UNIVERSITY OF CALIFORNIA PUBLICATIONS

COLLEGE OF AGRICULTURE

AGRICULTURAL EXPERIMENT STATION

New Control Methods

FOR THE

Thrips and Peach Tree Borer

BY

Earl L. Morris

Sprayed for Thrips. Unsprayed

BULLETIN No. 228

(Berkeley, Cal.)

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NEW CONTROL METHODS

FOR THE

PEAR THRIPS AND PEACH TREE BORER.

By Earl L. Morris.

[Introductory Notes.—The present Bulletin gives the practical results of studies on the two most serious pests in the Santa Clara Valley. They were conducted by Mr. Morris under the auspices of the Experiment Station. Very decided progress was made towards the control of these insects, both of which extend into other parts of the State and are causing much concern at the present time.—C. W. Woodworth.]

LIME SPRAY FOR THRIPS (Euthrips pyri).

This paper is based on an experiment in a pear orchard belonging to W. C. Bogen on San Tomas Road, near San José, California. It was possible to make this experiment, which extended over two seasons,

Fig. 1.—Whitewashed tree coming out into full bloom.

solely through the hearty coöperation of Mr. Bogen, who at all times gave freely of his time, money and counsel.

The period covers the fruiting season of 1910 and 1911. The writer had observed that in some instances pear trees sprayed with a heavy solution of home-cooked lime-sulphur, which contained a large excess of lime, were freer from attacks of thrips than pear trees in the same

Fig. 2.—Unsprayed trees at blossoming time. This tree is adjacent to the one shown in figure 1.

orchard which were not sprayed. From previous experiments it seemed highly improbable that sulphur in chemical combination with the lime was the active agency. The only other possible agency was the free lime which was sufficient to make a thin whitewash. Acting on the above suggestion in the spring of 1910, we sprayed four rows of pear trees, thirty-one trees in a row, and three trees on each of the next

two rows, making in all one hundred thirty trees. This was six trees more than one sixth of the orchard, and the adjacent unsprayed trees made an excellent check. The application was made with a hand pump, without constant agitation, with the result that the last whitewash sprayed from the tank was much thicker than the first. The last trees sprayed, especially the last six, which were in unsprayed rows, were covered with a very thick, heavy whitewash. This application was made when very few blossom buds were open sufficiently to admit the thrips. At the time of full blossom it was very apparent that the number of blossoms was in direct proportion to the amount of whitewash. The trees which had a thin coating of whitewash had very few blossoms; those which had a very thick coating of whitewash had abundance of blossoms. Fig. 1 shows thickly whitewashed trees in full bloom. Fig. 2 shows adjacent unsprayed trees with very few blossoms, the blossom buds having been destroyed by the thrips. The amount of fruit corresponded to the amount of blossom.

The season of 1911 the experiment was repeated on a larger scale. Between one and two weeks before the time for the buds to open, Mr. Bogen sprayed a large number of trees very thoroughly with thick whitewash. Time is a great factor in the control of thrips, and we had hoped to show from this experiment that the whitewash would have the same beneficial effect when applied a week or more before the buds open as when applied at the time of opening. An exceedingly heavy downpour of rain washed the lime from the buds and defeated our plans. By the time the orchard was again dry enough for spraying, the buds were just beginning to open and conditions were ripe for duplicating the experiment of the previous season.

About one half of the orchard was used for the experiment. It consisted, including checks and sprayed trees, of seven rows, thirty-six trees to the row. The same material was used as in the previous experiment. Two rows were sprayed, one row unsprayed, two sprayed, two unsprayed, with this exception, that in the one unsprayed row of trees seven trees were sprayed by mistake.

The results were the same as the previous year. All the sprayed trees, including the seven in the unsprayed row, came into full blossom. The unsprayed trees blossomed very feebly. The fruit corresponded very closely to the blossoming. The sprayed trees averaged eight times as much fruit as the unsprayed trees. Fig. 3 shows sprayed and unsprayed trees at picking time. Fig. 4 shows the fruit from a sprayed and an unsprayed tree.

We used eighty (80) pounds of quicklime for one hundred (100) gallons of spraying material. The whitewash was strained through one fourteenth (1/14) inch mesh wire screen and the same sized screen used on the suction hose of the pump. The ordinary Bordeaux nozzles

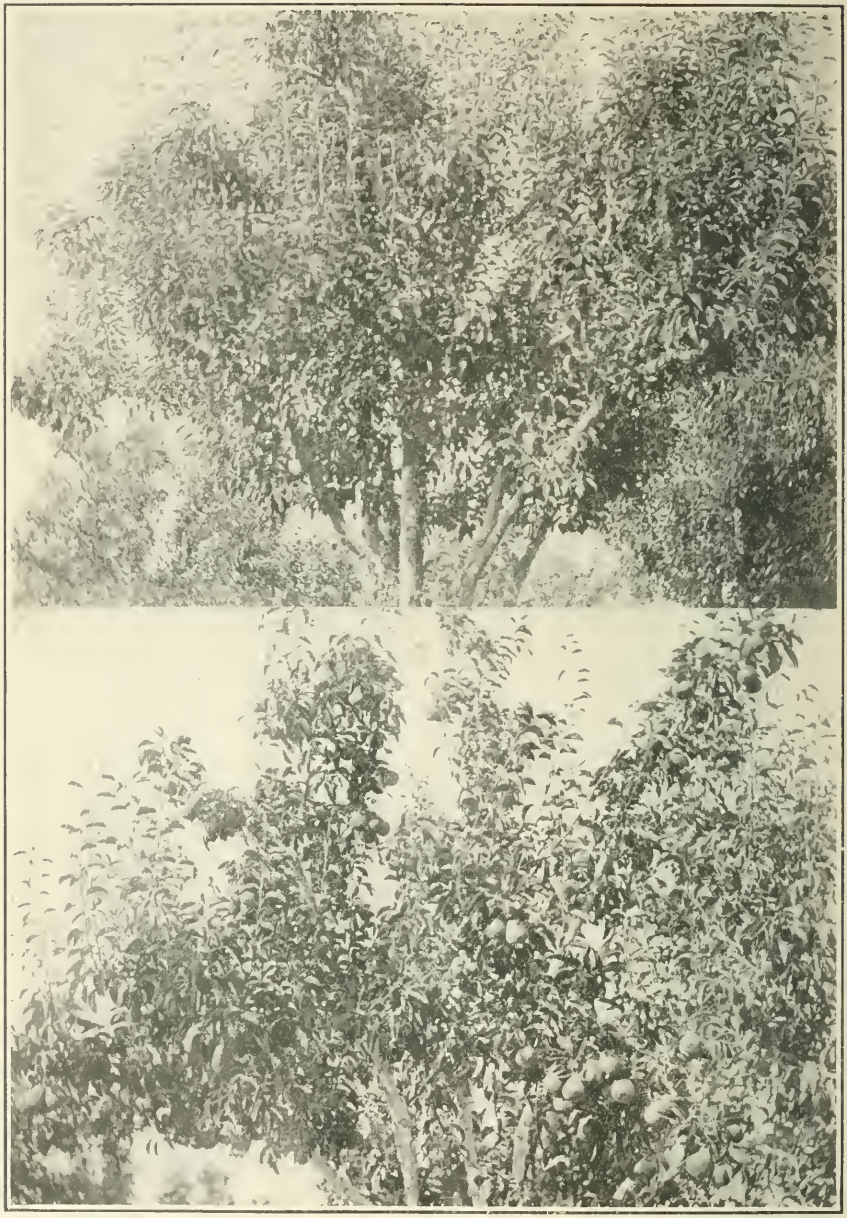

FIG. 3.—Trees at harvest time; the lower one was whitewashed and carries fruit.

worked well. But it was necessary to enlarge slightly the opening in the disks of Vermorel type nozzles. We found it very important to have the lime properly slaked. Good lime properly slaked is of creamy consistency, with a negligible amount of grit. It forms a smooth, uniform, creamy coating on the tree. An attempt to use improperly slaked lime will usually result in complete failure. No amount of written instruction will teach one to slake lime. The knowledge must come from actual work with some one who has had the experience.

In orchard practice we found it convenient to have our slaking vat, which was 6 by 4 by 1 feet, elevated about three feet, with one end slightly lower than the other. In the lower end we arranged a sliding door through which the whitewash flowed by gravity into a containing

(Unsprayed.) (Whitewashed.)

FIG. 4.—Fruit at harvest from treated and untreated trees.

vat. The lower vat was shorter, narrower, and deeper than the slaking vat to facilitate the removal of the material to the spray tank. Between the two vats we arranged a piece of window screen, of one fourteenth inch mesh, supported by chicken fencing, through which the whitewash passed in flowing from the slaking vat.

The cost of material ranges from one (1) to one and one half (1½) cents per gallon, depending upon the cost of lime and labor. One application proved sufficient to protect the blossoms and permit setting of fruit. We did not find it necessary to spray a second time for larvæ, although in the first experiment enough larvæ appeared to lead us to believe that in some cases a second spraying would be necessary with some good contact spray.

ASPHALTUM TREATMENT FOR THE PEACH TREE BORER.

The western peach tree borer (*Sanninoidea pacifica*) is an insect of much economic importance in the horticultural district about the southern arm of San Francisco bay.

The investigations upon which this paper is based were made in most part in the peach orchard of the J. H. Flickinger Company, Berryessa, California. They have extended over a period of four years. The results have not been verified for other districts.

The adult borers are slender, blue-black, day-flying moths, about one inch long. They are seldom seen and very rarely recognized by the orchardists. They issue more or less from February to September, but

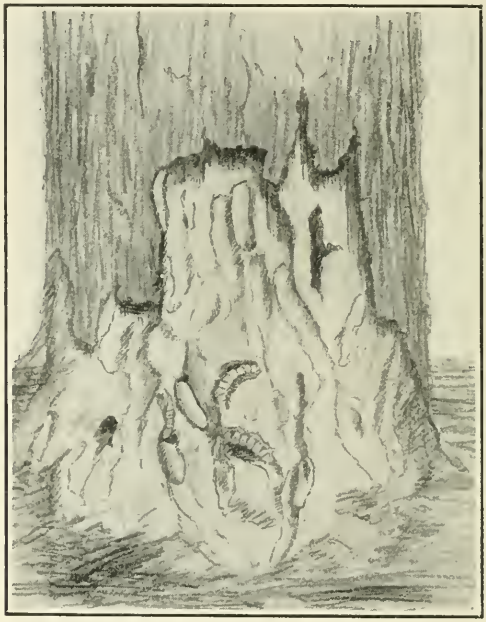

FIG. 5.—Work of the peach tree borer.

the mass of them appear about the middle of July. They place the eggs on the trunk of the tree from the ground up two feet, one to twenty-five eggs in a place. These are very small and generally escape notice. They hatch in a few days.

The newly hatched larvæ, or "worms," which are difficult to find, usually enter the bark at or near the ground. The new burrow is marked at first by light brown bark dust, which in a few hours disappears, after which it is nearly impossible to find the opening. The larvæ grow rapidly, work their way through the bark, and spend most of their life between the bark and wood, where they may do great

damage by boring long distances, often completely girdling the trees. Gum flows as a result of this injury and is a fairly reliable indication of the presence of the large "worms." Unfortunately there is nothing to show the presence of the small "worms."

The full-grown larvæ are about one inch long and the diameter of a slate pencil. They have white bodies and dark brown heads. When ready to pupate, they seek places from which the moths can easily issue and construct about themselves cocoons from the chewed-up wood and bark. The cocoons are light brown capsule-shaped bodies, slightly larger than the "worms." They may be found under the bark, in the bark, or in the ground an inch or more from the tree.

The usual method of combating the peach borer is to dig out the "worms" during the winter season, but often the knife causes more damage than the borers, especially if the digging must be done con-

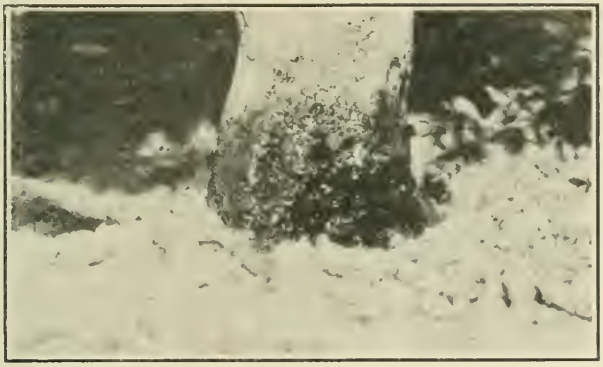

Fig. 6.—The asphaltum treatment for the peach tree borer.

secutive years or by careless workmen. In the fall the soil is removed from the base of the tree to a depth of six or eight inches and the borers dug. In the spring they are dug again and the soil replaced. The second digging is necessary because in the fall many of the "worms" are too small to be found.

Many preparations are being used on the trunks of trees; some to keep the moths from depositing eggs, some to prevent the "worms" from entering, some to kill the "worms" after they have entered. None of these have been wholly satisfactory. Experiments along these lines by the writer led to the use of hard asphaltum, grades "C" and "D," with good results. This was applied early in the spring to badly infested trees from which the borers had not been dug. It was found that a thick heavy coating prevented both the issuance and the entrance of about 95 per cent to 98 per cent of the insects, the degree of efficiency depending upon the thoroughness of the application. Asphaltum does

not penetrate, crack, deteriorate, or bind the tree, since it yields to the slightest pressure. Four years of experimenting have not shown the least injury.

The material is applied warm with a brush from five inches below to five inches above the ground. It is easier to apply two or more coatings than to try to put on more at one time than will adhere firmly. The first coating will harden very quickly and the second can be applied without loss of time. Two coatings are generally sufficient unless the bark is very rough. But in any case a thick, uniform covering is absolutely necessary for the best results.

Borers are seldom uniformly distributed over an orchard. Small blocks of trees here and there may be badly infested and the most of the orchard comparatively free from the pest. In such cases it is not necessary to treat all of the trees with asphaltum, but it is necessary to examine them carefully, for in no other way can the true conditions be known.

A convenient way to handle the asphaltum is to mount an iron kettle on the running gear of an orchard truck and suspend beneath it a sheet-iron apron as a fire box. Keep hard asphaltum in the kettle all the time so that the melted asphaltum will not get too hot to carry in small containers and apply directly to the trees.

We have also used asphaltum to a limited extent for covering wounds and for grafting. And although our experiments are not completed, we believe it may become very useful as a dressing for tree surgery.

SUMMARY.

In the fall throw the soil away from the trees and dig the borers. In the spring dig the borers again and apply a thick coating of asphaltum and replace the soil. Examine the trees each subsequent year to remove borers and to repair any thin or broken places in the asphaltum coating.

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