

# Walnut Aphid Control

## aphicide in May codling moth spray effective in northern California

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**Natural enemies** of the walnut aphid—one of the most destructive insects attacking walnuts in northern California—serve to keep the aphid population in check.

The aphid is always present and large populations can be expected every year.

Despite the effective work of the predators, which appear to be the most important of the natural enemies, there is a constant tendency for the aphid population to reach a dangerous level and chemical control measures are justified.

Aphicides should be applied at a time when they will have the least adverse effect upon the host predator balance. Most benefit is likely to result if treatment is applied when there is an approximate average of 10 aphids per leaflet on an increasing population. At this point the predator population is usually at a very low level, and the aphid population is on the threshold of a rapid expansion.

If the application of an aphicide is delayed until the aphid population reaches a much higher level it is considerably harder to get a satisfactory clean out. As a result it has been noted on various occasions that where a material such as nicotine has been used a rapid and heavy build up has quickly followed. There is some evidence to indicate that a good clean out with one of the organic materials will lessen this danger.

Investigations have shown that the insecticides used for the control of the codling moth on walnuts have a tendency to increase the aphid problem and this response is marked with materials such as DDT. Where the latter is used in the spray program it should be in combination with an aphicide.

With the Payne variety it is usually a desirable practice to apply a spray during the first half of May to control the codling moth. By the addition of an aphicide to this spray, the aphid is controlled at a time when insecticides appear to have the least adverse effect upon the host predator balance. Further, the pest is controlled at a time that makes a spring irrigation possible without the danger of a destructive aphid population developing while the orchard is under water.

Where conventional rigs were used to apply the sprays—one pound of 14% nicotine dry concentrate; or two-thirds pound of benzene hexachloride containing 10% gamma isomer; or one-third

pound 25% parathion wettable powder; or one-fourth pint 20% tetraethyl pyrophosphate per 100 gallons of spray—all sprays resulted in excellent control of the walnut aphid. However, satisfactory control can be assured only if the sprays are thoroughly applied.

### Benzene Hexachloride

No serious objections to the use of any of the above aphicides have been encountered to date. Of the four, benzene hexachloride is the cheapest, but has one possible serious disadvantage in that there is danger of its imparting an off-flavor to the nuts. When used in the early codling moth spray as recommended above, no such off-flavor has been detected. However, where used by growers in a two-spray program or later in the season, an off-flavor has occurred on occasions. Because of this, benzene hexachloride will have to be used with considerable caution.

Investigations are needed to determine if there is any danger of benzene hexachloride accumulating in the soil—over a period of years—to a point where it will flavor the nuts even though its use is restricted to a single treatment in early season. If its use should be limited because of an off-flavor, there is the possibility that lindane, which is the purified gamma isomer of benzene hexachloride, can be used in its place at a somewhat heavier dosage. This change would add considerably to the cost of the aphid control program.

### 1949 Investigations

Based upon information obtained during 1949, it would appear that parathion should prove effective at a dosage of much less than one-third pound of 25% wettable powder to the 100 gallons of spray. How much the dosage might be reduced still remains to be determined.

It is difficult to know just what aphicide should be recommended at the present time. The grower will have to make his own selection, but pending further investigations it would appear that 14% nicotine dry concentrate offers the least hazard. Properly used, this insecticide will give good control either when applied with a conventional sprayer or speed

sprayer, and it is known to have the least adverse effect upon wildlife as well as the natural enemies of the aphid.

In the course of the investigations it was observed that aphicides were more effective when used in combination with DDT than with standard lead arsenate.

Investigations were undertaken in 1949 to determine whether speed-type sprayers could be effectively used to apply aphicides to control the walnut aphid. The results obtained were extremely promising.

### Rates of Aphicides

The aphicides applied were wettable parathion powder, tetraethyl pyrophosphate, and nicotine dry concentrate. They were used at the following rates in 500 gallons of water: 25% parathion, 10 pounds; 40% tetraethyl pyrophosphate, five pints; 14% nicotine dry concentrate, 60 pounds.

The diluted sprays were applied at approximately 50 gallons per acre with the parathion resulting in the best control. The results obtained with tetraethyl pyrophosphate were good, although the dosage used was close to the minimum to insure satisfactory control. Where the rate of application dropped much below 50 gallons per acre, some aphids escaped the treatment. Because it is difficult to maintain a constant application of 50 gallons per acre, it is believed that the amount of 40% tetraethyl pyrophosphate should be increased from one-half to three-fourths pint per 50 gallons of spray. This is equivalent to 7½ pints to the 500 gallons of water.

The initial kill obtained with the nicotine treatment did not quite equal that secured with parathion or tetraethyl pyrophosphate. However, many predators survived the treatment and these appeared to hold the pest in check so that in the end the nicotine produced a control at least equal to that obtained with tetraethyl pyrophosphate. If nicotine dry concentrate is used for commercial applications, it is believed that the dosage should be raised from 60 pounds to either 69 or 72 pounds to the 500 gallons of water.

At the dosage used in the applications, made with the speed-type sprayers both parathion and tetraethyl pyrophosphate are very destructive to natural enemies of the aphid. Therefore, it is highly desirable that an exceptionally good kill of the aphid be obtained when these insecticides are used. Failure to accomplish this is very likely to result in a serious and rapid increase in the aphid population. Where the control of aphids is nearly complete, predators will usually re-establish themselves in the orchard by the time the aphid population begins to increase rapidly. Thus, if further artificial control

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edible portion of the spear is left in the field.

In California the spears are trimmed mechanically in the cannery to the desired length rather than hand snapped as in the East. Therefore, snapped spears would not save labor except in butt disposal. Since the snapped spears are of unequal length there is a loss of usable asparagus when trimmed to equal lengths. Thus the cost to the canner on the actual asparagus canned would be increased proportionally to the loss in trimming.

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is not applied against the aphids, the predators may well be in a position to check the infestation before too much damage is done.

### Caution Required

Although the results obtained with the speed-type sprayer look very promising, further investigations are very much needed: the effect of parathion and tetraethyl pyrophosphate upon predators and parasites has not been determined adequately; effects upon bird and other wild-life have not been ascertained; it is not known whether continued use will result in plant injury or in the increase of another pest; and, until some of these possible problems are more fully understood, commercial use of these materials should proceed with caution.

Exceptionally good control of the aphid was obtained where tetraethyl pyrophosphate was applied as a smoke aerosol. Despite this, it is considered too hazardous to warrant a general recommendation because there is no way of controlling the drift of the smoke.

Because of the extreme toxicity of tetraethyl pyrophosphate and parathion to human beings, these insecticides should be used and handled with caution. The precautions as given by the manufacturer should be followed carefully.

Highly satisfactory control of the walnut aphid can be obtained where nicotine dusts are applied under favorable weather conditions. Treatments should not be applied during periods of unsettled cool weather, for poor control will result, making frequent treatments necessary. This should be avoided because observations indicate that trees covered with an excessive amount of dust are more subject to serious attacks by orchard mites than are those which are covered with only moderate amounts of dust.

No matter what method is used, satisfactory control of aphids will result only

where the proper dosage is used and the insecticide is evenly and thoroughly applied.

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## LAMB

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being marketed has become so large that retail trade disfavor has resulted in a producer price penalty recently amounting to approximately 2½ cents per pound live weight on lambs dressing at 48 pounds and above.

When feed supplies are available, both producers and feeders try to utilize it through heavier weight lambs. With increasing feed supplies in prospect for the next several years, this pressure will probably continue and intensify.

The attitudes of retail meat dealers towards heavy lambs vary all the way from outright refusal to handle them at any price to a willingness to handle them even at the same price as lightweight carcasses. The position of the bulk of the trade seems to lie between these extremes—they are willing to handle a limited number of heavy lambs at a wholesale price differential of four to eight cents per pound below the lighter weights.

Habit and custom of both the retailer and his customers apparently bear heavy influence. Some retailers have experimented with cutting lamb steaks from the heavy legs; others have tried cutting the leg in two parts. The latter method has been more successful, particularly in the self-service market, where the customer can easily see the cut in a cellophane package.

Some retailers will refuse any experimentation whatever and are certain that cuts of these types have no prospect of selling.

Lamb consumption patterns, extremely variable in character and under the heavy hand of habit and custom, have for years confronted lamb producers and distributors with perplexing problems. To these are now added the questions of why demand for lamb by the middle income groups has declined, and what to do about marketing heavy lambs. These questions deserve investigation for the prospects are that the supply of lamb will increase towards its prewar relative position and that feed and production conditions will be favorable to heavy lambs.

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## BEET

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eggs. About two days elapsed between mating and egg laying and adults lived about two weeks. The egg period varied from five to six days at mean average temperatures of from 74° F to 78° F.

At least two generations occur in the field a year. Under caged conditions at a mean average temperature of 76° F, a complete life history was completed in from 34 to 39 days.

Two larval parasites were found during 1949 but parasitism was extremely low as shown by the fact that only four specimens representing two species—a tachinid and a hymenopterous parasite—were recovered from thousands of larvae collected.

### Control

A series of replicated plots was treated by means of rotary hand dusters and compressed air sprayers during July, 1949, at Woodland. The chemicals were applied when the beets were four to five inches high. These experiments indicated that DDT and parathion both as dusts and sprays showed promise and should be included in future experimental work. DDT as a 10% dust at the rate of 90 pounds per acre was effective as was a 50% wettable DDT powder applied as a spray at the rate of two pounds per 88 gallons of spray per acre. A 2% parathion dust at the rate of 107 pounds per acre, and a parathion spray of two pounds of 20% wettable powder to 88 gallons of spray per acre, were also effective. Under the conditions of this experiment the other materials used were not as effective as DDT and parathion. In order to secure adequate control it was found necessary to concentrate the chemicals at the bases of the plants.

Control of the caterpillars attacking broccoli was difficult, although the repeated application of DDT sprays concentrated in the plant rows was fairly successful.

The periodicity of abundance of this insect makes it difficult to predict its future economic status as a sugar beet pest in California. Damage to sugar beets in 1949 was correlated with time of planting. Beets planted in May and June were in a more susceptible stage of growth during July and August than those planted prior to this time. During years when beets can be planted prior to May and June they usually will be established firmly prior to abundance of the crown borer.

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