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Families Anarthruridae Lang, 1971, Colletteidae Larsen & Wilson, 2002, and Leptognathiidae Sieg, 1976*

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* *In*: Larsen, K. & Shimomura, M. (Eds.) (2007) Tanaidacea (Crustacea: Peracarida) from Japan III. The deep trenches; the Kurile-Kamchatka Trench and Japan Trench. *Zootaxa*, 1599, 1–149.

Abstract

The records of the tanaidomorphan family Anarthruridae, from the trenches and other Japanese waters are limited to three species of Anarthruridae, *Anarthruropsis langi* Kudinova-Pasternak, *A. longa* Kudinova-Pasternak and a new species of *Siphonolabrum* Lang. The abysso-hadal *Siphonolabrum tenebrosus* n.sp. that is described from this trench material is very similar to a shallow-water species, *S. californiensis* Dojiri & Sieg, from the Santa Barbara Channel, California.

The heterogeneous family Colletteidae is represented by only three genera in records of tanaidaceans from Japanese waters, the Kurile-Kamchatka Trench and the Japan Trench, *Collettea*, *Leptognathiopsis* and *Tumidochelia*. New specimens of *Leptognathia langi* have allowed it to be partially redescribed and transferred to *Leptognathiopsis*.
Recent changes in the taxonomy and classification of the Family Leptognathiidae are reflected in a much reduced list of species that are recorded from Japanese waters and the Kurile-Kamchatka/Japan Trench. All three genera, *Biarticulata*, *Forcipatia* and *Leptognathia* are represented, by six species. A new species of *Leptognathia* is described and a partial redescription is given of *Forcipatia rotundicauda* with the collection of new material.

Key words: Tanaidacea, Anarthruridae, *Anarthruropsis*, *Biarticulata*, Colletteidae, *Collettea*, *Forcipatia*, *Leptognathia*, Leptognathiidae, *Siphonolabrum*, Japan, Kurile-Kamchatka Trench, Japan Trench

Introduction

The family Anarthruridae Lang, 1971 is not particularly common in deep-sea benthic samples compared to other tanaidomorphan families such as the Agathotanaidae, Colletteidae, Tanaellidae, or Typhlotanaidae, but can be usually assured of a representation by a species belonging to one of the eight described genera or of some as yet undescribed filiform taxa (Bird 2004; Larsen 2005). As a group, the anarthrurids are immediately recognizable through the structure of their uropods and chelipeds, the former with a fused exopod, and the latter with a direct articulation with the carapace via a 'pseudocoxa' or sclerite. Cheliped shape and setation also tends to be more complex than in the Agathotanaidae that superficially display similar uropod and cheliped characters as probable homoplasies.

Until now, in Japanese waters only *Anarthruropsis longa* Kudinova-Pasternak, 1984 has been recorded from shelf and bathyal depths (200–1300 metres) in the Sea of Japan (Kudinova-Pasternak 1984; Larsen & Shimomura 2007). In addition, a congener, *A. langi* Kudinova-Pasternak, 1976, has been recorded at hadal depths (7795–8015 metres) in the northern part of the Kurile-Kamchatka Trench (Kudinova-Pasternak 1976). A (new) species of *Siphonolabrum* Lang, 1972 has now been recorded from the Kurile-Kamchatka Trench and Japan Trench and is described here.

One of the new families defined by Larsen & Wilson (2002) in their phylogenetic study of the Paratanaidoidea, the Colletteidae is a taxon showing great morphological disparity and heterogeneity, and it is often well represented in deep-sea samples, particularly by the genus *Collettea* Lang, 1973. However, up to and includ-

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ing the present study, only three genera and four species have been recorded in Japanese waters and the trenches: *Collettea cylindrata* (G.O. Sars, 1882), *Leptognathia langi* Kudinova-Pasternak, 1970, and *Leptognathia dentifera* G.O. Sars, 1896 (now in genus *Tumidochelia* Knight, Larsen & Heard, 2003) were identified and/or described from the Kurile-Kamchatka Trench by Kudinova-Pasternak (1970) and a new species of *Tumidochelia*, *T. knighti*, was described recently from bathyal Japanese waters, 635–654 metres (Larsen & Shimomura 2007). New specimens of *L. langi* obtained for the present study have allowed a better definition of this species and its transfer to the genus *Leptognathiopsis* Holdich & Bird, 1986.

In spite of the many species attributed to the family Leptognathiidae Sieg, 1973 or genus *Leptognathia* G.O. Sars, 1882 that have been recorded in Japanese waters and the Kurile-Kamchatka and Japan Trench (e.g. Kudinova-Pasternak 1966, 1970, 1976, 1984; Larsen & Shimomura 2007), only five remain that are members of the family Leptognathiidae as construed in the recent classifications given by Larsen & Wilson (2002) and Larsen & Shimomura (2007): *Biarticulata greveae* (Kudinova-Pasternak, 1976), *B. parelegans* (Kudinova-Pasternak, 1970), *B. tuberculata* (Hansen, 1913), *Leptognathia bamberi* Larsen & Shimomura, 2007, and *Forcipatia rotundicauda* (Kudinova-Pasternak, 1970). The other *Leptognathia* species have either been re-assigned outside of the family Leptognathiidae to more recently-described genera such as *Akanthophoreus* Sieg, 1986a, *Chauliopleona* Dojiri & Sieg, 1997, and *Tumidochelia* Knight, Larsen & Heard, 2003, or remain as species *incertae cedis* within *Leptognathia* (Larsen & Shimomura *op.cit*.). Other former leptognathiid genera are no longer attributed to any family, as in the case of *Exspina* Lang, 1968 (see Larsen & Wilson 2002).

A sixth, new species (of *Leptognathia sensu stricto)* has now been recorded from the Kurile-Kamchatka and Japan Trench and is described here, along with a partial re-description of *F. rotundicauda* that is based on new material. Some species previously classified within either the genus *Leptognathia* or family Leptognathiidae are discussed by Bird elsewhere in this publication.

Materials and methods

Terminology follows Larsen (2003). Measurements of body length are from tip of rostrum to apex of pleotelson. Drawings were made with the aid of a camera-lucida.

Family Anarthruridae Lang, 1971

Family Anarthruridae Lang, 1971: 366–367. Sieg, 1978: 119–121 (erection of subfamily Anarthrurinae). Sieg, 1986b: 140. Sieg, 1986a: 17 (*partim*).

Subfamily Anarthrurinae: Sieg, 1986a: 21, 58–60 (*partim*, as Tribe Anarthrurini). Larsen & Wilson, 1998: 360, table 1. Gutu & Sieg, 1999: 384.

Family Anarthruridae Lang, 1971 [revised]: Larsen & Wilson, 2002: 12. Bird, 2004: 6–8. Larsen, 2005: 141.

Genera included (Japanese and trench genera in bold): *Anarthrura* G.O. Sars, 1882; *Anarthrurella* Bird, 2004; ***Anarthruropsis*** Lang, 1968; *Anisopechys* Bird, 2004; *Ithyomus* Bird 2004; ***Siphonolabrum*** Lang, 1972, *Synanarthrura* Bird, 2004; *Thorkelius* Bird, 2004.

Remarks. The taxonomic history of the Anarthruridae is quite convoluted and has seen several familial revisions and amendments (Lang 1971, Sieg 1978, Sieg 1986a, Larsen & Wilson 2002), the most recent being that by Bird (*op.cit.*), based on some Anarthruridae from the North-East Atlantic. In the last, novel (for the family) morphological characters such as cheliped 'folds', maxilliped palp and pereopod setation were invoked to help diagnose and classify existing and undescribed taxa. Sieg (1986b) and Larsen (2005) pointed out problems in separating *Siphonolabrum* from *Anarthruropsis* and the doubtful position in the genus of *S. langi* Kudinova-Pasternak, 1981, but as *Siphonolabrum* and *Anarthruropsis* were not recorded in the North-East Atlantic study (Bird *op.cit*.), these genera were not discussed in any detail.

Genus *Anarthruropsis* Lang, 1968

Anarthruropsis Lang, 1968: 183–184 (generic diagnosis), 184–188, figs 114–116 (description of *A. galatheae*). Kudinova-Pasternak, 1976: 121–123, fig 3 (description of *A. langi*). Sieg, 1983: 292. Kudinova-Pasternak, 1984: 834–836, fig.3 (description of *A. longus* – now *A. longa*). Kudinova-Pasternak, 1990: 102–103, fig. 7 (description of *A. similis*). Gutu & Sieg, 1999: 384 (classification). Larsen & Wilson, 2002: 12 (classification derived from phylogenetic analysis). Bird, 2004: 7–8 (remarks). Larsen, 2005: 141–142 (revised generic diagnosis), 142–147 (description of *A. edentula* and key to species).

Type species: *A. galatheae* Lang, 1968 (by monotypy).

Species included (Japanese and trench species in bold): *A. edentula* Larsen (2005), Gulf of Mexico, 1402–2050 metres; *A. galatheae*, Guatemala Basin, 3570 metres; ***A. langi***; ***A. longa***; *A. similis* Kudinova-Pasternak, 1990, Walvis Basin (SE Atlantic) 1038 metres.

Diagnosis. (Largely derived from Larsen (2005), *via* Lang (1972), but with some amendments).

Female/neuter. Anarthrurid with eyes and eye-lobes absent. Pleon with five free pleonites, at least as wide as pereon. Antennule with four articles. Antenna with five to six articles. Labrum elongate-conical, protruding from under carapace to reach antenna article 3, not an obvious siphon-shape. Mandibles reduced (type species) or absent; if present molar process weak, without chitinisation. Labium inconspicuous with one pair of lobes. Maxillule with five short, stout and blunt terminal setae. Maxilliped endites rounded and with one process (type species) or smooth; palp article 3 with three inner setae. Epignath elongate. Cheliped attached via large (three times larger than basis) pseudocoxa; without lateral propodal fold. Pereopods 1–3 with coxa. Pereopods 4–6 without coxa; carpus with three spiniform setae. Pleopods reduced or absent. Uropod endopod one-articled, exopod (fused to basal article), very short.

Male. Similar to female but with thicker (wider) antennule. Pleopods present, with mainly simple setae.

Remarks. This genus has not received as much attention as others in recent years, but Larsen (2005) critiqued the existing taxonomy as part of the account of the new Gulf of Mexico species, *A. edentula*. Using the type-species *A. galatheae* as a standard would possibly indicate that there is more heterogeneity in the genus than may be sustainable, especially with regard to chela shape, mandibular structure, pereopod setation and possibly maxillule-endite setation. Until more irrefutable material of Kudinova-Pasternak's species are obtained, *in lieu* of missing or unobtainable type specimens, further revision of the genus is impracticable.

Anarthruropsis langi Kudinova-Pasternak, 1976

Anarthruropsis langi Kudinova-Pasternak, 1976: 121–123, fig 3.

Remarks. Although not recorded in the recent Japanese surveys, this species has been recorded from the northern part of the Kurile-Kamchatka Trench, at hadal depths, 7795–8015 metres. The complex and varied spiniform setae on pereopods 3–6 distinguish it from *A. longa*, as well as its shorter pereonites 4–5.

Anarthruropsis longa Kudinova-Pasternak, 1984

Anarthruropsis longus Kudinova-Pasternak, 1984: 834–835, fig 3.
Anarthruropsis longa Kudinova-Pasternak, 1984: Larsen, 2005: 142, 147.

Remarks. Recorded from the Sea of Japan at shelf and bathyal depths, 200–1189 metres, this species has not been collected since Kudinova-Pasternak's original study. Larsen (2005) corrected the gender of the specific name from masculine to feminine, to conform to the ICZN Code.

Genus *Siphonolabrum* Lang, 1972

Siphonolabrum Lang, 1971: 361, 365 (remarks), 367 (key to genera), as *nomen nudum*. Sieg, 1986b: 140–142 (remarks on genus and key to species), 142–152, figs 95–99 (description of *S. fastigatum*).

Siphonolabrum Lang, 1972: 214 (generic diagnosis), 214–221, figs 1–4, plate 1 (description of *S. mirabile*). Sieg, 1983: 299–300 (bibliography). Kudinova-Pasternak, 1984: 108–109, figs 10–11 (description of *S. langi*). Gutu & Sieg (1999), 384 (classification). Dojiri & Sieg, 1997: 220–224, figs 3.12–3.13 (description of *S. californiensis*). Larsen & Wilson, 2002: 12, 14 (classification derived from phylogenetic analysis). Bird, 2004: 2, 7–8 (remarks). Larsen, 2006: 141, 142 (remarks).

Type species: *Siphonolabrum mirabile* Lang, 1972, by monotypy.

Species included (Japanese and trench species in bold): *S. californiensis* Dojiri & Sieg, 1997 (Santa Barbara Channel, California, 98 metres); *S. fastigatum* Sieg, 1986 (Joubin Islands, Antarctic Peninsula, 49–75 metres); *S. langi*, (Central Pacific, 1735–2430 metres); *S. mirabile*, (Guatemala Basin [Central East Pacific], 3534–3563 metres, and the Azores [NE Atlantic], 4165 metres); ***S. tenebrosus* n.sp**.

Diagnosis (largely derived from Lang (1972) and Sieg (1986b) but with some amendments).

Female/neuter. Anarthrurid with pleon with five pleonites, about as wide as the pereonite 6 and pleotelson. Antennule of female four-articled. Antenna six-articled (but see below), terminal article very small. Labrum prominent, narrower than deep. Mandibles translucent and weak, incisor narrow, with denticulate tip, molar and lacinia mobilis lacking. Epignath with short terminal seta. Maxillule with eight unequal terminal setae. Maxilliped palp article 3 with three long setae; endite with one long seta. Cheliped propodus and fixed finger without fold, but with longitudinal ridge on latter; fixed finger with one ventral seta and two prominent teeth on incisive margin. Dactylus of pereopods 1–3 with long accessory seta. Carpus of pereopods 4–6 with three spiniform and one rod-like seta. Pleopods well-developed, biramous, with setae. Uropod exopod fused with basal article, short or as long as proximal article of endopod, with two terminal setae; endopod two-articled.

Male with enlarged pleon; antennule seven-articled (two-articled peduncle and five-articled flagellum), cheliped fixed finger with reduced teeth, pleopod with longer setae than female, uropod exopod articulated from basal article, endopod three-articled.

Remarks. Although the generic distinctions of *Siphonolabrum* from *Anarthruropsis* are said to be minor (Sieg 1986b; Larsen 2005), i.e. restricted to the number of maxillule endite spines and labrum shape, other characters appear to be valid, consistent and useful for making identifications: the probable existence of a mandibular molar in *Anarthruropsis* (for the type species *A. galatheae* at least), one long seta on each maxilliped endite in *Siphonolabrum*, rather than two small setae; one ventral cheliped fixed finger in *Siphonolabrum* – although *A. edentula* also has only one (possibly because only manca-II stages were described), and two prominent teeth on the fixed finger in *Siphonolabrum*. A more detailed revision of the two genera is desirable but is beyond the scope of this paper, as are analyses of phylogenetic relationships within and without the family Anarthruridae.

There may be an issue with the character-state given for the number of antennal articles, since the small 'article' figured by most authors and also in this paper (Figure 2C) could be a basal peduncle, so that the actual article-number state could be 'five' rather than 'six'. Ideally, scanning-electron-microscope study might resolve this problem.

Of the four previously described species, *S. langi* seems to be of dubious status within the genus, at least because the uropod exopod is shown by Kudinova-Pasternak (1981) as being discrete, not fused. In addition, the cheliped shape is more similar to those of some other taxa such as *Robustochelia* Kudinova-Pasternak, 1983 albeit having the anarthrurid or agathotanaid form of the attachment to the cephalothorax.

Apart from a dubious record (of a manca stage) from the North-East Atlantic (Azores) of *S. mirabile* (Lang 1972), the genus appears to be known so far only from the Pacific Ocean—the *S. fastigatum* records coming from the Pacific side of the Antarctic Peninsula.

***Siphonolabrum tenebrosus* n.sp.**
Figures 1–3

Material examined. Holotype: 1 non-ovigerous female, 3.03 mm (KMNH IvR 500.173), station TD-4, 39°27.08'–39°29.15'N 143°37.79'–143°38.52'E, 3272–3146 metres, 26 September 2001. **Paratypes**: 1 non-ovigerous female, 1 preparatory male (?) same location; 1 non-ovigerous female (KMNH IvR 500.174), station XR-7, 42°12.87'–42°12.10'N 145°33.93'–145°32.05'E, 3853–3858 metres, 17 September 2002; 1 non-ovigerous female (partially dissected; KMNH IvR 500.175), station TD-7, 38°47.93'–38°45.87'N 144°08.07'–144°07.89'E, 7340–7433 metres, 30 September 2001.

Diagnosis. *Siphonolabrum* with labrum elongate but almost as broad as deep. Cheliped merus without triangular process, propodus inner comb with seven setae. Uropod exopod as long as proximal article of endopod.

Etymology. From the Latin adjective *tenebrosus*, 'dark' or 'gloomy', referring to the blackness of the abysso-hadal environment.

Description non-ovigerous female.

Body (Figs 1A–B). Slender, 6.75 times as long as broad (contracted holotype) to 7.4 times as long as broad (relaxed paratype specimen from station XR-7); length 2.89 mm (range 2.13–3.16 mm).

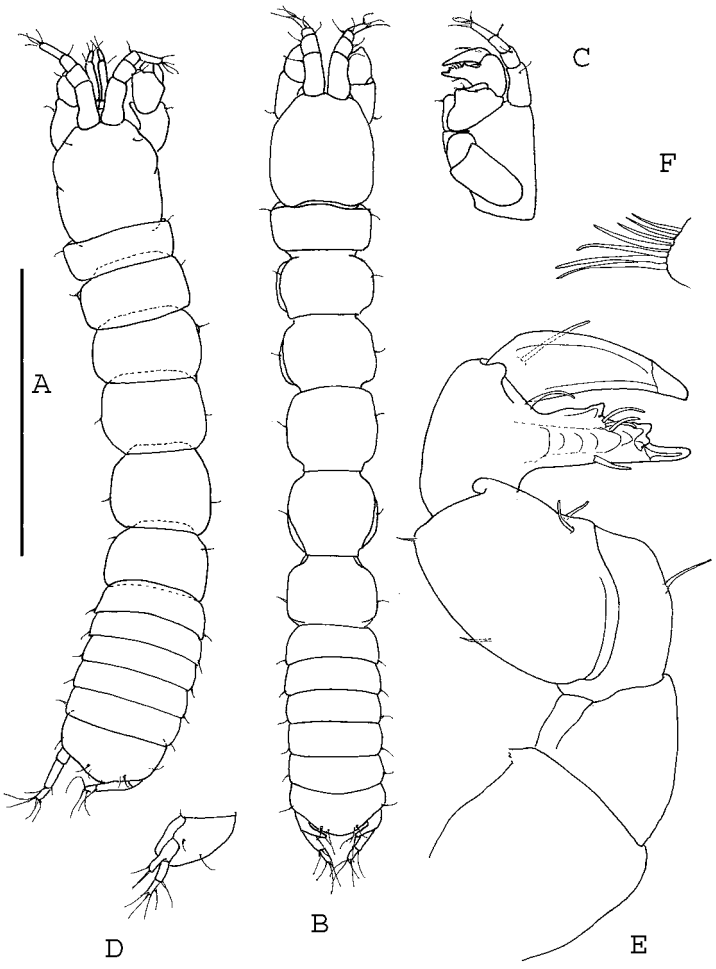

FIGURE 1. *Siphonolabrum tenebrosus* n.sp. A, holotype non-ovigerous female (contracted state); B, paratype non-ovigerous female (relaxed-extended state); C, cephalothorax, lateral view; D, pleotelson, lateral view; E, right cheliped; F, inner setal group on cheliped propodus, adjacent to dactylus. Scale bar = 1 mm for A-D, 0.25 mm for E-F.

Carapace. As long as broad, with parallel lateral margins and weak rostrum, just shorter than pereonites 1–2 combined (*i.e*. 0.9 times as long), 14.2% of body length (range 14.2–16.3%); with small seta behind antennule insertion.

Pereonites. With slightly rounded or sub-parallel lateral margins. Pereonite 1 shortest. Only pereonite 5 as long as or slightly longer than broad. Pereonites 1–6 0.49, 0.65, 0.75, 0.90, 1.10, and 0.69 times as long as broad respectively; seta on lateral margins of each pereonite; inter-pereonal gaps greater in extended/stretched specimens.

Pleon. 22.2% of body length (range 20.7–23.6%). Pleonites much shorter than wide, with weakly expanded epimera in dorsal view, each with a seta; sternal processes weakly developed.

Pleotelson (Fig. 1D). About as long as preceding two pleonites (foreshortened in dorsal view), with broadly rounded apex; one seta near each uropod basis and two simple and two sensory setae dorsally.

Antennule (Fig. 2B). Stout, about as long as carapace. Article 1 broad at base, about 2.5 times as long as broad, and not quite half as long as the whole appendage, with one disto-outer seta and three outer sensory setae. Article 2 stout, 1.3 times as long as broad, with unequal inner and outer setae. Article 3 about as long as broad, with inner seta and sensory seta. Article 4 about as long as articles 2–3, narrow, with about four terminal setae and one aesthetasc.

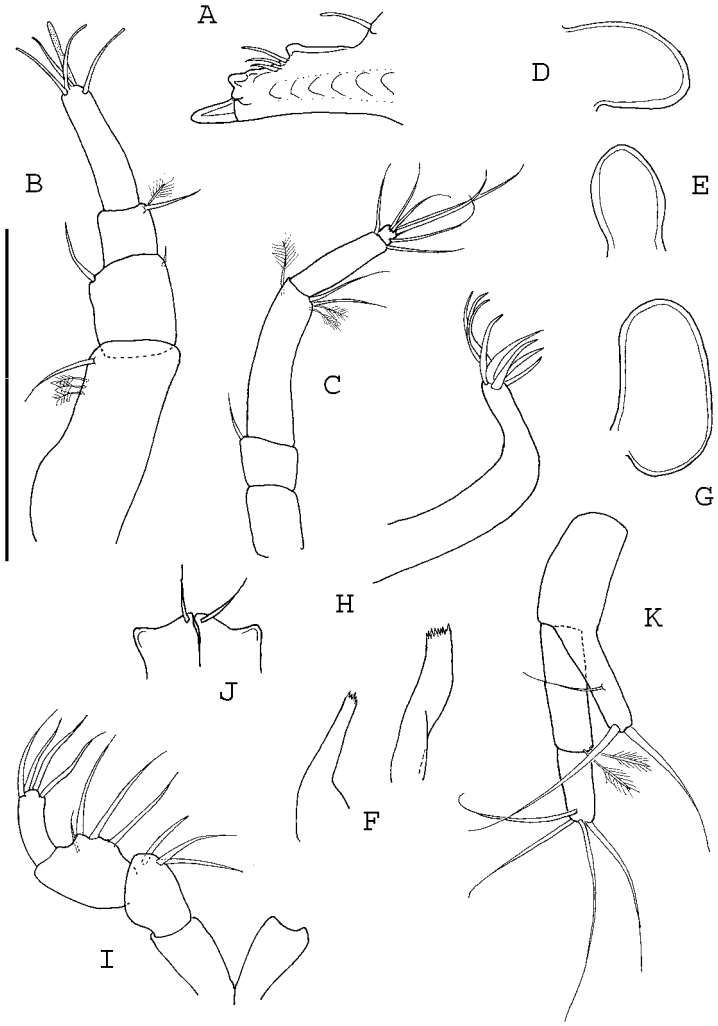

FIGURE 2. *Siphonolabrum tenebrosus* n.sp. Non-ovigerous female. A, cheliped fixed finger detail; B, antennule, C, antenna (lateral view); D–E, labrum dorsal and lateral profile respectively; F, mandible; G, maxilla; H, maxillule endite, I, maxilliped palp, one omitted; J, maxilliped endite (distal); K, uropod. Scale bar = 0.25 mm for A-E, G, I-K, 0.125 mm for F and H.

Antenna (Fig. 2C). About three-quarters as long as antennule. Article 1 short and annular. Article 2 longer than article 3, the latter with a dorsal seta. Article 4 about 3.5 times as long as broad, with terminal simple and sensory setae. Article 5 about 3.6 times as long as broad, with terminal seta. Article 6 small, with one distal and four terminal setae.

Mouthparts. Labrum (Figs 2D–E) clearly visible in whole animal, protruding with sub-conical lateral profile and slightly narrower cross-section. Labium not recovered. Mandibles (Fig. 2F) (only one recovered), delicate, elongate, without molar or lacinia mobilis, incisor with denticulate tip. Maxilla (Fig. 2G) sub-ovate, without setae. Maxillule (Fig. 2H) endite with group of eight unequal terminal spiniform setae, the longest three closely grouped, almost fused. Maxilliped (Figs 2I–J) typical of genus, bases small; endites unfused, with simple distal margin, each with a long inner seta; palps relatively large, article 2 with three inner setae; article 3 with one small and three large setae; article 4 with at least four long terminal setae.

Cheliped (Fig. 1E). Attached to carapace via a large sub-rectangular pre-basal sclerite or 'pseudocoxa' (Fig. 1C). Basis short and almost annular, with seta. Merus lying along wide proximal part of carpus, with strong seta. Carpus broad, about 1.3 times as long as broad, narrower distally, with proximal and distal setae on dorsal margin and two unequal setae on ventral margin. Chela about as large as carpus. Propodus deep, without fold, but with outer longitudinal ridge on fixed finger, with seven setae on inner face (Fig. 1F) and one outer setae near dactylus insertion. Fixed finger (Fig. 2A) about as long as propodus, with long narrow terminal spine and two sub-triangular teeth on almost straight cutting margin, the distal tooth bifid, with strong ventral seta and three setae near cutting edge. Dactylus as broad as fixed finger, dorsal margin strongly curved, with long inner spiniform seta.

Pereopod 1 (Fig. 3A). Longer than pereopods 2–3; annular coxa with seta. Basis about four times as long as broad. Ischium with seta. Merus just longer than carpus, with ventral seta. Carpus sub-rectangular, about twice as long as broad and as long as propodus, with one dorsal and two ventral setae. Propodus tapering distally, with ventral seta nearly as long as dactylus. Dactylus and unguis about 1.4 times as long as propodus, dactylus with long accessory setae, tip minutely bifid, unguis tip slightly spatulate.

Pereopod 2 (Fig. 3B). Similar to pereopod 1 but slightly smaller, with merus and carpus proportionately stouter. Dactylus and unguis shorter than that of pereopod 1 but still longer than propodus.

Pereopod 3 (Fig. 3C). Similar to pereopod 2 but shorter still, especially merus and carpus.

Pereopod 4 (Fig. 3D). Without distinct coxa. Basis broader than in pereopods 1–3, about as long as succeeding articles together, with two ventral plumose setae. Ischium with two unequal setae. Merus shorter than carpus, with two ventral spiniform setae. Carpus sub-rectangular, about as long as propodus and about twice as long as broad, with two ventral spiniform setae, one long outer spiniform seta, and one small rod-like dorsal seta. Propodus about 2.8 times as long as broad, with three long terminal spiniform setae. Dactylus longer than unguis, together about as long as propodus.

Pereopod 5 (Fig. 3E). Similar to pereopod 4.

Pereopod 6 (Fig. 3F) similar to pereopods 4–5 but with one basal plumose seta. Propodus with four terminal spiniform setae.

Pleopod (not figured). Basal article without setae. Exopod sub-ovate, just over twice as long as greatest width, as long as basis of pereopods 4–6, with at least 23 plumose setae, graduated in length from short near basal article to long near apex. Endopod slightly smaller than exopod, with one dorso-distal seta and about 21 on ventral margin, one near to basal article separated from remainder.

Uropod (Figs 1D, 2K). Just shorter than pleotelson, basal article about twice as long as broad. Fused exopod as long as proximal article of endopod, with one inner and two strong terminal setae. Endopod five times as long as broad, two-articled, proximal article longer than distal, with two sensory setae, distal article with four long setae.

Remarks. The abysso-hadal *S. tenebrosus* n.sp. shows a close morphological affinity to the shallow-shelf *S. californiensis*, in an interesting parallel to the relationship between *Akanthophoreus phillipsi* Sieg & Dojiri,

1991 and *A. undulatus* n.sp. (Bird, elsewhere in this publication) Both are characterized by a long uropodal exopod but *S. tenebrosus* n.sp. appears to have a proportionately shorter carapace, a longer pleon, a greater size-disparity in antennule articles 2–3, a longer pereopod 1 merus, and lacks a prominent triangular process on the cheliped merus.

Siphonolabrum tenebrosus n.sp. can be distinguished from *Anarthruropsis langi* at least by its longer uropod exopod (a very short process in *A. langi*), single ventral seta on cheliped fixed finger (two in *A. langi*), double-toothed incisive margin of fixed finger (more numerous and less obvious dentition in *A. langi*) and a narrower labrum. In the unlikely circumstance of direct sympatry, similar chelipedal and uropodal criteria separate *S. tenebrosus* from the shallower-occurring *A. longa*. As its specific epithet might imply, *A. longa* is also more slender than *S. tenebrosus* n.sp., being about 8.7 times as long as broad, its pereonites 4–5 as long as or slightly longer than broad.

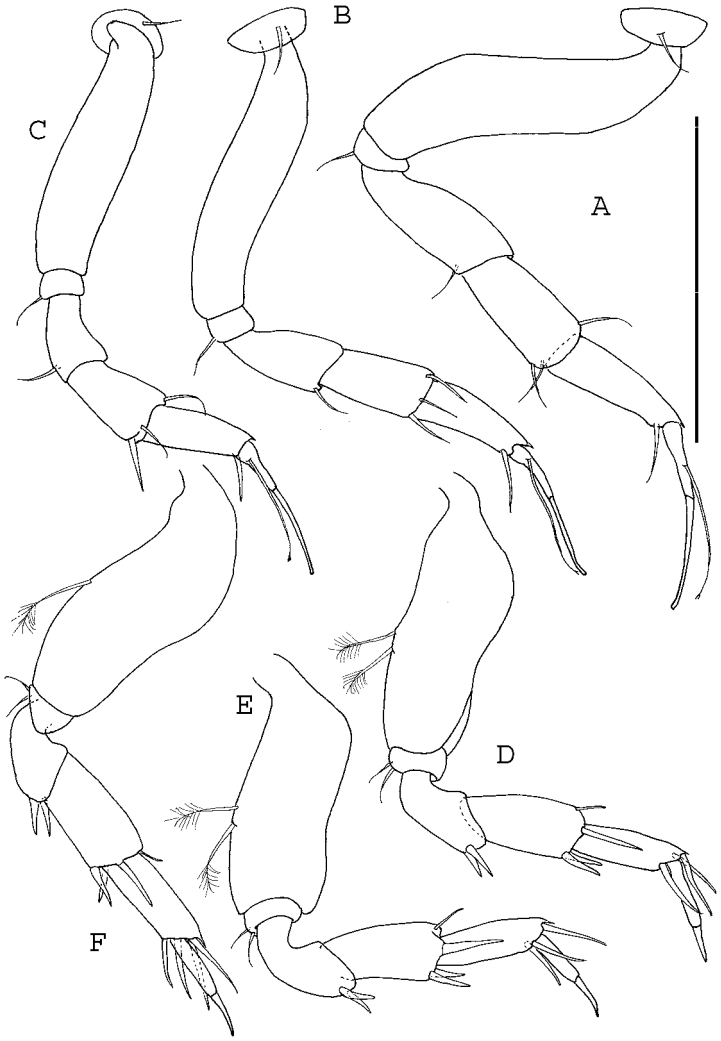

FIGURE 3. *Siphonolabrum tenebrosus* n.sp. Non-ovigerous female. A–F, pereopods 1–6 respectively. Scale bar = 0.25 mm for A-F.

Distribution. The three records of *S. tenebrosus* cover a remarkable bathymetric range, from 3272–7433 metres in the Japan Trench and the Kurile-Kamchatka Trench.

Key to the Anarthruridae of the Sea of Japan, Japan Trench, and the Kurile-Kamchatka Trench

1 Cheliped propodus with one ventral seta; cheliped fixed-finger almost straight, with two prominent teeth; uropod exopod well-developed, as long as article 1 of endopod ..... *Siphonolabrum tenebrosus* n.sp.
- Cheliped propodus with two ventral setae; cheliped fixed finger convex, with more numerous, less prominent teeth; uropod exopod very short, bud-like 2
2 Pereonites 4–5 clearly longer than broad; pereopods 3–6 with unspecialized spiniform setae on merus and carpus; shelf-bathyal species ..... *Anarthruropsis longa*
- Pereonites 4–5 shorter than broad; pereopods 3–6 with clavate, pectinate and bifid spiniform setae on merus and carpus; hadal species .....*A. langi*

Family Colletteidae Larsen & Wilson, 2002

Restricted synonymy and bibliography
Colletteidae: Larsen & Wilson, 2002: 2, 7, 12. Larsen, 2005: 147–149.

Genera included (Japanese waters and trenches in bold): *Cetiopyge* Larsen & Heard, 2002, ***Collettea*** Lang, 1973, *Caudalonga* Larsen, 2005, *Filitanais* Kudinova-Pasternak, 1973, *Haplocope* G.O. Sars, 1882, *Isopodidus* Larsen & Heard, 2002, *Leptognathiella* Bird & Holdich, 1984, ***Leptognathiopsis*** Holdich & Bird, 1986, *Libanius* Lang, 1971, *Macrinella*, Lang, 1971, *Mirandotanais* Kussakin & Tsareva, 1974, *Nematotanais* Bird & Holdich, 1985, *Pseudoleptognathia* Sieg, 1986b, *Subulella* Holdich & Bird, 1986, ***Tumidochelia*** Knight, Larsen & Heard, 2003.

Diagnosis. See Larsen (2005).

Remarks. This comparatively genus-rich and morphologically disparate family is also relatively weakly demarcated from the families Tanaellidae and Leptognathiidae (Larsen 2005) and future revisions based on updated phylogenetic analyses will undoubtedly restructure this classification. It is also almost certain that the family is, in reality, much better represented in Japanese waters, Japan Trench, and the Kurile-Kamchatka Trench than indicated by the few taxa recorded in this study.

Genus *Collettea* Lang, 1973

Restricted synonymy and bibliography.
Collettea: Lang, 1973: 227. Larsen, 2000: 682. Larsen, 2005:156–157. B³a¿wicz-Paskowycz & Larsen, 2005: 2.
Strongylura: G.O. Sars, 1882: 52.

Diagnosis. See Larsen (2005).

Remarks. Fourteen described species were recognized by Larsen (2005) and three more new species were described by Błażewicz-Paskowycz & Larsen (2005). The genus is distributed throughout the world's oceans and several species ought to be discovered in Japanese waters, Japan Trench, and the Kurile-Kamchatka Trench.

***Collettea* cf. *cylindrata* (G.O. Sars, 1882)**

Restricted synonymy and bibliography.
Strongylura cylindrata G.O. Sars, 1882: Kudinova-Pasternak, 1970: 366 [doubtful synonymy with *C. cylindrata* (G.O. Sars, 1882).

Remarks. A *Collettea* species recorded under the obsolete name *Strongylura cylindrata* was reported from four 'Vitjaz' stations in the Kurile-Kamchatka Trench, at abyssal and hadal depths, 4895–6710 metres by Kudinova-Pasternak (1970). While not impossible, this record is doubtful since the nominal species is known primarily from West European waters and the NE Atlantic. Another species, *Collettea larviformis*, from 5000 metres near the Aleutians (Kudinova-Pasternak 1973), is a possible synonymy for the Kurile-Kamchatka species. New material is required for unequivocal identification.

Genus *Leptognathiopsis* Holdich & Bird, 1986

Leptognathiopsis Holdich & Bird, 1986: 87. Gutu & Sieg, 1999: 384 [classification]. Larsen & Wilson, 2002; 2, 12 [phylogenetic classification].

Leptognathia G.O. Sars, 1882 (*partim*): Holdich & Jones, 1983a: 72; Holdich & Jones, 1983b: 173 [misidentification of *Leptognathia manca*]. Kudinova-Pasternak, 1970: 359–360 [for *L. langi*] *Leptognathia incertae cedis (partim)*: Larsen & Shimomura, 2007: 15 [removal of *L. langi* from *Leptognathia sensu stricto* to *incertae cedis*].

Type species: *Leptognathiopsis attenuata* Holdich & Bird, 1986, by monotypy.

Species included (Japanese and trench species in bold): *L. attenuata* Holdich & Bird, 1986, British Isles, Faeroe Islands; ***L. langi*** (Kudinova-Pasternak, 1970) comb. nov.

Diagnosis (modified after Holdich & Bird 1986). Colletteid, *female* with body slightly tapering posteriorly, all pereonites shorter than broad; pleonites with epimera with long seta. Antennule four-articled, article 4 with large terminal aesthetasc. Antenna six-articled. Mandible molar acuminate, with terminal spines. Maxilliped endite with disto-medial cusp and disto-lateral setae. Pereopods 1–3 ischium with seta at least half as long as merus, merus with ventral spiniform seta over-reaching carpus. Pereopods 4–6 ischium with two setae, one at least half as long as merus, carpus with three spiniform setae and one rod-like seta, pereopods 4–5 propodus with one dorso-distal spiniform seta, pereopod 6 with two setae. Pleopods present or absent in female; uropod biramous, exopod one-articled, endopod two-articled. *Preparatory male* (natatory male unknown, if present) as female, but antennule thicker, four-articled, and pleopods present (if absent in female).

Remarks. This genus was originally established for a British shallow-water species, *L. attenuata* that had previously been misidentified as *Leptognathia manca* G.O. Sars, 1882 in several British publications (e.g. Holdich & Jones 1983a, b). In a phylogenetic analysis Larsen & Wilson (2002) placed *Leptognathiopsis* in the new family Colletteidae. With the collection of new specimens that seem clearly identifiable as *Leptognathia langi* Kudinova-Pasternak, 1970 a redescription was made possible as well as a transfer of the species to the genus *Leptognathiopsis*.

A correction to the figures of the pereopods 4–6 of *L. attenuata* given by Holdich & Bird (*op.cit.*) is required, as the double dorso-distal propodal spiniform setae on pereopods 4–5 was incorrect (possibly due to an optical effect of a larger, single grooved seta). Only a single seta is present (Fig. 6G), although two are present on pereopod 6 (Fig. 6I). Also, one of the carpal setae is more slender than the other three, rather than being equally thick. A new record of *L. attenuata* has been obtained from outside of the British Isles, *viz.* the Faeroe Islands shelf, at 283 metres (BIOFAR project – Bird *ined*.).

Leptognathiopsis langi (Kudinova-Pasternak, 1970) comb.nov.

Figures 4–6

Leptognathia langi Kudinova-Pasternak, 1970: 359–360, fig.12.

Material examined. 1 non-ovigerous female (KMNH IvR 500.176), station TD-7, 38°47.93'–38°45.87'N

144°08.07'–144°07.89'E, 7340–7433 metres, 30 September 2001. 1 non-ovigerous female (right uropod missing), (partly dissected; KMNH IvR 500.177), station XR-7, 42°12.87'–42°12.10'N 145°33.93'–145°32.05'E, 3853–3858 metres, 17 September 2001. 2 ovigerous females (KMNH IvR 500.178), station TD-4, 39°27.08'–39°29.15'N 143°37.79'–143°38.52'E, 3272–3146 metres, 26 September 2001.

Diagnosis. *Leptognathiopsis* with long, deflexed, apical process on pleotelson. Uropod basis and rami slender.

Redescription of non-ovigerous female.

Body (Fig. 4A). Slender, 6.7 times as long as broad, weakly tapering posteriorly, length 1.75–1.98 mm (1.6 mm, Kudinova-Pasternak 1970).

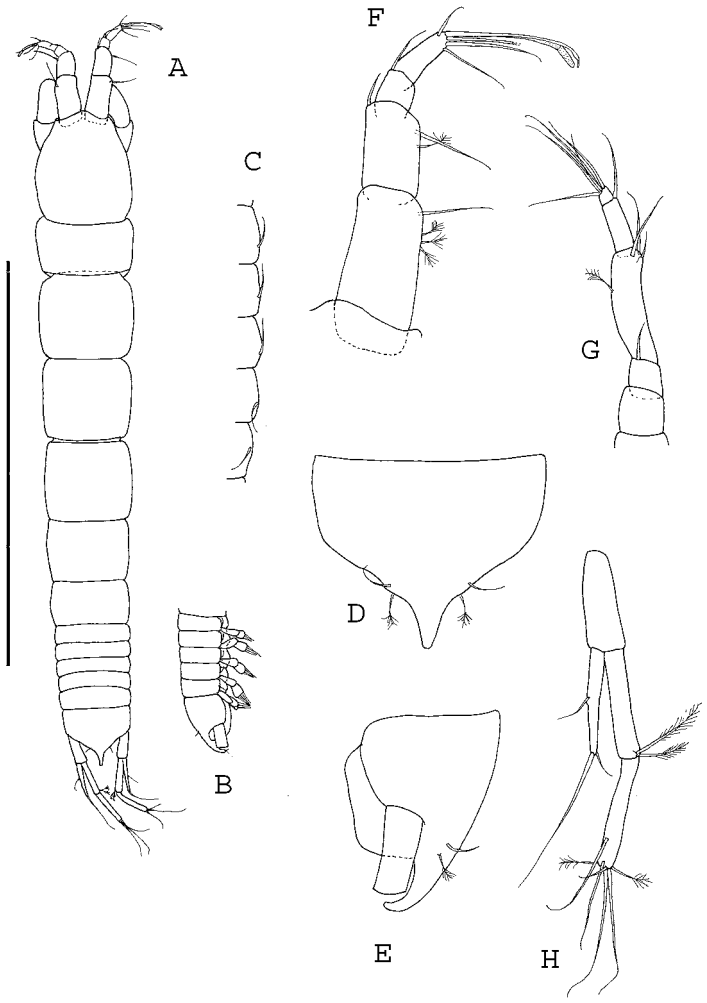

FIGURE 4. *Leptognathiopsis langi* comb. nov. Non-ovigerous female; A, habitus; B, pleon and pleotelson, lateral view; C, pleonal margins, lateral view enlargement; D–E, pleotelson, dorsal and lateral view; F, antennule; G, antenna; H, uropod. Scale bar = 1 mm for A and B, 0.31 mm for C-H.

Carapace. Fairly stout, 1.2 times as long as broad, with rounded rostrum and convex lateral margins, shorter than pereonites 1–2 together.

Pereonites. With weakly convex lateral margins. Pereonite 1 slightly narrower posteriorly. Pereonites 1–6 0.51, 0.89, 0.94, 0.9, 0.76, and 0.52 times as long as broad, respectively.

Pleon (Fig. 4B). Short, 13% of total body length, epimera with marginal seta generally aligned close to edge, sternal profile shallow.

Pleotelson (Figs 4D–E). As long as three and a half preceding pleonites, with long, deflexed, acuminate apical process, with two setae and two sensory setae.

Antennule (Fig. 4F). 0.8 times as long as carapace, overlapped by rostral margin at base. Article 1 half of total antennule length, 2.2 times as long as broad, with disto-outer seta and three more proximal sensory setae. Article 2 1.6 times as long as broad, with one inner and outer setae and one sensory setae. Article 3 short, as long as broad, with inner seta almost as long as article. Article 4, shorter than article 2, with one aesthetasc and one short and four long setae.

Antenna (Fig. 4G). Six-articled, 0.8 times as long as antennule. Article 3 with dorsal seta. Article 4 3.75 times as long as broad, with distal sensory seta and three terminal setae. Article 5 with terminal seta. Article 6 small, with about five terminal setae.

Mouthparts. Labrum (Fig. 5A) rounded, hood-shaped, distally setose. Labium (Fig. 5B) lobes with small apical notch. Maxilla (Fig. 5C) tongue-shaped. Mandible (Fig. 5D) incisor with about four cusps, lacinia mobilis (left mandible) strong, slightly tapering, molar tapering, with about seven apical spines, medial two longer than others. Maxillule (Fig. 5E) endite with at least five terminal spiniform setae (some concealed). Maxilliped (Figs 5F–G) with bases unfused distally, and seta near palp articulation, endites unfused, with medial process and lateral setae on distal margin; palp article 2 with three inner and one outer setae, article 3 as long as article 2, with two long and one shorter, setae; article 4 with five terminal setae.

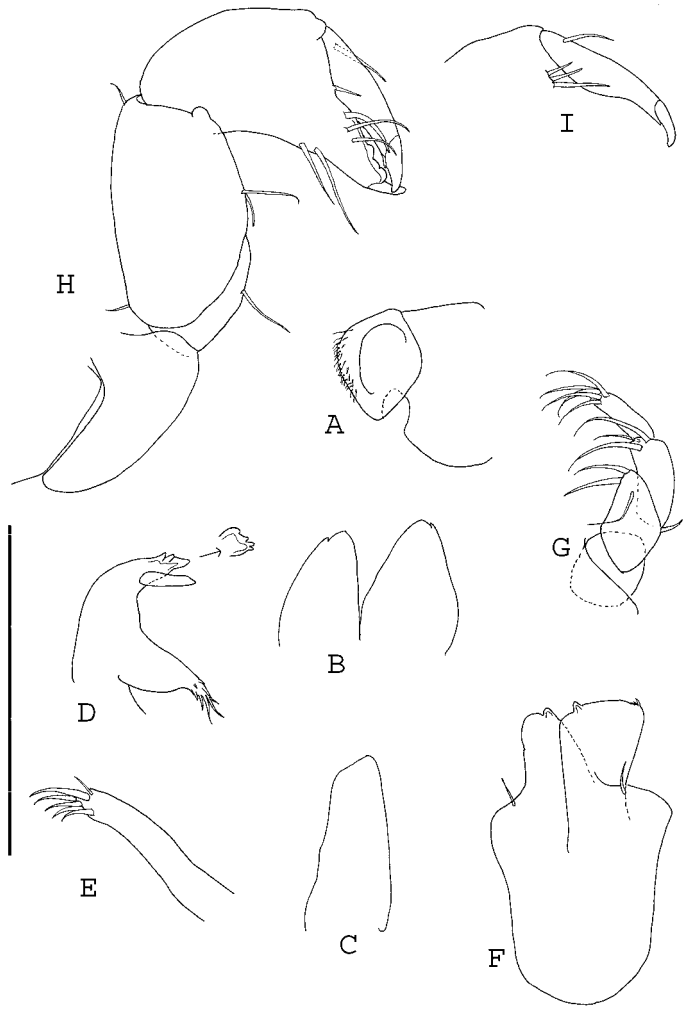

FIGURE 5. *Leptognathiopsis langi* comb. nov. Non-ovigerous female. A, labrum, lateral view; B, labium; C, maxilla; D, left mandible; E, maxillule endite; F, maxilliped bases and endites; G, maxilliped palp; H, right cheliped; I, left cheliped, inner face of distal propodus and dactylus. Scale bar = 0.31 mm for H and I, 0.125 mm for A-G.

Cheliped (Figs 5H–I). Attached via posterior sclerite. Basis with long posterior free process. Merus with ventral seta. Carpus 1.75 times as long as broad, without shield, with two unequal ventral setae, and one proximal and one distal dorsal seta. Propodus and spine longer than carpus, 2.3 times as long as broad, with three unequal spiniform setae on inner face and one outer seta near base of dactylus. Fixed finger with three rounded teeth on incisive margin, three outer setae and two ventral setae. Dactylus with inner seta.

Pereopod 1 (Fig. 6A). Larger than pereopods 2–3. Coxa annular, with seta. Basis shorter than succeeding articles together, 3.9 times as long as broad. Ischium with seta almost half as long as merus. Merus with short inner seta and long outer spiniform seta that over-reaches carpus. Carpus rectangular, stout, shorter than merus, with two, dorsal and ventral, spiniform setae that reach end of propodus, and with few ventral spinules. Propodus longer than merus, with ventral spinules and ventro-distal spiniform seta longer than dactylus. Dactylus and unguis shorter than propodus, unguis with spatulate tip.

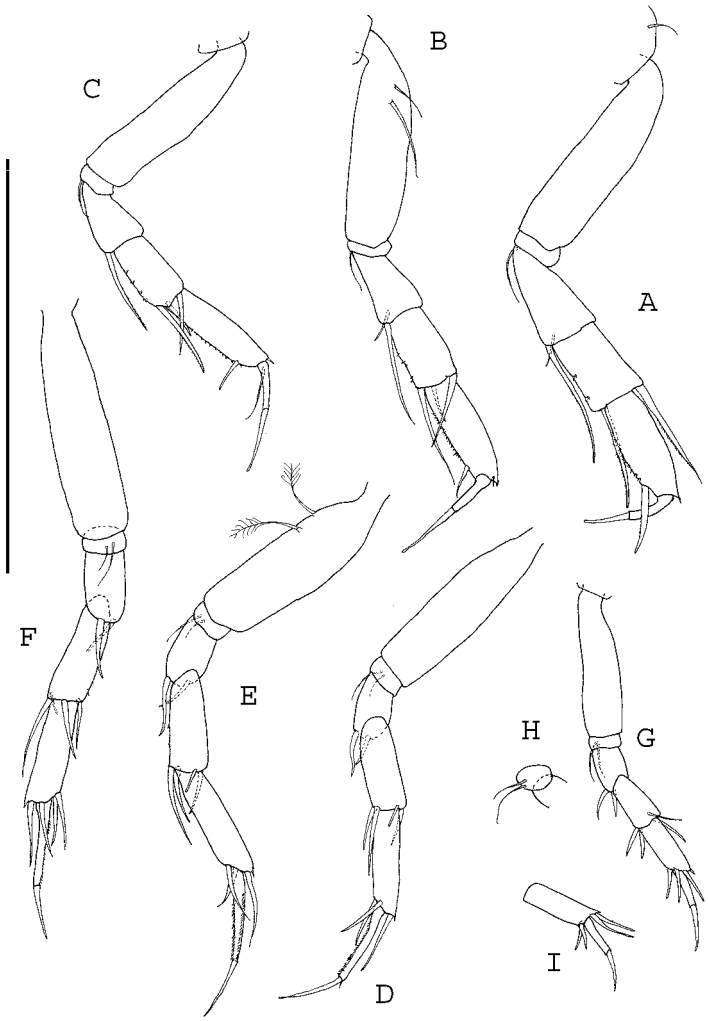

FIGURE 6. *Leptognathiopsis langi* comb. nov. Non-ovigerous female. A–F, pereopods 1–6 respectively. *Leptognathiopsis attenuata*. Ovigerous female. G, pereopod 4; H, pereopods 4–6 ischium; I, pereopod 6 propodus and dactylus/unguis. Scale bar = 0.25 mm for A-I.

Pereopod 2 (Fig. 6B). Similar to pereopod 1 but shorter. Basis with two (sensory?) setae. Carpus with one long, one medium and one short spiniform setae. Ventro-distal spiniform seta of propodus as long as dactylus.
Pereopod 3 (Fig. 6C). Similar to pereopod 2, but smaller. Basis without sensory setae. Dactylus with accessory seta (perhaps present on pereopods 2–3).

Pereopod 4 (Fig. 6D). Without obvious coxa. Basis slightly longer than in pereopod 3, four times as long as broad. Ischium with two unequal setae. Merus with two ventral spiniform setae. Carpus rectangular, longer than merus, 2.7 times as long as broad, with three unequal spiniform seta and one rod-like seta. Propodus longer than carpus, with two ventro-distal spiniform setae and one dorso-distal spiniform seta. Dactylus and unguis together longer than propodus, dactylus with spinulose ventral margin.

Pereopod 5 (Fig. 6E). Similar to pereopod 4, but basis with two sensory setae.

Pereopod 6 (Fig. 6F). Similar to pereopods 4–5 but propodus with two dorso-distal spiniform setae.

Pleopod (not figured). Present, similar to those of preparatory male of *L. attenuata*.

Uropod (Fig. 4H). Long and slender, as long as pleotelson and two and a half preceding pleonites. Basal article 2.7 times as long as broad, as long as exopod. Exopod one-articled, as long as article 1 of endopod, eight times as long as broad, with one seta at halfway point, one short and one long terminal setae. Endopod two-articled, article 1 five times as long as broad, with two sensory setae, article 2 as long as article 1, with one distal seta, two sensory setae and four terminal setae.

Ovigerous female. Generally as above but with oostegites, length 1.58–1.66 mm.

Remarks. The very similar habitus, mouthparts and general cheliped, pereopod and uropod morphology indicate a close relationship of *Leptognathiopsis langi* with the only other congeneric species, *L. attenuata*. The abysso-hadal *L. langi* is, however, characterized by the strong pleotelson projection and more slender uropods. *Leptognathia langi* is now removed from the list of doubtful (*incertae cedis*) species of *Leptognathia* given by Larsen & Shimomura (2007).

Distribution. Kurile-Kamchatka Trench and Japan Trench, 3146–7433 metres (this study), 6675–6710 metres (Kudinova-Pasternak 1970).

Tumidochelia cf. *dentifera* (G.O. Sars, 1896)

(restricted synonymy and bibliography)

Leptognathia dentifera G.O. Sars, 1896: 30, plate XIV fig.2. Kudinova-Pasternak, 1970: 353 [doubtful synonymy].
Tumidochelia dentifera (G.O. Sars, 1896): Larsen & Shimomura, 2007: 8, fig. 3.

Remarks. The genus *Tumidochelia* is an *Akanthophoreus*-like taxon, largely characterized by a relatively short antennule article 1 and inner spiniform process on the uropod basal article. The original diagnosis (and repeated by Larsen & Shimomura 2007 in the enlargement of the genus) is in error in stating that the cheliped carpal shield is on the inner face – it is on the outer face.

Tumidochelia dentifera, principally a shelf and shallow-bathyal species from west European waters (see Sieg 1983), has been doubtfully recorded from the Kurile-Kamchatka Trench (Kudinova-Pasternak 1970), at 4895–6225 metres while another species, *T. knighti* Larsen & Shimomura, 2007, has been recently described from bathyal depths (635–654 metres) off Okinawa.

Family Leptognathiidae Sieg, 1973 *sensu* Larsen & Shimomura (2007)

(restricted synonymy and bibliography)
Leptognathiidae Sieg, 1973: unpublished, but see Sieg, 1976. Sieg, 1976: 185, 194.
Leptognathiidae subfamily Leptognathiinae: Sieg, 1986b: 110.
Anarthruridae Lang, 1971 subfamily Leptognathiinae: Sieg, 1986a, 21, 44. Gutu & Sieg, 1999: 384.
Leptognathiidae Sieg, 1973 [revised]: Larsen & Wilson, 2002: 2, 13. Larsen & Shimomura, 2007: 14.

Genera included (Japanese and Kurile-Kamchatka genera in bold): ***Biarticulata*** Larsen & Shimomura, 2007; ***Forcipatia*** Larsen & Shimomura, 2007; ***Leptognathia*** G.O. Sars, 1882.

Diagnosis (after Larsen & Shimomura 2007). *Female*. Medium body calcification. No plates in carapace. Eyes and eye-lobes absent. Pereon with six free pereonites; pereonite 1 not reduced. Pleon with five free pleonites, as wide as pereon; articulated setae on pleonites absent. Antennule four-articled. Antenna five or six-articled, article 3 without spiniform setae dorsally. Molar process of mandible pointed. Labium with one pair of lobes, medial spiniform setae absent. Maxilliped bases fused, endites not fused, narrower than basis, without setose or serrated anterio-lateral corners, flat setae or denticles. Cheliped slender and attached via sclerite, fixed finger and dactylus elongated or simple. Pereopod coxae present or absent on pereopods 1–3 but always absent on pereopods 4–6; dactylus and unguis of pereopods 4–6 not fused. Pleopods well developed or absent. Uropodal endopod two-articled, exopod one or two-articled. Marsupium of four pairs of oostegites.

Preparatory male. Generally as above but antennule thicker and pleon and pleopods more well-developed.

Natatory (terminal) male. Body significantly shorter than female. Pereonites less, pleonites more developed than in female. Antennule seven-articled, densely packed with aesthetascs. Mouthparts reduced. Cheliped not enlarged. Pleopods well developed.

Remarks. As has happened with the Family Anarthruridae (Bird 2004), the Leptognathiidae has undergone considerable changes since its establishment by Sieg (1973). Major revisions occurred through Sieg's (1986a, b) appraisal of pereopod setation and more recently as an outcome of a controversial phylogenetic analysis by Larsen & Wilson (*op.cit*.); included genera fell from nine (*Exspina* Lang, 1968; *Leptognathia*; *Leptognathiopsis* Holdich & Bird, 1986; *Mirandotanais* Kussakin & Tzareva, 1974; *Pseudoleptognathia* Sieg, 1986b; *Pseudoparatanais* Sieg, 1973; *Robustognathia* Kudinova-Pasternak, 1989; *Subulella* Holdich & Bird, 1986 and *Tanaopsis* G.O. Sars, 1896) in Gutu & Sieg's classification to just one (*Leptognathia*) in the Larsen & Wilson version. Very recently, *Leptognathia* itself has been partially revised, reduced in species complement, and split into three genera, *Biarticulata*, *Forcipatia* and *Leptognathia sensu stricto*, largely based on uropod morphology (Larsen & Shimomura 2007). Further restriction of the genus *Leptognathia* is highly probable, clustering around the type-species, *L. breviremis* (Lilljeborg, 1864).

Genus *Biarticulata* Larsen & Shimomura, 2007

(restricted synonymy and bibliography)
Tanais Latreille, 1831 *(partim):* G.O. Sars, 1877: 347, 370.
Strongylura G.O. Sars, 1882 *(partim):* Norman & Stebbing, 1886: 110, 116–117.
Cryptocope G.O. Sars, 1882 *(partim):* G.O. Sars, 1882: 50–51. Hansen, 1913: 106.
Leptognathia G.O. Sars, 1882 (*partim*): Hansen, 1913: 82–83. Kudinova-Pasternak, 1965: 82. Kudinova-Pasternak, 1976: 119. Kudinova-Pasternak, 1977: 120. Kudinova-Pasternak, 1981: 102.

Species included (Japanese waters, Kurile-Kamchatka Trench and Japan Trench species in bold): *B. arctophylax* (Norman & Stebbing, 1886), NE Atlantic; *B. distincta* (Kudinova-Pasternak, 1981), Central Pacific, 1600–1900 metres; *B. elegans* (Kudinova-Pasternak, 1965), Bougainville Trench, 7974–8006 metres; ***B. greveae*** (Kudinova-Pasternak, 1976); *B. mironovi* (Kudinova-Pasternak, 1981), Central Pacific, 1735–2430 metres; *B. parabranchiata* (Kudinova-Pasternak, 1977), Palau Trench, 7000–7170 metres; ***B. parelegans*** (Kudinova-Pasternak, 1970); ***B. tuberculata*** (Hansen, 1913); *B. voeringi* (G.O. Sars, 1877), Arctic Ocean.

Diagnosis (after Larsen & Shimomura 2007). *Female*. Leptognathiid with cheliped fixed finger and dactylus simple. Uropodal exopod two-articled.

Remarks. Although deriving from a revision and splitting of the genus *Leptognathia* (Larsen & Shimomura *op.cit*.), this new genus is a pragmatic (and probably temporary) formation and is clearly polyphyletic, the only common feature among the largely disparate species being the bi-articulated uropod exopod. A significant problem faces potential revisers of *Biarticulata*, if no existing genus can accommodate transferred species, as no type species was designated.

Biarticulata greveae (Kudinova-Pasternak, 1976)

Leptognathia greveae Kudinova-Pasternak, 1976: 119–120, 123, fig.2.
Biarticulata greveae (Kudinova-Pasternak, 1976): Larsen & Shimomura, 2007: 19.

Remarks. An incompletely-described species of unknown affinities, with a short and broad pleon and pleotelson, and *Akanthophoreus*-like antennule, antenna, uropod and mandibles. It is a hadal species from 8185–8400 metres in the Kurile-Kamchatka Trench (45° 25'N 153° 07'E), known from one specimen (Kudinova-Pasternak 1976). Not recorded in the present material.

Biarticulata parelegans (Kudinova-Pasternak, 1970)

Leptognathia parelegans Kudinova-Pasternak, 1970: 358–359, fig.11.
Biarticulata paraelegans [*sic*] Kudinova-Pasternak, 1976: Larsen & Shimomura, 2007: 19.

Remarks. A small (1.8 mm) species, which is poorly described. The pereonites are of different shapes, the pleotelson is shown to be slightly narrower than the pleon and long pereopodal spiniform setae are present on the merus (pereopods 3 and 6) and carpus (pereopods 1 and 3). Recorded from the Kurile-Kamchatka Trench (Kudinova-Pasternak 1970), at 5240 metres but not recorded in the present material.

Biarticulata tuberculata (Hansen, 1913)

Leptognathia tuberculata Hansen, 1913: 82–83, plate VIII figs 3a–f. Kudinova-Pasternak, 1966: 532 [uncertain synonymy]. Kudinova-Pasternak, 1970: 353 [uncertain synonymy].
Biarticulata tuberculata (Hansen, 1913): Larsen & Shimomura, 2007: 19.

Remarks. This somewhat enigmatic species, originally described by Hansen (*op.cit.*) from material collected in the Davis Strait at depths of 2194–2625 metres has also been reported from the Kurile-Kamchatka Trench at 4895 metres by Kudinova-Pasternak (1970) and the central North Pacific, 6051 metres (Kudinova-Pasternak 1966). It is very doubtfully placed in the Leptognathiidae as it is clearly either a species of *Akanthophoreus* or *Chauliopleona*, although it escaped the revision of both genera (the former as *Paraleptognathia* Kudinova-Pasternak, 1981) by Guerrero-Kommritz (2004, 2005). It is a very slender species, one syntype from Ingolf Station 36 having a carapace 1.8 times as long as broad and with pereonites 2–5 all longer than broad.

For additional comments on this species and Kudinova-Pasternak's record see Bird, elsewhere in this publication.

Genus *Forcipatia* Larsen & Shimomura, 2007

Forcipatia Larsen & Shimomura, 2007: 19–20 (diagnosis and key to species).
Leptognathia G.O. Sars, 1882 (*partim*): Kudinova-Pasternak, 1970: 363–364. Larsen, 2005: 200.

Species included (Japanese waters, Kurile-Kamchatka Trench and Japan Trench species in bold): *F. longimanus* Larsen, 2005, Gulf of Mexico, 336–1875 metres; ***F. rotundicauda*** Kudinova-Pasternak, 1970.

Diagnosis (after Larsen & Shimomura). *Female*. Leptognathiid with cheliped fixed finger and dactylus elongated. Uropodal exopod uniarticulated.

Remarks. This genus is relatively easy to recognize owing to the cheliped morphology, which approaches that of some pseudotanaid taxa. The mandibular structure is very similar to the type genus *Leptognathia*, with a crenulate margin of both incisors. Unlike the previous leptognathiid genus (*Biarticulata)*, *Forcipatia* is a small, monophyletic taxon.

***Forcipatia rotundicauda* (Kudinova-Pasternak, 1970)**
Figures 7–8

Leptognathia rotundicauda Kudinova-Pasternak, 1970: 363–364, fig. 15. Larsen, 2005; 200 (remarks and comparison with *L. longimanus* Larsen).

Material examined. 1 preparatory male (?) and 1 juvenile (KMNH IvR 500.179), station TD-4, 39°27.08'N 143°37.79'W, 3146–3272 metres, 28 September 2001.

Description (supplementary to Kudinova-Pasternak 1970).

Preparatory male (?). Body (Fig. 7A). Stout, five times as long as broad, length 1.4 mm.

Cephalothorax. As long as broad, with round lateral margins, weak rostrum and seta near base of each antennule.

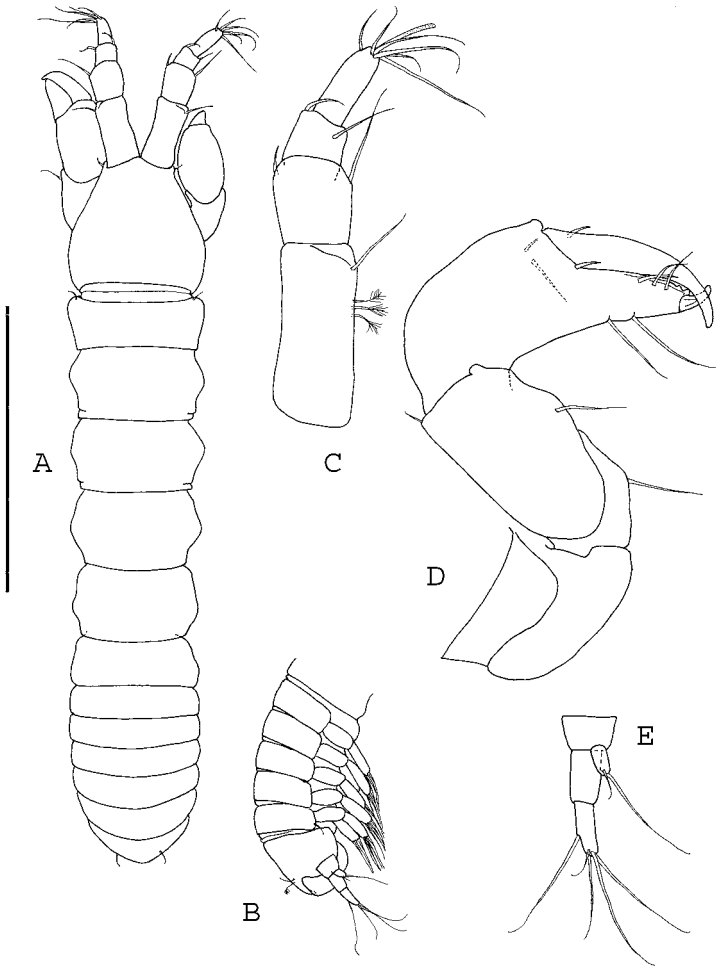

FIGURE 7. *Forcipatia rotundicauda* Kudinova-Pasternak, 1970. Preparatory male (?). A, habitus; B, pleon, lateral view; C, antennule; D, right cheliped; E, uropod. Scale bar = 0.5 mm for A and B, 0.22 mm for C-E.

Pereonites. All shorter than broad, with lateral process over pereopod insertion, 0.31, 0.56, 0.53, 0.59, 0.58 and 0.33 times as long as broad respectively.

Pleon (Fig. 7B). 23% of body length. Pleonite 5 with lateral seta, sternites with only low ventral profile.

Pleotelson. As long as two preceding pleonites, conical, with small deflexed apex and large anal valves.

Antennule (Fig. 7C). Longer than carapace. Article 1 just less than half of total length, stout, 2.4 times as long as broad, with disto-lateral seta and three more proximal sensory setae. Article 2 very stout, just longer than broad, with lateral and medial setae. Article 3 short, as long as broad, with two unequal setae. Article 4 as long as article 2, almost three times as long as broad, with several terminal setae and an aesthetasc.

Cheliped (Fig. 7D). Basis attached via a sclerite to carapace. Merus with long seta. Carpus about twice as long as broad, with ventral seta and small disto-dorsal seta, without shield; propodus 1.5 times as long as carpus and 0.4 times as deep as long, with two long ventral setae, two unequal medial setae and lateral seta near articulation with dactylus. Fixed finger with curved terminal spine, two or three small teeth on incisive margin and three unequal lateral setae. Dactylus long and strongly deflexed distally, with proximo-medial seta.

Pereopod 1 (Fig. 8A). Larger than pereopods 2–3. Coxa annular, with seta. Basis slender, about 5–6 times as long as broad. Ischium with seta half as long as merus. Merus twice as long as broad, with ventral seta. Carpus rectangular, 2.25 times as long as broad, with two unequal dorsal setae. Propodus longer than carpus and four times as long as broad, with three distal spiniform setae. Dactylus and unguis together shorter than propodus, unguis tip spatulate.

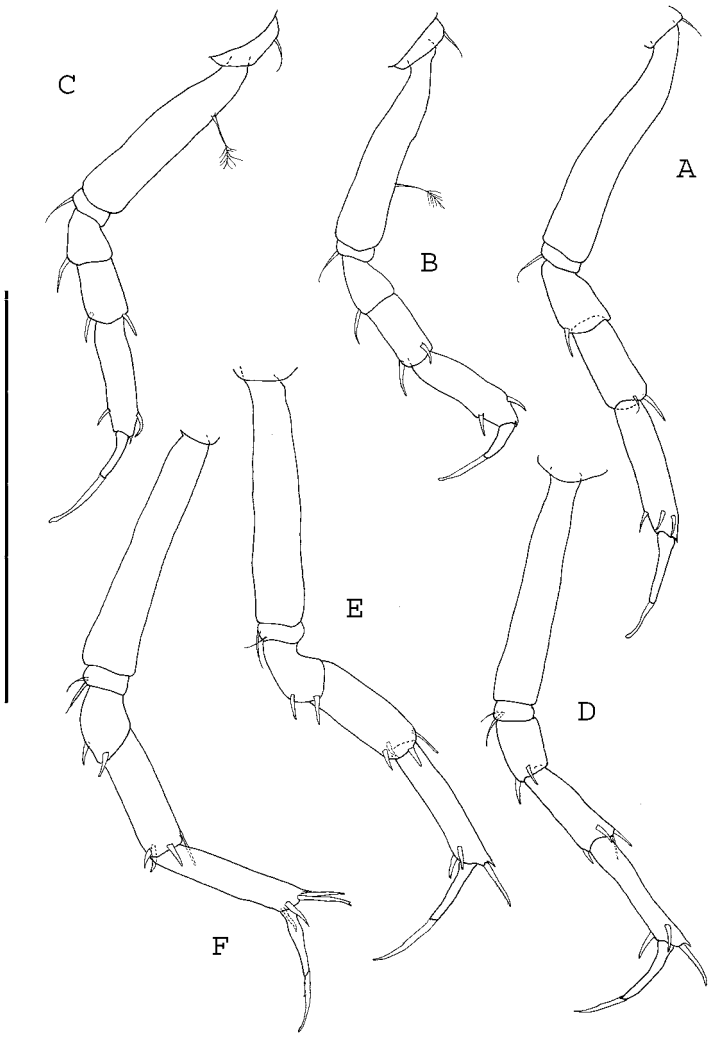

FIGURE 8. *Forcipatia rotundicauda*. Preparatory male (?), A–F, pereopods 1–6 respectively. Scale bar = 0.25 mm for A-F.

Pereopod 2 (Fig. 8B). About 85% length of pereopod 1, similar but with sensory seta on basis, shorter merus, carpus and propodus and with only two distal propodal setae. Dactylus and unguis together as long as propodus.

Pereopod 3 (Fig. 8C). Similar to pereopod 2.

Pereopod 4 (Fig. 8D). Slender, as long as pereopod 1, with apparent coxa. Basis nearly six times as long as broad. Ischium with two unequal setae. Merus less than twice as long as broad, with two short ventral spiniform setae. Carpus twice as long as merus, with three spiniform setae and a more slender rod-like seta. Propodus five times longer than broad and longer than carpus, with two ventro-distal spiniform setae and one longer terminal spiniform seta. Dactylus and unguis together 0.8 times as long as propodus, unguis with small ventral spine.

Pereopod 5 (Fig. 8E). Similar to pereopod 4.

Pereopod 6 (Fig. 8F). Similar to pereopods 4–5 but propodus with two long terminal spiniform setae and unguis with two minute spines.

Pleopod (not figured). Basal article longer than broad. Rami as long as or just longer than basal article; terminal setae longer than rami.

Uropod (Fig. 7E). About 0.75 times as long as pleotelson. Basal article shorter than broad. Exopod one-articled, half as long as article 1 of endopod, with one small distal seta and one long terminal seta. Endopod two-articled, articles of equal length, article 2 with five unequal distal and terminal setae.

Juvenile. Generally similar to above but pleopods only rudimentary, without setae, length 1.16 mm. Specimen lacks chelipeds.

Remarks. The two specimens recorded in the recent material closely conform to Kudinova-Pasternak's description and seem to be unambiguously conspecific. The larger specimen is considered to be a preparatory male owing to its thick antennules and relatively well-developed pleon/pleopods compared to the original description (of a female).

Although Kudinova-Pasternak indicated 'pereopod IV' on her figure 15, this would have been equivalent to pereopod 3 in current usage; however what is drawn is representative of pereopods 4–5 (pereopods V–VI in earlier terminology). The pectination of the terminal propodal seta is actually quite slight and is not in conflict with Larsen's account of *L. longimanus*, where a pectinate seta is present on pereopod 5. This Gulf of Mexico species has a more slender body, proportionately longer cheliped propodus, sparser pereopod setation and pleopods are lacking in females.

Distribution. The original record of *F. rotundicauda* was from the Kurile-Kamchatka Trench, 4945 metres, the present record was from the Japan Trench, 3146–3272 metres.

Genus *Leptognathia* G.O. Sars, 1882

(restricted synonymy and bibliography)
Leptognathia G.O. Sars, 1882: 40–41.
Cryptocope G.O. Sars, 1882 (*partim*): Kudinova-Pasternak, 1982: 155–156.
Tanais Latreille, 1831 *(partim*): Lilljeborg, 1864: 21.
Type species: *Tanais breviremis* Lilljeborg, 1864.

Species included (Japanese waters, Kurile-Kamchatka Trench and Japan Trench species in bold): ***L. aneristus*** n.sp., ***L. bamberi***, *L. breviremis*, NE Atlantic; *L. breviremoides* Sieg, 1986a, Antarctica; *L. glandiceps* Shiino, 1978, Kerguelen Islands, 60 metres; *L. gyreae* Larsen, 2005, Gulf of Mexico, 675–677 metres; *L. longa* (Kudinova-Pasternak, 1982), Mediterranean Sea, 2890 metres; *L. manca* G.O. Sars, 1882, NE Atlantic; *L. vitjazi* (Kudinova-Pasternak, 1982), Mediterranean Sea, 1320 metres.

Diagnosis (after Larsen & Shimomura 2007) *Female/neuter*. Leptognathiid with cheliped fixed finger and dactylus simple. Uropod exopod one-articled.

Remarks. *Leptognathia* has suffered both the greatest accretion and, latterly, attrition of all tanaidomorphan genera as species have been added to it or removed in subsequent revisions (e.g. Hansen 1913; Lang 1968; Bird & Holdich 1984; Sieg 1986a; and Larsen & Shimomura 2007). Further revision and contraction is anticipated.

***Leptognathia aneristus* n.sp.**
Figures 9–11

Material examined. Holotype: 1 non-ovigerous female, 1.68 mm (KMNH IvR 500.180), station XR-7, 42°12.87'–42°12.10'N 145°33.93'–145°32.05'E, 3853–3858 metres, 17 September 2001. **Paratypes:** 1 ovigerous female (in poor condition), 2 non-ovigerous females (KMNH IvR 500.181), same location; 1 non-ovigerous female (KMNH IvR 500.182), station TD-7, 38°47.93'–38°45.87'N 144°08.07'–144°07.89'E, 7340–7433 metres, 30 September 2001.

Diagnosis. *Leptognathia* with carapace as long as broad. Pleonites with high sternal spurs. Antennule article 2 less than half as long as article 1. Cheliped propodus with one ventral seta. Pereopod 6 with three pectinate dorso-distal setae; uropod exopod shorter than article 1 of endopod.

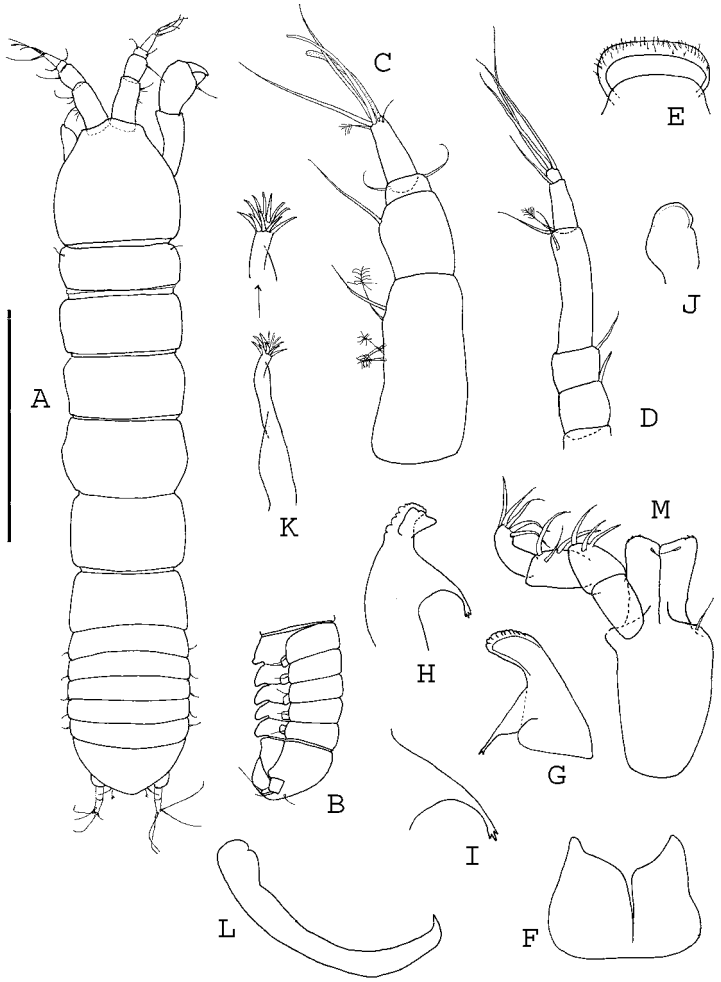

FIGURE 9. *Leptognathia aneristus* n.sp. A–D, Holotype, non-ovigerous female; E–M, Paratype. A, habitus; B, pleon, lateral view, pleopods excluded for clarity; C, left antennule; D, antenna; E, labrum, dorsal or ventral view; F, labium; G, right mandible; H, left mandible; I, molar of left mandible, enlarged; J, maxilla; K, maxillule endite, with enlargement of terminal setae; L, epignath; M, maxilliped, one palp not shown for clarity. Scale bar = 0.5 mm for A and B, 0.15 mm for C-E and G and H, 0.11 mm for I.

Etymology. From Latinisation of the Greek '*aneristos*', meaning 'undisputed', 'undoubted'; referring to its unequivocally close relationship to the generic type species.

Description. *Non-ovigerous female*.

Body (Figs 9A). Fairly stout, 5.4 times as long as broad, length 1.68–1.84 mm. *Carapace* as long as broad, just longer than pereonites 1–2.

Pereonites. With slightly rounded or almost parallel lateral margins, pereonite 1 shortest, pereonites 1–6 times as long as broad respectively.

Pleon (Fig. 9B). 18.5% of body length, pleonites much shorter than wide, with shallow epimera, each with a small seta. Sternites with high, recurved processes.

Pleotelson (Fig. 9B). As long as two preceding pleonites, with shallow conical apical profile in dorsal view, with two setae and two sensory setae, but with deflected acuminate apex bearing two terminal setae.

Antennule (Fig. 9C). About 0.8 times as long as carapace. Article 1 just over half length of whole, about twice as long as broad, with one simple and four sensory setae on outer margin. Article 2 1.2 times as long as broad, as long as articles 3–4 together, with outer seta. Article 3 short, annular, with two setae. Article 4 with three simple setae (one blunt-tipped), one aesthetasc and two sensory setae.

Antenna (Fig. 9D). Six-articled, 0.81 times as long as antennule. Article 1 short, annular. Articles 2–3 shorter than broad, each with dorsal seta. Article 4 without pseudo-articulation or 'fusion-line', 3.3 times as long as broad, with two simple and one sensory setae. Article 5 0.4 times as long as article 4, with long terminal seta. Article 6 small, with three terminal setae.

Mouthparts. Labrum (Fig. 9E) hood-like, broadly conical in ventral or dorsal view. Labium (Fig. 9F) with acuminate distal processes, lacking setae. Mandibles (Figs 9G–I) with crenulate incisor, that of right mandible more curved than left, lacinia mobilis of left mandible broad; molar (Fig. 9I) abruptly acuminate with about three minute terminal denticles. Maxilla (Fig. 9J) lamelliform, ovate, not setose. Maxillule palp with two unequal terminal setae, endite (Fig. 9K) with eleven terminal spiniform setae. Epignath (Fig. 9L) elongate, without setae. Maxilliped (Fig. 9M) bases fused, cardiform, with seta near each palp insertion; endites unfused, with simple distal margin and distal seta; palp articles 2–4 with three, three and five long setae respectively.

Cheliped (Fig. 10A). Basis narrow, with free posterior margin about 33% of length. Merus sub-triangular, with one ventral seta. Carpus twice as long as deep, with two ventral setae, one mid-dorsal seta and one disto-dorsal seta. Chela slender, about as long as carpus, dorsal margin of propodus (Fig. 10B) about twice as long as dactylus, with long ventral seta, three inner setae and small outer seta near dactylus insertion. Fixed finger (Fig. 10C) with triangular terminal spine and three or four small teeth on incisive margin, with three outer setae. Dactylus unarmed.

Pereopod 1 (Fig. 11A). Longer than pereopods 2–3. Coxa annular, with setae. Basis slender, about six times as long as broad. Ischium with seta. Merus about twice as long as broad, with ventral seta. Carpus as long as merus, rectangular, with two short and two long setae. Propodus slender, about 1.6 times as long as carpus, with one ventral seta and two stronger dorso-distal setae. Dactylus and unguis together as long as propodus, dactylus with proximal seta, unguis with spatulate tip.

Pereopod 2 (Fig. 11B). Similar to pereopod 1 but basis, merus, carpus, propodus and dactylus/unguis slightly shorter. Basis with dorsal seta. Carpus with four unequal setae. Propodus with one dorso-distal seta.

Pereopod 3 (Fig. 11C). Similar to pereopod 2.

Pereopod 4 (Fig. 11D). Basis slender, about five times as long as broad, with one or two sensory setae. Ischium with two setae. Merus about twice as long as broad, with two ventral spiniform setae. Carpus longer than merus, with three long spiniform setae and a smaller rod-like seta. Propodus as long as carpus, with two ventro-distal spiniform setae and a finely-pectinate terminal spiniform seta. Dactylus and unguis together longer than propodus.

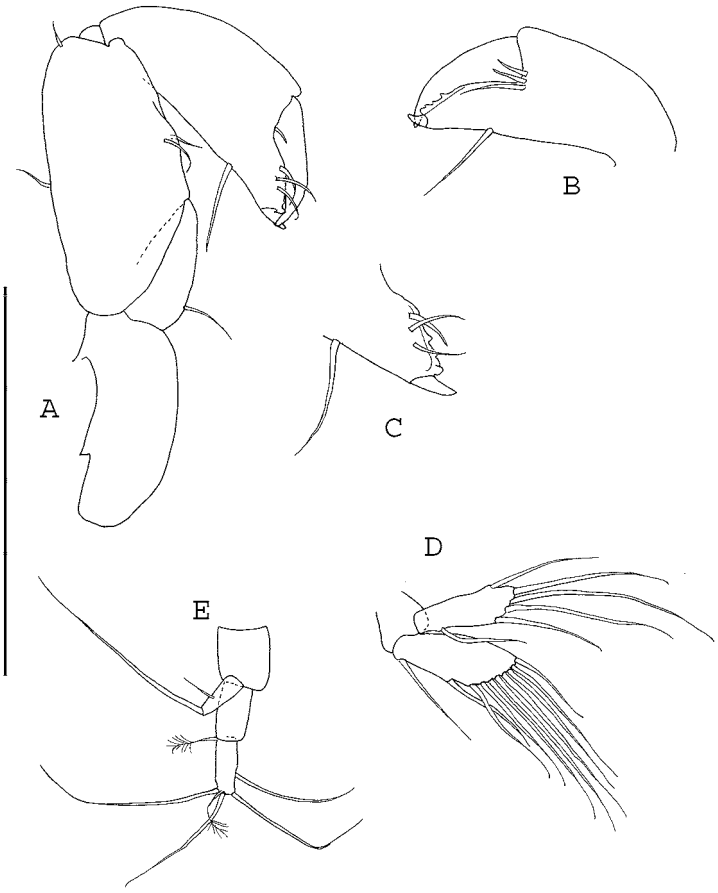

FIGURE 10. *Leptognathia aneristus* n.sp. Holotype. A, right cheliped; B, inner face of right chela; C, right cheliped fixed finger, enlarged. Paratype. D, pleopod; E, uropod. Scale bar = 0.25 mm A, B, D and E, 0.20 mm for C.

Pereopod 5 (Fig. 11E). Similar to pereopod 4, but basis with up to three sensory setae (although none on specimen figured).

Pereopod 6 (Figs 11F–G). Similar to pereopods 4–5, but propodus with three terminal pectinate setae.

Pleopod (Fig. 10D). Biramous, well-developed. Exopod elongate-ovate, with one proximal seta and nine distal setae on ventral margin. Endopod smaller, with proximal ventral seta, four distal-terminal setae and one disto-dorsal seta.

Uropod (Fig. 10E). About two-thirds as long as pleotelson, basal article as long as broad. Exopod as long as basal article, just shorter than proximal article of endopod, with distal seta and long terminal seta. Endopod two-articled, twice as long as basal article, article 1 with distal sensory seta, article 2 with distal seta, three long terminal seta and one sensory seta.

Remarks. This species very closely resembles *L. breviremis*, the Antarctic *L. breviremoides*, and *L. vitjazi;* these four constitute a close group of sibling, even cryptic species together with '*Leptognathia cf. breviremis*' (Dojiri & Sieg 1997), although the Mediterranean taxon *L. vitjazi* (originally in genus *Cryptocope* G.O. Sars, 1882) needs further study. Another, as yet undescribed, species of this '*breviremis*-group', occurs in the Arctic Ocean (Bird *ined*.) and may prove to be conspecific with *L. aneristus* n.sp. From *L. breviremis*, *L. aneristus* n.sp. it differs in having a shorter, more rounded cephalothorax, shorter antennule article 2, *distally* acuminate mandible molars, shorter pereopod 1 dorso-distal propodal setae, and three distinctly pectinate setae on the pereopod 6 propodus. The Antarctic species *L. breviremoides* is more similar to *L. aneristus* n.sp. but has more obviously pectinate and shorter carpal setae on pereopods 4–6, lacks the pereopod 6 pectinate propodal setae, has more setiferous pleopods and the uropod exopod is as long as the endopod article 1. From

the recently described Japanese *L. bamberi*, *L. aneristus* n.sp. is distinguished by a single ventral seta on the cheliped propodus and longer pereopodal setae, especially those of the carpus and merus, but as the former is a shelf/upper slope species it is unlikely that the two species will be encountered in the same samples.

Distribution. Kurile-Kamchatka Trench and Japan Trench, at depths 3853–7433 metres.

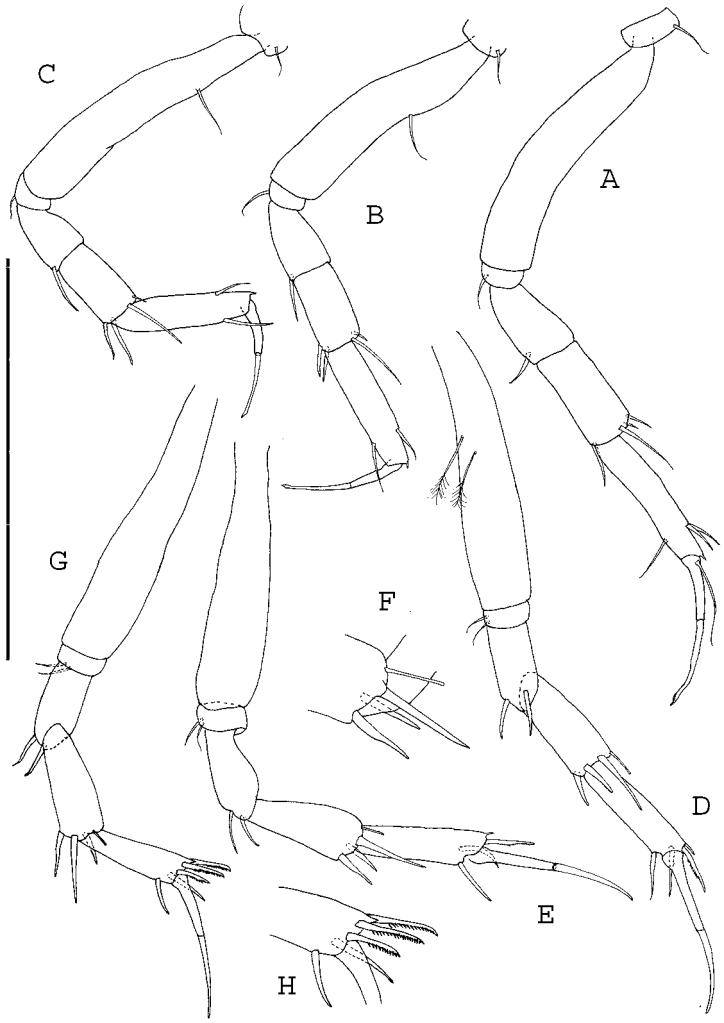

FIGURE 11. *Leptognathia aneristus* n.sp. Paratype. A–E, G, pereopods 1–6 respectively; F, pereopods 4–6 carpal setation, enlargement; H, pereopod 6 propodal setation, enlargement. Scale bar = 0.25 mm for A-G, 0.20 mm for H.

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I thank Dr. Kim Larsen for the opportunity and support for me to contribute to the systematics and distribution of Japanese tanaidaceans – a region with great zoogeographic and bathymetric complexities.

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1. This includes the correct date and page numbers for the reference quoted in Bird (2004)—as Sieg (1983c); apologies are offered for any confusion that was caused by this *lapsus calami*.