Codling Moth Infestations Up

damage to harvested walnuts increased markedly in northern California during the 1956 season in comparison with 1955

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Codling moth populations on walnuts vary from year to year but during the 1956 season—in all districts where investigations were conducted—there was a general rise in the seriousness of infestations.

The rise in the codling moth population was illustrated in the check trees in the experimental walnut orchard at Linden where the infestation in the harvested crop was 29.1% during the 1956 season as compared to 7.3% in 1955.

Control experiments were conducted in 1956 at Linden—where the most extensive tests were made—at Modesto, Walnut Creek, and San Jose.

The infestation at Linden was more severe in the north half of the experimental orchard than in the south half—a situation that has gradually developed in the past three to four years and one that is not easily explained. However, there is a slight possibility that the codling moth in the north half of the orchard may be acquiring some resistance to DDT. For experimental purposes, the orchard was divided into two sections and most of the programs testing the comparative effectiveness of treatments were conducted in the north section. The test plots were approximately 4½ acres in area and most of the treatments were replicated four times.

Codling Moth Damage to Harvested Walnuts at Linden. *Treatment applied by air carrier sprayer.

Treatment Amount of insecticide applied per acre	No. and date of application	% infested nuts
Check	None	29.10
DDT, 50% wettable powder, 8 lbs.	1, May 1 2, May 1; June 20	4.95 1.30
DDT, 50% wettable powder, 12 lbs.	1, May 1	2.28
Ryania, 30 lbs.	2, May 1; June 20	4.00

* Applied in 200 gallons of water per acre.

Best results obtained from treatments applied by air carrier spray rig were where there were two applications of DDT, 50% wettable powder, at the rate of eight pounds per acre for each treatment. Next best control occurred where 12 pounds of DDT, 50% wettable powder, were applied in a single application made the first of May. Two applications of ryania resulted in control slightly better than that obtained with a single treatment of eight pounds per acre of DDT, 50% wettable powder, applied during the first of May.

Treatments applied by conventional sprayer were made in the south section—with the lower codling moth population—of the orchard. A standard lead arsenate and DDT mixture was compared with DDT used alone. The mixture gave slightly better control than did the DDT alone.

Codling Moth Damage to Harvested Walnuts in Experimental Orchard at Linden. *Treatment applied by conventional sprayer.

Treatment Amount of insecticide applied per acre	% infested nuts
Standard lead arsenate, 20 lbs. plus 50% DDT wettable powder 5 lbs. in 1,000 gals. of water	0.2
50% DDT wettable powder 7½ lbs. in 1,000 gals. of water	0.4

* Sprays applied May 8, 1956.

Also, in the south section—but applied in 200 gallons of water per acre with an air carrier sprayer—Diazinon, 25% wettable powder, at 16 pounds per acre, was compared with DDT, 50% wettable powder, at eight pounds per acre. At harvest, the per cent of infested walnuts in the Diazinon treatments averaged 1.4% as compared with an average of 0.3% for the adjacent plots treated with DDT only.

The investigations have shown that for satisfactory control of codling moth on walnuts, treatments must be properly timed and thoroughly applied. For early varieties—such as Payne—control measures should be made when the average cross-sectional diameter of the developing walnuts is between ⅜" and ½". For late varieties—such as Franquettes—treatment should be applied about the middle of June.

In most areas of northern California, a single—thoroughly applied—treatment has given adequate control of the codling moth for the entire season. Best results were obtained when treatment was applied at the proper time so that the first brood of codling moth is practically eliminated. However, there are some areas where a single application may not give adequate control and a second treatment is necessary to control the second brood. Increasing the dosage of the first treatment is not advisable because the danger of inducing increases in the spider mite and soft scale populations rises as the amount of DDT applied rises.

Infested nut damage may be mistakened for codling moth injury when actually it was caused by the navel orangeworm or the filbertworm. No effective spray program has been developed that will control either of these pests. However, adequate control of the codling moth aids in the suppression of the navel orangeworm, because this insect is primarily a scavenger and uncontrolled infestations of the codling moth favor an increase in the population of the navel orangeworm.

Where DDT sprays are used for codling moth control, an aphicide can be incorporated in the material for control of the walnut aphid. The following mixture—in combination with a suitable aphicide—has given adequate control when applied by air carrier sprayer at the rate of 200 gallons per acre:

DDT, 50% wettable powder ..... **20 pounds**
DDT depositor ..... **2 pounds**
Light summer oil emulsion containing 80% oil ..... **3 gallons**
Water ..... **500 gallons**

Where a satisfactory control with a single application has failed, a second application should be applied during the last half of June.

Where treatments were made with a conventional sprayer, each of the following mixtures—in combination with a suitable aphicide—applied as a thorough coverage spray has given adequate control:

Standard lead arsenate ..... **2 pounds**
DDT, 50% wettable powder ..... **½ pound**
Safener-commercial basic zinc sulfate product containing 50% zinc expressed as metallic ..... **½ pound**
Light summer oil emulsion containing 80% oil ..... **¼ to ⅓ gallon**
Water ..... **100 gallons**

or

DDT, 50% wettable powder ..... **¾ pound**
Light summer oil emulsion containing 80% oil ..... **¼ to ⅓ gallon**
Water ..... **100 gallons**

Regardless of the formula used, the dry ingredients must be slurried and added to the spray tank while the agitator is going and the tank is one-third to one-half filled with water. The oil should be added when the tank is three-fourths or more full. For large trees, upward to 1,000 gallons or more of the spray mixture are needed per acre.

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