EVALUATION OF PHEROMONE TRAPS FOR THE COTTON LEAFWORM *SPODOPTERA LITTORALIS* (BOISD.)

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Abstract

Pheromone dispenser reduced significantly catches of male moths of *spodoptera littoralis* by 95% during the period from June to September than in the untreateed fields.

Egg-masses were less frequent in the treated fields than in the untreated ones.

The highest reduction in egg-masses occurred at the center of treated fields, and gradually decreased towards the periphery of the experimental area.

INTRODUCTION

Egg-deposition of *S.littoralis* was studied by many authors (Bishara 1934, 1936; Moussa *et al.*, 1964; Hosny 1976). They noticed that the number of egg-masses varied according to the directions of the field (North-South). Based on location of egg-laying, egg deposition was high at the outer sides of the field than at the middle. This might be due to moisture content of soil which depends on the location of irrigation canals. Nasr *et al.* (1983), Kehat (1983) and Radwan (1985) stated that using of pheromone disruption reduced the egg-laying in cotton fields.

MATERIALS AND METHODS

An experiment was carried out in Bany-Amer and Manshiat -Abu-El-Akhdar localities, 5km far from Zagazig City to evaluate the efficiency of sex pheromone dispenser in the disruption of *S. littoralis* male and its effect on the deposited egg-masses. In this area, 27 traps were used (Plastic yellow cone trap). Each 20 feddans received one trap. The traps were placed at a level higher than cotton plants.

The traps were established in June,4 and the captured male moths were counted in the next day. During the period from 10th to 15th June, a Japanese pheromone dispenser was placed around the upper third of cotton plants, at the rate of 400 dispenser per feddan . Each dispenser contained 36 mg active ingredient of the sex pheromone (cis-9-trans-11-tetradecadien-1-yl-acetate). The rate of active ingredient of pheromone that was used per feddan was about 14.4 g. The distance between the hanged dispensers was about 320 cm from all directions. Another area was left untreated as a control and was provided with a trap per 20 feddans . Daily count of egg-masses in the treated and untreated areas was carried out.

Hand picking of egg-masses completely covered the tested area (535 feddans) within three days.

To study the relationship between the location of coton plants in the field and the number of deposited egg-masses in both treated and untreated cotton plants, each selected cotton area was divided into three zones, outer, middle , and central (Fig. 1) . The egg-masses were collected from each zone every three days to evaluate the effect of the location of cotton plants and its relation with the movement and distribution of the cotton leafworm moths in the field.

RESULTS AND DISCUSSION

Data in Table 1 showed that the daily average number of *S. littoralis* male moths in the pheromone treated fields was 2.87 male moth per trap, on the other hand, male moths captured per trap in the untreated area during the whole period was 77.15.

Results also showed that the highest mean number of male moths was 99.9 in the untreated fields during the second week of August . The highest mean number of male moths in the same period of a single trap in the pheromone treated area was

Table 1. Effect of using pheromone dispensers on captured male moths of *S. littoralis* in treated and untreated fields and percentage of reduction at Zagazig, Sharkia Province during 1987 season.

Period		Daily counts of male moths		Rduction %
		Treated fields Daily average	Untreated fields Daily average	
June 87	5-11	33.50	75.80	55.8
	12-18	4.70	38.14	87.7
	19-25	0.72	47.21	98.5
	26-30	0.72	52.71	98.6
July	1-7	0.40	106.21	99.3
	8-15	0.39	108.00	99.6
	16-23	0.24	36.57	99.3
	24-31	0.29	9.14	96.8
August	1-7	0.26	162.07	99.8
	8-15	0.33	232.07	99.9
	16-23	0.30	138.78	99.8
	24-31	0.26	29.28	99.1
September	1-8	0.25	15.64	98.4
	8-15	0.22	29.14	99.2
	16-23	0.23	49.50	99.7
Total		43.11	1157.26	95.4
x		2.87	77.15	

T. value = 8.837 **

$$\text{Reduction\%} = \frac{\text{Untreated daily average - treated daily average}}{\text{Untreated daily average}} \times 100$$

33.5 per day in the first week of June. Generally , there was an obvious reduction in the cotton leafworm male moths revealing 35% during the whole inspection period which started from June 5th to September 23rd , 1987.

There was a highy significant difference between treated and untreated fields (t value = 8.837).

Data tabulated in Table 2 showed that the daily average number of egg-masses picked per feddan in treated fields with pheromone dispenser was lower than those collected from the control (90.23 egg-masses and 197.75 egg-masses, respectively).

The maximum number of egg-masses recorded per feddan was 960 on June 23rd in the untreated field, while it was 329 egg-masses per feddan on June 29th in the pheromone treated area. The pheromone dispenser decreased obviously the number of deposited egg-masses in the treated fields. Average reduction of egg-masses collected from pheromone treated fields ranged between 16.67% -83% with an average reduction of 55.94% during the whole period from June to August 1987.

Using the simple regression analysis , the difference between the number of egg-masses in the treated and untreated fields was significant (r=0.969). The average number per feddan in untreated fields was 32 egg-masses while in the treated fields it was 100 egg- masses as an average during the whole period from June to August 1987.

Data shown in Table 3 revealed that the outer zones of cotton plants in treated and untreated areas harboured the highest mean number of egg-masses than those in the middle and inner zones. The mean number per feddan of collected egg-masses during the whole period was nearly 81 and 96 egg masses in the outer zone in treated and untreated cotton fields , respectively. Furthermore , the inner area harboured the lowest mean number of egg -masses , being 13 and 43 egg-masses per feddan in treated and untreated cotton fields, respectively. Highly significant differences were recorded between the three zones in egg masses collection (F value=+15.285).

As a general conclusion, the outer zone is the first zone facing the invasion of moths in the treated fields and adjacent untreated fields. Therefore, the large number of moths recorded in the outer zone is due to the distribution of the pheromone in

Table 2. Effect of pheromone dispenser on collected egg-masses from treated and untreated fields and percentage of reduction at Zagazig, Sharkia Province during 1987.

Date	Daily average egg-masses collected from		Egg-masses reduction %
	Treated fields	Untreated fields	
5/6/87	21	32	34.38
8	90	72	16.67
11	87	145	40.00
14	106	451	60.00
17	227	698	49.67
20	321	90	57.88
23	382	787	66.56
26	329	547	51.46
29	179	380	39.85
2/7/87	101	233	52.89
5	32	93	56.65
8	5	20	65.59
77	2	7	75.00
14	1	3	71.43
17	0.33	1	66.67
20	0.17	1	22.33
23	1	4	83.00
26	5	15	75.00
29	5	14	66.67
1/8/87	3	9	64.29
4	2	5	66.67
7	1	2	60.00
10	1	2	50.00
13			50.00
Total	2183.50	4746	1342.66
General average	90.23	197.75	55.94

l value = + 0.969** b value = + 2.197 a = - 2.16

Table 3 . Effect of pheromone site on deposited egg-masses, Zagazig, Sharkia Province during 1987 season.

No. of Sampleing	Outer zone		Middle zone		central zone	
	Treated	Untreated	Treated	Untreated	Treated	Untreated
1	10	20	8	7	3	5
2	35	42	15	19	10	11
3	57	90	18	35	12	20
4	66	180	22	60	18	25
5	140	275	50	100	37	76
6	165	395	70	190	59	113
7	210	420	71	310	40	230
8	240	310	93	267	49	210
9	217	230	80	170	30	147
10	104	170	50	120	25	90
11	65	95	20	78	16	60
12	18	40	10	32	4	21
13	3	9	1	6	1	5
14	1	3	1	3	1	1
15	1	2	0	1	0	0
16	1	1	0	0	0	0
17	1	1	0	0	0	0
18	0	2	1	2	0	0
19	2	7	2	5	1	3
20	3	8	2	4	0	2
21	3	5	1	3	1	1
22	1	3	1	1	0	1
23	1	2	0	0	0	0
24	1	2	0	0	0	0
Total	1945	2312	516	1413	307	1021
x	81.0416	69.3333	21.5	58.875	12.7916	42.5416

F. value = 15.2854 **

the central zone thus less number of moths moved towards the middle and the inner zones to deposit eggs.

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تقييم دور المصائد الجنسية في جذب دودة ورق القطن

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من النتائج المتحصل عليها فيما يختص بتقييم الفيرومون المعلق لدودة ورق القطن في نباتات القطن كوسيلة لتشتيت ذكورها وبالتالي تقليل وضع اللطع في حقول القطن أوضحت النتائج ما يلي :

١ – خفض الفيرومون من تعداد الفراشات وكانت هناك فروق معنوية عالية بين المناطق المعاملة وغير المعاملة.

٢ – لطع دودة ورق القطن كانت أقل في المناطق المعاملة بالفيرومون عن التي لم تعامل به .

٣ – انخفض توزيع لطع دوردة ورق القطن بوضوح في حقول القطن المعاملة حيث كانت كثافة اللطع عالية في المنطقة الخارجية ثم المنطقة التالية ثم كان اقل تعداد في المنطقة الداخلية للحقول المعاملة.