Capture of Alabama argillacea Hübner Adults with Black Light Traps

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ABSTRACT

Cotton leaf worm (Alabama argillacea Hübner) is a migratory pest, a native of the tropics that moves into Argentina every year. Black light traps (15W BLB) were used to cotton leaf worm population fluctuation at Reconquista (Santa Fe, Argentina, 29º 11´LS and 59º 52´LO), two or three nights per week during 1981-1997. Adults were collected the following morning. Peak population usually occurred in March. First capture usually occurred during the first 20 days of November every year and the last capture in May or June. The earliest capture was on October 21. The largest number of adults was collected were with a minimum temperature of 14-22ºC. There were no captures when the average minimum temperature was below 10ºC.

Introduction

The cotton leaf worm, *Alabama argillacea* Hübner is a migratory pest, native to the tropics. Every year adults migrate from Central and South America to Mexico and the United States. In South America, the species is present throughout Colombia, Ecuador, Venezuela, Brazil, Peru to Argentina. Its presence on cotton results from annual migration and occurs at the beginning of the summer. Large amounts of insecticide have been used during recent campaigns against this pest, especially during the 1995/96 season outbreak. Light trap provide information on lepidopterous adult population fluctuations over time. Adults capture can be used to worn farmers of the possibility of arrival of the pest in the crop fields in the areas near the traps (Sosa, 1989, 1991 and 1995).

This research studied the fluctuation of *A. Argillacea* population throughout adult captures in light traps and determined the first and last moth captures every cotton season and to identify population peaks.

Materials and Methods

A permanent black light trap was used. It was placed in the field in the Agricultural Experimental Station of INTA at Reconquista, 29º 11´ LS and 59º 52´ LO. The luminous source was a 15 W fluorescent black light bulb. The trap has been working from December 1980 until the present, with some unavoidable interruptions. It was turned on in the evening, two or three times a week, working all night through. The following morning the adults were collected and taken to the laboratory for identification and to record the insects captured.

In order to facilitate interpretation and to relate the light trap capture to temperature and rain, the daily capture observation were averaged every ten days. Complementary information on the frequency of frost, date of first and last frost and the date of minimum absolute temperature during 1981-1997 was compiled.

Results

Population peaks occurred in January, March or April each season. In most years, the first captures were in November (69%), December (23%) or October (7%). The earliest capture ranged from October 21 in 1994 to December 22 in 1989. There is no information on first captures 1981, ‘87 or ‘88 because of trap malfunction. The dates of last capture range from April 14 to July 10 (June 37 %, May 31 %, April 25 % and July 6%). Population peaks occurred frequently in March (53%), February (18%) and April (12%). The biggest mean daily trap catch was 2,070 moths on March 14 1996. This was ten times higher than the peaks in other years (Table 1).

Discussion

In Reconquista, the first moths arrive during the first fortnight of November. Barral *et al.* (1965) mentioned that the first adults could be seen at the end of November or during December, Margheritis and Rizzo (1965) said that the first capture occurred in December. It is probable that moths arrive earlier in the north because of higher temperatures. The last capture date usually occurred in May and June and is related to low temperatures at that time. Although the number of frosts is low in most of the years in period considered, the number of agrometeorology frost was higher, ranging from 8 (1997) to 45 (1998). The minimum absolute temperature registered in 17 years at 0.5 m, without protection, were –11.0ºC (August 8 of 1989) and –10.4ºC (July 22 of 1992). The first agrometeorology frost occurred in May (71%), June (23 %), or April (5 %). This low temperature would restrict the survival of this species in this region in winter. Larvae and pupas are very sensitive to low temperatures and would die at 4ºC (Margheritis and Rizzo, 1965).

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An average capture for each ten day period was obtained. The maximum average was registered at mid March, but peaks were recorded in January, February and April. From May to November there were no adult captures (Figure 1).

The average adults captured against the average minimum temperature of the ten day period considered occurred in the range of 11.0 to 23.0ºC (Figure 2). Although in that range there were night without captures, this was much more likely when the average minimum temperatures were below 10ªC. With temperature less than 11ªC or more than 23ªC, there were no moths captured, explaining why there were few captures in October and November.

There appears to be no competition between cotton crops and the trap. When a lot of moths were flying over the cotton plants, a very high number were captured in the trap, including when cotton crops were no more than 300 or 400 metres away, when 2,070 moth were counted in one night followed by another with more than 1000 moths. The peaks of capture occurred when the crops were developing.

No relationship was found between light trap capture and rain accumulated by ten day period. To study this relation would be necessary to have working the trap every day, rather than two or three times a week. Future work should be the study of the association of trap catch with maximum temperature and hours of cold temperatures in order to broadcast the appearance of the first moth.

For the following season we plan to compare the counts of adults captured with black light traps, white light traps and pheromone traps.

Conclusions

The frosts of May and the low temperatures of spring affect moth activities. It is most improbable that this pest survives winter in this area, reinforcing the hypothesis that moths migrate from the north every year when the temperature increases and return when it lowers in April or May.

The first adult capture usually occurred in the first fortnight of November and the last in May or June. The extreme dates registered between 1981 and 1997 were October for the earliest capture and July for the latest.

References

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Table 1. Dates occurring first and last adults capture and peak of population captured by black light trap from 1981 to 1997, at INTA Reconquista.

Season	First capture date	Peak date (Nº ad/day)[1]				Last capture date
		January	February	March	April	
81/82		4 (15)	19 (47)	12 (15)	(	6/5/82
82/83	9/11/82	15 (50)	3 (70)	15 (**205)**	16 (24)	20/4/83
83/84	4/11/83	20 (70)	28 (53)	2 (**136)**	3 (114)	19/6/84
84/85	16/11/84	25 (3)	21 (7)	19 (**214)**	11 (190)	30/5/85
85/86	3/12/85	14 (6)	20 (41)	6 (45)	28 (**120)**	19/6/86
86/87	7/11/86	28 (10)	4 (**33)**	4 (16)	2 (11)	14/4/87
87/88	-		4 (41)	23 (**43)**	7 (20)	26/4/88
88/89	-		22 (58)	10 (**142)**	6 (130)	21/6/89
89/90	22/12/89	25 (14)	20 (**99)**	22 (67)	17 (34)	30/5/90
90/91	20/11/90	22 (25)	2/ (26)	11 (13)	8 (25)	14/6/91
91/92	27/11/91	30 (**90)**	25 (70)	24 (73)	2 (61)	22/692
92/93	21/10/92	26 (48)	18 (18)	22 (**105)**	26 (4)	30/4/93
93/94	3/11/93	10 (61)	7 (31)	4 (**123)**	4 (7)	16/6/94
94/95	16/11/94	23 (113)	22 (52)	27 (**170)**	6 (**175)**	18/5/95
95/96	7/12/95	9 (150)	22 (500)	14 (**2070)**	11 (240)	22/5/96
96/97	12/11/96	28 (23)	4 (**70)**	12 (67)	3 (40)	10/7/97
97/98	10/12/97					

[1] Bold = annuak maximum

Figure 1. Evolution of the average of adult captured by decade during 1981-1997.

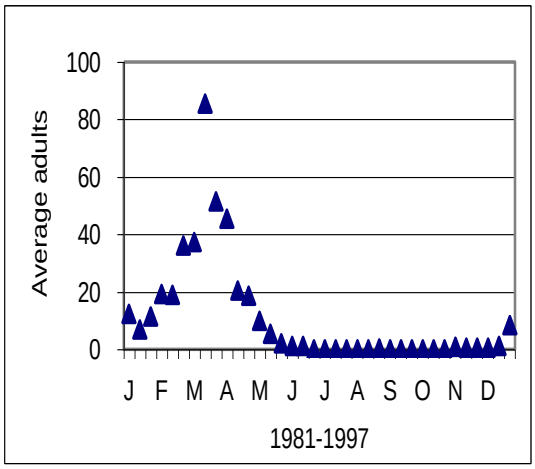

Figure 2. Relation between minimum temperature and light trap capture of Alabama argillacea adults 1981-1997.