

New Records of Four Grapsoid Crabs (Crustacea: Decapoda: Brachyura) from Japan, with Notes on Four Rare Species

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Abstract Four species of semiterrestrial grapsoid crabs are recorded from Japanese waters for the first time based on material from the Ryukyu Islands. These are: *Pachygrapsus planifrons* De Man, 1888 (Grapsidae); *Nanosesarma andersoni* (De Man, 1888), *Sesarmoides kraussi* (De Man, 1887), and *Stelgistra stormi* (De Man, 1895) (Sesarmidae). Supplementary information is provided for four other little known species, three sesarmids *Clistocoeloma villosum* (A. Milne-Edwards, 1869), *Metasesarma obesum* (Dana, 1851) and *Perisesarma semperi* (Bürger, 1893), and one varunid *Ptychognathus capillidigitatus* Takeda, 1984. The generic assignment of *C. villosum* is briefly discussed. The range of *P. capillidigitatus* is extended south to Iriomote Island.

Key words: Crustacea, Decapoda, Brachyura, Grapsoidea, taxonomy, new record, Ryukyu Islands, Japan

Introduction

The crustacean fauna of the coastal regions of the Ryukyu Islands, particularly that of mangroves and estuaries, has been relatively poorly investigated in spite of an expected high diversity. Nakasone and Irei (2003) compiled information on the known blackish water and mangrove crab fauna of the Ryukyu Islands, but indicated that their faunal inventory was still incomplete. Documentation of coastal fauna is particularly important for conservation, as coastal regions are readily affected by human activities. Since 1994, the authors have made extensive collections of decapod crustaceans in various locations in the Ryukyu Islands, i.e. Amami, Okinawa, Kerama, Kume-jima, Miyako, Ishigaki and Iriomote islands. The present paper is intended as the first of a series of papers that provide new taxonomic information on the grapsoid crab families from the Ryukyu Islands. The following eight species are

treated in this paper: one grapsid, *Pachygrapsus planifrons* De Man, 1888; five sesarmids, *Clistocoeloma villosum* (A. Milne-Edwards, 1869), *Metasesarma obesum* (Dana, 1851), *Nanosesarma andersoni* (De Man, 1888), *Perisesarma semperi* (Bürger, 1893), *Sesarmoides kraussi* (De Man, 1887), and *Stelgistra stormi* (De Man, 1895); and one varunid *Ptychognathus capillidigitatus* Takeda, 1984. Of them, *N. andersoni*, *P. planifrons*, *Sesarmoides kraussi* and *Stelgistra stormi* are new to the Japanese fauna. A minor southerly range extension is also recorded for the varunid *Ptychognathus capillidigitatus*.

Material and methods

The specimens examined in this study are deposited in the Natural History Museum and Institute, Chiba, Japan (CBM), and the Ryukyu University Museum, Fujukan, Okinawa, Japan (RUMF). The carapace width, abbreviated as cw, was taken from the widest position, which varies according to species.

The partially fused anterior three thoracic sternites are termed here the "anterior sternal plate." Synonymies are restricted to the original citation and references providing significant information on morphology and/or distribution.

Identification of species belonging to the Grapsidae, Sesarmidae and Varunidae is sometimes very difficult. Therefore, detailed descriptions are given for the five little known species, *Pachygrapsus planifrons*, *Clistocoeloma villosum*, *Nanosesarma andersoni*, *Perisesarma semperi* and *Sesarmoides kraussi*, for clear documentation of the specific identity and for providing information on supposedly important characters not fully mentioned in previous literature (i.e., antennae, epistome, buccal cavity, suborbital region and thoracic sternites). Illustrations of selected parts are given for *Stelgistra stormi*, *Metasesarma obesum* and *Ptychognathus capillidigitatus* in order to facilitate identification of these species and to supplement the previous descriptions.

Taxonomic accounts

Superfamily Grapsoidea

Family Grapsidae

Pachygrapsus planifrons De Man, 1888

(Figs. 1A, 2)

Pachygrapsus planifrons De Man, 1888: 368, pl. 10, fig. 2; Tesch, 1918: 77; Ward, 1934: 25; Edmondson, 1959: 173, figs. 10b, 11a-e; Garth, 1965: 30, figs. 15, 16; Dai and Yang, 1991: 510, fig. 261-1, pl. 65, fig. 4.

? *Pachygrapsus planifrons* - Hartnoll, 1975: 307, table 1.

Material examined. Ishigaki Island: Shiraho, upper intertidal, under stone, 1 July 2001, coll. T. Komai, 2 males cw 7.7, 9.0 mm (CBM-ZC 7051); same locality, 14 July 1998, coll. T. Komai, 1 male cw 7.6 mm (CBM-ZC 7131); Tonoshiro, upper intertidal, under stone, 10 July 2000, coll. T. Komai, 3 males cw 7.9-9.2 mm (CBM-ZC 7407). Iriomote Island: Hoshizuna Beach, under stone, upper intertidal, 5 July 2001, coll. T. Komai, 4 males cw 6.0-7.6 mm, 2 females cw 6.9, 7.8 mm (CBM-ZC 7067); Haemida Beach, upper inter-

tidal, under stone, 11 July 1998, coll. T. Komai, 1 male cw 6.7 mm, 1 female cw 7.2 mm (CBM-ZC 7166). Kuroshima Island: Iko Pier, upper intertidal, under stone, 11 July 1998, coll. T. Komai, 1 male cw 8.7 mm (CBM-ZC 5439).

Comparative material. Thailand. Phuket: Patong Beach, upper intertidal, 10 November 1995, coll. T. Komai, 4 males cw 6.6-7.9 mm, 4 ovigerous females cw 5.7, 8.0 mm (CBM-ZC 6078); Cape Panwa, beach in Phuket Marine Biological Centre, upper intertidal, under stone, 16 October 1990, coll. T. Komai, 5 ovigerous females cw 4.3-6.6 mm (CBM-ZC 6319).

Description. Carapace (Figs. 1, 2A) trapezoidal in dorsal view, greatest width between exorbital teeth about 1.3 times carapace length. Front about 0.6 exorbital width, produced anteriorly as thin eave overhanging antennae, anterior margin very faintly sinuous; preorbital angle broadly rounded. Dorsal surface of carapace naked, shining, with 2 widely separated postfrontal lobes on either side of midline, mesial lobe with convex anterior margin; regions poorly indicated; 1 lateral branchial striae originating from exorbital tooth. Upper orbital margin concave, slightly oblique; lower orbital margin (Fig. 2B) sinuous in anterior view, smooth; inner orbital tooth triangular, somewhat directed laterally, not reaching to preorbital angle of front. Exorbital angle produced as a sharp tooth directed anterolaterally. Lateral margin slightly concave, and slightly converging posteriorly, without trace of epibranchial tooth.

Antennal peduncle (Fig. 2B) obliquely set; second segment with elongate dorsolateral projection; flagellum relatively long.

Epistome (Fig. 2B) with sharp lateral ridge just inferior to antennule on either side. Anterior part of buccal cavity concave, without median ridge.

Ischium of third maxilliped with proximomesial angle somewhat produced; merus shorter than ischium, with strongly produced mesial margin, anterolateral margin broadly rounded; exopod slender, with well-developed flagellum.

Male chelipeds (Fig. 1A) subequal, moderately large, robust. Merus (Fig. 2C) with

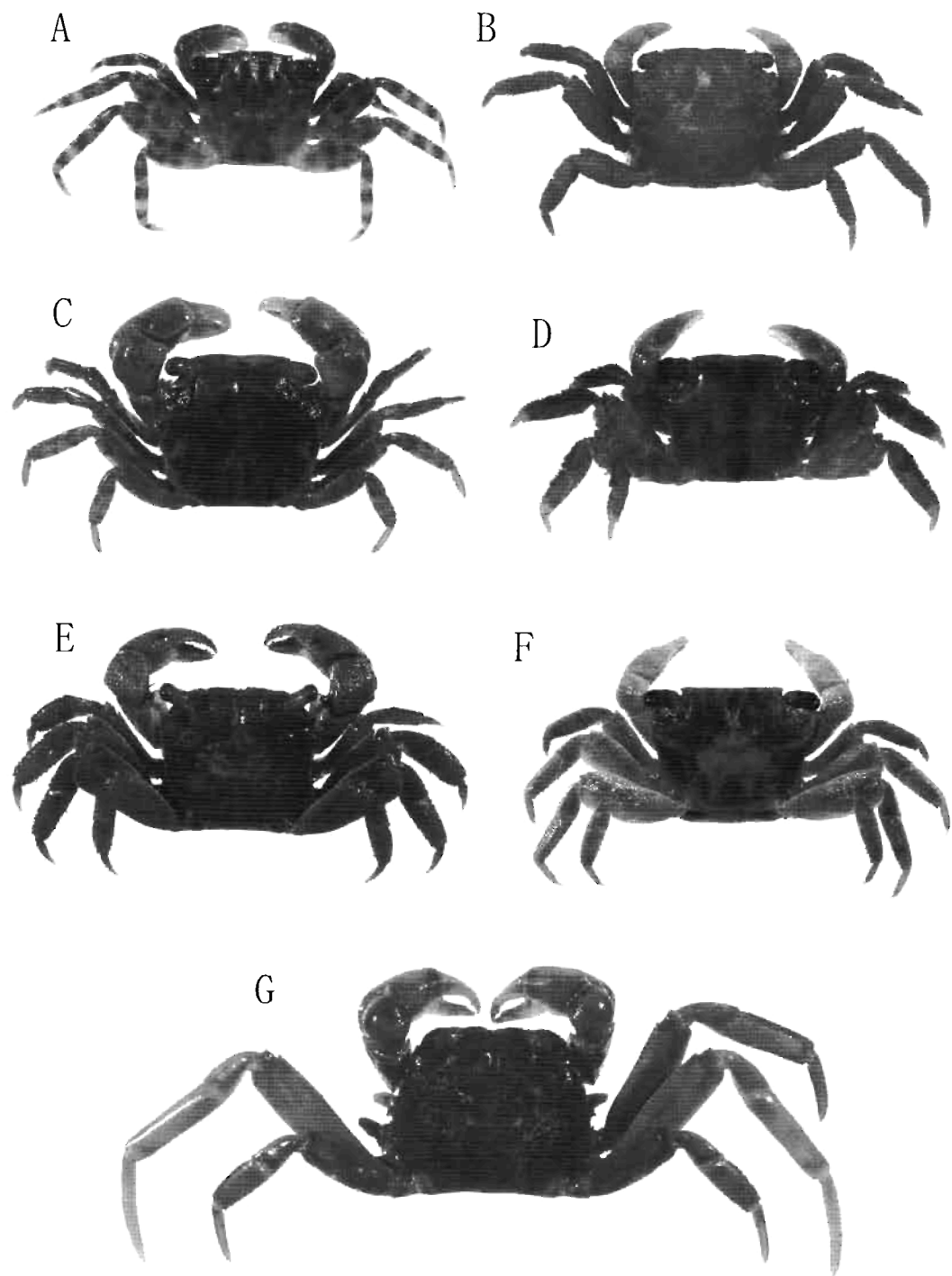
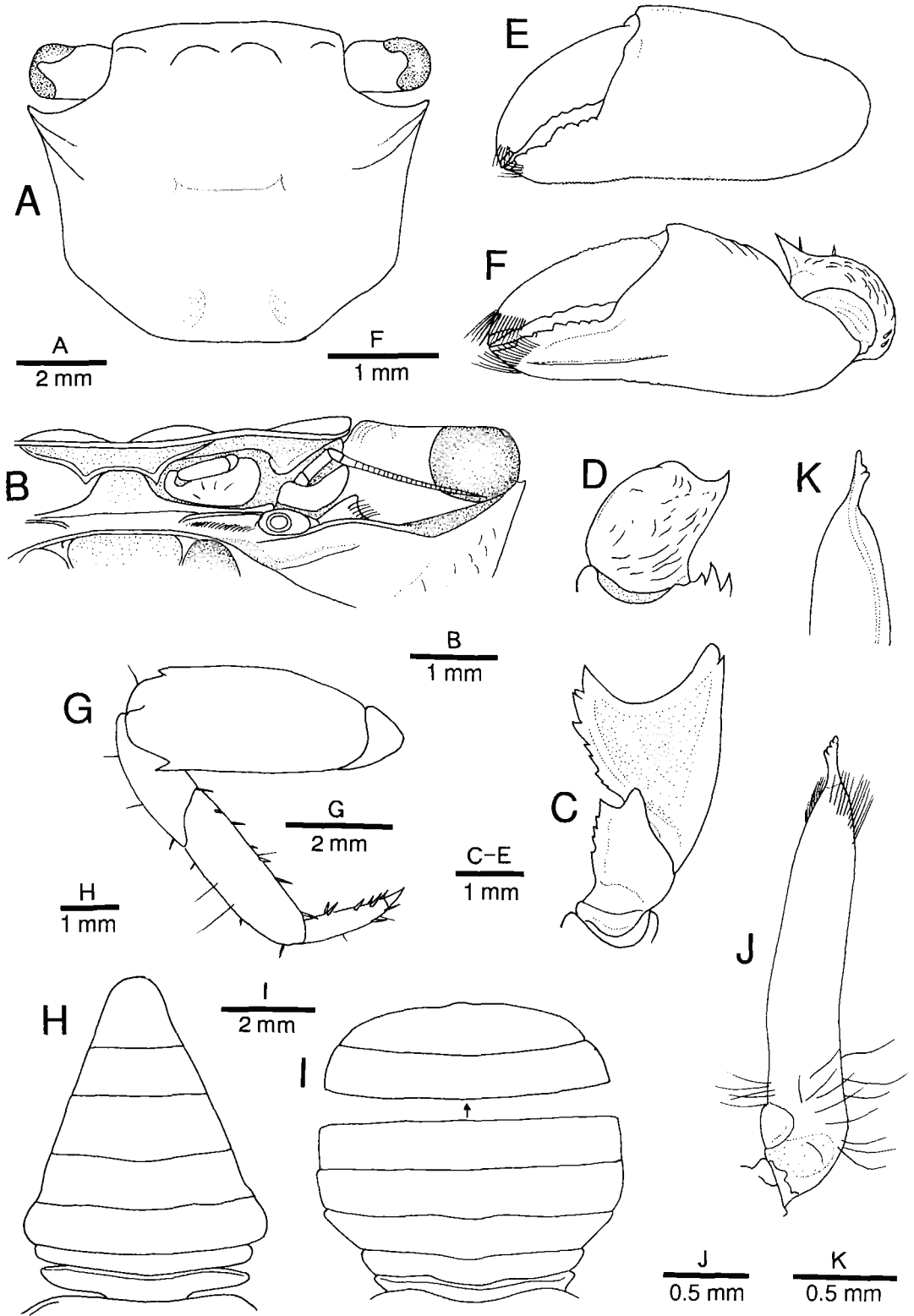


Fig. 1. A, *Pachygrapsus planifrons* De Man, 1888, male from Tonoshiro, Ishigaki Island (cw 9.2 mm; CBM-ZC 7407); B, *Clistocoeloma villosum* (A. Milne Edwards, 1869), female from Hoshidate, Iriomote Island (cw 15.3 mm; CBM-ZC 7095); C, *Metasesarma obesum* (Dana, 1851), male from Hoshizuna Beach, Iriomote Island (cw 16.4 mm; CBM-ZC 7403); D, *Nanosesarma andersoni* (De Man, 1887), male from Hoshidate, Iriomote Island (cw 8.0 mm; CBM-ZC 7091); E, *Perisesarma semperi* (Bürger, 1893), male from Hoshidate, Iriomote Island (cw 27.8 mm; CBM-ZC 7192); F, *Stelgisra stormi* (De Man, 1895), ovigerous female from Hoshizuna Beach, Iriomote Island (cw 16.2 mm; CBM-ZC 7378); G, *Sesarmoides kraussi* (De Man, 1887), male from Shirahama, Iriomote Island (cw 23.7 mm; CBM-ZC 7401).



inner ventral margin bearing row of sharp teeth increasing in size distally; dorsal surface rounded, rugose; outer surface slightly rugose. Carpus (Fig. 2D) with inner angle produced as large sharp tooth; dorsal surface with scattered, longitudinal or oblique short ridges. Palm (Fig. 2E) with microscopically granular surfaces; no trace of ventral ridge on outer surface. Tips of fingers somewhat spoon-shaped, each bordered by corneous claw, bearing subterminal tuft of short setae. Fixed finger straight, cutting edge with row of small, rounded teeth. Dactylus weakly curved, shorter than palm, surfaces microscopically granular, cutting edge with very low teeth; narrow hiatus between fingers.

Female chelipeds (Fig. 2F) smaller than male chelipeds. Fixed finger with distinct longitudinal ridge on outer surface. Subterminal setae on fingers longer than those of males. Dactylus slightly longer than palm.

Ambulatory legs (Figs. 1A, 2G) moderately long, fourth pereopod longest. Coxa of fourth pereopod with dense tufts of soft setae. Each merus armed with sharp subdistal tooth on both anterior and posterior margins, merus of fourth pereopod about 2.2–2.3 times as long as wide; dorsal surfaces of meri naked, but with traces of short transverse ridges; anterior margins sharply edged, each with row of corneous spinules (only few spinules present on fifth pereopod); posterior margin not sharply edged. Distal three segments slender. Carpi smooth on dorsal surfaces. Propodi each with few long corneous spinules on inner margin. Dactyli 0.6–0.8 times as long as propodi, each with double row of long corneous spinules on inner margin and some subterminal corneous spinules on outer surface.

Thoracic sternum smooth, naked.

Male abdomen (Fig. 2H) moderately broadly triangular in general outline; outer surface smooth, naked; sixth somite slightly shorter than fifth, with straight lateral margins;

telson subtriangular, slightly longer than basal width, lateral margins straight and terminal margin rounded. Female abdomen (Fig. 2I) broad, subcircular in general outline; telson very wide, about 4.5 times as wide as long.

First gonopod (Fig. 2J) relatively slender, nearly straight in mesial view; terminal process (Fig. 2K) elongate, bearing several irregular lobules.

Coloration. Carapace mottled with brown. Cheliped generally brown, paler ventrally, fingers also paler. Ambulatory legs obscurely banded by brown.

Distribution. Widely distributed in the Indo-Pacific Ocean: Tanzania, Mergui Archipelago (type locality), Phuket, Christmas Island, Indonesia, Hainan Island in the South China Sea, southern Ryukyu Islands (Ishigaki, Iriomote, and Kuroshima islands), Davao Gulf of Mindanao in the Philippines, Palau Islands, Hawaii, and Clipperton Islands. (De Man, 1888; Tesch, 1918; Tweedie, 1936; Ward, 1941; Edmondson, 1959; Garth, 1965; Hartnoll, 1975; Takeda, 1989; Dai and Yang, 1991; this study).

Ecological notes. This species was commonly found in the upper intertidal zone of rocky areas. The crabs were active during the day. When disturbed, they very quickly run away.

Remarks. The present specimens from the Ryukyu Islands agree well with the previous descriptions of *Pachygrapsus planifrons* by De Man (1888), Garth (1965) and Dai and Yang (1991) and with the comparative material from Phuket, Thailand. This species is characterized by a suite of characters, including the rather smooth dorsal surface of the carapace having a few obliquely transverse striae, the merus of the fifth pereopod armed only with one tooth on the posterior margin, the posteriorly convergent lateral margins of the carapace lacking an epibranchial tooth, and the possession of a brush-like tuft of

Fig. 2. *Pachygrapsus planifrons* De Man, 1888. A–E, G, H, J, K, male from Tonoshiro, Ishigaki Island (cw 9.2 mm; CBM-ZC 7407); F, I, female from Hoshizuna Beach, Iriomote Island (cw 6.9 mm; CBM-ZC 7067). A, carapace and eyes, dorsal view; B, anterior part of carapace and cephalic appendages, left side, anterior view; C, ischium and merus of left cheliped, ventral view; D, carpus of left cheliped, dorsal view; E, F, left chela, outer view; G, left fifth pereopod, dorsal view; H, I, abdomen, ventral (outer) view; J, left first gonopod, lateral view; K, same, distal part, mesial view.

setae at the tip of the cheliped fingers. Regardless of sex, these characters immediately separate *P. planifrons* from other known East Asian species of *Pachygrapsus* Randall, 1840, *P. crassipes* Randall, 1840, *P. fakaravensis* Rathbun, 1907, *P. minutus* A. Milne-Edwards, 1873, and *P. plicatus* (H. Milne Edwards, 1837). The first gonopod of the male is also distinctive in having a multi-lobed terminal process.

Our specimens represent the first record of *P. planifrons* from East Asian waters, although this species is widely distributed in the tropical Indo-West Pacific. In Iriomote and Ishigaki islands, this species is common in the upper intertidal zone of rocky areas. Two other grapsid species, *Metopograpsus thukuhar* (Owen, 1839) and *M. messor* (Forskål, 1775), are found sympatrically. *Pachygrapsus planifrons* can be easily mistaken for juveniles or young individuals of *Metopograpsus* species, and perhaps such confusion is why this species has not been previously recorded from Japanese waters.

Family Sesarimidae

Clistocoeloma villosum (A. Milne Edwards, 1869)

(Figs. 1B, 3)

Sesarma villosum A. Milne-Edwards, 1869: 31; Rathbun, 1907: 35.

Sesarma villosa - De Man, 1887: 644; Lenz, 1910: 560.

Sesarma (*Sesarma*) *villosa* - De Man, 1895: 153; 1898: pl. 29, fig. 30, 30a-e.

Sesarma (*Holometopus*) *villosa* - Tesch, 1917: 208, pl. 17, fig. 2; Sandler, 1923: 35.

Sesarma (*Holometomus*) *villosum* - Crosnier, 1965: 55, figs. 75, 76, 77a, 78; McNeil, 1968: 79.

Clistocoeloma villosum - Davie, 2002: 221.

Chiromantes villosum - Nomoto *et al.*, 1999: 9, pl. 1-6; Kishino *et al.*, 2001a: 17, pl. 2, 2; Kishino *et al.*, 2001b: 127; Shokita *et al.*, 2002: 78, photo 4A-1.

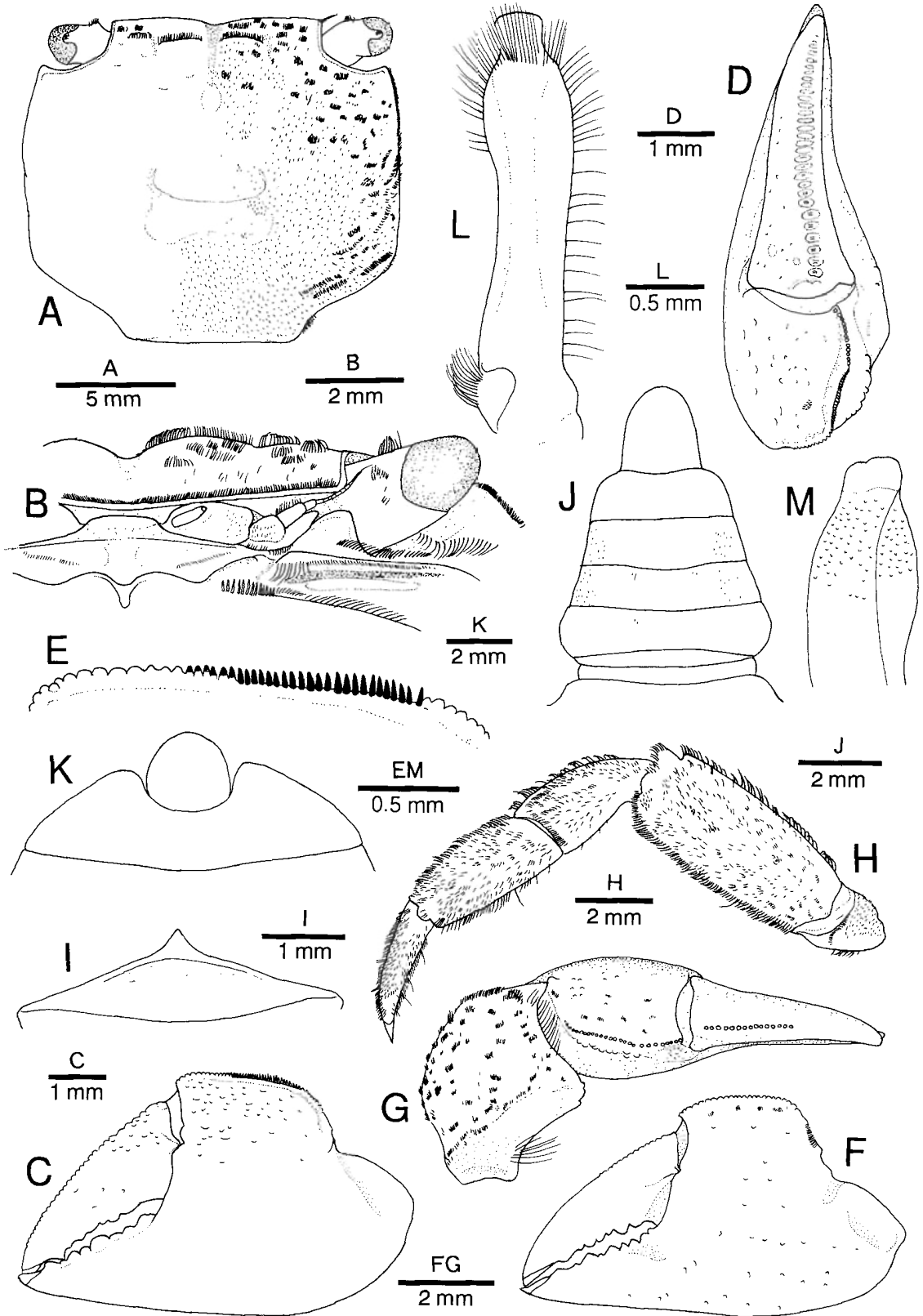
Material examined. Miyako Island: Ohura Bay, mangrove swamps, upper intertidal, mud bottom under stone, 22 December 1996, coll. T. Komai, 1 male cw 10.5 mm (CBM-ZC 3347); Irie, mangrove swamps, upper intertidal, mud bottom under stone, coll. T. Komai, 1 male cw 12.8 mm (CBM-ZC 3352). Iriomote Island: Yonada-gawa estuary, Hoshidate, burrow under boulder, upper intertidal, 10 July 2001, coll. T. Komai, 2 females cw 8.0, 15.3 mm, 1 ovigerous female cw 16.4 mm (CBM-ZC 7095); Uehara Beach, under coral rocks, upper intertidal, 16 July 2000, coll. T. Komai, 1 male cw 10.3 mm, 1 female cw 8.7 mm (CBM-ZC 7405); Urauchi River, upper margin of mangrove forest, 26 February 2003, coll. T. Nagai and A. Yogi, 1 male cw 12.6 mm, 1 female, cw 14.7 mm (RUMF-ZC-129).

Comparative material. *Clistocoeloma meruiense* De Man, 1888: Sungei Buloh mangroves, Singapore, May 1998, coll. T. Komai, 3 males cw 10.0-11.4 mm, CBM-ZC 6106.

Clistocoeloma sinense Shen, 1933. Obitsugawa Estuary, Kaneda, Kisarazu, Chiba Prefecture, Japan, 7 May 2000, coll. T. Furota, 2 males cw 12.1, 13.0 mm, 5 females cw 11.0-16.0 mm, CBM-ZC 6453.

Description. Carapace (Figs. 1B, 3A) rectangular; greatest width across middle of carapace, width about 1.2 times length. Front 0.60-0.65 times as wide as exorbital width, moderately deflexed, with faint median notch; preorbital angle rounded. Dorsal surface of carapace with numerous very short stiff setae often grouped in small patches, always covered with mud and sediment;

Fig. 3. *Clistocoeloma villosum* (A. Milne-Edwards, 1869). A, B, F-H, K, female from Hoshidate, Iriomote Island (cw 16.4 mm; CBM-ZC 7095); C-E, L, M, male from Irie, Miyako Island (cw 12.8 mm; CBM-ZC 3347). A, carapace and eyes, dorsal view (setae omitted on left side); B, anterior part of carapace and cephalic appendages, left side, anterior view (setae partially omitted); C, F, left chela, outer view; D, same, dorsal view; E, inner dorsal margin of left palm, showing pectinated crest, outer view; G, carpus and chela of left cheliped, dorsal view; H, left fifth pereopod, dorsal view; I, anterior sternal plate, ventral view (setae omitted); J, abdomen; K, sixth abdominal somite and telson, ventral view (setae omitted); L, left first gonopod, lateral view; M, same, distal part, mesial view (setae removed).



post-frontal lobes inconspicuous; regions on dorsal surface poorly indicated; lateral branchial striae absent. Exorbital angle weakly produced, blunt. Lateral margin of carapace slightly sinuous with anterior part slightly convex, without trace of epibranchial tooth. Upper orbital margin concave, slightly oblique; lower orbital margin (Fig. 3B) minutely granular, covered with very short setae; inner orbital tooth rather large, broadly rounded, but not reaching to preorbital angle of front.

Antennule and antenna (Fig. 3B) contiguous. Basal antennular segment subrectangular. Antenna set obliquely; second segment with elongate distolateral process overreaching distal margin of third segment; flagellum relatively long, extending into orbit.

Epistome (Fig. 3B) concave on outer surface; ventral margin smooth, protuberant medially, extending onto anterior part of buccal cavity as short ridge.

Third maxilliped with well-developed flagellum on exopod.

Male chelipeds (Fig. 3C, D) subequal or slightly unequal, moderately robust. Merus with inner ventral margin weakly tuberculate, but without conspicuous tooth; dorsal margin sharply carinate, with row of very short stiff setae and/or row of granules; outer surface apparently smooth. Carpus with inner angle weakly produced in rounded lobe, inner margin not clearly delimited; dorsal surface with scattered small patches of short setae; inner face narrow, unarmed. Palm with 1 sharp, partially pectinated ridge over entire length of dorsal surface (Fig. 3E), composed of 20–30 small corneous teeth medially and becoming small tubercles distally and proximally; outer surface of palm convex, smooth, without trace of ventral ridge; inner surface with weak elevation lined with row of small tubercles adjacent to dorsal margin, otherwise smooth; ventral surface (including fixed finger) also smooth; fixed finger straight, terminating in weakly bifid corneous claw, cutting edge with row of small, rounded teeth. Dactylus slightly longer than palm, terminating in simple corneous claw; dorsal surface bearing 20–25 tubercles becoming lower toward tip; each tu-

bercle transversely ovate, proximal tubercles each with slightly compressed summits; with microscopic striae running parallel to longitudinal axis of dactylus; outer surface of dactylus smooth; cutting edge with row of blunt teeth; narrow hiatus between fingers.

Chelipeds of females (Fig. 1B) somewhat smaller than those of males. Palm (Fig. 3F, G) with dorsal carina finely tuberculate, but lacking pectinated corneous teeth. Dactylus (Fig. 3F, G) with 12–16 very small, rounded tubercles on proximal 0.6, tubercles becoming obsolete toward tip.

Ambulatory legs (Figs. 1B, 3H) moderately short, fourth pereopod longest, each covered with short stiff setae. Coxae with short stiff setae on ventral surfaces, but lacking tufts of long setae. Each merus armed with low, blunt subdistal projection on anterior margin, but unarmed on posterior margin, merus of fourth pereopod about 2.2–2.3 times as long as wide; dorsal surfaces of meri with sparse very short setae and scattered small patches of short setae; anterior and posterior margins not sharp, each with numerous short stiff setae. Carpi each with 1 or 2 lines of short stiff setae on dorsal surface. Propodi stout, each with numerous short stiff setae and rows of longish setae on surfaces, but without corneous spinules. Dactyli 0.7–0.8 times as long as propodi, lacking corneous spines, but with covering of short stiff setae and rows of longish setae.

Anterior sternal plate (Fig. 3I) broadly triangular, with concave lateral margins; surface slightly concave, with few short setae. Fourth sternite with short to long setae particularly numerous along margins; suture between third and fourth sternites lined by long setae. Abdominal cavity in males nearly reaching to suture between third and fourth sternites.

Male abdomen (Fig. 3J) wide, abruptly narrowed at base of telson; surface covered with sparse very short setae. Sixth abdominal somite almost as long as fifth somite, with strongly convex lateral margins. Telson distinctly longer than basal width, lateral margins evenly convex and terminal margin rounded.

Female abdomen with telson (Fig. 3K) evenly rounded, as long as basal width and

longer than mid-line length of sixth abdominal somite.

First gonopod (Fig. 3L) stout, nearly straight, subdistal portion slightly inflated; terminal process (Fig. 3M) short, truncate distally, with shallow notch distally.

Coloration. Generally muddy color; palm of cheliped purplish; facial setae dark brown.

Distribution. Widely distributed in the Indo-Pacific: Madagascar, Aceh, Sumatra, central and southern Ryukyu Islands (Miyako, Iriomote, Okinawa, and Amami-Oshima islands), Kii Peninsula in Honshu mainland of Japan, New Guinea, Queensland, Australia, Caroline Islands, and Samoa Islands (type locality) (A. Milne-Edwards, 1869; De Man, 1895; Rathbun, 1907; Tesch, 1917; Sandler, 1923; Crosnier, 1965; McNeil, 1968; Nomoto *et al.*, 1999; Kishino *et al.*, 2001a; Shokita *et al.*, 2002; this study).

Ecological note. *Clistocoeloma villosum* occurs under stones of landward edges of mangrove forests. Soil of the habitats is slightly wet, occasionally covered with fallen leaves. This species sometimes occurred sympatrically with hippolytid shrimp *Merguia oligodon* (De Man, 1888) and sesarmid *Sesarmoides kraussi* in Iriomote Islands, and while in Okinawa Island, it was found together with *Parasesarma acis* Davie, 1993 (see Ng *et al.*, 2001 for possible synonymy with *Parasesarma tripectinis* (Shen, 1940)).

Remarks. The specimens at our disposal agree with the previous accounts of this species [De Man (1895), as *Sesarma* (*Sesarma*) *villosa*; Tesch (1917), as *Sesarma* (*Holometopus*) *villosa*; Crosnier (1965), as *Sesarma* (*Holometopus*) *villosum*; Nomoto *et al.* (1999) and Kishino *et al.* (2001a), as *Chiromantes villosum*].

The generic assignment of this species has been subject to disagreement. Originally, this species was assigned to *Sesarma* Say, 1817 (A. Milne Edwards, 1869), and later Tesch (1917) and Crosnier (1965) referred it to the subgenus *Holometopus* H. Milne Edwards, 1853. Tesch (1917) mentioned that *S. villosum* was clearly different from species of *Clistocoeloma* A. Milne-Edwards, 1873 in the structure of the orbit. Japanese authors (Nomoto *et al.*, 1999; Kishino *et al.*, 2001a, 2001b; Shokita *et al.*, 2002) referred the spe-

cies to *Chiromantes* Gistel, 1848, perhaps following the subgeneric assignment to *Holometopus* by Tesch (1917) and Crosnier (1965) [for nomenclatural amendments from *Holometopus* to *Chiromantes*, see Holthuis (1977)]. Ng and Liu (1999) commented that the real *Chiromantes* might be restricted for *C. haematocheir* (De Haan, 1833) and also suggested that *Chiromantes villosum* was more likely to be a species of *Clistocoeloma* on account of the features of the carapace and setose surfaces. In his catalogue of Australian brachyuran crabs, Davie (2002) referred this species to *Clistocoeloma*, although no detailed comments were given. We compared our specimens with specimens of *Clistocoeloma merguense* De Man, 1888 and *C. sinense* Shen, 1933. Our examination has shown that this species is rather similar to the species of *Clistocoeloma* than those of *Chiromantes* (sensu Serène and Soh, 1970; Ng and Liu, 1999) in the following points: the carapace and ambulatory legs are covered with short stiff setae, occasionally forming prominent patches; and the palm of the cheliped is provided with a single pectinated crest running the over entire length of the dorsal surface. One of the diagnostic characters of *Clistocoeloma* is the orbit excluding the antennular flagellum with an inner orbital tooth that extends to the preorbital angle of the front (e.g. Tesch, 1917; Serène and Soh, 1970). However, it has been found that the development of the inner orbital tooth is variable in *Clistocoeloma merguense* and *C. sinense*, and thus the antennular flagellum is occasionally in touch with the orbit in the latter two species. The generic significance of this antennule-orbit character is questionable. Therefore, we follow Davie (2002) to assign the present species to *Clistocoeloma*.

The genus *Clistocoeloma* contains the following seven species other than *C. villosum*: *C. amamaparense* Rahayu and Takeda, 2000; *C. balansae* A. Milne-Edwards, 1873 (type species of the genus); *C. lanatum* (Alcock, 1900); *C. merguense*; *C. sinense*; *C. suvaense* Edmondson, 1951; and *C. tectum* (Rathbun, 1914). Some species, such as *C. balansae*, *C. lanatum* and *C. suvaense*, needs to be redescribed, as the previous descriptions are insufficient. Nevertheless, *C. villosum* may be read-

ily distinguished from the other seven species by the absence of epibranchial teeth or lobes on the carapace. The latter species all have one or two epibranchial teeth on the carapace.

***Metasesarma obesum* (Dana, 1851)**

(Figs. 1C, 4)

Sesarma obesum Dana, 1851: 252; 1852: 356; 1855: pl. 22, fig. 10.

Metasesarma rousseauxi H. Milne Edwards, 1853: 188; 1854: 158, pl. 10, fig. 1, 1a-c; Crosnier, 1965: 73, figs. 166-120; Ng and Davie, 1995: 39, fig. 5a-c; Watanabe and Wada, 2002: 112, figs. 3, 4.

Metasesarma granularis Heller, 1862: 522.

Metasesarma rugulosa Heller, 1865: 65.

Sesarma (*Metasesarma*) *rousseauixii* - Pilai, 1951: 37.

Chiromantes obesum - Ng and Liu, 1999: 229.

Metasesarma obesum - Ng and Schubert, 2003: 426, figs. 1-3.

Material examined. Iriomote Island: Yonada-bashi, Hoshidate, shoreline grassland, coll. T. Komai, 1 male cw 8.7 mm (CBM-ZC 7139); Sonai, terrestrial, under boulder, 10 July 2002, coll. T. Komai, 1 male cw 11.3 mm, 1 ovigerous female cw 12.8 mm (CBM-ZC 7402); Hoshizuna Beach, terrestrial, under coral rocks, 13 July 2002, coll. T. Komai, 2 males 15.3, 16.4 mm, 2 females 15.5, 16.7 mm (CBM-ZC 7403). Miyako Island: Nikawadori, supralittoral coral pebble beach, 25 July 2002, coll. T. Naruse *et al.*, 1 male cw 8.2 mm (RUMF-ZC-128).

Description. Carapace (Fig. 1C, 4A) subquadrate, relatively deep; dorsal surface naked, but covered with minute, low, squamiform tubercles on gastric region and minute granules on cardiac and mesial part of branchial region; posterolateral part of branchial region with numerous short oblique striae; 2

postfrontal lobes present on either side of distinct median groove, mesial lobe distinct, but lateral lobe only faintly defined. Front deep, vertically deflexed, somewhat spatulate, covering antennae in anterior view, frontal width more than half of greatest carapace width; free edge slightly convex in anterior view, preorbital angle slightly produced, rounded; frontal width about 0.6 of exorbital width. Lateral margin of carapace unarmed, convex in anterior part, slightly converging backwards in posterior part; exorbital tooth directed forward. Upper orbital margin strongly oblique; lower orbital margin (Fig. 4B, C) granulate, with numerous very short setae; inner orbital tooth triangular, extending to inner side of preorbital lobe in adults, thus antenna completely excluded from orbit. Sharp carina extending from exorbital tooth into orbit.

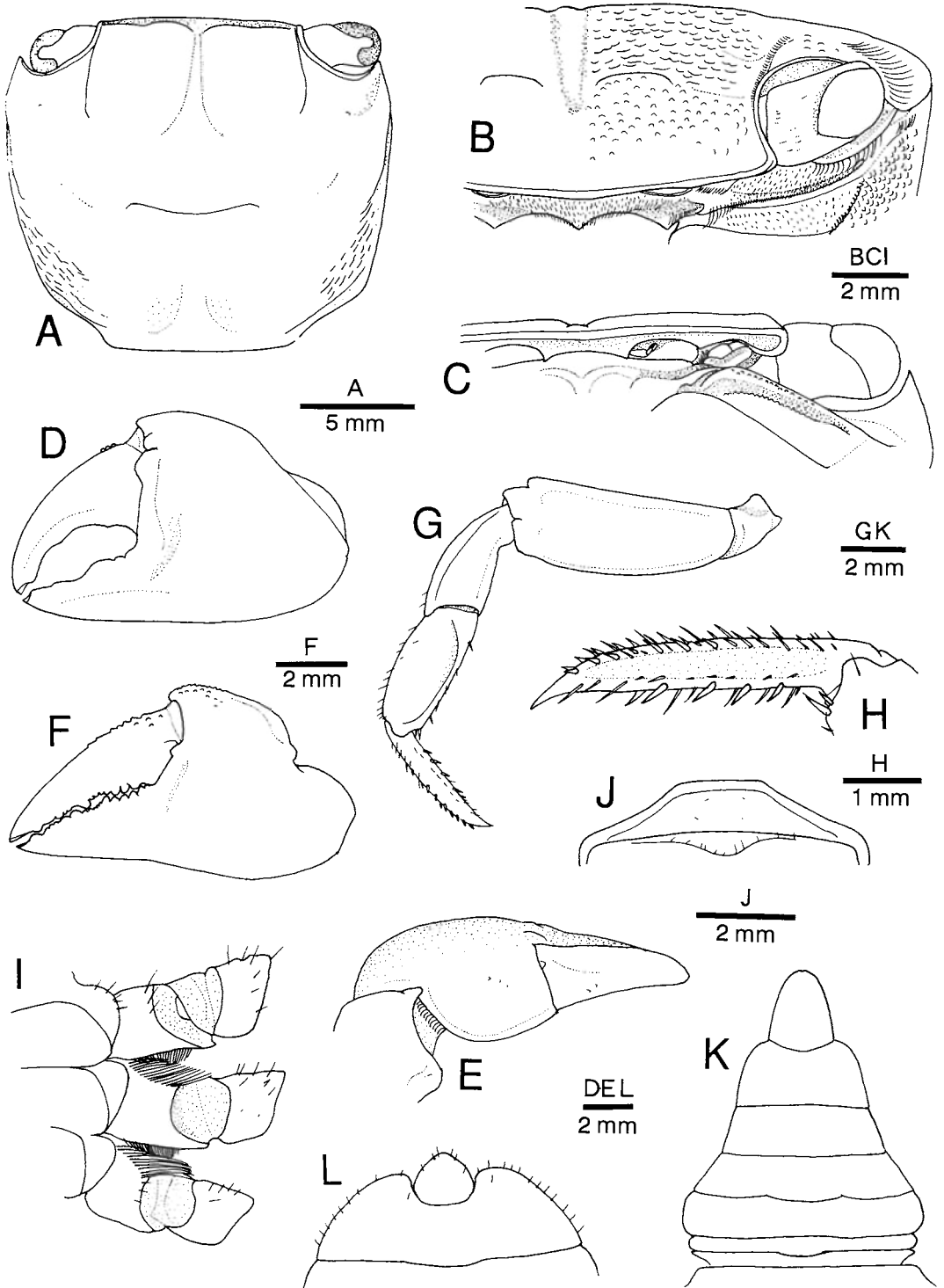
Antennule and antenna (Fig. 4C) contiguous, visible only in ventral view. Basal segment of antennule transversely elongate subrectangular; flagellum greatly reduced. Antenna small, set obliquely; second segment with distolateral process reaching distal margin of fourth segment; flagellum absent.

Epistome (Fig. 4B, C) nearly flat on outer surface, with dense covering of short setae; ventral margin smooth, protuberant medially, extending onto anterior part of buccal cavity as short ridge.

Third maxilliped with exopod bearing rudimentary flagellum in adults; outer margin of merus regularly convex

Male chelipeds (Fig. 1C) subequal. Ischium with small granules on inner margin. Merus with dorsal surface strongly convex, distinctly ridged; inner ventral margin smooth, without distinct tooth. Carpus with dorsal surface nearly smooth, inner angle somewhat produced, but not forming tooth or spine. Chela (Fig. 4D, E) massive; dorsal surface of

Fig. 4. *Metasesarma obesum* (Dana, 1851). A-C, F-H, L, female from Hoshizuna Beach, Iriomote Island (cw 16.7 mm; CBM-ZC 7403); male from same lot, D, E, I, J, K (cw 16.4 mm). A, carapace and eyes, dorsal view (ornamentation on dorsal surface omitted); B, anterior part of carapace, left side, anterior view; C, anterior part of carapace and cephalic appendages, ventral view (setae omitted); D, F, left chela, outer view; E, same, dorsal view; G, left fifth pereopod, dorsal view; H, same, dactylus, dorsal view; I, coxae of left second to fourth pereopods (= first to third ambulatory legs), ventral view; J, anterior sternal plate, ventral view (setae partially omitted); K, abdomen, ventral (outer) view (setae omitted); L, sixth abdominal somite and telson, ventral view (setae partially omitted).



palm nearly smooth, inner margin distinctly ridged, faintly granular; outer surface of palm convex, smooth; inner surface concave dorsally, bearing some large but low tubercles; fingers moderately long, tips pointed; cutting edges each with rudimentary teeth; no subterminal tuft of brush-like setae. Dactylus curved, without row of tubercles on dorsal surface.

Chelipeds of females somewhat smaller than those of males. Carpus rugose with short rows of granules on dorsal surface. Palm (Fig. 4F) with short longitudinal rows of granules on dorsal surface adjacent to inner margin; fingers with row of small but distinct teeth on cutting edges. Dactylus straight, with small granules on dorsal surface proximally

Ambulatory legs (Fig. 1D, 4G) relatively short, rather slender. Meri each with 1 blunt subdistal projection on anterior margin, but unarmed on posterior margin. Carpi each with distinctly carinate anterior margin; dorsal surfaces each with 1 or 2 longitudinal carinae. Propodi each with bristles arranged in 3–4 irregular rows on outer surface and bristles and small corneous spines arranged in 2 rows on inner surface. Dactyli (Fig. 4H) subequal in length to propodi, each with 3 rows of corneous spines or bristles on outer surface and 2 rows of corneous spines or bristles on inner surface; dorsal surface shallowly concave, with row of short bristles adjacent to inner margin. Tufts of long setae on anteroventral surfaces of coxae of third and fourth pereopods (Fig. 4I).

Anterior sternal plate transversely elongate rectangular (Fig. 4J); surface nearly flat, with few short stiff setae. Fourth sternite with line of short stiff setae along margins. Abdominal cavity not reaching suture between third and fourth sternites in males.

Male abdomen (Fig. 4K) triangular, relatively broad for sesarmids, distinctly narrowed at base of telson; sixth somite slightly longer than fifth somite, with strongly convex lateral margins; telson longer than broad and distinctly longer than sixth abdominal somite.

Female telson (Fig. 4L) evenly rounded, as long as wide and shorter than mid-line length of sixth abdominal somite.

First gonopod illustrated by Ng and Davie (1995) and Watanabe and Wada (2002).

Coloration. See Ng and Davie (1995).

Distribution. Widely distributed in the Indo-Pacific: Zanzibar, Madagascar, Laccadive Islands, Mergui Archipelago, Kerala (Travancore), India, Sri Lanka, Christmas Island, Indonesia, Sabah (type locality; neotype designation by Ng and Schubart (2003)), Philippines, Taiwan, southern Ryukyu Islands (Iriomote and Miyako islands), Guam, New Guinea, and Tahiti (Dana, 1851; H. Milne Edwards, 1853; De Man, 1888; Tesch, 1917; Pilai, 1951; Crosnier, 1965; Ng and Davie, 1995; Ng *et al.*, 2001; Watanabe and Wada, 2002; Ng and Schubart, 2003; this study).

Ecological notes. This species occurs in terrestrial boulder area somewhat remote from the beach line. The crabs hide under stone or coral rock during the day.

Remarks. Ng and Schubart (2003) discussed that *Sesarma obesum* Dana, 1851, was a senior synonym of *Metasesarma rousseauxi* H. Milne Edwards, 1853, and transferred *Sesarma obesum* to the genus *Metasesarma* H. Milne Edwards, 1853. However, considering the extensive geographical range of the species, Ng and Schubart (2003) still suggested that *Metasesarma obesum* may involve more than one species and that *Metasesarma rousseauxi* (type locality: Zanzibar) may yet prove to be different from *Metasesarma obesum* (type locality: northern Sabah). Our adult specimens agree very well with the neotype of *M. obesum* figured by Ng and Schubart (2003). In this study, we follow Ng and Schubart's (2003) account in applying the name *Metasesarma obesum* for the Japanese material.

This species was recently reported from Japanese waters for the first time by Watanabe and Wada (2002, as *M. rousseauxi*) based on material from Iriomote Island. Our specimens agree very well with the previous accounts of *M. obesum* (cf. Crosnier, 1965; Ng and Davie, 1995; Watanabe and Wada, 2002; as *M. rousseauxi*), except for a small specimen collected from Miyako Island (cw 8.2 mm; RUMF-ZC-128). The specimen from Miyako Island has the antenna incompletely excluded from the orbit and a well-developed flagellum on the exopod of the third maxilli-

ped. These discrepancies are most probably size-related, as that specimen is much smaller than other specimens examined.

The genus *Metasesarma* is represented by two species, *M. aubryi* A. Milne Edwards, 1869 and *M. obesum*. Although *M. aubryi* has been recorded from Taiwan (Ng *et al.*, 2001), there has been no record of *M. aubryi* as yet from Japanese waters. Future collections may eventually reveal the presence of *M. aubryi* in the Ryukyu Islands. The two species are distinguished by several morphological features (Ng and Davie, 1995): the frontal width is less than half the greatest carapace width in *M. aubryi*, rather than more than it in *M. obesum*; the lateral margin of the ex-orbital angle is slightly diverging backward in *M. aubryi*, while subparallel to the longitudinal axis of the carapace in *M. obesum*; the lateral margin of the merus of third maxilliped bears a broad and low lobe in *M. aubryi*, rather than regularly convex in *M. obesum*; and the terminal process of the first gonopod is more strongly bent in *M. aubryi* than in *M. obesum*.

Metasesarma obesum is easily distinguished from other local sesarmid crab by the vertically deflexed front covering the very narrow antennal region in anterior view, the antenna excluded from the orbit, the unarmed lateral margin of the carapace, the rudimentary exopodal flagellum of the third maxilliped, and the absence of pectinated crests on the cheliped palm.

***Nanosesarma andersoni* (De Man, 1887)**

(Figs. 1D, 5)

Sesarma andersoni De Man, 1887: 657; 1888: 172; pl. 12, figs. 1-4; Alcock, 1900: 418.

Sesarma (*Parasesarma*) *andersoni* - Tesch, 1917: 129.

Nanosesarma andersoni - Tweedie, 1950: 310.

Nanosesarma (*Beanium*) *andersoni* - Serène and Soh, 1970: 394.

Beanium andersoni - Tan and Ng, 1994: 82.

Material examined. Iriomote Island: Yonada-gawa estuary, Hoshidate, mangrove swamps, burrow on dead wood piece, coll. T. Komai, 1 male cw 8.0 mm (CBM-ZC 7091); Funaura, mangrove swamps, burrow on dead wood piece, 15 July 2003, coll. T. Komai, 1

male cw 7.3 mm, 1 female cw 7.8 mm (CBM-ZC 7486).

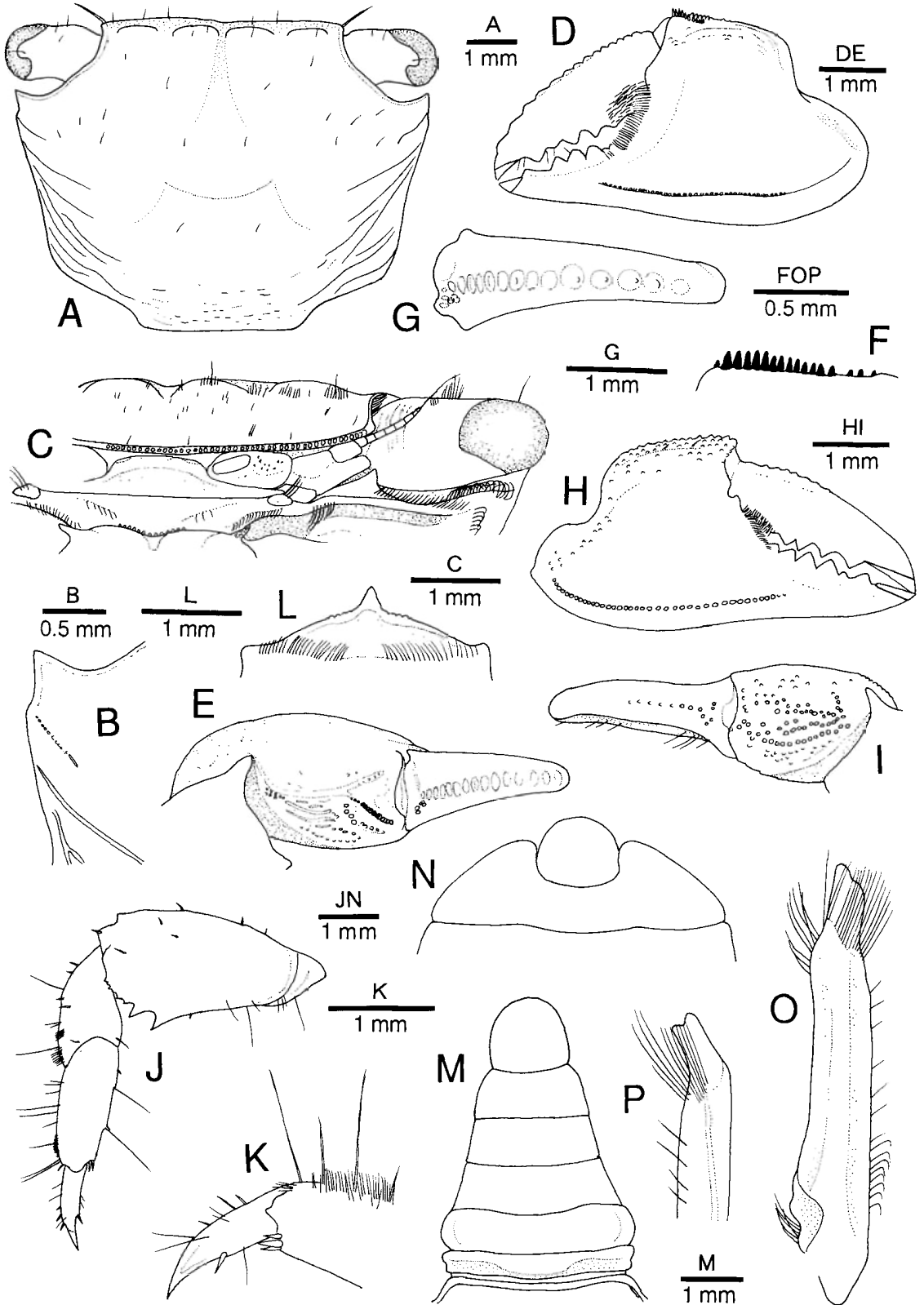
Description. Carapace (Fig. 1D, 5A) trapezoidal with lateral margins somewhat converging backward; dorsal surface nearly smooth, but with scattered short stiff setae (setae more numerous in females than in males), and having several long oblique striae on lateral part; 2 postfrontal lobes present on either side of midline, both low, but distinctly demarcated. Front vertically deflexed, but not covering antennae in anterior view; preorbital angle rounded. Lateral margin with trace of epibranchial tooth (Fig. 5B). Upper orbital margin strongly oblique; lower orbital margin (Fig. 5C) smooth; inner orbital tooth triangular, somewhat directed laterally, reaching only halfway between lower orbital margin and pre-orbital angle of front.

Antennule and antenna (Fig. 5C) contiguous. Basal segment of antennule subrectangular. Antenna set obliquely; second segment with elongate distolateral process reaching distal margin of third segment; flagellum relatively long, extending into orbit.

Epistome (Fig. 5C) nearly flat on outer surface, without covering of dense setae; ventral margin granular, protuberant medially, extending onto anterior part of buccal cavity as short ridge.

Third maxilliped with exopod bearing well-developed flagellum.

Male chelipeds (Fig. 1D) subequal. Ischium with 1 conspicuous tooth on inner margin. Merus with dorsal surface strongly convex, bluntly ridged; inner ventral margin minutely denticulate, with prominent subdistal tooth. Carpus with dorsal surface rugose with short ridges, inner angle produced in weak tooth, with row of long stiff setae proximal to tooth. Chela (Fig. 5D, E) with low but distinct ventral ridge on smooth outer surface; dorsal surface of palm rugose with longitudinal or obliquely longitudinal granular ridges of various length and 1 obliquely transverse pectinated crest (Fig. 5F); inner surface of palm nearly smooth, lacking distinct ridge; fingers moderately long, tips not particularly expanded, but spoon-like, cutting edges each with distinct triangular teeth



ver entire length; no subterminal tuft of brush-like setae; patches of dense, short setae on bases of both fingers. Dactylus (Fig. 5G) nearly straight, with 14 tubercles on dorsal surface; tubercles increasing in size but becoming lower toward tip of dactylus, proximal 6 tubercles somewhat longer in transverse axis, other tubercles basally circular.

Female chelipeds subequal, generally similar to male chelipeds but somewhat smaller. Palm (Fig. 5H, I) with irregular rows of very small tubercles, but lacking pectinated crests; ventral ridge on outer surface more coarsely tuberculate than in males. Dactylus with longitudinal row of 8 very small tubercles on proximal half of dorsal surface.

Ambulatory legs (Fig. 1D, 5J) moderately long, stout; dorsal surfaces of meri, carpi and propodi weakly to somewhat rugose. Meri very broad, foliaceous, each with 1 subacute subdistal tooth on anterior margin and 2 or 3 strong subdistal teeth on strongly expanded posterodorsal margin, posterodorsal distal margin with row of several tiny teeth. Carpi each with patch of short plumose setae on anterior surface and 1 sharp median ridge on dorsal surface. Propodi each with patch of thick short plumose setae on dorsal surface and with several corneous spinules on outer distal margin. Scattered longish, darkly pigmented setae on outer and inner margins of carpi and propodi. Dactyli about half of propodi in length, each with scattered short setae on outer margin and 1 pair of slender corneous spinules arising mid-length of dactylus on inner margin (Fig. 5J). No prominent tufts of long setae on coxae of ambulatory legs.

Anterior sternal plate triangular (Fig. 5L); surface slightly to somewhat concave, with few short setae. Fourth sternite with sparse setae; suture between third and fourth stern-

ites lined by row of long setae. Abdominal cavity in males nearly reaching to suture between third and fourth sternites.

Male abdomen (Fig. 5M) triangular, relatively narrow for sesarmids, not abruptly narrowed at base of telson; sixth somite nearly as long as fifth somite, with weakly convex lateral margins; telson nearly subovate, slightly longer than broad and distinctly longer than sixth abdominal somite.

Female telson (Fig. 5N) evenly rounded, distinctly wider than long and longer than mid-line length of sixth abdominal somite.

First gonopod (Fig. 5O) moderately slender, nearly straight in mesial view; corneous terminal process (Fig. 5P) somewhat elongate, bent at right angle, with shallow notch distally.

Coloration. Generally brown in dorsal view. Distal parts of propodi of ambulatory legs paler.

Distribution. Mergui Archipelago (type locality); Malay Peninsula, and southern Ryukyu Islands (Iriomote Island) (De Man, 1888; Tan and Ng, 1994; this study).

Ecological notes. The present specimens were collected from cavities made by wood boring sphaeromatid isopod on decayed wood in mangrove swamps.

Remarks. The genus *Nanosesarma* Tweedie, 1950, was partially revised by Serène and Soh (1970), who divided the genus into two subgenera, *Nanosesarma* sensu stricto and *Beanium* Serène and Soh, 1970. Later, Tan and Ng (1994) considered full generic status for the two taxa, although they mentioned that a revision of *Nanosesarma* sensu lato by P. Davie was in progress at that time. As pointed out by Holthuis (1978), however, the designation of the type species of the two subgenera by Serène and Soh (1970) was incorrect. Tweedie (1950) clearly stated that

Fig. 5. *Nanosesarma andersoni* (De Man, 1887). A–G, J–M, O, P, male from Hoshidate, Iriomote Island (cw 8.0 mm; CBM-ZC 7091); H, I, N, female from Funaura, Iriomote Island (cw 7.8 mm; CBM-ZC 7486). A, carapace and eyes, dorsal view; B, exorbital tooth and anterolateral margin of carapace, dorsal view; C, anterior part of carapace and cephalic appendages, left side, anterior view; D, left chela, outer view; E, same, dorsal view; F, pectinated crest on palm, outer view; G, dactylus of left chela, dorsal view; H, right chela, outer view; I, same, dorsal view; J, left fifth pereopod, dorsal view; K, same, dactylus and distal part of propodus, dorsal view; L, anterior sternal plate, ventral view; M, abdomen, ventral (outer) view (setae omitted); N, sixth abdominal somite and telson, ventral view (setae omitted); O, left first gonopod, mesial view; P, same, distal part, mesial view.

the type species of *Nanosesarma* was *Sesarma andersoni*, while Serène and Soh (1970) indicated that *Sesarma minutum* De Man, 1887 was the type species of *Nanosesarma* and assigned *Sesarma andersoni* to the subgenus *Beanium*. Therefore, the assignment of *Sesarma andersoni* to *Nanosesarma* sensu stricto is correct. The species assigned to *Beanium* by Serène and Soh (1970) should be referred to *Nanosesarma*, and a new generic name should be proposed for the species assigned to *Nanosesarma* by Serène and Soh (1970). However, as suggested by Tan and Ng (1994), a thorough revision of *Nanosesarma* sensu lato is needed to assess the taxonomic position of the species assigned to *Nanosesarma* sensu stricto or *Beanium*. This is beyond the scope of this study and is currently being completed by P. Davie.

Our specimens from Iriomote Island agree generally with the previous descriptions of *Nanosesarma andersoni* by De Man (1888, as *Sesarma andersoni*) and Alcock (1900, as *Sesarma andersoni*). De Man (1888) mentioned that the lateral margins of the carapace were nearly parallel, scarcely converging backward, while his illustration (De Man, 1888, plate 12, fig. 1) clearly shows that a trapezoidal carapace with the lateral margins somewhat converging backward. In our specimen, the lateral margins of the carapace are slightly converging backwards. Alcock (1900) stated that the lateral margins of the carapace of this species were slightly converging backwards. We assume that De Man (1888) was inaccurate in stating the shape of the carapace. The geographical range of this species is substantially extended north from the Malay Peninsula.

Nanosesarma andersoni is most similar to *N. nunongi* (Tweedie, 1950) in having a non-setose dorsal surface of the carapace and the absence of a conspicuous epibranchial tooth

(Tweedie, 1950). The possession of a single pectinated crest on the dorsal surface of the cheliped palm and the presence of a short transverse ridge posterior to the upper orbital margin seem to distinguish *N. andersoni* from *N. nunongi*. In *N. nunongi*, there are two pectinated crests on the dorsal surface of the palm; the carapace lacks a short transverse ridge posterior to the upper orbital margin. From the other local species of the Sesarmitidae, *N. andersoni* can be easily separated by the ambulatory meri armed with strong spines on the posterior margins and the non-setose carapace lacking an epibranchial tooth.

***Perisesarma semperi* (Bürger, 1893)**

(Figs. 1E, 6, 7)

Sesarma semperi Bürger, 1893: 630, pl. 21, fig. 1; Tweedie, 1950: 342, fig. 1e.

Sesarma (*Perisesarma*) *semperi* - De Man, 1902: 542.

Sesarma (*Chiromantes*) *semperi* - Tesch, 1917: 198.

Sesarma (*Chiromantes*) *semperi* *semperi* - Campbell, 1967: 4 (key).

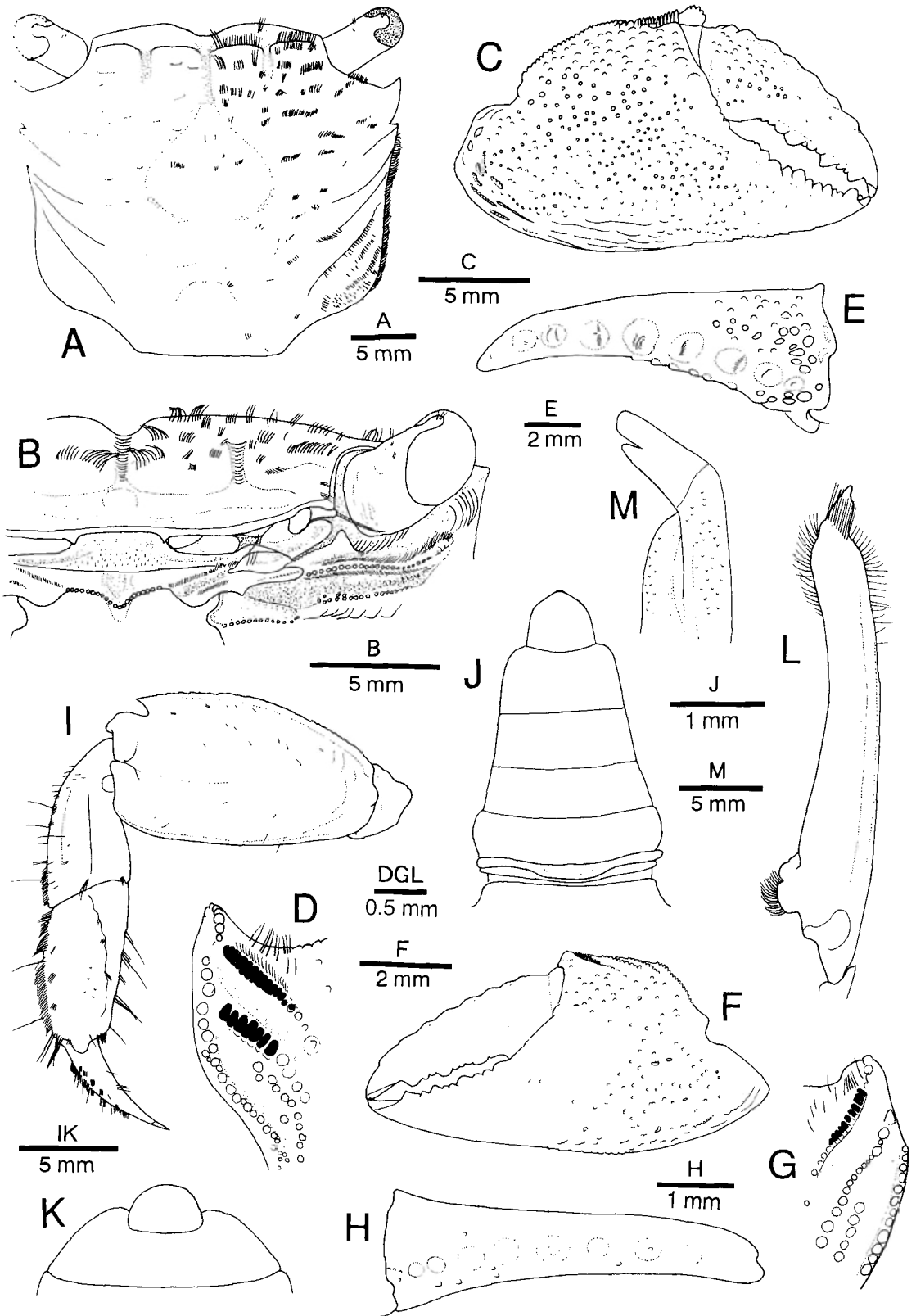
Perisesarma semperi - Rahayu and Davie, 2002: 605.

Perisesarma semperi semperi - Nakasone and Irei, 2003: 272 (key), 275.

Material examined. Iriomote Island: Funaura, mangrove swamps, upper intertidal, 23 March 1997, coll. T. Komai, 2 males cw 17.7, 26.0 mm, 1 female 21.7 mm (CBM-ZC 3761); Yonada-gawa estuary, Hoshidate, mangrove swamps, 6 July 1998, coll. T. Komai, 1 male cw 27.8 mm, 1 female cw 15.5 mm (CBM-ZC 7192); Funaura, mangrove swamps, upper intertidal, 8 July 1998, coll. T. Komai, 1 male cw 16.8 mm (CBM-ZC 7231).

Comparative material. *Perisesarma bidens* (De Haan, 1835). Kume-jima Island: Tomari,

Fig. 6. *Perisesarma semperi* (Bürger, 1893). A-E, I, J, L, M, male from Hoshidate, Iriomote Island (cw 27.8 mm; CBM-ZC 7192); F, G, K, female from same lot (cw 15.5 mm). A, carapace and eyes, dorsal view (setae omitted on left side); B, anterior part of carapace and cephalic appendages, left side, anterior view (setae partially omitted); C, F, chela, outer view (C, right; F, left); D, G, distomesial part of dorsal surface of palm (D, right; G, left), showing pectinated crests, dorsal views; E, H, dactylus of chela, dorsal view (E, right; H, left; setae omitted); I, left fifth pereopod; dorsal view; J, abdomen, ventral (outer) view (setae omitted); K, sixth abdominal somite and telson, ventral view (setae omitted); L, left first gonopod, mesial view; M, same, distal part, lateral view (setae removed).



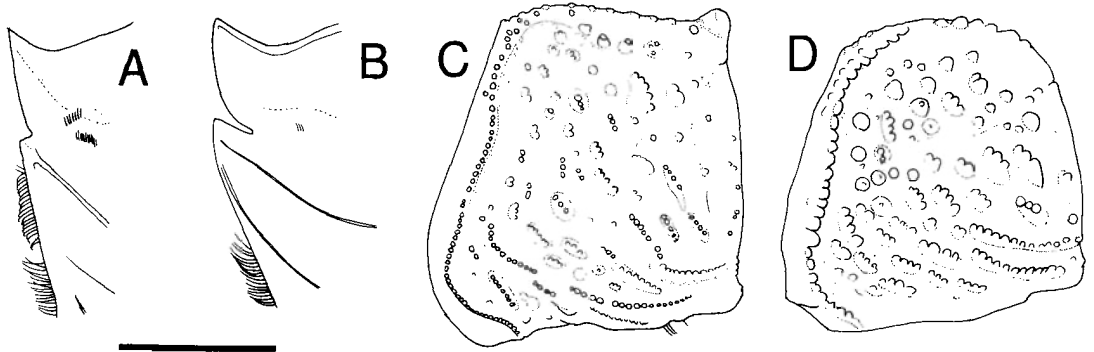


Fig. 7. A, C, *Perisesarma semperi* (Bürger, 1893), male from Hoshidate, Iriomote Island (cw 27.8 mm; CBM-ZC 7192); B, D, *Perisesarma bidens* (De Haan, 1835), male from same locality (cw 22.0 mm; CBM-ZC 3753). A, B, exorbital tooth and anterolateral margin of carapace, dorsal view; C, D, carpus of right cheliped, dorsal view.

upper intertidal, 12 June 1995, coll. T. Komai, 4 males cw 13.9–14.5 mm, 2 females cw 17.7, 21.5 mm (CBM-ZC 3131). Iriomote Island: Hoshidate, Yonada-gawa river mouth, upper intertidal, 23 March 1997, coll. T. Komai, 2 males cw 17.0, 22.0 mm, 1 female 16.3 mm (CBM-ZC 3753); Hoshidate, mangrove swamps, upper intertidal, 6 July 1998, coll. T. Komai, 2 females cw 16.7, 17.2 mm (CBM-ZC 7404).

Description. Carapace (Figs. 1E, 6A) rectangular; greatest width between exorbital angles about 1.3 times carapace length. Front 0.55–0.60 times as wide as exorbital width, moderately deflexed, with broad median notch and shallow concavity accommodating antennal peduncle just mesial to preorbital angle; preorbital angle weakly produced and bluntly pointed. Dorsal surface of carapace with tufts or short transverse rows of short stiff setae (tufts of setae sparse on posterior part); two distinct post-frontal lobes on either side of midline, mesial lobe broader than lateral lobe, separated by deep furrow; regions moderately well indicated; lateral branchial ridges rather obsolete, each accompanied by row of short stiff setae. Exorbital angle sharply pointed. Lateral margin of carapace slightly concave, with small subacute epibranchial tooth defined by relatively shallow V-shaped notch (Fig. 7A). Upper orbital margin faintly sinuous; lower orbital margin (Fig. 6B) minutely granular, with small, triangular inner orbital tooth not reaching to preorbital angle of front.

Antennule and antenna (Fig. 6B) separated by incomplete septum. Basal segment of antennule subrectangular. Antenna set obliquely; second segment with elongate distolateral process reaching distal margin of fourth segment; flagellum relatively short, but extending into orbit.

Epistome (Fig. 6B) concave on outer surface, covered with very short setae; ventral margin granular, protuberant medially, extending onto anterior part of buccal cavity as short ridge.

Third maxilliped with exopod bearing well-developed flagellum.

Male chelipeds (Fig. 1E) subequal or slightly unequal, large, robust. Merus with anteroventral margin tuberculate, bearing large, subdistal triangular tooth; dorsal margin sharply carinate, tuberculate, with small subdistal tooth; posterior surface with numerous transverse rows of granules. Carpus (Fig. 7C) with inner angle not produced, inner margin granular; dorsal surface with scattered short to moderately long, transverse rows of small granules or tubercles; inner surface with longitudinal row of tiny granules on midline. Palm (Fig. 6C, D) with 2 obliquely transverse pectinated crests each followed by row of small, rounded tubercles and few tufts of short stiff setae distally on dorsal surface; first crest composed of 13–15 long corneous teeth; second crest well developed, shorter than first, with 7–9 wider corneous teeth; 1 additional row of small tubercles proximomesial to second crest; dorsal inner

margin of palm bordered by small, rounded tubercles, distal portion faintly dentate; outer surface of palm convex, naked, covered with very small, low, rounded tubercles, but without trace of ventral ridge; inner surface also covered with small, low tubercles; ventral surface (including fixed finger) with sharper tubercles; fixed finger straight, cutting edge terminating in trifid corneous claws, with row of small, rounded or pointed teeth. Dactylus (Fig. 6C, E) slightly longer than palm, terminating in bifid corneous claw; dorsal surface bearing 6–8 tubercles widely spaced and becoming lower toward tip; each tubercle dome-like, with microscopic striae running parallel to longitudinal axis of dactylus; inner dorsal margin of dactylus with row of small, rounded tubercles in proximal half; outer surface with scattered small to very small tubercles proximally; cutting edge with row of triangular or blunt teeth; narrow hiatus between fingers.

Female chelipeds proportionally smaller than those of males, but generally similar in structure. Palm (Fig. 6F, G) with 1 pectinated crest composed of corneous teeth (corneous teeth more slender than those of males) and 2 granular ridges subparallel to inner dorsal margin; inner surface less granular. Dactylus (Fig. 6F, H) with 7 or 8 dome-like tubercles, distal-most tubercle very low, obsolete; inner dorsal margin with short row of small tubercles proximally.

Ambulatory legs (Figs. 1E, 6I) moderately short, fourth pereopod longest. Meri broad, foliaceous, each armed with sharp subdistal tooth on anterior margin, but unarmed on posterior margin, merus of fourth pereopod about twice as long as wide; dorsal surfaces of meri of third and fourth pereopods each with short, occasionally tuberculate or granular, transverse ridges. Carpi each with 2 distinct carinae on dorsal surface. Propodi stout, with dense stiff setae on outer surfaces and row of darkly pigmented corneous spines on inner distal margin. Dactyli 0.7–0.8 times as long as propodi, devoid of corneous spines or spinules, but with some longitudinal rows of short stiff setae. No prominent tufts of long setae on coxae of ambulatory legs.

Anterior sternal plate triangular; surface

slightly concave, heavily setose. Fourth sternite of male with dense soft setae on anterior part. Abdominal cavity in males not reaching to suture between third and fourth sternites.

Male abdomen (Fig. 6J) moderately wide. Telson as long as broad at base, evenly rounded, slightly shorter than sixth abdominal somite. Sixth abdominal somite longer than fifth somite, strongly convex at anterolateral angle; width across anterolateral angles distinctly greater than basal width of telson.

Female abdomen with telson (Fig. 6K) evenly rounded, shorter than basal width and shorter than mid-line length of sixth abdominal somite.

First gonopod (Fig. 6L) rather slender, slightly curved; corneous terminal process (Fig. 6M) somewhat elongate, bent at about 30°, with deep, narrow notch distally.

Coloration. Carapace and ambulatory legs generally dark brown. Merus and carpus of chelipeds also dark brown; outer surface of chelae dark reddish brown.

Distribution. Singapore, Labuan, Malaysia, Philippines, southern Ryukyu Islands (Ishigaki and Iriomote islands), and southwestern Irian Jaya, Indonesia. (Bürger, 1893; De Man, 1902; Tesch, 1917; Ward, 1941; Tweedie, 1950; Tan and Ng, 1994; Rahayu and Davie, 2002; Nakasone and Irei, 2003; this study).

Ecological notes. This species occurs in coastal or sheltered mangrove swamps, but it is not common in the Ryukyu Islands. The congeneric *P. bidens* was occasionally found sympatrically.

Remarks. According to Rahayu and Davie (2002), the following 16 species are assigned to the genus *Perisesarma* De Man, 1895 at present: *P. bengalense* Davie, 2003; *P. bidens* (De Haan, 1835); *P. brevicristatum* (Campbell, 1967); *P. cricotus* Rahayu and Davie, 2002; *P. darwinensis* (Campbell, 1967); *P. dussumieri* (A. Milne Edwards, 1853); *P. eumolpe* (De Man, 1895); *P. foresti* Rahayu and Davie, 2002; *P. guttata* (A. Milne Edwards, 1869); *P. haswelli* (De Man, 1887); *P. indiarum* (Tweedie, 1940); *P. lividum* (A. Milne Edwards, 1869); *P. longicristatum* (Campbell, 1967), *P. messa* (Campbell, 1967); *P. onychophorum* (De Man, 1895); and *P. semperi* (Bürger, 1893). In

Japanese waters, this genus has long been represented only by *P. bidens* until Nakasone and Irei (2003) recorded this species (as *Perisesarma semperi semperi*) from Ishigaki and Iriomote Islands. However, Nakasone and Irei (2003) did not retain voucher specimens. The presence of this species in Japanese waters is here confirmed based on specimens from Iriomote Island.

Perisesarma semperi is characterized by having six to eight, similarly shaped dactylar tubercles, which are circular and widely spaced. In most other congeneric species, the dactylar tubercles count more than eight. *Perisesarma onychophorum* also has relatively few dactylar tubercles, counting seven to nine (Tesch, 1917), but *P. onychophorum* can be immediately distinguished because the distalmost dactylar tubercle is greatly elongate and occupies nearly one-quarter of the length of the dactylus.

It is useful to compare *P. semperi* and *P. bidens*, as the two species sometimes occur sympatrically in the Ryukyu Islands. Other than the number of dactylar tubercles, the following characters can be used to discriminate the two species. The notch defining the epibranchial tooth is shallower in *P. semperi* (Fig. 7A) than in *P. bidens* (Fig. 7B), thus the epibranchial tooth of *P. semperi* is less clearly defined. The striae on the lateral part of the dorsal surface of the carapace are less clearly demarcated in *P. semperi* (Fig. 7A) than in *P. bidens* (Fig. 7B). The outer surface of the palm of the male chela is covered with very small tubercles in *P. semperi*, rather than coarse tubercles in *P. bidens*. The tubercles on the dorsal surface of the carpus are also much smaller in *P. semperi* (Fig. 7C) than in *P. bidens* (Fig. 7D), and this character is useful for both male and female. Finally, the color of the chela is different between the two species. In *P. semperi*, the chela is dark reddish brown, while it is yellowish brown in *P.*

bidens.

***Sesarmoides kraussi* (De Man, 1887)**

(Figs. 1G, 8)

Sesarma kraussi De Man, 1887: 652; 1888: 193, pl. 14, figs. 1–3; Alcock, 1900: 425.

Sesarma (*Sesarma* s.s.) *kraussi* - Tesch, 1917: 164; Tweedie, 1936: 51; 1954: 119; Guinot and Crosnier, 1964: 212, figs. 1–3, 6.

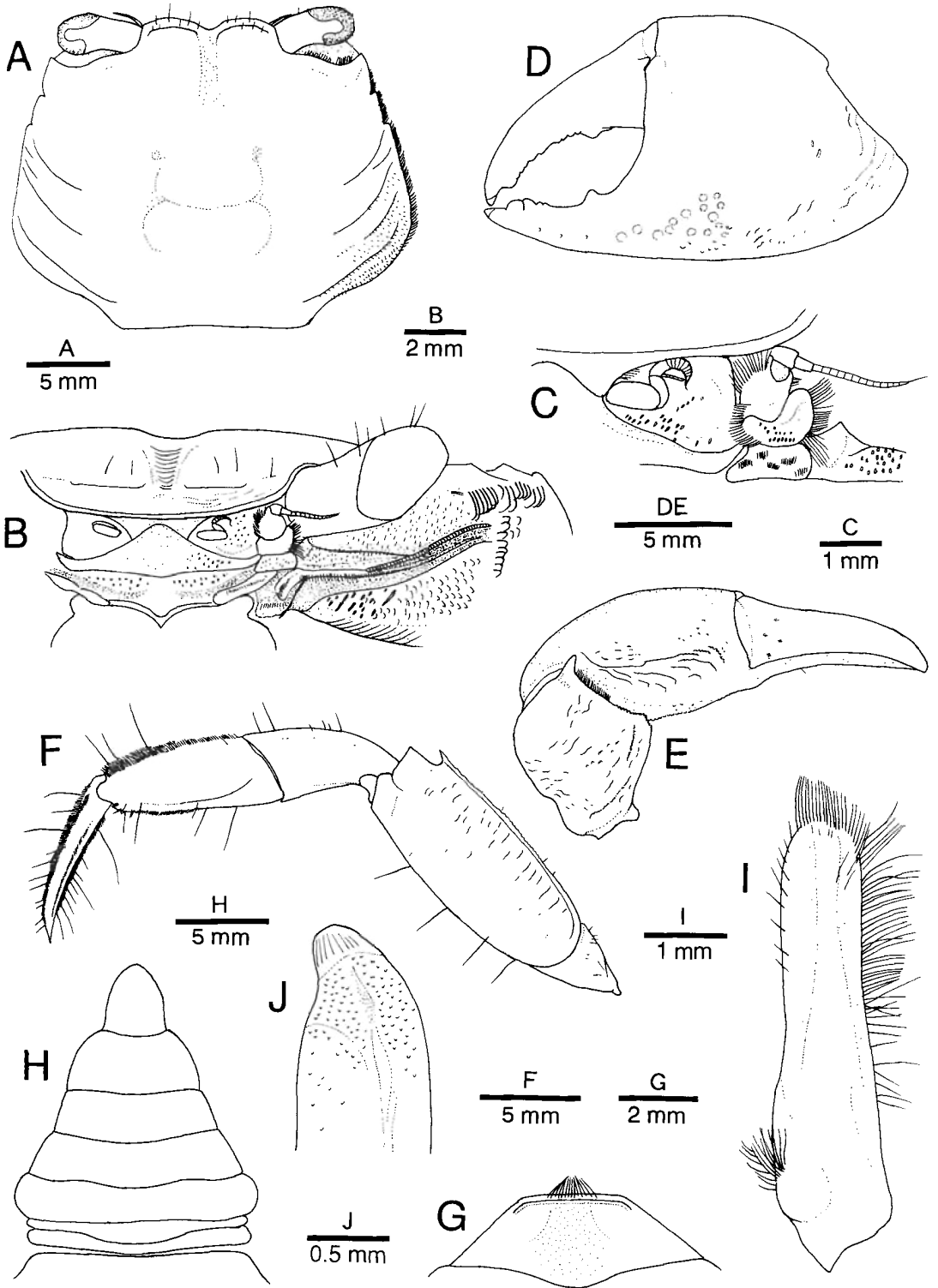
Sesarmoides kraussi - Serène and Soh, 1970: 403; Ng, 2002: 434 (key).

Material examined. Iriomote Island: Shirahama, outer edge of mangrove swamp, upper intertidal, burrow under stone, 13 July 2002, coll. T. Komai, 1 male cw 23.7 mm (CBM-ZC 7401); Kuira-gawa river mouth, mangrove swamps, 14 July 2003, coll. T. Saki, 1 male cw 23.4 mm (CBM-ZC 7417); Yukishida-gawa river mouth, mangrove forest, 19 October 2001, coll. T. Naruse, 1 young male cw 5.8 mm (RUMF-ZC-130); Urauchi River, landward edge of mangrove forest, 26 February 2003, coll. T. Nagai and A. Yogi, 1 male cw 9.3 mm, 1 female cw 13.6 mm (RUMF-ZC-131). Ishigaki Island: Miyara-gawa river mouth, 29 June 2003, coll. A. Nomoto, 1 young male cw 9.3 mm (CBM-ZC 7533).

Comparative material. Phuket, Thailand: Ao Nam Bor, landward edge of mangrove swamp, under stone, 25 October 1995, coll. T. Komai, 1 male cw 14.3 mm, 1 juvenile cw 6.9 mm (CBM-ZC 2333).

Description. Carapace (Fig. 1F, 8A) trapezoidal with lateral margins notably diverging backwards; greatest width between posterolateral corners about 1.3 times carapace length. Front about 0.4 times as wide as ex-orbital width, weakly deflexed, with broad median notch; preorbital angle rounded. Dorsal surface apparently shining, but minutely punctate, with sparse very short setae; post-frontal lobe on either side of midline low, not divided; regions moderately well in-

Fig. 8. *Sesarmoides kraussi* (De Man, 1887). Male from Shirahama, Iriomote Island (cw 23.4 mm; CBM-ZC 7401). A, carapace and eyes, dorsal view (setae omitted on left side); B, anterior part of carapace and cephalic appendages, left side, anterior view; C, left antennule, antennal and inner orbital tooth, anterior view; D, left chela, outer view; E, carpus and chela of left cheliped, dorsal view; F, left fifth pereopod, dorsal view; G, anterior sternal plate, ventral view (setae partially omitted); H, abdomen, ventral (outer) view (setae omitted); I, left first gonopod, mesial view; J, same, distal part, lateral view (setae removed).



licated; lateral branchial striae weak, granular, occasionally lined with very short setae. Exorbital angle sharply pointed, but not strongly produced. Lateral margin with 2 blunt epibranchial teeth, both defined by U-shaped notch; second tooth much smaller than first tooth. Upper orbital margin faintly sinuous, slightly oblique; lower orbital margin (Fig. 8B) composed of 2 ridges, upper ridge sharply crested, minutely granular, not reaching level of base of antenna, lower ridge less sharp, not granular but setose; inner orbital tooth very small, subtriangular.

Antennule and antenna (Fig. 8B) contiguous. Basal segment of antennule relatively large, subtriangular. Antenna set vertically; second segment with short distolateral process not reaching distal margin of third segment; flagellum relatively short, but extending into orbit.

Epistome (Fig. 8B) concave on outer surface, with sparse setae; ventral margin smooth, protuberant medially, extending onto anterior part of buccal cavity as short ridge.

Male chelipeds (Fig. 1G) subequal or slightly unequal, large, robust. Merus with inner ventral margin nearly smooth or faintly granular, lacking prominent tooth; dorsal margin sharply carinate, faintly tuberculate, but without conspicuous tooth; outer surface with numerous short transverse ridges. Carpus (Fig. 8E) with inner angle not markedly produced; dorsal surface with few short to moderately long ridges; inner surface narrow, smooth. Palm (Fig. 8D, E) lacking pectinated crests on dorsal surface; dorsal inner margin of palm bordered with low, branched ridge; outer surface of palm convex, almost smooth, but with sparse very short setae, without trace of ventral ridge; ventrodistal part of outer surface with 14–16 low, rounded tubercles, extending onto fixed finger as short row; inner surface with scattered low, rounded tubercles; ventral surface (including fixed finger) nearly smooth. Tips of fingers pointed, terminating in simple corneous claw. Fixed finger straight in young individuals, weakly curved in adults, cutting edge with row of small teeth in young individuals, with 2 small, but prominent teeth (distal tooth at subterminal posi-

tion) in adults. Dactylus longer than palm, straight in young individuals, weakly curved in adults; dorsal surface almost smooth except for proximal part bearing few very small tubercles; cutting edge similarly armed as fixed finger, but adults bearing several rudimentary teeth between 2 prominent teeth; broad hiatus between fingers in adults.

Ambulatory legs (Figs. 1G, 8F) long; fourth pereopod noticeably elongated, 2.3–2.7 times as long as carapace width. Each merus armed with sharp subdistal tooth on anterior margin, but unarmed on posterior margin, merus of fourth pereopod about 3.5 times as long as wide; dorsal surfaces of meri of third and fourth pereopods each with sparse granules or very short ridges. Carpi each with 2 faint longitudinal ridges on dorsal surface. Propodi slender, with 1 or 2 black corneous spinules at inner distal margin; setation different among pereopods; propodus of second and third pereopods with mat of dense short setae on both outer and inner surfaces, that of fourth pereopod with narrow longitudinal band of very short setae on distal halves of both outer and inner surfaces, that of fifth pereopod with mat of dense short setae on whole outer surface and narrow band of short setae on distal half of inner surface. Dactyli 0.7–0.8 times as long as propodi, devoid of corneous spines; outer and inner surfaces each covered with short setae mixed with several longish setae; dorsal and ventral surfaces each with 2 longitudinal bands of short setae on either side of naked midline. Prominent tufts of long setae present on anteroventral surfaces of coxae of third and fourth pereopods.

Anterior sternal plate (Fig. 8G) trapezoidal; surface somewhat concave, with sparse short setae. Fourth sternite of male with dense soft setae on anterior part. Abdominal cavity in males not reaching to suture between third and fourth sternites.

Male abdomen (Fig. 8H) relatively wide, somewhat narrowed at base of telson. Sixth somite, with strongly convex lateral margins, distal margin slightly concave, length 0.44–0.45 times as wide as basal width, longer than fifth somite. Telson distinctly longer than basal width and slightly longer than sixth abdominal somite, lateral margins

weakly convex, terminal margin rounded.

First gonopod (Fig. 8I) stout, almost straight; corneous terminal process (Fig. 8J) short, slightly bent, broadly rounded or truncate distally, without notch.

Coloration. Large individuals entirely dark purplish brown in dorsal view; outer surface of chelae generally light yellowish brown, but becoming darker toward dorsal surface. Small immature specimen bearing reddish pereopods, with propodus and proximal half of dactylus of fourth pereopod being whitish.

Distribution. Mergui Archipelago (type locality), west coast of Malay Peninsula, and southern Ryukyu Islands (Ishigaki and Iriomote islands) (De Man, 1888; Alcock, 1900; Tweedie, 1936; Tan and Ng, 1994; this study).

Ecological notes. The specimens from Iriomote Island were found burrowing in well drained areas of sandy mud near the seaward edge of mangrove swamps. As mentioned before, *Clistocoeloma villosum* was occasionally found in the same habitat.

Remarks. Our specimens agree generally with the previous descriptions of *Sesarmoides kraussi* by De Man (1888, as *Sesarma kraussi*) and Guinot and Crosnier (1964, as *Sesarma* (*Sesarma*) *kraussi*) except for the much stouter chela. In his key to species of the genus *Sesarmoides*, Ng (2002) mentioned that the outer surface of the fixed finger of the chela bears a distinct longitudinal row of small conical tubercles in *S. kraussi*. Guinot and Crosnier (1964) also mentioned the presence of a row of conspicuous tubercles on the outer surface of the fixed finger. However, in the present specimens, the number and shape of the tubercles are rather variable. In adult male specimens examined here, no distinct row of small conical tubercles is seen on the outer surface of the fixed finger, but there are patch of low, rounded tubercles at the base of the fixed finger, two or three of which extend onto the fixed finger in a very short row. The young male specimen from Ishigaki and Iriomote islands (cw 5.3–9.3 mm) do not have conspicuous tubercles on the outer surface of the palm. The young male specimen from Phuket (cw 14.3 mm) has a row of five low tubercles on the proximal part of the fixed finger; the much smaller male specimen from the same lot (cw 6.9 mm) lacks tubercles on

the fixed finger. Variations in the development of the row of tubercles on the palm is probably size-related.

Sesarmoides kraussi is most similar to *S. borneensis* (Tweedie, 1950) in the features of the carapace, chelae, and ambulatory legs. *Sesarmoides kraussi* can be distinguished from *S. borneensis* by minor differences in the chela and male abdomen (Ng, 2002). The tubercles on the fixed finger of the chela are more numerous (eight to 13) and less elongate in *S. kraussi*, rather than less numerous (three to five) and more elongated in *S. borneensis*. The sixth somite of the male abdomen is slightly shorter than half the proximal width in *S. kraussi*, slightly longer in *S. borneensis*. In our specimens, the number of tubercles on the outer surface of the chela is 14–16, and the sixth abdominal somite of male is 0.44–0.45 times as long as the proximal width. Therefore, we refer the two adult specimens from Iriomote Island to *Sesarmoides kraussi* with little hesitation. An additional character that may be useful in discriminating *S. kraussi* and *S. borneensis* is the shape of the dactyli of the ambulatory legs, which appears less slender in *S. kraussi* than in *S. borneensis* (see Ng, 2002, fig. 1).

Among the local sesarmid species, this species is readily recognized by the trapezoidal carapace with markedly posteriorly diverging lateral margins, the presence of two distinct epibranchial teeth, the lack of pectinated crests on the dorsal surface of the palm of the chela and the noticeably elongate third and fourth pereopods. Some other characters, such as the relatively large basal segment of the antennular peduncle, vertically standing antennal peduncle broadly in touch with the inner part of the orbit, and the sharp suborbital crest, and the trapezoidal anterior thoracic plate are also useful in distinguishing *S. kraussi* from other sesarmid species in local waters.

Sesarmoides currently contains 14 species from the Indo-Pacific region (Ng, 2002), but none has been reported from Japanese waters.

***Stelgitra stormi* (De Man, 1895)**

(Figs. 1F, 9)

Sesarma (*Sesarma*) *stormi* De Man, 1895: 148;

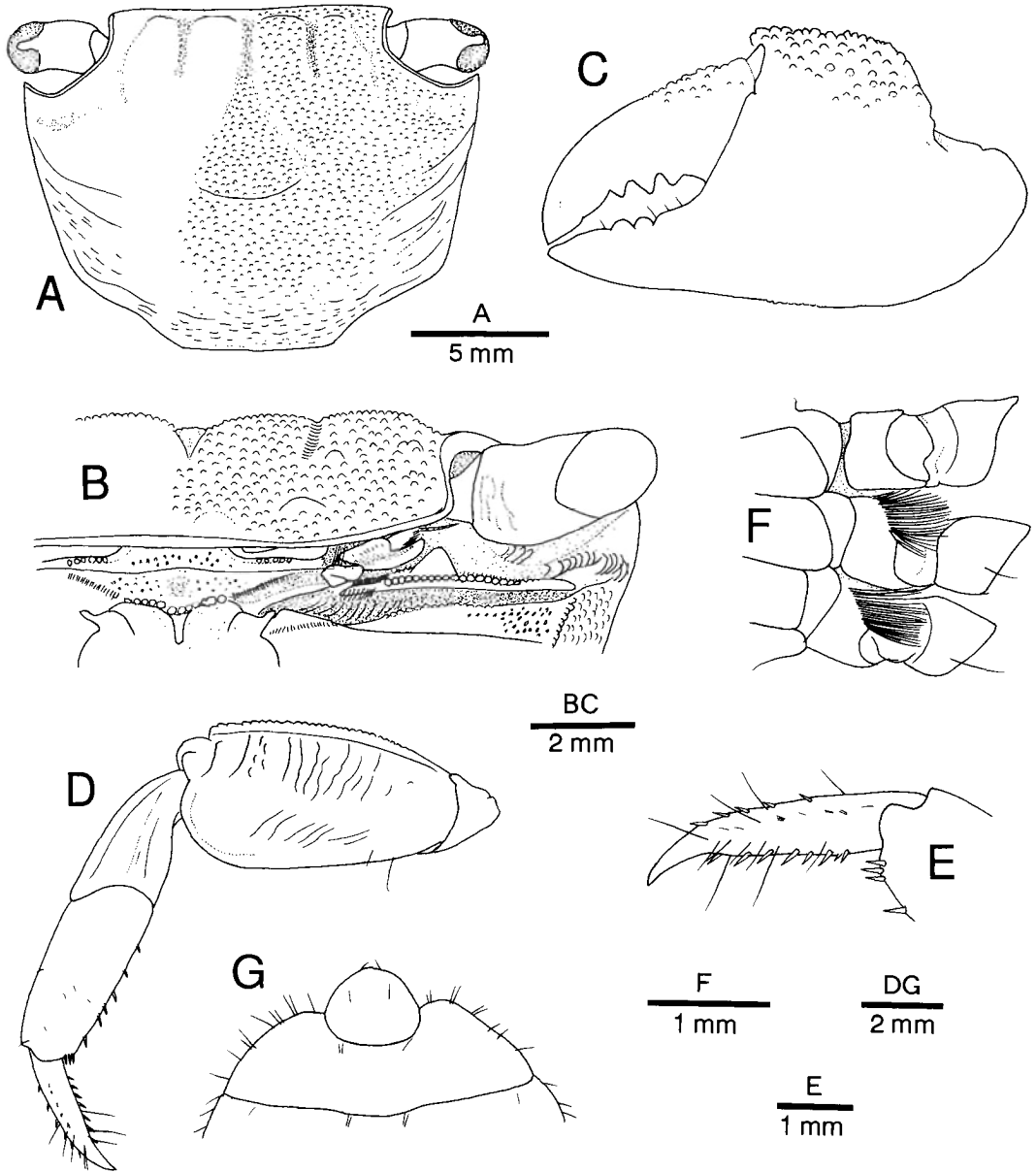


Fig. 9. *Stelgistra stormi* (De Man, 1895). A–E, G, female from Hoshizuna Beach, Iriomote Island (cw 16.2 mm; CBM-ZC 7378); F, male from same lot (cw 11.7 mm). A, carapace and eyes, dorsal view (dorsal ornamentation omitted on left side); B, anterior part of carapace and cephalic appendages, left side, anterior view; C, left chela, outer view; D, left fifth pereopod, dorsal view; E, same, dactylus and distal part of propodus, dorsal view; F, coxae of left second to fourth pereopods, ventral view; G, sixth abdominal somite and telson, ventral view.

1898: 702, pl. 29, fig. 29.

Sesarma (Holometopus) stormi - Tesch, 1917: 200, 237.

Stelgistra stormi - Ng and Liu, 1999: 234, figs. 5-10.

Material examined. Iriomote Island: Hoshizuna Beach, crevice on rock, supra-littoral, 5 July 2001, coll. T. Komai, 2 males cw 11.1, 13.3 mm (CBM-ZC 7062); same locality, 12 July 2002, 1 male cw 11.7 mm, 1 ovigerous female cw 16.2 mm (CBM-ZC 7378); same locality, 21 July 2001, coll. M. Osawa, 1 male cw 14.3 mm, 1 ovigerous female cw 16.0 mm (CBM-ZC 7416).

Description. See Ng and Liu (1999).

Supplemental description. Front with broadly rounded preorbital angle (Fig. 9B). Inner orbital tooth triangular, falling far short of preorbital angle of front. Suborbital ridge bordered by small tubercles.

Antennal region (Fig. 9B) narrow, partially overhung by deflexed front. Basal segment of antennular peduncle transversely oblong, only ventral portion visible in frontal view. Antennule and antenna separated by narrow hiatus, but without septum between them. Antenna set obliquely; second segment deeply concave on outer surface, bearing elongate ventrolateral process; antennal flagellum short.

Epistome (Fig. 9B) concave on outer surface, ventral margin bordered by rounded tubercles, protuberant medially, extending onto anterior part of buccal cavity as short ridge.

Female abdomen moderately broad; telson (Fig. 9G) roundly subtriangular, slightly longer than mid-line length of sixth abdominal somite.

Coloration. See Ng and Liu (1999).

Distribution. Aceh, northern Sumatra, Indonesia (type locality), Kenting National Park, Pingtung County, southern Taiwan, and southern Ryukyu Islands (Iriomote Island,); supra-littoral (De Man, 1895; Ng and Liu, 1999; this study).

Ecological notes. As Ng and Liu (1999) mentioned, this species occurred only on highly eroded dead coral heads in the supra-littoral or intertidal zone 1 to 1.5 m above the surface of the water. The crab seemed to

move according to the changing of tidal level. Ng and Liu (1999) stated that the crab hides in deep crevices or holes in rock during the day. However, we encountered active crabs climbing on the rock surface during the day.

Remarks. In the key to the Indo-Pacific genera of Sesarmidae, Serène and Soh (1970) defined the genus *Holometopus* for species characterized by the antenna excluded from the orbit, the lateral margin of the carapace devoid of the trace of an epibranchial tooth, and the dorsal surface of the palm of the male chela bearing only one pectinated ridge, or having none at all. Although Serène and Soh (1970) did not list species assigned to *Holometopus*, Serène (1968) had earlier listed 13 species *Holometopus* (as a subgenus of *Sesarma*), including *Sesarma stormi* known at that time by the type series from northern Sumatra. Holthuis (1977) clarified nomenclatural confusion in sesarmid genera. He showed that *Chiromantes* is a senior synonym of *Holometopus*, as the type species of the two genera was the same, *Grapsus haematocheir* De Haan, 1833. Recently, Ng and Liu (1999) redescribed *Sesarma stormi* and reassigned it to the newly established genus *Stelgistra* based on a single syntype and supplemental specimens newly discovered from southern Taiwan.

The present specimens from Iriomote Island closely agree with the detailed redescription of *Stelgistra stormi* by Ng and Liu (1999). Therefore, we have no hesitation in assigning our specimens to this species. As mentioned before, this species has been reported only twice, from the type locality in the northern part of Sumatra, and from the southern part of Taiwan. Our specimens extend the geographical range of this rare species slightly to the north.

As Ng and Liu (1999) noted, *Stelgistra stormi* is similar to species of *Chiromantes* in the characters mentioned by Serène and Soh (1970). *Stelgistra stormi* can be easily distinguished from species currently assigned to *Chiromantes* by the spoon-shaped tips of the fingers of the chela (Figs. 1F, 9C). Furthermore, the markedly trapezoidal carapace (Fig. 9A), the broadly foliaceous meri of the ambulatory legs (Fig. 9D), the dactyli of the

ambulatory legs armed with a row of corneous spinules on the inner margins (Fig. 9E), and the presence of dense tufts of soft setae on the coxa of the third and fourth somites (Fig. 9F) are also useful in recognizing this species. The carapace of most species of *Chiromantes* is squarish, except for *C. obtusifrons* Dana, 1851, which has a markedly trapezoidal carapace. The presence of the dense tufts of soft setae on the third and fourth pereopods is also known in *C. eulimene* (De Man, 1898), *C. obtusifrons*, and *C. ortmanni* (Crosnier, 1965) (cf. Ng and Liu, 1999).

Family Varunidae

***Ptychognathus capillidigitatus* Takeda, 1984**

(Fig. 10)

Ptychognathus capillidigitatus Takeda, 1984:

117, figs. 1–4; Marumura, 1994: 65, fig. 1; Nomoto *et al.*, 1999: 6, pl. 1–3; Kishino *et al.* 2001b : 127 ; Nakasone and Irei, 2003: 274, fig. 48.

Material examined Iriomote Island: Urauchi, river mouth of unnamed small river, under stone, 12 July 1998, coll. T. Komai, 1 male cw 5.5 mm (CBM-ZC 7135); Nishi-Gehda-gawa river mouth, under stone, 11 July 2002, coll. T. Komai, 1 male cw 4.7 mm (CBM-ZC 7406); Gehda-gawa river mouth, 16 July 2000, coll. T. Komai, 3 males cw 5.7–9.1 mm, 2 ovigerous females cw 5.3, 5.8 mm (CBM-ZC 7415).

Comparative material. Fukuro, Kushimoto, Kii Peninsula, under stone, 24 October 1984, coll. K. Wada, 2 males cw 5.9, 7.3 mm, 1 female cw 7.6 mm (CBM-ZC 5208).

Description. See Takeda (1984).

Supplemental description. Carapace (Fig. 10

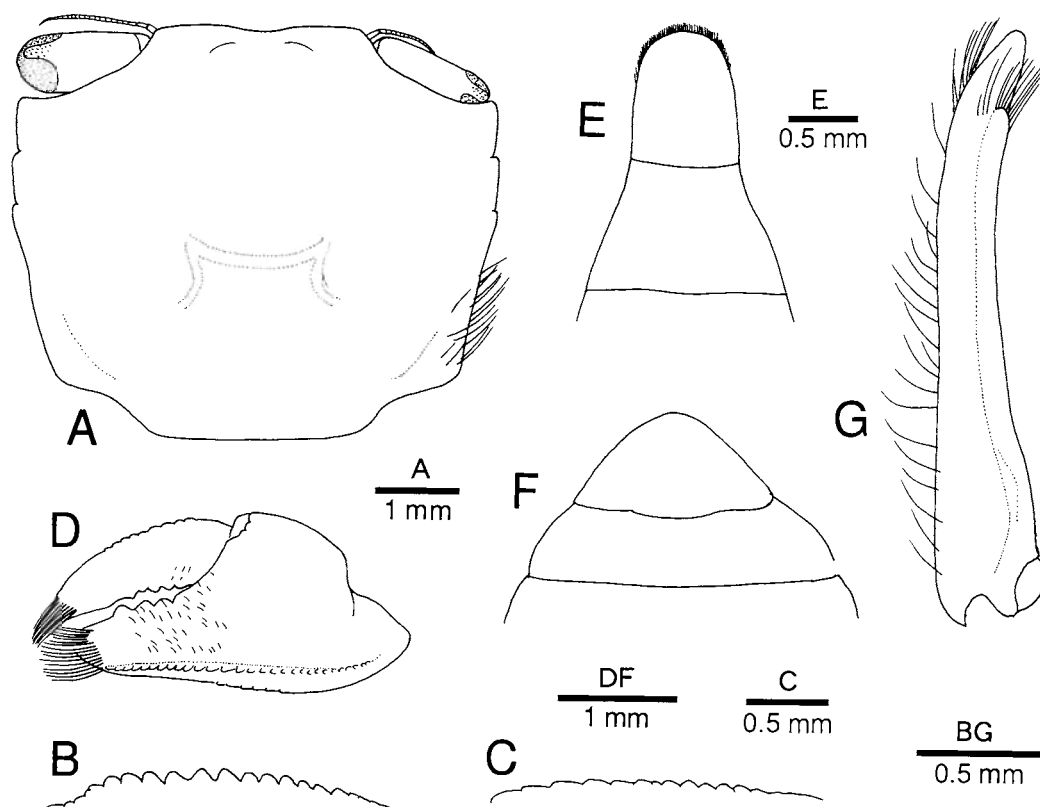


Fig. 10. *Ptychognathus capillidigitatus* Takeda, 1984. A, B, D, F, ovigerous female from Gehda-gawa river mouth, Iriomote Island (cw 5.3 mm; CBM-ZC 7415); C, E, G, male from same lot (cw 9.1 mm). A, carapace, eyes and antennae, dorsal view; B, C, left lower orbital margin, ventral view; D, left chela, outer view; E, F, sixth abdominal somite and telson, ventral view; G, left first gonopod, lateral view.

A) nearly quadrate, greatest width across ex-orbital angles or first epibranchial teeth; lateral margins with 2 small, blunt epibranchial teeth, posterior half slightly converging backwards. Tubercles on suborbital border more conspicuous in females (Fig. 10B) than in males (Fig. 10C).

Female chela (Fig. 10D) with conspicuous tuberculate ventral ridge on outer surface; fixed finger with scattered short setae on outer surface in basal half; fingers each with subterminal tuft of long stiff setae; dactylus with few short setae basally on outer surface and low tubercles on dorsal surface.

Male telson (Fig. 10E) about twice as long as wide, lateral margins nearly parallel, terminal margin broadly rounded. Female abdomen moderately broad; telson triangular (Fig. 10F), about 1.8 times as long as wide and distinctly longer than sixth abdominal somite.

First gonopod (Fig. 10G) almost straight in ventral view, slightly curved dorsally in lateral view, moderately slender, terminal corneous process relatively long, partially obscured by tufts of setae; subterminal process obsolete, with tuft of long setae.

Coloration. Generally dark brown in dorsal view.

Distribution. So far known only from Japan: Kii Peninsula (type locality) and central to southern Ryukyu Islands (Amami-Oshima, Okinawa, and Iriomote islands) (Kishino *et al.*, 2001; Nakasone and Irei, 2003; this study).

Ecological notes. This species occurred at the mouth of small rivers strongly influenced by seawater. Crabs were found to hide under stone. Reproductive characteristics were reported by Fukui and Wada (1986).

Remarks. Our specimens from Iriomote Island agree well with the original description of *Ptychognathus capillidigitatus* by Takeda (1984) and comparative material from topotypic locality (Kii Peninsula).

The taxonomy of the genus *Ptychognathus* is still in need of considerable study. Other than *P. capillidigitatus*, the following nine named species have been reported from East Asian waters (Sakai, 1976; Dai and Yang, 1991; Miyake, 1998; Nakasone and Irei, 2003): *P. affinis* De Man, 1895; *P. altimanus* (Rath-

bun, 1914); *P. barbatus* (A. Milne Edwards, 1873); *P. glaber* Stimpson, 1858; *P. hachijoen-sis* Sakai, 1955; *P. ishii* Sakai, 1939; *P. johannae* Rathbun, 1914; *P. pusillus* Heller, 1865; and *P. takahashii* Sakai, 1939. In addition to the 10 named species, there are still four undescribed species from Okinawa Island (Nakasone and Irei, 2003).

Ptychognathus capillidigitatus is readily distinguished from the 14 East Asian congeners by a suite of characters: the carapace with the greatest width across the exorbital or first epibranchial tooth; the presence of two epibranchial teeth behind the exorbital tooth; the chela having a tuft of long setae at the proximal part of the fixed finger in males and having a patch of very short setae at the same position in females; the fingers of the chela having subterminal tufts of brush-like setae; and the rather inconspicuous frontal median ridge consisting of a single row of small, low granules. The shape of the carapace and the possession of the subterminal tuft of setae on each dactylus and fixed finger of the chela are particularly useful in recognizing this species from the rest of the local crab fauna.

Acknowledgments

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日本から初めて記録されるイワガニ上科
(甲殻上綱: 十脚目: 短尾下目) 4 種の
報告および 4 稀種に関する分類学的情報の
補足

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本論文は、日本から初めて記録されるイワガニ上科カニ類を報告する研究の第 1 報である。本稿において、以下の 4 種を報告する: *Pachygrapsus planifrons* De Man, 1888 (イワガニ科: 新称イダテンイワガニ);

Nanosesarma andersoni (De Man, 1888) (ベンケイガニ科: 新称クチキヒメベンケイガニ); *Sesarmoides kraussi* (De Man, 1887) (ベンケイガニ科: 新称アシナガベンケイガニ); *Stelgistra stormi* (De Man, 1895) (ベンケイガニ科: 改称スマトライワベンケイガニ). これらの4種について, 同定の根拠を明確にすることと従来の記載を補足することを目的として, 記載と図を与えた. 酒井(2003)は, *Stelgistra stormi* を日本産種として扱っているが, 本種の正式な記録産地はタイ産地であるスマトラ島と台湾南部のみであった. さらにスマトライワガニという和名が酒井(2003)により与えられていたが, 本種はイワガニ科ではなく, ベンケイガニ科に所属するものであり, 所属を明示するために, 上記のように和名を訂正することを提唱する.

さらに, *Clistocoeloma villosum* (A. Milne-

Edwards, 1869) (ベンケイガニ科: フジテガニ), *Metasesarma obesum* (Dana, 1851) (ベンケイガニ科: イワトビベンケイガニ), *Perisesarma semperi* (Bürger, 1893) (ベンケイガニ科: フタバカクガニモドキ), *Ptychognathus capillidigitatus* Takeda, 1984 (モクズガニ科: ヒメヒライソモドキ) の4稀種について, 分類学的な補足情報を与えた. フジテガニの所属については議論があるが, 本論文ではウモレベンケイガニ属 *Clistocoeloma* に帰属させた. 酒井(2003)は, *C. villosum* と *M. obesum* (*Metasesarma rousseauxi* として) のそれぞれにサモアベンケイガニ, アカハマベンケイガニという和名を与えたが, 上記の和名がすでに提唱されており(野元他, 1999; 渡部・和田, 2002), これらの和名を適用するのが適切であると考え.