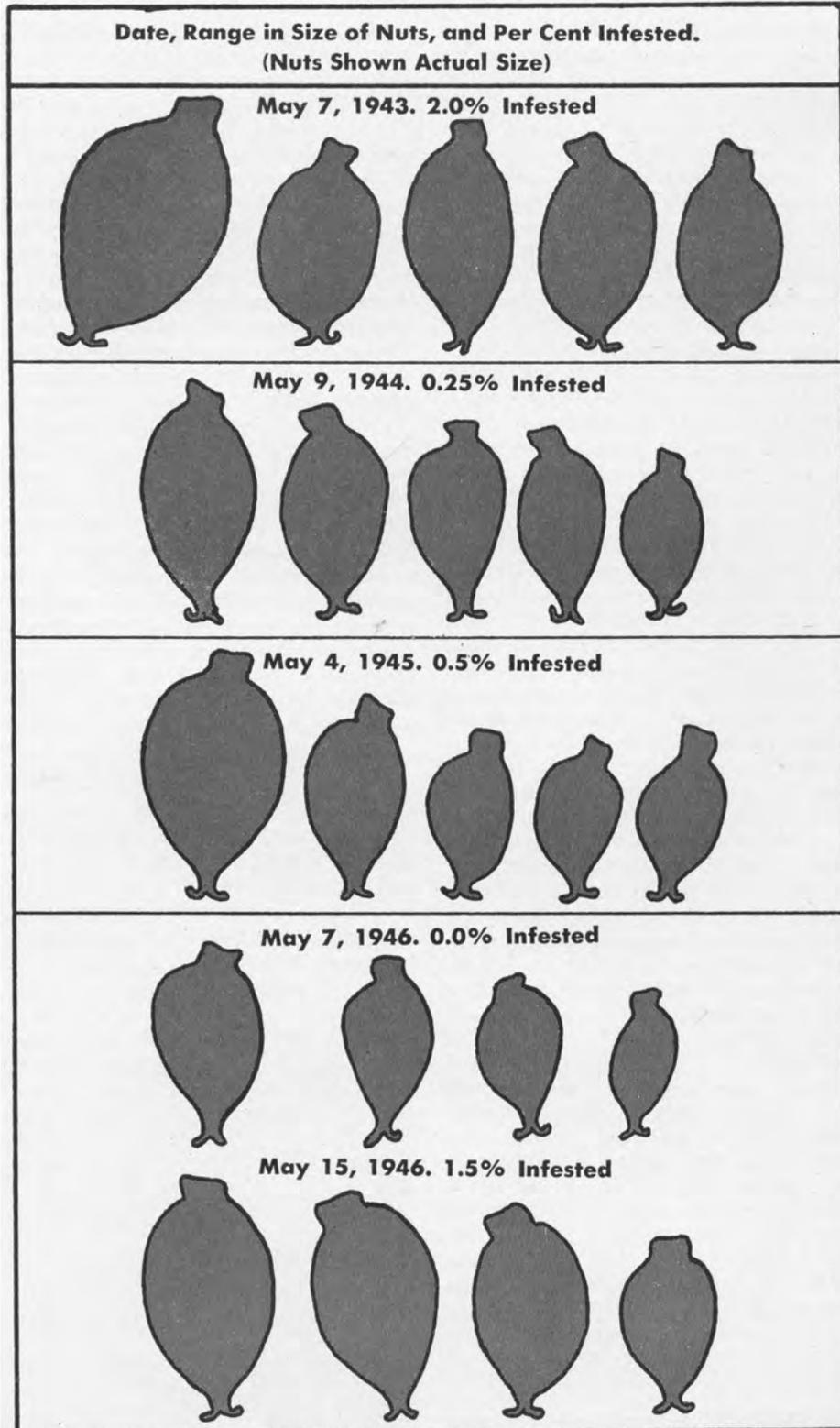


Timing of Spray Treatments

control on Payne walnuts in northern California influenced b



The codling moth is one of the most important pests of Payne walnuts.

In certain areas, if it is not controlled, a very high percentage of the crop may be destroyed. If the infestation in the harvested crop is sufficiently high, the nuts may be fit for culls only.

There are two broods of caterpillars that must be controlled. The first brood usually begins to enter the developing nuts in May while the second starts making its appearance in July. Under most conditions a single effective, properly timed, spray will control both broods. The timing of this spray is extremely important, and this is particularly so as the severity of the infestation increases.

The period at which the first brood of caterpillars starts entering the nuts varies with the season and the district. At Linden it usually makes its appearance during the first half of May and in the more coastal San Jose area about 15 days later.

Although observations in the Sacramento Valley have been somewhat limited, it is believed the information obtained on the activity of the pest fairly well parallels that obtained for Linden.

The time to apply the spray can be determined rather accurately if bait pan records are kept. However, the bait pans must be well serviced if the data obtained from them are to be of any real value.

During the course of the investigations on walnut insects every effort was made to determine the trend of the infestation. Considerable time was devoted to obtaining data on the time that the first brood caterpillars begin to enter the developing nuts. Much information has been acquired, and it indicates that the size of the nuts might be used as a gauge for the proper timing of the spray. Each year records were made—from time to time—of the developing nut sizes during the growth of the crop. At the time these size records were taken, tree surveys were made to determine the trend of the infestation in the developing crop.

In the two large illustrations are shown the range in size of the nuts in the different years and the per cent of nuts infested. The information shown was obtained in the experimental orchard at Linden. It should be noted that the size of the nuts as well as the infestation for a particular date varied from year to year. In some years the nuts were more advanced and the infestation earlier than in others. An

For Codling Moth

y size of nuts when sprayed

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examination of the data presented shows that there is some relation between the size of the nuts and the beginning of the infestation. In general the infestation is usually beginning when the average diameter of the nuts is a little more than one-half inch.

To apply a treatment before the start of the infestation, a spray should be applied just before or about the time the average diameter of the nuts reaches one-half inch. In orchards where serious infestations are likely to occur, it is very desirable that this be done. Such precise timing is not necessary in orchards or areas that have a record of low infestation.

The accompanying graph shows the trend of infestation in the developing nut crop in the check trees associated with the experimental plots at Linden for the years 1945 to 1949. It is evident that the degree of infestation during these years has shown considerable variation. The important thing to note is that the infestation began on different dates which is in agreement with the information obtained on size of nuts and the amount of infestation.

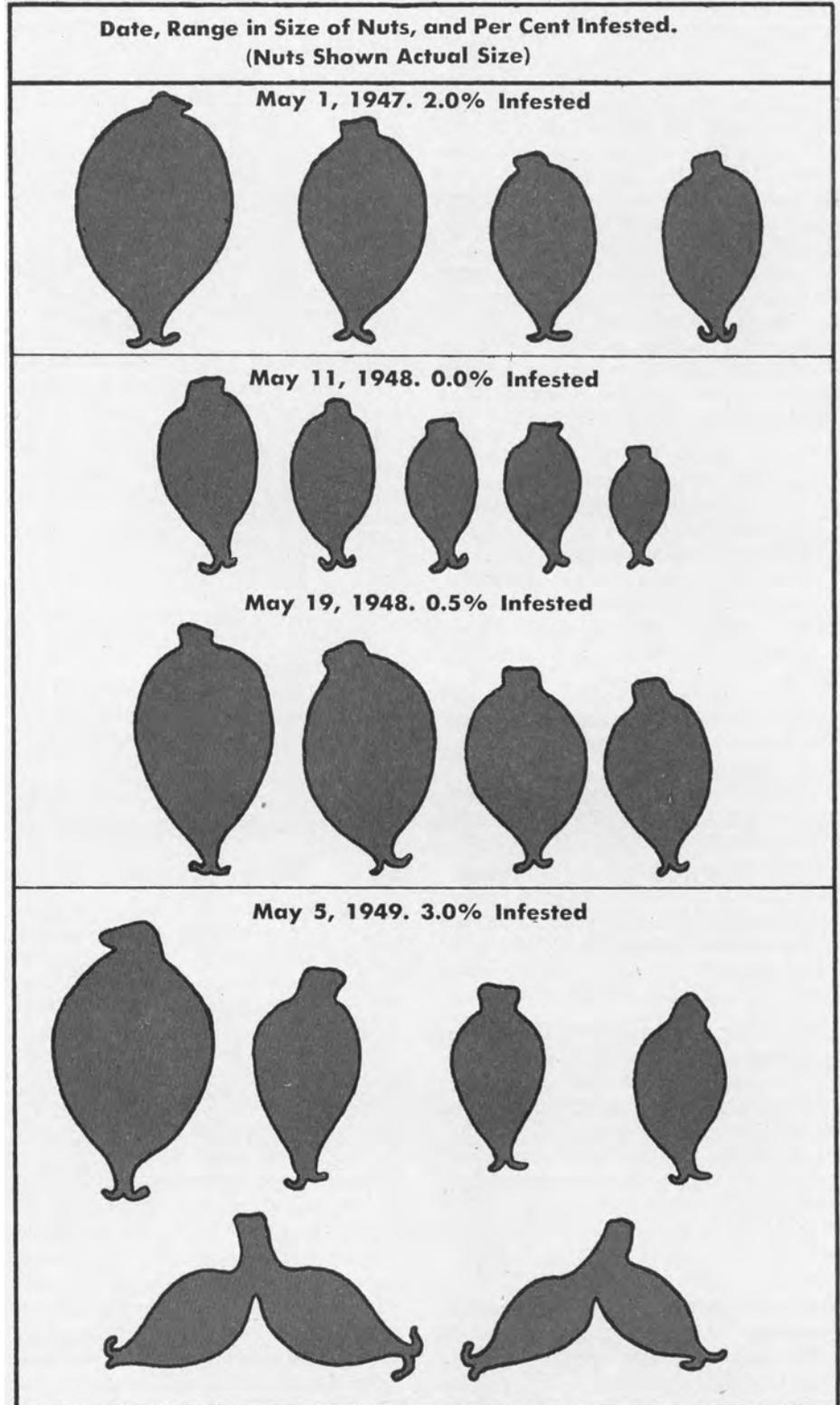
In some years the infestation started by the end of April while in others it was May 15th or slightly later. It can also be noted that in those years where the infestation was fairly to very severe, the rise in infestation by the first brood was rapid, in which case a few days delay in the application of a treatment would result in a serious loss.

Most of the first brood of caterpillars enter the nuts at the blossom end. Once they have penetrated into the nut they are little affected if the trees are treated with a standard lead arsenate spray. However, if a DDT spray is used alone or in combination with standard lead arsenate, many caterpillars that just recently entered the nuts are killed.

Under most conditions if a spray is thoroughly applied, a single treatment should result in satisfactory control for the entire season. Where a standard lead arsenate spray is used and there is question concerning the control of the second brood, a second spray applied any time in June will insure excellent control.

Thorough application of sprays is necessary for satisfactory control. In areas where control is desirable and where heavy infestations are not encoun-

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tered, it appears that the most satisfactory spray that can be recommended for general use is as follows:

Standard lead arsenate	3 pounds
Safener—a commercial basic zinc sulfate product containing 50% zinc expressed as metallic	1 pound
14% nicotine dry concentrate	1 pound
Light medium summer oil emulsion containing 80% to 83% oil	1/3 gallon
Water	100 gallons

The nicotine should be slurried before and during the addition of the standard lead arsenate and the safener. The slurried ingredients should be added to the spray tank—with agitator going—when the tank is one-third to one-half filled with water and the oil added when the tank is three-fourths or more full.

A single application of the above spray mixture should result in satisfactory control for the entire season.

In regions where infestations of the codling moth have been severe, a single timely application of the following spray should result in satisfactory control:

Standard lead arsenate	3 pounds
DDT, 50% wettable powder	1/2 pound
Safener—a commercial basic zinc sulfate product containing 50% zinc expressed as metallic	1/2 pound
14% nicotine dry concentrate	1 pound
Light medium summer oil emulsion	1/3 gallon
Water	100 gallons

The same procedure for mixing is followed here as for the straight standard lead arsenate spray.

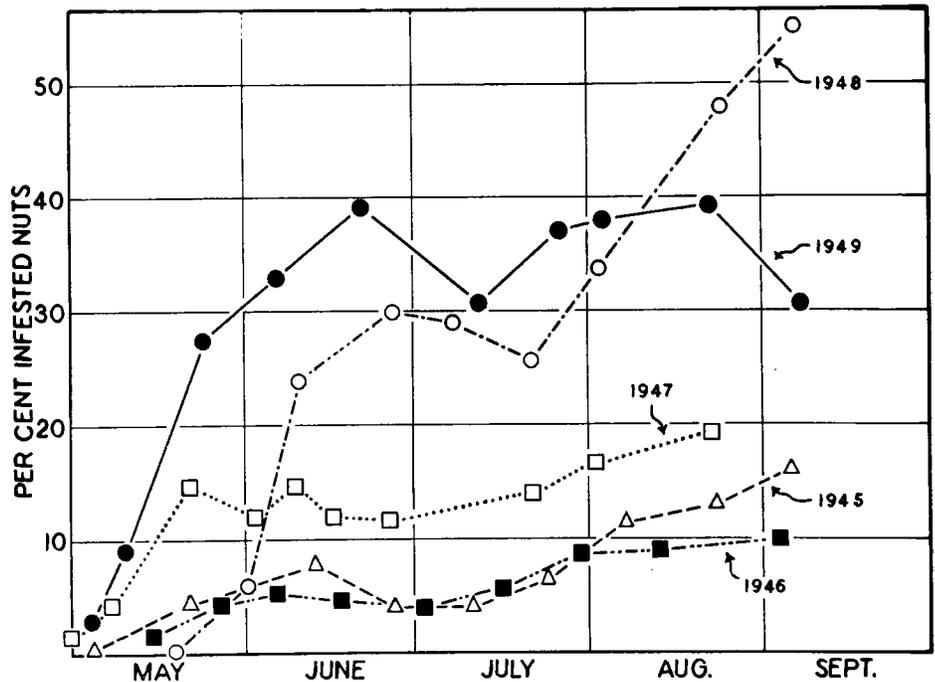
Although not a recommended treatment, some growers might be interested in applying the following DDT spray:

DDT, 50% wettable powder	1 pound
Depositor	1/3 pound
14% nicotine dry concentrate	1 pound
Light medium summer oil emulsion	1/3 gallon
Water	100 gallons

In mixing this spray the DDT and depositor should be slurried together then the nicotine slurried and the former added to tank—with agitator going—when the tank is one-third to one-half full, followed by the nicotine and then the oil.

There are growers who have speed-type sprayers who would like to use that equipment to treat their orchard. For these growers the following spray is recommended:

50%, DDT wettable powder	10 pounds
Depositor	3 pounds
14% nicotine dry concentrate	9 pounds
Light medium oil emulsion	3 1/3 gallons
Water	500 gallons



Trend of infestation during the maturing of the crop in the check trees associated with the experimental plots at Linden

This spray mixture should be applied to large trees at the rate of 22 gallons per tree. The number and kind of nozzles and the rate of speed to travel to insure proper application as recommended by the manufacturer for successful control should be established.

One properly timed and applied treatment should control the codling moth for the entire season.

Insecticides used for the control of walnut insects are poisonous and care should be used in handling and applying them.

Particular caution should be used with such materials as tetraethyl pyrophosphate and parathion. When using these insecticides be certain to follow carefully the precautions as given on the containers.

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ORANGE

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cluding the 1949 crop, it was evident that the fertilizer caused greater increases in fruit size in the years when the fruit of the check trees was small. When the fruit of the check trees was large, the effects of potash applications were small. This suggests that potash fertilization tends to offset the effects of seasonal factors which restrict the growth of the fruit. These factors are presumably of a climatic origin, but their nature is not known.

The effects of potash fertilization upon the size and other characteristics of the fruit of the 1941-1949 crops are shown in the accompanying table. The average increase in the percentage of fruit size 220 and larger was 6.9; the average decrease in the number of fruits per packing box was 11.6; while the average increase in the diameter of the fruit was 0.045 inch. The small increase in the average

diameter had a considerable effect upon the packing house sizes.

Fertilization with sulfate of potash did not affect the number of fruits harvested from the trees. Evidently there was no effect on fruit setting or preharvest drop. Since the use of potash fertilizer resulted in larger fruits, the weight of the crop was increased a little.

The commercial grade of the fruit was only slightly improved by potash fertilization. This improvement was associated with the larger size of the fruit. Large sizes were apparently graded more leniently. Although the over-all improvement in grade was small, it exerted a favorable effect upon the percentage of the fruit which is both larger in size and of better grade.

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The above progress report is based on Research Project No. 594.