南西水研研報
Bull. Nansei Natl. Fish.
Res. Inst. No. 26, 1–8, 1993

A New Caridean Shrimp, *Psalidopus tosaensis*, from Tosa Bay, Japan (Decapoda: Caridea, Psalidopodidae)

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A new species of the scissor-foot shrimp, is described and illustrated based on two specimens taken in a lower bathyal depth of Tosa Bay, Japan. This is the third species to be known in the genus.

Key words: *Psalidopus tosaensis*, sp. nov., Psalidopodidae

The scissor-foot shrimps of the genus *Psalidopus* are one of the rarer members among the carideans. According to CHACE and HOLTHUIS (1978) who revised the genus, only two species should be known in the genus: *P. barbouri* CHACE, 1939, from the western Atlantic and *P. huxleyi* WOOD-MASON and ALCOCK (1892), from the Indo-West Pacific. *Psalidopus japonensis* KUBO (1952) and *P. spiniventris* WOOD-MASON and ALCOCK (1892), the nominal species theretofore described, were both synonymized with *P. huxleyi* (see CHACE and HOLTHUIS, 1978).

Materials and methods

Personnel at the Nansei National Fisheries Research Institute, Kochi Station, have been collecting benthic animals in Tosa Bay, Japan, as part of major projects of the institution. Among a recent collection from the deeper part of the sea we found two unusual crustaceans belonging to the scissor-foot shrimp. They were taken with a 9-foot beam trawl by the R/V "Tansei-Maru" from the sea floor at depths of 2765–2881 m, much greater depth than those for the two known species. Apparently they represent a new species which is hereby described and illustrated. The postorbital carapace length in mm is shown in parentheses under "Type material." The material is deposited in the Department of Biology, Faculty of Science, Kochi University (BSKU).

Results and discussion

Psalidopus tosaensis new species

(Figs. 1–3, 5)

New Japanese name: Tosaigaguri-ebi

Type material: Holotype, male (25.7 mm), BSKU 80112, paratype, female (26.9 mm), BSKU 80113, off Muroto Cape, Kochi Pref., Japan, 32°13′12″ N, 134°01′36″ E, 2765–2881 m, 9 Nov. 1989, coll. Osamu Okamura.

Received: November 18, 1992. Contribution No. A19 from Nansei National Fisheries Research Institute, Ohno-cho, Saeki-gun, Hiroshima 739–04, Japan
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Diagnosis: Rostrum horizontally straight. Carapace with longitudinal row of spines on dorsal part of branchial region much reduced and without spines on submarginal region. Sixth abdominal somite with 5 or 6 spines in dorsal midline. Antennal scale 2.4–2.5 times as long as wide. Lower bathyal inhabitant.

Description: Body strongly chitinized, exceedingly spiny (Figs. 1a, 2a). Rostrum horizontal, directed nearly straight forward, about 1.2 times as long as carapace, armed with 10 dorsal, 6–9 ventral and 12–13 lateral spines; lateral spines very small and restricted to proximal third of rostrum (Figs. 1a, d, e, 2a).

Supraorbital, antennal, branchiostegal and pterygostomial spines well-developed, first of these in particular. Carapace with 4 pairs of spine rows: median row composed of 15–19 spines (with or without alternation of large and small spines); intermediate row including supraorbital spine leading to posterior marginal groove composed of 12–13 spines; posterior antennal row composed of 10–12 small spines; sublateral row including branchiostegal spine leading to posterior marginal groove composed of 12 spines about as large as those of intermediate row. Branchial region with smooth surface elevated in oval circle bearing 23 spines along its extremity.

Abdomen spinulose, with middorsal ridge on first to sixth somites except for fifth, each ridge with more pronounced spines: 2 on first somite, 4–6 on second, 6 on third, 5 or 6 on fourth, 5 or 6 on sixth; fifth somite with 5 middorsal spines (Figs. 1a, 2a). Pair of spines flanking anterior end of middorsal row of spines on each somite. Pleura with 3, 3, 2, 2, and 2 large marginal spines on first, second, third, fourth and fifth somites, respectively. Sixth somite with 4 laterally directed spines on pleural margin, posteriormost one prominent. Telson with gutter-like wide groove in dorsal midline, flanked by submedian spines, 22 in number on each side (Fig. 1b, c).

Eyes very small, unpigmented; peduncle immovable.

Antennular peduncle subcylindrical; stylocerite acute, overreaching distolateral margin of second segment; basal segment with strong median ventral spine; second and third segments unarmed on distolateral angle (Fig. 1f). Antennal scale 2.4–2.5 times as long as wide, about 0.7 times as long as postorbital carapace length; lateral margin nearly straight, bearing 9 spinules on proximal half, ending in stout, acute spine, basal segment of antennal peduncle with 2 strong spines, ventral one longer (Fig. 2b).

Mouthparts typical of family; mandible with 2-segmented large palp; molar process of square-prism in shape bearing thick short hairs on cutting edge; incisor process relatively large, spine-like (Fig. 2c). First maxilla with about 14 marginal spines on distal half of distal endite; palp slightly constricted near midlength (Fig. 2d). Second maxilla with distal endite divided into large and small lobes, scaphognathite relatively broad (Fig. 3a). Endopod of first maxilliped unsegmented; exopod comparatively broad and strongly incurved; epipod well developed and bilobed (Fig. 3b). Second maxilliped of inverse L-shape with well-developed epipod and elongate exopod; ischium and merus fused with each other; carpus short, propodus broadly subtriangular, dactylus very short and broad (Fig. 3c). Third maxilliped reaching anterolateral spine of antennal scale; exopod overreaching opposite midlength of second segment (Fig. 3d).

First pereiopod reaching distal end of antennal peduncle; merus dorsally with 1 large terminal and 4 small median spines; carpus relatively short, with large distodorsal spine and 6 small spines on dorsal margin; propodus more robust, fingers scissor-like, each cutting edge with 13–15 teeth (Fig. 3e).

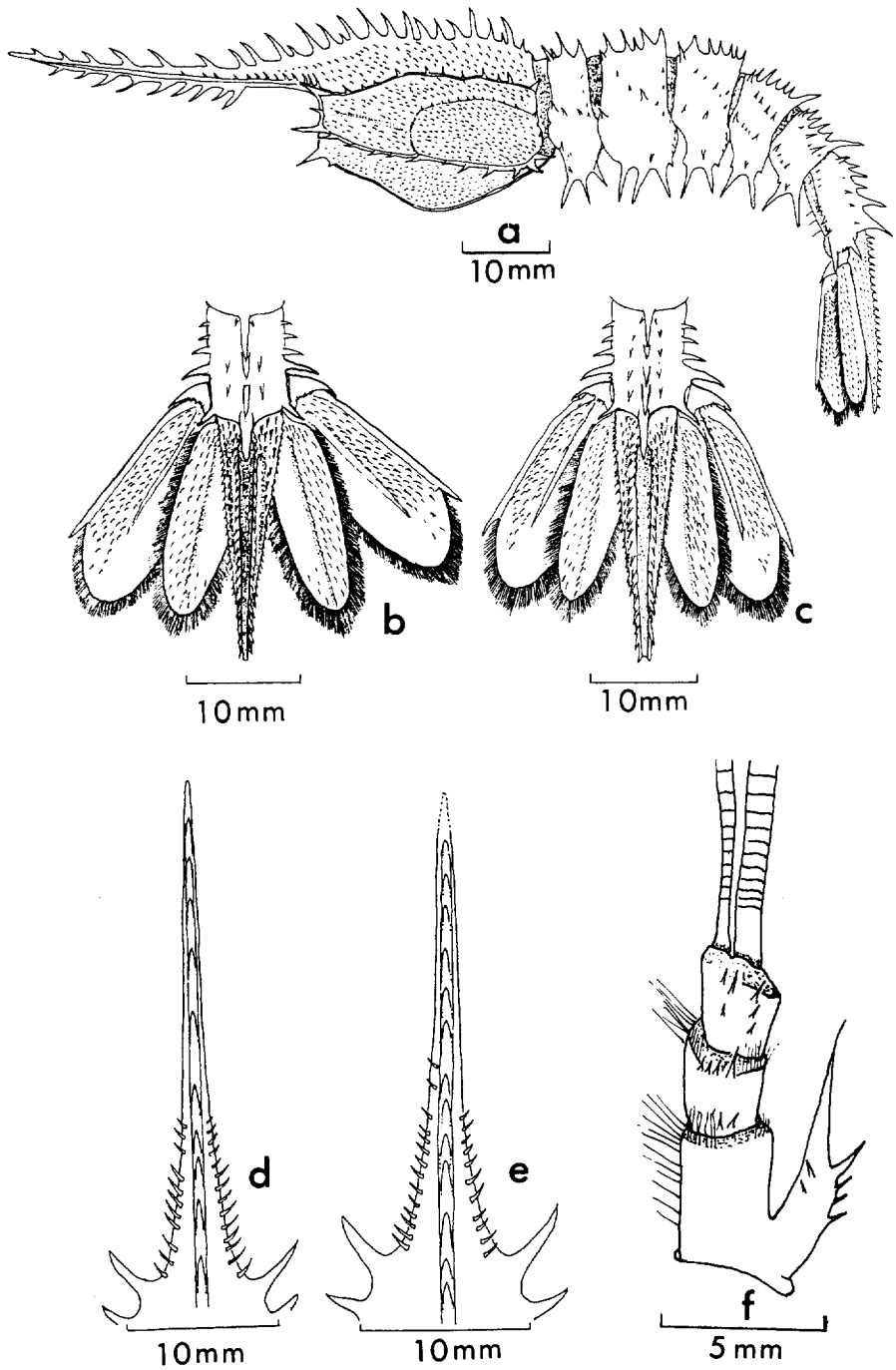

Fig. 1. *Psalidopus tosaensis* sp. nov., a, c and d, male, holotype: b, e, and f, female paratype: a, body, lateral view; b, c, telson and uropods, dorsal view; d, e, rostrum, dorsal view; f, right antennular peduncle, dorsomesial view.

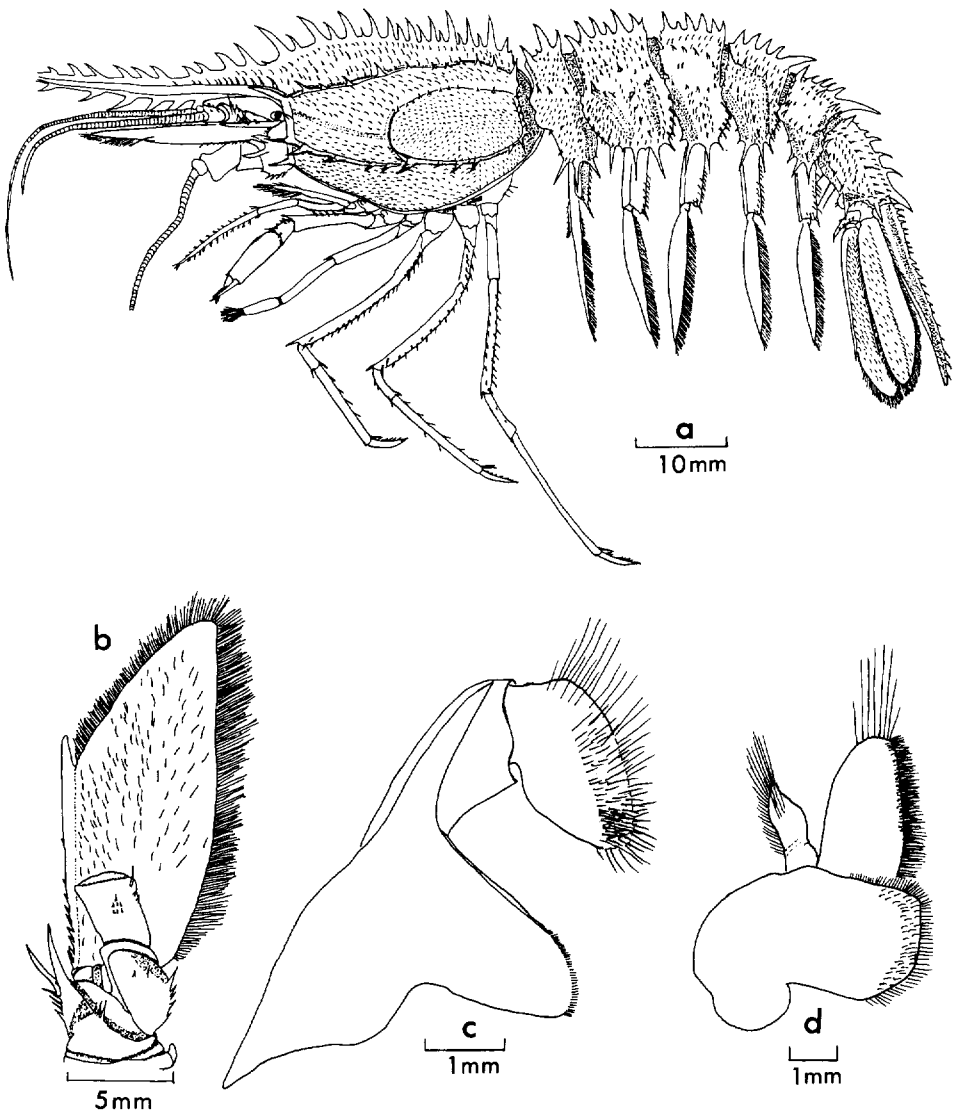

Fig. 2. *Psalidopus tosaensis* sp. nov., female, paratype: a, lateral view; b, right antennal peduncle and scale; c, right mandible, posterior view; d, left first maxilla.

Second pereiopod slightly shorter than first pereiopod; merus with 1 large terminal spine and 1 small spine at midlength of dorsal margin; carpus and propodus unarmed; dactylus with brush-like long setae (Fig. 3f).

Third pereiopod overreaching anterolateral spine of antennal scale by length of dactylus; ischium and merus fused with each other, with 2 rows of spines along ventral margin (30 spines each) and with acute spine on distodorsal edge; carpus short, with 2 dorsal spines proximally and 3 terminal spines; propodus with pair of long spine-like setae on distoventral margin; dactylus curved, ventral margin with 6 small spines (Fig. 3g).

Fourth pereiopod as long as third pereiopod; ischium with 2 rows of spines (8 spines each) on ventrolateral margin; merus with 18 spines on ventrolateral margin; carpus with 1 distal and 1

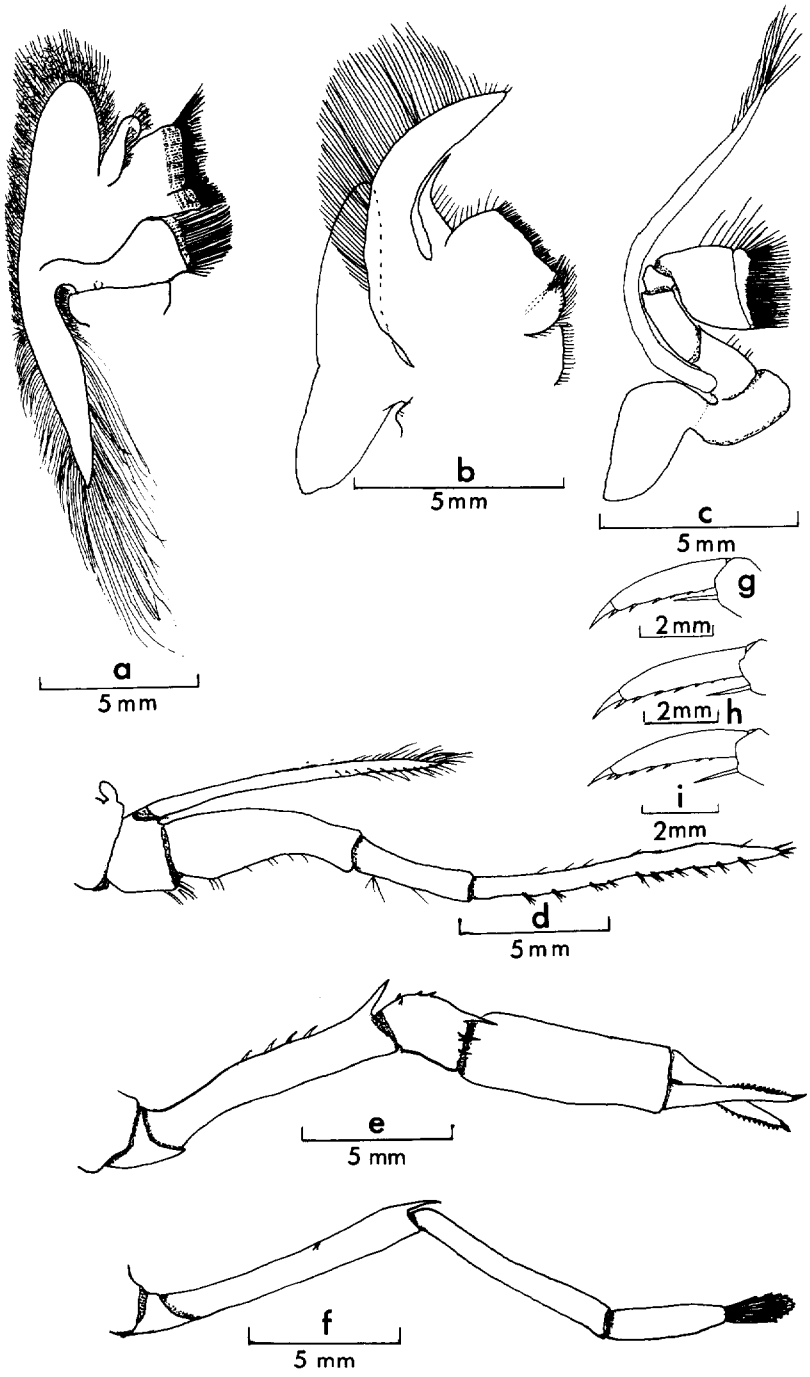

Fig. 3. *Psalidopus tosaensis* sp. nov., female, paratype : a, right second maxilla; b, right first maxilliped; c, right second maxilliped; d, right third maxilliped; e, right first pereiopod; f, right second pereiopod; g, dactylus of left third pereiopod; h, dactylus of left fourth pereiopod; i, dactylus of left fifth pereiopod.

middorsal spine; propodus with pair of long spine-like setae on distoventral margin; dactylus with 7 small spines on ventral margin (Fig. 3h).

Fifth pereiopod reaching distal margin of antennal scale; ischium unarmed; merus with 2 rows of spines (17 spines each); carpus with 1 distodorsal and 1 distoventral spine; propodus with pair of long spine-like setae on distoventral margin; dactylus similar to those of third and fourth pereiopods, ventral margin with 7 small spines (Fig. 3i). Ischium and merus partly fused with each other of first to fourth pereiopods but those of fifth pereiopod apparently articulated.

Uropod slightly shorter than telson; lateral margin of exopod smooth, without spines but a large terminal one (Fig. 1b, c).

Color: Body color deeper than in *P. huxleyi* and *P. barbouri*. Rostrum, and antennular and antennal flagella, light brown. Thoracic appendages and pleopods including tailfan, bright red. Dorsal surfaces of carapace and abdomen, pale brown. Branchial region and antennal scale, reddish. Eyes, white (Fig. 5).

Remarks: The new species seems to be related more closely to the western Atlantic *P. barbouri* than to the Indo-Pacific *P. huxleyi* in the shorter and less numerous spines on the carapace, from both of which it may differ in the following respects. The rostrum is horizontally straight in the new species, more or less ascendant in the two known species (distinctly upcurved in *P. huxleyi*); the lateral spines in the new species, 12 or 13 in number, are restricted to the basal portion proximal to the opposite distal end of the antennular peduncle, and much smaller than those in the other two species in which they are present along the whole length of the rostrum (Figs. 1d, e, 4).

The antennal scale in *P. tosaensis* has on the proximal half of the lateral margin small spines instead

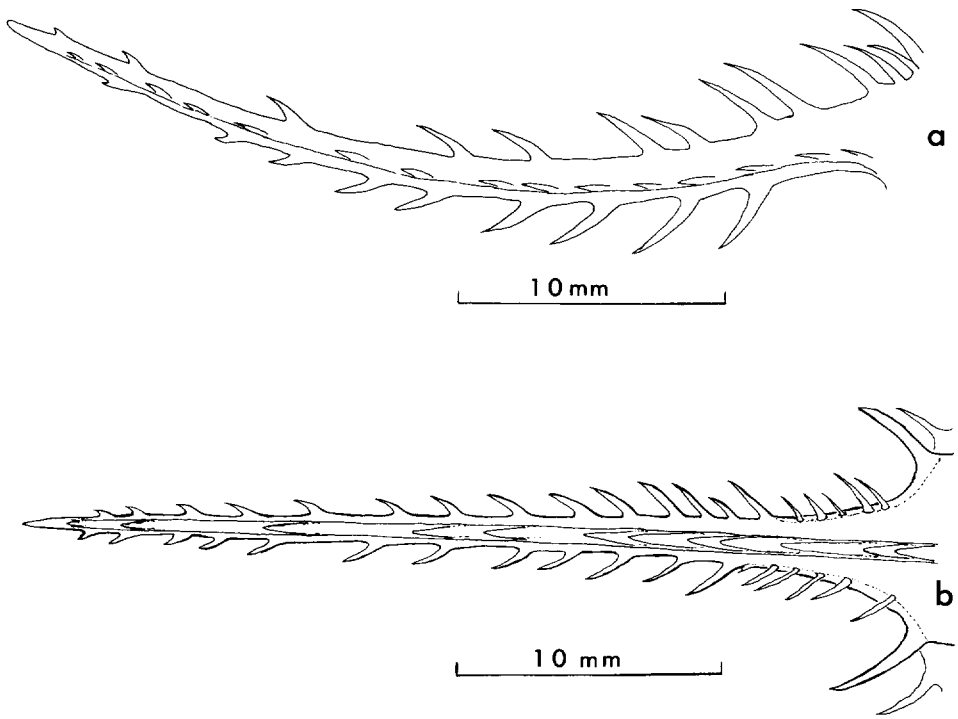

Fig. 4. *Psalidopus huxleyi* WOOD-MASON and ALCOCK, 1892, male from Tosa Bay, carapace length 22.7 mm, a, lateral view; b, dorsal view.

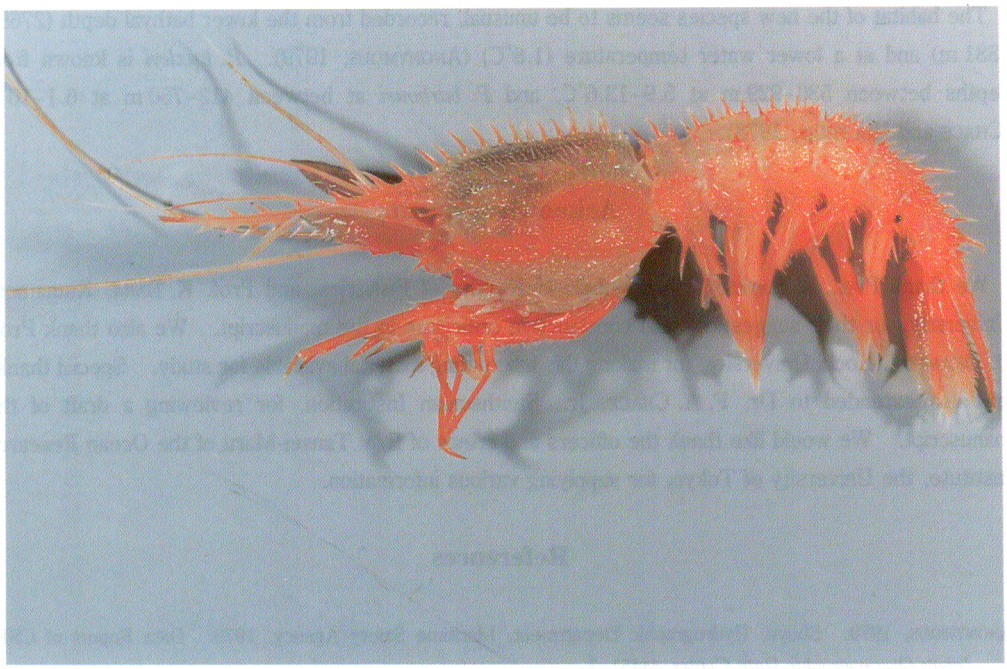

Fig. 5. *Psalidopus tosaensis* new species, male, holotype, lateral view.

Table 1. Comparison of meristic and morphometric characters among *P. tosaensis*, *P. huxleyi* and *P. barbouri*. Numerals in parentheses indicate mean values.

Characters	*P. tosaensis*	*P. huxleyi*	*P. barbouri.*
No. of rostral spines			
Dorsal	10	9–15(10.1)	6–12(8.3)
Lateral	12–13	10–22(16.3)	5–16(10.7)
Ventral	6– 9	7–16(10.5)	10–12(15.5)
No. of carapace spines			
Dorsal midline	19	10–14(11.3)	10–17(12.9)
Anterior intermediate row	3	5– 9(7.0)	5– 9(6.5)
Posterior intermediate row	10	4– 8(5.6)	3– 7(4.7)
Anterior antennal row	0	1– 3(1.4)	0– 2(1)
Posterior antennal row	10	5–10(6.9)	0– 6(1)
Branchial region	0–7(5.1)	0, rarely 1–2	
Anterior sublateral row	4	3– 6(4.5)	3– 9(5.1)
Posterior sublateral row	8	7–12(9.3)	6–13(9.7)
Submarginal region	0	7–36(8.5)	(less than 1)
No. of middorsal spines on sixth abdominal somite	5–6	4– 5	5– 9
Length-width ratio of antennal scale	2.43–2.59	2.8–5.0	2.0–4.2

of relatively large ones as in the known species. The exopod of the uropod in *P. tosaensis* has the lateral margin almost smooth instead of bearing a series of small spines as in *P. barbouri* and *P. huxleyi*.

Additional differences in meristic and morphometric characters among the three species are shown in Table 1.

The habitat of the new species seems to be unusual, recorded from the lower bathyal depth (2765–2881 m) and at a lower water temperature (1.6°C) (ANONYMOUS, 1979). *P. huxleyi* is known from depths between 530–929 m at 5.9–13.6°C, and *P. barbouri* at between 412–750 m at 6.1–10°C (CHACE and HOLTHUIS, 1978).

Acknowledgements

We thank Prof. K. HAYASHI, Shimonoseki University of Fisheries, and Prof. K. BABA, Kumamoto University, for their suggestions and constructive criticisms to the manuscript. We also thank Prof. O. OKAMURA, Kochi University, for making this interesting material available for study. Special thanks are also extended to Dr. F. A. CHACE, Jr., Smithsonian Institution, for reviewing a draft of the manuscript. We would like thank the officers and crews of R/V Tansei-Maru of the Ocean Research Institute, the University of Tokyo, for supplying various information.

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土佐湾産 *Psalidopus tosaensis* sp. nov. について

通山正弘・堀川博史

標本は1989年11月9日に土佐湾の大陸斜面にあたる水深2,765–2,881 mの深海底から東京大学海洋研究所“淡青丸”のビームトロール網によって2個体採集された。詳細に調べたところ本種は新種と考えられ、*P. tosaensis* sp. nov.—トサイガグリエビ（新称）—としてここに記載する。本属には *P. barbouri* と *P. huxleyi* の2種が大西洋とインド・北西太平洋からそれぞれ報告されているが、本種の出現であらたに1種の生息が確認された。本種の額角はほぼ水平に伸び、額角左右の棘が著しく小さいので、他種から容易に識別される。