CUMACEAN CRUSTACEANS OBTAINED BY THE 26TH JAPANESE ANTARCTIC RESEARCH EXPEDITION (1984–1985), WITH DESCRIPTIONS OF FOUR NEW SPECIES

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Abstract: In a small collection of cumacean crustaceans taken by the 26th Japanese Antarctic Research Expedition (1984/85) at three stations (275-293 m deep) off Princess Ragnhild Coast, using beam-trawls and MTD-net, in February 1985, six species were found. Four of them, *Vaunthompsonia laevifrons, Cyclaspis cristulata, Leucon breidensis*, and *Cumella pectinifera*, are proposed herein as new to science. Brief accounts and illustrations of the other two, *Cyclaspis* (?) sp. and *Hemilamprops* sp., are given, but the exact identification of the species is reserved until further specimens are available for study.

1. Introduction

Our knowledge of the cumacean crustaceans of the Antarctic Seas is due to the contributions by SARS (1887), ZIMMER (1902, 1907a, b, 1908, 1909, 1913), HANSEN (1908), CALMAN (1907, 1917a, b, 1918), HALE (1937), GAMÔ (1959), LOMAKINA (1968) and JONES (1971).

This paper deals with a small collection of cumaceans taken from off Princess Ragnhild Coast during the cruise of the SHIRASE in February 1985, by Mr. Y. FUKUDA of Kumamoto University, the zoologist of the 26th Japanese Antarctic Research Expedition (1984/85) (JARE-26).

On careful examination of the collection, the following six species were found. Four of them, *Vaunthompsonia laevifrons*, *Cyclaspis cristulata*, *Leucon breidensis* and *Cumella pectinifera*, are proposed as new to science, and the exact specific identification of the other two species, *Cyclaspis* (?) sp. and *Hemilamprops* sp., is reserved until further specimens are available for study.

The holotype and allotype specimens will be reserved in the collections of the National Science Museum, Tokyo, and other paratype specimens will be deposited in the collections of the National Institute of Polar Research.

2. Station List

The samples were taken at the following three stations (Fig. 1), using beam-trawls and MTD-net (Motoda multiple horizontal towing net).

Stn. 5 (JARE-26), 8 February 1985, 70°09.0'S, 23°34.3'E, Breid Bay, depth 275–283 m, sandy mud bottom, with glass sponges. Gear: Beam-trawl.



Fig. 1. Chart of the Antarctic region, showing the location of the Stations 5, 7, 9 (×), from which the cumaceans were collected by the 26th Japanese Antarctic Research Expedition (1984–1985).

Vaunthompsonia laevifrons sp. nov. Leucon breidensis sp. nov. Cumella pectinifera sp. nov.

Stn. 7 (JARE-26), 25 February 1985, 68°23.6'S, 34°09.6'E, Gunners Bank, Northwest of Lützow-Holm Bay, depth 293 m, sandy bottom. Gear: MTD-net.

Cyclaspis (?) sp.

Hemilamprops sp.

Stn. 9 (JARE-26), 10 February 1985, 70°13.7'S, 24°25.7'E, Breid Bay, depth 276–289 m, sandy mud bottom, with glass sponges. Gear: Beam-trawl.

Vaunthompsonia laevifrons sp. nov.

Cyclaspis cristulata sp. nov.

Cumella pectinifera sp. nov.

3. Material and Method

The entire samples, containing about 300 ml (Stn. 5), 500 ml (Stn. 7) and 50 ml (Stn. 9) of sediment and animals, were fixed in about 10% buffered formalin made up with seawater. The samples were sorted in the laboratory under the binocular stereoscopic microscope. After that, the cumacean specimens were transferred to 80% ethanol for preservation. The specimens were dissected with the aid of dissecting fine needles and binocular stereoscopic microscope while the specimens were

immersed in 80% ethanol on a watch glass.

4. Systematics

Family Bodotriidae Subfamily Vaunthompsoniinae Vaunthompsonia laevifrons sp. nov.

(Fig. 2)

Description: The holotype is a female, length about 3.8 mm, injured in the different portions of body. The body is rather compact, smooth, and covered with minute reticulated patterns.

The carapace (Fig. 2: A, B) is about 1 1/2 times as long as the depth, much less than twice as long as the width, and a little longer than the five free thoracic segments combined, without carinae or serrations. As seen from the side, the dorsal outline of the carapace is moderately arched. The antennal notch is shallowly concave, and its anterolateral angle is defined by a small tooth. The atnerolateral or lower margin of the carapace is serrated. The ocular lobe is large, rounded, without spines, and bears obvious eyes with lenses. The pseudorostral lobes barely meet in front of the ocular lobe, and its lower portion has two small teeth.

The cephalothoracic portion (Fig. 2: A, B) is longer than the abdomen.

The telsonic segment (Fig. 2: C) is produced backward between the uropodal peduncles for about 1/4 of its length, and provided with a pair of long plumose setae.

The first segment of the peduncle of the antennule (Fig. 2: D) is robust. The third segment is the shortest. The main flagellum is missing. The accessory flagellum consists of only one segment.

The antenna is shown in Fig. 2: E.

The mandible (Fig. 2: F, G) is normal type of the genus. The incisor process has six setae on the right, and a lacinia mobilis and six setae on the left mandible.

The palp of the maxillule (Fig. 2: H) bears two filaments.

The maxilla is normal type of the genus.

The first and second maxillipeds are as shown in Fig. 2: I and J.

The distal five segments of the third maxilliped (Fig. 2: K) are missing. The outer distal portion of the basis is a little produced distally, and provided with long plumose hairs.

The distal five segments of the first and second peraeopods (Fig. 2: L, M) are missing. The third to fifth peraeopods are shown in Fig. 2: N-P.

The peduncle of the uropod (Fig. 2: A, C) is damaged in the distal portion, and its inner border bears seven spines. The rami are missing.

Material: Holotype female, one juvenile female (manca), Stn. 5 (JARE-26), Breid Bay, 275–283 m, sandy mud bottom, with glass sponges; 8 February 1985.

One female (anterior portion of body), Stn. 9 (JARE-26), Breid Bay, 276–289 m, sandy mud bottom, with glass sponges; 10 February 1985.

Remarks: The new species is very like *V. meridionalis* SARS, 1887, from Kerguelen and South Georgia, 5–310 m deep, and *V. inermis* ZIMMER, 1909, from South Georgia, 24–52 m deep, but it is easily distinguished from *V. meridionalis* by that the carapace of



Fig. 2. Vaunthompsonia laevifrons sp. nov., holotype female, length about 3.8 mm. A: lateral view, B: anterior portion of body, dorsal view, C: last two abdominal segments with peduncles of uropods, D: antennule with accessory flagellum, E: antenna, F-G: left (F) and right (G) mandibles, H: maxillule, I: distal portion of first maxilliped, J: second maxilliped, K: basis of third maxilliped, L-M: bases of first (L) and second (M) peraeopods, N-P: third (N) to fifth (P) peraeopods.

the new species bears no submedian carina or groups of denticles, and it also differs from V. *inermis* in that the carapace is a little longer than the five free thoracic segments combined (in V. *inermis*, the carapace is as long as the first four free thoracic segments combined).

Subfamily Bodotriinae Cyclaspis cristulata sp. nov. (Fig. 3)

Description: The holotype is a juvenile female (manca), length about 3.8 mm. The body is rather compact, and the integument is calcified and covered with minute spiniform granules (Fig. 3: A).

The carapace (Fig. 3: A, B) is very large, a little less than 1 1/2 times as long as the depth, which is more than the width. As seen from the side, the carapace is somewhat ellipsoidal in outline, and provided with a longitudinal dorsomedian carina, bearing minute serrations, which runs backward from the tip of the ocular lobe to the hind margin of the carapace, and similar dorsomedian carina is also well marked on all the thoracic and abdominal segments. The ocular lobe is large, rounded and furnished with nine distinct eyes with lenses. The pseudorostral lobes do not meet in front of the ocular lobe. The antennal notch is deep, and provided with a round anterolateral angle. The anterolateral or lower margin of the carapace is entirely smooth.

The cephalothoracic portion (Fig. 3: A, B) is about as long as the abdomen. The second free thoracic segment is firmly fused with the carapace.

The abdominal segments (Fig. 3: A, B) are almost cylindrical in shape. The fifth segment is the longest, and about as long as the telsonic segment. The posterior portion of the telsonic segment is much produced backward between the uropodal peduncles, about 1/3 as long as the telsonic segment.

The first peduncular segment of the antennule (Fig. 3: D) is robust, and much longer than the distal two segments combined. The third segment is much longer than the second. The main flagellum is 2-segmented, shorter than the third peduncular segment. The second segment is 1/2 as long as the first, and provided with two long aesthetascs. The accessory flagellum is very minute, composed of only one segment, and furnished with plumose setae at the apex.

The antenna is shown in Fig. 3: E.

The mandible is normal type of the genus. The incisor process has 17 setae on the right (Fig. 3: F), and a lacinia mobilis and 16 setae on the left mandible.

The palp of the maxillule (Fig. 3: G) bears only one filament.

The maxilla is normal type.

The second maxilliped is as shown in Fig. 3: H.

The basis of the third maxilliped (Fig. 3: I) is rather slender, moderately curved, somewhat expanded distally, and much longer than the remaining distal segments together. Its outer distal angle is much produced, reaching about the middle portion of the merus. The merus has a hyaline tooth on the outer angle.

The basis of the first peraeopod (Fig. 3: J) is wide, stout, and nearly as long as the remaining distal segments together. The carpus is the longest, a little longer than



Fig. 3. Cyclaspis cristulata sp. nov., holotype juvenile female (manca), length about 3.8 mm. A: lateral view, B: dorsal view, C: last two abdominal segments with left uropod, D: antennule, E: antenna, F: right mandible, G: maxillule, H: second maxilliped, I: third maxilliped, J: first peraeopod, K: second peraeopod, L-M: third (L) and fourth (M) peraeopods.

the propodus.

The second peraeopod (Fig. 3: K) is 7-segmented, and nearly 1/3 as long as the first peraeopod. The basis is nearly 2/3 as long as the remaining distal segments

together. The dactylus is a little longer than the propodus, and furnished with two large teeth on the outer border, and three unequal spines at its apex.

The third and fourth peraeopods (Fig. 3: L, M) are almost similar in appearance, and longer than the second. The fifth peraeopod is quite wanting, and there is no trace of the appendage on the last thoracic segment. It is a juvenile (manca larval stage) character.

The peduncle of the uropod (Fig. 3: C) is shorter than the telsonic segment, and unarmed on the inner border. The endopod is 1-segmented, and armed with several setules and a spine on the inner border. The exopod is a little shorter than the endopod, and bears a plumose seta on the inner distal border and a spine at its apex.

Material: Holotype juvenile female (manca), Stn. 9 (JARE-26), Breid Bay, 276–289 m, sandy mud bottom, with glass sponges; 10 February 1985.

Remarks: C. cristulata sp. nov. is well characterized from the previously described species of the genus by that the dorsal surface of the body is provided with a salient longitudinal dorsomedian carina with minute serrations. The holotype is a juvenile female (manca stage); however, it may already possess the main specific characters as in the adult. The specific name, cristulata, is derived from the fact that this species bears a salient dorsomedian carina on the dorsum of the carapace and all the body segments.

Cyclaspis (?) sp.

(Fig. 4)

Material: Five juveniles (manca), Stn. 5 (JARE-26), Breid Bay, 275–283 m, sandy mud bottom, with glass sponges; 8 February 1985.

Two juveniles (manca), Stn. 7 (JARE-26), Gunners Bank, Northwest of Lützow-Holm Bay, 293 m, sandy bottom; 25 February 1985.

Remarks: These specimens are most related to the species which was briefly described and illustrated as *Cyclaspis* sp. (?) by LOMAKINA (1968) from off Sabrina Coast, Wilkes Land, 181 m deep, in general aspect. The author also referred these specimens to the genus Cyclaspis with considerable doubt by that it has aberrant shape of the ocular lobe, the second and third maxillipeds, etc. Unfortunately the present specimens are all juveniles (manca stage), so that the exact specific identification is reserved until further specimens are available for the study. The general morphological features of the species are given in Fig. 4.

Family Leuconidae

Leucon breidensis sp. nov.

(Figs. 5–7)

Description: The holotype is a female with rudimentary oostegites, length about 2.9 mm (Fig. 5). The fifth abdominal segment is heavily injured. The integument is rather thin and covered with minute reticulated patterns.

The carapace (Fig. 5: A, B) is about 1 2/3 times as long as the first four free thoracic segments together, and about twice as long as the width, which is nearly as wide as the depth. The dorsomedian carina is present and provided with about 12 small teeth on the anterior portion. The pseudorostral lobes are a little directed upward, and



Fig. 4. Cyclaspis (?) sp., juvenile female (manca), length about 2.1 mm. A: lateral view, B: dorsal view, C: anterior portion of body, lateral view, D: last two abdominal segments with left uropod, E: antennule, F: antenna, G: mandibles, H: maxillule, I: maxilla, J-L: first (J) to third (L) maxillipeds, M-P: first (M) to fourth (P) peraeopods.

meet in front of the ocular lobe for a distance about 1/4 of the carapace length. The ocular lobe is rather large, and without discernible ocelli. The antennal notch is rounded. The anterolateral angle is pointed, and provided with small teeth on the inner side. The anterolateral or lower margin of the carapace is serrated.

The cephalothoracic portion (Fig. 5: A) is much longer than the abdomen.



Fig. 5. Leucon breidensis sp. nov., holotype female with rudimentary oostegites, length about 2.9 mm. A: lateral view, B: anterior portion of body, dorsal view, C: antennule, D: antenna, E: third maxilliped, F: first peraeopod, G: second peraeopod, H-J: third (H) to fifth (J) peraeopods.

The abdomen (Fig. 5: A) is much less than 1/2 of the total body length. The fifth abdominal segment is rather long, a little longer than the fourth one, and about 1 1/2 times as long as the telsonic segment.

The antennule (Fig. 5: A, C) is short, not reaching the tip of the pseudorostrum. The first peduncular segment is very short, robust, and about as long as the second, which is about 1 1/3 times as long as the third one. The main flagellum is 3-segmented. The first segment is slightly longer than the second. The third segment is very minute, and provided with two aesthetascs. The accessory flagellum is 1-segmented, about 3/4 as long as the main lash, and furnished with three unequal apical spines.

The antenna is shown in Fig. 5: D.

The mandible is normal type of the genus. The incisor process has two setae on the right, and a lacinia mobilis and a seta on the left mandible.

The first and second maxillipeds are normal type of the genus.

The basis of the third maxilliped (Fig. 5: E) is a little more than $1 \frac{1}{2}$ times as long as the remaining distal segments together, and furnished with fine hairs on the inner border, and short plumose setae on the inner distal angle.

The first peraeopod (Fig. 5: F) is 7-segmented. The basis is a little shorter than the remaining distal segments together, and provided with plumose setae on the inner border. The ischium is short, and bears two hyaline teeth on the inner border. The dactylus is nearly 3/4 as long as the propodus, and much less than 2/3 as long as the carpus.

The second peraeopod (Fig. 5: G) is 6-segmented. The ischium is obsolete. The basis is almost cylindrical in shape, and nearly as long as the remaining distal segments together.

The third to fifth peraeopods (Fig. 5: H–J) are 7-segmented. The first three pairs of peraeopods have well developed exopods.

The uropods (Fig. 5: A) are injured. The peduncle is a little shorter than the subequal rami. The first segment of the endopod is nearly 3 times as long as the second, and furnished with about eight spines on the inner border. The second segment has four spines on the inner border.

The allotype young male (Fig. 6), length about 2.9 mm, bearing two pairs of undeveloped pleopods (Fig. 6: K, L), is very like the holotype female in general appearance.

The carapace (Fig. 6: A, B) is about twice as long as the first four free thoracic segments combined, and a little more than twice as long as the width, which is slightly less than the depth. The dorsum of the carapace is provided with a denticulate dorsomedian carina which runs backward from the tip of the ocular lobe to the hind end of the carapace.

The maxillule has a filament on the palp.

The basis of the third maxilliped (Fig. 6: F) is about $1 \frac{3}{4}$ times as long as the remaining distal segments together.

The basis of the first peraeopod (Fig. 6: G) is slightly longer than the remaining distal segments together. The merus has a hyaline tooth on the inner distal border. The basis of the second peraeopod (Fig. 6: H) is much longer than the remaining distal segments together. The first four pairs of peraeopods have well developed exopods.

The peduncle of the uropod (Fig. 6: C) is nearly as long as the subequal rami.

The paratype subadult male (Fig. 7), length about 3.2 mm, is very like the holotype female and the paratype young male in general appearance. The antenna reaches

Cumacea (Crustacea) from Antarctic Sea



Fig. 6. Leucon breidensis sp. nov., allotype young male, length about 2.9 mm. A: lateral view, B: anterior portion of body, dorsal view, C: telsonic segment with uropods, D: antennule, E: antenna, F: third maxilliped, G: first peraeopod, H: second peraeopod, I-J: fourth (I) and fifth (J) peraeopods, K-L: first (K) and second (L) pleopods.

the base of the second peraeopod. The basis of the third maxilliped (Fig. 7: C) is much more than twice as long as the remaining distal segments together. The merus of the first peraeopod (Fig. 7: D) has a hyaline tooth on the inner distal border. The



Fig. 7. Leucon breidensis sp. nov., paratype subadult male, length about 3.2 mm. A: anterior portion of carapace with antennule, lateral view, B: last two abdominal segments with uropods, C: third maxilliped, D-E: first (D) and second (E) peraeopods, F: first pleopod.

second peraeopod (Fig. 7: E) has 6 segments, and the basis is about 1 1/2 times as long as the remaining distal segments together. The uropods are injured. The first and second pleopods (Fig. 7: F) are fully developed.

Material: Holotype female with rudimentary oostegites, allotype young male, four juveniles (manca), Stn. 5 (JARE-26), Breid Bay, 275–283 m, sandy mud bottom, with glass sponges; 8 February 1985.

One subadult male, Stn. 9 (JARE-26), Breid Bay, 276–289 m, sandy mud bottom, with glass sponges; 10 February 1985.

Remarks: L. breidensis sp. nov. is most allied to L. sagitta ZIMMER, 1907a, b, from South Georgia, 12-310 m, in having the second peraeopod with six segments. It is distinguished from L. sagitta by that the carapace is much longer than the first four free thoracic segments combined (in L. sagitta, the carapace is about as long as the first four free thoracic segments combined), and provided with distinct large ocular lobe.

Family Nannastacidae Cumella pectinifera sp. nov.

(Fig. 8)

Description: The holotype is a female with rudimentary oostegites, length about 2.6 mm. General appearance of this new species closely resembles that of C. australis CALMAN, 1907, at a glance. The brownish carapace and the body segments have thin purplish margins in the specimens preserved in 10% buffered formalin. The integument is moderately calcified.

The carapace (Fig. 8: A, B) is much less than 4/9 of the total body length, about 1 1/3 times as long as the greatest width, which is a little less than the depth. As seen from the side, the dorsal outline is strongly arched. There is a longitudinal dorso-



Fig. 8. Cumella poctinifera sp. nov., holotype female with rudimentary oostegites, length about 2.9 mm. A: lateral view, B: dorsal view, C: antennule, D: antenna, E-F: right (E) and left (F) mandibles, G: maxillule, H: distal portion of first maxilliped, I: second maxilliped, J: third maxilliped, K: first peraeopod, L: second peraeopod, M-N: fourth (M) and fifth (N) peraeopods.

median carina with fine serrations, which runs backward from the tip of the ocular lobe to the hind margin of the carapace. The ocular lobe is large, subglobular in shape, about 1/10 as long as the carapace length, and without discernible eyes. The pseudorostral lobes are rather short, and meet in front of the ocular lobe for a distance about as long as the ocular lobe. The antennal notch is widely concave, and its antero-

lateral angle is rounded, without teeth. The anterolateral or lower margin of the carapace is entirely smooth.

The cephalothoracic portion (Fig. 8: A, B) is as long as the abdomen. The combined length of all the free thoracic segments is much less than 1/2 of the carapace length. The third free thoracic segment is produced dorsally into an acute stout spine, which is situated in the middle line, curved upward and somewhat overhanging the following segment.

The abdominal segments (Fig. 8: A, B) are rather stout and cylindrical. The first three segments are subequal in length. The fifth segment is the longest, about $1 \frac{1}{3}$ times as long as the fourth, and slightly shorter than the telsonic segment.

The antennule (Fig. 8: A, C) is long and slender. The first peduncular segment is a little shorter than the subequal two distal segments together. The main flagellum is about 1 1/4 times as long as the third peduncular segment, and 3-segmented. The distal segment is very short, about 1/3 as long as the subequal first and second segments combined, and provided with two long aesthetascs. The accessory flagellum is minute, much shorter than the first segment of the main lash, and 2-segmented. The distal segment is about twice as long as the basal one.

The antenna is as shown in Fig. 8: D.

The mandible (Fig. 8: E, F) is normal type of the genus. The incisor process is provided with 6 setae on the right, and a lacinia mobilis and 5 setae on the left mandible.

The maxillule (Fig. 8: G) has two filaments on the palp.

The first and second maxillipeds are shown in Fig. 8: H and I.

The basis of the third maxilliped (Fig. 8: J) is about 1 1/3 times as long as the remaining distal segments together, and furnished with a stout hyaline tooth on the inner distal border. The outer distal portion is a little produced distally, much exceeding the end of the merus, and provided with two long plumose setae. The merus bears two stout hyaline teeth on the inner border, and the carpus also has a smaller one on the inner distal border.

The basis of the first peraeopod (Fig. 8: K) is a little more than 4/5 as long as the remaining distal segments together, and provided with about six hyaline stout teeth on the outer distal border and two such teeth on the inner border.

The basis of the second peraeopod (Fig. 8: L) is broad, a little less than 3/4 as long as the remaining distal segments together, and furnished with some serrations on the outer distal border. The dactylus is rather broad, about as long as the carpus, and provided with a long and four short spines at the apex.

The fourth and fifth peraeopods are shown in Fig. 8: M and N.

The peduncle of the uropod (Fig. 8: A, B) is a little less than twice as long as the telsonic segment, and bears two short spines on the inner border. The endopod is about 1/2 as long as the peduncle, and provided with four short spines on the serrated inner border, and three unequal spines on the distal end. The exopod is much shorter than the endopod, and provided with two unequal distal spines.

The allotype male is very heavily injured and its posterior portion of body is missing. In general, the male is very similar to the female. The first four pairs of peraeopods have well developed exopods.

Material: Allotype male (the posterior portion of body is missing), one juvenile female (manca), Stn. 5 (JARE-26), Breid Bay, 275–283 m, sandy mud bottom, with glass sponges; 8 February 1985.

Holotype female with rudimentary oostegites, two juvenile females (manca), Stn. 9 (JARE-26), Breid Bay, 276–289 m, sandy mud bottom, with glass sponges; 10 February 1985.

Remarks: C. pectinifera sp. nov. resembles C. pygmaea SARS, 1865, from the Northeastern Atlantic (Norwegian and British coasts to the Bay of Biscay), the Mediterranean, and the Black Seas, 4–124 m deep (SARS, 1900; STEBBING, 1913; FAGE, 1951; JONES, 1976), and C. argentinae JONES, 1984, from off Argentine, 256–239 m, and it is most allied to C. australis CALMAN, 1907, from Keiser Wilhelm II Land ($66^{\circ}2'S$, $89^{\circ}38'E$), Commonwelth Bay, King George V Land and the Ross Sea, 45–583 m (CALMAN, 1907; ZIMMER, 1907b, 1913; STEBBING, 1913; HALE, 1937; JONES, 1971). The new species is well distinguished from the above-mentioned three related species by that 1) the carapace of the new species bears a salient serrulate dorsomedian carina, which runs backward from the tip of the ocular lobe to the hind end of the carapace; 2) the round anterolateral angle without serrations or teeth; and 3) the anterolateral or lower margin of the carapace without teeth or serrations.

The specific name, *pectinifera*, is derived from the fact that the carapace has a salient cockscomb-like serrulate dorsomedian carina, running backward from the tip of the ocular lobe to the hind end of the carapace.

Family Lampropidae Hemilamprops sp. (Fig. 9)

Only two damaged specimens are available, one juvenile female (the posterior portion of body is missing) and one heavily injured juvenile female (manca). These specimens may be referable to *Hemilamprops* by having the carapace with obsolete antennal notch, and the exact specific identification could not be made.



Fig. 9. Hemilamprops sp., juvenile female (posterior portion of body is missing). A: anterior portion of body, lateral view. Juvenile female (manca), length about 1.9 mm. B: last two abdominal segments with telson and uropods.

Material: Two juvenile females (1 manca; both heavily injured), Stn. 7 (JARE-26), Gunners Bank, Northwest of Lützow-Holm Bay, 293 m, sandy bottom; 25 February 1985.

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