

HYMENOPTEROUS PARASITOIDS AS A BIOAGENT FOR CONTROLLING HOMOPTEROUS INSECTS IN EGYPT

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Abstract

Homoptrous insects are of the most important pests that attack different economic plants as cotton, citrus, vegetables and other food crops in Egypt. These insects have piercing sucking mouth parts besides the secretion they exude honey dew that acquire black sticky paint on leaves stopping proper respiration and consequently results in drastic damage to other parts of the plants. Till now these are mostly controlled by chemical compounds that cause a lot of pollution to Egyptian environment (Abd-Rabou and Ghahari,2004).

The piercing sucking insects comprise whiteflies (Aleyrodoidea), armored scale insects (Coccoidea), mealybugs (Coccoidea), soft scales (Coccoidea), aphids (Aphidoidea), jassids (Jassidoidea) and psyllids (Psyllidoidea). It was found that the most effective control measures lie in biological control by specialized parasitoids (Polaszek *et al.*,1992). These parasitoids play a very eminent role in controlling these varieties mostly these fall within some superfamilies and families of Chalcidoidea, Proctooidea and Platygasteroidea, of these are aphelinids, encyrtids, platygastriids and eulophids (Hayat, 1983; Subba Rao & Hayat,1985 and Abd-Rabou,1998c).

This work includes a review on the action of these parasitoids and the role they have played in addition to taxonomical, biological, ecological studies and control in Egypt is demonstrated.

Table (1) shows species of parasitoids attacking Aleyrodidae, Coccidae, Diaspididae and Pesudococcidae as well as effective, importation and the possibility of mass rearing species.

Table 1. Numbers of parasitoid species attacking different homopterous insects in Egypt

Families	Numbers of Parasitoids	Effective species	Importation species	Possibility of mass rearing
Aleyrodidae (Whiteflies)	29	17	7	10
Coccidae (Soft scales)	26	14	1	9
Diaspididae (Armored scale insects)	37	14	0	6
Pesudococcidae (Mealybugs)	24	8	1	9

The present study also demonstrates numbers of parasitic hymenopterous species that attacking different families of homopterous insects(Table 2).

Table 2. Families of parasitic hymenoptera and their numbers of species that associated with homopterous insects in Egypt.

Families of parasitic hymenoptera	Families of homopterous insects			
	Aleyrodidae (Whiteflies)	Coccidae (Soft scales)	Diaspididae (Armored scale insects)	Pseudococcidae (Mealybugs)
Aphelinidae	25	8	34	2
Encyrtidae	0	15	2	26
Eulophidae	2	1	0	0
Mymaridae	0	1	0	0
Platygastridae	2	0	0	0
Pteromalidae	0	1	0	1
Signiphoridae	0	0	0	1

N.B: The materials of this work preserved in the collection of Plant Protection Research Institute (PPRI)

Parasitoids of whiteflies (Homoptera: Aleyrodidae):

Whiteflies (Homoptera: Aleyrodidae) are well known to exert a lot of damage to a number of economic plants, vegetables and fruits (Simmons *et al.*, 2002).

These whiteflies were formally controlled chemically, however with growth of research a well known number of parasitoids were found effective for natural control of these whiteflies without polluting the environment chemically (Abdel-Fattah *et al.*, 1985 and Azab *et al.*,1969)

Therefore, it became important to identify these parasitoids, classifying, and gives knowledge about the proper action of each parasitoid individually, together with each category of its biology (De Santis,1979; Hayat,1985 and Abd-Rabou, 2002d). These numbers of parasitoids are specific for their hosts of whiteflies and accordingly are of

known specific behavior, biology and ecology concerned with these alyrodids (Ferriere, 1965).

List of parasitoids attacking whiteflies in Egypt:

Family: Aphelinidae

1. *Encarsia acaudaleyrodis* Hayat
2. *Encarsia davidi* Viggiani and Mazzon
3. *Encarsia elegans* Masi
4. *Encarsia formosa* Gahan
5. *Encarsia galilea* Rivany and Gerling
6. *Encarsia inaron* (Walker)
7. *Encarsia lahorensis* (Howard)
8. *Encarsia lutea* Masi
9. *Encarsia mineoi* Viggiani
10. *Encarsia olivina* (Masi)
11. *Encarsia perconfusa* Evans and Abd-Rabou
12. *Encarsia protransvena* Viggiani
13. *Encarsia ramsesi* Polaszek
14. *Encarsia sofia* Girault
15. *Eretmocerus aegypticus* Evans and Abd-Rabou
16. *Eretmocerus cadabae* Viggiani
17. *Eretmocerus corni* Haldeman
18. *Eretmocerus diversicilatus* Silvestri
19. *Eretmocerus emiratus* Zolnerowich and Rose
20. *Eretmocerus eremicus* Rose and Zolnerowich
21. *Eretmocerus hayati* Zolnerowich and Rose
22. *Eretmocerus mundus* (Mercet)
23. *Eretmocerus roseni* Gerling
24. *Eretmocerus siphonini* Viggiani & Battaglia
25. *Eretmocerus parasiphonini* Evans and Abd-Rabou

Family: Platygasteridae

26. *Amitus hesperdium* Silvestri
27. *Amitus aleurotubae* Viggiani and Mazzone

Family: Eulophidae

28. *Euderomphale chelidonii* Eröds
29. *Euderomphale ezzati* Abd-Rabou

Family: Aphelinidae

1. *Encarsia acaudaleyrodis* Hayat

Diagnosis: Mid lobe and axillae dark anteriorly. Mide lobe of mesoscutum with 2+2 setae and each side lobe of mesoscutum with only 1 seta. Longest seta on marginal

fringe of fore wing less than the maximum width of the wing disc. Ovipositor 1.2X or more as long as mid tibia.

Material Examined: 2♀♀, New Valley, Dakhla Oases, 15.IV.1992, ex. *Tetraleurodes leguminicola* (Bink-Moenen) on *Acacia tortilis* (PPRI).

Distribution: New Valley governorate.

Hosts: *T. leguminicola* (Homoptera: Aleyrodidae).

Remarks: This species was collected for the first time in Egypt by Polaszek *et al.* (1999).

Role in the biological control: This species is recorded only associated with *Acacia* whitefly, *T. leguminicola* in New Valley governorate (Polaszek *et al.*, 1999).

2. *Encarsia davidi* Viggiani and Mazzon

Diagnosis: Head and thorax light-lemon yellow, gaster brown. Female with antennal club 3-segmented, first 2 funicular segments square or wide than long (each about 1-2/3 times, as long as wide). Gaster with distinctly pale, unpigmented areas, third valvulae dark and elongate, approximately 0.40x as long as the ovipositor.

Material Examined: 1 ♀, Qalyubiya, 17. VIII. 1991, ex. *Bemisia argentifolii* (Bellows & Perring) on *Altheae rosea*; 1 ♀, New Valley (Dakhla), 15. III. 1992, ex. *Ramsesseus follioti* Zaharadnik on *Acacia tortilis* (PPRI); 5♀♀, El-Arish, 8. X. 1991, *Siphoninus phillyreae* (Hal.) on *Punica granatum*.

Distribution: Aswan, Giza, Qalyubiya, North and South Sinai governorates.

Hosts: *Acaudaleyrodes rachipora* (Singh), *Aleurolobus marlatti* (Quaintance), *Aleyrodes proletella* (L.), *B. argentifolii* and *S. phillyreae* (Homoptera: Aleyrodidae).

Role in the biological control: Abd-Rabou and Abou-Setta (1998) recorded this species associated with *S. phillyreae* in El-Arish with maximum parasitism rates 8% in August and Abd-Rabou (1998e) mentioned that *E. davidi* attacking *B. tabaci* in El-Arish with average parasitism rates 6%.

3. *Encarsia elegans* Masi

Diagnosis: Head and thorax brown, gaster dark-brown. Female with antennal club 2-segmented. Gaster, except apex of T7, largely brown to dark brown. Face with one or two brown to dark cross bands above the toruli (antennal insertions). Side lobes of mesoscutum each with three setae. Male antenna with sensorial complex on funicular segments.

Material Examined: 6 ♀♀, Sharqiya, 26. VII. 1996, ex. *A. marlatti* on *Z. spinachristi*; 3 ♀♀, Assiut, 4. III. 1993, ex. *A. marlatti* on *Z. spinachristi*.

Distribution: Assiut, Aswan, El-Minya, Sharqiya and North Sinai governorates.

Hosts: *A. marlatti*, *Aleurolobus olivinus* (Silvestri) and *B. argentifolii* (Homoptera:Aleyrodidae).

Role in the biological control: *E. elegans* is considered the dominant parasitoids of *A. marlatti* with parasitism rates of 72.0% and 56% in Sharqya and Assiut, respectively (Abd-Rabou, 1997e). Later Abd-Rabou (2001c) manipulated this species in large number from Sharqiya to different localities in Egypt to discuss the effective role of this species in controlling different whitefly species.

4. *Encarsia formosa* Gahan

Diagnosis: Head and thorax largely brown or black, gaster largely yellow. Female with antennal club 2-5segmented. Mesoscutum with 24 setae. Mid tarsi 4-segmented. Tarsal formula 5-4-5. Tibial supr of middle leg about ½ as long as the corresponding basitarsus. Each axilla with at least 6 reticulated cells longitudinally. Male antenna 7-segmented. Fourth and fifth funicular segments of male antenna separate.

Material Examined: 19 ♀♀, Qalyubiya, 7. VIII. 1997, ex. *B. argentifolii* on *Lantana camara* (PPRI).

Distribution: Beni-Suef, Qalyubiya and Gharbiya governorates.

Hosts: *B. argentifolii* and *Trialeurodes ricini* (Misra) (Homoptera: Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou (1998b).

Role in the biological control: Abd-Rabou (1998f) introduced, reared and released about 30000 individuals from this species to control *B. argentifolii* on *L. camara* in Giza and maximum parasitism rate reached 83%. The same author (1998g), also introduced, reared and released about 23000 individuals from *E. formosa* on *T. ricini* and maximum parasitism rates reached 70%.

5. *Encarsia galilea* Rivany and Gerling

Diagnosis: Head and thorax largely yellow with brown spots. Female with antennal club 3-segmented. Mesoscutum with 14 long setae. Mid tarsi 5-segmented. Tibial supr of middle leg about 2/3 as long as the corresponding basitarsus. Gonostyli yellow.

Material Examined: 10 ♀♀, North Sinai (El-Arish) 15. VII. 1996, ex. *S. phillyreae* on *Punica granatum* (PPRI).

Distribution: North Sinai (El-Arish) governorate.

Hosts: *S. phillyreae* (Homoptera: Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou (1998b).

Role in the biological control: Parasitism rates by this species in El-Arish region on the whitefly, *S. phillyreae* on *P.granatum* 0.4 averaged during June (Abd-Rabou,1998b).

6. *Encarsia inaron* (Walker)

Diagnosis: Head, thorax and gaster brown to black. Female with antennal club 2-segmented. Mesoscutum 12 setae. Stigmal vein of fore wing without an evident a setose area proximally. At least one small seta proximal to the stigmal vein. F1 with at least one longitudinal sensillum. Male antenna 8-segmented. Fifth and sixth funicular segments of male antenna separate.

Material Examined: 2 ♀♀, 7 ♂♂, Qalyubiya, 12. XII. 1994, ex. *T. ricini* on *Ricinus communis*; 6 ♀♀, 5 ♂♂, North Sinai (El-Arish), 7. IX. 1991, ex. *S. phillyreae* on *P. granatum* (PPRI).

Distribution: Assiut, Beni-Suef, Cairo, Kafr El-Sheikh, North Sinai and Qena governorates.

Hosts: *A. rachipora*, *S. phillyreae*, *A. proletella*, *B. argentifolii* and *T. ricini* (Homoptera: Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Priesner & Hosny (1940).

Role in the biological control: Abd-Rabou (1998d) concluded that the parasitoid *E. inaron* has some potential for suppressing population of *S. phillyreae* on Pomegranate. To be successful in Pomegranate orchards using relatively selective pesticide. Later Abd-Rabou (2001d) recorded two strains of *E. inaron* in Egypt and he reared, released and evaluated these strains on *P. granatum* and *R. communis* in different localities in Egypt.

7. *Encarsia lahorensis* (Howard)

Diagnosis: Head and thorax yellow, gaster pale-yellow, gonostyli yellow, F1 clearly longer than F2. Female with antennal club 3-segmented. Mesoscutum with 4 long setae. Mid tarsi 5-segmented. Gaster with distinctly pale, unpigmented areas. Third valvulae pale, not contrasting with the remainder of the ovipositor. Male funicular segments subequal in length.

Material Examined: 1♀, Qalyubiya 20-IX. 1996, ex *Dialeurodes citri* (Ashmead) on *Citrus* sp.(PPRI).

Distribution: Qalyubiya governorate.

Hosts: *D. citri* (Homoptera: Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou (1997d).

Role in the biological control: Abd-Rabou (1999b) introduced, released and recovered about 25000 individuals of this species into citrus orchards infested by *D.*

citri. The results indicated that *E. lahorensis* is established in Egypt and may be considered an effective antagonist of *D. citri*.

8. *Encarsia lutea* Masi

Diagnosis: Head and thorax light-lemon yellow, gaster pale-brown. Female with antennal club 3-5 segmented, first 2 funicular segments longer than wide (each about, one 2-2.5 times as long as wide. Gaster with distinctly pale, unpigmented areas. Third valvulae dark, in contrast to the remainder of the ovipositor, shorter, not more than 0.35X as long as the ovipositor and usually less. Male antenna with strongly developed sensorial complex on funicular segments

Material Examined: 2 ♀♀, Dokki, Giza, 27. X. 1991, ex. *B. argentifolii* on *L. camara*

Distribution: Aşwan, Alexandria, Behira, Cairo, Daqahilya, Giza and Qalyubiya governorates.

Hosts: *A. marlatti*, *B. argentifolii*, *Parabemisia myricae* (Kuwana), *S. phillyreae* and *T. ricini* (Homoptera: Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou (1998b).

Role in the biological control: This species attacking *B. argentifolii* with maximum parasitism rates 24% (Abd-Rabou, 1998e), *A. marlatti*, 27.2% (Abd-Rabou, 1997e); *S. phillyreae*, 6% (Abd-Rabou and Abou-Setta, 1998); *A. rachipora* 23% and *P. myricae* 22% (Abd-Rabou, 1998a and 1999d).

9. *Encarsia mineoi* Viggiani

Diagnosis: Head, thorax and gaster yellow. Female with antennal club 2- segmented. Mesoscutum 4 setae. Longest longest seta on marginal fringe of fore wing less than the maximum width of the wing disc. Ovipositor shorter than, or up to 1.1x as long as, mid tibia. Axillae pale, very rarely dark anteriorly. Male antenna with fifth and sixth funicular segments partly fused, third funicle segment without sensorial complex.

Material Examined: 2 ♀♀, Qalyubiya, 31. VII. 1991, ex. *B. argentifolii* on *L. camara* (PPRI).

Distribution: Cairo, Giza, Qalyubiya and Sharqiya governorates.

Hosts: *A. rachipora*, *B. argentifolii* and *T. ricini* (Homoptera: Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Polaszek *et al.* (1992).

Role in the biological control: (Abd-Rabou, 1998e) recorded this species associated with *B. argentifolii* with maximum parasitism rate 13%.

10. *Encarsia olivine* (Masi)

Diagnosis: Gaster mostly blackish, antenna with narrow scape, about 4 times as long as wide, second and third funicle segments subcylindrical each about twice as long as wide, club 3-segmented, about 1/5 longer and slightly wide than funicle, each segment about as long as third funicle segment.

Material Examined: 5 ♀♀, North Sinai (El-Arish), 12. VII. 1995, ex. *Aleurolobus olivinus* Silvestri on *Olea* sp. (PPRI)

Distribution: North Sinai (El-Arish) governorate.

Hosts: *A. olivinus* (Homoptera:Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou (2000a).

Role in the biological control: This species collected by the author in a few numbers.

11. *Encarsia perconfusa* Evans and Abd-Rabou

Diagnosis: Body yellow. Female with antennal club 2- segmented. Mesoscutum 8 setae. Longest longest seta on marginal fringe of fore wing less than the maximum width of the wing disc. Ovipositor shorter than, or up to 1.1x as long as, mid tibia. Axillae pale, very rarely dark anteriorly. Male antenna with fifth and sixth funicular segments partly fused, third funicle segment without sensorial complex.

Material Examined: 4 ♀♀, Aswan, 4. I. 1991, ex. *T. leguminicola* on *Acacia* sp. (PPRI)

Distribution: Aswan, Qena and New valley governorates.

Hosts: *T.leguminicola* (Homoptera:Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Evans and Abd-Rabou (2005).

Role in the biological control: This species collected by the author in a few numbers.

12. *Encarsia protransvena* Viggiani

Diagnosis: Scutellar sensilla very closely placed, separated by a distance of about the width of one sensillum or less, F1 at least twice as long as wide, stigmal vein distinctly angled from marginal vein. Wing fringe short, clearly less than half the disc width. Submarginal vein with 2 setae. Mid lobe of mesoscutum with fewer than 14 setae.

Material Examined: 2 ♀, Qalyubiya, 20. IX. 1996, ex. *D. citri* on *Citrus* sp.(PPRI).

Distribution: Qalyubiya governorate.

Hosts: *D. citri* (Homoptera : Aleyrodidae)

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou (1997d).

Role in the biological control: Abd-Rabou (1997f) introduced and released this species into citrus orchards infested by *D. citri*. Parasitism rate by this species after six months from the introduction was 1.3%.

13. *Encarsia ramsesi* Polaszek

Diagnosis: Scutellar sensilla very closely placed, separated by a distance of about the width of one sensillum or less, F1 at least twice as long as wide, stigmal vein distinctly angled from marginal vein. Wing fringe short, clearly less than half the disc width. Submarginal vein with 3 or more setae. Mid lobe of mesoscutum with fewer than 14 setae.

Material Examined: 4 ♀♀, Kharga, 16. IV. 1992, ex. *R. follioti* on *A. tortilis* (PPRI).

Distribution: New Valley governorate .

Hosts: *R. follioti* (Homoptera:Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Polaszek *et al.*,(1999).

Role in the biological control: This species was recorded attacking the Egyptian whitefly, *R. follioti* attacking *A. tortilis* only in Upper Egypt (Polaszek *et al.*, 1999).

14. *Encarsia sofia* Girault

Diagnosis: Body yellow, F1 very slightly shorter than F2. Female with antennal club 3-segmented. Mesoscutum with 8 long setae. Mid tarsi 5-segmented. Tibial spur of middle leg ½ as long as the corresponding basitarsus. Longest cilia of marginal fringe 3/5 time of the width of disc.

Material Examined: 5 ♀♀, Qalyubiya, 20. IX. 1999, ex. *B. argentifolii* on cotton (PPRI)

Distribution: Demyaate, Kafr El-Sheikh, Qalyubiya and Sharqya governorates.

Hosts: *B. argentifolii* (Homoptera : Aleyrodidae)

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou (1998b) as a *Encarsia transvena* (Timberlake).

Role in the biological control: During the period 2000-2002 a total of about 100,000 individuals of the parasitoid *Encarsia (Transvena) sofia* Girault obtained from Ethiopia was released at 60 sites for biological control of *B. argentifolii* on cotton plants in Egypt. Average parasitism rates by these parasitoids were 23.4, 14.8, 19.0 and 26.8% in Sharqya, Demyaate, Kafr El-Sheikh and Qalyubiya governorates,

respectively. The population of *E. sophia* was found to be significantly correlated with the build-up of the population of *B. argentifolii* in all four governorates. These results indicate establishment of this parasitoid on this important economic cotton crop in Egypt (Abd-Rabou, 2003a).

15. *Eretmocerus aegypticus* Evans and Abd-Rabou

Diagnosis: Body yellow, legs yellow with last tarsal segment fuscous, F1 1.14 as long as wide. Wing fringe short, clearly less than half the disc width. Submarginal vein with 3 setae. Mid lobe of mesoscutum with 4 setae. Club 8.2 times as long as wide, 3.3 as long as pedicel.

Material Examined: 10 ♀♀, Giza, 7. V. 1993, ex. *B. argentifolii* on *L.camara* (PPRI).

Distribution: Giza, Cairo and New Valley governorates.

Hosts: *B. argentifolii* (Homoptera:Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou and Evans (2002).

Role in the biological control: This species collected by the author in a few numbers.

16. *Eretmocerus cadabae* Viggiani

Diagnosis: Body entirely yellowish. The first funicle segment triangular. Female antennal club 3-4 times as long as wide. Mesoscutum with 8 setae. Marginal vein subequal to stigmal vein, submarginal vein with 2 setae. Tibial spur of middle leg 0.5 times as long as basitarsus. Male antennal club 10-11 times as long as wide.

Material Examined : 3 ♀♀, Eastern desert, 18. IX. 1997, ex. *Aleuroplatus cadabae* Priesner and Hosny on cadaba plant (PPRI).

Distribution: Eastern desert

Host: *A. cadabae* (Homoptera:Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Viggiani (1982).

Role in the biological control: Viggiani (1982) recorded this species only on *A. cadabae* in Eastern desert in Egypt and Later recorded by Abd-Rabou (1998b) in the same localities and on host plants.

17. *Eretmocerus corni* Haldeman

Diagnosis: The first funicle segment triangular. Female antennal club 6-7 times as long as wide. Mesoscutum with 10 setae. Marginal vein longer than stigmal vein, submarginal vein with 3 setae, marginal fringe twice the width of disc. Tibial spur of middle leg 1.5 times as long as basitarsus. Male antennal club 9-10 times as long as wide.

Material Examined: 1♀, Qalyubiya, 5. VIII. 1991, ex. *B. argentifolii* on *L.camara* (PPRI).

Distribution: Assiut, Beni-Suef, Cairo, North Sinai (El-Arish), Giza and Qalyubiya governorates.

Hosts: *B. tabaci*, *S. phillyrae* and *T. ricini* (Homoptera: Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Priesner and Hosny (1940).

Role in the biological control: This species is recorded associated with *B. argentifolii* with average parasitism rates 5% (Abd-Rabou, 1998b).

18. *Eretmocerus diversicilatus* Silvestri

Diagnosis: The first funicle segment triangular. Female antennal club 5 times as long as wide. Mesoscutum with 6 setae. Marginal vein subequal to stigmal vein, submarginal vein with 3 setae, marginal fringe about 2.4 times the width of disc. Tibial spur of middle leg twice as long as basitarsus. Male antennal club 10 times as long as wide.

Material Examined: 2 ♀♀, 2 ♂♂ Giza, 21. VII. 1991, ex. *B. argentifolii* on *L. camara* (PPRI).

Distribution: Cairo, North Sinai (El-Arish), El-Minya, Giza, Qalyubiya and South Sinai (El-Tor) governorates.

Hosts: *A. rachipora*, *B. argentifolii* and *S. phillyrae* (Homoptera : Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou(1998b)

Role in the biological control: This species was recorded associated with *B. argentifolii* and *S. phillyrae* with maximum parasitism rates 5% and 19.1%, respectively (Abd-Rabou, 1998d and Abd –Rabou and Abou-Setta ,1998).

19. *Eretmocerus emiratus* Zolnerowich & Rose

Diagnosis: The first funicle extremely short and triangular. Female antennal club 6.4 times as long as wide. Mesoscutum with 4 setae.

Material Examined: 2 ♀♀, Qalyubiya, 15. VI. 1997, ex. *B. argentifolii* on *L. camara* (PPRI).

Distribution: Qalyubiya governorate.

Hosts *B. argentifolii* (Homoptera: Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou and Evans (2002)

Role in the biological control: This species was collected by the author in a few numbers.

20. *Eretmocerus eremicus* Rose & Zolnerowich

Diagnosis: Female antennal club 7-3 times as long as wide. Pedicel that is 3-4 times as long as wide and 0.3-0.39 times as long as the club. Mesoscutum with 1 pair, but occasionally 2 pairs of lateral setae.

Material Examined: 15 ♀♀, 7 ♂♂, Qalyubiya 1. XI. 1995, ex. *B. argentifolii* on *L. camara* (PPRI)

Distribution: Alexandria, Gharbiya, Minufiya and Qalyubiya governorates.

Hosts: *B. argentifolii* (Homoptera : Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou(1998b)

Role in the biological control: This parasitoid was introduced in Egypt from the Netherlands, mass reared and colonized to control *B. argentifolii* on three crops, eggplants, tomatoes and cucumbers. Maximum parasitism rates reached 60, 50 and 36%, respectively (Abd-Rabou 1999c).

21. *Eretmocerus hayati* Zolnerowich and Rose

Diagnosis: Club 5.6-0.7 times as long as wide, 0.6-0.75 as long as pedicel. F1 1.14 as long as wide. Wing fringe short, clearly less than half the disc width. Submarginal vein with 3 setae. Mid lobe of mesoscutum with 4 setae.

Material Examined: 20 ♀♀, Qalyubiya, 12. X. 2002, ex. *B. argentifolii* on *L. camara* (PPRI).

Distribution: Beni-Suef , Minufiya and Qalyubiya governorates.

Hosts: *B. argentifolii* (Homoptera:Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou (2004a).

Role in the biological control: In Egypt for biological control of *B. argentifolii* on different host plants, about 200700 individuals of the imported parasitoid *E. hayati* were released during 2000- 2002 on different host plants in Egypt. The average parasitism rates in different governorates on *L. camara*, *Gossypium barbadence*(Cotton), *Helianthus annus*(soybean) and *Solanum melongena* (eggplant) were 10.3 and 14%, 16 and 11.4%, 12.9 and 8.7%, 18 and 13% during 2001 and 2002, respectively. Significantly the population of *E. hayati* was correlated with the build up of the whitefly population all over the four governorates, which indicated the establishment of *E. hayati* parasitoid on these economic crops in Egypt (Abd-Rabou, 2004a).

22. *Eretmocerus mundus* (Mercet)

Diagnosis: The first funicle segment quadrate, second funicle segment longer than wide. Female antennal club 8 times as long as wide. Mesoscutum with 6 setae. Marginal vein longer than stigmal vein, submarginal vein with 3 setae, marginal fringe 1/3 width of disc. Tibial spur of middle leg twice as long as basitarsus. Male antennal club 7.5 times as long as wide.

Material Examined: 2 ♀♀, 24 ♂♂, Qalyubiya, 8. VII. 1991, ex. *B. argentifolii* on *L. camara* (PPRI)

Distribution: Alexandria, Cairo, Demyaate, Giza, New Valley and Qalyubiya governorates.

Hosts: *A. cadabae*, *A. rachipora*, *B. argentifolii* and *Dialeurodes kirkadlyi* (Kot.) (Homoptera : Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by El-Helaly *et al.*, (1971).

Role in the biological control: Abd-Rabou (1998e) recorded this species associated with *B. argentifolii* in El-Arish region with average parasitism rate 17% and the same author (2000e and 2001d) manipulated this species from El-Arish associated with *S. phillyreae* to different localities in Upper Egypt to control *S. phillyreae*. Results indicated that *E. mundus* was recovered in all regions in Upper Egypt. **Abd-Rabou (2003d)** studied the comparison between the efficacy of indigenous and imported of *E.mundus*. He showed the introduced strain of the parasitoid was relatively more effective than the indigenous one.

23. *Eretmocerus roseni* Gerling

Diagnosis: The first funicle segment trapezoidal, second funicle segment longer than wide. Female antennal club 4 times as long as wide. Mesoscutum with 4 setae. Marginal vein subequal to stigmal vein. Marginal fringe 1/4 width of disc. Male antennal club 10 times as long as wide.

Material Examined: 3 ♀♀, Beni-Suef 28.x.1990, ex. *A. rachipora* on *Citrus* sp. (PPRI)

Distribution: Beni-Suef and Giza governorates.

Hosts: *A. rachipora* (Homoptera : Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou (1998d).

Role in the biological control: Abd-Rabou (1999d) recorded this species associated with *A. rachipora* in Giza with average parasitism rates 19.6 and 21.7 during the two season, under considerations, respectively.

24. *Eretmocerus siphonini* Viggiani & Battaglia

Diagnosis: The first funicle segment triangular. Female antennal club 5 times as long as wide. Marginal vein longer than stigmal vein. Marginal fringe about 1/5 width of disc.

Material Examined: 7 ♀♀, Sharqiya 25. VII. 1996, ex. *A. marlatti* on *Z. spinachristi* (PPRI)

Distribution: Assiut and Sharqiya governorates.

Hosts: *A. marlatti* and *S. phillyreae* (Homoptera : Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou (1998b).

Role in the biological control: *E. siphonini* is one of the most important parasitoid attacking some species of whiteflies in Egypt. The average parasitism rates reached 17.2 on *A. marlatti* in Sharqiya and 5.8% on *S. phillyreae* in Giza (Abd-Rabou, 1999f).

25. *Eretmocerus parasiphonini* Evans & Abd-Rabou

Diagnosis: The first funicle segment small and triangular. Mesoscutum with 4 setae. Female antennal club 3.5 times as long as wide. Marginal vein longer than stigmal vein. Marginal fringe about 1/4 width of disc.

Material Examined: 7 ♀♀, Sharqiya 25. VII. 1996, ex. *A. marlatti* on *Z. spinachristi* (PPRI)

Distribution: Sharqiya governorate.

Hosts: *A. marlatti* and *S. phillyreae* (Homoptera : Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou and Evans(2002)

Role in the biological control: This species collected by the author in a few numbers.

Family: Platygasteridae

26. *Amitus hesperdium* Silvestri

Diagnosis: Club as narrow basally as segment VII, broadening a little distally, 2.5 times as long as wide, 3-segmented. Tergite I with a median, carinate elevation, with submidian pits and irregular carinate at the sides. Male, essentially like the female, lateral plate of antennal fourth segment about 2/3 as long as the segment, male flagellar segments longer, more loosely connected, without antennal club.

Material Examined: 3 ♀♀, Qalyubiya, 11. V. 1994, ex. *P. myricae* on *Citrus* sp. (PPRI).

Distribution: Qalyubiya governorate.

Hosts: *P. myricae* (Homoptera : Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou(1998b).

Role in the biological control: Parasitism rates by this species on Qalyubiya region on the whitefly, *P. myricae* on *Citrus* sp.with an average 2.2% during May (Abd-Rabou, 1998b).

27. *Amitus aleurotubae* Viggiani and Mazzone

Diagnosis: Pronotum triangular in a lateral view, reaching tegulae; antennae elbowed or filiform, number of antennal segments(7-15), club 3-segmented; fore wings with five or fewed closed cells or font wings with six or more closed cells. Male antennae without club .

Material Examined: 1 ♀, Qaluybiya 15.VII. 1999 ex. *P. myricae* on *Citrus* sp. (PPRI).

Distribution: Qalyubiya governorate.

Hosts: *P. myricae* (Homoptera : Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou (2004b).

Role in the biological control: This species collected by the author in a few numbers.

Family: Eulophidae

28. *Euderomphale chelidonii* Erdős

Diagnosis: Postmarginal vein present, first funicle segment shorter than second funicle segment, length of fore wing 0.8-1.0 mm., length of marginal fringe at least 20% of the greatest width of the wing.

Material Examined: 4 ♀♀, Qalyubiya 20.IX.1995, ex. *A. proletella* on *Solanum nigrum* (PPRI).

Distribution: Giza governorate.

Hosts: *A. proletella* (Homoptera : Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou (1998b).

Role in the biological control: This species was collected by the author in a few numbers.

29. *Euderomphale ezzati* Abd-Rabou

Diagnosis: Postmarginal vein present, first funicle segment subequal second funicle segment, length of fore wing 0.7 mm., length of marginal fringe at least 33% of the greatest width of the wing.

Material Examined: 10 ♀♀, Qalyubiya 11.II.1993, ex. *T. ricini* on *R. communis* (PPRI).

Distribution: Qalyubiya governorate.

Hosts: *T. ricini* (Homoptera : Aleyrodidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou (1998b).

Role in the biological control: Parasitism rates by this species in Qalyubiya on the whitefly, *T. ricini* on *R. communis* with an average 1.2% during August (Abd-Rabou, 1998b).

II. Parasitoids of soft scales (Homoptera: Coccidae):

About twenty three species of soft scale insects are found in Egypt (Ezzat and Nada, 1986). These mostly are of great economic importance specially if we know that sugar cane plants that form a lot of economy due to its importance is subject to infestation by these soft scale insects that may deteriorate the plant. Molasses, glycerin, pulp and other constituents of this plant form a vast number of certain industries essential for Egyptian economy and mainly are products of this sugar cane plant (Ali *et al.*,2000).

In the mean time, these soft scales attack some fruiting plants of eminent to the Egyptian farmer and consumer, among this is soft scales of olive, guava and some other stone fruits.

As a tradition in Egypt it was found at the times of last decade, these insects are to be controlled chemically; however the existence of accompanying parasitoids that were recorded recently revealed that these parasitoids form a good category for natural control of these soft scales.

List of parasitoids attacking soft scales in Egypt:

Family: Aphelinidae

1. *Coccophagus bivittatus* Compere
2. *C. cowperi* Girault
3. *Coccophagus ishii* Compere
4. *C. lycimnia* (Walker)
5. *C. qenai* Abd-Rabou
6. *C. scutellaris* (Dalman)
7. *Marietta leopardina* Motschulsky
8. *M. picta* (Andre)

Family : Encyrtidae

9. *Baeoanusia oleae* Silvestri
10. *Blastothrix erythrostethus* Walker
11. *Bothriophryne acaciae* (Risbec)
12. *Cheiloneurus* sp
13. *Diversinervus elegans* Silvestri
14. *Encyrtus inflex* (Embleton)
15. *Metaphycus anneckei* Guerrieri and Noyes

16. *M. flavus* (Howard)
17. *M. helvolus* (Compere)
18. *M. lounsburyi* (Howard)
19. *M. zebratus* (Mercet)
20. *Microterys flavus* (Howard)
21. *Paraceraptocherus africanus* Giralut
22. *P. italicus* (Masi)
23. *Parechthrodryinus coccidiphagus* (Mercet)

Family : Eulophidae

24. *Tetrasticus* sp.

Family : Mymaridae

25. *Alaptus* sp.

Family : Pteromalidae

26. *Scutellista caerulea* (Fonscolombe)

Family: Aphelinidae.

1. *Coccophagus bivittatus* Compere

Diagnosis: The body yellow in colour with longitudinal dark brown stripe down sides of thorax and abdomen; antenna 7 segmented (1,1,3,2), first funicle segment much shorter than pedicel; stigmal vein swollen, submarginal vein with a row of setae usually more than 5 setae; mesoscutum with numerous setae.

Material Examined: 3 ♀♀, Giza, 21.II .1992, ex. *Kilifia acuminata* (Signoret) on *M. indica*.

Distribution: Giza governorate.

Hosts: *K. acuminata* and *Coccus hesperidum* (L.) (Homoptera: Coccidae).

Remarks: Abd-Rabou (1999a) reported this species for the first time in Egypt associated with *K. acuminata*.

Role in the biological control: Abd-Rabou *et al.* (1999) stated that *C. bivittatus* restricted to Giza, where the percentage parasitism on *Coccus hesperidum* L. was 0.7% with a peak of 4% in Feb.

2. *C. cowperi* Girault

Diagnosis: Hind tibia usually entirely yellowish, hind femur black, scutellum entirely yellow, anterior margin more or less black. Scutellum with three pairs of setae, rarely with a few extra setae near cephalic margin. Fore wing hyaline. All coxae usually black or blackish or at least partly so.

Material Examined: 7 ♀♀, North Sinai (El-Arish), 13.X.2002, ex. *Saissetia coffeae* (Walker) on *Olea* sp.

Distribution: Matruh and North Sinai (El-Arish) governorates.

Hosts: *S. coffeae* (Homoptera : Coccidae).

Remarks: Abd-Rabou (2004c) impoted, mass reared and released this species for the first time in Egypt associated with *S. coffeae*.

Role in the biological control: The hemispherical soft scale, *S. coffeae* is one of the most important pest attacking olive trees in Egypt. During the period 2001- 2003, a total of about 300000 individuals of the parasitoid, *C. cowperi* (Hymenoptera: Aphelinidae) obtained from India was released at 35 sites for biological control of *S.coffeae* (Homopetra: Coccidae) on olive trees in Egypt. The maximum parasitism rates by these individuals reached 53 and 62%, while, average parasitism rates were 17.2 and 30.8 % in Matruh and El-Arish locations, respectively. The results indicate the establishment of this parasitoid on this important economic insect pest in Egypt (Abd-Rabou 2004c).

3. *Coccophagus ishii* Compere

Diagnosis: General colour black, including head and antennae. First funicle segment less than twice as long as wide, first club segment wider than long, mesoscutum with numerous short, black setae, each parapsis with four or five short setae. Mid tibial spur more than one-half as long as basitarsus.

Material Examined: 3 ♀♀, Qena, 10.XI.1996, ex. *C. hesperidum* on *Olea* sp. (PPRI).

Distribution: North Sinia (El-Arish).

Hosts: *C. hesperidum* (Homoptera: Coccidae).

Remarks: This species was recorded for the first time in Egypt associated with *C. hesperidum* by Abd- Rabou *et al.* (1999).

Role in the biological control: Abd-Rabou *et al.*, (1999) stated that *C. ishii* restricted to El-Arish , where the percentage parasitism on *Nerium* sp. was 0.4% with a maximum of 2%in June.

4. *C. lycimnia* (Walker)

Diagnosis: Face and cheeks black to blackish brown thorax black except scutellum entirely or almost entirely yellowish or whitish; antenna 7 segmented (1,1,3,2), first funicle segment longer than pedicel; stigmal vien not swollen, submarginal vien with a row at setae usually more than 5 setae; mesoscutum with numerous setae.

Material Examined: 3 ♀♀, Giza, 31.V. 1992, ex. *C. hesperidum* on *Psidium guajava* (PPRI).

Distribution: Assiut, Aswan, Gharbiya, Giza and Northern Coast governorates.

Hosts: *Ceroplastes floridensis* Comstock, *C. rusci* (L.), *C. hesperidum*, *Parasaissetia nigra* (Nietner), *Parthenolecanium persicae* (Fabricius), *Pulvinaria floccifera* (Westwood), *P. mesembryanthemi* (Vallot), *S. coffeae* and *S. oleae* (Oliver) (Homoptera : Coccidae).

Remarks: This species was collected for the first time in Egypt associated with *C. hesperidum* by Abd-Rabou (1999a).

Role in the biological control: *C. lycimnia* appeared to be quite important parasitoids of *S.coffeae* in Alexandria and Northern Coast with average parasitism rates of 8.3 and 10.8% and the maximum parasitism rates were 28 and 26% during November in Northern Coast and Alexandria, respectively (Abd-Rabou, 2001b).

5. *C. qenai* Abd-Rabou

Diagnosis: Head, thorax and gaster black, only scutellum largely yellowish white, all tibia yellow, all coxae black, femora dark except apices and bases yellow; antenna 7 segmented (1,1,3,2), first funicle segment longer than pedicel; stigmal vein short and broad, mesoscutum with 70-75 setae. Gaster as long as the thorax, ovipositor occupying the distal one half of gaster.

Material Examined: 3 ♀♀, Qena, 15.xi. 2000, ex. *C. hesperidum* on *Bambusia* sp. (PPRI).

Distribution: Qena governorate.

Hosts: *C. hesperidum*

Remarks: This species was collected for the first time in Egypt associated with *C. hesperidum* by Abd-Rabou (2003b).

Role in the biological control: This species was collected by the author in a few numbers.

6. *C. scutellaris* (Dalman)

Diagnosis: Scutellum with numerous setae, fore coxa yellow. First funicle segment more than twice as long as wide and first club segment longer than wide.

Material Examined: 1♀, Beni-Suef, 11.XI. 1998, ex. *Pulvinaria psidii* Maskell on *P. guajava*; 10 ♀♀, Qena, 15.XI. 2000, ex. *Pulvinaria tenuivalvata* (Newstead) on *Saccharum officinarum*; 7 ♀♀, Qena, 5.X. 2000, ex. *C. hesperidum* on *Bambusia* sp. (PPRI).

Distribution: Beni- Suef, Cairo, Giza, Gharbiya and Northern Coast governorates.

Hosts: *C. floridensis*, *C. hesperidum*, *P. floccifera*, *P. psidii*, *S. coffeae* and *S. oleae* (Homoptera: Coccidae).

Remarks: This species collected for the first time in Egypt by Priesner and Hosny (1940).

Role in the biological control: This species is one of the best known species of the family Aphelinidae. *C.scutellaris* first recorded in Alexandria by Priesner and Hosny (1940) parasitizing *C. hesperidum* and *P. floccifera* (Westwood) on *Citrus* sp. and *Ficus* sp., respectively. Recently Abd-Rabou (2002a) recorded this species attacking 6 species of soft scales, mentioned that the maximum parasitism rates of this species on *S. coffeae* and *S. oleae* reached 26 and 22%, respectively. Abd-Rabou *et al.* (1999) found it in Gharbiya, where the percentage parasitism on *P.guajava* was 1.1%, with a peak of 7% in Nov.

7. *Marletta leopardina* Motschulsky

Diagnosis: Antennal scape less than 6 times as long as wide, or with one or two brownish bands or spots; antennal scape with the band short; extending caudad from about middle of ventral margin; propodeum distinctly shorter than, metanotum; apex of fore wing without infusate band in middle, mesoscutum 4 setae.

Material Examined: 1 ♀♀ Northern Coast, 1. VI. 1998, ex. *S. coffeae* on *Olea* sp. (PPRI)

Distribution: Behira, Giza and Northern Coast governorates.

Hosts: *C. floridensis*, *C. hesperidum*, *S. coffeae*, *S. oleae*, *P. ziziphi*, *Coccus longulus* (Douglas), *P. floccifera*, *P. mesembryantheni* and *P. psidii* (Homoptera : Coccidea).

Remarks: This species was recorded for the first time in Egypt by Priesner and Hosny (1940).

Role in the biological control: This species is a hyperparasitoids of different species of armored and soft scale insects in Egypt (Abd-Rabou, 2003c). He mentioned that *M.leopardina* was reared out of 48 Hemiptera and scales parasitic Hymenoptera species. The survey covered 16 governorates in Egypt. Classically orders, families and species of the host insects associated with his hyperparasitoid are given together with locality and month of abundance.

8. *M.plcta* (Andre)

Diagnosis: Antennal scape nearly as long as wide, with 2 oblique fuscous bands, one outer and the other inners, fore wing broad less than twice as long as wide, with a slightly different pattern.

Material Examined: 12 ♀♀ Qalyubiya, 15. VII. 2000, ex. *Stozia ephedrae* (Newstead) on *Citrus* sp.(PPRI)

Distribution: Qalyubiya governorate.

Hosts: *S.ephedrae* (Homoptera : Coccidae).

Remarks: This species was recorded for the first time in Egypt as a hyperparasitoids associated with *C. hesperidum* by Abd- Rabou *et al.* (1999).

Role in the biological control: Abd- Rabou *et al.* (1999) recorded this species only from North Sinai (EL-Arish) , where the percentage parasitism on *Nerium* sp. was 2.55 with a peak of 8% in Feb.

Family : Encyrtidae

9. *Baeoanusia oleae* Silvestri

Material Examined: 11 ♀♀ Qalyubiya, 26. X. 1999, ex. *S. oleae* on *Olea* sp.(PPRI)

Distribution: North Sinai (El-Arish) governorate.

Hosts: *S. oleae* (Homoptera : Coccidae).]

Remarks: This species was recorded for the first time in Egypt by Priesner and Hosny (1940).

Role in the biological control:. About 735 individuals of *B. oleae* was released on olive trees infested by *S.oleae* in North Sinai (EL-Arish). The result indicated that the parasitism rates reached 3% after releasing (Abd-Rabou,2004d).

10. *Blastothrix erythrostethus* Walker

Diagnosis: Mesopleuron large and without a femoral groove, hypopygium reaching more than two-third along gaster. Fore wing with postmarginal vein longer than stigmal vein, fore wing hyaline. Head, dorsum of thorax and mesopleuron with distinctive deep punctate sculpture, scutellum never with apical flange.

Material Examined: 4 ♀♀ Aswan, 10. XII. 2000, ex. *Waxiella mimosae* (Signoret) on *Acacia* sp.(PPRI)

Distribution: Aswan and Qena governorates.

Hosts: *W. mimosae* (Homoptera : Coccidae).

Remarks: This species was recorded for the first time in Egypt by Priesner & Hosny (1940). Later , Abd-Rabou (2004d) recorded this species on the same host insect and plant.

Role in the biological control: This species was collected by the author in a few numbers.

11. *Bothriophryne acaciae* (Risbec)

Diagnosis: Mesopleuron large and without a femoral groove, hypopygium reaching more than two-third along gaster. Fore wing with postmarginal vein not longer than stigmal vein; scape more than three times as long as broad, ovipositor exserted, pedicel subtriangular, shorter than F1 and club not or hardly longer than F1.

Material Examined: 12 ♀♀, Aswan, 10. XII. 2000, ex. *W. mimosae* on *Acacia* sp.(PPRI)

Distribution: Aswan and Qena governorates.

Hosts: *W. mimosae* (Homoptera : Coccidae).

Remarks: This species was recorded for the first time in Egypt by Priesner & Hosny (1940). Later , Abd-Rabou(2004d) recorded this species on the same host insect and plant.

Role in the biological control: This species was collected by the author in a few numbers.

12. *Cheiloneurus* sp.

Diagnosis: Mesopleuron large and without a femoral groove, hypopygium reaching more than two-third along gaster. Fore wing shortned, clearly not reaching apex of gaster, scutellum with a subapical group of dark coarse setae arranged in a more or less combact bundle. Mesoscutum without a transverse depression

Material Examined: 2♀♀ Gharbiya, 18. X. 2000, ex. *Ceroplastes floridensis* Comstock on *Citrus* sp.(PPRI).

Distribution: Gharbiya

Hosts: *C. floridensis* (Homoptera : Coccidae).

Remarks: Abd-Rabou(2001e) recorded this species on *C. floridensis*

Role in the biological control: This species collected by the author in a few numbers.

13. *Diversinervus elegans* Silvestri

Diagnosis: Mesopleuron large and without a femoral groove, hypopygium reaching more than two-third along gaster. Fore wing shortned, clearly not reaching apex of gaster, scutellum with a subapical group of dark coarse setae arranged in a more or less combact bundle. Mesoscutum with a distinct transverse depression, body yellow, sides of propodeum and mesopleura posteriorly more or less dark metallic.

Material Examined: 14♀♀ Gharbiya, 1. XI. 2002, ex. *C. floridnsis* on *Citrus* sp.(PPRI).

Distribution: Giza, Gharbiya and Notheren Coast governorates.

Hosts: *C. floridnsis*, *S. oleae*, *P. floccifera* and *C. hesperidum* (Homoptera: occidae).

Remarks: This species was recorded for the first time in Egypt by Priesner & Hosny (1940). Later , Abd-Rabou (2001e) recorded this species on different host soft scale insects.

Role in the biological control: This species was recorded by Priesner & Hosny (1940) associated with *S. oleae*, *P. floccifera* and *C. hesperidum* in Egypt. Abd-Rabou *et al.*2003 showed that rates of parasitism by this species in Notheren Coast site on *S. oleae* on olive averaged 0.3 and 2.4% during the two years under investigations. Maximum parasitism rates was attained during early July and mid of July wich represented by 6.2 and 8.3 %, respectively. They also recorded this species

associated with *C. hesperidum* from Giza and Gharbiya on *P. guajava* with max. in Giza of 15% in Oct. and in Gharbiya of 23% in June. *D. elegans* was reared from *K. acuminata* with an average parasitism rates 6.3 % Abd-Rabou and Hafez (2001). Later, Abd-Rabou (2004 d) mass reared and released at monthly intervals in olive groves infested with *Saissetia oleae* at three localities in Egypt and percentages of parasitism increased after releasing from 4 to 11%.

14. *Encyrtus inflex* (Embleton)

Diagnosis: Mesopleuron large and without a femoral groove. Fore wing normal at least very nearly reaching apex of gaster, scutellum with a group of coarse, long, dark setae arranged in a more or less compact bundle. Antenna with scape longer than the basal three funicle segments combined.

Material Examined: 4♀♀ Alexandria, 7. X. 2002, ex. *C. floridensis* on *Citrus* sp. (PPRI).

Distribution: Alexandria governorate.

Hosts: *C. floridensis* (Homoptera : Coccidae).

Remarks: This species was recorded for the first time in Egypt by Priesner & Hosny (1940). Later, Abd-Rabou (2001e) recorded this species on different host soft scale insects.

Role in the biological control: *E. inflex* was recorded as a parasitoid of *S. coffeae* on olive in Alexandria, with an average parasitism rates 1.9%. (Abd-Rabou, 2001e)

15. *Metaphycus annecki* Guerrieri and Noyes

Diagnosis: Head at least 4X as wide as frontovertex; notaular lines incomplete, not reaching more than halfway across mesoscutum; scape at most 2.7X as long as broad; clava with apical sensorial slightly oblique and transverse, 4/5 as wide as clava; forewing hyaline and uniformly infuscate Male torulus without associated pores.

Material Examined: 3♀♀, Qena 25.X. 2001 ex. *P. tenuivalvata* on *S. officinarum* (PPRI).

Distribution: Qena governorate.

Hosts: *P. tenuivalvata* (Homoptera : Coccidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou (2004b).

Role in the biological control: This species was collected by the author in a few numbers.

16. *M. flavus* (Howard)

Diagnosis: Body completely yellow, legs without annular darkish spots on tibiae, antennal scape spindleshaped, about 3.5 times as long as the greatest width, ovipositor 1.2 times as long as the middle tibia and third valvulae 1/5 as long as ovipositor.

Material Examined: 7♀♀, Giza, 26. IV. 1992, ex. *C. hesperidium* on *Ficus nitida* (PPRI).

Distribution: Alexandria, Assiut, El-Minya, Giza, and Northern Coast governorates.

Hosts: *C. hesperidium*, *P. floccifera* and *S. oleae* (Homoptera : Coccidae).

Remarks: This species was recorded for the first time in Egypt by Priesner & Hosny (1940).

Role in the biological control: This species was recorded by Priesner & Hosny (1940) associated with *C. hesperidium*, *P. floccifera* and *S. oleae* in Delta and Upper Egypt. The percentages of parasitism by this species at Northern Coast site on *S. oleae* averaged 3.7 and 5.8% during the two years of investigations, respectively. Maximum rates of parasitism reached 12.3 and 15% during Mid August and early of September, respectively. This species, also recorded from Giza and Gharbiya. Percentage parasitism in Giza on *F. nitida* was 1.4% and in Gharbiya on *P. guajava* was 3.9%, with maximum parasitism of 12% in Giza in June and 7% at Gharbiya in July (Abd-Rabou *et al.* 1999). It is also considered as dominant parasitoids of *S. coffeae* with maximum parasitism rates 28 and 8% during December and October in Northern Coast and Alexandria Abd-Rabou (2001b). Abd-Rabou (2001e) recorded this species attacking *C. floridensis* with average parasitism rates 18.2% in Gharbiya governorate. The maximum parasitism rates was 27%.

17. *M. helvolus* (Compere)

Diagnosis: Maxillary and labial palpi 2 segmented; legs without annular darkish spots on tibiae; antennal scape 2.5 times as long as wide, with entire ventral margin; ovipositor 1.2 times longer than the middle tibia and third valvulae 1/5 as long as ovipositor.

Material Examined: 10 ♀♀ Fayoum, 13. III. 1996, ex. *S. oleae* on *Olea* sp. (PPRI).

Distribution: Alexandria, Fayoum, Northern Coast and North Sinia (El-Arish) governorates.

Hosts: *S. oleae* and *K. acuminata* (Homoptera : Coccidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou (1998h).

Role in the biological control: Abd-Rabou (2001b) observed the effective role of this species in controlling *S. coffeae* in Alexandria and Northern Coast, with total parasitism rates 13.5 and 10.6%, respectively. *M. helvolus* recorded parasitizing *C. hesperidum* but only recorded from El-Arish and Gharbiya. Percentage parasitism in Gharbiya. On *P. guajava* 0.9% and in El-Arish on *Nerium* sp. 4.0% with a max. 4.0% in Gharbiya during March and of 14% in El-Arish in June Abd-Rabou *et al.* (1999). This species was reared from *K. acuminata* with an average parasitism rates 4.3%. and maximum parasitism rates was 28% (Abd-Rabou and Hafez, 2001). Also, *M. helvolus* was mass reared and released at monthly intervals in olive groves infested with *S. oleae* at three localities in Egypt and percentages of parasitism increased after releasing from 13 to 31% Abd-Rabou (2004d).

18. *M. lounsburyi* (Howard)

Diagnosis: Head without darkish spots on checks; fore wings hyaline; middle and hind legs with annular darkish spots on tibiae; antennal scape provided with a characteristic darkish area in the middle, 2.5 times as long as wide; ovipositor shorter than in length to middle tibiae and third valvulae 1/4 as long as ovipositor.

Material Examined: 20 ♀♀, North Sinai (El-Arish), 17. I. 1994, ex. *S. oleae* on *Olea* sp. (PPRI)

Distribution: Matruh, Northern Coast and North Sinai (El-Arish) governorates.

Host: *S. oleae* (Homoptera : Coccidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou(1998h).

Role in the biological control: Indigenous parasitoid *M. lounsburyi* from different localities in Egypt, were manipulated, reared and mass produced for classical biological control in Egypt, more than 193130 parasitoids were released. Several releases were made between May 1999 to April 2001. Increased of the parasitism from 17.4 to 42.0 and the first year (1999-2000) and the second year (2000-2001), respectively in Northern Coast. This parasitoid from 6.4 to 19.2 during became established in some of release sites in El-Arish and Matruh Governorates Abd-Rabou (2004f).

19. *M. zebratus* (Mercet)

Diagnosis: Body yellow, larger patch on pronotum; maxillary palpi 4-segmented, labial palpi 3-segmented; antennal scape more than 2.5 times as long as wide; ovipositor only slightly longer than or subequal in length to middle tibia and third valvulae 1/4 as long as ovipositor.

Material Examined: 10 ♀♀, Northern Coast, 1.VI. 1996, ex. *S.oleae* on *Olea* sp. (PPRI)

Distribution: Daqahliya, Northern Coast and Qalubiya governorates.

Hosts: *S.oleae* (Homoptera : Coccidae).

Remarks: This species was recorded for the first time in Egypt by Priesner & Hosny (1940). Later Abd-Rabou (1998h) recollected this species from different localities.

Role in the biological control: *M. zebratus* is one of the parasitoids attacking *C. floridensis* with average parasitism rates 0.9% in Beheira governorate. The maximum parasitism rate was 10% (Abd-Rabou, 2001e). This parasitoid was mass reared and released at monthly intervals in olive groves infested with *S. oleae* at three localities in Egypt and percentages of parasitism increased after releasing from 8 to 43% (Abd-Rabou, 2004d).

20. *Microterys flavus* (Howard)

Diagnosis: Mesopleuron large and without a femoral groove. Fore wing shortened, clearly not reaching apex of gaster; scutellum without such a group of setae. Ovipositor and gonostyli hardly protruding caudally.

Material Examined: 10 ♀♀ Fayoum, 13. III. 1996, ex. *S.oleae* on *Olea* sp. (PPRI).

Distribution: Fayoum, Northern Coast and North Sinai (El-Arish) governorates.

Hosts: *C. floridensis* and *S. oleae* (Homoptera : Coccidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou, *et al.*(1999).

Role in the biological control: The rate of parasitism of this species on *C. floridensis*, averaged 0.8 and 2.4% during the two years under considerations, respectively. Maximum parasitism rates reached 3.4 and 8.0% during Mid Nov. and early Nov., respectively Abd-Rabou (2001e). *M.flavus* was mass reared and released at monthly intervals in olive groves infested with *S. oleae* at three localities in Egypt and percentages of parasitism increased after releasing from 11 to 35% (Abd-Rabou, 2004d).

21. *Paraceraptrocerus africanus* Giralut

Diagnosis: Mesoscutum large and without a femoral groove. Hypopygium not reaching more than two-third a long gaster, scale tending to be subrectangular the flattened part of upper edge more than one-half as long as the straight part of the lower edge.

Material Examined: 30 ♀♀ El-Arish, 13. III. 2000, ex. *S.oleae* on *Olea* sp. (PPRI).

Distribution: Aswan, Qena and North Sinia (El-Arish) governorates.

Hosts: *S.oleae* and *W. mimosae*(Homoptera : Coccidae).

Remarks: This species was recorded for the first time in Egypt by Priesner & Hosny (1940).

Role in the biological control: About 957 individuals of *P. coccidiphagus* was released on olive trees infested by *S. oleae* in El-Arish, with parasitism rates 1.6% (Abd-Rabou, 2004d).

22. *P. italicus* (Masi)

Diagnosis: Mesoscutum large and without a femoral groove. Fore wing normal at least very nearly reaching apex of gaster. Scutellum without a distinct tuft or bundle of setae or scale like setae, hypopygium not reaching more than two-third a long gaster, scape has a groove on outer side for reception of the pedicel.

Material Examined: 4♀♀, Giza, 10. IV. 1998, ex. *C. longulus* on grass (PPRI).

Distribution: Giza governorate.

Hosts: *C. longulus* (Homoptera : Coccidae).

Remarks: This species was recorded for the first time in Egypt by Priesner & Hosny (1940).

Role in the biological control: This species was collected by the author in a few numbers.

23. *Parechthrodryinus coccidiphagus* (Mercet)

Diagnosis: Mesoscutum large and without a femoral groove. Fore wing normal at least very nearly reaching apex of gaster. Scape more than three times as long as broad.

Material Examined: 11♀♀ Qena, 10. XII. 1997, ex. *W. mimosae* on *Acacia* sp. (PPRI).

Distribution: Qena governorate.

Hosts: *W. mimosae* (Homoptera : Coccidae).

Remarks: This species was recorded for the first time in Egypt by Priesner & Hosny (1940).

Role in the biological control: *P. coccidiphagus* was mass reared and released at monthly intervals in olive groves infested with *Saissetia oleae* at three localities in Egypt and percentages of parasitism increased after releasing from 10 to 15% (Abd-Rabou, 2004d).

Family : Eulophidae

24. *Tetrastichus* sp.

Diagnosis: Mesopleuron impressed and with a femoral groove. Tarsi four-segmented, scutellum with distinct submedian grooves, mesoscutum usually with a median groove.

Material Examined: 11♀♀ Giza , 14. X. 1999, ex. *C. floridensis* on *Citrus* sp.(PPRI).

Distribution: Aswan, Giza and Qena governorates.

Hosts: *C. floridensis* and *W. mimosa* (Homoptera : Coccidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou(2001e).

Role in the biological control: *Tetrastichus* sp. was recorded attacking *C. floridensis* infested citrus trees in Giza governorate with an average parasitism rate 0.7 %. The maximum parasitism rate was 4% (Abd-Rabou,2001c).

Family : Mymaridae

25. *Alaptus* sp.

Diagnosis: Hind wing basally and stalk, marginal fringe of wing usually very long; stigmal vein rudimentary, wings and legs long and slim, body generally nonmetallic.

Material Examined: 2♀♀ Matruh , 14. IX. 1996, ex. *S. oleae* on *Olea* sp.(PPRI)

Distribution: Matruh governorate.

Hosts: *C. hesperidum* and *S. oleae* (Homoptera:Coccidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou (2001f).

Role in the biological control: *Alaptus* sp. was mass reared and released at monthly intervals in olive groves infested with *S. oleae* at three localities in Egypt and percentages of parasitism increased after releasing from 1 to 6% (Abd-Rabou, 2004d).

Family : Pteromalidae

26. *Scutellista caerulea* (Fonscolombe)

Diagnosis: Mesoscutum impressed and with a femoral groove. Tarsi five-segmented, gaster distinctly at its junction with propodeum, female antenna with 9, scutellum very long, at least twice as mesoscutum, extending well over the gaster.

Distribution: Beheira governorate.

Hosts: *K. acuminata*, *C. floridensis*, *P. nigra*, *S. coffeae* and *S. oleae* (Homoptera: Coccidae).

Remarks: This species was recorded for the first time in Egypt by Priesner & Hosny (1940).

Role in the biological control: This parasitoid was recorded in Egypt by Priesner and Hosny, 1940 associated with *Ceroplastes africanus* on *Acacia nilotica*, *Albizzia lebbek*, *Ficus carica*, also *P. nigra* on *Ficus sycamorus* and *S. coffeae* on olive in Lower and Upper Egypt. *S. caruleae* was recorded attacking *C. floridensis* infested citrus trees in Beheira governorate with an average parasitism rate 4.5% and the maximum parasitism rate was 13% (Abd-Rabou, 2001e). Later Abd-Rabou *et al.* (2003) recorded average parasitism rate of 2.0 and 3.5% during the two years under considerations, respectively. Maximum rate of parasitism was estimated to be during mid June and early June as 5.5 and 11.1, respectively. This parasitoid was reared from *K. acuminate*, with an average parasitism rate 1.8% (Abd-Rabou and Hafez, 2001). Later, Abd-Rabou (2004 d) mass reared and released the parasitoid at monthly intervals in olive groves infested with *S. oleae* at three localities in Egypt and percentages of parasitism increased after releasing from 14 to 35%.

III. Parasitoids of armored scale insects (Homoptera: Diaspididae)

Organophosphorus insecticides have been used commercially for the control of scale insects in Egypt for many years (Coll and Abd-Rabou, 1998). Parasitoids of armored scale insects found in Egypt play an important role in control of these scales that mainly exert a lot of damage to economic plant specially, citrus (El-Nahal *et al.*, 1980).

These parasitoids can play a distinguished role in control of seventy six species of scales that attack these economic plants and consequently reduce the evolution sound fruits. About 37 parasitoids, according to new researches were compiled, differentiated and classified by new means of classification and nomenclature.

These will lead to rear and sometimes import the specific concerned parasitoids from abroad to combat these armored scale. In the mean time there are some other predators that attack and drastically reduce the number of armored scales (Hayat, 1983, 1985).

List of parasitoids attacking armored scale insects in Egypt:

Family: Aphelinidae

1. *Ablerus atomon* (Walker)
2. *A. clisiocampae* (Ashmead)
3. *A. perspiciosus* (Girault)
4. *Aphytis africanus* Quednau
5. *A. aonidiae* (Mercet)

6. *A. azai* Abd-Rabou
7. *A. chilensis* Howard
8. *A. chrysomphali* (Mercet)
9. *A. coheni* DeBach
10. *A. diaspidis* (Howard)
11. *A. hispanicus* (Mercet)
12. *A. libanicus* Traboulsi
13. *A. lingnanensis* Comepre
14. *A. maculicornis* (Mercet)
15. *A. matruhi* Abd-Rabou
16. *A. mytilaspidis* (Le Baron)
17. *A. paramaculicornis* De Bach & Rosen
18. *A. philippinensis* DeBach & Rosen
19. *A. phoenicis* DeBach & Rosen
20. *A. sinaii* Abd-Rabou
21. *A. vandenboschi* DeBach & Rosen
22. *Coccobius* sp.
23. *Coccophagoides kuwanai* (Silvestri)
24. *C. similis* (Masi)
25. *Encarsia aurantii* (Howard)
26. *E. berlesei* (Howard)
27. *E. citrina* (Craw)
28. *E. lounsburyi* (Berlese & Paoli)
29. *E. perniciosi* (Tower)
30. *Marietta carnesi* (Howard)
31. *M. leopardina* Motschulsky
32. *M. picta* (Andre `)
33. *Pteroptrix bicolor* (Howard)
34. *P. smithi* (Compere)
35. *P. aegyptica* Evans & Abd-Rabou

Family: Encyrtidae

36. *Habrolepis aspidioti* Compere & Annecke
37. *H. rouxi* Compere

Family: Aphelinidae

1. *Ablerus atomon* (Walker)

Diagnosis: Antenna 7-segmented (1,1,4,1), first funicle segment 3 times as long as wide, third funicle segment 1.5 times as long as wide; submarginal vein with one setae, marginal fringe 1.6 times as long as the width of disc; mesoscutum 2-4 pairs of setae.

Material Examined. 13 ♀♀, Fayoum, 12. VI. 1996 ex. *Chionaspis stantophri* (Cooley) on half a grass (PPRI).

Distribution: Fayoum governorate.

Hosts: *C. stantophri* (Homoptera : Diaspididae).

Remarks: This species was recorded for the first time in Egypt associated with *C. stantophri* by Abd-Rabou (1999a).

Role in the biological control: This species is a hyperparasitoids of *C. stantophri* (Abd-Rabou,1999a).

2. *Ablerus clisiocampae* (Ashmead)

Diagnosis: Body elongated and depressed, mainly black with yellow or white; antennal formula 1,1,4,1; fore wing with disc sparsely setose or almost bare, uniformly infuscated except on apex, submarginal vein 1 seta, stigmal vein long with apex hardly enlarged; legs with five-segmented tarsi; gaster longer than head and thorax combined; tibial spur of middle leg as long as basitarsus and ovipositor clearly exerted.

Material Examined. 7 ♀♀, Beni-Suef, 10. VIII. 1998 ex. *Chrysomphalus aonidum* (L.) on *Citrus* sp. (PPRI).

Distribution: Beni-Seuf governorate.

Hosts: *C. aonidum* (Homoptera : Diaspididae).

Remarks: This species was collected for the first time in Egypt by (Abd-Rabou, 2000a).

Role in the biological control: This species is a hyperparasitoids of *C. aonidum* (Abd-Rabou,2000a).

3. *Ablerus perspiciosus* (Girault)

Diagnosis: Antennae 7-segmented (1,1,4,1), first funicle segment 3-5 times as long as wide, third funicle segment 2 times as long as wide, fourth funicle segment 2 times as long as wide, club 3.2 times as long as wide, submarginal vein with one setae, marginal fringe 3.1 as long as the width of disc; mesoscutum 2-4 pairs of setae.

Material Examined. 16 ♀♀, Qalyubiya, 2. VIII. 1993 ex. *Pseudolecaspis pentagona* (Targioni – Tozzetti) *Oleander* sp. (PPRI).

Distribution: Qalyubiya governorate.

Hosts: *P. pentagona* (Homoptera : Diaspididae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou (1999 a) associated with *P. pentagona*

Role in the biological control: This species is a hyperparasitoids of *P. pentagona* (Abd-Rabou ,1999 a).

4. *Aphytis africanus* Quednau

Diagnosis: This is biparental species. Occiput without suchbars on sides of foraman, mouth margin and malar sulcus usually not fuscous. Propodeal crenulae relatively smaller and overlapping, thoracic sternum dusky. Propodeum 0.6 times as long as scutellum 4.6 times as long as metanotum, overlapping 6 crenulae; ovipositor 1.5 times as long as midtibia, 3.7 times as long as sheath; sheath 0.4 as long as midtibia. Tergite VII 2 setae, tergite VIII 4 setae and syntergum 5-6 setae. Mesoscutum 12 setae, club shorter less than as long as broad.

Material Examined: 5 ♀♀, 6 ♂♂, North. Sinai (El-Arish) 23.V. 1997 ex. *Aonidiella aurantii* (Maskell).

Distribution: Beni-Suef, Cairo, El-Arish, El-Minya, Giza, Matruh, Sharqiya and Qalyubiya governorates.

Hosts: *A. aurantii*, *C. aonidum* and *Lindingaspis floridana* Ferris (Homoptera: Diaspididae).

Remarks: Abd-Rabou and Hayat (2003) collected this species for the first time in Egypt.

Role in the biological control: The maximum parasitism rate of *A. africanus* on *A. aurantii* on *Citrus* sp. in Qalyubiya was 14.6% during Oct., with an average rate 7.4%.

5. *Aphytis aonidiae* (Mercet)

Diagnosis: This is holarctic species and male unknown. Occiput without such bars on sides of foraman, mouth margin and malar sulcus usually not fuscous. Propodeal crenulae non overlapping. Mesoscutum 6 setae, marginal vein 8 setae, marginal fringe 0.2 as long as the width of disc. Thoracic setae dark; ovipositor 1.6 times as long as midtibia, 4.6 times as long as sheath. Posterior margin of scutellum narrowly lined with blackish fuscous.

Material Examined: 3 ♀♀, Alexandria, 15. I. 1992, ex. *Aonidia lauri* (Bouche) on *Laurus nobilis*.

Distribution: Alexandria, Behira, Cairo, Ismailia, Qalyubia and Sharqiya governorates

Hosts: *A. lauri*, *Aonidiella citrina* (Coquillett) and *Hemiberlesia latania* (Signort) (Homoptera: Diaspididae).

Remarks: This species was recorded by Abd-Rabou and Hayat (2003) attacking *A. lauri* for the first time in Egypt.

Role in the biological control: This species was collected by the author in a few numbers.

6. *Aphytis azai* Abd-Rabou

Diagnosis: Biparental species. Body yellow and thoracic sterna immaculate. Length 0.9 mm. Thoracic sterna immaculate, club 3.1 times as long as wide. Mesoscutum 10 setae, 1.3 times as long as scutellum; parapsis 4 setae; axilla 2 setae; scutellum 4 setae, 1.4 times as long as propodeum, 2.7 times as long as wide, Ovipositor 1.6 times as long as midtibia, 3.1 times as long as sheath and 0.5 as long as midtibia. Tergite VII 6-7 setae, tergite VIII 6 setae and syntergum 6 setae.

Material examined: 14 ♀♀, 6 ♂♂, El-Minya, 13. III. 1997, ex. *A.aurantii* on *Citrus* sp. (PPRI).

Hosts: *A.aurantii* (Homoptera: Diaspididae).

Distribution: El-Minya governorate.

Remarks: Abd-Rabou (2004e) collected this species for the first time in Egypt.

Role in the biological control: This species is considered as a promising parasitoid in controlling *A.aurantii* on citrus in Egypt.

7. *Aphytis chilensis* Howard

Diagnosis: This is cosmopolitan and biparental species. Occiput with a fuscous to black bar on each side of foramen, the mouth margin and or malar sulcus sometimes fuscous. First segment of funicle small, triangular, smaller than F2. Club 3-4 times as long as wide and 9 sensilla; setae on head readily visible; propodeum 0.6 as long as scutellum, 3.5 times as long as metanotum; non overlapping 11 crenulae. Male antennae 4-segmented, antennal scape pale and pedicel faintly dusky.

Material Examined: 4 ♀♀, Ismailia 11.XII.1996, ex. *H. lataniae* on *M. indica* (PPRI).

Distribution: Ismailia governorate.

Hosts: *Aspidiotus hedrae* (Vallot), *Chrysomphalus dictyospermi* (Morgan), *Diaspis echinocacti* (Bouche) and *H. latania* (Homoptera: Diaspididae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou and Hayat (2003).

Role in the biological control: The maximum parasitism rate of *A. chilensis* on *C. dictyospermi* on *Ficus nitida* in El-Minya was 3.3% during Dec., with an average rates 0.7 %.

8. *Aphytis chrysomphali* (Mercet)

Diagnosis: This is a cosmopolitan and uniparental species. Thoracic setae paler, thoracic sterna faintly dusky, with a conspicuous longitudinal median black line on the stem of mesosternal furca. Antennae slender; propodum 0.7 as long as scutellum, 6 times as long as metanotum; non overlapping crenulae

Material Examined: 10♀♀, Gharbiya 21.X.1999, ex. *C. dictyospermi* on *F. nitida*.

Distribution: Gharbiya, Giza, Kafr El-Shikh and Qalyubiya governorates

Hosts: *A. aurantii*, *C. dictyospermi*, *Lpidosaphes beckii* (Newman), *L. floridana* and *Parlatoria ziziph*(Lucas) (Homoptera: Diaspididae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou and Hayat (2003).

Role in the biological control: About 13000 individuals of *A.chrysomphali* was released on olive trees infested by *P.oleae* in Northern Coast, the parasitism rates reached maximum 11% (Abd-Rabou, 2001g). Abd-Rabou (2000f) recorded the parasitoid, associated with five armored scale insects in different locations in Egypt.

9. *Aphytis coheni* DeBach

Diagnosis: This is biparental species. Occiput without such bars on sides of foramen, mouth margin and malar sulcus usually not fuscous. Thoracic sterna dusky, body setae relatively coarser and darker; mid lobe with 12-14 setae; delta of fore wing with 50-70 setae. Club about 3 times as long as broad; propodeum 0.8 as long as scutellum, 4.3 times as long as metanotum; overlapping 10 crenulae; ovipositor 1.9 times as long as midtibia, 3.2 times as long as sheath; sheath 0.5 times as long as midtibia. Tergite VII 2 setae, tergite VIII 4 setae and syntergum 5-8 setae.

Material Examined: No specimens were examined during the present work.

Distribution: Alexandria, El-Arish (North Sinai) and Northern Coast governorates.

Hosts: *A. aurantii* (Homoptera: Diaspididae).

Remarks: This species was recorded for the first time in Egypt by Hafez (1988).

Role in the biological control: The maximum parasitism rates of *A.coheni* on *A.aurantii* on *Citrus* sp. In Alexandria was 3.9% during Dec., with an average rates 0.6 % (Hafez ,1988).

10. *Aphytis diaspidis* (Howard)

Diagnosis: This is biparental and uniparental. Occiput with a fuscous to black bar on each side of foramen, the mouth margin and malar sulcus fuscous. Gaster uniformly fuscous or dusky dorsally, with distinct darker cross-bands on terga. Pedicel and flagellum rather uniformly fuscous, tip of club usually blackish, 7 sensilla. Mesoscutum

with 16 setae, crenulae usually wider, more rounded and 6 non overlapping. The relative length of the ovipositor 1.3 times as long as midtibia.

Material Examined: 9 ♀♀, Northern Coast, 4. IV. 1994 ex. *Parlatoria oleae* (Colvee) on *Olea* sp.(PPRI).

Distribution: Alexandria, Assiut, Beheria, Beni-Suef, Giza, Kafr El-Shikh, Ismailia, Minufiya, Qalyubiya, Northern Coast and Sharqiya governorates.

Remarks: This species was recorded for the first time in Egypt by Priesner & Hosny (1940).

Role in the biological control: The maximum parasitism rate of *A. diaspidis* on *P.oleae* on *Olea europaea* in Northern Coast was 26.1% during May, with an average rates 7.9% (Abd-Rabou,2001g).

11. *Aphytis hispanicus* (Mercet)

Diagnosis: This is palearctic and uniparental species. Occiput with a fuscous to black bar on each side of foramen. Gaster not uniformly fuscous or dusky dorsally, but paler with short fuscous strips on sides, and at most with complete cross-bands on terga 1-5 (TI-V). First tergite (TI) of gaster with a fuscous cross-band that on TV obliterated centrally. Pedicel and flagellum uniformly fuscous; apex of club blackish, club 6 sensillae; mesoscutum 13 setae; propodeum 0.6 as long as scutellum, 4 times as long as metanotum. Marginal fringe 0.3 as long as width of disk. Basitarsus 1.1 times as long as midtibial, 2.4 times as long as sheath and 0.7 as long as ovipositor.

Material Examined: 13 ♀♀, Al-Qanater El-Khairya, Qalyubiya, 14. III. 1995 ex. *C.dictyospermi* on *F.nitida* (PPRI).

Distribution: Beni-Suef, Giza, Ismailia, Matruh, Qalyubiya, Sharqiya and Suez governorates.

Hosts: *P. oleae*, *C. dictyospermi* and *Insulaspis pallidula* (Green) (Homoptera: Diaspididae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou and Hayat (2003).

Role in the biological control: The maximum parasitism rates of *A. hispanicus* on *I.pallidula* on *M. indica* in Ismailia was 9.4% during Oct., with an average rates 3.7%.

12. *Aphytis libanicus* Traboulsi

Diagnosis: This is Mediterranean and biparental species. Occiput without such bars on sides of foramen, mouth margin and malar sulcus usually not fuscous. Propodeal crenulae short, non-overlapping; posterior margin of scutellum pale as rest of scutellum; thoracic setae paler; ovipositor stylets about 1.8 times as long as mid tibia. Mesoscutum 11 setae and marginal fringe 0.2 as long as width of disc.

Material Examined: 6 ♀♀, North Sinai (El-Arish) 19 III. 1996 ex. *P. oleae* on *Olea* sp. (PPRI).

Distribution: Fayoum and North Sinai (El-Arish) governorates.

Hosts: *Lucaspis riccae* Targioni-Tozzetti and *P. oleae* (Homoptera: Diaspididae).

Remarks: Abd-Rabou and Hayat (2003) recorded this species for the first time in Egypt.

Role in the biological control: The maximum parasitism rates of *A. libanicus* on *L. riccae* on *O. europaea* in Fayoum was 28.6% during Nov. with an average rates 6.8%.

13. *Aphytis lingnanensis* Comepre

Diagnosis: This is a cosmopolitan and biparental species. Occiput without such bars on sides of foramen, mouth margin and malar sulcus usually not fuscous. Body setae slender and pale. Club about 0.5 of mid tibia, mesoscutum usually with 10-12 setae; delta of fore wing with 30-50 setae. Propodeum 0.6 as long as scutellum, 4.7 times as long as metanotum, large and overlapping 9 crenulae. Ovipositor 1.9 times as long as midtibia, 3.7 times as long as sheath and 0.5 as long as midtibia. Tergite VII 2 setae, tergite VIII 4 setae and syntergum 5-8 setae.

Material Examined: 3 ♀♀, 2 ♂♂, Giza, 21.IX. 1992 ex. *A. aurantii* on *Citrus* sp.(PPRI).

Distribution: Alexandria, Behira, Giza, Qalyubiya and Sharqiya governorates.

Hosts: *A. aurantii*, *A. nerii*, *C. aonidum*, *C. dictyospermi*, *H. latania*, *I. pallidula*, *P. ziziphi* and *P. pentagona* (Homoptera: Diaspididae).

Remarks: Hafez (1988) recorded this species as the most common species of *A. aurantii* on *Citrus* sp.

Role in the biological control: The maximum parasitism rates of *A. lingnanensis* on *P.ziziphi* on *Citrus* sp. in Giza was 43.2% during July, with an average rates 24.9%.

14. *Aphytis maculicornis* (Mercet)

Diagnosis: This is palearctic and uniparental species. Occiput with a fuscous to black bar on each side of foramen, the mouth margin and malar sulcus fuscous. Antennal club with basal part paler than funicle, apex blackish, usually more than 3 times as long as broad; pedicel usually twice as long as wide. Mesoscutum 8-10 setae; delta are sometime not clearly separated from row of setae; propodeal crenulae elongate.

Material Examined: No specimens were examined during the present work.

Distribution: Giza, Matruh, and Northern Coast governorates.

Hosts: *P. oleae*, *Lepidosaphes ulmi* (L.) and *diaspis echniocacti* (Homoptera: Diaspididae).

Remarks: This species was recorded for the first time in Egypt by Priesner and Hosny (1940).

Role in the biological control: This species recorded only by Priesner and Hosny (1940).

15. *Aphytis matruhi* Abd-Rabou

Diagnosis: Biparental species. Body yellow, thoracic setae paler. club 2.8 times as long as wide and 7 sensilla; parapsis 4 setae; axilla 2 setae; scutellum 4 setae; 1.6 times as long as propodeum; anteromedian apodeme robust, metanotum 1.1 times as long as apodeme. Forewing hyaline, 2.6 times as long as wide, veins pale, marginal vein 12 setae, submarginal vein 2 setae, 18 bullae, delta 44 setae in 4 rows, marginal fringe 0.1 as long as width of disk. Basitarsus Ovipositor 1.9 times as long as midtibia

Material Examined: 12 ♀♀, 8 ♂♂, Matruh, 1. VI. 1998, ex. *L. beckii* on *M. indica* (PPRI).

Distribution: Matruh governorate.

Hosts: *L. beckii* (Homoptera: Diaspididae)

Remarks: Abd-Rabou (2004e) collected this species for the first time in Egypt.

Role in the biological control: This species was collected in a few numbers by Abd-Rabou (2004e)

16. *Aphytis mytilaspidis* (Le Baron)

Diagnosis: This is a cosmopolitan, biparental and uniparental species. Occiput without such bars on sides of foramen, mouth margin and malar sulcus usually not fuscous, mandibles well developed. Propodeal crenulae distinct, rounded, non overlapping, pigmented; thoracic sterna dusky. Mesoscutum 13 setae; marginal vein 6 setae and marginal fringe 0.2 as long as width of disc.

Material Examined: 4 ♀♀, 2 ♂♂, Itay, El-Barood (Beheira), 28.VIII. 1995 ex. *L. beckii* on *M. indica* (PPRI).

Distribution: Alexandria, Beni-Suef, El-Minya, Ismailia, Matruh, Behira, Northern Coast and Sharqiya governorates.

Hosts: *C. stantophti*, *H. latania*, *Lepidosaphes ficus* (Signoret), *L. ulmi* and *P. oleae* (Homoptera: Diaspididae).

Remarks: Priesner & Hosny (1940) recorded this species for the first time in Egypt from all over the Nile Delta.

Role in the biological control: The maximum parasitism rates of *A. mytilaspidis* on *P.oleae* on *Prunus arminaca* in Qalyubiya was 66.0% during Nov., with an average rates 30%.

17. *Aphytis paramaculicornis* De Bach & Rosen

Diagnosis: This is biparental and solitary parasitoid species. Occiput with a fuscous to black bar on each side of foramen, the mouth margin and malar sulcus fuscous. Pedicel 1.8 times as long as wide, antennal club with basal part paler than funicle, apex of club usually about 3 times as long as broad; delta 130 setae in 10 rows and mesoscutum 14 setae.

Material Examined: 2 ♀♀, 1 ♂, Northern Coast, 15. VI. 1996 ex. *P. oleae* on *Olea* sp.; 1 ♀, North Sinai (El-Arish), 17. I. 1994, ex. *P. oleae* on *Olea* sp. (PPRI).

Distribution: Beni-Suef, Fayoum, Ismailia, Sinai and Northern Coast governorates.

Hosts: *D.echinocacti*, *L. ulmi* and *P. oleae* (Homoptera: Diaspididae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou and Hayat (2003).

Role in the biological control: About 57000 individuals of *A.paramaculicornis* was released on olive trees infested by *P.oleae* in Northern Coast, parasitism rates increased from 7% to 16% (Abd-Rabou, 2001g).

18. *Aphytis philippinensis* DeBach & Rosen

Diagnosis: This is biparental and southeast Asian species. Occiput with a fuscous to black bar on each side of foramen, the mouth margin of fuscous. Mesoscutum with 15 setae; TV with 2 setae between the lateral fuscous strips, TVI with 4 setae between spiracles; propodeum 3-4 times as long as metanotum and non overlapping 10 crenulae. Ovipositor 1.7 times as long as midtibia, 4.3 times as long as sheath and sheath 0.4

as long as midtibia.

Material Examined: 13 ♀♀, 5 ♂♂, North Sinai (El-Arish), 17. I. 1994 ex. *P.oleae* on *Olea* sp. (PPRI).

Distribution: Beni-Suef, El-Minya, Giza, North Sinai (El-Arish) and Qalyubiya governorates.

Hosts: *C. anonidum* and *P. oleae* (Homoptera: Diaspididae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou and Hayat (2003).

Role in the biological control: The maximum parasitism rates of *A. philippinensis* on *C. anonidum* on *Oleander* sp. in Qalyubiya was 1.1% during Nov., with an average rates 0.1%.

19. *Aphytis phoenicis* DeBach & Rosen

Diagnosis: This is uniparental species. Occiput with a fuscous to black bar on each side of foramen and malar sulcus fuscous. Marginal vein 7 setae, marginal fringe 0.1 as long as the width of disk. Propodeal crenulae non-overlapping; thoracic setae immaculate; propodeum usually 4-4.5 times as long as metanotum; ovipositor stylet 1.7-2 times as long as mid tibia and mesoscutum 6-8 setae.

Material Examined: 1♀, 1♂, North Sinai (El-Arish), 10-XI. 1997 ex. *Parlatoria blanchardii* Targioni-Tozzetti on *Phoenix dactylifera* (PPRI).

Distribution: Beni-Suef, North Sinai (El-Arish), Giza and Ismailia governorates.

Hosts: *P. blanchardii* (Homoptera: Diaspididae).

Remarks: Abd-Rabou & Hayat (2003) recorded this species for the first time in Egypt.

Role in the biological control: The maximum parasitism rates of *A. phoenicis* on *P. blanchardii* on *P. dactylifera* in Ismailia was 20.4% during August, with an average rates 12.7% (Abd-Rabou and Hendawy, 2000).

20. *A. sinaii* Abd-Rabou

Diagnosis: This is biparental species. Club 4.3 times as long as wide and 4 sensilla. mesoscutum 15setae, 1.3 times as long as scutellum; parapsis 4 setae; axilla 2 setae; scutellum 4 setae, 1.7 times as long as propodeum; metanotum the same length as apodeme. Forewing 2.7 times as long as wide, marginal fringe 0.2 as long as width of disk. Basitarsus times as long as midtibia spur and midtibia 2.4 times as long as sheath, 0.7 as long as ovipositor. Ovipositor 1.8 times as long as midtibia and 4 times as long as sheath.

Material Examined: 11 ♀♀, 9 ♂♂, South Sinai 20.VI. 2002 ex. *A. aurantii* on *F. nitida* (PPRI).

Distribution: North Sinia governorate.

Hosts: *A. aurantii* (Homoptera: Diaspididae)

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou (2004b).

Role in the biological control: This species was collected in a few numbers by Abd-Rabou (2004b).

21. *Aphytis vandenboschi* DeBach & Rosen

Diagnosis: This is uniparental species. Occiput with a fuscous to black bar on each side of foramen, the mouth margin of fuscous. Mesocutum usually with 3-5 setae in a line between the lateral fuscous strips; TVI with 6-10 setae in a line between spiracles; propodeum not more than 3 times as long as metanotum; non overlapping

9 crenulae. Ovipositor 1.5 times as long as midtibia, 3.2 times as long as sheath and sheath 0.4 as long as midtibia.

Material Examined: 1 ♀, 1 ♂, Northern Coast 1. VI. 1997 ex. *P. oleae* on *Olea* sp. (PPRI).

Distribution: Qalyubiya and Behira governorates.

Hosts: *A. nerii* and *P. oleae* (Homoptera: Diaspididae).

Remarks: Abd-Rabou & Hayat (2003) recorded this species for the first time in Egypt from Northern Coast.

Role in the biological control: This species was collected by the author in a few numbers.

22. *Coccobius* sp.

Diagnosis :

Material Examined: 3♀♀, El-Minya, 5.4.1991 ex. *A. aurantii*. On citrus (PPRI).

Distribution: El-Minya governorate.

Hosts: *A. aurantii* (Homoptera: Diaspididae).

Remarks: This species was recorded for the first time in Egypt, associated with *A. aurantii* by Abd-Rabou (1999h).

Role in the biological control: This species is a primary parasitoids of *A. aurantii* with rare parasitism rates.

23. *Coccophagoides kuwanai* (Silvestri)

Diagnosis: Body dark brown, with only the center of the metanotum, legs silvery white, the propodeum yellow; first funicle segment $\frac{1}{2}$ as long as second funicle segment; ovipositor not strongly exerted.

Material Examined: 6 ♀♀, 8 ♂♂, Giza, 15. VII. 1997 ex. *Quadraspidiotus* sp. on *Cactus* sp. (PPRI).

Distribution: Giza governorate.

Hosts: *Quadraspidiotus* sp. (Homoptera: Diaspididae).

Remarks: This species was collected for the first time in Egypt, by (Abd-Rabou, 2000a) associated with *Quadraspidiotus* sp.

Role in the biological control: This species is recorded only attacking the *Quadraspidiotus* sp. in Egypt (Abd-Rabou, 2000a).

24. *Coccophagoides simillies* (Masi)

Diagnosis: Antennal flagellum spindle-shaped, apical segment conical with pointed apex, the funicle short and thick and gradually increasing in width distally, first funicle

segment 2/3 as long as the second segment; mesoscutum 10 setae; parapsis 6 setae; submarginal vein 3 setae; ovipositor not strongly exerted.

Material Examined: 1♀ Northern coast 5. XII. 1995 ex. *P. oleae* on *Olea* sp. (PPRI).

Distribution: Northern Coast region.

Hosts: *P. oleae* (Homoptera: Diaspididae).

Remarks: This species was recorded for the first time in Egypt, by (Abd-Rabou, 2000a) associated with *P. oleae*

Role in the biological control: Abd-Rabou (1997a) studied the abundance of this species as a *Coccophagoides* sp. on *P. oleae* in El-Arish and he recorded average and maximum parasitism rates of 5.1 and 10%, respectively.

25. *Encarsia aurantii* (Howard)

Diagnosis: Face without dark brown cross bands above the toruli, gaster except apex of T7, largely brown to dark brown. Side lobes of mesoscutum each with two or fewer setae. Antennal club 3-segmented, ovipositor very short, clearly much shorter than mid tibia.

Material Examined: 3 ♀♀, Northern Coast, 4.III. 1994, ex. *P. oleae* on *Olea* sp. (PPRI).

Distribution: Beheira, Fayoum, Ismailia, Matruh ,Northern Coast, Qalyubiya and Sharqiya governorates.

Hosts: *A. aurantii*, *A. orientalis*, *H. lataniae* and *P. oleae* (Homoptera: Diaspididae).

Remarks: This species was recorded for the first time in Egypt by Hafez (1988).

Role in the biological control: *E. aurantii* is one of the effective parasitoid attacking some armored scale insects. The highest level of parasitism with *H. lataniae* and *P. oleae* were found to be 61 and 71%, respectively (Abd-Rabou, *et al.*, 2001). About 44000 individuals of *E.aurantii* was released on olive trees infested by *P.oleae* in Northern Coast, the parasitism rates increased from 44% to 71% (Abd-Rabou, 2001g).

26. *Encarsia berlese* (Howard)

Diagnosis: Face without dark brown cross bands above the toruli, gaster except apex of T7, largely brown to dark brown, F1 without any longitudinal sensilla, longer than wide, Club narrow and 3-segmented side lobes of mesoscutum each with two or fewer setae. Ovipositor either subequal in length to the mid tibia or slightly shorter.

Material Examined: 49 ♀♀, Alexandria, 28. V. 1991, ex. *P. pentagona* (PPRI).

Hosts: *P. pentagona*. (Homoptera : Diaspididae).

Remarks: This species recorded for the first time in Egypt by Priesner & Hosny (1940).

Role in the biological control: During the present work this species was collected only in Egypt associated with *P. pentagona* with rate parasitism rare.

27. *Encarsia citrina* (Craw)

Diagnosis: Body largely pale. Longest seta on marginal fringe of fore wing less than the maximum width of wing disc. Submarginal vein of fore wing with 2 setae.

Material Examined: 7 ♀♀, Dokki (Giza), 18. X. 1992, ex. *P. ziziphi* on *Citrus* sp.

Distribution: Cairo, North Sinai (El-Arish), Giza and Qalyubiya governorates.

Hosts: *A. aurantii*, *A. hedraeae*, *C. dictyospermi*, *C. aonidum*, *Insulaspis gloveri* (Yackard), *L. beckii*, *L. floridana* and *P. ziziphi* (Homoptera : Diaspididae).

Remarks: This species was recorded for the first time in Egypt by Priesner & Hosny (1940).

Role in the biological control: Abd-Rabou (1997b) mentioned that *E. citrina* should be considered a promising candidate for utilization in biological control of armored scale insects in Egypt. This species was reared from 8 species of diaspidid scale insects and maximum parasitism rates ranged between 23 and 65%.

28. *Encarsia lounsburyi* (Berlese & Paoli)

Diagnosis: Body largely pale, longest seta on marginal fringe of fore wing less than the maximum width of the wing disc. Submarginal vein of fore wing with 1 seta.

Material Examined: 12 ♀♀, El-Minya, 3. XI. 1997, ex. *A. aurantii* on *Citrus* sp. (PPRI).

Distribution: Assiut, Aswan, Beni-Suef, El-Minya, Fayoum, Giza and Sohag governorates.

Hosts: *Abgrallaspis cyanophylli* (Signoret), *A. aurantii*, *A. rerii*, *C. stantophri*, *C. aonidum*, *C. dictyospermi*, *D. echinocacti*, *Fiorinia fioriniae* (Targioni-Tozzetti), *H. latania*, *I. pallidula*, *L. beckii*, *Lineaspis striata* (Newstead) and *Mycetaspis personata* (Comstock) (Homoptera: Diaspididae).

Remarks: This was recorded for the first time in Egypt by Priesner & Hosny (1940).

Role in the biological control: Abd-Rabou (2000b) recorded this species associated with 13 species of armored scale insects in Egypt. He observed the effective role of this parasitoid on the armored scale insects.

29. *Encarsia perniciosi* (Tower)

Diagnosis: Antennae with F2 about twice as long as F1 and with 2 linear sensilla . Fore wings 2-3 setae basal to parastigma. Marginal fringe from slightly longer than one sixth to two-fifth of wing width.

Material Examined: 8 ♀♀, Sharqyia, 23. I. 2003, ex. *I. pallidula* on *M.indica* (PPRI).

Distribution: Sharqyia governorate.

Hosts: *I. pallidula* (Homoptera: Diaspididae).

Remarks: This was recorded for the first time in Egypt by Evans and Abd-Rabou(2005).

Role in the biological control: This parasitoid was collected in a few numbers by the author.

30. *Marietta carnesi* (Howard)

Diagnosis:Antennal scape about 6 times as long as wide, fore wing with apex largely hyaline and with 3 large cells on disc beyond linea calva but without defined cells a long anterior margin; mid tibia with 2 more or less complete bands.

Material Examined: 63 ♀♀, Northern Coast, 5. VIII. 1991, ex. *Parlatoria* sp. on *Olea* sp. (PPRI).

Distribution: Beni-Suef , Giza and Northern Coast governorates.

Hosts: *C. aonidum* and *Parlatoria* sp (Homoptera:Diaspididae).

Remarks:This species was recorded for the first time in Egypt by Abd-Rabou (2000a).

Role in the biological control: This species is a hyperparasitoids of *C. aonidum* and *Parlatoria* sp. in Egypt Abd-Rabou (2000a).

31. *Marietta leopardina* Motschulsky

Diagnosis: Antennal scape less than 6 times as long as wide, or with one or two brownish bands or spots; antennal scape with the band short; extending caudad from about middle of ventral margin; propodeum distinctly shorter than, metanotum; apex of fore wing without infuscate band in middle, mesoscutum 4 setae.

Material Examined: 4 ♀♀, Giza, 10. VII. 2000, ex. *C. dictyospermi* on *F.nitida*(PPRI)

Distribution: Beni-Suef, Behira, Cairo, Giza, Ismailia and North Sinia governorates.

Hosts: *A. aurantii*, *A. nerii*, *C. stantophri*, *C. aonidum*, *C. dictyospermi*, *D. echinocacti*, *F.floriniae*, *H. latania*, *I. pallidula*, *L. beckii*, *L. striata* and *M. personata* (Homoptera: Diaspididae).

Remarks: This species was recorded for the first time in Egypt by Priesner and Hosny (1940).

Role in the biological control: This species is a hyperparasitoids of different species of armored and soft scale insects in Egypt (Abd-Rabou, 2003c). He mentioned that *M.leopardina* was reared out of 48 Hemiptera and scales parasitic Hymenoptera species. The survey covered 16 governorates in Egypt. Classically orders, families and species of the host insects associated with his hyperparasitoid are given together with locality and month of abundance. Through a survey, the hyperparasitoid, *M .leopardina* was reared out of 48 Hemiptera and scales parasitic Hymenoptera species. The survey covered 16 governorates in Egypt. Classically orders, families and species of the host insects associated with his hyperparasitoid are given together with locality and month of abundance.

32. *M.picta* (Andre)

Diagnosis: Antennal scape nearly as long as wide, with 2 oblique fuscous bands, one outer and the other inners, fore wing broad less than twice as long as wide, with a slightly different pattern.

Material Examined: 3 ♀♀, Alexandria , 2. VI. 2001, ex. *A. aurantii* on *Citrus* sp. (PPRI).

Distribution: Alexandria governorate.

Hosts: *A. aurantii* (Homoptera: Diaspididae).

Remarks: This species was recorded for the first time in Egypt as a hyperparasitoids associated with *A. aurantii* by Abd- Rabou (1999h). Later , Abd-Rabou(2001a) also recorded this hyperparasitoid species.

Role in the biological control: This species was collected by the author in a few numbers.

33. *Pteroptrix bicolor* (Howard)

Diagnosis: Female antenna 8-segmented, club one-segmented; submarginal vein 2 setae, marginal fringe 3. 1times as long as the width of disc, mesoscutum 4 setae and axilla two species.

Material Examined: 7 ♀♀, 3 ♂♂, North Sinai (El-Arish), 5.X. 1990, ex. Unknown (PPRI)

Distribution: North Sinai (El-Arish) governorate.

Hosts: *Parlatoria crotonis* (Douglas) (Homoptera : Diaspididae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou (1999a).

Role in the biological control: This species was collected only associated with *P. crotonis* from North Sinai by small numbers (Abd-Rabou, 1999a).

34. *Pteroptrix smithi* (Compere)

Diagnosis: Funicle 2-segmented, first funicle segment longer than pedicel, with linearsensilla, club 3-segmented; submarginal vein with one small seta.

Material Examined: 2 ♂♂, 15 ♂♂, Qalyubiya, 20. VIII. 1997, ex. *Conaspis* sp. (PPRI).

Distribution: Qalyubiya governorate.

Hosts: *C. aonidum* (Homoptera : Diaspididae).

Remarks: This species was recorded for the first time in Egypt by (Abd-Rabou, 2000a).

Role in the biological control: *P. smithi* has a quite role in controlling *C. aonidum* in Egypt (Abd-Rabou, 2000a).

35. *Pteroptrix aegyptica* Evans & Abd-Rabou

Diagnosis: The head brown, the mesoscutum brown with a pale, central triangular-shaped area, F3 and F4 each slightly wider than long, the marginal fringe 0.9-1.0X as long as forewing width and male with F3 quadrate.

Material examined : 7 ♂♂, 10 ♂♂, North Sinai(El-Arish), 10. VI. 1999, ex. *P. blanchardi* on *P. dactylifera* (PPRI).

Hosts : *P. blanchardi* (Homoptera : Diaspididae).

Distribution: North Sinai governorate.

Remarks: This species was recorded for the first time in Egypt by (Evans and Abd-Rabou, 2005).

Role in the biological control: This species was collected in a few numbers by the author.

36. *Habrolepis aspidioti* Compere & Annecke

Diagnosis: Females with large conspicuous, lamelliform setae on scutellum and smaller suberect ones on head at fronto-occipital margin. Apex of fore wing distinctly infuscated and provided with coarse setae beyond hyaline transverse cross band. Base of fore wing with a fine setae extending based in an acuminate area almost to base of wing, antennal funicle segment I-IV transverse, V usually like wise.

Material examined: 25 ♂♂, 10 ♂♂, Qalyubiya, 20. VIII. 1997, ex. *C. aonidum* on *Citrus* sp.(PPRI)

Hosts : *A. aurantii*, *A. rerii*, *C. aonidum*, *C. dictyospermi*, *H. latania*, *I. pallidula*, *L. beckii* and *M. personata* (Homoptera: Diaspididae).

Distribution: Giza, Minyufiya, Northern Coast, Qalyubiya, Sohag and South Sinia governorates.

Remarks: This species was recorded for the first time in Egypt by Priesner and Hosny (1940).

Role in the biological control: This species reported as an effective parasitoid on different armored scale insects in different locations in Egypt (Abd-Rabou, 1997c).

37. *Habrolepis rouxi* Compere

Diagnosis: Females with large conspicuous, lamelliform setae on scutellum and smaller suberect ones on head at fronto-occipital margin. Apex of fore wing hyaline and without coarse setae or at most very narrowly setose at extreme apex.

Material examined: 4 ♂♂, 2 ♀♀, Qalyubiya, 1. VII. 1999, ex. *C. dictyospermi* (PPRI).

Hosts : *C. dictyospermi* (Homoptera: Diaspididae).

Distribution: Qalyubiya governorate.

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou (2002c).

Role in the biological control: This species was collected in a few numbers by the author.

IV. Parasitoids of mealybugs (Homoptera : Pseudococcidae)

Parasitoids of mealybugs are more or less concentrated within for families namely Aphelinidae, Encyrtidae, Platygastridae and Signiphoridae (Abd-Rabou, 2001h). These mealybugs exert not only damage to the plants they attack but also due to its nature cause sooty moulds that grow and form a drastic allerging, its viscous nature interfere with cleanliness of these plants and fruits, other annoying problems are due to the action of both the mealybugs and their products.

Mealybugs also as other damaging insects were controlled formerly through chemical procedures that caused a lot of disturbance to growers and grown plants and fruits, consequently when it came to pass that a number of important parasitoids of mealybugs produced a handsome amount of control of these mealybugs showed the imminence of these parasitoids. These parasitoids as previously mentioned fall within these four families each being characterized by its specific biology.

List of parasitoids attacking mealybugs in Egypt:

Family: Aphelinidae

1. *Marietta leopardina* Motschulsky
2. *M. picta* (Andre)

Family : Encyrtidae

3. *Acerophagus* sp.
4. *Anagyrus aegyptiacus* Moursi
5. *A. greeni* (Howard)
6. *A. kamali* Moursi
7. *A. pseudococci* (Girault)
8. *A. saccharicola* Timberlake
9. *A. shahidi* Hayat
10. *Blepyrus insularis* (Cameron)
11. *Gyranusioidea indica* Shaffee, Alam & Agarwal
12. *Homalotylus vicinus* Silvestri
13. *Leptomastidea abnormis* (Girault)
14. *L. dactylopii* Howard
15. *L. flava* Mercet
16. *L. nigrocoxalis* Compere
17. *Microterys* sp.
18. *Neoplatycerus palestinensis* (Rivany)
19. *Praphaenaodiscus* sp.
20. *Prochiloneurus aegyptiacus* (Mercet)
21. *Rhopus nigriclavus* (Girault)
22. *Allotropa mecrida* (Walker)

Family: Pteromalidae

23. *Pachyneuron* sp.

Family: Signiphoridae

24. *Chartocerus subaeneus* (Foerster)

Family: Aphelinidae

1. *Marietta leopardina* Motschulsky

Diagnosis: Antennal scape less than 6 times as long as wide, or with one or two brownish bands or spots; antennal scape with the band short; extending caudad

from about middle of ventral margin; propodeum distinctly shorter than, metanotum; apex of fore wing without infuscate band in middle, mesoscutum 4 setae.

Material Examined: 1 ♀♀, Cairo, 15. VIII. 1999, ex. *Maconellicoccus hirsutus* (Green) on *Hibiscus* sp. (PPRI)

Distribution: Behira, Cairo and Giza governorates.

Hosts: *Dysmicoccus brevipes* (Cockerell), *M. hirsutus*, *Niacoccus minor* Green, *Nipaecoccus nipae* (Maskell) and *Planococcus citri* Risso (Homoptera: Pseudococcidae).

Remarks: This species was recorded for the first time in Egypt by Priesner and Hosny (1940).

Role in the biological control: This species is a hyperparasitoid of different species of armored and soft scale insects in Egypt (Abd-Rabou, 2003c). He mentioned that *M.leopardina* was reared out of 48 Hemiptera and scales parasitic Hymenoptera species. The survey covered 16 governorates in Egypt. Classically orders, families and species of the host insects associated with his hyperparasitoid are given together with locality and month of abundance. Through a survey, the hyperparasitoid, *M .leopardina* was reared out of 48 Hemiptera and scales parasitic Hymenoptera species. The survey covered 16 governorates in Egypt. Classically orders, families and species of the host insects associated with his hyperparasitoid are given together with locality and month of abundance.

2. *M.picta* (Andre)

Diagnosis: Antennal scape nearly as long as wide, with 2 oblique fuscous bands, one outer and the other inners, fore wing broad less than twice as long as wide, with a slightly different pattern.

Material Examined: 14 ♀♀, Alexandria , 20. V. 2000, ex. *M. hirsutus* on *Hibiscus* sp. (PPRI)

Distribution: Alexandria governorate.

Hosts: *M. hirsutus* (Homoptera :Pseudococcidae).

Remarks: This species was recorded for the first time in Egypt as a hyperparasitoid associated with *M. hirsutus* by Abd- Rabou (2000d).

Role in the biological control: This species collected by the author in a few numbers.

Family : Encyrtidae

3. *Acerophagus* sp.

Diagnosis: Funicle 5-segmented, club three-segmented. Cheeks as long as or longer than, transverse eye diameter. Upper two teeth of mandible subequal, lower tooth

smaller and more basal, frontovertex less than twice as long as wide, ocellar triangle more or less obtuse, antennae unicolorous and always pale.

Material Examined: 8 ♀♀ Beni-Suef, 11. VIII. 2001, ex. *Nipaecoccus viridis* (Newstead) on *Lebbke* sp. (PPRI).

Distribution: Beni-Suef governorate.

Hosts: *N. viridis* (Homoptera :Pseudococcidae).

Remarks: This species was recorded for the first time in Egypt by Abd-Rabou and Abd El-Gawad (2002).

Role in the biological control: *Acerophagus* sp . was recorded attacking *N.viridis* with an average parasitism rates 3.6 and 2.9% during the two years under considerations. The peaks parasitism rates by this species were 18.3 and 14% Abd-Rabou and Abd El-Gawad (2002) .

4. *A.aegyptiacus* Moursi

Diagnosis: First and second funicle segments completely dark brown, remainder of flagellum white, ventral surface of costal cell with at least two complete lines of seta, propodeum with at least one or two setae inside each spiracle, eye margin distinctly diverging anterior to posterior ocelli, mesoscutum entirely orange or orange mixed with brown, marginal and postmarginal veins combined a little longer than stigmal, postmarginal quite long and distinct, gaster about as long as thorax, ovipositor very slightly exerted.

Material Examined: 10 ♀♀, Beni-Suef, 15. X. 1996, ex. *N.viridis* on *lebbke* (PPRI).

Distribution: Beni-Suef and Giza governorates.

Hosts: *N.viridis* (Homoptera :Pseudococcidae).

Remarks: This species was recorded for the first time in Egypt by Moursi (1948)

Role in the biological control: *A. aegyptiacus* was reared from *N.viridis* , with an average parasitism rates 30.4.% and maximum parasitism rates was 12% Abd-Rabou and Abd El-Gawad (2002).

5. *A. greeni* (Howard)

Diagnosis: First funicle segment brown, remainder of flagellum white, ventral surface of costal cell with at least two complete lines of setae, hypopygium not unusually elongate, p marginal and postmarginal veins combined at least as long as stigmal vein , gaster shorter than head and thorax together, ovipositor slightly exerted and frontovertex nearly two-fifth head width.

Material Examined: 10 ♀♀, Giza , 5. IX. 2001, ex. *S. sacchari* (Cockerell) on sugar cane (PPRI).

Hosts: *Antonina* sp., *Pseudococcus* sp. and *S. sacchari* (Homoptera :Pseudococcidae)

Distribution : Cairo, Giza and Qalyubiya governorates.

Remarks: This species was recorded for first time in Egypt by (Abd-Rabou, 2001h).

Role in the biological control: *A. greeni* was reared from *S. sacchari* with an average parasitism rates 1.3% and maximum parasitism rates was 6.5% (Abd- Rabou, 2000c).

6. *A. kamali* Moursi

Diagnosis: Fore wing with postmarginal vein not longer than stigmal vein. First funicle segment dark brown, remainder of flagellum brown. Ventral surface of costal cell with several lines of setae, marginal and postmarginal veins shorter than to as long as stigmal, gaster about as long as thorax, ovipositor not exerted, apex of forewing devoid of marginal setae and frontovertex slightly wider to much wider than one-third head width.

Material Examined: 23♀♀, Giza, 15. IX. 1999, ex. *M. hirsutus* on *Hibiscus* sp.(PPRI).

Hosts : *M. hirsutus* (Homoptera :Pseudococcidae).

Distribution : Cairo, Giza and Qalyubiya governorates.

Remarks: This species was recorded for the first time in Egypt by Moursi (1948).

Role in the biological control: *A. kamali* was reared from : *M. hirsutus*, with an average parasitism rates 20.7.% and maximum parasitism rates was 37% (Abd-Rabou, 2000d).

7. *A. pseudococci* (Girault)

Diagnosis: First funicle segment dark brown, remainder of flagellum white, ventral surface of costal cell with at least two complete lines of setae, stigmal vein longer than combined lengths of marginal and postmarginal veins, gaster about as long as thorax, ovipositor very slightly exerted. frontovertex less than one third head width and genae, mouth margin, interantennal prominence almost dark brown.

Material examined: 3♀♀, Alexandria, 1. X. 2001, ex. *P. citri* on *Vitis venivera*(PPRI)

Hosts : *M. hirsutus* and *P. citri* (Homoptera : Pseudococcidae).

Distribution : Alexandria and Giza governorates.

Remarks: This species was recorded for first time in Egypt by Abd-Rabou, 2001h

Role in the biological control: *A. pseudococci* was reared from *N. viridis* with an average parasitism rates 9.4% and maximum parasitism rates was 35.4% Abd-Rabou and Abd El-Gawad (2002). This parasitoid was reared from *S. sacchari* with an average parasitism rates 1.8% and maximum parasitism rates was 12% (Abd- Rabou, 2000c).

8. *A. saccharicola* Timberlake

Diagnosis: First funicle segment dark brown, remainder of flagellum white, stigmal vein about as long as marginal vein, gaster about as long as head and thorax together, ovipositor hardly exerted. frontovertex two-fifth head width and head in side view about twice as long as deep.

Material examined: 3♀♀, Beni-Suef, 1. X. 2001, ex. *S. sacchari* on sugar cane(PPRI).

Hosts : *S. sacchari* (Homoptera : Pseudococcidae)

Distribution : Beni-Suef governorate.

Remarks: This species was imported, reared and released for first time in Egypt by Abd-Rabou (2002b).

Role in the biological control: About 146163 parasitoid adults of *A. saccharicola* mass reared and released in five governorates in Upper Egypt. This parasitoid established readily and spread rapidly (Abd-Rabou,2002b).

9. *A. shahidi* Hayat

Diagnosis:Flagellum varying from yellow brown to dark brown almost always with F2 and F3 white to yellow, frontovertex about half head width , ovipositor hardly exerted, forewings characteristically infusate below submarginal vein and apex of venation.

Material examined: 12♀♀, Alexandria, 1. X. 1999, ex. *Antonina graminis*(Maskell)on grass(PPRI)

Hosts : *A. graminis* (Homoptera : Pseudococcidae).

Distribution : Alexandria governorate.

Remarks: This species was recorded for first time in Egypt by Karam and Abou-EIKhair(1996).

Role in the biological control: During the present work, this species is a primary parasitoids of *A. graminis* with rare parasitism rates.

10. *Blepyrus insularis* (Cameron)

Diagnosis: Fore wing normal, at least very nearly reaching apex of gaster. Scutellum without a distinct tuft or bundle of setae or scale like setae. First funicle segment not longer than broad.

Material examined: 12♀♀, Giza , 11. IX. 2001, ex. *Ferrisia virgata* (Cockerell) on *Acalipha* sp.(PPRI).

Hosts : *F. virgata* (Homoptera : Pseudococcidae).

Distribution: Giza governorate.

Remarks: This species was recorded for first time in Egypt by Awadallah *et al.*(1999).

Role in the biological control: Awadallah *et al.*(1999) observed this parasitoid has effective role in controlling *F.vergata*

12. *Gyranusoidea indica* Shaffee, Alam & Agarwal

Diagnosis: Mesopleuron large and without a femoral groove. Scutellum without a distinct tuft or bundle of setae, notaular lines absent, scape not more than 3 times as long as broad, fore wing with infuscation limited to longitudinal streaks adjacent to venations, fore wing with postmarginal vein at least a little longer than stigmal vein.

Material examined: 4♀♀, Cairo, 9. X. 1999, ex. *M.hirsutus* on *Hibscus* sp. (PPRI).

Hosts : *M.hirsutus*(Homoptera : Pseudococcidae).

Distribution: Cairo governorate.

Remarks: This species was recorded for first time in Egypt by Abd-Rabou(2000d).

Role in the biological control:This parasitoid was reared from *M.hirsutus* with an average parasitism rates 6.2% and maximum parasitism rates was 20 % (Abd-Rabou, 2000d).

13. *Homalotylus vicinus* Silvestri

Diagnosis: Fore wing normal, at least very nearly reaching apex of gaster. Scutellum without a distinct tuft or bundle of setae or scale like setae . First funicle segment longer than broad. Notular lines present. Funicle 7–segmented.

Material examined: 4♀♀, Cairo, 9. X. 1999, ex. *M.hirsutus* on *Hibscus* sp. (PPRI).

Hosts : *M.hirsutus* (Homoptera : Pseudococcidae).

Distribution: Cairo governorate.

Remarks: This species was recorded for first time in Egypt by Priesner and Hosny (1940).

Role in the biological control: This species was collected in a few numbers by the author.

14. *Leptomastidea abnormis* (Girault)

Diagnosis: Fore wing normal, at least very nearly reaching apex of gaster. Scutellum without a distinct tuft or bundle of setae or scale like setae. First funicle segment longer than broad. Notular lines absent. Scape not more than 3 times as long as broad. Fore wing with one or two distinct fuscus bands, marginal vein shorter than the stigmal.

Material examined: 41♀♀, Cairo, 9. X. 1999, ex *M.hirsutus* on *Hibscus* sp. (PPRI).

Hosts : *M. hirsutus*, *N. nipae* and *P. citri*(Homoptera : Pseudococcidae).

Distribution: Alexandria and Cairo governorates.

Remarks: This species was recorded for first time in Egypt by Abd-Rabou (2000d).

Role in the biological control: *L. abnormis* was reared from *M. hirsutus* with maximum parasitism rate was 21% (Abd- Rabou, 2000d)

15. *L. dactylopii* Howard

Diagnosis: Fore wing normal, at least very nearly reaching apex of gaster. Scutellum without a distinct tuft or bundle of setae or scale like setae. First funicle segment longer than broad. Notular lines absent. Scape more than 3 times as long as broad. Fore wing not more than about 2.5 times as long as broad.

Material examined: 4♀♀, Cairo, 9. X. 1999, ex. *M.hirsutus* on *Hibiscus* sp. (PPRI)

Hosts : *M. hirsutus*(Homoptera : Pseudococcidae).

Distribution: Cairo and Alexandria governorates.

Remarks: This species was recorded for first time in Egypt by Abd-Rabou (2000d).

Role in the biological control: *L. dactylopii* was reared from *M. hirsutus* with maximum parasitism rate was 8% (Abd- Rabou, 2000d).

16. *L. flava* Mercet

Diagnosis: Mesopleuron large and without a femoral groove, funicle at least 6-segmented, scutellum without a distinct tuft or bundle of setae or scale like setae. Scape more than 3 times as long as broad. Second funicle segment with sensile.

Material examined: 11♀♀, Beni-Suef, 19. XI. 2001, ex. *N. viridis* on lebbke (PPRI).

Hosts : *N. viridis* (Homoptera : Pseudococcidae).

Distribution: Beni-Suef governorate.

Remarks: This species was recorded for first time in Egypt by Priesner and Hosny (1940).

Role in the biological control: *L. flava* was reared from *N. viridis* with maximum parasitism rate 26.6 % (Abd-Rabou and Abd El-Gawad ,2002).

17. *L. nigrocoxalis* Compere

Diagnosis: Mesopleuron large and without a femoral groove, funicle at least 6-segmented, scutellum without a distinct tuft or bundle of setae or scale like setae. Scape more than 3 times as long as broad. Second funicle segment without sensile.

Material examined: 23♀♀, Beni-Suef, 20. IX. 2000, ex. *N. viridis* on lebbke (PPRI).

Hosts : *N. viridis* and *M.hirsutus* (Homoptera : Pseudococcidae).

Distribution: Beni-Suef and Cairo governorates.

Remarks: This species was recorded for first time in Egypt by Abd-Rabou(1999a).

Role in the biological control: *L. nigrocoxalis* was reared from *N. viridis* with an average parasitism rates 8.4% and maximum parasitism rates was 21% Abd-Rabou and

Abd El-Gawad (2002). Also this parasitoid attacked *M.hirsutus* with an average parasitism rates 2.4% and maximum parasitism rates was 13%(Abd- Rabou, 2000d).

18. *Microterys* sp.

Diagnosis: Fore wing normal, at least very nearly reaching apex of gaster, hypopygium not reaching more than two-thirds a long gaster, scutellum with a thin apical flange.

Material examined: 2♀♀, Qena, 12. IX. 1997, ex. *S. sacchari* on sugar cane (PPRI).

Hosts : *S. sacchari* (Homoptera : Pseudococcidae).

Distribution: Assiut and Qena governorates.

Remarks: This species was recorded for first time in Egypt by Abd-Rabou (2000c).

Role in the biological control: *Microterys* sp. was reared from *S. sacchari* with an average parasitism rates 3.1% and maximum parasitism rate was 13% (Abd-abou, 2000c).

19. *Neoplatycerus palestinensis* (Rivany)

Diagnosis: Fore wing with postmarginal vein well developed, at most only about one-third shorter than stigmal, pedicel usually longer and broader than F1. Fore wing with proximal margin of linea calva without any flattened scale, antennal flagellum distinctly oval in profile.

Material examined: 2♀♀, Qena, 12. IX. 1997, ex. *S. sacchari* on sugar cane (PPRI).

Hosts : *Planococcus ficus* (Signoret) (Homoptera : Pseudococcidae).

Distribution: Giza governorate.

Remarks: This species was recorded for first time in Egypt by Awadallah *et al.* (2002).

Role in the biological control: Awadallah *et al.* (2002) recorded this species in a few individuals in April.

20. *Paraphaenaodiscus* sp.

Diagnosis: Fore wing normal, at least very nearly reaching apex of gaster and hypopygium not reaching more than two-thirds a long gaster and scutellum with a thin apical flange.

Material examined: 2♀♀, Qena, 18. X. 1999, ex. *S. sacchari* on sugar cane (PPRI).

Hosts : *S. sacchari* (Homoptera : Pseudococcidae).

Distribution: Qena governorate.

Remarks: This species was recorded for first time in Egypt by Abd-Rabou (2000c).

Role in the biological control: *Paraphenaodiscus* sp. was reared from *S. sacchari* with an average parasitism rates 0.2% and maximum parasitism rate was 1% (Abd-Rabou, 2000c)

21. *Prochiloneurus aegyptiacus* (Mercet)

Diagnosis: Funicle at least 6-segmented, fore wing normal at least very nearly reaching apex of gaster, scutellum with a group of coarse, long dark setae arranged in a more or less compact tuft or bundle or with two or more scale like setae, marginal vein at least nearly as long as stigmal vein.

Material examined: 2♀♀, Alexandria, 9. X. 1999, ex. *M.hirsutus* on *Hibscus* sp. (PPRI).

Hosts : *M.hirsutus* (Homoptera : Pseudococcidae).

Distribution: Alexandria governorate.

Remarks: This species was recorded for first time in Egypt by Abd-Rabou (2000a).

Role in the biological control: This species was recorded as a hyperparasitoid of *M.hirsutus* with a few numbers Abd-Rabou (2000d).

22. *Rhopus nigriclavus* (Girault)

Diagnosis: Mesopleuron large and without a femoral groove. Fore wing normal, at least very nearly reaching or very nearly reaching apex of gaster, hypopygium reaching or very nearly reaching apex of gaster, scape normally 5 times as long as broad, linea calva not interrupted and club not longer than funicle.

Material examined: 3♀♀, Beni-Suef, 10. IX. 1998, ex. *S. sacchari* on sugar cane (PPRI).

Hosts : *S. sacchari* (Homoptera : Pseudococcidae).

Distribution: Beni-Suef governorate.

Remarks: : This species was recorded for first time in Egypt by Abd-Rabou (2000c).

Role in the biological control: *R. nigriclavus* was reared from *S. sacchari* with an average parasitism rates 0.2% and maximum parasitism rate was 2% (Abd-Rabou, 2000c).

Family : Platygastriidae

23. *Allotropa mecrida* (Walker)

Diagnosis: Pronotum triangular in a lateral vein reaching tegulae, antennae elbowed or filiform, number of antennal segments (7-15), fore wings with five or fewed closed cells, submarginal vein without setae.

Material examined: 4♀♀, Alexandria, 12. XI. 1998, ex. *M.hirsutus* on *Hibscus* sp. (PPRI).

Hosts : *M. hirsutus*, *Pseudococcus longispinus* (Targioni- Tozzetti) (Homoptera: Pseudococcidae).

Distribution: Alexandria governorate.

Remarks: This species was recorded for first time in Egypt by Abd-Rabou (2000d) as a *Allotropa* sp. Later Abd-Rabou and Hendawy (2004) nominated this parasitoid.

Role in the biological control: This species parasitized *M. hirsutus* with an average parasitism rates 9.8 % and maximum parasitism rate was 27% (Abd-Rabou, 2000d).

Family : Pteromalidae

24. *Pachyneuron* sp.

Diagnosis: Antennae with 2 anelli and 6 funicular segments, first segment of the funicle $\frac{3}{4}$ length of pedicel or less-thorax arched dorsally. Scutellum convex. Fore wing hyaline, marginal fringe present, marginal vein moderately thick 4-5 times as long as wide, about as long as the stigmal vein, postmarginal vein considerably longer, upper surface of basal cell bare, at most with 5 setae and speculum.

Material examined: 10 ♀♀, Beni-Suef, 2. X. 2000, ex. *N. viridis* on lebbke (PPRI).

Hosts : *N. viridis* (Homoptera : Pseudococcidae).

Distribution: Beni-Suef governorate.

Remarks: This species was recorded for first time in Egypt by Abd-Rabou (2001h)

Role in the biological control: *Pachyneuron* sp. was reared as a hyperparasitoid from *N. viridis* with an average parasitism rate 0.5 % and maximum parasitism rates was 3.5% (Abd-Rabou and Abd El-Gawad, 2002).

Family : Signiphoridae

25. *Chartocerus subaeneus* (Foerster)

Diagnosis: Funicle absent, but with 1-4 anelli. Fore wing 3 times as long as wide longest marginal cilia $\frac{1}{2}$ - $\frac{2}{3}$ width of disc, submarginal vein with 2 setae.

Material examined: 4 ♀♀, Cairo, 9. X. 1999, ex. *M. hirsutus* on *Hibiscus* sp. (PPRI).

Hosts : *M. hirsutus* and *S. sacchari* (Homoptera : Pseudococcidae).

Distribution: Alexandria, Assiut, Beni-Suef and Cairo governorates.

Remarks: : This species was recorded for first time in Egypt by Abd-Rabou (1999a).

Role in the biological control: *C. subaeneus* was reared as a hyperparasitoid from *S. sacchari* with an average parasitism rates 0.8.% and maximum parasitism rate was 4%.

V. Genus *Aphelinus* as an effective parasitoid species of aphid in Egypt:

The species of the aphelinid genus, *Aphelinus* Dalman (Hymenoptera : Aphelinidae) are parasitoids of aphids (Homoptera: Aphidoidea). Some species have also been

recorded from coccoids (Homoptera: Coccoidae). The genus *Aphelinus* represents one of the most important parasitic groups used in biological control, and various species are currently being collected as part of intensive foreign exploration efforts to search for parasites of aphids .

List of Genus *Aphelinus* in Egypt:

1. *Aphelinus asychis* Walker
2. *Aphelinus demyaati* Abd-Rabou
3. *Aphelinus flavipes* (Forester)
4. *Aphelinus mali* (Haldeman)
5. *Aphelinus paramali* Zehavi and Rosen

1. *Aphelinus asychis* Walker

Diagnosis: Femora of middle legs brownish, tibial spur of middle leg shorter than basitarsus; speculum measly bounded by about 65 cilia. Scape and pedicel dark brown and club light brown, third funicle segment one and two thirds times as long as wide; submarginal vein with 3 setae. Male third funicle segment about four times as long as wide.

Material Examined: 3♀♀, 1♂, Demyaate, 10.VIII.1998 ex. *Aphis craccivora* (PPRI).

Distribution: Demyaate, Minufiya, Garbiya, Behira and Giza governorates.

Hosts: *Aphis craccivora* (Hemiptera: Aphididae).

Remarks: This species was recorded for the first time in Egypt by Hassan (1963).

Role in the biological control: This species was recorded as a parasitoid of *A. craccivora* and is considered as an effective parasitoid of this pest.

2. *Aphelinus demyaati* Abd-Rabou

Diagnosis: Speculum measly bounded by more than 30 cilia. Tibial spur of middle leg as long as basitarsus, speculum measly bounded by about 30-40 cilia Femora of all legs whitish, middle and hind coxae brown; male third .Fore femur with varying amounts of dark centrally, pale on apices middle femur dark, hind femur yellow, all coxae black; male third funiclesegment shorter than wide

Material Examined: 3♀♀, 2♂♂, Demyaate, 20.X.1999 ex. *Aphis* sp. on cotton (PPRI).

Distribution: Demyaate governorate

Hosts: *Aphis* sp. (Hemiptera: Aphididae).

Remarks: This species recorded for the first time in Egypt by Abd-Rabou (2005).

Role in the biological control: This species was recorded as a parasitoid of *Aphis* sp. and is collected in a few numbers by the author.

3. *Aphelinus flavipes* (Forester)

Diagnosis: Femora of all legs whitish, middle and hind coxae brown, frontovertext as long as wide, tibial spur of middle leg as long as basitarsus; speculum measly bounded by about 30 cilia. Male third funicle segment about longer than wide.

Material Examined: No specimens were examined during the present work.

(Hosts: Atriptera: Aphidae)

Distribution: Minufiya governorate.

Remarks: This species recorded for the first time in Egypt by Abd-Rabou (2002d).

Role in the biological control: This species was recorded as a parasitoid of *A. gossypii* and is collected in a few numbers by the author.

4. *Aphelinus mali* (Haldeman)

Diagnosis: Scape and pedicel brown, funicle and club yellow; speculum measly bounded by one complete and 2-3 incomplete rows of cilia. Ovipositor 1-5times length of middle tibia, third gasteral segment usually dark. Male, scape and pedicel brown, funicle and club yellow; third funicle segment longer than wide.

Material Examined: 1♀, 1♂ Demyaate, 23.IV.1995 ex. *A. gossypii* on cotton (PPRI).

Distribution: Demyaate governorate.

Hosts: *A. gossypii* (Hemiptera: Aphididae).

Remarks: This species recorded for the first time in Egypt by Kamal (1951).

Role in the biological control: This species was recorded as a parasitoid of *A. gossypii*

5. *Aphelinus paramali* Zehavi and Rosen

Diagnosis: Scape and pedicel brown, funicle and club yellow; speculum measly bounded by one complete and 2-3 incomplete rows of cilia. Ovipositor as long as middle tibia, third gasteral segment usually pale. Male, scape and pedicel dark, funicle and club yellow; third funicle segment longer than wide.

Material Examined: 2♀, 3♂ Minufiya, 11.IV.1999 ex. *A. gossypii* on cotton (PPRI).

Distribution: Minufiya governorate.

Hosts: *A. gossypii* (Hemiptera: Aphididae).

Remarks: This species recorded here for the first time in Egypt by Abd-Rabou (2004g).

Role in the biological control: This species was recorded as a parasitoid of *A. gossypii* and was collected in a few numbers by the author.

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