
Contribution to the knowledge of the genus *Megalopinus* Eichelbaum, 1915 in the Oriental region (Coleoptera: Staphylinidae)

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Abstract

Two new species of the genus *Megalopinus* Eichelbaum, 1915 are described: *Megalopinus ingeae* sp. nov. (Philippines: Mindanao) and *Megalopinus rolandmuelleri* sp. nov. (Philippines: Mindanao). An overview of all *Megalopinus* species known from the Philippines so far is presented. *Megalopinus lapsus* nom. nov. is established as a replacement name for the homonymous *Megalopinus modestus* Puthz, 2021 (Laos). A proposal for a uniform designation of the elytral puncture-rows of the genus *Megalopinus* is presented.

Keywords: beetles, Megalopsidiinae, *Megalopinus*, new species, nomenclature, Philippines, Oriental Region.

Introduction

The subfamily Megalopsidiinae Leng, 1920 comprises a single genus, *Megalopinus* Eichelbaum, 1915, with more than 430 species. Its highest diversity is found in the Neotropical Region (Puthz, 2012). The natural history of the group is still poorly known. L. Benick (1951) quotes several authors who provided data about collecting sites of *Megalopinus*: F. Nevermann, for example, states that he found both type specimens of *Megalopinus nevermanni* (L. Benick, 1951) (= *Megalopinus politus* (Sharp, 1886)) in Costa Rica at night on the withered leaves of the palm *Acanthorhiza* sp. (= *Cryosophila*). L. Benick (1951) also refers to Sharp, who cites stumps of freshly felled trees and fungi as a habitat of these beetles. Based on this information L. Benick (1951) concludes that species of *Megalopinus* are xylophilous. Puthz (2012) refers to fungi as habitat by naming new species *Megalopinus fungicola* Puthz, 2012 and *Megalopinus polyporicola* Puthz, 2012, since both species (based on information given on the labels) were found on fungi. Leschen & Newton, 2003 studied the ecology of *Megalopinus* in more detail and stated that the adults and larvae live on fungal decaying logs, where they hunt small prey.

There are 72 extant species known from the Oriental Region so far (Puthz, 2012, 2013, 2014, 2021; Naomi & Hirano, 2014; Naomi & Nomura, 2015). Yamamoto & Solodovnikov (2016) added with *Megalopinus extinctus* Yamamoto & Solodovnikov, 2016 the first fossil *Megalopinus*, which was found in Upper Cretaceous Burmese amber.

The first *Megalopinus* from the Philippines were described by Bernhauer (1926). Later, L. Benick (1941) added another new species. Puthz (2012) described three new species and reported collecting data of *Megalopinus sexdentatus* (Cameron, 1914) from Palawan, which was originally described from Sri Lanka.

DOI: <https://doi.org/10.53716/jtc.3.1.7.2022>

ZOOBANK: <https://zoobank.org/References/B7B03A1D-B97B-4858-B843-1C0DFFF08017>

Received: 29 April 2022

Published: 30 July 2022

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Recent material from the Philippines yielded two additional new species, increasing the total number of the known Philippine species to 12, and that of Oriental species to 74 (+ one fossil). In addition, a new name is given for a species described from Laos (Puthz, 2021), because of the homonymy with a Neotropical species. Finally, a uniform nomenclature designating elytral puncture-rows of *Megalopinus* is proposed.

Materials and methods

Morphological studies were carried out using a stereoscopic microscope (Lomo MBS-10) and a compound microscope (Euromex BB.1153.PLI).

The high-resolution images were obtained by a Digital Camera (Sony Alpha 7 II), with a Canon MP-E 65 mm objective. The images were edited using Helicon Focus, Adobe Lightroom and Gimp 2.10 software.

The images of the aedeagi were obtained using a Touptek microscope camera (ToupCam 14MP). Image stacks were captured with ToupView Lite (MacOS) and processed using Zerene Stacker. The genitalia are embedded in Euparal (soluble in alcohol). The description of colors follows Syme (1821).

The following acronyms are used:

BL	length of body
DE	average distance between eyes
dsr	dorsal row
EL	maximal length of elytra
EW	maximal width of elytra
FBL	length of forebody (head, pronotum, elytra)
HT	holotype
HW	head width
PL	pronotal length
PM	proportional measurements
PT	paratype
PW	pronotal width
shr	subhumeral row
SL	sutural length of elytra
slr	sublateral row
ssr	subsutural row
ssr-c	subsutural-complex (consists of ssr and unassignable puncture)
str	sutural row

The material listed below is deposited in the following collections:

cTM	private collection Tobias Mainda, Greifswald, Germany
NHMB	Naturhistorisches Museum, Basel, Switzerland

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Checklist of *Megalopinus* species of the Philippines

<i>Megalopinus bakeri</i> (Bernhauer, 1926)	Basilan
<i>Megalopinus creberrimus</i> (L. Benick, 1941)	Palawan
<i>Megalopinus flavolineatus</i> (Bernhauer, 1926)	Luzon
<i>Megalopinus fungicola</i> Puthz, 2012	Mindanao
<i>Megalopinus ingeae</i> sp. nov.	Mindanao
<i>Megalopinus luzonicus</i> (Bernhauer, 1926)	Luzon
<i>Megalopinus palawanensis</i> Puthz, 2012	Palawan
<i>Megalopinus philippinus</i> (Bernhauer, 1926)	Luzon
<i>Megalopinus polyporicola</i> Puthz, 2012	Mindanao
<i>Megalopinus rolandmuelleri</i> sp. nov.	Mindanao
<i>Megalopinus sexdentatus</i> (Cameron, 1914)	Palawan
<i>Megalopinus uniformis</i> (Bernhauer, 1926)	Mindanao

Megalopinus ingeae sp. nov.

Figs. 1A-1F

Zoobank: urn:lsid:zoobank.org:act:5C41CAB9-E552-496F-B0DC-CD85898B80A8

Type specimen. Holotype male: "Philippines, Mindanao, Situbo Falls, Zamboanga Del Norte Prov., 28.v.1996, R. A. Müller" / red label "♂ – Holotype, *Megalopinus ingeae* nov. sp., design. Mainda 2022" [cTM].

Description. Measurements of the male HT (in mm): BL: 2.40, DE: 0.43, FBL: 1.70, EL: 0.63, EW: 0.86, HW: 0.73, PL: 0.57, PW: 0.64, SL: 0.49.

Habitus as in Fig. 1A. Liver-brown, without microsculpture; elytra with lightened chestnut brown cross band in anterior half of each elytron, not reaching suture, and three rows of punctures and a complex of punctures close to suture; antennae yellowish, club clearly darkened; legs faintly bicolored, femora dark brown, tibia and tarsi yellowish.

Head 0.85 times narrower than elytra, frons coarsely and quite widely punctured; shiny.

Pronotum 1.12 times as broad as long, broadest in posterior half, sides towards anterior margin convexly, towards posterior margin concavely narrowed. With four punctated transverse rows disrupted in the middle; anterior part of area punctate, posterior part completely smooth and shiny. Each side with four small denticles, anterior one sharp, others less distinct.

Elytra 1.37 times as broad as long; humeral calli prominent, each with single minute denticle. Puncture on left elytron: slr (5), shr (8), dsr (6), ssr-c (7), str (0); puncture on right elytron: slr (5), shr (6), dsr (7), ssr-c (8), str (0). Broadest in middle; sides towards anterior and posterior margin convexly narrowed.

Abdomen broader than head, shiny. The lateral line of tergite V extends to the middle of tergite.

Male. Antennomere XI 5 times as long and 1.4 times as wide as antennomere X. Sternite VIII (Fig. 1E) slightly impressed at posterior margin. Tergite VIII (Fig. 1F) without special features. Sternite IX (Fig. 1C) spatula-shaped, 0.29 mm long, 0.16 mm broad. Tergite X (Fig. 1D) finely punctate, shiny. Aedeagus (Fig. 1B) with bended apical portion, two hook-shaped sclerites (black arrow) and pair of dark and sclerotized sclerites (grey arrow). Parameres with six subapical setae.

Female. Unknown.

Diagnosis. The new species is distinguished from *Megalopinus malayanus* Puthz, 2012 by its color, the inner structure of the aedeagus (Fig. 97 in Puthz, 2012) and the insignificant shorter

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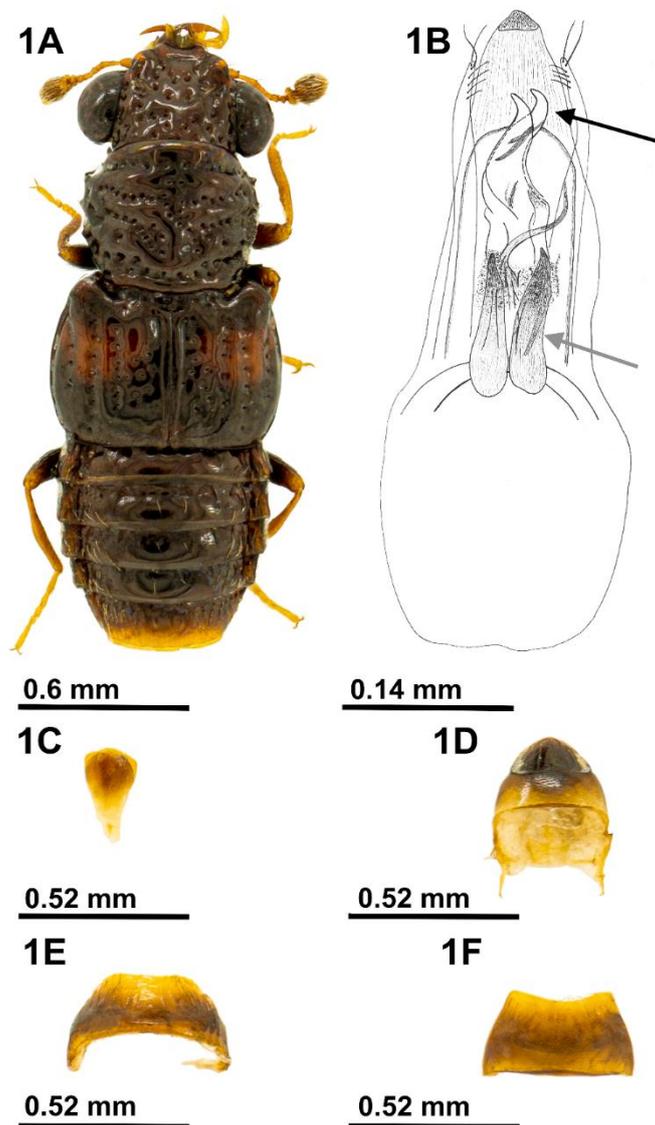
Received: 29 April 2022

Published: 30 July 2022

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lateral lines on the tergite V. It is separated from *Megalopinus zwicki* Puthz, 2012 by its color and the inner structure of the aedeagus (Fig. 108 in Puthz, 2012). It differs from *Megalopinus indifferens* Puthz, 2012 by its color and the aedeagus (Fig. 93 in Puthz, 2012).

Etymology. This new species is named in memory of my beloved late grandmother Inge Gottschalk † (1938-2022, Nauen, Germany), who was always a model to me with her cheerful nature.



Figures 1A-F. Holotype of *Megalopinus ingeae* sp. nov. Habitus (1A); Aedeagus (1B), pair of hook-shaped sclerites (black arrow) and pair of dark and sclerotized sclerites (grey arrow); Sternite IX (1C); Tergite X (1D); Sternite VIII (1E); Tergite VIII (1F).

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Published: 30 July 2022

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***Megalopinus rolandmuelleri* sp. nov.**

Figs. 2A-F

Zoobank: urn:lsid:zoobank.org:act:726ED998-523B-4CD8-9137-3F6F3ABC0257

Type specimens. Holotype male: "Philippines, Mindanao, Aglayan, Bukidnon Prov., 15.iv.1995, R. A. Müller" / red label "♂ - HOLOTYPE *Megalopinus rolandmuelleri* nov. sp., design. Mainda 2022" [cTM]; Paratype female: same collecting data as the HT / yellow label "♀ - PARATYPE *Megalopinus rolandmuelleri* nov. sp., design. Mainda 2022" [cTM].

Description. Measurements of the male HT (in mm): BL: 3.25, DE: 0.60, FBL: 2.00, EL: 0.85, EW: 1.16, HW: 1.12, PL: 0.74, PW: 0.86, SL: 0.60. Measurements of the female PT (in mm): BL: 3.35, DE: 0.60, FBL: 2.00, EL: 0.85, EW: 1.15, HW: 1.05, PL: 0.73, PW: 0.83, SL: 0.58.

Habitus as in Fig. 2A. Blackish brown, without microsculpture; pronotum with light and dark brown areas, anterior and posterior margin yellowish; elytra brown with yellowish coloration and four rows of punctures, bright elytron band appears as four single bright dots per elytron, sutural portion just slightly lightened, humeral calli lightened; abdomen brown, posterior half of tergites and entire paratergites brown-yellowish; antennae yellowish; legs bicolored, apical part of femora darkened, tibia yellow.

Head 0.97 times narrower than elytra, frons coarsely and widely punctate.

Pronotum 1.16 times as broad as long, broadest in posterior third; sides towards anterior margin convexly, towards posterior margin concavely narrowed. With four transverse rows of coarse and deep punctures. First (anterior) row disrupted by shiny area. Second row not disrupted. Third row arcuate, disrupted by a shiny impunctate Y-shaped area in the middle of pronotum. Fourth row not disrupted. Diameter of row punctures as large as basal cross-section of antennomere II. Pronotum with a shiny impunctate elevated area on anterior and posterior third of each side.

Elytra 1.45 times as broad as long; humeral calli prominent, buckled raised. Puncture on left elytron: slr (5), shr (6), dsr (7), ssr (2), str (6); puncture on right elytron: slr (5), shr (7), dsr (7), ssr (2), str (7). Broadest in the middle, posterior and lateral margins rounded.

Abdomen narrower than head, shiny, with very fine extensive and almost invisible puncture. Lateral line of tergite V extends almost to the middle of tergite.

Male. Antennomere XI 2.75 times as long and 1.29 times as wide as antennomere X. Sternite VIII (Fig. 2E) shallowly impressed at posterior margin. Tergite VIII (Fig. 2F) without special features. Sternite IX finely microsculptured, spatula-shaped, weakly asymmetrical (Fig. 2C). Tergite X (Fig. 2D) finely punctured, microsculptured. Aedeagus (Fig. 2B) very slender, with two pairs of dark and sclerotized sclerites. Apical pair (black arrow) sickle-shaped, other pair (grey arrow) tapered anteriad and with innumerable tooth-like projections visible at high magnification. Parameres with eight subapical setae.

Female. Antennomere XI 2.5 times as long and 1.17x times as wide as antennomere X. Tergite X as in male.

Diagnosis. This new species is related to some species of the *acutangulus*-group (see Puthz, 2012 for the group definition) sharing a series of punctures along elytral suture. The species is distinguished from *Megalopinus borneensis* (Cameron, 1933) by the coloration, the much wider elytral punctures (Fig. 24 in Puthz, 2012) and by the inner structure of the aedeagus (Fig. in 103 Puthz, 2012). It is separated from *M. bakeri* and *M. palawanensis* by the shorter lateral lines on the tergite V as well as by the coloration. It differs from *M. flavolineatus* by its distinctly different

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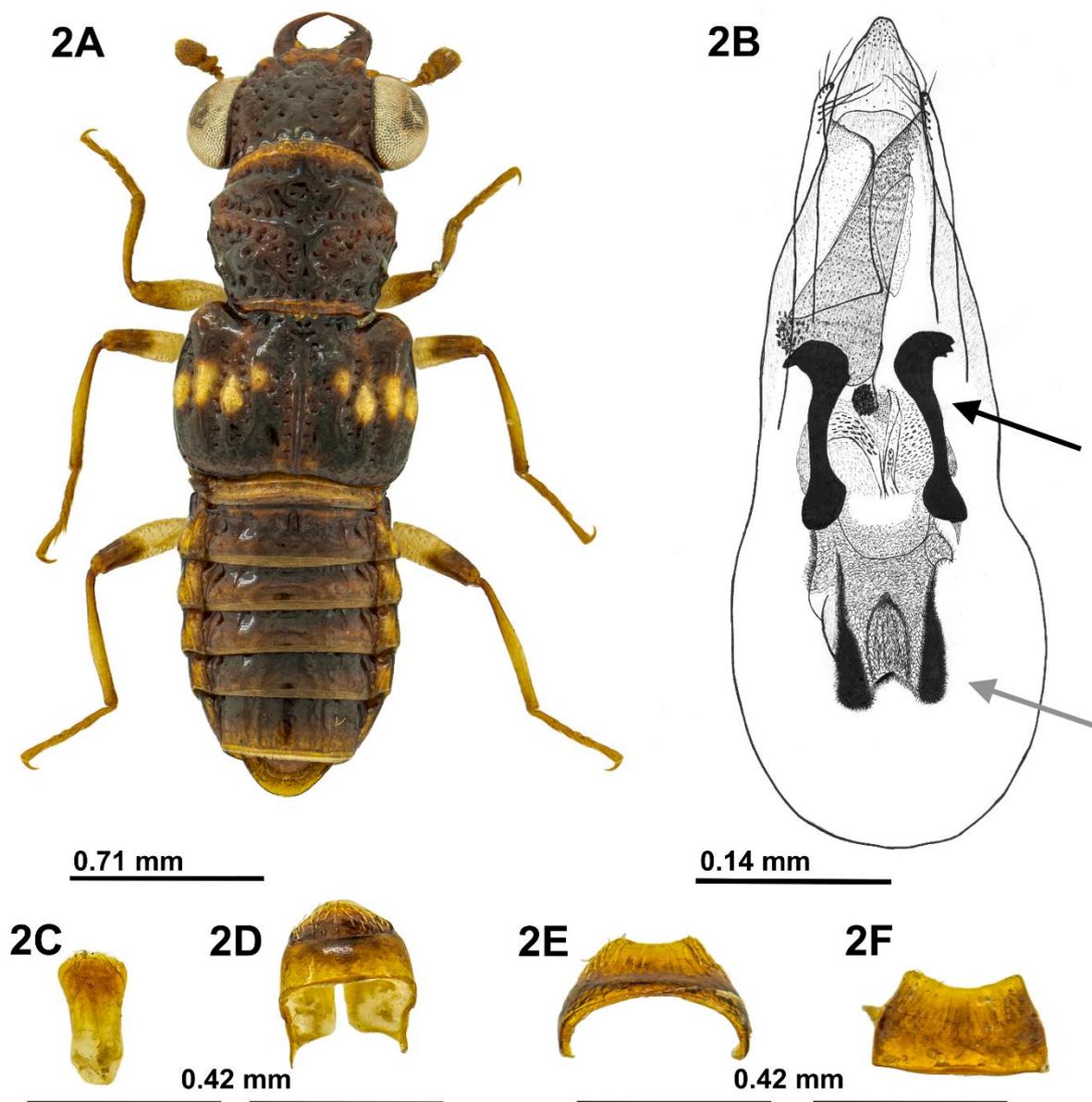
ZOOBANK: <https://zoobank.org/References/B7B03A1D-B97B-4858-B843-1C0DFFF08017>

Received: 29 April 2022

Published: 30 July 2022

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elytral coloration and the inner structure of the aedeagus (Fig. 87 in Puthz, 2012). It is distinguished from *M. fungicola* by its wider head, the coloration and the inner structure of the



Figures 2A-F. *Megalopinus rolandmuelleri* sp. nov. Habitus of the female paratype (2A); Aedeagus of the holotype (2B), with two pairs of dark and sclerotized sclerites: apical pair (black arrow) sickle-shaped, the other pair (grey arrow) with innumerable tooth-like projections; Abdominal segments of the holotype: Sternite IX (2C); Tergite X (2D); Sternite VIII (2E); Tergite VIII (2F).

aedeagus (Fig. 83 in Puthz, 2012). *M. rolandmuelleri* sp. nov. is separated from *M. philippinus* by the coloration of the legs, the shorter elytra and the aedeagus (Fig. 86 in Puthz, 2012).

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Etymology. It is a personal concern and a great pleasure for me to honor my good friend Roland A. Müller † (1936-2016, St. Gallen, Switzerland) with this new species. His entomological work not only led to the invention of the “light trapping tower” for insect trapping (Müller, 1970). However, he became known in professional circles for his “Roland Müller Zoological Expeditions to the Philippines”, which took him to the archipelago several times in the 1980s and 1990s, during which he also visited the island of Mindanao (Hämäläinen & Müller, 1997; Hämäläinen & van Tol, 2017). During my visits in St. Gallen, he reported in detail about his experiences in the Philippines and emphasized again and again how the destruction of the unique nature is being pushed forward there and in other parts of the world. One of his quotes perfectly describes the way mankind deals with nature and is nowadays more topical than ever when it comes to climate change and its consequences for the planet and the whole of the human civilization: “Mankind is driving towards the abyss at full throttle - and nobody is braking!”.

***Megalopinus lapsus* nom. nov.**

Figs. 3A-E

Megalopinus modestus Puthz, 2021 (**nec** *Megalopinus modestus* (Sharp, 1886))

Type specimen. Holotype male of *M. modestus* Puthz, 2021: “Laos: Houa Phan prov., Phu Phan Mt., ca. 1750 m, 20°12’N, 104°01’E, 17.V.-3.VI.2007, leg. V. Kubáň” [NHMB].

Puthz (2021) described two new *Megalopinus* species from Laos, one species named *Megalopinus modestus* Puthz, 2021. However, this name is preoccupied by *Megalopinus modestus* (Sharp, 1886), a species from Panama and Costa Rica. Therefore, according to Article 60.3 of the ICZN (1999), the name is to be replaced by a new one (a junior synonym is unknown). The above-mentioned specimen remains the holotype. A red label “***Megalopinus lapsus* nom. nov.**, des. Mainda 2022” is added to the type specimen. Figures 3A-E show the habitus of the holotype and the abdominal segments. For the figure of the aedeagus see Fig. 4 (Puthz, 2021).

Note on the deposit of the holotype. Puthz (2021) noted that the holotype should be deposited in the collection of V. Assing (Hannover, Germany). In fact, it is deposited in the Naturhistorisches Museum, Basel, Switzerland.

Etymology. The species epithet is a Latin noun referring to the lapse in naming the species (lapsus = lapse).

Proposal for a uniform designation of the elytral puncture-rows of the genus *Megalopinus*

Jałoszyński (2020) introduced standardized designation of the elytral puncture-rows in *Megalopinus*. These are adopted and supplemented, as shown in Fig. 4. It is necessary to describe puncture pattern of each elytron individually, because their number may vary within specimens as within an individual. Therefore, a larger amount of material is needed to assess the variability. Differences in the number of elytral punctures alone do not seem to be reliable for species differentiation. The rows of punctures indicated in Fig. 4 do not occur in this way in all species. Most species have well-developed sublateral rows (slr), subhumeral rows (shr) and dorsal rows (dsr). Some species additionally have a row of punctures along the suture (str). In addition, there

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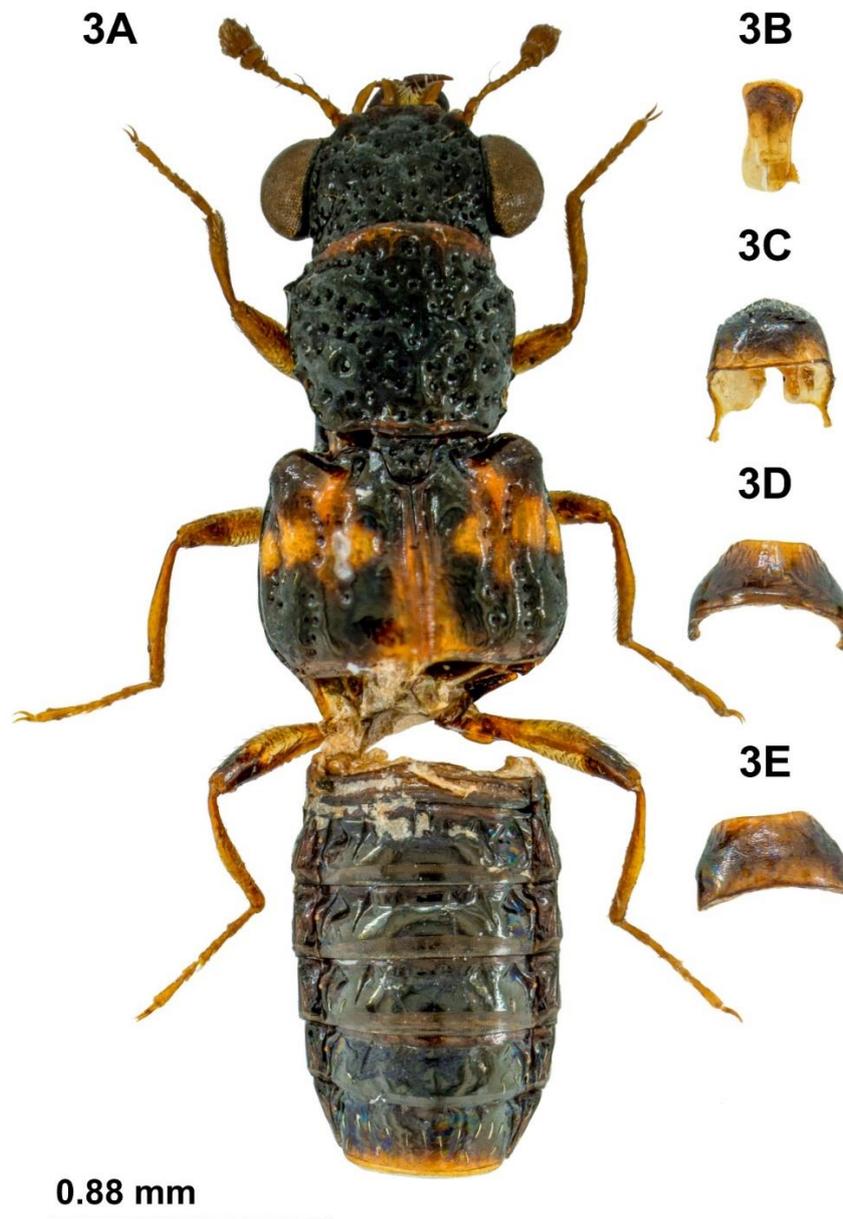
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Received: 29 April 2022

Published: 30 July 2022

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are species that have a row of a few punctures between str and dsr, the subsutural row (ssr). In other species the ssr is replaced by a puncture patch, the subsutural-complex (ssr-c).



Figures 3A-E. *Megalopinus lapsus* nom. nov. Habitus of the holotype (3A); Sternite IX (3B); Tergite X (3C); Sternite VIII (3D); Tergite VIII (3E).

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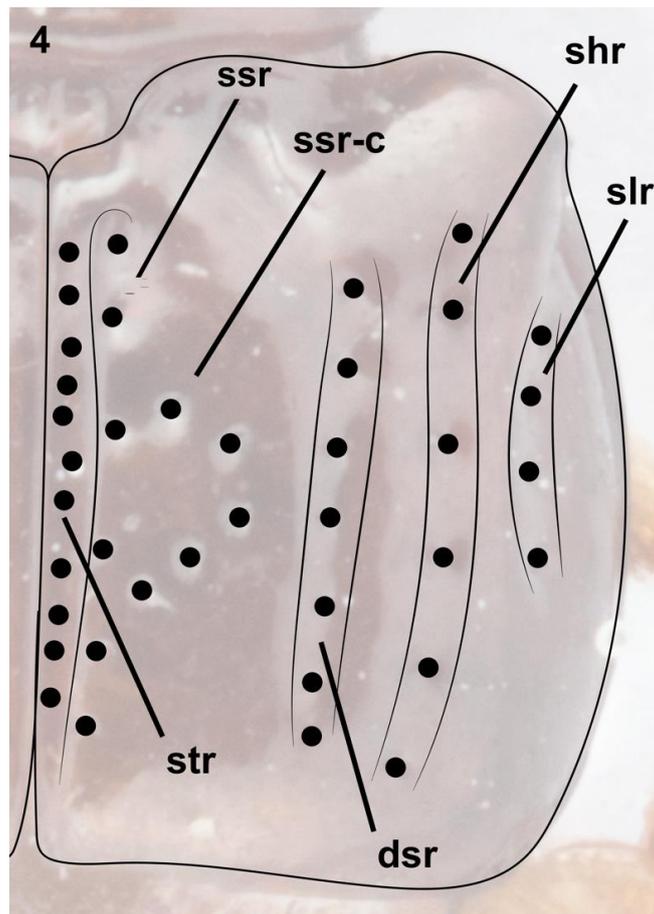


Figure 4. Punctuation of the right elytron of *Megalopinus* sp. Sutural row (str); subsutural row (ssr), subsutural-complex (ssr-c); dorsal row (dsr); subhumeral row (shr); sublateral row (slr). Each black dot stands for a potential puncture. The black lines are meant to indicate that the punctures belong to a row. Without scale.

Competing interest

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

Acknowledgement

I thank Nicolai Wendlandt (Berlin, Germany) for taking the images of the material referred to. Moreover, I am thankful also to Max Barclay, Beulah Garner (both The Natural History Museum London, United Kingdom), Giulio Cuccodoro (Muséum d'histoire naturelle, Genève, Switzerland) and Arnaud Faille (Staatliches Museum für Naturkunde, Stuttgart, Germany) for loans of type material. Furthermore, Volker Puthz (Schlitz, Germany) suggested to replace the homonymous *M. modestus* Puthz, 2021, and discussed diverse issues while a visit in March 2022. Jens Esser (Berlin, Germany) checked the English text of the paper. Finally, I would like to thank Ivan Löbl (Genève, Switzerland) for many useful comments on a draft of the present paper.

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