

Tarnished Plant Bug Injury to Peach¹

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It has been known for some time that the tarnished plant bug, *Lygus lineolaris* (Palisot de Beauvois, 1898), causes injury to peach. Much work has been done on the problem, but it seems that most of it has been concerned with injury to the fruit, known as cat-facing. It was believed that there was a need for a detailed study of the effects of the feeding of the tarnished plant bug on the flower buds, flowers, fruit buds, and very young fruit with special reference to the resultant dropping of these parts. The feeding habits of the insect indicated that the potential loss incurred by this early feeding would be greater than that incurred by feeding on larger fruits.

The tests were conducted on four Elberta peach trees located in the Purdue McCormick Tract Orchard near West Lafayette, Indiana, during the spring and summer of 1953.

In carrying out this experiment cages were placed over certain branches so that a given number of tarnished plant bugs could be introduced for a definite period of time and so that all other insects could be excluded. The cages were allowed to remain on the branches throughout the season. In an effort to protect the test insects as much as possible, no insecticides were applied to the test trees at any time during the experiment.

The cages, in which the peach branches were encased during the experiment, were constructed of 18 x 14 mesh bronze screen wire and cheesecloth. A cylinder was formed by stapling the opposite edges of a piece of screen wire to a piece of lightweight wood molding. The finished cylinder was nine inches long with a diameter of five and three-fourths inches. A cheesecloth sleeve ten inches long was attached to each end of the cylinder. After the cage was placed around the peach branch, it was secured by a length of heavy string.

The cages were placed on the peach branches on April 10 and on May 6. Those cages placed on the peach branches on April 10 were placed on three trees. They were so placed that each of the three cages used in a series of tests would be on a different tree, at a different height, and facing a different direction. Thus, when the results from the three cages were tabulated, the average obtained would not be overly influenced by conditions on a single tree, height, or relative position of the cages. After the cages were placed on the branches, each cage was labeled and designated for a specific test, with seven cages designated to remain insect free and serve as checks.

By the first part of May it became apparent that the cages would have to be placed on a fourth tree. This was necessary because some of the branches holding test cages had died while others had been blown down during storms. The branches of the fourth tree upon which cages were to

1. This paper is based on a Master's thesis submitted at Purdue University in May, 1954.

be placed were thoroughly inspected for evidences of natural feeding of any insects, wind damage, or any other type of injury. Any damaged blossoms found were removed before the cages were attached.

The tarnished plant bugs used in these tests were collected with an insect net by sweeping the weeds and grass in the fields surrounding the orchard. For the most part, the insects were used in a test on the same day they were taken, but a reserve supply was maintained for use when inclement weather prevented the collection of insects. This reserve supply was kept in the orchard in a screen wire box nine and one-fourth inches by six and one-half inches. In an effort to keep conditions as natural as possible, pieces of sod containing plants from which the insects were taken were placed within the box. The supply of insects was changed every two to three days. The transfer of insects from net to cage was accomplished by means of an aspirator bottle.

In each test of the experiment five tarnished plant bugs were introduced into each of the test cages and left there for a period of two days. This experiment was concerned with the following tests: (1) one test during the pink to full bloom period, (2) four tests during the full bloom to petal fall period, (3) three tests during the petal fall to shuck split period, (4) four tests during the shuck split period, and (5) three tests after the shucks had dropped, here designated fruit tests.

The number of blossom buds, blossoms, fruit buds, or fruit in the cages were counted at the time the insects were introduced into the test cages, after the insects were removed from the cages, and at intervals of five to ten days for the remainder of the season.

The dates given in this work for pink, full-bloom, petal fall, shuck split, and shuck drop are the dates that these various stages were noted in the test cages concerned with that particular stage of development. Considering the orchard as a whole, there was a considerable variance in the date of the first appearance of these various stages. Broadly speaking, the pink stage started about April 10 and lasted until about April 25. The first full bloom was noted in the orchard on April 20 and the period lasted until about May 2. The petals began to fall April 27 and most of them were gone by May 7. The shuck split stage was noticed first on May 8 and continued until May 25 at which time all the shucks had fallen.

The natural population of tarnished plant bugs in the orchard seemed to be very sparse. No success was had when jarring methods were used, and only a very few individuals were taken when the grass in the center portion of the orchard was swept with an insect net. A few individuals were taken by sweeping the grass under the trees which were at the edges of the orchard. The tarnished plant bugs were plentiful, however, on the weeds, grass, and certain plants in the fields adjoining the peach orchard. No tarnished plant bugs were observed feeding naturally on the blossoms, fruit buds, or fruits of the test trees.

There was a low rate of mortality among those tarnished plant bugs which were used in the tests of this experiment, there being only five individuals lost out of the total number of insects used. No more than one insect was lost in any one test.

Results

The pink to full bloom test was begun on April 21 during the pink stage. A difference between the test and check cages in the per cent of drop of flower buds was noted within two days after the insects were introduced. There was a pronounced difference in the per cent of drop during the first 15 days; 78.4 per cent of the original flower buds in the test cages had dropped as compared to 40.2 per cent in the checks. The test indicated that the droppage which was due to tarnished plant bug feeding had ceased within 25 days after the insects were introduced. The results of the tests conducted in this experiment indicate that when tarnished plant bugs fed on peach during the pink to full bloom period, their feeding was responsible for a loss of 62.6 per cent of the potential crop.

The full bloom to petal fall tests were begun on April 23, 25, 27, and 29. In the four tests of this series the effects of the feeding of the tarnished plant bugs were noted within two to four days after the insects were introduced. Most of the drop which was due to the feeding of the insects was noted within a period of 13 to 26 days. The differences in per cent of drop between the test and check cages ranged from 26.5 per cent in Test D, to 27.0 per cent in Test B, to 32.0 per cent in Test C, to 51.2 per cent in Test A. When the feeding occurred during the full bloom to petal fall period, an average loss of 65.7 per cent of the potential crop was obtained.

The petal fall to shuck split tests were begun on May 1, 6, and 7. In the three tests of this series the effects of the feeding of the tarnished plant bugs were noted within one to seven days after the insects were introduced. The differences between the per cent of drop of fruit buds in the test cages and those in the check cages ranged from 44.7 in Test A, to 47.9 in Test B, to 74.4 in Test C. An average loss of 79.1 per cent of the potential crop was noted when the feeding occurred during the petal fall to shuck split period.

The shuck split tests were begun on May 8, 16, 17, and 21. In the four tests of this series the effects of the feeding of the tarnished plant bugs were noted within two days after the insects were introduced. Most of the drop which was due to the feeding of the insects was noted within a period of eight to fifteen days. The differences in per cent of drop between the test and check cages ranged from 10.7 per cent in Test A, to 18.7 per cent in Test B, to 34.7 per cent in Test D, to 44.7 per cent in Test C. When fed upon during the shuck split period, the potential crop was reduced by an average of 54.9 per cent.

The fruit test series consisted of three tests which were begun on May 23, 25, and 31. In this series no fruit droppage which was due to the feeding of the tarnished plant bug was noted. In each test the per cent of fruit drop in the check cages was as great as, or greater than, that in the test cages.

In no cage in which fruit remained at harvest time was there any evidence of cat-facing.

Conclusions

From the results obtained in this experiment, the following conclusions may be drawn:

1. That when the tarnished plant bug feeds upon the bloom and fruit of peach during the pink to full bloom, the full bloom to petal fall, the petal fall to shuck split, and, or the shuck split stage, it may cause from 55 to 80 per cent of the blossoms or fruit to drop.
2. That the feeding of the tarnished plant bug causes less drop during the shuck split stage than in the earlier stages.
3. That the feeding of the tarnished plant bug causes no significant fruit droppage when it occurs after the shucks have fallen.