

TWO NEW SPECIES OF THE GENUS *GONEPLAX* (DECAPODA, BRACHYURA, GONEPLACIDAE) FROM EAST ASIA

BY

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ABSTRACT

Two new species of goneplacid crab, *Goneplax marivenae* and *G. megalops*, are described from the Philippines and Japan, respectively. Both new species are closely similar to *G. sigsbei* (A. Milne-Edwards, 1880) from the western Atlantic Ocean in the form of the carapace, eyestalk, fourth ambulatory leg, and male pleopods, but can be distinguished from *G. sigsbei* by the form of the orbit. Both new species are also similar to *G. maldivensis* Rathbun, 1902, but are distinguished from *G. maldivensis* by the form of the male abdomen. *Goneplax marivenae* is most closely similar to *G. megalops*, but can be distinguished from *G. megalops* by the form of the extraorbital tooth and the male first pleopod.

RÉSUMÉ

Deux espèces nouvelles de crabes Goneplacidae, *Goneplax marivenae* et *G. megalops*, sont décrites respectivement, des Philippines et du Japon. Les deux espèces nouvelles sont très proches de *G. sigsbei* (A. Milne-Edwards, 1880) de l'océan Atlantique occidental par la forme de la carapace, les pédoncules oculaires, la quatrième patte ambulatoire, et les pléopodes mâles, mais s'en distinguent par la forme de l'orbite. Les deux nouvelles espèces ressemblent également à *G. maldivensis* Rathbun, 1902, mais s'en distinguent par la forme de l'abdomen mâle. *Goneplax marivenae* est le plus proche de *G. megalops*, mais en diffère par la forme des dents extraorbitales et le premier pléopode mâle.

INTRODUCTION

The genus *Goneplax* Leach, 1814 currently consists of two species from the Atlantic Ocean, viz., *G. rhomboides* (Linnaeus, 1758) (the type species) and *G. sigsbei* (A. Milne-Edwards, 1880), and five species from the Indo-Pacific (Serène & Umali, 1972), viz., *G. sinuatifrons* Miers, 1886, *G. maldivensis* Rathbun, 1902, *G. renoculis* Rathbun, 1914, *G. wolfi* Serène, 1964, and *G. serenei* Zarenkov, 1972. Rathbun (1918) synonymized *Frevillea* A. Milne-Edwards, 1880 with *Goneplax*,

but Guinot (1969) clarified the identity of *Frevillea* and *Goneplax*, respectively. Serène & Soh (1976) established a new genus, *Singhaplax*, to accommodate two species of *Goneplax*, *G. ockelmanni* Serène, 1971 (the type species) and *G. nipponensis* Yokoya, 1933.

In February 2003, we had an opportunity to take a field trip to Balicasag Island, Bohol, Philippines, as a part of a research project of the National Science Museum, Tokyo, entitled "Natural History of the West Pacific Archipelago". On this, arranged by Ms. Marivene R. Manuel of the National Museum of the Philippines, we could obtain many brachyuran specimens from the local shell fishermen of Balicasag Island. Some of these specimens proved to belong to a new species of the genus *Goneplax*. In addition to this material, some specimens collected from Japanese waters prove to belong to another new species of *Goneplax*. This new species is identical with the species recorded as *Goneplax* sp. aff. *sigsbei* by Nagai & Tsuchida (1996) from Miyake-jima I., Izu Is., and off Shiono-misaki Cape, Kii Peninsula, central Japan, and was misidentified as *G. renoculis* by Takeda (1978) from Oshima I., Izu Is., central Japan. In this paper, we clarify the differences between our two new species and their congeners, and describe them as new to science.

Measurements, given in millimeters (mm), are of the greatest carapace length and width (including the anterolateral teeth), respectively. Pereiopods are measured along the outer margin from ischium to dactylus. The specimens examined are deposited in the Department of Zoology, National Science Museum, Tokyo (NSMT), the National Museum of the Philippines (NMCR), the Natural History Museum and Institute, Chiba (CBM), and the Showa Memorial Institute, National Science Museum, Tokyo (NSMT S).

TAXONOMY

***Goneplax marivenae* n. sp. (figs. 1-3, 7A)**

Material examined. — Holotype: male (12.3 × 18.2), NSMT-Cr 15531, Balicasag I., Bohol, Philippines, tangle nets, coll. local shell fishermen, February 2003.

Paratypes: 2 males (11.7 × 17.5, 11.4 × 18.0), 1 ovig. female (10.2 × 15.7), NSMT-Cr 15532, same data as holotype; 1 male (12.2 × 19.1), NMCR, same data as holotype.

Description. — Carapace (fig. 1a) trapezoidal in general outline, 1.5-1.6 times broader than long (holotype 1.5 times); upper surface smooth and glabrous, convex dorsally; regions ill-defined, marked with H-shaped groove at center. Frontal region (fig. 1b) about 0.3 times as broad as carapace, anteriorly sloping downwards, transversely rectangular; margin subtruncate, weakly concave medially, with small median triangular tooth, forming almost right angle with supraorbital margin,

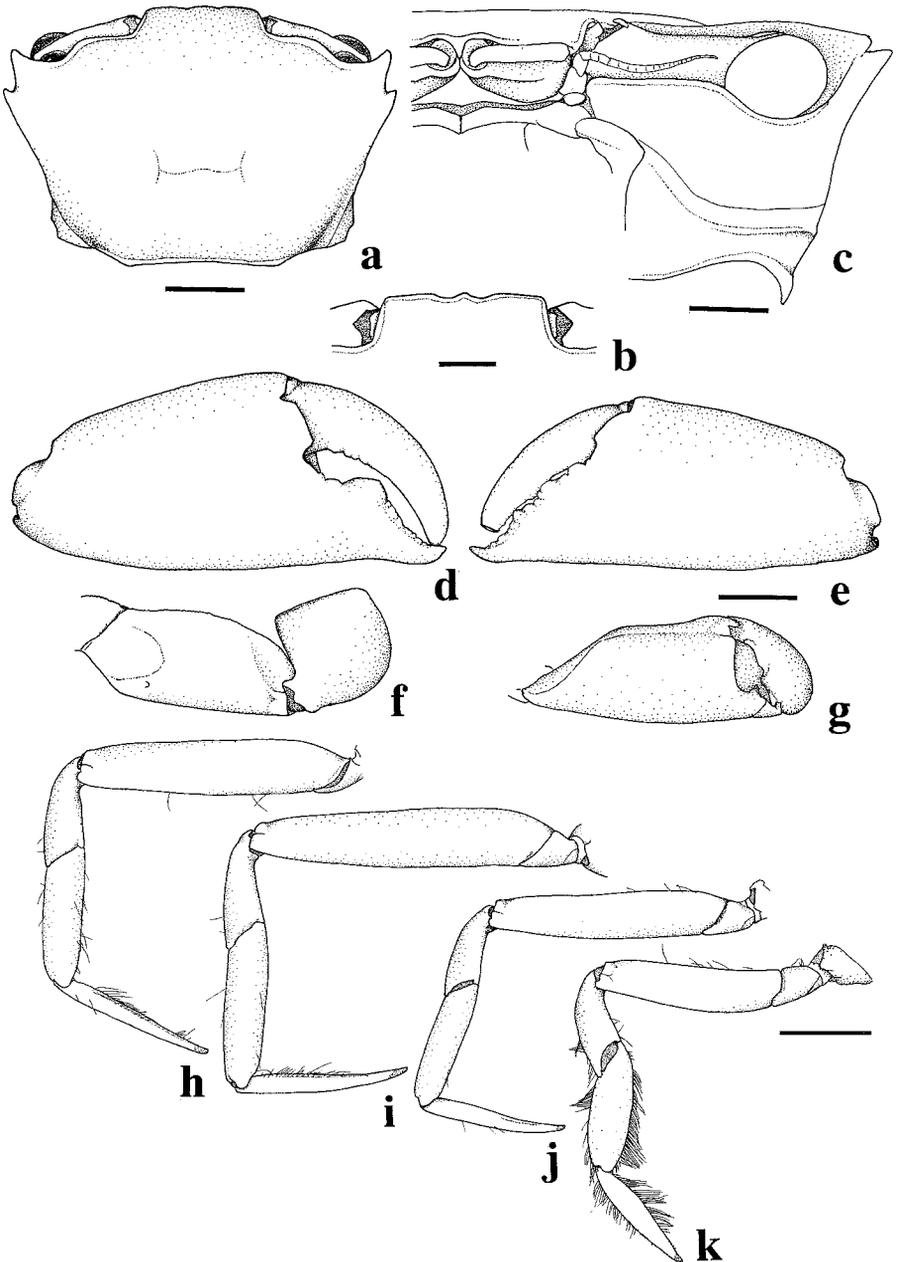


Fig. 1. *Goneplax marivenae* n. sp., holotype, male, Balicasag I., Bohol, Philippines, 12.3 × 18.2 mm, NSMT-Cr 15531: a, carapace, dorsal view; b, frontal region, antero-dorsal view; c, same, frontal view of left half with flagellum of antennule retracted in fossa and flagellum of antenna cut at midway; d, e, right and left chelae (tip of immovable finger of left chela broken), respectively, external views; f, merus and carpus of cheliped, dorsal view; g, same, lateral view; h-k, left first to fifth ambulatory legs, dorsal views. Scales: a, d-g, h-k = 2 mm; b, c = 1 mm.

marked with weak submarginal line. Lateral margin of carapace moderately converging posteriorly, with large, triangular extraorbital tooth with blunt point on corner with supraorbital margin; a small, acute triangular tooth is placed just behind the extraorbital tooth, both teeth directed antero-laterally. Posterior margin almost straight, double.

Orbit (fig. 1a, c): supraorbital margin sinuate, without suture, slightly turned upwards, fringed with very short setae; infraorbital margin straight in mesial half, arcuate in lateral half, slightly turned upwards. Eystalk (fig. 1c) long, completely set in orbit when retracted; dorsal extension onto cornea narrowly rectangular, with rounded tip; cornea much broader than stalk, 0.4 times as long as total eyes-talk.

Antennule (fig. 1c) transversely folded into fossa; basal segment occupying ventral 0.7, with weak transverse ridge along midline. Antenna (fig. 1c): first segment transversely ovate; second and third segments subcylindrical, occupying orbital hiatus; flagellum long, slightly longer than eyes-talk.

Epistome (fig. 1c) triangular, separated from buccal frame by transverse fissure. Mandible (fig. 2a): endopod well calcified, with short suture at middle; palp three-segmented; proximal segment very short; second segment fringed with plumose setae on outer margin; distal segment entirely fringed with simple setae. Maxillule (fig. 2b): coxal endite elongate tongue-shaped, thin, fringed with short simple setae, with some long plumose setae on proximal part of lower margin; basial endite triangular, fringed with thin and stout simple setae along mesial margin; endopod two-segmented, fringed with plumose setae along mesial margin of proximal segment, distal segment lobular and covering mandible in situ. Maxilla (fig. 2c): coxal endite bilobed, both lobes elongate tongue-shaped, fringed with plumose setae; basial endite distally bilobed, entirely fringed with simple setae; endopod triangular, narrowed at tip, fringed with short plumose setae except tip; exopod (scaphognathite) longitudinally ovate, entirely fringed with short plumose setae. First maxilliped (fig. 2d): epipod present; coxal endite rounded, with dense simple setae; basial endite ovate, fringed with simple setae, with submarginal row of simple setae along mesial margin; endopod lobular, subsquare in distal half, fringed with plumose setae along proximal half of mesial margin; exopod with long flagellum, flagellum fringed with long plumose setae. Second maxilliped (fig. 2e): one epipod and one podobranch present; ischium-merus with submarginal row of simple setae along lateral margin; propodus produced outwards on lateral margin, with simple setae; dactylus with stout setae around tip; exopod elongate rectangular, fringed with short plumose setae along proximal 0.7 of lateral margin and distal margin; flagellum long, fringed with long plumose setae.

Third maxilliped (fig. 2f): podobranch present; coxa and epipod covering afferent channel; basis triangular, fused with ischium but divided by suture; is-

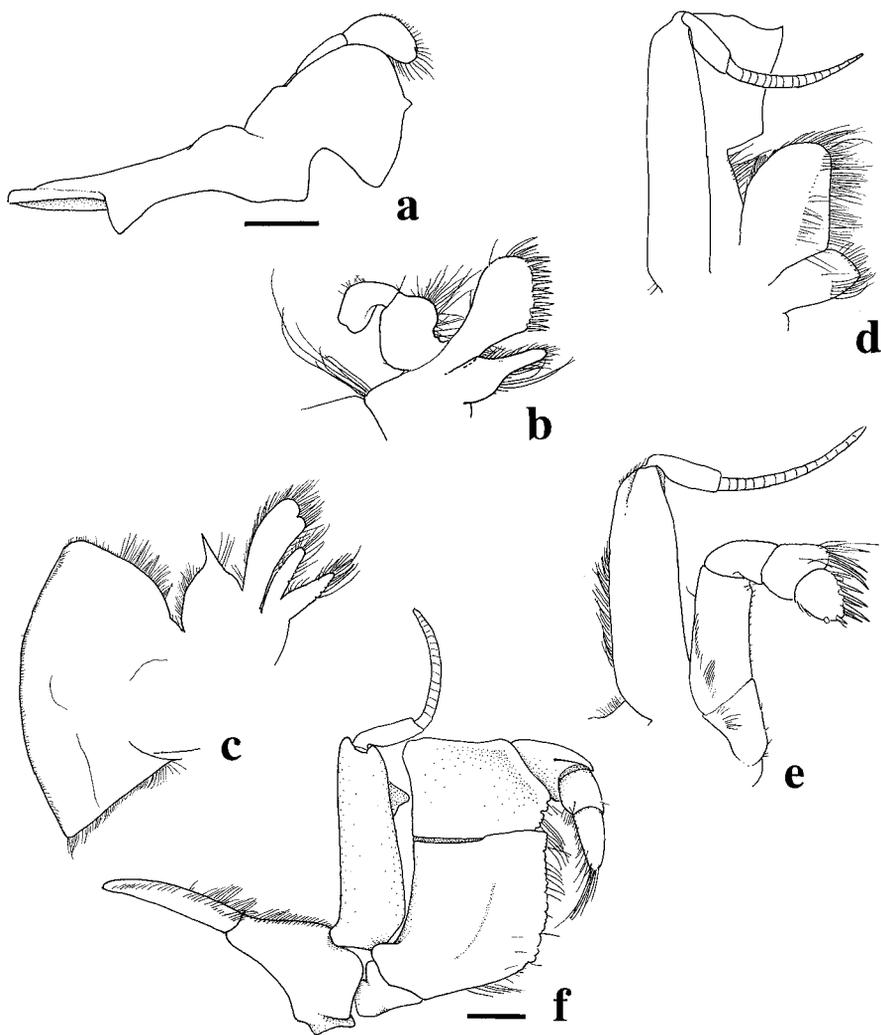


Fig. 2. *Goneplax marivenae* n. sp., holotype, male, Balicasag I., Bohol, Philippines, 12.3 × 18.2 mm, NSMT-Cr 15531. Right mouthparts in external view, setae of each flagellum of exopod omitted: a, mandible; b, maxillule; c, maxilla; d, first maxilliped; e, second maxilliped; f, third maxilliped. Scales: a-e, f = 1 mm.

chium with shallow oblique groove at center, dentate and fringed with short setae on mesial margin; merus triangularly projecting on mesial margin, dentate on proximal half of mesial margin, produced on disto-lateral corner; palp exposed, fringed with simple setae on inner margins of propodus and dactylus; exopod sub-rectangular, with long flagellum fringed with long plumose setae, with triangular process on distal 0.3 of mesial margin, process concealed beneath merus in situ.

Cheliped (fig. 1d-g) stout, smooth, 2.8-2.9 times as long as carapace in adult male ($n = 4$; holotype 2.9 times), 2.5 times in adult female ($n = 1$); coxal condyle small, rounded in both sexes; merus subcylindrical, with small, obtuse triangular tooth at proximal 0.3 of outer margin of dorsal surface, covered with fine flattened granules on inner surface; carpus hemispherical, inner angle obtuse in adult male and acute in adult female. Chelae (fig. 1d, e) dimorphic in both sexes, usually right chela slightly larger than left one; palm weakly convex, weakly dilated distally; fingers triangular, crossed at the tip, movable finger inside. Cutting edges of left chela (fig. 1e) irregularly dentate, entirely meeting, more strongly dentate on immovable finger. In adult male, cutting edges of right chela (fig. 1d) leaving gap; cutting edge of movable finger almost blunt; cutting edge of immovable finger armed with large, obtuse triangular tooth at middle, weakly dentate except median tooth. In subadult male and adult female, cutting edges of right chela as in left chela.

Ambulatory legs (fig. 1h-k) slender, long, sparsely fringed with short setae, similar in shape except fourth leg; first to fourth leg about 2.3-2.4, 2.5-2.6, 2.5, and 1.8 times as long as carapace (holotype 2.3, 2.5, 2.5, and 1.8 times), respectively; coxal condyles small, rounded in both sexes; merus, carpus, and propodus compressed, sparsely fringed with short setae along margins; dactylus slender, fringed with short setae along inner margin; propodus and dactylus of fourth leg (fig. 1k) strongly compressed and broadened, densely fringed with plumose setae along inner and outer margins.

Male thoracic sternites (fig. 3a) smooth; sternites 1 and 2 fused; sternite 3 divided from sternite 2 by transverse suture; sternite 4 fused with sternite 3, but leaving short oblique suture on each side; sternite 5 with small granular button; sternite 8 slightly visible between second and third somites of abdomen on each side; sutures between sternites 4 and 5, 5 and 6, and 7 and 8 interrupted medially; median suture reaching to suture between sternites 6 and 7; abdominal cavity reaching to medial portion of sternite 4.

Female thoracic sternites as in male in formula; sternite 5 with ovate gonopore; sutures as in male; abdominal cavity reaching to border between sternites 3 and 4.

Male abdomen (fig. 3b) smooth, almost flat, dorsally exposed in first and second somites, all somites free; first somite very short; second somite short, transversely rectangular; third to sixth somites subtrapezoidal, gradually decreasing in width distally; telson triangular with rounded tip.

Female abdomen smooth, convex externally, ovate; each somite subrectangular, gradually getting longer from first to sixth somite; lateral margins fringed with short soft setae; telson transversely triangular with rounded tip, fringed with short soft setae.

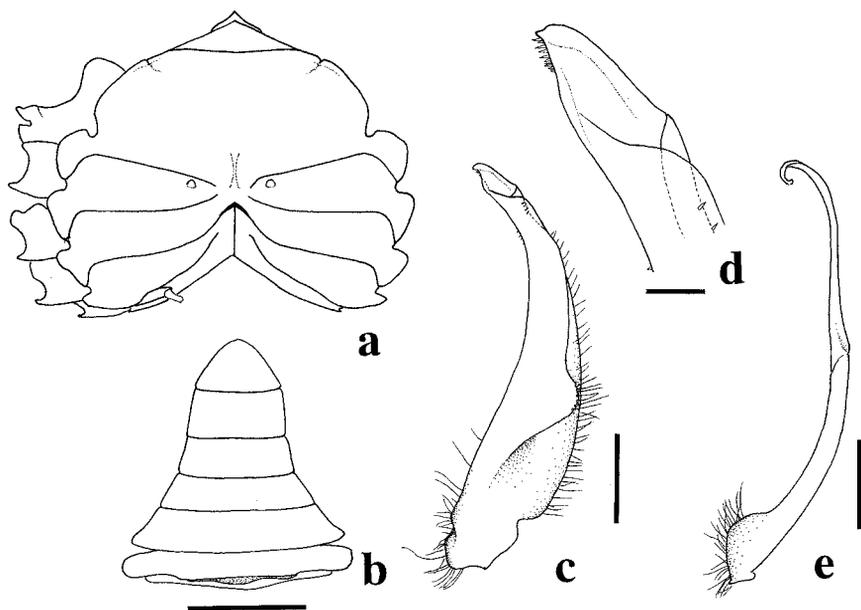


Fig. 3. *Goneplax marivenae* n. sp., holotype, male, Balicasag I., Bohol, Philippines, 12.3 × 18.2 mm, NSMT-Cr 15531: a, sternum, ventral view; b, abdomen, external view; c, right male first pleopod, external view; d, tip of same, external view; e, right male second pleopod, external view. Scales: a-b = 2 mm; c, e = 1 mm; d = 0.2 mm.

Male first pleopod (fig. 3c) weakly compressed, getting narrower distally, with some very small spinule setae just below apical aperture; medial shoulder with some plumose setae; mesial margin entirely fringed with short plumose setae; lateral margin fringed with plumose setae along proximal 0.3; apical aperture largely open on external surface; tip (fig. 3d) triangular, directed laterally, roundly convex on mesial margin, with some very short setae along lateral margin. Male second pleopod (fig. 3e) elongate, slightly longer than first one, two-segmented, fringed with plumose setae at base of lateral margin; tip curled externally.

Etymology. — This species is dedicated to Ms. Marivene R. Manuel of the National Museum of the Philippines, who kindly arranged the field trip in the Philippines. The name is a noun in the genitive singular.

Distribution. — Philippines: Balicasag I., Bohol (type locality). Exact depth unknown.

Remarks. — *Goneplax marivenae* n. sp. is most similar to *G. megalops* n. sp. in the form of the carapace, the fourth ambulatory leg and the male pleopod, but can be distinguished from *G. megalops* by that the extraorbital tooth does not project beyond the second tooth, whereas it projects beyond the second tooth in *G. megalops*; the mesial margin of male first pleopod is entirely fringed with plumose setae, whereas it is fringed with short simple setae along the distal half in

G. megalops; the tip of the male first pleopod of *G. marivenae* is broader than that of *G. megalops*; and *G. marivenae* is about twice as large as *G. megalops* when considering carapace size.

The present two new species can be readily distinguished from *Goneplax renoculis* Rathbun, 1914 (type locality: off southern Luzon, 146-186 m) by that the second tooth of the lateral margin of the carapace is situated just behind the first (extraorbital) tooth, whereas that of *G. renoculis* leaves a short space with the first one; the dorsal extension of the eyestalk onto the cornea is narrow, whereas that of *G. renoculis* is broad; the fourth ambulatory leg is fringed with dense plumose setae, whereas that of *G. renoculis* is simple and similar in shape to the other legs; the form of the male first pleopod is quite different from that of *G. renoculis* (see Takeda & Miyake, 1968, fig. 8c-e); and the male second pleopod is curled at the tip, whereas that of *G. renoculis* is straight.

The present two new species are similar to *G. maldivensis* Rathbun, 1902 (type locality: Maldives Is., 36 m) in the form of the anterolateral teeth of the carapace and the broadened propodus and dactylus of the fourth ambulatory leg. But they can be distinguished from *G. maldivensis* by the fact that the frontal margin is subtruncate, whereas that of *G. maldivensis* has a notch at the outer angle in which the antenna is lodged; the first somite of the male abdomen is visible in dorsal view, whereas that of *G. maldivensis* is hidden under the carapace; and the male abdomen is subtriangular, whereas that of *G. maldivensis* is much narrowed.

The present two new species are also similar to *G. sigsbei* (A. Milne-Edwards, 1880) from the western Atlantic Ocean (type locality: Grenada, 166 m) in the form of the anterolateral teeth of the carapace, the narrow dorsal extension of the eyestalk onto the cornea, the setose fourth ambulatory leg, and the form of the male first pleopod. But they can be distinguished from *G. sigsbei* by the fact that the infraorbital margin is almost straight in its mesial half, whereas that of *G. sigsbei* has a small triangular notch just near the mesial end (see Guinot, 1969, fig. 68), and the carpus of the cheliped has a small or inconspicuous tooth on the inner angle, whereas that of *G. sigsbei* has a large tooth on the inner angle.

***Goneplax megalops* n. sp. (figs. 4-6, 7B)**

Goneplax renoculis — Takeda, 1978: 78 (in list). [Not *G. renoculis* Rathbun, 1914.]

Goneplax sp. aff. *Sigsbei* [sic] — Nagai & Tsuchida, 1996: 32, pl. 1 fig. 7. [Not *G. sigsbei* (A. Milne-Edwards, 1880).]

Material examined. — Holotype: male (6.2 × 9.5), CBM-ZC 7031, 26° 18.86'N 127° 09.01'E, Kerama Is., Ryukyus, southwestern Japan, RV "Tansei-maru" cruise KT02-03, stn E5-2, dredge, 182-169 m, coral rock and sand, coll. T. Komai, 19 April 2002.

Paratypes: 1 young male (4.8 × 7.3), NSMT-Cr 5603, southeast of Oshima I., Izu Is., central Japan, dredge, 23-65 m, coll. M. Takeda, 12 July 1977; 1 ovig. female (7.4 × 11.2), NSMT-Cr 10015, off

Kushimoto, Kii Peninsula, central Japan, RV "Tansei-maru" KT84-12 cruise, stn12-1, dredge, 100-101 m, coll. E. Tsuchida, 31 August 1984; 3 young females (3.4×4.6 - 5.1×7.5 ; largest one infected by *Thompsonia*), NSMT-Cr 5594, Oshima I., Izu Is., central Japan, dredge, 30 m, coll. M. Takeda, 12 July 1977; 1 young female (5.0×7.3), NSMT-Cr 6891, Omuro-dashi Bank, Izu Is., central Japan, dredge, 87-184 m, coll. T. Okutani, 26 June 1972; 1 young female (3.5×4.1), NSMT-Cr S3, $34^{\circ}41.88'N$ $139^{\circ}20.35'E$, south of Oshima I., Izu Is., TRV "Shin'yo-maru", dredge, 106-103 m, coll. H. Komatsu, 24 October 2002; 1 ovig. female (6.2×9.3), CBM-ZC 5288, $34^{\circ}58.47'N$ $139^{\circ}34.15'E$, Okinoyama Bank, Sagami-nada, TRV "Shin'yo-maru" cruise SY96, stn 19, dredge, 121-129 m, coll. T. Komai, 24 October 1996.

Description. — This new species is closely similar to *Goneplax marivenae* n. sp. in most diagnostic characters, so that only the differences are described in this section.

Carapace (fig. 4a) 1.4-1.5 times broader than long ($n = 9$; holotype 1.5 times); regions ill-defined, slightly depressed at center. Frontal region (fig. 4b) with small obtuse median tooth. Lateral margin of carapace with large, acute triangular extraorbital tooth on corner with supraorbital margin, with small acute triangular tooth just behind extraorbital tooth, both teeth directed antero-laterally.

Eyestalk (fig. 4c) long, slightly protruding from orbit when retracted; cornea much broader than stalk, 0.5 times as long as total eyestalk.

Mouthparts shown in fig. 5. First maxilliped (fig. 5d): coxal endite with dense plumose setae; basial endite fringed with plumose setae; endopod fringed with very short setae along distal margin and with plumose setae along proximal half of mesial margin. Second maxilliped (fig. 5e): propodus with long simple setae around lateral margin; exopod elongate, fringed with short plumose setae along proximal half of lateral margin and distal margin.

Cheliped (fig. 4d-i) 2.3, 2.0, 2.2, and 1.8-1.9 times as long as carapace in adult male ($n = 1$; holotype), young male ($n = 1$), adult female ($n = 2$) and young female ($n = 3$), respectively; merus with small acute triangular tooth at proximal 0.4 of outer margin of dorsal surface, tooth directed distally, finely granulate on inner surface; carpus with small triangular tooth on inner angle. In adult male, cutting edges of right chela (fig. 4d) leaving gap; cutting edge of movable finger almost blunt except proximal rounded tooth. In young male and female, cutting edges of right chela (fig. 4f) entirely meeting, more strongly dentate than those of left chela, with rounded or roundly triangular process on base of immovable finger and rounded tooth on proximal-end of movable finger.

Ambulatory legs (fig. 4j, k): first to fourth leg about 2.1-2.3, 2.4-2.6, 2.3-2.5, and 1.8-1.9 times as long as carapace (holotype 2.1, 2.5, 2.4, and 1.9 times), respectively.

Thoracic sternites and abdomen (fig. 6a, b) of both sexes as in *G. marivenae*. Male abdomen: first somite (fig. 6b) longer than that of *G. marivenae*.

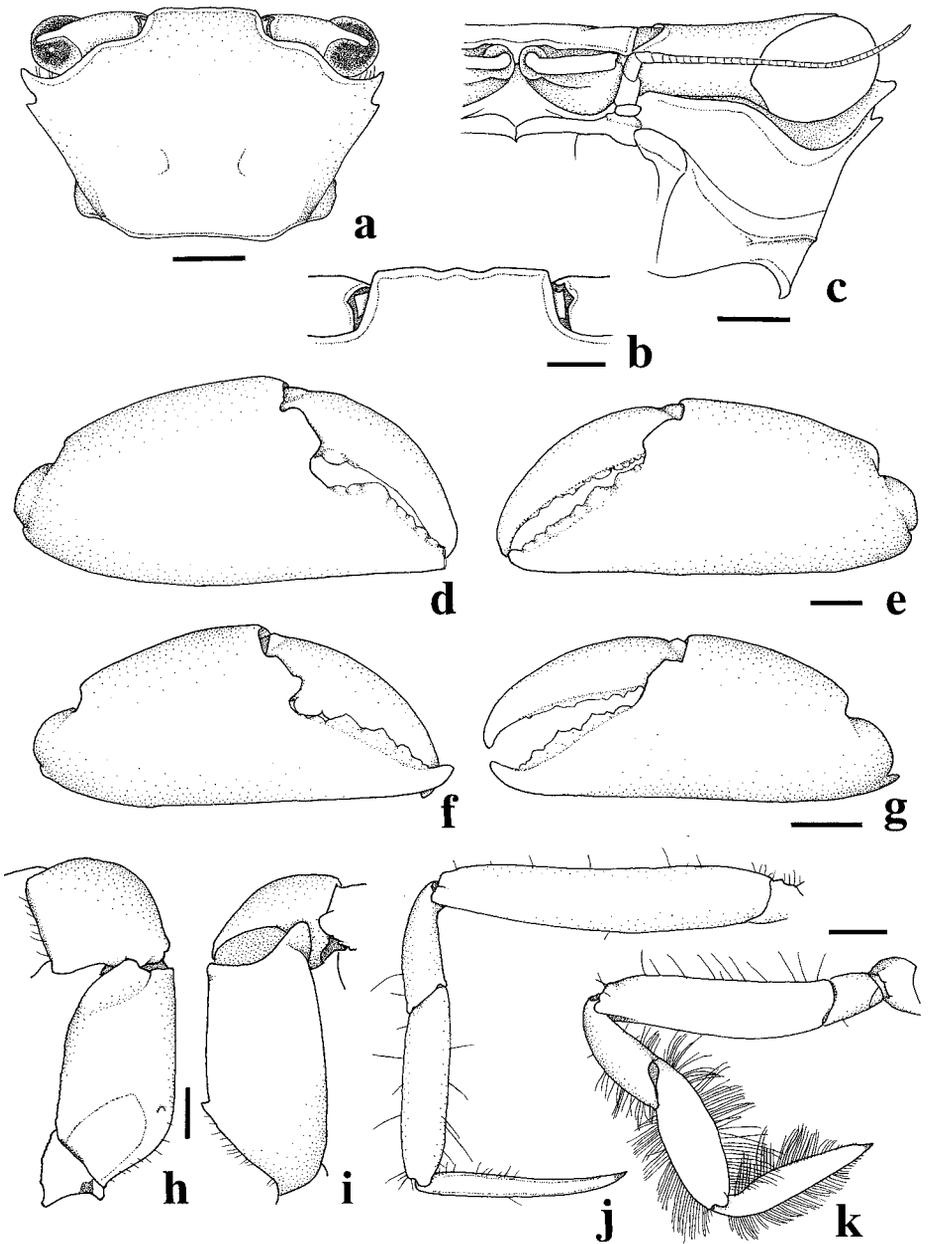


Fig. 4. *Goneplax megalops* n. sp. a-e, h-k, holotype, male, Kerama Is., Ryukyus, southwestern Japan, 6.2 × 9.5 mm, CBM-ZC 7031; f, g, paratype, young male, Izu Is., central Japan, 4.8 × 7.3 mm, NSMT-Cr 5603. a, Carapace, dorsal view; b, frontal region, antero-dorsal view; c, same, frontal view of left half, with flagellum of antennule retracted in fossa; d, f, right chela, tip of immovable finger broken in d, external view; e, g, left chela, external view; h, merus and carpus of cheliped, dorsal view; i, same, lateral view; j, k, left third and fourth ambulatory legs, dorsal views. Scales: a = 2 mm; b, c, d-e, f-g, h-i, j-k = 1 mm.

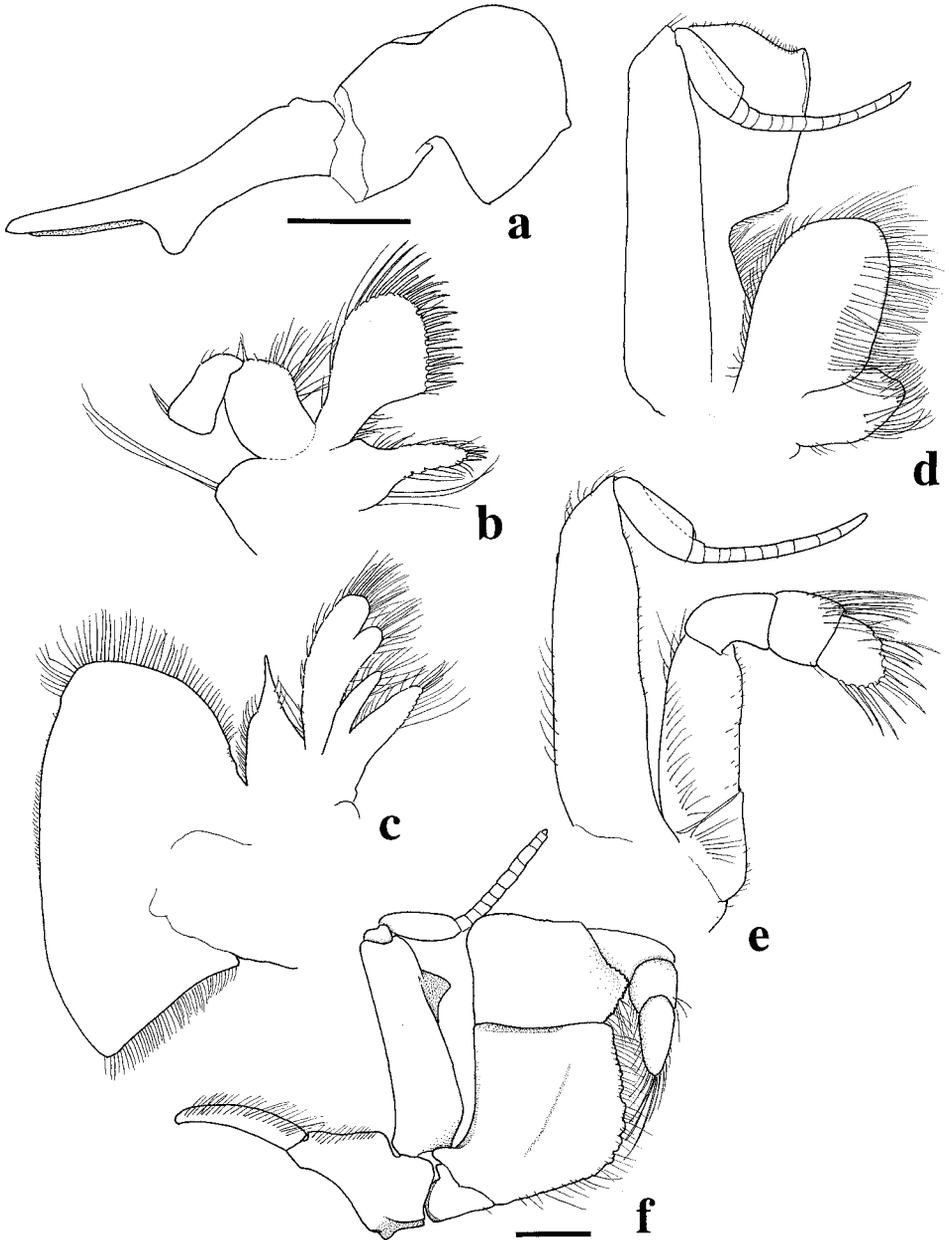


Fig. 5. *Goneplax megalops* n. sp., paratype, young male, off Oshima I., Izu Is., central Japan, 4.8 × 7.3 mm, NSMT-Cr 5603. Right mouthparts in external view, setae of each flagellum of exopod omitted: a, mandible, medially broken; b, maxillule; c, maxilla; d, first maxilliped; e, second maxilliped; f, third maxilliped. Scales: a-e, f = 0.5 mm.

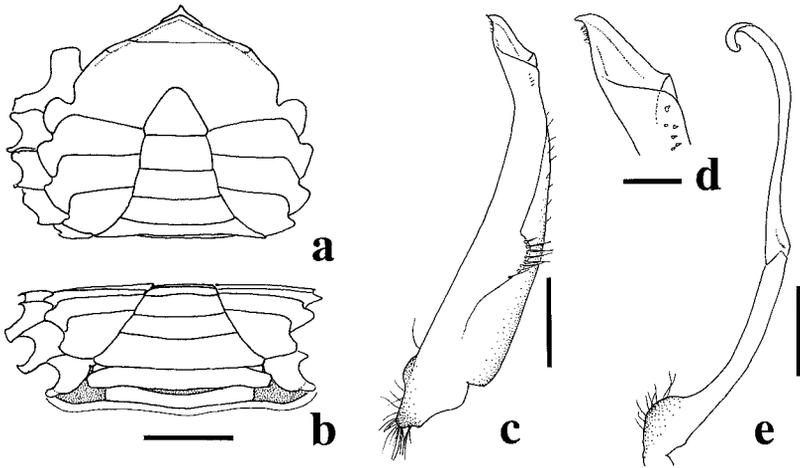


Fig. 6. *Goneplax megalops* n. sp., holotype, male, Kerama Is., Ryukyus, southwestern Japan, 6.2 × 9.5 mm, CBM-ZC 7031: a, sternum and abdomen, ventral view; b, same, posterior view; c, right male first pleopod, external view; d, tip of same, external view; e, right male second pleopod, external view. Scales: a-b = 2 mm; c, e = 0.5 mm; d = 0.2 mm.

Male first pleopod (fig. 6c) weakly compressed, getting narrower distally, with some very small spinule setae just below apical aperture; mesial margin fringed with short simple setae along distal half; lateral margin fringed with plumose setae at basal part; apical aperture largely open on external surface; tip (fig. 6d) acutely triangular, directed laterally, with some very short setae along lateral margin. Male second pleopod (fig. 6e) as in *G. marivenae*.

Colour of young female. — Dorsal surface of carapace, cheliped, and ambulatory legs symmetrically speckled with dark magenta punctae; ventral surface ivory-white. Eyestalk dark magenta; cornea black.

Etymology. — The specific name is a combination of the Greek, mega (= large) and ops (= eye), in reference to the characteristic, large stalked eye. It is a noun in apposition to the generic name.

Distribution. — Japan: Izu Is., off Kii Peninsula, and Ryukyus (type locality). Occurring at depths of 23-184 m.

Remarks. — *Goneplax megalops* n. sp. can be distinguished from its congeners as explained in the 'Remarks' section of *G. marivenae* n. sp., above.

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The authors wish to express their cordial thanks to Ms. Marivene R. Manuel of the National Museum of the Philippines and to local fishermen of Balicasag Island for their kind help during the field trip in the Philippines. Thanks are also due to



Fig. 7. A, *Goneplax marivenae* n. sp., holotype, male, Balicasag I., Bohol, Philippines, 12.3 × 18.2 mm, NSMT-Cr 15531; B, *Goneplax megalops* n. sp., holotype, male, Kerama Is., Ryukyus, southwestern Japan, 6.2 × 9.5 mm, CBM-ZC 7031.

Dr. T. Komai of the Natural History Museum and Institute, Chiba, for providing us with the valuable specimens.

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