



THE OCCURRENCE OF THE PANDALID SHRIMP
HETEROCARPUS ABULBUS YANG, CHAN & CHU, 2010
(DECAPODA, CARIDEA) IN JAPAN

BY

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Heterocarpus abulbus Yang, Chan & Chu, 2010, was described on the basis of material collected from Taiwan and the Philippines at depths of 200-400 m. Yang et al. (2010) remarked that specimens referred to *H. gibbosus* Spence Bate, 1888 by Miyake (1998) might actually represent *H. abulbus*, although no voucher specimens from Japan were available to them for examination. Miyake's (1982, 1991, 1998) records of *H. gibbosus* included specimens from Tosa Bay and off the Koshiki Islands in Kagoshima Prefecture. Otherwise there are no records of *H. abulbus* from Japanese waters.

During ecological and fishery studies of deep-water shrimp in Kagoshima Bay, Kyushu, Japan, the junior author collected two specimens of an unfamiliar species of *Heterocarpus*. Detailed examination has revealed that these specimens represent *H. abulbus*, which confirms the occurrence of this species in Japanese waters. In this short article, we provide a brief description providing evidence for the identification.

Specimens examined in this study are deposited in the Natural History Museum and Institute, Chiba (CBM). The size of the specimens is indicated by postorbital carapace length (CL) measured from the level of the posterior margin of the orbit to the midpoint of the posterodorsal margin of the carapace.

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TAXONOMIC ACCOUNT

Heterocarpus abulbus Yang, Chan & Chu, 2010

[Japanese name: Tengu-mino-ebi]

(figs. 1, 2)

Heterocarpus gibbosus — Miyake, 1982: 65 (part), pl. 22 fig. 3; 1991: 65 (part), pl. 22 fig. 3; 1998: 65 (part), pl. 22 fig. 3; Chan & Yu, 1987: 54 (part), pl. 1A, B. Not *Heterocarpus gibbosus* Spence Bate, 1888.

Heterocarpus abulbus Yang, Chan & Yu, 2010: 207, figs. 1, 3A, B, 4A-D, 5A.

Material examined.— Kagoshima Bay, Kyushu, Japan, 31°26.6'N 130°37.8'E, 227 m, 12 July 2011, T/V "Nansei-maru", trawl, 1 female (CL 18.5 mm), CBM-ZC 11307; same locality, 9 December 2011, 1 ovigerous female (CL 22.1 mm), CBM-ZC 11308.

Description.— Rostrum (fig. 1A) 1.1 times as long as carapace, moderately to strongly upturned, only with obsolete lateral carina discernible in proximal half; dorsal margin armed with 7 or 8 teeth, including 3 or 4 widely spaced teeth on rostrum proper and 4 on carapace posterior to orbital margin; no subterminal teeth; ventral margin with 12-14 teeth. Carapace (fig. 1A) with basal rostral crest relatively low, not particularly strongly crested, thus dorsal outline in lateral view slightly convex; posteriormost tooth of rostral series located slightly posterior to midlength of carapace; lateral surface with complete, but blunt post-orbital carina extending at least posterior one-fourth of carapace, short, blunt antennal carina and anteriorly sharp and posteriorly blunt branchiostegal carina extending to posterior one-fourth of carapace; branchiostegal tooth not exceeding beyond antennal tooth; shallow depression on hepatic region.

Abdomen (fig. 1B) unarmed and rounded dorsally; third tergite faintly elevated medially, but without distinctly delineated median boss or carina (fig. 1C). Telson with 3 or 4 small dorsolateral spines on either side.

Antennal scale (fig. 1D) about 0.6 times as long as carapace, about 3.3 times as long as wide, lateral margin faintly convex; distolateral tooth slightly falling short of rounded distal lamella (fig. 1E).

Third maxilliped (fig. 2A) with moderately long (about 0.3 times as long as antepenultimate segment), distally setose exopod. Second pereopods (fig. 2B, C) strongly unequal, left longer and much slenderer than right; left carpus with 24 articles, right carpus 8 articles; left merus annulated, right merus not annulated. Third pereopod (fig. 2D) overreaching antennal scale by 0.3 length of carpus; dactylus (fig. 2E) slightly twisted, flattened in distal half (subspatulate), 0.3 times as long as propodus, bearing 5 minute accessory spinules restricted to proximal 0.4 of flexor margin; carpus 0.7-0.8 times as long as propodus, bearing 1 or 2 lateral spines; merus with 10-12 ventrolateral and 4 or 5 ventromesial or ventral spines; ischium with 2 ventral spines. Fourth pereopod overreaching antennal scale by

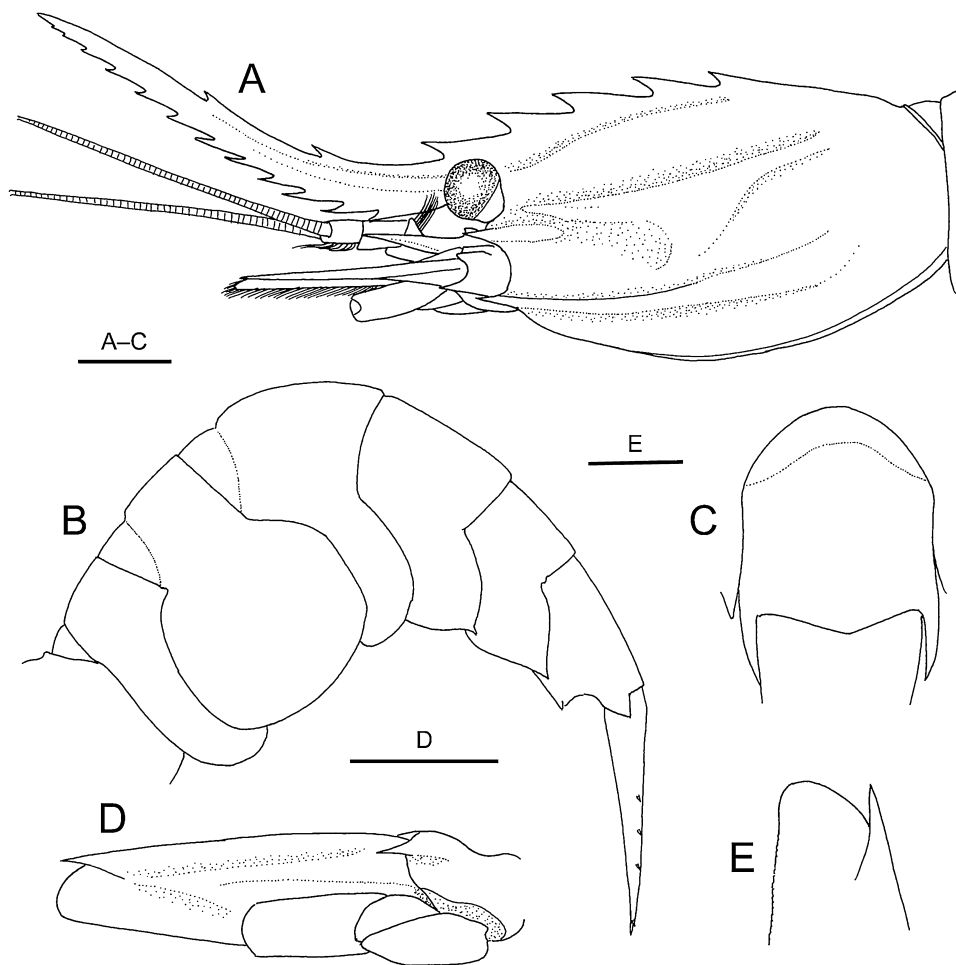


Fig. 1. *Heterocarpus abulbus* Yang, Chan & Chu, 2010, ovigerous female (CL 22.1 mm), CBM-ZC 11308, Kagoshima Bay. A, carapace and cephalic appendages, lateral view (distal parts of antennular flagella omitted; antennal flagellum missing); B, abdomen and telson, lateral view (setae omitted); C, third abdominal somite, dorsal view; D, left antenna, ventral view (setae omitted; flagellum missing); E, distal part of antennal scale, ventral view. Scale bars: 5 mm for A-D; 2 mm for E.

full length of propodus, similar to third pereiopod; carpus with 1 spine at about midlength; merus with 7 lateral spines, mesial to ventral side unarmed or only with 1 distomesial spine. Fifth pereiopod similar to third and fourth pereiopods, overreaching antennal scale by 0.7 of propodus length; carpus unarmed or with 1 lateral spine; merus with 6-8 lateral spines, mesial and ventral side unarmed; ischium unarmed.

Coloration in life.— Body generally orange. Cornea dark brown. Antennular and antennal flagella also orange, no distinct markings. Third maxilliped with

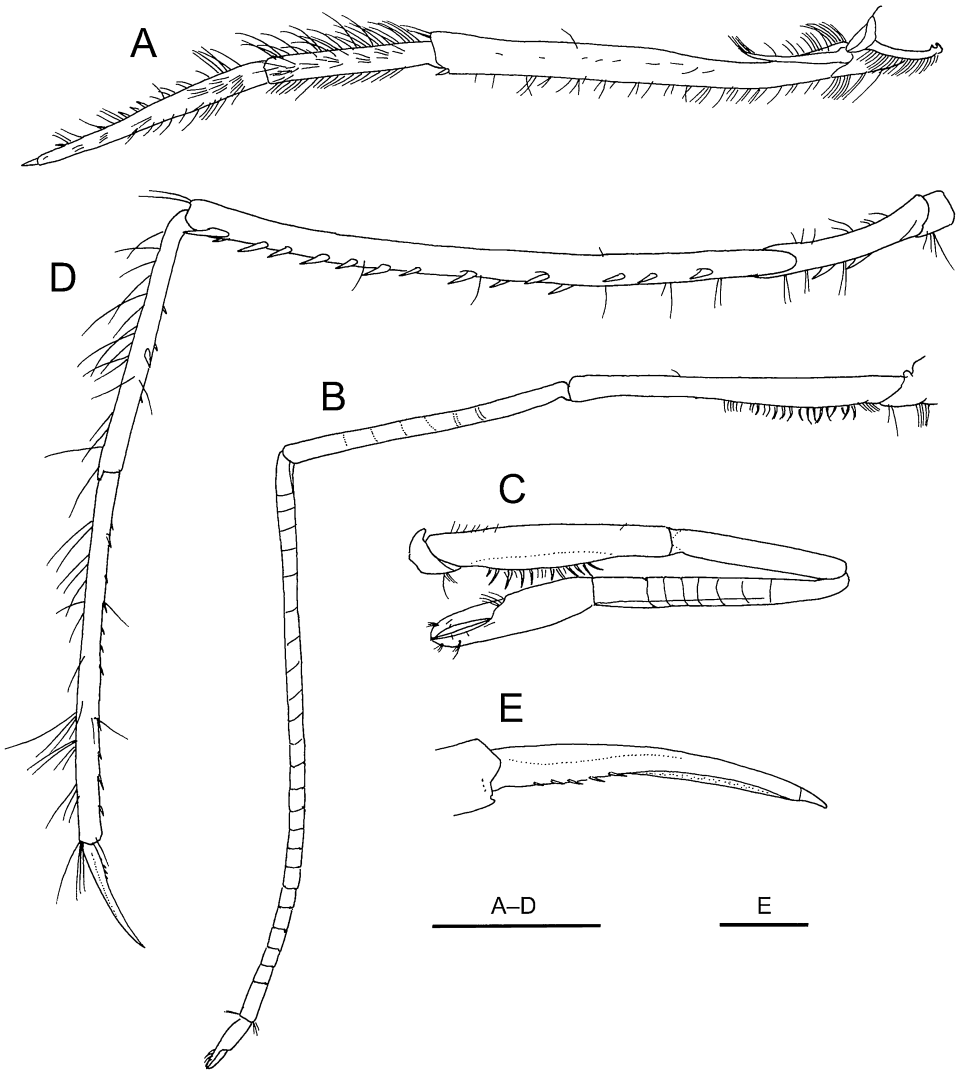


Fig. 2. *Heterocarpus abulbus* Yang, Chan & Chu, 2010, ovigerous female (CL 22.1 mm), CBM-ZC 11308, Kagoshima Bay. A, left third maxilliped, lateral view; B, left second pereiopod, lateral view; C, right second pereiopod, lateral view; D, left third pereiopod, lateral view; E, same, dactylus, mesial view. Scale bars: 5 mm for A-D; 1 mm for E.

distal two segments red, otherwise orange. Pereiopods generally pinkish, darker in distal half of meri; distal parts of propodi also reddish. Eggs dark green.

Distribution.— Previously known with certainty only from Taiwan and the Philippines, 200-400 m. The present specimens confirm the occurrence of this species in Japanese waters.

Remarks.— The present specimens agree well with the original description of *Heterocarpus abulbus* by Yang et al. (2010) in all diagnostic aspects, including the coloration in life (see above description). *Heterocarpus abulbus* is morphologically similar to *H. chani* Li, 2006; *H. corona* Yang, Chan & Chu, 2010; *H. gibbosus*; *H. lepidus* De Man, 1917 and *H. tricarinatus* Alcock & Anderson, 1894 in the possession of two distinct longitudinal carinae and a short ridge supporting the antennal tooth on the carapace, the moderately strong branchiostegal tooth not exceeding the antennal tooth, and the dorsally unarmed abdomen. In fact, this species was previously confused with *H. gibbosus* (cf. Yang et al., 2010). As Yang et al. (2010) mentioned, *H. abulbus* is characteristic in the genus by lacking a clearly defined boss or sharp middorsal carina on the third abdominal tergite. Furthermore, the basal rostral crest of *H. abulbus* seems to be lower than those of other close relatives. *Heterocarpus chani* is distinguished from *H. abulbus* and the other three species by the presence of a rudimentary exopod on the third maxilliped (Li, 2006). *Heterocarpus corona* is characteristic in having a highly elevated basal rostral crest (Yang et al., 2010). *Heterocarpus lepidus* differs from *H. abulbus* and the other three species in the shorter branchiostegal carina fading away at about the midlength of the carapace, and the proportionately shorter dactyli of the last three pairs of pereopods (0.2 times or less as long as the propodus versus 0.3 or more) (Chace, 1985). *Heterocarpus tricarinatus* differs from *H. abulbus* and the other three species in having a distinct lateral carina on the rostrum (Chace, 1985); the possession of more numerous dorsal rostral teeth (12-15 versus 6-10) are also useful in separating *H. tricarinatus* from *H. abulbus*.

As noted above, Yang et al. (2010) considered that Japanese specimen referred to *Heterocarpus gibbosus* by Miyake (1998) might actually represent *H. abulbus* because of the relatively low basal rostral crest, though the photographed specimen was assumed to be lost. The present specimens confirm the occurrence of this species in Japanese waters.

At present, 29 species of the genus are known globally (De Grave & Fransen, 2011), of them 16 species have now been recorded from the western Pacific (e.g., De Man, 1920; Chace, 1985; Crosnier, 1988; Cleva & Crosnier, 2006; Hayashi, 2007a, b; Yang et al., 2010). Hayashi (2007a, b) reported the following six species of *Heterocarpus* from Japanese waters: *H. dorsalis* Spence Bate, 1888, *H. gibbosus*, *H. hayashii* Crosnier, 1988, *H. laevigatus*, *H. sibogae* De Man, 1917 and *H. woodmasoni* Alcock, 1901. We have noticed that specimens Hayashi (2007a, b) referred to as *H. gibbosus* are actually *H. corona* instead. The occurrence of *H. gibbosus* in Japanese waters has not been confirmed (see Yang et al., 2010). In total, seven species of the genus are now known from Japan. Concerning the species level diversity of the genus in the Indo-West Pacific region, there is little doubt future studies will find more species from the Japanese Archipelago.

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