

Codling Moth on Walnuts

southern California studies of varying methods of DDT application

J. C. Ortega

Ordinary spray rig applications of DDT for control of codling moth on walnuts were given comparative tests against several other methods of application during the 1947 experimental program.

DDT wettable powder sprays were applied with a regular spray rig and with a speed sprayer in comparison with aerosol applications of DDT as a wettable powder and in a kerosene solution.

DDT dusts were applied with the ordinary walnut duster and with the airplane.

In the first tests last year at Tustin, two treatments of basic lead arsenate applied with the regular spray rig gave very poor results—21.7% wormy nuts—compared with the other treatments, except one applied with the aerosol generator.

Two applications, each using two pounds of 50% wettable DDT powder per 100 gallons, applied with a regular spray rig or with a speed sprayer gave comparably excellent results—0.5% and 0.8% wormy nuts, respectively.

Each of the three dust treatment programs gave satisfactory control. Two applications of 10% DDT dust at five pounds per tree at each treatment were as efficient as two 20% DDT dust applications at the same dosage per tree—1% wormy nuts in both cases.

Where DDT was applied with the aerosol generator, leaves on the lower branches which were closest to the nozzle applicator were slightly burned. Leaf burn was more pronounced and the percentage of wormy nuts greater where technical grade DDT was dissolved in kerosene with the aid of a mutual solvent.

A second series of tests was made to compare applications of DDT with the regular spray rig versus the walnut duster and the airplane duster.

Two applications with the regular spray rig were compared against single spray rig treatments combined with a second treatment using either the walnut or the airplane duster. Spray rig treatments used two pounds of 50% DDT wettable powder, while 10% DDT dust was applied at the rate of five pounds per tree in the dustings.

There was no difference in codling moth control between using the spray rig or the walnut duster, but results from the airplane dust application were significantly inferior to those from the walnut duster.

Trees treated with DDT dust by air yielded over 2% wormy nuts while trees getting the walnut duster application yielded only 0.6% wormy nuts.

Some of the treatments applied in the Tustin tests were duplicated near Chino.

A single spray rig application of basic lead arsenate or DDT did not give satisfactory control, although two treatments using two pounds of 50% DDT wettable powder per treatment applied with either the spray rig or the speed sprayer reduced the per cent of wormy nuts to between 1.3% and 0.5%. The two DDT dust treatments gave satisfactory control but little or no practical advantage was gained by a third application.

Where the aerosol generator was used, a slight burn on the leaf tips again was observed, and the DDT was not uniformly deposited on the trees.

Aphids and Mites

Supplementary materials were added to the DDT spray mixture at the second codling moth treatment to control aphids and/or the European red mite and the two-spotted mite—red spider.

The materials used were: DN-111 at various concentrations and also in combination with Black Leaf 40, Black Leaf Dry Concentrate—14% nicotine—or benzene hexachloride, and the organic phosphates—hexaethyl tetraphosphate—HETP—and tetraethyl pyrophosphate—TEPP.

Most of the aphid treatments gave very good control, although the addition of nicotine preparations such as Black Leaf 40 and Black Leaf Dry Concentrates did not give satisfactory control in some instances.

In no case did the addition of materials—such as DN-111, HETP or TEPP—give satisfactory control of the European red mite or the two-spotted mite.

Black Leaf 40, Black Leaf Dry Concentrate, benzene hexachloride, HETP and TEPP were applied with a speed sprayer for control of aphids. Results from these treatments—applied at the rate of 100 gallons per acre—showed much promise even under adverse weather conditions.

An unusually heavy build-up of the European red mite followed the use of DDT for codling moth control on one ranch. Fearing that this mite could become an important pest following use of

DDT, four different dust treatments were applied with the objective of controlling both the aphids and the European red mite with one application.

All of the treatments were highly effective against the walnut aphid.

Parathion afforded a very high initial kill of mites, but appeared to have little or no residual effect.

K-1875 and DN-D8 reduced the mite population initially, but not as extensively as did parathion. None of these treatments prevented subsequent infestation by the two-spotted mite which practically defoliated the trees.

In another test a heavy infestation of two-spotted mite which followed two DDT spray applications was treated with DN-D8 dust at 40 pounds to the acre. Unsatisfactory control was achieved.

Detailed observations following six subsequent dust treatments showed none was effective in controlling mites.

The difference between using DN-D8 dust at 40 pounds or at 75 pounds per acre was very slight. There was no observed difference between the 1% and the 2% parathion treatments, or between the 2% and the 4% K-1875 dust applications. Trees in all plots were seriously defoliated.

Additional tests to control the two-spotted mite by various speed sprayer treatments—with DN-111, K-1875, parathion or IN 4200—were ineffective.

Navel Orangeworm

In practically all instances where a program of two spray treatments of DDT wettable powder was used for codling moth control, infestation of navel orangeworm was very slight.

On the basis of the 1947 experimental work, it appears that where excellent control of codling moth was obtained, the navel orangeworm was of minor consequence.

Results of the tests seem to justify recommendation of the use of DDT this year in those groves where codling moth infestation was high in 1947. It may be necessary, however, to apply additional control measures for the walnut aphid and the two-spotted mite later in the season.

If DDT is used, only the two-spray program using two pounds of 50% DDT

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California Blackeye 5

state's third most important dry bean being improved for wilt resistance

Francis L. Smith

The **blackeye** variety of cowpeas is classed as a dry bean in California but in the southern states it is known as the Blackeye pea.

As a bean variety in California it is the third most important following the small and large lima beans.

The annual production in California from 1929 to 1947 varied from 275,000 bags in 1932 to 1,154,000 in 1940. The average for the 18-year period was 621,800 bags.

The average production of cowpeas per acre in the United States is 5.4 bushels while the California average for the Blackeye variety is about 20 bushels.

The California crop is largely sold in the southern states as dry edible beans, and some are used for seed.

In the latter part of the nineteen-twenties large areas of rather light sandy soil in the San Joaquin Valley were becoming unfit to produce Blackeye beans because of infestation with nematodes and the cowpea wilt.

A breeding program was started to add resistance to these two diseases. For the resistant parent the Iron variety was chosen. It is highly resistant to both these widely diverse organisms. The California Blackeye was used as the recurrent parent in a backcross breeding program.

Eventually the Blackeye 5 most nearly duplicated in growth habit and maturity the old California Blackeye. Because of its superiority in seed size and smoothness and whiteness of the seed coat; its erect, bushy habit, high potential yielding ability, and ease of threshing, it soon spread throughout all the Blackeye growing areas in the state regardless of whether disease resistance was or was not a factor.

It is doubtful if the old Blackeye can be found at the present time anywhere in the state. As the Blackeye 5 increased in acreage in California more seed of this variety was shipped to the southern states for dry beans as well as for seed. Most of the Blackeye planted anywhere in the south from California seed is now Blackeye 5.

Cowpea Wilt

In recent years the cowpea wilt has made great inroads in the destruction of stands of even Blackeye 5. This may be

due to the fact that the resistance of this line was not high, and with heavier attack it has broken down to almost susceptibility; or the wilt organism itself may have changed through known biological processes to produce strains to which the Blackeye 5 is susceptible.

At the present time, which one of the alternatives is true has not been answered by critical experiments.

It is apparent, however, in experimental plots that the Blackeye 5 still has more resistance than the old Blackeye. However Blackeye 5 in the Modesto-Turlock area of the San Joaquin Valley is not resistant enough to wilt to allow planting on wilt sick soil without incurring considerable loss.

Some other strains of Blackeye which have greater wilt resistance are now coming into the Modesto-Turlock area. One has been tested for three years and is being increased for commercial production in 1949. It is a selection known as Blackeye 7. Although it is somewhat later and more viney than Blackeye 5, its higher resistance has made it attractive to many growers.

In those areas where wilt is not so devastating, the Blackeye 5 is still the dominant strain. A number of the early releases are still grown by a few people. In the Chino area, for example, a strain is grown which local growers call Chino 3. In all the tests made, it has been found to be indistinguishable from Blackeye 5.

In order to keep the Blackeye 5 variety pure, a number of seed producer-growers handle certified seed. In 1947 there were 58 growers producing 2,861 acres of certified seed of this variety. These growers are spread well over the state as indicated by their locations by counties: Stanislaus 34, San Joaquin 7, Madera 3, Sutter 3, and one each in Tulare, Merced, Kern, Ventura, Los Angeles and Riverside.

Breeding for Resistance

Breeding experiments are underway to increase the resistance of Blackeye 5 by crossing it to the Iron variety. In the new breeding program, now in its second year, considerable emphasis will be made to reclaim a type which is as near like Blackeye 5 as possible with more resistance to wilt added to it.

The nematode resistance of Blackeye 5

is apparently on a par with any of the other Blackeye hybrids.

The breeding program is bound to take time and southern growers should use Blackeye 5 unless their soil is wilt sick. In that case the next best thing is to switch to the new Blackeye 7 variety.

Since Blackeye 5 still does fairly well under light infestation of wilt, it will probably hold up until a new more resistant type can be bred.

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tering. The fruit holds for a long time, either on the vine or in storage.

Perlette does not show the brown discoloration after handling so characteristic of very early varieties. No large-scale shipping tests of either variety have yet been made to eastern markets.

Thompson Seedless is being used to an increasing extent for canned fruit salad and fruit cocktail mix. Cannerymen have had poor results with the variety largely because the stems do not come off the berries easily. The berries split and do not retain a good color during processing. Both Perlette and Delight have been consistently superior to Thompson Seedless in canning tests conducted in 1946 and 1947 with three commercial canneries.

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wettable powder per 100 gallons of water should be considered.

Time of treatment will depend on the development of both walnuts and the codling moth. In normal instances, the first application in most localities should be made before May 10, and the second, before June 1.

There is insufficient evidence of the certainty of a high degree of codling moth control from DDT dust treatments. Also, the drift of dust—at the time of application—from the orchard onto the adjoining vegetation may have serious consequences.

Until further information is available on these important points, it is not believed that growers should consider use of DDT dust on walnuts.

Use of lead arsenate rather than DDT during 1948 will avoid risks of aphid and two-spotted mite build-up, which is attendant with DDT applications.

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