
***Pachyrhynchus panumanon* sp.nov., a new species of easter egg weevil
(Coleoptera, Curculionidae, Entiminae, Pachyrhynchini) from
Northern Mindanao, Philippines**

¹Analyn Anzano Cabras, ²Melbert Baul, ³Reagan Joseph Villanueva,
¹Milton Norman Medina

^{1,4} Coleoptera Research Center, University of Mindanao, Davao City, Philippines

² College of Arts and Sciences Education, University of Mindanao,
Matina, Davao City

³ Human Resources for Health Network, Department of Health Center for Health Development -
Northern Mindanao, J.V. Serina Street, Carmen,
Cagayan de Oro City, Philippines

Corresponding author: A.A. Cabras, ann.cabras24@gmail.com

Abstract

A new species of easter egg weevil belonging to the *Pachyrhynchus speciosus* group from Misamis Oriental, Mindanao Island, Philippines is described with brief notes on its ecology and behavior.

Keywords: biodiversity, novel species, *speciosus* group, taxonomy, weevils.

Introduction

The genus *Pachyrhynchus* Germar of the tribe Pachyrhynchini is flightless plant-feeding weevils with its center of diversity in the Philippines. They are one of the most conspicuous beetles in the world due to their colorful elytra adorned with bright iridescent markings often used as an aposematic signal (Tseng et al., 2014). The genus is represented by roughly 165+ species, wherein 94% are endemic to the country (Schultze, 1923; Rukmane, 2018; Bollino, 2022; Cabras et al., 2022). Mindanao, the second biggest island in the Philippines, is home to more than 60 species of *Pachyrhynchus*. Some of the recently described species belong to *Pachyrhynchus speciosus* species group (Cabras & Rukmane, 2016; Yoshitake, 2017; Yoshitake et al., 2019). This group is currently represented by species from Greater Mindanao Pleistocene Aggregate Island Complex (PAIC), a group of islands comprised of mainland Mindanao and nearby smaller islands (*i.e.*, Siargao, Dinagat, Bohol, Samar, Leyte, Basilan, Biliran) with less than 200 meters isobaths and previously connected due to the lowering of the sea level (Catibog-Sinha & Heaney, 2006). This group is distinguished from other *Pachyrhynchus* species groups by a set of characters provided by Rukmane and is currently represented by 13 species (Rukmane, 2019). Despite the increasing number of new Pachyrhynchini species in the region during the past decade, more species are still expected to be discovered in Mindanao as it remain under-documented. In the last expedition of the authors, a new species from northern Mindanao was collected. Together with specimens donated by colleagues, the new species is described with short notes of its ecology and behavior.

DOI: <https://doi.org/10.53716/jtc.3.1.11.2022>

ZOOBANK: <https://zoobank.org/References/6224F087-029C-4D7A-A7E9-CC0234EF2899>

Received: 29 April 2022

Published: 30 July 2022

www.jtcoleop.com

Materials and methods

The specimens deposited in the University of Mindanao Coleoptera Research Center were collected by sheet beating and handpicking and killed in vials with ethyl acetate. Morphological characters were observed under Luxeo 4D and Nikon SMZ745T stereomicroscopes. Illustrations and treatment of the genitalia followed Yoshitake (2011). The female anatomical parts are no longer illustrated due to little or almost no use in delineating species (Cabras et al. 2022). Images of the habitus and genitalia were taken using a Nikon D5300 digital camera with a Sigma 18–250 macro lens. All images were stacked and processed using a licensed version of Helicon Focus 6.7.0 and Photoshop CS6 Portable software. Label data are indicated verbatim. Abbreviations and symbols mentioned in this paper are abbreviated as follows:

/ different lines;

// different labels;

LB length of the body in dorsal view, from the apical margin of the pronotum to the apices of the elytral;

LE length of the elytra in dorsal view, from the level of the basal margins to the apices of the elytral;

LP length of the pronotum, from the base to apex along the midline;

LR length of the rostrum;

WE maximum width across the elytra;

WP maximum width across the pronotum;

WR maximum width across the rostrum.

Comparative materials and specimens used in the study are deposited in the following institutional collections:

PNMNH Philippine National Museum of Natural History, Manila, Philippines;

SMTD Senckenberg Natural History Collections, Dresden, Germany;

UMCRC University of Mindanao Coleoptera Research Center, Davao City Philippines.

Taxonomy

Pachyrhynchus panumanon Cabras & Medina sp. nov.

(Fig. 1 A–D)

Material. Holotype (Fig. 1 A– B), male: Philippines – Mindanao / Gingoog City/ v.2022 / Lg. LC/ coll. UMCRC (typed on white card) // HOLOTYPE male / *Pachyrhynchus panumanon* / CABRAS & MEDINA 2022 (typed on red card). Presently in UMCRC, it will be deposited in the Philippine National Museum of Natural History (PNMNH) under the National Museum of the Philippines (NMP). Paratypes. 6 ♂♂, 11 ♀♀: same data with holotype. Presently in UMCRC.

DOI: <https://doi.org/10.53716/jtc.3.1.11.2022>

ZOOBANK: <https://zoobank.org/References/6224F087-029C-4D7A-A7E9-CC0234EF2899>

Received: 29 April 2022

Published: 30 July 2022

www.jtcoleop.com

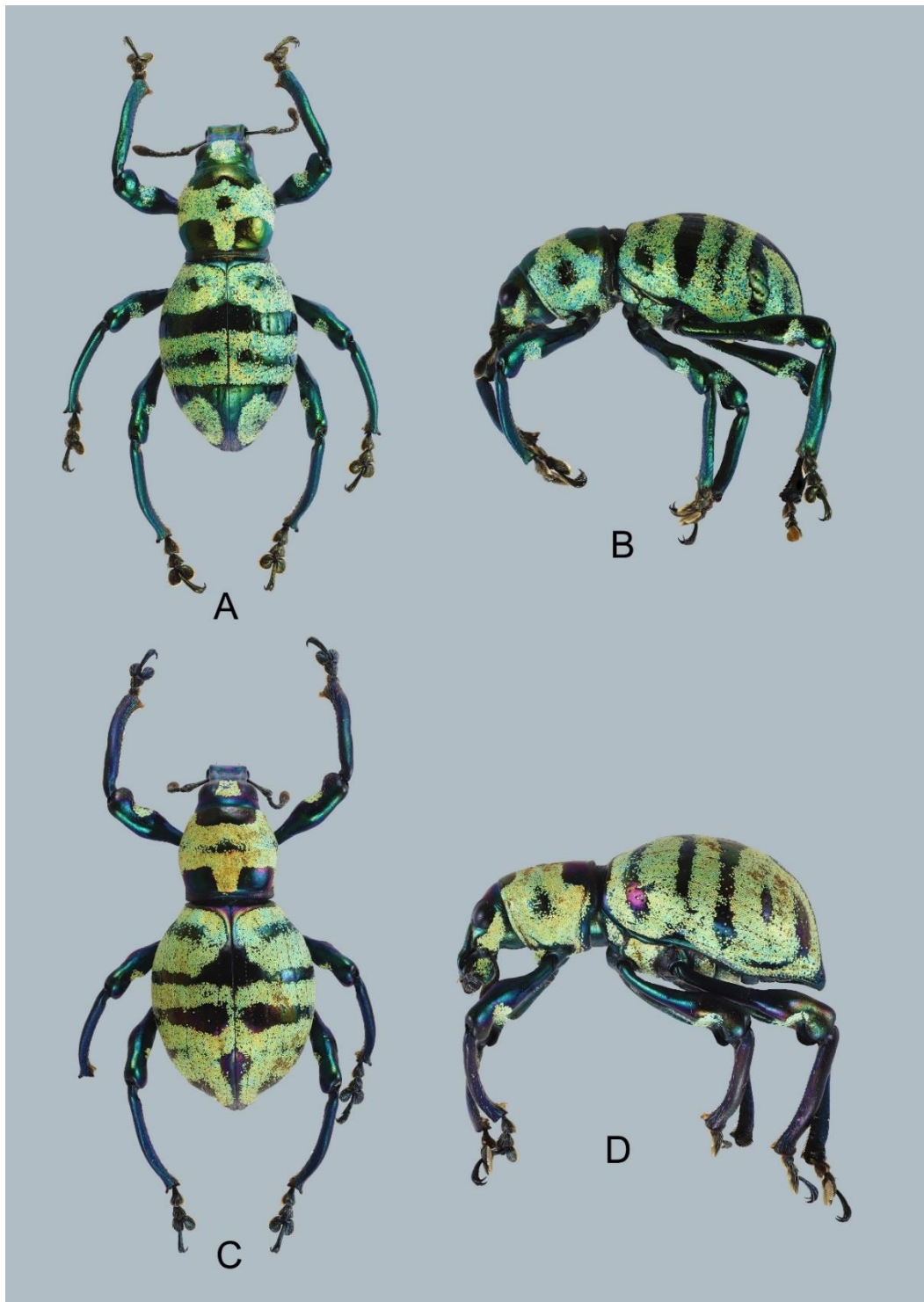


Figure. 1 A-D. *Pachyrhynchus panumanon* sp. nov.: A- B, Holotype male; A. dorsal view, B. lateral view. C- D, Paratype female; C. dorsal view, D. lateral view

DOI: <https://doi.org/10.53716/jtc.3.1.11.2022>

ZOOBANK: <https://zoobank.org/References/6224F087-029C-4D7A-A7E9-CC0234EF2899>

Received: 29 April 2022

Published: 30 July 2022

www.jtcoleop.com



Figures 2 A–C. Male genitalia of *Pachyrhynchus panumanon* sp. nov. aedeagus in dorsal view A, idem in lateral view B, sternite IX in dorsal view C.

Diagnosis: *Pachyrhynchus panumanon* sp. nov. belongs to *Pachyrhynchus speciosus* species group. It differs from its congeners for a combination of the following characters: a) color of the body and investiture ranging from green, purple, and black, b) cross-shape scaly pronotal marks, c) unique scaly elytral marks consisting of two thick elliptical rings on basal third, two thick transverse median stripes from suture to lateral margin, and a subtriangular ring on apical third which extends from stria I to lateral margin. Other *Pachyrhynchus* species with cross shape pronotal marks are *Pachyrhynchus davaoensis* Schultze, 1934, *Pachyrhynchus notocruciatus* Yoshitake 2017, and *Pachyrhynchus cabrasae* Rukmane & Barševskis, 2016. However, *P. panumanon* sp. nov. differs from *P. cabrasae* for having three bands in the elytra whereas *P. cabrasae* has net-like elytral marks, and although it shares similar elytral bands with *P. davaoensis* and *P. notocruciatus*, it differs for having greenish to purple, and black body color, subglobular pronotum, and slender body with a faintly narrowed subapical constrictions.

Description. Dimensions : LB: 10.4–10.8 (holotype 10.4 mm). LR: 2.0–2.2 (holotype 2.0 mm). WR: 1.7–1.9 (holotype 1.7 mm). LP: 4.6–4.8 (holotype 4.6 mm). WP: 4.6–4.8 (holotype 4.6 mm). LE: 7.5–8.0 (holotype 7.5mm). WE: 6.0–6.5 (holotype 6.0mm). N=7.

Integument of elytra metallic green with a golden sheen. Body dorsal surface, rostrum, and head glossy, and ventral surface with weaker luster.

DOI: <https://doi.org/10.53716/jtc.3.1.11.2022>

ZOOBANK: <https://zoobank.org/References/6224F087-029C-4D7A-A7E9-CC0234EF2899>

Received: 29 April 2022

Published: 30 July 2022

www.jtcoleop.com

Body mostly covered with hairs and with lustrous golden yellow and turquoise recumbent round scales. **Head** with minute punctures and very fine hairs, weakly corrugated on lateral sides, and with two prominent markings: a) a large scaly subcircular patch of metallic golden yellow, and turquoise recumbent round scales on dorsum between the eyes, and b) large elliptical patch of metallic golden yellow, and turquoise recumbent round scales interspersed with sparse minute subadpressed setae on lateroventral parts behind eyes; forehead between eyes weakly depressed. Eyes medium-sized and strongly convex from the outline of head. **Rostrum** slightly longer than wide (LR/WR: 1.17), basal half with shallow concavity with nearly obscure shallow median sulcus, apical half dorsally flattish, contour of dorsal surface flattish on basal half then gradually raised and weakly and gradually arcuate towards apex; lateral sides with weakly widened apicad; dorsum with minute punctures and hairs, lateral surface with a patch of shiny turquoise and bluish recumbent elliptic scales, and long suberect light yellow hairs at the antero-lateral surface. Antenna strongly clavate, scape shorter than the funicle, scape with sparse, recumbent bluish setae, and fine and very adpressed hairs. Funicle with suberect brownish hairs. Funicular segment I and II nearly 1.5 times longer than wide; segments III-VI as long as wide; segment VII slightly longer than wide; club sub-ovoid, nearly twice longer than wide.

Prothorax subglobular, as long as wide (LP/WP: 1.0), sparsely covered with very minute hairs, weakly corrugated on lateral sides, widest at middle, weakly convex, and with metallic scaly markings of metallic golden yellow, and turquoise recumbent, round scales: a) cross-band in the middle of the pronotum, with transverse band extended towards lateral sides, and b) large semi-circular rings at lateral sides confluent with the cross-band.

Elytra ovate, longer than wide (LE/WE:1.25), moderately wider and longer than prothorax (WE/WP: 1.3, LE/LP: 1.63), lustrous metallic green, conspicuously covered in finer hairs on basal half, and longer hairs on apical half, coarsely striate-punctate, dorsum moderately and uniformly convex in profile with a gradual apical declivity. Each elytron has scaly markings of metallic golden yellow and turquoise recumbent round scales: a) two thick elliptical rings on basal third, from suture towards lateral sides, b) two thick transverse median stripes from suture to lateral margin, well separated but confluent both on suture and lateral margin, and c) subtriangular ring on apical third which extends from stria I to lateral margin. All three scaly markings are confluent in the lateral margin.

Legs with strongly clavate femora, covered in minute punctures and hairs. Femora with golden-yellow, and turquoise round scales at apical third interspersed with brownish adpressed setae. Tibiae with sparse brown hairs, weakly serrate along inner edge with longer suberect brownish hairs. Fore, mid, and hind tibiae bear a mucro at apex. Tarsomeres covered with dense pubescence. Coxae with sparse brown hairs. Forecoxa with partially covered golden-yellow and turquoise round scales. **Abdomen:** Mesoventrite with scaly patch of golden yellow and turquoise round scales. Metaventrite strongly depressed covered with golden yellow and turquoise round scales interspersed with sparse short hairs. Ventrite I strongly depressed on disc with golden yellow and turquoise round scales interspersed with hairs on distal ends near apical margins. Ventrite II almost covered with golden yellow, and turquoise round scales interspersed with yellowish hairs except middle of disc. Ventrites III-V with sparse brown short hairs and coarsely punctured on distal ends. Apical half of Ventrite V with sparse brown hairs, mostly coarsely punctured and weakly rugose. Male genitalia as shown in Figure 3 A-C.

DOI: <https://doi.org/10.53716/jtc.3.1.11.2022>

ZOOBANK: <https://zoobank.org/References/6224F087-029C-4D7A-A7E9-CC0234EF2899>

Received: 29 April 2022

Published: 30 July 2022

www.jtcoleop.com

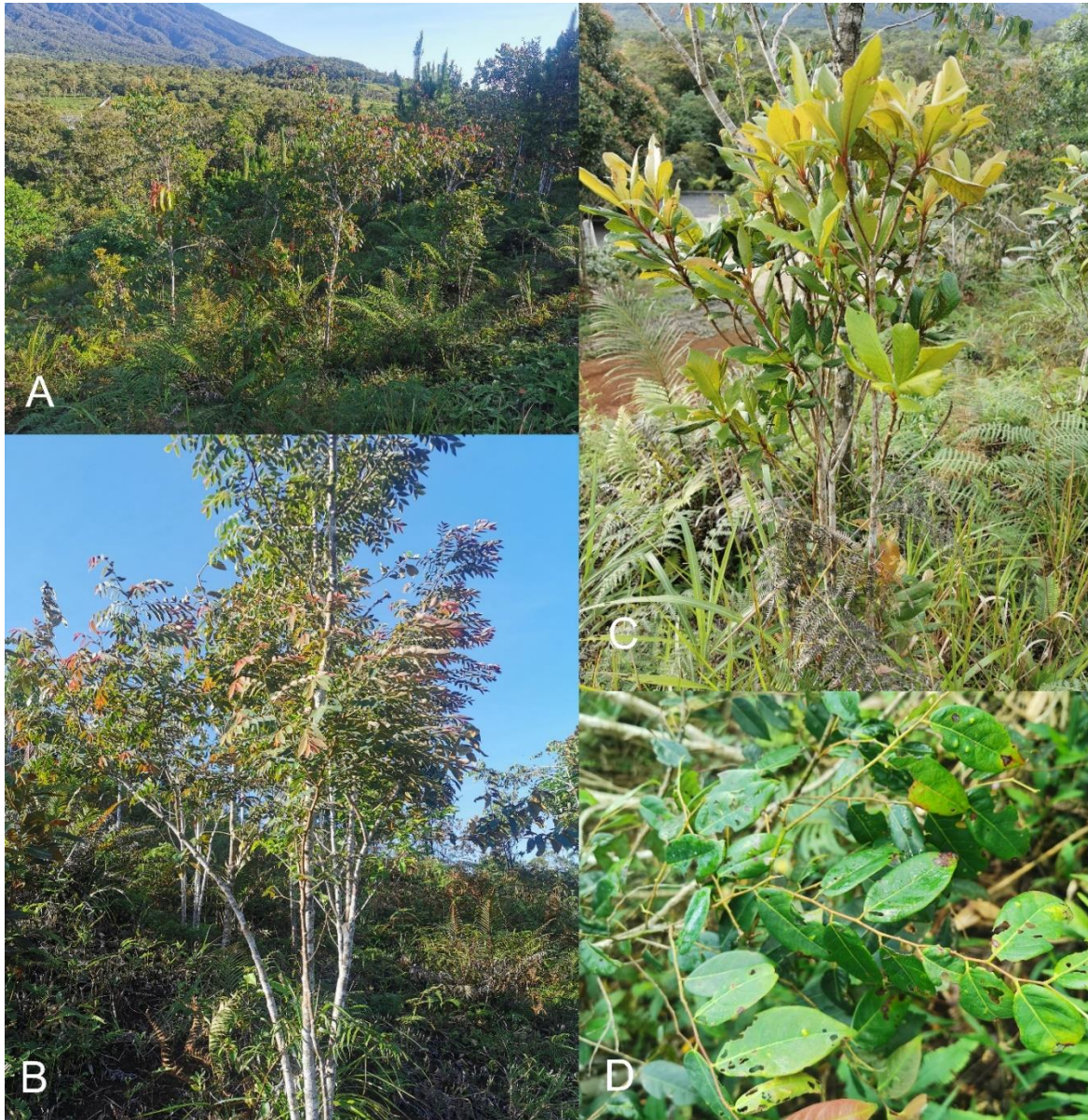


Figure 3 A-D. Habitat and plant associations of *Pachyrhynchus panumanon* sp. nov.: A) Habitat of *Pachyrhynchus panumanon* sp. nov. in the forest edge, B) *Glochidion* sp. (Phyllanthaceae) tree, C) *Clethra* sp. (Clethraceae), D) *Glochidion* sp. leaves with bite marks.

Female (Fig. 1 C-D)

Dimensions: LB:13.0–13.8 mm: LR:2.5–2.6 mm: WR: 1.9–2.1 mm. LP: 4.0–4.2 mm. WP: 4.5–4.6 mm. LE: 9.0–9.5 mm. WE: 7.5–8.0 mm. N=5

Habitus as shown in Figure 1 A-D.

DOI: <https://doi.org/10.53716/jtc.3.1.11.2022>

ZOOBANK: <https://zoobank.org/References/6224F087-029C-4D7A-A7E9-CC0234EF2899>

Received: 29 April 2022

Published: 30 July 2022

www.jtcoleop.com

Females differ from males by having wider elytra (LE/WE: 1.31-1.44), purplish integuments, wider gap between the two transverse median strips, and weakly bulging Ventrite I on disc. Otherwise mentioned, similar to the male.

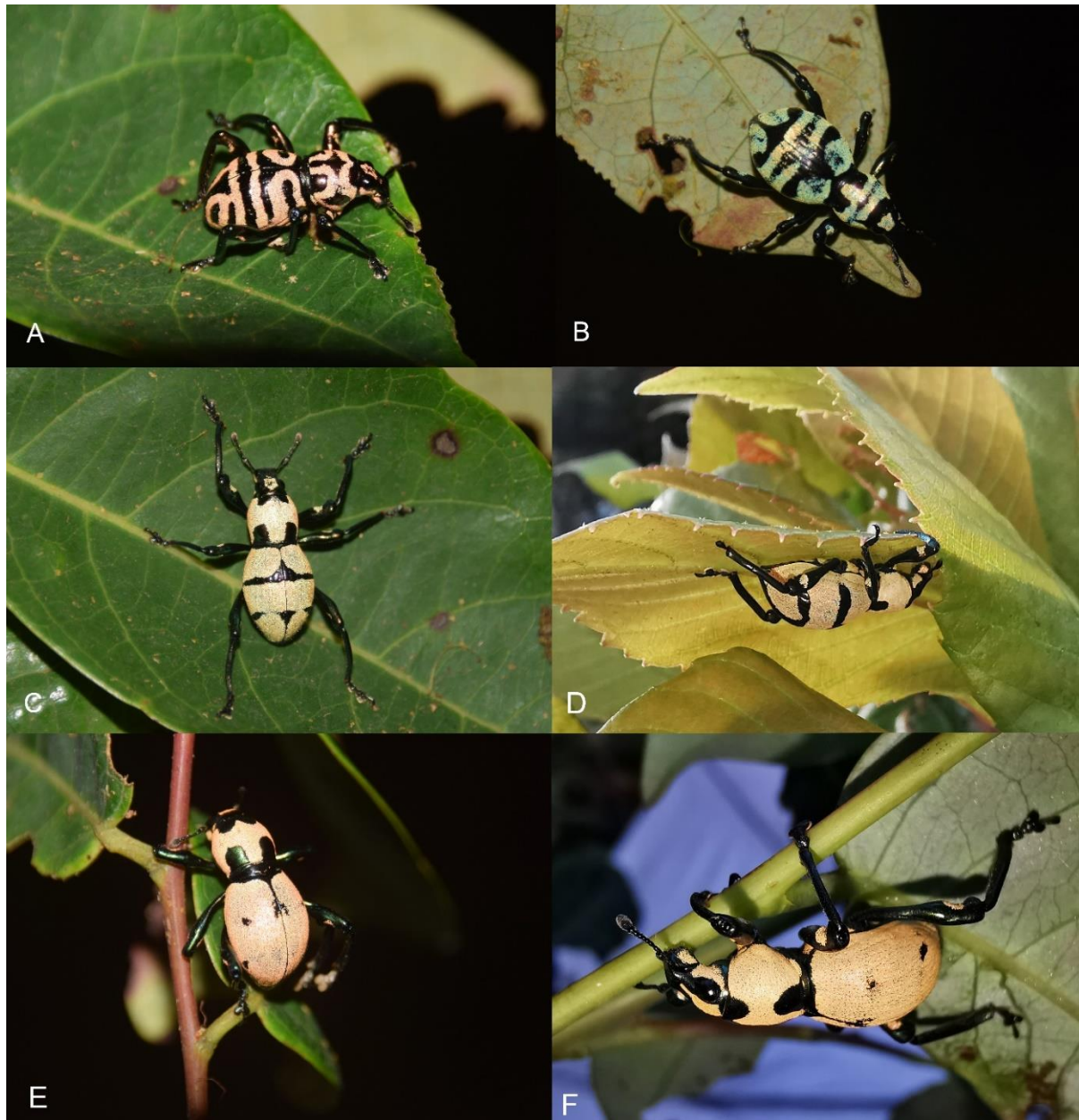


Figure 4 A-F. Habitus, and behavior of *Pachyrhynchus panumanon* sp. nov.: A) Non-banded male perching on a leaf, B) non-banded female underside the leaf, C) banded male perching on a leaf, D) banded male camouflaging with the colors of young leaves of *Clethra* sp., E) fully banded walking on branch, and F) fully banded clinging to the branch when lightly shaken.

DOI: <https://doi.org/10.53716/jtc.3.1.11.2022>

ZOOBANK: <https://zoobank.org/References/6224F087-029C-4D7A-A7E9-CC0234EF2899>

Received: 29 April 2022

Published: 30 July 2022

www.jtcoleop.com

Etymology

The specific epithet is named after “*Panumanon*” the Higaunon god who guards the animals including insects.

Notes on Variability

The new species markings range from filled to a non-filled cross band in the pronotum, and non-filled, and fully filled transverse elliptical rings in the elytra as well as elytra fully covered in scales (Figure 5 A-E). The color of the integuments also varies from green, purple, and black. The species with non-filled and filled markings are collected from the same plant and even observed to be mating.

Distribution

Pachyrhynchus panumanon sp. nov. is known so far known from Misamis Oriental.

Short Notes on the Ecology and Behavior of *Pachyrhynchus panumanon* sp. nov.

Pachyrhynchus panumanon sp. nov. was collected in a slopy, forest edge in Gingoog, Misamis Oriental within Region 10 (Fig. 4 C). The city is located on the northeastern coast of the province and is bounded by Gingoog bay on the north, Agusan del Norte on the east, and Agusan del Sur on the south. *Pachyrhynchus panumanon* sp. nov. was collected at an elevation of around 1247m to 1300m perching on the leaves and stem of *Glochidion* sp. (Phyllanthaceae) (Fig. 4 B, D) and *Clethra* sp. (Clethraceae) (Fig. 4 C). The area does not have a significant riverine ecosystem nearby and was relatively dry. The soil is ultramafic with low pH which explains the stunted growth of plants like *Glochidion* sp., and *Clethra* sp. Collecting the new species was easy because of the height of the plants which were mostly not more than 3 meters tall.

Gingoog is greatly influenced by the monsoon systems: the Northeast Monsoon System from November to March and the Southwest Monsoon System from June to October of which the Northeast Monsoon greatly affects its wind circulation. For most areas in Mindanao, *Pachyrhynchus* species are very sensitive to movement and vibrations and would easily free-fall to the ground with the slightest sense of movement or vibration. Thus, the use of a beating sheet works perfectly during collection. During the first and last authors’ fieldwork in Gingoog, the authors observed that *Pachyrhynchus panumanon* sp. nov., unlike the rest of the *Pachyrhynchus* species from Mindanao did not easily free-fall to the ground when the plants were lightly shaken. Also, when the author lightly shook the branch where the new species was perching, instead of free-falling, it clung even more to the twig. The authors believe that this behavior is due to the species’ adaptation to the strong monsoon winds that they must endure in the area. The same behavior was reported by Mr. Stan Cabigas and Mr. Hilario Cahilog for the Luzon *Pachyrhynchus* (pers. comms.). Most species are actively feeding and breeding between 7:00AM to 10:00AM and 5:00PM to 8:00PM.

DOI: <https://doi.org/10.53716/jtc.3.1.11.2022>

ZOOBANK: <https://zoobank.org/References/6224F087-029C-4D7A-A7E9-CC0234EF2899>

Received: 29 April 2022

Published: 30 July 2022

www.jtcoleop.com

Competing interests

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

Acknowledgment

We wish to express our gratitude to the Coleoptera Research Center research team; to Felix Landim, and Dexter Patalita for the help in the collection, and the tribal chieftain of the Higaunon Baliguian tribe Datu Ramil P. Anshagan. We thank the Higaunon community: Ricky, Biboy, Ken2x, Wen2x and Jomar for hospitality and assistance in the field. We are grateful to Dr. Arvids Barševskis for the continuous support especially during our visit to Ilgas (Daugavpils, Latvia), to Dr. Hiraku Yoshitake during the first author's visit to Institute for Agro-Environmental Sciences, NARO, Tsukuba, Japan (NIAES), and to Dr. Klaus-Dieter Klass and Olaf Jäger for their help during the first authors' visit in Senckenberg Natural History Collections, Dresden, Germany (SMTD). We would also like to thank Dr. Matthew Van Dam, and Ms. Anita Rukmane for reviewing the manuscript.

REFERENCES

- Bollino M. 2022. Three new species of *Pachyrhynchus* Germar 1824, (Coleoptera, Curculionidae, Entiminae) from Mindanao Island, The Philippines, with taxonomical notes. *Zootaxa* 5116(4):504–516. DOI: <http://10.11646/zootaxa.5116.4.2>
- Cabras AA, Rukmane A. 2016. A New Species of *Pachyrhynchus* Germar, 1824 (Coleoptera: Curculionidae: Entiminae). *Acta Biologica Universitatis Daugavpiliensis*, 16(1): 123–127.
- Cabras AA, Medina MND, Madjos G, Bollino M. 2022. Three new species of the genus *Metapocyrtus* Heller 1912, subgenus *Orthocyrtus* Heller 1912 (Coleoptera, Curculionidae, Entiminae, Pachyrhynchini), from Mindanao Island, Philippines. *ZooKeys* 1088: 115–128. <https://doi.org/10.3897/zookeys.1088.79021>
- Cabras AA, Medina MND, van Dam M. 2021. *Pachyrhynchus obumanuvu* sp. nov., a new species of easter egg weevil (Coleoptera, Curculionidae, Entiminae, Pachyrhynchini) from Mindanao Island, Philippines. *Baltic Journal of Coleopterology*, 21(1): 43–48.
- Catibog-Sinha C, Heaney LR. 2006. Philippine Biodiversity: Principles and Practice. Quezon City, Haribon Foundation for the Conservation of Nature: p. 495.
- Rukmane A. 2018. An annotated checklist of genus *Pachyrhynchus* (Coleoptera: Curculionidae: Pachyrhynchini). *Acta Biologica Universitatis Daugavpiliensis*, 1(1): 63–68.
- Rukmane A. 2019. To the knowledge on the genus *Pachyrhynchus* Germar, 1824 (Coleoptera: Curculionidae: Pachyrhynchini), corrections and additions on the *Pachyrhynchus speciosus* species group. *Acta Biologica Universitatis Daugavpiliensis*, 19 (2): 253–260.
- Schultze W. 1923. A monograph of the Pachyrhynchid group of the Brachyderinae, Curculionidae: Part I. *Philippine Journal of Science*, 23: 609–673.
- Tseng HY, Lin CP, Hsu JY, Pike DA, Huang WS. 2014. The Functional Significance of Aposematic Signals: Geographic Variation in the Responses of Widespread Lizard Predators to Colourful Invertebrate Prey. *PLoS ONE* 9(3): e91777. <http://doi:10.1371/journal.pone.0091777>

DOI: <https://doi.org/10.53716/jtc.3.1.11.2022>

ZOOBANK: <https://zoobank.org/References/6224F087-029C-4D7A-A7E9-CC0234EF2899>

Received: 29 April 2022

Published: 30 July 2022

www.jtcoleop.com

-
- Yoshitake H. 2017. Six New Taxa and a New Synonym of the Genus *Pachyrhynchus* Germar (Coleoptera: Entiminae: Pachyrhynchini) from the Philippines. *Elytra, Tokyo, New Series* (7)1: 247-263.
- Yoshitake H, Bollino M, Sandel F. 2019. Two New Species of the Genus *Pachyrhynchus* Germar, 1823 (Coleoptera: Entiminae: Pachyrhynchini) from the Islands of Bohol and Mindanao in the Philippines. *Elytra, Tokyo, New Series* (9)1: 183-191.

DOI: <https://doi.org/10.53716/jtc.3.1.11.2022>

ZOOBANK: <https://zoobank.org/References/6224F087-029C-4D7A-A7E9-CC0234EF2899>

Received: 29 April 2022

Published: 30 July 2022

www.jtcoleop.com