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New species and new distributional record of *Doliops* Waterhouse, 1841 (Coleoptera: Cerambycidae: Lamiinae) with notes on ecology and mimicry from Mindanao Island, Philippines

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Doliops Waterhouse, 1841 in the Philippines is represented by 60 species. A new species, *Doliops barsevskisi* sp.n. from Bukidnon is described and illustrated with notes on its ecology and mimicry with *Pachyrhyncus speciosus* Waterhouse 1841. A new distributional record is also presented for *Doliops duodecimpunctata* Heller, 1923 with notes on its habitat, behavior and mimicry with *Pachyrhynchus erichsoni* Waterhouse 1841. This serves as first ecologic data of the genus *Doliops* in Mindanao Island.

Keywords: endemism, long horn, mimic, Mt. Kitanglad Range Natural Park, Pachyrhynchini

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INTRODUCTION

The genus *Doliops* Waterhouse, 1841 is currently represented with 60 species in the Philippines of which Mindanao is represented by 25 species (Cabras & Barševskis, 2015; Yoshitake & Yamasako, 20116; Barševskis 2013, 2014, 2017, 2018; Barševskis & Jaeger 2014). This genus' distribution is exclusive in the Philippines and Taiwan with most of the species showing remarkable mimicry with the tribe Pachyrynchini and some other weevil groups (Barševskis, 2013, 2014, 2017). In the recent National List of Threatened Philippine Fauna (DENR-Dao, 2017), *Doliops* Waterhouse 1841 are among the threatened species listed. However, as more thorough assessment of *Doliops* Waterhouse 1841 population in the wild, the conservation status of this group should be raised due to their rarity with some species being represented only by very few specimens and at times only single holotype in museums (Barševskis & Jaeger, 2014). Since most of the species described from this genus were based on museum specimens and most works done were taxonomic in nature, information about its ecology and biology is very scarce if ever available at all. In the recent years, work on this genus greatly advanced with many species especially from Mindanao Island being described and added to the list (Cabras & Barševskis, 2016; Barševskis, 2017).

In the recent expedition of the Coleoptera research team of the University of Mindanao in Marilog District, Davao City and Mt. Kitanglad Range Natural Park, two species of *Doliops*

Waterhouse 1841 were discovered to be new to science and a new distributional record. In this paper, photos of the habitus and aedeagus of the *Doliops* Waterhouse 1841 species new to science and with new distributional record are presented together with notes on the mimicry with Pachyrynchini, habitat and food plants association. Due to the limited information on this genus which has been known only through museum specimens, data on its habitat, food plants and elevational distribution is very important in future conservation actions. As the Philippines experiences devastating habitat loss with majority of the forests being converted to agricultural and commercial purposes, forest dwelling taxon such as *Doliops* Waterhouse 1841 among others need immediate conservation actions.

MATERIALS AND METHODS

The specimens deposited in University of Mindanao Coleoptera Research Center (UMCRC) were collected through beating sheet and handpicking and killed in vials with ethyl acetate. Morphological characters were observed under Luxeo 4D and Nikon SMZ745T stereomicroscopes. Stacked digital habitus images were taken with Nikon D5300 digital camera and Sigma 18-250 macro lens, whereas digital images of genitalia were taken with Ricoh WG-50. All images were then stacked and processed using a licensed version of the software Photoshop CS6Portable. 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 given in millimetres.

The specimens are deposited in the following collections:

UMCRC- University of Mindanao Coleoptera Research Center, Mindanao, Philippines

RESULTS

***Doliops barsevskisi* sp.n. (Fig. 1A-D)**

Holotype (Fig. 1A-B), male: Philippines – Mindanao / Mt. Kitanglad Range Natural Park/ Bukidnon / July 2018 / coll. Medina. Presently in UMCRC, it will be deposited in National Museum of Natural History (NMNH) under National Museum of the Philippine (NMP). Paratype. 1 male: Philippines – Mindanao / Mt. Kitanglad Range Natural Park/ Bukidnon / July 2018 / coll. Cabras. Presently in UMCRC.

Diagnosis. New species is similar to *Doliops ageometrica* but different on the patterns of the pronotum and shape of the elytra's transverse bands with *D. ageometrica* having an X shape scaly marking and widely separated elytral transverse bands. Also similar to *Doliops geometrica* but has different pattern of pronotum and elytra's transverse bands with *D. geometrica* having a triangular basal band and very distantly separated middle transverse bands (Fig. 1 A-B).

Male genitalia as shown in Figure 1 C-D.

Description. Dimensions: LB: 11.5 (holotype 11.5 mm). LP: 3.8 (3.8 mm). WP: 4.0 (4.0 mm). LE: 7.5-8.1 (7.5mm). WE: 5.2- 5.6(5.2 mm). N=2 for all measurements.

Body black and shiny with greenish and reddish metallic luster. Surface with bands of pale yellow and green scales. Length: 7.5 mm, Width: 5.2 mm. Head black, finely punctate shiny; head with longitudinal median band of pale yellow and green scales between eyes and antennal bases. Genae under the eyes with oblique band of pale yellow and green scales. Labrum covered with numerous setae. First antennomere black, shiny and pubescent, without metallic luster. Basal half of the second antennomere brown with white pubescence; apical half of the second antennomere

black with black pubescence and scarce setae. Basal half of the 3rd antennomere pubescent with white setae, apical half brown to black pubescent with scattered long black setae. Antennomere segments 4-8 brown with white and brown pubescence and few scattered black setae. Antennomere 9-10 black and with pubescence.

Pronotum convex, finely and sparsely punctured especially the lateral side. Black and shiny with very faint patch of pale yellow and turquoise scales in the apical margin, and long band in lateral side extending from the basal margin towards the apical margin almost confluent with long lateroventral band from basal margin to apical margin forming a half circle band.

Scutellum rounded and tomentose apically.

Elytra convex, black and shiny, and punctured with the following bands: a) Two transverse band near the base with the first band curved and confluent with the second band near suture, b) two transverse band in the middle confluent at 1st interval or near suture. Distance between the two bands is very narrow. Apical stripe triangular not reaching the transverse band at the middle. Elytra finely punctate and tomentose. In basal part with sparse and coarse punctuation and tomentose.

Femora with light yellow apical spots and more or less tomentose. Surface of tarsomeres covered with white tomentum with sparse black setae. Tibia and tarsi apically covered with numerous setae, tomentose. Underside has the following markings of pale yellow and green scales: large C-shape patch on each side of metasternum; irregular band at each side along apical margin of ventrite I; a small patch on each side of ventrites II–IV, and a tiny spot on ventrite V.

Distribution. Mt. Kitanglad Range Natural Park, Bukidnon, Mindanao Island

Etymology. The new species is named after our collaborator and good friend Dr. Arvids Barševskis for his valuable contribution to Coleoptera fauna research in the Philippines and the establishment of Philippine Coleopterological Network (PhilColNet).

***Doliops duodecimpunctata* Heller,1923 (Fig. 2 A-D)**

Materials. 1 B&- Philippines, Marilog District, Davao City, July 2018.

Doliops duodecimpunctata Heller, 1923 Tijdschr. Entomol. 66: 46
Doliops duodecimpunctata Baševskis, 2013 Baltic J. Coleopterol. 13 (2): 85
Doliops duodecimpunctata Barševskis, 2014 Baltic J. Coleopterol. 14 (2): 128
Doliops duodecimpunctata Barševskis & Jaeger, 2014 - Baltic J. Coleopterol. 14 (1): 14
Doliops duodecimpunctata Barevskis, 2015 Conference "Contemp. Probl. Entomol. East. Eur." 12
Doliops duodecimpunctata Cabras & Barševskis, 2016: 148
Doliops gutowskii Barševskis, 2013- Baltic J. Coleopterol.,2013 (2): 73-89.
Doliops duodecimpunctata Heller, 1923 = *D. gutowskii* Barševskis, 2013 syn. - Baltic J. Coleopterol. 17(2) 2017

Distribution. Mindanao island, Surigao island
Endemicity: Mindanao endemic

Holotype deposited. Senckenberg Naturhistorische Sammlungen Dresden (SNSD)

Comment. The species was firstly described by Heller in 1923 based on series of specimens collected from Surigao, Mindanao Island. The present record of *Doliops duodecimpunctata* Heller, 1923 in Marilog District, Davao City presents a new record of this species.

Notes on Ecology and Behavior

Doliops barsevskisi sp.n and *Doliops duodecimpunctata* Heller, 1923 were both collected in an open ridge along the road in sunny forest patch. *Doliops barsevskisi* sp.n and was

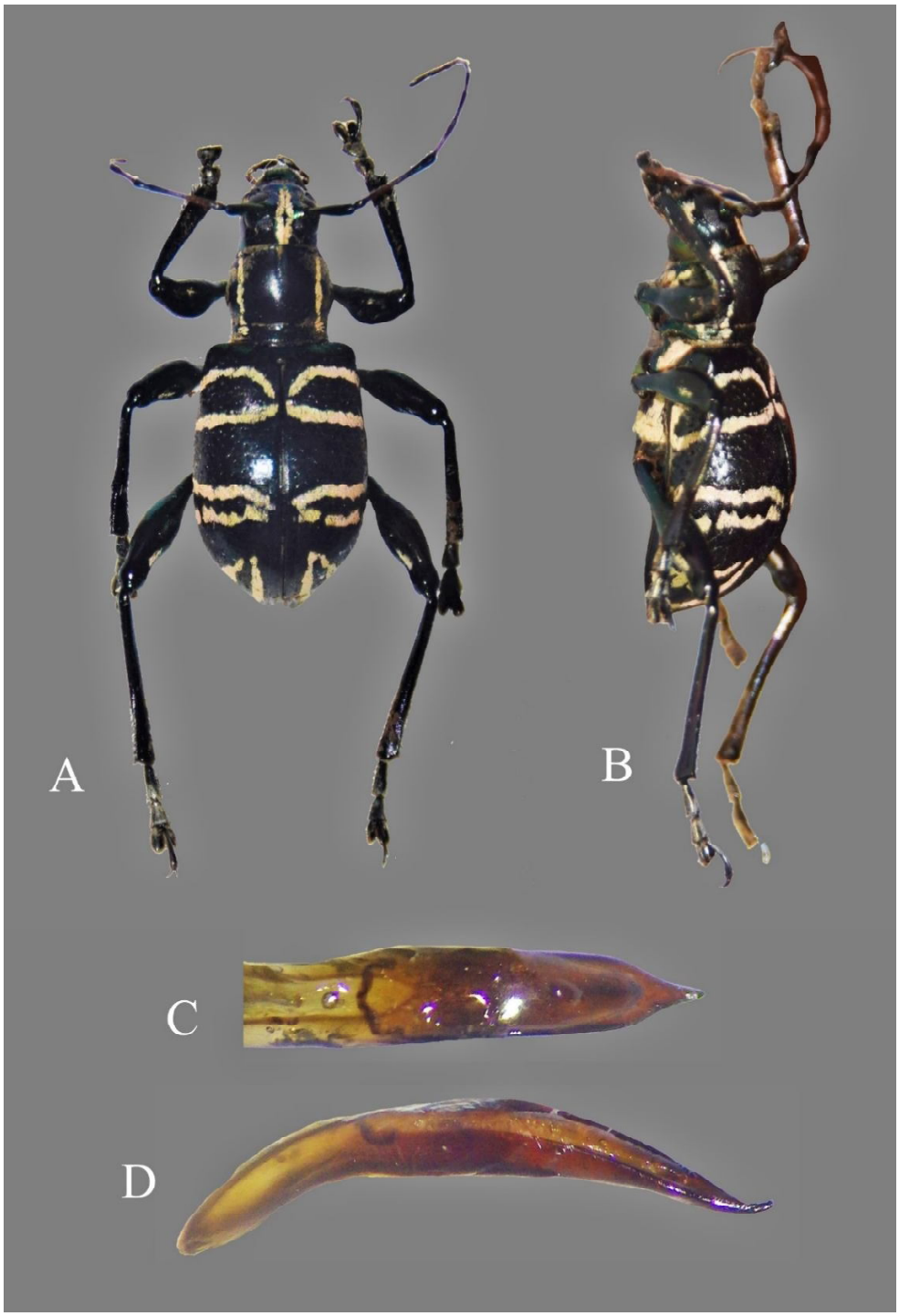

Fig 1. A-D. A: *Doliops barsevskisi* sp.n. Holotype; B: idem, lateral view; C: *Doliops barsevskisi* sp.n. aedeagus in ventral view; D: idem, lateral view

Fig 2. A-D. A: *Doliops doudecimpunctata* Heller, 1923 B: idem, lateral view; C: *Doliops doudecimpunctata* Heller, 1923 aedeagus in ventral view; D: idem, lateral view

collected on the stem and leaves of *Helianthus* sp. in the lower elevation of 1,100 masl in Mt. Kitanglad Range Natural Park (MKRNP) (Fig. 4-A) while *Doliops duodecimpunctata* Heller, 1923 (Fig. 4-B) was collected underside the leaves between *Melastoma* sp. and *Helianthus* sp. in an open forest patch in Marilog District at an elevation of 1200 masl (Fig. 4-B). *Doliops barsevskisi* sp.n and *Doliops duodecimpunctata* Heller, 1923 were both found just along the road with abundant *Melastoma* sp. and *Helianthus* sp. shrubs with height approximately 8.2 to 9.8 feet. Both habitats share common characteristics being beyond 1000 masl with temperature around 20-25 ý° Celcius, and open roads along the ridge of forests patch. Both species were collected using hand picking. For a long time, data on the ecology of *Doliops* Waterhouse 1841 has been very limited due to their cryptic nature and this genus is still an enigma to most coleopterists.

The two species were both collected around 8:00 to 9:00 in the morning where most insects are found basking in the sun. *Doliops barsevskisi* sp.n was collected in the stem and leaf of *Helianthus* sp. using handpicking since they were immobile while basking in the sun (Fig. 3). The two *Doliops* species exhibited similar behavior to that most beetles which moves to the underside of the leaves or hides when they sense some disturbances or vibrations in nearby vegetation. An interesting behavior observed was with *D. duodecimpunctata* Heller, 1923 which exhibited the same behavior with members of the tribe Pachyrynchini which free falls to the ground and pretends to be dead for

Fig 3. *Doliops barsevskisi* sp.n. in its natural habitat

Fig 4. A- Habitat of *Doliops barsevskisi* sp.n., B- Habitat of *Doliops doudecimpunctata* Heller, 1923

some time upon collection. Despite its capability of flight, it chose to free fall to the ground and pretends to be dead. Thus, it was easily mistaken as another Pacyrynchini. Both *Doliops* Waterhouse 1841 species were easily mistaken for *Pachyrhynchus* or *Metapocyrtus* species due to their striking resemblance of color and elytral markings as well as behavior. Indeed, the mimicry exhibited by these beetles are truly remarkable and can fool predators.

Notes on the Mimicry

Doliops barsevskisi sp.n. is a mimic of *Pachyrhyhcnhus speciosus* (Fig. 5) which is also found in the same locality. Meanwhile, *Doliops doudecimpunctata* Heller, 1923 seems to mimic *Pachyrhynchus erichsoni* (Fig. 5) which shares the same habitat in Marilog District. Another *Metapocyrtus* mimic of *Doliops doudecimpunctata* Heller, 1923 was also observed in Marilog District, Davao City.

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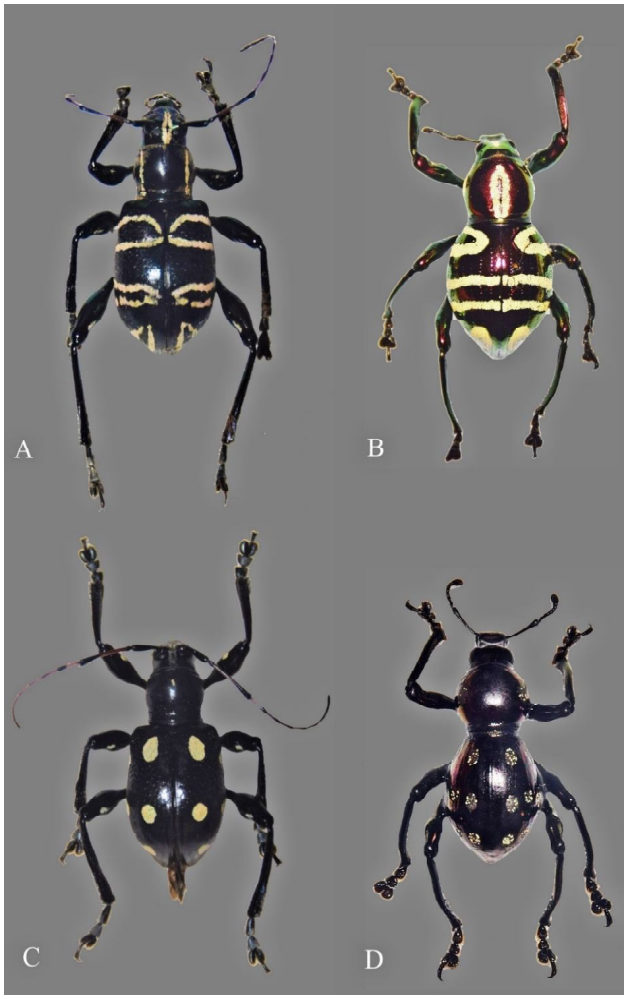

Fig 5. A-D. A: *Doliops barsevskisi* sp.n. habitus, B: *Pachyrhynchus speciosus* Waterhouse 1841, C: *Doliops doudecimpunctata* Heller, 1923, D. *Pachyrhynchus erichsoni* Waterhouse 1841

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