ropean red mite would indicate that this material does not sufficiently control this mite. The control of the two-spotted mite was somewhat better but would require frequent applications.

Parathion (15% wettable powder) was not received early enough to be included in the early mite sprays but was used over the more critical period of mite control (July 15 to August 22). It was applied at a dosage of one pound per 100 gallons in the last two sprays (July 15 and August 15) on a plot showing poor control from previous applications.

For a period of thirty days during the period of high temperatures and heavy mite attack it held the populations of both mites so as to prevent foliage injury. This material was the only one of the nine materials tested in 1947 that prevented a marked build up in mite populations during the late season.

TABLE 4

Control of the Pear Bud Mite

Materials	Dosage per 100 gals.	Per cent mortality
HETP—50%	1 pint	93
Lauryl thiocyanate	1½ pints	97
BHC 6% gamma	4 pounds	18
Parathion 15%	3 pounds	42

In a block of Bartlett and Hardy pears, sprays were applied September 11 and September 29 for the control of the pear bud mite which was under the first scales of the fruit buds. Counts were made under the binocular two weeks following the applications, and the results are given in table 4.

In the control of bud moth larvae of prunes a post harvest application of a number of insecticides were applied September 4. Subsequent counts showed the following mortality percentages.

Per 100 gallons:	Per cent mortality
4 pounds Basic Lead Arsenate	18
2 pounds 50% wettable DDT	54
2 pounds Genicide A	33
4 pounds BHC (6% gamma)	15
1½ pounds parathion (15%)	100

It was noted that all larvae within the hibernaculae at this time were killed by the parathion and further experimental tests were made (October 21) at dosages from one half to two pounds. Counts were made at one and four weeks after the application. The percentage mortality as given is after allowances were made for natural mortality. The results are given in table 5.

In a prune orchard heavily infested with brown apricot and black scale, applications of 15% parathion were applied (November 11) at several dosages, and counts were made under a binocular of the scale found on 10 twigs from each tree, at weekly intervals, following the

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Melon Insects and Mites

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HONEYDEW MELONS are subject to the attacks of several very important insects and mites. Until the advent of parathion, none of the recently developed insecticides offered too much promise in the control of all the harmful pests on melons. In fact, the use of DDT will frequently cause an increase of mites and aphids and as a result, must be used with a great deal of caution.

An opportunity to treat a small plot of Green Flesh Honeydew melons was presented during 1947 on a ranch at Woodland. The plot was a three-acre portion of a 65-acre melon field. Three pounds of a commercial 15% wettable parathion material in 100 gallons of water were used per acre. It was applied on August 27, 1947 by means of a homemade spray rig equipped with 38 nozzles on a 36 foot boom. The machine developed a maximum pressure of only 60 pounds per square inch.

The plot was not replicated. An adjacent untreated portion of the field was used as a check.

Comparative figures on the abundance of aphids, leafhoppers, and mites were obtained by examining at each survey from 10—65 leaves. It was arbitrarily decided to consider as infested all leaves with a visible population of mites, aphids, or leafhoppers.

Counts were made at weekly intervals in both the treated and untreated plots.

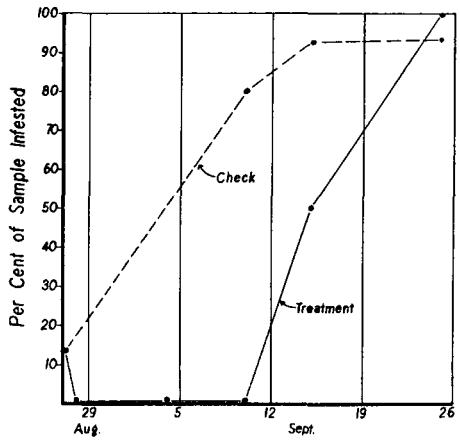
Population counts in the treated and untreated portions of the field are presented in figures 1, 2, and 3. At the end of 14 days the leaves in the sprayed plot were free of aphids—*Aphis gossypii*—while in the check, 80% of the leaves were infested. Two weeks later, however, the population in the treated portion surpassed that in the check plot.

Parathion held the leafhoppers—*Empoasca* sp.—under excellent control for seven days but after 19 days they increased to a 46% infestation as compared to 87% in the check. The first stages to appear were young nymphs, indicating either a lack of ovicidal action or else an incomplete coverage by the spray.

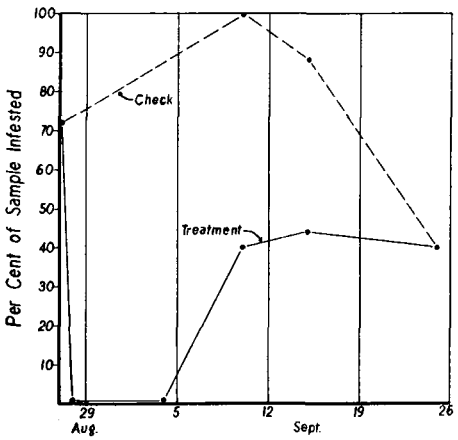
All moving forms of mites—*Tetranychus pacificus, Pacific mite and Tetranychus bimaculatus, Two-spotted mite*—were apparently killed as indicated in figure 3, but the population began to increase immediately after the first day and over 90% of the leaves were infested after 28 days. The first mites to appear after treatment were in the nymphal stage of development.

Predators and parasites were almost completely eliminated from the treated plot but maintained an increasing population in the check.

No harmful effect on the plants or fruit was noted. The grower thought he detected a more luxuriant growth at first in the treated plot two weeks after application, but later no difference could be noted.



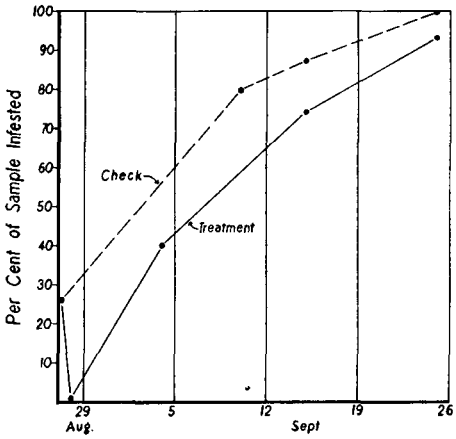
Trend of the aphid population following spraying with parathion.



Trend of the leafhopper population following spraying with parathion.

It was apparent that the spray rig used was not adequate to give a coverage on the undersides of the leaves and it is felt that this in a large measure explains the rapid increase of mites and leafhoppers. As previously noted, the first stages of these to appear were the immature forms. A contributing factor also may have been the marked reduction of predators and parasites in the treated plot.

A second experiment using parathion at the same concentration and rate of application was performed at Patterson. Application was made from a power rig using two hand guns with double nozzles. Although the application was uneven, the



Trend of the mite population following spraying with parathion.

Walnut Aphid

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control of mites, leafhoppers, *Diabrotica*, and aphids was good on those plants that were hit.

An application of three pounds of a 15% parathion in 100 gallons of water per acre on a three-acre plot of honeydew melons was made at Woodland. The melon aphid was successfully controlled for 14 days, the leafhopper, *Empoasca* sp. for seven days, and the adults and the nymphal forms of the two-spotted and Pacific mites were apparently killed. It was felt that the homemade spray rig which developed only 60 pounds pressure per square inch was not sufficient to give adequate coverage on the undersides of the leaves. However, the reduction in population of natural enemies may well have been responsible for the rapid increase in the aphid and mite populations. The first stages of mites and leafhoppers to appear were immature. No plant injury was noted.

To study the control of the walnut aphid, the following aphicides were added to the codling moth sprays applied to nine blocks of 40 trees each. The insecticides used for this purpose were a 14% dry nicotine concentrate, benzene hexachloride(gamma isomer content 6%) and 50% hexaethyl tetraphosphate. These were used in conjunction with DDT, standard lead arsenate, and basic lead arsenate. The spray programs are given in table 1.

In mixing the sprays the dry materials were always slurried. Frequently the dry nicotine concentrate was slurried separately and added to the tank either just before or immediately after the oil emulsion. In general the order of mixing was as follows: The dry materials were slurried and added to the spray tank when one third to one half full, followed by the oil emulsion. In experiments where HETP was used, this material was added just as the tank was full, and the spray immediately applied.

The trees were large and approximately 55 gallons of spray were applied per tree. The spray was applied at a pressure of 600 pounds with sprayers having 25-foot towers equipped for automatic spraying.

Numerous surveys were made in order to compare treatments and to follow the seasonal population trends of the aphid. The relative aphid population was determined by counting the number of individuals on the next to the terminal leaflet. Six leaflets were collected at random from the skirt of each of five trees, in each of the treatments. As in previous years, a wide variation in the number of aphids found on the leaflets of the same tree was noted.

Where nicotine dusts are used to control aphids, it is very difficult to avoid dusting contiguous experimental plots. This has made it difficult to accurately evaluate the addition of aphicides to the early codling moth spray. The orchard would usually require treatment for the control of aphids prior to that of the experimental area. This condition was eliminated in the Linden experiments this past year. Here an aphicide was added to the early codling moth spray applied to the grower-treated portion of the orchard. As a result, the need for aphid control in the entire orchard paralleled rather closely the need for treatment in the plot area. The results obtained are given in table 1. An examination of the table shows that the addition of an aphicide to the early codling moth spray resulted in excellent aphid control.

All treatments were so effective in reducing the aphid population that a week after treatment it was extremely difficult to find any aphids in any of the treatments. The control of aphids held up remarkably well, and in all the treatments the population remained at a rather low

TABLE 1

Control of the Walnut Aphid in the Commercial Sprayed Codling Moth Plots at Linden
(Entire Experimental Area Dusted with a Nicotine Dust, June 12)

Treatment and date applied*	Average number of aphids per leaflet on the survey date given												
	Apr. 23	May 1	May 8	May 22	June 2	June 9	June 17	June 27	July 14	July 31	Aug. 19	Sept. 12	Oct. 21
DDT, depositor, HETP oil, May 2	0.9	4.9	0.0	0.1	1.3	2.1	1.3	12.7	38.7	2.6	6.6	7.7	0.8
DDT, depositor, nicotine, oil, May 2	1.8	9.0	0.0	0.8	7.5	9.0	3.4	18.0	40.0	1.1	5.0	14.5	0.5
DDT, depositor, benzene hexachloride, May 2	2.3	6.4	0.0	0.1	8.5	6.3	7.3	33.8	40.4	1.7	5.5	6.5	0.2
Standard lead arsenate, safener, HETP, oil, May 2	1.5	8.1	0.0	1.1	5.5	17.7	8.1	50.0	8.6	1.1	4.8	17.4	0.3
Standard lead arsenate, safener, benzene hexachloride, May 2	1.4	6.3	0.0	0.2	3.5	16.3	5.2	33.2	5.7	1.1	4.2	32.5	0.2
Standard lead arsenate, safener, nicotine, oil, May 2	1.5	4.5	0.0	0.6	6.0	8.1	6.3	24.0	4.5	0.8	3.2	32.0	1.4
Two sprays basic lead arsenate, benzene hexachloride, May 2 and June 2	0.9	3.9	0.0	0.1	2.2	3.6	1.2	23.0	6.0	0.5	3.2	30.6	1.2
Two sprays basic lead arsenate, nicotine, oil, May 2 and June 2†	1.2	3.4	0.0	0.7	1.6	3.5	2.0	9.0	2.2	0.9	5.2	21.9	1.1
Two sprays basic lead arsenate, HETP, oil, May 2 and June 2	0.8	2.1	0.1	1.5	6.3	8.7	1.7	7.9	3.1	1.7	11.2	23.0	1.5

* Composition of sprays per 100 gallons of water as follows: DDT, 1 pound 50 per cent wettable powder; depositor ½ pound; HETP, 1 pint of a 50 per cent concentrate where used with DDT and ½ pint where used with lead arsenate; oil, ½ gallon medium summer oil emulsion containing 83 per cent oil; nicotine, 1 pound of a 14 per cent dry nicotine concentrate; benzene hexachloride, 1 pound of a material containing 6 per cent gamma isomer; standard lead arsenate, 3 pounds; safener, 1 pound of a commercial basic zinc sulfate product containing 50 per cent zinc expressed as metallic; basic lead arsenate, 4 pounds.
† No nicotine dry concentrate used in June 2 application.