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ON THE NATURAL ENEMIES OF THE MAJOR PESTS INFESTING COTTON IN EGYPT

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Abstract

Population densities of the six predators *Coccinella undecimpunctata, Chrysopa carnea, Orius albidipennis, paederus alfierii, Scymnus* sp. and true spiders prevailing in contton fields were studied in Fayoum Governorate from May until September, 1988. The study was carried out weekly in 5 plots treated with different insecticides and in a control plot. The poputlation densitiy of the predators was high in july then decreased gradually until the end of the season. Due to insecticide treatments the numbers of predators / 100 hills in treated plots were always lower compared with those in the control plots. Two species of parasites were found attacking the cotton leafworm *spodoptera littoralis* ; the egg - larval parasite, *Chelonus inanitus* and the larval parasite, *Microplitis rufiventris.* In addition, three other species of parasites were found parasitising on the pink bollworm *Pectinophora gossypiella* .These were *Bracon brevicornis, Exirestes roborator and Apanteles* sp. The cotton ophid *Aphis gossipii* was observed during May , August and September without parasites parasitizing upon it.

INTRODUCTION

Many authors surveyed the population density of major predators occuring in cotton fields (kamal, 1951; Ibrahim, 1962; Hafez, 1960; Habib *et al.*, 1976; El - Heneidy *et al.*, 1979 Hamed *et al.*, 1983). They showed that the successive application of pesticides to control cotton pests badly affected the natural enemies and accordingly the population of sucking pests (aphids, thrips and whiteflies) increased to considerable levels , thus causing loss in cotton yield .

The jpresent work was designed to investigate the present status of the population of major predators in cotton fields, the rate of infestation by aphids on cotton plants, and the role of parasites attacking aphids, the cotton leafworm, and the pink bollworm in association with insecticidal application.

MATERIALS AND METHODS

Poplution densities of predators

Population densities of the six major predators *Coccinella Undecimpunctata, Chrysopa carneam, Orius albidipennis, Paederus alfierii , Scymnus* spp. and true spiders prevailing in conton fields were studied during May 3rd until september 11th. 1988. Cotton plants, in 100 hills, were examined and the weekly number of predators found were recorded in six plots, five were treated with chemical insecticides against cotton bollworms and the remaining one did not receive any insecticides and served as a control. The insecticides used were: Cymbush (Pyrethroid), Gusathion (Organophosphorus compound), Gusathion combi (a mixture of Gusathion and Sir, Insect growth regulator) , Sevin 85% and Larvin 80% (Carbamates). Three insecticidal applications were practiced starting on July 21st at 3 week - intervals in case of pyrethoids and 2 week - intervals in case of the other chemical groups.

Survey of parasites of *Spodoptera littoralis* and *pectinophora gossypiella*

the survey was carried out during 1987 and 1988 cotton seasons. Egg-masses and larvae of *S. littoralis* were collected during May and June and reared in the laboratory until emergence of parasites. Unopened cotton bolls, remained after harvesting , were collected in October 1987 and 1988. 500 bolls were collected from each of the treated and untreated plots then kept in wooden boxes 40x80 cm with three sides of cloth and a door of glass. The boxes were examined daily for emergence of any parasites.

Rates of infestation by aphids

During the period started from May to September 1988, the number of cotton plants, in 100 hills, infested by aphids was counted regardless of the density of aphids. Such study was performed to study periods of aphid occurence on cotton plants.

In the meantime, rate of parasitism on aphids was estimated in the laboratory by weekly dissection of 100 individuals during the whole season.

RESULTS AND DICUSSION

Population densities of predators

On May 3, the total number of predators /100 hills in the control plot was 14. The number increased gradually to reach the first peak (282/100 hills)in the first week of July then decreased to 186 / 100 hills a week later. It increased again to reach the second peak 232 / 100 hills on August 1st then a decrease in the number of predators was attained gradually until the end tof the season, ranging between 36-110/100 hills (Table1).

In the treated plots, the total numbers of predators ranged between 180 - 213 individualls / 100 hills on July 19th just before the application of insecticides. These numbers decreased dramatically (36-56/ 100 hills) after application of insecticides. Such decrease was always noticed in the treated plots compared with the control plot until the end of the season. The data showed that Gusathion combi was less detrimental on the predators followed by Cymbush. On the other hand, Larvin 80 seemed to be the most destuctive insecticide on predators. These results contradicted those repoted for a similar experiment carried out in Sharkyia Governorate (unpublished) were sevin and larvin caused the least harm to predators while Cymbush was the most destructive.In general all tested insecticides were harmful to predators occuring in cotton fields .

It is recommended that insecticidal application against the cotton bollworms should not be carried out before the last week of July because the number of predators start to decrese naturally at that time.

With regard to the relative abundace of predators in the control plot (Table2), the predators could be arranged descendingly according to their densities throughout the whole season as follows: the true spiders, *C. undecimpunctata, O. albidipennis, Scymnus* sp., *C. carnea* and *P. alfierii.* The total numbers of such predators in the whole season were 664, 500, 409, 292, 246 and 103, respectively.

El - Heneidy *et al* ., 1979 conducted a similar study in cotton fields in Fayoum

Governorate in 1977. They arranged the predators descendingly as follows : *O. albidipennis*, the true spiders, *P. alfierii*, Scymnus sp., *C. undecimpunctata*, and *C. carnea*.

Parasites of *S. littoralis*

The egg - larval parasite, *Chelonus inanitus* (Hym. Braconide) was found to parasitize *S. littoralis*. Out of 164 egg- masses collected during May - June in 1987 only 6 parasites emerged from 6 larvae while out of 150 egg - masses collected during the same period in 1988 only 3 parasites were obtained. The larval parsite, *Microplitis ruficentris* (Hym. :Braconidae) was found to parasitize the larvae. Out of 297 larvae collected in 1987 only 4 larvae were parasitized. No parasites were found to emerge from 194 larvae collected in 1988. Hafez *et al.*, (1976) reported that the rates of parasitism in *S. littoralis* larvae collected from different host plants during the whole season averaged 3.9, 6.2 and 3.6 in 1970, 1971 and 1972, respectively. The most effective parasites were *M. rufiventris* and *C. inanitus* among 6 species were found to attack *S. littoralis*.

Parasites attacking *P. gossypiella*.

Three species of parasites wre found to attack *P. gossypiella* , these were *Bracon brevicornis* (Hym. : Braconidae), *Apanteles* sp. (Hym. : Braconidae) and *Exeristes roborator* (Hym. : Ichneumonidae). It is well known that rates of parasitism on *P. gossypiella* are very low during Sptember and October while increase gradually in winter during storage of contton stalks in the villages. This might indicate that the parasites can easily reach their host after dryness and opening of cotton bolls . Farrag (1976) determined the rates of parasitism on *p. gossypiella* in cotton bolls stored on the roofs of farmers buildings from November 1974 until May 1975. The average rate of parasitism was 33.9% by the ectoparasitic mite, *Pyemotes harfsi* , 1.7 % by *E . roborator*, and 0.7% by *Perisierola* sp. (Hym. Bethylidae).

Rate of infestation by aphids

Aphids, Mostly *Aphis gossypii* , started to appear on the control plot on May 10, 1988 with an infestation rate of 18%. The same rate of infestation existed until May 17 then decreased sharply to 4% on May 24, and to 2% on May 29 and June 4. No infestation was noticed from june 11 until July 27. The aphids appeared again on August 1 with a rate of infestation of 1% in both treated and control plots In the following weeks, the rate of infestation ranged between 1 - 2 % in the control plot and

Table 1. Weekly numbers of predators per 100 hills of treated and untreated cotton plants in Fayioum Governorate (1988).

Date of Count	Total Number of predators / 100 hills					
	Treated fields					
	Control	Cymbush	Gusation	Gusathion-Combi	Sevin 85	Larvin 80
3.5.88	14					
10.5	64					
17.5	82					
24.5	100					
29.5	54					
4.6	78					
11.6	88					
18.6	156					
25.6	192					
2.7	282					
1.7	186					
+19.7	210	192	216	180	208	198
1.8	232	44	52	36	50	56
8.8	110	54	44	124	30	32
15.8	82	70	48	66	32	24
22.8	56	90	44	38	38	30
29.8	108	64	52	54	78	26
5.9	84	52	100	64	66	28
11.9.88	36	38	22	60	30	26
Total	2214	604	578	622	232	420

+ Counting in treated fields started on July 19 just two days before insecticide application .

1 - 8 % in treatments. The highest rate of infestation took place during August 29 - September 11.

Percentage of parasitism in all samples of aphids collected from treated and untreated plots during the whole season was always nil.

Habib *et al.*, (1976) reported that aphids occurred in cotton fields during May

Table 2. Weekly numbers of six predators per 100 hills in untreated cotton plants (1988).

Date	No. of predators / 100 hills					
	Scymnus Sp.	*P.alfierii*	*C. undecim - punctata*	*C. carnea*	*O.albidipen - nis*	True spiders
3.5.88	—	—	6	—	2	6
10.5	4	—	18	10	10	22
17.5	10	—	30	10	12	20
24.5	18	2	28	18	14	20
29.5	6	—	16	8	6	18
4.6	8	4	26	12	10	18
11.6	12	—	20	10	14	22
18.6	28	2	42	18	2	64
25.6	18	12	46	16	42	58
2.7	52	18	68	28	45	62
1.7	27	21	38	27	25	48
19.7	20	22	54	10	44	60
1.8	28	20	42	24	60	58
8.8	12	—	11	11	32	44
15.8	11	—	9	6	22	34
22.8	10	—	8	2	14	22
29.8	14	2	18	16	24	34
5.9	8	—	10	16	18	32
11.9.88	6	—	_	2	4	22
Total	292	103	500	246	409	664

- September and the highest rates of ifestation were atained in May, July and August.

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الاعداء الطبيعية لاهم الأفات التي تصيب القطن في مصر

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درست الكثافات العددية لستة أنواع من المفترسات الشائعة في حقول القطن وذلك في محافظة الفيوم في الفترة من مايو إلي سبتمبر ١٩٨٨. أجريت هذه الدراسة في سته معاملات استخدمت المبيدات الكيماوية ضد ديدان اللوز في خمسة منها ولم تستخدم في المعاملة السادسة لتمثل المقارنة . ولقد وجد من هذه الدراسة أن أقصي تعداد للمفترسات كان خلال شهر يوليو ثم أنخفضت الاعداد تدريبجيا حتي نهايه الموسم في سبتمبر . كما وجد أيضا أن كل المبيدات الكيماويه التي استخدمت كانت ضاره بالمفترسات والتي انخفض تعدادها عقب رش المبيدات مباشرة واستمر تعدادها منخفضا حتي نهاية الموسم .

أهتمت هذه الدراسة أيضا بحصر طفيليات كل من دودة ورق القطن ودودة اللوز القرنفليه ووجد أن هناك نوعين من الطفيليات بتطفلان علي دودة ورق القطن وثلاثه أنواع أخري تتطفل علي دودة اللوز القرنفليه ولكن كانت نسبه التطفل منخفضة للغاية.

درست أيضا نسب اصابة نباتات القطن بالمن طوال الموسم ووجد أن أكثر فترات تواجد المن تكون خلال مايو ، أغسطس ، سبتمبر – كما وجد أن نسبه التطفل علي المن كانت صفر ٪ طوال الموسم.