

ECOLOGICAL STUDIES ON KEY PESTES INFESTING GUAVA TREES AND THEIR ASSOCIATED PREDATORS IN QALUBIA GOVERNORATE.

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ABSTRACT

The present work was carried out to study the major insect pest species and their common natural enemies during the seasons of 2003 and 2004 in Qalubia Governorate had been studied . The obtained data revealed that the occurrence of the mealy bugs (2 species, *Icerya aegyptiaca* Doug. and *I. seychelorum* West.) on guava trees covered only 6 months (January to June). Population increased gradually until reaching the maximum weekly total numbers of 608 and 625 individuals / 500 leaves during the fourth week of March 2003 and 2004 (at 18.2 C and 75 % R.H. and 21.6 C and 69 % R.H. during the two seasons , respectively. The occurrence of scale insects (4 species including *Aonidiella aurantii* Mask., *Ceroplastes floridensis* Comst., *Planococcus citri* Rosso and *Saissetia oleae* (Delivier)) covered also 6 months of the year. The scale insect *P. citri* was the most abundant insect species among the other recorded species. The cotton aphid, *Aphis gossypii* (Glover) occurred during the period extended from the 1st week of May to the 1st week of July. No insect species were found on guava trees during the period extended from July to December, 2003 and 2004. The maximum monthly total numbers of most common predators were in May. The ladybird beetles had the highest percentage of occurrence among other recorded predators (5 different species were recorded). Generally, the two predators, ladybird beetles and *Chrysoperla carnea*, could be laboratory mass reared and released for controlling the major pests attacking guava trees, with other available safe control methods that are developed in Integrated Pest Management (I.P.M.) programs, for protecting the surrounding environment.

Keywords: Guava, Mealy bugs, Scale insects, *Aphis gossypii*, Predators.

INTRODUCTION

Guava trees (*Psidium guava* L.) represent one of the most economic crops in Egypt. A great attention has been done to increase the production and to improve the quality and quantity of this crop. These trees are subjected to be attacked by several insect pest species, causing considerable damage and , consequently affecting the yield . Scale insects and mealy bugs are usually considered as the most injurious pests infesting guava trees in many countries of the world. They cause damage which appears as distortion of foliage, discoloration of flowers, galls and tumors formation, distorted blossoms and reduction in the general vigor of the trees (Hammad *et al.*, 2003)., Aphids are also infested different crops all over the world including Guava trees (Ismail *et al.*, 1991).

In many fruit orchards, predators and other natural enemies play a natural role against insect pests, attacking these fruits. Nowadays, great importance is concentrated on studying the natural role of these predators . According to Hamed and Hassanein (1991) , the survey of natural enemies of scale insects and mealy bugs will form a good basis for further researches

leading to better understanding of the role of biotic mortality factors affecting the population densities of the insect pests. It is noteworthy that Protecting the biocontrol agents from the undesirable uses of chemical insecticides became one of the first goals of biological pest control in the field (Abul Fadel et al. 2005) .

In addition, biological control depends mainly on studying the natural role of biological agents and knowing the most efficient natural enemies for future uses against insect pests.

In the present study, a survey of the most common pests, attacking guava trees and their associated natural enemies was carried out during two seasons of 2003 and 2004 in Qalubia Governorate. Such Knowledge may help in planning Integrated Pest Management (I.P.M.) strategies, against major insect pests attacking guava trees.

MATERIALS AND METHODS

The present study was carried out in a guava orchard (one feddan), located in Sariaqous district (Qalubia Governorate) during two successive seasons of 2003 and 2004. 20 Guava trees (variety Baladi), nearly 12 year-old were selected and the different agricultural practices were conducted, except insecticides uses. Sampling started in 5th January and ended in 27th December. Every week, sample of 500 leaves was collected (5 branches X 5 leaves / branch X 20 trees)). The five branches represented the four main directions and the central core of each tree. The samples were used for surveying the major insect pest species attacking guava leaves and their associated natural enemies. The biocontrol agents were directly identified and counted in the experimental orchard. Then, the sampled leaves were kept in paper bags and transferred to the laboratory for further examination. Alive nymphs and adults of mealy bugs and scale insects were counted by using a stereomicroscope. Obtained data were statistically analyzed according to procedure outlined by Snedecor and Cochran (1980). The L. S. D. values and the correlation coefficient (r) were calculated by using SAS program (SAS Institute, 1994). Moreover, the weather factors including the means of temperature and relative humidity were obtained from the Meteorological Station at A.R.C.

RESULTS AND DISCUSSION

Major pests attacking guava trees.

The survey revealed that 7 different insect species attacked guava leaves during the seasons 2003 and 2004, in Qalubia Governorate. They were; *Icerya* spp. (Homoptera: Margarodidae) (2 species of mealy bugs including *I. aegyptiaca* Dougl. and *I. seychelorum* (Westwood), scale insects (4 species including *Aonidiella aurantii* Maskell) (Homoptera: Diaspididae), *Ceroplastes floridensis* Comst., *Planococcus citri* Risso and *Saissetia oleae* (Dilivier) (Homoptera: Coccidae) and the cotton aphid, *Aphis gossypii* (Glover) (Homoptera: Aphididae). The weather conditions during the two successive seasons of 2003 and 2004 were recorded in Table (1).

Table (1): Total numbers of mealy bugs and scale insects individuals / 500 leaves attacking guava trees during the seasons of 2003 and 2004 , in Qalubia Governorate .

Date of inspection 2003, 04	Mealy bugs		Scale insects							
	2003	2004	<i>A. aurantii</i>		<i>C. floridensis</i>		<i>P. citri</i>		<i>S. oleae</i>	
			2003	2004	2003	2004	2003	2004	2003	2004
Jan. 4, 5	161	171	16	23	0	2	8	12	34	48
11, 12	271	304	31	45	7	16	104	120	102	120
18, 19	134	147	54	63	36	45	118	126	130	139
25, 26	99	113	9	15	69	74	160	174	150	169
Feb. 1, 2	143	158	16	22	111	121	186	200	160	176
8, 9	169	185	21	33	119	129	184	200	189	199
15, 16	188	201	19	23	119	133	158	168	121	134
22, 23	279	295	10	19	73	85	140	153	109	124
March 1, 1	411	431	4	8	21	37	109	120	81	89
8, 8	419	438	1	3	6	21	81	93	62	78
15, 15	509	537	2	4	4	4	53	68	32	46
22, 22	608	625	0	0	5	8	43	55	19	29
29, 29	274	293	0	0	0	0	22	33	13	20
April 5, 5	110	127	0	0	0	0	9	17	6	13
12, 12	71	85	0	0	0	0	3	6	0	0
19, 19	35	48	0	0	0	0	0	0	0	0
26, 26	16	29	0	0	0	0	0	0	0	0
May 3, 3	12	21	0	0	0	0	0	0	0	0
10, 10	4	10	0	0	0	0	0	0	0	0
17, 17	3	6	0	0	0	0	0	0	0	0
24, 24	2	4	0	0	0	0	0	0	0	0
31, 31	1	2	0	0	0	0	0	0	0	0
Jun. 7, 7	1	1	0	0	0	0	0	0	0	0
14, 14	1	0	0	0	0	0	0	0	0	0
21, 21	0	2	0	0	0	0	0	0	0	0
28, 28	0	0	0	0	0	0	0	0	0	0
total	3922	4227	183	258	570	675	1378	1545	1214	1376
Average	653.7	704.2	30.5	43	95	112.5	229.7	257.5	202.3	229.3

1- Mealy bugs occurrence.

Data in Table (1) revealed that mealy bugs started to appear on guava trees during the 1st week of January. Nymphs and adults of *Icerya* spp. appeared with moderate numbers with a weekly density of 161 and 171 individuals / 500 leaves in 2003 and 2004 seasons , respectively

Their population increased gradually until reaching the maximum weekly total numbers of 604 and 625 individuals / 500 leaves during the fourth week of March 2003 and 2004 (at 18.2 ° C & 75 % R.H. and 21.6° C and 69 % R.H.). during the two seasons , respectively . The population decreased until the first week of July. Hamed and Hassanein (1991) demonstrated that *I. seychellarum* attacked guava trees in Nile Delta. Mealy bugs are shown by Abbas and Hebbeis (1998), among the most significant plant pests. El-Serafi *et al.* (2004) showed that, *I. seychellarum* and *I. aegyptiaca* attacked guava trees and the first pest had a peak of population by the end of March on guava trees, in Mansoura district.

2- Scale insects occurrence.

Data in Table (1) showed that the scale insects surveyed were 4 insect species (*A. aurantii*, *C. floridensis*, *P. citri* and *S. oleae*). The nymphs and adults of *A. aurantii* started to appear on guava trees during the 1st week of January. Their population appeared with moderate numbers of 16 and 23 individuals / 500 leaves (at 14.8 and 64 % R.H. and 16.4° C and 58 % R.H. in 2003 and 2004 seasons , respectively). They gradually increased until reaching the maximum weekly total numbers of 54 and 63 individuals / 500 leaves during the 3rd week of January (at 13.3 ° C and 70 % R.H and 14.9° C and 72 % R.H . in 2003 and 2004 seasons , respectively). The population decreased until the 3rd week of March (at 18.2 ° C and 75 % R.H and 21.6° C and 69 % R.H. in 2003 and 2004 seasons, respectively).

The nymphs and adults of *C. floridensis* started to appear on guava trees during the 1st week of January. Their population appeared with low numbers of 0 and 2 individuals / 500 leaves (at 14.8 ° C and 64.0 % R. H and 16.4° C and 58.0 % R. H. in 2003 and 2004 seasons , respectively) with a weekly density. They gradually increased until reaching the maximum weekly total numbers of 119 and 133 individuals / 500 leaves, during the 3rd week of February (at 14.4 ° C and 55 % R.H and 16.2° C and 61 % R.H. in 2003 and 2004 seasons , respectively). The population decreased until vanishing in last week of March (at 21.7 and 23.9° C and 59.0 and 83.0.0 % R.H. in both experimental seasons, respectively). Hamed and Hassanein (1991) and El-Serafi *et al.* (2004) recorded *C. floridensis* as a common pest attacking guava trees.

The nymphs and adults of *P. citri* started to appear on guava trees during the 1st week of January. Their population appeared with low numbers with a weekly density of 10 individuals / 500 leaves (at 14.8 ° C and 64.0 % R.H 16.4° C and 58.0 % R.H.),. They gradually increased until reaching the maximum weekly total numbers of 193 individuals / 500 leaves during the 1st week of February (at 14.2° C and 66.0 % R.H.). The population decreased until the 3rd week of April (at 22.2° C and 68.0 % R.H.). Mani and Krishnamoorthy (1990) and Hussain *et al.* (1996) recorded *P. citri* as a pest of guava trees.

The nymphs and adults of *S. oleae* started to appear on guava trees during the 1st week of January. Their population appeared with moderate numbers of 189 and 199 individuals / 500 leaves during the second week of February at 15.9 ° C and 75 % R.H and 18.1° C and 81 %R.H. during the two seasons 2003 and 2004, respectively. They gradually increased until reaching the maximum weekly total numbers of 34 and 48 individuals / 500 leaves, during seasons 2003 and 2004, respectively during the 2nd week of February (at the 17.0° C and 77.0 % R.H.). The population decreased until the 1st week of Jul in the two seasons (table 1).

The percentages of the 4 different species of scale insects to each others as shown in Table (1) revealed that, *P. citri* had the highest percentages of occurrence among the other three insect pest species, followed by *S. oleae*, *C. floridensis* and *A. aurantii*, respectively.

The mean percentages of scale insects and mealy bugs to each others were showed that, the occurrence of scale insects were highest in January

then decreased gradually till April there after disappeared. On the other hand, the mealy bugs started with lower numbers than that of scale insects, but at the time progressed the occurrence was increased till then decreased gradually till the end of the experiment.

3-Aphids occurrence.

Date in table (2) showed that the winged individuals of *Aphis gossypii* started to appear on guava trees during the 1st week of March. Their population (winged and wingless individuals) appeared until reaching the maximum weekly total numbers of 11984 and 12718 individuals / 500 leaves for 2003 and 2004 , respectively, during the 1st week of May (at 21.9 ° C and 57 % R.H and 24.3° C and 79 % R.H.). The aphid population decreased until the 1st week of July (Table, 2). El-Serafi *et al.* (2004) indicated that *A. gossypii* had a peak of its population on guava trees by mid- May in the 1st season of their study and by the end of April, in the 2nd season.

Table (2): Total numbers of *A . gossypii* individuals / 500 leaves at guava trees during the two seasons 2003 and 2004 ,in Qalubia Governorate .

Date of inspection 2003, 04	2003			2004		
	Winged	Wingless	Total	Winged	wingless	Total
Jan. 4, 5	0	0	0	0	0	0
11, 12	0	0	0	0	0	0
18, 19	0	0	0	0	0	0
25, 26	0	0	0	0	0	0
Feb. 1, 2	0	0	0	0	0	0
8, 9	0	0	0	0	0	0
15, 16	0	0	0	0	0	0
22, 23	0	0	0	0	0	0
March 1, 1	2	0	2	4	0	4
8, 8	21	250	271	31	286	317
15, 15	11	1215	1226	27	1521	1548
22, 22	11	1983	1994	25	2185	2210
29, 29	36	3485	3521	50	3749	3799
April 5, 5	311	5998	6309	405	6260	6665
12, 12	501	8405	8906	637	8827	9464
19, 19	425	4298	4723	521	4738	5259
26, 26	319	5256	5575	429	5886	6315
May 3, 3	886	11098	11984	954	11764	12718
10, 10	91	6884	6975	125	7328	7453
17, 17	61	3345	3406	97	3727	3824
24, 24	2	659	661	6	723	729
31, 31	0	301	301	0	333	333
Jun. 7, 7	0	164	164	0	196	196
14, 14	0	33	33	0	59	59
21, 21	0	6	6	0	14	14
28, 28	0	0	0	0	0	0
total	2677	53380	56057	3311	57596	60907
Average	102.961	2053.077	2156.038	127.346	2215.231	2342.577

Generally, it could be noticed that, *A. gossypii* were recorded having the highest percentages among the other two insect pests (mealy bugs and scale insects) during the period of their existence (January- June, 2003- 2004).

Common predators.

Data summarized in Table (3) represented the field observations of the most common predators recorded associated with the major insect pests on guava trees. Several predaceous species belong to 3 orders and 3 families were recorded during the period extended from January to July, 2003 and 2004. True spiders (unidentified species) were also found during this study.

Table(3) :Percentages of predatory species to each other , on guava trees the during the seasons of 2003 and 2004 , in Qalubia Governorate .

Date of inspection 2003, 04	Insect Predators										Total No. of predators
	<i>C. carnea</i>		<i>Coccinella sp.</i>		<i>Scymnus syriacus</i>		<i>Syrphus sp.</i>		Spider mites		
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004	
Jan. 4, 5	9	11	3	5	0	0	0	0	1	3	16
11, 12	15	21	0	2	0	0	0	0	0	0	19
18, 19	26	34	1	3	5	9	0	0	2	2	41
25, 26	8	14	1	1	1	3	0	0	1	3	16
Feb. 1, 2	5	9	6	8	1	1	2	1	1	1	17
8, 9	8	10	10	14	0	2	4	3	2	0	26
15, 16	8	12	7	9	0	0	0	0	1	3	20
22, 23	7	9	7	11	3	5	0	0	0	2	22
March 1, 1	4	4	2	6	2	5	0	0	0	0	10
8, 8	0	0	11	17	3	3	0	0	0	0	18
15, 15	0	2	22	30	1	0	0	0	0	0	29
22, 22	1	3	39	49	0	0	0	1	0	0	47
29, 29	6	10	46	60	2	2	2	4	1	1	67
April 5, 5	12	18	78	94	0	2	3	7	2	0	108
12, 12	20	26	94	110	1	3	2	4	0	2	131
19, 19	59	67	118	136	2	6	2	4	1	3	199
26, 26	101	116	141	165	5	7	0	0	2	6	271
May 3, 3	129	141	201	227	8	14	0	1	1	3	363
10, 10	145	161	415	437	10	16	0	0	3	5	596
17, 17	121	137	146	162	11	17	0	1	5	7	304
24, 24	180	204	31	49	12	20	0	0	0	1	249
31, 31	121	139	18	40	12	26	1	4	1	3	182
Jun. 7, 7	33	45	6	14	10	24	2	4	2	4	72
14, 14	9	13	0	0	9	33	3	5	0	2	37
21, 21	1	3	0	0	4	0	0	0	0	0	4
28, 28	0	0	0	0	0	0	0	0	0	0	0
Grand total	1028	1209	1403	1649	102	198	21	35	26	51	2864
Average	39.5	46.5	53.9	63.4	3.9	7.6	0.8	1.3	1	1.9	110.2

The predators were green lace wing, *Chrysoperla carnea* (Stephens) (Neuroptera: Chrysopidae); ladybird beetles, *Chilocorus sp.*, *Rodalia cardinalis* Mulsant, *Coccinella undecimpunctata* (Linnaeus), *Cydonia vicina*

isis Mulsant, *C. v. nilotica* Mulsant and *Scymnus syriacus* Marseul (Coleoptera: Coccinellidae) and *Syrphus* sp. (Diptera: Syrphidae). Numbers of the predators increased gradually to reach their peak during the 2nd week of May (596 individuals). Their numbers declined and no predators were recorded from July until the end of the season. However, the predators of *Coccinella* sp (ladybird beetles) were the highest in their numbers on guava trees, where their total numbers recorded 1403 and 1649 individuals for 2003 and 2004 seasons, respectively, which considered the highest among all other predators). The predators were detected during the period from the 1st week of January until the 1st week of June.

The predator, *C. carnea* appeared from the 1st week of January and continued up to the 1st week of July. Their total numbers were 1028 and 1209 individuals for 2003 and 2004 seasons, respectively. The highest abundance occurred during the last week of May (180 (2003), 204 (2004) individuals). Chrysopids are useful predators attacking aphids and mealy bugs. In Egypt *C. carnea* was recorded as a predator on aphids, mealy bugs and scale insects (Hafez *et al.*, 1978 and Megahed *et al.*, 1982). While, Mani and Krishnamoorthy (1990) found that , the presence of *C. lacciperda* (Kimmis) on guava trees reduced the populations of *P. citri* with the role of other common predators.

Also from Table (3), it could be mentioned that, the occurrence of the predator *S. syriacus* was during the period extended from the 3rd week of January to the 2nd week of February, from the last week of February to the 3rd week of March and from the last week of March until the 1st week of July. The maximum total number of this predator was recorded during the last week of May (12 (2003), 26 (2004) individuals).

The predator *Syrphus* sp. occurred during the periods; 1st and 2nd weeks of February, from the last week of March until the 3rd week of April, 1st week of May, 3rd week of May and from the last week of May until the 2nd week of June. The maximum total numbers was during the 1st week of April (3 and 7 individuals for the two seasons, respectively).

True spiders were recorded on guava trees during the periods 1st week of January, from the 3rd week of January to the last week of February and from the last week of March until the 2nd week of June. The maximum total number of these predators was during the 3rd week of May (5 (2003), 7 (2004) individuals).

Moreover, from Tables (1, 2 and 3), it could be mentioned that occurrence of the previous predators synchronized with that of the major insect species recorded during this study. El-Serafi *et al.* (2004) found that the peaks of predators recorded on guava trees in Mansoura district were always following the presence of the insect pest species; i.e., the predators play an important natural role against insect pests attacking guava trees. Moreover, Hamed and Hassaein (1991) reported *R. cardinalis* as a common predator on *Icerya* spp., where their numbers increased during spring and summer. Also, they surveyed *Chrysopa* spp. larvae as very common predators and polyphagous in guava orchards. Abbas and Hebbis (1998) reported *Rodalia* sp. associated with the Egyptian mealy bug, *I. aegyptiaca* attacking guava trees. Ladybird beetles, *Chrysoperla carnea*, syrphids and

Scymnus spp. were found to prey on aphid on wheat plants by many authors (Hafez, 1994 and El-Heneidy and Abdel-Samad, 2001). Many predators were shown to attack scale insects, mealy bugs and *A. gossypii* on guava trees in Mansoura district (Dakahlia Governorate) (El-Serafi *et al.*, 2004). They surveyed the following predators: *C. bispustulatus* L., *R. cardinalis*, *S. syriacus*, *C. undecimpunctata*, *C. vicina isis*, *C. carnea* and *Metasyrphus corollae* Fabr

No pests or predators recorded during the period from July to December. This may be due to the migration of the pest species and predators from guava trees to attack other fruit orchards or other crops.

Data presented in Table (4) revealed that the ratio between the major insect pests attacking guava trees and their common predators began with the ratio of 23.2: 1 (2003) and 17.3 (2004). This ratio reached the maximum (66.1: 1 (2003) and 56.3 (2004)) during March. The ratio decreased to reach its lowest level at June (3.2 : 1 (2003) and 1.8 :1 (2004)). El-Adl and Ghanim (1988) found that when the predator : prey ratio was under 1 : 40, the predators play an effective role in controlling the injurious insects in different field crops and could keep their abundance in low level, and when the ratio was higher than 1 : 40, the role of the predator is considered not effective. In addition, Verghese and Tandon (1987) stated that there was a positive association between *A. gossypii* and the coccinellid predator *Menochilus sexmaculatus* in an unsprayed guava ecosystem in India.

Total (4): Ratio between major insect pests and their common predators on guava trees during the seasons of 2003- 2004 in Qalubia Governorate.

Months	2003			2004		
	Total no. of pests	Total no. of Predators	Ratio between pest : predators	Total no. of pests	Total no. of Predators	Ratio between pest : predators
January	1693	73	23.2 : 1	1918	111	17.3 : 1
February	2514	70	35.9 : 1	2758	100	27.6 : 1
March	9791	148	66.1 : 1	10919	194	56.3 : 1
April	12234	642	19.1 : 1	13043	776	16.8 : 1
May	23349	1573	14.8 : 1	25100	1815	13.8 : 1
June	250	79	3.2 : 1	272	147	1.8 : 1
Total	49831	2585	19.3 : 1	54010	3143	17.2 : 1

The statistical analysis (variance ratio and correlation) recorded between major insect pests (mealy bugs, scale insects and *A. gossypii*) and common predators with each others and with mean of temperature and relative humidity were shown in Tables (5 and 6). Liu and Chang (1984) stated that the population of both nymphs and adults of citrus mealy bug, *P. citri* on guava trees were large in the cool dry months from November to April and small in the warm wet months from November to September. There was a negative relationship between mealy bug populations and temperature.

It could be concluded from the obtained results that, the predators play an active natural role in guava orchards against major insect pests attacking

these trees. Accordingly, this role must be encouraged and developed continuously. Also, *Coccinella sp* (ladybird beetles) and *C. carnea* could be mass reared and released against the previous pests during the critical periods of pest infestation with other safe control methods, in the frame of Integrated Pest Management (I.P.M.) strategies. Chrysopids are amongst the most abundant predators associated aphids, and thus they could play a noticeable role in reducing aphid populations (Ibrahim *et al.*, 1991).

Table (5): A comparison between means of mealy bugs, scale insects and *A. gossypii* and predators, for the six months of their occurrence.

Pest species (together)	Mealy bugs	Scale insects (total)				<i>A. gossypii</i>	L.S.D. _{0.05}
		<i>S. oleae</i>	<i>P. citri</i>	<i>c. floridensis</i>	<i>A. aurantii</i>		
Scale insects	679.83 b	599.3 b				9747.0 a	218.83
Predators	<i>C. carnea</i>	215.17 b	243.67 a	103.67 c	36.67 d	L. S. D. _{0.05} 4.15	16.94
		<i>Coccinella sp.</i>	<i>S. syriacus</i>	<i>Syrphus sp.</i>	True spiders		
	186.3 b	254.3 a	25.0 c	5.3 d	6.5 d		

* Means of the same letters are not significantly different.

Table (6): Correlation coefficient (r) between weather factors (means of temperature and relative humidity) and total numbers of mealy bugs, scale insects, *A. gossypii* and predators.

Tested factors	Tested factors x means of temperature		Tested factors x means of relative humidity
	r- value	Equation	
Mealy bugs	0.5442	Y= -80.985x +2349.5	0.8697**
			Y= 162.45x -9549
Scale insects	0.8294**	Y= -194.24x +5283.6	0.8987
			Y= 264.16x -15354
<i>A. gossypii</i>	0.3830	Y= 837.11x - 7511.3	0.3974
			Y= -1089.8x +78370
Predators	0.4524	Y= 50.892x - 571.88	0.3796
			Y= -53.587x +3851.6

Note: the correlation existed in this Table, represented the period between January-June,2003 - 2004 only.

** Highly significant at 5 %.

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دراسات بيئية على الآفات الرئيسية التي تصيب أشجار الجوافة و المفترسات المصاحبة لها في محافظة القليوبية.
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أجري هذا العمل بغرض حصر الآفات الرئيسية التي تهاجم أشجار الجوافة خلال موسمي ٢٠٠٣ و ٢٠٠٤ في محافظة القليوبية. كذلك اشتمل الحصر المفترسات الهامة المصاحبة لتلك الآفات المسجلة.

أظهرت النتائج أن تواجد نوعان من البق الدقيقي (*I. seychelorum* , *Icerya aegyptiaca*) على أشجار الجوافة لمدة ستة أشهر من العام (و ذلك في الفترة الممتدة من يناير و حتى يونيو). و كان أعلى تعداد للبق الدقيقي خلال فترة الدراسة ٣٩٢٢ و ٤٢٢٧ فردا. كما اظهرت النتائج تواجد الحشرات القشرية (٤ أنواع تشمل *Saissetia oleae* , *Planococcus citri* , *Ceroplastes floridensis* , *Aonidiella aurantii*) أيضا لنفس الفترة من السنة بمتوسط تعداد كلي ٣٣٣٧ و ٣٨٥٤ فردا .

و قد سجل أعلى تعداد للحشرات القشرية في حالة الحشرة *P. Citri* بالمقارنة بتعداد باقي أنواع الحشرات القشرية الأخرى المسجلة. و تواجد من القطن *Aphis gossypii* خلال الفترة الممتدة من الأسبوع الأول من مارس و حتى الأسبوع الأول من يوليو. و لم يسجل تواجد للآفات على أشجار الجوافة خلال الفترة من يوليو و حتى أغسطس خلال موسمي ٢٠٠٣ و ٢٠٠٤.

بلغ أعلى تعداد للمفترسات الهامة الأكثر شيوعا خلال شهر مايو. و تواجدت المفترسات من عائلة خنافس أبو العيد بنسبة أعلى من باقي الأنواع الأخرى المسجلة (٥ أنواع مختلفة) . و عموما، فإن مفترسات أبو العيد و أسد المن يمكن تربيتها معمليا و الإطلاق الحقل لها لمكافحة الآفات الرئيسية على أشجار الجوافة ، جنبا إلى جنب مع باقي الوسائل الأخرى المتاحة و الأمانة للمكافحة في إطار منظومة برامج مكافحة المتكاملة للآفات، حفاظا على البيئة المحيطة من التلوث.