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On the generic characters of *Chirostylus*, with description
of two Japanese species (Crustacea, Anomura)*

Sadayoshi MIYAKE and Keiji BABA

The genus *Chirostylus* is one of the rare members in the Chirostylidae, in which 12 species are recorded. Of those known species 9 have been taken from the Indo-Pacific region and the other 3 from the Atlantic. The genus was monotypically established by Ortmann (1892), being based upon *Chirostylus dolichopus* from the Sagami Bay, Japan. Before this was described *Ptychogaster* by A. Milne Edwards (1880), the type-species is *P. spinifer* from the West Indies. Subsequently, it was a subject of Bouvier (1896) to consider that the above two genera are synonymous, but he took *Ptychogaster* for available name in that report and his latter works in collaboration with A. Milne Edwards (1897) as well. In the same year (1896) Caullery pointed out that *Ptychogaster* A. Milne Edwards was preoccupied by the genus of Chelonia [= *Ptychogaster* Pomel, 1847], and renamed for it as *Gastroptychus*. Afterwards, Ortmann himself (1901) admitted of their synonymy and assigned his *Chirostylus* for the valid name. Subsequent workers (van Dam, 1933; Chace, 1942, etc.) have all followed the Ortmann's conclusion.

The "five-segmented antenna" has been mentioned as an important part of the familial characters (Ortmann, 1901; Balss, 1957). As far as the Japanese *Chirostylus* is concerned, the details of the segmentation of that appendage have remained indistinct. Ortmann (1892) illustrated the antenna of *Chirostylus dolichopus* and stated that it consists of eight segments, the proximal third being the longest with a strong spine. From his study it was thought that the antennal peduncle is composed of three segments. Here were examined some of the specimens of *Chirostylus dolichopus* from the Sagami Bay deposited in the Biological Laboratory, Imperial Household, Japan, and a single specimen from Northern Kyushu, Japan which was described here as *C. ortmanni* sp. nov. An examination of the present material showed that both of the species lack

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antennal scale, and revealed that Ortmann's basal segment of the antennal peduncle is not the true one since he might have overlooked other two basal segments (Fig. 1). Accordingly, the antennal peduncle consists of five segments except for the flagellum. This fact correlatively agrees with the case of *Ptychogaster spinifer* (A. Milne Edwards & Bouvier, 1897, pl. 9, fig. 18, pl. 10, fig. 11). The illustrations given by the French authors, however, are somewhat insufficient, especially in the segmentation of the antennal peduncle. Fortunately, it was very kind of Dr. Fenner A. Chace, Jr. of the U.S. National Museum to have the opportunity to examine a pair of West Indies material of *Chirostylus spinifer* (USNM 98661). After the examination of that material, it was proved, as shown in the accompanying figure, that the antennal scale is apparently present and **a** in Fig. 1, *d* [=that by the French authors] is the third segment, which correlatively agrees with those of *Uroptychus*. The antennal peduncle is therefore considered to be five-segmented in the West Indies species. According to Ortmann (1901), *Chirostylus* is characterized by the following: "Rostrum an der Spitze zugespitzt (selten fehlend). Körper mehr weniger dornig. Pereiopoden sehr lang," and the presence or absence of antennal scale is out of his attention. In addition to the discussed

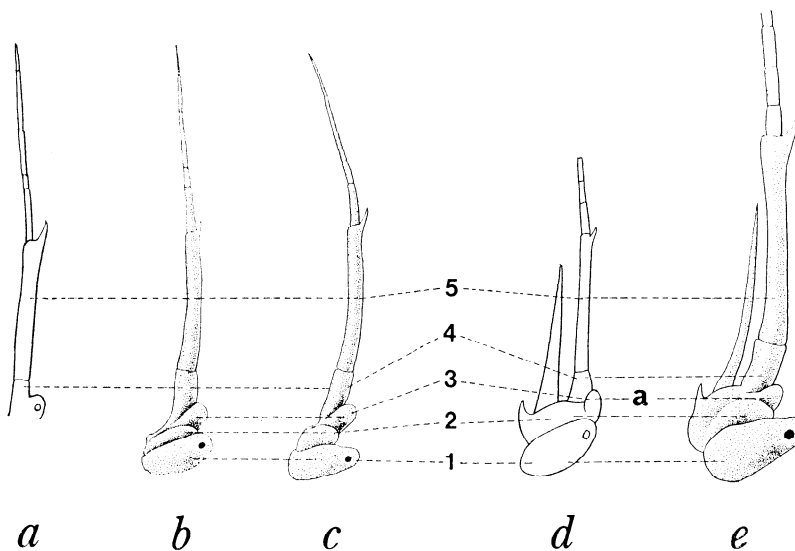


Fig. 1. Diagram of the segmentation of antenna, *a*, *Chirostylus dolichopus* (after Ortmann, 1892); *b*, *Chirostylus dolichopus* from Sagami Bay (BLIH 199); *c*, *Chirostylus ortmanni* sp. nov. from Northern Kyushu (ZLKU 13761); *d*, *Gasteroptychus spinifer* (after Milne Edwards & Bouvier, 1897); *e*, *Gasteroptychus spinifer* from West Indies (USNM 98661).

character, the absence of the rostrum is common between the two Japanese species and considered here to be an important generic character together with the absence of the antennal scale. Fortunately, an appearance of *Chirostylus ortmanni* afforded a clue to us for the identity of the old genera. It was, therefore, concluded that *Chirostylus* s. l. should be separated again into the original two genera, *Chirostylus* and *Gastroptychus*, by the presence or absence of antennal scale and rostrum.

Key to the Japanese species of the genus *Chirostylus*

1. Carapace with a spine on anterior portion of branchial region, without spine at center; outer distal marginal spine of antennular basal segment divided distally into four spinules..... *dolichopus*
- Carapace with a spine on median lateral portion of branchial region, and a single spine at center; outer distal marginal spine of antennular basal segment divided distally into two spinules.. *ortmanni*

Chirostylus dolichopus Ortmann, 1892

(Figs. 1, *b* and 2)

Chirostylus dolichopus Ortmann, 1892, p. 246, pl. 11, figs. 2, 2b, 2c, 2e, 2i, 2z;
Miyake, 1960, p. 97, pl. 48, fig. 8.

Material examined:

Between Maruyama-dashi and Kannonzuka-dashi, Sagami Bay, 63-68 m deep, Jan. 24, 1958. — 1 ovig. ♀, BLIH 199.

Between Maruyama-dashi and Kannonzuka-dashi, Sagami Bay, 65-70 m deep, June 5, 1960. — 1 ♂, BLIH 383.

Description: The carapace is narrow at the anterior and becomes wide posteriorly so that the greatest width is measured at the posterior fourth, and again becomes narrow posteriorly. The rostrum is entirely absent. The anterior margin of the carapace is smoothly protruded. The dorsal surface is smooth without any transverse ridges. It is not completely calcified so that in 70 per cent of alcohol the branchial region is transparent and gills are seen through the carapace. Behind the insertion of the eye the carapace is rounded and slightly convex with one pair of spines. Outside of the eye is a prominent anterolateral spine. The outer orbital angle is slightly spinulated. One pair of spines is also placed on the anterior parts of both the left and the right branchial regions.

The basal segment of the antennule has on the outer distal margin a large spine which is divided into four spines distally and therefore seen as a pediform. The antennal peduncle consists of five segments; the distal one (fifth segment) is the longest with a single spine on the

inner distal margin. The antennal scale is absent.

In the third maxilliped the merus is as long as the ischium, with a large spine near the distal end of the outer margin. The carpus has two spinules on the outer margin, the one being on the distal and the other on the proximal portion.

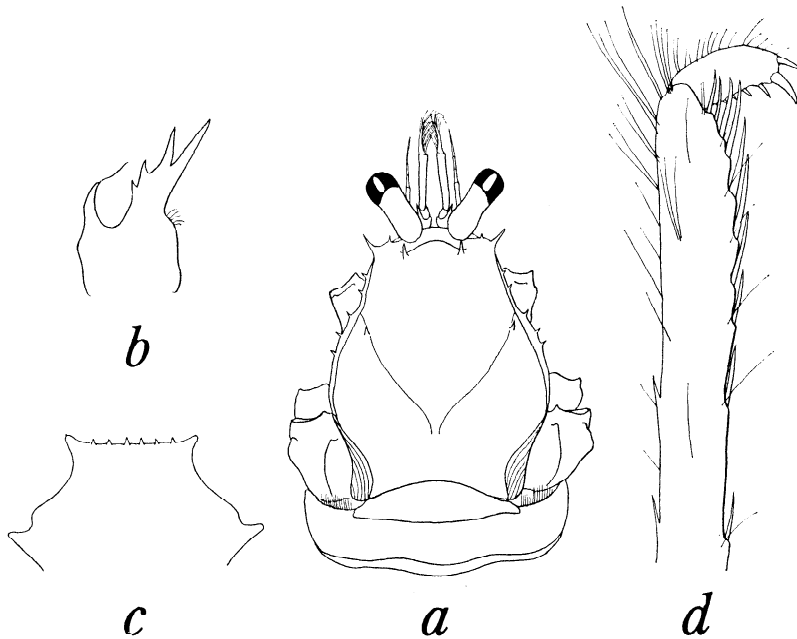


Fig. 2. *Chirostylus dolichopus* Ortmann, *a*, animal in dorsal view, $\times 4$; *b*, basal segment of left antennule, $\times 30$; *c*, anterior part of sternal segments, $\times 6$; *d*, distal segments of first ambulatory leg, $\times 10$.

The chelipeds are about 12 times as long as the carapace, they are slender, cylindrical and sparsely furnished with long setae. The arm has sharp spines on the surface, i.e. 18 dorsal spines, 16 inner marginal and 8 outer marginal spines, and other 4 spines situated rather ventrally on the outer margin. The wrist bears spines in similar manner to the arm; the inner marginal spines are denser than the dorsal or outer marginal spines. The palm is widest at the distal portion, bearing 13 inner marginal, 12 outer marginal and 23 dorsal spines. The fingers touch each other in the distal third; they have one large tubercle at the proximal third of the cutting edge, that of the movable finger being situated more proximally than that of the immovable finger; the fingers are gapped in the median third with short setae; long setae are also

scattered at the distal portion.

The ambulatory legs are similar, slender, depressed and scarcely setose. The merus of the first pair bears about 14 dorsal, 18-30 outer (upper) marginal, 6-16 inner (lower) marginal and 7-9 ventral spines. The carpus has on the outer margin 21-29 spinules which are particularly dense on the proximal half, and 4 spinules on the inner margin. The propodus is broad near the distal portion and sparsely furnished with long setae; it is armed on the outer margin with 16-20 spinules which are dense on the proximal portion, and also with 13-20 slender spines densely placed on the distal portion of the inner margin. The dactylus is short, being one-eleventh times as long as the propodus; it bears on the inner margin 6-8 spines, the penultimate of which is well developed and larger than the other spines.

The anterior margin of the third thoracic sternite is straight and not embayed, with about six spinules. The pterygostomial flap has spinules on the surface.

Measurements: The male measures 3.9 mm in carapace length and 51.6 mm in cheliped length, the ovigerous female 6.5 mm in carapace length.

Ecology: Taken from depths of 50 to 70 m. Ovigerous females are recorded in December and January.

Remarks: Though Ortmann's description (1892) considerably enters into details except for the armature of the pereopods, here is provided a full description. The coloration and some of the characters of the present material are previously shown by Miyake (1960).

Distribution: Previously known only from the Sagami Bay.

Chirostylus ortmanni sp. nov.

(Figs. 1, c and 3)

Material examined:

Off Okino-shima, Sea of Genkai, Northern Kyushu, 90 m deep, Apr. 3, 1963, K. Sakai & K. Baba leg. — 1 ♀, ZLKU 13761 (holotype).

Description of holotype: The carapace is narrow at the anterior portion, becoming wide posteriorly so that the greatest width is measured at the level of the insertion of the third ambulatory leg; the posterior margin is embayed; the carapace is rather soft as that of the preceding species, being devoid of striae and setae. Behind the insertion of the eyes is one pair of spines. The anterolateral spine is well developed. The cardiac region is slightly convex with a spine. The carapace is also armed with two spines on the lateral portion of the branchial region. From each of those spines a carina runs backwards, the outside of which is very soft. The outer orbital angle is spinulated.

The basal segment of the antennule has on the outer distal margin a well-developed stylocerite which is divided into two spines distally. The antennal peduncle consists of five segments without antennal scale. The fourth segment is about one-third of the distal (fifth) segment; the latter is long with a strong spine on the distal end of the inner margin.

In the third maxilliped the merus is nearly as long as the ischium, with a single spine near the distal end of the outer margin; the carpus is smooth and unarmed.

The chelipeds are equal in shape and size, they are cylindrical, devoid of setae except for fingers and about 10 times as long as the carapace. The arm has 15 inner marginal, 14 dorsal, 8 outer marginal and 12 ventral spines. The wrist bears three longitudinal rows of spines marginally and dorsally, i.e. 12 inner marginal, 11 dorsal, 6 outer marginal spines; the ventral surface is also armed with three longitudinal rows of spines, one of the rows consisting of about 10 spines of large size and the other two each of 9 or 10 spinules. The palm is as long as the preceding segment, it bears 13 inner marginal, 19 dorsal, 11 outer marginal spines and two rows of ventral spines each consisting of about 16 spinules. The fingers are short, measuring one-third of the preceding segment; they touch in the distal fourth with tubercles; in the proximal fourth they also occlude each other not entirely but incompletely with a protuberance; in the middle portion the fingers are gapped, with many setae on the gapped portion; the margins and surface are furnished with long setae.

The ambulatory legs are slender, depressed and sparsely furnished with setae on the distal two segments. The merus of the first pair bears 12 outer (upper) marginal, 2 dorsal and 14 ventral spines, the lattermost being close to the outer marginal spines; the inner margin bears a single spine dorsally and ventrally. The carpus has 4 inner marginal spinules and 21 outer marginal spines of small size which are densely placed on the proximal two-thirds of the margin. The propodus does not become wide near the distal portion, and has 12 outer marginal spines which are not distributed on the distal third of the margin; the inner margin bears 15 long and slender spines, the distal 5 or 8 being large. The dactylus has on the inner margin seven spines including terminal claw; the penultimate spine is not so developed as in *C. dolichopus*.

The second and third ambulatory legs are similar to the first, with the exception that the merus bears 5 to 7 inner marginal spines.

The sternal segments are as represented in Fig. 3, c; the anterior margin is almost straight with four spines; its lateral angle directed anterolaterally. The pterygostomial flap is spined at the anterior corner

and also bears a single spine on the surface.

Colour: When alive, the animal is reddish purple on whole over the surface, with following markings: The carapace is reddish orange at the posterior half of the lateral margin and has two light coloured lines which run backwards from the anterior portion of the carapace and diverge posteriorly. The cheliped is orange at the fingers. The first three pairs of ambulatory legs each has two bands of reddish orange at the distal portion of the merus, and is also marked with the same colour on the outer margins of the carpus and proximal two-thirds of the propodus.

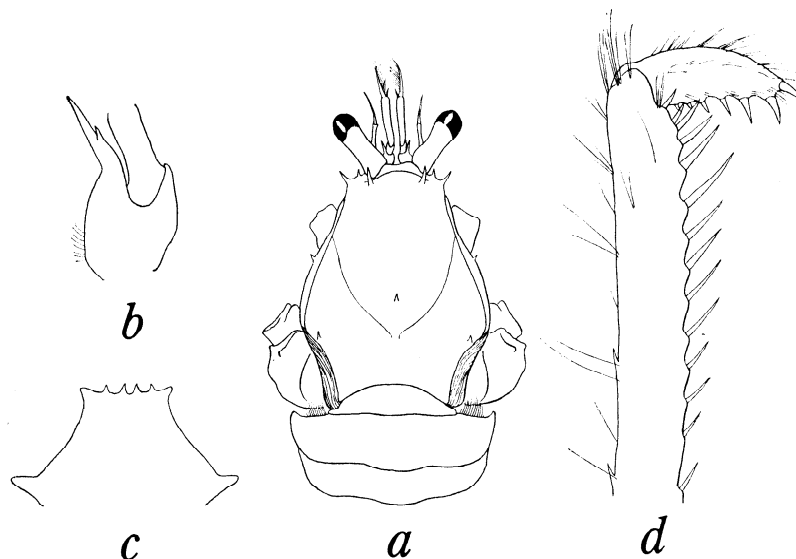


Fig. 3. *Chirostylus ortmanni* sp. nov., holotype, female, *a*, animal in dorsal view, $\times 4$; *b*, basal segment of right antennule, $\times 30$; *c*, anterior part of sternal segments, $\times 6$; *d*, distal segments of first ambulatory leg, $\times 10$.

Measurements of holotype (in mm):

Length of carapace.....	6.2
Width of carapace	5.1
Length of cheliped.....	61.1
Length of wrist	15.3
Length of palm.....	15.5
Width of palm.....	0.9
Length of movable finger	5.0

Ecology: A single specimen was dredged from a shelly bottom with

lime algae in a depth of 90 m.

Relationships: The species is distinguished from the preceding species by the following respects: (1) This species has a cardiac spine and one pair of spines on the middle portions of the branchial region, however, the preceding bears no cardiac spine but a pair of spines on the anterior portions of the branchial regions. (2) This species has a single spine on the surface of the pterygostomial flap, while the preceding bears about six spines on the same. (3) In this species the penultimate spine on the inner margin of the dactylus of the ambulatory legs is not so developed as in the preceding species.

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