



A new species of *Mada* Gordon from the Andes (Coleoptera: Coccinellidae: Epilachnini)

KAROL SZAWARYN¹ & GUILLERMO GONZÁLEZ²

¹Department of Invertebrate Zoology and Parasitology, University of Gdańsk, Wita Stwosza 59, 80-308 Gdańsk, Poland.

E-mail: karol.szawaryn@biol.ug.edu.pl

²La Reina, Santiago, Chile. E-mail: willogonzalez@yahoo.com, www.coccinellidae.cl

Although Gordon (1975) revised the herbivorous ladybirds of the New World, the taxonomy of this group in the Americas is still poorly studied. Some recent efforts have been made at the generic (Szawaryn 2015b) as well as species level (Szawaryn 2015a; González & Gómez 2013; González 2015) to describe and improve our knowledge of the systematics of Neotropical Epilachnini, but they still need more investigation.

Gordon (1975) revised the genus *Mada* Mulsant, 1850 and listed 31 species. Subsequently, Gordon & Almeida (1986a, 1986b, 1988) described twelve additional species and Szawaryn (2015a) one more from the Andes. Currently, 44 species have been described.

The genus *Mada* is distributed in Central and South America. Species belonging to this genus are characterized by a double tarsal claw with an additional large basal claw and a narrow, transverse labrum. In his revision, Gordon (1975) mentioned that this genus is probably not monophyletic. Recent molecular phylogenetic studies (Szawaryn *et al.* 2015) proved that *Mada* do not form a monophyletic group. The variable characters are, for example, as follows: the presence of apical spurs on tibiae; the presence of depressions for receiving apices of middle and hind femora on epipleuron; the shape of abdominal postcoxal lines—round or strongly angulate. Further taxonomic investigation of genus *Mada* is needed.

In this contribution we describe *Mada hirsuta* sp. nov. from the Andes, increasing the number of known species of the genus to 45. Specimens used in this study were found in the entomological collections of the Natural History Museum in London and the Entomology Museum at the University of Kansas, Lawrence, KS, USA.

Material and methods

Specimens used in this study are deposited in the following collections:

MUSM Museo de Historia Natural de la Universidad Nacional Mayor de San Marcos, Lima, Perú.

NHM Natural History Museum, London, United Kingdom.

Measurements were made using an ocular micrometer attached to a Bresser ETD-101 dissecting microscope. Measurements recorded were as follows: (TL) total body length, from apical margin of clypeus to apex of elytra; (PL) pronotal length, from the middle of anterior margin to margin of basal foramen; (PW) pronotal width at widest part; (EL) elytral length along suture, including scutellar shield; (EW) elytral width across both elytra at widest part. Male genitalia were dissected, cleared in 10% solution of KOH, and subsequently transferred to glycerol on a microscope slide for further study. After examination the genitalia were glued on cards and pinned beneath the specimen or stored in microvials with glycerol. Digital photographs were made using a Leica M205A with a digital camera attached. Terminology used in this paper follows Ślipiński (2007) and Lawrence *et al.* (2011).

Systematics

Mada hirsuta sp. nov.

(Figs. 1–3)

Etymology. The species name is derived from its distinctive elytral pubescence.

Diagnosis. This species can be quite easily distinguished from other *Mada* species by the surface of elytra covered

with long setae irregularly arranged in whirling pattern (Fig. 1A). Moreover it has protibiae distinctively broadened (Fig. 2G), male genitalia with penis guide narrow, pointed, shorter than parameres, and female genitalia with coxites much longer than wide, narrow at base and broadened at posterior part.

Description. Length 3.9–4.3 mm; width 3.4–3.7 mm; TL/EW = 1.14–1.16; PL/PW = 0.50–0.51; PL/EL = 0.30–0.31; PW/EW = 0.57–0.61; EL/EW = 0.95–1.00.

Body oval, convex (Figs. 1A, 1B); pronotum and elytra covered with long setae. Head and mouthparts yellowish-brown (Fig. 1C); pronotum yellowish-brown with anterior angles more pale, disc with five dark spots, one at base and four in a curved row across middle (Fig. 1C); elytra yellowish-brown with lateral margin pale yellow (Fig. 1B). Ventral surface light-brown. Head and pronotum punctate; elytron dually punctate.

Head exposed, transverse; ventral antennal grooves present. Eye finely faceted, with inner orbits emarginate anteromedially (Fig. 1C). Antenna shorter than width of head, 11-segmented (Fig. 2D); scape large, swollen, about twice as long as pedicel; pedicel longer than wide, swollen; antennomere 3 elongate, shorter than antennomeres 4–6 combined; antennomeres 4–7 elongate, antennomere 8 transverse; antennal club relatively compact, 3-segmented, asymmetrical. Clypeus transverse; labrum transverse with anterior part membranous, covered with long setae (Fig. 2F). Mandibles multidentate, with large teeth on inner edge, with several small denticles on dorsal surface (Fig. 2E).

Pronotum transverse, widest at base and gradually narrowing anteriorly; anterior angles and base not bordered; disc convex, finely punctate (Fig. 1C). Prothoracic hypomeron smooth; notosternal suture distinct; prosternal process with weak grooves along its lateral margins. Mesoventrite with anterior edge emarginate with raised border for entire length; mesoventral process smooth, as broad as coxal diameter; meso-metaventral articulation with suture straight. Scutellar shield small, triangular. Elytra at base broader than pronotum; with dual punctation; humeral angles well developed; lateral margins narrow, visible from above throughout (Fig. 1A); elytral epipleuron complete, with distinct depressions for receiving apices of mid and hind femora, with submarginal carina complete; metaventrite with intercoxal process broadly bordered; metaventral postcoxal lines forming straight line with two rounded, setose projections, laterally complete, recurved; metaventrite with discrimen complete.

Legs short and stout, not protruding from outer margin of elytral epipleuron. Trochanters roundly produced, with cavities on their inner surfaces for receiving tip of tibiae in repose. Femora cylindrical with weak grooves throughout for receiving tibiae. Tibiae with apical spurs of formula 1-2-2, protibiae expanded with weak grooves throughout for receiving tarsi (Fig. 2G), mid and hind tibiae on outer edge near apex with oblique carina; tarsal claw double with additional large, subtriangular basal tooth (Fig. 2N).

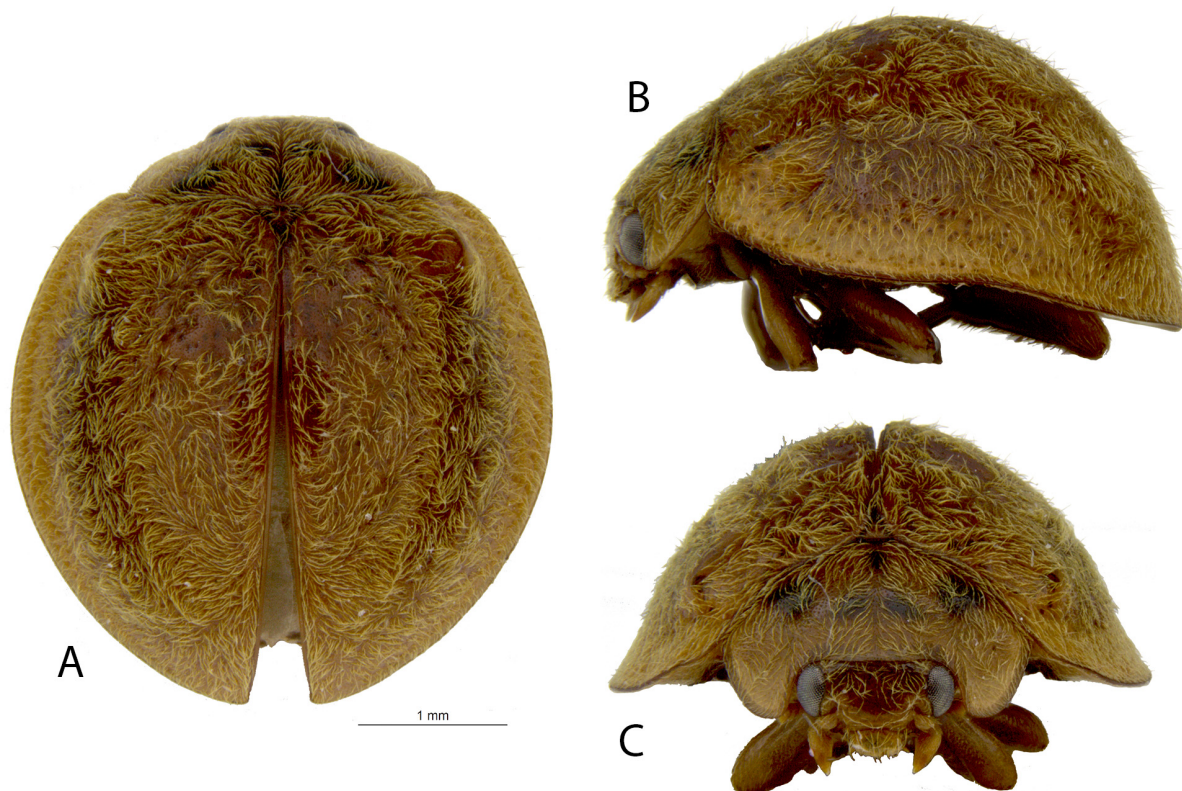


FIGURE 1. *Mada hirsuta* sp. nov., habitus; A) dorsal; B) lateral; C) anterior.

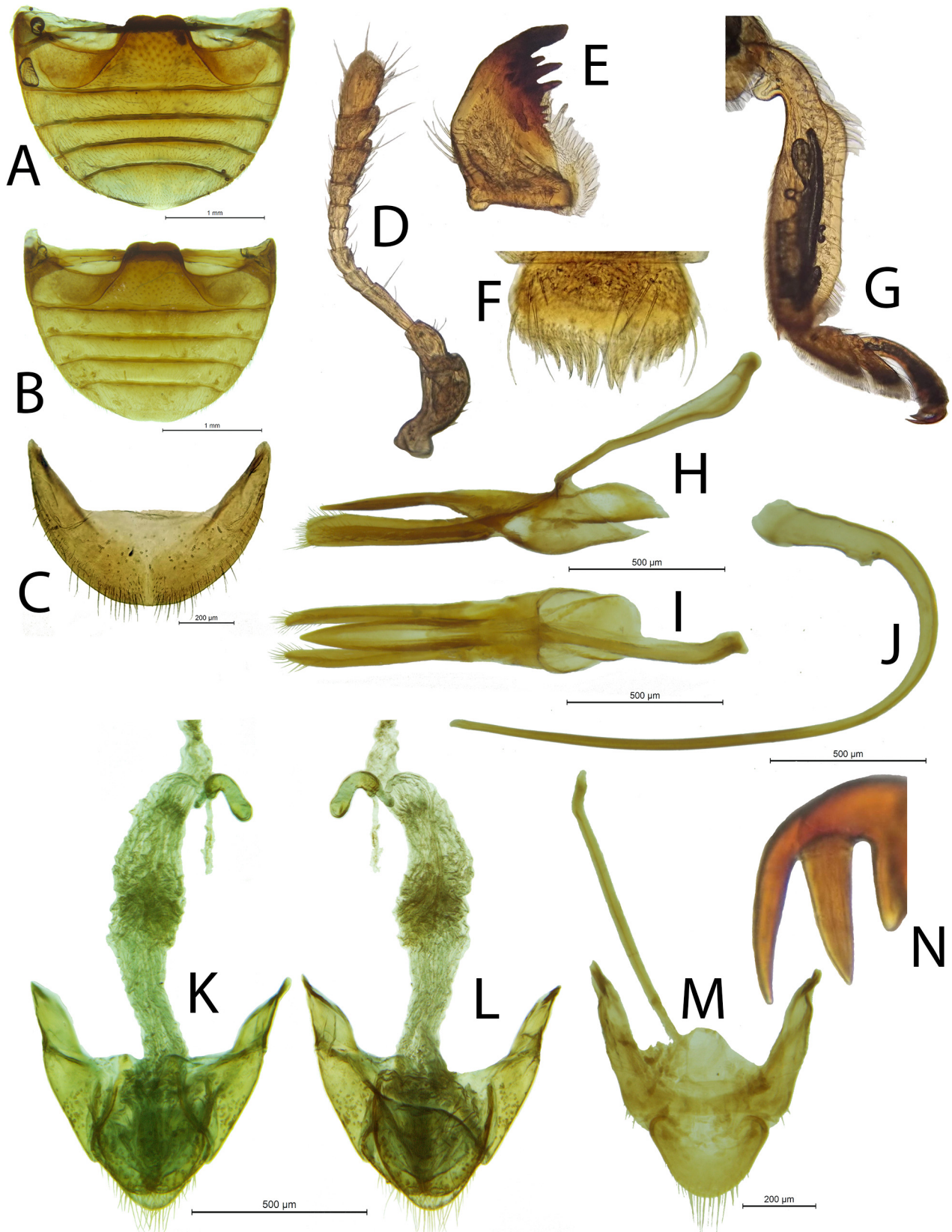


FIGURE 2. *Mada hirsuta* sp. nov.; A) abdomen, female; B) abdomen, male; C) sternite VIII, female; D) antenna; E) mandible; F) labrum; G) proleg; H) tegmen, lateral; I) tegmen, ventral; J) penis, lateral; K) female genitalia, dorsal; L) female genitalia, ventral; M) male genital segment, dorsal; N) tarsal claw.

Abdomen with five ventrites in males with tip of 6th ventrite visible (Fig. 2B) and five ventrites in females (Fig. 2A). Abdominal postcoxal lines recurved roundly and incomplete, almost reaching posterior margin of ventrite 1 (Figs. 2A, B). In males apical margin of ventrite 5 truncate (Fig. 2B); ventrite 6 emarginate medially; tergite VIII rounded. Apodeme of male sternum IX simple, thin, rod-like. Tergite X rounded at apex (Fig. 2M). In females apical margin of ventrite 5 rounded (Fig. 2A); sternite VIII rounded, entire, with membranous part in middle appearing divided into two parts (Fig. 2C), tergite VIII rounded. Proctiger (TX) membranous at base, elongate, rounded apically (Fig. 2L).

Male terminalia and genitalia (Figs. 2H–J). Penis guide symmetrical, thin, with sides almost parallel, spindle shaped, widest at basal part in lateral view, with pointed apex; shorter than parameres. Parameres well developed, simple, setose apically. Penis base with capsule reduced. Penis simple, rod-like.

Female genitalia (Figs. 2K, L). Coxites elongate, narrow at base, broadly widened at posterior part, styli not observed. Bursa copulatrix ending with oviduct, sperm duct diverges slightly below oviduct; sperm duct short, lightly sclerotized, simple; spermatheca small, membranous, vermiform, without clear nodulus and ramus; accessory gland thin, a bit longer than spermatheca.

Type material. **Holotype**, male, Ecuador (Orellana), Payamino Research Station 0°29'36.01"S 77°17'29.15"W 300m Tropical Rainforest Malaise trap, 30.VII–12.VII.2007/ coll. CPDT Gillet BMNH(E) 2007-65 (BMNH). **Paratypes**, ECUADOR: 1 female, Ecuador (Orellana), Payamino Research Station 0° 29' 36.01"S 77° 17' 29.15"W 300m Tropical Rainforest, malaise trap, 30.VII–12.VII.2007/ coll. CPDT Gillet BMNH(E) 2007-65 (BMNH); PERU: 1 female, Peru, Madre de Dios, CICRA Field Stn, garden. 12.56940°S 70.10100°W 260m, 25.X–1.XI.2010, MJ Endara, malaise trap, PER10-10-MAT-021/ SEMC1097096 KUNHM-ENT (MUSM).

Distribution. Ecuador, Peru (Fig. 3).

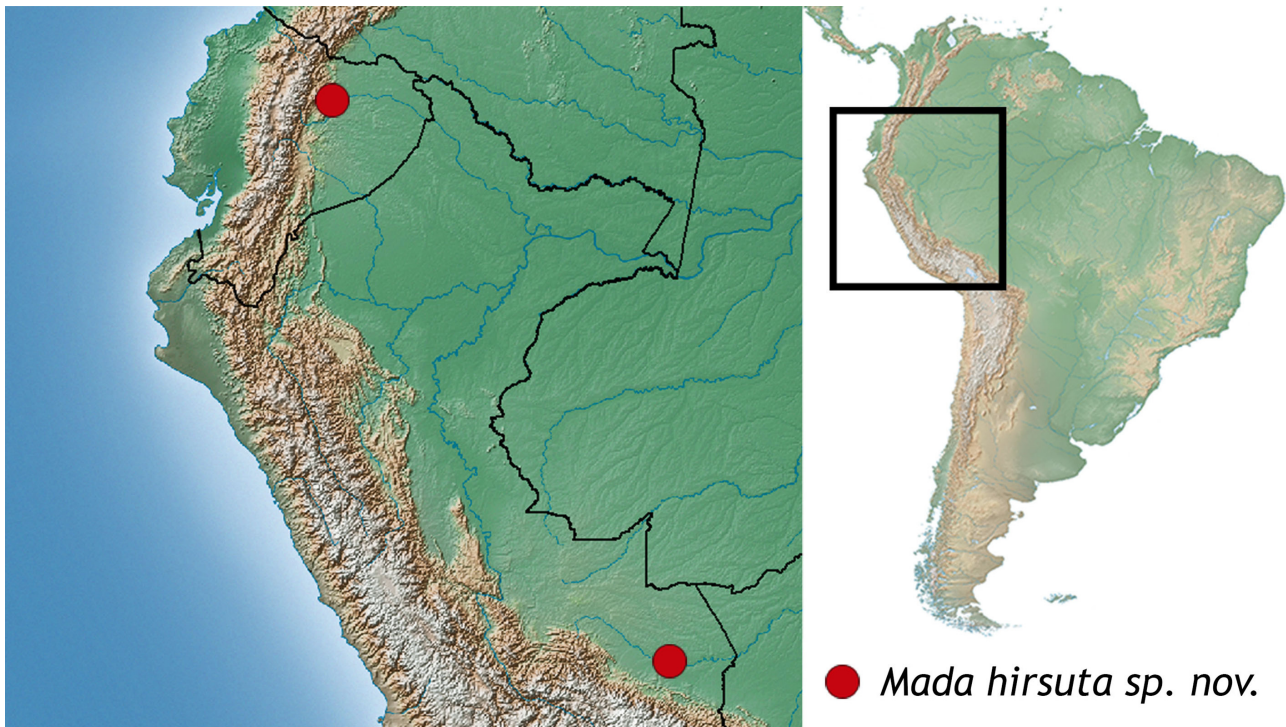


FIGURE 3. *Mada hirsuta* sp. nov. distribution map.

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