

Abstract

Twenty species of pelagic shrimps from deep waters from off southern Australia to the Antarctic Ocean are described. One species, *Gennadas kemp* STEBBING, is firstly recorded from the Antarctic Ocean. *Pasiphaea acutifrons* BATE and *P. scotiae* (STEBBING) are fully re-described. *P. longispina* LENZ and STRUNCK is synonymized with *P. scotiae*.

1. Introduction

The biological investigation of the Southern Ocean has had a long history, beginning with the voyage of H.M.S. CHALLENGER and continuing recently as the Biological Investigations of Marine Antarctic Systems and Stocks (BIOMASS). Several authors reported pelagic shrimps from the Southern Ocean (BATE, 1888; STEBBING, 1914a; LENZ and STRUNCK, 1914; BAGE, 1938; HALE, 1941; ZARENKOV, 1968), and their fauna in the Southern Ocean was reviewed by YALDWYN (1965) and OMORI (1974). However, still little is known of the pelagic shrimp fauna in the Southern Ocean between 150°E and 115°E. Only nine species were collected from this sector of the Southern Ocean by two expeditions: the voyage of H.M.S. CHALLENGER and the Australasian Antarctic Expedition (BATE, 1888; HANSEN, 1903; BAGE, 1938). This paper deals with the taxonomy of pelagic shrimps collected by R.V. HAKUHO MARU from south of Australia to the Antarctic Ocean. The results on their biomass and distribution have been reported by IWASAKI and NEMOTO (1987b).

2. Materials and Methods

Samplings were carried out on the R.V. HAKUHO MARU during the KH-83-4 cruise (BIOMASS SIBEX phase-1) conducted by the Ocean Research Institute, University of Tokyo in the Southern Ocean between 150°E and 115°E in December 1983 and January 1984.

Samples were collected by oblique hauls of three kinds of nets: an ORI-net (OMORI,

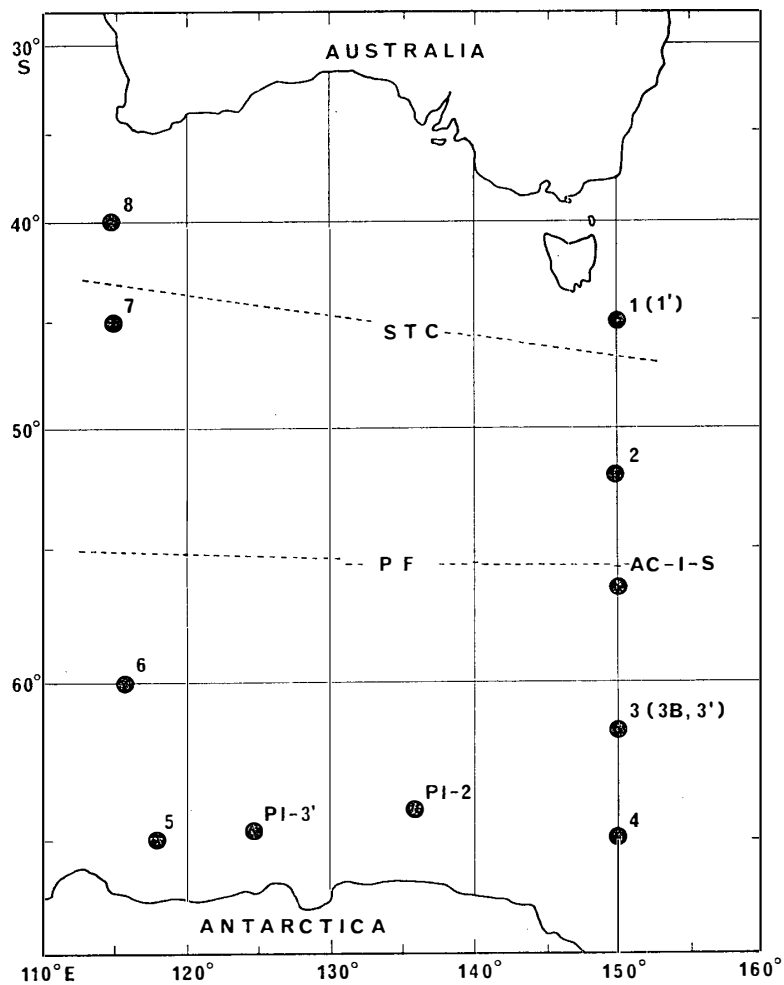


Fig. 1. Location of sampling stations in the R. V. HAKUHO MARU cruise, KH-83-4 (BIOMASS SIBEX phase-1). STC, Sub-tropical Convergence; PF, Polar Front.

Table 1. List of sampling data.

Sample	Station	Location	Date	Sampling layer (m)	Gear
1	1	45-00. 0S, 150-03. 7E	14 Dec. 1983	0-1012	ORI-69
2	1	45-06. 8S, 150-09. 9E	14 Dec. 1983	0-1050	IKMT**
3	1'	44-58. 7S, 150-00. 4E	9 Jan. 1984	0- 97	IKMT
4	2	52-05. 9S, 149-41. 0E	16 Dec. 1983	0- 748	ORI-69
5	2	52-07. 4S, 149-52. 6E	16 Dec. 1983	0- 905	IKMT
6	AC-I-S	56-26. 6S, 150-15. 4E	28 Dec. 1983	0- 830	IKMT**
7	3	61-31. 5S, 150-28. 2E	19 Dec. 1983	0- 844	ORI-69
8	3	61-27. 0S, 150-29. 6E	19 Dec. 1983	0- 870	IKMT
9	3B	61-17. 9S, 150-01. 3E	26 Dec. 1983	0- 873	ORI-69
10	3B	61-25. 6S, 150-00. 1E	26 Dec. 1983	0- 860	IKMT
*	3'	61-32. 3S, 150-26. 3E	13 Jan. 1984	0- 535	IKMT
*	4	64-57. 8S, 150-06. 5E	22 Dec. 1983	0- 918	ORI-69
11	4	64-56. 4S, 150-10. 4E	21 Dec. 1983	0- 670	IKMT
*	PI-2	64-21. 4S, 135-56. 7E	16 Jan. 1984	0- 875	ORI-69
12	PI-2	64-13. 5S, 135-43. 1E	17 Jan. 1984	0- 570	IKMT
*	PI-3'	64-45. 6S, 125-03. 0E	18 Jan. 1984	0- 26	IKMT
*	5	65-05. 0S, 117-50. 1E	20 Jan. 1984	0-1035	ORI-69
13	5	65-01. 6S, 118-12. 2E	19 Jan. 1984	0- 780	IKMT
14	5	65-03. 0S, 118-03. 9E	19 Jan. 1984	0- 890	IKMT**
15	6	60-03. 0S, 116-07. 8E	21 Jan. 1984	0-1030	ORI-69
16	6	60-03. 3S, 116-04. 0E	21-22 Jan. 1984	0- 798	ORI-69
17	6	60-00. 3S, 116-01. 0E	22 Jan. 1984	0- 862	IKMT
18	6	60-00. 7S, 115-47. 8E	22 Jan. 1984	0- 850	IKMT**
19	7	45-03. 2S, 115-01. 1E	26 Jan. 1984	0-1058	ORI-69
20	7	45-01. 7S, 114-59. 4E	26 Jan. 1984	0-1060	ORI-69
21	7	44-48. 4S, 114-57. 3E	27 Jan. 1984	0- 980	IKMT
22	7	44-55. 5S, 114-58. 9E	26 Jan. 1984	0- 934	IKMT**
23	8	39-57. 7S, 114-51. 5E	28 Jan. 1984	0- 863	IKMT

* Pelagic shrimps were not collected.

** IKMT with EMPS.

1965) with a mesh opening of 0.69 mm, a 3.16m Isaacs-Kidd midwater trawl (IKMT) with a mesh opening of 5 mm, and the IKMT with a 1 m² Electronic Multiple Plantkon Sampler (EMPS) with five codend nets (PEARCY *et al.*, 1977). A total of 28 tows were carried out at eleven stations, and of these five did not sample pelagic shrimps (Fig. 1, Table 1). The oceanographic conditions were described by NAKAI *et al.* (1986).

Catches were immediately fixed in a 10% formalin/seawater solution buffered with sodium tetraborate. After pelagic shrimps were sorted, they were preserved in a 5% formalin/seawater solution. Carapace lengths (CL) from the orbital margin to the midposterior margin of the carapace were measured with an ocular micrometer or slide calipers. All specimens were deposited at the Ocean Research Institute, University of Tokyo.

Types and other reference specimens were loaned from the following institutions: the British Museum (Natural History), London (BMNH); the Museum of Comparative Zoology, Harvard University, Cambridge (MCZ); the South Australian Museum, Adelaide; and the Zoologisches Museum, Museum für Naturkunde der Humboldt-Universität zu Berlin, DDR (ZM).

3. Taxonomical Accounts

Order DECAPODA
Suborder DENDROBRANCHIATA
Superfamily PENAEOIDEA
Family ARISTEIDAE
Genus *Gennadas* BATE, 1881

(1) *Gennadas gilchristi* CALMAN, 1925

Restricted synonymy

Gennadas gilchristi CALMAN, 1925: pp. 6–7, pl. 1, figs. 3–4.—BURKENROAD, 1936: pp. 66 (in key), 76–77, 79–80, fig. 58.—BARNARD, 1950: pp. 629 (in key), 633, figs. 118g–h.—KENSLEY, 1971b: pp. 273 (in key), 280–283, fig. 6.

Amalopenaeus elegans (not SMITH, 1882) STEBBING, 1917: p. 31.

Amalopenaeus Gilchristi BALSS, 1927: pp. 261–262, figs. 16–17.

Material examined

Sample 1, 3 females (CL 5.04–7.92 mm), 1 male (CL 6.60 mm); Sample 2, 38 females (CL 4.80–8.76 mm), 12 males (CL 5.28–7.68 mm); Sample 20, 1 female (CL 6.48 mm); Sample 21, 2 females (CL 6.00, 6.36 mm), 4 males (CL 5.28–6.00 mm); Sample 22, 8 females (CL 6.60–8.40 mm), 7 males (CL 6.60–8.64 mm); Sample 23, 1 female (CL 6.96 mm), 7 males (CL 5.88–8.40 mm).

Description

Thelycum of female with anteriorly notched plate on eighth thoracic sternite. Seventh thoracic sternite with two anteriorly-directed, apically notched projections.

Petasma of male with external lobe divided into two lobules, inner longer than outer; median lobe divided into two slender lobules; internal lobe acute; accessory lobe well developed.

Remarks

BURKENROAD (1936) pointed out that BALLS' figure of the impregnated thelycum of *Amalopenaeus gilchristi* BALSS (1927, fig. 17) was incomplete and somewhat misleading. Therefore, he reexamined and illustrated BALSS' (1927) specimen, and showed that the free margin of the lamella was cut into a pair of large teeth, which were not sharp; the median margins of these teeth appressed but not fused.

According to RICHARDSON and YALDWYN (1958), there are blue patches laterally on the abdomen. But we could not find out these in the preserved specimens. It seems that blue patches were discolored in the formalin/seawater solution.

Distribution

Tasman Sea (GRIFFITHS and BRANDT, 1983a, b), off New Zealand (RICHARDSON and YALDWYN, 1958; ROBERTSON *et al.*, 1978), south of Australia (present study), southern Indian Ocean (BALSS, 1925), off Cape Point (STEBBING, 1917; BALSS, 1927), off South Africa (STEBBING, 1917; CALMAN, 1925; BALSS, 1925; KENSLEY, 1968, 1971b, 1977, 1981).

This species was known from the Indian and Pacific Oceans from west of South Africa to east of New Zealand, and from 25°S to 45°S. This is the first record of the species from south of Australia.

(2) *Gennadas kempi* STEBBING, 1914*Restricted synonymy*

Gennadas kempi STEBBING, 1914a: pp. 283–284, pl. 27.—STEBBING, 1914b: p. 12.—

CALMAN, 1925: pp. 4–5.—BURKENROAD, 1936: pp. 64 (in key), 68–71, figs. 52, 54.—

BARNARD, 1950: pp. 628 (in key), 630–631, figs. 118a–d.—KENSLEY, 1971b: pp. 273 (in key), 285–286, fig. 8.

Amalopenaeus Kempfi BALSS, 1927: pp. 260–261, figs. 14–15.

Material examined

Sample 2, 7 females (CL 5.64–8.52 mm), 4 males (CL 5.16–6.00 mm), 1 damaged male; Sample 5, 5 females (CL 4.80–8.16 mm), 3 males (CL 4.68–6.60 mm); Sample 6, 3 females (CL 6.36–7.56 mm), 1 male (CL 6.12 mm); Sample 8, 2 males (CL 9.36, 12.00 mm); Sample 10, 4 females (CL 9.60–15.2 mm), 5 males (CL 10.56–13.6 mm); Sample 15, 2 females (CL 7.32, 10.96 mm); Sample 17, 6 females (CL 7.44–10.56 mm), 11 males (CL 6.96–11.76 mm); Sample 18, 8 females (CL 8.04–12.00 mm), 8 males (CL 7.56–11.16 mm); Sample 21, 6 females (CL 5.40–8.28 mm), 11 males (CL 4.92–8.16 mm); Sample 22, 6 females (CL 6.24–9.96 mm), 2 males (CL 6.00, 6.24 mm).

Description

Thelycum of female consisting of triangular plate on sixth thoracic sternite, rectangular plate on seventh thoracic sternite and hexagonal plate on eighth thoracic sternite.

Apex of external lobe of petasma in male acute; median and internal lobes undivided and truncated; median lobe broader than internal lobe; accessory lobe not elongate.

Remarks

BURKENROAD (1936) pointed out that *Gennadas kempi* STEBBING was distinguished from the closely related *G. capensis* CALMAN, by characters not affected by sexual dimorphism, the apex of the blade of the antennal scale in *G. kempi* being symmetrically placed in the center of the distal margin, rather than near the lateral edge as in *G. capensis*.

Distribution

Tasman Sea (GRIFFITHS and BRANDT, 1983a), off New Zealand (RICHARDSON and YALDWYN, 1958), south of Australia (present study), off South Africa (STEBBING, 1914 a, b; CALMAN, 1925; BALSS, 1927; KENSLEY, 1968, 1971b, 1981), southern Indian Ocean (BALSS, 1927; HALE, 1941), Antarctic Ocean (present study).

This is the first record of *G. kempi* from south of Australia and the Antarctic Ocean.

Superfamily SERGESTOIDEA
 Family SERGESTIDAE
 Genus *Sergestes* H. MILNE EDWARDS, 1830

(3) *Sergestes arcticus* KRÖYER, 1855

Restricted synonymy

Sergestes arcticus KRÖYER, 1859: pp. 240–243, 276–277, 285–286, pl. 3, figs. 7a–g; pl. 5, fig. 16.—SMITH, 1882: pp. 96–97.—SMITH, 1884: pp. 415–416, pl. 8, fig. 2.—SMITH, 1886: p. 696, pl. 20, figs. 1–2.—THIELE, 1905: pp. 462–463, figs. 34–37.—KEMP, 1910: pp. 30–35, pl. 3, figs. 13–19.—ILLIG, 1914: pp. 355–356.—SUND, 1920: pp. 6 (in key), 8–9, fig. 5.—HANSEN, 1922: pp. 40 (in key), 62–75, pl. 1, figs. 1–2; pl. 3, figs. 3–5; pl. 4, figs. 1–2.—ILLIG, 1927: pp. 306–310, figs. 53–65.—LEGENDRE, 1940: pp. 218–223, figs. 36–38.—BARNARD, 1950: pp. 639–641, figs. 120a–d.—HOLTHUIS, 1952: pp. 8–10, fig. 1.

Sergestes Rinkii KRÖYER, 1859: pp. 265–268, 280, 285–286, pl. 2, figs. 3a–g. (Mastigopus).

Sergestes Meyeri METZGER, 1875: pp. 302–304, pl. 6, fig. 7.

Sergestes magnificus CHUN, 1888: pp. 33–34, pl. 4, figs. 4–5.

Sergestes (Sergestes) arcticus YALDWYN, 1957: pp. 8 (in key), 9–14, figs. 1–5.—KENSLEY, 1971a: pp. 230 (in key), 232, fig. 7.

Material examined

Sample 1, 9 females (CL 4.08–6.96 mm), 5 males (CL 5.04–6.72 mm); Sample 2, 7 females (CL 6.48–14.40 mm), 3 males (CL 7.20–10.92 mm); Sample 4, 2 males (CL 9.84, 10.80 mm); Sample 5, 18 females (CL 8.40–13.92 mm), 8 males (CL 8.40–9.60 mm); Sample 6, 6 females (CL 9.12–15.0 mm); Sample 10, 1 female (CL 12.72 mm); Sample 19, 3 females (CL 4.80–6.00 mm), 2 males (CL 5.16, 5.28 mm); Sample 20, 3 females (CL 4.44–6.24 mm), 1 male (CL 6.60 mm); Sample 21, 16 females (CL 3.96–12.84 mm), 6 males (CL 4.20–10.80 mm); Sample 22, 8 females (CL 5.76–18.0 mm), 5 males (CL 9.96–11.16 mm); Sample 23, 3 females (CL 11.40–12.24 mm), 4 males (CL 9.84–11.64 mm).

Description

Rostrum small. Supraorbital and hepatic spines present. Third segment of antennular peduncle shorter than first. Third maxilliped reaching end of third pereopod. Two distal segments of fifth pereopod setose on ventral margin.

Lobus armatus of petasma in male curved and armed with row of hooks along inner margin; processus ventralis long and armed distally with several clustered spine-like hooks; lobus connectens triangular and covered with large hooks; lobus terminalis with several terminal hooks; processus uncifer terminally hooked.

In female, coxa of third pereopod with two uncifer teeth.

Remarks

Sergestes arcticus KRÖYER is closely related to *S. similis* HANSEN, but is easily distinguished from that species by the following characters; the lobus terminalis of *S. similis* is longer than the processus ventralis, and the lobus armatus is not armed with hooks along the entire length of the median margin (MILNE, 1968).

This species is distributed in the Atlantic, Mediterranean, southern Indian, South Pacific and Antarctic Oceans. On the other hand, *S. similis* is restricted to the northern North Pacific Ocean, occurring from off Japan to the Bering Sea and the Gulf of

California (OMORI *et al.*, 1972). These species are also geographically isolated from one another.

HOLTHUIS (1977) examined RISSO's publications and manuscripts which were important to work on carcinology under way in the Mediterranean, but some descriptions were not sufficiently complete or were partly erroneous. He identified some species by the name of *Nika Sinuolata* RISSO, *S. edwardii* RISSO and *S. Simiona* RISSO in RISSO's work, which until now had remained an enigma to most carcinologists, as *S. arcticus*.

Distribution

Off Chile (HOLTHUIS, 1952; RETAMAL, 1981), off New Zealand (YALDWYN, 1957; ROBERTSON *et al.*, 1978), Tasman Sea (GRIFFITHS and BRANDT, 1983a), south of Australia (HANSEN, 1903, present study), northeast of Amsterdam Island (ILLIG, 1927), off South Africa (HANSEN, 1925; ILLIG, 1927; BARNARD, 1950; KENSLEY, 1971a, 1981), west of Iceland and west of Norway (HANSEN, 1908), south of Iceland to north of Ireland (KEMP, 1910), north of British Isles to Canary Islands and east of Newfoundland (SUND, 1920), Bay of Biscay to off Nova Scotia (HANSEN, 1922), Mediterranean (HANSEN, 1922; ZARIQUIEY ALVAREZ, 1968), South Atlantic Ocean (ILLIG, 1914), Antarctic Ocean (present study).

An acanthosoma larva which seemed to be indistinguishable from *S. arcticus* has been reported from 54°02'S, 177°00'W (GURNEY and LEBOUR, 1940). This is the first record of adults of *S. arcticus* from the Antarctic Ocean.

(4) *Sergestes armatus* KRÖYER, 1855

Restricted synonymy

Sergestes armatus KRÖYER, 1859: pp. 260–262, pl. 3, figs. 6a–e.—HANSEN, 1896: pp. 950 (in key), 966.—ILLIG, 1914: p. 370.—SUND, 1920: pp. 6 (in key), 23, figs. 39–41.—HANSEN, 1922: pp. 142 (in key), 174–182, pl. 10, figs. 6–7.—HANSEN, 1925: p. 26, —BARNARD, 1950: pp. 639 (in key), 643–644, figs. 120 m–p.

Sergestes incertus HANSEN, 1896: pp. 950 (in key), 962.

Sergestes (Sergestes) armatus KENSLEY, 1971a: pp. 230 (in key), 232–234, fig. 8.

Material examined

Sample 23, 1 female (CL 12.00mm), 1 male (CL 12.00mm).

Description

Rostrum elongate, terminating in strong point. Supraorbital and hepatic spines present. Supraorbital ridge absent. Third maxilliped much longer than pereopods and dactylus consisting of four segments. Two distal segments of fifth pereopod setose on ventral margin.

Lobus terminalis of petasma in male long with distal hooks; lobus inermis stout with small lobule on lower margin; lobus connectens globular with numerous hooks; lobus armatus consisting of small globular lobule with tiny hooks and elongate lobule with large hooks; processus ventralis slender with small process at base; processus uncifer pointed.

In female, coxa of third pereopod with single acute projection.

Remarks

The petasmata of the present specimen and KENSLEY's (1971a) description closely resemble each other, in particular having the lobus inermis bilobed. But the lobus

inermis of Hansen's specimens is not bilobed (HANSEN, 1922, pl. 10, figs. 6g–i).

According to HANSEN (1903), BATE (1888) identified the specimens from the Pacific Ocean as *Sergestes armatus* KRÖYER by mistake.

Distribution

Off Japan (HANAMURA, 1979; KIKUCHI and OMORI, 1985), off Hawaii (WALTERS, 1976), Tasman Sea (GRIFFITHS and BRANDT, 1983a, b), south of Australia (present study), off Mozambique to off South Africa (KENSLEY, 1968, 1971a, 1977, 1981), north of Crozet Islands (HANSEN, 1896), waters of Gulf Stream, Sargasso Sea and South Equatorial Current (ORTMANN, 1893), south of Newfoundland to off Morocco (SUND, 1920; HANSEN, 1922), off Bermuda (DONALDSON, 1975), Gulf of Mexico (HOPKINS *et al.*, 1981), South Atlantic Ocean (ILLIG, 1914).

This is the first record of *S. armatus* from south of Australia.

(5) *Sergestes disjunctus* BURKENROAD, 1940

Restricted synonymy

Sergestes (*Sergestes*) *disjunctus* BURKENROAD, 1940: pp. 38–39.—KENSLEY, 1971a: pp. 230 (in key), 236, 238, fig. 11.

Material examined

Sample 23, 1 male (CL 16.4 mm).

Description

Rostrum slightly elevated with short acute apex directed anteriorly. Supraorbital and hepatic spines well developed. Third maxilliped subequal to third pereopod. Two distal segments of fifth pereopod setose on both margins.

Lobus armatus of petasma in male straight with clusters of hooks on apex and base; processus ventralis pointed and flared with eight spiny papillae; lobus connectens stout with numerous small hooks on surface; lobus terminalis shorter than lobus inermis, with several terminal hooks; lobus inermis slender; processus uncifer terminally hooked.

Remarks

According to KENSLEY's figure (1971a, fig. 11b), the lobus inermis is about 1.5 times as long as the lobus terminalis. In the present specimen the lobus inermis is about 2 times as long as the lobus terminalis.

The petasma of *Sergestes disjunctus* BURKENROAD is most closely related to *S. henseni* (ORTMANN) and *S. seminudus* HANSEN. *S. disjunctus* differs from them as follows; in *S. henseni* the lobus connectens is not stout and the lobus armatus bears some hooks at the middle of the inner margin (CROSNIER and FOREST, 1973), while in *S. seminudus* the lobus armatus is armed with a row of hooks on the inner margin (HANSEN, 1919).

Distribution

Tasman Sea (GRIFFITHS and BRANDT, 1983a, b), off New Zealand (BURKENROAD, 1940; RICHARDSON and YALDWYN, 1958), south of Australia (present study), off South Africa (KENSLEY, 1971a, 1981).

This is the first record of *S. disjunctus* from south of Australia.

(6) *Sergestes pectinatus* SUND, 1920 (Fig. 2)

Restricted synonymy

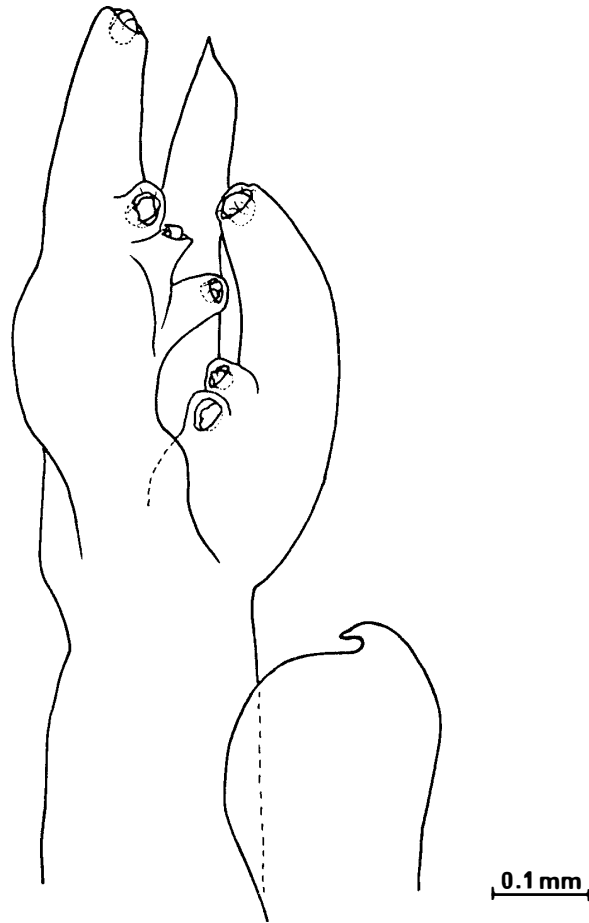


Fig. 2. *Sergestes pectinatus* SUND, male, petasma.

Sergestes henseni (not ORTMANN, 1893) HANSEN, 1896: pp. 950 (in key), 959 (in part).—

ILLIG, 1914: pp. 360–363 (in part), figs. 11, 21–22.

Sergestes pectinatus SUND, 1920: pp. 6 (in key), 24–25, figs. 42–43.—HANSEN, 1922: pp. 141 (in key), 142–148, pl. 8, fig. 4; pl. 9, fig. 1.—ILLIG, 1927: pp. 315–317, figs. 77–80.

Sergestes (Sergestes) pectinatus KENSLEY, 1971a: pp. 230 (in key), 240–241, fig. 13.

Material examined

Sample 23, 1 male (CL 6.24mm).

Description

Rostrum short, terminating in small spine. Supraorbital and hepatic spines present. Supraorbital ridge absent. Third maxilliped missing. Two distal segments of fifth pereopod setose on both margins.

Lobus armatus of petasma in male slightly curved, with apical hook and two proximal hooks; processus ventralis pointed, unarmed and slightly shorter than lobus terminalis; lobus terminalis elongate and curved with single apical and three proximal hooks; two proximal hooks having short peduncle; processus uncifer hooked; lobus inermis and lobus connectens lacking.

Remarks

The petasma of *Sergestes pectinatus* SUND resembles KENSLEY's figure (1971a, fig. 13c) except for the following; the end of processus ventralis is rounded and lobus terminalis is armed with two proximal hooks in KENSLEY's figure. HANSEN (1922) described the lobus armatus as distally stout with two large apical hooks, a row of four hooks along the inner margin and the lobus terminalis is armed with a large apical hook, a row of five hooks on the inner margin.

Distribution

Off Japan (HANAMURA, 1979; KIKUCHI and OMORI, 1985), off Hawaii (WALTERS, 1976), off Baja California (HANAMURA, 1983), Tasman Sea (GRIFFITHS and BRANDT, 1983a, b), south of Australia (present study), Bengal Bay, south of Sri Lanka, Chagos Archipelago, east of Seychelles and between Amsterdam Island and Cocos Islands (ILLIG, 1927), off South Africa (ILLIG, 1927; KENSLEY, 1971a, 1977, 1981), south of Newfoundland to off Morocco (SUND, 1920), off Canary Islands (ILLIG, 1927; ABBES and CASANOVA, 1973), off Bermuda (DONALDSON, 1975), Gulf of MEXICO (HOPKINS *et al.*, 1981), off Sierra Leone (ILLIG, 1927).

S. pectinatus is distributed between 43°N and 40°S in the Pacific, Indian and Atlantic Oceans. This is the first record of the species from south of Australia.

(7) *Sergestes sargassi* ORTMANN, 1893 (Fig. 3)

Restricted synonymy

Sergestes sargassi ORTMANN, 1893: pp. 31 (in key), 34, pl. 3, fig. 1.—HANSEN, 1922: pp. 141 (in key), 148–159. pl. 9, figs. 2–3.

Sergestes henseni (not ORTMANN, 1893) HANSEN, 1896: pp. 950 (in key), 959 (in part).—ILLIG, 1914: pp. 360–363 (in part), figs. 12, 14–15, 17.

Sergestes Henseni (not ORTMANN, 1893) SUND, 1920: pp. 6 (in key), 25–27, figs. 44–47.—ILLIG, 1927: pp. 317–319, figs. 81–84.

Sergestes (Sergestes) sargassi KENSLEY, 1968: pp. 304, 307, figs. 9c, 10d, 11c.—KENSLEY, 1971a: pp. 230 (in key), 241, 245, fig. 14.

Material examined

Sample 23, 1 male (CL 9.00mm).

Description

Rostrum elevated with terminal spine. Supraorbital and hepatic spines small. Supraorbital ridge absent. Third maxilliped overreaching pereopods. Two distal segments of fifth pereopod setose on both margins.

Lobus armatus of petasma in male armed with two large terminal hooks and strong hook on inner margin; processus ventralis elongate with eight distal stellate spines and four single spinules; lobus terminalis slender with terminal hook; end of lobus inermis pointed; processus uncifer hooked; lobus connectens lacking.

Remarks

The petasma of the present specimen is very similar to HANSEN's description (1922, pl. 9, figs. 21–2n) except that the lobus inermis is terminally rounded in HANSEN's description. KENSLEY (1971a) described the lobus armatus as unarmed on the inner margin and the lobus terminalis with a hook on its base. According to ILLIG's figure (1927, fig. 83), the lobus armatus is armed with three hooks on its inner margin. The number of hooks on the lobus armatus and lobus terminalis in *Sergestes sargassi*

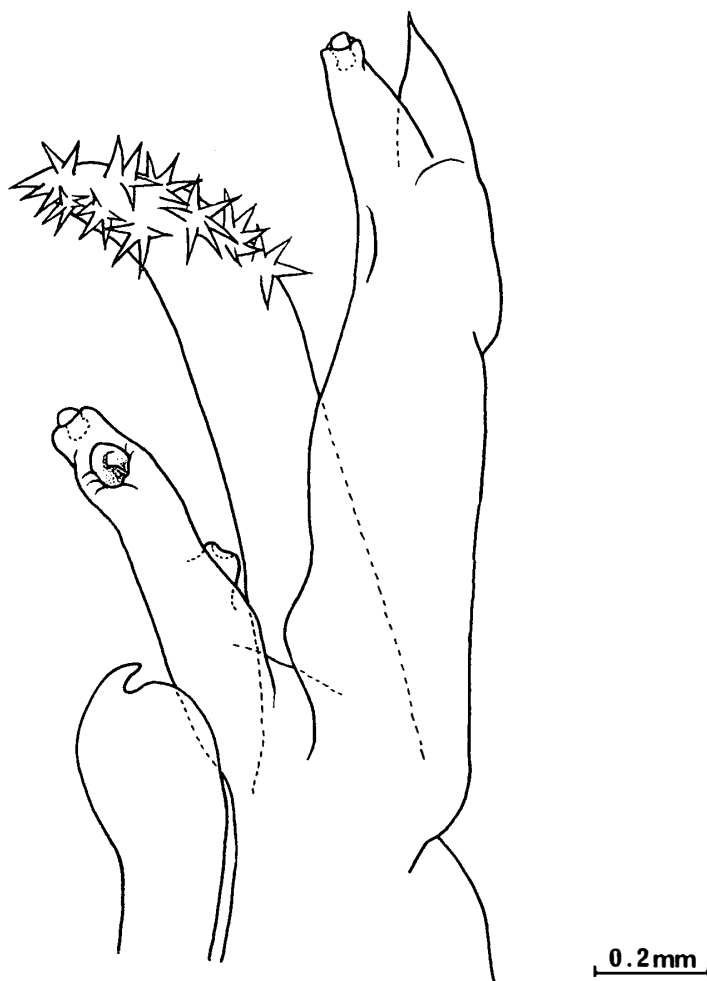


Fig. 3. *Sergestes sargassi* ORTMANN, male, petasma.

ORTMANN seems to vary as in *S. pectinatus* SUND. Single spinules on the tip of the processus ventralis in the present specimen are larger than those previously described.

HANAMURA (1983) pointed out that *S. sargassi* and the closely related *S. pestifer* BURKENROAD could be distinguished from each other by the number of spines on the third subjoint of the dactylus of the third maxilliped and the number of stellate spines on the processus ventralis.

Distribution

Off Japan (HANAMURA, 1979; KIKUCHI and OMORI, 1985), off Hawaii (WALTERS, 1976), off Baja California (HANAMURA, 1983), Tasman Sea (GRIFFITHS and BRANDT, 1983a, b), south of Australia (present study), Bay of Bengal, off Sri Lanka, off Chagos Island and off Somalia (ILLIG, 1927), off South Africa (KENSLEY, 1968, 1971a, 1977, 1981), off Ireland (HARGREAVES, 1984), waters of the Gulf Stream, Sargasso Sea, North Equatorial Current and South Equatorial Current (ORTMANN, 1893), south of Newfoundland to off Morocco (SUND, 1920), off southern Portugal to Sargasso Sea (HANSEN, 1922), off Bermuda (DONALDSON, 1975), Gulf of Mexico (HOPKINS *et al.*, 1981), Mediterranean (HANSEN, 1922); ZARIQUIEY ALVAREZ, 1968).

This is the first record of *S. sargassi* from south of Australia.

Genus *Sergia* STIMPSON, 1860(8) *Sergia potens* (BURKENROAD, 1940)*Restricted synonymy*

Sergestes bisulcatus (not WOOD-MASON and ALCOCK, 1891) STEBBING, 1905: pp. 87–88, pl. 24A.

Sergestes grandis (not SUND, 1920) HANSEN, 1925: pp. 23.

Sergestes (Sergia) potens BURKENROAD, 1940: pp. 48–49.—YALDWYN, 1957: pp. 9 (in key), 15–22, figs. 11–19.—KENSLEY, 1971a: pp. 245 (in key), 253, fig. 19.

Sergestes phorcus (not FAXON, 1893) BARNARD, 1950: pp. 639 (in key), 641–642, figs. 120e–g.

Material examined

Sample 21, 1 female (CL 19.5 mm), 1 male (CL 24.0 mm); Sample 22, 1 female (CL 24.0 mm), 4 males (CL 20.2–28.0 mm); Sample 23, 2 females (CL 18.8, 24.1 mm).

Description

Rostrum moderately long and deep with small denticle on upper margin. Supra-orbital spine and ridge absent. Hepatic spine represented by blunt knob.

Lobus armatus of petasma in male long and curved with several hooks distally and number of hooks along inner margin; lobus accessorius at base covered with tiny hooks; processus ventralis acutely triangular; lobus connectens and lobus terminalis bilobed and armed with hooks; lobus inermis projecting; processus uncifer hooked.

In female, coxa of third pereopod produced medially into two blunt lobes and posterior margin of fifth thoracic sternite convex and bulbous.

Remarks

YALDWYN (1957) suggested that the South African records of *Sergestes bisulcatus* WOOD-MASON sensu STEBBING (1905), *Sergestes (Sergia) potens* BURKENROAD, 1940, *Sergestes phorcus* FAXON sensu BARNARD (1950) and probably *Sergestes grandis* SUND sensu HANSEN (1925) all refer to the same species, and that species must be known as *S. (Sergia) potens*.

Distribution

Off New Zealand (YALDWYN, 1957; RICHARDSON and YALDWYN, 1958; ROBERTSON *et al.*, 1978), south of Australia (present study), off South Africa (HANSEN, 1925; BURKENROAD, 1940; BARNARD, 1950), off Mozambique (KENSLEY, 1971a), off South Africa (KENSLEY, 1971a, 1977, 1981).

This is the first record of this species from south of Australia.

(9) *Sergia prehensilis* (BATE, 1881)*Restricted synonymy*

Sergestes prehensilis BATE, 1881: pp. 193–194.—BATE, 1888: pp. 385–387, pl. 71.—HANSEN, 1903: pp. 56–57, pl. 11, figs. 4a–b.—GORDON, 1935: pp. 314–318, figs. 8–9.—SAKAI and NAKANO, 1985: pp. 26–34, figs. 6–9.

Sergestes gloriosus STEBBING, 1905: pp. 84–87, pls. 22–23.—HANSEN, 1925: pp. 24–26.—BARNARD, 1950: pp. 639 (in key), 642–643, figs. 120h–j.

Sergestes (Sergia) prehensilis KENSLEY, 1968: pp. 308–309.—KENSLEY, 1971a: pp. 245 (in key), 253–254, 256, fig. 20.

Material examined

Sample 1, 1 female (CL 8.04 mm).

Description

Rostrum lanceolate with acute apex. Supraorbital spine and ridge absent. Hepatic spine represented by blunt knob. Row of twelve lens-bearing photophores on branchiostegite and parallel with lower border of carapace. Row of seven or eight lens-bearing photophores on antennal scale.

In female, coxa of third pereopod bearing single short and acute projection.

Remarks

Although BARNARD (1950) described a coxa of the third pereopod in female with two sharp curved teeth, it bears a single projection in this specimen and KENSLEY's (1971a) description.

HANSEN (1922, pp. 35, 38) pointed out that *Sergia prehensilis* (BATE) of previous Japanese workers (e.g., NAKAZAWA and TERA0, 1915), was in reality *S. lucens* (HANSEN).

Distribution

Off Japan (BATE, 1881, 1888; HANAMURA, 1979; KIKUCHI and OMORI, 1985; SAKAI and NAKANO, 1985), north of Hawaii (KING and IVERSEN, 1962), Tasman Sea (GRIFFITHS and BRANDT, 1983a, b), south of Australia (present study), off Mozambique (KENSLEY, 1971a), off South Africa (HANSEN, 1925; KENSLEY, 1968, 1969, 1971a, 1977, 1981).

This is the first record of *S. prehensilis* from south of Australia.

Genus *Petalidium* BATE, 1881(10) *Petalidium foliaceum* BATE, 1881 (Fig. 4)*Restricted synonymy*

Petalidium foliaceum BATE, 1881: pp. 194–195.—BATE, 1888: pp. 349–350, pl. 60.—HANSEN, 1903: pp. 54–56, pl. 11, figs. 1a–g.—ILLIG, 1914: pp. 372–373, figs. 31–34.—STEBBING, 1914a: pp. 284–285, pl. 28.—HALE, 1941: pp. 261–262, figs. 1–2.—KENSLEY, 1971a: pp. 228–230, fig. 6.

Material examined

Sample 2, 5 females (CL 7.32–13.20 mm), 8 males (CL 6.00–8.88 mm); Sample 5, 8 females (CL 5.76–16.8 mm), 4 males (CL 6.60–8.64 mm), 5 sex unknown (CL 5.16–7.92 mm); Sample 7, 1 sex unknown (CL 12.00 mm); Sample 8, 3 females (CL 11.40–16.8 mm), 2 males (CL 9.60, 11.76 mm); Sample 10, 1 female (CL 11.76 mm), 1 male (CL 11.76 mm); Sample 15, 1 male (CL 12.24 mm); Sample 17, 1 male (CL 9.84 mm); Sample 18, 7 females (CL 10.20–16.2 mm), 3 males (CL 10.56–13.0 mm); Sample 20, 1 female (CL 6.24 mm); Sample 21, 7 females (CL 6.60–13.20 mm), 4 males (CL 8.28–11.76 mm), 1 sex unknown (CL 7.20 mm); Sample 22, 1 female (CL 6.00 mm); Sample 23, 5 females (CL 6.12–6.96 mm), 1 male (CL 6.00 mm), 2 sex unknown (carapace missing).

Description

Rostrum short with forwardly directed tooth, sometimes with posterior tooth. Supraorbital spine and ridge absent. Hepatic spine minute. Third maxilliped and pereopods missing from all specimens.

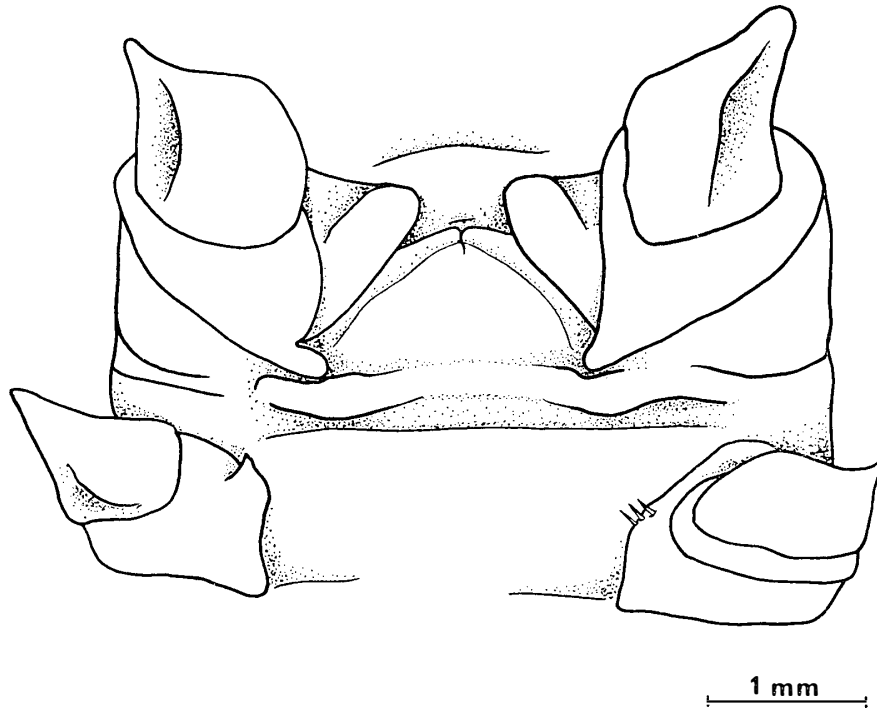


Fig. 4. *Petalidium foliaceum* BATE, female, thelycum.

Processus ventralis slender and distally divided into two rami, short apically hooked ramus and long ramus, armed with hooks; lobus terminalis consisting of long slender ramus with several apical hooks and short slender ramus with single terminal hook; lobus inermis blunt and unarmed; lobus armatus consisting of upper blunt lobe with several hooks and lower blunt lobe with two apical hooks; lobus connectens knob-like between lobus inermis and lobus armatus; processus uncifer with oblique tooth.

In adult female, coxa of third pereopod produced into triangular lamella on inner margin, apex roundish; sixth thoracic sternite convex and slightly bilobed.

Remarks

The petasma of the present species is in close agreement with KENSLEY's figure (1971a, fig. 6e) except for the number of hooks on the lobus armatus. ILLIG (1914) noted that the supraorbital spine was present, but it is absent in the present specimens, and HANSEN's (1903) and KENSLEY's (1971a) descriptions.

Distribution

South of Australia (BATE, 1888; present study), east of Heard Island (HALE, 1941), near Marion Island (BATE, 1888), off South Africa (ILLIG, 1914; KENSLEY, 1971a, 1981); south of Gough Island (STEBBING, 1914a), Antarctic Ocean between 150°E and 115°E (present study), Indian sector of the Antarctic Ocean (ILLIG, 1914; HALE, 1941).

Suborder PLEOCYEMATA

Infraorder CARIDEA

Superfamily ATYOIDEA

Family NEMATOCARCINIDAE

Genus *Nematocarcinus* A. MILNE EDWARDS, 1881

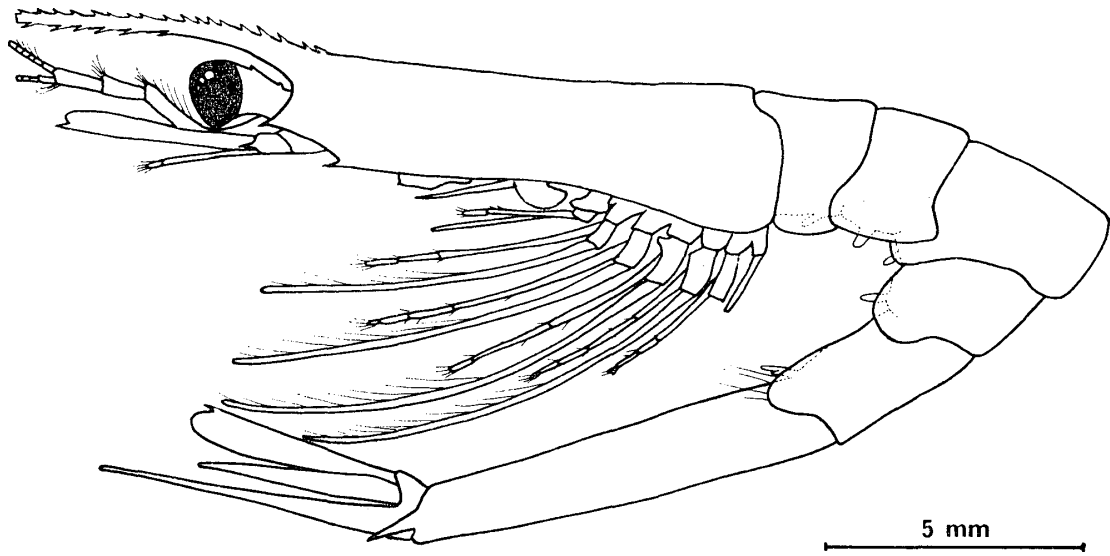


Fig. 5. *Nematocarcinus* sp., larva, lateral view.

(11) *Nematocarcinus* sp. (Fig. 5)

Material examined

Sample 14, 4 larvae (CL 7.92–12.36 mm); Sample 19, 3 larvae (CL 2.28–2.40 mm); Sample 20, 2 larvae (CL 2.42, 2.64 mm).

Description

Rostrum long, slender and denticulate on dorsal and ventral margins. Branchio-stegal and pterygostomian spines present. Third maxilliped and pereopods with long exopods. No pereopods chelate. Fifth pereopod short. Pleura of second abdominal somite overlapping first and third. Third abdominal somite compressed into dorsal hump. Telson sulcate with eleven pairs of lateral spines and twelve terminal spines disposed upon rounded projection. Second terminal spines from outside long and stout.

Remarks

Nematocarcinus sp. was identified by Dr. K. HAYASHI of the Shimonoseki University of Fisheries, Japan. The species seems to be *N. lanceopus* BATE or *N. longirostris* BATE both of which have spines on the dorsal and ventral margins of the rostrum and are known from subantarctic and antarctic waters (BATE, 1888; ZARENKOV, 1968; LEDOYER, 1979).

Family OPLOPHORIDAE

Genus *Oplophorus* H. MILNE EDWARDS, 1837

(12) *Oplophorus novaezeelandiae* DE MAN, 1931

Restricted synonymy

Hoplophorus novae-zeelandiae DE MAN, 1931: pp. 369–378, figs. 1–20.

Oplophorus novaezeelandiae CROSNIER and FOREST, 1968: pp. 1126–1129, fig. 2.—HAYASHI and MIYAKE, 1969: pp. 72–73, fig. 5.—CROSNIER and FOREST, 1973: pp. 24 (in key), 26–27, fig. 5.

Material examined

Sample 3, 1 female (CL 11.16 mm); Sample 21, 1 female (CL 12.00 mm); Sample 22, 3 females (CL 11.5–18.0 mm), 1 male (CL 17.5 mm).

Description

Rostrum slender, longer, upper margin with 13 or 14 teeth and lower margin with seven to nine teeth. Antennal spine present. Pterygostomian angle of carapace rectangular. No spine on posterolateral angle of carapace. No barb on inner margin of antennal scale, outer margin of antennal scale not spinose. Third to fifth abdominal somites terminating in long spine. Spine on third somite well-developed, reaching beyond hind margin of fifth somite, the spine of two specimens (CL 11.5, 12.00 mm) reaching beyond hind margin of sixth somite. Telson with three pairs of lateral spines and terminating in a point.

Remarks

The length of the rostrum could not be measured exactly, for most specimens lacked the tip of the rostrum. However, the length of the rostrum in young (CL 12.00 mm) seems to be more than twice the length of the carapace, while that of adults (CL 14.2–18.0 mm) seems to be less than twice the length of the carapace.

Distribution

Tasman Sea (GRIFFITHS and BRANDT, 1983a, b), off New Zealand (RICHARDSON and YALDWYN, 1958; ROBERTSON *et al.*, 1978), off Chile (RETAMAL, 1981), south of Australia (present study), west of Australia (HAYASHI and MIYAKE, 1969), off Angola (CROSNIER and FOREST, 1968, 1973), west of South Africa (BOSCHMA, 1949).

This is the first record of this species from south of Australia.

Genus *Acanthephyra* A. MILNE EDWARDS, 1881(13) *Acanthephyra pelagica* (RISSO, 1816)*Restricted synonymy*

Ephyra Haeckelii VON MARTENS, 1868: pp. 52–54, pl. 1, fig. 7.

Acanthephyra Agassizzi SMITH, 1884: pp. 372–376 (in part), pl. 8, fig. 1.

Acanthephyra sica BATE, 1888: pp. 739–744, pl. 125, fig. 1.—BURUKOVSKY and ROMENSKY, 1982: pp. 1799–1800, figs. 7–17.

Acanthephyra purpurea LO BIANCO, 1903: pp. 185–186.—KEMP, 1906: pp. 4–16 (in part), fig. 2, no. 1–3.—KEMP, 1907: pp. 206–212.—KEMP, 1910: pp. 56–58 (in part).—PESTA, 1913: pp. 70–71.—PESTA, 1918: pp. 70–73, fig. 22.

Acanthephyra rectirostris LO BIANCO, 1903: p. 186.—THIELE, 1905: p. 467.

Acanthephyra haeckelii THIELE, 1905: pp. 466–467.—CHACE, 1940: pp. 140–143, figs. 18–20.—BARNARD, 1950: pp. 666 (in key), 668.

Acanthephyra purpurea var. *multispina* COUTIÈRE, 1905: pp. 10–15.—COUTIÈRE, 1938a: pp. 198–201.—SZÜTS, 1915: pp. 433–436.

Acanthephyra parva multidentis COUTIÈRE, 1905: pp. 17–18, fig. 5, no. 1–2.—COUTIÈRE, 1938a: p. 202, pl. 7, fig. 5, no. 1–2.

Acanthephyra multispina COUTIÈRE, 1906: pp. 18–20, figs. 7C–D.—STEPHENSON, 1923: pp. 44–48, 50–54.—STEPHENSON, 1935: p. 30.—COUTIÈRE, 1938b: pp. 222–223, pl. 6, figs. 7C–D.—LEGENDRE, 1940: pp. 235–240, figs. 42–43.

AcanthePHYra haeckeli KEMP, 1939: pp. 572, 574–575, 578.

AcanthePHYra pelagica SIVERTSEN and HOLTHUIS, 1956: pp. 7–12, figs. 3–7.—CROSNIER and FOREST, 1973: pp. 27 (in key), 29–31.—BOSCHI, 1973: p. 236, figs. 1a, 2.

Material examined

Sample 1, 1 female (CL 7.80 mm); Sample 2, 8 females (CL 7.20–22.9 mm), 1 male (CL 13.40 mm); Sample 5, 4 female (CL 6.00–17.3 mm), 2 males (CL 16.5, 18.2 mm); Sample 6, 1 female (CL 13.0mm); Sample 17, 1 female (CL 11.16mm); Sample 19, 1 female (CL 8.64 mm); Sample 21, 10 females (CL 7.08–9.12mm); Sample 22, 1 female (CL 8.64mm), 1 male (CL 18.2mm); Sample 23, 1 postlarva (CL 3.60mm).

Description

Rostrum long and slender. Carapace not dorsally carinate posteriorly. Branchio-stegal spine supported by a short carina. Third to sixth abdominal somites terminating in spine. Telson with six to eleven pairs of lateral spines.

Remarks

AcanthePHYra pelagica (RISSO) is closely allied to *A. purpurea* A. MILNE EDWARDS, which can be distinguished from *A. pelagica* in having four pairs of lateral spines on the telson and no dorsal spine on the fourth abdominal somite (KEMP, 1939). The sexual maturity size of *A. purpurea* is smaller than *A. pelagica* (SIVERTSEN and HOLTHUIS, 1956).

According to CHACE (personal communication), BATE's (1888) description of *A. sica* BATE was based on material of more than one species. For that reason the records of *A. sica* from the North Pacific are unreliable.

Distribution

Banda Sea, Coral Sea and off Kermadec Islands (BATE, 1888), off New Zealand (BATE, 1888; RICHARDSON and YALDWYN, 1958; ROBERTSON *et al.*, 1978), south of Australia (BATE, 1888; HALE, 1941; present study), off Chile (RETAMAL, 1981), between Amsterdam Island and Australia (HALE, 1941), west of Kerguelen (KEMP, 1939), off South Africa (BARNARD, 1950; KENSLEY, 1968, 1981), Davis Strait and off Iceland (HANSEN, 1908), north of British Isles and off Tanger to east of Newfoundland (SIVERTSEN and HOLTHUIS, 1956), Bay of Biscay and south of Azores (COUTIÈRE, 1905, 1906, 1938a, b), off Sahara (ABBES and CASANOVA, 1973), off Senegal (CROSNIER and FOREST, 1973), off Bermuda (CHACE, 1940), Mediterranean (STEPHENSEN, 1923; HOLTHUIS and GOTTLIEB, 1958), off Argentina (BOSCHI, 1973; TAKEDA and HATANAKA, 1984), off Cape Horn (KEMP, 1939), off Crozet (LEDOYER, 1979), Antarctic Ocean (present study), Bellingshausen Sea (KEMP, 1939).

A. pelagica is widely distributed in the oceans. The present study extended its recorded southern limit to 60°S.

(14) *AcanthePHYra quadrispinosa* KEMP, 1939

Restricted synonymy

AcanthePHYra batei (not FAXON, 1895) STEBBING, 1905: pp. 107–109, pl. 24B.

AcanthePHYra quadrispinosa KEMP, 1939: pp. 571–572, 567.—BARNARD, 1950: pp. 666 (in key), 668–669, fig. 124 g.—AIZAWA, 1974: pp. 31–32, fig. 22.

Not *AcanthePHYra quadrispinosa* BUTLER, 1971: p. 1616 (= *Systellaspis cristata* (FAXON, 1893)).

Material examined

Sample 1, 1 female (CL 11.6 mm), 1 male (CL 11.0 mm); Sample 2, 3 females (CL 6.60–12.24 mm), 2 males (CL 9.84, 11.52 mm); Sample 21, 1 female (CL 15.3 mm); Sample 22, 3 females (CL 7.80–15.0 mm), 1 male (CL 14.8 mm); Sample 23, 1 female (CL 6.00 mm).

Description

Rostrum long and slender. Carapace not dorsally carinate posteriorly. Branchio-stegal spine supported by a short carina. Third to sixth abdominal somites terminating in spine, spine on fourth somite slightly smaller than that of fifth somite. Telson with four pairs of lateral spines.

Remarks

Acanthephyra quadrispinosa KEMP closely resembles *A. pelagica* (RISSE) and *A. purpurea* A. MILNE EDWARDS. The lateral spines of the telson differ in number between *A. quadrispinosa* and *A. pelagica*; four pairs of lateral spines in the former and six to eleven pairs in the later. A dorsal spine on the fourth abdominal somite is present in *A. quadrispinosa*, while absent in *A. purpurea*.

Distribution

Off Japan (AIZAWA, 1974; HANAMURA, 1979; KIKUCHI and OMORI, 1985), Aleutian Current Zone (KING and IVERSEN, 1962), off Oregon (KRYGIER and PEARCY, 1981), Tasman Sea (GRIFFITHS and BRANDT, 1983a, b), off New Zealand (RICHARDSON and YALDWIN, 1958; ROBERTSON *et al.*, 1978), south of Australia (present study), southeast of Amsterdam Island (HALE, 1941), off South Africa (BARNARD, 1950; KENSLEY, 1968, 1977, 1981).

KEMP (1939) reported that *A. quadrispinosa* was distributed in the South Atlantic from 32°S to 40°S, Indo-Pacific from the east African coast to 163°W, and from 25°N to 42°S. This is the first record of *A. quadrispinosa* from south of Australia.

Genus *Notostomus* A. MILNE EDWARDS, 1881(15) *Notostomus auriculatus* BARNARD, 1950*Restricted synonymy*

Notostomus westergreni (not FAXON, 1893) STEBBING, 1905: pp. 110–111.—KENSLEY, 1968: p. 310 (in part).

Notostomus longirostris (not BATE, 1888) BALSS, 1925: p. 268.—HOLTHUIS, 1951: pp. 29–31.

Notostomus auriculatus BARNARD, 1950: p. 670, figs. 124h–i.—CROSNIER and FOREST, 1973: pp. 49 (in key), 52–56, 59–63, figs. 14, 16c.

Notostomus sp. HOLTHUIS and SIVERTSEN, 1967: pp. 32–36, figs. 4–5.

Material examined

Sample 2, 1 female (CL 13.80 mm), 1 juvenile (CL 5.40 mm); Sample 21, 1 juvenile (CL 5.64 mm).

Description

Rostrum reaching beyond antennal scale. Dorsal carina of carapace strongly arched and serrated. Upper and lower lateral rostral carinae present, upper lateral rostral carina extending posteriorly beyond hind margin of orbit. Five lateral carinae

on posterior half of carapace, first to sixth abdominal somites dorsally keeled, third to sixth abdominal somites terminating in point. Telson dorsally sulcate, armed with three pairs of lateral spines, tip of telson broken.

Remarks

CROSNIER and FOREST (1973) reexamined HOLTHUIS and SIVERTSEN's (1967), HOLTHUIS' (1951) and BALSS' (1925) samples. They identified them as *Notostomus auriculatus* BARNARD. The present materials agree with the description of CROSNIER and FOREST (1973).

Distribution

South of Australia (present study), north of Amsterdam Island (BALSS, 1925), off South Africa (KENSLEY, 1968, 1981), south of Canary Islands and off Senegal (CROSNIER and FOREST, 1973), off Nigeria (HOLTHUIS, 1951), off Gabon to off Angola (CROSNIER and FOREST, 1968), off Tristan da Cunha (HOLTHUIS and SIVERTSEN, 1967).

This is the first record of *N. auriculatus* from southern Australian waters.

Genus *Hymenodora* SARS, 1877

(16) *Hymenodora gracilis* SMITH, 1886

Restricted synonymy

Hymenodora gracilis SMITH, 1886: pp. 680–681, pl. 12, fig. 6.—STEPHENSEN, 1923: pp. 60–61.—CHACE, 1940: pp. 175–179, figs. 46–49.—CHACE, 1947: pp. 32–35.—SIVERTSEN and HOLTHUIS, 1956: pp. 16–17, figs. 12–13.—ZARIQUIEY ALVAREZ, 1968: p. 91, figs. 34c–d.—CROSNIER and FOREST, 1973: pp. 82 (in key), 83–84, fig. 25a.

Hymenodora glacialis (not BUCHHOLZ, 1874), KEMP, 1910: pp. 72–75 (in part).—LENZ and STRUNCK, 1914: pp. 331–334, fig. 5.—BALSS, 1925: pp. 270–271 (in part).—CALMAN, 1925: p. 15.—BARNARD, 1950: p. 665, fig. 124b.—HOLTHUIS, 1951: p. 32 (in part).—KENSLEY, 1968: p. 309.

Material examined

Sample 17, 1 female (CL 7.68 mm), 1 sex unknown (CL 6.96 mm).

Description

Integument thin, membranous. Rostrum short, not extending beyond eyes, armed with two to four spines on dorsal margin. No crescent-shaped sulcus in hepatic region on carapace. Second maxilliped with podobranch on epipod. Telson dorsally sulcate, end of telson broken.

Remarks

The number of rostral spines varies from one to six (BARNARD, 1950; KENSLEY, 1968; ZARIQUIEY ALVAREZ, 1968; CROSNIER and FOREST, 1973).

Hymenodora gracilis SMITH and *H. glacialis* (BUCHHOLZ) are very closely related with each other. *H. glacialis* is distinguished from *H. gracilis* in having a crescent-shaped sulcus in the hepatic region of the carapace and no podobranch on the epipod of the second maxilliped (STEPHENSEN, 1923; SIVERTSEN and HOLTHUIS, 1956).

Distribution

Off Japan (KIKUCHI and OMORI, 1965), off Iriomote Shima (HANAMURA, 1979), off Oregon (KRYGIER and PEARCY, 1981), off Baja California (HANAMURA, 1983), off Chile (RETAMAL, 1981), Arabian Sea (CALMAN, 1939), off Somalia (BALSS, 1925), off

South Africa (KENSLEY, 1968, 1981), off Hebrides to southeast of Newfoundland and to west of Canary Islands (SIVERTSEN and HOLTHUIS, 1956), Bay of Biscay and off coast of the Peninsular (ZARIQUIEY ALVARTZ, 1968), off Liberia to off Ghana (BALSS, 1927), off east coast of United States (SMITH, 1886), off Bermuda and off Bahamas (CHACE, 1947), off Pointe-Noire (CROSNIER and FOREST, 1973), off Angola (BALSS, 1925), Antarctic Ocean (present study), off Enderby Land (HALE, 1941).

H. gracilis is found in the Pacific, Indian, Atlantic and Antarctic Oceans.

Genus *Systellaspis* BATE, 1888

(17) *Systellaspis debilis* (A. MILNE EDWARDS, 1881)

Restricted synonymy

Acanthephyra debilis A. MILNE EDWARDS, 1881: pp. 13–14.—KEMP, 1906: pp. 16–20, pl. 2, figs. 4–7.—KEMP, 1907: pp. 212, 214.—LENZ and STRUNCK, 1914: p. 327.—WILLIAMSON, 1915: pp. 358–359, figs. 35–38 (larvae).—CALMAN, 1925: p. 13.

Miersia gracilis SMITH, 1882: pp. 70–73. pl. 11, figs. 4–4d.

Acanthephyra gracilis SMITH, 1886: pp. 672–673.—HANSEN, 1908: pp. 76–77.

Systellaspis debilis COUTIÈRE, 1905: pp. 5–8, fig. 2.—COUTIÈRE, 1906: pp. 1–12, figs. 1–4.—DE MAN, 1920: pp. 43, 50–51.—STEPHENSEN, 1923: pp. 54–56, fig. 16.—BALSS, 1925: pp. 242–243.—COUTIÈRE, 1938a: pp. 195–197, pl. 6, figs. 1–4; pl. 7, fig. 2.—COUTIÈRE, 1938b: pp. 212–218, pl. 6, figs. 1–4.—CHACE, 1940: pp. 181–184, figs. 51–53.—LEGENDRE, 1940: pp. 241–244, figs. 45–46.—CHACE, 1947: pp. 35–39.—BARNARD, 1950: pp. 663–665, fig. 124a.—SIVERTSEN and HOLTHUIS, 1956: pp. 17–19, fig. 14.—FIGUEIRA, 1957: pp. 31–34, fig. 2.—ZARIQUIEY ALVAREZ, 1968: p. 93, fig. 34a.—HAYASHI and MIYAKE, 1969: pp. 67–68.—CROSNIER and FOREST, 1973: pp. 87–92, figs. 26b, 27b.—AIZAWA, 1974: p. 35.—ZHONG and LAN, 1983: p. 185, fig. 10.

Systellaspis Bouvieri COUTIÈRE, 1905: pp. 8–10, fig. 3.—COUTIÈRE, 1938a: pp. 197–198, pl. 7, fig. 3.

Acanthephyra (Systellaspis) debilis KEMP, 1910: pp. 59–66, pl. 6, figs. 1–15.

Systellaspis debilis var. *indica* DE MAN, 1920: pp. 43, 51–53, pl. 6, figs. 11–11f.

Material examined

Sample 2, 3 females (CL 6.24–7.80 mm); Sample 3, 1 ovigerous female (CL 11.76 mm); Sample 21, 1 female (CL 5.64 mm); Sample 22, 1 female (CL 6.60 mm); Sample 23, 4 females (CL 4.56–13.5 mm) including 1 ovigerous, 1 male (CL 13.0 mm).

Description

Rostrum slender and longer than carapace. Branchiostegal spine not supported by a definite carina. Third abdominal somite and posterior portion of fourth somite dorsally carinate. Third somite terminating in spine, fourth and fifth somites terminating in small point, hind margins of those denticulate. A notch in lower posterior margin of pleuron of fifth somite. Telson with four or five pairs of dorsal spines, apically with five pairs of spines, first pair much stouter than others, apex of telson pointed. Photophores present on carapace, abdomen, eye-stalks and bases of appendages.

Remarks

BARNARD (1950) reported that the telson was armed with three to five pairs of

dorsal spines. FIGUEIRA (1957) reported an asymmetrical arrangement of dorsal spines on the telson; the number of spines on the right side differed from the number on the left side in his three specimens. In our eleven specimens, two of them have four pairs of the spines, seven of them have five pairs of the spines, one of them is armed with four spines on the right side and five on the left side and the last is unknown because of the missing telson.

Young specimens differ from adults in the comparative length of the rostrum, that of the fifth and sixth abdominal somites, the size of abdominal median spines, and the number of serration of the fourth and fifth somites (BARNARD, 1950; HAYASHI and MIYAKE, 1969). In addition to these features, the length of the sixth somite is more than twice its width in the young (below 9 mm in the carapace length), while in the adults it is less than twice as long as wide.

Distribution

Off Japan (AIZAWA, 1974; HANAMURA, 1979; KIKUCHI and OMORI, 1985), South China Sea (ZHONG and LAN, 1983), off Kauai Island, Hawaii (RATHBUN, 1906), off Oregon (KRYGIER and PEARCY, 1981), Halmaheira Sea (DE MAN, 1920), Tasman Sea (GRIFFITHS and BRANDT, 1983a, b), off New Zealand (ROBERTSON *et al.*, 1978), south of Australia (present study), west of Sumatra to south of Cocos Islands (HAYASHI and MIYAKE, 1969), off Tanzania (CALMAN, 1939), off Mozambique to off South Africa (KENSLEY, 1968, 1977, 1981), south of Iceland (HANSEN, 1908), north of Ireland to northeast of Newfoundland and to Bay of Biscay (SIVERTSEN and HOLTHUIS, 1956), off Madeira (FIGUEIRA, 1957), east coast of United States (SMITH, 1882), off Bermuda (CHACE, 1940), Gulf of Mexico (HOPKINS *et al.*, 1981), off West Indies (BATE, 1888), Gulf of Guinea (BALSS, 1925), off Gabon to off Angola (CROSNIER and FOREST, 1969, 1973), Indian sector of the Antarctic Ocean (BALSS, 1925).

This species is widely distributed in all oceans between 63°N and 58°S. This is the first record of the species from south of Australia.

Superfamily PASIPHAEOIDEA

Family PASIPHAEIDAE

Genus *Pasiphaea* SAVIGNY, 1816

(18) *Pasiphaea acutifrons* BATE, 1888 (Figs. 6–8)

Restricted synonymy

Pasiphaea acutifrons BATE, 1888: pp. 871–872, pl. 141, fig. 3.—HOLTHUIS, 1952: pp. 10–14, fig. 2.—RETAMAL, 1973: pp. 7–8, figs. 1–3.—BOSCHI *et al.*, 1981: pp. 240–241, fig. 3.—TAKEDA and HATANAKA, 1984: pp. 8–9.

Pasiphaea forceps A. MILNE EDWARDS, 1891: pp. 51–53, pl. 6, fig. 2.

Pasiphaea (Phye) acutifrons ZARENKOV, 1968: p. 156, fig. 1.

Not *Pasiphaea acutifrons*? FAXON, 1895: pp. 175–176 (= *P. faxoni* RATHBUN, 1902).

Not *Pasiphaea acutifrons* DOFLEIN and BALSS, 1912: p. 26, fig. 1 (= *P. dofleini* SCHMITT, 1932).

Material examined

Sample 5, 2 females (CL 10.44, 19.2 mm); Sample 8, 1 female (CL 21.2 mm); Sample 9, 1 female (CL 28.0 mm); Sample 18, 1 female (CL 29.5 mm); Sample 22,

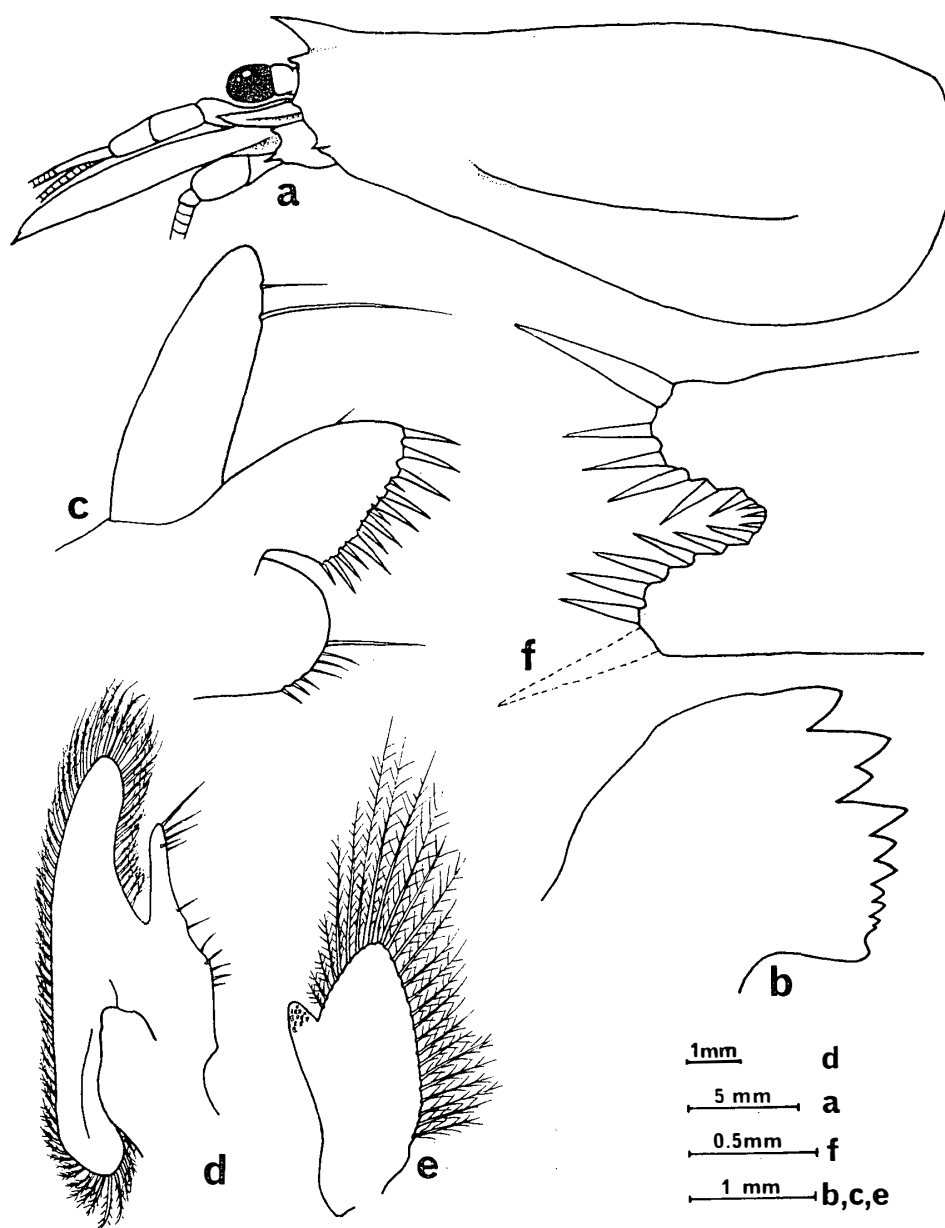


Fig. 6. *Pasiphaea acutifrons* BATE, female; a, carapace, lateral view; b, mandible; c, first maxilla; d, second maxilla; e, endopod of first pleopod; f, tip of telson, dorsal view.

1 female (CL 12.4 mm).

CHALLENGER Expedition, 1873–1876. Stn. 311, 52°45'30''S, 73°46'W, 1 female, CL 15.5 mm (identified as *P. acutifrons* by BATE, 1888, lectotype, BMNH).

Description

Rostrum strong, pointed and overreaching frontal margin. Carapace dorsally carinate, carina ending slightly before posterior margin of carapace. Branchiostegal spine present. Second and third joints of antennular peduncle subequal and cylindrical.

Antennal scale reaching far beyond distal extremity of antennular peduncle, armed on outer margin with strong tooth. Mandible with eleven-toothed incisor process, palp

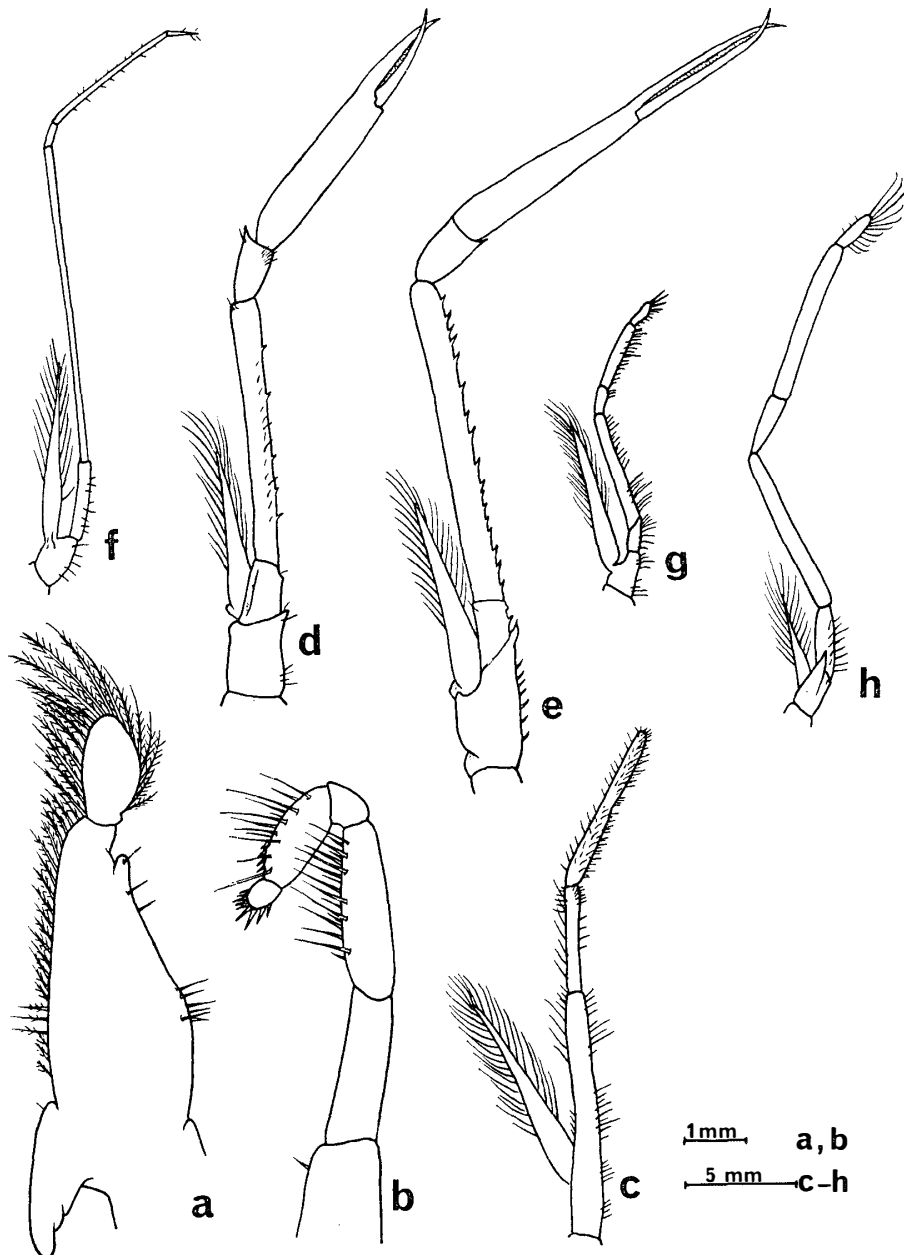


Fig. 7. *Pasiphaea acutifrons* BATE, female; a, first maxilliped; b, second maxilliped; c, third maxilliped; d, first pereopod; e, second pereopod; f, third pereopod; g, fourth pereopod; h, fifth pereopod.

absent. First maxilla with rounded proximal endite, strongly toothed distal endite and simple endopod armed with two setae. Second maxilla with simple endopod and large scaphognathite. First maxilliped reduced to large elongate lamina, articulated distally. Second maxilliped simple, consisting of six segments without epipod or exopod. Third maxilliped reaching slightly before distal margin of antennal scale, with three-segmented endopod, exopod well developed.

All pereopods with well developed exopods, but no epipod. First pereopod extending with fingers beyond antennal scale, fingers slender, cutting edges toothed, tips

curved and capable of crossing one another, merus armed with two to seven spines along entire posterior margin. Second pereopod slightly longer than first pereopod, fingers slender, cutting edges toothed, tips curved and capable of crossing one another, merus with 10–19 spines along entire ventral margin. Third pereopod slender, extending beyond merus of second pereopod. Fourth pereopod shorter than third and fifth pereopods. Fifth pereopod extending beyond mid-length of merus of second pereopod, tips of setae on dactylus slightly curved.

First pleopod of female with broad ovate endopod, small lobe bearing some hooks. Telson slightly shorter than sixth abdominal somite, dorsally sulcate and deeply incised in tip with seven to nine spines on one side.

Remarks

The rostrum overreaches the frontal margin of carapace but does not reach the posterior margin of the cornea in most cases. However, the rostrum of the largest specimen (CL 29.5 mm) overreaches the posterior margin of the cornea. The rostra in BATE's (1888) and RETAMAL's (1973) descriptions do not overreach the frontal margin of the carapace, while in this material they do. In HOLTHUIS' (1952, fig. 2) and RETAMAL's (1973, fig. 1) figures, the rostra did not overreach the anterior margin of the carapace. In the Smithsonian collection there is a pair of specimens that are assumed to be *Pasiphaea acutifrons* BATE from ALBATROSS station 2784: 48°41'00''S, 74°24'00''W; near the northern limit of Magallanes Province, Chile. The male has a carapace length of 24.2 mm, the female 17.3 mm. In neither specimen does the rostrum overreach the frontal margin, but it appears to be somewhat deformed in the larger male (CHACE, personal communication).

The number of posterior spines of the meri of the first and second pereopods was variable. It ranged from two to eight in the first pereopod, ranged from seven to 32 in the second according to the previous work.

The smallest specimen (CL 10.44 mm) is not dorsally carinate on the first and second abdominal somites.

The tip of the telson is armed with 27 spines in RETAMAL's figure (1973, figs. 2–3), while it bears 15–17 spines in our material. The posterior cleft in the telson in the Smithsonian collection is deeper and narrower than it is in our illustration and it seems to be armed with eleven spines on each side (CHACE, personal communication).

BATE (1888) recorded *P. acutifrons*, with some doubt, from off Japan. Because this species is almost always found in the southern oceans, the specimen should be reexamined in detail. Unfortunately, the specimen from CHALLENGER station 236 (off Japan) has been missing for many years according to the British Museum (Natural History).

P. acutifrons is closely related to *P. faxoni* RATHBUN and *P. dofleini* SCHMITT. RATHBUN (1904) described the differences between *P. acutifrons* and *P. faxoni*. They are distinguishable from each other by the shape of telson. The telson in the former is deeply incised, while that in the latter it is truncated. *P. acutifrons* is also allied to *P. rathbunae* (STEBBING). We reexamined fragments of the type of *P. rathbunae* (BMNH), in the collection of the Scottish National Antarctic Expedition, 1902–1904 (STEBBING, 1914a). These two species are easy to distinguish from each other by a few minute details; the first maxilliped is incompletely articulated distally and the merus of the first pereopod is armed with nine spines in *P. rathbunae*. We reexamined the specimens

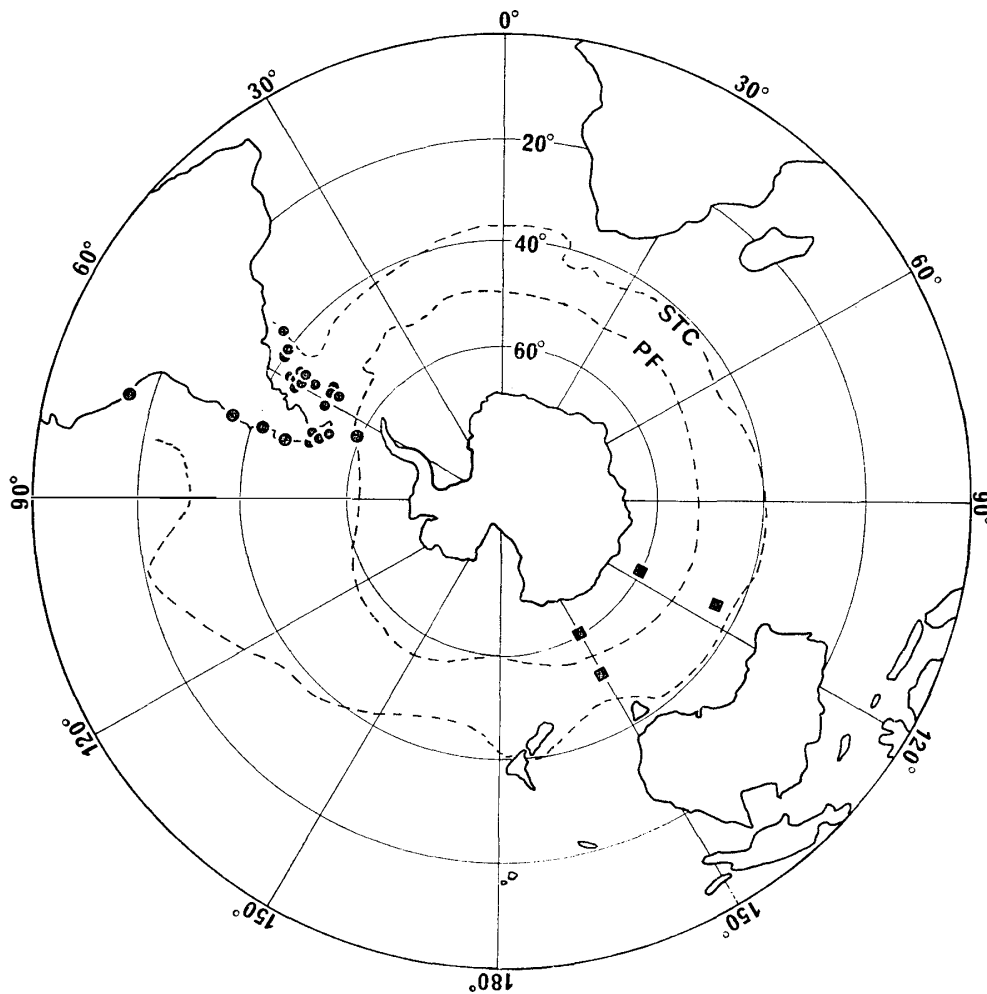


Fig. 8. Map showing distribution of *Pasiphaea acutifrons* BATE. Circles, previous records (refer to the text); squares, present record; STC, Subtropical Convergence; PF, Polar Front.

from ALBATROSS station 3403 (MCZ) that FAXON (1895) tentatively called *P. acutifrons*? and reidentified them as *P. faxoni*.

Distribution

Off Peru (RETAMAL, 1981); Seno Reloncavi (HOLTHUIS, 1952), off Magallanes (BATE, 1888; RETAMAL, 1973, 1981), south of Australia (present study), off Argentina (BOSCHI *et al.*, 1981), south of Falkland Islands (TAKEDA and HATANAKA, 1984), Antarctic Ocean between 150°E and 115°E (present study), Atlantic sector of the Antarctic Ocean (ZARENKOV, 1968).

P. acutifrons was known from off southern South America. This is the first record of the species from south of Australia (Fig. 8).

(19) *Pasiphaea scotiae* (STEBBING, 1914) (Figs. 9–11)

Restricted synonymy

Phye scotiae STEBBING, 1914a: pp. 294–295, pl. 30.

Pasiphaea longispina LENZ and STRUNCK, 1914: pp. 315–316, pl. 19, figs. 1–11.—BORRA-

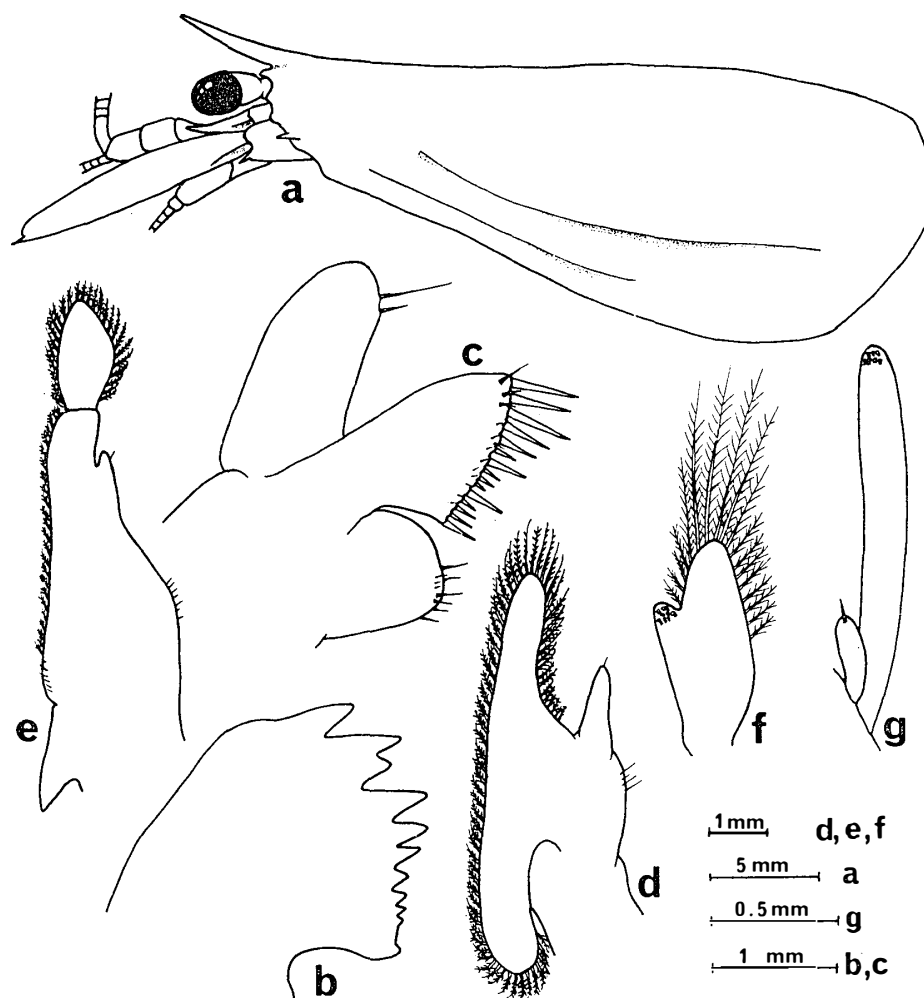


Fig. 9. *Pasiphaea scotiae* (STEBBING), a, carapace, lateral view; b, mandible; c, first maxilla; d, second maxilla; e, first maxilliped; f, endopod of first pleopod; g, appendices interna and masculina of second pleopod. a-e, female; f, g, male.

DAILE, 1916: pp. 83-84.

Pasiphaea (*Phye*) *longispina* BALSS, 1925: p. 238, fig. 11.—LEDOYER, 1979: p. 146, fig. 3B.

Material examined

Sample 5, 3 females (CL 11.76-17.1 mm); Sample 6, 6 females (CL 10.80-17.3 mm); Sample 7, 1 juvenile (CL 5.88 mm); Sample 8, 4 females (CL 14.9-39.2 mm); Sample 9, 2 females (CL 10.80, 22.2 mm); Sample 10, 2 females (CL 9.60, 15.6 mm); Sample 11, 1 female (CL 12.84 mm), 1 sex unknown, damaged; Sample 12, 2 females (CL 8.40, 9.94 mm); Sample 13, 2 females (CL 21.9, 29.0 mm); Sample 14, 2 females (CL 8.76, 15.8 mm); Sample 16, 1 female (CL 23.0 mm); Sample 17, 4 females (CL 8.52-16.5 mm), 1 male (CL 30.0 mm), 1 juvenile (CL 6.48 mm); Sample 18, 16 females (CL 8.88-28.0 mm), 1 juvenile (CL 7.20 mm); Sample 22, 1 female (CL 18.2 mm).

Deutschen Südpolar-Expedition, 1901-1903. 65°15'S, 80°19'E, 1 male, CL 40 mm (identified as *P. longispina* by LENZ and STRUNCK, 1914, ZMB).

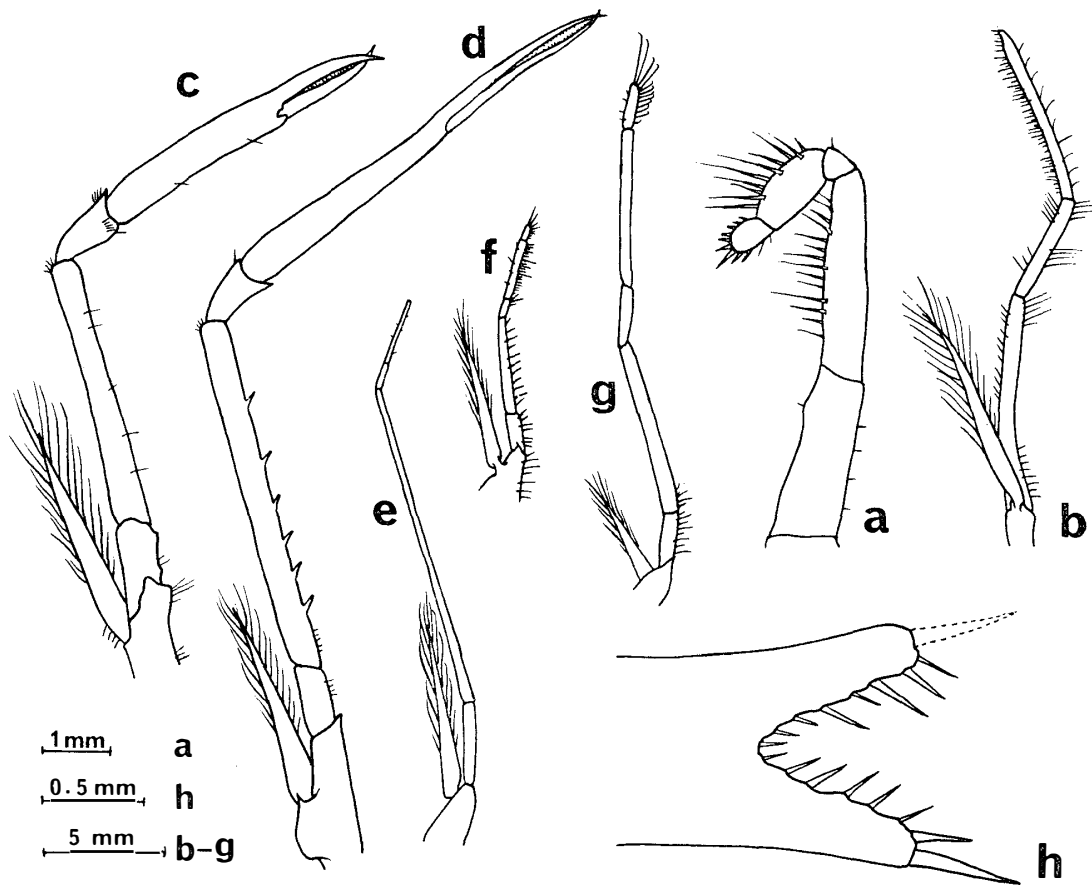


Fig. 10. *Pasiphaea scotiae* (STEBBING), female; a, second maxilliped; b, third maxilliped; c, first pereopod; d, second pereopod; e, third pereopod; f, fourth pereopod; g, fifth pereopod; h, tip of telson, dorsal view.

Scottish National Antarctic Expedition, 1902–1904. Weddell Sea, fragments of type (identified as *Phye scotiae* by STEBBING, 1914, BMNH).

British Antarctic (Terra Nova) Expedition, 1910–1913. Stn. 276, 71°41'S, 166°47'W, 1 female, carapace broken; 1 sex unknown, CL 32 mm (identified as *P. longispina* by BORRADAILE, 1916, BMNH).

British Australian and New Zealand Antarctic Expedition, 1929–1931. Stn. 27, 64°32'S, 75°55'E, 1 female, CL 30.8 mm; Stn. 33, Coll. 593, 66°30'S, 61°08'E, 1 female, CL 32.0 mm; Stn. 45, 63°51'S, 54°16'E, 1 female, CL 15.6 mm; Stn. 67, 45°53'S, 84°33'E, 1 female, CL 20.4 mm (identified as *P. longispina* by HALE, 1941, SAM).

Description

Rostrum slender, pointed and overreaching eyes. Carapace dorsally carinate, carina ending before posterior margin of carapace. Branchiostegal spine present. Two longitudinal carinae on lateral surface of carapace.

Mandible with eleven-toothed incisor process, palp absent. First maxilla with rounded proximal endite, strongly 15-toothed distal endite and simple endopod with one or two setae. Second maxilla with simple endopod armed with one or two setae and large scaphognathite. First maxilliped reduced to large elongate lamina, articulated distally. Endopod of second maxilliped simple, five-segmented, without epipod or ex-

opod. Third maxilliped reaching slightly beyond antennal scale with three-segmented endopod and well developed exopod.

All pereopods with well developed exopods, but no epipods. First pereopod reaching with fingers and two-thirds palm beyond antennal scale, fingers toothed, tips curved; merus unarmed on posterior margin. Second pereopod longer than first pereopod, fingers elongate and toothed, tips curved, merus armed with four to seven spines, usually six or seven spines, on entire posterior margin. Third pereopod reaching cornea, dactyli lost. Fourth pereopod short, reaching ischium-basis articulation of second pereopod. Fifth pereopod longer than fourth pereopod, reaching slightly beyond carpus-merus articulation of third pereopod, tips of setae on dactylus slightly curved.

First pleopod in male and female with broadly ovate endopod, small lobe bearing some hooks. Second pleopod with longer appendix interna bearing some hooks distally and with shorter appendix masculina bearing a seta distally. Second to sixth abdominal somites carinate dorsally. Telson dorsally sulcate and deeply incised at tip with seven to nine spines on one side.

Remarks

Pasiphaea scotiae (STEBBING) has been said to be possibly synonymous with *P. longispina* (YALDWYN, 1965; BURUKOVSKY, 1976), but they have never been critically compared. We found *P. scotiae* to be consistent with LENZ and STRUNCK's (1914), BORRADAILE's (1916) and HALE's (1941) specimens, which were identified by the name of *P. longispina*, and our materials except for the following: the palm of the first pereopod in *P. scotiae* is longer than the merus, while it is shorter in *P. longispina* and our materials. It is impossible to keep *P. scotiae* separate as a species distinct from *P. longispina*. Accordingly they are treated here as a single species.

We determined that *P. scotiae* is the senior synonym for the following reason. The STEBBING report was issued separately June 4, 1914. Whereas it is not obvious when the LENZ and STRUNCK report was issued, but only the year, 1914 is specified. In this case, the date of publication to be adopted is the last day of the year according to the International Code of Zoological Nomenclature, Art. 21c (INTERNATIONAL TRUST FOR ZOOLOGICAL NOMENCLATURE, 1985). The publication date is estimated to be in or after August 1914 because of the date of August 1914 on the editor's preface of the volume which carried LENZ and STRUNCK report.

P. scotiae varies in some characters with growth. In immature specimens the rostrum does not overreach the eyes, the lateral carinae on the carapace are indistinct, the finger of the second pereopod is shorter than the palm and the dorsal margins from the middle of third abdominal somite to the sixth somite is carinate. On the other hand, the rostrum overreaches the eyes, the lateral carinae on the carapace are distinct, the finger of the second pereopod is as long as the palm or slightly shorter, and the dorsal margins from the second abdominal somite to the sixth is carinate in adults (about 3cm in CL).

LENZ and STRUNCK's (1914) specimen corresponds to the present materials except the following. In LENZ and STRUNCK's specimen, the propodus of the fourth pereopod is four times as long as the carpus, and the appendix masculina of the second male pleopod is elongate with several setae. Whereas the propodus of the fourth pereopod is more than three times as long as the carpus, and the appendix masculina of the

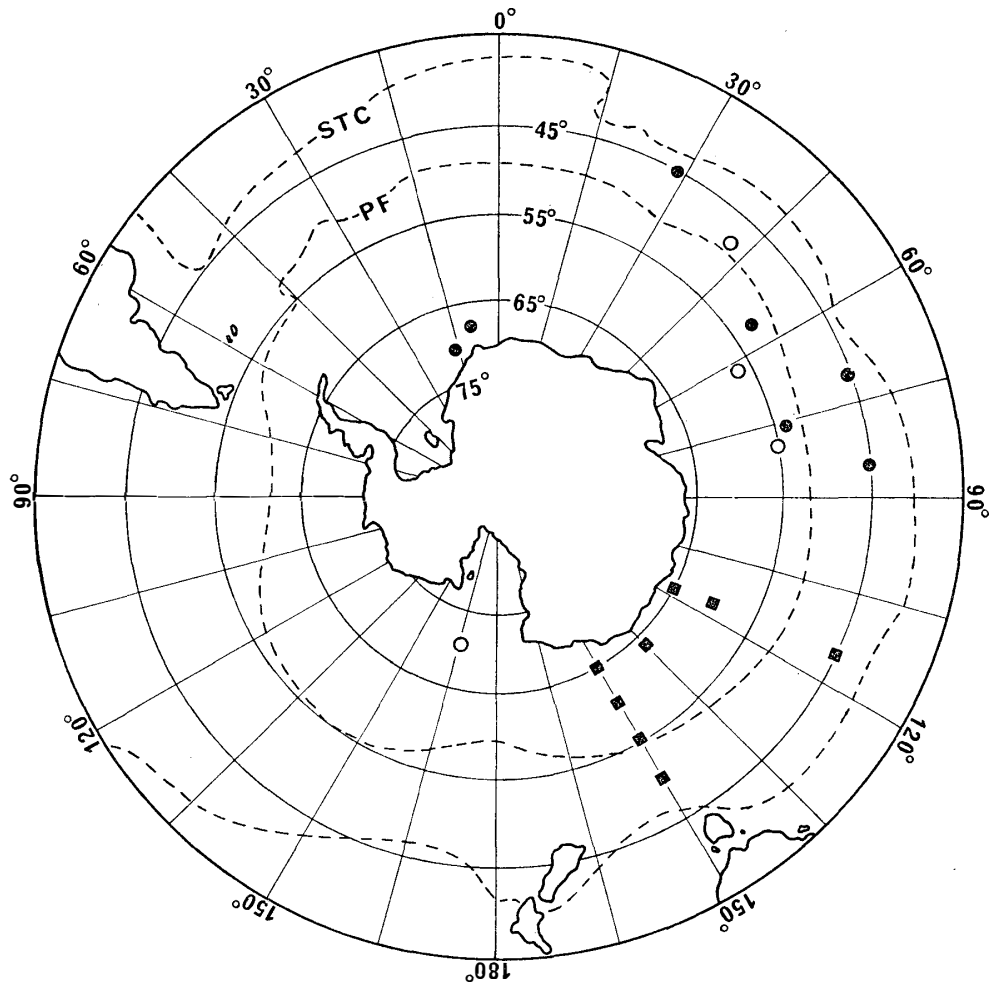


Fig. 11. Map showing distribution of *Pasiphaea scotiae* (STEBBING). Open and closed circles, previous records (refer to the text); open circles, taken from the stomachs of aves; squares, present record; STC, Subtropical Convergence; PF, Polar Front.

second male pereopod is short with a single seta in our material. In STEBBING's (1914a) and BORRADAILE's (1916) specimens the propodus of the fourth pereopod is 2.5 times as long as the carpus and in HALE's (1941) specimens it is four times as long as the carpus. Thus there seems to be variation in the proportion between the segments of the fourth pereopod.

Distribution

South of Australia (present study), off Kerguelen (LEDOYER, 1979), Ross Sea (BORRADAILE, 1916), Antarctic Ocean between 150°E and 115°E (present study), Indian sector of the Antarctic Ocean (BALSS, 1925; HALE, 1941), Weddell Sea (STEBBING, 1914a).

P. scotiae is a circumpolar species. It was taken from the stomachs of an emperor penguin *Aptenodytes forsteri* GRAY, a light-mantled sooty albatross *Phoebetria palpebrata* (FORSTER) and a snow petrel *Pagodroma nivea* (FORSTER) in the Antarctic region (LENZ and STRUNCK, 1914; BALSS, 1925; HALE, 1941). The present collection extends the range of its distribution northerly to 45°S (Fig. 11). This is the first record of *P. scotiae* from south of Australia.

Genus *Parapasiphae* SMITH, 1884(20) *Parapasiphae sulcatifrons* SMITH, 1884*Restricted synonymy*

Parapasiphaä sulcatifrons SMITH, 1884: pp. 384–387, pl. 5, fig. 4; pl. 6, figs. 1–7.—HANSEN, 1908: p. 79.—KEMP, 1910: pp. 47–55, pl. 5, figs. 1–21.—STEBBING, 1914b: p. 33.—BALSS, 1925: pp. 236–237 (according to CROSNIER and FOREST, 1973, in part), fig. 10, pl. 20.—CHACE, 1940: pp. 126–128, fig. 6.—LEGENDRE, 1940: pp. 233–235, fig. 41.—BARNARD, 1950: pp. 649–650, fig. 122d.

Parapasiphae sulcatifrons PEQUEGNAT, 1970: pp. 66–67.—CROSNIER and FOREST, 1973: pp. 142–144, fig. 41.—BUTLER, 1980: pp. 58–59, figs. on p. 58.—HANAMURA, 1983: p. 78.

Material examined

Sample 22, 4 females (CL 8.76–12.00mm), 1 juvenile (CL 7.20mm).

Description

Rostrum short, not extending beyond middle of eye stalk. Carapace dorsally carinate, strongly arched anteriorly; no spine on anterior edge of lateral portion of carapace.

Finger of second chelae not longer than palm. Abdominal somites not dorsally carinate. Telson dorsally sulcate.

Remarks

The number of segments of the palp on the mandible has been considered to be an important generic character in the family Pasiphaeidae. But it varies with growth in this species: juveniles have no mandibular palp, the young have a one-segmented palp, and adults have a two-segmented palp (KEMP, 1910; HANAMURA, 1983). In the present material, specimens 7.20–9.72 mm in CL have no mandibular palp and those 10.20–12.00 mm in CL have a one-segmented palp.

The terminal spine of the fourth abdominal somite is absent or inconspicuous, because the present specimens are still young.

Distribution

Off Japan (HANAMURA, 1979; KIKUCHI and OMORI, 1985), off British Columbia (BUTLER, 1971, 1980), off Oregon (KRYGIER and PEARCY, 1981), off Baja California (HANAMURA, 1983), south of Australia (present study), southeast of Amsterdam Island (HALE, 1941), off South Africa (KENSLEY, 1981), Davis Strait (STEPHENSEN, 1935), off Iceland (HANSEN, 1908), off Ireland (KEMP, 1910), south of Iceland to off Morocco (STEPHENSEN, 1923), off Hebrides to southwest of Newfoundland to south of the Azores (SIVERTSEN and HOLTHUIS, 1956), Gulf of Cadiz (ZARIQUIEY ALVAREZ, 1968), off east coast of United States (SMITH, 1884, 1886), off Bermuda (CHACE, 1940), Gulf of Mexico (PEQUEGNAT, 1970), off Congo (BALSS, 1925), off Gabon to off Angola (CROSNIER and FOREST, 1968, 1973).

This is the first record of this species from south of Australia.

4. Discussion

In this study eight species in seven genera were found in the Antarctic Zone (south of the Polar Front) and fourteen species in eleven genera were found in the subantarctic waters, between the Subtropical Convergence and the Polar Front, for a total of fifteen species in twelve genera (Table 2). In addition the following species, which were not discussed above, are found in the Antarctic Zone and subantarctic waters. According to BATE (1888), STEBBING (1914a), HALE (1941), ZARENKOV (1968), BURUKOVSKY (1976) and LEDOYER (1979), *Hymenodra glacialis* (BUCHHOLZ) *Nematocarcinus* sp. ZARENKOV

Table 2. Pelagic shrimps collected from the Southern Ocean between 150°E and 115°E. Asterisk indicates pelagic shrimps occurred.

Sea area Station	Subtropical			Subantarctic		Antarctic						
	1	1'	8	2	7	AC-I-S	3	3B	4	PI-2	5	6
Aristeidae												
<i>Gennadas gilchristi</i>	*		*		*							
<i>G. kempfi</i>	*			*	*	*	*	*				*
Sergestidae												
<i>Sergestes arcticus</i>	*		*	*	*	*		*				
<i>S. armatus</i>			*									
<i>S. disjunctus</i>			*									
<i>S. pectinatus</i>			*									
<i>S. sargassi</i>			*									
<i>Sergia potens</i>			*		*							
<i>S. prehensilis</i>	*											
<i>Petalidium foliaceum</i>	*		*	*	*		*	*				
Nematocarcinidae												
<i>Nematocarcinus</i> sp.					*							
Oplophoridae												
<i>Oplophorus novaezeelandiae</i>		*			*							
<i>Acanthephyra pelagica</i>	*		*	*	*	*						*
<i>A. quadrispinosa</i>	*		*		*							
<i>Notostomus auriculatus</i>	*				*							
<i>Hymenodora gracilis</i>												*
<i>Systellaspis debilis</i>	*	*	*		*							
Pasiphaeidae												
<i>Pasiphaea acutifrons</i>				*	*		*					*
<i>P. scotiae</i>				*	*	*	*	*	*	*	*	*
<i>Parapasiphae sulcatifrons</i>					*							

and *Pasiphaea grandicula* BURUKOVSKY occur in the Antarctic Zone, *Pasiphaea rathbunae* STEBBING occurs in the subantarctic waters, and *N. lanceopes* and *N. longirostris* live in both waters. This amounts to seven genera and thirteen species in the Antarctic Zone, and eleven genera and seventeen species in the subantarctic waters.

The decapod crustacean fauna of the antarctic is said to be scanty in comparison with the arctic decapod fauna (YALDWYN, 1965; ZARENKOV, 1968). In the Northern Hemisphere, fourteen species in eleven genera are known in the Subarctic Zone of the North Atlantic (HANSEN, 1908; SUND, 1912; STEPHENSEN, 1935) and eleven species in eight genera are recorded in the Subarctic Zone of the North Pacific (RATHBUN, 1904; VINOGRADOV, 1947; OMORI, *et al.*, 1972; BUTLER, 1980; IWASAKI and NEMOTO, 1987a). However, only two species, *H. glacialis* and *Pasiphaea tarda* KRÖYER, occur in the Polar-arctic Zone which is defined by EKMAN (1953) as the region north of America and Asia as well as the arctic part of the North Atlantic (SUND, 1912; STEPHENSEN, 1935). Thus the antarctic pelagic fauna is not scanty in comparison with the arctic fauna, which is particularly poor in the Polar-arctic Zone. This is in agreement with the finding that the antarctic fauna is richer in benthic species than the Polar-arctic fauna (EKMAN, 1953).

Acknowledgments

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* Not seen.

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Note added after submission of the manuscript: We were given the opportunity to read a manuscript on *Pasiphaea* species from the Southern Ocean (A. CLARKE and L. J. HOLMES, Br. Antarct. Surv. Bull., **74**, 17–30, 1987). CLARKE and HOLMES viewed the ELTANIN collections between 1962 and 1968 and those of the DISCOVERY in 1979. They reported that *P. scotiae* was probably synonymous with *P. longispina* and appeared to have a circumpolar distribution, ranging from close to the continent as far north as the Polar Front. Moreover, they found that *P. rathbunae* lived in the subantarctic and antarctic waters. We would like to thank Dr. CLARKE of the British Antarctic Survey for sending us their manuscript.