NOT FOR PUBLICATION

LAST LEAFHOPPER TRIAL
WALH p12

FRUIT INSECT AND MITE CONTROL STUDIES - EASTERN NEW YORK - 1978

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Materials Tested

Ambush 25WP	ICI America, Inc.
Carzol 92SP	NOR-AM Agric. Prod., Inc.
CGA 29170 0.8EC	Ciba-Geigy Corporation
Dikar 77W	Rohm and Haas Company
Dipel WP	Abbott Laboratories
DISA 274 50WP	DuPont Company
Guthion 50WP	Mobay Chemical Corp.
HAG 107 3EC	American Hoechst Corp.
Kelthane EC	Rohm and Haas Company
Lannate 2.4LV	DuPont Company
Lannate 1.8L	DuPont Company
Lorsban 4E	Dow Chemical Company
Oil 60 sec	Sun Oil Company
Penncap 2FM	Pennwalt Corporation
Plictran 50WP	Dow Chemical Company
Pydrin 2.4EC	Shell Development Co.
SAN 6538 4EC	Sandoz, Inc.
Thiodan 50WP	FMC Corporation
UC 55248 4EC	Union Carbide Corporation
Vydate 2L	DuPont Company
Zolone 3EC	Rhodia, Inc.

1980 WEATHER CONDITIONS - HUDSON VALLEY LABORATORY, HIGHLAND, NY

Date	Temp. Max	Temp. Min	Rain in.
Apr 1	44	35	.17
2	57	36	
3	50	30	
4	60	42	.56
5	55	41	
6	54	36	
7	64	36	
8	64	43	
9	61	44	.05
10	55	44	1.89
11			
12			
13			.01
14			.15
15	62	38	.41
16	65	40	
17	51	28	
18	55	32	
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			.80
29			1.36
30	51	44	.01
	TOTAL		5.41
May 1	67	48	
2	66	53	
3	72	47	
4	81	53	
5	71	46	
6	83	52	
7	83	49	.07
8	72	44	.14
9	61	37	
10	62	35	
11	71	49	
12	62	54	.34
13	69	58	.05
14	78	53	.29
15	72	46	
16	65	41	
17	71	43	
18	79	54	
19	61	54	.16
20	76	54	
21	77	54	.02
22	58	51	.19
23	84	54	.01
24	88	59	
25	89	63	
26	75	44	
27	71	44	
28	72	45	
29	73	48	
30	76	50	
31	70	56	
	TOTAL		1.27
Jun 1	77	57	
2	84	57	.17
3	80	62	.03
4	83	56	
5	73	47	
6	74	46	
7	78	59	.53
8	66	58	
9	77	37	.05
10	57	40	
11	63	38	.1
12	66	41	
13	70	44	
14	77	49	
15	83	58	
16	86	55	.33
17	70	50	
18	75	51	
19	77	51	
20	81	53	.01
21	71	54	
22	76	50	
23	84	53	
24	87	62	
25	93	66	
26	93	65	
27	89	63	
28	93	56	
29	76	55	
30	69	61	2.01
	TOTAL		3.23
Jul 1	74	54	.05
2	81	61	
3	78	62	.19
4	79	61	
5	87	62	
6	86	62	1.07
7	75	50	
8	82	60	
9	82	55	.05
10	85	61	
11	86	64	
12	88	63	.07
13	80	52	
14	81	55	
15	86	62	
16	88	73	
17	96	69	
18	91	68	
19	86	64	
20	92	69	
21	97	75	
22	98	67	1.57
23	88	68	.22
24	84	58	
25	82	56	
26	87	60	
27	88	65	
28	88	65	
29	85	69	
30	77	63	.25
31	86	58	
	TOTAL		3.47
Aug 1	86	64	
2	85	64	
3	92	66	.95
4	89	67	
5	91	66	
6	91	68	.61
7	90	64	
8	89	68	
9	92	73	
10	91	61	
11	85	65	.27
12	85	68	
13	84	61	
14	84	60	.27
15	77	61	.03
16	84	55	
17	73	51	
18	80	56	
19	82	59	
20	78	65	.24
21	73	61	
22	71	62	
23	78	59	
24	82	59	
25	85	62	
26	84	59	
27	90	63	
28	94	65	.12
29	79	64	
30	82	65	
31	87	69	
	TOTAL		2.49

1980 WEATHER CONDITIONS - PERU, NY

Date	Temp. Max	Temp. Min	Rain in.
May 1	70	44	
2	73	44	
3	78	44	
4	70	45	
5	59	41	
6	68	32	.05
7	66	34	.22
8	58	36	
9	57	40	.08
10	64	40	
11	66	33	
12	73	41	
13	66	41	.10
14	60	44	.05
15	60	43	.03
16	72	46	
17	73	37	
18	71	48	.21
19	68	52	.12
20	70	40	
21	78	40	
22	85	54	
23	78	55	
24	76	50	
25	72	48	
26	65	45	
27	66	48	
28	66	41	
29	69	35	
30	76	40	
31	83	48	
	TOTAL		.86
Jun 1	77	57	.12
2	73	50	.08
3	77	58	
4	72	55	
5	70	50	
6	77	49	
7	71	55	
8	65	51	.35
9	54	30	.03
10	55	36	.08
11	58	40	
12	61	37	
13	82	42	
14	87	49	
15	82	60	.15
16	68	45	.08
17	72	45	
18	80	40	
19	73	53	.08
20	68	54	.27
21	71	50	.15
22	81	56	
23	81	55	
24	89	60	.43
25	91	68	
26	89	65	
27	86	63	
28	70	40	
29	78	45	
30	73	56	.36
	TOTAL		2.18
Jul 1	78	51	
2	75	60	.09
3	81	55	
4	81	54	
5	82	52	
6	73	55	
7	80	46	
8	76	60	.46
9	77	55	
10	82	49	
11	88	61	.04
12	72	47	
13	81	54	
14	90	55	
15	89	66	
16	89	71	
17	90	60	.13
18	86	53	
19	90	57	
20	90	69	.05
21	86	63	.22
22	75	68	.45
23	86	64	.08
24	83	59	
25	86	58	
26	80	68	
27	85	65	
28	81	63	
29	78	68	.40
30	83	61	.04
31	85	59	
	TOTAL		1.96
Aug 1	85	53	.30
2	87	64	.17
3	82	64	
4	85	58	
5	87	53	
6	85	60	.08
7	90	63	
8	91	68	
9	84	73	
10	77	51	
11	80	50	.75
12	80	61	
13	77	57	
14	77	56	.25
15	77	57	
16	70	48	.10
17	78	50	
18	80	48	
19	78	60	.08
20	73	61	.09
21	76	50	
22	78	48	
23	82	52	
24	85	53	
25	84	56	
26	84	57	
27	78	64	.02
28	77	55	.45
29	75	46	
30	82	54	1.55
31	82	64	
	TOTAL		3.84

Table 1.

Treatment and oz. form./100 gal	% Fruit injured[1]				
	Tarnished plant bug	Plum curculio	Codling moth	San Jose scale	SS, VLR OBLR[2]
SAN 6538 4EC 8.0	2.2ab	7.3a	0.6a	0.3a	0.2a
SAN 6538 4EC 16.0	2.1ab	3.1a	0.3a	0.6a	0.0a
CGA 29170 0.8EC 76.2	4.7 b	66.1 d	26.4 b	25.4 bc	2.4 b
DISA 274 50WP 8.0	2.6ab	10.2a	0.3a	1.0a	0.8a
DISA 274 50WP 16.0	3.3ab	9.4a	0.1a	0.6a	0.3a
UC 55248 4EC 16.0	3.2ab	59.0 d	21.1 b	31.6 bc	3.2 bc
HAG 107 0.3EC 1.2	2.6ab	35.4 bc	0.4a	16.0ab	0.2a
HAG 107 0.3EC 1.8	2.8ab	25.7 b	0.7a	14.4ab	0.1a
Zolone 3EC 10.7 + Penncap 2FM 8.0	3.2ab	3.1a	0.0a	0.4a	0.0a
Pydrin 2.4EC 2.6	0.8a	2.1a	0.0a	17.4 bc	0.0a
Guthion 50WP 8.0	3.0ab	1.4a	0.0a	0.4a	0.6a
Check	3.1ab	45.8 cd	25.8 b	41.3 c	3.8 c

[1] Based on 100 fruits/tree from each of three cultivars/replicate; cultivars and harvest dates included: 'McIntosh' - September 11, 'Cortland' - September 15, and 'Golden Delicious' - October 3.

[2] SS = *Sparganothis sulfureana*, VLR = variegated leafroller, OBLR = obliquebanded leafroller.

* *

Table 2.

Treatment and oz form./100 gal	% Fruit injured[1]			% Clean fruit	$\bar{X}$ russet rating/apple[2]
	Green fruitworm	Apple maggot			
		punctures	tunnels		
SAN 6538 4EC 8.0	0.1a	0.6ab	0.2a	89.1ab	1.3
SAN 6538 4EC 16.0	0.0a	0.6ab	0.0a	93.3a	2.1
CGA 29170 0.8EC 76.2	3.0 b	10.3 d	9.9 c	13.9 d	0.9
DISA 274 50WP 8.0	0.0a	1.1ab	0.4a	84.2ab	0.8
DISA 274 50WP 16.0	0.1a	1.2ab	0.6a	85.6ab	0.9
UC 55248 4EC 16.0	0.6ab	3.0 bc	2.6ab	17.3 d	0.9
HAG 107 0.3EC 1.2	0.1a	0.2ab	0.1a	53.0 c	0.8
HAG 107 0.3EC 1.8	0.0a	0.8ab	0.7a	61.9 bc	0.7
Zolone 3EC 10.7 + Penncap 2FM 8.0	0.0a	0.2ab	0.1a	93.3a	1.6
Pydrin 2.4EC 2.6	0.0a	0.0a	0.0a	80.1ab	0.8
Guthion 50WP 8.0	0.1a	0.4ab	0.0a	93.4a	0.3
Check	0.6ab	4.6 cd	4.2 bc	17.7 d	0.7

[1] Based on 100 fruits/tree from each of three cultivars/replicate; cultivars and harvest dates included: 'McIntosh' - September 11, 'Cortland' - September 15, and 'Golden Delicious' - October 3.

[2] Based on scale of 0 (best finish) to 3 (worst finish); 100 'Golden Delicious' apples evaluated/replicate.

APPLE: Malus sylvestris
Tarnished plant bug: Lygus lineolaris (P. de B.)
Plum curculio: Conotrachelus nenuphar (Herbst)
Codling moth: Laspeyresia pomonella (L.)
San Jose scale: Quadraspidiotus perniciosus (Comstock)
a leafroller: Sparganothis sulfureana Clemens
Variegated leafroller: Platynota flavedona (Clemens)
Obliquebanded leafroller: Choristoneura rosaceana (Harris)
a green fruitworm: Orthosia hibisci Guenee
Apple maggot: Rhagoletis pomonella (Walsh)

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APPLE, INSECT CONTROL, HUDSON VALLEY, HIGHLAND, NEW YORK, 1980: Eight-tree plots of from 5-7 different apple cultivars were replicated 3 times in a randomized complete block design. The trees were 16-yrs-old, ca 12 ft high, on EM 2 rootstock, and spaced 15 x 30 ft. Treatments were applied at pink ('McIntosh'), May 1, petal fall (Rome), May 19, and in 6 cover sprays, June 5, June 19, July 3, July 17, July 31, and August 14, except the CGA 29170 treatment which was applied only at pink, and the UC 55248 treatment which was applied at pink and petal fall. Treatments were applied dilute to runoff using a high pressure handgun sprayer at 400 psi delivering 3.2 (during May) to 4.2 (June on) gal spray/tree (307-403 gal/acre). The fungicides Difolatan 4F (5 qt/100 gal) and Cyrex 65WP (4 oz/100 gal) were applied over all plots by airblast sprayer at 3X (133 gal/acre) on April 17 and June 13, respectively. Plictran 50WP (4 oz/100 gal) was included for mite control with the DISA, HAG, Pydrin and Guthion treatments on the July 3 application. Above normal temperatures and below normal rainfall prevailed during the entire growing season. Plum curculio, San Jose scale, and codling moth populations were above normal while other insect pressure was low.

Guthion, Zolone + Penncap, SAN 6538, DISA 274, and Pydrin provided the best overall insect control, however DISA 274 was weak on Plum curculio, while Pydrin did not provide commercially acceptable San Jose scale control. Pydrin was the only material which showed a significant reduction in tarnished plant bug injury. Both SAN 6538 and the Zolone + Penncap combination caused fruit finish problems.

Table 1.

Treatment and oz. form./100 gal	% Fruit injured[1]				
	Tarnished plant bug	Plum curculio	Codling moth	San Jose scale	SS, VLR OBLR[2]
SAN 6538 4EC 8.0	2.2ab	7.3a	0.6a	0.3a	0.2a
SAN 6538 4EC 16.0	2.1ab	3.1a	0.3a	0.6a	0.0a
CGA 29170 0.8EC 76.2	4.7 b	66.1 d	26.4 b	25.4 bc	2.4 b
DISA 274 50WP 8.0	2.6ab	10.2a	0.3a	1.0a	0.8a
DISA 274 50WP 16.0	3.3ab	9.4a	0.1a	0.6a	0.3a
UC 55248 4EC 16.0	3.2ab	59.0 d	21.1 b	31.6 bc	3.2 bc
HAG 107 0.3EC 1.2	2.6ab	35.4 bc	0.4a	16.0ab	0.2a
HAG 107 0.3EC 1.8	2.8ab	25.7 b	0.7a	14.4ab	0.1a
Zolone 3EC 10.7 + Penncap 2FM 8.0	3.2ab	3.1a	0.0a	0.4a	0.0a
Pydrin 2.4EC 2.6	0.8a	2.1a	0.0a	17.4 bc	0.0a
Guthion 50WP 8.0	3.0ab	1.4a	0.0a	0.4a	0.6a
Check	3.1ab	45.8 cd	25.8 b	41.3 c	3.8 c

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[1] Based on 100 fruits/tree from each of three cultivars/replicate; cultivars and harvest dates included: 'McIntosh' - September 11, 'Cortland' - September 15, and 'Golden Delicious' - October 3.

[2] SS = _Sparganothis sulfureana_, VLR = variegated leafroller, OBLR = obliquebanded leafroller.

* *

Table 2.

Treatment and oz form./100 gal	% Fruit injured[1]			% Clean fruit	$\bar{X}$ russet rating/apple[2]
	Green fruitworm	Apple maggot			
		punctures	tunnels		
SAN 6538 4EC 8.0	0.1a	0.6ab	0.2a	89.1ab	1.3
SAN 6538 4EC 16.0	0.0a	0.6ab	0.0a	93.3a	2.1
CGA 29170 0.8EC 76.2	3.0 b	10.3 d	9.9 c	13.9 d	0.9
DISA 274 50WP 8.0	0.0a	1.1ab	0.4a	84.2ab	0.8
DISA 274 50WP 16.0	0.1a	1.2ab	0.6a	85.6ab	0.9
UC 55248 4EC 16.0	0.6ab	3.0 bc	2.6ab	17.3 d	0.9
HAG 107 0.3EC 1.2	0.1a	0.2ab	0.1a	53.0 c	0.8
HAG 107 0.3EC 1.8	0.0a	0.8ab	0.7a	61.9 bc	0.7
Zolone 3EC 10.7 + Penncap 2FM 8.0	0.0a	0.2ab	0.1a	93.3a	1.6
Pydrin 2.4EC 2.6	0.0a	0.0a	0.0a	80.1ab	0.8
Guthion 50WP 8.0	0.1a	0.4ab	0.0a	93.4a	0.3
Check	0.6ab	4.6 cd	4.2 bc	17.7 d	0.7

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[1] Based on 100 fruits/tree from each of three cultivars/replicate; cultivars and harvest dates included: 'McIntosh' - September 11, 'Cortland' - September 15, and 'Golden Delicious' - October 3.

[2] Based on scale of 0 (best finish) to 3 (worst finish); 100 'Golden Delicious' apples evaluated/replicate.

APPLE: Malus sylvestris
European red mite: Panonychus ulmi (Koch)
Predator mite: Amblyseius fallacis (Garman)

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APPLE, MITE CONTROL, HUDSON VALLEY, HIGHLAND, NEW YORK 1980: Eight-tree plots of from 5-7 different apple cultivars were replicated 3 times in a randomized complete block design. Insecticide treatments were applied at pink (McIntosh), May 1, petal fall (Rome), May 19, and in 6 cover sprays, June 5, June 19, July 3, July 17, July 31, and August 14. The CGA 29170 treatment was applied only at pink, while the UC 55248 treatment was applied at pink and petal fall. Plictran 50W (4 oz form./100 gal) was included with the DISA, HAG, Pydrin and Guthion treatments for mite control on July 3. All treatments were applied dilute to runoff using a high pressure handgun sprayer at 400 psi delivering 3.2 (during May) and 4.2 (June through remainder of season) gal spray/tree (307-403 gal/acre). Fungicides applied over the plots by airblast sprayer a 3X (133 gal/acre) included Difolatan 4F (5 qt/100 gal) on April 17 and Cyprex 65WP (4 oz/100 gal) on June 13. Above normal temperatures and below normal rainfall contributed to rather early and severe European red mite buildup. The "open" winter (no snow cover) apparently reduced Amblyseius fallacis populations which remained low during the entire season.

The early season applications of UC 55248 and CGA 29170 provided excellent European red mite control as did the SAN 6538 treatments applied in a seasonal program.

Table 1. European red mite (ERM) and *Amblyseius fallacis* (AMB) populations on apple leaves in a seasonal insecticide screening program. Hudson Valley Laboratory, Highland, NY. 1980.

Treatment and oz form./100 gal		Mean no. mites[a] or eggs/leaf					
		July 1			August 5		
		ERM	ERME	July 3	ERM	ERME	AMB
1. SAN 6538 4EC	8.0	1.4	0.4		0.8	0.1	0.00
2. SAN 6538 4EC	16.0	0.4	0.1		1.2	0.1	0.07
3. CGA 29170 0.8EC	76.2	0.5	1.0		10.3	2.3	0.24
4. DISA 274 50WP	8.0	18.3	33.0	Plic.	13.5	4.5	0.00
5. DISA 274 50WP	16.0	3.6	12.1	Plic.	3.0	2.0	0.00
6. UC 55248 4EC	16.0	0.2	0.2		4.3	1.0	0.00
7. HAG 107 0.3EC	1.2	20.4	15.4	Plic.	1.2	1.1	0.00
8. HAG 107 0.3EC	1.8	10.7	17.9	Plic.	3.4	0.9	0.01
9. Zolone 3EC +Penncap 2FM	10.7 8.0	0.2	0.1		12.0	5.8	0.01
10. Pydrin 2.4EC	2.6	3.5	4.1	Plic.	0.7	0.3	0.00
11. Guthion 50WP	8.0	14.6	10.2	Plic.	5.0	2.9	0.03
12. Check		25.8	55.0		1.5	0.5	0.43

[a]ERM = European red mite, ERME = European red mite eggs, AMB = *Amblyseius fallacis*.

APPLE: Malus sylvestris
Tarnished plant bug: Lygus lineolaris (P. de B.)
San Jose scale: Quadraspidiotus perniciosus (Comstock)
Speckled green fruitworm: Orthosia hibisci Guenee
Rosy apple aphid: Dysaphis plantaginea (Passerini)

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APPLE, PYDRIN EUP EVALUATION STUDY, MILTON, NY, 1980: Seasonal programs comparing reduced spray schedules of the synthetic pyrethroid, Pydrin, and a Thiodan (pink only) Guthion standard were conducted near Milton, NY. Unreplicated adjacent 1.4 acre plots of 'McIntosh' and 'Rome Beauty' trees spaced 20 x 30 ft were used. Four 'Rome' trees at the outermost western row of the block were left untreated as a check. Treatments were applied at 4X (100 gal/acre) with a Myers 3 pt. hitch PTO driven sprayer at 3 mph. Treatments were applied at pink, May 3, petal fall, May 21, and in 4 cover sprays June 16, July 11, August 8, and August 28. The 'Rome Beauty' cultivar was examined for rosy apple aphid presence on May 29. At harvest on September 17, 50 'McIntosh' apples from the top of each tree and 50 from the bottom were examined from 4 trees in each program for insect injury.

The extended intervals of the spray schedules allowed San Jose scale to buildup in all programs. Rosy apple aphid control was excellent in the Pydrin treatments.

* *

Treatment and rate form./acre	$\bar{X}$ no. RAA infested terminal/25[1]	% Fruit injury			% Clean fruit
		tarnished plant bug	San Jose scale	Green fruitworm	
Pydrin 2.4EC 2/3 pt	0.0	0.3	7.0	0.0	92.8
Thiodan 50WP 2 lb[2] Guthion 50WP 1 1/2 lb	2.3	0.8	11.0	0.5	87.5
Pydrin 2.4EC 2/3 pt	0.0	0.8	25.0	0.0	74.0
Check	12.5	-	-	-	-

[1] Based on examining 25 terminals/tree May 29 from 4 'Rome Beauty' trees/plot. RAA = Rosy apple aphid.

[2] Applied at pink (May 3) only.

APPLE: Malus sylvestris
Tarnished plant bug: Lygus lineolaris (P. de B.)

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APPLE, PYDRIN EUP EVALUATION STUDY, MARLBORO, NY, 1980: The synthetic pyrethroid, Pydrin, was compared in a seasonal schedule with a standard program of Thiodan at pink followed by Guthion at petal fall and remaining cover sprays. A 2.7 acre block of mature 'Red Delicious' and 'McIntosh' trees was divided so that 1/2 of the block received Pydrin sprays and the remainder the standard program. Likewise an adjacent 5 acre block of 15-yr-old semidwarf 'Spartan' trees was divided in half and the forementioned programs compared. Treatments were all applied at 4X (100 gal/acre) with a Bean model 707 Speed sprayer at a ground speed of 4 mph. The treatments were applied at pink, May 3, petal fall, May 15, and in 6 cover sprays May 22, June 13, July 1, July 18, August 5, and August 15. The fruit was evaluated on the 'Spartan' cultivar September 17 and the 'Red Delicious' cultivar September 30 by examining 100 apples/tree from 4 trees in each program.

Tarnished plant bug injury was the only injury found in the test. The Pydrin treated blocks had considerably less tarnished plant bug injury than those treated with the standard program.

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Treatment and rate form./acre	Cultivar	% Tarnished plant bug injury	% Clean fruit
Pydrin 2.4EC 1 pt	'Red Delicious'	0.5	99.5
Thiodan 50WP[1] 4 lb Guthion 50WP 1 3/4 lb	'Red Delicious'	2.0	98.0
Pydrin 2.4EC 1 pt	'Spartan'	3.0	97.0
Thiodan 50WP[1] 4 lb Guthion 50WP 1 3/4 lb	'Spartan'	8.0	92.0

[1] Applied at pink (May 3) only.

APPLE: Malus sylvestris
San Jose scale: Quadraspidiotus perniciosus

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APPLE, SAN JOSE SCALE CONTROL, MILTON, NEW YORK, 1980: Three programs were evaluated for San Jose scale control in unreplicated 1 acre plots containing 'McIntosh', 'Spartan' and 'Milton' apple cultivars spaced 20 x 30 ft. Four trees throughout the block were left untreated at green tip but received the same sprays as the rest of the block thereafter. Treatments included 60 sec spray oil at the 10 1/2 and 7 1/2 gal/acre rates, and Lorsban 4E at the 4 pt/acre rate. Treatments were all applied by airblast sprayer at green tip (McIntosh) on April 11 using 350 gal spray/acre. A reduced spray program with insecticides was applied over the entire block at 3 1/2X (114 gal/acre) during the remainder of the season and included: Thiodan 50WP 2 1/2 lb/acre April 30, Guthion 50WP 1 1/2 lb/acre May 17, July 10, and August 8, and Penncap 2FM 4 pt/acre on June 14. Treatments were evaluated September 12 by examining 50 apples from the top and 50 from the bottom of 4 'Spartan' trees in each treatment.

The reduced program of summer sprays was insufficient to achieve commercially acceptable San Jose scale control. There was very little difference between the 3 green tip applications, the highest rate of oil looking the best. In general more scale was found in the tops of the trees where coverage is most difficult to achieve.

* *

Treatment and rate form./acre	% San Jose scale infested fruit		
	Top	Bottom	Total
60 sec oil 10 1/2 gal	0.0	1.0	0.5
60 sec oil 7 1/2 gal	2.0	0.0	1.0
Lorsban 4E 4 pt	3.0	1.0	2.0
Untreated	25.0	19.0	22.0

APPLE: Malus sylvestris
Tarnished plant bug: Lygus lineolaris (P. de B.)

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APPLE, TARNISHED PLANT BUG CONTROL STUDIES, PERU, NY, 1980: Several insecticide programs were evaluated for tarnished plant bug control in large 1 1/3 acre plots replicated twice for each treatment. The block consisted of 51-yr-old 'McIntosh' trees spaced 40 x 40 ft. Treatments were applied at 6X (67 gal/acre) concentration with a Bean model 502 speed sprayer with a ground speed of 3 1/2 mph. Treatments were applied at pink (May 13) and petal fall (May 29). Treatments were evaluated for insect damage on August 14 by examining 200 fruits/tree from 4 trees/replicate.

The Pydrin application at pink provided the greatest reduction in tarnished plant bug injury. Other treatments had only slightly less tarnished plant bug injury than the check.

* *

Treatment and rate form./acre	Application dates	% Tarnished plant bug injury
1. Guthion 50WP 2 lb	5/13, 5/29	1.8
2. Vydate 2L 8 pt Guthion 50WP 2 lb	5/13	1.4
3. Thiodan 50WP 4 lb Guthion 50WP 2 lb	5/13 5/29	1.8
4. Pydrin 2.4EC 1 pt Guthion 50WP 2 lb	5/13 5/29	0.7
5. Thuricide HPC 4 pt Pydrin 2.4EC 1 pt	5/14 5/29	1.7
6. Check		2.3

Apple: Malus sylvestris
Rosy apple aphid: Dysaphis plantaginea (Passenni)
Gypsy moth: Lymantria dispar (Linnaeus)
Plum curculio: Conotrachelus nenupar (Herbst)
Tarnished plant bug: Lygus lineolaris (P. de B.)
Apple maggot: Rhagoletis pomonella (Walsh)
San Jose scale: Quadraspidiotus perniciosus (Comstock)

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APPLE, INSECT CONTROL, STONE RIDGE, NY, 1980: Four programs and a check were compared in 1/4 acre plots replicated twice on 'Golden Delicious', once on 'Milton', and once on the 'Lodi' cultivars. Trees were large 16-18 ft in height and spaced 30 x 35 ft. Treatments were all applied at 4X (100 gal/acre) concentration with a Friend model 393 airblast sprayer driven at 3 mph. Treatments were applied at pink, May 2, petal fall, May 20, and in 4 cover sprays, June 26, July 11, July 25, and August 8. Rosy apple aphid and gypsy moth populations were assessed May 16 by examining 25 terminals/tree, 4 trees/replicate, from 2 replicates of 'Golden Delicious' and 1 of 'Milton'. The 'Golden Delicious' trees were evaluated September 29 by examining 50 fruits/tree from 4 trees in each replicate.

Guthion, Ambush and Pydrin provided good plum curculio and apple maggot control. All treatments provided good early lepidopteran control, primarily of the gypsy moth. Thiodan, Ambush and Vydate provided good rosay apple aphid control. The only program which provided commercially acceptable San Jose scale control consisted of Guthion in the cover sprays. Considerable San Jose scale predation by ladybird beetles and their larvae was observed in the Dipel and untreated check programs.

Table 1.

Treatment and rate form./acre	Application dates	$\bar{X}$ no. infested terminals/25		% Fruit injury						% Clean Fruit
		Rosy apple aphid	Gypsy moth lar.	PC	TPB	Apple maggot punct.	Apple maggot tunn.	SJS	Early Lep.	
1. Thiodan 50WP 4 lb Guthion 50WP 2 lb	5/2 5/20, 6/26, 7/11 7/25, 8/8	0.4	1.6	2.0	2.7	0.2	0.2	0.5	0.2	94.2
2. Ambush 25WP 13 oz 26 oz	5/2, 5/20 6/26, 7/11, 7/25 8/8	0.0	1.0	3.0	1.5	0.5	0.5	7.2	0.2	87.7
3. Vydate 2L 8 pt Pydrin 2.4E 10 oz	5/2 5/20, 6/26, 7/11, 7/25, 8/8	0.0	2.3	1.5	2.2	0.2	0.2	6.2	0.0	90.5
4. Dipel 4 pt	5/2, 5/20	2.3	2.7	35.2	3.2	5.0	4.7	4.7	0.2	54.2
5. Check		1.8	7.3	62.0	4.7	20.2	19.7	3.5	3.7	23.2

PC = Plum curculio, TPB = Tarnished Plant Bug, SJS = San Jose Scale.

APPLE: Malus sylvestris
Tarnished plant bug: Lygus lineolaris (P. de B.)
San Jose scale: Quadraspidiotus perniciosus (Comstock)

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APPLE, INSECT CONTROL WITH METHOMYL, CLINTONDALE, NY, 1980. Three seasonal insecticide programs were compared in unreplicated 3 1/3 acre blocks of large 'McIntosh' and 'Red Delicious' trees. Treatments were applied using a Myers model 2A42 airblast sprayer at a speed of 2 1/2 mph and 6 2/3X concentration (75 gal/acre). Treatments were applied at pink, May 3, petal fall, May 17, and in 6 cover sprays, May 28, June 13, July 2, July 19, August 2 and August 25. A final cover spray of Guthion 50WP, 2 lb/acre, was applied over all treatments when San Jose scale activity was noticed on September 5. Treatments in the standard program consisted of Thiodan 50W 4 lb/acre pink (May 3), Guthion 50WP, 1 3/4 lb/acre at petal fall (May 17), May 28, Aug. 2 and Aug. 25, while Imidan 50WP, 6 lb/acre, was used June 13, July 2, and July 19. 'McIntosh' apples were evaluated from all plots on September 22 by picking 50 from the top and 50 from the bottom of each of 4 trees in each program.

The San Jose scale was responsible for the greatest amount of fruit damage. The scale was greatest in the LV plot but was also found in the L and standard programs. Tarnished plant bug injury was least in the LV program.

* *

Treatment and rate form./acre	% Fruit injury		%
	Tarnished plant bug	San Jose scale	Clean fruit
Lannate 1.8L 8 pt	1.3	1.0	97.8
Lannate 2.4LV 6 pt	0.5	10.5	88.8
Standard Prog.	1.0	2.5	96.5

APPLE: Malus sylvestris
European red mite: Panonychus ulmi (Koch)
Tarnished plant bug: Lygus lineolaris (P. de B.)
San Jose scale: Quadraspidiotus perniciosus (Comstock)
Spotted tentiform leafminer: Phyllonorycter blancardella (F.)

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APPLE, SEASONAL MITE AND INSECT CONTROL PROGRAMS, CLINTONDALE, NEW YORK, 1980: A 25 acre block of large (16 ft) apple trees was divided in unreplicated 2-5 acre plots in which different seasonal insecticide and miticide programs were tested. Cultivars within the plots included 'Staymans', 'McIntosh', 'Early McIntosh', 'Golden Delicious' and 'Red Delicious' with each plot containing at least 4 rows of 'Red Delicious' trees used for sampling. Tree spacings in the programs were 35 x 35 or 36 ft except in programs 1 and 2 which were 40 x 40 ft. Treatments were all applied by the grower with a Meyers airblast sprayer at 4X (100 gal/acre) concentration driving 2 1/2 - 3 mph. Additional pesticide sprays not in table 1 include: Dikar 77W 6 lb/acre on programs 1 & 2 on 4/25, 4/30, 5/12, 5/27, and 6/2; Guthion 50W 1 1/2 lb/acre on programs 1, 2, 5, 6 and 7 on 5/3, and over all programs on 5/16, 5/27, 6/11, 6/24, 7/8, 7/21, 8/4, and 8/18; Thiodan 50W 4 lb/acre on programs 3 and 4 on 5/3, Manzate 200 2 1/2 lb/acre + Benlate 50W 1/2 lb/acre on all programs (except 1 & 2) on 4/25, 4/30, 5/3, 5/12, 5/27, and 6/2, Thiram 4 lb/acre and Captan 4 lb/acre used in remaining cover sprays; Solubor and Epsom salts added to cover sprays on 7/8 and 7/21. Mites were sampled throughout the season by collecting 25 leaves/tree from 4 'Red Delicious' trees/program and brushing each sample with a mite brushing machine. The 1st generation tentiform leafminer population was assessed July 2 by counting the number of mines on 25 fruit clusters (ca 8 leaves/cluster) per tree from 4 'Red Delicious' trees/program. The fruit was evaluated September 22, by sampling 100 'Red Delicious' fruits/tree from 4 trees/program.

With the exception of the early Dikar program and the June Plictran applications in program 2, most miticides performed very well Table 1. The pink and petal fall applications of Carzol looked exceptionally good even through July. The late July-early August applications of Carzol was of dubious necessity in several programs at that time. Spotted tentiform leafminer was effectively controlled by the pink-petal fall Carzol applications while Thiodan was less effective and Guthion least effective Table 2. Tarnished plant bug injury was variable but in general Carzol appeared to provide some control. San Jose scale was found where the tree spacing was greatest (i.e. 40 ft rows) indicating that coverage was the factor responsible for their presence.

Table 1.

Program No.	Trt. & rate form./acre	May 14 ERM[1]	May 16	Mean no. mites and eggs/leaf: June 2 ERM	June 2 ERME	June 9 ERM	June 9 ERME	June 11	June 16 ERM	June 16 ERME	June 18	June 24 ERM	June 24 ERME
1	Dikar 77W 6 lb	2.0	Dikar 77W 6 lb	5.1	37.3	10.1	6.0	Kelthane EC 6 pt	4.6	7.7	Kelthane EC 6 pt	0.2	8.2
2	Dikar 77W 6 lb	2.0	Dikar 7W 6 lb	5.1	37.3	8.3	5.8	Plictran 50W 1 lb	2.2	2.9	Plictran 50W 4/5 lb	0.3	9.6
3		1.2		1.2	9.3	19.5	8.5	Kelthane EC 6 pt	5.3	3.3	Kelthane EC 6 pt	0.4	21.5
4		1.2		1.2	9.3	5.5	2.9	Plictran 50W 1 lb	1.2	3.3	Plictran 50W 4/5 lb	0.0	0.2
5	Plictran 50W 1 lb	0.5	Plictran 50W 1 lb	0.1	0.4	-	-		-	-			
6	Carzol 92SP 1 lb	0.1	Carzol 92SP 1 lb	0.0	0.1	-	-		-	-			
7	Carzol 92SP 2 lb	0.0	Carzol 92SP 2 lb	0.0	0.2	-	-		-	-			

[1]Adult ERM per blossom cluster, based on sampling 5 blossom clusters/tree from 4 trees/program.

Table 1. Continued.

	July 7		July 8	July 15	July 28		July 29	August 4	August 8		August 18	
	ERM	ERME			ERM	ERME			ERM	ERME	ERM	ERME
1	0.1	0.0			0.2	0.6	Carzol 92SP 1 lb	Carzol 92SP 1 lb	0.3	0.0	0.0	0.0
2	0.2	0.2			15.2	18.7	Carzol 92SP 1 lb	Carzol 92SP 1 lb	9.3	0.2	0.0	0.0
3	0.0	0.0			0.8	1.5	Carzol 92SP 1 lb	Carzol 92SP 1 lb	0.1	0.0	0.0	0.0
4	0.0	0.0			1.1	2.8	Carzol 92SP 1 lb	Carzol 92SP 1 lb	2.6	0.0	0.7	1.3
5	1.2	1.6	Kelthane EC 6 pt	Kelthane EC 6 pt	0.1	0.2			0.0	0.0	0.0	0.0
6					0.1	0.3	Carzol 92SP 1 lb	Carzol 92SP 1 lb	0.2	0.0	0.0	0.0
7					0.1	0.1	Carzol 92SP 1 lb	Carzol 92SP 1 lb	0.1	0.0	0.0	0.0

Table 2.

Treatments and rates/acre[1]		Mean no. mines/25 clusters	% Fruit injured	
May 3	May 16		San Jose scale	Tarnished plant bug
Guthion 50W 1 1/2 lb	Guthion 50W 1 1/2 lb	7.0	1.5	2.0
Guthion 50W 1 1/2 lb	Guthion 50W 1 1/2 lb	3.5	0.0	0.3
Thiodan 50W 4 lb	Guthion 50W 1 1/2 lb	2.0	0.5	1.3
Carzol 92SP 1 lb +Guthion 50W 1 1/2 lb	Carzol 92SP 1 lb +Guthion 50W 1 1/2 lb	0.3	0.0	0.8
Carzol 92SP 2 lb +Guthion 50W 1 1/2 lb	Carzol 92SP 2 lb + Guthion 50W 1 1/2 lb	0.0	0.0	0.5

[1]Additional insecticide treatments given in text.

APPLE: Malus sylvestris
Spotted tentiform leafminer: Phyllonorycter blancardella (F.)

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APPLE, SPOTTED TENTIFORM LEAFMINER PHEROMONE TRAPPING TRIAL, HIGHLAND, NY, 1980: Two trap designs were tested, the "delta" trap manufactured by Conrel Intern., Needham Heights, MA 02194, and the "sectar 1" trap manufactured by 3M Co., St. Paul, MN and distributed by Zoecon Corp., Palo Alto, CA 94304. The pheromone bait was (E)-10- dodecenyl acetate. Conrel Intern. supplied the bait in a controlled release strip while Wendell Roelofs laboratory, Geneva, NY, supplied the bait on an impregnated plastic cap. Treatments were replicated 5 times in a randomized complete block design with traps spaced 9 m within blocks and 9 m between blocks. Traps were deployed on August 10 and checked at 2-6 day intervals thereafter. Traps were rerandomized within each block following the trap counts.

The Conrel pheromone bait and "sectar 1" trap combination caught the most adult moths over the duration of the trial.

* *

Trap	Pheromone	Mean no. moths/trap 8/13	8/20	8/26	Mean/ counts
1. Delta	Geneva	7.8 c	17.6 b	5.4 b	10.3 c
2. Delta	Conrel	47.8ab	41.6a	11.4 b	33.6 b
3. Delta	-	1.0 c	0.0 c	0.0 b	0.3 c
4. Sectar	Geneva	14.4 bc	30.2ab	33.8a	26.1 b
5. Sectar	Conrel	65.8a	43.4a	37.0a	48.7a
6. Sectar	-	0.8 c	1.2 c	0.2 b	0.7 c

Means followed by same letter are not significantly different by Waller and Duncan's BSD test K = 100 (P = ca. .05).

APPLE: Malus sylvestris
Obliquebanded leafroller: Choristoneura rosaceana (Harris)

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APPLE, OBLIQUEBANDED LEAFROLLER PHEROMONE TRAPPING TRIAL, HIGHLAND, NY, 1980: Three trap designs were evaluated, the "delta" and "wing" traps manufactured by Conrel Intern., Needham Heights, MA 02194, and the "pherocon 1C" manufactured by Zoecon Corp., Palo Alto, CA 94304. The pheromone used was C11-14:Ac (7% trans). The Zoecon bait consisted of an impregnated rubber septum while the Conrel bait was a controlled release strip. The "Geneva" bait used for 2nd generation moth flight was obtained from Dr. Wendell Roelofs laboratory and consisted of an impregnated plastic cap. Traps for 1st generation were hung June 3 and checked at 4-7 days intervals until July 2. Traps were hung in a randomized complete block design with 5 replicates for each treatment. Traps were spaced 9 m apart within blocks with 18 m between blocks. Traps were hung 3 m from ground level in semi-dwarf (12 ft) apple trees. Treatments were rerandomized within blocks after each inspection date. Traps were hung Aug. 11 for 2nd generation flight in the same manner as for 1st generation.

More leafrollers were trapped during the 1st generation flight than during the 2nd. Both the Zoecon and Geneva pheromone baits caught more males than the Conrel bait during 1st and 2nd generation flights, respectively. No differences in trap captures were noted between different trap designs during 1st generation, while the pherocon design caught more during the 2nd generation flight.

Trap	Pheromone	Mean no. 1st generation adults/trap 6/10	6/16	6/20	6/26	7/2	Mean counts/ date
1. Delta	-	0.0 c	0.0 b	0.0 b	0.0 c	0.0 c	0.0 b
2. Delta	Conrel	0.4 bc	6.4ab	0.6 b	3.4abc	0.8 c	2.3ab
3. Delta	Zoecon	0.2 c	12.0a	7.0a	5.2abc	2.0 bc	5.3a
4. Wing	-	0.8 bc	0.0 b	0.0 b	0.4 c	0.0 c	0.2 b
5. Wing	Conrel	1.8ab	10.2a	3.2ab	2.0 bc	2.0 bc	3.8a
6. Wing	Zoecon	1.2abc	3.6ab	10.0a	9.2a	4.4ab	5.7a
7. Pherocon	-	0.4 bc	0.0 b	0.0 b	0.4 bc	0.0 c	0.2 b
8. Pherocon	Conrel	2.6a	5.4ab	2.6ab	2.6abc	1.0 c	2.8ab
9. Pherocon	Zoecon	0.4 bc	3.4ab	4.8ab	8.6ab	6.4a	4.7a

		Mean no. 2nd generation adults/trap 8/13	8/20	8/26	Mean counts/ date
1. Delta	-	0.0 b	0.0 c	0.0a	0.0 c
2. Delta	Geneva	0.6ab	1.2 c	1.2 b	1.0 bc
3. Delta	Conrel	0.0 b	0.2 c	0.0 b	0.1 c
4. Wing	-	0.0 b	0.0 c	0.0 b	0.0 c
5. Wing	Geneva	0.6ab	3.0 b	0.8 b	1.5 b
6. Wing	Conrel	0.0 b	0.0 c	1.4 b	0.5 bc
7. Pherocon	-	0.0 b	0.0 c	0.0 b	0.0 c
8. Pherocon	Geneva	1.2a	6.4a	5.6a	4.4a
9. Pherocon	Conrel	0.0 b	0.8 bc	0.6 b	0.5 bc

Means followed by same letter are not significantly different by Waller and Duncan's BSD test K = 100 (p = ca. .05).