

**A New Shrimp of the Genus *Palaemon* (Crustacea, Decapoda)  
from the Ogasawara Islands**

By

**Haruhiko KATO**

Laboratory of Aquatic Zoology, Tokyo University of Fisheries, Tokyo

and

**Masatsune TAKEDA**

Department of Zoology, National Science Museum, Tokyo

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A New Shrimp of the Genus *Palaemon* (Crustacea, Decapoda)  
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Haruhiko KATO<sup>1)</sup>

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During the sampling travel to the Ogasawara Islands (Fig. 1) in August 1979 and June 1980, a total of 36 specimens of inlandwater shrimps was collected by the senior author and the colleague. At first sight they were without doubt morphologically similar to *Palaemon* (*Palaemon*) *pacificus* (STIMPSON) which is widely distributed in the coastal waters of the Indo-West Pacific waters north to Honshu, Japan (KUBO, 1942; HOLTHUIS, 1950). For example they share some features in common with *P. pacificus* such as the long rostrum with two or three teeth behind the orbit and four or five teeth on the lower margin, but are readily distinguished from it by having some definitive features as noted below. They are described as a new species in the following lines, with notes on the morphological variation.

The holotype and some of the paratypes are kept in the National Science Museum, Tokyo (NSMT) and the other paratypes are deposited at the Museum, Tokyo University of Fisheries (MTUF).

Family Palaemonidae

Genus *Palaemon* FABRICIUS, 1798

*Palaemon* (*Palaemon*) *ogasawaraensis* sp. nov.

[New Japanese name: Ogasawara-ko-tenagaebi]

(Figs. 2-5)

*Holotype*. Male, NSMT-Cr 7203; stream mouth, a stream flowing into Buta beach (Minami-fukurosawa), Chichi-jima I., Ogasawara Is., June 28, 1980, H. KATO leg. Measurements (in mm) are as follows. Rostrum, 13.30. Body, 31.15 (Carapace, 7.35, abdomen, 18.95, telson, 4.85). First and second pereopods — dactylus (movable

1) Present address: Minamichita Beach Land, Mihama-cho, Aichi Prefecture.

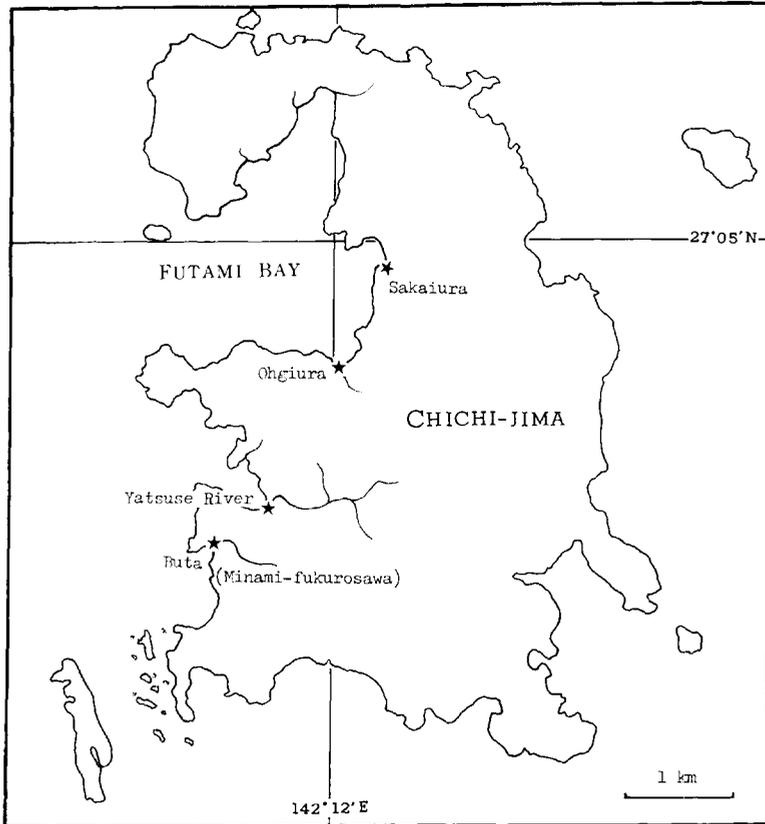


Fig. 1. Map of Chichi-jima Island, showing the sampling stations.

finger), palm, chela, carpus, merus, ischium — 0.85, 1.05, 1.80, 4.00, 3.00, 2.10; 1.50, 2.85, 4.35, 4.95, 4.15, 3.50. Third, fourth and fifth perciopods — dactylus, propodus, carpus, merus, ischium — 1.30, 3.75, 2.55, 4.75, 1.90; 1.35, 4.50, 2.90, 5.25, 2.05; 1.30, 4.70, 3.05, 5.45, 2.20.

The rostrum is long and slender, strongly curved upward in the distal half, reaching far beyond the end of the scaphocerite; its length is about 1.8 times as long as the carapace; the upper margin is provided with two apical and ten basal teeth, the first two of which are placed on the carapace behind the posterior limit of the orbit; the first of the basal teeth is placed farther from the second than the third is; except for the teeth on the carapace, the intervals between the distals are larger than that of the proximals; the last apical tooth is small and placed close to the apex of the rostrum; the lower margin bears five teeth widely separated; there are fine setae between the teeth on both margins; the lateral carina is present, but not conspicuous.

The antennal and branchiostegal spines are present on the carapace; the branchio-

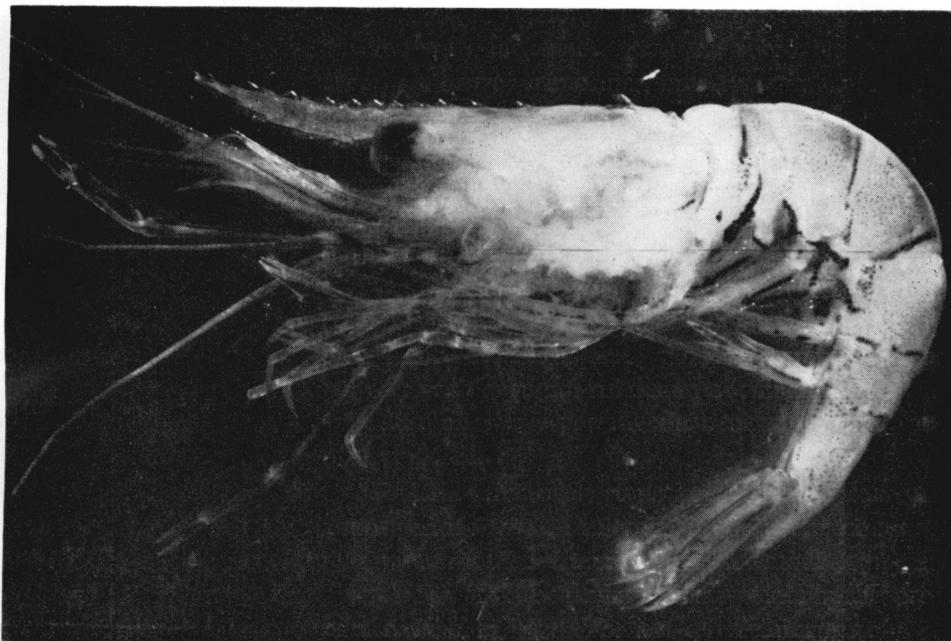


Fig. 2. *Palaemon (Palaemon) ogasawaraensis* sp. nov.

stegal spine is smaller than the antennal spine and placed on the anterior margin of the carapace. The branchiostegal groove is present, reaching the anterior margin of the carapace just above the branchiostegal spine.

The pleurae of the first four abdominal somites are rounded, while in the fifth it ends in an acute angle; that of the sixth is very short and ends in a sharp tooth; the sixth somite is about 1.5 times as long as the fifth.

The telson is about as long as the sixth abdominal somite; its dorsal surface is armed with two pairs of spines, which are placed laterally in the middle and at 3/4 of the length of the telson; its posterior margin ends in a median process and is provided with two pairs of spines, the inner pair being much longer than the outer; two feathered setae are present between the inner spines.

The eyes are well developed; the cornea is about as long as the stalk; an ocellus is present.

The basal segment of the antennular peduncle is broad and provided with a distinct sharp stylocerite, its anterolateral angle being produced to be a sharp spine; the second and third segments are much shorter and narrower than the basal segment; the distal two segments are subequal in length. The two branches of the outer antennular flagellum are fused basally for eight joints; the free part of the inner branch consists of 29 joints, being about four times as long as the fused part.

The antennal scale is about 3.2 times as long as broad; its outer margin is almost

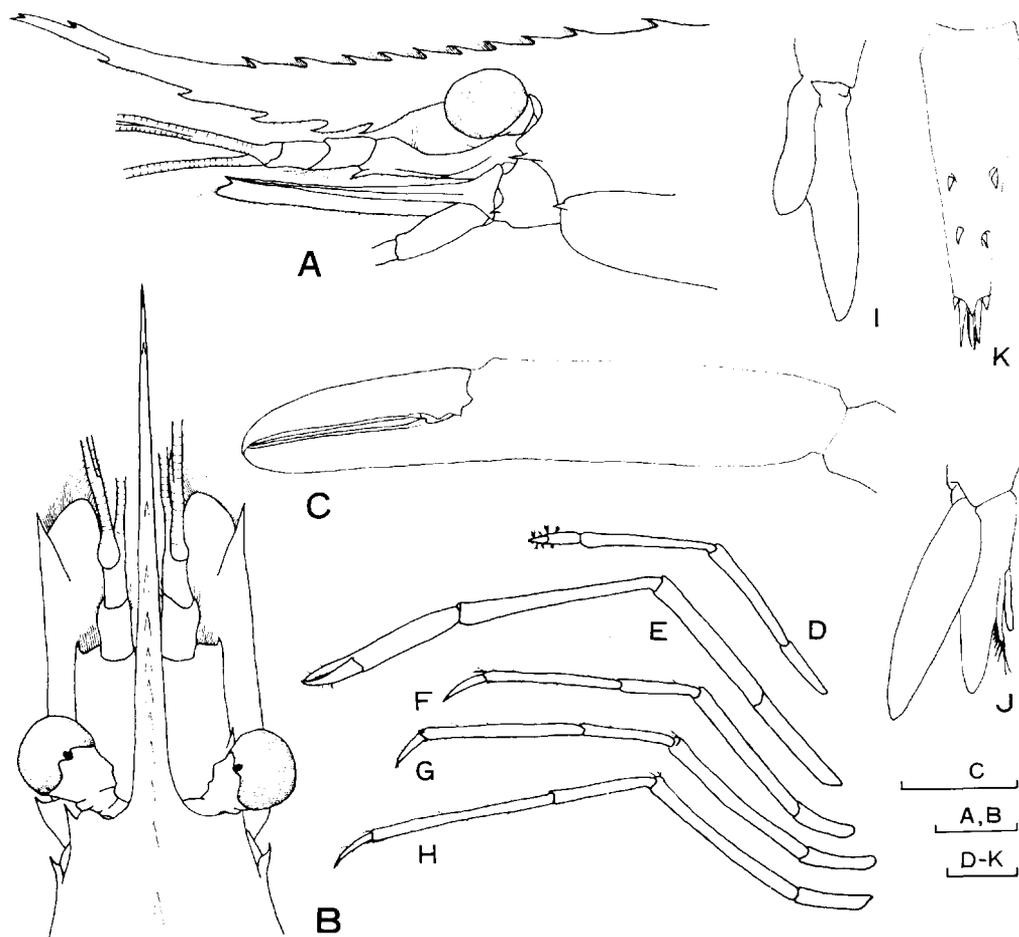


Fig. 3. *Palaemon (Palaemon) ogasawaraensis* sp. nov., ovig. ♀, NSMT-Cr 7205 (A, B, D-H), ovig. ♀, MTUF 15002 (C, K), and ♂, NSMT-Cr 7204 (I, J). — A, B, anterior part of body in lateral (A) and dorsal (B) views; C, second chela; D-H, first to fifth pereopods; I, J, first and second pleopods; K, telson. Scales for A, B and D-K represent 2 mm, and that for C represents 1 mm.

straight and ends in a distinct final tooth, which is overreached by the broad anterior margin of the lamella; at some distance above the base the lamella is the broadest and slightly narrows toward the apex.

The oral parts are normal. Four teeth are on the incisor process of the left mandible, three are on the right; both mandibles are provided each with a palp which is three-jointed. The maxillula has the inner lacinia distally recurved inward and the outer lacinia provided with a row of strong teeth at its distal margin; the palp is distinctly bilobed. The maxilla has the endite deeply cleft, the palp is well developed, and the scaphognathite is rather broad. All maxillipeds are provided with the well

developed exopods; the first maxilliped has the endite separated into the coxa and basis by a distinct notch, with the well developed palp; the exopod bears at the basal part a distinct broad caridean lobe, with the large and distinctly bilobed epipod. The second maxilliped is pediform, having the last joint fused with the penultimate for its entire length; the exopod reaches much beyond the endopod, and the epipod bears a well developed podobranch. The third maxilliped is pediform and slender, reaching distinctly beyond the distal margin of the basal segment of the antennular peduncle; the ultimate segment is about  $2/3$  as long as the penultimate segment which is about  $2/3$  as long as the antepenultimate segment.

The first pereopod is slender and slightly overreaches the scaphocerite by the length of the chela; the fingers are provided with tufts of setae and somewhat shorter than the palm; the cutting edges are straight and bear no teeth; the carpus is about two times as long as the chela; the merus is about 1.5 times as long as the chela.

The second pereopods of both sides are equal in length and longer than the first, reaching with the carpus beyond the end of the scaphocerite; the fingers measure  $2/3$  of the length of the palm, with the tips inturned; the movable finger is armed with two small teeth at the proximal part of the cutting edge, the fixed finger bearing a tooth which fits in the concavity between the two teeth on the movable finger; the palm is cylindrical; the carpus is somewhat longer than the chela; the merus is somewhat shorter than the chela; the ischium measures about  $7/8$  of the length of the chela; all joints are unarmed.

The last three pairs of the pereopods are slender and similar in structure; the dactyli are simple and recurved backward, bearing some setae on the anterior margins; all the last three pairs of pereopods overreach the end of the scaphocerite; the propodus of the third is almost three times as long as the dactylus, the posterior margin being armed with five spines; the carpus is about two times as long as the dactylus.

The endopod of the first pleopod is ovate in shape and smaller than the exopod; the appendix interna is absent. The second pleopod is provided with an appendix interna and a strong appendix masculina with some stiff setae; the appendix masculina is longer than the appendix interna.

The uropods overreach the tip of the telson; the exopod is broader than the endopod; the outer margin of the exopod is slightly convex and ends in a distinct tooth, the inner side of the exopod being provided with a movable spine.

*Paratypes.* Stream mouth, a stream flowing into Buta beach (Minami-fukuro-sawa), Chichi-jima I., Ogasawara Is., 4 ♂♂, 1 ♀, NSMT-Cr 7204, June 28, 1980, H. KATO leg. Stream mouth, a stream flowing into Sakaiura beach, Chichi-jima I., 1 ♂, 7 ovig. ♀♀, 5 ♀♀, NSMT-Cr 7205, June 28, 1980, H. KATO leg. Stream mouth, a stream flowing into Ohgiura beach, Chichi-jima I., 4 ovig. ♀♀, MTUF 15000, Aug. 29, 1979, T. KONISHI leg. Stream mouth, a stream flowing into Buta beach, Chichi-jima I., 1 ♂, 3 ovig. ♀♀, 1 ♀, MTUF 15001, Aug. 30, 1979, T. SASAKI leg. River mouth, Yatsuse River, Chichi-jima I., 3 ♂♂, 4 ovig. ♀♀, 1 ♀, MTUF 15002, Aug. 26, 1979, H. KATO leg.

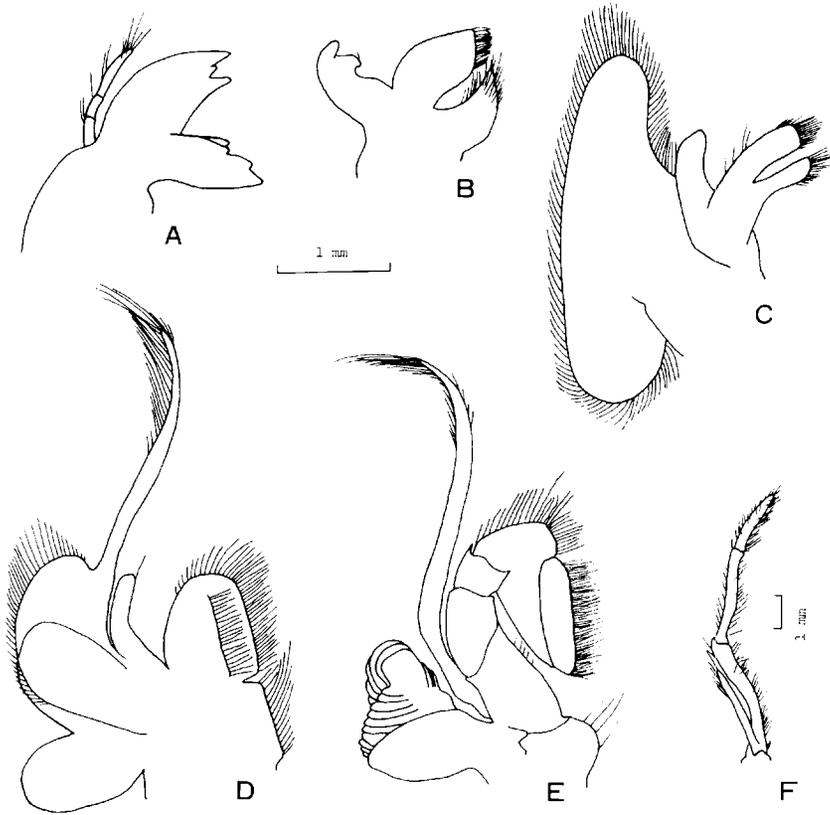


Fig. 4. Mouth parts of *Palaemon (Palaemon) ogasawaraensis* sp. nov., ovig. ♀, NSMT-Cr 7025. — A, mandible; B, maxillula; C, maxilla; D–F, first to third maxillipeds. Longer scale is applied to A–E.

The length of the carapace is 4.30–7.65 mm in males, 4.50–8.55 mm in ovigerous females and 4.55–8.60 mm in females. The number and size of the eggs are 5–461, and  $0.83 \times 0.66$  mm (average), respectively.

The variation is found in such characters as the shape of the rostrum, the relative length of the rostrum against the carapace, the number of the rostral teeth, the relative length of the free part of inner branch of the outer antennular flagellum against the carapace, the relative length of the second chela against the carapace and the relative length of the carpus against the chela of the second pereiopod.

1) Shape of rostrum

The shape of the rostrum is considerably variable. Some of the profile of the rostrums are illustrated in the figures. The rostrum is usually turning upward at its distal part slightly or strongly, but a few are almost straight.

2) Relative length of rostrum against carapace

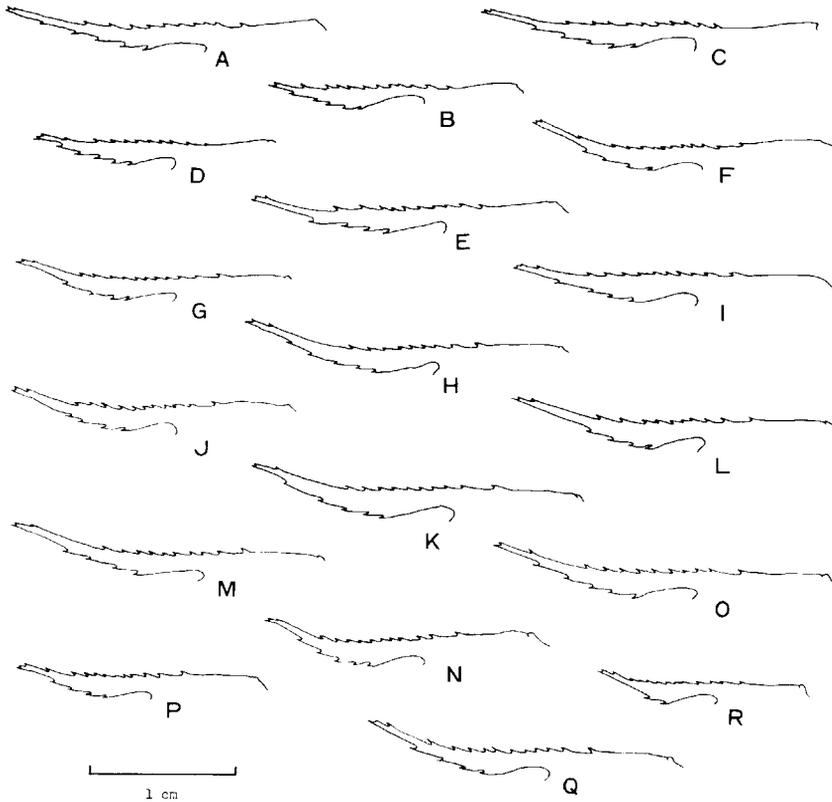


Fig. 5. Rostrums of holotype (A) and selected paratypes (B–E, male; F–R, female) of *Palaemon* (*Palaemon*) *ogasawaraensis* sp. nov.

This variation is due mainly to the differences of sex and partly to the developmental and individual differences. In males, the relative length of the rostrum against the carapace varies between 1.51 and 1.92, while this proportion in females varies between 1.21 and 1.68. This difference of the range makes it evident that the males have a tendency to have more elongated rostrums than the females.

### 3) Number of rostral teeth

All the specimens examined fit into a formula of  $\frac{2-3}{2-5}7-12+1-3$ ; of 35 specimens one has seven upper basal teeth, two have nine, 18 have ten, 13 have eleven and one has twelve teeth, while on the lower margin two have two teeth, 16 have four and 17 have five teeth. Showing as above, usually ten or eleven basal teeth are on the upper margin and four or five on the lower margin of the rostrum. The first two or three of the upper basal teeth are on the carapace.

### 4) Relative length of free part of inner branch of outer antennular flagellum against carapace

This variation is also due to the sexual dimorphism. The free part of the inner branch expressed as parts per 100 of the carapace varies from 45.6 to 67.2 in females, and 57.1 to 75.4 in males.

5) Relative length of second chela against carapace

The second chela expressed as parts per 100 of the carapace varies from 49.7 to 82.0 (average, 65.2). The range of variation is wide, and is due to the differences in age or individuals.

6) Relative length of carpus against chela of second pereiopod

The variation of the relative length of the carpus against the chela of the second pereiopod is within the narrow limits. The proportion varies from 0.92 to 1.19. In this sample, of 36 specimens, 32 have each carpus longer than the chela, three have the shorter carpi and one has the carpus and chela of equal length. The length of the carpus is therefore generally longer than that of the chela with a few exception.

*Color in life.* Overall color is semitransparency. Some complex blackish brown lines are on the carapace. On the abdomen each segment has a same colored cross line, of which that on the third segment is the most strong. A speckle is visible on the dorsal midline of the second abdominal segment. The articulations of the pereiopods are orange and the palm of the second pereiopod is light blue. The bases of the pleopods are banded with blackish brown color.

*Habitat.* The shrimps were observed on sand or on the fallen leaves in pools of the lower reaches of the Yatsuse River and the streams flowing into the Buta beach (Minami-fukurosawa), Sakaiura beach and Ohgiura beach. Water temperature and salinity varies from 26.5 to 33.2°C, and 28.24 to 32.04‰ respectively.

*Remarks.* HOLTHUIS (1950) subdivided the genus *Palaemon* into four subgenera, viz., *Palaemon s.s.*, *Palaeander*, *Nematopalaemon* and *Exopalaemon*. This new species is without doubt included in the subgenus *Palaemon* by having the following characters: Rostrum without basal crest, dactyli of last three legs shorter than propodi, presence of branchiostegal groove, and three-jointed mandibular palp. In the subgenus, this species is most closely related to *P. pacificus* (STIMPSON), because the rostrum is rather long, two or three teeth are situated on the carapace behind the posterior limit of the orbit, the subapical teeth are on the rostrum, four or five teeth are on the lower margin of the rostrum and the length of the dactyli of the last three legs are about, or less than, one third of the propodi. The new species is, however, readily distinguished by the following points. 1) In the new species the proportional length of the rostrum to the carapace varies between 1.21 and 1.92 (average 1.54), while in *P. pacificus* the rostrum is as long as or only slightly longer than the carapace. 2) The upper basal rostral teeth are usually 10 or 11 in the new species instead of usually 8 or 9 in *P. pacificus*. 3) In the new species the carpus of the second pereiopod is usually somewhat longer than the chela, while it is shorter than the chela in *P. pacificus*. 4) The fifth pereiopod reaches with the dactylus beyond the scaphocerite in the new species, whereas that leg does not reach to the tip of the scaphocerite in *P. pacificus*. 5) The

color pattern of the new species is much more simpler than that of *P. pacificus*. 6) The new species is found only in the mouth of the stream, while *P. pacificus* is a littoral form.

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### Literature

- HOLTHUIS, L. B., 1950. The Decapoda of the Siboga Expedition. Part X. The Palaemonidae collected by the Siboga and Snellius Expeditions with remarks on other species. I. Subfamily Palaemoninae. *Siboga Exped.*, **39a**<sup>9</sup>: 1-268.
- KUBO, I., 1942. Studies on Japanese palaemonoid shrimps. III. *Leander*. *J. Imp. Fish. Inst.*, **35**: 17-85.