

## Some Ecological Notes on the Soft Brown Scale, *Coccus hesperidum* Linn Infesting Five Ornamental Plants in Alexandria Gardens.

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### ABSTRACT

During this study, the soft brown scale, *Coccus hesperidum* is recorded on many ornamental trees and shrubs in the inspected gardens. These plants are *Hibiscus mutabilis*, *Acalypha wilkensisiana*, *Nerium oleander*, *Ficus benghalensis* and *Lantana camara*. It was found confused with *Eucalymtus tessellatus* on *H. mutabilis*. The highest percentage of infestation of *C. hesperidum* on *H. mutabilis* was in Montazaha garden during August ( $95.0 \pm 6.3$  %) while the lowest percentage of infestation was recorded in Shallalat garden during January ( $7.5 \pm 0.7$  %). In Montazaha garden the calculated rate of infestation and total individuals per tree of the soft brown scale were higher than the other inspected gardens. The higher rates of adult females occurred on June, July, September and February. The parasitized individuals with eulophid species *Metaphycus flavus* with higher percentage 18.7 % on June 15.2 % on July, 8.3 % on September and October at Antoniadés. In Montazaha garden, the brown soft scale, concentrated on leaves in high numbers during July and autumn months vice versa during spring months and early summer the insect concentrated on branches. It has four overlapping generations per annum on *H. mutabilis*. On *L. camara* the infestation rate was relatively low and pre-adult individuals were not observed. The data showed that the biotic factors, daily mean temperature, relative humidity, wind speed and daylight were not the main factors which effect the activity of the brown soft scale.

### INTRODUCTION

Family Coccidae represents an economically important group of insects. Many species attack agricultural, ornamental and greenhouse plantings throughout the world. Soft scales remove plant sap by their feeding, and excrete a large amount of honeydew, which is a liquid excretion rich in sugars and nitrogenous compounds. Honeydew adheres to plant surfaces and serves as a medium for the growth of sooty mold fungi which are dirty or sooty in appearance, not only inhibit photosynthesis by the plant, but also greatly reduces the aesthetic qualities of the plant (Hamon and Williams, 1984).

The soft brown scale, *Coccus hesperidum* Linn. is one of the economic insect pest of Coccidae. It listed as a major pest of Citrus in Peru and Cyprus and economically important in China, Brazil, Israel, Italy,

Mexico, Republic of South Africa, Rhodesia, and the United States (Talhouk, 1975; Zalomi and Morse, 1991).

In Egypt, it recorded on citrus, sycamore fig trees, guava trees and ornamental plants (Bodenheimer, 1951a; Moursi, 1974; Swailem and Awadallah, 1973; Habib *et al.*, 1974 and Abdel Razak, 2000).

The present investigation was carried out in the hope of throwing light on the ecological aspects of the studied insect pest on five ornamental plants, which are a great importance from the viewpoint of economics.

## MATERIALS AND METHODS

The study was carried out in three of Alexandria public gardens located in East and West of Alexandria Governorate (Sallalat, Antoniades and Montazaha), from May, 1998 till April, 1999. The soft brown scale in this study was *Hibiscus mutabilis*, *Acalypha wilkesiana*, *Nerium oleander*, *Ficus benghalensis* and *Lantana camara*. The chosen plant species for studying, the dynamical changes in the estimated densities of this insect pest throughout the period of investigation were *H. mutabilis* and *L. camara*.

The shrubs were not exposed to any chemical material except in Montazaha garden where they were applied with the precedent year as recommended by Ministry of Agriculture programme.

From each inspected plant species, five trees or shrubs were chosen to survey and study the population density of *C. hesperidum* in each garden. Five small branches (15 cm. Long) with ten leaves were picked out at random, every at two weeks intervals from all directions of each tree, leaves and branches were put in cloth bags and transported to the laboratory for counting and classifying the existing individuals of detected species using a stereoscopic binocular microscope. The upper and lower surfaces of the leaves were examined and the pre-adult, and parasitized stages of the inspected insect were counted and recorded.

The rate of increase in population densities (half – monthly variations) was calculated by dividing the mean number found in a sampling data over that found in preceding one (Bodenheimer, 1951b). The obtained results were statistically analyzed according to Snedecor (1970).

The chosen weather factors in this study to determine their effects on the population densities of soft brown scale: daily mean temperature, mean relative humidity, wind speed and day light. Daily records of these weather factors in Alexandria Governorate were obtained from the general Authority for Meteorology at Kobri El-Kobba, Cairo

Simple correlation (r) and partial regression (b) values were calculated to obtain information about the relationship between the mean number of individuals / tree and the mean records of four tested weather factors.

## RESULTS AND DISCUSSION

During this study, the soft brown scale, *C. hesperidum* L., was recorded on many ornamental trees and shrubs in the inspected gardens. From these plants were *H. mutabilis*, *A. wilkesiana*, *N. oleander*, *F. benghalensis* and *L. camara*. The obtained data proved the following finding during the study period : -

### 1- On *H.mutabilis* in three gardens : -

It is important to mention here that the soft brown scale, *C. hesperidum* had been found confused with the other coccid species, namely *Eucalymnatus tessellatus* (Sing) on the infested shrubs of *Hibiscus mutabilis*. This finding agrees with Hamon and Williams (1984) who mentioned that young females of *E.tessellatus* could be confused with brown soft scale.

Results in Table (1) and Figs (1, 2) show the monthly variations in infestation rate (%) and the total number of individuals per thirty leaves of *H.mutabilis* in the three selected gardens during 1998 – 1999. The obtained data elucidate that the highest percentage of infestation was recorded in Montazah garden during August ( $95.0 \pm 6.3$  %) and September ( $90.3 \pm 4.7$  %), while the lowest percentage in Shallalat garden during January ( $7.5 \pm 0.7$  %). Similarly in Antoniades garden the highest rate of infestation was noticed during the same period as Montazaha but in low percentage comprised  $50.9 \pm 4.7$  % and  $56.1 \pm 4.7$  % in August and September, respectively. The minimum percentage of infestation  $10.0 \pm 0.4$  % occurred during October in Antoniades garden (Table 1). In Shallalat garden, the infestation rate in general was low, the highest infestation incidence was recorded during March ( $48.2 \pm 0.8$  %) ; the lowest ones was  $8.1 \pm 0.7$ ,  $9.2 \pm 0.8$ ,  $8.6 \pm 0.5$  and  $7.5 \pm 0.7$  %, on May, August, December and January, respectively (Table 1 – fig. 2).

Considering the fluctuating changes of *C.hesperidium* population in the three selected gardens on *H.mutabilis*, the include data in Table (1) and fig. (2) show the occurrence of higher rate of the total inspected individuals of the soft brown scale during August and September ( $95.0 \pm 6.3$  and  $90.3 \pm 4.7\%$ ) in Montazaha and ( $50.0 \pm 4.7$  and  $56.1 \pm 4.7$ ) in Antoniades gardens. That higher rate of infestation was observed on July ( $34.4 \pm 2.5$  %) and March ( $65.8 \pm 4.7$ ) in Shallalat garden while these rates were more or less extent decreased during the other months of inspection up to  $10.0 \pm$

0.4% in Antoniades,  $7.5 \pm 0.7\%$  in Shallalat and  $27.2 \pm 1.5$  in Montazaha garden during October, January and February, in respect. Generally in Montazaha garden, the calculated rate of infestation and total individuals per tree of the soft brown scale *C.hesperidum* on *H.mutabilis* were higher than the both other inspected gardens.

The illustrated data in table (2) and Fig. (3 and 4) show that the higher rates of infestation with per-adult *C.hesperidum* occurred in May, December and March (100.0, 100.0 and 97.1%, respectively) in Antoniades garden. The higher rates of adult females infestation in the same garden occurred on the 2<sup>nd</sup> half of June, 16.7% and 13.2% on the 2<sup>nd</sup> half of January and September in respect. The infestation with adults was completely coincided during October and December. (Table 2 and Fig 4)

On the other hand, the monthly variations (v) in the population density occurred in August and March were 11 and 5.19, respectively (Table, 2).

The performed field observations on the soft brown scale revealed that it is usually parasitized with eulophid parasitoid, *Metaphycus flavus* (Howard). The calculated percentage of parasitized nymphs of *C.hesperidum* reached the maximum during the 1<sup>st</sup> and 2<sup>nd</sup> half of June (18.7 and 7.2 %), July (15.2 and 6.3 %), the 2<sup>nd</sup> half of September (8.3 %) and 1<sup>st</sup> half of October (8.3 %). During the winter months and early spring the parasitoid disappeared, this is may be due to the unfavorable meteorological conditions during these months (Table 2 and Figs 3 and 4).

The included results in Table (2) also show that the soft brown scale concentrated on leaves during June 21<sup>st</sup>, July 1<sup>st</sup>, October and December 21<sup>st</sup>, February, 1<sup>st</sup>, March 1<sup>st</sup> up to April (88.5, 81.1, 100, 100, 85.6, 89.1 and 100 % of the total content ; respectively). While it was in high ratio on branches during May (86.8 and 78.7), August, (83.2 and 91.4) September (77.0 and 65.6) and November 21<sup>st</sup> (64.9 %).

In Montazaha garden where the mean infestation rate was high and three higher rates of pre-adult were recorded in May, August and November (76.2, 73.5 and 99.5 %) in average respectively. The higher rates of adult female infestation were detected in July, March and April (56.29 % 27.9 and 27.7 in average, respectively). (Table 3 and Figs. 3 and 4).

Results in the previous table also declare that in Montazaha garden the brown soft scale concentrated on leaves in high numbers during July and Autumn months (September, October and November) and represented 72.2 %, 73.5, 87.3 and 65 % of total counts, respectively. Vise versa, during spring months (March, April and May) and early summer (June), the

insect concentrated on branches and represented 72.2, 88.6, 58.2 and 68.4 % in average, respectively (Table 3).

The parasitized individuals with the parasitoid *Metaphycus flavus* (Howard) were observed during summer months (June, July and August), early autumn months (September and October), February and late spring months (April and May) in considerable rates (Table 3). The highest ratio was recorded during the first half of September (11% of total count).

The number of generations of *C.hesperidum* can be nearly detected from the calculated percentages of pre-adults. From Table (3), it can be observed four overlapping generations per annum for *C.hesperidum* on *H.mutabilis* in Alexandria Governorate, particularly throughout May, August, December and March, respectively.

This finding is agree with those obtained by Talhouk (1969) who reported that the brown soft scale had several generations per year under Lebanon climatic and Zalomi and Morse (1991) indicated that it had three to five overlapping generations per year.

## **2- On Lantana camara at Montazaha garden :**

The infestation rate of *C. hesperidum* was relatively low compared with that on *H.mutabilis* (Fig. 2). Data in Table (4) revealed the incidence of higher rates infestation during May (9.4 %) and November (11.5 %). Considering the total counted individuals per three results indicated that the highest counted total numbers of the brown soft scale were in September followed by August and December (Table 4 and Fig. 5).

It is worth to mention that, all the detected individuals of *C.hesperidum* on *L.camara* were pre-adult females. The adult females were not observed on this host all over the period of inspection. It means that *L.camara* is not preferable host plant to *C.hesperidum* as *H.mutabilis* and the noticed infestation of the insect on *L.camara* occurred temporally from the neighbouring Hibiscus shrubs. (Fig. 5)

The average of annual fluctuation of the total number of pre-adults reached 5-2 the monthly variation in the population of pre adults reached 1.44, 1.32, 1.77 and 1.12 during July, August, November and April, respectively. (Table 5).

Concerning the effect of a biotic factor i-e., the weather factors on *C.hesperidum*, the simple correlation of the effect of daily mean temperature, relative humidity, wind speed and day light, indicated positive and insignificant weak relationship between the daily mean temperature and population density of *C.hesperidum* during the elapsing period from May, 1998 till April, 1999. (Table 5 and Fig. 5)

This relation with relative humidity was very weak negative and insignificant; weak positive and insignificant with wind speed and daylight.

(That means that these factors are not the main factors, which affect the activity of the brown soft scale, *C. hesperidum* population in this garden.

In general, the data agree with those obtained by Talhouk, (1969) and Zalomi and Morse, (1991) who mentioned that the population of *C. hesperidum* are usually highest from mid-summer to early fall

**Table (1) : Monthly variations in infestation rate (%), and total number/ tree of *Coccus hesperidum* on *Hibiscus mutabilis* in three public gardens in Alexandria district (May 1998 - April 1999).**

Date of inspection	Antoniades garden		Shalalat garden		Montaza garden	
	Total No. /tree	Infestation (%)	Total No. /tree	Infestation (%)	Total No. /tree	Infestation (%)
May 1998	33.5 ±1.20	39.7 ±2.70	0.90 ±0.10	8.10 ±0.70	16.7 ±3.10	47.8 ±4.70
June	5.30 ±0.50	25.0 ±4.10	9.20 ±3.70	7.1 ±8.20	34.8 ±7.30	63.1 ±5.70
July	4.00 ±1.70	23.9 ±8.20	9.70 ±1.20	34.4 ±2.50	40.3 ±4.50	69.2 ±4.10
August	26.5 ±0.80	50.9 ±4.70	2.50 ±0.20	9.20 ±0.80	76.8 ±6.10	95.0 ±6.30
September	9.40 ±0.80	56.1 ±4.70	3.20 ±0.80	21.3 ±0.80	51.7 ±6.30	90.3 ±4.70
October	2.40 ±0.50	10.0 ±0.40	4.20 ±0.80	26.7 ±4.70	34.7 ±1.60	78.9 ±4.70
November	4.50 ±0.80	37.8 ±5.10	2.40 ±0.50	15.3 ±4.70	27.7 ±1.70	63.6 ±8.20
December	4.20 ±0.80	19.0 ±0.80	1.90 ±0.50	8.60 ±0.50	27.0 ±4.90	58.6 ±2.80
January, 99	3.00 ±0.80	21.4 ±4.70	2.50 ±0.50	7.50 ±0.70	9.90 ±0.80	43.9 ±1.70
February	4.50 ±1.60	28.3 ±4.70	11.2 ±2.10	33.9 ±3.30	3.40 ±0.50	27.2 ±1.50
March	17.7 ±0.50	27.8 ±5.70	48.2 ±0.80	65.8 ±4.70	17.9 ±1.40	50.8 ±5.70
April, 1999	3.70 ±0.50	20.0 ±4.70	30.9 ±1.90	33.9 ±4.70	49.2 ±4.90	64.2 ±1.80

**Table (2) : Fortnightly variations in total individuals, population age structure (%) and quotient of increase of *Coccus hesperidum* on *Hibiscus* leaves and branches at Antoniades garden in Alexandria district (May 1998 - April 1999).**

Date of inspection	Infestation (%)	Total individual on		Population age structure %			Q.I.
		Leaves	Branches	Immature	adults	Parasite	
May	1 <sup>st</sup>	28.0±2.30	13.2	86.8	100.0	0.00	0.00
	21 <sup>st</sup>	39.0±3.10	21.3	78.7	92.6	5.00	1.39
June	1 <sup>st</sup>	8.00±1.90	41.3	58.7	72.3	9.00	18.7
	21 <sup>st</sup>	2.60±0.50	88.5	11.5	42.8	50.0	7.20
July	1 <sup>st</sup>	5.30±0.80	81.1	18.9	72.3	12.5	15.2
	21 <sup>st</sup>	2.70±0.80	63.0	37.0	31.2	62.5	6.30
August	1 <sup>st</sup>	29.7±3.30	16.8	83.2	88.1	11.9	0.00
	21 <sup>st</sup>	23.3±1.30	8.60	91.4	98.1	1.20	0.70
September	1 <sup>st</sup>	10.0±0.50	23.0	77.0	95.5	4.50	0.00
	21 <sup>st</sup>	8.70±0.80	34.5	65.5	78.5	13.2	8.30
October	1 <sup>st</sup>	3.00±0.80	100.0	0.00	91.7	0.00	8.30
	21 <sup>st</sup>	1.70±0.50	100.0	0.00	100	0.00	0.00
November	1 <sup>st</sup>	3.30±0.20	60.6	39.4	100.0	0.00	0.00
	21 <sup>st</sup>	5.70±1.60	35.1	64.9	92.9	4.70	2.40
December	1 <sup>st</sup>	6.30±1.60	68.3	31.7	100.0	0.00	0.00
	21 <sup>st</sup>	2.00±0.80	100.0	0.00	100.0	0.00	0.00
January	1 <sup>st</sup>	2.00±0.50	85.0	15.0	100.0	0.00	0.00
	21 <sup>st</sup>	4.00±0.80	50.0	50.0	83.3	16.7	0.00
February	1 <sup>st</sup>	2.70±0.50	100.0	0.00	100.0	0.00	0.00
	21 <sup>st</sup>	6.30±0.60	52.4	47.6	71.9	28.9	0.00
March	1 <sup>st</sup>	32.7±3.10	85.8	14.4	94.7	5.80	0.00
	21 <sup>st</sup>	2.70±0.50	74.1	25.9	100.0	0.00	0.00
April	1 <sup>st</sup>	6.40±0.50	89.1	10.9	75.6	25.0	0.00
	21 <sup>st</sup>	3.00±0.50	90.0	10.0	100	0.00	0.00

Table (3) Fortnightly variations in total individuals, population age structure and quotient of increase of *Coccus hesperidum* infesting *Hibiscus* leaves and branches at Montazaha garden in Alexandria district (1998 - 1999).

Date of inspection	Infestation (%)	% of total		Population age structure %			Q.I	
		Leaves	Branches	Immature	adults	Parasite		
May	1 <sup>st</sup>	46.4±4.90	42.5	57.5	73.5	21.5	4.90	
	15 <sup>th</sup>	9.70±1.60	41.2	58.8	78.9	21.1	0.00	0.21
June	1 <sup>st</sup>	23.6±3.10	30.9	69.1	66.4	28.2	5.40	2.43
	15 <sup>th</sup>	46.3±7.10	32.4	67.6	79.6	18.4	2.00	1.96
July	1 <sup>st</sup>	23.4±7.30	58.5	41.5	62.5	37.5	0.00	0.51
	15 <sup>th</sup>	26.0±4.50	85.8	14.2	17.1	75.0	7.90	1.11
August	1 <sup>st</sup>	54.6±2.40	61.0	39.0	71.6	18.3	10.1	2.10
	15 <sup>th</sup>	91.0±3.70	57.9	42.1	95.4	0.00	4.60	1.67
September	1 <sup>st</sup>	62.7±6.10	73.4	26.6	79.4	9.60	11.0	0.69
	15 <sup>th</sup>	49.3±2.40	73.6	26.4	76.5	14.0	9.50	0.79
October	1 <sup>st</sup>	54.0±1.70	88.3	11.7	83.8	9.50	6.70	1.10
	15 <sup>th</sup>	46.3±4.80	86.4	13.6	86.9	8.00	5.10	0.86
November	1 <sup>st</sup>	22.7±1.60	73.6	26.4	100.0	0.00	0.00	0.49
	15 <sup>th</sup>	39.0±2.90	56.4	43.6	99.0	1.00	0.00	1.72
December	1 <sup>st</sup>	16.3±1.70	49.1	50.9	98.1	1.90	0.00	0.42
	15 <sup>th</sup>	23.0±4.90	53.5	46.5	94.2	5.80	0.00	1.41
January	1 <sup>st</sup>	31.0±3.50	57.1	42.9	79.5	20.5	0.00	1.35
	15 <sup>th</sup>	13.0±2.90	48.5	51.5	92.0	8.00	0.00	0.42
February	1 <sup>st</sup>	6.70±0.80	40.3	59.7	90.3	9.70	0.0	0.52
	15 <sup>th</sup>	2.60±0.50	50.0	50.0	41.6	50.0	8.4	0.39
March	1 <sup>st</sup>	4.30±0.50	30.2	69.8	77.5	22.5	0.0	1.65
	15 <sup>th</sup>	5.60±0.50	5.40	94.6	56.8	43.2	0.0	1.30
April	1 <sup>st</sup>	30.3±4.50	13.2	86.8	62.7	31.7	5.6	5.41
	15 <sup>th</sup>	52.0±6.70	9.60	90.4	69.7	23.6	6.7	1.72

Table (4) Monthly variations in infestation rate (%) and total population and quotient of increase of *Coccus hesperidum* on *Lantana camara* leaves at Montazaha garden (May 1998 - April 1999).

	Infestation (%)	Total no./tree	Q.I.
May, 98	9.40 ± 0.5	15.0 ± 4.7	
June	7.30 ± 0.9	46.7 ± 9.1	0.78
July	10.5 ± 0.5	48.4 ± 4.9	1.44
August	13.9 ± 2.5	55.0 ± 8.2	1.32
September	12.9 ± 2.1	60.0 ± 8.2	0.93
October	6.50 ± 1.7	36.7 ± 8.2	0.50
November	11.5 ± 2.9	46.7 ± 2.5	1.77
December	9.70 ± 2.9	50.0 ± 2.5	0.84
January	7.50 ± 1.6	46.7 ± 2.5	0.77
February	6.00 ± 1.6	40.0 ± 4.7	0.80
March	1.70 ± 0.5	11.7 ± 4.7	0.28
April	1.90 ± 0.5	16.7 ± 4.7	1.12

Table (5) The calculated simple correlation ( $r$ ) and partial regression ( $b$ ) values with their significance of four a biotic factors in the measured population density of *C. hesperidum* on *Hibiscus mutabilis* in Alexandria Governorate (1998 - 1999).

Sources of variance	Daily mean temperature (°C)	R.H. (%)	Wind speed (m/sec.)	Day light (hrs.)
Simple correlation ( $r$ )	0.301	-0.02	0.41	0.45
Partial regression ( $b$ )	0.610	-0.05	3.42	3.15
Degree of freedom	10.00	10.0	10.0	10.0
t. value	1.000	0.06	1.42	1.60

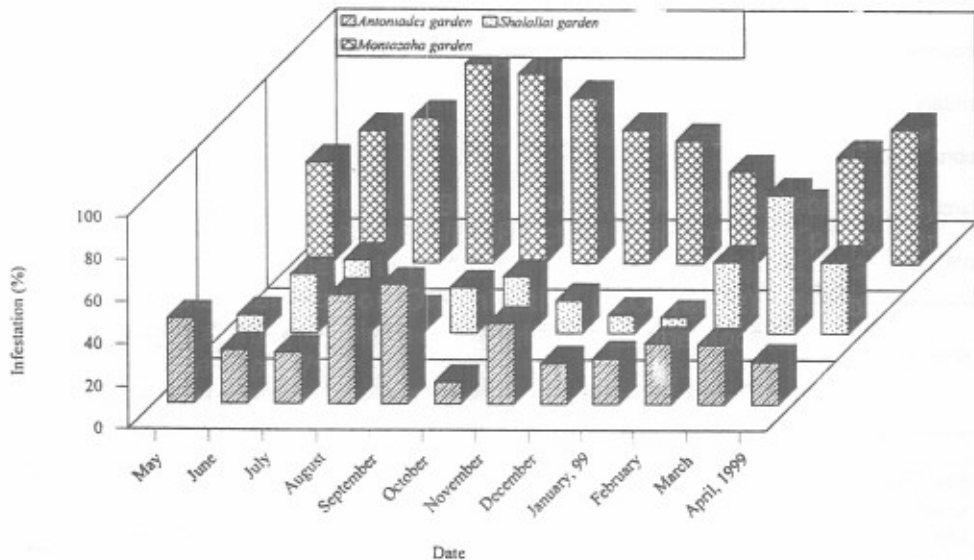


Fig. (1) : Effect of host plants on Monthly variations in infestation rate (%), of *Coccus hesperidum* on *Hibiscus mutabilis* in three gardens in Alexandria district (May, 98 - April, 1999).



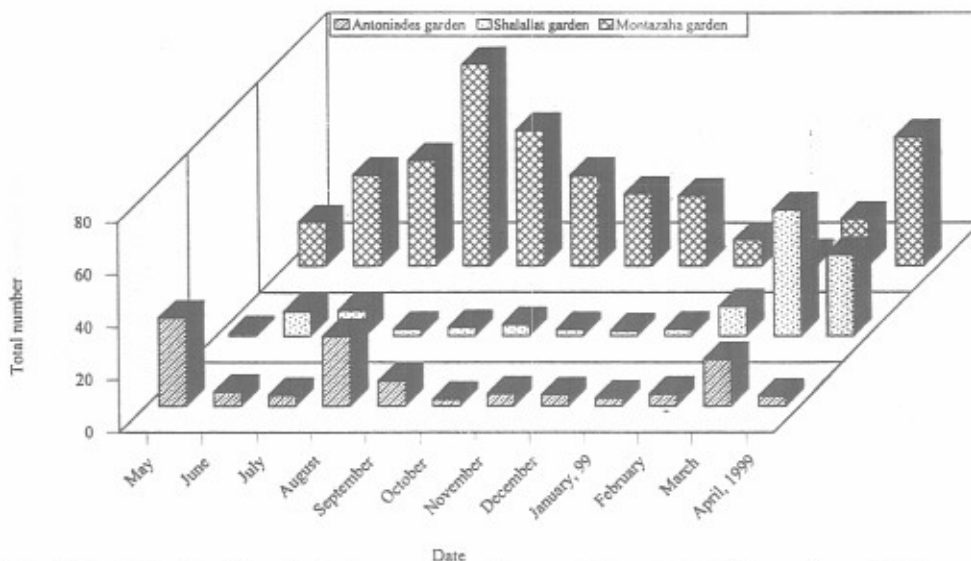


Fig. (2) : Effect of host plants on Monthly variations in total number of *Coccus hesperidum* on *Hibiscus mutabilis* in three public gardens in Alexandria district (May, 98 - April, 1999).

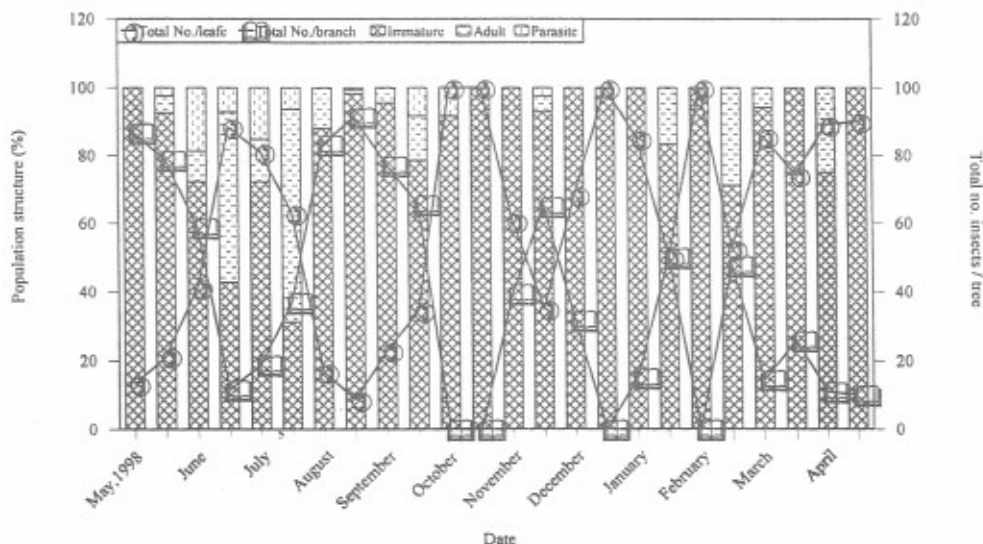


Fig. (3) : Fortnightly variations in total individuals and population age structure (%) of *Coccus hesperidum* infesting *Hibiscus* leaves and branches at Antoniades garden in Alexandria district (May, 1998 - April, 1999).

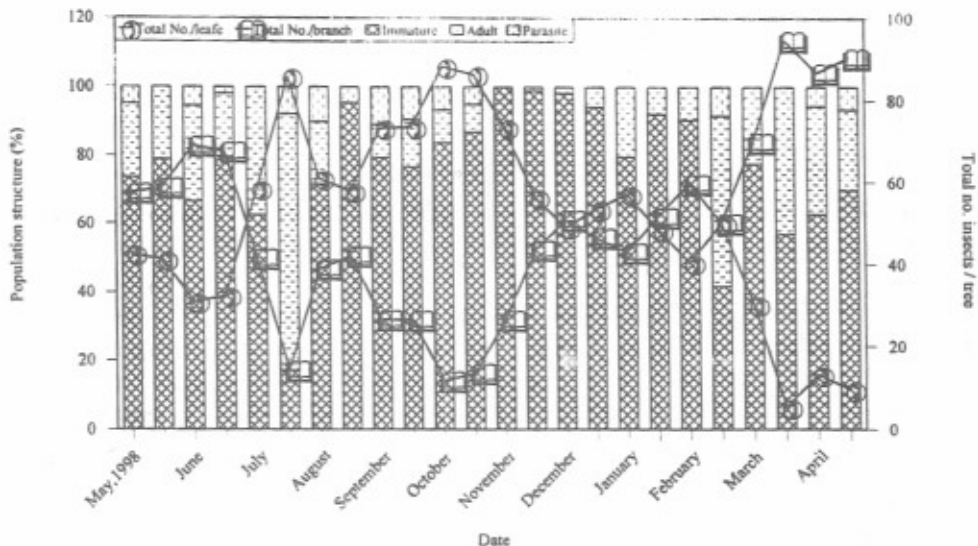


Fig. (4) : Fortnightly variations in total individuals and population age structure (%) of *Coccus hesperidum* infesting *Hibiscus* leaves and branches at Montazaha garden in Alexandria district (May, 1998 - April, 1999).

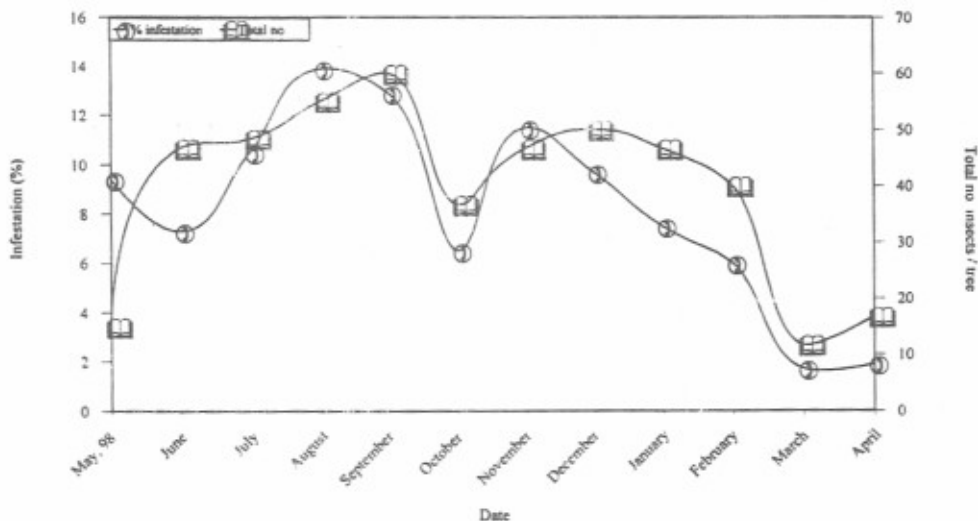


Fig. (5) : Monthly variations in infestation rate (%) and total number of *Coccus hesperidum* infested *Lantana camara* leaves through out different annual seasons at Montazah garden in Alexandria district (1998 - 1999).

## REFERENCES : -

- Abdel Razak S.I (2000)** ; Studies on certain abundant Scale insects attacking ornamental plants in public gardens. M.SC. Thesis, Fac. of Agric. Alex. Univ., Egypt.
- Bodenheimer, F.S. (1951 a).** Additions to the Coccidae of Iran, with descriptions of two new species. Bull. Ent. Soc.D'Egypt, 28 : 81-84.
- Bodenheimer, F.S. (1951 b).** Citrus Entomology in the middle east (text Book).
- Habib, A. ; Salama, H.S. and Amin, A.H. (1974).** Population studies on scale insects infesting citrus trees in Egypt. Z. Angew Ent. 69 : 318 - 330
- Hamon, A.B. and Williams, M.L. (1984).** The soft scale insects of Florida (Homoptera : Coccoidea : Coccidae) Florida Department of Agriculture · Consumer Services. Text Book.
- Moursi K.S. (1974).** Studies on some scale insects attacking fruit trees in Alexandria district. M.Sc. Thesis, Fac. of Agric. Alex. Univ., Egypt.
- Snedecor, G.M. (1970).** Statistical methods applied to experiments in Agriculture and Biology. Iowa State press, U.S.A. 534 pp.
- Swailam, S.M. and Awadallah, K.T. (1973).** On the seasonal abundance of the insect and mite fauna on the leaves of sycamore fig trees. Bull. Soc. ent. Egypt, LV II, 1973 [ 1 ].
- Talhok A.B. (1969).** Insects and Mite injurious to European Middle Eastern countries. Monogra – phien Zur Angew. Entomologie, No. 21. pp. 339.
- Talhok, A.S. (1975).** (Citrus pests throughout the world. Citrus (CIBA - GELGY) Agrochemicals Tech. Monogr. No. 4 : 88 pp.
- Zalomi, F.G. and Morse, J.G. (1991).** Integrated pest Management for citrus. 2<sup>nd</sup> 1d,univ, of California Statewide IPM project Div. of Agric. And Natural Resources publication 3303.

## الملخص العربي

بعض الدراسات البيئية على الحشرة البنية الرخوة *Coccus hesperidum*

التي تصيب خمس نباتات زينة في حدائق الإسكندرية<sup>0</sup>

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قد تم تسجيل هذه الحشرة على العديد من أشجار و شجيرات الزينة في الحدائق العامة من هذه النباتات الهيسكس مقفول الزهرة (بلحة) ، الاكاليا ، النقلة ، التين البنغالي ، اللانتانا 0

#### 1 - على نبات الهيسكس مقفول الزهرة

وقد وجدت هذه الحشرة متداخلة ويصعب فصلها عن حشرة أخرى أثناء الفحص وهي حشرة ال *Eucalymnatus tessellates* على نبات الهيسكس وأوضحت النتائج أن نسبة الإصابة الشهرية في

الثلاث حدائق على نبات الهيسكس كانت كما يلي : -

أن أعلى معدلات للإصابة سجلت في حديقة المنتزه كانت خلال شهري أغسطس وسبتمبر  $(95.0 \pm 6.3)$  ،  $(90.3 \pm 4.7 \%)$  على التوالي وأقل معدلات للإصابة كانت في حديقة الشلالات خلال شهر يناير  $(7.5 \pm 0.7 \%)$  وفي حديقة أنطونياس كانت أعلى معدلات للإصابة خلال نفس شهر حديقة المنتزه ولكن أقل المعدلات كانت خلال شهري أغسطس  $(50.9 \pm 4.7 \%)$  وسبتمبر  $(56.1 \pm 4.7 \%)$  وكانت نسبة التطفل أعلى ما يمكن خلال شهري يونيو ويوليو والنصف الأول من سبتمبر وأكتوبر وخلال أشهر الشتاء وأوائل الربيع يخفي الطفيل *Metaphycus flvus* 0 وأوضحت النتائج أنه في حديقة المنتزه تتجمع الحشرة بصورة كبيرة أي بأعداد كبيرة على الأوراق خلال شهر يولييه وفصول الخريف (سبتمبر، أكتوبر، نوفمبر) ولكن خلال أشهر الربيع (مارس، أبريل، مايو) وجد أن الحشرة تتركز أكثر على الأفرع 0

#### 2 - على نبات اللانتانا :

في حديقة المنتزه وجد أن معدل الإصابة بالحشرة كان منخفضا على هذا النبات مقارنة على نبات الهيسكس 0 وأوضحت النتائج أن أعلى معدلات للإصابة كانت خلال شهر مايو وأغسطس ونوفمبر  $(11.5 \%, 13.9 \%, 9.4 \%)$  على التوالي 0 ولم يتم تسجيل الانات الكاملة على هذا النبات خلال فترة الدراسة ولكن كانت الإصابة بالحوريات فقط حيث أن هذه الإصابة كانت نتيجة انتقالها من نباتات الهيسكس المجاورة 0 وقد تم دراسة تأثيرات بعض العوامل الجوية على تعداد هذه الحشرة مثل متوسط درجات الحرارة اليومي ومتوسط الرطوبة النسبية ، سرعة الرياح وكذلك فترة سطوع الشمس (الفترة الضوئية) كانت العلاقة موجبة وضعيفة بين متوسط درجة الحرارة اليومي وتعداد الحشرة خلال فترة الدراسة 0 وكانت العلاقة سالبة وضعيفة جداً بين الرطوبة النسبية والكثافة العددية للحشرة وكانت العلاقة موجبة بين سرعة الرياح وطول الفترة الضوئية وبين الكثافة العددية للحشرة مما يوضح أن هذه العوامل ليست هي الأساسية في معدل نمو الحشرة