SEASONAL ABUNDANCE OF CERTAIN PREDATORS IN UNTREATED EGYPTIAN CLOVER AND COTTON FIELDS IN FAYOUM GOVERNORATE, EGYPT

by A.H. EL HENEIDY, M.S.T. ABBAS and M.S.I. EL-DAKRUORY
Plant Protection Res. Institute, Ministry of Agriculture, Dokki, Cairo

INTRODUCTION

Several authors have determined the population densities of predators in clover and cotton fields and studied their role in regulating the cotton pests in Egypt (Kamal, 1951; Hafez 1960 and 1972; Ibrahim, 1962; Abdel-Kawi, 1971; El-Heneidy, 1976). The recent widespread application of organic pesticides for control of cotton pests has in many cases seriously affected the population densities of natural enemies in this country leading to considerable problems in the situation of cotton pests. An important example of these problems is the expansion since 1972 of certain previously unimportant pests in many regions of Egypt. Among these pests are the American bollworm, *Heliothis armigera* Hb.; the cotton white fly, *Bemisia tabaci* Genn ; the green bug, *Nezara viridula* L. and certain species of jassids (Hafez and Khalifa, 1975).

During few years in the mid-seventies, an attempt towards an integrated control programme for cotton pests was conducted in Fayoum Governorate, with the aim of restoring the natural balance and attaining better pest control with less need for pesticidal control.

The present work was conducted to study the seasonal abundance of certain predators in clover fields and to follow their abundance in an untreated cotton field in order to assess their population fluctuations all over the season in Fayoum Governorate.

METHODS and TECHNIQUE

Counting of the main predators in Egyptian clover and cotton fields was carried out in Fayoum Governorate (Sannoris Province) during the season 1977. An area of about 5 feddans cultivated with clover was chosen for the counts. This area was not subjected to any chemical control applications. Between 10/2/1977 and 16/6/1977, 100 full-length double net-strokes were prac-

tised at weekly intervals by crossing the tow diagonals of the experimental area. Catch was killed in an ordinary cyanide jar, and was spread on a sheet of white paper for identification and counting. About one feddan of cotton directly adjacent to the experimental clover field was chosen to follow the migration of predators to the cotton field. This particular area where the test cotton field was taken was not treated with any pesticides all over the season. Weekly counts were conducted in the cotton field throughout the period from 2/6/1977 until 8/9/1977. Each count comprised 100 randomized hills, of two cotton plants each. The direct counting method was used (Hafez, 1960). Periods of counts amounted to 19 weeks in case of clover and to 15 weeks in case of cotton.

Six groups of predators were considered. These were *Coccinella undecimpunctata aegyptiaca* Reiche, *Scymnus* spp, *Paederus alfierii* Koch, *Orius* spp, *Chrysopa carnea* Steph. *and* Spiders.

RESULTS

Results obtained in clover and cotton fields are summarized in Tables I and II, respectively. These results seem to indicate the following :

ORIUS spp :

The obtained data indicate that the nymphs and adults of *Orius* spp. did not occur in the clover field before 14/4. The population tended to increase through April, May and June with a peak of 1045 insects/100 double net-strokes at 9/6. Nymph and adult populations prevailed in the cotton field during June and first half of July, and a peak of 119 insects/100 hills occurred by 30/6. After that peak the population generally began to decrease, but with certain fluctuations, until the last count on 8/9 when only 26 insects/100 hills occurred.

COCCINELLA UNDECIMPUNCTATA AEGYPTIACA :

The initial occurrence of the larvae and adults in the clover field took place by 17/2. The population began to increase until a peak of 69 individuals/ 100 strokes occurred by 17/3. This peak was followed by a gradual decrease until 7/4 but a second peak of 64 individuals was recorded by 21/4. Then a moderate decline occurred, but in general the population seemed relatively high until it reached the highest peak of 86 individuals by 2/6 and then dropped drastically to reach only 2 insects at the last count on 16/6.

In the cotton field, larvae and adults of *C. undecimpunctata* reached their peak of 9 insects/100 hills by 16/6 and the population kept relatively steady till 30/6, then began to occur in oscillating very low numbers until the end of the season.

TABLE I

Weekly numbers of predators per 100 double net-strokes in clover field, Fayoum Governorate (1977).

Date	*Orius* spp	*C. undecim-punctata*	*P. alfierii*	*Scymnus* spp	*C. carnea*	Spiders	Total
10.2	...	...	3	...	...	1	4
17.2	...	3	28	...	...	3	34
24.2	...	7	30	...	...	1	38
2.3	...	6	19	...	...	...	25
9.3	...	5	6	...	...	...	11
17.3	...	69	2	...	2	...	73
24.3	...	37	...	...	...	3	40
31.3	...	32	9	...	2	...	43
7.4	...	22	10	3	3	1	39
14.4	6	36	3	6	...	...	51
21.4	207	64	16	4	2	7	300
28.4	122	46	...	2	2	2	174
5.5	167	44	16	2	4	...	233
12.5	202	52	11	8	3	20	296
19.5	153	23	5	...	5	2	188
26.5	141	70	32	...	5	...	248
2.6	411	86	15	...	9	1	522
9.6	1045	13	6	...	4	23	1091
16.6	26	2	22	...	...	11	61
Total	2480	617	233	25	41	75	3471

PAEDERUS ALFIERII :

In the clover field, the beetles occurred in low numbers during the first counting in the first half of February. They gradually increased and reached a peak of 30 beetles/100 strokes during the fourth week of February and then decreased also gradually until they disappeared on 24/3. The beetles then oscillated rather irregularly until the end of the season, with the highest numbers (32/100 strokes) occurring towards the end of May.

In the cotton field, numbers of beetles started to increase gradually and reached a peak of 10/100 hills on 23/6 after which they decreased almost steadily until they disappeared late in July. Numbers increased again (8 - 9/100

hills) during August and then dropped down to 1 - 2/100 hills until the last count on 8/9.

TABLE II

Weekly numbers of predators per 100 hills in untreated cotton field, Fayoum Governorate (1977)

Date	*Orius* spp	*C. undecim-punctata*	*P. al-fierii*	*Scym-nus* spp	*C. car-nea*	Spi-ders	Total
2.6	51	5	1	...	17	38	112
9.6	56	8	7	14	6	37	128
16.6	99	9	9	8	...	41	166
23.6	96	6	10	3	...	62	183
30.6	119	7	5	7	...	56	194
7.7	94	2	7	7	...	47	157
14.7	74	1	4	3	...	57	193
21.7	51	2	3	3	...	37	96
28.7	31	1	...	4	1	51	88
4.8	67	2	8	3	...	43	123
11.8	44	...	9	3	6	44	106
18.8	49	4	1	3	2	43	102
25.8	40	3	8	2	4	48	105
1.9	34	4	1	4	5	51	99
8.9	26	1	2	3	...	38	70
Total	931	55	81	67	41	693	1868

SCYMNUS spp

In general, the population of *Scymnus* spp was limited and did not occur in the clover field before early April. They showed in low numbers ranging between 2 - 8 beetles/100 strokes during the period 7/4 — 12/5. Thereafter, the beetles disappeared until the last count on 16/6. In th cotton field, *Scymnus* population was highest (14/100 hills) when the beetles started to show on 9/6. Then they decreased almost steadily, being present in low numbers until the last count on 8/9 showed 3 individuals/100 hills.

CHRYSOPA CARNEA :

Larvae and adults of *C. carnea* were not found in the clover field between the start of sweeping on 10/2 and 9/3. An irregular and sometimes interrupt-

ed increase occurred through the period 17/3 - 9/6 with a peak of 9 individuals/ 100 strokes on 2/6. During this same week (2/6), the highest numbers of *Chrysopa* (17/100 hills) were observed in the cotton field. Then the population decreased in this field by the following week and the insect disappeared almost completely between 16/6 and 4/8. Late in the season, the insect started to show again in low numbers (2 - 6/100 hills) during the period 11/8 - 1/9. No insects were observed at the last count conducted on 8/9.

SPIDERA :

Populations of the spiders in the clover field were irregular and generally low, and were completely absent during several weeks, throughout the sweeping period until 5/5. The highest numbers during this period did not exceed 7 spiders/100 strokes. Later in the season, from about mid-May to mid-June the numbers were generally higher, reaching a maximum of 20 and 23 spiders/100 strokes on 12/5 and 9/6, respectively. Population of spiders in the cotton field was generally high all over the season with relatively steady numbers and with no distinct peak, but the maximum number (62/100 hills) was observed by 23/6. In general, populations of spiders in the cotton fields were exceeded only by populations of *Orius* spp.

DISCUSSION and CONCLUSION

The obtained results indicate that in general the population densities of the considered predators differ from one species to another. This variation is attributed to the different behaviour of each species and to their varying reactions to given environmental conditions.

In general, predator populations started to increase in the clover field during March-May. A sudden remarked increase occurred in late April and continued until the first week of June. The outstanding peak of abundance of total numbers of predators (1091 predators/100 strokes) occurred on 9/6 after which the numbers dropped down abruptly and drastically to only 61 predators/100 strokes on the next week 16/6.

When the clover plants started to senesce, the predators migrated from the clover field to the green and growing cotton plants. This usually happen during June where, in general, the population density of the predators decreases in clover field and starts to increase in the cotton field. An abrupt decline is observed in cotton fields during July and then populations increase again during August.

In general, *Orius* spp seemed to be the dominant predator in the experimental clover field of Fayoum, followed by *C. undecimpunctata,* while the most inferior species were *Scymnus* spp followed by *C. carnea.* In the cotton field,

Orius spp were also the dominant but followed by the spiders.

Population levels of the considered predators seem to be associated with the seasons of abundance of their major preys in clover and cotton fields; mainly aphids, eggs and young larvae of *Spodoptera* spp and of *Heliothis armigera* and certain mites.

Results obtained in the present work are generally in agreement with those obtained by Hafez (1960, 1972), Abdel-Kawi (1971) and El-Heneidy (1976).

SUMMARY

Weekly counts of six groups of predators in untreated Egyptian clover and cotton fields were conducted in Fayoum Governorate during 1977. Counting was conducted in 100 double net-strokes in the clover field and in 100 cotton plant hills each week.

It was found that, in general, the populations of the predators started to increase in the clover field during March-May until it reached its peak of abundance during late April and May. In June, the predators migrate to the cotton fields and achieve the maximum abundance in these latter fields during that month.

In general, *Orius* spp seemed to be the dominant predator in the clover and cotton fields followed by *C. undecimpunctata* in clover and spiders in cotton. Population levels of the predators seem to coincide with the abundance season of their preys; mainly aphids, eggs and young larvae of *Spodoptera* spp and of *Heliothis armigera* and certain mites.

REFERENCES

ABDEL-KAWI, F. (1971) : Studies on different predators of certain economic pests. (*M. Sc. Thesis, Plant Protection Dept., Fac. of Agric., Assiut Univ.*).

EL-HENEIDY, A.H. (1976) : Studies on the insect fauna of Egyptian clover (*Trifolium alexandrinum* L.) fields. (*M.Sc. Thesis, Dept. Econ. Ent. and Pesticides, Fac. of Agric., Cairo Univ.*).

HAFEZ, MOSTAFA (1960) : The effect of some new insecticides on predators of the cotton leafworm in cotton fields. (*Agric. Res. Rev., Cairo,* 38, 1 : 47 - 79).

HAFEZ, MOSTAFA (1972) : Methods of integrated insect control in cotton, Statement of Arab Republic of Egypt. (*International Cotton Advisory Committee,* 31 *st Plenary Meeting, Managua, Nicaragua* : 30 - 58).

HAFEZ, MOSTAFA and A. KHALIFA (1975) : Report on cotton culture and cotton pest control in Egypt, (*FAO/UNEP Consultation on Pest Management Systems for the Control of Cotton Pests, Karachi,* 13 - 16 *October,* 1975).

IBRAHIM, M.M. (1962) : An indication of the effect of the widespread use of pesticides on the population of some predators in cotton fields. (*Bull. Soc. ent. Egypte,* 46 : 317 - 323).

KAMAL, M. (1951) : The biological control of the cotton leafworm (*Prodenia litura* F.) in Egypt. (*Bull. Soc. ent. Egypte,* 35 : 221 - 270).