

MARINE RECORD

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Rediscovery of *Chirostylus dolichopus* Ortmann, 1892 (Crustacea: Decapoda: Anomura: Chirostylidae) from its type locality, Boso Peninsula, Japan, with description of the colouration in life

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Abstract

Background: The chirostylid squat lobster, *Chirostylus dolichopus* Ortmann, 1892, was rediscovered from its type locality, Katsuyama (Boso Peninsula, Honshu, Japan) (35°06.7'N, 139°48.8'E), since the holotype had been collected in 1880. The colouration in life of *C. dolichopus* is reported for the first time on the basis of a recently captured topotypic specimen.

Results: *Chirostylus dolichopus* is characterized by the brilliant yellow ground colour and spot pattern on the meri of the ambulatory pereopods.

Conclusions: The colouration in life of *C. dolichopus* is diagnostic for species of *Chirostylus*. The examination of the present specimen revealed that *C. dolichopus* is distinguishable from other shallow water congeners, such as *C. ortmanni*, *C. sandyi*, and *C. stellaris*, by the colouration as well as morphology.

Keywords: Crustacea, Chirostylidae, *Chirostylus dolichopus*, Topotypic specimen, Colouration, Japan

Background

Chirostylus Ortmann, 1892 is a small genus of the family Chirostylidae and contains seven species, all from the Indo-West Pacific (Baba *et al.*, 2008; Baba, 2009): *C. dolichopus* Ortmann, 1892; *C. micheleae* Tirmizi & Khan, 1979; *C. novaecaledoniae* Baba, 1991; *C. ortmanni* Miyake & Baba, 1968; *C. rostratus* Osawa & Nishikiori, 1998; *C. sandyi* Baba, 2009, and *C. stellaris* Osawa, 2007. The type species of the genus, *C. dolichopus*, was originally described from Katsuyama (= Katsuyama), Boso Peninsula, Japan, and has hitherto been reported from wide but scattered localities in the Indo-West Pacific (cf. Baba *et al.*, 2008). Prior to the present study, no additional specimens of the species have been recorded from the type locality since the German biologist, Dr.

Ludwig H. P. Döderlein collected the holotype there in 1880. Moreover, the colouration in life is diagnostic for species of *Chirostylus* (see Baba, 2009), but was not recorded for the holotype of *C. dolichopus*. During a recent study on the shallow-water crustacean fauna of Boso Peninsula, we found the second specimen referable to *C. dolichopus* from Katsuyama. The present paper describes for the first time the colouration in life of *C. dolichopus* based on a topotypic material. The possible identities of specimens from other localities previously reported as *C. dolichopus* were briefly discussed.

Methods

CL indicates specimen size, and is measured along the dorsal midline from the posterior margin of the orbit to the posterior margin of the carapace. The specimen examined was collected with SCUBA equipment, and is deposited in the collection of CMNH.

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Results

Taxonomic account

Order Decapoda Latreille, 1802
 Infraorder Anomura MacLeay, 1838
 Family Chirostylidae Ortmann, 1892
 Genus *Chirostylus* Ortmann, 1892
Chirostylus dolichopus Ortmann, 1892
 Figs. 1 & 2

Synonymy

Chirostylus dolichopus Ortmann, 1892: 246, figs. 2, 2b, c, e, i, o, z [type locality: Kadsiyama (= Katsuyama), Boso Peninsula, Japan, shallow water]; Miyake, 1960: 97, pl. 48, fig. 8; Miyake & Baba, 1968: 381, figs. 1a, b, 2; Takeda, 1982: 49, fig. 147; Baba, 2005: 16 (part, see discussion), fig. 2; Baba *et al.*, 2008: 14 (part, see discussion; not fig. 1A).

Material examined

CMNH-ZC 02495, 1 female (CL 5.5 mm), Uki-shima Islet, Katsuyama, Kyonan, Boso Peninsula (east side of Tokyo Bay), Honshu, Japan, 35°06.7'N, 139°48.8'E, 30 m, SCUBA, 14 July 2015, coll. J. Okuno.

Distinguishing characters

Rostral lobe rounded, unarmed (Fig. 1a). Gastric and cardiac regions unarmed. Branchial regions armed each with 1 spine near anterior extremity of each cervical groove (Fig. 1a). Third thoracic sternite with surface

concave; anterior margin transverse, armed with 6 small spines (Fig. 1b). Abdominal somites with smooth dorsal surface. Ocular peduncle with feebly dilated cornea (Fig. 1a). Dactyli of second to fourth pereopods each with 6 (except for 7 in left fourth pereopod) corneous spines on flexor margin, penultimate spine distinctly stouter than ultimate spine (Fig. 1c).

Colouration

Ground colour of body and pereopods overall bright yellow (Fig. 2a, b). Dorsal surface of carapace (Fig. 2c) pale orange, with 3 main concentric U- to V-shaped markings: outermost U-shaped, red with clear inner and outer margins, approximately following carapace outline; next white with narrow, clear margins, apex tightly rounded, approximately enclosing protogastric region; innermost white-clear with red margins, acutely triangular, anterior apex slightly exceeding cervical groove. Pterygostomian flap with alternating white and orange-red longitudinal lines. Abdominal tergites (Fig. 2c) transparent; anterior margin and midline each with orange line. Ocular peduncles each with thick red line dorsomesially. Cheliped (first pereopod) (Fig. 2a, b) with white and red longitudinal lines dorsolaterally. Second to fourth pereopods (Fig. 2a, b) each with red longitudinal line dorsally except for distal part of propodus, this part brighter yellow than others; all meri each with white and red spots (red spot larger) near disto-extensor end, meri of both second pereopods and right fourth pereopod each with additional 1 or 2 red small spots on distal one third of extensor margin.

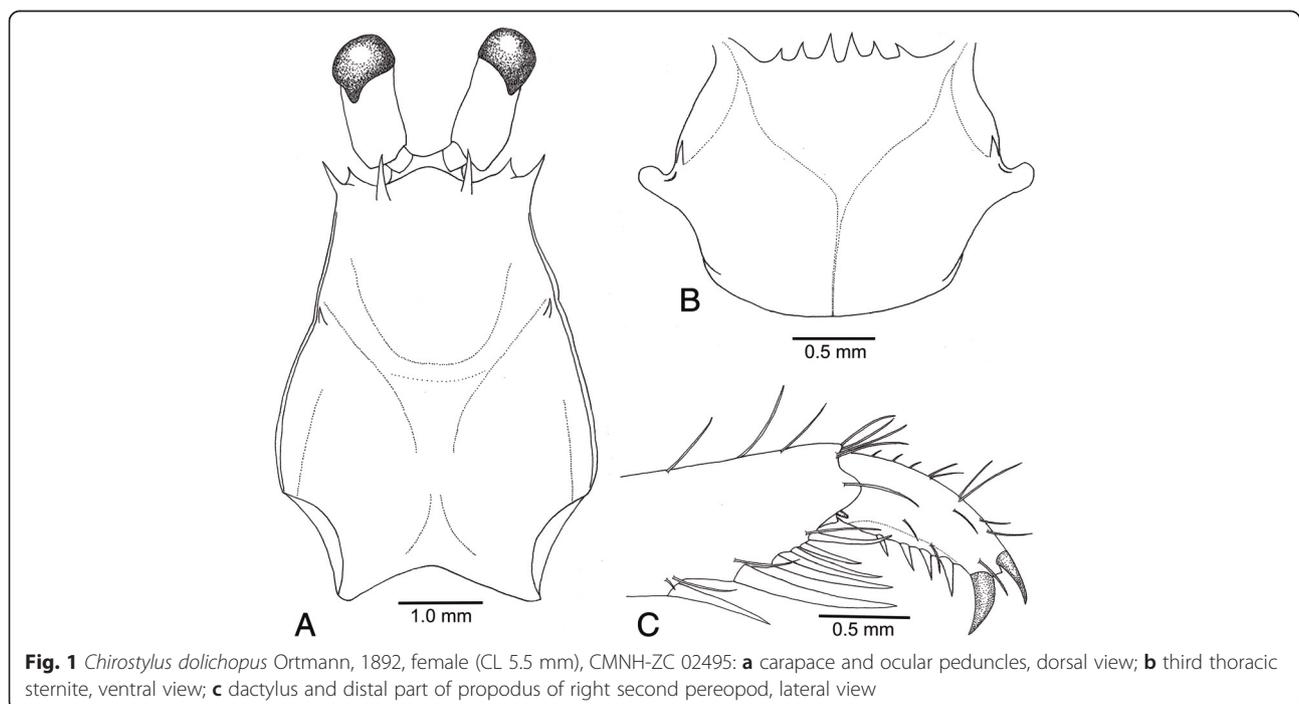
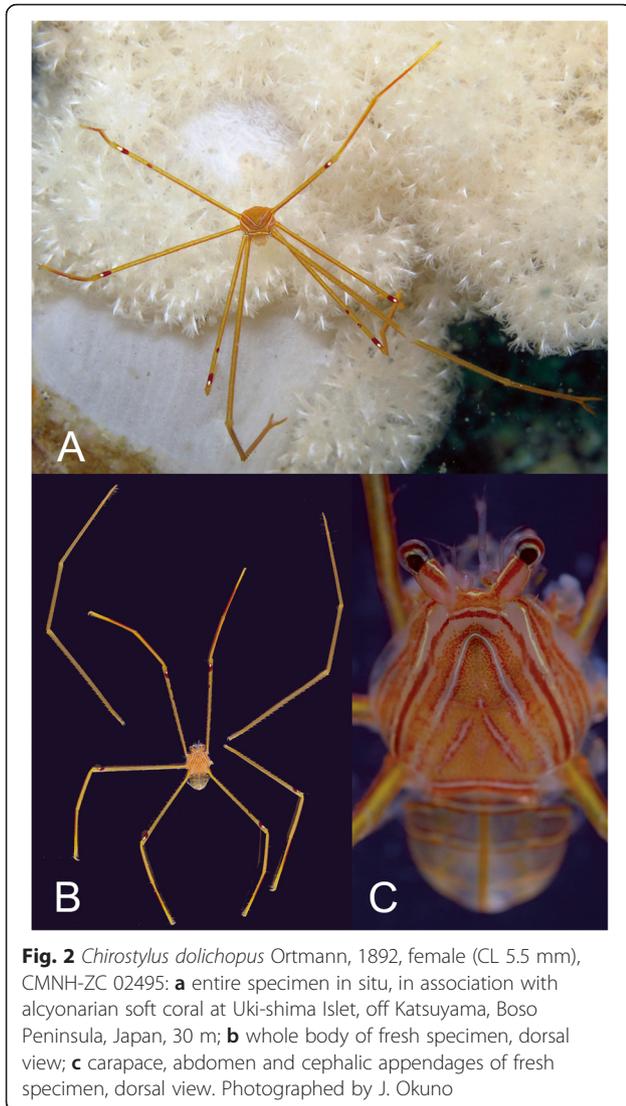


Fig. 1 *Chirostylus dolichopus* Ortmann, 1892, female (CL 5.5 mm), CMNH-ZC 02495: **a** carapace and ocular peduncles, dorsal view; **b** third thoracic sternite, ventral view; **c** dactylus and distal part of propodus of right second pereopod, lateral view



Habitat

The present specimen was associated with an unidentified alcyonarian octocoral attached to a small rock on the sandy slope at a depth of 30 m (Fig. 2a). The steep slope is situated at eastern margin of the Tokyo Submarine Canyon, and reaches about 200 m depth over narrow horizontal distance (about 3 km) (see Yano *et al.*, 2007). At the diving sites around Uki-shima Islet, divers have observed nine other individuals referable to *C. dolichopus* during June to August of 2015, some living on colonies of fan-like gorgonaceans (Jiro Uochi, personal communication).

Distribution

Type locality: Kadsiyama (= Katsuyama), west coast of Boso Peninsula (east side of Tokyo Bay), Honshu, Japan (Ortmann, 1892). Also known from Sagami Bay (Miyake & Baba, 1968). Other records of *C. dolichopus* from outside of Japan (cf. Baba *et al.*, 2008) should be confirmed

(see discussion). Known from the depths ranging 22 to 70 m (Miyake & Baba, 1968; present study).

Discussion

The present specimen agrees quite well with the previous descriptions of *C. dolichopus* by Ortmann (1892), Miyake & Baba (1968) and Baba (2005) on account of the distinguishing characters mentioned above. Baba (2005) re-examined the holotype of *C. dolichopus* and provided illustrations of selected parts of the specimen.

Baba (2009) noted that the information on colouration of *C. dolichopus* is available from Miyake (1960, 1982) and Takeda (1982). However, as indicated by Osawa (2007), the illustrated specimen in Miyake (1982) can be identified as *C. ortmanni* on account of the characteristic colour pattern, especially the presence of black-white-black bands on the subterminal parts of the ambulatory meri. The illustrations of *C. dolichopus* by Miyake (1960) and Takeda (1982) are unfortunately inadequate to determine the precise colouration and probably show a non-fresh specimen. Therefore, the detailed life-colouration of *C. dolichopus* is reported here for the first time on the basis of the Japanese material.

Baba *et al.* (2008, Fig. 1a) showed a colour photograph of a Philippine specimen identified as *C. dolichopus*. However, the specimen differs from the present topotypic specimen in having the carmine-red chelipeds and ambulatory legs, and in the absence of the subterminal white and red spots on the ambulatory meri. The difference of colouration suggests that the specimen of Baba *et al.* (2008) may not belong to the true *C. dolichopus*, although re-examination of morphological characters of the specimen is required.

Furthermore, the distributional range of the true *C. dolichopus* is probably restricted in Japan and its adjacent waters in consideration of the known distributions of three shallow water congeneric species. *Chirostylus ortmanni* is distributed in the warm temperate waters of Japan ranging from Boso Peninsula of Honshu mainland to Satsuma Peninsula of southern Kyushu (including the Izu Islands), and northern part of Taiwan; *C. sandyi* has been recorded only from the Philippines and Indonesia; and *C. stellaris* is known only from the Ryukyu Islands (Osawa, 2007; Baba, 2009; Lin & Osawa, 2014). Except for Japanese waters, *C. dolichopus* has been previously reported from Somali Republic, Mozambique Channel and Mauritius in the western Indian Ocean (Tirmizi & Khan, 1979; Baba, 2005), Western Australia and Northern Territory in Australia (Haig, 1974; Ah Yong & Baba, 2004) and Sulu Archipelago in the Philippines (Baba, 1988); the recorded depths ranges were 35–238 m (Baba *et al.*, 2008). Therefore, more detailed study is required for clarifying the systematic position of these specimens from outside of Japan.

Ortmann (1892) described five species of squat lobsters from Japan as new to science: two chirostylids, *Chirostylus dolichopus* and *Uroptychus japonicus* Ortmann, 1892; one munidid, *Munida heteracantha* Ortmann, 1892; and two munidopsid, *Munidopsis camelus* (Ortmann, 1892) (as *Galacantha* A. Milne-Edwards, 1880) and *M. taurulus* Ortmann, 1892. As mentioned above, the type locality of *C. dolichopus* is Katsuyama of Boso Peninsula, Tokyo Bay. *Munida heteracantha* was also originally described on the basis of two specimens collected from Katsuyama and Sagami Bay, but the type locality of the species is regarded as Sagami Bay on account of the lectotype selection by Macpherson & Baba (1993). Thus, *C. dolichopus* is the sole squat lobster taxon which Ortmann (1892) originally described from Tokyo Bay.

Conclusions

The present paper describes for the first time the colouration in life of *C. dolichopus* based on a topotypic material. Our examination on the topotypic specimen revealed that *C. dolichopus* has a characteristic colouration in life, i. e., the brilliant yellow ground colour, the meri of the second to fourth pereopods each with white and red spots on the dorsal subterminal part, and the absence of white small spots through the entire length of the pereopods. Other shallow water congeners, such as *C. ortmanni*, *C. sandyi*, and *C. stellaris*, have a reddish brown ground colour and white spots on the meri of ambulatory legs (see Osawa, 2007; Baba, 2009).

Abbreviations

SCUBA: self-contained underwater breathing apparatus; CL: postorbital carapace length; CMNH: Coastal Branch of Natural History Museum and Institute Chiba.

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Authors' contributions

JO collected the specimen, initially identified it, and drafted the manuscript. MO checked the identification of the specimen and helped to improve the final manuscript. All authors read and approved the final manuscript.

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JO is a senior researcher and curator at CMNH. MO is a researcher at the Research Center for Coastal Lagoon Environments of Shimane University.

Competing interests

The authors declare that they have no competing interests.

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