Peach Tree Borer Control Tests

fall treatments with soil fumigants and use of trunk sprays evaluated in experimental program during the 1955–56 seasons

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Almond, peach and apricot growers in the Brentwood area suffered considerable damage from the peach tree borer in 1955.

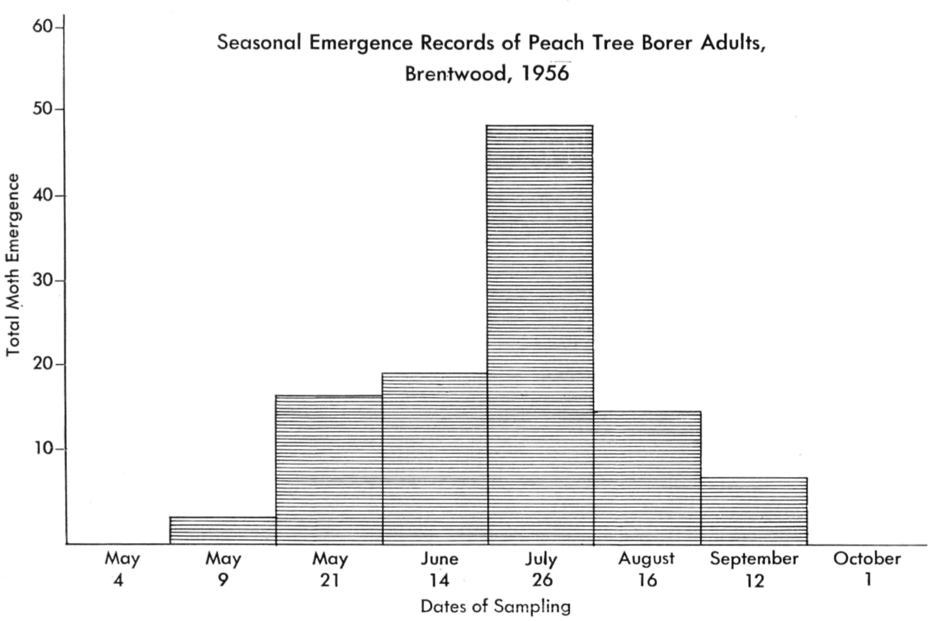
The standard control measure has been the use of paradichlorobenzene as a soil treatment in the fall. However, there is considerable hand labor involved in the application of paradichlorobenzene crystals. In addition, there has been some question as to the efficiency of DDT as a trunk spray, although—if applied at least three times during the season—it seemed to give satisfactory control of the young larvae as they hatched from the eggs. In response to grower request, further experimental work was started in the fall of 1955 and continued through the 1956 season.

Peach tree borer damage is done by the larvae feeding on the cambium layer of the tree trunk—usually from the soil line down to the main roots. Most damage is done during the fall and winter months when the larvae are present in the greatest numbers. On young trees, an infestation can kill the tree very quickly. On older trees, the damage may vary from a general weakening of the tree to complete killing. In most cases, older trees will survive several years' attack unless infestations are extremely high.

In general, the peach tree borer overwinters—as active larvae—within the cambium layer of the tree. Pupation takes place during the spring in cells constructed of frass. The cells may be formed next to the trunk or in cracks in the soil away from the tree. Adults emerge during the summer, and after mating, lay eggs on the trunks of the trees. After hatching, the young larvae burrow through the bark to the cambium layer and then feed downward.

A young apricot orchard which had suffered heavily from the peach tree borer in previous seasons was selected for the 1955–56 experimental work. Each study plot consisted of six single randomized trees. Materials used included paradichlorobenzene, ethylene dichloride, propylene dichloride, and tetrachloroethane. In addition, several new materials—Vapam, Stauffer 339, Nemagon, parathion granules, and lindane drench—were tested but limited to small plots because nothing was known of their phytotoxic properties.

In the large plots, paradichlorobenzene was used at the rate of one ounce per tree and scattered in a band 2″ from the trunk. The crystals were covered with dirt and packed down with a shovel. Ethylene and propylene dichloride were used at a six parts of water to four parts of 50% emulsion dilution, poured around the tree at a rate of one-half pint per tree and covered with dirt after application. Tetrachloroethane was injected with a weed gun set to deliver one-half ounce of undiluted material per injection. Eight injections were made around each tree to give a four-ounce per tree dosage.



Soil Fumigant Treatments for Control of Peach Tree Borer, 1955

Material	Dosage per tree	Total moth emergence	Average emergence per tree
Paradichlorobenzene	1 oz. of crystals	8	1.3
Propylene dichloride	½ pint of a 6–4 dilution	7	1.1
Ethylene dichloride	½ pint of a 6–4 dilution	24	4.0
Tetrachloroethane	4 oz. in eight ½ oz. injections	4	0.8
Check	No treatment	44	8.8

An evaluation of the effectiveness of the treatments was made the following season by counting cocoons and pupal cases because they project from the base of the tree or from cracks in the soil, and make it possible to record them at intervals during the season.

Paradichlorobenzene, propylene dichloride, and tetrachloroethane gave satisfactory control—in this test—as compared with the check. Ethylene dichloride was less effective than the other materials, possibly because the emulsion used was not properly formulated.

Although tetrachloroethane gave good results in these trials, it is dangerous to use because of phytotoxic effects. To check the toxicity of the newer chemicals, the same materials at the same dosages and methods of applications as used is the tests were applied to healthy trees in a young almond orchard during the spring of 1956. Five trees per treatment were used, and the treatments were randomized. The trees were checked for phytotoxic effect during the season, and by harvest, three of the five trees treated with tetrachloroethane were dead and the other two showed leaf burn, poor growth, and shriveled nuts. It was evident that this material is too phytotoxic for use on fruit trees. None of the other materials showed any adverse effect on the trees.

Although some of the materials tested gave control equal to paradichloroben-

Concluded on page 15

PEACH TREE BORER

Continued from page 3

zene, they have no advantages in cost or ease of application.

A series of trunk treatment plots were also established in 1956 to test out new materials, and evaluate standard materials with and without stickers. The materials were applied at monthly intervals, starting in May and continuing through September. Emergence records of the moths were used for timing of the sprays, and the emergence data show the difficulties involved with trunk sprays. The chart on page 3 gives the seasonal emergence records for the 1956 season. Emergence starts in May, reaches a peak in July, and continues into September. Because of this long emergence, sprays must be applied several times or materials must be found that possess long residual values.

Because the only way to evaluate the plots is by emergence records, it will not be possible to ascertain the results of the 1956 trunk sprays until the end of the 1957 season.

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BARTLETTS

Continued from page 10

The slight increase in total titratable acidity that occurred during the ripening of fresh pears below 4.9 pounds pressure test is reflected in the canned product. This increase in acidity might be related to the improvement in aroma and flavor during the second phase of ripening.

As the pears matured, their volatile reducing substances increased while the pressure test decreased to 1.5 pounds. The sample that scored high in aroma and flavor had high content of volatile reducing substances. Thus, the volatile reducing substances content might provide a measurement for evaluating flavor and aroma of canned Bartlett pears.

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NEMATODES

Continued from page 6

equivalent, and the soil temperature was 95°F at a depth of 9″. The air temperature was 110°F. The root-knot nematode species was *M. javanica*. Four replicate plots, each two rows wide and 200′ long, were provided for each treatment. The row applications were made with two chisels, 12″ apart—6″ on either side of the planting row. Fumigants were injected to a depth of 11″ in the bed and the surface sealed by a V-shaped drag. Early Pak tomatoes were direct-seeded six weeks after soil treatment. No significant differences in yield occurred between plots in which fumigants were applied in the row or as solid applications. Root scores obtained at the end of the picking season indicated all treatments—with EDB the most effective—were significantly better than the untreated check plots. Row placement applications were as effective as solid applications in reducing the amount of galling on the main lateral roots.

The San Joaquin County plot soil was a clay loam having a moisture content of 17.3% and soil temperature range of 62°–65°F. The moisture equivalent was 17.1%. Applications for control of nematode species—*M. incognita* var. *acrita*—were made by chisel to four replicate plots each 10′ × 175′. Three weeks after treatment New Improved Pearson tomatoes were transplanted by machine into the plots. Yields obtained by commercial pickers showed no significant increase in any treatment over the untreated plots. A solid application of Nemagon at 2.5 gallons per acre resulted in a significant decrease in yield. Root scores showed EDB and Nemagon to be the most effective.

Again—in 1955—two plots were established, one involving a fresh fruit crop near Reedley in Fresno County and the other a canning crop near Nicolaus in Sutter County.

The plot in Fresno County was established for control of *M. incognita* var. *acrita* on staked tomatoes grown for the fresh fruit market. The treatments were made in February to six replicate plots, each treatment covering an area of 10′ × 132′. The soil was a clay loam with a pH acidity—relative acidity-alkalinity with seven as neutral—of 6.5 and a moisture equivalent of 12.3% to 15.3%. Soil moisture at the 8″ depth at time of treatment was 8.1% to 8.8% with the soil temperature at 50°F. Three weeks after treatment, New Improved Pearson tomato plants were set by hand in all plots. Harvest of the plots was begun on July 20 and subsequent pickings made at 3–7 day intervals until August 23. Plots were harvested 6–9 times, depending upon the relative yields of the vines. Results showed that D-D at 20 gallons per acre, solid application, produced the highest yields. Nemagon appeared to give the best nematode control based on root scores. Vapam, at the dosages used in this experiment, applied by chisel or disk, did not effectively control nematodes. Nemagon, at the rate of 1.5 gallons per acre, solid application, or 0.6 gallon per acre, row-placement application, appears to depress tomato plants with a resulting decrease in yields. However, when the dosage was decreased to 0.75 gallon per acre, solid application, or 0.3 gallon per acre, row-placement application, there was no apparent depression of yields and excellent control of root-knot resulted. However, there was a marked effect on the roots of plants grown on any plot treated with Nemagon. Roots were brown with a coarse texture and fewer lateral roots.

The experimental plot in Sutter County comprised about four acres. Treatments were for control of *M. javanica* and were made in February and March to a sandy soil having a moisture equivalent of 7.7% and a pH of 6.9. The soil temperature was 40°–48°F and the moisture content was 14.9% at the time the injection treatments were made. The soil temperature was 50°–58°F at the time of the plow, disk, and sprinkler applications of Vapam. The size of plot utilized for treatment by chisel applicator was 10′ × 174′. The disk and plow applications were made to plots each 20′ × 174′. The treated areas for the sprinkler plots each were approximately 120′ × 120′. Six sprinkler heads were used per plot, at a spacing of 30′ in the row with rows 60′ apart.

One month after treatment the plots were direct-seeded with New Improved Pearson tomato seed. Shortly after the seedlings emerged, a heavy wind and drifting sand caused a total loss to the seedlings. The plots were disked and transplants set the last part of April. Because of these operations, some of the transplanting did not occur exactly in the treated areas of the row-placement series. Consequently, data from row-placement application plots were not reliable. Also, because of very poor nematode control in the Vapam-treated plots and poor stands because of competition with bermudagrass and saltgrass, no yield records were obtained from two of the four replications. However, one picking was obtained on the other two replications. A 100′ section of each plot was utilized for yield records which showed that D-D, Nemagon, and EDB were about

Concluded on next page