ments were applied to small olive branches at Fresno using a hand sprayer. At the time the sprays were applied the scale had started oviposition but only a few eggs were laid. An examination was made on April 23. On this date some of the treated adult female scale were alive and able to move but had a strange appearance. The body contents had contracted to the center leaving a thin, light colored margin around the scale. These scale were counted as "dead." It appeared that the treatments had delayed oviposition. The results of the examination appear in table 2.

On April 24, 1947, sprays were applied to two-tree plots using a Hardie sprayer at 500 pounds pressure. At this time the blossoms had not yet opened on the olive trees. By June 12 the young fruit were about one fourth inch in diameter and where ever olive scale had settled the olives showed a dark purple spot. On this date a sample of 100 olives from each plot was examined. A like sample was examined again on September 24. The results of these examinations are summarized in table 3.

On June 28, 1947, scale were examined from three of the plots. Where two pounds of the 15% parathion per 100 gallons of water had been used, most of the eggs appeared to have been killed. Where the adult female had not been killed, however, a few normal appearing eggs were seen among the dead ones. Some eggs were hatching. Many old scales had live young beneath them and some live young were seen on leaves. Many crawlers had died during hatching.

Where four pounds of 15% parathion had been used the appearance of the eggs was much as where two pounds was used. No live young were seen where four pounds was used but some of the eggs from the few surviving adult females appeared normal. Where two pounds of 15% parathion and one quart of Velsicol

TABLE 3

Results of Parathion Sprays Applied April 24, for Control of Olive Scale

Treatment per 100 Gallons	Per cent scale infested olives	
	June 12	September 24
Parathion 15%, ½ lb.	29	100
Parathion 15%, 1 lb.	4	97
Parathion 15%, 2 lbs.	1	47
Parathion 15%, 4 lbs.	0	18
Parathion 15%, 2 lbs.; methyl naphthalenes, 1 qt.	0	42
Untreated	43	100

TABLE 4

Results of a Parathion Spray to Control Olive Scale at Fresno

Treatment per 100 gallons August 8, 1947	Per cent dead scale Sept. 4, 1947		Number live scale per foot of twig January 7, 1948
	Immature scale	Adult females	
Parathion 15%, 4 lbs.	97.3	40.4	0.05
Untreated	5.7	15.6	19.45

Continued on page 24

Fig Scale

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FIG SCALES SPEND THE WINTER as adult females on the wood of the fig tree. Eggs are laid from February to June.

Hatching starts early in April and continues well into June. While most of the young settle on the leaves, some settle on the fruit and a few settle on the wood. Additional broods of the scale develop during the summer and fall. The young females settle principally on the leaves during the summer and on the twigs in the fall. The scales on the twigs form the overwintering brood. The scales that settle on the fruit cause the greatest losses. On canning figs the part beneath and surrounding the scale remains dark green and will not "cook out" in processing. Such figs must go into jam stock with consequent reduction in returns. Heavily infested drying figs are less acceptable to packers, being lighter in weight and having a warty appearance.

A parathion spray was applied to an Adriatic fig tree near Fresno on March 31, 1947. At that time eggs were present

TABLE 1

Results of a Parathion Spray to Control Fig Scale (1 Pint of 20 Per Cent Parathion in Emulsible Di 2 Ethyl Hexyl Phthalate per 100 Gallons of Water. Applied March 31, 1947)

Average number scale per lead on third basal leaves, July 2, 1947	
Sprayed	Unsprayed
10.4	397.6
Average number scale per fig on oldest 2 figs, July 2, 1947	
Sprayed	Unsprayed
0.8	21.6

TABLE 2

Results of a Parathion Spray in Reducing Scale Infestation on Figs

Number of scale on figs	Number of figs in each group	
	Unsprayed	Sprayed
0	0	22
1–5	0	50
6–10	4	18
11–15	5	7
16–20	8	3
21–25	11	0
26–50	35	0
51–100	28	0
Over 100	9	0
	100	100

and hatching was about to start. On July 2, the number of scales on the third leaf of two twigs from five locations on the sprayed tree (top center, bottom center, north, south, east, and west sides) and a nearby unsprayed tree were counted. At the same time, the number of scales on the first and second figs on these same twigs were counted. The results are summarized in table 1.

Both counts indicated a material reduction in infestation following the use of parathion. Only the early stages of the scale were found on the leaves and figs from the sprayed tree while all stages, including ovipositing females and empty scales of emerged males, were present on the unsprayed tree. The application of

Continued on page 12

Hexaethyl Tetraphosphate Thermal Aerosol Fog Effective Against Grape Leafhopper

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DURING SEPTEMBER, 1947, observations were made of hexaethyl tetraphosphate applied as a thermal aerosol fog for control of the grape leafhopper, *Erythroneura elegantula* Osb., on grapes. A commercial operator of a Tifa machine (Todd Insecticide Fog Applicator) coöperated in tests and the results of several commercial applications were evaluated.

For all treatments a commercial preparation containing 50% of HETP—Vapotone—was mixed with a commercial light medium spray oil—Greenol—and applied in Emperor variety vineyards in Tulare County. The Tifa machine was mounted on a jeep, with the outlet nozzle so adjusted that the fog was directed to the ground at a point about 10 feet to the rear and midway between the rows. Controls were set to deliver particles of 20 to 30 microns in size.

Three vineyards were treated, two at sundown and the third at sunrise, with a mixture of one part of 50% HETP and three parts of oil applied at one gallon per acre in alternate middles. No actual counts were made of leafhoppers killed but both evening treatments resulted in a very good commercial reduction of populations. The early morning test showed no observable effect.

Two additional evening tests were made. In one vineyard a mixture of one part of 50% HETP and three parts of oil was applied at two gallons per acre in every middle. This resulted in a reduction of the average population per leaf on 10 leaves from 64.4% to 0.9% or 98.6%. In the second vineyard a mixture of equal parts of 50% HETP and oil was applied at one gallon per acre in alternate middles. The average population per leaf on 10 leaves was reduced from 123.8 to 1.6 or 98.7%. In both cases pretreatment population samples were taken the day of treatment and post-treatment samples counted the day following application.

An application was then made over a 100-acre vineyard in which equal parts of HETP and oil were applied at night in alternate middles at one gallon per acre. This resulted in a very excellent kill of leafhoppers. In spots where averages of 398, 141, 168, and 139 leafhoppers per leaf had been counted prior to treatment the population had apparently been reduced by 100%. It was difficult to find a live adult or nymph anywhere in the treated area the day after treatment.

No discernable injury developed on the vines as a result of any treatment.

Further use and tests of this method will be necessary to determine its relative merits as a means of controlling the grape leafhopper.

RED SPIDER

Continued from page 5

four ounces of TEPP was fortified with B 1956 and IN4200 the combination was more effective than eight ounces of HETP (i.e. one pint of 50%). But in the second application the HETP was more effective than TEPP when used alone. By comparing with the data in table 5, it can be seen that the double applications of ethyl phosphates in table 6 were not as effective as single applications of parathion at two pounds of 15% per 100 gallons.

TABLE 6—Double Applications of Ethyl Phosphates on Pacific Mite on Grapes

Plot	Sprayed, 1947	Material	Amount per 100 gallons	Ave. live mites per leaf
No. 1	July 10	TEPP	4 oz.	4.8
		B1956	4 oz.	
		IN4200	1 pint	
	July 17	TEPP	4 oz.	11.4
No. 2	July 10	HETP 50%	1 pint	40.8
	July 17	HETP 50%	1 pint	8.1

FIG SCALE

Continued from page 9

parathion near the start of hatching had evidently retarded the establishment of the summer forms until late in the hatching period of eggs from the overwintered females.

At harvest, August 7, 1947, 100 figs from the sprayed and unsprayed tree were examined for numbers of scale present (table 2). All the figs from the unsprayed tree and 78% of those from the sprayed tree were infested. The high percentage of infestation on fruit from the sprayed tree was expected since observations in 1944 and 1945 had indicated that unless the infestation in late June was substantially less than 1 per leaf, an appreciable fruit infestation could be expected on the mature figs. Table 2 shows that 72% of the figs from the sprayed tree had five or fewer scales each while 72% of those from the unsprayed tree had 26 or more scales.

This preliminary test indicates that parathion may be very effective in control of fig scale. Information on dosage, timing, residue, etc., must be obtained. The possibility of controlling spider mites and other pests makes the possible use of parathion even more interesting.