

Four new species of *Agraphydrus* Régimbart, 1903 with additional faunastic record from China (Coleoptera, Hydrophilidae, Acidocerinae)

Zhen-ming Yang¹, Fenglong Jia¹, Lu Jiang², Qiang Guo²

¹ Institute of Entomology, Life Sciences School, Sun Yat-sen University, Guangzhou, 510275, Guangdong, China

² Shenzhen Wilde life Conservation Division, Shenzhen, China

<http://zoobank.org/F88F5F2B-EC5A-408E-9819-0188E87DB024>

Corresponding author: Fenglong Jia (fenglongjia@alilyun.com)

Academic editor: James Liebherr ♦ Received 20 March 2021 ♦ Accepted 19 April 2021 ♦ Published 18 May 2021

Abstract

Four new species of *Agraphydrus* Régimbart are described from China: *A. pseudoniger* **sp. nov.** from Shangyou County, Jiangxi Province, *A. komareki* **sp. nov.** from Shangchuan island, Taishan County, Guangdong Province, *A. sabulosus* **sp. nov.** from Fengkai, Guangdong Province, *A. dapengensis* **sp. nov.** from Dapeng peninsula, Shenzhen, Guangdong Province. Diagnosis and illustration of the new species are provided. The key given by Komarek and Hebauer (2018) to Chinese species of *Agraphydrus* Régimbart is updated.

Key Words

Agraphydrus, Acidocerinae, China, Hydrophilidae, new species, Oriental region

Introduction

Agraphydrus Régimbart, 1903 contains common water scavenger beetles occurring mainly in the Oriental and Afrotropical Regions (Przewoźny 2017). But it was ignored by hydrophiloid specialists until 10 years ago. By 2013, only 18 species had been described (Short and Fikáček 2013). Hansen (1999a) established the genus *Megagrphydrus* Hansen, synonymized with *Agraphydrus* by Minoshima et al. (2015) and all known species transferred to *Agraphydrus*, and 7 new species from the Oriental region including South China were described. Minoshima (2016) described a new species from Japan and reviewed all known Japanese species. Two species of Chinese *Agraphydrus* were described by Jia (1998, 2010). Komarek and Hebauer (2018) reviewed the Chinese fauna and described 33 new species. The fauna of the Indian subcontinent, Southeast Asia, Afrotropical Region, Western Asia and Australia were reviewed (Komarek 2018, 2019, 2020; Komarek and Freitag 2020). A total of 199 species are now known (Komarek 2020). Most of them occur in the Oriental region including four species that

are endemic to Kyushu, Shikoku and adjacent islands, and Ryukyu islands which are considered as part of the Oriental region.

Materials and methods

For this study, we have examined more than 2000 specimens of Chinese *Agraphydrus* species. Aedeagi of the holotypes of four new species were dissected. After 8–10 hours in 10% KOH at room temperature, dissected genitalia were transferred to a drop of distilled water, remaining membranes were removed under a compound microscope, and the cleaned genitalia was subsequently mounted into a drop of glycerin on a piece of transparent plastic attached below the respective specimen after they had been photographed. Habitus photographs were taken using a Nikon DS-Ri2 mounted on a Nikon SMZ25; layers were captured and aligned in the NIS-Elements software. Photographs of genitalia were taken using a Zeiss AxioCam HRc mounted on a Zeiss AX10 microscope with the Axio Vision SE64 software. These images were

then aligned in Helicon focus (v7.0.2). SEM photographs were taken with a Phenom Prox scanning electronic microscope. All images were digitally enhanced using Adobe Photoshop CC 2019.

Morphological terminology used in the description mainly follows Hansen (1991) and Komarek and Hebauer (2018).

Examined specimens are deposited in the following collections:

- IZCAS** Chinese Academy of Sciences, Institute of Zoology, Beijing, China;
SYSU Collection of Sun Yat-sen University, Guangzhou, China.

Taxonomy

Agraphydrus dapengensis Yang & Jia, sp. nov.

<http://zoobank.org/25E5AEA5-765C-4254-9D89-0311C3B56F29>

Figs 1A, B; 3; 7A

Type locality. China, Guangdong Province, Shenzhen, Dapeng Peninsula.

Material examined. *Holotype*: male (SYSU); Guangdong Province, Shenzhen, beside Nan'ao highway; 22°30'32"N, 114°31'24"E, 4.viii.2019, Fenglong Jia, Zuqi Mai leg. *Paratypes*: (3 exs., IZCAS, SYSU): same data as holotype.

Diagnosis. This species is distinguished from other species of *Agraphydrus* by the following combination of characters: labrum, clypeus and frons black; preocular patches indistinct; head without microsculpture; maxillary palpi with apical palpomere about 1.5× as long as penultimate, palpomere 4 without apical infuscation; antennae with eight antennomeres; elytra with four rows of systematic punctures; mesofemora pubescent in about basal 2/3, pubescence restricted to a narrow anterior margin and posterior strip on metafemora; aedeagus with parameres is about 1.5× as long as phallobase, corona located in middle position; parameres with cuspidal, hook-like subapical protrusion.

Description. *Form and color.* Total length: 1.7–1.9 mm; elytral width: 0.9–1.0 mm; E.I.: 1.2–1.3, P.I.: 2.19–2.38, elytra ca. 2.8–3.15× as long as pronotum. Body broad and oval, weakly convex dorsally. Labrum, clypeus and frons black, clypeus with weakly light brown preocular patches laterally, smaller than eyes; maxillary palpi unicolorous yellow, pronotum dark brown with moderate wide reddish-brown lateral margin; elytral black with narrow reddish-brown margin; ventrites black; femora and tibiae dark reddish-brown, tarsomeres yellow brown.

Head. Labrum with dense, fine punctures, without microsculpture. Clypeus (Fig. 3A) with angularly excised anterior margin, without microsculpture, ground punctures as on the labrum, interspaces 2–4× as large as punctures,

systematic punctures distinct; ground punctures on frons as on clypeus, systematic puncture distinct. Eyes large, not protruding. Antennae (Fig. 3B) with eight antennomeres. Maxillary palp (Fig. 3C) about as long as pronotum in midline, 0.75–0.84× as long as maximum width of clypeus; length ratio palpomere 4:3 = 1.27–1.31, palpomere 4 asymmetrical. Mentum (Fig. 3D) with several fine punctures on lateral portions, without microsculpture.

Thorax. Pronotum ca. 2× as wide as long, pronotal ground punctures as on frons, surface between ground punctures without microsculpture, systematic punctures distinct, forming a row in the anterolateral and located lateral middle position of the clypeus, each with a long seta. Elytral ground punctation as on head and pronotum, surface between ground punctures as on pronotum; with four distinct rows of systematic punctures, mesal rows of systematic punctures reaching anterior margin. Prosternum slightly convex, without carina medially, with a transverse groove. Mesoventrite (Fig. 3E) with moderate bulge, abruptly declining posteriorly, with horizontal ridge posteriorly. Metaventricle with distinct mesal convexity, bearing a small glabrous area posteromedial part.

Legs. Pubescence present on proximal 2/3 of profemora (Fig. 3G) with oblique hairline, on about half of mesofemora (Fig. 3H) with straight hairline, restricted to a narrow anterior strip on the basal half of metafemora (Fig. 3I).

Abdomen. Ventricle 5 (Fig. 3F) without apical emargination.

Aedeagus (Fig. 7A). Length: 0.53 mm. Phallobase about 2/3× as long as the parameres, manubrium wide at base, about third of the width of phallobase, apex handle shape. Parameres wide at the base, margin narrowing apically; apex obliquely, with cuspidal, hook-like subapical protrusion and with strong constriction in the apical 1/4; middle margin slight sigmoid-shape. Basal protrusion extending into 1/5 of the phallobase. Median lobe wide at the base, strongly narrowing toward apex; apex dentiform, almost as long as the parameres, corona moderately large, located in middle position; basal apophyses long, vertical, barb shape, almost reaching half of phallobase.

Etymology. This species is named after the type locality, Dapeng Peninsula, Shenzhen, Guangdong Province.

Distribution. Only known from type locality.

Remark. This species shares similar dorsal coloration, maxillary palpi unicolorous yellow, mesoventrite with strong mesal bulge and similar aedeagus with *A. activus* Komarek & Hebauer and *A. anhuianus* Hebauer, but differs from them by its clypeus without small median notch, antennae with eight antennomeres, pubescence restricted to a narrow anterior strip on the basal half of metafemora, phallobase moderately long and the lateral margin of parameres slightly curved (phallobase short in *A. activus* and *A. anhuianus*, the lateral margin of parameres straight in proximal 3/4 in *A. activus* and lateral margin slightly sinuate in proximal 3/4 in *A. anhuianus*). It



A



B



C



D

Figure 1. Habitus: A, B. *Agraphydrus dapengensis* sp. nov. C, D. *Agraphydrus komareki* sp. nov.

shares maxillary palpi unicolorous yellow, mesoventrite with distinct mesal bulge and metafemoral pubescence restricted to anterior margin or absent with *A. longipalpus* (Jia) and *A. calvus* Komarek & Hebauer, but differs from them by parameres with hook-like subapical protrusion and median lobe with corona located in middle position (parameres without hook-like subapical protrusion, median lobe with corona located in basal position, crescentic sclerotized structure existing in *A. longipalpus*; parameres without hook-like subapical protrusion, median lobe with corona situated in distal to midlength, shield-shaped sclerotized structure existing in *A. calvus*).

***Agraphydrus komareki* Yang & Jia, sp. nov.**

<http://zoobank.org/C40E8204-E492-4147-B202-CF76A8871E2C>

Figs 1C, D; 4; 7B

Type locality. CHINA, Guangdong Province, Taishan County, Shangchuan Island.

Material examined. *Holotype*: male (SYSU), Guangdong Province, Taishan, Shangchuan Island, Rhesus monkey provincial national nature reserve, ca 21°46'12"N, 112°51'39"E, 10m a.s.l., 19.I.2019, Fenglong Jia & Zulong Liang leg. *Paratypes* (13 exs., IZCAS, SYSU): same data as holotype.

Diagnosis. This species is distinguished from the other species of *Agraphydrus* by the following combination of characters: Labrum, clypeus and frons black; preocular patches present; clypeus entirely microsculptured; maxillary palpi with apical palpomere about 1.5–1.6× as long as penultimate, palpomere 4 without apical infuscation; antennae with eight antennomeres; elytra with four systematic punctures; meso- and metafemora pubescent in about basal 3/4; aedeagus with median lobe wider than parameres, corona large, located at basal third; parameres with indistinct subapical constriction. Differs from *A. gracilipalpis* by eight antennomeres and features of the aedeagus.

Description. *Form and color.* Total length: 1.6–2.0mm; elytral width: 0.8–1.0mm; E.I.:1.1–1.3, P.I.:2.1–2.4, elytra 2.6–3.0× as long as pronotum. Body oval, convex dorsally. Labrum, clypeus and frons dark reddish-brown, clypeus with reddish-brown preocular patches; maxillary palpi unicolorous yellow; pronotum dark reddish-brown mesally with light red brown margin; elytral dark reddish-brown, lighter posteriorly; ventrites reddish-brown or brown; legs light brown or light reddish-brown.

Head. Labrum entirely microsculptured, with few punctures at the anterior margin. Clypeus (Fig. 4A) with angularly excised anterior margin, entirely microsculptured, ground punctures sparse, interspaces 3–4× as large as punctures, systematic punctures distinct. Frons with dense ground punctures, interspaces 2–4× as large as punctures, systematic punctures distinct. Eyes large, not protruding. Antennae (Fig. 4B) with eight antennomeres. Maxillary palpi (Fig. 4C) 1.2–1.3× as long as pronotum

in midline, about as long as maximum width of clypeus; length ratio palpomere 4:3 = 1.5–1.6, palpomere 4 asymmetrical. Mentum (Fig. 4D) with sparse coarse punctures, microsculpture existing on lateral portions.

Thorax. Pronotum ca. 1.1–1.3× as wide as long, pronotal ground punctures as on frons, surface between ground punctures with shallow microsculpture; systematic punctures indistinct, only several coarse punctures existing on the middle of the lateral part. Elytral ground punctation slightly larger than that on head and pronotum, interspaces 1.4–1.6× as large as punctures, surface between ground punctures as on the pronotum; 4 rows of systematic punctures distinct, with strongly reduced number of punctures, mesal row not reaching anterior margin, intervals without coarse punctures. Prosternum slightly convex, without carina medially. Mesoventrite (Fig. 4E) with distinct, flexuose and narrow mesal carina. Metaventrite distinctly convex mesally, with a small glabrous area posteromedially.

Legs. Pubescence present on about 2/3 of femora (Fig. 4G, H, I), hairline oblique on pro- and mesofemora, slightly oblique on metafemora.

Abdomen. Ventrite 5 (Fig. 4F) densely pubescent, apical emargination semicircular, with a row of strong setae.

Aedeagus (Fig. 7B). Length: 0.33mm. Phallobase about 2/3× as long as the parameres, manubrium blunt basally. Apex of parameres truncate, almost flat, weakly inclining toward midline; lateral margin straight, with indistinct subapical constriction; inner margin slightly concave subapically; basal portion extending into about half of phallobase. Median lobe wider than paramere, apical third gradually narrowing apicad, apex bluntly rounded; corona large, locating at the basal third; basal apophyses moderately short, bending laterad; reaching third of the phallobase.

Etymology. This species is named after Dr. Albrecht Komarek, a specialist in Hydrophilidae, who works at Naturhistorisches Museum, Wien, Austria.

Distribution. Only known type locality.

Remark. This species belongs to the group of species entirely chagrinated clypeus and unicolorous maxillary palpomere 4, together with *A. igneus* Komarek & Hebauer, *A. umbrosus* Komarek & Hebauer, *A. gracilipalpis* Komarek & Hebauer and *A. schoenmanni* Komarek & Hebauer. It differs from *A. igneus* by eight antennomeres (nine antennomeres in *A. igneus*), pronotum without anterolateral chagrination, lateral margin of parameres straight and parameres slightly constricted subapically (lateral margin of parameres strongly sigmoid and with distinct subapical constriction in *A. igneus*), from *A. umbrosus* by eight antennomeres (nine antennomeres in *A. umbrosus*) and parameres moderately narrow, lateral margin straight with indistinct subapical constriction (Parameres moderately wide; lateral margins very slightly curved with distinct subapical constriction in *A. umbrosus*), from *A. gracilipalpis* by eight antennomeres and lateral margin of parameres with indistinct subapical constriction and median lobe with apical third gradually narrowing apicad (lateral

margin of parameres with distinct supapical constriction and median lobe with margins of ventral face converging to narrow, parallel-sided apical half in *A. gracilipalpis*), from *A. schoenmanni* by eight antennomeres (nine antennomeres in *A. schoenmanni*), lateral margin of parameres straight with indistinct subapical constriction and median lobe with corona locating at the basal third (lateral margins of aedeagus distinctly sigmoid with strong subapical constriction and median lobe with corona located at apical third in *A. schoenmanni*). Very similar to *A. reticuliceps*, differs in its small size, entire chagrinated clypeus, eight antennomeres (nine antennomeres in *A. reticuliceps*), median lobe with apical third gradually narrowing apicad and bluntly rounded apically (median lobe apex globular, with subapical constriction in *A. reticuliceps*).

***Agraphydrus pseudoniger* Yang & Jia, sp. nov.**

<http://zoobank.org/60AE015E-045B-493C-A251-4224BB6296B5>

Figs 2A, B; 5; 7C

Type locality. CHINA, Jiangxi Province, Shangyou County, Guanggushan Nature Reserve.

Material examined. *Holotype*: male (SYSU); Jiangxi Province, Shangyou County, Guanggushan Nature Reserve, ca 25°55'11"N, 114°03'04"E, 846m a.s.l., 21.vi.2015, Fenglong Jia, Yudan Tang leg. *Paratypes*: (47exs., IZCAS, SYSU): 21 exs., same data as holotype; 3 exs., Jiangxi Province, Suichuan County, Nanfengmian Nature Reserve, 816m a.s.l., 26°17'04"N, 114°03'52"E, 18.vi.2015, Fenglong Jia, Yudan Tang leg; 3 exs., Guangdong Province, Dadongshan Nature Reserve, 19–22.vi.2013, Fenglong Jia leg; 24 exs., Guangdong Province, Nanling, Dadongshan, 22–26.vi.2009, Fenglong Jia leg; 5 exs, Guangdong Province, Lianzhou City, Dadongshan, 23.ix.2008, Yun Wang leg.

Diagnosis. This species is distinguished from other species of *Agraphydrus* by the following combination of characters: labrum, clypeus and frons black; without preocular patches; maxillary palpi with apical palpomere slightly longer than penultimate, palpomere 4 without apical infuscation; clypeus without microsculpture, antennae with eight antennomeres; elytra with four rows of systematic punctures; meso- and metafemora pubescent in about basal 2/3; aedeagus with apex of the parameres distinct bending mesally, corona large, located at subapical position.

Description. *Form and color.* Total length: 1.9–2.3 mm; elytral width: 1.0–1.2 mm; E.I.: 1.1–1.2, P.I.: 2.1–2.3, elytra 2.5–3× as long as pronotum. Body oblong oval, distinct convex dorsally. Labrum, clypeus and frons black, preocular patches absent; maxillary palpi unicolorous yellow; pronotum black with reddish-brown margin; elytral black; ventrites black; femora and tibia dark reddish-brown, tarsus yellow.

Head. Labrum with dense, fine punctures and several coarse punctures. Clypeus (Fig. 5A) with angularly deep excised anterior margin and small median notch

(Fig. 5B), without microsculpture, with very sparse ground punctures, coarser than that on the labrum, interspaces 1–3× as large as punctures. Systematic punctures distinct. Ground punctures on the frons as on the clypeus, systematic punctures distinct. Eyes small, not protruding. Antennae (Fig. 5C) with eight antennomeres. Maxillary palpi (Fig. 5D) 1.0–1.1× as long as pronotum in midline, 0.9–1.0× as long as maximum width of clypeus; length ratio palpomere 4:3 = 1.0–1.3, palpomere 4 asymmetrical. Mentum (Fig. 5E) with fine and sparse punctures on the lateral portions, without microsculpture.

Thorax. Pronotum ca. 1.10–1.25× as wide as long, pronotal ground punctures sparse, as on frons, interspaces 1–3× as large as punctures, surface between ground punctures with microsculpture, systematic punctures distinct, located in the anterior and lateral middle position of the clypeus, each with a long seta on the middle. Elytral ground puncture slightly larger than that on head and pronotum, interspaces 1–2× as large as punctures, surface between ground punctures as on the pronotum; with four distinct rows of systematic punctures, mesal rows reaching anterior margin. Prosternum slightly convex, without median carina. Mesoventrite (Fig. 5F) with narrow, needle-like and strong median carina, extending to middle of mesofemora. Metaventrite moderately convex mesally, with small glabrous area posteromedially.

Legs. Pubescence present on proximal 2/3 of femora (Fig. 5H, I, J), hairline oblique on pro- and mesofemora, straight on metafemora.

Abdomen. Ventrite 5 (Fig. 5G) round, without apical emargination, with a row of strong setae.

Aedeagus (Fig. 7C). Length: 0.31mm. Phallobase about as long as parameres, manubrium wide and triangular. Base of parameres wide, slightly narrowing apicad, apical 1/3 strongly narrowed, apex blunt, moderately bending mesad, lateral margin straight at basal 2/3, cambered in apical 1/3, basal protrusion extending into about half of phallobase. Median lobe slender, shaped like an index finger, margin cambered; apex bluntly rounded, slightly shorter than parameres, corona moderately larger, located at subapical position; basal apophyses long, reaching to half of phallobase.

Etymology. Specific name derived from Latin “pseudo”, false, and “niger”, black, refers to the similarity with *Agraphydrus niger* Komarek & Hebauer, 2018.

Distribution. CHINA (Jiangxi, Guangdong).

Remarks. This species shares four rows of distinct systematic punctures, absence of clypeal microsculpture, unicolorous maxillary palpomeres, antennae with eight antennomeres with *A. fasciatus* Komarek & Hebauer, *A. niger* Komarek & Hebauer, *A. yunnanensis* Komarek & Hebauer and *A. longipenis* Komarek & Hebauer. It differs from *A. yunnanensis* and *A. longipenis* by eyes small, mesoventrite carinate (*A. yunnanensis* and *A. longipenis* without mesoventral carina), parameres moderately curved inwards subapically, median lobe with corona located at subapical position (apex of parameres not curved inwards, median lobe with corona located at

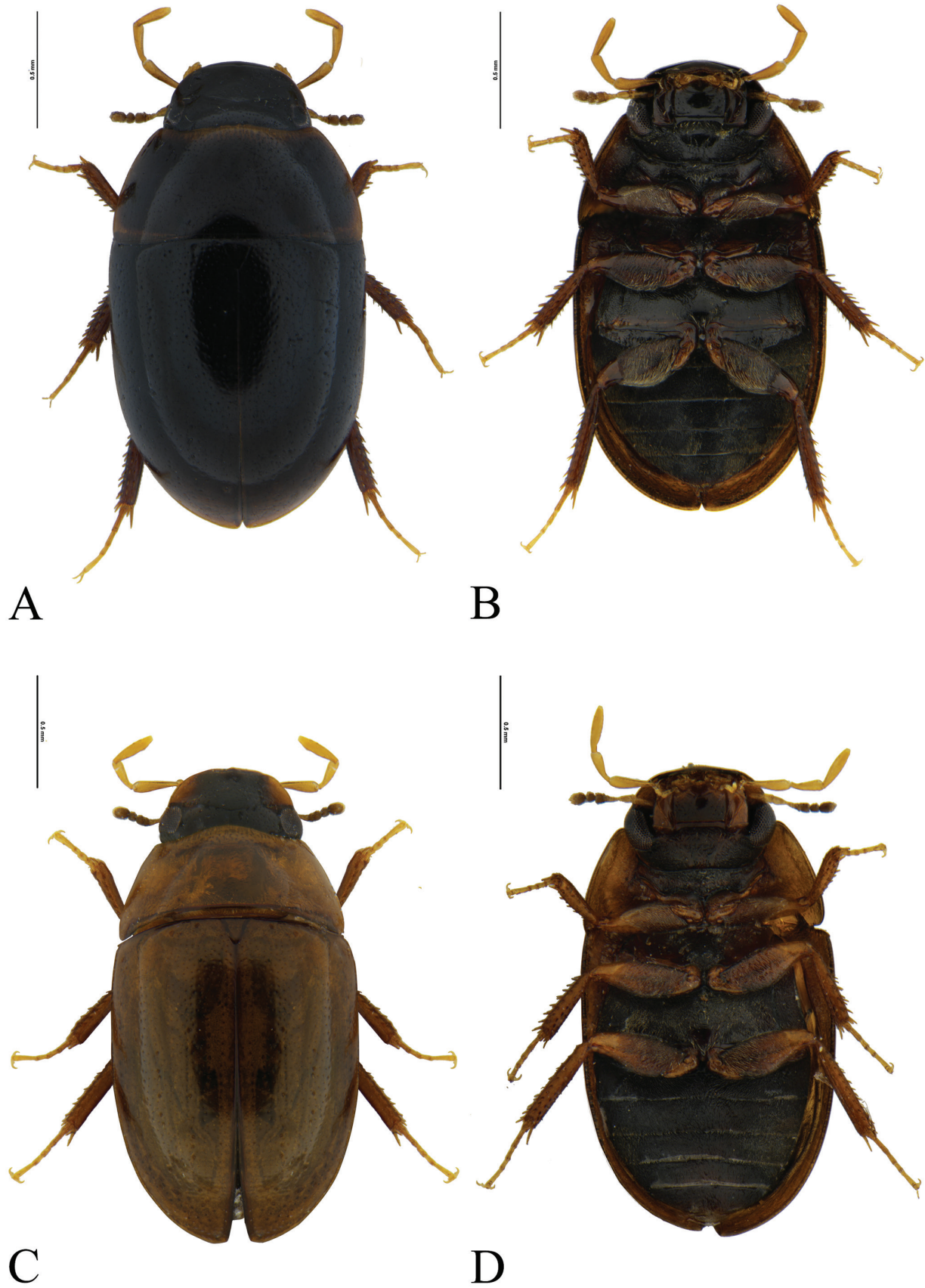


Figure 2. Habitus: A, B. *Agraphydrus pseudoniger* sp. nov. C, D. *Agraphydrus sabulosus* sp. nov.

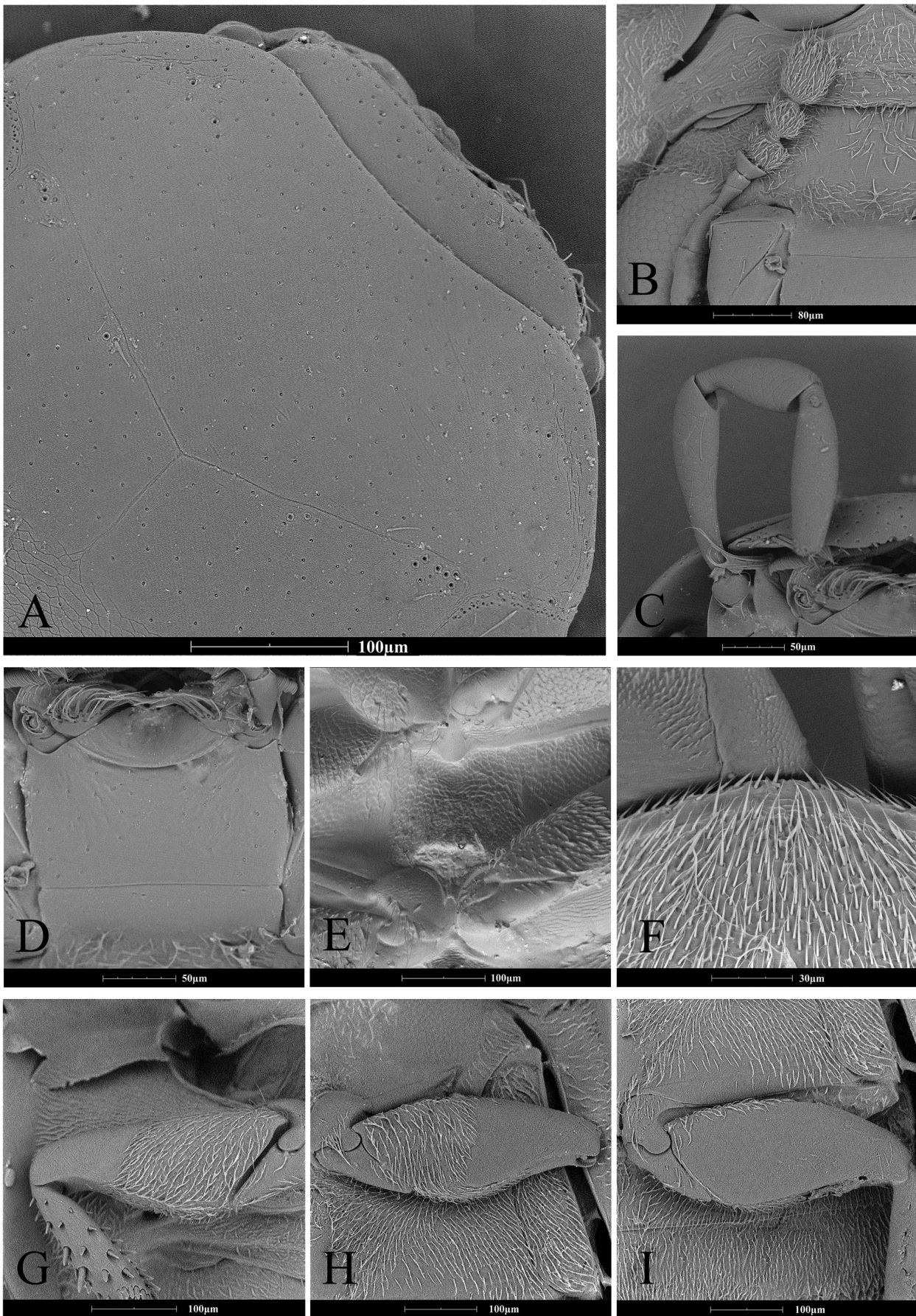


Figure 3. *Agraphydrus dapengensis* sp. nov.: A. Clypeus; B. Antennae; C. Maxillary palp; D. Mentum; E. Mesoventrite; F. Ventrite 5; G. Profemora; H. Mesofemora; I. Metafemora.

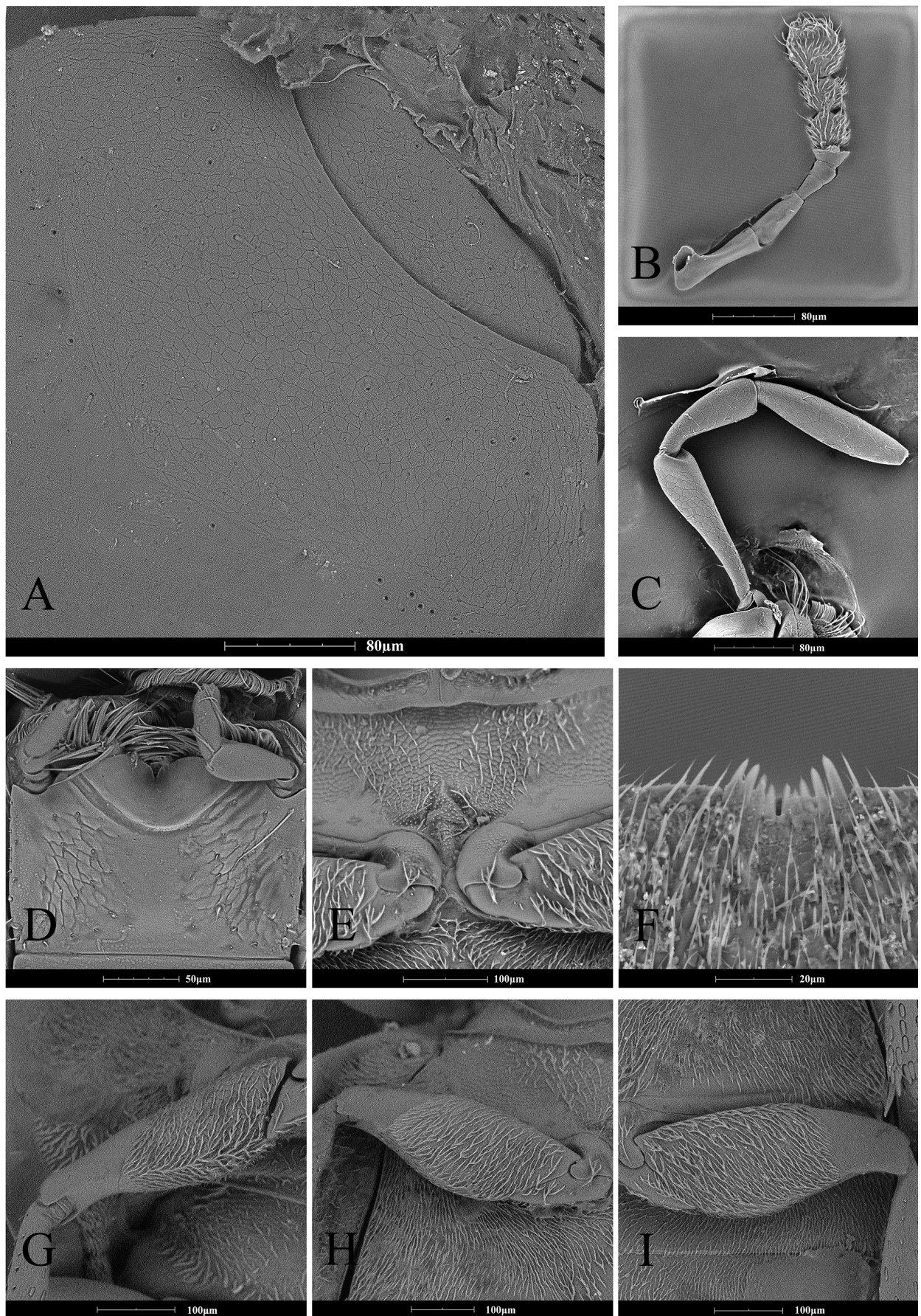


Figure 4. *Agraphydrus komareki* sp. nov.: A. Clypeus; B. Antennae; C. Maxillary palpi; D. Mentum; E. Mesoventrite; F. Ventrite 5; G. Profemora; H. Mesofemora; I. Metafemora.

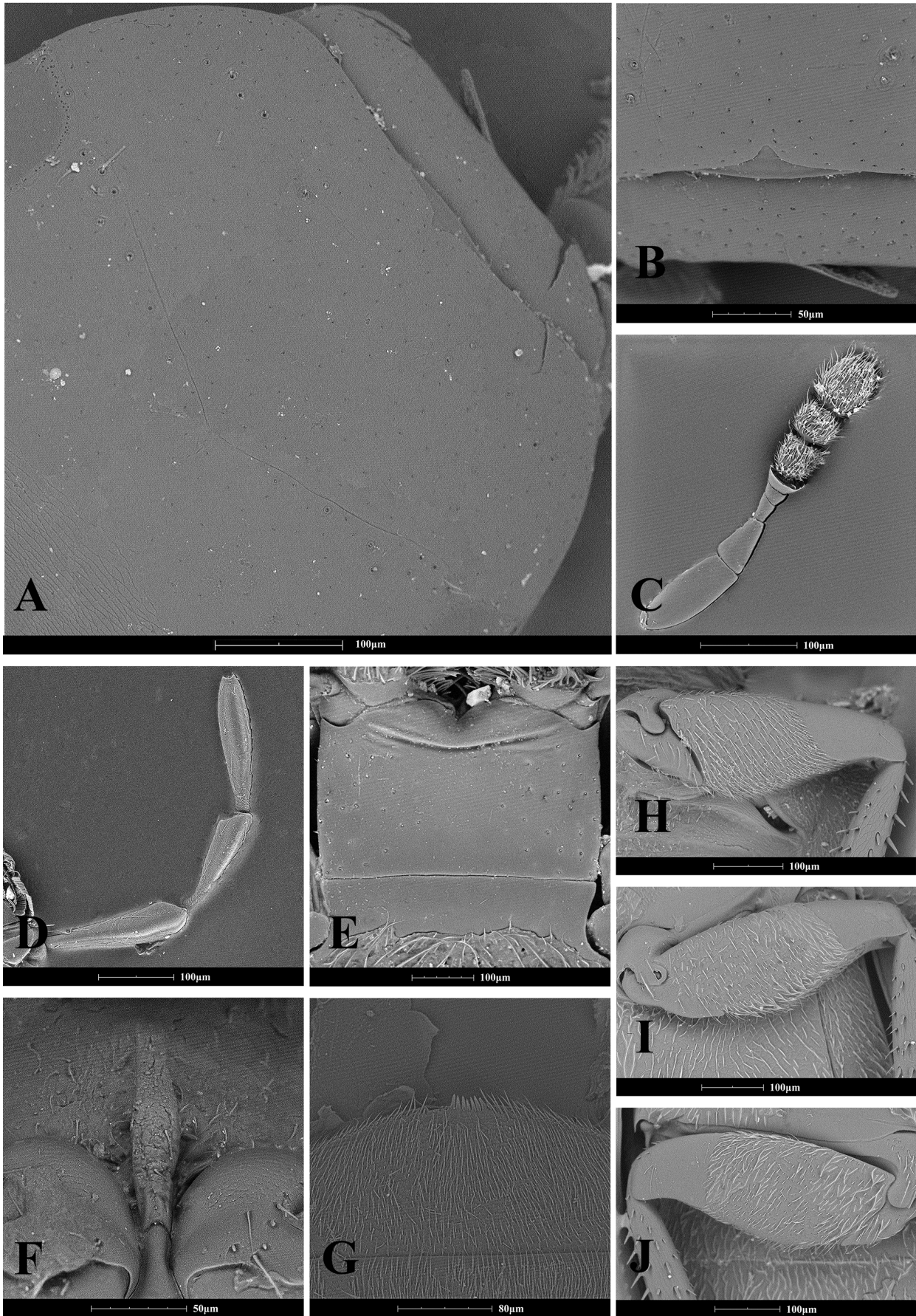


Figure 5. *Agraphydrus pseudoniger* sp. nov.: A. Clypeus; B. Clypeus; C. Antennae; D. Maxillary palpi; E. Mentum; F. Mesoven-trite; G. Ventricle 5; H. Profemora; I. Mesofemora; J. Metafemora.

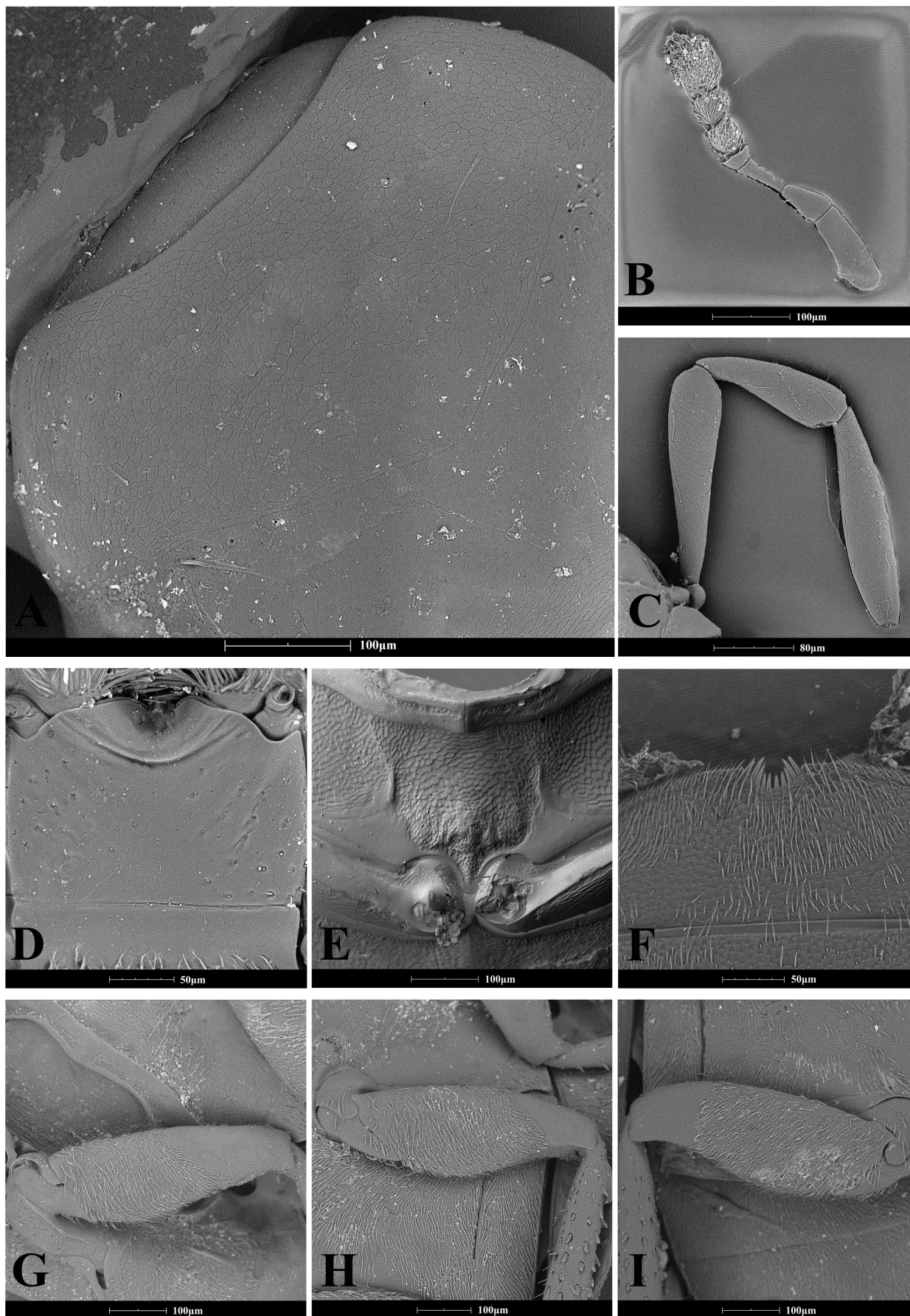


Figure 6. *Agraphydrus sabulosus* sp. nov.: A. Clypeus; B. Antennae; C. Maxillary palpi; D. Mentum; E. Mesoventrite; F. Ventrite 5; G. Profemora; H. Mesofemora; I. Metafemora.

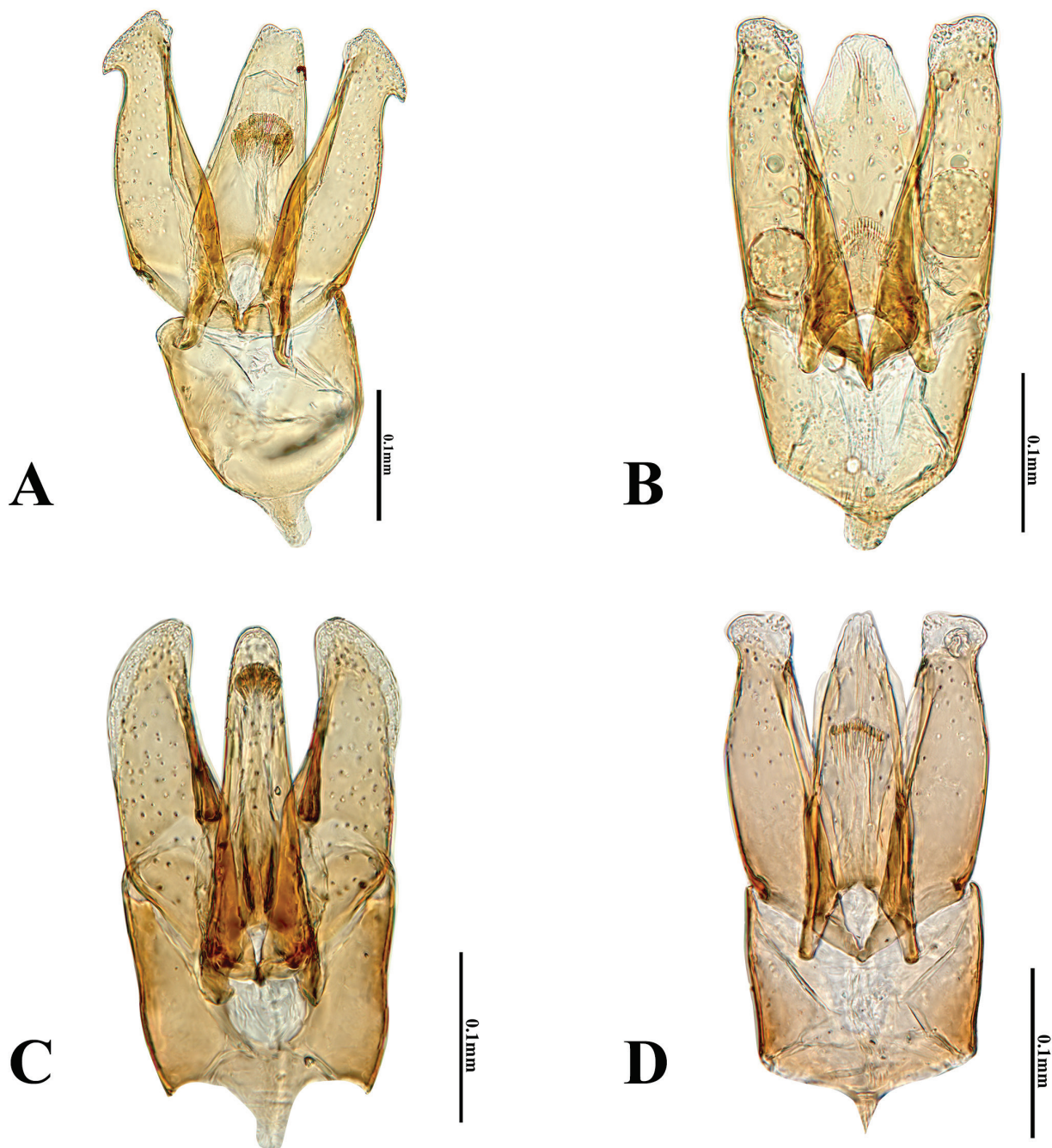


Figure 7. Aedeagi: **A.** *Agraphydrus dapengensis* sp. nov.; **B.** *Agraphydrus komareki* sp. nov.; **C.** *Agraphydrus pseudoniger* sp. nov.; **D.** *Agraphydrus sabulosus* sp. nov.

base in *A. yunnanensis* and *A. longipennis*). Shares small eyes, mesoventral carina with *A. fasciatus*, *A. niger* and *A. fujianensis* Komarek & Hebauer, similar aedeagus with *A. fasciatus*, *A. niger* and *A. politus* Komarek & Hebauer, differs from *A. fujianensis* by abdominal ventrite 5 with apical emargination, coloration of pronotum and elytra (dark yellowish to rufous brown in *A. fujianensis*, black in *A. pseudoniger*), parameres moderately curved inwards subapically and corona of median lobe locating at subapical position (apex of parameres not curved inwards, median lobe with corona basally in *A. fujianensis*);

from *A. politus* by small size, with four rows of punctures (ten in *A. politus*), phallobase about as long as parameres and apex of parameres moderately curved inwards (phallobase slightly longer than the parameres, parameres strongly curved inwards subapically in *A. politus*); from *A. fasciatus* by clypeus without preocular patches, pronotum and elytra black and parameres slightly longer than median lobe (parameres about 2x as wide as median lobe in *A. fasciatus*); from *A. niger* by clypeus with a deep excision anteriorly and small median notch and mesal rows of systematic punctures reaching anterior margin.

***Agraphydrus sabulosus* Yang & Jia, sp. nov.**

<http://zoobank.org/A752C9B0-3C60-4426-AC26-F0E2DE083E0D>

Figs 2C, D; 6; 7D

Type locality. CHINA, Guangdong Province, Fengkai County, Heishiding Nature Reserve.

Material examined. Holotype: male (SYSU); CHINA: Guangdong Province, Fengkai, Heishiding Nature Reserve, ca 23°31'N, 111°52'E, 20–22.xii.2014, Fenglong Jia, Renchao Lin, Yudan Tang leg. **Paratypes:** (9 exs., IZCAS, SYSU): 4 exs., same data as holotype; 5 exs., Jiangxi Province, Shangyou Country, Guanggushan Nature Reserve, 846m a.s.l, 25°55'11"N, 114°03'04"E, 21.vi.2015. leg. Renchao Lin, Yudan Tang.

Diagnosis. This species is distinguished from the other species of *Agraphydrus* by the following combination of characters: labrum, clypeus and frons black; preocular spots present; clypeus entirely microsculptured; maxillary palpi with apical palpomere about 1.5× as long as the penultimate one, palpomere 4 without apical infuscation; antennae with 9 antennomeres; elytra with four irregular series of coarse punctures; meso- and metafemora pubescent in about basal 2/3; aedeagus with median lobe narrowing toward the apex; parameres with obvious subapical constriction.

Description. Form and color. Total length: 1.9–2.1 mm; elytral width: 1.0–1.1 mm; E.I.: 1.1–1.3, P.I.: 1.3–2.2, elytra 3–4× as long as pronotum. Body moderately oval, moderately broad, slightly convex dorsally. Labrum and frons black, clypeus black mesally with yellow preocular patches, as wide as eyes; maxillary palpi unicolor yellow; pronotum unicolor light yellow or dark brown mesally with light red brown margin; elytra light yellow or light yellow mesally, lateral and anterioral margin black. Ventrites black; legs light to dark brown.

Head. Labrum entirely microsculptured, with several punctures at the anterior margin. Clypeus (Fig. 6A) almost entire surface covered by microsculpture, absent only from a small posterior region; ground punctures only present at the non-microsculptured area, as on frons, interspaces 1–2× as large as punctures; clypeus and frons with distinct systematic punctures. Eyes moderately large, distinctly protruding. Antennae (Fig. 6B) with nine antennomeres. Maxillary palpi (Fig. 6C) 1.2–1.5× as long as pronotum in midline, 1.0–1.1× as long as maximum width of clypeus; length ratio palpomere 4:3 = 1.4–1.5, palpomere 4 asymmetrical. Mentum (Fig. 6D) with several coarse punctures in lateral portion, without microsculpture.

Thorax. Pronotum ca. 3–4× as wide as long, pronotal ground punctures as on frons and clypeus, surface between ground punctures smooth, without microsculpture; systematic punctures distinct, located at the middle of the lateral margin. Elytral ground punctures as that on head and pronotum; systematic punctures distinct, arranged into 4 rows, mesal row not reaching anterior margin, intervals without coarse punctures. Prosternum weakly

convex, not carinate medially, with a transverse groove. Mesoventrite (Fig. 6E) slightly bulged. Metaventrite with a bulge mesally, hydrofuge pubescence present on the surface, only absent from a small area on posteromedian part.

Legs. Pubescence present on proximal 2/3 of femora (Fig. 6G, H, I), hairline oblique on pro- and mesofemora, straight on metafemora.

Abdomen. Ventrite 5 (Fig. 6F) trapezoidal, with distinct semicircular apical emargination.

Aedeagus (Fig. 7D). Length: 0.3 mm. The length of the phallobase 2/3× as long as the parameres, margin distinct bend toward slender, pointed manubrium. Apex of parameres obtuse, moderately flat; lateral margin is curved in basal 3/4, sunken in apical 1/4; mesal margin slanted but straight; base extending into about 1/3 of phallobase. Median lobe wide basally, narrowing toward apex, apex delicate; corona moderately large, locating at middle of the median lobe; basal apophyses slender and moderately long, slightly bending laterad; reaching the 1/3 of the phallobase.

Etymology. This species is named after the holotype acquisition environment, which has a lot of sand.

Distribution. China (Guangdong, Jiangxi).

Remark. This species shares almost entirely chagrinated clypeus and unicolor maxillary palpomere 4 with *A. arduus* Komarek & Hebauer, *A. annapurnensis* Komarek, *A. connexus* Komarek & Hebauer, *A. flavonotus* Komarek, *A. gracilipalpis* Komarek & Hebauer, *A. gilvus* Komarek, *A. igneus* Komarek & Hebauer, *A. narusei* Komarek, *A. ogatai*, *A. orientalis* Komarek & Hebauer, *A. reticuliceps* Komarek & Hebauer, *A. schoenmanni* Komarek & Hebauer, and many individuals of *A. umbrosus* Komarek & Hebauer. Its dorsal color is very similar to some individuals of *A. connexus*, differs from *A. connexus* by parameres with apex obtuse, moderately flat, manubrium slender and pointed (parameres with apex delicate and bluntly rounded, dorsal face connected with base of median lobe by distinct median band and the manubrium conical in the *A. connexus*). Its aedeagus is very like that of *A. flavonotus* Komarek, from which it differs by clypeus with distinct ground punctures (ground punctures obsolete on clypeus in *A. flavonotus*), four rows of systematic punctures distinct (indistinct in *A. flavonotus*), mesoventrite with moderately distinct mesal bulge (strong in *A. flavonotus*), apex of median lobe delicate and basal apophyses reaching the 1/3 of the phallobase (apex of median lobe flatly and the basal apophyses reaching half of phallobase in *A. flavonotus*). Differs from *A. arduus* and *A. igneus* by pronotum without anterolateral chaggrination, parameres with apex obtuse, moderately flat, lateral margin of the parameres slightly curved and median lobe narrowing toward apex (parameres with apex delicate, bulgy, lateral margin of parameres slightly sigmoid and median lobe with blunt or flat, rarely slightly indented apex in *A. arduus*, and apex of parameres strongly inflated, lateral margin of the parameres strongly sigmoid and apex of median lobe bluntly rounded with numerous distinct setae on top in *A. igneus*).

The key to Chinese species of *Agraphydrus*

The key to Chinese species of *Agraphydrus* (Komarek & Hebauer, 2018) may be modified as follows (the species with an asterisk means it has been examined):

- 1 Elytra with 9–10 rows of coarse punctures..... 2
- Elytra with 4–6 rows of coarse punctures..... 4
- 2 Antennae with nine antennomeres; coarse punctures on elytra arranged in almost equal rows; pubescence present at least on proximal 2/3 of metafemur (Komarek and Hebauer 2018: fig. 87); aedeagus: fig. 129.....
..... *Agraphydrus attenuatus* Hansen, 1999
- Antennae with eight antennomeres; coarse punctures on elytra arranged in four primary rows of closely spaced punctures alternating with four to five secondary rows of widely spaced punctures; pubescence present on proximal half of metafemur (Komarek and Hebauer 2018: Figs 106, 112); aedeagus: (Komarek and Hebauer 2018: figs 148, 154).... 3
- 3 Elytral punctures in secondary rows widely spaced (Komarek and Hebauer 2018: fig. 28); aedeagus (Komarek and Hebauer 2018: fig. 148)..... *Agraphydrus insidiator* Minoshima, Komarek & Ôhara, 2015
- Elytral punctures in secondary rows closely spaced (Komarek and Hebauer 2018: fig. 34); aedeagus (Komarek and Hebauer 2018: fig. 154)..... *Agraphydrus politus* Hansen, 1999
- 4 Six rows of very distinct, coarse punctures present on elytra, mesal series 1 consisting of few punctures near anterior margin; habitus: (Komarek and Hebauer 2018: fig. 35); aedeagus: (Komarek and Hebauer 2018: fig. 155).....
..... *Agraphydrus puzhelongi* (Jia, 2010)*
- Four rows of distinct or indistinct systematic punctures present on elytra, mesal series 1 present in posterior half, present or absent in anterior half 5
- 5 Anterior margin of clypeus with angulate excision, median notch present (Komarek and Hebauer 2018: fig. 47); aedeagus: apex of median lobe indented, parameres with lateral projections (Fig. 7C, Komarek and Hebauer 2018: figs 125, 127).... 6
- Anterior margin of clypeus with evenly rounded excision, median notch absent (Komarek and Hebauer 2018: figs 48–53, 55–67); if median notch present (in some individuals of *A. fasciatus*, Komarek & Hebauer, 2018: fig. 54), then apex of median lobe not indented, parameres without projections (Komarek and Hebauer 2018: fig. 141)..... 8
- 6 body length 1.9–2.3mm. Antennae with eight antennomeres..... *Agraphydrus pseudoniger* Yang & Jia, sp. nov.
- body length 2.5–3.0mm. Antennae with nine antennomeres..... 7
- 7 Aedeagus (Komarek and Hebauer 2018: fig. 127): parameres with distinct subapical bulge on lateral margin.....
..... *Agraphydrus anhuianus* (Hebauer, 2000)*
- Aedeagus (Komarek and Hebauer 2018: fig. 125): parameres without subapical bulge on lateral margin
..... *Agraphydrus activus* Komarek & Hebauer, 2018*
- 8 Clypeus chagrinate, at least at anterior margin, in some species chaggrination restricted to a very narrow seam at anterior margin..... 9
- Clypeus entirely lacking chaggrination, some species with narrow microsculptured seam at lateral margins or in anterolateral corner, but never at anterior margin 28
- 9 Maxillary palpomere 4 infuscated apically 10
- Maxillary palpomere 4 not infuscated apically..... 12
- 10 Ground punctures on pronotum and elytra moderate; aedeagus: corona in basal position of median lobe (Komarek & Hebauer 2018: Fig. 162) *Agraphydrus umbrosus* Komarek & Hebauer, 2018 (partim)*
- Ground punctures on pronotum and elytra very fine or moderate; aedeagus: corona situated in midlength of median lobe (Komarek and Hebauer 2018: figs 126, 164)..... 11
- 11 Ground punctures on pronotum and elytra very fine, interspaces more than 2× as wide as punctures; aedeagus (Komarek and Hebauer 2018: fig. 126): lateral margin of parameres straight *Agraphydrus agilis* Komarek & Hebauer, 2018
- Ground punctures on pronotum and elytra moderate, interspaces 1–2× as wide as punctures; aedeagus (Komarek and Hebauer 2018: fig. 164): lateral margin of parameres curved *Agraphydrus variabilis* Komarek & Hebauer, 2018*
- 12 Clypeus entirely or almost entirely chaggrinated, or chaggrination restricted to anterior half 13
- Chaggrination of clypeus restricted to a variably extended area on less than anterior half 21
- 13 Pronotum with weak anterolateral chaggrination; aedeagus (Komarek and Hebauer 2018: figs 128, 147): apex of parameres inflated, lateral extension absent..... 14
- Pronotum without anterolateral chaggrination; aedeagus (Fig. 7B, D, Komarek and Hebauer 2018: figs 137, 146, 157, 159, 162): apex of parameres not inflated, lateral extension present or absent 15
- 14 Elytra dark brown, or light brown with a darker sublateral band widening anteriorly; clypeal and elytral ground punctures fine (Komarek and Hebauer, 2018: fig. 4); aedeagus: (Komarek and Hebauer 2018: fig. 128).....
..... *Agraphydrus arduus* Komarek & Hebauer, 2018
- Elytra unicolored yellowish or ferruginous; clypeal and elytral ground punctures moderate (Komarek and Hebauer, 2018: fig. 27); aedeagus: (Komarek and Hebauer 2018: fig. 147)..... *Agraphydrus igneus* Komarek & Hebauer, 2018*

- 15 Pronotal and elytral ground punctation moderate, body length 2.4–2.8 mm; aedeagus: (Komarek and Hebauer 2018: figs 146, 157) 16
- Pronotal and elytral ground punctation very fine to fine, body length 1.6–2.2 mm, rarely larger (some individuals of *A. umbrosus* may reach 2.5 mm); aedeagus: (Fig. 7B, D, Komarek and Hebauer 2018: figs 137, 159, 162) 17
- 16 Elytra slightly attenuating from anterior margin to apex (Komarek and Hebauer 2018: fig. 26); aedeagus (Komarek and Hebauer 2018: fig. 146): parameres with lateral extension.....*Agraphydrus gracilipalpis* Komarek & Hebauer, 2018*
- Elytra parallel-shaped (Komarek and Hebauer 2018: fig. 37); aedeagus (Komarek and Hebauer 2018: fig. 157): parameres without extension*Agraphydrus reticuliceps* Komarek & Hebauer, 2018*
- 17 Aedeagus (Komarek and Hebauer 2018: fig. 137): parameres distinctly connected with base of median lobe by a distinct band-shaped median extension*Agraphydrus connexus* Komarek & Hebauer, 2018 (partim)
- Aedeagus (Fig. 7B, D, Komarek and Hebauer 2018: fig. 159, 162): parameres not visibly connected with base of median lobe 18
- 18 Aedeagus (Fig. 7B, Komarek and Hebauer 2018: fig. 162): lateral margin of parameres weakly curving, corona at basal position of median lobe 19
- Aedeagus (Fig. 7D, Komarek and Hebauer 2018: fig. 159): lateral margin of parameres distinctly curving, corona situated at midlength of median lobe..... 20
- 19 Antennae with nine antennomeres; aedeagus (Komarek and Hebauer 2018: fig. 162) : Parameres moderately wide; lateral margins very slightly curved with distinct subapical constriction
.....*Agraphydrus umbrosus* Komarek & Hebauer, 2018 (partim)*
- Antennae with eight antennomeres; aedeagus (Fig. 7B): Parameres moderately narrow, lateral margin straight with indistinct subapical constriction.....*Agraphydrus komareki* Yang & Jia, sp. nov.
- 20 Aedeagus: basal portion of parameres reaching half of phallobase. median lobe narrow basally; basal apophyses extending to half of phallobase (Komarek and Hebauer 2018: fig. 159).....*Agraphydrus schoenmanni* Komarek & Hebauer*
- Aedeagus: basal portion of parameres reaching 1/3 of phallobase. Median lobe wide basally, narrowing toward apex; basal apophyses extending to 1/3 of phallobase (Fig. 7D).....*Agraphydrus sabulosus* Yang & Jia, sp. nov.
- 21 Pronotum largely yellow, unicolored or with small mesal infuscation; aedeagus (Komarek and Hebauer 2018: fig. 132): median lobe distinctly shorter than parameres, basal lobe very short.....
.....*Agraphydrus cantonensis* Komarek & Hebauer, 2018*
- Pronotum largely dark brown or black, with narrow yellow lateral margins or with decreasing intensity of coloration towards lateral yellow margins; aedeagus: median lobe not shorter than parameres, basal lobe as long as parameres or slightly shorter 22
- 22 Body strongly attenuating towards elytral apex (Komarek and Hebauer 2018: figs 12, 16), eyes very small (Komarek and Hebauer 2018: figs 50, 51) 23
- Body not attenuating towards elytral apex, eyes large or moderately large 24
- 23 Aedeagus (Komarek and Hebauer 2018: fig. 138): parameres with subapical constriction, apex inflated, corona proximal to midlength of median lobe*Agraphydrus contractus* Komarek & Hebauer, 2018*
- Aedeagus (Komarek and Hebauer 2018: fig. 136): parameres without subapical constriction, apex not inflated, corona distal to midlength of median lobe.*Agraphydrus conicus* Komarek & Hebauer, 2018*
- 24 Aedeagus (Komarek and Hebauer 2018: fig. 145): aedeagus very stout, of almost spherical shape
.....*Agraphydrus globipenis* Komarek & Hebauer, 2018*
- Aedeagus not very stout, not of spherical shape 25
- 25 Total body length 1.8–2.3 mm; apex of parameres not balloon-shaped (Komarek and Hebauer 2018: figs 137, 143).....26
- Total body length 2.3–3.0 mm; apex of parameres distinctly balloon-shaped (Komarek and Hebauer 2018: figs 130, 160) 27
- 26 Aedeagus (Komarek and Hebauer 2018: fig. 137): basis of palpomeres connected with basis of median lobe by a distinct band-shaped extension.....*Agraphydrus connexus* Komarek & Hebauer, 2018 (partim)
- Aedeagus (Komarek and Hebauer 2018: fig. 143): basis of palpomeres not visibly connected with basis of median lobe*Agraphydrus forcipatus* Komarek & Hebauer, 2018*
- 27 Clypeus, pronotum, and elytra black with narrow yellow lateral margins, ground punctures coarse; habitus cylindrical (Komarek and Hebauer 2018: fig. 6); body length 2.6–3.0; aedeagus: (Komarek and Hebauer 2018: fig. 130)
.....*Agraphydrus audax* Komarek & Hebauer, 2018*
- Clypeus dark brown, pronotum dark brown with wide yellow lateral margins, elytra brown with darker sublateral band, ground punctures fine; habitus cylindrical or oval (Fig. 40); body length 2.3–2.8; aedeagus: (Komarek and Hebauer 2018: fig. 160).....*Agraphydrus setifer* Komarek & Hebauer, 2018
- 28 Metafemur with reduced pubescence, present on proximal half or restricted to anterior margin (Fig. 31, Komarek and Hebauer 2018: figs 89, 98, 108, 114) 29
- Metafemur pubescent on more than proximal half 33

- 29 Metafemoral pubescence present on basal half (Komarek and Hebauer 2018: figs 98,114); aedeagus (Komarek and Hebauer 2018: figs 140, 156): phallobase as long as parameres..... 30
- Metafemoral pubescence restricted to anterior margin or absent (Fig. 3I, Komarek and Hebauer 2018: figs 89, 108); aedeagus (Fig. 7A, Komarek and Hebauer 2018: figs 131, 150): phallobase shorter than parameres..... 31
- 30 Elytral systematic punctures strongly reduced in number; abdominal ventrite 5 without apical emargination; body length 1.5–1.7 mm; aedeagus:(Komarek and Hebauer 2018: fig. 156).....*Agraphydrus reductus* Komarek & Hebauer, 2018
- Elytral systematic punctures very coarse, numerous; abdominal ventrite 5 with shallow apical emargination; body length 2.1–2.5 mm; aedeagus: (Komarek and Hebauer 2018: fig. 140)..... *Agraphydrus decipiens* Komarek & Hebauer, 2018
- 31 Body length 2.2–3.0 mm; antennae nine-segmented; eyes large; abdominal ventrite 5 with apical emargination; aedeagus: parameres less than 2× as long as basal lobe, corona located in basal position, crescentic sclerotized structure present (Komarek and Hebauer 2018: fig. 150).....*Agraphydrus longipalpus* (Jia 1998)*
- Body less than 2.0 mm; antennae eight-segmented; eyes large or small; abdominal ventrite 5 without apical emargination..... 32
- 32 Antennae eight-segmented; eyes small; abdominal ventrite 5 without apical emargination; aedeagus : parameres more than 2× as long as basal lobe, corona located in distal to midlength of median lobe, shield-shaped sclerotized structure present (Komarek and Hebauer 2018: fig. 131)..... *Agraphydrus calvus* Komarek & Hebauer, 2018*
- Antennae eight-segmented; eyes small; abdominal ventrite 5 without apical emargination; aedeagus : parameres less than 2× as long as basal lobe, with cuspidal, hook-like subapical protrusion, corona located in distal to midlength of median lobe (Fig. 7A)*Agraphydrus dapengensis* Yang & Jia, sp. nov.
- 33 Maxillary palpomere 4 apically infuscated; elytra widening posterior of midlength (Komarek and Hebauer 2018: figs 10, 11, 17, 18, 19, 29, 38) 34
- Maxillary palpomere 4 apically not infuscated; elytra not widening posteriorly (Komarek and Hebauer 2018: figs 9, 21, 22, 24, 31, 32, 33, 41, 43, 45, 46)..... 38
- 34 Elytra dark brown or black (Komarek and Hebauer 2018: fig. 29); aedeagus: (Komarek and Hebauer 2018: fig. 149).....
..... *Agraphydrus jilanzhui* Komarek & Hebauer, 2018
- Elytra light brown or yellow (Komarek and Hebauer 2018: figs 10, 11, 17, 18, 19, 38); aedeagus: (Komarek and Hebauer 2018: figs 134, 135, 139, 158) 35
- 35 Aedeagus (Komarek and Hebauer 2018: fig. 158): apex of parameres with lateral extensions
.....*Agraphydrus robustus* Komarek & Hebauer, 2018*
- Aedeagus (Komarek and Hebauer 2018: fig. 134, 135, 139): apex of parameres without extensions..... 36
- 36 Aedeagus (Komarek and Hebauer 2018: fig. 135): apex of parameres strongly bending mesad
.....*Agraphydrus confusus* Komarek & Hebauer, 2018*
- Aedeagus (Komarek and Hebauer 2018: figs 134, 139): apex of parameres not strongly bending mesad..... 37
- 37 Aedeagus (Komarek and Hebauer 2018: fig. 134): apex of parameres attenuating apicad
..... *Agraphydrus comes* Komarek & Hebauer, 2018
- Aedeagus (Komarek and Hebauer 2018: fig. 139): apex of parameres not attenuating apicad
.....*Agraphydrus coomani* Komarek & Hebauer, 2018*
- 38 Body length > 3.0 mm, width > 1.5 mm; clypeus yellow, with or without small central infuscation; eyes slightly protruding (Komarek and Hebauer, 2018: fig. 43); aedeagus: (Komarek and Hebauer 2018: fig. 163)
.....*Agraphydrus uncinatus* Komarek & Hebauer, 2018
- Body length < 3.0 mm, width < 1.5 mm; clypeus dark brown or black with or without yellow preocular patches; eyes not protruding..... 39
- 39 Antennae with eight antennomeres 40
- Antennae with nine antennomeres 46
- 40 Abdominal ventrite 5 truncate, apical emargination absent 41
- Abdominal ventrite 5 with apical emargination..... 43
- 41 Body length 2.0 mm; habitus broad (E.l.: 1.3; Komarek and Hebauer 2018: figs 21, 24); eyes small, lateral margin of clypeus 2.5–2.6× as long as lateral margin of eyes; length ratio palpomeres 4:3 = 1.1–1.2 (Komarek and Hebauer 2018: figs 72, 73); mesoventrite carinate; metafemoral pubescence present on proximal 2/3–3/4 42
- Body length 1.7 mm; habitus slender (E.l.: 1.5; Komarek and Hebauer, 2018: fig. 45); eyes large, lateral margin of clypeus 1.5× as long as lateral margin of eyes; length ratio palpomeres 4:3 = 1.5 (Komarek and Hebauer 2018: fig. 81); mesoventrite without carina; metafemoral pubescence present on proximal 4/5; aedeagus: fig. 165
.....*Agraphydrus wangmiaoi* Komarek & Hebauer, 2018*
- 42 Maxillary palpi as long as pronotum, slightly shorter than clypeal width; aedeagus:(Komarek and Hebauer 2018: fig. 144).....
..... *Agraphydrus fujianensis* Komarek & Hebauer, 2018*
- Maxillary palpi 1.2× as long as pronotum, as long as clypeal width; aedeagus: (Komarek and Hebauer 2018: fig. 141)
.....*Agraphydrus fasciatus* Komarek & Hebauer, 2018 (partim)*

- 43 Eyes small, lateral margin of clypeus 2.4–2.6× as long as lateral margin of eyes; clypeus 3.8–3.9× as wide as long; length ratio maxillary palpomere 4:3 = 1.1; mesoventrite with low median carina..... 44
- Eyes moderate to large, lateral margin of clypeus 1.9× as long as lateral margin of eyes; clypeus 4.8–5.3× as wide as long; length ratio maxillary palpomere 4:3 = 1.3; mesoventrite without carina..... 45
- 44 Clypeus with yellow preocular patches; pronotum and elytra brown (Komarek and Hebauer 2018: fig. 21); aedeagus: (Komarek and Hebauer 2018: fig. 141)..... *Agraphydrus fasciatus* Komarek & Hebauer, 2018 (partim)*
- Clypeus without preocular patches; pronotum and elytra black (Komarek and Hebauer 2018: fig. 33); aedeagus: (Komarek and Hebauer 2018: fig. 153)..... *Agraphydrus niger* Komarek & Hebauer, 2018
- 45 Aedeagus (Komarek and Hebauer 2018: fig. 166): median lobe moderately wide.....
- *Agraphydrus yunnanensis* Komarek & Hebauer, 2018*
- Aedeagus (Komarek and Hebauer 2018: fig. 151): median lobe very narrow.....
- *Agraphydrus longipenis* Komarek & Hebauer, 2018
- 46 Clypeus and pronotum dark yellow mesally, elytral systematic punctures very coarse, mesal row 1 reaching anterior margin, an additional series of coarse punctures present along lateral margin in most individuals; aedeagus: (Komarek and Hebauer 2018: fig. 142)..... *Agraphydrus fikaceki* Komarek & Hebauer, 2018*
- Clypeus and pronotum dark brown or black mesally; elytral systematic punctures indistinct or moderately distinct, mesal row 1 not reaching anterior margin, additional lateral series absent..... 47
- 47 Eyes large, lateral margin of clypeus 1.7–1.8× as long as lateral margin of eyes; mesoventrite with mesal bulge; abdominal emargination present..... 48
- Eyes small, lateral margin of clypeus 3.2× as long as lateral margin of eyes; mesoventrite with low crescentic horizontal ridge; abdominal emargination absent; aedeagus:(Komarek and Hebauer 2018: fig. 133).....
- *Agraphydrus chinensis* Komarek & Hebauer, 2018*
- 48 Ground punctures on pronotum and elytra fine; maxillary palpi 1.1× as long as pronotum; length ratio palpomeres 4:3 = 1.4 (Komarek and Hebauer, 2018: fig. 80); aedeagus (Komarek and Hebauer 2018: fig. 161): apex of parameres flat without projections..... *Agraphydrus splendens* Komarek & Hebauer, 2018
- Ground punctures on pronotum and elytra moderate; maxillary palpi 0.8× as long as pronotum; length ratio palpomeres 4:3 = 1.1 (Komarek and Hebauer 2018: fig. 77); aedeagus (Komarek and Hebauer 2018: fig. 152): apex of parameres with two lateral projections..... *Agraphydrus masatakai* Minoshima, Komarek & Ôhara, 2015*

Discussion

For a long time *Agraphydrus* was a group of scavenger beetles, ignored by entomologists, that is, until recently. The study by Minoshima (2015, 2016), Komarek (2018, 2019) and Komarek and Hebauer (2018) shows that it is a very species-rich genus and many new species can be expected.

The vast majority of the individuals were collected south of the Chang Jiang, Asia's longest river, dividing China into its northern and southern part. Only two species, *A. jilanzhui* Komarek & Hebauer and *A. audax* Komarek & Hebauer, are distributed northward over the Chang Jiang to Gansu and Shaanxi, respectively. No representative is hitherto found in other Provinces north of the Huanghe River.

The Japanese fauna is usually considered as Palearctic by entomologists (e.g., Hansen 199b). However, there is no doubt that Ryukyu islands are part of the Oriental region (Jia and Tang 2018). Lots of data on insects show that the fauna of Kyushu, Shikoku and adjacent islands, is very similar to those of Taiwan of China and the Philippines (Hansen 1999b; Short and Fikáček 2011; Przewoźny 2017), but clearly different from other Palearctic regions including north Honshu and Hokkaido in Japan. So, Kyushu, Shikoku and adjacent islands should be considered as part of the Oriental region.

Based on known data, the Chinese fauna of *Agraphydrus* is more similar to the fauna of Southeast Asia than

to the fauna of the Indian Subcontinent. Of 42 known species from China, only four species are known in both China and the Indian Subcontinent. *A. pauculus* (Knisch, 1924) and *A. pygmaeus* (Knisch, 1924) are only known from Chinese (Xizang), India (Uttarakhand) and Nepal and can therefore be considered as endemic to the Himalaya. *A. connexus* Komarek & Hebauer occurs in China (Hainan), India. Except *A. coomani* (Orchymont) that is in the Oriental (China, Vietnam, India, Southeast Asia) and Australian regions, another 10 species, *A. activus* Komarek & Hebauer, *A. agilis* Komarek & Hebauer, *A. arduus* Komarek & Hebauer, *A. confusus* Komarek & Hebauer, *A. connexus* Komarek & Hebauer, *A. igneus* Komarek & Hebauer, *A. longipenis* Komarek & Hebauer, *A. setifer* Komarek & Hebauer, *A. masatakai* Minoshima, Komarek & Ôhara, *A. attenuatus* (Hansen), are also distributed in Southeast Asia. Obviously, the Chinese fauna of *Agraphydrus* has a closer relationship to Southeast Asia than to the Indian Subcontinent. (Komarek and Hebauer 2018; Komarek 2018, 2019).

Acknowledgements

We are grateful to Professor Shen-yu Miao, Guangzhou University, for providing this opportunity to the second author for collection. We thank Zhu-qi Mai and Zhuo-yin Jiang, the graduates of Sun Yat-sen University, for

their help in collecting and photographing the specimens. We also thank Albrecht Komarek, an Austrian specialist of Hydrophilidae, and Robert Angus, who is a specialist on aquatic beetles, in UK, for their reviewing, and also improving the manuscript for English. This study was supported by GDAS Special Project of Science and Technology Development (2020GDSYL-20200102021, 2020GDASYL-20200301003) and by Shenzhen Wilde life Conservation Division.

References

- Hansen M (1991) The hydrophiloid beetles. Phylogeny, classification and a revision of the genera (Coleoptera, Hydrophiloidea). *Biologiske Skrifter* 40: 1–367.
- Hansen M (1999a) Fifteen new genera of Hydrophilidae (Coleoptera), with remarks on the generic classification of the family. *Entomologica Scandinavica* 30(2): 21–172. <https://doi.org/10.1163/187631200X00228>
- Hansen M (1999b) *World Catalogue of Insects 2: Hydrophiloidea* (s.str.) (Coleoptera). –Stenstrup: Apollo Books, 416 pp.
- Jia F-L (1998) A new genus *Pseudopelthydrus* gen. n. from Hainan Island, China (Coleoptera: Hydrophilidae: Hydrophilinae). *Chinese Journal of Entomology* 18(4): 225–230.
- Jia F-L (2010) *Megagraphydrus puzhelongi*, sp. nov., a new water scavenger beetle from China (Coleoptera: Hydrophilidae: Hydrophilinae). *Zootaxa* 2498: 65–68. <https://doi.org/10.11646/zootaxa.2498.1.6>
- Jia F-L, Tang Y-D (2018) A faunistic study of genus *Chasmogenus* Sharp, 1882 of China (Coleoptera, Hydrophilidae). *ZooKeys* 738: 59–66. <https://doi.org/10.3897/zookeys.738.21711>
- Komarek A (2018) Taxonomic revision of *Agraphydrus* RÉGIMBART, 1903 II. The Indian Subcontinent (Coleoptera: Hydrophilidae: Acidocerinae). *Koleopterologische Rundschau* 88: 103–204. <https://doi.org/10.11646/zootaxa.4452.1.1>
- Komarek A (2019) Taxonomic revision of *Agraphydrus* RÉGIMBART, 1903 III. Southeast Asia (except Philippines) and Australian Region (Coleoptera: Hydrophilidae: Acidocerinae). *Koleopterologische Rundschau* 89: 151–316. <https://doi.org/10.11646/zootaxa.4452.1.1>
- Komarek A (2020) Taxonomic revision of *Agraphydrus* RÉGIMBART, 1903 IV. Africa, Western Asia, and redescription of the genus (Coleoptera: Hydrophilidae: Acidocerinae). *Koleopterologische Rundschau* 90: 127–200.
- Komarek A, Freitag H (2020) Taxonomic revision of *Agraphydrus* RÉGIMBART, 1903 V. Philippine species and their first DNA barcodes (Coleoptera: Hydrophilidae: Acidocerinae). *Koleopterologische Rundschau* 90: 201–242.
- Komarek A, Hebauer F (2018) Taxonomic revision of *Agraphydrus* Régimbart, 1903 I. China and Taiwan (Coleoptera: Hydrophilidae: Acidocerinae). *Zootaxa* 4452(1): 1–101. <https://doi.org/10.11646/zootaxa.4452.1.1>
- Minoshima YN (2016) Taxonomic review of *Agraphydrus* from Japan (Coleoptera: Hydrophilidae: Acidocerinae). *Entomological Science* 19: 351–366. <https://doi.org/10.1111/ens.12213>
- Minoshima YN, Komarek A, Ôhara M (2015) A revision of *Megagraphydrus* Hansen (Coleoptera, Hydrophilidae): synonymization with *Agraphydrus* Régimbart and description of seven new species. *Zootaxa* 3930(1): 1–63.
- Przewoźny M (2017) *Catalogue of Palearctic Hydrophiloidea* (Coleoptera). Online updated. Version 2017/01/01, 58 pp. <http://www.waterbeetles.eu> [accessed 31 October 2017]
- Short AEZ, Fikáček M (2013) Molecular phylogeny, evolution and classification of the Hydrophilidae (Coleoptera). *Systematic Entomology* 38: 723–752. <https://doi.org/10.1111/syen.12024>

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Deutsche Entomologische Zeitschrift \(Berliner Entomologische Zeitschrift und Deutsche Entomologische Zeitschrift in Vereinigung\)](#)

Jahr/Year: 2021

Band/Volume: [NF_68](#)

Autor(en)/Author(s): Yang Zhen-ming, Jia Fenglong, Jiang Lu, Guo Qiang

Artikel/Article: [Four new species of Agraphydrus Régimbart, 1903 with additional faunastic record from China \(Coleoptera, Hydrophilidae, Acidocerinae\) 189-205](#)