

Two New Species of *Metapocyrtus* Heller, 1912 (Coleoptera: Pachyrhynchini) from Mount Natampod, Pantaron Range, Bukidnon, Mindanao, Philippines

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Mindanao is home to many unknown weevil species, specifically those remote and unexplored mountain ecosystems. Two new species, *Metapocyrtus (Metapocyrtus) mendioi* sp. nov. and *M. (M.) edmai* sp. nov. are described from Mount Natampod, Pantaron Range, San Fernando, Bukidnon, Mindanao, Philippines. Habitat, ecology, and threats are provided. Moreover, a distribution map of all known *Metapocyrtus* species in the Philippine archipelago is also provided.

Keywords: distribution, new species, Pantaron Range, pronotum, weevils

INTRODUCTION

Despite recent discoveries of many new species of weevils in the southern Philippines, many endemic and rare undocumented and undescribed species still await to be described.

Species belonging to genus *Metapocyrtus* Heller, 1912 (Pachyrhynchini: Entiminae) are flightless and attractive weevils that inhabit mostly intact tropical vegetation of mountainous regions between 200–2000 m above sea level (masl) and between 16°–18° north latitude (Schultze 1923; Yap and Gapud 2007). They can be easily distinguished morphologically by their fused elytra covering the entirety of the meso- and metathorax plus the abdomen, a fully enclosed prothorax, apically lobulated femora, presence of the rostrum, bent antennae, and a wide range of richly

colored scales, metallic, or deep black body, and a variety of patterns (Schultze 1925).

Mindanao is a known home to many species of beetles in the tribe Pachyrhynchini, including the speciose genus *Metapocyrtus* with already more than 260 known species, including the two new species described herein (Yap 2008; Patano *et al.* 2021b).

Studies on the biodiversity of forested and mountainous areas in the Misamis, Bukidnon, Davao, and Cotabato regions with descriptions of new species have recently been conducted by Filipino and international entomologists (Ballentes *et al.* 2006; Cabras *et al.* 2016, 2017, 2021; Mohagan *et al.* 2018, 2020b; Patano *et al.* 2020, 2021a; Bollino *et al.* 2020).

Forested and mountainous areas in Mindanao can be mostly found in the Bukidnon region. One of its known mountain ranges is Mount Natampod, Pantaron Range. This is located

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in the central part of Mindanao and contains one of the most extensive mountain massifs of the island, which is a major part of the central cordillera (Gronemeyer *et al.* 2014). The mountain ecosystem is already been explored recently, showing high biodiversity with many noteworthy species (Coritico *et al.* 2018; Mohagan *et al.* 2020b). These studies only cover a small percentage of the entire mountain range, which implies that it might still harbor many more noteworthy and new species just waiting to be discovered.

In this study, we describe two new species of *Metapocyrtus* from Mount Natampod, Pantaron Range, San Fernando, Mindanao, Philippines. We provide also information about the natural habitat, ecology, and threats of the new taxa. In addition, an updated distribution map of all known *Metapocyrtus* species in the Philippine archipelago is also provided.

MATERIALS AND METHODS

Entry Protocol and Obtaining of Permits

Prior to the study, the research was presented to stakeholders of San Fernando, Bukidnon, Philippines to obtain prior informed consent. An approved gratuitous permit (GP) from the Department of Environment and Natural Resources (DENR permit number: 2020-06) was then issued in compliance with Republic Act No. 9147.

Sampling, Collection of Specimens, Photography, and Gathering Measurements

The collection of specimens of the two new species was done through sweep netting and handpicking whenever encountered along the established 2-km transect on Mount Natampod, Pantaron Range, San Fernando, Bukidnon (Figure 1). Collected specimens were then air-dried, mounted, examined, and photographed using a DSLR Canon camera combined with a Labomed stereomicroscope. Final image editing was done through the use of licensed Adobe Photoshop CS software.

Specimens of the two new species were measured using an ocular micrometer and digital caliper in accordance with the methodology of measurements of Yoshitake (2011). The abbreviations used in the measurements are the following: BL – body length (from the apical margin of pronotum to the apex of the elytra), EL – elytral length (from the level of the basal margins to the apex of the elytra), WE – maximum width across elytra, PL – pronotal length (from the base to apex along the midline), WP – maximum width across pronotum, RL – rostrum length, and WR – maximum width of the rostrum. All measurements are shown in mm.

All type specimens collected and examined in this study were deposited in Central Mindanao University, University Museum, Zoological Section, Curculionidae Collection (CMU-MZ).

TAXONOMY

Metapocyrtus (Metapocyrtus) mendioi Patano & Yap, sp. nov. (Figures 2 and 4)

Material examined. Holotype, male (Figures 2A and B): PHILIPPINES: Mindanao, Bukidnon, Mount Natampod, Pantaron Range; Natampod, 7°51'40.58"N, 125°25'25.50"E, 1,050 masl; 24 Jun 2021; coll. R.R. Patano Jr., A.B. Mohagan, & V.B. Amoroso (Central Mindanao University, University Museum, Zoological Section); three paratypes, two females and one male, same data as the holotype [CMU-MZ 13000 (holotype), 13001, 13002, and 13003].

Diagnosis. *Metapocyrtus (Metapocyrtus) mendioi* sp. nov. is unique from other congeners present in Mindanao Island by the color and pattern of its pronotal and elytral markings, and by having the two transverse rose gold scales in the middle of pronotum may or may not confluent with each other. This species belongs to subgenus *Metapocyrtus* by having dorso-lateral edge of rostrum rounded, head and rostrum not slender, and elytra ovate and striate-punctate.

Description. Measurements (n = 4): BL 10.2–12.1 (10.2 holotype), EL 5.7–6.4 (5.7 holotype), WE 3.9–4.8 (3.9 holotype), PL 2.8–3.8 (2.8 holotype), WP 3.2–4.0 (3.2 holotype), RL 1.8–2.0 (1.8 holotype), and WR 1.3–1.4 (1.3 holotype).

Integument black. Body surface weak lustrous black with rose gold, blue-green, yellowish-green, and golden yellow scales. Head with the following markings: [a] rose gold and golden-yellow scales under and between eyes and on each baso-lateral side of the rostrum, and [b] patches of rose gold and golden-yellow scales on the front, extended to the middle of the rostrum.

Rostrum slightly rugose, longer than wide, with minute light brown hairs in the dorsal and lateroventral surface, and long light brown hairs towards the apex; dorsal surface convex; prominent longitudinal median groove with dense rose gold to golden yellow scales extending from the base to the middle. Front slightly depressed. Eyes medium-sized and weakly convex; dense rose gold to golden yellow scales at the frons and below the eyes. Antennal scape shorter than funicle plus club (1.8: 2.6). Funiculus composed of seven segments: segment I three times as long as wide and widest at the distal end, longer

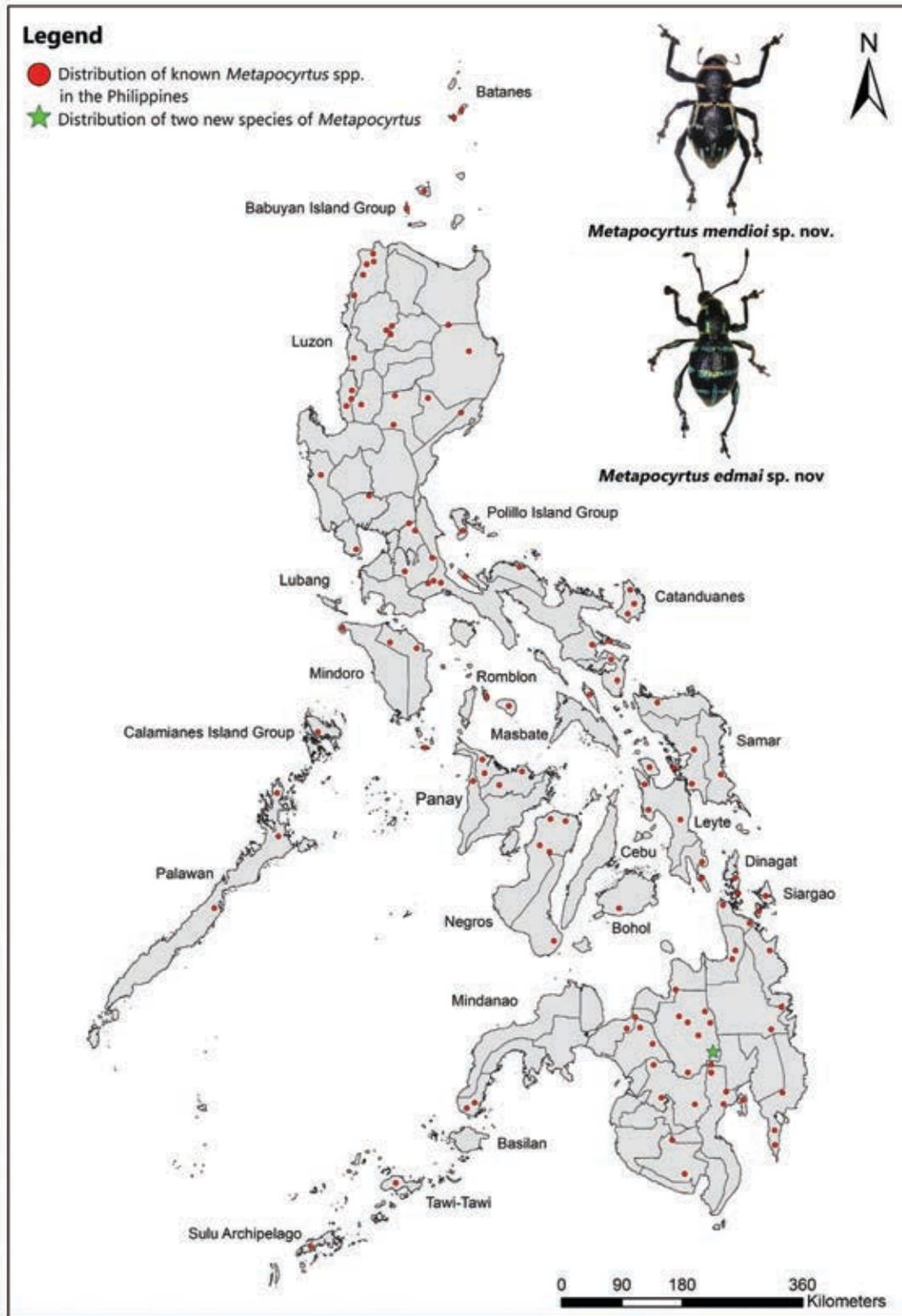


Figure 1. Map of the Philippines showing the distribution of *Metapocyrtus* spp. (red dots) and location of Mount Natampod, Pantaron Range, San Fernando, Bukidnon (774–1,140 masl), where the specimens of the two new species were collected (green star).

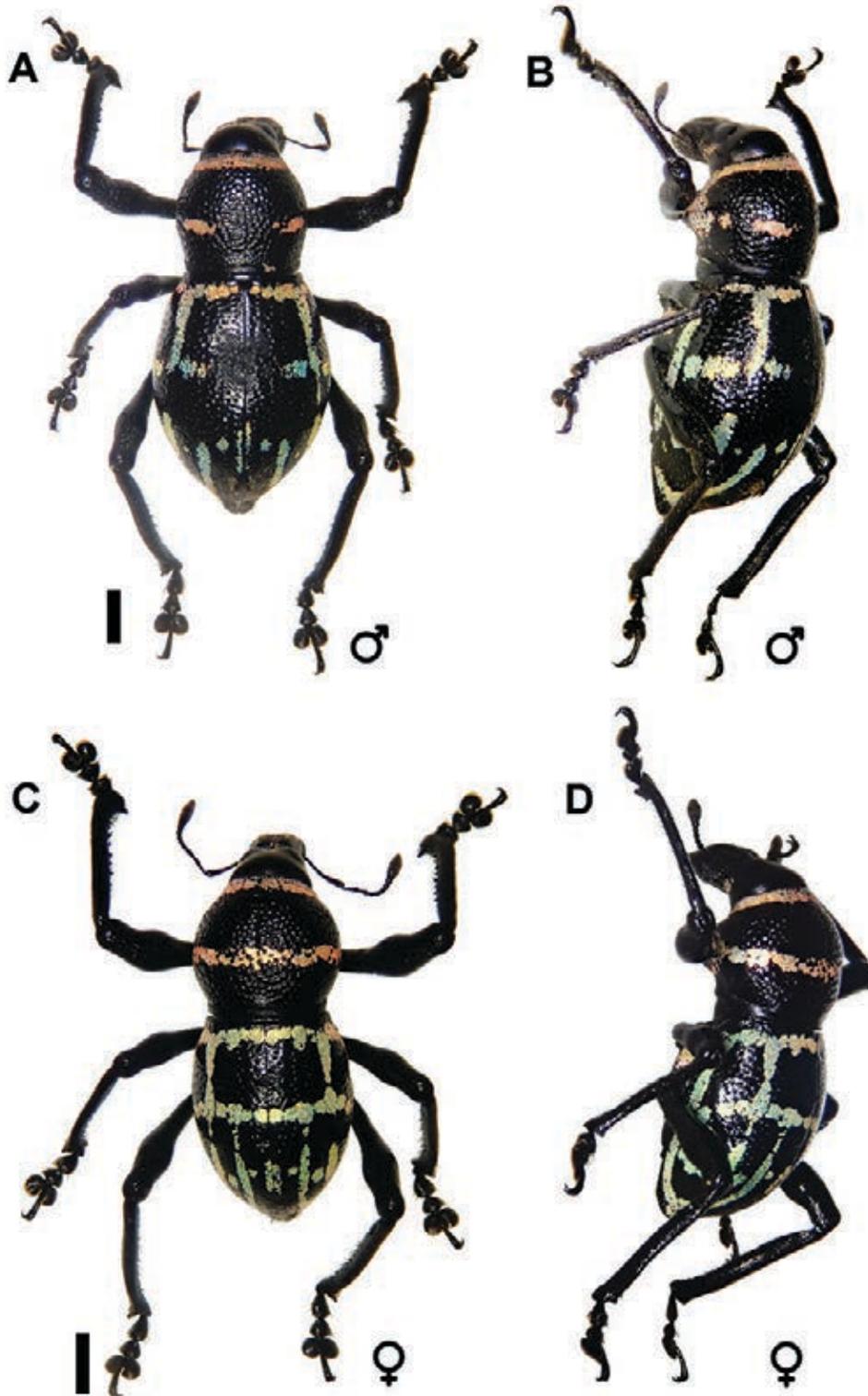


Figure 2. *Metapocyrtus mendioi* sp. nov. habitus male [A, B], female [C, D], dorsal [A, C], and lateral [B, D] views. Scale bars: 1 mm.

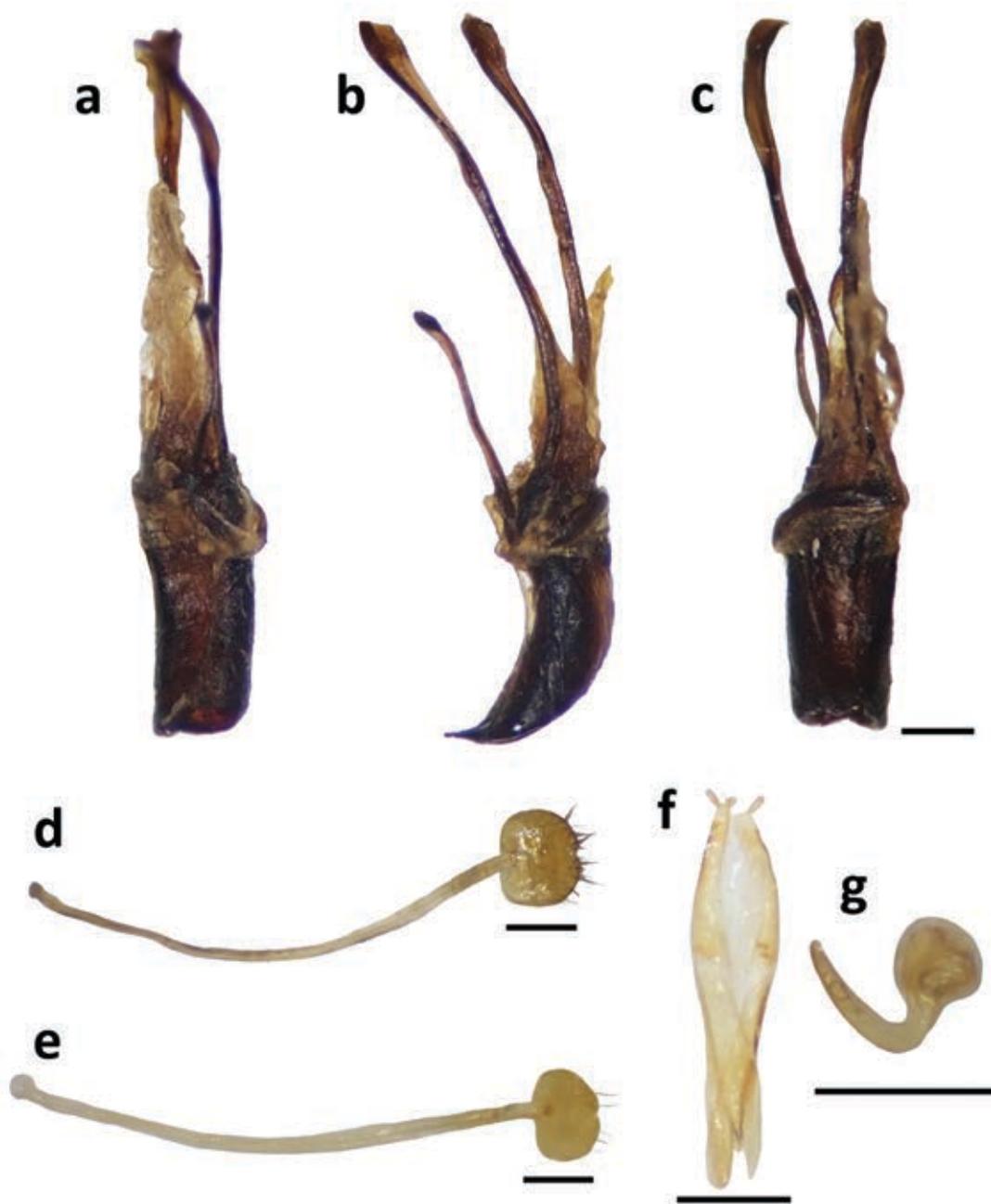


Figure 3. *Metapocyrtus mendioi* sp. nov. Male and female genitalia; aedeagus in ventral [a], lateral [b], and dorsal [c] view; sternite VIII in dorsal [d] and ventral [e] view; ovipositor [f]; and spermatheca [g]. Scale bars: 0.5 mm.



Figure 4. *Metapocyrtus mendioi* sp. nov. in its natural habitat perching on an epiphytic fern in the secondary montane forest ecosystem of Mount Natampod, Pantaron Range, San Fernando, Bukidnon, Mindanao, Philippines.

than segments II and III (1: 0.80: 0.6); segments IV, V, VI, and VII identical in size but three times shorter than segment I. Antennal club almost 1 mm in length and 0.45 mm in width, subellipsoidal in shape, and almost entirely covered with brown setae.

Pronotum sub-globular to globular, widest at the middle, weakly convex, glossy and coarsely granulated, with very minute and sparse hairs. In males, a thin band of rose gold, yellow-green, and golden yellow at the anterior margin confluent with the middle stripes at the latero-ventral side. In females, middle stripes not contiguous.

Elytra glossy black, striate punctuate with short hairs, slightly convex. Each elytron with three transverse bands confluent with the latero-ventral side: thin anterior band extending transversely confluent to the longitudinal thin band and the latero-ventral margin; thin transverse bands slightly in front of the highest point of elytron; a transverse band at apex formed by series of small spots. A longitudinal stripe along the first interval confluent with the anterior, middle, and apical transverse stripes. A short longitudinal stripe starting from apical band confluent with the median and latero-ventral thin bands.

Underside weakly lustrous with yellow and some green scales on the latero-ventral side of ventrites 1 and 3.

Legs with clavate femora. Fore, mid, and hind femora covered with short hairs along posterior margins with yellow and blue-green scales at the proximal ends. Fore tibiae armed with short spikes inner edge. Each tibia having scattered blue-green scales mingled with white short hairs.

Male and female genitalia as illustrated in Figure 3.

Notes on variability in markings. Two out of four specimens have yellow-green bands instead of rose gold ones; moreover, only one out of four specimens having non-intersecting middle transverse bands of the elytra.

Etymology. The new species is named after Michaelangelo P. Mendio, the Municipal Tourism Head of the Local Government Unit (LGU) of San Fernando, Bukidnon. His overwhelming support is very important in making the field sampling in Mount Natampod, Pantaron Range possible. The specific epithet is a noun in the genitive case.

2. *Metapocyrtus (Metapocyrtus) edmai* Patano, Amoroso & Yap, sp. nov. (Figures 5 and 7)

Material examined. Holotype, male (Figures 5C and D): PHILIPPINES: Mindanao, Bukidnon, Mount Natampod, Pantaron Range; Natampod, 7°51'41.2"N, 125°25'24.32"E, 1,056 masl; 25 Jun 2021; coll. R.R.

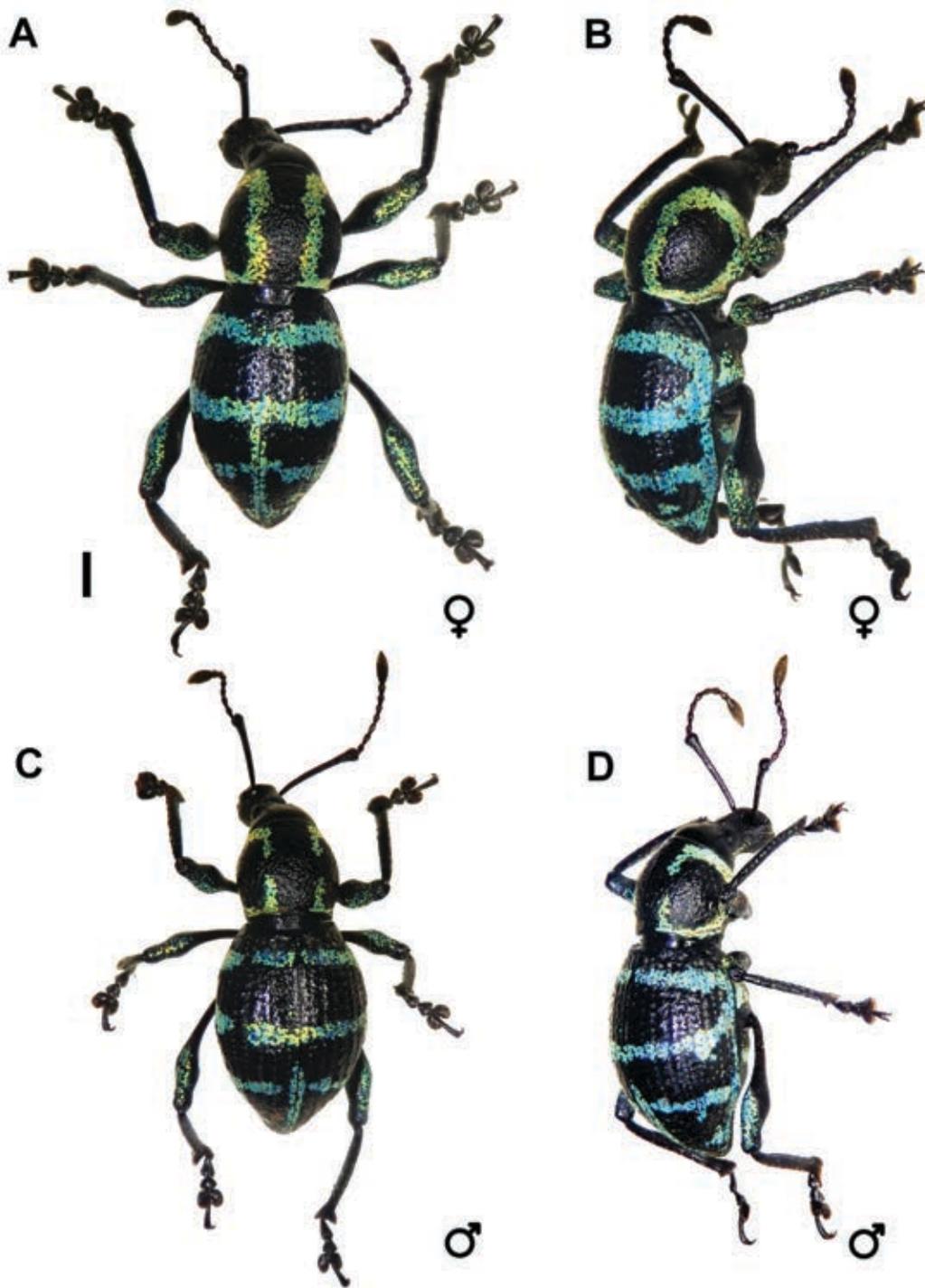


Figure 5. *Metapocyrtus edmai* sp. nov. habitus female [A, B] and male [C, D] in dorsal [A, C] and lateral [B, D] views. Scale bar: 1 mm.

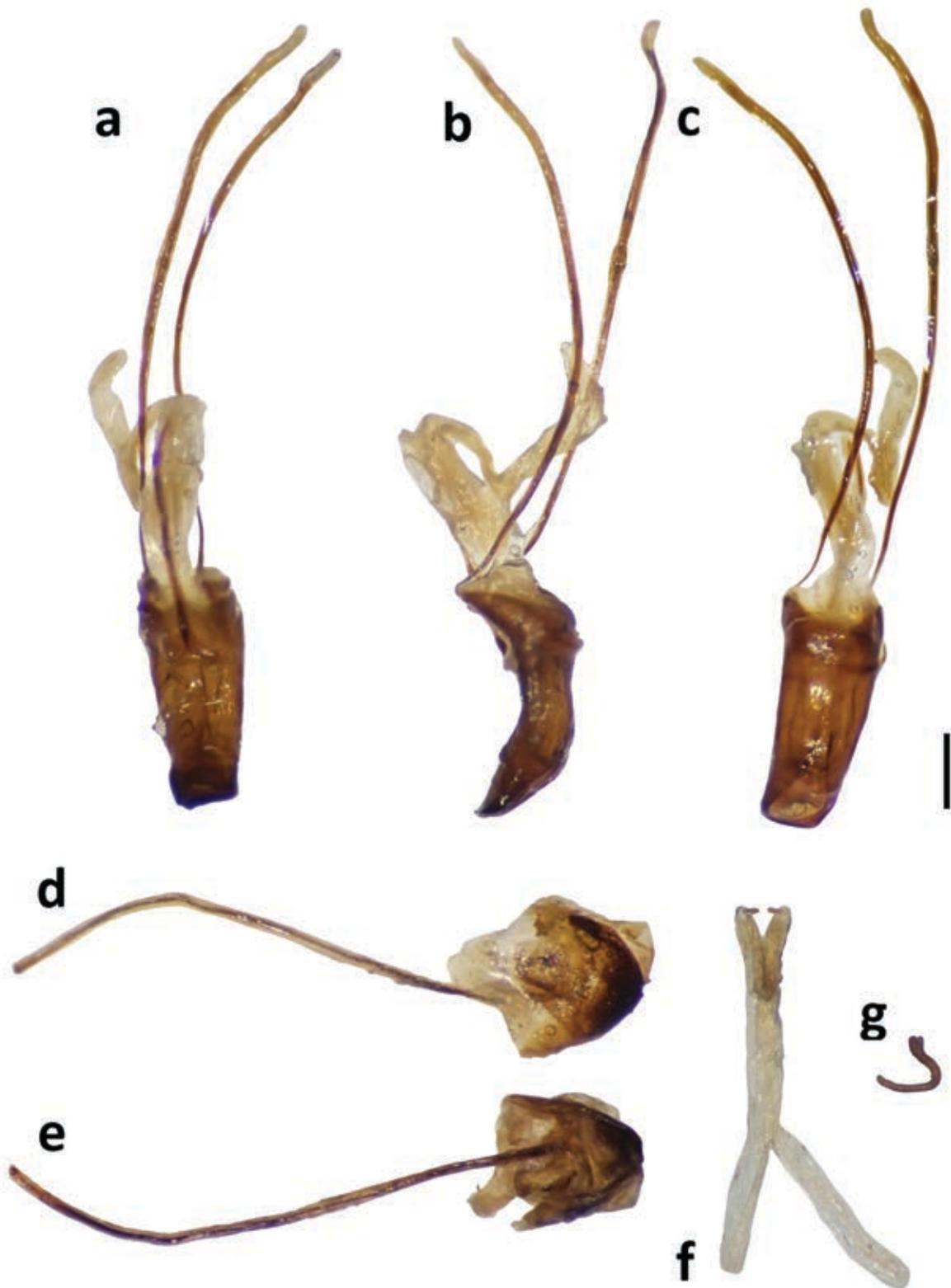


Figure 6. *Metapocyrtus edmai* sp. nov. male and female genitalia; aedeagus in ventral [a], lateral [b], and dorsal [c] view; sternite VIII in dorsal [d] and ventral [e] view; ovipositor [f]; and spermatheca [g]. Scale bar: 0.5 mm.



Figure 7. *Metapocyrtus edmai* sp. nov. in its natural habitat perching on an understory plant (*Tridax procumbens* L.) in the secondary montane forest ecosystem of Mount Natampod, Pantaron Range, San Fernando, Bukidnon, Mindanao, Philippines.

Patano Jr., A.B. Mohagan, and V.B. Amoroso (Central Mindanao University, University Museum, Zoological Section); one paratype, female, same data as the holotype [CMU-MZ 13004 (holotype) and 13005].

Diagnosis. The new species differs from all known congeners by the presence of two circular markings of light yellow and yellow-green scales formed by longitudinal and lateral margins on the pronotum. Presence of four transverse bands in the elytra confluent to each other through the lateral margin bands.

Description. Measurements ($n = 2$): BL 8.0–8.3 (8.0 holotype), EL 4.5–5.35 (4.5 holotype), WE 3.2–3.3 (3.2 holotype), PL 2.1–2.6 (2.1 holotype), WP 2.0–2.5 (2.0 holotype), RL 1.2–1.45 (1.2 holotype), and WR 1.0–1.1 (1.0 holotype).

Integument black. Body surface mostly shiny except underside with weaker luster. Body mostly finely striate punctured, with markings of mostly glossy transverse dark blue scales, more or less mingled with minute hairs and scales.

Head sparsely minutely pubescent. Eyes, antennae, and tarsomeres black. Eyes small and weakly convex with few scattered yellow-green scales below. Antennal scape smaller compared to funicle plus club (1: 1.3). Funiculus

composed of seven segments: segment I two times as long as wide and widest at the distal end, just slightly longer compared to the segments II, III, and IV (1: 0.90: 0.85: 0.83); segments V, VI, and VII identical in size but slightly shorter than segment I. Antennal club almost 1 mm in length and 0.31 mm in width, subellipsoidal in shape, and almost entirely covered with brown setae.

Rostrum rugose, slightly longer than wide with white setae and long yellow hairs towards the apex, with the presence of a prominent longitudinal median groove. Ventral and lateral sides with scattered short hairs.

Pronotum subglobular in shape, weakly convex, plus dorsally and finely granulated. Two circular markings formed by the longitudinal markings confluent with the anterior, posterior, and lateral bands at the base of the lateral margin. Markings composed of mixed light yellow to yellow-green scales.

Elytra with regular coarsely striate-punctate, very weakly convex, mingled short apical hair. Four transverse bands for each elytron; broad bands on the sub-basal, middle, sub-apical, and apical confluent to each other. The sub-basal band broad transversely extending lateral margin; the middle transverse band broad located medially of the elytra; the sub-apical band confluent apical transverse

band through a short longitudinal band at the middle. Underside dense dark blue to light blue scales on the basal lateral margin of the pronotum confluent with the four transverse bands. Presence of markings in the latero-ventral side of ventrites 1 and 3.

Legs black with white short hairs. Fore, mid, and hind femora almost 3.8 mm long and 0.9 mm in width with dense scale markings at the ventral side at the distal end. Tibiae with some scattered scales and armed with tooth-like projections at the inner margin covered with short setae. Tarsomeres covered with brown sparse setae.

Male and female genitalia as illustrated in Figure 6.

Etymology. The new species is named after Levi C. Edma Sr., the Mayor of the Municipality of San Fernando, Bukidnon. His overwhelming support to the biodiversity research program leads to many discoveries in Mount Natampod, Pantaron Range, including the two new species described herein. The specific epithet is a noun in the genitive case.

Habitat, ecology, and threats. The two new species were both collected in the tropical secondary upper montane forest of Mount Natampod, Pantaron Range, Natampod, San Fernando (Figure 8). Specimens of the two new species were observed mating in epiphytic ferns (*Asplenium* spp.), whereas some were perching

on shrub and understory plants (*Tridax procumbens* L.). Mount Natampod, Pantaron Range has its highest elevation of 1,140 masl and lowest elevation of 774 masl characterized by having secondary montane to agroforest ecosystems. The forest over a loamy substrate with some gravel is dominated with very common pteridophytes such as *Taenitis blechnoides* (Willdenow) Swartz, *Lindsaea hamiguitanensis* Karger & Amoroso, *Diplazium cordifolium* Blume and *Calochlaena javanica* (Blume) Turner & White, and trees and shrubs such as *Spiraeopsis celebica* (Blume) Miq., *Shorea polysperma* (Blco.) Merr., *Callophylum blancoi* Planch & Triana, and *Shorea* sp. The agroforest ecosystem in lowland areas is most dominated by planted crop plants such as *Musa textilis* Née (*abaca*), *Zea mays* L., and *kamote* (*Ipomoea* spp.). Some Mindanao endemic weevil and pygmy grasshopper species were also observed in the site such as *Metapocyrtus kitangladensis* Cabras *et al.* 2019; *Metapocyrtus apoensis* Schultz, 1925; *Tegotettix derije* Patano *et al.* 2021c; *Arulenus validispinus* Stål, 1877; and *Hirrius punctatus* Stål, 1877. Some of the threats to biodiversity observed in the site are human activities and exploitations, *i.e.* road construction, logging, agricultural activities such as the *abaca* plantation, and infrastructure development. Conservation and protection initiatives of this mountain range must be given high priority.



Figure 8. Habitat of the two new species of *Metapocyrtus*, a tropical secondary upper montane rainforest of Mount Natampod, Pantaron Range, San Fernando, Bukidnon, Mindanao, Philippines.

Distribution of *Metapocyrtus* in the Philippines

The Philippines now has 272 species, with the additional two new species of *Metapocyrtus* described herein; Luzon is still the island with the highest number of species, having 129. Mindanao overtook the Visayas with 71 and 51 *Metapocyrtus* species, respectively. Studies and discoveries are more concentrated recently in Mindanao and its adjacent islands. It is expected that many more new species will be discovered in Mindanao Island, as there are still large areas of forested and mountain ecosystems to be explored and sampled.

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