
LIFE CYCLE STUDIES ON THE PECAN NUT CASEBEARER, *ACROBASIS CARYAE* GROTE

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The overwintering forms of the pecan nut casebearer change to the pupae stage about the middle of May, and the adult moth emerges the last week in May or the first week of June. In 2 to 4 days after the adult emerges the female begins to deposit her glistening white eggs on the clusters of small nuts. These observations were begun about the time that the overwintering forms were changing to the pupal stage and were continued through the 1948 season until late in August.

The appearance of the first and second generations was determined by examining a given number of nut clusters and noting the appearance of egg deposits on them. The condition of the eggs was recorded as white, red and hatched. At the time of oviposition the eggs of this insect are glistening pearly white, then after about three days and before the larva hatches from the egg it turns reddish in color. The egg shell left by the hatched larva becomes a dull white.

The number of eggs found together with the hatched eggs or empty egg shells left on the nut clusters was used as a criterion to establish the beginning and end of the first and the beginning of the second generation. In Table I it will be noted that eggs for the first generation began to appear May 24 and began to hatch on May 31, at which time 9.8 per cent of all the eggs found that day had hatched. It will also be noted that there was a gradual increase until June 9th. After that date a sharp decline followed, indicating a peak of oviposition had been reached and passed. By June 11 no more recently oviposited eggs were found as indicated by the condition of the eggs.

The time interval from June 11 to July 9th essentially corresponds with the developmental period of the pecan nut case bearer as observed by other workers. June 11th was, therefore considered to be the last date on which the first generation adults deposited eggs, whereas eggs found on July 9th indicates that date to be the beginning of the second generation.

The peak of oviposition for the second generation apparently was reached July 21st to 28th as is shown in Table II. Table II also shows that the greatest number of second generation larvae emerged from the egg stage and entered the nut during the first week in August. At this time the nut is sufficiently developed so that the larva feeds only in the husk and does little injury.

Table III very largely corroborates the data shown in Tables I and II with regard to the time of appearance of the first and second generations.

In addition to this it also shows the mortality of the casebearer in the larval stage. This information was obtained by collecting the injured nuts from infested nut clusters. To begin with, the nuts from 100 infested clusters were collected and brought to the laboratory where they were dissected and examined for the inhabiting larvae and pupae to determine whether larvae in the nuts were alive, dead or had pupated. It was not always possible to determine the cause of the death of the larvae, and because of this it became necessary to record these larvae as dead without consideration of the cause. In other instances, however, it was definitely possible to determine that the larvae had been parasitized, and these instances were recorded accordingly.

It is rather interesting to note that of the 468 larvae collected from June 24 to August 27, a total of 60.7 per cent was found to be parasitized and a total of 12.8 per cent was found to be dead due to some unknown cause. This makes a total mortality of 73.5 per cent for the pecan nut casebearer larvae in the vicinity of Stillwater for the 1948 season.

TABLE I

*First Generation Casebearer Infestation Record,
Adam's Pecan Grove, Stillwater, 1948.*

| NUMBER OF EGGS FOUND ON 400 NUT CLUSTERS* | | | | | PER CENT HATCHED | NUMBER OF LARVAL ENTRANCES |
|---|-------|-----|---------|-------|---------------------|----------------------------------|
| DATE | WHITE | RED | HATCHED | TOTAL | | |
| May 21 | 0 | 0 | 0 | 0 | — | — |
| " 22 | — | — | — | — | — | — |
| " 24 | 10 | 4 | — | 14 | — | — |
| " 25 | 14 | 5 | 0 | 19 | — | — |
| " 26 | 12 | 17 | 0 | 29 | — | — |
| " 27 | 14 | 14 | 0 | 28 | — | — |
| " 28 | 15 | 16 | 0 | 31 | — | — |
| " 29 | 27 | 22 | 0 | 49 | — | — |
| " 31 | 29 | 17 | 5 | 51 | 9.8% | 1 |
| June 1 | 25 | 22 | 7 | 54 | 12.9% | 0 |
| " 2 | — | — | — | — | — | — |
| " 3 | 18 | 21 | 18 | 57 | 31.5% | 4 |
| " 4 | 15 | 25 | 20 | 60 | 33.3% | 18 |
| " 5 | 13 | 21 | 29 | 63 | 46. % | 35 |
| " 7 | 0 | 14 | 23 | 37 | 61.6% | 33 |
| " 8 | — | — | — | — | — | — |
| " 9 | 0 | 5 | 15 | 20 | 75. % | 118 |
| " 10 | — | — | — | — | — | — |
| " 11 | 0 | 3 | 4 | 7 | 57. % | 117 |

*All eggs found were counted regardless of how many per nut cluster.

TABLE II

*Second Generation Casebearer Infestation Record,
Adam's Pecan Grove, Stillwater, 1948.*

| DATE | NUMBER OF EGGS FOUND ON 400 NUT CLUSTERS* | | | | PER CENT HATCHED | NO. OF LARVAL ENTRANCES | NO. OF CLUSTERS EXAMINED |
|--------------|---|-----|---------|-------|---------------------|-------------------------------|--------------------------------|
| | WHITE | RED | HATCHED | TOTAL | | | |
| July 9, 1948 | 1 | 1 | 0 | 2 | 0 | 0 | 25 |
| " 14, " | 3 | 0 | 0 | 3 | 0 | 0 | 30 |
| " 16, " | 6 | 5 | 0 | 11 | 0 | 0 | 75 |
| " 19, " | 8 | 2 | 1 | 11 | 9 | 0 | 100 |
| " 21, " | 7 | 4 | 2 | 13 | 15.3 | 1 | 100 |
| " 23, " | 8 | 5 | 5 | 18 | 27.7 | 6 | 100 |
| " 26, " | 7 | 4 | 6 | 17 | 35.2 | 11 | 100 |
| " 28, " | 2 | 2 | 7 | 11 | 63.6 | 18 | 100 |
| " 30, " | 0 | 1 | 6 | 7 | 65 | 21 | 100 |
| Aug. 2, " | 1 | 1 | 7 | 9 | 77.7 | 23 | 100 |
| " 4, " | 0 | 1 | 5 | 6 | 83.3 | 24 | 100 |

*All eggs found were counted regardless of how many per nut cluster.

TABLE III

Mortality of Pecan Nut Casebearer at Stillwater, Oklahoma in 1948.

| DATE | NO. OF CLUSTERS INFESTED EXAMINED | LIVE | DEAD | PARASI- TIZED | NO. OF PUPA FOUND | NO. OF PUPA EMERGED | PER CENT OF PUPATION |
|-----------|--|------|------|------------------|-------------------------|---------------------------|----------------------------|
| | | | | | | | |
| " 26, " | 100 | 38 | 5 | 5 | 6 | 0 | 13.3 |
| " 28, " | 100 | 88 | 3 | 7 | 1 | 0 | 21.8 |
| " 30, " | 100 | 43 | 6 | 9 | 12 | 0 | 5.2 |
| July 2, " | 100 | 54 | 1 | 4 | 3 | 2 | 9.9 |
| " 5, " | 100 | 51 | 4 | 12 | 5 | 6 | 15.6 |
| " 7, " | 100 | 43 | 3 | 16 | 8 | 5 | 10.6 |
| " 9, " | 100 | 34 | 4 | 18 | 4 | 9 | 54.8 |
| " 12, " | 100 | 14 | 6 | 12 | 17 | 9 | 36.8 |
| " 14, " | 100 | 12 | 2 | 26 | 7 | 5 | 83.3 |
| " 16, " | 100 | 4 | 5 | 29 | 20 | 10 | 75. |
| " 19, " | 100 | 2 | 4 | 16 | 6 | 8 | 75. |
| " 21, " | 100 | 2 | 4 | 22 | 6 | 14 | 83.3 |
| " 23, " | 100 | 1 | 6 | 30 | 5 | 11 | 100. |
| " 26, " | 100 | 0 | 4 | 39 | 5 | | 100. |
| " 28, " | 100 | 0 | 1 | 18 | 4 | 26 | 00 |
| " 30, " | 50 | 0 | 1 | 4 | 0 | 12 | 0 |
| AUG. 2, " | 50 | 0 | 1 | 8 | 0 | 11 | 0 |
| " 11, " | 20 | 4 | 2 | 2 | 0 | 0 | 0 |
| " 16, " | 25 | 5 | 4 | 1 | 0 | 0 | 0 |
| " 18, " | 10 | 1 | 2 | 0 | 1 | 0 | 50 |
| " 20, " | 10 | 1 | 0 | 0 | 0 | 0 | 0 |
| " 22, " | 5 | 1 | 0 | 0 | 0 | 0 | 0 |
| " 25, " | 10 | 2 | 0 | 0 | 0 | 0 | 0 |
| " 27, " | 10 | 2 | 1 | 0 | 1 | 0 | 50 |
| TOTALS | 1740 | 399 | 69 | 281 | 114 | 129 | |

Per cent of larvae parasitized = 60.7

Per cent of larvae dead due to other causes = 12.8%.

SUMMARY

In the vicinity of Stillwater the one year records taken in the Adams pecan orchard indicated that oviposition for the first generation of the pecan nut casebearer began the last week in May, reached its peak about June 1st, and ended June 11th. The moths of the second generation emerged about July 1 and oviposited the first eggs for the second generation on July 9th. The observations also indicated that for the 1948 season 60.7 per cent of the larvae were parasitized and 12.8 per cent were dead due to some other cause.
