

NOT FOR PUBLICATION

FRUIT INSECT AND MITE CONTROL STUDIES  
IN EASTERN NEW YORK  
DURING 1982

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Materials Tested

Advantage 4EC

Ambush 2E

Carzol 92SP

Cymbush 3EC

Dylox 80SP

FCR 1272 2EC

Guthion 50WP

Imidan 50WP

Kelthane 4F, 35WP

Larvin 3.2F

Mavrik 2EC

Oncol 50WP

Orthene 75SP

Pay-Off 2.5EC

Penncap 2FM

PBO 8EC

Plictran 50WP

Pydrin 2.4EC

SIR 8514 25WP

SLJ-0312 50WP

Superior oil 60 sec

Thiodan 50WP

Vydate 2L

FMC Corp.

ICI America, Inc.

NOR-AM Agric. Prod., Inc.

ICI America, Inc.

Mobay Chemical Corp.

Mobay Chemical Corp.

Mobay Chemical Corp.

Stauffer Chemical Co.

Rohm and Haas Co.

Union Carbide Corp.

Zoecon Corp.

Otsuka Chemical Co., Ltd.

Chevron Chemical Co.

American Cyanamid Co.

Pennwalt Corp.

Prentiss Drug & Chemical  
Co., Inc.

Dow Chemical Co.

Shell Development Co.

Mobay Chemical Corp.

Mobay Chemical Corp.

FMC Corp.

FMC Corp.

DuPont Co.

1982 WEATHER CONDITIONS - PERU, NY

Date	Temp.		Rain in
	Max	Min	
Apr. 1	50	34	
2	42	30	
3	46	30	.67
4	40	28	
5	35	11	
6	23	20	
7	26	20	
8	36	21	
9	48	26	
10	50	28	
11	52	38	.06
12	42	34	
13	51	32	.02
14	53	39	
15	59	28	
16	76	38	
17	78	54	.69
18	60	38	
19	66	34	
20	71	36	
21	61	42	.09
22	45	34	
23	68	35	
24	62	44	
25	83	53	
26	73	51	
27	68	55	.06
28	56	38	
29	63	32	
30	73	37	
TOTAL			1.59

May 1	69	52	
2	68	40	.04
3	64	42	
4	63	46	
5	70	38	
6	76	47	
7	87	60	
8	79	56	
9	57	54	1.15
10	61	44	
11	61	36	
12	67	46	
13	64	46	
14	64	44	
15	68	38	
16	73	48	
17	67	53	
18	74	45	
19	80	54	.92
20	78	61	
21	61	43	.10
22	69	38	
23	62	48	.01
24	56	50	
25	73	53	.03
26	82	52	

Date	Temp.		Rain in
	Max	Min	
27	84	56	
28	84	60	
29	79	64	
30	84	57	.06
31	74	67	
TOTAL			2.31

June 1	80	64	
2	73	60	1.66
3	66	58	
4	58	44	
5	65	50	
6	62	56	
7	73	53	.71
8	76	54	
9	82	51	
10	64	52	
11	71	60	
12	77	48	
13	66	53	
14	71	52	.02
15	76	50	
16	72	60	
17	75	58	
18	73	56	
19	84	56	
20	66	54	.27
21	66	52	
22	77	50	1.20
23	68	57	
24	75	53	
25	69	59	
26	75	60	.10
27	78	48	
28	82	56	
29	69	62	
30	76	58	.31
TOTAL			4.27

July 1	73	46	
2	76	56	
3	72	48	.17
4	75	44	
5	80	48	
6	86	56	
7	90	62	
8	89	70	
9	88	60	
10	81	62	
11	89	59	
12	88	70	.02
13	84	62	
14	84	57	
15	91	60	
16	90	64	
17	94	66	
18	96	73	.02
19	93	76	

Date	Temp.		Rain in
	Max	Min	
20	74	64	
21	82	50	
22	87	56	
23	83	68	
24	83	54	
25	88	60	
26	89	68	
27	84	54	
28	66	62	1.15
29	79	62	
30	82	59	
31	79	59	.72
TOTAL			2.08

Aug. 1	84	64	
2	57	53	1.47
3	72	51	.03
4	81	53	
5	71	61	
6	78	54	
7	85	54	
8	83	62	
9	80	64	.72
10	79	66	.01
11	78	58	
12	74	60	
13	71	56	.46
14	77	56	
15	84	62	
16	88	61	
17	82	70	.13
18	77	50	
19	79	58	
20	78	64	.15
21	60	41	
22	73	43	
23	71	55	.04
24	77	60	
25	63	58	1.43
26	82	56	.05
27	84	59	
28	66	44	
29	66	43	
30	74	44	
31	73	58	.08
TOTAL			4.57

Sept.	1	81	61	.01
	2	71	60	.10
	3	83	62	.23
	4	78	48	
	5	69	44	
	6	74	48	
	7	79	51	
	8	69	54	
	9	68	51	
	10	78	54	
	11	85	53	
	12	84	53	
	13	86	56	
	14	83	59	

1982 WEATHER CONDITIONS - PERU, NY

Date	Temp.		Rain in
	Max	Min	
Apr. 1	50	34	
2	42	30	
3	46	30	.67
4	40	28	
5	35	11	
6	23	20	
7	26	20	
8	36	21	
9	48	26	
10	50	28	
11	52	38	.06
12	42	34	
13	51	32	.02
14	53	39	
15	59	28	
16	76	38	
17	78	54	.69
18	60	38	
19	66	34	
20	71	36	
21	61	42	.09
22	45	34	
23	68	35	
24	62	44	
25	83	53	
26	73	51	
27	68	55	.06
28	56	38	
29	63	32	
30	73	37	
TOTAL			1.59

May 1	69	52	
2	68	40	.04
3	64	42	
4	63	46	
5	70	38	
6	76	47	
7	87	60	
8	79	56	
9	57	54	1.15
10	61	44	
11	61	36	
12	67	46	
13	64	46	
14	64	44	
15	68	38	
16	73	48	
17	67	53	
18	74	45	
19	80	54	.92
20	78	61	
21	61	43	.10
22	69	38	
23	62	48	.01
24	56	50	
25	73	53	.03
26	82	52	

Date	Temp.		Rain in
	Max	Min	
27	84	56	
28	84	60	
29	79	64	
30	84	57	.06
31	74	67	
TOTAL			2.31

June 1	80	64	
2	73	60	1.66
3	66	58	
4	58	44	
5	65	50	
6	62	56	
7	73	53	.71
8	76	54	
9	82	51	
10	64	52	
11	71	60	
12	77	48	
13	66	53	
14	71	52	.02
15	76	50	
16	72	60	
17	75	58	
18	73	56	
19	84	56	
20	66	54	.27
21	66	52	
22	77	50	1.20
23	68	57	
24	75	53	
25	69	59	
26	75	60	.10
27	78	48	
28	82	56	
29	69	62	
30	76	58	.31
TOTAL			4.27

July 1	73	46	
2	76	56	
3	72	48	.17
4	75	44	
5	80	48	
6	86	56	
7	90	62	
8	89	70	
9	88	60	
10	81	62	
11	89	59	
12	88	70	.02
13	84	62	
14	84	57	
15	91	60	
16	90	64	
17	94	66	
18	96	73	.02
19	93	76	

Date	Temp.		Rain in
	Max	Min	
20	74	64	
21	82	50	
22	87	56	
23	83	68	
24	83	54	
25	88	60	
26	89	68	
27	84	54	
28	66	62	1.15
29	79	62	
30	82	59	
31	79	59	.72
TOTAL			2.08

Aug. 1	84	64	
2	57	53	1.47
3	72	51	.03
4	81	53	
5	71	61	
6	78	54	
7	85	54	
8	83	62	
9	80	64	.72
10	79	66	.01
11	78	58	
12	74	60	
13	71	56	.46
14	77	56	
15	84	62	
16	88	61	
17	82	70	.13
18	77	50	
19	79	58	
20	78	64	.15
21	60	41	
22	73	43	
23	71	55	.04
24	77	60	
25	63	58	1.43
26	82	56	.05
27	84	59	
28	66	44	
29	66	43	
30	74	44	
31	73	58	.08
TOTAL			4.57

1982 WEATHER CONDITIONS - HUDSON VALLEY LABORATORY, HIGHLAND, NY

Date	Temp		Rain (in.)
	Max	Min	
Sept. 15	80	57	
16	79	56	.52
17	75	48	.02
18	64	42	
19	69	41	
20	66	44	
21	59	49	.20
22	64	52	.22
23	58	53	.44
24	65	48	.02
25	70	47	
26	72	46	
27	68	54	.56
28	68	51	.02
29	74	52	
30	67	52	
TOTAL			2.34

APPLE: Malus domestica  
Comstock mealy bug: Pseudococcus comstocki (Kuwana)  
European red mite: Panonychus ulmi (Koch)  
Rosy apple aphid: Dysaphis plantaginea (Passerini)  
San Jose scale: Quadraspidiotus perniciosus (Comstock)  
Tarnished plant bug: Lygus lineolaris (P. de B.)

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APPLE, PAYOFF EUP TRIAL, GLENCOE MILLS, NY, 1982: A 35-yr-old block of 'Cortland' and 'Lobo' apple cultivars was divided into six plots ranging in size from 3.4 - 8.7 acres. Three treatments were arranged in a randomized block design with two replicates. Treatments included: Payoff which was applied in pink (May 1), petal fall (May 21), and 4 cover sprays; Pydrin which was applied at pink only followed by a standard spray schedule; and a standard spray schedule relying predominately on Guthion. The trees were ca 18 ft tall and spaced 40 x 40 ft. Additional treatments applied over the block (and combined with the insecticides whenever possible) included: Captan 50WP 2.5 lb (all rates given are per acre), Manzate 80WP 1 lb, and Sulfur 90WP 4 lb on Apr 26, May 1, May 8, May 21, May 28, and Jun 8; Captan 80WP 2.5 lb and Manzate 80WP 1 lb on Jun 15 and Jul 1; Captan 80WP 2.5 lb on Jul 14, Jul 29, Aug 12 and Sep 4; Solubor 2 lb May 21, May 28 and Jun 8; Fruitone N.5 lb on May 25; and Etherol 3 pt on 'Lobo' only Aug 18. Treatments were applied at 20 or 30 gal/acre (20-100) with a model 5002 Agtec PTO powered sprayer at 2.0 mph. Rosy apple aphid was evaluated on Jun 28 by examining 25 fruit clusters/tree from 4 'Cortland' trees in each plot. European red mites were sampled by brushing 25 leaves/tree and various times throughout the season. The 'Lobo' cultivar was evaluated on Aug 26 for insect injury while the 'Cortland' cultivar was evaluated Sep 23.

Mite suppression was found in the Payoff plots during the period the treatment was being applied. After the Payoff was discontinued in the plots the mite population increased rapidly. San Jose scale was less in the Payoff plots than the other treatments but this may have been due to the differences in initial infestation levels throughout the plots at the initiation of the test. Coverage was also apparently a problem as seen in the different infestation levels between the top and bottom of the tree canopy. In addition, several of Guthion applications were below the recommended per acre rate for large trees. Tarnished plant bug injury was less in the two pyrethroid treatments than in the Guthion standard. The mealy bug infestation was more severe in the Payoff plots.

Treatment, rate form./acre  
and application dates

1. Payoff 2.5EC 8.0 oz May 1, 21, Jun 8, 22, Jul 14, 27  
Guthion 50WP 2.5 lb Aug 12, Sep 4  
Carzol 92SP 1.0 lb Aug 12 . . . . .
2. Pydrin 2.4EC 12.0 oz May 1  
Guthion 50WP 1.0 lb May 21, 28; 2.5 lb Jun 15, Sep 4; 1.6 lb Jul 1, 29;  
Plictran 50WP 0.5 lb May 21, 28, Jul 1, 29; Phosphamidon 8EC 8.5 oz Jun 8, 15;  
Lannate 1.8L 4.0 pt Jul 14 . . . . .
3. Guthion 50WP 1.0 lb May 1, 21, 28; 2.5 lb Jun 15, Sep 4; 1.6 lb Jul 1, 29;  
Plictran 50WP 0.5 lb May 21, 28, Jul 1, 29; Phosphamidon 8EC 8.5 oz Jun 8, 15;  
Lannate 1.8L 4.0 pt Jul 14 . . . . .

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Treatment	Mean no. rosy apple aphid infested clusters/25 <sup>a</sup>	% Infested fruit <sup>b</sup>			
		San Jose scale		Tarnished plant bug	
		Top	Bottom	Top	Bottom
1 . . . . .	0.5	5.5a	0.0a	0.3a	0.0a
2 . . . . .	1.1	14.1ab	0.4a	0.5ab	0.0a
3 . . . . .	2.4	25.0 b	2.9 b	1.1 b	0.0a

		% Injured fruit <sup>c</sup>		
		Tarnished plant bug	San Jose scale	Mealy bug
1 . . . . .	1.1a		0.0	7.6 b
2 . . . . .	1.5ab		0.0	0.6a
3 . . . . .	2.8 b		0.5	0.2a

	Mean no. mites or eggs/leaf <sup>d</sup>					
	June 28		July 30		August 10	
	ERM	ERME	ERM	ERME	ERM	ERME
1 . . . . .	0.0	0.3	1.4	33.1	22.8	46.9
2 . . . . .	0.8	7.2	0.3	6.5	0.3	1.6
3 . . . . .	1.5	10.7	0.2	4.8	0.9	3.6

<sup>a</sup>Based on sampling 25 'Cortland' fruit clusters/tree, 4 trees/block.

<sup>b</sup>Based on sampling 200 'Lobo' apples/tree, 100 from top, 100 from bottom, 4 trees/block.

<sup>c</sup>Based on sampling 100 'Cortland' apples/tree, 4 trees/block.

<sup>d</sup>Based on sampling 25 'Cortland' leaves/tree, 4 trees/block, ERM = European red mite.

APPLE: Malus domestica  
 European red mite: Panonychus ulmi (Koch)  
 Tarnished plant bug: Lygus lineolaris (P. de B.)  
 Woolly apple aphid: Eriosoma lanigerum (Hausmann)

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APPLE, PYRETHROID INSECTICIDE TRIALS, PERU, NEW YORK, 1982: Several insecticides were applied at the pink stage of 'McIntosh' bud development on May 8 in 2 2/3 acre plots replicated twice for each treatment, except Payoff, which was applied to an unreplicated 6 1/4 acre block on a seasonal basis. Trees were 53-yr-old 'McIntosh' trees spaced 40 x 40 ft except in the Payoff block which were 24-yr-old and spaced 40 x 24 ft. Treatments were applied with a Bean model 502 speed sprayer at 2 1/2 - 3 mph using 67 gal/acre (6X) except in the Payoff block where 80 gal/acre (5X) was used. Additional treatments applied over the entire block and combined with the insecticides whenever spray dates coincided, included: (Applications with A behind date indicate applied as an Alternate row spray, all rates are amount formulation/acre) Dichlone 50WP 3/8 lb May 9A, 10A; Sulfur 95WP 4 1/2 lb May 9A, 10A, 27; Cyprax 65WP 1/2 lb May 20A, 21A, Jun 3A, 6A; Captan 80WP 4 lb May 27, 1 lb Jun 7A, 22, Jul 9, Aug 19A; Urea 2 lb May 27; Benlate 50WP 3 oz Jun 7A; & Solubor 4 lb Jun 22. Mite counts were made from the plots throughout the season. Treatments were evaluated for insect injury on Sep 23 by sampling 100 apples from each plot. A hailstorm which occurred Jun 22 damaged much of the fruit making the injury difficult to evaluate.

Moderate suppression of the mite population was found with the Payoff treatment, but numbers increased rapidly after the material was discontinued. Pydrin provided the best control of tarnished plant bug, which was the only insect responsible for visible fruit injury at harvest. Woolly apple aphid colonies were observed on sucker growth in all plots but the infestation was greater in the Payoff block than in the other treatment blocks.

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 Treatment, rate form./acre, and application dates

1. Payoff 2.5EC 8.0 oz May 8, 27, June 10, 22, Jul 9, 19; Carzol 92SP 1.0 lb Aug 18 . . . . .
  2. Pydrin 2.4EC 10.6 oz May 8; Guthion 50WP 1.3 lb May 27, Jun 10, 22, Jul 9, 19, Aug 5, 19; Carzol 92SP 1.0 lb May 27, Jul 19; Phosphamidon 8EC 8.0 oz Jul 9 . . . . .
  3. Thiodan 50WP 4.0 lb May 8; Guthion 50WP 1.3 lb May 27, Jun 10, 22, Jul 9, 19, Aug 5, 19; Carzol 92SP 1.0 lb May 27, Jul 19; Phosphamidon 8EC 8.0 oz Jul 9 . . . . .
  4. Guthion 50WP 1.3 lb May 27, Jun 10, 22, Jul 9, 19, Aug 5, 19; Carzol 92SP 1.0 lb May 27, Jul 19; Phosphamidon 8EC 8.0 oz Jul 9 . . . . .
- \* \* \* \* \*

Treatment	% TPB damaged fruit <sup>a</sup>	Mean no. mites or eggs/leaf <sup>b</sup>							
		May 26		Jun 9		Jul 12		Aug 13	
		ERM	ERME	ERM	ERME	ERM	ERME	ERM	ERME
1 . . . . .	1.9	1.3	1.8	0.7	1.5	0.7	1.2	5.7	17.7
2 . . . . .	0.8	0.2	0.4	0.0	0.1	1.7	0.7	0.3	1.5
3 . . . . .	1.6	1.6	4.4	0.0	0.0	2.1	1.1	1.1	6.8
4 . . . . .	2.1	0.2	0.2	0.0	0.0	0.1	0.1	0.0	0.8

<sup>a</sup>Based on examining 100 'McIntosh' fruits/tree, 4 trees/plot, 2 replicate plots for all treatments except Payoff. TPB = tarnished plant bug.

<sup>b</sup>Counts obtained from brushing 25 leaves/tree, 4 'McIntosh' trees/plot, one replicate/treatment. ERM = European red mite.

APPLE: Malus domestica

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

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APPLE, TARNISHED PLANT BUG CONTROL, MARLBORO, NY, 1982: A 6 acre block of 'Rome' and 'Golden Delicious' apple trees was divided into 3 unreplicated 2 acre plots. One plot received a pink (May 3) application of Pydrin, another Thiodan, while the 3rd was left untreated as a check. Trees were spaced 35 x 35 ft and were ca 17 ft in height. An adjacent block of semidwarf 'Spartan' and 'McIntosh' trees 17-yrs-old, spaced 16 x 27 ft, ca 14 ft in height were divided in 3 plots ranging in size from .9 - 2.7 acres and these plots received the previously mentioned treatments on the same date. Biweekly applications of Guthion 50WP 2.0 lb/acre plus Manzate 200 80WP 6 lb/acre or Captan 50WP 6 lb/acre, were applied during the remainder of the season. All treatments were applied with a Bean model 707 speed sprayer using 100 gal/acre (4X) at a speed of 2.75 mph. The fruit was evaluated for insect injury on Sep 13 by examining 100 apples/tree from 5 trees/plot.

Pydrin reduced tarnished plant bug injury while differences were noted between the check and Thiodan standard only in the Rome block.

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Treatment and rate form./acre	% Tarnished plant bug injury	
	'Rome'	'Spartan'
Pydrin 2.4EC 10.6 oz	0.6	0.0
Thiodan 50WP 4.0 lb	2.2	3.4
Check	4.2	3.0

APPLE

European red mite: Panonychus ulmi (Koch)  
Tarnished plant bug: Lygus lineolaris (P. de B.)  
Twospotted spider mite: Tetranychus urticae Koch  
Spotted tentiform leafminer: Phyllonorycter blancardella  
(Fabr.)  
White apple leafhopper: Typhlocyba pomaria McAtee

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APPLE, PAYOFF EUP TRIAL, MARLBORO, NY, 1982: A 25-yr-old block of 'Red Delicious' apple trees was divided into a 5 acre portion treated on a seasonal basis with Payoff, a 1.1 acre portion treated with a standard seasonal insecticide program, and a 0.8 acre portion in which the pink insecticide spray was omitted but the standard program was applied during the remainder of the season. Spacing varied throughout the block from 36 x 18 ft to 30 x 27 ft, while tree height varied from 16-18 ft. With the exception of an early (1/2" green stage Apr 24) oil application and an earlier (Apr 16) Glyodex fungicide application using 200 gal/acre (2X), all other applications were applied using 100 gal/acre (4X) with a Bean model 707 speed sprayer traveling 2.75 mph. Additional materials applied over all plots in combination with the insecticide treatments included: Manzate 200 80WP 6 lb/acre May 3 and 7; Dikar 77% WP 6 lb/acre May 18, 25, 28, Jun 9, 21, Jul 7, 23; and Captan 50WP 6 lb/acre Aug 5 and 21. White apple leafhopper and spotted tentiform leafminer were evaluated Jul 19, fruit was rated for insect injury on Sep 13, and mite counts were made periodically throughout the summer.

Payoff sprays effectively controlled both white apple leafhopper and spotted tentiform leafminer. The Thiodan pink application appeared to reduce the levels of the former pests by ca 50%. Tarnished plant bug injury was the only insect injury found and Payoff was the only treatment in the trial which reduced this injury. The Payoff + Dikar combination suppressed mites until both materials were discontinued. Much of the suppression was apparently due to the Dikar since mites increased rather slowly in the comparison plots where Dikar was used. The Carzol application controlled European red mite but was less effective against twospotted spider mites.

Treatment, rate form./acre  
and application dates

1. Payoff 2.5EC 8.0 oz May 3, 18, 28, Jun 21, Jul 7, 23; Pennncap 2M 4.0 pt Aug 5, 21; Carzol 92SP 2.0 lb Aug 5; Omite 6EC 2.0 pt Aug 21 . . . . .
2. Thiordan 50WP 4.0 lb May 3; Guthion 50WP 1.5 lb May 18, 28, Jun 9, Aug 5, 21; Pennncap 2FM 4.0 pt Jun 21, Jul 7, 23; Carzol 92SP 1.0 lb Jul 23, Aug 5; Vydate 2L 2.0 pt Jul 23, Aug 5 . . . . .
3. Guthion 50WP 1.5 lb May 18, 28, Jun 9, Aug 5, 21; Pennncap 2FM 4.0 pt Jun 21, Jul 7, 23; Carzol 92SP 1.0 lb Jul 23, Aug 5; Vydate 2L 2.0 pt Jul 23, Aug 5 . . . . .

Treatment	Mean no. WALH nymphs/25 clusters <sup>a</sup>	Mean no. STLM mines/25 clusters <sup>a</sup>	% TPB damaged fruit <sup>b</sup>
1 . . . . .	0.0	3.0	0.0
2 . . . . .	8.3	12.5	1.2
3 . . . . .	17.3	28.5	1.4

	Mean no. mites or eggs/leaf <sup>c</sup>									
	July 2		July 21				Aug 9			
	ERM	ERME	ERM	ERME	TSM	TSME	ERM	ERME	TSM	TSME
1 . . . . .	0.2	1.9	4.3	28.4	3.7	3.1	0.0	12.5	1.1	2.3
2 . . . . .	1.3	4.3	7.5	38.0	0.2	0.2	0.1	2.6	0.0	0.2
3 . . . . .	2.0	8.1	4.5	24.1	3.4	10.6	0.1	2.6	0.1	0.3

<sup>a</sup>Based on examining all leaves on 25 'Red Delicious' fruit clusters/tree, 4 trees/treatment, on Jul 19. WALH = White apple leafhopper, STLM = Spotted tentiform leafminer.

<sup>b</sup>Based on examining 100 'Red Delicious' fruits/tree, 5 trees/treatment, on Sep 13. TPB = Tarnished plant bug.

<sup>c</sup>Based on brushing 25 'Red Delicious' leaves/tree from 4 trees/treatment. ERM = European red mite, TSM = Twospotted spider mite.

APPLE: Malus domestica

European red mite: Panonychus ulmi (Koch)

Comstock mealybug: Pseudococcus comstocki (Kuwana)

San Jose scale: Quadraspidiotus perniciosus (Comstock)

Spotted tentiform leafminer: Phyllonorycter blancardella  
(Fabr.)

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

Twospotted spider mite: Tetranychus urticae Koch

R.W. Weires

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APPLE, PAYOFF EUP TRIAL, CLINTONDALE, NY, 1982: A 30-yr-old block of 'McIntosh' and 'Red Delicious' cultivars, 18-20 ft high, and spaced 20 x 40 ft, was divided into 2 blocks each 3 acres in size. Part of the block received Imidan (treatment 1) the other Payoff (treatment 2) on a seasonal basis. An adjacent 20-yr-old block of 'Spartan' and 'Red Delicious' cultivars, 14-16 ft high, and spaced 18 x 36 ft, was divided into 2 blocks each 2 acres in size. Again, part received Imidan (treatment 3) the other Payoff (treatment 4). Treatments were applied with either a Myers model A36 airblast sprayer or a Bean model 477CP speedsprayer traveling at 2 1/2 mph and delivering 100 gal/acre (4X). Additional treatments applied over the entire block and combined with the insecticides when possible included: Manzate 200 80WP 6.0 lb Apr 20, 26, 2.5 lb May 2, 18, 19, 26, Jun 3, 9, 23; Superior oil 8 gal Apr 24; Benlate 50WP 6.4 oz May 2, 8, 19, 26, Jun 3, 9, 23; Solubor 1.5 lb May 26, Jun 9; Epsom salts (omitted from Payoff plots) 20 lb Jun 9, 23; and Captan 50WP 3.0 lb Jul 8, 22, Aug 7, 22. Spotted tentiform leafminer was evaluated Jul 19 by counting the number of leaves with mines on all the leaves of 25 fruit clusters. Insect injury on the fruit was evaluated by examining 100 fruits from the top and 100 fruits from the bottom of each tree, 4 trees per plot. 'McIntosh' and 'Spartan' cultivars were evaluated Aug 24 while the 'Red Delicious' were evaluated Sep 17. Mealybugs were evaluated on Sep 21 from 'McIntosh' and 'Red Delicious' cultivars by examining 100 fruits/tree, 4 trees/plot. Mites were sampled by brushing 25 'Red Delicious' leaves/tree from 4 trees/plot at periodic intervals throughout the summer.

During the Jul 16 mite evaluation it was observed that the calyx end of many of the apples was covered with a sticky secretion in which a sooty mold fungus was growing. The problem was worse in the Payoff blocks and it was assumed that it was due to wooly apple aphids, which were building-up in the block. On closer examination it was found to be due to mealybugs and the plots were rated, indicating that Payoff was responsible for the problem possibly through natural enemy elimination or lack of efficacy. San Jose scale control was similar in both treatments with most of the scale found in the tops of the trees and only in the blocks having the tallest trees, indicating that coverage was probably responsible for the problem. Tarnished plant bug injury was more evenly distributed throughout the trees and, with the exception of the 'Spartan' cultivar, was more prevalent in the Imidan plots than in the Payoff plots. The early oil application provided rather good early season mite control while during the summer some mite suppression was noted with the Payoff treatment.

Treatment, rate form./acre, and application dates

1. Imidan 50WP 4 lb May 2, 19, Jun 3, 23, Jul 8, 22, Aug 7, 22; Phosphamidon 8EC 1 pt Jun 3; Vydate 2L 3.2 pt Jul 22 . . . . .
2. Payoff 2.5EC 7.2 oz May 2, 19, Jun 3, 23, Jul 8, 22; Guthion 50WP 1.5 lb Aug 7, 22; Plictran 50WP 0.8 lb Aug 7 . . . . .
3. Imidan 50WP 4 lb May 2, 19, Jun 3, 23, Jul 8, 22, Aug 7, 22; Phosphamidon 8EC 1 pt Jun 3; Plictran 50WP 0.8 lb Jun 23, Jul 8; Vydate 2L 3.2 pt Jul 22 . . . . .
4. Payoff 2.5EC 7.2 oz May 2, 19, Jun 3, 23, Jul 8, 22; Guthion 50WP Aug 7, 22; Carzol 92SP 1.0 lb Jul 22 . . . . .

Treatment	% mealybug infested fruit		% San Jose scale infested fruit					
			'Red Delicious'		'McIntosh'		'Spartan'	
	'Red Delicious'	'McIntosh'	Top	Bottom	Top	Bottom	Top	Bottom
1 . . . . .	1.8	2.0	0.5	0.3	3.3	0.0	-	-
2 . . . . .	17.0	15.0	0.0	0.3	2.0	0.5	-	-
3 . . . . .	0.3	-	-	0.0	-	-	0.0	0.0
4 . . . . .	12.8	-	-	0.0	-	-	0.0	0.0

	% tarnished plant bug injured fruit						Mean no. STLM mined leaves/25 clusters
	'Red Delicious'		'McIntosh'		'Spartan'		
	Top	Bottom	Top	Bottom	Top	Bottom	
1 . . . . .	1.0	1.5	0.8	2.3	-	-	26.3
2 . . . . .	0.3	0.0	0.3	0.8	-	-	0.3
3 . . . . .	-	0.5	-	-	0.8	0.3	24.0
4 . . . . .	-	0.3	-	-	0.8	0.3	0.5

Treatment	Mean no. mites or eggs/leaf									
	Jun 24		Jul 16				Jul 28		Aug 9	
	ERM	ERME	ERM	ERME	TSM	TSME	ERM	ERME	ERM	ERME
1 . . . . .	0.0	0.4	2.9	26.3	0.2	2.0	0.3	2.7	0.0	4.9
2 . . . . .	0.0	0.0	0.2	0.9	0.0	0.1	0.2	0.9	0.1	7.0
3 . . . . .	0.7	16.7	4.1	22.1	0.0	0.0	0.0	10.1	0.1	4.7
4 . . . . .	0.1	11.9	2.0	22.1	0.7	2.8	0.3	6.7	0.1	4.0

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

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APPLE, TARNISHED PLANT BUG CONTROL, WALDEN, NY, 1982: Three treatments were arranged in a randomized block design with 3 replicates, one replicate consisting of plots 0.3 acre in size containing Law 'Romes' planted in 1969, while the other 2 replicates contained plots 0.7 - 1.1 acres in size of regular 'Romes' planted in 1963. All trees were spaced 15 x 20 ft. Treatments were applied May 3 at the early pink stage of development with a Cardox model 115 airblast sprayer traveling at 2.5 mph and delivering 200 gal/acre (2X). Additional treatments applied over the entire block included: Manzate 200 80WP 6 lb/acre Apr 26, 3.6 lb May 3, 7A (indicates alternate row application); Benlate 50WP 0.5 lb May 3, 7A; Dikar 8 lb May 20A, 21A, 27A, Jun 2A, 9A, 15A, 22A, 30A, Jul 2A, 6 lb Jul 14A, 29 Aug 5A, 13A; Phosphamidon 8EC 0.6 qt May 21A, Jun 2A, 22A, 30A, Jul 2A; Guthion 50WP 2 lb May 20A, 21A, 27A, Jun 2A, 22A, 30A, Jul 2A, 14A, 29, Aug 5A, 13A; Carzol 92SP 1.5 May 21A, 27A; Jul 14A; Epsom salts 14 lb Jun 2A, 9A; Solubor 4 lb Jun 2A, 9A; Vydate 2L 0.8 gal Jul 29; Plictran 50WP 2.5 lb Jul 29; Zineb 3 lb Aug 5A, 13A, 26A; Kelthane 35% EC 3.2 pt Aug 5A, 6A, 6.4 pt Aug 13A, 26A, 31A; Alar 65WP 3.6 lb Aug 12; PennCap 2M 8 pt Aug 26A; and Captan 50WP 3 lb Aug 26A. Treatments were evaluated for insect injury by examining 100 apples/tree from 4 trees in each plot on Sep 22.

Tarnished plant bug injury was the only injury found in the plots. Control of tarnished plant bug was greater in the Pydrin block than in the Thiodan standard or the check.

\*\*\*\*\*

Treatment and oz formulation/acre	Application date	% Tarnished plant bug damaged fruit
Pydrin 2.4EC 10.6	May 3	1.0
Thiodan 50WP 64.0	May 3	5.9
Check		5.9

*Tellur. Oct. 19th.  
harrow reg. Romes  
Dec 20 packed out reg.  
Dec. 17 packed out few Romes*

APPLE: Malus domestica

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Apple aphid: Aphis pomi DeGeer

Rosy apple aphid: Dysaphis plantaginea (Passerini)

Codling moth: Laspeyresia pomonella (L.)

Plum curculio: Conotrachelus nenuphar (Herbst)

San Jose scale: Quadraspidiotus perniciosus (Comstock)

Variegated leafroller: Platynota flavedana (Clemens)

European apple sawfly: Hoplocampa testudinea (Klug)

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

White apple leafhopper: Typhlocyba pomaria McAtee

Comstock mealybug: Pseudococcus comstocki (Kuwana)

Spotted tentiform leafminer: Phyllonorycter blancardella (Fabr.)

a green fruitworm: Orthosia hibisci Guenee

APPLE, INSECT CONTROL, HUDSON VALLEY, HIGHLAND, NEW YORK, 1982: Treatments were applied to 8 tree plots replicated 3 times in a randomized complete block design. Treatments were applied at pink, May 4, petal fall, May 17, 18, and in 5 cover sprays, Jun 3, 22, Jul 9, 23, and Aug 12, using a high-pressure handgun sprayer at 400 psi delivering 4.2 gal spray/tree (403 gal/acre) dilute to runoff. Trees were 18-yrs-old, ca 12 ft high, on EM2 rootstock, and spaced 15 x 30 ft. Orthene treatments were only applied during the first 3 sprays, Guthion being used in the plots the remainder of the season. Ambush was only applied during the first 2 sprays, Cymbush being applied during the remaining sprays. Plictran 50WP at 8 oz formulation/100 gal was applied Jul 9 with all treatments except SIR 8514, Payoff, and FCR 1272. SLJ 0312 50WP at 8.0 oz formulation/100 gal was applied Jul 9 with the FCR 1272 treatment. Vanguard 10WP 7.5 oz/acre was applied May 3, 27, and Jul 7 while Rubigan IEC 9.0 oz/acre was applied Jun 15 over the entire block with an airblast sprayer at 4X (100 gal/acre) concentration. Thinning sprays were applied dilute by handgun using from 5-15 ppm of Naphthaleneacetic acid (depending upon the cultivar) on May 26. The weather was dry through the bloom period but June was unusually wet while August was cooler than normal. Pest populations were at normal levels throughout the season. Insect damage was assessed by examining 100 fruits/cultivar/plot from 'McIntosh' Sep 14, 'Cortland' Sep 17, 'Empire' Sep 24, and 'Golden Delicious' Sep 28, cultivars.

All materials, except the SIR 8514 and the Guthion standard, provided excellent control of both rosy apple aphid and apple aphid. All materials except Oncol and Guthion controlled the spotted tentiform leafminer, however Orthene was discontinued prior to 2nd brood activity and no conclusions can be made concerning its effectiveness. SIR 8514 and Guthion were the only materials which did not control White apple leafhopper. All materials provided good control of fruit feeding lepidoptera, including codling moth, fruitworm, and leafrollers. SIR 8514 did not control Plum curculio, tarnished plant bug, sawfly, or San Jose scale, whereas most other materials did. In general, fruit finish was quite poor this year, probably due to the 9.0 inches of rainfall received in early June. An outbreak of the comstock mealybug was found in the Payoff treatment and significantly more apples in this treatment had their calyx end covered with a sooty mold fungus growing on the honeydew-like exudate produced by this pest.

Treatment and oz form./100 gal	Mean no. aphid infested terminals/25			Mean No.	Mean No.
	Rosy apple aphid	Apple aphid		STLM* mines	WALH**
	Jun 10	Jun 10		25 clusters	nymphs
	'Golden Del.'	'McIntosh'	'Cortland'	Aug 16 'McIntosh'	25 clusters Aug 16 'Greening'
Oncol 50WP 4.0	0.7a	0.3a	0.3a	36.3 b	0.0a
Oncol 50WP 8.0	0.0a	0.0a	0.7a	38.3 b	0.0a
FCR 1272 2EC 1.2	0.0a	0.0a	0.0a	0.0a	0.0a
SIR 8514 25WP 6.8	9.3 c	15.3 d	16.0 c	0.0a	62.7a
SIR 8514 25WP 12.0	7.3 bc	15.0 d	13.7 bc	0.0a	63.3 c
Pennicap 2M 8.0					
+Ambush 2EC 3.2	0.0a	0.0a	0.0a	0.0a	0.0a
Orthene 75SP 4.0					
Guthion 50WP 8.0	0.0a	3.7ab	1.0a	29.0 b	0.0a
Orthene 75SP 8.0					
Guthion 50WP 8.0	0.0a	0.3a	0.0a	24.0 b	0.3a
Pay-Off 2.5EC 2.0	0.0a	0.0a	0.0a	0.0a	0.0a
Ambush 2EC 3.2					
Cymbush 3EC 1.7	0.0a	1.3ab	0.0a	0.3a	0.0a
Guthion 50WP 8.0	6.3 bc	5.7 bc	10.0 b	22.7 b	10.7ab
Check	4.0ab	10.0 c	15.0 c	28.0 b	19.0 b

Means followed by the same letter are not significantly different by Waller and Duncan's BSD test, K= 100 (P= ca 0.05).

\*STLM = Spotted tentiform leafminer; \*\*WALH = White apple leafhopper.

\*\*\*\*\*

Treatment and oz form./100 gal	% injured fruit			
	Plum curculio	Tarnished plant bug	European apple sawfly	Green fruitworm
Oncol 50WP 4.0	1.6a	4.0ab	0.0a	0.1a
Oncol 50WP 8.0	0.6a	4.0ab	0.0a	0.0a
FCR 1272 2EC 1.2	0.1a	3.1a	0.3a	0.0a
SIR 8514 25WP 6.8	44.9 b	8.2 cd	1.0 b	0.0a
SIR 8514 25WP 12.0	48.3 b	7.6 bcd	1.5 b	0.1a
Pennicap 2M 8.0				
+Ambush 2EC 3.2	0.2a	2.4a	0.0a	0.0a
Orthene 75SP 4.0				
Guthion 50WP 8.0	2.2a	9.1 d	0.1a	0.0a
Orthene 75SP 8.0				
Guthion 50WP 8.0	1.6a	4.8abc	0.0a	0.0a
Pay-off 2.5EC 2.0	1.8a	4.2ab	0.0a	0.0a
Ambush 2EC 3.2				
Cymbush 3EC 1.7	0.3a	3.7ab	0.1a	0.0a
Guthion 50WP 8.0	2.0a	4.9abc	0.0a	0.0a
Check	52.4 b	10.6 d	1.3 b	1.3 b

Means followed by the same letter are not significantly different by Duncan's Multiple Range Test, P= 0.05.

Treatment and oz form./100 gal	Codling moth	San Jose scale	VLR*	% Clean fruit	Mean russet rating/ apple**	Comstock mealybug
Oncol 50WP 4.0 .....	0.3a	0.3a	0.3a	92.3a	1.4	0.1a
Oncol 50WP 8.0 .....	0.1a	0.1a	0.3a	95.2a	1.3	0.4a
FCR 1272 2EC 1.2 .....	0.0a	0.0a	0.0a	96.6a	1.4	0.3a
SIR 8514 25WP 6.8 .....	0.3a	17.1 b	0.2a	41.3 b	1.1	5.2a
SIR 8514 25WP 12.0 .....	0.2a	8.4ab	0.3a	40.1 b	1.1	1.1a
Pennacap 2M 8.0						
+Ambush 2EC 3.2 .....	0.1a	0.0a	0.0a	97.3a	1.3	0.6a
Orthene 75SP 4.0						
Guthion 50WP 8.0 .....	0.0a	0.3a	0.0a	88.8a	1.2	1.1a
Orthene 75SP 8.0						
Guthion 50WP 8.0 .....	0.0a	0.1a	0.0a	93.3a	1.1	0.1a
Pay-Off 2.5EC 2.0 .....	0.0a	0.5a	0.0a	93.7a	1.2	22.4 b
Ambush 2EC 3.2						
Cymbush 3EC 1.7 .....	0.1a	0.1a	0.0a	96.0a	1.0	0.1a
Guthion 50WP 8.0 .....	0.0a	0.3a	0.1a	93.7a	1.3	0.8a
Check .....	10.9 b	4.2a	0.8 b	41.2 b	1.1	7.2a

Means followed by the same letter are not significantly different by Duncan's Multiple Range Test, P= 0.05.

\*VLR = Variegated leafroller.

\*\*Based on 0 (best) - 3 (worst) rating of finish on 'Golden Delicious' cultivar.

APPLE: Malus domestica

Rosy apple aphid: Dysaphis plantaginea (Passerini)

Spotted tentiform leafminer: Phyllonorycter blancardella  
(Fabr.)

San Jose scale: Quadraspidiotus perniciosus (Comstock)

European apple sawfly: Hoplocampa testudinea (Klug)

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

White apple leafhopper: Typhlocyba pomaria McAtee

Plum curculio: Conotrachelus nenuphar (Herbst)

Codling moth: Laspeyresia pomonella (L.)

Variegated leafroller: Platynota flavedana (Clemens)

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APPLE, EARLY SEASON INSECT CONTROL, HIGHLAND, NY, 1982: Several treatments were evaluated for different pests. Advantage was applied for San Jose scale control whereas most other treatments were evaluated for early season control of tarnished plant bug, plum curculio, and other pests present at this time. Materials were applied either at pink, May 1, or petal fall May 17, or in cover sprays timed for San Jose scale crawler emergence. Materials were also evaluated as miticides and additional applications were made in response to mite populations. Materials were applied by handgun sprayer at 400 psi, using 4.2 gal/tree (403 gal/acre). Treatments were applied to 8 tree plots replicated 3 times in a randomized complete block design. Trees were 18-yrs-old, ca 12 ft high, and spaced 15 x 30 ft. Additional sprays over the entire block included Rubigan IEC 9.0 oz/acre on May 3, 27, and Jul 7, while Vanguard IOWP 7.5 oz/acre was applied Jun 15, all by airblast sprayer at 4X (100 gal/acre) concentration. Thinning sprays of from 5-15 ppm of naphthaleneacetic acid were applied May 26. Insect damage was evaluated on Jun 2 by sampling 50 fruits/tree from one 'McIntosh' and one 'Cortland' tree in each plot. Injury was also evaluated at harvest by sampling 100 'McIntosh' fruits on Sep 15, and 100 'Golden Delicious' fruits on Sep 28. The rosy apple aphid was evaluated on Jun 7, white apple leafhopper nymphs were counted Aug 19, and spotted tentiform leafminer mines were also counted on Aug 19. June was unusually wet while August was unusually cool.

The pyrethroids, Pydrin and Mavrik, gave good control of rosy apple aphid, as did the high rate of Larvin and the Advantage-oil combination. The pyrethroids gave good spotted tentiform leafminer control, as well as controlling the white apple leafhopper. Advantage and the 3 Carzol applications also controlled white apple leafhopper. Plum curculio and tarnished plant bug control was better with the Larvin and the pyrethroid treatments. The pink + petal fall applications of Carzol, and to a lesser extent the Dylox treatments, also gave some plant bug control. San Jose scale results were erratic but the pyrethroids, Advantage, high rates of Larvin and Dylox, and the pink-petal fall Carzol, plots all had fewer scale on the fruit. The Dylox treatments injured the leaves, some of which turned yellow and dropped. Russet was also more prevalent in the Dylox treatment (high rate) possibly in response to the petal fall application.

Treatment & oz form./100 gal	Dates of application	Mean no. infester clusters/25		Mean no. mines/25 clusters
		Rosy apple aphid	White apple leafhopper	
Carzol 92SP	4.0 May 1			
	6.0 Jul 15 .....	16.7 b	10.3a	38.0 g
Carzol 92SP	4.0 May 17			
	6.0 Jul 15 .....	3.7ab	11.7a	12.7abc
Carzol 92SP	4.0 May 1,17			
	6.0 Jul 15 .....	3.0ab	0.3a	17.3 bcd
Dylox 80SP	16.0 May 1,17			
Kelthane 35WP	18.3 Jun 25, Jul 15 .....	9.3ab	13.3a	52.0 g
Dylox 80SP	32.0 May 1,17			
Kelthane 4F	12.0 Jun 25, Jul 15 .....	6.3ab	11.3a	16.0 bcd
Larvin 3.2F	10.0 May 1,17			
Kelthane 35WP	18.3 Jun 25, Jul 15 .....	9.3ab	14.7a	29.3 def
Larvin 3.2F	20.0 May 1,17			
Kelthane 4F	12.8 Jun 25, Jul 15 .....	0.0a	9.3a	20.0 cde
Pydrin 2.4EC	2.6 May 1, Jun 25, Jul 15			
PBO 8EC	10.4 Jun 25			
	3.2 Jun 15 .....	0.0a	0.0a	0.0a
Mavrik 2EC	1.6 May 1, Jun 25, Jul 15 ....	0.0a	0.0a	4.3ab
Advantage 4EC	8.0 Jun 25, Aug 11			
Plictran 50WP	4.0 Jun 25			
	6.0 Jul 15 .....	6.0ab	0.3a	32.3 cd
Advantage 4EC	8.0 Apr 23, Jun 25, Aug 11			
Superior oil	128.0 Apr 23			
Plictran 50WP	4.0 Jun 25			
	6.0 Jul 15 .....	0.0a	0.3a	19.7 cde
Check .....		6.7ab	34.7 b	28.7 def

Means followed by the same level are not significantly different by Duncan's Multiple Range Test,  $p = 0.05$ .

## EAST BLOCK

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## % Injured fruit

Treatment & oz form./100 gal	Dates of application	% Injured fruit			
		Plum curculio		Tarnished plant bug	
		Jun 2	Harvest	Jun 2	Harvest
Carzol 92SP 4.0	May 1				
	6.0 Jul 15	10.6ab	20.0abc	3.3 bc	4.0ab
Carzol 92SP 4.0	May 17				
	6.0 Jul 15	20.6 b	20.0abc	5.3 c	10.7 d
Carzol 92SP 4.0	May 1, 17				
	6.0 Jul 15	7.3ab	16.0ab	1.7ab	4.2ab
Dylox 80SP 16.0	May 1, 17				
Kelthane 35WP 18.3	Jun 25, Jul 15	5.3a	7.3a	1.3ab	3.7ab
Dylox 80SP 32.0	May 1, 17				
Kelthane 4F 12.0	Jun 25, Jul 15	2.6a	11.2ab	1.0ab	4.7abc
Larvin 3.2F 10.0	May 1, 17				
Kelthane 35WP 18.3	Jun 25, Jul 15	1.3a	7.0a	0.3a	2.2a
Larvin 3.2F 20.0	May 1, 17				
Kelthane 4F 12.8	Jun 25, Jul 15	0.0a	4.0a	0.7ab	2.0a
Pydrin 2.4EC 2.6	May 1, Jun 25, Jul 15				
PBO 8EC 10.4	Jun 25				
	3.2 Jul 15	3.3a	14.0ab	1.7ab	1.5a
Mavrik 2EC 1.6	May 1, Jun 25, Jul 15	4.6a	10.8ab	1.7ab	4.0ab
Advantage 4EC 8.0	Jun 25, Aug 11				
Plictran 50WP 4.0	Jun 25				
	6.0 Jul 15	5.7a	26.7 bc	2.3ab	9.0 cd
Advantage 4EC 8.0	Apr 23, Jun 25, Aug 11				
Superior oil 128.0	Apr 23				
Plictran 50WP 4.0	Jun 25				
	6.0 Jul 15	7.0ab	13.0ab	2.3ab	4.0ab
Check		19.7 b	33.7 c	2.3ab	7.8 bcd

Means followed by the same level are not significantly different by Duncan's Multiple Range Test,  $p = 0.05$ .

\*\*\*\*\*

## % injured fruit

Treatment & oz form./100 gal	Dates of application	% injured fruit		
		Codling moth	San Jose scale	Variegated leafroller
Carzol 92SP 4.0	May 1			
	6.0 Jul 15	14.3 bc	33.0 b	2.2 c
Carzol 92SP 4.0	May 17			
	6.0 Jul 15	7.8ab	19.5ab	1.2abc
Carzol 92SP 4.0	May 1, 17			
	6.0 Jul 15	2.7a	1.7ab	1.2abc
Dylox 80SP 16.0	May 1, 17			
Kelthane 35WP 18.3	Jun 25, Jul 15	7.3ab	13.3ab	0.8ab
Dylox 80SP 32.0	May 1, 17			
Kelthane 4F 12.0	Jun 25, Jul 15	11.3 bc	0.0a	2.0 bc
Larvin 3.2F 10.0	May 1, 17			
Kelthane 35WP 18.3	Jun 25, Jul 15	2.7a	11.3ab	0.7a
Larvin 3.2F 20.0	May 1, 17			
Kelthane 4F 12.8	Jun 25, Jul 15	1.8a	0.8a	0.7a
Pydrin 2.4EC 2.6	May 1, Jun 25, Jul 15			
PBO 8EC 10.4	Jun 25			
	3.2 Jul 15	1.3a	0.2a	0.0a
Mavrik 2EC 1.6	May 1, Jun 25, Jul 15	3.7a	0.3a	0.0a
Advantage 4EC 8.0	Jun 25, Aug 11			
Plictran 50WP 4.0	Jun 25			
	6.0 Jul 15	1.0a	1.2a	0.3a
Advantage 4EC 8.0	Apr 23, Jun 25, Aug 11			
Superior oil 128.0	Apr 23			
Plictran 50WP 4.0	Jun 25			
	6.0 Jul 15	0.3a	0.3a	0.2a
Check		15.7 c	16.5ab	1.0abc

Means followed by the same level are not significantly different by Duncan's Multiple Range Test,  $p = 0.05$ .

EAST BLOCK

Treatment & oz form./100 gal		Dates of application	% injured fruit European apple sawfly	% clean fruit	Mean russet rating/apple
Carzol 92SP	4.0	May 1			
	6.0	Jul 15.....	0.2a	39.8a	0.8
Carzol 92SP	4.0	May 17			
	6.0	Jul 15.....	0.0a	50.8ab	0.9
Carzol 92SP	4.0	May 1,17			
	6.0	Jul 15.....	0.2a	75.3 bc	0.9
Dylox 80SP	16.0	May 1,17			
Kelthane 35WP	18.3	Jun 25,Jul 15.....	0.2a	72.3 bc	0.7
Dylox 80SP	32.0	May 1,17			
Kelthane 4F	12.0	Jun 25,Jul 15.....	0.2a	73.8 bc	1.6
Larvin 3.2F	10.0	May 1,17			
Kelthane 35WP	18.3	Jun 25,Jul 15.....	0.0a	77.3 bc	0.7
Larvin 3.2F	20.0	May 1,17			
Kelthane 4F	12.8	Jun 25,Jul 15.....	0.2a	91.2 c	0.8
Pydrin 2.4EC	2.6	May 1,Jun 25,Jul 15			
PBO 8EC	10.4	Jun 25			
	3.2	Jul 15.....	0.0a	84.2 c	0.7
Mavrik 2EC	1.6	May 1,Jun 25,Jul 15.....	0.0a	80.3 bc	0.7
Advantage 4EC	8.0	Jun 25,Aug 11			
Plictran 50WP	4.0	Jun 25			
	6.0	Jul 15.....	1.5a	65.8abc	1.1
Advantage 4EC	8.0	Apr 23,Jun 25,Aug 11			
Superior oil	128.0	Apr 23			
Plictran	4.0	Jun 25			
	6.0	Jul 15.....	0.3a	83.2 c	0.7
Check.....			0.3a	40.2a	0.8

Means followed by the same level are not significantly different by Duncan's Multiple Range Test,  $p = 0.05$ .

APPLE: Malus domestica

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Apple rust mite: Aculus schlechtendali

European red mite: Panonychus ulmi (Koch)

Twospotted spider mite: Tetranychus urticae Koch

a predator mite: Amblyseius fallacis (Garman)

a predator mite: Zetzellia mali (Ewing)

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APPLE, INSECTICIDE EFFECTS ON MITES, HUDSON VALLEY, HIGHLAND, NY, 1982: Insecticide treatments were applied to 8 tree plots replicated 3 times in a randomized complete block design. Treatments were applied by high-pressure handgun at 400 psi, using 4.2 gal/tree (403 gal/acre), dilute to runoff. Treatments were all applied at pink, May 4, petal fall May 17, 18, and in 5 cover sprays, Jun 3, 22, Jul 9, 23, and Aug 12, except Orthene, which was used in first 3 sprays, and Ambush, which was applied in the first 2 sprays only. The miticide Plictran 50WP (8 oz formulation/100 gal) was applied Jul 9 in combination with all treatments except SIR 8514, Pay-Off and FCR 1272. SLJ 0312 50WP (8 oz formulation/100 gal) was applied Jul 9 along with the FCR 1272 treatment. Vanguard 10WP 7.5 oz/acre was applied May 3, 27, and Jul 7 while Rubigan IEC 9.0 oz/acre applied Jun 15 over the block for scab control. Mite bronzing was noted in the check plots starting approximately the 3rd week in Jun, and mites were counted on Jun 30. Mites were also counted on Jul 22 after the miticides had an opportunity to work. Mites were evaluated by sampling 25 'Red Delicious' leaves/tree, from one 'Red Delicious' tree in each plot, brushing the leaves with a mite brushing machine, and counting all live stages and species with a binocular scope.

Oncol, SIR 8514, and Guthion did not affect the predator Zetzellia mali and were apparently less toxic to Amblyseius fallacis than the other treatments. Plictran and SLJ 0312 effectively reduced European red mite and twospotted spider mite populations following the Jul 9 application, although the SLJ 0312 appeared to be less effective against the twospotted spider mite population. Predators were also reduced in these plots although whether through prey (food supply) elimination or direct toxicity was not possible to determine. Apple rust mite populations were reduced by the Oncol, Ambush, and Pay-Off treatments. Pay-Off mite suppression was found early but was less noticeable as the season progressed. Reduction of pest mites by biological control in the SIR 8514 treatments was evident on the final count date.

Mean no. mites/leaf

Treatment and oz form./100 gal	Twospotted spider mite				Apple rust mite		Amblyseius fallacis		Zetzellia mali	
	European red mite		Apple rust mite		Amblyseius fallacis		Zetzellia mali			
	Jun 30	Jul 22	Jun 30	Jul 22	Jun 30	Jul 22	Jun 30	Jul 22	Jun 30	Jul 22
Oncol 50WP 4.0.....	17.3	0.4	0.2	0.4	2.2	0.0	0.1	0.0	0.4	0.0
Oncol 50WP 8.0.....	0.4	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.5	0.0
FCR 1272 2EC 1.2.....	17.9	0.7	1.4	1.0	37.6	0.0	0.0	0.0	0.0	0.1
SIR 8514 25WP 6.8.....	0.4	0.8	0.1	1.3	192.7	2.3	0.1	0.0	1.0	3.7
SIR 8514 25WF 12.0.....	0.2	0.5	0.0	0.2	42.0	50.2	0.0	0.1	0.2	2.4
Pennicap 2M 8.0 +Ambush 2EC.....	1.1	0.0	0.1	0.0	4.0	0.0	0.0	0.0	0.0	0.0
Orthene 75SP 4.0 Guthion 50WP 8.0.....	7.4	0.1	0.1	0.1	36.6	7.5	0.0	0.0	0.1	0.0
Orthene 75SP 8.0 Guthion 50WP 8.0.....	2.4	0.0	0.2	0.0	30.8	18.7	0.0	0.0	0.0	0.0
Pay-Off 2.5EC 2.0.....	2.5	6.3	0.1	0.3	2.2	30.7	0.0	0.0	0.0	0.0
Ambush 2EC 3.2 Cymbush 3EC 1.7.....	1.4	0.5	0.1	0.8	1.9	6.5	0.0	0.0	0.0	0.0
Guthion 50WP 8.0.....	6.7	0.0	0.2	0.0	85.4	32.5	0.0	0.0	0.7	0.0
Check.....	27.2	0.0	0.5	0.0	98.0	23.9	0.0	0.0	0.1	0.0

APPLE: Malus domestica  
Apple rust mite: Aculus schlechtendali (Nalepa)  
European red mite: Panonychus ulmi (Koch)  
Twospotted spider mite: Tetranychus urticae Koch  
a predator: Amblyseius fallacis (Garman)  
a predator: Zetzellia mali (Ewing)

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APPLE, SEASONAL MITE CONTROL PROGRAMS, HUDSON VALLEY LABORATORY, HIGHLAND, NY 1982:

Treatments were applied to 8 tree plots replicated 3 times in a randomized complete block design. All treatments were applied by handgun at 400 psi dilute to runoff using 4.2 gal spray/tree (403 gal/acre). Trees were 18-yrs-old, ca 12 ft high, spaced 15 x 30 ft, and on the EM2 rootstock. Additional sprays applied to the block included: Rubigan IEC 9.0 oz/acre on May 3, 27 and Jul 7; Vangard 10WP 7.5 oz/acre on Jun 15; and NAA (naphthaleneacetic acid) 5-15 ppm on May 26. Treatments were evaluated for mites on Jun 16, Jul 7, and Aug 3, by sampling 25 'Red Delicious' leaves/tree from 1 tree/plot. Leaves were then brushed and all live mites counted.

Back to back applications of Carzol at pink and petal fall provided mite control into July while the single Carzol applications were not as effective. Summer applications of Carzol, Plictran, and Kelthane provided good mite control, but back to back application of Plictran and Kelthane were used as well as slightly higher than normal rates (6.0 oz/100 gal rather than 4.0 oz). The Pydrin + PBO and the Mavrik plots did not reduce mites sufficiently to prevent bronzing which was evident in the plots by early July. Zetzellia mali and Amblyseius fallacis were only found in the Carzol plots and in the case of A. fallacis, only after 1 1/2 months had elapsed following application.

Treatment & oz form./100 gal	Dates of application	European red mite			Twospotted spider mite		
		Jun 16	Jul 7	Aug 3	Jun 16	Jul 7	Aug 3
Carzol 92SP	4.0 May 1						
	6.0 Jul 15.....	2.4	15.1	0.5	0.9	1.4	0.0
Carzol 92SP	4.0 May 17						
	6.0 Jul 15.....	4.2	21.7	0.2	0.1	2.2	0.0
Carzol 92SP	4.0 May 1, 17						
	6.0 Jul 15.....	0.9	6.9	0.7	0.1	0.7	0.0
Dylox 80SP	16.0 May 1, 17						
Kelthane 35WP	18.3 Jun 25, Jul 15.....	15.4	0.6	0.0	0.7	0.0	0.0
Dylox 80SP	32.0 May 1, 17						
Kelthane 4F	12.0 Jun 25, Jul 15.....	14.8	0.5	0.0	5.7	0.2	0.0
Larvin 3.2F	10.0 May 1, 17						
Kelthane 35WP	18.3 Jun 25, Jul 15.....	11.6	2.6	0.0	2.3	1.8	0.2
Larvin 3.2F	20.0 May 1, 17						
Kelthane 4F	12.8 Jun 25, Jul 15.....	9.5	0.4	0.0	1.8	0.3	0.0
Pydrin 2.4EC	2.6 May 1, Jun 25, Jul 15						
PBO 8EC	10.4 Jun 25						
	3.2 Jul 15.....	5.5	7.9	1.1	0.3	0.4	5.0
Mavrik 2EC	1.6 May 1, Jun 25, Jul 15.....	6.0	10.1	1.0	0.5	2.1	7.1
Advantage 4EC	8.0 Jun 25, Aug 11						
Plictran 50WP	4.0 Jun 25						
	6.0 Jul 15.....	6.3	1.2	0.0	0.3	0.1	0.0
Advantage 4EC	8.0 Apr 23, Jun 25, Aug 11						
Superior oil	128.0 Apr 23						
Plictran	4.0 Jun 25						
	6.0 Jul 15.....	3.2	1.3	0.2	0.9	0.0	0.0
Check.....		8.9	18.5	0.1	1.1	0.6	0.0

## Mean no. mites/leaf

Treatment & oz form./100 gal	Dates of application	Mean no. mites/leaf			Amblyseius fallacis	Zetzellia mali
		Jun 16	Jul 7	Aug 3	Jul 7	Jul 7 Aug 3
Carzol 92SP	4.0 May 1					
	6.0 Jul 15.....	6.3	341.2	34.3	0.2	0.1 0.2
Carzol 92SP	4.0 May 17					
	6.0 Jul 15.....	8.2	63.8	9.0	0.2	0.5 0.7
Carzol 92SP	4.0 May 1, 17					
	6.0 Jul 15.....	3.5	417.0	11.6	0.1	0.1 1.2
Dylox 80WP	16.0 May 1, 17					
Kelthane 35WP	18.3 Jun 25, Jul 15.....	28.0	66.7	2.2	0.0	0.0 0.0
Dylox 80SP	32.0 May 1, 17					
Kelthane 4F	12.0 Jun 25, Jul 15...	180.7	0.0	0.0	0.0	0.0 0.0
Larvin 3.2F	10.0 May 1, 17					
Kelthane 35WP	18.3 Jun 25, Jul 15..	258.5	133.0	0.2	0.0	0.0 0.0
Larvin 3.2F	20.0 May 1, 17					
Kelthane 4F	12.8 Jun 25, Jul 15...	188.9	108.0	0.0	0.0	0.0 0.0
Pydrin 2.4EC	2.6 May 1, Jun 25, Jul 15					
PBO 8EC	10.4 Jun 25					
	3.2 Jul 15.....	10.4	21.0	20.5	0.0	0.0 0.1
Mavrik 2EC	1.6 May 1, Jun 25, Jul 15.....	71.3	301.3	6.0	0.0	0.0 0.0
Advantage 4EC	8.0 Jun 25, Aug 11					
Plictran 50WP	4.0 Jun 25					
	6.0 Jul 15.....	38.6	37.0	0.0	0.0	0.0 0.0
Advantage 4EC	8.0 Apr 23, Jun 25, Aug 11					
Superior oil	128.0 Apr 23					
Plictran	4.0 Jun 25					
	6.0 Jul 15.....	36.7	33.4	0.0	0.0	0.0 0.0
Check.....		32.1	205.0	50.8	0.0	0.0 0.0