

PARASITIDS ATTACKING SOFT SCALES (HOMOPTERA: COCCOIDEA : COCCIDEA) IN EGYPT

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Abstract

The present work deals with parasitoids attacking soft scales in Egypt. Parasitoids of species of soft scales are recorded and a key to these parasitoids is set up.

Each species of these parasitoids is definitely illustrated and shown by detailed figures. A detailed list of these parasitoids attacking these soft scales is given.

INTRODUCTION

Family Coccidae is one of the largest families of scale insects classified together with armored scales (Diaspididae) and mealy bugs (Pseudococcidae). There are 1,000 species distributed world wide and these comprise 100 genera approximately (Hamon and Williamsn 1984) of which Egyptian Coccidae comprise about 22 species included in 10 genera. Five of these species are dangerous pests in Egypt. Soft scales feed on a wide variety of host plants.

Many authors have dealt with hymenopterous parasitoids of soft scales. The mostly of which recent works are attributed to as Ben-Dov and Hodgsen (1997). They listed parasitoids in five families of Hymenoptera namely: Encyrtidae, Aphelinidae, Eulophidae, Pteromalidae and Signiphoridae. Priesner and Hosny (1940) and Abd-Rabou (1999 a, b) recorded some species of parasitoids associated with some economic species of soft scales.

This present work is an attempt to revise and record the parasitoid of soft scales in Egypt and the keys of the female parasitoids associated with each Egyptian soft scales.

LIST OF SOFT SCALE IN EGYPT AND THEIR PARASITIDS

1. *Acantholecanium haloxyloni* (Hall). On this species, no parasitoids were recorded.
2. *Acanthopulvinaria discoidalis* (Hall). On this species, no parasitoids were recorded.
3. *Ceronema africana* Macfie. One encyrtid parasitoid was collected from samples of *C. africana*. This species is *Metaphycus* sp.
4. *Ceroplastes floridensis* Comstock. Eleven species of aphelinids, encyrtids, eulophids and pteromalids were recorded and collected from concerned specimen under investigation here found in Egypt. These are: *Bothriophryne* sp., *Cheiloneurus* sp., *Coccophagus lycimnia* (Walker), *Diversinervus elegans* Silvestri, *Marietta leopardina* Motschulsky, *Metaphycus bartletti* Annecke and Mynhardt, *M. flavus* (Howard), *M. zebratus* (Mercet), *Microterys flavus* (Howard), *Scutellista cyanea* Motschulsky and *Tetrastichus* sp.

KEY TO SPECIES OF PARASITIDS *C. FLORIDENSIS*

1. Mesopleuron large and without a femoral groove.....5
 Mesopleuron impressed and with a femoral groove.....2
- 2 (1). Tarsi four-segmented, scutellum with distinct submedian grooves, mesoscutum usually with a median groove.....*Tetrastichus* sp. (Fig. 21)
 Tarsi five-segmented.....3
- 3 (2). Gaster distinctly constricted at its Junction with propodeum; antenna with 9; scutellum very long, at least twice as long as mesoscutum; extending well over gaster*Scutellista cyanea* (Fig. 23)
 Gaster sessile, broadly attached with the propodeum.....4.
- 4 (3). Antennae 7 segmented, fore wing generally without linea calva, all coxae black, femora dark except apices and bases yellow.....*Coccophagus lycimnia* (Fig. 2).
 Antennae 6 segmented, fore wing generally without linea calva, antennal scape with the band short, extending caudad from about middle of ventral margin.....*Marietta leopardina* (Fig. 6)
- 5 (1). Fore wing normal at least very nearly reaching apex of gaster8.
 Fore wing shortned, clearly not reaching apex of gaster6.
- 6 (5). Scutellum without such a group of setae, ovipositor and gonostyli hardly pro-

- truding caudally.....*Microterys flavus* (Fig. 15)
 Scutellum with a subapical group of dark coarse setae arranged in a more or less compact bundle.....7
- 7 (6). Mesoscutum with a distinct transverse depression, body yellow, sides of propodeum and mesopleura posteriorly more or less dark metallic.....*Diversinervus elegans* (Fig. 11)
 Mesoscutum without a transverse depression.....*Cheiloneurus* sp. (Fig. 9)
- 8 (5). Scape not more than three times as long as broad.....9
 Scape more than three times as long as broad.....*Bothriophryne* sp.
- 9 (8). Maxillary palpi 4-segmented, labial palpi 3-segmented, scape more than 2.5 times as long as wide.....*Metaphycus zebratus*
 Maxillary and labial palpi 3-segmented.....10
- 10 (9). Legs with annular darkish spots on tibiae, antennal scape at least 2.5 times as long as the greatest width.....*Metaphycus bartletti* (Fig. 14).
 Legs without annular darkish spots on tibiae, antennal scape about 3.5 times as long as the greatest width.....*Metaphycus flavus*
5. ***Ceroplastes rusci* (Linnaeus)**: Six species of aphelinids, encyrtids, eulophids and pteromalids were recorded and collected from concerned specimen under investigation here found in Egypt. These are: *Bothriophryne* sp., *Coccophagus lycimnia* (Walker), *Marietta leopardina* Motschulsky, *Metaphycus zebratus* (Mercet), *Scutellista cyanea* Motschulsky, and *Tetrastichus* sp.

KEY TO SPECIES OF PARASITIDS OF *C. RUSCI*

1. Mesopleuron large and without a femoral groove.....5.
 Mesopleuron impressed and with a femoral groove.....2.
- 2 (1). Tarsi four-segmented, scutellum with distinct submedian grooves, mesoscutum usually with a median groove.....*Tetrastichus* sp.
 Tarsi five-segmented.....3
- 3 (2). Gaster distinctly constricted at its Junction with propodeum; female antenna with 9, scutellum very long, at least twice as long as mesoscutum; extending well over the gaster*Scutellista cyanea*
 Gaster sessile, broadly attached with the propodeum.....4

- 4 (3). Antennae 7-segmented, fore wing generally without linea calva, all coxae black, femora dark except apics and bases yellow *Coccophagus lycimnia*
 Antennae 6-segmented, fore wing generally without linea calva, antennal scape with the band short, extending caudad from about middle of ventral margin..... *Marietta leopardina*
- 5 (1). Scape not more than three times as long as broad, maxillary palpi 4-segmented, labial palpi 3-segmented..... *Metaphycus zebratus*
 Scape more than three times as long as broad..... *Bothriophryne* sp.
6. ***Coccus capparidis* (Green)**: Two species of encyrtids were recorded and collected from concerned specimen under investigation here found in Egypt. These are: *Metaphycus bartletti* Anneck and Mynhardt and *M. flavus* (Howard).

KEY TO SPECIES OF PARASITIDS OF *C. CAPPARIDIS*

1. Legs with annular darkish spots on tibiae, antennal scape at least 2.5 times as long as the greatest width..... *Metaphycus bartletti*
 Legs without annular darkish spots on tibiae, antennal scape about 3.5 times as long as the greatest width..... *Metaphycus flavus*
7. ***Coccus hesperidum* L.**: Thirteen species of aphelinids, encyrtids, eulophids, mymarids and pteromalids were recorded and collected from concerned specimen under investigation here found in Egypt. These are: *Alaptus* sp., *Coccophagus bivittatus* Compere, *C. lycimnia* (Walker), *C. scutellaris* (Dalman), *Diversinervus elegans* Silvestri, *Encarsia citrina* (Craw), *Marietta leopardina* Motschulsky, *M. picta* (Andre), *Metaphycus flavus* (Howard), *Parechthrodryinus coccidiphagus* (Mercet), *Scutellista cyanea* Motschulsky and *Tetrastichus* sp.

KEY TO SPECIES OF PARASITIDS OF *C. HESPERIDUM*

1. Hind wing basally and stalk, marginal fringe of wings usually very long; stigmal vein rudimentary; wings and legs long and slim; body generally non-metallic..... *Alaptus* sp. (Fig. 22)
 Hind wing basally and other characters different..... 2
- 2 (1). Mesopleuron large and without a femoral groove..... 11
 Mesopleuron impressed and with a femoral groove..... 3
- 3 (2). Tarsi four-segmented, scutellum with distinct submedian grooves, mesoscutum

- usually with a median groove.....*Tetrastichus* sp.
Tarsi five-segmented.....4
- 4 (3). Gaster distinctly constricted at its Junction with propodeum; female antenna with 9; scutellum very long, at least twice as long as mesoscutum; extending well over the gaster.....*Scutellista cyanea*.
Gaster subsessile, broadly attached with the propodeum.....5
- 5 (4). Antennae 7 or 8-segmented fore wing generally without linea calva.....7
Antennae 6-segmented fore wing generally with linea calva.....6
- 6 (5). Antennal scape flattened and expanded beneath, not more than twice as long as wide*Marietta picta* (Fig. 7)
Antennal scape slender, or moderately flattened not less than twice as long as wide*Marietta leopardina*
- 7 (5). Antennae 8-segmented, axillae small, submarginal vein with two seta.....*Encarsia citrina* (Fig. 5)
Antennae 7-segmented, axillae large8
- 8 (7). Scutellum with 3 pairs of setae.....9
Scutellum with numerous setae.....10
- 9 (8). First funicle segment 3 times as long as pedicel, stigmal vein swollen.....*Coccophagus bivittatus* (Fig. 1)
First funicle segment 1-3 times as long as pedicel, stigmal vein not swollen.....*Coccophagus lycimnia*
- 10 (8). Fore coxa black, first funicle segment less than twice as long as wide, first club segment wider than long.....*Coccophagus ishii*
Fore coxa yellow, first funicle segment more than twice as long as wide, first club segment longer than wide..... *Coccophagus scutellaris* (Fig. 3)
- 11 (2). Fore wing normal at least very nearly reaching apex of gaster.....13
Fore wing shortened, clearly not reaching apex of gaster.....12
- 12(11) Scutellum without such a group of setae, ovipositor and gonostyli hardly protruding caudally.....*Microterys flavus*
Scutellum with a subapical group of dark coarse setae arranged in a more or less compact bundle, sides of propodeum and mesopleura posteriorly more or

- less dark metallic.....*Diversinervus elegans*
- 13(11) Scape not more than three times as long as broad.....14
 Scape more than three times as long as broad.....
*Parechthrodryinus coccidiphagus* (Fig. 20)
- 14(13) Maxillary and labial palpi 3-segmental, legs without annular darkish spots on tibiae, antennal scape about 3.5 times as long as the greatest width.....*Metaphycus flavus*
 Maxillary palpi 2-segmental, antennal scape with entire ventral margin.....*Metaphycus helvolus*

8. *Coccus longulus* (Douglas): Four species of aphelinids and encyrtids were recorded and collected from concerned specimen under investigation here found in Egypt. These are: *Encyrtus* sp., *Marietta leopardina* Motschulsky, *Metaphycus flavus* (Howard) and *Paraceraoprocerus italicus* (Masi).

KEY TO SPECIES OF PARASITIDS OF *C. LONGULUS*

1. Mesopleuron impressed and with a femoral groove; tarsi five-segmented; gaster subsessile; antennae 6-segmented, scape with the band short, extending caudad from about middle of ventral margin.....*Marietta leopardina*
 Mesopleuron large and without a femoral groove.....2
- 2 (1) Fore wing normal at least very nearly reaching apex of gaster.....3
 Fore wing shortened, clearly not reaching apex of gaster, scutellum without such a group of setae, ovipositor and gonostyli hardly protruding caudally.....*Microterys flavus*
- 3 (2). Scutellum with a group of coarse, long, dark setae arranged in a more or less compact bundle, marginal vein shorter than stigmal vein.....*Encyrtus* sp.
 Scutellum without a distinct tuft or bundle of setae or scale like setae; hypopygium not reaching more than two-thirds a long gaster; scape has a groove on outer side for reception of the pedicel.....*Paraceraoprocerus italicus*.

9. *Eucalymantus tessellatus* (Signorate): One species of encyrtid was recorded and collected from concerned specimen under investigation here found in Egypt.

10. *Kilifia acuminata* (Signorate): Three species of encyrtids and pteromalids

were recorded and collected from concerned specimen under investigation here found in Egypt. These are: *Diversinervus elegans* Silvestri, *Marietta* sp. *Scutellista cyanea* Motschulsky.

KEY TO SPECIES OF PARASITIDS OF *K. ACUMINATA*

1. Mesopleuron 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.....*Scutellista cyanea*
Mesopleuron large and without a femoral groove.....2
- 2 (1) Fore wing normal at least very nearly reaching apex of gaster, scape not more than three times as long as broad.....*Metaphycus* sp.
Fore wing shortened, clearly not reaching apex of gaster, scutellum with a subapical group of dark coarse setae arranged in a more or less compact bundle, sides of propodeum, and mesopleura posteriorly more or less dark metallic.....
.....*Diversinervus elegans*

11. ***Parasaissetia nigra* (Nietner):** Eight species of aphelinids, encyrtids and pteromalids were recorded and collected from concerned specimen under investigation here found in Egypt. These are: *Coccophagus lycimnia* (Walker), *Diversinervus elegans* Silvestri, *Marietta leopardina* Motschulsky, *Metaphycus africanus* Compere, *M. flavus* (Howard), *M. helvolus*, *Parechthrodryinus coccidiphagus* (Mercet) and *Scutellista cyanea* Motschulsky.

KEY TO SPECIES OF PARASITIDS OF *P. NIGRA*

1. Mesopleuron large and without a femoral groove.....4
Mesopleuron impressed and with a femoral groove.....2
- 2(1). Gaster distinctly constricted at its Junction with propodeum; female antenna with 9; scutellum very long, at least twice as long as mesoscutum; extending well over the gaster*Scutellista cyanea*
Gaster sessile, broadly attached with the propodeum.....3
- 3 (2). Antennae 7 segmented, fore wing generally without linea calva, all coxae black, femora dark except apices and bases yellow.....*Coccophagus lycimnia*
Antennae 6 segmented, fore wing generally with linea calva, antennal scape with

- the band short, extending caudad from about middle of ventral margin.....*Marietta leopardina*
- 4 (1). Fore wing shortened, clearly not reaching apex of gaster, scutellum with a distinct transverse depression, body yellow, sides of propodeum, and mesopleura posteriorly more or less dark metallic.....*Diversinervus elegans*
Fore wing normal at least very nearly reaching apex of gaster5
- 5(4). Scape not more than three times as long as broad.....6
Scape more than three times as long as broad....*Parechthrodryinus coccidiphagus*
- 6(5) Maxillary palpi 2-segmented..... 7
Maxillary palpi 3-segmented, legs without annular darkish spots on tibiae, antennal scape about 3.5 times as long as the greatest width.....*Metaphycus flavus*
- 7(6) Antennal scape 3.6 times as long as the greatest width.....
.....*Metaphycus africanus* (Fig. 13)
Antennal scape 2.5 times as long as wide.....*Metaphycus helvolus*
- 12. *Parthenolecanium persicae* (Fabricius):** Four species of aphelinids, encyrtids and eulophids were recorded and collected from concerned specimen under investigation here found in Egypt. These are: *Coccophagus lycimnia* (Walker), *Encarsia aurantii* Howard, *Metaphycus* sp. *Tetrastichus* sp.

KEY TO SPECIES OF PARASITIDS OF *P. PERSICAE*

1. Mesopleuron large and without a femoral groove, fore wing normal at least very nearly reaching apex of gaster, scape not more than three times as long as broad.....*Metaphycus* sp.
Mesopleuron impressed and with a femoral groove.....2
- 2(1). Tarsi four-segmented, scutellum with distinct submedian grooves, mesoscutum usually with a median groove.....*Tetrastichus* sp.
Tarsi five-segmented.....3
- 3(2). Antennae 8-segmented, axillae small; ovipositor short, not more than three-quarters the length of middle tibia and originating from segment VI; tergum VI of gaster with subtriangular spiracular plates.....*Encarsia aurantii* (Fig. 4)
Antennae 7-segmented, fore wing generally without linea calva, all coxae black, femora dark except apics and bases yellow.....*Coccophagus lycimnia*

13. *Pulvinaria chrysanthemi* Hall: On this species, no parasitoids were recorded.

14. *Pulvinaria floccifera* (Westwood): Six species of aphelinids and encyrtids were recorded and collected from concerned specimen under investigation here found in Egypt. These are: *Coccophagus lycimnia* (Walker), *C. scutellaris* (Dalman), *Diversinervus elegans* Silvestri, *Marietta leopardina* Motschulsky, *Metaphycus flavus* (Howard) and *Microterys flavus* (Howard).

KEY TO SPECIES OF PARASITIDS OF *P. FLOCCIFERA*

1. Mesopleuron large and without a femoral groove.....4
 Mesopleuron impressed, and with a femoral groove.....2
- 2 (1). Antennae 7-segmented, fore wing generally without linea calva.....3
 Antennae 6-segmented; fore wing generally with linea calva, antennal scape slender, or moderately flattened, not less than twice as long as wide.....*Marietta leopardina*
- 3(2) Scutellum with 3 pairs of setae, first funicle segment 1.3 times as long as pedicel.....*Coccophagus lycimnia*
 Scutellum with numerous setae, first funicle segment more than twice as long as wide.....*Coccophagus scutellaris*
- 4 (1) Fore wing normal at least very nearly reaching apex of gaster; scape not more than three times as long as broad; maxillary and labial 3-segmented, antennal scape about 3.5 times as long as the greatest width.....*Metaphycus flavus*
 Fore wing shortened, clearly not reaching apex of gaster.....5
- 5(4) Scutellum without such a group of setae, ovipositor and gonostyli hardly protruding caudally.....*Microterys flavus*
 Scutellum without a subapical group of dark coarse setae arranged in a more or less compact bundle, sides of propodeum and mesopleura posteriorly more or less dark metallic.....*Diversinervus elegans*

15. *Pulvinaria mesembryanthemi* (Vallot): Eight species of aphelinids and encyrtids were recorded and collected from concerned specimen under investigation here found in Egypt. These are: *Cheiloneurus* sp., *Coccophagus lycimnia* (Walker), *C. scutellaris* (Dalman), *Diversinervus elegans* Silvestri, *Marietta leopardina* Motschulsky, *Metaphycus flavus* (Howard), *M. helvolus* (Compere) and *Microterys flavus* (Howard).

KEY TO SPECIES OF PARASITIDS OF *P. MESEMBRYANTHEMI*

1. Mesopleuron large and without a femoral groove.....4
 Mesopleuron impressed, and with a femoral groove.....2
- 2 (1). Antennae 7-segmented, fore wing generally without linea calva.....3
 Antennae 6-segmented; fore wing generally with linea calva, antennal scape slender, or moderately flattened, not less than twice as long as wide
*Marietta leopardina*
- 3(2) Scutellum with 3 pairs of setae, first funicle segment 1.3 times as long as pedicel.....*Coccophagus lycimnia*
 Scutellum with numerous setae, first funicle segment more than twice as long as wide*Coccophagus scutellaris*
- 4 (1) Fore wing shortened, clearly reaching apex of gaster.....6
 Fore wing normal at least very nearly reaching apex of gaster.....5
- 5(4) Maxillary and labial palpi 3-segmented, legs without annular darkish spots on tibiae, antennal scape about 3.5 times as long as the greatest width.....*Metaphycus flavus*
 Maxillary palpi 2-segmented, antennal scape with entire ventral margin.....*Metaphycus helvolus*
- 6(4) Scutellum without such a group of setae, ovipositor and gonostyli hardly protruding caudally.....*Microterys flavus*
 Scutellum with a subapical group of dark coarse setae arranged in a more or less compact bundle.....7
- 7 (6). Mesoscutum with a distinct transverse depression, sides of propodeum, and mesopleura posteriorly more or less dark metallic.....*Diversinervus elegans*
 Mesoscutum without a transverse depression.....*Cheiloneurus* sp.
16. *Pulvinaria psidii* : Seven species of aphelinids and encyrtids were recorded and collected from concerned specimen under investigation here found in Egypt. These are: *Coccophagus* sp., *Cowperia* sp., *Diversinervus elegans* Silvestri, *Marietta leopardina* Motschulsky, *Metaphycus flavus* (Howard), *Metaphycus helvolus* (Compere) and *Microterys flavus* (Howard).

KEY TO SPECIES OF PARASITOIDS OF *P. PSIDII*

1. Mesopleuron large and without a femoral groove.....3
 Mesopleuron impressed and with a femoral groove.....2
- 2 (1). Antennae 7-segmented, fore wing generally without linea calva.....*Coccophagus* sp.
 Antennae 6-segmented; fore wing generally with linea calva, antennal scape with
 the band short, extending caudad from about middle of ventral margin
*Marietta leopardina*
- 3(1) Fore wing normal at least very nearly reaching apex of gaster.....5
 Fore wing shortened, clearly not reaching apex of gaster.....4
- 4(3) Scutellum without such a group of setae, ovipositor and gonostyli hardly protrud-
 ing caudally.....*Microterys flavus*
 Scutellum without a subapical group of dark coarse setae arranged in a more or
 less compact bundle, sides of propodeum and mesopleura posteriorly more or less
 dark metallic.....*Diversinervus elegans*
- 5(3) Scape more than three times as long as broad, marginal vein absent
*Cowperia* sp.
 Scape more than three times as long as broad.....6
- 6(5) Maxillary and labial palpi 3-segmented, legs without annular darkish spots on tib-
 iae, antennal scape about 3.5 times as long as the greatest
 width.....*Metaphycus flavus*
 Maxillary palpi 2-segmented, antennal scape with entire ventral mar-
 gin.....*Metaphycus helvolus*
17. *Rhizopulvinaria halli* Borchsenius: On this species, no parasitoids were recorded.
18. *Rhizopulvinaria retamae* (Hall): On this species, no parasitoids were recorded.
19. *Saissetia coffeae* (Walker): Eight species of aphelinids, encyrtids and ptero-
 malids were recorded and collected from concerned specimen under investigation
 here found in Egypt. These are: *Coccophagus lycimnia* (Walker), *C. scutellaris* (Dal-
 man), *Encyrtus infelix* (Embleton), *Marietta leopardina* Motschulsky, *Metaphycus*
helvolus (Compere), *M. lounsburyi* (Howard), *Microterys flavus* (Howard) and *Scu-*
tellista cyanea Motschulsky.

Key to species of parasitoids of *S. coffeae*

1. Mesopleuron large and without a femoral groove.....5
 Mesopleuron impressed, and with a femoral groove.....2
- 2(1) Gaster distinctly constricted at its Junction with propodeum; female antenna with 9; scutellum very long, at least twice as long as mesoscutum; extending well over the gaster*Scutellista cyanea*
 Gaster sessile, broadly attached with the propodeum.....3
- 3 (2). Antennae 7-segmented, fore wing generally without linea calva.....4
 Antennae 6-segmented; fore wing generally with linea calva, antennal scape with the band short, extending caudad from about middle of ventral margin*Marietta leopardina*
- 4(3) Scutellum with 3 pairs of setae, first funicle segment 1.3 times as long as pedicel.....*Coccophagus lycimnia*
 Scutellum with numerous setae, first funicle segment more than twice as long as wide*Coccophagus scutellaris*
- 5(1) Fore wing shortened, clearly reaching apex of gaster, scutellum without such a group of setae, ovipositor and gonostyli hardly protruding caudally.....*Microterys flavus*
 Fore wing normal at least very nearly reaching apex of gaster.....6
- 6(5) 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.....*Encyrtus infelix* (Fig. 12)
 Scutellum without a distinct tuft or bundle of setae or scale like setae.....7
- 7(6) Maxillary palpi 3-segmented, scape 2.5 times as long as wide, ovipositor shorter than in length to middle tibia*Metaphycus lounsburyi* (Fig. 47)
 Maxillary palpi 2-segmented, antennal scape with entire ventral margin.....*Metaphycus helvolus*
- 20. *Saissetia oleae* (Olivier):** Twelve species of aphelinids, encyrtids and mymarids and pteromalids were recorded and collected from concerned specimen under investigation here found in Egypt. These are: *Alaptus* sp., *Baeoanuisa* sp., *Coccophagus lycimnia* (Walker), *Diversinervus elegans* Silvestri, *Marietta leopardina* Motschulsky, *Metaphycus flavus* (Howard), *M. helvolus* (Compere), *M. zebratus*

(Mercet), *Microterys flavus* (Howard), *Parechthrodryinus coccidiphagus* (Mercet) and *Scutellista cyanea* Motschulsky.

KEY TO SPECIES OF PARASITIDS OF *S. OLEAE*

1. Hind wing basally and stalk, marginal tringle of wings usually very long; stigmal vein rudimentary; wings and legs long and slim; body generally non-metallic....*Alaptus* sp.
Hind wing basally and other characters different.....2
- 2(1). Mesopleuron large and without a femoral groove.....5
Mesopleuron impressed, and with a femoral groove.....3
- 3(2) Gaster distinctly constricted at its Junction with propodeum; female antenna with 9; scutellum very long, at least twice as long as mesoscutum; extending well over the gaster*Scutellista cyanea*
Gaster sessile, broadly attached with the propodeum.....4
- 4(3) Antennae 7-segmented; fore wing generally with linea calva, all coxae black, femora dark except apices and bases yellow.....*Coccophagus lycimnia*
Antennae 6-segmented; fore wing generally with linea calva, antennal scape with the band short, extending caudad from about middle of ventral margin*Marietta leopardina*
- 5(2) Fore wing normal at least very nearly reaching apex of gaster.....7
Fore wing shortened, clearly not reaching apex of gaster.....6
- 6(5) Scutellum without such a group of setae, ovipositor and gonostyli hardly protruding caudally.....*Microterys flavus*
Scutellum without a subapical group of dark coarse setae arranged in a more or less compact bundle, mesoscutum with a distinct transverse depression, body yellow, sides of propodeum and mesopleura posteriorly more or less dark metallic.....*Diversinervus elegans*
- 7(5) Scape more than three times as long as broad....*Parechthrodryinus coccidiphagus*
Scape not more than three times as long as broad.....8
- 8(7) Mesoscutum and scutellum completely dark, not yellow, orange or pale brown, calva strongly obliquely truncate and clearly longer than funicle.....*Baeoanusia* sp.
Mesoscutum or scutellum or both at least partly yellow, orange or pale orange brown.....9

- 9(8) Maxillary palpi 4-segmented, scape more than 2.5 times as long as wide
*Metaphycus zebratus*
 Maxillary palpi 2-3 segmented.....10
- 10(9) Maxillary palpi 3-segmented, legs without annular darkish spots on tibiae, anten-
 nal scape about 3.5 times as long as the greatest width.....*Metaphycus flavus*
 Maxillary palpi 2-segmented, antennal scape with entire ventral mar-
 gin.....*Metaphycus helvolus*
21. ***Stozia ephedrae***: Three species of aphelinids and encyrtids were recorded and
 collected from concerned specimen under investigation here found in Egypt.
 These are: *Coccophagus* sp., *Microterys* sp. and *Marietta picta* (Andre').

KEY TO SPECIES OF PARASITIDS OF *S. EPHEDRAE*

1. Mesopleuron large and without a femoral groove, fore wing normal at least very
 nearly reaching apex of gaster, scutellum without such a group of se-
 tae.....*Microterys* sp.
 Mesopleuron impressed and with a femoral groove, tarsi five segmented, gaster
 subsessile, broadly attached with the propodeum.....2
- 2 (1). Antennae 7-segmented, fore wing generally without linea calva.....
*Coccophagus* sp.
 Antennae 6-segmented; fore wing generally with linea calva, antennal scape flat-
 tened and expanded beneath, not more than twice as long as
 wide.....*Marietta picta*
22. ***Waxiella mimosae*** : Seven species of aphelinids, encyrtids and pteromalids were
 recorded and collected from concerned specimen under investigation here found
 in Egypt. These are: *Alpatus priseneri*., *Blastothrix erythrostethus* Walker, *Bothri-*
ophryne acaciae (Risbec), *Metaphycus lounsburyi* (Howard), *M. zebratus* (Mercet),
Paraceraptocherus africanus Giralut and *Scutellista cyanea* Motschulsky.

KEY TO SPECIES OF PARASITIDS OF *W. MIMOSAE*

1. Hind wing basally and stalk, marginal fringe of wings usually very long; stigmal vein
 rudimentary; wings and legs long and slim; body generally non-metallic....*Alpatus* sp.
 Hind wing generally and other characters different.....2
- 2(1). Mesopleuron impressed and without a femoral groove, gaster distinctly con-

- stricted at its Junction with propodeum; female antenna with 9, scutellum very long, at least twice as long as mesoscutum; extending well over the gaster.....*Scutellista cyanea*
Mesopleuron large and without a femoral groove.....3
- 3 (2). Hypopygium not reaching more than two-third along gaster, scape tending to be subrectangular, the flattened part of upper edge more than one-half as long as the straight part of the lower edge*Paracerapterocerus africanus*
Hypopygium reaching more than two-third along gaster.....4
- 4 (3) Fore wing with postmarginal vein longer than stigmal vein, fore wing hyaline; head, dorsum of thorax and mesopleurum with distinctive deep punctate sculpture; scutellum never with a pical flange.....*Blastothrix lerythrosethus*
Fore wing with postmarginal vein not longer than stigmal vein5
- 5 (4). Scape more than three times as long as broad; ovipositor exserted; pedicel subtriangular, shorter than F1 clava not or hardly longer than F1.....*Bothriophyryne acaciae*
Scape not more than three times as long as broad.....6
- 6 (5). Scape more than 2.5 times as long as wide, ovipositor only slightly longer than or subequal in length to middle tibia*Metaphycus zebratus*
Scape 2.5 times as long as wide; ovipositor shorter than in length to middle tibia *Metaphycus lounsburyi*

Through the present work it was observed that 35 parasitoid species are associated with 22 species of soft scales found in Egypt.

Priesner and Hosny (1940), Abd-Rabou (1999 a ,b) recorded 15 parasitoid species associated with 3 species of soft scale insects.

C. hesperidum, *C. floridensis* and *S. oleae* were found associated with the largest number of parasitoids with 14, 12, 12 species, respectively.

A. haloxylonii, *A. discoidalis*, *P. chrysanthemi*, *R. halli* and *R. retamae* were absolutely non-associated with any parasitoid. *M. flavus* *Met. flavus* and *S. cyaneae* are considered the most effective parasitoids attacking soft scales in Egypt. *D. elegans*, *C. lycimnia* and *M. helvolus* were recorded attacking 5-6 species of soft scales.

Ten parasitoids species are recorded through this work for the first time in Egypt associated with soft scales, these are:

Aphelinidae : *Coccophagus* sp., *E. aurantii*, *E. citrina*.

Encyrtidae: *Bothriophryne* sp., *Cheiloneurus* sp., *Cowperia* sp., *Metaphycus* sp., *Microterys* sp.

Eulophidae: *Tetrastichus* sp.

Mymaridae: *Alaptus* sp.

A LIST OF PARASITIDS OF SOFT SCALES IN EGYPT:

Family : Aphelinidae

Coccophagus bivittatus Compere.

C. lycimnia (Walker).

C. scutellaris (Dalman)

Coccophagus sp.

Encarsia aurantii Howard.

E. citrina (Craw).

Marietta leopardina Motschulsky.

M. picta (Andre').

Family: Encyrtidae.

Baeoanusia sp.

Blastothrix erythrostethus Walker.

Bothriophryne acaciae (Risbec).

Bothriophryne sp.

Cheiloneurus sp.

Cowperia sp.

Diversinervus elegans Silvestri.

Encyrtus inflex (Embleton).

Encyrtus sp.

Metaphycus africanus Compere.

M. bartletti Annecke and Mynhardt.

M. flavus (Howard).

M. helvolus (Compere).

M. lounsburyi (Howard).

M. zebratus (mercet).

Metaphycus sp.

Microterys flavus (Howard).

Microterys sp.

Paraceraptocherus africanus Giralut

P. italicus (Masi).

Parechthrodryinus coccidiphagus (Mercet).

Family: Eulophidae.

Tetrastichus sp.

Family: Mymaridae.

Alaptus sp.

Family: Pteromalidae.

Scutellista cyanea Motschulsky.

KEY OF THE PARASITOID SPECIES ATTACKING SOFT SCALE IN EGYPT

1. Hind wing basally narrow and stalk-like marginal fringe of wings usually very long; stigmal vein rudimentary; wings and legs long and slim; body generally non-metallic*Alaptus* sp.
- Hind wing basally narrow and other characters different.....2
- 2(1). Mesopleuron large, convex, horizontal and without a female groove, middle tarsi with at least the basitarsus with a double row of short, thick, peg-like spines beneath, prepectus not large, notaural lines rarely present, antenna with 1-7 funicle segment.....3
- Mesopleuron impressed, often grooved.....18
- 3(2). Fore wing shortened, clearly not reaching apex of gaster.....6
- Fore wing normal or over nearly reaching apex of gaster.....4
- 4(3). Scutellum without such a group of setae, ovipositor and gonostyli hardly protruding caudally*Microterys flavus*
- Scutellum with a subapical group of dark coarse setae arranged in a more or less compact bundle.....5
- 5(4). Mesoscutum with a distinct transverse depression in its posterior one-third, ei-

- ther mesoscutum with a more or less distinct bundle of setae in middle or posterior margin or pronotum has a line of stiff black bristle, sides of propodeum and mesopleura posteriorly more or less dark metallic.....*Diversinervus elegans*
- Mesoscutum without a transverse posterior depression, neither mesoscutum with a median bundle of setae nor posterior margin or pronotum with a line of stiff black bristles.....*Cheiloneurus* sp.
- 6(3). Scutellum without a distinct tuft or bundle of setae or scale-like setae.....7
- Scutellum with a group of coarse, long dark setae arranged in a more or less compact tuft or bundle or with two or more scalelike setae marginal vein shorter than stigmal vein, antenna with scape longer than the basal three funicle segments combined*Encyrtus infelix*
- 7(6). Hypopygium not reaching more than two-third along gaster, scape tending to be subrectangular, the flattened part of upper edge more than one-half as long as the straight part of the lower edge.....*Paracerapterocerus africanus*
- Hypopygium reaching apex of gaster.....8
- 8(7). Fore wing with postmarginal vein not longer than stigmal vein.....9
- Fore wing with postmarginal vein longer than stigmal vein, fore wing hyaline, head, dorsum of thorax and mesopleurum with distinctive deep punctate sculpture, scutellum never with apical flange.....*Blastothrix erythrosethus*
- 9(8). Scape not more than three times as long as broad.....10
- Scape more than three times as long as broad.....16
- 10(9) Mesoscutum or scutellum or both at least partly yellow, orange or pale orange brown.....11
- Mesoscutum and scutellum completely dark, not yellow, orange or pale brown, clava strongly obliquely truncate and clearly longer than funicle.....*Baeoanusia* sp.
- 11(10) Maxillary palpi 2-segmented.....12
- Maxillary palpi 3 or 4 segmented, labial palpi 3-segmented.....13
- 12(11) Antennal scape 3.6 times as long as the greatest wide
.....*Metaphycus africanus*
- Antennal scape 2.5 times as long as wide.....*Metaphycus heivulus*
- 13(11) Maxillary and labial palpi 3-segmented.....14
- Maxillary palpi 4-segmented and labial palpi 3-segmented.....15

- 14(13) Legs with annualr darkish spots on tibiae, antennal scape at least 2.5 times as long as the greatest width.....*Metaphycus bartletti*
- Legs without annualr darkish spots on tibiae, antennal scape about 3.5 times as long as the greatest width..... *Metaphycus flavus*
- 15(13) Scape more than 2.5 times as long as wide, ovipositor only slightly longer than or subequal in length to middle tibia*Metaphycus zebratus*
- Scape 2.5 times as long as wide, ovipositor shorter than in length to middle tibia.....*Metaphycus lounsburyi*
- 16(9) Fore wing with marginal vein absent, scape more than three times as long as broad*Cowperia* sp.
- Fore wing with marginal vein present.....17
- 17(16) Ovipositor exserted, pedical subtriangular, shorter than F1, calva not or hardly longer than F1.....*Bothriophyryne acaciae*
- Ovipositor not exserted, scape more than three times as long as broad.....*Parechthrodryinus coccidiphagus*
- 18(2) Tarsi 4-segmented, the gaster distinctly constricted at its junction with propodeum, scutellum with distinct submedian grooves, mesoscutum usually with a median groove.....*Tetrastichus* sp.
- Tarsi 5-segmented, if rarely some trasi 4-segmented than gaster broadly sessile.....19
- 19(18) Gaster subsessile, broadly attached with the propodeum, petiole strongly transverse.....20
- Gaster distinctly constricted at its junction with propodeum, the petiole sometimes distinct, female antenna with 9, scutellum very long, at least twice as long as mesoscutum, extending well over the gaster.....*Scutellista cyanea*
- 20(19) Antennae at most with 6-segmented, fore wing generally with linea calva, mesopleum large undivided.....21
- Antennae at most with 7-segmented, fore wing generally without linea calva.....22
- 21(20) Antennal scape flattened and expanded beneath, not more than twice as long as wide.....*Marietta picta*
- Antennal scape slender, or moderately flattened not less than twice as long as wide.....*Marietta leopardina*

22(20) Antennae 7-segmented, axillae large.....	23
- Antennae 8-segmented, axillae small.....	26
23(20) Scutellum with 3 pairs of setae.....	24
- Scutellum with numerous setae.....	25
24(23) First funicle segment 3 times as long as pedicel, stigmal vein swollen.....	<i>Coccophagus bivittatus</i>
- First funicle segment 1.3 times as long as pedicel stigmal vein not swollen.....	<i>Coccophagus lycimnia</i>
25(23) Fore coxa black, first funicle segment less than twice as long as wide, first club segment wider than long.....	<i>Coccophagus ishii</i>
- Fore coxa yellow, first funicle segment more than twice as long as wide, first club segment longer than wide.....	<i>Coccophagus scutellaris</i>
26(22) Submarginal vein 2 setae.....	<i>Encarsia citrina</i>
- Submarginal vein 3 setae.....	<i>Encarsia aurantii</i>

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الطفيليات التي تتطفل علي الحشرات الرخوة في مصر

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الزراعية - وزارة الزراعة - الدقي - جيزة - مصر

تم عمل حصر للطفيليات التي تتطفل علي الحشرات الرخوة في مصر الي جانب عمل مفاتيح
تصنيفيه للطفيليات التي تتطفل علي كل نوع من هذه الحشرات علي حده بالاضافه الي الرسومات
التوضيحية لهذه الأنواع وكذلك قائمه بهذه الأنواع المختلفة من الطفيليات .