Two new genera of Scolecitrichidae and redefinition of *Scolecithricella* Sars and *Amallothrix* Sars (Copepoda, Calanoida)

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New genera *Scolecitrichopsis* gen. n. (type species *Scolecithrix ctenopus* Giesbrecht, 1888; which corresponds to *"Scolecithrix" ctenopus* Group of Bradford et al., 1983) and *Pseudoamallothrix* gen. n. (type species *Amallothrix profunda* Brodsky, 1950; which includes 13 species previously placed in *Scolecithrix, Scolecithricella* or *Amallothrix*) are described. The type species of both new genera and the genera *Scolecithricella* Sars, 1902 and *Amallothrix* Sars, 1925 are redescribed. Lists of species placed in each of the 4 genera and a key for identification of these genera are given.

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Introduction

Almost all authors dealing with the species of the family Scolecitrichidae noted difficulties in identification of species and genera of the family. The first revision of the two families possessing transformed sensory setae on the terminal part of Mx2 and protopod of Mxp, Phaennidae and Scolecithrichidae, was published by Bradford (1973). She noted that the number and structure of sensory setae of Mx2 endopod is significant for family definition, placed in Scolecitrichidae 13 genera and 4 groups of species, redefined the family, 5 genera and 4 groups of species, but was unable to place definitely most of the described species in her redefined genera, because descriptions of the species were incomplete and the males unknown. The groups did not receive a definite taxonomic status, because the limits of Bradford's revised genera not always were clear. Later, some new genera were described for species either considered by Bradford or new ones (Roe, 1975; Park, 1983a; Vyshkvartzeva, 1989a, 1989b). Ferrari & Markhaseva (1996) placed in Scolecitrichidae the genus *Pseudophaenna* Sars, 1902 previously referred to Phaennidae by Sars (1902), so the list of Scolecitrichidae genera in their paper contained 18 genera.

But up to now the family position of some genera and generic position of some species remain controversial. The genus *Xantharus* Andronov, 1981, for example, was placed in Phaennidae by Andronov (1981) and Ferrari & Markhaseva (1996), but Ohtsuka et al. (1998) stated that this genus can be transferred to the Tharybidae. However the structure of Md, Mx1 and male P5 of the two species of *Xantharus* (Andronov, 1981; Schulz, 1998; personal reexamination of the type species) does not fit the Tarybidae, but fits well Scolecitrichidae. The key characteristic, 3 worm-like and 5 shorter brush-like sensory setae of Mx2 endopod of *Xantharus*, fits well the diagnostic character of the family Scolecitrichidae, hence, as stated by Vyshkvartzeva (1989a, 1989b) and further supported by Schulz (1998), the genus should be incorporated into Scolecitrichidae.

The systematic position of the genus *Neoscolecithrix* Canu, 1896 also remains controversial up to now. Rose (1933) and Brodsky (1950) placed it in Phaennidae. Fosshagen (1972) noted that *Neoscolecithrix* has features belonging to several Bradford's families, but left the genus in Phaennidae. Bradford et al. (1983) and Ferrari & Markhaseva (1996) assigned *Neoscolecithrix* to Tharybidae. Vyshkvartzeva (1989a, 1989b) stated that the genus should be incorporated into Scolecitrichidae, not into Tarybidae. Schulz & Beckmann (1995) noted the characters that prevent its placement within the Tharybidae, and supposed that Phaennidae or even more probably the Scolecitrichidae accomodate *Neoscolecithrix*.

The Mx2 endopod of *N. farrani* Smirnov, 1935, *N. watersae* (Grice, 1972) and *N. antarctica* Hulsemann, 1985 bearing 3 worm-like and 5 brush-like sensory setae, does not fit Phaennidae, where one worm-like and seven brush-like sensory setae in the distal part of Mx2 occur almost consistently (Bradford, 1973; Bradford et al., 1983; Park, 1983b; Ferrari & Markhaseva, 1996; Ohtsuka et al., 1998; personal observations), but corresponds well to the Scolecitrichidae. Some other characters (A1 with 24 segments; Re1-2 A2 with 2 setae each; 4 posterior setae on Li1 of Mx1; 3-segmented female P5; the male mouthparts not reduced, similar to those of female) noted by Fosshagen (1972) as reminiscent of Phaennidae are actually primitive features when compared with the hypothetical ancestor of the superfamily Clausocalanoidea (Vyshkvartzeva, 1994). Similar primitive features are met in some other genera of Scolecitrichidae. The male P5 of *Neoscolecithrix*, uniramous or biramous with a simple rudimentary right endopod and simple styliform segments of exopod, is similar to the male P5 of *Scolecitrichopsis* gen. n. and of some species of *Pseudoamallothrix* gen. n. (*P. ovata*, see present study), so at least the named 3 species of *Neoscolecithrix* may have their place in Scolecitrichidae.

The taxonomic status of Bradford's (1973) *Scolecithrix ctenopus* group of species was also unclear. The composition and definition of the group were later revised by Campaner (1979) and Bradford et al. (1983). In the latter publication, 9 species were placed in the group, but the authors noted that the taxonomic status of the group may be clarified only after the redefinition of the closely allied genus *Scolecithricella* Sars, 1902.

Also the generic limits of *Scolecithricella* were not clear. Sars (1925) described the genus *Amallothrix* closely allied to *Scolecithricella*. Some authors (Bradford, 1973; Roe, 1975; Campaner, 1984; Schulz, 1991; etc.), following to Sars (1925), separated these two genera, but disagreed in which of the two genera some species should be placed. Other authors (Vervoort, 1951, 1965; Tanaka, 1962; Park, 1980) treated *Amallothrix* as a junior synonym of *Scolecithricella*. Vervoort (1951) noted that one of the two generic distinguishing features proposed by Sars (1925), the number and structure of the maxillary sensory setae, seem to be basically similar in species of both genera, the other feature (structure of the 5th pair of legs) is more or less intermediate in several species referred afterward to either *Scolecithricella* or *Amallothrix*. New definitions of these two genera proposed by Bradford (1973) and Bradford et al. (1983) did not make the generic limits more clear. Even in 1983 Bradford with co-authors placed in *Scolecithricella* 9 species definitely and 16 species tentatively, and in *Amallothrix* 10 species definitely and 20 species tentatively. But the generic position even of some "definitely" placed species, as *Scolecithricella ovata*, *S. cenotelis*, *Amallothrix profunda*, etc., is controversial (see text below).

Park (1980), who accepted the genus *Scolecithricella* in very wide limits, distinguished *Scolecithricella minor* species group, including *S. dentata* (Giesbrecht, 1892), *S. minor* (Brady, 1883), *S. profunda* (Giesbrecht, 1892), *S. schizosoma* Park, 1980, and *S. vittata* (Giesbrecht, 1892). Schulz (1991) reviewed the definition of *Scolecithricella* s. str. and the list of included species. He placed in this genus additionally to Park's (1980) list *S. abyssalis* (Giesbrecht, 1892), *S. tenuiserrata* (Giesbrecht, 1892) and his new species *S. paramarginata* Schulz, 1991. He also partly reviewed the definition of *Amallothrix*, but did not consider the species composition of the latter. Moreover, he placed in this genus his new species that do not fit in some characteristics the definition of *Amallothrix* given by Bradford (1973) and Bradford et al. (1983).

Based on analysis of published data (Giesbrecht, 1888, 1892; Giesbrecht & Schmeil, 1898; T. Scott, 1894; Sars, 1902, 1905, 1920, 1924-1925; Farran, 1905, 1908, 1926, 1929, 1936; A. Scott, 1909; With, 1915; Davis, 1949; Wilson, 1950; Brodsky, 1950, 1955, 1962; Vervoort, 1951, 1957, 1965; Park, 1968, 1970, 1980, 1983a; etc.) and detailed morphological examination of 27 species, formerly placed in *Scolecithricella*, *Amallothrix* or *"Scolecithrix" ctenopus* Group, from the collection of the Zoological Institute, St.Petersburg, new features or combinations of features were used for generic definition. The result of our research is that 4 genera, *Scolecithricella* Sars, 1902, *Amallothrix* Sars, 1925, *Scolecitrichopsis* gen. n.

and *Pseudoamallothrix* gen. n., accommodate well most species of the discussed complex group. In this paper, new definitions of 2 of Sars's genera and description of 2 new genera with detailed redescription of their type species, *Scolecitrichopsis ctenopus* (Giesbrecht, 1888), comb. n. (from the area neighbouring to type locality) and *Pseudoamallothrix profunda* (Brodsky, 1950), comb. n. (based on type specimen and some other specimens) are presented. A key to the 4 genera and lists of species included in each genus are provided.

So, this family now contains 22 genera and became one of the largest among free-living Calanoida (see Razouls, 1995).

Material and methods

Females and males of *Scolecitrichopsis ctenopus* (Giesbrecht, 1888) and *Pseudoamallothrix profunda* (Brodsky, 1950) used for examination were separated from plankton samples obtained during 14th, 26th and 39th cruises of r/v "Vitjaz" and during 40th cruise of r/v "Akademik Korolev". The localities, their characteristics, and the numbers of examined males and females are given in the Table 1; references to the localities (loc.) in the figure captions refer to this table. Samples had been preserved in 4% formalin. The specimens are kept at the Zoological Institute, St.Petersburg.

The figures of body habitus and prosome and urosome measurements were made from animals placed in a drop of glycerine with formalin (1 : 1) under cover glass placed on wax strips. The dissected parts were mounted in Fauret's fluids. Prosome and urosome were measured at 32× magnification using a stereomicroscope. Prosome length was measured in lateral view from anterior part of forehead to posterolateral corner of prosome or to the base of spine-like process in posterolateral corner. Urosome length was measured in dorsal view from the place of fusion with prosome to the end of right caudal rami near the insertion of second inner seta.

Individual urosomal somites were measured in lateral view at magnifications 40× to 100× using a compound microscope. Their thickness was measured near posterior margin of somite, and their length from the anterior margin of somite, usually telescoped into preceding somite, to its posterior margin. The length of the free distal segment of female P5 of *Scolecitrichopsis ctenopus* was measured using a compound microscope at 320× magnification from the base of the free segment to the distal end of the apical spine-like process.

All drawings have been prepared using a modified camera lucida with the magnifications as follows: body 70×; prosome, urosome, swimming legs P1-P4, male P5 140×; genital field, mouthparts 200×; P5 of female CV and adults, apical spines on Re3 of P2-P4 300×.

The following abbreviations are used in the descriptions: CV – copepodid of the 5th stage; Pr – prosome; Ur – urosome; SmP1-SmP5 – somites bearing 1st-5th swimming legs; Ur1-Ur5 – 1st-5th urosomal somites; A1 – antennule; A2 – antenna; Md – mandible; Mx1 – maxillule; Mx2 – maxilla; Mxp – maxilliped; P1-P4 – swimming legs of 1st-4th pairs; P5 – 5th pair of legs; Re1-Re7 – 1st-7th segments of exopod; Ri1-Ri3 – 1st-3rd segments of endopod; Le1 – 1st outer lobe; Li1-Li5 – 1st-5th inner lobes.

Species noted with asterisks in the lists of included species have been examined by the author: one asterisk for examined female and two asterisks for female and male.

We have accepted the widely used principle that higher numbers of segments and setae for every appendage are relatively primitive, fewer segments and setae are derived (Dogiel, 1954; Beklemishev, 1964; Brodsky, 1972; Vyshkvartzeva, 1972, 1976, 1989a, 1989b, 1994; Fleminger, 1983; Park, 1986; Huys & Boxshall, 1991). Nowadays this principle of deduction on ancestral character states is widely applied in evolutionary reconstructions of various taxa of Copepoda.

Taxonomy

Scolecitrichopsis gen. n.

Type species: Scolecithrix ctenopus Giesbrecht, 1888.

Description. Calanoids of small and medium size (about 1.0-3.0 mm). Females and males subequal in size.

SmP4 and SmP5 separate or fused; if fused, a well-marked notch on ventro-lateral margin indicates the border of each somite. Posterolateral corners of last prosomal somite produced distally, triangular, sometimes with a spine-like process.

Rostrum as a short plate with two thin filaments (in *S. difficilis*, conical, without filaments).

Table 1. Oceanographic stations for two redescribed species

No.	Vessel	Cruise	Station	Date	Latitude	Longitude	Layer (m)	Equipment	Number of specimens	
									Females	Males
Scolecitrichopsis ctenopus										
1	Vitjaz	26	3863	07.02.58	0° 55′ S	171° 50′ E	0-100	BR 113	2	
2	Ak. Korolev	40	192/193	02.11.85	13° 00′ N	134° 30′ W	18-100	BJN	1	
3	–"–	40	194	02.11.85	12° 30′ N	134° 30′ W	10-104	–"–	1	1
4	–"–	40	196	02.11.85	12° 00′ N	134° 30′ W	181-346	–"–	2	1
5	–"–	40	202	03.11.85	12° 00′ N	133° 30′ W	0-14	–"–	1	
6	–"–	40	202	03.11.85	12° 00′ N	133° 30′ W	14-100	–"–	1	
7	–"–	40	217	05.11.85	12° 00′ N	133° 00′ W	48-106	–"–	2, 1 CV	
Pseudoamallothrix profunda										
8	North Polar	–	1	25.07.46	90 miles SE of Shipunsky Cape, Kamchatka		1000-4000	K 100		2*
9	Vitjaz	14	2218	01.07.53	43° 40′ N	149° 31′ E	6000-8500	BR 113	1**	
10	–"–	39	5612	27.07.66	45° 31′ N	152° 55′ E	6400-7700	–"–	1	
11	–"–	39	5612	27.07.66	45° 31′ N	152° 56′ E	6100-7320	–"–	2	
12	–"–	39	5617	5.08.66	45° 48′ N	153° 33′ E	3140-6600	–"–	3	2
13	–"–	39	5617	5.08.66	45° 48′ N	153° 33′ E	4080-5020	–"–	1	
14	–"–	39	5617	5.08.66	45° 48′ N	153° 33′ E	6120-7130	–"–	2	1 CV
15	–"–	39	5626	24.08.66	45° 11′ N	152° 28′ E	6470-7450	–"–	3, 2 CV	
16	–"–	39	5626	24.08.66	45° 11′ N	152° 28′ E	5400-6600	–"–	3	

Notes. * – lectotype and paralectotype of *Amallothrix profunda* Brodsky, 1950; ** – holotype of *Scolecithrix birshteini* f. *major* Brodsky, 1955. BJN – Big Judey net; BR 113 – modified Judey's nets with mouth square 1.0 m^2; K 100 – modified Nansen's nets with mouth square 0.75 m^2.

A1 of female with 24 segments (8th and 9th segments of the ancestral for the whole superfamily Clausocalanoidea 25-segmented A1 fused). A1 of male asymmetrical, left one with 21 segments (8-12th segments fused), right one with 20 segments (additional to those of the left leg, 20th and 21th segments fused).

A2 exopod of female with 4 medial setae (in Re3-Re6), of male with 5 medial setae (in Re2-Re6); exopod slightly longer than endopod.

Mx1: Li1 with 1-2 posterior setae; Li3 with 2-3 setae; exopod usually with 7 setae (in *S. tenuipes*, with 6 setae; in *S. difficilis*, with 10 setae).

Mx2 endopod distally with 3 worm-like and 5 small, subequal, brush-like sensory filaments. Li5 with 3 sclerotized setae (frequently 2 of them stout, hook-like, with denticles) and 1 worm-like sensory seta, or with 2 sclerotized and 2 sensory setae; on Li2-Li4 sometimes one of the 3 sclerotized setae transformed into worm-like one; Mx2 of *S. difficilis* with differing armament. Male mouthparts almost not reduced compared with those of female.

P1: Re1-Re3 usually with long external spine each; 1 species (*S. ctenopus*) without Re1 external spine.

Outer distal corner of Ri1 of P2 not produced, rounded; external spine on Re1 of P2 short, not longer than half of Re2.

Posterior surfaces of P2-P4 endopod and exopod segments usually with numerous spines and spinules; posterior surfaces of Ri2-3 and Re2-3 of P4 sometimes with flat, large, lancet-like spines; P4 segments of protopod with numerous spines and spinules; anterior surface of Ri2 of P3 with long spines distally.

P5 of female uniramous, 2-3-segmented, of variable shape; common basal segment long; surface of all or distal segments with spinules.

P5 of male uniramous, strongly asymmetrical; left leg much longer than the right one, 5-segmented; 4 proximal segments subcylindrical; 4th segment sometimes with long spines along inner margin, 5th segment short; right leg of 3-5 segments, not reaching beyond the middle of 2nd proximal segment of left leg.

Species included. Bradford (1973) separated *"Scolecithrix" ctenopus* group containing 4 other species not fitting any of the previously described genera and lying between *Scolecithrix, Scolecithricella* and *Amallothrix*. After additions and corrections (Campaner, 1979; Bradford et al., 1983), 9 species were placed in the group. As the group was named after *Scolecithrix ctenopus*, it was taken as the type species of *Scolecitrichopsis*, though *S. ctenopus* is one of the most specialized in the genus.

The following species, additional to the type species, certainly belong to this genus.

(1) *Scolecitrichopsis alvinae* (Grice & Hulsemann, 1970), comb. n. (= *Xanthocalanus alvinae* Grice & Hulsemann, 1970), ♀.

(2) ***S. ctenopus* (Giesbrecht, 1888), comb. n. (= *Scolecithrix ctenopus* Giesbrecht, 1888; = *Scolecithricella spinipedata* Mori, 1937, see Tanaka, 1962), ♀, ♂.

(3) *S. distinctus* (Grice & Hulsemann, 1970), comb. n. (= *Xanthocalanus distinctus* Grice & Hulsemann, 1970, ♂; it seems to be the male of *X. alvinae*).

(4) *S. elongatus* (Grice & Hulsemann, 1970), comb. n. (= *Xanthocalanus elongatus* Grice & Hulsemann, 1970), ♀, ♂.

(5) *S. pseudoculata* (Campaner, 1979), comb. n. (= *Scolecithricella pseudoculata* Campaner, 1979), ♀.

(6) ***S. tenuipes* (T. Scott, 1894), comb. n. (= *Scolecithrix tenuipes* T. Scott, 1894, ♂; = *Scolecithricella (Amallothrix) marquesae* Vervoort, 1965, ♀, **syn. n.**).

Species possibly belonging to this genus: *S. spinacantha* (Wilson, 1942), comb. n. (= *Scolecithricella spinacantha* Wilson, 1942); *S. difficilis* (Grice & Hulsemann, 1965), comb. n. (= *Xanthocalanus difficilis* Grice & Hulsemann, 1965) and *S. polaris* (Brodsky, 1950), comb. n. (= *Xanthocalanus polaris* Brodsky, 1950).

S. spinacantha has female P5 similar to that of *S. ctenopus*, but the description is incomplete, male unknown. *S. difficilis* (male unknown; description incomplete) is more similar to *Scolecitrichopsis* than to any other genus of Scolecitrichidae in the shape of body and last prosomal somite, structure of Md and Mxp, and armament of P1-P4. The species, indeed, differs from other species of the genus (Table 2) in the relatively primitive armament of Mx1 exopod with 10 setae and Li1 of Mx2 with 4 posterior setae. On the other hand, it has some peculiar derived characters: rostrum triangular, without filaments; reduced (specialized) armament of Li3-Li5 of Mx2 with 2, 2 and 1 setae respectively and endopod with 3 worm-like and only 2 small brush-like sensory filaments, and P1 endopod without outer lobe. These derived characters seem to be sufficient for separation of a new monotypic genus, but redescription of female and description of male are necessary for better understanding of the generic position of this species. *Xanthocalanus polaris* Brodsky, 1950 possibly also belongs to this new genus, as Markhaseva (1998) briefly noted that she included the species in the *Scolecithrix ctenopus* group.

Scolecitrichopsis ctenopus (Giesbrecht, 1888)
(Figs 1-33)

Scolecithrix ctenopus Giesbrecht, 1888: 338; 1892: 266, 282, 285, pl. 13, figs 36-38, pl. 37, fig. 15; T. Scott, 1894: 48, pl. 5, figs 2-9; Giesbrecht & Schmeil, 1898: 46; Farran, 1936: 95, fig. 9; Legaré, 1964: 22, 37, pl. 3, figs 9, 9a, pl. 11, fig. 7, 7a; Razouls, 1995: 362, 366.

Scolecithricella ctenopus: A. Scott, 1909: 91; Sewell, 1929: 212, fig. 79; Grice, 1962: 208, pl. 16, figs 6-15; Tanaka, 1962: 53, fig. 136; Brodsky, 1962: 125, fig. 27; Vervoort, 1965: 81; Chen & Zhang, 1965: 22; Owre & Foyo, 1967: 60, 61, figs 95-97, 113, 378; Gordeeva, 1971: 137; Morjakova, 1971: 149; Madhupratap & Haridas, 1990: 310-312; Razouls, 1995: 356.

Scolecithrix longicornis T. Scott, 1894: 50, pl. 5, figs 20-28.

Scolecithricella longicornis: A. Scott, 1909: 90.

Scolecithricella spinipedata Mori, 1937: 53, pl. 26, figs 11-16.

Description. Female. Body length 1.6-1.8 mm, mean length 1.66 mm (n = 9); prosome length 1.35-1.56 mm. Body strongly built (Figs 1, 2). Rostrum as a short plate with 2 small swellings in the middle and 2 moderately long filaments lateral to the swellings (Fig. 5). Forehead broadly rounded in dorsal and lateral views (Figs 3, 4). Cephalosome and SmP1 fused, but thin articulation suture sometimes visible. SmP4 and SmP5 fused, but a well marked notch on ventro-lateral margin indicates the border of each somite. Mediodorsal margin of last prosomal somite with thin spinules (Fig. 1); posterolateral corners of this somite produced distally as a large lobe terminating on each side in a spiniform process of variable size, shape and direction (Fig. 7a-d), usually reaching the middle of genital complex.

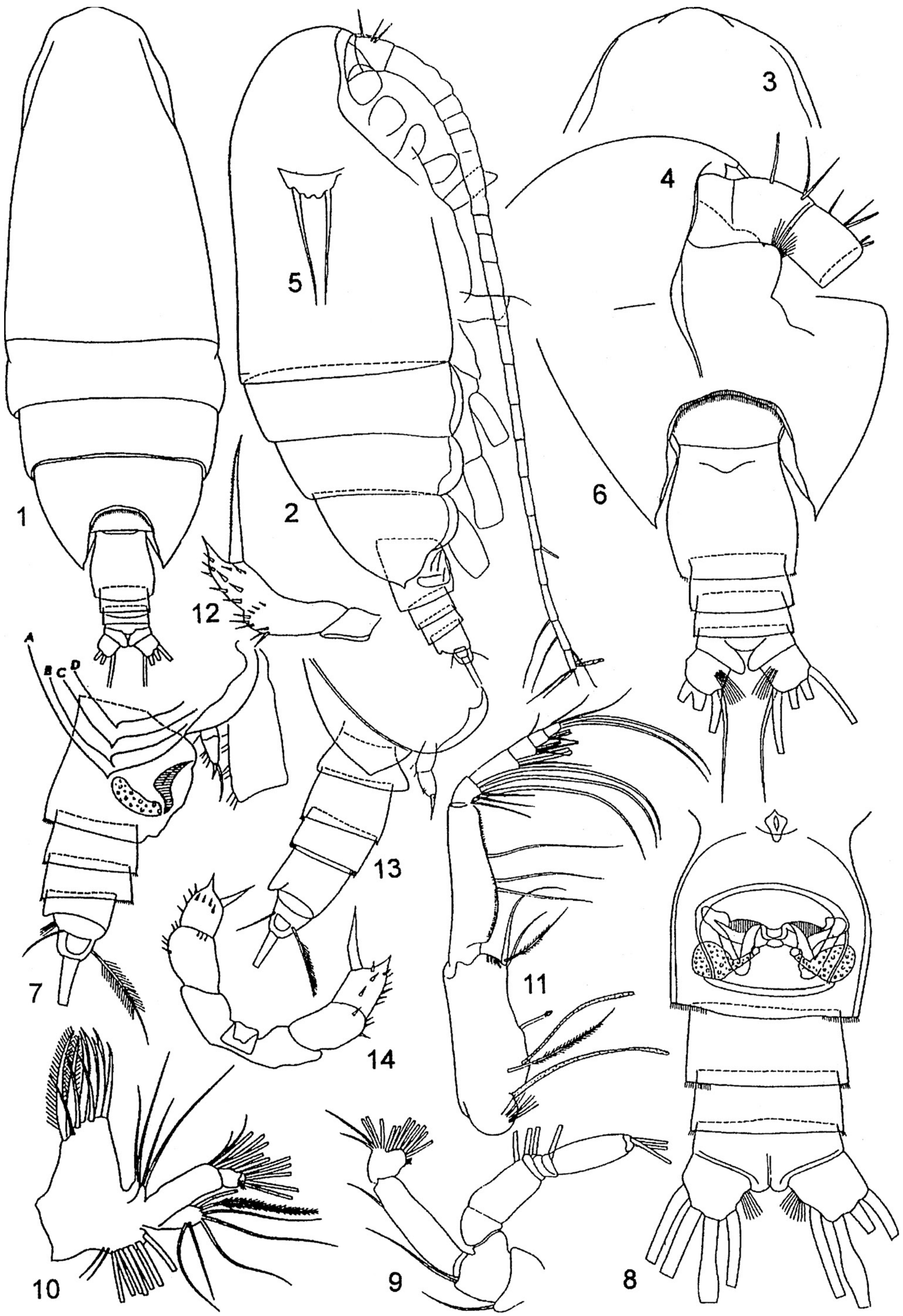
Urosome (Figs 6, 8) 0.21-0.24 times as long as prosome. Ur1 about as long as Ur2-Ur4 and caudal rami combined. Length/thickness ratio of Ur1 about 100/100-106, of Ur2 about 100/168-186 and of Ur3 and Ur4 about 100/200-203. Caudal rami as long as wide. Genital segment in lateral view with moderate genital swelling; ventral margin of swelling sinuous. Spermathecal vesicle large, elongate, lying obliquely antero-dorsally. Genital field in ventral view (Fig. 8) surrounded by chitinous frame; spermathecae situated in posterior corners of the frame, copulatory pores widely spaced.

A1 reaching back to the caudal rami, with 24 free segments; 8th and 9th segments fused with each other and partially fused with 10th segment. A2 (Fig. 9) endopod about 3/5 the length of exopod; Re2 and Re3 fused; Re3-Re6 with 1 seta each; Re7 with 3 terminal setae. Md basipod with 2 inner setae; exopod about as long as endopod; Ri1 with 1, Ri2 with 9 setae. Mx1 (Fig. 10): Li1 with 9 marginal and 1 posterior setae; Li2 and Li3 with 2 setae each; basipod with 5 (2-3 proximal setae shorter than distal setae); Ri1 and Ri2 almost completely fused, with 2 setae each; Ri3 with 3 apical setae. Mx2 (Fig. 20) with 5 inner lobes of increasing size from proximal to distal; Li1-Li4 with 3 setae each, one seta of Li4 stronger, denticulated; Li5 with 2 strong, sclerotized and denticulated setae and 2 worm-like sensory setae; distal part of Mx2 with 3 long, worm-like and 5 shorter brush-like sensory setae of about equal size with thin stem and small apical brush. Mxp (Fig. 11): Ri1 with 3 medial setae and a row of small spinules along inner margin, Ri2-Ri6 with 2+4, 3, 2, 3+1 and 4 setae respectively.

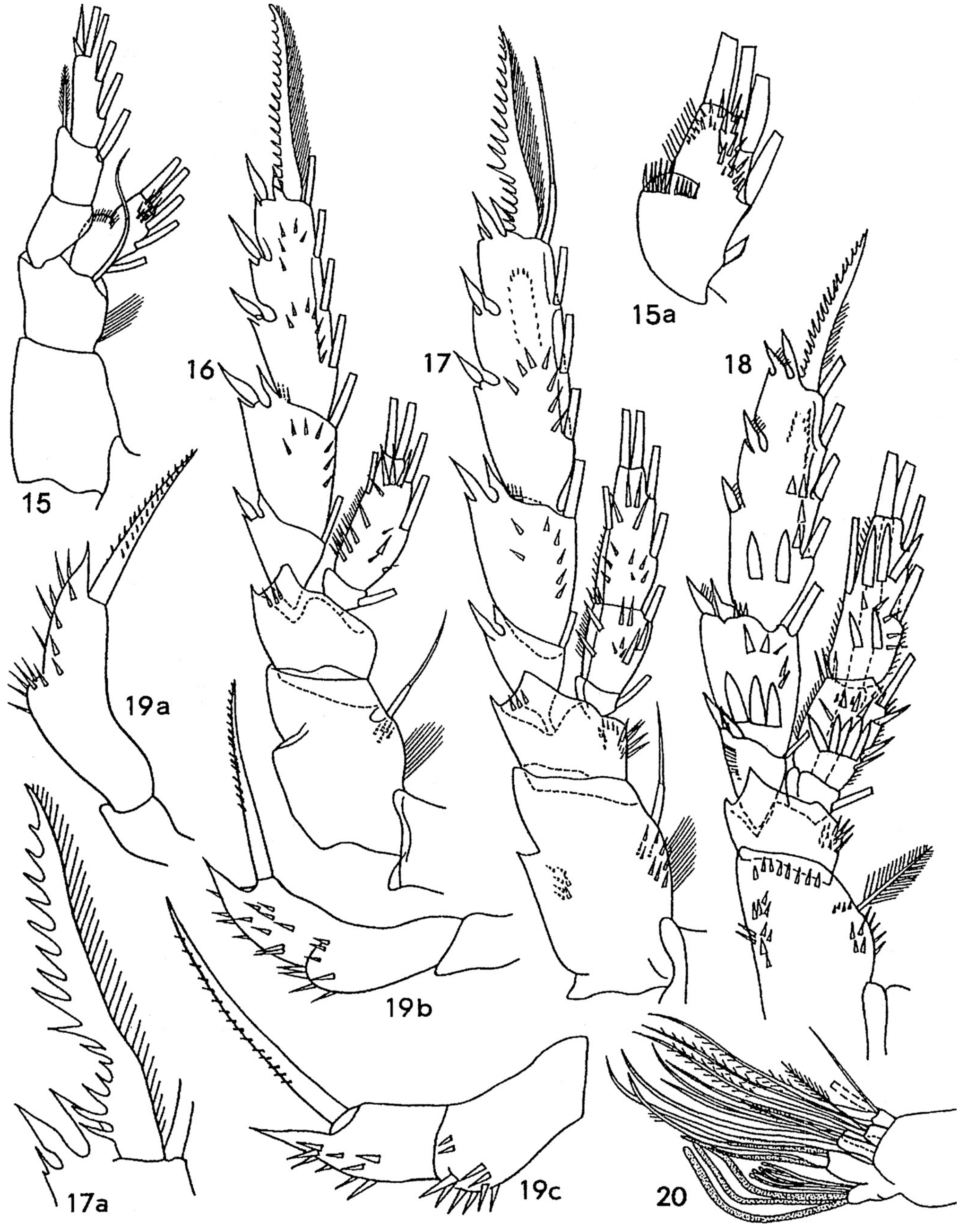
P1 (Figs 15, 15a) exopod 3-segmented; Re1 without setae or spines; Re2 wth 1 inner seta and 1 outer spine about 3/5 the length of Re3; Re3 with 3 inner and 1 apical setae and 1 outer spine; endopod 1-segmented, with spinous outer lobe and 5 setae; posterior surface with a variable number of spinules distally.

P2 (Fig. 16) coxa with an indentation in the middle of outer margin and 1 inner seta and a few spinules on the inner margin; basipod posteriorly with a few spines near outer distal corner. Endopod 2-segmented; Ri1 with 1 seta; Ri1 outer distal corner not produced, rounded; Ri2 with 5 setae and long spinules on posterior surface; external margin with a comb of spinules. Exopod 3-segmented; Re1 and Re2 with 1 inner seta and 1 outer spine. Outer spine of Re1 shorter than outer spines of Re2 and Re3, 1/3 the length of Re2 outer margin. Re3 with 4 inner setae, 3 outer and 1 apical spines; posterior surface of Re2 and Re3 with some spinules. Apical spine of Re3 about 0.86-0.89 times as long as Re3, with 15-19 teeth.

P3 (Figs 17, 17a) coxa with an indentation on outer margin, long inner seta on inner



Figs 1-14. *Scolecitrichopsis ctenopus* (loc. 7). 1-12, adult female; 13, 14, CV female. **1**, body, dorsal view; **2**, same, right lateral view; **3**, forehead, dorsal view; **4**, same, lateral view; **5**, rostrum; **6**, posterior part of body, dorsal view; **7**, Ur and posterolateral corners of Pr, right lateral view (A-D – variation); **8**, Ur, ventral view; **9**, A2; **10**, Mx1; **11**, Mxp; **12**, P5; **13**, posterior part of body, right lateral view; **14**, P5.



Figs 15-20. *Scolecitrichopsis ctenopus*, adult female (15-18, 20 – loc. 7; 19a, 19b – loc. 3; 19c – loc. 2). **15**, P1; **15a**, P1 endopod; **16**, P2; **17**, P3; **17a**, apical spine on Re3 of P3; **18**, P4; **19a**, **19b**, **19c**, P5 (variation); **20**, Mx2.

margin and a group of spinules on anterior and posterior surfaces; basipod with 2 groups of spinules on posterior surface and with small spinules arranged by arc on anterior surface. Endopod 3-segmented; Ri1 with 1 inner seta; outer distal corner not produced, rounded; Ri2 with 1 inner seta, a comb of spinules along external margin and 7-9 long spines on posterior surface; its anterior surface with 3-5 spines near the outer distal corner and 2 rows of small spinules along the segment; Ri3 with 5 setae, a comb of spinules along external margin, 2 groups of spines on posterior and 2 rows of small spinules on anterior surface. Exopod 3-segmented; Re1 and Re2 with 1 inner seta and 1 outer spine each; Re2 with an arc of spines on posterior and 3 rows of small denticles on anterior surface; Re3 with 4 inner setae, 3 outer and 1 apical spines, posterior surface with 2 arcs, anterior with 3 longitudinal rows of small denticles; apical spine about 0.74-0.80 times as long as Re3, slightly distorted, with 5-7 proximal teeth shorter than 9-12 distal ones.

P4 (Fig. 18) segmentation and setation as in P3. Coxa with straight outer and convex inner margin, the latter bearing 1 inner seta; posterior and anterior surfaces of coxa with spines; basis with spines near the inner margin. Ri2 and Ri3 with a comb of spinules along inner and outer margins, 2 and 3 groups of spines respectively on posterior surface (spines of proximal group on Re2 and proximal and distal groups on Re3 are lancet-like, transparent) and 2 rows of small spinules on anterior surface; Ri2 also with some long spines near distal margin on anterior surface. Posterior surface of Re2 and Re3 with 2 and 3 groups of spines respectively; spines of proximal groups are lancet-like; apical spine of Re3 about 0.67-0.72 times as long as Re3, with 16 teeth.

P5 (Figs 19, 19a) uniramous, symmetrical, usually 2-segmented: common basal segment long; distal segment slightly flattened, concave internally, with a rounded swelling about in the middle of external margin, with a number of spines along the swelling and distal part of segment; distal outer corner of segment produced into a long spine-like projection; internal corner terminates in strong seta about 0.68-0.83 times as long as distal segment including external projection; external margin of seta bears 16-20 setules. Sometimes distal segment of P5 partially divided on posterior surface by a suture just above external swelling.

CV female (Figs 13, 14). Body length 1.27 mm. Rostrum as in adult female. Prosome elongate. Cephalosome and SmP1 separate, SmP4 and SmP5 also separate. Posterior corners of SmP5 triangular, without apical spine. Urosome 1/5 length of prosome, 4-segmented. Ur1 and Ur3 short, subequal in length; Ur2 1.3 times as long as Ur3; Ur4 the longest, 1.8 times as long as Ur3. P5 uniramous, consisting of long common basal segment and 2 free segments of approximately equal length. Free segments bear a number of spines on external and posterior surfaces. Distal segment apically with spine-like projection and strong subapical inner seta; seta of left leg slightly longer than of right one.

Male (Fig. 21-33). Body length 1.58 mm; prosome length 1.21 mm (n = 2). Rostrum almost as in female. Body (Fig. 21) slightly more slender than in female. Forehead in lateral view (Fig. 22) rounded, in dorsal view almost truncated. Cephalosome with SmP1 fused, but thin line of fusion is visible. SmP4 divided from SmP5 by a thin line. Posterolateral corners of prosome slightly angular, without apical spine.

Urosome (Fig. 23) 1/3 length of prosome, 5-segmented, but Ur5 very short and completely telescoped into preceding somite. Length/ thickness ratio of Ur2 about 100 : 114, of Ur3 about 100 : 134, of Ur4 about 100 : 125. Posterior borders of Ur2-Ur4 with spinules.

A1 exceeding body length by 3 segments, slightly asymmetrical; left A1 of 21 segments, segments 8-12th fused; in the right A1, also 20th and 21th segments fused, distal segment indistinctly separated (Fig. 24). A2 (Fig. 25) exopod by 1/3 longer than endopod; Re2-Re6 with one seta each, Re7 with medial and 3 distal setae. In Md, basis and Ri1 with single short seta each. Mx1, Mx2 and Mxp (Fig. 27) almost as in female, but external endopodal setae of the latter distinctly longer.

P1-P4 (Figs 28-32) as in female. Length ratio of Re3 apical spine to Re3 is respectively in P2 1 : 1, in P3 80 : 100, in P4 72 : 100; apical spines of P2-P4 have 17, 16 (5 proximal shorter than the distal ones) and 16 strong teeth respectively. P5 (Fig. 33) uniramous; right leg very short, slightly exceeding first segment of left leg, 3-segmented, but distal elongated segment indistinctly separated. Left leg very long and slender, 2.3 times as long as urosome, 4-segmented; the proportional length of segments and apical spine are as 10 : 37 : 20 : 18 : 5. Distal segment distorted in distal two-thirds of its length; proximal 2/3 of segment with a comb-like row of slender spines; proximal 6 spines much longer than distal. Distal segment with 2 apical spines, one thin and curved, the other shorter, lamella-like, extending till 2/3 length of curved spine.

Type locality. The original description of the species was based on the specimens ob-

Figs 21-33. *Scolecitrichopsis ctenopus*, adult male (loc. 3). **21**, body, right lateral view; **22**, forehead, lateral view; **23**, posterior part of body, lateral view; **24**, right A1, 18-20th segments; **25**, A2; **26**, Md basipod; **27**, Mxp; **28**, P1; **29**, P2; **30**, P3; **31**, P3, basipod and Ri1-2, anterior surface; **32**, P4; **33**, P5.

tained in North tropical Pacific: 15° N, 138° W, 100 m; 20° N, 17° 30′ E, 100 m.

Distribution. S. ctenopus exhibits a warm-water circumglobal distribution in the tropical zone. In the Pacific, it is widely distributed (see Vervoort, 1965), penetrating as far to the north as 35° N (Brodsky, 1962) and as far to the south as 16° S (Farran, 1936). It was also recorded from the Malay Archipelago (A. Scott, 1909) and the Yellow and East China Seas (Mori, 1937; Chen & Zhang, 1965). In the Indian Ocean basin, it was recorded from the Bay of Bengal (Sewell, 1929), the Red and Arabian Seas (Gordeeva, 1971; Morjakova, 1971; Madhupratap & Harridas, 1990). From the Atlantic Ocean, the species was recorded from the Gulf of Guinea in the east (T. Scott, 1994; Vervoort, 1965) and near Venezuela (Legaré, 1964), from the Florida current off Miami, and Caribbean Sea (Owre & Foyo, 1967) in the west of the Ocean.

The species inhabits predominantly the epipelagic and mesopelagic zone. It seems to be not frequent and not abundant. The life cycle is not examined. According to twelve months observations of Legaré (1964) in the North-West Atlantic near Venezuela, the species was absent in the layer 0-500 m in July, August and October, maximum abundance was noted in March and May.

Remarks. The variability of this species in some characters was discussed by Farran (1936) and Tanaka (1962); judging from other descriptions (see the synonymy), it exhibits also the following variation: the posterolateral lobe of the last prosomal somite covers from 1/5 to 3/5 of Ur1 length; the length, shape and direction of spinelike process of SmP5 posterolateral lobe also varies: sometimes it is (in lateral view) triangular, stout, directed posteriorly, dorsal margin of process being continuous with dorsal margin of SmP5, ventral margin forming an angle with ventral margin of SmP5; sometimes it is thinner, curved, directed posteroventrally, of somewhat variable length.

Based on existing descriptions (see the synonymy) at least two morphological forms of *S. ctenopus* seem to exist. Their characteristic features are as follows. In one form: females with short, stout urosome, long posterolateral lobe of SmP5 covering 3/5 length of Ur1, spiniform process of SmP5 lobe stout, triangular, directed posteriorly (see Sewell, 1929; Mori, 1937; Brodsky, 1962). In the other form: females with proportionally more slender and longer urosome, with posterolateral lobe of SmP5 covering 1/5-1/2 length of Ur1, spiniform process of SmP5 lobe smaller, thinner, directed posteriorly (see Farran, 1936; Tanaka, 1962) or thin, curved, directed posteroventrally (see Grice, 1962). These morphological forms may be extremes of individual variability of the same species, or they may belong to different generations, or may be even to different species.

Taking into account the significant variability of *S. ctenopus* and the absence of description of female from the type locality, I presented a detailed description of both sexes of *S. ctenopus* based on specimens from the tropical Pacific neighbouring to the type locality. Our description differs from the most detailed description by Tanaka (1962) in some details of oral parts setation and swimming legs ornamentation. The lancet-like spines on posterior surfaces of P3-P4 endopod and exopod and long spines on anterior surface of Ri2 P3 in ornamentation of swimming legs were recorded for the first time. They are useful for the definition of the new genus.

Pseudoamallothrix gen. n.

Type species: Amallothrix profunda Brodsky, 1950.

Description. Calanoids of medium or large size; body length from 1.45 to 6.35 mm, subequal in female and male.

SmP4 and SmP5 usually fused in female (articulation suture sometimes visible dorsally), usually separate in male and some females of large species. Posterolateral corners of SmP5 not produced, broadly rounded, in the middle part with a shallow incurvation (incision), or slightly produced, narrowly rounded with indentation near dorsolateral part.

Rostrum as a short plate with 2 strong but short rami continuing in 2 thick aesthetasc-like filaments; the latter longer than the strong proximal part and frequently notched at apex.

A1 of female with 23-24 segments; 8th and 9th segments fused, 24th and 25th segments sometimes fused. A1 of male slightly asymmetrical: left A1 with 20 segments, 8-12th and 24-25th segments fused; right A1 with 19 segments, also 20-21th segments fused.

A2 endopod 1/2-2/3 the length of exopod; Re1 without seta, usually with a rounded swelling on internal margin (without swelling in *P. cenotelis, P. longispina* and *P.*

ovata); Re2-Re6 frequently with 1 seta each in female and male; seta of Re2 usually shorter in female, than in male.

Mx1: Li1 with 2 or 4 posterior setae; Li3 usually with 4, sometimes with 3 setae (*P. ovata, P. cenotelis*); exopod usually with 8 setae, in *P. ovata* and *P. cenotelis* with 5 setae.

Mx2: Li1-Li4 with 3 setae each; Li5 with 2-3 sclerotized setae and 1 or sometimes 2 worm-like sensory setae; on Li3, sometimes one of the 3 sclerotized setae transformed into sensory seta; 3-segmented endopod with 3 long worm-like and 5 brush-like sensory setae; distal brush of brush-like setae always small, but 3 of 5 setae have "stem" slightly or significantly longer and sometimes worm-like. Male mouthparts similar to those of female in meristic details, but some setae are shorter, slightly reduced.

Each of the three segments of P1 exopod with external spine of about 1/2-4/5 the length of the segment, in *P. longispina* longer than segment (Re1 without seta in *P. birshteini*; Re1-2 without setae in *P. canariensis*).

External distal corner of Ri1 of P2 produced into long, spine-like process; external spine on Re1 of P2 straight, usually short.

P2-P3 coxopod with a distinct indentation about in the middle of external margin; internal margin usually with well marked projection distally (without projection in *P. longispina*); the latter often with a notch; dorsal surface of exopod and endopod segments with spines arranged in arcs and with numerous spinules.

P4 coxopod with external margin smooth, internal margin bearing a rounded lamelliform lobe (without lobe in *P. longispina*); dorsal surface of segments with few spinules.

Female P5 uniramous with 1 or sometimes 2 free subcylindrical segments and 2 (apical and subapical) spines; common basal segment long.

Male P5 biramous, asymmetrical. In right leg, first and second exopodal segments almost completely fused, second segment with or without short distal projection, third exopodal segment curved, bearing lamella-like spine on distal end; right endopod of medium length, pointed. Left one-segmented endopod usually longer than 3-segmented exopod or sometimes as long as exopod. Right P5 sometimes significantly shorter than left (*P. indica*). Sometimes (in *P. ovata*, ?*P. cenotelis*) P5 uniramous, right leg much shorter than left.

Species included. The following 13 species are placed in the genus *Pseudoamallothrix*:

(1) **Pseudoamallothrix birshteini* (Brodsky, 1955), comb. n. (= *Scolecithrix birshteini* Brodsky, 1955 (= *Scolecithrix birshteini* f. *minor* Brodsky, 1955); ♂ unknown;

(2) **P. canariensis* (Roe, 1975), comb. n. (= *Scolecithricella canariensis* Roe, 1975); ♂ unknown;

(3) **P. cenotelis* (Park, 1980), comb. n. (= *Scolecithricella cenotelis* Park, 1980); ♂ unknown, but see the note to *P. ovata* below;

(4) **P. emarginata* (Farran, 1905), comb. n. (= *Scolecithrix emarginata* Farran, 1905; = *Scolecithrix polaris* Wolfenden, 1911, see Park, 1980; = ? *Scolecithrix aequalis* Wolfenden, 1911, see Sewell, 1947; ♂ described by With, 1915 as *Scaphocalanus obtusifrons*, see Tanaka, 1962);

(5) **P. hadrosoma* (Park, 1980), comb. n. (= *Scolecithricella hadrosoma* Park, 1980); ♂ unknown;

(6) *P. incisa* (Farran, 1929), comb. n. (= *Scolecithrix incisa* Farran, 1929); ♂ unknown;

(7) **P. indica* (Sewell, 1929), comb. n. (= *Amallothrix indica* Sewell, 1929; ♂ see Grice & Hulsemann, 1967);

(8) ***P. inornata* (Esterly, 1906), comb. n. (= *Scolecithrix inornata* Esterly, 1906; ♂ see Brodsky, 1950);

(9) **P. laminata* (Farran, 1926), comb. n. (= *Scolecithrix laminata* Farran, 1926; ♂ see Roe, 1975);

(10) *P. longispina* (Schulz, 1991), comb. n. (= *Amallothrix longispina* Schulz, 1991), ♀, ♂;

(11) **P. obtusifrons* (Sars, 1905), comb. n. (= *Amallophora obtusifrons* Sars, 1905; ♂ see Sars, 1924-1925);

(12) ***P. ovata* (Farran, 1905), comb. n. (= *Scolecithrix ovata* Farran, 1905, = *S. subdentata* Esterly, 1905, see Campaner, 1984; ♂ of this (?) species see Tanaka, 1962. Minoda (1971, pl. 2, fig. 8, 9) recorded two variants of *P. ovata* male right P5 distal segment, one of them is identical with that figured by Tanaka (1962, fig. 137o), the other with that figured by Bradford et al. (1983, fig. 66g). It is possible that these male P5 variants refer to two separate species, *P. ovata* and *P. cenotelis*. Which of them refers to the true *P. ovata* is still unclear);

(13) ***P. profunda* (Brodsky, 1950), comb. n. (= *Amallothrix profunda* Brodsky, 1950, ♂; = *Scolecithrix birshteini* f. *major* Brodsky, 1955, ♀).

Schulz (1991) for his new species *Amallothrix longispina* noted that it has characters atypical of *Amallothrix* in the definition by Bradford (1973) and Bradford et al. (1983), comprising the structure of the female and male P5. The structure of these legs and also of rostrum are indeed much closer to those in the new genus *Pseudoamallothrix*. The characters noted by Schulz as corresponding to *Amallothrix* definition are as follows: (1) 2 posterior setae on Li1 and 4 setae on Li3 of Mx1; (2) 3 outer spines on exopod of P1 and (3) multisegmented female P5. These and some other characters are shared by *Amallothrix* with *Pseudoamallothrix* (Table 2). In the Schulz's species, two derived characters typical of *Pseudoamallothrix* are lacking: the rounded process on the inner side of A2 Re1 of female and the projection or lobe on the inner coxal margin of P2-P4 (but a notch on the outer coxal margin is present). These character states of *P. longispina* are primitive and shared with most of Scolecitrichidae genera. However, the species is much closer to *Pseudoamallothrix* in important derived characters: the structure of rostrum and female and male P5, which quite well distinguish the latter genus from 3 other under discussion. So it seems best to place *longispina* within the genus *Pseudoamallothrix*. *P. longispina* seems to separate from ancestral form of *Pseudoamallothrix* very early, so the species retain some characters common with the ancestor of Scolecitrichidae.

P. ovata and *P. cenotelis* share with other species of *Pseudoamallothrix* peculiar derived characters, including the structure of rostrum and the P2-P4 coxopod with a large projection or lobe on the inner margin. But on the other hand, both species have no rounded process on the inner side of Re1 of A2 and have 3 setae instead of 4 on Li3 of Mx1, sharing these features with *Scolecithricella* and some other genera (Table 2). Furthermore, the female P5 with the flat, rounded distal part of distal segment in the two species under discussion is somewhat similar to that typical of *Scolecithricella*. Bradford (1973) and Bradford et al. (1983) considered the number of setae on Li3 of Mx1 and the structure of the female P5 as decisive characters and placed the two species in *Scolecithricella*, but these species differ from *Scolecithricella* in other derived and key characters (Table 2).

As to the characters shared by *P. ovata* and *P. cenotelis* with *Scolecithricella*, the following can be noted. The absence of the rounded process on the inner side of Re1 A1 is a primitive feature. Reduction of setae number on different parts of Mx1 as compared to ancestral Mx1 of Clausocalanoidea is a common, parallel way of Mx1 transformation in the monophyletic Bradfordian families (Fleminger, 1957; Ferrari & Markhaseva, 1996) and in other families of the superfamily Clausocalanoidea. So, this character seem to be less important in the generic definition than the above-mentioned peculiar derived characters shared with *Pseudoamallothrix*.

The 2-segmented female P5 of *P. ovata* and *P. cenotelis* with long common basal segment and inflated distal part of the subcylindrical in its proximal part free segment does not correspond to the typical one-segmented P5 of *Scolecithricella*, but seems to show the parallel with the *Scolecithricella* way of P5 free segment transformation: flattening of the segment or its distal part.

P. ovata and *P. cenotelis* differ from *Pseudoamallothrix* as also from *Scolecithricella* in the uniramous male P5 that they share with *Scolecitrichopsis*. But both species have no other typical key characters of *Scolecitrichopsis*. The uniramous male P5 with simple subcylindrical segments is noted also in *Neoscolecithrix*. The ancestral male P5 of Clausocalanoidea (Vyshkvartzeva, 1994), as also of more immediate ancestral form of Bradfordian families, was biramous. The uniramous male P5 with simple, subcylindrical segments seems to be a result of parallel character transformation in allied genera of Scolecithrichidae. The more, very similar uniramous male P5 are met in Phaennidae, another Bradfordian family. In the other family of Clausocalanoidea, in Aetideidae, simple uniramous male P5 is met along with simple primitive biramous (Markhaseva, 1996). In one more superfamily, Spinocalanoidea, closely allied to Clausocalanoidea (Andronov, 1974; Park, 1986), 2 species of the genus *Spinocalanus*, *S. angusticeps* Sars and *S. antarcticus* Wolfenden, have uniramous simple male P5 alongside with biramous simple male P5 of the other species of the same genus.

In *P. ovata* and *P. cenotelis*, a primitive character (the absence of a rounded process on the internal margin of A2 Re1) is combined with a derived character (uniramous male P5). This shows that both species early separated from the common ancestor of the genus. Possibly, a separate subgenus can be formed for these two species, but it seems better to postpone such a decision till the identity of the male of *P. cenotelis* will be confirmed and males of other species of the genus will be found.

Pseudoamallothrix profunda (Brodsky, 1950) (Figs 34-63)

Amallothrix profunda Brodsky, 1950: 263, fig. 172.
Scolecithrix birshteini f. *major* Brodsky, 1955: 178, fig. 9.

Description. Female. Body length 2.28-2.7 mm. Prosome narrowly elliptical in dorsal view. Forehead (Figs 34, 35) narrowly rounded in dorsal view, broadly rounded in lateral view. Rostrum (Fig. 36) with 2 short, strong branches each continuing in thick, long, aesthetasc-like filament. SmP4 and SmP5 separated; distal corners of SmP5 not produced, broadly rounded, with a shallow incurvation (Figs 37, 38).

Urosome (Fig. 38) of 4 somites, short, only one-fourth as long as prosome. Genital somite 1.3 times as long as second or third urosomal somite, slightly thicker than long in lateral view (Fig. 39), with rounded genital swelling in anterior 2/3 and curved ventral margin posterior to genital opening. Spermatheca in the form of elongate vesicle dilated distally and situated obliquely dorsoanteriorly. Ur2 and Ur3 of subequal size, as long as thick.

A1 with 23 free segments (8th and 9th and 24th and 25th segments fused), extending to posterior end of caudal rami. A2 (Fig. 40) exopod 1.5 times as long as endopod; Re1 with rounded swelling on internal margin; Re2 and Re3 fused, with 1 distal seta; Re6 with 1 medial seta in addition to 3 terminal setae. Md basipod (Fig. 41) with 3 inner setae; Ri1 with 2 inner and Ri2 with 9 terminal setae; endopod almost as long as exopod. Mx1: Li1 with 4 posterior setae; Li2, Li3 and basipod with 2, 4 and 5 setae respectively; endopod fused with basipod, bearing 3 inner and 5 terminal setae; exopod and Le1 with 9 setae each. Sometimes left or right Mx1 have on their exopod only 8 setae. Mx2 (Fig. 63): Li1 with 4 setae, Li2-Li4 with 3 setae each; Li5 with 2 sclerotized setae and 2 worm-like sensory setae; distal part of endopod with 3 long worm-like and 5 brush-like sensory setae, 3 of the latter distinctly longer than 2 others, with worm-like stem and small apical brushes, all 5 brushes almost equal in size. Mxp protopod with 1 seta and 2 worm-like setae in proximal part, 1 short brush-like seta in the middle and 3 setae distally; Ri1 with 3 setae in distal part and a row of small spinules along inner side till the distal seta; Ri2-Ri6 with 2 + 4, 4, 3, 3 + 1 and 4 setae respectively.

P1 (Fig. 42): Re1-Re3 with external spine each; anterior and posterior surfaces of exopod segments with small spinules; endopod 1-segmented, with 5 setae and spinous outer lobe, its posterior surface with spinules.

In P2-P3 (Figs 43, 44), anterior and posterior surfaces of all segments with numerous small spinules. P4 (Fig. 45) coxopod with lamellous, transparent, oval inner lobe; coxopod, exopod and endopod with few small spinules on posterior surface.

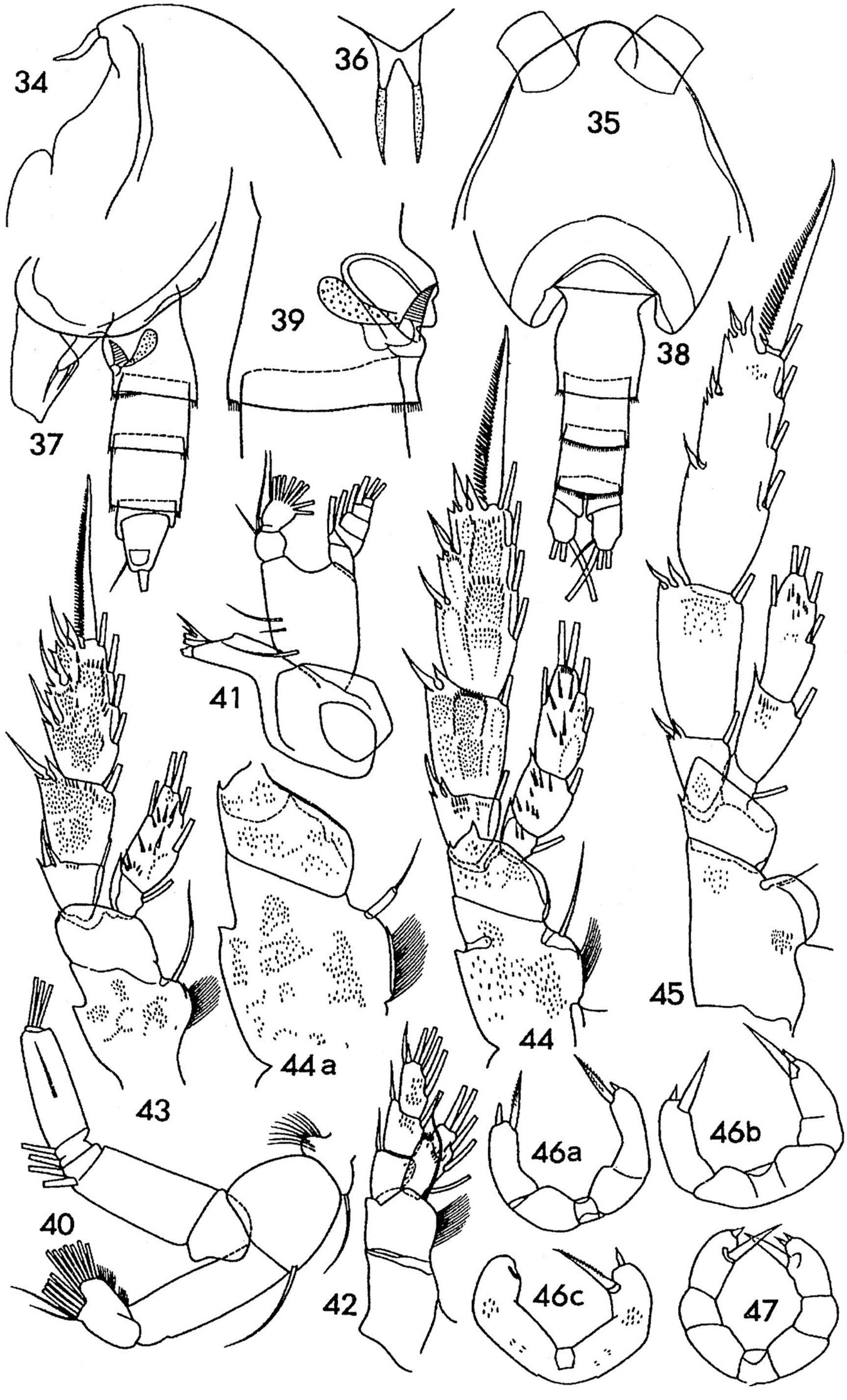
P5 (Figs 46a-c) usually symmetrical; each leg 2-segmented, with distal segment curved medially, sometimes partially divided by a short line about midway on inner side, carrying a subapical inner spine a little shorter than segment and a very short apical spine.

CV female (Fig. 59). Body length 2.39 mm. Rostrum as in adult female. Prosome elongate. Cephalosome and SmP1 separate; SmP4 and SmP5 also separate. Posterior corners of SmP5 broadly rounded. Urosome about 1/3 length of prosome, 4-segmented. Ur1-Ur2 short, wider than long; Ur3 as wide as long; Ur4 1.3 times as long as Ur3, longer than wide. P5 (Figs 47, 60) consists of long, common to left and right legs, basal segment and 2 free segments, proximal much shorter than distal, but the length of the latter is variable. Distal segment of both legs with more stout inner subapical and very short apical spines.

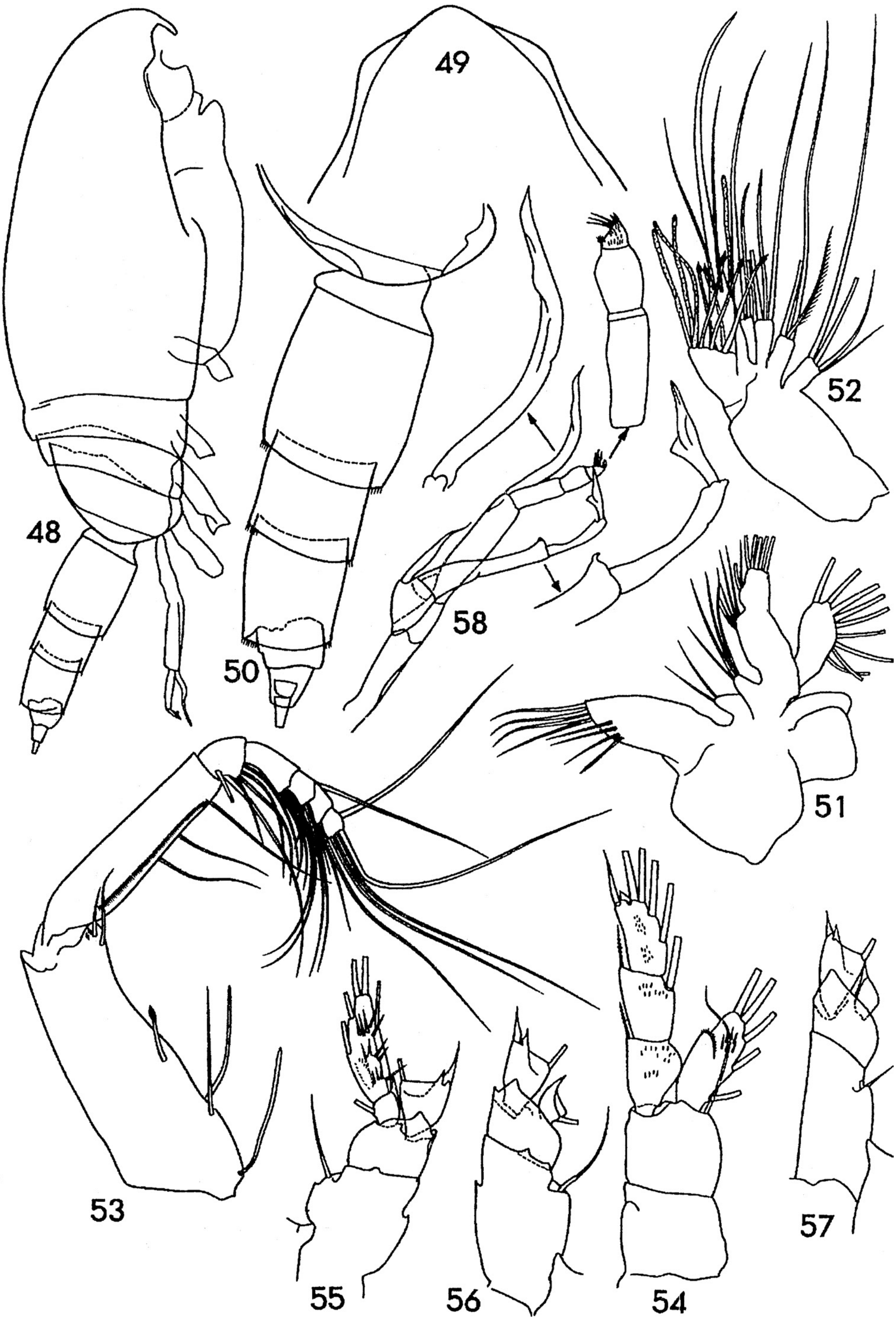
Male. Body length 2.75-2.80 mm. Body (Fig. 48) more slender than in female. Forehead smoothly rounded in lateral aspect; it looks as a low triangle with rounded apex in dorsal aspect (Fig. 49). Rostrum as in female. Cephalosome and SmP1 fused; SmP4 and SmP5 separate; distal edge of SmP5 broadly rounded (Fig. 50).

Urosome (Fig. 50) about 1/4 length of prosome. Ur2 the largest; its depth/length ratio about 80/100. Ur3 about 0.6 times as long as Ur2, as long as deep. Ur4 about 0.7 times as long as Ur2; its depth/length ratio about 83/100. Ur5 and caudal rami short.

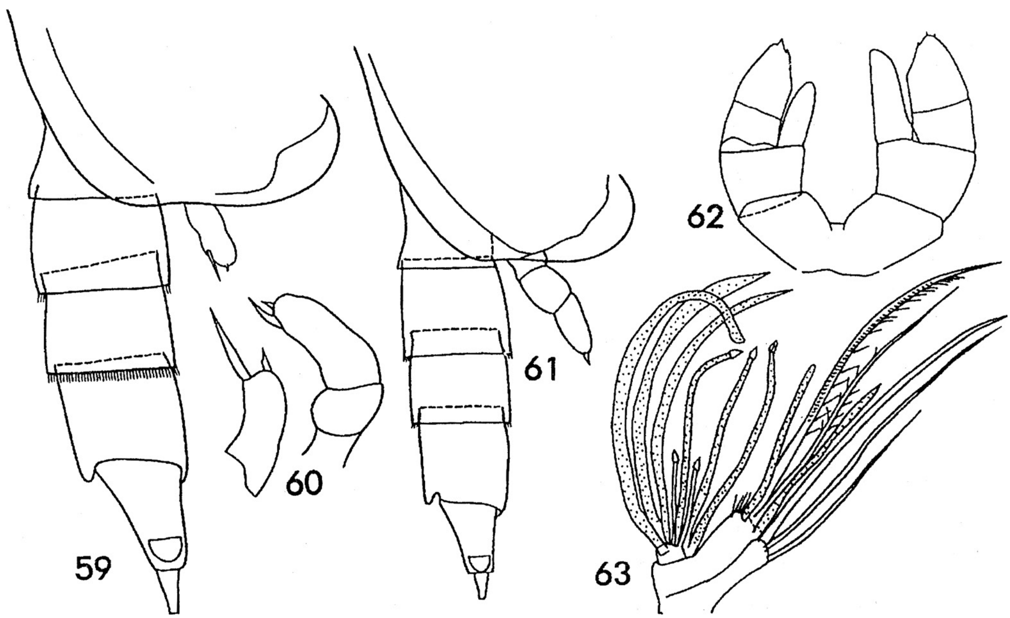
A1 with segments 8-9th and 10-12th completely fused, 9th and 10th partially fused; segments after 14 being broken. Oral parts similar to those of female in meristic details, but Mx1 (Fig. 51) and Mx2 (Fig. 52) smaller, in Mx1 setae of Li1-Li3 slightly shorter, Mx2 on Li5 with 3 sclerotized and 1 worm-like sensory setae. Outer setae on Ri5-Ri6 of Mxp (Fig. 53) distinctly longer than



Figs 34-47. *Pseudoamallothrix profunda* (loc. 15). 34-46, adult female; 47, CV female. **34**, forehead, left lateral view; **35**, forehead, dorsal view; **36**, rostrum; **37**, posterior part of body, right lateral view; **38**, same, dorsal view; **39**, genital complex, right lateral view; **40**, A2; **41**, Md; **42**, P1; **43**, P2; **44**, P3; **44a**, P3 coxopod and basipod; **45**, P4; **46a-c**, P5, variation; **47**, CV P5.



Figs 48-58. *Pseudoamallothrix profunda*, male (48-50, 53, 55-57 – loc. 12; 51, 52, 54, 58 – loc. 8, lectotype). **48**, body, right lateral view; **49**, forehead, dorsal view; **50**, posterior part of body, right lateral view; **51**, Mx1; **52**, Mx2; **53**, Mxp; **54**, P1; **55**, P2 without two distal exopodal segments; **56**, P3 without two distal exopodal and endopodal segments; **57**, P4 without two distal exopodal and endopodal segments (P1-P4 – posterior surface); **58**, P5.



Figs 59-63. *Pseudoamallothrix profunda.* **59**, CV female, posterior part of body; **60**, CV female P5 (loc. 15); **61**, CV male, posterior part of body; **62**, CV male P5 (loc. 14); **63**, Mx2, female (loc. 13).

in female. P1 (Fig. 54) as in female. In P2-P4 (Figs 55-57), basal segments almost as in female, but inner coxal projection less developed.

P5 (Fig. 58) reaching caudal rami, asymmetrical; left leg slightly longer than right. In right leg, mediodistal corner of Re2 slightly produced, with a small hook visible in some positions; Re3 slightly curved, bearing at distal end a lamella-like, long, triangular spine. In left leg, Re3 short, with spines and spinules; one-segmented endopod exceeding left exopod considerably.

CV male (Fig. 61). Body length and habitus very close to CV female, differs in the longer P5. P5 (Fig. 62) biramous, basipod and endopod of the right leg slightly larger than those of the left leg.

Type locality. 90 miles SE of Shipunsky Cape, Kamchatka, 1000-4000 m.

Distribution. The species was registered only in the North-West Pacific in abyssopelagic waters.

Remarks. P. profunda (Brodsky) is very similar to *P. laminata* (Farran), but the females of the former differ from those of the latter in the longer Ur2 and Ur3, presence of spines on posterior surface of P1 endopod, longer external spine of Re1P2, absence of spines on distal internal corner of P3 basipod and stronger and shorter subapical internal spine of P5. The males of *P. profunda* differ from males of *P. laminata*, as it was figured and described by Roe (1975: 320, fig. 9t-v), in the presence of spines on posterior surface of P1 endopod, absence of spines on distal internal corner of P3 basipod and may be in the absence of hook-like process on mediodistal corner of right Re2 of P5 in the latter.

Scolecithricella Sars, 1902

Type species: *Scolecithrix minor* Brady, 1883 (by original designation).

Description. Small and middle-sized calanoids; females and males of about equal length from 1 to 3 mm.

SmP4 and SmP5 in female completely fused, more or less produced distally, narrowly or broadly rounded, sometimes with a incision near the dorsal side, in male separate, broadly rounded.

Rostrum bifurcated, both long proximal processes strong, sausage-shaped, tapering distally into sensory filaments, varying from short to 3/5 length of proximal part.

A1 of female with 20-23 free segments, 8-10th segments of the typical 25-segmented calanoid antennule fused; 24th and25th, 1st and 2nd, and 12th and 13th segments sometimes also fused, partly or completely. A1 of male symmetrical, with 18-19 segments: segments 8-12th, 20-21th completely fused, 24-25th sometimes partly fused.

A2: Ri about 2/3 Re. Re1 without seta or swelling; Re2-Re6 with 1 seta each in both sexes; in female, seta of Re2 sometimes shorter than in male.

Md endopod reaching the end of exopod; basis with 1 inner seta reduced in male.

Mx1: Li1 with 1 or 2 posterior setae; Li3 with 3 setae; exopod with 5, 6, 7 or 8 setae.

Mx2: Li1 with 3 setae; Li2-Li4 with 2-3 setae; Li5 with 3 setae (one of them more stout) and usually with 1 worm-like sensory seta; distal 3 segments of endopod with 3 worm-like and 5 brush-like sensory setae; 2 of 5 brush-like setae shorter, their brushes slightly larger.

P1 exopod with 2 outer spines (Re1 without outer spine); spine of Re2 not longer than 2/3 length of Re3.

Outer distal corner of Ri1 P2 produced distally into obtuse or acute spine-like process;, external spine of Re1 P2 usually long, more than half as long as Re2.

P4 coxopod near outer distal margin with obtuse, knob-like process. Anterior and posterior surfaces of P4 protopod, endopod and exopod with sparse small spines.

P5 of female uniramous, one-segmented; segment flat, attached to common, very short coupler, armed with long inner spine (slightly shorter, equal or slightly longer than segment), shorter apical spine and a minute outer spine, the latter frequently absent. P5 sometimes completely absent.

P5 of male biramous, asymmetrical; length of right and left legs subequal or right leg slightly shorter; legs shorter than, about equal to or a little longer than urosome. Endopods of both legs short or rudimentary; exopods usually 3-segmented, segments subcylindrical. In right leg, Re1-Re2 partially or completely fused; Re2 with or more frequently without short medio-distal projection; Re3 usually with a minute seta distally, or tapering as a long spiniform process, or terminating with a characteristic grooved structure. Distal segment of left leg exopod usually the shortest, with spinules. Left endopod finger-like, not longer than half of exopod, usually with a minute seta distally.

Species included. The following species are placed in the genus *Scolecithricella*:

(1) ***Scolecithricella abyssalis* (Giesbrecht, 1888) (♂ see Giesbrecht, 1892; = *Scolecithrix tumida* T. Scott, 1894);

(2) ***S. dentata* (Giesbrecht, 1892), ♀ (= *Scolecithrix dubia* Giesbrecht, 1892, ♂, see Park, 1980);

(3) ***S. globulosa* Brodsky, 1950 (= *S. schizosoma* Park, 1980, **syn. n.**), ♀, ♂;

(4) ***S. minor* (Brady, 1883), ♀, ♂;

(5) **S. marginata* (Giesbrecht, 1888), ♀;

(6) *S. nicobarica* (Sewell, 1929), ♀, ♂;

(7) *S. orientalis* Mori, 1937 (? not synonym of *S. tenuiserrata*, differs in the setation of Mx1 exopod and endopod), ♀;

(8) *S. paramarginata* Schulz, 1991, ♀, ♂;

(9) **S. profunda* (Giesbrecht, 1892) (♂ see Tanaka, 1962; Bradford et al., 1983);

(10) **S. tenuiserrata* (Giesbrecht, 1892), ♀, ♂;

(11) **S. vittata* (Giesbrecht, 1892) (= *Scolecithricella subvittata* Rose, 1942, see Campaner, 1984), ♀, ♂.

Thus, in addition to 8 species included in *Scolecithricella* s. str. by Schulz (1991), we place in this genus another 4 species: *S. marginata, S. nicobarica, S. orientalis* and *S. globulosa*.

Species possibly belonging to this genus (their descriptions are insufficient and usually males unknown): *S. farrani* (Rose, 1942) (= ? *S. longipes*); *S. longipes* Giesbrecht, 1892; *S. longispinosa* Chen & Zhang, 1965; *S. pearsoni* Sewell, 1914 (♀, ♂); *S. sarsi* (Rose, 1942) (= ? *Scolecithricella globulosa*, but Mx1 exopod of *S. sarsi* with 7 setae instead of 8 and P5 slightly different); *S. vespertina* Tanaka, 1962.

Amallothrix Sars, 1925

Type species: *Scolecithricella gracilis* Sars, 1905 (designated by Wilson, 1950).

Description. Calanoids of medium or large sizes; body length subequal in female and male, from 1.5 to 4.5 mm.

SmP4 and SmP5 in female separate or partially or completely fused; posterolateral corners of last prosomal somite slightly produced, broadly rounded, usually with an incurvation near dorsal side. In male, SmP4 and SmP5 separate, not produced, broadly rounded.

Rostrum bifurcated; both long proximal processes strong, sausage-shaped, tapering distally into sensory filament as long as proximal part or about 1/3 its length.

A1 of female with 23-24 free segments; 8th and 9th, sometimes also 24th and 25th segments fused. A1 of male slightly asymmetrical: in left A1 8-12th segments, in right A1 also 20th and 21th segments fused.

A2 endopod about 2/3-4/5 length of exopod; Re2-Re6 with one seta each in female and male; Re7 usually with one medial and 3 distal setae.

Md basipod usually with 3 inner setae; 2 setae frequently rudimentary; endopod reaching about 2/3 length of exopod.

Mx1: Li1 with 2 (in *A. aspinosa*, with 4) posterior setae; Li3 with 4 (in *A. obscura*, with 3) setae; exopod with 8-9 setae.

Mx2: Li1-Li4 with 3 sclerotized setae; Li5 with 3 sclerotized setae (one seta being stronger, hook-like, denticulate) and 1 worm-like sensory filament. 3 endopodal segments with 3 long worm-like and 5 brush-like sensory setae, 2 brush-like setae being shorter than 3 others.

P1: Re1-Re3 usually with an external spine about 1/2-4/5 length of Re2 (in *A. lobophora* and *A. obscura*, Re1 without external seta; in *A. aspinosa*, Re1-Re2 without external seta each).

P2: distal outer corner of Ri1 produced into obtuse or acute spine-like process; external spine of Re1 usually long, more than half as long as Re2.

P4 coxopod internal and external margins smooth; no obtuse process near outer distal margin. Posterior surface of P2-P4 exopod and endopod with spines and spinules frequently arranged in arcs; on P4, ornamentation scarcer than on P2-P3.

P5 of female usually 2-segmented; common basal segment long; distal segment elongate, curved inward, usually with 3 spines: internal spine the strongest, as long as segment or slightly longer or shorter, with external edge serrated; apical spine about 1/4-1/2 length of internal; external spine small, usually situated opposite to internal spine; in some species, P5 segments with spines posteriorly.

P5 of male shorter than or as long as urosome, biramous, asymmetrical: the right leg usually a little shorter than the left. In right leg, endopod of moderate length, tapering distally; exopod 3-segmented; Re1-Re2 partly or completely fused; mediodistal corner of Re2 with well developed projection; Re3 curved, with apical spine about 1/2-1/3 length of Re3. In left leg, one-segmented endopod is about 3/5-4/5 length of 3-segmented exopod; Re3 the shortest, with spinules along inner margin.

Species included. The following species, in which both sexes are known, can be placed in the genus *Amallothrix*:

(1) **Amallothrix arcuata* (Sars, 1920) (♂ see Sewell, 1947; = ? *Scolecithricella pseudoarcuata* Park, 1970; = ? *Amallophora robusta* T. Scott, 1894, see Bradford et al., 1983);

(2) *A. lobophora* (Park, 1970) (♂ described by Roe (1975), but, according to Ferrari & Steinberg (1993), Roe's specimens probably are not conspecific with *A. lobophora*, differing in the 3 posterior setae on Li1 of Mx1 instead of 2);

(3) ***A. dentipes* (Vervoort, 1951) (♂ see Vervoort, 1957; = *Scolecithricella robusta*: Vervoort, 1957 (non T. Scott, 1894), see Park, 1980);

(4) *A. falcifer* (Farran, 1926) (♂ see Roe, 1975);

(5) ***A. gracilis* (Sars, 1905) (♂ see Tanaka, 1962; = *Scolecithrix globiceps* Farran, 1908, see Tanaka, 1962);

(6) *A. pseudopropinqua* (Park, 1980);

(7) **A. valida* (Farran, 1908) (♂ described by Brodsky (1950) and Tanaka (1962), but Park (1980) believed that the male differs from that described and figured by Brodsky and Tanaka, and described a male of this species which is identical with that of *Scolecithricella lanceolata* Tanaka, 1962 described from male. As noted by Bradford et al. (1983), the identity of the male of *A. valida* has yet to be clearly established).

Amallothrix denticulata (Tanaka, 1962) and *A. lanceolata* (Tanaka, 1962) known from males only and males described as *Amallothrix* sp. by Roe (1975) and *Scolecithricella* sp. 1, sp. 2 and sp. 3 by Park (1980) certainly belong to *Amallothrix*.

The following species, in which only females are known, belong much probably to *Amallothrix*: *A. aculeata* (Esterly, 1913) (=? *Scolecithrix elephas* Esterly, 1913, the latter seems to be a female of 5th copepodid stage); *A. modica* (Tanaka, 1962); *A. mollis* (Esterly, 1913); *A. obscura* (Roe, 1975); *A. parafalcifer* (Park, 1980); *A. propinqua* (Sars, 1920); *A. pseudoarcuata* (Park, 1970); *A. robusta* (T. Scott, 1894); **A. spinata* (Tanaka, 1962); **A. timida* (Tanaka, 1962) (= ? *A. mollis*); *A. valens* (Farran, 1926) (? = **A. paravalida* Brodsky, 1950).

Amallothrix obscura (Roe, 1975) much probably belongs to this genus, not to *Scolecithricella*, where it was placed by Roe

(1975) mainly because it has 3 setae on Li3 Mx1 and no outer spine of P1 Re1, the features characteristic of *Scolecithricella*. These derived characters were noted also in some species of other genera of Scolecitrichidae (Table 2) and represent the result of parallel transformation of Mx1 and P1. *Scolecithricella* and *Amallothrix* are very similar in most characters, but differ in the structure of P4 coxopod and female and male P5 (Table 2). As the species under consideration does not have the key characters of *Scolecithricella* (its P4 coxopod is without knob-like process; female P5 is with long basal segment and 3 spines on distal segment), it is placed in the genus *Amallothrix*.

Amallothrix lobophora (Park, 1970) seems also to have its place in this genus, though the species has no outer spine on Re1 of P1 and P5 of its female and male (?) are closer to those of *Pseudoamallothrix*. The absence of outer spine on Re1 of P1 is a derived character resulting from parallel transformation noted in some other species of *Amallothrix* and other genera (see above). In the species under consideration, the rostrum is with long proximal processes and shorter filaments, the rounded process on Re1 of A2 is absent, the outer spine on Re1 of P2 is long, and the inner and outer margins of P2-P4 coxopods are smoth, so it does not fit definition of *Pseudoamallothrix*; its female and male (?) P5 (if even the Roe's specimens are not conspecific with Park's species, they represent a very close species) seem to be a result of parallel with *Pseudoamallothrix* way of P5 transformation. In general, the species is closer to *Amallothrix*.

Scolecithricella tropica Grice, 1962 and **Scolecithricella aspinosa* Roe, 1975 probably also belong to *Amallothrix*. The description of *A. tropica* (Grice, 1962) (= *Scolecithricella beata* Tanaka, 1962, see Bradford, 1973) is incomplete: A1, A2, Md and P4 are not described. The armaments of Li3 of Mx1, Re of Mx1 and P1 are closer to those typical of *Scolecithricella*, but occuring in some species of 3 other genera as well. In *Scolecithricella*, these features are stabilized and so are important in the definition of the genus; in 3 other genera, these features occur sporadically and in another combination of features, and so are not decisive in generic definition. These features compared with hypothetical ancestor are derived, and their transformation go by parallel way in 4 genera under discussion (see Table 2). The female P5 of *A. tropica* with long common basal segment is not typical of *Scolecithricella*.

P5 distal segment of *A. tropica*, with 2 strong apical spines, is somewhat more similar to P5 of *Pseudoamallothrix*, but the species does not have the key features of the latter genus: the notch on external margin of P2 coxopod (so as P3) and projection on inner margin of P2-P4 coxopods (see Grice, 1962; Tanaka, 1962). So, the species certainly does not belong to *Pseudoamallothrix*. The male morphology could be decisive in clarifying the generic placement of this species. The male of this species probably is described as *Scolecithricella* sp. by Grice (1962: 211), as the female and male are similar in the body size, structure of rostrum, and ornamentation of Mx1. If the above supposition is correct, the species can be placed in *Amallothrix* with a higher probability than to any of 3 other genera under discussion, as the male P5 is typical of *Amallothrix*. The description of A2 and P4, however, is necessary for final decision.

Amallothrix aspinosa has the P4 coxa without knob-like process near the distal outer margin and the female P5 with long common basal segment which are more similar to those of *Amallothrix*, and do not fit the definition of *Scolecithricella*. Also the structure of rostrum, A2, Md, Mx1 (except 4 posterior setae on Li1), Mxp, P2 and P3 are corresponding to those typical of *Amallothrix*.

Roe (1975) noted the closeness of *A. aspinosa* in 6 characters to *P. canariensis* (Roe, 1975) placed in this work in the new genus *Pseudoamallothrix*, but as *A. aspinosa* does not have the key characters of *Pseudoamallothrix* (rostrum with thick filaments longer than strong proximal part; the swelling on Re1 of A2; the notch on the external margin of P2 and P3 and projection on the inner margin of P2-P4), it cannot be placed in *Pseudoamallothrix*. The similarities noted by Roe (1975) seem to be less essential than the peculiar characteristics of the two genera.

For example, a Mxp similar in shape to that noted by Roe (1975) for the two species have the species of all 4 genera: protopod of Mxp usually with 2 worm-like and 1 plumose seta proximally, 1 brush-like seta in the middle and 3 plumose setae distally; the number of setae on endopod segments vary in the species (Park, 1980; personal observations), and, in general, the armarment of Mxp has no characters useful in distinguishing of the 4 genera under consideration.

The number and structure of the sensory setae on the Mxp protopod is not constant in the family Scolecitrichidae and as assumed by Vyskvartzeva (1989a, 1989b), transformation of sclerotized, non-sensory setae goes independently in various genera and in some congeneric species. There are two groups of genera differing in the number of setae in the middle part of Mxp protopod. In some genera, the ancestral 3 setae were retained when one or two of these transformed in sensory setae; in the other group of genera, one seta became sensory and two other were lost. For example, *Scolecitrichopsis ctenopus* has 2 worm-like and 1 sclerotized seta in the proximal part of protopod (present study), but *S. tenuipes* has 1 and 2 respectively (Vyshkvartzeva, in press). A similar difference is noted between *Pseudoamallothrix obtusifrons* and *P. emarginata* (see Park, 1980). Most species of *Amallothrix* have 2 worm-like and 1 sclerotized seta in the proximal part of the Mxp protopod, but *A. lobophora* has 3 sclerotized setae (Park, 1970, 1980; personal observations). Hence, in contrast to the permanent composition of the sensory setae on distal segments of Mx2 endopod, the number of sensory setae on the Mxp protopod cannot be used as a diagnostic character in Scolecitrichidae and some other Bradfordian families (Ohtsuka et al., 1998).

A short external spine on Re1 of P2 is characteristic of *Pseudoamallothrix* and some species of *Amallothrix*, but as the length of the outer spine on Re1 of P2 is variable among species of the latter genus, its length is not used for generic definition.

The similar Re1-Re2 of P1 without external seta each and a raised lobe on the Ri2 of P2 are shared by both species, but do not occur in other species of either *Amallothrix* or *Pseudoamallothrix*. These characters compared with the hypothetical ancestor are derived and seem to represent parallelisms in the transformation of homologous structures in species of allied genera, as they are met in combination with different key characters.

The other similar features of *A. aspinosa* and *P. canariensis* (4 posterior setae on Li1 Mx1 and uniformly small brushes of the brush-like setae of Mx2) seem to be primitive features received from the common for the 4 genera under consideration ancestral form. The first feature being more ancient is presumed for the hypothetical ancestor of the superfamily Clausocalanoidea (Vyshkvartzeva, 1994). The second (uniformly small brushes of the brush-like setae of Mx2), seems to be a primitive feature for the family Scolecitrichidae, as was assumed by Vyshkvartzeva (1989a) according to the principle of oligomerization. The differentiation of brush-like setae in head size and stem length is an advanced feature (specialization). In the most specialized species of the family Scolecitrichidae, one or two of the five brush-like setae have the stem much thicker and head much larger than in other brush-like setae, the state noted in *Heteramalla* Sars, 1907, *Scopalatum* Roe, 1975 and *Puchinia obtusa* Vyshkvartzeva, 1989 (Vyshkvartzeva, 1989a).

The shape of the female P5 of *A. aspinosa* is peculiar and do not fit any of the 4 genera under discussion. In combination with some primitive and derived features listed above, this may be used for separation of a new subgenus (or genus?), but description of the male is necessary for final decision.

Key to the genera

1(2). P4 coxa with a knob-like process on outer distal margin. P5 of female one-segmented, flat and attached to common short coupler. P5 of male biramous, with right and left endopods short, left endopod not longer than half of its 3-segmented exopod . . . . **Scolecithricella** Sars

2(1). P4 coxa without a knob-like process on outer distal margin. P5 of female 2- or 3-segmented, with a long common basal segment. P5 of male uniramous or biramous, with right endopod tapering and moderately developed, and with left endopod usually at least as long as 2/3 of its 3-segmented exopod.

3(4). P2-P3 coxa with an indentation midlength of outer margin and with a projection on inner margin (without a projection in *P. longispina*). P4 coxa with an oval projection on inner margin (except for *P. longispina*). P5 of female with 2 spines, apical and subapical, on distal subcylindrical segment; in *P. ovata* and *P. cenotelis*, distal part of distal segment flat, expanded into roughly circular plate with usually 2 spines, apical and inner subapical. P5 of male biramous; endopod of left leg at least as long as its exopod, usually longer; right Re2 without or with a short mediodistal projection; in *P. ovata* (and in *P. cenotelis*?), P5 uniramous; left leg longer than right and about as long as urosome . . . . . **Pseudoamallothrix** gen. n.

4(3). P2-P3 coxa usually without an indentation midlength of outer margin, always without projection on inner margin. P4 coxa without projection on inner margin. P5 of female usually with 3 spines (internal, apical and external) on subcylindrical distal segment or distal segment slightly inflated with outer apical spine-like process and inner seta. P5 of male uniramous and left, longer

Table 2. Diagnostic features of 4 genera

Character	*Scolecithricella*	*Amallothrix*	*Pseudoamallothrix*	*Scolecitrichopsis*
SmP5, shape	produced, rounded, incised or not	not produced, broadly rounded, incurved or not	not produced, broadly rounded, incurved or not	produced, **triangular, with** or without **spine-like process**
Rostrum	2 long rami; filaments not longer than rami	2 long rami; filaments not longer than rami	**2 short rami; filaments longer than rami**	**no rami; filaments thin, moderately long** (conical in 1 sp.)
A1, ♀, fused segments	8-10th, sometimes also 24-25th and 1st-2nd	8-9th or 8-10th	8-9th	8-9th
A1, ♂, fused segments	8-12th, 20-21st, sometimes 24-25th	8-12th in both A1, also 20-21st in right A1		
A2, Re1, inner side	smooth	smooth	**with rounded process** (smooth in 3 spp.)	smooth
Mx1, number of setae Li1 (posterior setae only) Li3 Re	 1-2 3 6-8	 2 (4 in 1 sp.) 4 (3 in 2 spp.) 8-9 (7 in 1 sp.)	 2 or 4 4 (3 in 2 spp.) 8 (5 in 2 spp.)	 1-2 2-3 (4 in 1 sp.) 7 (6 in 1 sp., 10 in 1 sp.)
P1, outer setae or spines on Re1-3, number and size	**2**; medium	3 (2 in 3 spp., 1 in 1 sp.); medium	3 (2 in 1 sp., 1 in 1 sp.); medium	3 (2 in 1 sp.); **long**
P2, Ri1, shape of outer distal corner	spine-like or obtuse process	spine-like or obtuse process	long spine-like process	not produced, rounded
P2-P3, coxa inner margin outer margin	 smooth notched or not	 smooth smooth	 **with large projection** notched	 smooth notched or not
P3, Ri2, anterior surface ornamentation	small denticles	small denticles	small denticles	**long spines distally**
P4, coxa, peculiar features	**outer distal knob-like process**	—	**inner lobe** (absent in 1 sp.)	—
P4, spinules on posterior surface of rami	few, thin	few, thin	few, thin or absent	**dense, long, thin or partly lancet-like**
P5, ♀ number of segments (shape) number of spines (position) common base surface spines	 **1 (flat)** (no P5 in 1 sp.) 2-3 (inner, apical, sometimes also outer) **reduced (short coupler)** absent	 2-3 (subcylindrical) 3 (inner, apical, outer) long present or absent	 2-3 (subcylindrical) **2 (apical and subapical)** long absent	 2-3 (variable) 2-3 (variable) long present
P5, ♂ shape left Ri length	 biramous **1/2 Re**	 biramous **2/3-4/5 Re**	 biramous (uniramous in 2 spp.) **≥ Re** (<Re in 1 sp.)	 **uniramous** —

Note. Unique or almost unique characters are given in bold.

leg much longer than urosome or P5 biramous, endopod of left leg about 2/3-3/5 length of its exopod.

5(6). Rostrum as a short plate with 2 thin filaments of moderate length. In P4, all segments with numerous surface spines and spinules. P5 of female 3-segmented, with short distal segment bearing 3 spines or 2-segmented with distal segment elongate, flat, with outer distal spine-like process and inner seta. P5 of male uniramous, strongly asymmetrical, with left, longer leg usually much longer than urosome . . . . **Scolecitrichopsis gen. n.**

6(5). Rostrum with 2 long, strong proximal rami continuing into a soft, transparent sensory filament about as long as proximal part or shorter. P4 protopod segments usually without surface spines; endopod and exopod with a few surface spines. P5 of female usually 2-segmented; distal segment subcylindrical, with 3 spines: strong inner, shorter apical and small outer. P5 of male bi-

Table 3. Number of species in the 4 genera discussed

Species	*Scolecithricella*	*Amallothrix*	*Pseudoamallothrix*	*Scolecitrichopsis*
Included				
definitely	11 (♂ – 9)	20 (♂ – 15)	13 (♂ – 8)	6 (♂ – 4)
probably	5	2	–	3
Examined by the author	8 (♂ – 5)	6 (♂ – 3)	11 (♂ – 3)	2 (♂ – 2)

ramous; right 2nd exopodal segment usually with well developed mediodistal projection; left endopod about 2/3-3/5 length of its exopod . . . . **Amallothrix** Sars

Comparison of characters of the four genera under consideration is given in Table 2, and the number of included species in Table 3.

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