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A new species of *Coccophagus* from Egypt (Hymenoptera: Chalcidoidea: Aphelinidae)

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ABSTRACT

This study deals with a new species of hymenopterous parasitoid of the soft scale insects. Specimens of an Aphelinid parasitoid were collected from the soft scale insect *Pulvinaria taenuivalvata* (Newstead) (Coccidae) on sugarcane leaves at Alexandria. In Egypt, only five species of this genus were recorded, it is expected that more species could be found, as the Egyptian insect fauna still needs more studies. By examining the prepared slides and comparing the taxonomical characters of the species, they were not agreeing with any of the described species. Therefore, it is suggested to be a new species and named *Coccophagus nigricoxae* sp. nov., which is described and illustrated in this study.

Key words: Aphelinidae, *coccophagus*, *Coccophagus nigricoxae* sp., Egypt

INTRODUCTION

The genus *Coccophagus* Westwood is one of the best known genera of the family Aphelinidae. It is cosmopolitan and its species are endoparasitoids of the soft scale insects (Coccidae) but a few species are known to parasitize mealybugs (Pseudococcidae) (Clausen, 1978). Compere (1931) revised the world species of *Coccophagus* that included 76 species. Annecke and Insley (1970) described 57 species of *Coccophagus* that are known from Africa and Madagascar, fourteen of them were new species and nine were recorded from *Pulvinaria*.

According to Annecke and Insley (1974), over 200 species of *Coccophagus* have been described worldwide. In Egypt, Priesner and Hosny (1940) recorded *C. lunulatus* and *C. scutellaris*. Four species were recorded by Abd-Rabou (1999, 2001) namely, *scutellaris*, *bivittatus*, *lycimnia* and *ishiii*. Later on, Abd-Rabou (2003) recorded *C. qenai* as a new species. El-Serwey (2002) studied the parasitism of *Pulvinaria taenuivalvata* (Newstead) (the host of the concerned *Coccophagus* under investigation). He recorded six hymenopterous parasitoids, *C. semicircularis* was one of them, it was the most abundant species. Since the names *lunulatus* and *semicircularis* are synonyms of *C. scutellaris* (Compere, 1931) thus there are only 5 registered species in Egypt they are those of Abd-Rabou. It is worthy to mention that there are 29 species of family Coccidae are registered in Egypt (Mohammad and Ghabbour, 2008). Therefore, it is possible that more parasitoid species of these soft scale remain to be discovered.

This investigation represents description of a new species, *Coccophagus nigricoxae* sp. nov., with comparison with its closely related species.

MATERIALS AND METHODS

The specimens (6 females and 6 males) used in this study were reared from the soft scale *Pulvinaria taenuivalvata* (Newstead) infesting sugarcane leaves in March 2001 at Alexandria. For preparing slides, head, legs and wings of the specimens were removed then they were mounted directly on slides using Hoyer's fluid. The slides were dried in an oven at 45°C then examined by using stereoscopic microscope. Measurements of the diagnostic characteristics were made by using micrometer eyepiece. The used keys for identification were those of Alam (1956), Noyes and Valentine (1989) and Hayat (1998) for the genus and Compere (1931) and Annecke and Insley (1974) for the species.

In addition, extensive revision was made to the description and illustration of the new species which published by several authors in different regions of the world i.e, Annecke and Insley (1974), Hayat (1974, 1993); Ishihara (1977); Husain and Agarwal (1982); Abd-Rabou (2003); Myartseva (2004; 2006); Myartseva and Rutz-Cancino (2005); Sugonyaev (1998; 2012); Hayat *et al.* (2009); Woolley (1997). Comparisons of these descriptions with the prepared slides are sufficient to recognize that the species under study is a new species. Holotype and paratype were deposited in the collection of Department of Applied Entomology, Faculty of Agriculture, Alexandria University.

RESULTS AND DISCUSSION

Description of *Coccophagus nigricoxae* sp. nov.

Female: Length 1.4 mm, general colour black. Posterior two-third of scutellum white or pale yellow. Legs pale yellow except all coxae and hind femora which are black (Fig. 1a-c). Antennae pale yellow with brown rhinaria.

Head: Semicircular in frontal view. Antennae (Fig. 2) inserted at the line connecting lower margin of eyes, radical short, scape cylindrical about 2.5 times as long as wide, pedicel slightly shorter than F1 (16:18) F1 and F2 subequal, longer than wide (6:4.5 and 4:3.5, respectively) F3 quadrate. Club pointed at apex, its segments wider than long C1 (5:3), C2 (3.4:2), C3 (1.3:1). Funicle and club segments setose with short setae and rhinaria arranged as shown in Fig. 2. Eyes setose with minute setae about as long as ommatidia diameter.

Thorax: Mesoscutum (Fig. 3) width: length (5: 3), densely setose with dark setae. Each parapsis and axilla with 4 and 2 setae, respectively. Scutellum about as long as scutum, its width: length (5: 3.3), densely setose with brown setae and with one pair of long black bristles and shorter subapical pair. Mesoscutum, parapsis, axillae and scutellum with network reticulation. Distance between propodael spiracles less than length of middle tibia and endophragma triangular in shape (Fig. 4).

Wings: Hyaline ciliated (Fig. 5), fore wings twice as long as wide with short marginal fringe, marginal vein longer than submarginal vein. These veins with 20 and 11 setae, respectively. Costal cell with one row of 12 setae, postmarginal vein very short, stigmal vein short with an apical knob. Hind wings (Fig. 6) narrower than fore wings its length about four times as long as wide, ciliated and surrounded with short fringe. The hind wing base without setae, submarginal vein with only one seta.

Legs: Fore coxa with three stout black bristles on apical part of coxae and one on the subapical part of femur, middle tibial spur shorter than basitarsus, the latter as long as the following 3 segments combined, unequal paired spurs at apex of hind tibia.

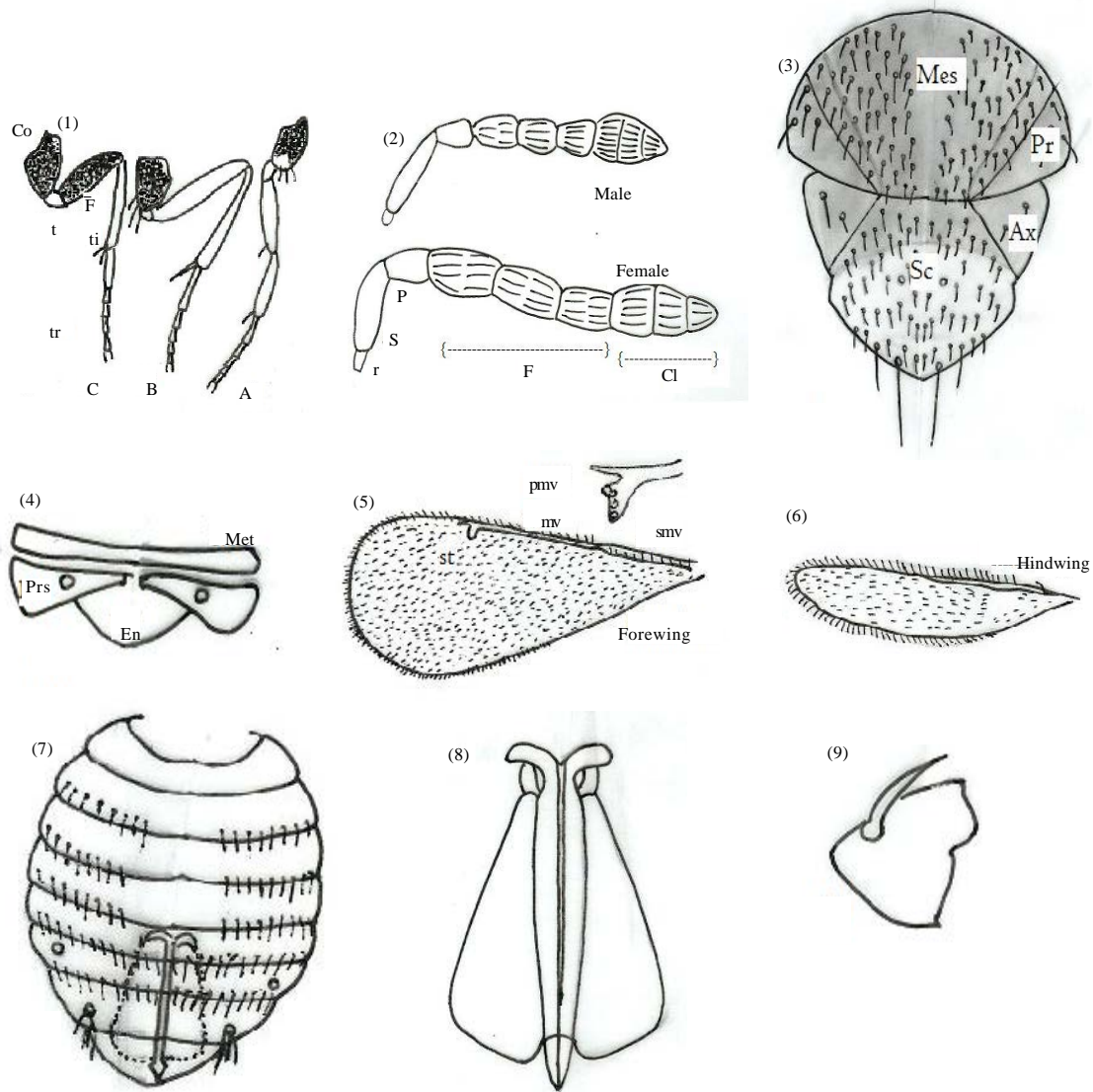


Fig. 1-9: *Coccophagus nigricoxae* sp. nov., A: Fore leg, B: Middle leg, C: Hind leg, Co: Coxae, F: Femur, t: Trochanter, ti: Tibia and tr: Tarsus, 2: Antennae, r: Radical, S: Scape, P: Pedicel, F: Funicular segments and Cl: Club, 3: Mesothorax, Ax: Axillae, Mes: Mesoscutum, Pr: Parapsis and Sc: Scutum, 4: Propodaeum, En: Endophragma, Met: Metanotum and Prs: Propodael spiracle, 5: Forewing, mv: marginal vein, pmv: Post marginal marginal vein, smv: Sub marginal vein and St: Stigma vein, 6: Hind wing, 7: Female, gaster, 8: Ovipositor and 9: Mandible

Gaster: It (Fig. 7) is longer than thorax (55: 35), fifth and sixth tergites with a row of setae extending across the dorsum, rows interrupted on preceding three tergites and absent on the first.

Ovipositor: It (Fig. 8) is short, not exerted at apex, slightly more than half the length of gaster and longer than middle tibia (5:3), ovipositor sheath shorter than midtibial spur. Cerci button shape with 2 long and one short hairs.

Table 1: Antennae measurements

Sex	Meas. (mm)	Scape	Pedicel	Funicle			Club		
				F1	F2	F3	C1	C2	C3
Female	Length	0.10	0.064	0.072	0.064	0.060	0.048	0.040	0.044
	Width	0.04	0.048	0.056	0.056	0.060	0.080	0.068	0.052
Male	Length	0.14	0.064	0.100	0.088	0.080	0.060	0.044	0.044
	Width	0.05	0.040	0.052	0.056	0.056	0.064	0.060	0.040

Table 2: Comparison between *C. nigricoxa* and *C. ishiii*

<i>C. ishiii</i>	<i>C. nigricoxae</i> , sp. nov.
Tarsi of fore legs brownish	Tarsi of fore legs lemon yellow
Antennal club broadly rounded at apex	Antennal club pointed at apex
Mandible faintly tridentate, emarginated	Mandible truncate (Fig. 9)
Scutellum slightly wider than long (6:5)	Scutellum distinctly wider than long (5: 3)
The yellow part of scutellum not sculptured, with white setae	The yellow part of scutellum visibly sculptured, with black setae
First two abdominal tergites with small black setae on both sides	First abdominal tergum without setae
Paired spurs at apex of hind tibia of about equal length	Paired spurs at apex of hind tibia unequal

Male: Similar to female except the smaller size, the colour of scutellum which is entirely black and the proportion of funicular segments which are longer than female and each with two rows of rhinaria. Fore tarsi completely brown, middle and hind tarsi with brown two apical segment.

Measurements (mm): Body length 1.4, scutum 0.23 long by 0.36 wide, scutellum 0.23 long by 0.30 wide, Mid tibia 0.27. Fore wing 0.87 long by 0.43, marginal vein 0.29, submarginal vein 0.22. Hind wing 0.7 long by 0.17. Gaster 0.89 long by 0.68 wide, ovipositor 0.44 and ovipositor sheath 0.08. The measurements of antennae are shown in Table 1.

Comment: This species is closely related to *C. ishiii* (Compere, 1931), they can be separated by the diagnostic characters (Table 2).

Etymology: This new species is named according to the black color of the coxae, since the varied color patterns of legs furnish the most conspicuous taxonomical characters used for separating the species (Compere, 1931).

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