

Codling Moth on Walnuts

tests made on Payne walnuts in northern California
compared effectiveness of sprays and types of sprayer

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DDT, standard lead arsenate, and combinations of the two chemicals were studied for comparative effectiveness in trials with conventional rigs and with air carrier sprayers.

The trials were made at Linden and at San Jose. In all cases, the sprays were applied when the average cross sectional diameter of the nuts was approximately $\frac{1}{2}$ "—the ideal time to apply the spray, because it is just before the first brood caterpillars enter the nuts in numbers.

Conventional Sprayers

The conventional sprayers used in the trials had 25-foot towers and were equipped for automatic spraying. The spray was applied at a pressure of 600 pounds and each tree was circled. There were 18 large trees to the acre and approximately 55 to 60 gallons of spray were applied per tree.

Most of the investigation compared the effectiveness of spray mixtures where the amount of standard lead arsenate was varied—three, two, and $1\frac{1}{2}$ pounds in 100 gallons of spray—while the amount of DDT was held at one half pound. All combination treatments resulted in good control. Increasing the amount of standard lead arsenate did not increase the effectiveness of the spray. In fact, best control was indicated with the lowest dosage of standard lead arsenate— $1\frac{1}{2}$ pounds to the 100 gallons of spray. The results with the standard lead arsenate-DDT combinations substantiate previous findings that the amount of standard lead arsenate for commercial practice can be safely reduced from three to two or $1\frac{1}{2}$ pounds per 100 gallons of spray. During the past season the two and three pound dosages were compared by several growers on a commercial basis and no difference could be detected in the control.

When one half pound of DDT alone was used, the control was promising but not as good as with the DDT-standard lead arsenate combinations.

In an unreplicated experiment where 25% Q-137 wettable powder was used at the rate of two pounds to the 100 gallons of spray, control was not as effective as with the DDT or DDT-standard lead arsenate combinations.

Air Carrier Sprayers

The principal air carrier sprayer used in the investigation was equipped with a volute and had an air capacity of at least 43,000 cubic feet per minute. The tests compared the effectiveness of DDT alone, in combination with standard lead arsenate, and standard lead arsenate alone. Studies were conducted in which the volume of water used per acre was varied

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RECOMMENDED SPRAY MIXTURES

For codling moth and aphid control

By Conventional Sprayer

Standard lead arsenate $1\frac{1}{2}$ to 2 pounds
DDT, 50% wettable powder $\frac{1}{2}$ pound
Safener, a commercial basic zinc sulfate
product containing 50% zinc expressed
as metallic $\frac{1}{2}$ pound
Parathion 25% wettable powder 3 ounces
or
B.H.C. (6% gamma isomer) 1 pound
Light summer oil emulsion containing 80% oil . . $\frac{1}{3}$ gallon
Water 100 gallons

By Air-Carrier Sprayer

DDT, 50% wettable powder 20 pounds
DDT depositor 2 or 3 pounds
Parathion, 25% wettable powder $2\frac{1}{2}$ pounds
or
14% nicotine dry concentrate 18 pounds
or
EPN 300, 25% wettable powder $7\frac{1}{2}$ pounds
or
B.H.C. (6% gamma isomer) 18 pounds
Light medium summer oil emulsion 3 gallons
Water 500 gallons

(To be used at the rate of 200 gallons per acre. Where air carrier sprayers are of low air capacity it might be desirable to increase the volume of water used per acre. If 400 gallons of spray are to be used per acre all the figures in the above formula should be reduced by one half except for the depositor, oil, and water.)



Arsenical burn to walnut leaves where trees were treated with standard lead arsenate.

Oakland families with children averaged 3.82 persons and Los Angeles families averaged 3.64 persons.

The average sizes of the groups without children were 2.15 persons in Oakland and 2.13 persons in Los Angeles.

When the consumption per person in the two groups was compared, the differences became less pronounced for all dairy products as a group and for fluid milk. Oakland families with children consumed—all dairy products—an average of 5.19 quarts in milk equivalent per person; those without children consumed 4.56 quarts. In Los Angeles the quantities were 5.63 and 5.58 quarts respectively. An average of 3.79 quarts of fluid milk were used per person by families with children in Oakland, and 2.94 quarts by those without children. In Los Angeles the respective quantities were 4.02 and 3.47 quarts.

For all other dairy products, except evaporated milk in Oakland, the families without children—in both cities—consumed on the average as much as or more per person than those with children. This was true with a few exceptions, regardless of the income group in which the families fell.

The effect of age of family members on consumption was indicated when families were classified according to age of head. In Oakland 35% of the families in which the head was under 30 years, and in Los Angeles 45%, consumed six or more quarts in milk equivalent per person during the week. About 25% of the families in Oakland and about 35% of those in Los Angeles in which the head was 60 years or more consumed this much per person. Conversely the proportions of the families using less than three quarts per person was about two times as large in groups with the older heads as in those with the younger heads.

The influence of children in a family on the consumption of dairy products was also studied by classifying the families with two adults according to those having one, two, or three children under 16 years.

The average consumption per family of all dairy products combined in terms of milk equivalent was from 2½ to three times as high in families with three children as those without children. Fluid milk consumption was from three to four times as high in families with three children. The average consumption of evaporated milk was from 2½ to 3½ times as high; that of cottage cheese and American Cheddar cheese was less than double, while for ice cream the consumption was about twice as high. The average consumption of butter was only slightly higher in the larger families while that of half and half was lower.

The average consumption per person for most of the products other than fluid milk was lower in the families with one, two, or three children than in those with two adults only. In Oakland the average consumption per person of evaporated milk was higher in families with three children than in those with two adults only but in Los Angeles it was about equal. The consumption of cottage cheese and American Cheddar cheese was lower in the families with children, decreasing with the addition of each child. The average consumption of butter per person in families with three children was only one half that of Oakland families with no children and only about one fifth as much in Los Angeles. The consumption of ice cream per person was also lower in the families with three children than in families without children.

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Average Quantities of Dairy Products Consumed per Person† in Seven Days According to Size of Family Income

		Annual income class (after Federal income taxes)											
		All income											
				Under \$2,000		\$2,000-2,999		\$3,000-3,999		\$4,000-5,999		\$6,000 and over	
		Oak.	L. A.	Oak.	L. A.	Oak.	L. A.	Oak.	L. A.	Oak.	L. A.	Oak.	L. A.
	qts.	qts.	qts.	qts.	qts.	qts.	qts.	qts.	qts.	qts.	qts.	qts.	qts.
All dairy products*	4.9	5.6	4.3	5.6	4.5	5.3	4.9	5.3	5.1	5.8	5.2	6.0	
Fluid milk ..	3.5	3.8	3.1	4.1	3.2	3.3	3.6	3.8	3.5	4.0	3.5	4.0	
Plain, homo., and multi-vitamin ..	3.2	3.4	2.6	3.3	2.8	3.0	3.5	3.4	3.2	3.5	3.1	3.6	
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Half and half	0.2	0.3	0.2	0.3	0.2	0.2	0.1	0.2	0.2	0.3	0.3	0.4	
Cream	0.1	0.1	**	0.1	**	0.1	**	0.1	0.1	0.1	0.1	0.1	
Evap. milk..	0.4	0.3	0.5	0.4	0.3	0.6	0.4	0.3	0.3	0.2	0.2	0.2	
Cottage cheese	0.2	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.4	0.3	0.4	
Am. Ched. cheese ...	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.2	0.2	0.1	0.2	
Ice cream ..	0.2	0.3	0.2	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	
Butter	0.2	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	

† One person = 21 meals at home.

* Milk equivalent.

** Less than 0.1 lb.

WALNUTS

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to determine whether this had any influence on the control obtained.

The DDT treatments outperformed DDT-standard lead arsenate combinations or standard lead arsenate alone, and the low-volume treatments were as effective as the higher ones. The DDT-standard lead arsenate combination proved to be slightly more effective than standard lead arsenate alone but none of these treatments approached the effectiveness of DDT when used alone.

The conclusion of the tests were confirmed by a grower who compared, on a commercial scale, the DDT-standard lead arsenate combination with DDT alone. Where the former was applied 3.9% of the nuts in the harvested crop were infested while only 0.3% were infested where the DDT was applied.

Spider Mites and Aphid

There was no evidence that any of the mixtures used for the control of the codling moth resulted in any noticeable increase in spider mites. This is in confirmation of the experimental investigations of preceding years which have shown there is little likelihood of the codling moth spray increasing the spider mite problem if DDT is used in a relatively low concentration.

Walnut aphid populations, however, are likely to increase at the concentration at which DDT is used in the codling moth spray. An effective aphicide should always be incorporated in the codling moth spray.

Arsenical Leaf-Burn

Under special conditions arsenical burn to walnut foliage can be expected where standard lead arsenate is applied. It was observed during the past season for the first time in northern California—in experimental blocks at San Jose—where standard lead arsenate alone, and a combination standard lead arsenate-DDT spray had been used. The treatments were applied with an air carrier sprayer and in no case was a safener added.

The injury was confined to the north side of the trees and limited to an arc on the trees which had been wetted during sprinkler irrigation of the orchard. The burn caused no serious tree injury because of the limited area covered.

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