

Spider Crabs of the Genus *Huenia* De Haan, 1837 (Crustacea, Decapoda, Brachyura) from Japan, with Descriptions of Two New Species

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Abstract Two new species of the genus *Huenia* De Haan, 1837 of the family Epialtidae (Majidae s.l.) are described from Japan under the names of *H. nagaii* and *H. toyoshioae*. A rare and poorly known species, *H. pacifica* Miers, 1879, is recorded from the Ryukyu Islands for the first time in Japanese waters. The *Huenia* species are sexually dimorphic and individually variable according to the developmental stages in the shape of the carapace, but both new species are differentiated from their eight congeners in the characteristic shape of the carapace.

Key words: Spider crabs, *Huenia*, Epialtidae, Majidae, new species, Ryukyu Islands, Japan.

Introduction

In Japanese waters the genus *Huenia* of the family Epialtidae (Majidae s.l.) is represented by *H. heraldica* (De Haan, 1837) (cf. Sakai, 1938; 1976) and *H. brevifrons* Ward, 1941 (cf. Sakai, 1976; Takeda *et al.*, 1976). As pointed out by Holthuis (1987), *Huenia heraldica* is the correct name prior to *H. proteus* (De Haan), and it is well known that *H. heraldica* is remarkably variable sexually, individually and developmentally in the shape of the carapace with protective coloration among seaweed. Thus there are synonymies with confusion as in Griffin and Tranter (1986) who partially revised the genus and distinguished eight species. The known species are eight as listed by Ng *et al.* (2008): *H. australis* Griffin et Tranter, 1986 (Southern Australia), *H. bifurcata* Streets, 1870 (East Australia), *H. brevifrons* Ward, 1941 (Indo-West Pacific from Japan to Maldives and Laccadive Islands in central Indian Ocean), *H. grandidierii* A. Milne Edwards, 1865 (East Africa), *H. halei* Griffin et Tranter, 1986 (Southern Australia), *H. heraldica* (De

Haan, 1837) (West Pacific from Japan to Australia), *H. keelingensis* Griffin et Tranter, 1986 (Cocos Keeling Islands in eastern Indian Ocean), and *H. pacifica* Miers, 1879 (West Pacific from Sulu Islands to northeast Australia, and Salas y Gómez Island off Chile in southeast Pacific).

In the present paper, two new species are described under the names of *Huenia nagaii* sp. nov. and *H. toyoshioae* sp. nov., and *H. pacifica* Miers, 1879 is newly recorded in the carcinological fauna of Japan. The dried specimens in the Nagai Collection of the Wakayama Prefectural Museum of National History have been softened with aqueous solution of ethylene glycol following the technique of Thompson *et al.* (1966) and preserved in 70% ethanol by the present authors.

The specimens used for this study are preserved in the Wakayama Prefectural Museum of Natural History, Wakayama (WMNH) and the National Museum of Nature and Science, Tokyo (NSMT). The size of the specimens is indicated in millimeters (mm) of the breadth (cb) and length (cl) of the carapace.

Taxonomy

Family Epialtidae

Genus *Huenia* De Haan, 1837

Huenia nagaii sp. nov.

(Figs. 1–3)

Material examined. Kurio, Yaku-shima I., south of Kyushu, 1♂ (cb 12.3×cl 14.5 mm), holotype, WMNH-Na-Cr 0328, S. Nagai leg., 1988.

Description of holotype. Male. Carapace

slightly longer than wide; its dorsal surface remarkably flattened, with weakly raised gastric and cardiac regions; gastric region indistinctly separated into three subequal parts, two protogastric and one mesogastric subregions; cardiac region as high and large as each gastric subregion. Lateral margin of carapace equipped with two prominent, thin lobes; anterior (hepatic) lobe distinctly wing-like, strongly curved upward, its margin convex, cut into some small, irregular lobes by shallow depressions, anterior margin almost transverse, inner part forming a wide gap

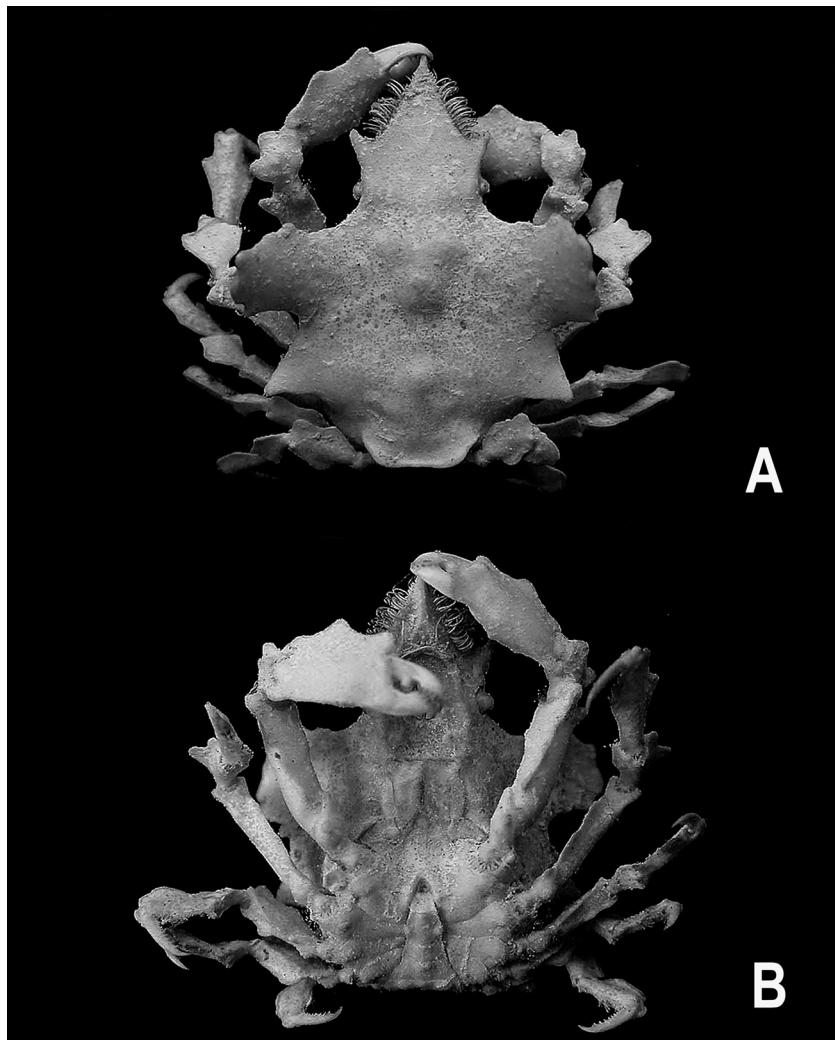


Fig. 1. *Huenia nagaii* sp. nov., holotype male (WMNH-Na-Cr0328; cb 12.3×cl 14.5 mm), dorsal (A) and ventral (B) views.

with supraorbital margin; posterior (branchial) lobe triangular, directed posterolaterally, weakly curved upward, with sharp tip; both margins straight, posterior margin transverse, about two thirds as long as anterior margin. Posterior margin of carapace as wide as distance between orbits of both sides, developed as a thin lobe, with rounded lateral ends.

Supraorbital margin weakly rimmed, not delimited from anterior margin of hepatic lobe of

carapace, ending anteriorly in a sharp preorbital tooth directed obliquely forward. Front flattened, sharply pointed at the tip, equilateral triangle in dorsal view, with a median strong crest on lower surface in front of antennular fossae; heavy fringe of curled setae at lateral margins of front.

Chelipeds subequal, well developed, but not inflated, with sharp margins of merus, carpus and palm; merus trigonous, with irregular margins; upper margin armed with basal, median and dis-

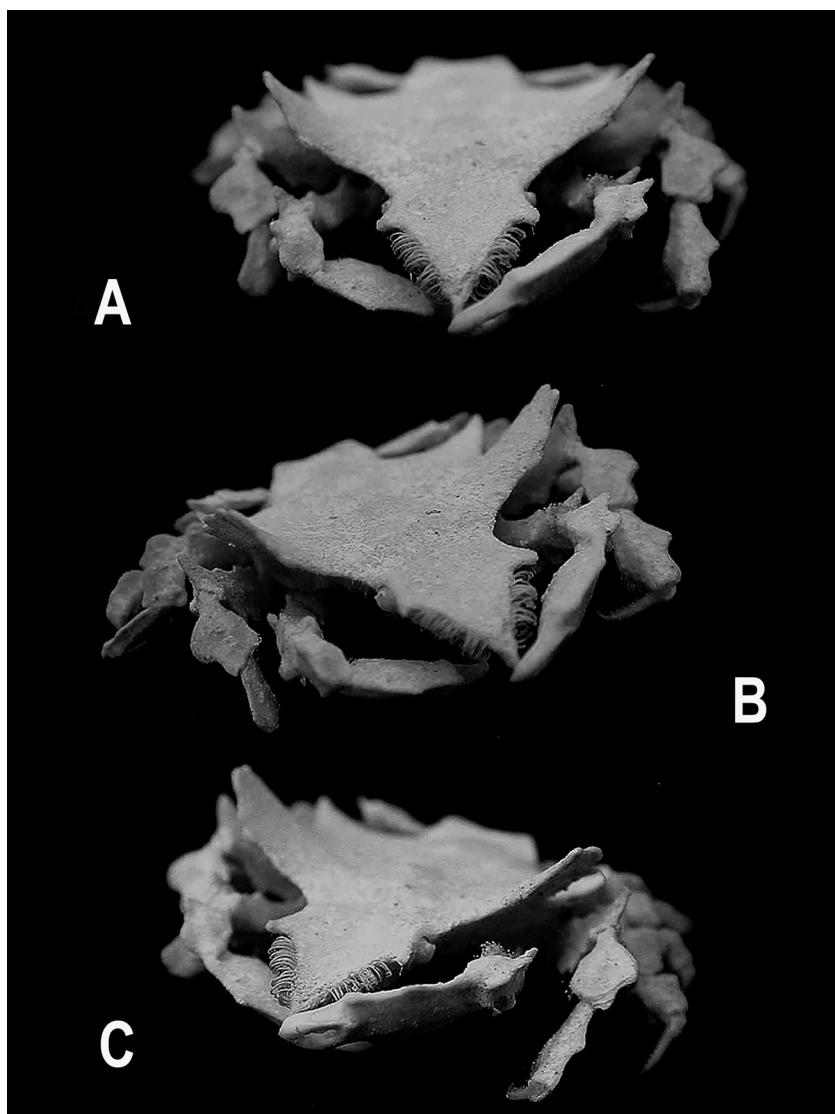


Fig. 2. *Huenia nagaii* sp. nov., holotype male (WMNH-Na-Cr0328; cb 12.3×cl 14.5 mm), three different views showing thin, wing-like hepatic outgrowths.

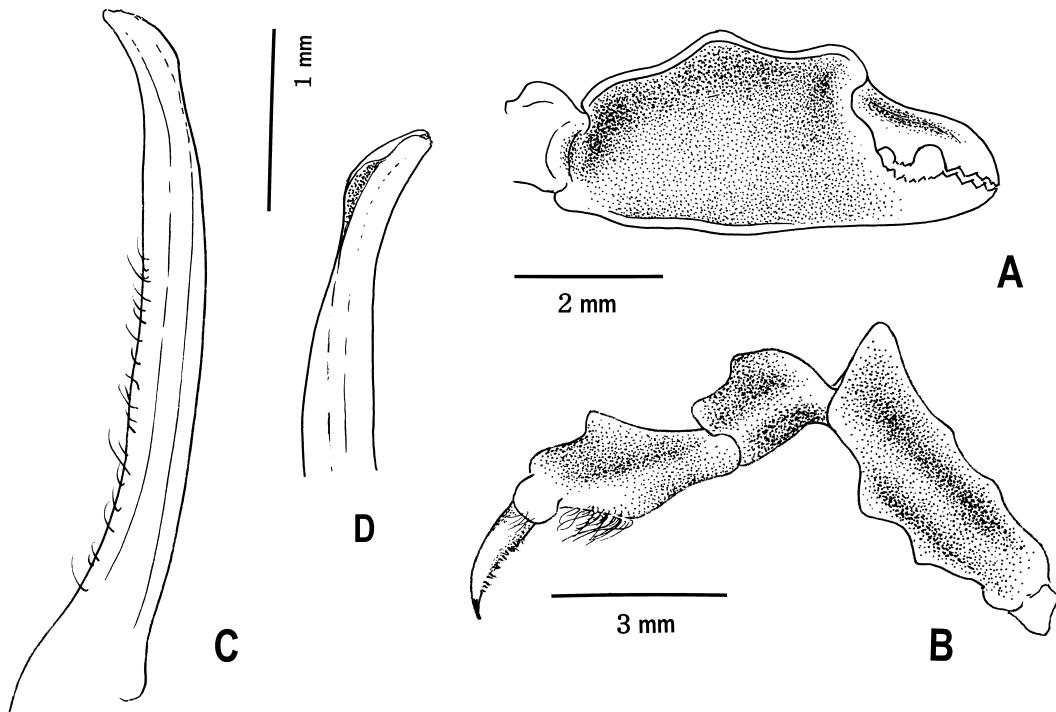


Fig. 3. *Huenia nagaii* sp. nov., holotype male (WMNH-Na-Cr0328; cb 12.3×cl 14.5 mm). A, right chela, outer view; B, left ambulatory leg; C, D, left first pleopod, sternal (C) and ventral (D) views.

tal tubercles, distalmost one strongest and directed obliquely forward; distal margin of merus armed with two tubular teeth at inner and outer parts; outer margin of carpus adorned with high crest which is separated medially with a deep gap; palm compressed, high, with a sharp upper margin armed with median tubercle; distal end of upper margin obtusely produced; fingers stout, toothed, meets along distal halves, with a high, truncated tooth from movable finger in proximal gape between both fingers.

Ambulatory legs stout, strongly depressed, with sharp, thin, high anterior margins of meri, carpi and propodi; meri trigonous, upper margin armed with four low, equidistant teeth, distalmost one at distal end forming a tubercle with obtuse tip; median part of anterior margin of each carpus developed as a lobe, remarkably developed in first pair; each propodus armed with a median obtuse tooth directed distally on anterior margin; entire length of posterior margin forming a low triangle, with a tip at median part; in first three

pairs distal part of posterior margin of each propodus provided with setae, forming subchelate structure; dactylus about two thirds as long as propodus, with seven spines.

First pleopod slender, slightly curved outward, fringed with silky hairs along outer margin, with its apex only slightly expanded at distal opening.

Remarks. As shown in the photographs of the holotype male (Fig. 2), the hepatic and branchial lobes are surprisingly well developed, thin and recurved dorsally, and the ambulatory legs are depressed. In most of the congeneric species, as typically seen in *H. heraldica* (De Haan), the large outgrowths of the carapace are referred to the female characters, although the holotype specimen of the new species is a male. The new species is described here with a sole male specimen, but an interesting problem should be posed in future for the biological study on the sexual dimorphism and mimicry, when the female will be found.

Etymology. This species is dedicated to the

late Mr. Seiji Nagai, whose collections of crabs were donated to the Wakayama Prefectural Museum of Natural History, Wakayama, for scientific research.

***Huenia pacifica* Miers, 1879**

(Figs. 4–5)

Huenia pacifica Miers, 1879, p. 5, pl. 4 fig. 3.—Griffin and Tranter, 1986, pp. 73 (in key), 80, fig. 24.—Retaimal, 2001, pp. 211–214, fig. 1.

Material examined. Off Yakata, Onna-son, Okinawa-jima I., Ryukyu Is., 2 m deep, 2♂♂ (cl 12.7×cb 5.9 mm; cl 15.3×cb 9.5 mm), WMNH-Na-Cr 0329, 1 June 1991, S. Nagai leg.; Tokashiki-jima I., Kerama Group, Ryukyu Is., 1 juv.♂ (cb 5.5×cl 3.0 mm), NSMT-Cr 18040, May 2007, H. Komatsu leg.

Description. Males. Carapace narrow, remarkably elongated, widened posteriorly; dorsal surface flattened, with weakly raised gastric and cardiac regions; surface between both orbits weakly concave; gastric region occupies main part of carapace, subdivided into three, viz. a pair of protogastric subregions arranged side by side and mesogastric subregion placed medially; cardiac

region as large as mesogastric subregion, with obtuse tip. Lateral margins of carapace weakly concave, rimmed, not delimited from supraorbital margins, each retreating from supraorbital spine to epibranchial angle; branchial surface close to epibranchial angle weakly curved dorsally; epibranchial angle sharp, but not spine-tipped; posterolateral margin of carapace behind epibranchial angle almost longitudinal in dorsal view; true posterior margin of carapace as long as distance between anterior ends of both orbits.

Rostrum horizontal, half as long as carapace, with triangular basal half and narrow distal half compressed laterally in dorsal view, fringed with curled setae; in lateral view, rostrum flattened, same height throughout its length, tips subtruncated. Supraorbital margin not markedly raised, with a sharp, distal spine directed obliquely forward and weakly upward.

Chelipeds long, stout; merus as long as palm and fingers combined; inner margin of merus armed with three equidistant obtuse tubercles; palm thick, but not inflated, with obtuse margins; fingers half as long as palm, sharply toothed.

Ambulatory legs very slender, cylindrical; merus and carpus thickened distally, carpus one

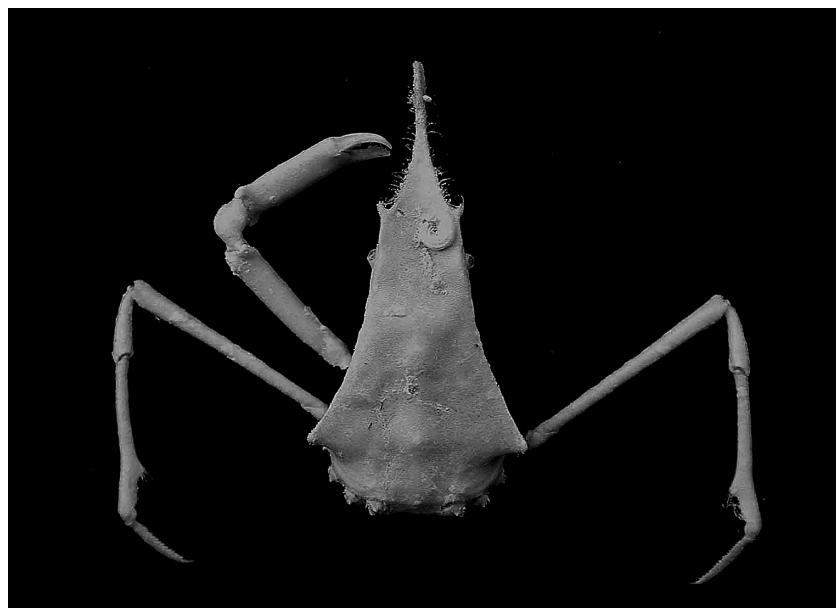


Fig. 4. *Huenia pacifica* Miers, male (WMNH-Na-Cr0329; cb 9.5×cl 15.3 mm).

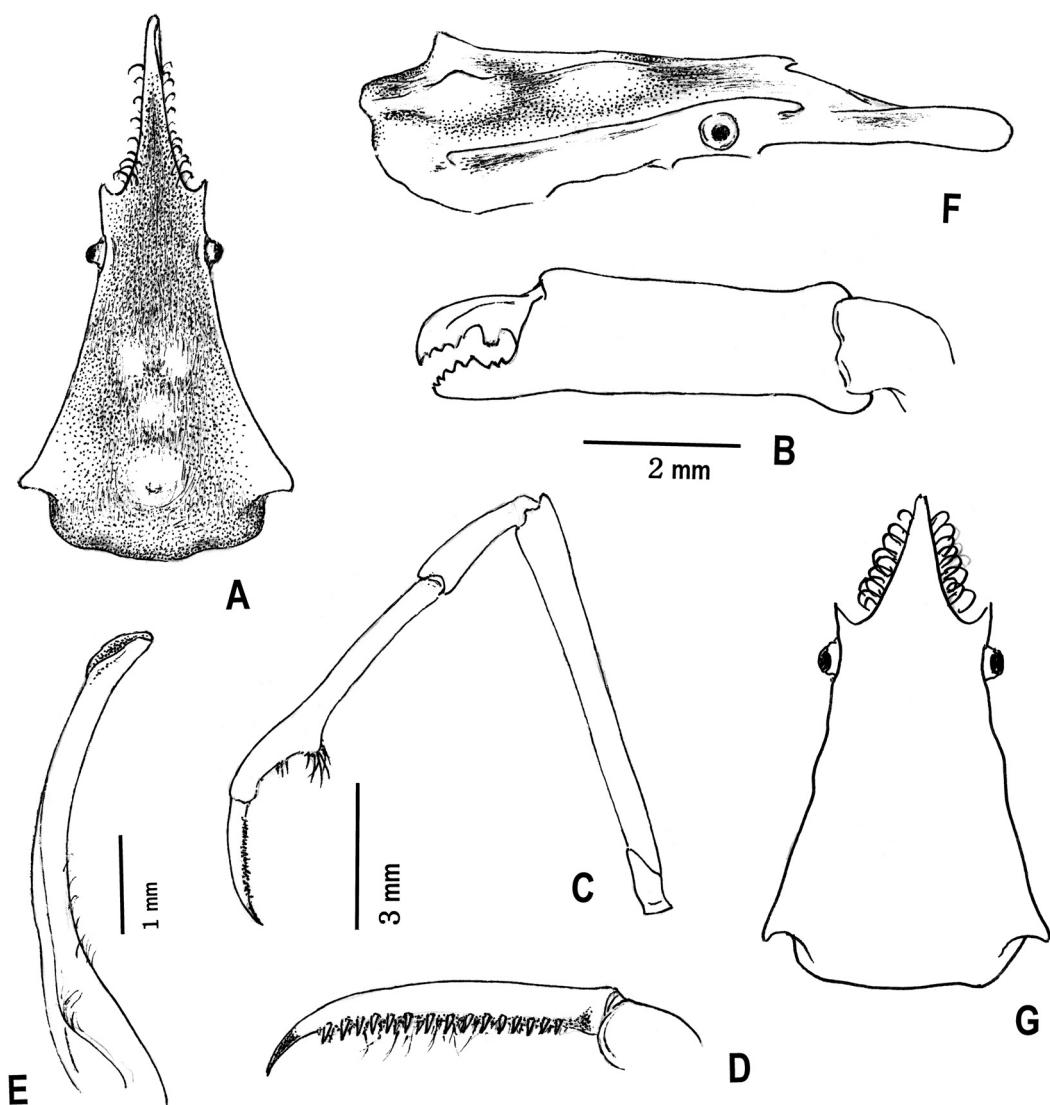


Fig. 5. *Huenia pacifica* Miers, male (WMNH-Na-Cr0329; cb 9.5×cl 15.3 mm) (A–F), juv. (NSMT-Cr 18040; cb 5.5×cl 3.0 mm) (G). A, F, G, dorsal (A, G) and lateral (F) views; B, left chela, outer view; C, left ambulatory leg; D, dactylus, enlarged; E, left first pleopod, ventral view.

third as long as merus; propodus twice as long as carpus, armed with an obtuse tubercle and setae at distal one third of inner margin; dactylus slender, covered with short hairs, about half as long as propodus, armed with two rows of 11 spines along inner margin.

First pleopod slightly curved outward, weakly broadened at distal opening.

Juvenile male. Carapace proportionally wider than that of adult male; anterior part of lateral

margin of carapace weakly but distinctly convex outward behind orbit; posterior end of lateral margin of carapace more or less lobate with obtuse tip, different from sharp epibranchial angle in male. Rostrum triangular in dorsal view, much shorter than mature male rostrum, corresponding to basal half of male rostrum.

Ambulatory legs short, stout, depressed; anterior margins of meri, carpi and propodi more or less thinly marked, convex medially; posterior

margins of each merus and propodus weakly produced at median part provided with cluster of longish setae; propodus provided with a bundle of hairs at thickened basal part of posterior margin; dactylus only slightly shorter than propodus, armed with a series of more than 10 sharp spinules.

Remarks. This species was hitherto recorded only by Miers (1879), Griffin and Tranter (1986) and Retamal (2001), but was probably confused with or misidentified as *Huenia proteus* (De Haan), which is now regarded as a synonym of *H. heraldica* (De Haan). In fact, the general shape of the male carapace is rather similar in the two species, *H. pacifica* and *H. heraldica*, in the narrow, elongated contour. In the present species, however, the carapace is narrower, with the epibranchial angle at the posterior end of the lateral margin being directed postero-dorsally, not laterally as in *H. heraldica*. Another remarkable difference is the shape of the ambulatory leg, as rightly illustrated by Griffin and Tranter (1984); in *Huenia pacifica* the ambulatory legs are slender and cylindrical, but in *H. heraldica* the anterior margins of the meri, carpi and propodi are thin-edged, with a strong outgrowth at distal end of each merus; in *H. heraldica* the posterior margin of the propodus is produced to form a kind of subchela together with dactylus, but in this species the dactylus is opposed to the convexity of the posterior margin of the propodus, being similar in shape to a pincette.

In this species, the female carapace is wider than, but not much different from, the male carapace, while in *H. heraldica*, as is well known, the female carapace has two pairs of lobate lateral outgrowths and is remarkably wider than, and quite different from, the male carapace.

According to Griffin and Tranter (1986), *Huenia grandidierii* is distinguished from *H. heraldica* and this species by the subacute (not truncate) branchial lobe of the female, the lack of carination on the ambulatory legs, and the convex (not straight) posterior margin of the carapace.

Distribution. Indo-West Pacific (Fiji, type lo-

cality; Australia (Queensland coast); Indonesia (Flores Sea; Kai Is.), Philippines (Sulu Is.), Japan (Ryukyu Is., present record); Southeast Pacific (Salas y Gómez I., off Chile). Based on the *Siboga* Expedition Griffin and Tranter (1986) recorded this species from the depths of 16–36 meters in Indonesian waters, with an unusual deep record of 304 meters off the Kai Islands, Indonesia.

Huenia toyoshioae sp. nov.

(Figs. 6–7)

Material examined. Nagannu I., Ryukyu Is., 53 m deep, 1♂ (cl 13.8×cb 8.4 mm), holotype, NSMT-Cr 16155, 22 May 2004, TV *Toyoshio Maru* 04–10 cruise, M. Osawa leg.; Off Onna-son, Okinawa-jima I., Ryukyu Is., 1♀ (cl 15.2×cb 9.5 mm), allotype, WMNH-Na-Cr 1266, 1 June 1991, S. Nagai leg.

Description of holotype. Male. Carapace narrow, elongated, widened posteriorly; surface smooth, with weakly demarcated gastric and cardiac regions. Rostrum narrow, tapering to sharp tip in dorsal view, with weakly depressed dorsal surface, slightly less than one third postrostral carapace length; lower surface strongly compressed to form a sharp median keel resembling the shape of a butter knife with rounded apex; rostral lateral margin and upper one third of lateral surface provided with curled setae facing both directions. Preorbital spine sharp, directed forward, with U-shaped sinus at posterior end of rostral lateral margin; supraorbital margin longitudinal, truncated laterally.

Hepatic margin produced into a small lobe weakly convex laterally and dorsally in dorsal view; lateral surface truncated, with dorsal margin thickened and curved dorsally. Branchial margin produced as a thin, upcurved, wing-like lobe, widely isolated from hepatic lobe; posterior margin of lobe transverse, weakly concave.

Right cheliped and one right ambulatory leg present, both detached. Cheliped feeble, not inflated; merus smooth, upper margin weakly

ridged, lower margin armed with three equidistant rounded nodules; distal end of inner and outer margins each with a more or less tubular outgrowth; carpus comparatively large, smooth; palm as long as merus, smooth, with upper and lower small outgrowths at articulation with carpus; fingers about half as long as palm, deeply excavated inside, with several sharp teeth on its prehensile edge.

Ambulatory leg not slender, depressed, with sharp anterior margins of merus, carpus and propodus; both margins of merus angulated, sharply in anterior margin and bluntly in posterior margin, with convex distal end of anterior margin; carpus two thirds as long as merus, produced as a convex, thin lobe for its length; propodus as long as merus, depressed, anterior margin produced as a rounded lobe from median to basal parts; median part of posterior margin weakly convex, with a cluster of several setae; dactylus only slightly shorter than propodus, weakly tapering, inner upper and lower margins each with a row of 11 spinules.

Abdomen narrow; first and second segments constricted between coxae of fifth ambulatory legs of both sides, third to fifth segments tapering, with a mound at lateral part of third seg-

ment; sixth segment as long as fourth and fifth segments combined, angulated at median part of each lateral margin; terminal segment two thirds as long as sixth segment, only weakly tapering.

First pleopod slender, very weakly curved, with oblique distal opening constricted at the base.

Allotype. Female. Carapace proportionally wider than male carapace, with well developed, upcurved hepatic lobes. Brachial lobe directed laterally, with obliquely subtruncated margin. Gastric and cardiac regions only weakly developed, quite similar to those of holotype male. Both chelipeds slender; merus armed with three nodules much smaller than those of holotype male; fingers meet throughout their prehensile edges, teeth much smaller than those of holotype male. Armatures of meri, carpi and propodi of detached two ambulatory legs of left side similar to, but not so strong as in holotype male.

Remarks. This species is characteristic in the shape of the male carapace having the convex hepatic lobe and the wing-like brachial lobe, and the main part of the female carapace is rather rectangular and much wider than the triangular male carapace. These characters are diagnostic for this species, which is quite distinctive among

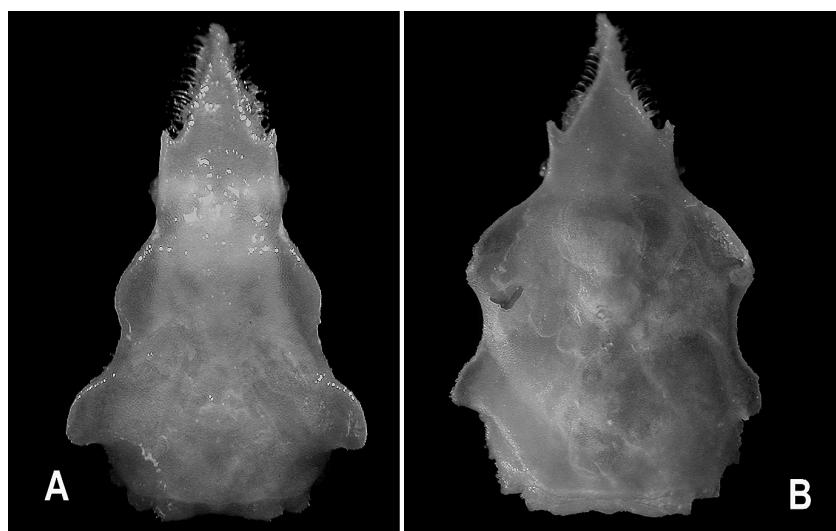


Fig. 6. *Huenia toyoshioae* sp. nov. A, holotype male (NSMT-Cr 16155; cl 13.8×cb 8.4 mm); allotype female (WMNH-Na-Cr 1266; cl 15.2×cb 9.5 mm).

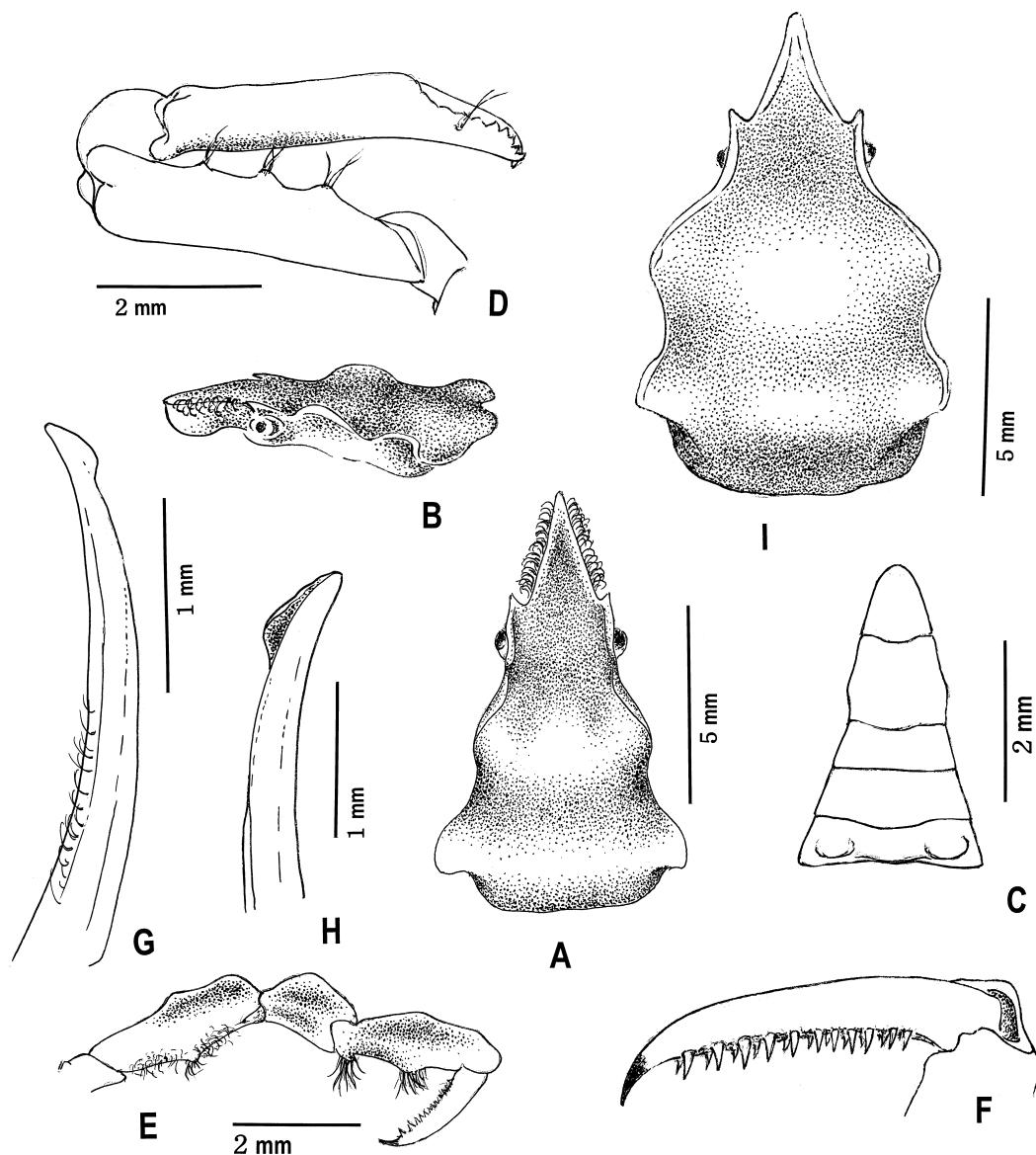


Fig. 7. *Huenia toyoshioae* sp. nov., holotype male (A-H NSMT-Cr 16155; cl 13.8×cl 8.4 mm), allotype female (I; WMNH-Na-Cr 1266; cl 15.2×cb 9.5 mm). A, B, I, carapace, dorsal (A, I) and lateral (B) views. C, abdomen, D, right cheliped, ventral view, E, right ambulatory leg; F, dactylus, ventral view, enlarged; G, H, left first pleopod, sternal (G) and ventral (H) views.

the known species of the genus. The female carapace reminds the male carapace of *Huenia keelingensis* Griffin et Tranter in which the hepatic lobe is more expanded than the branchial lobe in both sexes.

Etymology. The new species is named after TV Toyoshio Maru of Hiroshima University.

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