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ROLE OF THE PREDATORY BUG *CORANUS AFRICANA* EL-SEBAEY (HETEROPTERA: REDUVIIDAE) IN THE SUPPRESSION OF DIFFERENT INFESTATION LEVELS OF THE WHITE FLY, *BEMISIA TABACI IN* TOMATO FIELD

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ABSTRACT : This study was under taken to evaluate the ability of the reduviid bug, Coranus africana El-Sebaey to suppress the population of B. tabaci throught a field study conducted for successive years (2001-2002). C. africana was released against three levels of B. tabaci infestations in tomato field . A control experimental plots without C. africana were maintained for each level during the evaluation period. Reduction rates of B. tabaci infestation differed according to the number of predator in each treatment. When C. africana was released in the ratio of 1 predator/ plant, the infestation of B. tabaci was reduced by (91.2% & 89.2%) for adult and immature stages respectively. In case of moderate infestation the corresponding values were 96.5% & 90.7%, during first year opposed to 94.4%, 91.9%, 96.4% & 92.2%, during second year. When 2 predators/plant were released, the reduction increased in high level to reach 98.6 & 95.3% for adult and immature stage in first year and (99.2% & 95.86%) in second year. A complete eradication of the pest population was achieved in the case of low infestation levels by the use of 1 or 2 predators/plant. The same result was obtained in the three levels of infestation when 3 predators/plant were released. The basic yield parameters expressed as the weight of fruit and the number of fruits/plant were determined during two years.

INTRODUCTION

The role of natural enemies in the regulation of prey or host populations is of interest to both population and applied ecologists. It is also of interest to biological control practitioner, because natural enemies are the foundation for integrated pest management (IPM) (Stren et al., 1959 and Juck et al., 1999).

Many Reduviidae are important predators in several economic and wild plants (Hafez et al., 1979, Awadallah et al., 1984 & 1990 a,b Schafer & Ahmad 1987; Rosenhim and wilson 1993, El- Sebaey 1996 & 1998, Singh et al., 1997,.). Several, workers, including James 1994, Sahayaraj & Ambrose 1997; El-Sebaey et al 2002a,b, mentioned that this group should be more seriously considered when developing biological control programmes.

Coranus africana El-Sebaey has been recorded and described from Egypt (El-Sebaey

2001a) as a feeder on various insect pests of tomato. clover, maize and cotton crops (El-Sebaey 2001 b,c, & El-Sebaey et. al., 2002 a, b and El-Sebaey & Abd El- Whab 2003).

The present work was conducted to evaluate the role of the predatory bug, C. africana, in the suppresson of different infestastion levels of the white fly, Bemisia. tabaci in the experimental tomato fields.

MATERIALS AND METHODS

The predator Coranus africana El- Sebaey (Heteroptera: Reduviidae) was collected from tomato, clover, eggplant fields and some wild plants, such as Echinochloa colonum and cyndom doctylon in Wadi- El-Natroun destricit (Western Desert), Abu katata (Giza governorate) and kom Oshim (Fayoum, Governorate). Mass-rearing of the predator was carried out in the laboratory (30 ? 1?C and 70 ? 5% R.H) in plastic troughs on larvae of Anagasta kuehniella Zell., as reported by Clver et al., (1996) and El-Sebaey & El-Shazly (2002). Mass-reared and emerged adult predators in the labloratory were used for assessing their biocontrol potential in the experimental tomato field.

Experiments were conducted at Fayoum Governorate, Egypt in field (2800 m2 for three levels of infestation), each level was 900 m2 and surrounded by 33 m2 border of maize to create barrier and reduce movement of pests and predators, the area of each level divided into three treatment (Treatment = 270 m2) and surounded by 30 m2 as a border. Each of the three treatments mentioned was randomly replicated three times for experment and other three, for control (replicate = 40 m2), each replicate separated from other by 5 m2 (Biever & Chauvin, 1992). The tomato plants (variety magolna) were transferred after 100 days of planting to experimental plots. The following treatments were evaluated at separate plots.

Controls (A, B, C): tomato plants infested with high, moderate and low levels of infestation with B. tabaci (3 plots each), respectively

Experments (A1, A2, A3): tomato plants infested with high level of infestation with B. tabci with one adult predator/plant, (3 plots), two adult predators / plant, (3 plots), and three adult predators / plant, (3 plots), respectively.

Experments (B1, B2, B3): tomato plants infested with moderate level infestation of B. tabci with one adult predator / plant, (3 plots), with two adult predators / plant, (3 plots), and with three adult predators / plant (3 plots), respectively.

Experments (C1, C2, C3): tomato plants infested with low level infestation with one adult predator/plant, (3 plots), with two adult predators / plant, (3 plots), and with three adult predators / plant, (3 plots).

These infestaion levels of B. tabaci before and through the experimental peroid were estimated according to the procedure adopted by Gameel, (1973).

The adult predator, C. africana was released manually between the rows (1, 2 and 3 adult predators / plant). After release, the plants were checked and the counts of alive B. tabaci were recorded weekly as reported by Ambrose and Claver (1999).

A comparison between the yield in the experimental and control plots was determined

as reported by Saito and Ito (1967).

The statistical equation of Henderson and Tilton (1959) was applied to calculate the reduction in the population of the three pest levels.

RESULTS AND DISCUSSION

As shown in Table (1), different treatments of reduviid predator, C. africana Significantly suppressed the populations of B. tabaci level during the two experimental years. When one adult predator/plant was released, the high level of infestation of B. tabaci was reduced by 91.2 & 89.2% for adult and immature stages, respectively (Table 1). In case of moderate infestation the corresponding values were 96.5 and 90.7 % during the first year (2001). However, in the second year, these values were 94.4 91.9 % and 96.4 % & 92.2 % for the high and moderate level during the second year (Table 1).

When 2 predators/plant were released, the reduction increased in high level to reach 98.6 % & 95.3 % for adult and immature stages in first year A complete absence of the pest population was achieved in case of low infestation levels by the use of one or two predators / plant (Table 1).

Table (1) Suppression of different infestation levels of the white fly *B. tabaci* on tomato plants by *C. africana*

Year of release	Treatment	No. of *B. tabaci*							
		before release		after release after 7th days					
				1 predator/plant		2 predators/plant		3 predators/plant	
		Adult	Immature stage	Adult	Immature stage	Adult	Immature stage	Adult	Immature stage
1st year	A-High level	22.6±0.18	25.9±0.17	4.1±0.02 (91.2)	4.9±0.1 (89.2%)	0.3±0.03 (98.6%)	1.9±0.02 (95.3%)	-	-
	B- Moderate level	16.2±0.26	9.9±0.15	2.1± (96.5)	1.6± (90.7%)	-	-	-	-
	C- low level	8.9±0.11	3.2±0.26	-	-	-	-	-	-
	Control	27.072	33 0.81	49±0.56	50±0.42	52 ±0.12	52±0.15	54±0.61	57±0.19
2nd year	A- High level	22.6±0.17	25.6±0.12	4.1±0.02 (94.4%)	3.6±0.09 (91.9%)	-	-	-	-
	B- Modrate level	15.3±0.30	9.6±0.19	1.1± (96.4)	1.3± (92.2%)	-	-	-	-
	C- low level	8.3±0.42	2.6±0.32	-	-	-	-	-	-
	Control	26.01±0.49	32±0.44	47±0.97	4.7±0.37	47±0.97	47±0.16	47±0.34	56±0.32

Table (2) properties of tomato fruits in field infested different levels of *B. tabaci* and controlled by *C. africana*.

Year of release	Treatment	Weight of fruit (Gm)			No. of fruits/plant			Reduction of fruits number/plant			Reduction percentage of fruits number (%)		
		1predator /plant	2predators /plant	3predators /plant	1predator /plant	2predators /plant	3predators /plant	1predator /plant	2predators plant	3predators /plant	1predator /plant	2predators / plant	3predators /plant
1st year Release	A-High level	24.3+0.21	26.2+0.68	27.8+0.52	11.1+0.41	23.9+0.91	33.1+0.61	28.1+0.36	17.01±0.25	7.5±0.71	71.6 %	41.5 %	71.6 %
	B- Moderate level	25.9±0.32	27.3±0.71	28.2±0.22	18.2±0.63	35.2±0.8	40.2±0.42	21.0±0.38	4.3±0.67	0.8±0.15	53.5 %	13.9 %	53.5 %
	C- low level	31.01±0.61	31.1±0.39	30.3±0.45	39.2±0.37	40.2±0.37	41.01±0.26		-	-	-	-	-
	Control	22.8±0.94	22.8±0.17	22.8±0.37	10.1±0.32	10.0±0.19	10.0±0.46	27.2±0.55	30.9±0.48	31±0.23	74.4	75.5	75.6
2nd year Release	A- High level	23.5±0.55	25.7±0.79	28.9±0.49	9.8±0.33	24.5±0.21	33.5	30.4±0.4	16.9±0.37	8±0.47	75.6 %	41.1 %	19.5%
	B- Modrate level	25.3±0.21	28.9±0.53	29.6±0.75	17.9±0.75	36.6±0.11	40.9	22.3±0.4	4.5±0.23	0.6±0.84	55.4 %	10.9 %	10.4 %
	C- low level	31.2±0.97	31.3±0.42	31.6±0.53	40.2±0.28	41.1±0.4	41.2	-	-	-	-	-	-
	Control	21.6±0.21	21.6±0.36	21.6±0.36	9.2±0.46	9.2±0.22	9.2	31.0±0.51	31±0.23	31.6±0.45	77 %	77 %	77 %

At low levels of infestation, the pest was completely disappeared by using one or two predators/plant (Table 1)

The release of C. africana in all treatments reduced the damage caused by B. tabaci in the three levels of infestation as indicated by the fruit weight, and it was highly significant (P>0.01), in the presence of 1, 2 or 3 predators/plant thus, the fruit weight increased from 22.8 to 27.8, 26.2 and 24.3 gm/ fruit respectively) in high infestation level, the weight increased to 28.2, 27.3 and 25.9 gm/fruit when 1, 2&3 predators / plant were related, respectively, by the use of one, two or three predators/plant, respectively moderate level, and finally 30.3, 31.1 and 31.5 gm/ fruit respectively in low level during first year (Table 2). However the presentage reduction of fruit number/plant decreased in all treatments in the three levels (Table 2).

Coranus africana consumed considerable numbers of B. tabaci in three levels of infestation, indicating its strong potential for pest supprestion.

It seems that reduviid bugs is a promising group of natural enemies that could be augmented for release in pest management program (s). Thus, the reduction of infestation of Spodoptera litura, Mytabris pustulata and Dysdercus cingulatus in cotton field cages by the reduviid Rhynocoris marginatus F. have recently been documented by Ambrose and Claver (1999). Ambrose (1996) reported more than 50 % suppression of Helicoverpa armigera Hubner, S. litura and D. cinglatus by four reduviid predators; Acanthaspis pedestris stal, Catamiarus brevipennis Serville, R. marginatus and R. Kumarii.

On the other hand El-Sebaey et al., (2002b) mentioned that Coranus africana ruduced the level of infestation with B. tabaci in cucumber green house as early and total yields increased. In 2003, El-Sebaey & Abd El- Wahab reported that C. africana suppressed B. tabaci, Aphis gosspii and Spodoptera littoralis in tomato field plots with increasing of yield.

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تقييم دور المفترس (*Coranus africana El-Sebaey*) فصيلة البق السفاح ـ رتبة نصفية الأجنحة) فى خفض مستويات الإصابة المختلفة من الذبابة البيضاء (*Bemisia tabaci (Genn.)* فى حقول الطماطم.

إيمان إبراهيم عبد الرحمن السباعى ـ حورية على عبد الوهاب ـ سعاد على إبراهيم

مركز البحوث الزراعية ـ معهد وقاية النبات ـ دقى ـ جيزة ـ مصر

تم الإكثار المعملى للمفترس Coranus africana El-Sebaey وإطلاقه بثلاث معدلات (١، ٢، ٣ فرد / نبات) فى ثلاث مستويات إصابة من الذبابة البيضاء حيث إتضح من الدراسة أنه عند إطلاق المفترس بمعدل ١ فرد / نبات فى مستوى الإصابة المرتفع إنخفضت نسبة الإصابة بالأطوار الكاملة وغير الكاملة إلى (٢.٩١، ٢, ٨٩%) على التوالى أما فى حالة مستوى الإصابة المتوسط كانت نسبة الإنخفاض (٥.٩٦، ٧, ٩٠ %خلال العام الأول بينما كانت نسبة الإنخفاض خلال العام الثانى لهذه النسب (٤.٩٤، ٩, ٩١%) و (٤.٩٦، ٢, ٩٢ %على التوالى.

عند إطلاق ٢ مفترس / نبات زاد معدل الإنخفاض فى مستوى الإصابة المرتفع فى حالة الأطوار الكاملة وغير الكاملة 98.6)، ٣, ٩٥%) و (٢.٩٩، ٩٦, ٩٥%) فى العام الأول والثانى على التوالى.

لم تسجل أى إصابة عند إستخدام المفترس بمعدل ١ فرد أو ٢ فرد / نبات فى مستوى الإصابة المنخفض وكذلك تم الحصول على نفس النتيجة عند إستخدام المفترس بمعدل ٣ فرد/ نبات فى مستويات الإصابة الثلاث.

أيضا تم تقدير المحصول الناتج بعد مكافحة مستويات الإصابة المختلفة للذبابة البيضاء Bemisia tabaci (Genn.) بمعدلات مختلفة من المفترس.