

# Rosy Apple Aphid Control Tests

dormant oil plus phosphate compounds applied to control the overwintering eggs more efficient than spring foliage sprays

Harold F. Madsen and J. Blair Bailey

**Rosy apple aphid**—perhaps the commonest aphid found on apples in California—can be a very destructive pest if not controlled.

The damage caused by this aphid is rather severe on apples. The foliage is curled as it develops and the aphids are protected within the curled leaves. A considerable amount of honeydew is produced which drips to the fruit and foliage. In addition, the feeding of the aphids on the leaves affects the nearby fruit, and the apples become deformed and fail to increase in size.

Rosy apple aphid overwinters as an egg on the shoots and buds of the tree. The eggs hatch early in the season, usually about the time that the apple tree blooms. The stem mother that hatches from the egg gives rise to apterous forms which infest the unfolding leaves. Many generations are produced during the spring months, and in early June, alates become abundant. The winged aphids leave the apples for a summer host, where they remain until fall. At that time, winged aphids are produced on the summer host, and these aphids return to the apples where they give rise to sexual forms which mate and lay the overwintering eggs.

Because the aphid overwinters as an egg, and because of the difficulty in controlling aphids within curled leaves, the standard means of control has been the use of dormant oil plus dinitro compounds during the winter. This combination, if properly applied, will destroy the aphid eggs. Growers, however, have objected to this combination as it is a caustic spray and will burn and often destroy their winter covercrop.

A typical apple twig infested with rosy apple aphid.



In an attempt to find a substitute treatment during the winter, three combinations of oil and phosphate compounds were tried during 1957. The materials used were Trithion plus oil, Phostex-oil miscible, and Nialate-oil miscible. The materials were applied to acre plots with

blower sprayer equipment in late March, during the delayed dormant stage of the trees.

In May, the plots were evaluated by counting the number of infested shoots on 16 trees in the center of each plot. European red mite eggs were also numerous in this orchard, and the effects of the materials on mite eggs were checked by leaf counts in May and June.

All of the materials effectively controlled the rosy aphid eggs. The few infested shoots found on the Nialate plot were at the top of a very high tree, and probably represent inadequate coverage. With European red mite, Trithion plus oil and the Nialate-oil miscible reduced populations to a considerable degree as compared with the check trees. The Phostex-oil miscible, however, did not seem to affect the mite eggs, and the counts paralleled those in the check.

There was no adverse effect from the use of these materials on the cover crop, and these data indicate that certain oil-phosphate combinations could be substituted for the oil-dinitro sprays now in use.

In this same orchard, a plot had been established for woolly apple aphid control, and the trees involved had not received a dormant treatment. As a result, a heavy infestation of rosy apple aphid developed in this block of trees in late April. Since the first sprays for woolly apple aphid were applied in May, it was decided to evaluate the effect of these materials against rosy apple aphid. The plots consisted of single trees with eight replications, and materials were applied with conventional ground equipment and hand guns. The materials were evaluated four and 10 days after application by

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Summary of 1957 Rosy Apple Aphid Plots

Material	Dosage per 100 gallons	Date applied	Mortality	
			May 10	May 16
Systox	1 pt. 21%	May 6	100%	100%
Thimet	1 qt. 48%	May 6	100	100
Thimet	1 pt. 48%	May 6	100	100
Diazinon	1 lb. 25%	May 6	99.2	98.8
Guthion	1½ pts. 18%	May 6	40.3	73.0
Nialate	1 lb. 25%	May 6	28.1	59.0
Thiodan	2 lbs. 25%	May 6	34.5	68.2

Summary of 1957 Delayed Dormant Plots for Control of European Red Mite and Rosy Apple Aphid Eggs

Materials	Dosage per acre	Date applied	Rosy aphid counts*	European red mite counts**		
			May 16	May 10	June 6	June 21
10% Phostex-oil miscible..	3.6 gals.	March 21	0.0	0.6	6.4	12.6
5% Nialate-oil miscible..	3.6 gals.	March 21	0.7	0.2	0.2	0.5
48% Trithion .....	3.6 pts.	March 21	0.0	0.1	0.2	0.7
+ dormant oil .....	7.2 gals.					
Check .....			7.5	1.3	6.7	13.4

\* Expressed as average number aphid infested shoots per tree.

\*\* Expressed as average number mites per leaf.

San Diego counties offered only limited service. By comparison, fewer than one half of the stores in Butte and Fresno counties limited their delivery.

Urban stores offered delivery service relatively more frequently—26%–46%—than rural stores—0%–33%—in all of the counties. In Butte and Fresno counties, 26%–46% of the urban stores as compared with 10%–25% of the rural stores provided delivery. Of the stores

its use. The exception was in Alameda County where only 30% of the stores provided full delivery service.

On the other hand, over one half of the neighborhood-secondary stores in each county—51%–62%—offered only limited delivery service. In each of four counties, over seven tenths of the isolated stores—71%–100%—also offered only limited service. The exception was in Fresno County where 30% of the isolated stores offered the limited type of delivery service.

Delivery service was provided primarily by independent stores. The proportions of independent stores offering this service varied from 23% in Butte County to 53% in Alameda County.

As in the case of telephone service, a larger proportion of affiliated independent stores in each county than of nonaffiliated stores provided delivery. From 33% to 64% of the affiliated stores as compared with 17%–48% of the nonaffiliated stores offered such service. Alameda County had the highest proportions of both groups of independent stores offering delivery service and Butte County the lowest.

Only a small proportion of the chain stores in each county, one eighth or fewer, offered delivery service. In three counties, Alameda, Butte, and Los Angeles, the proportion of chain stores that provided delivery—3%–7%—was the same as the proportion that provided telephone service. In San Diego County delivery was provided by 12% of the stores but telephone service by only 4%. Although one fifth of the chain stores in Fresno County offered telephone service, none of them offered delivery service.

Considerable variation from county to county existed in the extent to which independent stores with delivery provided full or limited service. In Butte and

Fresno counties the majority of stores—55%–57%—had not restricted the availability of this service. On the other hand, in Alameda, Los Angeles, and San Diego counties the majority of stores—57%–58%—provided only limited delivery.

Of the independent stores offering delivery service, 43%–72% of the affiliated stores as compared with 33%–58% of the nonaffiliated provided limited service.

None of the chain stores offering delivery service in Alameda and San Diego counties placed any restrictions on its availability. By comparison, 83% of the chain stores in Los Angeles County and all chain stores in Butte County placed some restrictions on delivery.

As in the case of telephone service, stores employing 3–6 persons, for the most part, offered delivery service relatively more frequently than stores with either larger or smaller numbers of employees. From 32% to 82% of the stores with 3–6 employees made such service available as compared with 16%–42% of the stores with one or two persons and 6%–67% of those stores with 7–14 employees. Relatively few—0%–20%—of the stores employing 15 or more persons offered delivery service.

Of the stores supplying delivery service, the tendency was for relatively more of those employing one or two persons—41%–73%—and of those employing 15 or more persons—50%–100%—to offer only limited service. Conversely, the majority of those stores with 7–14 employees—50%–100%—offered full service. The proportions of stores employing 3–6 persons that provided limited and full delivery service were about equal.

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**Delivery Service Offered by Surveyed Grocery Stores**

County	Surveyed stores with delivery service	Type of delivery service	
		Full	Limited
Butte	21.1%	52.2%	47.8%
Fresno	39.5	56.7	43.3
San Diego	40.6	44.4	55.6
Alameda	44.2	42.4	57.6
Los Angeles	28.6	41.7	58.3

offering the service, the tendency was for the rural stores to limit delivery relatively more frequently—45%–100%—than the urban stores—40%–58%.

For the most part, stores in downtown shopping areas provided delivery service relatively more frequently than isolated stores or stores in neighborhood-secondary shopping areas. For downtown stores the proportions offering delivery varied from 32% in Los Angeles County to 65% in Fresno County. For neighborhood-secondary stores, from 28% of the stores in Butte and Los Angeles counties to 45% in San Diego County offered the service. Among the isolated stores the proportions providing delivery ranged from 3% in Butte County to 41% in Los Angeles County.

Of the stores making some type of delivery service available, one half or more of the downtown stores in four counties—50%–100%—did not restrict

## DEERBRUSH

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Further studies are being made on deerbrush and other species of this genus to learn more about the relationship between nodules and nitrogen-fixation. There are about 40 species in this genus and at least one occurs in practically every plant association in California.

Deerbrush is abundant on many forest areas in California, especially in the ponderosa pine zone where the soil nitrogen is generally low. Deerbrush is also one of the more important browse species, being well liked by deer, cattle, and sheep.

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## APPLE APHID

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taking 25 curled leaves at random from each plot and counting the live and dead aphids.

The systemic insecticides, Systox and Thimet, and the nonsystemic phosphate, Diazinon, all gave good control of the aphids, and new growth remained free of infestation for the rest of the season. Guthion, Nialate, and Thiodan all gave a measure of control, but it was not suf-

ficient to prevent continued infestation of the foliage. By three weeks after application, the new growth on these plots was again heavily infested, and it was not possible to tell that a treatment had been applied.

These data, however, do show that it is possible to obtain control of the rosy apple aphid with a foliage treatment. The controls directed against the overwintering eggs are preferred, however, because it is easier and less costly to apply control materials during the delayed dormant period.

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