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The Marine Fauna of New Zealand: Pelagic Calanoid Copepods: Families Euchaetidae, Phaennidae, Scolecithricidae, Diaixidae, and Tharybidae

by

J. M. BRADFORD, L. HAAKONSSEN and J. B. JILLETT

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The Marine Fauna of New Zealand: Pelagic Calanoid Copepods: Families Euchaetidae, Phaennidae, Scolecithricidae, Diaixidae, and Tharybidae

by

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ABSTRACT

The distribution and taxonomy of calanoid copepods of the families Euchaetidae, Phaennidae, Scolecithricidae, Diaixidae, and Tharybidae from the south-west Pacific in the vicinity of New Zealand (20-64°S, 164°E–164°W) is recorded.

All genera in these families are defined and a list of their species provided even though some genera have not been recorded from the south-west Pacific. The definition of the genus *Euchaeta* is here restricted and encompasses the following species: *E. indica*, *E. marina*, *E. marinella* and *E. rimana*. The genus name *Paraeuchaeta* is applied to the remaining species of Euchaetidae.

Species of the following genera are described and figured and their distributions mapped in the south-west Pacific: *Euchaeta*, *Paraeuchaeta*, *Cornucalanus*, *Onchocalanus*, *Phaenna*, *Xanthocalanus*, *Amallothrix*, *Lophothrix*, *Racovitzanus*, *Scaphocalanus*, *Scolecithricella*, *Scolecithrix*, *Scopalatum*, *Scottocalanus*, *Neoscolecithrix*, *Parundinella*, and *Undinella*. Eighteen of the species are new records for the area.

Keywords: Copepods, calanoid, Euchaetidae, Phaennidae, Scolecithricidae, Diaixidae, Tharybidae, distribution, taxonomy, marine fauna, New Zealand.

INTRODUCTION

This is the second paper in a series on the taxonomy and distribution of pelagic Copepoda in the New Zealand region of the south-west Pacific. Treatment of the material follows the style used by Bradford and Jillett (1980). The records of Park (1978, 1980) are added to the list of previous records of pelagic copepods from the south-west Pacific compiled by Bradford and Jillett (1980) (Fig. 1).

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It is intended this work shall record species and distributions from recent collections, include previous records from the region, and also provide a handbook for those wishing to go a stage further and identify a species not recorded from the region previously. Planktobenthic species are also included as a number are already in works on pelagic copepods when plankton nets fished near the bottom and there is no other formal vehicle for recording these species. Where appropriate or possible any taxonomic ambiguities which exist have been investigated.

For each family a definition is given and one species in the family, common in the south-west Pacific, is figured in full as an example of the family. Each genus, treated alphabetically, is also defined even when no example has been taken in the south-west Pacific. A list of all species in each genus is provided with their junior synonyms noted. Synonyms of each species recorded are generally not given as they have been fully listed previously by other workers, for example, Vervoort (1957, 1963, 1965b). In a few cases where a new synonym has been discovered, usually one particularly relevant to the New Zealand region, it has been included before the description of the species concerned. Material under "Description" refers principally to the original description and appropriate references are listed in brackets at the end of the section. Any differences in the south-west Pacific specimens are noted under "Remarks".

The ultimate goal of this work is to gain a knowledge of the fauna of the New Zealand region of the south-west Pacific and to analyse the distribution patterns and their relationships to the known physical environment and behaviour of the species when understood.

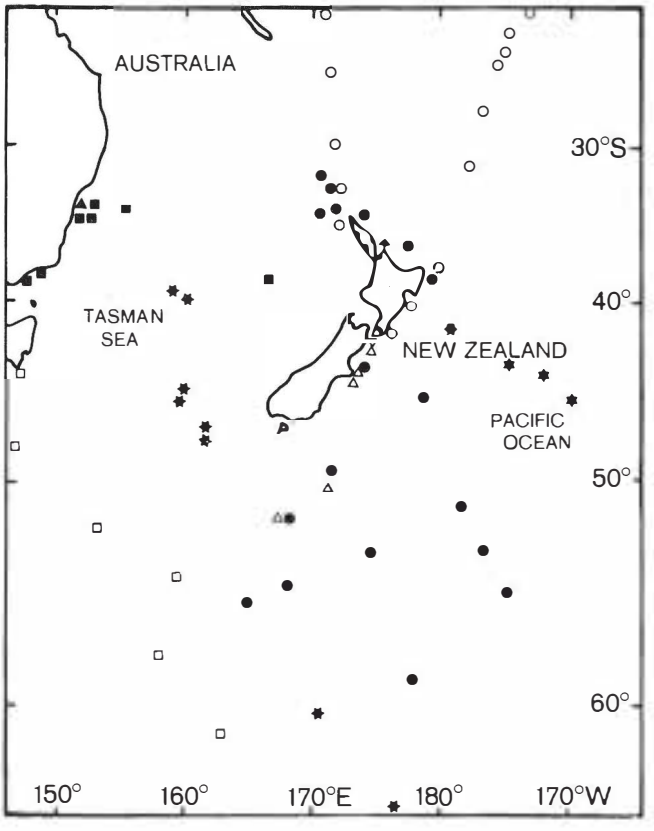


FIG. 1. Map of the south-west Pacific Ocean indicating the positions of stations from which copepods have been previously recorded in the literature: □ = Vervoort 1957; ▲ = Dakin and Colefax 1940; ■ = Brady 1883; ● = Farran 1929; △ = Bary 1951; ○ = Heinrich 1968; + = Jillett 1971; ▽ = Bradford 1972; * = Park 1978, 1980.

ACKNOWLEDGMENTS

Thanks are due to all those who provided material and gave encouragement to this work: Victoria and Auckland University Zoology Departments, Otago University Portobello Marine Laboratory, and New Zealand Oceanographic Institute, DSIR.

The drawings were inked by Mrs G. Crook from the author's pencil originals.

MATERIALS AND METHODS

The material used in this study was collected by the New Zealand Oceanographic Institute (NZOI), Victoria University Zoology Department (VUZ), Auckland University Zoology Department (AUZ), and Otago University Zoology Department. The stations (Fig. 2) were occupied by a variety of vessels using various combinations of sampling gear (*see* table at end of station data).

Samples had been preserved in 5% formalin in sea water. Parts were dissected from the animals and examined in lactic acid or were mounted permanently in Euparal, Canada Balsam, or Polyvinyl Alcohol Lactophenol and drawings made using a "camera lucida".

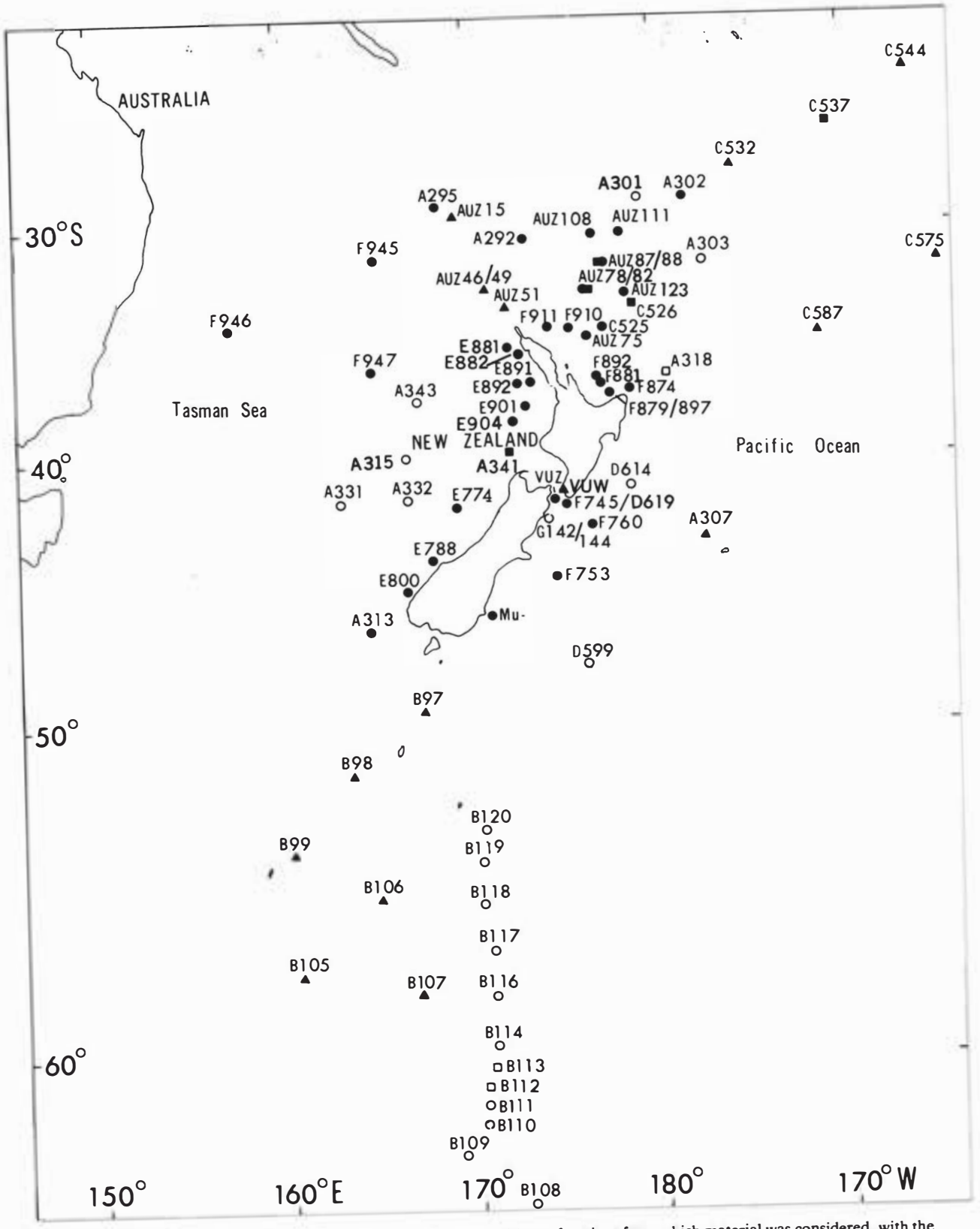


FIG. 2. Map of the south-west Pacific Ocean indicating the positions of stations from which material was considered, with the maximum sampling depth indicated: ▲ = surface; □ = 0–125 m; ■ = 126–250 m; ○= 251–500 m; ● = >501 m.

STATION DATA

Stn No.	Date	Time	Latitude	Longitude	Gear*	Depth of Haul (m)
New Zealand Oceanographic Institute Stations						
A292	5.6.56	1530	30°45′S	173°16′E	N70	500–1000
		1050–1150			L50	surface
A295	7.6.56	2210–2227	29°03.5′S	168°36′E	N70	400–1000
		2255–2308			N70	0–500
		2115–2345			L50	surface
A301	1.7.56	0955–1010	28°56′S	179°56′W	N70	0–500
A302	1/2.7.56	2220–2320	28°52′S	178°05′W	L50	surface
		0108–0125			N70	500–1000
		0148–0200			N70	0–500
A303	3.7.56	0920–1025	31°40′S	177°33′W	L50	surface
		1440–1447			N70	450–1000
A307	20.7.56	1630–2000	42°55′S	177°26′W	N50	surface
A313	17.8.56	0245–0606	46°46′S	164°35′E	N70	0–914
A315	19.8.56	–	39°56′S	167°45′E	N70	0–500
A318	10.1.57	0845–1430	36°36′S	179°18′W	N50	surface
					L50	0–88
A331	1.2.57	0430–0810	41°46′S	163°51′E	N70	surface
A332	1/2.2.57	2300–0225	41°41′S	167°03′E	N70	surface
A341	12.2.57	0912–1012	39°41′S	172°06′E	L50	surface
		1030			N70	0–250
		2230–2400			L50	surface
A343	13.2.57	1400–1700	37°46′S	167°28′E	N70	0–500
		1412–1520			L50	surface
B97	23.11.58	1630–1650	49°32′S	167°22.5′E	N70	surface
B98	24.11.58	1110–1130	51°41.5′S	163°49′E	N70	surface
B99	25.11.58	0955–1015	54°05.5′S	160°26′E	N70	surface
B105	26.11.58	1430–1450	57°36′S	161°02′E	N70	surface
B106	27.11.58	1450–1500	55°42.5′S	165°23′E	N70	surface
B107	28.11.58	1015–1025	58°19′S	167°18′E	N70	surface
B108	30.11.58	2245–2255	63°45.65′S	172°30′E	N15	surface
		2300			N15	0–125
		2315			N15	0–500
B109	1.12.58	1500	62°37′S	169°51′E	N15	0–125
		1515			N15	0–500
B110	1.12.58	1900	61°55.5′S	170°26′E	N15	0–125
		1915			N15	0–500
B111	2.12.58	0830	61°25.5′S	170°41′E	N15	0–500
B112	2.12.58	1408	60°47′S	170°44′E	N15	0–125
B113	2.12.58	1900	60°22′S	170°54′E	N15	0–125
B114	3.12.58	0115	59°39′S	171°02′E	N15	0–125
		0130			N15	0–500
B116	3.12.58	1730	58°20′S	171°14′E	N15	0–125
		1745			N15	0–500
B117	4.12.58	0330	57°11′S	171°06′E	N15	0–500
B118	4.12.58	1145	55°34.5′S	170°27′E	N15	0–125
		1200			N15	0–500
B119	4.12.58	2330	54°31′S	170°20′E	N15	0–500
B120	5.12.58	0700	53°26.34′S	170°15′E	N15	0–400
		0715			N15	0–150
C525	7.9.60	1140–1210	34°40′S	177°46′E	N70	surface
		1215–1235			N70	0–250
C526	17.9.60	1139–1148	33°40′S	179°09′E	N70	0–250
		1125–1155			N70	surface
C532	20.9.60	2105–2135	27°49′S	175°53′W	N70	surface

*Symbol only, details of the gear used at stations are given at the end of the station data.

Stn No.	Date	Time	Latitude	Longitude	Gear*	Depth of Haul (m)
C537	22.9.60	2130–2200	25°46′S	170°16′W	N70	surface
		2215–2235			N70	0–250
C544	24.9.60	0550–0620	23°01.2′S	166°19′W	N70	surface
C575	13.10.60	1100–1130	31°49′S	164°30′W	N70	surface
C587	15.10.60	1430–1500	35°10′S	170°55′W	N70	surface
D599	10.4.67	1732–	47°58′S	176°10′E	MPS	0–100
						100–250
		2240				250–500
D614	16.4.67	0318	41°20′S	178°48′E	MPS	0–100
						100–250
						250–500
D619	18.4.67	1030	41°56′S	175°17.5′E	MPS	0–100
						100–250
						250–500
E774	15.10.67	0921–1011	42°00′S	169°15′E	MT	0–1165
E788	17.10.67	1620–1748	44°00′S	168°11′E	MT	0–1193
E800	20.10.67	1805–1840	45°20′S	166°41.5′E	MT	0–700
E881	22.3.68	0954–1308	35°20′S	172°15′E	MT	0–1371
E882	22.3.68	2037–2354	36°00′S	172°42′E	MT	0–1212
E891	24.3.68	0507–0545	36°40′S	173°27′E	MT	0–1245
E892	24.3.68	1458–1543	37°20′S	173°35′E	MT	0–1224
E901	25/6.3.68	0107–0150	38°00′S	173°19′E	MT	0–1248
E904	28.3.68	0249–0335	38°39′S	172°24′E	MT	0–1243
F745	4.4.66	1123–1440	41°47′S	175°22′E	MT	0–1170
F753	18.8.66	1857–1932	44°45′S	174°30′E	MT	0–790
F760	20.8.66	0949–1030	42°45′S	176°30′E	MT	0–710
F874	3.10.68	0703–0848	37°18′S	178°11′E	MT	0–1357
F879	4.10.68	0040–1224	37°25.5′S	177°30′E	MT	0–1267
F881	4.10.68	1000–1125	37°07.5′S	177°14′E	MT	0–1260
F892	5.10.68	1945–2146	36°58.5′S	176°41′E	MT	0–1260
F897	6.10.68	0240–0329	37°25′S	177°30′E	MT	0–1269
F910	10.10.68	1548–1734	34°56′S	175°23′E	MT	0–1397
F911	11.10.68	0147–0321	34°38′S	174°36′E	MT	0–1697
F945	22.10.68	1458–1505	31°19.5′S	165°19′E	N70	0–200
		1538–1555				0–500
		1645–1700				500–1000
F946	2/3.11.68	2308–2315	34°32.5′S	157°31.5′E	N70	0–200
		2335–2344				200–500
		0025–0100				0–1000
F947	5.11.68	1350–1355	36°18.5′S	165°05.5′E	N70	0–200
		1446–1500				0–500
		1529–1540				500–1000
G142	20/1.9.67	2100	42°24.5′S	174°01.8′E	MPS	0–100
						100–250
						250–500
		2400	42°24.5′S	174°01.8′E	MPS	0–100
						100–250
						250–500
		0600	42°24.5′S	174°01.8′E	MPS	0–100
						100–250
						250–500
		1200	42°24.5′S	174°01.8′E	MPS	0–100
						100–250
						250–500
G144	21.9.67	1800	42°24.8′S	174°01.6′E	MPS	0–100
						100–250
						250–500

*Symbol only, details of the gear used at stations are given at the end of the station data.

Stn No.	Date	Time	Latitude	Longitude	Gear*	Depth of Haul (m)
Auckland University Zoology Department Stations						
AUZ15	8.7.62	0932–0946	29°26′S	169°49′E	1mC	surface
AUZ46	14.7.62	0926–1026	32°40′S	171°02′E	1mC	surface
AUZ49	14.7.62	2124–2155	32°40′S	171°02′E	1mC	surface
AUZ51	15.7.62	0750–0823	33°59′S	172°06′E	1mC	surface
AUZ75	22.7.62	1938–2010	35°15′S	176°15′E	1mC	0–200?
AUZ78	23.7.62	0537–0856	33°09′S	176°06′E	IKMT	0–870
AUZ82	23.7.62	1903–1945	33°09′S	176°06′E	1mC	0–100?
AUZ87	24.7.62	1630–1721	31°57′S	177°38′E	1mC	0–100?
AUZ88	24.7.62	1828–1918	31°57′S	177°38′E	1mC	0–100?
AUZ108	29.7.62	0215–0705	30°14′S	176°42′W	IKMT	0–823
AUZ111	30.7.62	0557–0656	30°26′S	178°15′W	1mC	0–100?
AUZ123	2.8.62	0730–0823	33°13′S	178°24′E	1mC	0–100?
A	15.5.63–21.5.65	1000–1300	36°49′S	174°50′E	.5mC	0–18
B	1.3.64–24.4.65	1000–1300	36°16′S	174°54′E	CB	0–45
Victoria University Zoology Department Stations						
VUZ93	24.8.57	1515–1815	41°53′S	175°14′E	4m	0–1097
VUZ105	28.12.57	1130–1440	41°47′S	175°01′E	4m	0–914
VUZ107	28.12.57	1850–2200	41°52′S	175°06′E	4m	0–914
VUZ112	29.1.61	1143–1335	41°45′S	174°55′E	4m	0–732
Otago University Stations						
Mu66/44	21.10.66	——	45°55′S	171°05′E	CB	0–200
Mu66/46	21.10.66	——	45°55′S	171°05′E	CB	0–200
Mu66/49A	21.10.66	——	45°55′S	171°05′E	CB	0–200
Mu66/56B	2.11.66	——	45°47′S	170°57′E	CB	0–80
Mu66/78	4.12.66	——	45°51′S	171°16′E	CB	0–100
Mu67/44	24.2.67	——	45°52′S	171°16′E	CB	0–150
Mu67/46	22.3.67	——	45°48′S	170°57′E	CB	0–150
Mu67/47	22.3.67	——	45°50′S	171°06′E	CB	0–150
Mu67/48	22.3.67	——	45°52′S	171°18′E	CB	0–150
Mu67/48s	22.3.67	——	45°52′S	171°18′E	S	0–1000
Mu67/49	14.4.67	——	45°46′S	170°47′E	CB	0–25
Mu67/52s	14.4.67	——	45°55′S	171°05′E	S	0–1000
Mu67/56	19.5.67	——	45°50′S	170°48′E	CB	0–150
Mu67/57s	19.5.67	——	45°50′S	170°48′E	S	0–1000
Mu67/62s	19.6.67	——	45°50′S	170°48′E	S	0–500
Mu67/77	19.6.67	——	45°50′S	171°05′E	CB	0–150
Mu67/78	19.6.67	——	45°55′S	171°16′E	CB	0–150
Mu67/88	14.7.67	——	45°50′S	170°48′E	CB	0–150
Mu67/88s	14.7.67	——	45°50′S	170°48′E	S	0–600
Mu67/94s	18.8.67	——	45°50′S	170°48′E	S	0–1000
Mu67/104s	18.9.67	——	45°50′S	170°48′E	S	0–823
Mu67/106s	18.9.67	——	45°50′S	170°48′E	S	0–1000
Mu 67/116s	24.10.67	——	45°50′S	170°48′E	S	0–1000
Mu67/147s	15.12.67	——	45°50′S	170°48′E	S	0–1000

*Symbol only, details of the gear used at stations are given at the end of the station data.

Details of gear used at stations.

Symbol	Net	Closing	Mesh Aperture µm	Diam. m	Source
N70	Discovery N70 net	yes	240	0.7	Kemp and Hardy 1929
L50	Lachlan 50 net	no	240	0.5	Bary 1956
N50	Discovery N50 net	no	53	0.5	Kemp and Hardy 1929
N15	——	no	240	0.15	——
MPS	Bé Multiple Plankton Sampler	yes	200	0.7×0.7	Bé 1962
MT	Modified Menzies Trawl	no	1200	1×0.15	Menzies 1962
1mC	1 m Cone net	no	1225	1	Tait *et al.* 1965
IKMT	Isaacs-Kidd Mid-water Trawl	no	12500	3	Tait *et al.* 1965, Isaacs & Kidd 1953
4m	4 m conical net*	no	25000	4	Records held in Island Bay Marine Laboratory, Victoria University, Wellington
CB	Clarke-Bumpus Sampler	yes	200-130	0.125	Clark and Bumpus 1940
S	Stramin net	no	1400	1	Jillett (pers. comm.)
.5mC	0.5 m Cone net	no	250	0.5	Jillett 1971

*Copepods were captured by this net only when it became clogged with medusae, etc.

SYSTEMATICS

FAMILY EUCHAETIDAE Sars, 1903

DEFINITION: Head and pedigerous segment 1 fused or incompletely separated. Anterior border of head pointed, rostrum with a single point. Pedigerous segments 4 and 5 fused. Urosome of female 4-segmented, anal segment very small, genital segment projecting ventrally; male urosome 5-segmented. Caudal rami short, internal seta generally very long. Antenna 1 slender with some elongated setae in female, with conspicuous aesthetascs in male. Maxilla 1 with endopod curved across inner lobe 1; outer lobe 1 with varying number of setae; inner lobe 1 with varying numbers of setae and spines; either inner lobe 2 or 3 may be absent. Maxilla 2 and maxilliped very strongly built, especially the latter, which has a bent tip and is provided with long, hooked setae. Mouthparts atrophied in male. Swimming legs as in the Aetideidae, outer edge of exopod segments 2 and 3 of leg 2 often deeply incised at the bases of unequally developed spines; leg 5 absent in female, large and complicated in male. Male left leg 5 basipod 2 large, endopod rudimentary, exopod segment 2 with serrated lamella and digitiform process, exopod segment 3 in form of lobe with haired tubercle at its base and distal group of spines; lobe may be extended beyond these spines into spine-like process of various lengths. Right leg 5 basipod 2 swollen, not as long as left leg 5 basipod 2; endopod 1-segmented, elongate; exopod composed of two elongated segments. (Rose 1933, Giesbrecht 1892)

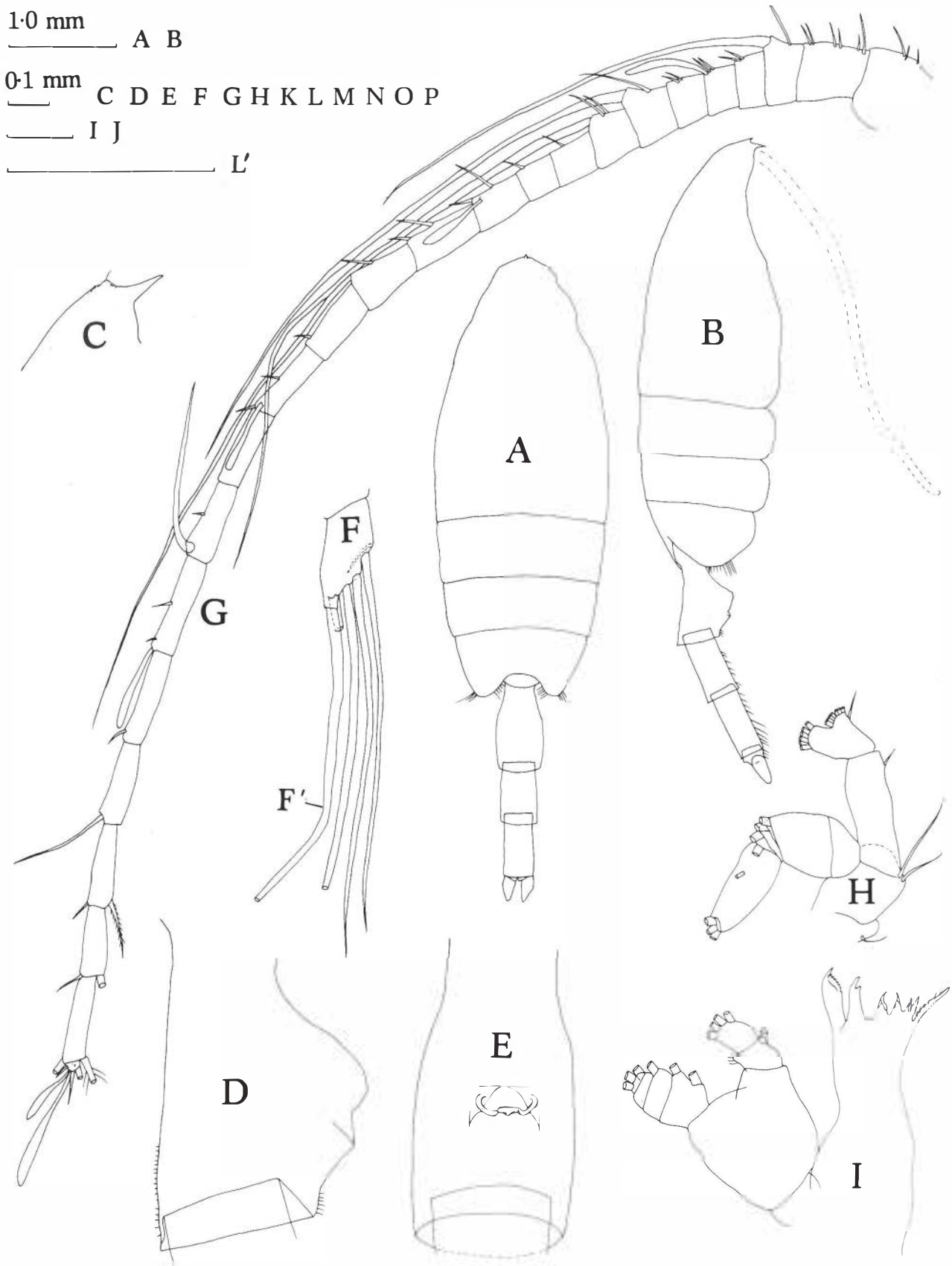
An example of this family is *Paraeuchaeta biloba* (Figs. 3, 4).

REMARKS: There are now two genera, *Euchaeta* and *Paraeuchaeta*, in this family, as *Pseudeuchaeta* and *Valdiviella* have been removed to the Aetideidae (*see* Bradford and Jillett 1980).

The validity of the genus *Paraeuchaeta* A. Scott, 1909 has been questioned by Vervoort (1957). He points out that when the form of the apical setae on maxilla 2 and male leg 5 (A. Scott 1909) and the form of the appendicular setae on the caudal rami (Sars 1925) are used to separate *Euchaeta* and *Paraeuchaeta* several species cannot be classified as they have intermediate characters. Recent work (Bradford 1974) has indicated that species in Vervoort's (1957) Group A (*E. marina, E. rimana, E. marinella* and *E. indica*) form a very distinct group with separate generic status. The name *Euchaeta* is available for these four species. All other species must take the remaining available name *Paraeuchaeta* until it becomes clear whether the occurrence of characters such as the nature of the terminal setae of maxilla 2, the appendicular setae of the caudal rami, male leg 5 (Vervoort 1957) and the female genital swelling (Heptner 1968) justifies further subdivision of the genus.

Members of the family Euchaetidae are mainly medium sized to large copepods. They are exclusively pelagic with the majority being meso- or bathypelagic (Vervoort 1965a, Mazza 1966).

Like most copepods living between 750–3000 m the Euchaetidae are carnivorous with the mouthparts adapted to this way of feeding, i.e., with a heavy chitinized dental plate on the mandible, and narrow teeth sometimes with high pointed crowns of the



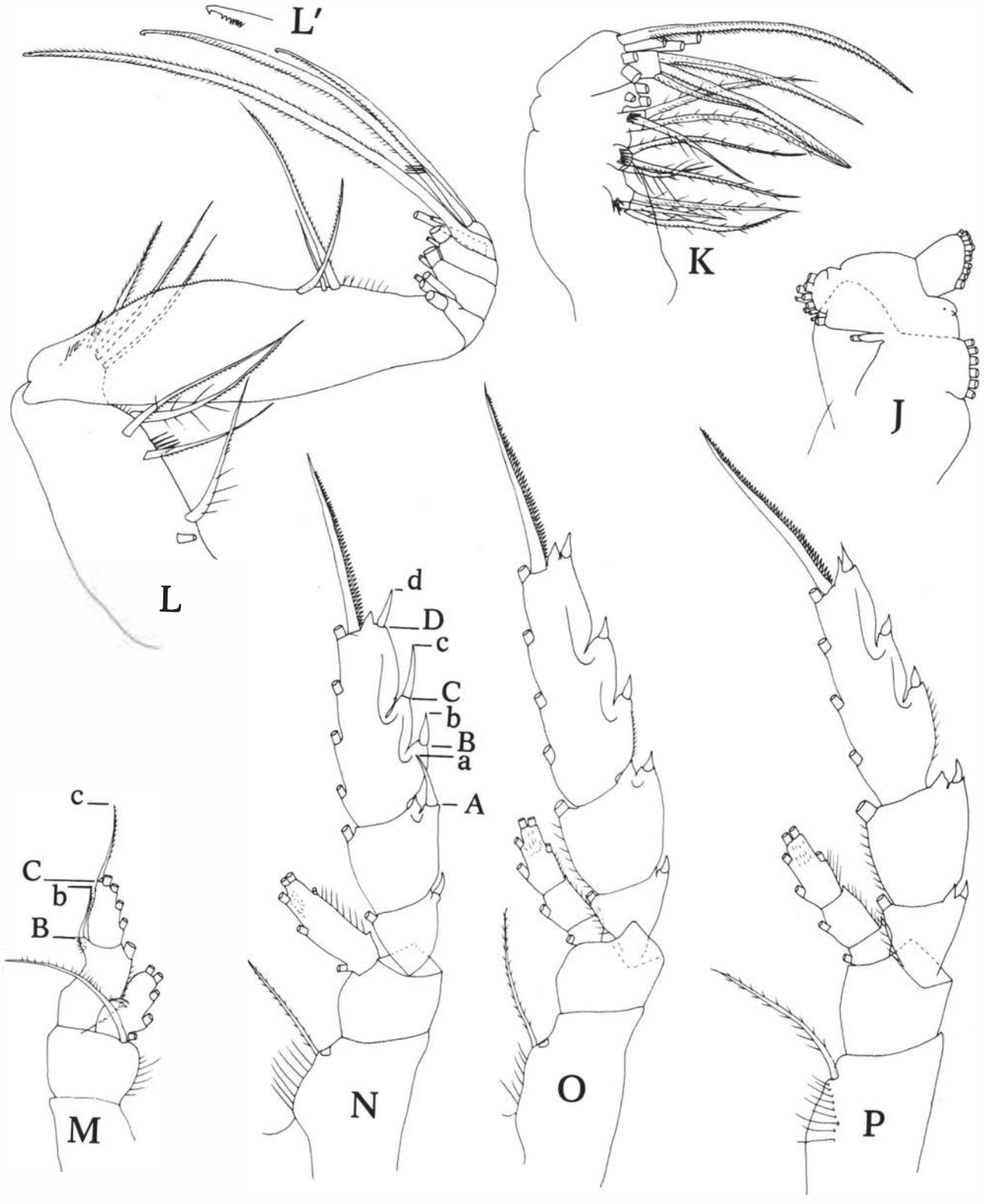
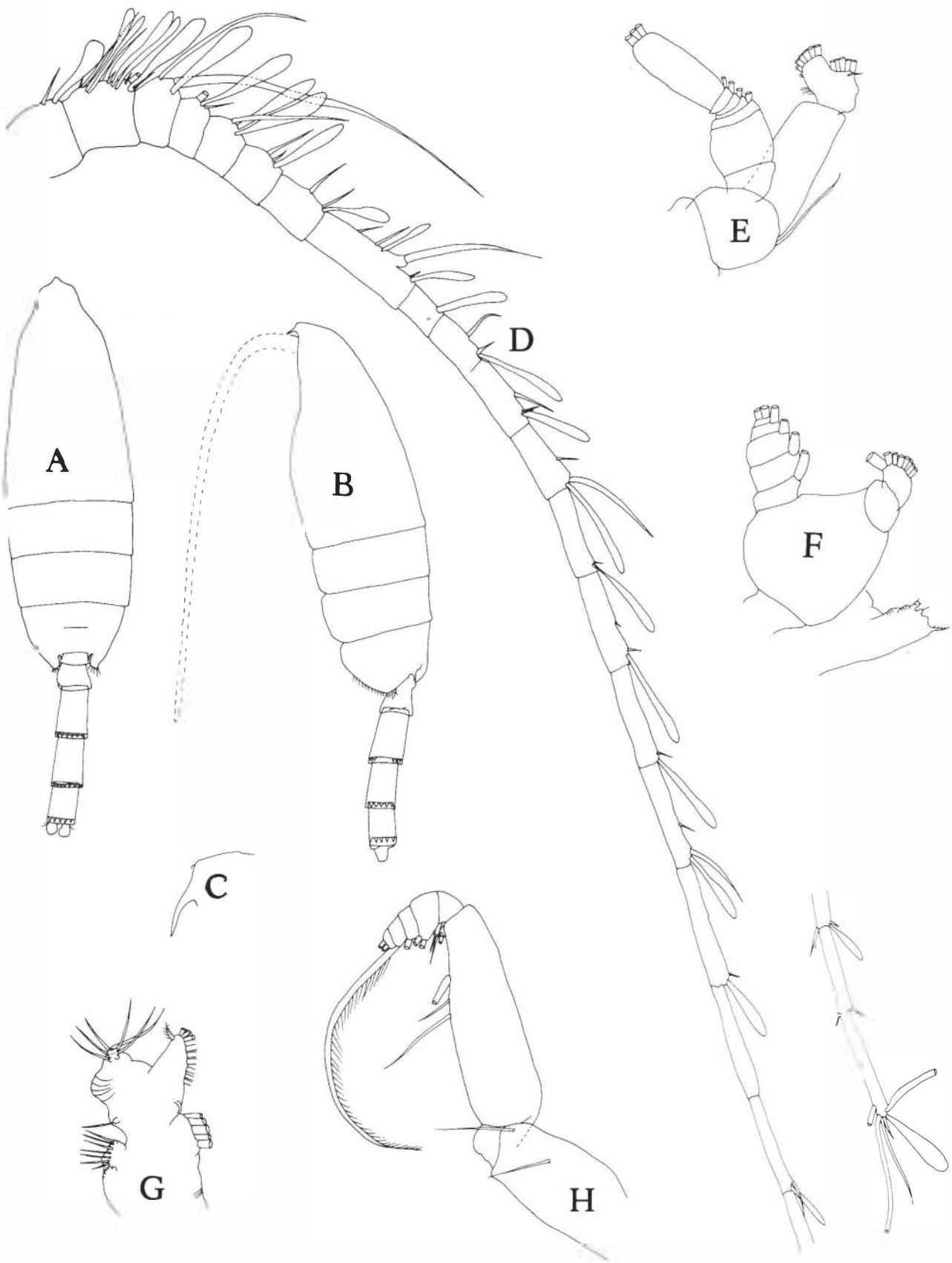


FIG. 3 (*opposite and above*). *Paraeuchaeta biloba* female from VUZ Stn 105: A, dorsal view; B, lateral view; C, rostrum; D, lateral view of genital segment; E, ventral view of genital segment; F, ventral view of caudal rami; F′, appendicular seta; G, antenna 1; H, antenna 2; I, mandible; J, maxilla 1; K, maxilla 2; L, maxilliped; L′, tip of endopod seta of maxilliped; M, leg 1; N, leg 2; O, leg 3; P, leg 4.



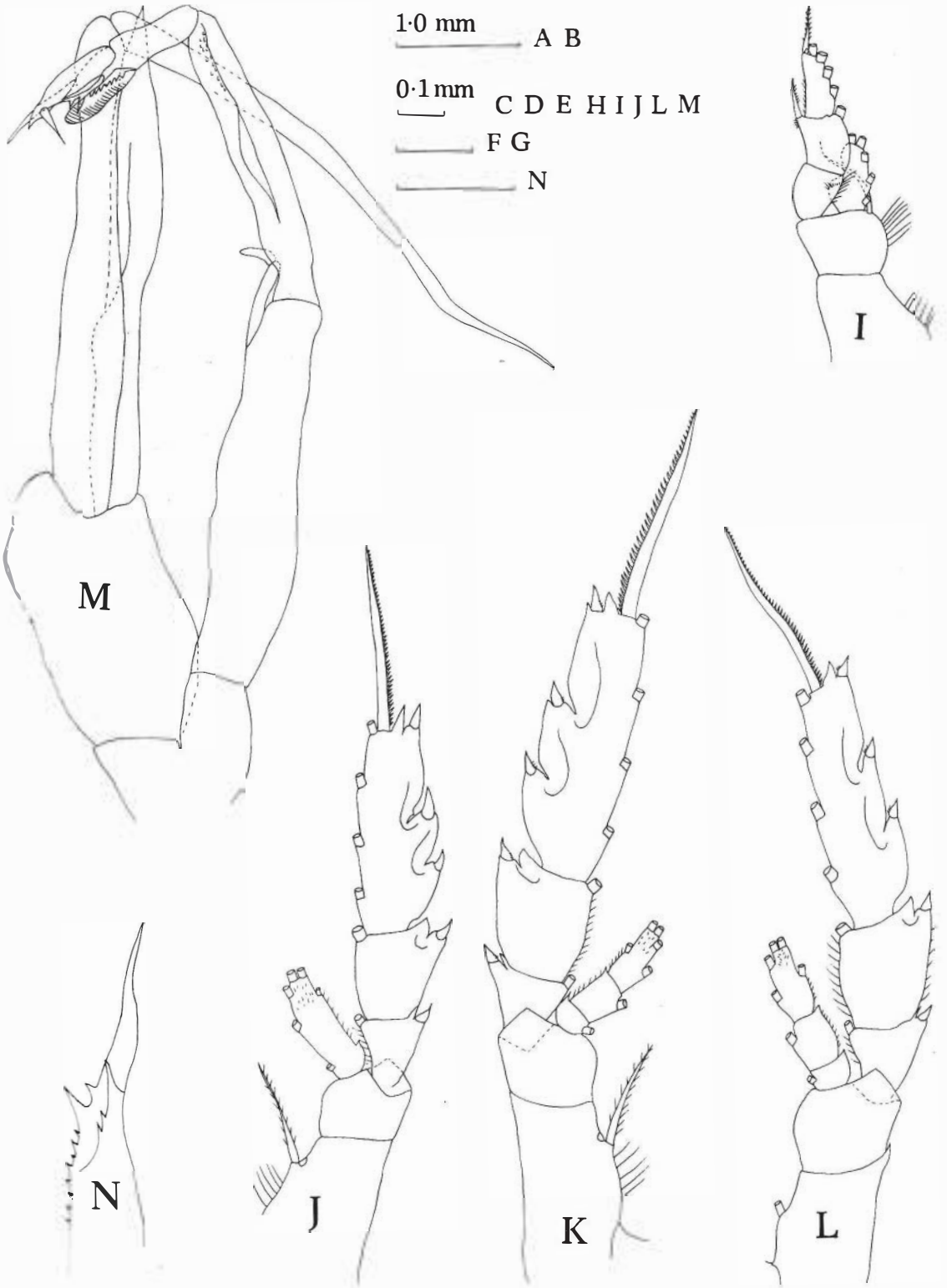


FIG. 4 (*opposite and above*). *Paraeuchaeta biloba* male from VUZ Stn 105: A, dorsal view; B, lateral view; C, rostrum; D, antenna 1; E, antenna 2; F, mandible; G, maxilla 1; H, maxilliped; I, leg 1; J, leg 2; K, leg 3; L, leg 4; M, leg 5; N, serrated lamella.

cutting type. The maxilla 2 and maxilliped are extended to form a catching net which is closed when a prey organism enters. The food most often consists of small crustaceans (Arashkevich 1969).

No definite spawning period seems to exist for the Euchaetidae. Mature individuals of *Paraeuchaeta russelli* spawn from summer to early winter (Koga 1960). Mature adults of *P. norvegica* have been found all year round (Bigelow 1926, Hopkins 1977, Bakke 1977), as also have nauplius stages and females with eggsacs of *P. elongata* (Campbell 1934, as *Euchaeta japonica*). Nevertheless, in *P. norvegica* biannual generations occur with peak numbers of adults found in May-June and November-December in Norwegian waters.

The development of the nauplius stages to copepodite stage 1 has been observed to last from four to five days: five days for *Paraeuchaeta norvegica* (Nicholls 1934) and four days for *P. russelli* and *Euchaeta marina* (Koga 1960, Bernard 1964). There is considerable retardation in the development of the mouth parts during the nauplius stages and only a small amount of growth takes place between consecutive stages followed by a sudden increase in length with the moulting to copepodite stage 1. It is suggested that the larvae do not feed through the nauplius stages, but live on the large supply of yolk (Nicholls 1934, Campbell 1934, Koga 1960). This theory is supported by the lack of setae which Gauld (1959) found to be principally concerned with feeding in other species. Males and females can be separated at the fourth copepodite stage by the nature of the fifth leg. At this stage the sex ratio is about 50:50 and the mouthparts are identical for the two sexes. From then on the males appear in a constantly decreasing ratio and a marked reduction of the male mouthparts begins. This has been observed for *Paraeuchaeta elongata* (Campbell 1934), *P. acuta* and *P. spinosa* (Mazza 1966). Campbell (1934) believes that females of *P. elongata* may produce several broods while the males die soon after the copulation.

The following characters are those principally used to distinguish species in this family: the shape of the female genital segment, the form of the male leg 5, and the relative lengths of the outer edge spines on the exopods of legs 1 and 2. These spines are described here according to the system of Heptner (1968) (Fig. 3 M and N).

Euchaeta Philippi, 1843

REDEFINITION: Distal edge of maxilla 1 inner lobe 1 with at least seven spines, posterior surface with up to four setae, total number of spines and setae on lobe: 11; inner lobe 2 or 3 absent, remaining lobe with one seta; basipod 2 with three setae, endopod with four setae, exopod with 11 setae, outer lobe with five setae. Females with two of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. Male left leg 5 with thin-skinned lobe at base of long terminal spiniform process of exopod segment 3; digitiform process always spine-like.

TYPE SPECIES: *Cyclops marinus* Prestandrea, 1833.

REMARKS: The genus as now defined contains the following species: *Euchaeta indica* Wolfenden, 1905 (= *E. wolfendeni* A. Scott, 1909, *see* Bradford 1974); *E. marina* (Prestandrea, 1833); *E. marinella* Bradford, 1974; and *E. rimana* Bradford, 1974.

The following species have been taken in the south-west Pacific:

Euchaeta indica Wolfenden, 1905

(Figs. 5, 79)

Euchaeta wolfendeni A. Scott, 1909

DESCRIPTION: *Size:* ♀♀ 2.21–3.00 mm, ♂♂ 2.21–2.92 mm.

Female: Posterolateral corners of metasome unequally rounded. Genital segment asymmetrical and longer than rest of urosome, right side more swollen than left and with rounded protuberance distally. Leg 1 exopod: Bb = $\frac{1}{2}$BC, Cc > BC. Leg 2 exopod: Aa ≥ $\frac{2}{3}$AB, Bb ≈ $\frac{1}{3}$BC, Cc ≤ $\frac{1}{2}$CD, Dd = $\frac{1}{3}$CD.

(Wolfenden 1905, pl. C, figs 7, 8, 10, 11, 17, 18; Scott 1909, as *E. wolfendeni*; Bradford 1974)

Male: Leg 1 exopod: Bb = $\frac{1}{2}$BC, Cc < BC. Leg 2 exopod: Aa = $\frac{1}{3}$AB, Bb = $\frac{1}{3}$BC, Cc ≈ $\frac{1}{3}$CD, Dd ≈ $\frac{1}{3}$CD. On left leg 5 the thin-skinned lobe on distal part of exopod segment 3 arises close to group of spines and extends beyond base of terminal spiniform process by half its length; serrated lamella of exopod segment 2 with incision which makes it appear bilobed, teeth border inner, outer and distal margin of lamella; digitiform process more than half as long as serrated lamella.

(Scott 1909, as *E. wolfendeni;* Park 1973, as *E. wolfendeni*; Bradford 1974)

REMARKS: Nil.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Dakin and Colefax (1940, as *E. marina*).

NEW RECORDS: Nil.

DISTRIBUTION: *Euchaeta indica* is an epiplanktonic species found widely in the Indo-Pacific Ocean.

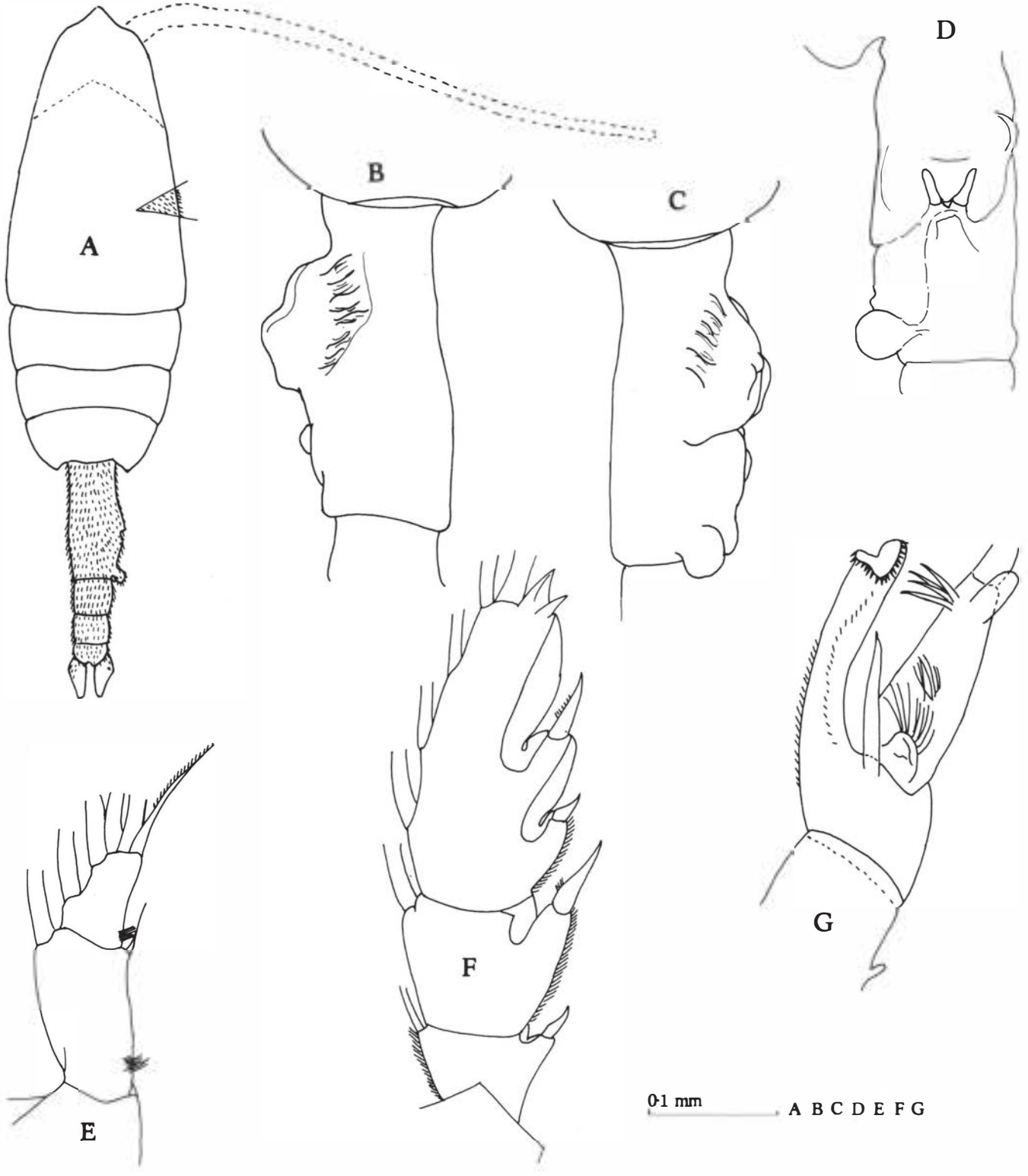


FIG. 5. *Euchaeta indica* female (from Wolfenden 1905): A, dorsal view; B, left lateral view of genital segment; C, right lateral view of genital segment; D, ventral view of genital segment; E, leg 1; F, leg 2 exopod. Male (from A. Scott 1909, as *Euchaeta wolfendeni*): G, terminal part of left leg 5 exopod.

Sig. 2*

Euchaeta marinella Bradford, 1974

(Figs 6, 79)

DESCRIPTION: *Size:* ♀♀ 2.35–2.68 mm, ♂♂ 2.30–2.55 mm.

Female: Genital segment in dorsal view without projection on left; right side with long flat projection which does not obscure more ventral, triangular projection; genital field in ventral view with genital flanges not meeting in mid-line, the gap between them about half width of right flange. Leg 1 exopod: Bb ≥ ½BC, Cc ≥ BC. Leg 2 exopod: Aa ≈ ¾AB, Bb ≤ ½BC, Cc ≤ ½CD. (Bradford 1974)

Male: On left leg 5 the thin-skinned lobe on distal part of exopod segment 3 arises very close to group of spines on that segment and barely extends beyond base of terminal spiniform process; serrated lamella of exopod segment 2 with distalmost part bordered by small teeth flanked distolaterally by larger teeth; digitiform process about half length of serrated lamella. (Bradford 1974)

REMARKS: Nil.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Bradford (1974).

NEW RECORDS: Nil.

DISTRIBUTION: Known only from the tropical Pacific (Bradford 1974).

Euchaeta rimana Bradford, 1974

(Figs 7, 79)

DESCRIPTION: *Size:* ♀♀ 2.80–4.30 mm, ♂♂ 3.11–4.10 mm.

Female: Posterolateral corners of metasome slightly asymmetrical, more produced on right. Left side of genital segment in dorsal view without prominent projection, right side with moderate projection that obscures more ventral projection. Genital field in ventral view with genital flanges almost meeting in mid-line, right flange triangular. Leg 1 exopod: Bb ≈ ⅔BC, Cc ≥ BC. (Bradford 1974)

Male: Left leg 5 exopod segment 2 serrated lamella without distal smooth excavation separating inner distal fine teeth and coarser outer teeth, digitiform process less than half length of serrated lamella. (Bradford 1974)

REMARKS: Nil.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Brady (1883), Dakin and Colefax (1940), Heinrich (1968), Bradford (1974).

NEW RECORDS:

Station Number	Depth of haul (m)	Specimens
AUZ15	Surface	13 ♀♀, 3.5–3.9 mm
		1 ♂, 3.6 mm
AUZ46	Surface	8 ♀♀, 3.5–4.3 mm
		3 ♂♂, 3.7–4.0 mm
AUZ49	Surface	15 ♀♀, 3.4–4.0 mm
AUZ51	Surface	51 ♀♀, 3.6–4.3 mm
		2 ♂♂, 4.1, 4.1 mm
AUZ75	0–200?	1 ♀, 3.6 mm
AUZ87	0–100?	1♀, 3.8 mm

DISTRIBUTION: Tropical and subtropical Indian and Pacific Oceans (Bradford 1974).

Paraeuchaeta A. Scott, 1909

REDEFINITION: Females with either: one of the six apical setae of maxilla 2 covered with long spines in addition to short spinules, or all six apical setae of maxilla 2 covered with spinules of uniform short length. Male left leg 5 without thin-skinned lobe on exopod segment 3, which may terminate in a long spiniform process, a short point, or be rounded.

TYPE SPECIES: *Euchaeta norvegica* Boeck, 1872.

REMARKS: This genus as now defined contains the following species: *Paraeuchaeta abbreviata* (Park, 1978); *P. abrikosovi* Heptner, 1971 (♂ unknown); *P. abyssalis* Brodsky, 1950 (♂ unknown); *P. acuta* (Giesbrecht, 1892); *P. aequatorialis* Tanaka, 1958; *P. affinis* (Cleve, 1904) (♂ unknown); *P. alaminae* (Park, 1975) (♂ unknown); *P. antarctica* (Giesbrecht, 1902); *P. austrina* (Giesbrecht, 1902); *P. barbata* (Brady, 1883) (*see* Park 1978); *P. biconvexa* (Park, 1978); *P. biloba* Farran, 1929; *P. birostrata* Brodsky, 1950; *P. bisinuata* (Sars, 1907); *P. bradyi* (With, 1915) (♂ unknown); *P. brevirostris* Brodsky, 1950; *P. californica* (Esterly, 1906) (= *Euchaeta dubia* Esterly, 1906, *see* Park 1977); *P. calva* Tanaka, 1958 (= *Euchaeta dubia*: Vervoort 1963; = *P. californica*: Tanaka and Omori 1968; = ♂ *P. comosa* Tanaka, 1958, *see* Park 1977); *P. comosa* Tanaka, 1958 (= ♂ *P. hanseni:* Tanaka 1958; = ♂ *Euchaeta regalis* Grice and Hulsemann, 1968; = ♀ *P. dubia:* Tanaka and Omori 1968, *see* Park 1978); *P. concinna* (Dana, 1849) (= *P. consimilis* (Farran, 1936), *see* Grice 1962); *P. confusa* Tanaka, 1958; *P. dactylifera* (Park, 1978) (♂ unknown); *P. diegensis* (Esterly, 1911); *P. elongata*

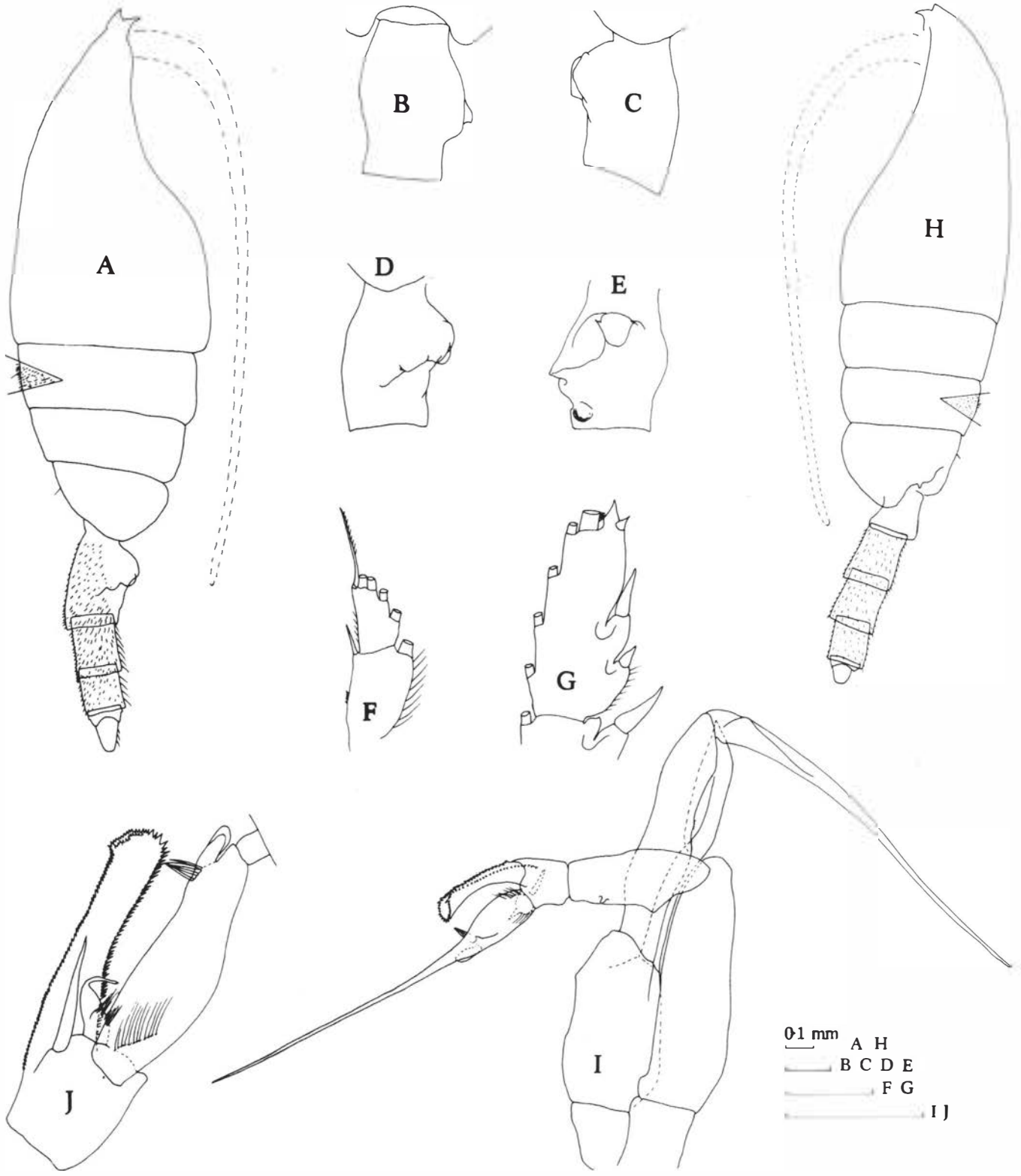


FIG. 6. *Euchaeta marinella* from NZOI Stn C544. Female: A, lateral view; B, dorsal view of genital segment; C, left lateral view of genital segment; D, right lateral view of genital segment; E, ventral view of genital segment; F, leg 1 exopod; G, leg 2 exopod segment 3. Male: H, lateral view; I, leg 5; J, terminal part of left leg 5 exopod.

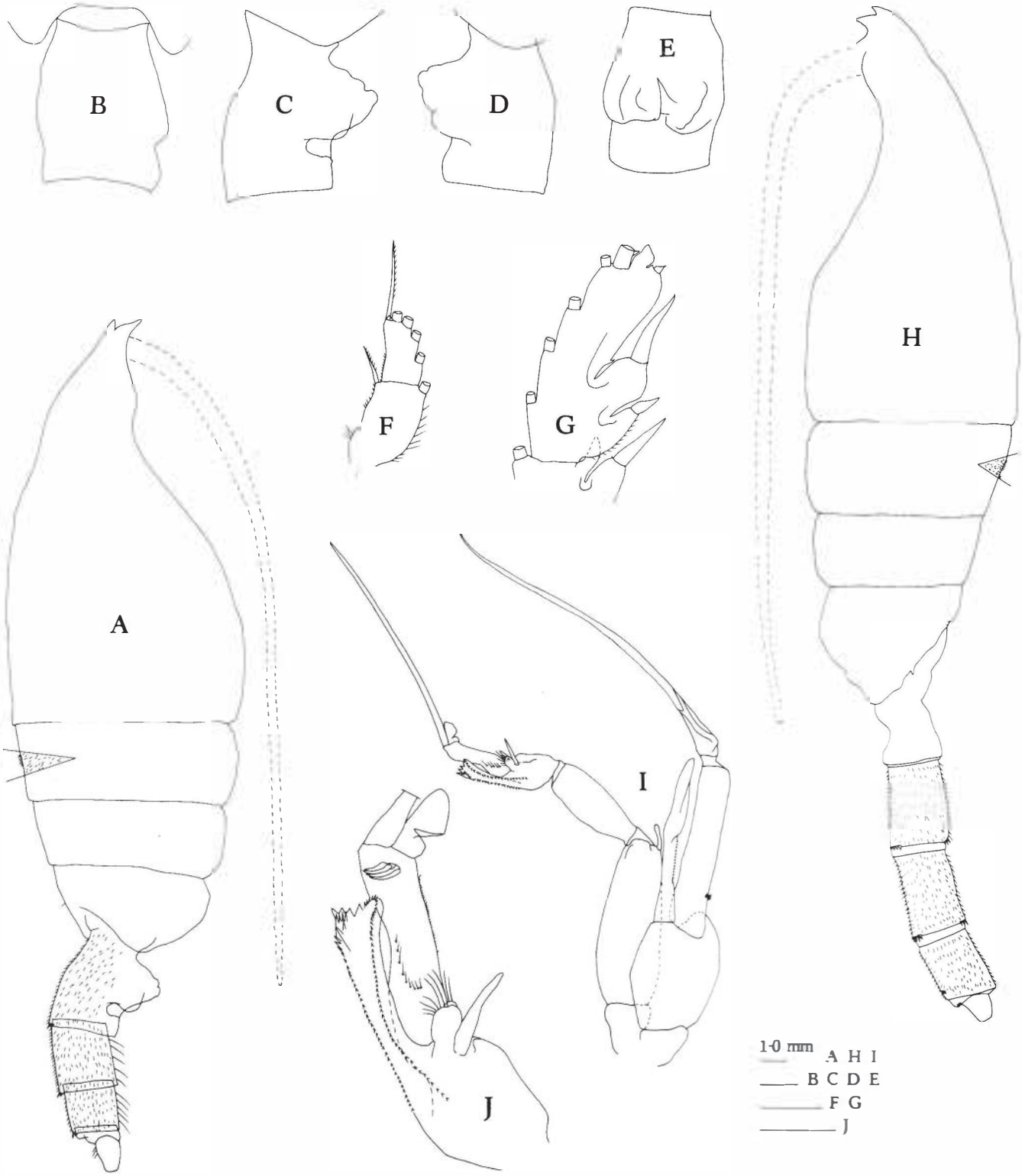


FIG. 7. *Euchaeta rimana* female from NZOI Stn C544: A, lateral view; B, dorsal view of genital segment; C, right lateral view of genital segment; D, left lateral view of genital segment; E, ventral view of genital segment; F, leg 1 exopod; G, leg 2 exopod segment 3. Male from AUZ Stn 46: H, lateral view; I, leg 5; J, terminal part of left leg 5 exopod.

(Esterly, 1913) (= *Euchaeta japonica* Marukawa, 1921) (♂ *see* Tanaka 1958); *P. eltaninae* (Park, 1978); *P. eminens* Tanaka and Omori, 1968 (♂ unknown); *P. erebi* Farran, 1929 (♂ unknown); *P. exigua* (Wolfenden, 1911) (♂ *see* Park 1978); *P. farrani* (With, 1915) (♂ *see* Park 1978); *P. flava* (Giesbrecht, 1888) (♂ unknown); *P. glacialis* (Hansen, 1886) (*see* Sars 1903); *P. gladiofera* (Gaudy, 1963) (♂ unknown); *P. gracilicauda* A. Scott, 1909 (♂ unknown); *P. gracilis* (Sars, 1905) (*see* Sars 1925) (= *Euchaeta quadrata* Farran, 1908); *P. grandiremis* (Giesbrecht, 1888) (♂ *see* Volkov 1970); *P. guttata* Heptner, 1971 (♂ unknown); *P. hansenii* (With, 1915) (= *P. withi* Sewell, 1947, *see* Park 1978); *P. hebes* (Giesbrecht, 1888) (*see* Giesbrecht 1892); *P. incisa* (Sars, 1905) (♂ unknown) (*see* Sars 1925); *P. investigatoris* Sewell, 1929 (= ♂ *P. californica:* A. Scott 1909, *see* Sewell 1947); *P. kurilensis* Heptner, 1971 (♂ unknown); *P. laudabilis* Tanaka and Omori, 1968 (♂ unknown); *P. longicornis* (Giesbrecht, 1888) (*see* Grice 1962); *P. longisetosa* Heptner, 1971 (♂ unknown); *P. longissima* (Park, 1978); *P. magniloba* (Park, 1978) (♂ unknown); *P. malayensis* Sewell, 1929; *P. media* (Giesbrecht, 1888) (*see* Giesbrecht 1892) (♂ *see* Park 1968); *P. modesta* Brodsky, 1950 (♂ unknown); *P. norvegica* (Boeck, 1872) (*see* Sars 1903); *P. oculata* Heptner, 1971 (♂ unknown); *P. orientalis* Brodsky, 1950 (♂ unknown); *P. paraacuta* (Tanaka, 1973); *P. paraconcinna* (Fleminger, 1957b); *P. parvula* (Park, 1978); *P. pavlovskii* Brodsky, 1955 (♂ unknown); *P. plana* (Mori, 1937) (= *Euchaeta murrayi* Sewell, 1947, *see* Tanaka and Omori 1968); *P. plicata* Heptner, 1971 (♂ unknown); *P. polaris* Brodsky, 1950 (♂ unknown); *P. polita* Tanaka and Omori, 1968 (♂ unknown); *P. prima* Heptner, 1971 (♂ unknown); *P. propinqua* (Esterly, 1906) (♂ unknown); *P. prudens* Tanaka and Omori, 1968 (♂ unknown); *P. pseudotonsa* (Fontaine, 1967); *P. pubera* (Sars, 1907) (*see* Sars 1925) (♂ *see* Park 1975); *P. rasa* Farran, 1929 (♂ *see* Park 1978); *P. regalis* (Grice and Hulsemann, 1968) (♂ *see* Park 1978); *P. robusta* (Wolfenden, 1911) (♂ unknown); *P. rubicunda* (Farran, 1908) (♂ unknown); *P. rubra* Brodsky, 1950 (= *P. crassa* Tanaka, 1958); *P. russelli* (Farran, 1936) (= *Euchaeta daitomarui* Mori, 1937); *P. sarsi* (Farran, 1908) (= *P. dentata* A. Scott, 1909, *see* Tanaka and Omori 1968); *P. scaphula* (Fontaine, 1967) (= *P. tuberculata* A. Scott, 1909); *P. scotti* (Farran, 1908) (*see* Sars 1925); *P. sibogae* A. Scott, 1909 (♂ unknown); *P. similis* (Wolfenden, 1908); *P. simplex* Tanaka, 1958; *P. simulantis* Tanaka and Omori, 1968 (♂ unknown); *P. spinifera* (Esterly, 1906) (♂ unknown) (*see* Sewell 1947); *P. spinosa* (Giesbrecht, 1892) (♂ *see* Park 1968); *P. striata* Tanaka and Omori 1968 (♂ unknown); *P. subtilirostris* Heptner, 1971 (♂ unknown); *P. tenuis* (Esterly, 1906) (= *Euchaeta solida* Esterly, 1911, *see* Grice 1962); *P. tonsa* (Giesbrecht, 1895) (♂ unknown, *see* Fontaine 1967); *P. tumidula* (Sars, 1905) (= *P. pseudotumidula* Brodsky, 1950, *see* Heptner 1971); *P. tycodesma* (Park, 1978) (♂ unknown); *P. vorax* (Grice and Hulsemann, 1968) (♂ unknown); *P. vervoorti* (Park, 1978) (♂ unknown); *P. weberi* A. Scott, 1909 (♂ *see* Grice and Hulsemann 1968); *P. wrighti* (Park, 1968) (♂ unknown).

In addition the following species have not been well described and have apparently not been recorded since the original description: *Paraeuchaeta plumifera* Brady, 1918; *Euchaetopsis haswelli* Brady, 1918; *Euchaeta wilsoni* Jespersen, 1934; *E. arabica* Sciacchitano, 1930a (*see* also 1930b); *E. trunculosa* Pesta, 1908; *E. oceana* I. C. Thompson, 1903; *E. pubescens* Dana, 1849; *E. diadema* Dana, 1849 (described from juveniles).

The following species have been taken in the southwest Pacific:

Paraeuchaeta abbreviata (Park, 1978)

(Figs 8, 80)

DESCRIPTION: *Size:* ♀♀ 7.66–8.00 mm, ♂♂ 7.33 mm.

Female: Genital segment symmetrical in dorsal and ventral view, widest at mid-length; dorsal wall smoothly arched, genital prominence in middle of segment with anterior and posterior surfaces about equal in height and degree of slope; genital flanges symmetrical, long and narrow in lateral view with straight ventral border, posterior part of genital flange large and directed medially in ventral view. Appendicular caudal setae slender and geniculate. Outer lobe of maxilla 1 with six long setae. None of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. Some of the long setae on endopod of maxilliped terminate in spinule. Leg 1 exopod: Aa < ⅛AB, Bb < ⅓BC, Cc > BC. Leg 2 exopod: Aa > AB (Aa = AB + ½Bb), Bb < BC, Cc ≤ CD. (Park 1978)

Male: Posterolateral corners of metasome asymmetrical in dorsal view; left side produced furthest. Leg 1 exopod: Aa ≤ ⅛Ab, Bb < ⅓BC, Cc ≥ BC. Leg 2 exopod: Aa ≈ ½AB, Bb ≥ ½BC, Cc ≈ ½CD. Left leg 5 exopod segment 2 bears tooth-like process proximally; serrated lamella curved with small uniform teeth along entire length of inner margin and few minute teeth along distal part of outer margin; digitiform process slightly shorter than serrated lamella; exopod segment 3 longer than serrated lamella by about one-third its length. (Park 1978)

REMARKS: Park (1978) compares *P. abbreviata* with *P. pavlovskii* Brodsky, 1950, although it also resembles *P. guttata* Heptner, 1971 and *P. plicata* Heptner, 1971 in size and the general shape of the genital segment and form of the spines on legs 1 and 2. Nevertheless it

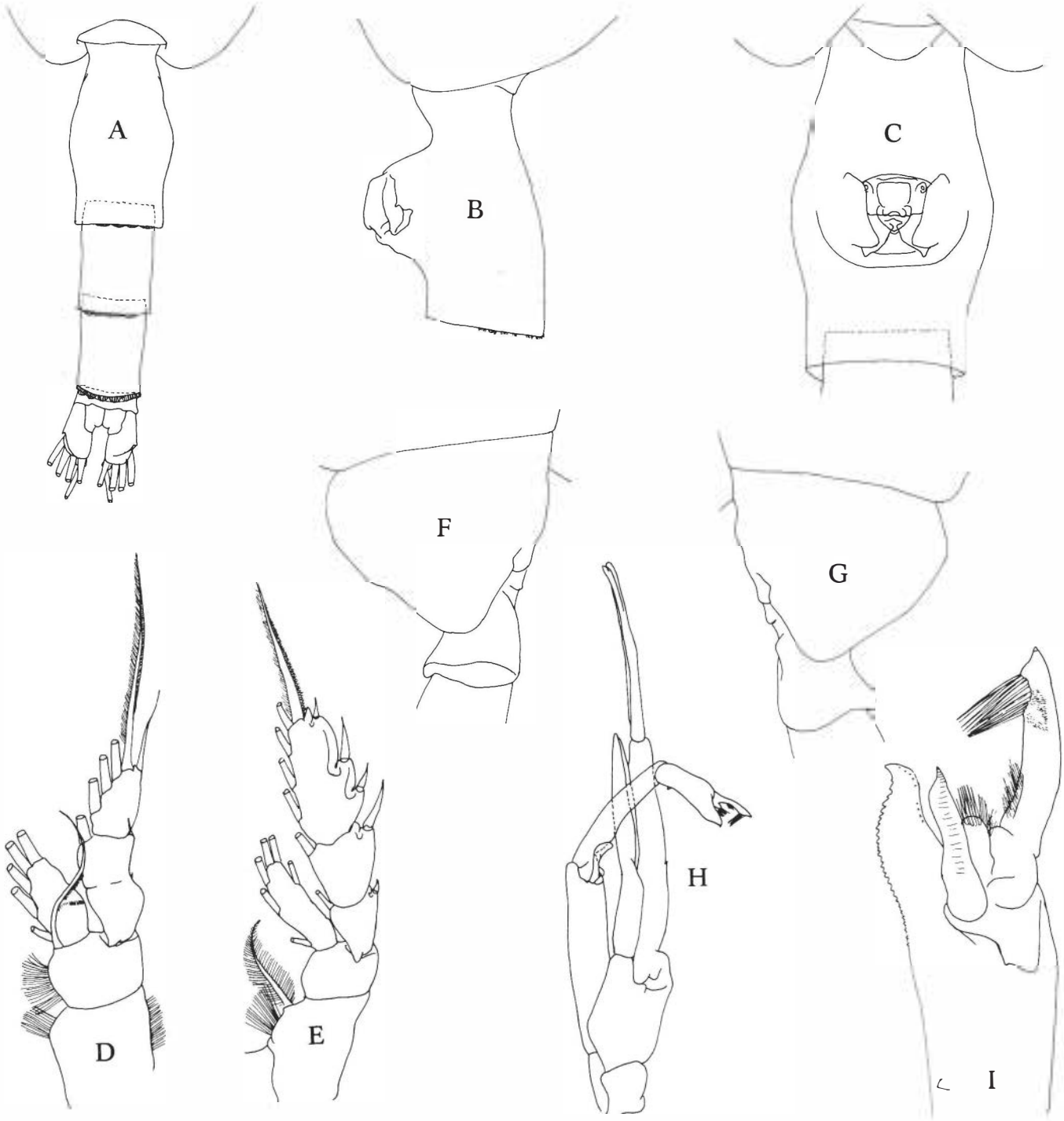


FIG. 8. *Paraeuchaeta abbreviata* (from Park 1978). Female: A, dorsal view of urosome; B, lateral view of genital segment; C, ventral view of genital segment; D, leg 1; E, leg 2. Male: F, left lateral view of last metasomal and genital segments; G, right lateral view of last metasomal and genital segments; H, leg 5; I, terminal part of left leg 5 exopod.

seems likely all four species are distinct, judging from the small differences noted in the original descriptions.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Park (1978).

NEW RECORDS: Nil.

DISTRIBUTION: South of the Antarctic Convergence (0–2359 m, 0–2560 m, 0–3660 m), taken in hauls extending deeper than 2000 m (Park 1978).

Paraeuchaeta acuta (Giesbrecht, 1892)

(Figs 9, 80)

DESCRIPTION: *Size:* ♀♀ 3.40–4.25 mm, ♂♂ 3.28–3.92 mm.

Female: Genital segment strongly asymmetrical in dorsal and ventral view with conspicuous protuberance on anterior left margin; genital prominence arises from anterior half of genital segment; genital flanges dissimilar, right flange pointed at mid-length and left flange enlarged posteriorly when viewed laterally. Appendicular caudal setae straight, thicker and longer than terminal setae. Outer lobe of maxilla 1 with six setae, the proximal seta minute. One of the six apical setae on maxilla 2 covered with long spines in addition to short spinules. Long setae on endopod of maxilliped terminate in spinule. Leg 1 exopod: Bb = BC, Cc = BC. Leg 2 exopod: Aa ≈ AB, Bb ≤ ⅓BC, Cc = CD.

(Giesbrecht 1892, Park 1978)

Male: Right leg 5 exopod segment 1 with tooth-like process one-third length from distal end; exopod segment 2 elongated and spiniform, almost equal in length to left leg. Left leg 5 basipod 2 with pointed inner process; exopod segment 2 serrated lamella triangular with uniformly serrated margin, digitiform process terminates bluntly; exopod segment 3 with long spiniform distal part.

(Giesbrecht 1892, Park 1978)

REMARKS: This species is easily distinguished from close relatives by the shape of the female genital segment and the form of the serrated lamella of the male leg 5.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Farran (1929), Vervoort (1957), Bradford (1972).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
A292	500–1000	2 ♀♀, 3.4, 3.5 mm
A302	0–500	1 ♀, 3.71 mm
		1 ♂, 3.20 mm
	surface	8 ♀♀, 3.4–3.7 mm
		2 ♂♂, 3.3, 3.2 mm
A313	0–914	1 ♀, 4.0 mm
A332	surface	2 ♀♀, 3.9, 4.1 mm
C526	surface	1 ♀, 3.9 mm
D614	?	1 ♂, 3.3 mm
E882	0–1212	1 ♀, 4.0 mm
E891	0–1245	1 ♀, 4.1 mm
E892	0–1224	3 ♀♀, 3.7, 3.8, 3.8 mm
E901	0–1248	1 ♀, 4.1 mm
F874	0–1357	2 ♀♀, 3.8, 4.0 mm
		1 ♂, 3.8 mm
F879	0–1267	2 ♀♀
F881	0–1260	2 ♀♀
		1 ♂, 4.1 mm
F892	0–1278	3 ♀♀, 4.1, 4.1, 4.2 mm
		1 ♂, 3.8 mm
F910	0–1397	3 ♀♀, 3.9 mm
		1 ♂, 4.0 mm
F911	0–1697	2 ♀♀, 4.1, 4.2 mm
F945	0–500	6 ♀♀, 3.5–3.9 mm
F946	0–200	6 ♀♀, 3.6–4.2 mm
		4 ♂♂, 3.5–4.0 mm
	200–500	8 ♀♀, 3.7–4.1 mm
		1 ♂, 3.9 mm
	0–1000	7 ♀♀, 3.8–4.2 mm
		1 ♂, 3.9 mm
F947	0–500	2 ♀♀, 3.6, 3.9 mm

DISTRIBUTION: Epipelagic in tropical and subtropical waters in all oceans (Park 1978, Vervoort 1957).

Paraeuchaeta antarctica (Giesbrecht, 1902)

(Figs 10, 80)

DESCRIPTION: *Size:* ♀♀ 7.47–9.75 mm, ♂♂ 6.25–7.58 mm.

Female: Genital segment symmetrical in dorsal and ventral view, in lateral view genital prominence placed posteriorly; characteristic lappet-like protrusion on anterior edge of genital prominence. Second medial seta of caudal ramus large and elongated, appendicular seta not geniculate. Outer lobe of maxilla 1 with nine setae. None of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. None of the long setae on endopod of maxilliped terminate in spinule. Leg 1 exopod: Aa ≤ AB, Bb > BC, Cc ≥ BC. Leg 2 exopod: Aa > AB, Bb = ½BC, Cc ≈ ⅔CD.

(Giesbrecht 1902, Park 1978)

Male: Leg 1 exopod: Bb ≈ ⅛BC, Bb ≥ ⅓BC. Leg 2 exopod: Aa ≥ AB, Bb ≈ ½BC, Cc ≥ ½CD. Left leg 5 exopod segment 2 with short serrated lamella which extends no further than tip of hairy tubercle.

(Park 1978)

REMARKS: The males described by Park (1978) differ from that originally assigned to *P. antarctica* by Giesbrecht (1902). It is likely that the male described by Giesbrecht belongs to *P. tycodesma* (Park, 1978) (*see* Bradford 1982).

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Vervoort (1957), Park (1978).

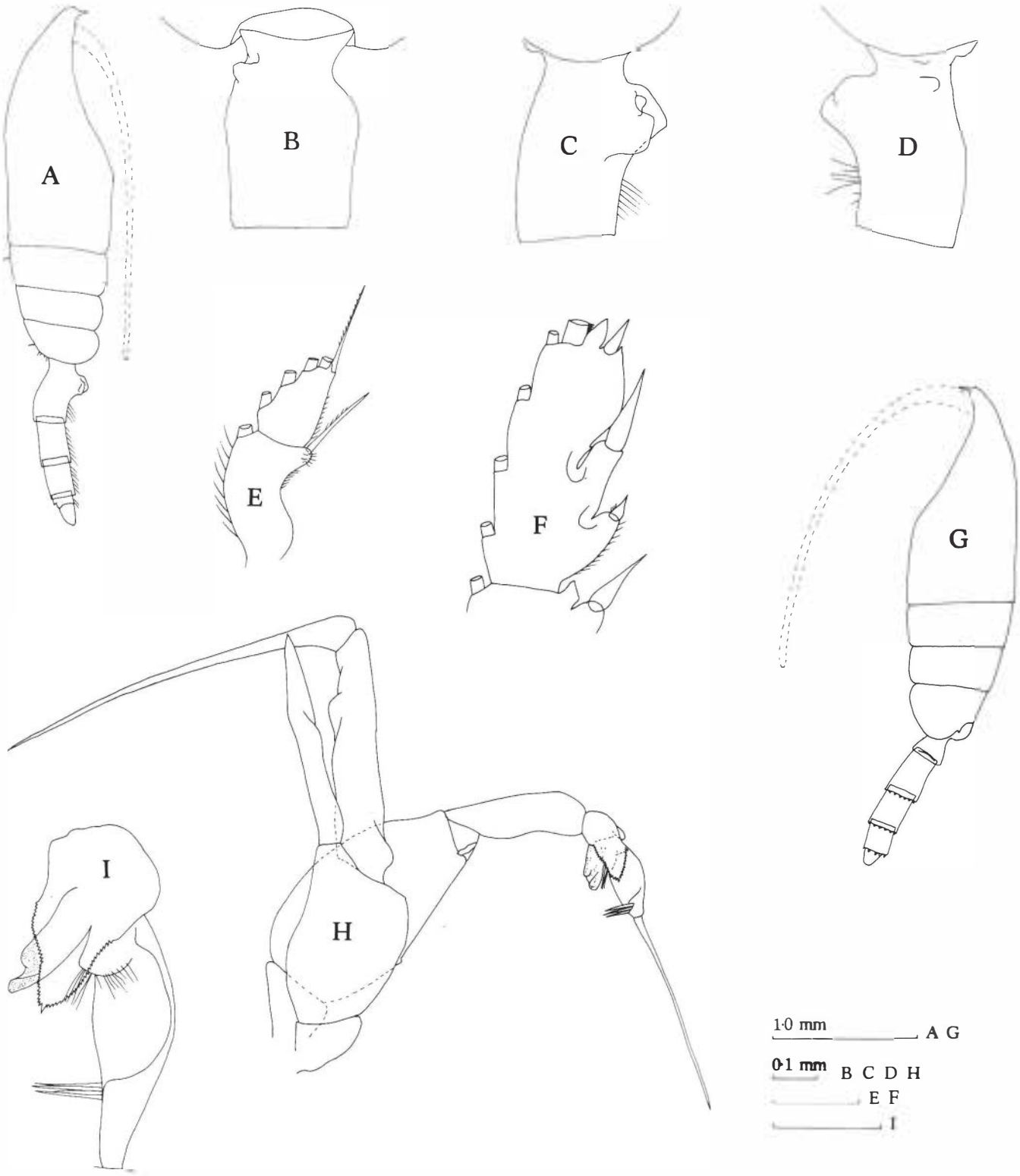


FIG. 9. *Paraeuchaeta acuta* from NZOI Stn A302. Female: A, lateral view; B, dorsal view of genital segment; C, right lateral view of genital segment; D, left lateral view of genital segment; E, exopod of leg 1; F, exopod segment 3 of leg 2. Male: G, lateral view; H, leg 5; I, terminal part of left leg 5 exopod.

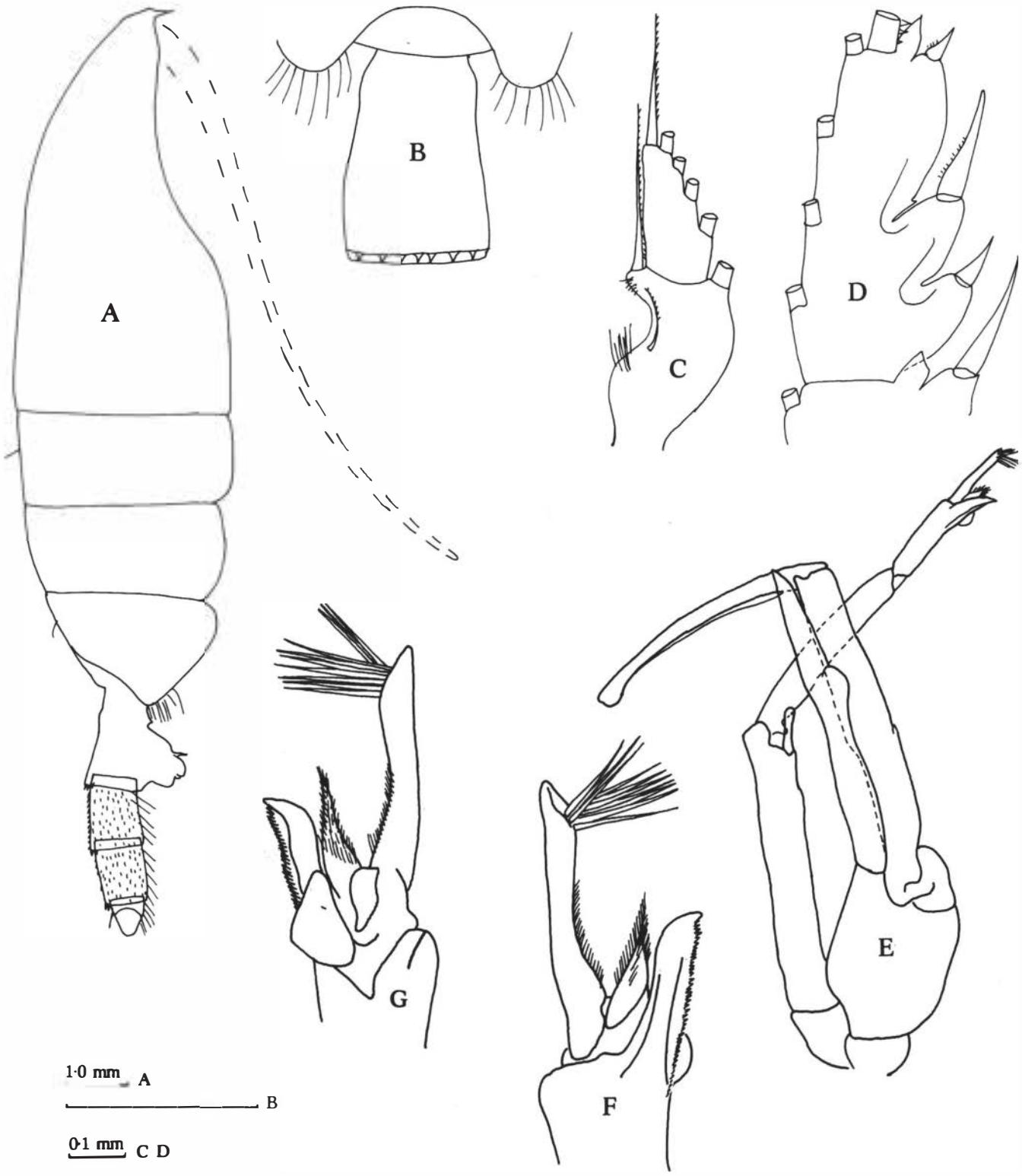


FIG. 10. *Paraeuchaeta antarctica* female from NZOI Stn B110: A, lateral view; B, dorsal view of genital segment; C, exopod of leg 1; D, exopod segment 3 of leg 2. Male (from Park 1978): E, leg 5; F, terminal part of exopod of left leg 5, lateral view; G, terminal part of exopod of left leg 5, medial view.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
B110	0–500	1 ♀, 6.8 mm

DISTRIBUTION: Widely distributed in antarctic waters south of the Antarctic Convergence at mesopelagic depths, but is occasionally swept north in Antarctic Intermediate Water (Vervoort 1957, Park 1978).

Paraeuchaeta barbata (Brady, 1883)

(Figs 11, 81)

?P. farrani (With, 1915)

DESCRIPTION: *Size: P. barbata* ♀♀ 6.17–10.82 mm, ♂♂ 7.07–7.8 mm. *P. farrani* ♀♀ 9.66–10.83 mm, ♂♂ 8.33–9.50 mm.

Female: Genital segment symmetrical except for a small process on left side just posterior to genital prominence and better seen in ventral view, in lateral view dorsal wall of genital segment bulges at mid-length; genital prominence large, arises from middle of segment, posterior surface slopes to meet ventral wall of segment at an obtuse angle; genital field symmetrical in ventral view; genital flanges large, produced posteriorly. Appendicular caudal setae geniculate, approximately as long as second terminal seta. Outer lobe of maxilla 1 with five long setae. None of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. Some of the long setae on endopod of maxilliped terminate in spinule. Leg 1 exopod: Aa > $\frac{1}{3}$AB, Bb = $\frac{5}{6}$BC, Cc = $1\frac{1}{3}$BC. Leg 2 exopod: Aa > AB, Bb < $\frac{1}{2}$BC, Cc ≤ CD.

(Park 1978)

Male: Leg 1 exopod: Aa minute, Bb = $\frac{2}{3}$BC, Cc ≈ $\frac{1}{2}$BC. Leg 2 exopod: Aa < $\frac{1}{2}$AB, Bb < $\frac{1}{2}$BC, Cc < $\frac{1}{2}$CD. Right leg 5 exopod segment 1 with small spine at mid-length on outer margin. Left leg 5 exopod segment 2 with proximal teeth, serrated lamella truncated distally with large tooth on one of distal corners, borders of serrated lamella lined with larger teeth; digitiform process approximately same length as serrated lamella.

(Park 1978)

REMARKS: This species is almost identical with descriptions of *P. farrani* (*see* Park 1978), which is probably a junior synonym of *P. barbata.*

Park (1978) reports that the only distinguishing character between female *P. barbata* and *P. farrani* (the length of leg 2 exopod segment 3 second outer edge spine) appears to vary to some extent with body size. The spine tends to be longer as the body size decreases. The present specimen, although small, has leg 2 exopod Cc < CD, and so would be attributable to *P. farrani* if *P. barbata* and *P. farrani* prove to be distinct species.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Park (1978, as *P. barbata*); Park (1978, as *P. farrani*).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
A302	500–1000	1 ♀, 8.1 mm

DISTRIBUTION: This species is widespread in deep waters of tropical, temperate and polar seas (Park 1978).

Paraeuchaeta biconvexa (Park, 1978)

(Figs 12, 81)

DESCRIPTION: *Size:* ♀♀ 4.24–4.44 mm, ♂ 4.20 mm.

Female: Genital segment almost symmetrical in dorsal view, large genital prominence in middle of segment; genital field symmetrical in ventral view; genital flange semicircular in lateral view, two-lobed when viewed ventrally; posterior border of genital field in lateral view produced into lobe visible posterior to genital flange. Appendicular caudal setae geniculate, shorter than terminal seta. Outer lobe of maxilla 1 with six long setae. None of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. Some of the long setae on endopod of maxilliped bear minute terminal spine. Leg 1 exopod: Aa < $\frac{1}{3}$AB, Bb > BC, Cc > $1\frac{1}{2}$BC. Leg 2 exopod: Aa = AB + $\frac{3}{4}$Bb, Bb = BC + $\frac{1}{3}$Cc, Cc < CD.

(Park 1978)

Male: Leg 1 exopod: Aa minute, Bb < $\frac{1}{2}$BC, Cc ≈ $\frac{4}{5}$BC. Leg 2 exopod: Aa < $\frac{1}{2}$AB, Bb ≈ $\frac{1}{2}$BC, Cc < $\frac{1}{2}$CD. Left leg 5 exopod segment 2 serrated lamella curved, with teeth bordering entire inner margin and distal part of outer margin; digitiform process slightly longer than serrated lamella.

(Park 1978)

REMARKS: Park (1978) compares his species with *P. tumidula* (Sars, 1905) and *P. pseudotumidula* Brodsky, 1950, which Heptner (1971) considers to be a junior synonym of *P. tumidula.* Heptner's redescription of *P. tumidula* is very like that of *P. biconvexa* except that the double lateral swellings of the female genital segment in the latter appear to be absent.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Park (1978).

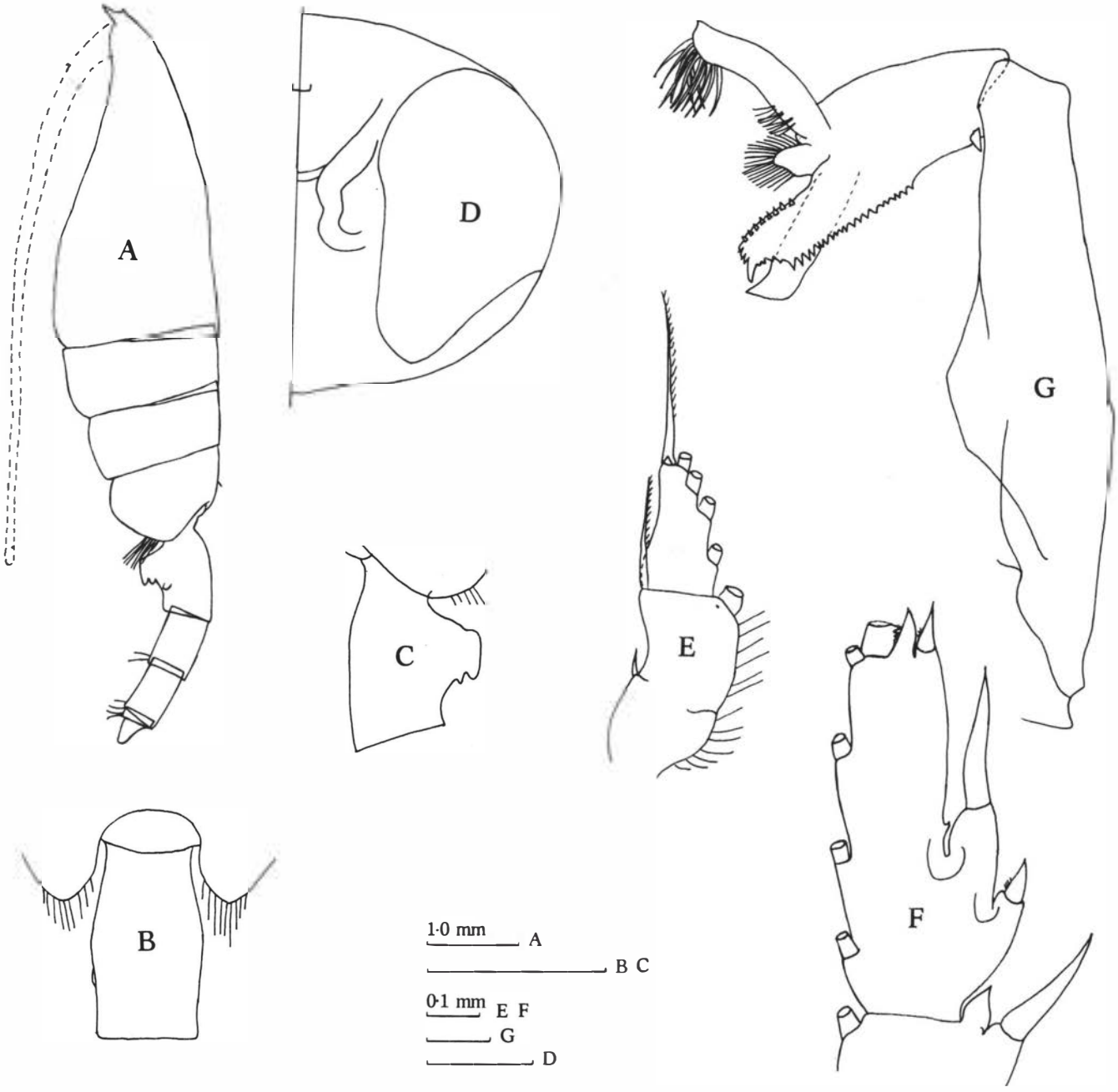


FIG. 11. *Paraeuchaeta barbata* female from NZOI Stn A302: A, lateral view; B, dorsal view of genital segment; C, lateral view of genital segment; D, ventral view of genital field; E, exopod of leg 1; F, exopod segment 3 of leg 2. Male (from A. Scott 1909): G, left leg 5 exopod.

NEW RECORDS: Nil.

DISTRIBUTION: Found at meso-bathypelagic depths in the southernmost Pacific and Antarctic waters south of New Zealand (Park 1978).

Paraeuchaeta biloba Farran, 1929

(Figs 3, 4, 81)

DESCRIPTION: *Size:* ♀♀ 4.2–6.75 mm, ♂♂ 4.4–5.66 mm.

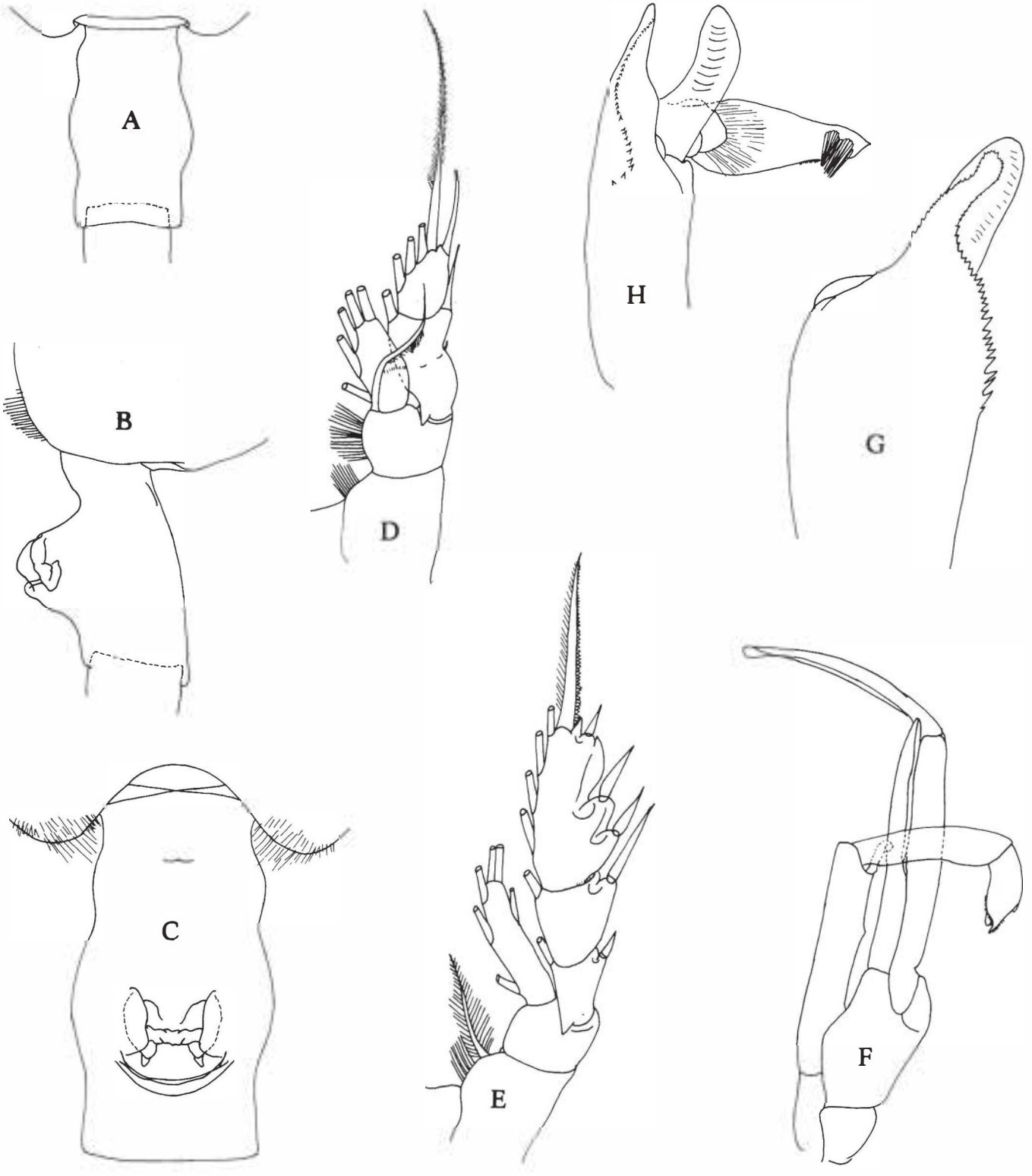


FIG. 12. *Paraeuchaeta biconvexa* (from Park 1978). Female: A, dorsal view of genital segment; B, lateral view of genital segment; C, ventral view of genital field; D, leg 1; E, leg 2. Male: F, leg 5; G, H, terminal part of left leg 5 exopod.

Female: Posterolateral corners of metasome slightly produced posteriorly, broadly rounded in dorsal and lateral view. Genital segment symmetrical in dorsal and ventral view; genital prominence comparatively flattened, bilobed in lateral view, posterior and anterior surfaces slope to meet ventral wall of segment at same angle; genital field asymmetrical, slightly rotated anticlockwise; genital flanges feebly developed. Appendicular caudal setae geniculate, thinner and much longer than terminal setae. Outer lobe of maxilla 1 with six strong setae. None of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. None of the long setae on endopod of maxilliped terminate in spinule. Exopod segments 1 and 2 of leg 1 almost completely fused. Leg 1 exopod: Bb ≤ BC, Cc ≈ BC. Leg 2 exopod: Aa = $\frac{1}{2}$AB, Bb = $\frac{1}{3}$BC, Cc = $\frac{1}{3}$CD, Dd = $\frac{1}{3}$CD.

(Farran 1929, Vervoort 1957, Park 1978)

Male: Posterolateral corners of metasome with tooth-like process on dorsal margin. Leg 1 exopod: Bb = $\frac{5}{7}$BC, Cc = $\frac{7}{10}$BC. Leg 2 exopod: Aa = $\frac{3}{10}$AB, Bb = $\frac{1}{4}$BC, Cc = $\frac{1}{4}$CD. Right leg 5 exopod segment 2 spiniform and almost as long as segment 1. Left leg 5 exopod segment 2 serrated lamella prolonged into strong spiniform process extending beyond distal end of exopod segment 3 by about one-quarter its length; lamella hollow with large and small tooth on inner and outer margin.

(Farran 1929, Park 1978)

REMARKS: Some south-west Pacific female specimens as figured here have longer outer edge spines on leg 2 exopod than on previously described specimens. Left leg 5 of south-west Pacific male specimens is generally similar to those figured by Vervoort (1957) and Park (1978), but the serrated lamella appears to differ in details. The hollow part of the serrated lamella is located at mid-length, one side is bordered with one large tooth and a row of smaller teeth which extends along the basal part of the lamella, the other side is bordered by one large and one to four smaller teeth.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Farran (1929), Vervoort (1957), Bradford (1972), Park (1978).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
A313	0–914	3 ♀♀, 2 ♂♂
Mu67/48s	0–1000	3 ♀♀, 5.2–5.7 mm
Mu67/52s	0–1000	2 ♀♀, 5.5, 5.9 mm
Mu67/57s	0–1000	8 ♀♀, 5.2–5.8 mm
		5 ♂♂, 4.8–5.2 mm
Mu67/62s	0–500	2 ♂♂, damaged
Mu67/94s	0–1000	34 ♀♀, 16 ♂♂
Mu67/104s	0–823	10 ♀♀, 5.4–5.9 mm
		6 ♂♂, 4.7–5.0 mm
Mu67/116s	0–1000	5 ♀♀, 5.0–5.5 mm
		2 ♂♂, 4.7, 4.8 mm
Mu67/147s	0–1000	7 ♀♀, 5.5–5.8 mm
		6 ♂♂, 4.5–5.1 mm
VUZ93	0–1000	13 ♀♀, 4.2–5.4 mm
		1 ♂, 4.7 mm
VUZ105	0–1097	13 ♀♀, 5.1–5.7 mm
		17 ♂♂, 4.6–5.0 mm
VUZ107	0–914	3 ♀♀, 5.4–5.7 mm
		3 ♂♂, 4.9–5.1 mm
VUZ112	0–732	6 ♀♀, 5.1–5.8 mm
		5 ♂♂, 4.6–4.8 mm

DISTRIBUTION: *Paraeuchaeta biloba* inhabits antarctic and subantarctic surface and intermediate waters but may penetrate north beyond the Subtropical Convergence in both the Pacific and Atlantic Oceans, probably in Antarctic Intermediate Water (Park 1978).

Paraeuchaeta bisinuata (Sars, 1907)

(Figs 13, 82)

DESCRIPTION: *Size:* ♀♀ 5.15–5.97 mm, ♂♂ 4.25–4.8 mm.

Female: Posterolateral corners of metasome rounded, not produced posteriorly. Genital segment symmetrical in dorsal view, widest at mid-length; genital prominence in lateral view three-lobed due to bilobed genital flange and single large protuberance posterior to genital field; genital field asymmetrical in ventral view, left anterior and right posterior lobe smaller than corresponding lobes of opposite side. Appendicular caudal setae scarcely geniculate, thinner and longer than marginal setae. Outer lobe of maxilla 1 with six setae, the distal seta shorter than rest. None of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. Long setae on endopod of maxilliped terminate in spinule. Exopod segments 1 and 2 of leg 1 almost completely fused, limitation marked anteriorly, exterior border has well-marked concavity. Leg 1 exopod: Aa = $\frac{2}{3}$AB, Bb ≈ BC, Cc > BC. Leg 2 exopod: Aa = AB + $\frac{1}{2}$Bb, Bb = $\frac{1}{2}$BC, Cc < CD.

(Sars 1925, With 1915, Park 1978)

Male: Leg 1 exopod segment 1 without outer spine, segment 2 with short spine. Outer edge spine of leg 2 exopod segment 2 very short compared to the female, second spine of exopod segment 3 does not reach distal end of segment. Right leg 5 endopod divided into two equal parts by exterior rounded eminence, distal part slender; exopod segment 1, one and one-half times as long as exopod segment 2. Left leg 5 exopod segment 2

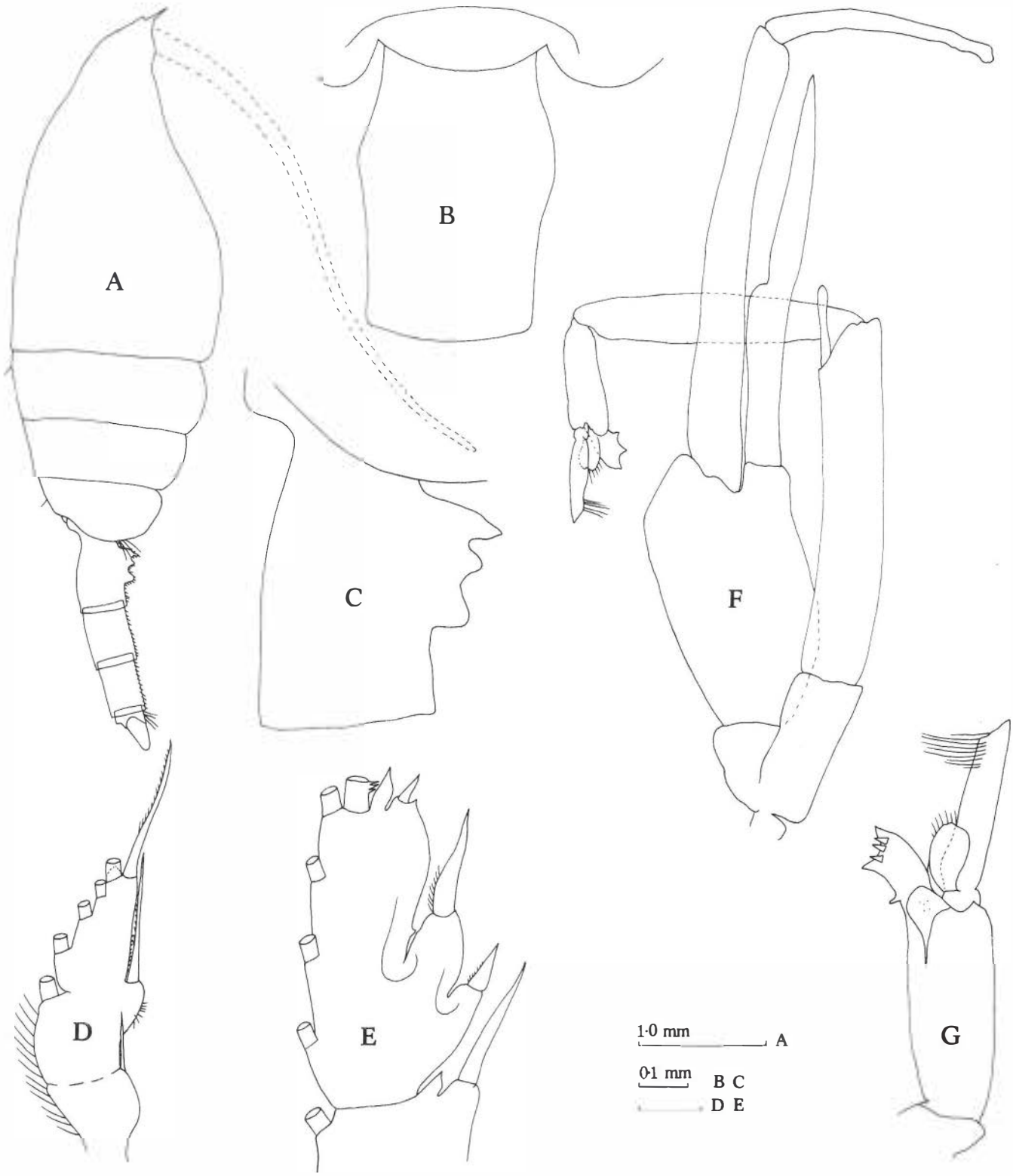


FIG. 13. *Paraeuchaeta bisinuata* female from VUZ Stn 93: A, lateral view; B, dorsal view of genital segment; C, lateral view of genital segment; D, exopod of leg 1; E, exopod segment 3 of leg 2. Male (from Sars 1925): F, leg 5; G, terminal part of left leg 5 exopod.

serrated lamella very short and truncated, with two distal rows of larger and smaller teeth; exopod segment 3 twice as long as serrated lamella, haired tubercle longer than reduced digitiform process and almost as long as serrated lamella.

(With 1915, Sars 1925)

REMARKS: The female from the south-west Pacific illustrated in Fig. 13 has longer spines on leg 1 but is otherwise identical with previous descriptions. In contrast to With (1915:185), Sars (1925:124) only mentions one row of teeth on the distal end of the serrated lamella of the male left leg 5.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Nil.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
F911	0–1697	1 ♀, 5.2 mm
VUZ93	0–1097	2 ♀♀, 5.2, 5.5 mm
VUZ105	0–914	1 ♀, 5.25 mm

DISTRIBUTION: *Paraeuchaeta bisinuata* is bathypelagic and widely distributed in tropical, subtropical and temperate waters, and reaches the subantarctic zone in the south-east Pacific Ocean (Park 1978).

Paraeuchaeta comosa Tanaka, 1958

(Figs 14, 82)

DESCRIPTION: *Size*: ♀♀ 8.24–9.88 mm, ♂♂ 8.27–9.08 mm.

Female: Posterolateral corners of metasome produced posteriorly and rounded. Genital segment symmetrical in dorsal view apart from small dorsolateral process on left side anterior to symmetrical swellings at middle of segment; genital prominence large, occupying most of segment in lateral view, posterior surface bulging into convex curve before meeting ventral wall of segment; genital field symmetrical in ventral view; genital flanges broad, prolonged distally into large lobe which extends beyond posterior margin of genital field; posterior edge of genital field produced into ridge which in lateral view appears like lobe behind posterior lobe of genital flange. Posterolateral margin of urosome segments 2 and 3 fringed with fine teeth. Appendicular caudal setae geniculate, thinner than terminal setae. Outer lobe of maxilla 1 with seven setae, the proximal seta shorter than rest. None of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. Some of the long setae on endopod of maxilliped terminate in spinule. Leg 1 exopod segments 1 and 2 fused, but fusion line visible. Leg 1 exopod: Aa minute, Bb = $\frac{3}{4}$BC, Cc > CD. Leg 2 exopod: Aa ≥ AB, Bb = $\frac{1}{2}$BC, Cc = $\frac{3}{5}$CD. Incision at base of second spine of exopod joint 3 very deep, reaching same level as incision at base of first spine.
(Tanaka 1958, as *P. dubia*; Tanaka and Omori 1968)

Male: Posterolateral corners of metasome asymmetrical; left side rounded and protruded, right side shorter and bluntly triangular. Leg 1 exopod: Aa minute, Bb = $\frac{1}{4}$BC, Cc < BC. Leg 2 exopod: Aa = $\frac{1}{3}$AB, Bb = $\frac{1}{2}$BC, Cc = $\frac{1}{3}$CD. Right leg 5 exopod segment 1 with tooth-like process at about mid-length; exopod segment 2 club-shaped with enlarged end about two-thirds length of segment 1. Left leg 5 exopod segment 2 serrated lamella dagger-shaped, proximal half of inner margin bordered by fine teeth, distal fifth by larger teeth, middle part of inner margin and entire length of outer margin without teeth; digitiform process about as long as serrated lamella; exopod segment 3 slightly longer than serrated lamella.
(Tanaka 1958, as *P. hanseni*; Grice and Hulsemann 1968, as *P. regalis*; Park 1978)

REMARKS: The south-west Pacific female illustrated in Fig. 14 differs from the original description by having a deeper incision at the base of the second spine of leg 2 exopod segment 3. The female of *P. comosa* is similar to *P. sarsi*, but can be distinguished from it by the shape of genital segment and the process on its dorsolateral margin.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Nil.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
VUZ93	0–1097	1 ♀, 9.1 mm
VUZ105	0–914	2 ♀♀, 8.8, 9.2 mm
VUZ112	0–732	1 ♀, 8.6 mm

DISTRIBUTION: *Paraeuchaeta comosa* is a bathypelagic species mainly recorded from the subtropical and temperate zones of the Indo-Pacific Ocean, but also found in the Atlantic Ocean and the subantarctic zone south of Australia (Park 1978).

Paraeuchaeta concinna (Dana, 1849)

(Figs 15, 82)

DESCRIPTION: *Size:* ♀♀ 2.36–3.75 mm, ♂♂ 2.24–3.00 mm.

Female: Posterolateral corners of metasome produced posterodorsally, the left one more so. Genital segment asymmetrical in dorsal and ventral view; large

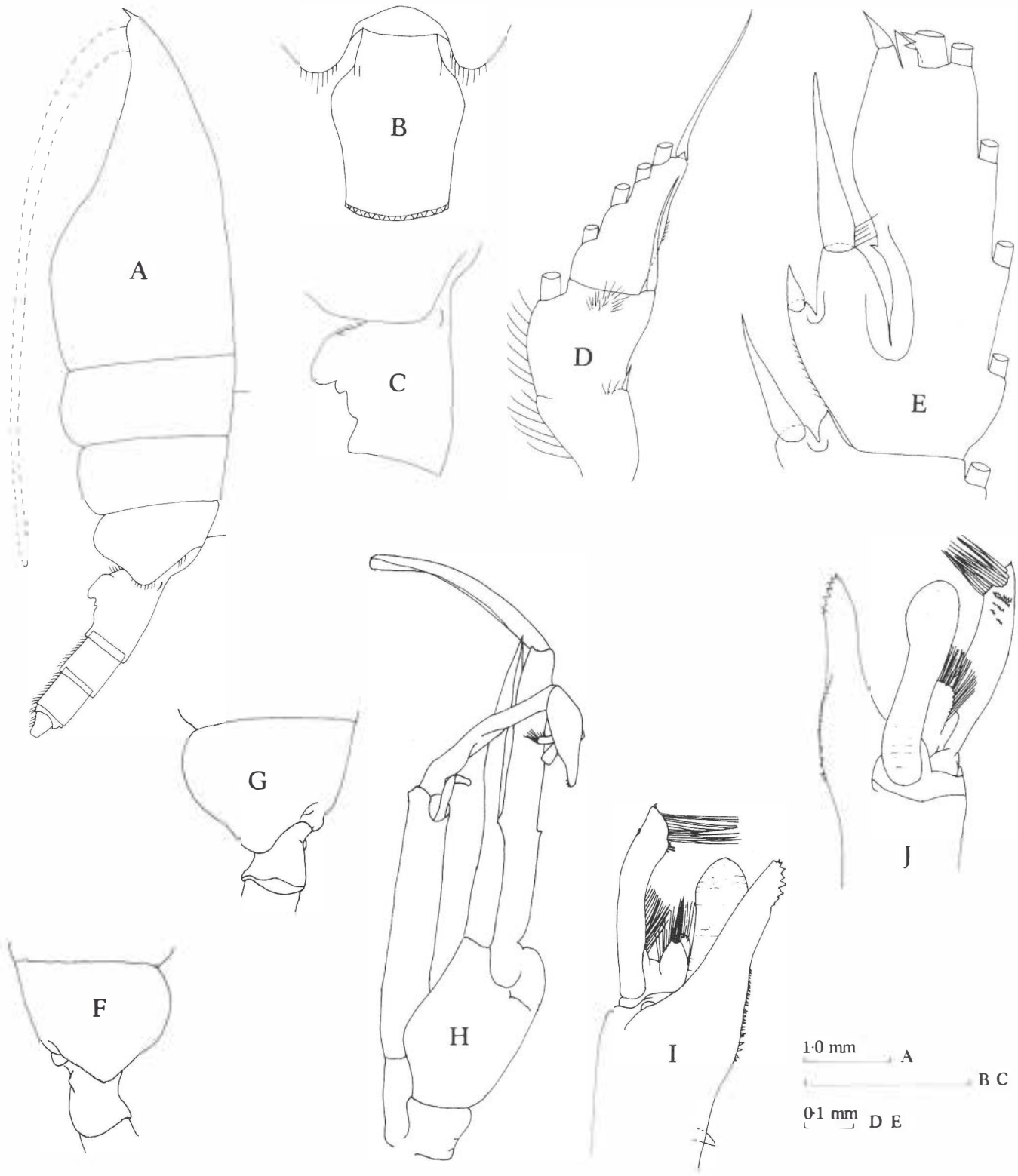


FIG. 14. *Paraeuchaeta comosa* female from VUZ Stn 112: A, lateral view; B, dorsal view of genital segment; C, lateral view of genital segment; D, exopod of leg 1; E, exopod segment 3 of leg 2. Male (from Park 1978): F, left lateral view of last metasome segment; G, right lateral view of last metasome segment; H, leg 5; I, anterolateral view of terminal part of left leg 5 exopod; J, medial view of terminal part of left leg 5 exopod.

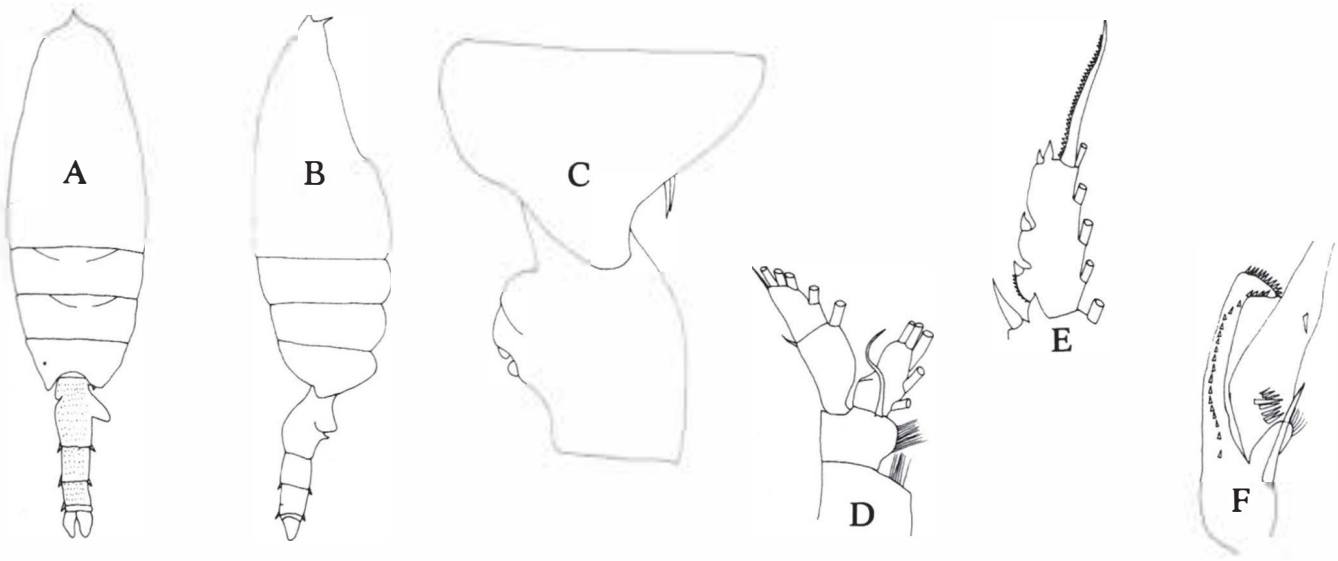


FIG. 15. *Paraeuchaeta concinna* (from Grice 1962). Female: A, dorsal view; B, lateral view; C, lateral view of genital segment; D, leg 1; E, exopod segment 3 of leg 2. Male: F, terminal part of left leg 5 exopod.

posterolaterally directed protuberance on proximal end of right side and proximal incision on left side. Appendicular caudal setae straight, thicker and about six times as long as marginal setae. Outer lobe of maxilla 1 with six setae, of which one is very small. One of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. Long setae on endopod of maxilliped terminate in spinule. Exopod segments 1 and 2 of leg 1 fused. Leg 1 exopod: Bb = $\frac{2}{3}$BC, Cc > BC. Leg 2 exopod: Aa ≈ Ab, Bb = $\frac{1}{3}$BC, Cc = $\frac{1}{4}$BC, Dd = $\frac{1}{5}$CD.

(Giesbrecht 1892, A. Scott 1909, Grice 1962)

Male: Leg 1 exopod: Bb = $\frac{1}{2}$BC, Cc > $\frac{1}{2}$BC. Leg 2 exopod: Aa = $\frac{1}{3}$AB, Bb = $\frac{1}{3}$BC, Cc = $\frac{1}{2}$CD, Dd = $\frac{1}{3}$CD. Right leg 5 exopod segment 1 shorter than endopod; exopod segment 2 twice as long as segment 1, tapering into spiniform process. Left leg 5 exopod segment 2 serrated lamella with distal end turned towards exopod segment 3, bordered by teeth along entire margin, and twice as long as spine-like digitiform process; exopod segment 3 three times longer than serrated lamella and terminating in spiniform process; haired tubercle well-developed but shorter than digitiform process, which is spine-like as in *Euchaeta*.

(A. Scott 1909, Grice 1962)

REMARKS: Grice's (1962: pl. 14, figs 6 and 7) figures of *P. concinna*, as shown here, have shorter spines on the outer edge of female legs 1 and 2 and male leg 2 than those of other authors (Giesbrecht 1892, A. Scott 1909, Mori 1937, Dakin and Colefax 1940). *Paraeuchaeta concinna* resembles *P. longicornis*, but the female of the latter lacks the incision on the left side of the genital segment and the posterolateral corner of the metasome is hardly produced; the male of *P. longicornis* is easily distinguished by the haired tubercle which is longer than the spine-like digitiform process on left leg 5.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Dakin and Colefax (1940), Heinrich (1968).

NEW RECORDS: Nil.

DISTRIBUTION: *Paraeuchaeta concinna* is an epipelagic species found in the Arabian Sea, the tropical Indo-Pacific Ocean, and temperate Pacific Ocean (A. Scott 1909, Grice 1962).

Paraeuchaeta dactyllfera (Park, 1978)

(Figs 16, 83)

DESCRIPTION: *Size:* ♀♀ 9.00–9.58 mm.

Female: Posterolateral corners of metasome slightly produced posteriorly, narrow in dorsal view but broadly rounded in lateral view. Genital segment symmetrical in dorsal and ventral view, slightly wider close to anterior end; genital field symmetrical in ventral view; genital flanges elongated posteriorly into large finger-shaped processes which reach far beyond posterior margin of genital field. Appendicular caudal setae slightly geniculate. Outer lobe of maxilla 1 with five setae. None of the six apical setae of maxilla 1

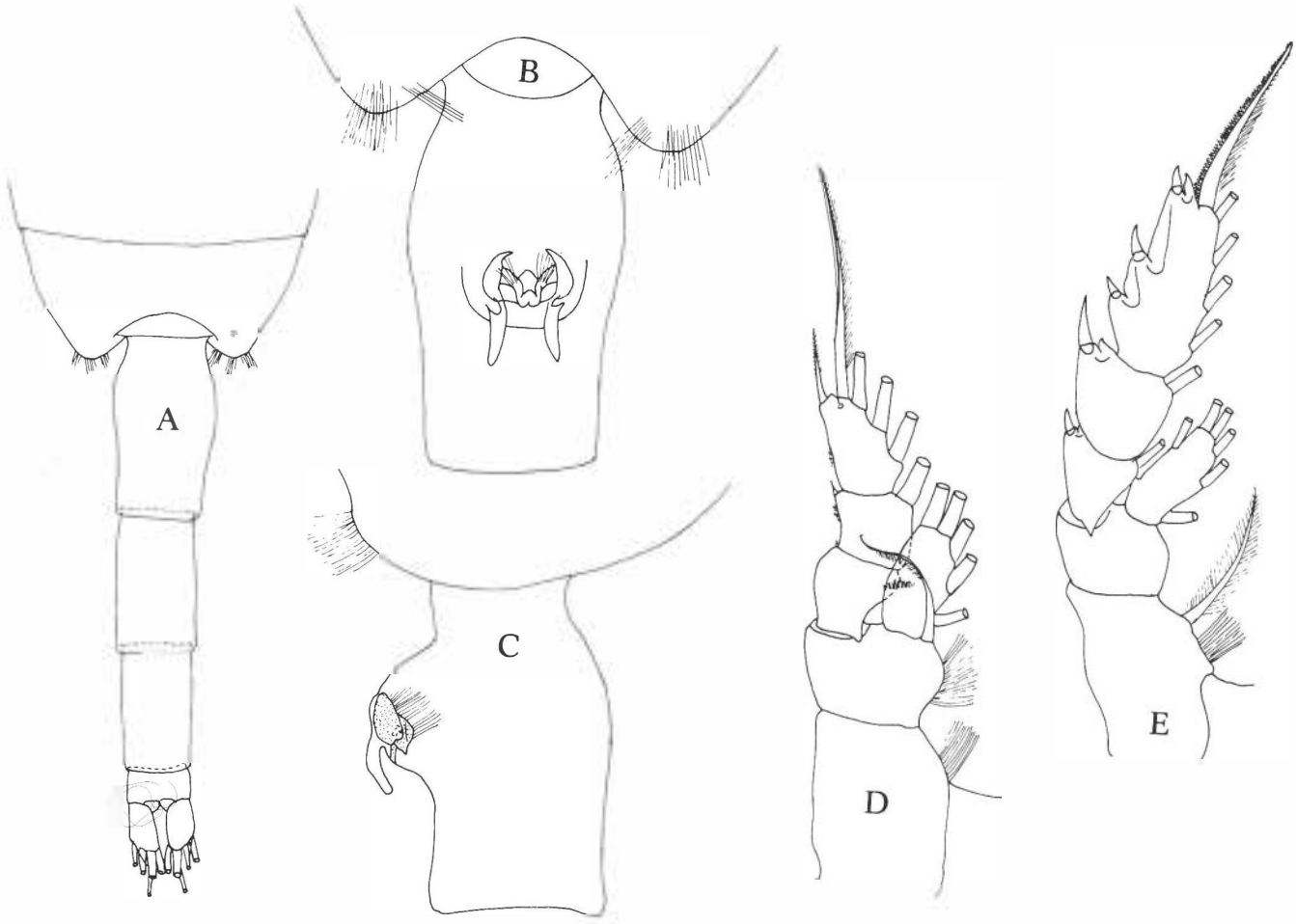


FIG. 16. *Paraeuchaeta dactylifera* female (from Park 1978): A, dorsal view of urosome; B, ventral view of genital segment; C, lateral view of genital segment; D, leg 1; E, leg 2.

covered with long spines in addition to short spinules. Long setae on endopod of maxilliped terminate in spinule. Leg 1 exopod segments 1 and 2 separate. Leg 1 exopod: Aa minute, Bb = $\frac{1}{10}$BC, Cc < BC. Leg 2 exopod: Aa ≈ AB, Bb = $\frac{1}{3}$BC, Cc = $\frac{1}{3}$CD, Dd = $\frac{1}{4}$CD.

(Park 1978)

Male: Unknown.

REMARKS: The female of *P. dactylifera* is easily identified by the large finger-shaped genital flanges.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Park (1978).

NEW RECORDS: Nil.

DISTRIBUTION: *Paraeuchaeta dactylifera* is a bathypelagic species recorded from the south-eastern Pacific, from south of New Zealand, and from 34°47′S in the south-western Atlantic (Park 1978).

Paraeuchaeta eltaninae (Park, 1978)

(Figs 17, 83)

DESCRIPTION: *Size:* ♀♀ 7.25–7.83 mm, ♂♂ 6.58–7.08 mm.

Female: Posterolateral corners of metasome slightly produced posteriorly. Genital segment symmetrical in dorsal and ventral view, widest at middle of segment, dorsal wall smoothly curved outward in lateral view; anterior surface of genital prominence rises steeply while posterior surface slopes gradually to merge into ventral wall of segment; genital field symmetrical in ventral view; genital flange large, prolonged distally into lobe; posterior edge of genital field produced

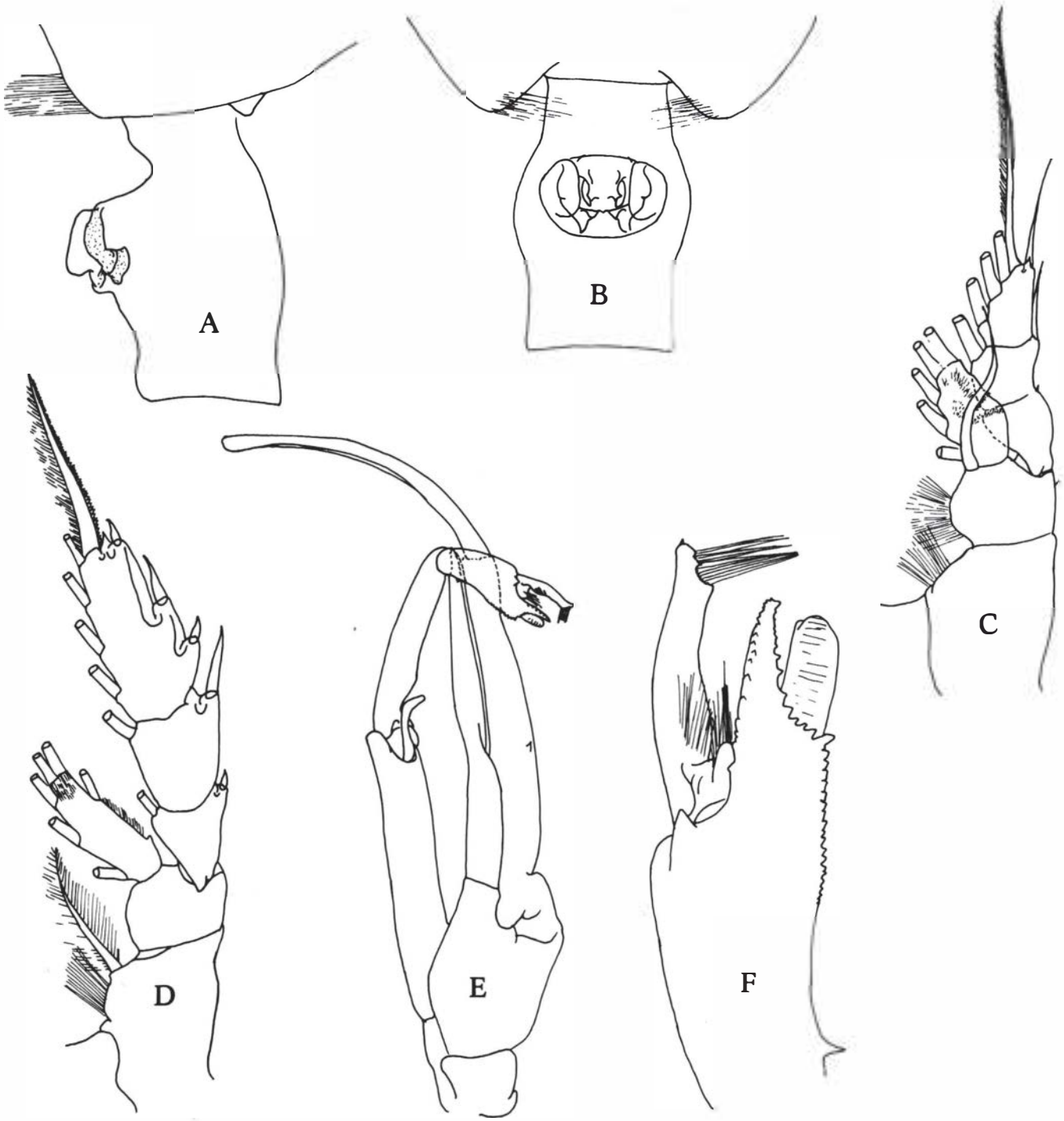


FIG. 17. *Paraeuchaeta eltaninae* (from Park 1978). Female: A, lateral view of genital segment; B, ventral view of genital segment; C, leg 1; D, leg 2. Male: E, leg 5; F, terminal part of left leg 5 exopod.

posteriorly into a well-defined ridge seen as a lobe behind genital flange in lateral view. Appendicular caudal setae geniculate, thinner and longer than terminal setae. Outer lobe of maxilla 1 with eight setae, the proximal seta shorter than rest. None of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. Long setae on endopod of maxilliped terminate in spinule. Exopod segments 1 and 2 of leg 1 fused. Leg 1 exopod: Aa minute, Bb = BC, Cc > BC. Leg 2 exopod: Aa > AB, Bb = $\frac{1}{3}$BC, Cc = $\frac{2}{3}$CD, Dd = $\frac{1}{3}$CD.

(Park 1978)

Male: Posterolateral corners of metasome more prolonged posteriorly than in female. Leg 1 exopod: Aa minute, Bb = $\frac{2}{5}$BC, Cc = $\frac{1}{3}$BC. Leg 2 exopod: Aa = $\frac{1}{6}$AB, Bb = $\frac{1}{3}$BC, Cc = $\frac{1}{4}$CD, Dd = $\frac{1}{4}$CD. Right leg 5 exopod segment 1 as long as endopod and with small tooth-like process just proximal to middle of external margin; exopod segment 2 club-shaped with slightly enlarged distal end, about three-quarters as long as segment 1. Left leg 5 exopod segment 2 with scoop-shaped serrated lamella which is prolonged distally along external margin; teeth of various lengths border entire length of external margin; large tooth-like process next to serrated lamella on anterior surface of segment; digitiform process almost as long as serrated lamella; exopod segment 3 longer than serrated lamella by about one-fifth its length.

(Park 1978)

REMARKS: *Paraeuchaeta eltaninae* is similar to *P. scotti* (Farran, 1908), but the female differs from the latter by a more gradual slope of the posterior surface of the genital boss and by the dorsal wall of the genital segment being curved outward. The male of *P. eltaninae* is distinguished from *P. scotti* by a rounded instead of pointed digitiform process, as well as a longer serrated lamella. The shape of the female genital segment is similar to that of *P. prudens* but the latter has only six setae on the outer lobe of maxilla 1 (Park 1978).

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Park (1978).

NEW RECORDS: Nil.

DISTRIBUTION: *Paraeuchaeta eltaninae* is a common bathypelagic species south of the Antarctic Convergence of the Atlantic and Pacific Oceans (Park 1978).

Paraeuchaeta eminens Tanaka and Omori, 1968

(Figs 18, 83)

DESCRIPTION: *Size:* ♀♀ 6.08–6.35 mm.

Female: Posterolateral corners of metasome slightly produced posteriorly, broadly rounded in dorsal and lateral view. Genital segment symmetrical in dorsal and ventral view, widest part anterior to middle of segment; dorsal wall of segment curved outward in lateral view; anterior surface of high genital prominence slopes gradually to meet depressed ventral wall of genital segment, while posterior surface rises steeply from depressed ventral wall; genital field symmetrical in ventral view; posterior lobe of genital flange extends beyond posterior edge of genital field, which is produced distally and in lateral view appears as small lobe behind large posteroventrally directed lobe of genital flange. Appendicular caudal setae geniculate, thinner than terminal setae. Outer lobe of maxilla 1 with eight setae, the proximal seta minute. None of the six distal setae of maxilla 2 covered with long spines in addition to short spinules. Long setae on endopod of maxilliped terminate in spinule. Exopod segments 1 and 2 of leg 1 fused. Leg 1 exopod: Aa minute, Bb = $\frac{5}{6}$BC, Cc > BC. Leg 2 exopod: Aa = Ab, Bb = $\frac{3}{4}$BC, Cc = $\frac{3}{4}$CD, Dd = $\frac{1}{4}$CD.

(Tanaka and Omori 1968, Park 1978)

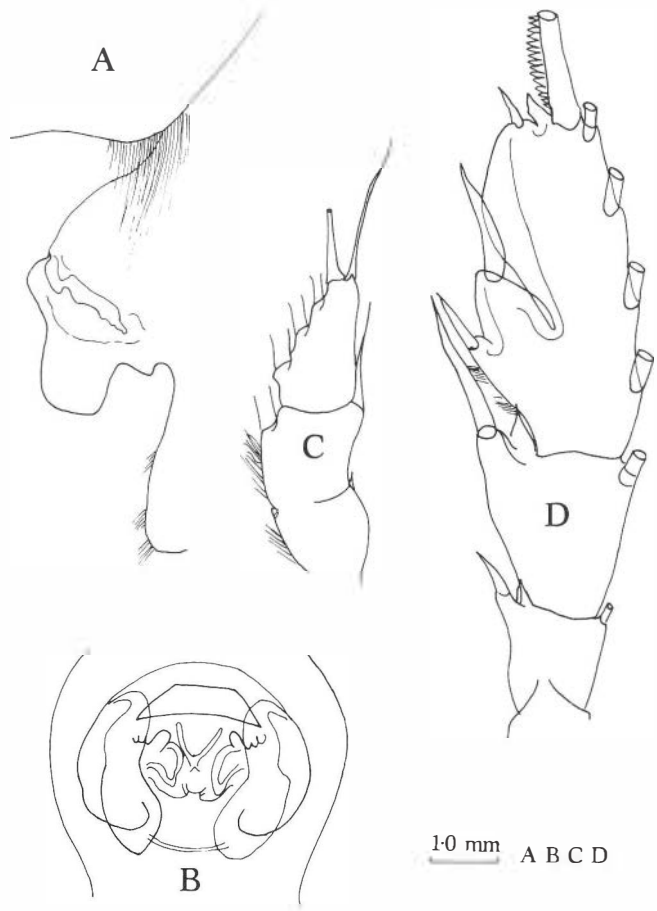


FIG. 18. *Paraeuchaeta eminens* female (from Tanaka and Omori 1968): A, lateral view of ventral genital segment; B, ventral view of genital field; C, exopod of leg 1; D, exopod of leg 2.

Male: Unknown.

REMARKS: Nil.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Park (1978).

NEW RECORDS: Nil.

DISTRIBUTION: *Paraeuchaeta eminens* has only been taken off the Pacific coast of Japan and in the Tasman Sea at 0–3150 m (Park 1978).

Paraeuchaeta exigua (Wolfenden, 1911)

(Figs 19, 84)

DESCRIPTION: *Size:* ♀♀ 6.1–7.66 mm, ♂♂ 4.7–5.83 mm.

Female: Posterolateral corners of metasome prolonged posteriorly, with tooth-like process on distal end; posterodorsal margins of urosome segments bordered by teeth. Genital segment symmetrical in dorsal and ventral view, widest anterior to middle; genital prominence very high, occupying most of segment and posteroventrally directed in lateral view; genital field symmetrical in ventral view; genital flange low and triangular in lateral view, genital operculum as high or higher than flange; posterior edge of genital field posteroventrally produced and together with genital flange makes genital prominence appear bilobed in lateral view. Appendicular caudal setae slender and geniculate. Outer lobe of maxilla 1 with nine setae, the two proximal setae shorter than rest. None of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. Long setae on endopod of maxilliped terminate in spinule, which may be very minute. Leg 1 exopod segments 1 and 2 fused, without visible joint. Leg 1 exopod: Aa = $\frac{1}{3}$AB, Bb = $\frac{2}{3}$BC, Cc ≈ BC. Leg 2 exopod: Aa ≥ AB, Bb = $\frac{1}{2}$BC, Cc = $\frac{3}{4}$CD, Dd = $\frac{1}{4}$CD.

(Wolfenden 1911, Park 1978)

Male: Like female with posterolateral corners of metasome prolonged, but tooth-like process more dorsally placed. Leg 1 exopod: Aa minute, Bb = $\frac{1}{3}$BC, Cc = $\frac{1}{2}$BC. Leg 2 exopod: Aa = $\frac{1}{3}$AB, Bb = $\frac{1}{2}$BC, Cc > $\frac{1}{3}$CD, Dd = $\frac{1}{4}$CD. Right leg 5 exopod segment 2 club-shaped, with distal end enlarged, slightly shorter than segment 1. Left leg 5 basipod 2 has tooth-like process on medial margin; exopod segment 2 serrated lamella scoop-shaped distally and tapering into larger curved spiniform process; internal margin of lamella bordered by teeth to about middle of segment, outer margin of lamella bears teeth on middle part only; tooth-like process next to serrated lamella on anterior surface of segment; digitiform process shorter than lamella by about one-third its length; exopod segment 3 slightly longer than digitiform process but shorter than lamella.

(Park 1978)

REMARKS: South-west Pacific females are generally like the original description and agree with the detailed account of Park (1978). The present males, however, vary in the length of the left leg 5 exopod segment 3 relative to the serrated lamella, which may be slightly longer or shorter.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Vervoort (1957), Bradford (1972), Park (1978).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
A295	400–1000	1 ♀, 6.5 mm
		1 ♂, 4.7 mm
E882	0–1212	2 ♀♀, 6.8, 7.0 mm
E891	0–1245	2 ♀♀, 6.8, 7.0 mm
E892	0–1224	3 ♀♀, 6.8–6.9 mm
		2 ♂♂, 4.9, 5.4 mm
E901	0–1248	4 ♀♀, 6.5–6.8 mm
		4 ♂♂, 4.9–5.3 mm
E904	0–1243	2 ♀♀, 6.1, 6.7 mm
		2♂♂, 5.0, 5.0 mm
F874	0–1357	2 ♀♀, 6.8, 6.8 mm
F881	0–1260	3 ♀♀, 7.5 mm, rest damaged
F897	0–1269	1 ♀, damaged
F946	0–1000	2 ♀♀, 6.8, 7.2 mm
G142	250–500	1 ♀, 7.2 mm
G144	250–500	2 ♀♀, 6.9, 6.9 mm
VUZ93	0–1097	3 ♀♀, 6.8–7.1 mm
VUZ105	0–914	8 ♀♀, 7.0–7.6 mm
VUZ112	0–732	8 ♀♀, 6.3–7.6 mm
Mu67/147s	0–1000	1 ♀, 7.2 mm

DISTRIBUTION: *Paraeuchaeta exigua* is a bathypelagic species found in subtropical parts of the Atlantic and Indo-Pacific Oceans, reaching into subantarctic waters south of Australia (Park 1978).

Paraeuchaeta farrani (With, 1915)

REMARKS: In the light of the doubtful separate identity of this species (Park 1978) we have chosen to regard it as synonymous with *P. barbata* (Brady, 1883).

Paraeuchaeta hansenii (With, 1915)

(Figs 20, 84)

DESCRIPTION: *Size:* ♀♀ 8.4–9.99 mm, ♂♂ 8.41–8.50 mm.

Female: Genital segment symmetrical in dorsal and ventral view, widest at middle of segment; low ridge visible on each side of anterior part of segment; anterior surface of large genital prominence slopes to meet ventral wall of genital segment at wider angle than

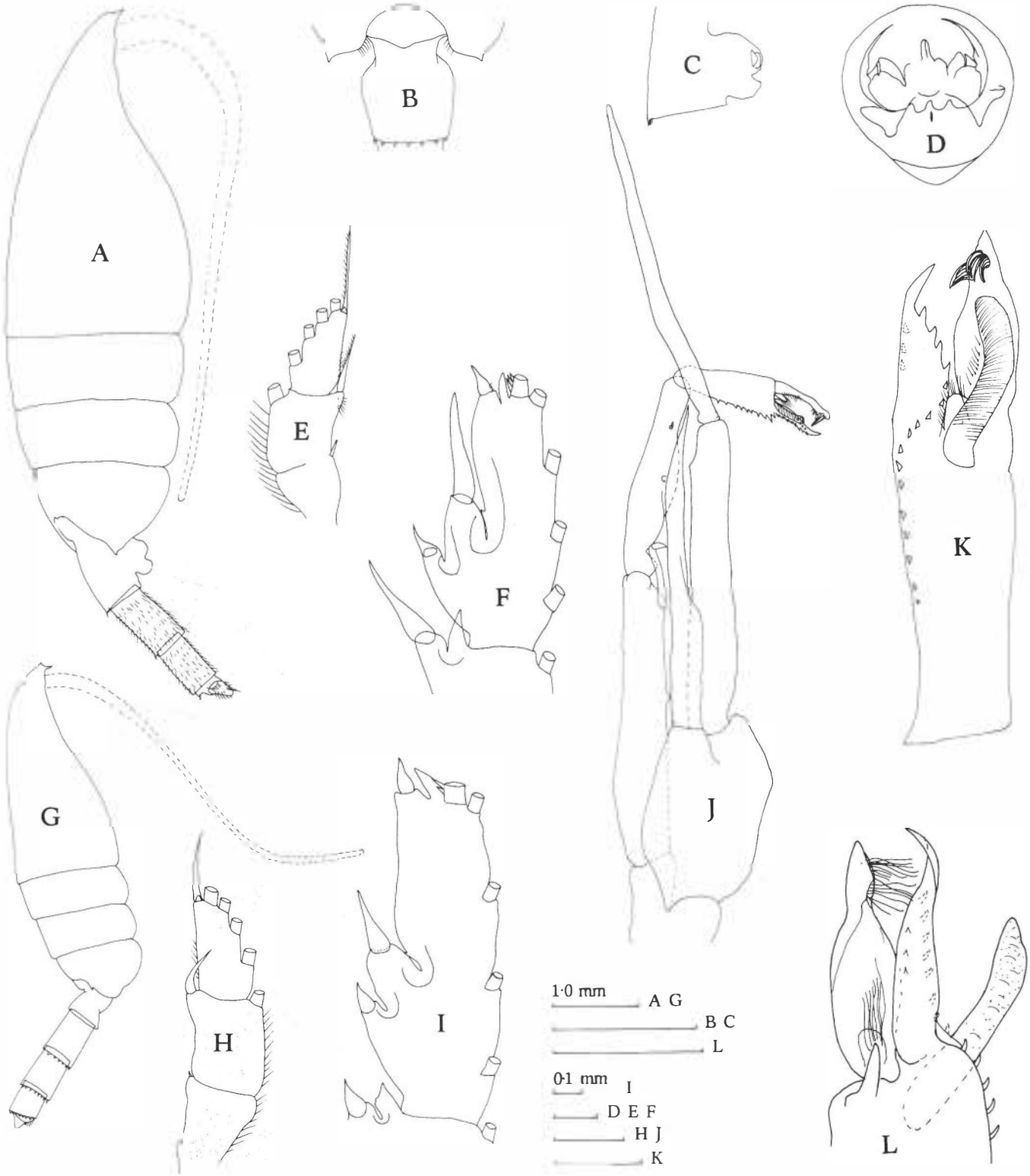


FIG. 19. *Paraeuchaeta exigua* female from VUZ Stn 112: A, lateral view; B, dorsal view of genital segment; C, lateral view of genital segment; D, ventral view of genital field; E, exopod of leg 1; F, exopod segment 3 of leg 2. Male from NZOI Stn E901: G, lateral view; H, exopod of leg 1; I, exopod segment 3 of leg 2; J, leg 5; K, medial view of terminal part of left leg 5 exopod; L, terminal part of left leg 5 exopod.

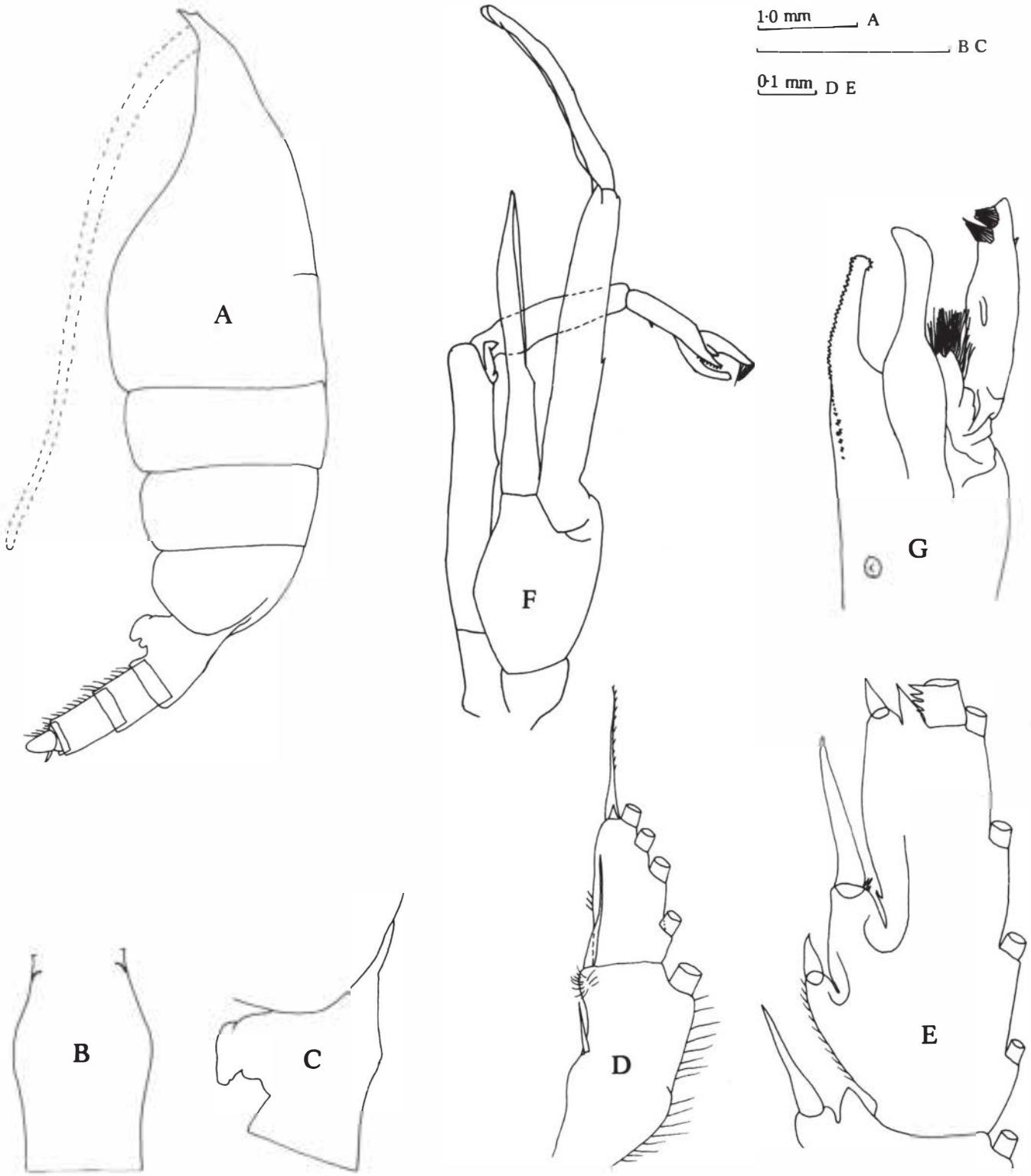


FIG. 20. *Paraeuchaeta hansenii* female from VUZ Stn 112: A, lateral view; B, dorsal view of genital segment; C, lateral view of genital segment; D, exopod of leg 1; E, exopod segment 3 of leg 2. Male (from Park 1978): F, leg 5; G, terminal part of left leg 5 exopod.

posterior surface; genital flange extremely large, with posteriorly produced lobe which extends beyond posterior margin of genital field and resembles blade of axe in lateral view; posterior margin of genital field produced posteriorly and is seen as small lobe behind genital flange. Appendicular caudal setae geniculate, slender and much prolonged. Outer lobe of maxilla 1 with nine setae, the two proximal setae shorter than rest. None of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. None of the long setae on endopod of maxilliped terminate in spinule. Leg 1 exopod segments 1 and 2 fused. Leg 1 exopod: Aa = ½AB, Bb ≤ ¾BC, Cc ≤ BC. Leg 2 exopod: Aa < AB, Bb ≤ ½BC, Cc = ¾CD, Dd = ⅓CD.

(With 1915, Sars 1925, Park 1978)

Male: Posterolateral corners of metasome produced posteriorly into lappets, dorsal margin of which bears small tooth-like process. Genital segment in lateral view with tooth-like process on dorsal margin. Leg 1 exopod: Aa minute, Bb < ½BC, Cc > ½BC. Leg 2 exopod: Aa = ⅓AB, Bb = ⅓BC, Cc = ⅓CD, Dd = ⅓CD. Right leg 5 exopod segment 1 with tooth-like process at mid-length; segment 2 club-shaped with enlarged distal end, two-thirds as long as segment 1. Left leg 5 exopod segment 2 serrated lamella scoop-shaped, bordered by teeth along entire length of inner margin and distal part of outer margin; tooth-like process some distance from continuous row of teeth on inner margin of lamella; digitiform process longer than serrated lamella, distal part curved outward and enlarged; exopod segment 3 longer than serrated lamella by about one-quarter its length.

(With 1915, as *E. sarsi*; Park 1978)

REMARKS: The female of *P. hansenii* is distinguished from other species by the genital flange which in lateral view looks like the blade of an axe. The external spine of leg 1 exopod segment 1 is longer in the south-west Pacific specimen illustrated than in the original description.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Nil.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
VUZ105	0–914	1 ♀, 9.0 mm
VUZ112	0–732	1 ♀, 8.4 mm

DISTRIBUTION: *Paraeuchaeta hansenii* is a widespread mesopelagic copepod found in the north and south Pacific (reaching into subantarctic waters south of Australia), the Arabian Sea, and the north and south Atlantic (Park 1978).

Paraeuchaeta longicornis (Giesbrecht, 1888)
(Figs 21, 84)

DESCRIPTION: *Size:* ♀♀ 2.49–3.23 mm, ♂♂ 2.54–3.00 mm.

Female: Posterolateral corners of metasome slightly produced. Genital segment as long as following three segments, asymmetrical in dorsal and ventral view because of long protrusion on right side, which extends posterolaterally and bears small spine on outer margin of rounded tip. Appendicular caudal setae thicker and five times as long as marginal setae. Outer lobe of maxilla 1 with five setae. One of the six apical setae of maxilla 1 bearing long spines in addition to short spinules. Leg 2 exopod: Aa ≈ AB, Bb = ⅔BC, Cc = ⁷⁄₁₀CD, Dd = ⁷⁄₁₀CD.

(Giesbrecht 1892, Grice 1962)

Male: Posterolateral corners of metasome much produced posteriorly, triangular with pointed tip in dorsal view, but broadly rounded in lateral view. Leg 2 exopod: Aa = ¼AB, Bb = ½BC, Cc = ⅓CD, Dd = ⅓CD. Fifth pair of legs relatively long and reach beyond caudal rami. Left leg 5 without endopod; exopod segment 2 serrated lamella dagger-shaped, bordered by teeth along entire margin except inner distal part, twice as long as spine-like digitiform process; serrated lamella about one-quarter length of

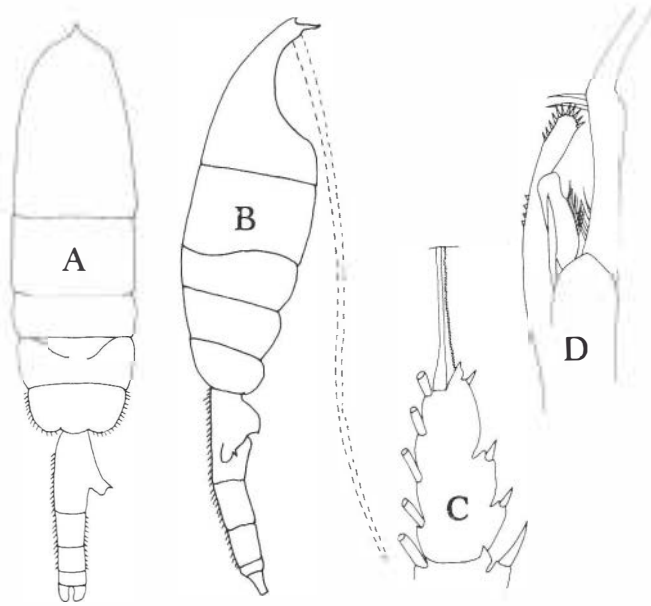


FIG. 21. *Paraeuchaeta longicornis* (from Grice 1962). Female: A, dorsal view; B, lateral view; C, exopod segment 3 of leg 2. Male: D, terminal part of left leg 5 exopod.

exopod segment 3, which terminates in spiniform process; haired tubercle well developed, longer than digitiform process of exopod segment 2.

(Wilson 1950, Grice 1962, Tanaka 1973)

REMARKS: *Paraeuchaeta longicornis* resembles *P. concinna*, but the female of the latter species has the posterolateral corners of the metasome posteriorly produced and an incision on the left side of the genital segment when seen in dorsal view. The male of *P. concinna* is distinguished from *P. longicornis* by the haired tubercle on leg 5 being shorter than the spine-like digitiform process of exopod segment 2.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Farran (1929).

NEW RECORDS: Nil.

DISTRIBUTION: *Paraeuchaeta longicornis* is epipelagic and widely distributed in Indo-Pacific waters (Tanaka 1973).

Paraeuchaeta longissima (Park, 1978)

(Figs 22, 85)

DESCRIPTION: *Size:* ♀♀ 7.25–7.91 mm, ♂♂ 6.50 mm.

Female: Posterolateral corners of metasome slightly produced distally, almost triangular in lateral view. Genital segment symmetrical in dorsal and ventral view, slightly broadened at middle of segment and almost as long as following two segments; genital field symmetrical in ventral view; genital flanges well developed, distally extended into lobe; posterior edge of genital field produced posteriorly, in lateral view seen as lobe behind distal lobe of genital flange. Appendicular setae geniculate, thinner and longer than terminal setae. Outer lobe of maxilla 1 with seven setae, the two proximal setae shorter than rest. None of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. Long setae on endopod of maxilliped terminate in spinule. Leg 1 exopod segments 1 and 2 fused. Leg 1 exopod: Aa = $\frac{1}{4}$AB, Bb = BC, Cc > BC. Leg 2 exopod: Aa = AB + $\frac{1}{2}$Bb, Bb = $\frac{1}{2}$ BC, Cc = CD, Dd = $\frac{1}{6}$CD.

(Park 1978)

Male: Posterolateral corners of metasome more produced posteriorly than those of female, triangular in ventral view with distal margin rounded. Leg 1 exopod: Aa minute, Bb < $\frac{1}{2}$BC, Cc = $\frac{3}{4}$BC. Leg 2 exopod: Aa = $\frac{1}{4}$AB, Bb = $\frac{1}{3}$BC, Cc = $\frac{1}{3}$CD, Dd = $\frac{1}{5}$CD. Right leg 5 exopod segment 1 with tooth-like process proximal to middle of external margin; exopod segment 2 club-shaped with distal end enlarged, two-thirds as long as segment 1. Left leg 5 exopod segment 2 serrated lamella spoon-shaped with teeth along entire length of internal margin in addition to distal half of external margin; serrated lamella about same length as digitiform process; low tubercle next to serrated lamella on anterior surface of segment; exopod segment 3 longer than serrated lamella by about one-quarter its length.

(Park 1978)

REMARKS: The female of *P. longissima* is somewhat similar to *P. gracilicauda*, but the latter has a small low tubercle on the left side of the genital segment and the second spine of exopod segment 2 of leg 2 is much longer than that of *P. longissima* (Park 1975, 1978).

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Park (1978).

NEW RECORDS: Nil.

DISTRIBUTION: *Paraeuchaeta longissima* seems to be restricted to deep waters south of the Antarctic Convergence (Park 1978).

Paraeuchaeta media (Giesbrecht, 1888)

(Figs 23, 85)

DESCRIPTION: *Size:* ♀♀ 3.3–4.64 mm, ♂♂ 3.3–4.20 mm.

Female: Posterolateral corners of metasome not produced posteriorly, broadly rounded in both dorsal and lateral view. Genital segment strongly asymmetrical in both dorsal and ventral views with proximal part of left side and distal part of right side of segment protruded; genital field in ventral view asymmetrical, rotated 30° clockwise with reference to body axis; genital flanges asymmetrical, left flange smallest; genital prominence anteroventrally directed in lateral view. Appendicular setae straight, much thicker and twice as long as marginal setae. Outer lobe of maxilla 1 with eight setae, of which the distal seta is very small and the two proximal setae are relatively short. One of the six distal setae of maxilla 2 covered with long spines in addition to short spinules. Long setae on endopod of maxilliped terminate in spinule. Leg 1 exopod segments 1 and 2 fused without trace of joint. Leg 1 exopod: Bb = BC, Cc > BC. Leg 2 exopod: Aa = AB, Bb = $\frac{1}{3}$BC, Cc = $\frac{3}{8}$CD, Dd = $\frac{1}{4}$CD.

(Giesbrecht 1892, Park 1978)

Male: Posterolateral corners of metasome produced posteriorly, triangular in lateral view, with distal

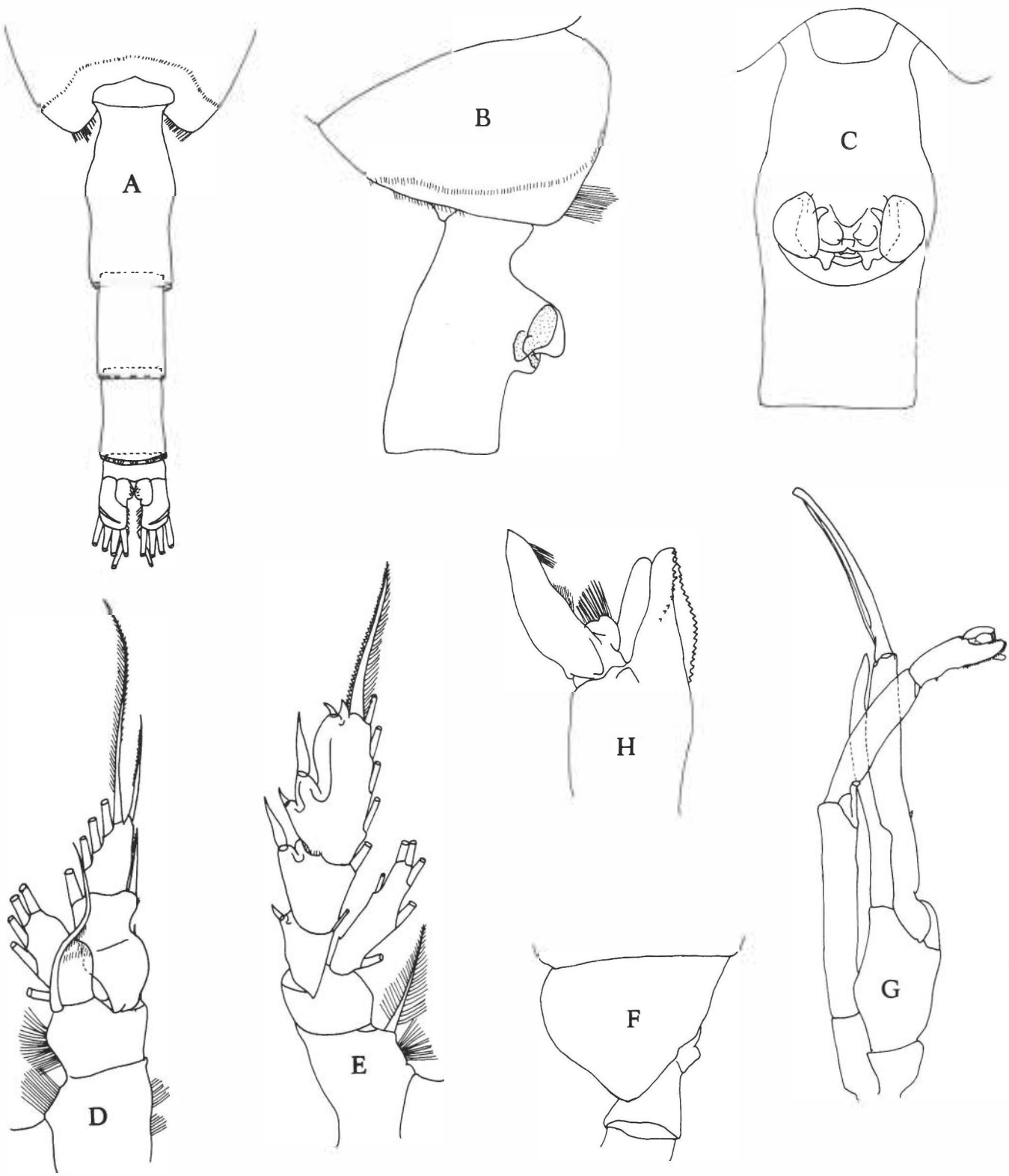


FIG. 22. *Paraeuchaeta longissima* (from Park 1978). Female: A, dorsal view of urosome; B, lateral view of genital segment; C, ventral view of genital segment; D, leg 1; E, leg 2. Male: F, lateral view of last metasomal and genital segments; G, leg 5; H, terminal part of left leg 5 exopod.

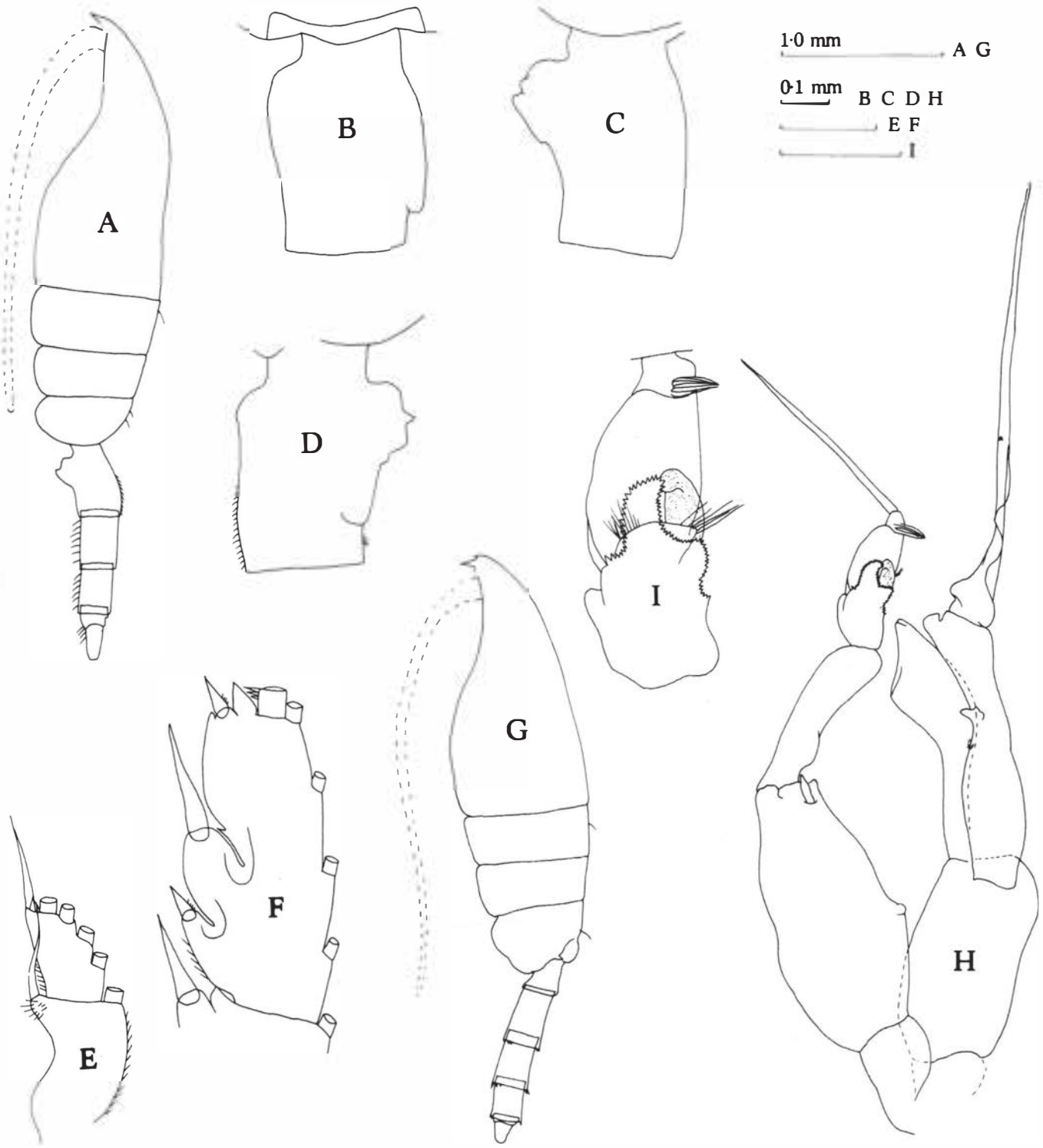


FIG. 23. *Paraeuchaeta media* female from NZOI Stn C537: A, lateral view; B, dorsal view of genital segment; C, left lateral view of genital segment; D, right lateral view of genital segment; E, exopod of leg 1; F, exopod segment 3 of leg 2. Male from NZOI Stn F945: G, lateral view; H, leg 5; I, terminal part of left leg 5 exopod.

margin rounded and with tooth-like process on dorsal margin. Anterior surface of right leg 5 exopod segment 1 with tooth-like process proximal to middle of segment; exopod segment 2 longer than segment 1 and spiniform with small tooth-like process on external margin at mid-length. Left leg 5 exopod segment 1 swollen, with hump on internal margin; exopod segment 2 serrated lamella with hollow base and distally dividing into two dissimilar lobes, external lobe longest, curved teeth border entire margin of lamella, which is of same length as digitiform process; exopod segment 3 extended into long spiniform process.

(Park 1978)

REMARKS: According to Park (1978: 208) the outer lobe of maxilla 1 has seven setae, while Giesbrecht (1892: 260, 263) describes eight. Park (1978: fig. 67F) does, however, indicate a small spine distal to the seven setae. The south-west Pacific specimens agree with the original description.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Farran (1929).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
A292	500–1000	3 ♀♀, 3.5 mm
A295	0–500	1 ♀, 3.4 mm
A302	surface	1 ♀, 3.9 mm
A303	450–1000	2 ♀♀, 3.3, 3.9 mm
		1 ♂, 3.4 mm
C537	surface	3 ♀♀, 3.9, 3.9, 4.0 mm
F874	0–1357	1 ♀, 4.0 mm
F910	0–1397	3 ♀♀, 3.9, 4.0, 4.1 mm
		1 ♂, 3.7 mm
F945	0–500	1 ♀, 3.6 mm
		2 ♂♂, 3.3 mm
F946	0–200	2 ♀♀, 3.9, 4.0 mm
F946	200–500	2 ♀♀, 3.9 mm
F947	0–500	3 ♀♀, 3.3, 3.5, 3.8 mm
AUZ75	0–200?	4 ♀♀, 3.8, 3.8, 3.9 mm
AUZ82	0–100?	1 ♀, 3.9 mm

DISTRIBUTION: *Paraeuchaeta media* is mainly epiplanktonic, though it has been recorded from deeper waters in the southern part of its range (Vervoort 1957). It occurs widely in the tropical, subtropical and subantarctic zones of the Indo-Pacific and Atlantic Oceans (Vervoort 1957, Park 1978).

Paraeuchaeta parvula (Park, 1978)

(Figs 24, 85)

DESCRIPTION: *Size:* ♀♀ 7.25–8.25 mm, ♂♂ 6.08–6.9 mm.

Female: Posterolateral corners of metasome produced posteriorly, broadly rounded in dorsal and lateral view. Genital segment symmetrical in dorsal and ventral view, widest at middle of segment; anterior surface of genital prominence slightly convex, posterior surface sloping to meet ventral surface of segment at wide angle; genital field symmetrical in ventral view; genital flanges large and discoidal, posteriorly produced into lobe; posterior border of genital field produced distally, in lateral view seen as small lobe behind posterior lobe of genital flange. Appendicular setae geniculate, thinner and larger than terminal setae. Outer lobe of maxilla 1 with five long setae. None of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. Some of the long setae on endopod of maxilliped terminate in minute spinule. Leg 1 exopod segments 1 and 2 fused but line of fusion visible. Leg 1 exopod: Aa minute, Bb ≈ BC, Cc = 2BC. Leg 2 exopod: Aa = AB + $\frac{1}{2}$Bb, Bb = $\frac{1}{2}$BC, Cc = $\frac{2}{3}$CD, Dd = $\frac{1}{4}$CD.

(Park 1978)

Male: Leg 1 exopod: Aa minute, Bb = $\frac{1}{4}$BC, Cc = $\frac{2}{3}$BC. Leg 2 exopod: Aa = $\frac{1}{4}$AB, Bb = $\frac{1}{3}$BC, Cc = $\frac{1}{3}$CD, Dd = $\frac{1}{4}$CD. Right leg 5 exopod segment 1 with tooth-like process on external margin proximal to middle of segment; exopod segment 2 club-shaped with enlarged distal end, three-quarters as long as segment 1. Left leg 5 exopod segment 2 serrated lamella with hollow rectangular main body and large pointed extension along external margin, internal margin of rectangular body and external margin of pointed extension bordered by teeth, digitiform process about same length as serrated lamella; exopod segment 3 slightly longer than serrated lamella.

(Park 1978)

REMARKS: Nil.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Park (1978).

NEW RECORDS: Nil.

DISTRIBUTION: *Paraeuchaeta parvula* seems to be a widely distributed bathypelagic copepod in antarctic and subantarctic waters (Park 1978).

Paraeuchaeta pseudotonsa (Fontaine, 1967)

(Figs 25, 86)

DESCRIPTION: *Size:* ♀♀ 6.23–7.26 mm, ♂♂ 5.5–6.58 mm.

Female: Posterolateral corners of metasome produced

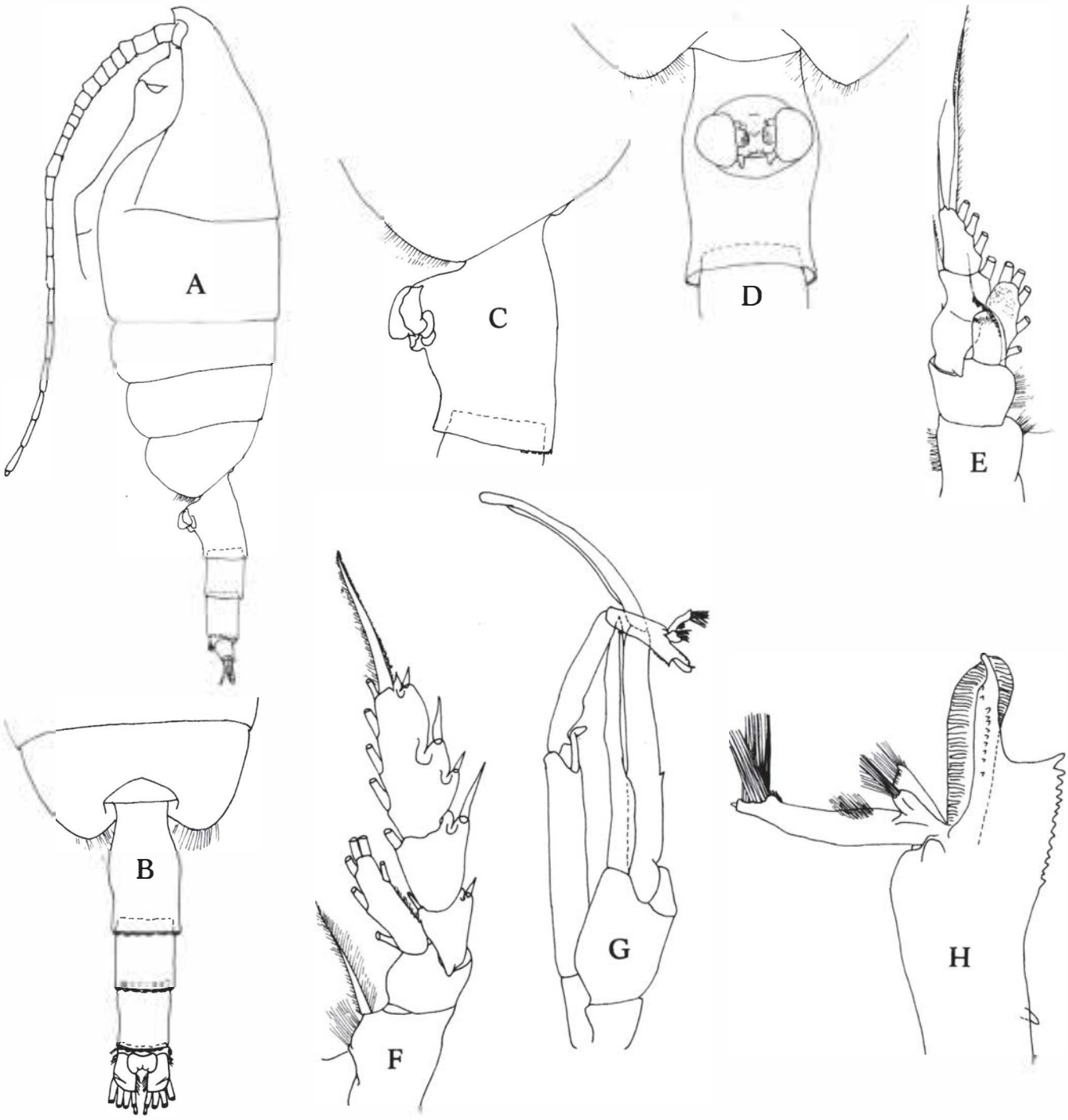


FIG. 24. *Paraeuchaeta parvula* (from Park 1978). Female: A, lateral view; B, dorsal view of urosome; C, lateral view of genital segment; D, ventral view of genital segment; E, leg 1; F, leg 2. Male: G, leg 5; H, terminal part of left leg 5 exopod.

posteriorly, triangular with pointed tip from either dorsal or lateral view. Posterodorsal margins of urosome segments bordered by teeth. Genital segment symmetrical in either dorsal or ventral view, with widest part posterior to middle of segment; genital prominence almost triangular in lateral view, anterior surface slightly convex; genital field symmetrical in ventral view and faces backward; genital flanges small; posterior edge of genital field with posteriorly directed hump in middle. Appendicular setae slender and

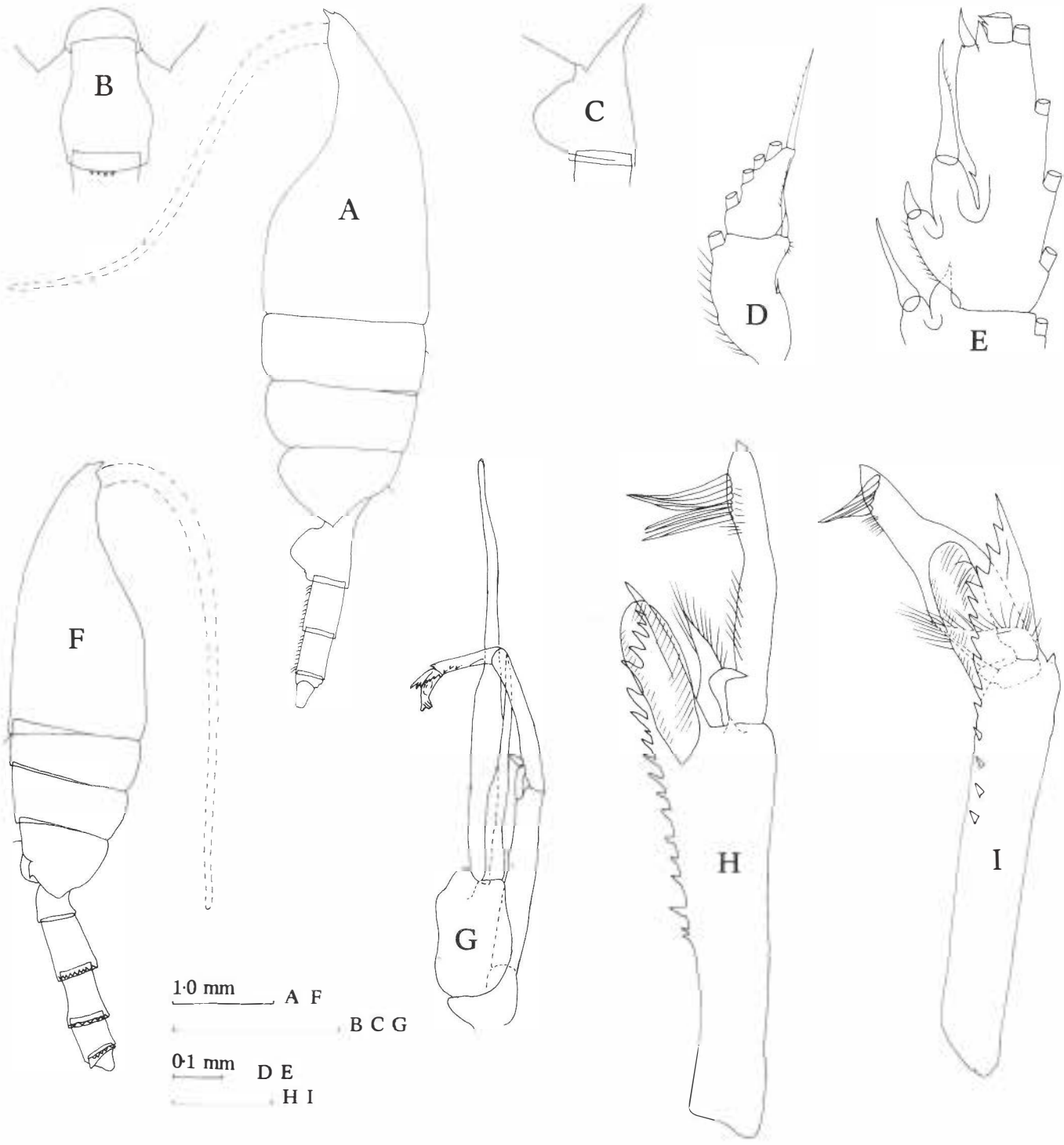


FIG. 25. *Paraeuchaeta pseudotonsa* from VUZ Stn 112. Female: A, lateral view; B, dorsal view of genital segment; C, lateral view of genital segment; D, exopod of leg 1; E, exopod segment 3 of leg 2. Male: F, lateral view; G, leg 5; H, medial view of terminal part of left leg 5 exopod; I, anterior view of terminal part of left leg 5 exopod.

geniculate. Outer lobe of maxilla 1 with nine setae, the two proximal setae shorter than rest. None of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. Some of the long setae on endopod of maxilliped terminate in spinule. Leg 1 exopod segments 1 and 2 fused. Leg 1 exopod:

Aa ≤ ½AB, Bb ≤ BC, Cc > BC. Leg 2 exopod: Aa > AB, Bb = ⅓BC, Cc = CD + ½Dd, Dd = ¼CD.
(Fontaine 1967, Park 1978)

Male: Posterolateral corners of metasome more rounded than those of female and with tooth-like process on dorsal margins. Leg 1 exopod: Aa minute, Bb = ⅓BC, Cc = ½BC. Leg 2 exopod: Aa = ½AB, Bb = ½BC, Cc = ⅓CD, Dd = ¼CD. Right leg 5 exopod segment 2 club-shaped, distal end blunt, about three-quarters as long as segment 1. Left leg 5 endopod rudimentary as usual, but apparently two-segmented; exopod segment 2 serrated lamella scoop-shaped, tapering into long tooth-like process, relatively large teeth along inner margin, lamella longer than digitiform process; tooth-like process on distal part of exopod segment 2 at base of serrated lamella; exopod segment 3 longer than serrated lamella by about one-third its length.
(Fontaine 1967, Park 1978)

REMARKS: The females of the south-west Pacific specimens are identified as *Paraeuchaeta pseudotonsa* on the basis of the shape of the genital segment in lateral view and the pointed posterolateral corners of the metasome. The males from the south-west Pacific differ from Fontaine's description in that on left leg 5 the serrated lamella is not very much longer than the digitiform process and exopod segment 3 extends beyond the serrated lamella by between a third and a half its length. All specimens examined have a row of teeth along one edge of the serrated lamella only; Park (1978) did, however, find that *P. pseudotonsa* could have two rows of teeth like *P. scaphula*. It appears that the male of *P. tuberculata* A. Scott, 1909 could equally well be attributed to *P. pseudotonsa* when compared with the present specimens and Park's (1978) description. Fontaine (1967) considers it to be a synonym of *P. scaphula*. The female of *P. pseudotonsa* is very similar to *P. tonsa* and *P. scaphula*. In dorsal view the widest part of the genital segment is closer to the posterior end in *P. tonsa* than in *P. pseudotonsa* and the anterior surface of the genital prominence is almost flat in the former while convex in the latter. *Paraeuchaeta scaphula* has an even more globose genital swelling than the two previously mentioned species and the posterior ridge of the genital field has a projection shaped like a bowl in the middle of the ridge. The male of *P. pseudotonsa* can, according to Fontaine (1967), be distinguished from the male of *P. scaphula* by the serrated lamella, which is longer than the digitiform process in the former, while of the same length in the latter.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Park (1978).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
E901	0–1248	1 ♀, damaged
F881	0–1260	1 ♂, 5.6 mm
F897	0–1269	2 ♀♀, damaged
Mu67/94s	0–823	2 ♀♀, 6.5 mm
		2 ♂♂, 6.45, 6.5 mm
Mu67/116s	0–1000	1 ♀, 6.8 mm
VUZ93	0–1097	1 ♀, 6.5 mm
		2 ♂♂. 5.5, 6.15 mm
VUZ105	0–914	2 ♀♀, 6.5, 6.7 mm
VUZ112	0–732	14 ♂♂, 6.1–6.8 mm

DISTRIBUTION: *Paraeuchaeta pseudotonsa* has mainly been taken at great depths, although it has also been recorded from more shallow water. It is widely distributed throughout the Atlantic Ocean and has been recorded from the south-east and south-west Pacific Ocean, as well as in Antarctic water south of Australia (Fontaine 1967, Grice and Hulsemann 1968, Park 1978).

Paraeuchaeta pubera (Sars, 1907)
(Figs 26, 86)

DESCRIPTION: *Size:* ♀♀ 3.7–4.2 mm, ♂♂ 2.92–3.52 mm.

Female: Posterolateral corners of metasome broadly rounded and not protruded posteriorly. Genital segment in dorsal view slightly asymmetrical, widest part one-third from proximal end of segment; genital prominence in lateral view high and close to proximal end of genital segment; genital field asymmetrical in ventral view because of claw-like process positioned on anterior part of right genital flange and seen as beak in right lateral view. Appendicular caudal setae thickened, three times as long as marginal caudal setae. Outer lobe of maxilla 1 with five setae. One of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. Setae on endopod of maxilliped terminate in spinule (present specimens). Leg 1 exopod: Bb ≈ BC, Cc > BC (present specimens). Leg 2 exopod: Aa = AB + ½Bb, Bb < ½BC, Cc = ⅓CD, Dd = ⅓CD.
(Tanaka 1958, Park 1975)

Male: Posterolateral corners of metasome not protruded posteriorly, but more pointed than those of female. Leg 1 exopod: Bb = ½BC, Cc > ½BC. Leg 2 exopod: Aa = ½AB, Bb = ⅓BC, Cc = ¼CD, Dd = ¼CD. Right leg 5 exopod segment 1 longer than endopod and with tooth-like process just distal to middle of segment; exopod segment 2 longer than segment 1 and tapering into spine. Left leg 5 exopod

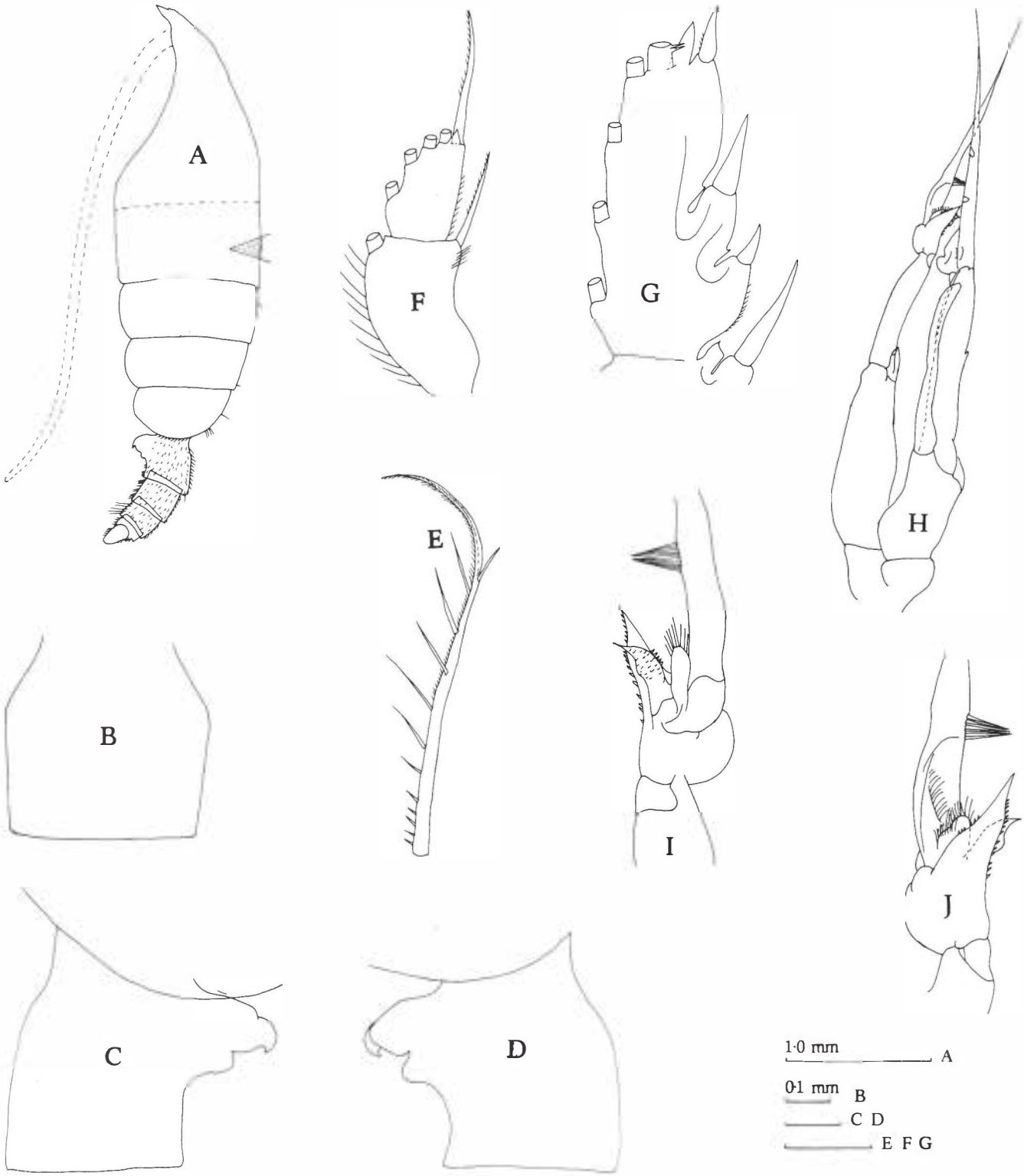


FIG. 26. *Paraeuchaeta pubera* female from VUZ Stn 111: A, lateral view; B, dorsal view of genital segment; C, right lateral view of genital segment; D, left lateral view of genital segment; E, apical seta of maxilla 2; F, exopod of leg 1; G, exopod segment 3 of leg 2. Male (from Park 1975): H, leg 5; I, anterior view of terminal part of left leg 5 exopod; J, medial view of terminal part of left leg 5 exopod.

segment 2 serrated lamella triangular in shape and uniformly small teeth along most of internal margin and on middle part of external margin, digitiform process with bulbous swelling in middle, distal end tapering into slightly curved spine; exopod segment 3 consists of hollow base followed by spiniform process several times longer than serrated lamella.

(Park 1975)

REMARKS: The appendicular caudal setae of *P. pubera* are the object of disagreement; according to Vervoort (1957) those of the female are three times as long as the marginal setae, while Tanaka (1958) says they are seven times as long. Park (1975) describes the appendicular caudal setae of the male as being geniculate and smaller than the other caudal setae. Only females were taken in the south-west Pacific and these had geniculate caudal setae about three times as long as the marginal caudal setae.

The south-west Pacific specimens are generally like previously described specimens except that they have longer spines on leg 2 exopod segment 3.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Farran (1929).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
AUZ111	0–100?	3 ♀♀, 3.7, 3.7, 3.9 mm
AUZ123	0–100?	1 ♀, 4.0 mm

DISTRIBUTION: *Paraeuchaeta pubera* is an epipelagic species found in the tropical, subtropical, and temperate zones of the Atlantic and the Pacific Oceans (Park 1975).

Paraeuchaeta rasa Farran, 1929

(Figs 27, 86)

DESCRIPTION: *Size:* ♀♀ 5.31–6.75 mm, ♂♂ 5.00–5.83 mm.

Female: Posterolateral corners of metasome slightly produced posteriorly, broadly rounded in dorsal and lateral view. Genital segment symmetrical in dorsal and ventral view, widest at middle of segment; genital prominence large, arising from middle of segment, with two low ridges on each side, one anterior and one posterior; anterior surface of prominence in lateral view slopes to meet depressed ventral wall at open angle while posterior surface meets ventral wall of segment at angle close to 90°; genital flanges large, prolonged posteriorly into lobe, right flange bigger and more rounded than left; posterior edge of genital field projects into ridge which appears as lobe behind posterior lobe of genital flange when seen in lateral view. Appendicular caudal setae geniculate, thinner and longer than terminal setae. Outer lobe of maxilla 1 with five long setae. None of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. Long setae on endopod of maxilliped terminate in spinule. Leg 1 exopod segments 1 and 2 fused. Leg 1 exopod: Bb = ½BC, Cc > BC. Leg 2 exopod: Aa = Ab, Bb = ½BC, Cc = ⁶⁄₇CD, Dd = ⅓CD.

(Farran 1929, Park 1978)

Male: Posterolateral corners of metasome more protruded than in female, pointed in dorsal view but rounded in lateral view. Leg 1 exopod: Bb = ⅓BC, Cc = ½BC. Leg 2 exopod: Aa = ¼AB, Bb = ⅓BC, Cc = ½CD, Dd = ⅓CD. Right leg 5 exopod segment 1 with tooth-like process at middle of external margin; exopod segment 2 club-shaped, about two-thirds as long as segment 1. Left leg 5 exopod segment 2 serrated lamella dagger-shaped and terminating in two tooth-like processes, teeth of unequal size border entire length of internal margin and distal third of external margin, digitiform process rounded at distal end and slightly longer than serrated lamella; exopod segment 3 longer than serrated lamella by about one-quarter its length.

(Park 1978)

REMARKS: Park (1978: 275) describes the genital field as symmetrical and records two low ridges on each side of the genital prominence; this is in contrast to Farran (1929: 241) and Vervoort (1957: 78), according to whom the right genital flange is larger and only the left side of the genital prominence bears two low ridges. Park (1978) also notes a minute spine on female leg 1 exopod segment 1 not observed by Farran (1929).

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Vervoort (1957), Park (1978).

NEW RECORDS: Nil.

DISTRIBUTION: *Paraeuchaeta rasa* inhabits the deep Antarctic and Subantartic waters. It is recorded as far north as 34°43′S in the south-west Atlantic Ocean, while in the Pacific Ocean it has only been found south of 49°10′S (Vervoort 1957, Park 1978).

Paraeuchaeta regalis (Grice and Hulsemann, 1968)

(Figs 28, 87)

DESCRIPTION: *Size:* ♀♀ 8.00–9.58 mm, ♂♂ 7.66–8.41 mm.

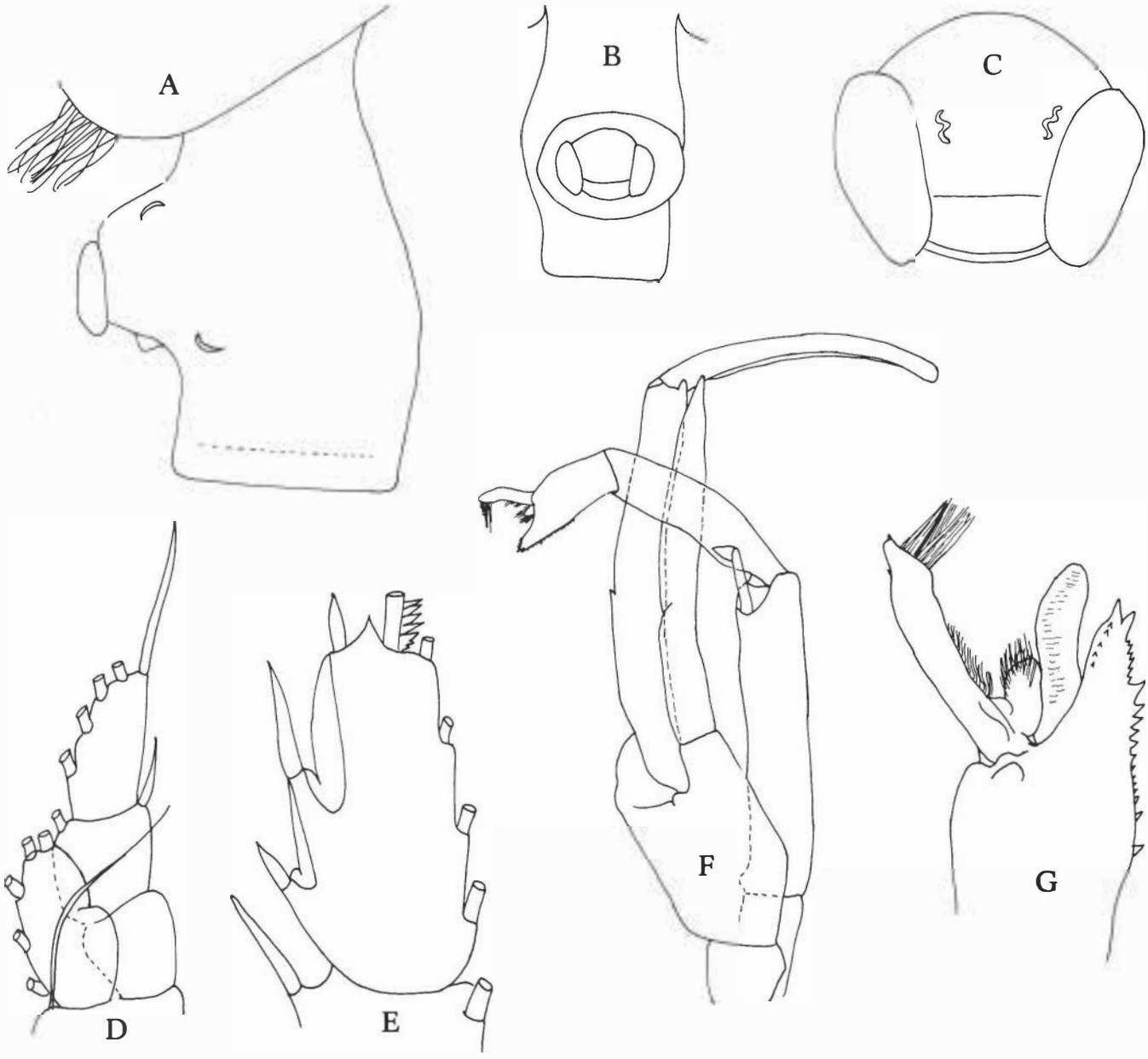


FIG. 27. *Paraeuchaeta rasa* female (from Farran 1929): A, lateral view of genital segment; B, ventral view of genital segment; C, genital field; D, leg 1; E, exopod segment 3 of leg 2. Male (from Park 1978): F, leg 5; G, terminal part of left leg 5 exopod.

Female: Posterolateral corners of metasome produced posteriorly and rounded in dorsal and lateral view. Genital segment symmetrical in dorsal and ventral view, moderately widened anterior to middle of segment; genital prominence high, arises from anterior half of genital segment and almost perpendicular to it; posterior part of prominence more produced than anterior part due to shape of genital flanges; genital field symmetrical; genital flanges large, posterior half produced into large lobes which bend inward in ventral view and point ventrally in lateral view. Appendicular caudal setae geniculate and slender. Outer lobe of maxilla 1 with eight setae, the three proximal setae minute. None of the six apical setae of maxilla 2 with long spines in addition to short spinules. None of the long setae on endopod of maxilliped terminate in spinules. Leg 1 exopod segments 1 and 2 fused. Leg 1 exopod: Aa minute, Bb = $\frac{4}{5}$BC, Cc > CD. Leg 2 exopod: Aa = Ab, Bb = $\frac{1}{3}$BC, Cc = $\frac{2}{3}$CD, Dd = $\frac{1}{4}$CD.

(Grice and Hulsemann 1968, Park 1978)

Male: Posterolateral corners of metasome produced into round lappets with tooth-like process on dorsal

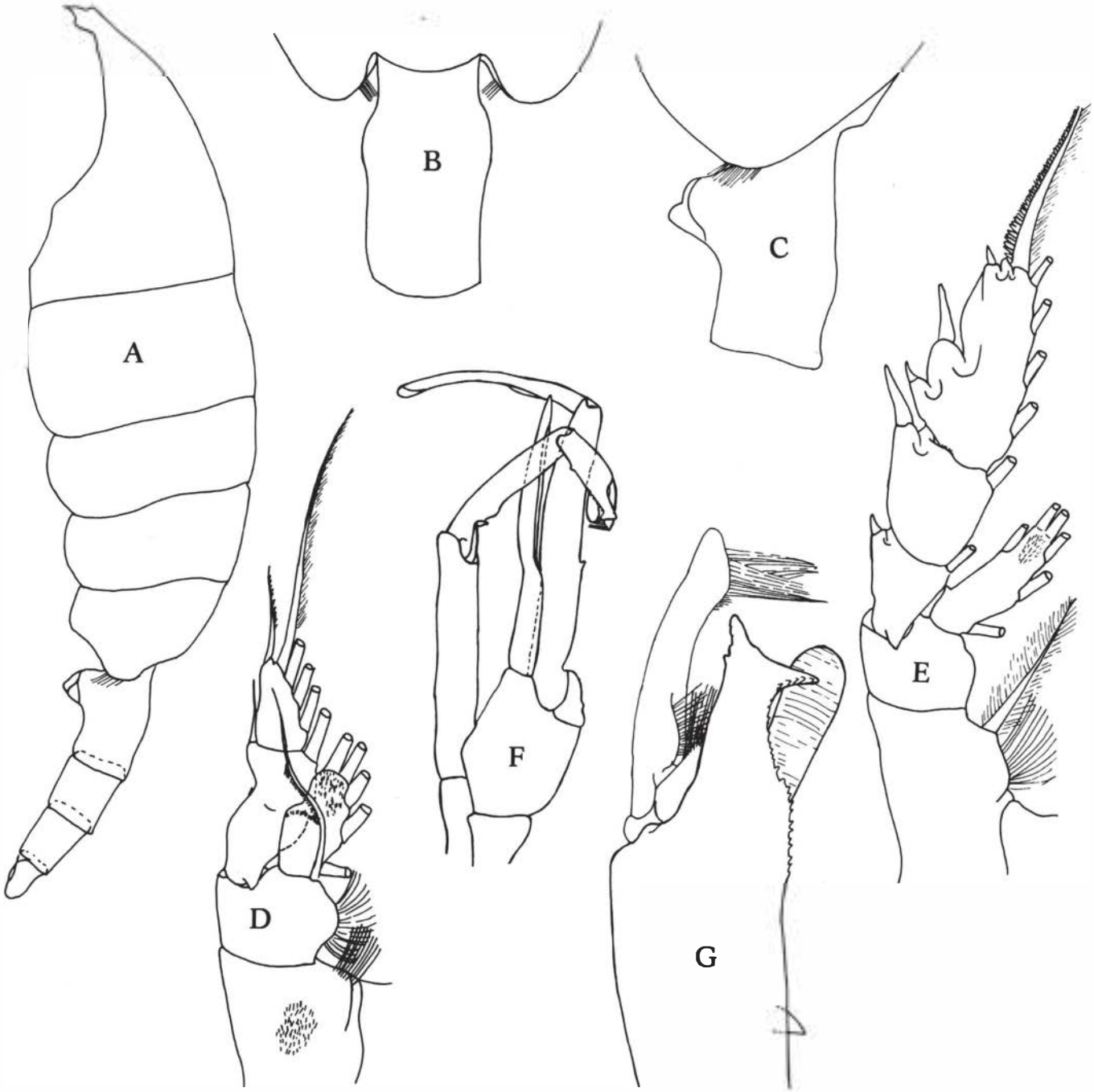


FIG. 28. *Paraeuchaeta regalis* female (A, B, C, from Grice and Hulsemann 1968; D, E from Park 1978): A, lateral view; B, dorsal view of genital segment; C, lateral view of genital segment; D, leg 1, E, leg 2. Male (from Park 1978): F, leg 5; G, terminal part of left leg 5 exopod.

margins. Leg 1 exopod: Aa minute, Bb = $\frac{1}{3}$BC, Cc = $\frac{2}{3}$CD. Leg 2 exopod: Aa = $\frac{1}{2}$AB, Bb = $\frac{1}{3}$BC, Cc = $\frac{1}{2}$CD, Dd = $\frac{1}{4}$CD. Right leg 5 exopod segment 1 with tooth-like process at middle of external margin; exopod segment 2 club-shaped with blunt distal end, about two-thirds as long as exopod segment 1. Left leg 5 exopod segment 2 serrated lamella with distal end divided into two widely diverging spiniform processes, teeth border entire length of inner margin and distal part of outer margin, digitiform process slightly shorter than serrated lamella; exopod segment 3 longer than serrated lamella by about one-quarter its length.

(Park 1978)

REMARKS: According to Grice and Hulsemann (1968: fig. 40) the second spine of leg 2 exopod segment 2

reaches the base of the following spine, which is longer than that described by Park (1978).

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Park (1978).

NEW RECORDS: Nil.

DISTRIBUTION: *Paraeuchaeta regalis* is a bathypelagic species mainly found in Antarctic and Subantarctic waters, but reaching into the subtropical zone of the south-east Pacific Ocean (Part 1978).

Paraeuchaeta sarsi (Farran, 1908)

(Figs 29, 87)

DESCRIPTION: *Size:* ♀♀ 7.8–10.66 mm, ♂♂ 6.94–8.33 mm.

Female: Posterolateral corners of metasome rounded in dorsal and lateral view. Genital segment symmetrical in dorsal and ventral view, widest at middle; large genital prominence arises from middle of segment and points ventrally, posterior part more produced than anterior; genital flanges, posterior lobe of which points posteroventrally, extend over entire genital field; posterior edge of genital field projected posteriorly into low ridge, in lateral view seen as lobe behind posterior lobe of genital flange. Appendicular caudal setae geniculate and three times as long as marginal setae. Outer lobe of maxilla 1 with six setae, the most proximal seta shorter than rest. None of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. None of the long setae on endopod of maxilliped terminate in spinules. Leg 1 exopod segments 1 and 2 fused. Leg 1 exopod: Aa minute, Bb = $\frac{4}{5}$BC, Cc > Bc. Leg 2 exopod: Aa = AB + $\frac{1}{2}$Bb, Bb = $\frac{1}{2}$BC, Cc = $\frac{2}{3}$CD, Dd = $\frac{1}{4}$CD.

(Farran 1908, Park 1978)

Male: Last metasome segment asymmetrical in dorsal view, left posterolateral corner more distally protruded than right corner; both corners with tooth-like process on dorsal margin. Genital segment has tooth-like process on right dorsolateral part near anterior border. Leg 1 exopod: Aa minute, Bb = $\frac{2}{3}$BC, Cc = $\frac{2}{3}$CD. Leg 2 exopod: Aa = $\frac{1}{2}$AB, Bb = $\frac{1}{2}$Cc, Cc < $\frac{1}{2}$CD, Dd = $\frac{1}{3}$CD. Right leg 5 exopod segment 1 with tooth-like process at middle of external margin; segment 2 club-shaped, about three-quarters as long as segment 1. Left leg 5 exopod segment 2 with tooth-like process at middle of internal border, serrated lamella dagger-shaped and terminating in pointed process, with teeth bordering entire length of inner margin and distal third of outer margin; digitiform process longer than serrated lamella and about same length as exopod segment 3.

(A. Scott 1909, as *P. dentata*; Tanaka 1958; Park 1978)

REMARKS: The female of *P. sarsi* is very similar to *P. californica*, *P. regalis*, *P. polita*, and *P. simulantis*, particularly in the shape of the genital segment, but can be distinguished by the number of setae on maxilla 1 and details of the genital segment. The south-west Pacific specimens of *P. sarsi* seem like the original description. In the only male available the digitiform process of left leg 5 exopod 2 has been lost. The relative lengths of the serrated lamella and exopod segment 3 are more like that figured by A. Scott (1909) than those of Tanaka (1958) and Park (1978).

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Park (1978).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
E760	0–710	1 ♀, 10.0 mm
E901	0–1224	1 ♀, ≈ 8.2 mm
VUZ93	0–1097	1 ♂, ≈ 7.2 mm
VUZ105	0–914	10 ♀♀, 9.0–9.9 mm

DISTRIBUTION: *Paraeuchaeta sarsi* is a bathypelagic species distributed in the tropical, subtropical, temperate, and even antarctic zones of the world's oceans (Park 1975, 1978).

Paraeuchaeta spinosa (Giesbrecht, 1892)

(Figs 30, 87)

DESCRIPTION: *Size:* ♀♀ 5.83–7.21 mm, ♂♂ 5.75–6.9 mm.

Female: Posterolateral corners of metasome not produced posteriorly, broadly rounded in dorsal and lateral view. Genital segment in dorsal view almost symmetrical, widest slightly anterior to middle; genital prominence strongly asymmetrical with large prominence on left side protruding beyond lateral wall of genital segment; genital flanges of same shape in lateral view but left longer than and slightly posterior to right. Appendicular caudal setae straight, much thicker and five times longer than marginal setae. Outer lobe of maxilla 1 with nine setae, one of which is very small and positioned at base of third proximal seta; two most proximal setae shorter than other six. One of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. Long setae on endopod of maxilliped terminate in spinules. Leg 1 exopod segments 1 and 2 fused. Leg 1 exopod: Bb = $\frac{1}{2}$BC, Cc = BC. Leg 2 exopod: Aa > Ab, Bb = $\frac{1}{4}$BC,

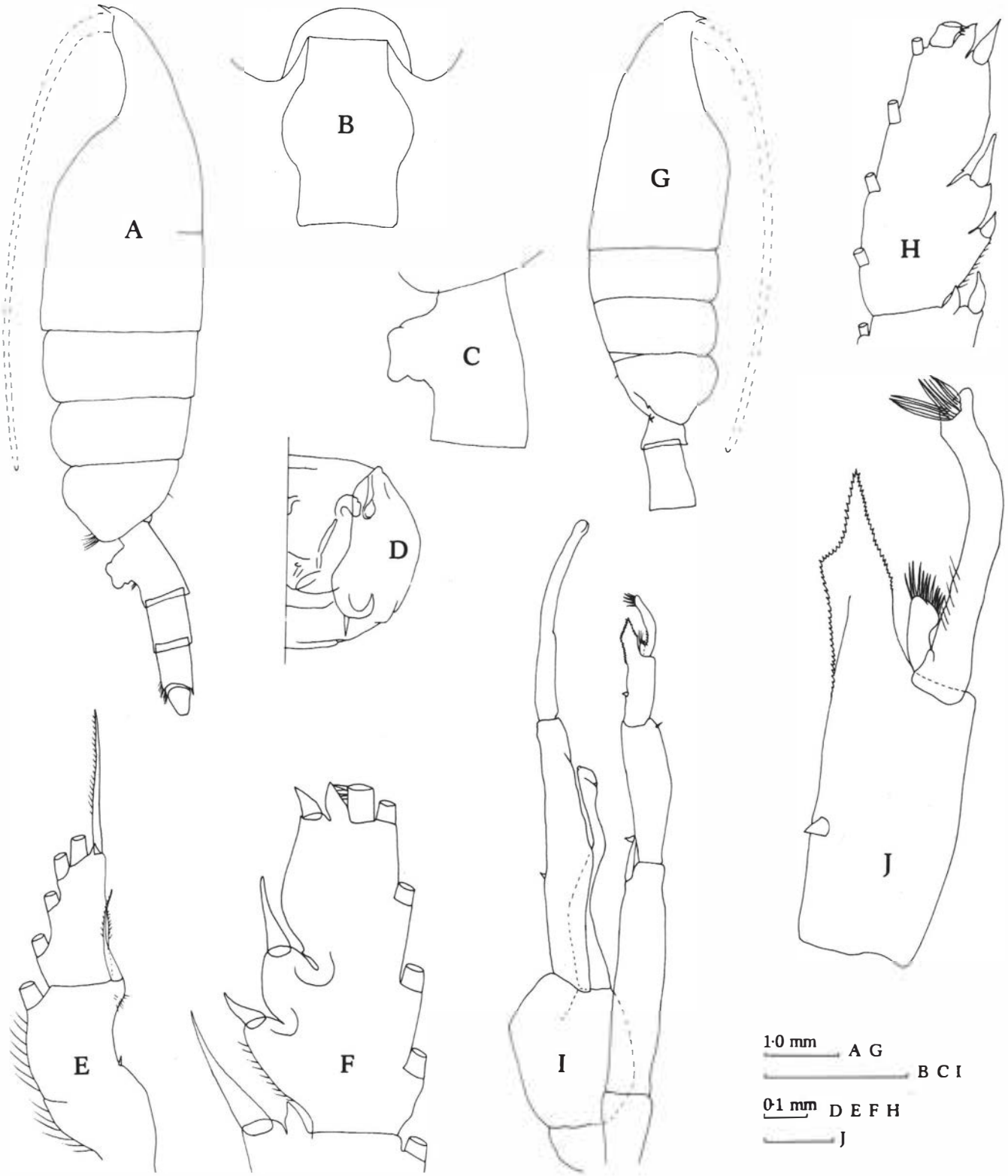


FIG. 29. *Paraeuchaeta sarsi* female from Stn VUZ 105: A, lateral view; B, dorsal view of genital segment; C, lateral view of genital segment; D, genital field; E, exopod of leg 1; F, exopod segment 3 of leg 2. Male from VUZ Stn 93: G, lateral view; H, exopod segment 3 of leg 2; I, leg 5; J, medial view of terminal part of left leg 5 exopod (digitiform process missing on this specimen).

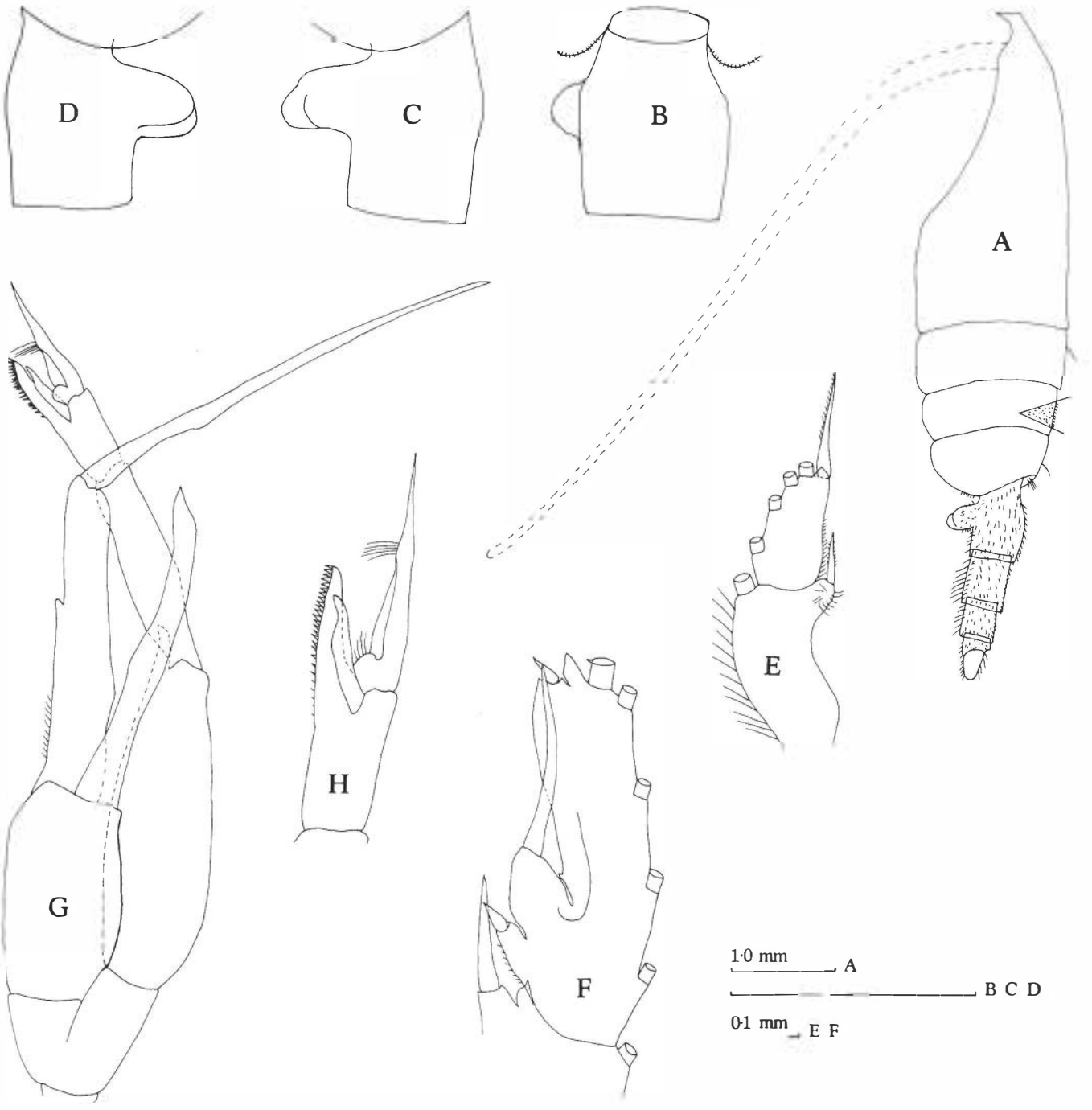


FIG. 30. *Paraeuchaeta spinosa* female from NZOI Stn A302: A, lateral view; B, dorsal view of genital segment; C, left lateral view of genital segment; D, right lateral view of genital segment; E, exopod of leg 1; F, exopod segment 3 of leg 2. Male (from Sars 1925): G, leg 5; H, terminal part of left leg 5 exopod.

Cc = CD + ½Dd, Dd = $\frac{1}{10}$CD.
(Giesbrecht 1892, Park 1978)

Male: Posterolateral corners of metasome produced posteriorly, triangular-shaped with rounded distal margins and tooth-like process on dorsal margins. Leg 2 exopod: Aa = ½AB, Bb = ⅓BC, Cc = ¼CD, Dd = $\frac{1}{6}$CD. Right leg 5 exopod segment 1 with tooth-like process at about mid-length; exopod segment 2 longer than segment 1 and tapering into long spiniform

process. Left leg 5 basipod 2 with pointed process at about middle of internal margin; exopod segment 2 serrated lamella spoon-shaped; entire inner margin and distal half of outer margin bordered by teeth which increase in size towards distal end. Digitiform process with pointed tip and three-quarters as long as serrated lamella; exopod segment 3 about as long as exopod segment 2 with hollow base and short spiniform process.

(Sars 1925, Park 1978)

REMARKS: The female of the south-west Pacific *P. spinosa* is exactly as previously described.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Nil.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
A302	0–500	1 ♀, 6.0 mm

DISTRIBUTION: *Paraeuchaeta spinosa* is a mesopelagic species recorded from tropical, subtropical, and temperate zones of the Atlantic and Indo-Pacific Oceans (Park 1978).

Paraeuchaeta sp. A

(Figs 31, 88)

DESCRIPTION: *Size:* ♀♀ 8.1–8.9 mm.

Female: Posterolateral corners of metasome not produced, and broadly rounded in dorsal and lateral view. Genital segment symmetrical in dorsal view, widest part anterior to middle; ventral wall anterior to genital prominence very depressed in lateral view; genital prominence high and almost perpendicular to segment; genital flanges large and extend over entire length of genital field; lobe-like process extends from posteromedial border of flange in ventral view; left process of genital flange larger than right, in lateral view seen as ventrally directed lobe from posterior part of genital flange. Appendicular caudal setae geniculate. None of the six distal setae of maxilla 2 covered with long spines in addition to short spinules. None of the long setae on endopod of maxilliped terminate in spinule. Leg 1 exopod: Aa minute, Bb = $\frac{6}{7}$BC, Cc > BC. Leg 2 exopod: Aa = AB, Bb = $\frac{1}{2}$BC, Cc = $\frac{7}{8}$CD, Dd = $\frac{1}{3}$CD.

REMARKS: *Paraeuchaeta* sp. A resembles *P. calva* and *P. polita*, but the latter two have symmetrical genital fields. These two specimens have not been named because they are damaged.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
E891	0–1245	1 ♀, 8.1 mm
VUZ112	0–731	1 ♀, 8.9 mm

Paraeuchaeta sp. B

(Figs 32, 88)

DESCRIPTION: *Size:* ♀♀ 5.9–6.3 mm.

Female: Posterolateral corners of metasome produced posteriorly, rounded in dorsal and lateral view and reaching almost to anterior surface of genital pominence. Genital segment symmetrical in dorsal and ventral view, widest part slightly anterior to middle; genital prominence large; slightly convex anterior surface of prominence meets ventral wall of genital segment at almost right angle while posterior surface slopes to meet depressed ventral wall at wide angle; genital field symmetrical; well-developed posterior lobe of genital flange points posteroventrally; posterior edge of genital field produced posteriorly into ridge, in lateral view seen as lobe behind posterior lobe of genital flange. Appendicular caudal setae geniculate. Outer lobe 1 of maxilla 1 with seven setae. None of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. None of the long setae on endopod of maxilliped terminate in spinule. Leg 1 exopod: Bb = $\frac{9}{10}$BC, Cc = BC. Leg 2 exopod: Aa = AB + $\frac{1}{2}$Bb, Bb = $\frac{1}{2}$BC, Cc = $\frac{6}{7}$CD, Dd = $\frac{1}{3}$CD.

REMARKS: The genital segment of *Paraeuchaeta* sp. B is similar to that of *P. sarsi* and *P. eltaninae*, but differs from these species in having the anterior surface of the genital prominence convex instead of straight and by the depressed ventral wall of the genital segment posterior to the genital prominence. *Paraeuchaeta* sp. B is also smaller than the other two species, especially *P. sarsi*. Furthermore, the dorsal wall of the genital segment curves dorsally and the outer lobe of maxilla 1 bears eight setae in *P. eltaninae*. *Paraeuchaeta* sp. B resembles *P. malayensis* also, but the posterolateral corners of the metasome are not so prolonged, the angle between the genital flange and the posterior border of the genital field seen in lateral view is more acute, and outer lobe 1 of maxilla 1 has seven setae instead of nine as in *P. malayensis*. *Paraeuchaeta* sp. B does not appear to agree with any described species but has not been named as all the specimens are damaged.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
E892	0–1224	1 ♀, 5.9 mm
E901	0–1248	1 ♀, 6.2 mm
E904	0–1243	1 ♀, 6.3 mm

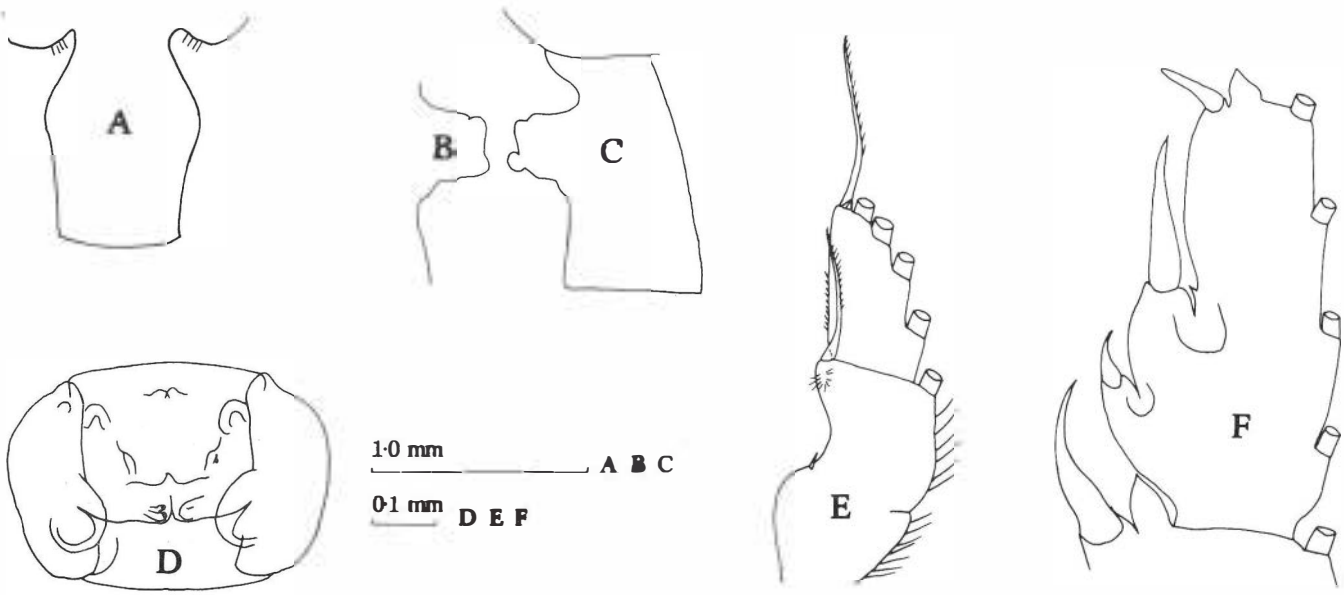


FIG. 31. *Paraeuchaeta* sp. A female from VUZ Stn 112: A, dorsal view of genital segment; B, right lateral view of genital prominence; C, left lateral view of genital segment; D, genital field; E, exopod of leg 1; F, exopod segment 3 of leg 2.

Paraeuchaeta sp. C

(Figs 33, 88)

DESCRIPTION: *Size:* ♀♀ 5.6–5.68 mm.

Female: Posterolateral corners of metasome rounded and not produced posteriorly. Genital segment symmetrical in dorsal and ventral view, widest part slightly anterior to middle; genital prominence high, anterior and posterior surfaces of genital prominence slope to meet ventral wall of genital segment at wide angle; genital field symmetrical in ventral view; genital flanges do not extend over entire genital field; posterior edge of genital field produced posteriorly, in lateral view seen as a lobe behind posterior lobe of genital flange. Appendicular caudal setae geniculate. Outer lobe 1 of maxilla 1 with seven setae, the proximal seta shorter than rest. None of the six apical setae of maxilla 2 covered with long spines in addition to short spinules. None of the long setae on endopod of maxilliped terminate in spinule. Leg 1 exopod: Bb = BC, Cc > BC. Leg 2 exopod: Aa = AB + ½Bb, Bb = ⅔BC, Cc = ⅝CD, Dd = ⅓CD.

REMARKS: *Paraeuchaeta* sp. C ressembles *P. confusa*, *P. laudabilis*, and *P. eltaninae*, but these three species are larger than *Paraeuchaeta* sp. C, have more setae on the outer lobe 1 of maxilla 1, and the genital prominence differs in lateral view and the genital field in ventral view. The damaged specimens of *Paraeuchaeta* sp. C are not conspicuously different from other species, but neither is it possible to place them in any described species.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
E904	0–1243	1 ♀, ≈ 5.6 mm
F745	0–1170	1 ♀, 5.68 mm

FAMILY PHAENNIDAE Sars, 1903

DEFINITION: Head and pedigerous segment 1 usually fused. Head sometimes with crest. Rostrum in form of bifurcated plate or with two filaments, rarely absent. Pedigerous segments 4 and 5 usually separate. Urosome short, genital segment not projected ventrally. Antenna 1 of 21–25 segments in female, fewer in male. Antenna 2 exopod six-segmented, at most one and one-half times as long as endopod. Maxilla 2 short; one stout spine-like seta on either lobe 4 or 5, or on both, bordered by short, often strong, spinules; lobe 5 without sensory filaments; endopod with one worm-like and seven brush-like sensory filaments. Legs strong; leg 1 endopod one-segmented, leg 2 endopod two-segmented, all other rami of legs 1–4 three-segmented; endopods of legs 2–4 wide and flat, with strong spinules on posterior surface; exopods of legs 2–4 often without conspicuous posterior surface spinules. Leg 5 generally present in female; small, uniramous and three-segmented. Male leg 5 asym-

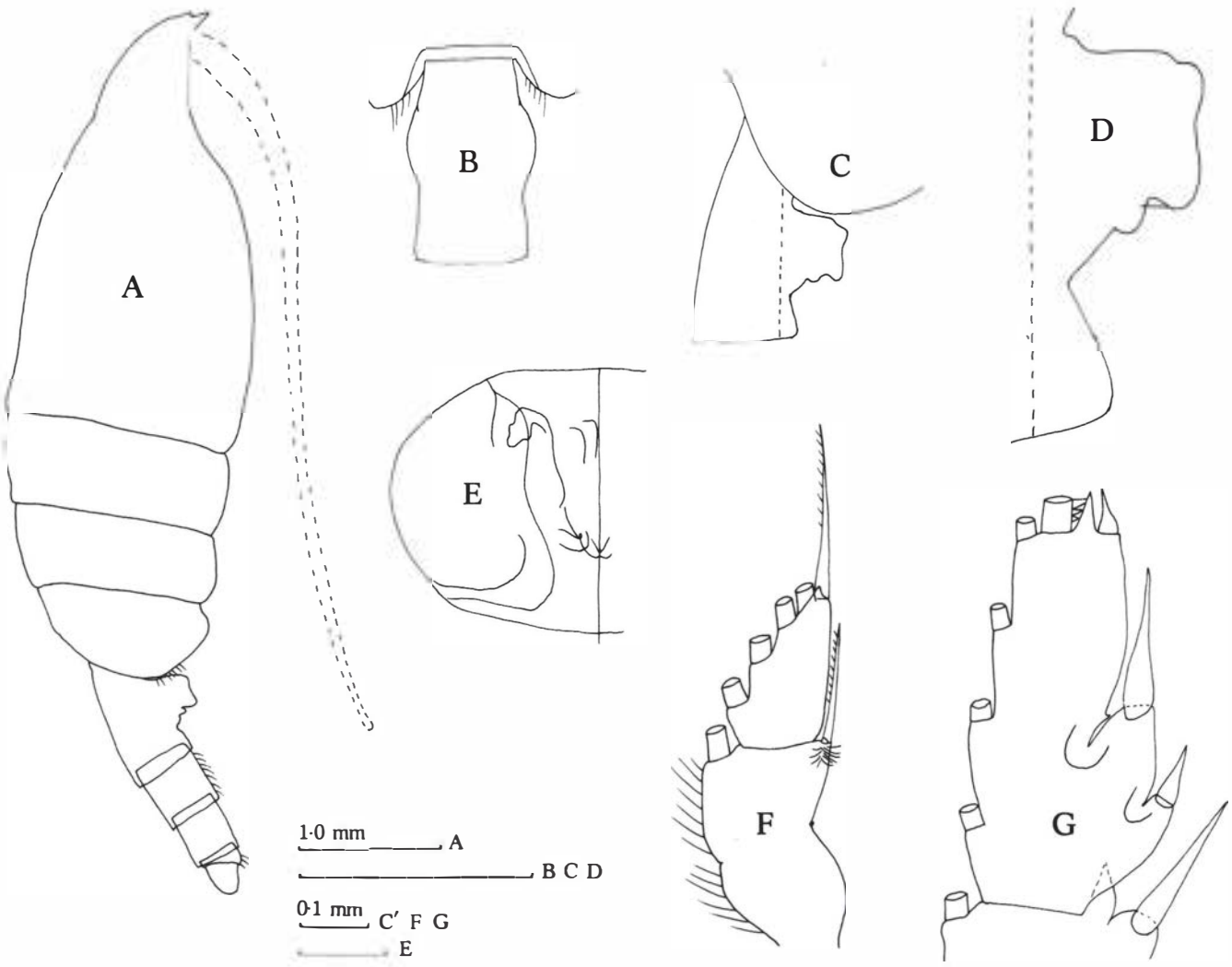


FIG. 32. *Paraeuchaeta* sp. B female from NZOI Stn E892: A, lateral view; B, dorsal view of genital segment; C, lateral view of genital segment; D, lateral view of genital prominence; E, genital field; F, exopod of leg 1; G, exopod segment 3 of leg 2.

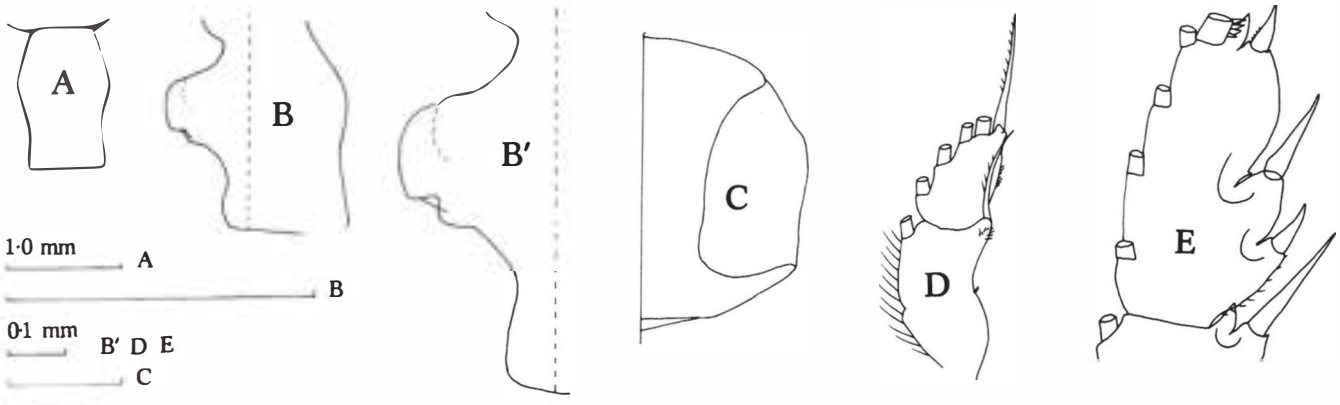


FIG. 33. *Paraeuchaeta* sp. C female from NZOI Stn E904: A, dorsal view of genital segment; B, lateral view of genital segment; B′, lateral view of genital prominence; C, genital field; D, exopod of leg 1; E, exopod segment 3 of leg 2.

metrical, usually uniramous, left leg longest; rudimentary endopods sometimes present.

(Bradford 1973)

A typical example of this family is *Phaenna spinifera* (Figs 34, 35).

REMARKS: Bradford (1973) redefined the Phaennidae and suggested the following genera be included in this family: *Brachycalanus, Cephalophanes, Cornucalanus, Onchocalanus, Phaenna* and *Xanthocalanus.* Roe (1975: 341) concurs with the removal of *Heteramalla* Sars, 1907 to the Scolecithricidae. A further genus, *Talacalanus* Wolfenden, 1911, has been redefined by Campaner (1978) to accommodate species formerly placed in *Xanthocalanus.* A new genus, *Xantharus* Andronov, 1981, has been placed in the Phaennidae. Andronov (1981) describes the terminal part of maxilla 2 as having only worm-like sensory filaments which would preclude its inclusion in the Phaennidae as defined here. The definition of this family awaits confirmation after all copepods with modified sensory terminal appendages on maxilla 2 have been re-examined.

Members of the family Phaennidae are medium to large forms which most often live at bathypelagic depths (Grice and Hulsemann 1967, Rose 1933) and may even be associated with the seabed (Matthews 1964). *Phaenna spinifera* may migrate to the surface at night (Vervoort 1965b).

Matthews (1964) made a few observations on the life history of *Xanthocalanus fallax* in Norwegian waters. The scarcity of nauplii in samples and the early appearance of young copepodites after an increase in males suggests the naupliar phase is short. It is possible that the number of stages is reduced since a narrow range of naupliar structure was observed. It appears the nauplii do not feed, as the yolk supply persists until the first copepodite stage. The annual life cycle consists of three main breeding seasons beginning in February, June and October, which result in peaks of young copepodites in March, August and September. The August peak is greatest, and after each peak the abundance of males falls rapidly.

The mouthparts of Phaennidae are adapted for seizing and chewing prey (Arashkevich 1969). The mandible is heavily sclerotised and the ventral teeth have sharp crowns. The lobes of maxilla 1 have dagger-shaped setae. The lobes of maxilla 2 have curved setae which may be especially large on lobes 4 and 5; the endopod has a tuft of sensory filaments. The Phaennidae are assumed to be predators though no record of their food composition is available. According to Matthews (1964) benthic Phaennidae appear to be scavengers. The adult male of *Xanthocalanus fallax* does not feed and has only a short life (Matthews 1964). The same is probably true for the males of other species which have reduced mouthparts.

Brachycalanus Farran, 1905

DEFINITION: Body robust, oval dorsally. Head and pedigerous segment 1 separate, pedigerous segments 4 and 5 fused or separate. Rostrum short with two filaments. Urosome densely covered with scale-like spinules, anal segment very small. Antenna 1 short, 24-segmented, with large aesthetes. Exopod of antenna 2 longer than endopod. Inner lobes 2 and 3 of maxilla 1 with two and four setae respectively. Endopod of maxilla 2 with one worm-like and seven? brush-like sensory filaments. Swimming legs with anterior and posterior surfaces of basal segments, exopods and endopods densely covered with scale-like spinules. Leg 5 three-segmented, terminal segment with two lateral and two terminal spines.

(Campaner 1978)

REMARKS: Farran (1905) erected this genus based on the shape of the rostrum (a broad, truncate plate in *B. atlanticus)* and the short antenna 1. Campaner (1978) redefined *Brachycalanus.* It appears that *Brachycalanus* hardly differs from *Xanthocalanus* apart from the very spinous surfaces of the swimming legs and the urosome.

The following species have been described: *Brachycalanus atlanticus* (Wolfenden, 1904) (♂ unknown); *B. bjornbergae* Campaner, 1978 (♂ unknown); *B. minutus* Grice, 1973 (♂ unknown); and *B. ordinarius* (Grice, 1973) (as *Xanthocalanus,* ♂ unknown). Campaner (1978) believes that *B. minutus* should not be retained in *Brachycalanus,* considering it to be *incertae sedis.* None of these species have been found in the south-west Pacific.

Cephalophanes Sars, 1907

DEFINITION: Similar to *Xanthocalanus* but recognised by two large frontal lenses, which are contiguous. Head and pedigerous segment 1, also pedigerous segments 4 and 5, separate. Antenna 1 25-segmented. Maxilla 2 terminated by six or seven slender brush-like appendages and perhaps one worm-like appendage. Female leg 5 three-segmented, the last segment with three or four spines; spinules on at least segments 1 and 2. Male leg 5 four-segmented on each side; right leg much shorter than left.

(Steuer 1926)

REMARKS: The following species have been described for this genus: *Cephalophanes frigidus* Wolfenden, 1911; *C. refulgens* Sars, 1907; *C. tectus* (Esterly, 1911) (*see* Grice 1969). None of these species has been taken in the south-west Pacific.

Cornucalanus Wolfenden, 1905

DEFINITION: Head and pedigerous segment 1 usually separate. Pedigerous segments 4 and 5 fused or separate. Head with or without spine. Antenna 1 24–25-segmented in female, fewer segments in male. Maxilla 2 has strong claw-like spine on lobe 5 as in *Onchocalanus*. Maxilliped endopod segments 2 and 3 each with a strong spine. Leg 5 uniramous, symmetrical in female, asymmetrical in male.

(Vervoort 1957, Tanaka 1960)

REMARKS: The following species have been described: *Cornucalanus antarcticus* Brodsky and Zvereva, 1976 (♂ unknown); *C. chelifer* (I. C. Thompson, 1903) (= *C. magnus* Wolfenden, 1911); *C. indicus* Sewell, 1929; *C. notabilis* Brodsky and Zvereva, 1976 (♂ unknown); *C. sewelli* Vervoort, 1957 (♂ unknown); *C. robustus* Vervoort, 1957 (♂ unknown); *C. simplex* Wolfenden, 1905 (♂ unknown).

One species has been taken in the south-west Pacific:

Cornucalanus chelifer (I. C. Thompson, 1903)

(Figs 36, 89)

DESCRIPTION: *Size:* ♀♀ 7.6–8.7 mm, ♂♂ 4.85–8.00 mm.

Female: Head and pedigerous segment 1 separate; head with spine. Antenna 1 24-segmented, hardly extending beyond metasome. Hook-shaped setae of maxilliped with row of widely spaced coarse spinules on basal part, while apical part is covered with fine spinules. Leg 5 three-segmented, with one terminal spine, and spinules on segment 3.

(With 1915, Vervoort 1957)

Male: Head without spine. Antenna 1 23-segmented, reaching posterior border of metasome. Maxilla 2 similar to that of *Onchocalanus cristatus*, but spine of lobe 4 is longer though less powerful than spine of lobe 5. Sensory setae of endopod distinctive, with short terminal filament and shorter brush-like setae. Maxilliped differs from that of female in not having the strong hook-shaped spines. Male varies very little from males of *Onchocalanus* except that the terminal sensory appendages of maxilla 2 are less atrophied and more irregularly shaped than in *Onchocalanus*. Right leg 5 three-segmented, with short terminal tooth; left leg 5 five-segmented, with short hairy terminal segment bearing small apical setae.

(With 1915, Rose 1933)

REMARKS: The female of the south-west Pacific specimens is in general like the original description, but antenna 1 is shorter. Some variation appears to exist in the number of segments in the shorter of the male leg 5. The present male specimen has spines on basipod segments 1 and 2 of the left leg, but otherwise agrees with the description of With (1915).

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Nil.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
VUZ93	0–1097	1 ♂, 6.3 mm
VUZ105	0–914	1 ♀, 7.6 mm

DISTRIBUTION: *Cornucalanus chelifer* has been recorded from deep waters of all oceans (Vervoort 1957, Tanaka 1960, Grice and Hulsemann 1967).

Onchocalanus Sars, 1905

DEFINITION: Female with head and pedigerous segment 1, as well as pedigerous segments 4 and 5, imperfectly separated. Head crested in some species. Rostrum in form of sclerotised, bifurcated plate. Antenna 1 24-segmented; in female segments 8 and 9 fused, in male segments 8–13 fused. Antenna 2 endopod and exopod nearly equal in length. Mandibular palp basipod 2 of female with three setae, endopod segment 1 with two setae, endopod segment 2 with nine setae; in male basipod 2 large. Female maxilla 1 inner lobe 1 with seven strong setae and three or four bristles; inner lobe 2 with three setae; inner lobe 3 with four setae; outer lobe 1 with nine setae; exopod with 10 setae; outer lobe 2 missing; basipod 2 with five setae; endopod segments 1–3 with three, two or three and four setae respectively. Female maxilla 2 lobe 5 with one seta claw-like and minutely denticulated near apex; endopod with seven brush-like and one worm-like sensory filaments. Maxilliped basipod 2 long with one proximal sensory appendage. Male maxillae 1 and 2 less well sclerotised and with weaker setae than female. Posterior surface of legs covered with spines. Female leg 5 three-segmented, first segment more or less fused with ventral surface of metasome; distal segment with two apical spines which may articulate with segment and an inner and outer spine; one of marginal spines, which usually are articulate, may be absent; posterior surface covered with strong hairs. Male leg 5 uniramous on each side; right leg short, three-segmented; left leg elongate, about as long as urosome and consists of two basal and three terminal segments.

(Vervoort 1950)

REMARKS: The genus contains the following species: *Onchocalanus affinis* With, 1915; *O. cristatus* (Wolfen-

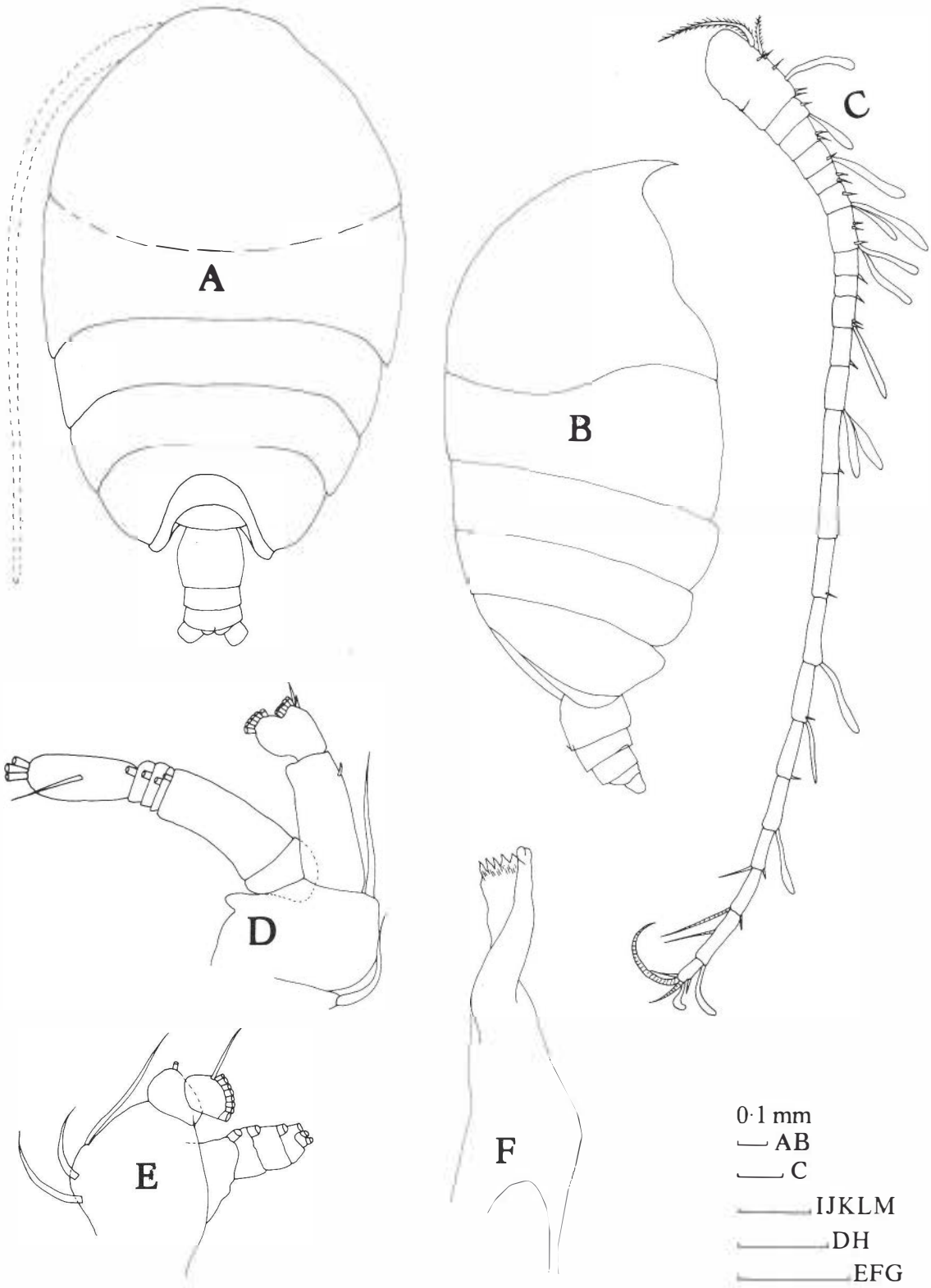
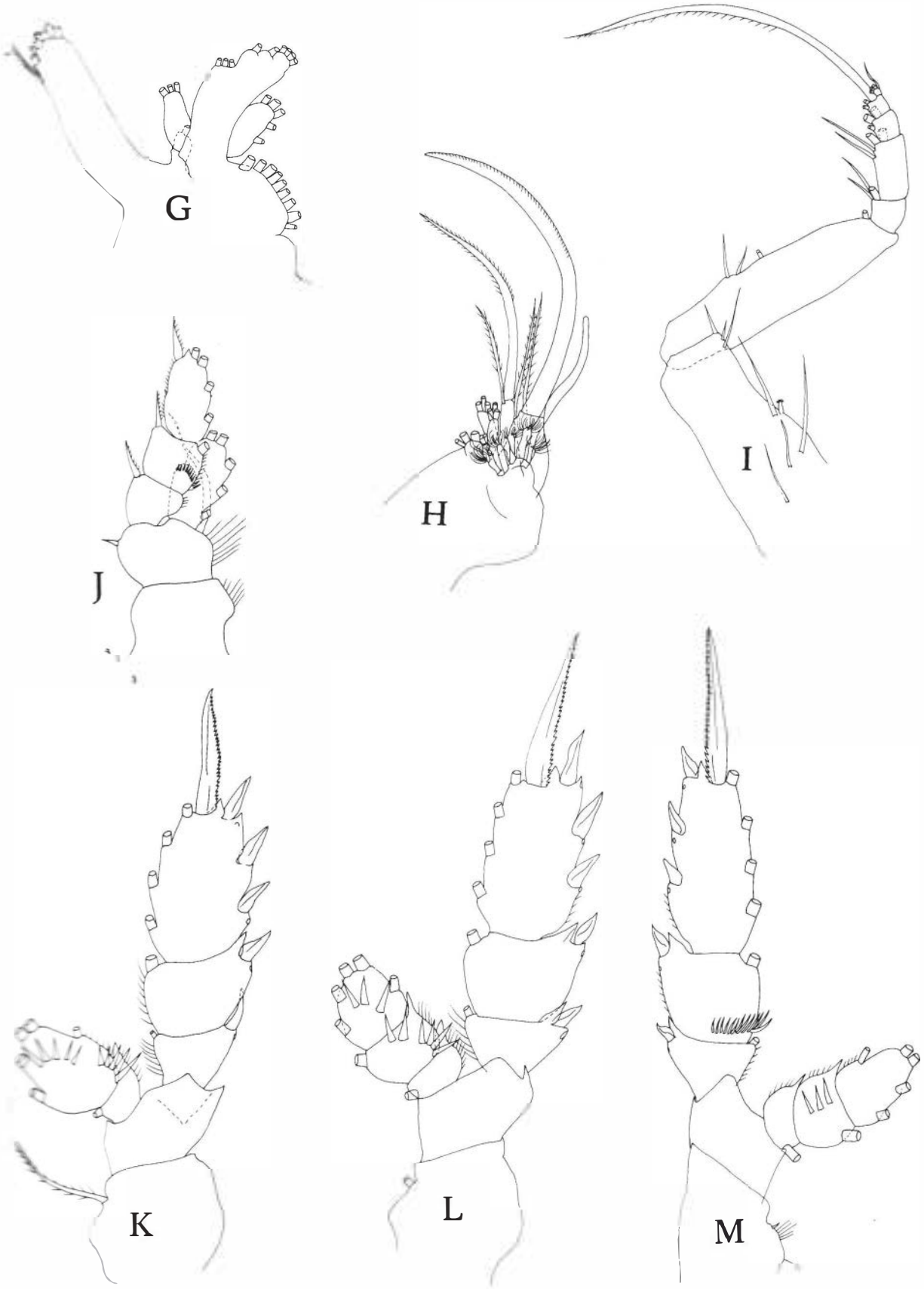
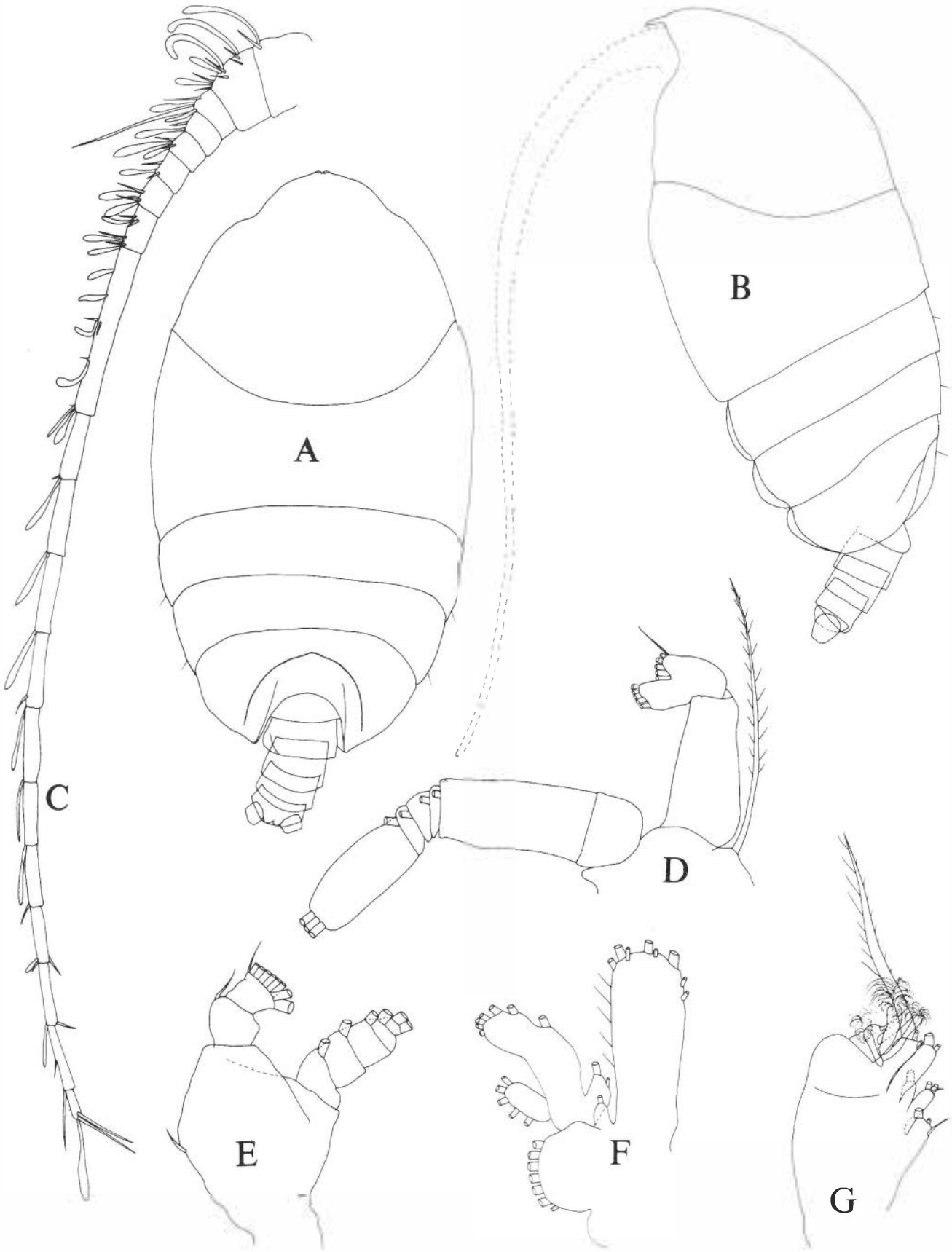


FIG. 34 (*above and opposite*). *Phaenna spinifera* female from NZOI Stn F945: A, dorsal view; B, lateral view; C, antenna 1; D, antenna 2; E, mandibular palp; F, mandible; G, maxilla 1; H, maxilla 2; I, maxilliped; J, leg 1; K, leg 2; L, leg 3; M, leg 4.





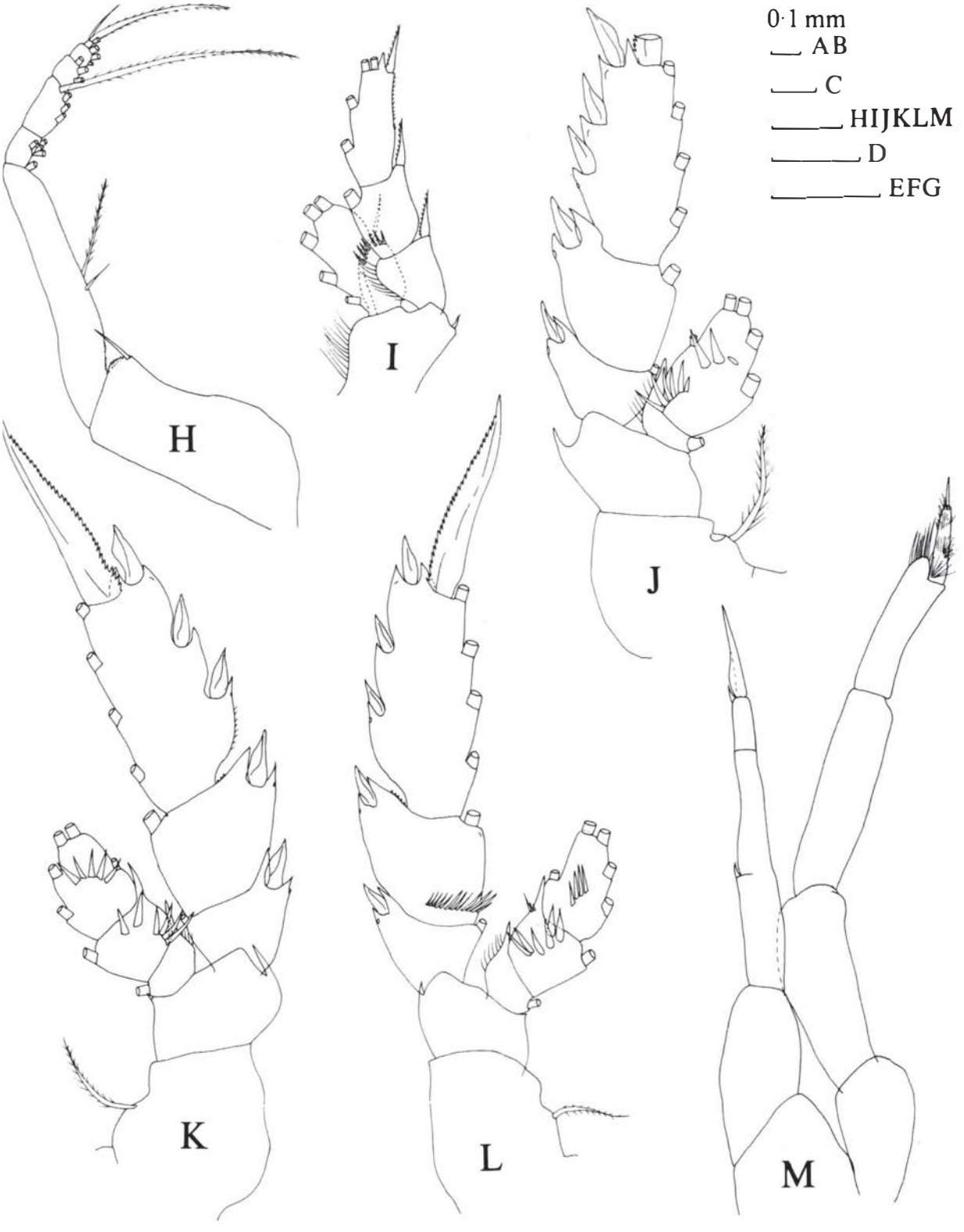


FIG. 35 (*opposite and above*). *Phaenna spinifera* male from NZOI Stn G144: A, dorsal view; B, lateral view; C, antenna 1; D, antenna 2; E, mandibular palp; F, maxilla 1; G, maxilla 2; H, maxilliped; I, leg 1; J, leg 2; K, leg 3; L, leg 4; M, leg 5.

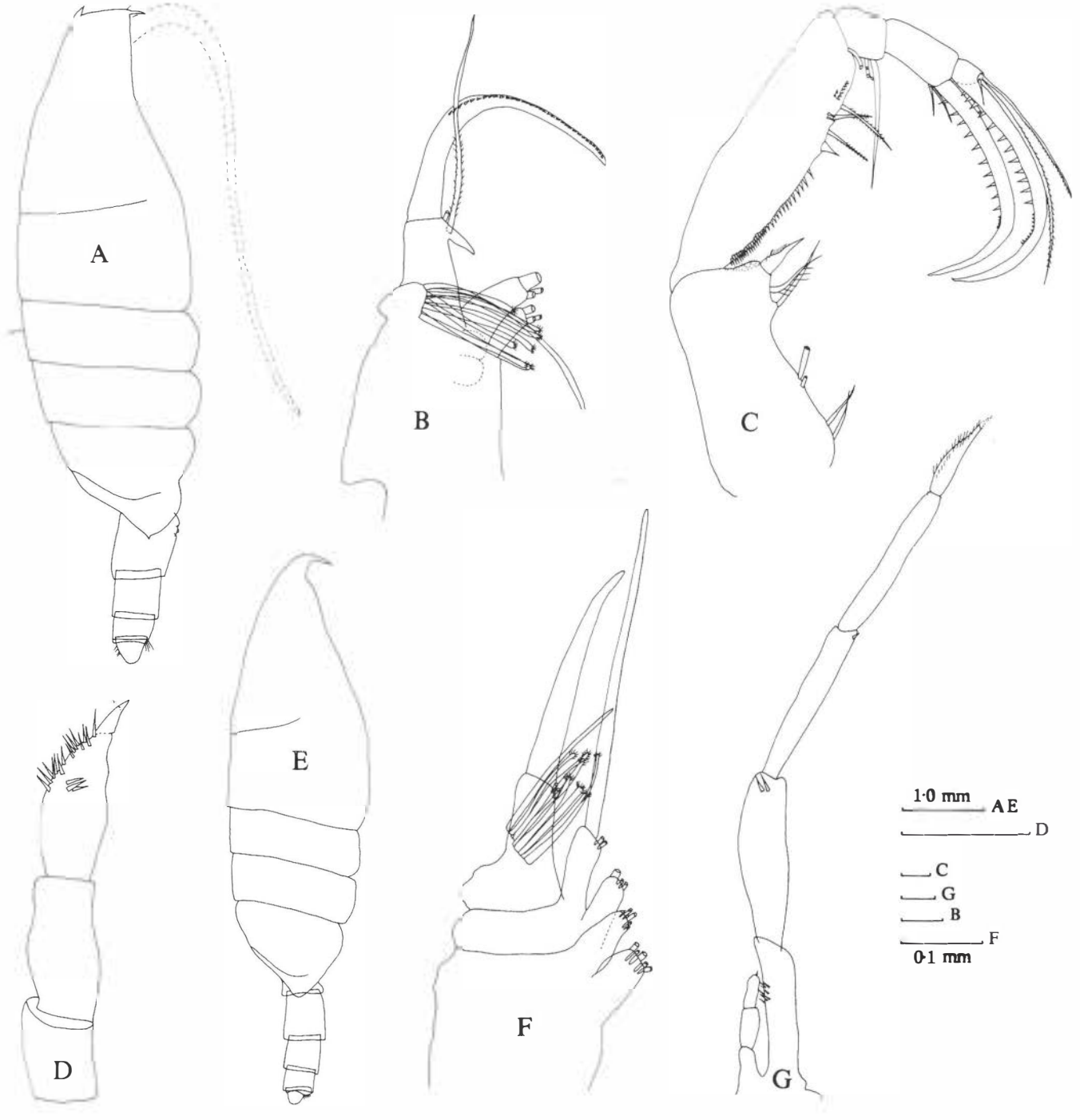


FIG. 36. *Cornucalanus chelifer* female from VUZ Stn 105: A, lateral view; B, maxilla 2; C, maxilliped; D, leg 5. Male from VUZ Stn 93: E, lateral view; F, maxilla 2; G, leg 5.

den, 1904) (= *Xanthocalanus similis* Esterly, 1906); *Onchocalanus hirtipes* Sars, 1905; *O. latus* Esterly, 1911 (♂ unknown); *O. magnus* (Wolfenden, 1906) (= *O. frigidus* Wolfenden, 1911) (♂ unknown); *O. scotti* Vervoort, 1950 (♂ unknown); *O. subcristatus* (Wolfenden, 1906) (♂ unknown); *O. trigoniceps* Sars, 1905 (= *O. steueri* Pesta, 1920); *O. wolfendeni* Vervoort, 1950 (♂ unknown).

The following species have been taken in the south-west Pacific:

Onchocalanus cristatus (Wolfenden, 1904)
(Figs 37, 89)

DESCRIPTION: *Size:* ♀♀ 5.0–8.15 mm, ♂♂ 5.6–6.5 mm.

Female: Head with distinct crest, which is rounded in lateral view. Posterolateral corners of metasome pointed. Antenna 1 extends as far as caudal rami. Leg 5 segment 3 longer than segment 2 but shorter than two basal segments combined; terminal segment tapers towards apex, which has two non-articulated spines and one articulated spine; posterior surface of leg 5 with long spiniform hairs.
(With, 1915)

Male: Head has relatively low crest. Antenna 1 extends to posterior border of urosome segment 3. Right leg 5 three-segmented, distal part composed of three incompletely fused segments; left leg 5 five-segmented, with about seven distal spines on segment 2 and one spine on segment 5.
(With 1915, Tanaka 1960)

REMARKS: The present female specimen agrees with the above description except for its shorter antenna 1. Vervoort (1950), however, describes the terminal joint of female leg 5 as having a spine on both the inner and outer margins, while the present specimen has the inner spine only. The male was not well preserved and some of the limbs were damaged. What exists of leg 5 appears in general to agree with With's (1915) description, although the distal part of the left leg segment 2 has only five spines. It is not possible to tell whether the distal joint has had a terminal spine, as it is damaged.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Nil.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
E904	0–1243	1 ♂, 5.6 mm
F945	500–1000	1 ♀, 6.65 mm

DISTRIBUTION: *Onchocalanus cristatus* is a deep-water species which has been recorded from the Atlantic and Indo-Pacific Oceans (Vervoort 1950).

Onchocalanus trigoniceps Sars, 1905
(Figs 38, 89)

DESCRIPTION: *Size:* ♀♀ 6.0–8.3 mm, ♂♂ 4.85–7.0 mm.

Female: Head poorly separated from pedigerous segment 1; pedigerous segments 4 and 5 separate. Head without crest. Antenna 1 24-segmented and extends as far as posterior margin of genital segment. Some setae of endopod of maxilliped coarsely denticulated. Leg 5 segment 3 as long as segments 1 and 2 together; one of two terminal spines of segment 3 non-articulated; inner and outer edge spine articulated and almost oppositely placed; anterior surface almost naked.
(Sars 1925, Vervoort 1950)

Male: General shape like that of female. Mouthparts less well-developed. Leg 5 as described for genus.
(Sars 1925)

REMARKS: The female specimen from the south-west Pacific deviates slightly from Vervoort's (1950) description. The anterior surfaces of leg 5 segments 2 and 3 are covered with short squat spinules. On segment 3 both terminal spines appear to be articulated; the region of articulation of the internal spine is placed more distally than that of the external spine. One of the sensory appendages terminating maxilla 2 is much wider than that figured by Vervoort (1950).

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Nil.

NEW RECORDS:

Station Number	Depth of haul (m)	Specimens
E788	0–1193	1 ♀, 6.7 mm

DISTRIBUTION: *Onchocalanus trigoniceps* has been taken from the deep waters of the Atlantic and Indo-Pacific Oceans (Vervoort 1950, Tanaka 1960).

Phaenna Claus, 1863

DEFINITION: Body large and globular. Rostrum bifurcate. Head and pedigerous segment 1 separate; pedigerous segments 4 and 5 incompletely separated. Antenna 1 of female 24-segmented, of male 20-segmented, with short feeble setae. Antenna 2 exopod longer than endopod. Masticatory process of mandible and inner lobe 1 of maxilla 1 very long; exopod of maxilla 1 short, with only five setae. Mouthparts of male reduced; maxilla 2 with one worm-like and seven brush-like filaments. Leg 5 absent in female; uniramous on each side of male, left leg five-segmented, right leg four-segmented.
(Claus 1863, Giesbrecht 1892, Bradford 1973)

REMARKS: There is only one species in this genus: *Phaenna spinifera* Claus, 1863. It has been taken in the south-west Pacific.

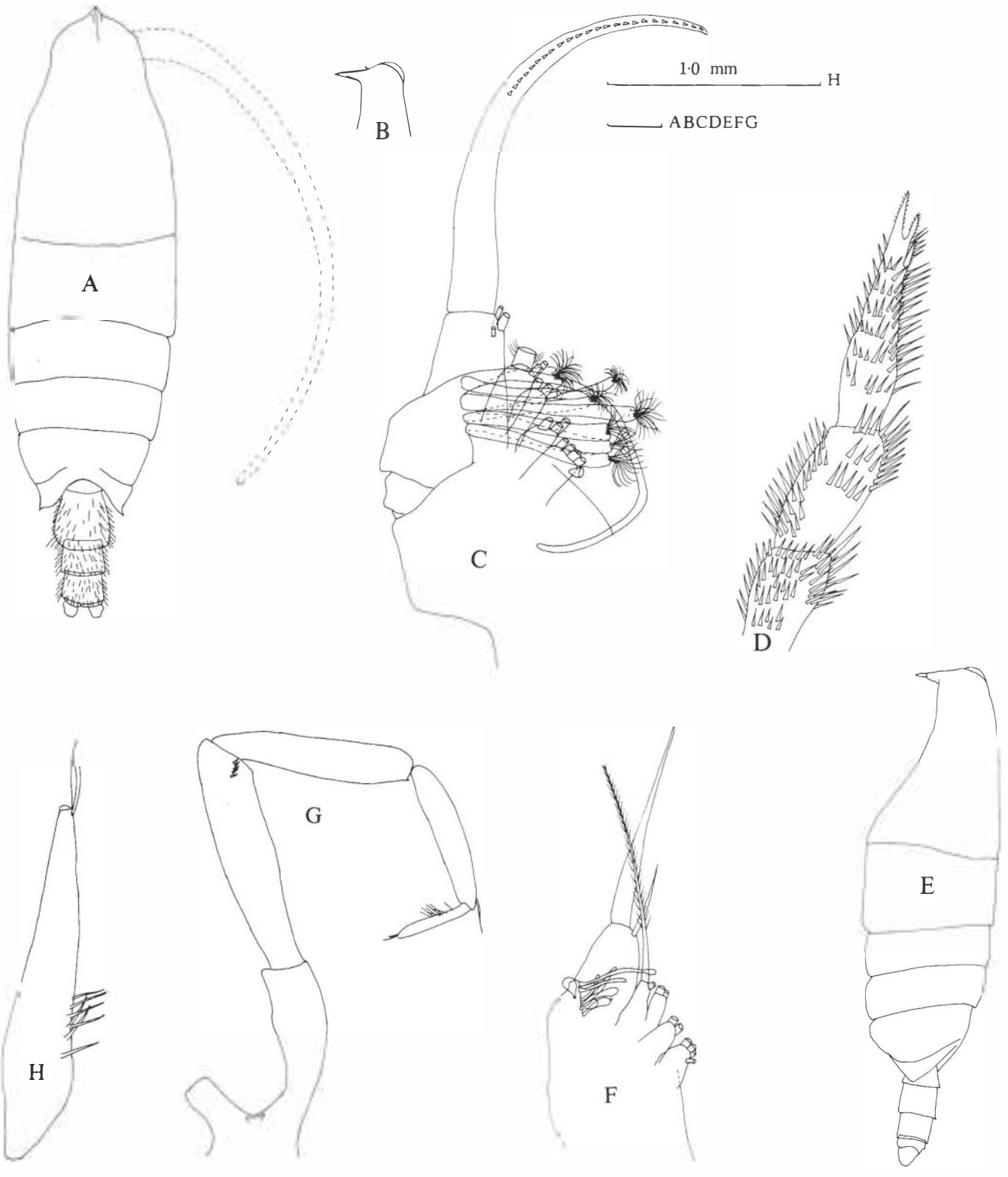


FIG. 37. *Onchocalanus cristatus* female from NZOI Stn F945: A, dorsal view; B, lateral view of rostrum; C, maxilla 2; D, leg 5. Male from NZOI Stn E904: E, lateral view; F, maxilla 2; G, leg 5; H, terminal part of left leg 5 exopod.

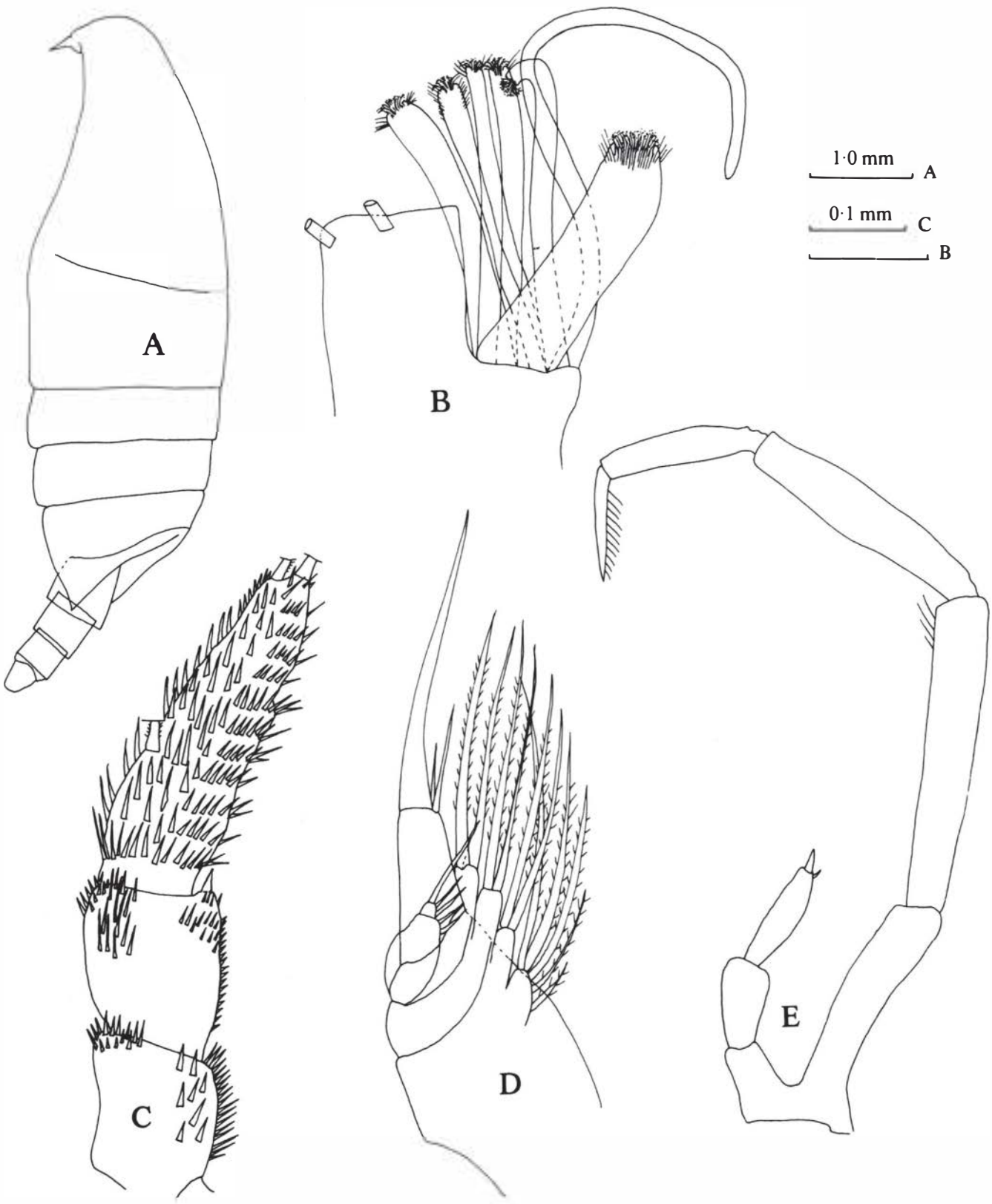


FIG. 38. *Onchocalanus trigoniceps* female from NZOI Stn E788: A, lateral view; B, maxilla 2; C, leg 5. Male (from Sars 1925): D, maxilla 2; E, leg 5.

Phaenna spinifera Claus, 1863

(Figs 34, 35, 89)

DESCRIPTION: *Size:* ♀♀ 1.8–2.9 mm, ♂♂ 1.8–2.5 mm.

Female: With characters of genus. Maxilla 1 inner lobe 1 with three posterior surface setae and total of 10 setae; inner lobe 2 with one long seta; inner lobe 3 with three setae; endopod short and fused with basipod. Maxilla 2 lobe 1 with five setae; lobes 2 and 3 with three setae; lobe 4 with two setae, one of them strong and distinctly curved; lobe 5 with very strong claw-shaped seta and two slender setae.

(Claus 1863, Giesbrecht 1892, With 1915)

Male: Very like female. Setation of mouthparts reduced. Leg 5 branches of almost equal length; left leg slightly longer.

(Claus 1863)

REMARKS: The south-west Pacific specimens appear to be very like those described by Giesbrecht (1892), although the number of setae on inner lobe 1 of maxilla 1 could not be verified because none of the specimens was intact.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Farran (1929), Bradford (1970b, 1972).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
F945	0–500	1 ♀, 2.05 mm
F946	0–200	1 ♀, 2.3 mm
G144	250–500	1 ♂, 2.5 mm

DISTRIBUTION: *Phaenna spinifera* is a mesopelagic species distributed over large areas of the tropical and subtropical Indo-Pacific Ocean. In the Atlantic Ocean it is more sparingly distributed, but reaches as far north as 54°53′N, although apparently only in deeper water. It is apparently able to perform rapid vertical migrations and may occur at or near the surface at night (Vervoort 1965b).

Talacalanus Wolfenden, 1911

DEFINITION: Head and pedigerous segment 1 separate. Pedigerous segments 4 and 5 fused. Anal segment very reduced. Antenna 1 24-segmented, extending approximately to posterior border of metasome; with few short setae. Endopod and exopod of mandibular palp of similar length, basal segment 2 broad with three setae. Inner lobe 1 of maxilla 1 well-developed, with razor-like setae; inner lobe 3 with three setae. Endopod of maxilla 2 with one worm-like filament and seven brush-like filaments in female; in male this part forming large bud-like structure. Endopod of maxilliped with razor-like setae. Terminal segment of female leg 5 with one terminal plus one or two subterminal spines. Male leg 5 very asymmetrical, with rudimentary endopods.

(Campaner 1978)

REMARKS: *Talacalanus* is very like *Xanthocalanus*, but is distinguished from it mainly by the broad razor-like setae on inner lobe 1 of maxilla 1 and the endopod of the maxilliped.

Campaner (1978) believes *Talacalanus* has two worm-like filaments on the terminal part of maxilla 2, unlike that figured by Wolfenden (1911); Tanaka and Omori (1967) describe *T. maximus* (as *Xanthocalanus*) as having eight bud-like sensory filaments.

Species recognised by Campaner (1978) as belonging to this genus are: *Talacalanus greeni* (Farran, 1905) (= *Xanthocalanus calaminus* Wolfenden, 1906); *Talacalanus maximus* (Brodsky, 1950); *Talacalanus (Xanthocalanus)* species 2 (Grice 1973). None of these species have been recorded from the south-west Pacific.

Xanthocalanus Giesbrecht, 1892

DEFINITION: Rostrum usually with two filaments. Head and pedigerous segment 1 more or less separate, pedigerous segments 4 and 5 fused or separate. Antenna 1 of 23–25 segments in female, fewer in male. Maxilla 1 inner lobe 1 with four posterior surface setae; none of setae on inner lobe 1 modified. Maxilla 2 with lobes 4 and 5 each with one of setae stout and spine-like; endopod with brush-like sensory filaments all different in size and shape, one usually much shorter and thicker than rest. Endopod of maxilliped without modified setae. Male mouthparts with varying degrees of degeneration. Maxilla 2 endopod similar to that of female or with largest brush-like sensory filament so enlarged as to almost obscure remaining filaments. Female leg 5 symmetrical, uniramous, two- or three-segmented and covered with spinules. Male leg 5 styliform, usually present on both sides; usually uniramous; rudimentary endopods sometimes present.

(Bradford 1973)

REMARKS: Bradford (1973) restricted to the Phaennidae those copepods having one worm-like and seven brush-like sensory filaments on the terminal part of maxilla 2. Among those species placed in *Xanthocalanus* existing descriptions of the maxilla 2 differ. It still remains unclear whether of not all *Xanthocalanus* have one worm-like and seven brush-like sensory

filaments. The recent description of *X. marlyae* by Campaner (1978) does not clarify the situation as the maxilla 2 of the female is described as having two worm-like and six brush-like filaments, yet in figure 12 this part is drawn with one worm-like and seven brush-like filaments, one of which is long and narrow.

The following species have been placed in this genus: *Xanthocalanus agilis* Giesbrecht, 1892 *(see* Roe 1975); *X. alvinae* Grice and Hulsemann, 1970 (♂ unknown); *X. amabilis* Tanaka, 1960 (♂ unknown); *X. antarcticus* Wolfenden, 1908 (♀ unknown); *X. borealis* Sars, 1900; *X. claviger* (T. Scott, 1909) (♀ unknown); *X. cornifer* (Tanaka, 1960) (as *Amallophora,* ♀ unknown); *X. crassirostris* (Tanaka, 1960) (as *Amallophora,* ♀ unknown); *X. difficilis* Grice and Hulsemann, 1965 (♂ unknown); *X. dilatus* Grice, 1962 (♂ unknown); *X. distinctus* Grice and Hulsemann, 1970 (♀ unknown); *X. echinatus* Sars, 1907; *X. elongatus* Grice and Hulsemann, 1970; *X. fallax* Sars, 1925 *(♂ see* Matthews 1964); *X. giesbrechti* I. C. Thompson, 1903 (♂ unknown); *X. gracilis* Wolfenden, 1911 (♂ unknown); *X. incertus* Sars, 1920 (*see* Sars 1925) (♂ unknown); *X. irritans* (Tanaka, 1960) (as *Amallophora,* ♀ unknown); *X. kurilensis* Brodsky, 1950; *X. legatus* Tanaka, 1960 (♂ unknown); *X. macilenta* (Grice and Hulsemann, 1970) (as *Amallophora,* ♀ unknown); *X. marlyae* Campaner, 1978 (♂ unknown); *X. medius* Tanaka, 1937 (♂ unknown); *X. minor* Giesbrecht, 1892 (= *X. fragilis* Aurivillius, 1898); *X. mixtus* Sars, 1920 (♂ unknown); *X. muticus* Sars, 1905 (♂ unknown); *X. obtusus* Farran, 1905 (♂ unknown); *X. oculata* (Tanaka, 1960) (as *Amallophora,* ♀ unknown); *X. pavlovskii* Brodsky, 1955 (♂ unknown); *X. pectinatus* Tanaka, 1960 (♀ unknown); *X. penicillatus* Tanaka, 1960 (♂ unknown); *X. pinguis* Farran, 1905; *X. polaris* Brodsky, 1950 (♂ unknown); *X. profundus* Sars, 1925 (♂ unknown); *X. propinquus* Sars, 1903 (♂ unknown); *X. pulcher* Esterly, 1911 (♂ unknown); *X. rotunda* (Grice and Hulsemann, 1970) (as *Amallophora,* ♀ unknown); *X. serrata* (Tanaka, 1960) (as *Amallophora,* ♀ unknown); *X. simplex* Aurivillius, 1898 (probably immature ♂); *X. soaresmoreirai* Bjornberg, 1975 (♀ unknown); *X. squamatus* Farran, 1936 (♂ unknown); *X. subagilis* Wolfenden, 1904; *X. tenuiremis* T. Scott, 1909 (♀ unknown); *X. tenuiserratus* Wolfenden 1911 (♂ unknown); *X. typicus* (T. Scott, 1894) (♀ unknown). Not all of these species are described well enough to either verify or reject their assignment to *Xanthocalanus*; the following do, however, differ significantly from the generic definition (*see* Bradford 1973): *X. alvinae, X. difficilis, X. distinctus,* and *X. elongatus.* In addition Campaner (1978) suggests that *X. echinatus, X. incertus, X. dilatatus, X. polaris, X. pulcher, X. tenuiremis,* and *X. giesbrechti* should also be removed from *Xanthocalanus.* He also suggests the species of *Xanthocalanus* can be split into two groups ("agilis" and "minor") and that some species possibly could be assigned to *Cephalophanes* if the presence of frontal lenses is not considered to be diagnostic.

Several species formerly included in *Xanthocalanus* have been tentatively assigned to the Tharybidae in this paper, including: *"X." hispidus* (=? *"X." paululus*), *"X." macrocephalon* and *"X." paraincertus.* Four other species have now been removed to other genera by Campaner (1978): *X. greeni* Farran, 1905 and *X. maximus* Brodsky, 1950 to *Talacalanus* Wolfenden, 1911, *X. watersae* Grice, 1973 to *Neoscolecithrix,* and *X. oridinarius* Grice, 1973 to *Brachycalanus.*

The following species have been taken in the south-west Pacific.

Xanthocalanus penicillatus Tanaka, 1960

(Figs 39, 89)

Xanthocalanus sp: Bradford 1972

DESCRIPTION: *Size:* ♀♀ 3.4–3.53 mm.

Female: Head and pedigerous segment 1 separate, pedigerous segments 4 and 5 fused. Rostrum with two fine filaments, base partly swol en in lateral view. First three urosome segments covered with small spinules. Antenna 1 reaches posterior border of metasome. Maxilla 2 endopod with one worm-like and seven brush-like sensory filaments, one of which is much thicker and shorter than others. Leg 5 three-segmented, distal joint with four terminal spines. All three joints have additional small spines and spinules. (Tanaka 1960)

Male: Unknown.

REMARKS: This south-west Pacific specimen agrees with Tanaka's (1960) description. *Xanthocalanus* sp. of Bradford (1972) could also belong to this species although the larger internal spine of leg 5 segment 3 is not as long as in Tanaka's (1960) description. Re-examination of this specimen revealed the presence of small spines on the urosome.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Bradford (1972, as *Xanthocalanus* sp.).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimen
VUZ105	0–914	1 ♀, 3.4 mm

DISTRIBUTION: This species has been taken at only one other place, off the coast of Japan in a 0–1000 m haul.

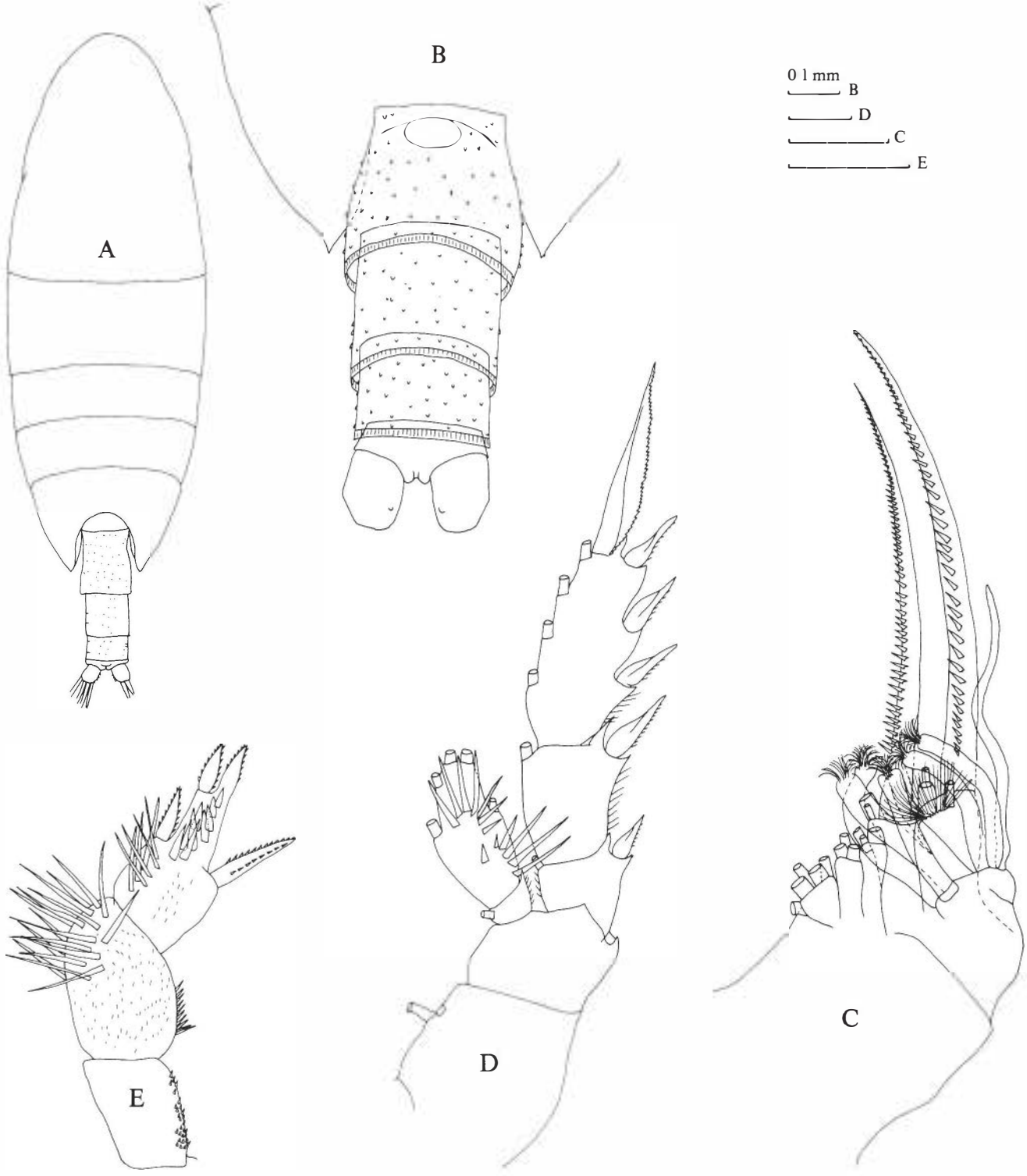


FIG. 39. *Xanthocalanus penicillatus* female (from Tanaka 1960): A, dorsal view. Female from VUZ Stn 105: B, ventral view of urosome; C, maxilla 2; D, leg 2; E, leg 5.

Xanthocalanus sp.

(Figs 40, 89)

DESCRIPTION: *Size:* ♀ 5.8 mm.

Female: Generally like other *Xanthocalanus*. Border between pedigerous segments 4 and 5 visible although segment does not appear to be moveable. Antenna 1 extends beyond pedigerous segment 3. Maxilla 2 endopod terminated by one worm-like appendage and seven brush-like appendages, one of which is much thicker and shorter than the others. Leg 5 three-segmented, segment 1 without spines, segment 2 with spines on outer part, distal segment with four large spines all articulated with the segment.

Male: Unknown.

REMARKS: Amongst those species of *Xanthocalanus* which have a three-segmented female leg 5 with four terminal spines and pedigerous segments 4 and 5 distinct, this specimen seems unique in having a naked internal border of leg 5 segments 1 and 2. Because of the damaged condition of this specimen it has not been given a name.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Nil.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimen
F881	0–1260	1 ♀, 5.8 mm

DISTRIBUTION: Not recorded in another collection.

FAMILY SCOLECITHRICIDAE Sars, 1903

DEFINITION: Head and pedigerous segment 1 fused. Rostrum of two filaments or a bifurcate plate. Head sometimes with crest. Pedigerous segments 4 and 5 usually fused. Urosome short, genital segment may project ventrally. Antenna 1 of 19–23 segments in female, fewer in male. Antenna 2 exopod six-segmented, at most one and one-half times length of endopod. Masticatory parts of mandible and maxilla 1 not strong. Maxilla 2 small, all lobes usually carrying ordinary non-thickened setae; lobe 5 with worm-like sensory filaments; endopod generally with three worm-like and five brush-like sensory filaments. Male mouthparts usually modified. Legs 2–4 with endopods flattened and usually broad; posterior surface of both rami with conspicuous spines; endopod one-segmented on leg 1, two-segmented on leg 2, all other rami three-segmented. Leg 5 usually present in female, uniramous, of two or three segments. Male leg 5 asymmetrical, usually biramous on both sides; basipods narrow and elongated on left leg, short on right leg with basipod 2 usually very swollen.

(Bradford 1973)

An example of this family is *Scolecithrix danae* (Figs 41, 42).

REMARKS: The following genera are placed in this family: *Amallothrix* Sars, 1925; *Heteramalla* Sars, 1907; *Lophothrix* Giesbrecht, 1895; *Macandrewella* A. Scott, 1909; *Mixtocalanus* Brodsky, 1950; *Parascaphocalanus* Brodsky, 1955; *Racovitzanus* Giesbrecht, 1902; *Scaphocalanus* Sars, 1900; *Scolecithricella* Sars, 1903; *Scolecithrix* Brady, 1883; *Scolecocalanus* Farran, 1936; *Scopalatum* Roe, 1975; *Scottocalanus* Sars, 1905; *Undinothrix* Tanaka, 1961.

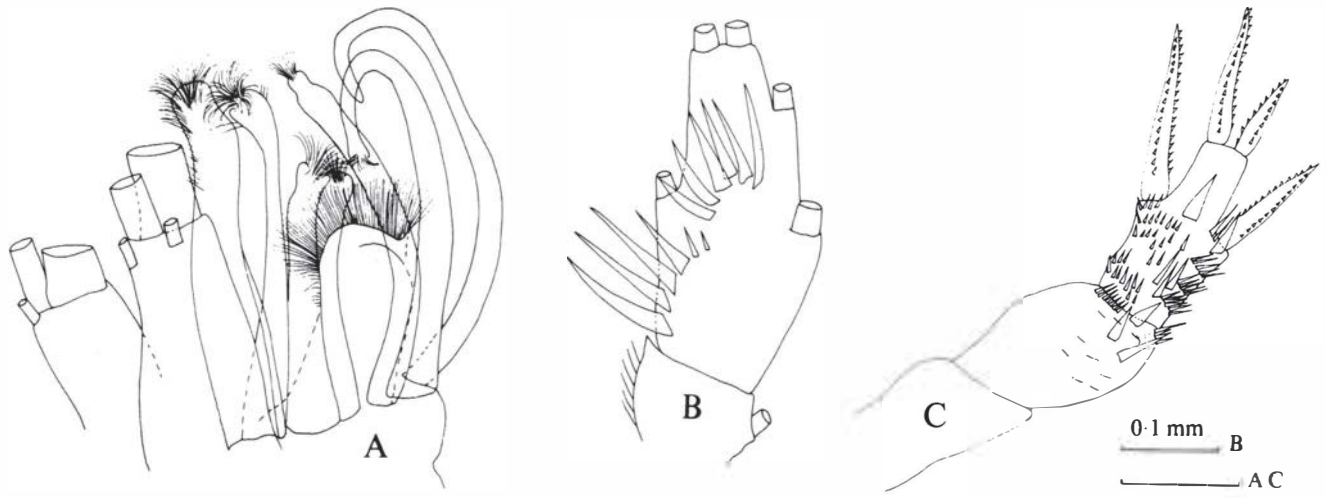


FIG. 40. *Xanthocalanus* sp. female from NZOI Stn F881: A, maxilla 2; B, exopod of leg 2; C, leg 5.

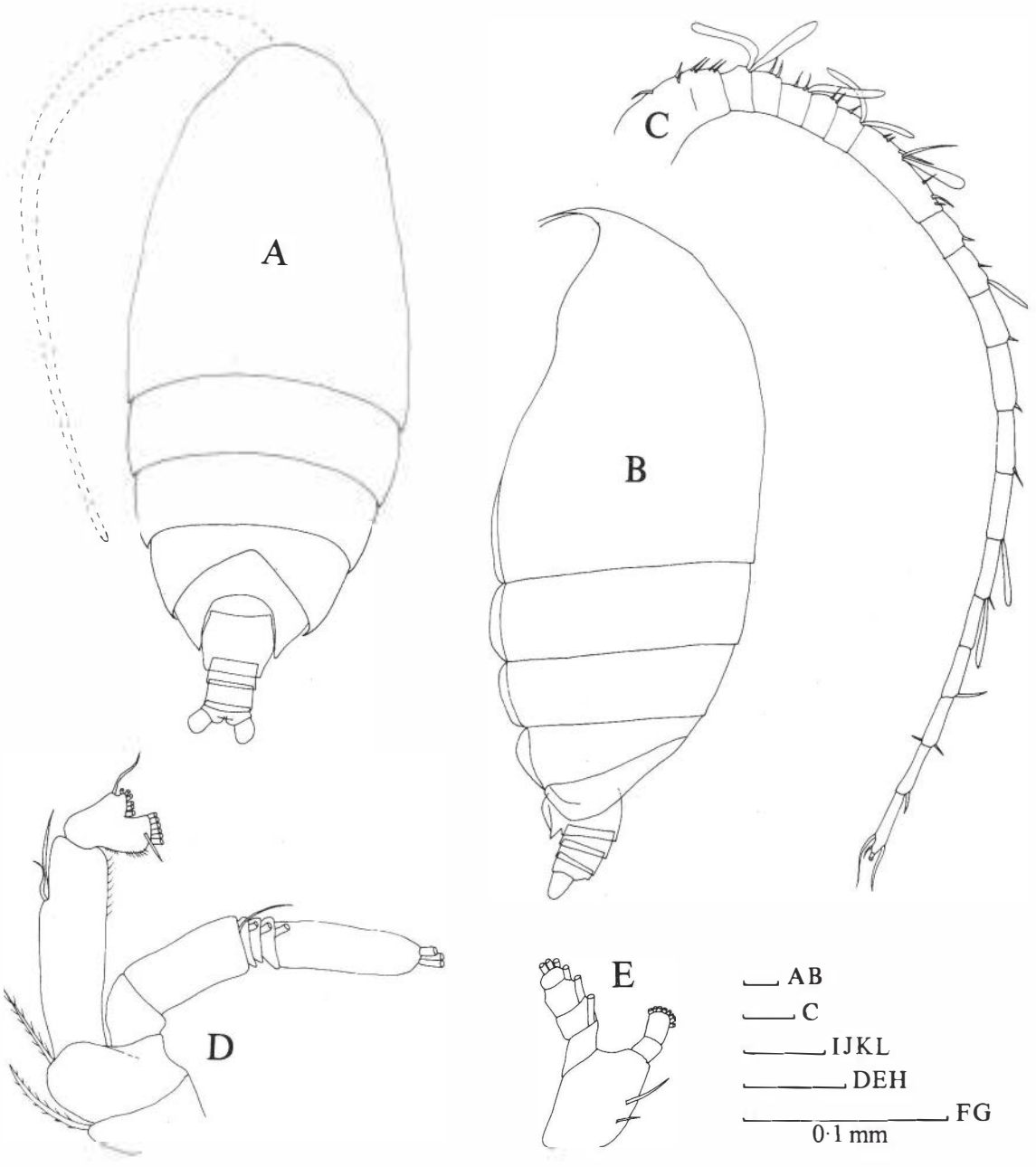
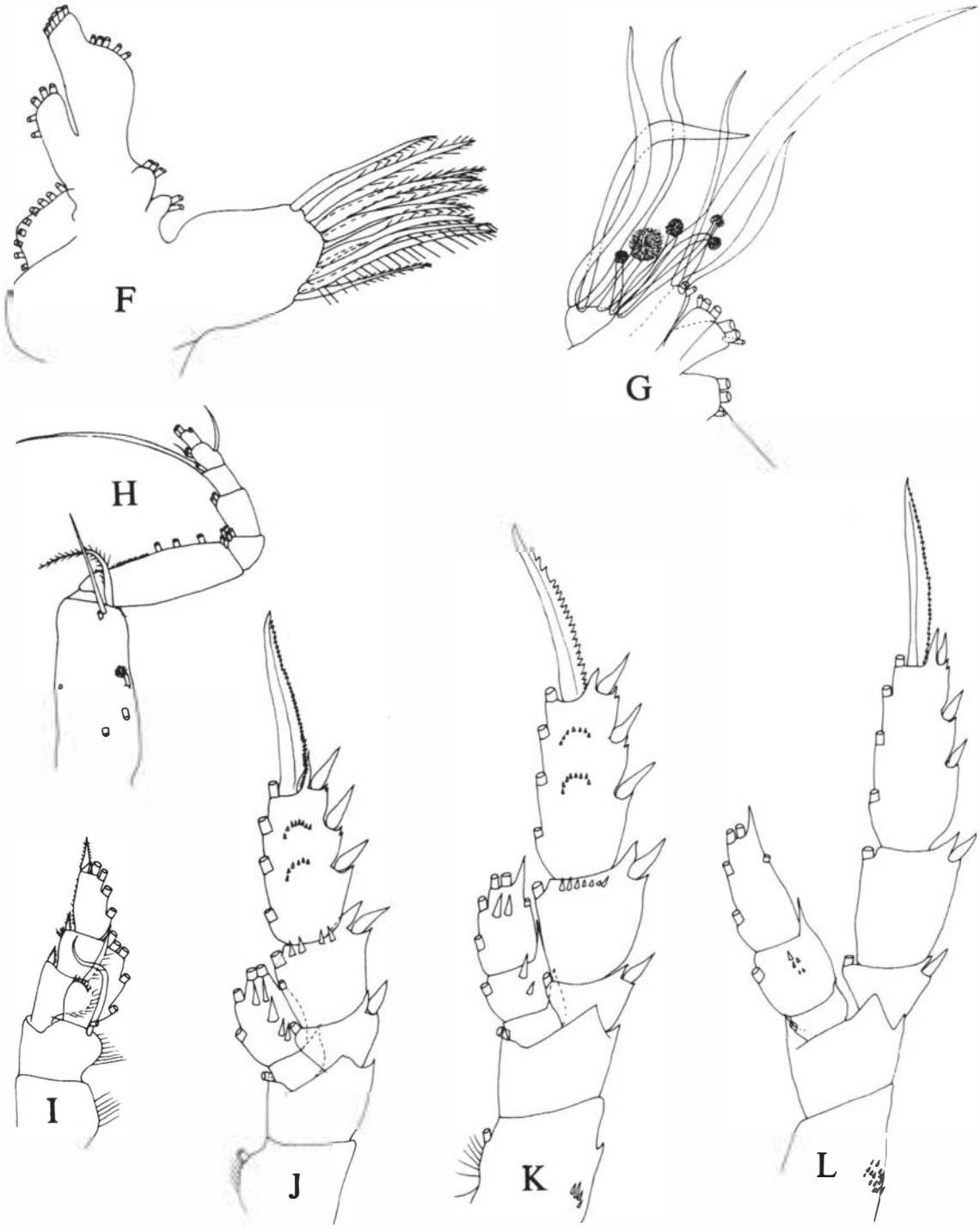


FIG 41. (*above and opposite*). *Scolecithrix danae* female from NZOI Stn F945: A, dorsal view; B, lateral view; C, antenna 1; D, antenna 2; E, mandible; F, maxilla 1; G, maxilla 2; H, maxilliped; I, leg 1; J, leg 2; K, leg 3; L, leg 4.

Since the attempt of Bradford (1973) to review this family it is apparent its definition and the limits of many of the genera which may be contained in this family are still uncertain (*see* Roe 1975).

At the moment the family definition rests principally on the numbers and type of sensory filaments on the terminal part of maxilla 2. Yet several species appear not to fit the definition. For example, *Racovitzanus antarcticus* has four worm-like and four brush-like sensory filaments, *R. porrectus* has five worm-like and three brush-like sensory filaments, while according to Tanaka (1961) *R. levis* has four worm-like and three brush-like sensory filaments. Roe (1975: 321) indicates that maxilla 2 of *Parascaphocalanus* Brodsky, 1955 differs from the above family definition although Brodsky does not specify the exact number of each kind of filament but illustrates two brush- and four worm-like filaments. *Scolecithricella canariensis* has three



worm-like and four brush-like filaments (Roe 1975: 323) and *S. modica* is described as having eight worm-like filaments (Tanaka 1962).

It is conceivable that some of the brush-like filaments which have a very small head (as in figure 21 of Bradford (1973)) have been mistaken for worm-like filaments. This appears to be the case for *S. laminata* which Grice and Hulsemann (1965) illustrate with worm-like filaments alone but which Roe (1975) describes as having two brush-like and six worm-like filaments.

Members of the family Scolecithricidae are medium to small copepods. Species of *Scolecithrix*, *Scolecithricella* and possibly *Macandrewella* are epipelagic

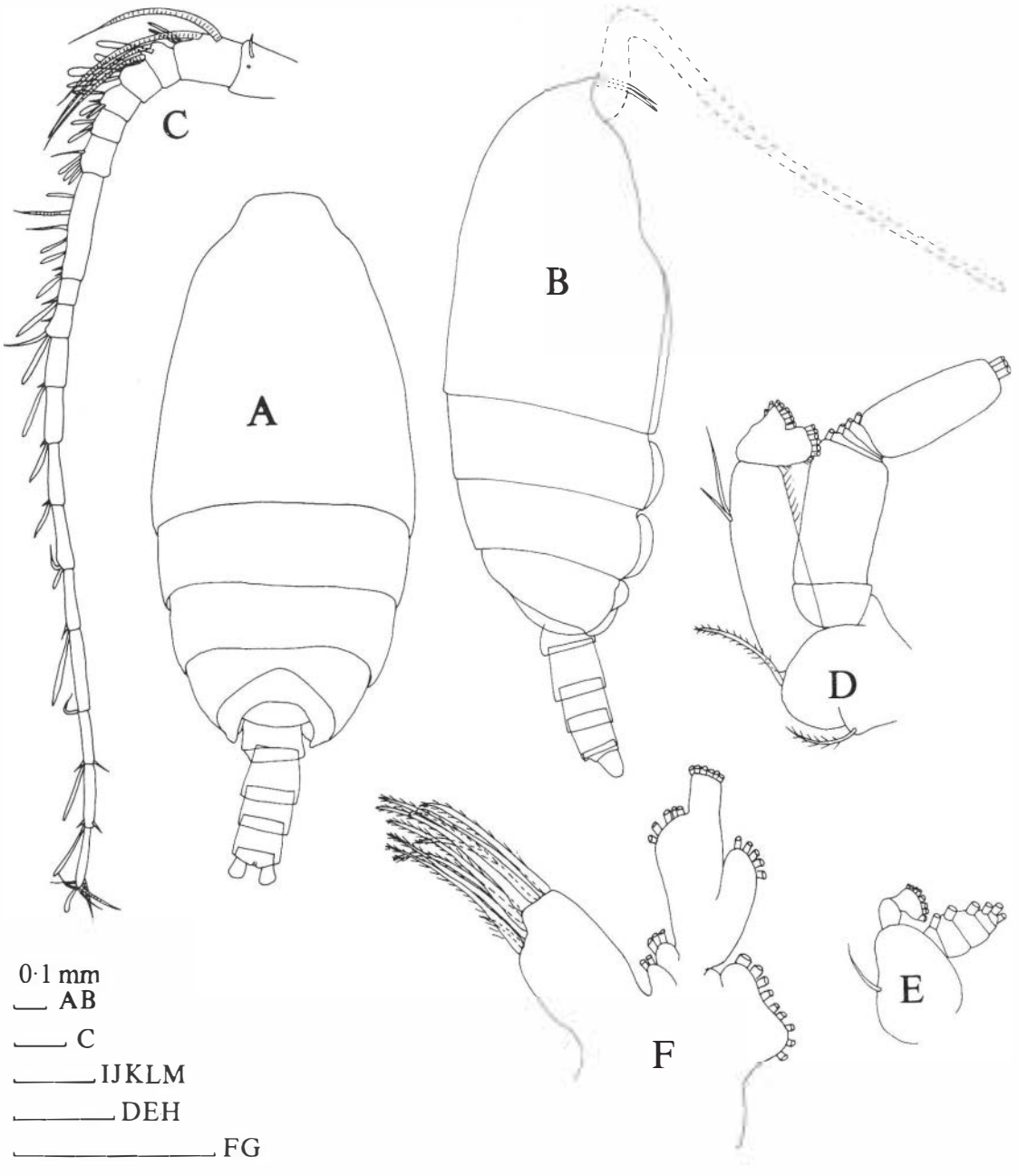
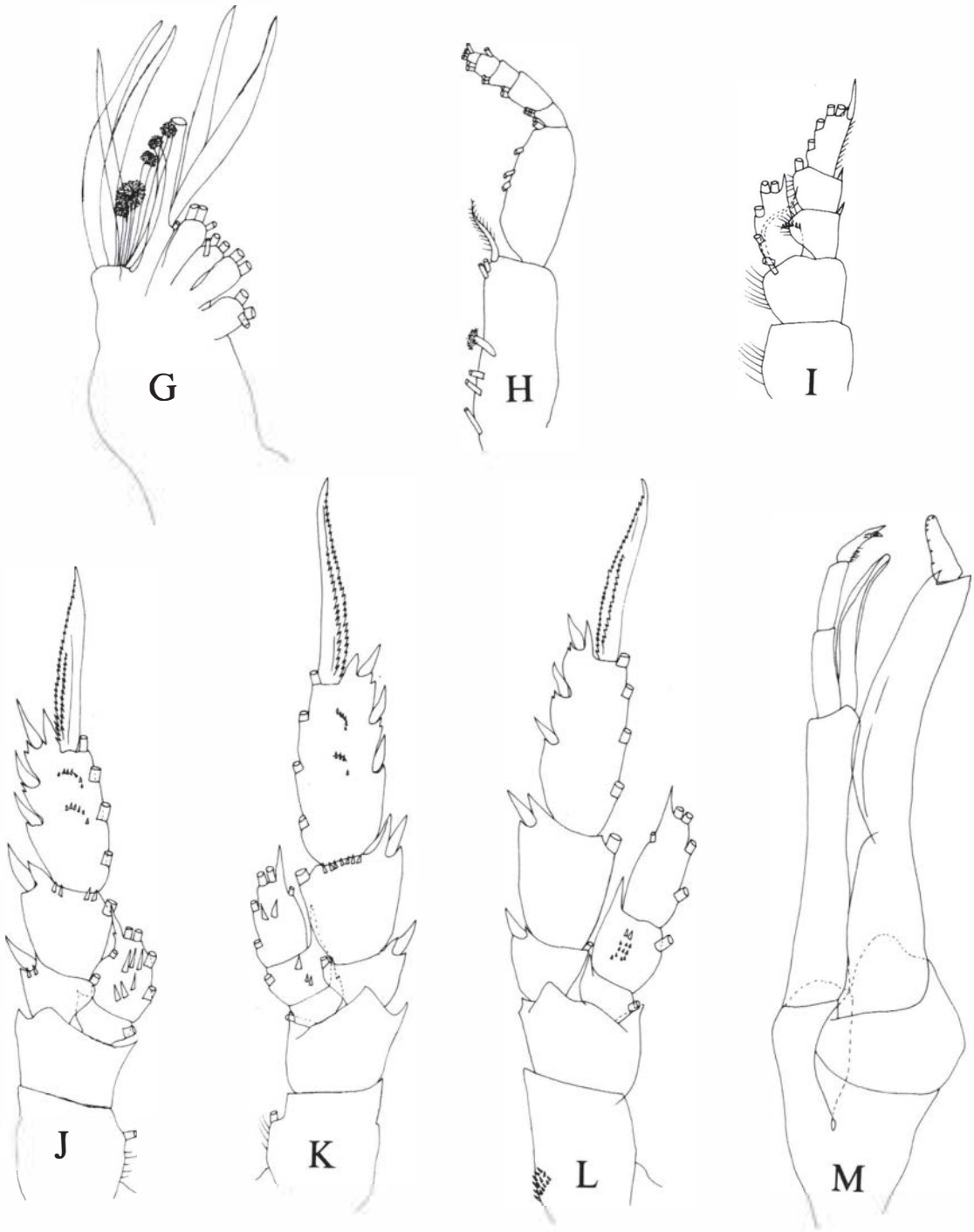


FIG. 42 (*above and opposite*). *Scolecithrix danae* male from NZOI Stn F945: A, dorsal view; B, lateral view; C, antenna 1; D, antenna 2; E, mandibular palp; F, maxilla 1; G, maxilla 2; H, maxilliped; I, leg 1; J, leg 2; K, leg 3; L, leg 4; M, leg 5.

(Farran 1936, Grice 1962). The remainder are mesopelagic or bathypelagic, but may perform diurnal vertical migrations into near-surface layers (Farran 1926).

The Scolecithricidae seem to be mixed feeders with the mouthparts adapted for seizing and filtration (Arashkevich 1969, Wickstead 1962). In the genus *Scaphocalanus* the mandible has a high cutting edge capped by sharp crowns. Maxilla 1 has stiff setae on the inner masticatory lobes and plumose setae on the remaining lobes. Maxilla 2 has pointed setae on the first three lobes and claw-like setae on lobes 4 and 5, while the terminal part bears sensory filaments. The maxilliped has long plumose setae (Arashkevich 1969).

The gut contents of several species from various genera investigated by Arashkevich (1969) indicates that scolecithricids eat diatoms, silicoflagellates, forams, radiolaria, coccolithophorids, polychaetes, and



crustaceans. Harding (1974) found that the gut of *Racovitzanus levis* contained amorphous homogeneous material which he interpreted as being the tissues of larger zooplankton organisms. Adult males probably do not feed. The male of *Scaphocalanus magnus* has only a thread-like digestive tract and reduced feeding appendages (Harding 1974).

Amallothrix Sars, 1925

DEFINITION: Pedigerous segments 4 and 5 fused in female, with fusion line sometimes showing dorsally; may be separate in male. Rostrum of two filaments. Antenna 1 of 22–23 segments in female, 19–21 segments in male. Maxilla 1 inner lobe 1 with two

posterior surface setae; inner lobe 3 with four setae; endopod segment 1 separated from segments 2 and 3. Leg 1 exopod segment 1 usually with an external spine. Male mouthparts slightly reduced. Female leg 5 uniramous, three-segmented, although two or all segments may be fused; terminal segment with two to four spines, inner one of which is longest; surface of leg often ornamented with small spinules. Male left leg 5 endopod usually shorter than exopod, not extending past distal part of exopod segment 2; right leg 5 endopod short, at most reaching slightly further than distal part of basipod segment 2.

(Bradford 1973)

REMARKS: This genus certainly contains the following species: *Amallothrix arcuata* (Sars, 1920) (= ?*Scolecithricella pseudoarcuata* Park, 1970; = ?*Amallophora robusta* T. Scott, 1894) (♂ *see* Sewell 1947); *Amallothrix dentipes* (Vervoort, 1951) (♂ *see* Vervoort 1957); *A. emarginata* (Farran, 1905) (= *Scolecithrix polaris* Wolfenden, 1911; = ?*Scolecithrix inornata* Esterly, 1906; = ?*Scolecithrix aequalis* Wolfenden, 1911, *see* Sewell 1947); *Amallothrix falcifer* (Farran, 1926) (♂ *see* Roe 1975); *A. gracilis* (Sars, 1905) (♂ *see* Tanaka 1962) (= *Scolecithrix globiceps* Farran, 1908); *Amallothrix hadrosoma* (Park, 1980); *A. parafalcifer* (Park, 1980); *A. pseudoarcuata* (Park, 1970) (♂ unknown); *A. pseudopropinqua* (Park, 1980); and *A. robusta* (T. Scott, 1894) (*see* Vervoort 1957) (♂ unknown). The following species differ from the generic description by having three posterior surface setae on inner lobe 1 of maxilla 1 as in *Scaphocalanus* and have a male and female leg 5 atypical for the genus (Roe 1975: 334): *Amallothrix altera* (Farran, 1929) (♂ *see* Park 1980); *A. auropecten* (Giesbrecht, 1892) (♂ *see* Rose 1942); *A. lobophora* (Park, 1970) (♂ *see* Roe 1975); and *A. vervoorti* (Park, 1980).

The following species probably belong in *Amallothrix*, but this cannot be confirmed because of incomplete descriptions of the mouthparts: *Scolecithrix aculeata* Esterly, 1913 (♂ unknown); *Scolecithricella curticauda* A. Scott, 1909 (♂ unknown); *S. denticulata* Tanaka, 1962 (♀ unknown); *Scolecithrix elephas* Esterly, 1913 (♂ unknown); *S. incisa* Farran, 1929 (♂ unknown); *Amallothrix indica* Sewell, 1929 (♂ *see* Grice and Hulsemann 1967); *A. invenusta* Wilson, 1950 (♂ unknown); *Scolecithricella lanceolata* Tanaka, 1962 (♀ unknown); *S. lobata* Sars, 1920 (♂ unknown); *Scolecithrix magnus* Wolfenden, 1911; *Scolecithricella marquesae* Vervoort, 1965 (♂ unknown); *Scolecithrix medius* Wolfenden, 1911 (♂ unknown); *S. mollis* Esterly, 1913 (♂ unknown); *Amallophora obtusifrons* Sars, 1905 (♂ unknown) (= *Scolecithricella tydemani* A. Scott, 1909); *Scolecithricella propinqua* Sars, 1920 (♂ unknown); *S. spinata* Tanaka, 1962 (♂ unknown); *S. timida* Tanaka, 1962 (♂ unknown); *Scolecithrix valens* Farran, 1926 (♂ unknown) (= ?*Amallothrix paravalida* Brodsky, 1950); *Scolecithrix valida* Farran, 1908 (♂ *see* Brodsky 1950).

The following species have been taken in the south-west Pacific:

Amallothrix arcuata (Sars, 1920)

(Figs 43, 90)

DESCRIPTION: *Size:* ♀♀ 2.49–2.8 mm, ♂♂ 2.94–3.00 mm.

Female: Body robust, broadly rounded anteriorly when seen in dorsal view. Posterolateral corners of metasome slightly produced and rounded. Urosome one-third length of metasome. Genital segment as long as two following segments, genital prominence slightly produced ventrally. Rostrum with short filaments. Antenna 1 23-segmented and extends to urosome segments 3 or 4. Legs 2 and 3 exopod segment 1 with long curved outer edge spine. Posterior surface of leg 2 endopod segment 2 with three semicircles of spinules. Leg 3 endopod segment 2 with six spinules in half-circle; endopod segment 3 with two groups of spinules, one with three and the other with five spinules. Legs 3 and 4 basipod (especially basipod segment 2) and exopod segments with fish-like scales on anterior surface. Leg 5 segments all more or less fused, terminated by short spine; inner edge spine placed in middle of terminal segment and longer than segment; outer edge with two denticles, one opposite inner edge spine and one beside terminal spine.

(Sars 1925, Sewell 1947, Tanaka 1962)

Male: General shape as in female. Mouthparts well developed and maxilla 1 identical with that of female. Right leg 5 endopod one-segmented and very short. Left leg 5 endopod two-segmented, extends almost to distal end of exopod segment 2; endopod segment 1 with tubercle at middle of inner edge, segment 2 small and stylet-shaped, placed at expanded part of segment 1; exopod segment 3 has hairs on inner border.

(Sewell 1947)

REMARKS: The south-west Pacific specimens have an extra small spinule on the posterior surface of leg 2 endopod 2 compared to Sars' (1925) illustration. Some variation in the female leg 5 has been noted. A specimen from Station F946 does not have the denticle at the base of the terminal spine. Park (1970) states that *A. arcuata* as described by Sewell (1947) and Tanaka (1962) is identical with *A. pseudoarcuata*, which he distinguishes from *A. arcuata* by differences in the swimming legs. In our opinion the illustrations of the swimming legs of *A. arcuata* made by Sars (1925), Sewell (1947) and Tanaka (1962), and of *Scolecithricella pseudoarcuata* made by Park (1970), differ very little. We think that *S. pseudoarcuata* is probably a junior synonym of *A. arcuata* (Sars, 1920).

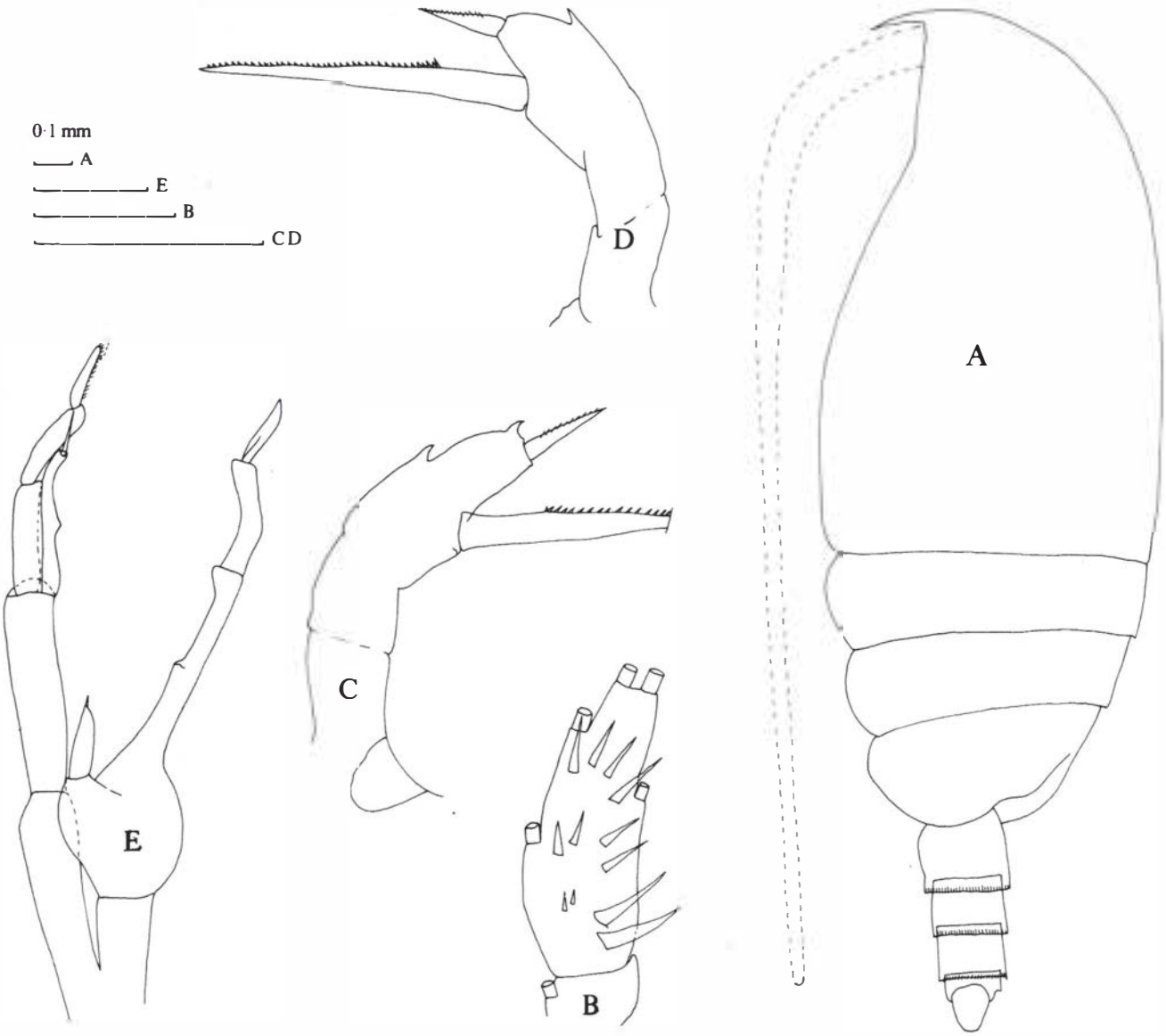


FIG. 43. *Amallothrix arcuata* female from NZOI Stn F946: A, lateral view; B, endopod of leg 2; C, leg 5. Female from NZOI Stn A303: D, leg 5. Male from NZOI Stn F946: E, leg 5.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Nil.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
A303	450–1000	1 ♀, 2.7 mm
F945	500–1000	1 ♀, 2.6 mm
F946	0–1000	2 ♀♀, 2.7, 2.6 mm
		1 ♂, damaged
VUZ112	0–732	1 ♀, 2.8 mm
Mu67/94s	0–1000	1 ♀, 2.65 mm
Mu67/104s	0–823	1 ♀, 2.7 mm

DISTRIBUTION: *Amallothrix arcuata* is a bathypelagic species taken in the warmer parts of the Atlantic, Indian, and Pacific Oceans (Tanaka 1962, Grice and Hulsemann 1967).

Amallothrix auropecten (Giesbrecht, 1892)
(Figs 44, 90)

DESCRIPTION: *Size*: ♀♀ 1.8–2.5 mm, ♂♂ 2.2–2.51 mm.

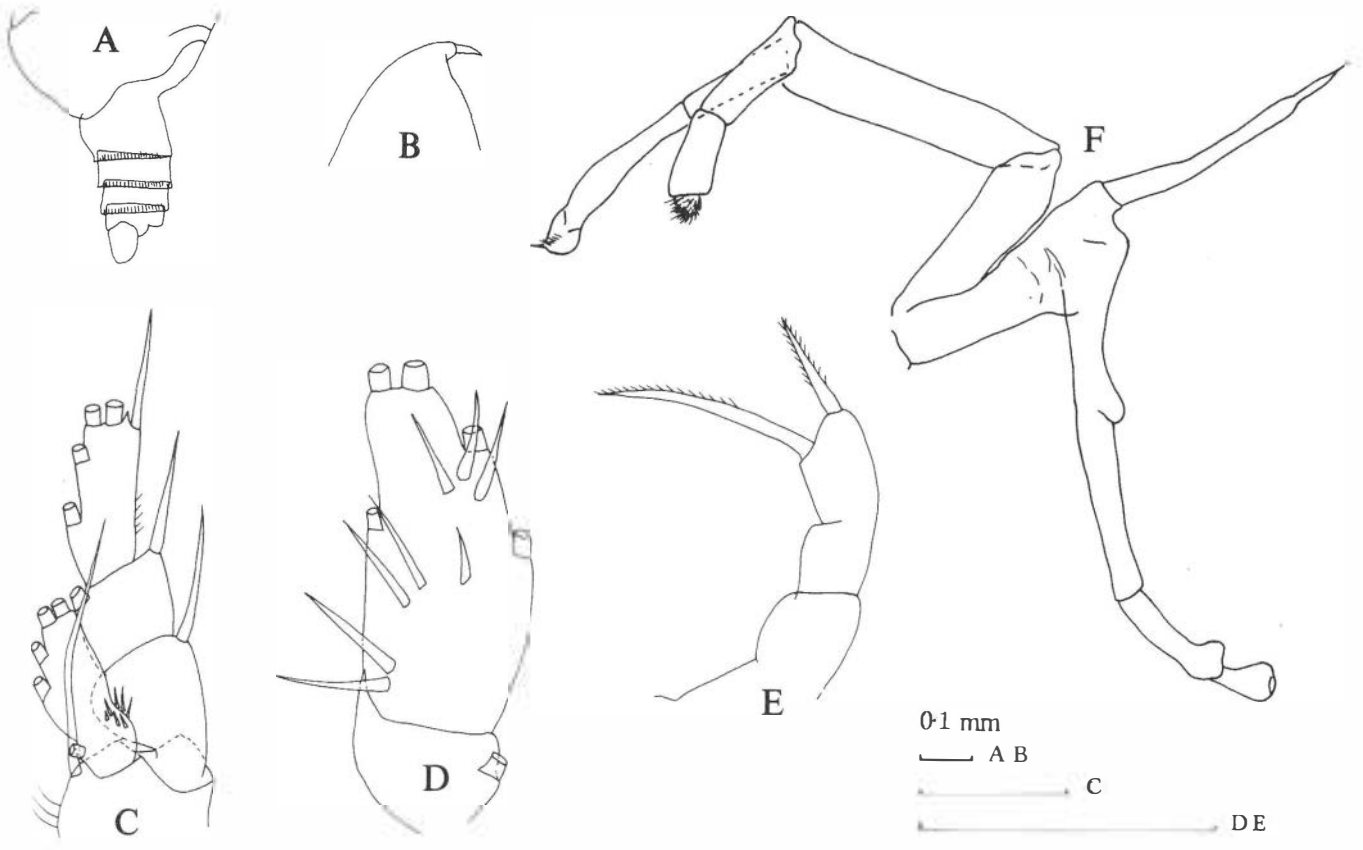


FIG. 44. *Amallothrix auropecten* female from NZOI Stn C537: A, lateral view of metasome posterolateral corner and urosome; B, rostrum; C, leg 1; D, endopod of leg 2; E, leg 5. Male (from Rose 1942): F, leg 5.

Female: Head broadly rounded in dorsal view; posterolateral corners of metasome pointed in dorsal view but rounded in lateral view. Urosome short, only one-fifth length of metasome. Antenna 1 23-segmented with many large sensory appendages, reaches to pedigerous segment 4. Leg 5 with two terminal segments fused, two spines on distal segment, inner edge spine twice as long as terminal spine.

(Giesbrecht 1892, Rose 1942)

Male: In general like female, but metasome only three times as long as urosome and pedigerous segments 4 and 5 separate. Antenna 1 19-segmented, extending as far as urosome segment 4. Right leg 5 basipod 2 slightly enlarged; exopod three-segmented, last segment short and swollen distally; endopod reaches past basipod and with sharp constriction close to terminal part, which is fine and pointed. Left leg 5 endopod two-segmented and much longer than exopod; exopod three-segmented, last segment very small and covered with small hairs.

(Rose 1942)

REMARKS: The present female specimen agrees with Rose's (1942) description except for a shorter terminal spine of leg 5. Maxilla 1 of *A. auropecten* is of the *Scaphocalanus* type with three posterior surface setae on inner lobe 1, and the male leg 5 is also more like this genus than *Amallothrix*, but leg 1 and female leg 5 are similar to *Amallothrix* and antenna 1 is not of the flattened *Scaphocalanus* type. *Amallothrix auropecten* is closely allied to *A. altera* and *A. lobophora* (*see* Roe 1975: 334).

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Nil.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
C537	Surface	1 ♀, 2.2 mm

DISTRIBUTION: This species has been taken in the Mediterranean (Giesbrecht 1892, Rose 1942), north Atlantic (Roe 1975), and Indian Oceans (Grice and Hulsemann 1967), at mesopelagic depths.

Amallothrix dentipes (Vervoort, 1951)

(Figs 45, 90)

DESCRIPTION: *Size:* ♀♀ 2.36–2.84 mm, ♂♂ 2.72–3.00 mm.

Female: Body oblong, rounded, narrows slightly at front. Fusion line between head and pedigerous segment 1 visible. Posterolateral corner of metasome not produced, rounded in dorsal view, in lateral view with distinct incision in dorsal part of border. Genital segment as long as following two segments, with distinct but low genital prominence in lateral view. Antenna 1 24-segmented, reaches urosome segments 2 or 3. Mandible basipod 2 with three setae, middle seta very small; endopod segment 1 with two setae. Maxilla 2 endopod with five brush-like and three worm-like sensory filaments. Posterior surface of legs 2–4 with semicircles of spines on various segments of both rami as well as scattered small scales or spinules; anterior surface of legs 2–4 with small scales or spinules. Leg 5 segments 1–3 fused and basal segments of both sides fused with ventral surface of the metasome. Apical segment of leg 5 between two and two and a half times as long as wide and carries strong inner edge spine at mid-length, the spine one and a half times as long as segment; terminal spine strong and short; outer edge spine very short and placed opposite inner edge spine. Another outer edge spine may or may not be present beside terminal spine. Posterolateral surface of basal and intermediate segments of leg 5 with small spinules.

(Vervoort 1951, Park 1980)

Male: General shape as in female but urosome relatively longer. Fusion line between pedigerous segments 4 and 5 visible in lateral aspect. Antenna 1 20-segmented, reaches middle of urosome segment 2. Mouthparts similar to those of female. Right leg 5 endopod small and stylet-shaped; exopod segment 2 curved, exopod segment 3 small, lancet-shaped. Left leg 5 endopod two- or three-segmented, proximal segment with thickening which may indicate its composition of two parts; exopod three-segmented, terminal segment extends into strong curved spine and covered with hairs forming lamella along internal border of segment.

(Vervoort 1957, Park 1980)

REMARKS: Park (1980), after examination of a large number of females, concludes that leg 5 is quite variable and encompasses the specimens Vervoort (1957) attributes to *Scolecithricella robusta* (T. Scott).

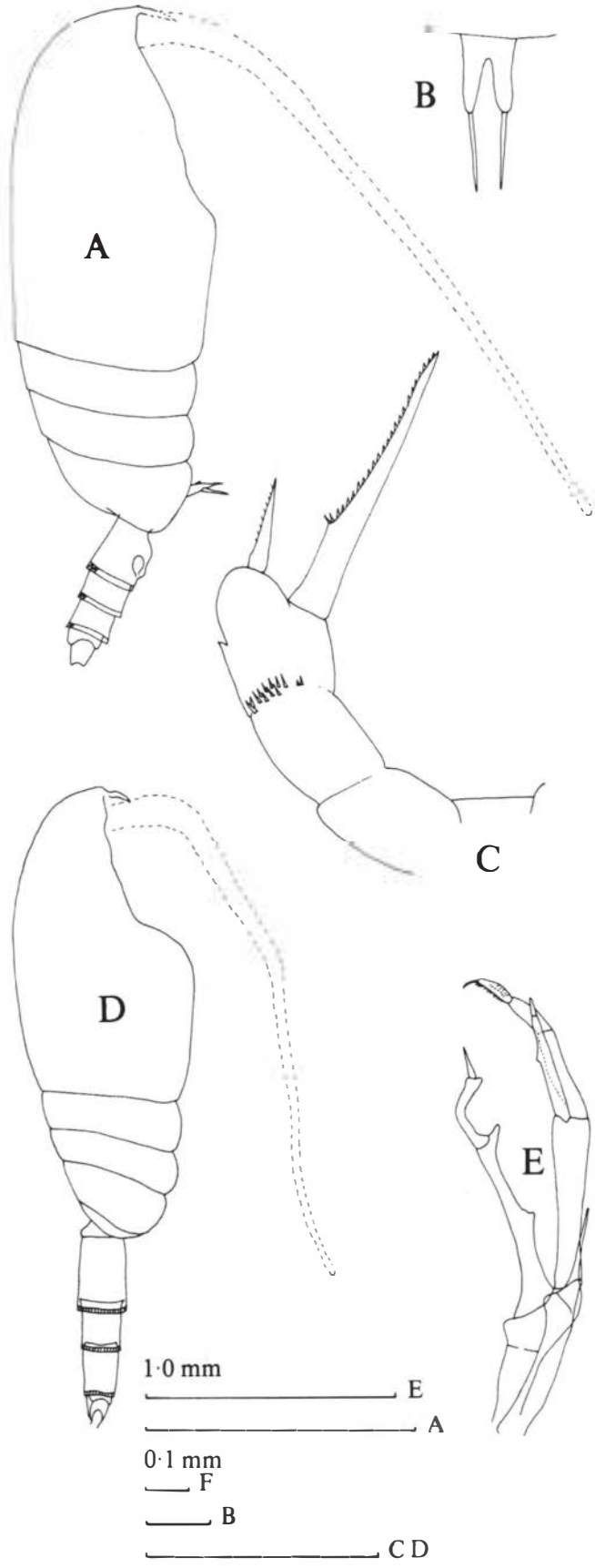


FIG. 45. *Amallothrix dentipes* female (from Vervoort 1957): A, lateral view; B, rostrum. Female from OU Stn Mu67/57s: C, leg 5. Male (from Vervoort 1957): D, lateral view; E, leg 5.

The south-west Pacific females are the type that do not have an extra small spinule beside the terminal spine of leg 5, neither do they always have spinules at the distal border of segment 1. *Amallothrix dentipes* is similar to *A. arcuata,* but the female of the latter has no spinules on the posterolateral surface of leg 5, the position of the scales on the anterior surface of the swimming legs differs, and leg 3 exopod segment 1 has a curved spine while in *A. dentipes* it is straight. The male of *A. dentipes* differs from the male of *A. arcuata* by left leg 5 exopod segment 3 terminating in a spine.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Vervoort (1957, as *Scolecithricella robusta*).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
B109	0–125	1 ♀, stage V 2.23 mm
Mu67/57s	0–1000	1 ♀, 2.5 mm
Mu67/116s	0–1000	1 ♀, 2.6 mm

DISTRIBUTION: Vervoort (1957) describes this species as being characteristic of Antarctic Intermediate Waters.

Amallothrix emarginata (Farran, 1905)

(Figs 46, 90)

DESCRIPTION: *Size:* ♀♀ 3.65–5.6 mm, ♂♂ 3.75–4.25 mm.

Female: Body long, narrow, tapers anteriorly; metasome four and two-third times as long as urosome, fusion line between pedigerous segments 4 and 5 visible in lateral view; posterolateral corners rounded and posterior dorsal margins of metasome emarginate. Rostrum small, with two robust filaments which are notched at apex. Genital segment slightly swollen, about as long as following two urosome segments together. Antenna 1 23-segmented on left, 22-segmented on right, exceeds urosome by one segment. Mandible basipod 2 with two well-developed setae, endopod segment 1 with two setae. Leg 1 exopod segment 1 with outer edge spine half as long as segment. Leg 2 exopod segment 1 with outer edge spine straight and less than one-third length of segment; posterior surface of endopod segment 2 with three rows of strong spines. Leg 5 with one free segment attached to basal segment; inner edge spine positioned close to terminal spine, which is half its length.

(Sars 1925, Farran 1926, Tanaka 1962)

Male: Body more slender than in female; metasome about twice as long as urosome. Antenna 1 20-segmented on left, 19-segmented on right, extends to distal end of last urosome segment. Posterior surface of leg 2 endopod segment 2 similar to that of female but with more spinules. Right leg 5 basipod segment 2 only slightly swollen; endopod short and terminates in long seta or spine half as long as its segment; exopod with three segments of decreasing length and thickness. Left leg 5 exopod three-segmented, distal segment shortest and with terminal spine; endopod two-segmented, narrower and longer than exopod.

(With 1915, as *Scaphocalanus obtusifrons*; Tanaka 1962)

REMARKS: Park (1980) notes that *Scolecithrix polaris* Wolfenden, 1911 may be encompassed by the description of *A. emarginata*, a species which appears to vary widely in size. The south-west Pacific specimens of *A. emarginata* are like the previous description apart from a slightly longer inner edge spine on leg 5. *Amallothrix emarginata* is similar to *A. obtusifrons*, but has a narrower body, the posterior metasomal margin is emarginate, and the female leg 5 has only two spines while *A. obtusifrons* has three spines as well as greater distance between the inner edge and the terminal spines. According to Sars' (1925) illustration endopod segment 2 of leg 2 has only two spinules in the second row while Tanaka (1962) found several. The present female specimen is like that of Tanaka (1962).

Sars' (1925) figure of male leg 5 of *A. obtusifrons* is identical to the present male of *A. emarginata.*

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Park (1980), Vervoort (1957, as *Scolecithricella polaris*).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
VUZ93	0–1097	8 ♀♀, 4.0–4.5 mm
VUZ105	0–914	1 ♀, 4.2 mm
		2 ♂♂, 3.8, 3.9 mm
VUZ112	0–732	2 ♀♀, 4.45, 4.6 mm
Mu67/94s	0–1000	1 ♀, 3.95 mm

DISTRIBUTION: *A. emarginata* has a wide distribution in the deep waters of all oceans (Tanaka 1962, Grice and Hulsemann 1965, 1967).

Amallothrix gracilis (Sars, 1905)

(Figs 47, 91)

DESCRIPTION: *Size:* ♀♀ 3.0–4.5 mm, ♂♂ 3.3–4.44 mm.

Female: Body oblong and slender. Metasome three and one-half times as long as urosome, posterolateral

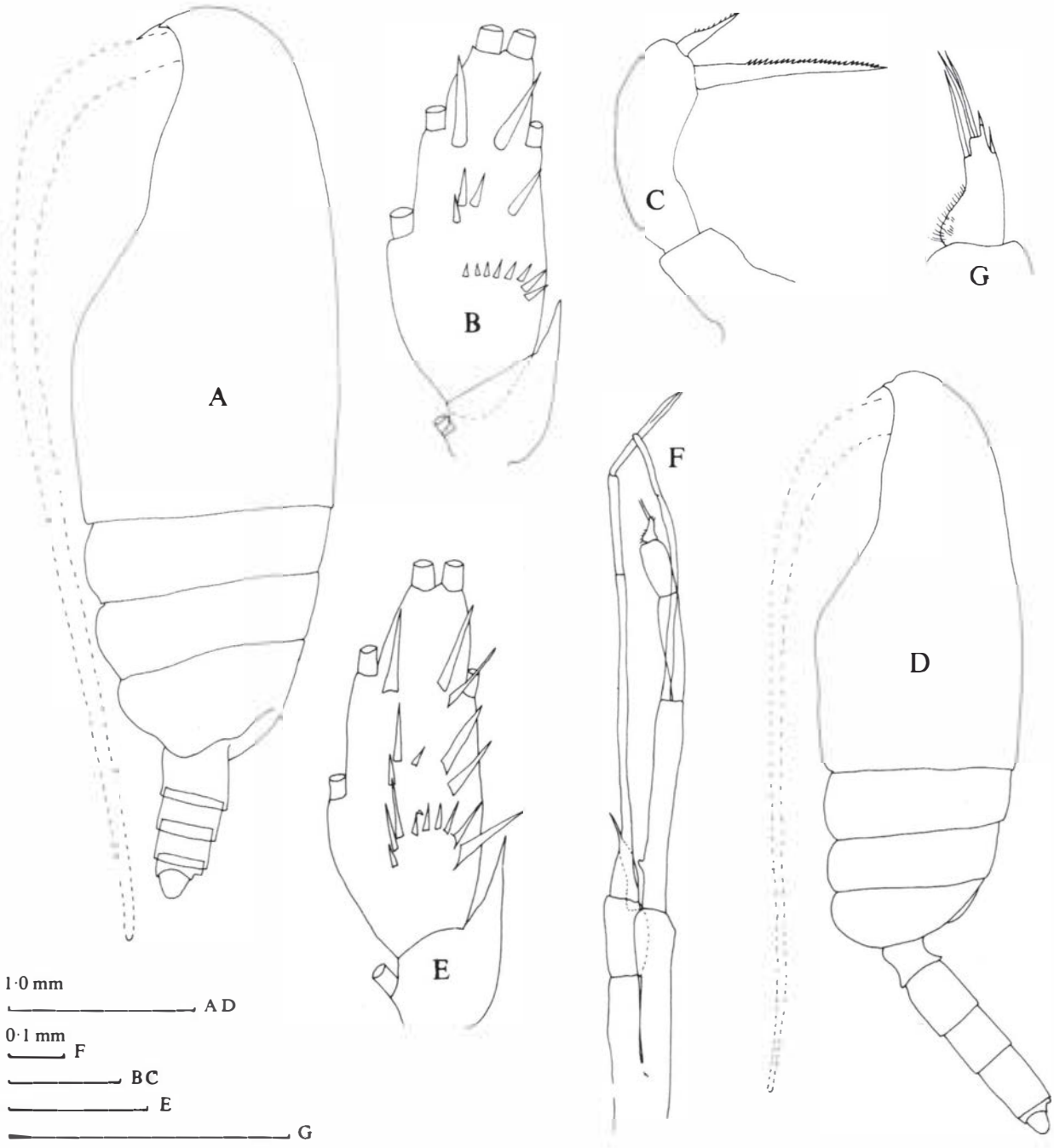


FIG. 46. *Amallothrix emarginata* female from VUZ Stn 112: A, lateral view; B, endopod of leg 2; C, leg 5. Male from VUZ Stn 105: D, lateral view; E, endopod of leg 2, F, leg 5; G, terminal part of left leg 5 exopod.

corners slightly produced and rounded. Genital segment not as long as following two urosome segments and genital prominence slightly swollen anterior to middle in lateral view. Antenna 1 24-segmented and reaches end of urosome. Leg 1 exopod segment 1 with outer spine as long as segment. Leg 2 exopod segment 2 with curved outer spine. Legs 2–4 with strong spinules on posterior surface of endopods and exopods; posterior surface of leg 2 endopod segment 2 with three groups of spines and spinules. Leg 5 curved, of uniform width, all segments fused; posterior surface carries two transverse rows of stiff hairs along distal borders of segments 1 and 2; terminal part cone-shaped with three spines; inner edge spine thick and more than twice as

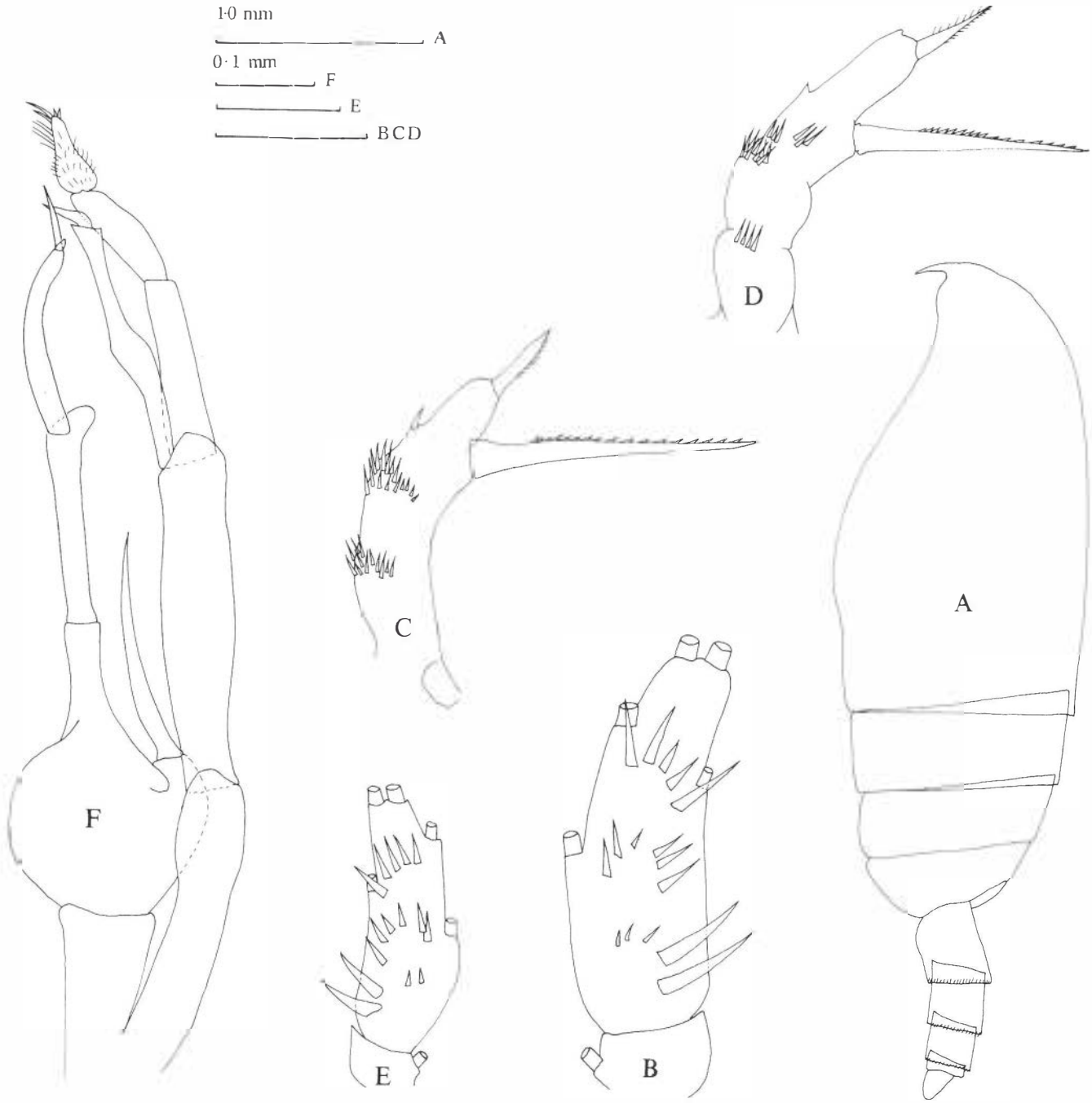


FIG. 47. *Amallothrix gracilis* female from VUZ Stn 93: A, lateral view; B, endopod of leg 2; C, leg 5. Female from NZOI Stn F946: D, leg 5. Male from VUZ Stn 112: E, endopod of leg 2; F, leg 5.

long as terminal spine; outer edge spine short and placed opposite inner edge spine.

(Sars 1925, Farran 1908, Tanaka 1962)

Male: Body more slender than in female; metasome almost three times as long as urosome. Head incompletely fused with pedigerous segment 1, fusion line visible in dorsal view. Antenna 1 reaches end of urosome, 21-segmented on left and 20-segmented on right. Leg 5 extends beyond end of caudal rami. Right leg 5 exopod segment 1 with a triangular process on inner margin at about mid-length, segment 2 with small triangular process on outer distal corner, segment 3 lancet-like; right endopod short. Left leg 5 endopod

does not reach distal part of exopod segment 2. (With 1915, as *Scaphocalanus globiceps;* Tanaka 1962)

REMARKS: The present south-west Pacific males are similar to Tanaka's (1962) description. With (1915) mentions two triangular processes on left leg 5 exopod segment 1, but neither Tanaka's nor the present specimen show these processes. The present male specimen differs from the above description in that the left leg 5 endopod extends beyond exopod segment 2, the right leg 5 endopod extends beyond basipod segment 2, and a triangular process on inner margin of right leg 5 exopod segment 1 is lacking.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Nil.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
F910	0–1397	2 ♀♀, 3.0, 3.4 mm
F946	0–1000	1 ♀, 3.2 mm
Mu67/94s	0–1000	1 ♂, damaged
VUZ93	0–1097	2 ♀♀, 4.0, 4.1 mm
VUZ105	0–914	2 ♂♂, 3.95 mm, damaged
VUZ112	0–732	1 ♂, 3.3 mm

DISTRIBUTION: *Amallothrix gracilis* has been recorded from both deep and surface waters of the north Atlantic Ocean, in the Indo-Pacific Ocean, and off the coast of Japan (Tanaka 1962).

Amallothrix parafalcifer (Park, 1980)
(Figs 48, 91)

DESCRIPTION: *Size:* ♀♀ 1.86–2.14 mm.

Female: Generally similar to *A. dentipes* but posterolateral corners of metasome less produced. Mandible basipod 2 with three setae, of which two distal setae very small. Leg 5 without spines on posterior surface; internal spine shorter than segment, about three times as long as distal spine; external spine small, located at same level as internal spine. (Park 1980)

Male: Unknown.

REMARKS: Park (1980) says *A. parafalcifer* differs from *A. falcifer* (Farran, 1926) in the form of the leg 5 and the mandible. In *A. falcifer* the external spine of leg 5 is located midway between the internal and distal spines, the distal spine is only slightly shorter than the internal spine, and the posterior surface is armed with spines.

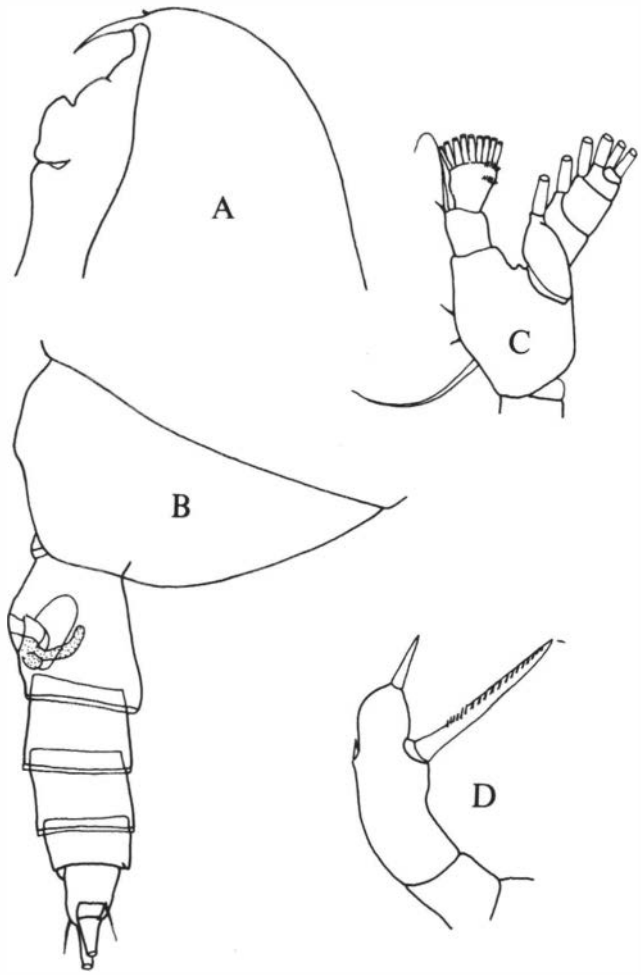


FIG. 48. *Amallothrix parafalcifer* female (from Park 1980): A, lateral view of head; B, lateral view of urosome; C, mandibular palp; D, leg 5.

According to Park (1980) the basipod 2 of *A. falcifer* mandible has three setae of which the "posteriormost" (?distal-most) is the longest.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Park (1980).

NEW RECORDS: Nil.

DISTRIBUTION: Except on one occasion *Amallothrix parafalcifer* was taken in the southern oceans north of the Antarctic Convergence (Park 1980).

Amallothrix pseudopropinqua (Park, 1980)
(Figs 49, 91)

DESCRIPTION: *Size:* ♀♀ 2.96–3.40 mm, ♂♂ 3.32–3.56 mm.

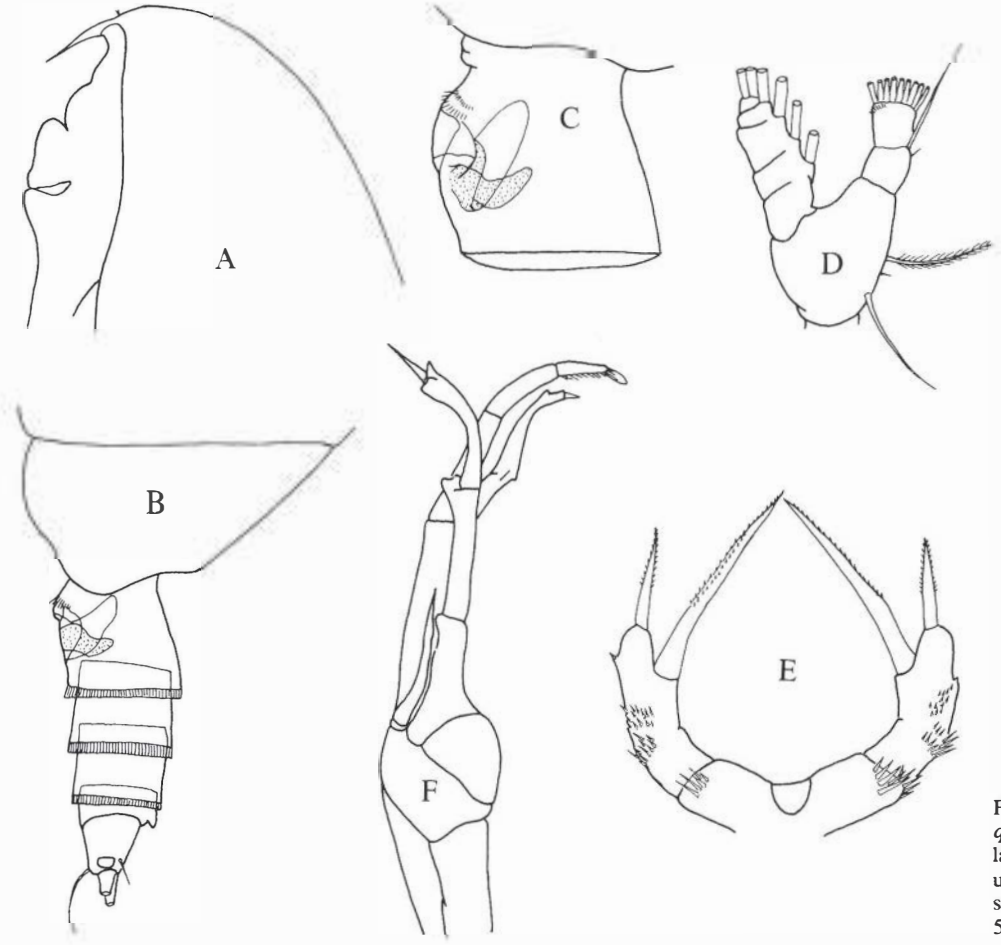


FIG. 49. *Amallothrix pseudopropinqua* (from Park 1980). Female: A, lateral view of head; B, lateral view of urosome; C, lateral view of genital segment; D, mandibular palp; E, leg 5. Male: F, leg 5.

Female: Generally similar to *A. dentipes.* Genital segment with row of spinules immediately anterior to genital field. Mandible basipod 2 with three setae, middle seta small. Outer spine of exopod segment 1 of leg 2 short. Leg 5 internal spine longer than segment; terminal spine half length of internal spine.

(Park 1980)

Male: Leg 5 resembles those of *A. dentipes*, but distal process of exopod segment 2 of right leg small; exopod segment 2 only slightly curved.

(Park 1980)

REMARKS: Park (1980) says *A. pseudopropinqua* is very like *A. propinqua* (Sars). The female appears to differ from *A. propinqua* only in the presence of the row of spinules anterior to the genital field. The male differs from *A. propinqua* in the size of the outer edge spine on exopod segment 1 of legs 2 and 3 and the size of exopod segment 3 and its distal seta on the right leg 5.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Park (1980).

NEW RECORDS: Nil.

DISTRIBUTION: *Amallothrix pseudopropinqua* is found in waters of the southern oceans to the north of the Antarctic Convergence (Park 1980).

Amallothrix valida (Farran, 1908)

(Figs 50, 92)

DESCRIPTION: *Size:* ♀♀ 2.1–4.40 mm, ♂♂ 4.00–4.64 mm.

Female: Body oblong oval-shaped, corner of last metasome segment rounded in lateral view and slightly produced in dorsal view. Antenna 1 22-segmented on right, 23-segmented on left, extending to distal end of urosome segment 2. Mandible basipod 2 with three setae, of which two distal setae are small. Outer edge spine on leg 1 exopod segment 1 about same length as segment 2. Leg 2 exopod segment 1 with curved spine half as long as following segment. Leg 5 with two distal

segments fused; inner edge spine positioned at middle of segment, three times as long as terminal spine, with coarse spinulations arranged in slightly twisted line; outer edge spine minute and positioned opposite inner edge spine.

(Farran 1908, Tanaka 1962, Park 1980)

Male: Less robust than female, fusion line between pedigerous segments 4 and 5 visible, posterior corner of metasome more produced than in female. Antenna 1 20-segmented on right, 21-segmented on left, extending to about distal end of metasome. Right leg 5 endopod short and furnished with small spine; distal segment of exopod lancet-shaped. Distal segment of left leg 5 endopod with spine which exceeds exopod segment 2; exopod segment 3 with small spine at apex and comb-like hairs on inner margin.

(Brodsky 1950, Tanaka 1962)

REMARKS: There appears to be some variation in the female leg 5. Tanaka (1962) and Brodsky (1950) found an extra minute spine placed laterally to the terminal spine, while Vervoort (1957) recorded two specimens both missing the outer edge spine.

Farran (1929) doubted that his specimens and that of Sars' (1925) were conspecific on the grounds that Sars' specimen was too small (2.1 mm), had a long curved spine on leg 2 exopod segment 1, and some minor differences in leg 5. If Farran (1929) is right then the minimum size of the female *A. valida* is recorded by Sewell (1929) and is 2.66 mm.

Park (1980) attributes a male to this species which differs from that figured here but which is identical with *Scolecithricella lanceolata* Tanaka, 1962. The identity of male *A. valida* has yet to be clearly established.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Vervoort (1957), Park (1980).

NEW RECORDS: Nil.

DISTRIBUTION: *Amallothrix valida* is a bathypelagic species recorded from all oceans including the Antarctic and the Far Eastern and Polar Seas of USSR (Tanaka 1962).

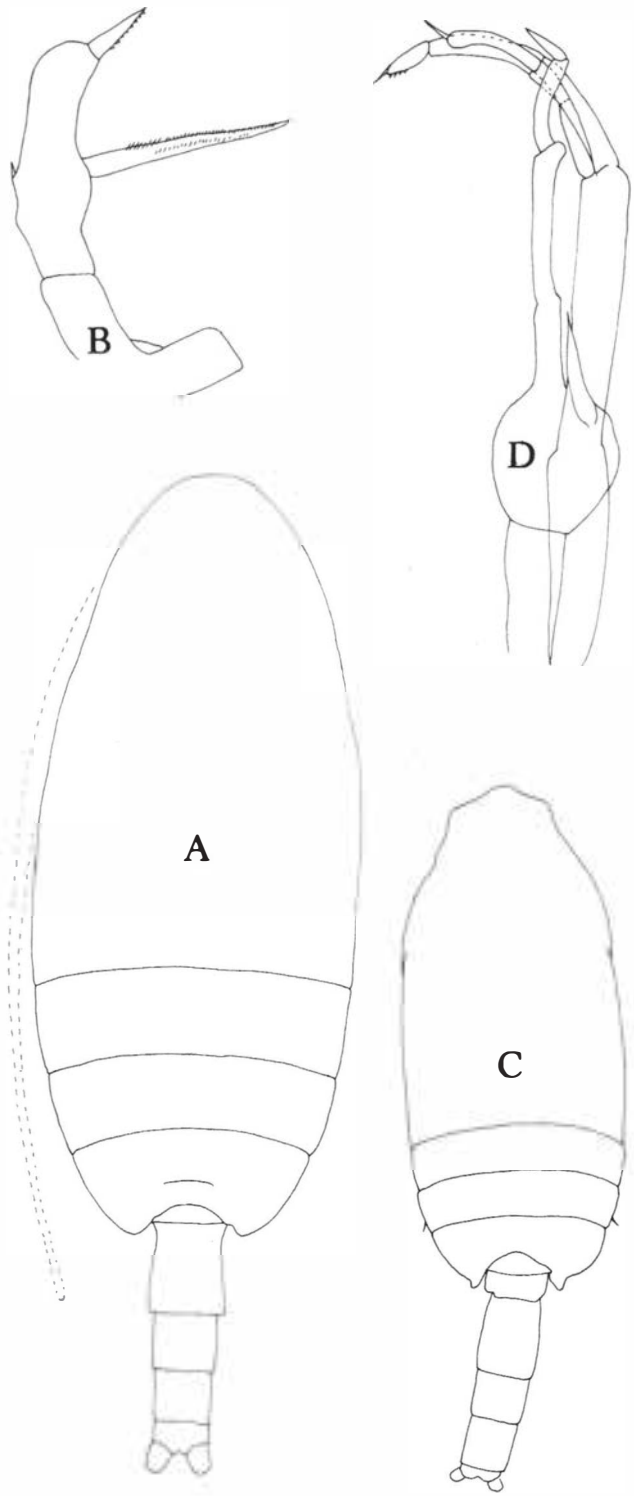


FIG. 50. *Amallothrix valida* (from Tanaka 1962). Female: A, dorsal view; B, leg 5. Male: C, dorsal view; D, leg 5.

Heteramalla Sars, 1907

DEFINITION: Maxilla 2 endopod with three worm-like and five brush-like sensory filaments, two of which are very large. Female leg 5 absent or uniramous, three-segmented, small and rudimentary, terminated by single point.

(Sars 1925, Grice and Hulsemann 1965)

REMARKS: Roe (1975: 341) agrees with Bradford (1973) that *Heteramalla* should be placed in the Scolecithricidae as presently defined.

Heteramalla is a monotypic genus containing *H. sarsi* Roe, 1975 (= ♀ *H. dubia*: Sars 1907) (♂ unknown). This species has not been taken in the south-west Pacific.

Lophothrix Giesbrecht, 1895

DEFINITION: Pedigerous segments 4 and 5 fused or separate. Rostrum may have short conical points or elongate filiform appendages. Head with or without crest. Antenna 1 of 24 segments in female, about 22 segments in male. Maxilla 1 inner lobe 1 with four setae on posterior surface; inner lobe 3 with four setae. Leg 1 exopod segment 1 with or without external spine. Male mouthparts reduced. Female leg 5 of three segments, the last two of which may be fused; last segment with three or four spines. Male leg 5 of *Scaphocalanus* type.
(Bradford 1973)

REMARKS: Species definitely in this genus are: *Lophothrix frontalis* Giesbrecht, 1895; and *L. latipes* (T. Scott, 1894) (= *Scolecithrix angusta* Esterly, 1911; = *Scolecithrix acutus* Wolfenden, 1911; = *Scaphocalanus pacificus* Mori, 1932) (♂ *see* Roe 1975). The following species are probably in this genus: *Brachycalanus gigas* A. Scott, 1909 stage V ♂ (♀ *see* Grice and Hulsemann 1968); *Lophothrix humilifrons* Sars, 1905 (♂ unknown); *L. insignis* Sars, 1920 (♂ unknown); *L. quadrispinosa* Wolfenden, 1911 (♂ unknown); *L. sarsi* Wilson, 1950 (♂ unknown); *L. similis* Wolfenden, 1911 (♂ unknown); *L. thorsoni* Björnberg, 1975 (♂ unknown); *L. varicans* Wolfenden, 1911 (♂ unknown); ?*Scaphocalanus angulifrons* Sars, 1920 (♂ unknown).

The following species have been taken in the south-west Pacific:

Lophothrix frontalis Giesbrecht, 1895
(Figs 51, 92)

DESCRIPTION: *Size:* ♀♀ 4.75–7.4 mm, ♂♂ 4.5–5.75 mm.

Female: Head pointed, with crest. Rostrum strongly bifurcate, with small apical points. Body slim, elongated, and metasome four times as long as urosome. Pedigerous segments 4 and 5 fused; posterolateral corners of metasome produced but with rounded apex. Genital segment not much longer than wide, slightly contracted proximally when seen in dorsal view and produced ventrally when seen in lateral view; lateroproximal margin of segment with small tuft of hairs seen in dorsal view. Urosome segments 1–3 fringed with fine teeth on distal border. Antenna 1 extends to end of urosome. Leg 1 exopod segment 1 without spine. Spinulation of posterior surfaces of legs 2–3 varies. Leg 5 with rows of spinules on posterior surface of segment 1; distal segment with three spines, inner edge spine extends just beyond terminal spine, outer edge spine shortest but extends beyond segment, all spines strongly spinulated.
(Giesbrecht 1895, A. Scott 1909, Sewell 1947, Tanaka 1961)

Male: Generally like female, but head without crest. Rostrum with two fairly long spines. Antenna 1 reaches end of urosome segment 2. Right leg 5 endopod two-segmented, extends to exopod segment 2, which is shorter than lancet-shaped segment 3. Left leg 5 endopod longer than exopod, narrowly pointed; exopod three-segmented, distal segment not much longer than wide and covered with hairs.
(Sewell 1947, Vervoort 1965b, Tanaka 1961)

REMARKS: The south-west Pacific specimens show minor differences from the original description. The fusion line of pedigerous segments 4 and 5 is evident dorsally in the female, the antenna 1 is slightly shorter and some of the female specimens have four spines on leg 5. One specimen of this type was taken at each of the following stations: VUZ93, VUZ112, F881, Mu67/104, and Mu67/116. Tanaka (1961) figures a pair of leg 5 which has three spines on one leg and four on the other, which is very like the limb Wolfenden (1911) figures for *L. quadrispinosa*.

The specimen taken at Mu67/104s is a *L. frontalis* f. *minor*. Sewell (1947) gives the size ranges for f. *minor* and f. *major* as 4.750–5.633 mm and 6.250–6.718 mm respectively. This means that the specimen of f. *minor* from Mu67/104s is almost as big as f. *major* as described by Sewell (1957). No other specimens were checked.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Nil.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
F881	0–1260	1 ♀, 6.5 mm
F946	200–500	3 ♀♀, 5.8, 5.85, 5.85 mm
VUZ93	0–1097	3 ♀♀, 6.3–6.75 mm 1 ♂, 5.65 mm
VUZ105	0–914	4 ♀♀, 5.6–7.05 mm 1 ♂, 5.75 mm
VUZ112	0–732	5 ♀♀, 5.9–6.4 mm
Mu67/104s	0–823	1 ♀, 6.2 mm
Mu67/116s	0–1000	1 ♀, 7.4 mm

DISTRIBUTION: *Lophothrix frontalis* is a widely distributed bathypelagic species occurring in all oceans

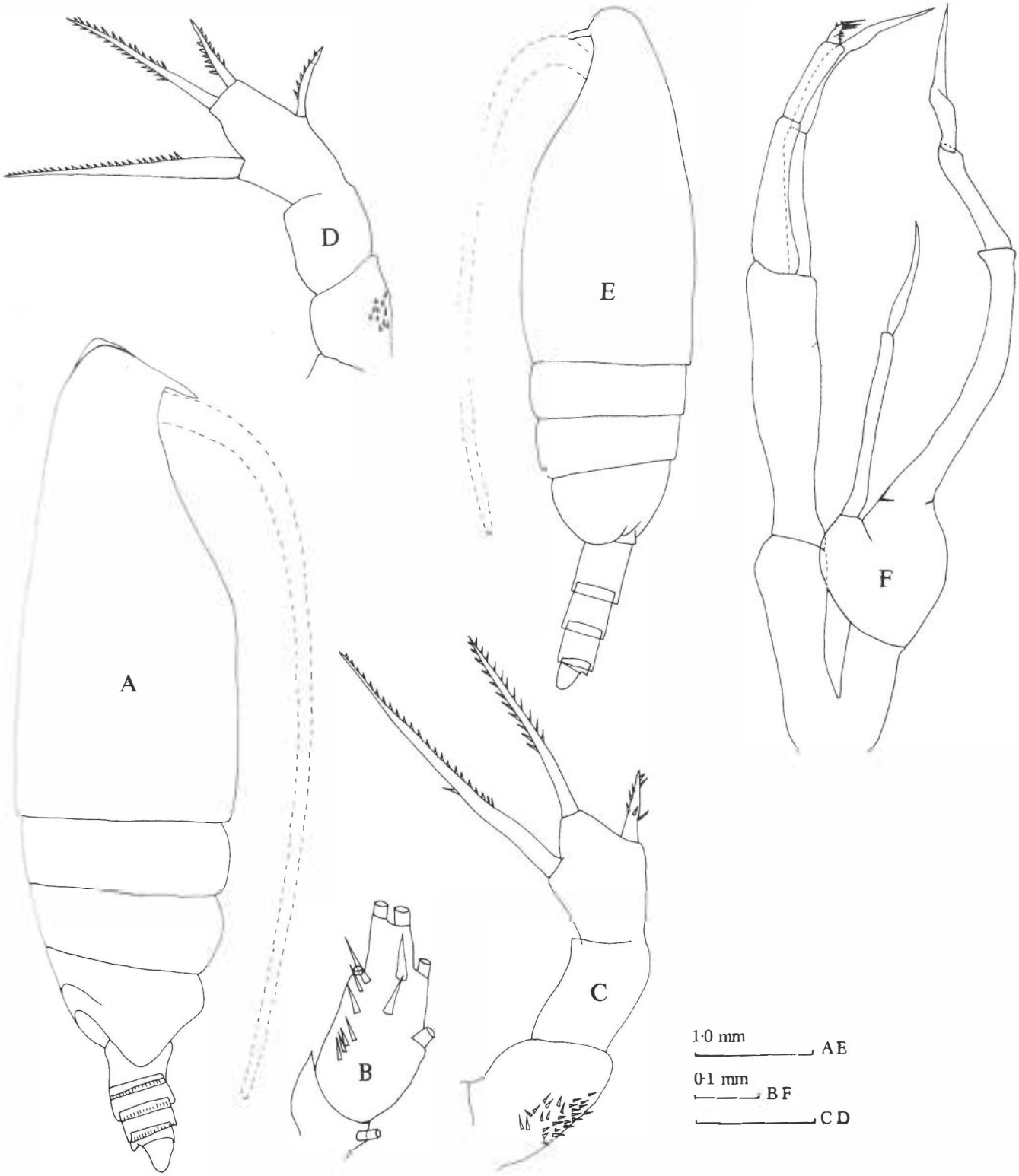


FIG. 51. *Lophothrix frontalis* from VUZ Stn 93. Female: A, lateral view; B, endopod of leg 2; C, D, leg 5. Male: E, lateral view; F, leg 5.

(Vervoort 1965b). It was taken in relatively shallow water at Station F946 but this was a night sample.

Lophothrix latipes (T. Scott, 1894)

(Figs 52, 92)

DESCRIPTION: *Size:* ♀♀ 2.65–3.2 mm, ♂♂ 2.96–3.19 mm.

Female: Head with small crest and forehead angular in lateral view; rostrum with filiform appendages. Pedigerous segments 4 and 5 separate; lateral corners of metasome posteriorly produced and pointed. Urosome about one-third as long as metasome. Antenna 1 reaches distal end of genital segment. Leg 5 three-segmented, with three relatively short spines on distal semi-circular segment.

(Sars 1925, Brodsky 1950)

Male: In general like female, but head has prominent shoulders when seen in dorsal view, posterior margin of pedigerous segment 1 undulates, and posterolateral corners of metasome more rounded. Antenna 1 of 20 segments, reaches end of metasome. Mouthparts reduced. Leg 1 exopod segment 1 without spine. Leg 5 reaches distal end of urosome segment 3. Right leg 5 exopod four-segmented, the last segment flattened and roughly triangular in shape; endopod two-segmented, reaches exopod segment 2. Left leg 5 exopod three-segmented, last segment has two wide setae distally and numerous spines; endopod two-segmented, terminates in ribbon-like seta.

(Roe 1975)

REMARKS: The south-west Pacific specimens are generally like previous descriptions, but the urosome seems shorter and one female specimen has four spines on the distal segment of leg 5. Leg 1 exopod segment 1 is without an outer edge spine.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Farran (1929).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
F945	0–500	1 ♀, 2.9 mm
F947	0–200	1 ♀, 3.05 mm

DISTRIBUTION: *Lophothrix latipes* is a mesopelagic species which has been taken in tropical and subtropical parts of all oceans, although it seems to have its main area of distribution in the northern temperate Atlantic Ocean between 29°N and 50°N (Vervoort 1965b).

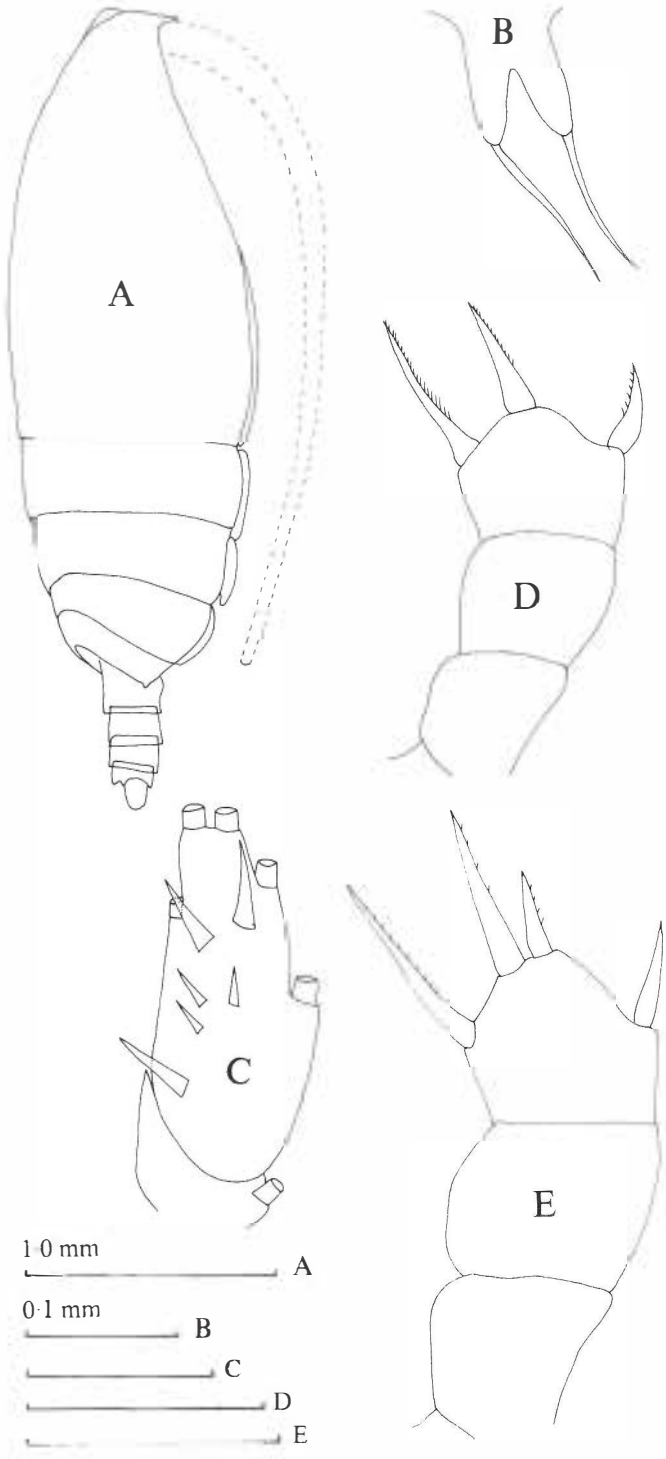


FIG. 52. *Lophothrix latipes* female from NZOI Stn F947: A, lateral view; B, rostrum; C, endopod of leg 2; D, leg 5. Female from NZOI Stn F945: E, leg 5.

Macandrewella A. Scott, 1909

DEFINITION: Head with circular lens-like organ on frontal margin and fused with pedigerous segment 1. Rostrum with slender filaments attached to common bifurcate base. Pedigerous segments 4 and 5 separate; posterior part of metasome and genital segment often asymmetrical. Leg 5 in female absent or small, one-segmented, attached to basal portion. Male generally like female; leg 5 well developed; right leg 5 endopod well developed, exopod with basal part produced internally and last segment usually forked apically; left leg 5 endopod well developed and exopod with apical spine.

(A. Scott 1909)

REMARKS: *Macandrewella* contains the following species: *M. agassizi* (Wilson, 1950); *M. asymmetrica* Farran, 1936; *M. chelipes* (Giesbrecht, 1896); *M. cochinensis* Gopalakrishnan, 1973; *M. joanae* A. Scott, 1909; *M. mera* Farran, 1936 (♂ unknown); *M. scotti* Sewell, 1929; *M. sewelli* Farran, 1936. None of these species have been taken in the south-west Pacific.

Mixtocalanus Brodsky, 1950

DEFINITION: Head and pedigerous segment 1 fused or separate, pedigerous segments 4 and 5 separate. Rostrum bifurcate with two filaments in female. Female maxilla 2 endopod with three worm-like and five brush-like sensory filaments, two of which have spherical tips. All filaments smaller than in *Heteramalla*. Male maxilla 2 with only two brush-like sensory filaments. Leg 1 exopod segment 1 with outer edge spine. Female leg 5 three-segmented, with one terminal spine. Male leg 5 uniramous, right leg strongly reduced, left leg several times longer than right.

(Brodsky 1950)

REMARKS: Brodsky (1950) defines this genus from a scolecithricid female and a male which does not seem to match the female, especially in the structure of antenna 1. The male seems to fit better into the definition of Phaennidae.

One species, *M. robustus* Brodsky, 1950, is described. This species has not been taken in the south-west Pacific.

Parascaphocalanus Brodsky, 1955

DEFINITION: This genus has been erected for a species differing from *Scaphocalanus* in having a strongly swollen genital segment and the absence of rostral filaments.

REMARKS: It is not at all clear that *Parascaphocalanus* is in fact a scolecithricid. Brodsky (1955) figures the terminal part of maxilla 2 with four worm-like and two brush-like sensory filaments, endopod segment 1 of leg 2 is small and narrow, and the male leg 5 is very like that of some tharybids. On the other hand *Parascaphocalanus* appears to differ from most tharybids in that the antenna 2 rami are of similar length and exopod segment 1 of leg 1 is without an outer edge spine.

Parascaphocalanus is a monotypic genus which contains *P. zenkevitchi* Brodsky, 1955. This species has not been taken in the south-west Pacific.

Racovitzanus Giesbrecht, 1902

DEFINITION: Rostrum cylindrical with two small filaments terminally. Maxilla 1 inner lobe 1 with two setae on posterior surface; inner lobe 3 with three setae. Maxilla 2 endopod with worm-like and brush-like sensory filaments. Leg 1 exopod segment 1 without external spine. Female leg 5 absent or two-segmented, with one or two spines, neither of which are external. Male leg 5 of the *Scaphocalanus* type.

REMARKS: Species probably in this genus are: *Racovitzanus antarcticus* Giesbrecht, 1902 (= ♂ *R. erraticus* Vervoort, 1957); *R. levis* Tanaka, 1961; *R. pacificus* (Esterly, 1905) (♂ unknown); *R. porrectus* (Giesbrecht, 1888) (= *R. nanus* Tanaka, 1953) (♂ unknown).

The nature of the terminal sensory filaments on maxilla 2 is difficult to observe and there is considerable variation in the number and type recorded by various authors (*see* Giesbrecht 1902, Tanaka 1961, Bradford 1973). There is a need for careful re-examination of these details in all species of *Racovitzanus*. The male which Vervoort (1957) attributes erroneously to *R. antarcticus* appears to differ from other *Racovitzanus* in having an outer edge spine on exopod segment 1 of leg 1.

The following species has been taken in the south-west Pacific:

Racovitzanus antarcticus Giesbrecht, 1902

(Figs 53, 92)

DESCRIPTION: *Size:* ♀♀ 1.77–2.42 mm, ♂♂ 1.8–2.03 mm.

Female: Pedigerous segments 4 and 5 fused. Rostrum sausage-shaped, carrying two fine, short terminal filaments. Posterolateral corners of metasome slightly produced, terminating in point. Genital segment

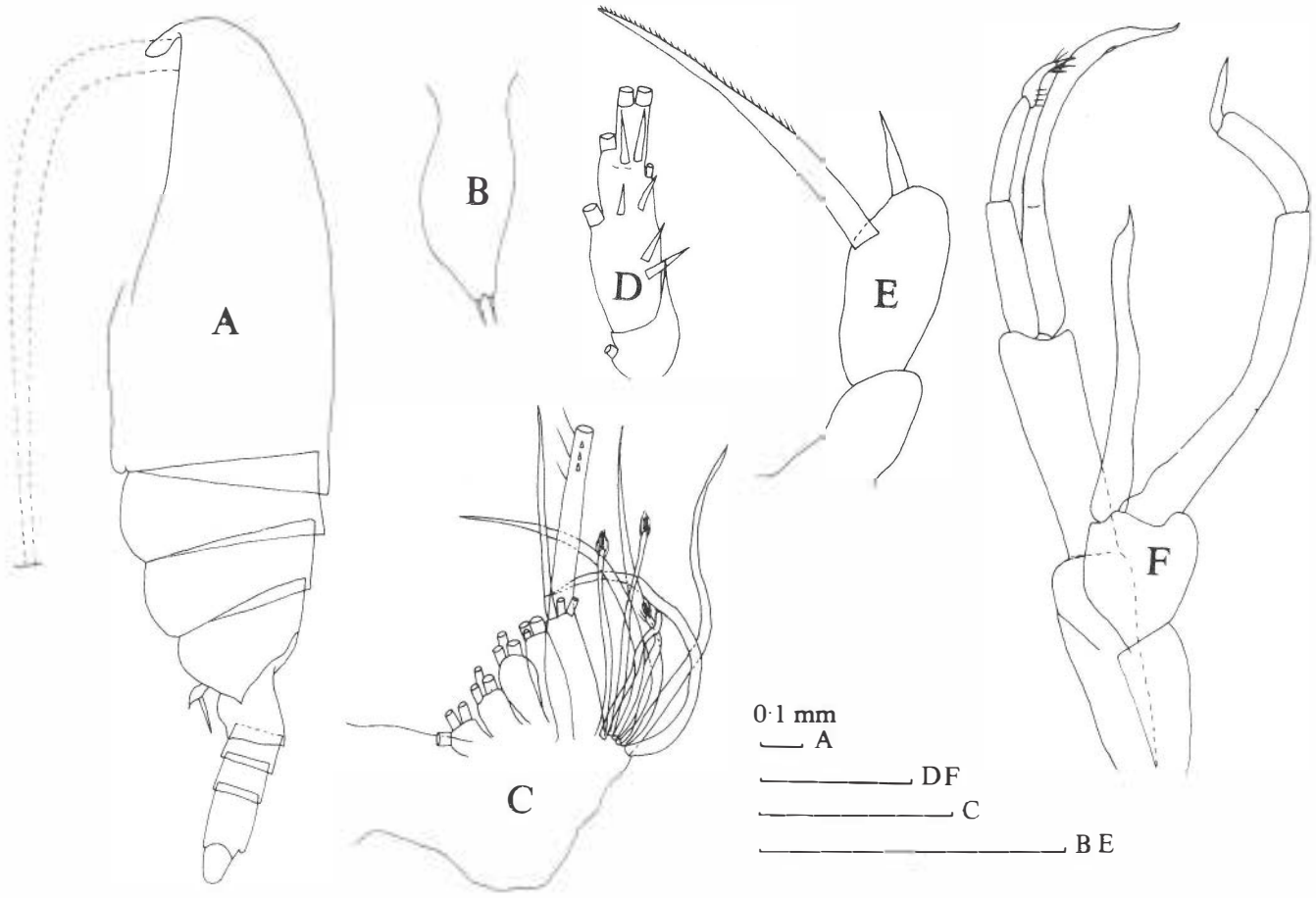


FIG. 53. *Racovitzanus antarcticus* female from NZOI Stn B109: A, lateral view; B, rostrum; C, maxilla 2; D, endopod of leg 2; E, leg 5. Male from Ross Sea: F, leg 5.

swollen ventrally and as long as combined length of urosome segments 2 and 3 and two-thirds of segment 4. Urosome segment 4 as long as combined length of segment 3 and one-half of segment 2. Caudal rami diverging. Antenna 1 of 23 segments, reaching middle of genital segment. Leg 1 exopod segment 1 without external spine. Leg 2 exopod segment 1 with curved spine about half as long as following segment. Posterior surface of exopod segments 2 and 3 of legs 2 and 3, also endopod segment 2 of leg 2 and endopod segments 2 and 3 of leg 3, with spinules. Leg 5 with common basal segment and oblong distal segment; distal segment with short smooth apical spine, and inner serrated spine curved inwards and five to six times longer than apical spine.

(Giesbrecht 1902, Brodsky 1950)

Male: In general like female. Antenna 1 has flattened joints and reaches urosome segment 3. Mouthparts reduced. Swimming legs like those of female. Right leg 5 exopod two-segmented, proximal segment long, slender and curved, possibly consisting of two fused segments; endopod one-segmented, about two-thirds length of proximal exopod segment. Left leg 5 exopod three-segmented, distal segment small, partly fused with previous segment, carries two curved hairs; endopod one-segmented, longer than exopod, with a small appendage near apex which may be second segment.

(Vervoort 1957, as *R. erraticus)*

REMARKS: The south-west Pacific female specimens are like those previously described and neither specimen has any trace of an endopod on leg 5 as described by Giesbrecht (1902). The existence of an endopod is regarded as an abnormal phenomenon (Wolfenden 1911, Farran 1929, Vervoort 1957).

The male described by Vervoort (1957) as *R. erraticus* seems more likely to be the male of *R. antarcticus* than the male of a new species, and is here regarded as the true *R. antarcticus* because the swimming legs are more like those of the female. Leg 1 exopod segment 1 is without an external spine, leg 2 exopod segment 1 has a relatively short and curved

spine, and the spinulation pattern of the posterior surfaces of the exopods and endopods of legs 2 and 3 is similar. The male of *R. antarcticus* as described by Vervoort (1957) differs from the female of *R. antarcticus* and the male of *R. erraticus* by the following characteristics: pedigerous segments 4 and 5 are separate, leg 1 exopod segment 1 has an external spine, leg 2 exopod segment 1 has a long straight spine, spinules of distal exopod segments of legs 2 and 3 are small and placed in large patches rather than three curved rows, and the endopods of legs 2 and 3 have more spinules.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Farran (1929), Vervoort (1957).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
B109	0–125	2 ♀♀, 2.1, 2.28 mm

DISTRIBUTION: Vervoort (1957) describes *R. antarcticus* as an epiplanktonic Antarctic species which occasionally occurs north of the Convergence, and has been recorded north of New Zealand and near the Great Barrier Reef, probably swept there in the Antarctic Intermediate Water. Vervoort (1957) records his male *R. erraticus* from purely Antarctic localities, in deep and moderately deep water. This agrees with Brodsky's (1950) observations of *R. antarcticus* as a high-latitude bathypelagic species in the north-western Pacific Ocean, Bering Sea and Sea of Okhotsk.

Scaphocalanus Sars, 1900

DEFINITION: Pedigerous segments 4 and 5 fused in female, usually separate in male. Head may have crest. Rostrum of two filaments. Antenna 1 of 22 segments in female, with segments 4–20 flattened and expanded posteriorly; of 19–21 segments in male. Maxilla 1 inner lobe 1 usually with three setae on posterior surface; inner lobe 3 with three or four setae; endopod segment 1 separated from segments 2 and 3. Maxilla 2 endopod with three worm-like and five brush-like sensory filaments. Leg 1 exopod segment 1 without external spine. Leg 2 endopod segment 1 without pointed external distal expansion. Male mouthparts reduced, especially maxilla 2 and inner lobes of maxilla 1. Female leg 5 absent or, more usually, present and three-segmented, often with last two segments fused; terminal segment with two to four, usually strong spines. Male left leg 5 endopod longer than exopod; right leg 5 endopod long, usually reaching segment 2, exopod segment 3 long and blade-like.

(Bradford 1973)

REMARKS: The number of setae on maxilla 1 inner lobes 1 and 3 appear not to be as constant as Bradford (1973) found. *Scaphocalanus difficilis* Roe, 1975 has two posterior surface setae on inner lobe 1 and *S. difficilis*, *S. curtus* (Farran, 1926) (*see* Hure and Scotto di Carlo 1968), *S. similis* Hure and Scotto di Carlo, 1968, and *S. invalidus* Hure and Scotto di Carlo, 1968, all have three setae on inner lobe 3.

Species definitely in this genus are: *Scaphocalanus acuminatus* Park, 1970 (♂ unknown); *S. affinis* (Sars, 1905) (= ? *Amallophora gracilis* Wolfenden, 1911); *S. amplius* Park, 1970; *S. brevicornis* (Sars, 1900) (= ? *Amallophora impar* Wolfenden, 1911; = *S. minutus* Tanaka, 1937); *S. brevirostris* Park, 1970; *S. curtus* (Farran, 1926) (= *S. subcurtus* Park, 1970); *S. difficilis* Roe, 1975; *S. echinatus* (Farran, 1905); *S. invalidus* Hure and Scotto di Carlo, 1968 (= ? *S. amplius* Park, 1970); *S. longifurca* (Giesbrecht, 1888) (= *S. temporalis* Tanaka, 1953); *S. magnus* (T. Scott, 1894) (= *S. acrocephalus* Sars, 1900); *S. major* (T. Scott, 1894) (= *Amallophora media* Sars, 1907; = *Scolecithrix gracilipes* Farran, 1908); *Scaphocalanus similis* Hure and Scotto di Carlo, 1968; *S. subbrevicornis* (Wolfenden, 1911) (= *S. gracilicauda* Tanaka, 1937).

The following species may be in *Scaphocalanus* but are not well enough described for this to be verified: *Scaphocalanus angulifrons* Sars, 1920 (♂ unknown); *Scolecithricella avia* Tanaka, 1962 (♀ unknown); *Scaphocalanus bogorovi* Brodsky, 1955; *Scaphocalanus californicus* Davis, 1949 (♂ unknown); *Amallophora elegans* Wolfenden, 1911 (♂ unknown); *Scaphocalanus elongatus* A. Scott, 1909; *Amallophora impar* Wolfenden, 1911 (♂ unknown); *Scaphocalanus insignis* Brodsky, 1950 (♂ unknown); *Scaphocalanus insolitus* Wilson, 1950 (♂ unknown); *Scolecithricella lobata* Sars, 1920 (♂ unknown); *Scolecithricella obscura* Esterly, 1913 (♂ unknown); *Scolecithricella polaris* Brodsky, 1950 (♂ unknown); *Amallothrix profunda* Brodsky, 1950 (♀ unknown); *Scaphocalanus subelongatus* Brodsky, 1950 (♂ unknown).

The following species have been taken in the south-west Pacific:

Scaphocalanus affinis (Sars, 1905)

(Figs 54, 93)

DESCRIPTION: *Size:* ♀♀ 3.6–5.4 mm, ♂♂ 3.5—5.0 mm.

Female: Head broadly rounded in lateral view and with crest. Posterolateral corners of metasome produced into bluntly pointed triangular expansion. Genital segment with fringed distal margin, slightly swollen ventrally when seen in lateral view, much shorter than following two segments together. Antenna 1 shorter than metasome. Leg 5 distinctly three-segmented, with

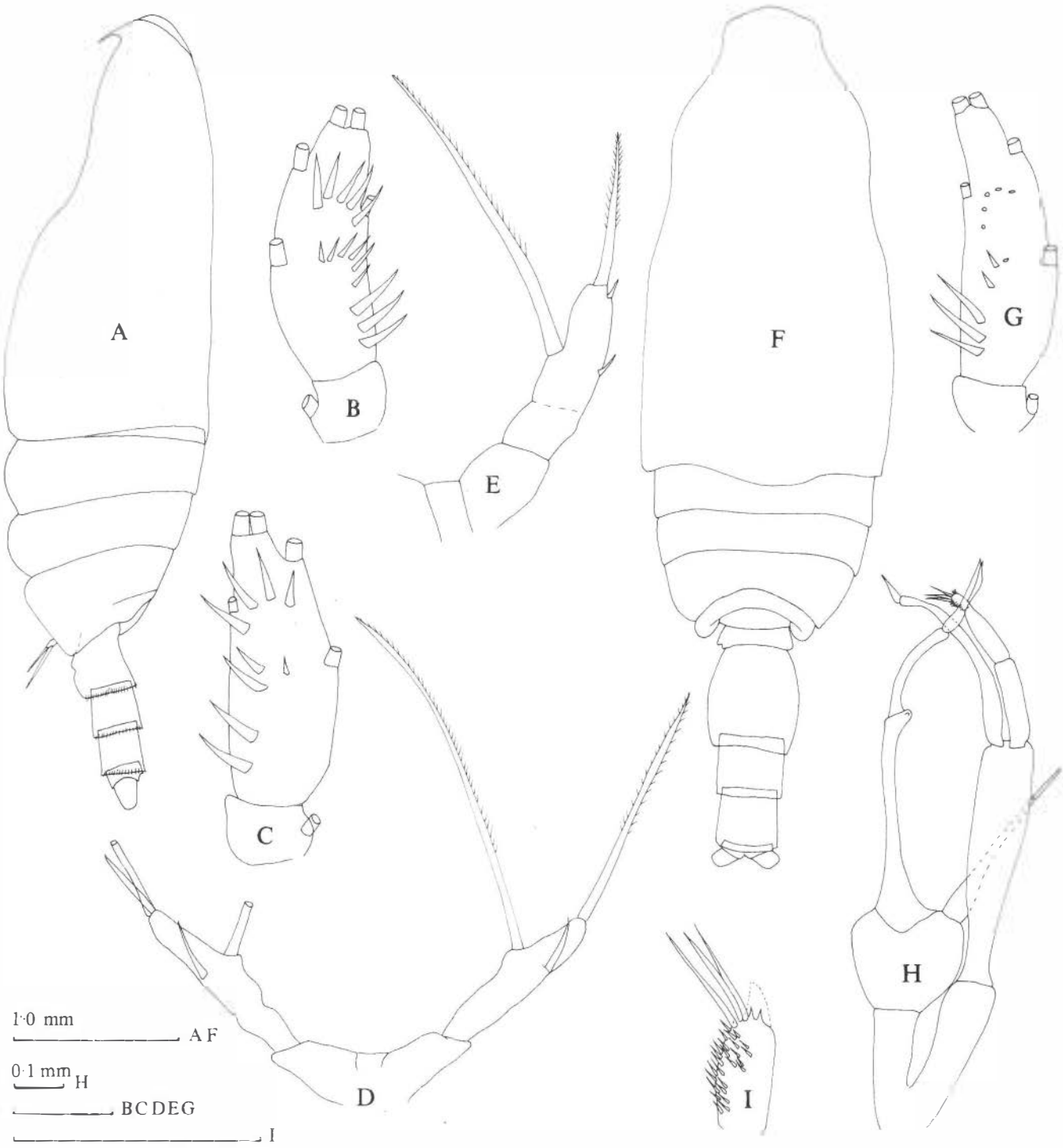


FIG. 54. *Scaphocalanus affinis* female from VUZ Stn 105: A, lateral view; B, endopod of leg 2; E, leg 5. Female from VUZ Stn 112: C, endopod of leg 2; D, leg 5. Male from VUZ Stn 93: F, dorsal view; G, endopod of leg 2; H, leg 5; I, terminal part of left leg 5 exopod.

four spines, inner edge spine twice as long as segment 3 and terminal spine longer than segment 3, two outer edge spines are much shorter.

(Sars 1925, Vervoort 1957, Tanaka 1961)

Male: Head without crest. Pedigerous segments 4 and 5 separated. Metasome with rounded posterolateral corners. Urosome segment 2 is swollen, twice as long as urosome segment 3. Right antenna 19-segmented. Leg

5 extends to distal margin of urosome segment 3. Right leg 5 endopod reaching almost to exopod segment 2, with small process on proximal part; left leg 5 endopod slightly longer than the exopod.

(Rose 1933, Tanaka 1961)

REMARKS: The shape of posterolateral corners of the metasome may vary as in *S. magnus* (Tanaka 1961). In the present specimens, where the female antenna 1 is intact, it extends slightly beyond the metasome. The posterior surface of the endopod of leg 2 seems to have a varying number of spinules in south-west Pacific specimens. The specimen from Station VUZ112 is very similar to Sars' (1925) specimen while the specimen from VUZ105 is more like Tanaka's (1961) specimen. The south-west Pacific female specimens here illustrated have the two distal segments of leg 5 fused and the length of the outer edge spines varies. The female from Station VUZ112 has spines like the specimen in Wolfenden's (1911) illustration of *Amallophora gracilis,* which has been synonymised with *S. affinis* (Tanaka 1961). The male specimen here illustrated has left leg 5 exopod segment 3 terminating in three strong setae, a thin lamella on the outer distal corner, and the median surface covered with spinules.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Vervoort (1957).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
E892	0–1224	1 ♂ , 4.2 mm
VUZ93	0–1097	1 ♀ , 5.3 mm
		1 ♂ , 5.0 mm
VUZ105	0–914	2 ♀ ♀ , 4.6, 4.7 mm
VUZ112	0–732	2 ♀ ♀ , 5.1, 5.25 mm

DISTRIBUTION: *Scaphocalanus affinis* occurs in deep or intermediate waters in the Atlantic and Pacific Oceans, but is exclusively a deep-water form in Antarctic waters (Vervoort 1957, Tanaka 1961).

Scaphocalanus brevicornis (Sars, 1900)

(Figs 55, 93)

DESCRIPTION: *Size:* ♀ ♀ 1.9—2.84 mm, ♂ ♂ 2.15–2.99 mm.

Female: Head broadly rounded in dorsal view and without crest. Lateral corner of last metasome segment angularly produced. Urosome segments 1–3 fringed with fine teeth on distal border. Genital segment slightly produced in lateral view. Antenna 1 22–segmented. Leg 2 exopod segment 1 with curved outer edge spine about half as long as exopod segment 2. Leg 5 with basal portion common to both legs; terminal segment three times as long as wide, with three spines; inner edge spine slightly curved at apex, exceeding terminal spine, which is longer than segment; outer edge spine about as long as width of segment and normally inserted opposite inner edge spine.

(Sars 1903, Vervoort 1951, Tanaka 1961)

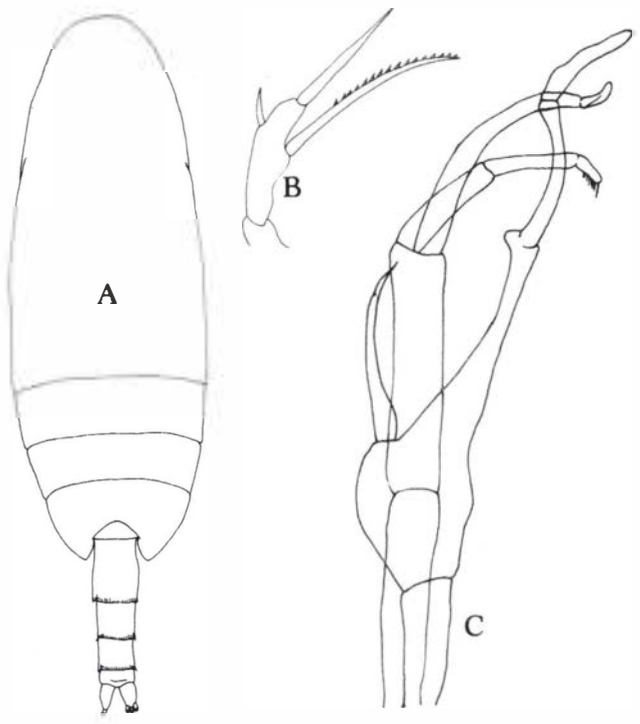


FIG. 55. *Scaphocalanus brevicornis* (from Tanaka 1961). Female: A, dorsal view; B, leg 5. Male: C, leg 5.

Male: Pedigerous segments 4 and 5 separate; distal border of urosome segments 2–4 fringed with fine teeth. Antenna 1 20–segmented, reaches distal end of urosome segment 3. Leg 5 reaches end of urosome segment 2. Right leg 5 exopod segment 3 knife-shaped; endopod two-segmented, styliform. Left leg 5 exopod segment 3 very small and carrying three long hairs and basal patch of short hairs; distal segment of endopod small, curved apically.

(With 1915; Tanaka 1937, as *Scaphocalanus minuta;* Vervoort 1957; Tanaka 1961)

REMARKS: *Scaphocalanus brevicornis* appears to vary in some respects. Lateral corners of the metasome differ slightly in shape (*see* Sars 1903, Brodsky 1950, Vervoort 1951, Tanaka 1961). Sars (1903) describes the antenna 1 as not reaching the distal end of the metasome, but Tanaka (1961) records it as reaching the distal end of the metasome. Vervoort (1951) records the outer edge spine of the exopod of leg 2 as one and

one half times as long as exopod segment 2, although he illustrates this spine as half the length of exopod segment 2. The number of spinules on the posterior surface of leg 2 endopod segment 2 varies slightly (*see* Sars 1903, Vervoort 1951, Tanaka 1961).

Scaphocalanus brevicornis is very similar to *S. major*, but can be distinguished from it by a longer spine on leg 2 exopod segment 2.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Vervoort (1957), Bradford (1970b).

NEW RECORDS: Nil.

DISTRIBUTION: *Scaphocalanus brevicornis* has been taken from the deep waters of all oceans (Vervoort 1957).

Scaphocalanus curtus (Farran, 1926)

(Figs 56, 93)

DESCRIPTION: *Size:* ♀♀ 0.96–1.3 mm.

Female: Head broadly rounded in dorsal view; posterolateral corners of metasome produced but rounded in lateral view. Genital segment hardly wider than following segments, without genital prominence, this segment and following two with small spines along posterior border. Antenna 1 of 23 segments with many long aesthetes, reaches just beyond pedigerous segment 1. Leg 5 absent.

(Farran 1926, Hure and Scotto di Carlo 1968)

Male: Unknown.

REMARKS: Farran (1926) states the exopods of legs 2–4 are without spinules while Hure and Scotto di Carlo's (1968) illustrations not only show spinulation on the exopods but also more spinules on the endopod of leg 3. Hure and Scotto di Carlo (1968) illustrate maxilla 1 inner lobe 3 with three setae instead of the four setae more usual for the genus. They also illustrate maxilla 2 with six worm-like and two brush-like filaments but an elongate brush-like filament with a small head, present in other *Scaphocalanus* (Bradford 1973), may have been mistaken for a worm-like filament. Tanaka's (1961) *S. curtus* and the large form (1.30 mm) of Farran's (1926) *S. curtus* may be synonymous with *S. invalidus* (*see* Hure and Scotto di Carlo 1968). Vervoort (1965) believes the male Tanaka (1961) attributes to *S. longifurca* is the male of *S. curtus*, because the male Tanaka (1961) places with *S. curtus* is much larger than the female. The identity of male *S. curtus* is yet to be resolved; Hure and Scotto di Carlo (1968) make no mention of the males.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Farran (1929).

NEW RECORDS: Nil.

DISTRIBUTION: *Scaphocalanus curtus* has been recorded from the west coast of Ireland, the Bay of Naples, the South Adriatic, and north of New Zealand, which indicates a world-wide distribution. It seems to be epipelagic (Farran 1926, 1929; Hure and Scotto di Carlo 1968).

Scaphocalanus echinatus (Farran, 1905)

(Figs 57, 93)

DESCRIPTION: *Size:* ♀♀ 1.6–2.48 mm, ♂♂ 1.26–1.34 mm.

Female: Head without crest; body slim, elongated. Posterolateral corners of metasome produced but not pointed. Genital segment as long as wide, produced slightly ventrally. Antenna 1 22-segmented, extends to end of genital segment. Leg 2 exopod segment 1 with curved spine about half as long as exopod segment 2; posterior surface of endopod with two proximally and three distally placed spines and three spinules in middle. Leg 5 inner edge spine with coarse teeth, the spine one and one-half times as long as two fused distal segments, but does not exceed terminal spine. Some specimens have no outer edge spine, but an additional small spine adjacent to larger terminal spine; some specimens have rudimentary endopod, and terminal spine much shorter than fused segments 1 and 2.

(Farran 1908, 1929; Tanaka 1961)

Male: Antenna 1 20-segmented on left, 19-segmented on right, extending to distal margin of urosome segment 2. Leg 5 reaches distal end of urosome segment 4. Right leg 5 exopod three-segmented, distal segment represented by small slender process; endopod reaches to exopod segment 1. Left leg 5 endopod one-segmented.

(Tanaka 1961)

REMARKS: The south-west Pacific specimens are like the previous descriptions. There appears to be some variation in the number of spinules on the posterior surface of the endopod of leg 2 and the length of the inner edge spine on female leg 5. *Scaphocalanus echinatus* differs from *S. brevicornis* in that the inner edge spine of female leg 5 has no fine teeth and does not exceed the length of the terminal spine.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Farran (1929), Bary (1951), Bradford (1970b, 1972).

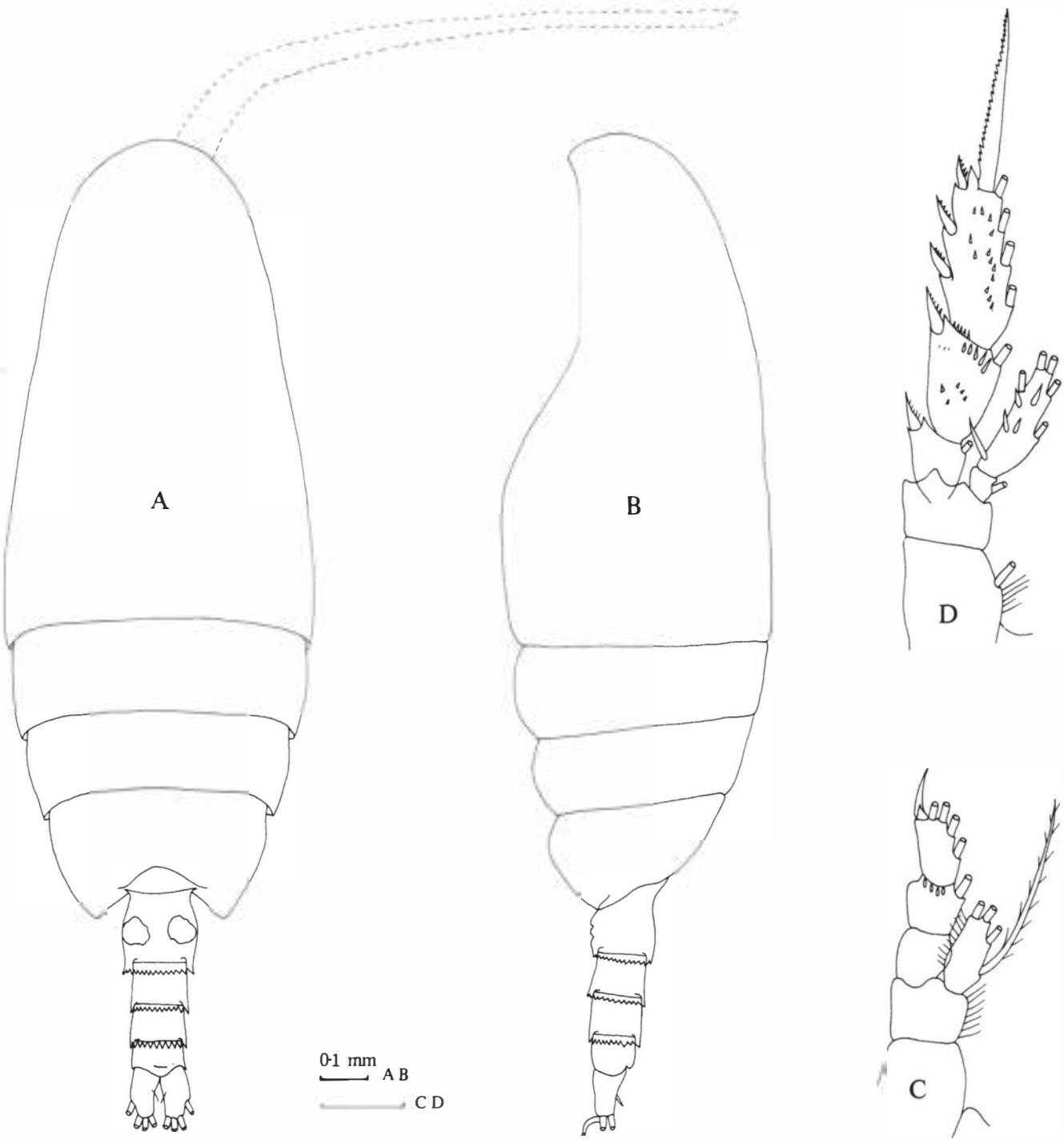


FIG. 56. *Scaphocalanus curtus* female (from Hure and Scotto di Carlo 1968): A, dorsal view; B, lateral view; C, leg 1; D, leg 2.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
A292	500–1000	4 ♀♀, 1.55, 1.7, 1.7, 2.15 mm
A295	0–500	1 ♀, 1.8 mm
A302	0–500	5 ♀♀, 1.7–1.8 mm
	500–1000	1 ♀, 2.1 mm
A303	450–1000	3 ♀♀, 1.6, 1.7, 2.1 mm
A313	0–500	5 ♀♀, 2.0–2.2 mm
B117	0–500	1 ♀, 2.2 mm
C526	0–250	1 ♀, 1.7 mm
F945	0–500	1 ♀, 1.85 mm
	500–1000	2 ♀♀, 2.15, 2.2 mm
F946	0–200	1 ♀, 2.3 mm
	0–1000	3 ♀♀, 1.9, 1.9, 1.95 mm

DISTRIBUTION: *Scaphocalanus echinatus* is recorded from deep waters by Tanaka (1961) and Grice and Hulsemann (1967), but Farran (1929) records it from 10–30 m depth, and Bary (1951) from 0–100 m. The present records are from mesopelagic depths. It has been recorded from both the Atlantic and Pacific Oceans.

Scaphocalanus longifurca (Giesbrecht, 1888)
(Figs 58, 94)

DESCRIPTION: *Size:* ♀♀ 1.25–1.75 mm, ♂♂ 1.7–1.9 mm.

Female: Body elongated, oval. Posterolateral corners of metasome triangularly produced, rounded at apex. Genital segment produced ventrally, as long as following two urosome segments. Antenna 1 22-segmented. Leg 2 exopod segment 2 with curved spine half as long as exopod segment 2. Posterior surfaces of basal segments of legs 2–4 covered with small triangular teeth. Leg 5 with two distal segments fused, carrying two to three spines; terminal spine half as long as distal segment; inner edge spine three times as long as terminal spine and finely serrated on each side.
(Giesbrecht 1892, Tanaka 1961)

Male: Lateral corners of metasome rounded and not produced. Antenna 1 18-segmented, extends to distal end of metasome. Leg 1 exopod without spine. Leg 2 exopod segment 2 with small straight spine. Left leg 5 endopod segment 1 swollen at middle, segment 2 very small; exopod short, three-segmented, last segment short, covered with hairs and some setae, two of which are long. Right leg 5 endopod does not reach distal

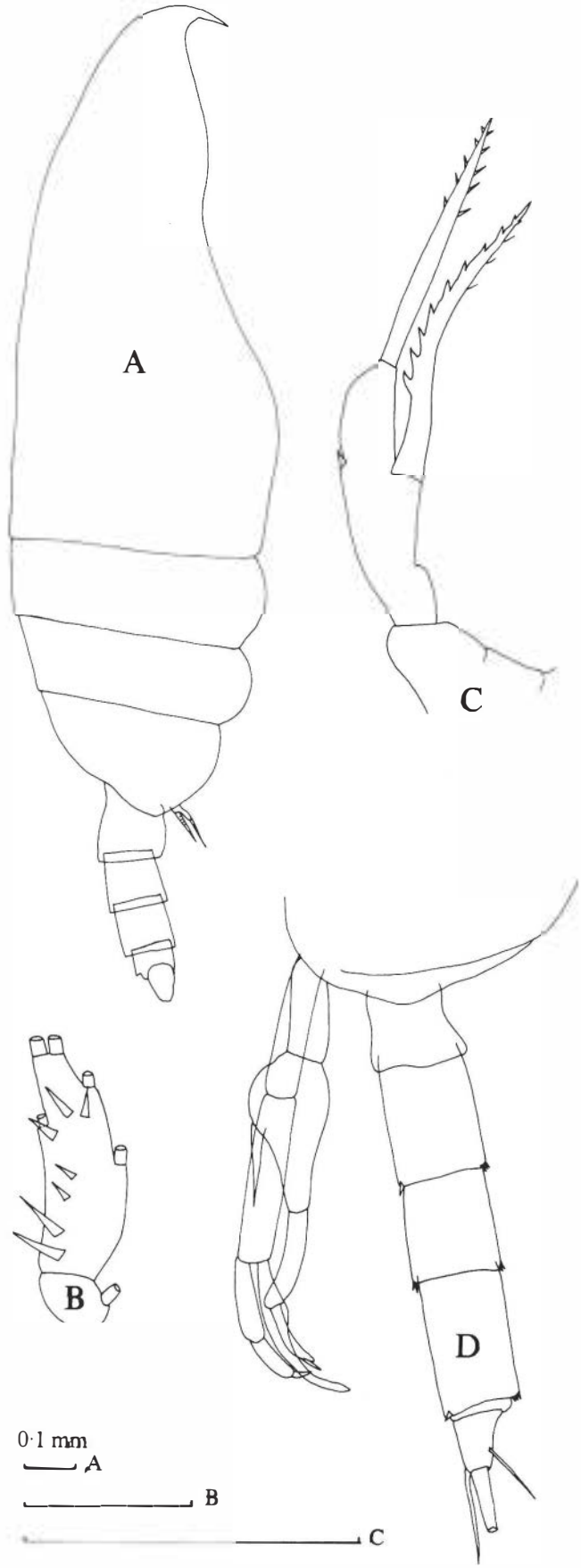


FIG. 57. *Scaphocalanus echinatus* female from NZOI Stn G142: A, lateral view; B, endopod of leg 2; C, leg 5. Male (from Tanaka 1961): D, leg 5.

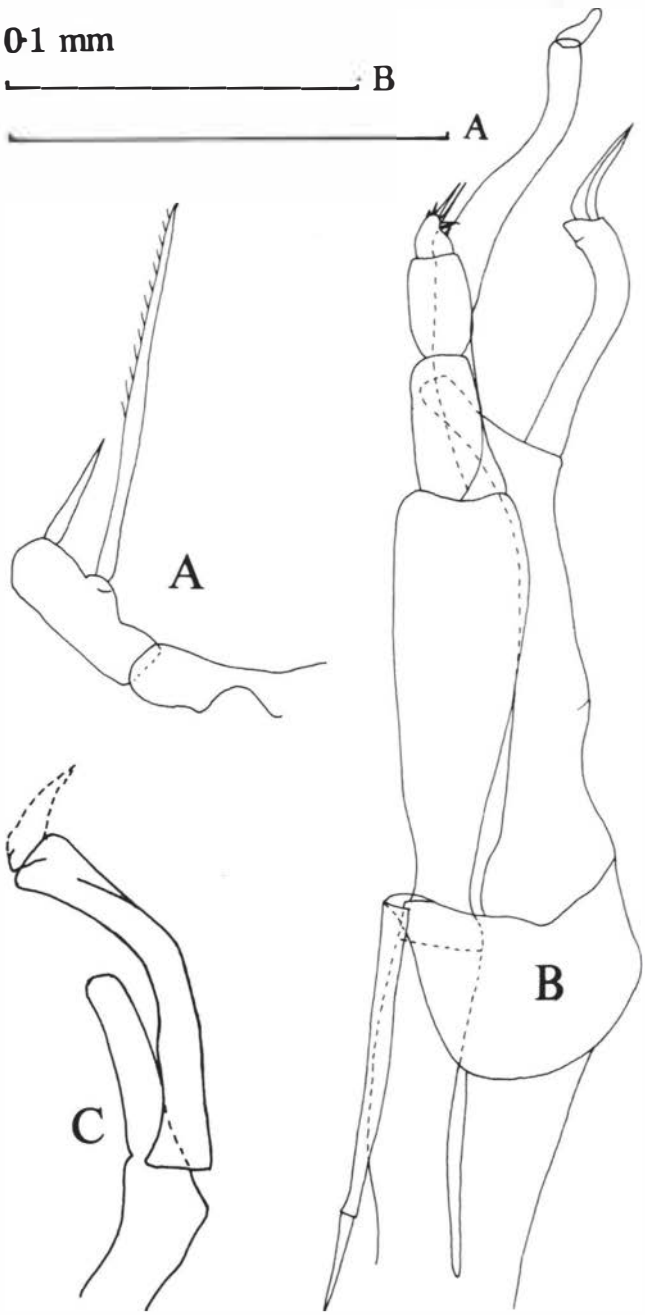


FIG. 58. *Scaphocalanus longifurca* female from NZOI Stn A292: A, leg 5. Male from NZOI Stn F946: B, leg 5; C, terminal part of exopod segment 1 and exopod segment 2 of right leg 5.

margin of exopod segment 1, which is greatly expanded terminally.

(Rose 1942, as *Scolecithricella vittata*)

REMARKS: There appears to be some variation in the presence and position of a third small spine on the female leg 5 (*see* Giesbrecht 1892, Tanaka 1961).

There is a great deal of confusion over the identity of males of *S. longifurca*. Vervoort (1965: 65) believes that the male of *S. longifurca* has been described as *Scolecithricella vittata* by Rose (1942) and *Scaphocalanus curtus* by Tanaka (1961), even though Tanaka specifically states the distal end of leg 5 exopod segment 1 is not produced, as it is in the south-west Pacific specimens and those of Rose. Vervoort (1965) attributes the male Tanaka (1961) describes as *S. longifurca* to *S. curtus*.

The south-west Pacific males attributed to *S. longifurca* are about the same size as the only two females taken. All the swimming legs are damaged but leg 5 exhibits characteristics in common with Rose's (1942) figure (as *Scolecithricella vittata*): the right leg 5 exopod segment 1 distal extension is long – about half the length of exopod segment 2; the right leg 5 endopod extends beyond the distal border of left leg 5 basipod 2; the thickening on the left leg 5 endopod is at about mid-length; the left leg 5 exopod segment 3 terminal spinules are longer than the segment. If these characters of the male leg 5 are specific then it is possible the following previous records are of *S. longifurca: Scolecithricella vittata:* Rose (1942), *Scaphocalanus gracilicauda:* Tanaka (1953), *S. subbrevicornis:* Tanaka (1961), *S. longifurca:* Grice (1962), *Scolecithrix glacialis:* Wolfenden (1911).

Scaphocalanus longifurca is very like *S. subbrevicornis*, but they can possibly be separated by the terminal spine of the female leg 5, which is much longer in *S. subbrevicornis;* the outer edge spine of exopod segment 1 of leg 2 which is curved in *S. longifurca*, but straight in *S. subbrevicornis*; the basal segments of leg 3 which are densely covered in spinules in *S. longifurca*, but naked in *S. subbrevicornis* (Vervoort 1951: 117); and the male leg 5 with characters described in the previous paragraph.

Since both *S. longifurca* and *S. subbrevicornis* appear to be variable species they must be re-examined and the possibility that they are synonymous, as suggested by Farran (1929), be further considered.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Nil.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
A292	500–1000	2 ♀♀, 1.25, 1.3 mm
F945	0–500	1 ♂, 1.2 mm
F946	200–500	1 ♂, 1.3 mm
	0–1000	1 ♂, 1.3 mm
F947	0–500	1 ♂, 1.35 mm

DISTRIBUTION: *Scaphocalanus longifurca* is meso-bathypelagic and has been sparingly recorded from all oceans (Tanaka 1961; Grice and Hulsemann 1965, 1967; Park 1970).

Scaphocalanus magnus (T. Scott, 1894)
(Figs 59, 94)

DESCRIPTION: *Size:* ♀♀ 3.55–5.6 mm, ♂♂ 3.5–4.74 mm.

Female: Head with crest. Body attenuated anteriorly; head and pedigerous segment 1 together as long as rest of body; posterolateral corners of metasome produced. Genital segment slightly swollen ventrally anterior to middle, hardly longer than following segment. First three urosome segments fringed with fine teeth on distal margin. Antenna 1 extends to end of metasome. Leg 5 imperfectly three-segmented; middle segment small and not distinctly defined from terminal segment, which has three spines, one terminal and two marginal, placed opposite each other; inner edge spine and terminal spine very long, outer edge spine short.
(Sars 1903, With 1915, Tanaka 1961)

Male: Head without crest. Body more slender and urosome longer than in female. Pedigerous segment 5 well marked and lateral corners rounded. Urosome segment 2 long and tumid. Antenna 1 extends beyond metasome. Leg 5 scarcely reaches beyond middle of urosome, both legs of about same length; rami of left leg 5 almost as long as basipod 2 and slightly incurved.
(Sars 1903, With 1915)

REMARKS: *Scaphocalanus magnus* shows some variation. There are differences in the shape of the posterolateral border of the metasome and female leg 5 (Vervoort 1957). The south-west Pacific specimens have a relatively long outer edge spine on leg 5 and the terminal spine does not extend as far as the inner edge spine; in the case of the specimens taken off Dunedin (Stations prefixed Mu67/), the terminal spine extends almost as far as the inner edge spine. Leg 2 exopod segment 2 of the illustrated specimen has more spines on the posterior surface than shown in With's (1915) illustration and is similar to those described by Tanaka (1961).

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Nil.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
E788	0–1193	1 ♀, 5.1 mm
E901	0–1248	1 ♂, 4.6 mm
E904	0–1243	1 ♀, 5.1 mm
VUZ93	0–1097	8 ♀♀, 4.3–5.15 mm
VUZ105	0–914	6 ♀♀, 4.4–4.7 mm
VUZ112	0–732	2 ♀♀, 4.7, 5.2 mm
Mu67/57s	0–1000	1 ♀, 5.1 mm
Mu67/94s	0–1000	3 ♀♀, 5.1, 5.2, 5.4 mm

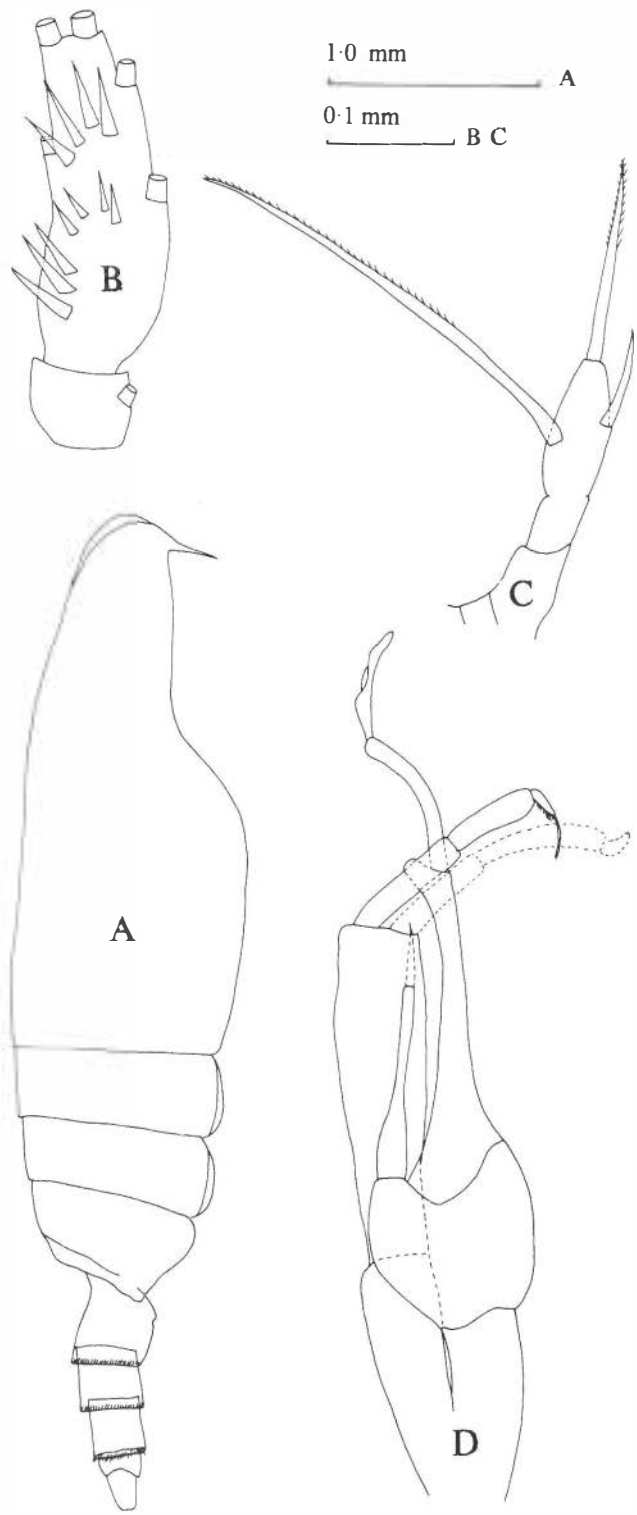


FIG. 59. *Scaphocalanus magnus* female from VUZ Stn 105: A, lateral view; B, endopod of leg 2; C, leg 5. Male from NZOI Stn E901: D, leg 5.

DISTRIBUTION: *Scaphocalanus magnus* has a worldwide distribution and is mainly recorded from deep waters (Vervoort 1957).

Scaphocalanus major (T. Scott, 1894)
(Figs 60, 94)

DESCRIPTION: *Size:* ♀♀ 2.3–3.1 mm, ♂♂ 1.8–2.76 mm.

Female: Head narrowly rounded in lateral view, without crest. Metasome with rounded posterolateral corners. Genital segment slightly produced ventrally and furnished with hairs on ventral margin posterior to genital opening. Urosome segments 1–3 of about same length, fringed with fine teeth on posterior margin. Caudal rami about twice as long as broad. Antenna 1 shorter than metasome. Leg 2 exopod segment 2 with curved spine slightly shorter than half of exopod segment 2; posterior surface of endopod segment 2 with spinules arranged in roughly three groups, middle group has smallest spinules. Leg 5 with last two segments fused; the fused segment about three times as long as wide, with three spines; inner edge spine placed at middle of fused segment, finely serrated, and twice as long as terminal spine, which is of same length as fused segment; outer edge spine short and placed more distally than inner edge spine.
(T. Scott 1894, Tanaka 1961)

Male: Lateral margins of head constricted anteriorly when seen in dorsal view; posterior corner of metasome slightly produced; pedigerous segments 4 and 5 separate. Antenna 1 19-segmented. Leg 2 exopod segment 1 with spine as in female. Leg 5 reaches distal margin of urosome segment 2. Right leg 5 exopod segment 1 with distal expansion, segment 2 curved, and segment 3 broadly knife-shaped; endopod two-segmented. Left leg 5 endopod curved and slightly inflated proximally; terminal segment of exopod with three apical bristles of different lengths, and hairy inner margin.
(Brodsky 1950, as *S. medius;* Tanaka 1961)

REMARKS: The posterior metasomal corners of the south-west Pacific females are pointed in a manner not previously recorded (*see* Tanaka 1961). The shape of the posterior metasome may be variable as it is more acutely pointed in the female from Station F946 than in the females from Station A302. There seems to be some variation in the relative lengths of spines of the female leg 5 (*see* Sars 1925, as *S. medius*; Brodsky 1950; Tanaka 1961) and the outer edge spine may be completely absent (Tanaka 1961). The south-west Pacific specimens are like Brodsky's description.

Scaphocalanus major is very similar to *S. brevicornis*, but has a shorter spine on leg 2 exopod segment 2 than in *S. brevicornis*.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Bradford (1970b, as *S. brevicornis*).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
A292	500–1000	1 ♂, 2.1 mm
A295	0–500	1 ♂, 1.8 mm
A302	500–1000	3 ♀♀, 2.2–2.5 mm
		1 ♂, 1.9 mm
F945	0–500	1 ♂, 1.95 mm
F946	200–500	2 ♂♂, 2.15, 2.2 mm
	0–1000	1 ♀, 2.7 mm
		2 ♂♂, 2.15, 2.2 mm

DISTRIBUTION: *Scaphocalanus major* is widely distributed in the deep waters of the Atlantic, Indian and Pacific Oceans (Tanaka 1961).

Scaphocalanus subbrevicornis (Wolfenden, 1911)
(Figs 61, 94)

DESCRIPTION: *Size:* ♀♀ 1.5–2.1 mm, ♂♂ 1.98–2.25 mm.

Female: Head broadly rounded in dorsal view but narrowly rounded in lateral view, without crest. Posterolateral corners of metasome slightly produced but rounded in lateral view. Genital segment not as long as following two segments, hardly produced ventrally. Caudal rami two and a half times long as wide. Leg 2 exopod segment 1 with short spine about one-third as long as exopod segment 2. Basal segments of legs 2–4 naked. Leg 5 three-segmented, middle segment short, incompletely separated from distal segment, which is twice as long as wide and carries three spines; inner edge spine long and slightly curved towards apex, arises from middle of distal segment, plumose on outer margin; terminal spine slightly longer than distal segment; outer edge spine small.
(Wolfenden 1911, Vervoort 1951, Tanaka 1961)

Male: Antenna 1 extends to distal end of metasome. Leg 5 extends to distal margin of urosome segment 3. Right leg 5 endopod one-segmented, styliform, does not extend beyond distal border of left leg basipod 2; exopod segment 1 distal extension less than half length of exopod segment 2. Left leg 5 endopod swollen at about one-third distance from distal end, terminal part strongly curved; two distal segments of exopod indistinctly separated, apex with two strong spinules and covering of hairs.
(Vervoort 1951)

REMARKS: For a discussion of the confusion which exists between *S. subbrevicornis* and *S. longifurca* see "Remarks" under *S. longifurca*. Vervoort (1957) finds the number of spines on the female leg 5 to be variable.

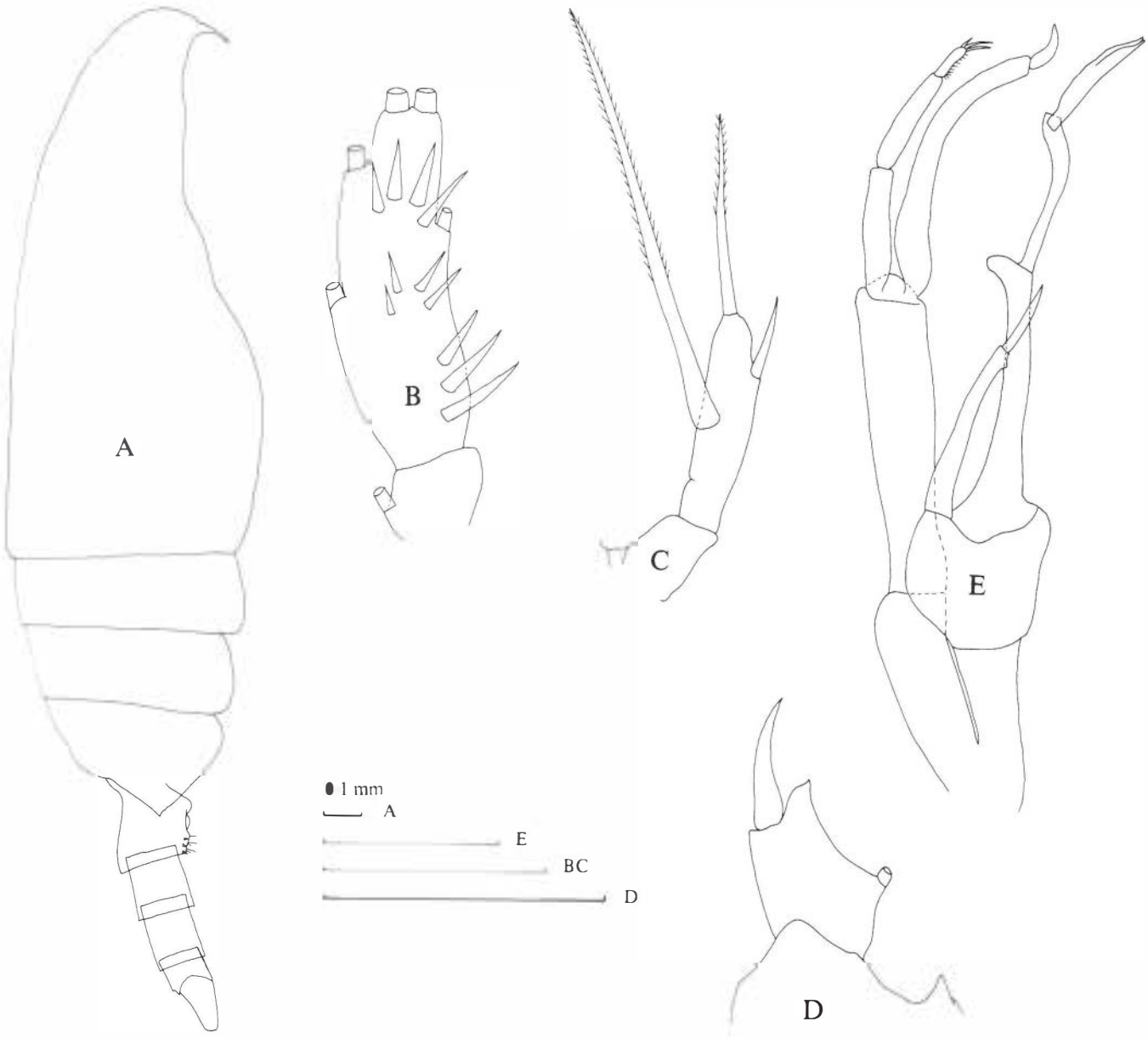


FIG. 60. *Scaphocalanus major* female from NZOI Stn F946: A, lateral view; B, endopod of leg 2; C, leg 5. Male from NZOI Stn F945: D, leg 2 exopod segment 1; E, leg 5.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Vervoort (1957).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
A292	500–1000	1 ♀, 2.0 mm
B108	Surface	1 ♀, 1.7 mm
B110	0–500	1 ♀, 1.5 mm

DISTRIBUTION: Vervoort (1957) states *S. subbrevicornis* is a deep-water inhabitant of Antarctic seas and is not found north of the Antarctic Convergence, but Tanaka's (1961) record from deep water off Japan and the present record at Station A292 (30° 45'S) indicates that this species may be widely distributed at great depths.

Scolecithricella Sars, 1903

DEFINITION: Pedigerous segments 4 and 5 fused. Rostrum of two filaments. Antenna 1 of 22 or 23 segments in female, 19 segments in male. Maxilla 1

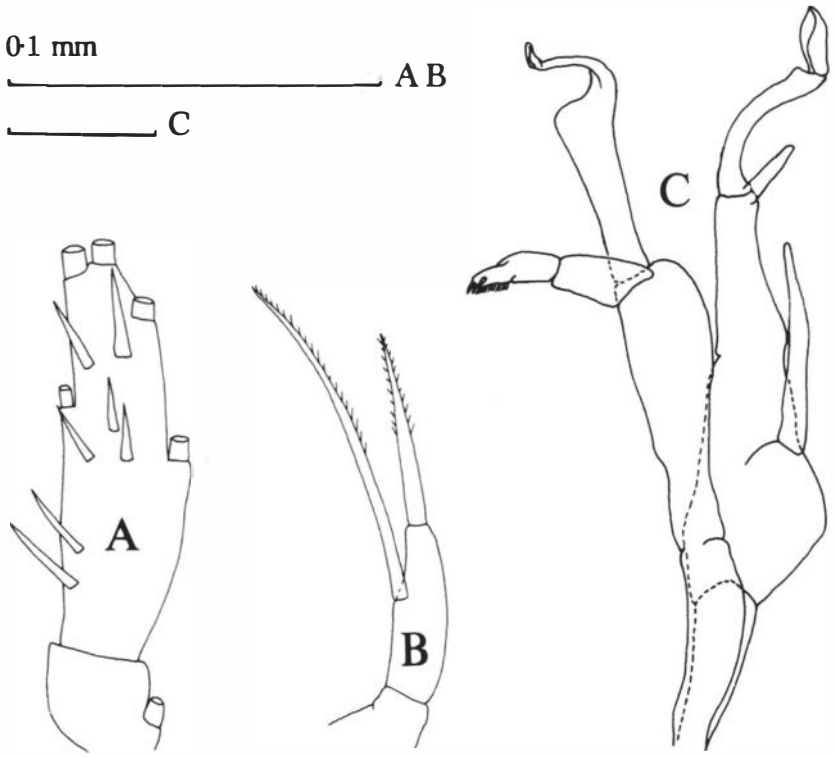


FIG. 61. *Scaphocalanus subbrevicornis* female from NZOI Stn B108s: A, endopod of leg 2; B, leg 5. Male (from Vervoort 1951): C, leg 5.

inner lobe 1 with two posterior surface setae, inner lobe 3 with three setae; endopod segment 1 usually separate from segments 2 and 3. Maxilla 2 endopod with three worm-like and five brush-like filaments. Leg 1 exopod segment 1 usually without an external spine. Male mouthparts slightly reduced compared with female. Female leg 5 uniramous, one-segmented, flattened, plate-like, attached to common basal segment. Male leg 5 biramous on both sides, both endopods very short.

(Bradford 1973)

REMARKS: The following species are placed in this genus: *Scolecithricella abyssalis* (Giesbrecht, 1892) (= *Scolecithrix tumida* T. Scott, 1894; = *Scolecithrix dubia* Giesbrecht, 1892 (*see* Tanaka 1962)); *S. cenotelis* Park, 1980; *S. dentata* (Giesbrecht, 1892); *S. minor* (Brady, 1883) (= *Scolecithrix römeri* Mrazek, 1902; = *Scolecithrix glacialis* Giesbrecht, 1902); *S. ovata* (Farran, 1905); *S. profunda* (Giesbrecht, 1892); *S. schizosoma* Park, 1980; *S. tropica* Grice, 1962 (= *S. beata* Tanaka, 1962) (♂ unknown); *S. vittata* (Giesbrecht, 1892) (♂ *see* Tanaka 1962).

The following species show a general likeness to *Scolecithricella*, especially in the female leg 5, but the number of setae on maxilla 1 has not been clearly established: *Amallothrix farrani* Rose, 1942 (♂ unknown); *Scolecithricella globulosa* Brodsky, 1950; *Scolecithrix longipes* Giesbrecht, 1892 (♂ unknown); *Scolecithrix marginata* Giesbrecht, 1888 (♂ unknown); *Scolecithricella modica* Tanaka, 1962 (♂ unknown); *Scolecithricella neptuni* Cleve, 1904; *Scolecithricella obscura* Roe, 1975 (♂ unknown); *Scolecithricella orientalis* Mori, 1937 (♂ unknown); *Scolecithricella pacifica* Chiba, 1956; *Scolecithricella pearsoni* Sewell, 1914; *Amallothrix sarsi* Rose, 1942 (♂ unknown); *Scolecithrix subdentata* Esterly, 1905 (♂ unknown); *Scolecithricella subvittata* Rose, 1942 (♂ unknown); *Scolecithrix tenuiserrata* Giesbrecht, 1892; *Scolecithricella unispinosa* Grice and Hulsemann, 1965 (♂ unknown); *Scolecithricella vespertina* Tanaka, 1955 (♂ unknown).

The following species or groups of species have been placed in *Scolecithricella* but differ from the generic definition. When the limits of the definition of *Scolecithricella* become clearer these species may have to be removed to new genera: *Scolecithrix laminata* Farran, 1926 (= *Amallothrix profunda* Brodsky, 1950 (*see* Roe 1975)) has a *Lophothrix* type of maxilla 1, six worm-like and two brush-like filaments on maxilla 2, an outer edge spine on leg 1 exopod segment 1 and a *Scaphocalanus* type of male leg 5 (Roe 1975); *Scolecithricella aspinosa* Roe, 1975 and *S. canariensis* Roe, 1975 have a *Lophothrix* type of maxilla 1, have no outer edge spines on leg 1 exopod segments 1 and 2, and show similarities with *Scaphocalanus bogorovi* Brodsky, 1955 (Roe 1975).

Bradford (1973) defined a group related to *Scolecithrix ctenopus*. Campaner (1979) described a related species and suggested changes to the definition. Species possibly in this group are: *Scolecithrix ctenopus* Giesbrecht, 1888 (= *Scolecithricella spinipedata* Mori,

1937); *Scolecithrix tenuipes* T. Scott, 1894; *Scolecithricella marquesae* Vervoort, 1965; *Scolecithricella pseudoculata* Campaner, 1979; *Scolecithricella spinacantha* Wilson, 1942; *Xanthocalanus difficilis* Grice and Hulsemann, 1965; *Xanthocalanus elongatus* Grice and Hulsemann, 1970; *Xanthocalanus alvinae* Grice and Hulsemann, 1970; and *Xanthocalanus distinctus* Grice and Hulsemann, 1970. These species appear to have maxilla 1 with one seta on the posterior surface of inner lobe 1, leg 1 exopod segment 1 usually with an outer edge spine, and the male leg 5 uniramous on both sides.

Andronov (1981) described a new genus and species, *Xantharus formosus*, the female of which appears to be closely related to *Scolecithrix maritima* Grice and Hulsemann, 1967; the male of *X. formosus* has a biramous leg 5. The relationships of these species are not clear because Andronov (1981) considers *Xantharus* to be closely related to *Xanthocalanus*, *Tharybis*, and *Brachycalanus*, genera from two families.

Scolecithrix fowleri Farran, 1926 and *Scolecithricella grata* Grice and Hulsemann, 1967 represent species in which the terminal part of maxilla 2 in the female is completely absent whereas in the male some vestige of the sensory filaments are present (*see* Bradford 1973). These two species appear to be related to the Phaennidae, Scolecithricidae, Diaixidae, and Tharybidae, but it is not clear to which of these families they belong as presently defined.

Scolecithricella ingolfi With, 1915 seems to be a juvenile which has not been recorded since its description.

The following species have been taken in the south-west Pacific:

Scolecithricella abyssalis (Giesbrecht, 1888)
(Figs 62, 95)

DESCRIPTION: *Size*: ♀♀ 1.74–2.21 mm, ♂♂ 1.45–2.25 mm.

Female: Posterolateral corner of metasome broadly rounded in lateral view. Genital segment slightly vaulted ventrally. Antenna 1 21-segmented, reaches almost to caudal rami. External spine of leg 2 exopod segment 1 curved inwards. Leg 5 semi-oval to triangular; internal spine at mid-length of inner border about twice length of terminal spine; small projection on outer border opposite internal spine.
(Giesbrecht 1892, Rose 1942, Grice 1962)

Male: Antenna 1 19-segmented, extends to middle of urosome segment 2. Leg 2 exopod segment 1 with curved external spine. Right leg 5 basipod 2 swollen; endopod one-segmented, with terminal seta; exopod three-segmented, segments 1 and 2 more or less fused, segment 3 elongated with one distal seta. Left leg 5 endopod one-segmented, truncated distal end with terminal seta; exopod segment 3 spatula-shaped, covered with stiff hairs especially along margins.
(Rose 1942, Tanaka 1962)

REMARKS: This species is similar to *S. profunda* Giesbrecht and may be synonymous with it (Vervoort 1965b). *Scolecithricella abyssalis* is also very similar to *S. vittata* but differs in that the internal spine of the female leg 5 is longer than the terminal spine in *S. abyssalis*. In *S. vittata* the terminal spine is twice as long as the internal spine (A. Scott 1909). Grice (1962) found that several specimens did not have the small external spine-like projection opposite the internal spine.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Bradford (1970b).

NEW RECORDS: Nil.

DISTRIBUTION: *S. abyssalis* has been recorded from the Atlantic Ocean, Mediterranean, Malay Archipelago, and the Pacific Ocean (Giesbrecht 1892, Tanaka 1962). It is usually found in deep waters though it has been taken in surface water (Tanaka 1962).

Scolecithricella dentata (Giesbrecht, 1892)
(Figs 63, 95)

DESCRIPTION: *Size*: ♀♀ 1.3–2.07 mm, ♂♂ 1.3–1.85 mm.

Female: Body regularly rounded anteriorly. Posterolateral corners of metasome notched on each side. Antenna 1 22–segmented, extends to distal end of genital segment. Basipod 2 of mandible with one seta, Three of five brush-like filaments of maxilla 2 endopod long and thin, while other two are short and thick. Leg 2 basipod 2 with group of small spines on inner margin; endopod segment 2 elongated, with five spines on posterior surface; exopod segment 1 outer spine long and strongly curved. Leg 5 terminal segment rounded, terminal spine very small, inner margin spine longer than terminal spine, outer margin spine small and may be absent.
(Giesbrecht 1892, Rose 1942, Park 1980)

Male: Posterolateral corners of metasome rounded. Antenna 1 19-segmented, extends to distal end of urosome segment 3. Mouthparts as in female but maxilla 1 smaller. Leg 5 extends to distal end of urosome. Right leg 5 basipod 2 swollen; endopod one-segmented, very short, with distal spine; exopod two-

FIG. 62. *Scolecithricella abyssalis* female (from Giesbrecht 1892): A, leg 5. Male (from Bradford 1970b): B, leg 2; C, leg 5; D, terminal part of left leg 5 exopod.

segmented, segment 1 long, with projection at middle of inner margin, segment 2 much shorter, with terminal spine. Left leg 5 endopod one-segmented, with terminal spine; exopod three-segmented, terminal joint spatula-shaped with small spines more or less aligned and stronger spines on one surface.

(Rose 1942, Tanaka 1962)

REMARKS: South-west Pacific specimens agree with previous descriptions. The female is recognised by the notched posterior border of the metasome and leg 5 with the very small spines, the male is known by leg 5, and both sexes have an inner edge spine on basipod 2 of leg 2.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Farran (1929), Bradford (1970b, 1972), Park (1980).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
A295	400–1000	1 ♂
A302	0–500	2 ♂♂, 1.3, 1.4 mm
A332	surface	3 ♀♀, 1.5 mm
F945	500–1000	1 ♂, 1.85 mm
F946	200–500	2 ♂♂, 1.8, 1.8 mm
	0–1000	1 ♀, 1.3 mm
		1 ♂, 1.5 mm

DISTRIBUTION: Widely distributed in tropical and subtropical parts of all oceans; found only north of 46°40'S by Park (1980). In the north-east Atlantic Grice and Hulsemann (1965) found it between 100–1000 m while in the tropical Indian Ocean it was found between 1000–2000 m (Grice and Hulsemann 1967).

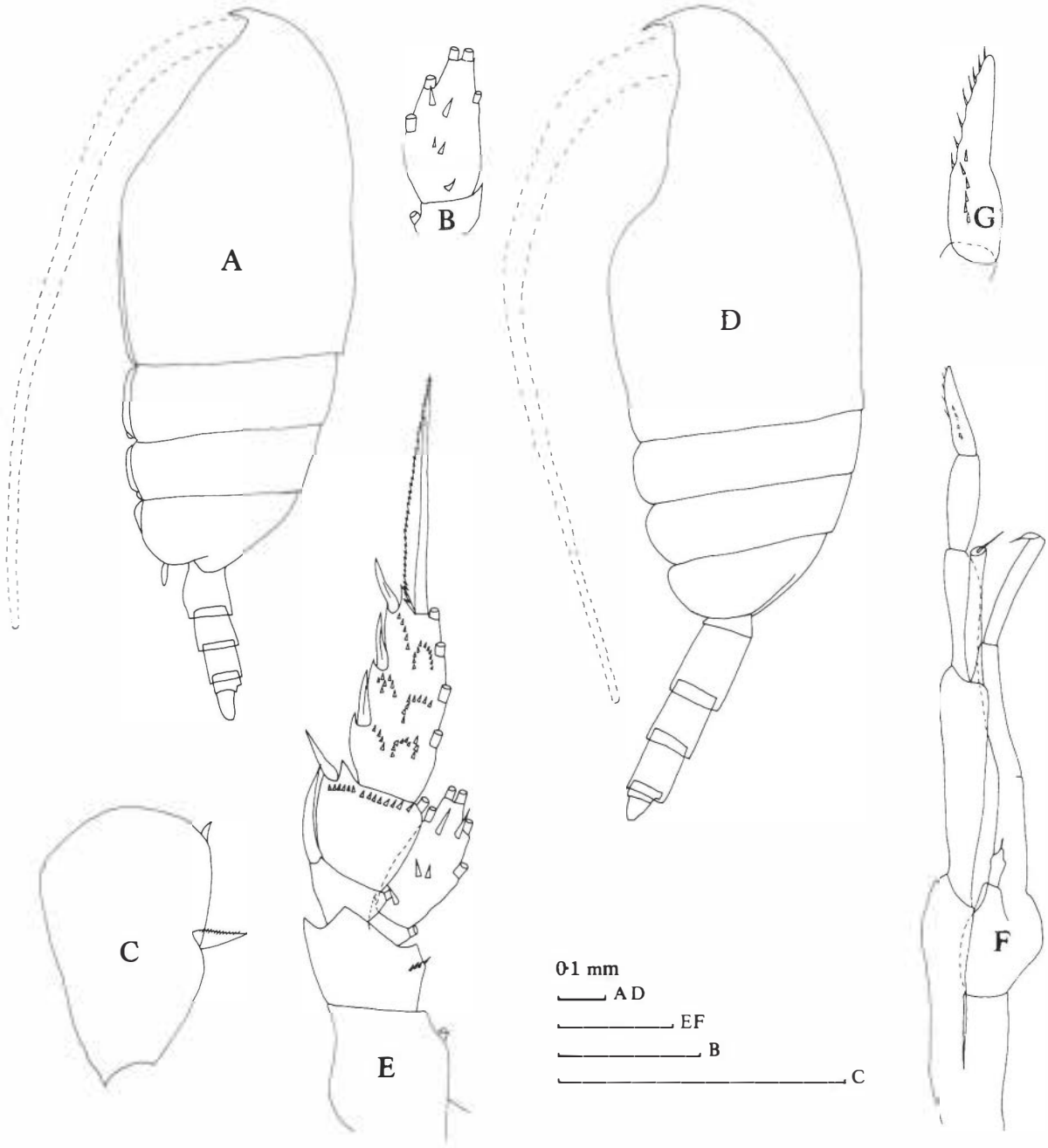


FIG. 63. *Scolecithricella dentata* female from NZOI Stn A332: A, lateral view; C, leg 5. Female from NZOI Stn F946: B, endopod of leg 2. Male from NZOI Stn F946: D, lateral view; E, leg 2; F, leg 5; G, terminal part of left leg 5 exopod.

"Scolecithricella" fowleri (Farran, 1926)
(Figs 64, 95)

DESCRIPTION: *Size*: ♀♀ 2.04 mm, ♂♂ 1.60–1.62 mm.

Female: Head and pedigerous segment 1, also pedigerous segments 4 and 5, fused. Posterolateral corners of metasome broadly rounded. Genital segment slightly swollen ventrally and almost as long as two following segments. Antenna 1 of 17 segments, reaches metasome segment 3. Maxilla 1 inner lobes 2 and 3 absent; outer lobe elongated with plumose setae; endopod with two setae; exopod with three setae. Maxilla 2 with all five lobes present, but no terminal sensory filaments. Leg 1 exopod segment 1 without spine. Leg 5 rather like *Racovitzanus*, with short apical spine and longer inner edge spine.

(Farran 1926, Grice and Hulsemann 1965)

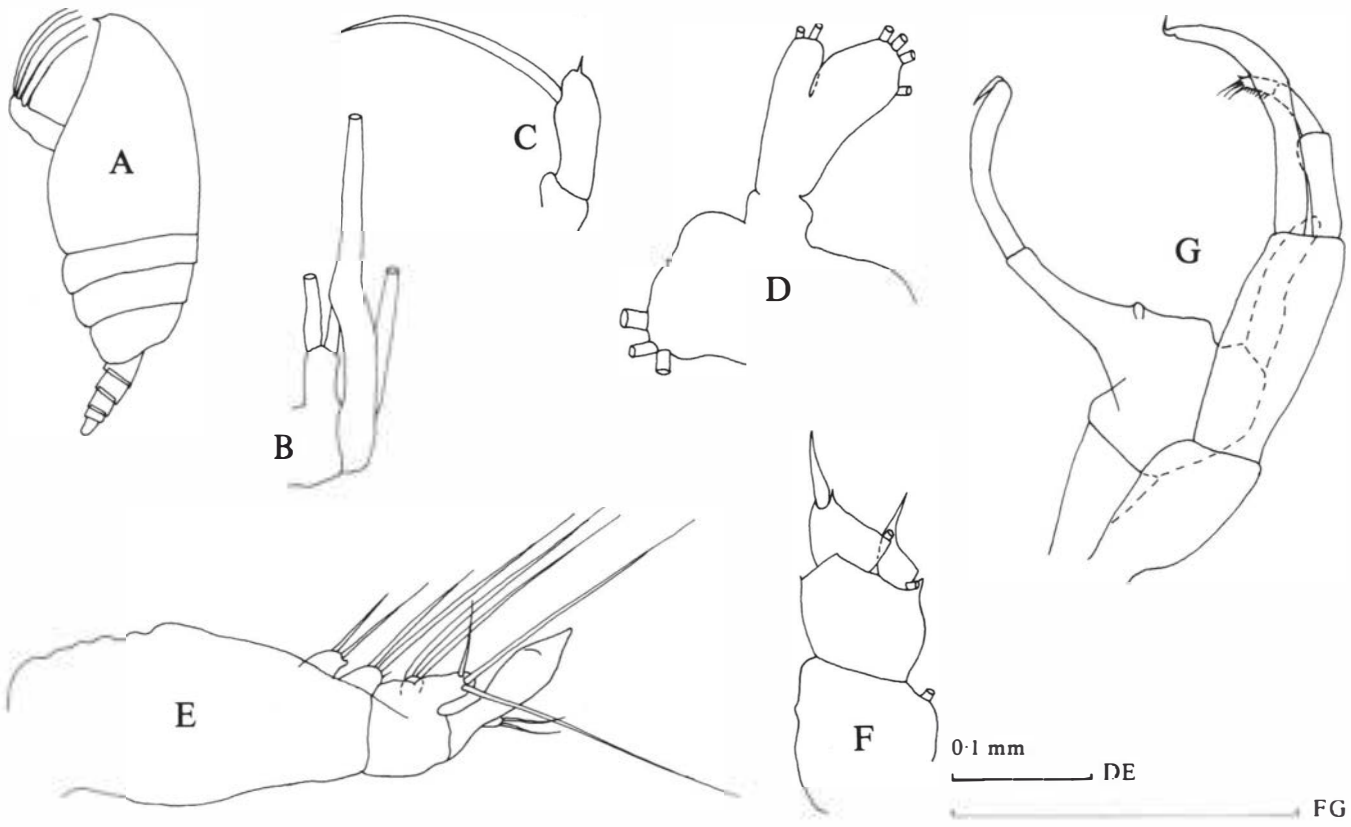


FIG. 64. *"Scolecithricella" fowleri* female (A, B, from Grice and Hulsemann 1965, C, from Farran 1926): A, lateral view; B, terminal part of maxilla 2; C, leg 5. Male from NZOI Stn A302: D, maxilla 1; E, maxilla 2; F, leg 2 proximal part; G, leg 5.

Male: Head and pedigerous segment 1 fused, pedigerous segments 4 and 5 separate. Maxilla 1 without inner lobes 1, 2, and 3, and setae of outer lobe 1 reduced; endopod with four setae; exopod with two setae. Maxilla 2 reduced, with four lobes and one rudimentary sensory filament distally. Leg 5 of *Scaphocalanus* type.

(Grice and Hulsemann 1967, Bradford 1973)

REMARKS: The only male caught agreed with Grice and Hulsemann's (1967) description except that maxilla 1 outer lobe 1 was damaged and had only three setae.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Nil.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
A302	0–500	1 ♂, 1.6 mm

DISTRIBUTION: This species is known from the Bay of Biscay (Farran 1926), the north Atlantic and Indian Oceans (Grice and Hulsemann 1965, 1967). The vertical distribution is not well known. Farran (1926) records it from 200 m while Grice and Hulsemann (1967) took it between 1020–1970 m.

Scolecithricella minor (Brady, 1883)

(Figs 65, 95)

Scolecithricella glacialis (Giesbrecht, 1902)

DESCRIPTION: *Size:* ♀♀ 1.08–1.46 mm, ♂♂ 1.2–1.46 mm.

Female: Posterolateral corners of metasome slightly produced and angular. Antenna 1 23-segmented, extends almost to distal end of genital segment. Basipod 2 of mandible with one seta. Leg 5 oval and about twice as long as wide; spine on inner margin positioned distally to middle, much longer than terminal spine; outer margin with very small spine.

(Park 1980)

Male: Posterolateral corners of metasome broadly rounded. Antenna 1 20-segmented, extends to posterior border of urosome segment 2. Leg 5 extends beyond urosome, basipod 1 of right and left leg partly

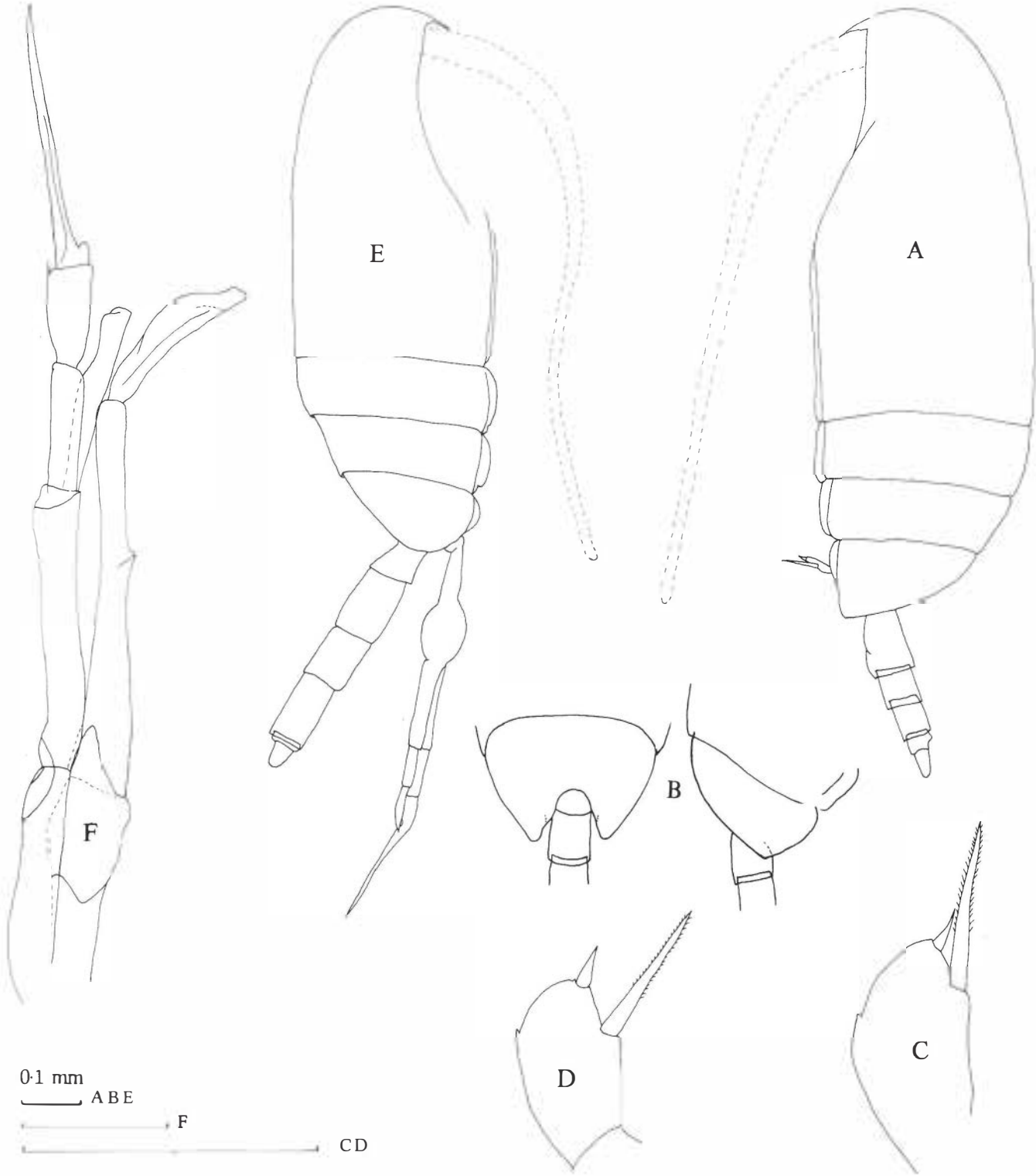


FIG. 65. *Scolecithricella minor* female from NZOI Stn B118: A, lateral view; B, posterior metasome dorsal and lateral views of another specimen; C, leg 5. Female from NZOI Stn B108: D, leg 5. Male from NZOI Stn B118: E, lateral view; F, leg 5.

fused. Right leg 5 endopod rudimentary, triangular; exopod segments 1 and 2 partly fused, with notch at place of fusion, exopod segment 3 elongated and slightly curved, with some elevated ridges on internal surface. Left leg 5 endopod one-segmented, cylindrical, and extends to middle of exopod segment 2; exopod segment 3 dagger-shaped with swollen base, longer than combined length of exopod segments 1 and 2.

(Park 1980)

REMARKS: *Scolecithrix minor* was first described by Brady (1883) from the south-west Indian Ocean. It was not well defined and the female leg 5 figured appears to be that of a female *Clausocalanus*. Subsequently Sars (1903) used the name *Scolecithricella minor* (Brady) for Norwegian specimens. Giesbrecht (1902) described *S. glacialis* from the Antarctic independently. Park (1980) believes that *S. glacialis* is a junior synonym of *S. minor*, an opinion which is followed here.

Brodsky (1950) records two varieties of *S. minor* which are characterised by the form of the female leg 5: var. *orientalis*, in which it is elongate, and var. *occidentalis*, which is as described by Sars (1903).

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Farran (1929), Vervoort (1957), Bradford (1972, as *S. glacialis*), Park (1980).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
B108	0–500	3 ♀♀, 1.25–1.40 mm
		1 ♂, 1.25 mm
B109	0–125	4 ♀♀, 1.3–1.4 mm
		2 ♂♂, 1.25, 1.3 mm
B110	0–500	1 ♂, 1.3 mm
B112	0–125	1 ♂, 1.4 mm
B113	0–500	2 ♀♀
		1 ♂, 1.2 mm
B114	0–125	5 ♀♀, 1.2–1.4 mm
		2 ♂♂
	0–500	5 ♀♀, 1.2–1.4 mm
B116	0–125	9 ♀♀, 1.2–1.35 mm
		1 ♂, 1.2 mm
B117	0–500	5♀♀, 1.2–1.35 mm
B118	0–500	4 ♀♀, 1.1–1.3 mm
		2 ♂♂, 1.2, 1.3 mm
B119	0–500	6 ♀♀, 1.2–1.3 mm
B120	0–150	3 ♀♀, 1.25–1.3 mm
	0–400	5 ♀♀, 1.15–1.3 mm
D599	0–100	1 ♀, 1.15 mm
	100–250	3 ♀♀
Mu66/43	0–200	1 ♂
Mu66/44	0–200	2 ♀♀
Mu66/78	0–100	1 ♂
Mu67/47	0–150	1 ♀
Mu67/77	0–150	1 ♀
Mu67/78	0–150	1 ♂

DISTRIBUTION: *Scolecithricella minor* is recorded widely from the world's oceans (Vervoort 1965) but is most commonly found as an epipelagic species at high latitudes in both hemispheres (Park 1980).

Scolecithricella ovata (Farran, 1905)

(Figs 66, 96)

DESCRIPTION: *Size:* ♀♀ 1.7–2.39 mm, ♂♂ 1.38–1.8 m.

Female: Posterolateral metasome border notched. Genital segment produced slightly ventrally. Antenna 1 23-segmented, extends to end of urosome segment 3. Basipod 2 of mandible with two setae. Leg 1 with outer edge spine on exopod segment 1. Leg 5 has pallet-shaped terminal segment and cylindrical basal segment which may be completely fused with pallet or separated from it, i.e., in some specimens there is a distinct joint between terminal and common basal segment; inner edge of joint always has spine, bordered by hairs, which is about as long as maximal width of pallet; second small nude spine may be placed subterminally.

(With 1915, Vervoort 1951, Park 1980)

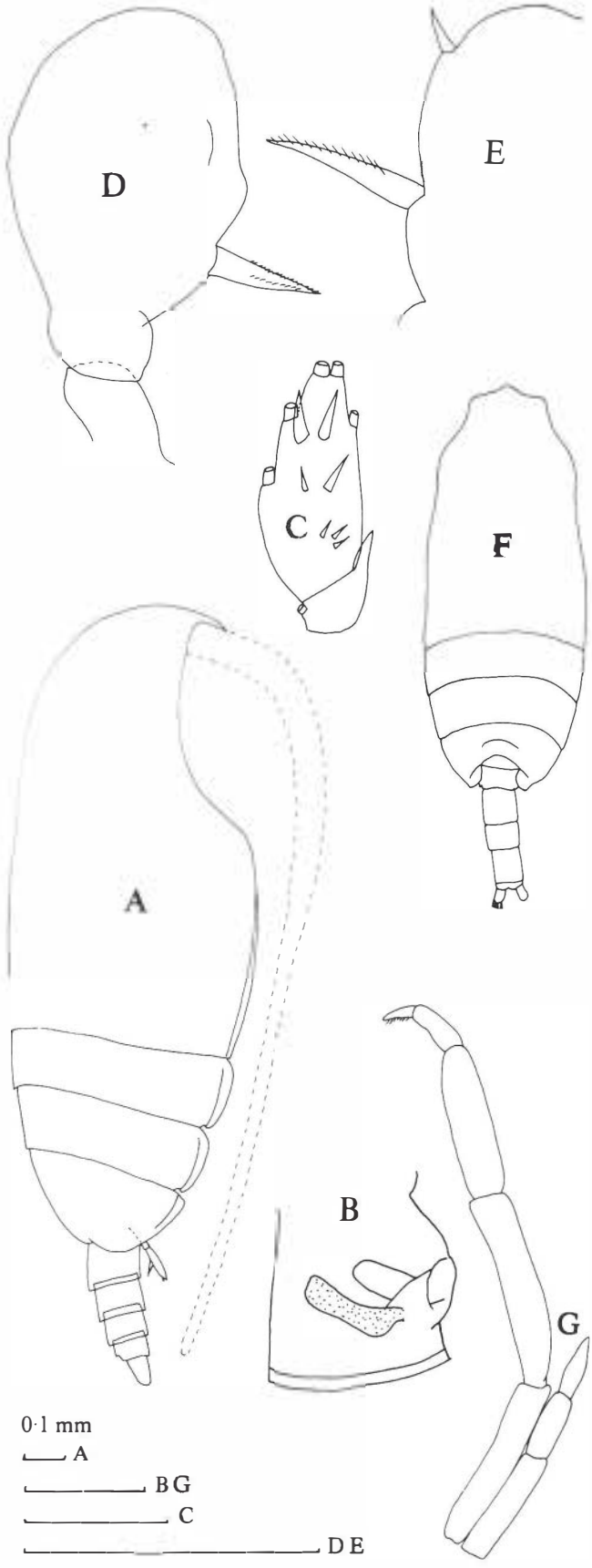
Male: Antenna 1 19-segmented, reaches distal end of urosome segment 3. Maxilla 1 reduced. Maxilla 2 endopod with worm-like filaments only. Leg 1 exopod segment 1 with outer edge spine. Leg 5 uniramous, extends to distal end of anal segment; right leg 5 short, three-segmented, distal segment varies in shape; left leg 5 exopod five-segmented and long, distal segment with two spines at apex and row of short hairs on inner margin.

(Tanaka 1962)

REMARKS: *Scolecithricella ovata* and *S. cenotelis* Park, 1980 differ from all other species placed in this genus because they have an outer edge spine on leg 1 exopod segment 1, an extra segment on female leg 5, and a uniramous male left leg 5 which is similar to that of *Scolecithrix ctenopus* Giesbrecht, 1888 (Tanaka 1962).

The south-west Pacific specimens are like those previously described. The left leg 5 terminal segment of the only male taken appears to be damaged. The inner edge spine of the female leg 5 may be shorter than the maximal width of the pallet. Park (1980) describes *S. cenotelis* which differs from *S. ovata* in that it has a long spermathecal vesicle curved anteriorly to lie diagonally across the genital segment in lateral view.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Farran (1929), Bary (1951), Vervoort (1957), Bradford (1970b), Park (1980).



NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
B111	0–500	2 ♀♀, 2.1, 2.1 mm
B114	0–500	2 ♀♀, 2.1, 2.2 mm
B119	0–500	1 ♀, 2.0 mm
D614	0–100	1 ♀, 1.7 mm
F945	0–500	2 ♀♀, 1.8, 1.9 mm
F946	0–1000	1 ♀, 1.95 mm
		1 ♂, 1.8 mm
F947	0–500	1 ♀, 1.95 mm
Mu67/47s	0–1000	2 ♀♀, 2.2, 2.2 mm
Mu67/57s	0–1000	2 ♀♀, 2.0, 2.3 mm
Mu67/104s	0–1000	1 ♀, 2.1 mm

DISTRIBUTION: This species has a world-wide distribution. It is found south of the Antarctic Convergence (Vervoort 1957) as well as in the Far Eastern and Polar Seas of USSR (Tanaka 1962) and in the tropical Indian Ocean (Grice and Hulsemann 1967). Vervoort (1957) summarises the distribution of this species as a characteristic north Atlantic mid-water species that occurs in small numbers in Pacific and Antarctic waters.

Scolecithricella profunda (Giesbrecht, 1892)
(Figs 67, 96)

DESCRIPTION: *Size:* ♀♀ 1.8–2.04 mm, ♂♂ 2.23 mm.

Female: Very similar to *S. abyssalis* but differs in that inner margin of last joint of leg 5 has spine bordered by coarse spinules, this spine placed almost perpendicular to the margin. In *S. abyssalis* inner spine forms an acute angle with margin.
(Giesbrecht 1892, A. Scott 1909)

Male: Tanaka (1962) describes a male very similar to his description of a male *S. abyssalis* but larger.

REMARKS: Rose (1942) and Vervoort (1956b) think this species is probably synonymous with *S. abyssalis.* The present female leg 5 looks very like Giesbrecht's (1892) original drawing of *S. profunda,* so we have retained this name.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Nil.

FIG. 66. *Scolecithricella ovata* female from NZOI Stn G142: A, lateral view; B, lateral view of genital segment. Female from NZOI Stn F946: C, endopod of leg 2. Female from NZOI Stn B114: D, leg 5. Female from NZOI Stn B119: E, leg 5. Male (from Tanaka 1962): F, dorsal view. Male from NZOI Stn F946: G, leg 5.

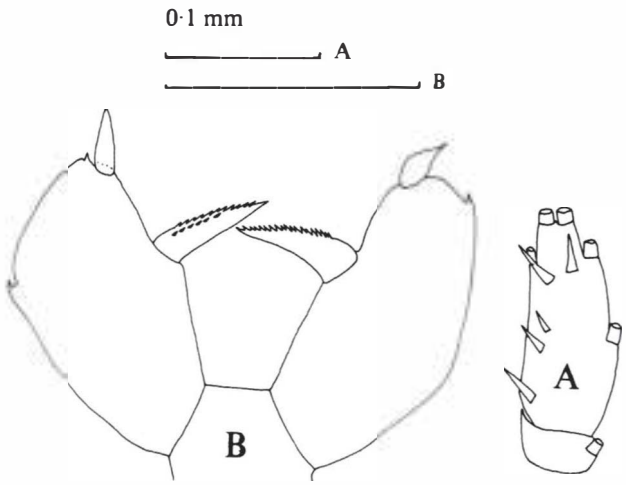


FIG. 67. *Scolecithricella profunda* female from NZOI Stn F945: A, endopod of leg 2; B, leg 5.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
F945	0–500	1 ♀, 2.0 mm

DISTRIBUTION: *Scolecithricella profunda* has been recorded from the Mediterranean, Malay Archipelago, Great Barrier Reef in Australia, off Japan, and in Subantarctic waters (Vervoort 1965, Park 1980).

Scolecithricella schizosoma Park, 1980

(Figs 68, 96)

DESCRIPTION: *Size:* ♀♀ 1.66–2.16 mm, ♂♂ 2.10–2.28 mm.

Female: Head broad in lateral view, posterior border of metasome incised. Antenna 1 extends as far as posterior border of urosome segment 2. Basipod 2 of mandible with one seta. Endopod of legs 1–4 not produced distally into spine. Leg 2 basipod 1 with conspicuous patch of spinules on external border, basipod 2 with inner edge spinules. Leg 5 in form of elongate lamella attached to common base, with small distal and large inner spine; minute spine usually found beside distal spine and also on outer border.

(Park 1980)

Male: Antenna 1 reaches posterior border of urosome segment 2. Endopod of legs 1–4 not produced distally into spine. Leg 5 similar to *S. dentata* except left leg exopod segment 3 is straight.

(Park 1980)

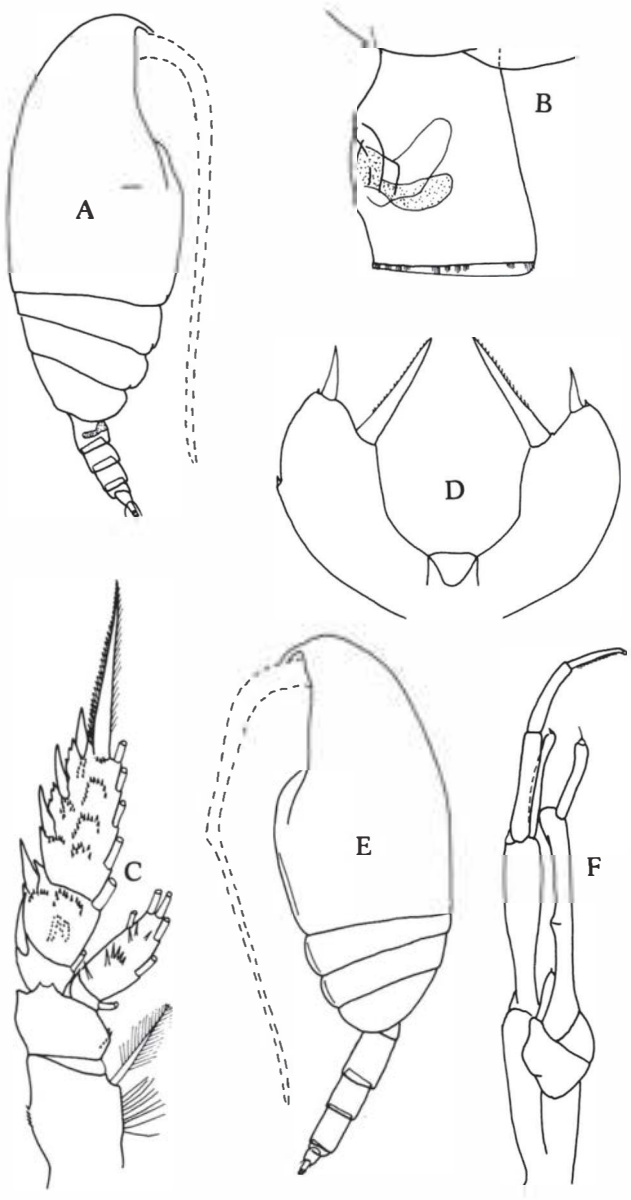


FIG. 68. *Scolecithricella schizosoma* (from Park 1980). Female: A, lateral view; B, lateral view of genital segment; C, leg 2; D, leg 5. Male: E, lateral view; F, leg 5.

REMARKS: *Scolecithricella schizosoma* is most like *S. dentata* but differs in that the female of *S. schizosoma* is larger, is without a distal spiniform process on the swimming leg endopods, and the leg 5 is elongate and curved. The male of *S. schizosoma* has a straight left leg 5 exopod segment 3 rather than curved as in *S. dentata* (Park 1980).

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Park (1980).

NEW RECORDS: Nil.

DISTRIBUTION: *Scolecithricella schizosoma* is widely distributed from the Antarctic to as far north as 38°25′S (Park 1980).

Scolecithricella vittata (Giesbrecht, 1892)
(Figs 69, 96)

DESCRIPTION: *Size:* ♀♀ 1.66–2.00 mm, ♂♂ 1.62–1.72 mm.

Female: Antenna 1 21-segmented, extends to end of rami. Basipod 2 of mandible with one seta. Three of five brush-like filaments of maxilla 2 endopod long and thin, while other two short and thick. Leg 2 endopod segment 2 elongated, with four strong spines on posterior surface. Leg 5 pallet-shaped, terminal spine bordered by hairs, the spine longer than segment itself and between one and one-half and two times as long as denticulate inner edge spine.
(Rose 1942, Grice 1962, Park 1980)

Male: Antenna 1 extends to distal end of urosome segment 3. Leg 5 extends beyond distal end of urosome. Right leg 5 endopod rudimentary; exopod segment 2 with two protuberances, one at mid-length, other on distal margin, exopod segment 3 terminates in bud-like process. Left leg 5 endopod half as long as exopod, with terminal spine; distal segment of exopod obliquely truncated and with lamella-like process on distal outer margin.
(Tanaka 1962)

REMARKS: The south-west Pacific specimen is like previous descriptions.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Farran (1929), Bradford (1970b), Park (1980).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
F947	0–200	1 ♀, 1.75 mm

DISTRIBUTION: *Scolecithricella vittata* has been recorded from the warmer parts of all oceans (Tanaka 1962). Tanaka (1962) records it from hauls 0–1000 m, but it has been taken at 100–500 m (Grice and Hulsemann 1965, Bradford 1970a) and at the surface (Farran 1929).

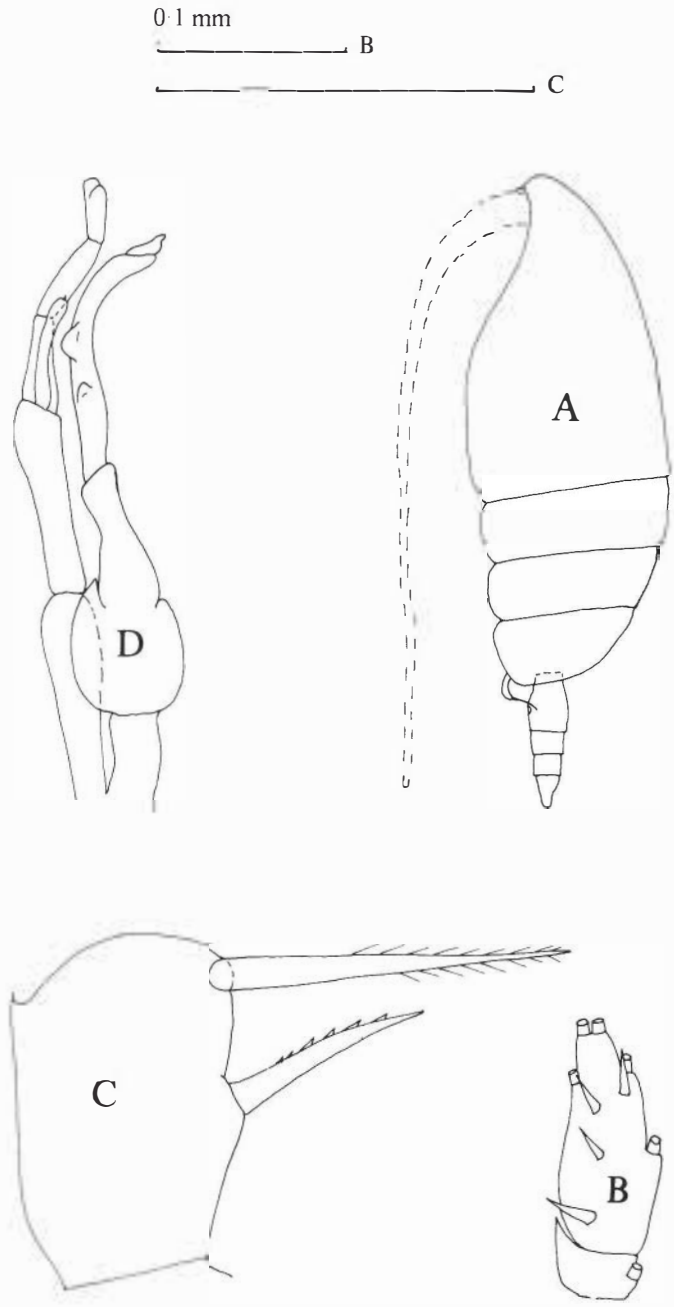


FIG. 69. *Scolecithricella vittata* female (from Rose 1942): A, lateral view. Female (from Bradford 1970b): B, endopod of leg 2. Female from NZOI Stn F947: C, leg 5. Male (from Tanaka 1962): D, leg 5.

Scolecithrix Brady, 1883

DEFINITION: Pedigerous segments 4 and 5 usually separate. Antenna 1 of 19 or 20 segments in female, 17–19 segments in male. Maxilla 1 inner lobe with one seta on posterior surface; endopod with all joints fused, carrying six setae. Leg 1 exopod segment 1 with or without external spine. Male mouthparts only very slightly reduced compared with female. Female leg 5 absent or, if present, small and asymmetrical. Male leg 5 tends to be uniramous on right, biramous on left.
(Bradford 1973)

REMARKS: *Scolecithrix* definitely contains *S. bradyi* Giesbrecht, 1888 and *S. danae* Lubbock, 1856. *Scolecithrix birshteini* Brodsky, 1955 and *S. nicobarica* Sewell, 1929 may also be in this genus.

Scolecithrix ancorarum Oliveira, 1946 is not a scolecithricid but probably represents a paracalanid and *S. longirostris* Esterly, 1913 seems to be a juvenile which has not been recorded since its description.

The following species have been taken in the south-west Pacific:

Scolecithrix bradyi Giesbrecht, 1888

(Figs 70, 97)

DESCRIPTION: *Size:* ♀♀ 1.1–1.61 mm, ♂♂ 1.3–1.56 mm.

Female: Pedigerous segments 4 and 5 partly separated. Posterolateral corners of metasome pointed and posteriorly produced, right corner longest. Genital segment three times as long as wide, left side strongly swollen in dorsal view. Caudal rami twice as long as wide. Antenna 1 23-segmented, does not reach end of metasome. Leg 5 rudimentary, lamelliform, one-segmented; right leg longer than left leg.

(Giesbrecht 1892)

Male: General form similar to female but posterolateral corners of metasome not pointed or produced. Antenna 1 19-segmented. Mouthparts not reduced. Left leg 5 biramous, with three-segmented exopod, and one-segmented endopod as long as exopod segment 1; right leg 5 uniramous, with two-segmented exopod, distal end of segment 1 with short digit-like process on inner margin, terminal segment divided into two subequal branches.

(Giesbrecht 1892)

REMARKS: The south-west Pacific specimens agree in general with the original description.

Scolecithrix bradyi resembles *S. danae*, but is smaller and differs in having longer extensions on the posterior metasome, a female leg 5, and a bifurcate terminal segment on the male right leg 5.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Farran (1929), Heinrich (1968).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
A302	0–500	2 ♀♀
C537	0–250	1 ♀, 1.2 mm
		1 ♂, 1.3 mm
F945	0–200	3 ♀♀, 1.2, 1.25, 1.25 mm
	0–500	3 ♀♀, 1.2, 1.2, 1.25 mm

DISTRIBUTION: *Scolecithrix bradyi* inhabits all tropical and subtropical seas, penetrates north and south in warm currents, and is a sub-surface form capable of rapid diurnal migrations (Vervoort 1965b).

Scolecithrix danae (Lubbock, 1856)

(Figs 41, 42, 97)

DESCRIPTION: *Size:* ♀♀ 1.8–2.4 mm, ♂♂ 1.97–2.21 mm.

Female: Pedigerous segments 4 and 5 separated, posterolateral corners produced. Ventral side of genital segment with posteriorly produced shovel-like process which partly covers urosome segment 2. Antenna 1 slightly longer than metasome. Leg 1 exopod segment 1 with one external spine. Leg 5 absent.

(Giesbrecht 1892)

Male: Generally similar to female, but corners of metasome not produced. Mouthparts hardly reduced. Left leg 5 biramous, exopod three-segmented, endopod one-segmented; right leg 5 uniramous, with two-segmented exopod of which terminal segment is very short.

(Giesbrecht 1892)

REMARKS: The south-west Pacific specimens are like previous descriptions. *Scolecithrix danae* is easily recognised by the posteroventral process on the genital segment.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Brady (1883), Farran (1929), Dakin and Colefax (1940), Heinrich (1968).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
A302	0–500	1 ♀
		1 ♂
F945	0–200	3 ♀♀, 2.05–2.2 mm
		1 ♂, 2.1 mm
	0–500	2 ♀♀, 2.1, 2.05 mm
		1 ♂, 2.1 mm
F946	0–200	1 ♀, 2.0 mm
	0–1000	1 ♀, 2.15 mm
F947	0–500	1 ♀, 2.1 mm

DISTRIBUTION: *Scolecithrix danae* is distributed over the tropical and subtropical parts of all the oceans, where it inhabits intermediate and near-surface layers (Vervoort 1965b).

Scolecocalanus Farran, 1936

DEFINITION: Form of body and appendages as in *Scottocalanus* except that rostral spines are larger and

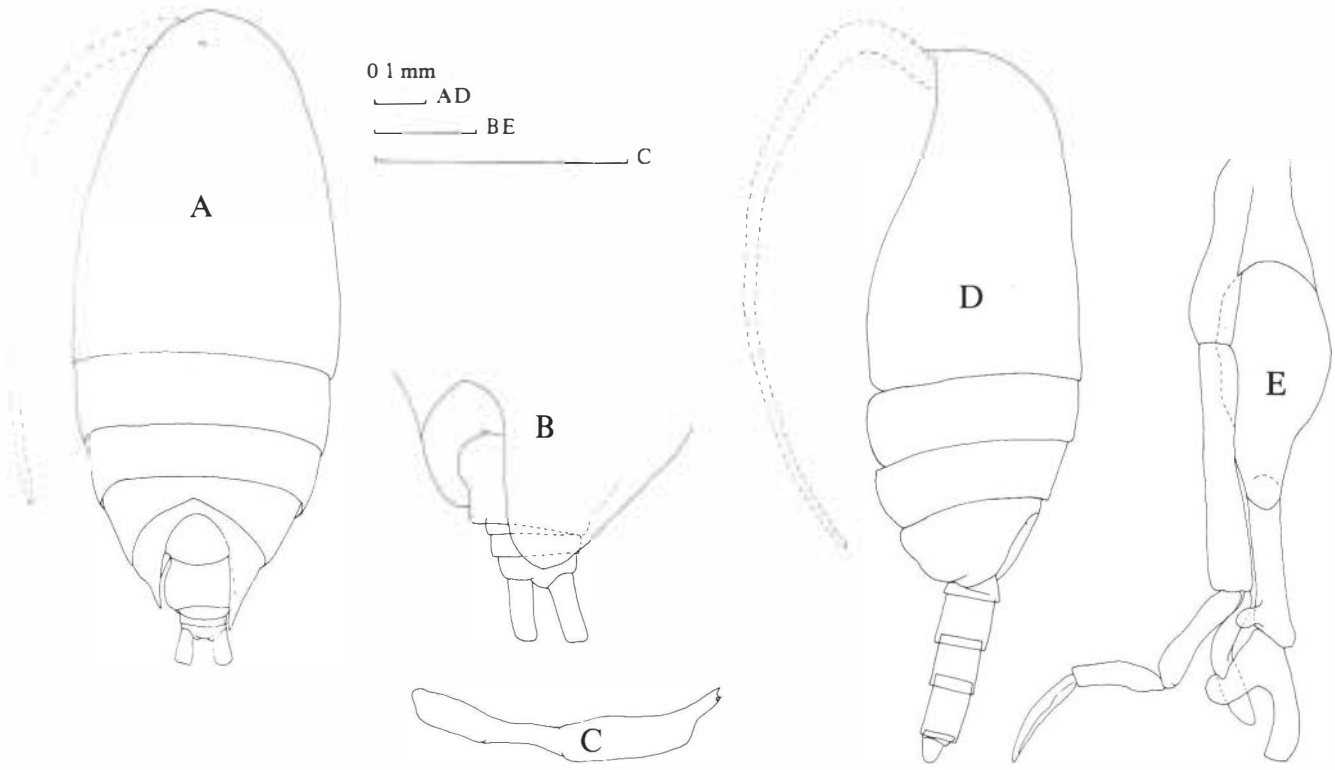


FIG. 70. *Scolecithrix bradyi* from NZOI Stn F945. Female: A, dorsal view; B, dorsolateral view of urosome; C, leg 5. Male: D, lateral view; E, leg 5.

more tapered. Indication of lenticular thickening at base of rostrum as in *Macandrewella* with which this genus has some affinities. Genital segment asymmetrical in dorsal view. Leg 4 exopod segments 3 and 4 bear longitudinal row of spinules on anterior surface. Female leg 5 present only on left side and consists of short basal segment bearing a long curved spine. Male right leg 5 basipod 2 swollen, endopod well developed, extending almost as far as exopod; left leg 5 endopod well developed.

(Farran 1936, Wilson 1950)

REMARKS: This genus contains the following species: *Scolecocalanus galeatus* Farran, 1936 (♂ unknown); *S. lobatus* Farran, 1936 (♂ unknown); *S. spinifer* Wilson, 1950. No specimens of *Scolecocalanus* have been taken in the south-west Pacific.

Scopalatum Roe, 1975

DEFINITION: Pedigerous segments 4 and 5 fused or separate. Rostrum with two filaments. Antenna 1 23-segmented in female, 20-segmented in male. Maxilla 1 inner lobe 1 with two posterior surface setae, inner lobe 2 with two setae, inner lobe 3 with four setae; endopod in female ornamented with spinules. Maxilla 2 endopod with one brush-like filament greatly enlarged. Male mouthparts weakly sclerotised and slightly reduced. Leg 1 exopod segment 1 with external spine. Female leg 5 uniramous, of two segments, which may be fused; attached to a common basal segment; with one to three spines. Male leg 5 similar to that of *Scaphocalanus*, left leg endopod longer than exopod, right leg exopod much longer than endopod.

(Roe 1975)

REMARKS: This genus contains the following species: *Scopalatum dubia* (T. Scott, 1894) (♀ unknown); *S. farrani* Roe, 1975 (= *Xanthocalanus typicus:* Farran 1908); *S. gibbera* Roe, 1975 (♂ unknown); *S. smithae* (Grice, 1962) (♂ unknown); *S. vorax* (Esterly, 1911) (♂ unknown). The female which Bradford (1973) erroneously attributed to *"Amallophora" altera* Farran, 1929 (*see* Roe 1975: 336) also belongs to *Scopalatum* and is the only member of this genus to have been taken in the south-west Pacific.

Scopalatum sp.

(Figs 71, 97)

Amallophora altera: Bradford 1973.

DESCRIPTION: *Size:* ♀ 3.2 mm.

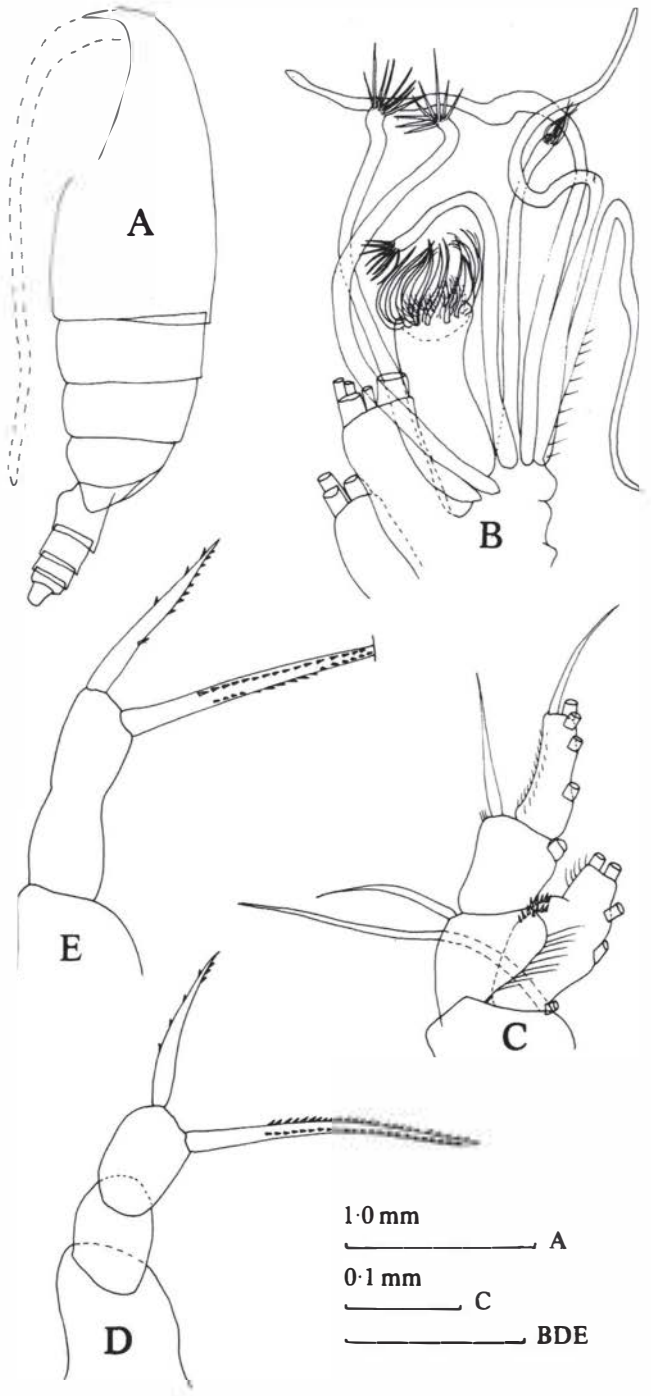


FIG. 71. *Scopalatum* sp. female from VUZ Stn 112: A, lateral view; B, maxilla 2; C, leg 1; D, E, leg 5.

Female: Pedigerous segments 4 and 5 separate and posterolateral corner of metasome produced but obtusely rounded. Antenna 1 barely reaches pedigerous segment 5. Leg 5 has last two segments fused; with two terminal spines, outer spine slightly shorter than fused segments, inner spine more than one and one-half times length of outer spine; both spines bear spinules which are sparse on outer terminal spine.
(Bradford 1973)

Male: Unknown.

REMARKS: Bradford (1973) erroneously attributed this specimen to "*Amallophora*" *altera* Farran, 1929 (Roe 1975). This specimen differs from the only large female described (*S. gibbera*) in not having a protuberance on the anterodorsal surface of the head and in having the outer spine on leg 5 almost as long as the fused segments; in *S. gibbera* this spine is about half the length of the segment.

The naming of this species must await the capture of more specimens because the present female was damaged and had only legs 1 and 5 intact.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Nil.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
VUZ112	0–732	1 ♀, 3.2 mm

DISTRIBUTION: *Scopalatum* sp. has only been obtained from 41°45′S, 174°55′E at 0–732 m.

Scottocalanus Sars, 1905

DEFINITION: Head usually with crest. Pedigerous segments 4 and 5 partly or completely fused, posterolateral corners of metasome usually produced posteriorly and pointed. Rostrum large, bifurcate terminally, and with or without short processes. Maxilla 1 inner lobe 1 with three setae on posterior surface, inner lobe 3 with three setae, endopod segments 2 and 3 with four setae. Leg 1 exopod segment 1 with external spine. Female leg 5 imperfectly three-segmented; terminal segment wide, with long sub-apical spine directed backwards and very small apical spine. Male leg 5 asymmetrical, biramous on both sides; right leg 5 endopod usually well developed, reaching exopod segment 2; left leg 5 endopod small, terminal part of exopod complex, prehensile, formed from distal part of segment 2 and small segment 3.
(Sars 1925)

REMARKS: Vervoort (1965b) reviewed the species in this genus. A further two species have been added to his list. Species in this genus are: *Scottocalanus corystes* Owre and Foyo, 1967 (♂ *see* Grice 1969); *S. dauglishi* Sewell, 1929; *S. farrani* A Scott, 1909; *S. helenae* (Lubbock, 1856) (= *S. australis* Farran, 1936); *S. infrequens* Tanaka, 1969 (♂ unknown); *S. investigatoris* Sewell, 1929 (♀ unknown); *S. longispinus*

A. Scott, 1909 (♂ *see* Farran 1936); *S. persecans* (Giesbrecht, 1895); *S. rotundatus* Tanaka, 1961; *S. securifrons* (T. Scott, 1894) (= *Scolecithrix cuneifrons* Willey, 1918); *S. sedatus* Farran, 1936 (♂ unknown); *S. setosus* A Scott, 1909 (♂ unknown); *S. terranovae* Farran, 1929; *S. thomasi* A. Scott, 1909 (=? *S. bachusi* Grice, 1969 (*see* Roe 1975)); *S. thorii* With, 1915.

The following species have been taken in the south-west Pacific:

Scottocalanus helenae (Lubbock, 1856)
(Figs 72, 98)

DESCRIPTION: *Size:* ♀♀ 3.18–4.1 mm, ♂♂ 3.80–3.95 mm.

Female: Forehead with triangular crest. Rostrum with short conical appendages. Pedigerous segments 4 and 5 fused; posterolateral corners of metasome produced into laterally directed rounded lappets, in lateral view these corners may be rounded or pointed. Genital segment as long as following three segments, with distinct genital prominence in lateral view, and low chitinised crest on each side and small dorsal hump. Urosome segments 1–3 fringed with teeth on distal margin. Antenna 1 of 24 segments, reaches distal end of urosome. Leg 5 has common basal segment and slightly constricted distal segment carrying terminal spine with distinct additional spinule at its base and long slender sub-terminal spine which reaches almost to end of urosome segment 4; this long spine bordered by two rows of spinules one of which curves around apex of spine.

(Vervoort 1965b)

Male: Margin of pedigerous segment 5 unevenly rounded in lateral view, with slightly but distinctly produced rounded lappets in dorsal view. Urosome segments 2–4 with teeth on dorsal margin. Antenna 1 of 20 segments. Right leg 5 endopod longer than exopod segment 1 and two-segmented, distal part curved outwards with distinct carina; exopod three-segmented, segment 1 has tooth-like projection at distal end of internal margin, segment 2 is curved, and segment 3 knife-shaped. Left leg 5 endopod club-shaped, half as long as exopod segment 1; exopod two-segmented, distal segment has distinct hyaline shoulder-shaped tubercle visible when viewed in some positions and bears at least two haired tubercles, one acute process (which may be a third exopod segment) and several lamellae.

(Vervoort 1965b)

REMARKS: This species has often been confused with other *Scottocalanus* species (Vervoort 1965b).

The south-west Pacific female specimens are generally like the redescription of Vervoort (1965b) except that the posterior margins of urosome segments 1–3 appear to be bordered by a thin, transparent, striated fringe rather than teeth.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Nil.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
A303	450–1000	2 ♀♀, 3.6, 3.7 mm
E891	0–1224	1 ♀, 4.1 mm
E892	0–1224	1 ♀, 3.9 mm
F945	0–500	1 ♀, 3.65 mm
F946	200–500	2 ♀♀, 4.0 mm
	0–1000	1 ♀, 3.8 mm
AUZ75	0–200?	1 ♀, 3.4 mm

DISTRIBUTION: *Scottocalanus helenae* is known from the subtropical Atlantic Ocean and off Great Barrier Reef. It is found both in deep water and at the surface and is probably an inhabitant of intermediate water (Vervoort 1956b).

Scottocalanus securifrons (T. Scott, 1894)
(Figs 73, 98)

DESCRIPTION: *Size:* ♀♀ 3.38–4.6 mm, ♂♂ 4.5–5.3 mm.

Female: Posterolateral corners of metasome produced posteriorly into triangular expansion terminating in sharp point. Each ramus of rostrum ending in short point. Genital segment swollen ventrally at mid-length, ventral posterior margin overlaps following segment, posterolateral margins of genital segment with spines. Antenna 1 of 23 segments, reaches end of caudal rami. Leg 5 slightly asymmetrical, with subterminal spine slightly thicker on left.

(Gopalakrishnan 1974)

Male: Posterolateral corners of metasome ending in small spine. Antenna 1 of 20 segments. Right leg 5 endopod very short; exopod segment 1 long, widened terminally and bearing several processes, segment 2 short, curved with terminal expansion, segment 3 short, rounded with single spine. Left leg 5 basipod 2 with proximal rounded process; endopod two-segmented, segment 1 short with distal process, segment 2 with bifurcate tip; exopod segment 1 short, segment 2 enlarged distally, with inner margin densely spinulated, and distal laminous process divided into two spines, segment 3 with few proximal teeth and longer pointed spine-like part.

(With 1915)

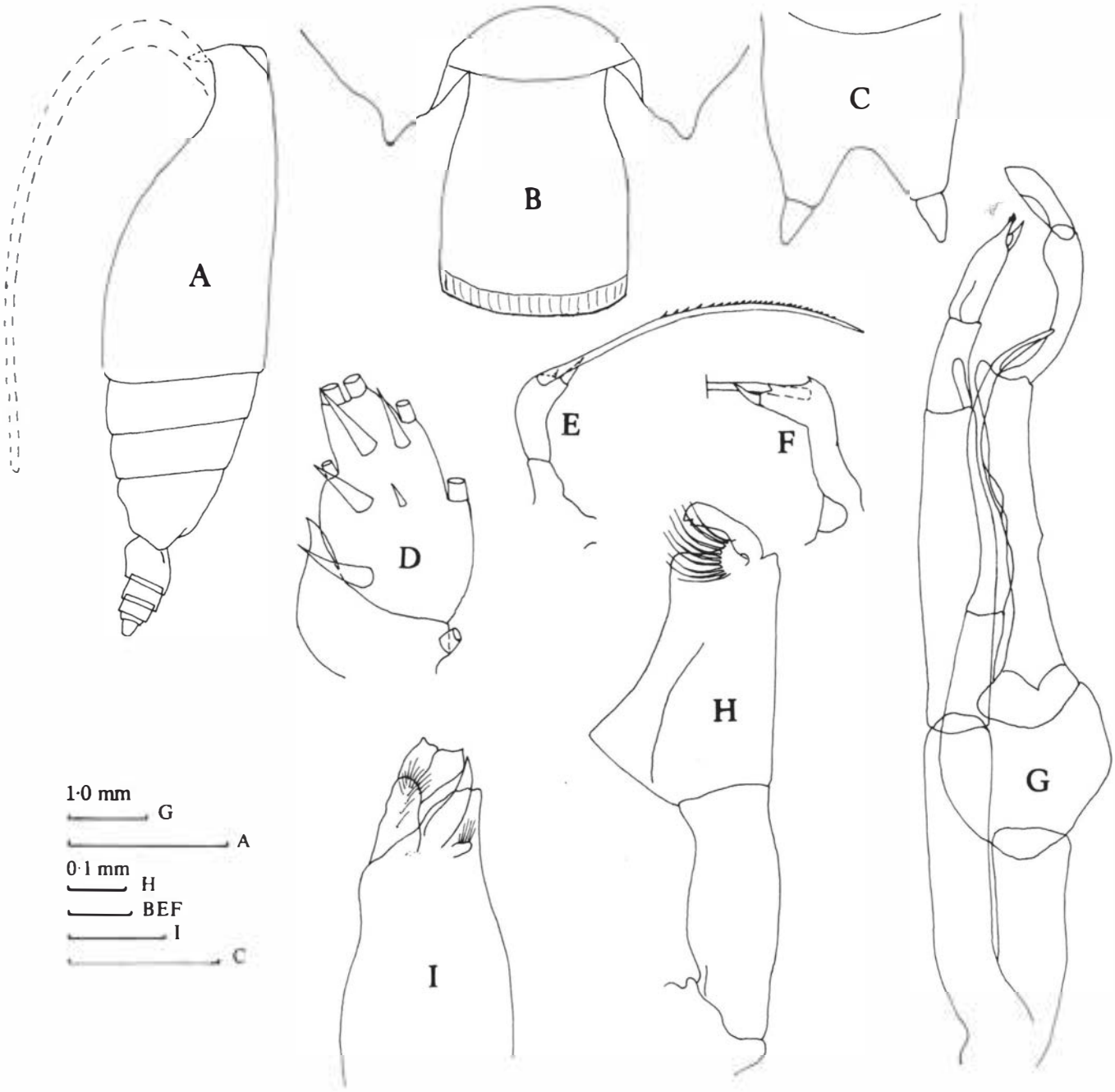


FIG. 72. *Scottocalanus helenae* female from NZOI Stn F945: A, lateral view; B, dorsal view of genital segment; C, rostrum; D, endopod of leg 2; E, leg 5. Female from NZOI Stn F946: F, leg 5. Male (from Vervoort 1965): G, leg 5; H, left leg 5 exopod; I, terminal part of left leg 5 exopod.

REMARKS: The south-west Pacific specimen illustrated here is generally like previous descriptions. There appears to be some variation in the shape of the posterior metasome borders in females. Brodsky (1950) suggests that specimens which have straight posterior metasome points (*see* Tanaka 1937) are a separate species. The south-west Pacific specimens have posterior metasome points which are directed straight back, unlike those illustrated by Sars (1925), which diverge.

The male leg 5 appears to not have as many articulated segments in some branches as described by With (1915). The right leg 5 exopod appears to be two-segmented; the terminal segment bears a pair of characteristic semi-circular processes on the distal half of the segment. The left leg 5 endopod does not seem to

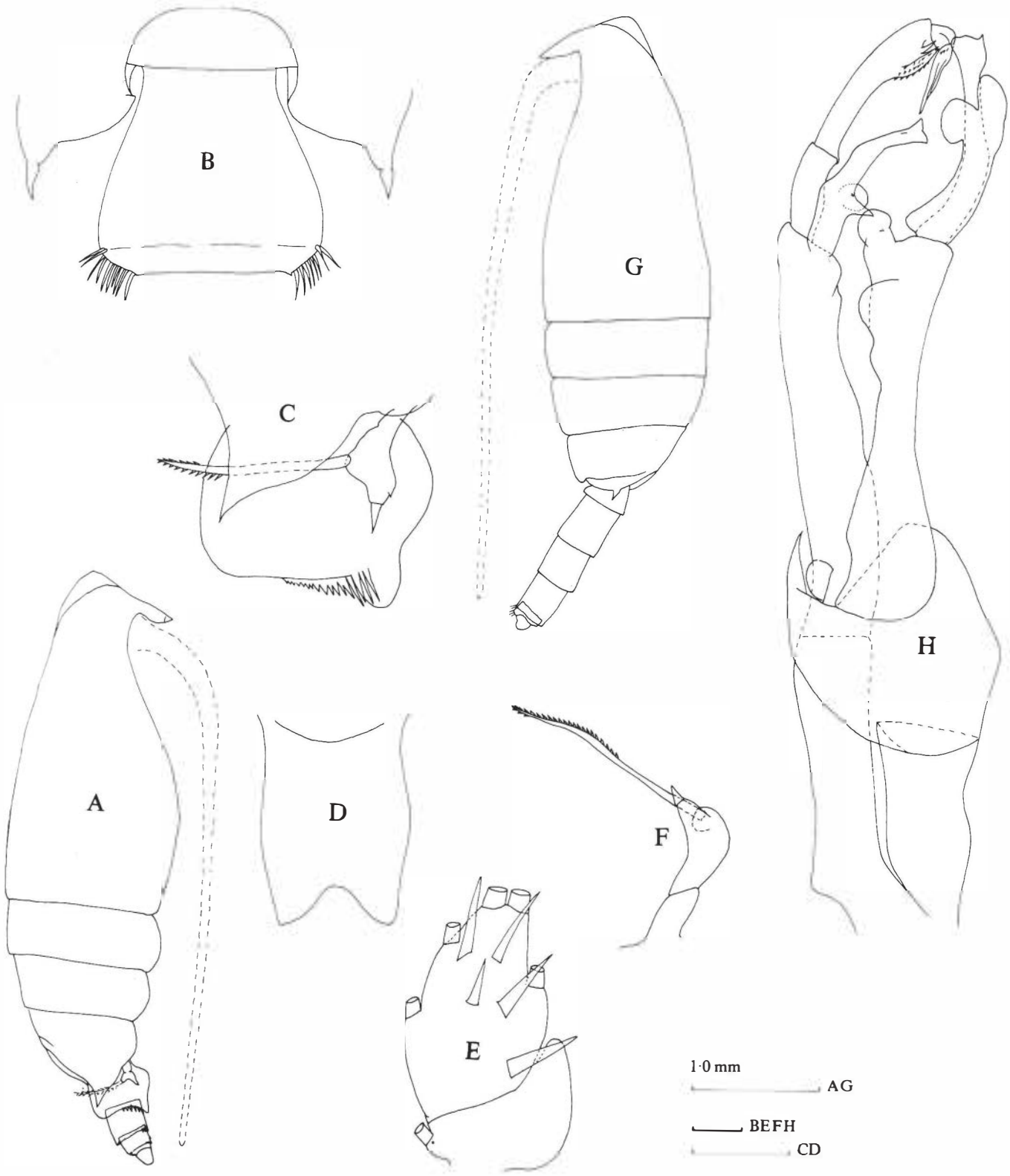


FIG. 73. *Scottocalanus securifrons* from VUZ Stn 112. Female: A, lateral view; B, dorsal view of genital segment; C, lateral view of genital segment and leg 5; D, rostrum; E, endopod of leg 2; F, leg 5. Male: G, lateral view; H, leg 5.

have a moveable articulation and bears one pointed and one semi-circular process at about mid-length.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Farran (1929).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
A292	500–1000	2 ♀♀, 4.0, 4.1 mm
		1 ♂, 4.3 mm
A303	450–1000	1 ♂, 4.5 mm
A313	0–914	7 ♀♀, 4.1 mm
		2 ♂♂, 4.4 mm
D614	0–100	1 ♂, 4.65 mm
E882	0–1212	1 ♀, damaged
		1 ♂, 4.6 mm
E891	0–1245	1 ♀, 4.5 mm
E892	0–1224	1 ♂, 4.45 mm
E901	0–1248	1 ♀, damaged
		1 ♂, damaged
E904	0–1243	1 ♀, 4.2 mm
F879	0–1267	1 ♂, damaged
F881	0–1260	1 ♀, damaged
		1 ♂, damaged
F911	0–1697	1 ♀, 4.4 mm
F945	0–500	5 ♀♀, 4.1–4.25 mm
F946	200–500	1 ♂, 4.8 mm
	0–1000	1 ♀, 4.3 mm
		1 ♂, 4.5 mm
MU67/94s	0–1000	1 ♀, 4.2 mm
VUZ93	0–1097	3 ♀♀, 4.15 mm
VUZ105	0–914	3 ♀♀, 4.1, 4.2, 4.6 mm
		6 ♂♂, 4.5–5.1 mm
VUZ107	0–914	8 ♀♀, 4.25–4.5 mm
		10 ♂♂, 4.5–5.0 mm
VUZ112	0–732	2 ♀♀, 4.5, 4.6 mm
		3 ♂♂, 4.5–5.3 mm

DISTRIBUTION: *Scottocalanus securifrons* is a common bathypelagic inhabitant of all oceans, probably penetrating far to the north and south (Vervoort 1965b).

Scottocalanus terranovae Farran, 1929

(Figs 74, 98)

DESCRIPTION: *Size:* ♀♀ 3.6–3.9 mm, ♂♂ 3.6–4.2 mm.

Female: Posterolateral corners of metasome rounded in lateral view, but constricted in dorsal view and appearing like sharp spines. Head has triangular crest; rostrum with short rami and apical projections shorter than excavation. Genital segment as long as following three segments, with genital protuberance. Leg 5 with terminal seta twice as long as leg, reaches distal end of urosome segment 3.

(Farran 1929)

Male: Rostrum as in female. Fusion line between pedigerous segments 4 and 5 visible. Right leg 5 endopod reaches beyond exopod segment 1; exopod segment 2 curved, exopod segment 3 very small. Left leg 5 endopod shorter than exopod segment 1; exopod at least two-segmented.

(Farran 1929)

REMARKS: The identity of *S. terranovae* is in doubt; Vervoort (1965b: 57) believes the male to be synonymous with *S. thorii* With. Six small (3.6–3.9 mm) *Scottocalanus* males from the south-west Pacific differ from With's (1915) description of *S. thorii* principally because they are smaller, because the left leg 5 endopod does not extend as far as exopod segment 2, and exopod segment 2 has a large transparent ridge visible in some positions. These males appear generally to fit Farran's (1929) description of *S. terranovae* although his written description of the male leg 5 is ambiguous. A small female (3.6 mm), taken with four of the males at Stn F945, is difficult to separate from *S. thorii, S. farrani* and *S. helenae*. It appears to be distinguished by the non-divergent rostral points, the rounded posterolateral metasomal borders which appear to be constricted in dorsal view and to extend slightly laterally, by the conspicuously striated hyaline membrane bordering the posterodorsal part of the genital segment, and by having the leg 5 without small auxillary spinules in addition to the short terminal and long subterminal spines. Tanaka's (1961) illustration of the leg 5 of a male specimen he attributes to *S. helenae* is very like the present specimens and Vervoort (1965b) excludes it from the synonymy of *S. helenae*.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Farran (1929), Bary (1951).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
A303	450–1000	1 ♂, 3.8 mm
E882	0–1212	1 ♂, 3.9 mm
F874	0–1357	1 ♂, 3.6 mm
F945	0–500	1 ♀, 3.6 mm
		4 ♂♂, 3.6–3.9 mm
F946	200–500	1 ♀, 3.75 mm

DISTRIBUTION: *Scottocalanus terranovae* is known definitely only from the south-west Pacific Ocean.

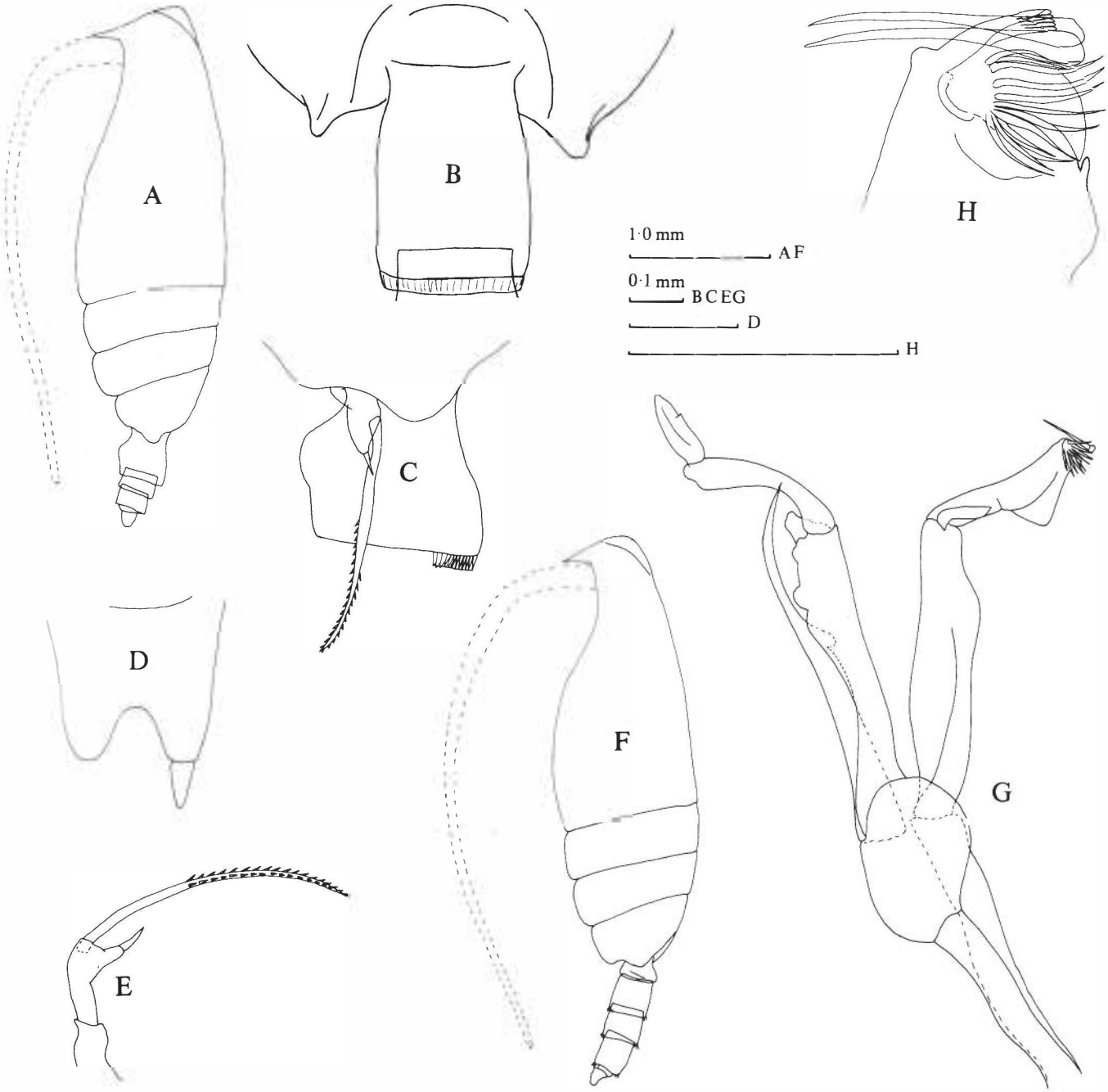


FIG. 74. *Scottocalanus terranovae* female from NZOI Stn F945: A, lateral view; B, dorsal view of genital segment; C, lateral view of genital segment and leg 5; D, rostrum. Female from NZOI Stn F946: E, leg 5. Male from NZOI Stn F945: F, lateral view; G, leg 5; H, terminal part of left leg 5 exopod.

Scottocalanus thorii With, 1915

(Figs 75, 98)

DESCRIPTION: *Size:* ♀♀ 4.69–4.8 mm, ♂♂ 5.24–5.3 mm.

Female: Posterolateral corners of metasome triangularly produced but obtusely rounded. Genital segment as long as following three urosome segments. Head with triangular crest; rostral projections shorter than excavation. Antenna 1 of 24 segments, reaches distal end of urosome segment 3. Leg 5 with three indistinct segments, distal segment with small apical conical process bearing short spine and long sub-apical spine

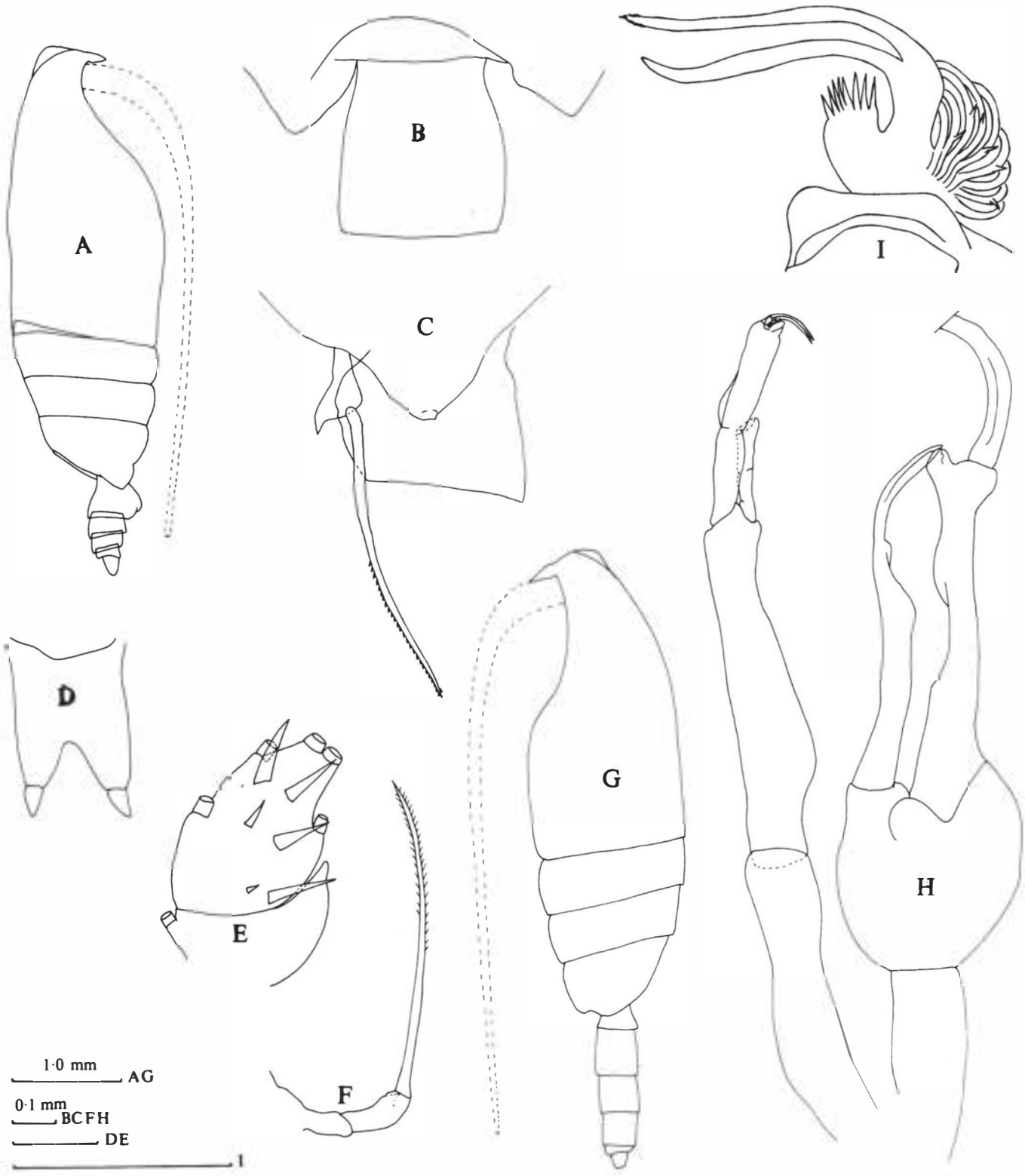


FIG. 75. *Scottocalanus thorii* female from NZOI Stn F945: A, lateral view; B, dorsal view of genital segment; C, lateral view of genital segment and leg 5; D, rostrum; E, endopod of leg 2; F, leg 5. Male from VUZ Stn 112: G, lateral view; H, leg 5; I, terminal part of left leg 5 exopod.

with rudimentary hair at its base; long spine extends to end of urosome segment 3.

(With 1915)

Male: Rostrum more slender than in female. Posterior border of urosome segments 2–4 serrated. Antenna 1 extends to urosome segment 4. Leg 5 distinctly longer than urosome. Right leg 5 endopod extends well beyond exopod segment 1; exopod segment 1 with several projections medially, terminally produced inwards, exopod segment 2 curved, segment 3 short and pointed. Left leg 5 endopod extends beyond exopod segment 1, has indication of segmentation; exopod two-segmented, distal segment terminates in two or three leaf-like structures including slender hook-shaped organ with terminal setae and plate with at least seven serrations.

(With 1915)

REMARKS: A large (4.7 mm) female was taken along with specimens identified here as *S. terranovae* at Stn F945. The large female differs from *S. terranovae* because of its large size, non-constricted posterolateral metasomal corners which are directed straight back, slightly divergent rostral points, inconspicuous hyaline fringe on posterodorsal part of genital segment, and a leg 5 without auxillary spinules (unlike With's 1915 description) as well as short terminal and long subterminal spines. A large male (5.3 mm) taken at Stn VUZ112 differed from the males assigned to *S. terranovae* because of its large size, a left leg 5 endopod which extends beyond exopod segment 1, and a left leg 5 exopod segment 2 with a small ridge visible in some positions.

Scottocalanus thorii is very like *S. terranovae, S. farrani* and *S. helenae.* Vervoort (1965b) reviews the status of *S. thorii,* but it is apparent uncertainty will remain until a large enough number of specimens are taken to describe the variation to be found in this and related species.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Bradford (1972, as *S. persecans*).

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
F945	500–1000	1 ♀, 4.7 mm
VUZ112	0–732	1 ♂, 5.3 mm

DISTRIBUTION: *Scottocalanus thorii* is probably found in the deep water of all oceans, but it has been repeatedly confused with *S. persecans* and *S. helenae,* which makes it impossible to be specific about its distribution (Vervoort 1965b).

Undinothrix Tanaka, 1961

DEFINITION: Pedigerous segments 4 and 5 incompletely separate, left corner of metasome more produced than right. Rostral filaments attached subterminally to bifurcate plate. Antenna 1 of 23 segments. Maxilla 1 exopod with 5 setae. Leg 1 exopod segment 1 without spine. Posterior surface of legs 2–4 exopods and endopods spinulated. Leg 5 symmetrical, three-segmented; terminal joint with three spines of which two apical spines are strong and coarsely denticulated. Male unknown.

REMARKS: This monotypic genus contains *U. spinosa* Tanaka, 1961, which has not been taken in the south-west Pacific.

FAMILY DIAIXIDAE Sars, 1903

DEFINITION: Head and pedigerous segment 1 fused or separate, pedigerous segments 4 and 5 separate. Rostrum with or without filaments. Maxilla 2 with sensory filaments. Female leg 5 absent. Male leg 5 uniramous, large, and complicated.

(Sars 1903, Grice and Hulsemann 1970)

REMARKS: This monotypic family contains *Diaixis* Sars, 1903.

Diaixis Sars, 1903

DEFINITION: Head and pedigerous segment 1 fused or separate; pedigerous segments 4 and 5 separate, may be notched in female. Rostrum simple, with or without filaments. Antenna 1 24-segmented in female, 23-segmented in male. Antenna 2 exopod more than twice as wide as endopod. Mandible with non-expanded blade, endopod of palp small. Terminal part of maxilla 2 with sensory filaments. Maxilliped endopod short. Posterior surfaces of legs 1–4 with or without spinules; terminal setae of legs 2–4 grossly denticulated. Leg 5 absent in female. Male leg 5 uniramous, with large common basal segment bearing comb-like row of spines; right leg two-segmented, terminal part with digitiform process; left leg four-segmented, segment 2 largest, laterally produced.

(Sars 1903, Andronov 1974, Grice and Hulsemann 1970)

REMARKS: Grice and Hulsemann (1970) describe maxilla 1 as having four ordinary and two sensory filaments on the exopod, but figure these on the endopod of *D. asymmetrica.* The terminal part of maxilla 2 has been described as having three brush-like

and six worm-like filaments in *D. asymmetrica* by Grice and Hulsemann (1970), worm-like filaments in *D. tridentata* by Andronov (1974), and about five worm-like filaments in *D. hibernica* by Sars (1903).

Diaixis contains the following species: *Diaixis asymmetrica* Grice and Hulsemann, 1970 (♂ unknown); *D. durani* Corral Estrada, 1972; *D. gambiensis* Andronov, 1979; *D. helenae* Andronov, 1979; *D. hibernica* (A. Scott, 1896) (*see* Sars 1903); *D. pygmaea* (T. Scott, 1899); *D. tridentata* (Andronov, 1974) (♂ unknown); and *D. trunovi* Andronov, 1979.

No specimens of this genus have been taken in the south-west Pacific.

FAMILY THARYBIDAE Sars, 1903

DEFINITION: Head and pedigerous segment 1 usually fused, pedigerous segments 4 and 5 fused or separate. Rostrum with or without bifurcate basis and with two filaments. Maxilla 2 endopod with sensory filaments. Legs 2–4 without conspicuous spinulation on anterior and posterior surfaces of rami; endopod segments not broadened, margin not lamelliform. Leg 5 present in both sexes.

(Sars 1903, Fleminger 1957a)

An example of this family is *Undinella brevipes* Farran, 1908 (Fig. 76).

REMARKS: This family contains the following genera: *Paraundinella* Fleminger, 1957a; *Tharybis* Sars, 1903; and *Undinella* Sars, 1900. We have tentatively added *Pseudophaenna* Sars, 1903 and *Neoscolecithrix* Canu, 1896, and the possibility that *Parascaphocalanus* Brodsky, 1955 belongs here must be further investigated. Bradford (1973) removed *Scolecithricella neptuni*, *Xanthocalanus paraincertus*, *X. hispidus*, *X. macrocephalon*, *X. paululus*, and *Amallothrix robustipes* from the Phaennidae and Scolecithricidae and these species along with Species 1 of Roe (1975) are tentatively assigned to the Tharybidae.

Neoscolecithrix fits the family as presently defined, but *Pseudophaenna* differs in that the rostrum is conical and without filaments, and the posterior mouthparts are reduced in the male. Personal observations of the female maxilla 2 of *P. typica*, provided by J. B. L. Matthews from Norway, revealed that the terminal part has at least three brush-like, and one large and three small worm-like sensory filaments.

Tharybis and *Undinella* are difficult to separate when all their species are taken into account. It seems that specimens with basipod 2 of the maxilliped thickened and widest at mid-length and which have the male left leg exopod segment 3 inserted terminally, fit Sars' (1903) definition of *Tharybis* (three species). Those species which have a slender basipod 2 of the maxilliped and which have the male left leg exopod segment 3 inserted subterminally may be attributed to *Undinella* Sars, 1900 (five species).

If the combination of these two characters, which appear to be consistent, were used to separate the genera, then the existing species would have to be assigned in the following manner: *Tharybis: T. macrophthalma*, ?*T. asymmetrica*, ?*T. megalodactyla*, ?*T. sagamiensis*, *T. fultoni*, *Undinella compacta*, *U. altera*, *"Xanthocalanus" macrocephalon*, *"X". paraincertus*, *Scolecithricella neptuni*. *Undinella: U. acuta*, *U. brevipes*, *U. oblonga*, *U. frontalis*, *U. gricei*, *U. hampsoni*, *"Xanthocalanus" hispidus* (=?*"X". paululus*), Species 1 of Roe (1975).

If this arrangement is correct then the form of the maxilla 1 overlaps between the genera. In *Tharybis*, which usually has inner lobe 1 extending beyond the endopod, there are three species (*T. fultoni*, *"X". macrocephalon* and *"X". paraincertus*) in which the inner lobe 1 hardly extends beyond the endopod. Within *Undinella*, which usually has two or three setae on the exopod, Species 1 of Roe (1975) has five setae, while in *Tharybis*, which usually has four or five setae on the exopod, there are three setae in *U. compacta* and two setae in *U. altera*. Shulz (1981) apparently agrees with this analysis.

Bradford (1976) excludes *Pseudotharybis* T. Scott, 1909 from this family.

Neoscolecithrix Canu, 1896

Oothrix Farran, 1905

DEFINITION: Head and pedigerous segment 1 fused, pedigerous segments 4 and 5 separate, segment 5 with bifurcate posterior border. Rostrum usually lamellar with two points or filaments. Antenna 1 24-segmented in female, 23- or 24-segmented in male. Antenna 2 endopod more than half length of exopod. Terminal part of maxilla 2 with varying numbers of brush-like and worm-like filaments. Surfaces of swimming legs may bear small spinules. Female leg 5 two-segmented, spinous, attached to common basal segment; with two or three terminal spines and lateral spine on each border of last segment. Male leg 5 styliform; right leg with two basal segments, small spine-like endopods, exopod two-segmented, each segment with small outer edge spine; left leg five-segmented, segments 1–4 hairy, last segment small.

(Rose 1933, Fosshagen 1972)

REMARKS: *Neoscolecithrix* contains the following species: *N. farrani* Smirnov, 1935 (= *Scolecithrix borealis* Wiborg, 1949; *see* Fosshagen 1972); *N. koehleri* Canu, 1896 (= *N. bidentata* (Farran, 1905); *see* T. Scott 1909); *N. magna* (Grice, 1973); and *N. watersae* (Grice, 1973) (as *Xanthocalanus*, *see* Campaner 1978).

An unnamed species has been taken in the south-west Pacific:

Neoscolecithrix sp.

(Figs 77, 99)

DESCRIPTION: *Size:* Stage V copepodite 3.2 mm.

Stage V Copepodite: Head and pedigerous segment 1 fused, fusion line visible dorsally; pedigerous segments 4 and 5 separate; posterior metasome extended into two points. Rostrum in form of large plate with two distal points. Antenna 1 24-segmented. Antenna 2 endopod one and one-half times length of exopod. Maxilla 2 with five worm-like and three brush-like sensory filaments terminally. Basipod 2 of legs 1–3 with posterior surface spines: three on leg 1, two on leg 2, one on leg 3. Leg 5 three-segmented, segment 1 with distal row of spinules, segment 2 naked, segment 3 with five spines, apical spine not articulated; last segment and spines very spinulose.

(Bradford 1973)

REMARKS: This specimen clearly differs from the known species in the genus, but has not been named pending the discovery of adults. It can be recognised by the form of the rostrum, leg 5, and its large size.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Bradford (1973).

NEW RECORDS: Nil.

DISTRIBUTION: This specimen was taken off the north-east coast of the South Island of New Zealand in a plankton haul which touched the bottom at 600 m.

Parundinella Fleminger, 1957a

DEFINITION: Head and pedigerous segment 1, as well as pedigerous segments 4 and 5, fused; posterolateral corners of metasome produced into lobiform or spiniform process. Genital segment symmetrical, swollen laterally, ventrally only weakly produced. Rostrum simple, bifurcate, with slender filament on each side. Antenna 1 23-segmented in female, 21-segmented in male. Mandibular blade elongate with three to four monocuspid, spiniform teeth confined to dorsal-most portion of lobe. Maxilla 1 inner lobe 1 moderately sized, not broad or truncate. Maxilla 2 lobe 5 with two sensory filaments, one normal seta and one enlarged falcate seta; terminal part of endopod with five or six sensory filaments, some with apical flagellum. External exopod spines of legs 2–4 ornamented with small denticles along upper and lower margins. Female leg 5 minute, one-segmented, attached to common basal segment; distal segment terminated by one or more pointed processes and one robust inner edge spine bearing ventral spinules. Male leg 5 biramous, asymmetrical; left leg exopod three-segmented, segment 1 with inner proximal process, endopod one-or two-segmented; right leg exopod two-segmented, endopod in part fused with basipod segment 2.

(Fleminger 1957a)

REMARKS: The following species are contained in this genus: *Parundinella dakini* Bradford, 1973 (= *Scolecithricella* sp. Dakin and Colefax, 1940); *P. emarginata* Grice and Hulsemann, 1970 (♀ unknown); *P. manicula* Fleminger, 1957a (♂ unknown); and *P. spinodenticula* Fleminger, 1957a.

The following species has been taken in the south-west Pacific:

Parundinella dakini Bradford, 1973

(Figs 78, 99)

Scolecithricella sp. Dakin and Colefax, 1940

DESCRIPTION: *Size:* ♀♀ 1.0 mm, ♂♂ 0.8 mm.

Female: Posterior border of metasome produced into dorsal tooth and ventral lobe. Leg 5 one-segmented with common basal joint, distal segment with two unarticulated terminal spines and one articulated inner and outer edge spine.

(Dakin and Colefax 1940)

Male: Right leg 5 exopod has small terminal segment with small spine; left leg 5 exopod segment 3 elongate, with hairy inner border, and two small spines and globular process distally.

(Dakin and Colefax 1940)

REMARKS: The form of leg 5 in both sexes indicates this species belongs to *Parundinella*, although the swimming legs and mouthparts have not been described. Dakin and Colefax (1940) describe the maxilla 2 endopod as having only worm-like appendages.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Dakin and Colefax (1940).

NEW RECORDS: Nil.

DISTRIBUTION: *Parundinella dakini* is only known from off Sydney (Dakin and Colefax 1940).

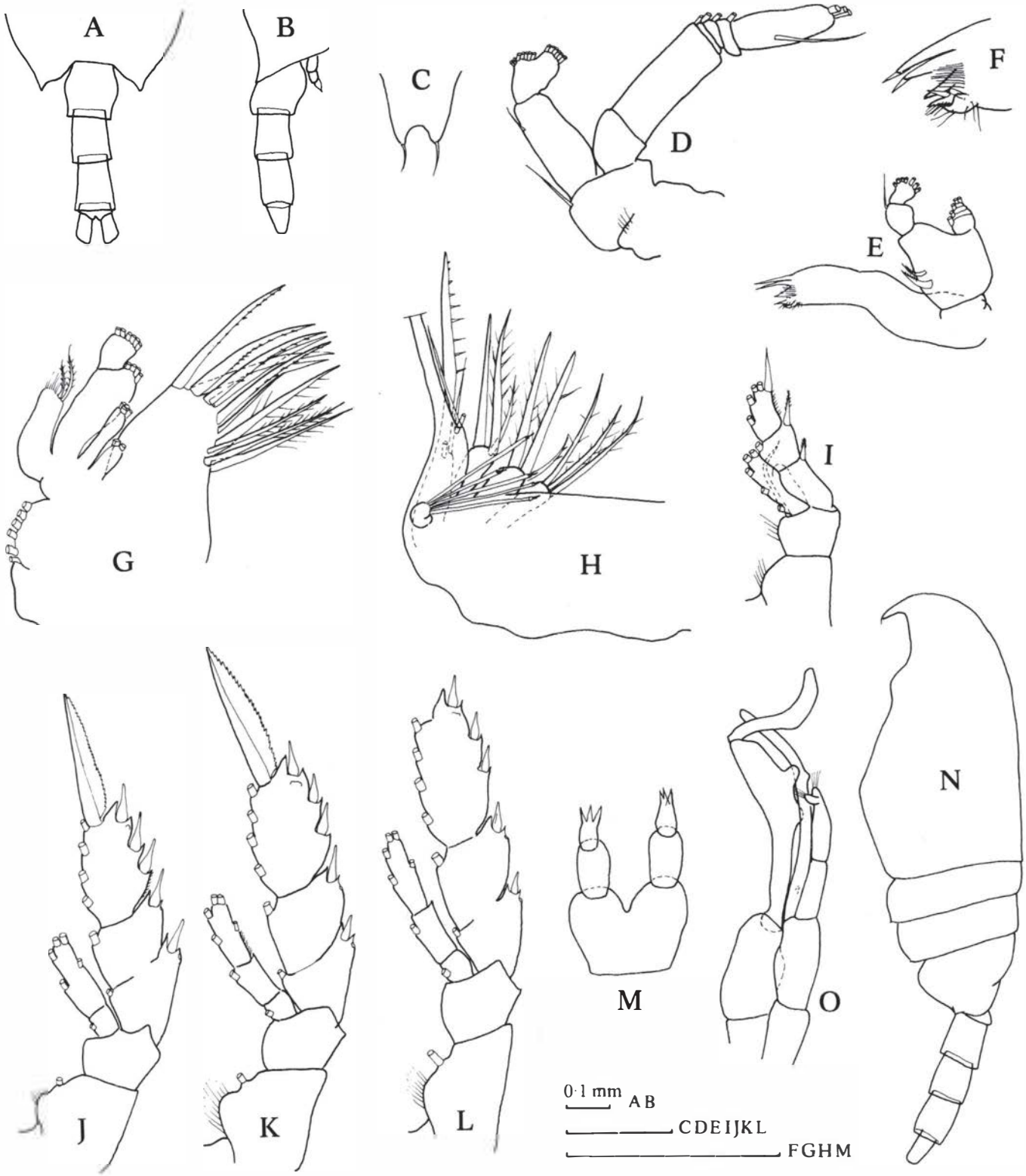


FIG. 76. *Undinella brevipes* female from NZOI Stn A292: A, ventral view of urosome; B, lateral view of urosome; C, rostrum; D, antenna 2; E, mandible; F, terminal part of mandibular blade; G, maxilla 1; H, maxilla 2; I, leg 1; J, leg 2; K, leg 3; L, leg 4; M, leg 5. Male (from Grice and Hulsemann 1965, as *U. simplex*): N, lateral view; O, leg 5.

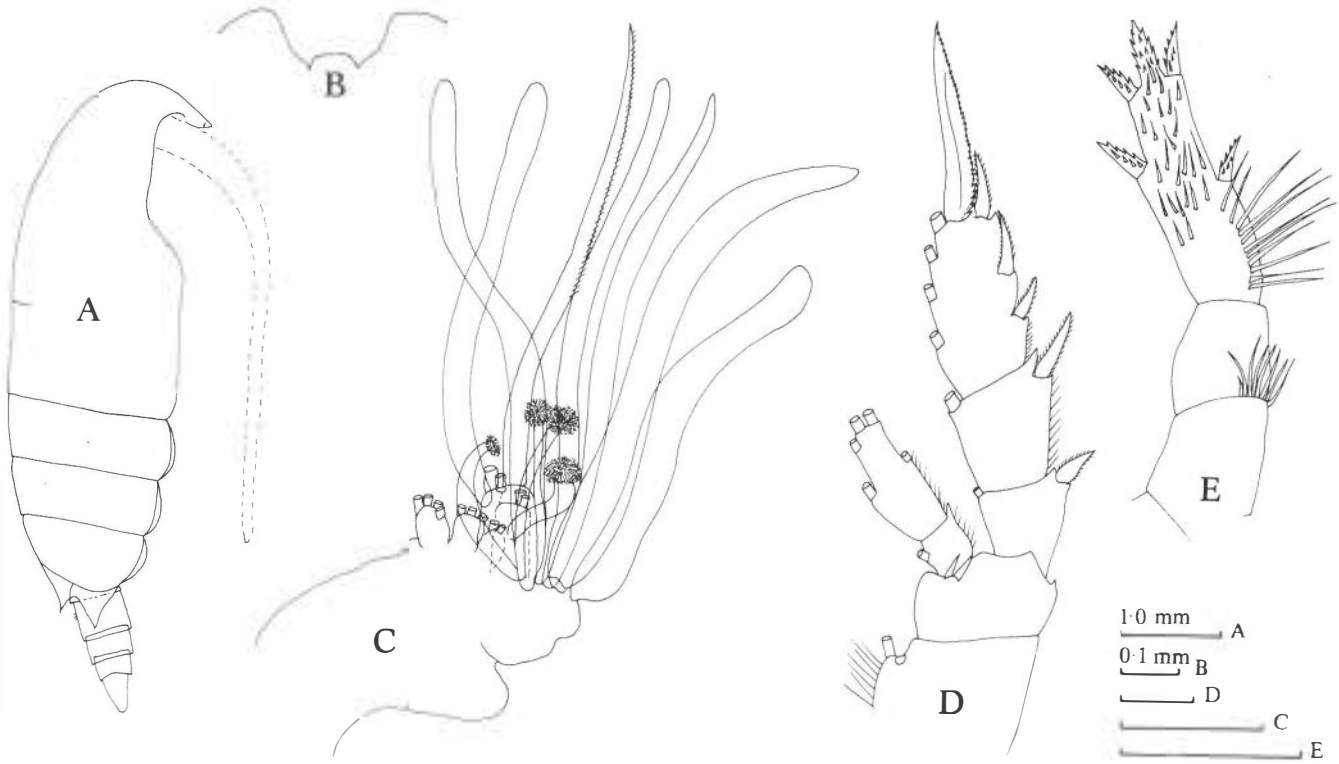


FIG. 77. *Neoscolecithrix* sp. stage V copepodite (from Bradford 1973): A, lateral view; B, rostrum; C, maxilla 2; D, leg 2; E, leg 5.

Pseudophaenna Sars, 1903

DEFINITION: Head and pedigerous segment 1 fused, pedigerous segments 4 and 5 separate. Rostrum conical. Antenna 1 23-segmented in female, 21-segmented in male. Antenna 2 exopod more than twice length of endopod. Maxilla 1 exopod with two setae. Maxilliped powerfully built. Posterior mouthparts of male reduced. Swimming leg endopods without spines on posterior surface. Female leg 5 symmetrical and three-segmented. Male leg 5 asymmetrical, uniramous and multi-segmented on each side, right leg terminates in spine.

(Sars 1903)

REMARKS: This monotypic genus contains *P. typica* Sars, 1903. No specimens of this genus have been taken in the south-west Pacific.

Tharybis Sars, 1903

DEFINITION: Head and pedigerous segment 1 fused or separate, pedigerous segments 4 and 5 fused. Rostrum short and rounded with or without two filaments. Antenna 1 24-segmented in female, 22-segmented on right and 23-segmented on left in male. Antenna 2 exopod more than twice as long as endopod. Mandibular blade with two unusually strong bifid teeth followed by dense series of plumose setae; mandibular palp with both rami well developed. Maxilla 1 with inner lobe 1 enlarged, extending beyond remainder of appendage; exopod reduced with three to five setae. Maxilla 2 endopod with 3 (4?) worm-like and 6 (4?) brush-like sensory filaments; lobes extend over more than half appendage. Maxilliped basipod 2 swollen. Posterior surfaces of swimming legs may bear small spinules, terminal spine of legs 2–4 coarsely serrated. Female leg 5 of two segments attached to common basal segment, terminal segment longest; terminal segment with one or two terminal spines as well as articulated inner edge spine. Male leg 5 asymmetrical, usually biramous on left, uniramous on right; left leg with two basal segments, exopod three-segmented, shorter than the one-segmented endopod, segment 3 inserted terminally; right leg three-segmented, segment 2 with inner edge distal process.

(Schulz 1981)

REMARKS: *Tharybis* contains the following species: *T. altera* (Grice and Hulsemann, 1970) (♀ unknown); *T. asymmetrica* Andronov, 1976 (♂ unknown); *T. compacta* (Grice and Hulsemann, 1970); *T. fultoni* Park, 1967; *T. macrophthalma* Sars, 1903; *T. megalodactyla* Andronov, 1976; *T. minor* Schulz, 1981;

T. neptuni (Cleve, 1904); and *T. sagamiensis* Tanaka, 1960 (♂ unknown). It is possible the following species could be assigned to *Tharybis:* *"Xanthocalanus" macrocephalon* Grice and Hulsemann, 1970 (♂ unknown); and *"X" paraincertus* Grice and Hulsemann, 1965 (♂ unknown).

The terminal part of maxilla 2 has been described as having only brush-like filaments in *T. macrophthalma* by Sars (1903), three worm-like and six brush-like filaments in *T. sagamiensis* by Tanaka (1960), and four worm-like and four brush-like filaments in *T. fultoni* by Park (1967).

Park (1967) described the biramous male leg 5 as being on the right, which contrasts with the other known males, where it is on the left.

No specimens of this genus have been taken in the south-west Pacific.

Undinella Sars, 1900

Paratharybis Tanaka, 1937

DEFINITION: Head and pedigerous segment 1 partly separate; pedigerous segments 4 and 5 fused or separate; posterior corners of metasome prolonged posteriorly in female. Rostrum with basal portion bifid, both parts terminated by one filament. Antenna 1 24-segmented in female, 23-segmented in male. Antenna 2 exopod more than twice as long as endopod. Mandibular blade with two strong bidentate teeth, mandibular palp with endopod larger than exopod. Maxilla 1 inner lobe 1 moderately enlarged, not extending beyond endopod; exopod reduced, with two or three setae. Maxilla 2 endopod with sensory filaments; lobes crowded on distal half of appendage. Maxilliped slender. Posterior surfaces of swimming legs may have some small spinules; terminal spine of legs 2–4 with fine shallow serrations. Female leg 5 symmetrical or asymmetrical, two-segmented, attached to common basal segment; segments of approximately equal length; distal segment with two to four short terminal spines and sometimes outer edge spine. Male leg 5 asymmetrical; uniramous on right, three-segmented, segment 2 usually with inner edge distal process; biramous on left, with one basal segment attached to common basal segment, endopod one-segmented, longer than three-segmented exopod, exopod segment 3 inserted subterminally on segment 2 to make pincers.

(Sars 1900, Fleminger 1957a)

REMARKS: The following species have been placed in this genus: *Undinella acuta* Von Vaupel-Klein, 1970 (♂ unknown); *U. altera* Grice and Hulsemann, 1970 (♀ unknown); *U. brevipes* Farran, 1908 (= *Xanthocalanus simplex* Wolfenden, 1906; *see* Vervoort 1957) (♂ *see* Grice and Hulsemann 1965, as *U. simplex*); *U. compacta* Grice and Hulsemann, 1970; *U. frontalis* (Tanaka, 1937) (♂ *see* Tanaka 1960); *U. gricei* Wheeler, 1970 (♀ unknown); *U. hampsoni* Grice and Hulsemann, 1970; *U. oblonga* Sars, 1900; *U. spinifera* Tanaka, 1960 (♂ unknown); and *U. stirni* Grice, 1971.

Undinella altera and *U. compacta* may belong to *Tharybis* and *"Xanthocalanus" paululus* Park, 1970 (♂ *see* Roe 1975) (= ? *"X" hispidus* Grice and Hulsemann, 1967) and Species 1 of Roe (1975) may belong to *Undinella.*

The following species has been taken in the south-west Pacific:

Undinella brevipes Farran, 1908

(Figs 76, 99)

DESCRIPTION: *Size:* ♀♀ 1.45–1.98 mm, ♂♂ 1.24 mm.

Female: Pedigerous segments 4 and 5 fused; posterior corners of metasome produced into acute points. Antenna 1 reaches beginning of genital segment. Leg 5 small, basal segment common to both legs; terminal

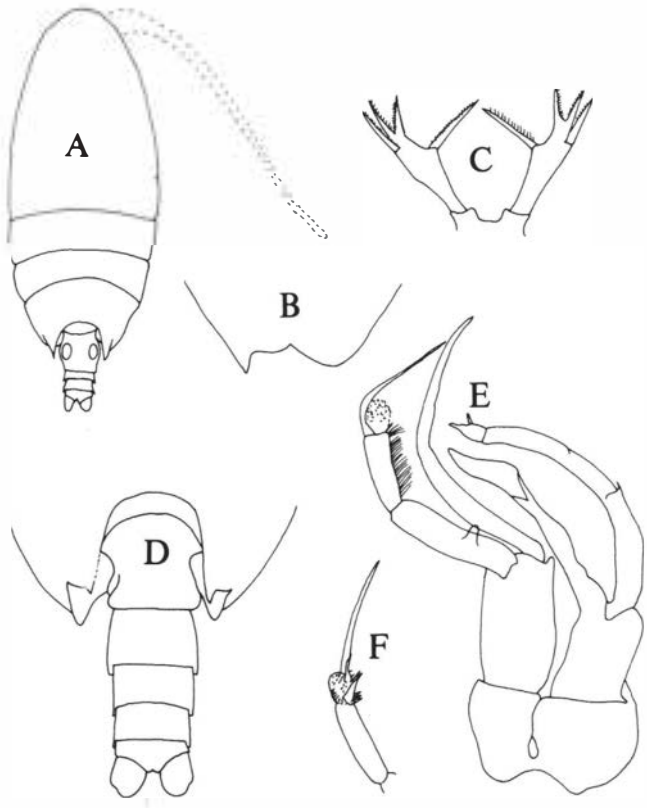


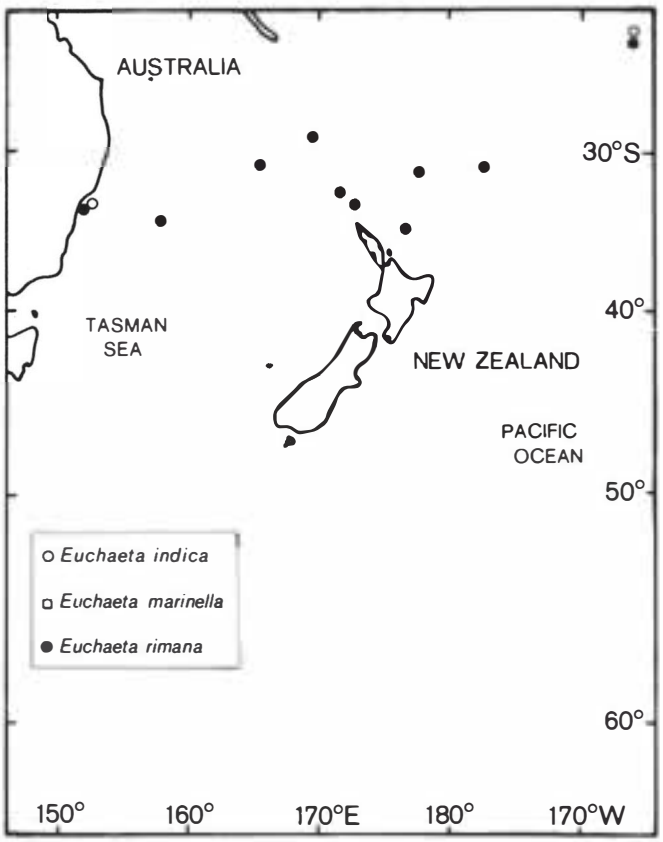
FIG. 78. *Parundinella dakini* (from Dakin and Colefax 1940). Female: A, dorsal view; B, posterolateral corner of metasome; C, leg 5. Male: D, posterior metasome and urosome in dorsal view; E, leg 5; F, terminal part of left leg 5.

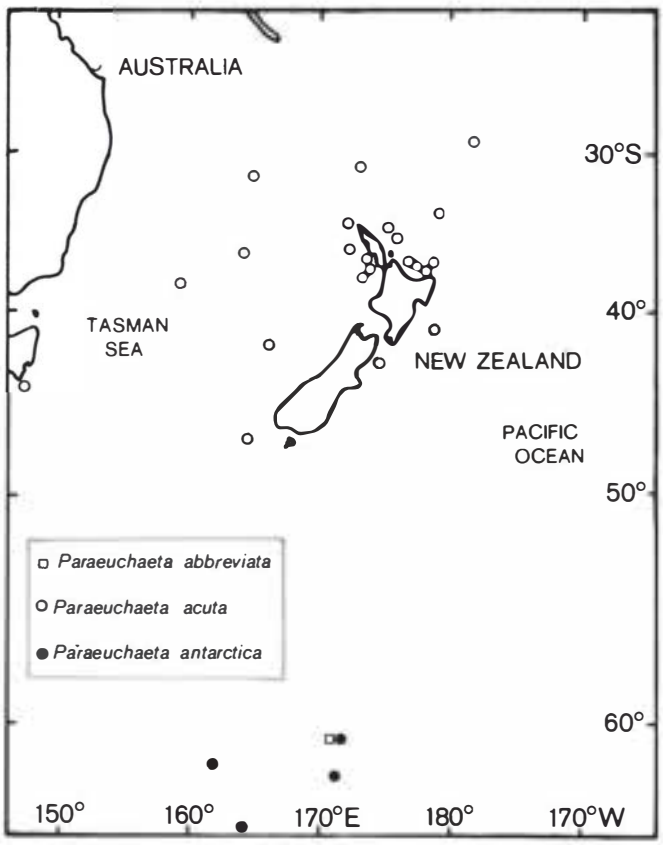
Top left: FIG. 79. Distribution of *Euchaeta indica*, *E. marinella* and *E. rimana* in the south-west Pacific.

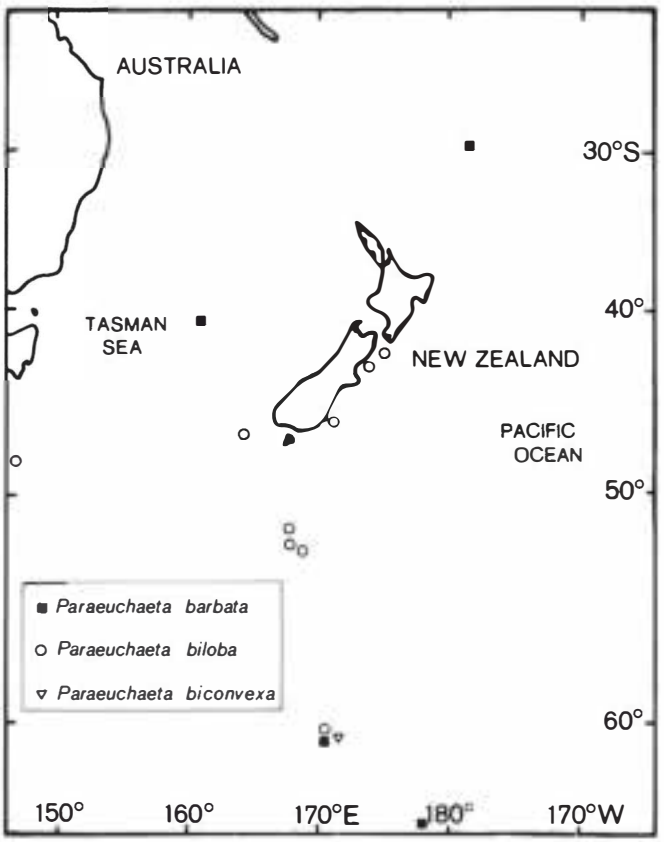
Top right: FIG. 80. Distribution of *Paraeuchaeta abbreviata*, *P. acuta*, and *P. antarctica* in the south-west Pacific.

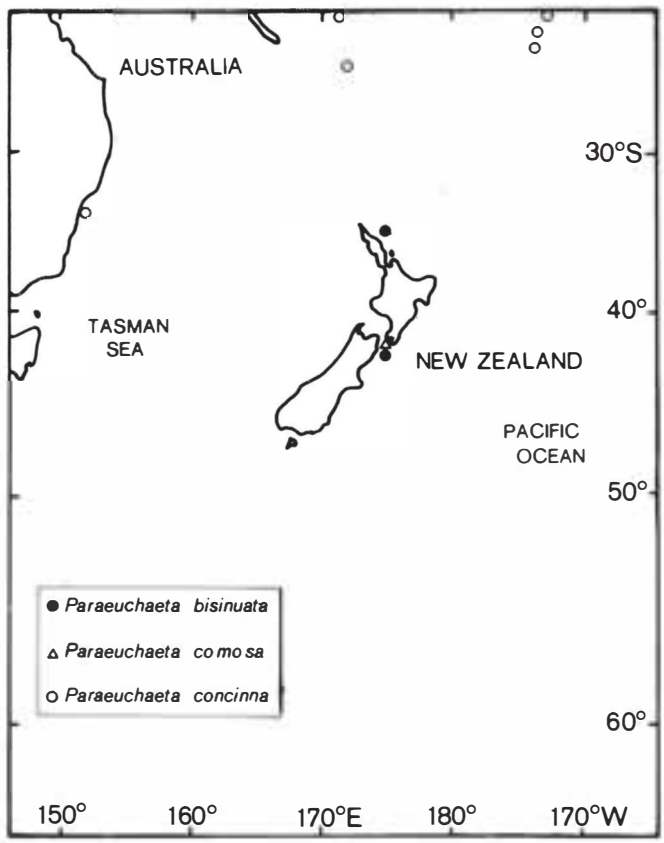
Bottom left: FIG. 81. Distribution of *Paraeuchaeta barbata*, *P. biconvexa*, and *P. biloba* in the south-west Pacific.

Bottom right: FIG. 82. Distribution of *Paraeuchaeta bisinuata*, *P. comosa*, and *P. concinna* in the south-west Pacific.







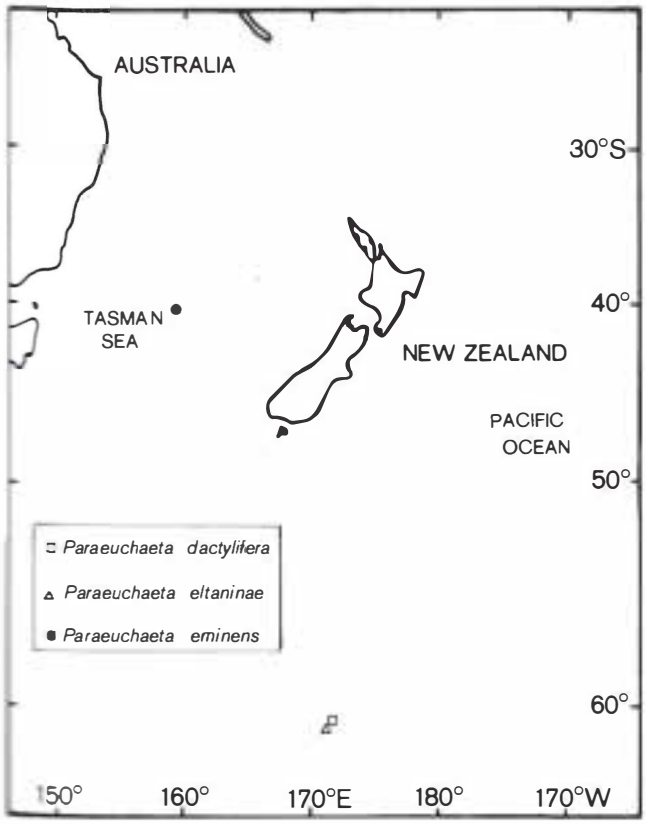


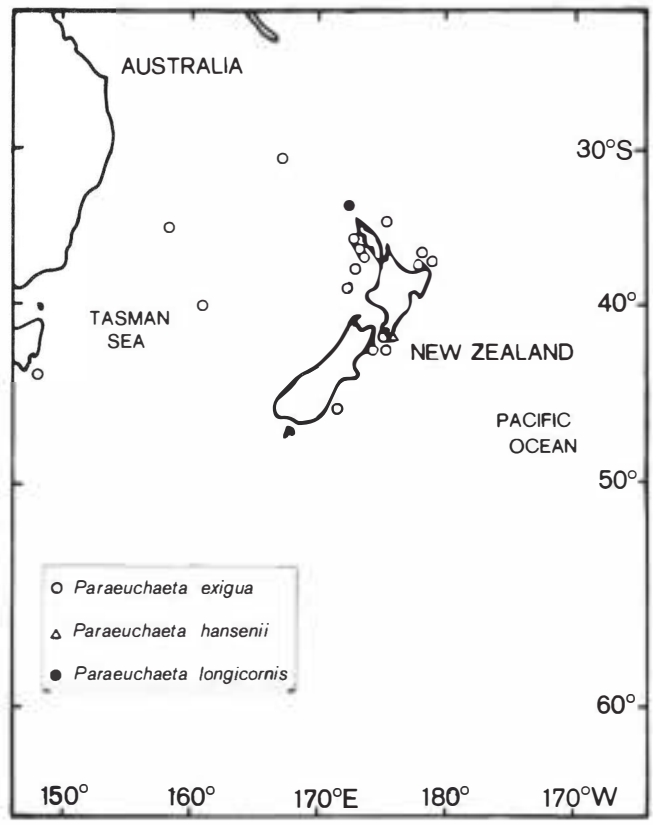
Top left: FIG. 83. Distribution of *Paraeuchaeta dactylifera, P. eltaninae,* and *P. eminens* in the south-west Pacific.

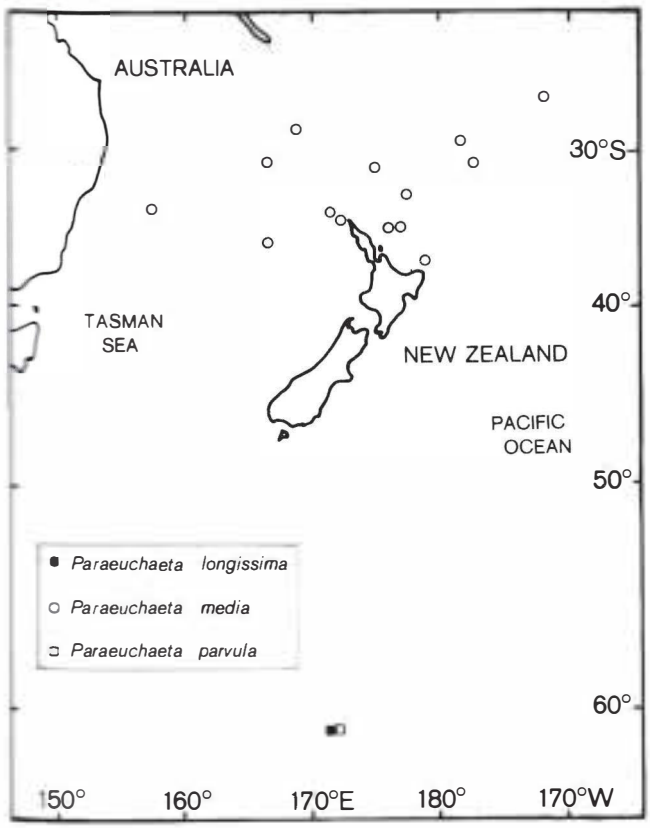
Top right: FIG. 84. Distribution of *Paraeuchaeta exigua, P. hansenii,* and *P. longicornis* in the south-west Pacific.

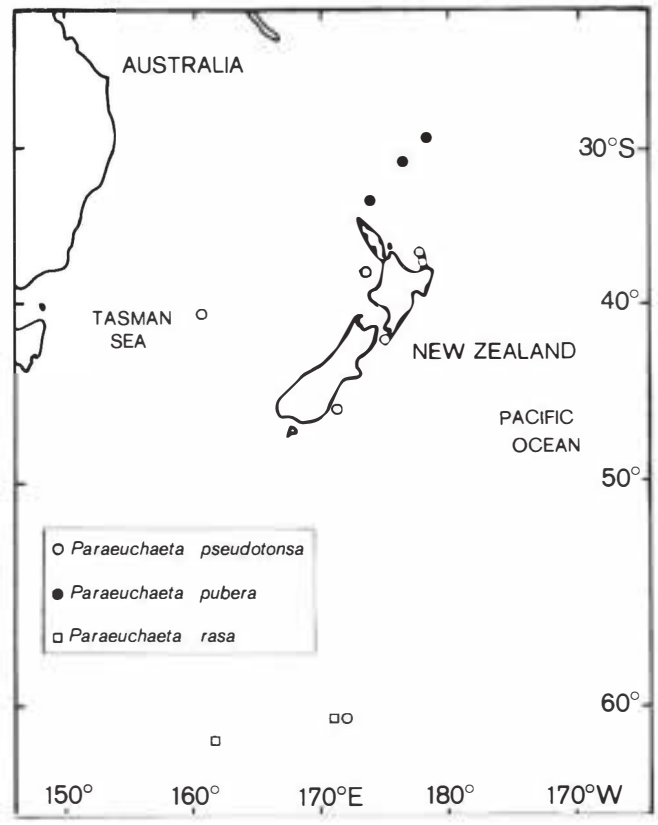
Bottom left: FIG. 85. Distribution of *Paraeuchaeta longissima, P. media,* and *P. parvula* in the south-west Pacific.

Bottom right: FIG. 86. Distribution of *Paraeuchaeta pseudotonsa, P. pubera,* and *P. rasa* in the south-west Pacific.







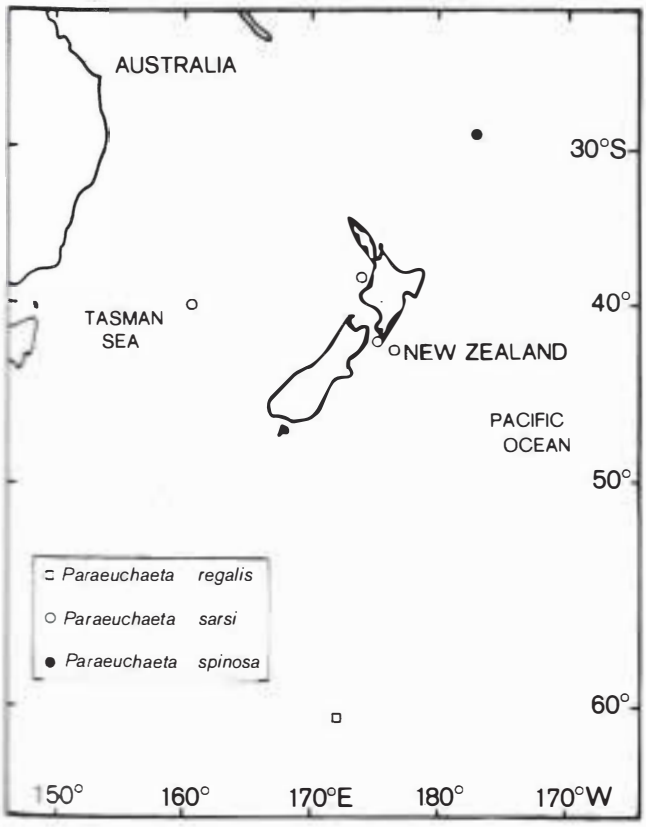


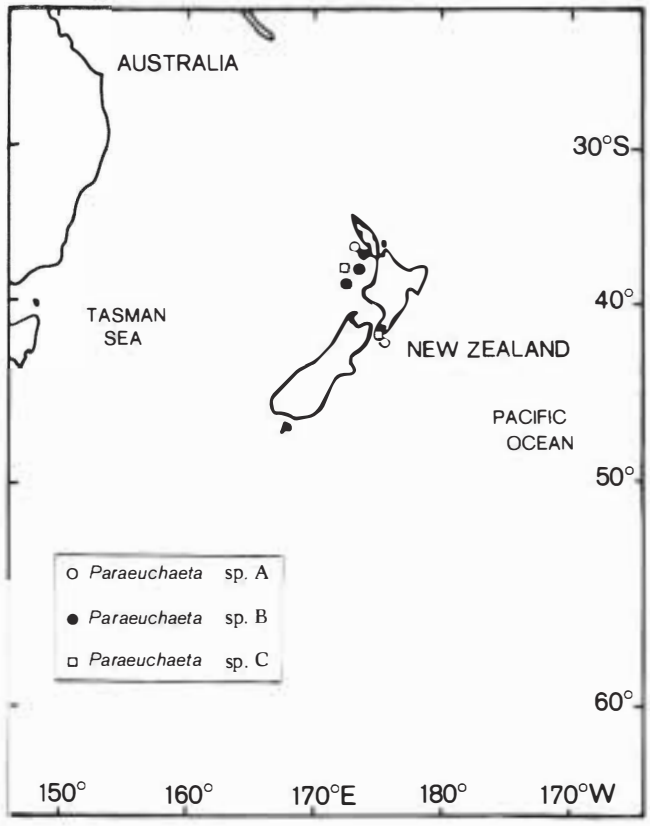
Top left: FIG. 87. Distribution of *Paraeuchaeta regalis, P. sarsi,* and *P. spinosa* in the south-west Pacific.

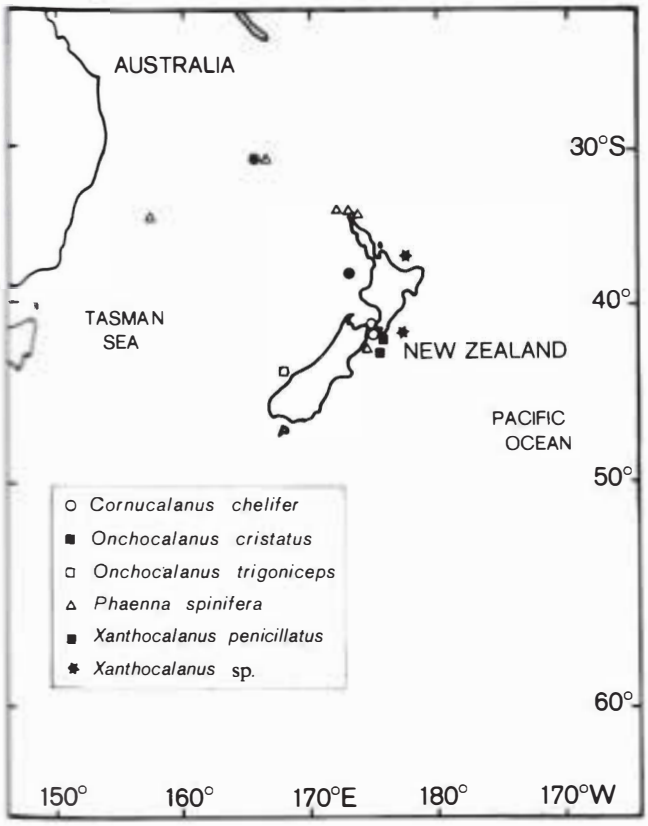
Top right: FIG. 88. Distribution of *Paraeuchaeta* sp. A, *Paraeuchaeta* sp. B, and *Paraeuchaeta* sp. C in the south-west Pacific.

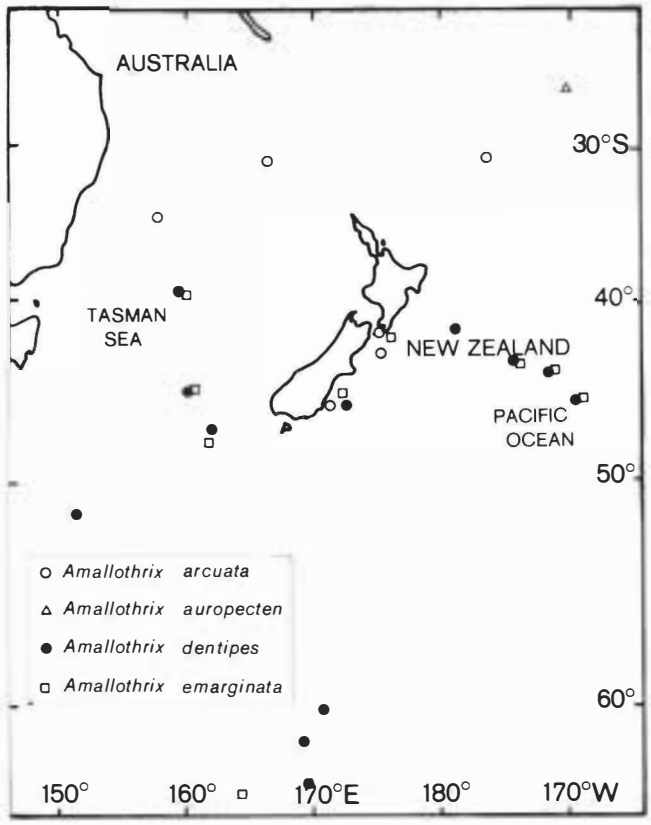
Bottom left: FIG. 89. Distribution of *Cornucalanus chelifer, Onchocalanus cristatus, O. trigoniceps, Phaenna spinifera, Xanthocalanus penicillatus,* and *Xanthocalanus* sp. in the south-west Pacific.

Bottom right: FIG. 90. Distribution of *Amallothrix arcuata, A. auropecten, A. dentipes,* and *A. emarginata* in the south-west Pacific.







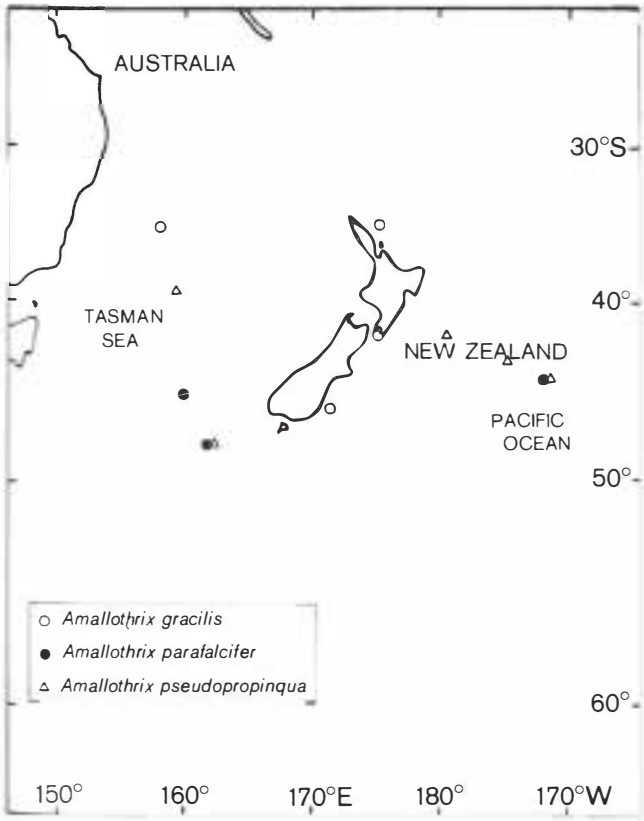


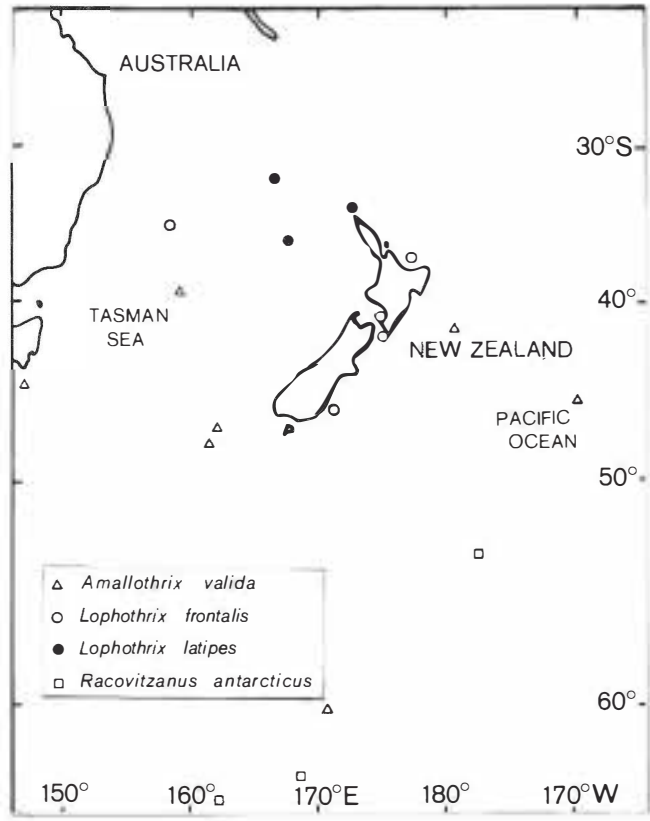
Top left: FIG. 91. Distribution of *Amallothrix gracilis, A. parafalcifer,* and *A. pseudopropinqua* in the south-west Pacific.

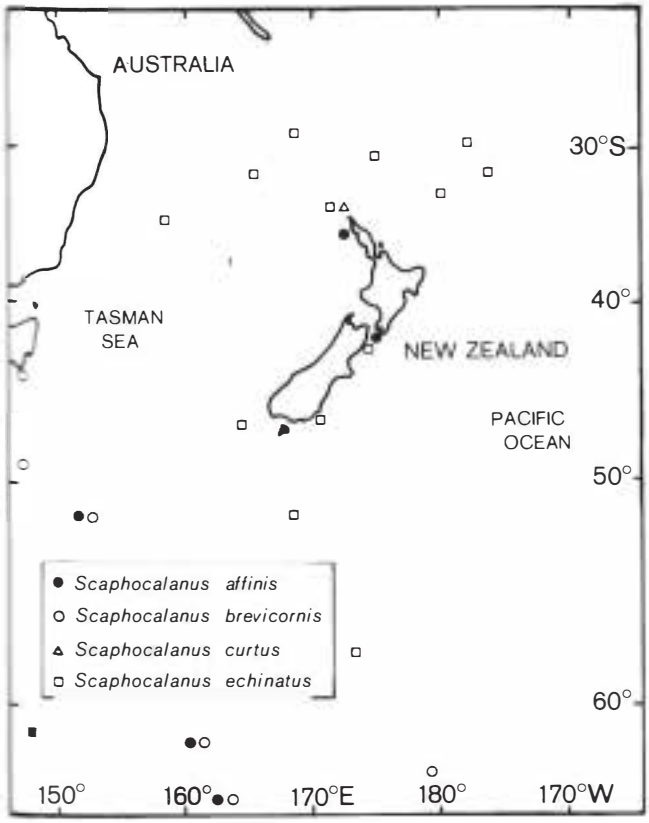
Top right: FIG. 92. Distribution of *Amallothrix valida, Lophothrix frontalis, L. latipes,* and *Racovitzanus antarcticus* in the south-west Pacific.

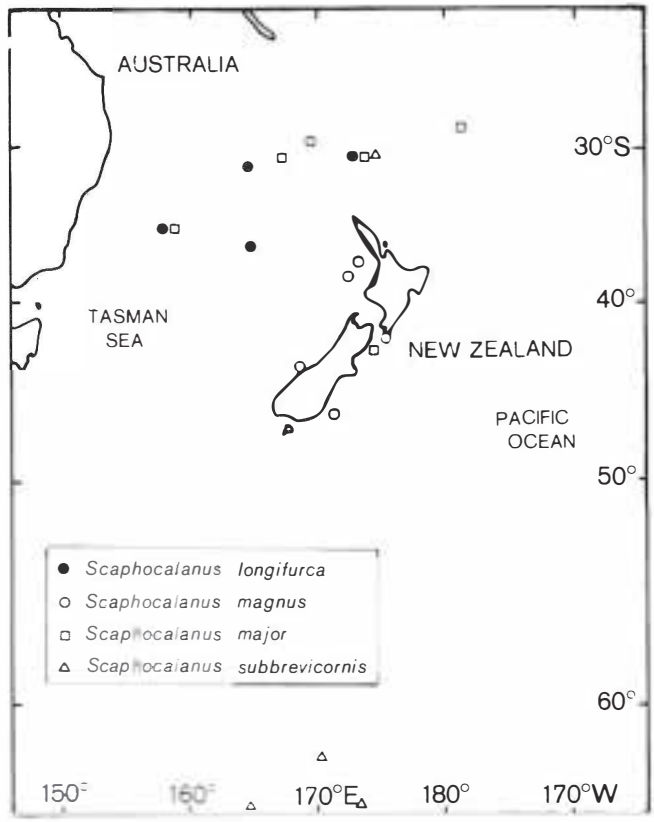
Bottom left: FIG. 93. Distribution of *Scaphocalanus affinis, S. brevicornis, S. curtus,* and *S. echinatus* in the south-west Pacific.

Bottom right: FIG. 94. Distribution of *Scaphocalanus longifurca, S. magnus, S. major,* and *S. subbrevicornis* in the south-west Pacific.







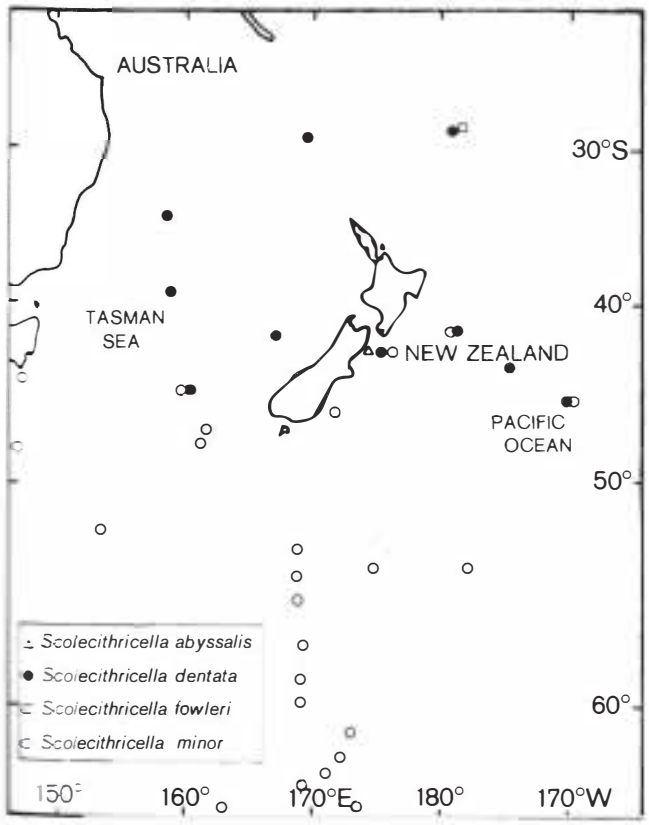


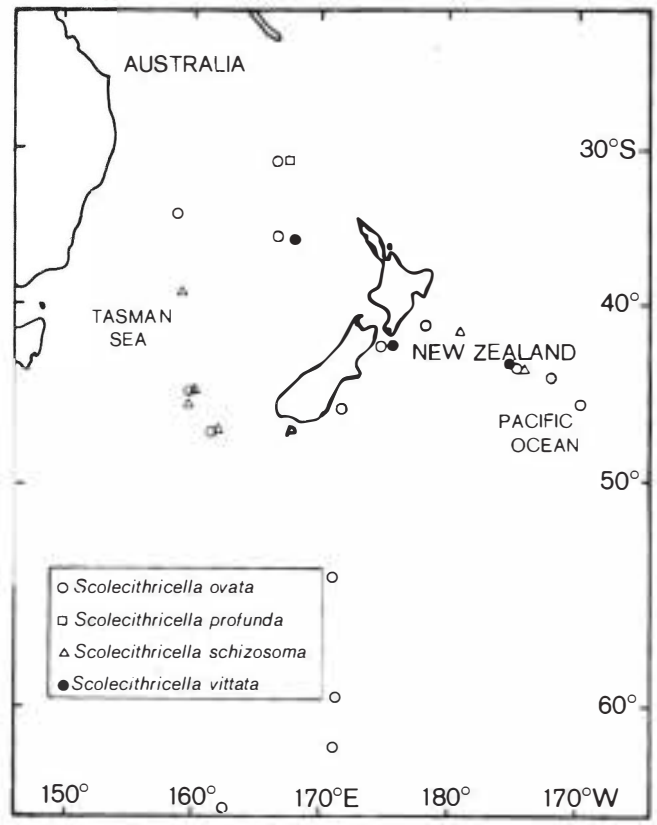
Top left: FIG. 95. Distribution of *Scolecithricella abyssalis, S. dentata, 'S.' fowleri,* and *S. minor* in the south-west Pacific.

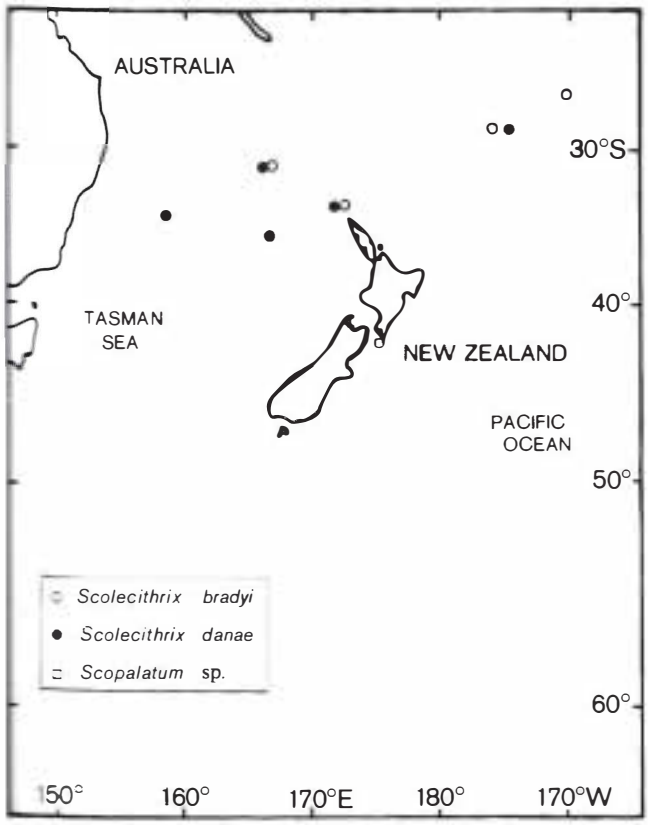
Top right: FIG. 96. Distribution of *Scolecithricella ovata, S. profunda, S. schizosoma,* and *S. vittata* in the south-west Pacific.

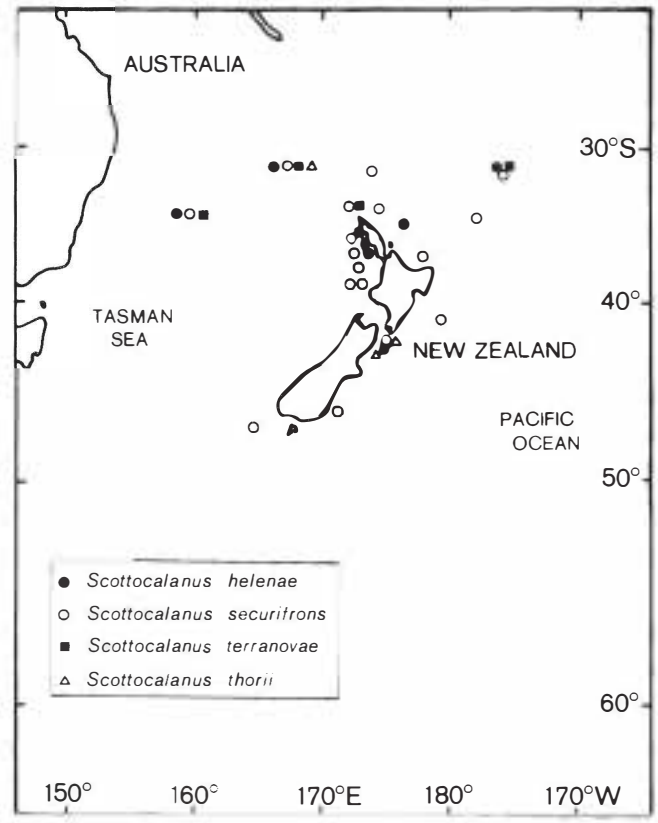
Bottom left: FIG. 97. Distribution of *Scolecithrix bradyi, S. danae,* and *Scopalatum* sp. in the south-west Pacific.

Bottom right: FIG. 98. Distribution of *Scottocalanus helenae, S. securifrons, S. terranovae,* and *S. thorii* in the south-west Pacific.









segment shorter than preceding segment, with three unarticulated terminal spines.

(Farran 1908)

Male: Head and pedigerous segment 1, as well as pedigerous segments 4 and 5, fused; posterior corners of metasome with notch-like protuberance in dorsal view, pointed in lateral view. Right leg 5 exopod two-segmented; left leg 5 exopod three-segmented, with distal tuft of hairs on each of two terminal segments; left leg 5 endopod one-segmented, longer than exopod.

(Grice and Hulsemann 1965, as *U. simplex*)

REMARKS: The south-west Pacific specimens have small chitinous thickenings on the posterior metasome, urosome, and basipod segment 1 of leg 4, as noted by Vervoort (1957). There is a tendency for the proximal segments of legs 2–4 to be fused. The south-west Pacific specimens have at least five brush-like setae on the endopod of maxilla 2.

PREVIOUS SOUTH-WEST PACIFIC RECORDS: Nil.

NEW RECORDS:

Station Number	Depth of Haul (m)	Specimens
A292	500–1000	1 ♀, 1.45 mm
F946	200–500	1 ♀, 1.55 mm

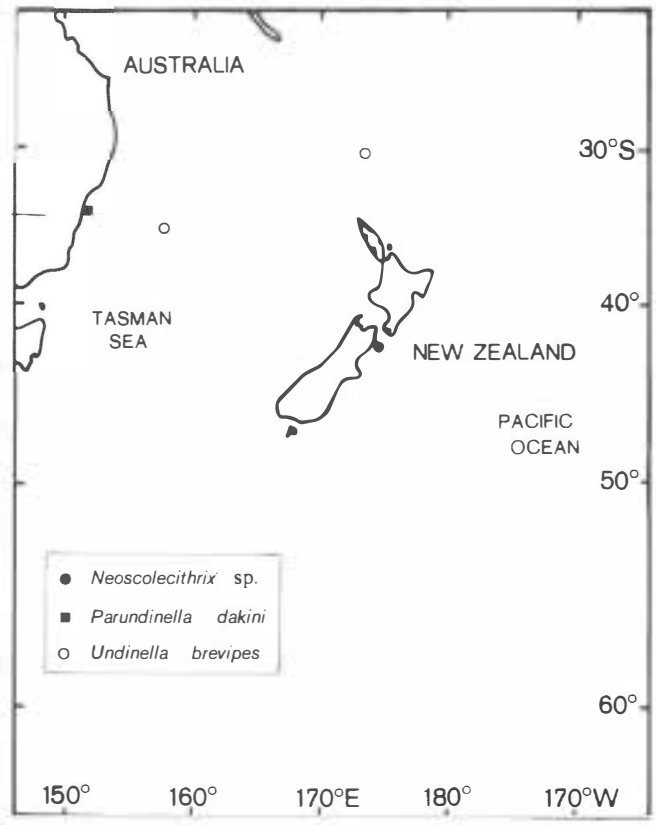


FIG. 99. Distribution of *Neoscolecithrix* sp., *Parundinella dakini*, and *Undinella brevipes* in the south-west Pacific.

DISTRIBUTION: *Undinella brevipes* has its main distribution in the north Atlantic Ocean, but has also been taken in Antarctic and Subantarctic waters and in the north Pacific Ocean (Vervoort 1957, Tanaka 1960). It seems to be a bathypelagic species and migrates to more superficial layers at night.

DISTRIBUTION OF SOUTH WEST PACIFIC EUCHAETIDAE, PHAENNIDAE, SCOLECITHRICIDAE, AND THARYBIDAE

The material studied was collected with a wide variety of gear between 23°S and 64°S. Near-surface layers down to 500 m were more comprehensively sampled than deeper waters (Fig. 100), but depths to 1000 m were also well represented in the collections, particularly by the series of Otago University stations. Bathypelagic depths were only sparsely sampled, often with inappropriate gear. These limitations accepted, the present collection, together with previous records from the area, are sufficiently comprehensive to demonstrate broad features of vertical and latitudinal distribution.

The characteristic depth zones of each species (Figs 101–103) were determined by several criteria apart from their observed occurrence in the present records. Where a species occurred in hauls from deep water to the surface we have assumed that it was caught in deep water provided that the species was absent from the numerous shallow samples. Also, existing records of distribution in other parts of the world have been considered in the determination of each characteristic vertical and latitudinal distribution. Bathypelagic species are defined as those which usually occurred in present samples with a maximum depth around 1000 m

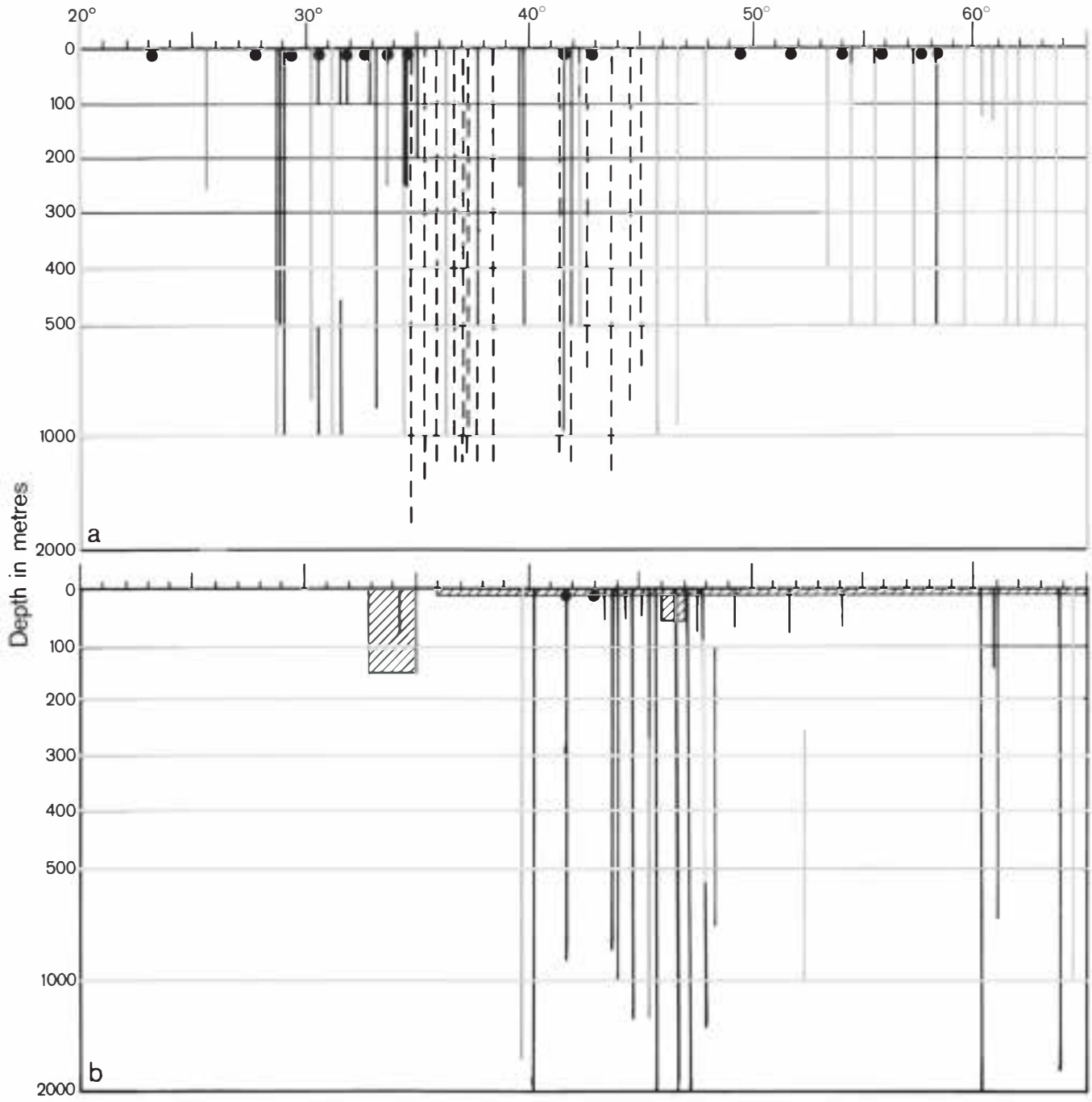


FIG. 100. Distribution of samples with latitude and depth from which present records are derived: a, new records; b, previous records. – – – Menzies trawl hauls, ——— vertical hauls, ● surface hauls, hatched areas represent a number of samples.

or more and were seldom taken in samples from less than 500 m. Mesopelagic species commonly occurred in samples with maximum depths between 500 and 1000 m but may be found at epipelagic depths, usually in night samples. Epipelagic species had a high proportion of their occurrence in samples from less than 200 m maximum depth.

Euchaetidae

About one third of all south-west Pacific euchaetids, including all three species of *Euchaeta*, are epipelagic with a tropical-subtropical distribution (Fig. 101). *Paraeuchaeta acuta* and *P. media* are the most common species.

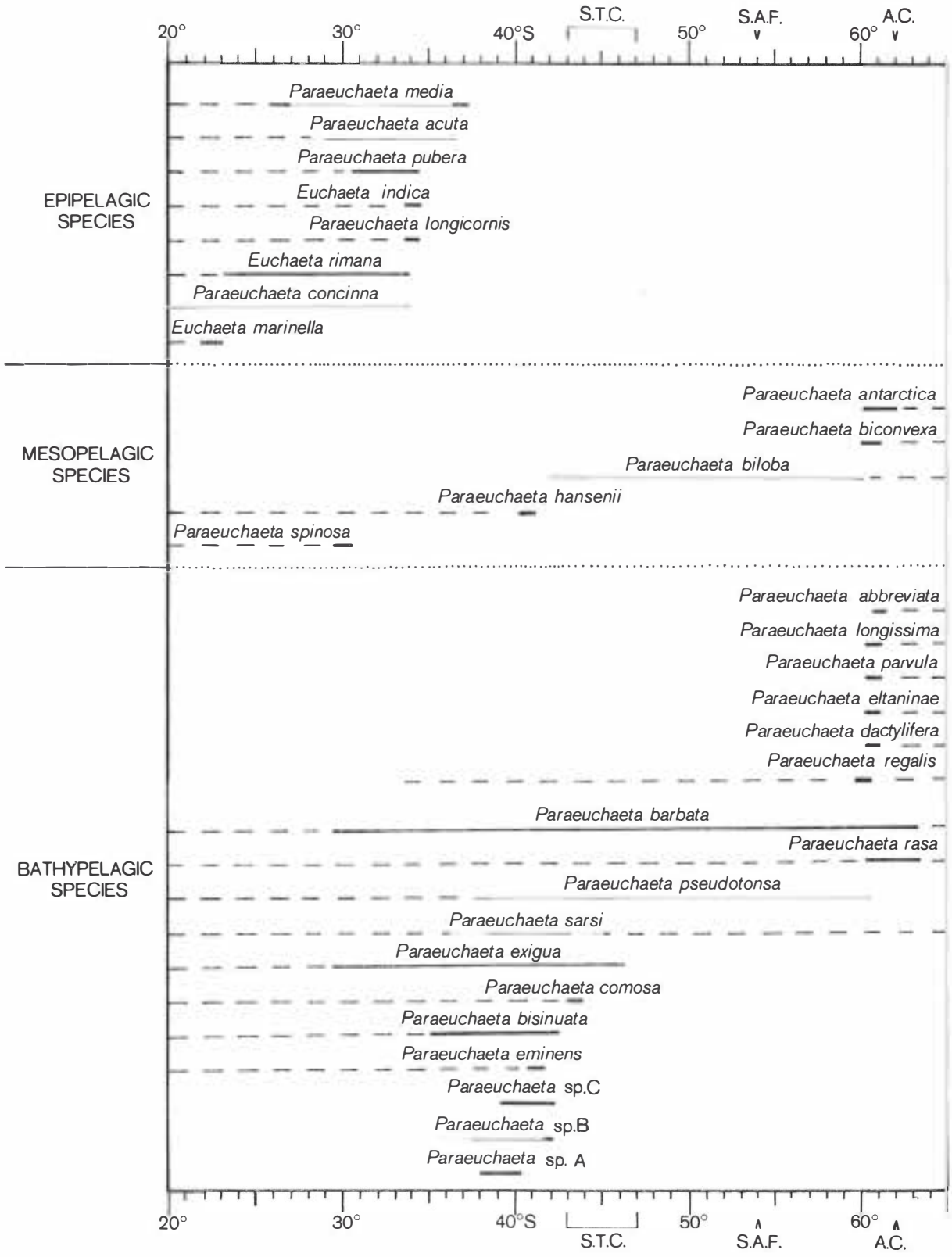


FIG. 101. Distribution of Euchaetidae with depth and latitude: —— south-west Pacific records, – – – likely distribution from all existing records. S.T.C. = Subtropical Convergence region, S.A.F. = Subantarctic Front, A.C. = Antarctic Convergence.

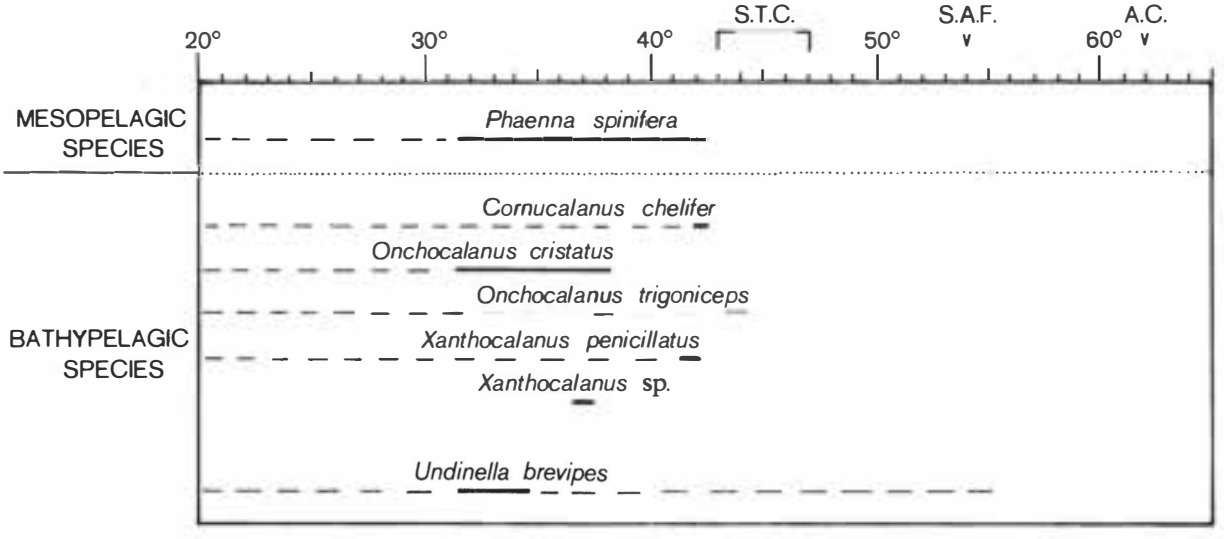


FIG. 102. Distribution of pelagic Phaennidae and Tharybidae with depth and latitude: ——— south-west Pacific records, - - - likely distribution from all existing records. Abbreviations as on Fig. 101.

Mesopelagic species (Fig. 101) are relatively few and include three species which are restricted to the Antarctic-Subantarctic. Two other species are distributed in both hemispheres and extend into subtropical waters. Among the mesopelagic species *Paraeuchaeta biloba* was the most common.

Bathypelagic euchaetids (Fig. 101) were usually present in small numbers but with high species diversity in our samples. *Paraeuchaeta exigua* was relatively common. Many bathypelagic species, as far as they are known, appear to be confined to Antarctic or Antarctic-Subantarctic waters. Others are distributed in both hemispheres and extend into subtropical, subantarctic or even Antarctic waters. Three undescribed species are known only from the New Zealand region.

Phaennidae

Only one species of those taken in the south-west Pacific, *Phaenna spinifera*, is mesopelagic in tropical-subtropical waters, while the remaining species are all bathypelagic at similar latitudes (Fig. 102). All of the species occurred rarely in the present collections.

Scolecithricidae

A few of the south-west Pacific Scolecithricidae are epipelagic (Fig. 103). Three of these species have tropical-subtropical distributions (*Scolecithrix bradyi*, *S. danae*, and *Scaphocalanus curtus*), but *Scolecithricella minor* is apparently much more widely spread and was one of the most common scolecithricids taken.

The remaining south-west Pacific scolecithricids are almost equally meso- or bathypelagic (Fig. 103). Most species are distributed in both hemispheres and penetrate varying degrees south except those which have been recorded on very few occasions (*Amallothrix parafalcifer*, *A. pseudopropinqua*, *Scolecithricella schizosoma*, *Scottocalanus terranovae*, and *Scopalatum* sp.). Only one species, *Amallothrix dentipes*, appears to have a southern ocean distribution. *Scottocalanus securifrons* was the most common meso- or bathypelagic species taken.

Tharybidae

It is possible that most tharybids are planktobenthic; their morphology tends to suggest such a mode of existence (Sars 1903, Bradford 1969). Two south-west Pacific species, *Parundinella dakini* and *Neoscolecithrix* sp., are probably planktobenthic. The remaining species, *Undinella brevipes*, has a pelagic habit and is found at bathypelagic depths. It is distributed in both hemispheres and extends as far south as the Antarctic Convergence (Fig. 102).

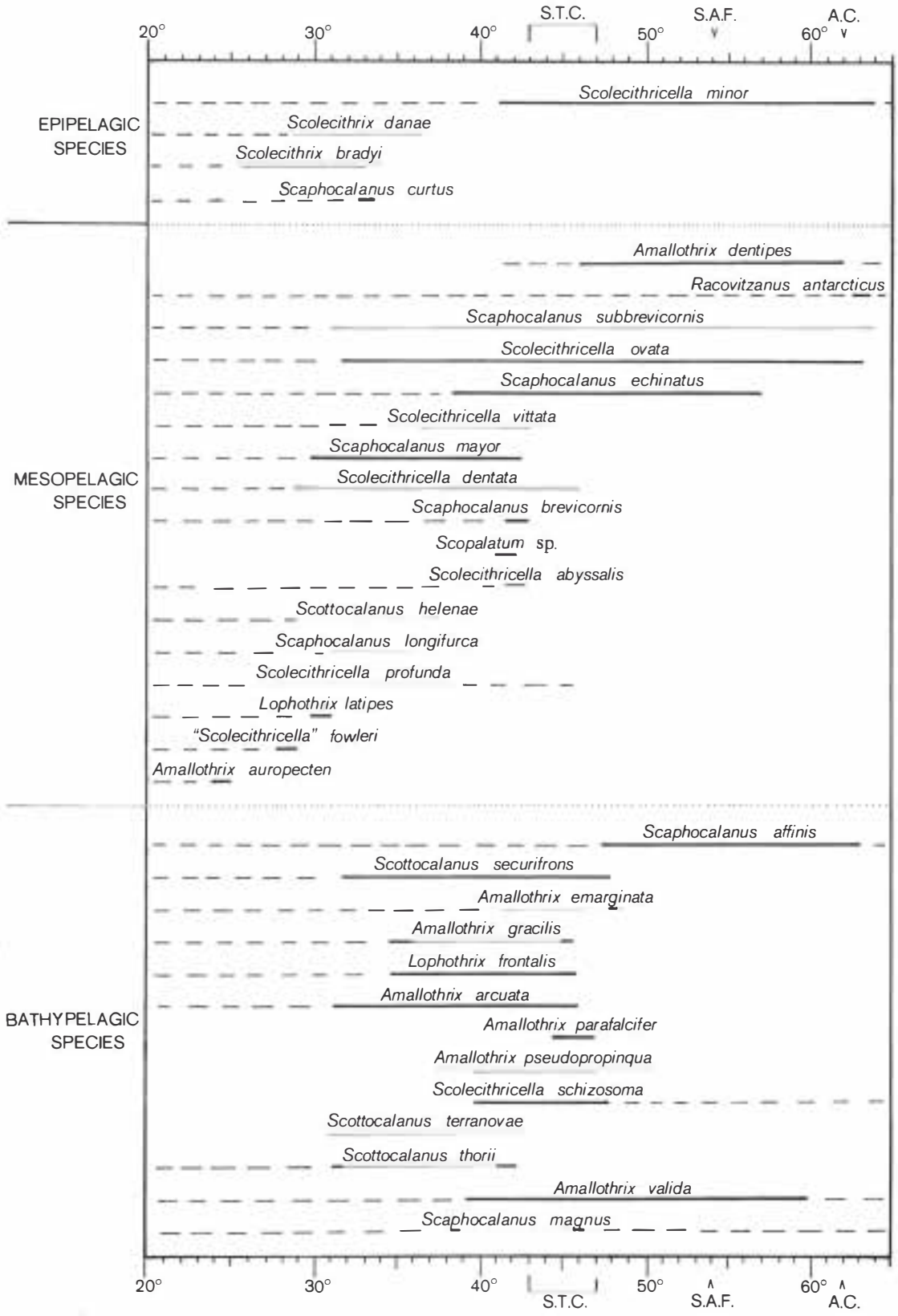


FIG. 103. Distribution of Scolecithricidae with depth and latitude: ——— south-west Pacific records, – – – likely distribution from all existing records. Abbreviations as on Fig. 101.

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