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A Synopsis and Key to the Egyptian Species of *Aphytis* Howard (Hymenoptera: Aphelinidae) Parasitoids of Diaspidid Scale Insects (Homoptera: Diaspididae)

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A synopsis of the species of *Aphytis* occurring in Egypt and comprising nine newly recorded species being *A. chilensis* Howard, *A. hispanicus* (Mercet), *A. paramaculicornis* DeBach and Rosen, *A. vandenboschi* DeBach and Rosen, *A. philippinensis* DeBach and Rosen, *A. africanus* Quednau, *A. lingnanensis* Compere, *A. phoenicis* DeBach and Rosen, *A. aonidiae* (Mercet) and *A. libanicus* Traboulsi. A key is given to these species.

Keywords: *Aphytis* sp., Aphelinidae, diaspidid scale insects, Diaspididae.

The genus *Aphytis* Howard is very little known from Egypt. In 1940, Priesner and Hosny recorded 4 species *(A. chrysomphali, A. diaspidis, A. maculicornis, A. mytilaspidis),* but as these species were recorded prior to the revision of the world species of the genus by Rosen and DeBach (1979), it is not now possible to determine whether these were correctly determined or not. Among these, we find only the record of *maculicornis* in Rosen and DeBach (1979). Later, Hafez (1988) recorded *A. chrysomphali, A. coheni, A. diaspidis* and *A. lingnanensis* from Egypt.

The present paper is based on survey and collection of specimens of *Aphytis* made by the first author (S. Abd-Rabou) in Egypt. This collection from a few areas yielded 15 species of which 9 species appear to be new for the Egyptian fauna.

The species of *Aphytis* have great potential in the biological control of diaspidid pests, and have been used for this purpose, mostly with successful results, throughout the world. We provide here a key for the identification of the known species from Egypt, and also give brief synopsis of the hosts and plants from which these parasitoids were collected. We, however, do not provide as detailed descriptions of these species are available in Rosen and DeBach's (1979) revision.

Materials and Methods

The survey and collection consisted of random samples of different host plants with diaspidid host species collected from different localities in Egypt. The survey and collections were carried out from 1992 to 1998. Diaspidid infested plants were trans-

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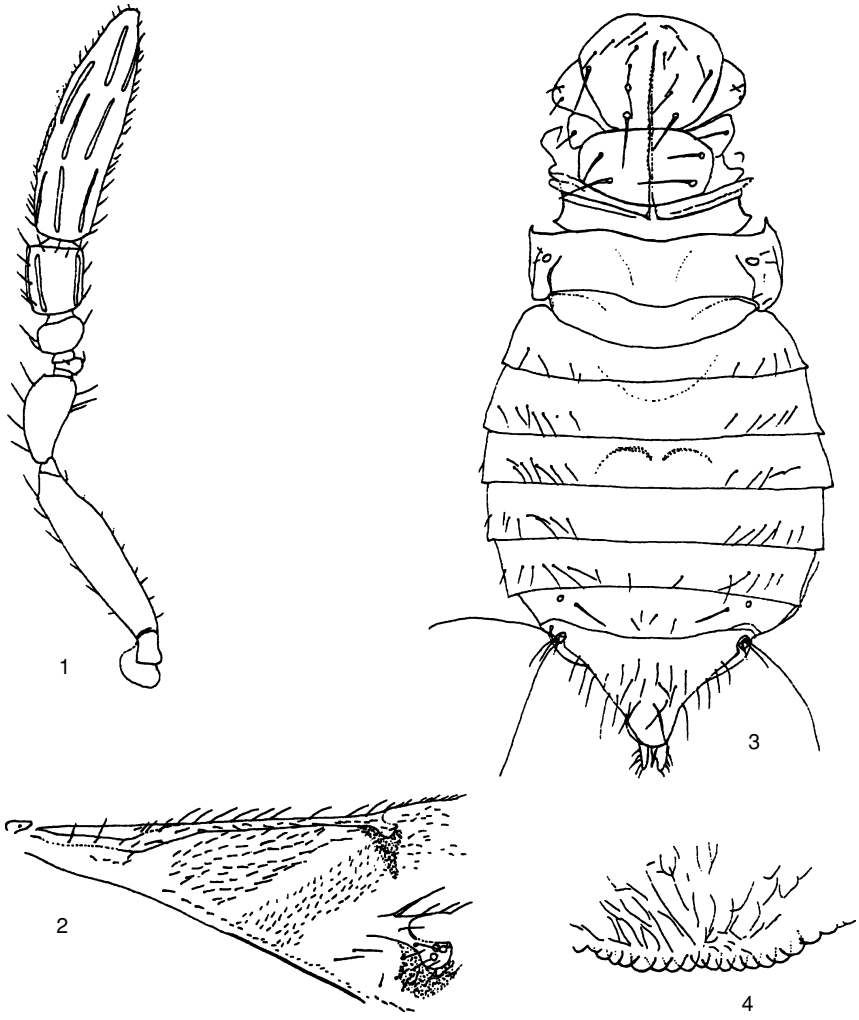
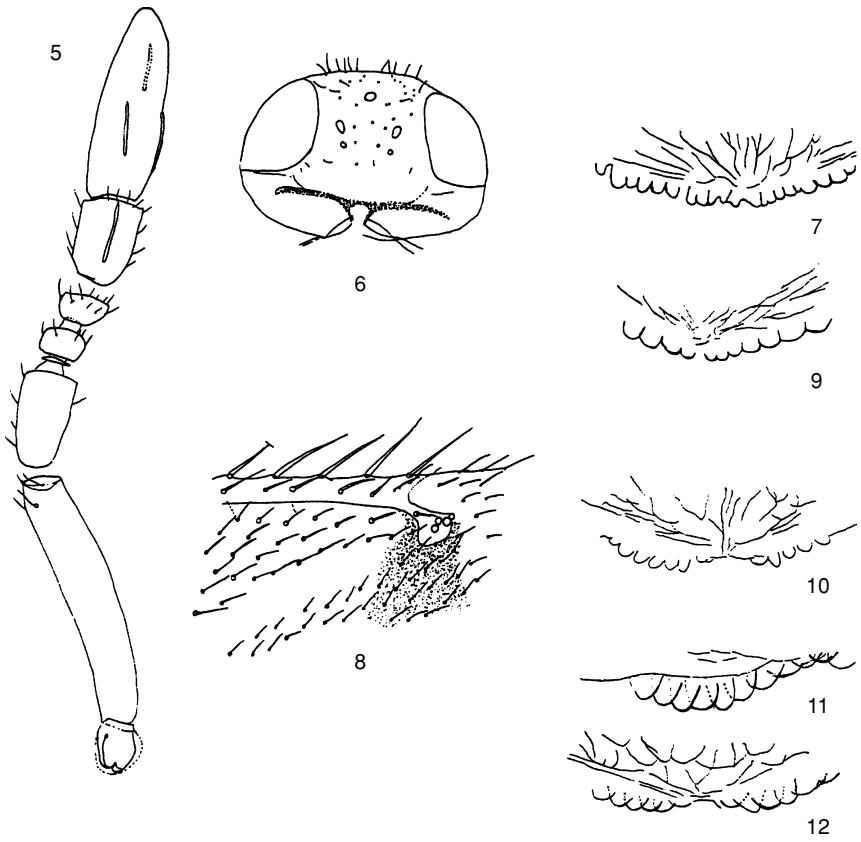
ferred separately to the laboratory inside a cool box and then kept in a well ventillated container until the emergence of any *Aphytis* species. Morphological terminology follows the terms of Hayat (1998). See also *Figs 1–12.*



Figs 1–4. *Aphytis chilensis:*
1. Antenna; 2. base of forewing; 3. propodeal crenulae; 4. thorax and gaster



Figs 5–12. – 5–8: *Aphytis diaspidis:*
5. antenna; 6. head; 7. propodeal crenulae; 8. apex of forewing venation;
9–12: propodeal crenulae:
9. *A. philippinensis;* 10. *A. mytilaspidis;* 11. *A. lingnanensis;* 12. *A. africanus*

Results and Discussion

Key to the Egyptian species of Aphytis, females

1. Occiput with a fuscous to black bar on each side of foramen *(Fig. 6);* the mouth margin and/or malar sulcus sometimes fuscous 2
– Occiput without such bars on sides of foramen; mouth margin and malar sulcus usually not fuscous 8

2. First segment of funicle (F1) small, triangular, smaller than F2 *(Fig. 1)*
1. *A. chilensis* Howard
– F1 not smaller than F2 *(Fig. 5)* 3
3. Gaster uniformly fuscous or dusky dorsally, with distinct darker cross-bands on terga. (Pedicel and flagellum rather uniformly fuscous, tip of clava usually blackish)
2. *A. diaspidis* (Howard)
– Gaster not uniformly fuscous or dusky, but paler with short fuscous strips on sides, and at most with complete cross-bands on terga 1–5 (TI–V) 4
4. First tergite (TI) of gaster with a fuscous cross-band, that on TV obliterated centrally (Pedicel and flagellum uniformly fuscous, apex of clava blackish)
3. *A. hispanicus* (Mercet)
– TI and V of gaster with complete fuscous cross-bands 5
5. Antennal clava with basal part paler than funicle, apex of clava blackish; propodeal crenulae elongate 6
– Antenna with pedicel, funicle and basal part of clava uniformly coloured, strongly infuscate; apex of clava blackish; propodeal crenulae rounded *(Fig. 9)* 7
6. Clava usually more than 3× as long as broad. Uniparental species
4. *A. maculicornis* (Mercet)
– Clava usually about 3× as long as broad. Biparental species
5. *A. paramaculicornis* DeBach and Rosen
7. Mid lobe of mesoscutum usually with 10–12 setae; TV of gaster 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× as long as metanotum. Uniparental species.
6. *A. vandenboschi* DeBach and Rosen
– Mid lobe of mesoscutum with 15 setae; TV with 2 setae between the lateral fuscous strips; TVI with 4 setae between spiracles; propdeum 3–4 × as long as metanotum. Biparental species 7. *A. philippinensis* DeBach and Rosen
8. Propodeal crenulae large and overlapping *(Figs 11, 12)* 9
– Propodeal crenulae (large or small) non-overlapping *(Fig. 10)* 11
9. Clava shorter, less than 3× as long as broad; ovipositor sheaths about 0.4× of mid tibia; (Propodeal crenulae relatively smaller, less elongate and more oblique) (Thoracic sterna dusky) 8. *A. africanus* Quednau
– Clava about 3× as long as broad; ovipositor sheaths about 0.5× of mid tibia. 10
10. Body setae slender and pale; mid lobe usually with 10–12 setae; forewing proximad of linea calva with 30–50 setae 9. *A. lingnanensis* Compere
– Body setae relatively coarser and darker; mid lobe with 12–14 setae; forewing proximad of linea calva with 50–70 setae. 10. *A. coheni* DeBach
11. Thoracic setae paler; clava more than 3× as long as broad; propodeum 6–8× as long as metanotum. (Thoracic sterna dusky. Uniparental species)
11. *A. chrysomphali* (Mercet)
– Thoracic setae dark and coarse; clava short, not more than 3× as long as broad; propodeum short, less than 4× as long as metanotum 12

12. Thoracic sterna dusky; propodeal crenulae rounded. Biparental species.
12. *A. mytilaspidis* (Le Baron)
– Thoracic sterna immaculate. Uniparental species 13
13. Propodeum usually 4–4.5× as long as metanotum; ovipositor stylets 1.66–2.00× as long as mid tibia; (mid lobe with 6–8 setae)
13. *A. phoenicis* DeBach and Rosen
– Propodeum shorter, 3–4× as long as metanotum; ovipositor stylets about 1.75× as long as mid tibia. 14
14. Posterior margin of scutellum narrowly lines with blackish or fuscous; thoracic setae dark 14. *A. aonidiae* (Mercet)
– Posterior margin of scutellum pale as rest of scutellum; thoracic setae paler
15. *A. libanicus* Traboulsi

Synopsis of species

1. *Aphytis chilensis* Howard

Specimens examined. EGYPT: Ismailia (4°), 11. 12. 1996, ex *Hemiberlesia lataniae* on *Mangifera indica.*

2. *Aphytis diaspidis* (Howard)

Recorded from all over the Delta and also the Nile Valley as far south as Qena, from *Parlatoria oleae* (Colvee) and scales on apricot, pear, rose, oleander and *Ficus* sp. (Priesner and Hosny, 1940). Hafez (1988) recorded it from *Aonidiella aurantii* (Maskell) on citrus in Alexandria.

Specimens examined. EGYPT: Northern Coast (9°), 4. 4. 1994, ex *Parlatoria oleae* on *Olea* sp.

3. *Aphytis hispanicus* (Mercet)

Specimens examined. EGYPT: Qanater El-Khariya (13°, 6 without heads), 14. 3. 1995, ex *Chrysomphalus dictyospermi* on *Ficus nitida.*

4. *Aphytis maculicornis* (Mercet)

Priesner and Hosny (1940) recorded it from the Delta and the environs of Cairo, from *Parlatoria oleae* on olive, apple, pear and rose; *Lepidosaphes ulmi* L. on grape vine; from *Diaspis echinocacti* Bouche on *Opuntia.* These authors also mention an unpublished subspecies (det. by Dr S. Novicky) collected from *Aspidiotus cyanophylli* Signoret on *Alternanthera* in Giza, and from *D. echinocacti on Opuntia* in Hawaber. Rosen and DeBach (1979), apart from recording this species from EGYPT (on *P. oleae*), also mention a thelytokous strain obtained from *Parlatoreopsis longispinus* (Newstead) in Egypt, and tentatively considered this as an aberrant form of *maculicornis.*

5. *Aphytis paramaculicornis* DeBach and Rosen

Specimens examined. EGYPT: Northern Coast (2°, 1°), 15. 6. 1996, ex *Parlatoria oleae* on *Olea* sp.; El-Arish (1o), 17. 1. 1994, ex *P. oleae* on *Olea* sp.

6. *Aphytis vandenboschi* DeBach and Rosen

Specimen examined. EGYPT: Northern Coast (1°), 1. 6. 1997, ex *Parlatoria oleae* on *Olea* sp.

7. *Aphytis philippinensis* DeBach and Rosen

Specimens examined. EGYPT: El Arish (13°, 5°), 17. 1. 1994, ex *Parlatoria oleae* on *Olea* sp.

8. *Aphytis africanus* Quednau

Specimens examined. EGYPT: South Sinai (5°, 6°), 23. 5. 1997, ex *Aonidiella aurantii,* on *Citrus* sp.

9. *Aphytis lingnanensis* Compere

Hafez (1988) recorded this as the most common species parasitizing *Aonidiella aurantii* (Maskell) on citrus in the Alexandria region.

Specimens examined. EGYPT: Giza (3°, 2°), 21. 9. 1992, ex *Aonidiella aurantii* on *Citrus* sp.

10. *Aphytis coheni* De Bach

This species was recorded by Hafez (1988) from *Aonidiella aurantii* (Maskell) infesting citrus in the Alexandria region.

11. *Aphytis chrysomphali* (Mercet)

Priesner and Hosny (1940) recorded this species from all over the Delta, from Alexandria south up to Giza province. They bred it from *Aonidiella aurantii* on citrus, *Chrysomphalus ficus* Riley on citrus, *C. (Mycetaspis) personatus* Comstock on *Mangifera indica,* and *Parlatoria oleae* on olive. Hafez (1988) also recorded it from Alexandria region on *A. aurantii* on citrus.

12. *Aphytis mytilaspidis* (Le Baron)

Priesner and Hosny (1940) recorded this species from all over the Nile Delta in Fayoum and in the Nile Valley south of Minia, from several diaspidid species: *Aonidiella aurantii* on citrus; *Aspidiotus cyanophylli* Signoret on *Alternanthera; A. hederae* Vallot on jasmine; *Diaspidiotus lataniae* Signoret on *Psidium guajava; Chionaspis satriata* Newstead on *Cupressus* and *Thuja; Diaspis echinocacti* on *Opuntia vulgaris; Lepidosaphes conchiformis* Gmelin (= *ficus* Signoret) on *Ficus carica; L. pinnaeformis* Bouche on citrus; *L. ulmi* L. on *Vitis vinifera* and *Populus* sp.; and *Parlatoria oleae* on apricot. They also mention from *Asterolecanium pustulans* Cockerell (on *Ficus carica*) as a host of this species, but this must be an erroneous host record.

Specimens examined. EGYPT: Itay El-Barood (4°, 2°), 28. 8. 1995, ex *Lepidosaphes beckii* on *Mangifera indica.*

13. *Aphytis phoenicis* DeBach and Rosen

Specimens examined. EGYPT: El – Arish (1°, 1°), 10. 11. 1997, ex P*arlatoria blanchardi* on *Phoenix dactylifera.*

14. *Aphytis aonidiae* (Mercet)

Specimens examined. EGYPT: Alexandria (3°, 2 with heads missing), 15. 1. 1992, ex *Aonidia lauri* on *Laurus nobilis.*

15. *Aphytis libanicus* Traboulsi

Specimens examined. EGYPT: El-Arish (6°), 19. 3. 1996, ex *Parlatoria oleae* on *Olea* sp.

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