

Rare Crabs (Crustacea, Decapoda, Brachyura) from Okinawa Island, with Description of a New Species of the Family Leucosiidae

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Abstract A small collection of brachyuran crabs made by night SCUBA at Okinawa Island, the Ryukyu Islands, is examined. A new species of leucosiid crab, *Heteronucia fujitai*, is described and illustrated based on single female specimen. *Heteronucia fujitai* is similar to *H. laminata*, but can be distinguished from *H. laminata* by the broader carapace, the fourth ambulatory leg being without laminar margin, and the concealed first segment of the female abdomen. All the species examined are listed, and some rare species of the families Aethridae, Leucosiidae, and Parthenopiidae are noted with supplementary descriptions and remarks.

Key words : Crustacea, Decapoda, Brachyura, Okinawa, Ryukyu Islands, *Heteronucia fujitai*, new species.

Introduction

Okinawa Island in the Ryukyu Islands is located in the southwestern most part of Japan. It is strongly influenced by the main stream of the warm Kuroshio Current and is known to have very rich fauna. Numerous surveys had already been carried out around this island, however, the fauna still remains to be completely elucidated.

A small collection of brachyuran crabs made by night SCUBA at the littoral area of Okinawa Island was provided us by Dr. Yoshihisa Fujita of the University of the Ryukyus. Since most of crabs inhabiting shallow water are more active in the night than in the daytime, night SCUBA is a useful method for collecting shallow-water crabs.

Measurements, given in millimeters (mm), are of the greatest carapace length (cl) (including the posterior lobe and excluding the rostral spine) and breadth (cb), respectively. All the specimens examined are deposited in the National Museum of Nature and Science (NSMT).

Taxonomy

Family Dromiidae

Lewindromia unidentata (Rüppell, 1830)

[Japanese name: Kinuge-kamuri]

(Fig. 1A)

Material examined. Cape Maeda, Onna, Okinawa I., 7.8 m deep; 1 ♂ (cl 21.4×cb 19.7), NSMT-Cr 20822; 16 August 1998.

Distribution. Widely distributed in Indo-Pacific (McLay, 1993).

Family Homolidae

Latreillopsis laciniata Sakai, 1936

[Japanese name: Edatoge-mizuhiki-gani]

(Fig. 1B)

Material examined. Cape Maeda, Onna, Okinawa I., 12.7 m deep; 1 ♀ (cl 11.6 in median line×cb 8.3 between branchial regions of both sides), NSMT-Cr 20823; 5 May 1998.

Distribution. Known only from Japan (Guinot

and Richer de Forges, 1995).

Family Calappidae

Calappa gallus (Herbst, 1803)

[Japanese name: Kobu-karappa]

(Fig. 1C)

Material examined. Cape Maeda, Onna, Okinawa I., 8 m deep; 1 ♀ (cl 19.4×cb 24.1), NSMT-Cr 20824; 14 May 1998.

Distribution. Widely distributed in Indo-West Pacific (Galil, 1997).

Family Leucosiidae

Heteronucia fujitai sp. nov.

[New Japanese name: Manju-ibo-tsubu-kobushi]

(Figs. 1D, 2–3, 4A–B)

Nucia sp.: Minemizu, 2000, p. 201 (color photograph).

Material examined. Mizugama, Kadena, Okinawa I., 6 m deep; 1 ovig. ♀ (cl 11.5×cb 12.9), holotype, NSMT-Cr 20825; 7 Aug. 1998.

Description of holotype. Carapace (Fig. 1D, 4A) subglobular, 1.1 times broader than long; dorsal surface evenly covered with small rounded granules, sparsely studded with small, subconical tubercles and very short, plumose setae; regions ill-defined, with very shallow, H-shaped groove between cardiac and intestinal regions. Frontal region weakly produced, concave medially. Pterygostomian margin weakly convex outwards. Branchial margin roundly convex, with 2 small, triangular tubercles on posterior half, tubercles weakly hooked and covered with cluster of granules. Posterior margin with 2 small, triangular tubercles on both sides, tubercles covered with cluster of granules.

Ocular peduncle (Fig. 2A) very short. Orbit with 2 short, straight fissures on dorsal roof, with V-shaped notch on infraorbital margin; orbital hiatus open. Antennule obliquely folded into fossa; basal segment occupying ventral 0.4 of fossa, covered with very short setae. Antenna: basal segment transversely ovate; second segment subsquamate, constricted anteriorly. Affer-

ent channel without tooth on mesial margin; anterior margin with V-shaped notch on lateral corner.

Mandible (Fig. 3A–B) well calcified; cutting edge triangular in outline, pointed medially; endopod palp 3-segmented, first segment very short, densely fringed with stout setae on terminal segment. Maxillule (Fig. 3C): coxal endite rod-like, directed mesially, fringed with short setae, terminal setae stout; basial endite triangular, fringed with stout and thin setae on mesial margin, with 1 plumose seta on lateral margin; endopod stilliform, with some plumose setae on proximal part of lateral margin. Maxilla (Fig. 3D): coxal endite roundly bilobed; basial endite elongate triangular, with some terminal setae; endopod tongue-shaped, with 1 seta on apex; exopod (scaphognathite) longitudinally expanded into oval structure, entirely fringed with short, plumose setae. First maxilliped (Fig. 3E): coxal endite rounded, with dense, weakly plumose setae; basial endite subtriangular, densely fringed with moderately long, plumose setae along mesial margin; endopod longitudinally expanded, rounded at apex, fitting in efferent channel, fringed with very short setae on apex; exopod longitudinally filiform, with some plumose setae on apex, bearing flagellum with some terminal setae. Second maxilliped (Fig. 3F): ischium and merus fringed with long plumose setae along mesial margin; propodus with dense setae along lateral margin and on disto-lateral part; dactylus armed with stout setae around tip; exopod tapering distally, with some plumose setae on apex, bearing flagellum with some terminal setae; exodite rounded.

Third maxilliped (Fig. 3G–H) covered with round granules of various sizes; basis fused with ischium but with suture on both surfaces; ischium subsquamate; merus moderately bent dorsally in situ, about 0.76 times as long as ischium along mesial margin; propodus and dactylus with distally denticulate, stout setae along inner margin; exopod subsquamate, rounded at tip, fringed with short plumose setae along lateral margin; internal exopodal ridge prominent, with dense setae along

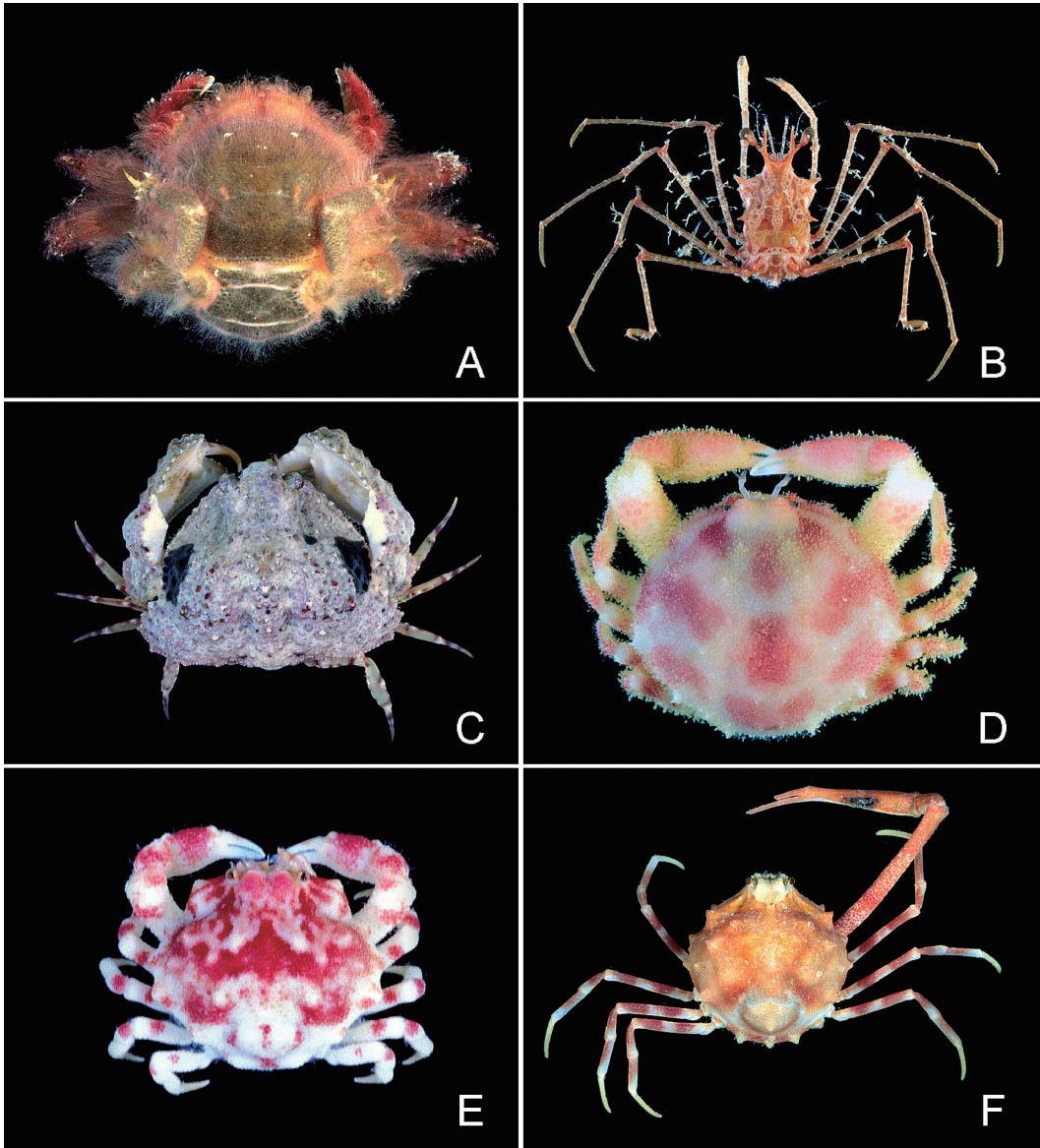


Fig. 1. A, *Lewindromia unidentata* (Rüppell, 1830), male (cl 21.4×cb 19.7), NSMT-Cr 20822; B, *Latreillopsis laciniata* Sakai, 1936, female (cl 11.6×cb 8.3), NSMT-Cr 20823; C, *Calappa gallus* (Herbst, 1803), female (cl 19.4×cb 24.1), NSMT-Cr 20824; D, *Heteronucia fujitai* sp. nov., holotype ovig. female (cl 11.5×cb 12.9 mm), NSMT-Cr 20825; E, *Nucia speciosa* Dana, 1852, female (cl 12.2×cb 13.7), NSMT-Cr 20826; F, *Rayllilia uenoi* (Takeda, 1995), female (cl 12.0×cb 13.1), NSMT-Cr 20827. (Photo: Y. Fujita)

ridge; epipod reduced, translucent on distal half; podobranch absent.

Cheliped (Fig. 2B) moderate, 1.3 times as long as carapace, sparsely furnished with very short, plumose setae; coxal condyle subcircular; merus

and carpus subcylindrical, covered with large, pearly granules; palm convex dorsally, slightly constricted distally, covered with pearly granules, granules smaller than those of merus and carpus; fingers weak, about 0.8 times as long as palm,

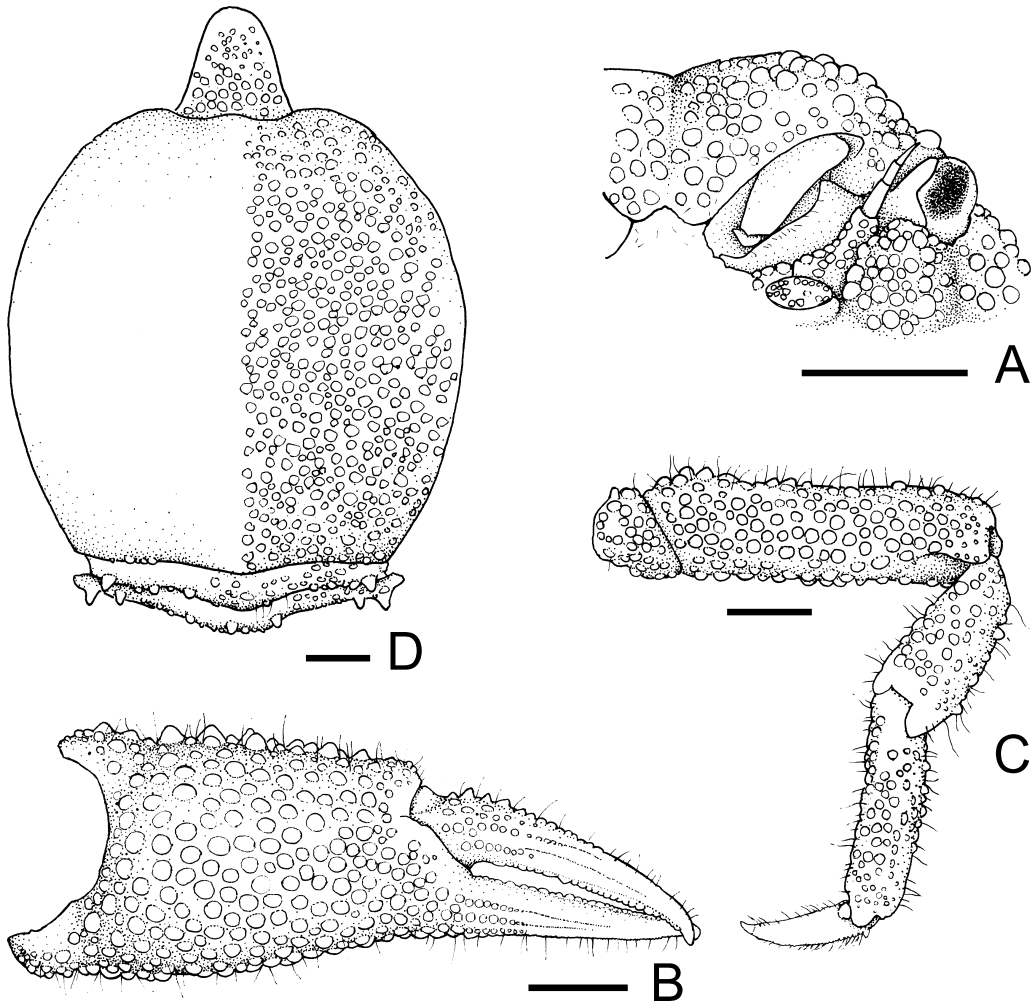


Fig. 2. *Heteronucia fujitai* sp. nov., holotype ovig. female (cl 11.5×cb 12.9), NSMT-Cr 20825. A, frontal region, ventral view; B, left chela, dorsal view; C, right first ambulatory leg, posterior view; D, abdomen, ventral view. Scales: 1 mm.

with gap between cutting edges along proximal 0.8 when closed, with thin, fine teeth along both cutting edges, teeth continuous in distal 0.7.

Ambulatory legs (Fig. 2C) moderate length, similar in shape, gradually decreasing in length from first to fourth, covered with small, rounded granules except dactyli, sparsely furnished with short plumose setae; coxal condyles rounded; meri and carpi subcylindrical; propodi weakly compressed; dactyli subconical, with smooth dactylo-propodal locks on proximal ends of dorsal surfaces, covered with inconspicuous, micro-

scopic granules.

Thoracic sternites covered with rounded granules of various sizes; first to fourth sternites fused; fourth to eighth sternites with medially interrupted sutures between sternites; abdominal cavity reaching to buccal cavity.

Abdomen (Fig. 2D) covered with rounded granules of various sizes; first segment completely concealed beneath carapace; second and third segments short, transversely subrectangular; main fused section composed of fourth to sixth segments, ovate, moderately convex ventrally;

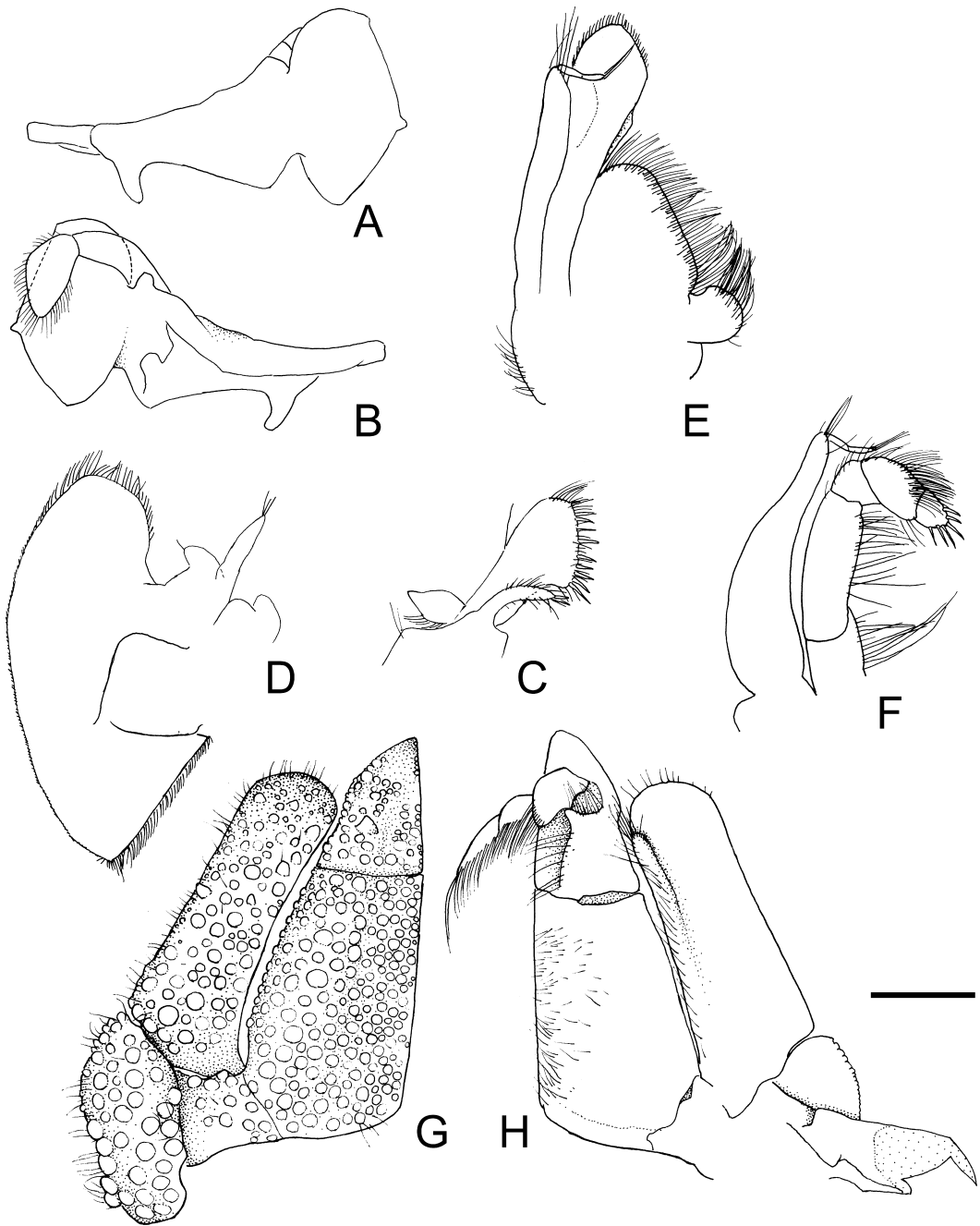


Fig. 3. Right mouth parts of *Heteronucia fujitai* sp. nov., holotype ovig. female (cl 11.5×cb 12.9), NSMT-Cr 20825. A, mandible, external view; B, same, internal view; C, maxillule, external view; D, maxilla, external view; E, first maxilliped, external view; F, second maxilliped, external view; G, third maxilliped, external view; H, same, internal view. Scale: 1 mm.

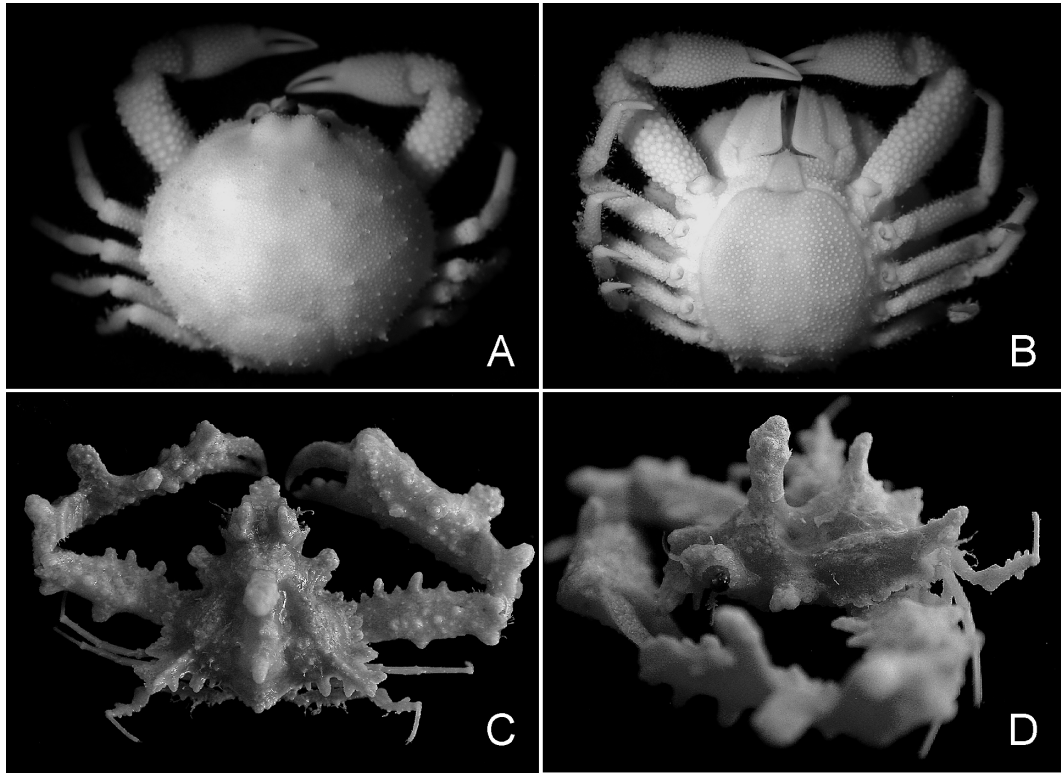


Fig. 4. A–B, *Heteronucia fujitai* sp. nov., holotype ovig. female (cl 11.5×cb 12.9), NSMT-Cr 20825; C–D, *Pseudolambrus longispinosus* (Flipse, 1930), female (cl 16.9×cb 18.2), NSMT-Cr 20833.

telson tongue-shaped, fringed with very short setae.

Color. Dorsal surfaces of carapace, chelipeds and ambulatory legs cream, symmetrically speckled with red punctae.

Etymology. This species was named after Dr. Yoshihisa Fujita of the University of the Ryukyus who kindly provided us the specimens for study.

Remarks. *Heteronucia fujitai* sp. nov. is similar to *H. laminata* (Doflein, 1904) in the globular carapace with only divided intestinal region, but can be distinguished from *H. laminata* by that (1) the carapace is broader than long (vs. longer than broad in *H. laminata*); (2) the ambulatory legs have no laminar margin (vs. the merus, carpus and propodus of the fourth ambulatory leg have laminar inner margins in *H. laminata*); (3) the first segment of the female abdomen is completely concealed beneath the carapace (vs. appeared

to be very short in *H. laminata*). This species is also photographed as *Nucia* sp. by Minemizu (2000) from Miyako Island, the Ryukyu Islands, at the depth of 6 m. Although the specimen was not collected, the photograph clearly shows that his species belongs to the present new species.

Distribution. Known only from Okinawa Island and Miyako Island, the Ryukyu Islands, occurring at depth of 6 m.

Nucia speciosa Dana, 1852

[Japanese name: Ibo-tsubu-kobushi]

(Fig. 1E)

Material examined. Cape Maeda, Onna, Okinawa I., 2 m deep; 1 ♀ (cl 12.2×cb 13.7), NSMT-Cr 20826; 19 May 1998.

Distribution. Whole Indo-West Pacific (Chen and Sun 2002).

Raylilia uenoi (Takeda, 1995)

[Japanese name: Ueno-kobushi]

(Fig. 1F)

Arcania uenoi Takeda, 1995, p. 151, figs. 1–2.*Raylilia uenoi*: Galil, 2001, p. 73, figs. 7–8.

Material examined. Cape Maeda, Onna, Okinawa I., 8 m deep; 1 ♀ (cl 12.0×cb 13.1), NSMT-Cr 20827; 4 August 2004.

Remarks. The specimen at hand is a female of good size and generally agrees well with the previous descriptions except for the mesobranchial tubercle shorter than the male specimens. This species was originally referred to the genus *Arcania*, and later included in the genus *Raylilia* newly established by Galil (2001) together with *Arcania gracilipes* Bell, *Randallia mirabilis* Zarenkov and *Raylilia coniculifera* Galil. According to Galil (2001), *Raylilia* is distinguished from *Arcania* by having the basal antennular segment entirely sealing the antennular fossa, the anterior margin of the efferent branchial channel medially fissured and separated from the orbital margin by a deep groove, the posterior margin of the carapace tridenticulate, the third to sixth segments of the male abdomen fused and bearing a preapical tubercle, and the first male pleopod distally expanded lamellate.

This species differs from the congeners most remarkably in having a strong mesobranchial tubercle directed obliquely backward and longer than the intestinal tubercle. The first male pleopod is characteristic in having the widened petal-shaped tip evenly denticulate along the margin.

Distribution. This species was originally reported from Ie-jima Island in the Ryukyu Islands, 35 m deep, and later from the Sulu Archipelago, Java, Chesterfield Island, New Caledonia and Madagascar, 30–65 m deep.

Urnalana insularis (Takeda and Kurata, 1976)

[Japanese name: Ogasawara-kobushi]

(Fig. 5A)

Leucosia insularis Takeda and Kurata 1976, p. 21, figs. 1, 3a, pl. 1 fig. 1; Ovaere, 1987, p. 185.

Urnalana insularis: Galil, 2005, p. 24, figs. 2D, 7A.

Material examined. Mizugama, Kadena, Okinawa I., 3 m deep; 1 young ♀ (cl 7.7×cb 8.0), NSMT-Cr 20828; 9 October 1996.

Remarks. Galil (2005) transferred this species to the new genus *Urnalana* and compared with the closely related *U. elata* (A. Milne Edwards) to which *Leucosia sagamiensis* Sakai and *L. bikiniensis* Sakai were synonymized. The specimen examined is a young female, so that it is impossible to compare the first male pleopod, but the contour of the carapace is seemingly different, with the longer posterolateral margin of the carapace in *U. elata*. Another congener, *U. elatula* Galil is also close to this species in the general shape of the carapace, but mentioned that the anterolateral margin of the carapace is angled and the third maxilliped coxa in female has a conical tubercle. In the present female the anterolateral margin of the carapace is not always nearly oblique, but also more or less angled, but the third maxilliped coxa is quite smooth.

Distribution. Japan, Mariana Is., Fiji, New Caledonia, Loyalty Is., Chesterfield Is., 1–200 m deep (Galil, 2005).

Urnalana purarensis (Ovaere, 1987)

[Japanese name: Kume-jima-kobushi]

(Fig. 5B)

Leucosia purarensis Ovaere, 1987, p. 192, figs. 2b, 6a; Marumura and Kosaka, 2003, p. 29, fig. 13.

Urnalana purarensis: Galil, 2005, p. 30, figs. 3B, 8B.

Material examined. Cape Maeda, Onna, Okinawa I., 3 m deep; 1 ♂ (cl 7.3×cb 7.6), NSMT-Cr 20829; 4 May 1998.

Remarks. This is the second record of this species from Japanese waters. Marumura and Kosaka (2003) listed this species from Kume Island, Kerama Group, the Rhyukyu Islands, 15–20 m deep, with a color photograph. The female specimen was examined by the junior author at the Wakayama Prefectural Museum of Natural History. These specimens agree well with the original description (Ovaere, 1987) and the sub-

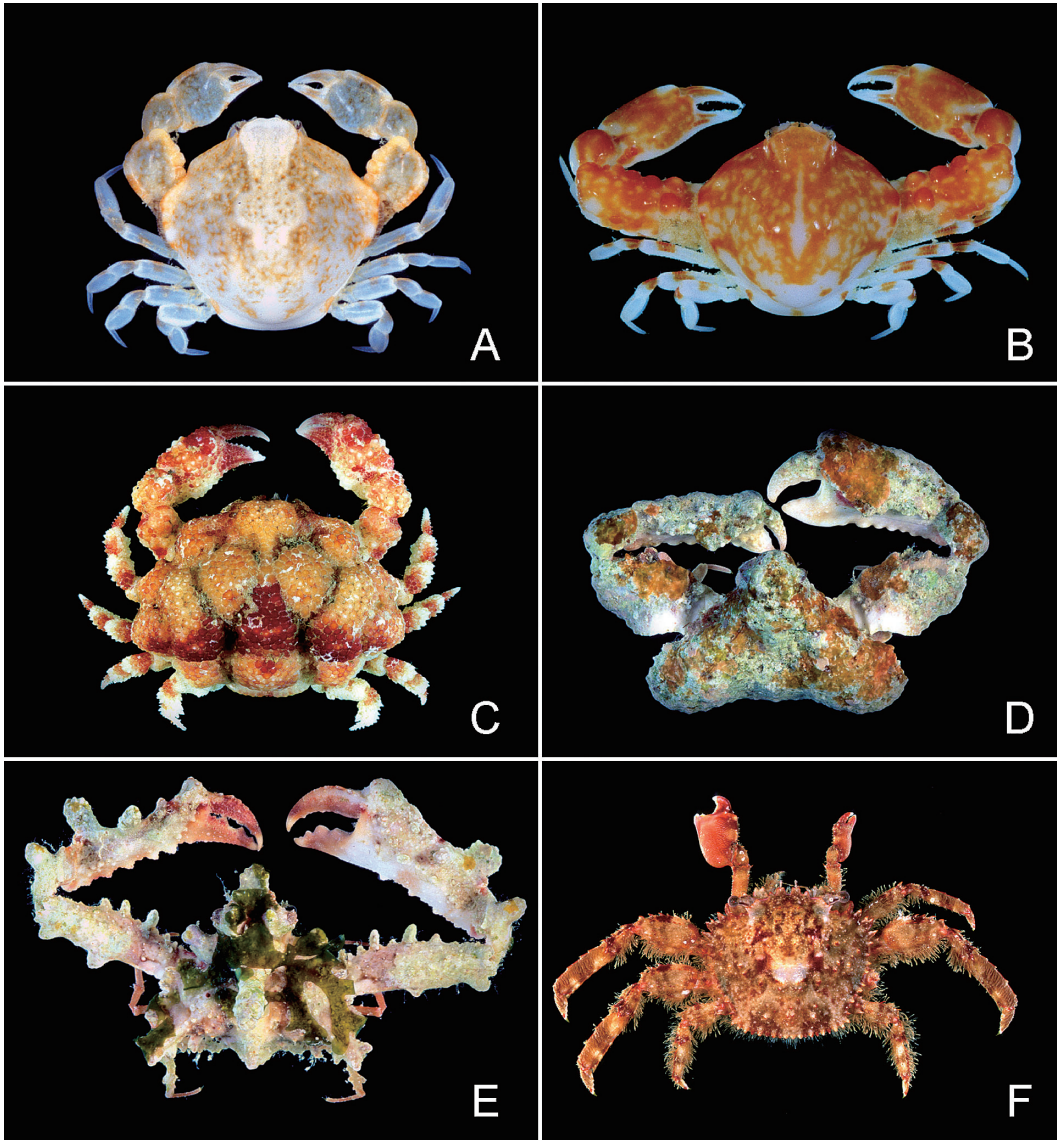


Fig. 5. A, *Urnalana insularis* (Takeda and Kurata, 1976), young female (cl 7.7×cb 8.0), NSMT-Cr 20828; B, *Urnalana purarensis* (Ovaere, 1987), male (cl 7.3×cb 7.6), NSMT-Cr 20829; C, *Drachiella caelata* Takeda and Tachikawa, 1995, female (cl 14.9×cb 20.0), NSMT-Cr 20830; D, *Furtipodia petrosa* (Klunzinger, 1906), male (cl 15.9×cb 23.9), NSMT-Cr 20831; E, *Pseudolambrus longispinosus* (Flipse, 1930), female (cl 16.9×cb 18.2), NSMT-Cr 20833; F, *Crossotonotus spinipes* (De Man, 1888), female (cl 32.3×cb 37.3), NSMT-Cr 20834. (Photo: Y. Fujita)

sequent description by Galil (2005).

Distribution. Japan, Taiwan, Papua New Guinea (type locality), Guam, Tahiti, Tuamotu Archipelago, occurring at the depths of 0–12 m (Galil, 2005; present study).

Family Aethridae

Drachiella caelata Takeda and Tachikawa, 1995

[Japanese name: Ukibori-mizo-kobushi]

(Figs. 5C, 6)

Drachiella caelata Takeda and Tachikawa, 1995, p. 212,

fig. 1.

Material examined. Mizugama, Kadena, Okinawa I., 8.2 m deep; 1♀ (cl 14.9×cb 20.0), NSMT-Cr 20830; 7 August 1998.

Supplementary description. Mandible well calcified; cutting edge triangular in outline, pointed medially; endopod palp 3-segmented, first segment very short, fringed with short setae on ter-

minal segment. Maxillule: coxal endite rod-like, directed mesially, densely fringed with stout and thin setae on lateral margin; basal endite triangular, fringed with stout and thin setae on mesial margin, with some weakly plumose setae on lateral margin; endopod stilliform, unsegmented, with some plumose setae on proximal part of lateral margin. Maxilla: coxal endite roundly

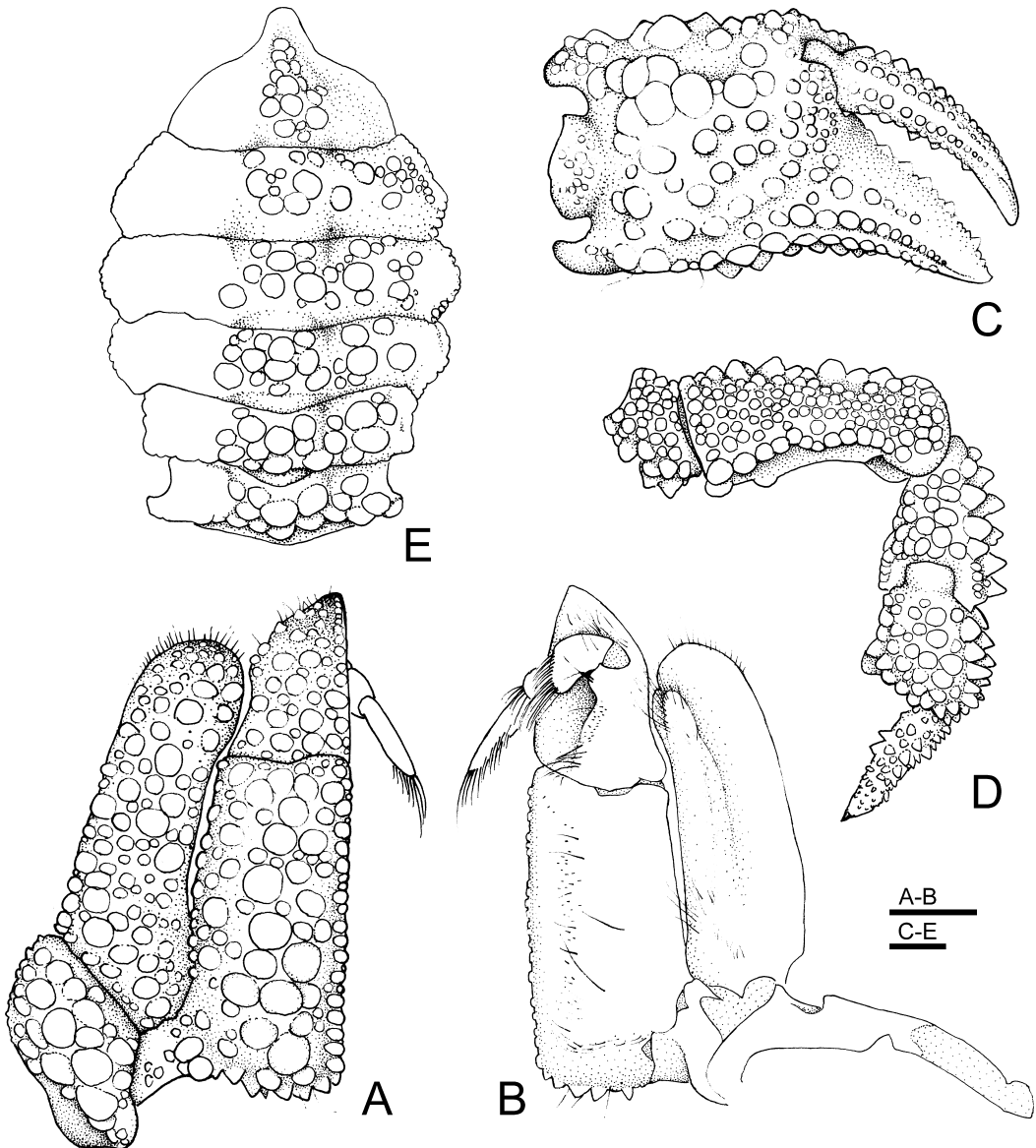


Fig. 6. *Drachiella caelata* Takeda and Tachikawa, 1995, female (cl 14.9×cb 20.0), NSMT-Cr 20830. A, right third maxilliped, external view; B, same, internal view; C, left chela, dorsal view; D, right first ambulatory leg, posterior view; E, abdomen, ventral view. Scales: 1 mm.

bilobed; basal endite narrow, elongate triangular, with some terminal setae; endopod tongue-shaped; exopod (scaphognathite) longitudinally expanded into oval structure, entirely fringed with short, plumose setae. First maxilliped: coxal endite rounded, with dense, weakly plumose setae; basal endite subtriangular, densely fringed with moderately long, plumose setae; endopod longitudinally expanded, rounded at apex, fitting in efferent channel, fringed with short setae along margin of distal half, carinate on upper surface; exopod longitudinally filiform, bearing flagellum with some terminal setae. Second maxilliped fringed with long plumose setae along mesial margin of ischium and merus and lateral margin of merus; propodus and dactylus densely fringed with long setae, setae around tip of dactylus stout; exopod narrow, tapering distally, fringed with short plumose setae on proximal half of lateral margin, bearing flagellum with some terminal setae; exodite rounded.

Third maxilliped (Fig. 6A–B) covered with coarse, rounded granules of various sizes; basis fused with ischium but with suture on internal surface; ischium subsquamate; merus moderately bent dorsally in situ, about 0.60 times as long as ischium along mesial margin; dactylus with distally denticulate, stout setae along inner margin; exopod subsquamate, rounded at tip, fringed with short setae along lateral margin; internal exopodal ridge prominent, with short setae along ridge; epipod reduced, translucent on distal half; podobranch absent.

Cheliped (Fig. 6C) moderate, 1.1 times as long as carapace, covered with rounded granules of various sizes; coxal condyle rounded; merus and carpus subcylindrical; palm broad, convex dorsally; movable finger subconical, about as long as palm, without gap between cutting edges when closed; immovable finger blade-like, about twice as broad as movable finger; both cutting edges with triangular teeth of various sizes.

Ambulatory legs (Fig. 6D) short, similar in shape, gradually decreasing in length from 1st to 4th, coarsely covered with granules of various sizes and shapes; coxal condyles rounded; meri,

carpi, and propodi subcylindrical, with acute granules on outer surfaces; dactyli subconical, without dactylo-propodal locks.

Abdomen (Fig. 6E) longitudinally ovoid; all segments divided from each other, but 2nd to 6th segments are fused together and immovable; 1st segment very short, transversely linear; 2nd to 6th segments short, almost same length, transversely subrectangular, covered with pearly granules of various sizes; telson subtriangular, tip tongue-shaped.

Remarks. This is the second record of this species since the original description from the Ogasawara Islands. The type specimens are only empty shell without all appendages and abdomen, therefore this is the first live specimen of this species. The present specimen agrees well with the original description in the characteristic areolation of the upper surface of the carapace. Supplementary description of the mouthparts, pereopods, and female abdomen is provided in this paper.

Recently Ng *et al.* (2008) removed the genus *Drachiella* from the family Leucosiidae to the family Aethridae. But the shape of the mouthparts and the afferent channel suggests this genus belongs to the family Leucosiidae. To clarify the taxonomic position of *Drachiella*, further phylogenetic analysis is needed.

Distribution. Known only from Ogasawara Is. and Ryukyu Is., Japan, at the depths of 6–8 m.

Family Parthenopidae

Furtipodia petrosa (Klunzinger, 1906)

[New Japanese name: Gareba-hishi-gani]

(Fig. 5D)

Heterocrypta petrosa Klunzinger, 1906, p. 53, pl. 2(9); Lenz, 1910: 543.

Furtipodia petrosa: Tan and Ng, 2003, p. 403, figs. 4b, 5c–d.

Daldorfia horrida: Hoover, 1998, p. 271, photo (b). [Not *Cancer horridus* Linnaeus, 1758]

Material examined. Cape Maeda, Onna, Okinawa I., 9 m deep; 1 ♂ (cl 15.9×cb 23.9), NSMT-Cr 20831; 6 August 1998.

Additional material examined. One empty shell (cl 15.9×cb 24.2), NSMT-Cr 20832, Kita Port, Haha-jima I., Ogasawara Is., southern Japan, pebble beach, under the rock, 1 m deep, coll. T. Kaneko, 21 Aug. 2008.

Remarks. The present specimen agrees well with the original description and the figures of Tan and Ng (2003). This is the first record of this species from Japanese waters. It is also noted at present that a male (cl 14.4×cb 21.5, WMNH-Na-Cr469) from Kuroshima Island, the Ryukyu Islands, was examined by the junior author at the Wakayama Prefectural Museum of Natural History. The specimen in the Nagai Collection was recorded by Marumura and Kosaka (2003) as *Heterocrypta* sp. In addition, this species was also collected from Haha Island, the Ogasawara Islands, by Mr. Takaaki Kaneko, a student of the Tokyo University of Marine Science and Technology. Unfortunately, other crabs fed on this specimen during the collecting work, therefore the empty shell of the carapace and the large, right cheliped were extant.

Distribution. Seychelles, Yemen, Red Sea (type locality), Sri Lanka, New Caledonia, Australia, Guam, Japan, Hawaii, occurring at intertidal water to 62 m (Tan and Ng, 2003; present study).

***Pseudolambrus longispinosus* (Flipse, 1930)**

[New Japanese name: Togenaga-hishi-gani]

(Figs. 4C–D, 5E)

Lambrus (*Pseudolambrus*) *hepatoconus* var. *longispinosus* Flipse, 1930, p. 59, fig. 35.

Not *Pseudolambrus longispinosus*: Takeda 1977, p. 77, figs. 2, 11–12. [= *Ps. hepatoconus* (Flipse, 1930)]

Material examined. Cape Maeda, Onna, Okinawa I., 8 m deep; 1 ♀ (cl 16.9×cb 18.2), NSMT-Cr 20833; 2 August 1998.

Remarks. This species is, as seen in the photographs (Fig. 4C–D), very characteristic in having two long, erect tubercles in the median line at the mesogastric and cardiac regions. The mesogastric tubercle is about twice as long and thick as the cardiac tubercle. The lateral view of the

carapace (Fig. 4D) indicates the remarkable length of the tubercles and the depressed branchial region ornamented with a ridge running from the posterolateral angle. The height and thickness of the tubercles may be variable, but the lobular armature of the chelipeds is also close to the original figure.

Takeda (1976) mentioned the occurrence of *Pseudolambrus hepatoconus* Flipse in the shallow water off Mage-jima Island, southwestern Japan, but Takeda (1977) changed its identification to *Ps. longispinosus* (Flipse). The specimen is characteristic in having thick, more or less elongated knobbed tubercles each at the mesogastric and cardiac regions and also some knobbed tubercles at the branchial region. On examination of the specimen Dr. S. H. Tan of the University of Singapore corrected its identification as *Ps. longispinosus* to *Ps. hepatoconus*.

Distribution. This species is known only by the holotype male from Sanguisiapo, 12 m deep, without subsequent record. Based on the present record, this species is rightly included in the carcinological fauna of Japan, together with *Pseudolambrus hepatoconus* (Flipse) from Mage-jima Island, southwestern Japan wrongly recorded as *Ps. longispinosus* by Takeda (1977).

Family Palicidae

***Crossotonotus spinipes* (De Man, 1888)**

[Japanese name: Ashibuto-itoashi-gani]

(Fig. 5F)

Material examined. Mizugama, Kadena, Okinawa I., 4 m deep; 1 ♀ (cl 32.3×cb 37.3), NSMT-Cr 20834; 7 August 1996.

Distribution. Whole Indo-West Pacific (Castro, 2000).

Acknowledgments

We wish to express our cordial thanks to Dr. Yoshihisa Fujita of the University of the Ryukyus for providing us the specimens and the color photographs. Our thanks are also due to Mr. Takaaki Kaneko of the Tokyo University of Marine Sci-

ence and Technology for offering the specimen, and the authority of the Wakayama Prefectural Museum of Natural History for the permit to examine the specimens in the Nagai Collection.

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