

A new record of the species *Caprella arimotoi* (Crustacea: Amphipoda: Caprellidae) from Korean waters

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A newly recorded species *Caprella arimotoi* Takeuchi, 1993, belonging to the family Caprellidae Leach, 1814, was collected from the South Sea, Korea. This species is morphologically very similar to *Caprella verrucosa* Boeck, 1871, with blunt dorsal projections on pereonites, oval-shaped propodus on gnathopod 2, and grasping spines on the pereopods 5–7. *Caprella arimotoi* originated from *C. verrucosa* and are difficult to distinguish because they have mixed characteristics. However, *C. arimotoi* was classified because of several morphological differences. The newly recorded species *C. arimotoi* is discernible from *C. verrucosa* by a forwardly curved anterodorsal projection on head, elongated gills, slender pereopod 7, and lacking ventrolateral projections on pereonites 2–7. To date, *C. arimotoi* has only been reported in Japanese waters. So, our record is the first record in Korean waters and outside of Japan. In this study, the Korean *C. arimotoi* is illustrated based on the mature male specimens with a brief description of the female, focusing on the sexually dimorphic characters.

Keywords: Amphipoda, Caprellidae, *Caprella arimotoi*, Korea, new record species

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INTRODUCTION

The genus *Caprella* Lamarck, 1801 is a very large group comprising 523 species (Holton *et al.*, 2020). Among them, *Caprella arimotoi* was first described by Takeuchi (1993) with a type locality in Mukaishima Island, Seto Island Sea, Japan. *Caprella arimotoi* Takeuchi, 1993 was first described as a *Caprella (Spinicephala) verrucosa* because these specimens were recognized as an immature condition of *C. verrucosa* by Arimoto in 1976. Two years later, Arimoto renamed this species as *Caprella (Spinicephala [sic.]) pseudoverrucosa*, thinking it was different from *Caprella (Spinicephala) verrucosa*. Later, Takeuchi renamed this species *Caprella arimotoi* without the subgenus name, *Spinicephala* (Takeuchi, 1993). In Korea, *Caprella verrucosa* similar to *C. arimotoi* was recorded (Kim and Lee, 1975; Lee, 1988; Lee and Hong, 2011). However, the *C. verrucosa* recorded by Lee & Hong in 2011 was not *C. verrucosa*, but rather *C. arimotoi*. The two species are morphologically similar in shape, so they are easily confused for each other. In this paper, we provide illustrations of *C. arimotoi* and compare these two species through morphological characteristics.

MATERIALS AND METHODS

Specimens were collected by light trapping (Holmes and O'Connor, 1988; Kim, 1992) and SCUBA diving from the shallow and subtidal zones in Korea (Fig. 1). The specimens were fixed with 80% ethanol and dissected in glycerin on Cobb's aluminum hollow slides. Drawings and measurements were performed with the aid of a drawing tube, mounted on an Olympus SZX 12 stereomicroscope and Olympus BX 51 interference contrast compound microscope (Olympus, Tokyo, Japan). Specimens are deposited at the National Institute of Biological Resources (NIBR), Incheon, Korea and the Marine Amphipod Resources Bank of Korea (MARBK), Dankook University, Cheonan, Korea.

SYSTEMATIC ACCOUNTS

Order Amphipoda Latreille, 1816
Family Caprellidae Leach, 1814
Genus *Caprella* Lamarck, 1801

***Caprella arimotoi* Takeuchi, 1993 (Figs. 2-4)**

나도흑등바다대벌레 (신칭)

Caprella (Spinicephala) verrucosa Arimoto, 1976: 122, fig. 67-D.

Caprella (Spinicephala [sic.] *pseudoverrucosa* Arimoto, 1978: 14, fig. 7C.

Caprella arimotoi Takeuchi, 1993: 115, figs. 1-3.

Caprella verrucosa: Lee and Hong, 2011: 32, fig. 18 [not *Caprella verrucosa* Boeck, 1871].

Material examined. 1♂ (NIBRIV0000876687), 1♀ (NIBRIV0000876686), Kuldo Island, Baegil-ri, Gwayeok-myeon, Goheung-gun, Jeollanam-do, Korea, 34°40'50.43" N, 127°28'16.64" E, 24 Aug 2008, collected by S.S. Hong; 1♂ (MARBK-201), Changjwa-ri, Hansan-myeon,

Tongyeong-si, Gyeongsangnam-do, 34°46'54.46" N, 128°29'39.13" E, 30 Sep 2019, collected by S.Y. Shin, Y.H. Kim.

Description. Male, body (Figs. 2A, 3A) long and slender, 6.95 mm long (NIBRIV0000876687). Head round, with triangular forwardly pointing projection anterodorsally. Eye small and round. Pereonites 2-4 with mid-dorsal and posterodorsal blunt projections; pereonites 3-4 with elongated elliptical gills; gill elongated, length $3.00 \times$ width; pereonite 5 with mid-dorsal blunt projection; pereonites 6-7 short, without dorsal projection; length ratio of pereonites 2-7 = 1.00 : 1.07 : 0.89 : 0.79 : 0.36 : 0.32.

Antenna 1 (Fig. 3B) $0.33 \times$ body length, peduncular articles moderately, with sparse short setae, peduncular article 3 slightly widening distally; length ratio of peduncular articles 1-3 = 1.00 : 1.42 : 0.64; flagellum 11-articulate, subequal in length to combined peduncular articles 1-3.

Antenna 2 (Fig. 3C) setose, $0.76 \times$ antenna 1; peduncular articles 4-5 and flagellum article 1 with swimming setae on posterior margin; length ratio of peduncular articles 3-5 = 1.00 : 2.67 : 2.75; flagellum article biarticulate, subequal in length to peduncular article 5, proximal article $3.71 \times$ distal one.

Gnathopod 1 (Fig. 3D) small, basis expanded posteriorly; ischium shorter than merus with simple setae posteriorly; merus subquadrate, with unequal simple setae; carpus expanded posteriorly; propodus subtriangular, narrowing distally, $1.40 \times$ basis, palm weakly serrated, with unequal simple setae, defined by a pair of grasping spines; dactylus falcate, inner margin irregularly serrate, length ratio of 6 articles = 1.00 : 0.27 : 0.5 : 0.33 : 1.40 : 1.33.

Gnathopod 2 (Fig. 3E) attached to rather anteroventral portion of pereonite 2; basis elongate, $0.39 \times$ pereonite 2; carpus very short, unarmed; propodus subovate, width $0.35 \times$ length, palm somewhat concave medially, with triangular projection and unequal simple setae near subdistal

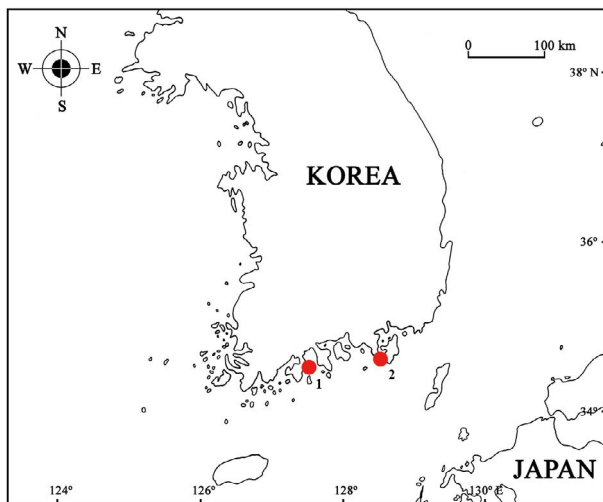


Fig. 1. Collecting sites of *Caprella arimotoi* (●) in this study. 1, Kuldo Island, Baegil-ri, Gwayeok-myeon, Goheung-gun; 2, Changjwa-ri, Hansan-myeon, Tongyeong-si.

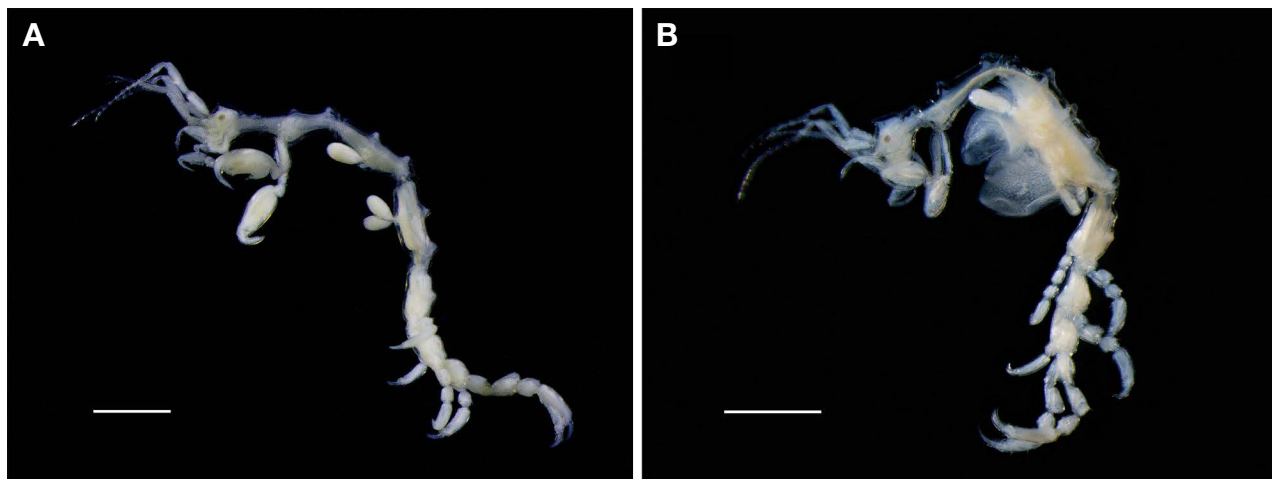


Fig. 2. *Caprella arimotoi* Takeuchi, 1993, A, male, 6.95 mm, habitus, B, female, 5.10 mm, habitus. Scale bars: A, B = 1.0 mm.

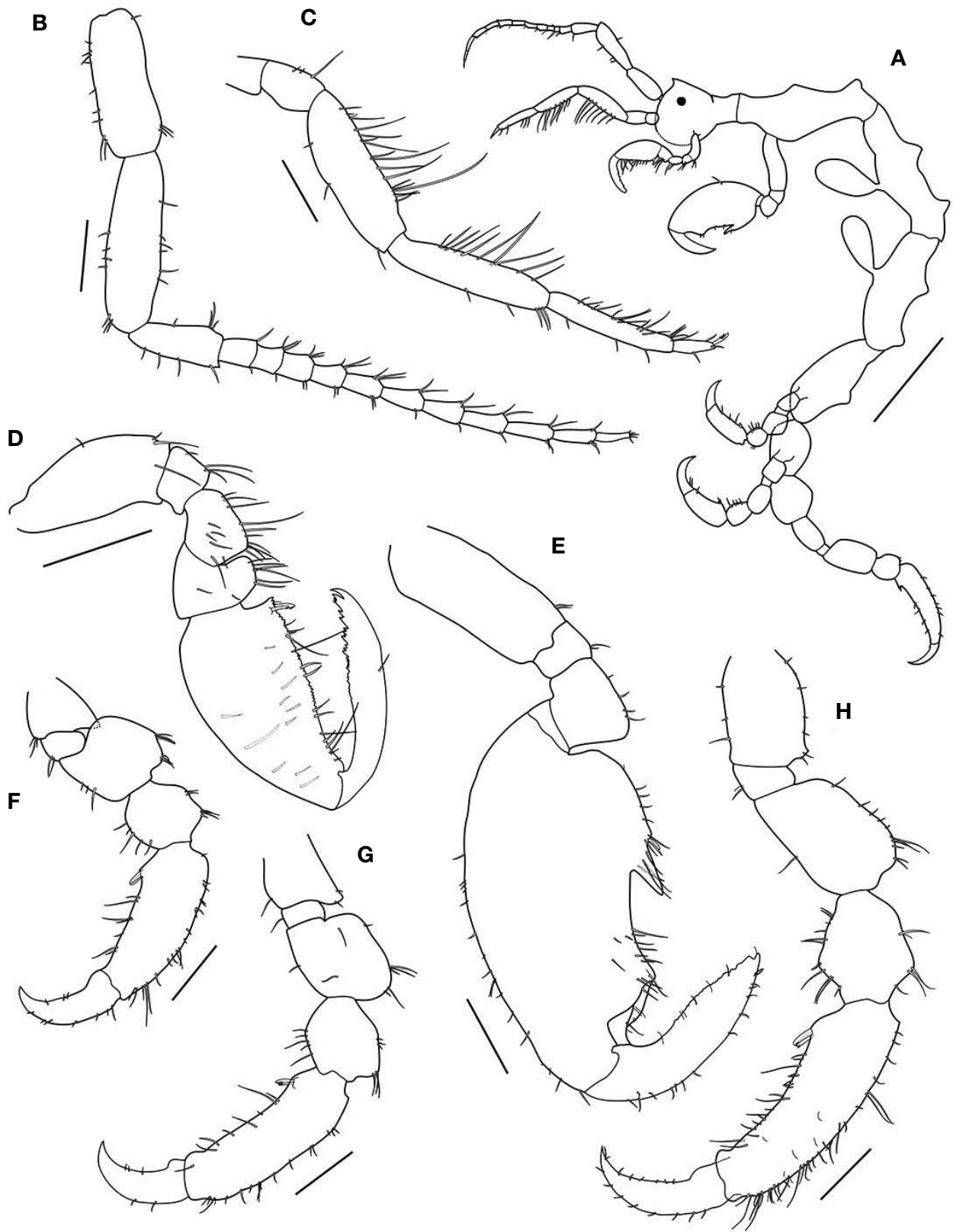


Fig. 3. *Caprella arimotoi* Takeuchi, 1993, male, 6.95 mm. A, Habitus; B, Antenna 1; C, Antenna 2; D, Gnathopod 1; E, Gnathopod 2; F, Pereopod 5; G, Pereopod 6; H, Pereopod 7. Scale bars: A = 1.0 mm, B–H = 0.2 mm.

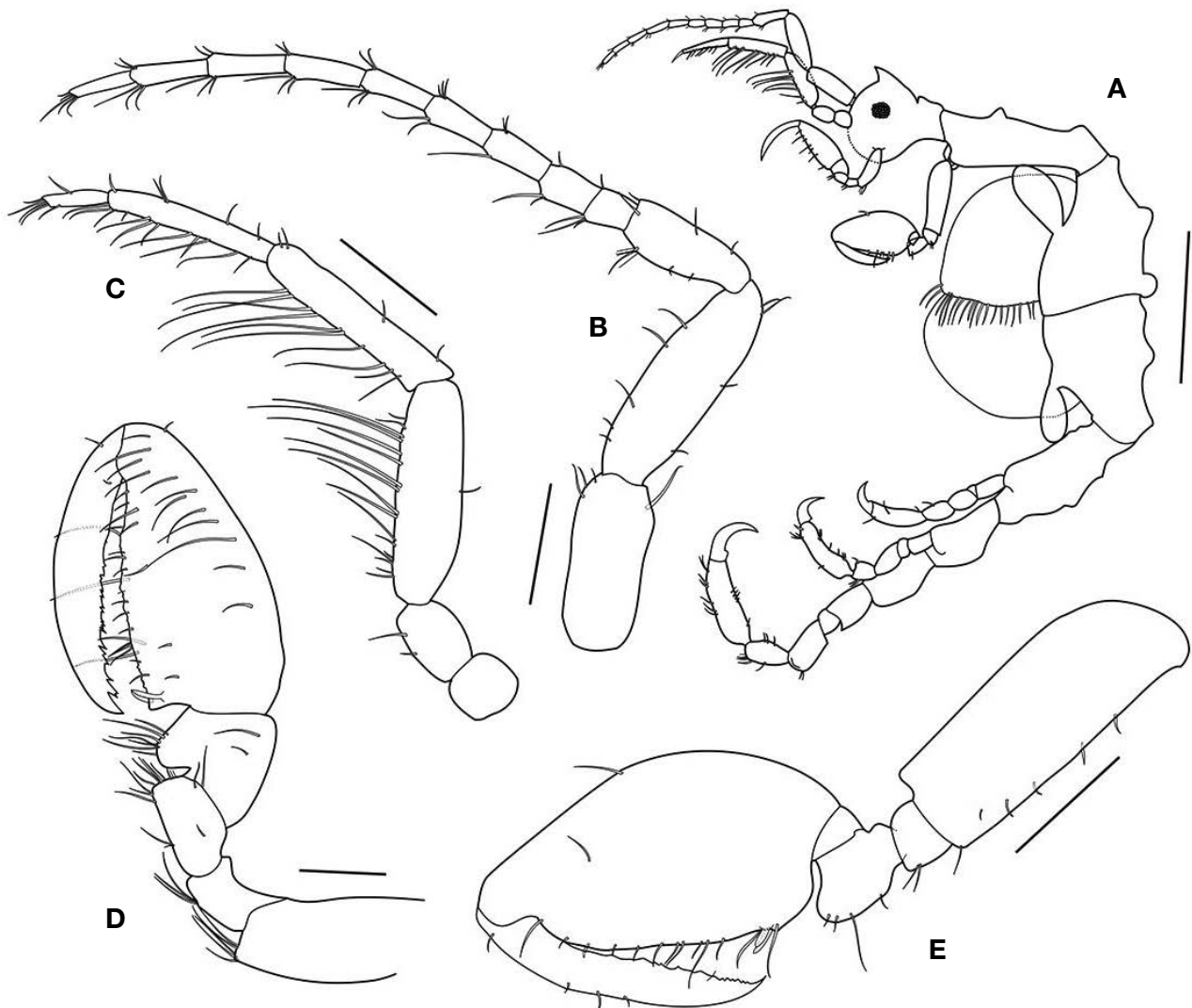


Fig. 4. *Caprella arimotoi* Takeuchi, 1993, female, 5.10 mm. A, Habitus; B, Antenna 1; C, Antenna 2; D, Gnathopod 1; E, Gnathopod 2. Scale bars: A = 1.0 mm, B, C, E = 0.2 mm, D = 0.1 mm.

margin, sharp projection located subproximal margin, below the subproximal projection with 1 small spine and unequal setae; dactylus falcate, inner margin serrulate; length ratio of 6 articles = 1.00 : 0.15 : 0.30 : 0.13 : 1.70 : 0.98.

Pereopod 5 (Fig. 3F), basis with process posterodistally; ischium short; merus expanded posteriorly, with 2 clusters of setae; propodus subrectangular, longest, both margins with unequal simple setae, palm defined by a pair of grasping spines anteroproximally; dactylus falcate; length ratio of 6 articles = 1.00 : 0.42 : 1.07 : 0.93 : 2.07 : 1.50.

Pereopod 6 (Fig. 3G) similar to pereopod 5, but more elongated than pereopod 5; length ratio of 6 articles = 1.00 : 0.40 : 1.07 : 1.00 : 2.30 : 1.13.

Pereopod 7 (Fig. 3H) similar to pereopod 5, but more elongated than pereopods 5 and 6; length ratio of 6 articles = 1.00 : 0.24 : 1.00 : 0.84 : 1.80 : 1.00.

Female, body (Figs. 2B, 4A) slender, 5.10 mm long (NIBRIV0000876686). Pereonites 3–4 with oostegites; length ratio of pereonites 2–7 = 1.00 : 0.82 : 0.86 : 0.46 : 0.39.

Antenna 1 (Fig. 4B) similar to that of male; length ratio of peduncular articles 1–3 = 1.00 : 1.37 : 0.74; flagellum 9-articulate.

Antenna 2 (Fig. 4C) similar to that of male; length ratio of peduncular articles 3–5 = 1.00 : 2.92 : 2.92; flagellum biarticulate, subequal in length to peduncular article 5, proximal article 3.00 × distal one.

Gnathopod 1 (Fig. 4D) similar to but smaller than that of male.

Gnathopod 2 (Fig. 4E), propodus subovate, slightly longer than basis; palm setose, smooth and slightly convex, without projections, defined by a pair of grasping spines

posteroproximally; length ratio of 6 articles = 1.00 : 0.16 : 0.18 : 0.06 : 1.06 : 0.86.

Distribution. Japan (Mukaishima Island, Seto Inland Sea, Tsushima Islands, Tateyama and Amatsu-Kominato, Chiba), Korea (South Sea).

Remarks. Takeuchi (1993) mentioned that *C. arimotoi* is very close to *C. verrucosa* with the following characteristics: 1) pereonites with dorsal blunt projections; 2) gnathopod 2, basis short; 3) propodus subovate; and 4) pereopods 5–7 with grasping spines anteroproximally. Takeuchi also mentioned that *C. arimotoi* can be distinguished from *C. verrucosa* (different characters of *C. verrucosa* in brackets) by a combination of the following features: (1) antenna 1, subequal to half of the body length (*vs.* about one third of the body length); (2) antenna 1, peduncular articles slender, each length about 4 × width (*vs.* 2 to 3 × width); (3) antenna 2, peduncular articles 2–3 with 4 to 5 pairs of plumose setae (*vs.* more than eight pairs of longer plumose setae); (4) head, mid-dorsal projection curved forward (*vs.* straight forward); (5) pereonites 3–4, without ventrolateral projections (*vs.* with ventrolateral projections); and (6) gills length 3 × width (*vs.* 1.5 × width) (Takeuchi, 1993). However, these differences between these two closely related species are inapplicable to Korean specimens because some of these differences are overlap between Korean *C. arimotoi* and *C. verrucosa* specimens. Thus, we clearly show the differences between *C. arimotoi* and *C. verrucosa* as follow (different characters of *C. verrucosa* in parentheses): (1) pereonites 2–7 without ventrolateral projections (*vs.* pereonites 3–4 with ventrolateral projections); (2) pereonites 3–5 and pereopod 7 slender and elongate (*vs.* stout and moderate); and (3) head with triangular forwardly pointing projection mid-dorsally (*vs.* straight forward). Our specimens share various morphological characteristics with those of the original description by Takeuchi (1993).

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