

A new *Metapocyrtus* Heller 1912 (Curculionidae: Entiminae: Pachyrhynchini) from Zamboanga Peninsula, Mindanao Island, Philippines

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Abstract

A new *Metapocyrtus* Heller, 1912 belonging to subgenus *Dolichocephalocyrtus* Schultze from Zamboanga Peninsula, Philippines is described with notes on its habitat and mimicry. The new species *Metapocyrtus* (*Dolichocephalocyrtus*) *zamboanganus* sp. nov. is sympatric with and believed to have a mimetic relation with *Pachyrhynchus* sp., *Polycatus jageri*, and *Doliops basilana zamboangana*.

Keywords: *Dolichocephalocyrtus*, mimicry, new species, taxonomy, weevil

Introduction

Zamboanga is a region in western Mindanao politically belonging to Region IX or Zamboanga Peninsula and a distinct biogeographic region together with the island of Basilan (Vallejo, 2011; Dickerson et al., 1928). Mindanao is believed to have formed from accretion or integration of several islands which contributes to its high biodiversity and unique species composition (Hall, 1998; Heaney et al., 1998). The island is divided geologically into two blocks, the island-arc-related eastern-central Mindanao block and the continental Zamboanga Peninsula, and biogeographically into 4 sub-regions of which Zamboanga Peninsula and Basilan belong to one biogeographic region while its neighboring islands Sulu and Tawi-tawi belongs to separate region (Yumul et al. 2004; Vallejo, 2011). Zamboanga Peninsula is reportedly a product of several continental fragment including that of Palawan microcontinental block which has drifted from mainland Asia as well as Borneo block (Yumul et al., 2004). Based on its flora and fauna, Zamboanga peninsula's biotic region has a high affinity with Bornean species and is very distinct from Eastern Mindanao (Dickerson et al. 1928; Vallejo, 2011).

Entomologically, Zamboanga region is one of the least explored areas in Mindanao, especially for its beetle fauna. Very few papers dealing with beetle fauna of Zamboanga have been published, mostly are taxonomic papers (i.e. Schultze, 1925; Yoshitake, 2012; Barsevskis, 2018; Anishchenko & Medina, 2019). The tribe Pachyrhynchini with 90% endemism in the Philippines whose members have a narrow geographic distribution and are almost exclusive in one biotope (Schultze, 1923, 1925; Cabras & Medina, 2018) has been the least studied in Zamboanga Peninsula. Due to their narrow geographic distribution, flightless nature, and dependence on forested habitats, these weevils are often found exclusively in unique biogeographic regions. To date, roughly 5 species of Pachyrhynchini have been described from Zamboanga (Schultze, 1925;

Yoshitake, 2012). From recent expeditions to Zamboanga, several specimens of *Metapocyrtus* were collected including the new species described herein. Description of biotope and possible mimicry with *Pachyryhnchus* Germar 1824, *Polycatus* Heller, 1913, and *Doliops* Waterhouse, 1841 are presented and discussed.

Material and Methods

The specimens deposited in the Coleoptera Research Center of the University of Mindanao were collected through beating sheet and handpicking and spressed with ethyl acetate. Morphological characters were observed under Luxeo 4D and Nikon SMZ745T stereomicroscopes. Stacked digital habitus images were taken with Canon EOS 800D digital camera and Canon MP-E 65mm macro lens, whereas digital images of genitalia were taken with Ricoh WG-50. All images were stacked and processed using a licensed version of Helicon Focus version 5.3 and portable Photoshop CS6. Data labels are verbatim. Label breaks are indicated by a slash ("/"). Measurements mentioned in this paper are abbreviated as follows: LB - body length (from the apical margin of pronotum to the apex of elytra); LE - elytral length (from the level of the basal margins to the apex of elytra); WE - maximum width across the elytra; LP pronotal length (from the base to apex along the midline); WP - maximum width across the pronotum; LR - length of rostrum; WR maximum width across the rostrum. All measurements are in millimeters (mm).

The specimens are deposited in the following collections:

UMCRC- Coleoptera Research Center, University of Mindanao, Philippines

MBLI- Private Collection of Maurizio Bollino, Lecce, Italy

ABFI- Private Collection of Arnaldo Bordini (Florence, Italy)

Results

Metapocyrtus (Dolichocephalocyrtus) zamboanganus Cabras & Medina, sp. nov.

(Fig. 1A-D)

Holotype (Fig. 1 A, C), male: Philippines- Mindanao/Zamboanga del Sur /Zamboanga City /January 2020 /coll. M.N.Medina (typed on a red white card).

Holotype male / *Metapocyrtus (Dolichocephalocyrtus) zamboanganus* / CABRAS & MEDINA, 2020 (typed on red card). Presently in UMCRC, to be deposited in the National Museum of Natural History (NMNH) under the National Museum of the Philippines (NMP).

Paratypes (23 ♂♂, 8 ♀♀): 1 ♀, Philippines - Mindanao / Zamboanga del Sur /Zamboanga City /January 2020 /coll. A. Cabras; 3 ♂, Philippines, Mindanao, Labuan, Zamboanga del Norte, local collector February 2018., all in UMCRC. 9♂♂, 3♀♀: Philippines - Mindanao I. / Labuan / Zamboanga del Norte / January 2018 / ex Lumawig - coll. Bollino; 1♂: Philippines - Mindanao / Labuan (Zamboanga City) / October-November 2018 / ex N. Mohagan - coll. Bollino; 2♂♂, 1♀: Philippines - Mindanao / Gotalac / (Zamboanga del Norte) / November-December 2018 / lgt. local people - coll. Bollino; 1♂ Philippines - Mindanao I. / Gotalac / (Zamboanga del Norte) / I-II.2019 / lgt. local people - coll. Bollino; 6♂♂, 3♀♀: Philippines - Mindanao / Labuan / (Zamboanga del Norte) / IV.2018 / ex Lumawig - coll. Bollino; 1♂: Philippines - Mindanao / Labuan / (Zamboanga del Norte) / January 2018 / ex Lumawig - coll. Bollino, all in MBLI. 1♂, Philippines, Mindanao, Labuan, Zamboanga del Norte, local collector February 2018- coll. Bordini, all in ABFI.

Diagnosis: *Metapocyrtus zamboanganus* sp. nov. belongs to the subgenus *Dolichocephalocyrtus* for having the following characteristics: long and slender rostrum, male rostrum presenting a V-shaped ridge on basal half, elytra of the male with rounded apex and steep apical declivity; elytra of the female presenting a sharp triangular projection at apex. The new species is different from its congener for its unique pronotal and elytral ornamentation.

Description. Male. Dimensions: LB: 7.0-7.8 (holotype 7.0 mm). LR: 1.8-1.9 (1.8 mm). WR: 1.0-1.1 (1.0 mm). LP: 2.9-3.0 (2.9mm). WP: 2.9-3.0 (2.9 mm). LE: 4.7-5.0 (4.7). WE: 3.0-3.1 (3.0). N=4. Integument black. Body surface shiny; rostrum, head, and underside with a weak luster. Body moderately glabrous. Head mostly glabrous, sparsely pubescent, with metallic pale blue colored hair-like elliptic scales on lateroventral parts; forehead between eyes covered with metallic shagreen and light-yellow ochre-colored round scales; median groove distinct, not reaching the vertex. Rostrum weakly rugose, longer than wide (LR/WR: 1.8), bearing minute yellow-ochre colored hairs in the dorsal surface, pale blue hair in the lateral surface, and long light brown hairs at the anterolateral margin; transverse basal groove distinct; longitudinal groove along midline on basal half creating a shallow depression beset with partly overlapping metallic golden yellow and red-colored round scales; lateral sides with round to elliptic shagreen scales; lateroventral part behind antennal scrobe densely beset with pale blue and shagreen elongated to short hair-like scales; dorsum finely punctured; dorsal surface weakly convex. Eyes medium-sized and feebly convex. Antennal scape and the funicle nearly as long, moderately covered with fine light-colored hairs. Funicular segments I and II almost of the same length, 3 times longer than wide; segments III-VII nearly as long as wide; club sub-ellipsoidal, nearly 3 times longer than wide.

Prothorax globular, as long as wide (LP/WP: 1.0), coarsely punctate, sparsely covered with cream- and violet-colored round scales on dorsolateral side, widest at middle, weakly convex, has distinct groove along midline, and with the following scaly markings of metallic light yellow ochre, golden yellow, shagreen, red and violet round scales: a) thin band at the anterior margin, b) thin longitudinal band along midline, c) dorsolateral subcircular patches on each side, and d) broad lateroventral stripe before the coxa and confluent with the anterior marginal band.

Elytra sub-elliptical (LE/WE:1.57), nearly as wide but moderately longer than prothorax (WE/WP: 1.03, LE/LP: 1.62), black, sub-glabrous, with very minute and sparse setiferous punctures, weakly convex with steep apical declivity; elytral apex rounded and sparsely covered with white, fine hairs. Elytra with three scaly bands of metallic light yellow ochre to shagreen colored round scales: a) basal transverse band which extends from suture to lateral margin, b) slightly oblique median transverse band in the entire width, slightly narrow from stria I and gradually widened laterally; basal and median bands connected laterally by a broad marginal stripe, c) subtriangular band on apical 1/3 extending from stria I to lateral margin.

Legs with clavate femora, covered with sparse shagreen, red, and violet round and elliptic scales. Femora covered with shagreen hair-like scales and pale shagreen and violet round scales towards apical part. Tibiae covered with sub-recumbent black bristles, weakly serrate along inner edge

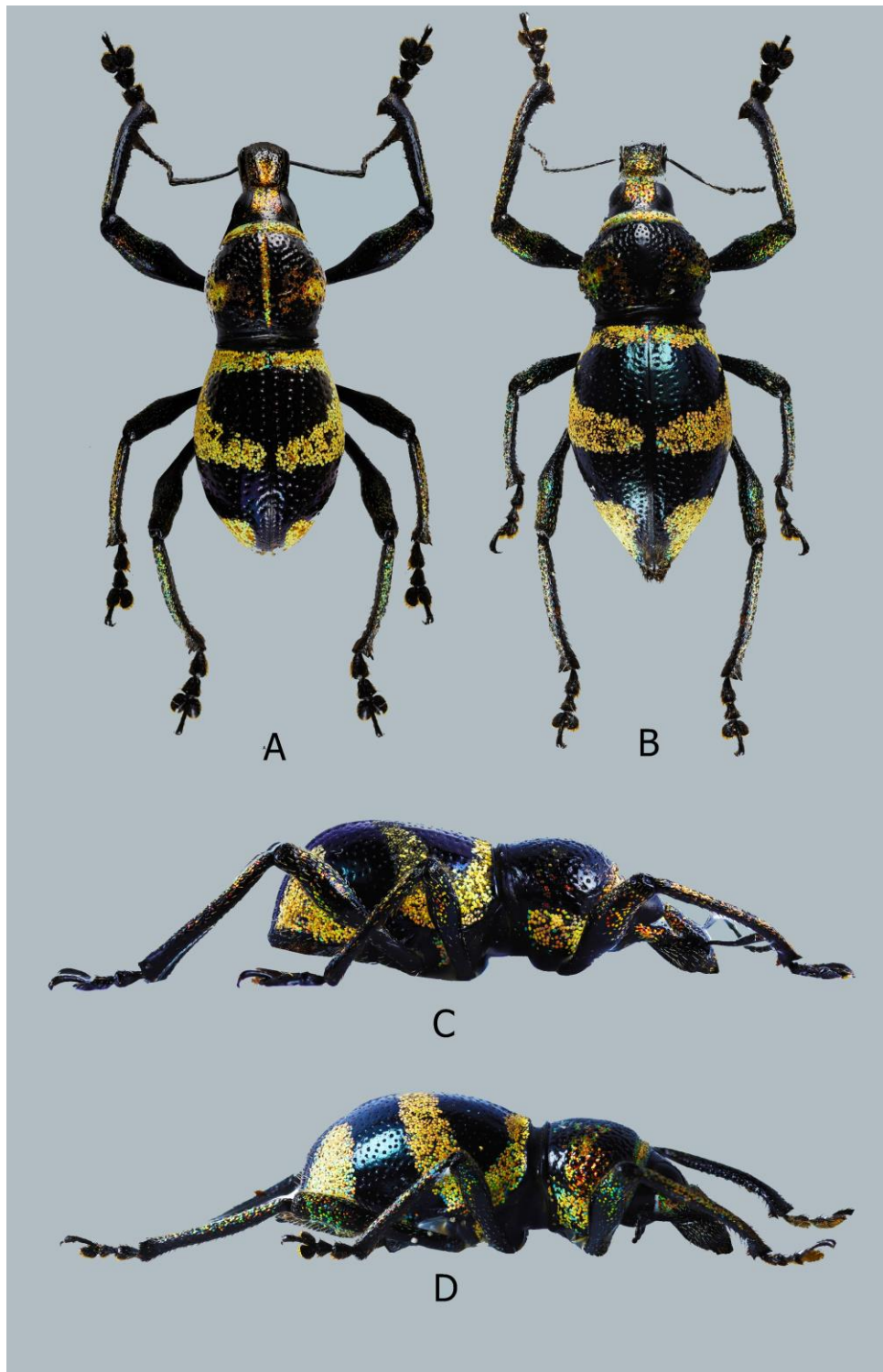


Figure 1. *Metapocyrtus (Dolichocephalocyrtus) zamboanganus* sp. nov. - A, C, Holotype male; A, dorsal view, C, lateral view. B, D, Paratype female; B, dorsal view, D, lateral view

and covered with narrow elliptic shagreen and violet scales along outer margin, less dense on apical part. Tarsomeres covered by sparse pubescence. Coxae with light green hairs.

Mesosternum with brown bristles and white lateral hairs between the coxae. Metasternum densely covered with long light brown bristles and shagreen and yellow-ochre colored round scales at lateral sides interspersed sparsely with bluish hair-like scales. Ventricle I to V with dense and long light brown bristles, laterally sparse light green bristles.

Male genitalia as shown in Figure 2 A-C. Aedeagal body long and slender, thin, and nearly as long as its apodeme in profile; apex rounded.

Female. Dimensions: LB: 9.0-9.1mm (9.0); LR: 1.5-1.6mm (1.5); WR: 1.1-1.2 (1.1). LP: 2.8-2.9 (2.8). WP: 3.5-3.6 (3.5). LE: 6.8-6.9 (6.8). WE: 4.0-4.1 (4.0). N=2.

Habitus as shown in Figure 1B-D.

The differences concerning males are: a) rostrum with deep transverse basal groove, V-shaped ridge creating a shallow elongated depression at the center, b) pronotum wider than long (LP/WP: 0.8), slightly shorter than in male; c) pronotum sub-globular, with a narrow elliptic smooth discal area in middle replacing the longitudinal median groove in male, and d) coarsely granulated at each side, e) elytra obovate (LE/WE: 1.7), slightly longer and wider (WE/WP: 1.14, LE/LP: 2.43) with a sharp triangular projection at the apex. Otherwise mentioned, similar to the male.

Etymology

The new species is named after its type locality- Zamboanga Peninsula.

Distribution

Metapocyrtus (Dolichocephalocyrtus) zamboanganus sp. nov. is known so far from Zamboanga Peninsula.

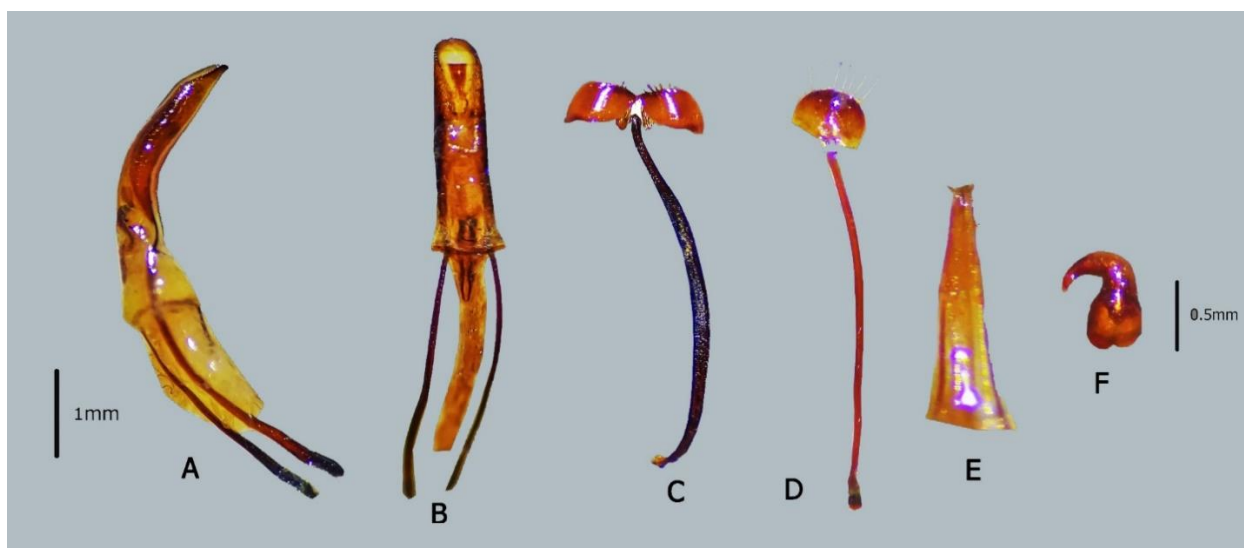


Figure 2. Male genitalia and female terminalia of *Metapocyrtus (Dolichocephalocyrtus) zamboanganus* sp. nov. A: penis in lateral view; B: idem in dorsal view; C: sternite IX in dorsal view; D: sternite VIII in ventral view; E: ovipositor in dorsal view G: spermatheca

Brief Ecological Notes

Metapocyrtus (Dolichocephalocyrtus) zamboanganus sp. nov. was collected in the secondary forest of Western Mindanao State University (WMSU) Experimental Forest in La Paz, Zamboanga City, Mindanao Island at an elevation of 800 m (Fig. 3A). It was collected in a semi-open area along the forest trail. A similar account was mentioned by Cabras, Medina & Zhang (2018) on the presence of Pachyrhynchini fauna along forest trails. The secondary forest of Western Mindanao State University (WMSU) Experimental Forest has rich vegetation of native trees and ferns. Among the native plants are *Cyathea* sp. (tree ferns), *Callophyllum blancoi* Planchon & Triana (Bitanghol), *Pourteria macrantha* (Merr.) Baehni (White nato), *Shorea contorta* S. Vidal (Mindanao white lauan), *Lithocarpus celebicus* (Miq.) Rehder (Ulaian), *Petersianthus quadrialatus* (Merr.) Merr. (Toog), and *Casuarina equisetifolia* Linn. (Agoho) among others. The new species was however collected on the leaves of a dipterocarp tree *Parashorea malaanonan* (Blanco) Merrill locally known as bagtikan. The leaves of *P. malaanonan* shown chew marks, suggesting that this plant is a potential food source (Fig. 3C). This interpretation is supported by Chung *et al.* (2013) who state that endemic dipterocarp seedlings are favored by some species of beetles.



Figure 3. A-D. A- WMSU Experimental Forest, B- Beating sheet method in the collection of the weevils, C- leaves of *Parashorea malaanonan* (Blanco) Merrill (bagtikan) presenting chew marks, D- *Metapocyrtus zamboanganus*.

Notes on Mimicry

Convergent evolution is the process by which non-related or distantly related organisms evolve to exhibit similar body forms, coloration, organs, and adaptations. Species can converge in sympatry, as in the case of mimicry complexes. This mimicry complex is a fascinating wonder of nature and evolution where undefended mimics imitate non-palatable species or both non-palatable evolved to look like each other and fool predators. In nature, this non-palatability is communicated to predators with aposematic signals usually in the form of bright colorations (Poulton 1890; Ruxton et al. 2004). Mimicry is well investigated in butterflies but far less understood in beetles which possess equally interesting mimetic patterns. The Philippines harbors interesting mimicry involving *Pachyrhynchus* Germar, 1824 and other genera from the tribe Pachyrhynchini such as *Metapocyrtus* Heller 1912, and *Macrocyrtus* Heller 1912, as well as other Entimiinae weevil groups such as *Polycatus* Heller, 1913 (Polycatini), *Neopyrgops* Heller, 1913 (Celeuthetini), *Eupyrgops* Berg, 1898 (Celeuthetini), and the longhorn beetle under the genus *Doliops* Waterhouse, 1841 (Cerambycidae: Lamiinae). This mimicry complex was already noticed by 19th-century naturalists- Wallace and Schultze (Wallace, 1889; Schultze, 1923).

In Zamboanga, one of the mimicry complexes is between *Pachyrhynchus* sp., *Polycatus jageri* Bramanti, Bramanti, and Rukmane- Bärbaile, 2020, and *Doliops basilana zamboangana* Barsevskis, 2018. These species were all found at the same locality in Zamboanga del Norte. Previous observations of Schultze (1925), Cabras and Medina (2018) and Cabras et al., (2019) also mentioned other models and mimics sharing the same locality and at times are collected on the same plant.

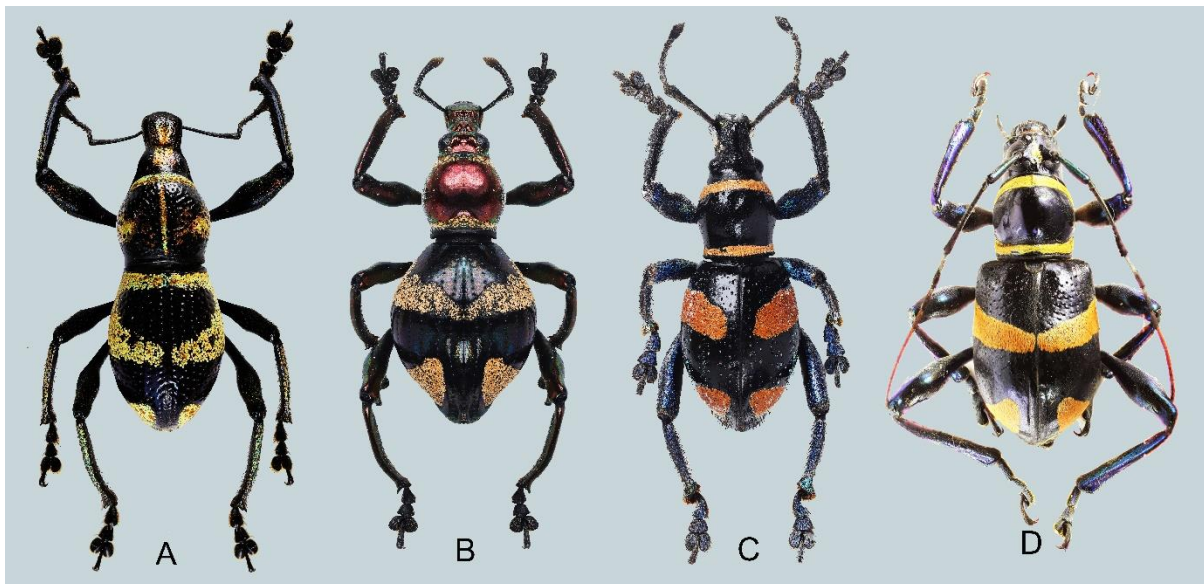


Figure 4. A- *Metapocyrtus (Dolichocephalocyrtus) zamboanganus* sp. nov., B- *Pachyrhynchus* sp., C- *Polycatus jageri* Bramanti, Bramanti, and Rukmane – Bärbaile, 2020, D- *Doliops basilana zamboangana* Barsevskis, 2018.

Competing interests

The authors declared that no competing interests exist in the preparation of the manuscript.

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