3 (+/-12D)  
                                    4/13 (+/-14D)  
    4/17 (+/-16D)  
    4/23 (+/-13D)  
    5/1 (+/-15D)  
    5/14 (+/-10D)

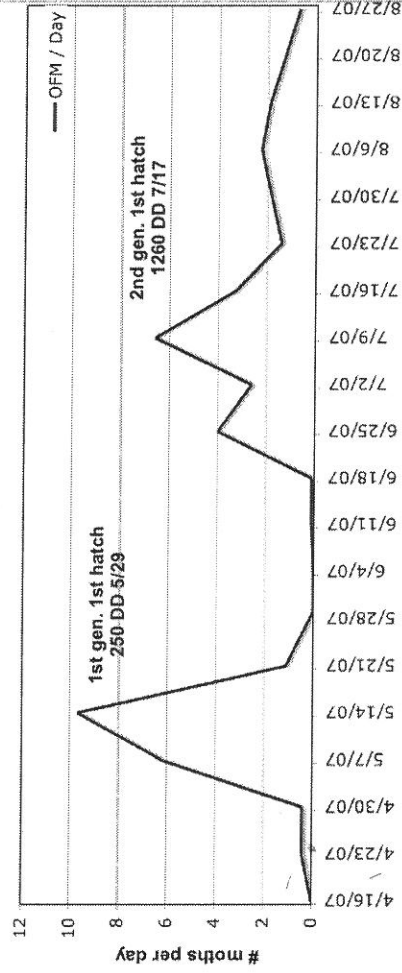
Pear Psylla on Untreated Bartlett Pear Foliage  
Hudson Valley Lab, Highland, NY - 2007



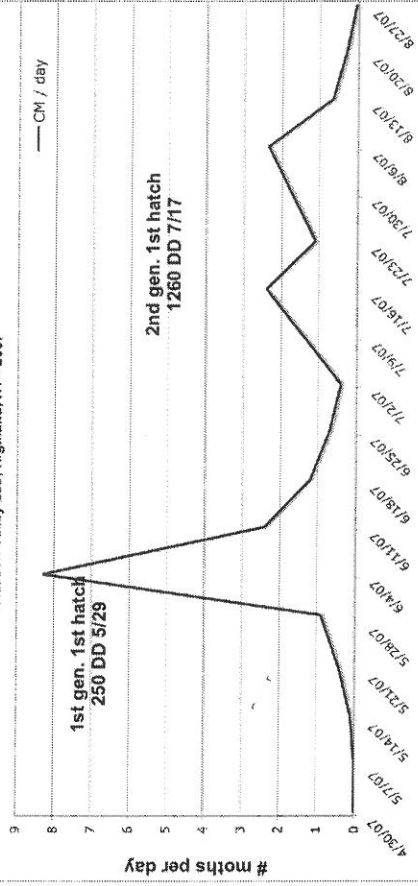
Degree Day Accumulations<sub>50</sub> and Rainfall During the  
Plum Curculio Migration Period in Apple. HVL - 2007

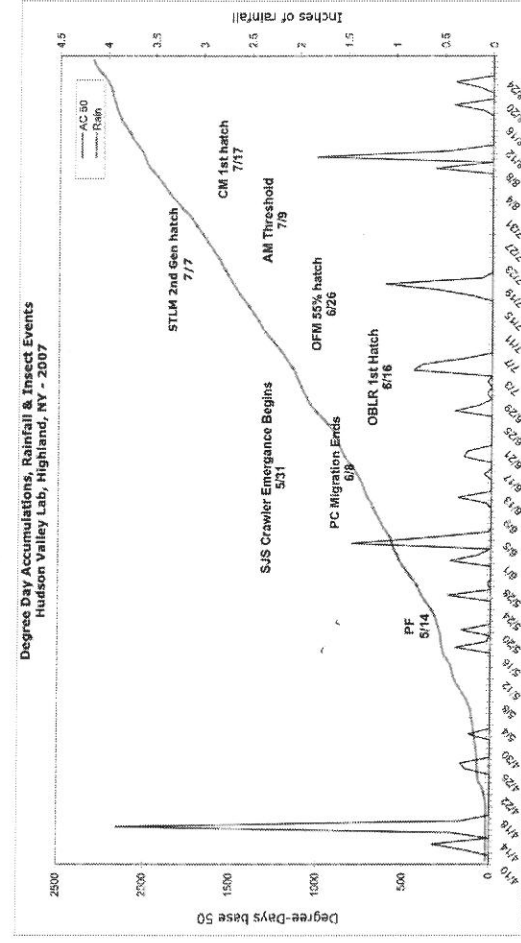
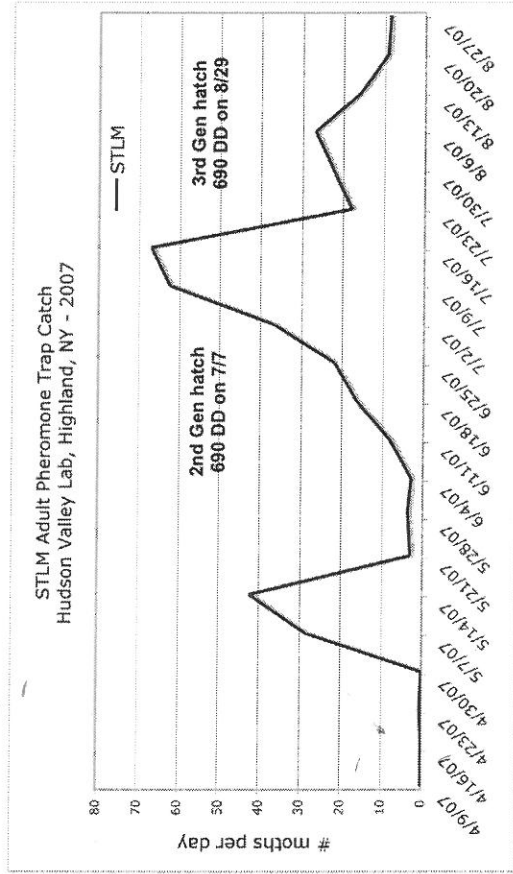
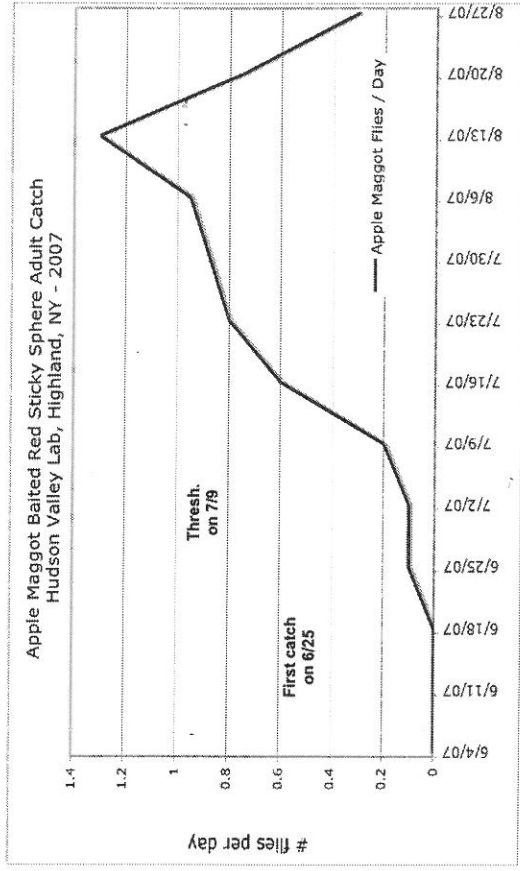
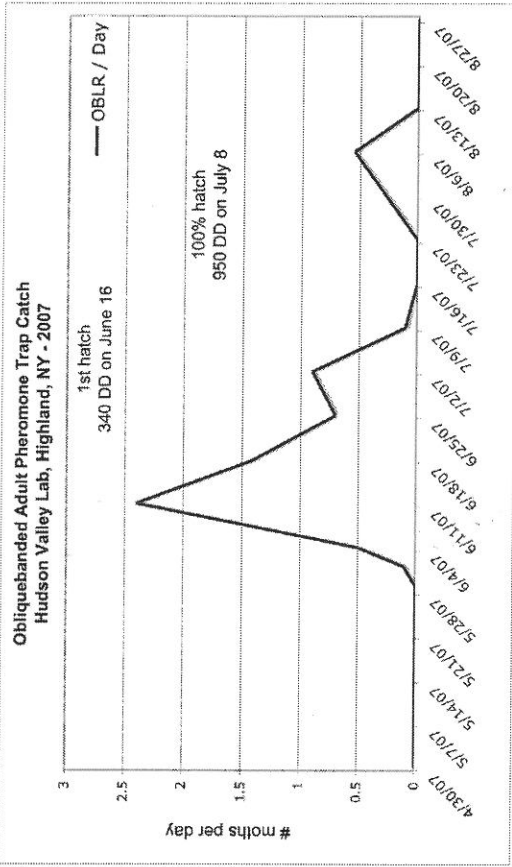


Oriental Fruit Moth Adult Pheromone Trap Catch  
Hudson Valley Lab, Highland, NY - 2007



Codling Moth Adult Pheromone Trap Catch  
Hudson Valley Lab, Highland, NY - 2007





**2007 MAXIMUM AND MINIMUM TEMPERATURES AND PRECIPITATION**  
**Hudson Valley Laboratory, Highland, NY**

All readings were taken at 0800 EST on the dates indicated

Date	MARCH			APRIL			MAY			JUNE			JULY			AUGUST			SEPTEMBER		
	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip
1	45	21	0.01*	55	28		74	45		89	61	0.42	82	54	0.06	87	64		75	54	
2	37	25	0.69	57	34	0.13	67	46	0.22	88	63	0.13	75	50		88	66		75	48	
3	46	26	0.70	52	41	0.02	68	39		88	66	0.01	74	48		92	69		76	54	
4	50	28	0.01	64	36		69	37		79	59	1.44	81	55		92	66	0.01	84	61	
5	40	25		39	35	0.70	68	39		69	61	0.62	74	64	0.79	91	58		80	57	
6	38	4		44	24		69	42		79	48	0.02	87	64	0.91	84	67		70	58	
7	16	5		38	24		61	35		67	42		84	58	0.03	84	68		82	63	
8	22	8	0.02	39	23		69	40		75	56		83	64		87	71	0.59	89	69	
9	30	2	0.01	41	27		79	49		89	68		90	70		94	67	0.01	91	69	0.03
10	31	8		46	28		87	60		81	64		93	70		82	59	1.82	82	67	
11	42	27	0.19	47	22		83	64		72	59	0.05	94	72		59	51	0.46	71	64	0.87
12	47	22		52	34	0.25	80	55		83	61	0.06	85	58	0.26	82	59		70	55	0.87
13	52	33		41	35	0.59	72	49		83	61		81	58		86	68	0.01	71	47	
14	61	39		46	36		67	34		67	55		83	58		86	54		73	54	
15	75	44	0.19	53	35	0.39	73	54		68	52		83	63		81	56		73	55	0.15
16	53	25	0.23	42	33	3.88	89	64		78	55		87	64		84	62		66	41	0.06
17	25	21		45	39	0.29	82	50	0.36	83	56		84	64		86	65	0.09	63	40	
18	33	18	0.42*	46	39		67	48	0.04	87	64		87	70	0.13	78	52	0.40	67	42	
19	38	21	0.03*	48	43		59	48	0.01	84	63		77	64	0.01	73	50		70	43	
20	42	31	0.04*	62	37		55	50	0.30	87	68	0.24	78	68	0.69	72	56		75	50	
21	45	15	0.13*	69	36		72	50		79	52		78	55		68	58	0.13	81	58	
22	42	25		76	40		68	41		82	58		82	59		61	56	0.39	82	56	
23	58	40	0.03	78	47		73	47		72	49		82	63		65	61		75	51	
24	52	31		87	62		78	52		74	45		68	59	1.16	73	62		77	48	
25	55	36	0.23	71	39		89	58		82	58		79	61		82	71		78	51	
26	50	31		59	39	0.25	89	61	0.44	87	68		84	65		91	70		87	64	
27	52	36	0.01	64	44	0.30	84	58		95	70		87	70		80	63		89	68	
28	68	42		55	47		82	62	0.03	94	69	0.13	86	67	0.37	82	63		84	64	0.03
29	56	30		66	57		84	50		90	62		84	67		84	62		72	54	
30	50	25		61	42		77	49		76	50		81	66		85	64		73	46	
31	61	35		84	57		84	57					87	63		87	65	0.03			

Avg/

Total 45.5 25.1 2.94 54.8 36.9 6.80 74.8 49.5 1.40 80.9 58.8 3.12 82.6 62.3 4.41 81.5 62.0 3.94 76.7 55.0 2.01

\* snow melt