

## The Use of Stilts in Peach Production

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In Indiana repeated attempts to colonize *Macrocentrus ancylivorus*, a parasite of the Oriental fruit moth, have failed in several sections of the State. No spray program yet devised, has been entirely successful in the control of this peach pest. In the areas where the insect is not parasitized in large numbers, the profitable growing of such peach varieties as Fleener and White Heath has become impossible. Mid-season Elberta is often 60 per cent infested.

For such areas, some effective method of control is needed, and one, "the twig-clipping method", has been investigated extensively. By this method, the infested twigs are removed early in the growing season at from five to seven day intervals. Similarly the infested fruits, which the larvae begin to enter as harvest approaches, are removed. The 1946 studies are interesting because this year clipping operations have been carried out using stilts while previously twig clipping operations have necessitated the use of ladders. Inasmuch as the six-year old trees, in the orchard under study, have been grown low to facilitate their use, stilts have proven to be most practical.

Through results of studies made from 1938 to 1942, it becomes evident that the Oriental fruit moth can be controlled by the twig-clipping method. During these first years of the investigation, when ladders had to be resorted to because the trees were high often it took from 15 to 20 minutes per tree to inspect and remove the infested twigs and fruits. Inasmuch as from 10 to 17 such operations are needed each season, the method would become more practical if the length of time necessary could be reduced.

In 1940 a small orchard of Gage Elberta peaches were planted in the Purdue Entomological Experimental Orchard near Mitchell to be grown low for clipping studies. These trees have had five crops on them and are approaching their prime. Every twig on the trees may be reached from the ground, from the crotch of the tree trunk, or by the use of stilts. The rather complete story, of the production of the 1946 crop on this isolated block of 25 Gage Elberta trees, and of the control operations as they were carried out, is as follows:

Approximately 28,930 peaches began development.

Of these, it is estimated that 5,620 were killed by frost on April 12th, when the temperature went down to 29 degrees F., at which time the diameter of the fruit was  $\frac{1}{8}$  inches.

From the crop that remained, 11,575 were thinned off or went to the ground as pre-harvest drops. The dropping of the fruit was very heavy between June 20 and 29.

There remained 11,735 peaches which matured, and these averaged 110 per bushel. The average crop per tree approximated 4.3 bushels.

Infested twigs and fruits were removed 11 times during the season beginning June 20th. During the operations, 4,726 twigs were taken off and this averaged 189 per tree. Former studies indicate that an average of one live Oriental fruit moth larva is removed for every two twigs clipped off. The labor cost for this work was \$21.56 or about 20 cents per bushel of peaches harvested.

The crop was disposed of as tree ripened fruit and the harvest began August 15th and lasted until September 4th. Brown rot and rodent injuries accounted for .6 per cent of the crop, 15.3 per cent were harvested as ripe drops and sold for \$2.00 per bushel. The picked fruit amounted to 84.1 per cent of the total and sold for \$4.00 per bushel.

Through this method of handling, no grading was necessary, brown rot peaches were removed at each of the six pickings and accordingly soon after infection set in. No curculio infestation remained in the orchard to hibernate and subsequently attack the 1947 crop.

For such a program, very little equipment is needed. San Jose scale and peach leaf curl must be controlled by spraying, and any type of sprayer which will break the spray stream into a fine mist and carry it 12 feet high, will do the job on low-grown trees. This is winter work and can be leisurely done. Occasionally brown rot will need to be controlled at harvest time and to do this, if the trees are not too tall and the orchard is not too large, a hand operated duster is just as satisfactory as a power machine. In the studies discussed here, operations for brown rot control were necessary only once in the past five years and that during the 1946 season. Two applications of sulphur dust were made. Although, during most seasons, curculio is held in check as the result of strict sanitation and the removal of faulty fruit at short intervals, if other measures against this insect are deemed necessary, a hand duster may be used for plantings of 200 trees or less. This same type of equipment may be used to control *Bacterium prunii*, if needed.

The average time necessary to clip the infested twigs for each tree, each operation, was 13.5 minutes. Fruit from the clipped block was compared with that from a neighboring commercial orchard of midseason Elberta. Harvest infestation figures were taken in the clipped block at two different periods in order that the stages of ripeness might be definitely stated.

Picking date	Commercially treated midseason Elberta	Clipped Gage Elberta	Stage of ripeness
August 15 infestation	40.67 percent		Hard ripe
August 25 infestation		10 to 12 percent	Hard ripe
September 3		20 percent	Tree ripe

In the commercial orchard, as shown in the table, the fruit was picked and marketed in the "hard ripe" stage and at that time it was 40.67 percent infested. At the same stage of ripeness though 10 days

later the Gage Elberta peaches from the clipped block was 10 to 12 percent infested. Inasmuch as this latter variety reaches a comparable stage of ripeness much later, from an infestation standpoint, this must be considered a disadvantage imposed on the Gage Elberta because the Oriental fruit moth has 12 days longer to develop a heavy infestation.

Infestation counts of "tree ripened" peaches were not available for the midseason Elbertas because harvest had been completed and the fruit sold before such a stage had developed. However, as shown in the table, the infestation of the clipped block on Sept. 3 was 20 per cent. This is 19 days after the counts were made on midseason Elberta. Nineteen days is more than half the time needed to develop a complete generation of the Oriental fruit moth and yet the infestation of the clipped block was only half as much as in the orchard which received the regular dust schedule suggested for commercial orchards.

This method of control of the Oriental fruit moth is discussed before the entomologists of Indiana for three reasons. In the first place, very little equipment is necessary for the small acreage grower, the one with 200 trees or less. Second, he can do most of the operations, both winter and summer, piecemeal and leisurely. As for the third reason, by this method, tree-ripened fruit of a quality considerably superior to that ordinarily available from large commercial orchards, can be produced, because the large acreage grower must harvest his crop sufficiently "hard ripe" to process in the usual way.