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

A. E. Michelbacher and Stephen W. Hitchcock

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 har-
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 experi-
mental 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,
it is a slight possibility that the
codling moth in the north half of the
orchard may be acquiring some resis-
tance to DDT. For experimental pur-
poses, the orchard was divided into two
sections and most of the programs test-
ing the comparative effectiveness of
treatments were conducted in the north
section. The test plots were approxi-
mately 11/2 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 spray.*

| Treatment | Amount of insecticide ap-
<table>
<thead>
<tr>
<th></th>
<th>plied per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check</td>
<td>None</td>
</tr>
<tr>
<td>DDT, 50% wettable powder</td>
<td>1 lbs. 1 May 1  4.95</td>
</tr>
<tr>
<td>DDT, 50% wettable powder</td>
<td>2 lbs. 1 May 2; June 20  1.30</td>
</tr>
<tr>
<td>Ryania, 12 lbs.</td>
<td>1 May 1  2.28</td>
</tr>
<tr>
<td>Ryania, 30 lbs.</td>
<td>2 May 1; June 20  4.00</td>
</tr>
</tbody>
</table>

* 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 treat-
ment. Next best control occurred where
12 pounds of DDT, 50% wettable pow-
der, were applied in a single application
made the first of May. Two appli-
cations of ryania resulted in control slightly
better than that obtained with a single treat-
ment 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 popula-
tion—of the orchard. A standard lead
arsenate and DDT mixture was com-
pared with DDT used alone. The mix-
ture gave slightly better control than did
the DDT alone.

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

| Treatment | Amount of insecticide ap-
<table>
<thead>
<tr>
<th></th>
<th>plied per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard lead arsenate, 20 lbs. plus 50% DDT wettable powder</td>
<td>5 lbs. in 1000 gal. of water  0.2</td>
</tr>
<tr>
<td>50% DDT wettable powder</td>
<td>7.5 lbs. in 1000 gal. of water  0.4</td>
</tr>
</tbody>
</table>

* 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% wet-
table powder, at eight pounds per acre.
At harvest, the per cent of infested
walnuts in the Diazinon treatments aver-
eged 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 meas-
ures should be made when the average
cross-sectional diameter of the develop-
ing walnuts is between 3/8" and 1/2". For
late varieties—such as Franquettes—
treatment should be applied after the
middle of June.

In most areas of northern California,
a single—thoughly applied—treat-
ment has given adequate control of the
codling moth for the entire season.
Best results were obtained when treat-
ment 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 applica-
tion may not give adequate control and
a second treatment is necessary to con-
trol the second brood. Increasing the
dosage of the first treatment is not ad-
visable because the danger of inducing
in increases in the spider mite and soft
scale populations arises as the amount of
DDT applied rises.

Infested nut damage may be mistak-
ened for codling moth injury when actu-
ally it was caused by the navel orangew-
torm or the filbertworm. No effective
spray program has been developed that
will control either of these pests. How-
ever, adequate control of the codling
moth aids in the suppression of the navel
orangeworm, because this insect is pri-
marily a scavenger and uncontrolled in-
estations of the codling moth favor an
increase in the population of the navel
orangeworm.

Where DDT sprays are used for cod-
ling moth control, an aphicide can be
incorporated in the material for control of
the walnut aphid. The following mix-
ture—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 | 100 lbs. | 200 gallons
Diazinon, 50% wettable powder | 50 lbs. | 200 gallons
Light summer oil emulsion con-
taining 80% oil | 50 lbs. | 200 gallons

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

Where treatments were made with a
conventional sprayer, each of the follow-
ing mixtures—in combination with a
suitable aphicide—applied as a thorough
coverage spray has given adequate con-
trol:

Standard lead arsenate | 2 pounds | 200 gallons
DDT, 50% wettable powder | 1/2 pound | 100 gallons
Safener-commercial basic zinc sulfate product containing 50%
expressed as metallic | 1/2 pound | 100 gallons
Light summer oil emulsion containing 80% oil | 1/2 to 1/2 gallon
Water | 1/2 to 1/2 gallon | 100 gallons

Regardless of the formula used, the
dry ingredients must be slurried and
added to the spray tank while the agita-
tor 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 mix-
ture are needed per acre.

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