RESULTS OF 1994 INSECTICIDE AND ACARICIDE TRIALS IN EASTERN NEW YORK

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TABLE OF CONTENTS

	Page Number
Apple, Evaluation of Insecticides Against Fruit & Foliar Pests	1 - 4
Apple, Control of Fruit-feeding Insects on Early-season Apple	5 - 6
Apple, Summary of Efficacy Against Fruit-feeding Insects	7 - 8
Apple, Mite Control with Insecticides	9 - 12
Apple, Mite and Insect Control with Ultra-fine OIL	13 - 15
Apple, Leafminer and Mite Control with Trans-lamellar and Systemic Materials	16 - 17
Apple, Evaluation of Miticides Against Mites and Leafhoppers	18 - 19
Pear, Insect and Mite Control	20 - 23
Sweet Corn, Insect Control with Granular Insecticides	24 - 25
Sweet Corn, Insect Control with Foliar Sprays of Insecticides	26 - 27
Sweet Corn, Insect Control with Foliar Sprays of Pyrethroid Insecticides	28 - 29
Onion, Control of Onion Thrips with Insecticides	30 - 31
APPENDIX I - Weather Data, HVL	32
APPENDIX II - Weather Data, Orange County	33
APPENDIX III - Insecticide Treatment Timing on Apple	34

APPLE: Malus domestica 'McIntosh'; 'Delicious'

Apple aphid: Aphis pomi De Geer
Apple blotch leafminer: Phyllonorycter crataegella (Clemmens)
European apple sawfly (EAS): Hoplocampa testudinea (Klug)
Green fruitworm (GFW): Lithophane antennata (Walker)
Obliquebanded leafroller (OBLR); Choristoneura rosaceana (Harris)
Plum curculio (PC): Conotrachelus nenuphar (Herbst)
Rosy apple aphid (RAA): Dysaphis plantaginea (Passerini)
Spirea aphid: Aphis citricola Van der Goot
Spotted tentiform leafminer: Phyllonorycter blancardella (Fabr.)
Tarnished plant bug (TPB): Lygus lineolaris (P. de B.)
White apple leafhopper (WALH): Typhlocyba pomaria McAtree

EVALUATION OF INSECTICIDES AGAINST FRUIT FEEDING AND FOLIAR FEEDING INSECT PESTS, 1994: Treatments were applied to eight-tree (of which 'McIntosh' and 'Delicious were included) plots replicated three times in a randomized complete block design. All treatments were applied dilute to runoff using a high-pressure handgun sprayer at 300 psi delivering from 1.7 to 2.7 gal spray/tree or 160 to 260 gal/acre depending upon foliage density. Trees on the EMII rootstock were 31 years-old, 10 ft high, and 12 ft wide. Treatments were applied on various schedules as per APPENDIX III. Damage to fruit by EAS, PC and TPB was assessed prior to 'June drop' (7 June) by randomly selecting 100 fruit and scoring for external damage by each pest; subsequently, fruits were dissected to detect internal damage. Infestations by early-season foliar pests were assessed by: numbers of aphids and predators per 50 infested terminals; number infested terminals counted during a 3 minute examination period (rosy aphids) ; and numbers per 100 leaves (hoppers and leafminers). Further evaluation of STLM and leafhoppers were made by counting numbers of mines and LH nymphs per 100 leaves.

The '94 early-season (prior to 'June drop') was characterized by below average rainfall and relatively moderate temperatures (see APPENDIX I). The incidence of TPB was generally low and all treatments provided satisfactory control of this pest (**Table 1a**) Likewise, all treatments provided good control of curculio, excepting Align(neem)+Guthion. The poor performance of Danspray @ 2.7 oz. is probably a function of experimental error...two reps of this treatment were located on the orchard border where PC pressure was highest. All treatments provided good control of sawfly and early Lepidoptera.

Unlike TPB, PC, EAS and early Leps that may have been adversely affected by the severe winter, aphid populations during '94 were unusually severe with nearly 100% of untreated terminals supporting colonies that produced damaging amounts of honeydew/sooty-mold. Excellent reductions of aphids (**Table 1b**) were provided by NTN33893, some combinations of Danspray and the Imidan/endosulfan schedule. Asana and NTN were particularly good against rosy apple aphid. Under unusually low WALH pressure, all treatments provided satisfactory control.

Further evaluations of foliar-feeding pests (**Table 1c**) showed good STLM efficacy by NTN, the Danspray treatments, RH 5992 and Align (neem). Excellent leafhopper control was provided by NTN, most of the Danspray treatments and Align.

Table 1a. Evaluation of insecticides for controling early season pest complex apple[1], N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-1994

Treatment	Formulation amt./100 gal.	Timing[3]	% fruit damaged by insect species[2] Tarnish Plant Bug	Plum Curculio	European Apple Sawfly	Early Lep. Sp.
1. Asana XL	2.0 oz.	1/2" G	0.8a	1.1a	0.2ab	0.1a
Guthion 3F	8.0 oz.	PF				
Imidan 70W	12.0 oz.	1C				
2. NTN 1.6	2.0 oz.	PF	1.6a	0.4a	0.0a	0.1a
Guthion 3F	8.0 oz.	PF-1C				
3. Asana XL	2.0 oz.	1/2" G	1.0a	0.2a	0.2ab	0.0a
Lorsban 50W	12.0 oz.	PF-1C				
4. Danspray 2.4 E	1.3 oz.	1/2" G	0.2a	1.2a	0.0a	0.0a
Guthion 3F	8.0 oz.	PF				
Imidan 70W	12.0 oz.	1C				
5. Danspray 2.4 E	2.7 oz.	1/2" G	0.1a	3.8a	0.2ab	0.1a
Guthion 3F	8.0 oz.	PF				
Imidan 70W	12.0 oz.	1C				
6. Danspray 2.4 E	4.0oz.	1/2" G	1.1a	0.2a	0.2ab	0.0a
Guthion 3F	8.0 oz.	PF				
Imidan 70W	12.0 oz.	1C				
7. Danspray 2.4 E	1.3 oz.	1/2" G	0.5a	0.9a	0.0a	0.1a
Danspray 25W	1.3 oz					
Guthion 3F	8.0 oz.	PF				
Imidan 70W	12.0 oz.	1C				
8. Danspray 2.4 E	2.7 oz.	1/2" G	0.1a	1.0a	0.2ab	0.1a
Danspray 25W	2.7 oz.	2C				
Guthion 3F	8.0 oz.	PF				
Imidan 70W	12.0 oz.	1C				
9. Danspray 2.4 E	4.0 oz.	1/2" G	0.2a	1.1a	0.2ab	0.0a
Danspray 25W	4.0 oz.					
Guthion 3F	8.0 oz.	PF				
Imidan 70W	12.0 oz.	1C				
10. Asana XL	2.0 oz.	1/2" G	0.1a	1.9a	0.0a	0.1a
Guthion 3F	8.0 oz.	PF				
Imidan 70W	12.0 oz.	1C				
11. Asana XL	2.0 oz.	1/2" G	0.2a	0.3a	0.0a	0.0a
Guthion 3F	8.0 oz.	PF				
Imidan 70W	12.0 oz.	1C				
12. Align	7.0 oz.	PF-1C	0.1a	2.8a	0.0a	0.1a
Guthion 3F	8.0 oz.	PF				
Imidan 70W	12.0 oz.	1C				
13. Imidan 70W	16.0 oz.	1/2" G	0.2a	0.2a	0.2ab	0.0a
Endosulfan 50W	16.0 oz.	1/2" G				
Imidan 70W	18.0 oz.	PF-1C				
14. Untreated	-		2.1a	15.9a	4.6 c	8.0 b

[1] Data from ' McIntosh' on 7 June prior to "June Drop".

[2] Mean separation by Fishers Protected LSD (P=<0.05). Arcsin transformation used for statistical analysis of data expressed as percentages. Treatment means followed by the same letter are not significantly different.

[3] McIntosh Phenology 1/2" G on 4/15; TC on 4/22; Bloom on 5/3; PF on 5/19; 1C on 6/3

* Treatments 1,3,10,11 recieved Sunspray 6E on 4/15.

Table 1b. Evaluation of insecticides for controling early season pest complex on apple[1], N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-1994

Treatment	Formulation amt./100 gal.	Timing	Per 50 infested terminals[2] 6/13 GAA/ SA	6/20 GAA/ SA	% Reduc.	Predatory larva Cec.	Syr.	# inf. term. /3 min RAA
1. Asana XL	2.0 oz.	1/2" G	49.3 c	18.4 bc	62.7%	0.4 a	0.0 a	0.4abc
Guthion 3F	8.0 oz.	PF						
Carbaryl	16.0 oz.	2C						
2. NTN 1.6	2.0 oz.	PF, 2C	48.4 bc	2.0 ab	95.9%	0.0 a	0.0 a	0.7a-d
Guthion 3F	8.0 oz.	PF-1C						
3. Asana XL	2.0 oz.	1/2" G	47.9 abc	31.7 c	33.8%	0.0 a	0.0 a	2.7 b-e
Lorsban 50W	12.0 oz.	PF-2C						
4. Danspray 2.4 E	1.3 oz.	1/2" G, 2C	49.1 c	5.7 ab	88.4%	1.3 a	0.4 a	2.2a-e
Guthion 3F	8.0 oz.	PF						
5. Danspray 2.4 E	2.7 oz.	1/2" G, 2C	45.7 ab	1.3 a	97.2%	2.0 a	0.0 a	0.9a-d
Guthion 3F	8.0 oz.	PF						
6. Danspray 2.4 E	4.0 oz.	1/2" G, 2C	49.1 c	4.7 ab	90.4%	2.4a	0.0 a	0.6a-d
Guthion 3F	8.0 oz.	PF						
7. Danspray 2.4 E	1.3 oz.	1/2" G	49.1 c	15.5 abc	68.4%	2.1 a	0.4 a	3.6 cde
Danspray 25W	1.3 oz.	2C						
Guthion 3F	8.0 oz.	PF						
8. Danspray 2.4 E	2.7 oz.	1/2" G	47.9 abc	13.1 abc	72.7%	0.9 a	0.0 a	1.5a-d
Danspray 25W	2.7 oz.	2C						
Guthion 3F	8.0 oz.	PF						
9. Danspray 2.4 E	4.0 oz.	1/2" G	45.7 abc	3.3 ab	92.8%	3.0 a	1.6 a	0.4abc
Danspray 25W	4.0 oz.	2C						
Guthion 3F	8.0 oz.	PF						
10. Asana XL	2.0 oz.	1/2" G	45.1 a	18.3 bc	59.4%	2.2 a	2.0 a	0.0a
Guthion 3F	8.0 oz.	PF						
RH 5992 2F	6.4 oz.	2C						
11. Asana XL	2.0 oz.	1/2" G	49.1 c	15.3 abc	68.8%	2.6 a	2.2 a	0.3ab
Guthion 3F	8.0 oz.	PF						
RH 5992 WP	2.3 oz.	2C						
12. Align	7.0 oz.	PF-1C	45.7 abc	6.4 ab	86.0%	3.3 a	1.4 a	4.0 de
Guthion 3F	8.0 oz.	PF						
13. Imidan 70W	16.0 oz.	1/2" G	45.7 abc	3.0 ab	93.4%	0.5 a	1.5 a	1.2a-d
Endosulfan 50W	16.0 oz.	1/2" G						
Imidan 70W	18.0 oz.	PF-1C						
14. Untreated	-		45.7 abc	29.6 c	35.2%	4.1 a	5.8 a	7.3 e

[1] Data from ' Red Delicious" on 6/13 for RAA, GAA Pre-counts, 6/20 GAA post counts.

[2] Mean separation by Fishers Protected LSD (P=<0.05). Arcsin transformation used for statistical analysis of data expressed as percentages. Treatment means followed by the same letter are not significantly different.
GAA = Green Apple Aphid *A .pomi* (>90%) SA= Spirea Aphid *A .spiraecola* (<10%) from samples on 6/20/94.

Table 1b. Evaluation of insecticides for controling early season pest complex on apple[1], N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-1994

Treatment	Formulation amt./100 gal.	Timing	Per 50 infested terminals[2] 6/13 GAA/ SA	6/20 GAA/ SA	% Reduc.	Predatory larva Cec.	Syr.	# inf. term. /3 min RAA
1. Asana XL	2.0 oz.	1/2" G	49.3 c	18.4 bc	62.7%	0.4 a	0.0 a	0.4abc
Guthion 3F	8.0 oz.	PF						
Carbaryl	16.0 oz.	2C						
2. NTN 1.6	2.0 oz.	PF, 2C	48.4 bc	2.0 ab	95.9%	0.0 a	0.0 a	0.7a-d
Guthion 3F	8.0 oz.	PF-1C						
3. Asana XL	2.0 oz.	1/2" G	47.9 abc	31.7 c	33.8%	0.0 a	0.0 a	2.7 b-e
Lorsban 50W	12.0 oz.	PF-2C						
4. Danspray 2.4 E	1.3 oz.	1/2" G, 2C	49.1 c	5.7 ab	88.4%	1.3 a	0.4 a	2.2a-e
Guthion 3F	8.0 oz.	PF						
5. Danspray 2.4 E	2.7 oz.	1/2" G, 2C	45.7 ab	1.3 a	97.2%	2.0 a	0.0 a	0.9a-d
Guthion 3F	8.0 oz.	PF						
6. Danspray 2.4 E	4.0 oz.	1/2" G, 2C	49.1 c	4.7 ab	90.4%	2.4a	0.0 a	0.6a-d
Guthion 3F	8.0 oz.	PF						
7. Danspray 2.4 E	1.3 oz.	1/2" G	49.1 c	15.5 abc	68.4%	2.1 a	0.4 a	3.6 cde
Danspray 25W	1.3 oz.	2C						
Guthion 3F	8.0 oz.	PF						
8. Danspray 2.4 E	2.7 oz.	1/2" G	47.9 abc	13.1 abc	72.7%	0.9 a	0.0 a	1.5a-d
Danspray 25W	2.7 oz.	2C						
Guthion 3F	8.0 oz.	PF						
9. Danspray 2.4 E	4.0 oz.	1/2" G	45.7 abc	3.3 ab	92.8%	3.0 a	1.6 a	0.4abc
Danspray 25W	4.0 oz.	2C						
Guthion 3F	8.0 oz.	PF						
10. Asana XL	2.0 oz.	1/2" G	45.1 a	18.3 bc	59.4%	2.2 a	2.0 a	0.0a
Guthion 3F	8.0 oz.	PF						
RH 5992 2F	6.4 oz.	2C						
11. Asana XL	2.0 oz.	1/2" G	49.1 c	15.3 abc	68.8%	2.6 a	2.2 a	0.3ab
Guthion 3F	8.0 oz.	PF						
RH 5992 WP	2.3 oz.	2C						
12. Align	7.0 oz.	PF-1C	45.7 abc	6.4 ab	86.0%	3.3 a	1.4 a	4.0 de
Guthion 3F	8.0 oz.	PF						
13. Imidan 70W	16.0 oz.	1/2" G	45.7 abc	3.0 ab	93.4%	0.5 a	1.5 a	1.2a-d
Endosulfan 50W	16.0 oz.	1/2" G						
Imidan 70W	18.0 oz.	PF-1C						
14. Untreated	-		45.7 abc	29.6 c	35.2%	4.1 a	5.8 a	7.3 e

[1] Data from ' Red Delicious" on 6/13 for RAA, GAA Pre-counts, 6/20 GAA post counts.

[2] Mean separation by Fishers Protected LSD (P=<0.05). Arcsin transformation used for statistical analysis of data expressed as percentages. Treatment means followed by the same letter are not significantly different.
GAA = Green Apple Aphid *A .pomi* (>90%) SA= Spirea Aphid *A .spiraecola* (<10%) from samples on 6/20/94.

Table 1c. Evaluation of insecticides on foliar feeding insects on apple[1,2], N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-1994

Treatment	Formulation amt./100 gal.	# STLM/ 100 lvs 6/20	# STLM/ 100 lvs 8/30	# WALH nym. /100 lvs 6/20	# LH nym. /100 lvs 7/12	# LH nym. /100 lvs 7/15
1. Asana XL	2.0 oz.	0.7a	35.2 f	2.6 b	3.7a-e	7.0
Guthion 3F	8.0 oz.					
Carbaryl	16.0 oz.					
Penncap-M	16.0 oz					
Imidan 70W	16.0 oz.					
2. NTN 1.6	2.0 oz.	0.5a	0.0a	0.5ab	0.0a	0.0
Guthion 3F	8.0 oz.					
3. Asana XL	2.0 oz.	0.9a	20.3 ef	0.2a	3.9 b-e	-
Lorsban 50W	12.0 oz.					
Imidan 70W	16.0 oz.					
4. Danspray 2.4 E	1.3 oz.	0.2a	2.7abc	0.1a	6.6 c-e	-
Guthion 3F	8.0 oz.					
5. Danspray 2.4 E	2.7 oz.	0.2a	4.1 bcd	1.6ab	0.8 de	-
Guthion 3F	8.0 oz.					
6. Danspray 2.4 E	4.0 oz.	1.4a	1.5ab	0.2a	0.8abc	-
Guthion 3F	8.0 oz.					
7. Danspray 2.4 E	1.3 oz.	2.3a	7.9 cde	0.1a	2.0a-d	-
Danspray 25W	1.3 oz.					
Guthion 3F	8.0 oz.					
8. Danspray 2.4 E	2.7 oz.	2.3a	4.6 bcd	0.2a	0.6abc	-
Danspray 25W	2.7 oz.					
Guthion 3F	8.0 oz.					
9. Danspray 2.4 E	4.0 oz.	0.9a	0.6ab	0.2a	0.0a	-
Danspray 25W	4.0 oz.					
Guthion 3F	8.0 oz.					
10. Asana XL	2.0 oz.	0.7a	2.4abc	2.6 b	10.9 de	9.0
Guthion 3F	8.0 oz.					
RH 5992 2F	6.4 oz.					
11. Asana XL	2.0 oz.	0.9a	1.3ab	0.2a	9.6 de	14.0
Guthion 3F	8.0 oz.					
RH 5992 WP	2.3 oz.					
12. Align	7.0 oz.	0.0a	1.8abc	1.4ab	1.9a-d	0.0
Guthion 3F	8.0 oz.					
13. Imidan 70W	16.0 oz.	0.5a	24.1 ef	0.0a	1.7a-d	0.0
Endosulfan 50W	16.0 oz.					
Imidan 70W	18.0 oz.					
Imidan 70W	12.0 oz.					
Dipel	2.0 oz.					
14. Untreated	-	1.4a	12.8 def	5.7 c	22.4 e	21.0

1 Data from ' Red Delicious'.

2 Mean separation by Fishers Protected LSD (P=<0.05). Log_{10} (X + 1) used prior to transformation for statistical analysis of data. Treatment means followed by the same letter are not significantly different. Untransformed data are presented.
STLM = spotted tentiform leafminer, WALH = white apple leafhopper, LH = leafhopper complex consisting of white apple leafhopper, rose leafhopper, and potatoe leafhopper.

APPLE: Malus domestica 'Jersey Mac'

Apple maggot (AM): Rhagoletis pomenella (Walsh)
Codling moth (CM): Laspeyresia pomonella (L.)
European apple sawfly (EAS): Hoplocampa testudinea (Klug)
Green fruitworm (GFW): Lithophane antennata (Walker)
Lesser appleworm (LAW): Grapholita prunivora (Walsh)
Obliquebanded leafroller (OBLR); Choristoneura rosaceana (Harris)
Oriental fruit moth (OFM): Grapholita molesta (Busck)
Plum curculio (PC): Conotrachelus nenuphar (Herbst)
San Jose scale (SJS): Quadraspidiotus perniciosus (Comstock)
Sparganothis fruitworm (SFW): Sparganothis sulfureana (Clemens)
Variegated leafroller (VLR): Platynota flavedana Clemens
Tarnished plant bug (TPB): Lygus lineolaris (P. de B.)

EVALUATION OF INSECTICIDES AGAINST FRUIT FEEDING INSECT PESTS ON EARLY-MATURING APPLE, 1994: Treatments were applied to eight-tree (of which 'Jersey Mac' was included) plots replicated three times in a randomized complete block design. All treatments were applied dilute to runoff using a high-pressure handgun sprayer at 300 psi delivering from 1.7 to 2.7 gal spray/tree or 160 to 260 gal/acre depending upon foliage density. Trees on the EMII rootstock were 31 years-old, 10 ft high, and 12 ft wide. Treatments were applied on various schedules as per APPENDIX III. Damage to fruit was assessed by randomly selecting 100 fruit at harvest maturity (July 26) and scoring for external damage by each pest; subsequently, fruits were dissected to detect internal damage. Damage by early-Lepidoptera includes OFM, OBLR and GFW. Damage from late-Lepidoptera includes OBLR, VLR and perhaps SFW and LAW. Data were converted to % damaged fruit (**Table 2**).

The '94 season was marked by a relatively dry April followed by excellent rainfall periods and relatively mild temperatures during July and August (see APPENDIX I)

All treatments utilized either Guthion 3F or Imidan 70W at first and second cover for the early-season pests TPB, PC and EAS. Those schedules that called for an application at 1/2"G may have influenced the efficacy against one or more of these pests. Poor performance against PC may be due to a 'border effect', i.e., the proximity of certain blocks to the orchard perimeter. All treatments provided varying but good control of high early-Lep and CM populations. Under extremely high late-Lep pressure, most treatments provided adequate control. Only Danspray 25W at the high rate and the standard schedule (Tmt #1) provided greater than 90% undamaged fruit. Poor overall performance by some treatments could be due to the variability of Guthion or Imidan efficacy against TPB and PC.

Table 2. Evaluation of insecticides in a seasonal program on 'Jersey Mc' apple[1,2], N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-1994

Treatment	Formulation amt./100 gal.	% fruit damaged by insect species[2] TPB	PC	EAS	E. LEP	CM	SJS	L. LEP	AMp	AMt	%CLEAN
1. Asana XL	2.0 oz.	2.6a	3.6ab	1.0a	0.7a	0.0a	0.1a	0.9ab	0.7a-c	0.0a	90.4 c
Guthion 3F	8.0 oz.										
Carbaryl	16.0 oz.										
Penncap-M	16.0 oz										
Imidan 70W	16.0 oz.										
2. NTN 1.6	2.0 oz.	2.4a	6.6a-c	0.5a	0.5a	0.1ab	0.0a	3.6ab	0.7a-c	0.2a	85.0 bc
Guthion 3F	8.0 oz.										
3. Asana XL	2.0 oz.	3.3a	6.1a-c	0.3a	0.8a	0.2ab	0.0a	0.7a	0.5a-c	0.1a	87.0 c
Lorsban 50W	12.0 oz.										
Imidan 70W	16.0 oz.										
4. Danspray 2.4 E	1.3 oz.	5.2a	7.0a-c	1.3a	0.5a	0.2ab	0.1a	3.4ab	0.7a-c	0.3a	79.8 bc
Guthion 3F	8.0 oz.										
5. Danspray 2.4 E	2.7 oz.	8.8a	15.7 cd	1.3a	0.7a	0.9ab	1.9a	6.4 b	1.1 bc	0.7a	71.4 b
Guthion 3F	8.0 oz.										
6. Danspray 2.4 E	4.0 oz.	2.9a	8.3a-c	1.0a	0.1a	0.5ab	0.5a	2.4ab	0.1ab	0.1a	84.0 bc
Guthion 3F	8.0 oz.										
7. Danspray 2.4 E	1.3 oz.	2.9a	12.8 bc	1.1a	1.5a	0.1ab	0.2a	5.1ab	0.7a-c	0.3a	78.1 bc
Danspray 25W	1.3 oz.										
Guthion 3F	8.0 oz.										
8. Danspray 2.4 E	2.7 oz.	3.7a	3.5ab	0.8a	1.5a	<0.1ab	0.0a	1.0ab	1.5 b-d	0.7a	86.4 bc
Danspray 25W	2.7 oz.										
Guthion 3F	8.0 oz.										
9. Danspray 2.4 E	4.0 oz.	2.0a	1.0a	0.0a	2.0a	<0.1ab	0.0a	0.7a	<0.1ab	0.0a	91.0 c
Danspray 25W	4.0 oz.										
Guthion 3F	8.0 oz.										
10. Asana XL	2.0 oz.	2.6a	8.2a-c	1.6a	1.8a	<0.1ab	0.1a	2.0ab	0.7a-c	0.0a	82.6 bc
Guthion 3F	8.0 oz.										
RH 5992 2F	6.4 oz.										
11. Asana XL	2.0 oz.	4.3a	7.3a-c	0.0a	0.5a	1.3 b	0.1a	1.8ab	2.3 cd	0.0a	83.1 bc
Guthion 3F	8.0 oz.										
RH 5992 WP	2.3 oz.										
12. Align	7.0 oz.	8.0a	6.0a-c	1.0a	1.0a	1.5 b	0.3a	3.4ab	0.0a	0.7a	80.2 bc
Guthion 3F	8.0 oz.										
13. Imidan 70W	16.0 oz.	7.6a	8.6a-c	0.7a	0.2a	0.7ab	0.0a	0.2a	<0.1ab	0.1a	83.5 bc
Endosulfan 50W	16.0 oz.										
Imidan 70W	18.0 oz.										
Imidan 70W	12.0 oz.										
Dipel	2.0 oz.										
14. Untreated	-	4.4a	30.0 d	0.1a	13.3 b	25.6 c	0.9a	52.8 c	4.6 d	5.2 b	10.5a

1 Data from ' Jersey Mc' harvested 7/26.

2 Mean separation by Fishers Protected LSD (P=<0.05). Arcsin transformation used prior to transformation for statistical analysis of data. Treatment means followed by the same letter are not significantly different.
TPB= tarnished plant bug, PC= plum curculio, EAS= european apple sawfly, E. LEP= early lepidoptera, CM= codling moth, SJS= san jose scale, L. LEP= late lepidoptera, AMp= apple maggot puncture, AMt= apple maggot tunnel.

APPLE: Malus domestica 'McIntosh'

European apple sawfly (EAS): Hoplocampa testudinea (Klug)
Green fruitworm (GFW): Lithophane antennata (Walker)
Lesser appleworm (LAW): Grapholita prunivora (Walsh)
Obliquebanded leafroller (OBLR); Choristoneura rosaceana (Harris)
Oriental fruit moth (OFM): Grapholita molesta (Busck)
Plum curculio (PC): Conotrachelus nenuphar (Herbst)
San Jose scale (SJS): Quadraspidiotus perniciosus (Comstock)
Sparganothis fruitworm (SFW): Sparganothis sulfureana (Clemens)
Variegated leafroller (VLR): Platynota flavedana Clemens
Tarnished plant bug (TPB): Lygus lineolaris (P. de B.)

EVALUATION OF INSECTICIDES AGAINST FRUIT FEEDING INSECT PESTS ON MID-SEASON APPLE, 1994: Treatments were applied to eight-tree (of which 'McIntosh' was included) plots replicated three times in a randomized complete block design. All treatments were applied dilute to runoff using a high-pressure handgun sprayer at 300 psi delivering from 1.7 to 2.7 gal spray/tree or 160 to 260 gal/acre depending upon foliage density. Trees on the EMII rootstock were 31 years-old, 10 ft high, and 12 ft wide. Treatments were applied on various schedules as per APPENDIX III. Damage to fruit was assessed by randomly selecting 100 fruit at harvest maturity (Sept 12) and scoring for external damage by each pest; subsequently, fruits were dissected to detect internal damage. Damage by early-Lepidoptera includes OFM, OBLR and GFW. Damage from late-Lepidoptera includes OBLR, VLR and perhaps SFW and LAW. Data were converted to % damaged fruit (**Table 3**).

The '94 season was marked by a relatively dry April followed by excellent rainfall periods and relatively mild temperatures during July and August (see APPENDIX I)

All treatments utilized either Guthion 3F or Imidan 70W at first and second cover for the early-season pests TPB, PC and EAS. Those schedules that called for an application at 1/2"G may have influenced the efficacy against one or more of these pests. Varying performance against PC may be due a 'border effect', i.e., the proximity of certain blocks to the orchard perimeter. All treatments provided remarkably good control of SJS, late-Leps and AM. The per cent clean fruit provided by all schedules was not significantly different. Poor overall performance by some treatments is likely due to the variability of Guthion or Imidan efficacy against TPB and PC.

Table 3. Evaluation of insecticides in a seasonal program on 'McIntosh' apple[1,2], N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-1994

Treatment	Formulation amt./100 gal.	% fruit damaged by insect species[2] TPB	PC	EAS	E. LEP	CM	SJS	L. LEP	AMp	AMt	%CLEAN
1. Asana XL	2.0 oz.	0.8a	2.6a	0.1a	0.1a	0.0a	0.1a	0.0a	0.0a	0.0a	95.1 b
Guthion 3F	8.0 oz.										
Carbaryl	16.0 oz.										
Penncap-M	16.0 oz										
Imidan 70W	16.0 oz.										
2. NTN 1.6	2.0 oz.	4.1a	1.3a	0.1a	0.0a	0.0a	0.1a	0.0a	0.0a	0.0a	93.2 b
Guthion 3F	8.0 oz.										
3. Asana XL	2.0 oz.	3.5a	0.1a	0.5a	0.0a	0.0a	0.1a	0.1a	0.0a	0.0a	94.6 b
Lorsban 50W	12.0 oz.										
Imidan 70W	16.0 oz.										
4. Danspray 2.4 E	1.3 oz.	0.8a	0.8a	0.3a	0.3a	0.0a	1.0a	0.3a	0.0a	0.0a	93.5 b
Guthion 3F	8.0 oz.										
5. Danspray 2.4 E	2.7 oz.	3.9a	5.0a	0.1a	0.1a	0.0a	1.8a	0.1a	0.0a	0.0a	84.0 b
Guthion 3F	8.0 oz.										
6. Danspray 2.4 E	4.0 oz.	0.7a	0.1a	0.0a	0.0a	0.0a	0.1a	0.2a	0.7a	0.0a	97.4 b
Guthion 3F	8.0 oz.										
7. Danspray 2.4 E	1.3 oz.	3.8a	2.0a	0.1a	0.0a	0.0a	0.1a	1.0a	1.3a	0.0a	91.7 b
Danspray 25W	1.3 oz.										
Guthion 3F	8.0 oz.										
8. Danspray 2.4 E	2.7 oz.	2.2a	0.2a	0.0a	0.0a	0.0a	1.5a	0.0a	0.0a	0.0a	94.7 b
Danspray 25W	2.7 oz.										
Guthion 3F	8.0 oz.										
9. Danspray 2.4 E	4.0 oz.	2.8a	7.3a	0.0a	0.0a	0.0a	0.0a	0.1a	0.5a	0.0a	88.3 b
Danspray 25W	4.0 oz.										
Guthion 3F	8.0 oz.										
10. Asana XL	2.0 oz.	2.5a	2.5a	0.0a	0.1a	0.0a	0.1a	0.3a	0.6a	0.0a	89.9 b
Guthion 3F	8.0 oz.										
RH 5992 2F	6.4 oz.										
11. Asana XL	2.0 oz.	1.9a	3.4a	0.0a	0.0a	0.0a	0.3a	0.3a	3.0a	0.0a	93.7 b
Guthion 3F	8.0 oz.										
RH 5992 WP	2.3 oz.										
12. Align	7.0 oz.	5.9a	0.3a	0.0a	0.1a	0.0a	0.2a	0.1a	0.0a	0.0a	91.9 b
Guthion 3F	8.0 oz.										
13. Imidan 70W	16.0 oz.	6.9a	0.0a	0.0a	0.0a	0.0a	0.0a	0.1a	0.0a	0.0a	93.2 b
Endosulfan 50W	16.0 oz.										
Imidan 70W	18.0 oz.										
Imidan 70W	12.0 oz.										
Dipel	2.0 oz.										
14. Untreated	-	2.9a	30.2a	0.2a	3.0 b	5.1a	14.1a	15.7 b	19.8a	12.0a	39.9a

1 Data from ' McIntosh' harvested 9/12.

2 Mean separation by Fishers Protected LSD (P=<0.05). Arcsin transformation used prior to transformation for statistical analysis of data. Treatment means followed by the same letter are not significantly different.
TPB= tarnished plant bug, PC= plum curculio, EAS= european apple sawfly, E. LEP= early lepidoptera, CM= codling moth, SJS= san jose scale, L. LEP= late lepidoptera, AMp= apple maggot puncture, AMt= apple maggot tunnel.

APPLE: Malus domestica 'Delicious'

Apple rust mite(ARM): Aculus schlechtendali (Nalepa)
A predatory phytoseid(AMB): Amblyseius fallacis (Garman)
European red mite(ERM): Panonychus ulmi (Koch)
Twospotted spider mite (TSM): Tetranychus urticae Koch

MITE CONTROL WITH INSECTICIDES, 1994: Treatments were applied to eight-tree (one of which was 'Delicious') plots replicated three times in a randomized complete block design. No dormant oil or miticide was applied. All treatments were applied dilute to runoff using a high-pressure handgun sprayer at 300 psi delivering from 1.7 to 2.7 gal spray/tree or 160 to 260 gal/acre depending upon foliage density. Trees on the EMII rootstock were 31 years-old, 10 ft high, and 12 ft wide. Treatments were applied on various schedules as per APPENDIX III.

The '94 season was marked by a relatively dry April followed by excellent rainfall periods and relatively mild temperatures during July and August (see APPENDIX I). ARM developed early and high populations were present at the first evaluation (6 Jun) (**Table 4**). ERM and TSM populations however, were slow to develop, probably due to poor survival of overwintering eggs. ERM populations had developed in some treatments on 22 July. By 23 Aug, ERM and TSM populations were quite high. Noteworthy suppression of ERM was provided by schedules that included NTN, RH 5992, Align and the standard (Tmt # 13).

Table 4. Evaluation of insecticides for controling mite populations on apple[1,2], N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-1994

Treatment	Formulation amt./100 gal.	6/6 Mean # of mites or eggs / leaf** ERM	ERME	TSM	AMB	ARM	6/22 Mean # of mites or eggs / leaf** ERM	ERME	TSM	AMB	ARM
1. Asana XL	2.0 oz.	0.0a	<0.1ab	0.0a	0.0a	0.2ab	<0.1ab	<0.1ab	0.0a	0.0a	1.0ab
Guthion 3F	8.0 oz.										
Carbaryl	16.0 oz.										
Penncap-M	16.0 oz										
Imidan 70W	16.0 oz.										
2. NTN 1.6	2.0 oz.	0.2a	0.1abc	<0.1a	0.0a	0.7abcd	1.0 ef	0.5 bcd	0.3a	0.0a	9.2 d
Guthion 3F	8.0 oz.										
3. Asana XL	2.0 oz.	<0.1a	0.2abc	0.0a	0.0a	0.0a	0.6 b-e	0.7 cd	<0.1a	0.0a	0.8ab
Lorsban 50W	12.0 oz.										
Imidan 70W	16.0 oz.										
4. Danspray 2.4 E	1.3 oz.	1.5 b	0.5 d	0.1a	0.0a	2.6 cd	1.9 f	0.8 d	0.1a	0.0a	4.1 bcd
Guthion 3F	8.0 oz.										
5. Danspray 2.4 E	2.7 oz.	0.5a	0.3 cd	<0.1a	0.0a	1.0abcd	0.6 cde	<0.1a	<0.1a	0.0a	0.6a
Guthion 3F	8.0 oz.										
6. Danspray 2.4 E	4.0 oz.	0.3a	<0.1ab	<0.1a	0.0a	0.7abcd	<0.1abc	<0.1a	0.0a	0.0a	1.7ab
Guthion 3F	8.0 oz.										
7. Danspray 2.4 E	1.3 oz.	0.3a	0.1abc	0.0a	0.0a	0.8abcd	0.3a-e	0.1ab	<0.1a	0.0a	6.8 cd
Danspray 25W	1.3 oz.										
Guthion 3F	8.0 oz.										
8. Danspray 2.4 E	2.7 oz.	0.0a	0.0a	0.0a	0.0a	1.3abcd	<0.1abc	0.2abc	<0.1a	0.0a	1.5ab
Danspray 25W	2.7 oz.										
Guthion 3F	8.0 oz.										
9. Danspray 2.4 E	4.0 oz.	<0.1a	0.1abc	<0.1	0.0a	0.9abcd	0.0a	0.0a	0.0a	0.0a	1.4ab
Danspray 25W	4.0 oz.										
Guthion 3F	8.0 oz.										
10. Asana XL	2.0 oz.	<0.1a	0.1abc	0.0a	0.0a	0.4abc	<0.1abc	<0.1ab	0.0a	0.0a	2.3abc
Guthion 3F	8.0 oz.										
RH 5992 2F	6.4 oz.										
11. Asana XL	2.0 oz.	<0.1a	<0.1ab	0.0a	0.0a	1.0abcd	0.2a-d	0.2abc	<0.1a	<0.1a	0.7a
Guthion 3F	8.0 oz.										
RH 5992 WP	2.3 oz.										
12. Align	7.0 oz.	<0.1a	<0.1a	<0.1a	0.0a	0.2ab	<0.1abc	<0.1ab	0.0a	0.0a	3.4 bcd
Guthion 3F	8.0 oz.										
13. Imidan 70W	16.0 oz.	0.0a	<0.1a	0.0a	0.0a	2.1 bcd	<0.1abc	<0.1ab	0.0a	0.0a	1.2ab
Endosulfan 50W	16.0 oz.										
Imidan 70W	18.0 oz.										
Imidan 70W	12.0 oz.										
Dipel	2.0 oz.										
14. Untreated	-	0.5a	0.2 bc	<0.1a	0.0a	21.3 e	0.8 de	0.8 d	0.1a	<0.1a	40.2 e

1 Data from ' Red Delicious'..

2 Mean separation by Fishers Protected LSD (P=<0.05). Log_{10} (X + 1) used prior to transformation for statistical analysis of data. Treatment means followed by the same letter are not significantly different.

* *ERM = European Red Mite, ERME = ERM Egg, TSM = Two Spotted Mite, AMB = Amblyseius fallacis, ARM = Apple Rust Mite.

Table 4. Evaluation of insecticides for controling mite populations on apple[1,2], N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-1994

Treatment	Formulation amt./100 gal.	7/6 Mean # of mites or eggs / leaf** ERM	ERME	TSM	AMB	ARM	7/22 Mean # of mites or eggs / leaf** ERM	ERME	TSM	AMB	ARM
1. Asana XL	2.0 oz.	0.4a-d	0.6a	0.0a	0.0a	1.4a	1.3abc	4.7abc	0.3a	<0.1a	4.1abc
Guthion 3F	8.0 oz.										
Carbaryl	16.0 oz.										
Penncap-M	16.0 oz										
Imidan 70W	16.0 oz.										
2. NTN 1.6	2.0 oz.	5.8 f	4.8 bcd	1.1a	<0.1a	35.6 de	9.7 def	21.5 cd	0.1a	0.0a	62.8 gh
Guthion 3F	8.0 oz.										
3. Asana XL	2.0 oz.	1.6 cde	2.2abc	0.2a	0.0a	0.8a	9.9 def	46.7 de	1.9a	0.0a	5.4 cd
Lorsban 50W	12.0 oz.										
Imidan 70W	16.0 oz.										
4. Danspray 2.4 E	1.3 oz.	3.2 ef	12.5 d	0.3a	0.0a	6.1a-d	20.7 f	106.2 e	<0.1a	0.0a	26.1 fg
Guthion 3F	8.0 oz.										
5. Danspray 2.4 E	2.7 oz.	0.8a-d	6.2 bcd	0.2a	0.0a	6.3a-d	10.4 ef	50.6 de	0.2a	0.0a	8.3 cde
Guthion 3F	8.0 oz.										
6. Danspray 2.4 E	4.0 oz.	0.1ab	1.6abc	0.0a	0.0a	0.8a	2.1abc	12.0 bcd	<0.1a	0.0a	9.4 c-f
Guthion 3F	8.0 oz.										
7. Danspray 2.4 E	1.3 oz.	1.3 b-e	6.4 cd	0.1a	0.0a	16.0 cde	4.9 cde	18.1 cd	0.1a	0.0a	22.9 efg
Danspray 25W	1.3 oz.										
Guthion 3F	8.0 oz.										
8. Danspray 2.4 E	2.7 oz	0.5a-d	2.1abc	<0.1a	0.0a	7.5a-d	1.9abc	7.5abc	0.2a	0.0a	13.4 c-f
Danspray 25W	2.7 oz.										
Guthion 3F	8.0 oz.										
9. Danspray 2.4 E	4.0 oz.	0.4abc	1.6abc	<0.1a	<0.1a	7.6a-d	3.7 b-e	12.9 bcd	0.1a	<0.1a	4.5abc
Danspray 25W	4.0 oz.										
Guthion 3F	8.0 oz.										
10. Asana XL	2.0 oz.	0.5a-d	0.6a	<0.1a	0.0a	1.5a	0.8ab	2.0ab	<0.1a	0.0a	5.2 bcd
Guthion 3F	8.0 oz.										
RH 5992 2F	6.4 oz.										
11. Asana XL	2.0 oz.	0.2ab	0.2a	<0.1a	0.0a	2.8abc	0.4a	1.3a	0.0a	0.0a	1.1a
Guthion 3F	8.0 oz.										
RH 5992 WP	2.3 oz.										
12. Align	7.0 oz.	0.6a-d	0.7a	<0.1a	0.0a	2.2abc	0.2a	0.9a	0.0a	0.0a	1.3ab
Guthion 3F	8.0 oz.										
13. Imidan 70W	16.0 oz.	0.2ab	0.4a	<0.1a	<0.1a	2.1ab	0.3a	0.9a	<0.1a	0.0a	16.6 def
Endosulfan 50W	16.0 oz.										
Imidan 70W	18.0 oz.										
Imidan 70W	12.0 oz.										
Dipel	2.0 oz.										
14. Untreated	-	1.9 de	4.9 bcd	0.2a	<0.1a	57.8 e	2.5a-d	6.9abc	<0.1a	0.0a	97.9 h

1 Data from ' Red Delicious'..

2 Mean separation by Fishers Protected LSD (P=<0.05). Log_{10} (X + 1) used prior to transformation for statistical analysis of data. Treatment means followed by the same letter are not significantly different.

* *ERM = European Red Mite, ERME = ERM Egg, TSM = Two Spotted Mite, AMB = Amblyseius fallacis, ARM = Apple Rust Mite.

APPLE: Malus domestica 'Rome Beauty'; 'McIntosh'; 'Delicious'; 'Empire'; 'Cortland'; 'Golden Delicious'; 'Jersey Mac'

Apple rust mite(ARM): Aculus schlechtendali (Nalepa)
A predatory phytoseid(AMB): Amblyseius fallacis (Garman)
European red mite(ERM): Panonychus ulmi (Koch)
Twospotted spider mite (TSM): Tetranychus urticae Koch

MITE AND INSECT CONTROL WITH SUMMER SCHEDULES OF ULTRA-FINE OIL, 1994: Treatments were applied to eight-tree (one of which was 'Delicious') plots replicated three times in a randomized complete block design. No dormant oil or miticide was applied. All treatments were applied dilute to runoff using an air-blast sprayer delivering 260 gal/acre, at a speed of 2.5 MPH. Trees on the EMII rootstock were 31 years-old, 10 ft high, and 12 ft wide. Treatments consisted of Ultra-fine oil at 1% and 2% concentration applied to seven cultivars on three schedules (see **Table 5a**).

Phytophagous and predacious mite populations were evaluated by sampling 25 leaves from one 'Delicious' tree per plot. Leaves were removed to the laboratory where they were brushed with a mite brushing machine, and the mites and eggs examined using a binocular scope. Infestations of 'Delicious' by foliar pests were assessed by average number of aphid infested terminals per 25 terminals (also average number of predators/infested terminal), and number infested terminals counted during a 3 minute examination period (rosy aphids). Evaluation of STLM and WALH infestations were made by counting numbers of mines and the number of stippled leaves per 100 leaf sample. Phytotoxicitiy to the foliage of seven cultivars was evaluated by utilizing a numerical rating; where 0, 1, 2 and 3 represented no damage, slight damage, moderate damage and severe damage, respectively.

ERM and TSM numbers were unusually low in the test block, never reaching >2.5 mites/leaf combined-species in the untreated. Unfortunately no conclusions could be make concerning the timing of oil applications, except to conclude that all schedules provided protection against these two mite species, and that the maximum schedules (1% and 2% @ PF through 6C) were not necessary for mite suppression. ARM populations however, reached high numbers from 27 Jun till the end of season. If ARM populations can be used to evaluate efficacy, all schedules provided control.

Oil applications had no effect against GAA/SA,Cecidomyiid/Syrphid larvae, RAA or LH, but all schedules apparently reduced 1st brood STLM infestations to some degree (**Table 5b**). A major objective of this trial was to evaluate the propensity of summer oil applications to cause phytotoxiocity to apple foliage under Hudson Valley conditions. Not unexpectedly, 2% oil applied during the warmest, most humid periods (PF-6C and 2C-5C) caused the greatest phytotoxicity. Phytotoxicity by 2% @ 1C-3C was minimal. All 1% applications caused essentially no phytotoxicity and were not significantly different than Imidan 70W (PF-6C). Among apple varieties, differences were evident. 'Rome Beauty' and 'McIntosh' were tolerant of oil applications. 'Red Delicious' and 'Empire' were moderately susceptible, with the foliar damage not of economic consequence. 'Cortland', 'Golden Delicious' and 'Jersey Mac' however, were susceptible. The degrees of foliar damage, although perhaps not damaging to yield or fruit quality during the current season, would probably be unacceptable to commercial producers. There was no noticeable phytotoxicity to fruit. It is noted that phytotoxicity from the 1% schedules was much less than for the 2% schedules, suggesting that 1% concentrations could be used during summer to provide suppression of phytophagous mites and possibly STLM, without fear of significant phytotoxicity.

Table 5a. Evaluation of Sunspray Ultrafine Oil for controling seasonal mite populations on apple[1,2], N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-1994

Treatment	Formulation amt./100 gal.	6/14 Mean # of mites or eggs / leaf** ERM	ERME	TSM	AMB	ARM	6/27 Mean # of mites or eggs / leaf** ERM	ERME	TSM	AMB	ARM	7/14 Mean # of mites or eggs / leaf** ERM	ERME	TSM	AMB	ARM
1. Sunspray UF	1.0 gal.	0.2a	0.3a	0.0a	0.0a	0.8abc	0.1a	0.2a	0.1a	0.0a	1.4ab	0.8 bcd	0.6 abc	<0.1a	<0.1a	1.8ab
2. Sunspray UF	1.0 gal.	<0.1a	<0.1a	0.0a	0.0a	0.0a	<0.1a	0.1a	0.1a	0.0a	0.4a	0.2ab	0.2ab	0.2a	0.0a	1.5ab
3. Sunspray UF	1.0 gal.	<0.1a	<0.1a	<0.1a	0.0a	0.2ab	<0.1a	<0.1a	<0.1a	0.0a	0.6a	0.4abc	0.2ab	0.0a	<0.1a	1.2ab
4. Sunspray UF	2.0 gal.	0.0a	<0.1a	0.0a	0.0a	0.2ab	<0.1a	<0.1a	0.0a	0.0a	0.9a	<0.1a	<0.1a	0.0a	0.0a	2.2ab
5. Sunspray UF	2.0 gal.	0.0a	0.0a	0.0a	0.0a	0.2ab	<0.1a	0.0a	0.0a	0.0a	0.2a	<0.1a	<0.1a	0.0a	0.0a	0.9a
6. Sunspray UF	2.0 gal.	<0.1a	<0.1a	0.0a	0.0a	0.7abc	<0.1a	<0.1a	<0.1a	0.0a	0.2a	<0.1a	0.1ab	<0.1a	0.0a	1.6ab
7. Untreated	-	0.1a	0.3a	0.0a	0.0a	2.2 cd	0.6a	0.4a	0.2a	0.0a	13.1 c	1.9 d	1.3 cd	<0.1a	<0.1a	10.9 c

Treatment	Formulation amt./100 gal.	8/2 Mean # of mites or eggs / leaf** ERM	ERME	TSM	AMB	ARM	8/15 Mean # of mites or eggs / leaf** ERM	ERME	TSM	AMB	ARM
1. Sunspray UF	1.0 gal.	0.5 b	1.0 bcd	0.0a	0.1a	6.3a	1.3a	2.3a	1.0a	0.1a	2.7a
2. Sunspray UF	1.0 gal.	0.1ab	0.1ab	<0.1a	<0.1a	2.4a	0.9a	2.5a	0.1a	0.2a	2.6a
3. Sunspray UF	1.0 gal.	<0.1a	0.5abc	<0.1a	<0.1a	6.7a	0.8a	1.4a	0.4a	0.1a	1.4a
4. Sunspray UF	2.0 gal.	0.0a	<0.1a	0.0a	<0.1a	0.7abc	0.5a	0.9a	0.4a	0.5a	8.7a
5. Sunspray UF	2.0 gal.	<0.1a	<0.1a	<0.1a	<0.1a	0.9a	0.2a	0.4a	0.3a	<0.1a	1.7a
6. Sunspray UF	2.0 gal.	0.1ab	0.2ab	<0.1a	<0.1a	3.0a	0.4a	1.1a	0.2a	0.1a	1.4a
7. Untreated	-	1.9 c	2.0 d	0.2a	<0.1a	13.9a	1.3a	1.2a	0.6a	0.5a	1.9a

[1] Data from ' Red Delicious'..

[2] Mean separation by Fishers Protected LSD (P=<0.05). Log_{10} (X + 1) used prior to transformation for statistical analysis of data. Treatment means followed by the same letter are not significantly different.

* *ERM = European Red Mite, ERME = ERM Egg, TSM = Two Spotted Mite, AMB = Amblyseius fallacis, ARM = Apple Rust Mite.

Sunspray ultrafine oil treatment timing on apple[1].

Treatment	Formulation amt./100 gal.1/2"	P	5/20 P F	6/3 1 C	6/16 2 C	6/30 3 C	7/13 4 C	7/25 5 C	8/10 6 C
1. Sunspray UF	1.0 gal.		X	X	X	X	X	X	X
2. Sunspray UF	1.0 gal.				X	X	X	X	
3. Sunspray UF	1.0 gal.			X	X	X			
4. Sunspray UF	2.0 gal.		X	X	X	X	X	X	X
5. Sunspray UF	2.0 gal.				X	X	X	X	
6. Sunspray UF	2.0 gal.			X	X	X			
7. Untreated	-								

[1] Trmts 1-6 also recieved 2% Sunspray 6E on 4/14

Table 5b. Evaluation of sunspray ultrafine oil for controling early season pest complex on apple[1] , N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-1994

Treatment	Formulation amt./100 gal.	Timing[3]	# infested / 25 terminals[2] GAA/ SA	Predatory larva Cec./Syr.	# inf. term. /3 min. RAA	# stipled /100 lvs WALH	# mines /100 lvs STLM
1. Sunspray UF	1.0 gal.	PF-2C	13.3a	1.0a	6.1a	9.4a	0.7a
2. Sunspray UF	1.0 gal.	2C	6.8a	1.0a	0.6a	10.4a	0.2a
3. Sunspray UF	1.0 gal.	1C-2C	6.5a	1.0a	2.5a	22.5a	0.7a
4. Sunspray UF	2.0 gal.	PF-2C	7.3a	2.3a	4.8a	17.8a	0.2a
5. Sunspray UF	2.0 gal.	2C	7.2a	1.7a	8.2a	13.5a	0.7a
6. Sunspray UF	2.0 gal.	1C-2C	8.0a	3.8a	5.4a	22.5a	0.0a
7. Untreated	-	-	15.0a	5.1a	7.3a	16.4a	1.4a

[1] Data from ' Red Delicious" on 6/22 for RAA, GAA, WALH, STLM.

[2] Mean separation by Fishers Protected LSD (P=<0.05). Arcsin transformation used for statistical analysis of data expressed as percentages. Treatment means followed by the same letter are not significantly different.

[3] Red Delicious spray timming 1/2" G 4/15; TC 4/22; Bloom 5/3; PF 5/19; 1C 6/3; 2C 6/14

* GAA = Green Apple Aphid *A . pomi* (>90%) SA= Spirea Aphid *A . spiraecola* (<10%) from samples on 6/94.

* All treatments recieved Sunspray 6E at 1/2"G, Imidan 70W PF-1C.

Table 5b. Evaluation of sunspray ultrafine oil phytotoxicity on apple foliage[1], N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-1994

Treatment	Formulation amt./100 gal.	Application Timming	Phytotoxicity Rating 0-3[2]	Variety	Phytotoxicity Rating 0-3[2]
1. Sunspray UF	1.0 gal.	PF-6C	0.4ab	Rome Beauty	0.3a
2. Sunspray UF	1.0 gal.	2C-5C	0.4ab	M^{c}Intosh	0.5a
3. Sunspray UF	1.0 gal.	1C-3C	0.7 b	Red Delicious	0.6ab
4. Sunspray UF	2.0 gal.	PF-6C	2.4 d	Empire	1.0 bc
5. Sunspray UF	2.0 gal.	2C-5C	1.5 c	Cortland	1.2 c
6. Sunspray UF	2.0 gal.	1C-3C	0.7 b	Golden Delicious	1.2 c
7. Imidan 70W	16.0 oz.	PF-6C	0.2a	Jersey M^{c}	1.4 c

[1] Data taken 9/20 on 'Rome beauty', 'M^{c}Intosh', 'Red Delicious', 'Empire', 'Cortland', 'Golden Delicious', 'Jersey M^{c}'.

[2] Mean separation by Fishers Protected LSD (P=<0.05). Log_{10} (X + 1) used prior to transformation for statistical analysis of data. Treatment means followed by the same letter are not significantly different.
Visual rating where; 0 = none, 1 = slight, 2 = moderate, 3 = severe.

APPLE: Malus domestica 'Empire'

Apple rust mite(ARM): Aculus schlechtendali (Nalepa)
A predatory phytoseid(AMB): Amblyseius fallacis (Garman)
European red mite(ERM): Panonychus ulmi (Koch)
Twospotted spider mite (TSM): Tetranychus urticae Koch

Spotted tentiform leafminer: Phyllonorycter blancardella (Fabr.)

MITE AND LEAFMINER CONTROL WITH SINGLE APPLICATIONS OF SYSTEMIC AND TRANS-LAMELLAR COMPOUNDS, 1994: Treatments were applied to five-tree plots replicated four times in a randomized design. No dormant oil or miticide was applied. Vydate 2L + Omite 30W (16 oz/100 gal. each) and AgriMek + oil (2.7 oz + 32 oz/100 gal.) were applied dilute tree-row-volume (100 gal/acre TRV) using an air-blast sprayer. Trees on the M.26 rootstock were 10 years-old, 8 ft high, and 3 ft wide. Treatments consisted of AgriMek and Vydate/Omite on two application schedules timed for either oblique-banded leafroller threshold (600 DD_{43} after initiation of 2nd flight) or the sap-feeding stage of 2nd brood STLM (see **Table 6**).

Phytophagous and predacious mite populations were evaluated by sampling 25 leaves (5 leaves/tree) from each plot. Leaves were removed to the laboratory where they were brushed with a mite brushing machine, and the mites and eggs examined using a binocular scope. Because STLM infestations were low, efficacy was assessed by counting numbers of tissue-feeding mines per 1-minute time period. Evaluations were to include assessment against leafrollers, but could not be accomplished because of extremely low populations in this block.

Against ERM, evaluations on 6 Sept. showed that AgriMek and Vydate/Omite applied at the earliest timing (7 July) were superior to AgriMek applied at the later timing (14 July), suggesting that the earlier application was more readily taken up by the leaf. Against TSM however, Vydate/Omite was inferior to either application of AgriMek. All schedules controlled ARM.

Against 2nd brood STLM, the earliest application of AgriMek was superior to Vydate/Omite and the later application of AgriMek. Against 3rd brood STLM, the earliest AgriMek was superior to the later application, both of which were superior to Vydate/Omite.

Table 6. Evaluation of systemic and trans-lamellar insecticides for controling mite and leafminer populations on apple[1,2], N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-1994

Insecticide treatment spray timing on apple

Treatment	Formulation amt./100 gal.	Timing	7/7 4C	7/14 5C
1. Agri-mek 0.15E	2.7 oz.	OBLR Threshold[3]	X	
Sunspray UF	32.0 oz.			
2. Vydate 2L	16.0 oz.	2nd brood STLM[4]	X	
Omite 30W	16.0 oz.			
3. Agri-mek	2.7 oz.	2nd brood STLM[4]		X
Sunspray UF	32.0 oz.			
4. Untreated	-			

Treatment	Formulation amt./100 gal.	7/13 Mean # of mites or eggs / leaf* ERM	ERME	TSM	ARM	8/11 Mean # of mites or eggs / leaf* ERM	ERME	TSM	ARM
1. Agri-mek	2.7 oz.	0.3a	0.2a	<0.1a	0.7a	0.5a	1.5a	0.8a	1.2ab
Sunspray UF	32.0 oz.								
2. Vydate 2L	16.0 oz.	1.2a	0.8a	0.7a	<0.1a	0.5a	1.3a	0.5a	0.8a
Omite 30W	16.0 oz.								
3. Agri-mek	2.7 oz.	0.9a	0.9a	0.4a	2.4a	3.8 b	7.5 b	4.1 b	2.7 b
Sunspray UF	32.0 oz.								
4. Untreated	-	0.6a	0.6a	0.6a	1.2a	5.2 b	14.2 c	13.7 c	8.3 c

Treatment	Formulation amt./100 gal.	9/6 Mean # of mites or eggs / leaf* ERM	ERME	TSM	AMB	ARM
1. Agri-mek	2.7 oz.	2.3a	5.4a	1.8a	0.5a	0.7a
Sunspray UF	32.0 oz.					
2. Vydate 2L	16.0 oz.	9.7ab	14.1a	22.1b	0.6a	3.7a
Omite 30W	16.0 oz.					
3. Agri-mek	2.7 oz.	20.7b	19.5a	10.6b	1.1a	2.9a
Sunspray UF	32.0 oz.					
4. Untreated	-	36.8b	14.1a	16.4b	2.0b	21.0 b

Treatment	Formulation amt./100 gal.	# 2nd brood tissue STLM* /1 minute 8/9	# 3rd brood tissue STLM* /1 minute 9/5
1. Agri-mek	2.7 oz.	4.0a	0.4a
Sunspray UF	32.0 oz.		
2. Vydate 2L	16.0 oz.	9.3 b	6.2 c
Omite 30W	16.0 oz.		
3. Agri-mek	2.7 oz.	11.0 b	2.3 b
Sunspray UF	32.0 oz.		
4. Untreated	-	22.9 c	9.2 c

1 Data from ' Empire'.

2 Mean separation by Fishers Protected LSD (P=<0.05). Log_{10} (X + 1) used prior to transformation for statistical analysis of data. Treatment means followed by the same letter are not significantly different.

3 Applied approximately 600 DD (base 43°F) after initiation of 2nd brood.

4 Applied when tissue feeders first noticed.

* *ERM = European Red Mite, ERME = ERM Egg, TSM = Two Spotted Mite, AMB = Amblyseius fallacis, ARM = Apple Rust Mite, STLM = spotted tentiform leafminer

APPLE: Malus domestica 'Delicious'

Apple rust mite(ARM): Aculus schlechtendali (Nalepa)
A predatory phytoseid(AMB): Amblyseius fallacis (Garman)
European red mite(ERM): Panonychus ulmi (Koch)
Twospotted spider mite (TSM): Tetranychus urticae Koch

Rose leafhopper (RLH): Edwardsiana rosae (L.)
White apple leafhopper (WALH): Typhlocyba pomaria McAtree

EVALUATION OF MITICIDE PROGRAMS AGAINST MITES AND LEAFHOPPERS, 1994: Treatments were applied to eight-tree (one of which was 'Delicious') plots replicated three times in a randomized complete block design. All treatments were applied dilute to runoff using a high-pressure handgun sprayer at 300 psi delivering from 1.7 to 2.7 gal spray/tree or 160 to 260 gal/acre depending upon foliage density. Trees on the EMII rootstock were 31 years-old, 10 ft high, and 12 ft wide. Omite 30W and Kelthane 50W were applied at PF (leafhoppers). Because the mite threshold had not been reached on 14 July, Omite 30W (20 oz), Omite 6E (8 oz) and Kelthane 50W were re-applied for leafhoppers.These treatments were applied again on 25 July, as called for in mite management protocol. For efficacy comparisons against leafhoppers, a treatment that included Bay NTN (PF, 2C, 4C & 5C) was observed.

Phytophagous and predacious mite populations were evaluated by sampling 25 leaves from one 'Delicious' tree per plot. Leaves were removed to the laboratory where they were brushed with a mite brushing machine, and the mites and eggs examined using a binocular scope. Efficacy against WALH/RLH was evaluated by counting numbers of nymphs per 100 leaf sample. No effort was made to separate species.

The '94 season was marked by a relatively dry April followed by excellent rainfall periods and relatively mild temperatures during July and August (see APPENDIX I) For reasons unknown, mite populations failed to develop in the test block, the untreated plot never exceeding threshold at any time during the season (**Table 7**). Regrettably, miticidal activity of treatments could not be assessed. Likewise, leafhopper populations were extremely slow to develop during '94, and damaging populations did not occur until mid-September. Because of the low populations during the time period of this trial, few evaluations of efficacy were revealing. A pre-count on 12 July showed very low LH numbers that were probably not resultant of the PF treatments. The post-count on 15 July showed no significant reductions in LH numbers due to any treatment.

Table 7 Evaluation of miticides for controling seasonal insect and mite populations on apple[1,2], N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-1994

Treatment	Formulation amt./100 gal.	6/14 Mean # of mites or eggs / leaf** ERM	ERME	TSM	AMB	ARM	6/27 Mean # of mites or eggs / leaf** ERM	ERME	TSM	AMB	ARM	7/14 Mean # of mites or eggs / leaf** ERM	ERME	TSM	AMB	ARM
1. Omite 30W	20.0 oz.	<0.1a	<0.1a	<0.1a	0.0a	0.0a	0.3a	0.4a	0.2a	0.0a	0.8a	1.2a	0.7 bc	<0.1a	<0.1a	2.8a
2. Omite 30W	20.0 oz.	<0.1a	0.1a	0.1a	0.0a	0.9ab	0.2a	0.2a	0.1a	<0.1a	3.2ab	0.4a	0.3ab	0.1a	<0.1a	3.1a
Omite 6E	8.0 oz.															
3. Kelthane 50W	21.2 oz.	0.0a	0.2a	0.0a	0.0a	0.7ab	0.2a	0.1ab	0.1a	0.0a	0.3a	0.6a	0.5abc	0.1a	0.0a	0.6a
4. Untreated	-	0.1a	0.3a	0.0a	0.0a	2.2 bc	0.6a	0.4a	0.2a	0.0a	7.4 b	0.5a	1.3 c	<0.1a	0.0a	10.9a

Treatment	8/2 Mean # of mites or eggs / leaf** ERM	ERME	TSM	AMB	ARM	8/15 Mean # of mites or eggs / leaf** ERM	ERME	TSM	AMB	ARM
1.	0.1ab	0.4ab	<0.1a	<0.1ab	1.5a	0.2a	0.5a	0.4a	<0.1a	1.9a
2.	0.0a	<0.1a	0.0a	0.0a	0.4a	0.5a	0.5a	0.4a	0.1a	2.8a
3.	<0.1a	0.8abc	<0.1a	<0.1ab	0.6a	0.5a	0.6a	0.3a	<0.1a	0.8a
4.	0.5a	2.0 c	0.0a	<0.1ab	13.9a	1.3a	1.2a	1.1a	<0.1a	1.9a

[1] Data from ' Red Delicious'..

[2] Mean separation by Fishers Protected LSD (P=<0.05). Log_{10} (X + 1) used for statistical analysis of data prior to transformation. Treatment means followed by the same letter are not significantly different.

* *TSM = Two Spotted Mite, AMB = Amblyseius fallacis, ARM = Apple Rust Mite. ERM = European Red Mite, ERME = ERM Egg,

Treatment	Form. amt./100 gal.	Mean # of LH / mid-terminal lf 7/12	7/15
1. Omite 30W	20.0 oz.	14.7	9.7
2. Omite 30W	20.0 oz.	51.7	45.0
Omite 6E	8.0 oz.		
3. Kelthane 50W	21.2 oz.	7.0	8.0
4. NTN 1.6	2.0 oz.	0.0	0.0
5. Untreated	-	25.3	24.7

[1] Data from ' Red Delicious'.

[2] LH = Rose Leafhopper *Edwardsiana rosae* , White Apple Leafhopper *Typhlocyba pomaria* .

Miticide / insecticide treatment timing on apple·

Treatment	Formulation amt./100 gal.	1/2"	P	5/20 PF	1 C	6/15 2 C	3 C	7/14 4 C	7/25 5 C
1. Omite 30W	20.0 oz.			X				X	X
2. Omite 30W	20.0 oz.			X					
Omite 6E	8.0 oz.							X	X
3. Kelthane 50W	21.2 oz.			X				X	X
4. NTN 1.6	2.0 oz.			X		X		X	X
5 Untreated	-								

Table 8a. Early season evaluations of insecticides for controling Pear Psylla on Bartlett Pear[1,2], N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-1994

Treatment	Formulation amt./100 gal.	Timing[4]	5/17 # / Leaf* Nymphs	Eggs	PRM	5/26 # / Leaf* Nymphs	Eggs	PRM	6/10 # / Leaf* Nymphs	Eggs	PRM	6/20 # / Leaf* Nymphs	Eggs	PRM
1. Mitac 1.5E	30.0 oz.	1,4C	0.2a	0.7ab	4.8a	0.2ab	1.1abc	0.0a	0.4ab	3.7a	<0.1a	2.3ab	6.0abc	0.0a
Sunspray Oil 6E	2.0 gal.	D												
Guthion 35W	12.0 oz.	PF												
2. Lorsban 4E	5.0 oz.	D	0.4ab	0.9abc	<0.1a	0.8 bc	2.0 bcde	0.0a	3.3 c	37.6 de	0.0a	3.7ab	9.5abc	0.0a
Lorsban 4E	16.0 oz.	2,4C												
Sunspray Oil 6E	2.0 gal.	D												
Guthion 35W	12.0 oz.	PF												
3. AgriMek	5.0 oz.	1C	1.0 bc	1.9 bcd	<0.1a	0.5abc	2.3 cde	0.0a	0.2a	7.4ab	0.0a	2.0ab	2.8a	0.0a
Sunspray Ultrafine	32.0 oz.	1C												
Guthion 35W	12.0 oz.	PF												
4. NTN 1.6F	5.0 oz.	PF-1C	0.4ab	0.8abc	8.0a	0.3abc	0.3a	0.0a	0.1a	10.8 bc	<0.1a	1.7ab	4.6ab	0.0a
Guthion 35W	12.0 oz.	PF												
5. Mitac 1.5E	30.0 oz.	1,4C	1.3 c	1.4abcd	8.0a	0.6abc	1.8 bcd	3.2 ab	0.6ab	21.3 cd	0.0a	1.6a	2.5a	0.0a
Guthion 35W	12.0 oz.	PF												
6. Asana .66E	5.0oz.	D,4C	<0.1a	0.3a	0.0a	0.2ab	0.7ab	0.0a	1.3 bc	24.5 cd	0.0a	4.5ab	5.4ab	0.0a
Sunspray Oil 6E	2.0 gal.	D												
Guthion 35W	12.0 oz.	PF												
7. Comply	75.5 oz.	BB-WB	<0.1a	3.0 d	<0.1a	0.5a	4.4 e	4.8ab	0.2ab	23.4 cd	<0.1a	3.7ab	20.4 c	0.0a
Sunspray Oil 6E	2.0 gal.	D												
Guthion 35W	12.0 oz.	PF												
8. Untreated	-	-	1.6 c	2.4 cd	7.2a	1.0c	3.0 de	12.8 b	2.2 c	79.7 e	<0.1a	5.11 b	16.9 bc	0.0a

1 Harvest 8/29

2 Treatment means followed by the same letter are not significantly different (P<0.5; Fishers protected LSD). Data treated by $\log_{10}(x+1)$ transformation prior to analysis.

3 Application Dates: Dormant (D) 4/9; Bud Burst (BB) 4/19; White Bud (WB) 4/28; Petal Fall (PF) 5/11; (1C) 5/23, (2C) 6/13; (4C) 7/7;
*Counts taken from spur leaves until 6/9; thereafter apex shoots were sampled.

PEAR: Pyrus communis 'Bartlett'

Pear psylla: Psylla pyricola Forester
Pear rust mite: Epitrimerus pyri (Nalepa)

PEAR INSECT AND MITE CONTROL, 1994: Treatments were applied to 8 tree plots, replicated 3 times in a randomized complete block design. Each plot contained 4 'Bartlett' and 4 'Bosc' cultivars, spaced 12 x 18 ft, 12 ft in height and 19 years old. Treatments were applied by high-pressure handgun sprayer, dilute to runoff, at 300 psi using from 1.7 to 2.6 gal/tree or 160 to 260 gal/acre, depending on foliage density. All plots received Guthion at PF for plum curculio. NTN 33893 was applied at PF (11 May) and first cover (23 May). AgriMek + 1% oil was applied at 14 days post-PF (23 May). Comply (phenoxycarb) was applied at bud-break (19 April) and at white-bud (28 May). Lorsban + 2% oil was applied dormant on 11 May and again on 7 July. Mitac was applied at white-bud (11 May) and again on 7 July. One Mitac plot received dormant oil, while another did not. Asana + 2% oil was applied at white-bud and again (Asana alone) on 7 July.

Efficacy against pear psylla was evaluated by sampling leaves from five spurs or five shoots from five trees in each plot, removing to the laboratory, and counting nymphs and eggs, and pear rust mite, using a binocular scope. On 30 Aug., trees in all treatments were rated (1 to 4 scale) for foliar damage and leaf-drop attributed to secretions of honeydew. On 3 Sept., 100 'Bartlett' fruits from a single scaffold limb in each plot were weighed and sized; and rated for russeting and sooty-mold as per Horsfall-Barratt (1 to 11 scale). Throughout the season, beginning 31 March, adult populations were sampled weekly by sweeping foliage of the untreated plots for nine minutes with a vacuum device.

The '94 season was marked by a relatively dry April followed by excellent rainfall periods during July and August. Psylla populations did not follow a normal pattern, as they built slowly, reached peak nymph and egg numbers the latter part of June, and persisted throughout the summer (**Table 8a**). The infestation pressure from psylla was unusually severe during '94, and many treatments were over threshold by 20 June. Additional applications of Mitac, Lorsban and Asana were required on 7 July. Lorsban failed to reduce the population to acceptable numbers and foliage was in poor condition most of the season. Noteworthy treatments were a single-application of AgriMek and two applications of Mitac and Comply. The use of dormant oil + Mitac resulted in slower psylla development relative to Mitac without dormant oil, substantiating the rationale of a dormant oil treatment.

Fruit size/weight and russet/sooty-mold ratings taken at 'Bartlett' harvest are presented in **Table 8b**. Fruit size was not remarkably different in treatments, except for Lorsban that yielded significantly smaller and lighter fruits. The AgriMek and Comply treatments yielded significantly larger fruits and heavier fruits than other treatments. Because of superior control of psylla, AgriMek had significantly lower ratings for contamination of fruit by sooty-mold than other treatments. In general, all treatments, save AgriMek and Comply, had excessive leaf damage from sooty-mold and resulting leaf necrosis. Moreover, significant premature leaf-drop resulted in the Lorsban and Asana treatments.

During most seasons, psylla populations crash during mid-July. Perhaps because of excellent growing conditions during July and Aug of '94 however, second generation adults remained active until the end of Aug (**Table 8b**). The increase in oviposition during this period subjected treatments to unusually high nymph populations. A re-application of many treatments during the first week of August would have been warranted.

Table 8a. Mid to late season evaluations of insecticides for controling Pear Psylla on Bartlett Pear[1,2], N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-1994

Treatment	Formulation amt./100 gal.	Timing[4]	7/6 # / Leaf* Nymphs	Eggs	PRM	7/18 # / Leaf* Nymphs	Eggs	PRM	8/1 # / Leaf* Nymphs	Eggs	PRM	8/29 # / Leaf* Nymphs	Eggs	PRM
1. Mitac 1.5E	30.0 oz.	1,4C	4.7 bc	10.1 cd	<0.1a	0.4ab	2.9ab	<0.1a	2.6 b	15.8ab	99.2a	5.4a	5.3a	67.2ab
Sunspray Oil 6E	2.0 gal.	D												
Guthion 35W	12.0 oz.	PF												
2. Lorsban 4E	5.0 oz.	D	9.9 c	13.5 cd	0.0a	7.2 d	18.0 c	<0.1a	13.5 c	20.0ab	1.6a	17.7 bc	6.7ab	104.0bc
Lorsban 4E	16.0 oz.	2,4C												
Sunspray Oil 6E	2.0 gal.	D												
Guthion 35W	12.0 oz.	PF												
3. AgriMek	5.0 oz.	1C	0.2a	1.2a	0.0a	0.1a	0.9a	<0.1a	1.4ab	13.5a	8.0a	7.4a	6.4a	24.0a
Sunspray Ultrafine	32.0 oz.	1C												
Guthion 35W	12.0 oz.	PF												
4. NTN 1.6F	5.0 oz.	PF-1C	4.3 bc	10.4 cd	0.0a	1.0 bc	3.7ab	6.4a	1.6ab	19.3ab	12.8a	20.0 bc	14.9bcd	110.4bc
Guthion 35W	12.0 oz.	PF												
5. Mitac 1.5E	30.0 oz.	1,4C	0.7ab	2.2ab	0.0a	0.2ab	3.0ab	<0.1a	2.1ab	24.2ab	128.0a	9.4ab	8.5abc	142.4bc
Guthion 35W	12.0 oz.	PF												
6. Asana .66E	5.0oz.	D,4C	5.2 bc	6.6 bc	0.0a	2.0 c	5.9ab	<0.1a	9.7 c	35.1 b	96.0a	11.1abc	4.3a	126.4ab
Sunspray Oil 6E	2.0 gal.	D												
Guthion 35W	12.0 oz.	PF												
7. Comply	75.5 oz.	BB-WB	4.5 bc	24.6 d	0.0a	0.4ab	4.3ab	<0.1a	0.8a	14.0a	150.4a	20.2 bc	17.6 cd	283.2 c
Sunspray Oil 6E	2.0 gal.	D												
Guthion 35W	12.0 oz.	PF												
8. Untreated	-	-	4.6 bc	7.5 bcd	12.8a	0.3ab	1.5ab	3.2a	1.5ab	11.9a	252.8a	21.9 c	19.9 d	147.2bc

1 Harvest 8/29

2 Treatment means followed by the same letter are not significantly different (P<0.5; Fishers protected LSD). Data treated by $\log_{10}(x+1)$ transformation prior to analysis.

3 Application Dates: Dormant (D) 4/9; Bud Burst (BB) 4/19; White Bud (WB) 4/28; Petal Fall (PF) 5/11; (1C) 5/23, (2C) 6/13; (4C) 7/7;

*Counts taken from spur leaves until 6/9; thereafter apex shoots were sampled.

Table 8b. Fruit evaluations of insecticides for controling Pear Psylla on Bartlett Pear[1,3], N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-1994

	Treatment	Formulation amt./100 gal.	Timing[2]	Fruit Size(cm)*	Fruit Weight(gm)*	Barratt-Horsfall rating[4] Fruit Russett*	Fruit Sooty Mold*	Leaf[5]
1.	Mitac 1.5E	30.0 oz.	1,4C	6.1 de	107.6 cd	5.0 b	3.7 c	3.9 bc
	Sunspray Oil 6E	2.0 gal.	D					
	Guthion 35W	12.0 oz.	PF					
2.	Lorsban 4E	5.0 oz.	D	5.3a	70.6a	3.6a	6.5 f	**9.9** d
	Lorsban 4E	16.0 oz.	2,4C					
	Sunspray Oil 6E	2.0 gal.	D					
	Guthion 35W	12.0 oz.	PF					
3.	AgriMek	5.0 oz.	1C	6.4 f	121.2 f	5.5 c	2.2a	0.4a
	Sunspray Ultrafine	32.0 oz.	1C					
	Guthion 35W	12.0 oz.	PF					
4.	NTN 1.6F	5.0 oz.	PF-1C	6.1 c	103.0 c	5.7 cd	5.5 e	4.5bcd
	Guthion 35W	12.0 oz.	PF					
5.	Mitac 1.5E	30.0 oz.	1,4C	6.1 cd	103.2 c	6.9 e	4.4 d	4.3 bc
	Guthion 35W	12.0 oz.	PF					
6.	Asana .66E	5.0oz.	D,4C	5.8 b	82.2 b	5.0 b	7.3 g	**7.0** cd
	Sunspray Oil 6E	2.0 gal.	D					
	Guthion 35W	12.0 oz.	PF					
7.	Comply	75.5 oz.	BB-WB	6.4 f	117.03 ef	3.9 b	2.9 b	1.8 b
	Sunspray Oil 6E	2.0 gal.	D					
	Guthion 35W	12.0 oz.	PF					
8.	Untreated	-	-	6.3 ef	112.0 de	5.9 d	3.8 c	**6.9** cd

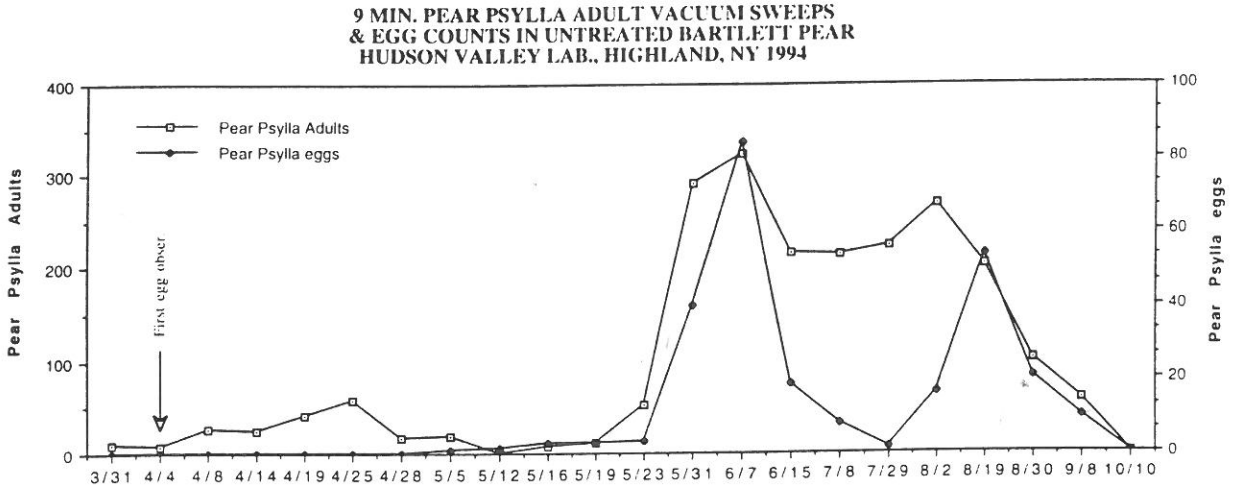
[1] Harvested 8/29.

[2] Application Dates: Dormant (D) 4/9; Bud Burst (BB) 4/19; White Bud (WB) 4/28; Petal Fall (PF) 5/11; (1C) 5/23, (2C) 6/13; (4C) 7/7.

[3] Treatment means followed by the same letter are not significantly different (P<0.5; Fishers protected LSD). Data treated by $\log_{10}(x+1)$ transformation prior to analysis.

[4] Ratings for russett and sooty mold based on Horsfall-Barratt rating system (0-11), the higher the number the greater the damage. * Based on 100 fruit from a single scaffold limb.

[5] Sooty mold and / or leaf necrosis rating based on Horsfall-Barratt rating system (0-11). Leaf numbers in bold type showed significant leaf drop.



SWEET CORN: Zea mays 'Ambrosia'

European corn borer (ECB): Ostrinia nubilalis (Hubner)

INSECT CONTROL ON EARLY-SEASON SWEET CORN WITH WHORL-APPLICATIONS OF INSECTICIDES, 1994: 'Ambrosia' sweet corn was planted 25 April in Tioga silt-loam soil at New Paltz, NY. Treatments were arranged in 2-row plots 488 ft. long, replicated 4 times in a randomized block design. Granular insecticides (Whirl 5GR [Bacillus thuringiensis, var. aizawai] and Lorsban 15G) were applied as single applications into the whorls of ca. 2.5 ft high corn plants by use of a Gandy® applicator mounted on a high-clearance sprayer, operated at 2.5 MPH. An insecticide emulsion (Ambush 2E) was applied into whorls by use of the same sprayer, through one D3-25 cone nozzle/row, dispensing 51 GPA @ 100 PSI @ 3 MPH. Single insecticide treatments were applied on two timing schedules: Early application (6 Jun) - estimated 50% egg hatch, e.g., 380 DD_{50} from introduction of reproductive moth pairs, as determined by greenhouse cage studies; Later application(22 Jun) - actual 50% egg hatch e.g., 530 DD_{50} from first moth caught in a black-light trap located within the plot. All plants (ca. 300 plants) in a sequential series of early-planted 'Quickie' sweet corn plots were monitored twice-weekly for egg masses, that were marked and observed for time of hatching. The data was used to project the actual field 50% hatch date at which time the late application treatment was made.

All plants in each plot were visually inspected at tassel emergence for infestations by ECB larvae (5 July) and the percent infestation was recorded. Subsequently (20 July), 25 randomly selected ears/replicate were examined and the number of infested ears recorded. Larval boring into the butt-portion of the ear was included as economic ear damage.

Growing conditions during early '94 were marked by a relatively cool and dry May -June, with warmer, more moist conditions during July (see APPENDIX I). ECB infestations were low, with 8.7% infested ears in the untreated. The acceptance threshold for fresh market sweet corn is 5% infested ears.

Based on posttreatment tassel infestations (**Table 9**), the Ambush spray killed significantly more whorl-infesting larvae than did any of the granulars, and almost all treatments performed better if applied in late June @ ca 530 DD's - i.e., at 50% egg hatch. It is evident from the harvest evaluations that there was little positive linear relationship between the degree of tassel infestation and the ultimate degree of ear infestation at harvest, i.e., low tassel infestations by the early Ambush treatment did not insure low ear infestations. Apparently, some oviposition was taking place during the silking period, at which time the whorl-treatments had no carry-over effect. The harvest data showed significant control of ECB (<5% infest.) by all of the applications at 530 DD's.

Table 9. Evaluation of whorl applications of insecticides to early-season sweet corn. NYSAES, Hudson Valley Lab., Highland NY - 1994.

	% Infested by European corn borer[1]	
	(5 July) Tassel @ emergence	(20 July) Ear @ harvest
Early application		
6/16 (380 DD_{50}) [2]		
1. WHIRL 5G @ 5 lb/acre	20.1 c	5.1 bcd
2. WHIRL 5G @ 7.5 lb/acre	18.3 bc	6.3 cd
3. WHIRL 5G @ 10 lb/acre	15.1 bc	5.6 bcd
4. LORSBAN 15G @ 6.5 lb/acre	15.6 bc	4.8 bcd
5. AMBUSH 2EC @ 0.2 ai/acre	2.7 a	5.6 bcd
Later application		
6/22 (530 DD_{50}) [3]		
6. WHIRL 5G @ 5 lb/acre	18.9 bc	4.1 bc
7. WHIRL 5G @ 7.5 lb/acre	12.9 b	2.8 ab
8. LORSBAN 15G @ 6.5 lb/acre	16.7 bc	3.5 bc
9. AMBUSH 2EC @ 0.2 ai/acre	4.2 a	1.0 a
10. UNTREATED	44.9 d	8.7 d

[1]Mean separation by Fisher's Protected LSD (P=/<0.05). Data treated by arcsin transformation for proportions prior to statistical analysis; data re-converted for presentation. Treatments followed by the same letter are not significantly different.

[2] Estimated 50% egg hatch based on greenhouse studies. DD's initiated by pairings of reproductive adults.

[3] Actual 50% egg hatch based on field experiments. DD's initiated by 1st moth caught in black-light traps.

SWEET CORN: Zea mays 'Sensor'

Corn earworm (CEW): Helicoverpa zea Boddie
European corn borer (ECB): Ostrinia nubilalis (Hubner)
Fall armyworm (FAW): Spodoptera frugiperda J.E. Smith

INSECT CONTROL ON MID-SEASON SWEET CORN WITH FOLIAR SPRAYS OF INSECTICIDES, 1994: 'Sensor' sweet corn was planted 7 June in Tioga silt-loam soil at New Paltz, NY. Treatments were arranged in 2-row plots 488 ft. long, replicated 4 times in a randomized block design. Insecticide emulsions were applied by high-clearance sprayer, through three D3-25 cone nozzles/row, dispensing 51 GPA @ 100 PSI @ 3 MPH. Treatments were applied starting at first silk on 4 Aug., followed by another on 9 August.

Efficacy was evaluated 19 August by examining 25 randomly selected ears per treatment/replicate. Growing conditions during '94 were marked by a relatively cool and dry June, with warmer, more moist conditions during July and August (see APPENDIX I). Insect infestations were moderate (ECB above normal), with 31.6% infested ears in the untreated. The acceptance threshold for fresh market sweet corn is 5% infested ears.

Results are presented in **Table 10**. Please note that the "total % infested ears" column presents transformed data; when data are converted back to real terms, the mathematic conversions carry inherent adjustments for variability, and therefore the sums of "% infested by species" rows may not match the converted data figures. Excellent control was provided by Baythroid, Larvin (0.75 ai), Karate (1E & 1CSO) and TD2348-1 FM. Three silk applications are normal in the Hudson Valley when all three Lepidoptera species are present, and many materials, Penncap and Ambush in particular, may have performed better with an additional application.

Table 10. Evaluation of insecticides on mid-season sweet corn. NYSAES, Hudson Valley Lab., Highland, NY - 1994.

Treatment /rate[2]	% infested ears by species[1] ECB	CEW	FAW	Total % infested ears[3]
1. Baythroid 2E @ 0.044 lb AI/acre	0	0	0	0 a
2. Larvin 80DF @ 0.75 lb AI/acre	0	0	0	0 a
3. Larvin 80DF @ 0.50 lb AI/acre	2.5	2.5	0	5.0 bcd
4. Decis 0.2EC @ 0.025 lb AI/acre	2.5	5.0	0	7.3 bcd
5. Decis 0.2EC @ 0.0125 lb AI/acre	2.5	2.5	0	5.0 bc
6. Decis 0.2EC @ 0.0065 lb AI/acre	5.0	3.8	1.3	9.2 cd
7. Penncap M 2FM @ 1.0 lb AI/acre[4]	6.3	6.3	1.3	13.5 d
8. TD2342-1 FM @ 1.0 lb AI/acre	0	5.0	1.3	5.7 bcd
9. TD2348-1 FM @ 1.0 lb AI/acre	3.8	0	0	2.8 abc
10. Ambush 2E @ 0.15 lb AI/acre	6.8	3.3	3.8	9.4 cd
11. Karate 1E @ 0.02 lb AI/acre	0	3.8	0	1.9 ab
12. Karate 1CSO @ 0.02 lb AI/acre	0	2.5	0	1.3 ab
13. UNTREATED	18.8	11.3	2.5	31.6 e

[1]ECB, European corn borer; CEW, corn earworm; FAW, fall armyworm.

[2]Treatments applied twice (Aug 4; Aug 9) beginning at first silk; evaluated Aug 19.

[3]Mean separation by Fisher's Protected LSD (P=/<0.05). Data treated by the arcsin transformation for proportions prior to statistical analysis; data re-converted for presentation. Treatment means followed by the same letter are not significantly different.

[4]Due to lack of material, second application made @ 0.8 lb AI/acre.

SWEET CORN: Zea mays 'Sensor'

Corn earworm (CEW): Helicoverpa zea Boddie
European corn borer (ECB): Ostrinia nubilalis (Hubner)
Fall armyworm (FAW): Spodoptera frugiperda J.E. Smith

INSECT CONTROL ON MID-SEASON SWEET CORN WITH FOLIAR SPRAYS OF PYRETHROID INSECTICIDES, 1994: 'Sensor' sweet corn was planted 7 June in Tioga silt-loam soil at New Paltz, NY. Treatments were arranged in 2-row plots 488 ft. long, replicated 4 times in a randomized block design. Insecticide emulsions were applied by high-clearance sprayer, through three D3-25 cone nozzles/row, dispensing 51 GPA @ 100 PSI @ 3 MPH. Treatments were applied starting at first silk on 5 Aug., followed by additional sprays on 9 August & 12 August. One Capture protocol required a single application @ 0.05 AI/acre at the first cover spray; another required split applications @ 0.035 AI/acre at the first and third cover spray.

Efficacy was evaluated 23 August by examining 25 randomly selected ears per treatment/replicate. Growing conditions during '94 were marked by a relatively cool and dry June, with warmer, more moist conditions during July and August (see APPENDIX I). Insect infestations were moderate (ECB above normal), with 40% infested ears in the untreated. The acceptance threshold for fresh market sweet corn is 5% infested ears.

Results are presented in **Table 11**. Please note that the "total % infested ears" column presents transformed data; when data are converted back to real terms, the mathematic conversions carry inherent adjustments for variability, and therefore the sums of "% infested by species" rows may not match the converted data figures. Under relatively severe insect pressure, acceptable control was provided by all but one treatment (e.g., #3).

Table 11. Evaluation of pyrethroid insecticides on mid-season sweet corn. NYSAES, Hudson Valley Lab., Highland, NY - 1994.

Treatment /rate[2]	% infested ears by species[1] ECB	CEW	FAW	Total % infested ears[3]
1. Fury 1.5EC @ 0.0375 lb AI/acre	3.0	0	0	1.5 a
2. Fury 1.5EW @ 0.0375 lb AI/acre	3.0	0	2.0	3.7 ab
3. Fury 1.5 EW @ 0.03 lb AI/acre	4.0	0	5.0	8.7 b
4. Pounce 3.2EC @ 0.15 lb AI/acre	4.0	1.0	0	4.9 ab
5. Pounce 3.2EC @ 0.20 lb AI/acre	1.0	2.0	2.0	4.9 ab
6. Capture 2EC @ 0.02 lb AI/acre	0	0	2.0	0.5 a
7. Capture 2EC @ 0.025 lb AI/acre	3.0	0	2.0	3.7 ab
8. Capture 2EC @ 0.03 lb AI/acre	2.0	0	1.0	2.3 ab
9. Karate 1EC @ 0.02 lb AI/acre	2.5	2.5	0	3.7 ab
10. Karate 1EC @ 0.025 lb AI/acre	4.0	1.0	0	3.5 ab
11. Pl94-383 @ 0.10 lb AI/acre	2.0	1.0	2.0	3.5 ab
12. Pl94-383 @ 0.125 lb AI/acre[4]	2.0	1.0	2.0	4.9 ab
13. Capture 2EC @ 0.035 lb AI/acre[5]	2.0	0	1.0	0.8 a
14. Capture 2EC @ 0.05 lb AI/acre[6]	3.0	1.0	0	2.9 ab
13. UNTREATED	18.5	4.0	15.0	40.0 c

[1]ECB, European corn borer; CEW, corn earworm; FAW, fall armyworm.

[2]Unless otherwise noted, treatments applied three times (Aug 5; Aug 9; Aug 12) beginning at first silk; evaluated Aug 23.

[3]Mean separation by Fisher's Protected LSD (P=/<0.05). Data treated by the arcsin transformation for proportions prior to statistical analysis; data re-converted for presentation. Treatment means followed by the same letter are not significantly different.

[4]Only two applications (Aug 5; Aug 9) due to shortage of material.

[5]First and third applications only (Aug 5; Aug 12) as per protocol.

[6]First application only (Aug 5) as per protocol.

ONION: *Allium cepa* L. 'Spartan Banner 80'
Onion thrips: *Thrips tabaci* Lindeman

CONTROL OF ONION THRIPS WITH INSECTICIDES, 1994: 'Spartan Banner 80' was seeded into muck soil 5 April at Pine Island NY. Treatments were arranged in 1-row plots, 40 ft long, and replicated 4 times in a randomized block design. Insecticide emulsions were applied as single applications when thrips exceeded threshold (3 nymphs/leaf) on 28 July. Treatments were applied over the plants with a CO_2 pressurized (100 PSI) back-pack sprayer dispensing 38 GPA @ 2 MPH. Efficacy evaluations were made at 6 days and 14 days postapplication by harvesting 10 randomly selected plants per treatment-replicate, and examining for number of thrips larvae by means of a 10-power 'OptiVisor' scope. A single application only was employed because thrips populations did not rise rapidly during early August, and because frequent rainfall periods during the period 12 Aug - 20 Aug (see APPENDIX II) did not allow for subsequent applications. Reduction in numbers of thrips were determined by: [# thrips pretreatment - # thrips posttreatment] ÷ [# thrips pretreatment] x 100. Because observations on 15 August showed extremely high pressure from immigrating thrips adults, treatments were rated for relative adult numbers.

Results are presented in **Table 12**. At 6 days postapplication (3 Aug), only Karate 1E, Karate 1CSO and TD2342-1 FM had reduced the initial population > 70%. For all other treatments, it is apparent that another application would have been warrented. At 14 days postapplication (11 Aug), the same three treatments and Baythroid maintained population reductions in excess of 70 %, suggesting quite good residual toxicity. These same treatments had very low adult populations 18 days postapplication, as expressed by their number one ratings. Any treatment having a rating of three or four, had no apparent effect on immigrating adults.

Table 12. Evaluation of insecticide treatments against onion thrips. NYSAES, Hudson Valley Lab, Highland , NY (trials conducted in Pine Island, NY) - 1994.

		Evaluation dates[1] (% reduction)			Adult
Treatment	Rate(AI/acre)	7/28	8/3	8/11[2]	rating[3]
1. Karate 1E	0.025		84.8 a	80.8 ab	1
2. Karate 1CSO	0.025		72.7 ab	97.5 a	1
3. TD2342-1 2FM	1.0		75.8 ab	73.0 b	1
4. TD2348-1 2FM	1.0		63.6 bc	46.2 c	2
5. TD2344-1 .44E	0.03		39.4 fgh	19.2 d	3
6. Baythroid 2EC	0.05		51.5 c-f	96.2 a	1
7. Orthene 75S	0.5		51.5 c-f	0.0 e *	3
8. Orthene 75S	0.75		39.4 fgh	0.0 e *	3
9. Orthene 75S	1.0		51.5 c-f	0.0 e *	3
10. Danitol 2.4E	0.1		60.6 cd	0.0 e *	4
11. Danitol 2.4E	0.2		42.4 efg	0.0 e *	4
12. Orth + Danitol	0.5 + .1		57.6 cd	0.0 e *	4
13. Ambush 2E	0.3		48.5 d-g	0.0 e *	3
14. Guthion 3F	0.75		18.2 h	0.0 e *	4
15. Diazinon 4E	1.0		54.5 cde	0.0 e *	4
16. Penncap M 2FM	1.0		39.4 fgh	0.0 e *	3
17. Lannate 1.8L	0.45		57.6 cd	0.0 e *	4
18. UNTREATED NYMPHS/LEAF		3.3	2.6	29.7	3

[1]Application date; 28 July. Percent reduction based on pre-count at each evaluation date by: [# thrips pretreatment - # thrips posttreatment] ÷ [# thrips pretreatment] x 100. Means followed by the same letter are not significantly different as determined by DMRT (P=/<0.05). Data treated by arcsin transformation for proportions prior to statistical analysis; data re-converted for presentation.

[2]Treatments marked by asterisk (*) designate those over threshold of 3 nymphs/leaf at 14 days postapplication.

[3]Rating of adult populations on 15 August where: **1** = 0-5 adults/plant; **2** = 6-50 adults/plant; **3** = 51-100 adults/plant; and **4** = >100 adults/plant.

APPENDIX I

1994 MAXIMUM AND MINIMUM TEMPERATURES AND PRECIPITATION
Hudson Valley Laboratory, Highland, NY

All readings were taken at 0800 EST on the dates indicated for the preceding 24 hours

	APRIL			MAY			JUNE			JULY			AUGUST			SEPTEMBER		
Date	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip
1	55	32		71	52	.43	84	64	0.06	83	63	0.15	82	65		74	63	
2	60	31		75	42	.05	83	42		84	62		84	66	0.15	77	47	
3	55	35		61	33		70	46		87	69		86	69	0.05	70	44	
4	60	32		65	45		79	44		80	60		88	67		72	51	
5	54	28		62	48		82	49		84	59		87	64		70	47	
6	66	42		65	46		82	54		83	71		75	50	0.34	72	48	
7	52	39		64	36		79	66	0.03	92	71		71	48		75	51	
8	48	27		71	51	0.90	84	57		92	71	1.10	79	53		76	52	
9	52	30		60	43	0.05	73	43		91	70	0.18	80	58		81	54	
10	59	44		76	51		82	49		89	69	0.16	84	64		79	50	
11	59	37		68	38		82	53		87	55		79	59		70	42	
12	59	37		70	52	0.15	74	61	0.63	81	55		73	62	0.38	71	44	
13	48	43		67	37	0.15	72	64	0.42	84	64		79	67		76	59	
14	55	47		60	38		83	68	0.27	91	65	0.27	85	70	0.19	85	67	0.15
15	67	44		75	41		87	68	0.25	82	66	0.07	77	53	0.55	79	56	
16	82	57		70	56	0.80	90	72		76	66		73	50	0.01	74	60	
17	64	40	0.48	67	46	0.27	83	66		86	65		77	61	0.01	77	64	0.02
18	61	40		59	42		89	69		87	68	0.09	72	66	1.87	82	57	0.38
19	66	45	0.07	61	48	0.15	92	69		78	69		73	67	0.15	71	45	
20	75	42		56	47	0.10	91	61		89	67		77	64		74	44	
21	59	32		66	41		86	63		89	69	0.45	84	67		78	48	
22	59	29		79	48		73	60	0.04	90	74	0.07	84	66	1.65	79	52	
23	57	30		86	52		82	57		87	72	0.68	66	52	0.42	64	55	1.28
24	64	42		87	52		87	64		77	67	0.32	72	48		65	59	0.20
25	81	58		81	60	0.05	68	63	0.48	88	67		75	54		69	61	
26	76	45	.08	80	55	Tr	77	60	0.02	88	67	0.48	80	63		72	64	
27	67	47	.01	74	44	0.17	85	65		87	64	0.08	85	64		72	61	0.70
28	87	54		63	34		85	68	0.01	83	66	0.57	85	64		67	55	1.27
29	64	46	.01	73	45		81	63	0.05	82	63	0.05	85	61	0.40	68	47	
30	61	48		78	50		76	65	1.10	75	65	0.03	74	51		63	48	
31				83	58					87	65		76	57				
Avg/tot	62.4	40.1	0.65	70.1	46.2	3.28	81.4	59.8	3.36	85.1	65.9	4.75	78.9	60.3	6.17	73.4	53.2	4.00

APPENDIX II

1994 MAXIMUM AND MINIMUM TEMPERATURES AND PRECIPITATION
MIDDLETOWN, NEW YORK

	APRIL			MAY			JUNE			JULY			AUGUST			SEPTEMBER		
Date	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip
1	56	32		69	53	0.81	79	58	0.04	80	62		83	64		69	56	
2	56	32		70	42		77	41	0.02	85	62		84	65	0.16	76	46	
3	59	32		63	38		62	42		85	61		85	69		63	44	
4	59	32	0.19	65	43		71	43		85	60		85	67	0.14	74	49	
5	62	30		72	51		77	49		85	60		79	67	0.16	63	45	
6	63	41		59	48		77	53	0.05	90	71		74	50	0.12	62	45	
7	48	38	0.49	70	43	0.03	67	53	0.09	90	71		78	51		64	45	
8	56	30		60	48	1.10	74	57		90	71		79	53		66	49	
9	56	31		72	46	0.06	68	45		90	68	0.18	82	56		70	49	
10	58	41	0.15	72	51		74	46		87	69	0.50	82	62		71	47	0.09
11	62	37	0.43	67	45		78	51		83	59		75	58		60	43	
12	59	41	0.28	66	52	0.16	64	54	0.69	83	56		79	62	0.20	60	45	
13	48	41	0.57	61	40		67	57	0.38	87	62		85	70		65	46	
14	64	42	0.71	70	39		78	59	0.17	88	67		78	67	0.30	75	54	
15	80	46		73	46		80	62	0.01	86	64	0.09	72	55	0.55	70	54	
16	79	48	0.48	65	54	0.93	87	67		85	66		74	53		74	60	
17	61	42		67	46	0.24	78	64		86	63		73	62	0.09	71	58	
18	63	42		68	50	0.10	83	65		85	67		77	65	2.70	77	53	0.43
19	72	43	0.10	67	51	0.05	87	69		87	69	0.05	76	65	0.30	60	45	
20	66	43		67	46		86	59		89	66		82	63		63	45	
21	58	39		77	42		79	59		89	71		82	69		68	46	
22	57	35		84	41		69	56	0.07	89	73	0.10	75	62	2.10	69	49	
23	60	32		88	55		75	57		85	70	0.65	75	49		58	49	0.86
24	75	47		88	55		77	59		86	65	0.40	76	49		59	53	0.27
25	77	58		76	58	0.15	63	57	0.42	86	67		78	55		62	54	
26	77	43	0.05	76	56	0.04	63	55	0.30	83	64		82	62		63	56	0.05
27	84	43		71	44		78	57		81	64	0.75	86	62		63	54	0.45
28	84	44	0.29	72	38		78	62	1.25	80	62	0.67	84	62		60	49	1.98
29	70	47		75	47		70	59	0.02	82	61		81	57	0.50	59	43	0.07
30	69	53	0.12	79	53		68	60	1.59	85	61		73	54		54	41	
31				80	53					84	66		72	52				
Avg/Tot	64.6	40.2	3.86	71.3	47.5	3.67	74.7	55.8	5.10	85.7	65.2	3.39	78.9	59.9	7.32	64.6	48.8	4.20

APPENDIX III

Insecticide treatment spray timing on apple

Treatment	Formulation amt./100 gal.	Timing[1]	4/15 1/2"	P	5/19 PF	6/3 1C	6/14 2C	7/1 3C	7/14 4C	7/27 5C	8/10 6C
1. Asana XL	2.0 oz.	1/2" G	X								
Guthion 3F	8.0 oz.	PF			X						
Carbaryl	16.0 oz.	2C					X				
Penncap-M	16.0 oz	3-5C						X	X	X	
Imidan 70W	16.0 oz.	6C				X					X
2. NTN 1.6	2.0 oz.	PF, 2,4,5C			X		X		X	X	
Guthion 3F	8.0 oz.	PF-1,3-6C			X	X		X	X	X	X
3. Asana XL	2.0 oz.	1/2" G	X								
Lorsban 50W	12.0 oz.	PF-3C			X	X	X	X			
Imidan 70W	16.0 oz.	4-6C							X	X	X
4. Danspray 2.4 E	1.3 oz.	1/2" G, 2C	X				X				
Guthion 3F	8.0 oz.	PF			X						
Imidan 70W	16.0 oz.	1,4-6C				X			X	X	X
5. Danspray 2.4 E	2.7 oz.	1/2" G, 2C	X				X				
Guthion 3F	8.0 oz.	PF			X						
Imidan 70W	16.0 oz.	1,4-6C				X			X	X	X
6. Danspray 2.4 E	4.0 oz.	1/2" G, 2C	X				X				
Guthion 3F	8.0 oz.	PF			X						
Imidan 70W	16.0 oz.	1,4-6C				X			X	X	X
7. Danspray 2.4 E	1.3 oz.	1/2" G	X								
Danspray EXP.	1.3 oz.	2C					X				
Guthion 3F	8.0 oz.	PF			X						
Imidan 70W	16.0 oz.	1,4-6C				X			X	X	X
8. Danspray 2.4 E	2.7 oz.	1/2" G	X								
Danspray EXP.	2.7 oz.	2C					X				
Guthion 3F	8.0 oz.	PF			X						
Imidan 70W	16.0 oz.	1,4-6C				X			X	X	X
9. Danspray 2.4 E	4.0 oz.	1/2" G	X								
Danspray EXP.	4.0 oz.	2C					X				
Guthion 3F	8.0 oz.	PF			X						
Imidan 70W	16.0 oz.	1,4-6C				X			X	X	X
10. Asana XL	2.0 oz.	1/2" G	X								
Guthion 3F	8.0 oz.	PF			X						
RH 5992 2F	6.4 oz.	2-5C					X	X	X	X	
Imidan 70W	12.0 oz.	6C									X
11. Asana XL	2.0 oz.	1/2" G	X								
Guthion 3F	8.0 oz.	PF			X						
RH 5992 WP	2.3 oz.	2-5C					X	X	X	X	
Imidan 70W	12.0 oz.	6C									X
12. Align	7.0 oz.	PF-4C			X	X	X	X	X		
Guthion 3F	8.0 oz.	PF			X						
Imidan 70W	12.0 oz.	1-6C				X	X	X	X	X	X
13. Imidan 70W	16.0 oz.	1/2" G	X								
Endosulfan 50W	16.0 oz.	1/2" G, 4C	X						X		
Imidan 70W	18.0 oz.	PF-1C			X	X					
Imidan 70W	12.0 oz.	2-6C					X	X	X	X	X
Dipel	2.0 oz.	3C						X			
14. Untreated	-	-									

*Treatments 1 - 9, 12, 13 recieved AG-98 at 2 oz. / 100 from PF to EOS. Treatments 10, 11 recieved AG-98 at 12 oz. / 100 from PF to EOS. Treatments 1,3,10,11 recieved Sunspray 6E for 1/2" G.