RESULTS OF 2000 INSECTICIDE AND ACARICIDE TRIALS IN EASTERN NEW YORK

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

HARVEST EVALUATION OF INSECTICIDES AGAINST FRUIT-FEEDING INSECTS ON THREE APPLE CULTIVARS OF DIFFERENT MATURITIES, 2000: Treatments were applied to four-tree (of which 'Ginger Gold' and 'McIntosh' & 'Delicious' were included) plots replicated four times in a randomized complete block design. All dilutions are presented as amt/100 gal - (based on 400 gallons/acre). All treatments were applied dilute to runoff using a high-pressure handgun sprayer at 300 psi delivering 57 gal/acre. Trees on the M.26 rootstock were 6 years-old, and had not yet filled their space. Treatments were applied on various schedules as shown in Tables 1-3. 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 epidermins made by an oviositing female. Late PC damage is characterized by a feeding or oviposition cavity lacking the typical crescent-shaped scar. Damage by early Lepidoptera includes GFW & OBLR, late Lepidoptera includes OBLR or other leafrollers, 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.

Seasonal rainfall was above normal and may have caused undue weathering of some treatments. A shortened interval between PF and 1C was necessary because of 2.26" of rainfall within a 5d period (see APPENDIX). Temperatures during summer were below normal. Temperatures during May 6 – 10 however, were unusually warm, coinciding with bloom. Insect infestation pressure was high; TPB, EAS, SJS and OBLR populations in particular were higher than normal at the test siste. The early season temperature extremes contributed to high PC activity. Because of moist soil conditions allowing for optimum emergence, and immigration from recently abandoned apple orchards near the test site, AM pressure was extreme. Apple cultivars, because of varying earliness of fruit set or lateness of fruit maturity dates, may be exposed to differential infestation pressure from insects – notably, PC and AM. This phenomenon is reflected in Tables 1 – 3, and the reader is encouraged to consider a conpound's performance on each cultivar. A summary of performance (without statistical analyses) is provided in Table 4.

Because test trees, being only in the 6th leaf, bore relatively few fruit, exposure to PC was inordinately severe. Because PC immigrate from orchard borders, replicated plots typically receive differential infestation pressure depending upon location in relation to distance from the

immigration routes – resulting in extreme variability within and among replicates and consequent lack of statistical significance. *It should be noted, that as cultivars progress from early- to late-maturing, the incidence of early damage verses late damage shifts to the latter*. On Ginger Gold, which had the greatest pressure from PC, few treatments save Calypso + Guthion and Actara (1.5 oz) maintained early damage below 5%. Much of the weakness may be attributable to excessive rainfall during the PF – 1C period. Apparently 'pink' sprays were vital this season, and those schedules that lacked this treatment performed poorly. Infestation pressure from AM on McIntosh was light relative to other cultivars. For reasons unknown, McIntosh is historically less attractive to AM.. Actara performed poorly against Lepidoptera (OBLR and CM).

Table 1. Evaluation of insecticides for controlling pest complex on apple[1] , Cornell's Hudson Valley Lab., Highland, N.Y. - 2000

Treatment	Formulation amt./100 gal.	Timing[3]	% fruit damaged by insect species[2] Early Plum Curculio	Late Plum Curculio	Tarnish Plant Bug	European Apple Sawfly	San Jose Scale	Early Lep. Species	Late Lep. Species	Codling Moth	Apple Maggot Punct	Apple Maggot Tunnel	Clean
Cryocide 96	3.3 lb.	PF, 1-7C	22.4a	5.1 c	29.1 e	3.8 cd	57.6 b	0.5a	29.5 cd	1.8ab	0.9ab	31.5 e	2.9a
Actara	1.2 oz	P, PF, 1-7C	8.76a	0.5ab	6.3abc	0.1a	1.3a	0.9a	27.2 bcd	0.7ab	5.5 c	18.3 cde	40.6 bcd
Actara	1.5 oz	P, PF, 1-7C	3.28a	0.2ab	2.7a	0.7abc	6.9a	0.9a	24.7 bc	10.8 bcd	2.9abc	7.4abcd	54.5 bcdef
Actara	1.8 oz	P, PF, 1-7C	9.12a	0.0ab	11.8abcd	0.9abc	10.8a	0.0a	28.0 bcd	3.4 bc	2.1abc	10.9 bcde	38.7 bcd
Avaunt WG	2.0 oz.	P, PF, 1-7C	7.29a	0.1ab	11.3abcd	1.0abc	14.0a	0.1a	13.3abc	0.1a	4.0 bc	27.1 de	39.3 bcd
Avaunt WG	1.6 oz.	P, PF, 1-7C	10.6a	0.1ab	8.2abcd	0.5abc	8.6a	0.1a	2.0a	0.3ab	2.0abc	10.5abcde	63.2 bcdef
Guthion 50W Lorsban 50W	8.0 oz. 12.3 oz.	PF, 1-2, 4-7C OBLR	29.3a	0.5ab	18.0 cde	0.4ab	2.8a	0.0a	6.8a	0.5ab	13.5 d	0.5a	33.1 bc
Guthion 50W Lorsban 75WG	8.0 oz. 9.0 oz.	PF, 1-2, 4-7C OBLR	18.8a	0.0ab	22.7 cd	2.2 bcd	4.5a	0.4a	11.7ab	0.0a	5.6 c	0.7ab	28.0 b
Danitol 2.4 EC Guthion 50W	5.3 oz. 8.0 oz.	P PF, 1-7C	6.86a	0.6ab	6.5abc	0.6abc	9.7a	0.4a	5.4a	0.0a	4.8 c	1.3ab	72.3 def
Surround WP	25.0 lb.	EPF, 1-7C	25.9a	0.2ab	16.9 bcde	1.3abc	4.5a	1.0a	12.1abc	1.0ab	0.7ab	1.6ab	45.8 bcde
Calypso 4F Calypso 4F	0.5 oz. 1.0 oz.	P PF, 1-7C	9.3a	0.7ab	4.7ab	0.3ab	3.5a	0.4a	11.9abc	0.0a	7.7 cd	4.7abc	63.8 cdef
Calypso 4F Guthion 50W + Provado	0.5 oz. 8.0 oz. 2.0 oz.	P PF, 1-7C 3C	1.9a	0.1ab	6.5abc	0.7abc	3.9a	0.5a	4.7a	0.0a	2.1abc	1.0ab	88.7 f
Supracide 25WP Imadan 70WP Provado Spintor	16.0 oz 16.0 oz 2.0 oz. 2.5 oz.	P PF, 1-2C, 5-7C 3C OBLR	9.0a	0.5ab	6.9abc	0.8abc	4.2a	0.1a	7.4a	0.0a	3.8 bc	1.4ab	76.4 ef
Untreated		-	42.3a	2.1 bc	22.0 de	6.3 d	68.2 b	1.5a	54.2 d	17.2 d	0.5ab	71.9 f	0.7a

1 Data from ' Ginger Gold' on 16 August.

2 Means followed by the same letter are not significantly different (Fishers Protected LSD; $P=<0.05$). Log transformation used for statistical analysis of data expressed as percentages.

3 McIntosh phenology: 1/2" G on 4/2; TC on 4/14; Pink on 4/26, Bloom on 5/1; PF on 5/8 , 1C on 5/16; all other covers @ 14d intervals. Short interval between PF & 1C due to 2.26" rainfall on during interval.

Table 2. Evaluation of insecticides for controlling pest complex on apple[1], Cornell's Hudson Valley Lab., Highland, N.Y. - 2000

Treatment	Formulation amt./100 gal.	Timing[3]	% fruit damaged by insect species[2] Early Plum Curculio	Late Plum Curculio	Tarnish Plant Bug	European Apple Sawfly	San Jose Scale	Early Lep. Species	Late Lep. Species	Codling Moth	Apple Maggot Punct	Apple Maggot Tunnel	Clean
1 Cryocide 96	3.3 lb.	PF, 1-7C	9.0a	1.0abc	9.5a	0.1a	23.1a	0.0a	24.4 ef	2.1ab	5.2a	10.7a	18.9ab
2 Actara	1.2 oz	P, PF, 1-7C	5.4a	5.7 c	3.1a	0.0a	2.9a	0.0a	53.3 h	11.8 c	8.7a	3.3a	24.9ab
3 Actara	1.5 oz	P, PF, 1-7C	6.6a	3.3 bc	0.4a	0.5a	2.1a	0.0a	40.8 fgh	21.7 cd	2.6a	2.3a	28.7abc
4 Actara	1.8 oz	P, PF, 1-7C	6.2a	0.0ab	1.2a	0.9a	0.0a	0.0a	38.3 fgh	8.1 bc	9.0a	0.0a	35.3abcd
5 Avaunt WG	2.0 oz.	P, PF, 1-7C	8.4a	0.0ab	1.9a	0.4a	0.1a	0.0a	2.3abc	0.0a	0.4a	0.1a	82.3 ef
6 Avaunt WG	1.6 oz.	P, PF, 1-7C	13.3a	1.1abc	7.9	0.0a	5.6a	0.2a	7.7 bc	0.0a	2.1a	1.4a	56.7 cde
7 Guthion 50W Lorsban 50W	8.0 oz. 12.3 oz.	PF, 1-2, 4-7C OBLR	21.0a	2.6abc	5.8a	0.0a	0.0a	0.0a	23.2 def	0.0a	2.4a	3.1a	43.3 bcd
8 Guthion 50W Lorsban 75WG	8.0 oz. 9.0 oz.	PF, 1-2, 4-7C OBLR	5.6a	0.0ab	1.5a	0.0a	0.0a	0.0a	1.5 ab	0.0a	1.5a	0.0a	83.0 ef
9 Danitol 2.4 EC Guthion 50W	5.3 oz. 8.0 oz.	P PF, 1-7C	2.7a	0.3ab	0.0a	0.2a	0.2a	0.0a	4.1abc	0.0a	0.0a	0.0a	82.6 ef
10 Surround WP	25.0 lb.	EPF, 1-7C	14.2a	1.3abc	7.9a	0.0a	0.2a	0.0a	8.6 bcd	2.3ab	0.0a	0.0a	61.1 de
11 Calypso 4F Calypso 4F	0.5 oz. 1.0 oz.	P PF, 1-7C	4.8a	0.2ab	0.3a	0.0a	0.0a	0.0a	12.8 cde	0.0a	0.0a	0.7a	73.3 ef
12 Calypso 4F Guthion 50W + Provado	0.5 oz. 8.0 oz. 2.0 oz.	P PF, 1-7C 3C	2.0a	0.0ab	5.4a	0.0a	0.0a	0.0a	0.9ab	0.0a	0.5a	0.0a	83.3 ef
13 Supracide 25WP Imadan 70WP Provado Spintor	16.0 oz 16.0 oz 2.0 oz. 2.5 oz.	P PF, 1-2C, 5-7C 3C OBLR	8.3a	0.0a	2.1a	0.0a	0.0a	0.0a	0.2a	0.0a	0.2a	0.0a	87.3 f
14 Untreated		-	19.3a	18.7 d	6.8a	0.4a	1.1a	0.0a	45.9 gh	27.7 d	1.6a	1.5a	13.1a

1 Data from ' Red Max' McIntosh on 9 September.

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

3 McIntosh phenology: 1/2" G on 4/2; TC on 4/14; Pink on 4/26, Bloom on 5/1; PF on 5/8 , 1C on 5/16; all other covers @ 14d intervals. Short interval between PF & 1C due to 2.26" rainfall on during interval.

Table 3. Evaluation of insecticides for controlling pest complex on apple[1] , Cornell's Hudson Valley Lab., Highland, N.Y. - 2000

Treatment	Formulation amt./100 gal.	Timing[3]	% fruit damaged by insect species[2] Early Plum Curculio	Late Plum Curculio	Tarnish Plant Bug	European Apple Sawfly	San Jose Scale	Early Lep. Species	Late Lep. Species	Codling Moth	Apple Maggot Punct	Apple Maggot Tunnel	Clean
1 Cryocide 96	3.3 lb.	PF, 1-7C	2.9a	10.1 b	2.9a	0.4a	20.8a	2.9a	28.1 bcd	2.9a	0.0a	5.5 ab	6.5ab
2 Actara	1.2 oz	P, PF, 1-7C	0.1a	0.7a	0.1a	0.0a	0.2a	0.1a	30.5 cde	53.4 b	1.0 bc	3.3 ab	11.8ab
3 Actara	1.5 oz	P, PF, 1-7C	0.2a	0.0a	0.0a	0.2a	3.7a	0.2a	72.6 e	58.8 b	0.7 bc	3.7 b	0.7a
4 Actara	1.8 oz	P, PF, 1-7C	0.9a	0.0a	1.2a	0.0a	0.1a	0.9a	64.0 de	33.1 b	2.0 c	4.8 b	3.5a
5 Avaunt WG	2.0 oz.	P, PF, 1-7C	0.1a	0.0a	1.1a	0.0a	0.1a	0.1a	6.6abc	0.0a	0.3abc	3.0 ab	74.0 cde
6 Avaunt WG	1.6 oz.	P, PF, 1-7C	0.0a	0.0a	0.6a	0.0a	7.8a	0.0a	2.0a	0.0a	0.0a	3.5 ab	69.9 cde
7 Guthion 50W Lorsban 50W	8.0 oz. 12.3 oz.	PF, 1-2, 4-7C OBLR	0.0a	0.4a	1.6a	0.0a	12.5a	0.0a	4.4a	0.0a	0.0a	0.2 ab	54.3 cd
8 Guthion 50W Lorsban 75WG	8.0 oz. 9.0 oz.	PF, 1-2, 4-7C OBLR	1.0a	0.0a	0.4a	0.3a	0.2a	1.0a	2.1a	0.0a	0.0a	0.1 a	81.7 de
9 Danitol 2.4 EC Guthion 50W	5.3 oz. 8.0 oz.	P PF, 1-7C	0.0a	0.0a	0.8a	0.0a	0.0a	0.0a	0.4a	0.0a	0.2ab	0.2 ab	95.2 e
10 Surround WP	25.0 lb.	EPF, 1-7C	4.8a	0.1a	1.0a	0.2a	9.1a	4.8a	8.2ab	1.4a	0.0a	1.0 ab	33.3 bc
11 Calypso 4F Calypso 4F	0.5 oz. 1.0 oz.	P PF, 1-7C	0.7a	0.1a	1.0a	0.2a	0.0a	0.7a	9.1ab	0.3a	0.0a	0.5 ab	68.3 cde
12 Calypso 4F Guthion 50W + Provado	0.5 oz. 8.0 oz. 2.0 oz.	P PF, 1-7C 3C	3.5a	1.6ab	0.4a	0.0a	0.0a	3.5a	9.5abcd	0.0a	0.4abc	1.6 ab	34.5 bcd
13 Supracide 25WP Imadan 70WP Provado Spintor	16.0 oz 16.0 oz 2.0 oz. 2.5 oz.	P PF, 1-2C, 5-7C 3C OBLR	0.7a	0.0a	2.8a	0.0a	0.2a	0.7a	2.1a	0.0a	0.2abc	0.2 a	75.0 cde
14 Untreated		-	10.3a	25.8 b	1.4a	0.0a	36.8a	10.3a	54.5 cde	45.6 b	0.8 bc	57.3 c	0.3a

1 Data from 'Smoothie' Golden Delicious on 3 October.

2 Treatment means followed by the same letter are not significantly different.(Fishers Protected LSD; $P=<0.05$). Arc sin transformation used for statistical analysis of data expressed as percentages.

3 M^{c}Intosh phenology: 1/2" G on 4/2; TC on 4/14; Pink on 4/26, Bloom on 5/1; PF on 5/8 , 1C on 5/16; all other covers @ 14d intervals. Short interval between PF & 1C due to 2.26" rainfall on during interval.

APPLE: Malus domestica 'Delicious'

Potato leafhopper (PLH): *Empoasca fabae* (Harris)
Rose leafhopper (RLH): *Edwardsaina rosae* (Linnaeus)
White apple leafhopper (WALH): *Typhlocyba pomaria* McAtee

EVALUATION OF INSECTICIDES AGAINST LEAFHOPPER PESTS OF APPLE, 2000: Treatments were applied to four-tree (of which 'Delicious' was included) plots replicated four times in a randomized complete block design. 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 57 gal/acre. Trees on the M.7 rootstock were 6 yr-old, and had not yet filled their space. Treatments were applied on various schedules as shown in Table 5. Adult leafhopper infestations were assessed on 5 Jun by sweeping the tree perimeter for 3 min. with a vacuum sampling machine.

Early-season rainfall was above normal and may have caused undue weathering of some treatments. A shortened interval between PF and 1C was necessary because of 2.26" of rainfall within a 5d period (see APPENDIX). Temperatures during May 6 – 10 were unusually warm, coinciding with bloom. PLH immigrations throughout the Northeast were unusually early during 2000, and feeding symptoms on terminals were evident during the sampling period. WALH populations were normal. Immigration of rose leafhopper from overwintering sites (multiflora rose) had not begun when assessment was made.

An adult leafhopper threshold has not been established. It should be noted that assessment was made ca 10d postapplication, possibly allowing for some degree of reinfestation – particularly by PLH. Notwithstanding however, a good or adequate leafhopper treatment would be expected to outperform Guthion, to which WALH is resistant.

Table 4. Evaluation of insecticides for controlling leafhopper complex on apple[1] , Cornell's Hudson Valley Lab., Highland, N.Y. – 2000.

Treatment	Formulation amt./100 gal.	Timing[3]	# of adult LH sampled in 3 min. vacuum sweeps[2] rose & white apple leafhopper	potato leafhopper	total leafhopper
1. Cryocide 96	3.3 lb.	PF, 1-7C	12.6 e	0.3a	13.1 c
2. Actara	1.2 oz	P, PF, 1-7C	0.6ab	0.4a	0.8a
3. Actara	1.5 oz	P, PF, 1-7C	1.9abcd	0.7a	2.3ab
4. Actara	1.8 oz	P, PF, 1-7C	3.3abcde	0.6a	4.0 abc
5. Avaunt WG	2.0 oz.	P, PF, 1-7C	1.3abc	1.8a	4.0 abc
6. Avaunt WG	1.6 oz.	P, PF, 1-7C	0.6ab	0.3a	1.0a
7. Guthion 50W Lorsban 50W	8.0 oz. 12.3 oz.	PF, 1-2 OBLR	4.1 bcde	0.8a	4.4 abc
8. Guthion 50W Lorsban 75WG	8.0 oz. 9.0 oz.	PF, 1-2 OBLR	5.0 cde	1.3a	6.8 bc
9. Danitol 2.4 EC Guthion 50W	5.3 oz. 8.0 oz.	P, ERM thresh PF, 1-2	3.9 bcde	0.0a	3.9abc
10. Surround WP	25.0 lb.	EPF, 1-7C	0.6ab	0.3a	0.8a
11. Calypso 4F Calypso 4F	0.5 oz. 1.0 oz.	P PF, 1-7C	0.7ab	0.3a	0.8a
12. Calypso 4F Guthion 50W + Provado	0.5 oz. 8.0 oz. 2.0 oz.	P PF, 1-7C 3C	0.4ab	0.6a	1.0a
13. Supracide 25WP Imadan 70WP Provado Spintor	16.0 oz 16.0 oz 2.0 oz. 2.5 oz.	P PF, 1-2C, 5-7C 3C OBLR	0.8ab	1.1a	2.1ab
14 Untreated			6.8 de	0.7a	7.4 bc

1 Data from ' Red Delicious' on 5 May prior to "June Drop".

2 Treatment means followed by the same letter are not significantlydifferent(Fishers Protected LSD; P=<0.05). Log transformation used for statistical analysis of data expressed as percentages.

3 McIntosh phenology / spray dates: 1/2" G on 4/2; TC on 4/14; Pink on 4/26, Bloom on 5/1; PF on 5/8 ; 1C on 5/16; all other covers @ 14d intervals. Short interval between PF & 1C due to 2.26" rainfall on during interval.

APPLE: Malus domestica 'Delicious'

Rose leafhopper (RLH): *Edwardsaina rosae*
Spotted tentiform leafminer (STLM): *Phyllonorycter blancardella* (Fabr.)
White apple leafhopper (WALH): *Typhlocyba pomaria* McAtee

EVALUATION OF INSECTICIDES AGAINST LEAFHOPPER AND LEAFMINER PESTS OF APPLE, 2000: Treatments were applied to four-tree (of which 'Delicious' was included) plots replicated four times in a randomized complete block design. 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 at 300 psi delivering 57 gal/acre. Trees on the M.7 rootstock were 6 yr-old, and had not yet filled their space. Treatments were applied on various schedules as shown in Table 6. Damage to foliage was assessed on 9 Oct. by:

- estimating leafhopper foliar damage (1st and 2nd generation) by selecting 20 proximal terminal leaves and rating: 0=no stippling; 1=slight stippling(<10%);2=low stippling(>10-25%); 3=moderate stippling(>26-50%); and 4=high stippling(>50%).
- counting the number of STLM mines per 100 randomly selected leaves.

Seasonal rainfall was above normal and may have caused undue weathering of some treatments. A shortened interval between PF and 1C was necessary because of 2.26" of rainfall within a 5d period (see APPENDIX). Temperatures during summer were below normal. Temperatures during May 6 – 10 however, were unusually warm, coinciding with the bloom period.

The leafminer treatment threshold is 1 mine/generation (in this instance, 2 mines/leaf). All treatment schedules, save those involving Cryocide and Guthion, provided excellent efficacy against this pest.

Leafhopper populations were relatively high during 2000. Ratings of leafhopper damage were performed during early-Oct. With ratings below 1.0 representing very little stippling, exemplary results were obtained by most schedules.

Table 5. Evaluation of insecticides for controlling STLM and leafhopper complex on apple[1,2], Cornell's Hudson Valley Lab, Highland, N.Y.-2000

Treatment	Formulation amt./100 gal.	Timing[3]	# mines / lf. STLM	Leaf Rating 0-4[4] rose & white apple leafhopper damage
1. Cryocide 96	3.3 lb.	PF, 1-7C	0.8 b	3.6 e
2. Actara	1.2 oz	P, PF, 1-7C	0.2a	0.0a
3. Actara	1.5 oz	P, PF, 1-7C	0.1a	0.0a
4. Actara	1.8 oz	P, PF, 1-7C	0.0a	0.0a
5. Avaunt WG	2.0 oz.	P, PF, 1-7C	1.1a	0.1 b
6. Avaunt WG	1.6 oz.	P, PF, 1-7C	1.1a	0.2 b
7. Guthion 50W Lorsban 50W	8.0 oz. 12.3 oz.	PF, 1-2, 4-7C OBLR	0.9 bc	2.9 d
8. Guthion 50W Lorsban 75WG	8.0 oz. 9.0 oz.	PF, 1-2, 4-7C OBLR	1.1 cd	3.7 e
9. Danitol 2.4 EC Guthion 50W	5.3 oz. 8.0 oz.	P, ERM thresh PF, 1-7C	1.0 bc	3.1 d
10. Surround WP	25.0 lb.	EPF, 1-7C	0.8 bc	0.2 b
11. Calypso 4F Calypso 4F	0.5 oz. 1.0 oz.	P PF, 1-7C	0.0a	0.0a
12. Calypso 4F Guthion 50W + Provado	0.5 oz. 8.0 oz. 2.0 oz.	P PF, 1-7C 3C	1.0 cd	0.4 c
13. Supracide 25WP Imadan 70WP Provado Spintor	16.0 oz 16.0 oz 2.0 oz. 2.5 oz.	P PF, 1-2C, 5-7C 3C OBLR	1.3 d	0.2 b
14 Untreated			3.0 d	3.0 d

1 Data from ' Red Delicious' on 9 October.

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

3 McIntosh phenology / spray dates: 1/2" G on 4/2; TC on 4/14; Pink on 4/26, Bloom on 5/1; PF on 5/8 ; 1C on 5/16; all other covers @ 14d interval. Short interval between PF & 1C due to 2.26" rainfall on during interval.

4 20 terminal leaves / tree representing 1 & 2nd generation white apple and rose leafhopper damaged leaves. 0 = no stipling; 1 = <10% leaf stippling; 2 = >10-25% leaf stippling; 3 = >25-50% leaf stippling; 4 = >50% leaf stippling.

APPLE: Malus domestica 'Delicious' & 'Golden Delicious'

Potato leafhopper (PLH): *Empoasca fabae*
Rose leafhopper (RLH): *Edwardsaina rosae*
White apple leafhopper (WALH): *Typhlocyba pomaria* McAtee

EVALUATION OF REDUCED RATES OF PROVADO AGAINST LEAFHOPPER PESTS OF APPLE, 2000: Populations of WALH and RLH were relatively high during 2000. Immigrations of PLH occurred earlier than usual and damage to most cultivars was severe by late-June. This trial was performed in response to questions from growers regarding the possibiliy of control with reduced rates of Provado. Estimated costs per acre were based on 1999 prices supplied by a local pesticide distributor and are not necessarily accurate.

Treatments were applied to plots containing one tree each of 'Delicious' and 'Golden Delicious', replicated four times in a randomized complete block design. All dilutions are presented as amt/100 gal - (based on 400 gallons/acre). Applications were dilute to runoff using a high-pressure handgun sprayer at 300 psi delivering 50 gal/acre. Trees on the M.7 rootstock were 3 yr-old, and had not yet filled their space. Treatments were applied on various schedules as shown in Table 7. Efficacy was assessed on 6 July by:

- counting the number of nymphs per 5 leaf sample.
- adult leafhopper infestations were assessed by sweeping the tree perimeter for 4 min. with a vacuum sampling machine.
- estimating % of leaves damaged or curled by PLH by sampling 10 distal leaves on 10 termimals

Provado was applied at (1) full rate, 3C; (2) full rate, 3C & 4C; (3) full rate, 3C and quarter rate, 4C & 5C; (4) quarter rate, 3C-5C, and (5) quarter rate, 5C. The best overall control of nymphs of the complex was provided by Tmt #3 at an estimated cost of $36. However, Tmts # 4 and #5 utilizing reduced rates provided control not significantly different, and at significantly reduced costs.

Table 6. Evaluation of reduced rate applications of Provado 1.6F for controlling leafhopper complex on apple[1], Cornell's Hudson Valley Lab., Highland, N.Y. - 2000

Treatment	Formulation amt./100 gal.	# appl. & Timing[3]	# of LH nymphs / 5 leaves (5 lower (WA/RLH) five upper lvs (PLH) / term.) rose & white apple leafhopper	potato leafhopper	total leafhopper	Approx. cost / acre
1. Provado 1.6F	2.0 oz.	1 @ 3C	<0.1	13.0	13.1 c	$24.00
2. Provado 1.6F	2.0 oz.	2 @ 3, 4C	0.0	1.6	1.6 b	$48.00
3. Provado 1.6F Provado 1.6F	2.0 oz. 0.5 oz.	1 @ 3C 2 @ 4, 5C	0.0	0.2	0.2 a	$36.00
4. Provado 1.6F	0.5 oz.	3 @ 3-5C	0.0	0.7	0.7 ab	$18.00
5. Provado 1.6F	0.5 oz.	1 @ 5C (IPM threshold*)	0.2	0.8	0.9 ab	$6.00
6. UNTREATED	-		5.1	11.0	18.5 c	-

[1]Data taken on 3 year old Red Chief (Red Delicious) and Smoothie (Golden Delicious) on 6 July.
3C on 6/13 adult presence, 4C on 6/23 post oviposition but pre-hatch, 5C on 7/4

Treatment	Formulation amt./100 gal.	# appl. & Timing[3]	# of LH adults per 4 minute sweep / 4 trees rose & white apple leafhopper	potato leafhopper	10 distal lvs rated per terminal, 10 terminals / tree % of leaves PLH damage	% leaves curled by PLH	PLH leaf damage rating 0-3
1. Provado 1.6F	2.0 oz.	1 @ 3C	0	3.0	66.0	43.0	3.0
2. Provado 1.6F	2.0 oz.	2 @ 3, 4C	0	13.0	19.0	4.0	1.3
3. Provado 1.6F Provado 1.6F	2.0 oz. 0.5 oz.	1 @ 3C 2 @ 4, 5C	0	6.0	56.0	1.0	1.4
4. Provado 1.6F	0.5 oz.	3 @ 3-5C	0	6.0	37.0	6.0	1.5
5. Provado 1.6F	0.5 oz.	1 @ 5C (IPM threshold*)	0	4.0	74.0	40.0	2.9
6. UNTREATED	-		0	4.5	97.0	77.5	3.0

[1].Data taken on 3 year old Smoothie (Golden Delicious) on 7 July.

APPLE: *Malus domestica*, 'McIntosh'

Green apple aphid (GAA): *Aphis pomi* De Geer
Spirea aphid (SA): *Aphis spiraecola* Patch

EVALUATION OF INSECTICIDES AGAINST APHIDS AFFECTING APPLE, 2000: Treatments were applied to six-tree plots replicated four times in a randomized complete block design. Treatments included Pirimor (1.3, 2.0 &2.6 oz/100 gal), Provado, Fulfill and an untreated. After a precount, treatments were applied 9June, dilute to runoff, using a high-pressure handgun sprayer at 300 psi delivering 100 gal/acre. All dilutions are presented as amt/100 gal - (based on 400 gallons/acre). Trees on the M.9 rootstock were 10 years old and 15 ft high. Treatment efficacy (% reduction from precounts) was assessed 3d, 5d and 10d postapplication by:

- Thirty aphid infested terminals/replicate were tagged for pretreatment counts and subsequent evaluation. Populations of aphids were estimated by a rating system:
  - 0 = no aphids;
  - 1 = 1-10 aphids/terminal leaf; and
  - 2 = 11-100 aphids/terminal leaf
  - 3 = >100 aphids/terminal leaf

Results are presented in Table 7. A number of insecticides have sufficient efficacy to reduce aphid populations somewhat. The most desirable aphicides however, are those that prevent or delay reinfestation by alates (winged adults). The success of a particular treatment to maintain reduced populations could be attributed to low toxicity to natural enemies, and/or to a generally high degree of residual activity or persistence. At 3d postapplication, only the high rate of Pirimor had reduced aphid populations by >75%. Provado and Fulfill had not started to show significant kill of aphids. At 5d postapplication, all Pirimor rates gave excellent kill. Provado showed increased kill, but Fulfill was still allowing for aphid increase. At 10d postapplication, only Pirimor at 2.0 and 2.6 oz/100 prevented resurgence. The systemic activity of Fulfill wasn't apparent until 10d postapplication. Reduction in untreated check at 10d posttreatment was likely due to natural mortality, although the typical predators (larvae of Syrphidae and Cecidomyiidae were not in evidence.

Table 7. Evaluation of insecticides for controlling aphid complex on apple[1], Cornell's Hudson Valley Lab., Highland, NY - 2000

Treatment	Formulation amt./100 gal.	Prespray Rating[2]	(Rating) % Reduction[2] 3d post	5d post	10d post
Pirimor 50W	1.3 oz.	0.15	(0.07) 53.3 a	(0.00) 100.0 a	(0.04) 76.6 a
Pirimor 50W	2.0 oz.	0.16	(0.04) 75.0 a	(0.00) 100.0 a	(0.00) 100.0 a
Pirimor 50W	2.6 oz.	0.17	(0.00) 100.0 a	(0.00) 100.0 a	(0.00) 100.0 a
Provado 1.6F	2.0 oz.	0.12	(0.07) 41.7 a	(0.04) 66.7 a	(0.04) 70.7 a
Fulfill 50WG	0.92 oz.	0.12	(0.81) -575.0 b	(0.75) -525.0 b	(0.00) 100.0 a
Untreated	-	0.15	(0.79) -426.7 b	(1.07) -613.3 b	(0.04) 76.6 a

Means followed by the same letter are not significantly different (Fishers Protected LSD; *P*=<0.05). Data transformed by arcsine (sq.rt. X) prior to analysis.

[1]Data from ' Rogers McIntosh' on M-9 rootstock.

[2]Rating of 0-3 for green apple and spirea aphids / leaf where: 0=0 / lf; 1 = 1-10 / l; 2 = 11-100 / lf; and 3 = >100 / lf. Percent reduction based on precounts, 9 June.

APPLE: *Malus domestica* 'Empire'

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

HARVEST EVALUATION OF SPRING APPLICATIONS OF INSECTICIDES AGAINST SCALE, 2000: Characteristically, SJS infestations are very randomly distributed throughout an orchard, contributing to high degrees of variability in data. To overcome this phenomenon, individual trees that sustained damage from SJS during 1999 were tagged, and used for the subsequent evaluations during the 2000 season. Treatments were applied to three-tree plots replicated four times in a randomized complete block design. All dilutions are presented as amt/100 gal - (based on 400 gallons/acre). Treatments were applied once (31 May), dilute to runoff, using a high-pressure handgun sprayer at 300 psi delivering 57 gal/acre. Trees on the M.26 rootstock were 10 years-old. Efficacy was assessed by randomly selecting 100 fruit/replicate (20 July) and determining % damaged fruit; and subsequently by a rating where: 0 = 0 SJS/fruit; 1 = 1-5 SJS/fruit; 2 = 6-10 SJS/fruit; 3 = >10 SJS/fruit. Prior to analysis by Fisher's Protected LSD, damaged fruit data were transformed by arcsine (sq.rt. X) and ratings data were transformed by $\log_{10}(X+1)$.

Based on peak activity of crawlers (500 DD_{50}), treatments were applied 31 May. Results are shown in Table 8. Percent damage is the relative numbers of fruit that had damage, while fruit rating is an estimate of the degree or seriousness of damage. In general, a fruit rating >0.25 indicates an unacceptable degree of damage, and probably unmarketable. On that basis, Calypso, Compound 'B' and Guthion provided substandard control, while Actara and Compound 'F' were very efficacious. Percent fruit damage followed the same general order of effect. Damage in the untreated was low, probably because we assigned the most infested trees to insecticide treatments.

Table 8. Evaluation of spring application of insecticides on San Jose Scale populations on apple[1], Cornell' Hudson Valley Lab., Highland, N.Y.- 2000.

Treatment/formulation	Amt./100 gal.	Fruit rating 0-3[2]	% Damaged fruit
Calypso 4F	1.0 oz.	0.29 b	22.5 c
Provado 1.6F	2.0 oz.	0.10 a	9.7 a
Compound 'B'240SC	4.0 oz.	0.50 c	33.7 c
Guthion 50W	10.0 oz.	0.25 b	17.0 bc
Lorsban 50W	10.0 oz.	0.10 a	10.2 ab
Actara	1.5 oz.	0.08 a	7.2 a
Compound 'F'240SC	5.1 oz.	0.04 a	4.2 a
Untreated	-	0.08 a	6.7 a

Treatment means followed by the same letter are not significantly different (Fishers Protected LSD ; P=<0.05). . Statistical analysis includes treatments omitted from text. Data for ratings and damaged fruit transformed by Log_{10} (X + 1) and arcsine (sq. rt. X), respectively.

[1]Data from M.26./'Empire'; application 31 May, evaluated 20 July.

[2]Fruit rating where: 0 = 0 SJS / fruit; 1 = 1-5 SJS / fruit; 2 = 6-10 SJS / fruit; 3 = >10 SJS / fruit.

APPLE: *Malus domestica* 'McIntosh'

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, 2000: Treatments were applied to four-tree (of which 'McIntosh' 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. All dilutions are presented as amt/100 gal – (based on 400 gallons/acre). Trees on the M.7 rootstock were 6 years-old, and had not yet filled their space. Seasonal treatments were applied on various schedules as shown in Table 9. 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.

Mite assessments were made 25 April, 13 June, 10 July & 24 July. Because mite populations did not develop at at the Hudson Valley Lab site, separation of miticide treatments could not be accomplished.

Table 9. Evaluation of miticides for controlling mite complex on apple, Cornell's Hudson Valley Lab., Highland, NY - 2000

Treatment	Formulation amt./100 gal.	Timing[1]	ERM	ERME	TSM	TSME	AMB	ARM
25 April								
1. Compound B	4.0 oz./100	PF, threshold	0.2 b	0.5 cd	0.0a	0.0a	0.0a	0.0a
2. Compound B	4.0 oz./100	threshold	0.0a	<0.1ab	0.0a	0.0a	0.0a	1.1 c
3. AgriMek	3.3 oz./100	PF	0.0a	<0.1ab	0.0a	0.0a	0.0a	0.1ab
+ SS UF oil	32.0 oz./100							
4. Pyramite 60WP	3.3 oz./100	7 d p PF	0.0a	0.0a	0.0a	0.0a	0.0a	0.0a
5, Pyramite 60WP	3.3 oz./100	threshold	0.0a	0.3 bcd	0.1a	0.1a	0.0a	1.1 c
6. Vendex 50WP	8.0 oz./100	threshold	0.0a	0.6 d	0.0a	0.0a	0.0a	0.0a
7. Kelthane 50WP	24.0 oz./100	threshold	0.0a	0.1ab	0.0a	0.0a	0.0a	5.8 d
8. Kelthane 50WP	24.0 oz./100	7 d p PF	0.0a	0.2ab	0.0a	0.0a	0.0a	1.3 c
9. D2341	2.7 oz./100	threshold	0.0a	0.2abc	0.0a	0.0a	0.0a	0.6 bc
+ LI700	32.0 oz./100							
10. Untreated			0.0a	<0.1ab	0.0a	0.0a	0.0a	0.6 bc
13 June								
1. Compound B	4.0 oz./100	PF, threshold	0.0a	0.0a	0.0a	0.0a	0.0a	0.5ab
2. Compound B	4.0 oz./100	threshold	0.2a	0.0a	0.2a	0.3a	0.0a	3.3 cd
3. AgriMek	3.3 oz./100	PF	0.0a	0.0a	0.0a	0.0a	0.0a	0.2 cd
+ SS UF oil	32.0 oz./100							
4. Pyramite 60WP	3.3 oz./100	7 d p PF	0.0a	0.1a	0.0a	0.0a	0.0a	1.3abc
5, Pyramite 60WP	3.3 oz./100	threshold	0.4a	0.3a	0.2a	0.8a	0.0a	4.3 cd
6. Vendex 50WP	8.0 oz./100	threshold	0.2a	0.2a	0.1a	0.5a	0.0a	2.1 bcd
7. Kelthane 50WP	24.0 oz./100	threshold	0.0a	0.3a	0.0a	0.2a	0.0a	5.4 d
8. Kelthane 50WP	24.0 oz./100	7 d p PF	0.0a	0.2a	0.0a	0.1a	0.0a	0.3ab
9. D2341	2.7 oz./100	threshold	0.0a	0.3a	0.0a	0.4a	0.0a	1.7abcd
+ LI700	32.0 oz./100							
11. Untreated			0.1a	0.1a	0.3a	0.3a	0.0a	1.6abc

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

[1]McIntosh phenology: 1/2" G on 4/2; TC on 4/14; Pink on 4/26, Bloom on 5/1; PF on 5/8, 1C on 5/16. Threshold treatments applied on 13 July.

APPLE: *Malus domestica* 'Delicious'

A predatory phytoseid(AMB): *Amblyseius fallacis* (Garman)
European red mite(ERM): *Panonychus ulmi* (Koch)
Twospotted spider mite (TSM): *Tetranychus urticae* Koch

COMPARISON OF RESCUE MITICIDE TREATMENTS AGAINST LATE-SEASON OUTBREAKS OF MITES, 2000: Treatments were applied in a commercial orchard to four-tree plots (15yr-old M.26/'Delicious') replicated four times in a RCB design. Treatments were applied with a truck-mounted airblast sprayer calibrated to deliver 200 gallons of water/acre. All dilutions are presented as amt/100 gal – (based on 400 gallons/acre). The blocks had been uniformly treated with Apollo at petal fall, but by early-August ERM and TSM populations were generally well above threshold (see prespray count,Table 10).

Results from previous years had suggested that Vendex was very effective against TSM. Under 2000 conditions, the efficacy of Vendex was verified, but it's weakness against ERM was evident(Table 10). Likewise, Kelthane provided quick knockdown of TSM, but was weak against ERM. Moreover, previous data had shown Pyramite to be weak against TSM, but during this season, it provided quick knockdown of both species The activity of Compound 'B' was slow against ERM, but by 15d postapplication it provided excellent kill. Likewise, D2341 was relatively slow against ERM, but provided quick knockdown of TSM.

Table 10. Evaluation of miticides for controlling late-season mites on apple, Cornell's Hudson Valley Lab., Chaissan Farm., Modena, N.Y.-2000.

Treatment	Formulation amt./100 gal.	Timing	ERM	ERME	TSM	TSME	AMB
Prespray count(15 Aug)							
1. Vendex 50WP	8.0 oz./100	Threshold	10.1	58.8	10.4	32.2	0.3
2. Compound B	4.0 oz./100	Threshold	10.1	61.2	5.7	24.2	0.3
3. D2341 + LI700	2.7 oz./100 32.0 oz./100	Threshold	12.9	68.5	9.8	30.5	0.2
4. Kelthane 50WP	24.0 oz./100	Threshold	6.6	41.6	3.1	23.9	0.1
5. Pyramite 60WP	3.3 oz./100	Threshold	10.9	40.8	6.7	18.1	0.2
6. Untreated	-	-	6.8	30.5	2.2	10.8	0.1

8 d post (23 Aug)

Treatment	ERM	% Red.	ERME	% Red.	TSM	% Red.	TSME	% Red.	AMB	% Red.
1. Vendex 50WP	8.2 d	18.5	14.2 b	75.9	1.9 b	81.8	1.2ab	96.2	0.2ab	41.7
2. Compound B	6.1 cd	39.6	11.1 b	81.8	1.3ab	77.3	2.7 b	88.9	0.3ab	6.9
3. D2341 + LI700	2.6ab	79.8	2.9a	95.8	0.8a	91.7	1.2ab	96.2	0.2ab	-14.8
4. Kelthane 50WP	3.4 bc	48.9	3.5a	91.6	0.7a	76.8	0.8a	96.7	0.1a	-16.4
5. Pyramite 60WP	1.1a	90.3	11.7 b	71.4	0.6a	90.7	1.5ab	91.7	0.1a	37.7
6. Untreated	8.6 d	-26.8	19.6 b	35.8	0.7a	70.0	2.3	79.0	0.3 b	-156.0

15 d post (30 Aug)

Treatment	ERM	% Red.	ERME	% Red.	TSM	% Red.	TSME	% Red.	AMB	% Red.
1. Vendex 50WP	5.8 b	42.8	8.5 bc	85.6	1.7 b	83.1	2.6a	92.1	0.9 b	-169.6
2. Compound B	0.3a	96.8	1.9a	96.9	0.6a	89.3	2.1a	91.4	0.3a	-8.1
3. D2341 + LI700	4.0 b	68.7	2.6a	96.1	1.1ab	88.4	1.8a	94.1	0.6ab	-282.7
4. Kelthane 50WP	5.7 b	12.5	6.7 b	83.9	1.8 b	42.3	1.8a	92.3	0.2a	-86.5
5. Pyramite 60WP	0.8a	92.5	15.7 c	61.5	1.1a	83.9	2.8a	84.6	0.1a	40.4
6. Untreated	7.1 b	-4.7	14.8 c	51.6	2.1 b	5.6	2.9a	73.1	0.5ab	-445.3

[1]Means followed by the same letter are not significantly different (Fishers Protected LSD; P=<0.05). Log and arcsine transformations used prior to analysis of count and % data, respectively.

[2]Mite counts depicted per leaf.

Percent reduction formula = ([pre ct. - post ct] / pre ct) * 100 for each of the two post count sample dates.

PEAR: *Pyrus communis* L. 'Bartlett'

Pear psylla(PP): *Cacopsylla pyricola* (Foerster)

PEAR PSYLLA CONTROL WITH CONVENTIONAL AND REDUCED-RISK INSECTICIDES, 2000: 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 23 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. All plots received Guthion at petal fall (PF), fruit-set and 12d post PF for plum curculio and pear midge. Insecticide efficacy against PP was evaluated by sampling 25 spur leaves from five separate spurs until 5 June, and thereafter sampling five terminals/treatment each containing one proximal, one distal, and three mid-terminal leaves. Samples were removed to the laboratory, where PP nymphs and eggs were counted using a binocular scope. Data were transformed by arcsine square root prior to analysis by Fisher's Protected LSD test.

At prespray evaluation on 11 May, psylla populations in all treatments were abnormally low for the test site (Table 11) and remained so for the entire season. By 16 May, Brigade (low rate) and Calypso were close to threshold, but populations subsided to very low levels by 25 July.

Table 11. Evaluations of insecticides for controlling pear psylla on Bartlett pear, Cornell's Hudson Valley Lab., Highland, NY – 2000.

Treatment	Formulation amt./100 gal.	Treat. Timing[1]	# Nymphs / leaf 6/5	6/16	7/25
Brigade WSB	9.1 gr	8dpPF	0.8 a	1.5 d	0.1 a
Brigade WSB	15.1 gr	8dpPF	0.5 a	0.7 abcd	0.0 a
Actara	42.5 gr	8dpPF	0.2 a	0.4 abc	0.1 a
Actara	52.5 gr	8dpPF	0.0 a	0.8 bcd	0.0 a
Calypso 4F	2.0 oz	8dpPF	0.3 a	1.3 cd	0.1 a
Compound F	3.84 oz	8dpPF	0.4 a	0.2 ab	0.2 a
Compound F	7.68 oz	8dpPF	0.1 a	0.1 ab	0.0 a
Provado 1.6F	1.7 oz	8dpPF	0.4 a	0.5 abc	0.1 a
AgriMek 0.15 EC	2.2 oz + UF oil	8dpPF	0.1 a	0.3 ab	0.0 a
Surround WP	25.0 lbs	BB, WB, PF, 8dpPF; all covers	0.2 a	0.1 ab	0.0 a
Surround WP	50.0 lbs	BB, WB, PF 8dpPF; all covers	0.0 a	0.0 a	0.0 a
Pyramite 60WP	3.3 oz	WB	0.3 a	0.1 ab	0.0 a
Neem 4.5 + Sunsprya 6E oil 2% @ SB, BB	4.0 oz	8dPPF	0.0 a	0.4 abc	0.1 a
M-Pede + Sunsprya 6E oil 2% @ SB, BB	1.5 gal	8dPPF	0.0 a	0.2 ab	0.0 a
Sunsprya 6E oil 2% @ SB, BB			0.1 a	0.5 abcd	0.0 a
Untreated			0.4 a	0.4 ab	0.6 b

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

[1]Application timings: SB, March 25; BB, 9 April; WB,18 April; Petal Fall (PF), May 8; 8dPPF, 16 May

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

INSECT CONTROL ON LATE-SEASON SWEET CORN WITH FOLIAR SPRAYS OF INSECTICIDES, 1999: 'Sensor' sweet corn was planted 29 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 (3 MPH), through three D3-25 cone nozzles/row, dispensing 51 GPA @ 100 PSI. Treatments were applied starting either at open tassel (Avaunt & Dipel) or at first silk on 23 AUG and 25 AUG, respectively. Additional sprays were applied on a 5-day schedule. Efficacy was assessed on 8 SEPT. by examining 25 randomly selected ears per treatment/replicate.

Data are presented in (Table 12). All species were present, but FAW infestations were extreme The traditional acceptance threshold for fresh market sweet corn is <5% infested ears. Under this standard, all treatments except for Avaunt, TD2416 alone or Dipel provided acceptable control. The addition of Penncap to TD2416 significantly inproved performance.

Table 12. Efficacy of insecticide treatments against sweet corn insects, Cornell's Hudson Valley Lab, Highland, NY – 2000.

		% infested ears			
Treatment [1]	Form./A	ECB	CEW	FAW	Total[4]
Spintor 2SC[3] + Silwet	4.5 oz	0.0	0.0	0.0	0.0 a
Baythroid 2E[3]	2.8 oz	0.0	0.0	0.0	0.0 a
Spintor 2SC[3] + Silwet	2.3 oz	1.0	0.0	1.0	0.5 ab
Warrior 1E[3]	3.0 oz	1.0	1.0	0.0	1.0 ab
Capture 2EC[3]	4.2 oz	1.0	0.0	1.0	1.0 ab
Warrior 1E[3]	1.5 oz	1.0	1.0	1.0	1.5 ab
TD2426-01 0.86E[3] + Penncap M 2L	4.5 oz 32.0 oz	2.0	1.0	0.0	2.3 ab
Capture 2EC[3]	2.1 oz	4.0	0.0	1.0	2.5 ab
Avaunt 30WG[2]	3.0 oz	9.0	0.0	0.0	5.7 b
Avaunt 30WG[2]	1.5 oz	5.0	2.0	2.0	6.1 b
TD2416-01 0.86E[3]	9.0 oz	5.0	1.0	3.0	6.8 b
Dipel DF[2]	32.0 oz	8.0	6.0	24.0	36.7 c
Dipel DF[2]	16.0 oz	7.0	7.0	20.0	39.7 c
UNTREATED	-	12.0	6.0	25.0	42.8 c

Means followed by the same letter are not significantly different (Fishers Protected LSD; P=0.05). Data transfomed by arsine (sq. rt. x) prior to analysis.

[1]Planting date – 29 June; Evaluation date – Sept. 8

[2]Spray dates – Aug 23; Aug 25; Aug 30; Sept 5

[3]Spray dates – Aug 25; Aug 30; Sept 5

[4] Transformed means presented and therefore, columns may not total as expected.

Corn flea beetle (CFB): *Chaetocnema pulicaria* Melsheimer

CONTROL OF CORN FLEA BEETLE IN RELATIONSHIP TO REDUCTIONS IN INCIDENCE OF STEWART'S WILT DISEASE OF SWEET CORN, 2000: The Stewart's wilt bacterium overwinters in the corn flea beetle. Standard methods to reduce disease incidence traditionally include systemic insecticide granular or emulsions at planting, or foliar sprays early in the season to control flea beetle populations. This trial was performed to evaluate imidacloprid seed treatments to a number of Harris-Moran sweet corn Sh_2 cultivars. The insecticide (Gaucho®) was applied at the commercial rate by the seed company.

Each entry (6 hybrids, treated and untreated) was planted sequentially (2 May; 16 May & 20 June) in a randomized block design. Three planting dates were used to include varying degrees of infestation pressure from flea beetles. For each planting, visual observations of disease symptoms were made at the late-whorl stage. Because of extremely wet spring conditions (see Appendix), the first planting emerged poorly and yielded no data; the 2nd planting had poor emergence but enough plants were present for evaluation.

Data are presented in (Table 13). In general, Confection, Bandit, and Morning Star appeared to be relatively susceptible to wilt, and thus benefited greatly from the seed treatment. Less susceptible hybrids also benefited from treatment, but to a lesser degree. When all entries were considered across two planting dates, seed treatment significantly reduced disease incidence. Under such conditions (high vector pressure and disease incidence), routine treatment of seeds with Gaucho would be advisable and cost effective.

Table 13. Efficacy of Imidacloprid seed treatments to Harris Moran Sweet Corn Hybrids for protection against bacterial wilt disease, Cornell's Hudson Valley Lab., New Paltz, NY – 2000

		% infected plants			
Hybrid	Insecticide	Planting 1[a]	Planting 2[b]	Planting 3[c]	Ave.
Zeneth	treat.	no data	0.6 a	0.0 a	0.3
Zeneth	untreat.	"	4.4 abc	2.4 b	3.4
Sweet Magic	treat.	"	2.9 ab	4.6 bc	3.8
Sweet Magic	untreat.	"	3.6 abc	12.2 cd	7.9
Confection	treat.	"	4.1 abc	4.6 bc	4.4
Confection	untreat.	"	13.6 cd	11.9 cd	12.8
Ice Queen	treat.	"	8.5 bcd	3.1 b	5.8
Ice Queen	untreat.	"	4.1 abc	7.5 bcd	5.8
Bandit	treat.	"	4.6 bc	4.7 bc	4.7
Bandit	untreat.	"	20.6 d	18.3 d	19.5
Morning Star	treat.	"	22.3 d	3.3 b	12.8
Morning Star	untreat.	"	31.3 d	11.5 cd	21.4
Average infection of untreated			12.9%	10.6 %	
Average infection of treated			7.2%	3.4 %	

Means followed by the same letter are not significantly different (Fisher's Protected LSD; $P<0.05$). Data transformed by arcsine (sq. rt. X) prior to anlaysis. Untransformed means are presented.

[a] Planted 5/2 ; low stand count because of rain-packed soil and probable herbicide effects.

[b] Planted 5/16 ; evaluated at late-whorl, 7/19 ; poor emergence because of rain-packed soil.

[c] Planted 6/20 ; evaluated at late-whorl, 8/8

2000 MAXIMUM AND MINIMUM TEMPERATURES AND PRECIPITATION

Hudson Valley Laboratory, Highland, NY

All readings were taken at 0800 EST on the dates indicated

Date	MARCH			APRIL			MAY			JUNE			JULY			AUGUST			SEPTEMBER		
	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip
1				53	27		62	36		72	51		78	54		73	65	0.01			
2				65	42		66	51	0.02	85	58		81	57		74	67				
3				64	49		64	37		90	59	0.03	86	60		85	72	0.02			
4				69	53	0.43	69	44		71	45		84	66		82	63	0.16			
5				64	37	0.01	74	56		75	49	0.04	84	58		79	55				
6				45	29		83	58	0.16	57	50	0.33	83	51		79	56				
7				68	38		86	59	0.01	59	49	2.95	76	52		76	66	0.56			
8				62	50		92	63		72	47		75	49		87	68				
9				75	31	0.16	92	65		77	58		79	53		88	71	0.02			
10				44	29	0.26	95	57	0.40	86	59		82	68	0.01	88	64	0.25			
11				50	29		64	52	0.91	91	66		90	56		84	65				
12				45	35	0.02	71	50	0.16	93	56	0.98	83	56		83	64	0.37			
13				48	26		62	53	0.26	60	55	0.02	83	55		71	60				
14				51	29		74	51	0.53	59	51	0.28	86	62		74	64				
15				60	39		71	41		59	53	0.01	79	66	0.53	74	63	0.61			
16				70	53		63	36		76	58		68	64	0.94	80	64	0.21			
17				73	40	0.01	70	49		85	73		81	60		82	55				
18				43	35	0.62	72	51	0.17	90	58		83	64		75	51				
19				45	36	0.02	78	46	0.76	66	58	0.23	87	55		69	52				
20				57	43		48	43	0.62	73	52		68	57		76	50				
21	51	34		63	46	0.34	52	45	0.34	80	59		74	51		70	46				
22	49	37		48	43	1.48	57	52		80	67	0.36	81	60	0.44	74	49				
23	54	30		45	42	0.06	60	53	0.09	85	60		78	52		77	56				
24	65	35		56	41	0.69	62	54	0.63	80	55		79	57		71	61	0.22			
25	66	34		66	38		80	56	0.23	84	65		77	62		81	54				
26	66	43	0.07	61	40		73	53		89	70	0.29	78	63		80	54				
27	64	30		47	37	0.08	72	46		88	69		67	61	2.83	82	61				
28	61	47	1.02	53	40		74	46		83	59	0.17	70	63	0.03	83	64				
29	54	37	0.02	58	34		68	51		81	62	0.33	78	63		81	65	0.07			
30	53	39		70	46		66	43		78	58	0.01	74	65	0.14	80	58	0.01			
31	53	29					68	43					71	67	0.14	80	64				
2000 Avg/Total				57.3	38.6	4.18	70.6	49.7	5.29	77.5	57.6	6.03	78.8	58.9	5.06	78.6	60.2	2.51	Means for April thru August		
Mean 96-99				60.0	38.5	3.60	70.1	48.2	3.56	79.8	58.4	3.27	83.9	61.9	5.17	82.2	60.9	2.55	**75.2**	**53.6**	**3.63**
99 data				60.9	38.4	1.02	71.8	47.9	2.67	83.6	58.6	0.79	89.2	64.7	1.14	82.7	60.7	2.58	**77.6**	**54.1**	**8.2**
98 data				62.0	39.9	3.81	74.2	52.5	6.14	76.1	58.3	6.70	82.7	61.6	3.66	84.2	62.0	1.65	**75.8**	**54.9**	**22.0**
97 data				57.5	36.3	4.07	66.2	45.5	2.76	80.2	56.7	1.68	83.5	60.1	6.78	80.5	59.5	4.50	**73.6**	**51.6**	**19.8**
96 data				59.6	39.3	5.51	68.3	46.7	2.68	79.2	60.0	3.91	80.0	61.2	9.08	81.2	61.4	1.47	**73.7**	**53.7**	**22.7**

- MATERIALS TESTED -

Actara	Novartis
AgriMek	Novartis
Avaunt	Dupont
Baythroid	Bayer
Brigade	FMC Corp
Calypso	Bayer
Capture	FMC Corp
Cryocide	Elf Atochem
D2341	Uniroyal
Danitol	Valent
Dipel	Abbott
Compound 'B'	Bayer
Compound 'F'	Bayer
Fulfill	Novartis
Gaucho ST	Bayer/Harris-Moran Seed Co.
Guthion	Bayer
Imidan	Gowan
Kelthane	Rohm & Haas
Lorsban	Dow
M-Pede	Mycogen
Neemix	Thermo Trilogy Corp
Penncap M	Elf Atochem
Pirimor	Bayer
Proclaim	Novartis
Provado	Bayer
Pyramite	BASF
SpinTor	Dow
Supracide	Gowan
Surround	Englehardt
TD2383-01	Elf Atochem
Vendex	Griffin
Vydate	DuPont
Warrior	Zeneca/Novartis