

Chemicals on European Red Mite

two different methods of evaluation of spray materials for spider mite control used in field tests during 1957 season

Harold F. Madsen

Variable conditions in the fruit growing areas of California make it difficult to project the results from evaluation tests in one area to another. As a consequence, field plots were established for the 1957 season in Bartlett pear orchards—in Sacramento, Solano, El Dorado, Lake, and Mendocino counties—for University personnel to evaluate spray materials under local conditions. As a correlative evaluation, spray chemicals used in codling moth and aphid control plots were checked for their effects on spider mites.

Materials Tested

Three materials—Trithion, Kelthane, and Tedion—were selected for trial because they had performed well on small scale plots the previous season. In the 1957 trials, they were compared with Sulphenone as a standard material. In all test plots the treatments were applied with grower equipment.

Kelthane gave good control of European red mite and two spotted mite in all localities and—in most cases—a single application held the mites in check for nine weeks or longer. Tedion also gave excellent control of European red mite and two spotted mite in all of the areas. Here again, a single application kept the mites in check for periods of 9–11 weeks. Trithion in all localities except Lake County compared favorably with Kelthane and Tedion on the two mite species involved. In Lake County, the material failed to hold and required re-treatment. In this case, the area has a history of phosphate resistance which may account for the results. All materials held longer than the standard acaricide,

Sulphenone, which required re-treatment some 3–4 weeks earlier than any of the new compounds. In Solano County, brown almond mite was one of the species present, and the three test acaricides gave good control of this mite.

In conjunction with test plots on Pippin apples for codling moth in Santa Cruz County, near Soquel, there was an opportunity to see how several materials performed for control of European red mite, which reached treatment levels in July.

Four of the codling moth test compounds—DDT, DDT plus parathion, Ryania, and Sevin—did not show any acaricidal effects. Therefore, specific acaricides were added to these materials at the July 18 application. Spider mite counts were taken before and after treatment by selecting 100 leaves at random from each plot. All materials were applied with conventional ground equipment and orchard guns. Applications averaged 750 gallons per acre.

Trithion and Nialate, which were used for codling moth control, prevented the

buildup of European red mite, and these plots were almost free of mites for the season. Of the acaricides added to the codling moth test materials, Tedion and Kelthane reduced the populations to a low level and no further treatments were necessary for the remainder of the season.

Ovex and Fenson failed to provide any measure of control, and by August 1 these plots were in danger of defoliation. It was necessary to re-treat these trees with another acaricide in order to prevent injury. It was learned—after the applications were made—that this particular trial orchard had a history of Ovex resistance, although the material had not been used for two full seasons. It is evident that resistance was maintained in this orchard, and it is not surprising that Fenson failed to give control because it is chemically very close to Ovex.

In a test plot near Watsonville—for control of aphids on Pippin apples—several phosphate materials were evalu-

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Mite Counts from Woolly Apple Aphid Control Plots
Pippin apple orchard, Watsonville, 1957

Material	Dosage per 100 gallons	Dates of application	Average number mites per leaf		
			July 25	Aug. 8	Sept. 3
Thimet	1 quart 48%	May 6 July 11	0.2	1.6	8.8
Thimet	1 pint 48%	May 6 July 11	0.2	3.0	8.3
Diazinon	1 pound 25%	May 6 July 11	6.3	8.7	37.4
Nialate	1 pound 25%	May 6, June 10, July 11, Aug. 8	0.2	1.0	5.4
Guthion	1½ pints 18%	May 6, June 10, July 11, Aug. 8	0.1	0.7	2.4
Thiodan	2 pounds 25%	May 6, June 10, July 11, Aug. 8	3.7	7.5	58.1
Check	No spray	1.3	10.8	23.1

European Red Mite Control on Codling Moth Plots. Soquel, 1957

Mite counts expressed as average number of mites per leaf, dosages expressed as amounts per acre

Spray application and mite count dates							
May 6	May 23	June 10	June 13	July 4	July 18	Aug. 1	Aug. 15
DDT—14.8 lbs. 50%	0.4	DDT—13.6 lbs. 50%	1.0	4.2	DDT—13.6 lbs. 50% and Tedion—6.8 lbs. 25%	0.6	0.5
DDT—14.8 lbs. 50% and Parathion—7.4 lbs. 25%	0.8	DDT—13 lbs. 50% and Parathion 6.5 lbs. 25%	0.5	4.7	DDT—13.6 lbs. 50% and Parathion—6.8 lbs. 25% and Ovex—10.2 lbs. 50%	11.8	..
Ryania—40.2 lbs.	0.5	Ryania—39 lbs.	1.1	5.1	Ryania 40 lbs. and Fenson—3.3 lbs. 50%	16.4	..
Trithion 6.8 pts. 50%	0.1	Trithion 6.5 pts. 50%	0.0	0.2	Trithion 6.7 pts. 50 %	0.2	0.6
Sevin 11.4 lbs. 50%	0.7	Sevin—10 lbs. 50%	1.5	4.7	Sevin—11.4 lbs. 50% and Kelthane—11.4 pts. 18%	1.2	0.3
Nialate 16.4 lbs. 25%	0.02	Nialate—13 lbs. 25%	0.0	0.1	Nialate—16.2 lbs. 25%	0.2	0.3

This may be due to the fact that magnesium levels are low, as are sodium. There is a tendency for a reciprocal relationship between these two elements and potassium. At Davis, for example, the magnesium content has been found to be 2-3 times as high as in the Kern County experimental plots, and the potassium content is much lower.

The leaf analyses provided an obvious explanation of the failure of the trees to respond to nitrogen. The analyses also pointed up the difficulty of getting absorption of phosphorus and potassium—even with heavy applications on a light soil—and emphasized the importance of time of sampling in the interpretation of leaf analyses.

E. L. Proebsting is Professor of Pomology, University of California, Davis.

A. N. Kasimatis is Extension Specialist in Viticulture, University of California, Davis.

GRAPES

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ters and berries of vines sprayed with the gibberellin at 5 ppm were larger than those of unsprayed and unringed vines, but smaller than those of the unsprayed but ringed vines. Very large clusters and berries resulted from treatment with the compound at 20 ppm and 50 ppm. The percentage of total soluble solids was lowest and the percentage of acid highest in the fruit sprayed with the compound at 50 ppm.

Zinfandel

Grape varieties with compact clusters are undesirable because rot is likely to develop in them. If the cluster parts could be lengthened, such clusters would be loosened and the tendency to rot reduced. Shoots of Zinfandel, a variety with very compact clusters, were sprayed with gibberellin at 0, 1, 10, 100, or 1,000 ppm on April 7 when the shoots were 2"-3" long. Canes were removed and fruit harvested on September 23. The shoots and their internodes were elongated in pro-

portion to the concentration of compound used. When measured on July 15, the shoots sprayed with the compound at 1,000 ppm were twice as long as the untreated shoots.

The length of cluster parts was increased in proportion to the concentration of the gibberellin used. The compound at 10 ppm resulted in the production of rather loose clusters as a result of the elongation of cluster parts. Very loose clusters resulted from application of the compound at 100 ppm, but there were many shot berries. At 1,000 ppm the clusters were virtually destroyed. In this treatment ovaries still adhered to the greatly elongated pedicels, but the cluster framework was cracked and quite brittle. Above 1 ppm the average weight per cluster and berry usually decreased with increasing concentrations of the compound, probably because the number of small shot berries increased.

There was no definite trend in the percentage of total soluble solids or acid. However, treatments at later dates hastened coloration and maturation.

Robert J. Weaver is Associate Viticulturist, University of California, Davis.

Stanley B. McCune is Senior Laboratory Technician in Viticulture and Enology, University of California, Davis.

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ated for mite control in an orchard with a history of mite resistance to parathion and malathion. Although the sprays were applied for aphid control, mite counts were taken at intervals throughout the season. All materials were applied with conventional ground equipment and orchard guns, at an average of 350 gallons per acre.

A definite mite resistance to parathion and malathion was observed in past seasons and in 1957 Diazinon did not hold the mites in check. The trees in the test plot showed severe mite injury to the leaves. Thimet, at two dosages, Nialate, and Guthion gave what could be considered commercial control in spite of the phosphate resistance present. However, in the previous season, Thimet gave such good control in this orchard that only a few mites could be found on the treated trees. In the 1957 season, although commercial control was obtained, the plots were close to treatment levels. Guthion and Nialate had not been used previously in this orchard.

Thiodan—the only nonphosphate compound used in these trials—had little or no acaricidal effect.

The results of these tests indicate that even though resistance to one or more phosphate chemicals may be present, it is possible to obtain spider mite control for at least a season or so with other phosphate materials. How long the materials will continue to be effective is a matter of conjecture.

Harold F. Madsen is Assistant Entomologist, University of California, Berkeley.

Gordon Morehead, Sacramento County, Jim DeTar, Solano County, Dick Bethell, El Dorado County, Russell Gripp, Lake County, and Bruce Bearden, Mendocino County; Farm Advisors, University of California, cooperated in trials with Bartlett pears.

PARASITES

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Aphelinus semiflavus adults began to appear commonly in the San Joaquin and Salinas valleys in the fall of 1957. The shiny black aphid mummy is quite distinct, but it is not conspicuous because it is found usually on the under surface of the lower leaves.

In addition to the three imported parasites, over 8,000 individuals of several aphid feeding predators imported from India have been released in northern California. Among these predators are three ladybeetles—*Coccinella septempunctata* Linn.; *Adonia variegata* Goeze; and *Scymnus nubilis* Mulsant. Also from India a green lacewing—*Chrysopa carnes* St.—has been released against the spotted alfalfa aphid. None of these predators had been recovered by November 1957. One of the difficulties in establishing the predators is the effective competition of native natural enemies of the spotted alfalfa aphid in the spring and fall.

Because the three wasp parasites overwintered successfully in the San Joaquin Valley and *Praon* survived the winter as far north as Tehama County, it is expected that they will be widely distributed throughout the state in 1958, and become abundant enough to contribute significantly to the natural control of the spotted alfalfa aphid in northern California as they have done in southern California.

Kenneth S. Hagen is Assistant Entomologist in Biological Control, University of California, Berkeley.

James K. Holloway is Entomologist, United States Department of Agriculture, and Associate in Biological Control, University of California, Berkeley.

F. E. Skinner is Principal Laboratory Technician in Biological Control, University of California, Berkeley.

G. L. Finney is Associate Specialist in Biological Control, University of California, Berkeley.

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Data at Harvests for Black Corinth and Thompson Seedless Grapes

Treatment, concentration gibberellin ppm	Av. wt./cluster gm	Av. wt./berry gm	Total soluble solids %	Acid %
Black Corinth				
0 not girdled..	59.8	0.14	27.7	0.85
5 not girdled..	122.0	0.47	23.2	0.85
20 not girdled..	215.9	0.65	23.5	0.89
0 girdled.....	131.7	0.35	24.1	1.02
Thompson Seedless				
0 not girdled..	0.66	1.59	22.4	0.79
5 not girdled..	0.95	1.91	23.2	0.73
20 not girdled..	1.46	2.71	18.9	0.83
50 not girdled..	2.15	3.15	17.6	0.94
0 girdled.....	1.10	2.26	23.0	0.74