

SOME THALASSINID COLLECTIONS BY R/V "HAKUHO-MARU" AND
R/V "TANSEI-MARU", UNIVERSITY OF TOKYO, IN THE SULU SEA,
PHILIPPINES, AND IN SAGAMI BAY AND SURUGA BAY, JAPAN,
INCLUDING TWO NEW SPECIES, ONE NEW GENUS, AND ONE NEW
FAMILY (DECAPODA, THALASSINIDEA)

BY

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ABSTRACT

Two species of the genus *Eiconaxius*, *E. indicus* (De Man, 1907) and *E. hakuho* n. sp., and one species of the genus *Spongaxius*, *S. brucei* Sakai, 1986 were collected from the Sulu Sea, Philippines. One species of *Eiconaxius*, *E. farreae* Ortmann, 1891 has been found in Sagami Bay, and a new species of the genus *Ambiaxius*, *A. surugaensis* n. sp. was collected from Suruga Bay, both in Japan. The family Eiconaxiidae n. fam. is established for the genus *Eiconaxius* Bate, 1888. The generic name *Briancaris* is proposed as a replacement for *Callistocaris* Kensley, 1989, a synonym of *Ambiaxius* sensu Kensley, 2000 [not *Ambiaxius* Sakai & De Saint Laurent, 1989] in the family Calocarididae Ortmann, 1891.

ZUSAMMENFASSUNG

Zwei Arten der Gattung *Eiconaxius*, *E. indicus* (De Man, 1907) und *E. hakuho* sp.n., und eine Art der Gattung *Spongaxius*, *S. brucei* Sakai, 1986, sind in der Sulu See (Philippinen) gesammelt worden. Eine Art der Gattung *Eiconaxius*, *E. farreae* Ortmann, 1891, fand sich in Japan in der Sagami Bucht und eine neue Art der Gattung *Ambiaxius*, *A. surugaensis* sp.n., in der Suruga Bucht auch in Japan. Für die Gattung *Eiconaxius* Bate, 1888 wird die Familie Eiconaxiidae fam.n. errichtet. Es wird vorgeschlagen, in der Familie Calocarididae Ortmann, 1891 den Gattungsnamen *Callistocaris* Kensley, 1989, einem Synonym von *Ambiaxius* sensu Kensley, 2000 [nicht *Ambiaxius* Sakai & De Saint Laurent, 1989], durch den Gattungsnamen *Briancaris* zu ersetzen.

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INTRODUCTION

The results of the collections made in dredging operations by two research vessels, R/V “Hakuhou-Maru” and R/V “Tansei-Maru”, in the years 1989-2004, directed by one of us (SO; University of Tokyo), include five thalassinids. Two species of the genus *Eiconaxius*, *E. indicus* (De Man, 1907) and *E. hakuhou* n. sp., and a species of the genus *Spongiaxius*, *S. brucei* Sakai, 1986 were collected from the Sulu Sea, in the Philippines. One species of *Eiconaxius*, *E. farreae* Ortmann, 1891 was found in Sagami Bay, and a new species of the genus *Ambiaxius*, *A. surugaensis* n. sp. was collected from Suruga Bay, Japan.

The family Eiconaxiidae n. fam. is newly established, based on the genus *Eiconaxius*. *Callistocaris* Kensley, 1989 was synonymized by Kensley et al. (2000) with *Ambiaxius* Sakai, 1989. This genus is, however, different from Sakai’s (1989) *Ambiaxius*, so *Briancaris* n. gen. is proposed for Kensley et al.’s (2000) species of *Callistocaris* or *Ambiaxius* (cf. Kensley et al., 2000; not Sakai, 1989) by the different form of the rostrum and Plp2.

Though one of us (KS) hesitated to separate the Axioidea from the Callianasoidea s. str. in a previous paper (Sakai, 2005) we now feel confident to distinguish these two superfamilies. This brings the total of superfamilies incorporated in the Thalassinidea to three, i.e., including the Thalassinidea Latreille, 1831.

Abbreviations used in this paper are as follows: A1 and A2, antennule and antenna, respectively; P, pereopod; Plp, pleopod. CL, carapace length; TL, total length; both in mm. BLT, Biological Laboratory, Shikoku University, Tokushima; MZS, Musée Zoologique de l’Université Louis Pasteur et de la Ville de Strasbourg, Strasbourg; NSMT, National Science Museum, Tokyo; SAMC, South African Museum, Cape Town; BTP or BT, Ocean Research Ecology Division, University of Tokyo (ORE), meters span beam trawl (BT) with or without pinger system (P).

TAXONOMY

Superfamily AXIOIDEA Huxley, 1879

Poore, 1994: 96.

Diagnosis. — Rostrum developed. Cervical groove distinct or indistinct. Linea thalassinica absent. Eyestalks cylindrical or oval; maxilla 2 scaphognathite with a posterior whip; P1 chelate, equal or unequal; P2 chelate; P3 simple, P4-5 simple or subchelate, or P3-5 dactyli oval. Plp1 present or absent. Plp2-5 biramous, endopods with appendix interna, Plp2 similar to Plp3-5 in shape. Propyloric ossicle of gastric mill simple, lacking a series of transverse septa on its posterior surface.

Remarks. — The superfamily Axioidea Huxley, 1879 is different from the Callianassoidea Dana, 1852. However, the two taxa both have a simple propyloric ossicle without a series of transverse septa on its posterior surface (Sakai, 2005), and P2 is chelate. The Axioidea differ from the Callianassoidea, because in Axioidea the maxilla 2 scaphognathite bears a long posterior whip, while in Callianassoidea the maxilla 2 scaphognathite has no such whip.

Families included. — Axiidae Huxley, 1879; Calocarididae Ortmann, 1891; Eiconaxiidae n. fam.; Strahlaxiidae Poore, 1994.

Family EICONAXIIDAE n. fam.

Diagnosis. — Rostrum conspicuous, concave on dorsal surface, cervical groove indistinct. No linea thalassinica present. Scaphocerite strong. P3-5 dactyli rounded and their ventral margins spinulate. Male Plp1 absent, male Plp2-5 narrow, biramous; Plp2 with appendix interna and appendix masculina, Plp3-5 all with appendix interna. Female Plp1 uniramous, Plp2-5 narrow, biramous, and all with appendix interna.

Remarks. — Eiconaxiidae n. fam. is proposed for *Eiconaxius*, because this genus is conspicuously different from all other genera of the family Axiidae. In the Eiconaxiidae, the P2 is chelate (fig. 2C); the P3-5 dactyli are rounded in shape (fig. 2D-F), and their ventral margins spinulate; the cervical groove is indistinct; and the male Plp1 is absent. In the other genera of the family Axiidae, the P3-5 dactyli are simple, forming a subchela with the ventrodistal protrusion of the propodi as figured in *Acanthaxius polychaetes* Sakai, 1994 (cf. Sakai, 1994, fig. 13f), *A. formosa* Kensley & Chan, 1998 (cf. Kensley & Chan, 1998, fig. 2I), *Platyaxius brevirostris* Sakai, 1994 (cf. Sakai, 1994, fig. 5), and *Scytoleptus serripes* Gerstäcker, 1856 (cf. Poore & Griffin, 1979, fig. 11i); the cervical groove is conspicuous as usual, and the male Plp1 is usually present as a uniramous appendage, generally consisting of a proximal segment and a multiarticulate flagellum.

Type genus. — *Eiconaxius* Bate, 1888.

Genus *Eiconaxius* Bate, 1888

Eiconaxius Bate, 1888: 40.

Iconaxiopsis s. str. Alcock, 1901: 193 [type species: *Eiconaxius kermadeci* var. *laccadivensis* Alcock & Anderson, 1894]; Balss, 1925: 210.

Iconaxius Alcock, 1901: 193 [mis-spelling].

Iconaxiopsis s. str. — Borradaile, 1903: 537.

Eiconaxius s. str. — Borradaile, 1903: 537; De Man, 1925b: 14.

Definition. — Rostrum widely triangular, dorsally furrowed, and with acute or rounded apex; lateral margins armed or unarmed, extending backward to gastric

region. Gastric region convex. No linea thalassinica present. Cervical groove indistinct. Eystalks short; cornea pigmented or not. Antennal scaphocerite conspicuously developed. P1 subequal or unequal; palm with or without dorsodistal tooth. P3-5 dactyli short, oval, and spinulate on ventral margin. Vestigial gills present on Mxp2. Pleurobranchs present on P2-4. Pleura and terga entire. Male Plp1 absent; female Plp1 two-segmented. Male Plp2 bifurcate, endopod with appendix interna and appendix masculina. Male Plp3-5 and female Plp2-5 bifurcate, endopods with appendix interna. Uropodal exopod without transverse suture. Telson oblong, denticulate on lateral margins, and with or without posteromedian tooth. In deep-water habitat.

Type species. — *Eiconaxius acutifrons* Bate, 1888;

Species included. —

[Indo-Pacific oceans]. *E. acutifrons* Bate, 1888; *E. albatrossae* Kensley, 1996; *E. andamanensis* (Alcock, 1901); *E. asper* Rathbun, 1906; *E. baja* Kensley, 1996; *E. consobrinus* (De Man, 1907); *E. cristagalli* (Faxon, 1893); *E. demani* Sakai, 1992; *E. farreae* Ortmann, 1891; *E. hakuhou* n. sp.; *E. indicus* (De Man, 1907); *E. kermadecensis* (Chilton, 1911); *E. kermadeci* Bate, 1888; *E. kimbla* Kensley, 1996; *E. laccadivensis* (Alcock & Anderson, 1894); *E. mortenseni* Sakai, 1992; *E. parvus* Bate, 1888; *E. sibogae* De Man, 1925; *E. singularis* Zarenkov, 1981; *E. spinigera* (MacGilchrist, 1905); *E. weberi* (De Man, 1905).

[Atlantic Ocean]. *E. agassizi* Bouvier, 1905; *E. albatrossae* Kensley, 1996; *E. antillensis* Bouvier, 1905; *E. borradailei* Bouvier, 1905; *E. caribbaeus* (Faxon, 1896).

***Eiconaxius farreae* Ortmann, 1891 (figs. 1-2)**

Eiconaxius farreae Ortmann, 1891: 49; Sakai, 1992: 162, fig. 5; Komai, 1999: 63.

“?Axius (*Iconaxiopsis*) *farreae*” — Borradaile, 1903: 537.

Axius (*Eiconaxius*) *farreae* — Balss, 1914: 88; De Man, 1925a: 125, text — figs. 3-3d; De Man, 1925b: 16; Yokoya, 1933: 52.

Iconaxiopsis farreae — Balss, 1925: 209, 211.

Axius farreae — Sakai, 1987: 304.

Material examined. — Paralectotypes, MZS 313, 7 males (TL/CL: 19.0/5.7-12.0/3.8); 1 ovig. female (20.0/6.5); 2 females (21.0/6.5-17.0/5.9), 1 juv. (8.0/2.5). Lectotype, MZS 314 (1 specimen inside a sponge*). Paralectotype, MZS 315 (1 specimen inside a sponge*), Sagami Bay, Japan. (**Farrea occa* Bowerbank, 1862, Hexasterophora, det. C. Eckert.) BLT 18245, 3 males (TL/CL: 19.0/6.4-2.4/7.9), 1 ovig. female (2.6/8.0), Sagami Bay, S. flank of Merase, 34°50.06'N 139°43.10'E - 34°50.10'N 139°43.24'E, 517-528 m depth, R/V “Tansei-Marū”, St. MR-1-2, 13.v.2004, 08:03-08:12 h, 1 m biological dredge.

Remarks. — In Sagami Bay, two species of the genus *Eiconaxius*, *E. farreae* Ortmann, 1891 and *E. mortenseni* Sakai, 1992 are known. In *E. farreae*, the rostrum is lanceolate (fig. 1A-C), the median dorsal carina is bifurcate posteriorly

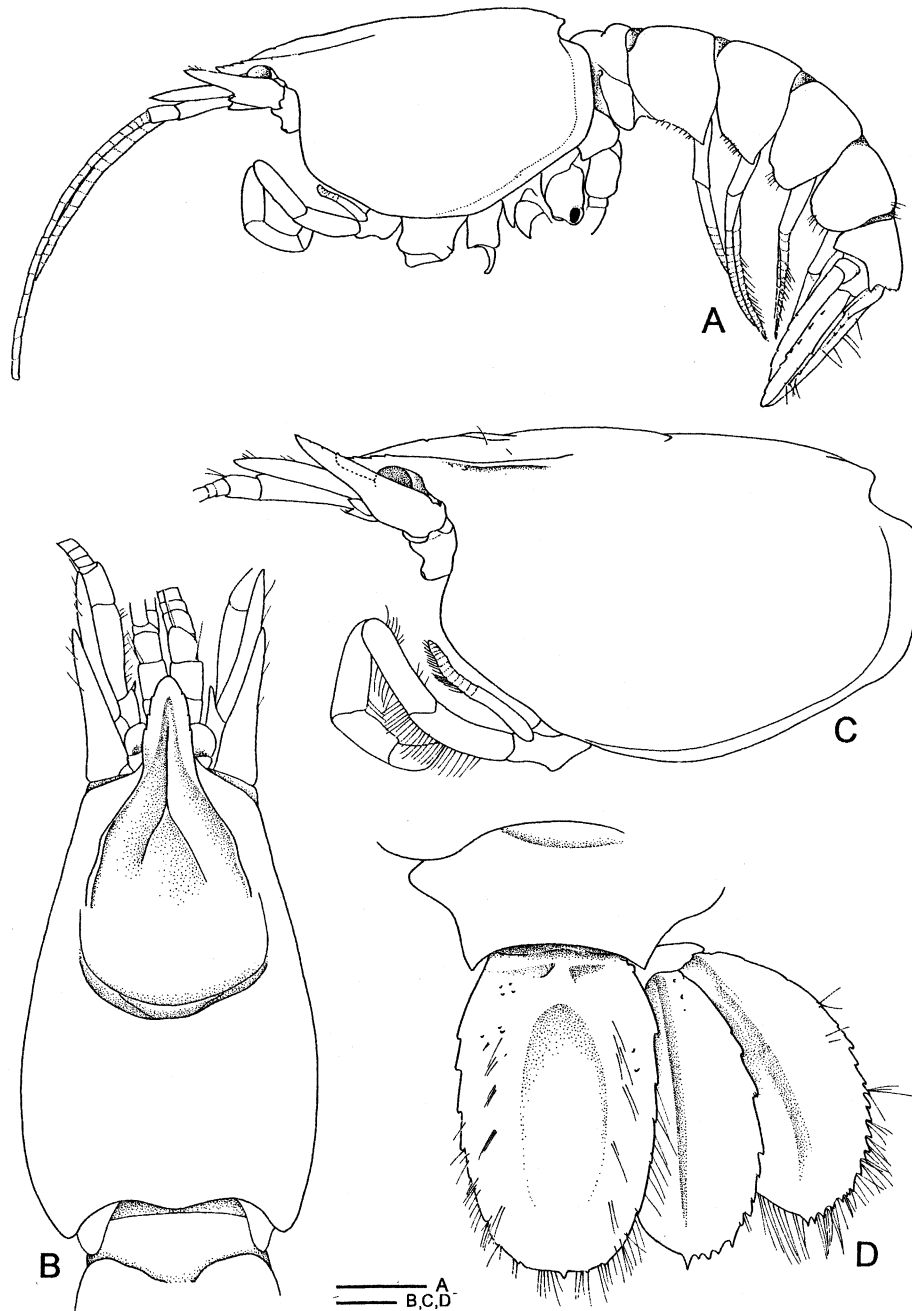


Fig. 1. *Eiconaxius farreae* Ortmann, 1891. A, whole body, lateral view; B, carapace, dorsal view; C, carapace, lateral view; D, abdominal somite 6, telson, and right uropod. A-D, male, BLT 18245, Sagami Bay, S. flank of Merase, 34°50.06'N 139°43.10'E - 34°50.10'N 139°43.24'E, 517-528 m depth. Scale bars: A, 2 mm; B, C, D, 1 mm.

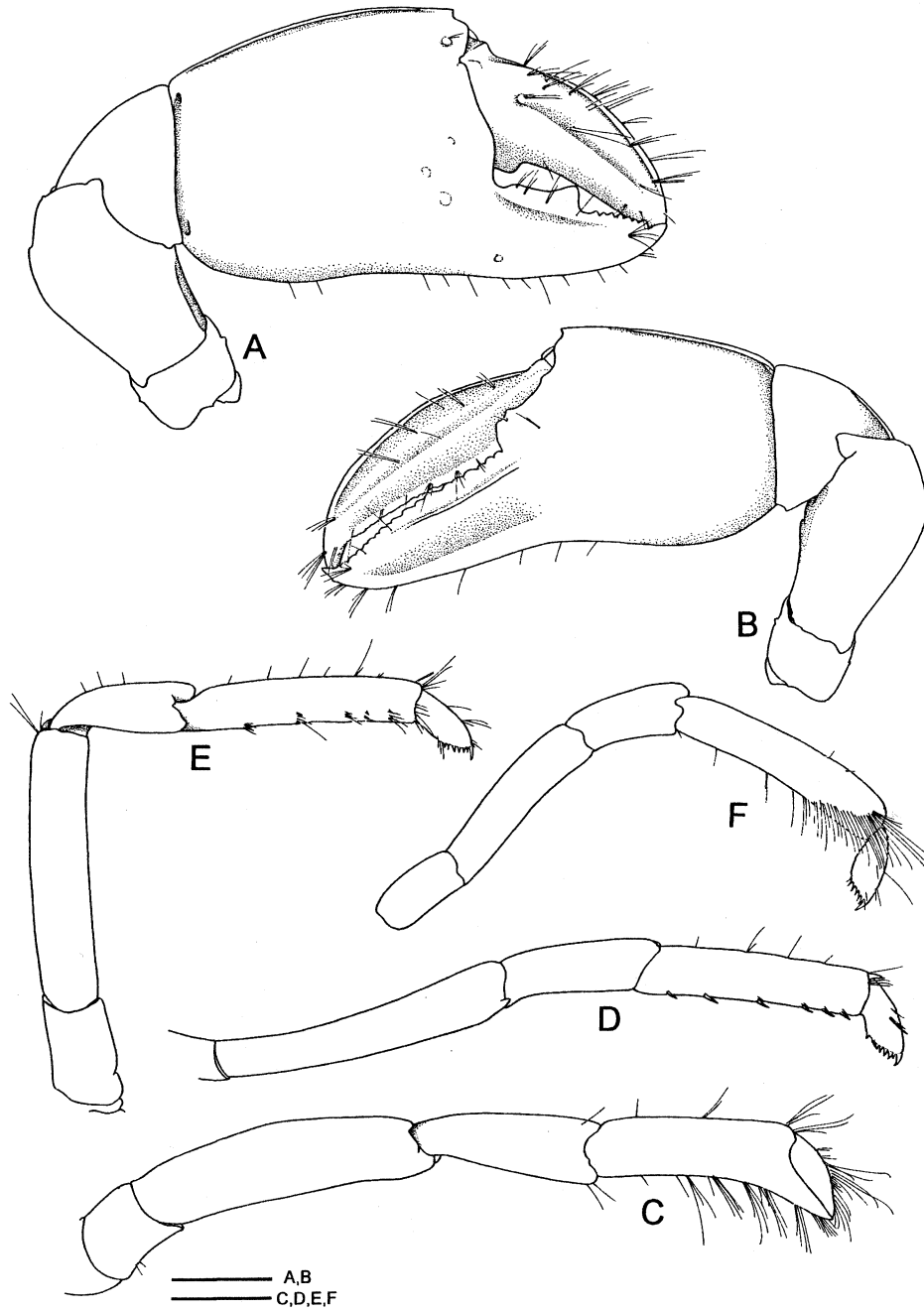


Fig. 2. *Eiconaxius farreae* Ortmann, 1891. A, larger cheliped; B, smaller cheliped; C, P2; D, P3; E, P4; F, P5. A-F, male, BLT 18245, Sagami Bay, S. flank of Mearse, 34°50.06'N 139°43.10'E - 34°50.10'N 139°43.24'E, 517-528 m depth. Scale bars: A, B, 3 mm; C, D, E, F, 1 mm.

on the gastric region (fig. 1B). Left and right P1 are subequal, the larger cheliped (fig. 2A) with a broad palm, and the cutting edge of the fixed finger is armed with a distinct median tooth, while distal to that it is denticulate. In the smaller cheliped (fig. 2B), the palm is less broad than in the larger one, and the cutting edges of the dactylus and the fixed finger are regularly denticulate. Telson subsquare on the posterior margin (fig. 1D).

Type locality. — Sagami Bay, Japan; 182-364 m depth.

Distribution. — Tokyo Bay to Goto Island, Japan; 77-600 m.

***Eiconaxius indicus* De Man, 1907 (figs. 3-5)**

Iconaxius crista-galli var. *indica* De Man, 1907: 128.

Iconaxius cristagalli var. *indica* — Balss, 1925: 210.

Axius (*Eiconaxius*) *crista-galli* var. *indica* — De Man, 1925b: 15, 31, pl. 2 figs. 3-3b.

Material examined. — BLT 18248, 1 female (TL/CL: 22.0/7.2), Sulu Sea, Philippines, 08°06.36'N 118°26.49'E - 08°07.04'N 118°26.06'E, 688-693 m depth, R/V "Hakuhou-Marui", KH-02-04, St. 7-B, 23.xi.2002, 22:44-21:18 h, 3 m BTP.

BLT 18246, 3 males (13.0/4.7-19.0/7.0), 1 male (CL. 7.6, damaged abdominal somites 4-5), 3 females (15.0/5.2-24.0/7.5), 2 ovig. females (24.0/7.7-24.0/7.8), Sulu Sea, Philippines, 08°07.72'N 118°34.76'E - 08°08.51'N 118°34.44'E, 1012-1015 m depth, R/V "Hakuhou-Marui", KH-02-04, St. 8-B, 24.xi.2002, 06:47-07:21 h, 3 m BTP.

BLT 18247, 1 male (21.0/6.9), 1 ovig. female (23.0/7.3), Sulu Sea, Philippines, 08°06.41'N 118°29.18'E - 08°07.32'N 118°28.44'E, 796-804 m depth, R/V "Hakuhou-Marui", KH-02-04, St. 8-A, 23-24.xi.2002, 23:37-00:22 h, 3 m BTP.

BLT 18254, 2 males (13.0/4.5-16.0/5.4), Sulu Sea, Philippines, 08°22.77'N 118°56.11'E - 08°24.31'N 118°55.61'E, 1981-2019 m depth, R/V "Hakuhou-Marui", KH-02-04, St. 9, 24.xi.2002, 18:44-19:51 h, 3 m BTP.

Description. — Carapace smooth. Rostrum (figs. 3, 4A-B) lanceolate, apex upturned and subacute, reaching middle of A1 article 2; lateral margin dentate anteriorly from above eyestalks, with four lateral teeth, proximally extending outward onto anterolateral margin of carapace. Gastric region with a median, a pair of submedian, and a pair of lateral carinae, running backwards; median carina reaching anteriorly to tip of rostrum and provided with 10 distinct teeth; submedian row smooth, branched out from posterior end of median carina, and lateral row also smooth, prolonged from basal part of rostrum. Cervical groove indistinct.

Abdominal somites smooth; somite 1 short, ventrally deflected into a narrow, rounded ventral margin; somite 2 largely deflected posteriorly with a subacute posterolateral angle; somites 3-4 evenly convex, smaller than somite 2, and ventrally produced into rectangular posteroventral corners; somite 5 also rounded on ventrolateral margin; somite 6 (fig. 4C) ventrally triangular, and denticulate on posterior margin. Telson (fig. 4C) oblong, slightly longer than broad, and much longer than somite 6; lateral margins subparallel and denticulate; dorsal surface slightly depressed medially and posterior margin with median tooth.

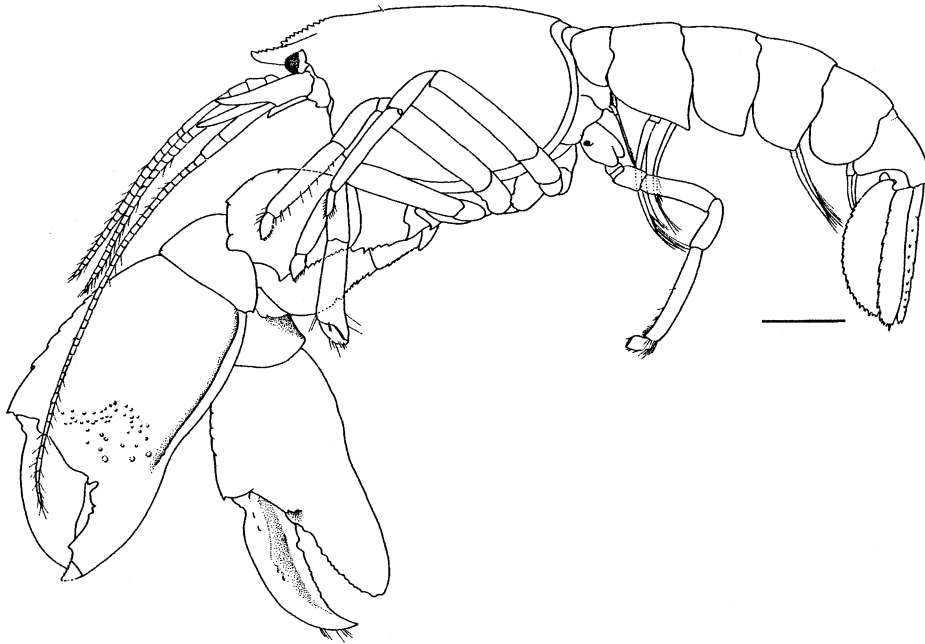


Fig. 3. *Eiconaxius indicus* (De Man, 1907). Female, whole body, lateral view. BLT 18246, TL/CL: 23.0/7.5, Sulu Sea, Philippines, 08°07.72'N 118°34.76'E - 08°08.51'N 118°34.44'E, 1012-1015 m depth, R/V "Hakuhou-Maru". Scale bar: 2 mm.

Eyestalks (fig. 4B) thick and short, reaching short of middle of rostral length. A1 peduncle of 3 articles, proximal article overreaching tip of eye, articles 2 and 3 short and subequal in length. A2 proximal article short, with ventrodistal tooth; article 3 distolaterally produced into elongate tooth, directed outward from middle of article. Scaphocerite extending forward beyond distolateral tooth of article 3. Penultimate article about half length of article 3 and unarmed. Article 5 unarmed and one-third length of penultimate article. A2 flagellum about twice length of A1 flagella. Mxp3 coxa and basis, respectively, each with a sharp distal tooth on mesial margin; exopod consisting of a proximal segment and a multiarticulate flagellum, overreaching distal margin of ischium.

P1 (fig. 5A-D) unequal. In larger female cheliped, coxa with a distal spine on both mesial and lateral margins. Basis unarmed. Ischium (fig. 5A, B) denticulate on ventral margin. Merus about 1.3 times as long as broad, denticulate on ventral margin, and three low teeth on dorsal margin. Carpus two-thirds length of merus, distinctly broader than long, and with a ventrodistal tooth. Chela 1.8 times as long as broad; palm broad, 1.0-1.2 times as long as broad, and about twice length of carpus, distal margin with a ventral tooth; fixed finger about half length of palm, cutting edge denticulate and with a distinct tooth at distal one-third. Dactylus broad, three-fourths length of palm, and finely denticulate on cutting margin. In

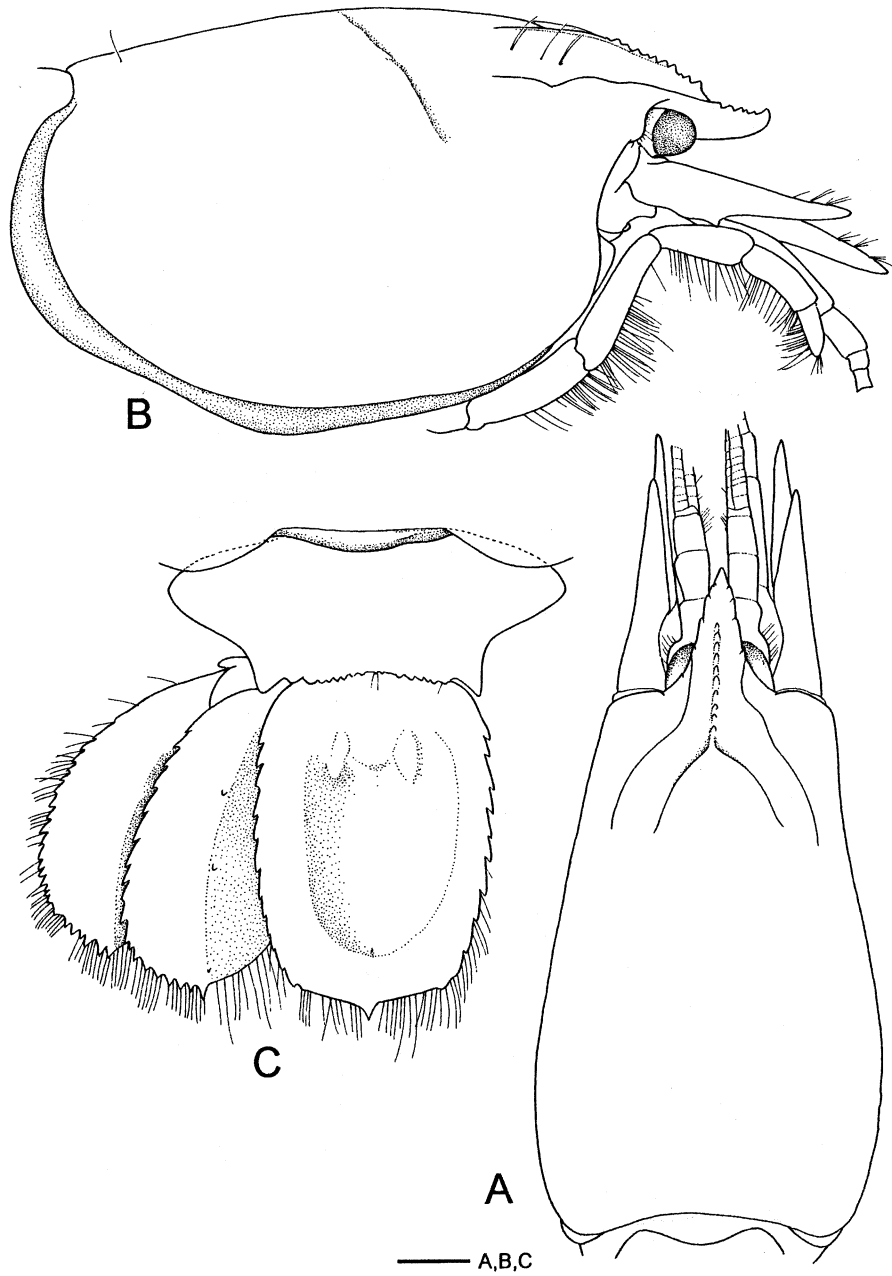
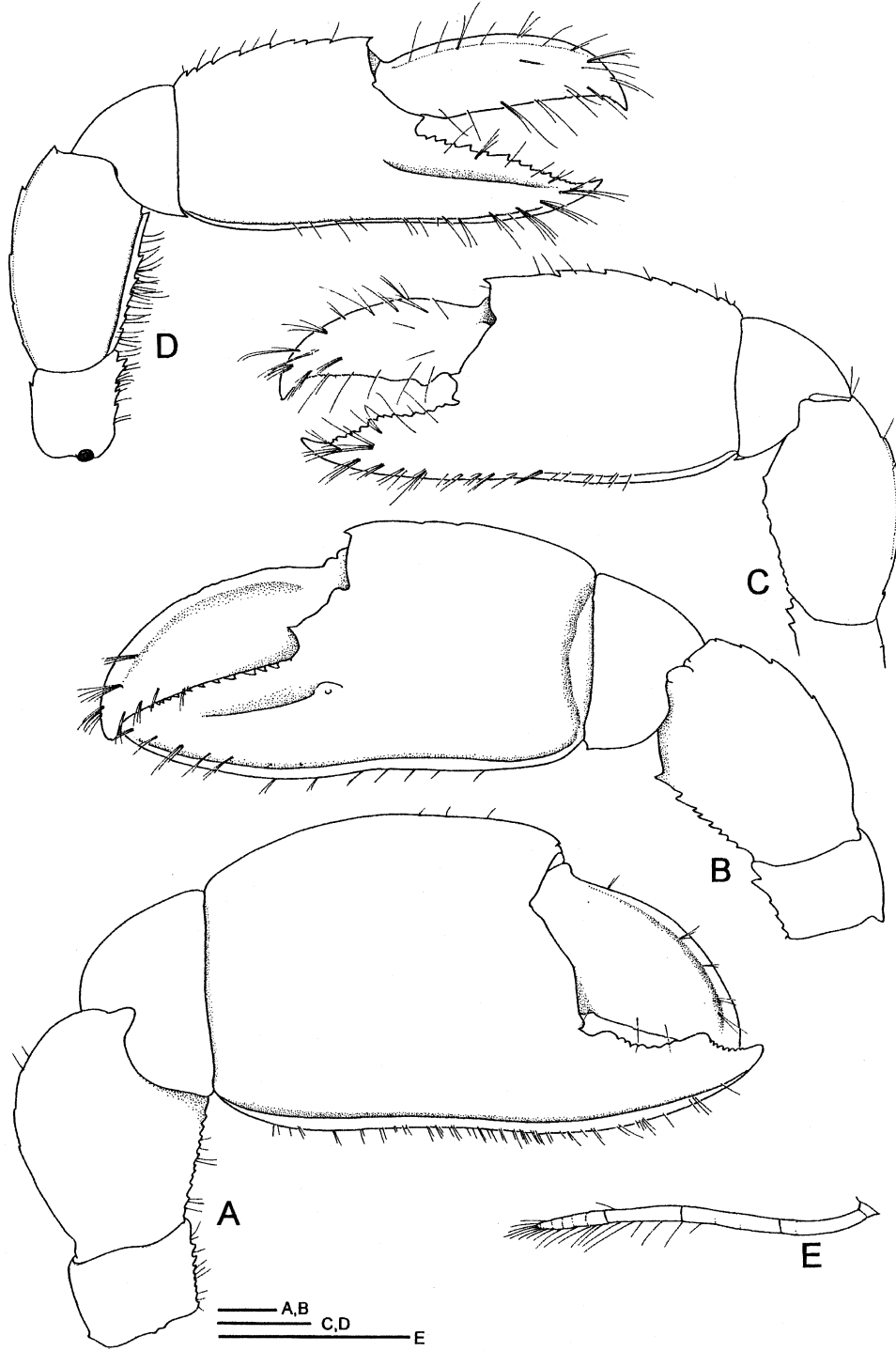


Fig. 4. *Eiconaxius indicus* (De Man, 1907). A, carapace, dorsal view; B, carapace, lateral view; C, abdominal somite 6, telson, and left uropod, dorsal view. A-C, BLT 18246, female, TL/CL: 23.0/7.5, Sulu Sea, Philippines, 08°07.72'N 118°34.76'E - 08°08.51'N 118°34.44'E, 1012-1015 m depth, R/V "Hakuhou-Maru". Scale bar: A, B, C, 2 mm.



female smaller cheliped, merus (figs. 5B) two-thirds as long as broad, ventral margin denticulate, bearing acute tooth located slightly distant from distal margin, successive teeth reduced in size toward proximal ones, and dorsal margin with four low teeth including a distal one on dorsodistal angle. Carpus slightly more than half length of merus. Chela twice as long as broad; palm as long as broad and about twice length of carpus; ventral margin distinctly carinate, dorsal margin indistinctly denticulate and terminated distally with a small tooth; distal margin distinctly declined forward to make an acute tooth. Dactylus longer than palm and denticulate on cutting edge. In male smaller cheliped, palm (fig. 5B) with distinct row of low teeth on dorsal margin. In larger cheliped, fixed finger regularly denticulate on slightly convex cutting edge (fig. 5D).

P2 (fig. 3) chelate and unarmed. P3 simple, propodus 1.5 times length of carpus, and with transverse rows of spinules on ventral margin; dactylus leaf-like, bearing a row of spinules on ventrodiscal margin. P4 simple, propodus 1.7 times length of carpus, and with a transverse row of spinules on ventral margin; dactylus leaf-like and with a row of spinules on ventrodiscal margin. P5 simple, propodus twice length of carpus, and with a tuft of setae on distoventral corner; dactylus leaf-like and with a row of spinules on ventrodiscal margin.

Male Plp1 absent. Female Plp1 uniramous, biarticulate; distal segment multi-subsegmented with setae (fig. 5E). Plp2-5 slender, biramous, endopods with appendix interna. Uropodal exopod (fig. 4C) largely convex and serrated on lateral margin; uropodal endopod largely convex on distolateral margin and a median distal tooth on distal margin.

Type locality. — Off south-east coast of Great Kei Is., 984 m.

Distribution. — Great Kei Is. and Malay Archipelago, 934-984 m.

Remarks. — In the genus *Eiconaxius*, there are three species bearing a denticulate median carina on the rostrum: *E. asper* Rathbun, 1906 from Kauai Is., Hawaii, 765-966 m; *E. cristagalli* (Faxon, 1893) from Pacific Panama, 851 m, and the Galapagos Islands, 717 m; and *E. indica* (De Man, 1907) from off the south-east coast of Great Kei Is., 984 m, and the Malay Archipelago, 934-980 m.

De Man (1925: 34) mentioned, in comparison with *E. asper* Rathbun, 1906 from Kauai Is., that the palm of the larger chela was higher in proportion to its length, and its upper border being entire. However, in the present material the (larger) female has the larger cheliped (fig. 5A, B) higher in proportion to the smaller one of the (smaller) male (fig. 5B, C).

Fig. 5. *Eiconaxius indicus* (De Man, 1907). A, female larger cheliped; B, female smaller cheliped; C, larger cheliped in small male; D, smaller cheliped in small male; E, female Plp1 uniramous, biarticulate; distal segment multisegmented, with setae. A, B, E, BLT 18246, female, TL/CL: 23.0/7.5, Sulu Sea, Philippines, 08°07.72'N 118°34.76'E - 08°08.51'N 118°34.44'E, 1012-1015 m depth, R/V "Hakuhou-Maru"; C, D, same, males (13.0/4.7). Scale bar: 1 mm.

***Eiconaxius hakuhou* n. sp.** (figs. 6, 7)

Material examined. — Holotype, female (TL/CL: 15.0/5.4), paratype, male (13.0/4.5, lacking larger cheliped), Sulu Sea, Philippines, 08°22.77'N 118°56.11'E-08°24.31'N 118°55.61' E, 1981-2019 m depth, R/V "Hakuhou-Marui", KH-02-04, St. 9, 24.xi.2002, 18:44-19:51 h, 3 m BTP.

Diagnosis. — Rostrum lanceolate, with lateral margins denticulate, median carina distinctly denticulate.

Description. — Carapace smooth. Rostrum (fig. 6A-C) lanceolate, apex upturned and subacute, reaching distal end of A1 basal article; lateral margin indistinctly dentate (fig. 6C), anteriorly from above eyestalks with four lateral teeth, proximally extending outward onto anterolateral part of carapace. Gastric region with a median, a pair of submedian, and a pair of lateral carinae; median carina anteriorly reaching to tip of rostrum, with 8 indistinct tubercles, and posteriorly branched out into two indistinct carinae; submedian row obscurely developed, and lateral row smoothly prolonged from basal part of rostrum. Cervical groove indistinct.

Abdominal somites smooth, middorsal length of abdominal somite 1 short, those of somites 2-6 subequal. Somite 1 ventrally deflected into a narrow, rounded ventral margin; somite 2 largely deflected posteriorly into subacute posterolateral angle; somites 3-4 evenly convex at posteroventral angles, produced into a rounded ventral angle; somite 5 also convex on posterolateral margin; somite 6 (fig. 7D) rounded on ventral margin, and smooth on posterior margin. Telson (fig. 7D) subsquare, slightly longer than broad, shallowly depressed medially, and much longer than somite 6; lateral margins nearly parallel and denticulate; dorsal surface slightly convex medially, posterior margin with median tooth.

Eyestalks (fig. 6A-C) thick and short, reaching short of half length of rostrum. A1 proximal article overreaching tip of rostrum, articles 2 and 3 short, subequal in length. A2 article 1 short, with ventrodiscal tooth, article 2 distolaterally produced into elongate tooth directing forward. Scaphocerite extending forward beyond distal article of A2 peduncle. Article 4 about half length of article 3 and unarmed. Article 5 twice length of article 4. A2 flagellum about twice length of A1 flagellum.

Mxp3 coxa and basis, respectively, with a sharp distomesial tooth; ischium to dactylus unarmed. Exopod with a proximal segment and a multiarticulate flagellum, overreaching level of distal margin of merus.

P1 unequal. In larger cheliped (fig. 7B), coxa unarmed, basis unarmed, and ischium with a few teeth on ventral margin; merus about 1.5 times as long as broad; ventral margin denticulate on ventral margin and dorsal margin with three low teeth in distal half. Carpus two-thirds length of merus along dorsal margin and broader than long; ventral margin armed subterminally with a low tooth. Chela broad, slightly less than twice as long as broad; palm slightly divergent in height

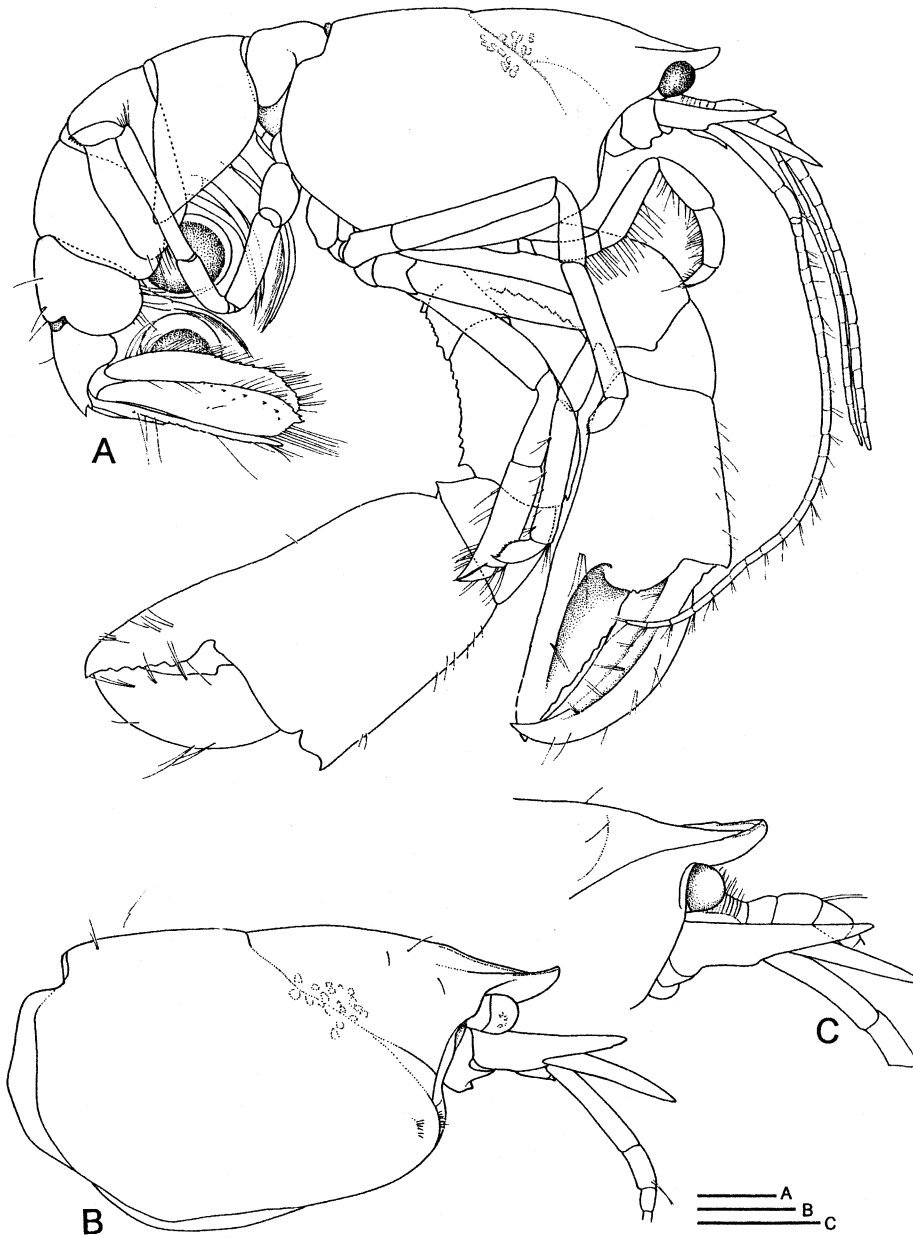


Fig. 6. *Eiconaxius hakuhou* n. sp. A, female whole body, lateral view; B, carapace, lateral view; C, anterior part of carapace. A-C, Holotype, BLT 18249, female, TL/CL: 15.0/5.4, Sulu Sea, Philippines, 08°22.77'N 118°56.11'E - 08°24.31'N 118°55.61'E, 1981-2019 m depth, R/V "Hakuhou-Maru". Scale bar: 1 mm.

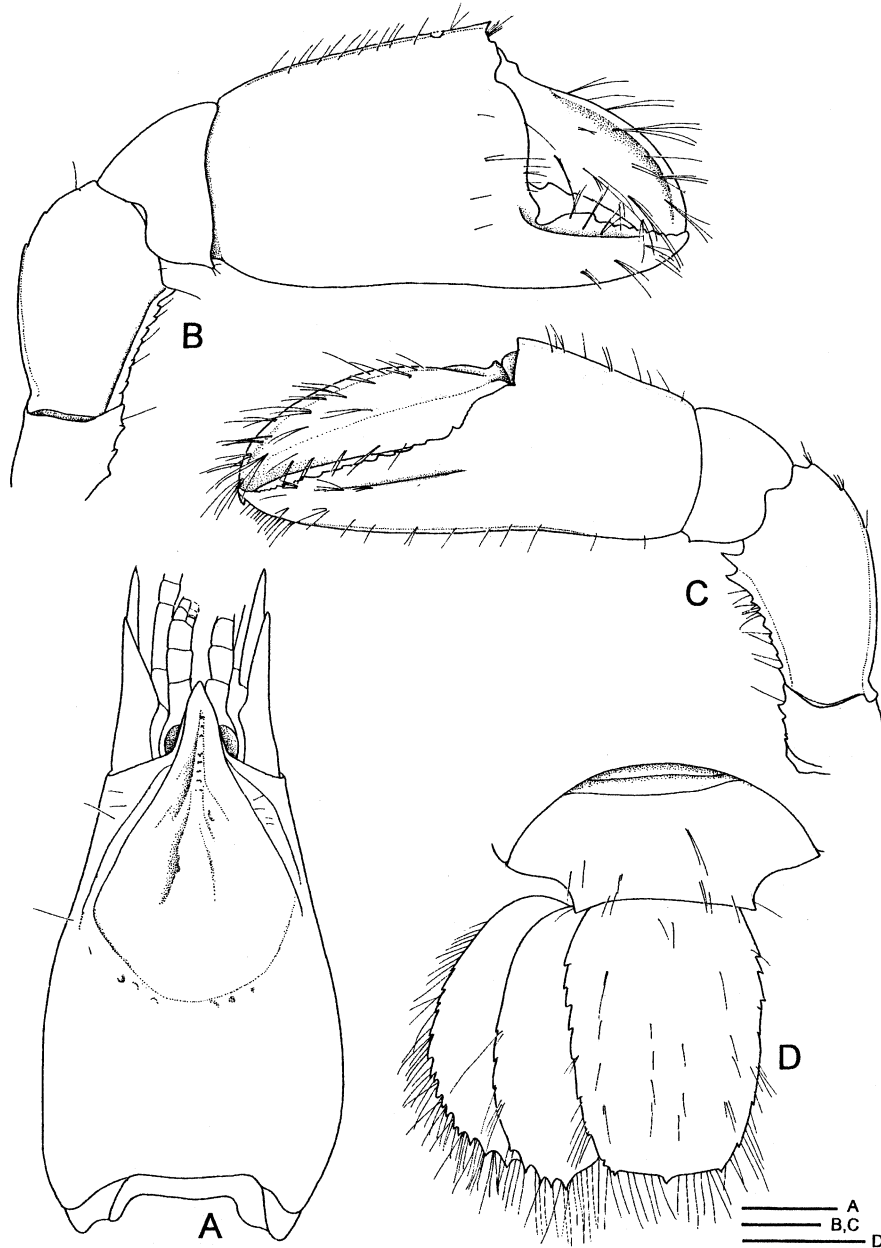


Fig. 7. *Eiconaxius hakuhou* n. sp. A, carapace, dorsal view; B, female larger cheliped; C, female smaller cheliped; D, abdominal somite 6 and left part of tail fan, dorsal view. A-D, Holotype, BLT 18249, female, TL/CL: 15.0/5.4, Sulu Sea, Philippines, 08°22.77'N 118°56.11'E - 08°24.31'N 118°55.61'E, 1981-2019 m depth, R/V "Hakuhou-Maru". Scale bar: 1 mm.

distally, and slightly more than twice length of carpus along dorsal margin; dorsal margin smoothly carinate and furnished with an acute distal tooth; distal margin convex and with an obtuse tooth at ventral angle. Fixed finger concave proximally and roughly denticulate on cutting margin; lateral and mesial surfaces each with a prolonged concavity along cutting margin, respectively. Dactylus carinate along dorsal margin, cutting margin with a low proximal tooth and distal to that smooth. In male smaller cheliped (fig. 7C) coxa unarmed. Basis unarmed and ischium ventrally with a few irregular teeth. Merus 1.8 times as long as broad; ventral margin distally with two distinct teeth and proximal to these roughly denticulate; dorsal margin with two low teeth in distal third. Carpus half length of merus along dorsal margin; ventral margin with a subdistal tooth. Chela 2.3 times as long as wide, divergent in height distally; palm about as long as broad; dorsal margin with a distal triangular tooth; distal margin convex, finely denticulate and with an acute tooth ventrally, declining to cutting margin of fixed finger. Fixed finger half length of palm, denticulate on cutting edge, lateral surface longitudinally carinate a little distance from cutting edge, and with a distinct concavity along cutting edge on mesial surface. Dactylus 1.5 times length of palm, 3.5 times as long as broad, cutting edge largely concave and unarmed.

P2 chelate and unarmed. P3 simple, propodus 1.5 times length of carpus and with a transverse row of spinules on ventral margin; dactylus leaf-like and with a row of spinules on ventrodiscal margin. P4 simple, propodus 1.7 times length of carpus and with a row of transverse spinules along ventral margin; dactylus leaf-like and with a row of spinules on ventrodiscal margin. P5 simple, propodus twice length of carpus, with a tuft of setae on ventrodiscal angle; dactylus leaf-like and with a row of spinules on ventrodiscal margin.

Male Plp1 absent. Female Plp1 uniramous, segmented; distal segment jointed. Plp2-5 slender; endopods with appendix interna. Uropodal exopod (fig. 7D) largely convex and serrated on lateral margins; uropodal endopod serrated on distolateral margin, with a distinct median tooth on distal margin.

Type locality. — Sulu Sea; 1981-2019 m.

Distribution. — Known only from the type locality.

Remarks. — In the Sulu Sea, *E. kermadecensis* (Chilton, 1911), and *E. sibogae* De Man, 1925 have been recorded. This new species is the third from the Sulu Sea, and it is similar to *E. consobrinus* (De Man, 1907) in the chelipeds. In De Man's (1907) species the rostrum reaches to the middle of the second article of A1, the rostral median carina is smooth, and the smaller cheliped bears no proximal tooth on the cutting edge of the fixed finger, whereas in the present new species the rostrum reaches only to the distal margin of the proximal article of A1, the rostral median carina is armed with eight inconspicuous tubercles, and the smaller cheliped bears a triangular proximal tooth on the cutting edge of the fixed finger.

Family CALOCARIDIDAE Ortmann, 1891

Calocaridae Ortmann, 1891: 47, 50; Lagerberg, 1908: 47 (key), 50; Stephensen, 1910: 75, 77, 189; Runnstrøm, 1925: 14.

Calocarididae-Kensley, 1989: 960; Poore, 1994: 98; Kensley, 1996: 158.

Diagnosis. — Hermaphroditic. Linea thalassinica absent. Maxilla 2 scaphognathite bearing spinulose whip. P1-2 chelate. P3-5 dactyli simple. Plp1 biarticulate, with distal segment broadened and flattened, and bearing appendix interna; Plp2 biarticulate, distal segment of endopod enlarged with a boot-shaped appendix masculina with a small protrusion, and with a small appendix interna. Uropodal exopod with a transverse suture.

Type genus. — *Calocaris* Bell, 1846 [not 1853].

Genera included. — *Ambiaxius* Sakai, 1989; *Bouvieraxius* Sakai, 1989; *Calocaris* Bell, 1846; *Calastacus* Faxon, 1893; *Briancaris* n. gen.

Remarks. — *Calocaris* Bell was published in 1846, not in 1853, as was clearly shown by Gordon (1960: 191).

Genus **Ambiaxius** Sakai & De Saint Laurent, 1989

Ambiaxius Sakai & De Saint Laurent, 1989: 54.

Callistocaris, Kensley, 1989: 961 [= *Briancaris* n. gen.].

Not *Ambiaxius* Kensley, 1996: 486 [= *Briancaris* n. gen.].

Definition. — Rostrum styliform, lateral margins extending backward on gastric region. Anterolateral margin of carapace unarmed or armed with a pair of small teeth. Gastric region convex and with five carinae. Cervical groove remarkable. Abdominal pleura with smooth surface and truncate margins. Telson oblong, obliquely marked by a pair of carinae on surface, and without posteromedian spine. Eyestalks rounded, fusing with carapace; cornea unpigmented. A2 scaphocerite prominent; A2 penultimate article long. Pl symmetrical. P3 and P5 coxae with genital pore. All gills poorly developed or devoid of gill-branches. No pleurobranchs. Male Plp1 two-segmented; distal segment lanceolate and with appendix interna. Male Plp2 biramous; distal segment of endopod enlarged with a boot-shaped appendix masculina with a small protrusion, on which is a small appendix interna, that is slightly distant from basal segment. Plp3-5 narrow and with appendix interna. Uropodal exopod with transverse suture.

Remarks. — The genus *Ambiaxius* Sakai & De Saint Laurent, 1989 (October) was established with the type species, *Calocaris alcocki* McArdle, 1900. Two months later Kensley described the genus *Callistocaris* Kensley, 1989 (19 December) with the same type species, *Calocaris alcocki* McArdle, 1900, and including the species: *Calocaris aberrans* Bouvier, 1905 from off St. Lucia, Lesser Antilles, 809 m, *Calocaris alcocki* McArdle, 1900 from the Bay of Bengal, 992 m, and

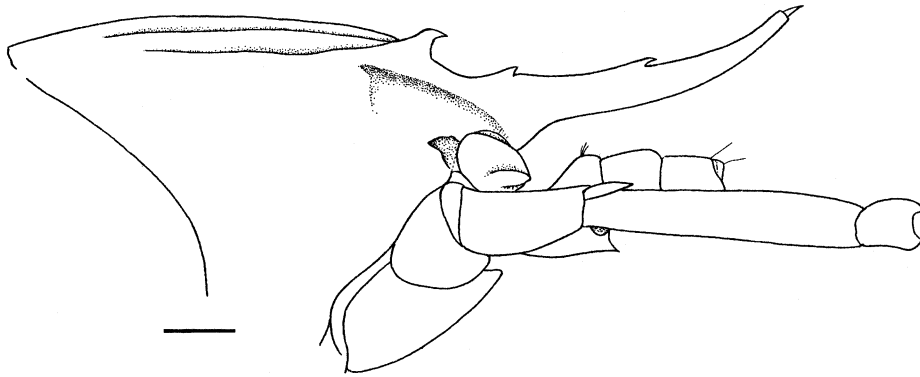


Fig. 8. *Ambiaxius alcocki* (McArdle, 1900). Anterior part of carapace. SAMC-A 1550, broken female, Natal Basin, 30°14'S 31°25'E, 1000 m, 17.v.1977, leg. R/V "Meiring Naude". Scale bar: 1 mm.

Calocaris cf. *alcocki* McArdle, 1900 from SW Indian Ocean, 1000 m. *Callistocaris* Kensley, 1989 is clearly objectively synonymous with *Ambiaxius* Sakai & De Saint Laurent, 1989, because the type species of *Callistocaris* is the same as that of *Ambiaxius*. Nevertheless Kensley (1996: 486) further defined the genus *Ambiaxius*, in which he included *Calocaris aberrans* Bouvier, 1905, *Calocaris alcocki* McArdle, 1900, and *Calocaris* cf. *alcocki* McArdle, 1900, and added his new species *Ambiaxius japonicus* Kensley, 1996 and *A. foveolatus* Kensley, Lin & Yu, 2000. McArdle (1900: 476) described the adult female of *Calocaris alcocki*, the type species of both *Ambiaxius* and *Callistocaris*, as "Rostrum long, narrow, and curved upwards," so Kensley's *Callistocaris* is obviously different from Sakai & De Saint Laurent's *Ambiaxius* in the shape of rostrum and Plp2. In fact Kensley (1989: 962) described nothing about the shape of rostrum and just mentioned about Plp2 "pleopod 2 appendix masculina with indication of fusion of two articles, with double row of spines along mesial margin, and with appendix interna fused basally" and in Kensley's (1989) *Ambiaxius*, he did not exactly compare his *Ambiaxius* with Sakai & De Saint Laurent's (1989) genus, but with "*Calocaris* Bell, 1853". As a result, he did not notice the difference between Sakai & De Saint Laurent's *Ambiaxius* and *Callistocaris*. I propose herewith a new genus *Briancaris* n. gen. for species that Kensley (1989) and Kensley et al. (2000) placed in *Ambiaxius* (see further below).

Type species. — *Calocaris Alcocki* McArdle, 1900.

Species included. — *Ambiaxius alcocki* (McArdle, 1900); *A. franklinae* Sakai, 1994; *A. surugaensis* n. sp.

Ambiaxius surugaensis n. sp. (figs. 9, 10)

Ambiaxius alcocki-Sakai, 1995: 80, figs. 1-5; Takeda, 1997: 250.

Material examined. — Holotype, BLT 18251, hermaphroditic male (TL/CL: 57.0/19.6 including rostrum), W. off Matsuzaki, Suruga Bay, 490-547 m, R/V. "Tansei Maru", KT-89-06, St. SB 27, 3 m 18.v.1989, ORE beam trawl; lectotype, NSMT 11478, hermaphroditic male (44.0/16.0 including rostrum), Suruga Bay, 34°57.1'N 138°43.6'E - 34°57.6'N 138°41.5'E, 26.x.1977, F/V "Seishin Maru" at Heta, Shizuoka Pref.

Description. — Rostrum (fig. 9A-C) styliform, curved upward, with two pairs of proximal teeth, distal one small, proximal one distinctly triangular, lateral margins extending backward to middle of gastric region; anterolateral margins with a pair of denticles. Gastric region concave dorsally and grooved with five longitudinal carinae, a pair of lateral carinae extending backward to middle of gastric region, anteriorly demarcated from posterior part of rostrum, median carina conspicuous with a median pit, posteriorly reaching cervical groove, and a pair of obscure intermediate carinae, extending backward to posterior three-fourths of gastric region. Cardiac region faintly developed, with broad median dorsal carina extending from cervical groove backward to posterior region, slightly distant from posterior margin of carapace. Abdominal pleura with smooth surface and truncate margins.

Eyestalks (fig. 9B-D) rounded, fusing with carapace; cornea unpigmented. A1 proximal article with a minute spine on lateral margin (fig. 9C), peduncle reaching to proximal one-third of A2 penultimate article. A2 scaphocerite slender and prominent; penultimate article more than four times as long as terminal article. Mxp3 (fig. 10A) with exopod; endopod pediform, coxa and basis each with a distomesial tooth; ischium unarmed on margins, crista dentata present on mesial surface; merus with subdistal tooth on mesial margin.

Cheliped on left side missing. Cheliped on right side slender (fig. 10B); ischium with subterminal tooth on mesial margin. Merus elongate, about five times as long as broad; lateral margin with subterminal tooth. Carpus two-fifths length of merus. Chela three times as long as carpus; palm twice as long as broad, with a triangular distal tooth on dorsal margin; fixed finger slightly longer than palm, cutting edges of fixed finger and dactylus minutely denticulate. P2 chelate. P3 overreaching P2 by half of propodus. P4 reaching distal end of P3. P5 extending to proximal part of P4 propodus. P3 and P5 coxae with genital pore. All gills (fig. 10C) with poorly developed gill branches. No pleurobranchs.

Branchial formula as in table I.

Plp1 (fig. 10D, E) two-segmented; distal segment lanceolate. Plp2 (fig. 10F) biramous, endopod biarticulate, distal segment developed as a boot-shaped appendix masculina bearing a row of spinules, and basally with a small appendix

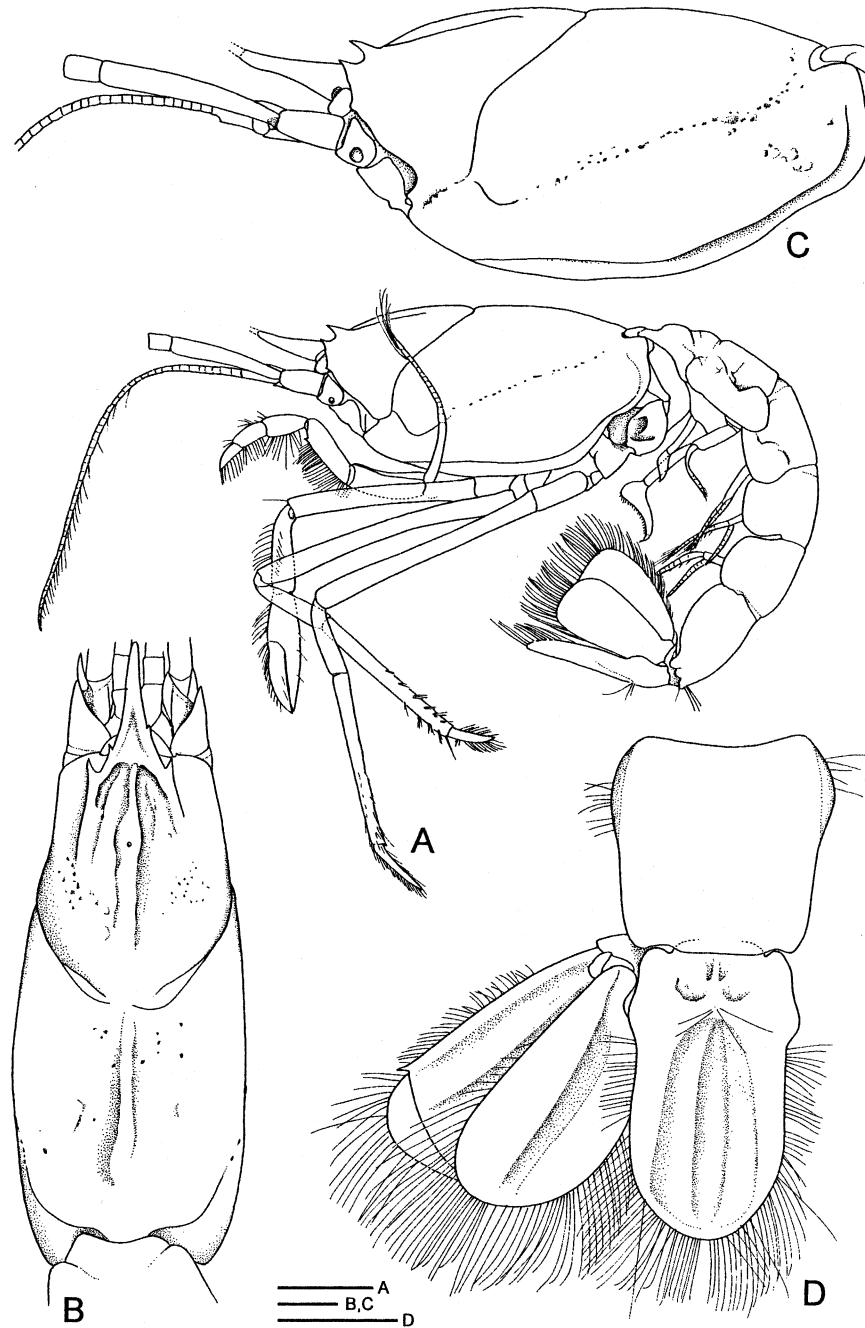


Fig. 9. *Ambiaxius surugaensis* n. sp. A, whole body, lateral view; B, carapace, dorsal view; C, carapace lateral view; D, abdominal somite 6 and left half of tail fan. A-D, Holotype, BLT 18251, hermaphroditic male, TL/CL: 57.0/19.6, including rostrum, W. off Matsuzaki, Suruga Bay, 490-547 m, R/V "Tansei Maru", 18.v.1989. Scale bars: A, 5 mm; B, C, 2 mm; D, 3 mm.

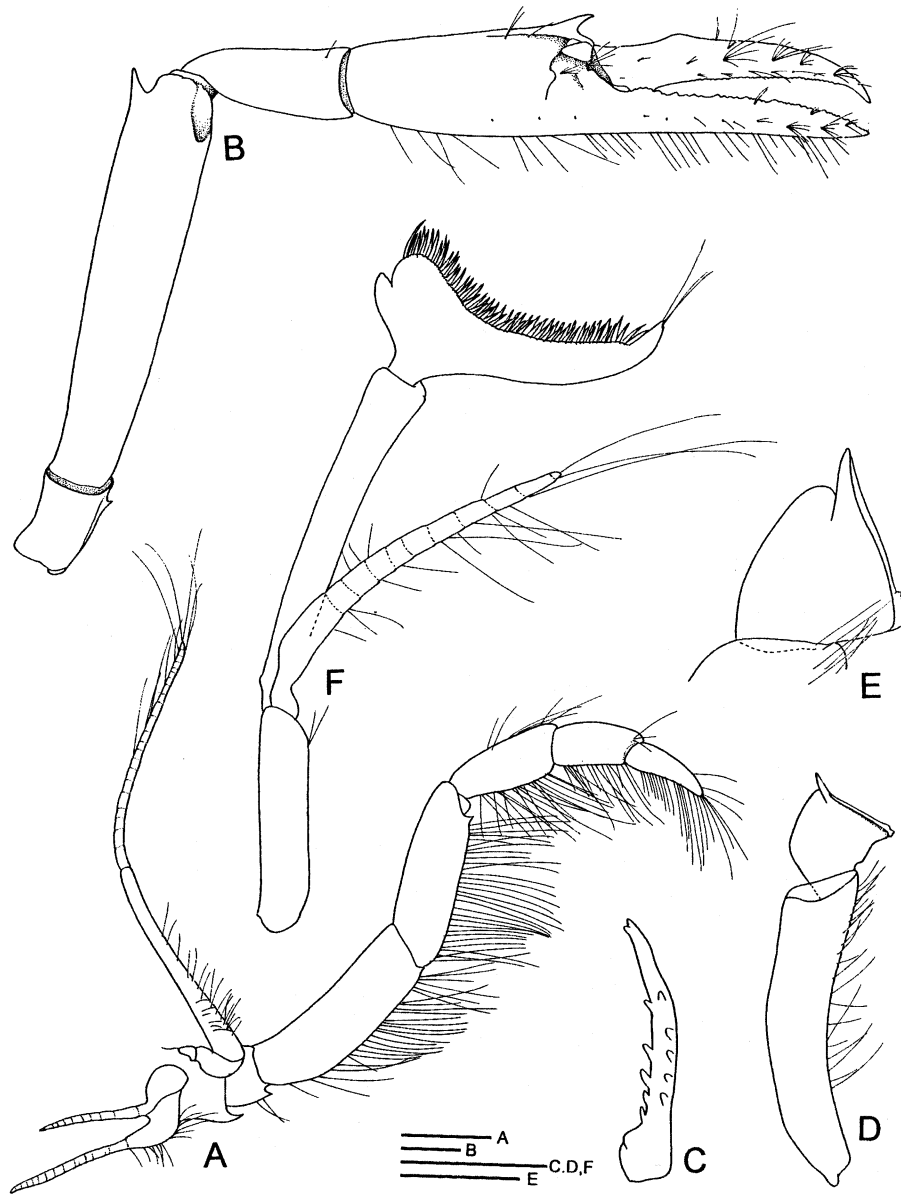


Fig. 10. *Ambiaxius surugaensis* n. sp. A, Mxp3, lateral view; B, smaller cheliped, lateral view; C, arthrobranch on P1; D, male Plp 1; E, distal segment of male Plp1; F, male Plp2. A-E, Holotype, BLT 18251, hermaphroditic male, TL/CL: 57.0/19.6 including rostrum, W. off Matsuzaki, Suruga Bay, 490-547 m, R/V "Tansei Maru", 18.v.1989. Scale bars: A, 3 mm; B, 2 mm; C, D, F, 2 mm; E, 1 mm.

TABLE I
The gill formula of *Ambiaxius surugaensis* n. sp.

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Pleurobranchs	—	—	—	—	—	—	—	—
Arthrobranchs			2	2	2	2	2	—
Podobranchs	1	1	1	—	—	—	—	—
Epipods	—	1	1	1	1	1	1	—

interna on mesial protrusion; exopod consisting of proximal segment and multi-articulate segments. Plp3-5 narrow, all endopods with appendix interna. Telson oblong, obliquely marked by a pair of carinae on surface, and without posteromedian spine. Uropodal endopod with a median furrow; exopod with a distal spine on lateral margin; transverse suture distinct.

Remarks. — This hermaphroditic specimen misses the cheliped on the left side. This species is closely similar to *Ambiaxius alcocki* (McArdle, 1900) from Cape Natal (SAM-A 15887), and *A. franklinae* Sakai, 1994 from the Coral Sea, east side of Australia. However, the new species is also clearly different, because the present specimen from Suruga Bay has all gills with poorly developed gill branches (fig.10C), and the rostrum reaches to the middle of the penultimate article of A2, while in *A. alcocki* (fig. 8) from Cape Natal, and *A. franklinae* from the Coral Sea, the branchial gills are foliaceous, and the rostrum is conspicuously uncurved and overreaching the A2 peduncle.

Briancariss n. gen.

Callistocaris Kensley, 1989: 961.

Ambiaxius — Kensley, 1996: 486.

Diagnosis. — Rostrum short and triangular, with a denticulate lateral margin. Male Plp2 biramous; the distal segment of the endopod enlarged with a boot-shaped appendix masculina with a small protrusion bearing a small appendix interna, which is attached closely to the proximal segment basally.

Remarks. — As mentioned in the remarks on the genus *Ambiaxius* (above), this new genus, *Briancariss* is named for the species, *Calocaris aberrans* Bouvier, 1905, *Ambiaxius japonicus* Kensley, 1996, and *Ambiaxius foveolatus* Kensley, Lin & Yu, 2000, because those species are characteristic in that the rostrum is triangular with a denticulate lateral margin, and the Plp2 is biramous; and the distal segment of the endopod enlarged with a boot-shaped appendix masculina with a small protrusion bearing a small appendix interna, which is attached closely to the proximal segment basally. Whereas in *Ambiaxius* Sakai & De

Saint Laurent, 1989, the rostrum is styliform, almost unarmed laterally, and Plp2 is biramous, the distal segment of the endopod enlarged with a boot-shaped appendix masculina with a small protrusion on which is a small appendix interna, which is slightly distant from the proximal segment basally. The type species of *Briancaris* n. gen. is designated as *Ambiaxius japonicus* Kensley, 1996, because *Calocaris aberrans* Bouvier, 1905 was described on a female. Therefore, *Ambiaxius japonicus* Kensley, 1996, *A. foveolatus* Kensley, Lin & Yu, 2000, and *Calocaris aberrans* Bouvier, 1905 are included in the genus *Briancaris* n. gen.

Type species. — *Briancaris japonica* (Kensley, 1996).

Species included. — *Calocaris aberrans* Bouvier, 1905; *Ambiaxius japonicus* Kensley, 1996; *Ambiaxius foveolatus* Kensley, Lin & Yu, 2000.

Etymology. — The genus is named for the late Dr. Brian Kensley, National Museum of Natural History, Smithsonian Institution, Washington, D.C., in recognition of his efforts to document this genus. The gender of the generic name is feminine.

Family AXIIDAE Huxley, 1879

Diagnosis. — Rostrum conspicuous, concave on dorsal surface. No linea thalassinica present. Cervical groove distinct. Scaphocerite strong. P3-5 dactyli simple. Male Plp1 present, male Plp2-5 narrow, biramous; Plp2 with appendix interna and appendix masculina, Plp3-5 all with appendix interna. Female Plp1 uniramous, Plp2-5 narrow, biramous, and all with appendix interna.

Genera included. — *Acanthaxius* Sakai, 1989; *Allaxius* Sakai, 1989; *Anophthalmaxius* De Man, 1905; *Axiopsis* Borradaile, 1903; *Axiorygma* Kensley & Simons, 1988; *Axius* Leach, 1815; *Calaxiopsis* Sakai, 1989; *Calaxius* Sakai, 1989; *Calocarides* Wollebaek, 1908; *Dorphinaxius* Sakai, 1989; *Eutrichocheles* Wood Mason, 1875; *Mamaxois* Kensley, 2003; *Oxyrhynchaxius* Paris, 1917; *Parascytoleptus* Sakai, 1989; *Paraxius* Bate, 1888; *Scytoleptus* Gerstäcker, 1856; *Spongiaxius* Sakai & De Saint Laurent, 1989.

Genus *Spongiaxius* Sakai & De Saint Laurent, 1989

Spongiaxius Sakai & De Saint Laurent, 1989: 41; Poore, 1994: 97 (key).

Sakaiocaris Kensley, 1989: 964.

Definition. — Rostrum prominent, furrowed on surface; margins armed with a row of erect spines, extending onto gastric region. Anterolateral margin of carapace unarmed. Gastric region convex and with serrated median, submedian, and lateral carinae. Cervical groove noticeable except its anterolateral part. Abdominal pleura almost smooth on surface and acute on margins. Telson oblong and with posteromedian spine. Eyestalks subglobose; cornea pigmented. Antennal acicle prominent, of comma-shape. P1 unequal in shape, not in size; chela with flattened ventral surface. P2 chela strongly pubescent on the outside. P3 propodus with

transverse rows of spines. P5 subchelate. P3-4 coxae with knobs. Both P3 and P5 coxae with genital pore. Pleurobranchs on P2-4.

Male Plp1 uniramous, biarticulate; distal segment spatulate. Female Plp1 uniramous, consisting of proximal segment and multiarticulate flagellum. Male Plp2 with appendix masculina and appendix interna. Male and female Plp3-5 with appendix interna. Uropodal exopod with short transverse suture or not. Usually living in sponges.

Type species. — *Axiopsis brucei* Sakai, 1986, by original designation.

Species included. — *Songiarius odontorhynchus* (De Man, 1905); *Songiarius novaezealandiae* (Borradaile, 1916); *Songiarius brucei* (Sakai, 1986).

***Songiarius brucei* (Sakai, 1986) (fig. 11)**

Axiopsis brucei Sakai, 1986: 12, figs. 1-6.

Songiarius brucei - Sakai & De Saint Laurent, 1989: 44; Sakai, 1994: 200 (key).

Material examined. — One male (TL/CL: 61.0/21.0), Sulu Sea, Philippines, 08°06.36'N 118°26.49'E - 08°07.04'N 118°26.06'E, 688-693 m depth, R/V "Hakuhou-Maru", KH-02-04,



Fig. 11. *Songiarius brucei* (Sakai, 1986), male (TL/CL: 61.0/21.0), Sulu Sea, Philippines, 08°06.36'N 118°26.49'E - 08°07.04'N 118°26.06'E, 688-693 m depth, R/V "Hakuhou-Maru", KH-02-04, St. 7-B, 23.xi.2002, 22:44-21:18 h, 3 m BTP. (Photo S. Ohta.)

St. 7-B, 23.xi.2002, 22:44-21:18 h, 3 m BTP. One ovig. female (56.0/18.8), Sulu Sea, Philippines, 08°05.97'N 118°20.78'E - 08°06.70'N 118°20.43'E, 514-516 m depth, R/V "Hakuhou-Maru", KH-02-04, St. 7-A, 23.xi.2002, 18:28-19:01 h, 3 m BTP.

Type locality. — North-west shelf, Western Australia, 18°43.7'S 117°02.2'E, R/V "Soela", stn NWS-43, trawl, 454 m.

Distribution. — Australia, north-west shelf, W.A. (Sakai, 1986; Sakai & De Saint Laurent, 1989); 296-456 m.

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