



# A new record of *Caprella aino* (Crustacea: Amphipoda: Caprellidae) from the southeastern waters of Korea, with comparison to *Caprella mutica*

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## Abstract

40 species of the family Caprellidae Leach, 1814 are recorded in Korean waters. *Caprella aino* Utinomi, 1943 was newly collected from seaweed farms from the southeastern waters of Korea. *C. aino* was firstly reported in Japanese waters in 1943. Adults of *C. aino* and *Caprella mutica* Schurin, 1935 are easily distinguished in that *C. aino* have pereonite II and gnathopod II without setae and two small tubercles of articulation of gills in pereonite III–IV, while *C. mutica* do pereonite II and gnathopod II covered with setae and those of pereonites III–VII with many tubercles. However, subadult *C. mutica* is hardly distinguishable from *C. aino* in that tubercles of pereonite III are less developed and they have inconspicuous setae of pereonite II and gnathopod II. Nevertheless, *C. aino* is distinguished from subadult *C. mutica* because adult *C. aino* have dorsal tubercles on pereonite IV, V, VI, VII unlike that of *C. mutica*. We report *C. aino* as a new record in Korean water with comparison of *C. mutica*.

**Keywords:** New record, *Caprella aino*, *Caprella mutica*, Korean water

## Introduction

Seaweed beds provide substrates and foods for diverse invertebrates including amphipods (Yoo et al., 2007). Many seaweeds farms are located in the southeastern waters of Korea. Seaweed farms are anchored and structured by strong ropes. Ropes as well as seaweeds also provide habitats for diverse invertebrates. During a series of researches on invertebrates, tremendous number of caprellids have been found on the floating ropes in seaweed farms (Fisheries Resource Research Center of Gijang-County, 2019, 2020).

The family Caprellidae Leach, 1814 includes 108 genera. Among the genera, the largest genus *Caprella* Lamarck, 1801 comprises 209 species (WoRMS, 2023). 40 species in the family Caprellidae have been reported in Korean waters (NIBR, 2023).

*Caprella aino* Utinomi, 1943 was firstly reported in Japanese waters (Utinomi, 1943). *C. aino* is hardly distinguishable from subadult *Caprella mutica* Schurin, 1935. *Caprella cf aino* was reported as a fouling organism on a fishing net in Tongyeong (Kim et al., 2021). Accordingly, similar species may be misidentified or regarded as *C. aino*.

This study reports firstly *C. aino* with illustrations. Also, this

Received: Apr 5, 2023 Revised: May 25, 2023 Accepted: May 26, 2023

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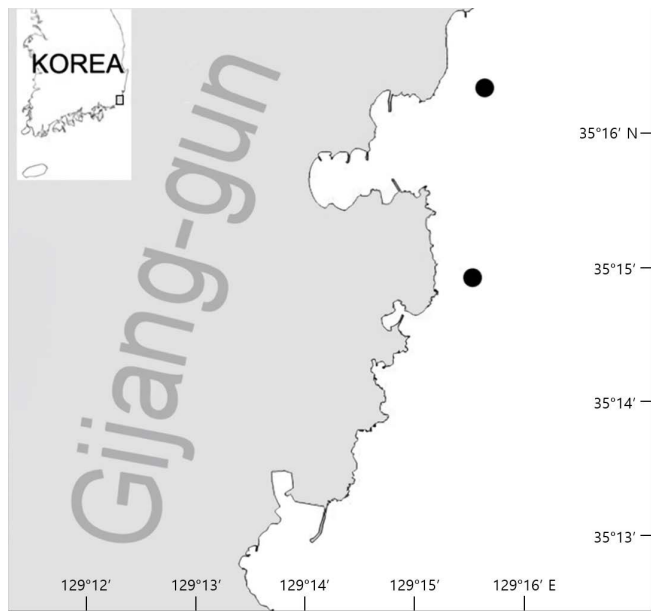
study provides differences between morphological characteristics between *C. aino* and *C. mutica*.

## Materials and Methods

Attached organisms on the floating ropes were monthly collected from seaweed farms from the southeastern water (Gijang-county, Busan) of Korea from March 2021 to December 2021 (Fig. 1). The organisms were fixed in 70% ethyl alcohol in the sampling sites and transported to the laboratory. The attached organisms were classified and *Caprella* spp. were separated under the stereomicroscope (Olympus SZX2ILLK). *C. aino* and *C. mutica* were identified by Arimoto (1976), Heo et al. (2020) and Utinomi (1943). Gnathopod II and pereopods V to VII of adult *C. aino* and subadult *C. mutica* were dissected and mounted on depression slides. Drawings were made with the aid of a drawing tube. Then the illustrations were transformed into digital inking by Adobe Illustrator CC program.

## Results and Discussion

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



**Fig. 1.** Map of the sampling site of southeastern waters in Korea.

### *Caprella aino* Utinomi, 1943 (Figs. 1 and 2)

(New Korean name: A-i-no-ba-da-dae-beol-rae).

*Caprella aino* Utinomi, 1943 (Utinomi, 1943: 284-286, Fig. 2).

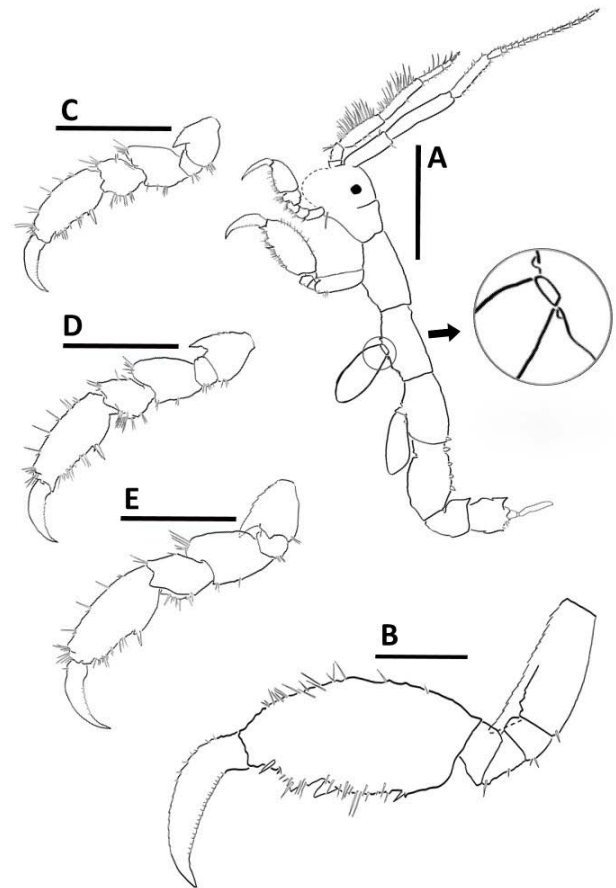
*Caprella (Caprella) aino* Arimoto, 1976 (Arimoto, 1976: 114-116, Figs. 61 and 62).

### Material examined

6♂♂, 8♀♀, Korea: Busan: Gijang-gun: Ilgwang-eup, 23 Jul 2021, 1♂, 3♀♀, Jangan-eup, 28 Oct 2021; 2♂♂, 2♀♀, Gijang-eup, 28 Oct 2021.

### Description

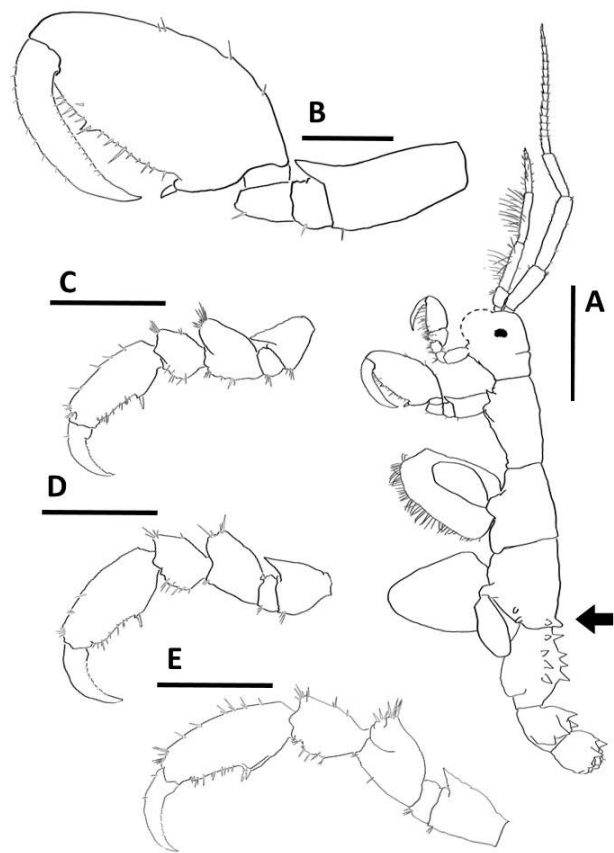
Adult male: Body (Fig. 2A) length about 6.16 mm. Smooth body surface, but with some dorsal tubercles of pereonites V to VII. Length ratio of pereonites I to VII, 0.31:1:0.95:0.86:0.84:0.32:0



**Fig. 2.** *Caprella aino* Utinomi, 1943, male, 6.16 mm. A: Habitus. B: Gnathopod 2. C: Pereopod 5. D: Pereopod 6. E: Pereopod 7. Scale bars: A = 1.0 mm, B = 0.5 mm, C–E = 0.7 mm.

.42. Head rounded and smooth. Pereonite I short. Pereonite II longest. Little shorter pereonite III than pereonite II. Pereonite IV shorter than pereonite III. Pereonite V shorter than pereonite IV. Pereonite VI shortest. Pereonite VII little longer than pereonite VI. Pereonites III and IV of two small tubercles above of articulation of gills. Dorsal tubercles of two pairs on pereonite IV. Pereonite V of four dorsal tubercles. Pereonites VI and VII of one dorsal tubercle. Basis little shorter than half of pereonite II. Short ischium, merus, and carpus, slender propodus, falcate dactyl. Antenna I longer than half of body length. Flagellums 16-articulate with short setae. Peduncular 3-articulate, looking thicker than flagellum with sparse short setae. Antenna II setose, longer than half of antenna I. Flagellum 5 articulate with long setae. Peduncular 1 articulate with sparse short setae. Gills long and narrow. Gnathopod I small, attached to back of mouth part of head. Propodus looking quarter circle shaped. Gnathopod II (Fig. 2B) attached to little front part of pereonite II. Pereopod V (Fig. 2C) propodus with two proximal grasping spines, falcate dactyl. Length ratio of pereopod V 0.58:0.14:0.41:0.51:1:0.60. Pereopod VI (Fig. 2D) form similar to pereopod V, little longer than form similar to pereopod V. Length ratio of pereopod VI 0.49:0.23:0.46:0.52:1:0.63. Pereopod VII (Fig. 2E) form similar to pereopod V, little longer than pereopod VI. Length ratio of pereopod VII 0.45:0.24:0.49:0.53:1:0.59.

Adult female: Body (Fig. 3A) length about 7.01 mm. Smooth body surface, but with some dorsal tubercles of pereonites V to VII. Length ratio of pereonite I to VII 0.21:0.95:1:0.97:0.90:0.43:0.40. Head rounded and smooth. Pereonite I little shorter than half of head. Pereonite II short than pereonites III. Pereonite III longest. Pereonite IV little shorter than pereonite III. Pereonite V little shorter than pereonite IV. Pereonite VI shorter than pereonite V. Pereonite VII shortest. Pereonite IV with two dorsal tubercles. Pereonite V with four dorsal tubercles. Pereonites VI and VII with one dorsal tubercle. Antenna I longer than half of body length, flagellums slender and 16-articulated with short setae. Peduncular 3 articulated with sparse setae. Antenna II little shorter than peduncle of antenna I and setose, flagellums 5 articulated with long setae. Peduncule 1 articulate with sparse setae. Gills long and narrow. Gnathopod I small, attached to back of mouth part of head, propodus looking quarter circle shaped. Gnathopod II (Fig. 3B) attached to front part of pereonite II, basis little shorter than half of pereonite II, short ischium, merus, and carpus, slender propodus, falcate dactyl. Pereopod V (Fig. 3C) Propodus with two proximal grasping spines, falcate dactyl. Length ratio of pereopod V 0.46:0.19:0.49:0.47:1:0.62.



**Fig. 3. *Caprella aino* Utinomi, 1943, female, 7.01 mm.** A: Habitus. B: Gnathopod 2. C: Pereopod 5. D: Pereopod 6. E: Pereopod 7. Scale bars: A = 1.0 mm, B = 0.5 mm, C–E = 0.7 mm.

Pereopod VI (Fig. 3D) form similar to pereopod V, little longer than pereopod V. Length ratio of pereopod VI 0.48:0.17:0.44:0.49:1:0.64. Pereopod VII (Fig. 3E) form similar to pereopod V, little longer than pereopod VI. Length ratio of pereopod VII 0.53:0.13:0.55:0.59:1:0.60.

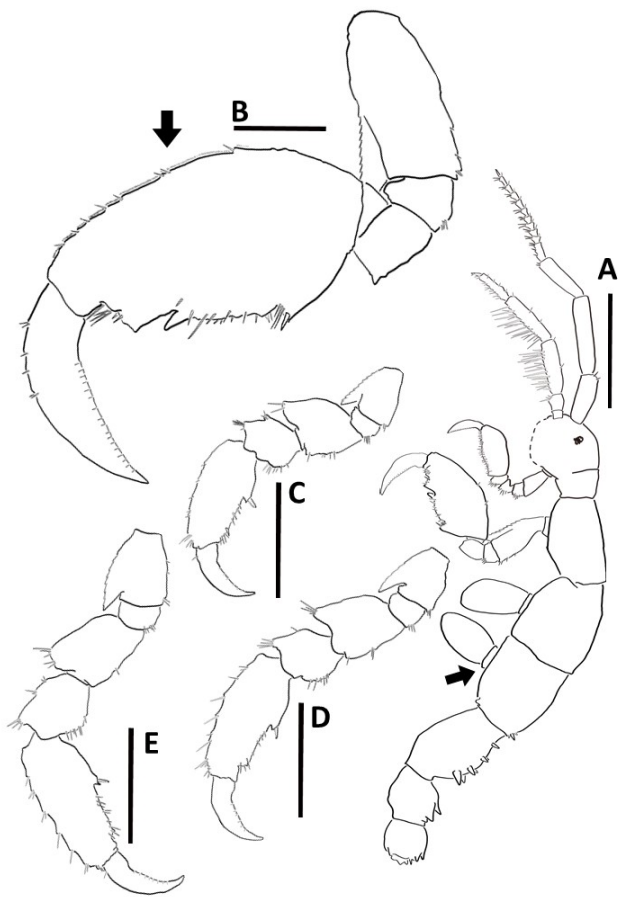
#### **Distribution**

Busan in Korea (the present study); Hokkaido and Bentenzima in Japan (Arimoto, 1976; Utinomi, 1943).

#### ***Caprella mutica* Schurin, 1935 (Fig. 3)**

*Caprella mutica* Schurin, 1935 (Heo et al., 2020: 188-190, Fig. 4; Schurin, 1935: 112, 198, Fig. 1).

*Caprella (Caprella) mutica* Arimoto, 1976 (Arimoto, 1976: 111-112, Fig. 59).



**Fig. 4.** Subadult *Caprella mutica* Schurin, 1935, male, 7.61 mm. A: Habitus. B: Gnathopod 2. C: Pereopod 5. D: Pereopod 6. E: Pereopod 7. Scale bars: A = 1.0 mm, B = 0.5 mm, C–E = 0.7 mm.

*Caprella macho* Platvoet, de Bruyne & Gmelig Meyling (Platvoet et al., 1995: 1–4, Fig. 1).

**Material examined**

1♂, Korea: Busan: Gijang-gun: Jangan-eup, 28 Apr 2021; 5♂♂, 4♀♀, Ilgwang-eup, 10 Jun 2021; 1♂, Ilgwang-eup, 28 Oct 2021; 6♂♂, 2♀♀ Jangan-eup, 06 Dec 2021; 1♂, Ilgwang-eup, 06 Dec 2021.

**Description**

Subadult: Body (Fig. 4A) length about 7.61 mm. Body covered very short setae of pereonite 2 and gnathopod 2, many dorsal tubercles of pereonites III to VII. Length ratio of pereonite I to VII 0.33:0.95:1:0.98:0.97:0.48:0.41. Head rounded and smooth. Pereonite I shortest. Pereonite II similar to basis of gnathopod

II. Pereonite III longest. Pereonite IV little short than pereonite III. Pereonite V as long as pereonite IV. Pereonite VI almost half length of pereonite V. Pereonite VII short than pereonite VI. Pereonite IV with dorsal tubercles of two pairs. Pereonite V with four dorsal tubercles., Pereonites VI and VII with one dorsal tubercle. Antenna I longer than half of body length. Flagellums slender and 11 articulated with short setae. Peduncle 3 articulated with sparse setae. Antenna II little longer than peduncle of antenna I. Flagellums 4 articulated with long setae. Peduncle 1 articulate with sparse setae. Gills long and narrow. Gnathopod I small and attached to back of mouth part of head. Propodus rectangle, gnathopod II (Fig. 4B) attached to little front part of pereonite II, basis little short than pereonite II, short ischium, merus and carpus, propodus very short hairy, falcate dactyl. Pereopod V (Fig. 4C) propodus with short two proximal grasping spines, falcate dactyl, length ratio of pereopod V 0.54:0.14:0.51:0.47:1:0.64. Pereopod VI (Fig. 4D) form similar to pereopod V, little longer than pereopod V, length ratio of pereopod VI 0.44:0.19:0.54:0.45:1:0.61. Pereopod VII (Fig. 4E) form similar to pereopod V, little longer than pereopod VI, length ratio of pereopod VII 0.51:0.17:0.51:0.48:1:0.56.

**Distribution**

Korea (Heo et al., 2020), North-East Asia, Europe, Pacific and Atlantic Ocean of North America, New Zealand (Ashton et al., 2007), South Africa (Peters & Robinson, 2017).

**Discussion**

*C. aino* was firstly recorded in Japanese water. Characteristic of *C. aino* was accorded Arimoto (1976) and Utinomi (1943). *C. aino* and *C. mutica* are found in the same area. Adults of *C. aino* and *C. mutica* are easily distinguishable because adult *C. mutica* have pereonite II and gnathopod II covered with setae and pereonites III–VII with many tubercles, while *C. aino* bear pereonite II and gnathopod II without setae and two small tubercles of articulation of gills. However, adult *C. aino* and subadult *C. mutica* are hardly distinguishable because these have less developed tubercles on pereonite III and inconspicuous setae of pereonite II and gnathopod II. *C. aino* is distinguished from subadult *C. mutica* because adult *C. aino* have dorsal tubercles on pereonite IV, V, VI, VII unlike *C. mutica*. *C. aino* have some dorsal tubercle on pereonite IV–VII. These morphological characteristics given in the study help to tell adult *C. aino* apart subadult *C. mutica*.

**Competing interests**

No potential conflict of interest relevant to this article was reported.

**Funding sources**

This work was supported by a Research Grant of Pukyong National University (2021).

**Acknowledgements**

Not applicable.

**Availability of data and materials**

Upon reasonable request, the datasets of this study can be available from the corresponding author.

**Ethics approval and consent to participate**

This study conformed to the guidance of animal ethical treatment for the care and use of experimental animals.

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