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**HOST PLANTS, DISTRIBUTION AND SEASONAL ABUNDANCE OF  
THE DATE PALM SCALE, *Parlatoria blanchardi* (TARGIONI-  
TOZZETTI) (HOMOPTERA: DIASPIDIDAE) AND ITS NATURAL  
ENEMIES IN EGYPT  
BY**

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**ABSTRACT**

The present work of *Parlatoria blanchardi* (Targioni-Tozzetti) (Homoptera: Diaspididae), deals with its host plants, distribution, population dynamics and its natural enemies. During 2004 – 2005, the date palm scale, *P. blanchardi* was recorded attacking 4 host plants in 9 localities of 8 governorates in Egypt and it was attacked by 3 parasitoids and 5 predators. These parasitoids are *Aphytis phoenicis* De Bach & Rosen, *Encarsia citrina* (Craw) and *Pteroptrix aegyptica* Evans & Abd-Rabou and the predators are *Chilocorus bipustulatus* L., *Chrysoperla carnea* Steph., *Chrysopa vulgaris*, *Rodalia cardinalis* Muls. And *Scymnus syriacus* Muls. The seasonal abundance of *P. blanchardi* and its natural enemies were studied for two successive years from Jan., 2004 to Dec. 2005 on date palm trees at Giza and North Sinai Governorates. The obtained data showed that, the insect population (preadult and adult) per 50 leaflets of date palm trees had two peaks during April 15<sup>th</sup> (7032 insects) and Dec. 15<sup>th</sup> (2972 insects) in the first year. In the same times of the second year, the insect had, also, two peaks during April 15<sup>th</sup> (7331 insects) and Dec. 15<sup>th</sup> (3444 insects). Also, results indicated that *E. citrina* and *C. bipustulatus* are the active natural enemies attacking *P. blanchardi* in Egypt.

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**Key words:** Host plants, seasonal abundance, natural enemies, *Parlatoria blanchardi*.

**INTRODUCTION**

The date palm scale, *Parlatoria blanchardi* (Targioni-Tozzetti) (Homoptera: Diaspididae) is a pest of commercial dates and other palms (Gill, 1997) and is one of the most important pests of date palm in Egypt (Abd-Rabou and Hendawy, 2000). It attacks all the growing parts of the tree including leaf stalks, leaflets and fruits. The primary feeding site of *P. blanchardi* is the succulent white tissue at the base of the leaf stalk. Discolored area of injured tissue develops where individuals settle and feed. Heavy infestation weaken the tree by increasing transpiration, depleting nutrients and destroying chlorophyll, so impairing photosynthesis and productivity. Infestations often produce discoloration of the leaves and may cause yellowing and premature leaf drop.

fruit may be stunted, distorted or shriveled and the vigor of the tree may be reduced (Benassy, 1990 and Abivardi, 2001). *P. blanchardi* has been recorded from date palm and other hosts belonging to the plant family Palmae (Borchsenius, 1966). It is distributed in different parts of the world (Benassy, 1990). The use of natural enemies against *P. blanchardi* is specially valuable in those areas where chemical control cannot be used. Although the initial build up of the scale is rapid and poses a serious threat to the host plant, introduction of parasitoids and predators have consistently been found to reduce the pest population to acceptable levels (Carpenter and Elmer, 1978).

The aim of this work is to study host plants, distribution, population dynamics, of the date palm scale, *P. blanchardi* and its natural enemies in Egypt.

## MATERIALS AND METHODS

### 1. Host plants and distribution of the date palm scale, *Parlatoria blanchardi* in Egypt:

A survey of host plants and distribution of *P. blanchardi* was carried out all over Egypt, approximately, during a period extended from 2003 to 2005 year. Infested plants with the date palm scale, *P. blanchardi* were examined in the field, using a pocket lens. Leaves and leaflets were collected and placed separately in paper bags and transferred for further examination in the laboratory. Identification of *P. blanchardi* was made by examining its adult in Canada Balsam, according to Abd-Rabou (2003).

### 2. Seasonal abundance of the date palm scale, *Parlatoria blanchardi*:

Seasonal abundance of the date palm scale, *P. blanchardi* was carried out on *Phoenix dactylifera* (date palm) in Giza Governorate during 2004 and 2005 year. The location selected for this investigation received no chemical control measures for several years. About 10 trees of date palm, almost similar in age, shape, size and growth conditions were randomly chosen for sampling two times a month at biweekly intervals. On each sampling, 50 leaflets were chosen at random. Thereafter, the leaflets were kept in a closed paper bags and transferred to the laboratory to estimate the total number of preadults, adults per 50 leaflets of each sample by the aid of binocular microscope, where the number of preadults and adults of the date palm scale, *P. blanchardi* were counted per one leaf.

Records of the meteorological factors, mainly the daily means of minimum (D.Min.T.), maximum (D. Max.T.) temperatures and relative humidity (D.M.R.H.), were obtained from the Meteorological Department records. The daily records of these factors were recalculated to get the daily averages within two weeks prior to sampling date.

Simple correlation values were calculated to obtain information about the relationships between the three tested weather factors and the population of the date palm scale, *P. blanchardi*.

**3. Survey and seasonal abundance of natural enemies of the date palm scale,, *Parlatoria blanchardi* :**

A survey of natural enemies of the date palm scale, *P. blanchardi* and their abundance was continued from 2004 to 2005 year on *P. dactylifera* trees in two localities, namely, North Sinai (El-Arish) and Giza.

Two locations heavily infested by the date palm scale, *P. blanchardi* were selected to achieve investigation and were sampled monthly. During the study, no chemical control for the pest was performed on these trees. In each location, 10 trees were selected randomly for sampling. Units of sampling consisted of 50 leaflets. These were detached off and brought to the laboratory for inspection. Each leaflet was stored in a well-ventilated emergence glass tube and monitored daily for parasitoid emergence. Rate of parasitism was determined by dividing the number of emerging parasitoid from each by the number of hosts scale existing. Meanwhile, the predators were examined and counted, directly, in the field. The specimens were identified and confirmed by the first author and the Department of survey and Classification, Plant Protection Research Institute, ARC.

**RESULTS AND DISCUSSION**

**1. Host plants and distribution of the date palm scale,, *Parlatoria blanchardi* in Egypt:**

As shown in Table (1), date palm scale, *P. blanchardi* is recorded attacking 4 host plants in 9 localities of 8 governorates in Egypt.

**Table (1): Host plants and distribution collection dates of *Parlatoria blanchardi* in Egypt**

Host Plants		Distribution		Date of Collection
Family	Species	Governorate	Locations	
Palmae	<i>Hyphaene</i> sp.	Beni-Suef	Beba	June, 2004
	<i>Jasminum</i> sp.	Cairo	Maadi	October, 2004
	<i>Phoenix dactylifera</i>	Cairo	Nasr City	November, 2004
	<i>P. dactylifera</i>	Aswan	Nasr El-Noba	November, 2004
	<i>P. dactylifera</i>	Baharia Oasis	Baharia Oasis	December, 2005
	<i>P. dactylifera</i>	Giza	Dokki	August, 2005
	<i>P. dactylifera</i>	Ismailia	Ismailia	July, 2005
	<i>P. dactylifera</i>	North Sinai	El-Arish	October,, 2004
	<i>Washingtonia</i> sp.	Sohag	Sohag	June, 2004

**2- Seasonal abundance of the date palm scale, *Parlatoria blanchardi*:**

The seasonal abundance of *P. blanchardi* was studied for two successive years from 2004 and 2005 on *P. dactylifera* trees in Giza Governorate. The obtained results in Figs (1 and 2) show that, the insect population (preadult,

adult female and gravid female) had two peaks during April 15<sup>th</sup> (7032) and Dec.15<sup>th</sup> (2972) in the first year. while, the second year has two peaks during April 15<sup>th</sup> (7331) and Dec.15<sup>th</sup> (3444). The simple correlation values indicated positive and highly significant the relationships between the seasonal abundance of *P. blanchardi* population and average of daily maximum and minimum temperatures ( $r = \text{max. } 0.978, 0.6912$  in 2004 & 2005;  $r = \text{min. } 0.845, 0.535$  in 2004 & 2005). The small insignificantly negative simple correlation ( $r$ ) value between the seasonal abundance of *P. blanchardi* population and relative humidity ( $r = -0.165$  in 2004 & 2005;  $r = -0.171$  in 2004 & 2005). It is concluded that, *P. blanchardi* occurred all year round on date palm. These results disagree with the finding of Madkouri (1976), recording 3-4 generations per year .

### 3. Survey and seasonal abundance of natural enemies of the date palm scale,, *Parlatoria blanchardi* :

Three species of parasitoids and five predators were surveyed attacking *P. blanchardi* on date palm trees. These are listed below Parasitoids:

1. *Aphytis phoenicis* De Bach & Rosen (Hymenoptera : Aphelinidae)
2. *Encarsia citrina* (Craw) (Hymenoptera : Aphelinidae)
3. *Pteroptrix aegyptica* Evans & Abd-Rabou (Hymenoptera : Aphelinidae)

#### Predators:

1. *Chilocorus bipustulatus* L. (Coleoptera : Coccinellidae) 1.
2. *Chrysoperla carnea* Steph. (Neuroptera : Chrysopidae)
3. *Chrysopa vulgaris* (Neuroptera : Chrysopidae)
4. *Rodalia cardinalis* Muls. (Coleoptera : Coccinellidae)
5. *Scymnus syriacus* Muls. (Coleoptera : Coccinellidae)

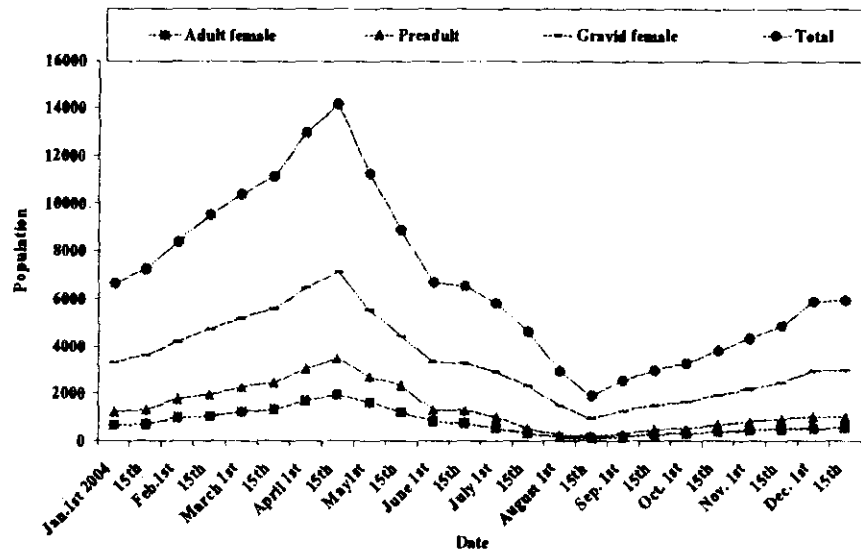


Fig. (1) : Half monthly mean numbers of *Parlatoria blanchardi* on date palm trees in Giza Governorate during 2004

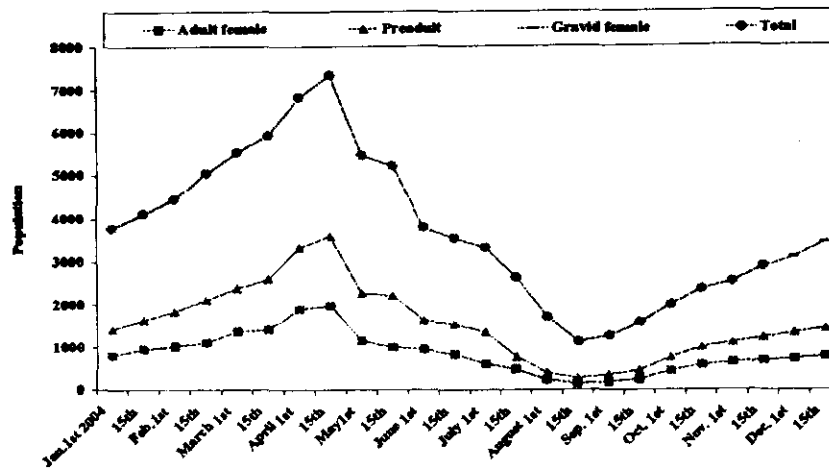


Fig. (2) : Half-monthly mean numbers of *Parlatoria blanchardi* on date palm trees in Giza Governorate during 2005

In Giza, *P. blanchardi* was parasitized by *Aphytis phoenicis* De Bach & Rosen, *Encarsia citrina* (Craw) and *Pteroptrix aegyptica* Evans & Abd-Rabou with average parasitism rates of 0.8, 1.8 and 0.4 % during the first year 2004 . Parasitism peaks were at 2.8, 4.5 and 1.1%, respectively (Fig. 3). In the second year 2005, the average parasitism rates were 1.1, 1.6 and 0.4 % and peaks of parasitism were at 3.4, 3.1 and 1.9 %, respectively (Fig. 3). The results revealed that *E. citrina* is the most common parasitoid attacking *P. blanchardi* in Giza.

In El-Arish, The average parasitism rates by *Aphytis phoenicis* De Bach & Rosen, *Encarsia citrina* (Craw) were 3.1% and 1.5% during the first year. While, in the second year the average parasitism rates were 2.7% by *A. phoenicis* and 1.5% by *E. citrina*, respectively. In the first year 2004, peaks of parasitism were 7.9 and 4.8 % by *A. phoenicis* and *E.citrina* recorded during October (Fig.4). Also, peaks of parasitism 2.7 and 4.5 of *A.phoenicis* and *E. citrina* in the second year 2005 were observed during October (Fig.4). The results indicated that *A. phoenicis* recorded here is a dominant parasitoid attacking this armored scale insect in El-Arish .Abd-Rabou (1997) found that *E. citrina* was associated with 8 armored scale insect species in different locations in Egypt and the maximum parasitism rate (65%) was recorded when *E.citrina* was associated with *Chrysomphalus dictyospermi*(Morgan) .

In Giza *P. blanchardi* was attacked by three predators. These are *Chilocorus bipustulatus* L., *Chrysopaerla carnea* Steph .and *Scymnus syriacus* Muls. In this location, the predator *C. bipustulatus* was the most abundant predators attacking *P. blanchardi* .The highest number recorded for this predator was 10 and 8 individuals per 50 leaflets during April, 2004-2005, respectively. The predators *Chrysopa carnea* Steph .and *S. syriacus* Muls.were found attacking this pest at high rates of 8, 3 and 9, 7 per 50 leaflet during the first and second years, respectively (Fig. 5).

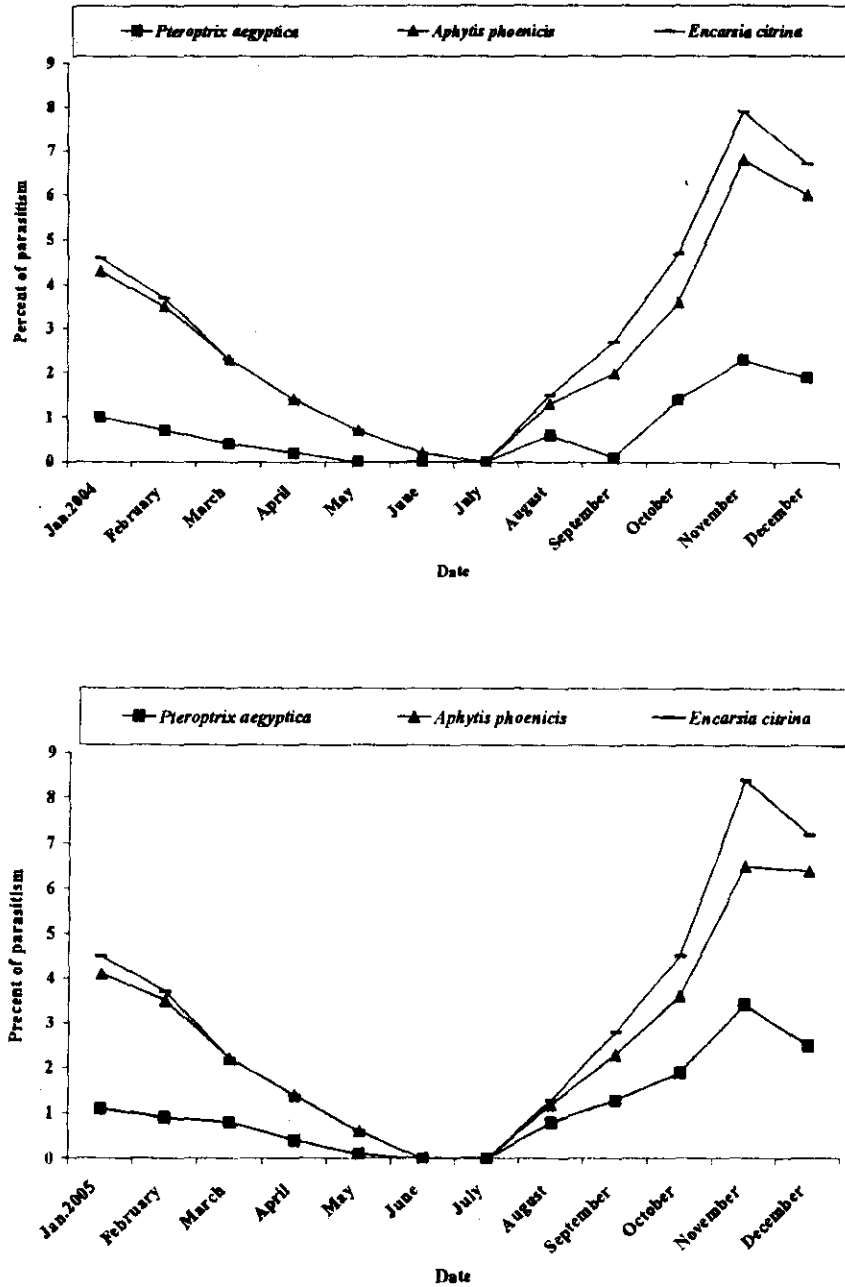


Fig.(3): Percentages of parasitism on *P.blanchardi* infested date palm trees by aphelinid parasitoids at Giza governorate throughout 2004 and 2005 year.

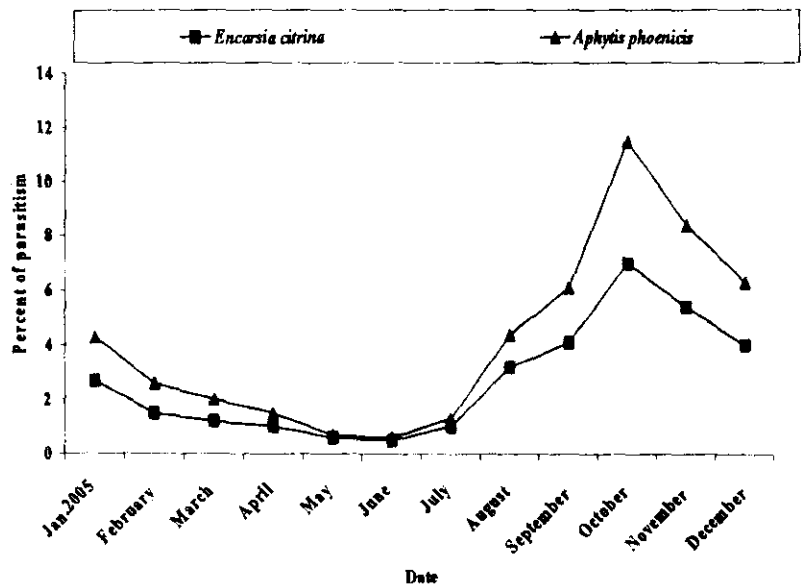
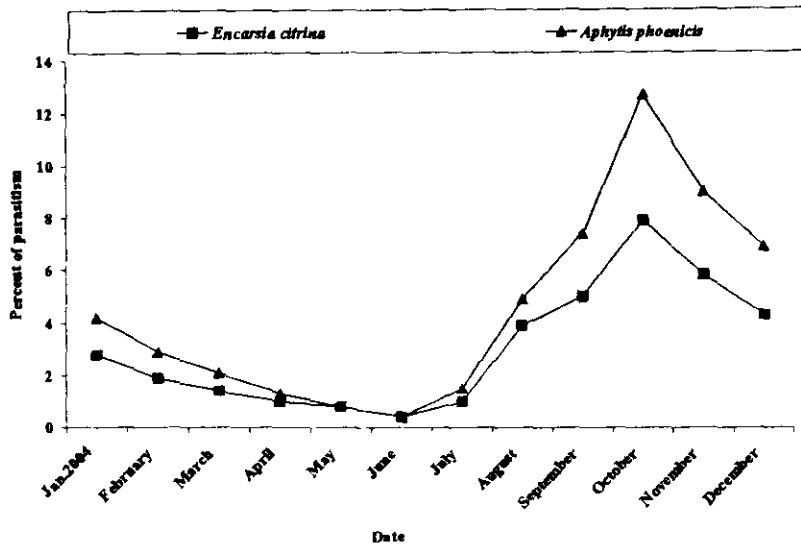


Fig. (4) : Percentages of parasitism on *P. blanchardi* infested date palm trees at El-Arish city throughout 2004 and 2005 year

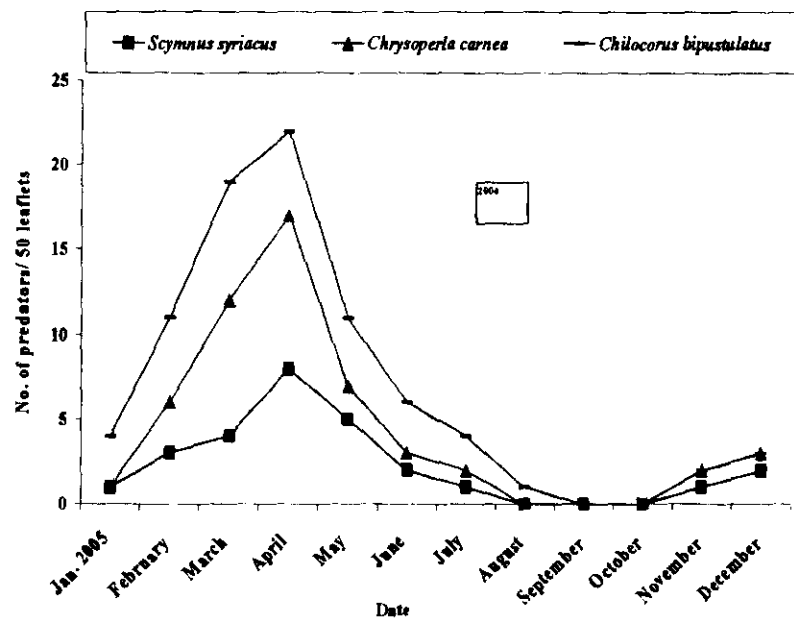
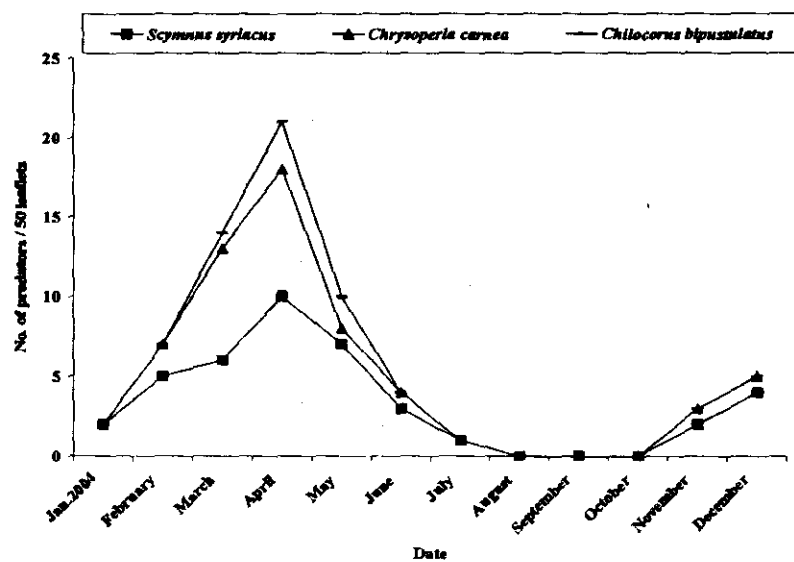


Fig. (5): Numbers of different predators counted on date palm trees (by direct count) at Giza governorate during 2004 and 2005 year.



In El-Arish, *P. blanchardi* was attacked by three predators, i.e. *C. bipustulatus*, *C. vulgaris* and *R. cardinalis*. In this location, the predators *C. bipustulatus* and *C. vulgaris* are the most abundant predators attacking *P. blanchardi*. The highest numbers recorded for these predators were 14, 12 and 13, 14 individuals per 50 leaflets during April, 2004 and 2005, respectively. The predator *R. cardinalis* was found attacking this pest at high rates of 7 and 9 per 50 leaflets during the first and second years, respectively (Fig. 6).

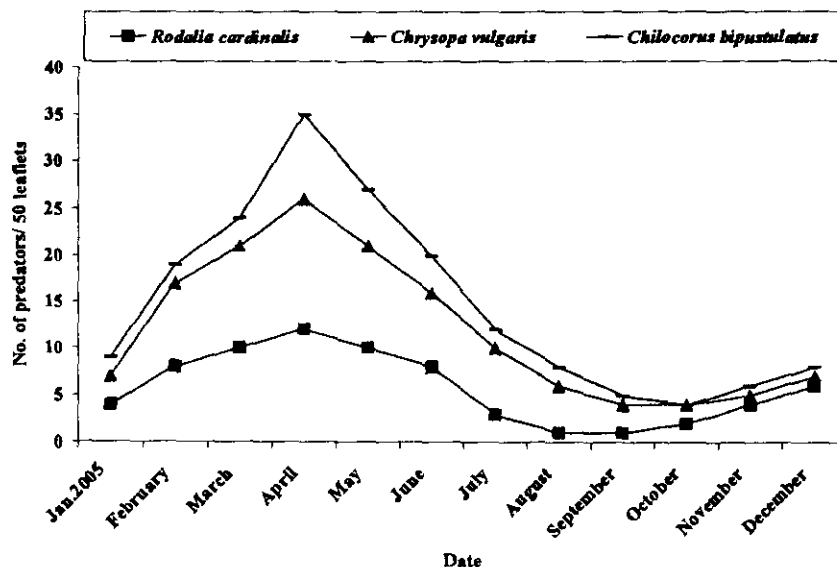


Fig. (6): Numbers of different predators counted on date palm trees ( by direct count) at El-Arish city during 2004 and 2005 year.

#### REFERENCES

- Abd-Rabou, S. (1997): The role of *Encarsia citrina* (Hymenoptera: Aphelinidae) in the biological control of armored scale insects (Homoptera: Coccoidea: Diaspididae) in Egypt. Proceeding of the First Scientific Conference of Agricultural Sciences, Faculty of Agric. Assiut Univ., Vol. II, 711-718.
- Abd-Rabou, S. (2003): Scale insects and their management in Egypt Adv. Agric. Res. In Egypt Vol. 4 (1): 1- 63.
- Abd-Rabou, S. and Hendawy, A. S. (2000): Parasitoids attacking date palm scale, *Parlatoria blanchardi* (Targioni-Tozzetti) (Homoptera : Diaspididae) in Egypt. J. Agric. Sci., Mansoura Univ., 25 (12): 8217-8222.
- Abivardi, C. (2001): Iranian entomology: an introduction. Volume 2. Applied entomology. Springer-Verlag, Berlin, Heidelberg, New York. Pp 445-1033.

- Bénassy, C. (1990): Date palm. In: D. Rosen (ed.), Armoured scale insects, their biology, natural enemies and control. Vol. 4B. World Crop Pests. Elsevier, Amsterdam, the Netherlands: 585-591.
- Borchsenius, N.S. (1966): A catalogue of the armoured scale insects (Diaspidoidea) of the world. (In Russian.) Nauka, Moscow, Leningrad, Russia. 449 pp.
- Carpenter, J.B. and Elmer, H.S. (1978): Pests and diseases of the date palm. Agriculture Handbook, Science and Education Administration, United States Department of Agriculture No. 527. 42 pp.
- Gill, R.J. (1997): The scale insects of California. Part 3. The armored scales (Homoptera: Coccoidea: Coccidae). Technical Series in Agricultural Biosystematics and Plant Pathology No. 3. California Department of Food and Agriculture, Sacramento, California, USA. 307 pp.
- Madkouri, M. (1976): *Parlatoria blanchardi* Tag.: Cochenille blanche des Palmacees. Pp.168-169. In: Ravageurs et maladies des plantes cultivees au Maroc. Direction de la Recherche Agronomique (Ed.),Rabat, Morocco

العوائل النباتية والتوزيع الجغرافي والتوزيع الموسمي لحشرة النخيل القشرية  
*Parlatoria blanchardi* واعدائها الحيوية في مصر

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معهد بحوث وقاية النباتات- مركز البحوث الزراعية - الدقي - الجيزة

في هذا البحث تم عمل دراسات على العوائل النباتية والتوزيع الجغرافي والتوزيع الموسمي لحشرة النخيل القشرية *Parlatoria blanchardi* واعدائها الحيوية في مصر. خلال الفترة من يناير ٢٠٠٤ حتى ديسمبر ٢٠٠٥ وقد تم تسجيل حشرة النخيل القشرية على ٤ عوائل نباتية موزعة على ٩ أماكن في ٨ محافظات. وقد وجد أن هذه الآفة تهاجم بواسطة ٣ أنواع من المتطفلات الحشرية وهي *Aphytis phoenicis* De Bach & Rosen, *Encarsia citrina* (Craw) and *Pteroptrix aegyptica* Evans & Abd-Rabou, و٥ أنواع من المفترسات الحشرية *Chilocorus bipustulatus* Predators: *Chrysoperla carnea* Steph., *Chrysopa vulgaris*, *Rodalia cardinalis* Muls. and *Scymnus syriacus* Muls. ولقد تم دراسة التوزيع الموسمي لحشرة النخيل القشرية واعدائها الحيوية في مصر لموسمين متتالين في محافظتي الجيزة وشمال سيناء أثناء الفترة من يناير ٢٠٠٤ حتى ديسمبر ٢٠٠٥ وقد أظهرت النتائج أن هذه الآفة لها قمتين الأولى في النصف الثاني من ابريل (٧٠٣٢ حشرة) أما الثاني فكانت في النصف الثاني من ديسمبر (٢٩٧٢ حشرة) وهذا في السنة الأولى. أما في السنة الثانية فالقمتين كانت (٧٣٣١ حشرة) في النصف الثاني من ابريل و(٣٤٤٤ حشرة) في النصف الثاني من ديسمبر. كما تبين من الدراسة ان المفترس *C. bipustulatus* والطفيل *E. citrina* من أكثر الأعداء الحيوية المؤثرة في تعداد هذه الآفة.