

A new species of the genus *Chirostylus* Ortmann, 1892 (Crustacea: Decapoda: Anomura: Chirostylidae) from the Ogasawara Islands, southern Japan

Masayuki Osawa and Kazuomi Nishikiori

(MO) Ocean Research Institute, The University of Tokyo, 1-15-1, Minamidai, Nakano-ku, Tokyo 164-8639, Japan; (KN) Tokyo Metropolitan Ogasawara Fisheries Center, Kiyose, Chichijima Island, Ogasawara, Tokyo 100-2101, Japan

Abstract.—A new anomuran crustacean, *Chirostylus rostratus*, is described and illustrated based on a male specimen collected from the Ogasawara Islands. A well-developed rostral spine displayed by the species requires redefinition of the genus *Chirostylus*. Re-examination of Ogawa & Matsuzaki's (1993) material reveals that *C. ortmanni* should not be synonymized with *C. dolichopus*.

The genus *Chirostylus* Ortmann, 1892, includes four species: *C. dolichopus* Ortmann, 1892 (the type species of the genus), *C. ortmanni* Miyake & Baba, 1968, *C. micheleae* Tirmizi & Khan, 1979, and *C. novaecaledoniae* Baba, 1991; all are recorded only from the Indo-West Pacific (Baba 1991:466). Ogawa & Matsuzaki (1993:65) synonymized *C. ortmanni* with *C. dolichopus*, but as herein discussed this is hardly accepted.

Recently, an unusual specimen of *Chirostylus* was collected from the Ogasawara (Bonin) Islands, the southern oceanic islands of Japan. The specimen does not fit any known species of the genus in having a well-developed rostral spine, the character resembling that of species of the genus *Gastroptychus* Caullery, 1896. We herein describe and illustrate the Ogasawara specimen as a new species of *Chirostylus*, and the genus is redefined to include this species.

The holotype is deposited in the National Science Museum, Tokyo (NSMT). The post-orbital carapace length (CL) is measured from the dorsal posterior margin of the orbit to the median posterior end of the carapace.

Chirostylus rostratus, new species

Figs. 1, 2

Type specimen.—Holotype: male (CL 7.3 mm); west of Minamijima Island, Oga-

sawara Islands; 180 m; 14 Sep 1996; coll. S. Yokoyama; NSMT-Cr 12028.

Description.—Carapace (Fig. 1A, B) excluding rostrum, 1.11 times longer than greatest width. Rostrum 0.18 length of post-orbital carapace; basal portion broad; rostral spine longer than epigastric spines, directed anterodorsally. Anterolateral spines prominent, preceded by smaller spine at lateral limit of orbit. Pair of epigastric spines situated behind eyes, directed anterodorsally. Gastric region moderately inflated, unarmed. Cardiac region somewhat flat, without spine. Cervical grooves weakly developed. Branchial regions ridged posteriorly along row of 4 spines nearly parallel to lateral margin, first and second spines slender, last spine smallest. Lateral margins of carapace diverging posteriorly to point approximately $\frac{1}{2}$ from posterior end, converging behind it with strong concavity. Posterior margin strongly concave.

Pterygostomian flaps (Fig. 1B) with row of irregularly arranged, small spines parallel to lateral margin of carapace, accompanied by a few spinules ventral to this row on posterior half, anteriorly ending in small, sharply pointed spine; small depression situated at anterior $\frac{1}{3}$.

Third thoracic sternite (Fig. 1C, D)

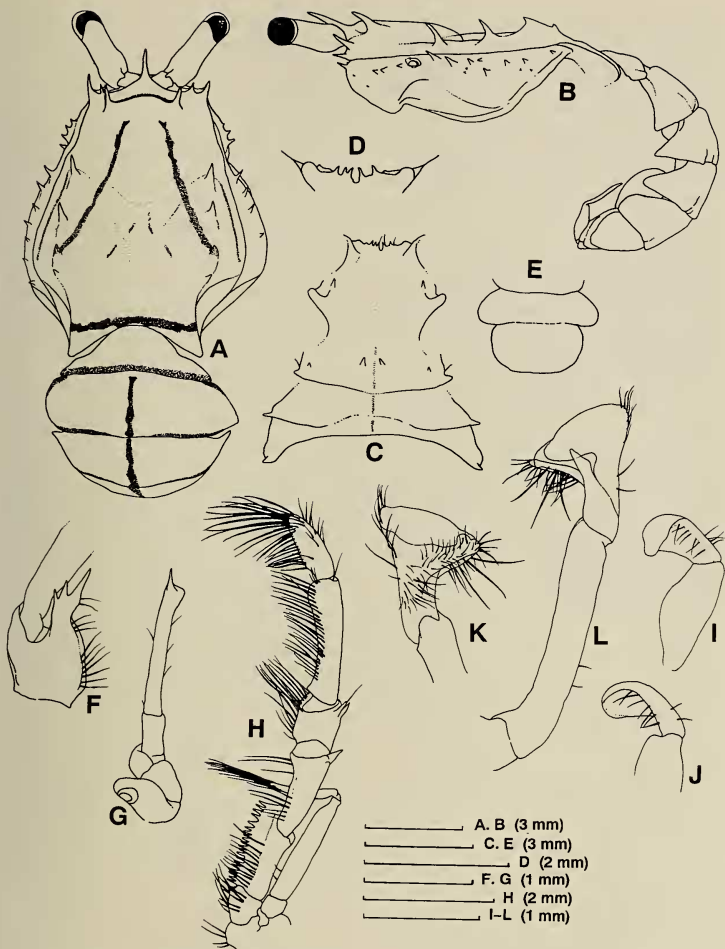


Fig. 1. *Chirostylus rostratus*, new species. Holotype, male (CL 7.3 mm, NSMT-Cr 12028). A, carapace and abdomen, dorsal; B, same, left lateral; C, thoracic sternum, ventral; D, third thoracic sternite, ventral; E, telson, dorsal; F, left antennular peduncle, ventral; G, left antennal peduncle, ventral; H, left third maxilliped, ventral; I, left first pleopod, dorsal; J, same, ventral; K, left second pleopod, dorsal; L, same, ventral.

somewhat depressed from level of following sternite; anterior margin nearly transverse, with 5 small spines, U-shaped median notch flanked by 2 submedian spines. Fourth thoracic sternite with distinct spine on each proximal lateral margin. Fifth thoracic sternite with 2 pairs of spines on posterior transverse line, each pair situated at median and lateral regions. Following sternites unarmed.

Abdomen (Fig. 1A, B) glabrous and unarmed; pleura of second to fourth somites triangular with rounded (second and fourth somites) or pointed (third somite) apex, those of fifth and sixth somites ending in rounded margin. Telson (Fig. 1E) divided into 2 lobes by indistinct transverse fissure; anterior lobe with strongly convex lateral margins, 1.31 times as broad as posterior; posterior lobe 1.65 times longer than anterior, semi-elliptical.

Eyestalks (Fig. 1A, B) elongate, 0.35 length of postorbital carapace, subcylindrical, slightly broadened proximally; cornea slightly dilated, approximately $\frac{1}{2}$ length of remaining ocular peduncle.

Antennular basal segment (Fig. 1F) with 3 spines on distolateral projection, distal-most largest; distal 2 segments unarmed.

Antennal peduncles (Fig. 1G) 5-segmented, lacking scale; ultimate segment 3.32 times as long as penultimate, with ventromesial terminal spine; proximal 4 segments unarmed.

Third maxillipeds (Fig. 1H) having basis with small but broad spine at distomesial end, ischium with crista dentata of 20 acute teeth, merus with strong distolateral spine, carpus with 2 distolateral spines.

Chelipeds (Fig. 2A-C) similar to each other but right slightly longer than left, subcylindrical, slender, 11.2 times as long as postorbital carapace, bearing sparse coarse setae except for setose fingers. Merus, carpus, and palm provided with 6 longitudinal rows of spines (2 dorsal, 2 ventral, 1 mesial, and 1 lateral) and irregularly arranged smaller spines. Merus and palm 1.76 and 1.16 times longer than carpus, respectively.

Fingers 0.43 as long as palm; opposable margins with small, rounded or subtriangular tubercles on gaping median $\frac{1}{2}$; proximal $\frac{1}{2}$ margins with distinctly larger, subtriangular teeth (2 on movable finger, and 1 on immovable finger); distal $\frac{1}{2}$ margins with small, low protuberances bearing slender, corneous spinules; distal ends with 2 corneous, larger spines.

Ambulatory legs (Fig. 2D-I) slender, spinose, subcylindrical, somewhat depressed lateromesially, slightly overreaching end of cheliped carpus; meri successively diminishing in size posteriorly but carpi and propodi each subequal in three legs. Coxa of third leg visible entirely in dorsal view, closely fitting strong concavity of lateral margin of carapace. Ischium short, with several small spines. Merus 0.89 (first leg), 0.82 (second leg), and 0.79 (third leg) as long as carpus and propodus combined, with rows of slender spines on extensor and flexor margins and irregularly arranged, smaller spines on lateral surface. Carpus resembling merus in its spiny condition, but spines on extensor margin more closely arranged. Propodus 0.94 length of carpus, slightly narrower than carpus in lateral view, with 2 rows of fixed spines along extensor margin; flexor margin with movable, slender spines: 21 on first leg, 21 or 22 on second leg, and 19-22 on third leg, including distal 2 pairs (terminal pair much larger). Dactyl 0.13 length of propodus, moderately curving, with flexor margin bearing 7 (first and second legs) or 8 (third leg) spines (including terminal) gradually decreasing in size toward base of segment, penultimate spine slightly longer than ultimate.

Male with 5 pairs of pleopods on first to fifth abdominal somites; those of first and second somites modified as gonopods, those on third to fifth somites each reduced to very small, elongate bud. First pleopod (Fig. 1I, J) moderately elongate; protopod inflated dorsolaterally, naked; endopod directed dorsolaterally, curving dorsally in distal half, bearing several short setae on

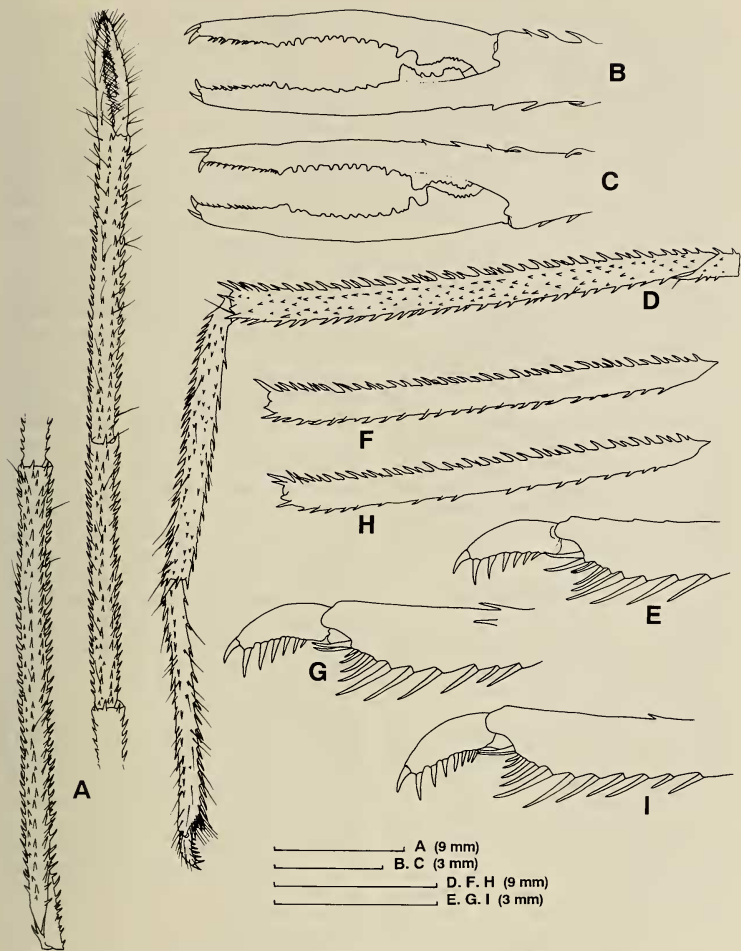


Fig. 2. *Chirostylus rostratus*, new species. Holotype, male (CL 7.3 mm, NSMT-Cr 12028). Appendages from left side except for C, right side. A, cheliped, dorsal; B, C, same, distal part of chela, dorsal, setae omitted; D, first ambulatory leg, lateral; E, same, distal part of propodus and dactyl, lateral, setae omitted; F, second ambulatory leg, merus, lateral; G, same, distal part of propodus and dactyl, lateral; H, third ambulatory leg, merus, lateral; I, same, distal part of propodus and dactyl, lateral.

proximal $\frac{2}{3}$ of mesial region. Second pleopod (Fig. 1K, L) considerably larger than first, elongate; protopod slender, bearing 2 short setae on proximal part of lateral region; endopod strongly expanded distally, dorsally curved in distal portion, giving subtriangular rounded appearance in dorsal or ventral view; dorsal surface covered with setae of irregular-sizes; ventral surface with keel-like structure terminating in slender process.

Color.—Body and pereopods whitish pink, with reddish lines and bands on carapace and abdomen as figured. Carapace with distinct line in large triangle and narrow lines between epigastric spines and along branchial spines. Abdominal somites each with transverse band along dorsoposterior margin, bands of second to sixth somites interrupted by median longitudinal line. Pterygostomian flaps with reddish longitudinal lines along anterior, dorsal, and ventral margins. Third thoracic sternite pale reddish along anterior margin. Ocular peduncles whitish pink, with pale reddish distal part on dorsal face, and reddish longitudinal narrow line on ventral face. Chelipeds with reddish longitudinal line on mesial face of coxa to ischium, ischium and merus each with reddish spines on proximal $\frac{2}{3}$ of ventrolateral to mesial faces. Ambulatory legs with reddish line on coxa to ischium as in chelipeds, merus with reddish spines on proximal $\frac{1}{4}$ of mesial face, carpus with broad transverse band of pale red.

Etymology.—The specific name is derived from the Latin, *rostratus* meaning beaked, in reference to the characteristic rostral spine.

Remarks.—*Chirostylus rostratus* is immediately distinguishable from the other known species of the genus by the rostral spine being longer than the epigastric spines. Baba (1988:5) mentioned that the rostral spine of *Chirostylus* species should not be regarded as the true rostrum and is structurally identical with spines appearing irregularly elsewhere on the carapace. Therefore, the presence or absence of a dis-

tinct spiniform rostrum has been believed to be the sole character discriminating between *Chirostylus* and *Gastroptychus*. The rostral spine of *Chirostylus rostratus*, however, seems not to be a small slender structure on the rounded rostrum but to form a spiniform rostral area. To accommodate the new species in *Chirostylus*, the genus can be redefined by a combination of the following characters: the carapace is so strongly concave on the posterior lateral margins that the coxa of the third ambulatory leg closely fits the concavity and is visible entirely in dorsal view; and the ocular peduncles are elongate and far overreaching the rostral spine.

Ogawa & Matsuzaki (1993:65) concluded that *C. ortmanni* should be synonymized with *C. dolichopus*, because of variation of spines on the carapace, pterygostomian flaps, third thoracic sternite, and basal segment of the antennular peduncles. However, they did not discuss the relative sizes of the ultimate and penultimate spines on the flexor margin of the ambulatory dactyls, which is a distinguishing character between the two species originally indicated by Miyake & Baba (1968:386). Re-examination of Ogawa & Matsuzaki's material now in the collection of the National Science Museum, Tokyo (NSMT-Cr 11672 to 11686) discloses that the sizes of the two spines are approximately equal in most of the specimens. Even if the ultimate spine is somewhat smaller than the penultimate on one side, these spines are subequal on the other side of the same specimen. The material also lacks a spine near the anterior extremity of the branchial region as in the account and figure of *C. ortmanni* by Miyake & Baba (1968:386, fig. 3a). We are inclined to believe that the material discussed by Ogawa & Matsuzaki (1993) is referable to *C. ortmanni*. The re-examination of their material also reveals that the third thoracic sternite bears four or five spines on the anterior margin except for a juvenile specimen from the Ryukyu Islands (CL 1.9 mm, NSMT-Cr 11686, 2 spines), and the fourth

thoracic sternite has a bluntly or acutely pointed tubercle, which is sometimes indistinct, on each lateral side.

Chirostylus rostratus resembles *C. novaecaledoniae* in the following: the carapace has a row of dorsal spines along each of the branchial lateral margins; and the fourth thoracic sternite is provided with a distinct lateral spine. However, the former species is distinguishable from the latter by the unarmed posterior gastric and anterior cardiac regions (usually one spine on each of the two regions in *C. novaecaledoniae*); the chelipeds and ambulatory legs are covered with numerous spines (less spinose in *C. novaecaledoniae*); and the dactyls of the ambulatory legs have the penultimate spine slightly longer than the ultimate (these spines are subequal in *C. novaecaledoniae*). The very spinose pereopods also seem to link *C. rostratus* to *C. micheleae*. *Chirostylus micheleae*, however, is rather distant from the remainder of the species of the genus, including *C. rostratus*, in the very spinose body, the carapace in particular, and the presence of a dorsomedian projection on the fourth abdominal somite.

The triangular line pattern on the dorsal surface of the carapace as displayed by *C. dolichopus*, *C. ortmanni*, and *C. novaecaledoniae* is also found in *C. rostratus*, but its coloration is different. *Chirostylus rostratus* possesses a reddish line pattern on the whitish pink ground color, while the other three species have a white or light colored line pattern on the light carrot-orange or reddish purple ground color (Miyake 1960: pl. 48, fig. 8, 1982: pl. 48, fig. 1; Miyake & Baba 1968:385; Baba 1991: 465, fig. 8a, b).

Key to species of the genus *Chirostylus*

1. Carapace covered with numerous spines on dorsal surface. Fourth abdominal somite with distinct median projection on dorsal surface *C. micheleae*
Carapace less spinose. Fourth abdominal somite unarmed on dorsal surface. 2
2. Rostral spine longer than epigastric

- spines. Chelipeds and ambulatory legs very spinose *C. rostratus*
Rostral spine shorter than epigastric spines or lacking. Chelipeds and ambulatory legs less or moderately spinose . . . 3
3. Carapace with anterior cardiac region bearing spine, branchial regions with row of spines along lateral margins *C. novaecaledoniae*
Carapace with anterior cardiac region unarmed, posterior branchial regions unarmed or bearing 1-3 spines near each anterior part of strong lateral concavities 4
 4. Spine present near each anterior extremity of branchial regions. Third thoracic sternite with 6 spines on anterior margin. Dactyls of ambulatory legs bearing penultimate spine stronger than ultimate *C. dolichopus*
Spine absent near each anterior extremity of branchial regions. Third thoracic sternite with 4 or 5 spines on anterior margin. Dactyls of ambulatory legs bearing penultimate spine subequal with ultimate. *C. ortmanni*

Acknowledgments

We thank Dr. M. Takeda of the National Science Museum, Tokyo, for loaning the comparative material. The Ogasawara specimen was kindly made available from Mr. S. Yokoyama of the Ogasawara Fishermen's Union. We also wish to express our sincere gratitude to Dr. K. Baba of Kumamoto University, Dr. A. B. Williams of the Systematics Laboratory, the National Marine Fisheries Services, Dr. A. L. Rice of the Institute of Oceanographic Sciences Deacon Laboratory, and Dr. R. K. Kropp of Battelle Ocean Sciences, for their valuable comments on the manuscript.

Literature Cited

- Baba, K. 1988. Chirostyliid and galatheid crustaceans (Decapoda: Anomura) of the "Albatross" Philippine Expedition.—Researches on Crustacea, Special Number 2:i-v, 1-203.
———. 1991. Crustacea Decapoda: *Chirostylus* Ortman, 1892, and *Gastroptychus* Caullery, 1896

- (Chirostylidae) from New Caledonia. Pp. 463–477 in A. Crosnier, ed., *Résultats des Campagnes MUSORSTOM*, Volume 9.—Mémoires du Muséum National d'Histoire Naturelle, Paris, section A 152.
- Caullery, M. 1896. Crustacés Schizopodes et Décapodes. Pp. 365–419 in R. Koehler, ed., *Résultats scientifiques de la campagne du "Caudan" dans le Golfe de Gascogne, août-septembre, 1895.*—*Annales de l'Université de Lyon* 26.
- Miyake, S. 1960. Decapod Crustacea, Anomura. Pp. 88–97 in K. Okada and T. Uchida, eds., *Encyclopedia zoologica illustrated in colours*, Vol. 4. Hokuryukan Publishing Co., Tokyo, Japan. (In Japanese).
- . 1982. Japanese crustacean decapods and stomatopods in color. I. Macrura, Anomura and Stomatopoda. Hoikusha Publishing Co., Osaka, Japan, viii+261 pp. (In Japanese).
- , & K. Baba. 1968. On the generic characters of *Chirostylus*, with description of two Japanese species (Crustacea, Anomura).—*Journal of the Faculty of Agriculture, Kyushu University* 14: 379–387.
- Ogawa, K., & K. Matsuzaki. 1993. *Chirostylus ortmanni* Miyake et Baba, 1968, a synonym of *C. dolichopus* Ortmann, 1892 (Crustacea, Anomura, Chirostylidae).—*Bulletin of Institute of Oceanic Research and Development, Tokai University* 14:65–69.
- Ortmann, A. 1892. Die Decapoden-Krebse des Strassburger Museums, mit besonderer Berücksichtigung der von Herrn Dr. Döderlein bei Japan und bei den Liu-Kiu-Inseln gesammelten und zur Zeit im Strassburger Museum aufbewahrten Formen. IV. Die Abtheilungen Galatheidea und Paguridea.—*Zoologischen Jahrbücher. Abtheilung für Systematik, Geographie und Biologie der Thiere* 6:241–326.
- Tirmizi, N. M., & B. Khan. 1979. Two species of *Chirostylus* from the Indian Ocean with observations on the generic characters (Decapoda, Chirostylidae).—*Crustaceana*, Supplement 5: 77–88.