Citrus Thrips Control with DDT

investigated in two Coachella Valley groves

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RESULTS OBTAINED in the Coachella Valley with DDT for the control of citrus thrips indicated that DDT gave poorer control than standard nicotine-sugar sprays.

In those initial experiments, conducted in 1944 and 1945, two pounds of DDT per acre were applied with a spray-duster, as a 20% DDT wettable powder suspension in 100 gallons of water.

The results were in striking contrast to those obtained in the San Joaquin Valley, where a similar application of DDT on oranges, gave much better control than standard nicotine-sugar sprays.

This indicated that under the higher temperature conditions in the Coachella Valley, DDT did not have the same effectiveness as in the San Joaquin Valley.

Higher dosages of DDT were tested in 1946 in two groves in the Coachella Valley. In the first grove nicotine-sugar had given poor results the previous year, while in the second grove, excellent thrips control had been obtained.

Applications were made in the first grove on April 8 and April 16. Fruit scarring records were made in all plots on outside fruits that could be examined from the ground level. In some plots, the fruits in the tops of trees were examined.

Results showed that DDT was superior to nicotine-sugar sprays when at least four pounds of actual DDT—eight pounds of 50% DDT wettable powder—were applied per acre.

Where the DDT was dissolved in kerosene, and applied as an emulsion, the control was not so good as with DDT wettable powder suspensions.

Comparisons Made

Two applications of Black Leaf 40-sugar gave no increase in effectiveness over a single application. Black Leaf 155 appeared to be slightly less effective than Black Leaf 40, when applied with a spray-duster. When Black Leaf 155-sugar, or DDT wettable powder suspensions, were applied with a regular spray rig at the rate of 1000 gallons per acre, using ground and tower guns, the results were superior to spray-duster applications, particularly in the tops of the trees.

Applications of insecticides, with a regular spray rig, for thrips control would be of doubtful practical value because of the much greater cost as compared to spray-duster applications.

Fruits Scarred

A greater percentage of fruits was scarred in the tops of the trees than at lower levels, in all plots treated with the spray-duster, as well as in the untreated plots. More top fruits were scarred than lower fruits in plots in which nicotine-sugar was applied with a regular spray rig.

When DDT was applied with a regular spray rig, fruit scarring was prevented in the tops of the trees as well as at lower levels.

It is apparent that DDT was much more effective than nicotine-sugar in this particular grove.

Since the top fruits were scarred in plots in which DDT was applied with a spray-duster it is indicated that the tops of the trees were not satisfactorily covered. This is understandable since many of the trees in this grove were 25 to 30 feet high and beyond the reach of the equipment used.

Additions to DDT

The addition of sulfur or sugar to the DDT sprays did not materially increase their effectiveness. Eight pounds of 50% DDT wettable powder per 100 gallons appeared to be nearly as effective as 20 pounds.

In the second experiment, comparisons were made between various nicotine preparations and DDT. The results showed that Black Leaf 155 was superior to Black Leaf Dry Concentrate.

The addition of a small amount of DDT wettable powder to either Black Leaf 155 or Black Leaf Dry Concentrate did not increase their effectiveness.

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COMPARISON OF DDT AND NICOTINE FOR THE CONTROL OF CITRUS THRIPS. APPLICATION APRIL 22, 1946, WITH SPRAY-DUSTER AT RATE OF 100 GALLONS PER ACRE

Treatment	Amounts per 100 gallons	Per cent of outside fruits scarred
Black Leaf 155 (14% nicotine)	7 lbs.	....
Sugar	4 lbs.	4.4
Black Leaf 155 (12% nicotine) + 7% DDT	7 lbs.	....
Sugar	4 lbs.	2.6
Black Leaf Dry Concentrate (14% nicotine)	7 lbs.	....
Sugar	4 lbs.	23.9
Black Leaf Dry Concentrate (12% nicotine) + 7% DDT	7 lbs.	....
Sugar	4 lbs.	23.7
Black Leaf Dry Concentrate (12% nicotine) + benzene hexachloride (3% gamma)	7 lbs.	....
Sugar	4 lbs.	28.5
50% DDT wettable powder	8 lbs.	2.1
50% DDT wettable powder	8 lbs.	....
Sugar	4 lbs.	1.7
50% DDT wettable powder	20 lbs.	0.2
4.8% DDT in kerosene solution + emulsifier	5 gals.	9.3
Untreated check	.....	40.4

MEALYBUG

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covered with a bag and 15 were found on the scions which were uncovered, but shaded with a parasol, again indicating no advantage to the mealybugs on the scions covered with a bag.

At the conclusion of the experiment made in the Encinitas orchard, the dust treatment was continued on the dusted trees, and, of the other six trees, three were painted with a slurry made with 50% wettable DDT powder, and three were painted with a slurry made of a wettable powder containing 10% of the gamma isomer of benzene hexachloride.

The slurries contained one ounce of powder to 100 cubic centimeters of water. They were applied with a paint brush to the tops of the grafted stumps and three or four inches below the top.

The treatments were applied on April 28, 1947, and observations were made on May 21, 1947. On that date, one of the trees treated with DDT dust had 17 mealybugs on the scions and one of the trees treated with the DDT slurry had 10 mealybugs. No mealybugs could be found on any of the other trees.

Resealed Graft Clefts

When a graft cleft seal is cracked, it is the practice to reseal the cleft. Any insecticide applied before the second application of sealing substance is thereby covered over. In the experiment referred to above, it was learned that on the trees on which the mealybugs were seen, the grafting cleft had been resealed with a substance used for that purpose but not repainted with the insecticide. This made a "bridge" for the mealybugs and ants to reëstablish connections with the scions.

In this orchard, as well as in all the other orchards in which experiments were made, it was only on trees on which the graft clefts were resealed after the application of the insecticide that it was possible for the mealybugs to become established.

When graft clefts are resealed, the insecticide should be reapplied on the affected trees.

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NEW PUBLICATIONS

BEEKEEPING IN CALIFORNIA, by J. E. Eckert. Ext. Cir. 100, revised December, 1947. (96 pages).

THE COMMERCIAL FREEZING OF FRUIT PRODUCTS, by M. A. Joslyn and Leonora A. Hohl. Bul. 703, January, 1948. (108 pages).

COST OF ALMOND PRODUCTION IN CALIFORNIA, by R. L. Adams and A. D. Reed. Cir. 375, January, 1948. (22 pages).

HOME ECONOMICS AT THE UNIVERSITY OF CALIFORNIA, by the Departments of Home Economics at Berkeley, Davis, Los Angeles, and Santa Barbara. Brochure. (18 pages).

SOILS OF A PORTION OF PALO VERDE VALLEY (Between the Levee and the River), by Walter W. Weir and R. Earl Storie. Lithoprinted, August, 1947. (14 pages).

CITRUS THRIPS

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The addition of benzene hexachloride to Black Leaf Dry Concentrate was of no benefit.

All DDT wettable powder suspensions gave only slightly better control than Black Leaf 155-sugar sprays.

This is in contrast to the results obtained in the first experiment where DDT wettable powder sprays were markedly better than nicotine-sugar sprays. A spray containing 20 pounds of 50% DDT wettable powder per 100 gallons gave slightly better control than one containing eight pounds. As in the first experiment the DDT-kerosene emulsion spray was less effective than the DDT wettable powder suspension.

Vedalia Beetle

A fairly large acreage of citrus in the Coachella Valley has been treated experimentally with DDT each year since 1944 and thus far, there has been no abnormal increase in the population of cottony-cushion scale, in any of the plots, as a result of killing off the predacious vedalia beetle.

The plots have been widely scattered over the citrus-growing area so it is not possible, at this time, to predict what might happen if the entire citrus acreage were treated with DDT.

It is definitely known that the vedalia beetles are very susceptible to DDT and until more information is developed on the length of time DDT residues will kill this beneficial insect, care should be used in applying sprays containing DDT.

Recommendations Limited

Because of the many factors that are as yet unknown about DDT applications on citrus, it is not recommended for general use. It should not be applied commercially, for the control of thrips, in groves where nicotine-sugar sprays have given satisfactory results.

In groves where nicotine-sugar sprays have failed to give satisfactory control, growers may wish to apply DDT. In such cases, eight pounds of 50% DDT wettable powder per 100 gallons of water per acre, applied with the spray-duster, should be used.

Further experimental work is under way in the Coachella Valley, using DDT as well as other promising materials.

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The initial experiments mentioned in the second paragraph were conducted by C. O. Persing, then Assistant Entomologist in the Experiment Station, Riverside.

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