The caprellidean Amphipoda from the subantarctic islands of New Zealand and Australia with the description of a new genus and two new species*

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SUMMARY: The Caprellidea of The Snares, Antipodes Islands, Auckland Islands, Campbell Island and Macquarie Island are reported from collections made between 1973 and 1977 by the Australian Museum, and collections made between 1967 and 1972 by researchers associated with the United States Antarctic Program (USAP). One new genus, *Caprellaporema*, and two new species, *Caprellaporema subantarctica* and *Pseudaeginella campbellensis* are described, *Caprella manneringi* McCain, 1979 is redescribed, and lateral view figures of the remaining species of the subantarctic islands are also provided.

Key words: Crustacea, Amphipoda, Caprellidea, Subantarctica, new taxa.

RESUMEN: LOS ANFÍPODOS CAPRÉLIDOS DE LAS ISLAS SUBANTÁRTICAS DE NUEVA ZELANDA Y AUSTRALIA CON LA DESCRIPCIÓN DE UN NUEVO GÉNERO Y DOS NUEVAS ESPECIES. – Se estudiaron los caprélidos (Amphipoda: Caprellidea) de las islas Snares, Antipodes, Auckland, Campbell y Macquarie, recolectados entre 1973 y 1977 por el *Australian Museum*, y entre 1967 y 1972 por investigadores asociados al *United States Antarctic Program* (USAP). Se describe un género nuevo, *Caprellaporema*, y dos especies nuevas, *Caprellaporema subantarctica* y *Pseudaeginella campbellensis*, y se redescribe *Caprella manneringi* McCain, 1979. Se incluyen también ilustraciones de las vistas laterales del resto de las especies encontradas en las islas subantárticas

Palabras clave: Crustacea, Amphipoda, Caprellidea, Subantártida, nuevos taxones.

INTRODUCTION

Recently, there has been a general effort to contribute to the knowledge of Antarctic and Subantarctic fauna. For example, the "Polarstern" surveys, carried out within the framework of the international EASIZ (Ecology of the Antarctic Shelf Ice Zone) Programme, are helping to improve our understanding of the Southern Ocean fauna, including caprellids (Guerra-García, 2001; Guerra-García and Coleman, 2001). From 1963 to 1992 the Smithsonian Oceanographic Sorting Center (SOSC) received and sorted more than 20,000 samples of benthic invertebrates, plankton, algae and fish collected by researchers associated with the United States Antarctic Program (USAP). The project "Synopses of the Antarctic Amphipods", devoted to amphipod crustaceans, is another example of improving the knowledge of Antarctic marine invertebrates through the Antarctic Amphipodologists Network, which is assisted by the Royal Belgian Institute of Natural Sciences, Brussels.

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The majority of the above projects and sampling programmes focus on Antarctic fauna, and few studies have been carried out along Subantarctic areas, which are very important as transitional zones between temperate and Antarctic waters. However, we can point out the important scientific effort undertaken by the "Joint Magellan" Expedition (Chilean-German-Italian) in 1994 on board the *Victor Hensen* in the Magellanic region; the collection of the Amphipoda from the "Joint Magellan" expedition were investigated by De Broyer and Rauschert (1999).

The Australian Museum, as a part of a general shallow-water amphipods collection, carried out several sampling programmes along the Subantarctic Islands of New Zealand and Australia (Aucklands Islands, The Snares and Campbell Island). Additionally, caprellids were collected by the USAP Program (National Museum of Natural History, Smithsonian Institution) from the Antipodes Islands, Campbell Island and Macquarie Island. The collections of the Australian Museum focused on shallow water amphipods, while the Smithsonian Collections focused on deeper waters (around 100 m). The caprellids from both collections are studied in the present paper.

The gammaridean collections of the Australian Museum around these Subantarctic Islands have recently been studied (families Melitidae and Hadziidae by Lowry and Fenwick (1983), family Lysianassoidea by Lowry and Stoddart (1983)) but the caprellidean collections were still awaiting identification. Before these extensive works of Lowry and Fenwick (1983) and Lowry and Stoddart (1983), only a few studies had been carried out along the islands south of New Zealand and Australia. Lowry and Fenwick (1983) gave a general account of previous amphipod studies from this area, plus a description and maps of the sampling areas where the Australian Museum staff collected the material, an account of collecting methods, and a detailed station list.

Only four caprellid species had been reported from the area before this study: *Caprella equilibra* Say, 1818, a cosmopolitan species reported from the Auckland Islands (McCain, 1969) and the Antipodes Islands (McCain, 1979), *Caprella manneringi* McCain, 1979 associated with a starfish from Antipodes Island (McCain, 1979), *Caprellina longicollis* (Nicolet, 1849) found at the Antipodes and Auckland Islands (McCain, 1969, 1979) and *Caprellinoides mayeri* (Pfeffer, 1888), an Antarctic species which has been recorded from Macquarie Island (McCain and Gray, 1971). The present collection studied in this paper contained these four species that had already been recorded in the area, plus one new genus, *Caprellaporema,* and two new species, *Caprellaporema subantarctica* sp. nov. and *Pseudaeginella campbellensis* sp. nov., which are described as new for science in the present paper. Together with the complete descriptions of the new taxa, a full redescription of *C. manneringi* and lateral views of the remaining species are given. A key to the six species reported so far in the study area is also provided.

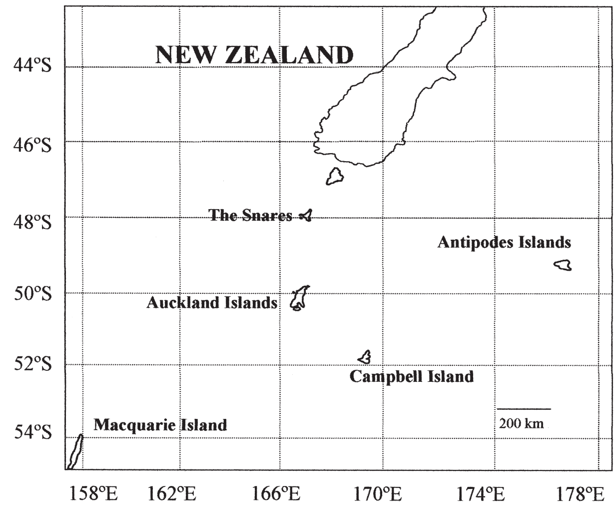

FIG. 1. – Map of the study area showing the location of The Snares, Antipodas Islands, Auckland Islands, Macquarie Island and Campbell Island. For more information and maps of each island see Lowry and Fenwick (1983).

STUDY AREA

The Subantarctic Region, extending between the Antarctic convergence and the loosely defined Subtropical Convergence or Front, entirely under the West Wind Drift influence, can be divided into two sub-regions or provinces (De Broyer and Jazdzewski, 1993): the Magellanic sub-region which embraces the seas around the southern tip of South America, and the Subantarctic Islands sub-region which comprises several groups of islands. The Antipodes Islands, Auckland Islands, Campbell Islands, Macquarie Island and The Snares belong to these groups of islands in the Subantarctic Region (Fig. 1). A detailed geological and biological description of these islands is given in Lowry and Fenwick (1983).

STATION LIST

Auckland Islands
(All from the Australian Museum collections)

SA 502-513 south-east side of Ocean Island, Port Ross; Auckland Islands, 50°32'S 166°16'E; algae from rocks, 0-3m; D.S. Horning, 19 and 20 February 1973.
SA 580 Western Harbour, Auckland Islands, 50°49'S 165°55'E; algae from soft bottom, on anchor of *Acheron*, 10m; J.K. Lowry 2 February 1973.
SA 581, 586 and 600 Waterfall Inlet, Auckland Islands, 50°49'S 166°13'E; red and brown algae on rocky bottom, 3-4m; J.K. Lowry, 22 February 1973.
SA 601-602 Derry Castle Reef, Enderby Island, Auckland Islands, 50°29'S 166°19'E; algae on rocks in high intertidal pool; J.K. Lowry, 13 February 1973.

The Snares
(All from the Australian Museum collections)

SA 612 west side of Ho Ho Bay, The Snares, 48°07'S 166°36'E; algae, 20-22m; D.S. Horning, 24 November 1974.
SA 703 Mollymawk Bay, The Snares, 48°07'S 166°36'E; algae on rock, 12-15 m; D.S. Horning, 6 December 1974.
SA 753 south Promontory, The Snares, 48°07'S 166°36'E; algae in high intertidal zone; C.E. Holmes, 14 November 1974.
SA 876 east end of Seal Point, The Snares, 48°07'S 166°36'E; algae in large sheltered tide pool, 0-2 m; C.E. Holmes, 1 February 1975.
SA 901 Cod Cavern Gutway, The Snares, 48°07'S 166°36'E; algae on rock wall, 7-15 m; D.S.Horning, 24 January 1975.
SA 921 Trumpeter Bay, The Snares, 48°07'S 166°36'E; 0-2 m, algae; C.E. Holmes, 10 February1975.
SA 928 Divers Cove, Broughton Island, The Snares, 48°07'S 166°36'E, algae on rock face, 10-12 m; D.S. Horning, 11 February 1975.
SA 3083 Trumpeter Bay, The Snares, 48°07'S 166°36'E; fine broken shell bottom, 22 m; D.S. Horning, 10 January 1975.
SA 3333 Trumpeter Bay, south Promontory, The Snares, 48°07'S 166º36'E; bryozoans on rock faces, 10-14 m; D.S. Horning, 10 January 1975.
SA 3541 Ho Ho Islet, The Snares, 48°07'S 166°36'E; sponges and algae in intertidal pools; D.S. Horning, 17 February 1977.

Antipodes Islands
(All from the Smithsonian Collections, USAP Program)

USAP 301715, 301863-64, Eltanin R/V, West of Islands, Antipodes Islands, 49º40'S 178º53'E, collected with Blake Trawl, 103 m, 3 January 1967.
USAP 301722, Eltanin R/V, East of Islands, Antipodes Islands, 49º40'S 178º52'E to 49º31'S 178º54'E, collected with Blake Trawl, 86-95 m, 26 February 1968.

Campbell Island
(From the Australian Museum Collections)

CA 22 east side of Vire Point, Perseverance Harbour, Campbell Island, 52°33'S 169°10'E; red algae on rocks, 3 m; J.K. Lowry and P.C. Terrill, 26 December 1979.
CA 70 west side of Davis Point, Perseverance Harbour, Campbell Island, 52°34'S 169°13'E; *Macrocystis pyrifera* holdfast, red algae and epizoic red algae on mussels, 16 m, P.C. Terrill, 1 January 1980.
CA 92 caves east of Divers Point, Perseverance Harbour, Campbell Island, 52°34'S 169°11'E; sponges, hydroids, tunicates, red algae and spider crab from cave wall, 3 m; J.K. Lowry and P.C. Terrill, 3 January 1980.
CA 98 west side of Davis Point, Perseverance Harbour, Campbell Island, 52°34'S 169°13'E; red algae in low intertidal zone; J.K. Lowry and P.C. Terrill, 4 January 1980.
CA 103 west side of Davis Point, Perseverance Harbour, Campbell Island, 52°34'S 169°13'E; sediment from level coarse sand and shell bottom, 25 m; J.K. Lowry, 4 January 1980.
CA 121 cliffs on north west side of Boulder Beach, Smoothwater Bay; Campbell Island, 52°32'S 169°12'E; general collection from rock faces and underneath rock overhangs 16 m; J.K. Lowry, 9 January 1980.
CA 122 cliffs on north west side of Boulder Beach, Smoothwater Bay, Campbell Island, 52°32'S 169°12'E; sponges, coralline algae and red algae on boulders, 8 m; J.K. Lowry, 9 January 1980.
CA 124 cliffs on north west side of Boulder Beach, Smoothwater Bay, Campbell Island, 52°32'S 169°12'E; red algae from boulders, 8 m; P.C. Terrill, 9 January 1980.
CA 142 cliffs on north west side of first bay north west of Boulder Beach, Smoothwater Bay, Campbell Island, 52°32'S 169°12'E; sediment and red algae from boulders, 10 m; J.K. Lowry and P. C. Terrill, 12 January 1980.
CA 144 cliffs on north west of side of first bay north west of Boulder Beach, Smoothwater Bay, Campbell Island, 52°32'S 169°12'E; *Macrocystis pyrifera* and entangled drift algae on sloping cliff, 8 m; P.C. Terrill and J.K. Lowry, 12 January 1980.
CA 147 cliffs on north west side of first bay north west of Boulder Beach, Smoothwater Bay, Campbell Island, 52°32'S 169°12'E; brown and red algae from sloping cliff face, 6-8 m; J.K. Lowry and P.C. Terrill, 12 January 1980.
CA 150 cliffs west of East Cape, Smoothwater Bay, Campbell Island, 52°33'S 169°13'E, 12-18 m, holdfast of *Durvillea antarctica,* sediment and red algae from rock crevice, P.C. Terrill, 13 January 1980.
CA 154 cliffs west of East Cape, Smoothwater Bay, Campbell Island, 52°32'S 169°12'E, 10 m, red algae and hydroids from crevice in rock face, J.K. Lowry, 13 January 1980.
CA 155 cliffs west of East Cape, Smoothwater Bay, Campbell Island, 52°32'S 169°13'E; epiphytic red algae on brown algae from sloping rock face, 5-10m; J.K. Lowry, 13 January 1980.
CA 165 first bay north west of Boulder Beach, Smoothwater Bay, Campbell Island, 52°32'S 169°12'E; encrusting sponges, tunicates, bryozoans and hydroids beneath boulders in *Macrocystis pyrifera* bed, 10m; P.C. Terrill, 14 January 1980.
CA 184 east side of Windlass Bay, Campbell Island, 52°33'S 169°04'E; red algae from boulders, 3 m; J.K. Lowry, 22 January 1980.
CA 191 mouth of Windlass Bay, Campbell Island, 52°33'S 169°04'E; fauna under rocks, some red algae, 8m; J.K. Lowry, 23 January 1980.
CA 205 mouth of small cove east of Limestone Point, Northwest Bay, Campbell Island, 52°33'S 169°04'E; *Desmarestia, Lessonia,* tufted brown algae, red algae, coralline algae, *Codium* and mussels from boulders, 6-8 m; P.C. Terrill, 24 January 1980.
CA 208 mouth of small cove east of Limestone Point, Northwest Bay, Campbell Island, 52°33'S 169°04'E; sea urchins, spider crab and red algae with epiphytic coralline algae from rock bottom, 8 m; J.K. Lowry, 24 January 1980.
CA 250 west side of Southeast Harbour, Campbell Island, 52°36'S 169°09'E; barnacles, tunicates, sponges, sea stars and sediment beneath boulder overhangs, 2 m; J.K. Lowry, 1 February 1980.
CA 251 west side of Southeast Harbour, Campbell Island, 52°36'S 169°09'E; encrusting platelet coralline alga from boulders in *Macrocystis pyrifera* bed, 8 m; J.K. Lowry, 1 February 1980.
CA 275 cliffs west of Davis Point, Perseverance Harbour, Campbell Island, 52°34'S 169°13'E, 23 m, coarse sediment and shell fragments, J.K. Lowry, 7 February 1980.

Campbell Island
(From the Smithsonian Collections, USAP Program)

USAP 301695-696, Eltanin R/V, Campbell Island, 52º08'S 169º43'E to 52º08'S 169º44'E, collected with Menzies Trawl, 91-92 m, 20 January 1972.

Macquarie Island
(From the Smithsonian Collections,
USAP Program)

USAP 301724, Eltanin R/V, Macquarie Ridge, Macquarie Island, 54º30'S 158º59'E to 54º34'S 158º59'E, collected with Blake Trawl, 112-124 m, 15 February 1967.

RESULTS

Family PHTISICIDAE Vassilenko, 1968
Caprellina longicollis (Nicolet, 1849)
(Fig. 2)

Caprella longicollis Nicolet, 1849: 251-252, pl. 4, fig. 3.
Caprella brevicollis Nicolet, 1849: 252-253, pl. 4, fig. 4.
Caprellina novae-zealandiae Thomson, 1879: 330.
Caprellina longicollis Mayer, 1882: 27-28, figs. 4-5; Mayer, 1890: 15-16, pl. 6, fig. 4; Mayer, 1903: 30; Stebbing, 1910: 470-471; Barnard, 1930: 440; McCain, 1969: 289-290, fig. 2; McCain and Steinberg, 1970: 46; Guerra-García, 2002: in press.
Caprellinopsis longicollet Hutton, 1904: 261.
Caprellinopsis longicollis Stephensen, 1927: 354, 385.

Material examined: AM P61393 to P61423, P61446 to P61452, P61462 to P61473 and USAP 301864 from the following stations (number of specimens in parentheses): SA 502-513(<25), SA 580(3), SA 581(>25), SA 586(16), SA 600 (16), SA 601(15), SA 602 (>25), SA 612(4), SA 703(2), SA 753(3), SA 876(>25), SA 901(>25), SA 921(1), SA 928(>25), SA 3083(>25), USAP 301864(1), CA 22(7), CA 70(2), CA 98(1), CA 103(1), CA 122(5), CA 124(5), CA 142(4), CA 144(5), CA 147(>25), CA 150(12), CA 155(3), CA 184(3), CA 191(6), CA 205(>25), CA 208(>25).

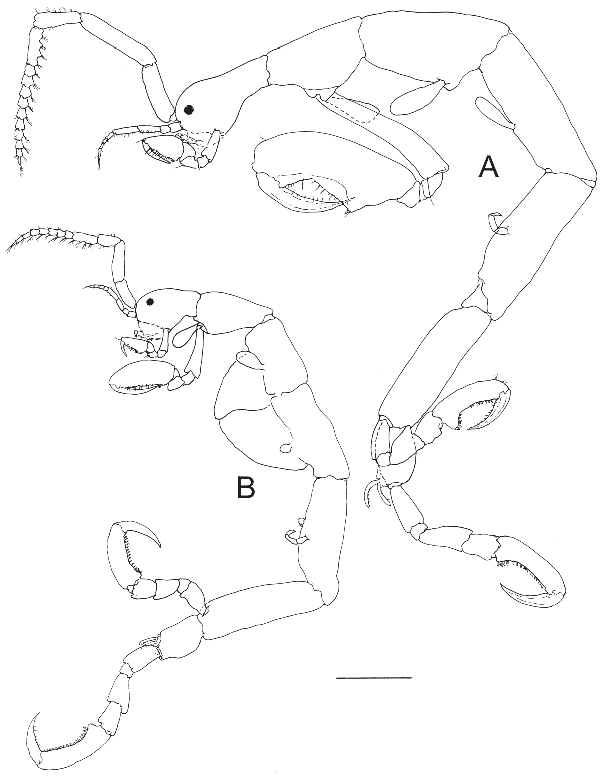

FIG. 2. – *Caprellina longicollis* (Nicolet, 1849). Lateral view. A, male; B, female. Scale bar: 1 mm (Figures based on Tasmanian specimens, Guerra-García and Takeochi, in prep.).

Remarks: *Caprellina longicollis* (Nicolet, 1849) has been redescribed in detail based on specimens collected from Coquimbo, central-northern Chile by Guerra-García (2002), including notes on ontogenetic development and clinging behaviour. This species, which has been found in Chile, the Magellanic subregion, South Africa and New Zealand, could probably belong to the cold-temperate region identified by Lancelloti and Vásques (1999, 2000). The region of Coquimbo represents the most northern record for *C. longicollis* so far. Although Coquimbo belongs to the warm-temperate region, it is still affected by the oscillations of the cold Humboldt Current system.

Ecology: Although McCain and Steinberg (1970) reported a depth range of between 0 and 29 m for the species, McCain (1969) examined some material from 123 m deep. In the present study, the species has been found down to 103 m. *Caprellina longicollis* has been recorded from algae, under rocks and attached to buoys (Guerra-García, 2002). In the present study *C. longicollis* has been found in the majority of the stations, being the most frequent and abundant species in the area. According to McCain (1969), this was the most common species in his New Zealand collections.

Distribution: Type locality: Chile (Nicolet, 1849). Other records: Magellan sub-region (De Broyer and Rauschert, 1999), South Africa, New Zealand (North and South Islands, Stewart Island, Brother Islands, The Snares, off the Antipodes Islands, off the Auckland Islands) (McCain and Steinberg, 1970). New record to Campbell Island.

Caprellinoides mayeri (Pfeffer, 1888)
(Fig. 3)

Caprellina mayeri Pfeffer, 1888: 137-139, pl. 3, fig. 4.
Piperella grata Mayer, 1903: 59, pl. 2, fig 29; pl. 7, figs. 40-45; pl. 9, figs. 24-25, 62.
Caprellinoides mayeri Mayer, 1890: 88, pl. 5, figs. 57-58; pl. 6, figs. 15, 26; pl. 7, fig. 48; McCain and Steinberg, 1970: 47; McCain and Gray, 1971: 116-119, figs. 4-5; Laubitz, 1991: 36-38, fig. 6.
Caprellinoides spinosus K. H. Barnard, 1930: 441, fig. 62.

Material examined: (number of specimens in parentheses): USAP 301715(1), USAP 301724(144).

Remarks: The four species of *Caprellinoides* were synonymised by McCain and Gray (1971) as *C. mayeri*. Nevertheless, Vassilenko (1972) and Laubitz (1991) resurrected *C. antarcticus*, *C. spinosus* and *C. tristanensis*. Recently Guerra-García

FIG. 3. – *Caprellinoides mayeri* (Pfeffer, 1888). Lateral view. A, male; B, female. Scale bar: 1 mm (Figures based on Antarctic specimens, Guerra-García and Coleman, 2001).

(2001) considered only *C. mayeri* and *C. tristanensis* as valid species. *Caprellinoides spinosus* and *C. antarcticus* were considered junior synonyms of *C. mayeri* and *C. tristanensis*, respectively. The specimens of *C. mayeri* collected from the Antipodes Islands and Macquarie Island are in agreement with the material of *C. mayeri* redescribed by Laubitz (1991) and the type material revised by Guerra-García (2001).

Ecology: Little known. *Caprellinoides mayeri* occurs typically along cold Antarctic and Subantarctic waters. Depths reported are from 1 to 412 m (Laubitz, 1991).

Distribution: Type locality: South Georgia (Pfeffer, 1888). Other records: Antarctica, Magellan subregion (De Broyer and Rauschert, 1999), Scotia Ridge, Tristan da Cunha, Tierra del Fuego, Macquarie Island, Kerguelen, Crozet, Marion and Prince Edward islands (McCain and Steinberg, 1970). New record in Antipodes Islands.

Family CAPRELLIDAE Leach, 1814
Caprella equilibra Say, 1818
(Fig. 4)

Caprella equilibra Say, 1818: 391-392; McCain, 1968: 25, figs. 12-13; McCain and Gray, 1971: 19; Cavedini, 1982: 500; Krapp-Schickel, 1993: 782-783, fig. 533.
Caprella monacantha Heller, 1866: 54, fig. 17-19
Caprella aequilibra Mayer, 1882: 45, pl.1, fig. 7; pl. 2, figs 1-11; pl. 4, figs. 20-25; pl. 5, figs. 16-18; Chevreux and Fage, 1925: 455, fig. 433.

Material examined: AM P61372 to P61374 and USAP 301863 from the following stations (number of specimens in parentheses): SA 502-513(2), USAP 301863(6), CA 92(32), CA 250(4).

Remarks: The morphology of the specimens examined is in agreement with the figures of McCain (1968), Krapp-Schickel (1993), Guerra-García and Thiel (2001) of specimens of different world areas. Contrary to other cosmopolitan species of *Caprella*, such as *C. penantis* and *C. scaura,* which present a high degree of intraspecific variation throughout the world, the morphology of *C. equilibra* seems to be more constant.

Ecology: Schellenberg (1926) cites *Caprella equilibra* occurring from surface to 3000 m. The

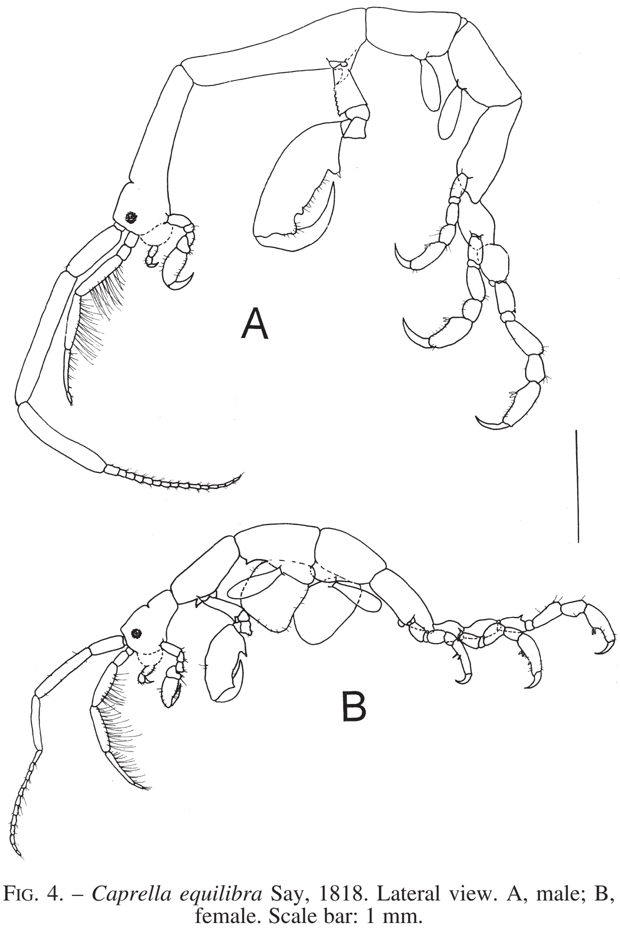

FIG. 4. – *Caprella equilibra* Say, 1818. Lateral view. A, male; B, female. Scale bar: 1 mm.

species has been found living in *Posidonia*, green and red algae, hydroids, bryozoans, sponges and ascidians (Krapp-Schickel, 1993; Guerra-García and Thiel, 2001). Schellenberg (1926) observed predation on *Amphitoe*, *Jassa* and small Polychaeta using gnathopod 1 or rarely gnathopod 2. Keith (1969) reported filter-feeding and scavenging as feeding habits for *C. equilibra*. Fiorencies (1940) found this species to be characteristic of calm and dirty water. O'Brien (1975) reported its association with *Squilla empusa* Say, 1818, where they live between the pleopods.

Distribution. Cosmopolitan (McCain, 1968; Krapp-Schickel, 1993). New record in Campbell Island.

Caprella manneringi McCain, 1979 (Figs.5-8)

Caprella manneringi McCain, 1979: 471-473, fig. 1.

Material examined: AM P61381-3 from the station SA 3541 (5 males, 1 premature female, 30 juveniles).

Redescription.

Male "a" (AM P61381)

Body length. 5.1 mm.

Lateral view (Fig. 5A). Body smooth; head with a small rostrum; suture between head and pereonite 1 present, pereonite 2 the longest with a ventral projection medially, pereonites 3-6 subequal in length, pereonite 7 the shortest.

Gills (Fig. 5A). Present on pereonites 3-4, oval, length about 2 times width.

Mouthparts. Upper lip (Fig. 6B) symmetrically bilobed, setose apically and medially. Mandibles (Fig. 6D,E) without palp; mandibular molar present; left mandible (Fig. 6D) with incisor five-toothed, lacinia mobilis five-toothed followed by three plumose setae; right mandible (Fig. 6E) with incisor five-toothed, lacinia mobilis four-toothed followed by two plumose setae; molar flake present on right mandible, oval, setose apically. Lower lip (Fig. 6C) with inner lobes well-demarcated; inner and outer lobes provided with sparse setulae apically. Maxilla 1 (Fig. 6F) outer lobe carrying seven robust setae; distal article of the palp with ten apical robust setae and seven setae laterally. Maxilla 2 (Fig. 6G) inner lobe oval; outer lobe rectangular, about 1.2 times as long as inner lobe; inner and outer lobe with abundant setae apically. with 12 apical setae and a row of ten tiny setulae laterally. Maxilliped (Fig. 6A) inner plate rectangular carrying two strong nodular short setae distally and several plumose setae; outer plate oval, twice as long as the inner plate, with eight robust nodular setae (like teeth); palp 4-articulate, setose; dactylus with rows of setulae.

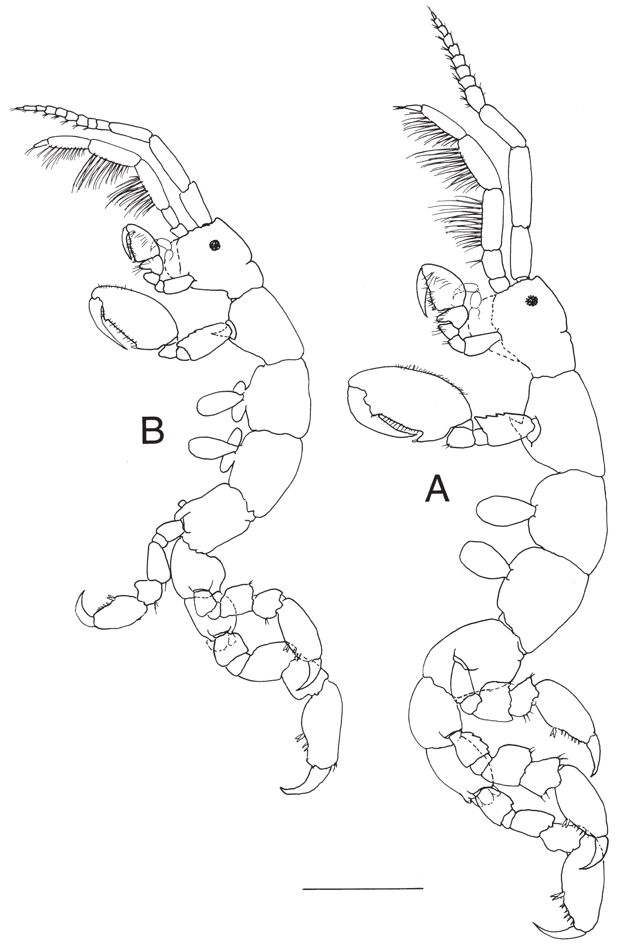

FIG. 5. – *Caprella manneringi* McCain, 1979. Lateral view. A, male; B, female. Scale bar: 1 mm.

Antennae. Antenna 1 (Fig. 7A) about the half of body length; peduncular articles robust; flagellum 9-articulate. Antenna 2 (Fig. 7B) almost as long as antenna 1; swimming setae present well-developed; flagellum two-articulate, basal article about three times as long as distal one.

Gnathopods. Gnathopod 1 (Fig. 7C) setose, basis as long as ischium, merus and carpus combined; ischium and merus rectangular; carpus triangular; propodus length about 1.5 times width, palm with a pair of proximal grasping spines, grasping margin denticulate in the proximal half; dactylus margin minutely serrated. Gnathopod 2 (Fig. 7D) inserted in the middle of pereonite 2; basis about two-fifths as long as pereonite 2, provided with carina and projection distally; ischium and merus rectangular; carpus small and triangular; propodus oval, length

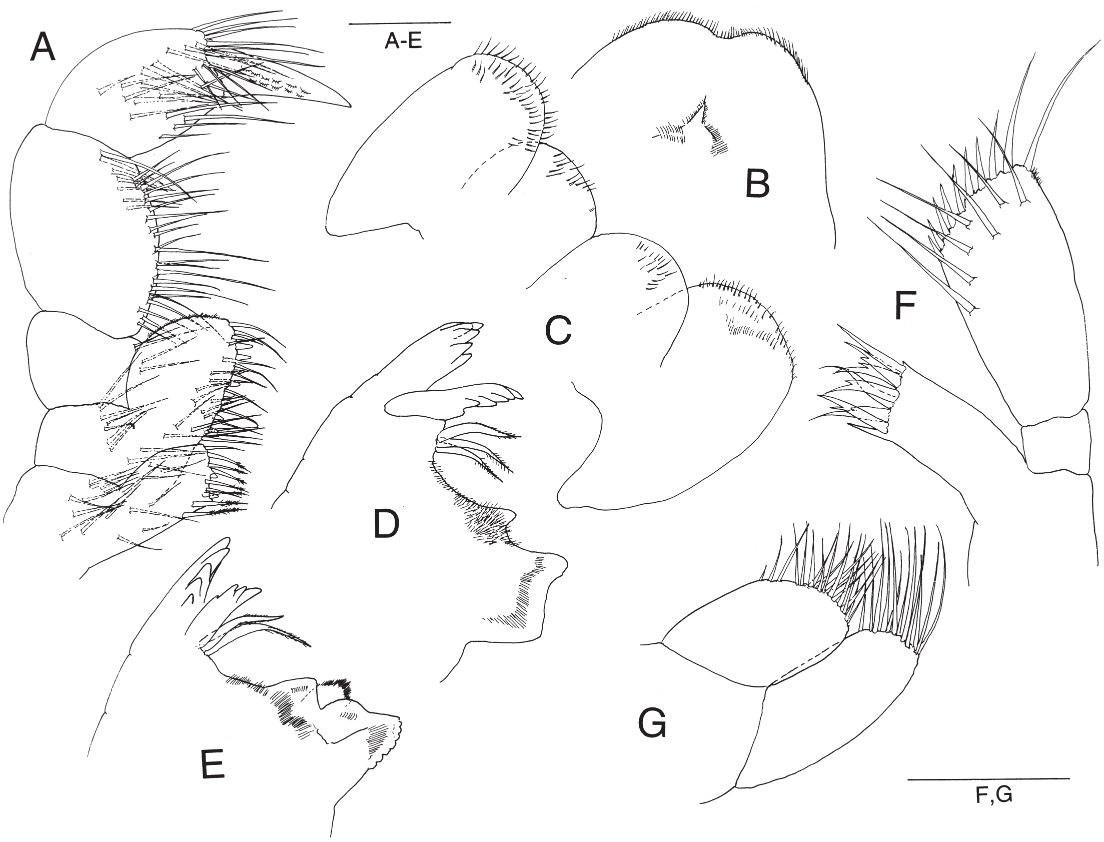

FIG. 6. – *Caprella manneringi* McCain, 1979. Male. A, maxilliped; B, upper lip; C, lower lip; D, left mandible; E, right mandible; F, maxilla 1; G, maxilla 2. Scale bars: 0.1 mm.

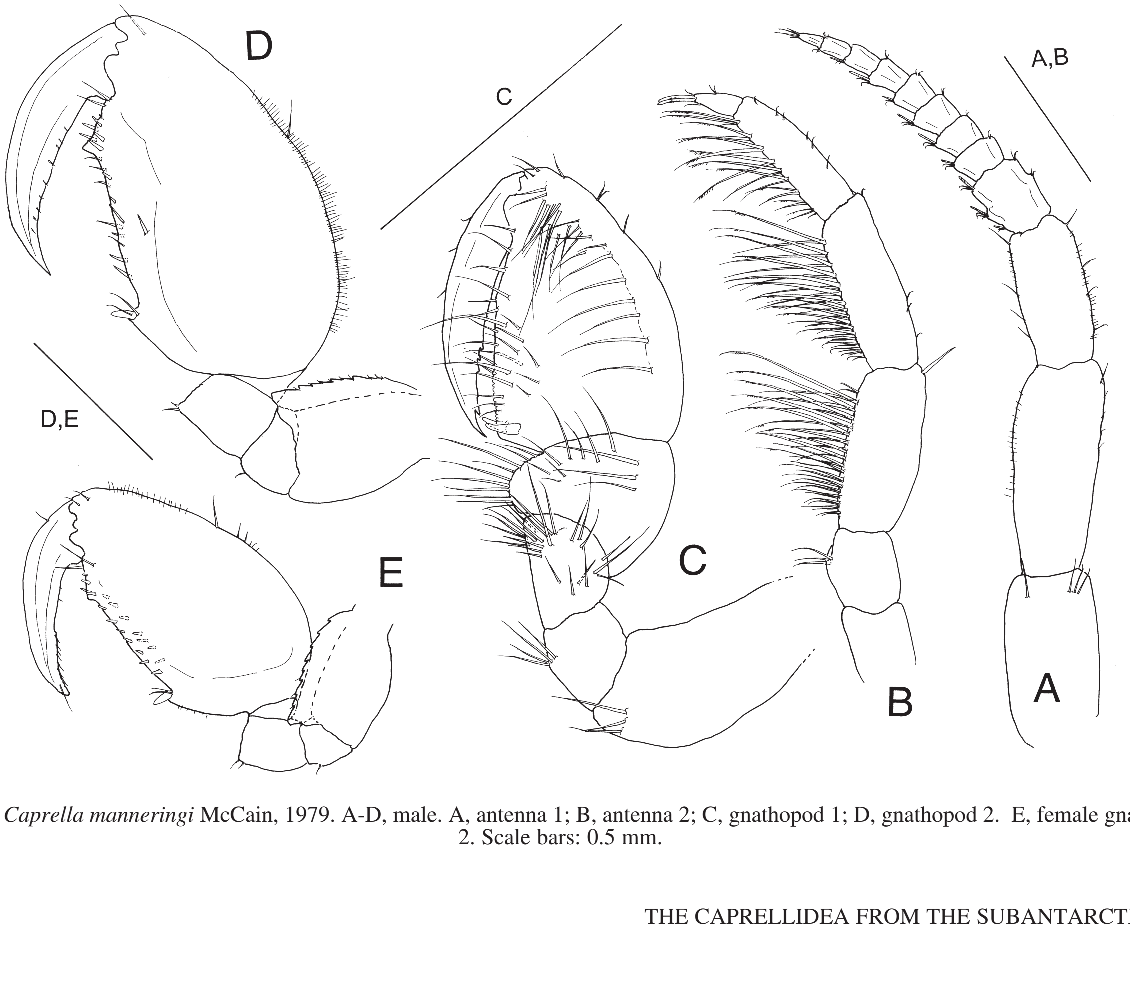

FIG. 7. – *Caprella manneringi* McCain, 1979. A-D, male. A, antenna 1; B, antenna 2; C, gnathopod 1; D, gnathopod 2. E, female gnathopod 2. Scale bars: 0.5 mm.

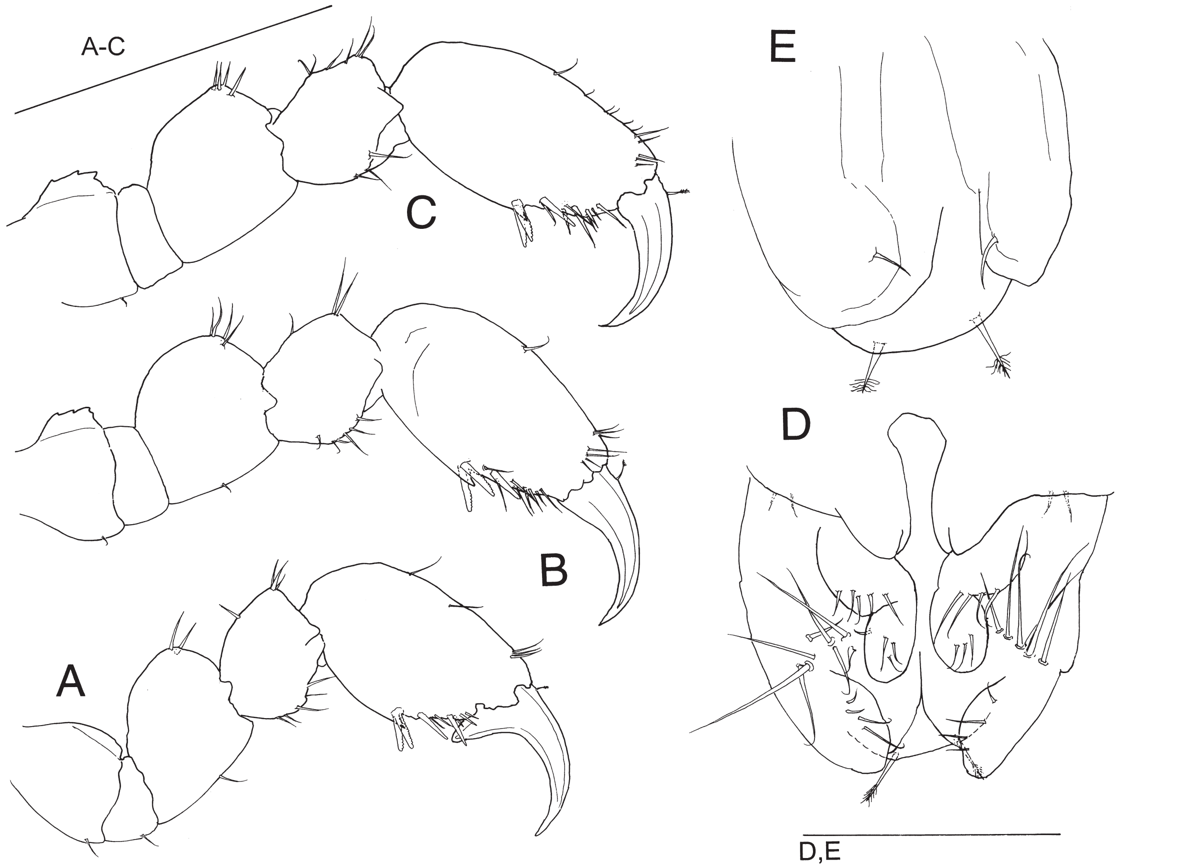

FIG. 8. – *Caprella manneringi* McCain, 1979. A-D, male. A, pereopod 5; B, pereopod 6; C, pereopod 7; D, abdomen (ventral view). E, female abdomen (ventral view). Scale bars: A-C: 1 mm; D,E: 0.1 mm.

about 2 times width, palm with a grasping spine proximally and a triangular projection distally.

Pereopods. Pereopods 5-7 (Fig. 8A-C) increasing in length respectively, although pereopod 6 and 7 almost subequal; basis carinate, palm of propodus oval, with a pair of grasping spines medially followed by rows of smaller spines; dactylus short .

Penes (Fig. 8D) situated medially, length about 1.3 times width.

Abdomen (Fig. 8D) with a pair of appendages, a pair of lateral lobes and a single dorsal lobe; appendages one-articulate although slightly constricted medially; lateral lobes setose; dorsal lobe provided with a pair of plumose setae.

Premature female "b" (AM P61382)

Body length 4.3 mm. Gnathopod 2 inserted on the anterior part of pereonite 2; abdomen (Fig. 8E) without appendages; lateral lobes carrying a single seta.

Remarks: The specimens examined in the present study have been identified as *Caprella manneringi* on the basis of the combination of the following characteristics: short antennae, body robust, a ventral projection between gnathopods 2, gnathopod 2 with a tringular projection and propodus of the pereopods with the grasping spines medially in the palm. The original description and figures of *C. manneringi* are not complete and although McCain (1979) reported that the type material of the species is deposited in the Canterbury Museum, New Zealand, this material has not been located during the present study. McCain (1979) only illustrated the lateral view of the holotype male and details of the gnathopod 1, gnathopod 2 and propodus of pereopod 5. The male specimens examined in the present study present the pereonite 2 shorter than the holotype figured by McCain (1979). Furthermore the basis of gnathopod 2 is provided with a well developed carine not visible in the figure of McCain (1979). Additionally, the number of spines between the grasping spines in the propodus palm of pereopod and the dactylus is higher in the specimens examined here. Nevertheless, these differences could be due to some intraspecific variation or to the lack of details in the simple figures of the original description. The length of pereonite 2 is quite variable depending on the degree of development, being more elongate in the oldest and largest males.

Ecology: Prior to this study, *Caprella manneringi* had only been found associated with the asteroid *Calvasterias suteri* (de Loriol). McCain (1979) suggested that the small number of spines and setae on the pereopods, the convex palm of the propodus and the short, massive dactylus of the pereopods were probably adaptations to living with *Calvasterias*, perhaps as an obligate commensal. In the present study the species were also collected in intertidal pools, as was the type material of the species, but from sponges and algae and not asteroids. This suggests that *C. manneringi* is not an obligate commensal of asteroids, unless the collection on algae and sponges were accidental and the species were really living close by on the surface of a starfish. Consequently, the striking propodus of the pereopods could also be useful to cling to some species of algae and sponges. The species *Caprella andreae* Mayer, 1890 shows a similar pereopod feature, in this case as a morphological adaptation for clinging to the algal substratum on the turtle caparaces (Aoki and Kikuchi, 1995).

Distribution: Type locality: Antipodes Islands (McCain, 1979). New record in The Snares.

Pseudaeginella campbellensis sp. nov.
(Figs. 9-13)

Type material: Male holotype sta. CA 154 (AM P61379), Female allotype sta. CA-154 (AM P61380). Paratypes: sta. CA 121 (1 female, AM P61378), sta. CA 122 (2 males, 1 premature female, AM P61376), sta. CA 154 (1 male, AM P61377), sta. CA 165 (5 males, 9 juveniles, AM P61375).

Type locality: Cliffs west of East Cape, Smoothwater Bay, Campbell Island, 52°32'S 169°12'E, 10 m. deep. Other localities: first bay north west of Boulder Beach, Smoothwater Bay, Campbell Island, 52°32'S 169°12'E, 10 m deep; 121 cliffs on north west side of Boulder Beach, Smoothwater Bay; Campbell Island, 52°32'S 169°12'E, 8 and 16 m deep.

Etymology: The specific name refers to the type locality, Campbell Island.

Description:
Holotype male (AM P61379)
Body length. 6.3 mm.
Lateral view (Fig. 9A). Head with a dorsal acute projection; suture between head and pereonite 1 present; pereonite 1 with a dorsal projection distally; pereonite 2 with two dorsal projections medially and a single dorsal one distally; pereonites 3-7 dorsally smooth although pereonites 3-5 provided with later-

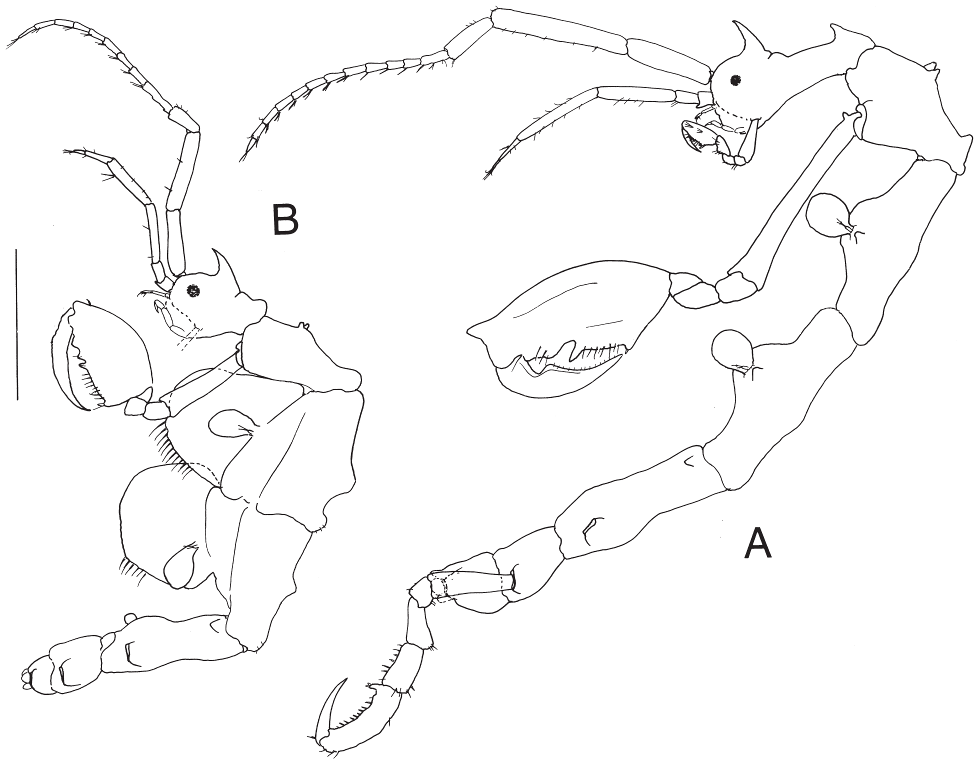

FIG. 9. – *Pseudaeginella campbellensis* sp. nov. Lateral view. A, male; B, female. Scale bar: 1 mm.

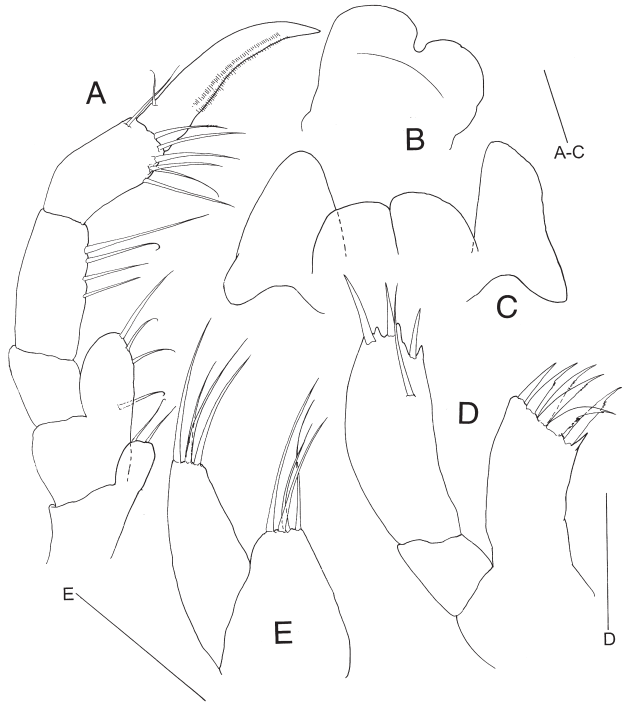

FIG. 10. – *Pseudaeginella campbellensis* sp. nov. Male. A, maxilliped; B, upper lip; C, lower lip; D, maxilla 1; E, maxilla 2. Scale bars: 0.05 mm.

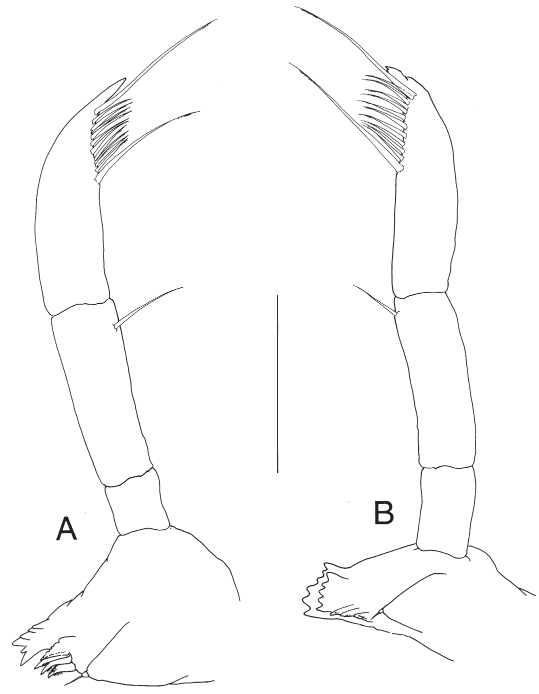

FIG. 11. – *Pseudaeginella campbellensis* sp. nov. Male. A, right mandible; B, left mandible. Scale bar: 0.1 mm.

al projections; pereonites 3-5 subequal in length, pereonite 7 the shortest.

Gills (Fig. 9A). Present on pereonites 3-4, rounded, almost as long as wide.

Mouthparts. Upper lip (Fig. 10B) symmetrically bilobed, smooth apically. Mandibles (Fig. 11A, B) with mandibular molar present but reduced to a cone with a distal tubercle ending in a spine; incisor 6-toothed, lacinia mobilis 5-toothed in left mandible (Fig. 11B) and minutely serrate in right mandible (Fig. 11A); a row of three plumose plated setae on both mandibles; molar flake absent; palp 3-articulate, second article with a single seta, distal article with a distal knob and a setal formula 1-x-1 being x=10 (all setae on distal article are plumose). Lower lip (Fig. 10C) without setulae. Maxilla 1 (Fig. 10D) outer lobe carrying six robust setae; distal article of the palp with three apical teeth and three robust setae distally, one setae laterally. Maxilla 2 (Fig. 10E) inner lobe triangular; outer lobe rectangular, about 1.8 times as long as inner lobe; inner and outer lobe with 4 setae apically. Maxilliped (Fig. 10A) inner plate small and rectangular with two setae; outer plate oval, three times as long as the inner plate, with four setae; palp 4-articulate, dactylus with rows of setulae.

Antennae. Antenna 1 (Fig. 12A) a little shorter than the half of body length; peduncular articles setose; flagellum 11-articulate. Antenna 2 (Fig. 12B) about a half of antenna 1 in length, with short setae although swimming setae absent; basal article of the peduncle with a distal projection; flagellum two-articulate, basal article about two times as long as distal one.

Gnathopods. Gnathopod 1 (Fig. 12C) setose, basis as long as ischium, merus and carpus combined; carpus triangular, propodus length about 1.5 times width, palm with a pair of proximal grasping spines, grasping margin smooth; dactylus margin smooth. Gnathopod 2 (Fig. 12D) inserted in the middle of pereonite 2; basis about 1.5 times as long as pereonite 2, provided with a rounded projection proximally; ischium rectangular; merus rounded; carpus small and triangular; propodus elongate with a dorsal projection distally, length about 2.5 times width, palm with a grasping spine proximally and U-notch distally; dactylus wide, thicken medially.

Pereopods. Pereopod 3 (Fig. 13A) and 4 (Fig. 13B) reduced to one article, about one fourth gills in length. Pereopod 4 wider than pereopod 3, both provided with a pair of long plumose setae. Pereopods 5 and 7 missing in holotype. Pereopod 6 (Fig.13C) six articulate, palm of propodus with a pair of small grasping spines proximally.

Penes (Fig. 13D) large, length about 3 times width, suture present apically.

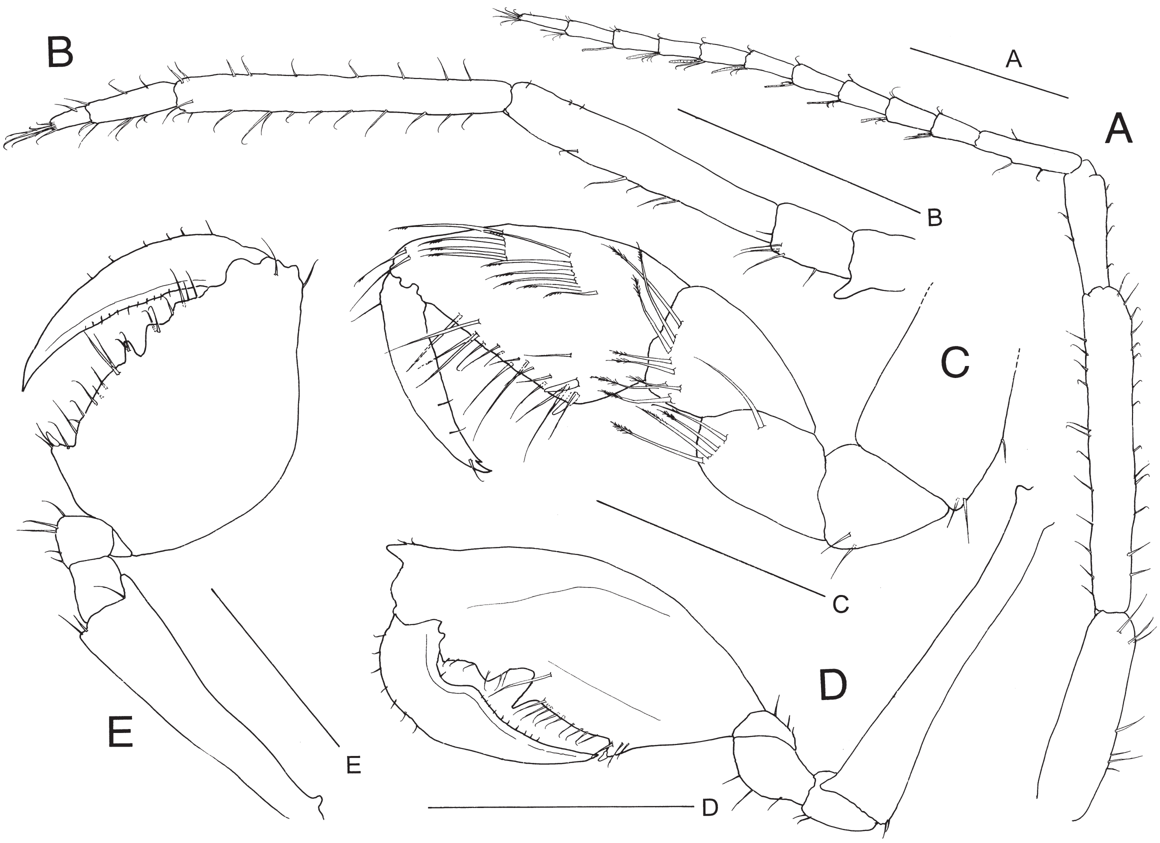

FIG. 12. – *Pseudaeginella campbellensis* sp. nov. A-D, male. A, antenna 1; B, antenna 2; C, gnathopod 1; D, gnathopod 2. E, female gnathopod 2. Scale bars: A,B,E: 0.5 mm; C: 0.2 mm; D: 1 mm.

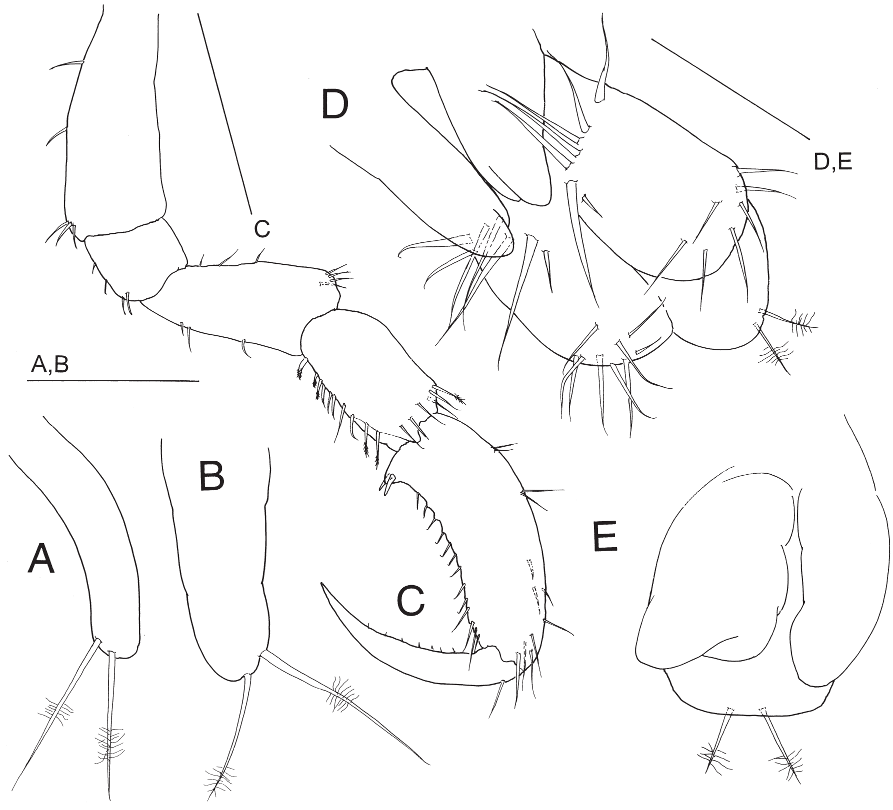

FIG. 13. – *Pseudaeginella campbellensis* sp. nov. A-D, male. A, pereopod 3; B, pereopod 4; C, pereopod 6; D, abdomen (ventral view). E, female abdomen (ventral view). Scale bars: A,B: 0.05 mm; C: 0.5 mm; D,E: 0.1 mm.

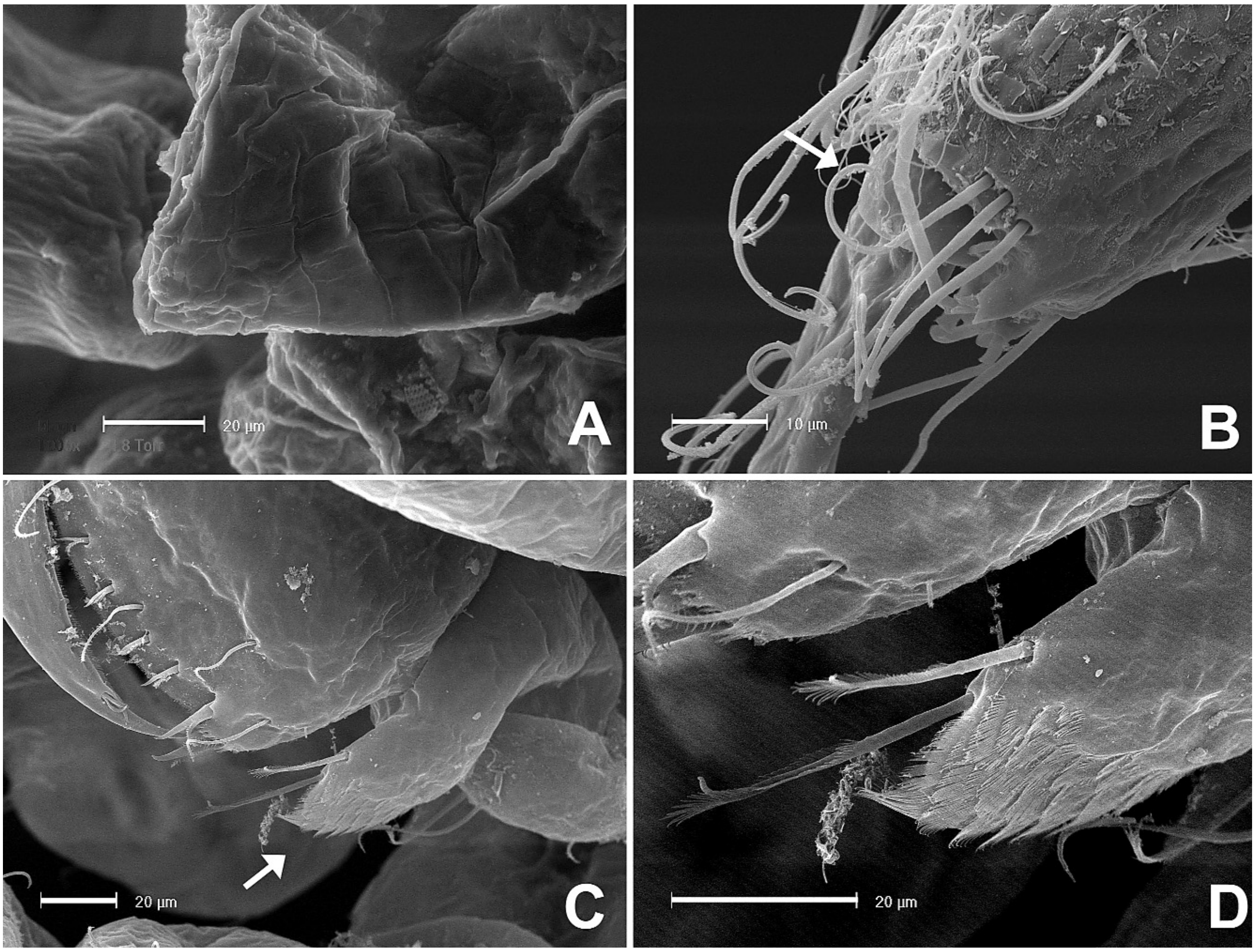

FIG. 14. – *Caprellaporema subantarctica* gen. et sp. nov. A-D, male. A, eye projection; B, basal article of the flagellum of antenna 2; C, gnathopod 1; D, carpus of gnathopod 1.

Abdomen (Fig. 13D) without appendages, with a pair of lateral lobes and a single dorsal lobe; lateral lobes setose; dorsal lobe provided with a pair of plumose setae.

Allotype female (AM P61380)

Body length 4.2 mm. Pereonite 1 shorter than in male (Fig. 9B). Lateral projections on pereonites 3 and 4 absent. Antenna 1 flagellum 9-articulate. Gnathopod 2 inserted on the anterior part of pereonite 2; basis without proximal rounded projection; propodus wider than in male, without distal projection, length about 1.5 times width (Fig. 12E). Abdomen lateral lobes without setae (Fig. 13E).

Intraspecific variation: The morphological characteristics of the specimens examined are very constant although there is some variation in the setal formula of the mandibular palp 1-x-1 with x varying between 6 and 12 depending on the specimens.

Remarks: Six species of *Pseudaeginella* were known up to now, *P. antiguae* Barnard, 1932 from Antigua, *P. biscaynensis* (McCain, 1968) from Florida, *P. montoucheti* (Quitete, 1971) from Brasil, *P. polynesica* (Müller, 1990) from Bora Bora and Moorea, Society Islands, *P. sanctipauli* Laubitz, 1995 from St. Paul and Amsterdam Islands, and *P. tristanensis* (Stebbing, 1888) from Tristan da Cunha. Recently, after examination of specimens of *Pseudaeginella tristanensis* from Southern Indian Ocean, Laubitz (1995) considered the genus *Fallotritella* synonymous with *Pseudaeginella* mainly based on the presence of minute pereopods 3 and 4 also in *Pseudaeginella*. Consequently, the species *P. biscaynensis, P. montoucheti* and *P. polynesica*, previously belonging to the genus *Fallotritella*, were transferred to the genus *Pseudaeginella*. The idea that *Fallotritella* is synonymous with *Pseudaeginella* had been previously suggested by several authors (McCain, 1968; Laubitz, 1993) but due to the lack of available material of

Pseudaeginella and that the location of the type material of *P. tristanensis* is unknown, probably missing, the genus *Fallotritella* was maintained as a valid genus until Laubitz (1995) redescribed *Pseudaeginella* based on the material newly collected from the Indian Ocean, and established *Fallotritella* as a junior synonymous of *Pseudaeginella*.

The six species of *Pseudaeginella* are compared in Laubitz (1995). *Pseudaeginella campbellensis* sp. nov. is closer to *P. polynesica,* differing in the following characteristics (see Müller, 1990): (1) *P. campbellensis* has three projections on pereonite 2, two medially and one distally; the distal projection is lacking in *P. polynesica*; (2) *P. campbellensis* presents a lateral projection on pereonites 3-5 (males) and pereonite 5 (females); these projections are lacking in *P. polynesica*; (3) there is a small rounded projection on the basis of gnathopod 2 males in *P. campbellensis*; this projection is absent in *P. polynesica*; (4) the propodus of gnathopod 2 in *P. polynesica* has strong spines laterally on the distal half, which are lacking in *P. campbellensis*; (5) the distal projection present in male propodus of gnathopod 2 in *P. campbellensis* is absent in *P. polynesica*; (6) pereopods 3 and 4 are larger in *P. campbellensis* and provided with two plumose setae apically, while in *P. polynesica* they carry only one simple seta. There are also some differences in the mouthparts: (7) the incisor is 5-toothed in *P. polynesica* and 6-toothed in *P. campbellensis*; (8) the molar is reduced to a cone and single setae in *P. polynesica*, whereas there is a cone, a small tubercle and single setae in *P. campbellensis*; (9) the setal formula of the mandible palp is 1-5-1 in *P. polynesica* and 1-x-1 with x between 6 and 12 in *F. campbellensis*; (10) the second article of the mandibular palp has a seta in *F. campbellensis*, this seta is absent in *F. polynesica*.

Ecology: The species has been collected from shallow water (8-16 m. deep), from rock faces and underneath rock overhangs, sponges, coralline algae on boulders, red algae and hydroids from crevices in rock faces and encrusting sponges, tunicates, bryozoans and hydroids beneath boulders in beds of *Macrocystis pyrifera* C. Agardh, 1820 .

Distribution: So far, only known from Campbell Island, New Zealand.

Caprellaporema gen. nov.

Diagnosis: Flagellum of antenna 1 two-articulate. Flagellum of antenna 2 two-articulate, the proximal article being very reduced. Gills present on pereonites 3 and 4. Pereopods 3 and 4 absent. Pereopod 5 two-articulate. Pereopods 6 and 7 six-articulate. Mandibular palp 3-articulate. Molar absent. Male abdomen with a pair of small appendages and pair of lobes; female abdomen without appendages.

Type species: *Caprellaporema subantarctica* sp. nov.

Gender. Feminine.

Etymology: The term "aporema" reflects the difficulty in establishing the phylogenetic position of this genus. "Aporema" is a word of Greek in origin which means "a difficult problem to solve".

Remarks: The phylogenetic position of *Caprellaporema* new genus is difficult to establish because it shares characteristics with both caprellid groups, families Phtisicidae and Caprellidae (see Takeuchi, 1993). The flagellum of antenna 1 is two-articulate. This character is only present in another two genera inside the Caprellidea: *Perotripus* (LaFollette, 1915) belonging to the Phtisicidae and *Pedoculina* Carausu, 1940, belonging to the Caprellidae. According to the structure of the antenna, the general shape of the body, gnathopods and pereopods, and the lack of gills on pereonite 2, the new genus seems to be closer to *Pedoculina*. However, in the genus *Pedoculina* the molar process is present and the mandibular palp is absent, while *Caprellaporema* lacks a molar but has a 3-articulate palp. In this sense, it is more similar to *Perotripus*; in fact the lack of molar is the general tendency in the Caprellidae. Furthermore, the feature of the maxilliped plates and the inner lobes of the lower lip (which are fused) is very similar in *Perotripus* and *Pedoculina*. The abdomen is also very similar in *Caprellaporema* and *Perotripus brevis* (LaFollette, 1915), the only species of *Perotripus* described so far. Nevertheless, the two taxa differ in general features of the antennae and body, the setal formula of the palp, the gills (three pairs in *Perotripus* and two pairs in *Caprellaporema*), and the pereopods (pereopod 3 and 4 present in *Perotripus* and absent in *Caprellaporema*, pereopod 5 three-articulate in *Perotripus* and two-articulate in *Caprellaporema*). In connection with the lack of pereopods 3 and 4, and the reduction of pereopod 5, *Caprellaporema* could be related to some genera of the family Caprellidae; however, the absence of molar seems to connect the new genus with *Caprellinoides* in the family Phtisicidae. Other

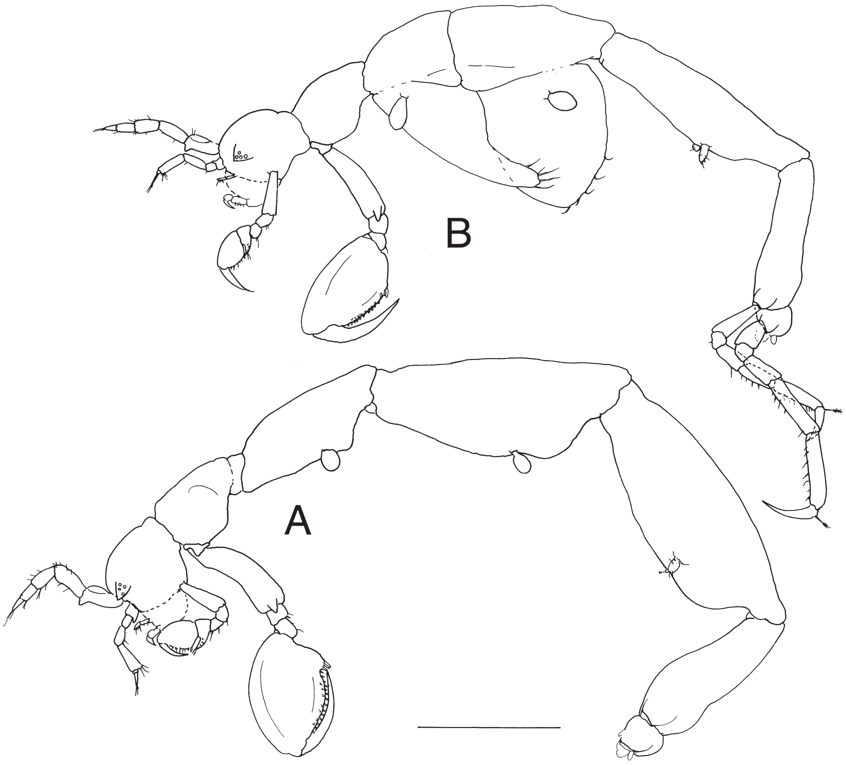

FIG. 15. – *Caprellaporema subantarctica* gen. et sp. nov. Lateral view. A, male; B, female. Scale bar: 0.5 mm.

characteristics present in *Caprellaporema* are unique among the Caprellidea, such as the location of the ocelli in an acute projection on the head (Fig. 14A), the short basal article of the flagellum of antenna 2 (Fig. 14B), and the striking ventral projection of the carpus of gnathopod 1 (Fig. 14C,D). Although extensive studies on the Caprellidea are still necessary to clarify the phylogeny of this group, this genus shares characteristics of the two large groups of caprellids, Phtisicidae and Caprellidae, perhaps linking both groups of the Caprellidea and raising again the question whether the Caprellidea is a monophyletic group, which is still under debate.

Caprellaporema subantarctica sp. nov.
(Figs 15-18)

Type material: Male holotype sta. USAP 301715 (USNM 301715), Female allotype sta. USAP 301715 (USNM 1007241). Paratypes: sta. USAP 301715 (16 males, 2 premature females, 8 mature females, USNM 1007242), sta. USAP 301695 (1 premature female, USNM 301695), sta. USAP 301696 (3 mature females, USNM 301696), sta. SA 3333 (1 male, AM P61384), sta. CA 251 (6 males, 1 premature female, 6 mature females, AM P61386) sta. CA 275 (4 males, 1 premature female, 1 mature female, 1 juvenile, AM P61385).

Type locality: West of Islands, *Antipodes Islands*, 49º40'S 178º53'E, 103 m deep. Other localities. *Campbell Island*: 52º08'S 169º43'E to 52º08'S 169º44'E, 91-92 m deep; west side of Southeast Harbour, 52º36'S 169º09'E, 8 m deep; cliffs west of Davis Point, Perseverance Harbour, 52º34'S 169º13'E, 23 m deep. The Snares: Trumpeter Bay, 48º07'S 166º36'E, 10-14 m deep.

Etymology: The specific name is an adjective qualifying the geographic area where the species have been found.

Description:
Holotype male (USNM 301715)

Body length. 3.7 mm.

Lateral view (Fig. 15A). Body smooth without projections; head rounded; suture between head and pereonite 1 almost absent; eye composed of 4 ocelli (Fig. 15) on a triangular projection (Fig. 14A); pereonite 2 rectangular as long as cephalon (head + pereonite 1); pereonites 4 and 5 subequal in length, ventrally widened; pereonite 7 the shortest.

Gills (figure 15A). Present on pereonites 3-4, small and rounded.

Mouthparts. Upper lip (Fig. 16D) symmetrically bilobed, smooth apically. Mandibles (Fig. 16A,B) without molar; left mandible with incisor 6-toothed, lacinia mobilis 5-toothed followed by a row of plates setulose distally; right mandible with incisor 6-toothed, lacinia mobilis transformed into a wide plate, followed by three more plates setulose distal-

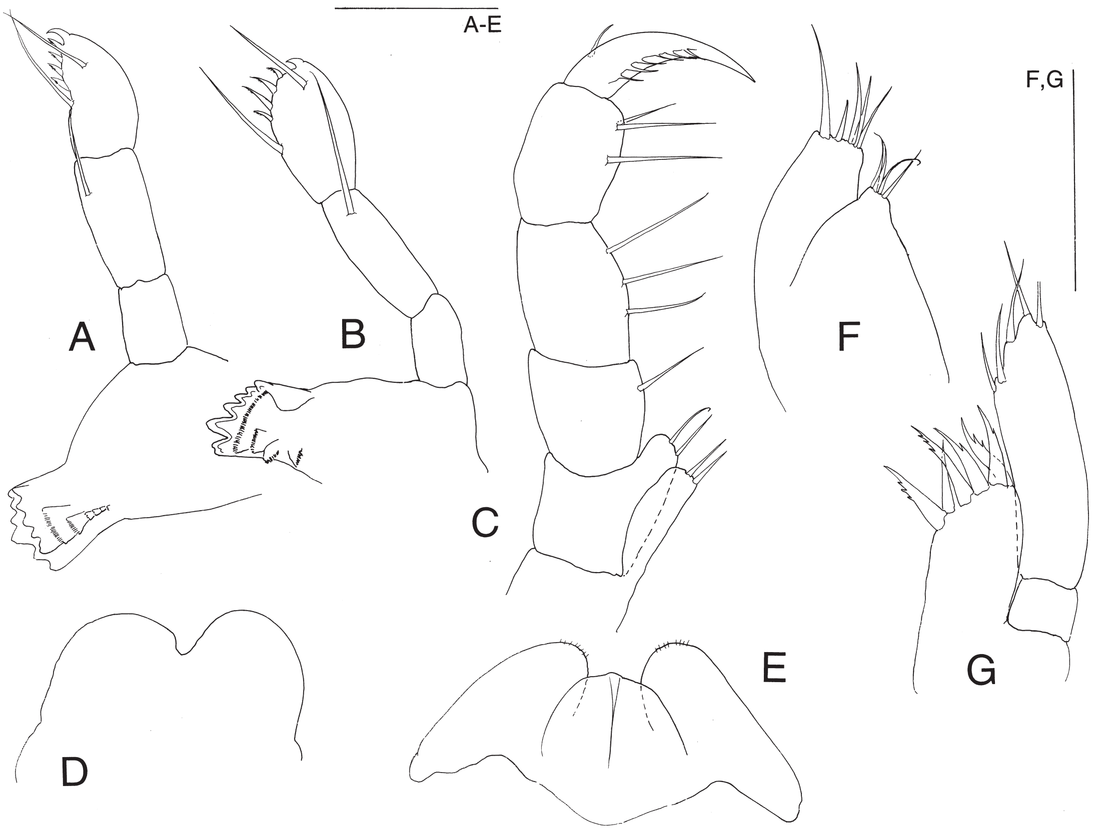

FIG. 16. – *Caprellaporema subantarctica* gen. et sp. nov. Male. A, left mandible; B, rigth mandible; C, maxilliped; D, upper lip; E, lower lip; F, maxilla 2; G, maxilla 1. Scale bars: 0.05 mm.

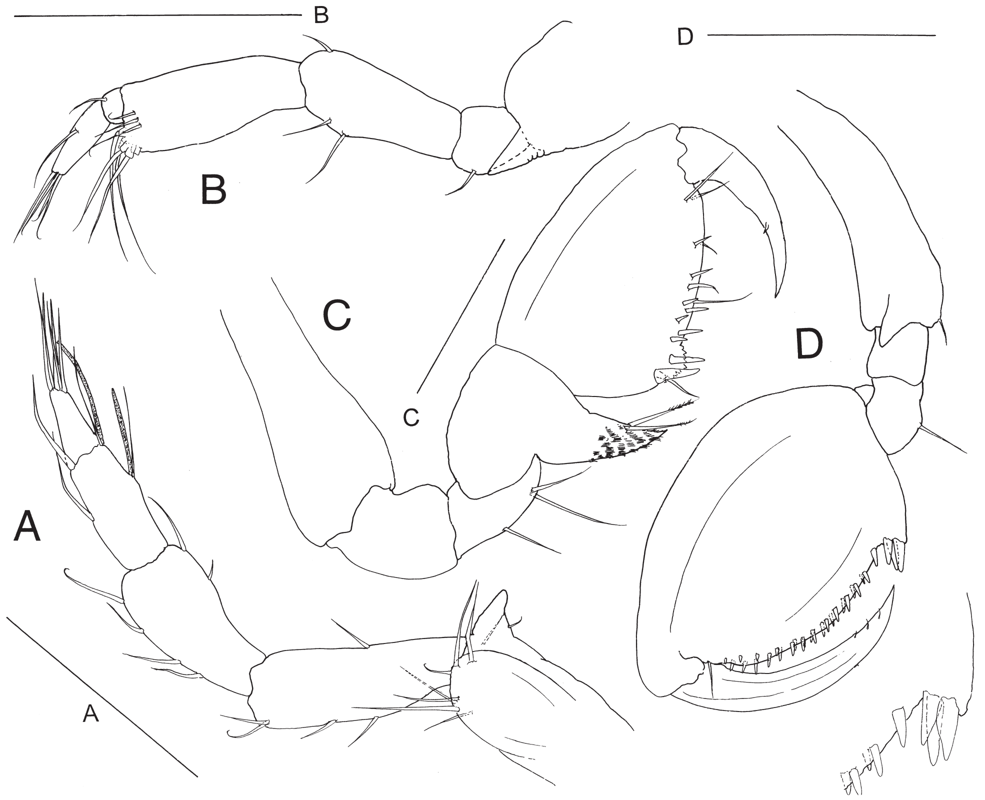

FIG. 17. – *Caprellaporema subantarctica* gen. et sp. nov. Male. A, antenna 1; B, antenna 2; C, gnathopod 1; D, gnathopod 2. Scale bars: A, B: 0.2 mm; C: 0.1 mm; D: 0.3 mm.

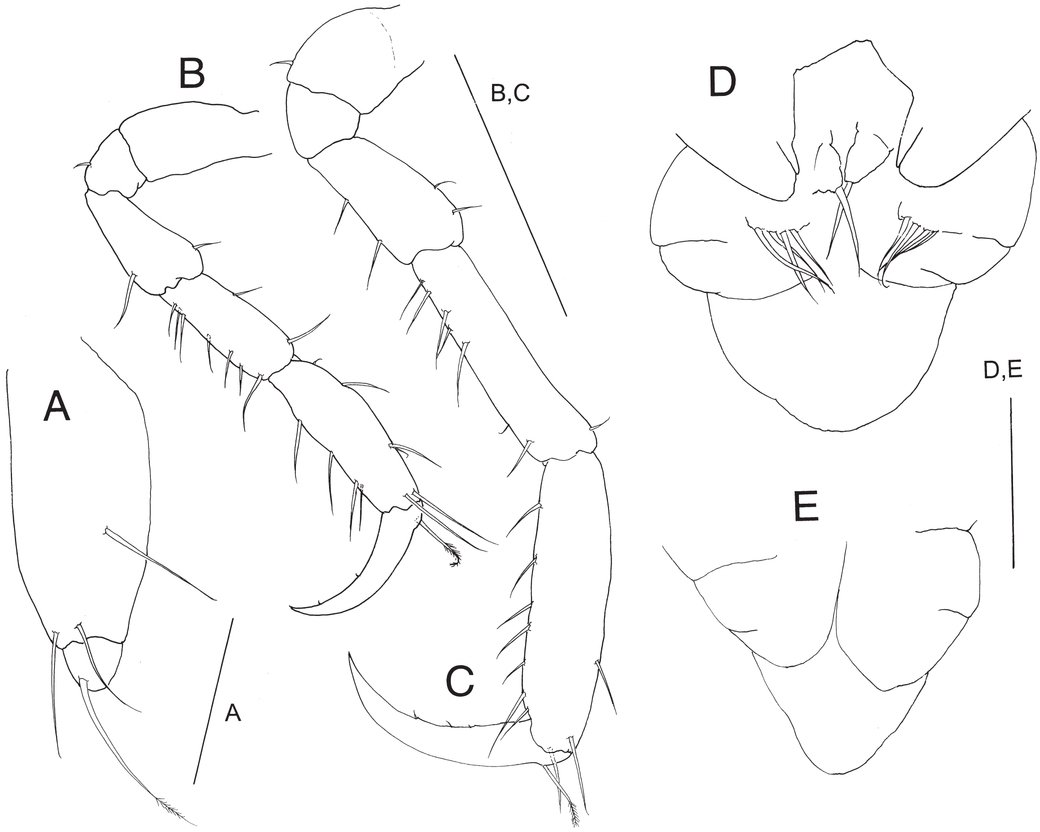

FIG. 18. – *Caprellaporema subantarctica* gen. et sp. nov. A-D, male. A, pereopod 5; B, pereopod 6; C, pereopod 7; D, abdomen (ventral view). E, female abdomen (ventral view). Scale bars: A: 0.05 mm; B-C: 0.3 mm; D, E: 0.05 mm.

ly; palp 3-articulate, second article with a single seta, distal article with a long simple setae medially, followed by four short and robust plumose setae, another long simple seta and a small hook projection distally. Lower lip (Fig. 16E) with inner lobes fused; outer lobes carrying fine and short setae apically. Maxilla 1 (Fig. 16G) outer lobe carrying six robust and serrate setae; distal article of the palp with five setae distally, no setae laterally. Maxilla 2 (Fig. 16F) inner lobe triangular with four setae; outer lobe rectangular with five setae. Maxilliped (Fig. 16C) inner plate small and rectangular with two setae; outer plate similar to inner one, with two setae as well; palp 4-articulate, dactylus with a row of ventral setae as serration and a short dorsal one.

Antennae. Antenna 1 (Fig. 17A) a little shorter than head to pereonite 2 combined; basal article of the peduncle with a distal acute projection and another round projection; flagellum 2-articulate. Antenna 2 (Fig. 17B) about two-thirds of antenna 1; basal article of the peduncle with an acute projection; distal article of the peduncle with a group of setae; flagellum 2-articulate, basal article very small (Fig. 14B), about one-fourth of distal article in length.

Gnathopods. Gnathopod 1 (Fig. 17C) basis as long as ischium, merus and carpus combined; ischium rectangular; merus rounded; carpus striking (Fig 14C, D), provided with a ventral acute projection carrying rows of small setulae and a pair of plumose setae; propodus length about 1.5 times width, palm with a pair of proximal grasping spines, grasping margin serrate proximally; dactylus margin short. Gnathopod 2 (Fig. 17D) inserted on the anterior part of pereonite 2; basis as long as pereonite 2, provided with a projection distally; ischium rectangular; merus rounded; carpus small and triangular; propodus oval, length about 1.5 times width, with four proximal grasping spines and two rows of smaller spines along the palm.

Pereopods. Pereopod 3 and 4 absent (Fig. 15A). Pereopod 5 two-articulate (Fig. 18A). Basal article with a constriction proximally and with 3 setae; distal article short, about one-fifth as long as basal article, with a long plumose setae. Pereopods 6 and 7 missing in holotype, described from a paratype (Fig. 18B, C), basis without carina, ischium short, propodus without grasping spines and dactylus with a dorsal plumose setae proximally.

Penes (Fig. 18D) large, tringular, as long as wide, suture present apically.

Abdomen (Fig. 18D) with a pair of appendages, a pair of lateral lobes and a single dorsal lobe; appendages small and triangular, carrying a strong setae distally; lateral lobes with a row of four setae each one; dorsal lobe smooth.

Allotype female (USNM 1007241)

Body length 2.8 mm. Pereonites 4 and 5 not widened (Fig. 15B). Gills larger than in male and more elongate. Oosteguites scarcely setose. Abdomen (Fig. 18E) without appendages; lateral lobes without setae.

Intraspecific variation: Body length measures: Males 3.3 ± 0.5 mm (mean ± standard deviation), range (2.6-4.1 mm), n=28. Females (mature) 2.8 ± 0.6 (2.1-4.0), n=19.

The morphological characteristics of the species are rather constant in the specimens examined. Only some variation was found in the number of setae on the distal article of the mandibular palp (ranging between 5-8). The setation of the inner and outer plates of the maxilliped is constant but the number and organisation of the setae along the maxilliped palp is variable.

Remarks: (See remarks under genus *Caprellaporema*).

Ecology: *Caprellaporema subantarctica* has been found in a depth range 8-103 m living on bryozoans on rock faces, encrusting platelet coralline alga from boulders in *Macrocystis pyrifera* C. Agardh, 1820, bed and coarse sediment and shell fragments.

Distribution: Antipodes Islands, Campbell Islands and The Snares.

DISCUSSION

The study area is interesting from the biogeographical point of view as it is a transition between the temperate region and the cold Antarctic waters. Although a great number of stations were sampled along these subantarctic islands and collections were targeted on amphipods (see Lowry and Fenwick, 1983) only six caprellid species are present in the collections. One of them, *Caprella equilibra,* is a cosmopolitan species, *Caprellina longicollis* is distributed in the cold-temperate region throughout the world, *Caprellinoides mayeri* is one of the common species of Antarctic waters (Guerra-García, 2001) and the remaining three species, *Caprella manneringi*, *Pseudaeginella campbellensis* and *Caprellaporema subantarctica* are, so far, endemic for the subantarctic Islands. The low caprellid number of species around the area could be due to the cold increase in waters towards the Antarctic region. Recently, Thiel *et al*., 2003 observed a latitudinal gradient with decreasing abundance and species richness of littoral caprellids towards the South along the Pacific coast of continental Chile. The same pattern was obtained by Laubitz (1970) for the Caprellidea of the North Pacific: the number of species was decreasing towards high latitudes with colder waters, so this tendency of the caprellids avoiding the coldest waters seems to be general. The number of littoral caprellid species recorded from Tasmania and nearby areas of South Australia is about twenty (Guerra-García, in prep.); this number decreases to six in the Subantarctic Islands studied in the present paper. This study seems to support the general tendency of decreasing species richness of the caprellidean amphipods with a decrease in water temperature. Additionally, Thiel *et al*., 2003 reported that this decrease was also affecting the abundance of species, not only the species richness. However, in the present study, *Caprellina longicollis* was very abundant in the majority of stations. This species is the most common in New Zealand waters (McCain, 1979), probably being very well adapted to the marine environments of New Zealand and nearby Subantarctic Islands. Since some species are numerous in colder waters, we could not explain the decrease of the species richness on the basis of a difficult environment. Rather, the absence of large algal habitats could play an important role to explaining why are there fewer species of caprellids in colder waters.

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