Zoological Studies **50**(2): 230-234 (2011)

Zoological Studies

First Record of the Genus *Dilyta* in Asia, with a Description of a New Species *Dilyta orientalis* (Hymenoptera: Cynipoidea: Figitidae: Charipinae)

Mar Ferrer-Suay[1,*], Jordi Paretas-Martínez[2], Jesús Selfa[1], and Juli Pujade-Villar[2]

[1]*Universitat de València, Facultat de Ciències Biològiques, Departament de Zoologia. Campus de Burjassot-Paterna, Dr. Moliner 50, Burjassot (València) E-46100, Spain*

[2]*Universitat de Barcelona, Facultat de Biologia, Departament de Biologia Animal. Avda. Diagonal 645, Barcelona 08028, Spain*

(Accepted October 15, 2010)

Mar Ferrer-Suay, Jordi Paretas-Martínez, Jesús Selfa, and Juli Pujade-Villar (2011) First record of the genus *Dilyta* in Asia, with a description of a new species *Dilyta orientalis* (Hymenoptera: Cynipoidea: Figitidae: Charipinae). *Zoological Studies* **50**(2): 230-234. A new species of the genus *Dilyta, Dilyta orientalis* sp. nov., is described here, being the 1st record of this genus from Asia and the Oriental biogeographical region and the 1st record of the subfamily Charipinae from Indonesia. The morphological features and diagnostic characters of this new species are illustrated, and its importance is discussed. http://zoolstud.sinica.edu.tw/Journals/50.2/230.pdf

Key words: Hymenoptera, Figitidae, Charipinae, *Dilyta*, Oriental.

The Charipinae is a diverse and species-rich subfamily of very small wasps within the family Figitidae (Hymenoptera: Cynipoidea). In contrast to most others members of the Figitidae, which are primarily parasitoids of dipteran larvae of the Cyclorrapha (Ronquist 1999), members of the Charipinae are hyperparasitoids of aphids and psyllids (Hemiptera) and are a very important focus of study as biological agents of aphid pests.

Eight genera are recognized within the subfamily Charipinae (Carver 1993, Ronquist 1999, Paretas-Martínez and Pujade-Villar 2006, Pujade-Villar and Paretas-Martínez 2006, Paretas-Martínez et al. 2007 2008): *Alloxysta* Förster, 1869 (cosmopolitan, host Aphididae); *Phaenoglyphis* Förster, 1869 (cosmopolitan, host Aphididae); *Lytoxysta* Kieffer, 1909 (North America, host Aphididae); *Dilyta* Förster, 1869 (Europe, North America, and Africa, host Psyllidae); *Thoreauana* Girault, 1930 (Australia, host unknown); *Apocharips* Fergusson, 1986 (Europe, Africa, and Central America, host Psyllidae); *Dilapothor* Paretas-Martínez and Pujade-Villar, 2006 (Australia, host unknown); and *Lobopterocharips* Paretas-Martínez and Pujade-Villar, 2007 (Asia, host unknown).

Species of the genus *Dilyta* are hyperparasitoids of the Psyllidae via the Encyrtidae (Hymenoptera: Chalcidoidea) (Menke and Evenhuis 1991). This genus includes 7 species: *Dilyta subclavata* Förster from Europe, *Dilyta rathmanae* Menke and Evenhuis from Washington State, USA, and 5 species from the Afrotropical Region (Benoit 1956, Paretas-Martínez et al. 2009).

We herein describe a new species of *Dilyta* from Java: *D. orientalis* sp. nov. This is the 1st record of the genus *Dilyta* from Asia and the Oriental biogeographical region and the 1st species of the Charipinae described in Indonesia.

*To whom correspondence and reprint requests should be addressed. Tel: 34-666-941499. E-mail:mafesuay@alumni.uv.es

MATERIAL AND METHODS

The specimen studied belongs to the United States National Museum of Natural History (USNM, Smithsonian Institution, Washington DC, USA, Dr. M. Buffington). The type material was preserved on cards and deposited in the USNM.

The morphological terms used are drawn from Gibson (1985), Ronquist and Nordlander (1989), and Ronquist (1994). The terms for the sculpturing follow Harris (1979). The following abbreviations are used: OOC (ocello-ocular distance), the distance between the external margin of the lateral ocellus and the internal margin of the compound eye; F1-F11, 1st and following flagellomeres, T2 and T3, 2nd and 3rd terga of the metasoma.

The specimen was studied using stereo-microscopy and environmental scanning electron microscopy (ESEM). The field-emission gun environmental SEM (FEI Quanta 200 ESEM, at the University of Barcelona) was used for high-resolution imaging without gold-coating of the specimens.

Dilyta orientalis Ferrer-Suay and Paretas-Martínez sp. nov.

(Fig. 1)

Holotype: (♀): Tjibodas Mt Gede Java, Altitude 5000 ft, Bryant & Palmer Coll, Dilyta Det. Menke 198_, holotype, M. F-S desig. (red label), *Dilyta orientalis* sp. nov. Ferrer-Suay and Paretas-Martínez det. 2010. (deposited in USNM).

Diagnosis: *Dilyta orientalis* sp. nov. can be distinguished from the other *Dilyta* species using characters of the antenna, metasoma, and scutellar carinae. The new species is distinguished from the African species of *Dilyta* by having a ∩-shaped carina on the apex of the scutellum (Fig. 1F), as do European and North American species, while the 5 species from Africa have 2 small longitudinal carinae, one on each side (Fig. 2B); *D. orientalis* sp. nov. differs from *D. subclavata* by the distal area of the metasoma being smooth with few or no punctures (Fig. 1G), while this area is very punctate in *D. subclavata* (Fig. 2C); the antennae of these 2 species are similar, but in *D. orientalis* sp. nov., F1 is longer than the pedicel and much longer and thinner than that of *D. subclavata*, and F2 is slightly shorter than F3, while in *D. subclavata* both are subequal. *Dilyta orientalis* sp. nov. differs from *D. rathmanae* by the shape of the antennae, which completely differ in the 2 species (Fig. 2A).

Description: Only the female is known.

Length: Female. 1.17 mm.

Color: Head, mesosoma, and metasoma brown. Antennae and legs yellow or dark yellow; apical part of antennae slightly brown.

Head: (Fig. 1A) Rounded in anterior view, eyes located at middle line of head, malar space subequal to OOC. Surface completely smooth, with no strigae, malar impression, epistomal sulcus, or clypeo-pleurostomal lines. Clypeus almost straight, slightly projecting over mandibles, without marginal inflection. Setae sparse, principally concentrated below toruli.

Antennae: (Figs. 1B, C) F1 narrow, slightly longer or subequal to pedicel; F1 longer than F2, F3, and F4; F2 slightly shorter or subequal to F3; F4 longer than F2 and F3; F5 longer than F4; F5 subequal to F1; F6 longer than F5; F6-F11 wider than previous segments; antennae slightly clavate from F6; sensilla beginning on F6.

Mesosoma: (Fig. 1D) Only anterior part of pronotum with setae; pronotal carinae long and clearly indicated, running from scutum to anterior part of pronotum. Mesoscutum smooth, shiny, almost without setae. Mesopleuron smooth, with no longitudinal ridge on lower part. Scutellum smooth and with scarce setae on its posterior and lateral parts. Propodeum with 2 strong broad carinae.

Apex of scutellum: (Fig. 1F) with ∩-shaped carina.

Forewing: (Fig. 1E) Large, longer than body; covered with dense pubescence; long marginal setae present. Veins brown. Radial cell small and completely open; R1 very short, barely reaching costal margin; Rs short and almost straight, reaching wing margin; R1 and Rs not parallel; Cu1a, M + Cu1a, Rs + M, and M veins absent.

Metasoma: (Fig. 1G) Distal area smooth, without punctures.

Biology: Unknown.

Distribution: Java, Indonesia.

Etymology: The name of this species refers to the biogeographical region where it was collected.

DISCUSSION

The genus *Dilyta* includes very few species despite the wide distribution of its primary psyllid hosts. Until recently, the genus *Dilyta* included only 3 species: *D. subclavata* Förster from Europe, *D. africana* (Benoit) from the D.R. Congo, and *D. rathmanae* Menke and Evenhuis from the USA. In

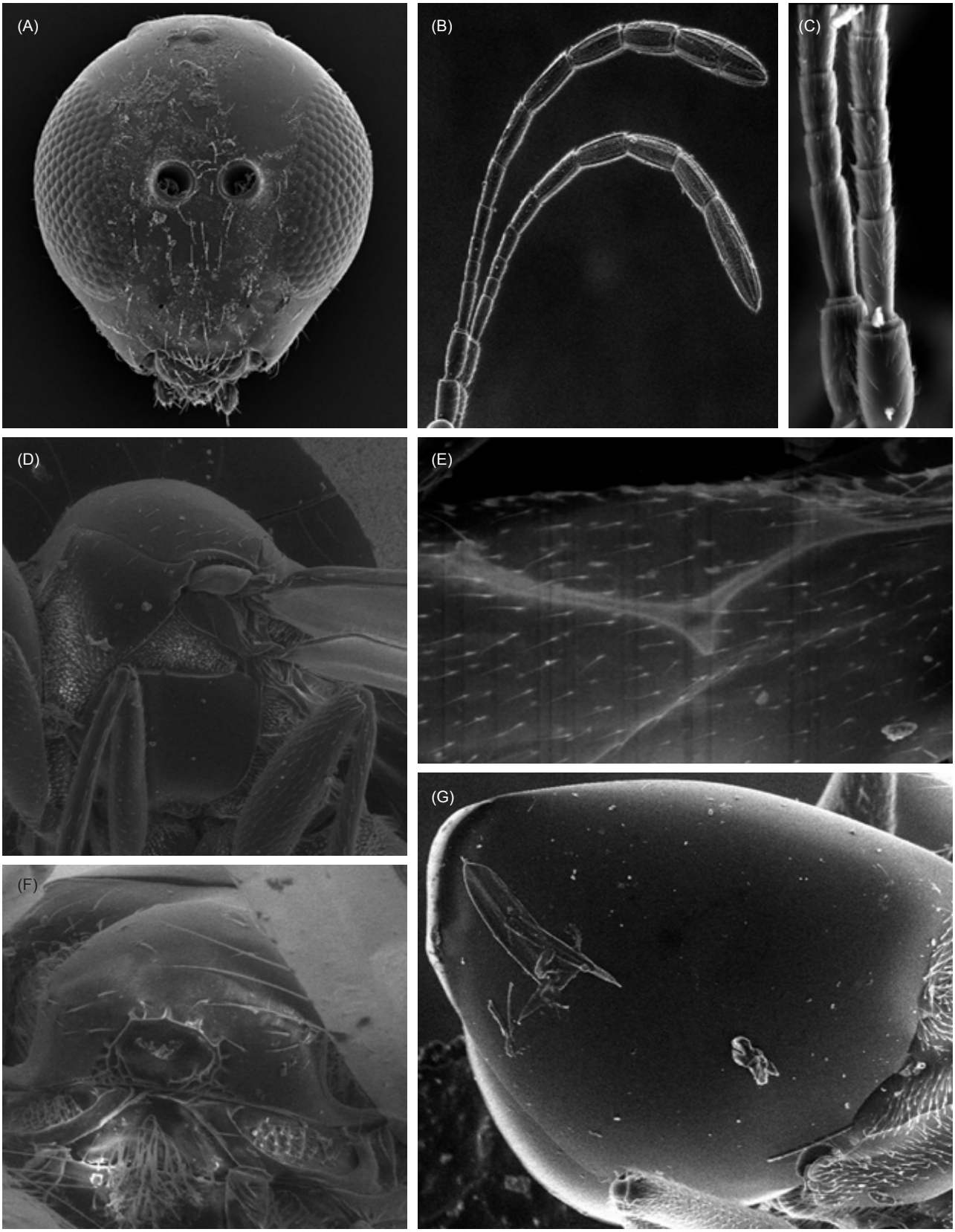

Fig. 1. *Dilyta orientalis* sp. nov. (A) Head, anterior view; (B) female antenna; (C) pedicel-F4, female antenna; (D) mesosoma, lateral view; (E) radial cell, forewing; (F) scutellum, posterior view; (G) metasoma, lateral view.

2009, 4 more species were described from Africa (Paretas-Martínez et al. 2009). *Dilyta orientalis* sp. nov. is the 1st record of this genus in Asia and concretely from the Oriental Region, and the 1st record of the Charipinae in Indonesia, thus increasing the ranges of distribution of the genus and subfamily.

One of the diagnostic characters assigned to *Dilyta* is the ∩-shaped carina on the apex of the scutellum, but Paretas-Martínez et al. (2009) showed that this character is modified in African species, which instead have only 2 small lateral symmetrical carinae, not meeting dorsally and thus not closing to form the typical ∩-shape seen in other members of the genus. The morphology of this important character is the same in *D. orientalis* sp. nov. as in Nearctic and Western Palaearctic species of *Dilyta*. This can be explained by the proximity of the Oriental region to the Holarctic, and confirms the presence of 2 morphological groups (African and non-African) inside the genus *Dilyta* according to the shape of the carinae on the apex of the scutellum, as predicted by Paretas-Martínez et al. (2009).

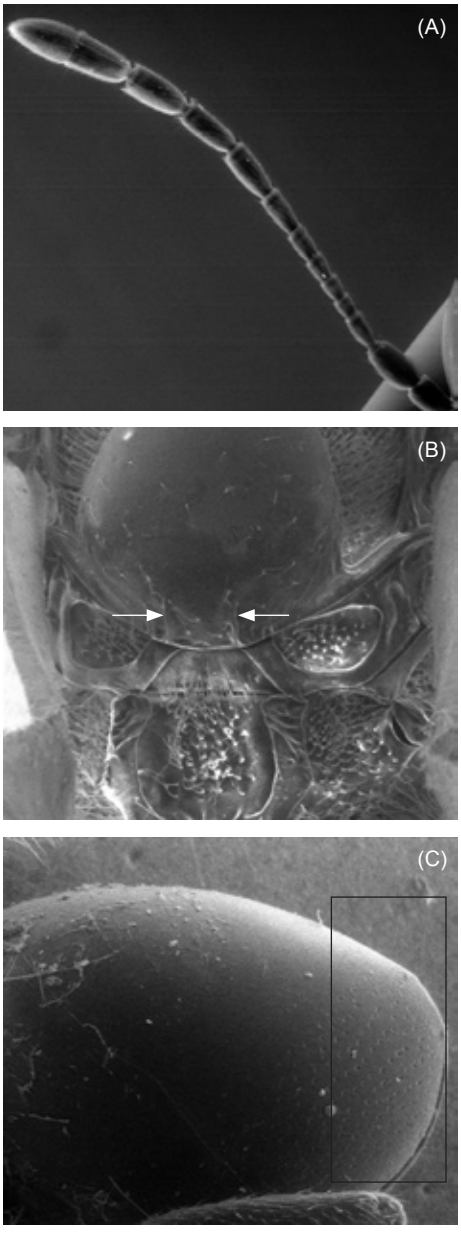

Fig. 2. Characters of other *Dilyta* species mentioned in the diagnosis of *D. orientalis*. (A) Female antenna, *D. rathmanae*; (B) scutellum of *D. australafricana*, posterior view, symmetrical carinae indicated by arrows; (C) metasoma of *D. subclavata*, lateral view, distal part with a punctate area indicated by a box.

Acknowledgemnts: We are very grateful to Dr. M. Buffington (USNM) for the loan of the specimen described in this work. This research was supported by the projects CGL 2005-00687 and 2005SGR-00045 of the Science and Education Ministry of Spain and the Catalan Government (Spain), respectively.

REFERENCES

Benoit PLG. 1956. Deux Cynipidae-Charipinae inedits du Congo Belge. Rev. Zool. Bot. Afr. **53:** 437-440.

Carver M. 1993. Australian Charipinae (Hymenoptera: Cynipoidea: Charipidae) described by A.A. Girault. J. Aust. Entomol. Soc. **32:** 43-44.

Fergusson NDM. 1986. Charipidae, Ibaliidae and Figitidae (Hymenoptera: Cynipoidea). Handbk Ident. Br. Insects **8:** 1-55.

Förster A. 1869. Ueber die Gallwespen. Verhandlungen Zool.-Bot. Gesellschaft Wien **19:** 327-370.

Gibson GAP. 1985. Some pro- and mesothoracic characters important for phylogenetic analysis of Hymenoptera, with a review of terms used for structures. Can. Entomol. **117:** 1395-1443.

Girault AA. 1930. New pests from Australia, VIII. Privately published. Brisbane, Australia, 6 pp.

Harris RA. 1979. A glossary of surface sculpturing. State Calif. Dept. Food Agric. Occas. Papers Entomol. **28:** 1-31.

Kieffer JJ. 1909. Beschreibung neuer in Blattlausen schmartozender Cynipiden. Naturw. Ztschr. F. Forst.-Lands. Stuttgart **7:** 479-482.

Menke AS, HH Evenhuis. 1991. North American Charipidae: key to genera, nomenclature, species checklists, and a new species of *Dilyta* Förster (Hymenoptera: Cynipoidea). Proc. Entomol. Soc. Wash. **93:** 136-158.

Paretas-Martínez J, MA Arnedo, G Melika, J Selfa, MV Seco-Fernandez, D Fülop, J Pujade-Villar. 2007. Phylogeny of the parasitic wasp subfamily Charipinae (Hymenoptera, Cynipoidea, Figitidae). Zool. Scripta **36:** 153-172.

Paretas-Martínez J, G Melika, J Pujade-Villar. 2008. Description of *Lobopterocharips arreplegata* gen. n. and sp. n. (Hymenoptera: Figitidae: Charipinae) from Nepal,

with notes on its phylogenetic position. Insect Systemat. Evol. **38:** 473-479.

Paretas-Martínez J, G Melika, J Pujade-Villar. 2009. Description of four new species of *Dilyta* Förster (Hymenoptera: Figitidae: Charipinae) from the Afrotropical Region. Afr. Entomol. **17:** 207-214.

Paretas-Martínez J, J Pujade-Villar. 2006. Two genera of Charipinae (Hymenoptera: Figitidae) from Australia: revision of the genus *Thoreauana* Girault, 1930 and description of *Dilapothor* n. gen. Aust. J. Entomol. **45:** 219-226.

Pujade-Villar J, J Paretas-Martínez. 2006. *Phaenoglyphis* 'versus' *Hemicrisis*, and the description of a new sculptured species of Charipinae (Hymenoptera: Figitidae). Eur. J. Entomol. **103:** 477-481.

Ronquist F. 1994. Evolution of parasitism among closely related species: Phylogenetic relationships and the origin of inquilinism in gall wasps (Hymenoptera, Cynipidae). Evolution **48:** 241-266.

Ronquist F. 1999. Phylogeny, classification and evolution of the Cynipoidea. Zool. Scripta **28:** 139-164.

Ronquist F, G Nordlander. 1989. Skeletal morphology of an archaic cynipoid, *Ibalia rufipes* (Hymenoptera, Ibaliidae). Entomol. Scand. **33(Supplement):** 1-60.