SURVEY OF LEAFHOPPER SPECIES AND THEIR TIME OF APPEARANCE IN COTTON FIELDS AT KAFR EL-SHEIKH

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Abstract

Many different species of leafhoppers were found attacking cotton plants causing serious damage to the plants. Therefore, this work was carried out to survey the species of leafhoppers and their time of appearance in cotton fields at Sakha Agric. Res. Station Farm, Kafr El-Sheikh during two successive seasons, 1999 and 2000.

Monthly samples with sweeping net on cotton indicated the existence of nine species of leafhoppers belonging to Five genera from two subfamilies, Typhlocybinae and Deltocaphalinae of family Cicadellidae, Homoptera. Four species belonged to genus *Empoasca*, *Empoasca decipiens* Paoli, *Empoasca decedens* Paoli, *Empoasca lybica* Paoli and *Empoasca distinguenda* (de Berg), two genus *Cicadulina*, *Cicadulina bipuncatella zeae* China and *Cicadulina chinai* (Ghauri) and one species belonging to genus *Exitianus*, *Exitianus capicola* Stal. And one species belonging to genus *Macrosteles*, *Macrosteles sexnotatus* Fall in additional of *Orosius* sp. *E. decipiens* was the most abundant species followed by *E. decedens* and they appeared on cotton plants from May until October, while *Orosius* sp. and *C. chinai* composed the lowest portion of the population and they appeared lately during the period from June to October.

However, the gained results are of great importance in planning programs of integrated pest management in cotton fields.

INTRODUCTION

The leafhoppers (Homoptera : Cicadellidae) are considered one of the most economically and important insect pests in the world. In the A. R. of Egypt, leafhoppers are widely spread all over the country attacking a wide variety of agricultural crops and many weed species. A large species of leafhoppers are found in cotton ecosystem where the crop is grown (Cadou, 1970, El-Bolok, 1976, Hendawy & Chiasson, 2001 and Ibraheem, 2001) .

However, a survey of insect species on the crop may be carried out to study the distribution and abundance of an insect species, consequently it can identify species of relatively high abundance and may show up seasonal patterns of occurrence. The aim of a survey is to locate and map geographical distribution of an insect species (Dent, 1991) .

So, this work was carried out to survey the species of leafhoppers and to determine the time of appearance on cotton plants during 1999 and 2000 season at Kafr El-Sheikh.

MATERIALS AND METHODS

The survey of leafhoppers species and their time of appearance on cotton plants were carried out at Sakha Agric. Res. Station Farm, Kafr El-Sheikh during two successive cotton seasons, 1999 and 2000. An area of about half feddan was cultivated with cotton variety of Giza 86 during the last week of March in the two seasons. The normal agricultural practices were adopted throughout the growing season without any pesticidal treatments. The sweep-net technique was used to survey the species of leafhoppers and their appearance on cotton plants. The utilized sweep-net had an opening 30 cm. in diameter, conical muslin bag 60 cm. deep and a wooden hand 70 cm. long. Monthly samples of 50 double strokes were taken at diagonal directions of the experimental field from May until October. The catch was anesthetized using chloroform emptied in polyethylene bag, then transferred to the laboratory and kept in the freezer for 15 minutes to kill the insects. which were later identified.

The collected leafhoppers were separated from the other insects and counted using a camel's hair brush and a hand glass lens 8x. Leafhopper genera were identified under a binocular stereoscope according to the key given by Habib *et al.* (1972)The samples were preserved in ethanol (70%), as the dry samples are necessary to study the insect color, where alcohol preserved samples are necessary to separated certain insect organs for study.

RESULTS AND DISCUSSION

Data presented in Tables 1 and 2 show the leafhoppers species surveyed on cotton plants and their population density during 1999 and 2000 seasons. The results indicated the existence of nine species of leafhoppers in five genera from two subfamilies, Typhlocybinae and Deltocaphalinae of family Cicadellidae , Homoptera. Four species belonged to genus *Empoasca* . *Empoasca decipiens* Paoli, *Empoasca decedens* Paoli, *Empoasca lybica* Paoli and *Empoasca distinguenda* (de Berg), two species belonging to genus *Cicadulina, Cicadulina bipuncatella zeae* China and *Cicadulina chinai* (Ghauri) and one species belonging to genus *Exitianus, Exitianus capicola* Stal. And one species belonging to genus *Macrosteles, Macrosteles sexnotatus* Fall in additional of *Orosius* sp.

The results of the first season, 1999 (Table 1) showed that the two species,. *E. decipiens* and *E. decedens* started to appear during May with very low numbers of 4 and 2 insects / 50 double strokes and increased suddenly to record maximum number during June by 85 and 55 insects / 50 double strokes, respectively. After that, a gradual decrease was recorded till the end of season during October.

Table 1. Monthly mean number of leafhoppers species on cotton plants using sweeping net technique during 1999 season at Kafr El-Sheikh governorate

Family	Subfamily	Genus	Species	No. of leafhoppers / 50 double strokes							
				May	June	July	Aug.	Sept.	Oct .	Mean	%
Cicadellidae	Typhlocybinae	Empoasca	*decipiens*	4	85	66	61	50	10	46.00	40.83
			decedens	2	55	10	20	10	2	16.50	14.64
			dybica	0	30	15	18	20	5	14.67	13.02
			distiguenda	0	25	11	15	10	5	11.00	9.70
	Deltocaphalinae	Cicadulina	*Bipuncatella zeae*	0	30	5	4	5	1	7.50	6.66
			chinai	0	0	1	5	3	3	2.00	1.78
		Exitianus	*capicola*	0	15	7	5	7	3	6.17	5.47
		Orosius	*sp.*	0	0	5	3	2	2	2.00	1.78
		Macrosteles	*sexnotatus*	0	20	10	4	3	4	6.83	6.06
			total	6	260	130	135	110	35	112.67	100

Table 2. Monthly mean number of leafhoppers species on cotton plants using sweeping net technique during 2000 season at Kafr El-Sheikh governorate

Family	Subfamily	Genus	Species	No. of leafhoppers / 50 double strokes							
				May	June	July	Aug.	Sept.	Oct .	Mean	%
Cicadellidae	Typhlocybinae	Empoasca	*decipiens*	5	45	60	65	71	15	43.50	38.84
			decedens	2	25	3	32	35	5	21.50	19.20
			dybica	0	15	20	20	21	5	13.50	12.05
			distigueńda	0	15	16	20	20	4	12.50	11.16
	Deltocaphalinae	Cicadulina	*Bipuncatella*	0	10	11	9	10	2	7.00	6.25
			zeae chinai	0	0	5	3	5	3	2.67	2.38
		Exitianus	*capicola*	0	9	5	5	7	3	4.83	4.32
		Orosius	*sp.*	0	0	3	4	5	2	2.33	2.08
		Macrosteles	*sexnotatus*	0	6	9	5	4	1	4.17	3.72
			total	7	115	156	163	178	40	112.00	100

June with means of 30, 25, 30, 15 and 20 insects / 50 double strokes, respectively. The population fluctuated till the end of the season during October. C. *chinai* and Orosius sp. appeared late during July in low numbers and continued till the end of the season. The results also, indicate that E. decipiens was the most dominant species, as it represented 40.83 % of the total number of leafhoppers collected ,while both C. chinai and Orosius sp. were in very low numbers representing 1.78 %of total leafhoppers of each. The other species could be arranged in a descending order as follows: *E. decedens* (14.64 %), *E. lybica* (13.02 %), *E. distinguenda* (9.70%). *C. bipuncatella zeae* (6.66 %), *M. sexnotatus* (6.06 %)*and Exitianus capicola* (5.47%).

Data of the second season, 2000 presented in Table 2 indicated that each species of leafhoppers had similar appearance trend on cotton plants as in the first season. *E. decipiens, E. decedens, E. lybica* and *E. distinguenda* recorded the maximum population during September by 71, 35, 21, and 20 insects / 50 double strokes, respectively. The other species appeared in very low number throughout the season. *E. decipiens* formed a great portion of the leafhoppers species) (38.84 %). while *Orosius* sp. and *C. chinai* composed the lowest portion by 2.08 % and 2.38 %, respectively. The remained species could be arranged in a descending order as follows: *E. decedens* (19.20 %), *E. lybica* (12.05 %), *E. distinguenda* (11.16 %) *C. bipuncatella zeae* (6.25 %), *Exitianus capicola* (4.31%)and *M. sexnotatus* (3.72 %).

These results agreed with the findings of El-Dessouki & Hosny (1969), Ammar et al. (1977), Sweify (1984) and Ibraheem (2001) who reported that E. decipiens was the most dominant leafhoppers species on cotton. On the other hand. El-Dessouki & Hosny (1969) and Herakly (1980) recorded four speciesof leafhoppers, *E. decipiens*, *E. lybica, E. decedens* and *E. distinguenda* on cotton plants in Egypt. El-Bolok (1976) at Giza (Egypt) surveyed ten species of leafhoppers on cotton, among of them *Cicadulina bipuncatella zeae* China. *Empoasca decipiens* (Paoli), *Exitianus capicola* Stal., *Macrosteles sexnoatus* Fall, *Orosuis* sp., *Hardya* sp. and *Psammatettix alienus* Dahib.

Finally, it can be stated that cotton plants harbored nine species of leafhoppers during the two study seasons. *E. decipiens* was the most abundant species and appeared early on cotton plants, while *Orosius* sp. and *C. chinai* composed the lowest portion of the population and they appeared during July. Also, the maximum number of leafhoppers was recorded during June and September for the first and second season, respectively.

However, the gained results are of great importance, as they are taken into account in planning programs of integrated pest management in cotton fields.

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حصر انواع نطاطات الأوراق ومواعيد ظهورها فى حقول القطن فى كفر الشيخ

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يوجد عديد من انواع نطاطات الأوراق تهاجم نباتات القطن مسببة ضرراً شديداً لذا اجريت هذة الدراسة فى مزرعة البحوث الزراعية بسخا ، كفر الشيخ لحصر أنواع نطاطات الأوراق ومواعيد ظهورها على نباتات القطن خلال موسمى ١٩٩٩ ، ٢٠٠٠ بأستخدام شبكة الكنس .

أوضحت النتائج المتحصل عليها عن وجود تسعة أنواع من نطاطات الأوراق تتبع خمسة أجناس من تحت عائلتين هما Deltocaphalinae, Typhlocybinae, من عائلة Cicadellidae ورتبة Homoptera . الجنس *Empoasca* تتبعه الأنواع *Empoasaa decipiens* Paoli ، *Empoasaa* decedens (Paoli) ، *Empoasca lybica* Paoli ، *Empoasca distinguenda* (deBerg) وجنس *Cicadulina* ويتبعه النوعان *Cicadulina bipuncatella zeae* China ، *Cicadulina chinai* (Ghauri) وجنس *Exitianus* ويتبعه نوع *Exitianus capicola* Stal وجنس *Macrosteles* ويتبعه النوع *Macrsteles sexnotatus* Fall، وجنس *Orosius* وكان النوع *E. decipiens* أكثر شيوعاً وظهوراً خلال الفترة من مايو وحتى أكتوبر ، أما النوع *Cicadulina chinai* والنوع *Orosius* sp. فكانا أقل الأنواع تواجداً وظهوراً خلال الفترة من مايو وحتى أكتوبر .

وعلى أية حال فأن النتائج المتحصل عليها لها أهمية كبيرة فى تصميم برامج الإدارة المتكاملة للآفات فى حقول القطن.