

## ECOLOGICAL STUDIES ON THE PURPLE SCALE INSECT, *LEPIDOSAPHES BECKII* (NEWMAN) ON THREE ORANGE VARIETIES IN RELEATION TO PARASITIC AND CLIMITIC FACTORS

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**ABSTRACT:** *The present work was carried out to study the seasonal abundance of the purple scale, *Lepidosaphes beckii* (Newman) on Balady, Navel and Succari orange varieties in Kafr Shokr, Qaliobia Governorate during two years started from February 2010 until January 2012. The obtained results showed that this scale has three or four generations on Balady, Navel and Succari orange in the first and second year, respectively. The effect of biotic and abiotic factors on the population of this scale insect was studied. On Balady trees four generations were recorded in the first year in (February - May), (May - July), (July – October) and (October – January) while three generations in the 2<sup>nd</sup> year in (January - May), (May – October) and (October – January). On Navel trees 1<sup>st</sup> year generations were recorded in (January - March), (March - July), (July – October) and (September – January) while in the 2<sup>nd</sup> year it were recorded in (February- April), (April - August) and (September – February). On Succari trees generations were in (February - April), (April - July), (July – September) and (September – January) during 1<sup>st</sup> year and in (January - April), (April - July) and (September – Dec.) during 2<sup>nd</sup> year.*

*The relation between population of the scale insect and parasitism was positive and highly significant in the 1<sup>st</sup> year and negative and insignificant during second year while the relation of temperature degrees was positive and insignificant during the two years of the study , on the other hand the relation of relative humidity was negative in the 1<sup>st</sup> year and positive in the 2<sup>nd</sup> year but insignificant in the two years of the study. The effect of all factors combined was significant in the 1<sup>st</sup> year and insignificant during the 2<sup>nd</sup> year 65.98% and 37.37 %, respectively.*

**Key words:** *Lepidosaphes beckii*, purple scale, seasonal abundance, generations, orange varieties.

### INTRODUCTION

The cultivated area of citrus in Egypt has been rapidly expanded from to another year, while in 1990, 254265 feddans it reached 453772 feddans in 2010. The quantity of production reached about 2367647 tons in 1990 and 3.5 million tons in 2010.

Citrus trees are infested with different scale insects, among them, citrus purple scale insect, *Lepidosaphes beckii* (Newman, 1869). This scale attacks citrus leaves, green twigs and fruits, especially on the inside of the tree (Bodeneimer, 1951 and Amin, 1970). Salama (1962), Hafez and Salama, (1969) Rawhy (1966) and Helmy (1975), in Egypt, reported 3-4 generations per a year for *Lepidosaphes beckii*.

Abdel Fattah *et al.* (1978) indicated that the main periods for *L. beckii* population were March-April, where temperature ranged between 14.9-19.3°C and RH. 63-74%. Abou-Setta (1981) found that the purple scale reached its highest peak in May 1978. This scale insect indicated three distinct peaks, in mid December 1977, May and November 1978. On the other hand, the quotient of increase showed four periods of increase population around mid-December (1.74), May (1.39), August (1.59) and mid-October (1.57). Hafez *et al.* (1987) studied the population fluctuation of *L. beckii* and their parasites. Moustafa (1992) indicated that there is 2-3 periods of activity were observed for *Lepidosaphes beckii*.

Rawhy *et al.* (1976) reported that nymphs' population of *Lepidosaphes beckii* reached peak numbers in September, November, March and May. Adult female populations did so in October, March and May, while the lowest nymph populations occurred during Jun., October, January and April.

The purpose of this investigation is to estimate the seasonal abundance of the purple scale insect, *Lepidosaphes beckii* (Newman) on three varieties of orange (Balady, Navel and Succari) in Qaliobia Governorate with reference to the effect of meteorological factors and the natural enemies on its population.

## MATERIALS AND METHODS

Seasonal abundance of the purple scale insect, *Lepidosaphes beckii* (Newman) infesting three orange varieties (Navel, Succari and Balady) *Citrus sinensis* (L.) Osbeck, was recorded along two years extended from February 2010 to January 2012 in a private citrus orchard at Kafr Shokr, Qaliobia Governorate.

Five trees of each orange variety at the same size, shape, height, vegetation and homogenous in their infestation with the purple scale insect were selected to represent the whole plantation. These trees were about fifteen years old and three meters high.

These trees received the normal agricultural practices and no chemical control measures were applied. The data were recorded on monthly basis, where 35 mature leaves were picked at random from each replicate. The leaves were kept in polyethylene bags and transferred to insect laboratory of Plant Protection Res. Institute. By using a stereoscopic binocular, individuals on upper and lower leaf surfaces were examined and registered into alive nymphs and adult females and then counted and recorded.

At the same times, parasites found on citrus leaves were also counted and recorded.

Weather factors data assumed to affect

*Lepidosaphes beckii* and their parasites (i.e. maximum and minimum daily temperatures and mean percent of daily relative humidity) were obtained from the Agricultural Meteorological Station, Alexandria governorate.

Statistical analysis of the obtained data, the simple correlation (*r*) and regression coefficient value (*b*) were adopted to clarify the change in population due to change in each of weather factors and compared the mean values with the least significant differences (LSD), using SAS computer program (SAS Institute, 1988).

## RESULTS AND DISCUSSION

### 1- Seasonal fluctuations of purple scale insect, *Lepidosaphes beckii* infesting three varieties of citrus trees along two years of study :

Data on the monthly population density of purple scale insect stages infested leaves of three citrus varieties along two successive years are shown at Tables 1 to 6 and illustrated at Figs. (1 & 2). Statistical analysis of results indicated that there were significant differences of the average numbers of purple stages among the months of study period.

#### 1.1 Balady orange:

As for the results of the first year on Balady orange, statistical analysis indicated that the highest insect stage numbers was recorded at August, May and June months (1161, 1156, 1052 individual / 35 leaves) respectively, while the least numbers were recorded at January 2011 (81 individ. / 35 leaves) with significant differences among them (LSD 5% = 161.4).

As for the results of the second year, statistical analysis indicated that the highest insect stage numbers was recorded at March, September and July months (109, 105, 104 individual / 35 leaves) respectively, while the least numbers were recorded at January February Dec. and June (from 21 to 37 individual / 35 leaves) with significant differences among them (LSD 5% = 16.9).

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**Table (1): Monthly fluctuations and seasonal abundance of *Lepidosaphes beckii* and associated parasites on Balady orange trees at Kafr Shokr, Qaliobia Governorate, from February 2010 till January 2011.**

Months	Ave. no. <i>L. beckii</i> / 35 leaves			Monthly variation	Parasites/35 leaves	Relative humidity (%)	Temp. °C
	Nymphs	Adults	Total				
February2010	250	153	403 g	-	42 cd	72.7	13.8
March	399	299	698 de	2.30	33 de	63.1	14.4
April	393	248	641 e	0.92	43 cd	44.6	20.3
May	671	485	1156 a	1.80	69 b	61.8	26.9
June	651	401	1052ab	0.91	89 a	62.1	29
July	267	166	433 fg	0.41	26 e	65.1	29
August	729	432	1161 a	2.68	45 cd	65.1	28.1
September	342	235	577 ef	0.50	46 cd	62.5	27
October	373	239	612 e	1.06	57 bc	64.5	22.6
Nov.	470	361	831 cd	1.36	57 bc	66.7	17
Dec.	564	416	980 bc	1.18	99 a	69.1	15.2
January2011	48	33	81 h	0.08	4 f	79.8	12.3
LSD 5 %			161.4		15.4		

Means in columns followed by the same letter (s) are not significantly different

**Table (2): Monthly fluctuations and seasonal abundance of *Lepidosaphes beckii* and associated parasites on Balady orange trees at Kafr Shokr, Qaliobia Governorate, from February 2011 till January 2012.**

Months	Ave. no. <i>L. beckii</i> / 35 leaves			Monthly variation	Parasites/35 leaves	Relative humidity (%)	Temp. °C
	Nymphs	Adults	Total				
February2011	19	11	30 d	-	1 d	68.2	13.2
March	54	55	109 a	3.63	2 d	29.7	14.3
April	36	28	64 c	0.59	2 d	62.1	17.6
May	33	24	57 c	0.89	11 ab	53.1	25.2
June	19	18	37 d	0.65	10 ab	61	27.1
July	59	45	104 ab	2.81	7 bc	70.2	29.1
August	43	48	91 b	0.88	3 cd	75.2	29.1
September	43	62	105 ab	1.15	1 d	72.9	26.5
October	19	61	70 c	0.67	0 d	76.1	21.2
Nov.	37	30	67 c	0.96	3 cd	76	17.4
Dec.	15	19	34 d	0.51	13 a	72.2	15.2
January2012	12	9	21 d	0.62	9 ab	67.5	13.2
LSD 5%			16.9		4.7		

Means in columns followed by the same letter (s) are not significantly different

**Table (3): Monthly fluctuations and seasonal abundance of *Lepidosaphes beckii* and associated parasites on Navel orange trees at Kafr Shokr, Qaliobia Governorate, from February 2010 till January 2011.**

Months	Ave. no. <i>L. beckii</i> / 35 leaves			Monthly variation	Parasites/35 leaves	Relative humidity (%)	Temp. °C
	Nymphs	Adults	Total				
February2010	345	210	555 e	-	41 fg	72.7	13.8
March	859	499	1358 a	2.45	71 cd	63.1	14.4
April	618	413	1031cd	0.76	72 cd	44.6	20.3
May	733	529	1262ab	1.22	77 c	61.8	26.9
June	716	442	1158bc	0.92	105 b	62.1	29
July	284	173	457 e	0.39	30 g	65.1	29
August	890	484	1374 a	3.01	52 ef	65.1	28.1
September	595	380	975 d	0.71	60 de	62.5	27
October	633	458	1091cd	1.12	101 b	64.5	22.6
Nov.	585	458	1043cd	0.96	95 b	66.7	17
Dec.	687	437	1124bc	1.08	131 a	69.1	15.2
January2011	58	33	91 f	0.08	8 h	79.8	12.3
LSD 5%			147.7		14.8		

Means in columns followed by the same letter (s) are not significantly different

**Table (4): Monthly fluctuations and seasonal abundance of *Lepidosaphes beckii* and associated parasites on Navel orange trees at Kafr Shokr, Qaliobia Governorate, from February 2011 till January 2012.**

Months	Ave. no. <i>L. beckii</i> / 35 leaves			Monthly variation	Parasites/35 leaves	Relative humidity (%)	Temp. °C
	Nymphs	Adults	Total				
February2011	13	9	22 g	-	1 c	68.2	13.2
March	87	77	164 a	6.63	2 c	29.7	14.3
April	28	26	54 f	0.33	2 c	62.1	17.6
May	30	24	54 f	1.00	8 b	53.1	25.2
June	37	26	63 ef	1.17	12 a	61	27.1
July	43	40	83 d	1.32	11 ab	70.2	29.1
August	56	50	106 c	1.28	1 c	75.2	29.1
September	69	65	134 b	1.26	10 ab	72.9	26.5
October	57	55	112 c	0.84	2 c	76.1	21.2
Nov.	33	31	64 ef	0.57	1 c	76	17.4
Dec.	39	32	71 de	1.11	12 a	72.2	15.2
January2012	19	12	31 g	0.44	10 ab	67.5	13.2
LSD 5%			15.5		3.8		

Means in columns followed by the same letter (s) are not significantly different

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**Table (5): Monthly fluctuations and seasonal abundance of *Lepidosaphes beckii* and associated parasites on Succari orange trees at Kafr Shokr, Qaliobia Governorate, from February 2010 till January 2011.**

Months	Ave. no. <i>L. beckii</i> / 35 leaves			Monthly variation	Parasites/35 leaves	Relative humidity (%)	Temp. °C
	Nymphs	Adults	Total				
February2010	193	110	303 f	-	15 g	72.7	13.8
March	862	485	1347ab	4.45	94 c	63.1	14.4
April	642	356	998 e	0.74	76 d	44.6	20.3
May	660	418	1078de	1.08	58 e	61.8	26.9
June	910	557	1467 a	1.36	127 b	62.1	29
July	249	171	420 f	0.29	34 f	65.1	29
August	882	463	1345ab	3.20	44 ef	65.1	28.1
September	834	533	1367ab	1.02	124 b	62.5	27
October	705	484	1189cd	0.87	121 b	64.5	22.6
Nov.	720	543	1263bc	1.06	147 a	66.7	17
Dec.	573	435	1008 e	0.80	116 b	69.1	15.2
January2011	89	69	158 g	0.16	12 g	79.8	12.3
LSD 5%			137.7		14.0		

Means in columns followed by the same letter (s) are not significantly different

**Table (6): Monthly fluctuations and seasonal abundance of *Lepidosaphes beckii* and associated parasites on Succari orange trees at Kafr Shokr, Qaliobia Governorate, from February 2011 till January 2012.**

Months	Ave. no. <i>L. beckii</i> / 35 leaves			Monthly variation	Parasites/35 leaves	Relative humidity (%)	Temp. °C
	Nymphs	Adults	Total				
February2011	18	8	26 g	-	3 de	68.2	13.2
March	42	77	119 a	4.58	2 ef	29.7	14.3
April	12	21	33 fg	1.74	1 f	62.1	17.6
May	15	19	34 fg	1.03	10 b	53.1	25.2
June	13	20	33 fg	0.97	13 a	61	27.1
July	40	35	75 c	2.27	13 a	70.2	29.1
August	26	37	63 d	0.84	4 d	75.2	29.1
September	37	59	96 b	1.52	6 c	72.9	26.5
October	33	54	87 b	0.01	2 ef	76.1	21.2
Nov.	18	30	48 e	0.55	11 b	76	17.4
Dec.	19	20	39 ef	0.81	10 b	72.2	15.2
January2012	20	9	29 fg	0.74	6 c	67.5	13.2
LSD 5%			11.2		1.8		

Means in columns followed by the same letter (s) are not significantly different

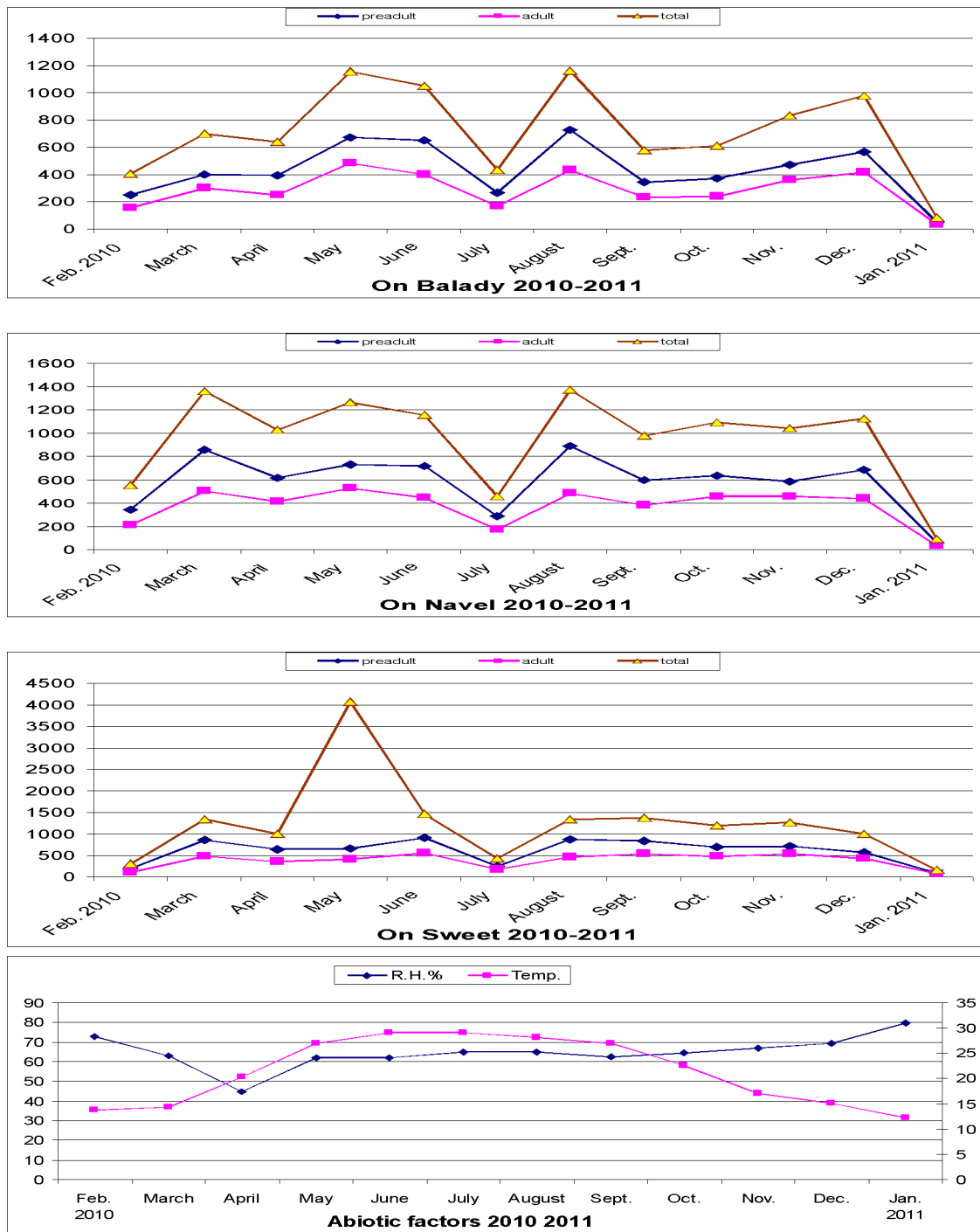
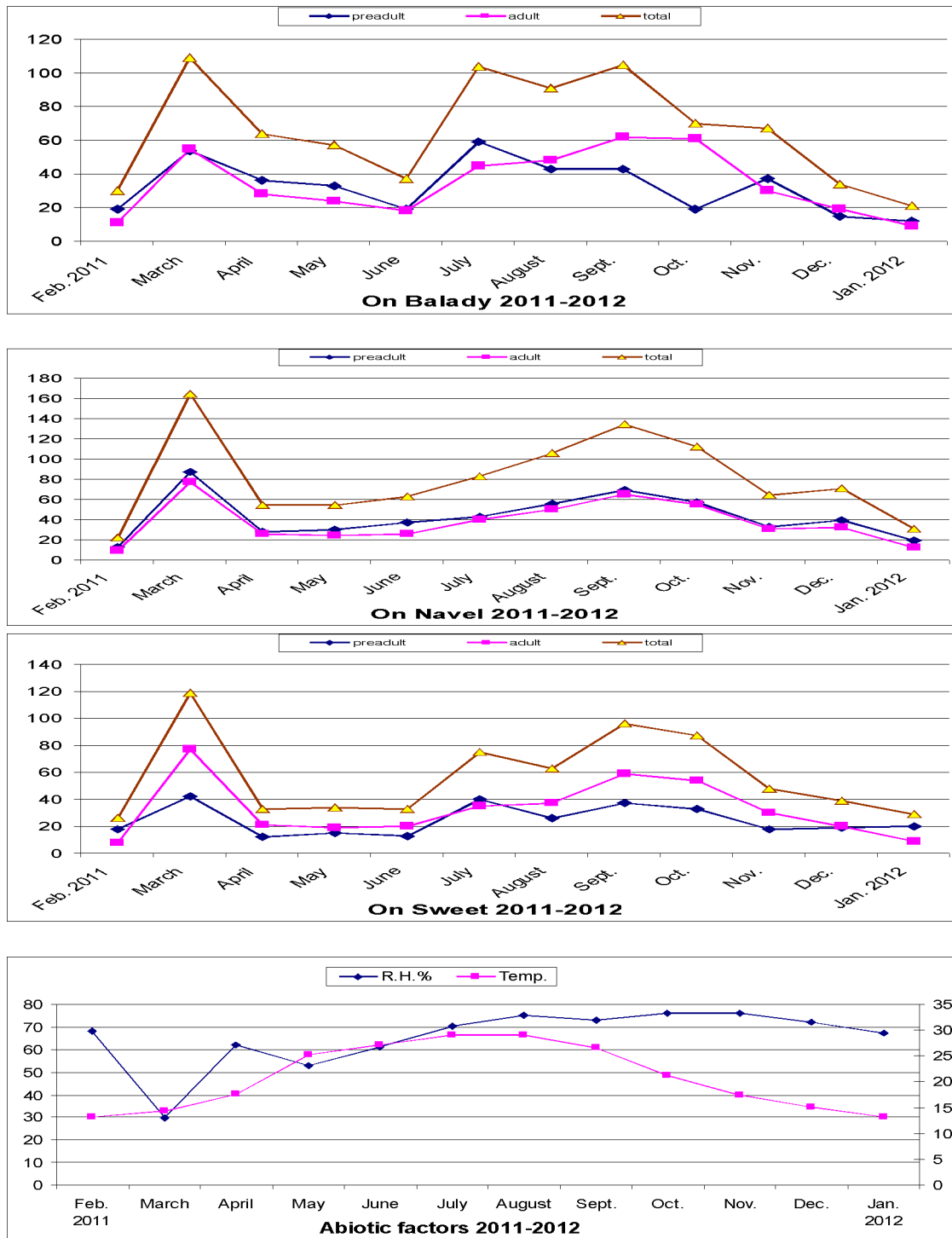


Fig. (1): Monthly fluctuations and seasonal abundance of *L. beckii* and associated parasites on the tested orange varieties at Kafr Shokr, Qaliobia Governorate, from February 2010 to January 2011.

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**Fig. (2): Monthly fluctuations and seasonal abundance of *L. beckii* and associated parasites on the tested orange varieties at Kafr Shokr, Qaliobia Governorate, from February 2011 to January 2012.**

### 1-2 Naval orange:

As for the results of the first year on Naval orange, statistical analysis indicated that the highest insect stage numbers was recorded at August and March, and May months (1374, 1358, 1262 individual / 35 leaves) respectively, while the least numbers was recorded at January month (91 individ./35 leaves) with significant differences among them (LSD 5%= 147.7).

As for the second year, statistical analysis indicated that the highest insect stage numbers was recorded at March month (164 individual / 35 leaves), while the least numbers were recorded at January and February months (31, 22 individual / 35 leaves), with significant differences among them (LSD 5%= 16.9).

### 1-3 Succari orange:

As for the results of the first year on Succari orange, statistical analysis indicated that the highest insect stage numbers was recorded at June, September, March and August, months (1467, 1376, 11347, and 1345 individual / 35 leaves) respectively, while the least numbers was recorded at January (158 individ. / 35 leaves) with significant differences among them (LSD 5%= 137.7).

As for the second year, statistical analysis indicated that the highest insect stage numbers was recorded at March month (119 individual / 35 leaves), while the least numbers were recorded at January, February, April, May, and June months (from 26 to 34 individual / 35 leaves), with significant differences among them (LSD 5%= 11.2).

Results of the first year Tables (1,3,5) (Fig. 1) showed that the peaks of total number of scales were in March, May, August and December. The peaks of both pre-adults and adult stages were in March, May, August and December. The average annual fluctuation of the population reached 14.33, 14.70 and 15.19 in the total number of scales, adult females and pre-adults, respectively.

On the other hand, the monthly variation

(V.) in the population density, showed that the favourable time for

annual insect in the total number occurred in May (1.79) and August (2.68) 2010.

Second year results (Tables 2,4,6) (Fig. 2) indicated that the peaks of the total number of scales were in March, July and September. There were two peaks recorded for adult females and three for non adults.

The first peak was recorded in March. The second was occurred in September for adult females and in July for nymphs. The third peak was recorded for nymphs during October. The average of annual fluctuation for the total number of scales, adult females and pre adults reached 5.19, 6.89 and 4.92, respectively. The monthly variation in the population of all stages reached 3.63, 2.81 and 1.51, respectively.

The number of generations of *L. beckii* was reported from the percentages of nymphs. It could be concluded that there were four generations in the first year for this scale insect on Balady orange in March, May, August and December. While there were three generations in the second year occurred in March, July and November.

Concerning the seasonal abundance of this pest on Navel orange, results of the first year (Fig. 1) indicated that there were four peaks recorded for the total number of the scales in March, May, August and December. The peaks of adult females were in March, May, August and November. The peaks of pre adults were recorded in March, May, August, October and December.

The average annual fluctuation of the population as calculated by dividing the maximum density by the minimum density (Bodenheimer, 1951) reached 15.10, 16.03 and 15.03 of total number of scale, adult females and nymphs, respectively. On the other hand, the monthly variation (V.) in the population density as calculated by dividing the number of individuals recorded in a given month by that of the preceding month, showed that the favorable time for this insect activity in the total number occurred in March and August where the values were



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2.45 and 3.01, respectively.

Results of the second year (Tables 2,4,6) (Fig. 2) showed three peaks for the total number of scales in March, September and December.

Two peaks were recorded for both nymphs and the adult females in March and September. A third small peak was recorded in December.

The average of annual fluctuation for the total number of scales, adult females and nymphs reached 7.45, 8.56 and 6.69, respectively. The monthly variation in the population density of all stages, reached 6.63 in March and about 1.3 during each of July, August and September.

According to the results of the first year on Navel orange, there were four generations recorded in March, May, August and December 2010. While there were three generations in the second year of investigation in March, September and December, respectively.

Results of the seasonal abundance of this insect on Succari orange (Fig. 1) recorded the first peak of the total number of scales in March and the second, third and fourth peaks were in June, September and November, respectively.

The peaks of adult females were in March, June, September and November 2010. The peaks of pre adults were recorded in March, June, August and November, respectively. The average annual fluctuation of the population reached 10.22, 8.07 and 9.28 in the population of pre adults, adult females and total number of scales, respectively. The monthly variation in the population showed that the favorable time for insect activity occurred in March and August, where the values were 4.45 and 3.2, respectively.

In the second year of investigation, (Fig. 2) three peaks were recorded in March, July and September. For adult females, two peaks were recorded in March, September. Regarding the nymphs, three peaks were recorded in March, July and September.

The average of annual fluctuation for the

total number of scales, adult females and nymphs reached 4.58, 9.63 and 3.50, respectively.

The monthly variation in the population density of all stages reached 4.58 in March and 2.27 in July.

In the first year of seasonal abundance for this insect on Sweet orange, there were four generations in March, June, August and November 2010, while the results of the second year demonstrated three generations in March, July and September, 2011.

Simanton (1962) in Florida found that this scale insect reached its highest peak in summer and lowest one in autumn. Although Salama (1962) mentioned that the highest peak occurred in October, and the lowest was in July.

The results are in agreement with Amin (1970), Habib *et al.*, (1971), Helmy (1975), Abdel-Fattah *et al.*, (1978), Abou-Setta (1981) and Mahmoud (1981) who found that the number of generations of *L. beckii* differed and depends upon seasons and regions.

El-Amir *et al.* (2012) recorded four generations of this scale on sour orange at Qalubia Governorate while Nadia (2011) recorded three generations of this scale when infest mango trees in Giza Governorate.

### **2- Seasonal fluctuations of the parasites of *Lepidosaphes beckii* associated with three varieties of citrus trees along two years :**

Results on the parasites of purple scale insects revealed that the hymenopterous parasite, *Aphytis lepidosaphes* Compere, 1955 (Hymenoptera: Aphelinidae), occupied the highest population density .

Statistical analysis of the results on the monthly population of parasites (Tables 1 to 6) indicated that there were significant differences in the numbers of parasites among months of the period study.

As for Balady orange, the highest parasites population at the first year was

recorded at December and June months 99,89 individuals /35 leaves , while the least numbers were at January month (4 individ.). At the second year of study the numbers of parasites was sharply decreased with significant differences among months.

Regarding to parasite results associated with Naval orange leaves at the first year recorded that the highest parasites numbers were recorded at December month (131 individ. /35 leaves), while the least numbers was at January (8 individ. /35 leaves).

At the second year of study the numbers of parasites was sharply decreased with significant differences among months.

Finally , the highest parasites numbers associated with the Succari orange leaves were recorded at November month (147 individ. /35 leaves) , while the least numbers was recorded at January and February months (12, 15 individ. /35 leaves) respectively. At the second year of study the numbers of parasites was sharply decreased with significant differences among months.

### **3-The effect of biotic and abiotic factors on *Lepidosaphes beckii* population infesting citrus varieties:**

The hymenopterous parasite, *Aphytis lepidosaphes* Compere, 1955 (Hymenoptera: Aphelinidae) was a highly specific ectoparasite of *C. beckii* where it was recorded monthly in Kafr Shokr, Qaliobia Governorate. The parasite was more abundant during fall and early winter and with moderate numbers during spring, and less abundance during summer.

Statistical analysis of data on Succari orange variety as shown in Table (7) to estimate the relation between the population density of this scales and population of the parasite, indicated positive and highly significant relationship in the first year, while this relation was negative and insignificant in the second one. This means that this factor was below the optimal range in the first year. In other words, the population of scale insects was more active than parasite population (one individual increase of

parasite accompanied with increasing of scale population by 6 individuals). While parasite effect in the second year was within the optimal range, then gave negative and insignificant correlation (Table, 7).

Zaki (1977) indicated that *Aphytis lepidosaphes* proved to be the most common and efficient parasites on *L. beckii*, and added that the rate of parasitism reached 58.5% in April, 66.5% in June and 84% in October.

Concerning the effect of abiotic factors, the simple correlation of the effect of daily mean of temperature and relative humidity indicated positive and insignificant relation between the mean of temperature and the population density of scale insect during the two years of investigation, while this relation was negative in the first year and positive in the second one for relative humidity but insignificant in the two years (Table, 7), Meaning that the two factors were within the optimal range for the activity of *C. beckii* population. These results are in agreement with that obtained by Ahmed (1975) who reported that this scale seemed to be increased under moderate temperature and high relative humidity.

Helmy (1975) recorded that the temperature from 27.9°C (during August) to 24.5°C (during September) considered to be favorable for the increasing and developing of nymphs of *L. beckii*. Abdel Fattah *et al.* (1978) indicated that the main periods for *L. beckii* population were March-April, where temperature ranged between 14.9-19.3°C and R.H. 63-74%.

Moustafa (1992) recorded that the activity of the parasite *A. lepidosaphes* appeared to be correlated with the activity of this scale.

The combined effect of these factors was calculated as the percentage of explained variance. It was significant in the first year and insignificant in the second one. However, the amount of variability in total population of this pest was large (65.98%) in the first year, while it was limited in the second one (37.37%).

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**Table (7) : Simple correlation and partial regression values of the three biotic and abiotic factors with their significant levels and percentages of explained variance in the population density of *Lepidosaphes beckii* scales on Sucarri orange trees at Kafr Shokr, Qaliobia Governorate from February 2010 to January 2012.**

Statistical parameters		First year (2010/2011)			Second year (2011/2012)		
		Daily mean temp.	Daily mean R.H.	Parasites no.	Daily mean temp.	Daily mean R.H.	Parasites no.
Simple correlations	correlation values	+0.402	-0.508	+0.738	+0.750	+0.486	-0.268
	probability (P)	+0.196 <sup>ns</sup>	+0.092 <sup>ns</sup>	+0.006**	+0.005**	+0.109 <sup>ns</sup>	+0.400 <sup>ns</sup>
Partial regression	partial regression (b)	-3.21	-12.58	+8.977*	+6.01	+2.148 <sup>ns</sup>	-0.198*
	probability (P)	+0.087 <sup>ns</sup>	0.110 <sup>ns</sup>	0.001***	0.020*	+0.110 <sup>ns</sup>	+0.342 <sup>ns</sup>
F- values	F-value	5.172			1.59		
	probability (P)	0.028*			0.266 <sup>ns</sup>		
Explained variance %		65.98			37.37		

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## دراسات بيئية علي حشرة الموالح الإرجوانية علي ثلاثة أصناف البرتقال و علاقتها بالمتطفلات و العوامل المناخية

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### المخلص العربي

تعد حشرة الموالح الإرجوانية من اخطر الحشرات القشرية التي تصيف أشجار الموالح في مصر. وقد أجريت هذه الدراسة البيئية علي تعداد الحشرة خلال موسمين متتاليين في الفترة من فبراير 2010 إلي يناير 2012 باحدي حدائق الموالح الخاصة بمركز كفر شكر محافظة القليوبية علي ثلاثة أصناف من البرتقال هي ( البلدي - السكري - أبو سره) و ذلك بأخذ عينات من الأوراق (35 ورقة) شهريا و فحصها معمليا و تسجيل الأطوار الكاملة و غير الكاملة و أعداد الحشرات الكاملة بالاضافة الي دراسة التغيرات الموسمية في تعداد الحشرة كما تم دراسة تأثير التطفل و العوامل المناخية (درجة الحرارة و الرطوبة النسبية) كمتوسطات يومية علي تعداد حشرة الموالح الإرجوانية علي اشجار البرتقال السكري وقد جاءت النتائج كالتالي:

- بالنسبة للبرتقال البلدي جاءت أجيال العام الأول الاربعة علي الترتيب كالتالي: (فبراير - مايو) و (مايو - يوليو) و (يوليو - أكتوبر) و (أكتوبر - يناير). في حين سجلت الحشرة ثلاث أجيال في العام الثاني كالتالي: (يناير - يونيو) و (يونيو - أكتوبر) و (أكتوبر - يناير).

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- أما بالنسبة الى البرتقال أبو سرّة فقد سجلت عليه أربعة أجيال للحشرة في العام الأول في الشهور الآتية: (يناير - مارس) و (مارس - يوليو) و (يوليو - أكتوبر) و (سبتمبر - يناير) في حين سجلت للحشرة في العام الثاني ثلاث أجيال في الفترات الآتية: (فبراير - أبريل) و (أبريل - أغسطس) و (سبتمبر - فبراير).
- أما بالنسبة للبرتقال السكري فقد جاءت أجيال الحشرة الأربعة في العام الأول كالتالي: (فبراير - أبريل) و (أبريل - يوليو) و (يوليو - سبتمبر) و (سبتمبر - يناير) وفي العام الثاني سجلت الحشرة ثلاثة أجيال على النحو التالي: (يناير - أبريل) و (أبريل - يوليو) و (سبتمبر - ديسمبر).
- كانت علاقة الطفيليات موجبة و معنوية جدا في العام الأول لكنها سالبة و غير معنوية في العام الثاني
- حققت درجة الحرارة علاقة موجبة و غير معنوية خلال عامي الدراسة.
- أعطت الرطوبة علاقة سالبة في العام الأول و موجبة في الثاني لكنها غير معنوية في عامي الدراسة.
- جاء تأثير العوامل مجتمعة معنويا في العام الأول و غير معنوي في العام الثاني حيث بلغت نسبة التأثير الاجمالي في العام الأول 65.98% و 37.37% في العام الثاني.