

Two species of *Upogebia* from Tokushima, Japan, with a description of a new species, *Upogebia trispinosa* (Crustacea: Decapoda: Thalassinidea)

K. Sakai & H. Mukai

Sakai, K. & H. Mukai. Two species of *Upogebia* from Tokushima, Japan, with a description of a new species, *Upogebia trispinosa* (Crustacea: Decapoda: Thalassinidae).

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Key words: Crustacea; Decapoda; Upogebiidae; *Upogebia*; description; distribution; Japan; Tohoku; Shikoku; Ryuku Islands.

Upogebia trispinosa spec. nov. is described from Tokushima, Japan. The species is rather closely related to *U. narutensis*.

Katsushi Sakai, Shikoku Women's University, Tokushima 771-11, Japan.

Hiroshi Mukai, Ocean Research Institute, University of Tokyo, Nakano, Tokyo 164, Japan.

Introduction

The vast muddy estuaries of the rivers Yoshino-gawa and Katsuura-gawa in Tokushima show an abundance of upogebiid species. The most common upogebiid belongs not to *U. major* (de Haan, 1841) commonly recorded from most of Japan (Hakata Bay, Fukuoka; Ariake Sea, Kumamoto; Tokyo Bay; Funka Bay, Hokkaido), but to *U. yokoyai* Makarov, 1930. Among our collections of *U. yokoyai*, a few specimens of a new species, *U. trispinosa*, were found.

Yokoya (1930) described a new species under the name of *Gebia affinis*, but later on Makarov (1938) became aware that the name used by Yokoya is a junior homonym of *Upogebia affinis* (Say, 1818) from the eastern coast of North America and he gave Yokoya's species a new name, *U. yokoyai*.

U. yokoyai shows a sexual dimorphism on pereopod 1; this pereopod of the male was figured by Yokoya (1930), while that of the female has not yet been figured. The new species, *U. trispinosa*, occasionally found among the specimens of *U. yokoyai*, is very characteristic in the morphology of pereopod 1 and the trispinose epistome. It is very different from other Japanese upogebiid species, *U. major*, *U. issaefi* (Balss, 1913), *U. yokoyai*, and *U. narutensis* Sakai, 1986.

Descriptions

Upogebia yokoyai Makarov, 1930 (figs. 1-3)

Gebia affinis Yokoya, 1930: 544, figs. 4-5 (junior homonym of *Gebia affinis* Say, 1818).

Upogebia (Upogebia) yokoyai Makarov, 1938: 57, fig. 18; Sakai, 1968: 47, fig. 1; Sakai, 1982: 61, figs. 11e, 15a-b, pls. B2, F2.

Upogebia major; Mukai, 1984: 191.

Material.— Six $\sigma\sigma$, TL 29.0-52.0 mm, 5, TL 31.0-51.0 mm (BLT 5668), Yamada Bay, Iwate, Japan, muddy flat, 1982, leg. H. Mukai; 3 $\sigma\sigma$, TL 36.0-40.0, 4 ovig ♀♀ , TL 67.0-59.0 mm, 2, TL 34.0-61.0 mm (BLT 5669), estuary of Yoshinogawa River, Ohjincho, Tokushima, muddy sand, 11.vii.1987, leg. K. Sakai; 1 σ , TL 36.0 mm, 4 ovig ♀♀ , TL 54.0-56.0 mm (BLT 206), estuary of Yoshinogawa River, Jyotocho, Tokushima, muddy sand, 7.ix.1982, leg. K. Sakai; 4 $\sigma\sigma$, TL 64.0-59.0 mm (BLT 1870A), estuary of Yoshinogawa River, Jyotocho, Tokushima, muddy sand, 9.viii.1983, leg. K. Sakai; 3 $\sigma\sigma$, TL 47.0-70.0 mm, 2 ♀♀ , TL 59.0-64.0 mm (BLT 1982), estuary of Yoshinogawa River, between Komatsu and Kita-Okinosu, muddy sand, 11.viii.1982, leg. K. Sakai; 11 $\sigma\sigma$, TL 48.0-59.0 mm, 7, TL 33.0-58.0 mm (BLT 5670), Jyatani coast, estuary of Katsuura-gawa River, Tokushima, muddy sand, 29.iv.1990, leg. K. Sakai; 3 $\sigma\sigma$, TL 20.0-54.0 mm (BLT 5671), Inoshiri, Tosa-city, Kochi, coarse sand, tidal zone, 20.v.1990, leg. K. Sakai; 1 σ , TL 25.0 mm, 2 ♀♀ , TL 25.0-44.0 mm (BLT 4672), coast between Sokari and Yadorihama, Setouch-cho, Amami-Oshima, muddy sand, 25.vii-7.viii.1990, leg. H. Saito; 2 $\sigma\sigma$, TL 38.0-39.0 mm, 2 ♀♀ , TL 35.0-41.0 mm (BLT 5674), Kuira-gawa, Iriomote-jima, Ryukyu Islands, tidal flat, vii.1980, leg. N. Yoshikawa.

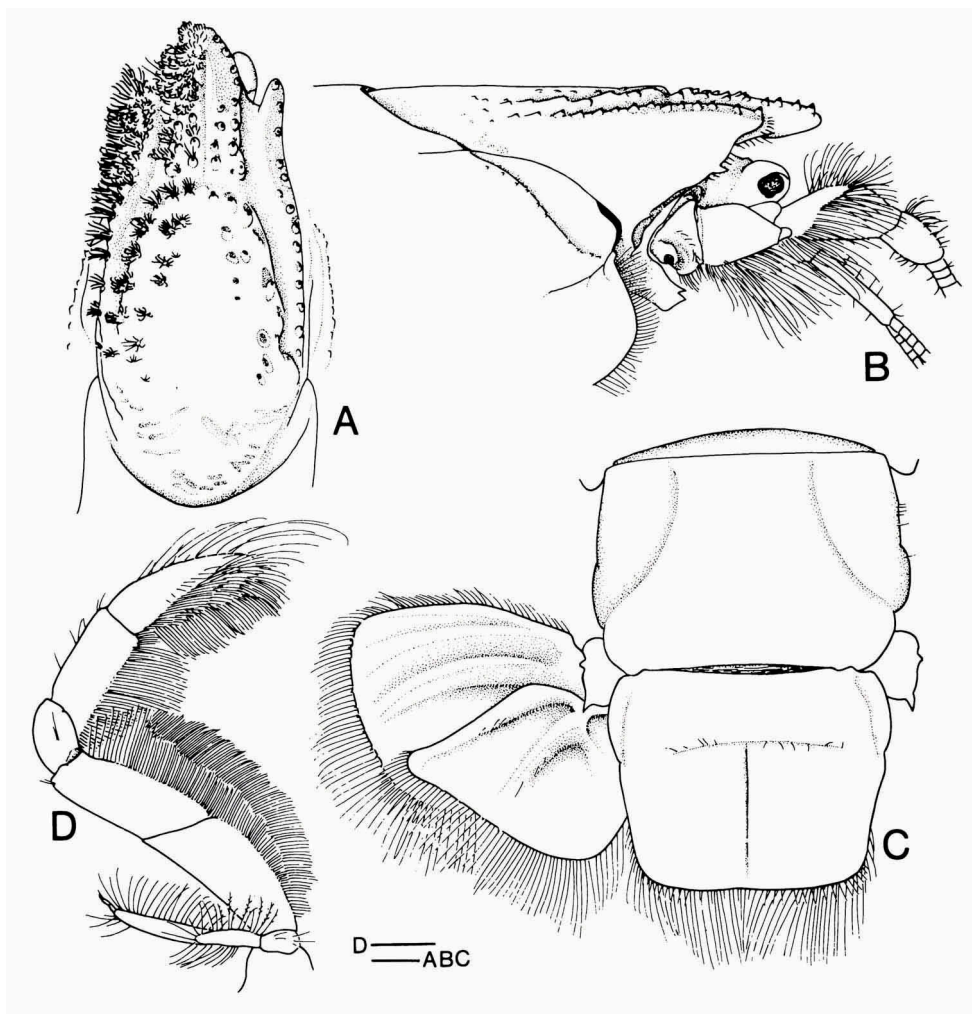


Fig. 1, *Upogebia yokoyai* Makarov, 1930, ovig. ♀ , TL 49.0 mm, BLT 5669. A, gastric region of carapace, dorsal view; B, same, lateral view; C, telson, dorsal view; D, maxilliped 3, lateral view. Scale bars 1 mm.

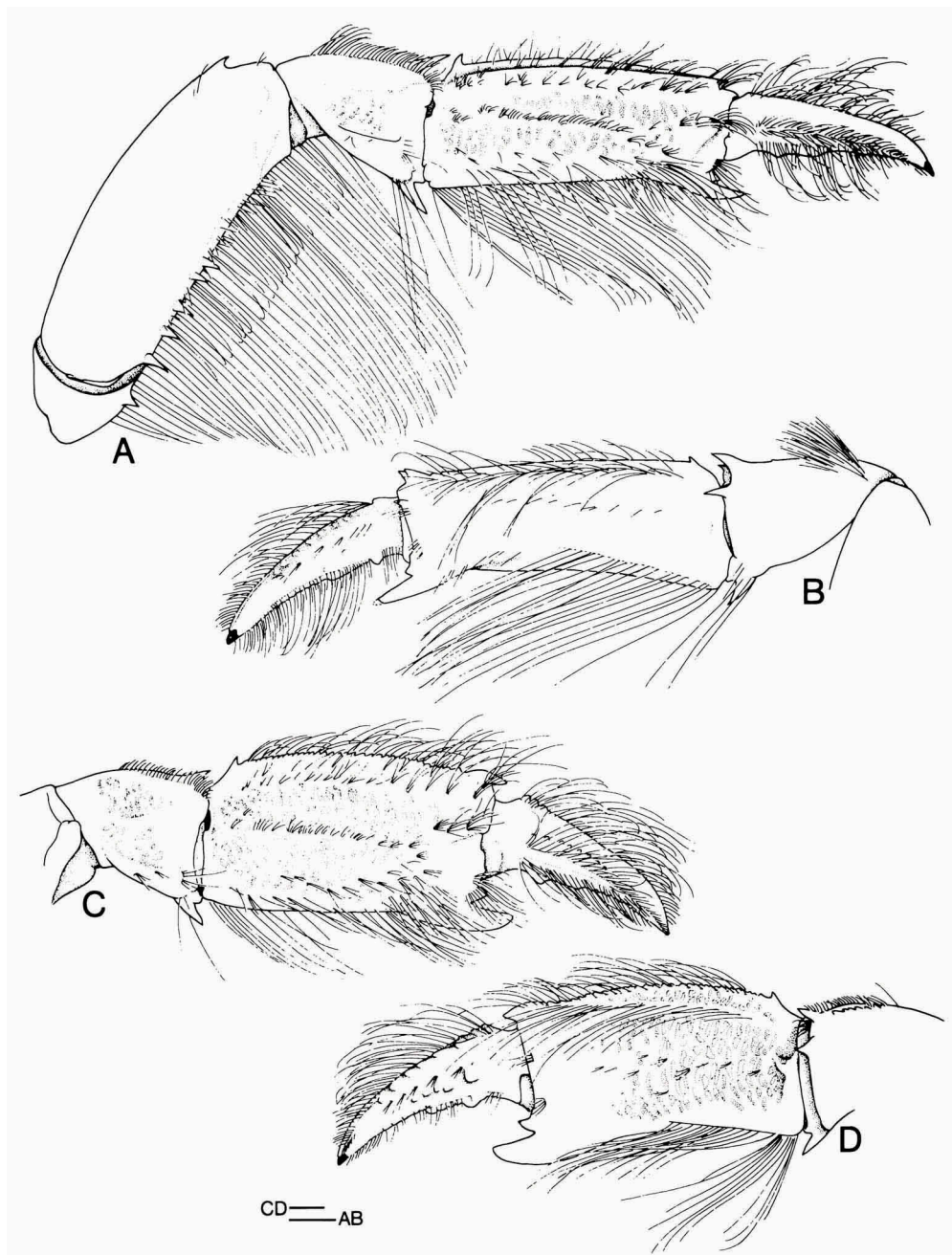


Fig. 2, *Upogebia yokoyai* Makarov, 1930, A-B, ovig. ♀, TL 49.0 mm BLT 5669; C-D, ♂, TL 67.0 mm, BLT 1982. A, pereopod 1 of female, lateral view; B, same, mesial view; C, pereopod 1 of male, lateral view; D, same, mesial view. Scale bars 1 mm.

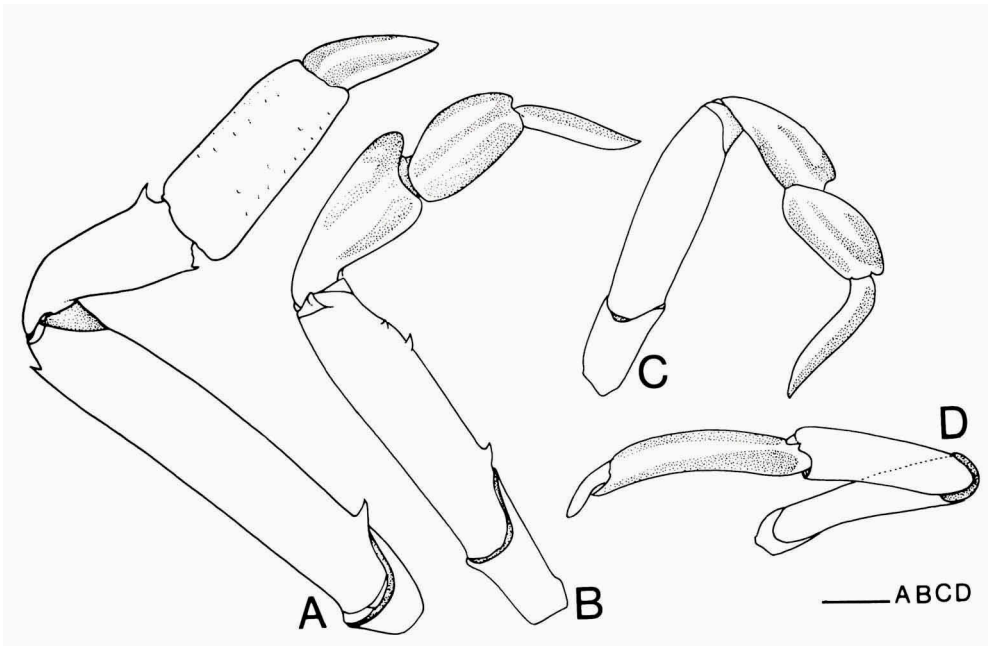


Fig. 3, *Upogebia yokoyai* Makarov, 1930, ♀, TL 44.0 mm, BLT 4672. A, pereopod 2, lateral view; B, pereopod 3, lateral view; C, pereopod 4, lateral view; D, pereopod 5, lateral view. Scale bar 1 mm.

Description of females.— Anterior region of carapace 1.8 times as long as posterior region. Cervical groove entire, laterally with a row of 7-10 denticles (fig. 1B). Linea thalassinica present on whole length of carapace, discontinuous on branchial region. Rostrum (fig. 1A) rounded distally; dorsal surface setose, with four marginal teeth, medially concave, extending to shallow transverse groove at anterior third region of carapace; ventral surface unarmed. Posterior to rostrum carapace setose, with sparse marginal and submarginal teeth. Lateral grooves broad and lateral crests with 14 teeth. Anterior margin of carapace with a single tooth. Epistome bifurcate.

Abdominal somites 1-6 and telson 1.0; 1.2; 1.0; 1.0; 1.0; 1.2; 1.1 in relative length. Telson (fig. 1C) 1.3 times broader than long; lateral margins almost parallel in proximal 0.4, converging straightly in distal 0.6; dorsal surface shallowly grooved medially in posterior 0.7; posterior margin slightly convex.

Antennular segments unarmed, reaching middle of distal segment of antenna; segment 2 short; segment 3 slender, about as long as segments 1 and 2 combined; flagella shorter than peduncle. Antennal segments 1 and 2 unarmed, segment 3 with short distoventral tooth, segments 4 and 5 unarmed, scaphocerite a rounded scale.

Maxilliped 3 (fig. 1D) with exopod consisting of a proximal segment and short, 3-segmented flagellum; ischium with a proximal tooth on interior surface.

Pereopods 1 (fig. 2A, B) subchelate and equal. Coxa and basis unarmed. Ischium with a sharp distoventral tooth. Merus 2.8 times as long as broad, with 5 or 6 sharp teeth on ventral margin, and one subterminal tooth on dorsal margin. Carpus with prominent tooth at both the dorsodistal and the distoventral angle, and mesial margin with a prominent distal tooth. Propod 2.3 times as long as wide; dorsal margin

broadly carinate, scarcely armed except for a sharp, upstanding curved proximal tooth and a distally directed distal tooth; lateral surface shallowly sulcate along dorsal margin, and mesial surface with a row of setae below dorsal margin, otherwise obliquely carinate ventrally with long setae in proximal half. Dactyl 0.7 times as long as propod; cutting edge convex in proximal half, most strongly so basally; distal half basally with a row of five denticles, and smooth in its distal two-thirds; mesial surface with a row of six depressed tubercles along dorsal margin.

Pereopod 2 with coxa, basis, and ischium unarmed. Merus (fig. 3A) with sharp proximal tooth on ventral margin, and with subterminal tooth on dorsal margin. Carpus more than half as long as merus, unarmed. Propod slightly longer than carpus, oblong on lateral surface. Dactyl 0.7 times as long as propod; lateral surface with a longitudinal smooth area in dorsal half, and smooth in ventral half. Pereopod 3 (fig. 3B) with coxa; basis and ischium unarmed. Merus with three teeth on ventral margin, and unarmed on dorsal margin. Carpus more than half the length of merus, dorsodistal margin roundly protruded over joint between carpus and propod; lateral surface with dorsal, median and ventral bands of thick setae. Propod shorter than carpus; lateral surface with three bands of setae. Dactyl about as long as propod, lateral surface setose on dorsal half, smooth on ventral half. Pereopod 4 (fig. 3C) similar in shape and pattern of setae, but shorter than Pereopod 3. Pereopod 5 (fig. 3D) subchelate; merus, carpus and propod subequal in length; propod about three times as long as dactyl.

Pleopod 1 of female simple, two-segmented. Pleopods 2-5 biramous; exopods larger than endopods. Pleopods 1-4 with numerous eggs, but pleopod 5 without eggs.

Uropod with endopod slightly shorter than, and exopod about as long as telson; dorsal surfaces of endopod and exopod with deep and wide grooves.

Description of males.—Pereopod 1 with propod (fig. 2C, D) 1.8 times as long as wide; dorsal margin finely denticulate, with stout distal tooth. Dactyl 0.8 times as long as propod; lateral surface with a median row of tubercles; mesial surface with a row of depressed tubercles along dorsal margin. Pleopod 1 absent.

Distribution.—Japan: Asadokoro, Aomori Prefecture (type locality) to Iriomote, Ryukyu Islands.

Remarks.—This species shows a sexual dimorphism in pereopod 1. Yokoya (1930, text-fig. 5) figured the male pereopod 1, showing the propod to be 1.7 times as long as wide, with a denticulate dorsal margin, but described the female propod in the text (Yokoya, 1930: 546) as "The palm of the chela is about twice as wide as long...".

The present species is abundant in the estuary of the Yoshinogawa-River, Tokushima, and recently some specimens of *U. yokoyai* were collected in Amami-Oshima Island.

Etymology.—Named after Mr Y. Yokoya.

***Upogebia trispinosa* spec. nov.**
(figs. 4, 5)

Material.—♀, TL 43.0 mm, CL 11.0 mm (holotype, RMNH D 40158), Jyadani coast, estuary of Katsura-gawa River, Tokushima, muddy sand, collected together with numerous *U. yokoyai*, 29.iv. 1990, leg. K. Sakai; 1 ♂, TL 32.0 mm, 1 ♀, TL 29.0 mm, 1 damaged ♀, (paratype, BLT 1870B), estuary of

Yoshinogawa River, Jyotocho, Tokushima, muddy sand, collected together with *U. yokoyai*, 9.viii.1983, leg. K. Sakai; 1 ♀, TL 49.0, (paratype, BLT 1531), estuary of Asakawa River, Kainan-cho, Tokushima, muddy sand, 29.iv.1983, leg. K. Sakai.

Diagnosis.— Rostrum unarmed on ventral surface, epistome with 2-3 distal teeth. Propod of pereopod 1 denticulate on dorsal margin; in male dactylus lateral surface finely denticulate on dorsal margin, medially with row of tubercles; mesial surface dorsally and medially with row of denticles.

Description of female holotype.— Anterior region of carapace 1.6 times as long as posterior region. Cervical groove entire, laterally with three denticles above crossing point with *linea thalassinica*, and with row of 13-19 denticles below it (fig. 4B). Rostrum (fig. 4A) rounded distally; dorsal surface setose, with four marginal teeth; medially concave, and ventral surface unarmed. Posterior to rostrum dorsal region

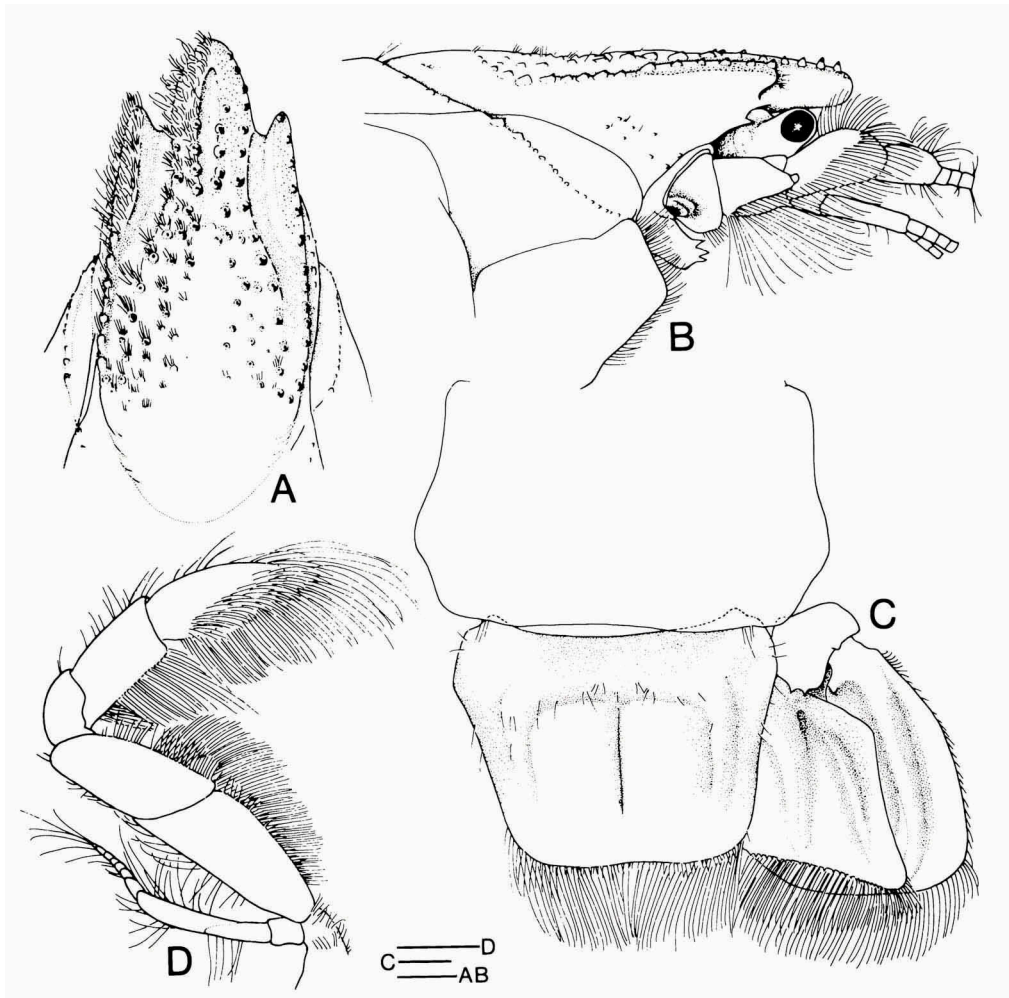


Fig. 4, *Upogebia trispinosa* spec. nov., holotype ♀, TL 43.0 mm, RMNH D 40158. A, gastric region, dorsal view; B, same, lateral view; C, telson, dorsal view; D, maxilliped 3, lateral view. Scale bars 1 mm.

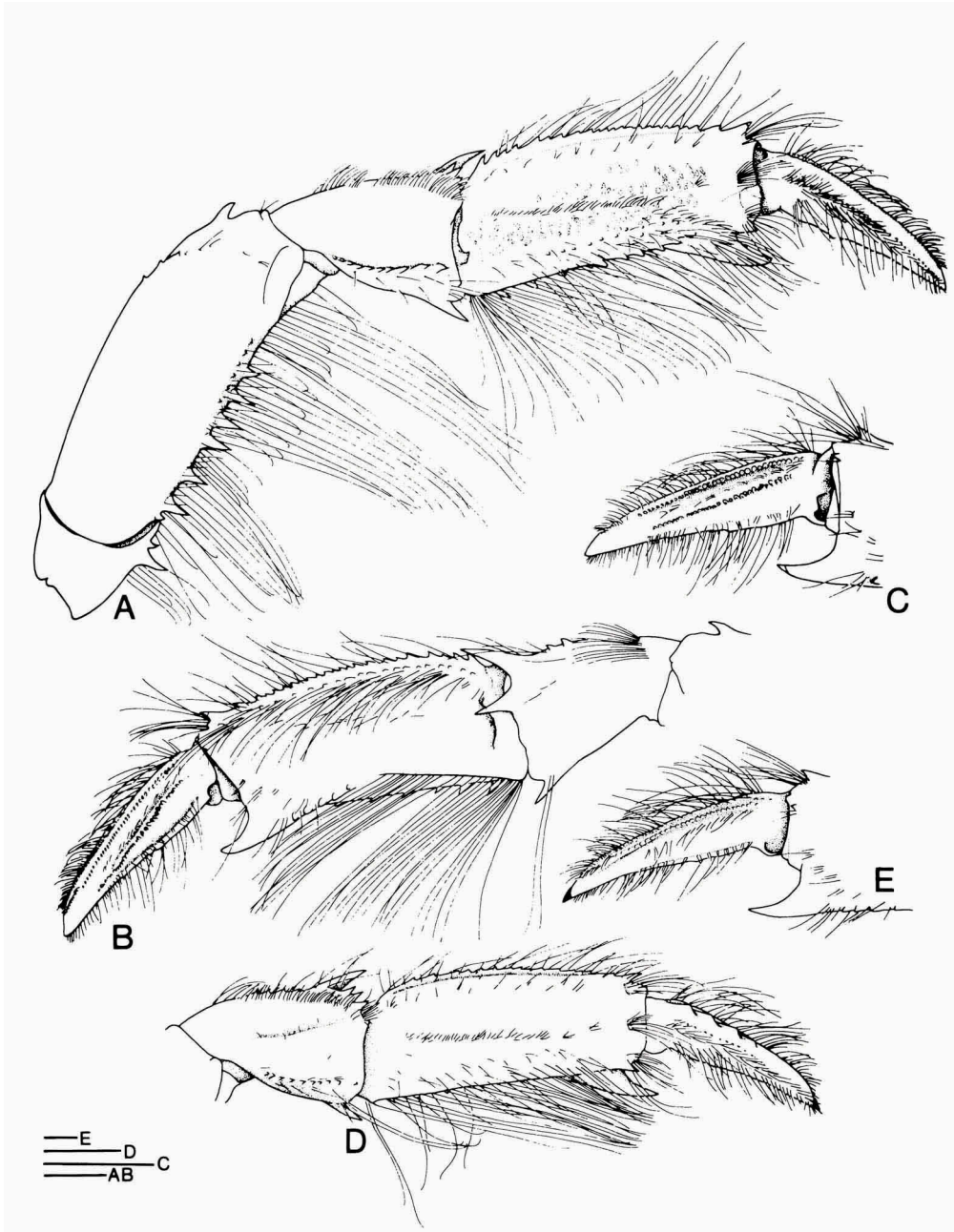


Fig. 5, *Upogebia trispinosa* spec. nov. A-C, holotype ♀, TL 44.0 mm, RMNH D 40158; D-E, ♂, TL 32.0 mm, BLT 1870B. A, pereopod 1, lateral view; B, same, mesial view; C, dactyl of same pereopod 1, mesial view; D, pereopod 1, lateral view; E, dactyl of same pereopod 1, mesial view. Scale bars 1 mm.

setose, dispersed with teeth extending posteriorly. Anterolateral surface of carapace with some denticles, with sharp tooth on anterolateral margin. Epistome terminated in 2 or 3 teeth.

Abdominal somites 1-6 and telson 1; 1; 0.8; 0.8; 0.9; 1.2; 1 in relative length. Telson (fig. 4C) 1.3 times broader than long; lateral margin broadened proximally, slightly converging posteriorly; posterior margin slightly concave, deformed by damage, dorsal surface concave centrally, with median groove except in broad proximal and posterior parts.

Antennular peduncle unarmed, failing to reach distal margin of antennal peduncle; flagella short, as long as the distance between proximal part of segment 1 and middle of segment 3. Antennal segment with segments 1 and 2 unarmed; segment 3 with distoventral tooth, segments 4 and 5 unarmed; scaphocerite truncate distally. Maxilliped 3 (fig. 4D) with ischium with sharp proximal tooth on mesial surface; exopod consisting of proximal segment and flagellum; flagellum 0.6 times as long as proximal segment.

Pereopods 1 (figs. 5A, B) subchelate, equal. Coxa with posterodistal tooth on mesial surface; basis with proximal tooth on ventral surface. Ischium distally with two fused teeth on ventral margin. Merus 2.5 times as long as wide; dorsal margin with stout subterminal tooth and with 2 or 3 denticles on oblique subterminal ridge; ventral surface with a row of 5 or 6 prominent teeth, and laterally with 6 or 7 denticles. Carpus about half length of merus; dorsal margin centrally with a row of three teeth, and with strong distal tooth; distolateral margin with four teeth in dorsal half; ventrolateral carina with a row of 10 teeth increasing distally in size, and with sharp distal tooth; mesial surface also with sharp distal tooth. Propod 2.2 times as long as broad, 1.5 times as long as carpus; dorsal margin denticulate by a row of 22 or 23 teeth, distal one much more distinct than others; lateral surface with a row of setae in middle line curved downward in subterminal region, with sharp ventrodistal tooth above fixed finger; ventral surface setose, with a row of 10 interspaced denticles; fixed finger triangular, carinate; carina continuing onto propod with a row of five ventral teeth; mesial surface with a row of denticles along dorsal margin. Dactyl 0.7 length of propod; dorsal surface with a row of setae; dorsolateral surface concave, with a row of fine tubercles on dorsal margin and also with row of tubercles on median line, below which with two rows of setae; mesial surface (fig. 5C) with a row of tubercles along dorsal margin, and medially with a row of distinct tubercles; cutting edge protruded in proximal half.

Pleopod 1 of female simple, two-segmented. Pleopods 2-5 biramous; exopods much larger than endopods.

Uropod with endopod slightly shorter than telson; posterior and lateral margins slightly concave; dorsal surface sculptured. Exopod slightly longer than endopod, proximally with tooth; dorsal surface deeply sculptured.

Description of male.— Males different from females in pereopods 1; dactyl (fig. 5D) similar to that of females, but lateral surface dorsally with four depressed, triangular teeth in proximal half, and medially with row of tubercles; mesial surface (fig. 5F) dorsally with row of denticles.

Etymology.— The species name is derived from the characters showing the epistome with trispinose tip.

Remarks.— The present species shows a sexual dimorphism in the dactylus of pereopods 1. In the male the lateral surface is provided with a row of four depressed

teeth in the proximal half, and the mesial surface is with a row of denticles only on the dorsal line. In the female the lateral surface is tuberculate on the dorsal margin, and the mesial surface is armed with rows of tubercles on the dorsal and medial lines.

U. trispinosa is different from the other Japanese upogebiids, *U. major*, *U. issaefi*, *U. yokoyai*, and *U. narutensis*. It is rather closely related to *U. narutensis* by that the dorsal margin of the propod of pereopod 1 is denticulate, and that the cervical groove is denticulate laterally. However, *U. narutensis* is characteristic in that the rostrum is armed with ventral spines and the anterolateral margin of the carapace is provided with four teeth.

U. trispinosa proves uncommon; the single female specimen was found among numerous specimens of *U. yokoyai* collected from the estuary, and three small specimens were also found together with *U. yokoyai*.

Abbreviations and acknowledgements

The following abbreviations are used in the descriptions: BLT = Tokushima Biological Laboratory, Shikoku Women's University, Tokushima; RMNH = Nationaal Natuurhistorisch Museum, Leiden; CL = carapace length; TL = total length.

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