

Codling Moth Emergence Records for 1952-54¹

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Data on adult moths emerging from overwintering codling moth larvae were again obtained for 1954 at the Department of Entomology Insectary. The methods of obtaining these data were similar to those used in preceding years (Bieberdorf, 1954). Briefly, they consisted of collecting adult larvae during the late summer and early fall of 1953 from infested apples and from corrugated paper bands which had been placed around the trunks and larger branches of the apple trees in the Station orchard near Perkins, Oklahoma. The trees were banded during July and August and the bands removed during October and November. The bands with the hibernating larvae were kept in the insectary during the winter and spring months. The infested or wormy apples collected at harvest time were placed in the insectary where the larvae in them were permitted to emerge and move into hibernation material provided for them. The exact number of larvae that were collected was not known; however, a total of 716 adults which came from the hibernating forms was taken through the season. The insectary in which the larvae passed the winter simulated the conditions found on the trunks of the trees in the orchards. It was located in an open field with all sides exposed to the weather so that rain, wind, or snow could sweep through it from all sides, but the roof covering prevented rain, snow, or sleet from falling directly on the hibernation material. In this respect it was similar to conditions found in and surrounding packing sheds, which are favorite codling moth hibernating places.

When one takes into consideration all the conditions and places in which the codling moth passes the winter, the insectary that was used is a reasonable approximation of conditions that might be found in nature. If there were any difference, it was perhaps more favorable to the hibernating individuals in the insectary. This should favor emergence of greater numbers of adult moths, and perhaps cause them to begin to emerge a day or so earlier in the season.

Emergence in 1954 began April 9, at which time 5 adults were taken from the cage. This was the earliest date an adult moth has been taken during the three-year period during which these observations have been in progress. Furthermore, it is also the earliest date of emergence on record for Oklahoma conditions since the author first made observation on

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codling moth emergence during the period 1924-1935 (Bieberdorf, G. A.) For that period of time, the adults were recorded as emerging on April 13 three times for the years 1925, 1928, and 1933.

After the initial emergence of the first adults on April 9, the moths which followed emerged in increasing numbers for a period of three weeks. This increase was then followed by a rapid decline in number of emerging moths until May 8, after which there was again an increase. This decline in rate of emergence of adult moths was closely associated with atmospheric temperatures. Temperature records taken in the insectary during this period showed a general downward trend of maximum and mean temperatures. The decline started with April 11 and ended with the week of May 9-15. On May 15 the rate of emergence of adult moths increased very rapidly and the peak of emergence was then reached during the week ending on May 29. After that date, the decline in the appearance of adult moths was as rapid as the rise the last moth was taken from the cage on July 1 (see table).

The emergence period of overwintering moths extended over 13 weeks, which contrasts with 5 weeks in 1952 and 8 weeks for 1953. During both 1953 and 1954 the first emergence came at an earlier date than for 1952. In 1953 and 1954 the last moths also emerged later in the season than in 1952, thus an extension of time was recorded at both ends of the emergence period.

FIRST GENERATION

Before the last of the overwintering adults had emerged, the first adults of the first generation appeared. This also was found to be the case for the years 1952 and 1953. During 1954, the first adults of the first generation began to appear on June 12, 20 days before the last of the overwintering forms were out. This compares to June 20 for 1953 and June 3 for 1952. The period of time during which the two generations emerged simultaneously, therefore, was 20 days for 1954 compared to 18 days for 1952 and 22 days for 1953.

Just how long the overwintering adults persisted in the summer is not known. The indications, however, were that large numbers of overwintering forms were still in the orchard a short time before the first generation adults reached their peak of emergence about July 11. During the 1954 season, the two peaks of emergence for the overwintering and first generation were separated by about three weeks and is comparable to the previous season's observations. It is during this period of time when two broods are ovipositing simultaneously in the orchard that the infested fruits show up in large numbers. It is also preceding and during such periods that the orchardist must be on the alert and keep his fruit well covered with the insecticide if he expects to harvest a good crop of clean, worm-free fruit. Fruit infestation observations and records made in the orchard during the summer indicated that there was an upward trend in infested fruits following the above mentioned period when the two broods were ovipositing simultaneously.

SUMMARY

During the 1954 season, adult moths emerged from the winter quarters at the earliest date on record for the time period that these observations have been made. The length of time during which the adults emerged started earlier in the season and continued to a later date. The overwintering brood was again found to overlap that of the first generation of adult moths. While the time period over which the overwintering adult moths emerged was extended, the length of time during which the two broods were in the field simultaneously was not found to be appreciably longer than for other years.

LITERATURE CITED

Bieberdorf, G. A., 1954. Proceedings, Okla. Acad. Sci. Vol. 34, in press
 Bieberdorf, G. A., 1954. Proceedings, Okla. Acad. of Sci., Vol. 16, pp. 33-35

Table I Daily Emergence Record for Overwintering Codling Moths
 1952-1953-1954

Date	1952	1953	1954	Date	1952	1953	1954	June 24	1952	1953	1954
Apr. 8	0	0	0	May 17	6	11	24	" 25	1	0	2
Apr. 9	0	0	5	May 18	1	2	0	" 26	0	0	1
Apr. 10	0	0	2	May 19	2	9	20	" 27	0	0	0
Apr. 11	0	0	0	May 20	9	5	11	" 28	—	—	0
Apr. 12	0	0	1	May 21	12	9	39	" 29			0
Apr. 13	0	0	0	May 22	24	16	—	" 30			1
Apr. 14	0	0	11	May 23	2	26	26	July 1			1
Apr. 15	0	0	0	May 24	14	40	41	July 2			1
Apr. 16	0	0	4	May 25	16	45	18	July 3			0
Apr. 17	0	1	6	May 26	18	54	53	July 4			0
Apr. 18	0	1	9	May 27	12	47	25				
Apr. 19	0	1	22	May 28	12	37	19				
Apr. 20	0	1	9	May 29	16	33	35				
Apr. 21	0	1	11	May 30	10	49	19				
Apr. 22	0	1	9	May 31	22	47	20				
Apr. 23	0	1	10	June 1	8	34	17				
Apr. 24	0	4	9	June 2	34	17	7				
Apr. 25	0	2	6	June 3	26	15	17				
Apr. 26	0	0	8	June 4	26	19	17				
Apr. 27	0	5	9								
Apr. 28	0	10	14	June 5	8	13	15				
Apr. 29	0	1	1	June 6	7	5	7				
Apr. 30	1	4	2	June 7	16	8	3				
May 1	0	17	1	June 8	27	3	3				
May 2	0	6	1	June 9	27	1	2				
May 3	1	2	1	June 10	38	2	2				
May 4	4	0	1	June 11	47	0	0				
May 5	1	1	6	June 12	40	0	0				
May 6	3	4	9	June 13	53	2	0				
May 7	2	3	2	June 14	13	0	2				
May 8	4	4	3	June 15	26	0	6				
May 9	4	7	0	June 16	18	0	1				
May 10	5	8	0	June 17	14	0	1				
May 11	3	6	2	June 18	7	0	3				
May 12	3	0	8	June 19	7	0	4				
May 13	9	1	6	June 20	2	0	0				
May 14	11	0	11	June 21	4	0	5				
May 15	10	1	16	June 22	1	0	0				
May 16	14	2	6	June 23	2	0	1				