

Caprellids (Crustacea: Amphipoda: Caprellidae) Collected from the Ogasawara (Bonin) Islands

Masakazu Aoki¹⁾ and Akira Asakura²⁾

¹⁾ Shimoda Marine Research Center, University of Tsukuba
5–10–1 Shimoda, Shizuoka 415, Japan

²⁾ The Natural History Museum and Institute, Chiba
955–2 Aoba-cho, Chuo-ku, Chiba 260, Japan

Abstract Five species of caprellids, *Caprella equilibra* Say, *C. brevirostris* Mayer, *C. penantis* Leach, *C. verrucosa* Boeck and *Hemiaegina minuta* Mayer (Crustacea: Amphipoda), were collected from the Chichijima of the Ogasawara Islands during the expedition conducted by the Natural History Museum and Institute, Chiba. Only four species of caprellids have previously been recorded from the Ogasawaras, and four species among the present collection are new to the Ogasawaras. The species composition strongly represented more temperate characteristics than tropical one, despite the subtropical location of the islands.

Key words: Oceanic islands, Ogasawara Islands, rocky intertidal, subtropical, *Caprella*, *Hemiaegina*.

The Ogasawara (Bonin) Islands (Lat. 27°N, Long 142°E) are isolated oceanic islands in the subtropical Pacific, located 1000 km south from the main Japan Islands, and several endemic species have been found in the marine environment (Asakura *et al.*, 1993). The caprellid fauna of the Ogasawara Islands has been poorly known, although the several marine biological expeditions have been conducted there to date (see Eldredge, 1975 for review). Four species have been recorded by Arimoto (1980, 1982); *Caprella corallina* Arimoto, *Caprella temperativa* Arimoto, *Caprella californica* Stimpson and *Caprella penantis* Leach. The Natural History Museum and Institute, Chiba, conducted biological expeditions to the Ogasawara Islands in 1989, 1990 and 1991. During these expeditions, five species of caprellids, including four species new to the Ogasawara Islands, were collected. Then, eight species of caprellids are recorded from the islands in total. In this paper, we report the five caprellid species and discuss the biogeographical characteristics of the caprellid fauna of the Ogasawara Islands.

Methods

All specimens were collected in the lower intertidal zone of rocky shores on the east side of Chichijima Island of the Ogasawara Islands on 26 May 1990 by the second author. Specimens were fixed with 10% formalin solution, brought to the laboratory, identified to species, sexed and body length was measured. The size in the description refers to body length, which was obtained by summing the lengths of the 7 pereonites. Individuals smaller than 3 mm in *Caprella brevirostris*, 5 mm in *C. penantis* and 4 mm in *C. verrucosa* are described as juveniles.

All of the specimens are deposited at the Natural History Museum and Institute, Chiba. CBM-ZC is the registration code for crustaceans. A list of collected species with restricted synonymy is given in this report. Previous records in the Ogasawara Islands are provided. For a detailed synonymy, consult McCain and Steinberg (1970).

List of Collected Species

Superclass Crustacea
Class Malacostraca
Order Amphipoda
Family Caprellidae

1. *Caprella equilibra* Say

Caprella equilibra Say, 1818, 391; Arimoto, 1971, figs. 1–3.

Caprella (*Rostrhicephala*) *equilibra*: Arimoto, 1976, 195, figs. 106–108.

Material examined. 1 female, 3.9 mm, on *Sargassum patens* C. Agardh, CBM-ZC-929.

Previous record. New to the Ogasawara Islands.

2. *Caprella brevirostris* Mayer

Caprella brevirostris Mayer, 1903, 95, pl. 3, fig. 45, pl. 7, figs. 74–76.

Caprella (*Rostrhicephala*) *brevirostris*: Arimoto, 1976, 206, fig. 111.

Material examined: 4 males, 3.6–4.8 mm, 10 females, 3.2–6.3 mm, on *Sargassum patens* C. Agardh, CBM-ZC-930; 3 males, 3.2–4.0 mm, 3 females, 3.8–5.1 mm, 9 juveniles, 1.1–2.8 mm, on *Pterocladia densa* Okamura, CBM-ZC-931; 1 juvenile, 1.0 mm, on *Laurencia* sp., CBM-ZC-932.

Previous record. New to the Ogasawara Islands.

3. *Caprella penantis* Leach

Caprella penantis Leach, 1814, 404

Caprella (*Rostrhicephala*) *penantis*: Arimoto, 1976, 209, figs. 113–114.

Material examined. 49 males, 5.7–11.1 mm, 72 females, 5.0–7.8 mm, 103 juveniles, 2.3–4.9 mm, on *Sargassum patens* C. Agardh, CBM-ZC-933; 3 males, 7.0–9.0 mm, 5 females, 5.5–7.5 mm, 11 juveniles, 1.3–4.5 mm, on *Pterocladia densa* Okamura, CBM-ZC-934; 2 juveniles, 2.8–3.0 mm, on *Laurencia* sp., CBM-ZC-935.

Previous record. Arimoto (1982).

4. *Caprella verrucosa* Boeck

Caprella verrucosa Boeck, 1871, 38, fig. 4.

Caprella (*Spinicephala*) *verrucosa*: Arimoto, 1976, 122, figs. 67A–C, figs. 67 E–H.

Material examined. 1 female, 4.2 mm, 1 juvenile, 2.7 mm, on *Sargassum patens* C.

Agardh, CBM-ZC-936; 9 males, 4.5–10.0 mm, 7 females, 4.1–5.2 mm, 19 juveniles, 1.2–3.1 mm, on *Pterocladia densa* Okamura, CBM-ZC-937.

Previous record. New to the Ogasawara Islands.

Remarks. Recently, Takeuchi (1993) revealed serious confusion of *C. verrucosa* Boeck, 1871 in which previously reported *Caprella verrucosa* (e.g., Arimoto, 1976) involved two different species and described one of these as a new species *Caprella arimotoi*, which has formerly known as “a slender type” of *Caprella* (*Spinicephala*) *verrucosa* (e.g., Fig. D in Arimoto, 1976). The present specimens are, however, identical with *Caprella verrucosa* but not with *Caprella arimotoi*.

5. *Hemiaegina minuta* Mayer

Hemiaegina minuta Mayer, 1890, 40, pl. 1, figs. 25–27, pl. 3, figs. 32–35, pl. 5, figs. 52–53, pl. 6, figs. 13, 33–34, pl. 7, fig. 4; Arimoto, 1976, 58, fig. 26; Arimoto and Kikuchi, 1977, 95, fig. 41.

Material examined. 3 males, 5.0–5.8 mm, 4 females, 3.0–4.7 mm, on a hydrozoa, *Plumularia* sp., CBM-ZC-938.

Previous record. New to the Ogasawara Islands.

Discussion

In total, eight species of caprellids have been recorded from the Ogasawara Islands (the present study; Arimoto, 1980, 1982), consisting of seven species of *Caprella* and one species of *Hemiaegina*. Dominance of *Caprella* in species composition of caprellids is a common phenomena in temperate to cold waters of Japan. In subtropical to tropical regions, however, genera other than *Caprella* are usually dominant (McCain and Steinberg, 1970; Arimoto, 1973; Laubitz, 1991). In the Ogasawara Islands, despite the subtropical location of the islands, the species of *Caprella* dominate in our collection.

The species found in the Ogasawaras may have higher dispersal ability. *C. penantis*, *C. equilibra* and *H. minuta* are known as cosmopolitan species, and *C. brevirostris* and *C. verrucosa* have been recorded from both the east and west coasts of the Pacific Ocean (McCain and Steinberg, 1970). The five *Caprella* spe-

cies, *C. brevisrostris*, *C. californica*, *C. equilibra*, *C. penantis* and *C. verrucosa*, have been found from floating seaweeds (Hirosaki, 1964; Arimoto, 1979; Ito, 1988) or floating buoys (Sakaguchi, 1979; Caine, 1987). Moreover, *C. penantis* and *C. equilibra* have been obtained as plankton (Irie, 1959; Williams and Bynum, 1972). Thus, these species may be able to migrate to isolated, oceanic islands such as the Ogasawaras by rafting, floating or drifting beyond the ocean. The Hawaii Islands are another oceanic islands, and *C. equilibra*, *C. penantis* and *H. minuta* have even been found there (McCain and Steinberg, 1970).

C. corallina and *C. temperativa* were described by Arimoto (1980, 1982), though little is known about the biogeographical distribution of these species.

Rafting, floating and passive dispersal are supposed to be major possible methods of migration for small crustaceans (Highsmith, 1985; Locke and Corey, 1989). Based on known records of caprellid distribution, the caprellid fauna so far having been recorded in the Ogasawara Islands seems to have been established by the migration from the other areas such as the main Japanese Islands, the Asian continent, and other temperate to tropical waters, and it is necessary to confirm whether this population is certainly established in the Ogasawaras or not. Furthermore, in this time, the samplings were made only at the lower intertidal zone of rocky shores. Further examination of the caprellid fauna in sheltered areas and in other subtidal habitats is needed to describe caprellid fauna in the Ogasawara Islands completely.

Acknowledgments

We would like to thank Raymond K. Nakamura of the Vancouver Aquarium and Dr. Shun-Ichiro Naomi of the Natural History Museum and Institute, Chiba, for improvement of the manuscript. Thanks are also due to Dr. Masahiko Miyata of the Natural History Museum and Institute, Chiba, for identifying seaweeds. This work is a part of the results of the project study "Natural History of the Izu-Mariana Arc" conducted by the Natural History Museum and Institute, Chiba. This is the contribution No. 577 to the Shimoda Marine Research Center, University

of Tsukuba.

References

- Arimoto, I. 1971. The Caprellidae (Crustacea, Amphipoda) of Lake Kamo-ko and Ryotsu Bay, Sado Island. Ann. Rep. Sado Mar. Biol. Stat. 1: 29-50.
- Arimoto, I. 1973. Studies on the distribution, ecology and other biological phenomena of caprellids around the Japanese Waters I. Bull. Biogeogr. Soc. Jap. 29: 39-64.
- Arimoto, I. 1976. Taxonomic studies of caprellids found in the Japanese and adjacent waters. Spec. Publ. Seto Mar. Biol. Lab. 3: 1-229.
- Arimoto, I. 1979. On caprellids with drifting seaweeds from Kodomari, Fukui Pref., Japan. Res. Crust. 9: 47-51.
- Arimoto, I. 1980. A new species *Caprella* (*Caprella*) *corallina* n. sp. (Amphipoda, Caprellidae) from Ogasawara, Japan. Ann. Rep. Stud. Bunkyo Univ. Women's College 24: 55-56.
- Arimoto, I. 1982. Three species of caprellid amphipods from Ogasawara Islands, with a description of a new species. Proc. Jap. Soc. Syst. Zool. 22: 21-23.
- Arimoto, I. and T. Kikuchi. 1977. Caprellids obtained in the vicinity of Amakusa Islands, West Kyushu. Publ. Amakusa Mar. Biol. Lab. 4: 91-98.
- Asakura, A., S. Nishihama and Y. Kondo. 1993. Studies on the biology and ecology of the intertidal animals of Chichijima Island in the Ogasawara (Bonin) Islands. 1. List of collected species with comments on some species. Atoll Res. Bull. 383: 1-17.
- Boeck, A. 1871. Bidrag til Californiens Amphipode-fauna. Forhandl. Vidensk. Selskabet Christiana, pp. 32-51.
- Caine, E. A. 1987. Potential effect of floating dock communities on a South Carolina estuary. J. Exp. Mar. Biol. Ecol. 108: 83-91.
- Eldredge, L. G. 1975. Biological research in the Bonin Islands. Atoll Res. Bull. 185: 34-37.
- Highsmith, R. C. 1985. Floating and algal rafting as potential dispersal mechanisms in brooding invertebrates. Mar. Ecol. Prog. Ser. 25: 169-179.
- Hirosaki, Y. 1964. Ecological study on fishes with the drifting seaweeds. III. Accompanying animals excluded fishes. Miscel. Rep. Res. Inst. Nat. Res. 62: 63-70.
- Irie, H. 1959. Studies on pelagic amphipods in the adjacent seas of Japan. Bull. Fac. Fish., Nagasaki Univ. 8: 20-42.
- Ito, S., K. Ikehara and Y. Honma. 1988. Caprellids (Crustacea: Amphipoda) attached to the floating seaweeds in the Sea of Japan. Benthos Res. 32: 30-36.
- Laubitz, D. R. 1991. Crustacea Amphipoda Caprell-

- idea: Caprellids from the western Pacific (New Caledonia, Indonesia and the Philippines). In A. Crosnier (ed.), Résultats des Campagnes Musorstom, Vol. 9. Mém. Mus. natn. Hist. nat. (A) 152: 101-123.
- Leach, W. E. 1814. Crustaceology. In The Edinburgh encyclopedia, (ed.) D. Brewster, Edinburgh, Vol. 7, Part 2, pp. 385-437.
- Locke, A. and S. Corey, 1989. Amphipods, isopods and surface currents: a case for passive dispersal in the Bay of Fundy, Canada. J. Plankton Res. 11: 419-430.
- McCain, J. C. and J. E. Steinberg. 1970. Amphipoda I. Caprellidea I. Fam. Caprellidae. Crustaceorum Catalogus, (eds.) H. E. Gruner and L. B. Holthuis, Part 2: 1-78.
- Sakaguchi, M. 1979. On the caprellids attaching to the buoys. Hyogo Seibutsu 7: 235-238.
- Say, T. 1818. An account of the Crustacea of the United States. J. Acad. Nat. Sci. Philadelphia 1: 374-401.
- Takeuchi, I. 1993. *Caprella arimotoi*, a new species (Crustacea: Amphipoda: Caprellidea) from the Seto Inland Sea, Japan. Proc. Biol. Soc. Wash. 106: 115-121.
- Williams, A. B. and K. H. Bynum. 1972. A ten-years study of meroplankton in North Carolina Estuaries: Amphipods. Chesapeake Sci. 13: 175-192.
(Accepted on 13 October 1994)

小笠原諸島から採集されたワレカラ類
(甲殻上綱, 端脚目, ワレカラ科)

青木優和¹⁾・朝倉 彰²⁾

¹⁾ 筑波大学下田臨海実験センター
〒415 静岡県下田市 5-10-1

²⁾ 千葉県立中央博物館動物学研究科
〒260 千葉市中央区青葉町 955-2

千葉県立中央博物館が小笠原諸島でおこなった調査で、5種類のワレカラ類 *Caprella equilibra* Say, *C. brevisrostris* Mayer, *C. penantis* Leach, *C. verrucosa* Boeck, *Hemiaegina minuta* Mayer を採集した。小笠原ではこれまで4種類の報告があるのみで、今回得られた種類のうち4種類が小笠原新記録種であった。これらの種組成は、小笠原が亜熱帯の気候下にあるにもかかわらず、温帯的要素を強く示していた。