

Studies on the hippolytid shrimps from Japan, III. : *Heptacarpus proptignatrix* (de Man), a synonym of *H. pandaloides* (Stimpson)

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Studies on the hippolytid shrimps from Japan, III.

Heptacarpus propugnatrix (de Man), a synonym of
H. pandaloides (Stimpson)¹⁾

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Recently a number of hippolytid shrimps collected from littoral weed-belts were presented to our laboratory by Dr. Taiji Kikuchi of the Amakusa Marine Biological Laboratory and Mr. Hitoshi Sando of the Yamagata Prefectural Fisheries Research Station, to whom we wish to express our hearty thanks. Through the courtesy of them, we could examine a series of specimens of *Heptacarpus pandaloides* (Stimpson) which was originally described under the name *Hippolyte pandaloides* from the Hakodate Bay, Hokkaido. Consequently the young specimens of this species proved to be rather different from the adults in the relative length of the rostrum and its spinulation.

In 1906 de Man described a new species, *Spirontocaris propugnatrix*, which is referred to the genus *Heptacarpus* (after Holthuis, 1947), collected together with *H. pandaloides* from the Inland Sea of Japan. As this species agrees well with the young specimens of *H. pandaloides*, we asked Dr. Isabella Gordon of the British Museum (Nat. Hist.) to examine the type specimen of *H. propugnatrix*. Owing to her kind examination of the type and comparison with de Man's specimens of *H. pandaloides* collected together, these two species proved to be entirely identical with each other. After de Man (1907) gave the extensive descriptions of these two species, *H. propugnatrix* has been for long time treated erroneously as a valid species.

We are indebted to Dr. Lipke B. Holthuis of the Rijksmuseum van Natuurlijke Historie, Leiden, for reading our manuscript and Dr. I. Gordon for correcting the manuscript and re-examining de Man's type of *H. propugnatrix* and his specimens of *H. pandaloides*.

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Heptacarpus pandaloides (Stimpson)

(Fig. 1)

Hippolyte pandaloides Stimpson, 1860, 103 [34] ; Doflein, 1902, 637.*Spirontocaris propugnatrix* de Man, 1906, 404; de Man, 1907, 414, pl. 32 figs. 35-41; Kemp, 1914, 124; Nakazawa, 1927, 1019, fig. 1960; Nakazawa and Kubo, 1947, 775, fig. 2236; Yasuda, 1956, 13; Kurata, 1963, 81.*Spirontocaris pandaloides*: de Man, 1907, 418, pl. 32 figs. 47, 48; Balss, 1914, 44; Kemp, 1914, 93; Kemp, 1916, 386; Parisi, 1919, 74; Nakazawa, 1927, 1019, fig. 1961; Yokoya, 1930, 530; Yokoya, 1939, 270; Nakazawa and Kubo, 1947, 775, fig. 2235; Yokoya, 1957, 637, fig. 3; Miyake, 1961, 9.*Heptacarpus pandaloides*: Holthuis, 1947, 13, 44; Liu, 1955, 37, pl. 13 figs. 6, 7; Sando, 1964, 32; Kubo, 1965, 615, fig. 974.*Heptacarpus propugnatrix*: Holthuis, 1947, 13; Miyake, Sakai and Nishikawa, 1962, 123; Kubo, 1965, 615, fig. 973.*Material examined.*Off Asamushi, Aomori Bay, 1040 spp. (no ovig. ♀), summer, 1959, '60, '63, '67, collected from *Sargassum* and *Zostera* belts, with small Danish seine, by H. Sando.Off Tsuyazaki, Fukuoka Pref., 11 spp. (including 6 ovig. ♀ ♀), May, 1956, Apr. 25 and May 23, 1967, collected from *Sargassum* and *Zostera* belts, with Danish seine, by S. Matsuura and T. Fujino.Tomioka Bay, Amakusa Islands, Kyushu, 102 spp. (including 16 ovig. ♀ ♀) Apr. 1955 to Jun. 1966, collected from *Zostera* belt, with small Danish seine or dredge, 0-5 m deep, by T. Kikuchi and others.

(One ovigerous female and one juvenile specimens are now deposited at the Rijksmuseum van Natuurlijke Historie)

Description.

The body is rather large, about 43 mm (ovigerous female) and 30 mm (male) in length. The rostrum is very long, measuring 1.3 to 2.0 times as long as the carapace. The upper border of the rostrum is provided with seven to ten teeth, of which the posterior two are situated on the carapace, and 9 to 13 teeth are on the lower border. The carapace is smooth and provided with an acute antennal spine which is separated from the obtuse suborbital angle by a notch. The pterygostomial angle is rounded in all the specimens examined, except for about 23 per cent of specimens collected from Aomori Bay which have a small spine on both or only one side of the antero-lateral angle of the carapace.

The abdomen is smooth, not geniculated at the third somite. The pleuron of the fifth somite is pointed acutely. The telson is usually

armed with five pairs of spines on dorsal side, but sometimes four to seven pairs or asymmetrical numbers of spines are observed. There are three pairs of spines on the apex of the telson.

The antennular peduncle reaches nearly to the proximal third of the rostrum. The second segment bears a small marginal spine on the lateral side, and the third is also armed with a similar spine on the dorsal side. The scaphocerite is long and broad, being as long as or slightly longer than the carapace. The terminal spine on the outer side falls far short of the lamellar part.

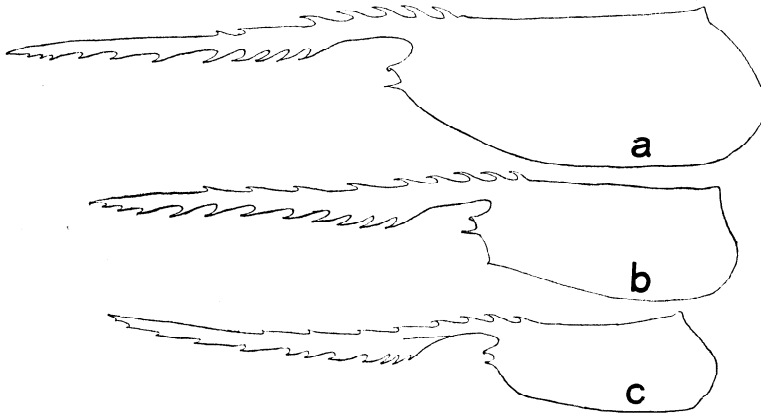


Fig. 1. *Heptacarpus pandaloides* (Stimpson), $\times 6$.

a, Female from Amakusa Islands; b, male with pterygostomian spine from Aomori Bay; c, young from Amakusa Islands.

The third maxilliped has an epipod but destitute of an exopod. There is no epipod on any of the pereopods. The first pereopod is rather stout, extending to the first segment of the antennular peduncle. The second pereopod is slender and long, reaching as far forward as the middle of the scaphocerite, the carpus is subdivided into seven joints. The third pereopod is the longest of all the pereopods, reaching beyond the tip of the second pereopod by the dactylus. The merus is provided with seven to nine teeth on the lateral side, and the dactylus is armed with six to seven spines excluding the terminal nail. The merus of the fourth pereopod is armed with five to seven lateral spines, and that of the fifth is armed with two to four lateral spines.

The first pleopod of males has the elongate endopod, narrowed in the distal part to a slender appendix interna which bears several retinacula at the top. There are about 18 short setae and two or three long plumose hairs on the inner margin and about 18 similar hairs on the outer

margin of the endopod. In such the males the second pleopod bears a distinct appendix masculina which is stouter and slightly longer than the appendix interna. There are many strong hairs along the inner margin of the appendix masculina.

Colour.

The species is entirely bright green but some specimens have small red spots on the lower margins of the first three abdominal somites, as already described by Stimpson (1860) and de Man (1907).

Distribution.

Stimpson (1860) described *H. pandaloides* from Hakodate Bay, Hokkaido. Since then it was collected chiefly from the weed, *Sargassum* and *Zostera*, belts around Japan and northern China, at the depth of 0-30 m. The records in literature are as follows: Hakodate Bay, Hokkaido (Stimpson, 1860; Doflein, 1902), Mutsu Bay and Aomori Bay, Aomori Pref. (Yokoya, 1939, Sando, 1964), Onagawa and Ishinomaki Bay, Miyagi Pref. (Yokoya, 1939, Kurata, 1963), Yokohama, Enoshima, and Misaki, Kanagawa Pref. (Doflein, 1902, Balss, 1914, Kemp, 1914, 1916, Parisi, 1919), Inland Sea of Japan (de Man, 1906, 1907, Holthuis, 1947, Yasuda, 1956), Tsuyazaki, Fukuoka Pref. (Miyake et al., 1962) Amakusa Islands, Kumamoto Pref. (Miyake, 1961, Miyake et al., 1962), Liau-Ning and Shan-Dong (Liu, 1955), Karachi (Kemp, 1914).

Kurata (1963) and Sando (1964) listed *Heptacarpus pandaloides* as the most abundant species in *Zostera* belt in northern Japan, Ishinomaki Bay and Aomori Bay, but less common in that belt in southern Japan.

Variation and growth.

Material from northern extreme of the range is rather different in the state of the pterygostomian angle from those in southern Japan. In the southern specimens the pterygostomian angle is largely rounded but about one-fourth of the northern specimens are provided with a spine on both or only one side of the pterygostomian angle.

Males are smaller than females, bearing more slender rostrum, and juvenile individuals resemble males in general form. The small juveniles (ca. 4.5-5.5 mm in carapace length) collected during from May to June have the rostrum of 1.9 times as long as the carapace, though the rostrum of still smaller specimens (ca. 3.4-4.0 mm in cl) from March to April is 1.7 times as long as the carapace. While in the rather large juvenile (ca. 5.2-7.1 mm in cl) in August this ratio decreases as low as 1.6 which is the same rate as in the large female (ca. 9.5-10.5 mm in cl) in November.

The life history of this species was well discussed by Kurata (1963), depending on the material from the Ishinomaki Bay. We also examined the specimens from the Amakusa Islands. The seasonal change in

growth of the Amakusa specimens coincides with his conclusion, except for the time when the juvenile specimens separate sexually. According to Kurata, in the Ishinomaki Bay the sex-unknown specimens disappear in August, but in the Amakusa Islands they are still present in September. The seasonal changes of the Amakusa specimens seem to show the same pattern as in *Heptacarpus geniculatus* (Stimpson) (Kikuchi, 1962, p. 144, fig. 3, B).

Remarks.

In 1906 de Man published the preliminary description of the new species *Spirontocaris propugnatrix* from the Inland Sea of Japan. In the following year he gave the full descriptions and illustrations of *S. propugnatrix* as well as *Spirontocaris pandaloides* (Stimpson). The subsequent many authors followed him and both species, which are now referred to the genus *Heptacarpus*, have been treated as the valid species.

The type specimen of *H. propugnatrix*, however, was collected together with *H. pandaloides*, and it differs from the latter only in minor details of rostral length and spinulation. The young specimens of *H. pandaloides* have the longer rostrum than the adults and the rostral teeth are variable in number. These two species are identical, *H. propugnatrix* is the juvenile stage of *H. pandaloides*.

On the other hand the present species is related to *Heptacarpus geniculatus* (Stimpson) but easily distinguished from the latter by the absence of the strong geniculation of the third abdominal somite. According to Dr. I. Gordon's personal communication, there is merely a lapse in Kemp's (1914) synonymic list; the 1907 entry under de Man's *Spirontocaris alcimede* (now synonymous with *Heptacarpus geniculatus*) should read *Spirontocaris alcimede* and not *Spirontocaris propugnatrix*, with which correction we entirely agree.

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