

INSECT PREDATORS ATTACKING THE HEMISPHERICAL SCALE, *Saissetia coffeae* (Walker) (Hemiptera: Coccidae) IN EGYPT

Abd-Rabou, S. and Hoda Badary

Plant Protection Research Institute, Agriculture Research Center, Dokki, Giza, Egypt

ABSTRACT

The hemispherical scale, *Saissetia coffeae* (Walker) (Hemiptera: Coccidae) has been recorded on olive, coffee, guava ornamental plants especially of cycads and frens and numerous other hosts in many subtropical and tropical areas. A survey of predators of *S. coffeae* specially their abundance was carried out during 2004-2005 on different host plants in four localities, namely, Gharbiya Giza Marsy Matrouh and North Sinai (El-Arish). Twelve species of predators of *S. coffeae* were collected. The coleopterous predators were *Coccinella septempunctata* L., *C. undecimpunctata* L., *Scymnus interruptus* Goez. *Scymnus syriacus* Mars., *Exochomus flavipes* Rodalia *cardinals* Muls. and *Paederus affierii* Koch. The neuropterous predator was *Chrysoperla carnae* Steph. The hemipterous predator were *Orius laevigatus* Fieb., *Orius albidipennis* (Reuter). The dipterous predator were *Metasyrphus corollae* Fab. and *Paragus compeaitus* Wied. On the other hand *S. syriacus* was the most abundant predator attacking *S. coffeae* in all locations under investigations

INTRODUCTION

The hemispherical scale, *Saissetia coffeae* (Walker) (Hemiptera: Coccidae) has been recorded on olive, coffee, guava ornamental plants especially of cycads and frens and numerous other hosts in many subtropical and tropical countries (Ben-Dove, 1993). The hemispherical scale is distributed in the tropics and in some sub-tropical areas (Hill, 1983). Willcocks (1922) recorded this pest for the first time in Egypt on Malabar nut trees. Later Abd-Rabou (2001) recorded this species on guava in Alexandria and Behira Governorates. *S. coffeae* infests different parts of the plant and fruits. Hemispherical scales feed on plant juices and cause a loss of vigor, spots on the foliage due to toxins in the scale saliva, deformation of infested plant parts, loss of leaves, retarded plant growth, and even death of the plant (Dekle, 1965; Reinert, 1974; Beardsley and Gonsalves, 1975; Ibrahim, 1985, Valand *et al.*, 1989,). Efficient biological control by parasitoids conducted in different localities of the world (Bartlett, 1978).

The aim of this investigation is to study the survey and seasonal abundance of the insect predators attacking *S. coffeae* in Egypt.

MATERIALS AND METHODS

A survey of predators of *S. coffeae* specially their abundance was carried out during 2004-2005 on different host plants in four localities, namely, Gharbiya, Giza, Marsy Matrouh and North Sinai (El-Arish).

Four locations heavily infested by *S. coffeae* 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 transferred to the laboratory for inspection.

Simple correlation was performed on data to determine the relationships between the populations of *S. coffeae* and the populations of the associated predators.

RESULTS AND DISCUSSION

Thirteen species of predators of *S. coffeae* were recorded on *Ficus nitida*, guava and olive trees in Gharbiya, Giza, Marsy Matrouh and North Sinai Governorates. The coleopterous predators were *Coccinella septempunctata* L., *C. undecimpunctata* L., *Scymnus interruptus* Goez., *Scymnus syriacus* Mars., *Exochomus flavipes* Thunb. *Rodalia cardinalis* Muls. *Paederus alfieri* Koch. The neuropterous predator was *Chrysoperlla carmae* Steph. The hemipterous predators were *Orius laevigatus* Fieb. and *Orius albidipennis* (Reuter). The dipterous predators were *Metasyrphus corollae* Fab. and *Paragus compeaitus* Wied.

Predators which surveyed from samples of *S. coffeae* on different host plants varied according to the four Governorates of Egypt.

Ficus nitida infested by *S. coffeae* in Giza Governorate and five predators were recorded as: *C. septempunctata*, *M. corollae*, *O. albidipennis*, *O. laevigatus* and *S. syriacus*.

Data represented in Fig.(1) and (2) showed that, *F. nitida* the predators, *S. syriacus* and *O. albidipennis* were the most abundant predators attacking *S. coffeae* and the highest numbers recorded for these predators were 23, 20 and 27, 25 individuals/ 50 leaves during 2004 and 2005, respectively. The predators, *C. septempunctata*, *O. laevigatus* and *M. corollae* are counted on *F. nitida* and were found attacking *S. coffeae* at high numbers / 50 leaves were 5,3,4 and 6,5,6 individuals / 50 leaves during 2004 and 2005 years, respectively. The relationship between population of *S. coffeae* and *S. syriacus* was significant with $r = 0.667$ and $P < 0.05$ (Figs 1 and 2)

As shown in figs (3 and 4) guava infested by *S. coffeae* in Gharbiya Governorate during 2004-2005. The insect pest attacking by five predators *C. undecimpunctata*, *E. flavipes*, *P. alfieri*, *S. interruptus* and *S. syriacus*.

On Guava the predators, *E. flavipes* and *P. alfieri* are the most abundant predators attacking *S. coffeae*. The highest numbers recorded for these predators were 21, 10 and 18, 8 individuals/ 50 leaves during 2004 and 2005, respectively. The predators, *C. undecimpunctata*, *S. interruptus* and *S. syriacus* are counted on Guava and were found attacking *S. coffeae* at high numbers that equivalent to per 50 leaves, 9,7,5 and 7,6,4 individuals during 2004 and 2005, respectively (Figs 3 and 4). The relationship between population of *S. coffeae* and *C. undecimpunctata*, *E. flavipes*, *P. alfieri*, and *S. syriacus* was significant with $r = 0.898$, 0.888 , 0.930 , 0.864 and $P < 0.01$ during 2004. During 2005 the relationship between population of *S. coffeae* and *C. undecimpunctata*, *P. alfieri*, and *S. syriacus* was significant with $r = 0.819$, 0.727 , 0.857 and $P < 0.01$ while *E. flavipes* with $r = 0.689$ and $P < 0.05$. Data represented in Figs (5-6) showed that, olive infested by *S. coffeae* in North

Sinia Governorate (El-Arish) during 2004 and 2005. The insect pest attacking by *C. undecimpunctata*, *S. syriacus*, *R. cardinals* and *C. carnae*

On Olive the predators, *C. carnae* and *S. syriacus* are the most abundant predators attacking *S. coffeae*. The highest numbers recorded for these predators were 18, 10 and 19, 15 individuals/ 50 leaves during 2004 and 2005, respectively. The predators, *C. undecimpunctata* and *R. cardinals* are counted on Olive and found attacking *S. coffeae* at high number were 10, 6 and 14, 9 individuals / 50 leaves ,during 2004 and 2005, respectively (Figs 5-6). The relationship between population of *S. coffeae* and *C. carnae* and *S. syriacus* was significant with $r = 0.780$, 0.932 , and $P < 0.01$ while *C. undecimpunctata* with, $r = 0.634$ and $P < 0.05$ during 2004. During 2005 the relationship between population of *S. coffeae* and *C. carnae* and *S. syriacus* was significant with $r = 0.769$, 0.910 , and $P < 0.01$ while *C. undecimpunctata* with, $r = 0.667$ and $P < 0.05$

As shown in Figs (7 and 8) olive infested by *S. coffeae* in , Marsy Matrouh Governorate during 2004-2005. The insect pest *S. coffeae* attacking by three predators *C. carnae*, *P. compeaitus* and *S. syriacus*.

On Olive the predators, *S. syriacus* are the most abundant predators attacking *S. coffeae*. The highest numbers recorded for these predators were 19 and 23 individuals/ 50 leaves during 2004 and 2005, respectively. The predators, *C. carnae* and *P. compeaitus* are counted on Olive and were found attacking *S. coffeae* at high number 8,6 and 9, 11 individuals/50 leaves during 2004 and 2005, respectively (Figs 7 and 8). The relationship between population of *S. coffeae* and *S. syriacus* was significant with $r = 0.832$ and $P < 0.01$ during 2004. During 2005 the relationship between population of *S. coffeae* and *S. syriacus* was significant with $r = 0.792$ and $P < 0.01$ while *C. carnae* with $r = 0.700$ and $P < 0.05$

The coleopterous insect predators feeding on soft scale infesting citrus, mango, ledge plants in Mansoura region were *Cydonia vicina isis* Cr., *Cydonia vicina nilotica* Muls., *C. septempunctata*, *C. undecimpunctata*, and *E. flavipes* (Abd Allah, 1988). The predators, *C. bipustulatus*, *S. syriacus*, *Pharoscymnus varius* Kirsch and *R. cardinals* were feeding on some soft scale insects. *Chrysopa* sp. larvae are very common and polyphagous predators feeding on many soft scale insects (Hamed and Hasanien, 1991). *C. bipustulatus*, *S. syriacus*, *C. bipustulatus*, *C. carnea* and *C. septempunctata* recorded associated with different species of soft scale insects in Kafr El-Sheikh (El-Agamy, et al., 1994). El-Batran (1997) investigated the searching behavior of larvae of *E. flavipes* and *C. carnea* for *Coccus hesperidum* L. Hendawy (1999) mentioned that the highest peak of soft scale insects was detected in November, which coincided with the highest peak of predators. Then the population of predators gradually declined and peaked in May just before the peak of scale insects. This statement agree with the results conducted in the present work. Abd-Rabou et al. (2003) recorded two peaks for *C. bipustulatus*, *C. undecimpunctata* and one peak for *S. syriacus*, *C. carnea* and *E. flavipes* when attacking the Mediterranean black scale, *Saissetia oleae* (Oliver). The predators of *S. coffeae* were studied by Monacon and Abbicco (1987) in Italy and Agowska (1995) in Poland while the present work studied here for the first time in Egypt.

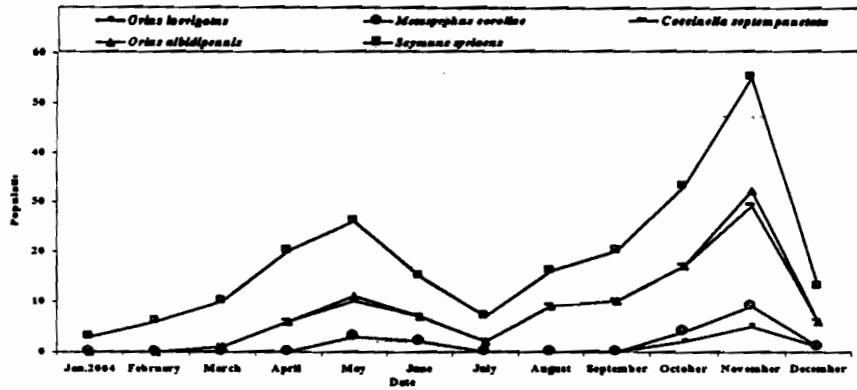


Fig.1: Monthly numbers of predators/ 50 leaves of *Ficus nitida* attacking *S. coffeae* in Giza Governorate in during 2004

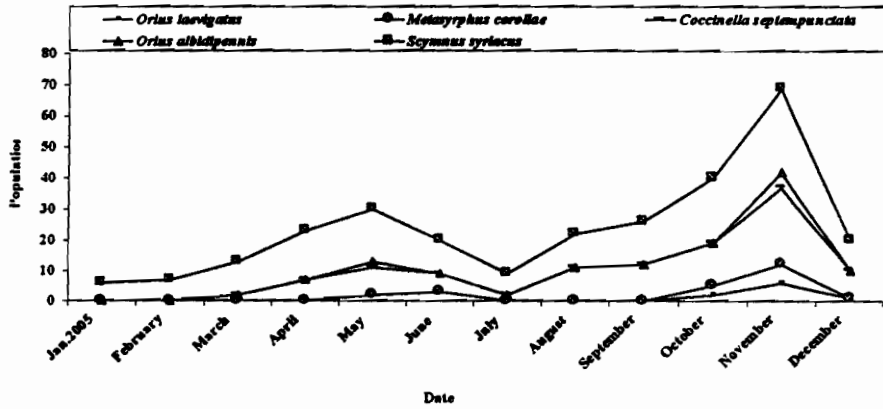


Fig.2: Monthly numbers of predators/ 50 leaves of *Ficus nitida* attacking *S. coffeae* in Giza Governorate in during 2005

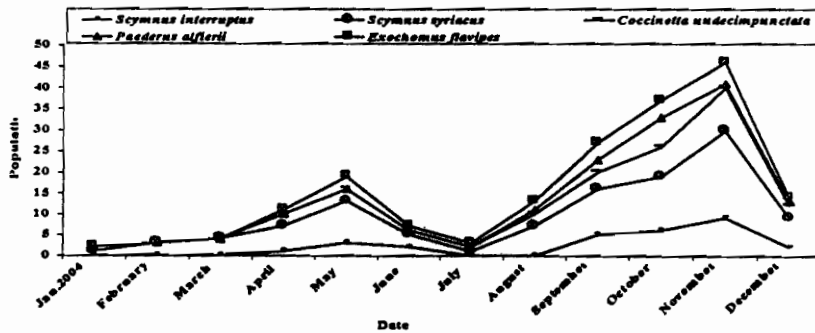


Fig.3: Monthly number of predators/ 50 leaves of guava attacking *S. coffeae* in Gharbiya Governorate during 2004

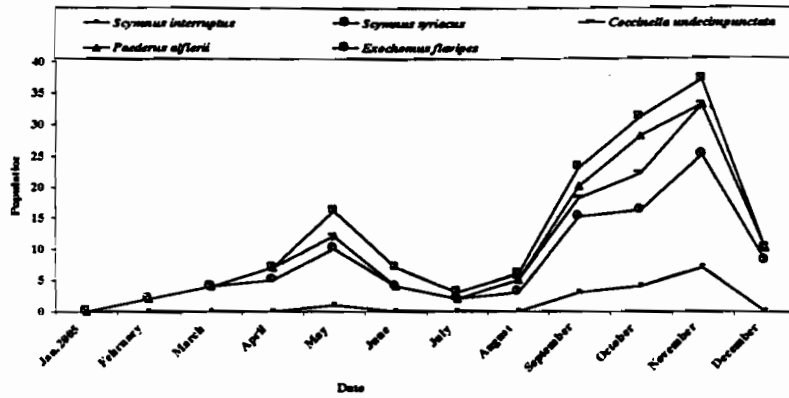


Fig.4: Monthly number of predators / 50 leaves of guava attacking *S. coffea* in Gharbiya Governorate during 2005

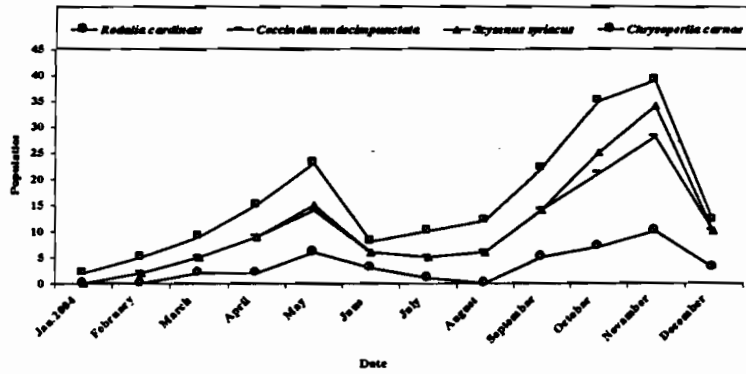


Fig.5: Monthly number of predators / 50 leaves of olive attacking *S. coffea* in North Sina Governorate (El-Arish) during 2004

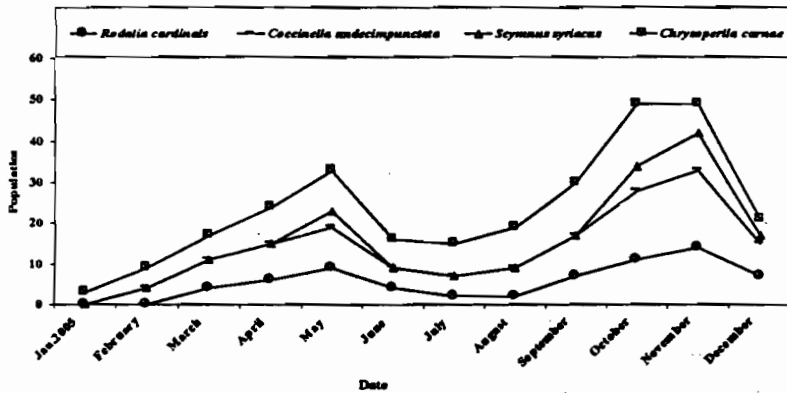


Fig.6: Monthly number of predators / 50 leaves of olive attacking *S. coffea* in North Sina Governorate (El-Arish) during 2005

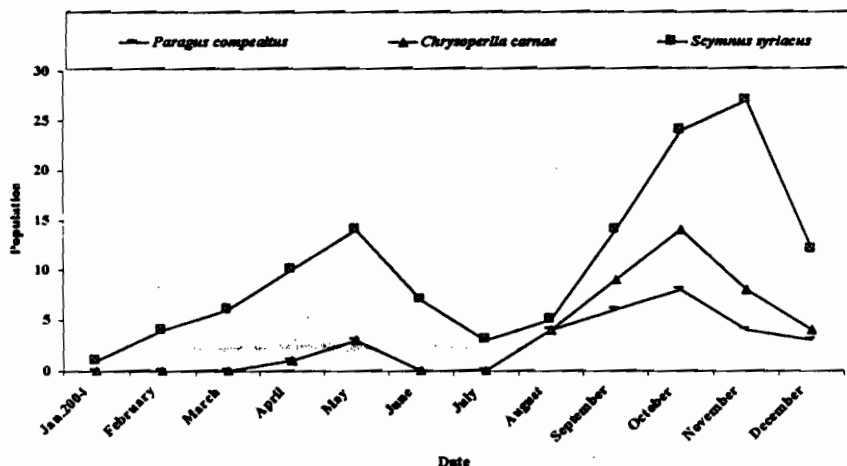


Fig.7: Monthly numbers of predators / 50 leaves of olive attacking *S. coffea* in Maryut Matrouh Governorate during 2004

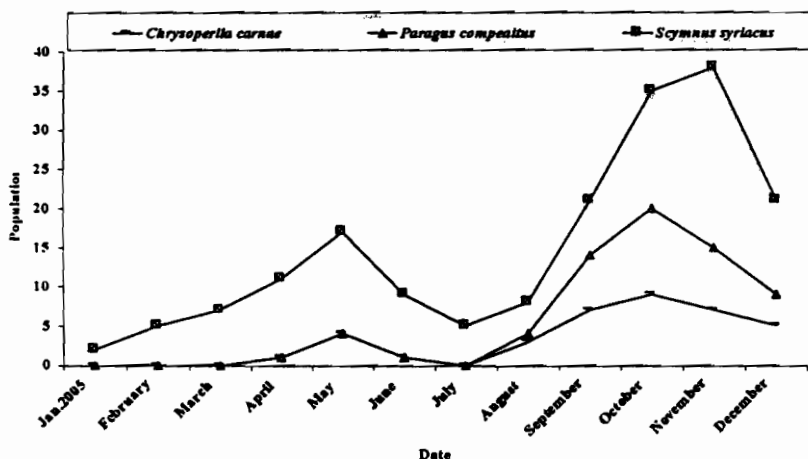


Fig.8: Monthly numbers of predators / 50 leaves of olive attacking *S. coffea* in Maryut Matrouh Governorate during 2005

REFERENCES

- Abd Allah, L.A. (1988): Studies on predator and parasite insects attacking scale insects and mealybugs in Dakahlia Governorate. Ph.D. Thesis, Fac. Agric., Mansoura Univ.
- Abd-Rabou, S. (2001): A survey of parasitoids associated with the hemispherical scale, *Saissetia coffea* (Walker) (Hemiptera : Coccidae) in North-west Coastal area of Egypt. Bull. Fac. Agric. Cairo, Univ. Special Edition, 1-5.

- Abd-Rabou, S., Hafez, A. and Badary, H. (2003): Survey and dynamics of natural enemies of the Mediterranean Black Scale, *Saissetia oleae* (Homoptera:Coccidae) in Egypt. Egyptian J. of Agric. Res. 81(1) : 115-123.
- Agowska, B. (1995): The biological control perspective of scale insects (Homoptera : Coccinea) on ornamental plants in greenhouses. *Wiadomosci Entomologiczne*, 14(1); 5-10.
- Bartlett (1978): Introduced parasites and predators of arthropod pests and weeds: a worldwide review. United States Department of Agriculture, Agricultural Handbook 480-545pp. [Coccidae, pp.57-74. In: Clausen, C.P.(Ed.)]
- Beardsley, J.W. and Gonsalves, R.H. (1975): The Biology and Ecology of Armored Scales. *Ann. Rev. Entomol.* 20: 47-73.
- Ben-Dove, Y. (1993): A systematic catalogue of the soft scale insects of the world (Homoptera: Coccoidea: Coccidae), with data on geographical distribution, host plants, biology and economic importance. Sandill Crane Press, INC., 497.
- Dekle, G. W. (1965): Arthropods of Florida Vol. 3, Florida Armored Scale Insects. Division of Plant Industry, Florida Department of Agriculture, Gainesville. 265 pp.
- El-Agamy, F. M.; Metwally, S.M.; Shower, M.B. and Metwally, M.M. (1994): The role of parasitoids in the control of Florida wax scale, *Ceroplastes floridensis* Comst. In Kafr El-Sheikh Governorate, Egypt, *J. Agric. Res. Tanta Univ.*, 20(1): 58-64.
- El-Batran, L.A. (1997): Laboratory studies on searching behaviour of larvae of *Exochomus flavipes* (Thunb.) and *Chrysoperla carnea* (Steph.) for *Coccus hesperidum* L. *Egypt. J. Biol. Pest Control*, 7(2): 103-105.
- Hamed, A.R. and Hasanien, F. A. (1991): Survey of parasitoids and predators of important scale insects, mealybug and whiteflies in Egypt. *Egypt. J. Biol. Pest Control*, 1(2):147-152.
- Hanafi, H. (1976): Studies on the morphology, biology and control of the hemispherical scale *Saissetia hemispheric* (Targioni) infesting Guava trees in A.R.E. M.Sc. Faculty of Agriculture, Al-Azhar University. 84pp.
- Hendawy, A. S. (1999): studies on certain natural enemies of scale insects attacking guava trees at Kafr El-Sheikh Govenorate. Ph.D. Thesis, Fac. Agric., Tanta Univ.
- Hill, D.S. (1983): *Agricultural Insect Pests of the Tropics and Their Control*, Second Edition. Cambridge University Press; Cambridge, London, New York, New Rochelle, Melbourne, Sydney. 746 pages.
- Ibrahim, A.G. (1985): The Effects of Temperature on the Development of Hemispherical Scale, *Saissetia coffeae* (Walker). *Pertanika*. 8(3): 381-386.
- Monacon, R. D. and Abbicco, M. (1987): Biological observations on *Saissetia coffeae* (Rhynchota -Hom.- Coccidae). *Entmologica*, 22:75-85.
- Reinert, J. A. (1974): Management of the False Oleander Scale, *Pseudaulacaspis cockerelli* (Cooley). *Proc. Fla. State Hortic. Soc.* 87: 518-520.

Valand, V.M., Patel, J.I. and Mehta, D.M. (1989): Biology of brown scale (*Saissetia coffeae*) on pointed gourd (*Trichosanthes dioica*). Indian J. Agric. Sci. 59(9): 610-611.

Willcocks, F. C. (1922): A survey of the more important economic insects and mites of Egypt. Sultaning Agricultural Society. (Bull., 1, p. 335).

المفترسات الحشرية التي تهاجم الحشرة النصف كروية الرخوة في مصر

شعبان عبد ربه و هدى بدارى

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

الحشرة النصف كروية الرخوة إحدى أهم الآفات التي تصيب أشجار الفاكهة في مصر وخاصة الزيتون و البن و الجوافة ونباتات الزينة في المناطق الأستوائية والشبه أستوائية . أثناء الفترة من ٢٠٠٤-٢٠٠٥ تم عمل حصر للمفترسات التي تفترس هذه الآفة في محافظات الغربية و الجيزة و شمال سيناء (العريش) و مرسى مطروح. ومن نتائج الحصر تم تسجيل ١٢ مفترس وهي: مفترسات غمدية الأجنحة كانت أبو العيد ذو السبع نقاط ، أبو العيد ذو الأحدى عشر نقطة ، أبو العيد الأسكنس المنقط، أبو العيد الأسكنس السورى، أبو العيد الأكر كومس و Xنفساء الرودوليا و الحشرة الرواعة. مفترسات شبكية الأجنحة كانت أسد المن. بينما مفترسات رتبة نصفية الأجنحة كانت *Orius laevigatus* Fieb., *Orius albidipennis* و قد كانت مفترسات ذات الجناحين هي ذبابة السرفس و *Paragus compeaitus* Wied. تم أيضا عمل دراسة موسمية لهذه المفترسات وقد أتضح أيضا من هذا العمل أن مفترس أبو العيد الأسكنس السورى أكثر هذه المفترسات تواجدا التي تفترس هذه الآفة في مصر.