

Studies on Eumalacostraca: a homage to Masatsune Takeda

By

Hironori Komatsu, Junji Okuno and Kouki Fukuoka
(Editors)

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A NEW SPECIES OF *BOLLEGIDIA* (AMPHIPODA, BOGIDIPELLIDAE
SENSU LATO) FROM KUSHIMOTO COAST, CENTRAL JAPAN

BY

HIROYUKI ARIYAMA¹⁾

Marine Fisheries Research Center, Research Institute of Environment, Agriculture and
Fisheries, Osaka Prefectural Government, Tanagawa, Misaki, Osaka 599-0311, Japan

ABSTRACT

Bollegidia takedai sp. nov. (Crustacea: Amphipoda: Bogidiellidae sensu lato) is described, based on specimens collected from Kushimoto coast in Wakayama Prefecture, central Japan. This new species is the third species in the genus *Bollegidia* Ruffo, 1974, which includes *B. sootai* (Coineau & Rao, 1972) from the Andaman and Nicobar Islands and *B. capensis* Ruffo, 1974 from South Africa. *Bollegidia takedai* differs from its congeners in an expanded palp article 2 of mandible, the presence of a setal row on the medial surface of gnathopod 2 and the shape of the pleopods, especially in male pleopod 1 with a complex membranous structure and male pleopod 2 with a 3-articulate ramus.

RESUMEN

Bollegidia takedai sp. nov. (Crustacea: Amphipoda: Bogidiellidae sensu lato) se describe sobre la base de muestras obtenidas para la costa de Kushimoto en la prefectura de Wakayama, en el centro de Japón. Esta nueva especie es la tercera especie del género *Bollegidia*, que incluye *B. sootai* (Coineau & Rao, 1972) de las islas de Andaman y Nicobar y *B. capensis* Ruffo, 1974 del África del Sur. *Bollegidia takedai* difiere de sus congéneres en (1) ampliar el artejo 2 del palpo mandibular, (2) la presencia de la fila de setas en la superficie medial de gnatópodo 2, y (3) formas de pleópodos, especialmente en pleópodo 1 del macho con complicada estructura membranosa y pleópodo 2 del macho con 3-articular rama.

INTRODUCTION

The amphipod genus *Bollegidia* was established by Ruffo (1974) with *B. capensis* Ruffo, 1974 as its type species, and he included *Bogidiella sootai*

¹⁾ e-mail: AriyamaH@mbox.epcc.pref.osaka.jp

Coineau & Rao, 1972 into this genus. *Bollegidia* was originally a member of the family Bogidiellidae Hertzog, 1936. However, Koenemann & Holsinger (1999) excluded the genus from this family, as the unusual combination of a uniramous uropod 1 and the extremely reduced rami of pleopods 1-3 is not diagnostic for bogidiellids according to their concept. During a survey of the amphipod fauna in Japan, a new species of the genus was obtained, herein described as *B. takedai*.

MATERIALS AND METHODS

About 2 liters of coarse sand were collected from sediment (ca. 10 cm sampling depth) in 4 m of water by snorkeling. The specimens were extracted from the sand using the decantation method, and fixed in a 10% formalin-seawater solution. Ten individuals of the amphipod were dissected and their appendages examined and illustrated under a phase-contrast microscope. Body length was measured from the apex of the rostrum along the dorsal margin to the distal end of the urosomites. The type series is deposited in the Osaka Museum of Natural History (OMNH), Osaka, Japan.

TAXONOMIC ACCOUNT

Genus *Bollegidia* Ruffo, 1974

***Bollegidia takedai* sp. nov.**

(figs. 1-4)

Material examined. — Holotype: female (OMNH-Ar 8781), 1.4 mm, 33°26'49"N 135°47'39"E, Izumozaki coast, Kushimoto, Wakayama Prefecture, 8 August 2009, coll. H. Ariyama. Paratypes: 4 males and 5 females (OMNH-Ar 8782-8790), 1.2, 1.2, 1.2, 1.2, 1.4, 1.4, 1.4, 1.5, 1.3 mm (dissected), and a female (OMNH-Ar 8791), 1.5 mm (not dissected), same data as holotype.

Description. — Female [holotype and paratypes (OMNH-Ar 8786-8789, 8791)]. Body (fig. 1) extremely flattened laterally; rostrum indistinct, eyes lacking; pereonite 2 narrow, pereonites 5-7 wide, each pereonites with 1-2 dorsal setae; pleonites wide, without dorsal tooth, pleonites 2 and 3 bearing 1 and 2 dorsal setae, respectively; urosomites narrow, dorsal margins bare; coxae scarcely overlapping.

Antenna 1 (fig. 2A) relatively slender, with length ratio of peduncular articles 1-3 1.0 : 0.7 : 0.4, ventral margin of article 1 with 2 robust setae;

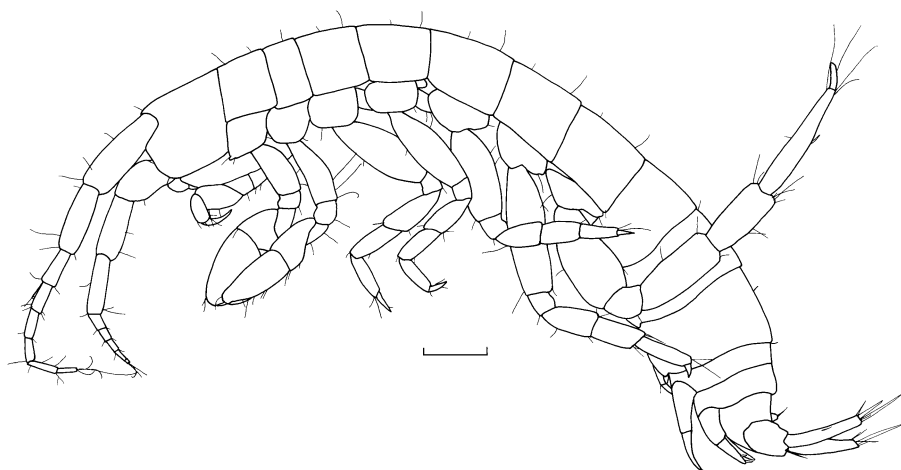


Fig. 1. *Bollegidia takedai* sp. nov., holotype, female (OMNH-Ar 8781), 1.4 mm, habitus, left lateral view. Scale: 0.1 mm.

accessory flagellum 2-articulate, with 3 setae on tip; flagellum with 5 articles, articles 3 and 4 each with aesthetasc at distal end. Antenna 2 (fig. 2B) relatively stout, shorter than antenna 1; ratio of lengths of peduncular articles 3-5 1.0 : 1.7 : 1.3, article 3 with anterior robust seta; flagellum short, with 4 articles.

Upper lip (fig. 2C) with ventral margin rounded, bare. Mandibles (fig. 2D, E) with left and right incisors bearing 5 and 4 cusps, respectively; both laciniae mobilis 2-toothed, both accessory blades 3 in number (1 wide and 2 narrow), molar small, simple; palp stout, article length ratio 1.0 : 1.3 : 1.3, article 2 expanded, articles 1-3 with 0, 1 and 3 setae, respectively. Lower lip (fig. 2F) with short mandibular process, apical margin bare. Maxilla 1 (fig. 2G) with round inner plate without setae; outer plate bearing 7 dentate robust setae apically; palp uniaarticulate, with 2 setae on tip. Maxilla 2 (fig. 2H) with inner plate bearing 5 apical setae, outer plate with 4 apical setae. Maxilliped (fig. 2I) large; inner and outer plates small, each bearing robust seta on tip; palp stout, consisting of 4 articles, article 2 with long seta distally, distal part of article 3 and medial part of article 4 bearing dorsal setal row, article 4 with apical nail.

Gnathopod 1 (fig. 3A, A1) small, subchelate; coxa produced anterodistally, bearing 2 setae; basis stout, with 3 posterior long setae; ischium with seta at posterodistal corner; merus with 2 posterodistal setae, posteromedial surface covered with fine setae; carpus with 4 thick setae at posterodistal corner and many fine setae on posteromedial surface; propodus longer than carpus, palm oblique, with 2 large and 2 small robust setae; dactylus slender. Gnathopod 2 (fig. 3B, B1) small, a little longer than gnathopod 1, subchelate; coxa with 2

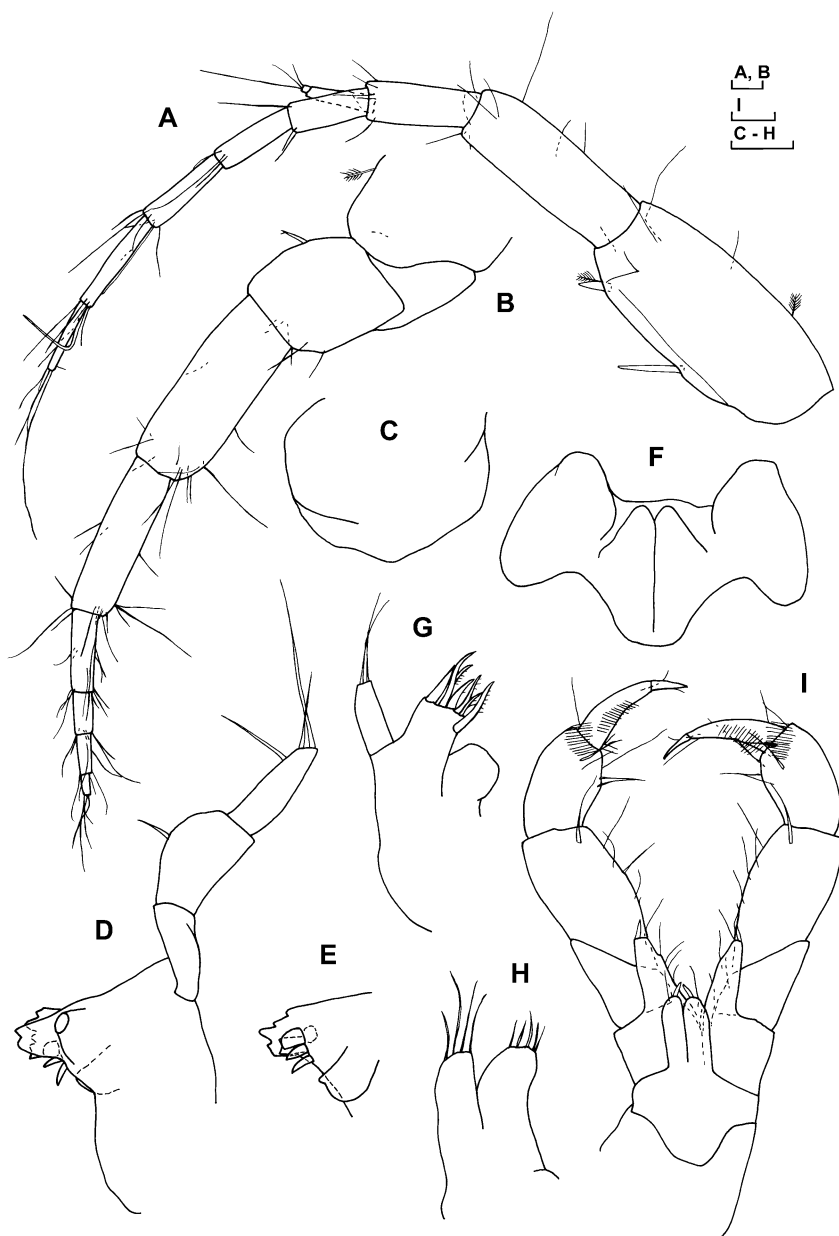


Fig. 2. *Bollegidia takedai* sp. nov. A, B, holotype, female (OMNH-Ar 8781), 1.4 mm; C, F, paratype, female (OMNH-Ar 8787), 1.4 mm; D, E, G–I, paratype, female (OMNH-Ar 8786), 1.4 mm. A, left antenna 1, lateral view; B, right antenna 2, medial view; C, upper lip, anterior view; D, left mandible, ventral view; E, right mandible (part), dorsal view; F, lower lip, ventral view; G, right maxilla 1, ventral view; H, right maxilla 2, ventral view; I, maxillipeds, dorsal view. Scales: 0.02 mm.

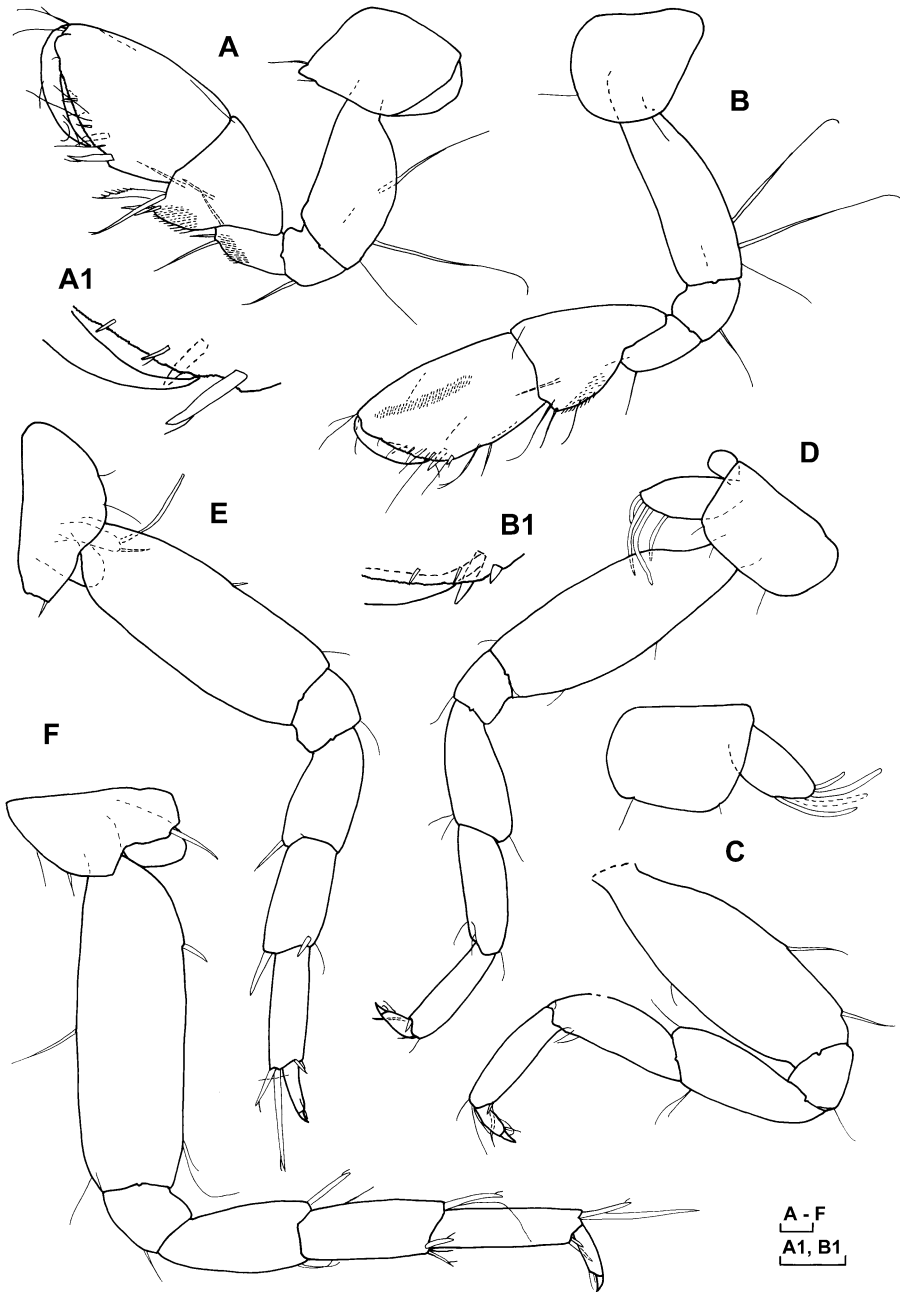


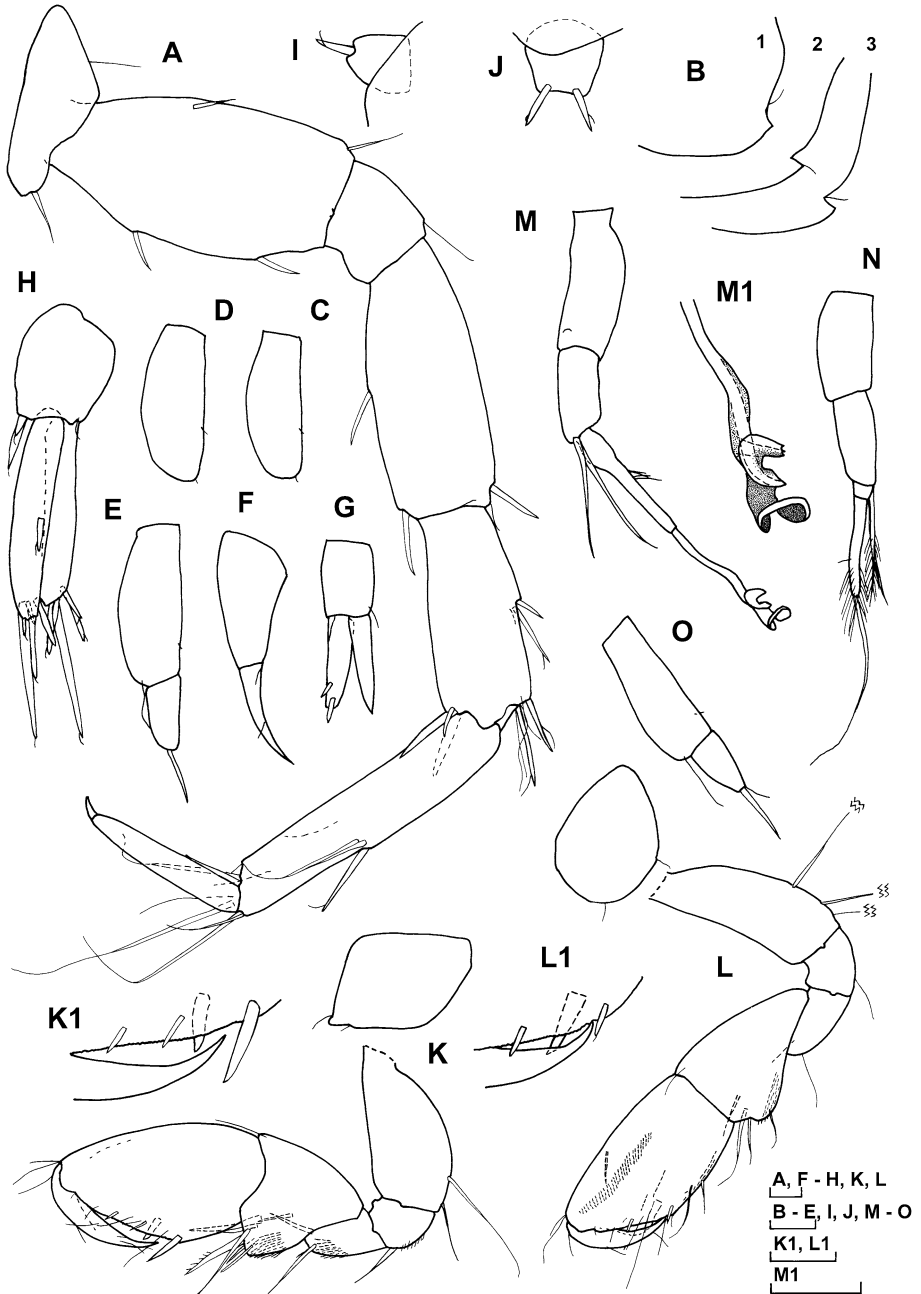
Fig. 3. *Bollegidia takedai* sp. nov., holotype, female (OMNH-Ar 8781), 1.4 mm. A, B, left gnathopods 1, 2, lateral views; A1, B1, palms of left gnathopods 1, 2, lateral views; C, left pereopod 3, lateral view; D, E, right pereopods 4, 5, lateral views; F, left pereopod 6, lateral view. Scales: 0.02 mm.

ventral setae, gill and oostegite lacking; basis slender, with 3 posterior long setae; ischium bearing posterior seta; merus with posterodistal seta; carpus with 3 posterodistal setae, posteromedial surface covered with fine setae; propodus a little longer than carpus, palm oblique, with 2 large and 2 small robust setae, anteromedial surface with row of fine setae; dactylus slender.

Pereopod 3 (fig. 3C) slender, longer than gnathopod 2; coxa short, with 2 ventral setae, gill absent, oostegite bearing 4 setae (1 lost); basis long, with 1 anterior and 2 posterior setae; merus, carpus and propodus slender, posterodistal corner of propodus with 1 long and 1 short robust setae; dactylus short, with nail. Pereopod 4 (fig. 3D) similar to pereopod 3, but coxa with 3 ventral setae, gill present, and basis with 2 anterior and 1 posterior setae. Pereopod 5 (fig. 3E) a little longer than pereopods 3 and 4; coxa triangular, bearing 2 ventral setae and posterodistal robust seta, gill present, oostegite with 2 setae; basis long, with 2 anterior setae; merus with posterodistal robust seta; carpus bearing 1 anterodistal and 1 posterodistal robust setae; propodus with 2 anterodistal robust setae and 2 posterodistal long thick setae; dactylus short, with nail. Pereopod 6 (fig. 3F) 1.2 times as long as pereopod 5; coxa bilobed, bearing 2 ventral setae and posterodistal robust seta, gill present; basis long, with 2 anterior setae, posteroproximal margin with robust seta; merus with posterodistal robust seta; carpus bearing 2 anterodistal and 1 posterodistal robust setae; propodus with 2 anterodistal robust setae and 2 posterodistal long thick setae; dactylus short, with nail. Pereopod 7 (fig. 4A) extremely long, 1.5 times as long as pereopod 6; coxa slightly bilobed, bearing ventral seta and posterodistal robust seta, gill absent; basis stout, anterior and posterior margins each with 2 robust setae; merus stout, with 1 anterodistal, 1 posterior and 1 posterodistal robust setae; carpus stout, with 2 anterior, 2 anterodistal and 3 posterodistal robust setae; propodus long, with 3 anterior, 3 anterodistal and 2 posterior long thick setae; dactylus slender, with nail.

Pleonal epimera 1-3 (fig. 4B) each with posteroventral tooth and short seta. Pleopods 1 and 2 (fig. 4C, D) similar; peduncles flattened dorsoventrally, each with small single coupling hook and mediolateral minute seta; rami lacking. Pleopod 3 (fig. 4E) much longer than pleopods 1 and 2; peduncle flattened dorsoventrally, with small single coupling hook and laterodistal seta; single

Fig. 4. *Bollegidia takedai* sp. nov. A, F–I, holotype, female (OMNH-Ar 8781), 1.4 mm; B, paratype, female (OMNH-Ar 8791), 1.5 mm; C–E, paratype, female (OMNH-Ar 8789), 1.4 mm; J, paratype, female (OMNH-Ar 8788), 1.4 mm; K–O, paratype, male (OMNH-Ar 8782), 1.2 mm. A, right pereopod 7, lateral view; B, left pleonal epimera 1–3, lateral view; C, D, left pleopods 1, 2, dorsal views; E, right pleopod 3, ventral view; F, left uropod 1, lateral view;



G, left uropod 2, dorsal view; H, left uropod 3, lateral view; I, telson, right lateral view; J, telson, dorsal view; K, L, left gnathopods 1, 2, lateral views; K1, L1, palms of left gnathopods 1, 2, lateral views; M, N, left pleopods 1, 2, ventral views; M1, tip of left pleopod 1, ventral view; O, right pleopod 3, ventral view. Scales: 0.02 mm.

ramus uniarticulate, bearing distal robust seta. Uropod 1 (fig. 4F) uniramous; peduncle with laterodistal seta; ramus pointed distally, with seta. Uropod 2 (fig. 4G) biramous, shorter than uropod 1; peduncle bearing mediiodistal seta; both rami longer than peduncle, outer ramus with 2 distal robust setae, inner ramus bare. Uropod 3 (fig. 4H) biramous, long, 1.9 times as long as uropod 2; peduncle short, with 2 laterodistal robust setae and mediiodistal seta; outer and inner rami 1.8 and 1.6 times as long as peduncle, respectively, outer ramus with 1 dorsal and 5 distal robust setae, inner ramus bearing 5 distal robust setae. Telson (fig. 4I, J) small, a little broader than long, fleshy, with 2 robust setae distally.

Male [paratype (OMNH-Ar 8782)]. Almost same as females except for oostegites and pleopods. Gnathopods 1, 2 (fig. 4K, K1, L, L1) similar to those of female, but basis of gnathopod 1 with 2 posterior long setae, and palm of gnathopod 2 with 1 large and 2 small robust setae. Pleopod 1 (fig. 4M, M1) long, not flattened; peduncle slender, with small single coupling hook; single ramus 2-articulate, article 1 with 2 long distal setae; article 2 with 4 short lateral setae and strange-shaped long thick setae bearing complicated membranous structure. Pleopod 2 (fig. 4N) long, not flattened; peduncle short; single ramus 3-articulate, article 1 relatively long, with plumose seta, article 2 very short, with simple seta, article 3 setose distally, bearing long thick seta on tip. Pleopod 3 (fig. 4O) similar to that of female, but single ramus bearing 1 robust and 1 normal setae distally.

Etymology. — The species name is dedicated to Dr. Masatsune Takeda for his great contribution to crustacean taxonomy.

DISCUSSION

Bollegidia takedai sp. nov. resembles *B. sootai* and *B. capensis* in most of the morphological characters. However, this new species differs from its congeners in the expanded palp article 2 of mandible, the presence of a setal row on the medial surface of gnathopod 2 and the shape of the pleopods, especially in male pleopod 1 with a complex membranous structure and male pleopod 2 with a 3-articulate ramus. In contrast, the palp article 2 of the mandible is straight and the setal row on the medial surface of gnathopod 2 is absent in both *B. sootai* and *B. capensis* (Coineau & Rao, 1972; Ruffo, 1974). In the female pleopods of both species, the peduncle of pleopod 2 bears relatively long seta, and the ramus of pleopod 3 is rather short, without seta. Moreover in the male pleopods of the both species, ramus of pleopod 1 does

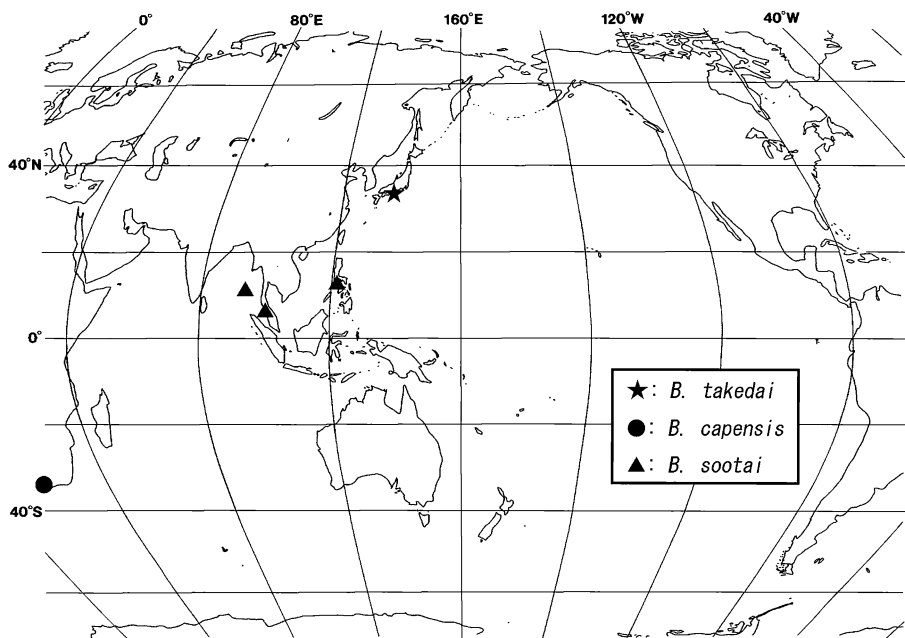


Fig. 5. Global distribution of *Bollegidia* species.

not possess membranous structure, ramus of pleopod 2 is 2-articulate in *B. sootai* and uniarticulate in *B. capensis*, and pleopod 3 is more slender (Coineau & Rao, 1972; Ruffo, 1994). In addition, *B. capensis* has a short dorsal tooth on each of pleonites 1-3; which is absent in *B. sootai* and *B. takedai*.

Figure 5 shows the global distribution of *Bollegidia* species. In the present study, *Bollegidia takedai* constitutes the first record of the genus for Japan, *Bollegidia sootai* was collected from the Andaman and Nicobar Islands, Malaysia and the Philippine Islands (Coineau & Rao, 1972; Ruffo, 1985, 1994), whilst *B. capensis* is only known from South Africa (Ruffo, 1974). Considering the very small body sizes of the species (1.2, 0.9 and 1.5 mm in *B. sootai*, *B. capensis* and *B. takedai*, respectively) and the relatively few studies so far on marine interstitial fauna, *Bollegidia* species may be more widespread in the Indo-West Pacific area.

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