

Redescription of the Bathyal Caprellid, *Caprella unguina*
MAYER, 1903 (Crustacea, Amphipoda)
from the North Pacific

By

Ichiro TAKEUCHI

Department of Fisheries, Faculty of Agriculture, University of Tokyo, Tokyo,

Masatsune TAKEDA

Department of Zoology, National Science Museum, Tokyo

and

Koji TAKESHITA

Shimonoseki Branch, Seikai Regional Fisheries Research Laboratory,
Shimonoseki

Abstract *Caprella unguina* MAYER, 1903 (Crustacea, Amphipoda) is redescribed on the basis of specimens from several localities in the North Pacific: Off British Columbia, off southern California, the Sea of Okhotsk and Suruga Bay of Japan. Contrary to the original figure, eyes cannot be recognized under the binocular microscope in specimens examined. This species varies in setation of antenna II and in shape of merus of gnathopod II. This is the first record of the species in Japanese waters.

In the largest genus of caprellid amphipods, *Caprella*, containing more than 100 species (MCCAIN and STEINBERG, 1970), only the following 10 species have been reported from depths greater than 400 m: *C. equilibra* SAY (SCHELLENBERG, 1926), *C. horrida* G. O. SARS (MAYER, 1890), *C. microtuberculata* G. O. SARS (STEPHENSEN, 1944), *C. punctata* BOECK (STEPHENSEN, 1944), *C. rinki* STEPHENSEN (STEPHENSEN, 1944), *C. unguina* MAYER (MAYER, 1903; VASSILENKO, 1974; GRIFFITHS, 1977; WICKSTEN, 1982), *C. gracillima* MAYER (VASSILENKO, 1974), *C. bathyalis* VASSILENKO (VASSILENKO, 1972, 1974), *C. pacifica* VASSILENKO (VASSILENKO, 1972, 1974) and *C. longicirrata* VASSILENKO (VASSILENKO, 1974). Of these species, *C. unguina* is unique in its habit of clinging to lithodid crabs (GRIFFITHS, 1977; WICKSTEN, 1982).

In 1976 and 1986, many specimens referred to a *Caprella* species unknown from Japanese waters were collected from the mouthparts of three lithodid crabs captured during experimental fishing in the Sea of Okhotsk and commercial fishing in Suruga Bay, on the Pacific side of central Japan. We noticed that this species is very close to, and in fact nearly identical with *C. unguina* MAYER, except that the former species lacks eyes.

In this paper, we redescribe *Caprella unguina* MAYER, 1903 on the basis of materials collected from four localities in the North Pacific, including the syntypes from off British Columbia (MAYER, 1903). *Caprella unguina* has so far been reported from the Sea of Okhotsk, the North Pacific, and several localities in the Southern Hemisphere. This is the first record of this species from the continental shelf of the Japanese Archipelago.

Abbreviations used in this paper are as follows. USNM: National Museum of Natural History, Smithsonian Institution, Washington, D.C.; NSMT: National Science Museum, Tokyo.

Family Caprellidae

Genus *Caprella* LAMARCK, 1801

Caprella unguina MAYER, 1903

(Figs. 1–4)

Caprella unguina MAYER, 1903: 127, pl. 5, fig. 36, pl. 8, figs. 30–31. — MCCAIN & STEINBERG, 1970: 44. — VASSILENKO, 1974: 156, figs. 68(4), 82–83. — GRIFFITHS, 1977: 104, fig. 6.

Material examined. Hecate Strait off Cape Saint James (southern tip of Queen Charlotte Islands), British Columbia, Canada. *Albatross* Station 2860 (51°23'00"N, 130°34'00"W), large beam trawl at 876 fathoms deep; 4 males and 1 premature female (USNM 02910), syntypes; August 31, 1888.

Off southern California (32°45'N, 118°14'W), 925 m deep, clinging to *Paralomis multispina* (BENEDICT); 1 male; May 10, 1978; Dr. M. K. WICKSTEN det.

Sea of Okhotsk (56°00'N, 147°01'E), 410 m deep, clinging to *Lithodes aequispina* BENEDICT collected with crab pot; 1 male and 1 premature female (NSMT–Cr 9526); June 13, 1976; K. TAKESHITA coll.

Off Heda, Suruga Bay, ca. 400 m deep, clinging to *Lithodes aequispina* collected with crab pot; 15 males, 20 immature females, 4 mature females and 6 juveniles (NSMT–Cr 9527); May 10, 1986; the *Seishin-Maru* (Messrs. M. IGARASHI and H. IGARASHI) coll.

Diagnosis. Head round; head and pereon without spine or projection. Pereonite II (and III) the longest of all body segments. Basis of gnathopod II more than half length of pereonite II. Gills oval. Propodi of pereopods V, VI and VII oval, with several stout spines on posterior margin.

Description. Male (syntype "a" from off British Columbia; body length 23.6 mm; Figs. 1 A, 2, 3 A, E, H–J). Head round without eyes (Fig. 2) (see remarks), head and pereon having neither spine nor projection. Pereonite II the longest. Length of head, pereonites I to VII as follows: 1.44, 3.75, 5.65, 4.09, 3.28, 3.28, 1.12 and 0.96 mm.

Antenna I longer than half body length; peduncular segments longer in order of II, III and I; flagellum composed of 15 segments, subequal to one third of peduncular length.

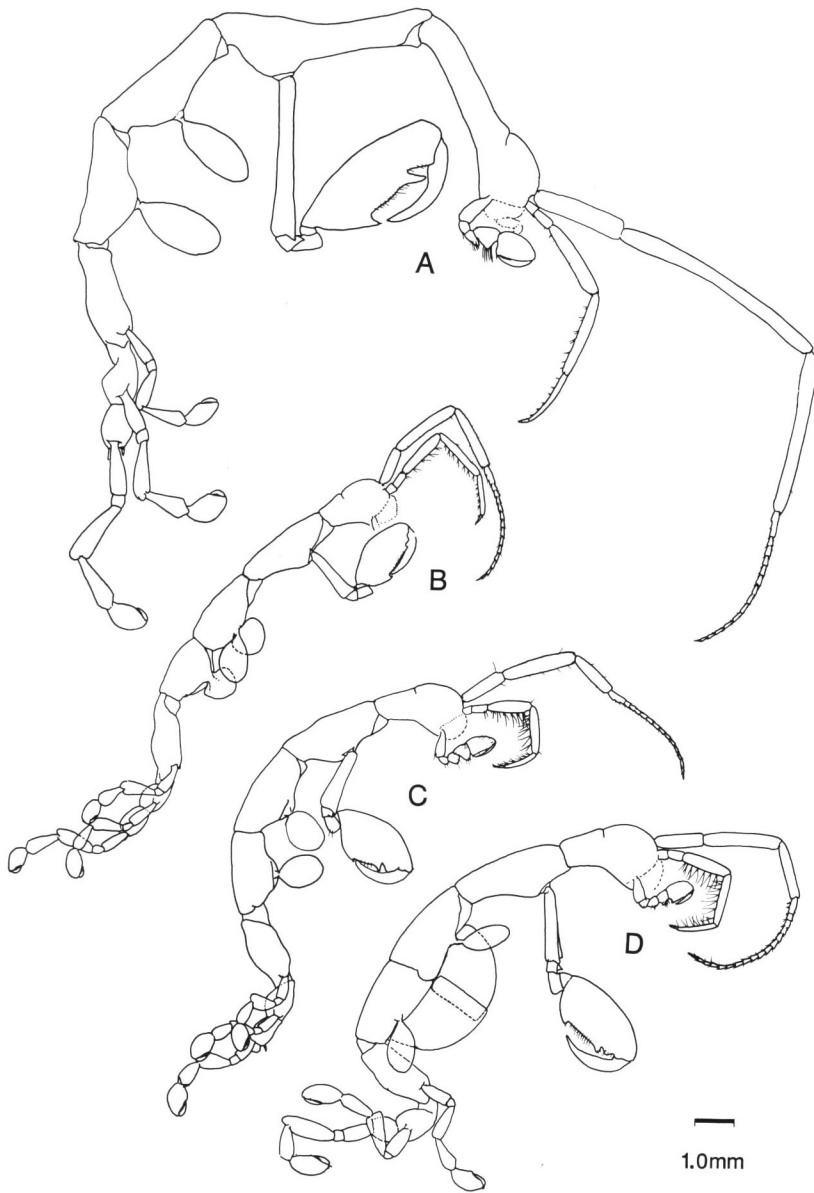


Fig. 1. *Caprella unguina* MAYER, 1903, syntypes from off British Columbia (A, B), and specimens from Suruga Bay (C, D). — A: Male "a". B: Premature female "e". C: Male. D: Mature female.

Antenna II (Fig. 3 A) slightly longer than half length of antenna I; several short setae on ventral surface of peduncular segment IV and flagellum segment I (see remarks).

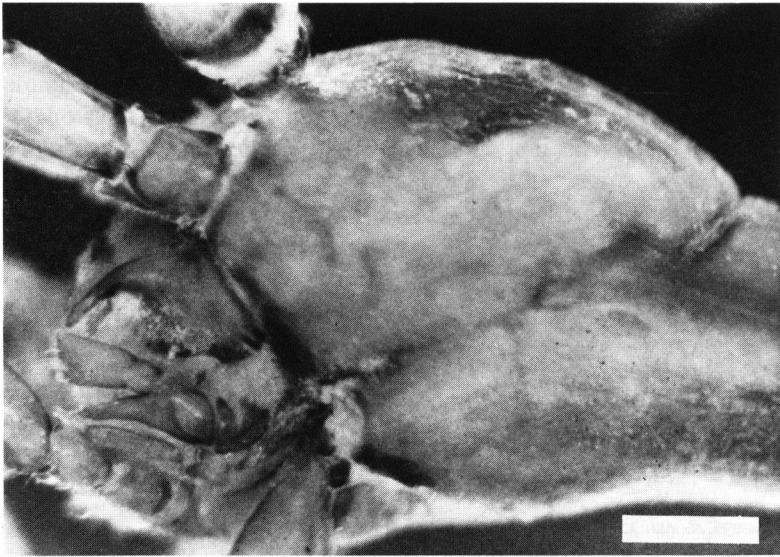


Fig. 2. *Caprella unguilina* MAYER, 1903, head of syntype male "a" from off British Columbia. Bar indicates 0.5 mm.

Gnathopod I with a pair of grasping spines at base of palm.

Gnathopod II (Fig. 3 E) attached to about one fourth from posterior end of ventral surface of pereonite II; basis longer than two thirds of pereonite II with triangular projection at distal end; ischium with a pair of triangular projections at distal end; merus round (see remarks); propodus three fourths as long as pereonite II; palm defined by proximal knob with a palmar spine at about one third from proximal end of propodus; narrow triangular tooth at distal end of palm; broader poison tooth isolated from the triangular tooth by an U-shaped notch.

Gills oval.

Pereopods V to VII (Fig. 3 H-J) longer in order of VII, VI, V. Basis of pereopod V without triangular projection; propodus oval; several stout spines at proximal part of palm. Pereopods VI and VII very similar to pereopod V.

Palp segment IV of maxilliped stout, falcate and longer than setae on palm segment III.

Male (Suruga Bay; body length, 12.1 mm; Figs. 1 C, 4 B, D-M). Pereonites II and III subequal and the longest; length of head, pereonites II to VII as follows: 1.21, 0.87, 2.29, 2.31, 2.06, 1.80, 0.79 and 0.75 mm.

Antenna I shorter than half body length; peduncular segment II the longest, segments I and III subequal; flagellum composed of 15 segments, slightly shorter than peduncle.

Antenna II (Fig. 4 B) with long setae on peduncular segments III, IV and flagellum segment I.

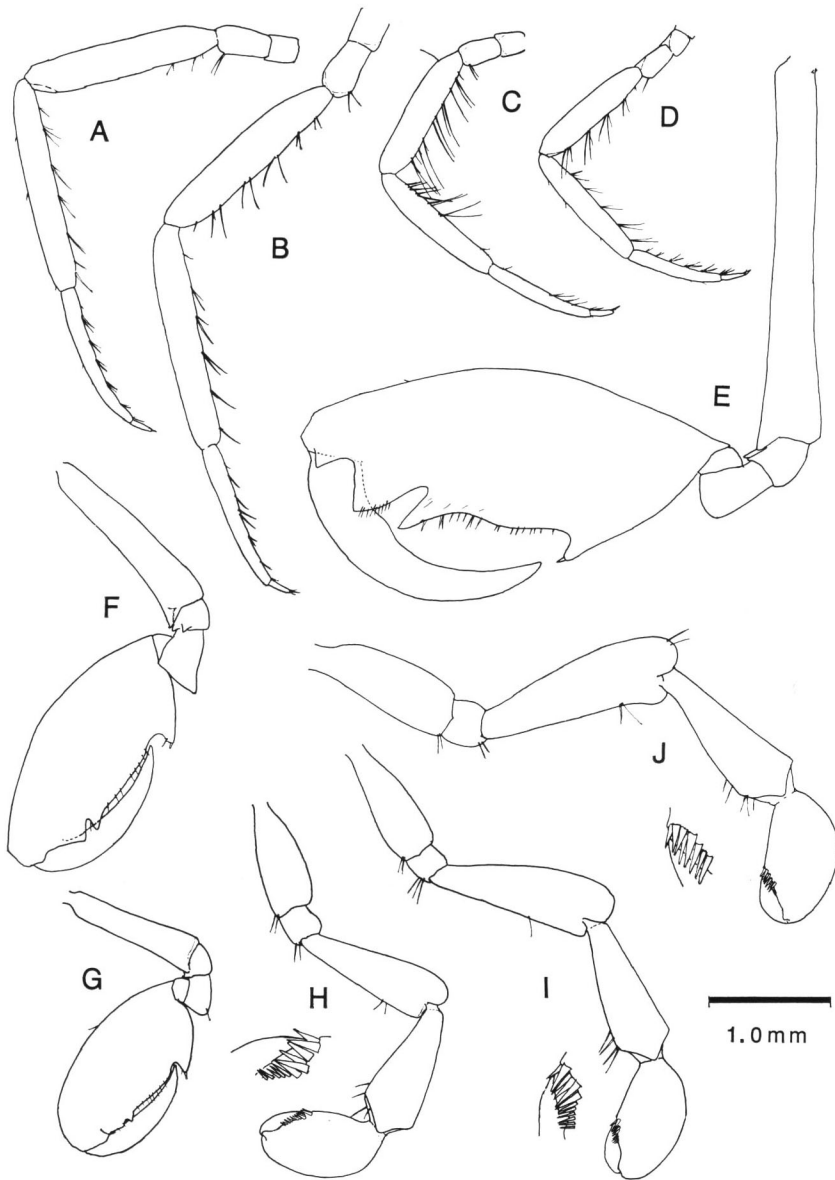


Fig. 3. *Caprella unguлина* MAYER, 1903, syntypes from off British Columbia. Male "a" (A, E, H-J), male "b" (B), male "d" (C, F), and female "e" (D, G). — A-D: Antenna II. E-G: Gnathopod II. H-J: Pereonite V-VII.

Basis of gnathopod II (Fig. 4 E) longer than half length of pereonite II.

Outer lobe of maxilliped (Fig. 4 F) with 10 stout spiniform teeth and several setae on margin; inner lobe with 3 spiniform teeth and numerous setae on margin and a

spiniform tooth near margin; palp segment II with numerous long setae on surface near inner margin; segment III with numerous long setae at medial parts of inner and distal margins; palmar segment IV falcate and longer than setae on segment III. Palp of maxilla I (Fig. 4 G) with 7 spiniform teeth and 3 setae on margin, and several setae on medial surface; outer lobe with 7 long spiniform teeth. Maxilla II (Fig. 4 H) with numerous setae on edges. Right mandible (Fig. 4 I) and left mandible (Fig. 4 J) with incisor divided into 5 teeth, *lacinia mobilis* divided into 5 teeth, and setal row with 2 setae. Lower lip (Fig. 4 K) densely pubescent at upper part of inner lobe and shoulder. Upper lip (Fig. 4 L) also with dense pubescence at upper part.

Tip of abdominal appendage round (Fig. 4 M); distal and proximal segments having 3 and several setae, respectively; abdominal lobe with several setae.

Mature female (Suruga Bay; body length, 13.1 mm; Figs. 1 D, 4 C). Pereonites II and III subequal and longest of body segments; length of head, pereonites I to VII as follows: 1.25, 1.06, 2.61, 2.62, 2.19, 1.97, 0.75 and 0.69 mm. Antenna I shorter than half body length; flagellum composed of 17 segments. Gnathopod II attached to one third from anterior end of pereonite II. Gills thin and oval. Oostegite of pereonite III with numerous short marginal setae on edge; oostegite of pereonite IV without setae.

Premature female (off British Columbia, syntype "e"; body length, 11.4 mm; Figs. 1 B, 3 D, G). Pereonite II the longest; length of head, pereonites I to VII as follows: 1.04, 0.68, 2.54, 2.07, 1.68, 1.96, 0.73 and 0.70 mm. Flagellum of antenna I composed of 15 segments. Basis of gnathopod II (Fig. 2 G) subequal to half length of pereonite II. Gills on pereonite III oval (gills on pereonite IV missing). Oostegites of pereonites III and IV fan-shaped.

Distribution. Type localities. York Bay, Staten Island off Tierra del Fuego; Galapagos Islands; off British Columbia (51°23'N, 130°34'W).

Additional localities. Off southern California (32°45'N, 118°14'W), 945 m deep, and Cortez Bank, off southern California, 1,015 m deep (WICKSTEN, 1982). Sea of Okhotsk, 416 and 410 m deep (VASSILENKO, 1974; present record). Off Heda, Suruga Bay of central Japan, ca. 400 m deep (present record). West of Cape Point of South Africa (33°50'S, 17°21'E), 1,100 m deep (GRIFFITHS, 1977). Puerto Pantalón, Falkland Islands (SCHELLENBERG, 1931). Off Tierra del Fuego (55°07.2'S, 66°29.3'W) (MCCAIN and GRAY, 1971).

Remarks. *Caprella unguina* was established without designation of holotype by MAYER (1903) who dealt with 30 specimens from off British Columbia, one male from the Galapagos Islands and about 20 specimens from Staten Island off Tierra del Fuego. MCCAIN and STEINBERG (1970) reported that the type specimens were deposited at the National Museum of Natural History, Washington, D. C. and the Naturhistoriska Riksmuseet, Stockholm, and designated the two localities, except for the Galapagos Islands, as the type localities. MCCAIN and GRAY (1971), however, designated all the three localities as the type localities. According to the record of USNM, more than 30 specimens from off British Columbia were deposited at the

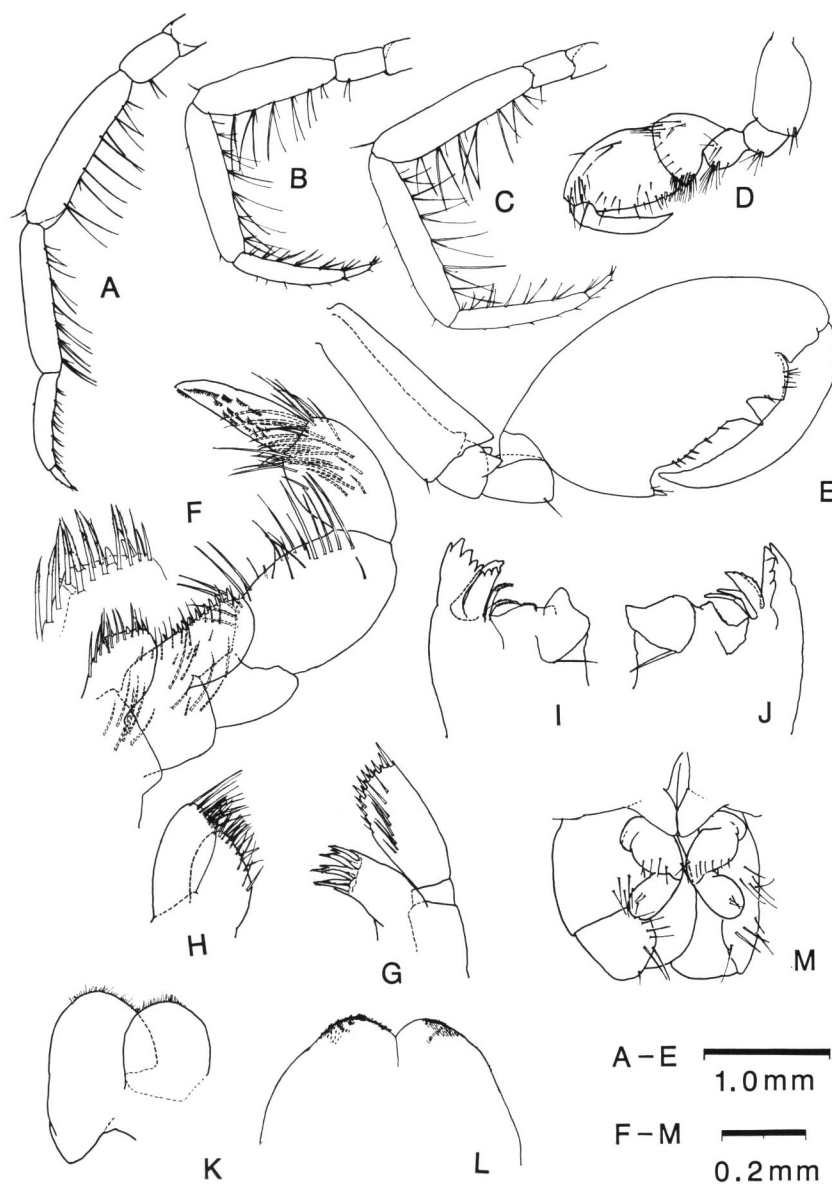


Fig. 4. *Caprella unguлина* MAYER, 1903, specimens from Suruga Bay. Male (17.4 mm) (A), male (12.1 mm) (B, D-M), and mature female (13.1 mm) (C). — A-C: Antenna II. D, E: Gnathopod I and II. F: Maxilliped. G, H: Maxilla I and II. I, J: Right and left mandibles. K, L: Lower and upper lips. M: Abdomen.

museum but only five of them are available for examination at present (BOWMAN, personal communication). Since only the five specimens of USNM were examined in this study, we have refrained from designating the lectotype and the type locality.

None of the four syntype males examined, 15.5 to 24.6 mm in body length, correspond to a male, 13.2 mm in body length, figured by the original author. Therefore, we redescribed and figured the male "a", 23.6 mm in body length, which possesses sexual characteristic of the male, and the female "e", which is a sole specimen of female. In addition, we examined a male from southern California, two specimens from the Sea of Okhotsk, and 45 individuals from Suruga Bay, and described and illustrated additionally a male with body length 12.1 mm and a mature female with 13.1 mm, both from Suruga Bay.

MAYER (1903, pl. 5, fig. 36) and VASSILENKO (1974, fig. 82) distinctly figured the eyes of this species. However, eyes could not be recognized under binocular microscope in any individuals examined by us. GRIFFITHS (1977) did not mention this point in his description, but figured no eyes on material from off Cape Point of South Africa. It is thought that the compound eyes are almost degenerated and covered by cuticular epidermal cells. Histological observations are necessary for elucidating the structure of sensory organs of this peculiar caprellid species.

Setation of antenna II may be variable. Antenna II of the syntype male "a" (23.6 mm; Fig. 2 A) lacks setae on ventral surface of peduncular segment III, while that of the syntype male "b" (24.6 mm; Fig. 2 B) carries setae on the same segment. It is difficult to decide whether the reduction of setae is due to loss during collection or preservation, or due to failure in molting. Among males figured (syntype males, "a," "b" and "d," and males of 17.4 mm and 12.2 mm from Suruga Bay), setae of antenna II of the smaller specimens (12 to 18 mm in body length) are comparatively longer than those of the specimens larger than 20 mm in body length. It is probable that the length of setae of antenna II becomes proportionally shorter as the body length increases, but it is impossible to explain why setae of the syntype female "e" (11.4 mm; Fig. 3 D) are shorter than those of a larger female (13.1 mm; Fig. 4 C) from Suruga Bay.

The posterodistal corner of the merus of gnathopod II varies from round (Fig. 3 E) to triangular (Fig. 3 F). In the specimens figured by MAYER (1903), VASSILENKO (1976) and GRIFFITHS (1977), the merus of gnathopod II is rounded. It is difficult to conclude at present whether or not this variation is merely individual, or developmental or geographical. Additional materials of different size from several localities must be examined for further study on the variation.

Discussion

This bathyal species has been actually studied by the original author (MAYER, 1903), SCHELLENBERG (1931), MCCAIN and GRAY (1971) and VASSILENKO (1974), but they have made no mention of habit and habitat condition of the specimens.

It was GRIFFITHS (1977) who first recorded numerous males and juveniles clinging to appendages of a deep-sea lithodid crab, *Neolithodes asperrimus* BARNARD, which is endemic in South Africa, 900–1,200 m deep (BARNARD, 1947, 1950; KENSLEY, 1968). Later, WICKSTEN (1982) obtained two specimens from *Paralomis multispina* (BENEDICT) of the family Lithodidae, collected at the Cortez Bank, off San Diego, California. In 1976, the third author (KT) found the caprellids on mouthparts of two females (137.5×128.0 m, 140.0×133.5 mm in carapace width $\times$ length) of *Lithodes aequispina* BENEDICT of the family Lithodidae, which were collected with crab pots at a depth of 410 m in the Sea of Okhotsk. Recently, in 1986, the second author (MT) had a chance to examine numerous specimens of *P. multispina* and two *L. aequispina* from Suruga Bay off Heda, west coast of the Izu Peninsula, central Japan, and obtained many caprellids from the mouthparts of one *Lithodes* specimen. According to SCHMITT (1921), SAKAI (1971) and other fragmentary data, *P. multispina* ranges from the Bering Sea to off San Diego, California, along the Pacific coast of America, and also through the Sea of Okhotsk and the Pacific coast of northern Japan to Suruga Bay, central Japan, living bathymetrically in depths from 300 to 1,500 m. In Suruga Bay *P. multispina* is fished commercially with crab pots and locally used for food. *L. aequispina* is also known from the Bering Sea, the Sea of Okhotsk, and the Pacific coast of northern Japan, 250–730 m deep (SAKAI, 1971). As already mentioned, *C. unguлина* is recorded not only from the North Pacific, but also from the Galapagos Islands, off Tierra del Fuego and the Falkland Islands. Therefore the distribution of this caprellid is wider than any species of lithodid crabs so far reported as the host of this species.

The third author (KT) transported two females of *Lithodes aequispina* from the Sea of Okhotsk to the laboratory aquarium of the Far Seas Fisheries Research Laboratory, Shimizu, Shizuoka Prefecture, central Japan. In the smaller female, more than 30 specimens of *Caprella unguлина* were found on the first to third maxillipeds, the maxilla and the basal part of the antenna, and in the larger female, more than 50 specimens clinging to the setae of the maxillipeds and maxilla and also of the palp of the mandible. Unfortunately, most of the caprellids were accidentally swept away during aquarium rearing with host crabs, and at present only two preserved specimens are available for examination. A result of brief observations on the clinging behavior of this caprellid will be published in another paper of us.

Acknowledgements

We express sincere thanks to Dr. T. E. BOWMAN, USNM, for critically reading the manuscript and loan of the type specimens examined. We also acknowledge Mr. S. ISHIMARU, Rokusei High School, for useful comments on the earlier draft of the manuscript, Mr. H. FUJITA, Far Seas Fisheries Research Laboratory, for assistance in collecting and rearing the caprellids, and Dr. M. K. WICKSTEN, Texas A & M University, for loaning the specimen used in this study. The first author (IT) expresses his thanks to Prof. R. HIRANO, the University of Tokyo, for providing him with

facilities and encouragement throughout the study. The Russian papers were read by Dr. Y. KUWANO, NSMT, to whom we must tender our cordial thanks.

Literature

- BARNARD, K. H., 1946. Descriptions of new species of South African decapod Crustacea, with notes on synonymy and new records. *Ann. Mag. nat. Hist.*, (11), **13**: 361–392.
- 1950. Descriptive catalogue of South African decapod Crustacea. *Ann. S. Afr. Mus.*, **38**: 1–837.
- GRIFFITHS, C. L., 1977. Deep-sea amphipods from west of Cape Point, South Africa. *Ann. S. Afr. Mus.*, **73**: 93–104.
- KENSLEY, B. F., 1968. Deep sea decapod Crustacea from west of Cape Point, South Africa. *Ann. S. Afr. Mus.*, **50**: 283–323.
- MAYER, P., 1890. Die Caprelliden des Golfes von Neapel und der angrenzenden Meeres-Abschnitte. Nachtrag zur Monographie derselben. *Fauna Flora Golf. Neapel*, **17**: 1–157, pls. 1–7.
- 1903. Die Caprellidae der Siboga-Expedition. *Siboga-Exped.*, **34**: 1–160, pls. 1–10.
- MCCAIN, J. C., & W. S. GRAY, JR., 1971. Antarctic and Subantarctic Caprellidae (Crustacea: Amphipoda). *Antarct. Res. Ser.*, **17**: 111–139.
- & J. E. STEINBERG, 1970. Amphipoda I. Caprellidea I. Fam. Caprellidae. *Crust. Catal.*, (2): 1–78.
- SAKAI, T., 1971. Illustrations of 15 species of crabs of the family Lithodidae, two of which are new to science. *Res. Crust.*, (4, 5): 1–49, pls. 1–21.
- SCHELLENBERG, A., 1926. Die Caprelliden und *Neoxenodice caprellinoides* n.g. n. sp. der deutschen Südpolar-Expedition, 1901–1903. *Deutsch. Südpol.-Exped.*, **18** (Zool.-10): 465–476.
- 1931. Gammariden und Caprelliden des Magellangebietes, Südgeorgiens und der West-antarktis. *Further zool. Res. Swed. Antarct. Exped.*, **2**(6): 1–290, pl. 1.
- SCHMITT, W. L., 1921. The marine decapod Crustacea of California, with special reference to the decapod Crustacea collected by the United States Bureau of Fisheries steamer "Albatross" in connection with the Biological Survey of San Francisco Bay during the years 1921–1923. *Univ. Calif. Publ. Zool.*, **23**: 1–470.
- STEPHENSON, K., 1944. Crustacea Malacostraca VIII (Amphipoda IV). *Danish Ingolf Exped.*, **3**(13): 1–51.
- VASSILENKO, S. V., 1972. New species of genus *Caprella* (Amphipoda, Caprellidae) from the Sea of Okhotsk and the north-west Pacific. *Trudy Zool. Inst., Acad. Sci. USSR*, **52**: 223–236. (In Russian with English title.)
- 1974. Caprellids of the sea of USSR and adjacent waters. *Opredel. po Fn. USSR*, (107): 1–287. (In Russian.)
- WICKSTEN, M. K., 1982. Crustaceans from baited traps and gill net off southern California. *Calif. Fish Game*, **68**: 244–248.