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Effect of weed borders on insect pests and their associated predators on sugar beet and cotton plant fields

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ABSTRACT

The study of the relationship between the important insect pests and their related predators on weeds border of the sugar beet and cotton fields was carried out at Kafr El-Sheikh region during two successive seasons, 2005/2006 and 2006/2007. Seven insect species, four insect pests and three predators were recorded on both weeds border and sugar beet plants, while eleven insect species occurred on cotton plants, seven insect pests and four predators. The most dominant predators were *Scymnus* spp., *Coccinella undecimpunctata* and *Paederus alfierii*. Significant correlation was found between *Scymnus* spp. on weeds and jassids on sugar beet and cotton. There was significant correlation between *Scymnus* spp. on weeds and on cotton plants (r = 0.502). Signficant correlation was recorded between *Scymnus* spp. on weeds and aphids on sugar beet (r = 0.598). On cotton plants, 97% of *Scymnus* spp. were larvae, while 100% of *Scymnus* spp. on weeds border were adults. There were relationship between the *C. undecimpunctata* and *P. alfierii* predators and *Oxycarenus hyalinipennis* pest on weeds border (0.791) and on cotton plants (0.522*). Highly significant correlation was recorded between *O. hyalinipennis* on weeds border and the on cotton plants (r=0.676**) in the second season. The weeds border served as dwelling of the predators especially in winter. *Scymnus* spp. was common predators on Bermod grass (*Cynodon dactylon*). When the predator numbers began to decrease on weeds border began to increase on plant crops by third week of May.

Key words: weeds border, beneficial insects, *Scymnus* spp., cotton, sugar beet.

INTRODUCTION

Weeds are an important plant resource for insects, although feeding by insects on weeds can have both positive and negative effects on crop productivity. Weeds also indirectly affect crops via their influence on beneficial insects, and by harboring plant and insect diseases (Capinera, 2005). From one side, weeds are major constraints on crops production, they may be important components of the agroecosystem (Marshall *et al.*, 2009). About 12.4% of the total world production of agricultural yield was reduced by weeds (Zaki, 1969), in addition to yield reduction by weed plants, they usually act as dwelling for many insect species, either for their nutritional purposes or as sites during diapauses (Shalaby, 1974). Mesbah *et al.* (2003) recorded nine insect species on the weed blader hibiscus in cotton field seven pests and two predators and this weed is considered the main resource of the spiny bollworm, *Earias insulana* and whitefly, *Bemisia tabaci*. On the other side, the weeds in agricultural can directly serve as a food source or provide other ecosystem resources for herbivorus arthropods and indirectly serve carnivorous (beneficial) arthropods by providing food and shelter to their prey. Weeds also can serve as alternative hosts for pests and beneficial arthropods when their preferred crop host is

absent. Weeds are considered source of increased diversity in agroecosystem (Norris and Kogan, 2005). Gliessman (2001) reported that weed borders are used in an agroecosystem to attract insects, facilitating colonization in the adjacent cauliflower crop. In this study, and to shed light upon the role of the weeds border as a natural storage of the natural enemies of the insect pests on sugar beet and cotton fields.

MATERIALS AND MEHODS

Field experimental was conducted at Sakha Agricultural Research Station, Kafr El-Sheikh Governorate during a period from November 18, 2005 until November 12, 2007 among two successive seasons of sugar beet (winter crop), cotton (summer crop) and their weeds border. Sugar beet (*Beta vulgaris*) was sown by third and fourth week of November of the first and second season, respectively. Cotton, variety Giza 86 (recommended by Ministry of Agriculture) was cultivated by the third week of March in the two seasons.

Direct counts of insect pests and their associated predators in cotton were taken weekly by the end of May until late September, while in sugar beet the sample was taken by the fourth week and the third week of December of the two seasons, respectively until harvest of the sugar beet crop. The sample was represented with twenty plants of both sugar beet and cotton plants. As for the weeds border of both crops, twenty five of double net stroke were taken weekly starting from November 8, 2005 until November 12, 2007. The main weed in the winter was Bermud grass (*Cynodon dactylon* L.), while during summer period, in the first season, there were complex of weeds, Barnyardgrass, *Echinochloa grass-galli* L., Jungle rice, *E. colonum* (L.), Pigweed, *Amaranthus caudatus* L. In the second season, the prevailing weed was *C. dactylon*. Coefficient of correlation progam SPSS var. II were calculated between important insect pests and their predators on weeds border and on both crops.

RESULTS AND DISCUSSION

1. Survey of the important insect pests and related predators

Six insect pests, Jassids, *Oxycarenus hyalinipennis, Aiolopus stiepens, Eyprepocnemis plorans, Homorocooryphus nitidulus* and *Cassida vittata*, and the predators were *Coccinella undecimpunctata, Scymnus* spp., and *Paederus alfierii* were recorded on weeds border (Tables 1 & 2). The present results are in agreement with those of Shenishen and Abd El-Rahman (1983) who surveyed several stem borers, namely, *Sesamia nonagrioides*, *Mythimna crenulata* and *Chilo luteellus* on the common red weed, *Phragmitis communis* Tnin. They also found that *Coccinella undecimpunctata, Paederus alfierii* and *Labidura riparia* were the important predators associated with the previous stem borer. Also, Mesbah *et al.* (2003) recorded nine insect species on the weed, blader hibiscus in the cotton field, seven pests and two predators.

On sugar beet four insect pests and three predators were recorded, the pest were jassid, aphids, *Spodoptera littoralis* and *C. vittata*, and the predators, *C. undecimpunctata*, *Scymnus* spp. and *P. alfierii*.

Seven insect pests were found on cotton plants, *O. hyalinipennis* , jassid, aphid, *S. littoralis, Pectinophora gossypiella, Earius insulana* and *Thrips tabaci*. Meanwhile, the predators were *C. undecimpunctata, Scymnus* spp., *P. alfierii* and *Orius* spp. El-Heneidy *et al*. (1996), Mesbah *et al*. (2003) and Mesbah (2007) found similar findings on cotton plants at Kafr El-Sheikh governorate.

Table (1): Weekly numbers of the important insect pests and associated predators on border weeds of sugar beet and cotton fields during 2005/2006 seasons at Kafr El-Sheikh region.

Date		Weeds							Sugar beet							Cotton									
		C. undecimpunctata	*Scymnus* spp.	*Paederus alferii*	*Jassids*	*Oxycarenus hyalinipennis*	*Tettigonid & Acridis**	*Cassida Vittata*	*C. undecimpunctata*	*Scymnus* spp.	*Paederus alferii*	*Jassids*	*Aphid*	*Spodoptera littoralis*	*Cassida vittata*	*C. undecimpunctata*	*Scymnus spp.*	*Paederus alfeierii*	*Orius* spp.	*Oxycacenus hyalinipemis*	Jassid	Aphid	*Spodoptera littoralis*	*Pectinophora gossypiella*	*Earius insulana*	*Thrips tabaci*
Stage		L_1A	L_1A	A	N_1A	N_1A	N_1A	N_1A	N_1A	N_1A	A	N_1A	N_1A	L	N_1A	N_1A	N_1A	A	N_1A	N_1A	N_1A	N_1A	L	L	L	N_1A
Nov.	12	1	1	0	22	0	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2005	19	0	4	1	27	0	1	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	26	0	4	1	32	1	1	0	(-)	(-)	(-)	(-)	(-)	(-)	(-)	-	-	-	-	-	-	-	-	-	-	-
Dec.	3	0	11	1	8	0	1	0	(-)	(-)	(-)	(-)	(-)	(-)	(-)	-	-	-	-	-	-	-	-	-	-	-
	10	0	11	1	4	0	0	0	(-)	(-)	(-)	(-)	(-)	(-)	(-)	-	-	-	-	-	-	-	-	-	-	-
	17	0	14	0	6	0	0	0	(-)	(-)	(-)	(-)	(-)	(-)	(-)	-	-	-	-	-	-	-	-	-	-	-
	24	0	4	0	10	0	0	0	0	0	0	2	2	0	0	-	-	-	-	-	-	-	-	-	-	-
	31	0	12	2	12	0	0	0	0	0	0	0	2	0	0	-	-	-	-	-	-	-	-	-	-	-
Jun.	7	0	22	1	11	0	0	0	0	1	0	0	60	0	0	-	-	-	-	-	-	-	-	-	-	-
2006	14	0	11	0	3	0	2	0	0	0	0	0	80	0	0	-	-	-	-	-	-	-	-	-	-	-
	21	0	10	0	7	0	0	1	0	1	0	0	150	0	0	-	-	-	-	-	-	-	-	-	-	-
	28	0	10	1	13	0	0	0	0	1	0	0	20	0	0	-	-	-	-	-	-	-	-	-	-	-
Feb.	4	0	6	0	10	0	0	0	0	1	0	0	7	0	0	-	-	-	-	-	-	-	-	-	-	-
	11	0	1	1	10	0	2	0	0	1	0	0	2	0	0	-	-	-	-	-	-	-	-	-	-	-
	18	0	1	0	6	0	1	1	0	0	0	3	0	0	0	-	-	-	-	-	-	-	-	-	-	-
	25	0	1	1	2	0	1	2	0	1	0	0	1	0	2	-	-	-	-	-	-	-	-	-	-	-
Mar.	4	0	8	1	3	0	1	0	0	2	0	0	320	0	0	-	-	-	-	-	-	-	-	-	-	-
	11	0	2	0	2	0	1	0	0	7	1	0	1	0	1	-	-	-	-	-	-	-	-	-	-	-
	18	0	9	0	1	0	0	0	0	0	0	0	1	0	0	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	25	0	2	0	0	0	1	0	0	1	0	4	4	0	1	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
Apr.	1	0	1	0	2	0	1	0	0	0	1	8	6	0	8	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	8	0	1	0	1	0	14	0	0	0	1	4	7	0	14	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	15	2	0	0	3	1	7	0	0	0	3	0	1	0	12	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	22	0	0	1	9	1	4	0	0	1	5	8	1	3	26	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	29	6	0	1	4	1	1	0	1	3	12	14	0	10	41	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
May	6	5	0	0	3	0	1	0	2	5	20	15	0	19	75	(-)	(-)	(-)	(-)	(-)	-	(-)	(-)	(-)	(-)	-
	13	4	3	0	3	0	4	0	2	6	16	25	0	10	19	(-)	(-)	(-)	(-)	(-)	-	(-)	(-)	(-)	(-)	
	20	2	0	1	4	0	0	1	2	6	0	13	0	10	24	(-)	(-)	(-)	(-)	(-)	-	(-)	0	(-)	(-)	-
	27	1	3	0	4	0	0	0	-	-	-	-	-	-	-	2	1	3	0	0	20	0	0	0	0	870
Jun.	3	1	1	1	11	0	5	0	-	-	-	-	-	-	-	4	2	5	3	4	22	0	0	0	0	56
	10	8	1	0	3	0	4	0	-	-	-	-	-	-	-	10	4	3	3	3	35	3	0	0	0	3
	17	3	1	0	2	4	3	0	-	-	-	-	-	-	-	11	8	34	3	1	20	287	0	0	0	8
	24	2	1	0	6	0	3	3	-	-	-	-	-	-	-	12	2	49	2	2	8	520	1	0	0	0
Jul.	1	0	1	1	2	9	0	0	-	-	-	-	-	-	-	13	5	1	1	0	8	1200	32	0	0	0
	8	0	1	1	21	0	0	0	-	-	-	-	-	-	-	28	3	7	0	0	52	620	8	0	0	0
	15	0	1	0	25	17	2	0	-	-	-	-	-	-	-	35	5	5	0	0	24	30	15	0	0	0
	22	0	0	0	5	36	2	0	-	-	-	-	-	-	-	11	2	10	0	0	40	1500	21	0	0	0
	29	0	1	0	2	0	2	0	-	-	-	-	-	-	-	9	7	6	0	0	30	750	12	1	1	0
Aug.	5	0	1	0	0	0	2	0	-	-	-	-	-	-	-	9	60	2	0	0	40	220	15	1	2	0
	12	0	1	2	1	0	3	0	-	-	-	-	-	-	-	14	125	0	0	0	20	110	8	1	1	0
	19	0	1	0	1	1	2	0	-	-	-	-	-	-	-	12	48	0	0	0	22	0	0	1	0	0
	26	0	1	0	0	0	2	0	-	-	-	-	-	-	-	10	16	0	0	0	4	50	0	0	0	0
Sept.	2	0	1	0	20	0	4	0	-	-	-	-	-	-	-	4	2	0	0	0	4	20	4	2	0	0
	9	0	4	0	116	4	2	0	-	-	-	-	-	-	-	0	0	0	0	0	10	0	4	4	0	0
	16	0	5	0	92	1	0	0	-	-	-	-	-	-	-	1	5	0	0	0	0	0	3	0	0	0
	23	0	4	1	32	16	2	0	-	-	-	-	-	-	-	0	6	0	0	0	0	0	0	0	0	0
	30	0	4	1	29	31	2	0	-	-	-	-	-	-	-	0	0	0	0	0	0	0	0	1	2	0
Oct.	7	0	4	0	343	0	4	0	-	-	-	-	-	-	-	-	-									
	14	0	15	0	191	0	1	0	-	-	-	-	-	-	-	-	-									
	21	0	10	0	150	0	0	0	-	-	-	-	-	-	-	-	-									
	28	0	12	1	620	0	10	0	-	-	-	-	-	-	-	-	-									
Nov.	4	0	1	1	340	0	8	0	-	-	-	-	-	-	-	-	-									
	11	0	4	0	250	0	6	0	-	-	-	-	-	-	-	-	-									

L = larvae, N = nymph, A = adult

* Tettigonid = Aiolopus stiepens

Acridis = *Eyrepocnemis plorans* and *Homorocooryhus nitidulus*

- = Before the sowing of the land

(-) = The plant was cultivated but no sampled

2. Population dynamic of insect pests and associated predators:

2.1. On weeds border and sugar beet (winter season)

Data in Tables (1 & 2) indicated that the weeds border acted as a refuge for the predators during the winter especially for the *Scymnus* spp., where the highest peaks of *Scymnus* spp. were recorded on January 7 during the first season (21 predators/25 double net strokes) and 21 predators/ 25 net strokes on December 9 in the second season. Data also revealed that the number of *Scymnus* spp., started to decrease by beginning of the spring (by warm weather) and began to move to the sugar beet plants (Fig. 1 & 2).

The same trend was recorded for jassid pests. As for *Cassida vittata* data show that it appeared on the weeds by one month earlier than on sugar beet.

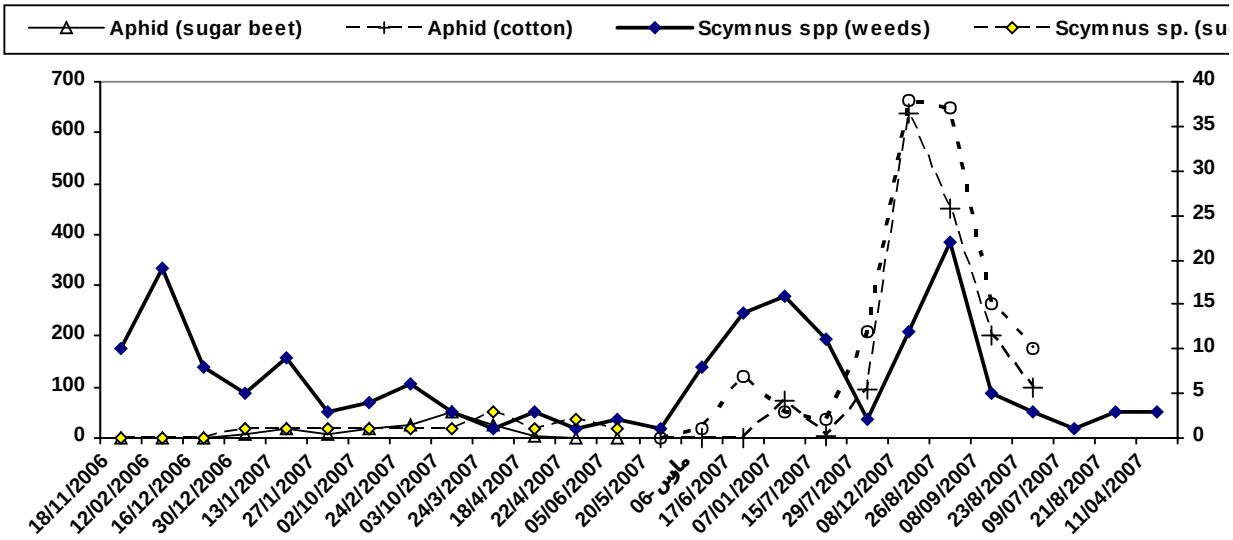

Fig. (1): Relationship between the major insect pests and its related predators on weeds border of sugar beet and cotton fields during 2005/2006 seasons.

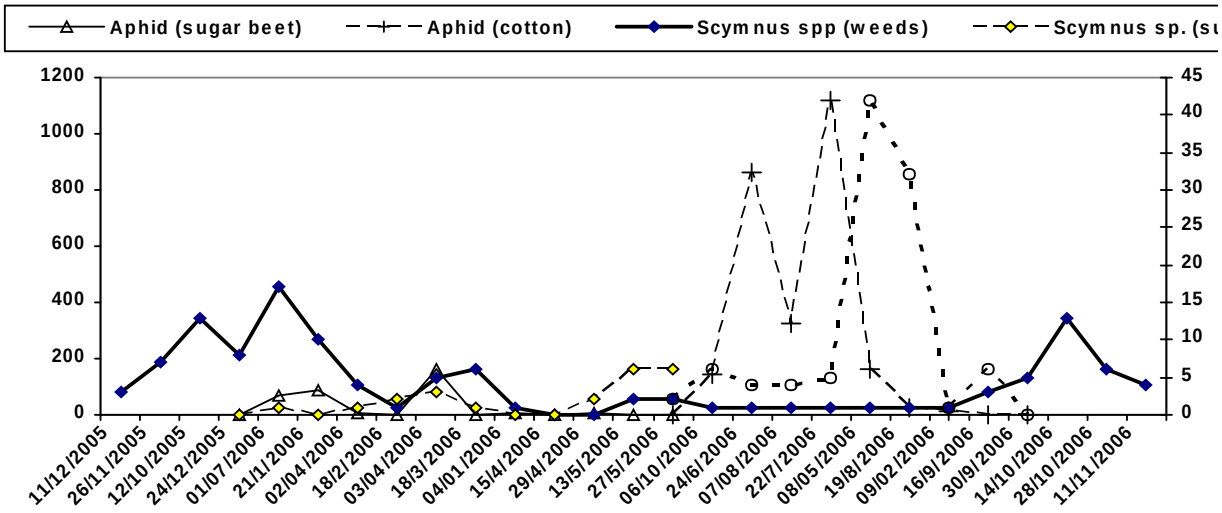

Fig. (2): Relationship between the major insect pests and its related predators on weeds border of sugar beet and cotton plant fields during 2006/2007 seasons.

Statistical analysis showed a negative correlation between *Scymnus* spp. on weeds and *Scymnus* spp. in sugar beet in the first season (r=-0.136), while, it was highly significant in the second season (r=0.987). Data also showed significant correlation between *Scymnus* spp. And jassids in the weeds in the first season (r = 0.434*) and positive only in the second one (r=0.431). The correlation was negative between *Scymnus* spp. in weeds and jassids in sugar beet plants (r = -0.307) and (-0.288) in the two seasons, respectively. On the other hand, there was positive correlation between *Scymnus* spp. in weeds and aphids in sugar beet plants. This means that the *Scymnus* spp. predators moved from weeds to sugar beet to fed in aphids in contrast for jassids in the sugar beet plants or due to high number of jassids in the weeds and in contrast for the aphids in the weeds.

2.2. On weeds and cotton plants:

Data in Tables (1&2) show that by the third week of May 2006, and the first one of May 2007 after the harvest of sugar beet plant, the important insect predators (*C. undecimpunctata, Scymnus* spp. and *P. alfierii*) were recorded with high numbers on the cotton seedling. At the same time, the predator numbers began to decrease in the weeds bordering cotton field, this may be due to the suitable stage of the cotton plants during this time.

Data in Table (2) revealed that at the period from the first week of June to the late week of July numbers of *Scymnus* spp. predators were high on the weed (*Cynodon dactylon*).

Table (2): Weekly numbers of the important insect pests and associated predators on border weeds of sugar beet and cotton fields during 2006/2007 seasons at Kafr El-Sheikh region.

Date		Weeds							Sugar beet							Cotton										
		C. undecimpunctata	*Scymnus* spp.	*Paederus alfierii*	*Jassids*	*Oxycarenus hyalinipennis*	*Tettigonid & Acridis**	*Cassida Vittata*	*C. undecimpunctata*	*Scymnus* spp.	*Paederus alfierii*	*Jassids*	Aphid	*Sodoptera littoralis*	*Cassida vittata*	*C. undecimpunctata*	*Scymnus spp.*	*Paederus alfierii*	*Orius* spp.	*Oxycacenus hyalinipemis*	Jassid	Aphid	*Spodoptera litoralis*	*Pectinophora gossyiella*	*Earius insulana*	*Thrips tabaci*
Stage		L_1A	L_1A	A	N_1A	N_1A	N_1A	N_1A	N_1A	N_1A	A	N_1A	N_1A	L	N_1A	N_1A	N_1A	A	N_1A	N_1A	N_1A	N_1A	L	L	L	N_1A
Nov.	18	0	10	0	520	0	4	0	(-)	(-)	(-)	(-)	(-)	(-)	(-)	-	-	-	-	-	-	-	-	-	-	-
2006	25	0	10	0	418	0	4	0	(-)	(-)	(-)	(-)	(-)	(-)	(-)	-	-	-	-	-	-	-	-	-	-	-
Dec.	2	0	18	0	450	0	5	0	(-)	(-)	(-)	(-)	(-)	(-)	(-)	-	-	-	-	-	-	-	-	-	-	-
	9	0	21	0	500	0	4	0	(-)	(-)	(-)	(-)	(-)	(-)	(-)	-	-	-	-	-	-	-	-	-	-	-
	16	0	6	3	220	0	6	0	0	0	0	5	1	0	0	-	-	-	-	-	-	-	-	-	-	-
	23	0	9	1	160	0	6	0	0	0	0	3	1	0	0	-	-	-	-	-	-	-	-	-	-	-
	30	0	5	0	150	0	4	2	0	0	0	0	1	0	0	-	-	-	-	-	-	-	-	-	-	-
Jun.	6	0	4	0	194	0	4	0	0	1	0	0	16	0	0	-	-	-	-	-	-	-	-	-	-	-
2007	13	0	11	1	48	0	2	0	0	1	0	0	38	0	0	-	-	-	-	-	-	-	-	-	-	-
	20	0	6	1	35	0	3	0	0	1	0	3	0	0	0	-	-	-	-	-	-	-	-	-	-	-
	27	0	1	1	15	0	2	0	0	1	0	4	6	0	0	-	-	-	-	-	-	-	-	-	-	-
Feb.	3	0	4	0	30	0	4	0	0	1	0	7	12	0	1	-	-	-	-	-	-	-	-	-	-	-
	10	0	5	0	23	0	2	0	0	1	0	10	19	0	2	-	-	-	-	-	-	-	-	-	-	-
	17	0	3	0	25	0	2	0	0	1	0	12	19	0	2	-	-	-	-	-	-	-	-	-	-	-
	25	0	4	1	48	1	2	0	0	2	0	10	19	0	2	-	-	-	-	-	-	-	-	-	-	-
Mar.	3	0	8	0	21	1	3	0	0	3	0	8	28	0	2	-	-	-	-	-	-	-	-	-	-	-
	10	0	3	0	25	1	0	0	0	1	0	10	48	0	1	-	-	-	-	-	-	-	-	-	-	-
	17	0	3	0	40	0	0	0	0	1	0	7	52	0	1	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	25	0	2	0	20	0	2	0	0	2	0	1	32	0	7	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
Apr.	1	0	0	0	15	0	0	0	0	2	0	1	20	0	15	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	8	0	2	0	8	0	2	0	0	1	1	3	4	0	120	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	15	0	3	0	12	0	1	0	0	1	1	8	6	0	230	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	22	0	1	0	0	0	0	0	0	0	0	12	2	0	170	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	29	0	1	0	4	0	1	0	0	0	0	12	0	0	80	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
May	6	0	3	0	11	0	6	0	0	0	0	6	0	0	310	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	13	0	0	0	10	1	4	0	-	-	-	-	-	-	-	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
	20	1	1	0	20	2	3	0	-	-	-	-	-	-	-	3	0	6	1	0	20	0	0	0	0	160
	27	2	0	1	0	5	2	0	-	-	-	-	-	-	-	7	0	11	0	0	16	0	0	0	0	93
Jun.	3	2	6	0	102	1	2	0	-	-	-	-	-	-	-	12	0	28	3	0	0	0	3	0	0	155
	10	10	12	2	120	72	0	0	-	-	-	-	-	-	-	11	1	20	4	0	13	0	1	0	0	200
	17	12	16	0	20	160	0	2	-	-	-	-	-	-	-	15	3	22	11	4	7	0	0	0	0	90
	24	0	12	4	15	180	4	1	-	-	-	-	-	-	-	11	10	18	14	52	12	0	0	0	0	0
Jul.	1	0	14	4	48	82	2	0	-	-	-	-	-	-	-	27	4	17	16	38	18	3	66	0	0	1
	8	0	18	14	0	128	4	1	-	-	-	-	-	-	-	43	2	14	8	100	25	140	8	0	0	0
	15	0	12	4	12	60	0	1	-	-	-	-	-	-	-	10	2	11	6	17	42	2	2	0	0	0
	22	0	9	2	40	66	0	1	-	-	-	-	-	-	-	7	2	12	10	8	52	8	4	2	0	0
	29	0	2	2	50	20	2	0	-	-	-	-	-	-	-	7	12	11	12	0	40	60	3	2	0	0
Aug.	5	0	1	1	70	12	4	0	-	-	-	-	-	-	-	13	11	8	13	0	32	128	4	2	0	0
	12	0	0	0	94	4	6	1	-	-	-	-	-	-	-	14	24	2	19	0	71	640	19	18	12	0
	19	0	24	0	240	0	39	1	-	-	-	-	-	-	-	12	52	2	15	0	60	798	7	20	8	0
	26	0	21	3	260	0	64	0	-	-	-	-	-	-	-	15	41	0	4	0	11	480	0	12	16	0
Sept.	2	0	23	3	150	6	5	0	-	-	-	-	-	-	-	3	33	2	0	0	10	420	2	14	14	0
	9	0	5	0	180	0	18	0	-	-	-	-	-	-	-	0	18	0	0	2	13	186	0	22	24	0
	16	0	5	0	155	0	28	0	-	-	-	-	-	-	-	1	12	0	0	0	4	216	0	27	15	0
	23	0	5	0	130	0	28	0	-	-	-	-	-	-	-	0	10	0	0	0	12	140	0	44	0	0
	30	0	0	0	110	0	23	0	-	-	-	-	-	-	-	0	10	0	0	0	0	60	0	48	2	0
Oct.	7	0	1	0	115	0	25	0	-	-	-	-	-	-	-											
	14	0	1	0	100	0	22	0	-	-	-	-	-	-	-											
	21	0	3	0	150	0	18	0	-	-	-	-	-	-	-											
	28	0	2	1	220	0	10	0	-	-	-	-	-	-	-											
Nov.	4	0	3	0	118	0	4	0	-	-	-	-	-	-	-											
	11	0	0	0	320	0	1	0	-	-	-	-	-	-	-											

L = larvae, N = nymph, A = adult

* Tettigonid = Aiolopus stiepens

Acridis = *Eyrepocnemis plorans* and *Homorocooryhus nitidulus*

- = Before the sowing of the land

(-) = The plant was cultivated but no sampled

Also, through the previous period the aphid infestation begun and recorded high peak on July 8 (140 aphids/20 cotton plants), this coincided with high peak of

Scymnus spp. on the week of the cotton field border (18 predators/25 net strokes). The highest peak of *Scymnus* spp. on both weeds and cotton plants were recorded on August 19 representing 24 predators/25 double net stroke on the weeds and 52 predators/20 cotton plants, which coincided with the highest peak of aphid (798 individual/20 cotton plants) (Fig. 1 & 2).

It is noteworthy that through the field observation there were 97% of the predators *Scymnus* spp. on the cotton plants were larvae and on contrast, on the weed, 100% of the *Scymnus* spp. were adults (Fig. 1 & 2) in the same time. The presented data demonstrated that by the end of September when the cotton plants dried, the number of *Scymnus* spp. and jassids pests were increased again on the weeds border.
Through the field observation on the second cotton season (Table 2), the cotton field was contained on the weed, blader hibiscus weed, *Hibiscus trionum*. Thus, there were high numbers of *Oxycarenus hyalinipennis* pest, where this weed is considered the important source of the previous pest (Mesbah *et al*. 2003). The *O. hyalinipenis* reached its highest number on July 8 (100 pests/20 cotton plants). Statistical analysis revealed a positive and significant correlation between *Scymnus* spp. (larvae) on cotton plants in 2006 and 2007 season, respectively.

The relationship between *Scymnus* spp. on weed and jassid on weed was significant in the first season (r= 0.434) and positive only in the second one (r=0.431), the same trend as for *Scymnus* spp. on cotton. Highly significant correlation was found between *C. undecimpunctata* and aphid on cotton in the two seasons (r=0.818 and 0.918, respectively). Also, highly significant difference was observed between *C. undecimpunctata* and *O. hyalainipennis* on cotton (r= 0.791) and it was significant only for the same pest on weeds in 2007 season (r=0.535*).

Data also pointed out significant correlation in 2007 season between *P. alfierii* and *O. hyalinipennis* on weeds (r=0.522*), while, it was highly significant on cotton plant (r=0.911**), the same results as for *P. alfierii* on cotton and *O. hyalinipennis* on weed and cotton, respectively. The present results demonstrated that weeds were differed in their harboured of insect pests and their related predators according to weed species.

Scymnus spp. were sheltered in the Bermud grass *Cynodon dactylon* L. especially in the winter. There were relationship between *Scymnus* spp. and jassids and aphid on cotton plants, while *C. undecimpunctata* was related with *O. hyalinipennis* in the weed and in the cotton plant, the same thing outcome was observed for *P. alfierii*.

The present results are in agreement with those of Stephen (2001) who reported that the weed borders can help in attracting beneficial predatory insects to agroecosystem giving organic farms some degree of conrol over pest population, the author added that in some cases these border strips can also repel pests, these by slowing, delaying or even preventing their arrival in the field while the plant is vulnerable. The present data demonstrated also that weeds border maintain the insect pests and associated predators in the winter especially *Scymnus* spp. with high number. In this regard, Norris and Kogan (2004) reported that the weed outside crop fields that maintain overwintering population of Arhtropod pests are the major reason for the developing of area-wide IPM programs for certain mobile Arthropoda pests. They also added that weed can serve as a source of increased diversity that has been the rational for enhancing biological control of arthropod pests through habitat management. Similar, finding was found by Penagos *et al*. (2003) who recorded that infestation of maize by fall armyworm larvae, *Spodoptera fragiperda* (Lepidoptera: Noctuidae) was more than twice as great in plots with strict weed control compared

with weedly plots at 20 days post-planting and the prevalence of aphid infestation was greater in weed-controlled plots. They also found that the density of beneficial predatory Coleoptera increased significantly in plots with weeds and it is suggested that this probably explains the lower incidence of pests. From the present result, it could be suggested that leaving strips of weeds border especially Bermud grass, *Cynodon dactylon* L., especially in winter, can be useful as a shelter for *Scymnus* spp. and other predators. The weeds of field border must not be related to the crops, because the related weeds increase the infestation of the fields.

REFERENCES

Capinera, J.L. (2005). Relationships between insect pests and weeds: An evolutionary perspective. Weed Science, 53(6): 892-901.

El-Heneidy, A.H.; Y.H. Fayad; D. Gonzalez, N.M. Abdel-Salam; J. Ellington and G.M. Moawad (1996). Pest-predators interaction in untreated cotton fields at three plant growth stages. 1. Location impact. Egypt. J. Biol. Pest. Control., 6(1): 75-81.

Gliessman, S.R. (2001). Agroecology: the ecology of sustainable systems, using weed borders to manage insect pests in California cauliflower fields. Second Edition, 282 pp.

Marshall, E.J.P.; W.K. Brownt; N.D. Boatman; P.J.W. Lutman; G.R. Squire and L.K. Ward (2009). The role of weeds in supporting biological diversity within crop fields. The Official Journal of the European Weed Research Soc., 43(2): 88-89.

Mesbah, A.H. (2007). Integrated pest management on major insect pests at Kafr El-Sheikh region. Egypt, J. Agric. Res., 85(6): 2027-2050.

Mesbah, A.H.; H.M. Boraei and A.H. El-Heneidy (2003). Importance of *Hibiscus trionum* L. weed, as a source of insect pests infesting cotton plants at Kafr El-Sheikh Governorate. Egypt. J. Agric. Res., 81(4): 1609-1618.

Mesbah, A.H.; M.A. Shoeb and A.H. El-Heneidy (2003). Preliminary approach towards the use of the egg parasitoid, *Trichogrammatoidae bactrae* Nagraja against cotton bollworms in Egyptian cotton fields. Egypt. J. Agric. Res., 81(3): 981-995.

Norris, R.F. and M. Kogan (2005). Ecology of interactions between weeds and arthropods. Annual Review of Entomology, 50: 479-503.

Penagos, D.I.; R. Magallanes; J. Valle; J. Cisneros; A.M. Martinez; D. Goulson; J.W. Chapman; P. Caballero; R.D. Cove and T. Williams (2003). Effect of weeds on insect pests of maize and the natural enemies Southern Mexico. International Journal of Pest Management, 49(2): 155-161.

Shalaby, F.F. (1974). Studies on insects associated with weeds. Ph.D. Thesis, Fac. of Agric., Cairo Univ., 278 pp.

Shenishen, Z. and I. Abd El-Rahman (1983). Natural enemies curtaling efficacy of certain possible biocontrol agents of the weed, *Phragmites communis*. Tnin. Proc. 2nd Arab Pesticide Conf. Tanta Univ. Sept.3: 146-152.

Stephen, R. Gliessman (2001). Agroecology: The Ecology of Sustainable Food System. Weed Borders are used in an Agroecosystem to attract insects, Facilitating Colonization in the Adjacent cauliflower crop. Second edition, 282 pp.

Zaki, M. (1969). Notes on weeds and weed control. M.Sc. Thesis, Fac. of Agric., Cairo Univ., 58 pp.

ARABIC SUMMARY

تأثير الحشائش الموجودة على حافة الحقل على أهم الأفات الحشرية والمفترسات المصاحبة لها فى حقول بنجر السكر والقطن

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أجريت هذه الدراسة لمعرفة العلاقة بين الأفات الحشرية فى كل من بنجر السكر كمحصول شتوى والقطن كمحصول صيفى والحشرات الموجودة على حشائش حافة الحقل لتلك المحاصيل وكذلك المفترسات المصاحبة لتلك الحشرات وذلك فى محطة البحوث الزراعية بسخا - محافظة كفرالشيخ خلال موسمى 2006/2005 ، 2007/2006. وقد تم حصر سبع أنواع من الحشرات منها أربع أفات وثلاث مفترسات فى كل من البنجر وحشائش الجافة بينما قد تم تسجيل أحدى عشر حشرة على نباتات القطن منها سبع أفات وأربع مفترسات. أكثر تلك المفترسات شيوعا هو *Scymnus* spp. يليه أبو العيد 11 نقطة *C. undecimpunctata* والحشرة الرواغة *P. alfierii* وقد أوضحت الدراسة وجود علاقة بين *Scymnus* spp. على الحشيشة والجاسيد jassids فى كل من الحشيشة والبنجر والقطن. وكذلك وجد ارتباط بين كل من Scymnus spp على الحشيشة ونفس المفترس على نباتات القطن ، كذلك بين *Scymnus* spp. والمن فى القطن وبينما كان المفترس *Scymnus* spp. على القطن هى يرقات بنسبة 97% كان على الحشائش حشرات كاملة (100%). وأظهرت الدراسة أيضا وجود ارتباط بين كل من المفترسان أبو العيد 11 نقطة *C. undecimpunctata* والحشرة الرواغة *P. alfierii* وقة بذرة القطن *O. hyalinipennis* التى توجد على القطن وحشائش الحافة فى الموسم الثانى ، كذلك وجد ارتباط بين تلك الآفة على كل من القطن والحشيشة. كما اتضح من الدراسة أن *Scymnus* spp. بفضل حشيشة النجيل المعمر *Cyndon dactylon* و Bermodgrass ويتواجد عليها بأعداد كبيرة خاصة فى فصل الشتاء. وفى حين بدأ تعداد المفترسات يتناقص على الحشائش خلال شهر مايو يبدأ يتزايد على النباتات المجاورة.