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New taxa of Lebinthina (Orthoptera: Gryllidae: Eneopterinae: Lebinthini) from New Guinea and nearby islands

Running title: New Lebinthina from New Guinea

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Abstract

Four new species from three genera of Lebinthina crickets are described here. These include one species of *Gnominthus: Gnominthus milneus* **sp. nov.** from Papua New Guinea; two new species of *Macrobinthus: Macrobinthus kei* **sp. nov.** and *Macrobinthus mamai* **sp. nov.** from Maluka and Papua New Guinea, respectively; and one species of *Microbinthus: Microbinthus elegans* **sp. nov.** from Papua New Guinea

Key words: Indonesia, Papua New Guinea, Grylloidea, Maluka, new species, Southeast Asia, taxonomy

Introduction

New Guinea, the world's second largest island, is a mega-diverse region known to host a high diversity of insects, birds and endemics (Novotný *et al.*, 2006, Novotný *et al.*, 2007; Králová *et al.*, 2019). The island also has the richest island flora with species discovery still increasing (Cámara-Leret, 2020) as well as being a part of the larger Indo-Malay-Philippine biodiversity hotspot for marine biodiversity (Gaither & Rocha, 2013). More than 1,000 species of Orthoptera have been recorded in New Guinea (Cigliano *et al.*, 2021). To the west of New Guinea is the Maluka archipelago, where more than 200 species have been recorded (Cigliano *et al.*, 2021). Yet, more species new to science are still awaiting discovery in this part of Southeast Asia. Since 2020, more than 20 new species have been described from New Guinea and Maluka (Gorochov, 2020; Ingrisch, 2020; Storozhenko, 2020; Tan & Robillard, 2020) and long-legged leaf katydids (Gorochov, 2020). That New Guinea and Maluka are candidates for new species discovery is particularly true also for species of crickets from the subfamily Eneopterinae.

Eneopterinae is a clade of crickets that is highly diversified on the island of New Guinea and seven of the 27 genera of eneopterines are found on the island (Gorochov, 2009; Robillard, 2010; Dong & Robillard, 2016; Cigliano *et al.*, 2021). Recent studies on the genus *Cardiodactylus* led to discovery of five new species from New Guinea (Dong & Robillard, 2016), and a biogeographic study demonstrated that the island is an important corridor for species dispersal to other parts of Southeast Asia for these crickets (Dong *et al.*, 2018). Recent systematic investigation on the subtribe Lebinthina, previously lumped in a single genus *Lebinthus*, also led to erection of new genera with distinct morphological features and that are supported by phylogeny. These include *Centuriarus* Robillard (Robillard 2011), *Gnominthus* Robillard & Vicente (Vicente *et al.*, 2015), *Microbinthus* Robillard & Dong, 2016, *Macrobinthus* Robillard & Dong, 2016 (Robillard *et al.*, 2016) and *Rugabinthus* Tan & Robillard, 2022 (Tan & Robillard, 2022). Compared to New Guinea, the eneopterine diversity in the Maluka archipelago is less well-known, and currently, only a handful of Lebinthini species have been reported there (Robillard, 2010; Robillard *et al.*, 2014; Cigliano *et al.*, 2021).

Even though numerous new species of encopterines have been described recently from newly collected materials (e.g., Robillard *et al.*, 2016; Tan *et al.*, 2019; Baroga-Barbecho *et al.*, 2020; Tan *et al.*, 2021a), many old specimens deposited in natural history museums also harbour undescribed species (e.g., Robillard & Su, 2018; Baroga-Barbecho *et al.*, 2019, 2020; Tan *et al.*, 2021b; Tan & Robillard, 2022). Based on materials from natural history collections, we describe here four new species from three genera of Lebinthina. These include one species of *Gnominthus: Gnominthus milneus* **sp. nov.** from Papua New Guinea; two new species of *Macrobinthus*:

Macrobinthus kei **sp. nov.** and *Macrobinthus mamai* **sp. nov.** from Maluka and Papua New Guinea, respectively; and one species of *Microbinthus: Microbinthus elegans* **sp. nov.** from Papua New Guinea

Materials and Methods

Materials Specimens in MNHN were studied and additional materials were loaned from ANIC, MZB and BPBM.

Morphology

Male tegminal veins and cells follow terminology by Desutter-Grandcolas (2003) and Robillard & Desutter-Grandcolas (2004). Male and female genitalia have been dissected in softened specimens by cutting the membranes between the paraprocts and the subgenital plate, or between the ovipositor and the subgenital plate respectively; they have been observed after cleaning with cold KOH, and then kept in glycerine. Male genitalia are named according to Desutter (1987), modified in Desutter-Grandcolas (2003) and Robillard & Desutter-Grandcolas (2004). Abbreviations: see below.

Close-up images of habitus and morphological features were done using a Canon EOS 6D digital SLR camera with a macro photo lens MP-E 65 mm f/2.8 USM (1–5×). Imaging stacking was done using Helicon Remote version 9.3.1. W and Helicon Focus 6.8.0. Photographs of male and female genitalia were done with a binocular microscope Leica MZ16 with AMScope Microscope Eyepiece Camera (MU1000, 10 MP Aptina Colour, CMO50) attached via an AmScope FMA050 fixed microscope adaptor and the software ToupView. Image editing was accomplished using CombineZP version 1.0 and Adobe Photoshop CC2014. To highlight the structural components of genitalia, water solution containing a drop of JBL Punktol was used. To fix orientations and stabilization of genitalia for photography, a clear and viscous Hand Sanitizer was used following Su (2016).

Abbreviations

Depositories:	
ANIC	Australian National Insect Collection (CSIRO), Canberra, Australia
BPBM	Bernice Pauahi Bishop Museum, Hawaii, U.S.A.
MNHN	Muséum national d'Histoire naturelle, Paris, France
MZB	Museum Zoologicum Bogoriense, Bogor, Java, Indonesia

General morphology

- I, II, III front, median, hind respectively (femora, legs, tibiae)
- F femora
- FW forewing
- TaIII-1 basal segment of hind leg tarsomere
- T tibiae

Measurements

FIIILlength of hind femoraFIIIWwidth of hind femoraFWLforewing lengthFWWforewing width (at the level of maximal width)OLovipositor lengthPronLpronotum lengthPronWpronotum widthTIIILlength of hind tibiae

Systematic part

Family Gryllidae

Subfamily Eneopterinae Saussure, 1874

Tribe Lebinthini Robillard, 2004

Subtribe Lebinthina Robillard & Tan, 2021

Genus Gnominthus Robillard & Vicente, 2015

Gnominthus Robillard & Vicente, 2015: 83.

Gnominthus - Robillard et al., 2016: 167; Vicente et al., 2017: 2204

Type species. Gnominthus baitabagus Vicente & Robillard, 2015, by monotypy and original designation

Distribution. New Guinea (PAPUA NEW GUINEA)

Included species:

Gnominthus baitabagus Vicente & Robillard, 2015 *Gnominthus milneus* **sp. nov.**

Gnominthus milneus sp. nov. (Figs 1–3)

Specimen examined. Holotype: PAPUA NEW GUINEA • ♂; Nowata, Milne Bay District; 600 m; July 1969; W. B. Hitchcock leg.; (ANIC14-036925). **Paratype:** PAPUA NEW GUINEA • ♀; same locality and collector as holotype, molecular sample L201 (ANIC14-036926).

Type locality. PAPUA NEW GUINEA: Milne Bay District, Nowata.

Etymology. This species is named after the type locality, Milne.

Diagnosis. The new species differs from *Gnominthus baitabagus* Vicente & Robillard, 2015 by the colour patterns on the face, and by the male and female genitalia, the latter having paired pseudepiphallic apical lophi and different shapes of pseudepiphallic parameters and endophallic sclerite.

Description. Habitus similar in size and general shape to *G. baitabagus* (Fig. 1). Vertex and fastigium yellow brown with numerous small dark spots. Dorsum of head yellow brown with six longitudinal dark bands at posterior end (Fig. 2A); back of eyes with a dark band. Scapes pale yellow brown, cream-coloured ventrally. Antennae orange brown. Face with a faint cream-coloured vertical band in the middle; fastigium verticis yellow brown with two dark spots; frons yellow brown with two dark spots and an oval dark patch above mouthparts (Fig. 2B). Clypeus cream-coloured; labrum cream-coloured with lateral parts black; mandibles entirely dark brown; maxillary palpi with segments cream-coloured, yellow brown mottled with black, anterior margin faintly concave (Fig. 2A); lateral lobes dark orange brown with a pale ventro-anterior corner (Fig. 2C). Legs: FI–II light brown with faint brown spots; TI–II brown; tarsomeres 1 and 3 of each leg yellow basally then brown; FIII brown, knees dark brown; TIII homogeneously red brown. Abdomen red brown. Cerci brown.

Male: FW reaching base of forth tergite. FW colouration (Fig. 2D): Dorsal field cells mostly brown, veins generally brown or dark brown; CuA cream-coloured, M yellow brown, area between M and R dark, R brown. Lateral field cells dark; longitudinal veins brown. FW venation: harp vein strongly angularly sinuous, surrounding a small dark median bump. Anal area of dorsal field small, including two short cell alignments (e and f); apex of dorsal field obliquely rounded. Lateral field with Sc and 4 strong ventral longitudinal veins straight; Sc with one subapical bifurcation.

Male genitalia (Figs 3A–C): Pseudepiphallus triangular, elongate, its basal margin straight, posterior apex truncated with short paired lophi; lophi setose dorsally and ventrally with apices obtuse. Rami short, slightly longer than half the pseudepiphallus length, slightly converging apically. Pseudepiphallic parameres with a ventral lobe forming a triangular plate; and a dorso-lateral lobe transverse, pointing inwards with obtuse apex. Ectophallic apodemes parallel and long, reaching beyond anterior margin of pseudepiphallic sclerite. Ectophallic arc transverse and slightly curved. Ectophallic fold mostly membranous, triangular not reaching base of

pseudepiphallic lophi. Endophallic sclerite narrowly Y-shaped, comprising a long anterior region and a triangular median expansion, fairly elongated lateral arms posteriorly not surpassing median expansion.

Female: FWs very short, not reaching the base of first tergite, very slightly overlapping (Fig. 1C). Cells of dorsal field brown, dorsal field with six strong orange longitudinal veins and very weak yellow transverse ones; lateral field with four longitudinal veins. Posterior corner between dorsal and lateral fields forming an acute angle, with oblong cream-coloured spot (Fig. 2E). Dorsal field apex oblique (Fig. 2E). Ovipositor rather short, apex faintly denticulate dorsally.

Female genitalia (Fig. 3D): Copulatory papilla conical, with a wide basal sclerite and a well-developed apex slightly sclerotized.

Measurements (in mm). Male holotype PronL = 2.6, PronW = 4.0, FWL = 3.5, FWW = 2.9, FIIIL = 8.7, FIIIW = 3.2, TIIIL = 7.0; female paratype PronL = 2.5, PronW = 3.8, FWL = 1.6, FWW = 1.5, FIIIL = 8.6, FIIIW = 3.3, TIIIL = 6.9, OL = 5.4.

Genus Macrobinthus Robillard and Dong, 2016

Macrobinthus Robillard & Dong, 2016: 168.

Macrobinthus - Robillard & Su, 2018: 259; Rentz & Su, 2019: 230

Type species. Larandopsis jharnae Bhowmik, 1981, by original designation

Distribution. Australia, Bismarck Archipelago, New Guinea

Included species:

Macrobinthus jharnae (Bhowmik, 1981) Macrobinthus kei **sp. nov.** Macrobinthus kutini Robillard & Su, 2018 Macrobinthus mamai **sp. nov.** Macrobinthus newguineae (Bhowmik, 1981) Macrobinthus songi Robillard & Dong, 2016 Macrobinthus wilhelmsis Robillard & Dong, 2016

Macrobinthus kei sp. nov. (Figs 4, 5, 6A–D)

Specimen examined. Holotype: INDONESIA • ♂; Maluku, Kei Eil. [Kai Islands], Gn. [= Gunung, mountain] Daab; 1922; #89; identified *Piestodactylus siebersi*, paratype, by L. Chopard; H. C. Siebers leg. (MZB-ORTH10032).

Paratypes: INDONESIA • \bigcirc ; **Indonesia,** Maluku, Kei Eil. [Kai Islands], Gn. [= Gunung, mountain] Daab; 1922; #132; H. C. Siebers leg. (MNHN-EO-ENSIF1429) • 4 \circlearrowright ; same information as holotype (MZB-ORTH10028, 10029, 10031, 10035) • 1 \bigcirc ; same information as holotype (MZB-ORTH10030) • 1 \circlearrowright ; same locality and collector as holotype, #82 (MNHN-EO-ENSIF1438) • 1 \circlearrowright ; same locality and collector as holotype, #79, molecular sample L74 (MNHN-EO-ENSIF1453) • 2 \heartsuit ; same locality and collector as holotype; #85 and #105 (MNHN-EO-ENSIF1439-1440).

Type locality. INDONESIA, Maluku, Kei Eil [Kai Islands].

Etymology. This species is named after its type locality, Kai Islands; noun in apposition.

Diagnosis. This new species is most similar to *Macrobinthus kutini* Robillard & Su, 2018 in the shape of the male genitalia, including shape of posterior pseudepiphallic lophi and pseudepiphallic parameres, but differs by a more elongated pseudepiphallus, with posterior end wider and truncated between the lophi, and by longer female FWs. It is also similar to *Macrobinthus jharnae* (Bhowmik, 1981) by the elongated pseudepiphallus, but differs by

shape of pseudepiphallic parameres and posterior end of pseudepiphallus between the lophi. It also differs from *Macrobinthus wilhelmsis* Robillard & Dong, 2016 by its larger size and by male genitalia having pseudepiphallus with paired lophi at posterior apex. The female of the new species also differs from *Macrobinthus newguineae* (Bhowmik, 1981) and *Macrobinthus songi* Robillard & Dong, 2016 by slenderer and more elongated copulatory papilla.

Description. Size medium for the genus (Fig. 4). Vertex and fastigium dark brown. Dorsum of head mostly dark brown, with five faint longitudinal pale bands (Fig. 5A); back of eyes with a yellow band. Scapes white, with brown patterns. Antennae orange brown. Fastigium verticis and frons dark brown (Fig. 5B); with faint whitish spots below antennae and eyes. Mouthparts brown and white, mandibles brown mottled white; clypeus white laterally and brown in the middle; maxillary palps with segments cream-coloured to pale brown, slightly darker at apices (Fig. 5B). Lateral parts of head mostly brown (Fig. 5C). Pronotum dorsal disk dark brown mottled with yellow, anterior margin straight; lateral lobes dark brown, darker than dorsal disk (Fig. 5C). Legs: FI–II light brown with brown spots; TI–II dark brown with a yellow ring; tarsomeres 1 and 3 of each leg yellow basally then brown; FIII brown finely mottled with yellow and dark brown, knees dark brown; TIII homogeneously dark brown. Abdomen brown. Cerci light brown with faint apical rings.

Male: FW reaching middle of third tergite. FW colouration (Fig. 5D): Dorsal field cells mostly brown, veins whitish or cream-coloured; M and R veins yellow brown. Lateral field cells brown, with ventral region more yellow brown; longitudinal veins brown with cross-veins cream-coloured. FW venation: 1A vein (file) slightly bisinuous. Harp narrow, with one main sinuous oblique vein. Mirror not differentiated from other cells of D alignment. Apical field including 2 short cell alignments; apex of dorsal field obliquely rounded. Lateral field with straight longitudinal vein, including Sc, without projection, and 5 more ventral veins.

Male genitalia (Figs 6A–C): Pseudepiphallus triangular, stout, with lophi setose dorsally and ventrally, more roundish with apices obtuse. Pseudepiphallic parameres large, trilobate; with a ventral lobe sclerotized and with posterior margin rounded, a lateral lobe oriented dorsally with obtuse apex, and a very small and stout basal lobe. Ectophallic apodemes slightly diverging anteriorly and long, barely surpassing beyond anterior margin of pseudepiphallic sclerite. Endophallic sclerite Y-shaped, comprising a long anterior region and a short median expansion with subacute apex and fairly elongated lateral arms posteriorly surpassing median expansion.

Female: FWs relatively long for the genus, reaching middle of fourth tergite, slightly overlapping. Cells of dorsal field dark brown, not translucent, with strong orange longitudinal veins and weak yellow or whitish transverse ones; with nine longitudinal veins on dorsal field and five on lateral field; 6th longitudinal vein from inner edge λ -shaped, with a bifurcation at mid-length; 7th vein fused to 8th vein at $\frac{2}{3}$ of FW length. Dorsal field apex rounded, lateral field posterior margin curved. Ovipositor as long as FIII, apex slightly denticulate dorsally.

Female genitalia (Fig. 6D): Copulatory papilla roundly triangular; basal sclerite forming a semi-circular ring with a small basal plate; bent at apical third in lateral view; apex narrowed and rounded, slightly sclerotized.

Measurements. Table 1.

Macrobinthus mamai sp. nov. (Figs 6E–G, 7, 8)

Specimen examined. Holotype: PAPUA NEW GUINEA • ♂; Central Province, east of Port Glasgow, Mamai plantation; 150 m.a.s.l.; 6 February 1965; R. Straatman leg.; light trap; molecular sample L175 (BPBM).

Type locality. PAPUA NEW GUINEA, Central Province, east of Port Glasgow

Etymology. This species is named after its type locality, Mamai plantation; noun in apposition.

Diagnosis. The new species differs from other species of the genus by shape of head, with smaller, more rounded eyes, face with a median whitish area. It is most similar to *Macrobinthus kutini* Robillard & Su, 2018 in male genitalia (shapes of pseudepiphallus and pseudepiphallic parameres) and FW venation, but differs by details of male genitalia (pseudepiphallic lophi more rounded, ventral lobe of pseudepiphallic parameres without long tapering anterior process). It differs from *Macrobinthus jharnae* (Bhowmik, 1981) by the stout pseudepiphallus

and shapes of pseudepiphallic parameres and pseudepiphallic lophi. It differs from *Macrobinthus kei* **sp. nov.** by the stouter pseudepiphallus, rounded pseudepiphallic lophi and ventral lobe of pseudepiphallic parameres without long tapering anterior process. It also differs from *Macrobinthus wilhelmsis* Robillard & Dong, 2016 by pseudepiphallus with paired lophi at posterior apex.

Description. Size average for the genus (Fig. 7). Eyes relatively small, rounded dorsally and located anteriorly on head. Vertex and fastigium dark brown. Dorsum of head with two faint narrow longitudinal pale bands in the middle (Fig. 8A); back of eyes with a narrow yellow band. Scapes mostly brown. Antennae orange brown. Face with a wide whitish-grey median area, dark brown laterally. Fastigium verticis dark brown with cream-coloured spots laterally (Fig. 8B). Mouth parts brown and grey, clypeus and mandibles whitish mottled with cream colour; maxillary palpi with segments yellow brown, slightly darker at apices (Fig. 8B). Pronotum dorsal disk dark brown mottled with yellow, anterior margin faintly concave and yellow; lateral lobes darker brown than dorsal disk (Fig. 8C). Legs: FI–II brown with few faint darker spots, knee areas markedly darker; TI–II dark brown with two faint yellow rings; tarsomeres 1 and 3 of each leg yellow basally then brown; FIII yellow brown with few brown spots; TIII homogeneously brown. Abdomen brown. Cerci light brown with faint apical rings.

Male: FW reaching apex of third tergite, narrow, occupying less than two third of abdomen width. FW colouration (Fig. 8D): Dorsal field cells mostly brown, veins yellow brown to cream-coloured; M and R brown. Lateral field cells brown, with ventral region more yellow brown; longitudinal veins brown with cross-veins cream-coloured. FW venation: harp with one main oblique vein faint and angularly sinuous. Mirror corresponding to an elongated d1 cell. Apical field small, including two short cell alignments; apex of dorsal field rounded. Lateral field with 6 straight longitudinal veins; Sc without projections.

Male genitalia (Figs 6E–G): Pseudepiphallus triangular, more elongate than *M. kei* **sp. nov.**, its basal margin rounded and slightly indented in the middle, posterior apex truncated with paired lophi; lophi setose dorsally and ventrally with apices subobtuse. Rami short, about half pseudepiphallus length, slightly converging anteriorly. Pseudepiphallic parameres trilobate; with a ventral lobe sclerotized and inverted pyriform, a wide lateral lobe oriented dorsally with acute apex, and a small and narrow basal lobe. Ectophallic apodemes parallel and long, reaching beyond anterior margin of pseudepiphallic sclerite. Ectophallic arc transverse. Ectophallic fold with two narrow ventral sclerites more or less parallel and diverging each other posteriorly, barely surpassing bases of pseudepiphallic lophi. Endophallic sclerite narrowly Y-shaped, comprising a long anterior region and a short median expansion with subacute apex and stout, lobular lateral arms posteriorly not surpassing median expansion. Endophallic apodeme with lateral lamellae.

Female: Unknown.

Measurements (in mm). Male holotype PronL = 4.1, PronW = 6.7, FWL = 6.6, FWW = 4.7, FIIIL = 16.4, FIIIW = 6.2, TIIIL = 16.5.

Genus Microbinthus Robillard & Dong, 2016

Microbinthus Robillard & Vicente, 2016: 188.

Type species. Lebinthus lifouensis Desutter-Grandcolas, 1997, by original designation

Distribution. Bismarck Archipelago, New Caledonia, New Guinea, Solomon Islands, Vanuatu

Included species:

Microbinthus cyclopus (Robillard, 2010) Microbinthus elegans **sp. nov.** Microbinthus greensladei (Robillard, 2010) Microbinthus kolombara (Robillard, 2010) Microbinthus lifouensis (Desutter-Grandcolas, 1997) Microbinthus malekulensis (Robillard, 2009) Microbinthus nattawa (Robillard, 2009) Microbinthus pintaudi Robillard & Dong, 2016 Microbinthus santoensis (Robillard, 2009)

Microbinthus elegans sp. nov. (Figs 9–11)

Specimen examined. Holotype: PAPUA NEW GUINEA • ♂; 15 km NE, by north of Port Moresby; 9°22'S, 147°13'E [near intersection of Laloki River and Hubert Murray Highway]; 24 April 1971; Balderson & Baker leg.; Key's field notes: Trip 171, Stop 27975.6; molecular sample L208 (ANIC14-037005).

Type locality. PAPUA NEW GUINEA: near Port Moresby

Etymology. This species name refers to the elegantly-elongated pseudepiphallic parametes and endophallic sclerite which are unique among congeners.

Diagnosis. This new species differs from congeners by male genitalia with pseudepiphallic lophi broadly spaced apart, with truncated apices pointing obliquely externally (instead of straight posteriorly); pseudepiphallic parameres elongated and enlarged with lateral lobe forming a falcate process; endophallic sclerite long (instead of short).

Description. Size small, average for the genus (Fig. 9). Vertex and fastigium cream-coloured with a dark brown spot in middle. Dorsum of head yellow brown with mottled brown, cream-coloured at posterior end with six longitudinal dark bands, the median ones almost fused together (Fig. 10A). Scapes pale generally dark brown. Antennae yellow brown. Face, frons, clypeus and mouth parts black (Fig. 10B). Maxillary palpi with segments cream-coloured, with apices dark (Fig. 10B). Gena black, posterior end cream-coloured with a black band at the back of eyes and another black band running ventrad towards mouthparts (Fig. 10C). Pronotum dorsal disk yellow brown mottled with black spots, anterior margin straight (Fig. 10A); lateral lobes black with posterior and ventral margins cream-coloured (Fig. 10C). Legs: FI–II light coloured with dark spots and stripes, knees areas dark; TI–II dark brown with two pale rings, one at base and another in middle; tarsomeres 1 and 3 of each leg cream-coloured basally then brown; FIII brown, knees dark brown; TIII red brown. Abdomen dark brown dorsally and laterally, sternites cream-coloured. Cerci dark brown.

Male: FW reaching base of forth tergite. FW colouration (Fig. 10D): Dorsal field cells mostly dark brown, veins generally brown or dark brown, veins at apical area yellow; area between M and Sc pale yellow; vein R brown, R and Sc orange. Lateral field cells dark; longitudinal veins dark brown. FW venation: harp oblique vein indistinct. Mirror made of an elongated cell not differentiated from rest of D alignment. Apical field small, made of two short cell alignments; apex of dorsal field truncated. Lateral field with Sc and 4 strong ventral longitudinal veins straight.

Male genitalia (Fig. 11): Pseudepiphallus triangular, elongate, its basal margin substraight, its lateral margins slightly raised dorsally, posterior apex truncated, with paired lophi; lophi broadly spaced apart, setose dorsally and ventrally with apices somewhat truncated and pointing obliquely from each other. Rami longer than half of pseudepiphallus length, slightly curved. Pseudepiphallic parameres elongated, forming a pair of claws oriented posteriorly, with a dorsal lobe small with posterior margin acute, a lateral lobe oriented ventrally producing a falcate process with acute apex, and an extended flat basal lobe. Ectophallic apodemes long, reaching beyond anterior margin of pseudepiphallic sclerite, diverging from each other basally. Ectophallic arc transverse. Ectophallic fold with parallel rectangular sclerites, not reaching base of pseudepiphallic lophi. Endophallic sclerite narrowly Y-shaped, comprising a long anterior region and indistinct median expansion, fairly elongated lateral arms with inner margins straight and outer margins rounded.

Female: Unknown.

Measurements (in mm). Male holotype PronL = 1.8, PronW = 2.8, FWL = 3.2, FWW = 2.4, FIIIL = 7.2, FIIIW = 2.5, TIIIL = 6.1.

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Tables

TABLE 1. Measurements (i	n mm) of Macrobinthus ke	i sp. nov.
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TABLE 1. Measurements (in min) of <i>Macrobitinus ket</i> sp. nov.										
	PronL	PronW	FWL	FWW	FIIIL	FIIIW	TIIIL	OL		
Holotype	3.2	5.4	4.7	2.8	15.2	4.5	12.5	-		
Males	3.2–3.5	4.5-5.8	4.7-5.5	2.8-4.4	13.8–17.1	4.5-5.2	12.5-14.8	-		
(n = 5)	(3.3)	(5.4)	(5.0)	(3.4)	(15.1)	(4.7)	(13.4)			
Allotype	3.4	5.6	5.6	3.3	17.5	5.5	15.1	13.5		
Females	3.2-3.8	5.2-5.6	4.9-5.6	3.2-3.5	15.4–17.5	5.1-5.8	13.9–15.1	13.1–13.5		
(n = 3)	(3.5)	(5.5)	(5.2)	(3.3)	(16.4)	(5.5)	(14.5)	(13.3)		

Figure captions



FIGURE 1. *Gnominthus milneus* **sp. nov.** habitus. Male habitus in dorsal (A) and lateral (B) views; female habitus in dorsal view (C). Scale bar = 10 mm.



FIGURE 2. *Gnominthus milneus* **sp. nov.** morphology. Head dorsum in dorsal view (A); face in anterior view (B); head, pronotum and FWs in lateral view (C); male FW in dorsal view (D); female FW in dorsal view (E). Scale bar = 1 mm(A-C); 0.5 mm (D).



FIGURE 3. Gnominthus milneus sp. nov. male genitalia in dorsal (A) and ventral (B) views. Scale bar = 1 mm.



FIGURE 4. *Macrobinthus kei* **sp. nov.** habitus. Male habitus in dorsal (A) and lateral (B) views; female habitus in dorsal (C) and lateral (D) views. Scale bar = 10 mm.



FIGURE 5. *Macrobinthus kei* **sp. nov.** morphology. Head dorsum in dorsal view (A); face in anterior view (B); head, pronotum and FWs in lateral view (C); male FW in dorsal view (D). Scale bar = 1 mm.



FIGURE 6. *Macrobinthus* genitalia. *Macrobinthus kei* **sp. nov.** male genitalia in dorsal (A) and ventral (B) views; *Macrobinthus mamai* **sp. nov.** in dorsal (C) and ventral (D) views; *Macrobinthus kei* **sp. nov.** female genitalia in ventral (E) and lateral (F) views. Scale bars = 1 mm (all except D); 0.5 mm (D).



FIGURE 7. *Macrobinthus mamai* sp. nov. male holotype in dorsal (A) and lateral (B) views. Scale bar = 10 mm.



FIGURE 8. *Macrobinthus mamai* **sp. nov.** morphology. Head dorsum in dorsal view (A); face in anterior view (B); head, pronotum and FWs in lateral view (C); male FW in dorsal view (D). Scale bar = 1 mm.



FIGURE 9. *Microbinthus elegans* sp. nov. male holotype in dorsal (A) and lateral (B) views. Scale bar = 10 mm.



FIGURE 10. *Microbinthus elegans* **sp. nov.** morphology. Head dorsum in dorsal view (A); face in anterior view (B); head, pronotum and FWs in lateral view (C); male FW in dorsal view (D). Scale bar = 1 mm.



FIGURE 11. *Microbinthus elegans* sp. nov. male genitalia in dorsal (A) and ventral (B) views. Scale bar = 1 mm.