Acta Zoológica Mexicana (n.s.) 22(1):95-101 (2006)

A NEW SPECIES OF *COCCOPHAGUS* FROM NUEVO LEON, MEXICO (HYMENOPTERA: CHALCIDOIDEA: APHELINIDAE)

S. N. MYARTSEVA
División de Estudios de Postgrado e Investigación, UAM Agronomía y Ciencias,
Universidad Autónoma de Tamaulipas, CP 87149, Ciudad Victoria, Tamaulipas, MÉXICO
e-mail: smyartse@uat.edu.mx

RESUMEN

Se describe e ilustra una nueva especie del afelínido *Coccophagus gonzalezi* sp.nov., con base en especímenes colctados en el estado de Nuevo León, México.
Palabras Clave: *Coccophagus gonzalezi,* nueva especie, Aphelinidae, Coccidae, México.

ABSTRACT

A new species of aphelinids, from the state of Nuevo León, Mexico, *Coccophagus gonzalezi* sp.nov., is described and illustrated.
Key Words: *Coccophagus gonzalezi,* new species, Aphelinidae, Coccidae, Mexico.

INTRODUCTION

The genus *Coccophagus* Westwood, 1833, includes more than 200 described species and it is one of the largest genera in Aphelinidae. Its distribution is cosmopolitan. The first regional revision of *Coccophagus* was published in Australia (Girault 1915). Later *Coccophagus* species in the Ethiopian region (Annecke & Insley 1974), China (Huang 1994) and India (Hayat 1998) were revised. The first revision of the world species of *Coccophagus* was published in 1931 (Compere 1931). Complete data about fauna, taxonomy, hosts and distribution of world *Coccophagus* species were presented by Noyes (2002). In the New World are known 59 species, including 10 species in Mexico (Myartseva & Ruíz-Cancino 2000, Noyes 2002, Myartseva & Coronado-Blanco 2003). Most of species registered now in Mexico were described by H. Compere and A. Girault.

The hosts of *Coccophagus* are soft scale insects from the family Coccidae and rarely mealybugs from the family Pseudococcidae (Homoptera). Female larvae of *Coccophagus* are primary solitary endoparasitoids. Male larvae are developed either as internal or as external hyperparasitoids on their own species or other species of Homoptera (Walter 1988). Many species of *Coccophagus* are of value in agriculture and have been used in the biological control of pests belonging to the family Coccidae (Clausen 1978, Greathead 1989).

The soft scale *Coccus hesperidum* L. is the most cosmopolitan of many different coccids attacking citrus. Several natural enemies are known to attack *C. hesperidum*

throughout the world. In Southern Africa, for example, this scale is attacked by more than 25 species of chalcidoid wasps (Prinsloo 1984). In Mexico, *Coccophagus pulvinariae* Compere (Contreras-Coronado 1972) and *Coccophagus* sp. (Olazarán & Ruíz 2000) were reared from this soft scale. In Peruvian citrus orchards, the rarity of *C. hesperidum* was due generally to two species of natural enemies, including *C. quaestor* Girault (Beingolea 1969; cit. by Kennett *et al.* 1999). In Chile, *C. caridei* (Brèthes) is the main natural enemy of many lecaniid coccids on grapes, including *Parthenolecanium corni* (Bouché) and *P. persicae* (Fabricius), and has an important role in maintaining pests populations below economic levels (González 1983; cit. by Flaherty & Wilson 1999).

One of the major biological control campaigns of the world has been conducted against the black scale *Saissetia oleae* (Bernard) in California, USA. From different countries, 11 species of *Coccophagus* were introduced to California, including *C. lycimnia* (Walker) and *C. mexicensis* Girault from Mexico (Clausen 1978). *C. rusti* Compere introduced to Perú from South Africa, on olives and citrus had substantial control of *Saissetia* spp. (Aguilar 1980, Jara 1998). In Mexico, *C. rusti* attack *Saissetia* species on citrus and ornamental plants (Ruíz *et al.* 2002, Myartseva & Coronado-Blanco 2003).

In the absence of imported natural enemies that keep 7 important South American pests under complete or substantial control, estimated costs of chemical control totally composed more than 17,600,000 US dollars, including costs about 2,000,000 US dollars for chemical control of *Saissetia oleae* (Altieri & Nicholls 1999).

Among the species known to occur in Mexico, *Coccophagus lycimnia* (Walker 1839) and *C. scutellaris* (Dalman 1825) are cosmopolitan and *C.quaestor* Girault is distributed in North and South America. This species is widely distributed in Mexico and only this one is cited for the state of Nuevo León (González-Hernández 2000, Ruíz-Cancino & Coronado-Blanco 2002). *C. rusti* Compere, species of African origin, introduced to California, USA, for biological control of *Saissetia* spp., penetrated later to Mexico by ecesis, *i.e.* with its hosts, and established there. At the present, it is known in thee Mexican states (Tamaulipas, Veracruz and Oaxaca) as parasitoid of *Saissetia* spp., predominantly on ornamental plants (Myartseva & Coronado-Blanco 2003).

Sixty five species from 26 genera of Coccidae are registered in Mexico (Miller 1996). Nine species from 6 genera are known in the state of Nuevo León (Ruíz-Cancino & Coronado-Blanco 2002). Thus, it is possible than more *Coccophagus* species as parasitoids and soft scales species as their hosts, remain to be discovered in this and other states of Mexico. Below is described a new species, *Coccophagus gonzalezi* sp.nov., collected in the state of Nuevo León, Mexico.

MATERIAL AND METODS

Two exemplares of aphelinids were received for identification from the Entomological Research Museum of the Department of Entomology of University of California,

Riverside, USA. They were collected in Mexico, the state of Nuevo León in July 1983 by entomologist Alexandro González Hernández. For their identification were prepared slides of specimens in balsam of Canada. Both females are belonging to genus *Coccophagus* Westwood and were identified as species novae. By identification of the genus and morphological study of species of these Aphelinidae were used keys and original descriptions of similar species of Compere (1931), Annecke & Insley (1974), Hayat (1998) and Taxapad of Chalcidoidea (Noyes 2002). This species is described below as *Coccophagus gonzalezi* sp. n.

RESULTS

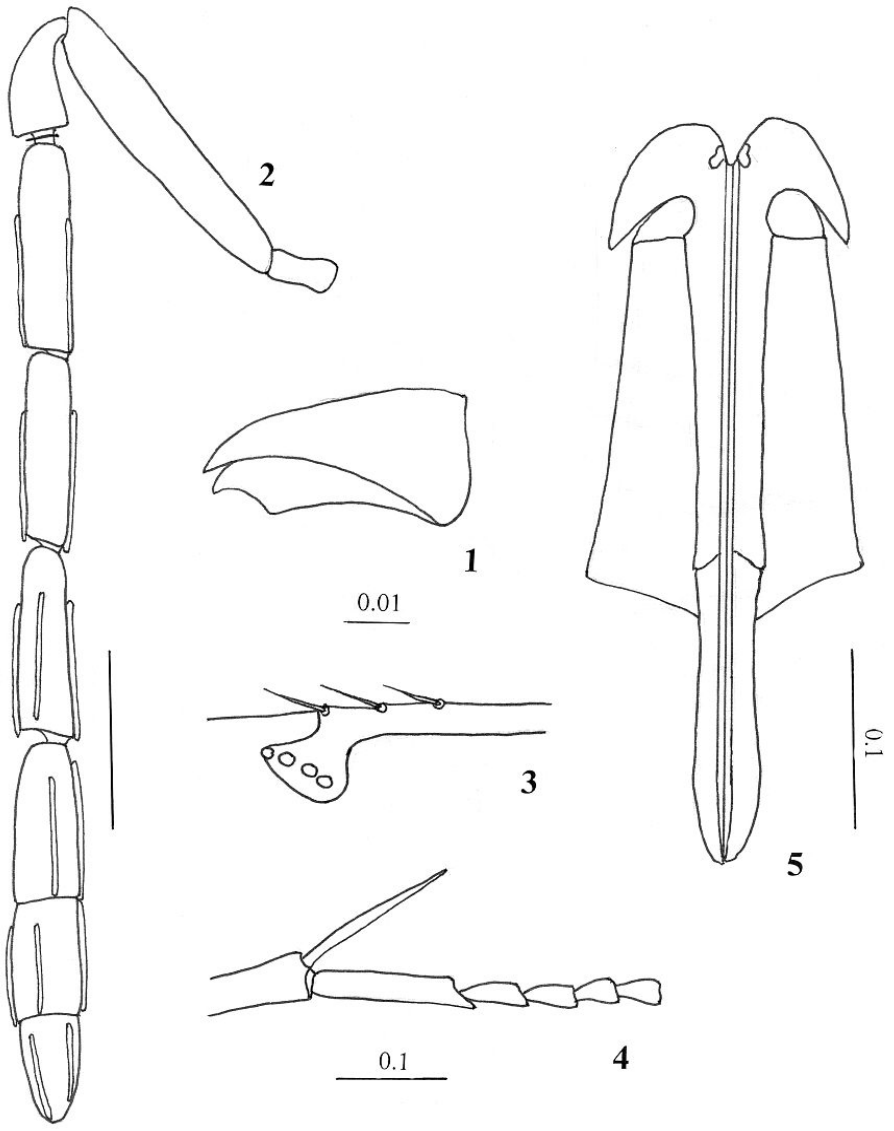
***Coccophagus gonzalezi* Myartseva sp.nov**.
(Figs. 1-5)

Female. Length: 1.30 mm.

Coloration. Head whitish-yellow, antennal scape and pedicel bright yellow, funicle and club brownish. Mesosoma whitish- yellow, fore and hind margins of propodeum laterally outlined brown. Fore wing hyaline, marginal vein very slightly infuscate. Legs whitish-yellow. Metasoma whitish-yellow, 1st-4th and 6th tergites dorsally brownish on sides, 5th brown fully, except for anterior margin, 7th brown in apical half; ovipositor sheaths brown, laterally black.

Morphology. Head slightly wider than mesosoma, slightly less than twice as wide as long and wider than hight. Frontovertex as long as wide, with erected short setae, its width twice less than head width. Ocelli forming an apical angle of about 90°; hind ocelli placed slightly closer to eyes than to occipital margin, on distance about one diameter of ocellus. Eyes naked, about 1.5 times as long as cheeks. Mandible (Fig. 1) with two teeth, the upper one well defined, the second blunter but long, and with a dorsal truncation. Antennae (Fig. 2) inserted close to mouth margin. Distance between toruli subequal to distance from torulus to eye. Radicle 2 times as long as wide; scape 6.2 times as long as wide; pedicel 2.3 times as long as wide; first funicular segment the longest, 4.8 times as long as wide and 1.6 times as long as pedicel; second segment 4.5 times as long as wide; third segment 3.3 times as long as wide, very slightly wider than two first segments; club 5.4 times as long as wide, slightly shorter than the two preceeding segments combined and slightly longer than scape. Two first funicular segments with two linear sensilla each one, third with 3 sensilla, club segments with 2, 3 and 2 sensilla, respectively. Mesoscutum wider than long, densely setose; scutellum shorter and wider than long, with three pairs of thin long setae; each axilla with 2 setae, each side lobe with 7 setae. Propodeum with short triangular prominence medially. Fore wing 2.5 times as long as wide; marginal vein 1.4 times as long as submarginal vein, postmarginal vein absent (Fig. 3). Midtibial spur (Fig. 4) subequal in length to basitarsus; basitarsus subequal in length to the next three tarsal segments combined. Ovipositor (Fig. 5) very slightly protruded, 0.8 times as long as middle tibia; third valvula 0.7 times as long as second valvifer.

Material examined. Holotype female – México, Nuevo León, Mun. Guadalupe, Rincón de la Sierra, 11-VII-1983 (A. González H.) (UCR Ent. No. 54597). Paratype female – same data as holotype (UCR Ent. No. 54598).



Figures 1-5
Coccophagus gonzalezi, sp.n., female: 1 - mandible, 2 - antenna, 3 - stigmal vein of fore wing, 4 - midtibial spur and tarsus, 5 - ovipositor. Scale - mm.

Etymology. New species is named in honour of the Mexican hymenopterist Dr. Alejandro González Hernández (Laboratorio de Entomología, División de Postgrado, Facultad de Ciencias Biológicas, UANL, San Nicolás, Nuevo León, México) for his important contribution to the study of Chalcidoidea of Mexico, the creation of one of the major Collection of Hymenoptera Parasitica of Mexico, and for collecting the interesting new species of *Coccophagus,* described here.

Type locality: México, Nuevo León, Guadalupe, Rincón de la Sierra.

Type depository: Entomological Research Museum of the Department of Entomology, University of California, Riverside, California, USA .

Paratype is preserved in the same Museum.

DISCUSSION

The new species *Coccophagus gonzalezi* sp.nov., is a very distinctive species, it differs from all the other species of the genus by the unusual long and thin funicular segments: first and second segments more than 4 times (4.8X and 4.5X, respectively) as long as wide. Unusual long and thin first funicular segment have only the Indian species *C. longicornis* Hayat, 1971 (5.7X) and the Australian species *C. redini* Girault, 1924 (about 4X), and possibly other Indian species, *C. subflavescens* Hayat, 1971 (3.75X).

From *C. longicornis,* the new species can be distinguished by the body coloration and also by the following: in *C. gonzalezi* - flagellum unicolored, brown, first funicular segment 1.6 times longer than pedicel, second segment 4.5 times as long as wide, scape 6.2 times as long as wide, side lobe with 7 setae, body length 1.30 mm; in *C. longicornis* - flagellum contrastingly colored, brown and white, first funicular segment 1.3 times as long as pedicel, second segment 4.7 times as long as wide, scape 5.5 times as long as wide, side lobe with 4 setae, body length 1.76 mm.

From *C. redini,* the new species can be distinguished by the following: in *C. gonzalezi* - flagellum unicolored, first funicular segment 1.6 times longer than pedicel, second segment 4.5 times as long as wide, axilla with two setae; in *C. redini* - flagellum bicolored, first funicular segment more than 2 times as long as pedicel, second segment 2 times as long as wide, axilla densely setose.

From the other Indian species, *C. subflavescens* Hayat, 1971, with the first funicular segment 3.75 times as long as wide, the new species differs also by other characters: in *C. gonzalezi* - fore wing hyaline, postmarginal vein absent, hind tibia whitish, first funicular segment 1.6 times as long as pedicel and 1.2 times as long as third segment; in *C. subflavescens* - fore wing with infuscation, postmarginal vein present, hind tibia medially dusky, first funicular segment 1.4 times as long as pedicel and equal to third segment in length.

The new species *Coccophagus gonzalezi* sp. n. can be referred to *ochraceus* group in the genus *Coccophagus.*

ACKNOWLEDGEMENTS

Author thanks to S.V.Triapitsyn (University of California, Riverside, California, USA) for loan interesting materials of Aphelinidae collected in Mexico and sending of some literature on this family of Chalcidoidea. Author would also like to thank División de Postgrado e Investigación of UAM Agronomía y Ciencias, Universidad Autónoma de Tamaulipas, México, and Cuerpo Académico Entomología Aplicada for providing facilities and help for this work.

LITERATURE CITED

Aguilar, P.G. 1980. Apuntes sobre el control biológico y el control integrado de las plagas agrícolas en el Perú. *Revista Peruviana de Entomología.* 23: 85-110.

Altieri, M.A. & C.I. Nicholls. 1999. Classical biological control in Latin America. Pp. 975-991. *In*: T.S. Bellows and T.W. Fisher (Eds.). *Handbook of Biological Control.* Academic Press, San Diego, California, USA.

Annecke, D.P. & H.P. Insley. 1974. *The species of Coccophagus Westwood, 1833 from the Ethiopian region (Hymenoptera: Aphelinidae).* Entomology Memoir, Department of Agricultural Technical Services, Republic of South Africa, 37. 62 pp.

Clausen, C.P. (Ed.). 1978. *Introduced parasites and predators of arthropod pests and weeds: A world review.* U.S.Dept. Agr., Agriculture Handbook No. 480. Washington, D.C., USA. 551 pp.

Compere, H. 1931. A revision of the species of Coccophagus, a genus of hymenopterous, coccid-inhabiting parasites. *Proc. U.S. Nat. Mus.* 78:1-132.

Contreras-Coronado, A. 1972. Clave práctica para algunas familias de Hymenoptera relacionadas con el combate biológico en la República Mexicana. *Fitófilo.* 25 (67): 27-30.

Flaherty, D.L. & L. T. Wilson. 1999. Biological control of insects and mites on grapes. Pp. 853-869. *In*: T.S. Bellows and T.W. Fisher (Eds.). *Handbook of biological control.* Academic Press, San Diego, California, USA. 1046 p.

Girault, A.A. 1915. Australian Hymenoptera Chalcidoidea - VII. The family Encyrtidae with descriptions of new genera and species. *Memoirs of the Queensland Museum.* 4.184 pp.

González-Hernández, A. 2000. Chalcidoidea (Hymenoptera). Pp. 649-659. *In*: J. Llorente Bousquets, E.González Soriano y N.Papavero (Eds.). *Biodiversidad, taxonomía y biogeografía de artrópodos de México: Hacia una síntesis de su conocimiento.* Vol. II. México. 676 pp.

Greathead, D. 1989. Biological control as an introduction phenomenon: a preliminary examination of programmes against Homoptera. *The Entomologist.* 108 (1-2): 28-37.

Hayat, M. 1998. *Aphelinidae of India (Hymenoptera: Chalcidoidea): a taxonomic Revision.* Memoirs on Entomology, International. Vol. 13. 416 pp.

Huang, J. 1994*. Systematic studies on Aphelinidae of China (Hymenoptera: Chalcidoidea).* Contributions of Biological Control Research Institute of Fujian Agricultural University. Special Publication. 5. 348 pp.

Jara, L.V. 1998. Control biológico de plagas en cítricos. Pp. 295-306. *In*: A.T. Lizárraga, U.C. Barreto y J.Hollands (Eds.). *Nuevos aportes del control biológico en la agricultura sostenible.* Lima, Perú. 397 pp.

Kennett, C.E., J.A. McMurtry and & J.W. Beardsley. 1999. Biological control in subtropical and tropical crops. Pp. 713-742. *In*: T.S. Bellows and T.W. Fisher (eds.). *Handbook of biological control.* Academic Press, San Diego, California, USA. 1046 pp.

Miller, D.R. 1996. Checklist of the scale insects (Coccidae: Homoptera) of Mexico. *Proc. Entomol. Soc. Wash.* 98 (1): 68-86.

Myartseva, S.N. & E. Ruíz-Cancino. 2000. Annotated checklist of the Aphelinidae (Hymenoptera: Chalcidoidea) of Mexico. *Folia Entomol. Mexicana.* 109: 7-33.

Myartseva, S.N. & J.M. Coronado-Blanco. 2003. *Coccophagus rusti* Compere: una especie de Äfrica en México. *Entomología Mexicana.* 2: 740-744.

Noyes, J.S. 2002. *Interactive Catalogue of World Chalcidoidea 2001*. Compact disc. Taxapad, Vancouver, Canada.

Olazarán, A.H. & E. Ruíz C. 2000. Control natural de coccoideos (Homoptera en la zona citrícola de Tamaulipas, México*. Memorias XXIII Congr. Nac. de Control Biológico.* México: 36-38.

Prinsloo, G.L. 1984*. An illustrated guide to the parasitic wasps associated with citrus pests in the Republic of South Africa.* Department of Agriculture. Science Bulletin, 402. Pretoria, Republic of South Africa.119 pp.

Ruíz Cancino, E. & J.M. Coronado-Blanco. 2002. *Artrópodos terrestres de los estados de Tamaulipas y Nuevo León, México.* Serie Publicaciones Científicas CIDAFF-UAT, No. 4. Cd. Victoria, Tamaulipas, México. 377 pp.

Ruíz C.E., J.M. Coronado B., S.N. Myartseva & J.A. Martínez R. 2002. Parasitoides de plagas del cedro rojo *Cedrela odorata L*. en Tamaulipas, norte de Veracruz y de San Luis Potosí. *Folleto divulgativo* No. 9. UAT. 4 pp.

Walter, G.N. 1988. Heteronomous host relationships in aphelinids – evolutionary pathways and adaptive significance (Hymenoptera: Chalcidoidea). *Advances in Parasitic Hymenoptera Research.* 1: 313-326.

Recibido: 23 de febreo 2004
Aceptado: 31 de octubre 2005