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## **Parasitoid fauna (Hymenoptera: Chalcidoidea) of the Egyptian clover, *Trifolium alexandrinum* LINNAEUS, in Egypt**

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### **Abstract**

A total of 23 species of Chalcidoidea in 20 genera and 5 families (Chalcididae, Eulophidae, Eurytomidae, Pteromalidae and Torymidae) were collected from the fields of Egyptian clover (*Trifolium alexandrinum* LINNAEUS) in Egypt. Five species represent new records for the Egyptian fauna, *Hockeria unicolor* WALKER and *Antrocephalus mitys* (WALKER) (Chalcididae), *Notoglyptus scutellaris* DODD & GIRAULT and *Homoporus fulviventris* (WALKER) (Pteromalidae), and *Eurytoma rosae* NEES (Eurytomidae). A simplified key is given to identify the 20 chalcid genera and known distribution and hosts are summarized for all the collected species.

Key words: Chalcidoidea, clover fields, faunistic list, new records, Egypt.

### **Zusammenfassung**

Insgesamt konnten 23 Arten in 20 Gattungen von Chalcidoidea (Chalcididae, Eulophidae, Eurytomidae, Pteromalidae und Torymidae), aufgesammelt in Ägypten auf Feldern des ägyptischen Klee (*Trifolium alexandrinum* LINNAEUS) nachgewiesen werden. *Hockeria unicolor* WALKER und *Antrocephalus mitys* (WALKER) (Chalcididae), *Notoglyptus scutellaris* DODD & GIRAULT und *Homoporus fulviventris* (WALKER) (Pteromalidae) sowie *Eurytoma rosae* NEES (Eurytomidae) erwiesen sich als neu für Ägypten. Ein einfacher Schlüssel zur Trennung der 20 Chalcididen-Gattungen wird vorgestellt, für die genannten Arten wurden die bekannte Verbreitung sowie die Wirte genannt.

## Introduction

The Egyptian clover (*Trifolium alexandrinum* LINNAEUS) is one of the most important foraging crops in Egypt between November and June (TAWFIK et al. 1976). It has been cultivated for forage longer than any other crop in Egypt. Not only does it have a very high yield potential, but it is also one of the most palatable and nutritious forage crops. Clover has the highest feeding value of all the common hay crops and it is grown widely throughout the world as forage for cattle as well as horses. Because clover plantations usually receive no insecticidal treatments, several insect pests damage this crop in different seasons. These pests are attacked by many natural enemies. Determining the natural enemies is considered to be the first step towards success in biological and IPM programs. Wasps of the superfamily Chalcidoidea are among the beneficial insects that play an effective role in biological control programs. Despite their importance in almost all agro-ecosystems, their diversity has not yet been fully studied in clover fields around the world or in Egypt. Previous studies of insects associated with clover fields in Egypt indicated the presence of large numbers of insect species belonging to 50 families from 7 Orders (TAWFIK et al. 1976), among which 12 parasitoid species were recorded, 10 Ichneumonoidea (6 ichneumonidae and 4 braconids) and two Chalcidoidea (2 Pteromalidae). The present study contributes to the knowledge of the chalcidoid parasitoids associated with clover (*Trifolium alexandrinum* LINNAEUS) in Egypt.

## Material and methods

Regular surveys of chalcid wasps were undertaken during 2009-2011 in clover fields (*Trifolium alexandrinum* L.) in various localities of Egypt. Sampling was done by means of net sweeping and Malaise traps. Some of the collected specimens were mounted on card points, whereas others were slide mounted in Hoyer's (ROSEN & De BACH 1979). Family-level identifications of the collected specimens were made with the help of NOYES & VALENTINE (1989) and NOYES (2011). MASI (1930), BOUČEK (1951), HABU (1960), HUSAIN & AGARWAL (1981, 1982) and NARENDRAN (1984, 1985) were used to identify Chalcididae, whereas GRAHAM (1987, 1991), REINA & La SALLE (2003) and YEFREMOVA & YEGORENKOVA (2009) were used for Eulophidae, GRAHAM (1969) and BOUČEK & RASPLUS (1991) for Pteromalidae, LOTFALIZADEH et al. (2006) for *Eurytoma rosae*; and MASI (1935) for *Podagrion klugianum*. Identification of some species was confirmed by comparing specimens with original descriptions or with identified specimens deposited in different Egyptian collections (see below list of depositories). Features in parentheses in the key represent features of the taxon that are not contrasted in the other part of the couplet.

Drawings were made using a camera lucida attached to an Olympus stereo-microscope (SZX9).

General distribution and host records of the listed species are based mainly on NOYES (2011) and YU et al. (2012). Some of the recorded parasitoid species were reared out from the larvae or the pupae of their hosts.

Previous records in Egypt are based on various available publications. Families as well as species names within genera are arranged alphabetically. New distribution records for Egypt are marked with an asterisk.

## List of depositories

ASUC .....Ain Shams University collection  
 AUC.....Al Azhar University collection  
 CUC.....Cairo University collection  
 ESEC .....Entomological Society of Egypt collection  
 MAC.....Ministry of Agriculture collection  
 HC .....Hager collection (Last authoress)

### Key to chalcid genera collected from Egyptian clover fields

- 1 Tarsi 4-segmented (Fig. 1); fore tibial spur straight and simple; funicle with 2-4 segments (Fig. 2) [Eulophidae] ..... 2
- Tarsi (at least hind tarsus) 5-segmented (Fig. 3); fore tibial spur curved apically and bifid; funicle with 5 or more segments (Fig. 4)..... 7
- 2 Fore wing with submarginal vein not broken proximal to marginal vein and usually equal to or longer than marginal vein (Fig. 5); postmarginal vein nearly always present (Fig. 5) ..... 3
- Fore wing with submarginal vein broken proximal to marginal and usually shorter than marginal vein (Fig. 6); postmarginal vein nearly always absent or only slightly developed (Fig. 6) ..... 4
- 3 Female flagellum with 2 funicular segments, male with 2 or 3 unbranched funicular segments; scutellum with 2 dorsal grooves (Fig. 7) ..... *Diglyphus* WALKER
- Female flagellum with 3 or -4 funicular segments, male with 4 or-5 branches (Fig. 8); scutellum without dorsal grooves ..... *Hemiptarsenus* WESTWOOD
- 4 Notauli incomplete (Fig. 9); metasoma often petiolate; axilla rounded anteriorly, rarely produced ..... *Pediobius* WALKER
- Notauli complete (Fig. 10); axilla angulate and produced anteriorly to differentiate a scapula on the mesoscutum ..... 5
- 5 Malar sulcus straight (Fig. 11) ..... 6
- Malar sulcus curved (Fig. 12); (mesoscutum with indistinct median line; body black with greenish to bluish hue) ..... *Baryscapus* FÖRSTER
- 6 Funicular segments not longer than broad, first funicular segment subquadrate or transverse (Fig. 13); metasoma in dorsal view ovate ..... *Oomyzus* RONDANI
- Funicular segments longer than broad (Fig. 14); metasoma in dorsal view pointed apically ..... *Aprostocetus* WESTWOOD
- 7 Hind femur swollen, less than three times as long as broad; hind tibia curved (Fig. 15); body dark without metallic lustere [Chalcididae]..... 8
- Hind femur not swollen, more than three times as long as broad; hind tibia straight; head and mesosoma often metallic ..... 11
- 8 Metasoma sessile, petiole very short and indistinct; head without horns ..... 9
- Metasoma distinctly petiolate; head with a pair of horns (Fig. 16) ..... *Dirhinus* DALMAN

- 9 Antennal sockets more or less away from clypeus; apex of hind tibia obliquely truncate with distinct apical spur and prolonged ventral spine; hind femur irregularly toothed ventrally (Fig. 15); legs often with colour pattern (Fig. 15); (metasoma with 7 visible tergites).....*Brachymeria* WESTWOOD
- Antennal sockets more or less close to clypeus; apex of hind tibia not obliquely truncate, with two apical spurs and without prolonged spine; hind femur with a comb of regular teeth on 1-3 broad lobes ventrally (Fig. 17)..... 10
- 10 Face with a strong horseshoe-like carina extending from above middle ocellus along inner orbits of eyes (Fig. 18).....*Antrocephalus* KIRBY
- Face without carina as described above (frons usually concave above antennal sockets when seen in lateral aspect; fore wing as in Fig. 19).....*Hockeria* WALKER
- 11 Pronotum in dorsal view large, quadrate to subrectangular and at least two-thirds as long as mesoscutum; antenna with no more than 6 funicular segments; head and dorsum of mesosoma with numerous piliferous punctures which often give rise to umblicate sculpturing; body usually not metallic [Eurytomidae]..... *Eurytoma* ILLIGER
- Pronotum in dorsal view transverse, less than half length of mesoscutum; head and mesoscutum usually reticulate; body usually metallic green or blue ..... 12
- 12 Head with an occipital carina (sometimes thin or fine); hind coxa usually elongate, subtriangular in cross-section and broadly attached to mesosoma; fore wing with long marginal and short stigmal veins and uncus hardly separated from well-developed postmarginal vein; ovipositor long and well-exserted (Fig. 20) [Torymidae] .....*Podagrion* SPINOLA
- Head without occipital carina or, if present, then hind coxa usually subcircular in cross-section and narrowly attached to mesosoma; fore wing venation not as above; ovipositor hardly exerted [Pteromalidae]..... 13
- 13 Antennae touching lower edge of head below apical margin of clypeus, situated on facial lobes which project slightly beyond level of clypeus; antenna without anelli, with 7 funicular segments between pedicel and clava..... *Spalangia* LATREILLE
- Antennae at least slightly separated from lower edge of head; antenna with 2 or 3 anelli and 5 or -6 funicular segments between pedicel and clava..... 14
- 14 Notauli complete, reaching posterior margin of mesoscutum ..... 15
- Notauli incomplete, not reaching posterior margin of mesoscutum or meeting posteriorly ..... 16
- 15 Clypeus with distinctly asymmetric teeth; scutellum without median fovea ..... *Halticoptera* SPINOLA
- Clypeus truncate; scutellum with median fovea and separated from mesoscutum by a broad curved depression (Fig. 21); (first metasomal tergite occupying most or entire metasoma).....*Notoglyptus* MASI
- 16 Metasoma distinctly petiolate (Fig. 22), and distinctly sculptured dorsally or if petiole almost smooth, then distinctly elongate ..... 17
- Metasoma sessile, or with transverse, very short petiole, its dorsal surface without distinct sculpturing..... 18
- 17 Marginal vein widened distally, hardly longer than submarginal vein (Fig. 23); pronotum mostly carinate; (first metasomal tergite moderately elongate) ..... *Pachyneuron* WALKER

- Marginal vein slender not thickened (Fig. 24); pronotum distinctly margined, rarely carinate (first and second metasomal tergites large, hind margin of first tergite broadly emarginated; mesosoma convex; petiole longer than propodeum, with dorsal surface densely reticulate; pronotum relatively long)..... *Sphegigaster* SPINOLA
- 18 Antennal clava distinctly acuminate or with a narrow apical specula (Fig. 25); occipital carina absent..... *Homoporus* THOMSON
- Antennal clava not acuminate apically..... 19
- 19 Postmarginal vein about as long as or slightly shorter than submarginal vein (Fig. 26); outer margin of wing not fringed..... *Conomorium* MASI
- Postmarginal vein at least 1.2 times as long as submarginal vein (Fig. 27); outer margin of wing fringed..... *Pteromalus* SWEDERUS

### Faunistic list of chalcidoid species

#### I. Family Chalcididae

##### \**Antrocephalus mitys* (WALKER 1846)

Material examined: 1♀, Fayoum, v.2009 (HC).

Previous Egyptian records: New record for Egypt.

Species recognition: see HUSAIN & AGARWAL (1982, as *Antrocephalus vitatus* HUSAIN & AGARWAL 1982).

Distribution: Cosmopolitan.

Host records: NOYES (2011) cited 5 species of Lepidoptera belonging to the families Pyralidae and Yponomeutidae.

##### *Brachymeria minuta* (LINNÉ 1767)

Material examined: A very large number of specimens were examined from different Egyptian localities all the year round: Gabal Asfar, 11.i.1952; Imbaba, 13.ii.1952; Abu Qir, 21.iv.1952; Khatatba, 7.viii.1953; Maadi, 8.x.1953; Komombo, 29.i.1954; Marsa Matruh, 28.ix.1954; Kerdasa, 23.vi.1976; Rosetta, 30.iii.1969 (ASUC); Abu Gabal, 19.iii.1950 (CUC); Massarah, 24.iv.1914; Massarah, 2.v.1914; Matariyah, 25.vi.1914; Shah el-Elbi, 6.iv.1915; Giza, 10.ix.1916; Marg, 8.iv.1917; Roda, 24.viii.1913; Ezbet el-Nakhl, 3.vi.1917; Matariah, ii.1927; Turah, v.1927; Ismailia, vii.1927; Cairo, 1.ix.1927; Abbassiah, 16.ix.1916 (ESEC); Ismailia, 20.I.1927; Alexandria, 13.vii.1924; Kafr Hakim, 26.xi.1924; Abu Rawash, 10.xii.1924; Bahariah Oasis, 20-25.iii.1925; Wadi Ibtadi, 29.iv.1925; Badrashein, 15.viii.1925; Mansura, 2.ix.1925; Hadra, 6.ix.1925; Kerdasa, 9.ix.1925; Kafr Hakim, 13.xi.1925; Mansura, 21.x.1925; Kerdasa, 24.x.1925; Pyramids, 17.xi.1929; Helwan, 27.v.1930; Nahia, 22.vi.1930; Helwan, 4.xi.1930; Kafr Hakim, 5.v.1932; Warraqel-Badr, 13.v.1932; Saff, 25.viii.1932; Magadlah, 27.viii.1932; Berak el-Khiam, 30.ix.1932; Helwan, 29.x.1932; Magadlah, 16.xi.1932; Helwan, 3.xii.1932; Wadi Hoff, 3.vi.1934 (MAC); 1♀, Fayoum, 17.ix.2010; 1♀, Fayoum, 1.xii.2010 (Present study, CUC).

Previous Egyptian records: Cairo (Maadi, Massara, Matarieh), Alexandria (MASI 1930), Assiut (BOUČEK 1956).

Species recognition: see MASI (1930), BOUČEK (1956), HABU (1960).

Distribution: Australia, Oriental and Palaearctic regions.

Host records: NOYES (2011) cited 33 species belonging to 15 families in 4 Orders (Coleoptera, Diptera, Lepidoptera and Hymenoptera). In the present study it was reared from the larva of white cabbage worm *Pieirs rapae* LATREILLE (Lepidoptera, Pieridae).

### ***Dirhinus excavatus* DALMAN 1818**

Material examined: large number of specimens were examined: Pyramids, 27.vii.1931; Abu Rawash, 23.vii.1931; Kerdasa, 9.ix.1934; Benha, 25.xi.1934 (AC); Kom Osheim, 6.v.1955 (ASUC); Wadi Rashid, 5.ix.1927 (ESEC); Giza, 16.v.1925; Giza, 20.vii.1925; Cairo, 1.viii.1925; Kafr Hakim, 13.vii.1930; Warraq, 23.vi.1932; Kerdasa, 7.xii.1932 (MAC); 1♀, Fayoum, v.2009; 1♂, Ebshway, vi.2009; 2♀♀, Ebshway, v.2010 (Present study, CUC).

Previous Egyptian records: Roda and Sennures (STOREY 1916).

Species recognition: see key to species in BOUČEK (1956), HUSAIN & AGARWAL (1981).

Distribution: Afrotropical, Oriental and Palaearctic regions.

Host records: NOYES (2011) cited 4 host species: *Stomorhina lunata* (FABRICIUS) (Diptera, Calliphoridae), *Pyrausta machaeralis* WALKER and *Sylepta derogata* (FABRICIUS) (Lepidoptera, Pyralidae) and *Herse convolvuli* (LATREILLE) (Lepidoptera, Sphingidae).

### **\**Hockeria unicolor* WALKER 1834**

Material Examined: 1♀, Fayoum, 22.ix.2010 (HC).

Previous Egyptian records: New record for Egypt.

Species recognition: see key to species in HUSAIN & AGARWAL (1982).

Distribution: Afrotropical and Palaearctic regions.

Host records: NOYES (2011) cited 17 species belonging to 10 families in 2 Orders (Coleoptera and Lepidoptera).

## **II. Family Eulophidae**

### ***Aprostocetus ceroplastae* (GIRAULT 1916)**

Material examined: 2♂♂, Fayoum, v.2009; 1♂, Fayoum, v.2010 (HC).

Previous Egyptian records: Alexandria (HAFEZ et al. 1987, as *Tetrastichus ceroplastae*), Mansoura (RAGAB 1995, as *Tetrastichus ceroplastae*).

**S p e c i e s r e c o g n i t i o n :** see GIRAULT (1916), GRAHAM (1969), TALEBI et al. (2008).

**D i s t r i b u t i o n :** Afrotropical, Australian and Palaearctic regions.

**H o s t r e c o r d s :** This species was recorded to parasitize *Phanococcus vovae* (NASONOV) (Hemiptera: Pseudococcidae) in Iran (TALEBI et al. 2008). NOYES (2011) cited 13 coccid species (Hemiptera). In Egypt it has been recorded from *Lepidosaphes bekkii* (NEWMAN) (Hemiptera: Diaspididae) and *Ceroplastes floridensis* COMSTOCK (Hemiptera: Coccidae) (HAFEZ et al. 1987) and *Ceroplastes rusci* (LINNAEUS) (Hemiptera: Coccidae) (RAGAB 1995).

### ***Baryscapus* sp.**

**M a t e r i a l e x a m i n e d :** 1 ♀, Fayoum, v.2009.

### ***Diglyphus isaea* (WALKER 1838)**

**M a t e r i a l e x a m i n e d :** 2 ♀ ♀, 1 ♂, Ebshway, vi.2009; 1 ♀, Fayoum, v.2010; 2 ♀ ♀, Atsa, v.2011 (HC).

**P r e v i o u s E g y p t i a n r e c o r d s :** This species was introduced from The Netherlands and established in Egypt (ABD-RABOU 2006). It was also recorded from Sids, El-Zarka, and Damanhour (EL-SERWY 2003).

**S p e c i e s r e c o g n i t i o n :** see LASALLE & PARRELLA (1991), ASADI et al. (2006).

**D i s t r i b u t i o n :** This species can be considered as a cosmopolitan species because introductory releases have been carried out in the USA, Canada and New Zealand (NOYES 2011).

**H o s t r e c o r d s :** NOYES (2011) recorded this species from 6 species of lepidopteran Gracillariidae, Lyonetiidae, and as a larval parasitoids of various species of leafminers, especially Agromyzidae (ASADI et al. 2006; NOYES 2011). In Egypt, it was reported from *Liriomyza cicerina* (RONDANI) and *L. bryoniae* (KALTENBACH) (EL-SERWY 2003) and *L. trifolii* (BURGESS) (ABD-RABOU 2006). In the present work it is recorded from *Liriomyza* sp. (Diptera, Agromyzidae).

### ***Hemiptarsenus zilahisebessi* ERDÖS 1951**

**M a t e r i a l e x a m i n e d :** 1 ♀, Atsa, 8.vi.2009; 2 ♀ ♀, 2 ♂ ♂, Fayoum, v.2009; 2 ♀ ♀, Fayoum, 7.vi.2009.

**P r e v i o u s E g y p t i a n r e c o r d s :** Recorded in Egypt with no specific locality by HAFEZ et al. (1974) and TRJAPITZIN (1978), and from Sids, El-Zarka and Damanhour by EL-SERWY (2003).

**S p e c i e s r e c o g n i t i o n :** see ASADI et al. (2006).

**D i s t r i b u t i o n :** Widespread and common in the Palaearctic region (YEFREMOVA 2002; NOYES 2011).

**Host records:** NOYES (2011) cited *Liriomyza bryoniae* (KALTENBACH), *L. congesta* (BECKER) and *L. trifolii* (BURGESS) (Diptera, Agromyzidae), *Hypurus* sp. (Coleoptera, Curculionidae) and *Stigmella* sp. (Lepidoptera, Nepticulidae). In Egypt, it was reported from *L. congesta* (HAFEZ et al. 1974), *L. cicerina* (RONDANI) and *L. bryoniae* (KALTENBACH) (EL-SERWY 2003). In the present work it is recorded from *Liryomyza* sp. (Diptera, Agromyzidae).

### ***Oomyzus scaposus* (THOMSON 1878)**

**Material examined:** Very large number of both males and females have been collected in the present study from Sohag between November and June (2009-2011).

**Previous Egyptian records:** Assiut (NASSER et al. 2000).

**Species recognition:** see WATERSTON (1915) (as *Syntomosphyrum taprobanes* WATERSTON).

**Distribution:** Australia, Nearctic, Neotropical (Columbia), Oriental and Palaearctic regions.

**Host records:** NOYES (2011) cited 19 coccinellid species (Coleoptera) as well as 3 *Chrysopa* spp. (Neuroptera, Chrysopidae). In the present study, *O. scaposus* is recorded as hyperparasitoid on *Coccinella undecimpunctata* LATREILLE (Coleoptera, Coccinellidae).

### ***Pediobius amaurocoelus* (WATERSTON 1915)**

**Material examined:** 1♂, 1♀, Fayoum, v.2009; 1♂, Atsa, 8.vi.2011 (HC).

**Previous Egyptian records:** Cairo (WATERSTON 1915).

**Species recognition:** see KERRICH (1973).

**Distribution:** Afrotropical and Palaearctic regions.

**Host records:** NOYES (2011) cited 5 host species in 5 families and 2 Orders (Coleoptera and Lepidoptera). In Egypt, it was recorded from a larva of *Anatrachyntis simplex* (WALSINGHAM) (Lepidoptera, Cosmopterygidae) in cotton bolls (WATERSTON 1915).

## **III. Family Eurytomidae**

### **\**Eurytoma rosae* NEES 1843**

**Material examined:** 1♂, Fayoum, v.2009 (HC).

**Previous Egyptian records:** none (new record for Egypt).

**Species recognition:** see LOTFALIZADEH et al. (2006).

**Distribution:** Nearctic and Palaearctic regions.

**Host records:** NOYES (2011) cited 26 species in 8 families and 4 Orders (Coleoptera, Diptera, Hemiptera and Lepidoptera). During the present study this species was collected by Malaise trap.



#### IV. Family P t e r o m a l i d a e

##### ***Conomorium* sp.**

M a t e r i a l e x a m i n e d : 1♂, Atsa, 8.vi.2009 (HC).

##### ***Halticoptera circulus* (WALKER 1833)**

M a t e r i a l e x a m i n e d : 2♂♂, Fayoum, v.2009 (HC).

P r e v i o u s E g y p t i a n r e c o r d s : Sids, El-Zarka, Damanhour (El-SERWY 2003).

S p e c i e s r e c o g n i t i o n : see GRAHAM (1969), Askew (1972), DOGANLAR (2006).

D i s t r i b u t i o n : Afrotropical, Nearctic and Palaearctic regions.

H o s t r e c o r d s : *Liryomyza cicerina* (RONDANI), *L. bryoniae* (BURGESS) and *L. sativae* Blanchard were recorded from Egypt (El-SERWY 2003). Several genera of Agromyzidae were also reported as hosts for this species in different parts of the world (PECK 1963, BURKS 1979, NOYES 2011).

##### **\**Homoporus fulviventris* (WALKER 1835)**

M a t e r i a l e x a m i n e d : 1♂, Fayoum, v.2009 (HC).

P r e v i o u s E g y p t i a n r e c o r d s : none (new record for Egypt).

S p e c i e s r e c o g n i t i o n : see GRAHAM (1969).

D i s t r i b u t i o n : Palaearctic region.

H o s t r e c o r d s : NOYES (2011) cited 3 cynipid and 5 eurytomid species (Hymenoptera).

##### ***Homoporus* sp.**

M a t e r i a l e x a m i n e d : 1♀, Fayoum, vi.2009 (HC).

##### **\**Notoglyptus scutellaris* DODD and GIRAULT 1915**

M a t e r i a l e x a m i n e d : 1♀, Fayoum, v.2009 (HC).

P r e v i o u s E g y p t i a n r e c o r d s : New record for Egypt.

S p e c i e s r e c o g n i t i o n : see HEYDON (1988).

D i s t r i b u t i o n : Worldwide, except Neotropical region (NOYES 2011).

H o s t r e c o r d s : No records.

***Pachyneuron aphidis* (BOUCHÉ 1834)**

**Material examined:** 1♀, Fayoum, v.2009; a large number of both males and females were collected from Sohag vi.2010.

**Previous Egyptian records:** Shebein El-Kom (KOLAIB 1991).

**Species recognition:** see GRAHAM (1969) and GIBSON (2001).

**Distribution:** Cosmopolitan.

**Host records:** GIBSON (2001) and NOYES (2011) listed more than 120 species as hosts for *P. aphidis* in various taxa. In the present study, it was collected from the pupae of *Coccinella* sp. and *Aphis gossypii* and the pupae of some Syrphidae. KOLAIB (1991) has recorded this species as a hyperparasitoid on the cabbage aphid *Brevicoryne brassicae* (LATREILLE).

***Pteromalus puparum* (LINNAEUS 1758)**

**Material examined:** 2♀♀, Fayoum, v.2009, 2010 (HC).

**Previous Egyptian records:** This species is widely distributed in Egypt (TAWFIK et al. 1976).

**Species recognition:** see GRAHAM (1969).

**Distribution:** Cosmopolitan.

**Host records:** NOYES (2011) cited a large number of host species in 5 Orders (Coleoptera, Diptera, Hemiptera, Hymenoptera and Lepidoptera). TAWFIK et al (1976) recorded it from fields of clover in Egypt and has also been recorded as a pupal parasitoid on cabbage worm *Pieris rapae* LATREILLE (Pieridae: Lepidoptera) (ABBAS and EL-DAKROURY 1985; YOUSSEF and MOURSU 1988; HUSSAIN et al. 1992; RAGAB 1992). In the present work it is recorded from the pupae of *Pieris rapae* LATREILLE.

***Pteromalus semotus* (WALKER 1834)**

**Material examined:** 1♀, Giza, vi. 2011 (HC).

**Previous Egyptian records:** Menouffia (KOLAIB et al. 1980).

**Species recognition:** Body generally metallic green to bronze; apical margin of clypeus emarginate; metasoma lanceolate, longer than head and mesosoma combined; first flagellomere equal to or slightly longer than pedicel; marginal vein longer than stigmal vein.

**Distribution:** Nearctic, Oriental, Palaearctic regions.

**Host records:** This is a common cosmopolitan parasite mostly 1ry parasite of various Lepidoptera, less often of certain beetles belonging to the family Curculionidae (BOUČEK & SUBBA RAO 1978). NOYES (2011) cited 60 host species belonging to 3 Orders (Coleoptera, Hymenoptera and Lepidoptera). In the present study, it is recorded as a parasitoid on the cabbage worm *Pieris rapae* LATREILLE (Lepidoptera, Pieridae) and *Syrphus* sp. (Diptera, Syrphidae).

***Pteromalus sequester* WALKER 1835**

Material examined: 1♀, Giza, 1.v.2011

Previous Egyptian records: Giza (TAWFIK et al. 1976 as *Habrocytus sequester*).

Species recognition: Body metallic green with bluish luster; anterior margin of clypeus bidentate; metasoma long and ovate, slightly longer than head and mesosoma combined.

Distribution: Widely distributed in different regions of the world.

Host records: This species was known under *Habrocytus* THOMSON (e.g. in GRAHAM, 1969) (BOUČEK & SUBBA RAO 1978). NOYES (2011) cited 37 species in 7 families and 4 Orders (Coleoptera, Diptera, Hymenoptera and Lepidoptera). In Egypt, it has been reported as parasitoid on different insect pests of clover (TAWFIK et al. 1976).

***Spalangia nigroaenea* CURTIS 1839**

Material examined: 2♀♀, Fayoum, vii.2009 (HC).

Previous Egyptian records: Shebin ElKom, Quessna, Elbagoor (Minufiya Governorate) (KOLAIB et al. 2011).

Species recognition: see GRAHAM (1969), GIBSON (2009).

Distribution: Cosmopolitan species, reported from all geographical regions (Palearctic, Nearctic, Afrotropical, Oriental, Australian) (BOUČEK 1963; NOYES 2011).

Host records: It was recorded as a cosmopolitan parasite in fly puparia especially of synantrophic species (BOUČEK & SUBBA RAO, 1978). NOYES (2011) cited more than 50 host species belonging to 7 families of Diptera and 1 species of Pyralidae (Lepidoptera). It has been recorded from house fly pupae in Egypt (KOLAIB et al. 2011).

***Sphegigaster agromyzae* (DODD 1917)**

Material examined: 7♀♀, Atsa, 8.vi.2009; 3♀♀, Fayoum, v.2009 (HC).

Previous Egyptian records: recorded from Egypt by DODD (1917) but without a specific locality.

Species recognition: see DODD (1917, as *Trigonogastra agromyzae* DODD).

Distribution: Australian, Oriental and Palaearctic regions.

Host records: NOYES (2011) cited 2 species of Agromyzidae (Diptera).

**V. Family T o r y m i d a e**

***Podagrion klugianum* (WESTWOOD 1847)**

Material examined: 1♀, Fayoum, viii.2009 (HC).

**Previous Egyptian records:** recorded from Egypt by MASI (1935) and WESTWOOD (1847), but without a specific locality, and as *Pachytomus klugianus* by DELVARE (2005).

**Species recognition:** see MASI (1935).

**Distribution:** Afrotropical and Palaearctic regions.

**Host records:** NOYES (2011) cited 10 speies of Mantidae (Orthoptera) as hosts.

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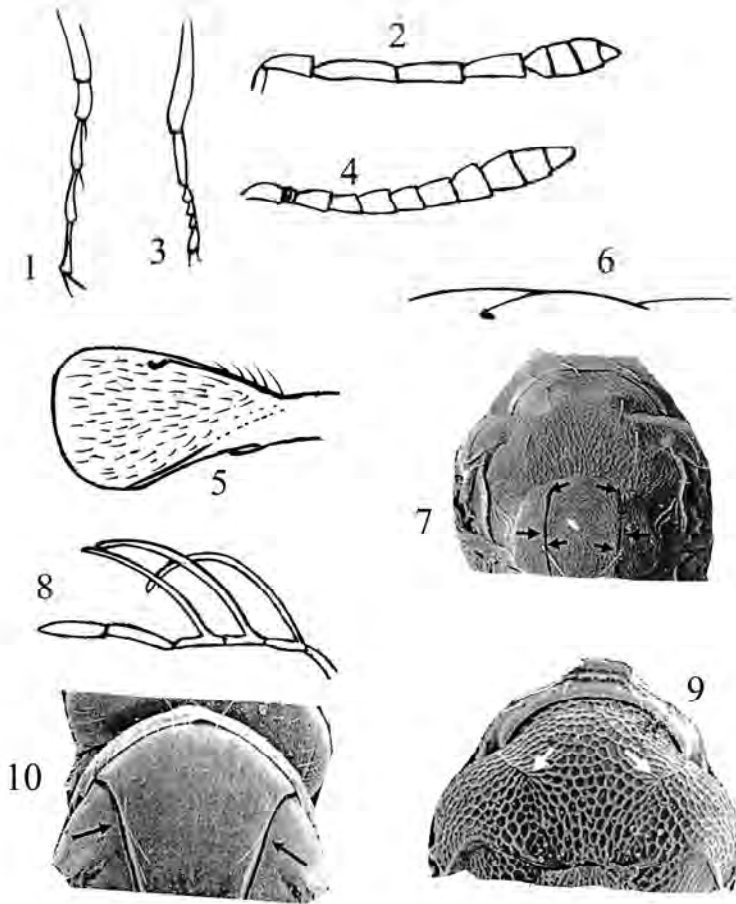
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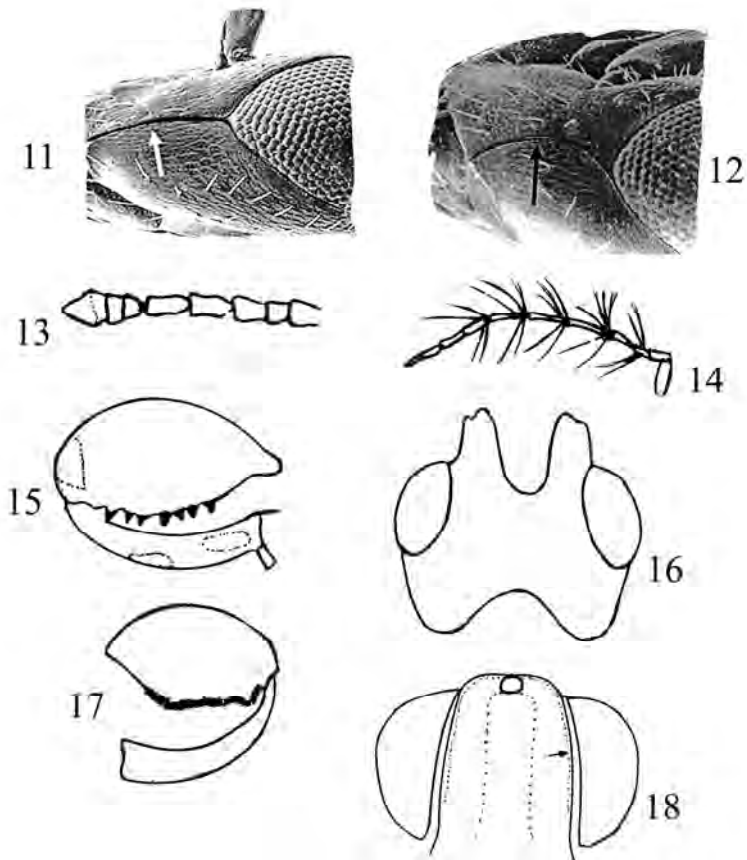
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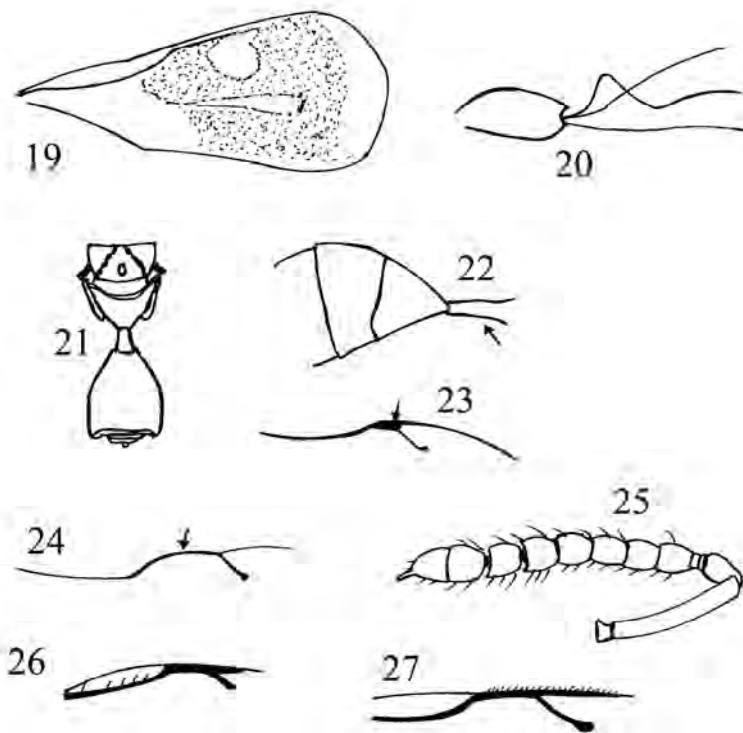




**Figs 1-10:** (1) *Baryscapus* sp. (front tarsus); (2) *Baryscapus* sp. (antenna); (3) *Spalangia* sp. (front tarsus); (4) *Pachyneuron* sp. (antenna); (5) *Diglyphus* sp. (fore wing); (6) *Pediobius* sp. (fore wing); (7) *Diglyphus* sp. (scutellum); (8) *Hemiptarsinus* sp. (male antenna); (9) *Pediobius* sp. (mesoscutum); (10) *Baryscapus* sp. (mesoscutum) (Figs 7, 9, 10 are taken from REINE & LASALLE 2003).



**Figs 11-18:** (11) *Aprostocetus* sp. (lateral view of head) (after REINE & LASALLE 2003); (12) *Baryscapus* sp. (lateral view of head, after REINE & LASALLE 2003); (13) *Oomyzus* sp. (male antenna); (14) *Aprostocetus* sp. (male antenna); (15) *Brachymeria* sp. (hind leg); (16) *Dirhinus* sp. (dorsal view of head); (17a) *Antrocephalus* sp. (hind leg); (17b) *Hockeria* sp. (hind leg); (18) *Antrocephalus* sp. (frontal view of head).



**Figs 19-27:** (19) *Hockeria* sp (fore wing); (20) *Podagrion* sp. (ovipositor); (21) *Notoglyptus* sp. (after BOUČEK & RASPLUS 1991); (22) *Sphigigaster* sp. (lateral view of metasoma); (23) *Pachyneuron* sp. (fore wing); (24) *Sphigigaster* sp. (fore wing); (25) *Homoporus* sp. (antenna, after SUBBA RAO 1973); (26) *Conomorium* sp. (part of fore wing); (27) *Pteromalus* sp. (part of fore wing).

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