

The Sex of European Corn Borer Moths Taken at Light Traps¹

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One of the factors entering into the use of light traps as a possible insect control measure is the sex of the insects captured. The present paper deals with the sex of European corn borer moths taken in different years and at different locations, by lamps emitting different wavelengths and intensities of radiant energy, by traps placed at different heights, and by traps placed in different directions in regard to the wind.

Studies on Year of Capture, Generation, and Location: One unidirectional light trap, equipped with a 15-watt BL lamp, was operated in Lawrence and another in Tippecanoe county, Indiana from 1953 through 1956. The traps were operated during the entire period of flight of both generations so that the proportion of the sexes caught was not influenced by the time of emergence of the moths. As a rule males are predominant at the beginning of the flight period and females toward the end.

TABLE 1

Sex of corn borer moths caught at light traps in Lawrence and Tippecanoe counties, Indiana. 1953-56.

Year	Lawrence County				Tippecanoe County			
	15-w BL		15-w BL		June-Flight		Aug.-Flight	
	No. Moths	Per Cent Fem.	No. Moths	Per Cent Fem.	No. Moths	Per Cent Fem.	No. Moths	Per Cent Fem.
1953	—	—	29	69	—	—	50	54
1954	400	67	106	42	86	47	89	45
1955	218	47	116	31	186	65	646	40
1956	256	45	42	52	546	43	249	46
Totals								
1953-56	874	55.5	293	45.1	818	48.3	1034	42.3

As shown in Table 1 the per cent of the moths of the June flight which were female varied in Lawrence county from 45 to 67 during the three years and that of the August flight from 31 to 69. In the same years, in Tippecanoe county the percentage of females captured varied from 43 to 65 in the June flight and from 40 to 54 in the August one.

¹Purdue University, Agricultural Experiment Station, Journal Paper No. 1044.

In Lawrence county about 10 per cent more of the moths of the June flight were females than of the August flight while in Tippecanoe county about six per cent more of the June than the August ones were females. On an average there was a higher percentage of female moths of the June flight in Lawrence than in Tippecanoe county. The percentage of females in the August flight was about the same for the two counties.

Studies on Wavelengths. The results of an experiment conducted in August, 1956, in which six traps equipped with different lamps were compared, are given in Table 2.

TABLE 2

Sex of August-flight, corn borer moths taken at lamps emitting different wavelengths of radiant energy. Tippecanoe county, Indiana, 1956.

Lamp	No. Moths	Per Cent Female
15-w BLB	463	63
15-w BL	481	68
15-w Green & 15-w BL	731	62
Green Fluorescent	511	54
150-w Incandescent	526	57
15-w Pink Fluorescent	302	57

The lamps were rotated every night for 18 nights. The BL lamp emits about 90 per cent of its energy at 3650 Å (near ultraviolet) and the rest in the visible spectrum. The BLB lamp has a filter which cuts out most of the visible light. As shown in the table the lamps emitting most of their energy in the ultraviolet region of the spectrum attracted a higher percentage of females than did those emitting longer wavelengths.

Studies on Intensities. In 1949 an experiment was conducted in which three intensities of mercury-vapor lamps during the June flight and a 15-watt BL and two intensities of mercury-vapor lamps during the August flight were compared.

TABLE 3

Sex of corn borer moths taken at traps equipped with lamps of different intensities. Tippecanoe County, Indiana, 1949.

Lamps	June-Flight		August-Flight		Per Cent Fem.
	No. Moths	Fem.	Lamps	No. Moths	
250-w M-V	567	70.4	15-w BL	52	65.4
400-w M-V	378	65.3	100-w M-V	225	52.9
1000-w M-V	897	66.4	250-w M-V	116	57.0
Total	1842	67.4		393	55.6

As shown in Table 3, a higher percentage of females appeared to be attracted to the lower than to the higher intensities.

Studies on Height of Traps. Studies to determine if the height of traps influenced the proportion of the sexes captured were conducted in 1954. Six traps were placed at a height of four feet and six at 12 feet. Unidirectional traps each equipped with a 15-watt BL lamp were used. These traps were in a barnyard at some distance from corn.

TABLE 4

Sex of June-flight corn borer moths taken at traps placed at heights of 4 and 12 feet. Tippecanoe County, Indiana, June 10-23, 1954.
All traps equipped with 15-w BL lamps.

Height of Traps	No. Moths	Per Cent Females
4 feet	262	37
12 feet	309	51

As shown in Table 4, 51 per cent of the moths taken at the 12-foot traps were females and only 37 per cent of those taken at the 4-foot ones were.

Effect of Wind Direction on Sex Ratio. In 1954 a series of unidirectional traps in which four faced north, four east and four west were operated from June 10 to 23. During this time the wind was mostly from the south-east. The traps were placed in a barnyard at some distance from corn.

TABLE 5

Sex of June-flight corn borer moths taken at unidirectional traps facing different directions. Tippecanoe County, Indiana, June 10-23, 1954.
All traps equipped with 15-w BL lamps. Wind mostly from south-east.

Direction Traps Faced	No. Moths	Per Cent Females
East	169	38
North	217	47
West	185	49

As shown in Table 5 more males than females came to the trap facing into the wind and about equal numbers of males and females came to the ones facing away from the wind.

Summary. Although the average sex ratio of European corn borer moths taken at light traps over a number of years is about 50:50, the results obtained in the studies reported here show that it varies rather widely from year to year and from generation to generation in the same locality, and from locality to locality in the same year. The results reported also show that more females than males are attracted to lamps which emit most of their energy in the ultraviolet region of the spectrum; that a higher percentage of females are attracted to lamps of low intensity than to those of higher; that traps placed at

a height of 12 feet captured a higher percentage of females than did those placed at a height of four feet; and that about equal numbers of cruising males and females were taken at unidirectional traps facing away from the wind but that more males than females came to traps facing into the wind.