

**CO-EXISTENCE OF *APHIS GOSSYPHII* GLOV. AND
BEMISIA TABACI GENN. ON THE DIFFERENT PARTS
OF COTTON PLANT AS INFLUNCED BY SOME BIOTIC
AND ABIOTIC FACTORS**

BY

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ABSTRACT

The cotton aphid, *Aphis gossypii* Glov. and the whitefly, *Bemisia tabaci* Genn. are among the most serious sucking insects attacking cotton plant in A. R. of Egypt. The population density of the two insects co-existing on leaves, squares and bolls as well as its relation to associated predators, temperature and relative humidity was studied at Farm of Sakha Agric. Res. Station , Kafr El-Sheikh during 2002 and 2003 seasons.

The obtained results indicated that the highest numbers of the two insects co-existed during August or early September on the three parts of cotton plant and this coincided with low population of the predators. Five predatory species; *Chrysoperlla carnea* Steph., *Paederus alferii* Koch., true spiders, *Coccinella* spp. and *Scymnus* spp. were found on the three parts of cotton plant. The first predator was the most dominant species ,while the last one was the least one . The leaves exhibited higher number of the two insects and predators than squares and bolls. Aphid population was higher in the first season than in the second one, while the reverse was found for whitefly and predators. The two insects mostly correlated insignificantly and highly significantly in the first and second season , respectively. The temperature was within the optimum range for the population activity of aphids and whitefly. The effect of relative humidity on the two insects was not stable and differed from season to another. The predators (as a total count of the predatory species) affected whitefly more than aphid especially during the second season. The combined effect of the predators and the two weather factors was more pronounced only on the whitefly population on bolls in both seasons.

However, these results are of great importance for developing programs of integrated control these insects in cotton fields.

Key words : *Aphis gossypii* - *Bemisia tabaci* .– temperature- relative humidity- predators – cotton

INTRODUCTION

Recently, the piercing-sucking insects are considered of the most serious insect pests that attack cotton plants under the Egyptian environmental conditions. However, when designing a program of pest control, it would be something precious to control more than one insect pests at the same time particularly belonging to certain groups e.g. piercing-sucking insects (Metcalf and William,1975). Therefore, more information concerning the relationship between these insects and its relation to associated predators as well as the prevailing weather factors would required to develop and utilize effective pest control strategies, as a crucial problem in successful pest management is the proper timing of insecticides application(Dent,1991 and Godfrey & Rosenheim,1996).

Thus, this work was carried out to determine the population density of *Aphis gossypii* Glov., *Bemisia tabaci* Genn. co-existing on the different parts of cotton plants (leaves, squares and bolls) and its relation to the associated predators and certain weather factors.

MATERIALS AND METHODS

The experiment was carried out at the Farm of Sakha Agricultural Research Station Kafr El-Sheikh Governorate during two successive cotton seasons; 2002 and 2003. An area of about one feddan (4200 m²) was divided into 4 equal plots. The cotton variety of Giza 86 was planted during the last week of March during the two seasons and received the normal agricultural practices throughout the growing season.

Weekly samples of 25 leaves,25 squares and 25 bolls were chosen at random from each plot , then the numbers of aphids (nymphs and adults), whitefly (adults) and associated predators were directly counted in the field. The considered predators were *Coccinella* spp. (adult and larva) , *Scymnus* spp. (adult and larva), *Chrysoperlla carnea* Steph. (larva) , *Paederus alferii* Koch. (adult) and true spiders.

The daily records of temperature and relative humidity throughout the experimental period were obtained from the

Meteorological Department at Sakha Research Station. The weekly means of the two factors and the predators were calculated to determine the simple correlation and partial regression values between these factors and both aphids and whitefly population according to Fisher (1950).

RESULTS AND DISCUSSION

1 – The population density of *Aphis gossypii* Glov., *Bemisia tabaci* Genn, and its relation to associated predators on the different parts of cotton plants:-

a – on leaves :-

The results in Table (1) show the population density of the cotton aphid, *A. gossypii*, whitefly, *B. tabaci* and the common associated predators on cotton leaves during 2002 and 2003 season. The cotton aphid exhibited two peaks of abundance on August 6th (381.8 individuals / 25 leaves) and August 20th (48.3 individuals) during the first season, while only one peak of 28.3 individuals was recorded on August 6th during the second season. As for whitefly, four peaks were found on July 13th, August 6th, August 27th and September 17th with means of 39.3, 130.0, 346.8 and 175.8 individuals, respectively during the first season, while three peaks of 34.5, 60.0, and 368.0 insects were recorded by July 2nd, July 23th and Sept.3rd, respectively during the second season. Five predatory species; *Chrysoperlla carnea* Steph., *Paederus alferii* Koch., true-spiders, *Coccinella* spp. and *Scymnus* spp. were found on cotton leaves with means of 5.02 , 0.58 , 0.19 , 0.13 and 0.06 individuals/ 25 leaves, respectively during the first season and 5.14 , 1.01 , 0.39, 1.81 and 0.60 individuals during the second season. Based on the total number of the mentioned species, it is clear that the highest population was recorded during May and June ; this synchronized with the decrease in the population of the two considered insects during this period. After that, the predators decreased and fluctuated up and down till the end of the season.

b- on squares ;-

The data in Table (2) indicated one peak of aphid abundance by August 6th (158.5 individuals /25 squares) and August 20th (11.8 individuals) in 2002 and 2003 , respectively. The whitefly peaked

Table (1): Weekly mean number of the cotton aphid *Aphis gossypii* Glov., whitefly, *Bemisia tabaci* Genn, and associated predators / 25 cotton leaves during 2002 and 2003 seasons.

Inspection date	2002 season								2003 season								
	Aphid	Whitefly	Predators						Inspection date	aphid	Whitefly	Predators					
			1*	2*	3*	4*	5*	total				1*	2*	3*	4*	5*	total
21/5	0.3	4.3	0.0	0.5	0.0	0.0	0.0	0.5	28/5	0.0	8.5	14.5	11.8	1.5	0.8	5.3	33.9
28/5	0.5	8.8	1.0	7.8	0.0	0.0	0.0	8.8	Mean	0.00	8.50	14.5	11.80	1.50	0.80	5.30	33.0
Mean	0.40	6.55	0.50	4.15	0.00	0.00	0.00	4.65	4/6	0.0	2.8	9.0	15.0	1.0	1.5	1.3	27.8
8/6	1.0	10.3	0.3	12.0	0.3	0.3	0.0	12.9	11/6	0.0	5.5	3.0	22.0	3.0	1.3	2.0	31.3
15/6	1.0	5.5	0.3	15.0	5.3	0.8	0.3	21.7	18/6	1.3	7.3	1.3	15.0	6.5	0.5	0.8	24.1
22/6	2.5	21.8	0.0	12.5	4.5	1.0	0.8	18.8	25/6	1.8	27.8	0.3	3.8	1.3	0.8	0.0	6.2
29/6	3.3	24.0	0.5	6.5	0.0	0.5	0.0	7.5	Mean	0.83	10.85	3.40	13.95	2.95	1.03	1.03	22.4
Mean	1.95	15.40	0.28	11.5	2.53	0.65	0.28	15.23	2/7	2.0	34.5	0.3	3.0	1.5	0.3	0.3	5.4
6/7	3.8	38.8	0.0	3.3	0.3	0.0	0.0	3.6	9/7	2.5	19.5	0.3	0.8	0.5	0.3	0.0	1.9
13/7	25.3	39.3	0.3	2.0	0.0	0.0	0.0	2.3	16/7	3.3	56.5	0.0	1.0	0.5	0.0	0.0	1.5
20/7	79.8	23.8	0.0	0.8	0.0	0.0	0.0	0.8	23/7	5.8	60.0	0.3	0.3	0.3	0.0	0.0	0.9
27/7	308.3	64.5	0.0	0.0	0.0	0.0	0.0	0.0	30/7	24.5	42.0	0.0	1.3	0.0	0.0	0.0	1.3
Mean	104.3	41.6	0.07	1.53	0.07	0.00	0.00	1.68	Mean	7.62	42.50	0.18	1.28	0.56	0.12	0.06	2.20
6/8	381.8	130.0	0.0	0.3	0.0	0.0	0.0	0.3	6/8	28.5	110.8	0.0	0.8	0.0	0.0	0.0	0.8
13/8	32.0	110.5	0.0	0.3	0.0	0.0	0.0	0.3	13/8	18.3	192.0	0.0	0.0	0.0	0.0	0.0	0.0
20/8	48.3	189.5	0.0	1.5	0.0	0.0	0.0	1.5	20/8	24.0	242.0	0.0	0.5	0.0	0.0	0.0	0.5
27/8	18.3	346.8	0.0	3.5	0.0	0.0	0.0	3.5	27/8	34.0	260.0	0.0	1.0	0.0	0.5	0.0	1.5
Mean	120.1	194.20	0.00	1.40	0.00	0.00	0.00	1.40	Mean	26.2	201.2	0.00	0.58	0.00	0.13	0.00	0.70
3/9	7.3	291.5	0.0	4.0	0.0	0.0	0.0	4.0	3/9	87.5	368.0	0.0	3.5	0.0	0.3	0.0	3.8
10/9	4.8	133.5	0.0	6.3	0.0	0.0	0.0	6.3	10/9	122.0	159.5	0.0	2.5	0.0	0.0	0.0	2.5
17/9	5.5	175.8	0.0	6.8	0.0	0.0	0.0	6.8	Mean	104.7	263.7	0.00	3.00	0.00	0.15	0.00	3.15
25/9	15.0	93.5	0.0	7.3	0.0	0.8	0.0	8.1	General mean	22.23	99.83	1.81	5.14	1.01	0.39	0.60	8.95
Mean	8.15	173.58	0.00	6.10	0.00	0.20	0.00	6.30									
General mean	52.16	95.15	0.13	5.02	0.58	0.19	0.06	5.98									

1* = *Coccinella* spp.

2* = *Chrysoperla carnea*

3* = *Paederus alferii*

4* = True spiders

5* = *Scymnus* spp

Table (2): Weekly mean number of the cotton aphid, *Aphis gossypii* Glov., whitefly, *Bemisia tabaci* Genn. and associated predators / 25 cotton squares during 2002 and 2003 seasons.

2002 season									2003 season								
Inspecti- On date	Aphid	Whitefly	Predators						Inspecti- on date	Aphid	Whitefly	Predators					
			1*	2*	3*	4*	5*	total				1*	2*	3*	4*	5*	total
22/6	0.0	0.0	0.8	2.8	4.8	2.8	2.8	14.0	11/6	0.0	1.3	3.5	1.0	5.3	0.3	4.0	14.1
29/6	0.0	3.5	0.3	0.3	1.8	0.8	0.5	3.7	18/6	0.0	3.7	2.5	0.3	10.0	1.3	5.5	19.6
Mean	0.00	1.75	0.55	1.55	3.30	1.80	1.65	8.85	25/6	0.0	6.3	1.5	0.3	7.3	0.3	3.0	12.4
6/7	0.3	8.5	0.0	0.5	0.3	0.5	0.0	1.3	Mean	0.0	3.77	2.50	0.53	7.53	0.63	4.17	15.36
13/7	0.3	12.3	0.0	0.3	1.3	1.0	0.0	2.6	2/7	0.0	7.0	0.3	0.5	5.5	0.3	2.0	8.6
20/7	36.0	3.5	0.0	0.0	0.0	0.3	0.0	0.3	9/7	0.0	13.3	0.6	0.3	3.3	1.0	1.0	6.2
27/7	98.0	17.3	0.0	0.0	0.0	0.0	0.0	0.0	16/7	0.0	23.5	0.3	0.0	4.5	0.3	1.0	6.1
Mean	33.65	10.40	0.00	0.20	0.40	0.45	0.00	1.05	23/7	0.0	17.8	0.0	0.3	3.3	0.3	1.0	4.9
6/8	158.5	18.3	0.0	0.5	0.0	0.0	0.0	0.5	30/7	3.5	27.5	0.0	0.3	0.0	0.0	0.3	0.6
13/8	27.3	50.0	0.0	0.8	0.0	0.3	0.3	1.4	Mean	0.70	17.82	0.24	0.28	3.32	0.38	1.06	5.28
20/8	0.8	31.3	0.0	1.3	0.0	0.0	0.3	1.6	6/8	0.8	54.5	0.0	0.3	0.3	0.0	0.3	0.9
Mean	62.20	33.20	0.00	0.87	0.00	0.10	0.20	1.17	13/8	2.8	86.8	0.0	0.3	0.0	0.0	0.0	0.3
General mean	35.78	16.08	0.12	0.72	0.91	0.63	0.43	2.82	20/8	11.8	93.8	0.0	0.3	0.3	0.3	0.3	1.2
									27/8	7.8	92.5	0.0	0.8	0.0	0.0	0.0	0.8
									Mean	5.80	81.90	0.00	0.43	0.15	0.08	0.15	0.80
									General mean	2.23	35.67	0.72	0.39	3.32	0.34	1.53	6.30

1* = *Coccinella* spp.

2* = *Chrysoperla carnea*

3* = *Paederus alferii*

4* = True spiders

5* = *Scymnus* spp

twice annually ;on July 13th and August 13th with means of 12.3 and 50.0 individuals, respectively during the first season and on July 16th (23.5 individuals insects) and August 20th (93.8 individuals) during the second season. The common predators found on squares were, *P. alferii* , *C. carnea*, true-spiders, *Scymnus* spp. and *Coccinella* spp. with means of 0.91, 0.72 , 0.63 , 0.43 and 0.12 individuals / 25 squares, respectively in the first season and 3.32, 0.39, 0.34 ,1.53 and 0.72 individuals in the second season. The population of predators (as a total count of the mentioned species) was found in high numbers during the early period of inspection; this was associated with the low numbers of the two considered insects. Then, the population decreased till the end of the season.

c-on bolls:-

Results of Table (3) showed that the aphid and whitefly exhibited a high peak of 141.3 and 101.5 individuals / 25 bolls on August 6th and September 3rd , respectively during the first season. In the second season, the whitefly peaked on August 27th (83.3 individuals), while the aphid reached the highest number (23.5 individuals) at the end of the season. The predators that found on bolls were *C. carnea*, true-spiders, *Scymnus* spp, *P. alferii* and *Coccinella* spp. with means of 1.34, 0.39, 0.22 , 0.18 and 0.05 individuals/ 25 bolls , respectively during the first season and 0.62, 0.36, 0.43, 2.81 and 0.14 individuals in the second season. The same trend of results was found as mentioned in the case of leaves and bolls ,where the high population of predators was correlated with the low number of the two insects.

Generally, from the previous results, it could mentioned that the highest population of aphid and whitefly during August synchronized with low number of predators ; this is of great of importance in developing and utilizing effective pest control tactics. Also, *C. carnea* was the most dominant predator ,while *Coccinella* spp. were the least dominant one.

These results agreed with the findings of El-Mezayyen and Abou- Attia (1996), they showed a high peak of *A. gossypii* and *B. tabaci* during the first and fourth week of August , respectively during 1995 cotton season at Kafr El-Sheikh. They also, reported that *C. carnea* was the most dominant predator, while *Scymnus* spp. were the least dominant one. Salama et al., (1999) and El-Zahi

Table (3): Weekly mean number of the cotton aphid, *Aphis gossypii* Glov., whitefly, *Bemisia tabaci* Genn. and associated predators / 25 cotton bolls during 2002 and 2003 seasons.

2002 season									2003 season								
Inspection date	Aphid	Whitefly	Predators						Inspection date	aphid	White-fly	Predators					
			1*	2*	3*	4*	5*	total				1*	2*	3*	4*	5*	total
6/7	9.0	11.3	0.3	0.3	0.0	0.5	0.0	1.1	2/7	0.0	2.5	0.3	0.3	11.8	0.5	1.5	14.4
13/7	0.5	15.0	0.0	0.3	1.0	1.0	0.3	2.6	9/7	0.0	12.5	0.5	0.0	9.3	0.5	1.0	11.3
20/7	14.5	4.0	0.0	0.3	0.0	0.5	0.0	0.8	16/7	0.0	20.5	0.3	0.0	5.3	0.5	1.0	7.1
27/7	114.5	18.5	0.0	0.3	0.0	0.3	0.3	0.9	23/7	0.0	34.8	0.0	0.0	0.3	0.3	0.0	0.6
Mean	32.38	12.20	0.07	0.30	0.25	0.57	0.15	1.35	30/7	2.0	35.0	0.0	0.3	0.8	0.3	0.5	1.9
6/8	141.3	23.8	0.0	0.5	0.0	0.3	0.0	0.8	Mean	0.40	21.06	0.22	0.12	5.50	0.42	0.80	7.06
13/8	12.5	28.5	0.3	0.5	0.0	0.0	0.0	0.8	6/8	1.3	56.3	0.3	0.3	0.0	0.3	0.0	0.9
20/8	10.3	51.5	0.0	1.5	0.0	0.0	0.3	1.8	13/8	2.8	57.5	0.0	0.5	0.3	0.3	0.0	1.1
27/8	7.5	80.8	0.0	1.3	0.3	0.3	0.3	2.2	20/8	5.0	70.3	0.0	0.8	0.0	0.3	0.0	1.1
Mean	42.90	46.15	0.07	0.95	0.07	0.15	0.15	1.40	27/8	6.0	83.3	0.0	1.5	0.3	0.3	0.3	2.4
3/9	3.5	101.5	0.0	2.3	0.3	0.3	0.3	3.2	Mean	3.78	66.85	0.07	0.78	0.15	0.30	0.07	1.38
10/9	2.3	77.3	0.0	2.3	0.5	0.0	0.3	3.1	3/9	23.5	69.8	0.0	2.5	0.0	0.3	0.0	2.8
17/9	4.3	85.5	0.0	2.0	0.0	0.5	0.5	3.0	Mean	23.50	69.80	0.00	2.50	0.00	0.30	0.00	2.80
25/9	2.5	60.8	0.0	4.5	0.0	1.0	0.3	5.8	General mean	4.06	44.25	0.14	0.62	2.81	0.36	0.43	4.36
Mean	3.15	81.28	0.00	2.77	0.20	0.45	0.35	3.77									
General mean	26.14	46.54	0.05	1.34	0.18	0.39	0.22	2.18									

1* = *Coccinella* spp. 2* = *Chrysoperla carnea* 3* = *Paederus alferii* 4* = True spiders 5* = *Scymnus* spp

(2005) found the highest number of aphids on cotton plants during August, while whitefly exhibited the highest population during August and September. Ibraheem (2001) and Mohamed (2004) showed that the relatively high occurrence of predators in cotton fields was found during June and July. Also, *C. carnea* was the most dominant predator in cotton fields (Salem *et al.*, 1993).

The results summarized in Table (4) indicate that the leaves of cotton harbored higher number of aphid, whitefly and predators compared to squares and bolls. Numbers of aphid were higher in the first season than in the second one on the three parts of cotton plant, while the reverse was found for whitefly and predators. Also, the population of whitefly was higher than aphid on the three cotton parts in both seasons except on square in the first season as the aphid number was more than whitefly.

Table (4): Seasonal mean of cotton aphid, *Aphis gossypii* Glov., whitefly *Bemisia tabaci* Genn. and predators on the different parts of cotton plant during 2002 and 2003 seasons.

Season	Insect	Leaf	Square	Boll	Total
2002	Aphids	52.16	35.78	26.14	114.08
	Whitefly.	95.15	16.08	46.54	157.77
	Predators	5.98	2.82	2.20	11.00
2003	Aphids	22.23	2.23	4.06	28.52
	Whitefly	99.83	35.67	44.25	179.75
	Predators	8.95	6.29	4.36	19.60

2- Aphid – whitefly relationship on the different parts of cotton plant :-

The results in Table (5) showed insignificant correlation between the population of aphid and whitefly on the three cotton parts in the first season and only on bolls in the second one, while the relationship was highly significant and positive on leaves and squares during the second season. This is of great importance to control the two insects together at the same time. These results agreed with those of El-Mezayyen and Abou-Attia (1996), they

showed insignificant negative and positive correlation between aphids and whitefly during 1994 and 1995 cotton season, respectively, while Khalafalla *et al.*, (1993) found a significant positive correlation between the population density of aphids and whitefly on cotton plants.

Table (5): Simple correlation coefficient between *Aphis gossypii* Glov. and *Bemisia tabaci* Genn. on the different parts of cotton plant during 2002 and 2003 seasons.

Season	Leaves	Squares	Bolls
2002	0.040	0.064	- 0.364
2003	0.671**	0.823**	0.569

** = significant at 1%

3- Effect of certain weather factors and predators on aphids and whitefly population on the different parts of cotton plant:-

a- mean temperature :-

Statistical analysis of the results in Table (6) indicated that the temperature had insignificant effect on aphids and whitefly on the three parts of cotton plant during the two seasons, except the effect on whitefly on leaves in the second season, as it was significant. This generally means that the temperature was within the optimum range for the population activity of these insects.

b- mean relative humidity :-

The effect of relative humidity on aphids was insignificant on the three parts of cotton plant in both seasons, except on leaves in the first season ,as it was significant (Table 6). The effect on whitefly was insignificant on leaves and squares and significant on bolls in the first season, while in the second season, the effect was highly significant and positive on leaves and significant and positive on squares as well as bolls. Generally, it can be concluded that whitefly population affected more than aphids with relative humidity.

c- predators :-

The results in Table (6) indicated insignificant negative correlation between the predators and aphids on the three parts of cotton plant in both seasons. The predators induced a high

significant negative effect on the whitefly in the second season, while in the first season, the effect was insignificant negative on leaves and squares as well as a high significant negative on bolls.

The combined effect of the two weather factors and predators on aphid and whitefly population was shown in Table (6) as percentage of explained variance. It is clear that the three factors affected the population of aphid on leaves by 31.43% and 20.06 % during the first and second season, respectively and whitefly by 35.14% and 45.63%, respectively. Also, the effect on aphid population on squares was in respect 40.98 % and 43.10 % in the first and second season and whitefly by 29.17 % and 60.95%, respectively. This means that there were many other unconsidered factors affecting the population of the two insects. The three factors induced more pronounced effect on whitefly infesting bolls than aphids, as it was 70.65% and 72.21 % for whitefly and 28.64% and 39.52 % for aphid in the first and second season, respectively.

However, many investigators studied the effect of predators and certain weather factors on the sucking insects in cotton fields. Salem *et al.*, (1993) and Khalafalla *et al.*, (1993) found that temperature had a significant positive effect on the population density of aphids and whitefly on cotton plants. El-Mezayyen and Abou-Attia (1996) reported that the population density of aphids and whitefly was affected positively by temperature and negatively by relative humidity on cotton plants. A significant correlation between the predators and each of aphids and whitefly on cotton plants was found by Mohamed (2004).

Table (6) : Simple correlation (r), partial regression (b) and explained variance (EV%) values between associated predators ,two weather factors and population fluctuations of two sucking insects on the different parts of cotton plant during 2002 and 2003 seasons.

Season	Insect	Factor	Leaf			Square			Boll		
			(r)	(b)	EV%	(r)	(b)	EV%	(r)	(b)	EV%
2002	Aphid	Temp.	0.339	2.397	31.43	0.628	35.126	40.98	0.396	0.658	28.64
		R.H.	0.531*	9.890		0.508	0.861		0.464	1.451	
		Pred.	-0.416	-3.701		-0.396	2.556		-0.530	-18.499	
	Whitefly	Temp.	0.336	16.108	35.14	0.273	4.990	29.17	-0.421	6.262	70.65
		R.H.	0.059	-14.833		0.048	-4.508		-0.745**	-4.375	
		Pred.	-0.326	-8.721		-0.393	-2.057		0.763**	18.124	
2003	Aphid	Temp.	0.156	-11.324	20.06	0.455	2.386	43.10	0.492	1.042	39.52
		R.H.	0.297	2.640		0.367	-0.667		0.621	1.177	
		Pred.	-0.365	-1.266		-0.544	-0.509		-0.264	0.078	
	Whitefly	Temp.	0.571*	11.461	45.63	0.550	14.893	60.95	0.541	8.542	72.21
		R.H.	0.646**	12.201		0.595*	-3.234		0.644*	1.285	
		Pred.	-0.511	-1.542		-0.747**	-4.926		-0.777**	-3.462	

* = significant at 5 %

** = significant at 1 %

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الملخص العربي

تواجد من القطن والذبابة البيضاء معاً على الأجزاء المختلفة لنبات القطن وعلاقتها ببعض العوامل الحيوية وغير الحيوية

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يعتبر من القطن والذبابة البيضاء من أخطر الحشرات الثاقبة الماصة التي تهاجم القطن في جمهورية مصر العربية، ولذا تم دراسة تواجد هاتين الحشريتين معاً على الأجزاء المختلفة لنبات القطن مثل الأوراق والوسواس واللوز وعلاقتها بالمفترسات المصاحبة ودرجة الحرارة والرطوبة النسبية في مزرعة محطة البحوث الزراعية بسخا - كفر الشيخ موسمي ٢٠٠٢ ، ٢٠٠٣ م.

أوضحت الدراسة أن أعلى تعداد لهاتين الحشريتين كان خلال أغسطس أو بداية سبتمبر على الأوراق والوسواس واللوز وترافق ذلك مع أقل تعداد للمفترسات. وجدت خمسة أنواع من المفترسات على الأجزاء المختلفة لنبات القطن وهي أسد المن ، الحشرة الرواعة ، العناكب الحقيقية ، ومجموعة أبو العيد ، الاسكنس ، ، وكان النوع الأول أكثر انتشاراً والنوع الأخير أقلهم . كان تعداد الحشريتين أكثر على الأوراق يليها الوسواس بينما كان أقل تعداداً على اللوز - وكان تعداد المن أكثر في الموسم الأول عن الموسم الثاني ، بينما وجد العكس بالنسبة للذبابة البيضاء والمفترسات. في أغلب الأحوال كان هناك ارتباط غير معنوي بين الحشريتين في الموسم الأول وعالي المعنوية في الموسم الثاني ، وكانت درجة الحرارة في المدى الأمثل لنشاط الحشريتين في كلا الموسمين بينما كان تأثير الرطوبة النسبية غير ثابت حيث اختلف من موسم لآخر. وكان للمفترسات تأثير أكبر على الذبابة البيضاء عن المن خصوصاً في الموسم الثاني - كان التأثير المشترك للمفترسات والعوامل الجوية واضحاً على الذبابة البيضاء خصوصاً المتواجدة على اللوز في كلا الموسمين.

والنتائج المتحصل عليها من هذه الدراسة ذات أهمية كبيرة في تطوير برامج مكافحة متكاملة لهاتين الحشريتين في حقول القطن.