

Payne Walnuts

codling moth investigations in northern California and recommendations for 1949

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Throughout Northern California the codling moth infestation in 1948 was much more serious than that encountered in any recent year. The cause of this is not known although it may have been associated in part with the lateness of the season.

This not only gave rise to late first brood but also resulted in the second brood occurring late in the summer. At Linden some nuts were being infested almost up to harvest, and at harvest an occasional adult moth was encountered.

Investigations at Linden and at San Jose—started in 1942—demonstrated that standard lead arsenate is more effective against the codling moth than is basic lead arsenate.

A single early spray of standard lead arsenate at the rate of three pounds to 100 gallons of spray proved about as effective as a two-spray program of basic lead arsenate used at the rate of four pounds per 100 gallons.

The addition of a basic zinc sulfate safener to the standard lead arsenate spray did not reduce the effectiveness of the material. A single spray of standard lead arsenate gives good control but everything possible should be done to in-

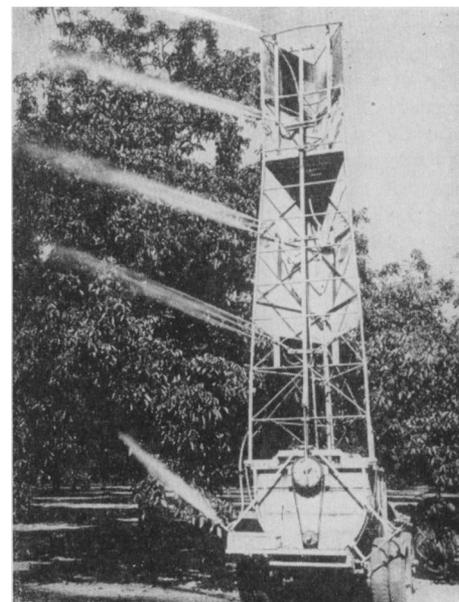
crease its effectiveness. Studies during the past two seasons indicate that the addition of a depositor to the spray mixture increases the deposit and improves the control obtained. If a depositor is added, the manufacturer's recommendations should be followed carefully.

DDT has resulted in excellent control of the codling moth but until a highly satisfactory method for controlling mites can be developed, DDT can not safely be recommended.

At Linden an early spray containing one-half pound of actual DDT per 100 gallons of water resulted in slightly better control than that obtained with a single spray of standard lead arsenate. At San Jose the same spray programs resulted in about equal control.

Investigations have shown that one-half pound of actual DDT per 100 gallons of spray is less likely to result in the development of a destructive orchard mite population than higher dosages. However, even at this lower amount there is some danger of serious infestations occurring.

Means of eliminating the increase in the walnut aphid and frosted scale populations following applications of DDT have been developed. It is hoped that a



Spray equipment used in the investigation.
Photo, C. C. Anderson.

spray program may be devised whereby DDT and standard lead arsenate can be used in alternate years or alternated the same year where two sprays may be necessary to insure satisfactory control. It is also possible that one-half pound of a 50% wettable DDT powder can be added safely to the regular standard lead arsenate spray. If a grower cares to apply DDT he should not use it at a dosage of more than one pound of a 50% wettable powder to the 100 gallons of spray and then always in combination with an aphicide.

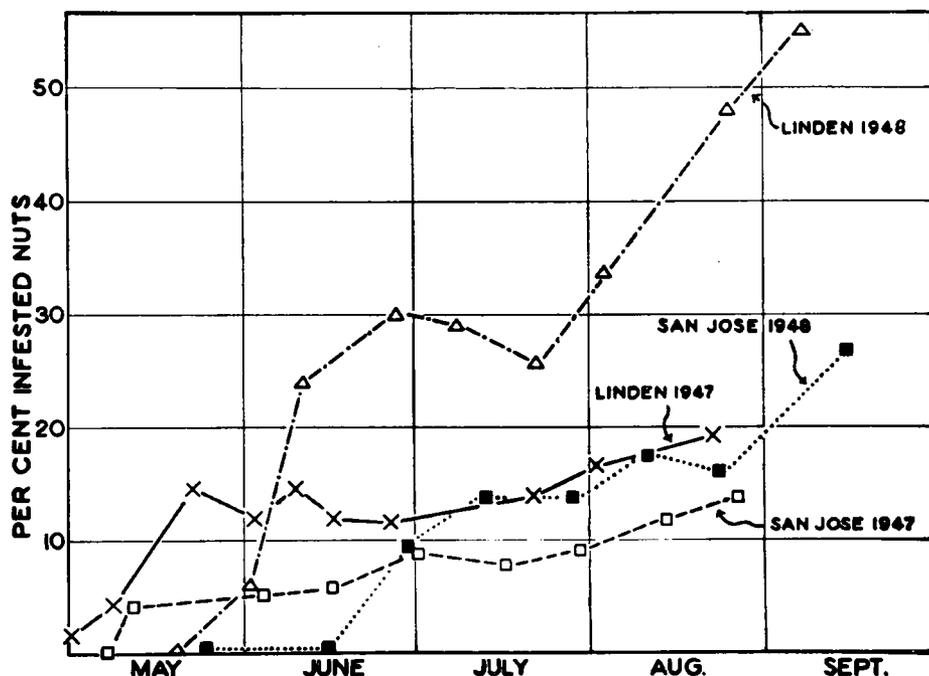
Based on extensive investigations for two seasons it appears that the addition of an aphicide to the early codling moth spray is a worth-while procedure. The addition of one pound of a 14% dry nicotine concentrate, or two-thirds pound of benzene hexachloride containing 10% gamma isomer, or one-third pound of 25% parathion, or one-fourth pint of tetra ethyl pyrophosphate all resulted in very satisfactory control of the walnut aphid. Because the dry nicotine concentrate is likely to have less adverse effect upon predators than do the new insecticides, it probably is the safest material to recommend until the others have further stood the test of time.

There are no reports where standard lead arsenate used with or without a safener has caused any injury to walnuts in northern California. Because investigations have shown it to be much more effective than basic lead arsenate, it appears that unlimited recommendations for its use can be made safely.

Tests to determine the desirability of using a speed sprayer for the application of codling moth sprays were undertaken in 1948. From these preliminary investi-

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Seasonal trend of infestation in the maturing nut crop in check plots.



gations it appears that a desirable dosage on large trees is around 22 gallons per tree of a spray mixture containing six pounds of standard lead arsenate, or two pounds of a 50% wettable DDT powder, to each 100 gallons of spray. The amount of insecticide applied per tree was 1.32 pounds of standard lead arsenate, or 0.43 pounds of DDT, as compared to 1.65 pounds of standard lead arsenate or 0.55 pounds of DDT applied per tree where applications were made with a conventional sprayer. However, further investigations are necessary before definite recommendations can be made concerning the use of speed sprayers.

During the past two seasons the first brood of codling moth was much later at San Jose than at Linden.

The infestations at San Jose do not appear to be as serious as those that are likely to be encountered at Linden. The trends of the infestations in the check trees during the growth of the nuts for 1947 and 1948 in the experimental orchards at Linden and at San Jose are shown on the graph on page 3.

At Linden the first brood in 1948 was later in getting started than in any year since the investigation was undertaken in 1942. In 1947 it was earlier than usual when 2% of the nuts was found infested on May 1. In this region first brood caterpillars do not usually begin entering nuts until the first to the 10th of May.

The infestation starts much later in the San Jose area where the nuts are not likely to be infested before May 15 to June 1.

The average date for applying the spray at Linden would be about May 5, while at San Jose it appears that there would be no need to apply a spray before May 20 at the earliest.

One properly applied spray in May before the first brood of caterpillars begins to enter the nuts, has generally resulted in satisfactory control. A second spray applied during the second half of June will improve control, but it appears that the added benefit obtained in many instances would not justify the cost of treatment.

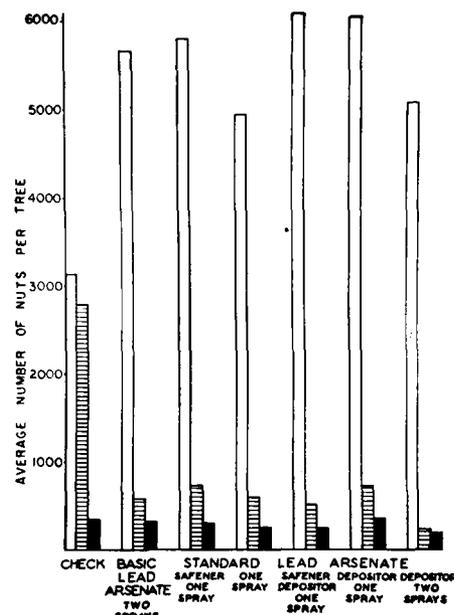
Where serious infestations were encountered in 1948, a two-spray program should be followed in 1949 to insure highly desirable results.

At the present time it appears that the most satisfactory spray that can be recommended for general use is as follows:

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| Standard lead arsenate..... | 3 pounds |
| Safener (Delmo Z, a commercial basic zinc sulfate product containing 50% zinc expressed as metallic, or a similar product)..... | 1 pound |
| 14% nicotine dry concentrate..... | 1 pound |
| Light medium summer oil emulsion containing 80% to 83% oil..... | ½ gallon |
| Water | 100 gallons |

Order of mixing: Slurry the nicotine, then add standard lead arsenate, safener and continue to slurry. Add slurried ingredients to spray tank with agitator going when one-third to one-half full, followed by the oil when tank is three-fourths or more full.

If desired, one-fourth to one-third pound of a depositor can be added to the



Average number of harvested nuts per tree classified as good, infested, and culls other than infested. Open bar, good; horizontal hatched bar, infested; solid bar, culls other than infested nuts.

above spray. It should be slurried with the dry ingredients.

Other aphicides that have shown promise at the following rates per 100 gallons of spray are the following: Benzene hexachloride containing 10% gamma isomer, two-thirds pound; or 25% parathion wettable powder, one-third pound; or tetra ethyl pyrophosphate, one-fourth pint. If the latter is used it should be added to the spray tank just as it is full.

The following DDT spray is given for growers who would like to use this insecticide on a limited acreage:

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|---|-------------|
| 50% DDT wettable powder..... | 1 pound |
| DDT depositor | ½ pound |
| 14% dry nicotine concentrate..... | 1 pound |
| Light medium summer oil emulsion containing 80% to 83% oil..... | ½ gallon |
| Water | 100 gallons |

Order of mixing: DDT and depositor slurried together, nicotine slurried, the former added to tank with agitator going when tank is one-third to one-half full, followed by the nicotine and then the oil.

To avoid a serious increase in the walnut aphid population, an aphicide should always be added to DDT sprays. In order that the advantages of DDT may be utilized and its disadvantages held to a minimum, it is recommended that if DDT is used, standard lead arsenate should be used in alternate years.

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The above progress report is based upon Research Project No. 1314.

Showing six halved walnuts of same age. Upper row. Walnut at left is without infestation. Other two nuts show late infestation. Lower row. Dropped nuts, infested in early May and lost to harvest. Photo taken June 25, 1948.

