Walnut Aphid Control

studies in northern California of effectiveness of addition of aphicide to codling moth spray

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Investigations on the control of the walnut aphid in northern California were expanded in 1948.

The insecticides investigated at Linden and at San Jose included Lethane 60, benzene hexachloride containing 10% gamma isomer, 25% wettable parathion, 14% dry nicotine concentrate and 20 or 40% tetraethyl pyrophosphate.

Population trends of the aphid were determined from time to time during the growing season.

At Linden two blocks of 100 trees were sprayed with Lethane 60, used at the rate of ½ gallon to 100 gallons of water. The application was made April 1, with sprayers having 25-foot towers, equipped for automatic spraying. Approximately 43 to 44 gallons were applied per tree. Growth had only recently started and an occasional catkin was open and shedding pollen.

At San Jose in a 15-acre orchard, all but a block of 49 trees were sprayed with Lethane 60 on April 2 and 3. Application was made with manually operated spray guns. The trees were smaller than those at Linden and approximately 11 to 12 gallons were applied per tree.

Some tip burn of the leaves occurred both at Linden and at San Jose. It appeared to be more severe where applications were made at elevated temperatures.

The Lethane spray resulted in a marked reduction in the walnut aphid population, and this suppression remained evident until well into the season. However, the control obtained, based upon a single season's investigations, does not appear to be any better, if as good, as that which resulted where an aphicide was added to the codling moth spray.

At Linden the aphid population was slow in developing, and the control was definitely better where aphicides were used in conjunction with the codling moth spray. After the middle of May the aphid population in the check started to increase rather rapidly and by June 10 the average number per leaflet was 54.91. This compares with 23.11 for the Lethane 60 treatment and 0.43 for the aphicide-codling moth combination.

The results obtained at San Jose were not so clear cut. This was due in part to the fact that additional aphid control was applied to the Lethane 60 treatment on May 25. This resulted in lowering the aphid population to a level similar to that encountered in the treatment where an aphicide was incorporated in the codling moth spray.

At Linden in 1947 highly satisfactory control of the aphid was obtained when aphicides were added to the codling moth spray. The materials and the rates per 100 gallons were as follows: 14% dry nicotine concentrate 1 pound; or benzene hexachloride wettable powder containing 6% gamma isomer, 1 pound; or 10% tetraethyl pyrophosphate ½ pint.

The materials used and the rates per 100 gallons in 1948 were as follows: 14% dry nicotine concentrate, 1 pound; benzene hexachloride containing 10% gamma isomer, two-thirds pound; tetraethyl pyrophosphate, one-eighth pint of 40% or one-fourth pint of 20%; and 25% wettable parathion, one-third pound. These aphicides were used in combination with arsenicals and DDT in codling moth spray programs.

The sprays were applied with conventional sprayers having 25-foot towers, equipped for automatic spraying. Approximately 55 gallons of material were applied per tree.

All the aphicides resulted in excellent control of the walnut aphid, and this occurred whether they were used in combination with arsenicals or with DDT.

These plots received no further aphid control although it would have been desirable to have treated the entire area with an aphicide prior to the peak population that occurred in July. This was not possible because the orchard was under irrigation and by the time the area could be treated, it was obvious that natural enemies were rapidly depleting the aphid population.

The decline that occurred in September was due to the killing action of a tetraethyl pyrophosphate smoke that drifted through the experimental area.

All sprays were applied on May 10 and 11. The average number of aphids per

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TREE DAMAGE

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Irrigations should be less frequent than normal and less water applied at each irrigation. The reduced need for soil moisture may continue during the entire growing season following the freeze.

Water should be applied only after careful observation of the soil moisture shows it to be required.

Fertilization of frozen trees should be considered carefully.

There is no evidence to indicate that frozen trees respond to any special fertilizer which is supposed to stimulate growth. Those materials which are customarily used in citrus orchards should be sufficient.

Slightly injured trees will require adequate nutrients to permit satisfactory growth and fruiting. The best results will be obtained when normal fertilizer applications are made.

Severely injured trees will usually produce an abundance of vigorous sucker growth which is difficult to control. Application of fertilizer to such trees is unnecessary and most likely will increase the difficulty of rebuilding the trees. Fertilizer applications should be omitted or reduced below the normal amount until a balance has been established between root and top.

Nutritional Sprays

Following serious loss of leaves and during the periods of unusually vigorous growth such as occur after a freeze the trees should be watched for evidences of deficiencies of zinc, copper and manganese. Deficiency of zinc is most likely to develop.

These materials should be applied as sprays and they should be used as often as symptoms are observed. Two or more applications may be required the first year.

Copper sprays frequently cause injury. They should not be used unless a deficiency is definitely known to exist.

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Recommendations concerning individual problems in various districts may be obtained from the Office of the County Farm Advisor or the University of California College of Agriculture, Agricultural Extension Service.

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leaflet a month after treatment was 0.27 for the standard lead arsenate-aphicide combination, 0.74 for the DDT-aphicide treatments as compared to 43.07 for the standard lead arsenate spray without an aphicide.

The control obtained was outstanding and the trees receiving the aphicide were in excellent condition as compared to those not receiving the treatment. The leaves of the latter were sticky due to the quantity of honey-dew being secreted by the aphids. So serious was the damage that this portion of the orchard was treated with an aphicide on June 13.

Dusts

Where applied under ideal conditions, nicotine dust can be expected to give excellent control of the walnut aphid. Where treatment occurs during periods of unsettled cool weather, poor kills are frequently obtained, which necessitates retreatment in a short time. 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.

The timing of applications is extremely important. Treatments should be applied before the aphid population reaches approximately 10 per leaflet. If treatment is much delayed it may do more harm than good, because the host predator population relationship may be so upset as to allow for a rapid increase in the aphid population.

Treatment appears to have little or no adverse effect upon the host-predator relationship when applied at about the time the aphid population reaches 10 per leaflet. It may actually help in establishing a more favorable host-predator balance.

During the past season many growers attempted to control the walnut aphid with homemade machines that generated tetraethyl pyrophosphate smoke. The tetraethyl pyrophosphate was usually mixed at the rate of one pint of actual material with one gallon or more of diesel oil and the mixture applied to the trees as a white smoke. The results obtained were variable but in some cases they were not highly satisfactory. Failure in many instances was due to the faulty construction of the machines. Many were not able to produce a smoke of the proper quality, or the capacity was not sufficient. To insure control under favorable weather conditions, approximately a pint of 40% tetraethyl pyrophosphate or its equivalent was needed per acre.

In limited experimental testing in early September excellent control of the walnut aphid was obtained when the tetraethyl pyrophosphate-diesel oil mixture was applied with a commercial smoke generating machine.

Where the tetraethyl pyrophosphate-diesel oil mixture was applied so that the amount of actual tetraethyl pyrophosphate was equivalent to 1¼ pints of a 40% material per acre, complete control of the walnut aphid was obtained. Not only were the aphids in the treated area killed, but the smoke drift was lethal to aphids over 20 rows downwind.

Reservations

Although the results obtained were very encouraging, no definite recommendations concerning the use of smoke machines can be made pending further investigations. Even though they continue to prove effective, their use may involve too great a hazard to make it safe to recommend them.

The effect of the smoke upon the operator must be determined. Further, the fact that the smoke drift can not be controlled is bound to result in serious limitations.

Tetraethyl pyrophosphate is a very toxic material and must always be used with considerable caution. If any is ever spilled on an operator, the affected part should be immediately washed with soap and water.

Walnut Aphid Population Trends where Aphicides Were Combined with Codling Moth Sprays as Compared to Codling Moth Spray without the Inclusion of an Aphicide at Linden, 1948

Treatment and date applied	Average number of aphids per leaflet on survey dates given									
	May 10	May 19	June 1	June 10	June 22	July 8	July 22	Aug. 2	Aug. 18	Sept. 7
Standard lead arsenate with aphicide, May 10....0.23	0.00	0.02	0.26	3.29	28.84	9.82	2.40	4.72	0.01	
DDT with aphicide, May 11..0.66	0.01	0.01	0.74	2.76	13.11	14.48	3.80	7.38	1.22	
Standard lead arsenate without aphicide, May 10....	1.95	6.75	43.07	3.96*	6.06	6.08	6.75	5.81	...	

* Plot treated with a nicotine dust on June 13.

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BLACKBERRIES

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The Thornless Boysen fruit is similar to that of the Rossberry but the vines are very different. The Rossberry canes are covered with numerous thorns while those of the Thornless Boysen are almost smooth. Only occasional small prickles occur on the canes of the latter.

Austin Dewberry

This variety is supposed to be a hybrid between a wild dewberry and a common blackberry. The berries are similar to those of the Boysen variety. In some cases the taste of the Boysen is somewhat sweeter and the shape of the berries is more conical. The berries of the Austin Dewberry tend to be elongate.

These differences are evident only when large samples are contrasted. The production characteristics of the two varieties appear to be identical.

Nectar

The Nectar variety is possibly a seedling of the Young and has been considered to be identical with the Boysen. This is not the case. It differs from the Boysen in the following important characteristics: The Nectar is less acid; the diameter of the berries is usually greater; there are approximately nine drupelets around the core at the calyx end instead of 10 to 11; the drupelets are larger and are not acute; the base of the style is not generally set in a depression.

The production characteristics of the two varieties are very similar.

Texas Everbearer

This blackberry variety is an extremely vigorous, erect type. It attains a height of nine feet.

Fruit is produced continuously throughout the season from June through late fall. All of the berries are small and none of them matures in the central coast region where it has been tested. They remain hard and highly acid. Possibly the coastal region is too cool for proper maturity of the fruit of this variety.

In any locality it would be undesirable because of the long, stout, hooked thorns which are numerous on all canes. The small size of the berries and the presence of large thorns would eliminate this variety from commercial consideration, and the flavor is too poor for home gardens.

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