

Establishment of a new genus for *Callianassa* (s.l.) *sakakuraorum* Karasawa, 2000 (Decapoda: Axiidea)

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Abstract

Re-examination of the type and additional specimens of *Callianassa* (s.l.) *sakakuraorum* Karasawa, 2000, from the Arida Formation (Barremian, Lower Cretaceous) of Japan, shows that *Callianassa* (s.l.) *sakakuraorum* is moved to Micheleidae Sakai, 1992, from Callianassidae Dana, 1852. *Amatukamius*, a new monotypic genus is proposed for *Callianassa* (s.l.) *sakakuraorum*. A re-description is given for the species. The occurrence of *Amatukamius* from the Barremian of Japan represents the oldest record for Micheleidae.

Key words: Decapoda, Axiidea, Arida Formation, Early Cretaceous, Japan

Introduction

Karasawa (2000) described *Callianassa* (s.l.) *sakakuraorum*, a new species of axiidean family Callianassidae Dana, 1852, from the Arida Formation (Barremian, Lower Cretaceous) of Japan. The detailed observations of the carapace, pleon, uropods, and maxillipeds 3 within additional specimens of *Callianassa* (s.l.) *sakakuraorum* indicate that the species belongs to Micheleidae Sakai, 1992, not Callianassidae Dana, 1852. The purpose of this paper is to establish a new genus to accommodate *Callianassa* (s.l.) *sakakuraorum* within Micheleidae.

Institutional abbreviations

WMNH-Ge: Wakayama Prefectural Museum of Natural History, Funo, Kainan, Wakayama 642-0001, Japan

MFM: Mizunami Fossil Museum, Yamanouchi, Akeyo, Mizunami, Gifu 509-6132, Japan

Systematics

Infraorder Axiidea de Saint Laurent, 1979

Families included: Anacalliidae Manning and Felder, 1991; Axiidae Huxley, 1879; Bathycalliidae Sakai and Türkay, 1999; Callianassidae Dana, 1852; Callianideidae Kossmann, 1880; Callianopsidae

Manning and Felder, 1991; Coralaxiidae Sakai and de Saint Laurent, 1989; Ctenochelidae Manning and Felder, 1991; Eucalliidae Manning and Felder, 1991; Gourretiidae Sakai, 1999; Lipkecallianassidae Sakai, 2005; Micheleidae Sakai, 1992; Paracalliidae Sakai, 2005; Strahlaxiidae Poore, 1994 (adopted from Karasawa *et al.*, 2019).

Family Micheleidae Sakai, 1992

Amatukamius, new genus

Type species: *Callianassa* (s.l.) *sakakuraorum* Karasawa, 2000, by monotypy; masculine gender.

Etymology: Derived from “Amatukami”, a collective name for the first gods at the time of the creation of Nippon.

Diagnosis: see species.

Discussion: Examination of additional specimens shows that *Callianassa* (s.l.) *sakakuraorum* is not a member of Callianassidae. The present species lacks the dorsal plate of the uropodal exopod and *linea thalassinica*, which are definitive characters of Callianassidae. Additionally, absence of the *linea thalassinica* suggests that the species is closely related to members of other axiidean families, Axiidae Huxley, 1879, Coralaxiidae Sakai and de Saint Laurent, 1989, Micheleidae Sakai, 1992, and Strahlaxiidae Poore, 1994. However, it differs from members of Axiidae, Coralaxiidae, and Strahlaxiidae in that the carapace lacks dorsal

carinae, the uropodal endopod is ovate, and the uropodal endopod lacks the diaeresis; therefore, it can be placed in Micheleidae.

Micheleidae consists of five genera, *Marcusiarius* Rodrigues and Carvalho, 1972, *Meticonaxius* de Man, 1905, *Michelea* Kensley and Heard, 1991, *Paki* Karasawa and Hayakawa, 2000, and *Tethisea* Poore, 1994 (Karasawa and Hayakawa, 2000; Poore and Collins, 2015). *Marcusiarius* and *Meticonaxius* have the Cretaceous fossil records (Poore, 1997; Franțesu, 2014) and *Paki* has been only known from the Campanian (Late Cretaceous) of Japan (Karasawa and Hayakawa, 2000). Among the species of these genera, *Callianassa* (s.l.) *sakakuraorum* has close affinities with *Paki rurkonsimpu* Karasawa and Hayakawa, 2000, by having an obovate uropodal exopod, but it differs in absence of a row of setal pits and ridges of the carapace and pleonal somites 1–5. *Callianassa* (s.l.) *sakakuraorum* is readily distinguished from members of *Marcusiarius* and *Meticonaxius* by lacking rows of setal pits on pleonal somites 3–5. *Callianassa* (s.l.) *sakakuraorum* cannot be assigned to *Tethisea* by having an obovate uropodal exopod. The species of *Michelea* has a minute or obtuse rostrum and a row of setal pits on each pleonal somite, both which do not be seen in “*C.*” (s.l.) *sakakuraorum*. Therefore, the species cannot be placed in the hitherto known genera of Micheleidae. As a result, a new monotypic genus is erected herein for *C.* (s.l.) *sakakuraorum*.

***Amatukamius sakakuraorum* (Karasawa, 2000),
new combination**

(Pl. 1–Pl. 4)

Callianassa (s.l.) *sakakuraorum* Karasawa, 2000, p. 236,
figs. 1.3–1.5.

Diagnosis: Large-sized micheleid. Carapace sclerotized; rostral spine short; lateral spine absent; *linea thalassinica* absent; cervical groove shallow, weakly developed. Pleon elongate, sclerotized, with smooth surface; somite 1 about as long as wide, trapezoidal in dorsal view, divergent posteriorly, with anterolateral lobes; somite 2 about 1.5 times as long as somite 1; somites 3–6 slightly shorter than somite 2; each pleuron of somites 2–5 broadly rounded with posteroventral margin directed posteriorly; somite 6 with transverse ridge along posterior margin. Telson about as long as somite 6, trapezoidal in dorsal view, much longer than wide, smooth dorsally. Uropodal endopod subtriangular, about 1.4 times as long as wide, with strongly convex distal margin and nearly straight lateral and mesial margins; dorsal surface with weak median ridge. Uropodal exopod obovate, slightly longer than endopod, much longer than wide, with

median ridge dorsally; distal and lateral margins strongly convex; diaeresis absent. Maxillipeds 3 elongate; ischium subrectangular, much longer than high, flattened laterally, bearing unarmed margins, without *crista dentata*; merus subrectangular, about twice times as long as high, slightly shorter than ischium, tapering distally, flattened laterally, with sinuous, unarmed dorsal and ventral margins; carpus shorter than merus, much longer than high, vaulted longitudinally, tapering proximally, with nearly straight, unarmed dorsal and ventral margins; propodus long, about fourth times as long as high, much longer than carpus, longitudinally vaulted laterally, with nearly straight, unarmed dorsal and nearly straight, minutely dentate ventral margins; lateral surface pitted along dorsal and ventral margins; dactylus about half length of propodus, tapering distally. Pereiopods 1 chelate, subequal, dissimilar in shape. Dactylus of major cheliped curved ventrally, about 40% of propodus length, with unarmed dorsal and occlusal margins; fixed finger nearly straight with unarmed occlusal margin and laterally keeled ventral margin; palm subrectangular, slightly longer than high, with unarmed dorsal margin and laterally keeled ventral margin; lateral surface with small, irregular pits arranged sparsely on ventral half; distal margin with pointed tubercle just above fixed finger; carpus subrectangular, short, about 0.3 times as long as propodus, about half as high as long, with nearly straight, unarmed dorsal and strongly curved, unarmed ventral margins; lateral surface with sparsely arranged small pits; merus about equal to carpus length, rhomboidal in lateral view, strongly inflated laterally, with strongly convex, unarmed dorsal and ventral margins; ischium without marginal teeth or spines. Propodus of minor cheliped slender, slightly shorter than that of major cheliped; dactylus about half of propodus length with unarmed dorsal margin; occlusal margin fringed with small pits; lateral surface with small pits medially; fixed finger with unarmed occlusal margin; ventral margin nearly straight, keeled laterally; lateral surface pitted medially; palm subrectangular, tapering proximally, height about 4/5 of its length, nearly straight, unarmed dorsal margin; ventral margin nearly straight, keeled laterally; distal margin with pointed tubercle just above fixed finger; carpus subtriangular, short, about 0.3 times as long as propodus, about as long as high, gently vaulted laterally, with nearly straight, unarmed dorsal and strongly curved, unarmed ventral margins; merus longer than carpus, subrectangular,

inflated laterally, with gently convex, unarmed dorsal and nearly straight, unarmed ventral margins. Pereiopod 2 compressed laterally; merus long. Pereiopod 3 compressed laterally; propodus large, subrectangular, with rugose lateral surface; carpus shorter than propodus, subtriangular, converged proximally; merus long. Pereiopod 4 slender; propodus small; carpus relatively long; merus long, elongate, about 3/4 times as long as carpus; ischium about half length of merus. Pereiopod 5 slender, elongate.

Revised description: Large-sized micheleid. Anterior part of carapace (C) preserved, sclerotized, laterally compressed. Frontal margin with short rostral spine (R) and without lateral spine; anterolateral concavity shallow. *Linea thalassinica* (LT) absent. Cervical groove (CR) shallow, weakly developed.

Pleon elongate, sclerotized, with smooth surface. Somite 1 (PS1) about as long as wide, trapezoidal in dorsal view, divergent posteriorly, with anterolateral lobes; tergite with articulate ring along posterior margin; pleuron reduced, widened posteriorly, directed posteriorly, with gently convex ventral margin. Somite 2 (PS2) about 1.5 times as long as somite 1; tergite bearing narrow articulate ring along anterior and posterior margins; pleuron broadly rounded with posteroventral margin directed posteriorly. Somites 3–5 (PS3–5), slightly shorter than somite 2; each tergite bearing narrow articulate ring along anterior and posterior margins; each pleuron broadly rounded with posteroventral margin directed posteriorly. Somite 6 (PS6) about as long as somite 5, converged posteriorly; pleuron reduced, ventral margin sinuous, with transverse ridge along posterior margin. Telson (T) poorly preserved, about as long as somite 6, trapezoidal in dorsal view, much longer than wide, smooth dorsally. Uropodal endopod (UEN) subtriangular, about 1.4 times as long as wide, without spine; distal margin strongly convex; lateral and mesial margins nearly straight; dorsal surface with weak median ridge. Uropodal exopod (UEX) obovate, slightly longer than endopod, much longer than wide, without spine; distal and lateral margins strongly convex; dorsal surface with median ridge more well defined rather than that of endopod; diaeresis absent.

Maxillipeds 3 elongate. Ischium subrectangular, much longer than high, flattened laterally, without crista dentata; dorsal margin gently concave, unarmed; ventral margin gently convex; lateral surface smooth. Merus subrectangular, about twice times as long as high, slightly shorter than ischium, tapering distally, flattened laterally; dorsal and

ventral margins sinuous, unarmed; lateral surface smooth. Carpus shorter than merus, much longer than high, tapering proximally; dorsal and ventral margins nearly straight, unarmed; lateral surface vaulted longitudinally. Propodus long, about fourth times as long as high, much longer than carpus, longitudinally vaulted laterally; dorsal margin nearly straight, unarmed; ventral margin nearly straight, minutely dentate; lateral surface pitted along dorsal and ventral margins. Dactylus about half length of propodus, tapering distally. Maxilliped 2 partly preserved, slender.

Pereiopods 1 (P1) chelate, subequal, dissimilar in shape. Dactylus of major cheliped curved ventrally, about 40% of propodus length, slightly longer than fixed finger, with pointed tip; dorsal and occlusal margins unarmed. Fixed finger nearly straight with pointed tip; occlusal margin unarmed; ventral margin keeled laterally. Palm subrectangular, slightly longer than high; dorsal margin unarmed; ventral margins keeled laterally; lateral surface with small, irregular pits arranged sparsely on ventral half; distal margin initially at about 90 degree angle to dorsal margin with pointed tubercle just above fixed finger; proximal margin at about 90 degree angle to ventral margin. Carpus subrectangular, short, about 0.3 times as long as propodus, about half as high as long; dorsal margin nearly straight, unarmed; ventral margin strongly curved, unarmed; lateral surface with sparsely arranged small pits. Merus about equal to carpus length, rhomboidal in lateral view; dorsal and ventral margins strongly convex, unarmed; lateral surface strongly inflated. Ischium without marginal teeth or spines. Propodus of minor cheliped slender, slightly shorter than that of major cheliped. Dactylus curved ventrally, about half of propodus length, with pointed tip; dorsal margin unarmed; occlusal margin fringed with small pits; lateral surface with small pits medially. Fixed finger slightly shorter than dactylus, with pointed tip; occlusal margin unarmed; ventral margin nearly straight, keeled laterally; lateral surface pitted medially. Palm subrectangular, tapering proximally; height about 4/5 of its length; dorsal margin nearly straight, unarmed; ventral margin nearly straight, keeled laterally; distal margin initially at about 100 degree angle to dorsal margin with pointed tubercle just above fixed finger; proximal margin at about 90 degree angle to ventral margin. Carpus subtriangular, short, about 0.3 times as long as propodus, about as long as high, dorsal margin nearly straight, unarmed; ventral margin strongly curved, unarmed; lateral surface

gently swollen. Merus longer than carpus, subrectangular; dorsal margin gently convex, unarmed; ventral margin nearly straight, unarmed; lateral surface inflated longitudinally. Ischium without marginal teeth or spines.

Pereiopod 2 (P2) compressed laterally. Dactylus and propodus not preserved. Carpus short, subtriangular, tapering proximally. Merus long; dorsal margin nearly straight; ventral margin gently convex. Pereiopod 3 (P3) compressed laterally. Dactylus not preserved. Propodus large, subrectangular, with rugose lateral surface. Carpus shorter than propodus, subtriangular, converged proximally, with unarmed dorsal and ventral margins. Merus long; dorsal margin nearly straight; ventral margin gently convex. Ischium short. Pereiopod 4 (P4) slender. Dactylus not preserved. Propodus small, but detailed characters not known. Carpus relatively long, tapering proximally. Merus long, elongate, about 3/4 times as long as carpus, with nearly straight dorsal and ventral margins. Ischium about half length of merus. Pereiopod 5 (P5) slender, elongate, but poorly known. Pleopods (PL) preserved, but detailed characters unknown.

Material examined: Holotype, MFM247015 and Paratype, MFM247016, from sandy mudstone of the Arida Formation (Barremian, Early Cretaceous) of Suhara (Loc. 02 of Karasawa *et al.*, 2008), Yuasa-cho, Wakayama Prefecture. Three additional specimens, WMNH-Ge-1140320032, WMNH-Ge-1140320114, and WMNH-Ge-1140320115; from sandy mudstone of the Arida Formation (Barremian, Early Cretaceous) of Suhara (near Loc. 02 of Karasawa *et al.*, 2008), Yuasa-cho, Wakayama Prefecture.

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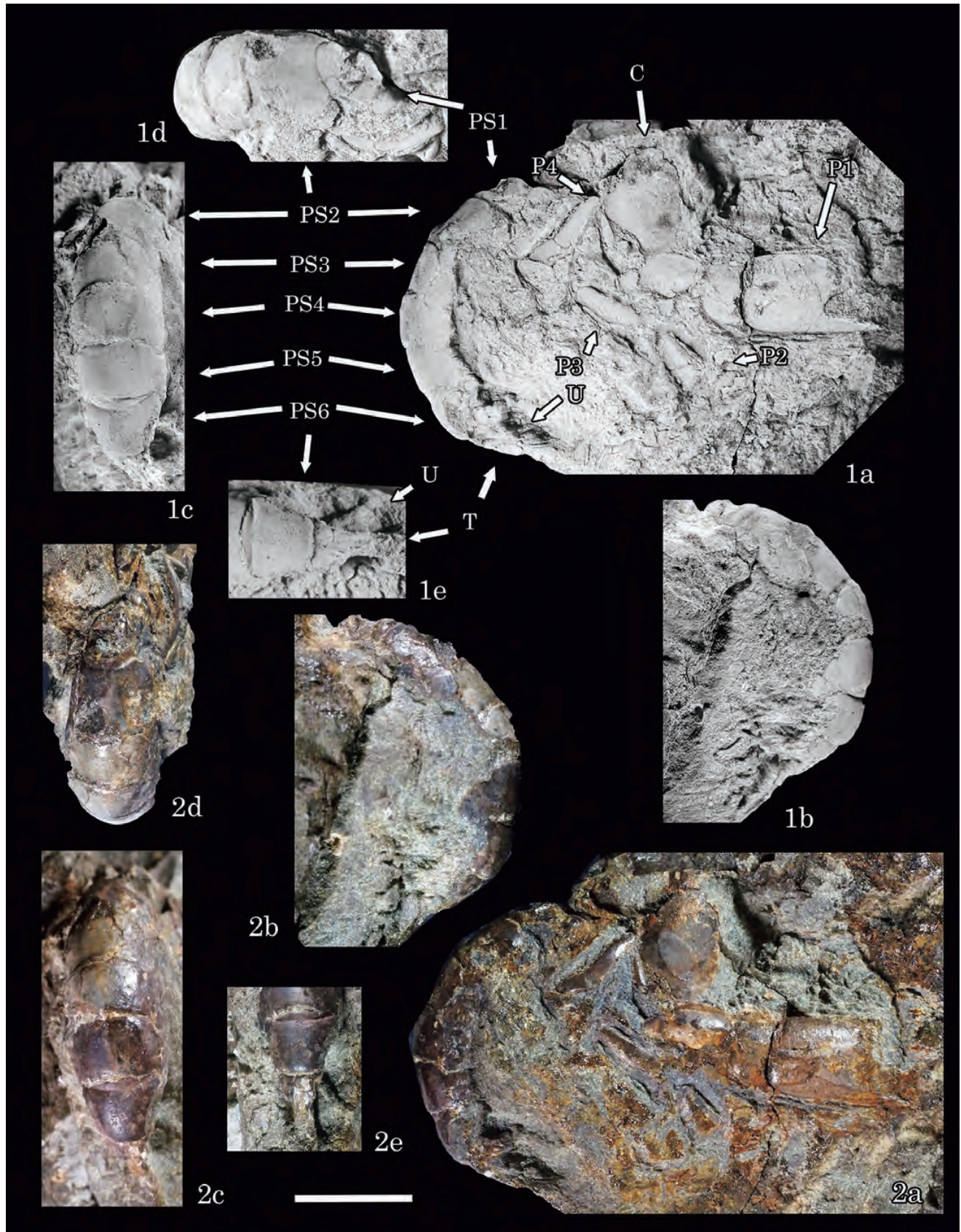
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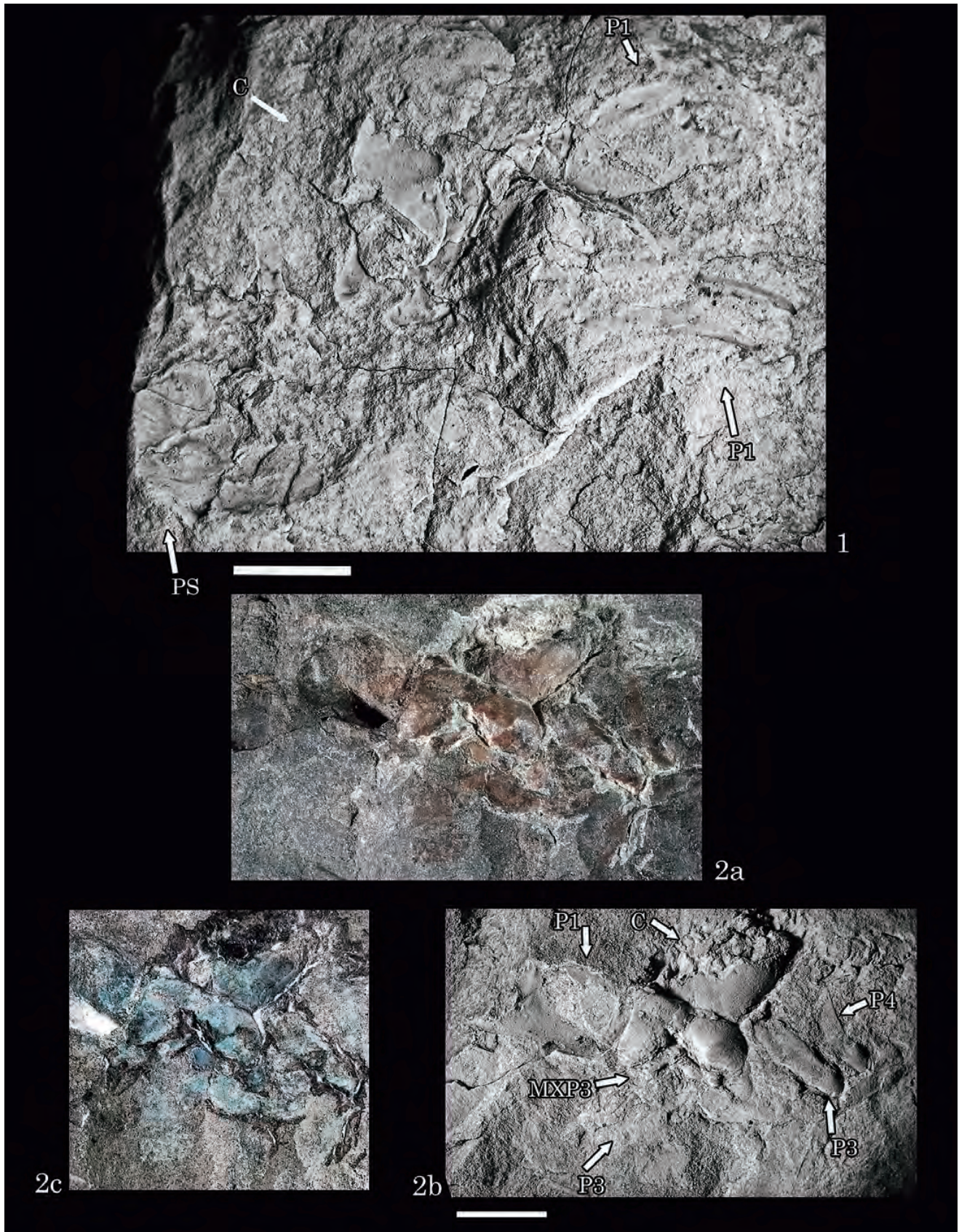
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Plate 1



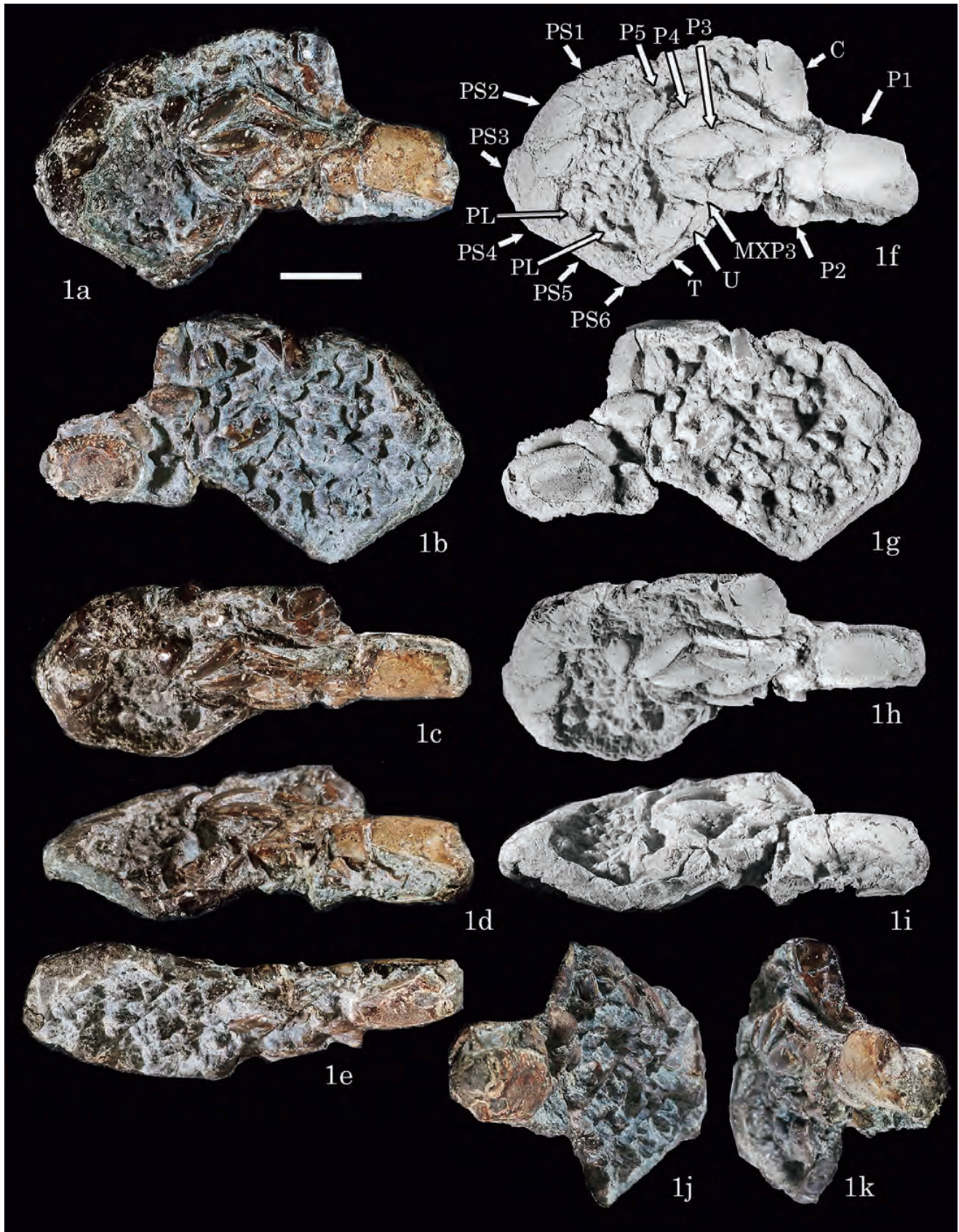
1a–2e. *Amatukamius sakakuraorum* (Karasawa, 2000), new combination. Holotype, MFM247015. Carapace, pleon, telson, uropods, and pereopods. 1a, b, 2a, b, lateral; 1c–e, 2c–e, dorsal view. Scale bar = 1 cm. Figs. 1a–e are coated with ammonium chloride sublimate. Abbreviations: C, carapace; P, pereopod; PS, pleonal somite; T, telson; U, uropod.

Plate 2



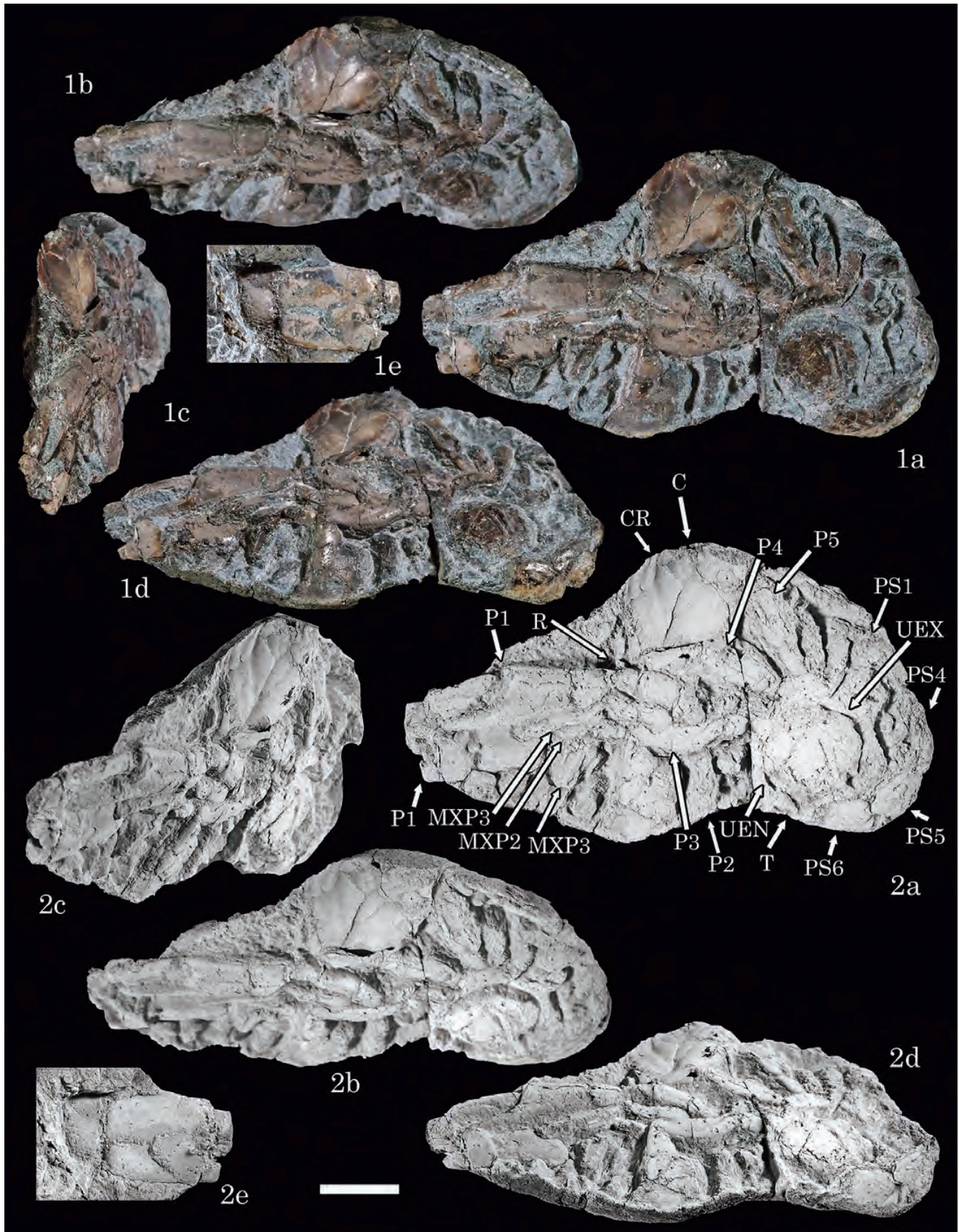
1–2c. *Amatukamius sakakuraorum* (Karasawa, 2000), new combination. 1, Paratype, MFM247016. Outer mold of carapace, pleon, and pereopods, lateral view. 2a–c, WMNH-Ge-1140320114. Carapace, maxilliped 3, and pereopods, lateral view. Scale bar = 1 cm. Fig. 2b is coated with ammonium chloride sublimate and Fig. 2c is an opposite image by Photoshop Elements 14. Abbreviations: C, carapace; MXP3, maxilliped 3; P, pereopod; PS, pleonal somite.

Plate 3



1a–1k. *Amatukamius sakakuraorum* (Karasawa, 2000), new combination. WMNH-Ge-1140320032. Carapace, pleon, telson, uropods, maxilliped 3, pereopods, and pleopods. 1a, b, f, g, lateral; 1c, h, dorsal; 1d, e, h, i, ventral; 1j, k, anterior view. Scale bar = 1 cm. Figs. 1f–i are coated with ammonium chloride sublimate. Abbreviations: C, carapace; MXP3, maxilliped 3; P, pereopod; PL, pleopod; PS, pleonal somite; T, telson; U, uropod.

Plate 4



1a–2e. *Amatukamius sakakuraorum* (Karasawa, 2000), new combination. WMNH-Ge-1140320115. Carapace, pleon, telson, uropods, maxillipeds, and pereopods. 1a, e, 2a, e, lateral; 1b, 2b, dorsal; 1c, 2c, anterior; 1d, 2e, ventral view. Scale bar = 1 cm. Figs. 2a–e are coated with ammonium chloride sublimate. Abbreviations: C, carapace; CR, cervical groove; MXP, maxilliped; P, pereopod; PS, pleonal somite; R, rostrum; T, telson; UEN, uropodal endopod; UEX, uropodal exopod.

Appendix

和文概要

Callianassa (s.l.) *sakakuraorum* Karasawa, 2000 (十脚目：アナエビ下目) に対する新属の創設

柄沢 宏明・小原 正顕

Karasawa (2000) は、和歌山県の下部白亜系有田層から産したアナエビ類の2標本に基づき新種 *Callianassa* (s.l.) *sakakuraorum* を記載した。その際、第3顎脚や尾肢が保存されていないことを理由に、本種を広義のスナモグリ属 (*Callianassa*) に帰属させた。追加標本を併せ模式標本の再検討の結果、本種は、甲のタラシナ線を欠くこと、背面に稜線をつけないこと、細く長く伸びる第3顎脚をもつこと、尾肢の内肢が楕円形をなすこと、尾肢の外肢は背板を欠き、またその後方に横断する線がないことが分かった。したがって、本種をスナモグリ科 (*Callianassidae*) から、ミッCHEルエビ科 (新称) (*Micheleidae*) に帰属させることとし、本種を模式種とし新属アマツカミエビ属 (新称) (*Amatukamius*) を創設した。また、本種の和名としてアマツカミエビ (新称) を与えることとした。アマツカミエビ属は、北海道の上部白亜系産パキエビ属 (新称) (*Paki* Karasawa and Hayakawa, 2000) に似るが、第1～5腹節に備わる小孔を穿つ線を持たないことで区別される。なお、本種はミッCHEルエビ科として最古の化石記録となる。