NATURAL ENEMIES OF THE SOFT BROWN SCALE, *COCCUS HESPERIDUM* L. (HOMOPTERA: COCCIDAE) IN EGYPT

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Abstract

The soft brown scale, *Coccus hesperidum* L. (Homoptera: Coccidae) is an important pest of orchards trees in Egypt. During January, 2003 – December, 2004 survey of *C. hesperidum* parasitoids and predators was conducted. The following thirteen parasitoid species of aphelinids, encyrtids, eulophids, mymarids and pteromalids were collected and recorded. Parasitoids included: *Alaptus* sp., *Coccophagus bivittatus* Compere, *C. ishii* Compere, *C. lycimnia* (Walker), *C. scutellaris* (Dalman), *Diversinervus elegans* Silvestri, *Encarsia citrina* (Craw), *Marietta leopardina* Motschulsky, *M. picta* (Andre), *Microterys flavus* (Howard), *Parechthrodryinus coccidiphagus* (Mercet), *Scutellista cyanea* Motschulsky and *Tetrastichus* sp. Six of them are new records in Egypt. However, 8 predators were collected, these are *Chrysoperla carnea* (Stephens), *Chrysopa septempunctata* Wesm., *Coccinella septempunctata* L., *Orius laevigatus* Fieb., *Orius albidipennis* Reuter, *Scymnus interruptus* Goez., *Exochomus flavipes* Thunb. and *Metasyrphus corollae* Fab. Abundance of these parasitoid and predator species was evaluated in three locations, namely Gharbiya, Qalyubiya and Giza. *C. scutellaris* and *E. flavipes* were collected from all investigated locations and were the effective natural enemies of *C. hesperidum.*

INTRODUCTION

The soft brown scale, *Coccus hesperidum* L. (Homoptera: Coccidae) is one of the most cosmopolitan and polyphagus coccid species . It has been recorded from about 236 host plants in 93 plant families and distributed among 112 countries. In Egypt, it is considered to be a serious pest, attacking 18 species belonging to 15 families, including citrus, guava and ornamental plants (Abd-Rabou *et al.*, 1999). It is more often a pest of ornamental plants but is usually controlled by natural enemies (Hamon and Williams, 1984).

Parasitoids and predators of *C. hesperidum* attracted many research workers all over the world including Egypt, Hamon and Williams (1984), Ben-Dov and Hodgson (1997), Hendawy (1999), Abd-Rabou *et al.* (1999) and Abd-Rabou (2001, 2003).

The aim of this investigation is to study the survey and the seasonal abundance of the natural enemies attacking *C. hesperidum* in Egypt.

MATERIALS AND METHODS

A survey of natural enemies (Parasitoids and Predotors) of *C. hesperidum* specially their abundance was carried out from January, 2003 – December , 2004 on *Psidium guajava* trees in three localities, namely, Gharbiya, Qalyubiya and Giza.

The above mentioned heavily infested locations by *C. hesperidum* were selected to achieve investigations 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 15 infested twigs (20 cm long) and 30 infested leaves. These were detached off and brought to the laboratory for inspection. Each twig or leaf 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. While, the predators were examined and counted in the field. The specimens were identified and confirmed by the first author and the Department of survey and Classification, Plant Protection Research Institute.

RESULTS AND DISCUSSION

During January, 2003 – December , 2004 survey of *C. hesperidum* parasitoids and predators was conducted.

I. Parasitoids

Thirteen parasitoid species of aphelinids, encyrtids, eulophids, mymarids and pteromalids were collected and recorded from concerned specimens under investigation.

These are: *Alaptus* sp., *Coccophagus bivittatus* Compere, *C. ishii* Compere, *C. lycimnia* (Walker), *C. scutellaris* (Dalman), *Diversinervus elegans* Silvestri, *Encarsia citrina* (Craw), *Marietta leopardina* Motschulsky, *M. picta* (Andre), *Microterys flavus* (Howard), *Parechthrodryinus coccidiphagus* (Mercet), *Scutellista cyanea* Motschulsky and *Tetrastichus* sp.

At Giza location the parasitism rates averaged 2.5, 0.3, 4, 0.3, 1.7 % and 1.3, 0.8, 1.4, 0.1, 2.9% by, *C. bivittatus, C. scutellaris, D elegans, E. citrina* and *M. flavus* for the first and second years, respectively. The climax of parasitism amounting 33 and 25.5 % occurring in Giza location was attained during Oct. 2003 and 2004, respectively (Figs 1 and 2).

In Qalyubiya location amounted 0.6, 0.5, 2.9, 0.3, 1.1 and 1.2, 0.8, 5.1, 0.9, 0.3% by *C. ishii, C. lycimnia, C. scutellaris, M. picta, M. leopardina,* for the first and second years, respectively. Peak parasitism totaled 16 and 22% during Oct. 2003 and 2004, respectively(Figs 3 and 4).

In Gharbiya location the parasitism rates averaged 0.3, 1.1, 4.8, 0.3, 0.4 % and 0.9, 0.9, 7.2, 0.5, 0.9 % by *P. coccidiphagus, Tetrastichus* sp., *C. scutellaris* , *S. cyanea, Alaptus* sp. for the first and second years, respectively. The peaks of parasitism amounting 21 and 33 % occurring in Gharbiya location was attained during Oct. 2003 and 2004, respectively (Figs 5 and 6).

Alaptus sp., *C. lycimnia, M. picta, P. coccidiphagus, S. cyanea* and *Tetrastic* sp. are reported here for the first time by this study as a *C. hesperidum* parasitoic Egypt. *C. scutellaris* was collected from all investigated locations. Also, it is the most abundant parasitoids of *C. hesperidum* .

Abd-Rabou (2003) reviwed the parasitoids of soft scale insects including *C. hesperidum* . The role of the parasitoids in controlling soft scale insects studied by Ben-Dov and Hodgson (1997) and Hamon and Wiliiams (1984).

II. Predators

Eight predators were collected, included: *Chrysoperla carnea* (Stephens), *Chrysopa septempunctata* Wesm., *Coccinella septempunctata* L., *Orius laevigatus* Fieb., *Orius albidipennis* Reuter, *Scymnus interruptus* Goez., *Exochomus flavipes* Thunb. and *Metasyrphus corollae* Fab.

At Giza location the peaks of predators were 15, 11, 18 and 12, 7, 12 by *C. carnea, O. laevigatus* and *E. flavipes* for the first and second years, respectively(Figs 7 and 8). In Qalyubiya location the peaks of predators were 10, 3, 17, 2 and 12, 12, 18, 2 by *C. septempunctata, S. interruptus, E. flavipes* and *O. albidipennis* for the first and second years, respectively (Figs 9 and 10). While, In Gharbiya location the peaks of predators were 1, 6, 13 and 4, 3, 14 by *M. corollae, C. septempunctata* and *E. flavipes* for the first and second years, respectively (Figs 11 and 12).

E. flavipes were collected from all investigated locations and were the effective natural enemies of *C. hesperidum.*

El-Batran (1997) and Hendawy (1999) agree with the findings of the present work. They observed *E. flavipes* as an effective bioagents in controlling *C. hesperidum.*

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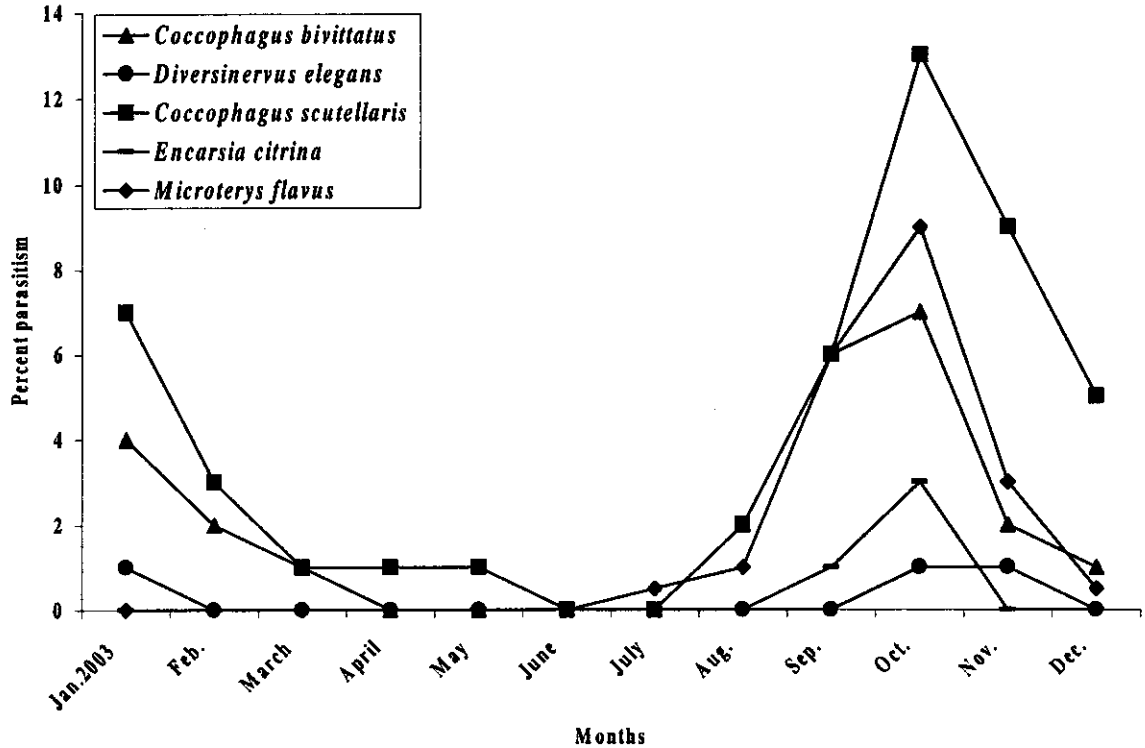

Fig.1: Percent parasitism of different parasitoids attacking *Coccus hesperidum* in Giza governorate during 2003

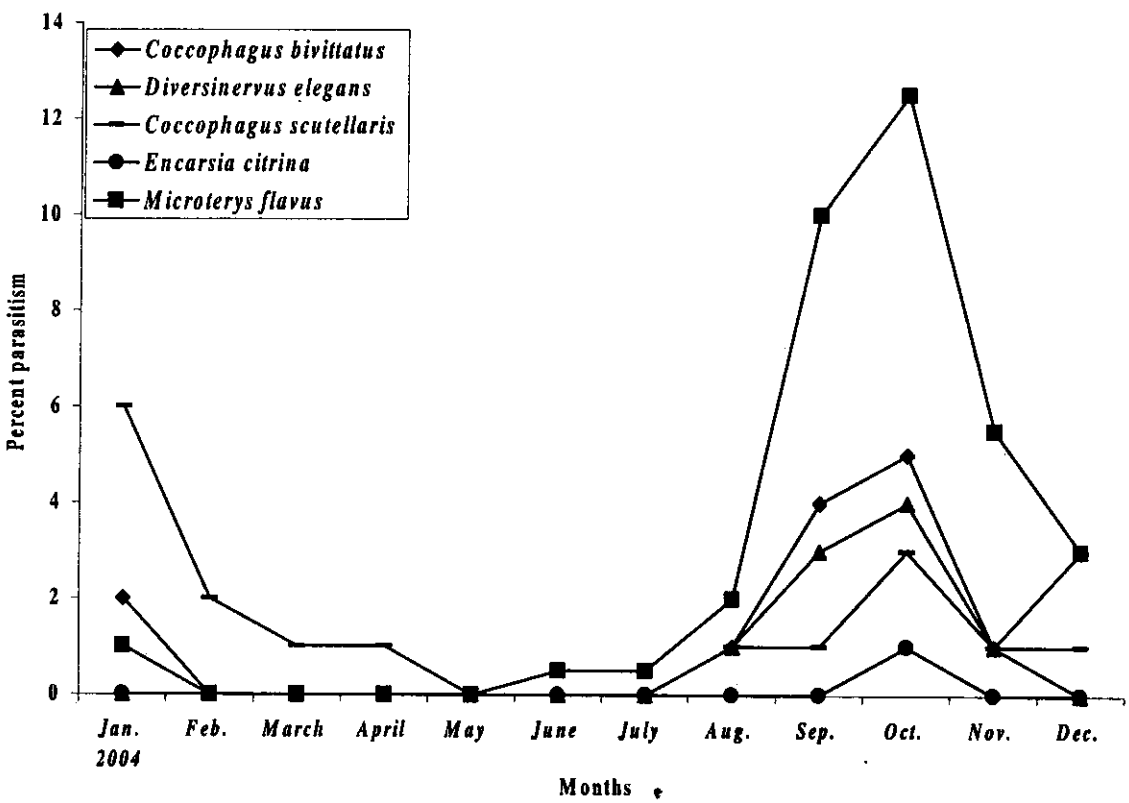

Fig.2: Percent parasitism of different parasitoids attacking *Coccus hesperidum* in Giza governorate during 2004

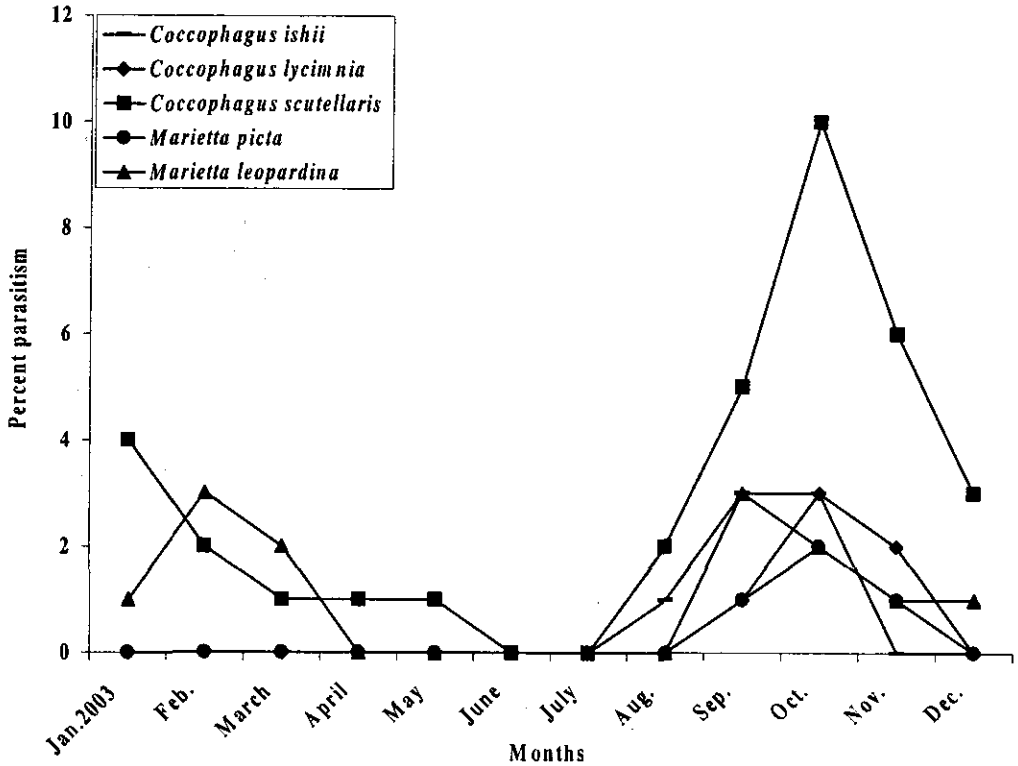

Fig.3: Percent parasitism of different parasitoids attacking *Coccus hesperidum* in Qalyubiya governorate during 2003

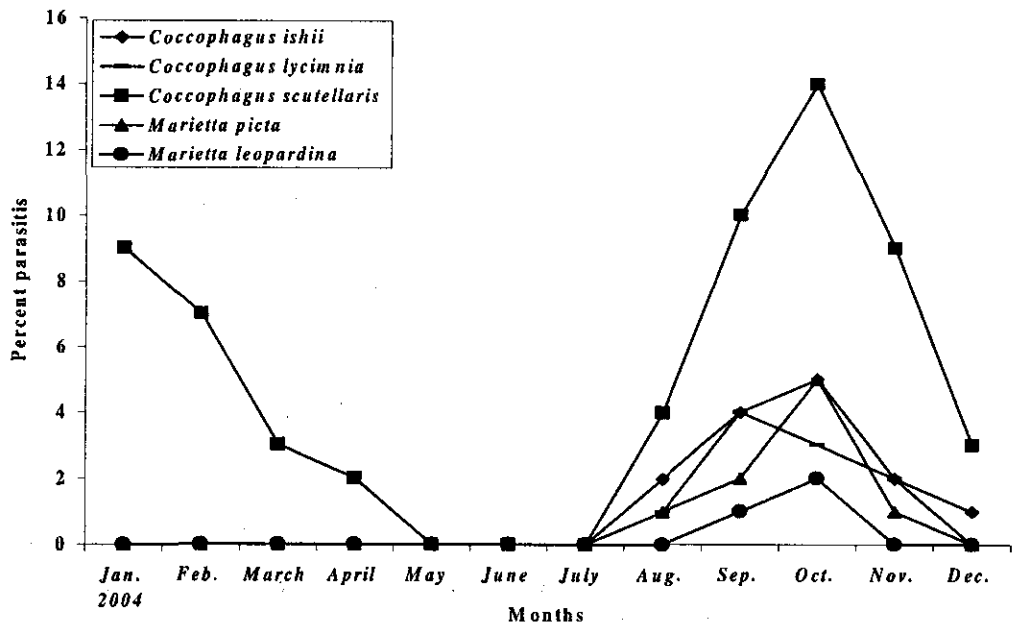

Fig.4: Percent parasitism of different parasitoids attacking *Coccus hesperidum* in Qalyubiya governorate during 2004

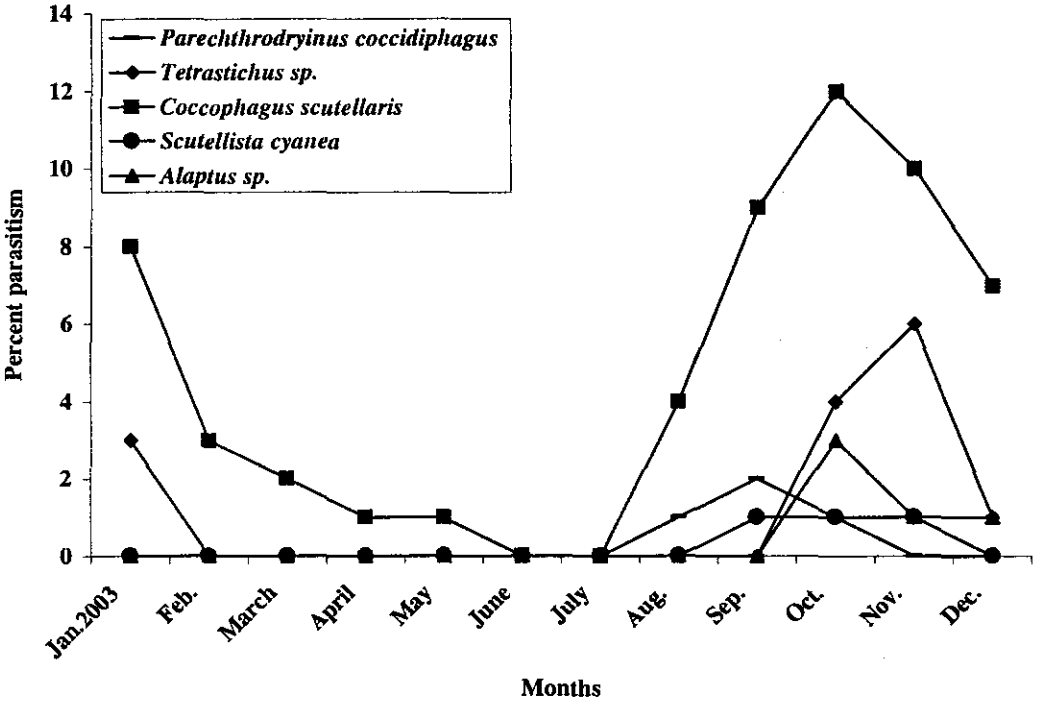

Fig.5: Percent parasitism of different parasitoids attacking *Coccus hesperidum* in Gharbiya governorate during 2003

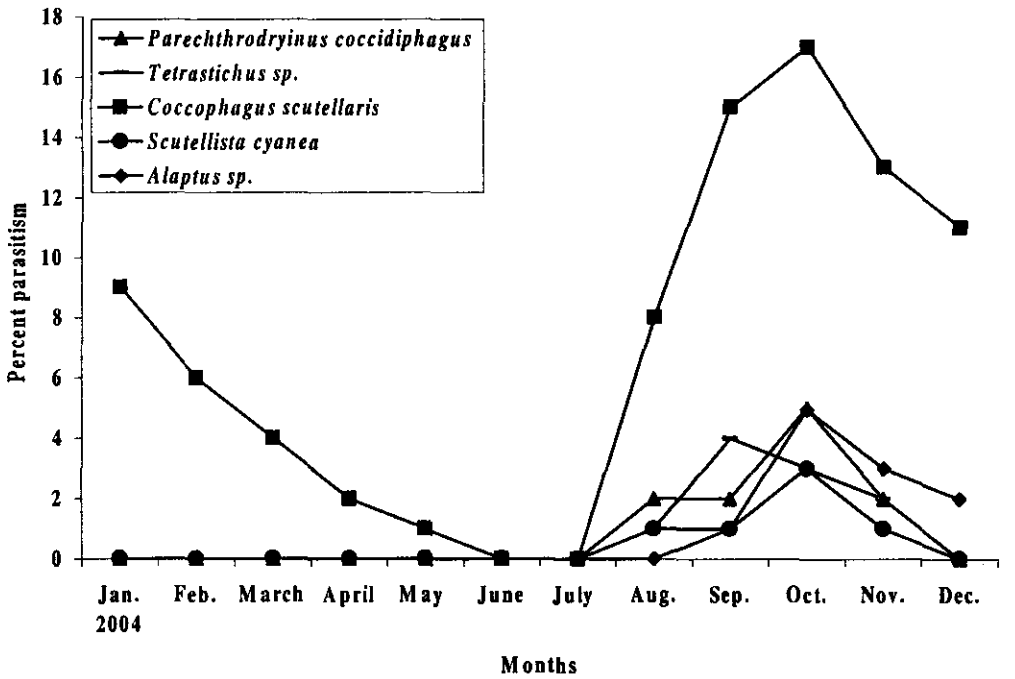

Fig.6: Percent parasitism of different parasitoids attacking *Coccus hesperidum* in Gharbiya governorate during 2004

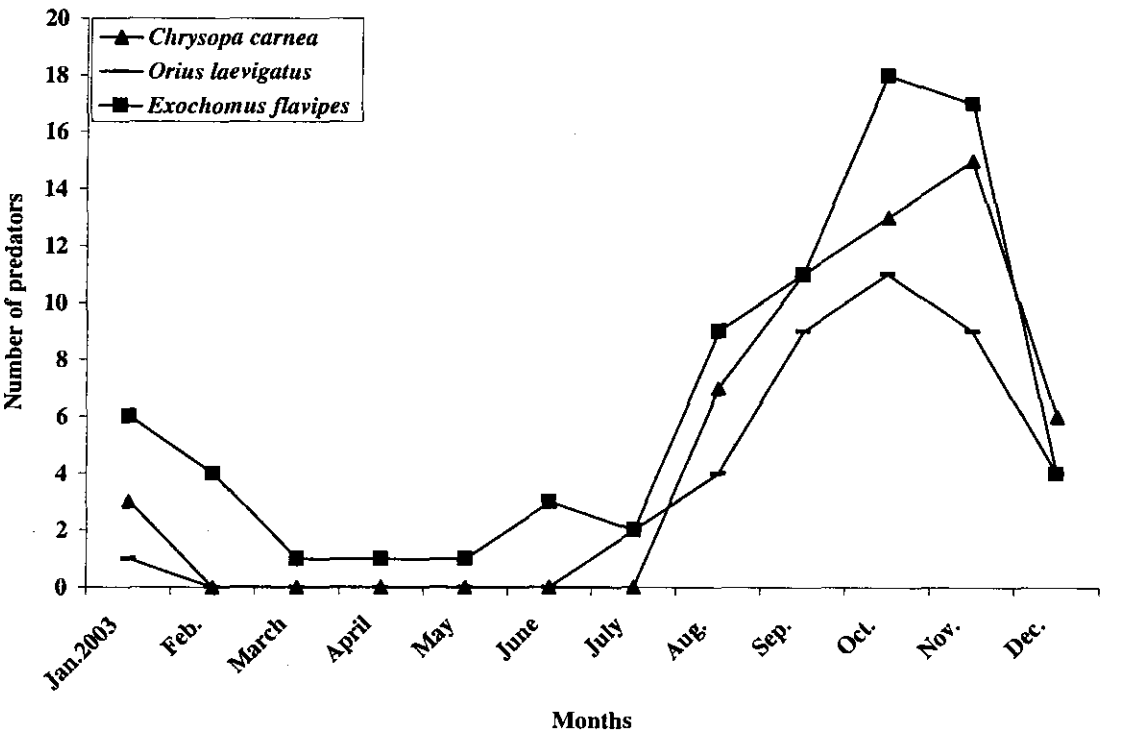

Fig.7: Number of different predators attacking *Coccus hesperidum* in Giza governorate during 2003

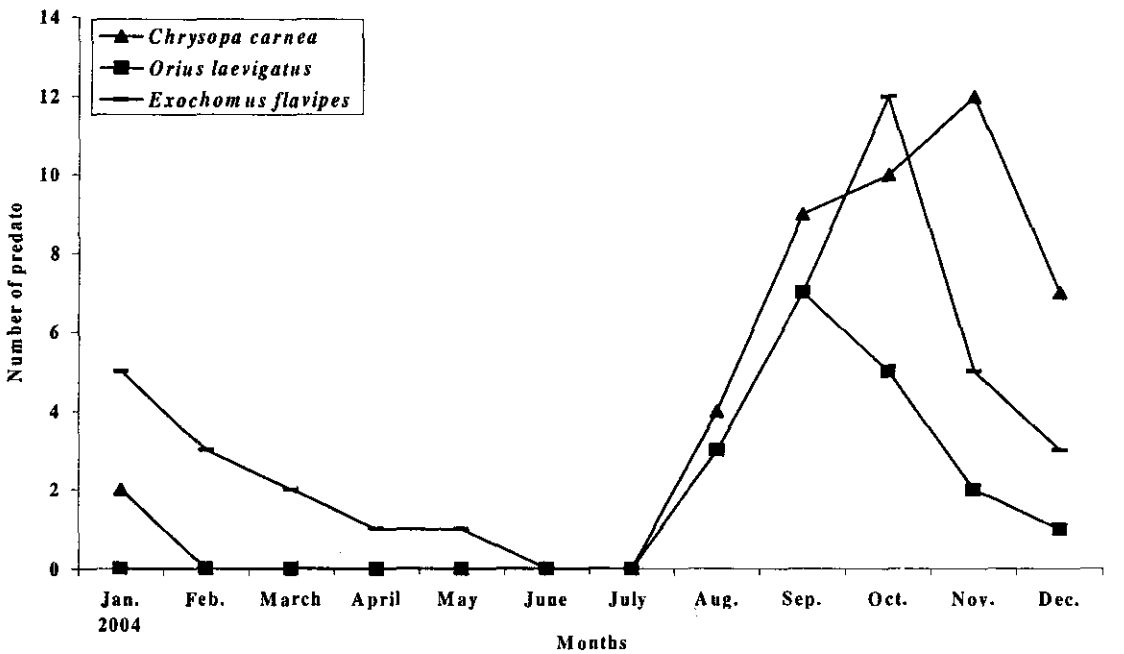

Fig.8: Number of different predators attacking *Coccus hesperidum* in Giza governorate during 2004

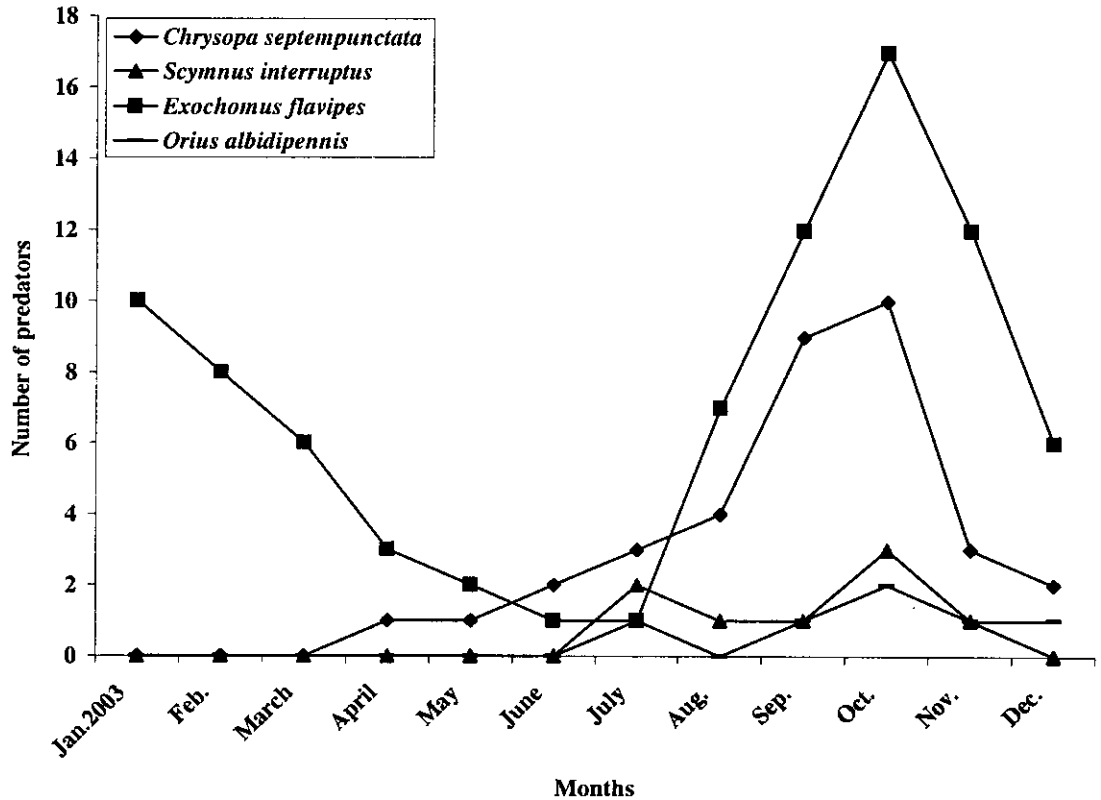

Fig.9: Number of different predators attacking Coccus hesperidum in Qalyubiya governorate during 2003

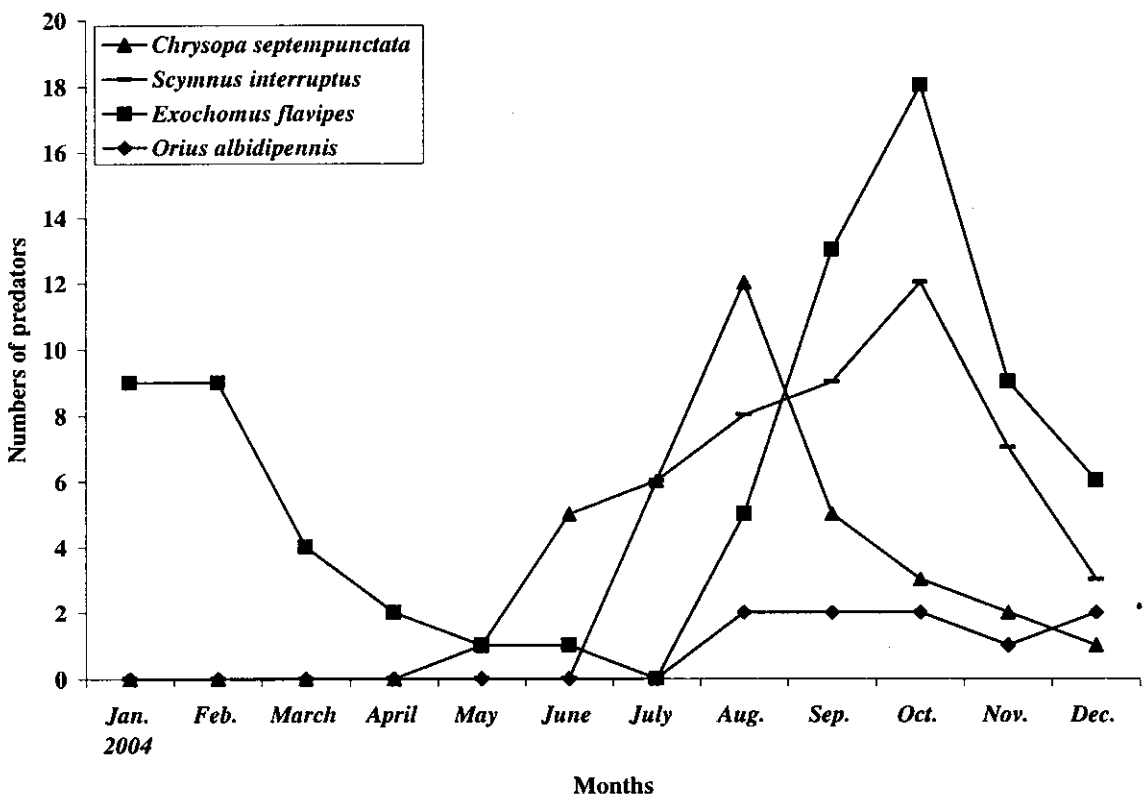

Fig.10: Number of different predators attacking *Coccus hesperidum* in Qalyubiya governorate during 2004

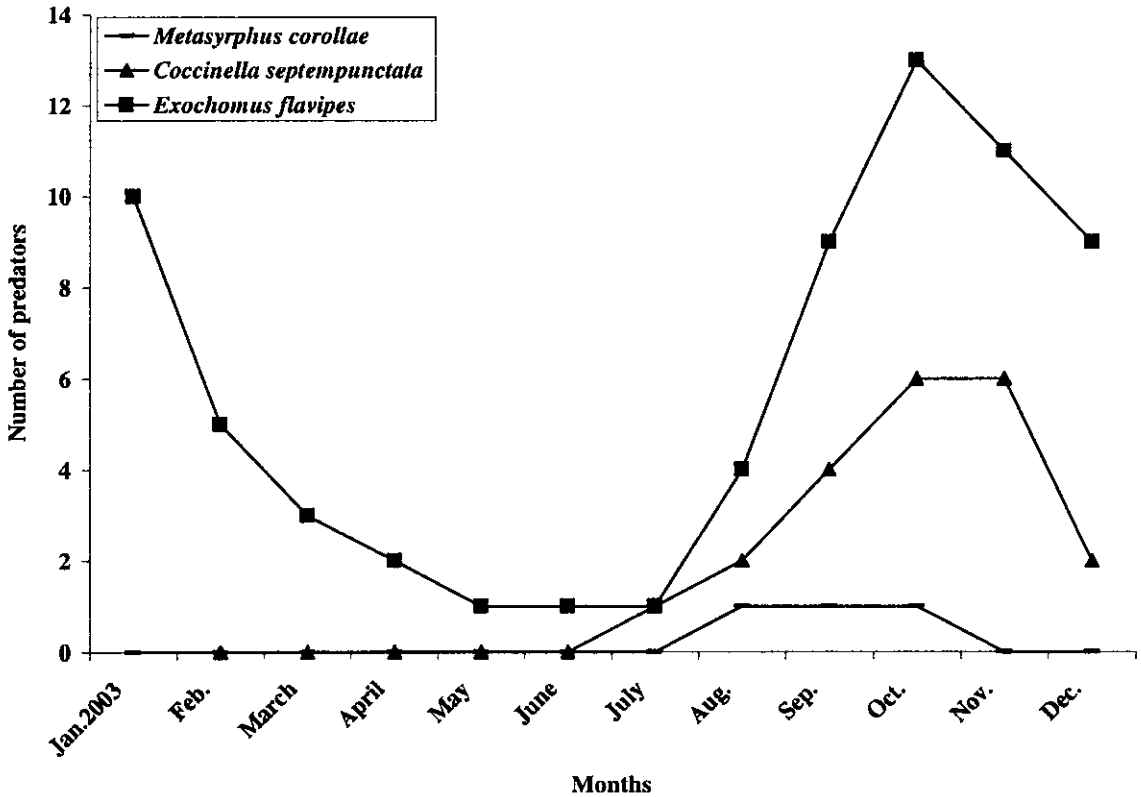

Fig.11: Number of different predators attacking *Coccus hesperidum* in Gharbiya governorate during 2003

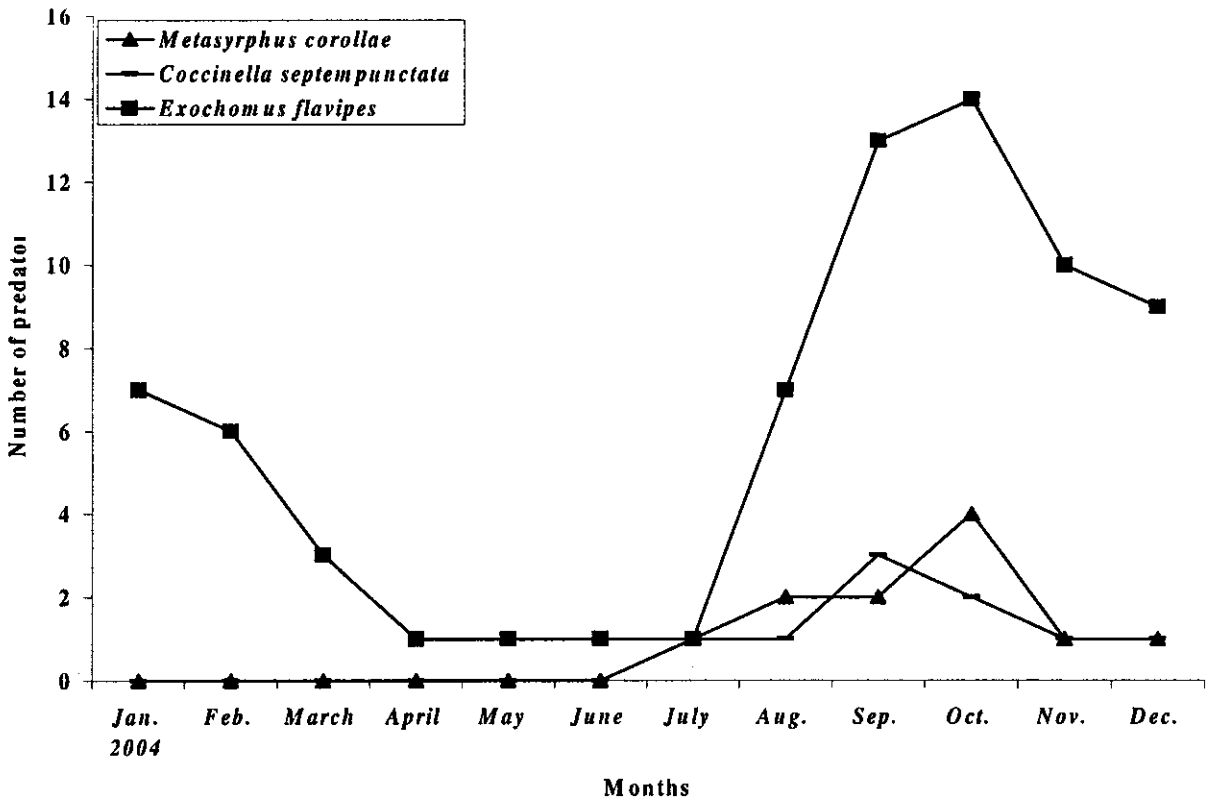

Fig.12: Number of different predators attacking *Coccus hesperidum* in Gharbiya governorate during 2004

الأعداء الحيوية علي الحشرة البنية الرخوة في مصر

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الحشرة البنية الرخوة إحدى أهم الآفات التي تصيب أشجار الفاكهة في مصر . أثناء الفتـــرة من يناير ٢٠٠٣- ديسمبر ٢٠٠٤ تم عمل حصر للطفيليات والمفترسات التي تتطفل وتفتـــرس هـــذه الآفة في مصر. ومن نتائج الحصر تم تسجيل ١٣ من الطفيليات الأولية والثانوية مصاحبة لهذه الآفة منهم ٦ أنواع تسجل لأول مرة في مصر وهى

Alaptus sp., *Coccophagus bivittatus* Compere, *C. ishii* Compere, *C. lycimnia* (Walker), *C. scutellaris* (Dalman), *Diversinervus elegans* Silvestri, *Encarsia citrina* (Craw), *Marietta leopardina* Motschulsky, *M. picta* (Andre), *Microterys flavus* (Howard), *Parechthrodryinus coccidiphagus* (Mercet), *Scutellista cyanea* Motschulsky and *Tetrastichus* sp.

و عدد ٨ مفترسات وهى:

Chrysopa carnea (Stephens), *Chrysopa septempunctata* Wesm., *Coccinella septempunctata* L., *Orius laevigatus* Fieb., *Orius albidipennis* Reuter, *Scymnus interruptus* Goez., *Exochomus flavipes* Thunb. and *Metasyrphus corollae* Fab.

تم أيضا عمل دراسة موسمية لهذه الطفيليات والمفترسات فى ثلاث محافظات وهم الغربيـــة و القليوبية و الجيزة . وقد أتضح أيضا من هذا العمـــل أن طفيـــل *C. scutellaris* و مفتـــرس *E. flavipes* من أهم الطفيليات و المفترسات التي تتطفل و تفترس هذه الآفة فى مصر.