



## A new species of *Chirostylus* Ortmann, 1892 (Crustacea: Decapoda: Anomura: Chirostylidae) from the Ryukyu Islands, southwestern Japan, with a supplemental description of *Chirostylus ortmanni* Miyake & Baba, 1968

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### Abstract

A new chirostylid crustacean, *Chirostylus stellaris*, is described from the Ryukyu Islands, southwestern Japan. The new species is morphologically close to *C. ortmanni* Miyake & Baba, 1968, but distinguishable by the armature of the meri of the male first pereopods and the proportion of lengths relative to the heights of the propodi of the second to fourth pereopods. The live coloration of the pereopods is also clearly different in the two species. *Chirostylus ortmanni* is described on the basis of specimens from various localities in Japan, to complement the original account of the species.

**Key Words:** Crustacea, Decapoda, Chirostylidae, *Chirostylus*, Ryukyu Islands, Japan

### Introduction

The genus *Chirostylus* Ortmann, 1892, currently contains five species, all from the Indo-West Pacific: *C. dolichopus* Ortmann, 1892 (type species), *C. micheleae* Tirmizi & Khan, 1979, *C. novaecaledoniae* Baba, 1991, *C. ortmanni* Miyake & Baba, 1968, and *C. rostratus* Osawa & Nishikiori, 1998 (see Osawa & Nishikiori 1998). These species are characterized by very long and slender “straw-like” pereopods and short rostral base. *Chirostylus ortmanni* is the best known species in shallow waters around Japan, reported to live on soft and black corals (Minemizu 2000, 2002; Kato & Okuno 2001), where its beauty attracts underwater photographers.

In their guidebooks on the Japanese marine crustaceans, Minemizu (2000, 2002) and Kawamoto & Okuno (2003) introduced an unidentified species of *Chirostylus* from the Ryukyu Islands, with photographs of live specimens, and they pointed out that the photographed specimens are different from *C. ortmanni* in coloration. Specimens from several islands of the Ryukyus, which agree well with the unidentified species in color pattern, were made available for study through the courtesy of the authors of the guidebooks and Y. Fujita who obtained larvae of this species. Examination of the specimens has revealed that they are closely allied to *C. ortmanni*, which is found from Honshu to southern Kyushu, but distinguished by several constant morphological characters. The Ryukyus species is herein described as new to science.

*Chirostylus ortmanni* was described by Miyake & Baba (1968) based on a female specimen from Okinoshima, northern Kyushu in Japan. In order to clarify intraspecific variation and complement the original account, *C. ortmanni* is described on the basis of specimens from various localities in Japan.

The general terminology followed is that used by Baba (2004, 2005). Abbreviations used in the text include P1 for first pereopod (cheliped) and P2–4 for second to fourth pereopods (ambulatory legs). The measurements given in millimeters (mm) under “Material examined” indicate postorbital carapace length (cl), the

distance between the orbital margin and posterior margin of the carapace in midline. The length of the eye-stalk (distal article of the ocular peduncle) was measured along the lateral surface. The lengths of articles of the cheliped were measured along the dorsomesial margins and those of ambulatory legs were along the extensor margins, respectively. The description of coloration is based on the photographs of fresh and live specimens. The specimens examined are deposited in the Coastal Branch of Natural History Museum and Institute, Chiba (CMNH) and National Science Museum, Tokyo (NSMT).

## Taxonomy

### Genus *Chirostylus* Ortmann, 1892

#### *Chirostylus ortmanni* Miyake & Baba, 1968

(Figs. 1, 2, 5A, B)

[Japanese name: Orutoman-waraebi]

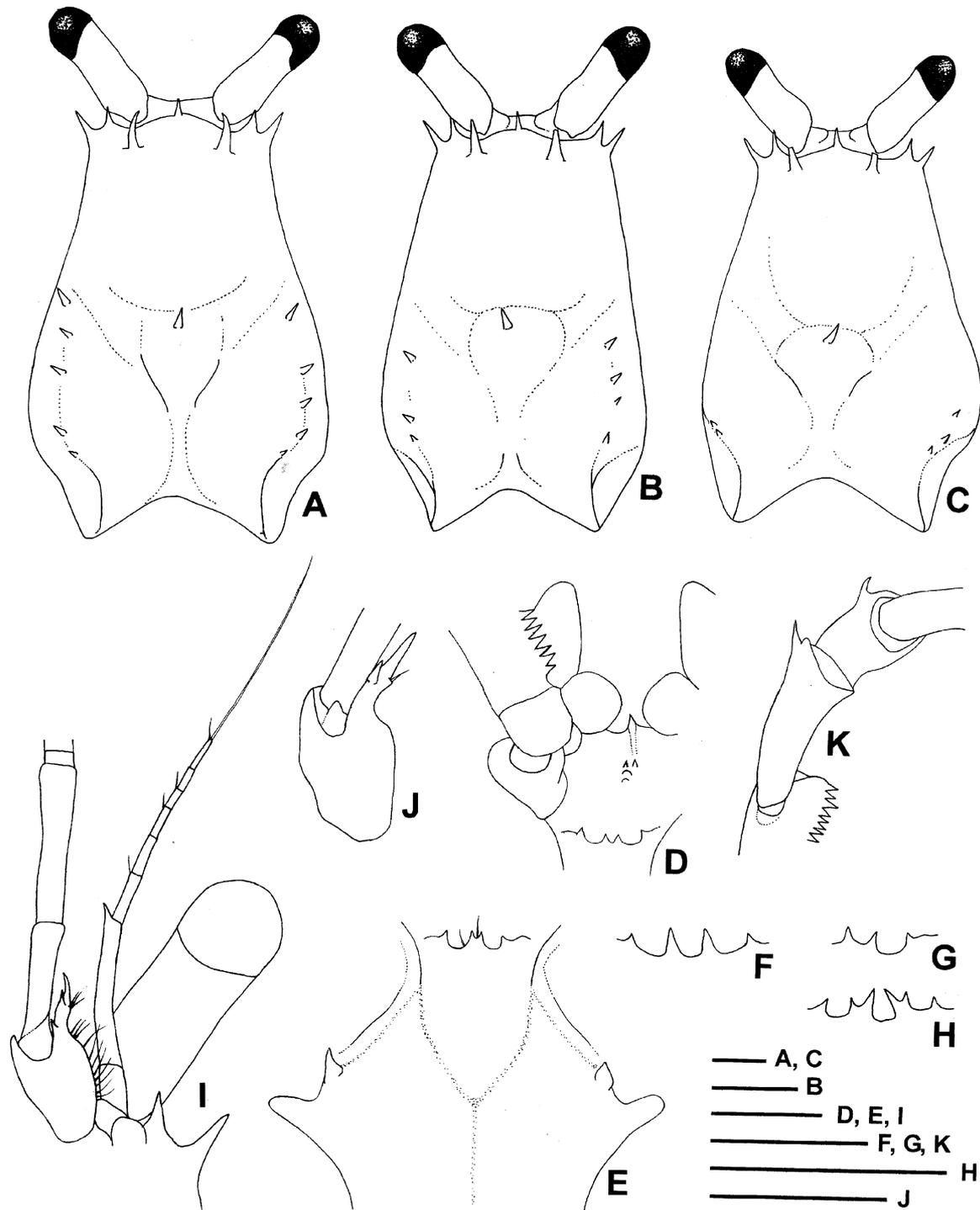
*Chirostylus ortmanni* Miyake & Baba, 1968: 383, figs. 1c, 3. — Minemizu, 2000: 164, unnumbered fig.; 2002: 164, unnumbered fig. — Kato & Okuno, 2001: 91, unnumbered fig. — Kawamoto & Okuno, 2003: 70, unnumbered fig. — Baba, 2005: 208.

*Chirostylus dolichopus*. — Miyake, 1982: 143 (part), pl. 48, fig. 1; 1991: 143 (part), pl. 48, fig. 1; 1998: 143 (part), pl. 48, fig. 1. — Takeda, 1986: 125, unnumbered fig.; 1994: 229 (part), fig. 9. — Ogawa & Matsuzaki, 1993: 65, figs. 1, 2. — Asakura, 1995: 368 (part), pl. 98, fig. 6. [Not *Chirostylus dolichopus* Ortmann, 1892].

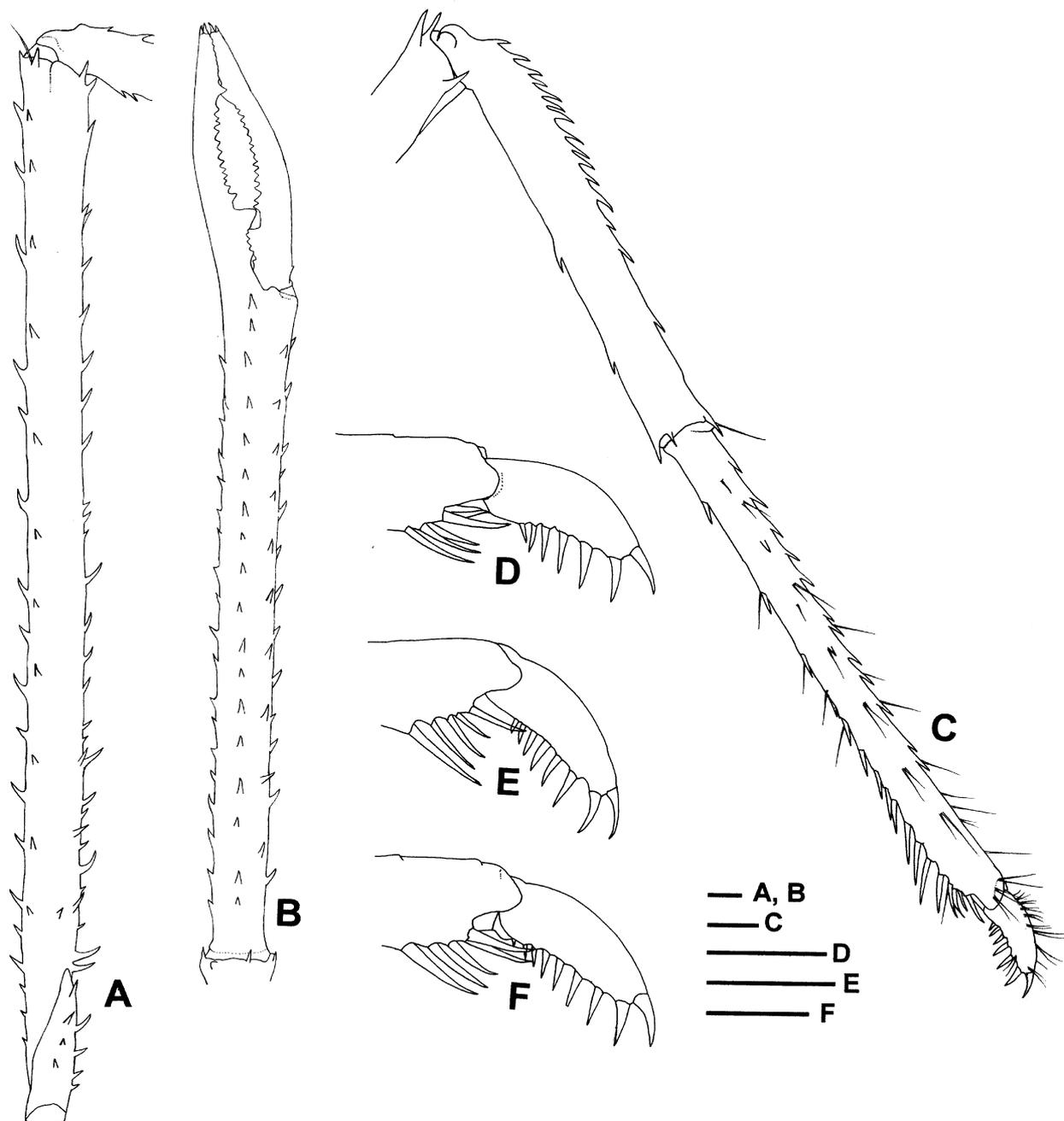
**Type Material.** ZLKU 13761, holotype female (cl 6.2 mm), off Okino-shima, Sea of Genkai, northern Kyushu, 90 m, 3 April 1963, coll. K. Sakai and K. Baba. Not available for study.

**Material examined.** NSMT-Cr 7787, 1 female (cl 6.7 mm), Manazuru, Kanagawa Prefecture, Sagami Bay, May 1981, coll. I. Soyama; NSMT-Cr 8037, 3 males (cl 2.4–6.5 mm), 1 female (cl 6.0 mm), Zyogasaki, Shizuoka Prefecture, Izu Peninsula, 20 m, 6 March 1981, coll. I. Soyama; NSMT-Cr 12523, 1 male (cl 6.0 mm), 1 female (cl 5.8 mm), Osezaki, Shizuoka Prefecture, Izu Peninsula, depth not recorded, 17 April 1975, collector not recorded; NSMT-Cr 11672, 1 ovigerous female (cl 4.9 mm), Sakurajima, Kagoshima Prefecture, 40 m, 1 August 1980, coll. K. Ogawa; NSMT-Cr 11673, 1 ovigerous female (cl 6.0 mm), Himejima, Sukumo, Kouchi Prefecture, 28 m, 14 August 1991, coll. K. Watanabe; NSMT-Cr 11674, 1 female (cl 6.0 mm), Miyake-jima Island, Izu Islands, MJ-1, 10 m, September 1984, coll. Okubo; NSMT-Cr 11675, 1 female (cl 5.8 mm), Miyake-jima Island, Izu Islands, MJ-2, 10 m, 1980–1985, coll. K. Ogawa and K. Matsuzaki; NSMT-Cr 11676, 1 female (cl 5.0 mm), Miyake-jima Island, Izu Islands, MJ-3, 10 m, 1980–1985, coll. K. Ogawa and K. Matsuzaki; NSMT-Cr 11677, 1 female (cl 5.8 mm), Miyake-jima Island, Izu Islands, MJ-4, 10 m, 1980–1985, coll. K. Ogawa and K. Matsuzaki; NSMT-Cr 11678, 1 female (cl 6.1 mm), Miyake-jima Island, Izu Islands, MJ-5, 10 m, 1980–1985, coll. K. Ogawa and K. Matsuzaki; NSMT-Cr 11679, 1 female (cl 3.4 mm), Miyake-jima Island, Izu Islands (MJ-6), 10 m, 1980–1985, coll. K. Ogawa and K. Matsuzaki; NSMT-Cr 11680, 1 male, (cl 6.1 mm), Izu Ocean Park, IP-1, 20 m, 25 December 1986, coll. M. Morita; NSMT-Cr 11681, 1 male, (cl 5.0 mm), Izu Ocean Park, IP-2, 20 m, 25 December 1986, coll. M. Morita; NSMT-Cr 11682, 1 female (cl 6.8 mm), Izu Ocean Park, IP-3, 20 m, 25 December 1986, coll. M. Morita; NSMT-Cr 11683, 1 male (cl 7.0 mm), Oshima Island, Kushimoto, Wakayama Prefecture, KP-1, 30 m, 4 April 1987, coll. T. Fukuda; NSMT-Cr 11684, 1 male (cl 4.3 mm), Oshima Island, Kushimoto, Wakayama Prefecture, KP-2, 30 m, 4 April 1987, coll. T. Fukuda; CMNH-ZC 39, 2 males (cl 4.4, 6.1 mm), Off Hasama, Tateyama, Chiba Prefecture, Boso Peninsula, 30 m, 4 July 1998, coll. J. Okuno; CMNH-ZC 531, 1 male (cl 4.1 mm), Igai-jima, Kamogawa, Chiba Prefecture, Boso Peninsula, 16 m, 29 June 2001, coll. J. Okuno; CMNH-ZC 1164, 1 male (cl 4.6 mm), 1 female (cl 5.5 mm), Funatsukiba, Hachijo-jima Island, Izu Islands, depth not recorded, 27 August 1996, coll. J. Okuno; CMNH-ZC 1165, 1 male (cl 4.5 mm), Occhogahama, Hachijo-jima Island, Izu Islands, depth

not recorded, 11 September 1997, coll. J. Okuno; CMNH-ZC 1166, 1 female (cl 4.2 mm), Occhogahama, Hachijo-jima Island, Izu Islands, depth not recorded, 11 September 1997, coll. J. Okuno.



**FIGURE 1.** *Chirostylus ortmanni* Miyake & Baba, 1968. NSMT-Cr 8037, male (cl 6.5 mm), Zyogasaki, Shizuoka Prefecture (A, D, E, I, K); NSMT-Cr 11681, male, (cl 5.0 mm), Izu Ocean Park (B, G, J); NSMT-Cr 11678, female (cl 6.1 mm), Miyake-jima Island, Izu Islands (C); NSMT-Cr 11682, female (cl 6.8 mm), Izu Ocean Park (F); NSMT-Cr 11684, male (cl 4.3 mm), Kushimoto, Wakayama Prefecture (H). A–C, carapace and ocular peduncles, dorsal view; D, anterior part of sternal plastron, including proximal parts of maxillipeds, ventral view; E, sternites 3 and 4, ventral view; F–H, anterior margin of sternite 3, ventral view; I, left ocular, antennular, and antennal peduncles, ventral view; J, basal article of left antennular peduncle, ventral view; K, carpus, merus, and distal part of ischium of right third maxilliped, lateral view. Scales equal 1.0 mm.



**FIGURE 2.** *Chirostylus ortmanni* Miyake & Baba, 1968. NSMT-Cr 8037, male (cl 6.5 mm), Zyogasaki, Shizuoka Prefecture (A, B); NSMT-Cr 11678, female (cl 6.1 mm), Miyake-jima Island, Izu Islands (C, D); CMNH-ZC 531, male (cl 4.1 mm), Kamogawa, Chiba Prefecture (E); NSMT-Cr 7787, female (cl 6.7 mm), Manazuru, Kanagawa Prefecture (F). A, ischium and merus of left P1, mesial view; B, chela of left P1, dorsal view; C, carpus, propodus, and dactylus of right P2, lateral view; D–F, dactylus and distal part of propodus of right P2, lateral view. Scales equal 1.0 mm.

**Size.** Male cl 2.4–7.0 mm, female cl 3.4–6.8 mm, ovigerous female cl 4.9–6.0 mm.

**Description.** Carapace (Fig. 1A–C) 1.1–1.3 times longer than greatest width. Rostrum low, rounded, unarmed or with spine clearly smaller than epigastric spines. Pair of epigastric spines situated behind eyes. Gastric region unarmed. Cardiac region with 1–3 spines in longitudinal row anteriorly. Branchial region unarmed or with 1–5 spines (including 1–4 spines on anterior portion) mesiad and parallel to entire lateral margin or along posterior concavity.

Pterygostomial flaps anteriorly ending in small spine, surface with several small spines.

Excavated sternum (Fig. 1D) anteriorly produced, subtriangular, ending in acute tip, surface with weak ridge in midline on anterior half and unarmed or with few minute spines and tubercles on posterior half. Sternite 3 surface (Fig. 1E–H) somewhat convex; anterior margin usually with 4 small spines (3 spines in NSMT-Cr 11681, 2 median spines subdivided distally in NSMT-Cr 11684, left spine subdivided distally in CMNH-ZC 39). Sternite 4 (Fig. 1E) unarmed or with acute or blunt spine on each proximal lateral margin.

Abdomen unarmed, but with short setae on dorsal surface; pleura of second to fourth segments subtriangular, those of fifth and sixth segments each ending in rounded margin. Telson divided into 2 lobes by indistinct transverse suture; posterior lobe narrower but distinctly longer than anterior, semi-elliptical.

Eyestalk (Fig. 1A–C) elongate; cornea slightly dilated.

Antennular peduncle (Fig. 1I, J), when fully extended, overreaching distal margin of cornea by distal one third to two thirds length of ultimate article; basal article bearing 2 or 3 spines on distolateral elongate projection, distolateral spine subequal to or larger than distomesial, when 3 spines present, proximal spine smaller than distal 2 spines; ultimate article distinctly longer than penultimate.

Antennal peduncle (Fig. 1I) short but slender, article 5 much longer than article 4, barely reaching to slightly overreaching proximal margin of cornea, with ventromesial distal spine.

Third maxilliped (Fig. 1D, K) slender; ischium with well developed crista dentata of 14–20 acute teeth; merus and carpus each bearing distolateral spine; propodus unarmed; exopod reaching 0.5–0.7 length of merus.

P1 (Fig. 2A, B) slender, 9.7–12.6 times as long as postorbital carapace. Merus longer than carpus and propodus, with 4 rows of sparse spines (1 dorsolateral, 1 dorsomesial, 1 mesial, and 1 ventral). Carpus with 4 rows of sparse spines (1 dorsolateral, 1 dorsomesial, 1 mesial, and 1 ventral). Palm 2.5–3.3 times longer than dactylus (movable finger), with 6 rows of sparse spines (1 dorsolateral, 1 ventrolateral, 1 lateral, 1 dorsomesial, 1 ventromesial, and 1 mesial). Opposable margins of fingers each with prominent tooth proximally and subtriangular, moderate-sized tooth on distal 0.3; median margin gaping, with row of small teeth; distal end with 2 unequal corneous spines.

P2–4 (Fig. 2C–F) long and slender, somewhat depressed lateromesially, subequal in length (meri successively diminishing in size posteriorly, propodi longer on P4 than on P2 and P3); P2 barely reaching to slightly overreaching distal margin of P1 carpus. Each merus with lateral surface bearing few spines; mesial surface unarmed or with few spines. Each carpus with extensor margin bearing row of closely-spaced spines in proximal part with few scattered spines beyond; lateral and mesial surfaces and flexor margin unarmed or with few spines. Each propodus narrower than merus and carpus in lateral view, 1.1–1.2 (mean, 1.1, on P2 and P3) and 1.1–1.3 (mean, 1.2, on P4) times as long as carpus, 6.0–8.1 (mean, 6.8, on P2), 5.8–7.8 (mean, 6.6, on P3), and 6.0–8.8 (mean, 7.3, on P4) length of dactylus, 12.3–15.3 (mean, 13.7, on P2), 12.3–16.8 (mean, 14.5, on P3), and 14.3–18.5 (mean, 16.1, on P4) times longer than proximal height; extensor margin with row of sparse spines; lateral and mesial surfaces unarmed or with few spines; flexor margin with row of 15–22 (P2 and P3), or 14–19 (P4) slender, corneous spines, distal spines closely arranged. Each dactylus with moderately curved extensor margin; flexor margin nearly straight, with 7–10 (P2), 6–10 (P3), and 6–9 (P4) corneous spines (including terminal spine) gradually decreasing in size toward base of article, distal 2 spines equal or subequal in length, ultimate spine equally broad as or somewhat narrower than penultimate.

**Coloration** (Fig. 5A, B). Body and pereopods with ground color of reddish brown. Carapace with moderately narrow, white or pale yellow line in large triangle bordered by dark brown, narrow lines; yellow line present along lateral margin; part between white and yellow lines and gastric and cardiac regions occasionally with white marks of irregular size. Abdominal tergites with dark brown and yellow, narrow lines along anterior and posterior margins and with moderately broad, dark brown line bordered by yellow, narrow lines along midline. Pterygostomial flaps each with 2 narrow, longitudinal white stripes. P1 merus with longitudinal rows of small, closely-set, yellow spots; carpus and chela with longitudinal narrow, yellow stripes. P2–4 meri each bearing white or pale blue, blotch or band bordered by dark brown bands near distal end and longitudinal row

of small yellow spots on remaining part (bases of spines) of extensor margin; carpi each with longitudinal yellow stripes; propodi dark brown with yellow tinge on distal part; dactyli yellow.

**Distribution.** Known only from Japan; Boso Peninsula of Honshu mainland to Satsuma Peninsula of southern Kyushu, and Izu Islands. The holotype was collected from off Okino-shima, northern Kyushu, at a depth of 90 m (Miyake & Baba 1968). The specimens examined were obtained at depths of 10–40 m.

**Habitat and ecology.** This species is found on soft and black corals (Alcyonacea and Antipatharia) or sponges (Minemizu 2000, 2002; Kato & Okuno 2001).

The ecology of *C. ortmanni* (as *C. dolichopus*) is noted in detail by Ogawa & Matsuzaki (1987). The authors suggested that the lifespan of the female is about one year based on the rearing under laboratory conditions.

**Remarks.** The holotype of *Chirostylus ortmanni* was not available for study. The specimen was previously deposited in the Zoological Laboratory, Faculty of Agriculture, Kyushu University (ZLKU), and now is supposedly transferred to the Kitakyushu Museum of Natural History and Human History, together with numerous crustacean specimens described by Dr. S. Miyake and his co-workers. However, the attempt to find the holotype of *C. ortmanni* in the collection of the museum was not successful (Dr. M. Shimomura; personal communication).

The morphology of the specimens examined in this study agrees well with the original description of *C. ortmanni* by Miyake & Baba (1968) in most diagnostic aspects. The above description complements their account of the species. Miyake & Baba (1968) also mentioned that their live specimen of *C. ortmanni* had two reddish orange bands on the distal portions of the P2–4 meri. This characteristic marking is distinct in the photograph of a live specimen shown by Minemizu (2000, 2002) and was also confirmed in the specimens examined from Boso Peninsula and Hachijo-jima Island.

Osawa & Nishikiori (1998) concluded that the specimens identified as *C. dolichopus* (NSMT-Cr 11672–11686) by Ogawa & Matsuzaki (1993) are referable to *C. ortmanni*. The specimens were re-examined for the above description and support their conclusion. Accurate identification of a specimen from Aka-jima Island in the Ryukyus (cl 1.6 mm, NSMT-Cr 11686) is difficult since it is a juvenile. Judging from its locality, the specimen probably belongs to *C. stellaris* n. sp., described below.

Specimens in color photographs identified by Miyake (1982, 1991, 1998), Takeda (1986, 1994), and Asakura (1995) as *C. dolichopus* can be referred to *C. ortmanni*. They all have the color pattern characteristic of *C. ortmanni*. The illustration of *C. dolichopus* shown by Miyake (1960, pl. 48, fig. 8) also seems to agree with the coloration of *C. ortmanni*. However, Miyake and Baba (1968: 383) noted that “The coloration and some characters of the present material (of *C. dolichopus*) are previously shown by Miyake (1960)”. The correct specific identification of Miyake’s (1960) specimen is difficult without re-examination. The morphological distinctions between *C. dolichopus* and *C. ortmanni* are cited in key to species of the genus provided by Osawa & Nishikiori (1998) and Baba (2005).

### ***Chirostylus stellaris* n.sp.**

(Figs. 3, 4, 5C–F)

[New Japanese name: Hoshizora-waraebi]

*Chirostylus* sp.— Minemizu, 2000: 164, unnumbered fig.; 2002: 164, unnumbered fig. — Kawamoto & Okuno, 2003: 97, unnumbered fig.

**Material examined.** Holotype: CMNH-ZC 2127, male (cl 3.5 mm), off Shimoji Islet, Miyako-jima Island, Ryukyu Islands, 21 m, 15 April 2003, coll. R. Minemizu.

Paratypes: CMNH-ZC 00539, 1 female (cl 2.6 mm), Maeda-misaki, Okinawa Island, Ryukyu Islands, 20 m, 10 August 2001, coll. T. Yanagisawa; CMNH-ZC 00616, 1 female (cl 2.5 mm), Shichu-gama, Kume-jima

Island, Ryukyu Islands, 15 m, 25 July 2001, coll. T. Kawamoto; CMNH-ZC 01018, 1 male (cl 3.8 mm), 1 ovigerous female (cl 3.5 mm), Umagai, Kume-jima Island, Ryukyu Islands, 25 m, 12 November 2002, coll. J. Okuno; CMNH-ZC 01115, 1 male (cl 4.1 mm), Umagai, Kume-jima Island, Ryukyu Islands, 25 m, 12 November 2002, coll. T. Kawamoto; CMNH-ZC 2128, 1 ovigerous female (cl 4.4 mm), off Shimoji Islet, Miyako-jima Island, Ryukyu Islands, 21 m, 15 April 2003, coll. R. Minemizu; CMNH-ZC 2129, 1 female (cl 2.6 mm), Zanpa-misaki, Okinawa Island, Ryukyu Islands, 30 m, 26 May 2001, coll. Y. Fujita; CMNH-ZC 2130, 1 female (cl 3.3 mm), Zanpa-misaki, Okinawa Island, Ryukyu Islands, 30 m, 26 May 2001, coll. Y. Fujita; CMNH-ZC 2131, 1 female (cl 3.6 mm), Maeda-misaki, Okinawa Island, Ryukyu Islands, 15.4 m, 31 July 2004, coll. Y. Fujita; CMNH-ZC 2132, 1 female (cl 3.5 mm), Maeda-misaki, Okinawa Island, Ryukyu Islands, 19 m, 21 June 2003, coll. Y. Fujita; CMNH-ZC 2133, 1 female (cl 3.8 mm), Maeda-misaki, Okinawa Island, Ryukyu Islands, 14.9 m, 22 June 2003, coll. Y. Fujita; CMNH-ZC 2134, 1 female (cl 4.2 mm), Maeda-misaki, Okinawa Island, Ryukyu Islands, 22 m, 21 June 2003, coll. Y. Fujita; CMNH-ZC 2135, 1 female (cl 3.3 mm), Maeda-misaki, Okinawa Island, Ryukyu Islands, 18.4 m, 13 August 2003, coll. Y. Fujita; CMNH-ZC 2136, 1 female (cl 3.8 mm), Maeda-misaki, Okinawa Island, Ryukyu Islands, 16 m, 30 September 2004, coll. Y. Fujita; CMNH-ZC 2137, 1 male (cl, 3.7 mm), Sesoko, Okinawa Island, Ryukyu Islands, 23 m, 18 July 2003, coll. Y. Fujita.

**Size.** Male cl 3.5–4.1 mm, female cl 2.5–4.2 mm, ovigerous female cl 3.5–4.4 mm.

**Description.** Carapace (Fig. 3A, B) 1.2–1.3 times longer than greatest width, glabrous. Lateral margins diverging posteriorly to point approximately one third from posterior end, converging behind it with strong concavity. Posterior margin strongly concave. Rostrum low, rounded, with spine clearly smaller than epigastric spines and directed anterodorsally. Anterolateral (first) spine prominent, preceded by smaller spine at lateral limit of orbit. Pair of epigastric spines situated behind eyes, directed anterodorsally. Gastric region weakly convex, unarmed, distinctly separated from cardiac region by narrow depression (cervical groove), and indistinctly from anterior branchial region. Cardiac region more strongly convex than gastric region, with 1 or 2 spines anteriorly (if 2 spines present, posterior spine minute). Branchial region unarmed or with 1–4 spines mesiad and parallel to lateral margin.

Pterygostomial flaps (Fig. 3B) anteriorly ending in small spine, surface with several small spines.

Excavated sternum (Fig. 3C) anteriorly produced, subtriangular, ending in subacute or acute tip, surface with weak ridge in midline on anterior half. Sternite 3 (Fig. 3D) somewhat convex on surface; anterior margin nearly transverse, usually with 4 small spines (3 spines in CMNH-ZC 2134, 1 spine subdivided distally in CMNH-ZC 00539). Sternite 4 (Fig. 3D) with acute or blunt spine on each proximal lateral margin.

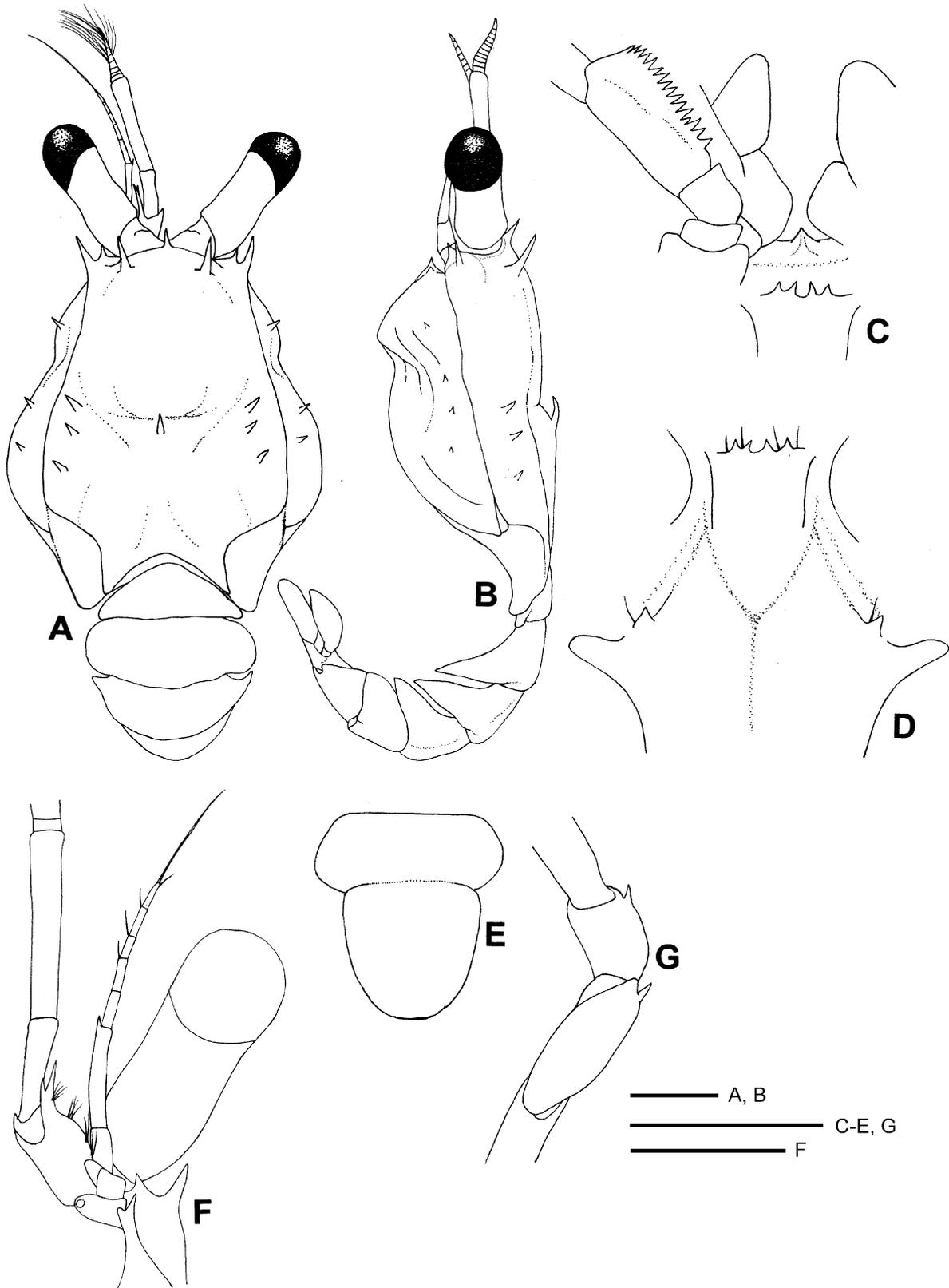
Abdomen (Fig. 3A, B) unarmed, but with few short setae on dorsal surface; pleura of second to fourth segments subtriangular, those of fifth and sixth segments each ending in rounded margin. Telson (Fig. 3E) divided into 2 lobes by transverse suture; anterior lobe with strongly convex lateral margins; posterior lobe narrower but distinctly longer than anterior, semi-elliptical.

Eyestalk (Fig. 3A, B, F) elongate, 0.4–0.5 length of postorbital carapace, subcylindrical, slightly broadened proximally; cornea slightly dilated, about 0.4 length of remaining ocular peduncle.

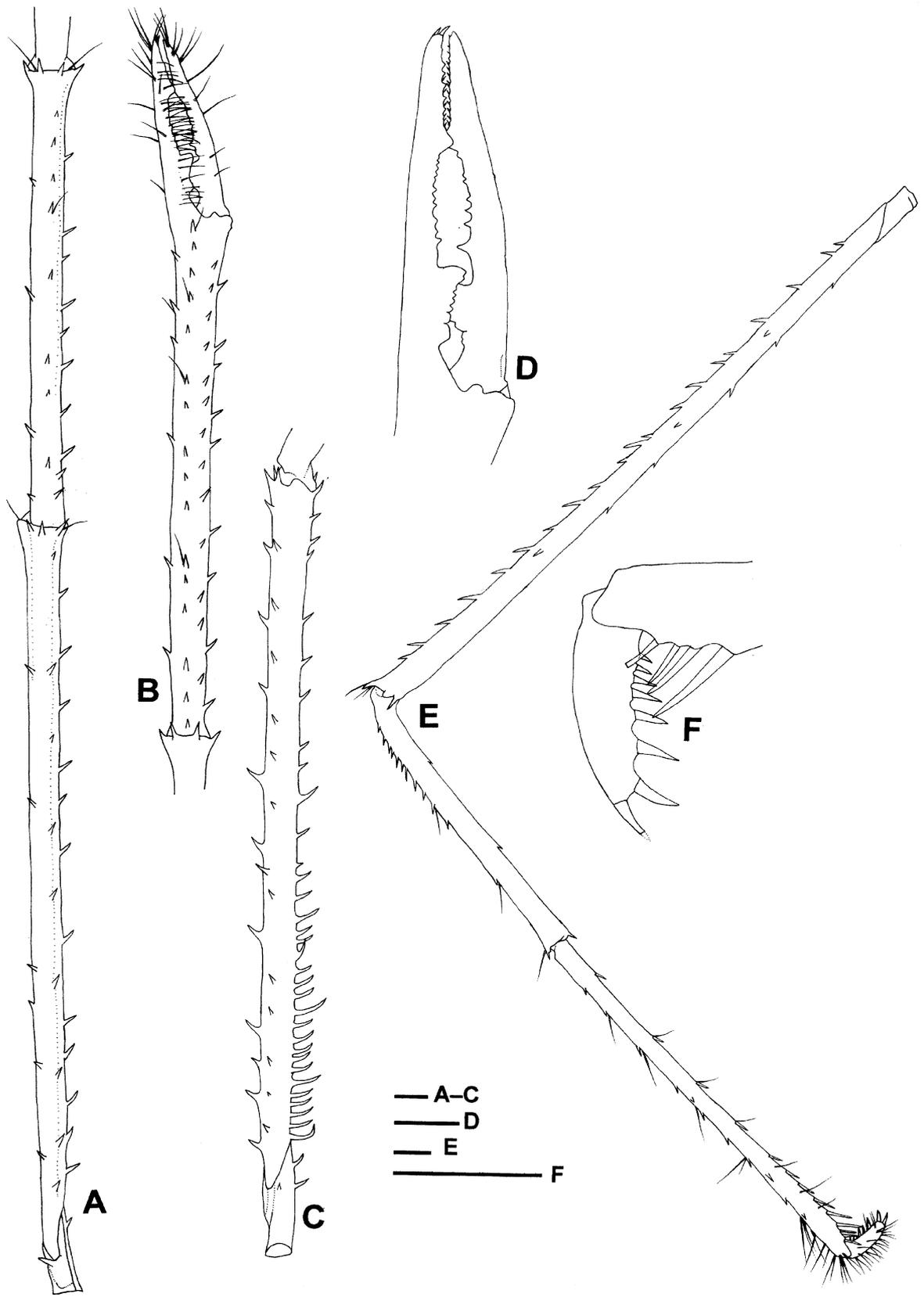
Antennular peduncle (Fig. 3F), when fully extended, overreaching distal margin of cornea by distal one third to half length of ultimate article; basal article with 2 spines on distolateral elongate projection, distolateral spine much larger than distomesial; distal 2 articles unarmed, ultimate article distinctly longer than penultimate.

Antennal peduncle (Fig. 3F) short but slender, reaching or not reaching proximal margin of cornea, consisting of 5 articles, lacking antennal scale; proximal 4 articles unarmed; article 5 much longer than article 4, with ventromesial distal spine; flagellum consisting of 4 or 5 articles.

Third maxilliped (Fig. 3C, G) slender; ischium with well developed crista dentata of 16–20 acute teeth; merus and carpus each with distolateral spine; propodus unarmed; exopod reaching to 0.6–0.8 length of merus.

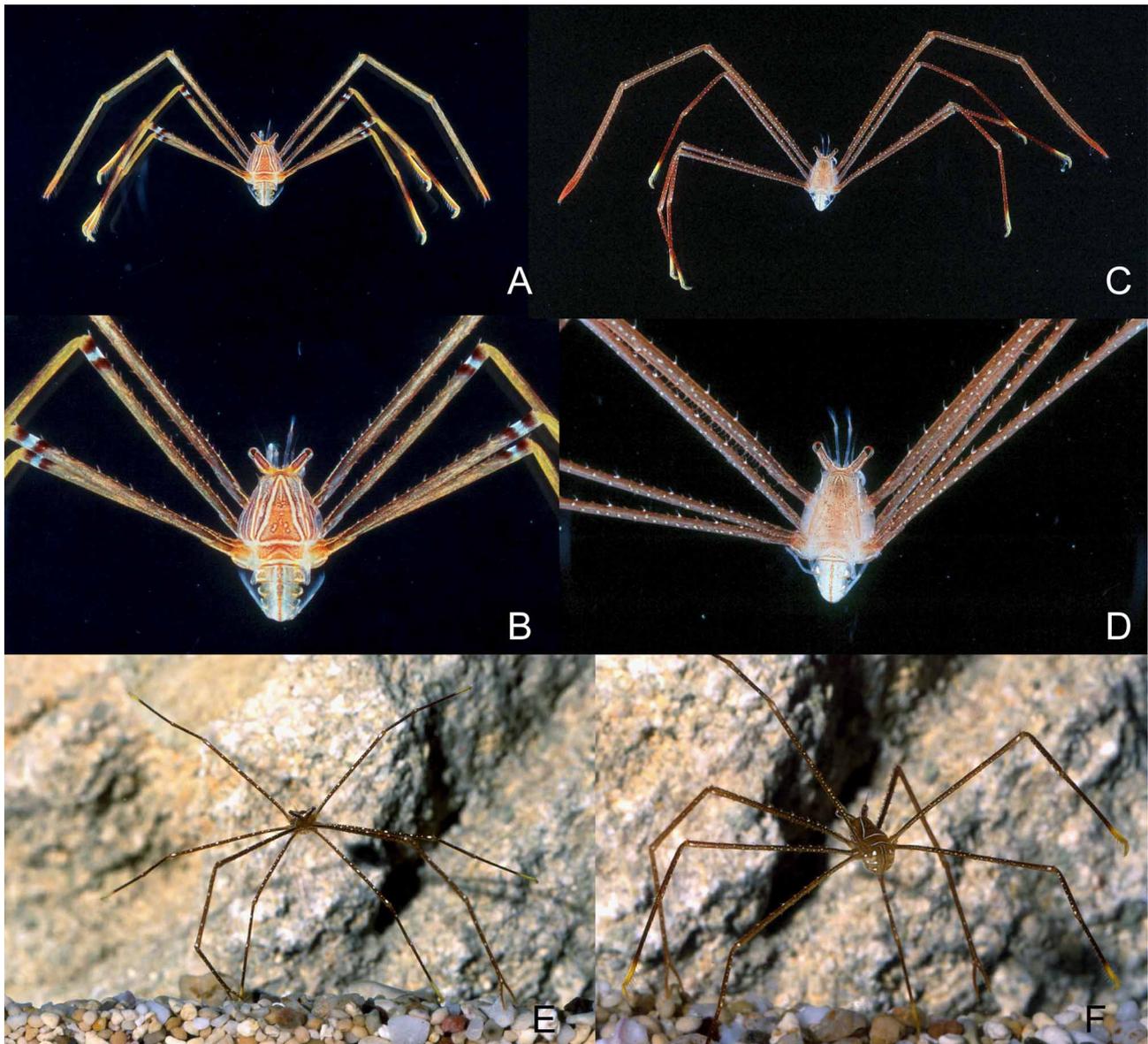


**FIGURE 3.** *Chirostylus stellaris*, n. sp. CMNH-ZC 2127, holotype male (cl 3.5 mm), Miyako-jima Island, Ryukyu Islands. A, carapace, abdomen, ocular peduncles, and left antennular and antennal peduncles, dorsal view; B, same, lateral view; C, anterior part of sternal plastron, including proximal parts of maxillipeds, ventral view; D, sternites 3 and 4, ventral view; E, telson, extensor view; F, left ocular, antennular, and antennal peduncles, ventral view; G, merus and carpus of left third maxilliped, lateral view. Scales equal 1.0 mm.



**FIGURE 4.** *Chirostylus stellaris*, n. sp. CMNH-ZC 2127, holotype male (cl 3.5 mm), Miyako-jima Island, Ryukyu Islands. A, left P1, ischium, merus, and carpus, dorsal view; B, same, chela, dorsal view; C, same, ischium and merus, mesial view; D, same, fingers, dorsal view; E, left P2, lateral view; F, same, dactylus and distal part of propodus, lateral view. Scales equal 1.0 mm.

P1 (Fig. 4A–D) subcylindrical, slender, 10.6–16.1 times as long as postorbital carapace; surfaces with sparse short setae except for setose fingers. Ischium with several spines. Merus longer than carpus and propodus, with 4 rows of sparse spines (1 dorsolateral, 1 dorsomesial, 1 mesial, and 1 ventral); in males, proximal half of ventral row composed of strong, closely-set spines; distal margin with 4 or 5 spines (1 or 2 dorsolateral, 1 dorsomesial, 1 ventrolateral, and 1 ventromesial). Carpus with 4 rows of sparse spines (1 dorsolateral, 1 dorsomesial, 1 mesial, and 1 ventral); distal margin with usually 6 spines (1 dorsolateral, 1 ventrolateral, 1 lateral, 1 dorsomesial, 1 ventromesial, and 1 mesial), lateral and mesial spines sometimes obsolete. Palm 2.6–2.9 times longer than dactylus (movable finger), with 6 rows of sparse spines (1 dorsolateral, 1 ventrolateral, 1 lateral, 1 dorsomesial, 1 ventromesial, and 1 mesial). Fingers narrow; opposable margins each with prominent tooth proximally and subtriangular, moderately large tooth on distal 0.3; median margin gaping, and bearing small teeth; distal margin with row of minute sharply pointed, corneous teeth interspaced by small calcareous teeth; distal end usually with 2 unequal corneous spines.



**FIGURE 5.** Fresh specimens. *Chirostylus ortmanni* Miyake & Baba, 1968, CMNH-ZC 531, male (cl 4.1 mm), Kamogawa, Chiba Prefecture (A, B); *Chirostylus stellaris*, n. sp., CMNH-ZC 01115, paratype male (cl 4.1 mm), Kumejima Island, Ryukyu Islands (C, D); CMNH-ZC 2130, paratype female (cl 3.3 mm), Zanpa-misaki, Okinawa Island, Ryukyu Islands (E, F). A, C, entire specimen, dorsal view; B, D, carapace, abdomen, and meri of pereopods, dorsal view; E, F, live specimen in aquarium. Photographed by J. Okuno (A–D) and Y. Fujita (E, F).

P2–4 (Fig. 4E, F) long and slender, subcylindrical, somewhat depressed lateromesially; P2 reaching or slightly overreaching distal margin of P1 carpus; entire length of P3 slightly shorter than P2 and P4, meri successively diminishing in size posteriorly, length of carpi subequal in P2–4, P4 propodus longer than P2 and P3. Each ischium unarmed or with few, very small spines. Each merus longer than carpus and propodus; extensor margin with row of spines and few short setae; lateral surface with few spines; flexor margin with row of sparse spines; mesial surface unarmed or few spines. Each carpus with extensor margin bearing row of closely-spaced spines in proximal part with few scattered spines beyond; lateral and mesial surfaces unarmed; flexor margin with few spines. Each propodus narrower than merus and carpus in lateral view, 1.2–1.3 (mean, 1.2, on P2) and 1.2–1.4 (mean, 1.3, on P3 and P4) times as long as carpus, 7.0–10.4 (mean, 7.8, on P2), 6.4–8.4 (mean, 7.7, on P3), and 7.4–9.9 (mean, 8.2, on P4) length of dactylus, 16.0–20.2 (mean, 18.6, on P2), 16.3–21.3 (mean, 19.0, on P3), and 17.7–22.6 (mean, 20.3, on P4) times longer than proximal height; extensor margin with row of sparse spines and setae; lateral surface unarmed; mesial face unarmed or with few small spines; flexor margin with row of 13–20 (P2), 14–18 (P3), and 13–17 (P4) slender, corneous spines, distal spines closely arranged. Each dactylus with moderately curved extensor margin; flexor margin nearly straight, with 7 or 8 corneous spines (including terminal spine) gradually decreasing in size toward base of segment, distal 2 spines subequal in length, ultimate spine slightly or somewhat narrower than penultimate.

**Coloration** (Fig. 5C–E). Body and pereopods with ground color of reddish brown. Carapace with moderately narrow, white or pale blue line in large triangle bordered by dark brown, narrow lines; white line present along lateral margin; part between white and yellow lines and gastric and cardiac regions occasionally with irregular-sized, white marks. Abdominal tergites with dark brown and white or pale blue, narrow lines along anterior and posterior margins and with moderately broad, dark brown line bordered by white or pale blue, narrow lines along midline. Pterygostomial flaps with 2 narrow, longitudinal white stripes. P1 merus, carpus, and chela with longitudinal rows of small white spots of moderate intervals; carpus and chela also occasionally with longitudinal narrow, white or pale blue stripes. P2–4 meri and carpi each bearing longitudinal rows of small white spots on extensor margin (bases of spines) and lateral surface; propodi with scattered small white spots, distal part dark brown and yellow tinge; dactyli yellow.

**Distribution.** At the present, only known from the Ryukyu Islands, southwestern Japan; at depths of 14.9–30 m.

**Habitat and ecology.** Like *C. ortmanni*, *C. stellaris*, **n. sp.** is also found on soft and black corals (Alcyonacea and Antipatharia) (Minemizu 2000, 2002; Kawamoto & Okuno 2003; as *Chirostylus* sp). This species is observed more frequently at night than during the day (Minemizu 2000, 2002).

**Etymology.** The specific name is derived from the Latin *stellaris* (speckled), referring to its spotted coloration.

**Remarks.** *Chirostylus stellaris* **n. sp.** closely resembles *C. ortmanni* in sharing the following characters: carapace with a small number of spines; posterior gastric region unarmed; anterior cardiac region with at least one spine; no spine near anterior extremity of branchial margin; rostrum rounded, with or without a median spine being shorter than epigastric spines; sternite 3 usually with four spines on the anterior margin; weakly dilated cornea; and P2–4 dactyli each armed with ultimate spine being subequal with penultimate. However, when the male specimens of the two species are compared, *C. stellaris* is distinguished from *C. ortmanni* by having a row of strong, closely-set spines on the proximal half of the ventral surface of the P1 merus (Fig. 4C). *Chirostylus ortmanni* possesses only sparse spines on the ventral surface (Fig. 2A). In both sexes, the P2–4 propodi are generally more slender in *C. stellaris* than *C. ortmanni*, although the ranges of the length relative to the height do partially overlap. In *C. stellaris*, the propodi are 16.0–20.2 (mean, 18.6, on P2), 16.3–21.3 (mean, 19.0, on P3), and 17.7–22.6 (mean, 20.3, on P4) times longer than high; whereas in *C. ortmanni*, they are 12.3–15.3 (mean, 13.7, on P2), 12.3–16.8 (mean, 14.5, on P3), and 14.3–18.5 (mean, 16.1, on P4) times longer (Figs. 2C, 4E). *Chirostylus stellaris* appears to reach a much smaller size than *C. ortmanni* based on the specimens examined. The maximum postorbital carapace lengths of the largest male and female are 4.1 and

4.4 (ovigerous) mm, respectively, in *C. stellaris*; and 7.0 and 6.8 mm, respectively, in *C. ortmanni*. The sizes of the smallest ovigerous females are also different between these species. Their postorbital carapace length is 3.5 mm in *C. stellaris* and 4.9 mm in *C. ortmanni*.

As shown in the photographs and pointed out under the name *Chirostylus* sp. by Minemizu (2000: 164, unnumbered fig., 2002: 164, unnumbered fig.) and Kawamoto & Okuno (2003: 97, unnumbered fig.), *C. stellaris* is clearly different from *C. ortmanni* in live coloration. The pereopods of *C. stellaris* have numerous, white or pale blue spots, whereas those of *C. ortmanni* possess comparatively less numerous and smaller, yellow spots (Fig. 5B, D). *Chirostylus ortmanni* also has a short, white or pale blue blotch or band caught between dark brown bands on the distal part of each of the P2–4 meri, which is not found in *C. stellaris* (Fig. 5A, C).

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