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OUTSIDE RESEARCH OR DEVELOPMENT GROUPS

FRUIT INSECT AND MITE CONTROL STUDIES IN EASTERN NEW YORK 1986

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APOLLO
= your blocks
028, 29 = your blocks

1986 MAXIMUM AND MINIMUM TEMPERATURES AND PRECIPITATION
Hudson Valley Laboratory, Highland, NY

All readings were taken at 0800 EST on the dates indicated

Date	April		May		June		July		August		September	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
1	68	36	71	43	86	62	79	47	68	61	78	48
2	74	46	71	43	89	51	81	61	79	59	77	55
3	63	39	53	33	62	39	67	54	77	65	76	59
4	62	37	51	31	68	45	76	46	82	58	73	59
5	52	36	60	45	79	58	76	60	81	57	66	59
6	57	34	86	53	76	60	89	69	82	64	70	60
7	43	35	85	54	62	60	92	66	78	66	79	49
8	62	43	83	48	66	59	96	56	80	68	65	44
9	68	37	66	40	84	53	90	67	86	64	70	39
10	53	35	65	34	75	45	84	55	85	60	75	45
11	46	31	72	38	80	64	80	54	82	69	77	60
12	48	33	73	38	86	60	76	61	82	54	84	68
13	49	24	69	49	60	52	63	60	73	50	84	52
14	60	30	75	38	75	55	75	60	79	52	80	46
15	66	36	74	47	80	54	79	58	81	56	67	39
16	67	43	62	54	85	63	83	56	81	67	70	46
17	52	43	71	58	83	52	81	60	82	69	62	35
18	59	47	81	53	73	44	82	69	83	67	68	39
19	67	34	88	60	72	48	88	71	81	68	70	53
20	69	41	89	58	77	58	85	64	79	65	74	50
21	68	47	72	63	74	51	78	69	81	64	72	57
22	58	39	70	59	78	50	84	61	71	58	70	51
23	56	33	73	53	81	62	83	60	77	65	64	56
24	48	32	75	50	86	57	88	57	79	56	72	61
25	68	49	71	53	81	48	87	68	71	50	79	54
26	72	52	77	53	71	45	86	70	78	52	74	58
27	68	55	78	52	80	53	84	69	80	65	80	54
28	73	47	86	58	86	64	82	69	82	55	61	54
29	80	49	86	51	86	64	80	69	64	49	65	58
30	80	47	88	61	85	55	85	66	67	41	76	66
31			92	61			73	61	75	45		
Total	1.59		1.75		6.86		5.39		2.33		0.52	

1986 MAXIMUM AND MINIMUM TEMPERATURES AND PRECIPITATION
Hudson Valley Laboratory, Highland, NY

All readings were taken at 0800 EST on the dates indicated

Date	April			May			June			July			August			September		
	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip	Max	Min	Precip
1	68	36		71	43		86	62	0.44	79	47		68	61		78	48	
2	74	46	0.01	71	43		89	51	0.06	81	61	0.66	79	59	0.10	77	55	0.01
3	63	39		53	33		62	39		67	54	0.60	77	65	1.09	76	59	
4	62	37		51	31		68	45		76	46		82	58		73	59	0.03
5	52	36	0.12	60	45		79	58		76	60		81	57		66	59	
6	57	34	0.19	86	53		76	60	2.28	89	69		82	64		70	60	0.06
7	43	35	0.12	85	54	0.09	62	60	2.07	92	66		78	66	0.10	79	49	
8	62	43	0.02	83	48	0.03	66	59	0.07	96	56		80	68		65	44	
9	68	37		66	40	0.03	84	53	0.32	90	67		86	64		70	39	
10	53	35	0.02	65	34		75	45		84	55		85	60		75	45	
11	46	31		72	38		80	64	0.10	80	54		82	69	0.12	77	60	
12	48	33	0.03	73	38		86	60	0.38	76	61	0.59	82	54		84	68	
13	49	24		69	49		60	52	0.62	63	60	0.36	73	50		84	52	0.08
14	60	30		75	38		75	55		75	60	0.54	79	52		80	46	
15	66	36		74	47		80	54		79	58	0.08	81	56		67	39	
16	67	43	0.24	62	54		85	63		83	56		81	67	0.04	70	46	0.02
17	52	43	0.36	71	58	0.21	83	52	0.26	81	60		82	69		62	35	0.01
18	59	47		81	53		73	44		82	69		83	67	0.10	68	39	
19	67	34		88	60		72	48		88	71		81	68	0.06	70	53	
20	69	41		89	58		77	58	0.08	85	64		79	65		74	50	
21	68	47	0.01	72	63	0.18	74	51		78	69		81	64		72	57	0.03
22	58	39	0.22	70	59	0.71	78	50		84	61		71	58	0.15	70	51	
23	56	33	0.11	73	53	0.45	81	62		83	60		77	65		64	56	0.07
24	48	32	0.03	75	50	0.05	86	57		88	57		79	56	0.39	72	61	0.04
25	68	49	0.10	71	53		81	48	0.10	87	68		71	50		79	54	
26	72	52		77	53		71	45		86	70		78	52		74	58	0.07
27	68	55		78	52		80	53		84	69	0.94	80	65	0.17	80	54	0.10
28	73	47		86	58		86	64	0.08	82	69		82	55		61	54	
29	80	49		86	51		86	64		80	69	0.25	64	49	.01	65	58	
30	80	47	0.01	88	61		85	55		85	66	0.78	67	41		76	66	
31				92	61					73	61	0.59	75	45				
Total	1.59			1.75			6.86			5.39			2.33			0.52		

APPLE: *Malus domestica*

Apple aphid: *Aphis pomi* De Geer

Apple maggot: *Rhagoletis pomonella* (Walsh)

Codling moth: *Laspeyresia pomonella* (L.)

Comstock mealybug: *Pseudococcus comstocki* (Kuwana)

European apple sawfly: *Hoplocampa testudinea* (Klug)

Plum curculio: *Conotrachelus nenuphar* (Herbst)

San Jose scale: *Quadraspidiotus perniciosus* (Comstock)

Spotted tentiform leafminer: *Phyllonorycter blancardella* (Fabr.)

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

White apple leafhopper: *Typhlocyba pomaria* McAtee

Woolly apple aphid: *Eriosoma lanigerum* (Hausmann)

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APPLE, INSECT CONTROL, HUDSON VALLEY LAB, HIGHLAND, NY, 1986:

Treatments were applied to eight tree plots replicated three times in a randomized complete block design. The Baythroid, TD 2207, and Lorsban treatments were applied on 28 Apr (pink), 10 May (petal fall), and in cover sprays on 26 May, 10 Jun, 23 Jun, 7 Jul, 21 Jul, 5 Aug, and 19 Aug. Orthene was applied 27 Apr and 10 May followed by Danitol in all the remaining cover sprays, while Brigade was applied 28 Apr and 10 May followed by Thiodan in the remaining cover sprays. The Dimilin treatments were applied 28 Apr, 23 Jun, and 5 Aug with Guthion applied on the remaining forementioned spray dates. Larvin was applied along with Guthion at the 4 oz rate on 10 May, and alone at the 8 oz rate on 23 Jun and 5 Aug, while Guthion was applied alone at the 8 oz rate on 28 Apr, 26 May, 10 Jun, 7 Jul, 22 Jul, and 19 Aug. Danitol was applied once at the 10 oz rate on 10 May, and in four applications at the 4 and 2.6 oz rates on 27 Apr, 10 May, 23 Jun, and 5 Aug. All treatments were applied dilute to runoff using a high-pressure handgun sprayer at 400 psi delivering 4.2 gal spray/tree or 403 gal/acre. Trees were 22 years-old, 12 ft high, spaced 15 by 30 ft, and on the EMII rootstock. Additional applications over the entire block included: Difolatan 80S 16 lb/acre 9 Apr; Bayleton 50W 3.5 oz/acre, 5 May; and Dithane M-45 78WP 4 1/2 lb/acre, 5 May and 20 May. Naphthaleneacetic acid was applied in thinning sprays on 15 May using from 5 to 15 ppm depending upon the cultivar. White apple leafhopper was evaluated by counting the no. of nymphs on 25 leaves from one "Greening" tree/plot on 23 Jul and 6 Sep. Spotted tentiform leafminer was evaluated 15 Aug by counting the no. of mines on 25 leaves from one "Greening" and one "Cortland" tree/plot. Apple aphids were evaluated by examining 25 terminals on one "McIntosh" tree/plot on 13 Jun and 27 Jun. Woolly apple aphids were evaluated by examining 25 terminals from one "McIntosh" tree/plot on 6 Sep. European apple sawfly and plum curculio were evaluated prior to Jun drop by examining all of the fruits in 50 fruiting clusters on one "McIntosh" tree/plot on 29 May. Insect damage to the fruit was assessed at harvest by examining 100 fruits/cultivar/plot from "McIntosh" 6 Sep, and "Golden Delicious" 1 Oct. An early Spring resulted in an early bloom lasting longer than normal. During bloom warm periods were often followed by sudden temperature drops and frost caused damage on two occasions in other areas of the valley. Several hailstorms passed through the area but caused only slight damage at this site. Rainfall was above average throughout the season, while temperatures were generally below normal.

Thiodan, Baythroid, and Danitol treatments provided excellent white apple leafhopper control, while the forementioned treatments plus the Dimilin treatments provided good control of the spotted tentiform leafminer. Apple aphids were quite effectively controlled by the Orthene/Danitol, Baythroid, and Lorsban treatments, and somewhat less effectively controlled by the Danitol (extended interval), Thiodan, and TD 2207 treatments. Early season European apple sawfly injury was evident in the Brigade treatment while the lower rate of Danitol was less effective than the higher rate against both early sawfly and plum curculio. Tarnished plant bug control was most evident where the pyrethroids were used, while extending the interval with Danitol or using Thiodan resulted in greater plum curculio injury than in the other treatments. Virtually all treatments controlled lepidopterous pests including codling moth and leafrollers. Comstock mealybug outbreaks were found in the pyrethroid treatments, while woolly apple aphid resurgences were found in the Larvin and, to a lesser extent, in the Dimilin treatments. TD 2207 and Lorsban treatments severely russeted the Golden Delicious fruit.

Treatment	Rate form. /100 gal	Mean no. nymphs or mines				Mean no. aphid infested				Mean no. infested		
		/25 leaves		/25 terminals		terminals/25		clusters/50				
		White apple leafhopper 23 Jul	Spotted tentiform leafminer 6 Sep	Greening 15 Aug	Cortland	Woolly apple aphid 6 Sep	Apple aphid 13 Jun	27 Jun	Plum curculio 29 May	E. apple sawfly 29 May		
1. Danitol 2.4E	10 oz.....	0.3 a	30.3 b	9.7 bc	2.7 ab	0.0 a	18.3 e	23.7 e	1.0 a	3.7 ab		
2. Danitol 2.	4 oz.....	0.0 a	0.0 a	4.3 abc	1.3 a	1.3 a	19.3 e	1.7 a	1.7 a	0.7 a		
3. Danitol 2.4E	2.6 oz.....	0.0 a	0.0 a	2.7 a	1.3 a	1.0 a	17.3 de	1.7 a	4.3 a	2.7 a		
4. Orthene 75SP	5.3 oz	0.0 a	0.0 a	1.3 a	0.0 a	0.3 a	0.0 a	0.0 a	0.7 a	2.0 a		
5. Baythroid 2E	0.8 oz.....	0.0 a	0.0 a	1.7 a	0.3 a	1.0 a	0.3 a	0.0 a	0.3 a	1.3 a		
6. Brigade 10W	2.4 oz	0.0 a	0.0 a	4.0 ab	2.0 ab	0.0 a	1.7 ab	6.7 ab	1.7 a	8.7 b		
7. Dimilin 2F	2 oz	11.7 a	5.0 abc	0.3 a	0.3 a	6.3 c	8.0 c	21.7 de	0.3 a	4.0 ab		
8. Guthion 50W	8 oz	8.3 a	3.0 a	1.3 a	1.3 a	5.3 c	6.0 c	20.7 de	1.7 a	4.7 ab		
9. Larvin 3.2F	4 oz	2.3 a	10.3 c	5.0 bc	5.0 bc	10.3 c	5.0 bc	22.0 de	0.3 a	0.7 a		
10. TD 2207 4F	12 oz.....	2.0 ab	15.1 a	18.0 de	11.3 e	0.0 a	4.7 bc	11.7 bc	0.7 a	0.7 a		
11. Lorsban 50W	12 oz.....	0.7 a	12.0 a	23.3 e	9.0 de	0.0 a	0.3 a	0.0 a	1.7 a	0.3 a		
12. Check.....	.....	11.0 c	54.3 c	16.7 d	7.3 cd	0.0 a	14.0 d	16.7 cd	33.3 b	21.0 c		

Treatment means followed by the same letter are not significantly different (P = 0.05; DMRT).

*New formulation, XF-85017.

Treatment	Rate form. /100 gal	Tarnished plant bug	Plum curculio	% injured fruit (McIntosh)					Late leafroller	Apple maggot	Comstock mealybug	% Clean fruit
				European apple sawfly	Early lepidoptera	Codling moth	San Jose scale					
1. Danitol 2.4E	10 oz.....	4.7 abcd	16.0 bc	6.3 a	0.0 a	1.3 a	8.7 ab	0.7 a	1.0 a	2.0 ab	64.7bc	
2. Danitol 2.4E	4 oz.....	2.3 ab	26.0 d	0.3 a	0.0 a	0.0 a	10.7 ab	0.3 a	0.3 a	14.0 cd	58.0 b	
3. Danitol 2.4E	2.6 oz.....	3.0 abc	22.7 cd	1.7 a	0.0 a	0.0 a	10.0 ab	0.0 a	0.0 a	18.7 d	53.3 b	
4. Orthene 75SP	5.3 oz											
Danitol 2.4E	4 oz.....	1.3 a	2.3 a	1.7 a	0.0 a	0.0 a	3.3 a	0.0 a	0.3 a	12.7 bcd	80.3 de	
5. Baythroid 2E	0.8 oz.....	3.7 abc	0.3 a	1.7 a	0.0 a	0.0 a	1.3 a	0.0 a	0.0 a	5.7 abc	88.3 e	
6. Brigade 10W	2.4 oz											
Thiodan 50W	16 oz.....	4.3 abc	8.3 ab	2.3 a	0.0 a	0.0 a	6.7 a	0.3 a	0.3 a	7.3 abc	73.3 cd	
7. Dimilin 2F	2 oz											
Guthion 3F	10.7 oz.....	10.3 d	0.7 a	5.0 a	0.7 a	0.0 a	2.3 a	0.0 a	0.0 a	2.7 ab	80.0 de	
8. Dimilin 25W	2 oz											
Guthion 50W	8 oz											
Kelthane 4F	12 oz.....	4.7 abcd	1.7 a	3.7 a	0.3 a	0.0 a	0.3 a	0.3 a	0.0 a	3.7 abc	86.3 de	
9. Larvin 3.2F	4 oz											
Larvin 3.2F	8 oz											
Guthion 50W	4 oz											
Guthion 50W	8 oz											
Kelthane 4F*	12 oz.....	6.3 abcd	1.7 a	0.3 a	0.3 a	0.0 a	0.3 a	0.0 a	0.3 a	1.3 a	91.3 e	
10. TD 2207 4F	12 oz.....	7.7 bcd	1.3 a	0.7 a	0.3 a	0.0 a	0.0 a	0.0 a	0.0 a	0.3 a	90.0 e	
11. Lorsban 50W	12 oz.....	9.0 cd	1.3 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	89.7 e	
12. Chéck.....		5.7 abcd	66.0 e	4.3 a	1.0 a	7.3 b	19.3 b	3.0 b	5.3 b	9.3 abcd	12.0 a	

Treatment means followed by the same letter are not significantly different (P = 0.05; DMRT).
*New formulation, XF-85017.

Treatment	Rate form. /100 gal.	% injured fruit (Golden Delicious)										Tarnished plant bug	Plum curculio	European apple sawfly	Early lepidoptera	Codling moth	San Jose scale	Late leafroller	Apple maggot	Comstock mealybug	% Clean fruit	Mean russet rating*/fruit
1. Danitol 2.4E	10 oz.....	4.0 abc	26.0 bcd	3.0 a	0.0 a	9.7 b	4.0 a	1.0 c	4.0 abc	52.3 b	0.5 a											
2. Danitol 2.4E	4 oz.....	2.0 ab	38.0 de	2.7 a	0.0 a	0.3 a	10.7 a	0.0 a	1.0 a	50.0 b	0.8 a											
3. Danitol 2.4E	2.6 oz.....	3.3 abc	34.0 cd	2.7 a	0.0 a	0.3 a	7.7 a	0.3 ab	1.3 a	46.7 b	0.8 a											
4.Orthene 75SP Danitol 2.4E	5.3 oz 4 oz.....	6.7 abcd	1.0 ab	7.0 a	0.0 a	0.0 a	1.0 a	0.0 a	0.0 a	79.3 c	0.7 a											
5. Baythroid 2E	0.8 oz.....	1.7 a	0.0 a	2.0 a	0.0 a	0.3 a	0.0 a	0.0 a	0.0 a	88.7 c	0.5 a											
6. Brigade 10W Thiodan 50W	2.4 oz 16 oz.....	2.7 ab	10.7 abc	5.0 a	0.0 a	4.3 ab	0.0 a	0.3 ab	2.7 a	68.7 bc	0.9 a											
7. Dimilin 2F Guthion 3F	2 oz 10.7 oz.....	10.7 d	1.0 ab	2.0 a	0.7 ab	0.0 a	0.3 a	0.0 a	0.0 a	85.3 c	1.0 a											
8. Dimilin 25W Guthion 50W Kelthane 4F	2 oz 8 oz 12 oz.....	7.7 bcd	3.0 ab	2.0 a	0.0 a	0.0 a	0.0 a	0.7 bc	0.0 a	86.7 c	0.8 a											
9. Larvin 3.2F Larvin 3.2F Guthion 50W Guthion 50W Kelthane 4F**	4 oz 8 oz 4 oz 8 oz 12 oz.....	8.7 cd	0.7 ab	1.3 a	0.0 a	0.0 a	0.0 a	0.0 a	0.0 a	89.3 c	0.7 a											
10. TD 2207 4F	12 oz.....	7.7 bcd	0.7 ab	1.0 a	0.0 a	0.0 a	0.0 a	0.0 a	0.3 a	90.3 c	1.8 b											
11. Lorsban 50W	12 oz	5.7 abcd	2.3 ab	0.7 a	0.0 a	0.0 a	0.0 a	0.0 a	0.3 a	91.0 c	2.1 b											
12. Check.....		7.0 abcd	59.7 e	6.3 a	1.3 b	62.7 c	7.7 a	5.0 d	7.7 b	4.3 a	0.9 a											

Treatment means followed by the same letter are not significantly different (P = 0.05; DMRT).

*0 = best, 3 = worst

**New formulation, XF-85017.

APPLE: *Malus domestica*

Apple rust mite: *Aculus schlechtendali* (Nalepa)

A predatory phytoseid: *Amblyseius fallacis* (Garman)

European red mite: *Panonychus ulmi* (Koch)

Twospotted spider mite: *Tetranychus urticae* Koch

A predatory stigmatid: *Zetzellia mali* (Ewing)

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APPLE, MITE CONTROL, INSECTICIDE BLOCK, HUDSON VALLEY LAB, HIGHLAND, NY, 1986: Treatments were applied to eight tree plots replicated three times in a randomized complete block design. The Baythroid, TD 2207, and Lorsban treatments were applied on 28 Apr (pink), 10 May (petal fall), and in cover sprays on 26 May, 10 Jun, 23 Jun, 7 Jul, 21 Jul, 5 Aug, and 19 Aug. Orthene was applied 27 Apr and 10 May followed by Danitol in all the remaining cover sprays, while Brigade was applied 28 Apr and 10 May followed by Thiodan in the remaining cover sprays. The Dimilin treatments were applied 28 Apr, 23 Jun, and 5 Aug with Guthion applied on the remaining forementioned spray dates. Larvin was applied along with Guthion at the 4 oz rate on 10 May, and alone at the 8 oz rate on 23 Jun and 5 Aug, while Guthion was applied alone at the 8 oz rate on 28 Apr, 26 May, 10 Jun, 7 Jul, 22 Jul, and 19 Aug. Danitol was applied once at the 10 oz rate on 10 May, and in four applications at the 4 and 2.6 oz rates on 27 Apr, 10 May, 23 Jun, and 5 Aug. Two different formulations of Kelthane 4F were compared in sprays applied on 13 Aug. All treatments were applied dilute to runoff using a high-pressure handgun sprayer at 400 psi delivering 4.2 gal spray/tree or 403 gal/acre. Trees were 22 years-old, 12 ft high, spaced 15 by 30 ft, and on the EMII rootstock. Additional applications over the entire block included: Difolatan 80S 16 lb/acre 9 Apr; Bayleton 50W 3.5 oz/acre, 5 May; and Dithane M-45 78WP 4 1/2 lb/acre, 5 May and 20 May. Naphthaleneacetic acid was applied in thinning sprays on 15 May using from 5 to 15 ppm depending upon the cultivar. Mite populations were evaluated by sampling 25 leaves from one "Red Delicious" tree/plot at biweekly intervals throughout the summer. The leaves were brought into the laboratory where they were brushed with a mite brushing machine, and the mites and eggs examined and counted using a binocular scope. During bloom warm periods were often followed by sudden temperature drops and frost caused damage on two occasions in other areas of the valley. Several hailstorms passed through the area but caused only slight damage at this site. Rainfall was above average throughout the season, while temperatures were generally below normal.

The single high-rate application of Danitol at petal fall provided excellent mite suppression through Aug while permitting the late season buildup of *Zetzellia mali*. The 14-day schedule of Danitol was more effective than the 4 application schedule, while the lower rate of the 4 application schedule was less effective than the higher but permitted better predator survival. The Brigade applications at pink and petal fall were also very effective in controlling mite pest species. *Z. mali* achieved high populations in the Dimilin, Larvin, TD 2207, Lorsban, and the check treatments. These high populations along with those of the apple rust mite ultimately kept spider mite populations in check through predation and competition. Where predators were eliminated, e.g. in the Baythroid plots, spider mite populations reached high levels by Aug. Both Kelthane formulations effectively reduced all mite species present in the plots where they were applied.

Mean no. of mites* or eggs/leaf**

Treatment	July 16							August 4						
	ERM	ERME	TSM	TSME	ARM	AMB	AMBE	Z.maliE	Z.mali	AMB	AMBE	ARM	TSME	TSM
1.....	0.5	0.0	0.0	0.0	4	0.09	0.03	0.05	0.0	0.09	0.03	275	0.2	0.1
2.....	0.0	0.0	0.0	0.0	0	0.0	0.0	0.03	0.0	0.0	0.0	24	0.1	0.0
3.....	0.0	0.0	0.1	0.1	33	0.01	0.0	0.0	0.0	0.03	0.0	300	1.	0.01
4.....	0.0	0.0	0.0	0.0	7	0.08	0.04	0.0	0.0	0.03	0.0	7	0.0	0.01
5.....	5.9	11.9	2.6	4.4	114	0.05	0.0	0.01	0.0	0.0	0.0	146	10.0	9.1
6.....	0.3	0.3	0.4	0.7	4	0.0	0.0	0.01	0.03	0.01	0.01	88	0.5	0.7
7.....	0.3	0.6	0.0	0.2	5	0.2	0.1	0.2	0.2	0.05	0.01	0	0.2	0.1
8.....	0.1	1.5	0.0	0.0	0	0.04	0.04	0.02	0.04	0.01	0.0	23	0.4	0.3
9.....	0.3	1.3	0.1	0.2	5	0.01	0.03	0.1	0.01	0.07	0.0	50	0.8	0.5
10.....	0.4	0.7	0.1	0.2	2	0.1	0.1	0.2	0.1	0.0	0.0	4	0.6	0.3
11.....	0.2	0.7	0.5	1.3	5	0.03	0.03	0.3	0.1	0.0	0.0	26	1.0	0.4
12.....	0.7	0.7	0.4	0.2	46	0.08	0.0	0.8	1.1	0.4	0.0	111	0.1	0.1

9

September 8

Treatment	September 8							September 8						
	ERM	ERME	TSM	TSME	ARM	AMB	AMBE	Z.maliE	Z.mali	AMB	AMBE	ARM	TSME	TSM
1.....	2.4	1.9	0.5	0.1	159	0.0	1.21	0.37	0.0	0.03	0.0	194	0.2	0.2
2.....	1.3	2.9	0.2	0.2	194	0.0	0.03	0.0	0.0	0.03	0.0	259	0.7	1.6
3.....	3.3	6.2	1.6	0.7	259	0.0	0.03	0.11	0.0	0.03	0.0	84	0.4	0.1
4.....	0.1	0.1	0.5	0.4	84	0.0	0.0	0.0	0.0	0.0	0.0	104	31.3	52.3
5.....	7.7	9.5	9.6	1.8	180	0.0	0.0	0.0	0.0	0.0	0.0	180	1.8	9.6
6.....	8.6	17.4	9.6	1.8	180	0.0	0.0	0.0	0.0	0.0	0.0	5	0.5	0.5
7.....	0.3	0.5	0.5	0.5	5	0.0	2.72	0.29	0.0	0.0	0.0	2	0.1	0.1
8.....	0.0	0.6	0.1	0.1	2	0.0	0.0	0.0	0.0	0.0	0.0	1	0.0	0.0
9.....	0.1	0.2	0.0	0.0	1	0.0	0.07	0.0	0.0	0.0	0.0	10	0.0	0.0
10.....	0.1	0.1	0.0	0.0	10	0.01	1.8	0.59	0.0	0.01	1.8	198	0.2	0.1
11.....	0.9	2.0	0.1	0.2	198	0.0	0.81	0.65	0.0	0.0	0.0	36	0.3	0.1
12.....	0.3	0.5	0.1	0.3	36	0.0	5.0	0.97	0.0	0.0	0.0	0.0	0.0	0.0

*ERM= European red mite, ERME= ERM eggs, TSM= Twospotted spider mite, TSME= TSM eggs, ARM= Apple rust mite, AMB = *Amblyseius fallacis*, AMBE= AMB eggs, Z.mali= *Zetzellia mali*, Z.maliE= Z.mali eggs

** Based on 25 leaves/tree, from one Red Delicious tree in each of three replicates/treatment.

APPLE: *Malus domestica*

Apple rust mite: *Aculus schlechtendali* (Nalepa)

A predatory phytoseid: *Amblyseius fallacis* (Garman)

European red mite: *Panonychus ulmi* (Koch)

Twospotted spider mite: *Tetranychus urticae* Koch

A predatory stigmaeid: *Zetzellia mali* (Ewing)

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APPLE, MITE CONTROL, MITICIDE BLOCK, HUDSON VALLEY LAB, HIGHLAND, NY, 1986: Treatments were applied to eight tree plots replicated three times in a randomized complete block design. All treatments were applied dilute to runoff using a high-pressure handgun sprayer at 400 psi delivering 4.2 gal spray/tree or 403 gal/acre. Trees were 22 years-old, 12 ft high, spaced 15 by 30 ft, and on the EMII rootstock. The oil applications were made at tight cluster (14 Apr), while remaining early season treatments were applied at either pink (27 Apr), petal fall (10 May), or both stages of bud development. The oil and PH 70-23 treatments were supplemented during the summer on 13 Aug. Additional materials and per acre rates applied over the entire block included: Manzate 200 80W 4.5 lb, 16 Apr and 5 May; 6 lb, 26 Apr; Rubigan 1E 8 oz, 26 Apr and 20 May; Bayleton 50W 3.5 oz/acre, 5 May, 3 Jun, and 11 Jun; Dithane M-45 78WP 3 lb/acre, 20 May; Cyprex 65W 4 lb, 11 Jun; and Sevin 50W 3.3 lb, 11 Jul. Naphthaleneacetic acid was applied in thinning sprays on 15 May using from 5 to 15 ppm depending upon the cultivar. Mite populations were evaluated by sampling 25 leaves from one "Red Delicious" tree per plot at biweekly intervals throughout the summer from 28 May to 22 Aug. The leaves were brought into the laboratory where they were brushed with a mite brushing machine, and the mites and eggs examined and counted using a binocular scope. During bloom warm periods were often followed by sudden temperature drops and frost caused damage on two occasions in other areas of the valley. Several hailstorms passed through the area but caused only slight damage at this site. Rainfall was above average throughout the season, while temperatures were generally below normal.

Mite populations were slow to develop in the plots probably due to the cool, wet weather, but by Aug it was evident that the petal fall Savey and pink plus petal fall AGB treatments had provided the lengthiest mite suppression. The late season Savey treatments reduced spider mite populations while not affecting predator or apple rust mite populations. PH 70-23 reduced all mite species except the predatory *Zetzellia mali*.

Treatment	Rate form /100 gal	Application date(s)	Mean no. mites* or eggs/leaf **											
			May 28						June 16					
			ERM	ERME	TSM	TSME	Z.mali	Z.maliE	ERM	ERME	TSM	TSME	AMB	Z.maliE
1. Oil 6E Savey 50W	1 gal .5 oz	Apr 14 Aug 13.....	0.0	0.3	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.0	0.0
2. Oil 6E Savey 50W	1 gal .625 oz	Apr 14 Aug 13.....	0.2	1.1	0.0	0.2	0.0	0.0	0.1	1.1	0.0	0.1	0.01	0.0
3. Oil 6E Savey 50W	1 gal .75 oz	Apr 14 Aug 13.....	0.1	0.3	0.0	0.0	0.01	0.01	0.1	0.3	0.0	0.0	0.0	0.03
4. Savey 50W	.25 oz	May 10.....	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
5. Savey 50W	.5 oz	May 10.....	0.3	57.6	0.0	2.4	0.0	0.0	0.0	2.7	0.0	0.2	0.0	0.0
6. Savey 50W	.75 oz	May 10.....	0.0	0.5	0.0	0.1	0.0	0.0	0.0	0.6	0.0	0.1	0.0	0.0
7. AGB-6162A	32 oz	Apr 27 May 10.....	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8. AGB-6162A	48 oz	Apr 27 May 10.....	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9. Morestan 25W	8 oz	Apr 27.....	0.0	0.7	0.1	0.2	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0
10. PH 70-23 10L	12.8 oz	Apr 27 Aug 13.....	0.1	1.4	0.0	0.2	0.0	0.0	0.1	1.0	0.0	0.1	0.01	0.0
11. PH 70-23 10L	19.3 oz	Apr 27 Aug 13.....	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12. Check.....			0.4	2.2	0.0	0.1	0.0	0.0	0.1	0.2	0.0	0.01	0.0	0.04

*ERM= European red mite, ERME= ERM eggs, TSM= Twospotted spider mite, TSME= TSM eggs, ARM= Apple rust mite, AMB= *Amblyseius fallacis*, AMBE= AMB eggs, Z.mali= *Zetzellia mali*, Z.maliE= Z.mali eggs.

**Based on 25 leaves/tree, from one Red Delicious tree in each of three replicates/treatment.

Mean no. of mites* or eggs/leaf**																		
Treatment	July 7								July 28									
	ERM	ERME	TSM	TSME	ARM	AMB	AMBE	Z.mali	Z.maliE	ERM	ERME	TSM	TSME	ARM	AMB	AMBE	Z.mali	Z.maliE
1.....	0.1	0.3	0.1	0.0	299	0.0	0.0	0.0	0.0.....1.6	5.5	0.3	0.4	191	0.0	0.0	0.0	0.0	0.0
2.....	0.1	0.0	0.1	0.0	128	0.0	0.01	0.0	0.0.....4.3	8.3	0.4	1.0	131	0.01	0.0	0.4	0.4	0.5
3.....	0.0	0.1	0.1	0.0	33	0.0	0.0	0.07	0.04.....0.1	0.4	0.2	0.2	16	0.0	0.0	0.8	0.7	0.7
4.....	0.0	0.0	0.0	0.0	339	0.0	0.0	0.0	0.0.....0.2	0.3	0.2	0.4	151	0.03	0.0	0.6	0.3	0.3
5.....	0.0	0.0	0.1	0.1	128	0.0	0.0	0.01	0.01.....0.4	0.5	0.2	0.3	115	0.01	0.0	0.03	0.04	0.04
6.....	0.0	0.0	0.0	0.0	224	0.0	0.0	0.01	0.0.....0.0	0.2	0.0	0.0	255	0.04	0.0	0.04	0.03	0.03
7.....	0.0	0.1	0.0	0.0	46	0.0	0.0	0.01	0.0.....0.1	0.1	0.1	0.0	68	0.01	0.0	0.0	0.0	0.0
8.....	0.1	0.0	0.0	0.0	44	0.0	0.0	0.0	0.0.....0.3	0.4	0.0	0.0	44	0.0	0.0	0.01	0.01	0.01
9.....	0.0	0.1	0.1	0.1	26	0.0	0.0	0.03	0.01.....0.6	2.3	0.2	1.2	48	0.0	0.0	0.01	0.01	0.01
10.....	0.0	0.0	0.1	0.0	35	0.0	0.0	0.0	0.0.....1.3	1.9	1.6	1.7	47	0.0	0.0	0.03	0.05	0.05
11.....	0.0	0.0	0.0	0.0	13	0.0	0.0	0.01	0.0.....1.0	2.1	0.4	0.8	27	0.04	0.0	0.01	0.01	0.01
12.....	0.0	0.1	0.1	0.0	86	0.0	0.0	0.2	0.1.....0.2	0.2	0.1	0.1	1	0.0	0.0	1.2	1.2	1.2
Treatment	August 11								August 22									
	ERM	ERME	TSM	TSME	ARM	AMB	AMBE	Z.mali	Z.maliE	ERM	ERME	TSM	TSME	ARM	AMB	AMBE	Z.mali	Z.maliE
1.....	1.3	5.0	0.7	0.7	226	0.08	0.03	0.3	0.2.....0.3	0.8	0.1	0.1	132	0.13	0.03	0.24	0.28	0.28
2.....	5.3	14.0	0.8	1.4	138	0.0	0.0	0.7	0.8.....0.2	4.1	0.0	0.0	119	0.0	0.0	0.84	0.84	0.84
3.....	0.1	0.5	4.6	1.5	25	0.01	0.0	0.3	0.2.....0.1	0.1	0.1	0.1	27	0.08	0.0	0.48	0.81	0.81
4.....	0.0	0.1	0.2	0.1	109	0.07	0.01	1.2	1.6.....0.9	0.8	0.1	0.3	167	0.01	0.0	1.2	1.6	1.6
5.....	0.2	1.5	0.1	0.1	148	0.0	0.0	0.2	0.01.....0.5	0.4	0.1	0.1	173	0.05	0.0	0.2	0.39	0.39
6.....	0.0	0.3	0.0	0.0	164	0.0	0.0	0.01	0.04.....0.4	0.2	0.0	0.0	195	0.01	0.0	0.5	0.8	0.8
7.....	0.5	0.7	0.3	0.3	110	0.0	0.0	0.05	0.03.....2.2	0.8	0.3	0.2	285	0.07	0.04	0.17	0.27	0.27
8.....	0.7	1.0	0.1	0.3	138	0.0	0.0	0.06	0.1.....0.8	0.6	0.1	0.0	92	0.01	0.0	0.8	0.7	0.7
9.....	2.8	10.5	1.0	1.8	205	0.0	0.0	0.1	0.1.....1.9	1.3	0.9	0.1	294	0.0	0.0	0.3	0.2	0.2
10.....	2.3	5.7	9.5	1.7	81	0.1	0.1	0.03	0.0.....0.5	0.7	0.1	0.1	46	0.0	0.0	0.04	0.01	0.01
11.....	0.8	2.1	0.3	0.4	91	0.1	0.1	0.03	0.07.....0.1	0.4	0.3	0.1	42	0.05	0.0	0.04	0.07	0.07
12.....	0.0	0.2	0.1	0.0	3	0.03	0.0	0.7	0.4.....0.0	0.0	0.1	0.1	3	0.01	0.0	1.1	0.3	0.3

*ERM= European red mite, ERME= ERM eggs, TSM= Twospotted spider mite, TSME= TSM eggs, ARM= Apple rust mite, AMB= Amblyseius fallacis, AMBE= AMB eggs, Z.mali= Zetzellia mali, Z.maliE= Z.mali eggs.

**Based on 25 leaves/tree, from one Red Delicious tree in each of three replicates/treatment.

PEAR: *Pyrus communis*
Pear Psylla: *Psylla pyricola* Forester
Pear rust mite: *Eupitrimerus pyri* (Nalepa)

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PEAR, PEAR PSYLLA AND MITE CONTROL, HUDSON VALLEY LAB, HIGHLAND, NEW YORK, 1986: Treatments were applied to 8 tree plots replicated 3 times in a randomized complete block design. Each plot contained 4 'Bartlett' and 4 'Bosc' cultivars, spaced 12 x 18 ft., 12 ft. in height and 12 years old. Treatments were applied by high-pressure handgun sprayer dilute to runoff at 350 psi using from 1.7 gal/tree (340 gal/acre) to 2.9 gal/tree (583 gal/acre). Treatments were applied at white bud 26 Apr, petal fall 6 May, and in cover sprays on 26 May, 10 Jun, 3 Jul, and 29 Jul. Additional applications over the entire block included Agri-Strep, 8 oz/100 gal, 8 May, and Dithane M45 80W 1.5 lb/100 gal, 3 Jul. Pear psylla were evaluated by collecting 5 Bartlett spurs (25 leaves) from each plot on 19 May, 2 Jun, and 26 Jun, and thereafter 5 Bartlett shoots (25 leaves) from each plot on 8 Jul, 21 Jul, and 11 Aug. All live nymphs and eggs on each leaf were counted in the laboratory using a binocular scope. Mites populations were assessed by sampling 25 Bartlett leaves per plot on 11 Jul and 29 Jul. These leaves were brushed with a mite brushing machine and all live mites counted with the aid of a binocular scope. Apr and May were drier than usual as were Aug and Sep, while Jun and Jul had above average rainfall. Temperatures were cooler than normal throughout the season and this factor may have contributed to the high, persistent pear psylla populations.

All treatments provided good early season pear psylla suppression. The higher rate of Danitol was more effective than the lower rate in providing pear psylla control. The Dimilin plus the spreader/sticker looked better than the Dimilin without it, but the addition of the spreader/sticker could have resulted in the presence of a small (dime-sized) russet ring noticed on approximately 5% of the Bartlett fruit in that treatment. The condition was similar to that observed where poor drying conditions followed spray applications. Mitac did an excellent job of summer pear psylla control where it was used as a standard or to supplement earlier treatments. The Morestan followed by Dowco 473 and the Asana treatments also provided good Pear psylla suppression. Pear rust mite populations and the resulting russeted Bartlett fruit were much worse in the pyrethroid treatments than where Dimilin, Dowco 473, and Morestan were used.

Treatment	Rate form. /100 gal.	Application Dates	Mean no. Pear psylla nymphs or eggs/5 spurs (shoots)				
			19 May	2 Jun	26 Jun	Eggs	Eggs
1. Danitol 2.4E	4.0 oz	26 Apr, 6 May					
2. Danitol 2.4E	5.3 oz	26 May, 3 Jul	24.7 a				
3. Asana 1.9E	0.8 oz	26 Apr, 6 May					
4. Morestan 25W Guthion 50W Dowco 473	24.0 oz 8.0 oz 19.0 oz	26 May, 3 Jul	9.0 a				
5. Dimilin 25W Lorsban 50W Mitac 1.5E	4.0 oz 16.0 oz 16.0 oz	26 Apr, 6 May	26.0 a				
6. Dimilin 25W + X-77 Guthion 50W	4.0 oz 8.0 oz 8.0 oz	26 May, 3 Jul	18.3 a				
7. Pydrin 2.4E Guthion 50W Mitac 1.5E	2.6 oz 8.0 oz 16.0 oz	20 Apr, 10 Jun 29 Jul 6 May, 26 May 3 Jul	10.3 a				
8. Untreated Check			82.0 a				

Treatment	Rate form. /100 gal.	Application Dates	Mean no. Pear psylla nymphs or eggs/5 spurs (shoots)					Mean russet rating*/fruit	
			8 Jul	21 Jul	11 Aug	11 Jul	29 Jul	6 Sep	6 Sep
1.	50.0 a		183.0 a	5.0 a	55.7 b	51.9 a	14.7 bc	2.4 bc	
2.	11.0 a		54.0 a	5.7 a	26.3 a	119.8 a	21.5 c	2.1 bc	
3.	7.3 a		54.7 a	3.7 a	8.7 a	99.5 a	21.5 c	2.5 c	
4.	26.7 a		103.0 a	40.0 a	8.7 a	14.4 a	22.6 c	0.4 a	
5.	60.7 a		201.7 a	6.0 a	3.0 a	1.1 a	0.9 a	0.1 a	
6.	73.0 a		248.0 a	217.3 b	8.7 a	23.1 a	4.3 ab	0.6 a	
7.	10.3 a		105.0 a	17.0 a	10.3 a	20.2 a	14.0 abc	1.8 b	
8.	325.3 b		205.3 a	38.0 a	25.0 a	31.4 a	11.2 abc	2.0 bc	

Treatment means followed by the same letter are not significantly different ($P=0.05$; DMRT)
 * 0=best, 3=worst

Treatment	Rate form. /100 gal	Application Dates	Mean no. Pear psylla nymphs or eggs/5 spurs/shoots)				
			19 May	2 Jun	26 Jun	Eggs	Eggs
1. Danitol 2.4E	4.0 oz	26 Apr, 6 May					
2. Danitol 2.4E	5.3 oz	26 May, 3 Jul		24.7 a		41.7 a	156.0 a
3. Asana 1.9E	0.8 oz	26 Apr, 6 May				44.0 a	342.7 a
4. Morestan 25W Guthion 50W Dowco 473	24.0 oz 8.0 oz 19.0 oz	26 May, 3 Jul		9.0 a		46.7 a	209.7 a
5. Dimilin 25W Lorsban 50W Mitac 1.5E	4.0 oz 16.0 oz 16.0 oz	26 Apr, 6 May		26.0 a		16.0 a	158.3 a
6. Dimilin 25W + X-77 Guthion 50W	4.0 oz 8.0 oz 8.0 oz	26 May, 26 May 10 Jun, 3 Jul				308.7 c	243.7 a
7. Pydrin 2.4E Guthion 50W Mitac 1.5E	2.6 oz 8.0 oz 16.0 oz	29 Jul		18.3 a		63.0 a	988.7 a
8. Untreated Check		20 Apr, 10 Jun 29 Jul 6 May, 26 May 3 Jul		24.3 a		27.0 a	256.0 a
		20 Apr, 10 Jun 29 Jul 6 May, 26 May 3 Jul				10.0 a	84.3 a
		20 Apr, 10 Jun 29 Jul 6 May, 26 May 3 Jul		10.3 a		179.3 b	481.3 a
		20 Apr, 10 Jun 29 Jul 6 May, 26 May 3 Jul		5.0 a		40.0 a	447.3 a
		20 Apr, 10 Jun 29 Jul 6 May, 26 May 3 Jul		82.0 a		351.7 c	572.3 a

Treatment	Mean no. Pear psylla nymphs or eggs/5 spurs (shoots)					Mean no. Pear Rust Mites/leaf		Mean russet rating*/fruit 6 Sep
	8 Jul	21 Jul	11 Aug	11 Jul	29 Jul	11 Jul	29 Jul	
1.....	50.0 a	5.0 a	55.7 b	205.7 a	51.9 a	14.7 bc	2.4 bc	
2.....	11.0 a	5.7 a	26.3 a	173.0 a	119.8 a	21.5 c	2.1 bc	
3.....	7.3 a	3.7 a	8.7 a	72.3 a	99.5 a	21.5 c	2.5 c	
4.....	26.7 a	40.0 a	8.7 a	97.3 a	14.4 a	22.6 c	0.4 a	
5.....	60.7 a	6.0 a	3.0 a	226.7 a	1.1 a	0.9 a	0.1 a	
6.....	73.0 a	217.3 b	8.7 a	105.0 a	23.1 a	4.3 ab	0.6 a	
7.....	10.3 a	17.0 a	10.3 a	92.7 a	20.2 a	14.0 abc	1.8 b	
8.....	325.3 b	38.0 a	25.0 a	51.7 a	31.4 a	11.2 abc	2.0 bc	

Treatment means followed by the same letter are not significantly different (P=0.05; DMRT)
 * 0=best, 3=worst

PLUM: *Prunus domestica* L.
Hop aphid: *Phorodon humuli* (Shrank)
Plum curculio: *Conotrachelus nenuphar* (Herbst)
Potato leafhopper: *Empoasca fabae* (Harris)

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PLUM, INSECT CONTROL, HUDSON VALLEY LABORATORY, HIGHLAND, NEW YORK, 1986: Two separate blocks were used in this test, the first consisting of four 16-tree plots with two plots receiving Lorsban sprays, one left untreated as a check, and the fourth receiving Guthion sprays. Each plot had two trees of the following eight cultivars, 'Italian', 'Oneida', 'Myrobalan', 'Valor', 'Seneca', 'Shiro', 'Green Gage', and 'Methley'. The second block consisted of 3-tree plots ('Stanley', 'Oullins', and 'NY56.713.1' cultivars) replicated six times in a randomized block design with the forementioned 3 treatments. All treatments were applied dilute to runoff using a high-pressure handgun sprayer at 350 psi delivering 1.8 gal/tree or 350 gal/acre. Treatment applications were made on 5 May, 26 May, and 3 Jul. Insect control was first evaluated 27 Jun by examining 25 terminals/tree for aphids and 25 leaves/tree for leafhoppers from one 'Oullins' tree in each plot of the second block. Fruit injury was assessed by examining from 50-200 'Shiro' and 'Seneca' fruits/plot from the first block on 11 Jul, and 100 'NY56.713.1' fruits/plot from the second block on 30 Jul.

Aphid control was excellent with both Lorsban and Guthion while the leafhoppers were controlled by Guthion but not Lorsban. Plum curculio control was better with the Guthion than Lorsban but both materials were under extreme pest pressure and the intervals between sprays was quite long. Leafroller damage was about equal in both treatments, but unfortunately the species was not determined. No phytotoxicity from either treatment was found on either fruit or foliage of any of the cultivars tested.

Treatment	Rate form. /100 gal	Mean no.		Mean no.		Mean no.		Mean no.		Mean no.		Mean no.		Mean no.		Mean no.	
		Aphid infested		Leafhopper nymphs		Plum curculio		Leafroller		% Injured fruit		% Clean fruit		% Injured fruit		% Clean fruit	
		terminals/25	27 Jun	/25 leaves	27 Jun	11 Jul	30 Jul	11 Jul	30 Jul	11 Jul	30 Jul	11 Jul	30 Jul	11 Jul	30 Jul	11 Jul	30 Jul
Lorsban 50W	16.0 oz.....	0.3		2.3		3.9	15.0	0.1	3.5			96.0	81.5				
Guthion 50W	8.0 oz.....	0.0		0.0		1.8	6.7	0.3	2.0			98.0	91.3				
Check	.....	6.0		3.0		58.1	23.9	1.1	9.3			40.7	66.8				

Apollo

APPLE: *Malus domestica*

European red mite: *Panonychus ulmi* (Koch)

Twospotted spider mite: *Tetranychus urticae* Koch

Phytoseid predator: *Amblyseius fallacis* (Garman)

R. W. Weires

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N.Y.S. Agric. Exp. Stn.

Highland, New York 12528

APPLE, MITE CONTROL, MODENA, NEW YORK, 1986: A ten acre block of Red Delicious and Empire apple cultivars on the M7a rootstock was divided into four unreplicated plots ranging in size from 1.9 to 3.7 acres. The trees had been planted in 1978, were spaced 15 by 22 ft and were approximately 12 ft in height. Twelve trees (.09 acre) in the Northwest corner of the block received no miticide treatments and were used as a check. All treatments were applied with a Swanson® airblast sprayer, delivering 100 gal/acre (4X) at a speed of 2.5 mph. Treatments included: Apollo applied 26 Apr (pink) and again 4 Jul, followed by Carzol on 19 Jul; Apollo 15 May (petal fall) followed by Kelthane 15 Aug; Carzol 15 May followed by Apollo 4 Jul; and Apollo 31 May (1st cover). Additional sprays and their rate (formulation/acre) applied over the entire block included: Benlate 50W 10 oz, 22 Apr (by air), 4 Jul, 6.4 oz, 7 May (by air), 26 Apr, 15 May, 31 May, and 18 Jun; Manzate 200 80W 2.4 lb, 22 Apr (by air), 26 Apr, 7 May (by air), 15 May, and 31 May; Pydrin 2.4E 10.6 oz, 26 Apr; Guthion 50W 1 1/2 lb, 15 May, 31 May, 4 Jul, and 19 Jul; Captan 50W 3 lb, 18 Jun, 4 Jul, 17 Jul, and 15 Aug; Cyprex 65W 1 lb, 15 Aug; Lorsban 50W 3 lb, 18 Jun; Phosphamidon 8E 1 1/2 pt, 19 Jul; and Imidan 50W 3 lb, 15 Aug. Mite populations were evaluated at 1-2 week intervals throughout the season by collecting 25 leaves/tree from 4 Red Delicious trees/plot. These leaf samples were brought back to the laboratory where they were brushed with a mite brushing machine and counted with the aid of a binocular scope.

European red mite populations exceeded 12 mites/leaf by the first sampling date and remained the predominant pest mite species throughout the season. Weather conditions were unfavorable for an increase in twospotted spider mite populations, which remained at low levels all season. Apollo at first cover provided excellent control which kept the mite population below 5 mites/leaf until the final Aug count. This was accomplished in spite of the fact that a large adult population was present which kept ovipositing so that eggs were found at moderate numbers for almost one month following the application. Apollo at petal fall was effective until the first week in Aug, whereupon Kelthane was applied which gave adequate control. Carzol at petal fall maintained populations below 5 mites/leaf for one month, after which time Apollo was applied and gave seasonal control. Apollo at pink provided mite suppression until late Jun. Another Apollo application was applied to this plot in Jul but was supplemented with Carzol when bronzing was noted in a section of the plot. Predators were virtually nonexistent in the plots until the end of Aug when *Amblyseius fallacis* was found in the check and first cover Apollo plots. The use of materials toxic to the mite predators, e.g., pyrethroids, Benlate, Carzol, herbicides, etc., probably contributed to their scarcity.

APPLE: *Malus domestica*

European red mite: *Panonychus ulmi* (Koch)

A predatory mite: *Amblyseius fallacis* (Garman)

Twospotted spider mite: *Tetranychus urticae* Koch

Apple rust mite: *Aculus schlechtendali* (Nalepa)

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Extension Fruit Specialist

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APPLE, MITE CONTROL, PERU, NEW YORK, 1986: A 22-year-old block of 'McIntosh', 'Cortland', and 'Spartan' apple trees spaced 22 by 40 ft and approximately 16 ft in height, was divided into two unreplicated plots, each 8.8 acres in area. An untreated check of eight trees was established at the North end of the block. Treatments were applied 20 or 21 Jun with a Bean model 502 Speedsprayer® delivering 57 gal/acre at a ground speed of 2.7 mph. Mites were sampled prior to the treatment applications on 19 Jun and again on 8 and 17 Jul. Mite samples consisted of 25 leaves/tree from 4 'Spartan' trees/plot. These were collected in plastic sacks and brought back to the laboratory where they were brushed with a mite brushing machine and the live mites and eggs counted on the glue-coated glass plates with the aid of a binocular scope.

Both treatments caused similar reductions in mite numbers, however, the increasing egg counts on the 17 Jul sample plus the fact that the trees were showing noticeable bronzing resulted in the grower's decision to re-treat the entire block with another material.

Treatment	Rate form. per acre	Applic. dates	Mean no. mites* or eggs per leaf			
			20 Jun			
			ERM	ERME	TSM	TSME
1. XRM 4868 5F	12.8 oz	20 Jun.....	32.5	25.0	0.4	1.0
2. Plictran 50W	16.0 oz	21 Jun.....	18.7	15.7	0.5	0.9
3. Check		61.9	43.6	0.5	1.0
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			8 Jul			
			ERM	ERME	TSM	TSME
1.....	12.8		10.7	2.0	1.0	43.0
2.....	6.1		4.6	1.0	0.4	56.6
3.....	70.5		61.7	1.7	1.0	14.8
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			17 Jul			
			ERM	ERME	TSM	TSME
1.....	9.6		22.0	0.4	0.6	5.2
2.....	5.7		16.3	0.1	0.7	8.0
3.....	54.4		20.3	0.2	0.4	26.3

*ERM= European red mite, TSM= twospotted spider mite, ARM= apple rust mite,
AMB= *Amblyseius fallacis* .

Treatment	Rate form. per acre	Applic. dates	Mean no. mites* or eggs per leaf			
			20 Jun			
			ERM	ERME	TSM	TSME
1. XRM 4868 5F	12.8 oz	20 Jun.....	32.5	25.0	0.4	1.0
2. Plictran 50W	16.0 oz	21 Jun.....	18.7	15.7	0.5	0.9
3. Check		.....	61.9	43.6	0.5	1.0
<hr/>						
			8 Jul			
			ERM	ERME	TSM	TSME
1.....	12.8		10.7	2.0	1.0	43.0
2.....	6.1		4.6	1.0	0.4	56.6
3.....	70.5		61.7	1.7	1.0	14.8
<hr/>						
			17 Jul			
			ERM	ERME	TSM	TSME
1.....	9.6		22.0	0.4	0.6	5.2
2.....	5.7		16.3	0.1	0.7	8.0
3.....	54.4		20.3	0.2	0.4	26.3

*ERM= European red mite, TSM= twospotted spider mite, ARM= apple rust mite,
AMB= *Amblyseius fallacis* .

APPLE: *Malus domestica*

Spotted tentiform leafminer: *Phyllonorycter*
blancardella (Fabr.)

White apple leafhopper: *Typhlocyba pomaria* McAtee

R. W. Weires

Hudson Valley Laboratory

N.Y.S. Agric. Exp. Stn.

Highland, New York 12528

APPLE, LEAFMINER AND LEAFHOPPER CONTROL, MILTON, NEW YORK, 1986: Two adjacent rows of 8-year-old Red Delicious apple trees were used to test new chemicals for their insecticidal properties. The trees were utilized in single tree plots with six treatments replicated 4 times in a randomized block design. The trees were approximately 10 ft in height, spaced 15 by 20 ft, and on the EM 7 rootstock. Treatments were applied dilute to runoff at pink (28 Apr) and third cover (27 Jun) with a high pressure handgun sprayer using 400 psi and delivering 2.8 gal/tree (400 gal/acre). Treatments were evaluated on 13 Jun by examining 25 clusters (approx. 7 leaves/cluster) from each tree and recording the number of clusters which were infested, i.e. had one or more leafminer mines present. Treatments were also evaluated on 15 Aug by recording the number of leafminer mines on 25 terminals/tree (approx. 9 leaves/terminal) and the number of leafhopper nymphs on 25 leaves/tree.

The Dimilin, Vydate and Larvin treatments resulted in better control of first brood leafminers than did the UC 84572 treatments. Second brood control was most effective with the Vydate and Dimilin treatments. The UC 84572, Larvin, and Vydate treatments appeared to give some leafhopper suppression.

Treatment	Rate form. per 100 gal	Application dates	Mean no. STLM infested clusters/25 13 Jun	Mean no. STLM mines per 25 terminals 15 Aug	Mean no. White apple leafhopper nymphs per 25 leaves 15 Aug
UC 84572-2F	6.4 oz	28 Apr, 27 Jun.....	4.3	28.0	14.5
UC 84572 2F + X-77 spreader	6.4 oz 8.0 oz	28 Apr, 27 Jun.....	2.5	19.8	23.5
Larvin LE + X-77 spreader	8.0 oz 8.0 oz	28 Apr, 27 Jun.....	1.8	22.8	25.3
Vydate 2L	16.0	28 Apr, 27 Jun.....	1.8	1.8	23.5
Dimilin 2S	2.0 oz	28 Apr, 27 Jun.....	1.5	4.8	41.0
Check		.....	6.0	24.3	38.8
STLM= Spotted tentiform leafminer					

APPLE: *Malus domestica*

Potato leafhopper: *Empoasca fabae* (Harris)

White apple leafhopper: *Typhlocyba*
pomaria McAtee

R. W. Weires

Hudson Valley Laboratory

N.Y.S. Agric. Exp. Stn.

Highland, New York 12528

APPLE, LEAFHOPPER CONTROL, ARDONIA, NY, 1986: A 7-year-old block of Rome apple trees was divided into three tree plots replicated four times in a randomized complete block design with 12 treatments. Trees were 7 ft in height and spaced 14 by 22 ft, and on the EM 7 rootstock. All treatments were applied dilute to runoff by high pressure handgun sprayer at 400 psi, using 2.1 gal spray/tree (296 gal/acre). All treatments were applied approximately two weeks after petal fall on 24 May. Treatments were evaluated by counting all live potato and white apple leafhopper nymphs found on 25 leaves per tree from the middle tree in each plot. Evaluations were made one day prior to treatment application (23 May), as well as one day (25 May), three days (27 May), and six days (30 May) following the sprays.

Larvin, Guthion, and the low rate of UC 84572 were ineffective in reducing the population of either the white apple leafhopper or the potato leafhopper. UC 84572 at the higher rate showed significant leafhopper reductions after 6 days, indicating a potential exists for the material provided one is able to determine the proper application timing. All other materials provided quick knockdown and a residual action of at least six days. The ineffectiveness of Guthion against white apple leafhopper was expected since organophosphate resistance to this species has been demonstrated, the ineffectiveness of this material against the potato leafhopper, however, was not expected.

Treatment	Rate form. /100 gal	Mean no. leafhopper nymphs/25 leaves											
		White apple leafhopper						Potato leafhopper					
		prespray	1 day postspray	3 day postspray	6 day postspray	prespray	1 day postspray	prespray	1 day postspray	3 day postspray	6 day postspray	prespray	1 day postspray
1. Larvin LE	8.0 oz.....	40.5 a	23.0 a	16.0 a	27.0 b	13.5 a	2.8 a	13.5 a	2.8 a	5.3 ab	7.0 a		
2. UC 84572 2F	6.4 oz.....	76.3 a	59.5 b	54.0 b	6.8 a	25.8 a	15.8 b	25.8 a	15.8 b	10.3 bc	3.0 a		
3. UC 84572 2F	0.6 oz.....	65.5 a	56.8 b	47.8 b	24.3 b	16.3 a	15.0 b	16.3 a	15.0 b	11.3 bc	5.8 a		
4. Carzol 92SP	2.0 oz.....	43.3 a	0.0 a	0.0 a	0.5 a	9.0 a	0.0 a	9.0 a	0.0 a	0.0 a	0.0 a		
5. Carzol 92SP	4.0 oz.....	78.3 a	0.0 a	0.0 a	0.3 a	20.5 a	0.0 a	20.5 a	0.0 a	0.0 a	0.0 a		
6. Thiodan 50W	16.0 oz.....	93.0 a	0.5 a	0.5 a	0.3 a	20.3 a	0.3 a	20.3 a	0.3 a	0.0 a	0.0 a		
7. Pydrin 2.4E	2.6 oz.....	47.0 a	0.3 a	0.0 a	0.0 a	5.0 a	0.0 a	5.0 a	0.0 a	0.0 a	0.0 a		
8. Lannate 1.8L	16.0 oz.....	65.3 a	1.0 a	0.0 a	1.0 a	14.5 a	0.3 a	14.5 a	0.3 a	0.0 a	0.0 a		
9. Vydate 2L	16.0 oz.....	65.8 a	1.3 a	0.5 a	1.3 a	11.5 a	0.5 a	11.5 a	0.5 a	0.0 a	0.0 a		
10. Sevin 50W	16.0 oz.....	59.0 a	0.0 a	0.0 a	0.0 a	17.0 a	0.0 a	17.0 a	0.0 a	0.0 a	0.0 a		
11. Guthion 50W	8.0 oz.....	72.8 a	68.0 b	61.0 b	49.0 c	14.5 a	7.5 a	14.5 a	7.5 a	12.8 bc	17.8 b		
12. Check.....		72.3 a	70.3 b	55.8 b	59.0 c	14.8 a	16.5 b	14.8 a	16.5 b	17.5 c	19.3 b		

Treatment means followed by the same letter are not significantly different (P=0.05; DMRT).

APPLE: *Malus domestica*

Spotted tentiform leafminer: *Phyllonorycter*
blancardella (Fabr.)

R.W. Weires
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APPLE, DIMILIN EUP STUDIES, CHAMPLAIN VALLEY, PERU, NEW YORK, 1986: Three sites were selected for trials comparing materials, rates, and timing of sprays for leafminer control in the Champlain Valley. Site A contained 41-year-old 'McIntosh' and 'Cortland' apple trees spaced 20 by 32 ft and approximately 17 ft in height. Treatments were applied by airblast sprayer for control of first brood at pink (6 May) in unreplicated 2-4 acre plots. Trees adjacent to the East and West ends of the block were untreated for leafminer and utilized as checks. Treatments were evaluated for second brood control by re-treating one of the plots and all but the 4 end trees on six rows of the West end check. First brood control was evaluated 19 Jun by examining all the leaves on 25 fruiting clusters/tree from five 'McIntosh' trees/plot for the presence of first brood mines. Second brood control was evaluated 20 Aug by counting the number of leafminer mines on 25 shoots/tree from four 'McIntosh' trees/plot. Site B was treated for second brood on 11 Jul by airblast sprayer. A five acre portion of the block was treated with Dimilin while a small portion of the block was left untreated on the East end and the remainder (approximately 6 acres) left untreated on the West end. Leafminer populations were evaluated on 20 Aug at site B by counting the number of mines on 25 fruiting clusters/tree from six 'McIntosh' trees/plot. Site C was divided into 5 acre unreplicated plots of 27-year-old 'McIntosh' and 'Cortland' apple trees which were treated with either Dimilin or Lorsban on 6 May. Plots were re-treated for second brood on 5 Jul with the Lorsban plot being divided in half so two treatments could be compared. An adjacent block of similar age trees was not treated for leafminer and served as a check. First brood control was evaluated 19 Jun by sampling 25 clusters/tree from five 'McIntosh' trees/plot for the presence of first brood mines. The number of mines on 25 leaves/tree from five 'McIntosh' trees/plot were tallied as part of the 20 Aug second brood leafminer evaluation.

First brood leafminer populations were rather low at the sites tested but all rates of Dimilin provided excellent control when compared with the check counts. Dimilin applications applied earliest against second brood (site C) were more effective than those applied later (sites A & B). Site B had experienced considerable mine establishment by the time the Dimilin was applied and since the material has no effect on the larvae in the mines they continued their development to adulthood. The Vydate applications were also quite effective where they were applied.

Site A				Mean no. STLM infested clusters/25	Mean no. STLM mines/25 clusters
Treatment	Rate form. /acre	Applic. dates	Block size (acres)	19 Jun	20 Aug
Check (East)			4.0.....	14.8	
Dimilin 25W	10.0 oz	6 May	3.0.....	0.0	
Dimilin 25W Vydate 2L	15.0 oz 64.0 oz	6 May 9 Jul	3.0.....	0.0	1.3
Check (West, 1st brood)					
Dimilin 25W	15.0 oz	9 Jul	2.0.....	6.6	12.8
Check (West, end trees)			0.4.....		110.0
Site B					
Check (East)			0.2.....		114.7
Dimilin 25W	12.0 oz	11 Jul	5.0.....		49.7
Check (West)			6.0.....		149.8
Site C					
Dimilin 25W Vydate 2L	8.0 oz 64.0 oz	6 May 5 Jul	5.0.....	0.0	0.2
Dimilin 25W	12.0 oz	6 May	5.0.....	0.0	0.3
Lorsban 50W Dimilin 25W	48.0 oz 12.0 oz	6 May 5 Jul	2.5.....	8.2	0.2
Lorsban 50W Vydate 2L	48.0 oz 64.0 oz	6 May 5 Jul	2.5.....		2.5
Check			4.0.....		8.2

APPLE: *Malus domestica*

Spotted tentiform leafminer: *Phyllonorycter*
blancardella (Fabr.)

R. W. Weires
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APPLE, DIMILIN EUP STUDIES, CLINTONDALE, NEW YORK, 1986: A large block of 'Cortland', 'McIntosh', and 'Red Delicious' apple trees was divided into a five acre portion treated with Dimilin while the remainder was treated with Diazinon at pink (27 Apr). Treatments were applied by airblast sprayer traveling at 2.2 mph and delivering 100 gal/acre. The trees were spaced from 16 by 24 to 30 by 36 ft, and were approximately 30-years-old and 16 ft in height. Additional treatments applied over the entire block included: Superior oil 6E 8-12 gal/acre, 15 or 21 Apr; Manzate 4F 2 qt/acre, 21 Apr, 27 Apr, 5 May, 11 May, 19 May, 27 May, and 9 Jun; Flowable sulfur 52% 2 qt/acre, 27 Apr, 11 May, and 27 May; Guthion 50W 1.5 lb/acre, 11 May, 27 May, 9 Jun, 25 Jun; Thiodan 50W 1 lb/acre, 27 May, 9 Jun; Captan 50W 1.5 lb/acre, 9 Jun; Polyram 80W 3 lb/acre, 25 Jun; and Phosphamidon 8E 0.5 pt/acre, 25 Jun. First brood leafminers were evaluated 20 Jun by counting the number of infested fruiting clusters in 25 clusters/tree from five 'McIntosh' trees/plot. Second brood leafminers were evaluated 15 Aug by counting the number of mines from 25 leaves/tree on six 'McIntosh' trees/plot.

The Dimilin treatment provided complete control of a low first brood population as well as apparently helping to reduce any reinfestation from second brood. Second brood as well as late first brood populations were also no doubt reduced by the Thiodan applications applied for aphid control in early Jun over the entire block.

Treatment	Rate form. /acre	Mean no. STLM	Mean no. STLM
		<u>infested clusters/25</u> 20 Jun	<u>mines/25 leaves</u> 15 Aug
Dimilin 25W	16.0 oz.....	0.0	0.0
Diazinon 50W	64.0 oz.....	1.5	6.5

Treatment	Rate form. per acre	Applic. dates	Mean no. mites* or eggs per leaf			
			20 Jun			
			ERM	ERME	TSM	TSME
1. XRM 4868 5F	12.8 oz	20 Jun.....	32.5	25.0	0.4	1.0
2. Plictran 50W	16.0 oz	21 Jun.....	18.7	15.7	0.5	0.9
3. Check		.....	61.9	43.6	0.5	1.0
<hr/>						
			8 Jul			
			ERM	ERME	TSM	TSME
1.....	12.8		10.7	2.0	1.0	43.0
2.....	6.1		4.6	1.0	0.4	56.6
3.....	70.5		61.7	1.7	1.0	14.8
<hr/>						
			17 Jul			
			ERM	ERME	TSM	TSME
1.....	9.6		22.0	0.4	0.6	5.2
2.....	5.7		16.3	0.1	0.7	8.0
3.....	54.4		20.3	0.2	0.4	26.3

*ERM= European red mite, TSM= twospotted spider mite, ARM= apple rust mite,
AMB= *Amblyseius fallacis* .

APPLE: *Malus domestica*

Spotted tentiform leafminer: *Phyllonorycter*
blancardella (Fabr.)

White apple leafhopper: *Typhlocyba pomaria* McAtee

R. W. Weires

Hudson Valley Laboratory

N.Y.S. Agric. Exp. Stn.

Highland, New York 12528

APPLE, LEAFMINER AND LEAFHOPPER CONTROL, MILTON, NEW YORK, 1986: Two adjacent rows of 8-year-old Red Delicious apple trees were used to test new chemicals for their insecticidal properties. The trees were utilized in single tree plots with six treatments replicated 4 times in a randomized block design. The trees were approximately 10 ft in height, spaced 15 by 20 ft, and on the EM 7 rootstock. Treatments were applied dilute to runoff at pink (28 Apr) and third cover (27 Jun) with a high pressure handgun sprayer using 400 psi and delivering 2.8 gal/tree (400 gal/acre). Treatments were evaluated on 13 Jun by examining 25 clusters (approx. 7 leaves/cluster) from each tree and recording the number of clusters which were infested, i.e. had one or more leafminer mines present. Treatments were also evaluated on 15 Aug by recording the number of leafminer mines on 25 terminals/tree (approx. 9 leaves/terminal) and the number of leafhopper nymphs on 25 leaves/tree.

The Dimilin, Vydate and Larvin treatments resulted in better control of first brood leafminers than did the UC 84572 treatments. Second brood control was most effective with the Vydate and Dimilin treatments. The UC 84572, Larvin, and Vydate treatments appeared to give some leafhopper suppression.

Treatment	Rate form. per 100 gal	Application dates	Mean no. STLM infested clusters/25 13 Jun	Mean no. STLM mines per 25 terminals 15 Aug	Mean no. White apple leafhopper nymphs per 25 leaves 15 Aug
UC 84572-2F	6.4 oz	28 Apr, 27 Jun.....	4.3	28.0	14.5
UC 84572 2F + X-77 spreader	6.4 oz 8.0 oz	28 Apr, 27 Jun.....	2.5	19.8	23.5
Larvin LE + X-77 spreader	8.0 oz 8.0 oz	28 Apr, 27 Jun.....	1.8	22.8	25.3
Vydate 2L	16.0	28 Apr, 27 Jun.....	1.8	1.8	23.5
Dimilin 2S	2.0 oz	28 Apr, 27 Jun.....	1.5	4.8	41.0
Check		.....	6.0	24.3	38.8
STLM= Spotted tentiform leafminer					

APPLE: *Malus domestica*

Potato leafhopper: *Empoasca fabae* (Harris)

White apple leafhopper: *Typhlocyba*
pomaria McAtee

R. W. Weires

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N.Y.S. Agric. Exp. Stn.

Highland, New York 12528

APPLE, LEAFHOPPER CONTROL, ARDONIA, NY, 1986: A 7-year-old block of Rome apple trees was divided into three tree plots replicated four times in a randomized complete block design with 12 treatments. Trees were 7 ft in height and spaced 14 by 22 ft, and on the EM 7 rootstock. All treatments were applied dilute to runoff by high pressure handgun sprayer at 400 psi, using 2.1 gal spray/tree (296 gal/acre). All treatments were applied approximately two weeks after petal fall on 24 May. Treatments were evaluated by counting all live potato and white apple leafhopper nymphs found on 25 leaves per tree from the middle tree in each plot. Evaluations were made one day prior to treatment application (23 May), as well as one day (25 May), three days (27 May), and six days (30 May) following the sprays.

Larvin, Guthion, and the low rate of UC 84572 were ineffective in reducing the population of either the white apple leafhopper or the potato leafhopper. UC 84572 at the higher rate showed significant leafhopper reductions after 6 days, indicating a potential exists for the material provided one is able to determine the proper application timing. All other materials provided quick knockdown and a residual action of at least six days. The ineffectiveness of Guthion against white apple leafhopper was expected since organophosphate resistance to this species has been demonstrated, the ineffectiveness of this material against the potato leafhopper, however, was not expected.

Treatment	Rate form. /100 gal	Mean no. leafhopper nymphs/25 leaves											
		White apple leafhopper						Potato leafhopper					
		prespray	1 day postspray	3 day postspray	6 day postspray	prespray	1 day postspray	prespray	1 day postspray	3 day postspray	6 day postspray	prespray	1 day postspray
1. Larvin LE	8.0 oz.....	40.5 a	23.0 a	16.0 a	27.0 b	13.5 a	2.8 a	13.5 a	2.8 a	5.3 ab	7.0 a		
2. UC 84572 2F	6.4 oz.....	76.3 a	59.5 b	54.0 b	6.8 a	25.8 a	15.8 b	25.8 a	15.8 b	10.3 bc	3.0 a		
3. UC 84572 2F	0.6 oz.....	65.5 a	56.8 b	47.8 b	24.3 b	16.3 a	15.0 b	16.3 a	15.0 b	11.3 bc	5.8 a		
4. Carzol 92SP	2.0 oz.....	43.3 a	0.0 a	0.0 a	0.5 a	9.0 a	0.0 a	9.0 a	0.0 a	0.0 a	0.0 a		
5. Carzol 92SP	4.0 oz.....	78.3 a	0.0 a	0.0 a	0.3 a	20.5 a	0.0 a	20.5 a	0.0 a	0.0 a	0.0 a		
6. Thiodan 50W	16.0 oz.....	93.0 a	0.5 a	0.5 a	0.3 a	20.3 a	0.3 a	20.3 a	0.3 a	0.0 a	0.0 a		
7. Pydrin 2.4E	2.6 oz.....	47.0 a	0.3 a	0.0 a	0.0 a	5.0 a	0.0 a	5.0 a	0.0 a	0.0 a	0.0 a		
8. Lannate 1.8L	16.0 oz.....	65.3 a	1.0 a	0.0 a	1.0 a	14.5 a	0.3 a	14.5 a	0.3 a	0.0 a	0.0 a		
9. Vydate 2L	16.0 oz.....	65.8 a	1.3 a	0.5 a	1.3 a	11.5 a	0.5 a	11.5 a	0.5 a	0.0 a	0.0 a		
10. Sevin 50W	16.0 oz.....	59.0 a	0.0 a	0.0 a	0.0 a	17.0 a	0.0 a	17.0 a	0.0 a	0.0 a	0.0 a		
11. Guthion 50W	8.0 oz.....	72.8 a	68.0 b	61.0 b	49.0 c	14.5 a	7.5 a	14.5 a	7.5 a	12.8 bc	17.8 b		
12. Check.....		72.3 a	70.3 b	55.8 b	59.0 c	14.8 a	16.5 b	14.8 a	16.5 b	17.5 c	19.3 b		

Treatment means followed by the same letter are not significantly different (P=0.05; DMRT).

APPLE: *Malus domestica*

Spotted tentiform leafminer: *Phyllonorycter*
blancardella (Fabr.)

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APPLE, DIMILIN EUP STUDIES, CHAMPLAIN VALLEY, PERU, NEW YORK, 1986: Three sites were selected for trials comparing materials, rates, and timing of sprays for leafminer control in the Champlain Valley. Site A contained 41-year-old 'McIntosh' and 'Cortland' apple trees spaced 20 by 32 ft and approximately 17 ft in height. Treatments were applied by airblast sprayer for control of first brood at pink (6 May) in unreplicated 2-4 acre plots. Trees adjacent to the East and West ends of the block were untreated for leafminer and utilized as checks. Treatments were evaluated for second brood control by re-treating one of the plots and all but the 4 end trees on six rows of the West end check. First brood control was evaluated 19 Jun by examining all the leaves on 25 fruiting clusters/tree from five 'McIntosh' trees/plot for the presence of first brood mines. Second brood control was evaluated 20 Aug by counting the number of leafminer mines on 25 shoots/tree from four 'McIntosh' trees/plot. Site B was treated for second brood on 11 Jul by airblast sprayer. A five acre portion of the block was treated with Dimilin while a small portion of the block was left untreated on the East end and the remainder (approximately 6 acres) left untreated on the West end. Leafminer populations were evaluated on 20 Aug at site B by counting the number of mines on 25 fruiting clusters/tree from six 'McIntosh' trees/plot. Site C was divided into 5 acre unreplicated plots of 27-year-old 'McIntosh' and 'Cortland' apple trees which were treated with either Dimilin or Lorsban on 6 May. Plots were re-treated for second brood on 5 Jul with the Lorsban plot being divided in half so two treatments could be compared. An adjacent block of similar age trees was not treated for leafminer and served as a check. First brood control was evaluated 19 Jun by sampling 25 clusters/tree from five 'McIntosh' trees/plot for the presence of first brood mines. The number of mines on 25 leaves/tree from five 'McIntosh' trees/plot were tallied as part of the 20 Aug second brood leafminer evaluation.

First brood leafminer populations were rather low at the sites tested but all rates of Dimilin provided excellent control when compared with the check counts. Dimilin applications applied earliest against second brood (site C) were more effective than those applied later (sites A & B). Site B had experienced considerable mine establishment by the time the Dimilin was applied and since the material has no effect on the larvae in the mines they continued their development to adulthood. The Vydate applications were also quite effective where they were applied.

Site A				Mean no. STLTM infested clusters/25	Mean no. STLTM mines/25 clusters
Treatment	Rate form. /acre	Applic. dates	Block size (acres)	19 Jun	20 Aug
Check (East)			4.0.....	14.8	...
Dimilin 25W	10.0 oz	6 May	3.0.....	0.0	.
Dimilin 25W Vydate 2L	15.0 oz 64.0 oz	6 May 9 Jul	3.0.....	0.0	1.3
Check (West, 1st brood)					
Dimilin 25W	15.0 oz	9 Jul	2.0.....	6.6	12.8
Check (West, end trees)			0.4.....	...	110.0
Site B					
Check (East)			0.2.....	...	114.7
Dimilin 25W	12.0 oz	11 Jul	5.0.....	...	49.7
Check (West)			6.0.....	...	149.8
Site C					
				Mean no. STLTM Mines/25 leaves 20 Aug	
Dimilin 25W Vydate 2L	8.0 oz 64.0 oz	6 May 5 Jul	5.0.....	0.0	0.2
Dimilin 25W	12.0 oz	6 May	5.0.....	0.0	0.3
Lorsban 50W Dimilin 25W	48.0 oz 12.0 oz	6 May 5 Jul	2.5.....	8.2	0.2
Lorsban 50W Vydate 2L	48.0 oz 64.0 oz	6 May 5 Jul	2.5.....	...	2.5
Check			4.0.....	...	8.2

APPLE: *Malus domestica*

Spotted tentiform leafminer: *Phyllonorycter*
blancardella (Fabr.)

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APPLE, DIMILIN EUP STUDIES, CLINTONDALE, NEW YORK, 1986: A large block of 'Cortland', 'McIntosh', and 'Red Delicious' apple trees was divided into a five acre portion treated with Dimilin while the remainder was treated with Diazinon at pink (27 Apr). Treatments were applied by airblast sprayer traveling at 2.2 mph and delivering 100 gal/acre. The trees were spaced from 16 by 24 to 30 by 36 ft, and were approximately 30-years-old and 16 ft in height. Additional treatments applied over the entire block included: Superior oil 6E 8-12 gal/acre, 15 or 21 Apr; Manzate 4F 2 qt/acre, 21 Apr, 27 Apr, 5 May, 11 May, 19 May, 27 May, and 9 Jun; Flowable sulfur 52% 2 qt/acre, 27 Apr, 11 May, and 27 May; Guthion 50W 1.5 lb/acre, 11 May, 27 May, 9 Jun, 25 Jun; Thiodan 50W 1 lb/acre, 27 May, 9 Jun; Captan 50W 1.5 lb/acre, 9 Jun; Polyram 80W 3 lb/acre, 25 Jun; and Phosphamidon 8E 0.5 pt/acre, 25 Jun. First brood leafminers were evaluated 20 Jun by counting the number of infested fruiting clusters in 25 clusters/tree from five 'McIntosh' trees/plot. Second brood leafminers were evaluated 15 Aug by counting the number of mines from 25 leaves/tree on six 'McIntosh' trees/plot.

The Dimilin treatment provided complete control of a low first brood population as well as apparently helping to reduce any reinfestation from second brood. Second brood as well as late first brood populations were also no doubt reduced by the Thiodan applications applied for aphid control in early Jun over the entire block.

Treatment	Rate form. /acre	Mean no. STLM <u>infested clusters/25</u>	Mean no. STLM <u>mines/25 leaves</u>
		20 Jun	15 Aug
Dimilin 25W	16.0 oz.....	0.0	0.0
Diazinon 50W	64.0 oz.....	1.5	6.5

PEAR: *Pyrus communis* L.
Pear psylla: *Psylla pyricola* Foerster

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PEAR, DIMILIN EUP TRIAL, ARDONIA, NEW YORK, 1986: A 0.7 acre block of 35-year-old 'Bartlett' and 'Bosc' pears was divided in half to compare two different treatments for pear psylla control. Four trees in the Southeast corner of the block were left untreated as a check plot. Treatments were applied at white bud (28 Apr) and supplemented as necessary during the remainder of the season. All treatments were applied by airblast sprayer delivering 200 gal/acre at a ground speed of 2.5 mph, except an emergency spray applied dilute to run-off 24 May to the four check trees using a high-pressure handgun sprayer at 400 psi. Additional sprays applied over the entire block included: Manzate 80W 2 lb/acre 1 Jun; Benlate 50W 3 oz/acre 1 Jun; Guthion 50W 2 lb/acre 1 Jun; and Mitac 50W 3 lb/acre 8 Jul. Pear psylla populations were monitored bi-weekly from 16 May to 22 Jul by collecting five fruit spurs or 5 new shoots per tree from four 'Bartlett' trees per plot. The spurs or shoots were kept in plastic sacks and transported back to the laboratory in an insulated cooler. Five leaves were removed from each spur or shoot and all live pear psylla eggs and nymphs found on the leaves were counted and the results recorded. Considerable rainfall occurred during the months of Jun and Jul, while rainfall for other months was below normal for the area. Temperatures were below normal for most of the growing season.

A very large pear psylla population developed in the check trees and may have contributed to the higher population found in the adjacent Dimilin block compared to the Pydrin standard. The handgun application of Pydrin over the check was very effective and further controls were not required until Jul, at which time Mitac was applied and worked very effectively.

Treatment	Rate form. /acre	Application dates	Block size [acres]	Mean no. Pear psylla nymphs and eggs/ 5 spurs or shoots (25 leaves)					
				16 May	23 May	9 Jun	16 May	23 May	9 Jun
				Nymphs	Eggs	Nymphs	Eggs	Nymphs	Eggs
1. Dimilin 2S	1.0 pt	28 Apr, 28 May	0.3.....	137.3	114.5	131.5	50.8	24.3	229.3
2. Pydrin 2.4E	10.0 oz	28 Apr							
Dimilin 2S	1.0 pt	28 May	0.4.....	3.3	55.5	59.0	38.8	2.3	135.3
3. Check									
Pydrin 2.4E	10.4 oz	24 May	0.1.....	391.5	134.0	429.3	24.5	0.3	0.8

Treatment	Mean no. Pear psylla nymphs and eggs/ 5 spurs or shoots (25 leaves)					
	25 Jun	7 Jul	22 Jul	25 Jun	7 Jul	22 Jul
	Nymphs	Eggs	Nymphs	Eggs	Nymphs	Eggs
1.....	42.0	443.0	37.0	76.8	1.0	2.3
2.....	50.0	275.0	35.5	65.5	1.0	0.3
3.....	17.8	52.5	7.5	55.0	0.0	0.0

PEAR: *Pyrus communis* L.
Pear psylla: *Psylla pyricola* Foerster

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PEAR, DIMILIN EUP TRIAL, CLINTONDALE, NEW YORK, 1986: Three blocks of pear trees ranging in size from 1.2 to 2.2 acres were treated with Dimilin while blocks adjacent to the two smaller plots were treated with Morestan and Mitac. All plots consisted of about equal numbers of 'Bartlett' and 'Bosc' cultivars at spacings from 12 by 18 ft to 20 by 22 ft, tree heights from 15 to 22 ft, and tree widths from 10 to 14 ft. Treatments were applied at white bud (26 Apr), petal fall (19 May) and or in selected cover sprays. Treatments were all applied by airblast sprayer traveling 2 2/3 mph and delivering 100 gal finished spray per acre. Additional sprays applied over all blocks included: C-0-C-S 50W 8 lb/acre 3 Apr; Superior oil 6E 8 gal/acre 3 Apr; Carbamate 76W 2 lb/acre 26 Apr and 19 May; Captan 50W 1 lb/acre 17 Jun; and Mitac 50W 1 3/4 lb/acre 15 Jul. Pear psylla populations were monitored bi-weekly from 8 May to 30 Jul by collecting five fruit spurs or 5 new shoots per tree from four 'Bartlett' trees per plot. The spurs or shoots were kept in plastic sacks and transported back to the laboratory in an insulated cooler. Five leaves were removed from each spur or shoot and all live pear psylla eggs and nymphs found while examining the leaves with the aid of a binocular microscope were counted and the results recorded. During the trial one of the standard treatment blocks was removed by bulldozer by the grower (This was the most effective psylla control measure we encountered). Considerable rainfall occurred during the months of Jun and Jul, while rainfall for other months was below normal for the area. Temperatures were below normal for most of the growing season.

Early season suppression was similar for Morestan and Dimilin, however, where direct comparison was available, Mitac provided better control than Dimilin. Pear psylla populations subsided as leaf and shoot growth 'hardened off' or became less succulent.

Treatment	Rate form. /acre	Application dates	Block size [acres]	Mean no. Pear psylla nymphs and eggs/ 5 spurs or shoots (25 leaves)					
				8 May	20 May	3 Jun	Nymphs	Eggs	Eggs
1. Dimilin 25W	1.0 lb	26 Apr, 17 Jun	2.2	0.3	4.8	18.0	18.0	6.5	181.0
2. Morestan 25W Mitac 50W	3.0 lb 1.5 lb	26 Apr 19 May	1.1	2.5	0.3	10.3	10.3	0.0	201.0
3. Dimilin 25W	1.0 lb	26 Apr, 17 Jun	1.2		12.0	11.0	11.0	2.3	145.5
4. Dimilin 25W	1.0 lb	26 Apr, 17 Jun	1.6			10.3	10.3		131.0
5. Morestan 25W Mitac 50W	3.0 lb 1.5 lb	26 Apr 19 May, 17 Jun	2.0			1.3	1.3		7.5

Treatment	Rate form. /acre	Application dates	Block size [acres]	Mean no. Pear psylla nymphs and eggs/ 5 spurs or shoots (25 leaves)					
				17 Jun	30 Jun	17 Jul	30 Jul	Nymphs	Eggs
1	42.5		244.0	33.3	324.3	1.8	53.5	0.8	0.0
2	block removed								
3	64.5		179.8	51.0	296.8	2.5	100.0	0.3	0.0
4	48.2		281.7	7.5	137.5	1.3	16.3	2.0	0.3
5	22.0		74.0	8.3	30.0	0.0	1.5	0.0	0.0

PEAR: *Pyrus communis* L.
Pear psylla: *Psylla pyricola* Foerster

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PEAR, DIMILIN EUP TRIAL, MARLBORO, NEW YORK, 1986: A 25-year-old block of 'Bosc', 'Bartlett', and 'Clapp's Favorite' pear cultivars was divided into three unreplicated plots ranging in size from 0.1 to 6.0 acres. Trees in the block were spaced 18 by 18 ft and were approximately 15 ft in height. Treatments were applied with an airblast sprayer delivering 100 gal/acre at a ground speed of 2.8 mph. Applications were made at green cluster (14 Apr), white bud (25 Apr), petal fall (7 May) or first cover (30 May). Additional materials applied over the entire block included: Manzate 200 80W 1 lb/acre 25 Apr and 7 May; Liquid fertilizer 4 pt/acre 7 May and 30 May; Captan 50W 2 lb/acre 30 May; and Mitac 1.5E 2 2/3 pt/acre 14 Jun. Pear psylla populations were monitored bi-weekly from 14 May to 22 Jul by collecting five fruit spurs or 5 new shoots per tree from four 'Bartlett' trees per plot. The spurs or shoots were kept in plastic sacks and transported back to the laboratory in an insulated cooler. Five leaves were removed from each spur or shoot and all live pear psylla eggs and nymphs found while examining the leaves with the aid of a binocular microscope were counted and the results recorded. Considerable rainfall occurred during the months of Jun and Jul, while rainfall for other months was below normal for the area. Temperatures were below normal for most of the growing season.

The Dimilin applications provided pear psylla suppression equal to that of the pyrethroid standard. Pear rust mite populations developed in the pyrethroid plot and caused some russetting of the 'Bartlett' fruit, but such russetting was not observed in the Dimilin plot.

Treatment	Rate form. /acre	Application dates	Block size [acre]	Mean no. Pear psylla nymphs and eggs/ 5 spurs or shoots (25 Leaves)				
				14 May	27 May	10 Jun		
				Nymphs	Eggs	Nymphs	Eggs	
1. Dimilin 2S	1.0 pt	14 Apr, 7 May 30 May						
+Superior oil 6E	5.0 gal	14 Apr						
+ C-O-C-S 50W	10.0 lb	14 Apr						
Guthion 50W	1.0 lb	30 May	2.0.....	4.8	3.8	0.0	0.0	50.8
2. Pydrin 2.4E	12.0 oz	25 Apr						
Guthion 50 W	1.0 lb	7 May, 30 May	6.0.....	4.5	5.3	0.0	4.3	61.0
3. Check			0.1.....	40.5	23.3	20.8	21.8	126.0

Treatment	Mean no. Pear psylla nymphs and eggs/ 5 spurs or shoots (25 Leaves)				
	25 Jun	7 Jul	22 Jul		
	Nymphs	Eggs	Nymphs	Eggs	
1.....	11.9	10.0	2.0	10.5	45.3
2.....	31.3	30.5	9.3	61.8	6.0
3.....	27.0	4.1	2.8	46.0	45.4

PEAR: *Pyrus communis* L.
Pear psylla: *Psylla pyricola* Foerster

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PEAR, DIMILIN EUP TRIAL, MILTON (SITE A), NEW YORK, 1986: A 10-year-old block of 'Bartlett' and 'Bosc' pears was treated with three Dimilin applications. Trees were spaced 14 by 20 ft and were approximately 12 ft in height. An adjacent 1.2 acre block of 35-year-old 'Bartlett' and 'Bosc' trees were treated with Morestan as a comparison. A 3-year-old block of the same cultivars, spaced 15 by 20 ft, with trees approximately 5 ft in height, was divided into a 0.5 acre portion treated with Dimilin with the remaining 4.0 acres receiving Guthion. Treatments were applied by airblast sprayer delivering from 50 to 150 gal spray/acre at a ground speed of from 2.0 to 2.5 mph. Treatments were applied at either white bud (25 Apr), petal fall (14 May) and/or first cover (5 Jun). Mitac 1.5E 3 pt/acre was applied over all plots on 21 Jul, while Pydrin 2.4E 10.0 oz/acre was applied in the 4.0 acre young planting on 16 Jun. Pear psylla populations were monitored bi-weekly from 16 May to 30 Jul by collecting five fruit spurs or 5 new shoots per tree from four 'Bartlett' trees per plot. The spurs or shoots were kept in plastic sacks and transported back to the laboratory in an insulated cooler. Five leaves were removed from each spur or shoot and all live pear psylla eggs and nymphs found while examining the leaves with the aid of a binocular microscope were counted and the results recorded. Considerable rainfall occurred during the months of Jun and Jul, while rainfall for other months was below normal for the area. Temperatures were below normal for most of the growing season.

Pear psylla populations developed very rapidly in the young planting requiring the special 16 Jun spray to provide control in the standard section. The Morestan plot had lower counts than the Dimilin plots, while three Dimilin applications resulted in lower counts than two applications.

Treatment	Rate form. /acre	Application dates	Block size [acres]	Mean no. Pear psylla nymphs and eggs/ 5 spurs or shoots (25 leaves)					
				16 May		3 Jun		18 Jun	
				Nymphs	Eggs	Nymphs	Eggs	Nymphs	Eggs
1. Dimilin 25W	1.0 lb	25 Apr, 14 May 5 Jun	0.6.....	4.8	17.0	40.0	520.8	13.5	242.3
2. Morestan 25W Guthion 50W	4.0 lb 1.5 lb	25 Apr 14 May, 5 Jun	1.2.....	1.0	0.8	20.8	114.3	14.5	229.8
3. Dimilin 25W	1.0 lb	14 May, 5 Jun	0.5.....			53.0	926.5	22.0	395.3
4. Guthion 50W	1.5 lb	14 May	4.0.....			306.0	1687.8	109.5	1042.0

Treatment	Mean no. Pear psylla nymphs and eggs/ 5 spurs or shoots (25 leaves)					
	1 Jul		14 Jul		30 Jul	
	Nymphs	Eggs	Nymphs	Eggs	Nymphs	Eggs
1.....	32.0	272.8	95.8	205.0	1.3	3.8
2.....	24.8	96.0	35.8	45.3	0.3	4.0
3.....	40.3	764.5	83.8	181.0	6.0	12.3
4.....	81.5	815.3	1.5	24.8	1.5	2.8

PEAR: *Pyrus communis* L.
Pear psylla: *Psylla pyricola* Foerster

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PEAR, DIMILIN EUP TRIAL, MILTON (SITE B), NEW YORK, 1986: An eight-acre block of 6-year-old 'Bartlett' and 'Bosc' pears was divided so that 1/4 of the trees were treated with Dimilin while the remainder were treated with Morestan/Guthion. The trees were spaced 15 by 20 ft and were approximately 12 ft in height. Treatment applications were made at green tip (5 Apr), white bud (23 Apr), petal fall (7 May), and/or in cover sprays (10 Jun, 7 Jul, and 21 Jul). Applications were made with a PTO driven airblast sprayer traveling at 2 1/2 mph delivering 250 gal finished spray/acre. Sprays applied over the entire block included: Manzate 200 80W 5 lb/acre 23 Apr; Thiodan 50W 3 3/4 lb/acre 7 Jul; Zolone 3E 5 pt/acre 7 Jul; and Mitac 1.5E 4 pt/acre 21 Jul. Pear psylla populations were monitored bi-weekly from 14 May to 30 Jul by collecting five fruit spurs or 5 new shoots per tree from four 'Bartlett' trees per plot. The spurs or shoots were kept in plastic sacks and transported back to the laboratory in an insulated cooler. Five leaves were removed from each spur or shoot and all live pear psylla eggs and nymphs found while examining the leaves with the aid of a binocular microscope were counted and the results recorded. Considerable rainfall occurred during the months of Jun and Jul, while rainfall for other months was below normal for the area. Temperatures were below normal for most of the growing season.

Pear psylla suppression was about equal between treatments for first generation, while the 10 Jun Dimilin application provided considerable second generation control. The Jul Mitac application over the entire block provided season long control.

Treatment	Rate form. /acre	Application dates	Block size [acres]	Mean no. Pear psylla nymphs and eggs/ 5 spurs or shoots (25 leaves)					
				14 May	3 Jun	18 Jun	Nymphs	Eggs	Eggs
1. Dimilin 2S	1.0 pt	5 Apr, 23 Apr 10 Jun							
Superior oil 6E	2.5 gal	5 Apr	2.0.....	1.0	2.0	39.3	122.3	6.8	59.3
2. Superior oil 6E	2.5 gal	3 Apr							
Morestan 25W	3.0 lb	23 Apr							
Guthion 50W	2.0 lb	7 May	6.0.....	0.8	5.5	15.0	238.5	17.0	254.3

Treatment	Mean no. Pear psylla nymphs and eggs/ 5 spurs or shoots (25 leaves)					
	1 Jul	14 Jul	30 Jul	Nymphs	Eggs	Eggs
1.....	12.3	43.5	0.3	0.3	0.3	0.3
2.....	47.0	173.5	6.0	6.0	30.0	1.8
						1.3

PEAR: *Pyrus communis* L.
Pear psylla: *Psylla pyricola* Foerster

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PEAR, DIMILIN EUP TRIAL, NEW PALTZ, NEW YORK, 1986: A one-acre planting of 22-year-old 'Bartlett' and 'Bosc' pear trees was divided so that half the block received Dimilin treatments and the remaining half Pydrin. An additional block 1/4 mi distant also received the same Dimilin treatments. The average spacing for the blocks was 10 by 24 ft, average tree height 16 ft, and average tree width 12 ft, giving an average tree-row-volume dilute base of 244 gal/acre. Treatment applications were made at white bud (27 Apr) and/or petal fall (7 May). All materials were applied by airblast sprayer at 2 3/4 mph delivering 166 gal/acre. Additional sprays applied over all the blocks included: Captan 50W 3 lb/acre 7 May, 29 May, and 27 Jun; Agrirestrep 1 lb/acre 7 May and 1 Jun; Guthion 50W 1 1/2 lb/acre 7 May and 29 May; and Mitac 1.5E 2 2/3 pt/acre 27 Jun. Pear psylla populations were monitored bi-weekly from 8 May to 1 Aug by collecting five fruit spurs or 5 new shoots per tree from four 'Bartlett' trees per plot. The spurs or shoots were kept in plastic sacks and transported back to the laboratory in an insulated cooler. Five leaves were removed from each spur or shoot and all live pear psylla eggs and nymphs found while examining the leaves with the aid of a binocular microscope were counted and the results recorded. Considerable rainfall occurred during the months of Jun and Jul, while rainfall for other months was below normal for the area. A hailstorm which passed through the area on 3 Jun caused slight to moderate damage to the fruit. Temperatures were above normal very early in the season but below normal for the remainder of the season.

The two Dimilin applications were slightly more effective in providing early season pear psylla suppression than the single Pydrin application. Psylla suppression lasted until Jun when the Mitac application was made. Mitac provided good control through the last Aug count.

Treatment	Rate form. /acre	Application dates	Block size [acres]	Mean no. Pear psylla nymphs and eggs/ 5 spurs or shoots (25 leaves)				
				8 May	21 May	30 May	Nymphs	Eggs
1. Dimilin 25W	12.0 oz 7.0 oz	27 Apr 7 May	0.6.....	4.0	5.3	3.0	2.0	75.0
2. Pydrin 2.4E	8.0 oz	27 Apr	0.5.....	1.8	24.5	15.5	11.0	78.5
3. Dimilin 25W	12.0 oz 7.0 oz	27 Apr 7 May	2.4.....	.....	17.0	10.0	0.5	84.5

Treatment	13 Jun	Mean no. Pear psylla nymphs and eggs/ 5 spurs or shoots (25 leaves)					1 Aug
		2 Jul	16 Jul	2 Aug	1 Aug	Eggs	
1.....	73.8	3.0	4.5	60.2	2.8	34.3	34.3
2.....	110.3	14.3	3.5	25.5	16.3	67.8	67.8
3.....	17.5	2.5	1.5	95.8	31.0	58.5	58.5