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Description of two new species of pontoniid shrimps
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In this paper are described two new species of pontoniids, *Periclimanaeus odontodactylus* and *P. leptodactylus*, both of which were found in commensal with sponges. The former was recently obtained in the shallow waters of the Amakusa Islands, west of Kyushu and the latter on the coral reef of Amami-oshima Island, the Ryukyu Archipelago. The materials here examined are deposited in the collections of the Zoological Laboratory of Kyushu University.

We are indebted to Dr. Taiji Kikuchi of the Amakusa Marine Biological Laboratory, Kyushu University and Mr. Masatsune Takeda of our laboratory who kindly placed the materials at our disposal. Thanks are also due to Dr. A. J. Bruce of the Pracon Research Project of Australia for his helpful suggestions and to Dr. Senji Tanita of the Freshwater Fisheries Research Laboratory for the identification of the sponges.

Periclimanaeus odontodactylus sp. nov.

(Figs. 1, 2)

Type. Holotype, ♀, ZLKU No. 10931, Ushibuka, Amakusa Is., west of Kyushu, Japan, Sept. 28, 1967, T. Kikuchi leg.

¹⁾ Contributions from the Zoological Laboratory, Faculty of Agriculture, Kyushu University, No. 379.

Description of holotype. General body form is swollen and rather compressed. The rostrum extends anteriorly to the level of the distal end of the third segment of the antennular peduncle. It is directed downwards, gradually becoming shallower towards the pointed apex. The upper border is more or less convex and bears six teeth, the first tooth is the smallest of all and placed just in front of the orbital margin. The second to the fifth teeth are all strong and subequal in shape, the distal being rather short and making a smaller angle with the lower border than the others. The lower border is straight and unarmed. The carapace is compressed and entirely smooth, and it is one and a half as long as broad. The orbital angle is slightly produced and there laterally is situated a strong antennal spine. The antero-lateral angle is not produced and broadly rounded (Fig. 1, *a, b*).

The abdomen is entire and has the pleura broad and rounded of the first to the fourth abdominal segments, that of the second being excessively expanded round. The pleuron of the fifth segment is smaller and much stouter than those of the former four and becomes narrow at the posterior corner. The sixth segment is as long as the fifth, the posteroventral angle being projected into a distinct lobe.

The telson is broad and slightly less than twice as long as broad. The dorsal surface bears two pairs of long spines some distance from the outer margins somewhat convex. The anterior pair is situated near the frontal margin of the telson. There are three pairs of terminal spines at the hind margin, the outer is very small and the inner two are long and subequal in length though the median is much stouter than the innermost (Fig. 1, *c*).

The eye is normal, the cornea being well pigmented and obliquely situated on the eyestalk which is dilated at the proximal part and as long as the cornea. The ocellus is fused with the cornea so that it is indistinct.

The basal segment of the antennular peduncle is rather broad. The outer margin is slightly convex, terminating in a strong, triangular projection which barely reaches the distal end of the second segment of the antennular peduncle. The stylocerite is broad and leaf-like, the tip being pointed and falling short of the level of the middle of the basal segment. The second and the third segments are subequal in breadth but the latter is somewhat longer than the former. The outer antennular flagellum is fused for six segments. The shorter free portion is very short while the longer is about twice as long as the fused portion.

The antennal scale is broad and oval, becoming broader anteriorly. It is more than twice as long as broad and reaches the distal end of the third segment of the antennular peduncle. The anterior margin of

the lamella is round and exceeds the lateral tooth. The carpoperite of the antennal peduncle is slender and about two-thirds of the length of the antennal scale, and the basicerite is laterally armed with a small, bluntly pointed projection.

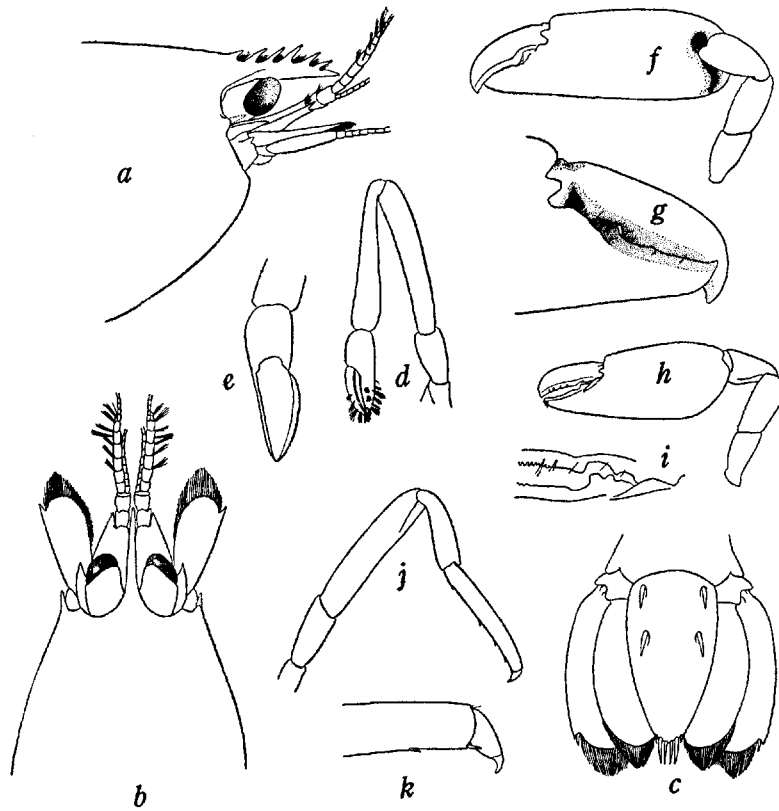


Fig. 1. *Periclimenaeus odontodactylus* sp. nov.

a, Anterior part of body in lateral view, $\times 9$; *b*, anterior part of body in dorsal view, $\times 9$; *c*, telson and uropods, $\times 9$; *d*, first pereopod, $\times 9$; *e*, chela of first pereopod, $\times 18$; *f*, larger second pereopod in inner view, $\times 4.2$; *g*, fingers of larger second pereopod in inner view, $\times 6$; *h*, smaller second pereopod in outer view, $\times 4.2$; *i*, cutting edges of fingers of smaller second pereopod, $\times 18$; *j*, third pereopod, $\times 9$; *k*, distal part of third pereopod, $\times 36$.

The mandible consists of the incisor process distally with two distinct teeth and the stout molar process with some irregular teeth but without setae (Fig. 2, *a*). The palp of the maxillule is bilobed, and its median lobe has distally a single seta. The distal endite is broad and

its upper margin is convex (Fig. 2, *b*). The maxilla has an elongated scaphognathite. The palp is rather broad and its tip is round without setae. The endite is distinctly bilobed (Fig. 2, *c*). The exopod of the first maxilliped is well developed with the caridian lobe somewhat elongated. The palp is normal and rather broad in its middle. The epipod has a shallow notch distally (Fig. 2, *d*). The second maxilliped is stout with the broad epipod (Fig. 2, *e*). The ultimate segment of the third maxilliped is about half as long as the penultimate which forms subcylindrical. The antepenultimate is much broader than the distal two, and it is two and a half as long as its maximum breadth and one and a half the length of the penultimate. The exopod reaches beyond the distal end of the antepenultimate. The epipod is stout and broad. A small arthrobranch is present (Fig. 2, *f*).

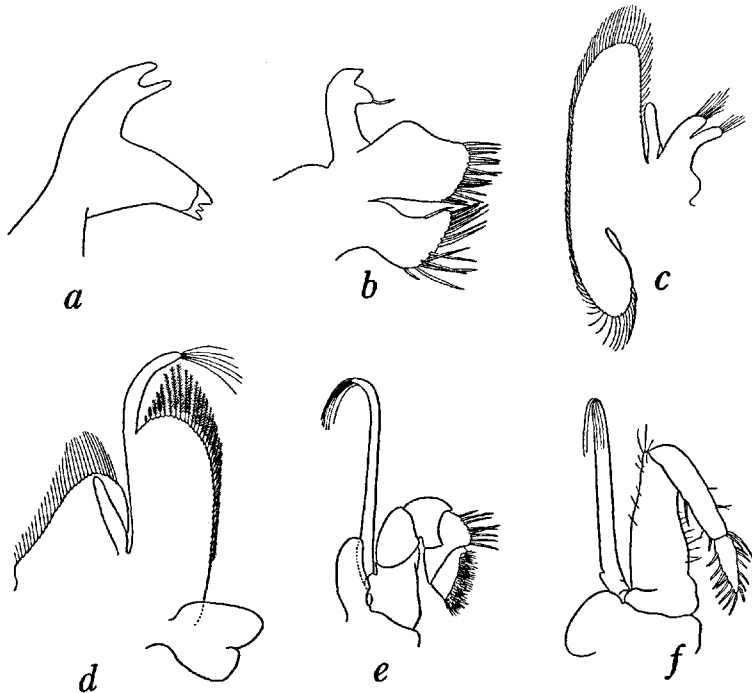


Fig. 2. *Periclimenaeus odontodactylus* sp. nov.

a, Mandible; *b*, maxillule; *c*, maxilla; *d*, first maxilliped; *e*, second maxilliped; *f*, third maxilliped.

The first pereiopod is slender, exceeding the carpocerite of the antennal peduncle by the length of the carpus and the chela. The fingers are somewhat longer than the palm and provided distally with many tufts of setae. The movable finger laterally bears a distinct

carina spatulated outwards to form a thin flap running in full length of this segment, which is furnished with an inconspicuous pectination on the edge. The cutting edge of the movable finger is entire, straight and thin. The carpus is cylindrical and becomes heavier distally, and it is about one and a half as long as the chela and also as the merus (Fig. 1, *d, e*).

The second pereiopods are asymmetrical. The larger cheliped is swollen and robust. The movable finger is stout, crooked downwards and ends in a bluntly pointed tip, the anterior margin being gently curved. It is broadly hollowed inwards at the portion behind the middle. The cutting edge in about the distal half is slightly concave with a fine pectination. The immovable finger is much stouter, shorter and less crooked than the movable, so that the tip of the immovable finger is overhanged by the tip of the movable. The cutting edge in the distal third is slightly concave and also bears a row of small, pectinated teeth which are not so distinct as in the movable finger. The proximal half lacks pectination but bears a strong, broad and truncated tooth somewhat near the base, which falls in the concavity on the cutting edge of the movable finger when the fingers are closed. The palm is swollen and robust and slightly less than twice as long as the maximum breadth, its surface being obscurely grained in meshes. It has a broad concavity inside near the proximal portion, where the distal end of the carpus is articulated. The carpus is short and forms an elongated cup-shape, its distal margin having notches on both the inner and the outer sides. The merus is somewhat longer than the ischium and provided with granules on the posterior side (Fig. 1, *f, g*). The smaller cheliped is rather similar to the larger in shape. The fingers are not so strongly curved as in the larger. The cutting edge of the immovable finger has the convexity in the proximal half to receive the broad and truncated tooth of the movable finger, which is further toothed at the top. The palm is broad and somewhat less than twice as long as the maximum breadth. The carpus is as long as that in the larger, and the distal part of its outer side being obliquely hollowed. The merus is subequal to the carpus in length and provided with granules as well as in the larger (Fig. 1, *h, i*).

The last three pereiopods are rather slender. The dactylus of the third pereiopod is short, simple, somewhat curved and broad at the base, its tip being pointed. The propodus is slender and straight, and its posterior margin bears some spinules but almost no hair. The merus is much stouter than the carpus and somewhat longer than the propodus. The last two pereiopods are similar to the third but rather slenderer than the latter (Fig. 1, *j, k*).

The uropod is broad and slightly longer than the telson. The outer

margin of the exopod is convex and ends in a small spine with a longer movable one just inside.

Size. Holotype (♀) body length 20 mm, carapace length 6 mm, rostrum length 1.9 mm, telson length 2.5 mm, larger chela of second pereopod length 8.5 mm, smaller chela of second pereopod length 6.1 mm.

Remarks. This species is easily distinguished from the other members of the present genus by lacking a distinct hammer-shaped tooth on the cutting edge of the movable finger of the larger second pereopod, which usually fits in an excavation on the cutting edge of the immovable finger. Although such a feature is one of the generic characters in the genus *Periclimenaeus*, it seems proper to include this species in the present genus in consideration of the accurate fitness of the other features of this species into the characteristics of the present genus. However, the immovable finger instead of the movable bears a thin and broad tooth on the cutting edge, which is received in the concavity of the inner side of the cutting edge of the movable finger. In addition to the account mentioned above, the carina with a thin flap on the lateral side of the movable finger of the first pereopod is also one of the specific characters in this species. Among the Indo-pacific species *Periclimenaeus fimbriatus* Borradaile, 1915 is the most closely related to this species, but it is distinctly separated from this species, apart from the aspects mentioned above, by the fact that the outer pair of the terminal spines of the telson in *P. fimbriatus* is placed distinctly before the inner two while all three pairs are situated at the same level on the terminal margin in this species.

The specimen here examined was found commensally with a large black sponge, *Ircinia fasciculata* (Pallas) which is nearly cosmopolitan.

Periclimenaeus leptodactylus sp. nov.

(Figs. 3-5)

Type. Holotype, ovig. ♀, ZLKU No. 9276, Kasari-cho, Amami-oshima I., Aug. 6, 1967, M. Takeda leg.; paratype, 1 ovig. ♀, ZLKU No. 9277, Kasari, Amami-oshima I., Aug. 6, 1967, M. Takeda leg.

Description of holotype. The body is small, compressed and rather slender (Fig. 3). The rostrum is shallow and bent slightly downwards, reaching anteriorly to the level of the end of the basal segment of the antennular peduncle. The upper border is more or less convex and armed with six teeth sharply pointed and placed in advance of the orbit. The lower border is provided with only one tooth which is subequal to the upper distal tooth in size and placed a little behind it.

The lower margin behind the tooth is almost straight and entire. The carapace is smooth, and the inferior orbital margin being slightly produced. There is an obscure carina paralleled with the orbital margin, which starts from an indistinct protuberance behind the eye and succeeds downwards to the end of the orbital angle where a distinct antennal spine is situated. The anterolateral angle is broadly rounded (Fig. 4, *a, b*).

The abdominal segments are all smooth. The pleura of the first three segments are broadly round, while those of the next two are narrowly produced posteroventrally in the form of an obtuse and smooth angle. The sixth segment is strongly depressed and slightly shorter than the fifth. The lateral border of the sixth segment is bluntly produced outwards, and the posterolateral part is also somewhat squarely convex with a small spine.

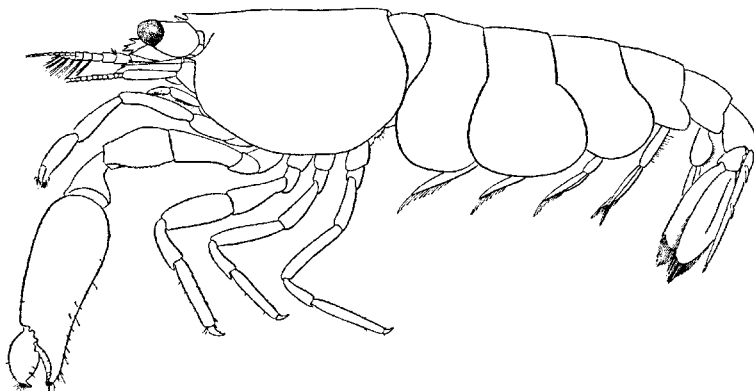


Fig. 3. *Periclimenaeus leptodactylus* sp. nov., $\times 7.8$.

The telson is flat and broad, and is a little less than twice as long as broad. The upper surface bears two pairs of long spines situated a short distance from the lateral margins somewhat convex. The anterior pair is closely near the frontal margin of the telson and the posterior is closer to the anterior pair than to the hind end of the telson. Of three pairs of terminal spines the outer is minute and the inner two are long, slender and subequal in length (Fig. 4, *c*).

The eye is well developed. The cornea is globular and obliquely situated on the stalk which is swollen and distinctly longer than the cornea.

The basal segment of the antennular peduncle is broad, becoming gradually narrower anteriorly. The lateral margin is straight and ends in a small terminal spine which scarcely reaches the middle of the second segment. The stylocerite is short, broad and leaf-like with a bluntly pointed tip falling short of the middle of the basal segment.

The second and the third segments are short and subequal in length but the former is rather broader than the latter. The outer antennular flagellum is fused for four joints. The shorter free portion is very short and less than half the length of the fused portion, while the longer is slender and somewhat more than twice the length of both the fused portion and the shorter free portion.

The antennal scale is rather broad and a little less than twice as long as broad, extending beyond the second segment of the antennular peduncle. The lateral margin is feebly concave and armed distally with a distinct tooth. The anterior margin of the lamella is rounded and slightly exceeds the lateral tooth. The carpocerite of the antennal peduncle is slender and reaches the end of the third segment of the antennular peduncle, and the basicerite is unarmed laterally.

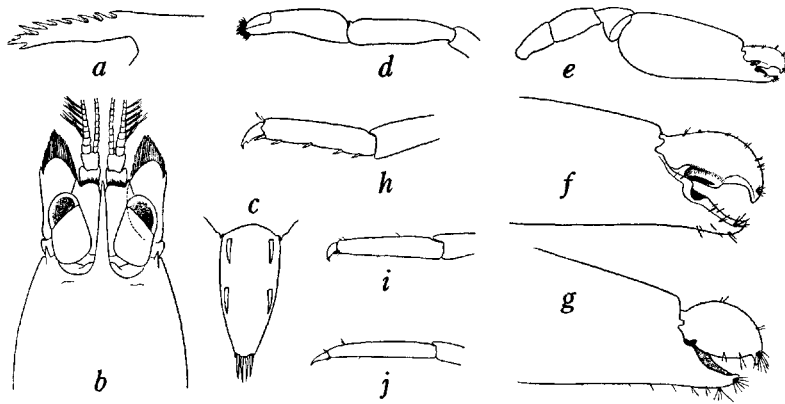


Fig. 4. *Periclimenaeus leptoductylus* sp. nov.

a, Rostrum, $\times 18$; *b*, anterior part of body in dorsal view, $\times 13.5$; *c*, telson, $\times 13.5$; *d*, first pereiopod, $\times 18$; *e*, larger second pereiopod, $\times 6$; *f*, fingers of larger second pereiopod, $\times 13.5$; *g*, fingers of smaller second pereiopod, $\times 18$; *h*, third pereiopod, $\times 18$; *i*, fourth pereiopod, $\times 18$; *j*, fifth pereiopod, $\times 18$.

The incisor process of the mandible is crenulated distally, and the molar process which makes a right angle with the incisor process is stout and bears distinct teeth (Fig. 5, *a*). The maxillule is typical, and the palp is stout and produced forwards with distally a small spine-like projection (Fig. 5, *b*). The maxilla consists of the rather long scaphognathite, the broad and somewhat curved endopod and the distally bifid endite (Fig. 5, *c*). The endopod of the first maxilliped is round at the tip, the caridian lobe of the exopod is rather broad, the outer margin of which is semicircular. The epipod has the shallow notch distally (Fig. 5, *d*). The third maxilliped is stout. The ultimate and the penultimate segments are both narrow and subequal in breadth, the latter being

longer than the former. The antepenultimate is broad and about twice as long as the penultimate. The exopod reaches the end of the antepenultimate. The epipod is broad and round (Fig. 5, *f*).

The first pereiopod exceeds the antennal scale by the length of the chela and the carpus when expanded. The fingers bear the cutting edges with pectinations in about the distal half and short hairs distally. The palm is cylindrical and becomes somewhat slender distally, being more than twice the length of the movable finger. The carpus is cylindrical and robust and becomes thick at the distal part, being about equal to the chela. The merus is slenderer and somewhat longer than the carpus (Fig. 4, *d*).

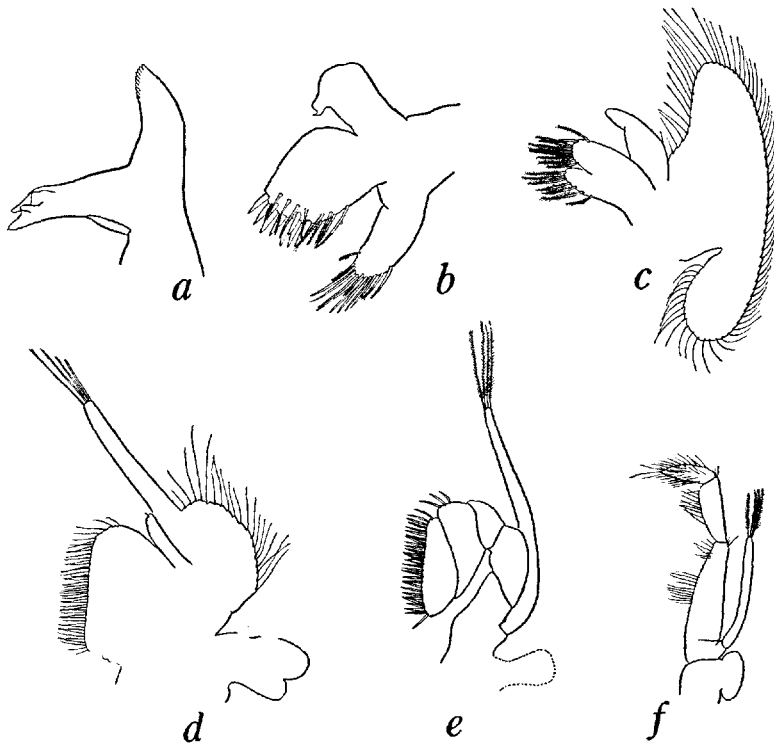


Fig. 5. *Periclimenaeus leptodactylus* sp. nov.

a, Mandible; *b*, maxillule; *c*, maxilla; *d*, first maxilliped; *e*, second maxilliped; *f*, third maxilliped.

The second pereiopods are asymmetrical, swollen and large. The outer margin of the movable finger of the larger pereiopod forms an almost perfect semicircle. On the cutting edge there is a large, blunt molar tooth which occupies a broad place near the middle. The immovable finger is deep at the base, becoming shallower towards the tip

and deeply hollowed in the middle to receive the molar tooth on the movable finger. The tips of both the fingers are curved and crossed when they are closed. Some tufts of setae are present near the tips. The palm is rather compressed and swollen, being twice as long as its maximum breadth and three times as long as the dactylus. The carpus is short and triangular-shaped, and the distal margin is entire without any tooth or serration. The merus is stout and about as long as the movable finger, the distal end of the posterior border being slightly produced squarely. At the posterior border there are many globular tubercles as seen in the smaller pereopod. The ischium is somewhat shorter than the merus, and the obscure small tubercles are also visible at the posterior border as in the merus (Fig. 4, *e, f*). In the smaller pereopod the outer margin of the movable finger is entirely semicircular, and the tip is provided with a stout claw. The cutting edge of the movable finger is thin, convex round smoothly with a small claw at the tip. The cutting edge is slitted along the edge so as to receive the thin edge of the movable finger. The chela bears setae distally. The palm is broad and less than twice as long as broad (Fig. 4, *g*).

The third pereopod is short and stout. The dactylus, which is about twice as long as the breadth at its base, is slightly curved with a pointed claw. The dactylus bears one small accessory tooth near the tip at the posterior side, which is followed by an ill-defined serration. The propodus is stout and straight, being as long as its maximum breadth and also about five times as long as the dactylus. The propodus bears a pair of strong spines and hairs at the distal border and five other spines on the posterior border. The merus is robust, and is one and a half as long as broad and as the propodus. The ischium is also robust but shorter than the merus (Fig. 4, *h*). The last two pereopods are rather similar to the third but much slenderer than it, the accessory teeth of the dactyli and the spines on the posterior borders of the propodi becoming reduced or entirely absent (Fig. 4, *i, j*).

The uropod is slightly longer than the telson. The outer margin of the exopod is convex and not serrated, terminating in a small distinct spine with a longer movable spine immediately adjacent inside.

The ova are large, about 0.5×0.4 mm in diameter and rather small number.

Size. Holotype (ovig. ♀) body length 7.5 mm, carapace length 2.0 mm, telson length 1.3 mm, larger chela of second pereopod length 3.1 mm, smaller chela of second pereopod length 2.0 mm; paratype (ovig. ♀) body length 9.1 mm, carapace length 2.9 mm, rostrum length 1.0 mm, telson length 1.3 mm, larger chela of second pereopod length 4.1 mm, smaller chela of second pereopod length 2.2 mm.

Remarks. In the external features there are a little differences between the holotype and the paratype. The upper teeth on the rostrum in the paratype are eight in number instead of six in the holotype, all being in front of the orbit and gradually becoming narrower and longer towards the apex except for the distal one which is short and slender and much separated from the distal second than from the apex. The lower border bears one small tooth which is situated at the place corresponding to between the upper distal and the second distal teeth.

This species is chiefly characterized by having one tooth on the lower border of the rostrum, the crenulation of the incisor process of the mandible and the smaller second pereopod with the peculiar structure. Only two other species are known to be closely related to this species in the Indo-pacific region. They are *Periclimenaeus novaezealandiae* (Borradaile, 1916) and *P. natalensis* (Stebbing, 1915), but this species is distinctly separated from the former by the shape of the first and the second pereopods. From the latter it is distinguished by the shape of the rostrum, the number of the dorsal teeth on the carapace, the shape of the incisor process of the mandible and the position of the dorsal spines of the telson.

The smaller second pereopod in this species, as already noted in the description, has the movable finger with the outer margin entirely semicircular and the thin edge. According to Holthuis (1951), these features are also observed in *Periclimenaeus hancocki* Holthuis, 1951 from Panama, but they are not in the case of the smaller pereopod but in the larger.

The specimens were taken in the small pits on the surface of a sponge living on the coral reef.

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