

**New Parasitic Choniostomatidae (Copepoda)
Mainly from Antarctic and
Subantarctic Ostracoda**

by

JANET M. BRADFORD



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Inset

**New Parasitic Choniostomatidae (Copepoda)
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ABSTRACT

Sixteen new species of Choniostomatidae (Copepoda) are described, fifteen in the genus *Sphaeronella*, and one in a new genus *Sphaeronelloides*. One species of *Sphaeronella* is parasitic on an amphipod, and the remaining fifteen species are parasitic on ostracods. *Choniomyzon panuliri*, parasitic on a decapod, is recorded for the second time. The genera in the Choniostomatidae and the species of the genus *Sphaeronella* are listed. The family Choniostomatidae is placed in the Cyclopoida, section Siphonostoma.

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Introduction

Several important additions have been made to the parasitic copepod family Choniostomatidae Hansen, 1886 since Hansen's (1897) monograph was published. The family now contains the following genera:

Aspidoecia Giard & Bonnier, 1889

Choniomyzon Pillai, 1962

Choniosphaera Connolly, 1929 (♂ *see* Gnanamuthu 1954)
(= *Lecithomyzon* Bloch & Gallien, 1933 (*see* Lemercier 1964))

Choniostoma Hansen, 1886, ♂ unknown.

(= *Heptalobus* Nierstrasz & Brender à Brandis, 1930
(*see* Stock 1958))

Homeoscelis Hansen, 1897

Myxidion Hansen, 1897

Nicothoe Audouin & Milne-Edwards, 1826, ♂ unknown

Paranicothoe Carton, 1970

Rhizorhina Hansen, 1892 (*see* Lützen 1964 – removed
from Herpyllobiidae)

(= *Salenskya* Giard & Bonnier, 1895 (*see* Hansen 1897:17))

Sphaeronella Salensky, 1868

Sphaeronelloides **new genus**, ♂ unknown

Sphaeronellopsis Hansen, 1905, ♂ unknown

Stenothocheres Hansen, 1897

A new genus, parasitic on a deep water isopod, also belonging to the Choniostomatidae, is being described by Ritchie (in press).

I agree with Gurney (1930:456) and Lemercier (1965) that Nicothoidea should not stand as a separate family and that it should be amalgamated with the family Choniostomatidae.

There has been much uncertainty as to where the parasitic copepods belong in the copepod classification scheme because the free-living and parasitic copepods have been regarded as separate groups. The Choniostomatidae now contains a number of genera in which the adults display varying degrees of retention of larval characters. The least modified genera *Paranicothoe*, *Choniosphaera*, *Choniomyzon*, and particularly *Nicothoe*, indicate how close the family is to the Cyclopoida. *Nicothoe* retains the full segmentation of *Cyclops* (five free thoracic and four free abdominal segments), has a more than 9-segmented antenna 1, the first four thoracic segments bear biramous swimming legs, the fifth thoracic segment bears a pair of vestigial limbs, the abdominal segments are limbless, and eggs are large in ovoid ovisacs (*see* Leigh-Sharp 1926:153).

I believe that the Choniostomatidae evolved from an ancestral cyclopoid, and it does not represent an evolutionary line from some more ancient podoplean stock. Other parasitic copepods have been placed in the Cyclopoida (Gurney 1933: 1–5) and more recently Cressey & Patterson (1973) have demonstrated, from fossil evidence, that the Dichelesthioidea are siphonostomes, confirming Lang's (1948:28) view concerning the caligiform copepod parasites.

I am placing the Choniostomatidae in the cyclopoid section Siphonostoma with which it shares the most important characters, defined by Sars (1915:82). Not only do choniostomatids (copepodites and some adults) show the same types of deviations from the definition as are already found in members of the Siphonostoma (*Cancerilla* Dalyell, 1851 has antenna 1 with reduced segmentation, antenna 2 without rudimentary exopod, short siphon, and reduced thoracic legs), but the first copepodite of *Cancerilla tubulata* Dalyell (Carton 1968: 14) is remarkably like a choniostomatid copepodite.

Choniostomatid copepods all parasitise other Crustacea. The adults are thought to be relatively immobile because of the small size of their limbs, which are adapted for clinging. All stages of Choniostomatidae (except *Rhizorhina* and the female of *Paranicothoe*) have a distinctive sucking mouth cone, which is expanded into a disc through which piercing mandibles are extended, presumably enabling them to feed on the blood of the host. Most species live in the brood pouch of the host (Fig. 1), and perhaps mimic the eggs of the host (Bowman & Kornicker 1967:5). The copepod lays its eggs separately in a gelatinous mass or in ovisacs which may be free or attached to the parent (Hansen 1897:43, 89). The young generally hatch as stage I copepodites which find a new host, except for *Choniosphaera* and *Choniomyzon* which hatch as nauplii. Those genera which hatch as a copepodite often reach the adult stage by way of a pupa (Hansen 1897:53).

The parasite appears to have very little effect on the host although it may inhibit ovulation and/or egg laying (Bowman & Kornicker 1967:5).

All parasites studied here belong to *Sphaeronella* Salensky, 1868, except for one new monotypic genus related to *Sphaeronella*; and one parasite in the genus *Choniomyzon* Pillai, 1962 is recorded.

Material and Methods

The majority of choniostomatid copepods described in this paper were taken from antarctic and subantarctic Ostracoda sampled principally off the southern part of South America with one species each taken off South Africa, the coast of Antarctica south of Australia, and the Kerguelen Islands. One species of choniostomatid was found on a spiny lobster from the British Solomon Islands and another on an amphipod from off Terra del Fuego (Table 1 and Fig. 2).

The ostracod hosts were identified and described by Kornicker (1975) who also discussed the host-parasite relationships in detail; Dr R. W. George of the West Australian Museum identified the spiny lobster; and Gray (in press) is describing the amphipod.

The parasites found on the spiny lobster and amphipod were amongst the eggs of the host. According to Dr Kornicker (pers. comm.) the choniostomatids on the ostracods were always located in the posterodorsal part of the carapace (Fig. 1). Apparently the attachment is

not strong, because the parasites are always free when the ostracod is removed from its carapace, or they are easily removed from inside the carapace without disturbing the body of the ostracod within the carapace. By microscopic examination of the position of the parasites through the carapace of the host, Dr Kornicker noted that some parasites seemed to be attached to the inner layer of the carapace.

Specimens were usually mounted and observed whole between two cover glasses fixed in a metal holder. The mounting medium was either Euparal or Polyvinyl Alcohol Lactophenol. Lightly sclerotised specimens were stained with Lignin Pink. All specimens, including the types, are deposited in the United States National Museum of Natural History (NMNH) registered by the catalogue number.

Unless otherwise stated the species name of the parasite is derived from the generic name of the host.

Characters used to diagnose species of *Sphaeronella*

Hansen's detailed account of the external morphology of *Sphaeronella* furnishes most of the information necessary for the determination of species of this genus. From the work on this collection and with the observations of other workers it is possible to judge the usefulness of characters to assist in identifying species, or to suggest further characters.

There is quite an amount of variation in certain characteristics of the adult female. Green (1958) indicated how much the characteristics of the genital area of *S. leuckarti* may vary, Hansen (1897) noted how ornamentation of the trunk may change with age, and personal observation of three females of *S. kornickeri*, four females of *S. anarthronis*, and three females of *S. skogsbergiellae* (Fig. 7c, e) indicate that the submedian skeleton may only be generally similar between individuals, and that details of sculpturing vary considerably.

It would be advantageous to be able to relate the copepodite to the type of adult because it is possible that the copepodite may be eventually used to re-evaluate the status of *Sphaeronella*. From personal observations I think there may be some characters overlooked by Hansen which will be useful. In this

collection, the only choniostomatid copepodite from an amphipod had legs which differed from those of most other copepodites in the collection. Hansen (1897) described the outer edge spines on the exopod of leg 1 as "four rather short, naked setae" and on the exopod of leg 2 as "three shorter, simple setae", and the subterminal, outer edge spine on the endopod of legs 1 and 2 as having "only one single seta, which is either short or naked, or very long and plumose". Generally, Hansen gave no further information on the nature of these spines for each species. In the present collection, all species of *Sphaeronella* had outer edge exopod spines in the form of a serrate-edged blade, and in most instances the outer edge endopod spines were similar, except in *S. grayi* and *S. homasteropeae* which had these spines modified to look like short, stout plumose setae.

Another important character of the species in the collection was the degree of fusion between segments of the abdomen. It is also possible that the shape of the first maxilla is related to the type of adult, but, as Hansen pointed out, this appendage is often difficult to discern accurately, and much effort is needed to record its characters.

Table 1 Station list

Station Number	Date	Latitude "S" 'S	Longitude "°" 'E	Gear	Depth (m)	Locality
<i>Octans</i>						
AZ	12 Feb 1961	66 16 38 – 66 16 20	110 30 48 – 110 31 24E	Trawl	128–146	Wilkes Station, Antarctica
AH	11 Dec 1961	66 15 56 – 66 15 57	110 31 09 – 110 31 47E	Dredge	55–91	Wilkes Station, Antarctica
TAT	28 Dec 1961	66 13 18 – 66 13 47	110 37 50 – 110 38 18E	Trawl	36	Wilkes Station, Antarctica
<i>Hero</i>						
Cruise 69–5 48	20 Oct 1969	53 41 40	72 00 45W	Epibenthic dredge	21.3	Fortesque Bay, southern South America
<i>Eltanin</i>						
Cruise 6						
340	3 Dec 1962	53 08 – 53 07	59 23 – 59 21W	Menzies trawl	578–567	Southern South America
350	4 Dec 1962	55 03 – 55 00	58 57 – 58 51W	Menzies trawl	2452	Southern South America
363	7 Dec 1962	57 09 – 58 00	58 58 – 58 50W	Phleger corer?	3590–3777?	Southern South America
412	1 Jan 1963	62 06 – 62 06	56 00 – 55 59W	Menzies trawl	1180	Southern South America
Cruise 11						
958	5 Feb 1964	52 56	75 00W	5-ft Blake trawl	92–101	Southern South America
967	10 Feb 1964	53 42 – 53 46	66 19 – 66 13W	5-ft Blake trawl	81	Southern South America
<i>Vema</i>						
Cruise 14						
14	19 Feb 1958	54 23	65 35W	Small bottom trawl	75	Southern South America
34	6 Apr 1958	34 05.5	18 06E	Small bottom trawl	179	Off South Africa
Cruise 15						
131	13 Apr 1959	40 14.6	55 24 7W	Small bottom trawl	1475	Southern South America
Cruise 17						
12	23 Mar 1961	43 30	74 55W	Small bottom trawl	112	Southern South America
13	24 Mar 1961	46 59.5	75 54W	Small bottom trawl	2657–2470	Southern South America
14	24 Mar 1961	47 01	75 44W	Small bottom trawl	1201–1146	Southern South America
71	18 May 1961	40 11	61 27W	Small bottom trawl	44	Southern South America
72	19 May 1961	39 21	61 08W	Small bottom trawl	15	Southern South America
75	23 May 1961	41 41	59 19W	Small bottom trawl	82	Southern South America
88	11 Jun 1961	45 11	60 55W	Small bottom trawl	110	Southern South America
97	13 Jun 1961	44 29	60 59W	Small bottom trawl	101	Southern South America
Cruise 18						
12	17 Feb 1962	47 09	60 38W	Small bottom trawl	424–428	Southern South America
13	17 Feb 1962	47 10	61 02W	Small bottom trawl	135	Southern South America
Hartmann Stations (specimens from Hamburg Zoological Museum)						
110	18 Mar 1960	42 16.5	74 22W	Bottom grab	44	Southern South America
French Antarctic Expedition to Kerguelen Islands						
Ker D70	28 Feb 1970	49 25	69 52E	Dredge	10–35	Bay of Mobihan, Laboureur Fjord, Kerguelen Is
R. U. Gooding material						
590d	8 Nov 1969	8 21.7	157 15E	Spear		British Solomon Is

Systematics

Genus *Choniomyzon* Pillai, 1962

***Choniomyzon panuliri* Pillai, 1962**

Figure 3, p. 13

FEMALE: Length 1.51 mm (from anterior head to small setae on caudal rami). Generally similar to description of *C. panuliri* but differs in following respects: antenna 1 like that of copepodite except segment 5 naked (Fig. 3n); segment 2 very small; each segment with slightly different numbers of setae than described by Pillai (1962); segment 10 apparently with aesthete. Segment 3 of antenna 2 with 1 of terminal spines very long and heavily built. Maxilla 1 with 1 posterior branch, 2 lateral branches, and anterior branch which bears terminal spine, 2 setae and 1 outer-edge seta. Maxilliped segment 2 with 1 spine, terminal segments longer and narrower than in Pillai's specimens. Distolateral corner of basipod 2 of legs 1 and 2 with larger plumose seta, longer than exopod segment 1. Leg 3 with 1 long distal seta and 2 smaller proximal setae. Abdomen may have 2 articulated segments. Caudal rami with proximal branching of terminal setae occurring close to small setae, and bearing up to 7 elongate ovisacs, which are apparently initially carried on genital segment, but in females with further development of ovaries, ovisacs attached to distal part of caudal setae.

MALE: Length 1.24 mm (from anterior head to small setae on caudal rami). As Pillai (1962:98) noted, males are smaller and with proportionally larger antennae and caudal rami. Slight sexual dimorphism in basipod 2 of legs 1 and 2 which have very small distolateral setae, caudal rami with first branching of large setae beginning more distally than in female. Abdomen does not appear to have any articulated segments.

COPEPODITE: Length 0.31 mm. Very like adult female but antenna 2 close to antenna 1. Segment 5 of antenna 1 with small seta. Maxilliped segment 2 naked. Legs not fully developed. Caudal rami without branching setae. Cephalothorax with transparent lateral flaps.

NAUPLIUS: Length 0.15 mm, 1.5 × long as wide.

MATERIAL EXAMINED:

♀♀, ♂♂, copepodites, nauplii, USNM 142184; host, ovigerous ♀ decapod *Panulirus versicolor* (Latreille), carapace length 63 mm; station RUG 590d (British Solomon Is).

REMARKS: The specimens were found amongst the eggs of an adult *Panulirus versicolor* (Latreille) speared in a hole in the outer reef between Hoppei and Kundu-Kundu Is, south coast of New Georgia I, British Solomon Is.

An attempt was made to compare these specimens with *C. panuliri*, but because I was unable to obtain the type material I have decided tentatively to attribute these specimens to Pillai's species even though some differences could be of specific significance.

Genus *Sphaeronella* Salensky, 1868

Of all the genera in the Choniostomatidae, *Sphaeronella* contains the largest number of species, and it is this genus which is principally expanded by the present collection. Hansen (1905) described the first choniostomatid copepod from an ostracod and created for it a new genus *Sphaeronellopsis*, because it differed from *Sphaeronella* by the presence of a genital flap covering the genital area and by having fused caudal rami. Subsequently, Bowman & Kornicker (1967) and Kornicker & Bowman (1969) described adult choniostomatids parasitic on ostracods, and Monod (1932) and Bowman & Kornicker (1968) recorded copepodites from the same subclass of host. All were assigned to the genus *Sphaeronellopsis*. Neither of the two recently described adults has a genital flap and fused caudal rami of Hansen's *Sphaeronellopsis littoralis*. Therefore, I consider all species of *Sphaeronellopsis*, except the type-species, to fit the genus *Sphaeronella* as presently constituted.

Since there have been a number of new species described in the genera *Sphaeronella* and *Sphaeronellopsis* since Hansen's (1897) extensive work, I have listed the species belonging to *Sphaeronella*, in the first place according to host, and then for each host, according to selected morphological characters (Table 2).

In general, there are numerous ways in which key morphological characters in *Sphaeronella* and *Sphaeronellopsis* may be combined, and these are not consistently related to the host. This is especially evident in the Isopoda and Ostracoda.

Nevertheless, among those parasites found on certain families of ostracods, common characters are found. Both copepods found on hosts of the family Sarsiellidae (*Sphaeronellopsis littoralis* and *Sphaeronella sarsiellae*) appear to have fused caudal rami; those parasites found on the host family Philomedidae (*Sphaeronella scleroconchae*, *S. kornickeri*, *S. anarthronis*, and *S. philomedesi*) have a 2-branched maxilla 1; and all those on the host family Cypridinidae (*Sphaeronella dikrothrix*, *S. doloriae*, *S. metavargulae*, *S. rugosidoloriae*, and *S. siphonostrae*) have a 3-branched maxilla 1. Those parasites on the host family Cylindroleberididae appear to have no character in common.

Table 2 List of *Sphaeronella* species arranged according to host and selected morphological characters. × = known stage; cop. = copepodite.

Host: Amphipoda

Female: Antenna 1 3-segmented, antenna 2 present, maxilla 1 3-branched, maxilliped 4-segmented.

Male: Head appendages as in female; legs and caudal rami well developed, often with very long setae.

Species marked * are in Hansen's (1897) *S. leukartii* group, with antenna 2 rudimentary or absent, maxilla 1 with tuft of hairs at base, and anterior of head of male with rectangular projection.

	♀	♂	cop.
<i>Sphaeronella</i> sp. (see Stock 1960)*		×	
<i>S. abyssi</i> Hansen, 1897	×	×	
<i>S. acanthozonis</i> Hansen, 1897	×		
<i>S. antillensis</i> Hansen, 1897*	×		×
<i>S. argissae</i> Hansen, 1897	×	×	×
<i>S. atyli</i> Hansen, 1897*	×		
<i>S. calliopii</i> Hansen, 1897	×	×	×
<i>S. capensis</i> Hansen, 1897	×	×	
<i>S. caprellae</i> Blake, 1929	×	×	
<i>S. chinensis</i> Hansen, 1897*	×	×	
<i>S. danica</i> Hansen, 1897* (see Green 1958)	×	×	×
<i>S. devosae</i> Stock, 1960*	×	?	
<i>S. ecaudata</i> Stock, 1960*	×		
<i>S. frontalis</i> Hansen, 1897 (see Green 1958)	×	×	×
<i>S. gitanopsidis</i> Hansen, 1897	×	×	
<i>S. grayi</i> new species	×	×	×
<i>S. holbolli</i> Hansen, 1897	×	×	
<i>S. intermedia</i> Hansen, 1897	×	×	×
<i>S. irregularis</i> Hansen, 1897	×		
<i>S. leptochairi</i> Hansen, 1897*	×	×	
<i>S. leukartii</i> Salensky, 1868* (see Green 1958)	×	×	×
= <i>S. elegantula</i> Hansen, 1897*	×	×	
= ? <i>S. aorae</i> T. Scott, 1905*	×	×	
<i>S. melphidippae</i> Hansen, 1897		×	
<i>S. messinensis</i> Hansen, 1897*	×		
<i>S. metopae</i> Hansen, 1897	×	×	
<i>S. norvegica</i> Hansen, 1905	×	?	
<i>S. paradoxa</i> Hansen, 1897	×	×	×
<i>S. pikei</i> Green, 1958	×		
<i>S. vestita</i> Hansen, 1897*	×		

Female: As above, but with maxilliped 3-segmented.

Male: As above, but known species without extremely long setae on legs and caudal rami.

<i>S. aeginae</i> Hansen, 1923	×	×	
<i>S. amphiloichi</i> Hansen, 1897	×		
<i>S. bonnierii</i> Hansen, 1897	×	×	
<i>S. dulichiae</i> Hansen, 1897	×		
<i>S. giardii</i> Hansen, 1897	×	×	
<i>S. longipes</i> Hansen, 1897 (see Green 1958)	×	×	×
<i>S. photidis</i> Blake, 1929	×		
<i>S. valida</i> T. Scott, 1905 (see Green 1958)	×		

Female: Antenna 1 1-segmented, antenna 2 absent; maxilla 1 3-branched; maxilliped 3-segmented, small.

Male: Caudal rami placed anterior to legs on ventral surface.

S. microcephala Giard & Bonnier, 1893 (see Hansen 1897)

	×	×	×
Species not well described:			
<i>S. callisomae</i> T. Scott, 1904	×		
<i>S. cluthae</i> T. Scott, 1904	×		
<i>S. minuta</i> T. Scott, 1904	×		
<i>S. pilosae</i> Blake, 1929	×		
<i>S. vararensis</i> T. Scott, 1905	×		

Host: Isopoda

Female: Antenna 1 3-segmented, antenna 2 present; maxilla 1 3-branched; maxilliped 3-segmented.

S. serolis Monod, 1930 (see Green 1959)

	×	×	×
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Female: Antenna 1 3-segmented, antenna 2 absent; maxilla 1 3-branched; maxilliped 4-segmented.

<i>S. affinis</i> Hansen, 1897	×		
<i>S. curtipes</i> Hansen, 1897	×	×	
<i>S. nannonisci</i> Hansen, 1923	×		

Female: Antenna 1 2-segmented, antenna 2 absent; maxilla 1 3-branched; maxilliped 3-segmented.

<i>S. munnuae</i> Hansen, 1923	×	×	
<i>S. pleurogonii</i> Hansen, 1923	×	×	

Female: Antenna 1 1-segmented, antenna 2 absent; maxilla 1 3-branched; maxilliped 4-segmented.

<i>S. munnopsidis</i> Hansen, 1897	×		×
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Host: Cumacea

Female: Antenna 1 1- to 3-segmented, antenna 2 usually absent; maxilla 1 2- or 3-branched; maxilliped 3- or 4-segmented, with basal segment heavily decorated with spines.

Male: Head appendages as in female, head lobed and decorated with spines; legs and/or caudal rami may be absent.

<i>S. decorata</i> Hansen, 1897	×	×	×
<i>S. dispar</i> Hansen, 1897	×	×	×
<i>S. insignis</i> Hansen, 1897	×	×	×
<i>S. marginata</i> Hansen, 1897	×	×	×
<i>S. modesta</i> Hansen, 1897	×	×	×
<i>S. rotundata</i> Hansen, 1923	×	×	

Species not well described:

<i>S. pygmaea</i> T. Scott, 1904	×		
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Host: Ostracoda

Female: Antenna 1 3-segmented, antenna 2 present; maxilla 1 2-branched; maxilliped 3-segmented.

S. scleroconchae new species

Female: Antenna 1 3-segmented, antenna 2 absent; maxilla 1 3-branched; maxilliped 3-segmented.

S. antarctica new species

Female: Antenna 1 2-segmented, antenna 2 present; maxilla 1 2-branched; maxilliped 3-segmented.

S. kornickeri new species

S. skogsbergiellae new species

Female: Antenna 1 2-segmented, antenna 2 absent; maxilla 1 3-branched; maxilliped 3-segmented.

S. dikrothrix (Kornicker & Bowman, 1969)

S. doloriae new species

S. metavargulae new species

S. sarsiellae new species

S. synasteropeae new species

Female: Antenna 1 2-segmented, antenna 2 absent; maxilla 1 2-branched; maxilliped 3-segmented.

S. anarthronis new species

S. monothrix (Bowman & Kornicker, 1967)

S. philomedesi new species

Female: Antenna 1 1-segmented, antenna 2 absent; maxilla 1 3-branched; maxilliped 3-segmented.

S. rugosidoloriae new species

S. siphonostrae new species

Female: Antenna 1 1-segmented, antenna 2 absent; maxilla 1 2-branched; maxilliped 3-segmented.

S. parasteropeae new species

Copepodite only known:

Sphaeronella sp. Monod, 1932

S. hebe (Bowman & Kornicker, 1967) (also see Bowman & Kornicker 1968)

S. homasteropeae new species

Sphaeronella grayi new species

Figure 4, p. 14

FEMALE: Length 1.05 mm, width 0.88 mm. Body constricted $\frac{1}{3}$ from anterior end; well sclerotised, especially head. Head on ventral surface short distance from anterior end, well defined, small. Frontal margin of head naked. Antenna 1 3-segmented, aesthete slightly longer than antenna. Antenna 2 probably 3-segmented (not clearly seen), with 1 terminal seta. Maxilla 1 4-branched, 1 seta arising lateral to maxilla 1. Maxilla 2 3-segmented, terminal segment well developed, toothed. Maxilliped 4-segmented; basal segment narrow, slightly longer than basal segment of maxilla 2, ornamented with several rows of fine spinules; segment 3 with inner distal spinous process; segment 4 with 2 rows of teeth. Submedian skeleton with conspicuous V-shaped ridge at base of maxilla 2 and maxilliped, extending posterior to maxilliped; 4 spherical raised processes in posterior midline. Trunk and head separated by single ridge. Lateral margins of head naked. Trunk naked, legs absent. Genital area large, as broad as base of head, broader than long, thickly sclerotised in form of semicircular band. Caudal rami close together, just behind posterior margin of genital plate, each with 2 setae. Seminal receptacle spherical.

MALE: Length 0.306 mm, width 0.281 mm. Body globular in ventral view. Head slightly shorter than trunk. Anterior head naked, transparent, lightly sclerotised, 3 ridges at base of antenna 1. Antenna 1 3-segmented, aesthete shorter than whole antenna. Antenna 2, maxilla 1, and maxilla 2 as in female except 4th outer seta of maxilla 1 appears to be absent. Maxilliped 4-segmented, larger than maxilla 2; basal segment heavily ornamented with curved rows of fine spinules and several semicircular sclerotised thickenings on surface; segment 3 without distal process; segment 4 as in female. Submedian skeleton with parallel ridges near base of maxilla 2, each ridge branching indistinctly posteriorly but not extending further than maxilliped; set of distinctive circular processes in midline between maxillipeds; posterolateral area at base of maxilliped bearing number of spines. Head separated from trunk by narrow ridge. Lateral margins of head fringed with spinules which extend just anterior to base of antenna 1. Trunk covered with 2 types of projections, simple spinules which are long anteriorly, and lateral and posterior scalpel-like processes arising from sclerotised cylindrical knobs. First pair of legs with large, spinous basal part from which arises outer and inner branch; outer branch bearing 1 small naked seta on small outer knob, and 2 terminal plumose setae, outer of which is longest. Inner branch with 1 seta about equal in length to inner terminal seta of outer branch. Leg 2 with 1 spinous branch terminated by 2 plumose setae, outer of which is shortest; dorsal surface of leg with small knob bearing small naked seta. Caudal rami each with large plumose seta, about same length as largest terminal seta of legs.

OVISAC: Larger than female, containing numerous, almost hatched, copepodites.

COPEPODITE: Described from unhatched copepodites inside ovisac. Length 0.186 mm. Body probably not

shaped as in free-swimming larva; antenna 1 only structure well sclerotised. Antenna 1 3-segmented, terminal segment could be considered to be 2 articulated parts, aesthete $2 \times$ length of antenna. Antenna 2 almost as long as antenna 1, 3-segmented, terminated by naked seta; segments 2 and 3 bearing fine spinules. Maxilla 1 4-branched, posterior branch plumose. Maxilla 2 3-segmented; segment 1 with inner patch of small, stout denticles; terminal claw segment naked. Maxilliped 4-segmented, without ornamentation; segment 3 slightly longer than segment 2. Legs biramous, each of 1 segment. Leg 1 with 2 basal segments; exopod 1-segmented, outer edge with serrate spines, 2 terminal and 2 inner-edge plumose setae; endopod 1-segmented with 1 outer-edge, subterminal, short, plumose seta, 2 terminal and 4 inner-edge plumose setae. Leg 2 with 2 basal segments; exopod 1-segmented with 3 outer edge, serrate spines, 2 terminal and 2 inner-edge plumose setae; endopod 1-segmented with 1 outer-edge subterminal short, plumose seta, 2 terminal and 3 inner-edge plumose setae. Seta on posterior angle of abdominal segment extends well beyond caudal rami, other seta narrower and shorter. Caudal rami small, distinctly separate from abdominal segment 3. Each caudal ramus with 4 apical setae, innermost very large, and seta on dorsal surface.

POSTLARVAL DEVELOPMENT: Unknown.

MATERIAL EXAMINED:

Holotype: ♀, USNM 142176, length 1.05 mm, width 0.88 mm; host, ovigerous ♀ amphipod *Liouvillea* sp., USNM 143424; station *Eltanin* 967 (east of southern South America).

Paratype: ♂, USNM 142177, length 0.306 mm, width 0.281 mm; host and station data as holotype.

Other material:

3 ovisacs (with copepodites), USNM 142179; host and station data as holotype.

Copepodites, USNM 142178, length 0.186 mm; host and station data as holotype.

ETYMOLOGY: This species is named after Dr W. S. Gray who collected the parasites from an amphipod (Gray *in press*).

RELATIONSHIPS: This species is closely related to *S. capensis* and *S. argissae*. The female most closely resembles that of *S. capensis* in having the head on the ventral surface but differs in a number of respects; *S. grayi* has basipod 1 of maxilliped ornamented and an incomplete genital plate, whereas *S. capensis* has basipod 1 of maxilliped naked and an angular sclerotised genital plate, roughly circular in shape. The male most closely resembles *S. argissae* in having a single seta on the caudal rami, a seta on the inner branch of leg 1, and a small outer-edge seta on the outer branch of leg 1, but *S. grayi* has subequal terminal setae on the outer branch of legs 1 and 2, and the seta on the caudal rami is as long as the longest seta on the legs. *S. argissae*, however, has one seta much longer than the other on the outer branch of legs 1 and 2, and the seta on the caudal ramus is much shorter than the longest seta on the legs. The copepodite appears to be typical of those associated with related adults, but not all those described have a 4-branched maxilla 1.

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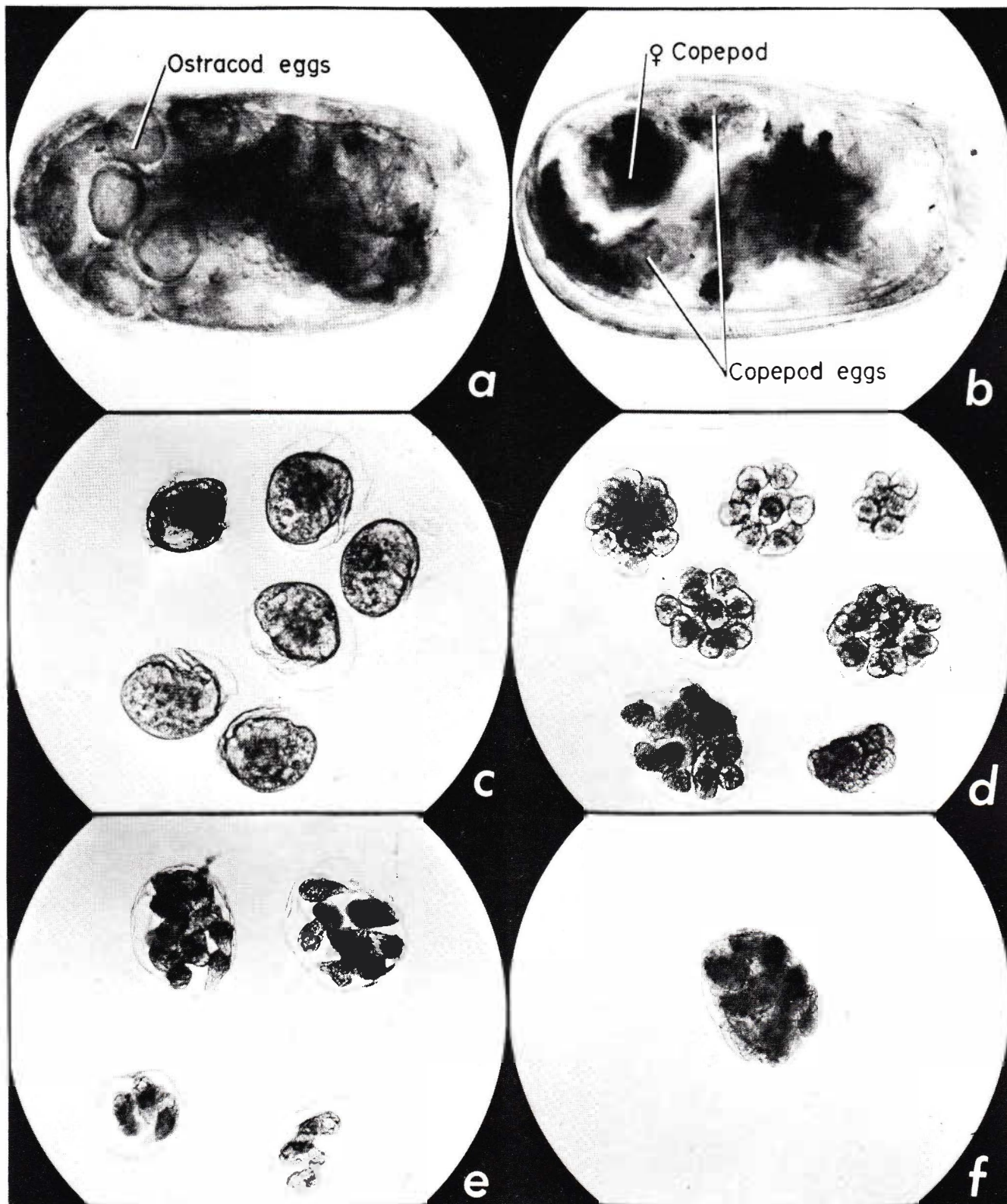


Figure 1 *Parasterope pollex* Kornicker (Ostracoda: Cyliindroleberidae). a ovigerous female, lateral; b parasitised adult female, lateral; c eggs. *Sphaeronella monothrix* (Bowman & Kornicker), ovisacs, showing 3 developmental stages: d round eggs; e pyriform eggs; f copepodites (a, b $\times 53$; c-f $\times 69$) (from Bowman & Kornicker 1967).

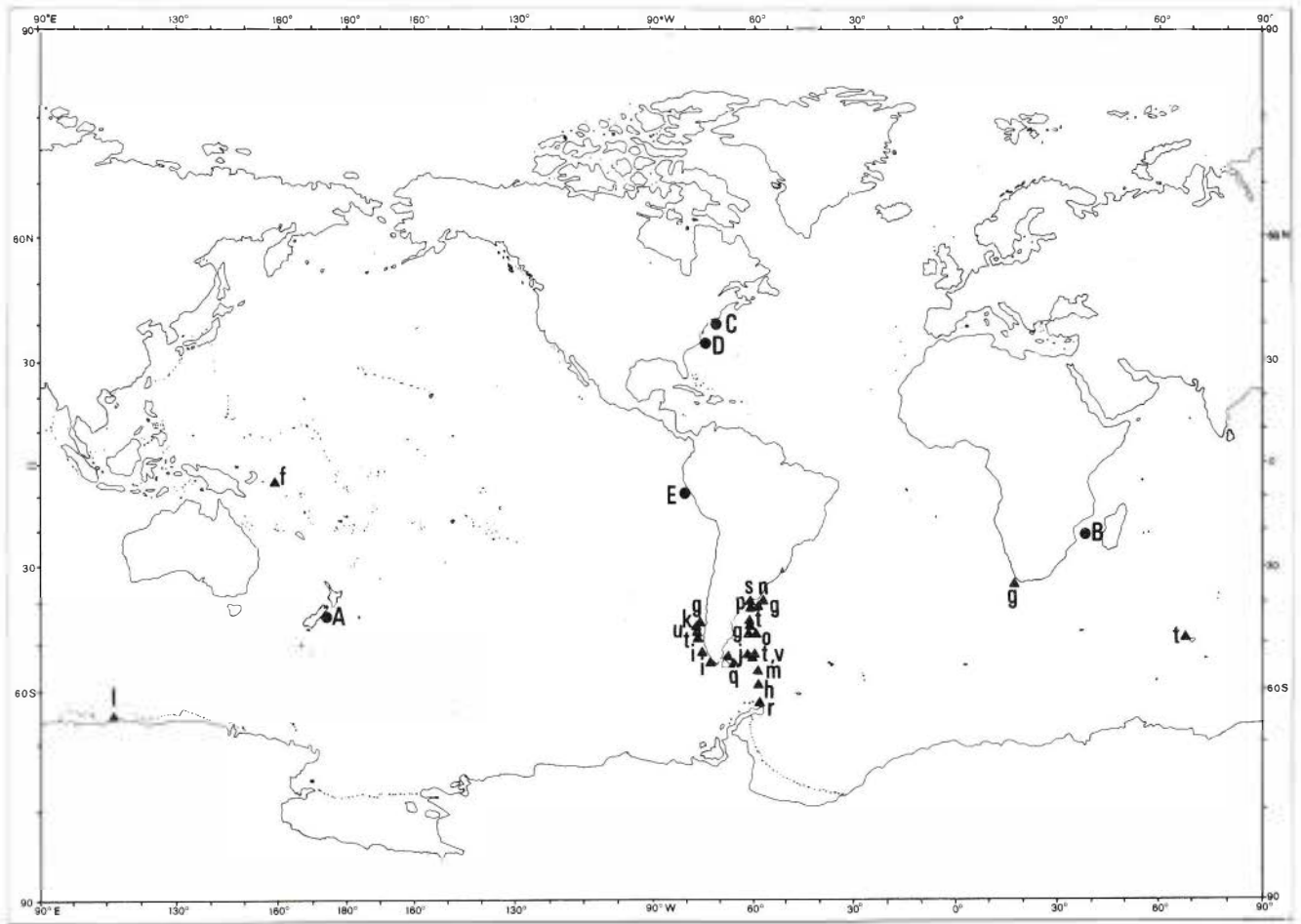


Figure 2 Map locating new (▲) and previous (●) records of choniostomatid copepods from Ostracoda. A *Sphaeronellopsis littoralis* (see Hansen 1905), B *Sphaeronellopsis* sp. (see Monod 1932) exact locality not known, C *Sphaeronella monothrix* (see Bowman & Kornicker 1967), D *S. hebe* (see Bowman & Kornicker 1968), E *S. dikrothrix* (see Kornicker & Bowman 1969), f *Choniomyzon panuliri*, g *Sphaeronella anarthronis*, h *S. antarctica*, i *S. doloriae*, j *S. grayi*, k *S. homasteropeae*, l *S. kornickeri*, m *S. metavargulae*, n *S. parasteropeae*, o *S. philomedesi*, p *S. rugosidoloriae*, q *S. sarsiellae*, r *S. scleroconchae*, s *S. siphonostrae*, t *S. skogsbergiellae*, u *S. synasteropeae*, v *Sphaeronelloides vargulae*.

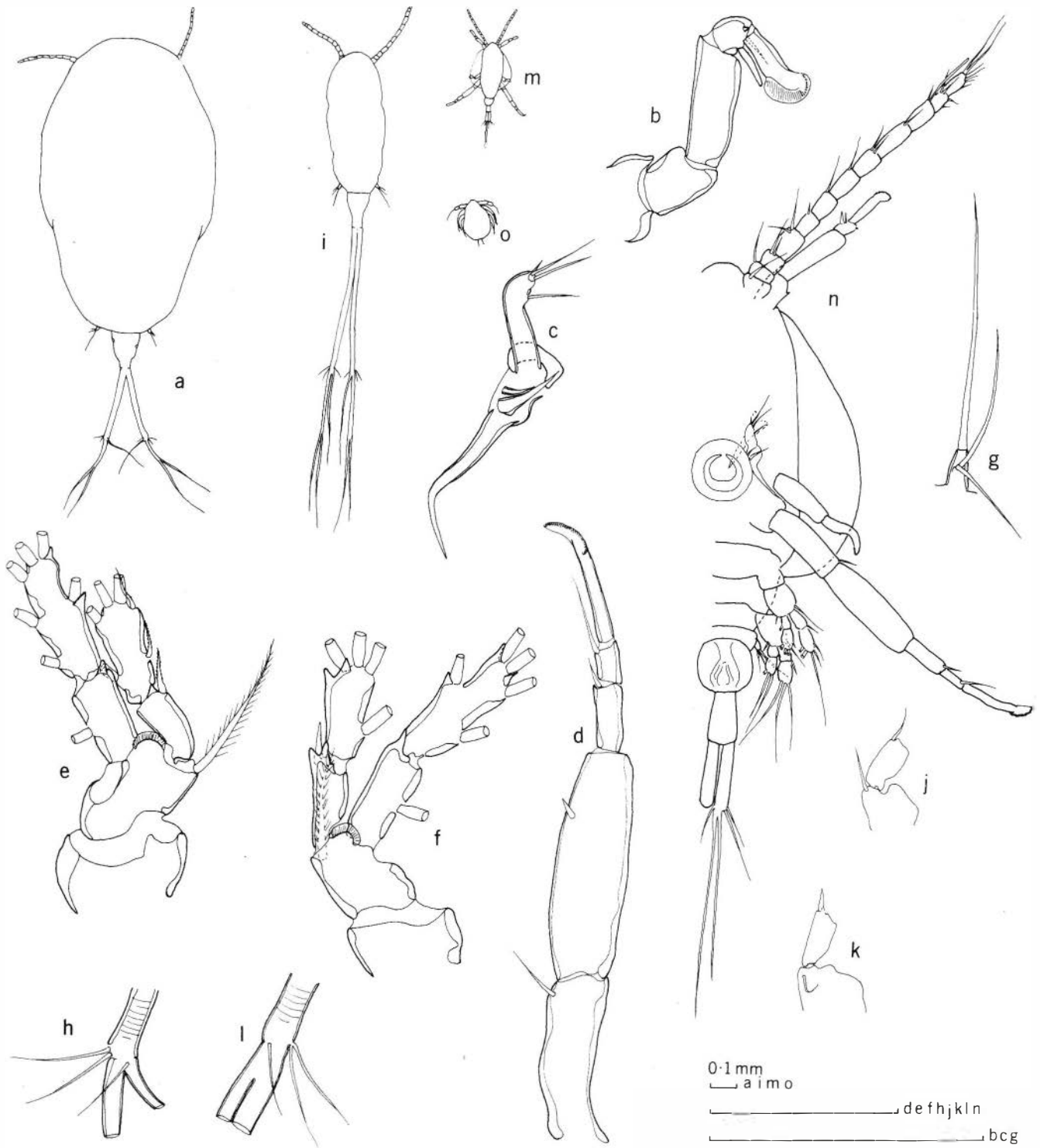


Figure 3 *Choniomyzon panuliri* Pillai. FEMALE: a dorsal view; b antenna 2; c maxilla 1; d maxilliped; e leg 1; f leg 2; g leg 3; h terminal part of caudal ramus. MALE: i dorsal view; j exopod segment 1 and basipod 1 of leg 1; k exopod segment 1 and basipod 1 of leg 2; l terminal part of caudal ramus. COPEPODITE: m dorsal view; n ventral view; o nauplius.



1.0mm — a d f
 0.1mm — e g
 0.01mm c
 — b h i j k



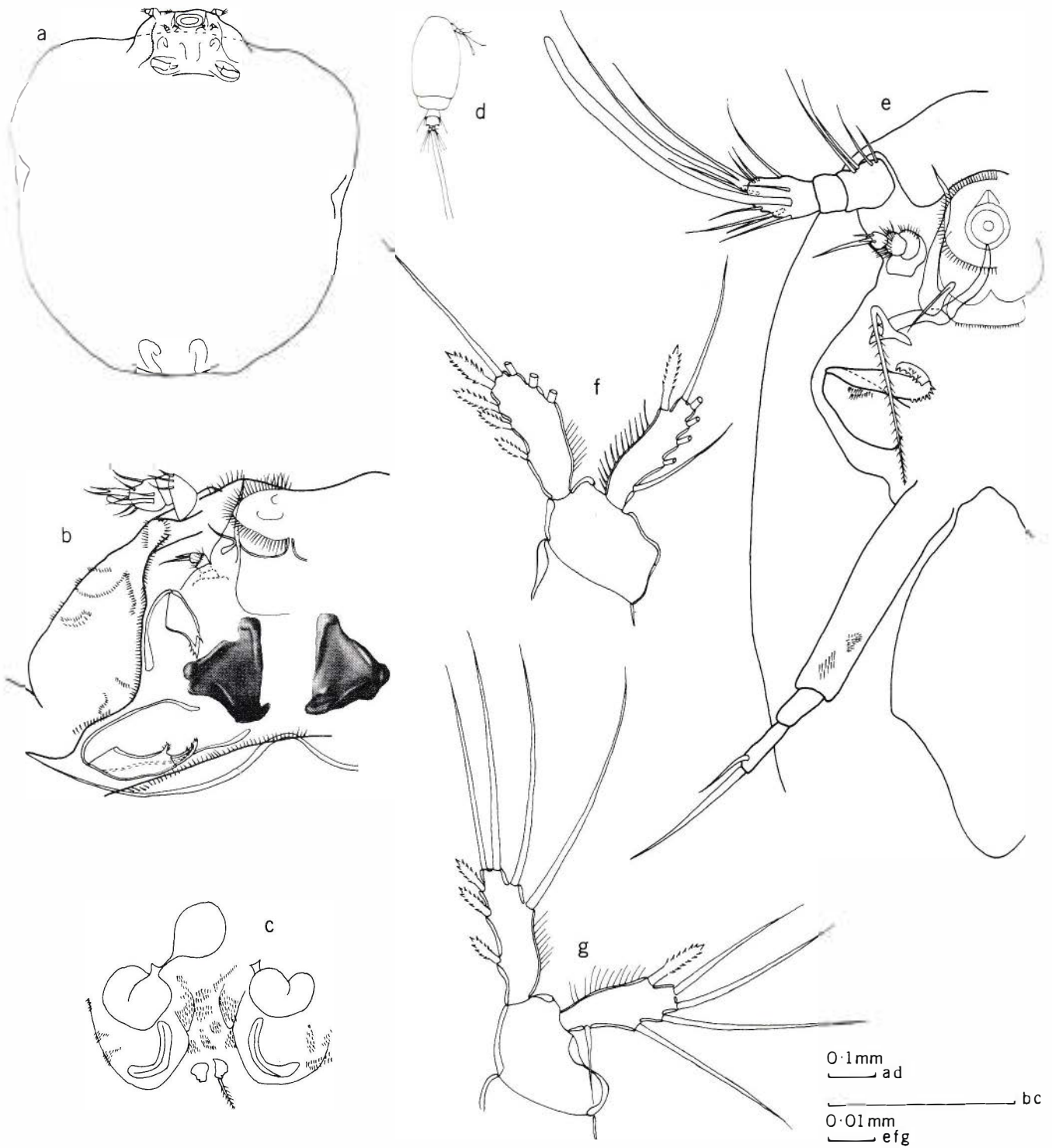


Figure 5 (above) *Sphaeronella scleroconchae* n. sp. FEMALE USNM 142145: a ventral view; b head, ventral view; c genital area. COPEPODITE: d dorsal view; e cephalothorax, ventral view; f leg 1; g leg 2.

Figure 4 (opposite page) *Sphaeronella grayi* n. sp. FEMALE: a ventral view; b head, ventral view; c genital area. MALE: d, e ventral view. COPEPODITE: f, g dorsal view; h cephalothorax, ventral view; i abdomen, dorsal view; j leg 1; k leg 2.

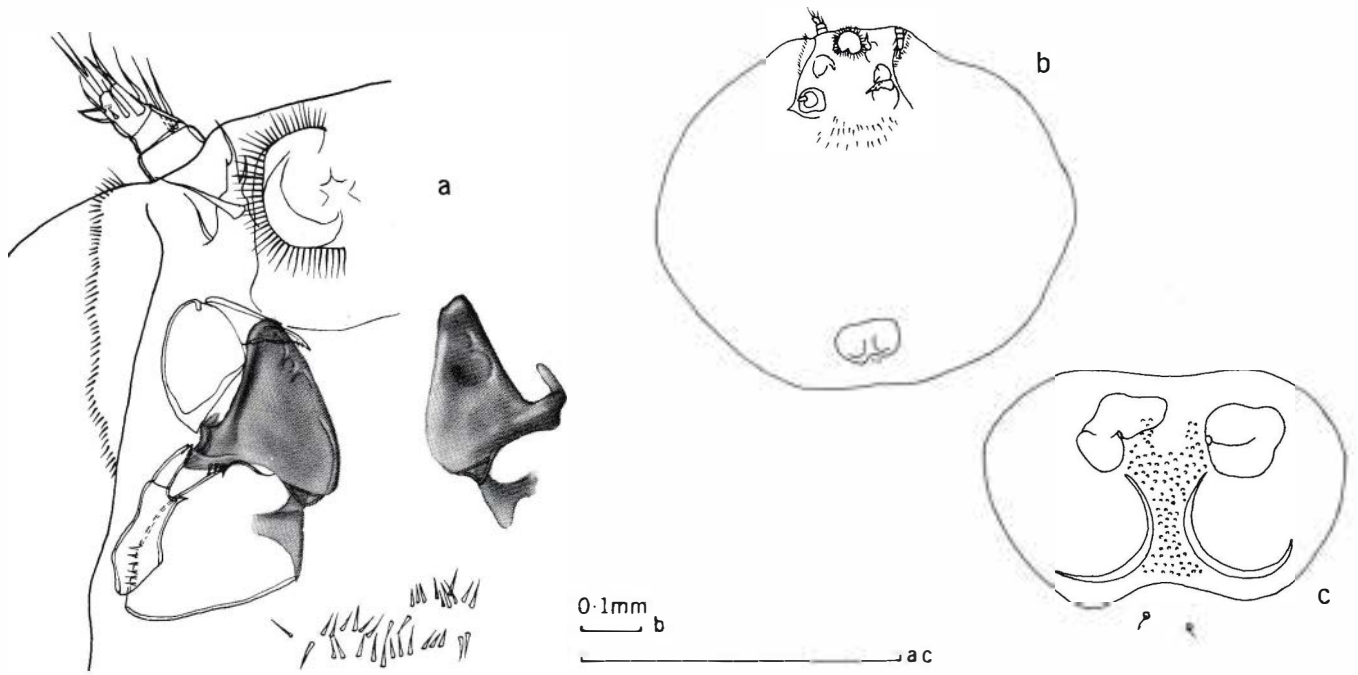
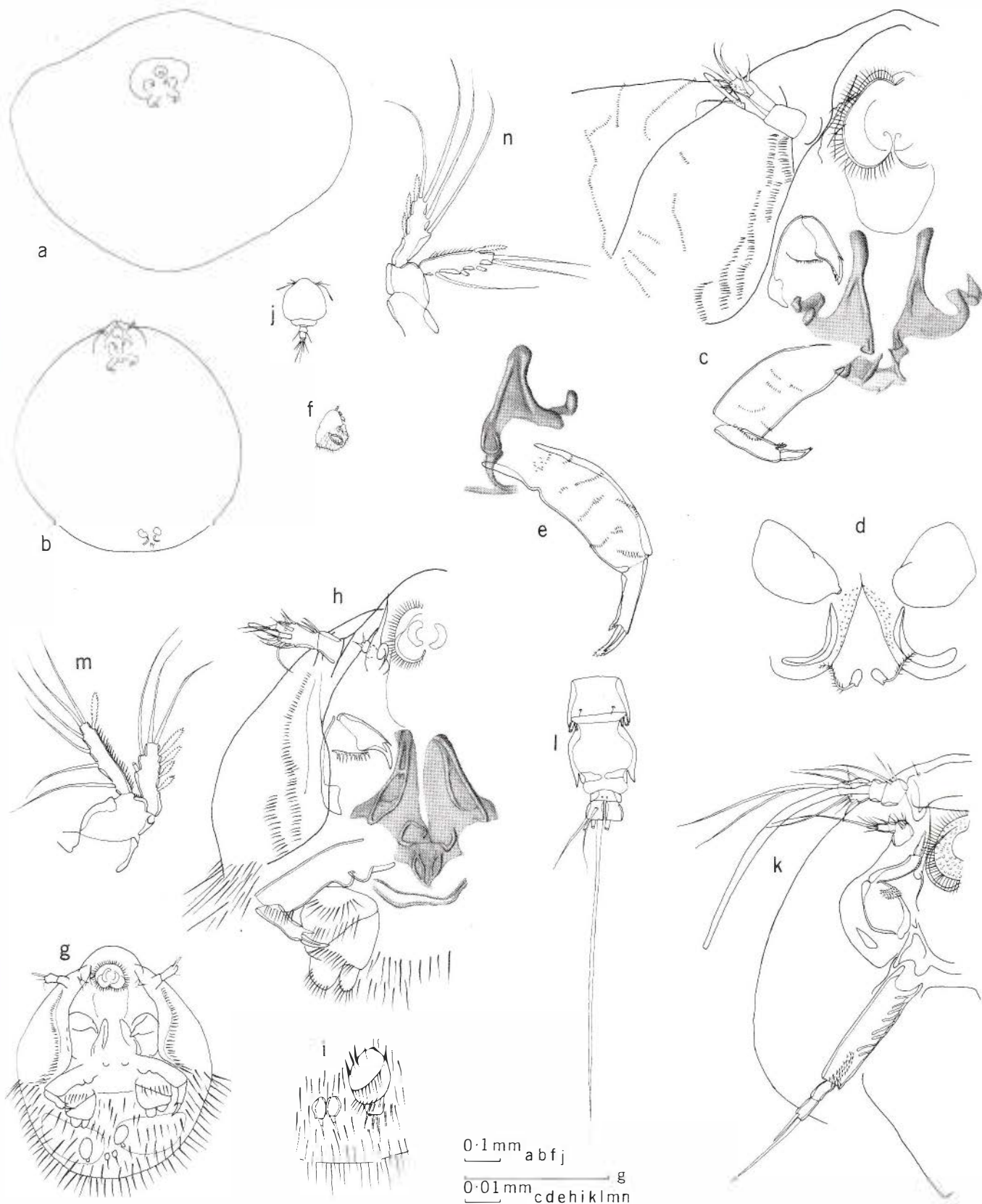


Figure 6 (above) *Sphaeronella antarctica* n. sp. FEMALE: **a** head, ventral view; **b** ventral view; **c** genital area.

Figure 7 (opposite page) *Sphaeronella skogsbergiellae* n. sp. FEMALE: **a** ventral view USNM 142153; **b** ventral view USNM 142151; **c** ventral view USNM 142151; **d** genital area USNM 142151; **e** submedian skeleton and maxilliped of another specimen USNM 142154. MALE: **f** lateral view; **g** ventral view; **h** head, ventral view; **i** caudal rami and leg 2. COPEPODITE: **j** dorsal view; **k** cephalothorax, ventral view; **l** abdomen, dorsal view; **m** leg 1; **n** leg 2.



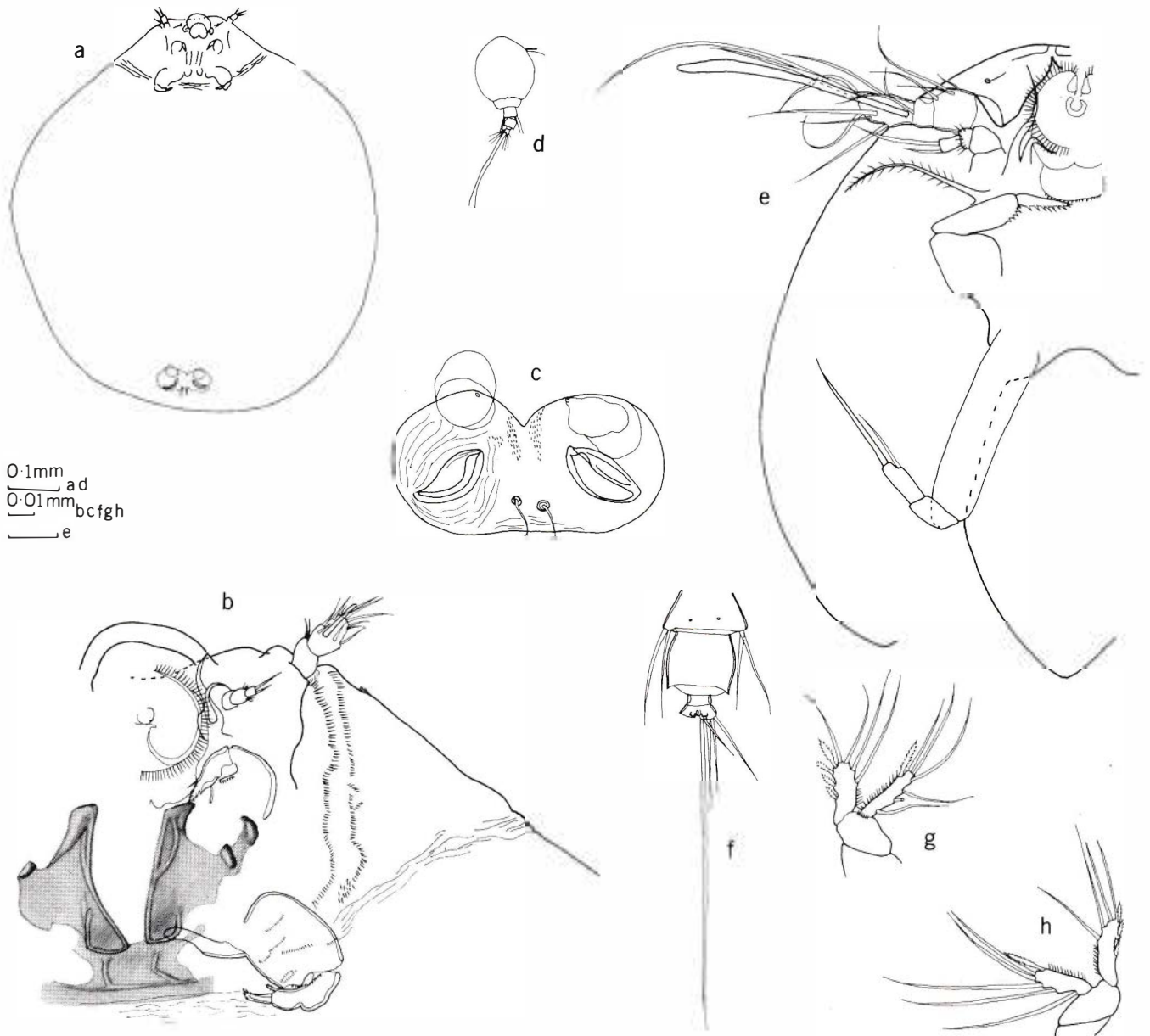


Figure 8 *Sphaeronella kornickeri* n. sp. FEMALE USNM 142161: a ventral view; b head, ventral view; c genital area. COPEPODITE: d dorsal view; e cephalothorax, ventral view; f abdomen, dorsal view; g leg 1; h leg 2.



Figure 9 *Sphaeronella doloriae* n. sp. FEMALE USNM 142125: a ventral view; b head, ventral view; c genital area. MALE: d ventral view; e lateral view; f head, ventral view. COPEPODITE: g dorsal view; h cephalothorax, ventral view; i abdomen, dorsal view; j leg 1; k leg 2. l PUPA.

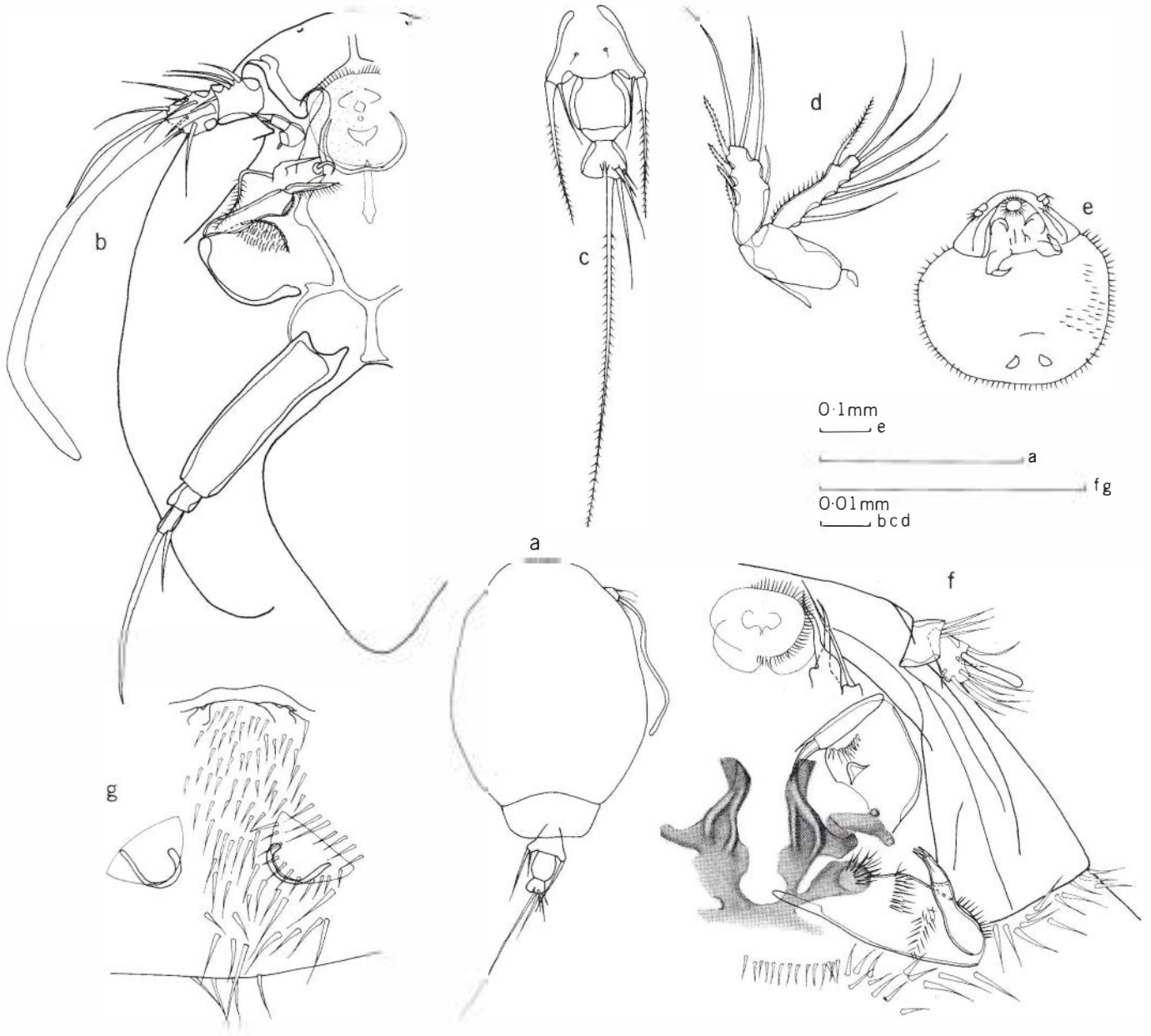


Figure 10 *Sphaeronella homasteropeae* n. sp. COPEPODITE: a dorsal view; b cephalothorax, ventral view; c abdomen, dorsal view; d leg I. *Sphaeronella metavargulae* n. sp. FEMALE: e ventral view; f head, ventral view; g genital area.

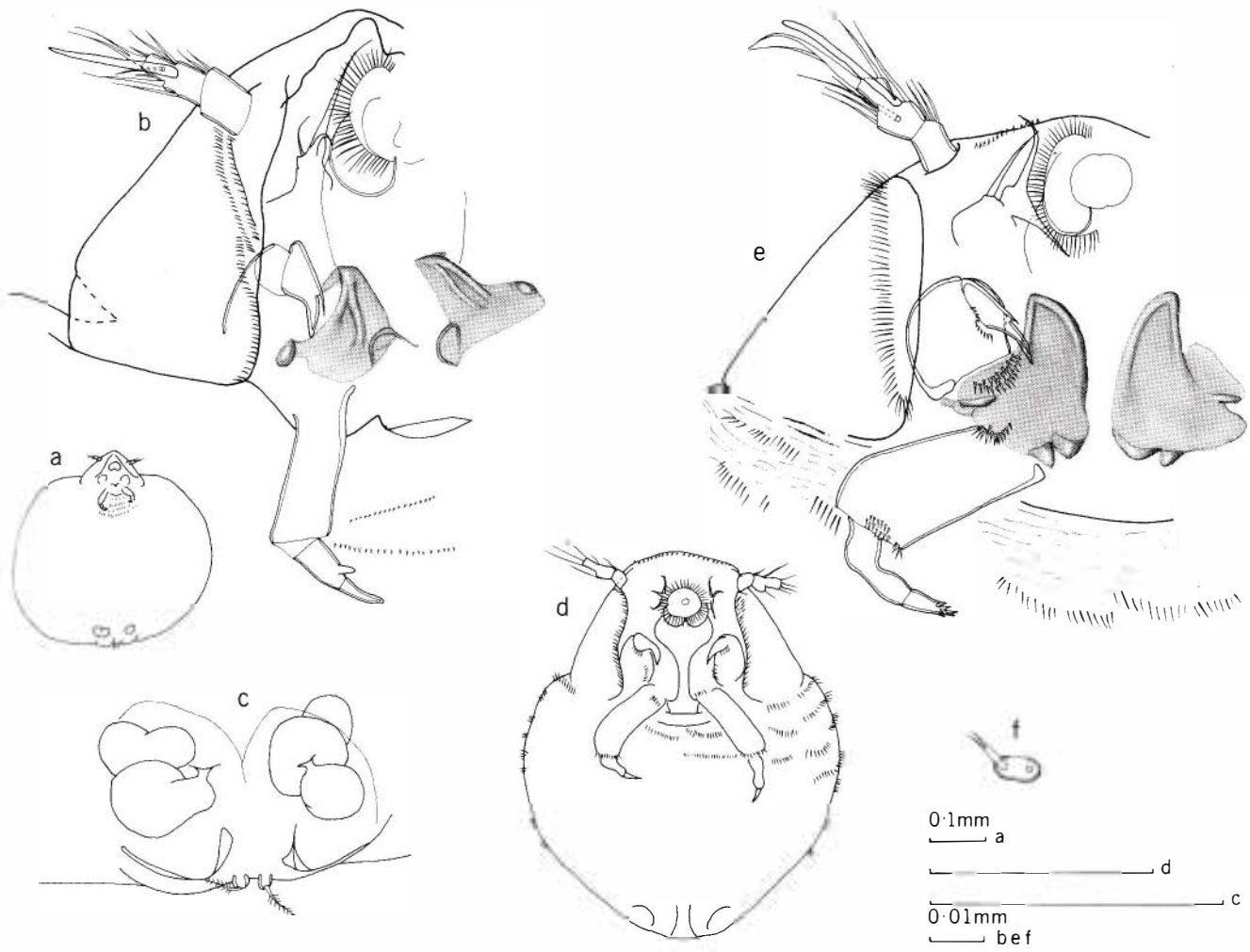


Figure 11 *Sphaeronella synasteropeae* n. sp. FEMALE: **a** ventral view; **b** head, ventral view; **c** genital area. *Sphaeronella sarsiellae* n. sp. FEMALE: **d** ventral view; **e** head, ventral view; **f** caudal rami.

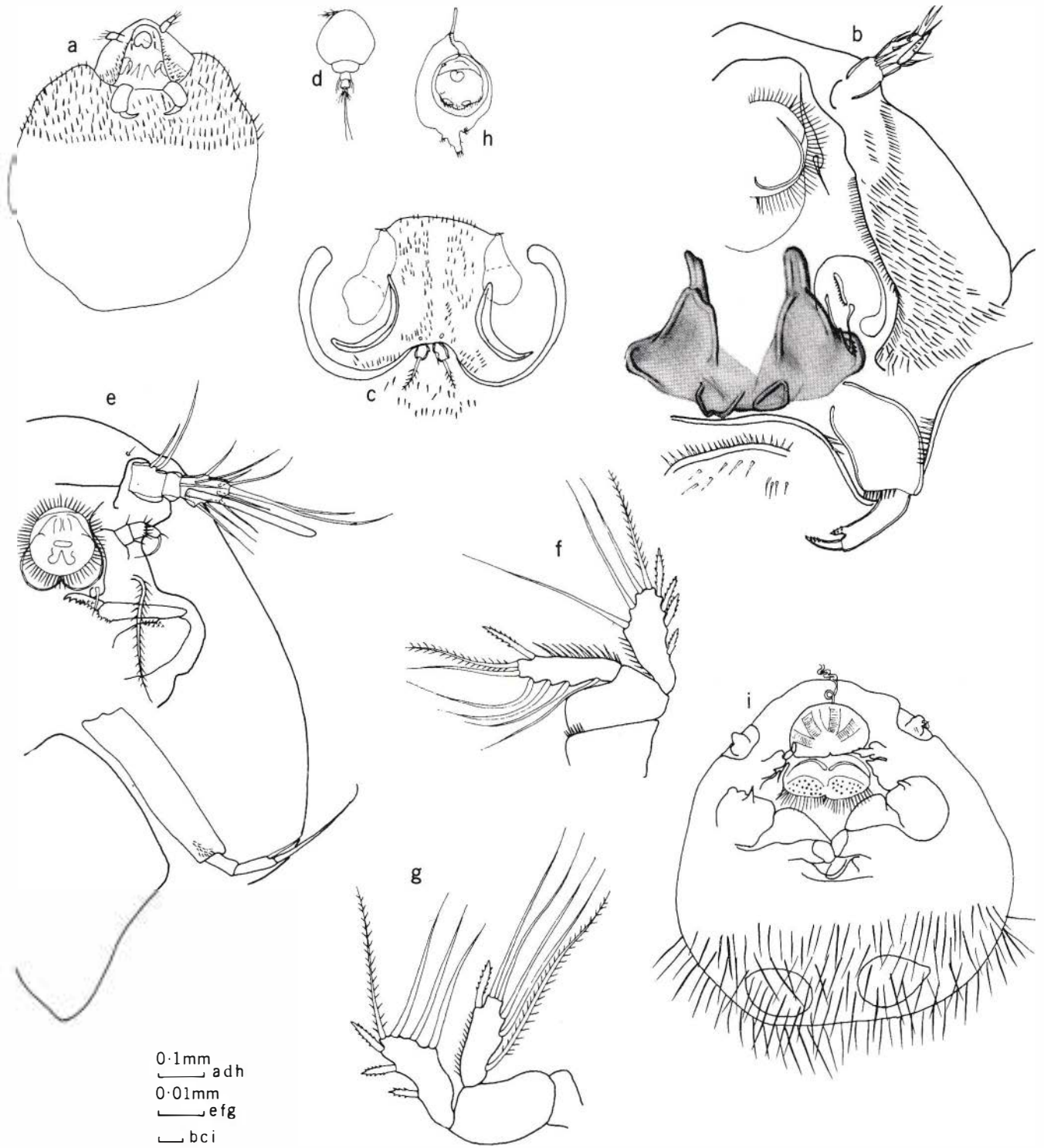


Figure 12 *Sphaeronella anarthronis* n. sp. FEMALE USNM 142130: a ventral view; b head, ventral view; c genital area. COPEPODITE: d dorsal view; e cephalothorax, ventral view; f leg 1; g leg 2. PUPA: h pupa inside exuviae of copepodite; i male pupa.

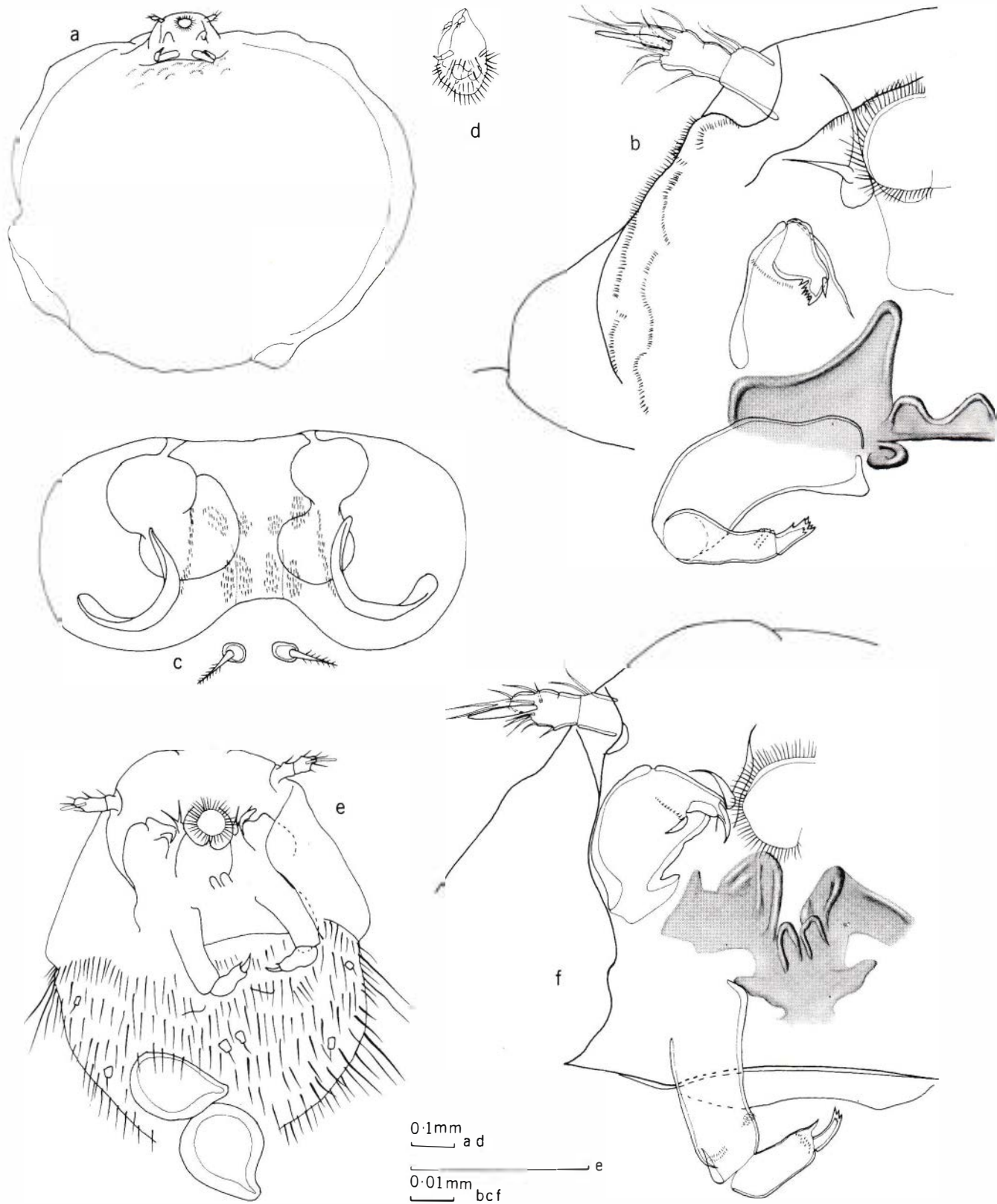


Figure 13 *Sphaeronella philomedesi* n. sp. FEMALE: a ventral view; b head, ventral view; c genital area. MALE: d lateral view; e ventral view; f head, ventral view.

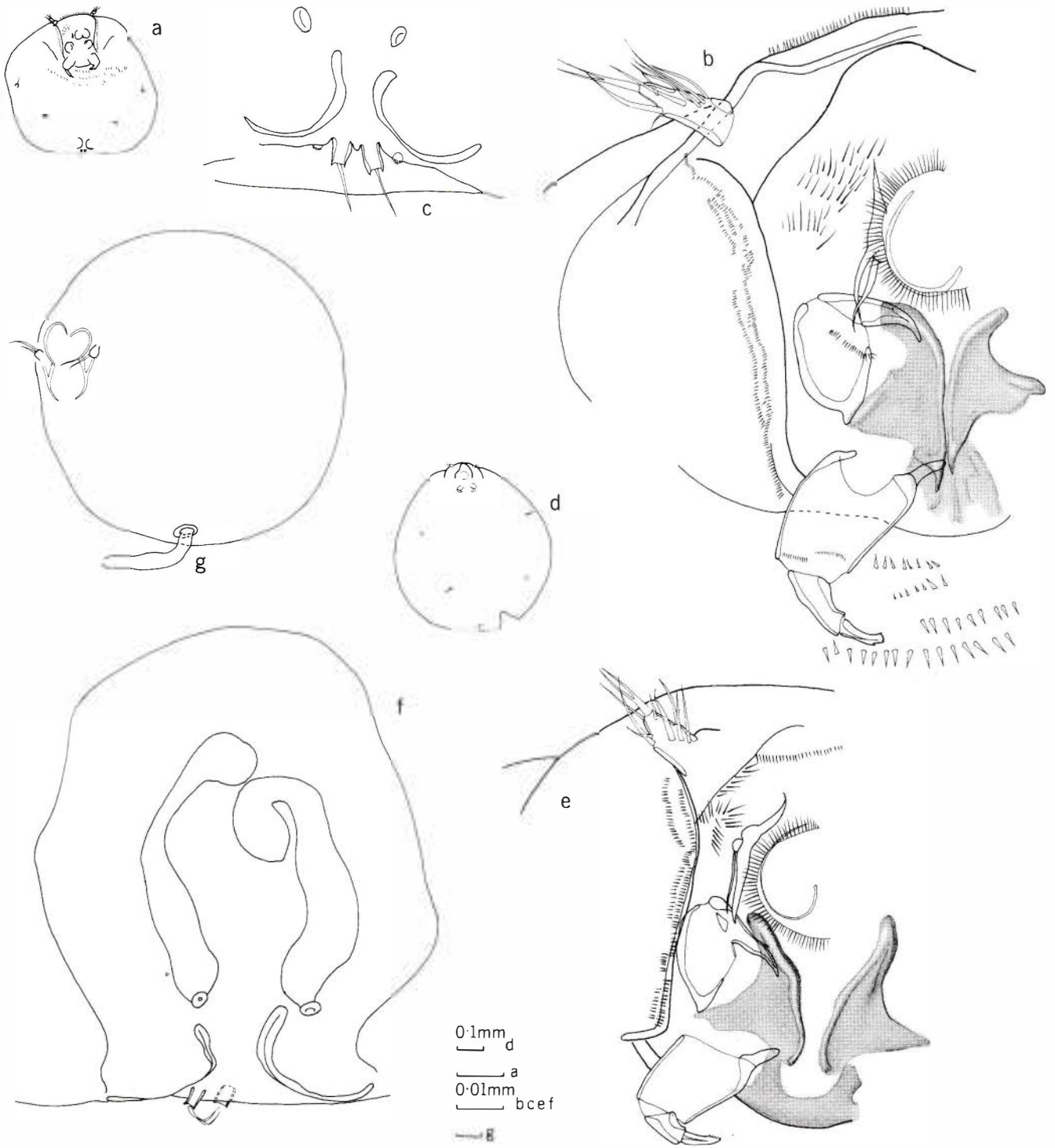


Figure 14 *Sphaeronella rugosidoloriae* n. sp. FEMALE: a ventral view; b head, ventral view; c genital area. *Sphaeronella siphonostrae* n. sp. FEMALE USNM I42169: d ventral view; e head, ventral view; f genital area. g PUPA.

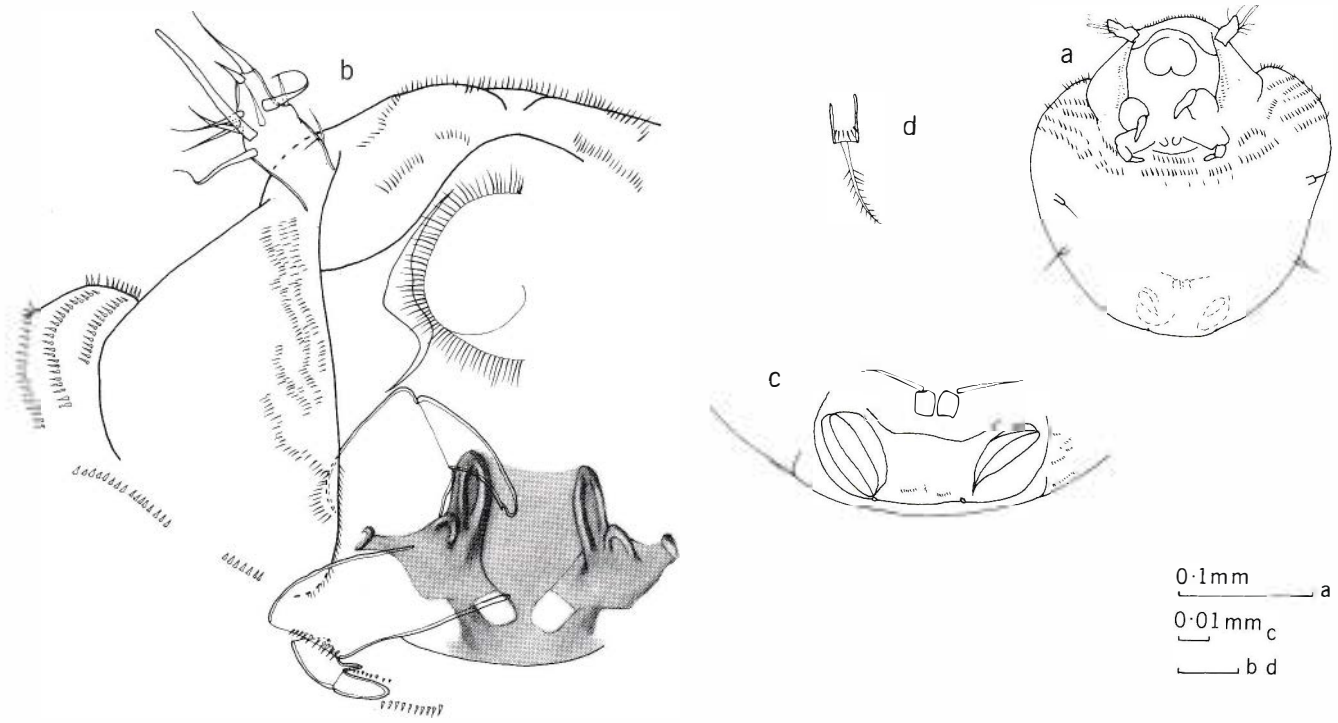


Figure 15 *Sphaeronella parasteropeae* n. sp. FEMALE: a ventral view; b head, ventral view; c genital area; d leg I.

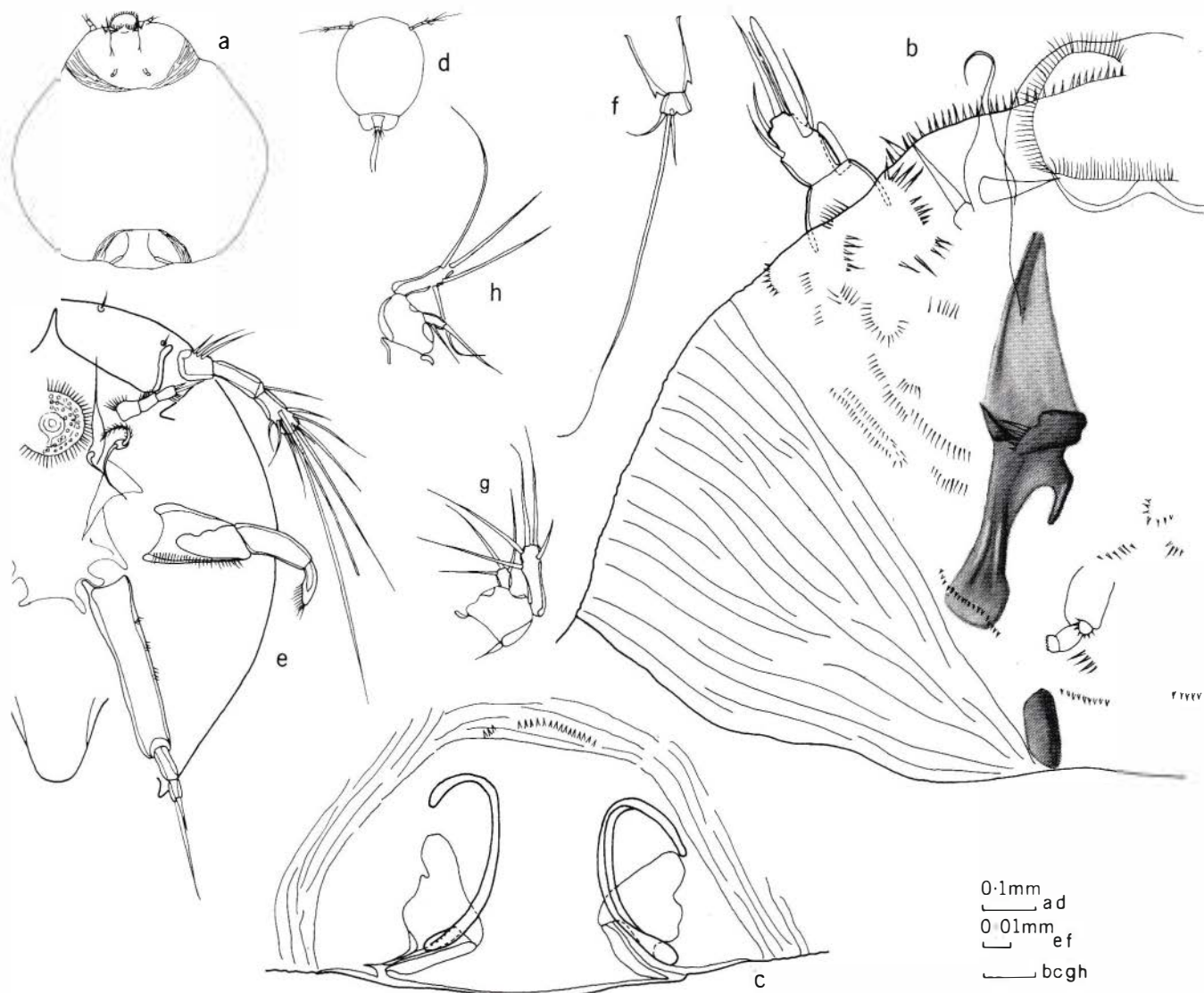


Figure 16 *Sphaeronelloides vargulae* n. gen., n. sp. FEMALE: **a** ventral view; **b** head, ventral view; **c** genital area. COPEPODITE: **d** dorsal view; **e** cephalothorax, ventral view; **f** abdomen, dorsal view; **g** leg 1; **h** leg 2.

Sphaeronella scleroconchae new species *Figure 5, p. 15*

FEMALE: Length 0.705–0.758 mm, width 0.683–0.690 mm. Body globular, head anterior. Frontal margins of head with some long spinules (absent on paratype). Antenna 1 3-segmented, aesthete short. Antenna 2 3-segmented with 2 terminal setae. Maxilla 1 2-branched. Maxilla 2 terminal segment toothed. Maxilliped 3-segmented; segment 2 with spinous projection on inner, distal margin; segment 3 with 2 rows of inner-edge teeth. Submedian skeleton with pair of broad ridges in midline and at base of maxilla 2, also 2 processes surrounded by narrow, complicated set of ridges on posterior margin. Head separated from trunk by ridge. Lateral margins of head with scattered rows of small spines. Trunk covered with semicircular rows of denticles on anterior part of dorsal and ventral surface. Legs not evident. Borders of genital area indistinct; genital apertures on pair of prominent, spinous areas, with spine patches between. Spermatophore attached to opening of right seminal receptacle. Caudal rami between genital aperture, each with 1 plumose apical seta.

MALE: Unknown.

OVISAC: Widest point 0.54–0.66 mm, with about 40 eggs.

COPEPODITE: Length 0.246–0.258 mm. Cephalothorax elongate, longer than wide. Antenna 1 3-segmented, aesthete 2 × length of antenna. Antenna 1 3-segmented with 1 large terminal seta, all 3 segments with spinules. Maxilla 1 3-branched; outer plumose branch located lateral to maxilla 1, hence appearing to arise from basal portion of mandible. Maxilla 2 3-segmented; basal segment with inner distal patch of denticles; segment 2 with inner distal row of teeth; segment 3 with 2 rows of teeth. Maxilliped 4-segmented; basal segment ornamented with some spinules distally; segment 2 shorter than segment 3, which bears long terminal spine-like segment and subterminal shorter spine. Legs 1 and 2 as in *S. grayi*, except endopod bears serrate subterminal spine on outer edge. Posterior angles of abdominal segment 1 with 2 setae each, longest extends beyond caudal rami; abdominal segment 3 and caudal rami separate. Caudal rami with 5 setae each; innermost longer than cephalothorax; dorsal surface with 1 small seta.

POSTLARVAL DEVELOPMENT: Unknown.

MATERIAL EXAMINED:

Holotype: ♀, USNM 142145, length 0.758 mm, width 0.690 mm; host, juvenile ♀ ostracod *Scleroconcha gallardoii* Kornicker, USNM 127286; station *Eltanin* 412 (east of southern South America).

Paratype: ♀, USNM 142146, length 0.705 mm, width 0.683 mm; host, juvenile ♀ ostracod *Scleroconcha gallardoii*, USNM 127287; station data as holotype.

Other material:

9 ovisacs, USNM 142148, width 0.54–0.66 mm; host and station data as holotype.

2 copepodites, USNM 142147, length 0.246 and 0.258 mm; host data as paratype; station data as holotype.

RELATIONSHIPS: Of the female *Sphaeronella* which have antenna 1 3-segmented, antenna 2 present, and maxilliped 3-segmented, *S. scleroconchae* is distinguished by the apparently single plumose seta on the caudal rami (if no setae have been broken off), by the toothed nature of the terminal segment of maxilla 2, and by a 2-branched (instead of 3-branched) maxilla 1.

Sphaeronella antarctica new species *Figure 6, p. 16*

FEMALE: Length 0.573 mm, width 0.676 mm. Body globular. Head on anterior border, frontal margin naked. Antenna 1 3-segmented, aesthete slightly longer than segment 3. Antenna 2 absent. Maxilla 1 3-branched, lateral branch very small, dorsal branch with small proximal branch on either side. Maxilla 2 terminal segment toothed along inner border. Maxilliped 3-segmented; basal segment with row of spines along distal border; segment 2 with pointed inner distal process; segment 3 toothed distally. Submedian skeleton with conspicuous ridge at base of maxilla 2, and 2 inner posterior semicircular processes demarcated by narrow ridges; some spines found posterior to maxilla 2. Head not separated from trunk in ventral midline. Small patch of spines on ventral surface of trunk just posterior to maxilliped, rest of trunk naked. Legs not apparent. Genital area well-defined, wider than long, area between genital apertures speckled. Caudal rami posterior to genital plate, very small, each bearing single seta.

MALE: Unknown.

OVISAC: Irregularly shaped, widest point varied greatly from 0.26 mm for one bearing 4 eggs to 0.66 mm for one bearing many eggs.

COPEPODITE AND POSTLARVAL DEVELOPMENT: Unknown.

MATERIAL EXAMINED:

Holotype: ♀, USNM 142149, length 0.573 mm, width 0.676 mm; host, adult ♀ ostracod *Skogsbergiella macrothrix* Kornicker, USNM 138039; station *Eltanin* 363 (east of southern South America).

Other material:

8 ovisacs, USNM 142150, widest point 0.26–0.66 mm; host and station data as holotype.

ETYMOLOGY: This species is named after the area where the host was found.

RELATIONSHIPS: This species has an unique combination of characters, of which the branching nature of the anterior branch of maxilla 1 is the most distinctive.

Sphaeronella skogsbergiellae new species *Figure 7, p. 17*

FEMALE: Length 0.642–0.900 mm, width 0.623–1.180 mm. Body globular. Head on anterior part of body, or on ventral surface in gravid specimens, frontal margin naked. Antenna 1 2-segmented, aesthete no longer than segment 2. Antenna 2 small, 2-segmented with 2 small, terminal setae. Maxilla 1 2-branched. Maxilla 2 terminal segment with some small, inner teeth. Maxilliped 3-segmented; basal segment ornamented with semicircular rows of denticles; segment 2 inner distal process with small spinules. Submedian skeleton with more or less thickened ridges in midline and at base of maxilla 2, also with 2 posterior triangular processes demarcated by ridges. Head separated from trunk by several ridges, some broken. Lateral margins of head bordered by rows of small spines. Head and trunk covered with semicircular rows of very small denticles. Legs not evident. Genital area not well-defined, only posterior border visible, seminal receptacle openings just anterior to genital apertures, genital plate between genital apertures speckled in appearance. Caudal rami posterior to genital plate, each a simple cylindrical segment bearing 1 plumose seta.

MALE: Length 0.162 mm, width 0.134 mm. Body almost globular in ventral view, triangular in lateral view. Head same size as trunk, frontal border naked. Antenna 1 2-segmented, aesthete no longer than segment 2. Antenna 2 2-segmented with 2 terminal setae. Maxilla 1 2-branched. Maxilla 2 terminal claw simple. Maxilliped 3-segmented; basal segment with 2 inner proximal swellings and row of long, distal spinules; segment 3 simple. Submedian skeleton with 3 pairs of prominent ridges on lateral edges; 1st pair of processes rounded, between outer borders of maxilla 2 and maxilliped; 2nd pair of more posterior processes are semicircular lobes between maxillipeds; 3rd pair of processes converge behind maxillipeds. Head separated from trunk by several ridges. Lateral borders of head lined with spinules which are long and thick posteriorly. Ventral and dorsoventral part of trunk thickly covered with long simple spines. Leg 1 with 2 basal segments ornamented with long spines and rudimentary inner and outer spinous branches. Leg 2 more rudimentary, with 2 basal segments and 1 terminal segment, all spinous. Caudal rami represented by pair of simple cylindrical segments each bearing 1 seta.

OVISAC: Flattened spheres, widest point 0.38–0.48 mm, some containing copepodites almost ready to hatch.

COPEPODITE: Length 0.177 mm. Cephalothorax slightly longer than wide. Antenna 1 3-segmented, aesthete more than 3 times length of antenna. Antenna 2 3-segmented with long terminal seta, each segment bordered distally by spinules. Maxilla 1 2-branched. Maxilla 2, distal part of segments 1 and 2 and terminal claw with toothed inner borders. Maxilliped 4-segmented; inner border of basal segment lined with rows of oblique ridges and distal spines. Legs 1 and

2 as in *S. scleroconchae*. Abdomen with 2 setae on posterior angle of segment 1, longest extending beyond caudal rami. Caudal rami and abdominal segment 3 separate. Caudal rami each with 5 setae; inner longest, same length as cephalothorax; 1 seta on dorsal surface.

POSTLARVAL DEVELOPMENT: Unknown.

MATERIAL EXAMINED:

Holotype: ♀, USNM 142151, length 0.642 mm, width 0.623 mm; host, adult ♀ ostracod *Skogsbergiella macrothrix* Kornicker, USNM 137081; station *Vema* 17–14 (west of southern South America).

Paratypes: ♀, USNM 142153, length 0.675 mm, width 0.887 mm; host, adult ♀ ostracod *Skogsbergiella macrothrix*, USNM 128853; station *Vema* 17–97 (east of southern South America).

♂, USNM 142152, length 0.162 mm, width 0.134 mm; host and station data as ♀ paratype above.

♀, USNM 142154, length 0.814 mm, width 0.705 mm; host, adult ♀ ostracod *Skogsbergiella scotti* Kornicker, USNM 139856; station Ker D70 (Kerguelen Is).

Other material:

♀, USNM 142155, length 0.900 mm, width 1.180 mm; host, ovigerous ♀ ostracod *Skogsbergiella macrothrix*; station *Eltanin* 340 (east of southern South America).

6 ovisacs (with copepodites), USNM 142159, widest point 0.38–0.48 mm; host and station data as holotype.

1 ovisac, USNM 142160; host and station data as paratype USNM 142153.

3 copepodites, USNM 142156–8, length 0.177 mm; host and station data as paratype USNM 142154.

RELATIONSHIPS: The following combination of characters is not found on any other species of *Sphaeronella*: antenna 1 2-segmented, antenna 2 present, and maxilla 1 2-branched in both sexes; male with flattened, plate-like legs bearing only small spinules.

Sphaeronella kornickeri new species *Figure 8, p. 18*

FEMALE: Length 0.760–0.940 mm, width 0.701–0.905 mm. Body globular, head anterior. Anterior margin of head naked. Antenna 1 2-segmented, aesthete shorter than segment 2. Antenna 2 3-segmented; segment 2 with distal row of spinules; segment 3 with 2 terminal setae, 1 short. Maxilla 1 2-branched. Maxilla 2, terminal segment with 2 rows of teeth. Maxilliped 3-segmented; basal segment with rows of small spinules; segment 2 notched on outer border, probably marking where 2 segments have fused, with inner distal spinous process; segment 3 with 2 rows of distal teeth. Submedian skeleton similar to that of *S. skogsbergiellae*. Head separated from trunk by wide ridge. Lateral margins of head bordered by 2 rows of spinules, lateral head flap hardly developed. Anterior dorsal and ventral surfaces of trunk with rows of small denticles. Legs not evident. Genital area well defined, wider than long; genital apertures only slightly curved; seminal receptacles located on anterior border; 2 patches of spinules on anterior border, either side of midline. Caudal rami on genital plate, represented by pair of cylindrical appendages, each bearing bifurcate seta.

MALE: Unknown.

OVISAC: One cluster of 7 ovisacs, widest point 0.40–0.44 mm, with about 40 eggs each; another cluster of 4 ovisacs, widest point 0.28–0.48 mm, with 14–30 almost hatched copepodites.

COPEPODITE: Length 0.132 mm. This lightly sclerotised specimen was removed from ovisac, therefore shape probably not that of free-swimming copepodite. Anterior head with ventrally curved flap, notched in midline; lateral borders at base of antenna 1 with straight ridge. Antenna 1 3-segmented, aesthete 2 × length of antenna. Antenna 2 3-segmented with 2 terminal setae, 1 of which is short; segment 2 with distal row of spinules. Maxilla 1 3-branched, with 1 plumose seta placed lateral to maxilla 1 but not obviously connected. Maxilla 2 3-segmented; segment 2 with inner distal teeth; segment 3 with 2 rows of teeth. Maxilliped 4-segmented, segment 3 bearing spine-like segment 4 and subterminal spine. Legs 1 and 2 as in *S. scleroconchae*. Posterior corners of abdominal segment 1 bear 2 naked setae, ventral seta fine; caudal rami and abdominal segment 3 completely separate. Caudal rami bear 5 setae each, 1 small seta on dorsal surface, innermost seta about same length as cephalothorax.

POSTLARVAL DEVELOPMENT: Unknown.

MATERIAL EXAMINED:

Holotype: ♀, USNM 142161, length 0.760 mm, width 0.710 mm; host, adult ♀ ostracod *Philomedes assimilis* Brady, USNM 138016; station *Octans* TAT (Wilkes Station, Antarctica, south of Australia).

Paratypes: ♀, USNM 142162, length 0.786 mm; host, adult ♀ ostracod *Philomedes assimilis*, USNM 136167; station *Octans* AZ (Wilkes Station, Antarctica, south of Australia).

♀, USNM 142163, length 0.940 mm, width 0.905 mm; host, adult ♀ ostracod *Philomedes assimilis*, USNM 136179; station *Octans* AH (Wilkes Station, Antarctica, south of Australia).

Other material:

7 ovisacs, USNM 142165, width 0.40–0.44 mm; host and station data as holotype.

4 ovisacs (with copepodites), USNM 142166, width 0.28–0.48 mm; host and station data as paratype USNM 142163.

Copepodites, USNM 142164, length 0.132 mm; host and station data as paratype USNM 142163.

ETYMOLOGY: This species is named after Dr L. S. Kornicker who collected most of the choniostomatids described in this paper.

RELATIONSHIPS: Females of this species appear to be related to *S. decorata* and *S. skogsbergiellae*. *S. kornickeri* differs from *S. decorata* in lacking the conspicuous vaulted eminence in the midline just posterior to the maxillipeds, and from *S. skogsbergiellae* chiefly in having the caudal rami on the genital plate. The copepodite differs from that of *S. skogsbergiellae* chiefly in having a third plumose branch associated with maxilla 1, but is like the copepodite of *S. decorata* in this respect. The anterior head of *S. decorata* is decorated with thick spines, whereas *S. kornickeri* has a naked head.

Sphaeronella doloriae new species

Figure 9, p. 19

FEMALE: Length 0.307–0.366 mm, width 0.300–0.310 mm. Body globular, head well defined, large, frontal margin bordered with small spines. Antenna 1 2-segmented, aesthete shorter than antenna. Antenna 2 absent. Maxilla 1 3-branched, large tuft of spinules at base. Maxilla 2, basal segment with strong distal spines. Maxilliped 3-segmented; basal segment ornamented distally with strong spines; segment 2 with inner, distal spines; segment 3 with number of terminal teeth. Submedian skeleton bears large patch of strong spines at base of maxillipeds; conspicuous ridges found in midline and at base of maxilla 2; posterior process demarcated by narrow ridges; posterior to maxilliped are 2 pairs of posteriorly directed ridges. Head separated from trunk by single spinous ridge. Lateral margins of head bordered by broad band of fine, short spinules. Trunk densely covered by long, simple spinules. Legs represented by 2 pairs of simple cylindrical projections bearing 1 naked, possibly bifurcate, seta. Genital area a well-defined, continuous plate, wider than long, with lateral groups of spinules and posterior patch of very strong spines between genital apertures; openings of seminal receptacles just anterior to genital apertures, but receptacles themselves not evident. Caudal rami close together, well posterior to genital plate, same form as legs.

MALE: Length 0.235 mm, width 0.196 mm. Body almost globular in ventral view; in lateral view head separated dorsally from trunk by conspicuous ridge. Head almost same size as trunk; frontal margin transparent, bordered by small spinules. Antenna 1 2-segmented; aesthete shorter than antenna. Antenna 2 absent. Maxilla 1, maxilla 2, and maxilliped as in female, but without spinules at base of maxilla 1, and distal segment of maxilliped has more teeth. Submedian skeleton with ridges in midline and at base of maxilla 2; posterolateral borders with fewer spines than on female; 2 semicircular ridges between maxillipeds. Head not set off from trunk by ridge in ventral median line. Lateral margins of head fringed with fine spinules. Trunk covered by simple spinules, some (posterior and anterior) very long. Cuticle of head and trunk warty in appearance. Legs each represented by simple cylindrical segment bearing 1 small seta. Caudal rami same as legs, set close together on ventral surface some distance from posterior border.

OVISAC: Unknown.

COPEPODITE: Length 0.188 mm. Cephalothorax almost as wide as long; thoracic segment with long posterior wings which reach posterior border of abdominal segment 1. Oblique ridge at base of antenna 1. Antenna 1 3-segmented, well sclerotised, aesthete more than 1.5 × length of antenna. Antenna 2 with 2 squat basal segments terminated by 1 short and 1 longer seta. Maxilla 1 2-branched. Maxilla 2 3-segmented; segments 1 and 2 each with inner patch of fine spinules; segment 3 bordered by fine spinules. Maxilliped 4-segmented; basal segment with groups of spinules distally, proxi-

mally, and at mid-length. Legs 1 and 2 as in *S. scleroconchae*. Posterior angle of abdominal segment 1 with 1 large plumose seta which extends beyond caudal rami, other seta much smaller. Caudal rami small and completely fused to abdominal segment 3; each ramus with 5 setae, innermost of which is longest, less than 0.5 length of body; small seta on dorsal surface.

POSTLARVAL DEVELOPMENT: Length of pupa 0.149 mm, width 0.124 mm. Slightly more elongate than globular, attachment thread arises from anterior dorsal surface, posterior part covered by conspicuous spinules (granular appearance of whole surface may indicate small spinules). Mouth, mandibles, and maxilla 1 only structures apparent.

MATERIAL EXAMINED:

Holotype: ♀, USNM 142125, length 0.307 mm, width 0.310 mm; host, adult ♂ ostracod *Doloria pectinata* Skogsberg, USNM 128059; station *Eltanin* 958 (west of southern South America).

Paratypes: ♂, USNM 142126, length 0.235 mm, width 0.196 mm; host and station data as holotype.

♀, USNM 142127, length 0.366 mm, width 0.300 mm; host, juvenile ♂ ostracod *Doloria pectinata*, USNM 139102; station *Hero* 48 (west of southern South America).

Other material:

Pupa, USNM 142129, length 0.149 mm, width 0.124 mm; host, adult ♀ ostracod *Doloria pectinata*, USNM 138024; station *Eltanin* 958 (west of southern South America).

2 copepodites, USNM 142128, length 0.188 mm; host and station data as pupa.

RELATIONSHIPS: My assignment of the copepodite and pupa (from a different host specimen) to *S. doloriae* is tentative since Hansen (1897:69) found that one species of crustacean can be host (even simultaneously) to more than one species of parasite.

Of all those *Sphaeronella* with antenna 1 2-segmented, antenna 2 absent, maxilla 1 3-branched, maxilliped 3-segmented, and with spines at the base of the maxillipeds on the submedian skeleton (*S. sarsiellae*, *S. doloriae*, *S. dikrothrix*, and *S. metavargulae*), only *S. doloriae* has spinules at the base of maxilla 1.

***Sphaeronella metavargulae* new species** *Figure 10 e-g, p. 20*

FEMALE: Length 0.373 mm, width 0.373 mm. Body globular, frontal border of head naked. Antenna 1 2-segmented (exact number of setae not seen). Antenna 2 absent. Maxilla 1 3-branched. Maxilla 2, basal segment with triangular, well sclerotised lobe; terminal segment naked. Maxilliped 3-segmented; basal segment ornamented with several rows of long spinules; terminal segment with at least 3 equal claws. Submedian skeleton with pair of thick, inner ridges which bifurcate posteriorly; lateral borders at base of maxilliped bear spinules. Head separated from trunk by ridge. Lateral margins of head naked. Trunk covered by large spinules. Legs not evident. Genital area indistinct, only anterior

border obvious where seminal receptacles open. Caudal rami absent.

MALE, COPEPODITE, OVISAC, AND POSTLARVAL DEVELOPMENT: Unknown.

MATERIAL EXAMINED:

Holotype: ♀, USNM 142167, length 0.373 mm, width 0.373 mm; host, adult ♀ ostracod *Metavargula adinothrix* Kornicker, USNM 125829; station *Eltanin* 350 (east of southern South America).

RELATIONSHIPS: Of all those *Sphaeronella* with antenna 1 2-segmented, antenna 2 absent, maxilla 1 3-branched, maxilliped 3-segmented, and with spinules at the base of the maxilliped on the submedian skeleton (*S. sarsiellae*, *S. doloriae*, *S. dikrothrix*, *S. metavargulae*), only *S. metavargulae* has the surface of basipod 1 of the maxilliped with many spinules.

***Sphaeronella homasteropeae* new species** *Figure 10 a-d, p. 20*

FEMALE, MALE, OVISAC: Unknown.

COPEPODITE: Length 0.167 mm. Cephalothorax oval, longer than wide. Anterior head with ventral fold bordered laterally by thick ridge. Antenna 1 2-segmented, aesthete at least 4 × length antenna. Antenna 2 2-segmented, with 2 terminal spines. Maxilla 1 4-branched; 2 branches laterally placed and not obviously connected with remaining 2; 1 of lateral setae plumose. Maxilla 2 3-segmented; basal segment with wrinkled inner surface; segment 2 with inner distal patch of small spinules; segment 3 bordered by long spinules. Maxilliped 4-segmented; segment 3 with terminal spine-like 4th segment and subterminal spine. Legs 1 and 2 as in *S. grayi*, but leg 1 exopod with small proximal inner-edge seta. Posterior angles of abdominal segment 1 bear 2 setae; ventral seta small. Caudal rami completely fused with abdominal segment 3; each ramus with 5 setae; inner seta about $\frac{2}{3}$ length of cephalothorax; dorsal surface with 1 seta.

POSTLARVAL DEVELOPMENT: Unknown.

MATERIAL EXAMINED:

Holotype: copepodite, USNM 142144, length 0.167 mm; host, adult ♀ ostracod *Homasterope micra* Kornicker, USNM 136076; station *Vema* 17-12 (west of southern South America).

RELATIONSHIPS: This copepodite is remarkable for the fusion of abdominal segment 3 with the caudal rami, and the 2-segmented antenna 1. The copepodite of *S. doloriae* also has abdominal segment 3 fused with the caudal rami, but differs from *S. homasteropeae* in having long posterior flaps on the last thoracic segment, a 3-segmented antenna 1, and a subterminal serrate spine on the outer edge of the leg endopods rather than the stiff plumose seta found in this position in *S. homasteropeae*.

Sphaeronella synasteropeae new species *Figure 11 a–c,*
p. 21

FEMALE: Length 0.345 mm, width 0.352 mm. Body globular. Head on anterior border, frontal margin with ventrally directed flap in midline. Antenna 1 2-segmented. Antenna 2 absent. Maxilla 1 3-branched. Maxilla 2 with smooth terminal segment. Maxilliped 3-segmented; segment 2 with inner distal process; segment 3 naked. Submedian skeleton with bifurcating ridge at base of maxilla 2; pair of processes demarcated by narrow ridges between maxillipeds. Head separated from trunk by ridge. Lateral margins of head bordered by fine spinules. Trunk ornamented on ventral, anterior surface with some rows of very small denticles. Legs not apparent. Genital area not well defined, situated on raised area; genital apertures set at right angles to main axis of body; openings of seminal receptacles some distance anterior to genital apertures. Caudal rami represented by pair of cylindrical segments, each bearing 1 plumose seta, set posterior to genital apertures.

MALE, OVISAC, COPEPODITE, AND POSTLARVAL DEVELOPMENT: Unknown.

MATERIAL EXAMINED:

Holotype: ♀, USNM 142139, length 0.345 mm, width 0.352 mm; host, juvenile ♂ ostracod *Synasterope dimorpha* (Hartmann), USNM 137258; station *Vema* 17–13 (west of southern South America).

RELATIONSHIPS: *Sphaeronella synasteropeae* is closely related to the group of species which have a 2-segmented antenna 1, no antenna 2, maxilla 1 3-branched, and a 3-segmented maxilliped, but unlike those members which have a naked anterior head (*Sphaeronellopsis littoralis*, *Sphaeronella metavargulae*), it alone has the terminal segments of both maxilla 2 and maxilliped without teeth.

Sphaeronella sarsiellae new species *Figure 11 d–f, p. 21*

FEMALE: Length 0.172 mm, width 0.142 mm. Body widest at mid-length, tapering towards both ends. Head well defined; frontal margin lined with spines. Antenna 1 2-segmented, aesthete longer than antenna. Antenna 2 absent. Maxilla 1 3-branched. Maxilla 2 terminal segment simple. Maxilliped 3-segmented; some sign of partial division of segment 2 of left maxilliped; basal segment with distal spinules; segment 3 toothed. Submedian skeleton with pair of ridges in midline and at base of maxilla 2, laterally decorated with spines; inner posterior part produced in rounded process. Head and trunk merge in ventral line without ridge between. Lateral margins of head bordered by row of long spinules. Trunk covered with rows of spinules. Legs not evident. Genital area not well defined probably because this specimen was very young; genital apertures set on posterior part of body. Caudal rami posterior to genital area, appeared to be fused at their bases (it was

not possible to mount specimen to make this point clear); each part bearing 1 seta bifurcate distally.

MALE, OVISAC, COPEPODITE, AND POSTLARVAL DEVELOPMENT: Unknown.

MATERIAL EXAMINED:

Holotype: ♀, USNM 142140, length 0.172 mm, width 0.142 mm; host, adult ♂ ostracod *Sarsiella lunata* Kornicker, USNM 137689; station *Vema* 16–34 (off South Africa).

RELATIONSHIPS: Among those species of *Sphaeronella* which have antenna 1 2-segmented, antenna 2 absent, maxilla 1 3-branched, maxilliped 3-segmented, and the anterior head spinous, *S. sarsiellae* is like *S. dikrothrix*, *S. metavargulae*, and *S. doloriae* in having the submedian skeleton spinous at the base of maxilla 2 and maxilliped. *S. sarsiellae* is closest to *S. dikrothrix*, which also has bifurcate setae on the caudal rami, but *S. sarsiellae* has segment 2 of antenna 1 about twice the length of segment 1 (*S. dikrothrix* has segment 2 three times the length of segment 1) and has the caudal rami at least touching at their bases (if not fused).

Sphaeronella anarthronis new species *Figure 12, p. 22*

FEMALE: Length 0.544–0.732 mm, width 0.513–0.621 mm. Body elongate globular. Head on anterior border, frontal margin naked, folded ventrally. Antenna 1 2-segmented, aesthete shorter than segment 2. Antenna 2 absent. Maxilla 1 2-branched. Maxilla 2 terminal segment with toothed inner border. Maxilliped 3-segmented; basal segment with distal row of spines; segment 2 with spinous inner distal process; segment 3 inner border with 2 rows of teeth. Submedian skeleton with ridges in midline and at base of maxilla 2, pair of processes demarcated by narrow ridges between maxillipeds. Head separated from body by several ridges. Lateral margins of head ornamented with broad band of spinules, increasing in width posteriorly. Trunk ornamented on anterior dorsal and ventral surfaces, also in vicinity of genital plate, with sparse spinules. Legs not evident. Genital area on dorsal surface of holotype when mounted, lateral borders of plate obvious, genital apertures with spinous area between. Caudal rami on posterior border of genital plate, each consists of simple cylindrical segment with terminal plumose seta, left caudal ramus with small inner-edge spine.

MALE: Unknown (*see* Postlarval development).

OVISAC: With relatively small number of eggs (15), widest point 0.26–0.40 mm.

COPEPODITE: Length 0.184 mm. Cephalothorax wider than long, widest part posterior. Antenna 1 3-segmented, aesthete short, almost 3 × length of segment 3. Antenna 2 3-segmented, with long terminal seta, segments 1 and 2 circled distally by spinules. Maxilla 1 3-branched with lateral plumose seta ♂ undetermined origin, possibly maxilla 1 or mandible.

Maxilla 2 3-segmented, inner distal part of segments 1 and 2 spinous, segment 3 toothed along inner border. Maxilliped 4-segmented, basal segment with patch of small spinules on inner distal border. Legs 1 and 2 as in *S. scleroconchae*. Abdominal segment 1 posterior angle with 2 setae, 1 very short, other hardly extending beyond caudal rami. Abdominal segment 3 and caudal rami separate. Caudal rami with 5 setae, inner seta slightly longer than cephalothorax, small seta on dorsal surface.

POSTLARVAL DEVELOPMENT: The pupa with its enclosing wall was still inside the remains of a copepodite exuviae, so that although development appeared superficially like that of *S. paradoxa* (see Hansen 1897:57), it seemed clear that a proper pupa had been formed. Male pupae, with their well developed spermatophores, showed no sign of trunk limbs, although rudiments of the head appendages were present, perhaps indicating the form of the adult male.

MATERIAL EXAMINED:

Holotype: ♀, USNM 142130, length 0.662 mm, width 0.550 mm; host, adult ♀ ostracod *Anarthron dithrix* Kornicker, USNM 137037; station *Vema* 18-13 (east of southern South America).

Paratypes: ♀, USNM 142131, length 0.573 mm, width 0.549 mm; host, adult ♀ ostracod *Anarthron dithrix*, USNM 137034; station *Vema* 17-88 (east of southern South America).

♂, USNM 142132, length 0.732 mm, width 0.621 mm; host, found loose in vial containing 1♂ and 6♀♀ ostracods *Anarthron chilensis* (Hartmann), K27280; station Hartmann 110 (west of southern South America).

♀, USNM 142133, length 0.544 mm, width 0.513 mm; host, adult ♀ ostracod *Anarthron dithrix*, USNM 128698; station *Vema* 17-75 (east of southern South America).

Other material:

2♂ pupae, USNM 142138, (a) length 0.131 mm, width 0.124 mm, and (b) length 0.141 mm, width 0.139 mm; host and station data as paratype USNM 142131.

1 copepodite, USNM 142134, length 0.184 mm; host and station data as paratype USNM 142132.

5 ovisacs, USNM 142136, width 0.26-0.40 mm; host and station data as holotype.

2 ovisacs (with copepodites USNM 142135), USNM 142137, width 0.44 and 0.50 mm; host and station data as paratype USNM 142133.

RELATIONSHIPS: Among those species which have antenna 1 2-segmented, antenna 2 absent, maxilla 1 2-branched, maxilliped 3-segmented, and lateral borders of the head ornamented with spines, *S. anarthronis* differs from *S. philomedesi* in having a distal process on segment 2 of the maxilliped. This is absent in *S. philomedesi*.

Sphaeronella philomedesi new species *Figure 13, p. 23*

FEMALE: Length 0.968 mm, width 1.022 mm. Body globular in dorsal view, very large. Head small, well defined; anterior border folded ventrally and posteriorly, bearing small spinules; anterior part of head naked. Antenna 1 2-segmented, aesthete very short. Antenna 2 absent. Maxilla 1 2-branched. Maxilla 2 terminal segment with inner border toothed. Maxilliped 3-segmented; basal segment naked; segment 2 with small

denticles on inner distal surface; segment 3 with 2 longitudinal rows of strong teeth. Submedian skeleton with pair of ridges in midline and at base of maxilla 2; pair of processes between maxillipeds, bordered anteriorly by curved ridge. Lateral margins of head with several rows of small spines. Trunk covered with semicircular rows of very small denticles. Legs not evident. Genital area on dorsal surface of mounted specimen, broader than long; genital apertures wide apart; central part of plate with patches of small spinules. Caudal rami near genital plate, each a conical projection bearing single plumose seta.

MALE: Length 0.184 mm, width 0.182 mm. Body globular in ventral view, more elongate in lateral view. Head about same size as trunk, well defined; anterior border naked, transparent. Antenna 1 2-segmented, aesthete small. Antenna 2 absent. Maxilla 1 2-branched. Maxilla 2 last segment terminating in simple claw. Maxilliped 3-segmented; basal segment with some distal spinules; segment 2 with pointed, inner, distal projection and patch of denticles; segment 3 with 2 longitudinal rows of teeth. Submedian skeleton with paired ridges in midline and at base of maxilla 2, conspicuous pair of inverted U-shaped ridges in midline at base of maxillipeds. Head separated from trunk by single ridge. Lateral margins of head naked. Trunk covered with long simple spinules. Legs represented by 2 pairs of conical projections each bearing small seta. Caudal rami similar to legs, on ventral surface some distance anterior to posterior border.

OVISAC: Shaped like flattened sphere, largest ovisac 0.387 mm at widest point, containing about 30-40 eggs.

COPEPODITE AND POSTLARVAL DEVELOPMENT:
Unknown.

MATERIAL EXAMINED:

Holotype: ♀, USNM 142141, length 0.968 mm, width 1.022 mm; host, adult ♀ ostracod *Philomedes subantarctica* Kornicker, USNM 137383; station *Vema* 18-12 (east of southern South America).

Paratype: ♂, USNM 142142, length 0.184 mm, width 0.182 mm; host and station data as holotype.

Other material:

5 ovisacs, USNM 142143, width 0.387 mm; host and station data as holotype.

RELATIONSHIPS: Female *S. philomedesi* are closely related to *S. anarthronis* but do not have a distal process on segment 2 of the maxilliped. Male *S. philomedesi* are most like *S. monothrix*, but have trunk limbs whereas *S. monothrix* do not.

Sphaeronella rugosidoloriae new species *Figure 14a-c, p. 24*

FEMALE: Length 0.289 mm, width 0.307 mm. Body globular, head large. Head well defined; frontal margin bordered by fine spinules. Antenna 1 1-segmented; aesthete absent. Antenna 2 absent. Maxilla 1 3-branched with group of long spinules at its base. Maxilla 2 terminal segment simple. Maxilliped 3-segmented, squat; terminal

segment ending in several small teeth. Submedian skeleton with broad ridges along midline, terminating posteriorly on 2 pointed processes; several narrow ridges found posterior to maxillipeds. Head separated from trunk by ridge. Lateral margins of head bordered by several rows of small spinules. Anterior part of ventral and dorsal trunk surface with sparse spines. Legs represented by 2 pairs of cylindrical segments each bearing 1 seta. Genital area indistinct, openings of seminal receptacles placed anteriorly to genital apertures. Caudal rami posterior to genital apertures, similar to legs.

MALE, OVISAC, COPEPODITE, AND POSTLARVAL DEVELOPMENT: Unknown.

MATERIAL EXAMINED:

Holotype: ♀, USNM 142168, length 0.289 mm, width 0.307 mm; host, juvenile ostracod *Rugosidoloria serrata* Kornicker, USNM 128683; station *Vema* 17-71 (east of southern South America).

RELATIONSHIPS: This species is most closely related to *S. siphonostrae*. Both have antenna 1 1-segmented, antenna 2 absent, spinules at the base of maxilla 1, maxilliped 3-segmented and squat, and a spinous anterior head, but in *S. rugosidoloriae* the submedian skeleton has 2 prominent processes in the midline posterior to the maxilliped.

***Sphaeronella siphonostrae* new species** *Figure 14d-g, p. 24*

FEMALE: Length 0.242-0.630 mm, width 0.242-0.593 mm. Body globular, head on anterior surface. Head well defined, frontal border (curved ventrally in holotype) lined by small spinules. Antenna 1 1-segmented; aesthete absent. Antenna 2 absent. Maxilla 1 3-branched with patch of spinules at its base. Maxilla 2 terminal segment simple. Maxilliped squat, 3-segmented; basal segment hardly longer than basal segment of maxilla 2; terminal segment with some fine distal teeth. Submedian skeleton with pair of ridges along midline. Head separated from trunk by wide ridge. Lateral margins of head bordered by fine spinules. Anterior ventral part of body covered with rows of very fine spinules, dorsal surface with some sparse spinules. Legs represented by 2 pairs of cylindrical segments each bearing 1 seta. Genital area indistinct, apparently longer than wide; seminal receptacles elongate. Caudal rami posterior to genital apertures, each represented by well developed cylindrical segment with 1 bifurcate seta.

MALE, OVISAC, AND COPEPODITE: Unknown.

POSTLARVAL DEVELOPMENT: One pupa found, greatest length 1.128 mm. Mouth (without hairs), mandibles, maxilla 1, and an apparent submedian skeleton were only parts evident.

MATERIAL EXAMINED:

Holotype: ♀, USNM 142169, length 0.630 mm, width 0.593 mm;

host, adult ♀ ostracod *Siphonostra hallex* Kornicker, USNM 137266; station *Vema* 17-71 (east of southern South America).

Paratype: ♀, USNM 142170, length 0.242 mm, width 0.242 mm; host, adult ♂ ostracod *Siphonostra hallex*, USNM 137267; station data as holotype.

Other material:

1 pupa, USNM 142171, length 0.128 mm; host, ovigerous ♀ ostracod *Siphonostra hallex*, USNM 137264; station data as holotype.

RELATIONSHIPS: The pupa is deduced to be that of *S. siphonostrae* because it was taken on the same host species as the adult although from a different specimen. This assumption must be verified since Hansen (1897:69) recorded more than one species of chonistomatid on one host species (even simultaneously).

This species is most closely related to *S. rugosidoloriae*. Both have antenna 1 1-segmented, antenna 2 absent, hairs at the base of maxilla 1, maxilliped 3-segmented and squat, and a spinous anterior head, but in *S. rugosidoloriae* the submedian skeleton has 2 prominent processes in the midline posterior to the maxilliped.

***Sphaeronella parasteropeae* new species** *Figure 15, p. 25*

FEMALE: Length 0.234 mm, width 0.218 mm. Body globular; head on anterior border. Frontal margin of head folded ventrally and ornamented with rows of spinules. Antenna 1 1-segmented, aesthete about as long as whole antenna, terminal seta single (not bifurcate as in most species of this genus). Antenna 2 absent. Maxilla 1 2-branched. Maxilla 2 terminal segment with only some very weak teeth on inner border. Maxilliped 3-segmented; basal segment with distal spines; segment 2 with inner, distal process; segment 3 simple. Submedian skeleton with ridges beside maxilla 2 and rounded process on outer border at inner articulation of maxilla 2. Head separated from trunk by ridge. Lateral margins of head with rows of spinules. Trunk covered with very small spines; anterior dorsal and ventral surfaces bearing rows of longer spines. Both pairs of legs represented by spinose cylindrical segments each bearing plumose seta; 2nd pair on dorsal surface. Genital area on dorsal surface, raised; genital plate not well defined, lips of genital apertures thick. Caudal rami set posterior to genital plate, similar to legs.

MALE, OVISAC, COPEPODITE, AND POSTLARVAL DEVELOPMENT: Unknown.

MATERIAL EXAMINED:

Holotype: ♀, USNM 142172, length 0.234 mm, width 0.218 mm; host, 3rd instar ♀ ostracod *Parasterope* sp., USNM 137250; station *Vema* 15-131 (east of southern South America).

RELATIONSHIPS: This species has a unique combination of characters distinguishing it from all others in the genus, i.e., antenna 1 1-segmented, antenna 2 absent, maxilla 1 2-branched, and maxilliped 3-segmented.

Genus *Sphaeronelloides* new genus

DIAGNOSIS: Female like *Sphaeronella*, but maxilla 2 absent, and maxilliped represented by 3-segmented rudiment. Copepodite differs from that of *Sphaeronella* in that trunk limbs have reduced rami, abdominal segments 1 and 2 are completely fused, as well as abdominal segment 3 and caudal rami, which bear 3 setae each. Male unknown.

TYPE-SPECIES: *Sphaeronelloides vargulae* new species.

ETYMOLOGY: Formed by adding the Greek suffix *-oides* (= having the form of) to *Sphaeronella*.

Sphaeronelloides vargulae new species *Figure 16, p. 26*

FEMALE: Length 0.474 mm, width 0.488 mm. Body globular, head anterior, set off by constricted area. Frontal margin lined with spines; 2nd row of spines, arising just inside antenna 1, crosses dorsal part of head just posterior to marginal spines. Antenna 1 2-segmented, segment 1 as well as segment 2 apparently with short aesthete. Antenna 2 absent. Maxilla 2 3-branched. Maxilla 2 absent. Maxilliped represented by 3-segmented rudiment; inner distal part of basal segment with semicircular lobe bordered by small teeth; terminal segment also bearing teeth. Submedian skeleton with outer edge thickened, bearing some spines at mid-length. Head separated from trunk by fold. Lateral margins of head without fold; inner margin with several rows of spinules; posterior central part of head with scattered patches of spines. Trunk ornamented on dorsal and ventral surfaces with rows of small spines. Legs not evident. Genital area represented by smooth area surrounded by wrinkled cuticle; main axis of genital apertures running anteroposterior, seminal receptacles with thick-walled neck. Caudal rami absent.

MALE: Unknown.

OVISAC: With 6 almost formed copepodites, widest point 0.32 mm.

COPEPODITE: Length 0.210 mm. Cephalothorax oval, as wide as long. Anterior head with 4 hairs on ventral fold; lateral edges ridged. Antenna 1 3-segmented, aesthete about $1.5 \times$ length of antenna. Antenna 2 3-segmented, with 2 terminal setae; all segments with spinules. Maxilla 1 4-branched; 2 branches (1 of which is plumose) lateral to others and not obviously connected. Maxilla 2 3-segmented, basal segment with longitudinal row of spinules; segment 3 rounded terminally with longitudinal row of spinules; segment 3 bearing spine-like 4th segment and subterminal spine. Leg 1 with 2 basal segments; exopod 1-segmented with 1 outer-edge spine, 2 terminal and 2 inner-edge setae; endopod 1-segment, small, with 3 plumose setae. Leg 2 with 2 basal segments; exopod 1-segmented with 1 outer, 1 terminal and 1 inner-edge plumose setae; endopod 1-segmented, small, with 2 plumose setae. Abdominal segments 1 and 2 completely fused, without setae; abdominal segment 3 and caudal rami completely fused. Caudal rami each bearing 3 setae; 1 short outer seta, 1 short dorsal seta, and 1 long inner seta $\frac{3}{4}$ length of cephalothorax.

POSTLARVAL DEVELOPMENT: Unknown.

MATERIAL EXAMINED:

Holotype: ♀, USNM 142173, length 0.474 mm, width 0.488 mm; host, 3rd instar ♂ ostracod *Vargula subantarctica* Kornicker, USNM 127960; station *Eltanin* 340 (east of southern South America).

Other material:

12 copepodites, USNM 142174–5, length 0.210 mm; host and station data as holotype.

1 ovisac, width 0.320 mm; host and station data as holotype.

RELATIONSHIPS: A new genus is created for *S. vargulae* because, although it resembles *Sphaeronella*, it has no maxilla 2 and only a rudimentary maxilliped. It is superficially like *Sphaeronella marginata* in which maxilla 1 is also absent, but *S. marginata* has a well developed maxilliped. The form of the copepodite of *S. vargulae* also differs from all other described copepodites (*S. marginata* included) in having abdominal segments 1 and 2 fused, abdominal segment 3 fused with the caudal rami, and reduced rami on the trunk limbs.

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