

A new subspecies of *Pachyrhynchus corpulentus* Schultze, 1922 (Entiminae: Pachyrhynchini) from Northern Mindanao, the Philippines with notes on species ecology

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Pachyrhynchus corpulentus ssp. *balatukan* subsp. nov., a new subspecies of Easter egg weevil, is described and illustrated from Mount Balatukan, Misamis Oriental, Mindanao, Philippines. Additionally, information about the habitat of the species and potential threats is also provided herein.

Key words: Coleoptera, *Pachyrhynchus*, montane forests, Mount Balatukan, the Philippines

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INTRODUCTION

The Philippines is known as the home of numerous unique and charismatic beetles, most of which can only be found in the archipelago. Some of these taxa that have very high endemism came from one of the speciose groups of the family Curculionidae,

which belongs to the genus *Pachyrhynchus* Germar, 1824.

This genus is a member of the tribe Pachyrhynchini, which includes flightless weevils that can be easily distinguished by their complete episternal suture and antennal scape that does not extend to the posterior

margin of the eye (Schultze, 1923). There are currently 174 *Pachyrhynchus* species in the Oriental region, with the just recently described species, *P. cebrem* Patano & Rukmane-Bärbale, from Mount Candalaga in Mindanao adding to over 55 known species in the Island (Yoshitake, 2012; Rukmane, 2018; Bollino *et al.*, 2017; Bollino *et al.*, 2020; Patano *et al.*, 2023; Cabras *et al.*, 2021; Cabras *et al.*, 2022).

Despite the presence of many *Pachyrhynchus* species in Mindanao Island, there are still many underexplored forest and mountain ecosystems, including some of the most important mountain ranges in Northern Mindanao. One of these is the Mount Balatukan Range Natural Park (MBRNP) situated within the region of Misamis Oriental, where the recently described *P. panumanon* was most likely discovered (Cabras *et al.*, 2022). In addition to this recently described site-endemic species, our recent preliminary field sampling collected a new species, *Pachyrhynchus corpulentus* ssp. *balatukan* **subsp. nov.**, that is described herein. We also provide details on its habitat, ecology, and threats.

MATERIALS AND METHODS

Specimens of the new species described herein were collected in Mount Balatukan, Barangay Civoleg, Misamis Oriental, Mindanao, Philippines (1,294 m asl; 24–27 March 2023) (Figure 1). This pristine mountain ecosystem was surveyed from its base, which is characterized as mixed agroforests, to the peak, which is classified as an upper montane forest habitat. An established trail was used, covering 20 meters on both sides, where the specimens were collected using a visual encounter, opportunistic and random sampling in pre-identified trails. All the specimens of the new species were first photographed in their natural habitat and then collected by

handpicking, whenever encountered during the diurnal and nocturnal (07:00–22:00 hours) period. Collected specimens were then preserved in vials filled with absolute ethyl alcohol.

The collected specimens were then brought to the museum for further processing. The specimens were then air-dried, mounted, and appropriately labeled. The morphological examination of the species was undertaken with the use of a Labomed stereomicroscope. Photographs were then taken using an Olympus Digital Camera. All images were processed using a licensed version of Photoshop CS6 Portable software. The methodology of Yoshitake (2011) was followed for the morphometrics and extraction of genitalia.

Following are the abbreviations used in the measurements:

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 millimeters.

All the type specimens collected in this study were initially deposited in the Central Mindanao University, University Museum (CMU-MZ), Zoological Section, Curculionidae collection.

RESULTS AND DISCUSSION

Pachyrhynchus corpulentus ssp. *balatukan*
Patano & Macalaba **subsp. nov.**
(Figs. 2-3, 4B, 6)

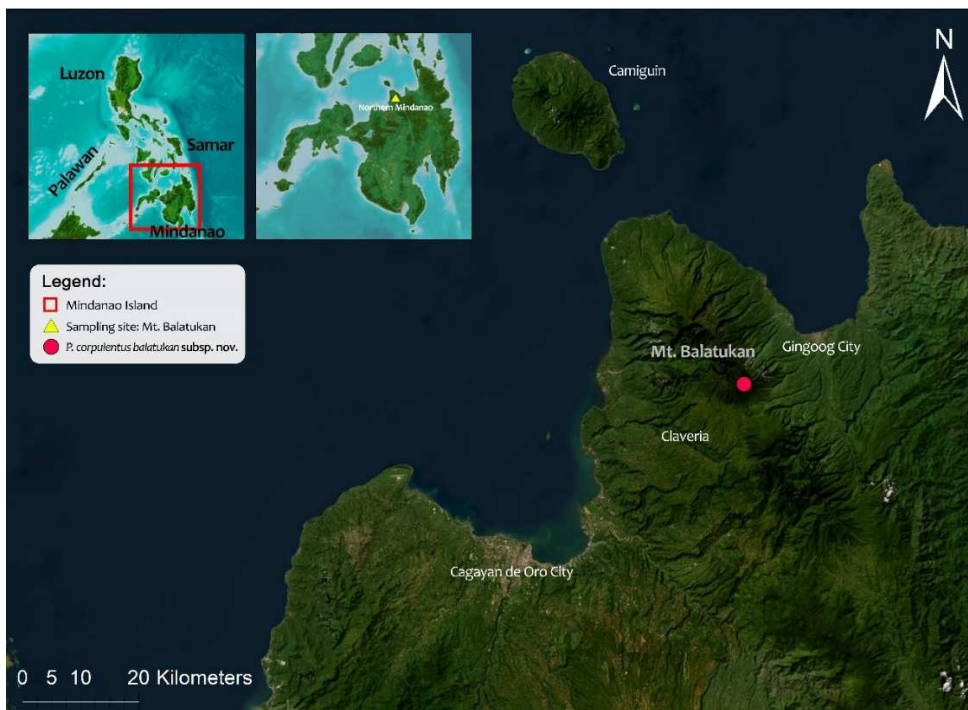


Fig. 1. Map of the Philippines and Mindanao showing Mount Balatukan, Civeleg, Gingoog City, Misamis Oriental ($8^{\circ}43'26''$ N, $125^{\circ}00'13''$ E; 1,294 m asl) where the specimens of the new subspecies were collected.



Fig. 2. *Pachyrhynchus corpulentus balatukan* subsp. nov. habitus holotype male (c, d), paratype female (a, b), dorsal (a, c), and lateral (b, d) views. Scale bar: 3 mm.



Fig. 3. *Pachyrhynchus corpulentus balatukan* **subsp. nov.** male aedeagus in lateral (a), ventral (b), dorsal (c). Scale bar: 0.5 mm.

Material examined. Holotype, male: “PHILIPPINES: Mindanao, Mount Balatukan, Gingoog City, Misamis Oriental, 1,294 m asl, 24-27 March, coll. R.R. Patano Jr., J.A. Macalaba, M.S. Alsa and E.P. Maglangit” (white printed label). With the following red label: “HOLOTYPE, *Pachyrhynchus corpulentus* ssp. *balatukan* Patano & Macalaba, 2023”.

Paratypes: 2 females, same white label as the holotype, with the following red label: “PARATYPE, *Pachyrhynchus corpulentus* ssp. *balatukan* Patano & Macalaba, 2023” (Central Mindanao University, University Museum, Zoological Section).

Differential analyses: *Pachyrhynchus corpulentus* ssp. *balatukan* **subsp. nov.** belongs to the *schoenherri* species group by the following features: 1) integument red; 2) eyes weakly convex from outline of the head; 3) prothorax subglobular, weakly convex, base strongly constricted; 4) patch of scales on both sides of pronotum medially (Bollino *et al.*, 2017). The new subspecies belongs to *P. corpulentus* Schultz, 1922 (Fig. 7) by presence of two longitudinal scale stripes on prothorax dorsally and features of rostrum (Fig. 8) but can be distinguished by the following features: 1) prothorax of *P. balatukan* sp. nov. with two narrow, longitudinal spots on disc dorsally similarly as in *P. corpulentus*, but shorter in

length and much narrower, with color of cyan and blue instead of orange to green as in *P. corpulentus*, rest of the group species with round to transverse spots; 2) small, round to transverse spots on elytra, elytral spots of the rest taxa of the group *schoenherri* strongly bigger or line-like; 3) one sutural spot at apical 1/3 of elytra instead of two sutural spots in rest of the species.

Description. Male. Measurements: BL: 12.25; EL: 8.8; WE: 6.65; PL: 4.45; WP: 3.9; RL: 2.2; WR: 2.0. N = 1 for all measurements.

Body and legs dark glowing red, body very shiny except underside with weaker luster. Body mostly finely punctured, with markings of round to oval cyan, blue and yellow scales. Dorsal habitus as shown in Fig. 2C, and lateral habitus as shown in Fig. 2D.

Head glabrous, minutely punctured on ventral and dorsal parts; two small spots in the middle of the forehead, subelliptic to long oval patch on each laterodorsal part below eye; forehead between eyes weakly depressed.

Rostrum slightly wider than long (WR/LR: 1.09), clearly depressed on basal half, with deep triangular impression, apical half weakly bulging; in dorsal contour straight, in lateral contour with impression just after the middle; dorsum minutely pubescent, lateral surface with sparse patch of cyan, blue and yellow recumbent scales, long brown hairs at anterolateral margin (Fig. 6).

Eyes small, moderately convex from the outline of head; antenna strongly clavate, scape shorter than funicle, with fine minute brown hairs towards the apex; antennal scape shorter than funicle and club; antennomeres I and II subequal in width (W:

0.53 mm), three times as long as wide, antennomeres III - VII subequal in size, three times as short as I and II (0.20 mm); club almost 1 mm in length and 0.46 mm in width, subellipsoidal in shape, nearly covered with brown setae.

Pronotum subglobular, longer than wide (LP/WP: 1.20), widest at the middle, weakly convex, with the following scaly markings: 1) two thin elongated spots on each dorsolateral part of disc from just before the middle to subbasal part 2) ventral part with small patch of scales before the coxa medially.

Elytra ovate, longer than wide (LE/WE:1.28), intervals smooth, nearly without punctured rows, each elytron with the following five to eight scaly spots: 1) two small transverse spots along lateral margin, one at subbasal part, one at medial part; 2) small rounded spot at subbasal part dorsally along interval II; 3) two transverse elongated small spots just before the middle, one along lateral submargin, one from interval III to IV; 4) one transverse elongated small spot at apical 1/3 redirected laterally; 5) small roundish sutural spot at apical 1/2; 6) small roundish spot near apex; metasternum with two irregular spots, each redirected laterally; ventrite I with two small round spots at subapical part, each redirected laterally.

Femora strongly clavate, with short white hairs; fore and mid femora almost 5.2 mm long and 1.4 mm in width, thinly covered with short setae and hair-like scales along posterior margins; tibiae with serrated projections along inner edge with short setae and small patch of cyan to yellowish scales at apical third; tarsomeres coppery black to black.

Aedeagus short, arcuate in lateral view; lamella short and wide, clearly pointed apically (Fig. 3).



Fig. 4. Habitat of *Pachyrhynchus corpulentus balatukan subsp. nov.* (b), a mixed agro-forest (a) of Mount Balatukan, Civoleg, Gingoog City, Misamis Oriental, Mindanao, Philippines.



Fig. 5. Mount Balatukan (a) and some of the common threats in the area such as the clearing of forests for *Falcata* (b) and squash (*Cucurbita maxima* Duch.) (b) plantations.



Fig. 6. Rostrum and underside of *P. corpulentus balatukan* subsp. nov.: A – lateral view; B – dorsal view; C – underside.

Female. Measurements: BL: 13.0-13.5; EL: 9.35-9.65; WE: 7.0-7.1; PL: 3.9-4.0; WP: 3.15-4.05; RL: 2.3-2.6; WR: 2.0-2.05. N = 2 for all measurements. Body bigger, elytra wider, otherwise essentially as in males. Dorsal habitus as shown in Fig. 2A, and lateral habitus as shown in Fig. 2B.

Etymology. The new species is named after its only known habitat, which is Mount Balatukan, one of the unexplored pristine

mountain ecosystems in Northern Mindanao.

Distribution. *P. corpulentus* Schultze in general is Distributed on Northern Mindanao with various distribution records reported. Type species was described from Lindabon. The new subspecies is only known from Mount Balatukan – the far North from type locality (Fig. 1).



Fig. 7. Type of *P. corpulentus* Schultze, 1922.

Habitat, Ecology, and Threats. The new subspecies was collected in Mount Balatukan Range Natural Park (MBRNP). The mountain range has its highest elevation of 2,238 meters above sea level. Specimens of *Pachyrhynchus corpulentus* ssp. *balatukan* **subsp. nov.** were collected in the mixed agro-forest habitat in the locality of Sitio San Isidro, Barangay Civoleg, Gingoog City, with an elevation of 1,250–1,350 meters above sea level. The new species was observed perching in understory plants and may disperse from its feeding sources (Fig. 4). Habitat is mostly composed of vegetation, which includes the following plants *Dillenia philippinensis* Rolfe, *Hellenia speciosa* (J. Koenig) Govaerts, *Freycinetia multiflora* Merr., ferns *Nephrolepis* spp., *Sphaeropteris glauca* (Blume), aroids, gingers, and climbing

vines. Unfortunately, numerous human-made disturbances threaten its diverse flora and fauna. One of the major threats is the cutting of indigenous plants in pristine forests for crop plants such as *Musa textilis* Née, *Coffea arabica* Linnaeus, 1753, *Cucurbita maxima* Duch., and *Falcata* spp. (Figure 5). In addition, the construction of roads and buildings also vanished wide portions of the forested areas of Mount Balatukan. Forest monitoring activities, planting of native and indigenous trees, and educational awareness campaigns on the importance of Mt. Balatukan are recommended to lessen the possible detrimental effects of anthropogenic pressures on this significant protected area in Northern Mindanao.



Fig. 8. Rostrum of *P. corpulentus corpulentus* Schultze, 1922.

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