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Bopyrids from Tanabe Bay IV

By

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With 10 Text-figures

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The present paper is a continuation of my earlier ones (1933, 1934, 1936). Four species described here are new to science, 2 of them even constituting new genera. The following is the list of the species :

Pseudione longicauda n. sp.

Procepon insolitum n. gen. & n. sp.

Portunicepon tiariniae n. sp.

Anomophryxus deformatus n. gen. & n. sp.

Gen. PSEUDIONE KOSSMANN

1881, R. KOSSMANN, Zeitschr. Wiss. Zool., vol. 35, p. 663.

Pseudione longicauda n. sp.

Female (fig. 1, A & B): Asymmetrical, dorsal flat, ventral convex. No pigment. Length excluding uropoda 5.4 mm., width 3.5 mm.

Cephalon round, slightly bilobed in front, distinct from thorax. Frontal lamina narrow, produced on each side. Eye absent.

Thoracic segments separate, with bilobed margin. Postero-lateral parts well developed in first 4 segments, much reduced and retreating from general outline of thorax in last 3 segments. Coxal plates present in first 4 segments, much reduced and irregular in shape. Ovarian bosses conspicuous only in 2nd to 4th segments. Anterior

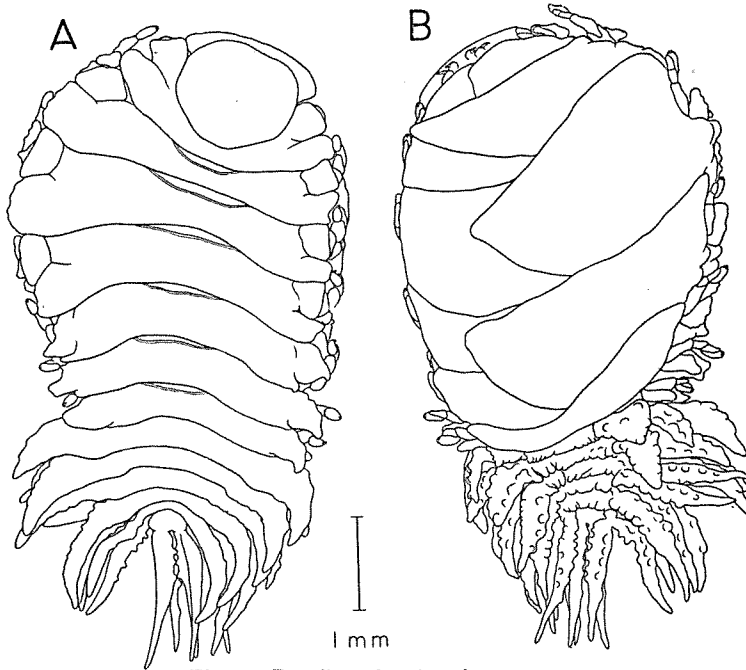


Fig. 1 *Pseudione longicauda* n. sp., ♀

A, dorsal view; B, ventral view.

Abbreviations used in text-figures:— ABD, abdomen; ENT, endopodite; EX, exopodite; LAT, lateral plate; MP, marsupial plate; PL, pleopod; U, uropod.

lateral parts of last 3 segments acuminate and more or less crenated. Marsupium complete.

All abdominal segments distinct. First 5 provided with well-developed lateral plates. These plates rather broad, foliaceous and imbricated in first 3 segments, lanceolate and not imbricated in last 2; all plates tuberculated on ventral surface. Terminal segment round, without lateral plate. Segmental borders crenated on ventral surface.

Pleopoda (fig. 2, A) biramous, tuberculated on surface and on margin. Both rami short, triangular, foliaceous in first 2 pairs; long, narrow and lanceolate in last 3 pairs. Uropoda (fig. 2, A & B) similar in appearance and in size to last pair of pleopoda; uniramous on the left, biramous on the right branching at a short distance from the base.

Male (fig. 2, c): Stocky, without pigment. Length 2.2 mm., width at 3rd thoracic segment 0.8 mm.

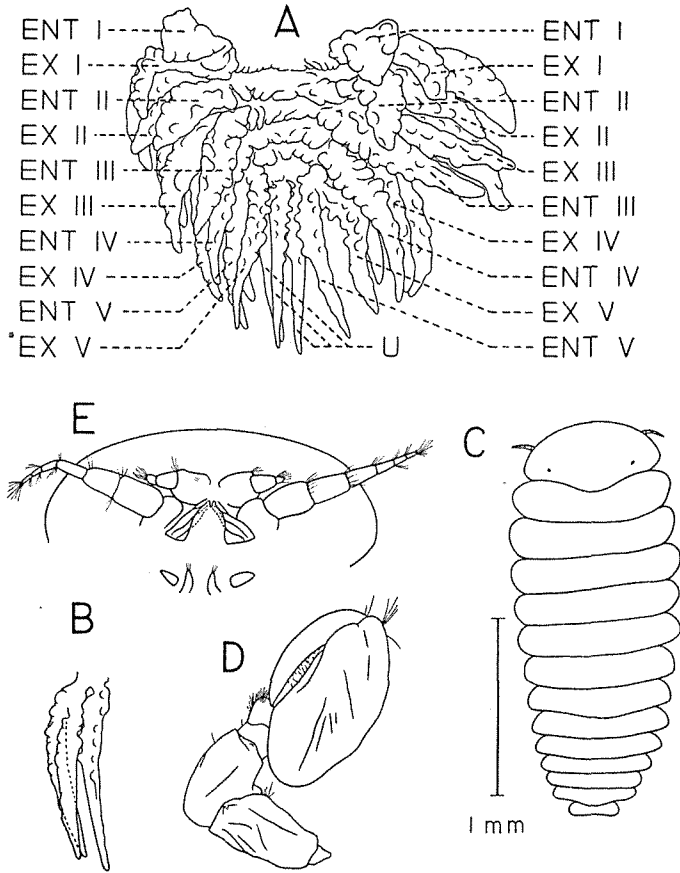


Fig. 2 *Pseudione longicauda* n. sp.

A, ♀, abdomen, ventral view; B, ♀, uropoda; C, ♂, dorsal view; D, ♂, thoracic leg, right I; E, ♂, cephalon.

Cephalon large, round in front, V-shaped behind. Small eyes present.

Thoracic segments gradually narrower posteriorly, all with round margin and without medio-ventral tubercle. Legs characteristic as shown in fig. 2, D.

All 6 abdominal segments separate, similar in shape to thoracic segments. Pleopoda and uropoda absent.

Remarks: Except that the uropod is biramous on one side and uniramous on the other, the present species has all the characteristics of *Pseudione*. In the possession of the biramous uropod, however, it shows affinity to the genera, such as *Parapagurion*, SHIINO, *Pagurion* SHIINO, *Apollobopyroides* NOBILI, *Munidion* HANSEN, *Apollobopy-*

rina SHIINO etc. From the first 2 of these, the present species differs in having elongated lateral plates in the female abdomen, and from the last 3 in having 6 distinct abdominal segments in the male. I am, therefore, rather of the opinion that the biramous nature of the present specimen may be due to an accidental bifurcation of the originally uniramous uropod, rather than a specific character.

The present species shares with *Pseudione*-like forms the constitution of pleopoda and lateral plates of the first 2 abdominal segments, while it bears certain resemblance in the form of the last 3 segments to *Cepon*-like forms. However, the constitution of the male and the shape of thoracic segments in the female seems to indicate the closer affinity of the species to *Pseudione* than to *Cepon*-like forms.

KOSSMANN (1881) has described a parasite under the name of *Pseudione callianassae* from the branchial cavity of *Callianassa subterranea* MONT., which is the forma typica of the host (var. *japonica*) of the present specimen. As regards this parasite, so far as I am aware, no description, except on the male cephalon, has hitherto been given by the author himself or by any subsequent worker. However, as the only figure of the male cephalon drawn by KOSSMANN²⁾ bears a close resemblance to that of my specimen (fig. 2, E), the two forms may possibly be identical. Yet, so long as the complete description of *callianassae* is missing, I hesitate to refer my specimen to this species. It seems to me more appropriate, for the present, to establish a new species for it in order to save future confusion.

Among the numerous species of *Pseudione*, the present species is characterized above all by that the lateral plates and the pleopoda are much elongated in posterior pairs and by the shape of the terminal segment in the male. It is closely related, especially in the constitution of the male, to *Ps. dohrni* GIARD and BONNIER³⁾ which was also found in *Callianassa (truncata)* GIARD and BONNIER). But, it is quite different in the absence of pleopoda in the male and in the constitution of the female abdomen.

Occurrence: A female accompanied by a male was found in the branchial cavity of *Callianassa subterranea* (MONT.) var. *japonica* ORTMANN taken at Seto by myself.

1) KOSSMANN, no. 6, p. 663.

2) KOSSMANN, no. 6, pl. 33, fig. 17.

3) BONNIER, no. 1, pp. 293-295, pl. 21.

Gen. **PROCEPON** n. gen.

Female has all segments separated. Medio-dorsal process absent. Lateral plates elongated in first 5 abdominal segments, but not finely digitated as in *Ione*; absent in terminal segment. Pleopoda biramous, with well-developed endopodite. Uropoda uniramous.

Male with all segments distinct. Lateral plates and uniramous pleopoda of first 5 abdominal segments as well as uropoda elongated in narrow processes. Terminal segment without lateral plate.

Of all genera of Bopyridae the new genus is closely related to *Ione* LATREILLE in the presence of elongated lateral plates in the male. The male of the present genus differs, however, from that of *Ione* in the distinct segmentation of the abdomen and in the possession of elongated pleopoda. As for the filiform appendages of the last segment they have been interpreted in *Ione* as the lateral plates.¹⁾ So far as the present genus is concerned, however, they appear to me to represent the uropoda.

In addition to these differences, the new genus is distinguished from that genus by the absence of the lateral plates in the terminal segment of the female, and by that those plates of the foregoing segments are not finely digitated.

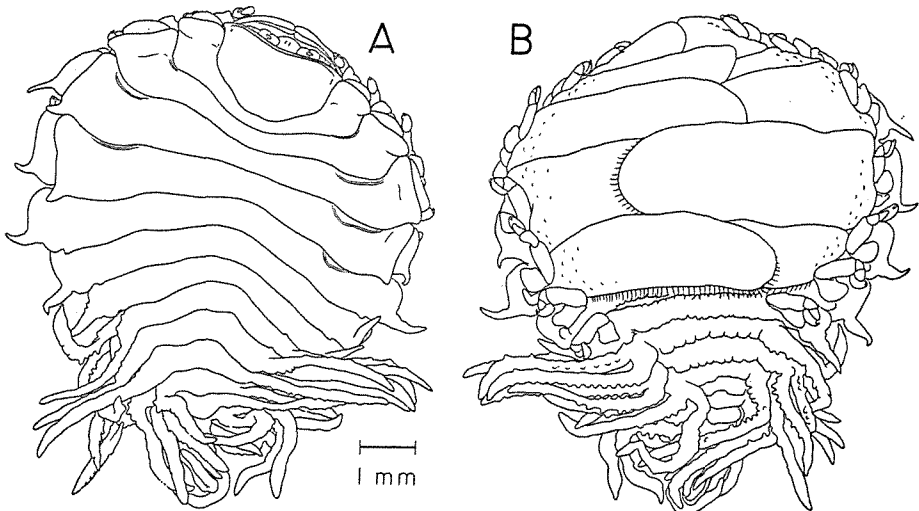


Fig. 3 *Procepon insolitum* n. gen. & n. sp., ♀
A, dorsal view; B, ventral view.

1) BONNIER, no. 1, p. 238; RICHARDSON, no. 13, p. 503.

***Procepon insolitum* n. sp.**

Female (fig. 3, A & B): Round, asymmetrical. Dorsal surface slightly concave, ventral highly convex. No pigment. Length excluding uropoda 7.8 mm., width 7.0 mm.

Cephalon more than 1.5 times as wide as long. Anterior margin nearly straight and slightly produced at lateral corners, posterior margin round. Very small eyes present.

All thoracic segments distinct and not bilobed on lateral margin. Coxal plates present in first 4 segments; these plates produced at posterior corner in narrow process in 4th segment and on shorter side of 3rd segment. Postero-lateral corners of last 3 segments also similarly produced. Ovarian boss absent. Marsupium complete, highly vaulted; all plates tuberculated on surface in basal part.

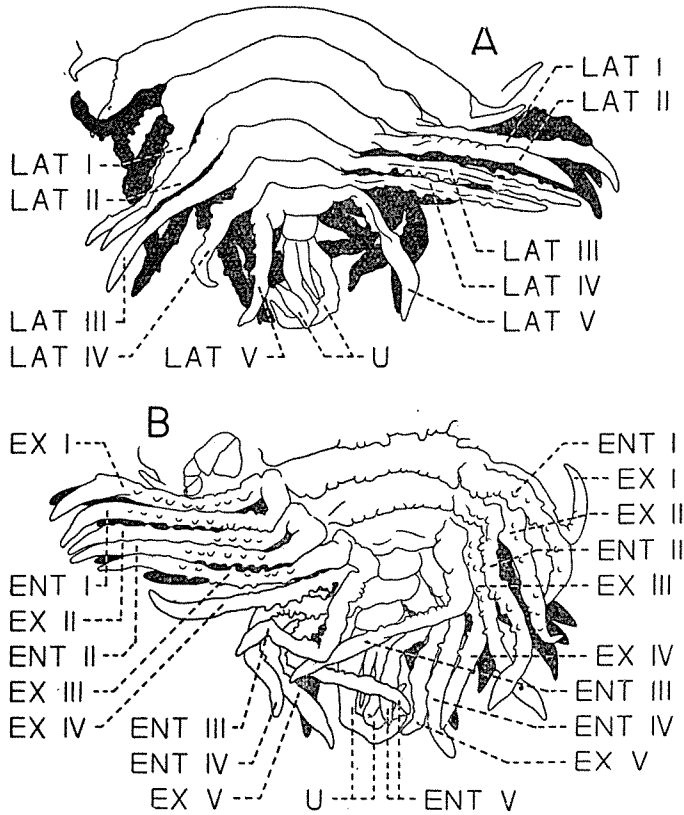


Fig. 4 *Procepon insolitum* n. gen. & n. sp., ♀ abdomen
A, dorsal view; B, ventral view.

Abdominal segments separate. Lateral plates (fig. 4, A) of first 5 segments elongated, freely projected laterally, with more or less tuberculated margin and similar in appearance to pleopoda. Last segment without lateral plate, but with a median long process. On ventral surface segmental borders more or less crenated.

Pleopoda (fig. 4, B) biramous; both rami narrow, about as long as lateral plates, directed outwards and tuberculated. Uropoda uniramous, similar in constitution to pleopoda.

Male (fig. 5, A & B): Length 4.9 mm., width at 5th thoracic segment 1.7 mm. No pigment.

Cephalon much broader than long, widely rounded in front, V-shaped behind. Small eyes present. Outer antennae projecting far beyond cephalic margin.

Thoracic segments discontinuous, subequal in size, and with round margin. Very small rudimentary medio-ventral tubercles present in 2nd to 7th segments.

Abdominal segments separate. First segment similar in shape to thoracic segments, having rather short lateral plates. In succeeding segments lateral plates developed into narrow elongate processes, more or less curved dorsally (fig. 5, c). Terminal segment without

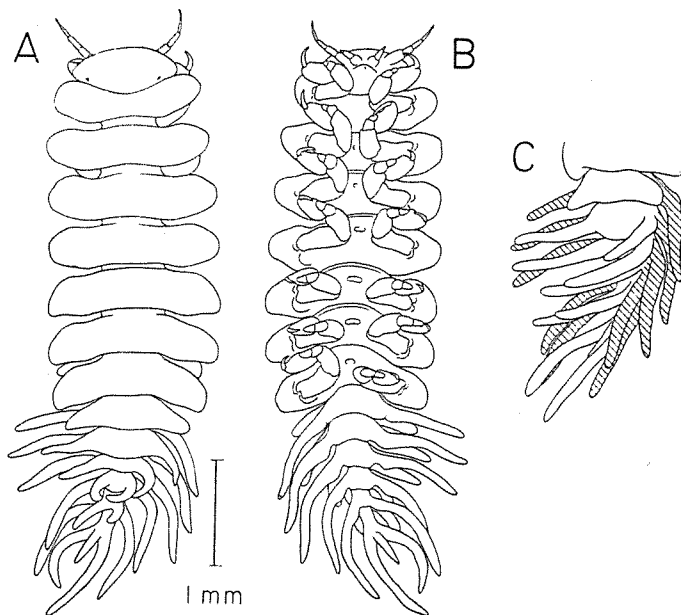


Fig. 5 *Procepon insolitum* n. gen. & n. sp., ♂
A, dorsal view; B, ventral view; C, abdomen, dorso-lateral view.

lateral plate, but with a narrow median process. Five pairs of uniramous pleopoda in the form of long processes, similar in appearance to lateral plates. Small and rather inconspicuous tubercles at the base of pleopoda probably representing rudiment of endopodite. Uropoda uniramous and elongated, closely resembling pleopoda.

Occurrence: A female carrying a male was found parasitic in the branchial cavity of *Gebia major* DE HAAN captured by myself on August 12, 1934 at Hatakeshima in Tanabe Bay.

Gen. **PORTUNICEPON** GIARD and BONNIER¹⁾

1887, A. GIARD and J. BONNIER, Trav. Inst. Zool. Lille et Lab. Zool. Mar. Wimereux, vol. 5, pp. 73-74.

Portunicepon tiariniae n. sp.

Female (fig. 6, A & B): Elongated, nearly symmetrical. Dorsal

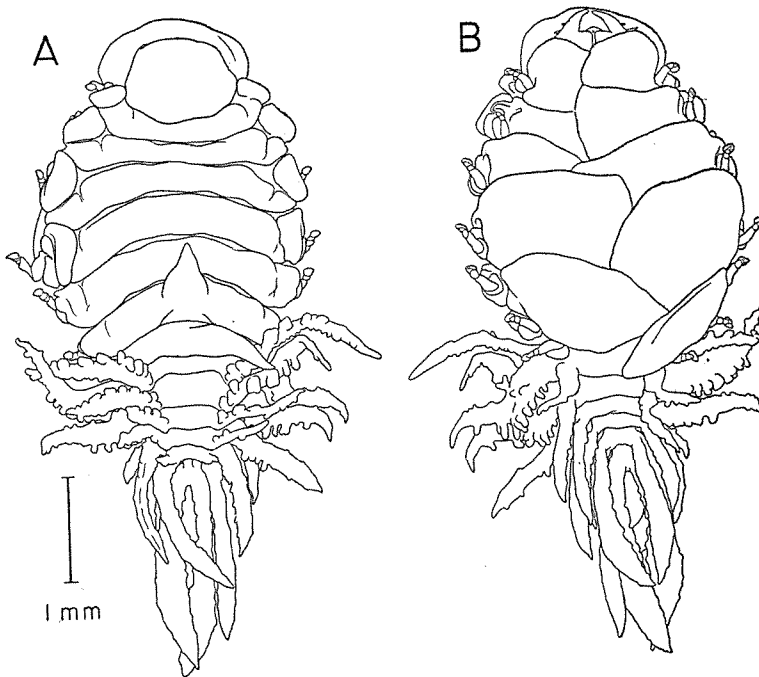


Fig. 6 *Portunicepon tiariniae* n. sp., ♀
A, dorsal view; B, ventral view.

1) cf. SHINO, no. 16, p. 274.

flat or slightly concave, ventral highly convex. No pigment, no eye. Length excluding uropoda 4.5 mm., width 2.5 mm.

Cephalon not deeply sunk in thorax, somewhat irregular in outline, wider than long. Frontal lamina broad, encircling anterior and lateral margins of cephalon. Posterior lamina with 2 pairs of hook-like lateral processes. Maxillipeds bearing palp.

Thorax oval, with distinct segmentation. Last 2 segments provided with acuminate medio-dorsal processes; mid-dorsal region of 5th segment slightly elevated, but not produced. Broad coxal plates present in first 4 segments, occupying almost entire lateral margin.

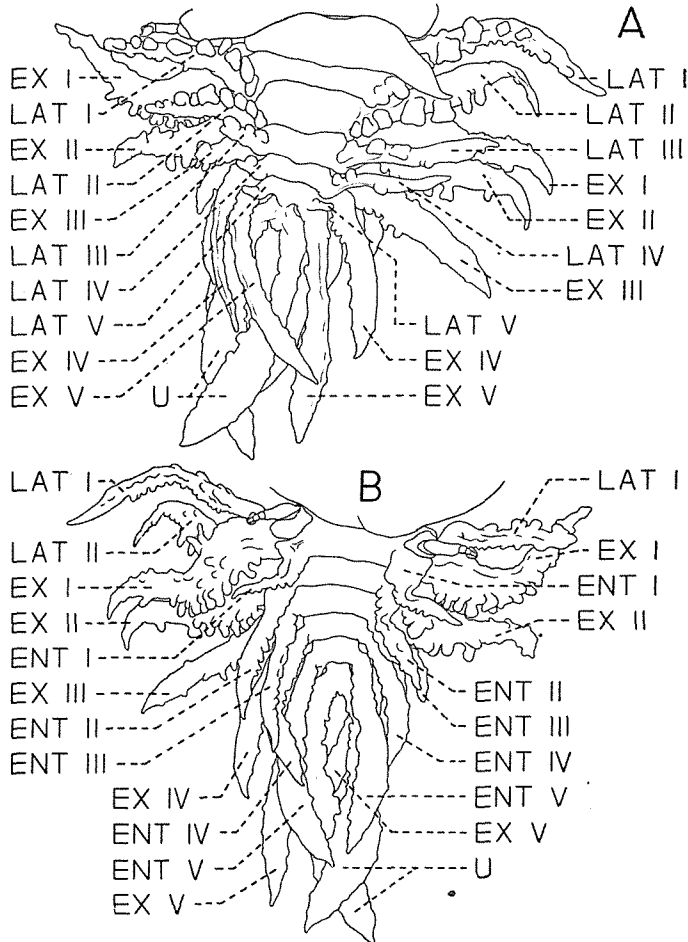


Fig. 7 *Portunicepon tiariniæ* n. sp., ♀ abdomen
A, dorsal view; B, ventral view.

Posterior lateral parts more or less distinct only in 2nd and 3rd segments. Ovarian boss absent. Marsupium complete and highly vaulted.

Abdomen narrow and short, with segmental borders smooth on both dorsal and ventral surfaces. Lateral plates (fig. 7, A) of 1st segment elongated and freely projected laterally; these plates gradually decrease in size posteriorly, and in 5th segment reduced into a pair of small papilliform processes. All plates strongly tuberculated on posterior margin. Terminal segment without these plates.

Pleopoda (fig. 7, B) biramous. Exopodite of first 2 pairs very broad at basal part, attenuating towards the tip and strongly tuberculated on margin; that of following 2 pairs narrower, lanceolate and with feebler tuberculation; exopodite of last pair much longer than that of 4th. Endopodite also tuberculated, increasing gradually in size from very short 1st to rather long 5th, but always shorter than corresponding exopodite. Uropoda similar in structure to last pair

of pleopoda, but broader and longer, being twice as long as abdomen proper.

Male (fig. 8, A & B): Elongated and slender. Length 1.3 mm., width at 5th thoracic segment 0.36 mm. A few scattered pigment spots on dorsal face

Cephalon ovate, with anterior margin slightly depressed in the middle and posterior margin straight. Both pairs of antennae projecting beyond cephalic margin. Eye absent.

Thoracic segments with round margins and large oval medio-ventral tubercles.

Abdominal segments distinct, with margins also rounded. First 2 segments with medio-ventral tubercles. Terminal segment (fig. 8, c) with postero-lateral corners produced in acuminate processes and with a small median process between these; a few setae present on lateral process. Pleopoda

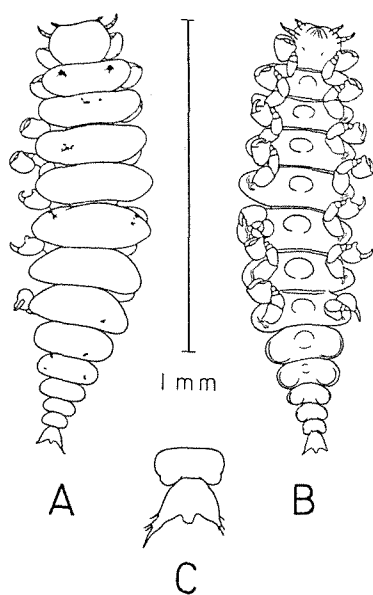


Fig. 8 *Portunicepon tiariniae* n. sp., ♂
A, dorsal view; B, ventral view;
C, terminal 2 segments, ventral view.

uniramous, represented by round protuberances at lateral part of segment. Uropoda absent.

Remarks: The present species is nearly allied to *Portunicepon goetici* SHIINO¹⁾ which has been reported also from Tanabe Bay. The difference from this species is found in that the endopodite of pleopoda increases in size towards posterior segment, while the lateral plate decreases. In *goetici* both the lateral plate and the endopodite decreases in size towards the posterior side. Moreover, the new species is distinguished from that species by the constitution of the terminal segment in the male. Differences from the other species of *Portunicepon* are comparatively greater.

Occurrence: Two females not accompanied by a male were collected in May, 1934 and 4 females each carrying a male, and 3 young females without male on September 9, 1934. In all these cases the parasite was found in the branchial cavity of *Tiarinia cornigera* (MILNE EDWARDS) collected at Seto by myself.

Gen. ANOMOPHRYXUS n. gen.

Female phryxid-form. Segmentation distinct on shorter side in all thoracic segments and on longer side in first 2 segments. Thoracic legs 7 on shorter side, only 2 (first 2) on longer side. Abdominal segments confluent, without lateral plates. Four pairs of pleopoda and uropoda uniramous.

Male cephalon fused with 1st thoracic segment. Remaining segments of thorax separated. Abdominal segments completely fused into one piece, without pleopoda and uropoda.

The most characteristic point by which the present genus is distinguished from other *Phryxus*-like genera, is the absence of the lateral plates in the female abdomen and the presence of uniramous pleopoda.

Anomophryxus deformatus n. sp.

Female (fig. 9, A & B): Greatly deformed and asymmetrical. Dorsal surface concave, ventral highly convex. No pigmentation. Length 3.5 mm., width 2.2 mm.

1) SHIINO, no. 16, pp. 274-276, fig. 8.

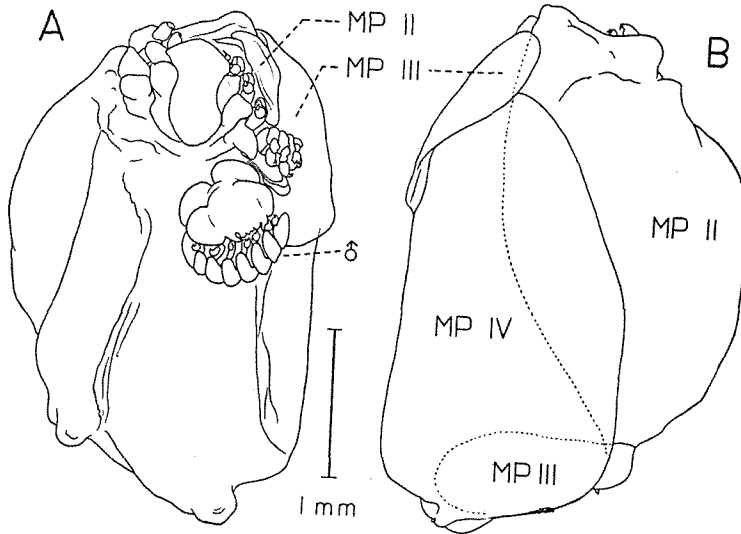


Fig. 9 *Anomophryxus deformatus* n. gen. & n. sp., ♀
A, dorsal view; B, ventral view.

Cephalon mushroom-shaped, deeply sunk in thorax, but with distinct borders. First antennae unsegmented, papilliform; 2nd antennae and maxillipeds usual (fig. 10, D). Posterior lamina provided with 2 hook-like processes on longer side and 1 on other side.

Thoracic segmentation distinct on shorter side and only in first 2 segments on longer side. In mid-dorsal region 1st segment obliterated, other segments coalesced. Lateral portion (fig. 10, B) more or less expanded on shorter side and produced posteriorly in linguiform lobe, but without coxal plate. First 2 segments of longer side not expanded in lateral part, and provided with triangular coxal plate. Seven legs present on shorter side and only first 2 on longer side. Marsupium spacious, consisting of 4 plates on longer side and 3 on shorter side; 1st pair (fig. 10, C) dissimilar on two sides, having round posterior lobe developed only on longer side; 2nd and 4th plates of this side (fig. 9, B) very large, representing principal part of marsupium; other plates much smaller.

Abdomen (figs. 9, A & 10, B) small, represented by a round protuberance attached to dorsal face in front of the middle. Segmentation indistinct and lateral plate absent. Four pairs of pleopoda and uropoda uniramous. First 2 pairs large and semicircular, last 2 pairs and uropoda very small, papilliform and crowded together at the posterior side of abdomen.

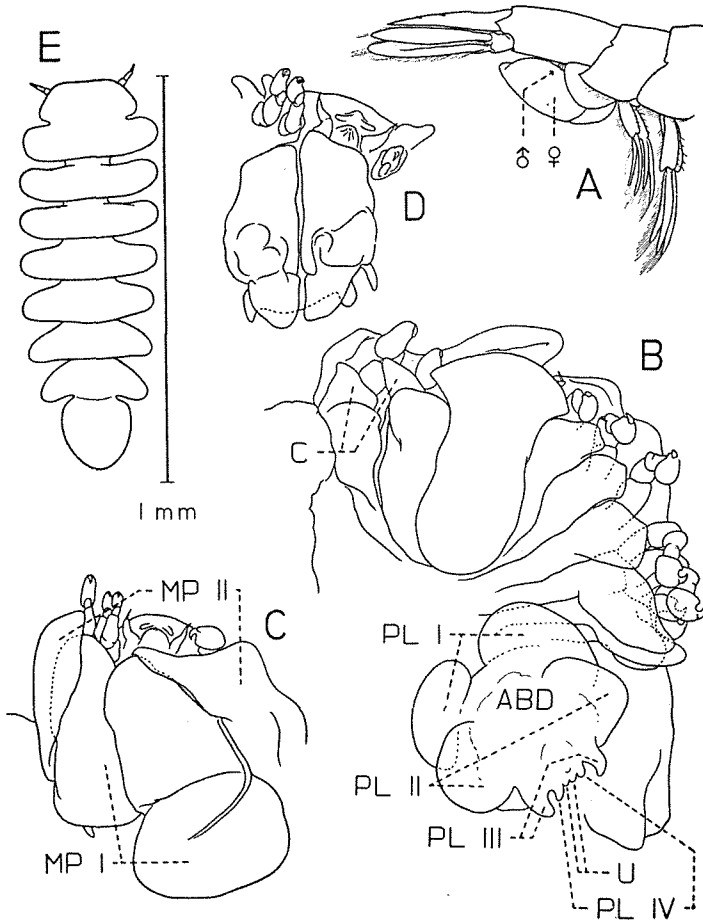


Fig. 10 *Anomophryxus deformatus* n. gen. & n. sp.
 A, posterior part of infected host; B, ♀, anterior part of body, dorsal view; C, ♀, marsupial plates I in situ; D, ♀, maxillipeds and cephalic appendages; E, ♂, dorsal view.

Male (fig. 10, E): stocky, length 0.9 mm., width at 2nd thoracic segment 0.55 mm. No pigment, no eye.

Cephalon trapezoid, completely fused with 1st thoracic segment in the middle, but laterally demarcated by deep notch.

Thoracic segments discontinuous, rounded on margin and subequal in size except 7th. Articulation between last segment and abdomen somewhat incomplete.

Abdominal segments completely coalesced into a round piece, occupying about 1/5 of total length. Pleopoda and uropoda absent.

Remarks: As regards the five pairs of abdominal appendages

present in this species, they may be interpreted in 4 different ways, viz. 1) 5 pairs of lateral plates, 2) 5 pairs of pleopoda, 3) 4 pairs of lateral plates and uropoda, and 4) 4 pairs of pleopoda and uropoda. But, since it is known in other *Phryxus*-like genera that the number of pleopoda is restricted to 4 pairs, and that the terminal segment is not provided with lateral plates, the first 2 interpretation are apparently inappropriate. Of the remaining 2, either is probable. However, I am rather of the opinion that those appendages represent the pleopoda and uropoda, since in other Bopyrids reduction of the lateral plates occurs more frequently than that of the pleopoda.

Occurrence: The present species is very commonly found parasitic on *Plesionika ortmanni* DOFLEIN, collected at a depth of 20-30 meters in Tanabe Bay. It is found fixed by its back invariably on the ventral surface of the 5th segment of the host abdomen close to the base of pleopoda, with its head turned towards the host's head.

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