RESULTS OF
2001
INSECTICIDE AND ACARICIDE TRIALS IN EASTERN NEW YORK

R.W. STRAUB, Professor of Entomology
Research Support Specialist.......... P. J. Jentsch
Technical Assistant......................H. Grimsland

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

Tel: (845) 691-7151
FAX: (845) 691-2719
e-mail: rws9@cornell.edu

*Part of the N. Y. State (Geneva) Agricultural Experiment Station

Cornell's Hudson Valley Lab Publication #F/V-01
November 2001

TABLE OF CONTENTS

APPLE: Malus domestica 'Ginger Gold'

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)
Redbanded leafroller (RBLR): *Argyrotaenia velutinana* (Walker)
Rosy apple aphid (RAA): *Dysaphis plantaginea* (Passerini)
Tarnished plant bug (TPB): *Lygus lineolaris* (P. de B.)

EVALUATION OF INSECTICIDES AGAINST EARLY-SEASON INSECT PESTS OF APPLE, 2001: Treatments were applied to four-tree plots (one of which was 'Ginger Gold') replicated four times in a randomized complete block design. Treatments were applied dilute to runoff using a high-pressure handgun sprayer at 300 psi delivering 57 gal/acre. Tree-row volume calculations were not used - all insecticide dilutions are presented as amt/100 gal - (based on the standard 400 gal/acre trees). Trees on the M.26 rootstock were 7 yr-old. Treatments were applied on various schedules as shown in Table 1. Damage to fruit was assessed by randomly selecting 100 fruits prior to 'June drop' (1 June) and scoring for external damage. Damage by RAA was assessed by 3 min counts/tree of curled cluster leaves containing live aphids. Leafroller were assessed by sampling 20 terminals/tree, and evaluating 5 distal leaves for larval damage. Damage data from all categories were converted to percent damage and transformed by arcsine (square root of x) prior to analysis by Fisher's Protected LSD.

Weather during the early portion of the '01 season was unusually dry with relatively high temperatures, poor conditions for vegetative growth and fruit development (see APPENDIX I) These conditions probably had little impact on early season insect pests, other than an extended bloom period that tends to make management of PC more difficult.

Fruit feeding damage - Infestation pressure from PC was moderate. All treatments that started at 'pink' maintained control of PC below 5%, while all schedules that started at PF generally allowed excessive damage – further evidence that 'soft' materials require prebloom applications to control this pest. Control of plant bug (TPB) was variable with no apparent rate response – Actara in general provided very good efficacy.

Foliar feeding damage – Terminal infestation by overwintering OBLR was relatively high. In general, all standard programs containing OP's or pyrethroids provided good control, while the 'soft' programs did not.

Table 1. Evaluation of insecticides for controlling pest complex on apple[1], N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2001

Treatment	Formulation amt./100 gal.	Timing	PC	% Damaged fruit: EAS	TPB	GFW	MPB	% Damaged clusters / terminals: RAA	RBLR	OBLR
1. Provado 1.6F +	2.0 oz.	PF, 1C	5.2 cd	0.0 a	4.5 abcd	0.0 a	0.5 a	0.0 a	0.9 a	35.5 de
Guthion 50W	8.0 oz.	PF, 1C								
Baythriod 2E	0.35 oz.	2-6C								
2. Provado 1.6F +	2.0 oz.	PF, 1C	3.5 abcd	0.2 ab	8.9 f	0.9 c	0.2 a	0.0 a	0.9 a	48.9 f
Guthion 50W	8.0 oz.	PF, 1C								
Baythriod 20WP	0.44 oz.	2-6C								
3. Calypso 4SC	0.5 oz.	P	1.4 abc	0.0 a	3.0 a	0.0 a	0.9 a	0.0 a	1.6 ab	11.9 bc
Calypso 4SC	1.0 oz.	PF-6C								
4. Calypso 4SC	1.0 oz.	P	0.5 a	0.9 ab	7.2 bcdef	0.0 a	0.5 a	0.0 a	0.0 a	14.8 c
Calypso 4SC	2.0 oz.	PF-6C								
5. Calypso 4SC	1.0 oz.	PF, 14dpa	5.2 cd	2.1 bc	4.2 abcde	0.0 a	0.5 a	0.0 a	3.3 b	33.0 de
6. Calypso 4SC	0.5 oz.	1C	11.4 ef	3.8 cd	4.2 abcde	0.0 a	1.2 a	1.4 a	3.5 b	42.6 ef
Calypso 4SC	1.0 oz.	14dpa								
7. Actara	1.8 oz.	P, PF, 1C	0.9 ab	0.5 ab	3.8 ab	0.2 a	0.5 a	0.0 a	3.5 b	30.9 de
Proclaim 5SG	1.1 oz.	2-6C								
UF Oil	0.25%	2-6C								
8. Actara	1.8 oz.	P, PF, 1C	0.9 ab	0.5 ab	4.5 abcde	0.0 a	0.0 a	0.0 a	0.0 a	14.8 c
Proclaim 5SG	1.6 oz.	2-6C								
UF Oil	0.25%	2-6C								
9. Actara	1.8 oz.	P, PF, 1C	1.2 abc	0.0 a	2.1 a	0.0 a	0.0 a	0.0 a	1.2 a	31.8 de
Proclaim 5SG	1.1 oz.	2-6C								
Regulade	0.25%	2-6C								
10. Actara	1.8 oz.	P, PF, 1C	0.5 ab	0.0 a	2.6 a	0.0 a	0.0 a	0.0 a	1.2 a	27.4 d
Proclaim 5SG	1.1 oz.	2-6C								
11. Guthion 50W	10.0 oz.	P, PF, 1C	0.0 a	0.5 ab	3.5 ab	0.0 a	0.2 a	0.0 a	0.0 a	2.6 ab
Spintor	2.5 oz.	2-6C								
12. Warrior	1.1 oz.	P, PF, 1-6C	0.7 ab	0.2 ab	3.3 ab	0.0 a	0.0 a	0.0 a	0.2 a	5.4 abc
13. Asana XL	3.3 oz.	P, 4C	0.9 abc	0.5 ab	1.9 a	0.0 a	0.9 a	0.0 a	0.0 a	1.9 a
Avaunt 30WG	2.0 oz.	PF, 1C								
UF Oil	0.25%	PF								
Guthion 50W	8.0 oz.	2C								
Spintor	1.7 oz.	3C								
Avaunt 30WG	2.0 oz.	5-6C								
14. Avaunt 30WG	2.0 oz.	PF-6C	7.9 de	1.4 ab	8.4 def	0.0 a	0.9 a	0.0 a	0.9 a	31.8 de
15. Thiodan 50W	16.0 oz.	P	4.7 bcd	0.0 a	7.2 bcdef	0.0 a	0.2 a	1.9 a	0.0 a	1.9 a
Guthion 50W	10.0 oz.	P, PF-6C								
16. Guthion 50W	10.0 oz.	PF, 1C	15.6 f	1.6 abc	7.9 cdef	0.0 a	1.2 a	0.9 a	0.0 a	29.4 d
Spintor	2.5 oz.	PF								
Spintor / LI700	5.0 oz. / 16.0 oz	2-4C								
17. Supracide 25WP	16.0 oz.	P	2.8 abc	0.5 ab	4.0 abc	0.0 a	0.5 a	0.0 a	0.5 a	5.4 abc
Imidan 70WP	16.0 oz	PF, 1C, 2-6C								
Savey	1.3 oz.	1C								
Provado 2.4L	1.3 oz.	1C								
18. Untreated	-	-	21.3 g	5.0 d	8.6 ef	0.7 bc	0.9 a	0.0 a	5.4 c	36.5 def

[1]Data from ' Ginger Gold' on 1 June.

[2]Means followed by the same letter are not significantly different (Fishers Protected LSD; P=<0.05). Log and sq.rt.(x) transformation used prior to statistical analysis.

APPLE: *Malus domestica* 'Delicious'

Apple maggot (AM): *Rhagoletis pomonella* (Walsh)
Codling moth (CM): *Cydia pomonella* (Linnaeus)
European apple sawfly (EAS): *Hoplocampa testudinea* (Klug)
Green fruitworm (GFW): *Lithophane antennata* (Walker)
Obliquebanded leafroller (OBLR): *Choristoneura rosaceana* (Harris)
Plum curculio (PC): *Conotrachelus nenuphar* (Herbst)
San Jose scale (SJS): *Quadraspidiotus perniciosus* (Comstock)
Tarnished plant bug (TPB): *Lygus lineolaris* (P. de B.)

HARVEST EVALUATION OF INSECTICIDES AGAINST FRUIT-FEEDING INSECTS ON THREE APPLE CULTIVARS OF DIFFERENT MATURITIES, 2001: Treatments were applied to four-tree plots (of which 'Delicious' was included) replicated four times in a randomized complete block design. All treatments were applied dilute to runoff using a high-pressure handgun sprayer at 300 psi delivering 57 gal/acre. Tree-row volume calculations were not used - all insecticide dilutions are presented as amt/100 gal - (based on the standard 400 gal/acre trees). Trees on the M.26 rootstock were 7 years old. Treatments were applied on various schedules as shown in Table 2. Damage to fruit was assessed by randomly selecting 100 fruit at harvest maturity and scoring for external damage by each pest; subsequently, fruits were dissected to detect internal damage. Early PC damage is characterized by the typical crescent-shaped scar resulting from the flap of apple epidermis made by an oviositing female. Late PC damage is characterized by a feeding or oviposition cavity lacks the typical crescent-shaped scar. Damage by early Lepidoptera includes GFW & OBLR; late Lepidoptera includes OBLR and/or redbanded leafroller, and internal damage was caused primarily by CM. Data were converted to % damaged fruit, and transformed by arcsine (square root of x) prior to analysis by Fisher's Protected LSD.

Temperatures during August were above normal with below normal rainfall (APPENDIX). Insect infestation pressure was high; PC, TPB, and SJS populations in particular were higher than normal at the test site. Lack of early season rainfall, prior to and for 7 days after PF, contributed to an extended PC oviposition period and above normal damage from this pest. In spite of dry soil conditions during the emergence period, AM pressure was high.

With few exceptions, control of PC oviposition was good – particularly given the extreme pressure (50.9%, untreated). Calypso treatments 5 & 6 were designed for CM control and were not expected to manage PC. High levels of feeding by adults suggest poor performance after the 2C period. Control of TPB generally requires an application during 'pink'. CM pressure was not severe and all schedules provided control. SJS infestations are generally not evenly distributed throughout the test orchard and variability is usually high – therefore, good results may be a function of non-infestation. Poor results however, are an indication of non-efficacy. AM populations were extreme and few schedules maintained damage below 5%. Full schedules of Calypso (#'s 3 & 4), and schedules that included either Guthion or Imidan during late season provided excellent control of AM.

Table 2. Harvest evaluation of insecticides for controlling pest complex on apple[1], N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2001

Treatment	Formulation amt./100 gal.	Timing	% Damaged fruit PC ovip.[2]	PC adult[2]	E. Lep.	TPB	CM	L. Lep	SJS	AM	Clean
1. Provado 1.6F +	2.0 oz.	PF, 1C	1.0 abcd	0.0 a	0.0 a	5.2 bcde	0.6 a-e	0.7 abc	3.7 a-d	18.6 cde	59.9 def
Guthion 50W	8.0 oz.	PF, 1C									
Baythriod 2E	0.35 oz.	2-6C									
2. Provado 1.6F +	2.0 oz.	PF, 1C	0.8 abcd	0.1 a	0.0 a	2.5 abcd	0.2 a-d	0.0 a	0.0 a	7.9 abc	85.2 gh
Guthion 50W	8.0 oz.	PF, 1C									
Baythriod 20WP	0.44 oz.	2-6C									
3. Calypso 4SC	0.5 oz.	P	0.3 ab	5.6 def	0.1 a	1.7 ab	0.2 a-d	5.8 ef	8.8 cd	4.8 ab	63.4 d-f
Calypso 4SC	1.0 oz.	PF-6C									
4. Calypso 4SC	1.0 oz.	P	0.0 a	1.7 abcde	0.0 a	1.8abc	0.0 a	7.6 f	13.6 d	4.6 ab	56.7 d-f
Calypso 4SC	2.0 oz.	PF-6C									
5. Calypso 4SC	1.0 oz.	PF, 14dpa	5.0 de	2.9 bcde	0.1 a	5.9 cde	1.1 d-e	14.8 g	2.6 a-d	48.1 gh	22.1 b
6. Calypso 4SC	0.5 oz.	1C	36.0 f	4.3 cdef	0.0 a	7.3 def	0.8 b-e	6.7 ef	0.4 a-c	29.2 d-g	28.9 bc
Calypso 4SC	1.0 oz.	14dpa									
7. Actara	1.8 oz.	P, PF, 1C	4.5 cde	0.0 a	0.0 a	8.2 ef	1.1 c-e	0.8 abc	2.3 a-d	45.2 f-h	45.0 b-d
Proclaim 5SG	1.1 oz.	2-6C									
UF Oil	0.25%	2-6C									
8. Actara	1.8 oz.	P, PF, 1C	1.1 abcd	1.0 abcd	0.0 a	3.9 bcde	0.1 abc	0.0 a	0.0 a	16.2 b-e	76.4 f-h
Proclaim 5SG	1.6 oz.	2-6C									
UF Oil	0.25%	2-6C									
9. Actara	1.8 oz.	P, PF, 1C	2.9 bcde	6.3 ef	0.0 a	1.9 abc	1.6 e	4.0 def	7.8 b-d	31.3 e-g	46.3 cd
Proclaim 5SG	1.1 oz.	2-6C									
Regulade	0.25%	2-6C									
10. Actara	1.8 oz.	P, PF, 1C	0.2 ab	3.2 bcde	0.0 a	0.2 a	0.5 a-e	3.3 cdef	3.4 a-d	25.9 d-f	57.9 d-f
Proclaim 5SG	1.1 oz.	2-6C									
11. Guthion 50W	10.0 oz.	P, PF, 1C	0.4 ab	0.5 ab	0.0 a	0.6 a	0.0 a	0.7 ab	0.2 a-c	33.4 e-g	61.0 d-f
Spintor	2.5 oz.	2-6C									
12. Warrior	1.1 oz.	P, PF, 1-6C	0.9 abcd	0.1 a	0.0 a	2.3 abc	0.1 a-c	0.1 a	4.6a-d	17.3 b-e	64.5 d-g
13. Asana XL	3.3 oz.	P, 4C	0.0 a	1.8 abcde	0.0 a	0.4 a	0.1 a-d	1.1 abcd	2.6 a-d	18.0 c-e	71.9 e-g
Avaunt 30WG	2.0 oz.	PF, 1C									
UF Oil	0.25%	PF									
Guthion 50W	8.0 oz.	2C									
Spintor	1.7 oz.	3C									
Avaunt 30WG	2.0 oz.	5-6C									
14. Avaunt 30WG	2.0 oz.	PF-6C	1.4 abcd	0.6 abc	0.0 a	4.2 bcde	0.0 a	0.6 ab	0.0 a	12.6 b-d	55.1 d-f
15. Thiodan 50W	16.0 oz.	P	0.5 abc	1.2 abcd	0.0 a	3.4 bcde	0.0 a	0.4 ab	0.0 a	0.7 a	90.4 h
Guthion 50W	10.0 oz.	P, PF-6C									
16. Guthion 50W	10.0 oz.	PF, 1C	7.1 e	9.7 f	0.0 a	4.5 bcde	0.0 a	2.5 bcde	0.0 a	19.3 c-e	52.6 c-e
Spintor	2.5 oz.	PF									
Spintor / LI700	5.0 oz. / 16.0 oz	2-4C									
17. Supracide 25WP	16.0 oz.	P	1.6 abcd	0.1 a	0.0 a	4.7 bcde	0.0 a	0.0 a	0.0 a	0.7 a	90.1 h
Imidan 70WP	16.0 oz	PF, 1C, 2-6C									
Savey	1.3 oz.	1C									
Provado 2.4L	1.3 oz.	1C									
18. Untreated	-	-	50.9 f	74.5 g	0.9 b	14.0 f	9.4 f	22.6 g	9.4 f	62.4 h	2.5 a

Means by followed by the same letter are not significantly different (Fishers Protected LSD; P=<0.05). Arc sine transformation used prior to analysis.

[1] Data from 'Delicious' harvested on 5 October.

[2] Typical damage done at oviposition (ovip); and damge done by adult feeding (adult)

APPLE: Malus domestica 'Delicious'

Potato leafhopper (PLH): *Empoasca fabae* (Harris)
Rose leafhopper (RLH): *Edwardsaina rosae* (Linnaeus)
White apple leafhopper (WALH): *Typhlocyba pomaria* McAtee
Redbanded leafroller (RBLR): *Argyrotaenia velutinana* (Walker)
Obliquebanded leafroller (OBLR): *Choristoneura rosaceana* (Harris)

EVALUATION OF INSECTICIDES AGAINST LEAFHOPPER AND LEAFROLLER PESTS OF APPLE, 2001: Treatments were applied to four-tree (of which 'Delicious' was included) plots replicated four times in a randomized complete block design. Treatments were applied dilute to runoff using a high-pressure handgun sprayer operated at 300 psi, delivering 57 gal/acre. Tree-row volume calculations were not used - all insecticide dilutions are presented as amt/100 gal - (based on the standard 400 gal/acre trees). Trees on the M.7 rootstock were 7 yr-old. Treatments were applied on various schedules as shown in Table 3. Adult leafhopper infestations were assessed on 1 July by sampling 5 terminals per tree, evaluating 5 proximal leaves for PLH and 5 distal leaves for WALH/RLH. Leafroller infestations were assessed on 11 July by sampling 20 terminals per tree and evaluating 5 proximal leaves for live larvae. Data were subjected to log transformation prior to analysis by Fisher's Protected LSD.

PLH immigrations throughout the Northeast were early during 2001, and populations on terminals were very high during the sampling period. WALH/RLH populations were below normal. A good or adequate treatment for WALH/RLH would be expected to outperform Guthion, to which this complex is resistant. Generally good control was provided by Provado, Calypso, Actara, Warrior and Spintor programs. Against PLH, which reinfests new growth not covered by insecticide residues, Provado, Calypso, Actara + Proclaim w/UF oil, Warrior and Spintor programs were effective. All programs provided good efficacy against leafroller larvae - except Calypso that generally appeared to be weak against these pests.

Table 3. Evaluation of insecticides for controlling leafhopper and leafroller complex on apple, N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2001

Treatment	Formulation amt./100 gal.	Timing[2]	# of LH nymphs / 25 leaves[1] rose & white apple leafhopper	potato leafhopper	# live larva / 10 terminals 7/11 OBLR / RBLR
1. Provado 1.6F +	2.0 oz.	PF, 1C	0.9 a	5.7 abc	0.00 a
Guthion 50W	8.0 oz.	PF, 1C			
Baythriod 2E	0.35 oz.	2-3C			
2. Provado 1.6F +	2.0 oz.	PF, 1C	2.3 ab	3.9 abc	0.19 ab
Guthion 50W	8.0 oz.	PF, 1C			
Baythriod 20WP	0.44 oz.	2-3C			
3. Calypso 4SC	0.5 oz.	P	0.0 a	2.7 ab	1.32 c
Calypso 4SC	1.0 oz.	PF-3C			
4. Calypso 4SC	1.0 oz.	P	0.0 a	2.3 ab	0.19 ab
Calypso 4SC	2.0 oz.	PF-3C			
5. Calypso 4SC	1.0 oz.	PF, 14dpa	0.9 a	34.3 fg	0.72 b
6. Calypso 4SC	0.5 oz.	1C	2.3 ab	27.6 efg	0.72 bc
Calypso 4SC	1.0 oz.	14dpa			
7. Actara	1.8 oz.	P, PF, 1C	0.9 a	5.3 abc	0.19 ab
Proclaim 5SG	1.1 oz.	2-3C			
UF Oil	0.25%	2-3C			
8. Actara	1.8 oz.	P, PF, 1C	4.3 abc	6.4 abc	0.19 ab
Proclaim 5SG	1.6 oz.	2-3C			
UF Oil	0.25%	2-3C			
9. Actara	1.8 oz.	P, PF, 1C	0.9 a	11.4 bcd	0.00 a
Proclaim 5SG	1.1 oz.	2-3C			
Regulade	0.25%	2-3C			
10. Actara	1.8 oz.	P, PF, 1C	4.3 abc	11.7 bcd	0.35 ab
Proclaim 5SG	1.1 oz.	2-3C			
11. Guthion 50W	10.0 oz.	P, PF, 1C	9.8 d	24.9 def	0.00 a
Spintor	2.5 oz.	2-3C			
12. Warrior	1.1 oz.	P, PF, 1-3C	0.0 a	0.9 a	0.00 a
13. Asana XL	3.3 oz.	P, 3C	2.7 abc	13.5 cde	0.00 a
Avaunt 30WG	2.0 oz.	PF, 1C			
UF Oil	0.25%	PF			
Guthion 50W	8.0 oz.	2C			
Spintor	1.7 oz.	3C			
14. Avaunt 30WG	2.0 oz.	PF-3C	4.3 abc	3.7 abc	0.00 a
15. Thiodan 50W	16.0 oz.	P	7.5 cd	8.2 abc	0.35 ab
Guthion 50W	10.0 oz.	P, PF-2C			
16. Guthion 50W	10.0 oz.	PF, 1C	1.8 a	6.0 abc	0.00 a
Spintor	2.5 oz.	PF			
Spintor / LI700	5.0 oz. / 16.0 oz	2-3C			
17. Supracide 25WP	16.0 oz.	P	3.3 abc	9.1 abc	0.35 ab
Imidan 70WP	16.0 oz	PF, 1C, 2-3C			
Savey	1.3 oz.	1C			
Provado 2.4L	1.3 oz.	1C			
18. Untreated	-	-	7.1 bcd	46.8 g	1.40 c

Means followed by the same letter are not significantly different (Fishers Protected LSD; P=<0.05). Log transformation used prior to statistical analysis.

1 Data from ' Delicious' on 1 July.

2 Application dates: Pink on 2 May; PF on 11 May; 1C on 24 May; 2C on 5 June; 3C on 26 June

APPLE: Malus domestica 'Liberty'

Rose leafhopper (RLH): *Edwardsaina rosae* (Linnaeus)
White apple leafhopper (WALH): *Typhlocyba pomaria* McAtee

EVALUATION OF STANDARD AND REDUCED RATES OF INSECTICIDES AGAINST LEAFHOPPER ADULTS ON APPLE, 2001: Treatments were applied to four-tree plots (in a commercial orchard), replicated four times in a randomized complete block design. Treatments were applied dilute to runoff using a high-pressure handgun sprayer at 300 psi delivering 57 gal/acre. Tree-row volume calculations were not used - all insecticide dilutions are presented as amt/100 gal - (based on the standard 400 gal/acre trees). Trees on the M.26 rootstock were ≈10 yr-old. Single application treatments were applied 18 Sept. after a precount of adults had been completed. Treatments were: Provado @ the standard rate (2 oz/100 gal) and @ one-quarter the standard rate (0.5 oz/100 gal); Sevin XLR @ the standard rate (16 oz.100 gal) and @ one-quarter the standard rate (4 oz/100 gal); and untreated. Efficacy against adults was assessed at 3d (PHI for carbaryl) and 7d (PHI for Provado) postapplication by sweeping the exterior and interior foliage for 3 min with a vacuum device. Percent reduction estimates were computed by using the precount assessments, and correction for untreated mortality by Abbott's formula. Data from adult count categories were transformed by Log_{10} prior to analysis by Fisher's Protected LSD.

Leafhopper populations were very high and consisted of ≈ 80% RLH and 20% WALH. At 3d postapplication all treatments reduced populations >90%, with the quarter rate of Sevin being the least effective (Table 3xx). At 7d postapplication, Provado at both rates reduced adults to a significantly greater degree than did Sevin. Results suggest that a reduced rate of Provado controls adults as well as the maximum-labeled rate. Sevin provided rapid knockdown, but displayed considerable loss of effectiveness (particularly the reduced rate) by 7d postapplication.

Table 3xx. Evaluation of maximum and reduced rates of insecticides for controlling leafhopper adults on 'Liberty' apple, Hepworth Farms, Milton, NY –2001.

Treatment[1]	Amt. per 100 gal	Precount # adults[2]	3 day post appn. # adults	3 day post appn. % redn.[3]	7 day post appn. # adults	7 day post appn. % redn.[3]
Provado 1.6F	2 oz	116.5 a	6.1 ab	93.4	2.9 a	95.3
Provado 1.6F	0.5 oz	120.1 a	7.3 ab	94.8	2.9 a	97.4
		MEAN	*6.7*	*94.1*	*2.9*	*96.4*
Sevin XLR	16 oz	96.9 a	3.8 a	95.9	12.5 b	86.3
Sevin XLR	4 oz	81.2 a	9.9 b	87.3	23.5 bc	69.3
		MEAN	*6.9*	*91.5*	*18.0*	*77.8*
Untreated	-	82.2 a	78.6 c	-	77.2 c	-

Treatments followed by the same letter are not significantly different (P<0.05; Fisher's Protected LSD test). Data transformed by Log_{10} prior to analysis.

[1]Single application.

[2]Applications made the same day (18 September).

[3]Corrected for untreated mortality by Abbott's formula.

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

MITE CONTROL WITH INSECTICIDES, 2001: Treatments were applied to four-tree plots (of which 'Delicious' was included) replicated four times. Treatments were applied dilute to runoff using a high-pressure handgun sprayer at 300 psi delivering 57 gal/acre. Tree-row volume calculations were not used - all insecticide dilutions are presented as amt/100 gal - (based on the standard 400 gal/acre trees). Trees on the M.7 rootstock were 4 yr-old. Seasonal treatments were applied on various schedules as shown in Tables 4a & 4b. Phytophagous and predacious mite populations were evaluated by sampling 25 leaves from each plot on 24 July. 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. Data were subjected to log transformation prior to analysis by Fisher's Protected LSD.

All treatments received 2-6 insecticide applications prior to the mite assessment, at which time ERM and TSM populations in most treatments were well below the July threshold of 5.0 motile mites/leaf – exceptions were Provado #1 & #2 (both included Baythriod) and Calypso #5. Egg counts for both mite species were low in number – except for the Provado schedules that included Baythroid, selected Calypso schedules, Warrior and Avaunt (#14). No schedule flared ARM to economic significance. Many treatments had minimal effects on predatory mites (AMB & ZM) – Avaunt (#14) appeared to be especially kind to these natural enemies.

Table 4a. First evaluation of insecticides for controlling early season mite complex on apple[1], N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2001

Treatment	Formulation amt./100 gal.	Timing[1]	ERM	ERME	TSM	TSME	AMB	ZM	ARM
1. Provado 1.6F +	2.0 oz.	PF, 1C	0.7 a	1.0 a	0.7 bcd	0.3 a	0.0 a	0.0 a	29.5 cdef
Guthion 50W	8.0 oz.	PF, 1C							
Baythriod 2E	0.35 oz.	2-3C							
2. Provado 1.6F +	2.0 oz.	PF, 1C	1.8 a	1.7 a	1.0 cd	0.6 a	0.0 a	0.1 a	50.8 ef
Guthion 50W	8.0 oz.	PF, 1C							
Baythriod 20WP	0.44 oz.	2-3C							
3. Calypso 4SC	0.5 oz.	P	1.1 a	1.0 a	0.4 abcd	0.3 a	0.1 a	0.1 a	4.7 ab
Calypso 4SC	1.0 oz.	PF-3C							
4. Calypso 4SC	1.0 oz.	P	0.8 a	2.4 a	0.3 abc	0.1 a	0.1 a	0.2 a	70.6 f
Calypso 4SC	2.0 oz.	PF-3C							
5. Calypso 4SC	1.0 oz.	PF , 14dpa	1.3 a	1.8 a	1.1 d	0.5 a	0.0 a	0.0 a	24.0 cdef
6. Calypso 4SC	0.5 oz.	1C	1.0 a	2.6 a	0.2 ab	0.2 a	0.0 a	0.1 a	38.3 ef
Calypso 4SC	1.0 oz.	14dpa							
7. Actara	1.8 oz.	P, PF, 1C	0.7 a	0.7 a	0.3 ab	0.0 a	0.0 a	0.1 a	2.8 a
Proclaim 5SG	1.1 oz.	2-3C							
UF Oil	0.25%	2-3C							
8. Actara	1.8 oz.	P, PF, 1C	0.2 a	0.5 a	0.3 ab	0.2 a	0.0 a	0.0 a	9.0 abcd
Proclaim 5SG	1.6 oz.	2-3C							
UF Oil	0.25%	2-3C							
9. Actara	1.8 oz.	P, PF, 1C	0.2 a	0.4 a	0.3 ab	0.0 a	0.0 a	0.2 a	16.5 bcde
Proclaim 5SG	1.1 oz.	2-3C							
Regulade	0.25%	2-3C							
10. Actara	1.8 oz.	P, PF, 1C	0.5 a	0.6 a	0.0 a	0.1 a	0.0 a	0.2a	8.8 abcd
Proclaim 5SG	1.1 oz.	2-3C							
11. Guthion 50W	10.0 oz.	P, PF, 1C	0.6 a	1.1 a	0.2 ab	0.2 a	0.0 a	0.1 a	7.7 abc
Spintor	2.5 oz.	2-3C							
12. Warrior	1.1 oz.	P, PF, 1-3C	0.1 a	0.3 a	0.2 ab	0.1 a	0.0 a	0.0 a	19.6 bcdef
13. Asana XL	3.3 oz.	P	0.4 a	0.3 a	0.3 ab	0.1 a	0.0 a	0.0 a	14.2 bcde
Avaunt 30WG	2.0 oz.	PF , 1C							
UF Oil	0.25%	PF							
Guthion 50W	8.0 oz.	2C							
Spintor	1.7 oz.	3C							
14. Avaunt 30WG	2.0 oz.	PF-3C	0.4 a	1.0 a	0.2 ab	0.2 a	0.0 a	0.1 a	16.7 bcdef
15. Thiodan 50W	16.0 oz.	P	0.8 a	1.0 a	1.1 d	0.4 a	0.1 a	0.0 a	24.1 cdef
Guthion 50W	10.0 oz.	P, PF-2C							
16. Guthion 50W	10.0 oz.	PF, 1C	0.1 a	0.2 a	0.1 ab	0.1 a	0.0 a	0.1 a	3.8 ab
Spintor	2.5 oz.	PF							
Spintor / LI700	5.0 oz. / 16.0 oz	2-3C							
17. Supracide 25WP	16.0 oz.	P	0.3 a	0.8 a	0.0 a	0.1 a	0.0 a	0.1 a	14.3 bcde
Imidan 70WP	16.0 oz	PF, 1C, 2-3C							
Savey	1.3 oz.	1C							
Provado 2.4L	1.3 oz.	1C							
18. Untreated	-	-	0.7 a	0.7 a	0.2 ab	0.1 a	0.0 a	0.1a	33.9 ef

Means followed by the same letter are not significantly different (Fishers Protected LSD; P=<0.05). Log transformation used prior to statistical analysis

[1] Data from 'Delicious' on 28 June. Application dates: Pink on 2 May; PF on 11 May; 1C on 24 May; 3C on 26 June.

Table 4b. Second evaluation of insecticides for controlling early season mite complex on apple[1], N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2001

Treatment	Formulation amt./100 gal.	Timing[1]	ERM	ERME	TSM	TSME	AMB	ZM	ARM
1. Provado 1.6F +	2.0 oz.	PF, 1C	13.5 d	32.0 c	3.4 d	5.4 d	0.1 a	0.1 a	72.5 abc
Guthion 50W	8.0 oz.	PF, 1C							
Baythriod 2E	0.35 oz.	2-6C							
2. Provado 1.6F +	2.0 oz.	PF, 1C	6.5 cd	21.4 bc	2.4 cd	4.1 cd	0.0 a	0.3 ab	33.0 ab
Guthion 50W	8.0 oz.	PF, 1C							
Baythriod 20WP	0.44 oz.	2-6C							
3. Calypso 4SC	0.5 oz.	P	1.9 abc	5.0 ab	1.2 bc	1.2 abc	0.1 a	0.2 a	238.8 cd
Calypso 4SC	1.0 oz.	PF-6C							
4. Calypso 4SC	1.0 oz.	P	2.4 bc	4.7 a	0.7 ab	1.1 ab	0.0 a	0.3 ab	91.4 abcd
Calypso 4SC	2.0 oz.	PF-6C							
5. Calypso 4SC	1.0 oz.	PF , 14dpa	0.9 ab	2.8 a	0.3 ab	1.1 ab	0.0 a	0.1 a	75.2 abcd
6. Calypso 4SC	0.5 oz.	1C	2.4 bc	5.1 ab	0.4 ab	0.1 a	0.0 a	0.2 a	66.4 abc
Calypso 4SC	1.0 oz.	14dpa							
7. Actara	1.8 oz.	P, PF, 1C	0.4 ab	1.2 a	0.2 ab	0.2 a	0.0 a	0.1 a	21.6 a
Proclaim 5SG	1.1 oz.	2-6C							
UF Oil	0.25%	2-6C							
8. Actara	1.8 oz.	P, PF, 1C	0.2 a	1.1 a	0.5 ab	0.2 a	0.1 a	0.0 a	72.5 abc
Proclaim 5SG	1.6 oz.	2-6C							
UF Oil	0.25%	2-6C							
9. Actara	1.8 oz.	P, PF, 1C	0.7 ab	1.1 a	0.2 ab	0.2 a	0.1 a	0.3 ab	115.6 abcd
Proclaim 5SG	1.1 oz.	2-6C							
Regulade	0.25%	2-6C							
10. Actara	1.8 oz.	P, PF, 1C	0.4 ab	1.1 a	0.2 ab	0.3 a	0.0 a	0.2 a	218.5 cd
Proclaim 5SG	1.1 oz.	2-6C							
11. Guthion 50W	10.0 oz.	P, PF, 1C	0.7 ab	1.7 a	0.1 a	0.1 a	0.0 a	0.3 a	115.6 abcd
Spintor	2.5 oz.	2-6C							
12. Warrior	1.1 oz.	P, PF, 1-6C	1.1 ab	2.5 a	0.7 ab	1.3 abc	0.0 a	0.0 a	117.1 abcd
13. Asana XL	3.3 oz.	P, 4C	0.4 ab	1.2 a	0.2 ab	0.9 ab	0.0 a	0.1 a	205.9 cd
Avaunt 30WG	2.0 oz.	PF , 1C							
UF Oil	0.25%	PF							
Guthion 50W	8.0 oz.	2C							
Spintor	1.7 oz.	3C							
Avaunt 30WG	2.0 oz.	5-6C							
14. Avaunt 30WG	2.0 oz.	PF-6C	0.8 ab	3.6 a	0.7 ab	2.3 bcd	0.2 a	1.0 c	78.4 abcd
15. Thiodan 50W	16.0 oz.	P	0.3 ab	0.9 a	0.2 ab	0.2 a	0.0 a	0.0 a	156.6 bcd
Guthion 50W	10.0 oz.	P, PF-2C							
16. Guthion 50W	10.0 oz.	PF, 1C	0.5 ab	1.5 a	0.5 ab	0.5 ab	0.0 a	0.7 bc	86.6 abcd
Spintor	2.5 oz.	PF							
Spintor / LI700	5.0 oz. / 16.0 oz	2-4C							
17. Supracide 25WP	16.0 oz.	P	0.3 ab	0.7 a	0.1 a	0.1 a	0.0 a	0.0 a	310.7 d
Imidan 70WP	16.0 oz	PF, 1C, 2-6C							
Savey	1.3 oz.	1C							
Provado 2.4L	1.3 oz.	1C							
18. Untreated	-	-	0.4 ab	0.9 a	0.1 a	0.6 ab	0.0 a	0.3 ab	75.6 abcd

Means followed by the same letter are not significantly different (Fishers Protected LSD; P=<0.05). Log transformation used prior to statistical analysis

[1]Data from ' Red Delicious' on 24 July. Application dates: Pink on 2 May; PF on 11 May; 1C on 24 May; 3C on 26 June; 4C on 12 July

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 MITICIDES, 2001: Treatments were applied to four-tree (of which 'Delicious' was included) plots replicated four times in a randomized complete block design. All treatments were applied dilute to runoff using a high-pressure handgun sprayer at 300 psi delivering 57 gal/acre. Tree-row volume calculations were not used - all insecticide dilutions are presented as amt/100 gal - (based on the standard 400 gal/acre trees). Trees on the M.7 rootstock were 4 yr-old. Seasonal treatments were applied on various schedules as shown in Table 5. Phytophagous and predacious mite populations were evaluated by sampling 25 leaves 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. Data were subjected to log transformation prior to analysis by Fisher's Protected LSD.

Mite assessments were made 26 June & 9 July. Mite populations were low but adequate for efficacy evaluation. At the first evaluation, the untreated population was at threshold of 2.5 mites/leaf. At this time, treatments scheduled for application at threshold had not yet been applied. At the second evaluation, all PF applications maintained populations below the July threshold (5.0 mites/leaf), while all threshold applications lowered populations below threshold. No schedule flared ARM to economic significance. Predatory mites were absent in all treatments.

Table 5. Evaluation miticides for controlling mite complex on apple , N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2001

Treatment*	Formulation amt./100 gal.	Timing[1]	ERM	ERME	TSM	TSME	AMB	ZM	ARM
1 Envior 240SC	3.5 oz.	PF	0.2 a	0.5 a	0.1 a	0.1 a	0.0 a	0.1 a	13.8 a
2 Envior 240SC	3.5 oz.	Untreated	1.2 a	2.2 a	0.4 a	0.2 a	0.0 a	0.4 b	23.9 a
3 Pyramite	1.5 oz.	Untreated	0.4 a	1.5 a	0.2 a	0.1 a	0.0 a	0.0 a	17.6 a
4 AgriMek / oil	3.3 oz.	PF	0.2 a	0.1 a	0.1 a	0.1 a	0.0 a	0.0 a	5.5 a
5 Acramite 50W + Silwet	2.7 oz.	Untreated	3.5 a	2.7 a	0.5 a	0.2 a	0.0 a	0.0 a	41.9 a
6 Acramite 50W + Silwet	4.0 oz.	Untreated	1.4 a	2.3 a	0.2 a	0.3 a	0.0 a	0.0 a	16.3 a
7 Acramite 50W + Silwet	5.4 oz.	Untreated	0.4 a	1.4 a	0.6 a	0.3 a	0.0 a	0.0 a	43.4 a
8 Untreated check	-	-	1.9 a	4.2 a	1.0 a	0.3 a	0.0 a	0.1 a	43.6 a

*Data from ' Red Delicious' on 26 June.

Treatment*	Formulation amt./100 gal.	Timing[1]	ERM	ERME	TSM	TSME	AMB	ZM	ARM
1 Envior 240SC	3.5 oz.	PF	0.1 a	1.5 a	0.1 a	0.0 a	0.0 a	0.0 a	15.1 a
2 Envior 240SC	3.5 oz.	early threshold	1.1 a	6.6 a	0.0 a	0.2 a	0.0 a	0.0 a	4.4 a
3 Pyramite	1.5 oz.	early threshold	0.2 a	6.7 a	0.0 a	0.0 a	0.0 a	0.0 a	5.0 a
4 AgriMek / oil	3.3 oz.	PF	0.2 a	1.2 a	0.0 a	0.1 a	0.0 a	0.0 a	6.8 a
5 Acramite 50W + Silwet	2.7 oz.	early threshold	0.3 a	5.9 a	0.0 a	0.3 a	0.0 a	0.0 a	8.2 a
6 Acramite 50W + Silwet	4.0 oz.	early threshold	0.3 a	6.0 a	0.0 a	0.0 a	0.0 a	0.0 a	16.5 a
7 Acramite50W + Silwet	5.4 oz.	early threshold	0.0 a	2.1 a	0.0 a	0.1 a	0.0 a	0.0 a	41.7 a
8 Untreated check	-	-	0.4 a	4.0 a	0.3 a	0.1 a	0.0 a	0.0 a	12.1 a

*Data from 'Delicious' on 9 July.

Application dates:PF on 16 May, early threshold on 5 July.

Means followed by the same letter are not significantly different (Fishers Protected LSD; P=<0.05). Log transformation used prior to statistical analysis

PEAR: *Pyrus communis* L. 'Bartlett'

Pear psylla(PP): *Cacopsylla pyricola* (Foerster)
Pear rust mite (PRM): *Epitrimerus pyri* (Nalepa)

PEAR PSYLLA CONTROL WITH CONVENTIONAL INSECTICIDE PROGRAMS, 2001: 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 24 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 200 GPA. Treatments were (application dates are listed in the Tables): Calypso [1.5 oz/100 gal @petal fall & 1st cover]; AgriMek [5 oz/100 @ petal fall]; Actara [1.5 & 1.8 oz/100 gal @ cluster bud]; Actara [1.5 & 1.8 oz/100 gal @ petal fall]; Actara [1.5 & 1.8 oz/100 gal @ threshold]; Provado [6 oz/100 gal @ threshold]; and untreated check. All plots received Guthion at petal fall (PF) and 12d post PF for plum curculio and pear midge. Insecticide efficacy against psylla was evaluated (11 & 25 June; 5 July) by sampling five terminals/treatment and from each we examined one proximal, one distal, and three mid-terminal leaves (25 leaf samples). Samples were removed to the laboratory, where psylla nymphs and eggs, and PRM were counted using a binocular scope. Data were transformed by $\log_{10}(X+1)$ prior to analysis by Fisher's Protected LSD test.

Pear rust mite populations were of no consequence. Psylla populations were high, with all the protocols requiring treatments to start at threshold (i.e., 1-2 nymphs/leaf) needing applications by the first evaluation date (11 June). At that time, all treatments receiving early season applications (#'s 1 through 6) held egg and nymph numbers at acceptable levels (Table 6a). Threshold protocols were enacted on 16 June, and by the next evaluation (25 June), threshold treatments had stopped psylla development – as expressed by decreased egg numbers (Table 6b). Because of high egg and nymph numbers, all treatments receiving early season applications (#'s 1 through 6) were retreated 3 July with the same insecticide. At the last evaluation (5 July), all treatments were below threshold, either due to efficacy or to naturally declining populations.

Of the early season applications, AgriMek and Actara (1.8 oz @ PF) appeared to be the best treatments. Calypso applied at PF and 1st cover had little effect on psylla. Although threshold applications appeared to have little immediate effect on nymphs, declines in egg numbers suggest some degree of efficacy from each treatment. Based on reduction in egg numbers (corrected for reduction in untreated check), the rankings were Actara @ 1.8 oz (73% reduction)> Provado (59% reduction)> Actara @ 1.5 oz (49% reduction).

Table 6a First evaluations of insecticides for controlling pear psylla and rust mite on Bartlett pear
N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2001

Treatment		Formulation amt./100 gal.	Application[1] Dates	6/11 # / Leaf[2] Nymphs	6/11 # / Leaf[2] Eggs	6/11 # / Leaf[2] Pear Rust Mites
1	Calypso 4SC PF, 1C	1.5 oz	5/7, 5/17	1.3ab	7.1ab	0.4
2	AgriMek PF	5.0 oz	5/7	0.2a	2.7a	0.0
3	Actara 25WG CB	1.5 oz	4/25	0.9ab	14.0 bc	0.0
4	Actara 25WG CB	1.8 oz	4/25	2.4ab	16.0 bcde	0.7
5	Actara 25WG PF	1.5 oz	5/7	0.9ab	14.6 bcde	1.1
6	Actara 25WG PF	1.8 oz	5/7	1.2ab	12.8 bc	1.3
7	Actara 25WG Threshold	1.5 oz	6/16	4.8 cd	37.5 ef	0.0
8	Actara 25WG Threshold	1.8 oz	6/16	5.5 cd	41.4 f	0.3
9	Provado 1.6F Threshold	6.0 oz	6/16	7.2 d	35.8 def	0.0
10	Untreated		-	7.4 d	26.7 cdef	0.0

Means followed by the same letter are not significantly different (P<0.5; Fishers Protected LSD). Data transformed by $\log_{10}(x+1)$ prior to analysis.

[1]Application Timings: Cluster bud (CB) on 25 April; Petal Fall (PF) on 7 May; Threshold on 16 June.

[2]Counts taken from 5 terminals / trmt. Each sample containing 5 proxmal leaves.

Table 6b. Second evaluations of insecticides for controlling pear psylla and rust mite on Bartlett pear N.Y.S.A.E.S., Hudson Valley Lab., Highland, N.Y.-2001

Treatment		Formulation amt./100 gal.	Application[1] Dates	6/25 # / Leaf[2] Nymphs	6/25 # / Leaf[2] Eggs	6/25 # / Leaf[2] Pear Rust Mites
1	Calypso 4SC PF, 1C	1.5 oz	5/7, 5/17	13.5 a	16.0 abcd	0.4 abc
2	AgriMek PF	5.0 oz	5/7	4.2 a	13.8 abc	0.0 a
3	Actara 25WG CB	1.5 oz	4/25	8.0 a	33.0 d	0.6 bc
4	Actara 25WG CB	1.8 oz	4/25	8.7 a	22.8 cd	0.2 ab
5	Actara 25WG PF	1.5 oz	5/7	11.7 a	24.4 cd	1.2 c
6	Actara 25WG PF	1.8 oz	5/7	3.6 a	9.4 ab	0.0 a
7	Actara 25WG Threshold	1.5 oz	6/16	5.6 a	14.2 abc	0.2 ab
8	Actara 25WG Threshold	1.8 oz	6/16	7.1 a	8.4 a	0.1 ab
9	Provado 1.6F Threshold	6.0 oz	6/16	8.1 a	11.1 abc	0.0 a
10	Untreated		-	8.1 a	20.0 bcd	0.2 ab

Means followed by the same letter are not significantly different ($P<0.5$; Fishers Protected LSD). Data transformed by $\log_{10}(x+1)$ prior to analysis.

[1]Application Timings: Cluster bud (CB) on 25 April; Petal Fall (PF) on 7 May; Threshold on 16 June.

[2]Counts taken from 5 terminals / trmt. Each sample containing 5 proxmal leaves.

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

INSECT CONTROL ON EARLY AND LATE-SEASON SWEET CORN WITH FOLIAR SPRAYS OF INSECTICIDES,, 2001: 'Temptation' sweet corn was planted 2 May and 'Sensor' sweet corn was planted13 July, both 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 (3 MPH), through three D3-25 cone nozzles/row, dispensing 51 GPA @ 100 PSI. Treatments were applied starting at at first silk. For early corn trial, applications were made on 7 and 13 July; for late corn trial, applications were made on 3, 6 & 9 September. Efficacy was assessed 7d after the final application by examining 25 randomly selected ears per treatment/replicate. Percentage data were transformed by arcsine prior to analysis by Fisher's Protected LSD test.

Early trial – Infestations included ECB only. The degree of infestation pressure from 1st brood ECB was relatively high (Table 7a). Although damage to husks was numerically different, a high degree of variation resulted in no significant differences among treatments. Both insecticide treatments were effective in reducing this type of damage. FO570 yielded significantly less ear infestation than did the standard Warrior.

Late trial - FO570, Spintor and Avaunt were compared to the standard Warrior and an untreated (Table 7b). Pressure from CEW was severe for Northeast conditions, while ECB was minimal and FAW was of no consequence. Except for Avaunt and the low rate of Spintor (1.5 oz), all treatments provided control well below the 5% infestation threshold.

Table 7a Evaluation of 1st brood ECB damage on sweet corn[1].
Cornell's Hudson Valley Lab., Highland, N.Y.-2001

	Treatment	Rate	% ECB in ear	% ECB damage to husk
1	FO570 .8EW	0.0175 AI	3.4 a	4.9 a
2	Warrior 1E	3.0 oz/A	16.7 b	5.8 a
3	Untreated	-	38.2 b	10.9 a

[1] Treatment means followed by the same letter are not significantly different ($P<0.05$; Fishers Protected LSD). Data treated by $\log_{10}(x+1)$ transformation prior to analysis.

[2] 'Temptation' planted on 2 May, silk applications on 7, 13 July. Sampling date on 19 July at 100 ears and husks sampled per treatment over 4 replicates.

Table 7b Evaluation of late season insect damage on sweet corn[1, 2].
Cornell's Hudson Valley Lab., Highland, N.Y.-2001

			% infested ears			
	Treatment	Rate	ECB	FAW	CEW	Total
1	FO570 .8EW	0.0175 AI	2.3 a	0.0 a	0.8 a	3.4 a
2	FO570 .8EW	0.021 AI	1.7 a	0.0 a	0.8 a	2.7 a
3	Spintor 2SC	6.0 oz/A	0.0 a	0.0 a	2.3 a	2.3 a
4	Spintor 2SC	3.0 oz/A	1.7 a	0.0 a	2.3 a	4.9 a
5	Spintor 2SC	1.5 oz/A	1.3 a	0.0 a	10.7 b	11.9 b
6	Warrior 1E	3.0 oz/A	0.0 a	0.0 a	2.7 a	2.7 a
7	Avaunt 30WG	3.0 oz/A	2.7 a	0.0 a	13.4 b	16.7 b
8	Untreated	-	4.0 a	0.8 a	48.4 c	53.8 c

[1] Treatment means followed by the same letter are not significantly different ($P<0.05$; Fishers Protected LSD). Data treated by $\log_{10}(x+1)$ transformation prior to analysis.

2 'Sensor' planted on 13 July, silk applications on 3, 6, 9 September. Sampling date on 16 September at 25 ears sampled per treatment over 4 replicates.

CONTROL OF CORN LEAF APHID WITH APPLICATIONS OF INSECTICIDES TO SWEET CORN WHORLS, NEW PALTZ, NY – 2001: Whorl infestation by corn leaf aphid was serious in some sweet corn plantings during mid-summer. Whorl treatment for aphids isn't a recommended or common practice, but data on insecticide efficacy is needed – our rationale was that, if efficacious when applied to whorls, a material should be equally effective as tassel or silk applications. Insecticides were applied by a tractor mounted boom sprayer (3 MPH), operated at 70 psi dispensing 40 GPA. Emulsions were directed into the whorls (late- whorl stage) of 'Sensor' sweet corn through a single nozzle per row. Efficacy was determined 7d prior to tassel emergence by pulling 25 enclosed tassels per replicate, and counting the number of live apterous aphids present within the leaf envelope.

Treatment[1]	Rate/acre	Mean # wingless[2] aphids/plant
Metasystox-R 2L	32.0 oz	0.0 a
Metasystox-R 2L	24.0 oz	0.5 a
Actara 25WG	3.0 oz	3.0 b
Provado 1.6F	3.75 oz	16.0 c
Provado 1.6F	2.0 oz	16.4 cd
Actara 25WG	1.5 oz	19.5 cde
Warrior 1E	3.2 oz	22.7 cdef
Calypso 4SC	1.5 oz	24.8 cdef
Penncap-M 2L	1.5 qt	31.3 defg
Calypso 4SC	1.12 oz	34.3 efg
UNTREATED	-	41.3 fg
Fulfill 50WG	2.8 oz	55.8 g

Means followed by same letter are not significantly different ($P<0.05$; Fisher's Protected LSD). Data subjected to log transformation prior to analysis.

[1]One nozzle directed over the whorl of 'Sensor' at 7 days prior to tassel emergence.

[2]Data represent number of live aphids present in enclosed tassels.

Although experiments on a variety of crops have shown these materials to have good efficacy against aphids in general, many were ineffective on sweet corn when applied in this fashion. Metasystox-R (at both rates) and Actara (at the high rate) performed significantly better than other treatments. Two standard aphidicides on sweet corn, PenncapM and Warrior, were not as effective as expected.

ONION: *Allium cepa* L. 'Spartan Banner 80'

Onion maggot: *Delia antiqua* (Meigen)

CONTROL OF ONION MAGGOT WITH INSECTICIDE DRENCH AND SEED TREATMENTS, PINE ISLAND, NY - 2001: Onion was seeded into muck soil on 25 April using a cone seeder mounted onto a PlanetJr frame. Treatments were arranged in 1-row plots, 40 ft long, and replicated 4 times in a randomized block design. Infurrow drench treatments (IF) were applied using the cone seeder equipped with a CO_2 pressurized (100 PSI) sprayer dispensing 38 GPA @ 2 MPH. Foliar treatments were applied over the plants using a CO_2 pressurized (100 PSI) back-pack sprayer dispensing 38 GPA @ 2 MPH. Seed treatments (ST) were applied using the cone seeder. Insecticide treatment of onion seeds was performed at Dept. of Hort. Sci. Seed Lab., NYSAES, Geneva. At ten days postemergence, a stand count in each treatment was estimated by counting the number of seedlings per 20 ft of row marked from the center of each 40 ft plot. Efficacy evaluations, begun 29 May and following at weekly intervals for five weeks, were made by examination of all wilted or dead plants and recording the number damaged by onion maggot. Numbers of damaged plants at each evaluation were divided by initial stand count to compute percent damage. Count data were subjected to log transformation, and percentage data were subjected to arcsine transformation, prior to analysis by Fisher's Protected LSD.

Throughout most of the '01 season, Southeastern NY experienced above average temperatures and below normal rainfall (APPENDIX I; not entirely representative of Orange County). Plots were subjected to considerable stress prior to stand count estimation and efficacy evaluation. Both rates of Regent IF (fipronil), Mundial ST (fipronil), Lorsban IF (high rate), and Crusier ST (thiamethoxam) all provided good to excellent control of maggot (1 – 4% cumulative damage)(Table 8). Given the extremely dry conditions preceeding and during the evaluations, these treatments fared much better than was expected. The efficacy of Crusier ST was a complete surprise – it appeared however, to be somewhat phytotoxic. A foliar Lorsban treatment to Trigard seed treatment (designed for control of seed corn maggot), inhanced the control of onion maggot. Vydate ST and IF drench (basically included for evaluation against onion bulb mite) were not significantly different than untreated.

Table 8. Evaluation of insecticide in-furrow and seed-treatments for control of onion maggot, Pine Island, NY – 2001.

Treatment	Appl.[1] method	Rate[2]	Stand count (# plants/20' of row)	Cumulative maggot damage (%)
Regent 80WG[3]	IF	0.298 oz/1000'	164.1 bc	0.4 a
Mundial[4]	ST	30 g/kg	170.6 bc	1.8 ab
Regent 80WG[3]	IF	0.149 oz/1000'	161.4 bc	1.7 b
Lorsban 4E	IF	2.6 oz/1000'	140.9 bc	2.2 ab
Trigard +	ST	50 g/kg +		
Lorsban 4E	F	1.3 oz/1000'	110.2 ab	2.4 ab
Crusier[5]	ST	10 g/kg	81.5 a	2.6 ab
Lorsban 4E	IF	1.3 oz/1000	114.0 ab	4.0 bc
Trigard	ST	50 g/kg	121.6 ab	5.9 bc
Vydate	ST	50 g/kg	141.6 bc	10.3 c
Lorsban 4E	F	1.3 oz/1000'	153.8 bc	21.4 d
Vydate 2L	IF	2 qt./acre	204.6 c	25.0 d
Untreated check	-	-	140.6 bc	26.9 d

Means followed by the same letter are not significantly different ($P<0.5$; Fishers Protected LSD). Count data transformed by $\log_{10}(x+1)$ prior to analysis; percentage data transformed by arcsine prior to analysis.

[1]IF = infurrow; F = spray over the row; ST = seed treatment.

[2]Acre rate based on 15" rows; seed treatment rates expressed as grams AI/kilogram of seed.

[3]Field corn formulation of fipronil

[4]Seed treatment formulation of fipronil

[5]thiamethoxam (Adage; Actara)

ONION: *Allium cepa* L. 'Spartan Banner 80'

Onion thrips: *Thrips tabaci* Lindeman

CONTROL OF ONION THRIPS WITH INSECTICIDES, WARWICK, NY 2001: Onion was seeded into muck soil on 26 April using a cone seeder mounted onto a PlanetJr frame. Treatments were arranged in 1-row plots, 40 ft long, and replicated 4 times in a randomized block design. Insecticide emulsion treatments were applied over the plants with a CO_2 pressurized (100 PSI) back-pack sprayer dispensing 38 GPA @ 2 MPH. Crusier seed treatment (ST) was applied in-furrow (IF) using the cone seeder. Treatment of onion seeds was performed at the Dept. of Hort. Sci. Seed Lab., NYSAES, Geneva. Foliar treatments were applied on 27 July and 2 August. Efficacy evaluations were made 5 days post application by harvesting 10 randomly selected plants per treatment-replicate, and examining the 4 youngest leaves for number of nymphs by means of a 10-power 'OptiVisor' scope. Seasonal nymph data were converted to cumulative thrips days per plant (1 nymph/plant for one day) by the formula: CTD $= [0.5(tpl_1 + tpl_2]*d_{1-2}$, where tpl_1 is the number of thrips per leaf at time 1, tpl_2 is the number of thrips per leaf at time 2, and d_{1-2} is the number of days elapsed between the 2 counts. Data were subjected to $\log_{10}(x+1)$ transformation prior to analysis by Fisher's Protected LSD.

Weather for Southeastern NY during '01 was unusually dry during early- and mid-season (APPENDIX I; not entirely representative of Orange County), resulting in generally poor condition of onion plants. Thrips infestations were generally low, only building to significant numbers during early August – by which time plants were starting to sceness due to poor earlier growing conditions. CTD's greater than 200 are required to cause ecomomic loss.

Although in previous trials, Crusier ST (fipronil) suppressed thrips populations during early season, we saw no evidence during this trial (Table 9). All dilutions of Vydate (16, 32 & 48 oz/acre) provided significantly better control of thrips than other treatments. Spintor (2 rates) and Provado provided supression, while all other treatments appeared to have little effect on thrips. Novaluron (alone or in combination with Warrior) and Warrior alone performed poorly relative to other treatments.

Table 9. Evaluation of thrips damage on onion[1]. N.Y.S.A.E.S., Chester, N.Y.-2001

Treatment	31 July evaluation[2] Nymphs / leaf	31 July evaluation[2] Cumulative Thrips days[4]	7 August evaluation[3] Nymphs / leaf	7 August evaluation[3] Cumulative Thrips days[4]
1. Crusier ST 50 gr. AI / kg	1.6 c d e f	11.7 b c d	4.2 b c	32.2 c d
2. Novaluron .83EC 0.023 AI/A	2.1 e f	13.0 c d e	3.9 b c	34.6 d
3. Novaluron .83EC 0.046 AI/A	1.2 c d e	11.1 b c d	4.8 c d	32.3 c d
4. Novaluron .83EC 0.092 AI/A	1.8 e f	13.9 c d e	4.4 b c	37.4 d
5. Novaluron .83EC 0.023 AI/A + Warrior 1E 0.025 AI/A	1.2 c d e	11.2 b c d	4.3 b c	31.3 b c d
6. Spintor 2SC 0.047 AI/A	0.8 b c	10.0 b c d	2.4 b	21.6 b
7. Spintor 2SC 0.094 AI/A	0.9 b c d	10.0 b c d	2.8 b c	23.1 b c
8. Warrior 1E 0.025 AI/A	2.5 f g	16.0 d e	3.1 b c	38.4 d
9. Vydate 2L 16.0 oz./A	0.5a b	9.0 b c	0.5a	12.9a
10. Vydate 2L 32.0 oz./A	0.2a	4.3a	0.9a	10.0a
11. Vydate 2L 48.0 oz./A	0.3a	7.7 b	0.5a	10.3a
12. Actara 25WG 0.047 AI/A	1.6 d e f	12.7 b c d e	4.2 b c	34.2 d
13. Provado 1.6F 0.05 AI/A	1.1 b c d e	11.2 b c d	2.8 b c	26.1 b c d
14. Untreated	3.6 g	19.7 e	8.4 d	62.1 e

Treatment means followed by the same letter are not significantly different (P<0.5; Fishers Protected LSD). Data
treated by log10(x+1) transformation prior to analysis.

[1]Planted on 26 April. Applications on 27 July, 2 August. Acre rates based on 15" rows; seed treatment rates expressed as grams AI/kilogram of seed.

[2]4 days post application.

[3]5 days post application.

[4]Cumulative thrips days (CTD) = [0.5 (tpl_1 + tpl_2) * d_{1-2}, where tpl_1 is the number of nymphs per leaf at time 1, tpl_2 is the number of nymphs per leaf at time 2, and d_{1-2} is the number of days elapsed between the 2 counts.

2001 MAXIMUM AND MINIMUM TEMPERATURES AND PRECIPITATION
Hudson Valley Laboratory, Highland, NY

All readings were taken at 0800 EST on the dates indicated

	APRIL			MAY			JUNE			JULY			AUGUST			SEPTEMBER			OCTOBER		
Date	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip
1	43	35		79	49		67	37		92	71		88	58		85	67	0.14	63	44	
2	39	36		86	51		70	53	1.40	86	50	0.45	89	63		78	44		59	47	
3	46	30		91	54		71	58		72	46		94	69		74	50		67	43	
4	52	31		93	57		74	51	1.54	76	62		89	70	0.17	79	58		75	49	
5	53	27		93	56		70	50		79	63	0.13	80	68	0.01	78	56	0.08	81	54	
6	62	32		72	41		76	59		82	52		88	66		75	47		81	53	
7	49	43	0.16	68	34		75	47		72	51		97	66		80	50				
8	49	38	0.24	69	36		78	49		81	65	0.08	98	72		89	57				
9	50	40	0.44	71	43		79	47		72	66	0.08	95	69	0.02	87	63				
10	74	45		77	45		79	47		89	61		101	78		87	65				
11	60	40		82	48		82	56	0.04	89	60	0.31	89	65		83	54	0.54			
12	55	43		88	59		72	59	0.11	79	55		86	69	0.99	79	49				
13	58	49		86	50	0.13	80	65		77	53		74	69	0.06	80	52				
14	71	39		66	37		87	64		77	55		85	63	0.46	86	52	0.76			
15	65	39		72	38		87	66		78	54		82	58		63	41	0.03			
16	63	42		71	45		88	68		80	56	0.01	85	60		67	41				
17	56	38		62	50		86	65	0.70	83	65	0.01	86	68		73	45				
18	52	39		61	52	0.02	76	59		74	64	0.04	81	60	0.04	76	47				
19	53	26		62	52		83	58		83	61		85	61		76	51				
20	56	29		80	56		88	66		80	55		84	69	0.08	78	63				
21	67	49		72	48		91	61	0.67	84	55		83	61	0.01	70	63	0.93			
22	69	52	0.05	68	58	0.39	68	62	0.08	86	60		83	60		77	62				
23	87	54		62	59	1.06	81	67		88	65		86	57		79	54				
24	83	57		63	57	0.75	75	62	1.09	92	72		75	61	0.09	76	55				
25	87	42		66	52		73	57		95	74		81	55		78	65	0.70			
26	56	33		60	54	0.01	82	60		99	65	0.35	81	56		69	43	0.04			
27	65	35		63	56	0.68	88	63		73	51	0.09	83	66		63	44				
28	71	44		69	58	0.23	90	63		75	50		81	64		62	49				
29	60	31		72	51		88	66		79	59		89	58	0.08	65	51	0.05			
30	64	32		72	43		85	68	0.01	78	53		83	54		63	44				
31				62	41					82	55		78	66							
Avg/Total	60.5	39.0	0.89	72.8	49.4	3.27	79.6	58.4	5.64	81.7	58.8	1.55	85.8	63.8	2.01	75.5	52.2	3.13			

- MATERIALS TESTED -

Acramite	Uniroyal
Actara	Syngenta
Actara seed treatment	Syngenta
AgriMek	Syngenta
Asana	Dupont
Avaunt	Dupont
Baythroid	Bayer
Brigade	FMC Corp
Calypso	Bayer
Endivor	Bayer
FO570	FMC corp
Fulfill	Novartis
Crusier seed treatment	Bayer
Guthion	Bayer
Imidan	Gowan
Lorsban	Dow
MetaSystox R	Gowen
Mundial seed treatment	Bayer
Novaluron	Uniroyal
Penncap M	Cerexagri
Proclaim	Novartis
Provado	Bayer
Pyramite	BASF
Regent	Bayer
Savey	Gowen
Sevin XLR	Bayer
SpinTor	Dow
Supracide	Gowan
Trigard seed treatment	Syngenta
Vydate	DuPont
Warrior	Syngenta