PROC. ENTOMOL. SOC. WASH.
108(1), 2006, pp. 119–124

CUNEOGASTER, A NEW GENUS OF THE SUBFAMILY MICROGASTRINAE (HYMENOPTERA: BRACONIDAE) FROM THE NEOTROPICAL REGION

WON-YOUNG CHOI AND JAMES B. WHITFIELD

Department of Entomology, 320 Morrill Hall, University of Illinois, 505 S. Goodwin Ave., Urbana, IL 61801, U.S.A. (e-mail: choi@life.uiuc.edu)

Abstract.—***Cuneogaster,*** a **new genus** of the subfamily Microgastrinae from the Neotropical Region, is described and illustrated, with ***C. inae,*** **n. sp.,** as the type species. The features and relationships of *Cuneogaster* and several somewhat similar microgastrine genera are discussed.

Key Words: parasitoid, New World, Microgastrine, *Cuneogaster inae*, new genus, new species

Microgastrinae is a cosmopolitan parasitoid subfamily recorded from tropical to arctic climates, but especially diverse at the generic level in the tropics (Whitfield et al. 2002). Mason (1981) has estimated that the actual number of world species may be 5,000–10,000, of which only about 1,500 species have been described. Many genera or species groups are endemic to single zoogeographical regions. Taxonomic treatments have mainly been focused on temperate regions, and the fauna remains poorly studied in the highly diverse tropical regions.

An ongoing revision of the genus *Diolcogaster* Ashmead from the New World has revealed some specimens that somewhat resemble the genus *Diolcogaster* and often key to this genus using the present microgastrine keys (Mason 1981, Whitfield 1997) but fit poorly using Mason's (1981) diagnosis. Saeed et al. (1999) redefined the genus *Diolcogaster* in their revision of the Australasian species, more accurately delimiting the genus *Diolcogaster*. Our unusual Neotropical specimens clearly do not fit within their redefined *Diolcogaster*.

Here, we describe a new genus, *Cuneogaster* Choi and Whitfield, from the Neotropical Region based upon a new species, *C. inae* Choi and Whitfield. Most specimens have been assembled from M. Sharkey and B. Brown's Colombian Insect biodiversity project (http://www.uky.edu/~mjshar0/colombia/welcome.html) except two specimens, from neighboring countries, one from Panama and the other from Venezuela. Relationships of *Cuneogaster* to other microgastrine genera are discussed.

MATERIAL AND METHODS

The holotype is deposited in the insect collection of the Humboldt Institute, Villa de Leyva, Colombia. Paratypes are deposited in the insect collection of the Humboldt Institute; Illinois Natural History Survey, Champaign, Illinois, USA; National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA; Texas A&M University, College Station, USA; and the Canadian National Insect Collection, Ottawa, Canada. Terms for general morphology and wing venation follow Sharkey and Wharton (1997). Additional terms include: lunule (Mason 1981), and

axillary trough of mesonotum and axillary trough of metanotum (Townes 1969).

Specimens for scanning electron microscopy were dried under room conditions, and mounted on carbon-based SEM subs. Specimens were coated in a Denton Desk II TSC turbo-pumped sputter coater with 40 nm of gold/palladium for 90 seconds and examined under a Philips XL30 field emission environmental scanning electron microscope with Hi-Vac mode.

Cuneogaster Choi and Whitfield, new genus

(Figs. 1–9)

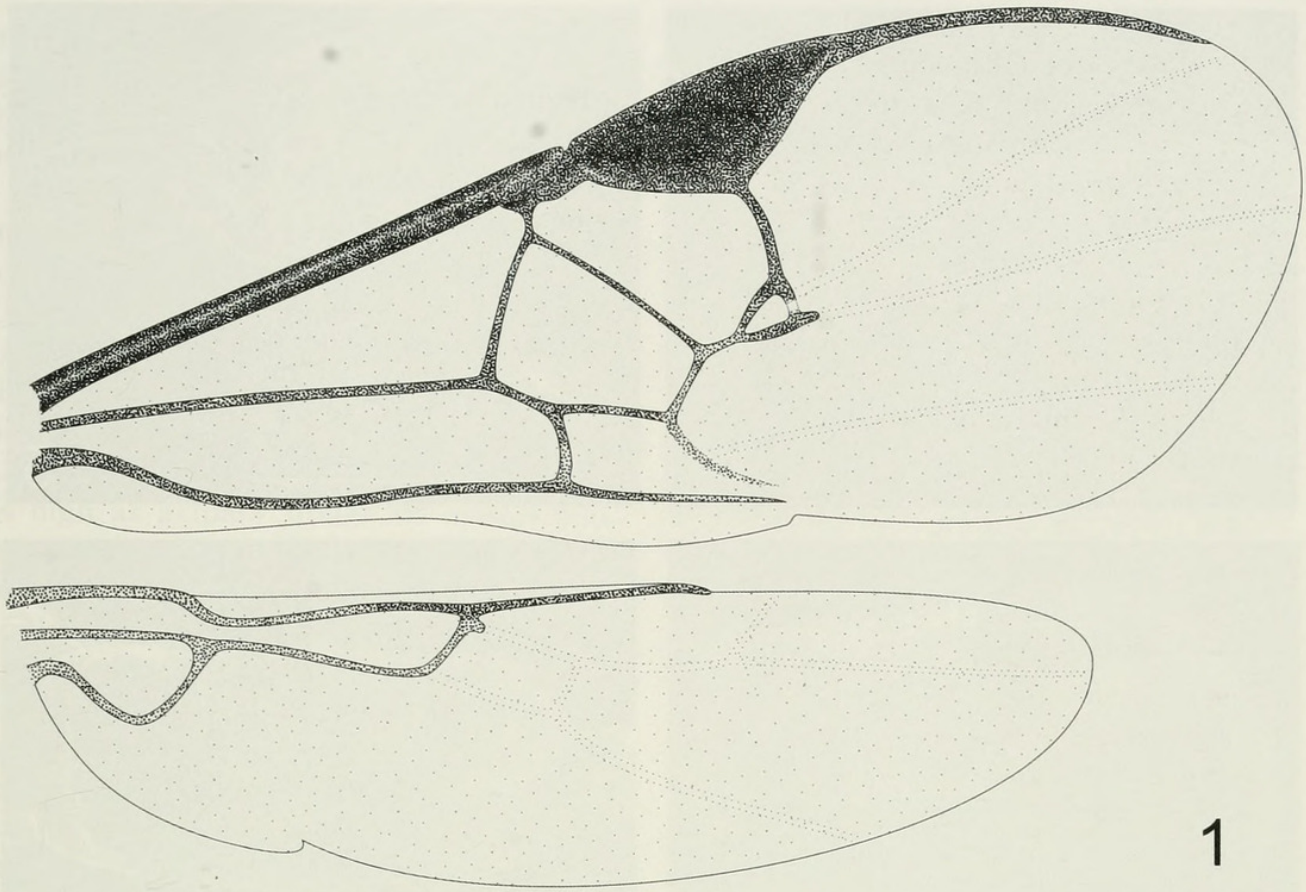
Type species.—*Cuneogaster inae,* n. sp. (described below).

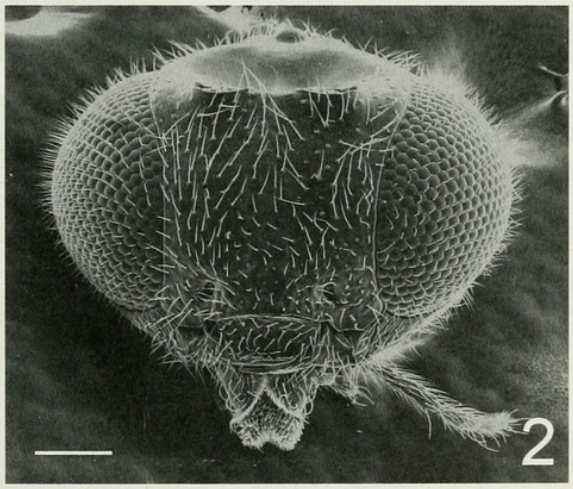
Diagnosis.—Median and lateral ocelli forming almost equilateral triangle. Glossa long and bilobed apically. Antennal placodes two-ranked. Mesoscutum without notauli. Medioposterior band of scutellum smooth. Metanotum with phragma of scutellum slightly exposed laterally. Metanotum smooth or weakly sculptured. Propodeum smooth with complete medial longitudinal carina, but transverse carinae never present. Fore wing second submarginal cell closed (areolet present). Hind wing vannal lobe slightly convex, margin with evenly destributed row of setae. Hind coxa large, longer than tergite I. Hind tibial spurs unequal in length, with inner spur always longer than outer spur. Hind tarsal claw with a tooth at midlength, with broad basal lobe. Tergite I narrowing posteriorly, median longitudinal groove of tergite I always present. Tergite II shorter than tergite III, tergite II widened posteriorly, smooth and polished, without well defined median field. Suture between tergite II and tergite III indistinct in dorsal view. Hypopygium short, as long as hind basitarsus, evenly sclerotized. Ovipositor short, mostly hidden within hypopygium. Ovipositor sheaths short, with setae on apical half.

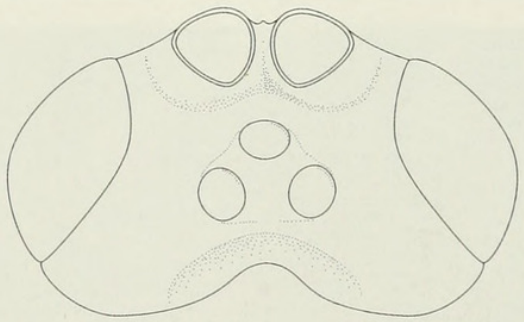
Note.—*Cuneogaster* possesses a unique combination of features that will easily distinguish it from any known genus of Microgastrinae. This new genus appears closely related to the genus *Diolcogaster* Ashmead by its possession of the following characters: two-ranked antennal placodes, propodeum with medial longitudinal carina but without transverse carinae, second submarginal cell of fore wing closed, large hind coxa (always longer than tergite I), median longitudinal groove of tergite I, short and evenly sclerotized hypopygium, and short ovipositor and ovipositor sheath. It can be separated from *Diolcogaster* by its long and apically bilobed glossa and posteriorly narrowing tergite I. It is also resembles *Pseudapanteles* Ashmead by its possession of the latter two characters, but differs in the small and evenly sclerotized hypopygium and the short ovipositor sheaths with setae only on the apical half. However, while females are easily diagnosed, there is currently no unique diagnostic character system that separates male *Cuneogaster* alone from other genera that share several key characters.

In a preliminary morphological and molecular (16S, 28S and COI genes) phylogenetic analysis of the genus *Diolcogaster* and relatives (W.-Y. Choi and J. B. Whitfield, in preparation), we attempted to resolve phylogenetic placement of *Cuneogaster. Cuneogaster* was supported as monophyletic. It was also grouped in a larger clade with *Buluka* De Saeger, *Diolcogaster, Exix* Mason, *Larissimus* Nixon, and *Protomicroplitis* Ashmead, but the morphologically similar *Pseudapanteles* was not related to *Cuneogaster.* The analysis did not strongly confirm relationships among many genera due to lack of molecular data in some rare genera such as *Buluka* and *Larissimus.*

Etymology.—The genus name is derived from the Latin word 'cuneus' (meaning wedge shape, because of the apically tapering tergite I) and the greek word 'gaster' (meaning abdomen). The gender is neuter.







Figs. 1–3. *Cuneogaster inae*. 1, Fore and hind wings. 2, Head, frontal view. 3, Head, dorsal view. Scale bars = 40 μm.

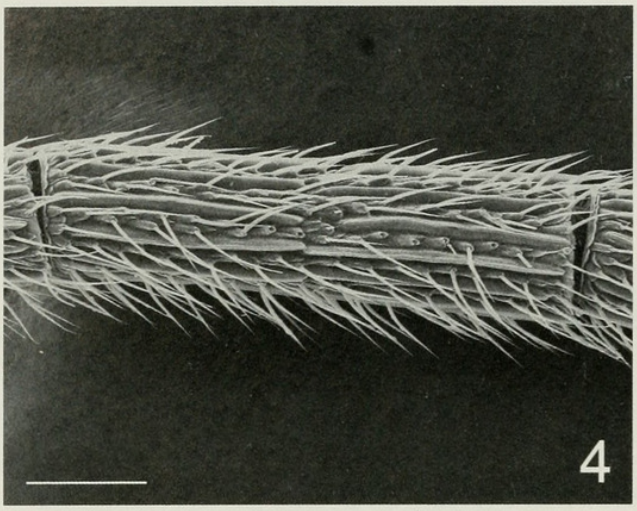
Cuneogaster inae Choi and Whitfield, new species

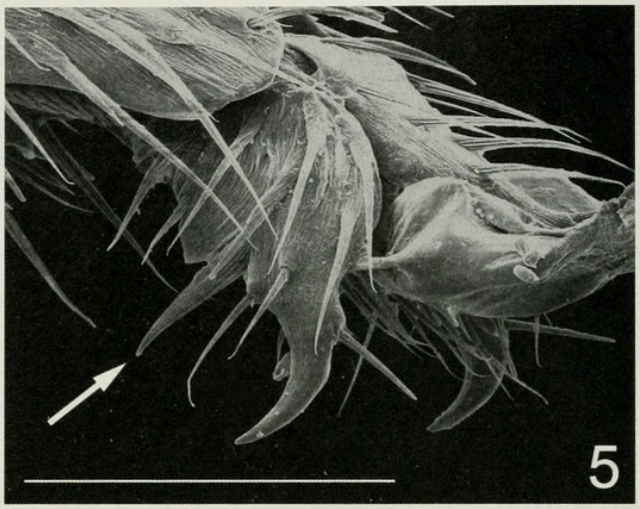
(Figs. 1–9)

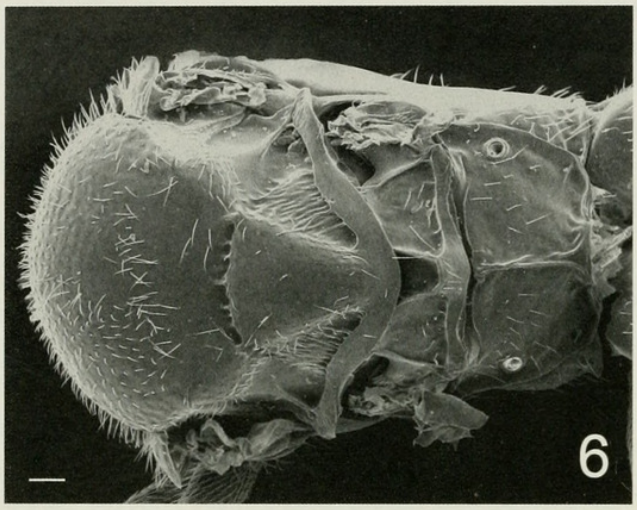
Female.—Body length 1.7 mm. Forewing length 1.9 mm.

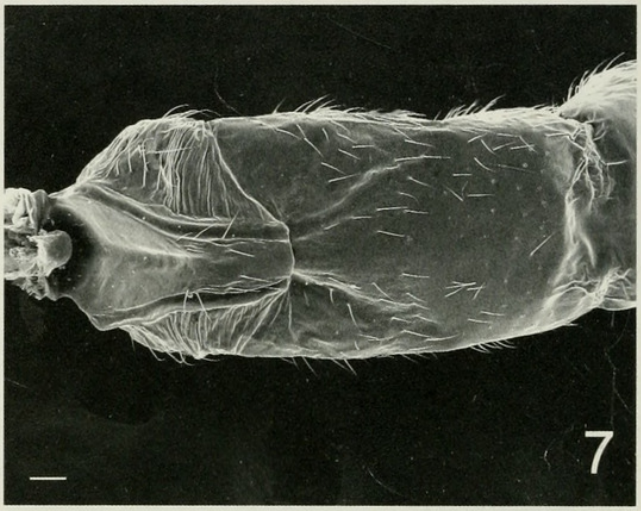
Color: Body mostly yellowish brown except dark brown scutellum and metanotum. Antenna dark brown except yellowish brown pedicel. Maxillary and labial palpi pale yellow. Mesosoma and metasoma yellowish brown to dark brown. Legs yellowish brown.

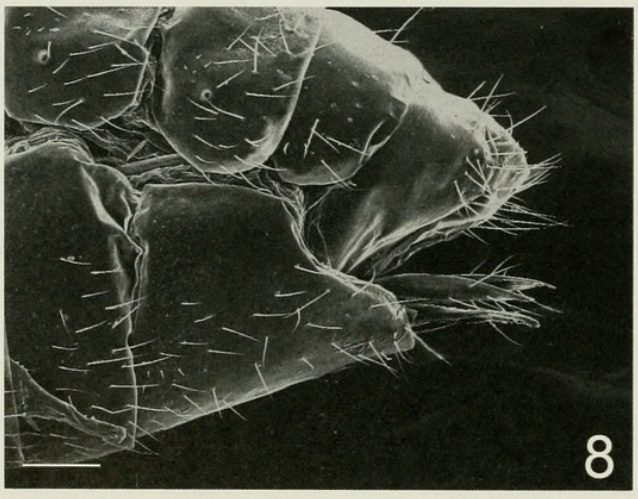
Head (Figs. 2–4): 1.0–1.1× as wide as scutum. Vertex smooth to weakly punctate and polished, with scattered setae; tangent to posterior margin of median ocellus pass-

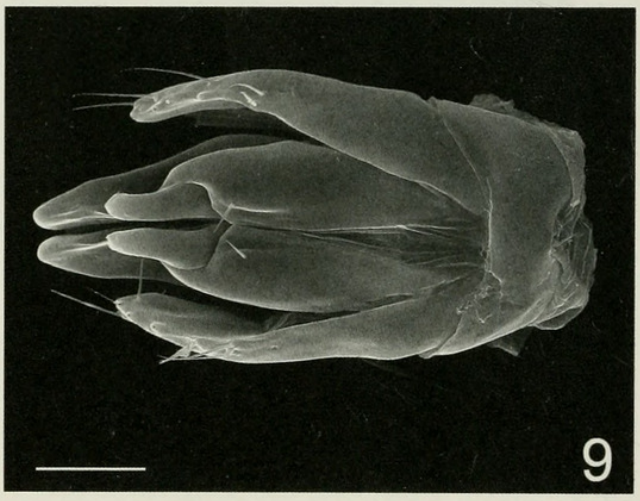












Figs. 4–9. *Cuneogaster inae*. 4, Fifth antennal segment, dorsal view. 5, Hind tarsal claw, lateral view, with a tooth indicated by arrow. 6, Mesosoma, dorsal view. 7, First—third tergites, dorsal view. 8, Metasoma and ovipositor mechanism, lateral view. 9, Male genitalia, dorsal view. Scale bars = 40 μm.

ing in front of lateral ocelli; distance between lateral ocelli 0.4× distance from lateral ocellus to edge of eye. Face 0.8–0.9× as broad at midheight as long medially, weakly punctate with scattered setae and with faint median longitudinal carina in dorsal one-third to half. Clypeus 1.7–1.8× as broad as its height. Malar space 0.2× eye height in frontal view. Eyes 1.3–1.4× higher than width. Temple smooth to weakly

punctate with scattered setae. Glossa long and bilobed apically. Antenna slightly longer than forewing; first flagellomere 3.4× as long as wide.

Mesosoma (Figs. 5–6): 1.1–1.2× longer than high. Scutum 1.2–1.3× as wide as long, weakly punctate with scattered setae. Dorsal scutellum 1.1× as wide as long, smooth medio-anteriorly to punctate posteriorly with scattered setae. Axillary trough of mesonotum generally coarsely carinate. Lunule of scutellum smooth and 0.3–0.4× as high as axillary trough of mesonotum, with nearly uniform height. Medioposterior band of scutellum smooth. Metanotum generally smooth. Axillary trough of metanotum smooth with scattered setae in posterior half. Medioposterior band of metanotum smooth, flat to slightly convex. Medioanterior pit of metanotum without longitudinal carina. Propodeum 2.4× as wide as long, smooth with sparse setae. Medial longitudinal carina apparently formed by incomplete fusion of two longitudinal carinae. Pronotum laterally granulate with ventral groove. Propleuron smooth to weakly punctate without propleural flange. Mesopleuron mostly smooth and polished with scattered setae anteriorly, anterodorsally and ventrally. Metapleuron mostly smooth and polished with scattered setae posteriorly. Hind coxa 2.1–2.2× as long as wide, 2× as long as first tergite, smooth and polished laterally, punctate dorsally and postero-ventrally. Inner hind tibial spur 1.6–1.8× as long as outer spur, 0.6× as long as hind basitarsus. Hind tarsal claw with single tooth in median portion, with broad basal lobe.

Wings (Fig. 1): Fore wing evenly setose. Stigma 2.5× as long as wide, vein r arising from middle of stigma, vein R1 1.3–1.4× as long as stigma. Vein 1M 0.7× as long as vein (RS+M)a, 2.0× as long as vein m-cu. 3RSa present. Areolet subtriangular. Vein r-m spectral. Hind wing evenly setose. Vannal lobe slightly convex with even fringe of setae. 1r-m 0.6× as long as 1RSa, 1.2× as long as 2r-m, 0.4× as long as 1RSb.

Metasoma (Figs. 7–8): Tergite I narrowing posteriorly, 3.7× as long as apical width anterior two-third smooth, glabrous, posterior one-third smooth to weakly rugose with sparse setae. Median longitudinal groove strongly present over anterior two-thirds, weakly impressed to absent on posterior one-third. Tergite II 0.6× as long as tergite I, 0.8× as long as tergite III, 1.7× as wide at posterior end as long, median tergite widened posteriorly, smooth and polished with sparse setae. Tergite III smooth and polish with sparse setae. Suture between tergite II and tergite III indistinct dorsally. Tergite IV to VII smooth with sparse setae. Hypopygium smooth with sparse setae, medioventral length 1.0× as long as hind basitarsus. Ovipositor sheaths short with setae in apical half.

Male.—As for female; Fig. 9 shows male genital capsule.

Material examined.—Holotype: ♀, COLOMBIA: Magdalena, PNN [= Parque Nacional Natural] Tayrona Pueblito, 11°20′N 74°02′W, 50 m, 17.x – 3.xi.2000, R. Henriquez Leg., M.789. Paratype: 1 ♂, COLOMBIA: same data as holotype; 2 ♂, Cundinamarca PNN Chingaza Valle del Fravlejon, 4°31′N 73°45′W 3,170 m, 31.viii.2000–13.ix.2000, A. Pérez Leg. M.732; 1 ♂, Magdalena, PNN Tayrona Zaino, 11°20′N 74°2′W 50 m, 28.vii.2000–14.viii.2000, R. Henriquez Leg. M.567; 4 ♂, Magdalena, PNN Tayrona Pueblito, 11°20′N 74°2′W 225 m, 26.x.2000–22.xi.2000, R. Henriquez Leg. M.944; 1 ♂, Magdalena, PNN Tayrona Cañaveral, 11°20′N 74°2′W 30 m, 19.ix.2000–30.ix.2000, R. Henriquez Leg. M.628; 1 ♂, Magdalena, PNN Tayrona Zaino, 11°20′N 74°2′W 50 m, 17.x.2000–3.xi.2000, R. Henriquez Leg. M.789; 2 ♂, Bolivar, SFF [= Santuario de Fauna y Flora] Los Colorados Venado, 9°54′N 75°7′W 320 m, 2.x.2000–17.x.2000, E. Deulufeut Leg. M.766; 2 ♂, Magdalena, PNN Tayrona Zaino,11°20′N 74°2′W 50 m, 29.ix.2000–17.x.2000, R. Henriquez Leg. M.793; 4 ♂, Magdalena, PNN Tayrona Zaino, 11°20′N

74°2′W 50 m, 3.xi.2000–22.xi.2000, R. Henriquez Leg. M.941; 1 ♂, Magdalena, PNN Tayrona Zaino, 11°20′N 74°2′W 50 m, 4.xii.2000–15.xii.2000, R. Henriquez Leg. M.966; 4 ♀, 1 ♂, Magdalena PNN Tayrona Cañaveral, 11°20′N 74°02′W, 30 m, 2–22.i.2001, R. Henriquez Leg., M.1207; 1 ♀, 3 ♂, Magdalena PNN Tayrona Pueblito, 11°20′N 74°02′W, 30 m, 4–15.xii.2000, R. Henriquez Leg., M. M. 962. 1 ♂, PANAMA: Las Cumbres, 26.v-8.vi.1982, H. Wolda. 1 ♂, VENEZUELA: Aragua Cumbolo, 100 m, 12.i.1996, R. Wharton.

Hosts.—Unknown.

Comments.—The species is named after Dr. Kyong-in Suh, for her unlimited support of W.-Y. Choi.

Acknowledgments

We thank Mike Sharkey of the University of Kentucky, Bob Wharton of Texas A&M University, and Henri Goulet of the Canadian National Insect Collection for loan of specimens. We also thank Josephine Rodriguez of the Department of Entomology, University of Illinois, and Scott Robinson of the Imaging Technology Group, Beckman Institute, University of Illinois, for aid in producing the SEM and ESEM photos. This work is supported in part by USDA NRI-CGP grant number 2003-35316-13679 and NSF DEB 0346712 awarded to JBW, and NSF DEB 9972024 and DEB 0205982 awarded to Michael J. Sharkey and Brian V. Brown.

Literature Cited

Mason, W. R. M. 1981. The polyphyletic nature of *Apanteles* Foerster (Hymenoptera: Braconidae): a phylogeny and reclassification of Microgastrinae. Memoirs of the Entomological Society of Canada 115: 1–147.

Saeed A., A. D. Austin, and P. C. Dangerfield. 1999. Systematics and host relationships of Australasian *Diolcogaster* (Hymenoptera: Braconidae: Microgastrinae). Invertebrate Taxonomy 13(1): 177–178.

Sharkey, M. J. and R. A. Wharton. 1997. Morphology and terminology, pp. 19–37. *In* Wharton, R. A., P. M. Marsh, and M. J. Sharkey, eds. Identification Manual of the New World Genera of the Family Braconidae (Hymenoptera). International Society of Hymenopterists Special Publication 1, 439 pp.

Townes, H. 1969. The genera of Ichneumonidae, part 1. Memoirs of the American Entomological Institute 11: 1–300.

Whitfield, J. B. 1997. Chapter 29. Subfamily Microgastrinae, pp. 333–364. *In* Wharton, R. A., P. M. Marsh, and M. J. Sharkey, eds. Identification Manual to the New World Genera of the Family Braconidae (Hymenoptera). International Society of Hymenopterists Special Publication 1, 439 pp.

Whitfield, J. B., P. Mardulyn, A. D. Austin, and M. Dowton. 2002. Phylogenetic relationships among microgastrine braconid wasp genera based on data from the 16S, COI and 28S genes and morphology. Systematic Entomology 27(3): 337–359.