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1973 European red mite control evaluations

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INTRODUCTION

Although six species of tetranychid mites have been reported as attacking apple in New York, only the European red mite, *Panonychus ulmi* (Koch), is at present of general economic concern. Occasionally, the two-spotted spider mite, *Tetranychus urticae* Koch, is troublesome late in the growing season. Such infestations, however, are sporadic and localized. Acaricidal evaluations in 1973 were conducted only against the European red mite.

Some subtle changes in the behavior and activity pattern of the European red mite have gradually occurred during the last 10-12 years. Earlier the species was considered an early summer pest. Populations "built-up" rapidly in late June, reached peak activity by mid-July, and then fell into a steep decline. For all practical purposes, the "red mite" season was over by early August. Some slight but minor flurries of activity were common in early September when eggs for the following year's generation were deposited.

Now, however, the situation is significantly different. The species still attains peak activity in mid-July but instead of declining sharply remains at relatively high levels well into September. This means that feeding and injury is now extended over a much longer period of the summer than in earlier years.

It will be appreciated that the prolonged period of activity has necessitated some changes in control practices. Earlier studies have shown that mite feeding in late June and July, when apple trees are making their maximum vegetative growth and producing fruit buds, can have a serious effect on yield. Not only is the current season's crop affected, but also that of the following year. To prevent such injury, it is felt that control can best be achieved with treatments in the immediate pre-bloom period directed against the overwintering eggs or newly hatched forms. Consequently, early season or preventative-type programs have been emphasized.

The efficiency of most pre-bloom acaricides is dependent upon proper timing in relation to the hatching of the winter eggs. Hatching under our conditions begins at the tight cluster bud stage, is 60-75 per cent complete at pink, 95-98 per cent complete at full bloom. At petal fall, eggs for the first summer generation are already being deposited.

A summary of the growing season temperature and rainfall for Geneva, New York is given in Table 1. The average temperature for the month of April was somewhat warmer than usual, and this was reflected in earlier bud development and overwintering egg hatch. First egg hatch was observed on April 23 (tight cluster bud stage) some 3 weeks earlier than in 1971 and 1972.

PROCEDURE

All mite control evaluations were conducted on apple. Treatments were applied either with a Myers airblast sprayer or a truck-mounted hydraulic orchard sprayer using a gun from the ground. The hydraulic sprayer was operated at 500 psi and the trees sprayed to run-off. It is assumed that complete coverage was obtained in all instances. The airblast rig was calibrated to deliver 33 gallons per minute per side at dilute or 1X concentration. Tractor speed varied from 2 to $2^1/2$ mph and sprays applied dilute or 3X. Applications were made only at times when wind conditions were such that thorough coverage was possible.

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Table 1.—Growing season temperature and rainfall. Geneva, New York.

	Temperature				Rainfall			
Month	Av.*	1971	1972	1973	Av.*	1971	1972	1973
April	44.5	41.4	39.9	46.5	3.16	1.39	2.86	4.34
May	55.1	54.4	57.6	52.7	2.68	2.30	3.77	3.70
June	65.5	65.5	62.0	67.8	2.70	4.49	10.63	3.55
July	71.6	68.4	69.7	70.8	2.77	4.47	3.78	1.65
Aug.	67.6	67.0	67.1	71.6	3.16	4.59	3.81	2.68
Sept.	60.8	64.6	61.9	61.5	2.14	2.30	3.02	2.50

*Average for the 15-year period, 1953-1967.

Efficacy was determined by two procedures. Weekly mite population counts for the early season tests were made using a Henderson-McBurnie mite brushing machine. The sample consisted of 100 leaves picked at random at approximately chest height (25 leaves from each of four selected trees or replicates). The leaves were placed in pint ice cream cartons, fumigated with ethylene dichloride and placed under refrigeration in the laboratory. The sample was brushed and counted within 48 hours. For the summer evaluations (Tables 14 and 15), counts were made directly in the orchard. A minimum of three observers using binocular microscopes made counts of all mite stages except eggs on independently selected sub-samples of 10 leaves.

DISCUSSION AND RESULTS

Early season tests.-Four mature apple plantings were used as test sites. Pertinent information regarding treatments and results obtained are given in Tables 2-7.

A 20-year-old, 20-acre Rome orchard, planted 30 feet x 30 feet or 48 trees/acre was used for tests listed in Tables 2-4. Plots in Tables 2 and 3 consisted of unreplicated blocks a minimum of 1 acre in size. Treatments here were applied with an airblast sprayer at either 1X (dilute) or 3X concentration. The application rate was ca. 350 gal./acre. Treatments in Table 4 were applied to four single tree replicates using a hand gun from the ground. Trees were sprayed to run-off or ca. 20 gallons/tree. The mite infestation was uniform throughout the planting as determined by an overwintering egg survey conducted during the dormant period and subsequent summer population counts taken in three strategically selected control areas.

Seasonal mite control was obtained with all 1 per cent "superior-type" oil (70 sec. vis.) applications as shown in Table 2. The inclusion of demeton with the oil or its use following earlier oil application did not enhance performance in this test.

Timing of pre-bloom applied acaricides is critical. Best performance with materials other than petroleum oil is ob-

Table 2.—Efficiency of a 1 per cent petroleum oil (70 sec. vis.) applied alone or in combination with 4 ounces of demeton (6E) at the tight cluster or pink bud stage. Host: Rome apple. R. Gage Orchard, Sodus, New York. 1973.

Treatment, concentration and application date(s)[a]	Av. no mites/leaf						
	6/19	7/4	7/11	7/23	8/6	8/13	8/24
P. oil, 1X, 4/23	.08	0.00	0.00	.06	.20	.64	2.50
P. oil, 3X, 4/23	.30	0.00	.02	.02	.22	.60	1.70
P. oil, 1X, 4/23—demeton, 1X, 5/7	.12	0.00	.02	0.00	.10	.48	2.30
P. oil, 3X, 4/23—demeton, 1X, 5/7	1.00	.42	.08	.04	.30	.42	2.50
P. oil, demeton, 1X, 5/7	.02	.06	0.00	.12	.12	.40	2.20
P. oil, demeton, 3X, 5/7	.90	.04	0.00	.06	.44	5.50	4.80
Controls:	6	20	36	97	114	146	49

[a] Applied with a Myers airblast sprayer. Treatment dates: 4/23—tight cluster; 5/7—pink.

Table 3.—Efficiency of early season acaricidal sprays against the European red mite. Host: Rome apple. R. Gage Farm, Sodus, New York. 1973.

Material & Formulation[a]	Rate form.	Spray date(s)[b]	Av. no. mites/leaf							
			6/19	6/28	7/4	7/11	7/23	8/6	8/13	8/24
Vendex (50% w.p.)	6 ozs.	4/23	0.00	.02	0.00	.16	.18	.76	3.40	17.10
Vendex (50%w.p.)	6 ozs.	5/03	.02	0.00	0.00	.06	.08	.32	2.20	8.70
Vendex (50% w.p.)	6 ozs.	5/29	.06	0.00	0.00	0.00	0.00	.04	.40	.60
Vendex (50% w.p.)	6 ozs.	5/03,5/29	.12	0.00	0.00	0.00	0.00	.14	.14	.60
Plictran (50% w.p.)	6 ozs.	4/23	.08	.02	.20	.02	.26	4.40	5.00	44.50
Plictran (50% w.p.)	6 ozs.	5/03	.04	.04	0.00	0.00	0.00	.22	.50	2.10
Plictran (50% w.p.)	6 ozs.	5/29	.26	.12	.12	.80	.64	1.60	24.70	25.30
Plictran (50% w.p.)	6 ozs.	5/03,5/29	.02	.02	0.00	0.00	.06	.18	.22	2.60
Galecron (4#/gal.)	8 ozs.	5/07	.06	—	.04	.02	.02	.02	.24	1.10
Fundal (97% s.p.)	4 ozs.	5/07	.18	—	0.00	0.00	.06	.10	1.30	1.50
Controls:			6	6	20	35	97	114	146	49

[a] All treatments applied with a Myers airblast sprayer. Vendex and Plictran applied dilute or 1X—Galecron and Fundal at 3X.

[b] Bud stages on treatment dates: 4/23—tight cluster, 5/3 & 5/7—pink, 5/29—petal fall.

Table 4.—Efficiency of various materials applied against the European red mite. Host: Rome apple. R. Gage Orchard, Sodus, New York. 1973

Material & Formulation[a]	Rate/ 100 gals.	Spray[b] date(s)	Av. no. mites/leaf 6/19	7/4	7/11	7/23	8/6	8/13	8/24
P. oil (60 sec. vis.)	2%	4/19	.10	.02	.10	.52	3.80	32.20	19.10
S15126 (1#/gal.)	32 ozs.	5/07	.06	.06	.12	.60	3.20	15.70	8.10
R 28627 (25% w.p.)	16 ozs.	5/07	0.00	0.00	.06	.53	1.70	15.50	11.20
CGA 15396 (4#/gal.)	16 ozs.	5/07	1.00	.20	.04	.68	2.60	24.90	17.40
Vendex (50% w.p.)	4 ozs.	5/30,6/8, 7/11,8/28	.60	.18	—	4.20	3.30	3.30	2.10
Vendex (50% w.p.)	6 ozs.	5/30,6/8, 7/11,8/28	.06	0.00	—	.54	66	5.10	.86
Vendex (50% w.p.)	12 ozs.	5/30,6/8, 7/11,8/28	.04	0.00	—	.70	2.80	2.70	.26
Controls:			5	20	35	97	114	146	49

[a] Treatments applied to four single tree replicates with a truck-mounted hydraulic orchard sprayer using a hand gun.

[b] Spray dates: 4/19—half-inch green, 5/7—pink, 5/30—petal fall.

tained with pink applications. Under New York conditions, the bulk of overwintering eggs are hatched at this time and the remainder are on the verge of hatching. The May 3 Plic-tran spray (Table 3) clearly demonstrated the value of correct timing. Excellent seasonal control was also obtained with the pink Fundal and Galecron sprays.

Of the numbered compounds screened as single pre-bloom sprays, several are worthy of further testing (Table 4).

Two Red Delicious plantings on the Ji-Meva Farm, Alton, New York were treated during the pink period, May 2,1973. Plots consisted of unreplicated acre-size blocks and sprays applied dilute with an airblast sprayer delivering ca. 325 gallons/ acre. The results obtained are presented in Tables 5 and 6. The Fundal treatment in the north block (Table 6) kept the mite population in check through July. This is in contrast to the lack of control with an identical treatment in the south block (Table 5). Similar results with Fundal were obtained there in 1972 and suggest the possibility of resistance developing.

Pink sprays (May 10,1973) of Plictran and Carzol were compared in a mixed Red Delicious and Golden Delicious planting (Table 7). Against a moderate mite population on Golden Delicious, both materials gave seasonal control. The Carzol treatment, however, in the case of Red Delicious where pressure was heavier, needed supplementation by mid-August.

Seasonal programs.-Six apple orchards served as test

Table 5.—Efficiency of various pink (5/2/73) applied acaricides against the European red mite. Host: Red Delicious apple. Ji-Meva Farm, Alton, New York. 1973.

Material & rate per 100 gals.[a]	Av. no. mites/leaf 6/12	6/25	7/2	7/9	7/16	7/23	7/30	8/7	8/14	8/20
Fundal, 4 ozs.	3.6	4.1	14.5	28.9	14.9	43.6	22.9	23.8	12.5	14.4
Carzol, 4 ozs.	0.2	1.1	1.3	9.9	4.1	32.3	14.7	18.1	4.3	40.1
Acarol, 8 ozs.	0.2	1.1	3.3	9.4	17.3	46.9	16.8	19.1	9.2	36.1
Controls:	13	12	65	113	57	115	59	25	9	16

[a] Treatments applied with a Myers airblast sprayer at dilute or 1X concentration.

Table 6.—Efficiency of various pink (5/2/73) applied acaricides against the European red mite. Host: Red Delicious apple. Ji-Meva Farm, Alton, New York. 1973.

Material & rate per 100 gals.[a]	Av. no. mites/leaf 6/12	6/25	7/2	7/9	7/16	7/23	7/30	8/7	8/14	8/20
P. oil (70 sec.), 1%	0.1	0.3	0.1	0.1	0.1	0.2	1.0	1.5	5.2	12.4
Plictran (50% w.p.), 6 ozs.	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.4	0.9	3.0
Galecron (4 EC), 8 ozs.	0.1	0.1	0.0	0.2	0.1	0.4	3.6	7.9	38.5	40.9
Fundal (97% s.p.), 4 ozs.	0.2	0.4	1.5	0.7	0.2	0.4	1.5	7.5	20.2	23.6
Carzol (92% s.p.), 4 ozs.	0.2	0.6	0.3	12.3	1.2	17.9	31.1	41.4	28.5	32.3
Controls:	10	14	58	65	56	53	110	65	17	7

[a] Treatments applied with a Myers airblast sprayer at dilute or 1X concentration.

Table 7.—Efficiency of Plictran and Carzol applied May 10, 1973 (pink stage) against the European red mite. Host: Apple. C. Fox Orchard, Sodus, New York. 1973.

Material and amount per 100 gals.[a]	Av. no. hatched mites/leaf								
	6/12	6/25	7/2	7/9	7/16	7/30	8/6	8/13	8/20
Red Delicious									
Plictran (50% w.p.), 6 ozs.	0.1	0.1	0.0	0.1	0.0	0.2	0.5	1.3	3.5
Carzol (92% s.p.), 4 ozs.	0.0	0.0	0.1	0.1	0.1	0.2	2.4	23.4	23.9
Controls:	7	11	37	83	49	101	69	83	51
Golden Delicious									
Plictran (50% w.p.), 6 ozs.	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.5	0.3
Carzol (92% s.p.), 4 ozs.	0.0	0.0	0.1	0.1	0.2	0.2	0.1	2.1	0.4
Controls:	1	1	8	11	14	39	26	89	90

[a] Treatments applied with a Myers airblast sprayer at dilute or 1X concentration.

blocks for the evaluation of seasonal or multiple spray programs. The results of these tests are presented in Tables 8-13.

Table 8.-One such site was a 5-acre mixed variety planting of 22-year-old McIntosh, Red Delicious, andCortland trees used for the testing of Benlate and Oil-Benlate programs. Overwintering mite eggs were uniformly distributed but were heaviest on Red Delicious. The rectangular block was divided into two equal sized plots separated by one untreated or check row. Treatments for the two programs under study were initiated on April 23, 1973 or tight cluster bud stage. Prior to the April 23 spray, the grower had applied two captan sprays. Plot 1 received 1 quart of a 70-second superior-type oil plus 2 ounces of Benlate in every spray. I n plot 2, the oil was used at the 1 per cent level with the 2 ounces of Benlate on April 23. Rather severe leaf burn occurred from this spray, and therefore further oil treatments in plot 2 were discontinued. No phytotoxicity was observed in plot 1. Mite control as noted in the table was excellent in both plots as was apple scab and powdery mildew.

In another test (Table 9), the acaricidal efficiency of post-bloom sprays of Dikar, Benlate, and Benlate + oil was evaluated. All programs at the concentration tested gave seasonal mite control. The fungicide program in the pre-bloom period consisted of a single application of Difolotan applied at green tip.

Results of grower applied oil-Benlate treatments are given in Tables 10 and 11.

Table 1O.-An entire 2-acre Cortland block, with the exception of four corner trees which served as controls, was treated by the grower with an airblast sprayer at dilute concentration. The trees were 40 years old and planted 40 feet

Table 8.—Efficiency of oil-Benlate against the European red mite on apple. R. Gage Orchard, Sodus, New York. 1973

Treatment schedule[a]			Av. no. mites/leaf								
Dates	Materials & amts./100 gal.	Cultivar	6/12	6/25	7/2	7/9	7/16	7/30	8/8	8/14	8/20
			Plot 1								
4/23,4/30,5/4	Oil 1 qt. Benlate 2 ozs.										
5/11	Benlate 4 ozs.	McIntosh	0.00	0.00	.02	.02	0.00	.02	0.00	.04	.16
		Cortland	0.00	0.00	0.00	0.00	.02	.04	.10	.40	.14
5/22,6/1,6/15, 7/2,7/16	Oil 1 qt. Benlate 2 ozs. Guthion ½ lb.	R. Delicious	.04	0.00	0.00	0.00	.02	.06	.04	.10	.06
8/3	Guthion ½ lb.										
			Plot 2								
4/23	Oil 1 gal. Benlate 2 ozs.										
4/30,5/4	Oil 1 qt. Benlate 2 ozs.										
		McIntosh	0.00	.04	.08	0.00	.04	.02	.08	.12	.66
5/11	Benlate 4 ozs.	Cortland	0.00	0.00	.04	.02	0.00	.04	.12	.86	1.10
		R. Delicious	0.00	.04	0.00	0.00	.02	0.00	.20	.62	.86
5/22,6/1,6/15, 7/2,7/16	Benlate 4 ozs. Guthion ½ lb.										
8/3	Guthion ½ lb.										
		McIntosh	1	1	2	9	14	109	38	126	62
Controls		Cortland	1	1	3	11	20	53	44	128	48
		R. Delicious	1	1	6	28	25	290	390	345	128

[a] All treatments applied with a Myers airblast sprayer at 3X concentration. Trees planted 28 feet x 28 feet or 55 trees/A. Delivery rate at 3X was 2.2 gal./tree or 360 gal./A on dilute basis.

Table 9.—Efficiency of various seasonal fungicide programs against the European red mite. Host: Rome apple. R. Gage Orchard. Sodus, New York. 1973.

Treatment & amount[a]	Av. no. mites/leaf							
	6/19	6/28	7/4	7/11	7/23	8/6	8/13	8/24
Benlate—3 ozs., P. oil—1 qt.[b]	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.1
Benlate—3 ozs., P. oil—1 qt.[b]	0.1	0.1	0.0	0.1	0.1	0.1	0.7	0.8
Benlate—6 ozs.[b]	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.1
Dikar—2 lbs.	0.1	0.1	0.1	0.1	0.1	0.1	1.3	3.0
Dikar—2 lbs.[b]	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.2
Controls:	6	6	30	35	97	114	146	49

[a] Treatment dates: 5/29 (petal fall); covers—6/8, 6/20, (6/26 fungicide only), 7/6, 7/23, (8/10 Guthion only). Guthion (50% w.p.), 1/2 pound included in all sprays except the 6/26 treatment. Treatments applied with a Myers airblast sprayer at dilute or 1X concentration. Delivery rate 6—6.5 gal./tree or approximately 300 gal./A (trees planted 30 feet x 30 feet, or 48 trees/A).

[b] Treated with 1 per cent (70 second) petroleum oil on 4/23/73—tight cluster bud stage.

Table 10.—Efficiency of 1 quart Pet. oil and 2 ounces Benlate against the European red mite on a seasonal apple pest control program. Host: Cortland apple. Ji-Meva Farm, Alton, New York. 1973.

Treatment[a]	Av. no. hatched mites/leaf									
	6/12	6/25	7/2	7/9	7/16	7/23	7/30	8/7	8/14	8/20
Oil-Benlate (all sprays)	0.1	0.1	0.1	2.4	0.3	1.1	3.5	3.4	5.7	14.7
Controls:	6.0	4.0	28.0	37.0	20.0	59.0	93.0	36.0	22.0	11.0

[a] Pre-bloom sprays—4/17, 4/24, 4/30, 5/7, 5/11, 5/17, 5/24—Oil-Benlate.
Petal fall—5/31—Oil-Benlate and 1 pound Imidan.
6/8—Oil-Benlate.
6/20, 7/3, 7/17—Oil-Benlate and 1/2 pound Guthion.

x 40 feet or 27/ acre. Benlate, 2 ounces +1 quart oil (70 sec. vis.) included in every application for disease and mite control. The insecticide in post-bloom sprays was either Im-idan or G uthion. Commercial control of mites and complete scab and mildew control was obtained in the treated trees. Better than 80 per cent of the fruit on the check trees were infected with apple scab. No phytotoxicity or reduction in fruit finish was encountered.

Table 11.-In another grower-applied test, Benlate, 2 ounces + 1 quart oil, was applied in every spray at 4X concentration. The test orchard was a mature 2-acre Baldwin block. Four corner trees were untreated and served as controls. On May 2, 1973 (tight cluster), half of the block was treated with 1 gallon of oil instead of 1 quart. This was the only variable in the test, and all of the other treatments were the same as noted in the Table. Some leaf burn occurred following the 1 -gallon oil application. No phytotoxicity was observed when the oil was used at the 1 -quart level. Scab, mildew, and mite control were excellent in both plots.

Table 12.-A McIntosh-Cortland block used by Dr. J. Gilpatrick[3] for the screening of various apple scab and powdery mildew control programs. European red mite counts were taken on all treatments suspected of having acaricidal activity. Plots consisted of blocks of four trees (two McIntosh and two Cortland). The material CW 524 under conditions of this test gave seasonal mite suppression. Similar results were also obtained the previous year. The value of multiple sprays of low rates (1 quart) of a "superior-type" oil for mite control was again demonstrated in the oil-Benlate and oil-Topsin plots.

Table 13.-Dr. K. Trammel[3] each year screens a host of

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Table 11.—Efficiency of seasonal oil-Benlate programs against the European red mite. Host: Baldwin apple. Chester Ver Dow Farm, Williamson, New York. 1973.

(5/2 Treatment) (tight cluster)	Av. no. hatched mites/leaf								
	6/12	6/25	7/2	7/9	7/16	7/30	8/8	8/14	8/20
1 gal. oil	0.00	.08	0.00	0.00	0.00	0.00	.08	.06	0.00
1 qt. oil	.04	0.00	.06	0.00	0.00	0.00	.02	.04	0.00
Controls:	12	4	23	26	12	32	6	6	3

Treatments applied by grower with an airblast sprayer at 4X concentration.
2 ounces Benlate, 1 quart oil—4/7, 4/17, 4/25, (5/2),—5/22.
2 ounces Benlate, 1 quart oil + 1 pint Zolone—5/7, 5/31, 6/13, 7/6, 8/13.
2 ounces Benlate, 1 quart oil + 1 pound Imidan—7/27.

Table 12.—Acaricidal activity of various seasonal fungicide programs against the European red mite. Hosts: McIntosh and Cortland apple. Gillam Orchard, Geneva, New York. 1973.

Material & formulation[a]	Rate form. /100 gals.	Av. no. hatched mites/leaf[b] 6/21	6/27	7/5	7/13	7/25	8/3	8/9	8/21
CW 524 (20% EC)	12 ozs.	0.1	0.1	0.4	0.1	0.2	0.1	0.8	0.2
CW 524 (25% w.p.)	9.6 ozs.	1.3	0.2	1.3	0.3	1.4	1.1	3.2	3.2
CW 524 Formula C—(EC)	12 ozs.	1.4	0.3	0.8	1.1	1.3	2.9	10.4	6.3
BD 19654 (50% w.p.)	8 ozs.	3.3	1.2	8.9	1.2	5.6	12.4	19.7	12.6
Captan (50% w.p.)	32 ozs.	4.4	0.8	5.4	5.5	13.1	5.7	20.9	15.4
RH 3928 (50% w.p.)	8 ozs.	2.8	1.2	5.3	2.2	7.4	5.2	15.2	18.9
Topsin M (70% w.p.)	2 ozs.	2.1	0.4	4.8	1.9	3.2	4.2	38.7	17.0
Topsin M (70% w.p. + P. oil (70 sec. vis.)	2 ozs. + 1 qt.	0.1	0.1	0.1	0.3	0.5	0.2	6.9	3.9
Benlate (50% w.p.)	4 ozs.	1.3	0.4	1.1	1.1	1.4	1.6	7.7	7.1
Benlate (50% w.p.) + P. oil (70 sec. vis.)	2 ozs. + 1 qt.	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.8
Captan (50% w.p.) + Afugan (30 EC)	16 ozs. + 4 ozs.	0.7	0.5	2.1	2.4	4.7	6.4	23.1	13.6

[a] Dilute sprays applied by hand gun. Treatment dates: 4/26—pink; 5/11—bloom; cover sprays 6/4, 6/11, 6/22, 7/18, 8/16.

[b] Counts are an average of four individual samples of 25 leaves each taken from two McIntosh and two Cortland trees.

Table 13.—Efficiency of seasonal apple pest control programs against the European red mite. Host: McIntosh apple. Orchard 12, Geneva, New York.

Material & formulation[a]	Rate form. /100 gals	Av. no. hatched mites/leaf[b] 7/31	8/9	8/16	8/23
AC 99876 (4 EC)	8 ozs.	31.2	79.4	34.0	36.8
AC 99876 (4 EC)	16 ozs.	10.0	25.4	16.2	21.3
Lorsban (25% w.p.)	8 ozs.	68.7	81.8	31.8	26.9
Lorsban (25% w.p.)	16 ozs.	65.1	69.6	37.9	30.1
Lorsban (25% w.p.)	24 ozs.	50.9	96.3	21.6	28.5
Dowco 214 (25% w.p.)	8 ozs.	90.6	114.7	88.3	21.8
Dowco 214 (25% w.p.)	16 ozs.	59.6	54.5	34.4	26.2
CGA 18809 (50% w.p.)	8 ozs.	7.4	1.5	1.1	2.4
CGA 18809 (50% w.p.)	16 ozs.	3.8	2.9	1.4	0.9
CGA 15324 (4 EC)	16 ozs.	0.8	1.9	0.7	1.9
CGA 15396 (EEC)	16 ozs.	0.9	—	0.7	1.8
S 2957 (4 EC)	4 ozs.	17.1	11.9	16.6	15.2
S 2957 (4 EC)	6 ozs.	9.9	51.5	15.3	26.0
Nexagon (25% w.p.)	16 ozs.	68.8	79.1	40.0	62.1
Nexagon (25% w.p.)	24 ozs.	67.7	97.6	52.0	67.1
Orthene (75% w.p.)	16 ozs.	1.6	3.8	0.6	0.5
S 15126 (1 EC)	32 ozs.	4.2	5.9	0.7	0.9
S 15126 (1 EC)	64 ozs.	2.5	2.6	5.6	0.6
Vydate (2 EC)	4 ozs.	43.6	39.5	6.9	6.4
Vydate (4 ozs.) + Guthion (8 ozs.)		4.9	4.3	1.8	1.8
Bay Hox 2709 (50% w.p.)	8 ozs.	8.3	19.5	17.6	19.9
Bay Hox 2709 (50% w.p.)	12 ozs.	11.1	11.5	4.6	3.4
Guthion (2 S)	20 ozs.	54.1	176.2	35.2	36.9
Sumithion (40% w.p.)	48 ozs.	10.7	80.9	26.9	8.2
San 52.135 (80% w.p.)	20 ozs.	13.6	9.7	2.0	2.1
Anthio 33 (2.67 EC)	24 ozs.	43.2	68.6	39.2	50.8
Imidan (70% w.p.)	11½ ozs.	57.4	216.9	35.9	24.0
Imidan (50% w.p.)	16 ozs.	44.0	51.6	23.5	8.8
Am Hoescht 2960 (30% w.p.)	27 ozs.	7.1	12.6	1.9	3.5
CHECK		49.3	112.9	25.9	3.9

[a] Applied second through sixth cover on 6/20, 7/3, 7/17, 7/31, 8/13.

[b] Counts are an average of two samples of 25 leaves each taken from two single tree applications.

pesticides against apple pests, primarily codling moth. Treatments are applied in five cover sprays with a hydraulic sprayer using a gun from the ground. To determine if any of the materials possess acaricidal value, leaf samples from two McIntosh trees were collected four times at approximately weekly intervals.

Of the materials in the test, the CGA series (18809, 15324, 15396) and S 15126 show promise and should be further evaluated as mite control agents.

Summer evaluations.–A Red Delicious planting having a uniform and moderately heavy European red mite population was selected as a test site for screening experimental materials against established populations. Treatments were applied by hand gun to the point of run-off. Pertinent

Table 14.—Efficiency of experimental acaricides applied as a single spray against the European red mite. Host: Red Delicious apple. J. Young Orchard, Sodus, New York. 1973. S. E. Lienk, New York State Agricultural Experiment Station, Geneva, New York 14456.

Material & formulation	Rate form. /100 gals.	Per cent reduction in population days after 7/17/73 treatment	
		2	9
S 15126 (1#/gal.)	12 ozs.	99.9	99.6
S 15126 (1#/gal.)	24 ozs.	100	99.8
S 15126 (1#/gal.)	48 ozs.	100	99.9
Galecron (4#/gal.)	8 ozs.	99.1	99.0
Acarol (2#/gal.)	8 ozs.	99.6	97.8
Vydate (2#/gal.)	32 ozs.	96.0	92.4
DPX 3654 (4#/gal.)	8 ozs.	99.7	98.1
DPX 3654 (4#/gal.)	16 ozs.	100	99.7
Torak (4#/gal.)[a]	8 ozs.	74.2	64.5
Torak (4#/gal.)[b]	8 ozs.	67.9	51.6
Torak (4#/gal.)[c]	8 ozs.	74.8	60.0
Bay Hox 2709 (50% w.p.)	8 ozs.	94.3	92.3
Bay Hox 2709 (50% w.p.)	16 ozs.	97.6	98.9
Bay Hox 1901 (40% w.p.)	20 ozs.	58.1	0
Fundal (97% w.p.)	4 ozs.	98.9	99.6
Carzol (92% s.p.)	4 ozs.	99.0	98.6
R 28627 (25% w.p.)	16 ozs.	99.7	96.7
		Av. no. hatched mites/leaf	
Controls:		88	92

[a] U. S. formulation.
[b] European formulation.
[c] Cherry formulation.

Table 15.—Efficiency of experimental acaricides applied as a single spray against the European red mite. Host: Red Delicious apple. J. Young Orchard, Sodus, New York. 1973. S. E. Lienk, New York State Agricultural Experiment Station, Geneva, New York 14456.

Material & formulation	Rate form. /100 gals.	Per cent reduction in population days after 7/17/73 treatment	
		2	9
Plictran (50% w.p.)	6 ozs.	98.8	99.9
Vendex (50% w.p.)	8 ozs.	92.8	98.7
K 673 (50% EC)	3 ozs.	76.9	48.7
K 673 (50% EC)	6 ozs.	96.9	89.5
PGP 102 (40% EC)	4 ozs.	65.7	86.7
PGP 102 (40% EC	8 ozs.	80.6	91.6
PGP 102 (40% EC	12 ozs.	88.8	94.9
PGP 103 (40% EC)	4 ozs.	92.3	93.2
PGP 103 (40% EC)	8 ozs.	98.3	98.7
PGP 103 (40% EC)	12 ozs.	99.3	99.5
U 36059 (1.66#/gal.)	9.6 ozs.	99.6	99.8
U 36059 (1.66#/gal.)	19.2 ozs.	100	99.9
CGA 15396 (500 EC)	16 ozs.	97.7	99.4
Kelthane (35% w.p.)	24 ozs.	99.0	99.6
Mesurol (75% w.p.)	22 ozs.	90.0	98.5
Omite (30W)	20 ozs.	83.2	98.1
Omite (6E)	8.8 ozs.	97.1	99.2
		Av. no. hatched mites/leaf	
Controls:		88	92

information regarding the test and the results obtained are presented in Tables 14 and 15. Performance records were taken in the orchard 2 and 9 days after treatment. No phytotoxicity was observed in any of the plots.

TEST MATERIALS

Materials	Formulation	Supplier
AC 99876	4.0 EC	American Cyanamid Co.
Acarol	2.0 EC	Geigy Chemical Co.
Afugan	30 EC	American Hoechst Corp.
Am Hoescht 2960	30% w.p.	American Hoechst Corp.
Anthio 33	2.67 EC	Velsicol Chemical Corp.
Azinphosmethyl	Guthion 50% w.p.	Chemagro Corporation
Bay Dam 19654	50% w.p.	Chemagro Corporation
Bay Hox 1901	4.0 EC	Chemagro Corporation
Bay Hox 2709	50% w.p.	Chemagro Corporation
Benlate	50% w.p.	DuPont Company
Captan	80% w.p.	Stauffer Chemical Co.
Carzol	95% w.p.	NOR-AM Agric. Prod., Inc.
Cela 524	20% EC	E. M. Laboratories, Inc.
CGA 15324	4.0 EC	Ciba-Geigy Corporation
CGA 15396	4.0 EC	Ciba-Geigy Corporation
CGA 18809	50% w.p.	Ciba-Geigy Corporation
Demeton	6.0 EC	Chemagro Corporation
Dikar	80% w.p.	Rohm & Haas Company
Dowco 214	25% w.p.	Dow Chemical Company
DPX 3654	4.0 EC	DuPont Company
Fundal	95% w.p.	NOR-AM Agric. Prod., Inc.
Galecron	4.0 EC	Ciba-Geigy Corporation
Imidan	50% w.p.	Stauffer Chemical Co.
K 673	50% EC	E. M. Laboratories, Inc.
Kelthane	35% w.p.	Rohm & Haas Company
Lorsban	25% w.p.	Dow Chemical Company
Mesurol	75% w.p.	Chemagro Corporation
Nexagan	25% w.p.	E. M. Laboratories, Inc.
Omite	30% w.p.	Uniroyal Chemical
Orthene	75% w.p.	Chevron Chemical Company
Petroleum Oil		Sun Oil Company
PGP 102	40% EC	Proctor & Gamble Company
PGP 103	40% EC	Proctor & Gamble Company
Plictran	50% w.p.	Dow Chemical Company
R 28627	25% w.p.	Stauffer Chemical Company
RH 3928	50% w.p.	Rohm & Haas Company
S 2957	4.0 EC	E. M. Laboratories, Inc.
S 15126	50% w.p.	Gulf Res. & Dev. Co.
San 52.135	80% w.p.	Sandoz-Wander, Inc.
Sumathion	40% w.p.	Ciba-Geigy Corporation
Topsin	70% w.p.	Pennwalt Corporation
Torak	4.0 EC	Hercules Incorporated
U 36059	1.66 EC	American Cyanamid Company
Vendex (SD 14114)	50% w.p.	Shell Chemical Company
Vydate	2.0 EC	DuPont Company
Zolone	3.0 EC	Rhodia, Inc.