First records of genus *Dilyta* from Madagascar with description of *Dilyta paretasmartinezi* n. sp. (Hymenoptera: Figitidae: Charipinae)

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Abstract

The genus *Dilyta* is mentioned from Madagascar for the first time. Two species have been collected: *D. subclavata* Förster, 1869 and *D. paretasmartinezi* n. sp. The new species has ∩-shaped carinae at the apex of scutellum which differentiate it from the African *Dilyta* species. Its morphological features and diagnostic characters are discussed and illustrated.

Keywords: Figitidae; Charipinae; *Dilyta*; Madagascar.

Resum. *Primeres troballes del gènere* Dilyta *a Madagascar amb la descripció de* Dilyta paretasmartinezi *n. sp. (Hymenoptera: Figitidae: Charipinae)*

Es cita per primera vegada el gènere *Dilyta* de Madagascar. Han estat col·lectades dues espècies: *D. subclavata* Förster, 1869 and *D. paretasmartinezi* n. sp. La nova espècie que aquí es descriu presenta una carena a l'àpex de l'escutel·le en forma de ∩, la qual cosa diferencia aquesta nova espècie de la resta d'espècies africanes del gènere *Dilyta*. Les característiques morfològiques i els caràcters diagnòstics es discuteixen i s'il·lustren.

Paraules clau: Figitidae; Charipinae; *Dilyta*; Madagascar.

Introduction

Members of subfamily Charipinae are characterized being very small wasp (0.8-2.0 mm), with a worldwide distribution, smooth and shiny body and with few diagnostic characters to distinguish genera and species between them. Charipinae are biologically characterized as hyperparasitoids of Hemiptera (Aphididae and Psyllidae) through three different groups of Hymenoptera (Aphelinidae, Braconidae and Encyrtidae). They are important altering the correct biological control

exercised by the primary parasitoids: reducing the abundance of primary parasitoids populations; increasing the dispersion of primary parasitoids; and increasing the number of hosts (van Veen et al., 2001). However, sometimes the Charipinae can play a regulatory effect on the populations of primary parasitoids (Müller, et al., 1999).

Eight genera are considered as valid: *Alloxysta* Förster (cosmopolitan), *Phaenoglyphis* Förster (cosmopolitan), *Lytoxysta* Kieffer (North America), *Lobopterocharips* Paretas-Martinez & Pujade-Villar (Nepal), *Dilyta* Förster (cosmopolitan except Australia and Neotropics), *Apocharips* Fergusson (Eastern Palaearctic and Neotropical), *Dilapothor* Paretas-Martinez & Pujade-Villar (Australia), and *Thoreauana* Girault (Australia).

Dilyta is the third most abundant genus in Charipinae after *Alloxysta* and *Phaenoglyphis*, with 12 species described all over the world of which nine have been described recently. *D. subclavata* Förster, 1869 from the Holarctic region; *D. rathmanae* Menke & Evenhuis, 1991 from the Nearctic; four species are present in the Palaearctic: *D. aleevae* Pujade-Villar & Paretas-Martínez, *D. japonica* Paretas-Martínez & Ferrer-Suay, *D. longinqua* Paretas-Martínez & Pujade-Villar and *D. sinica* Ferrer-Suay & Paretas-Martínez (in Paretas-Martínez et al., 2011); five species are present in the Australian region: *D. africana* (Benoit, 1956), *D. australafricana* Paretas-Martínez & Pujade-Villar, *D. ghanana* Paretas-Martínez, Pujade-Villar & Melika, *D. kenyana* Paretas-Martínez & Pujade-Villar, and *D. somaliana* Paretas-Martínez, Pujade-Villar & Evenhuis (the last four in Paretas-Martínez et al., 2009). The last species, recently described, is present in the Oriental region, *D. orientalis* Ferrer-Suay & Paretas-Martínez (in Ferrer-Suay et al., 2011). Species of this genus are hyperparasitoids of Psyllidae via Encyrtidae (Hymenoptera: Chalcidoidea) (Menke and Evenhuis 1991).

Here is described a new species of *Dilyta* from Madagascar: *D. paretasmartinezi* n. sp., which is the first record of this genus in Madagascar.

Material and methods

This study is based on the material of the Naturhistorisches Museum Wien (NMW). Voucher specimens are deposited in the collection Juli Pujade-Villar at Universitat de Barcelona (UB).

The specimen pictured was studied using stereomicroscopy and environmental scanning electron microscopy. The field-emission gun environmental scanning electron microscope (FEI Quanta 200 ESEM) was used for high-resolution imaging without gold-coating of the specimens.

The morphological terms used are drawn from Paretas-Martínez et al. (2007). Measurements and abbreviations include F1–F12, first and subsequent flagellomeres. The width of the forewing radial cell is measured from the margin of the wing to the beginning Rs vein. To determine that *D. paretasmartinezi* is a new species we have used the key presented in Paretas-Martínez et al. (2011) for Holarctic *Dilyta* species.

Results

Dilyta subclavata Förster, 1869

Diagnosis. Similar to *D. japonica* Paretas-Martínez & Ferrer-Suay, 2011, *D. longinqua* Paretas-Martínez & Pujade-Villar, 2011 and *D. sinica* Ferrer-Suay & Paretas-Martínez, 2011 in having the distal area of metasoma punctate. Differs from these in the proportions of antennal segments; F1 slightly shorter or subequal than pedicel, F2 subequal to F3, F4 slightly shorter than F1 but longer than F2 or F3, F1 subequal to F5, F6 longer than F5 in *D. subclavata* females; and F1 slightly longer than pedicel, F2 or F3 each shorter than F1, F1 subequal to F4, F4–F12 wider than previous flagellomeres, antenna slightly clavate from F4, sensilla beginning on F4 in *D. subclavata* males.

Studied material. (1♂ & 2♀). "CASENT, 2004787", "MADAGASCAR: Province d'Antananarivo 3Km 41º NE, Andranomay, 11.5 Km 147º SSE Anjozorobe, elev. 1300 m, 5-13 Dec 2000", 18º 28' 24'' S 47º 57' 36'' E, coll. Fisher, Griswold et al. California Acad. of Sciences, montane rainforest, Malaise trap, coll. code: BLF2375": 1♂; "CASENT, 2001157", "MADAGASCAR: Province d'Antsiranana. Parc National Montagne d'Ambre, 12.2 Km 211º SSW of Joffreville, elev 1300 m, 2-7 Feb 2001", "12º 35' 47'' S49º 9' 34'' E, coll. Fisher, Griswold et al. California Acad. of Sciences, Malaise-montane rainforest, collection code: BLF2853": 1♀; "CASENT, 2070729", "MADAGASCAR: Antsiranana, Parc National de Marojejy, Manantenina River, 28.0 Km 38º NE Andapa, 8.2 Km 333º NNW Manantenina, el 450 m", "12-25 November 2003, 14º 26' 12'' S 049º 46' 30'' E, California Acad. of Sciences, coll. B. L. Fisher et al, Malaise trap in rainforest, BLF8723", "Charipinae Det. K.Schick 2006".

Distribution. Europe and USA (Paretas-Martínez et al., 2011). Cited for the first time in this study from Madagascar. First record from Africa.

***Dilyta paretasmartinezi* n. sp.** (Fig. 1)

Diagnosis. This species is closely related to *D. subclavata* and *D. sinica* because of the presence of punctures in the distal part of metasoma, but differs from *D. sinica* in the relation pedicel/F1 (F1 slightly longer than pedicel and not arched in *D. paretasmartinenzi* n. sp. while in *D. sinica* F1 is much longer and arched). *Dilyta paretasmartinezi* n. sp. differs from *D. subclavata* in the beginning of rhinaria (F1 in *D. paretasmartinezi* n. sp. and F4 in *D. subclavata*).

Description.

Length. Female unknown. Male: 1.0 mm. **Coloration**. Head, mesosoma and metasoma brown. Scapus yellowish brown, pedicel and F1 yellow; F2-F12 yellowish brown. Legs yellow and veins yellowish brown. **Head**. Rounded in anterior view, smooth and shiny. With setae present below, between and a few above toruli. Without setae on vertex and with sparse setae on front. Transfacial line 0.8 times the height of compound eye. Malar space 0.5 times the height of compound eye. **Antenna**. 14-segmented, filiform (Fig. 1a). All antennomeres covered with sparse setae. F1-F12 with rhinaria and club shaped. F1 2.1 times as long

as wide; F2 2.1 times as long as wide; F3 2.1 times as long as wide; F4 2.0 times as long as wide. F1 slightly curved. F1-F3 subequal; F4 1.1 times as long as F3; F4-F12 subequal in length, width and shape. **Mesosoma**. Pronotum covered with

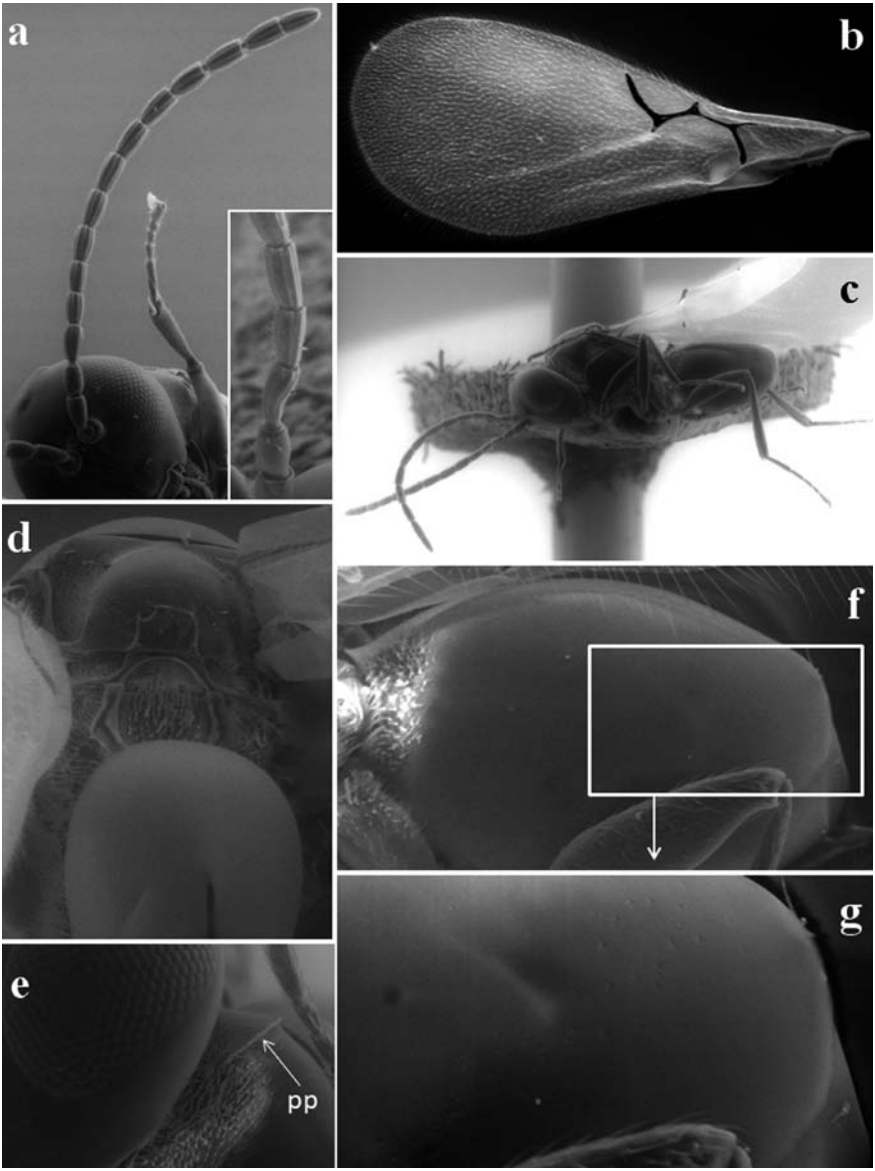

Figure 1. *Dilyta paretasmartinezi* n. sp.: **a**) antenna and detail of pecidellum and first flagellomeres; **b**) forewing; **c**) habitus; **d**) scutellum and propodeum; **e**) lateral of pronotal plate (pp); **f**) metasoma; **g**) detail of metasomal punctuation.

sparse setae; pronotal plate well differenciated by two lateral carinae (Fig. 1e). Mesoscutum smooth and shiny, round in dorsal view with few scattered setae. Scutellum also smooth and shiny with scatered setae present, with an ∩-shaped carinae on apex of scutellum (Fig. 1d). Height of mesopleural triangle along anterior margin 1.3 times the height of mesopleuron. Propodeum covered with a lot of setae; with two strong broad carinae (Fig. 1d). **Forewing**. Longer than body. Covered with dense pubescence; marginal setae present. Open radial cell, 1.8 times as long as wide (Fig. 1b). R1 short and slightly curved; Rs long and curved. **Metasoma**. Metasoma with only one big tergite visible (Fig. 1f). Proximal part with a complete ring of setae. Distal half strongly and loosely punctuated (Fig. 1g).

Type material: (3♂). HOLOTYPE: "CASENT, 2070687", "MADAGASCAR: Province, Fianarantsoa, Ranomafana, JIRAMA water works, 21º 14.91' S 47º 27.13' E" 2-10 January 2002, collector: R. Harin'Hala, California Academy of Sciences, Malaise trap near river, elev 690 m, MA-02-09D-10": 1♂. PARATYPES: "CASENT, 2003280", "MADAGASCAR: Province d'Antsiranana, Parc National Montagne of d'Ambre, 12.2 Km, 211º SSW of Joffreville, elev 1300 m, 2-7 Feb 2001", "12º 35' 47'' S 49º 9' 34'' E, coll. Fisher, Griswold et al., California Academy of Sciences, Malaise trap in montane rainforest, BLF2853": 1♂; "MADAGASCAR: Province Fianarantsoa, Ranomafana, JIRAMA water works, 21º 14.91' S, 47º 27.13' E", "2-10 January 2002, collector: R. Harin'Hala, California Academy of Sciences, Malaise trap near river, elev 690 m, MA-02-09D-10": 1♂. Holotype and 1 paratype NMW; 1 paratype UB.

Biology. Probably hyperparasitoids of Psyllidae via Encyrtidae (Hymenoptera: Chalcidoidea) as other members of this genus with known hosts.

Distribution. Madagascar.

Etymology. This new species is dedicated to our friend Jordi Paretas Martínez, for his contributions to Charipinae and particularly in the genus *Dilyta*.

Discussion

Dilyta is a very distinctive genus in subfamily Charipinae. It can be characterized by: male and female antennae with the last two flagellomeres broadly joined; metasoma with only one large tergite visible and radial cell open with R1 not reaching wing margin (Paretas-Martínez & Pujade-Villar, 2006). As other Charipinae, *Dilyta* species have very few diagnostic features to distinguish between them.

According to Paretas-Martínez at al. (2009) all *Dilyta* species shared some features related with head, mesosoma, forewing and some antennal and metasomal characters. The main features used to distinguish between *Dilyta* species are: punctuation of distal half of metasoma; proportion of flagellomeres in male and female; and shape of carinae at apex of scutellum. Nowadays 12 different *Dilyta* species are known and the shape of carinae at the apex of scutellum differentiates two geographical species groups: one group with ∩-shaped carinae is present in the Holarctic and Oriental regions and another group with M-shaped carinae is found in the Afrotropical area. The species mentioned here, *D. subclavata* and the new species described, have ∩-shaped carinae at the apex of scutellum; because of this, both

species belong morphologically to the Holarctic area, and they have probably been introduced in Madagascar. The genus *Dilyta* is poorly known and probably in the future the new species described here will be collected in the northern hemisphere.

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