

RESEARCH PAPER

# A review of the genus *Rhyparus* in the Philippines, with descriptions of two new species from Mindanao (Coleoptera: Scarabaeidae: Aphodiinae)

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**Abstract.** Species of the genus *Rhyparus* Agassiz, 1846 (Coleoptera: Scarabaeidae: Aphodiinae) from the Philippines are reviewed. Altogether six species are recorded, including description of two species new to science from Mindanao Island: *R. flavohirtus* sp. nov. and *R. mindanaoensis* sp. nov. *Rhyparus gracilis* Arrow, 1905 and *R. barclayi* Masumoto, Ochi & Ho, 2019 are recorded from the Philippines for the first time. All species are diagnosed and illustrated, including photos of epipharyngi and male genitalia. A key to Philippine *Rhyparus* species is provided.

**Key words.** Coleoptera, Scarabaeidae, Aphodiinae, Rhyparini, *Rhyparus*, taxonomy, new species, new records, Philippines, Oriental Region

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## Introduction

The tribe Rhyparini is represented by 13 genera and more than 100 species distributed nearly pantropically, with only six species in Africa. All biological data indicates that members of Rhyparini are inquilines with various termites (SKELLEY 2007); adults are frequently collected at light.

The most species rich genus is *Rhyparus* Agassiz, 1846 with 72 species and 1 subspecies. In the Oriental and Australasian Regions, the genus contains 55 species and 1 subspecies. The first list of *Rhyparus* from the area was given by MENCL et al. (2013) and contains 42 species and 2 subspecies. Since that time, 13 additional species have been described and one subspecies raised to species rank (MASUMOTO & OCHI 2018; MASUMOTO et al. 2018, 2019; MINKINA 2017, 2019; OCHI et al. 2018a,b, 2019), and MINKINA (2020) has transferred *R. octovirgatus* Schmidt, 1916 to a new genus, *Antecessorirhyparus* Minkina, 2020. Until today, only two species were recorded from the Philippines (ARROW 1905, PAULIAN 1981, OCHI 2001) – one of them, *R. philippinensis* Arrow, 1905, is considered endemic to the Philippine Archipelago.

Despite recent initiatives advancing coleopterological work in the Philippines, the country remains largely understudied, as is shown by the frequent discoveries of new taxa there. Already recognized as a biodiversity hotspot, the Philippines urgently require expanded coleopterological research in light of the rapid and ongoing destruction of the forest habitats that house most of the endemic species and diversity. In this paper, we present a list and key to the species of *Rhyparus* in the Philippines, and include the descriptions of two new species collected from different mountain ecosystems in Mindanao, Philippines.

## Material and methods

Specimens were studied using Nikon SMZ 745T and Nikon Eclipse E200 stereomicroscopes. The illustrations were made using a Canon EOS 6D digital camera with a Canon MP-E 65mm macro lens, using StackShot system and Helicon Focus auto montage, and subsequently edited in Photoshop.

Measurements were taken with an ocular graticule and include: body length, measured from the anterior margin



of the clypeus to the apex of the elytra along the suture; length of pronotum, measured along the midline; width of pronotum, measured at the widest point; length of elytra, measured from their base to the apex along the suture; and width of both elytra, measured at their widest points. The descriptive terminology follows the works of KRIKKEN & HUIJBREGTS (1987), MENCL et al. (2013) and OCHI et al. (2018b).

Exact label data are cited and given in quotation marks for the type material. Authors' additional remarks are provided in square brackets; separate labels are indicated by a double slash (//).

We examined material from the following institutional and private collections:

BMNH	The Natural History Museum (London, UK);
CNCW	Cezary Nowak collection (Włoszczowa, Poland);
DUBC	Daugavpils University Beetles collection (Daugavpils, Latvia);
ISEA	Institute of Systematics and Evolution of Animals (Kraków, Poland);
LMCN	Łukasz Minkina collection (Nowy Targ, Poland);
UMCRC	University of Mindanao Coleoptera Research Center (Davao, The Philippines).

## Taxonomy

### *Rhyparus* Agassiz, 1846

**Diagnoses of the genus were provided by** HOWDEN & STOREY (1992), PITTINO (2006) and SKELLEY (2007) and include the following features: head with four basal tubercles; clypeal disc convex, ringed with groove; clypeal margin broad with double edge; pronotum with longitudinal costae and grooves transected by single median transverse groove or set of deep fossae; elytra distinctly costate on alternating intervals, with apical bulbous protuberances with trichomes; prosternal process projecting caudally, hastate; metaventrite usually with posterior lateral projection; and all protibial teeth located in apical one-fourth.

### Key to the species of the genus *Rhyparus* from the Philippines

- 1 Elytron without accessory costa on third intercosta, or with short, vestigial costa only. .... 2
- Elytron with long accessory costa on third intercosta. Dorsal side abundantly covered by yellow macrosetae (Figs 2a–c). .... ***R. flavohirtus* sp. nov.**
- 2 All intercostae of pronotum densely and evenly punctate. .... 3
- Only median intercostae, and anterior part of other intercostae densely and evenly punctate. .... 4
- 3 Elytron without accessory costa on third intercosta. Elytral costae convex, intercostae with only two rows of large punctures (Figs 6a–c). .... ***R. philippinensis* Arrow, 1905**
- Elytron with short accessory costa on third intercosta. Elytral costae flat, intercostae with two rows of large punctures and additional one or two rows of small punctures between them (Figs 3a–c). .... ***R. gracilis* Arrow, 1905**
- 4 Medium-sized to large species: body length: 5.5–7.4 mm. Intermediate lobes of pronotum never larger

than anterior. Punctures in rows on intercostae of elytra proportionally smaller, distance between punctures in neighboring rows usually somewhat larger than their diameter. .... 5

- Small species: body length: 3.4–4.5 mm. Intermediate lobes of pronotum usually distinctly larger than anterior. Punctures in rows on intercostae of elytra proportionally larger, distance between punctures in neighboring rows usually smaller than their diameter. .... ***R. helophoroides* Fairmaire, 1893**
- 5 Smaller species; body length: 5.5–6.0 mm. Anterior parts of pronotal costae highly elevated (Fig. 11). Costae of pronotum and elytra high (Figs 5a–c). Internal and median protrusion of caudal bulbs of elytra well developed, with distinctly sinuate area between them. .... ***R. mindanaensis* sp. nov.**
- Larger species; body length 6.4–7.4 mm. Anterior parts of pronotal costae weakly elevated (Fig. 7). Costae of pronotum and elytra proportionally low (Figs 1a–c). Internal and median protrusion of caudal bulbs of elytra weakly developed, connected, with very weak sinuation between them. .... ***R. barclayi* Masumoto, Ochi & Ho, 2019**

### *Rhyparus barclayi* Masumoto, Ochi & Ho, 2019

(Figs 1a–c, 7, 13, 19, 25a–b)

**Material examined.** PHILIPPINES: LUZON: 1 ♀, Banaue, Ifugao, vii.2018, local coll. (CNCW). MINDANAO: 1 ♂, Dominorog, Bukidnon, i.2019, local coll. (LMCN); 1 ♀, Davao City, Talomo Mts., Mt. Talomo, 7°04'36.9"N 125°20'13.2"E, 1100 m., 25.–30.iii.2019, Medina MND. leg. (UMCRC); 1 ♀, Lake Holon, vi.2019 (DUBC); 1 ♀, South Cotabato, T'Boli, Lake Holon Mts., Lake Holon, 1466 m., 6°05'48.1"N 124°52'56.7"E, 12.vi.2019, Torrejos C. leg. (UMCRC).

**Diagnosis.** Large species: body length 6.0–7.4 mm (Figs 1a–c). Head depicted in Fig. 7; epipharynx as in Fig. 13. Pronotum with anterior lobes slightly larger than intermediate; median intercosta with dense punctation, second intercosta without punctures, third intercosta with moderately dense punctation; paramedian costae of pronotum can be basally slightly inwardly bent. All intercostae of elytra with two rows of medium-sized punctures. Internal and median protrusion of caudal bulbs connected, with very weak sinuation between them, external protrusion rather distinctly developed (Fig. 19). Surface between external protrusion of caudal bulb of elytra and lateral margin of elytra distinctly sinuate – external protrusion more or less developed; however, median and internal protrusions always with same proportions. Aedeagus as in Figs 25a–b.

**Distribution.** Species recorded from the Philippines for the first time. Previously was known from Taiwan (Lanyu Island).

### *Rhyparus flavohirtus* sp. nov.

(Figs 2a–c, 8, 14, 20, 26a–b)

**Type material.** HOLOTYPE: ♂, labelled: 'Mindanao, Lake Holon, vi.2019' (DUBC).

**Description.** Large species, body length 7.0 mm. Body surface matt, only pygidium with slightly shiny elevated area; black, except for brown or reddish-black preapical



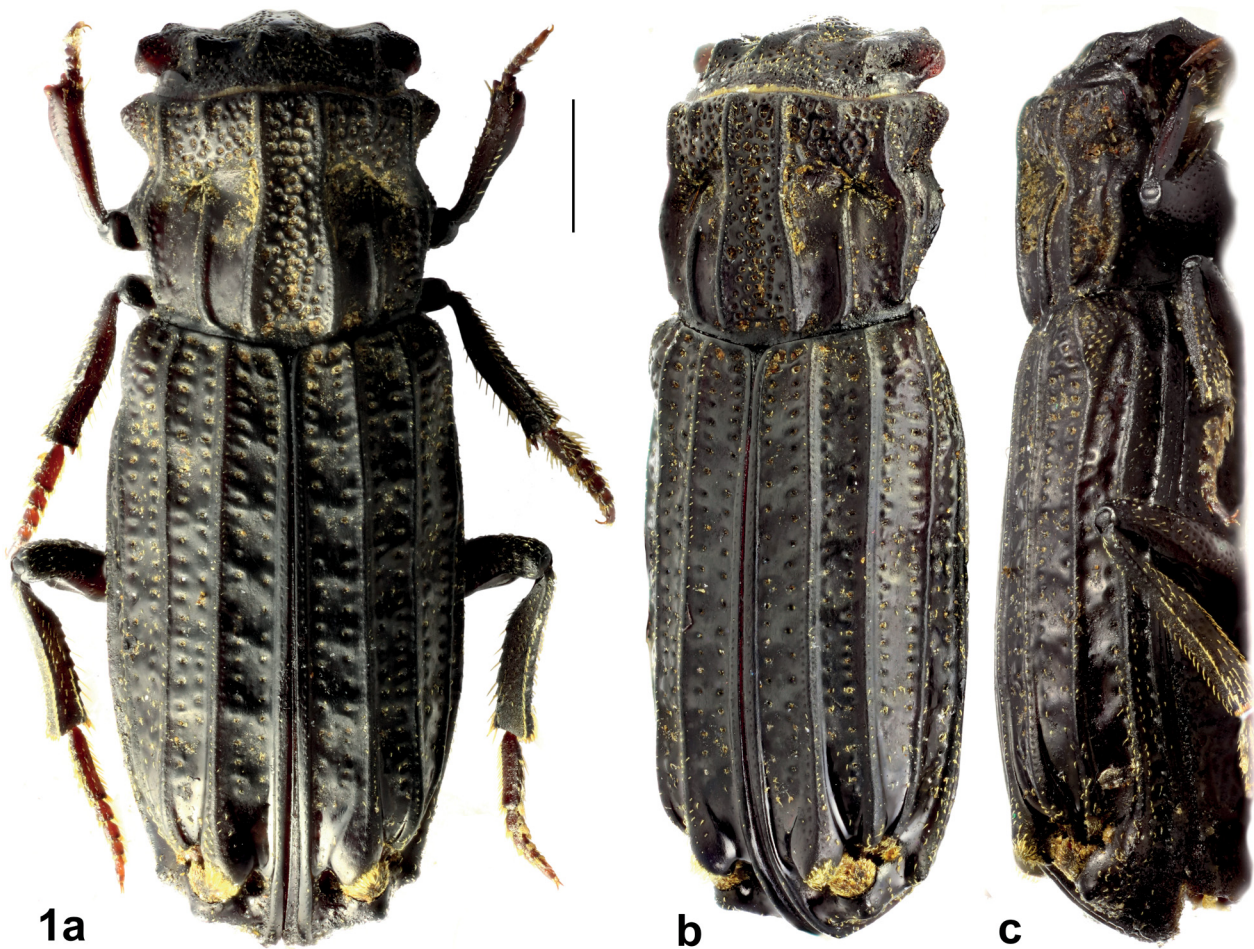


Fig 1. Habitus of *Rhyparus barclayi* Masumoto, Ochi & Ho, 2019: a – dorsal view; b – right dorsolateral view; c – right lateral view. Scale bar = 1.0 mm.

glandular area, more densely covered with yellow setae dorsally compared to other species (Figs 2a–c).

Head as observed dorsally and frontally (Figs 2c and 8, respectively): Clypeus anteriorly not sinuate, with indistinct teeth on sides, laterally distinctly emarginated and next with widely rounded angle, separated by rather small emargination from distinctly protruding, rounded genae; clypeal disc distinctly convex, ringed by deep groove, with pair of distinct, rounded tubercles. Frons with four short, blunt, posteriorly vanishing longitudinal costae, median pair shorter than lateral pair and separated one from another by narrow, deep furrow, distance between neighboring median and lateral costae twice as broad as that between two median costae. Head covered with irregularly spaced fine punctures bearing small setae. Epipharynx as in Fig. 14.

Pronotum subquadrate, 1.13 times as wide as long; with six distinctly (but not sharply) convex costae and seven longitudinal intercostae, surface densely covered with yellow setae. Lateral margin with moderately protruding two lobes, anterior lobe triangular, median lobe obtusely angled, slightly wider than anterior lobe. Costae on anterior part present anteriorly as rounded swellings with dense concentration of setae; costae 1 (paramedian pair), 3 and 4 (lateral pairs) – continuous, costae 2 widely interrupted by transverse depression with deep caviform fossae, and

another fossa in middle of third furrow at base of costae. First (median) inter-costa covered with distinct medium-sized punctures, very densely concentrated in middle to form elongated depression; lateral intercostae 1–3 abundantly punctured only in anterior part, intercostae 2 and 3 smooth in basal two thirds.

Elytra (Figs 2a–c, 20), elongate, 1.73 times as long as wide, each with five costae of similar height and width from elytral base to apex, and one very long, well defined accessory costa present between costae 3 and 4, terminating posteriorly before preapical depressed area; costae slightly shiny on top, covered with yellow setae: costae 1 (sutural) with one row of setae in middle, costae 2 and 3 bordered by row of setae on each side. Intercostae 1 and 2 flat with 3 rows of punctures, with punctures in lateral rows larger than punctures in median row, punctures of intercostae 3a, 3b and 4 arranged in two rows, distances between neighboring punctures not uniform, but larger than or approximately equal to puncture diameter. Apical bulbous area of second costa densely covered with yellow macrosetae. Caudal bulbs weakly developed. Internal and median protrusion of caudal bulbs connected; external protrusion moderately developed.

Pygidium with elevated area at base, extended as costa to pygidial apex, areas on each side of costa being strongly depressed.



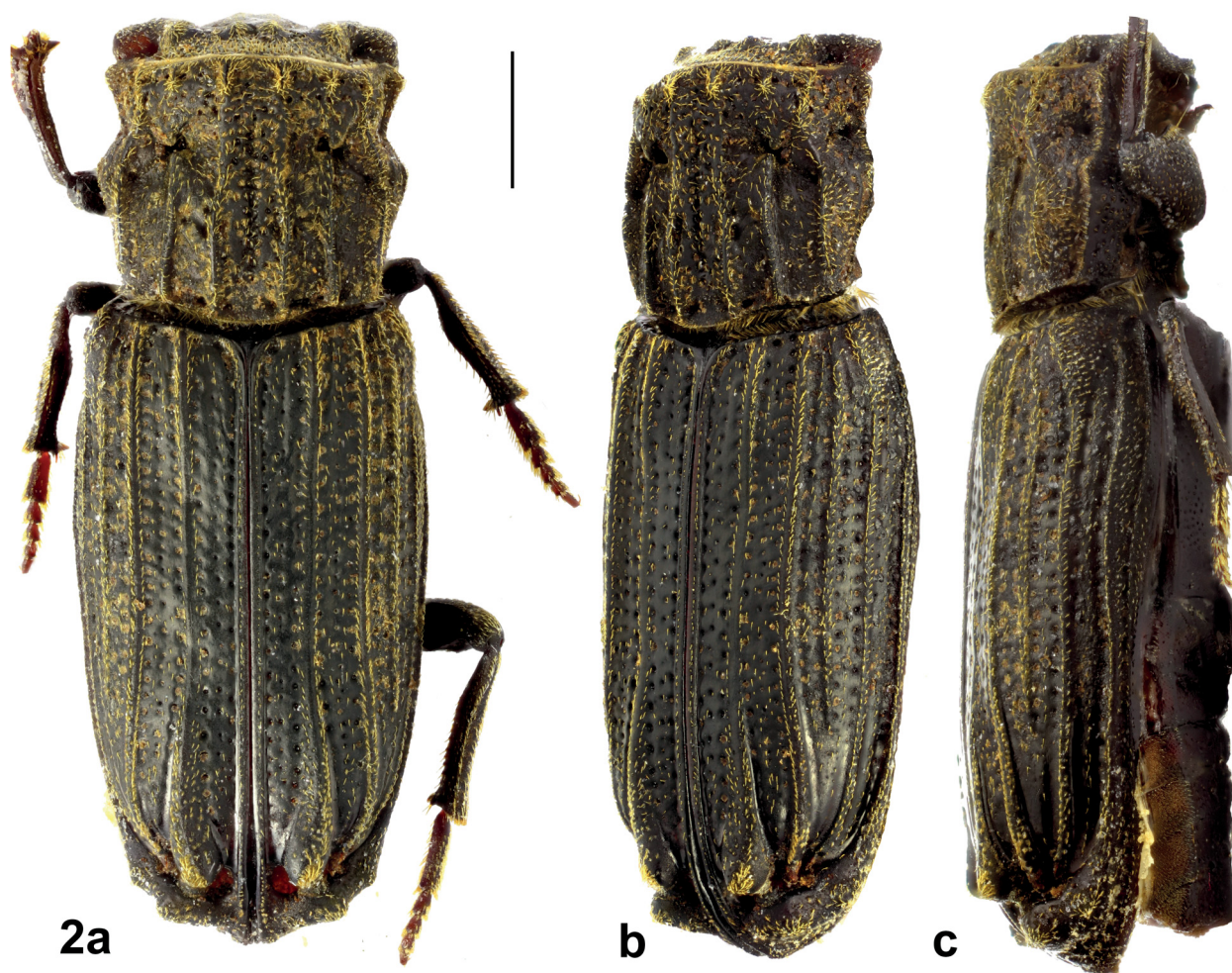


Fig. 2. Habitus of *Rhyparus flavohirtus* sp. nov., male, holotype: a – dorsal view; b – right dorsolateral view; c – right lateral view. Scale bar = 1.0 mm.

All legs sturdy, matt, covered with small punctures and triangular short setae (except for simple and smooth area along outer margin), greatest quantity of setae on mesotibia. Profemora strongly expanded, widest near basal third, with deep groove anteriorly; surface with medium-sized punctures throughout. Protibiae slenderer than mesotibiae, only slightly dilated apically and noticeably incurved apically; apex of protibiae with three small teeth. Mesofemora slightly narrower than profemur, posterior margin bilobed, surface punctate throughout, punctures smaller compared to those on profemora. Mesotibiae narrow at base, gradually expanded from base to about one third of length, and then narrowed to apex; apex of mesotibiae with large projection and tooth (larger than protibiae apical teeth). Metafemora long, slightly narrower than mesofemora; narrow at base, gradually expanded, apical part narrowed; punctures as on mesofemora. Metatibiae larger than mesotibiae, but similar in shape, but not narrowed preapically, only slightly widened to apex.

Venter matt, black. Prosternum with long anterior process with rounded apex and hastate posterior process. Mesoventrite with shallow setigerous punctures and small setae. Meso-metaventral plate with distinct, shallow median impression; surface otherwise with irregular medium-

sized setigerous punctures. Abdomen with six abdominal ventrites, all separated by impressed sutures; surface punctate-setose. Ventrites 3–5 triangularly grooved on each lateral broadened area, groove noticeably large on ventrite 5; ventrites 5–6 fused, medially with costae.

Aedeagus as in Figs 26a–b.

**Differential diagnosis.** The new species can be distinguished from all *Rhyparus* species worldwide based on the combination of very long accessory costa, dense setation of dorsal surface, and number of rows of punctures on intercostae.

**Etymology.** The specific epithet is composed of the Latin adjectives *flavus*, -a, -um and *hirtus*, -a, -um, and alludes to the dense covering of yellow setae on the dorsum of body.

**Distribution.** Species known only from type locality in Mindanao Island, the Philippines.

### *Rhyparus gracilis* Arrow, 1905

(Figs 3a–c, 9, 15, 21, 27a–b)

**Material examined.** PHILIPPINES: MINDANAO: 1 ♂ 3 ♀♀, Kalatungan, Bukidnon, ix.2016, local coll. (LMCN); 4 ♀♀, Bukidnon, Kitanglad Mts., Mt. Kitanglad, 8°03'24.8" N 125°00'22.9" E, 1200 m, 23.–24.x.2018, Medina MND. leg. (UMCRC); 1 ♂, Davao City, Talomo Mts., Mt. Talomo, 7°04'36.9" N 125°20'13.2" E, 1100 m, 25.–30.iii.2019, Medina MND.



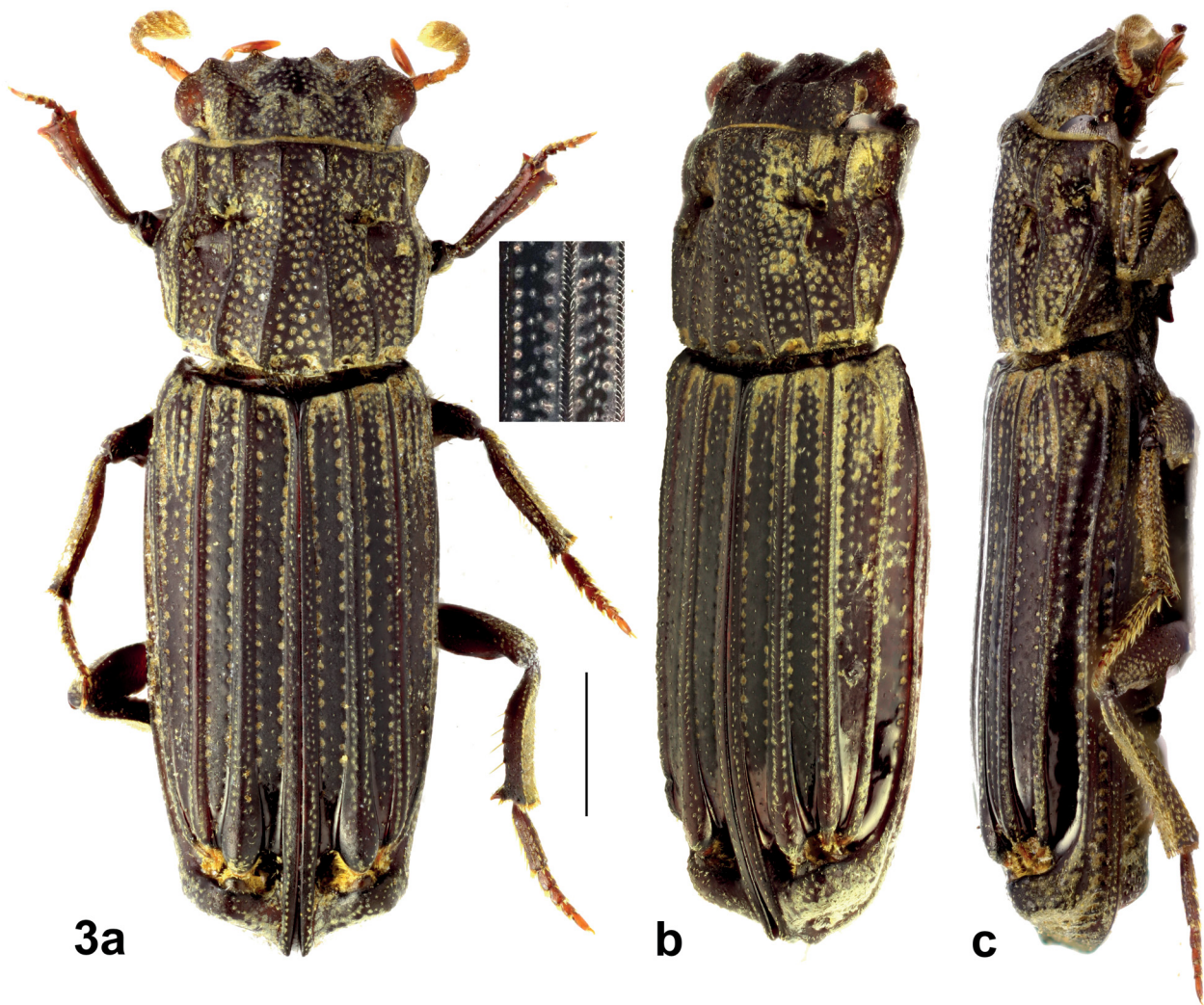


Fig. 3. Habitus of *Rhyparus gracilis* Arrow, 1905: a – dorsal view; b – right dorsolateral view; c – right lateral view. Scale bar = 1.0 mm.

leg. (UMCRC); 1 ♂, Araibo, Pantukan, Compostela Valley, Candalaga Mts., 7°16'35.3"N 126°10'12.8"E, 900 m, 15.–20.x.2019, Anichtchenko A. leg. (DUBC); 1 ♂, New Bataan, Cagan, 7°16'25"N 126°13'23.7"E, 18.–21.x.2019, Anichtchenko A. leg. (DUBC)

**Diagnosis.** Medium-sized to large species: body length 5.2–7.0 mm (Figs 3a–c). Head depicted in Fig. 9; epipharynx as in Fig. 15. Intermediate lobes of pronotum as large as anterior ones; median intercosta with dense punctation; second and third intercostae of pronotum with dense punctation basally. First, second and fourth intercostae of elytra with two rows of medium-sized punctures, third intercosta with three rows of medium-sized punctures basally – medium row presenting to about midlength of elytra. All protrusions of caudal bulb connected, weakly developed (Figs 3a–c, 21) (see also STEBNICKA 1998). Aedeagus as in Figs 27a–b.

**Distribution.** Species known from Papua New Guinea: Milne Bay, Central Province, Eastern Highlands, Gulf, Madang, Morobe, Oro, Western Highlands, Western Province, Sepik; and Indonesia: West Papua (MENCL et al. 2013). First record from the Philippines: Mindanao Island.

### *Rhyparus helophoroides* Fairmaire, 1893

(Figs 4a–c, 10, 16, 22, 28a–b)

**Material examined.** PHILIPPINES: LUZON: 1 ♂, Camirines Sur, Lagonoy, ii.2019, local coll. (CNCW). MINDANAO: 3 ♂♂ 1 ♀, Araibo, Pantukan, Compostela Valley, Candalaga Mts., 7°16'35.3"N 126°10'12.8"E, 900 m, 15.–20.x.2019, Anichtchenko A. leg. (DUBC); 4 ♂♂ 4 ♀♀, New Bataan, Cagan, 7°16'25"N 126°13'23.7"E, 18.–21.x.2019, Anichtchenko A. leg. (DUBC). 1 ♀, Maragusan, Marangig Falls, Candalaga Mts., 7°20'28.4"N 126°10'19.8"E, 700 m, 3.–4.v.2019, A. Anichtchenko leg. (DUBC). 1 ♀, S Cotobato, Lake Holon, 5.–10.x.2019, Anichtchenko A. leg. (DUBC). 1 ♀, Bukidnon, Kitanglad Mt., 8°03'24.8"N 125°00'22.9"E, 1200 m, 23.–24.x.2018, Medina MND. leg. (UMCRC); 1 ♀, Davao City, Marilog Mts., Marilog, 7°27'16.2"N 125°14'52.7"E, 1357 m, 15.–17.vii.2018, Medina MND. leg. (UMCRC); 1 ♂, Dominorog, Bukidnon, iv.2019, local coll. (LMCN).

**Diagnosis.** Small species: body length 3.4–4.5 mm (Figs 4a–c). Head as depicted in Fig. 10; epipharynx as in Fig. 16. Intermediate lobes of pronotum slightly larger than anterior one; median intercosta with dense punctation medially; second and third intercostae without or only with simple punctation basally. All intercostae of elytra with two rows of large punctures. Internal and median protrusion of caudal bulbs connected (Fig. 22); external



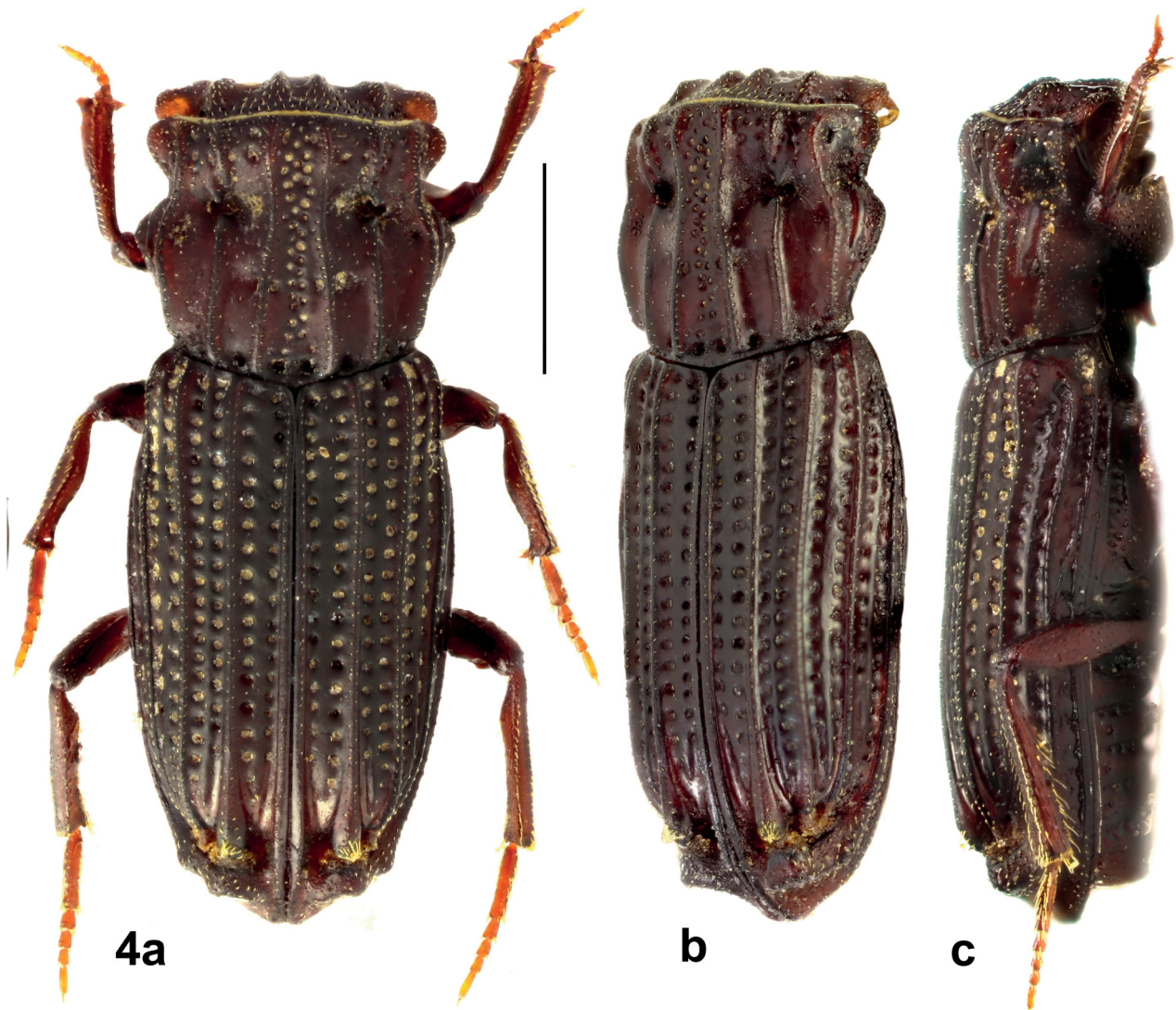


Fig. 4. Habitus of *Rhyparus helophoroides* Fairmaire, 1893: a – dorsal view; b – right dorsolateral view; c – right lateral view. Scale bar = 1.0 mm.

protrusion weakly developed (see also THÉRI & BORDAT 2012). Aedeagus as in Figs 28a–b.

**Distribution.** Australia (introduced): New South Wales, Queensland; Indonesia: Central Java, West Kalimantan, West Papua; Japan: Honshu, Kyushu, Shikoku, Ryukyus; Malaysia: Sabah; New Caledonia; Papua New Guinea: Central Province, Eastern Highlands, Morobe; the Philippines: Luzon, Negros; Vanuatu; Taiwan; ‘Bornéo’ (MENCL et al. 2013). First record from Mindanao Island.

***Rhyparus mindanaoensis* sp. nov.**  
(Figs 5a–c, 11, 17, 23, 29a–b)

**Type material.** HOLOTYPE: ♂, labelled: ‘Philippines, Mindanao, Maragusan, 700m, Marangig Falls, Candalaga Mts., 7°20′28.4″N 126°10′19.8″E, 3–4.v.2019, A. Anichtchenko leg.’ (DUBC). PARATYPES: 1 ♂, labelled: ‘Philippines, Mindanao, Bukidnon, Kalatungan, ix.2016, local coll.’ (LMCN). 1 ♀, labelled: ‘Palawan (Central), Sabang, 50–100m., via Underground River, I. Lobl, 30.xi.[19]95’ (ISEA).

**Description.** Male holotype: Moderately large species, body length 5.5 mm; robust, matt, except for shiny tops of

intervals 1–4; anterior part of pronotal costae with minute appressed microsetae as described below, but otherwise glabrous; black, except for dark brown antennae and mouth parts (Figs 5a–c).

Head, as observed dorsally and frontally (Figs 5c and 11, respectively), with anterior clypeal emargination with weak, very obtuse tooth on each side, distinct lateral emargination sinuate before widely rounded lateral angle; clypeal margin with upper and lower edges: upper edge concave, sharp and distinct, lower edge obsolete and not observable from above; clypeal disc very convex, ringed by deep groove, with pair of small rounded tubercles. Frons with four relatively long, sharp, longitudinal ridges of equal length; lateral ridges slightly less elevated; distance between median and lateral ridges slightly larger than that between two median ones. Head between genae almost as wide as pronotum; genae very large and strongly protruding. Head irregularly punctate, more sparsely so in frons, punctures large, separated by about 1.5–2.0 times their diameter and bearing minute, pale, relatively thin microsetae. Epipharynx as in Fig. 17.



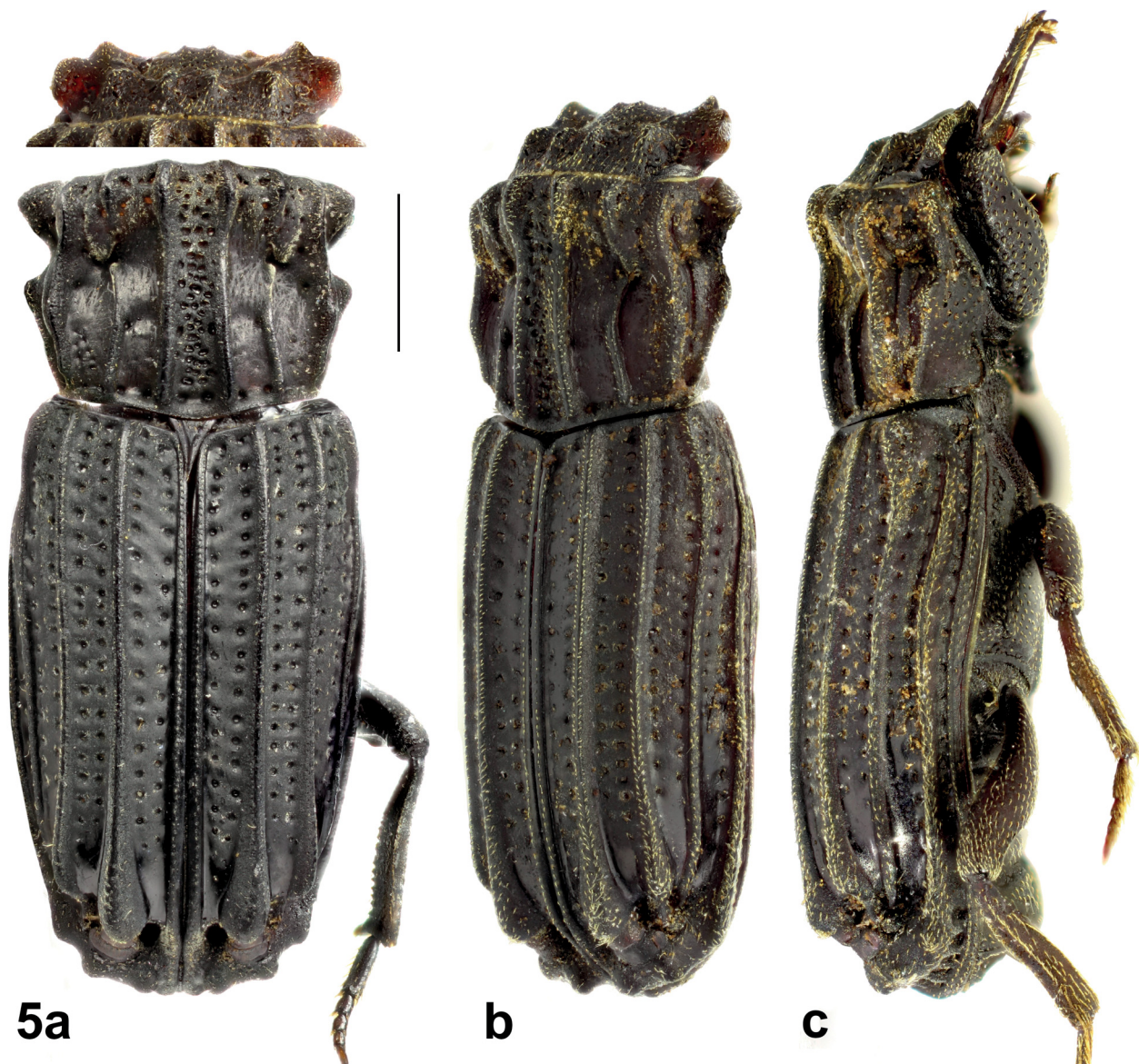


Fig. 5. Habitus of *Rhyparus mindanaoensis* sp. nov., male, holotype: a – dorsal view; b – right dorsolateral view; c – right lateral view. Scale bar = 1.0 mm.

Pronotum transverse, 1.26 times as wide as long; opaque, convex, anterior margin weakly bisinuate; disc with eight costae, six central costae sharp and well delimited. Costae 1 (paramedian pair) continuous, very highly elevated anteriorly and posteriorly, in anterior part forming elevated, elongate tubercles (Fig. 11); costae slightly and evenly convergent in central part. Costae 2 high and well delimited, flattened in transverse depression, anterior part short but very high; fossae of transverse depression small and caviform, with two coracoid processes hanging over fossae. Costae 3 continuous, distinctly elevated, weakly sinuous in anterior third. Costae 4 incomplete, flattened and low but distinct in median part, interrupted in apical third by two deep punctiform fossae, and effaced in basal third; one deep punctiform fossa situated at base of anterolateral pronotal process. Median intercosta densely covered with large punctures, punctures not confluent in median line and sparser in anterior half. Lateral intercostae 1 and 2

each with four large punctures in apical part; intercostae 2 and 3 with only few large punctures. Lateral margin with two lobes, anterior lobe large, relatively narrow and with pointed apex, median lobe subangulate.

Elytra (Figs 5a–c; 17) elongate, 1.65 times as long as wide. Humeral callus with large punctures separated by about one puncture diameter. Each elytron with five strong costae. First costa (sutural) straight, flattened on disc and slightly elevated in apical third, without apical tooth. Second costa sharp, very strongly elevated from base to apical bulbous area, and terminated as strong swelling with dense brown trichome at apex. Third costa slightly incurved, sharp, extending from base to a little before end of costa 2, apex slightly swollen and with brown elongate tubercle. Fourth costa high, of almost same length and width as costa 3, shortly curved at base and slightly sinuous near apex, with relatively long brown tubercle and dense trichome. Fifth costa sinuous, elevated, extending from base to apex,



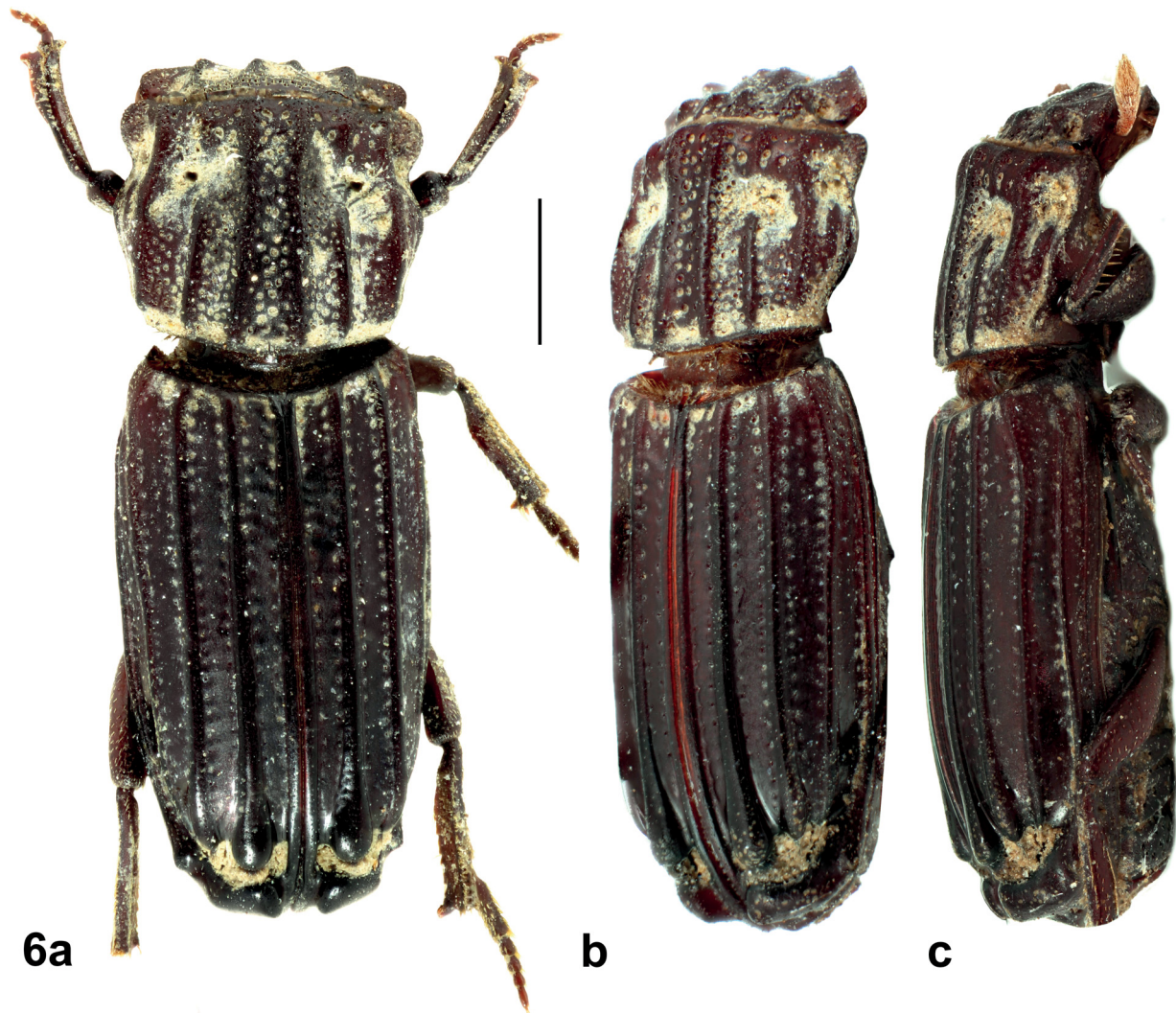


Fig. 6. Habitus of *Rhyparus philippinensis* Arrow, 1905, syntypes: a – dorsal view; b – right dorsolateral view; c – right lateral view. Scale bar = 1.0 mm.

with apical portion strongly swollen and forming bisinuate transverse protrusion with three large tubercles in dorsal view. Elytral intercostae very weakly and transversally corrugated, matt, except for very shiny and impunctate apical parts of intercostae 1–4. Intercostae 1–4 with two longitudinal rows of large and deep punctures of almost equal size, extending from base to near apex, distances between neighboring punctures relatively uniform, about 1.5–2.0 times puncture diameter. Caudal bulbs distinctly developed. Internal and median protrusion of caudal bulbs well developed; external protrusion moderately developed.

Pygidium with semicircular elevated area at base connected by narrow ridge with pygidial apex and by deep groove with basal margin, with areas on each side of ridge strongly depressed.

Legs. Profemora wide, with large punctures throughout. Protibiae thin at base; with slightly sinuate inner margin up to relatively large and slightly inward bent inner apical tooth, weakly dilated apically, with moderately arcuate and then emarginate inner margin in front of large outer tooth. Mesofemora with 4–5 tough, fairly long, sharp, pale microsetae along apical half of anterior edge; posterior

margin bilobed, with deep groove, its surface punctate throughout, punctures of half size of those on profemoral surface. Mesotibiae narrow at base, inner margin strongly widened from base to about third of its length and then almost parallel to apex, with short, pale, decumbent setae on inner surface and rows of longer, pale, semierect setae on edges; apex with backward directed inferior spine and inward bent tooth. Metafemora long, narrow, posterior margin slightly bilobed, punctuation smaller and sparser than on mesofemora. Metatibiae with outer margin concave, setation less developed than on mesotibiae; inferior apical tooth large and directed inward in male.

Venter matt, black. Prosternum with long anterior process with rounded apex and hastate posterior process. Mesoventrite with shallow setigerous punctures. Meso-metaventral plate with distinct, moderately deep median impression, surface with small setigerous punctures medially and larger punctures laterally. Abdomen with ventrites 1–5 with small, shallow and sparse setiferous punctures, punctures along apical and basal margin crenate; ventrites 3–5 triangularly grooved on each lateral broadened area, groove distinctly larger on ventrite 5; ventrites





Figs 7–12. Head of *Rhyparus* species, frontal view: 7 – *R. barclayi* Masumoto, Ochi & Ho, 2019; 8 – *R. flavohirtus* sp. nov.; 9 – *R. gracilis* Arrow, 1905; 10 – *R. helophoroides* Fairmaire, 1893; 11 – *R. mindanaoensis* sp. nov.; 12 – *R. philippinensis* Arrow, 1905. Scale bar = 1.0 mm.

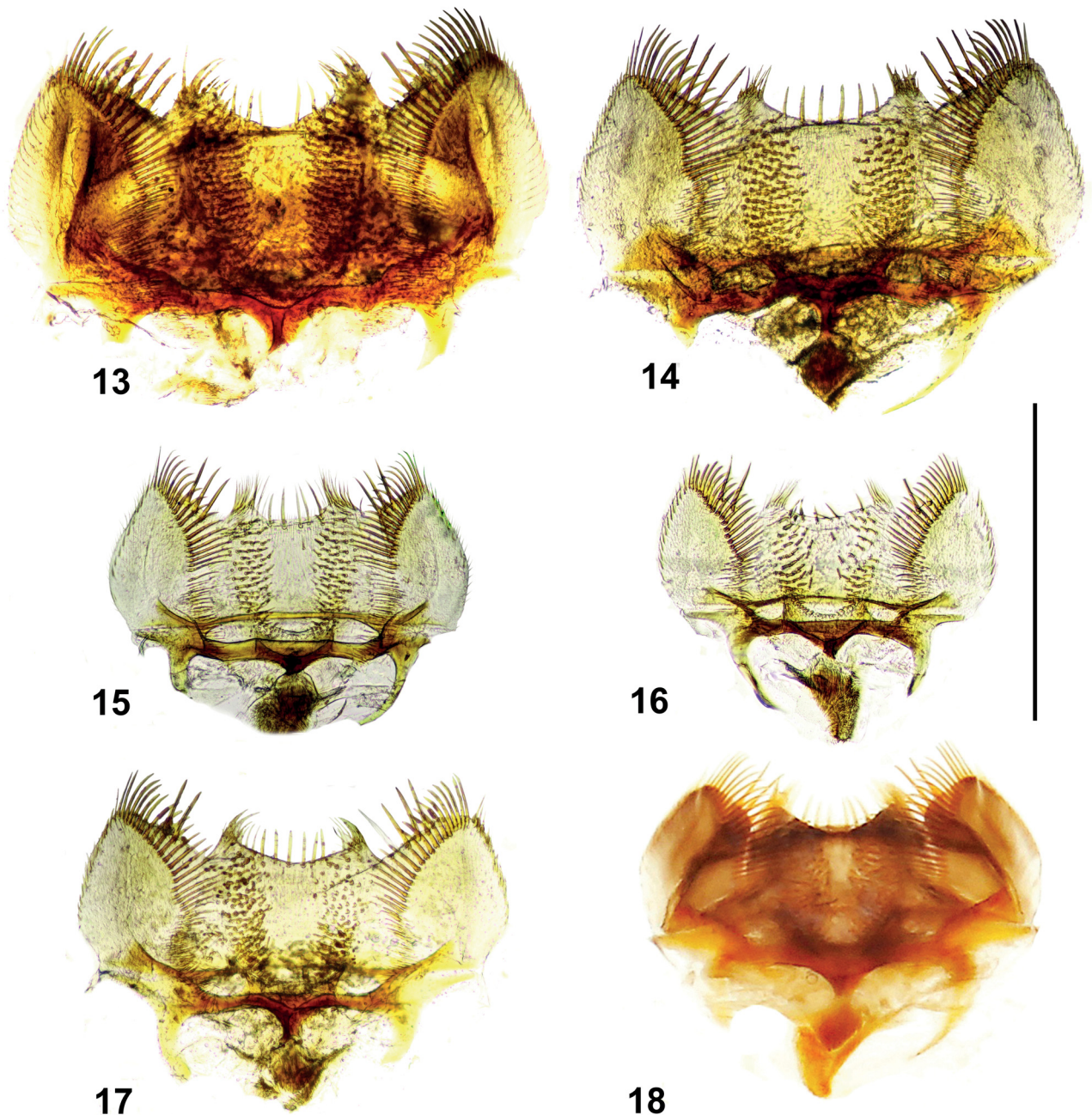
5 and 6 fused, ventrite 6 with large transverse groove with 16 large punctures.

Male genitalia. Aedeagus as in Figs 29a–b.

**Differential diagnosis.** Based on the moderately elongate habitus with elytra widest in basal third, body length 5.5–6.0 mm, anterior lateral lobes of pronotum wider than intermediate ones, very high costae of pronotum and elytra with deep intercostae, presence of two rows of punctures in all intercostae of elytra, distinctly divided median and internal protrusion of caudal bulb of elytra with distinct external protrusion, the new species is very

similar to *Rhyparus denticollis* Fairmaire, 1893. However, *R. mindanaoensis* sp. nov. can be distinguished from the former species by median intercosta of pronotum somewhat narrower and with denser punctation, second and third intercostae of pronotum with sparse/very sparse, irregularly distributed punctation in basal part (versus moderately dense punctation, rather evenly distributed, with similar density to punctation in median furrow), sinuation between internal and median protrusion of caudal bulb of elytra more distinct and tibiae relatively slender. **Etymology.** The specific epithet is derived from Min-





Figs 13–18. Epipharynx of *Rhyparus* species: 13 – *R. barclayi* Masumoto, Ochi & Ho, 2019; 14 – *R. flavohirtus* sp. nov.; 15 – *R. gracilis* Arrow, 1905; 16 – *R. helophoroides* Fairmaire, 1893; 17 – *R. mindanaoensis* sp. nov.; 18 – *R. philippinensis* Arrow, 1905. Scale bar = 0.5 mm.

danao Island, where the holotype of the new species was collected; the name is an adjective.

**Distribution.** Species known so far only from the Philippines: Mindanao and Palawan islands.

***Rhyparus philippinensis* Arrow, 1905**  
(Figs 6a–c, 12, 18, 24, 30a–b)

**Type material.** SYNTYPES: 1 ♂, labelled: ‘Phil. Isl.’ [round label] // ‘Syntype’ [round label] // ‘NHMUK 014189207’ (BMNH); 1 ♀, labelled: ‘Phil. Isl.’ [round label] // ‘45 49’ [round label] // ‘Syntype’ [round label] // ‘NHMUK 014189209’ (BMNH); 1 ♀, labelled: ‘Phil. Isl.’ [round label] // ‘Syntype’ [round label] // ‘NHMUK 014189208’ (BMNH); 1 ♀, labelled: ‘Phil. Isl.’ [round label] // ‘Syntype’ [round label] // ‘NHMUK 013906231’ (BMNH).

**Additional material examined.** PHILIPPINES: LUZON: 1 ♀, Lagonoy, Camarines Sur, Bicol, vii.2018, local coll. (CNCW); 1 ♀, Cagayan, Santa Ana, viii.2018, local coll. (DUBC); 1 ♂, Barlig Mt. Province, xii.2018, local coll. (LMCN). MINDANAO: 1 ♀, New Albay, Compostela Valley, vii.2018, local coll. (CNCW); 1 ♂, Wao, Lanao del Sur, x.2018, local coll. (CNCW); 1 ♀, Alamada, Lanao del Sur, x.2018, local coll. (CNCW).

**Diagnosis.** Medium-sized species: body length 5.0–6.5 mm (Figs 6a–c). Head as depicted in Fig. 12; epipharynx as in Fig. 18. Intermediate lobes of pronotum as large as anterior one; median intercosta with dense punctation; second and third intercostae with dense punctation basally. All intercostae of elytra with two rows of medium-sized punctures. Internal and median protrusion of caudal bulbs





Figs 19–24. Elytra of *Rhyparus* species, oblique apico-dorsolateral view: 19 – *R. barclayi* Masumoto, Ochi & Ho, 2019; 20 – *R. flavohirtus* sp. nov.; 21 – *R. gracilis* Arrow, 1905; 22 – *R. helophoroides* Fairmaire, 1893; 23 – *R. mindanaoensis* sp. nov.; 24 – *R. philippinensis* Arrow, 1905. Scale bar = 1.0 mm.

connected (Fig. 24); surface between external protrusion of caudal bulb of elytra and lateral margin of elytra distinctly sinuate – external protrusion more or less developed; however, median and internal ones always with the same proportions. Aedeagus as in Figs 30a–b.

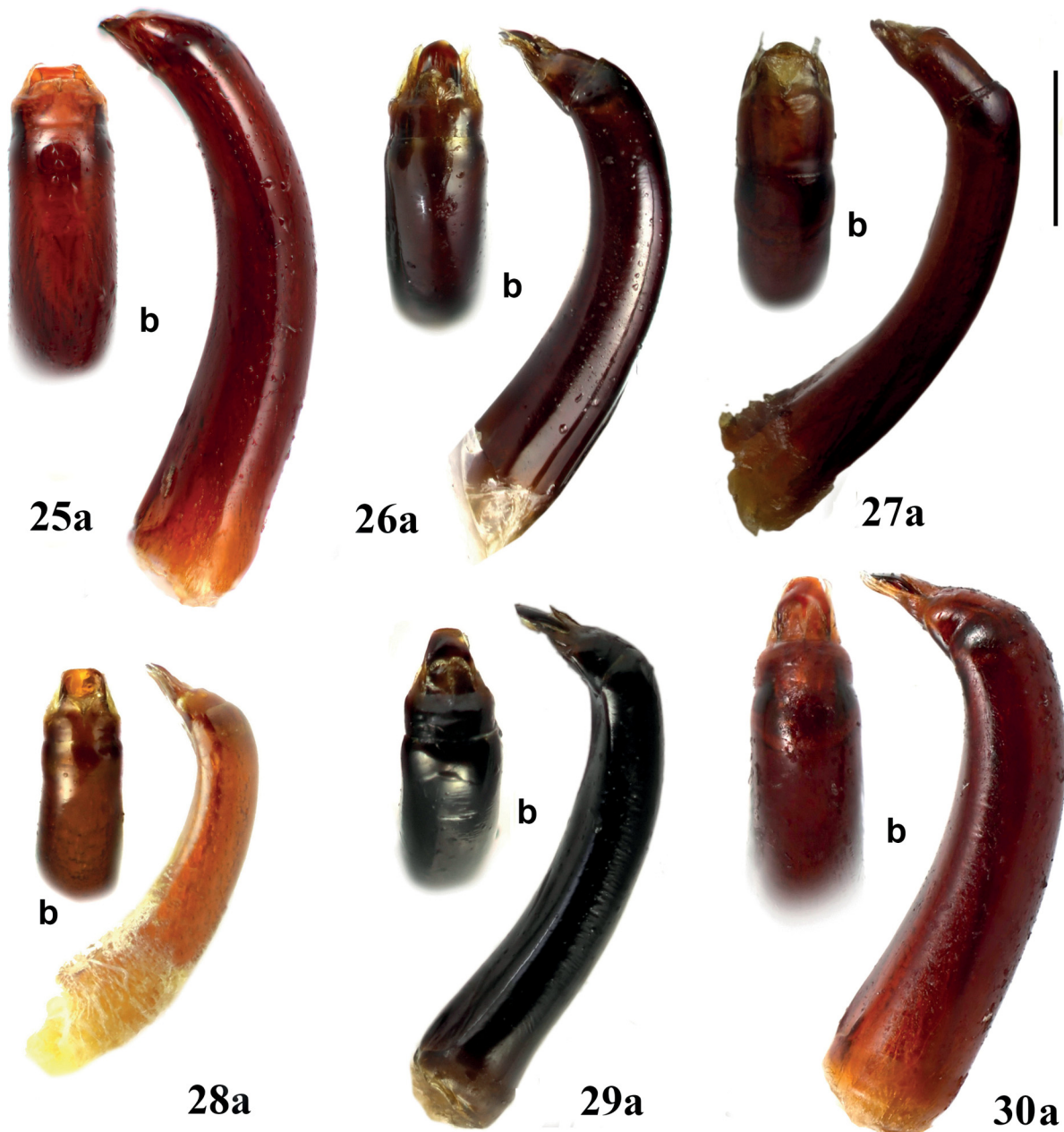
**Variability.** Lateral lobes of pronotum slightly variable in size and proportions. Punctures of intercostae of pronotum and elytra can be proportionally variable in size between the specimens. Costae of pronotum and elytra are slightly variable in height and width.

**Distribution.** Philippines: Luzon, Mindanao.

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Figs 25–30. Aedeagus of *Rhyparus* species, a – lateral view, b – dorsal view. 25 – *R. barclayi* Masumoto, Ochi & Ho, 2019; 26 – *R. flavohirtus* sp. nov.; 27 – *R. gracilis* Arrow, 1905; 28 – *R. helophoroides* Fairmaire, 1893; 29 – *R. mindanaoensis* sp. nov.; 30 – *R. philippinensis* Arrow, 1905. Scale bar = 0.5 mm.

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