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Revision of the genus *Peraeospinosus* Sieg, 1986 (Crustacea: Peracarida: Tanaidacea)

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Abstract

Ten species, four new to science, five formerly belonging to genus *Typhlotanais*, and *Peraeospinosus pushkini* (Tzareva, 1982) are congeneric species, based on the following set of characters: a row of setae is present on the dorsal margin of the cheliped carpus, the distal seta of pereopods 4–5 exceeds the bifurcated unguis, large prickly tubercles on pereopods 4–6 surrounded by well-calcified spines, the pleopods semi-elliptical, and the rami of the uropod subequal in length. The new definition of the genus is proposed together with a key for identification of the females. The present-day distribution of the genus does not in itself indicate geographical origin, although the possibility of a deep-water origin cannot be excluded. It is assumed that phylogenetically young, blind *Peraeospinosus* could have colonized Antarctic free niches and then radiated.

Keywords: Crustacea, Peracarida, *Peraeospinosus*, Tanaidacea, Typhlotanais, Typhlotanais

Introduction

The genus *Typhlotanais* was erected by Sars (1882) for tanaids characterized by an elongated, almost straight body; a carapace narrowly truncated in front or slightly produced in the middle, with no traces of an ocular lobe (blind); the first pereonite shorter than the others; the three-articled antennule, with article 2 shorter than other articles; the elongated cheliped, with the narrow propodus subequal in length to the carpus; pereopod 1 longer than the next two limbs, and the three last pereopods of a clinging type; the biramous uropod, with both rami with two articles or at least one ramus with one article. *Typhlotanais sensu lato* includes 56 described species (Anderson et al. 2005) and is the most speciose genus of the family Nototanaidae *sensu* Larsen and Wilson (2002).

Sieg (1986), in his monograph on Tanaidacea from the Antarctic Peninsula and the most southern part of South America, created a new genus *Peraeospinosus* for species bearing spiniform setae (=spines in Sieg's terminology) on the carpus and merus of pereopods 2 and 3. He included three typhlotanoid species in that genus: *Peraeospinosus* (= *Typhlotanais*) *pushkini* (Tzareva, 1982), *P.* (= *T.*) *adipatus* (Tzareva 1982), and *P.* (= *T.*) *mixtus* (Hansen,

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1913), and designated the first of them as the type species. Morphological observations on *Typhlotanais sensu lato* indicate that presence of the spiniform setae on the carpus and merus of pereopods 2 and 3 is a character displayed in many typhlotanoid taxa. Moreover, *Peraeospinosus pushkini* shows more similarity with some species of the genus *Typhlotanais* [*P. kerguelenensis* (Sars, 1882), *T. magnus* (Kudinova-Pasternak, 1990), *P. magnificus* (Kudinova-Pasternak, 1969), *P. peculiaris* (Lang, 1968), and *P. rectus* (Kudinova-Pasternak, 1966)] than with two other members of *Peraeospinosus* [*P. adipatus* (Tzareva, 1982) and *T. mixtus* (Hansen, 1913)].

Ten species, four new to science, five formerly classified as *Typhlotanais* and *Peraeospinosus pushkini*, which display a cluster of specific characters (e.g. a row of setae on the dorsal margin of the cheliped carpus, the distal seta on the propodus of pereopods 4 and 5 exceeds the bifurcated unguis, prickly tubercles on the merus and carpus of pereopods 4–6 are large and surrounded by well-calcified spines, the pleopods semi-elliptical, and the rami of the uropods subequal in length; see also Table I), are considered congeneric species and constitute the genus *Peraeospinosus*. Redefinition of the genus *Peraeospinosus* is the subject of the present paper.

Material and methods

Materials were examined with the dissecting and compound microscope. Dissected appendages were stained with chlorazol black and mounted on permanent slides with glycerol and glycygel.

Body length was measured from the tip of the rostrum to the tip of the pleotelson.

The morphological terminology generally follows Larsen (2003). The term *walking type* is used for styliform pereopods. In contrast, the term *clinging type* is applied to pereopods

Table I. List of the characters separating *Peraeospinosus* n. gen. from *Typhlotanais sensu lato*.

Character	<i>Typhlotanais sensu lato</i>	<i>Peraeospinosus</i>
Grooves on pereonites 1–5	Absent	Present
Setae on dorsal margin of cheliped carpus	Absent ^a	Present
Upper surface of labrum	With minute setae	With strong, needle-like setae
Molar process	Setae, if present, usually no more than five	With numerous setae always present
Labium external lobe	Smooth	With row of setae
Tip of epignath	Never bifurcated	Sharp, usually bifurcated
Distal setae of pereopods 4–5 propodus	Usually not reaching over unguis	Always reaching over unguis
Prickly tubercles on pereopods 4–6	Various	Always large and surrounded by well-calcified setae (Figure 3E')
Unguis of pereopods 4–6	Often simple	Always bifurcated
Exopod of pleopods	Oval	Semi-elliptical
Uropod rami	Usually exopod much shorter than endopod	Usually equal or subequal
Terminal setae on uropod exopod	One regular size, the other small but never minute	One robust and one minute

^aSimilar setae are present on *Typhlotanais greenwichensis* Shiino, 1970 and *T. messinensis* G. O. Sars, 1882.

which are generally shortened, thickened (especially at the basis), with the merus and carpus armed with hook-like setae, cusps, and tubercles covered with minute spines (*prickly tubercles*). Clinging legs are bent dorsally in the natural position.

The term *rod seta* is used for truncheon-shaped setae, commonly occurring on the appendages of species of *Peraeospinosus* (Figure 3C').

The labium of the Tanaidomorpha consists of paired lobes (Larsen 2003) that are separated (e.g. *Bathytanais*) or semi-fused (e.g. *Typhlotanais sensu lato*). The labium in typhlotanais displays an additional feature—extra external lobes that are delicate (membranous) and often lost during dissection.

Type materials of the new species have been deposited in: Museum of Natural History (USNM), Smithsonian Institute, Washington, DC in the USA, Zoological Museum and University of Hamburg (ZMH) in Germany, and Zoological Museum University of Copenhagen (ZMUC) in Denmark. The other holotypes are held by the Lomonosov Museum (MS) in Moscow and the Museum National d'Histoire Naturelle (MNHN) in Paris.

Remarks

According to the observations of Błażewicz-Paszkowycz (2004), the families Nototanaidae Sieg, 1973 and Typhlotanaisidae Sieg, 1984 were improperly combined by Larsen and Wilson (2002). In the present paper the systematic by Sieg is followed.

Systematics

Family TYPHLOTANAIIDAE Sieg, 1984

Nototanaidae: Sieg 1976, p 185, 192, 195.

Typhlotanaisidae: Sieg 1984, p 122.

Nototanaidae: Larsen and Wilson 2002, p 2, 7–8, 11, 13.

Diagnosis

Female. No plates in carapace. Eye absent. Pereonite 1 not reduced. Pleon with five free pleonites, as wide as pereon, no setae on pleonites. Antennule with three articles. Antenna with six articles. Molar process broad. Labium with two lobes, one tubercle in place of medial spiniform setae. Maxilliped basis at least partially fused, endites usually not fused, narrower than basis, with two tubercles on distal edge. Cheliped attachment usually via sclerite. Marsupium with four pairs of oostegites. Pereopods 4–6 clinging type, coxae absent. Pleopods well-developed. Uropod rami with one or two articles.

Male. Sexual dimorphism extensive. Antennule with more than five articles and multiple aesthetascs. Pleotelson with developed caudal process. Pereonites less developed, pleonites more developed than in female. Mouthparts reduced. Pleopods well-developed. Uropod endopod with one or two articles.

Genera included. *Peraeospinosus* Sieg, 1986; *Typhlotanais* G. O. Sars, 1882; *Typhlotanoides* Sieg, 1983.

Peraeospinosus* Sieg, 1986Diagnosis*

Female. Body robust, elongated, usually 5.6–10 times as long as wide, preserved specimens are often stiff and straight (stick-like). Some of pereonites 1–5 with collar-like grooves, usually anteriorly or posteriorly. Carapace usually oval or rounded, rarely narrow, rostrum well-developed. Dorsal margin of cheliped carpus with row of minute setae. Labrum hood-shaped, with upper part covered with needle-like setae. Molar process with row of setae on lower margin of crushing edge. Maxillule with nine spiniform setae distally, two semi-fused (10th short seta centrally usually not observable). Labium external lobes with row of minute setae on edges. Maxilliped bases wide, heart-shaped, endites with two small flat setae (tubercles) on distal margins. Epignath sharply tipped, often bifurcated. Pereopods 1–3 walking type. Pereopods 4–6 clinging type. Distal seta on propodus of pereopods 4 and 5 longer than unguis; prickly tubercles on pereopods 4–6, surrounded by blunt, calcified spines; unguis of pereopods 4–6 bifurcated. Exopod of pleopods semi-elliptical. Uropod rami usually uni-articled, equal or subequal. Uropod exopod tipped by diminutive and robust seta (at basis almost as wide as exopod).

Male. Only the male of *P. subtigaleatus* n. sp. is known. Swimming type. Pereonites less developed than in females, pleonites more so. Pleon subequal in length to pereon. Pleotelson elongated, with well-developed caudal process. Antennule and antenna seven-articled; antennule articles 4–6 with multiple aesthetascs. Mouthparts reduced. Maxilliped bases fused, forming heart-shaped plate; maxilliped endite lobe-shaped, with two setae and two flat setae (tubercles) distally. Cheliped with row of setae near insertion of dactylus. Pereopods long and slender (walking type). Pleopods well-developed. Uropod exopod three-articled, endopod two-articled.

Type species. *Typhlotanais pushkini* Tzareva, 1982.

Distribution

Members of newly defined *Peraeospinosus* have so far been recorded from the Pacific Ocean (off Alaska, Kurile-Kamchatka Trench, Japan Trench), the Indian Ocean (Sri Lanka, off Dunbar), the Atlantic (off Argentina), and the Southern Ocean (Kerguelen Island, Bransfield Strait, South Shetlands, Ross Sea). The genus is widely distributed in abyssal and hadal depths. Only in the Antarctic has it been found on the continental shelf at 300–400 m (Figure 25).

Remarks

Five species *Peraeospinosus* (= *Typhlotanais*) *kerghuelensis* (Beddard, 1886), *P.* (= *T.*) *magnificus* (Kudinova-Pasternak, 1969), *P.* (= *T.*) *magnus* (Kudinova-Pasternak, 1990), *P.* (= *T.*) *peculiaris* (Lang, 1968), and *P.* (= *T.*) *rectus* (Kudinova-Pasternak, 1968) are now placed in the genus *Peraeospinosus*.

Peraeospinosus (Sieg, 1986), *Typhlotanais* (G. O. Sars, 1882), and *Typhlotananoides* (Sieg, 1983) are the only typhlotanoid members that have pereopods 4–6 adapted for clinging in the tubes. Members of the newly defined *Peraeospinosus* share a few specific characters which allow them to be distinguished from the other typhlotanoids (see Table I). The third, monotypic, genus *Typhlotanaoides* has a hook-shaped unguis on pereopods 4–6 that is usually simple or bifurcate in the members of the genus *Typhlotanais sensu lato*.

Key to females of *Peraeospinosus*

1. Head round (length subequal to width) 2
- Head narrow (longer than wide) 6
2. Pleopods rudimentary *P. exiliremi* n. sp.
- Pleopods normally developed 3
3. One distal seta on pereopod 6 propodus longer than the other two . . . *P. rectus*
- All distal setae on pereopod 6 propodus the same length 4
4. Pereonites 2 and 3 longer than wide, pereonite 1 relatively long (two-thirds length of carapace length) *P. emergensis* n. sp.
- Pereonites 2 and 3 shorter than long, pereonite 1 relatively short (not longer than half length of carapace) 5
5. Endopod uropod with two articles. Cheliped carpus as long as propodus, proximal setae of both pleopod rami separated by a gap from other setae . . . *P. pushkini*
- Endopod uropod with one article. Cheliped carpus shorter than propodus; pleopods without gap between proximal seta and proximal setae . . . *P. kerguelenensis*
6. Pereon 1 longer than half of cephalothorax; antennule article 3 three times as long as article 2 7
- Pereon 1 shorter than half of cephalothorax; antennule article 3 twice as long as article 2 *P. subtigaleatus* n. sp.
7. Pleon longer than or subequal to carapace; pleopod endopod with two dorsal (inner) setae *P. magnus*
- Pleon shorter than carapace; pleopod endopod with one dorsal (inner) seta . . . 8
8. Pereon 6 short (one-third length of carapace); pereon 3 longer than carapace; ring-like furrow close to edges of segments *P. magnificus*
- Pereon 6 long (half length of carapace); pereon 3 shorter than carapace; ring-like furrows divide pereonites into three subequal parts 9
9. Two of three distal setae of pereopod 6 as long as dactylus; carpus of cheliped with well-developed carpal shield and with seven setae on dorsal edge . . . *P. peculiaroides*
- Two of three distal setae of pereopod 6 half length of dactylus; carpus cheliped with poorly developed carpal shield and with more than 17 setae on dorsal edge . . . *P. peculiaris*

Peraeospinosus kerguelenensis (Beddard, 1886) n. comb.

(Figures 1–3)

Synonymy. *Typhlotanais kerguelenensis* Beddard 1886a, p 117; 1886b, p 121–122, Plate 16 Figures 1–3; Shiino 1978, p 80–85.

Material examined

Kerguelen Island: syntype ♀ on slide, MHM 1889.4.27.105, *Challenger* 1873–76, Sta. 149H, 48°45'S, 69°14'E, depth 231 m. 3♀♀, 1♂ prepared on slides, MNHN Ta 316, *Marion-Dufresne* 04, Sta. G81/BB193, 48°57.6'S, 69°38.0'E, depth 230 m. 2♀♀, MNHN

Figure 1. *Peraeospinosus kerguelensis* (Beddard, 1886), female (MNHN Ta 316). (A) Dorsal view; (B) lateral view; (C) cephalon ventral view; (D) pleopod. Scale bars: 1.0 mm (A, B); 0.1 mm (C, D).

Figure 2. *Peraeospinosus kerguelensis* (Beddard, 1886), female (MNHN Ta 316). (A) Antennule; (B) antenna; (C) labrum; (D, E) mandibles left and right, respectively; (E') mandible molar process; (F) maxillule; (G) labium; (H) maxilliped. Scale bars: 0.1 mm.

Figure 3. *Peraeospinosus kerguelensis* (Beddard, 1886), female (MNHN Ta 316). (A) Cheliped; (B–G) pereopods 1–6 respectively; (C') details of pereopod 2 merus; (C'') details of pereopod 2 propodus, dactylus, and unguis; (E') details of pereopod 4 carpus; (F') details of pereopod 5 distal propodus; (G') details of pereopod 6 distal propodus; (H) uropod. Scale bars: 0.1 mm.

Ta 306, *Marion-Dufresne* 04, Sta. H84/BB201, 49°08.3'S, 69°56.5'E, depth 50 m. 3♀♀, MNHN Ta 199, Gulf of Morbihan, Sta. SMK 20 12/I, depth 42 m.

Diagnosis

Female. Carapace rounded, as long as wide, swollen. Pereonites 2 and 3 wider than long; pereonite 1 relatively short (one-third carapace length). Pleon longer than carapace, pleotelson truncated posteriorly. Antennule article 3 three times as long as article 2. Maxilliped article 2 with strongly serrated seta. Propodus of pereopod 2 length: width ratio about 6. All distal setae on propodus of pereopod 6 as long as dactylus. Pereopods 4–6 merus and carpus with weak and numerous spines ventrally. Pereopods 4–6 unguis with two blunt teeth below bifurcated tip. Pleopod endopod with one dorsal seta. Uropod exopod slightly shorter than endopod.

Supplementary description

Female without oostegites (Figures 1–3).

Body (Figure 1A, B). Length 4.6 mm. Body about six to seven times as long as wide.

Cephalothorax. Smooth, rounded, swollen, little longer than wide, rostrum distinctive.

Pereonites. Pereonites 1–3 and 5–6 wider than long; pereon 1 and 6 shortest, one-third as long as carapace; pereon 4 longest; ring-like grooves dividing segments into two (pereonites 1 and 4–6) or three (pereonites 2 and 3) subequal parts.

Pleon. Pleomeres and pleotelson combined longer than carapace; all pleonites similar in size; pleotelson truncated posteriorly.

Antennule (Figure 2A). Article 1 massive, about one-third longer than articles 2 and 3 combined, with three groups of simple and pinnate setae; article 2 one-third as long as article 3, with one simple seta; article 3 with seven simple and one pinnate apical setae.

Antenna (Figure 2B). Article 2 twice as long as article 3, with one simple seta; article 4 less than twice as long as article 5, with three minute rod setae and two pinnate setae distally; article 5 with one simple seta distally; article 6 very short, with seven terminal setae.

Mouthparts. Labrum (Figure 2C) hood-shaped, covered by numerous short needle-like setae. Mandible (Figure 2D, E) robust, molar process well-developed with undulated but spineless margins, bunch of delicate setae at “lower” margin (Figure 2E’), *lacinia mobilis* well-developed, crenulated. Maxillule (Figure 2F) endite as long as palp, with nine apical spiniform setae; two of them are fused together; palp lost during dissection. Maxilla lost during dissection. Both lobes of labium (Figure 2G) poorly separated and hirsute in distal parts; inner lobe with tubercle distally; each “accessory lobe” with row of short simple setae and comb of setae along outer margin.

Maxilliped (Figure 2H). Basis (typical for genus) fused in heart-shaped plate; endite with two simple setae and two flat setae (tubercles) distally; palp article 1 unarmed, article 2

wedge-shaped, with two weakly serrated and one strongly serrated setae on inner margin and one minute seta on outer margin; article 3 trapezoidal, with four weakly serrated setae on inner margin; article 4 slender, with one simple seta on outer margin and five weakly serrated distal setae.

Cheliped (Figure 3A). Basis robust, slightly rounded, 1.75 times as long as wide; merus wedge-shaped, with one rod seta; carpus with row of six small rod setae dorsally and two relatively long rod setae ventrally; propodus with distal seta on inner side; fixed finger (propodus projection) tipped with a strong spine, with two to three teeth and three rod setae dorsally and two setae ventrally; one seta near insertion of dactylus; dactylus slightly curved, with two strong spiniform setae ventrally and one short rod seta proximally on dorsal margin.

Pereopod 1 (Figure 3B). Slender (walking type); basis with two pinnate seta on proximal part only and short setae along article; ischium short with one seta; merus subequal to propodus, with two setae distally; carpus with three simple and one rod setae; merus and carpus combined longer than propodus; propodus with one simple and two rod setae distally, propodus length: width ratio 5.75; dactylus half unguis length, with long seta.

Pereopod 2 (Figure 3C, C', C''). Slender (walking type); basis little longer than rest of articles combined, with minute setae along article and two pinnate setae proximally; ischium with simple seta; merus and carpus subequal, each with combs of spines; merus with two simple setae and thick spiniform seta distally; carpus with two spiniform setae, two trifurcated and one blunt spine distally (Figure 3C'); propodus as long as merus and carpus combined, with blunt spiniform seta ventrally and thick rod seta dorsally (Figure 3C''); propodus length: width ratio 4.65; dactylus with one simple seta. Unguis subequal dactylus.

Pereopod 3 (Figure 3D). Similar to pereopod 2 but ischium with two setae, carpus with three extra spiniform setae; propodus with one simple, one spiniform, and one rod seta distally.

Pereopod 4 (Figure 3E). Clinging type; basis twice as long as wide, with two simple and two pinnate setae; ischium with two setae; merus subequal to carpus, with two strong spiniform setae on ventral margin and combs of blunt spines; carpus with two distal hooks, one seta dorsally and large tubercle covered by little spines and surrounded by row of calcified (Figure 3E'), blunt spines ventrally; propodus, with two spiniform setae ventrally and distal seta twice as long as propodus and dactylus combined length; dactylus tipped by weakly bifurcated unguis; two teeth on ventral margin.

Pereopod 5 (Figure 3F). Similar to pereopod 4.

Pereopod 6 (Figure 3G). Similar to pereopod 5; propodus tipped by three terminal setae as long as dactylus (two coarsely, one finely serrated).

Pleopods (Figure 1D). All pleopods similar in structure; exopod and endopod with a row of plumose setae on outer margin (length: width ratio of both exopod and endopod 3.0); no gaps between the most proximal and other setae.

Uropod (Figure 3H). Both rami uni-articled, exopod little shorter than endopod; endopod with two pinnate setae at middle, tipped by four simple terminal setae (one very short) and two pinnate setae; exopod with short simple middle seta on outer margin, tipped by strong and minute simple setae.

Distribution

Peraeospinosus kerguelenensis is known from the region of the Kerguelen Islands (Southern Ocean) (Figure 25) where it was collected at depths from 17 to 1390 m (Beddard 1886a; Shiino 1978).

Remarks

Peraeospinosus kerguelenensis was originally described as *Typhlotanais kerguelenensis* from Christmas Harbour (Kerguelen Island) (48°45'S–69°14'E) at 231 m depth. The only specimen available for study (syntype NHM 1889.4.27.105, body length about 4.6 mm, given as up to 3 mm by Beddard 1886a) mounted in Canada balsam. The condition of the specimen is poor but some of the characters can be easily observed: uropod rami, setation of the carpal cheliped, and the setation of the pereopods. These characters unambiguously place the species in the genus *Peraeospinosus*. The other specimen labelled as syntype (NHM 1889.4.15.104; slide in Canada balsam, depth 3731 m, Mid North Pacific: 36°10'N, 178°0'E; Beddard 1886b) without doubt does not represent *Peraeospinosus kerguelenensis*, or another species of *Peraeospinosus*.

Peraeospinosus kerguelenensis can be distinguished from the other members of *Peraeospinosus* by the relatively long pleon that is slightly longer than the carapace. Also, *Peraeospinosus magnus* (Kudinova-Pasternak 1990) also has a pleon slightly longer than the carapace but its carapace is long and narrow (length: width ratio 1.24) which distinguishes it from the former species. The carapace of *P. kerguelenensis* is round (length: width ratio 0.94) and resembles that of *P. emergensis* n. sp., but the last species, unlike *P. kerguelenensis*, has pereonites 2–4 longer than wide. The uropod exopod slightly shorter than the endopod is a character shared by *P. kerguelenensis*, *P. rectus* (Kudinova-Pasternak, 1966), *P. peculiaris* (Lang, 1968), and *P. peculiaroides* n. sp. Each of the last three species, however, has one seta on the propodus of pereopod 6 reaching far over the unguis, while *P. kerguelenensis* has all three setae not longer than the dactylus.

Peraeospinosus magnificus (Kudinova-Pasternak, 1969) n. comb.
(Figures 4, 5)

Synonymy. *Typhlotanais magnificus* Kudinova-Pasternak 1969, p 1737–1738; 1970, p 349–351; 1973, p 153; 1993, p 141–142.

Material examined

Holotype: ♀, MS-950, Vitjaz Sta. 5620, 44°06'N, 155°54'E, depth 4895 m.

Diagnosis

Female. Carapace 1.3 times as long as wide, oval; pereonites 1–5 longer than wide; pereonite 1 relatively long (three-quarters length of carapace). Pereonite 6 one-third as long

Figure 4. *Peraeospinosus magnificus* (Kudinova-Pasternak, 1969), holotype female (MS-950). (A) Female dorsal view; (B) antennule; (C) antenna; (D) labrum; (E) mandible right; (E') molar process; (F) maxillule. Scale bars: 1.0 mm (A); 0.1 mm (B–F).

Figure 5. *Peraeospinosus magnificus* (Kudinova-Pasternak, 1969), holotype female (MS-950). (A–E) Pereopods 1–5, respectively; (C') details of pereopod 3 carpus; (F) pleopod. Scale bars: 0.1 mm.

as carapace. Pereonites 1–3 narrowing in middle. Antennule article 3 three times as long as article 2. Propodus of pereopod 2 length: width ratio 5.5. Unguis of pereopods 4–6 without middle teeth. Merus and carpus of pereopods 4–6 with weak, blunt spines ventrally.

Propodus of pereopod 6 with one long seta distally. Pleopod endopod with one dorsal seta and six setae in distal part.

Supplementary description

Female, length 5.8 mm from rostrum to pleon 5 (Figure 4A).

Body. Body about eight times longer than wide.

Cephalothorax. Smooth, oval, one-quarter longer than wide; rostrum distinctively rounded.

Pereonites. Pereonites 1–5 longer than wide, with only slightly rounded corners; pereonite 6 three times wider than long and a little narrower than pereon 5, one-quarter as long as carapace.

Pleon. All pleonites similar in size. Pleotelson missing.

Antennule (Figure 4B). Article 1 narrow, four times as long as wide, with group of pinnate setae distally and two short rod setae along article; article 2 three times as long as article 3, with one rod seta and one pinnate seta distally; article 3 with six sharply tipped setae (three long and three short).

Antenna (Figure 4C). Article 2 a little longer than article 3; both articles naked; article 4 is 1.6 times longer than article 5, with three pinnate and two rod setae distally; article 5 with one simple seta distally; article 6 very short, with six terminal setae (four long and two short).

Mouthparts. Labrum (Figure 4D) typical for genus, covered by numerous short needle-like setae. Mandible (Figure 4E) robust, molar process well-developed, crushing edge covered by numerous tubercles or spines, with bunch of short spiniform setae (Figure 4E''). Maxillule (Figure 4F) typical for genus; endite one-quarter times longer than palp, with nine apical spiniform setae (two of them fused together); palp with two apical setae (one shorter than other). Maxilla, labium, maxilliped, and cheliped missing.

Pereopod 1 (Figure 5A). Basis with one pinnate seta in proximal part and three rod setae along article; ischium with one rod seta; merus subequal to propodus, with two rod setae distally; carpus with five rod setae distally; propodus five times as long as wide, with two rod setae dorsally and minute spiniform seta ventrally; dactylus as long as half unguis, with short seta (not longer than dactylus).

Pereopod 2 (Figure 5B). Basis little shorter than merus, carpus and propodus combined; with two rod setae in the middle of article and one pinnate proximal seta; ischium with rod seta; merus little longer than carpus, with two rod setae and two spiniform setae; carpus with five rod setae and one spiniform seta distally; propodus little shorter than merus and carpus combined, with one spiniform seta ventrally and one rod seta and one trifurcate seta dorsally; propodus length: width ratio 5.5; dactylus with one simple distal seta. Unguis twice as long as dactylus.

Pereopod 3 (Figure 5C, C'). Similar to pereopod 2 but merus with one trifurcate and one spiniform seta only; carpus with two trifurcate and three rod setae (Figure 5C').

Pereopod 4 (Figure 5D). Basis 2.6 times as long as wide, with two pinnate setae and one rod seta dorsally and two pinnate setae ventrally; ischium with one seta; merus with two spiniform setae and combs of blunt teeth ventrally; carpus with two distal hooks and large, prickly tubercle surrounded by row of blunt, calcified spines; propodus with two spiniform setae ventrally, pinnate seta dorsally and distal seta reaching over unguis; dactylus tipped by bifurcated unguis.

Pereopod 5 (Figure 5E). Similar to pereopod 4.

Pereopod 6. Missing in holotype. According to Kudinova-Pasternak (1970, p 350, Figure 5) propodus of pereopod 6 with one long seta distally.

Pleopods (Figure 5F). All pleopods similar in structure; endopod (length: width ratio 2.6) with one seta on dorsal margin; six plumose setae in distal part and one plumose seta proximally; large gap between distal and proximal setae; exopod with a row of 18 plumose setae on outer margin (length: width 3.9); relatively short gap between the most proximal and the other setae.

Uropod. Missing.

Distribution

The species has a discontinuous distribution: in the North Pacific (off California, off Japan and Alaska), the South Atlantic (Argentina), and the West Antarctic (Bransfield Strait) (Figure 25). Depth range: 1170–5225 m.

Remarks

The only specimen of *P. magnificus* available for the study lacks some of the appendages and pleotelson. The remaining appendages and the figures presented in Kudinova-Pasternak (1970, p 350) are enough for recognition and placement of the present species in *Peraeospinosus*. *Peraeospinosus magnificus* most resembles *P. emergensis* n. sp. and *P. exiliremis* n. sp. having pereonites 1–3 slightly narrowed in the middle and antennule article 3 three times longer than article 2. However, it has a much more elongated carapace than the two last species. Also, only *P. magnificus* has six, fully developed setae on the lower margin of the pleopod endopod, while *P. emergensis* has 15 setae on lower margin of the pleopod endopod and *P. exiliremis* has a few short simple setae there.

Peraeospinosus magnus (Kudinova-Pasternak, 1990) n. comb.
(Figure 6)

Synonymy. *Typhlotanais magnus* Kudinova-Pasternak 1990, p 94–96.

Material examined

Holotype: ♀, MS-9, R/V *Akademik Kutchatov*; 31°26.7'S, 10° 02'E, depth 4870–4862 m.

Figure 6. *Peraeospinosus magnus* (Kudinova-Pasternak, 1990), holotype female (MS-9). (A) Female dorsal view; (B) antennule; (C) antenna; (D) pleopod; (E) uropod. Scale bars: 1.0 mm (A); 0.1 mm (B–E).

Diagnosis

Female. Carapace 1.25 times longer than wide, truncated anteriorly. Pereonites 1, 2, and 4–6 wider than long. Pereonite 1 relatively long (two-thirds length of carapace). Pleon longer than carapace; pleotelson truncated posteriorly. Antennule article 3 three times as long as article 2. Pleopod endopod with two dorsal setae. Uropod rami subequal.

Supplementary description

Female without oostegites, length 6.1 mm (Figure 6A).

Body. Body about seven to eight times longer than wide.

Pereonites and pleonites. Pereon 1 is two-thirds as long as carapace and subequal to pereonite 6; pleon longer than carapace; all pleonites similar in size; pleotelson truncated posteriorly.

Antennule (Figure 6B). Article 1 a little longer than articles 2 and 3 combined, with three pinnate setae distally and three minute setae along article; article 2 is one-third as long as article 3, with one simple seta distally; article 3 with seven simple apical setae.

Antenna (Figure 6C). Article 2 twice as long as article 3, both with short rod seta; article 4 twice as long as article 5, with five setae distally; article 5 with one simple seta distally; article 6 very short, with seven terminal setae.

Mouth parts and pereopods. Missing.

Pleopods (Figure 6D). All pleopods similar in structure; endopod with two dorsal (inner) setae, exopod and endopod with a row of plumose setae on outer margin (length: width ratio of exopod 3.75; of endopod 2.9); no clear gap between the most proximal and other setae.

Uropod (Figure 6E). Both rami uni-articled, subequal; endopod with one pinnate seta at the middle, tipped by four simple terminal setae and three pinnate setae; exopod with short simple middle seta on outer margin, tipped by strong and minute simple seta.

Distribution

Known only from the type locality (Figure 25).

Remarks

Peraeospinosus magnus is known only from the holotype, a specimen which lacks most appendages. The combination of characters observed in the antennule, antennae, pleopods, and uropods is enough to recognize *P. magnus* as a valid species. It is the only member of *Peraeospinosus* with two setae on the inner margin of the pleopods.

Peraeospinosus peculiaris (Lang, 1968) n. comb.
(Figures 7, 8)

Synonyms. *Typhlotanais peculiaris* Lang 1968, p 161–166, Figures 99–101.

Material examined

Holotype: ♀, ZMUC CRU-7748, R/V *Galathea* Sta. 192, off Durban, 32°00'S, 32°41'E, depth 3530 m, 5 February 1951.

Diagnosis

Female. Based on Lang's (1968) description. Carapace semi-oval. Pereonites 2–5 as long as wide; pereonite 1 relatively long (two-thirds length of carapace). Pleon shorter than carapace, truncated posteriorly. Antennule article 3 three times longer than article 2. Propodus of pereopod 2 length: width ratio about 3.3. One of three distal setae on propodus of pereopod 6 reaching over dactylus, two others not longer than half of dactylus. Pereopods 4–6 unguis without teeth below bifurcated tip. Pereopods 4–6 merus and carpus with strong but rarely distributed spines ventrally. Pleopod endopod with one dorsal seta; clear gap between proximal seta and the remaining ones on pleopod endopod and exopod. Uropod exopod slightly shorter than endopod.

Supplementary description

Female without oostegites (Figures 7, 8).

Body (Figure 7A). Length 8.6 mm. Body about 8.5 times as long as wide.

Cephalothorax. Smooth, rounded, swollen, little longer than wide, rostrum distinctive.

Pereonites. Pereonite 1 two-thirds length of pereonite 2, pereonite 2 and 3 longer than wide, pereonite 4 and 5 as long as wide; pereonite 6 the shortest, half length of pereonite 5.

Pleon. Pleon shorter than carapace; all pleonites similar in size; pleotelson rectangular.

Antennule (Figure 7B). Article 1 massive, about one-third longer than articles 2 and 3 combined, with three rod setae marginally and two pinnate setae distally; article 2 one-third length of article 3, with one simple seta and two pinnate setae distally; article 3 with six apical setae.

Antenna (Figure 7C). Article 2 a little longer than article 3, both articles without setae; article 4 twice as long as article 5, with two pinnate setae distally; article 5 with one simple seta distally; article 6 very short, with six terminal setae.

Mouthparts. Labrum missing. Mandible (Figure 7D, E) typical for genus: robust, molar process well-developed with undulated margins with bunch of delicate and long setae at "lower" margin, *lacinia mobilis* well-developed, crenulated. Maxillule (Figure 7F) typical for genus: with nine apical spiniform setae; two of them fused together; palp missing. Maxilla missing. Labium (Figure 7G, G') typical for genus; both lobes poorly separated and hirsute in distal parts; inner lobe with tubercle distally; each external lobe with row of

Figure 7. *Peraeospinosus peculiaris* (Lang, 1968), holotype female (ZMCU CRU-7748). (A) Dorsal view; (B) antennule; (C) antenna; (D, E) mandibles left and right, respectively; (F) maxillule; (G) labium; (G') details of labium external lobe; (H) cheliped. Scale bars: 1.0 mm (A); 0.1 mm (B–H).

Figure 8. *Peraeospinosus peculiaris* (Lang, 1968), holotype female (ZMCU CRU-7748). (A–F) Pereopods 1–6, respectively; (G) pleopod; (H) uropod. Scale bars: 0.1 mm.

short simple setae and comb of setae along outer margin. Maxilliped missing. Epignath (not drawn) simply tipped (not bifurcated distally).

Cheliped (Figure 7H). Basis robust, slightly rounded, 1.6 times longer than wide; merus wedge-shaped with one seta ventrally; carpus with row of seven small rod setae dorsally and two relatively long rod setae ventrally; propodus robust, 1.6 times as long as wide; fixed finger (propodus projection) tipped with a thick spine, with three setae dorsally and two setae ventrally; dactylus slightly curved.

Pereopod 1 (Figure 8A). Basis with two rod setae dorsally in proximal part, one short seta ventrally in distal part; ischium short, with one seta; merus subequal to propodus, with one rod seta, one simple and one spiniform seta distally; carpus with three rod setae distally; merus and carpus combined longer than propodus; propodus with one spiniform seta and two rod setae distally, propodus length: width ratio 6.25; dactylus half as long as unguis, with long seta.

Pereopod 2 (Figure 8B). Basis little shorter than rest of articles combined, with one simple and one pinnate setae proximally, one rod seta distally, with numerous combs of setae along article; ischium with combs of setae; merus and carpus subequal, merus with one simple and one spiniform seta distally, with numerous combs of setae; carpus with three simple setae and one thick spiniform seta distally, with many combs of robust setae; propodus little shorter than merus and carpus combined, with blunt spiniform seta ventrally and rod seta dorsally, covered with numerous combs of setae; propodus length: width ratio 3.85; dactylus with one simple seta.

Pereopod 3 (Figure 8C). Similar to pereopod 2, except ischium with one seta, carpus with extra rod seta dorsally; basis, ischium, and merus without combs of setae.

Pereopod 4 (Figure 8D). Basis twice as long as wide, with three rod setae and two pinnate setae along article; ischium with two rod setae ventrally; merus little longer than carpus, with two strong spiniform setae and strong blunt spines ventrally; carpus with two distal hooks, one seta dorsally, and large prickly tubercle surrounded by row of calcified, blunt spines ventrally; propodus, with two spiniform setae ventrally and one long distal seta, one pinnate seta dorsally; dactylus tipped by clearly bifurcated unguis.

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

Pereopod 6 (Figure 8F). Similar to pereopod 5, except propodus tipped by three setae: two strongly serrated short setae (half length of dactylus) and one long setae (longer than dactylus).

Pleopods (Figure 8G). All pleopods similar in structure; exopod and endopod with a row of plumose setae on outer margin (length: width ratio of exopod 3.5, of endopod 4.1); clear gaps between the most proximal and other setae at both rami, endopod with one plumose seta on dorsal margin.

Uropod (Figure 8H). Both rami uni-articled, exopod little shorter than endopod; endopod with two pinnate setae at the middle, tipped by four simple terminal setae, one rod and two

pinnate setae; exopod with short simple middle seta on outer margin, tipped by one strong seta and one minute simple seta.

Distribution

This species is known only from the type locality: off Durban, 32°00'S, 32°41'E, depth 3530 m (Lang 1968) (Figure 25).

Remarks

Peraeospinosus peculiaris was described by Lang (1968) based on two specimens, one obtained from the area of Seychelles–Ceylon [=Sri Lanka] (1°54'N, 77°05'E) and one from the vicinity of Durban (32°00'S, 32°41'E, depth 3530 m). The re-examination of fragments and dissected appendages of both specimens held in the Zoological Museum University of Copenhagen revealed that each of those two specimens represent two nominal species.

The description of *P. peculiaris* (Lang, 1968) is confusing. Lang (1968, p 161–166) used the specimen from off Durban for describing external characters (body, carapace, pereonites, and pleon), while the description of the appendages was based on the specimen from the Seychelles–Ceylon region. Nevertheless, Lang clearly stated that the Durban specimen (Sta. 192) was the type specimen, and therefore the specimen from Seychelles–Ceylon is considered to be an undescribed species, described here as *Peraeospinosus peculiaroides* n. sp.

Peraeospinosus pushkini (Tzareva, 1982) (Figures 9–11)

Synonyms. *Typhlotanais pushkini* Tzareva 1982, p 56–58.

Peraeospinosus pushkini Sieg 1986a, p 2, 5, 7–9, 77, 79–85; 1986b, p 5, 8, 77; Błażewicz and Jażdżewski 1996, 215–217, 219; Błażewicz-Paszkowycz and Jażdżewski 2000, p 176, 178;

Błażewicz-Paszkowycz and Ligowski 2002, p 11–12, 14; Błażewicz-Paszkowycz and Sekulska-Nalewajko 2004, p 224, 226–227.

Material examined

Deposited at University of Łódź, Poland: 101 specimens (spms), OC-733, 7 December 1988, depth 400–600 m; 23 spms, OC-736, 17 December 1988, depth 300 m; three spms, OC-737, 17 December 1988, depth 480 m; three spms, OC-216, 3 March 1978, depth 290 m; two spms, OC-219, 3 March 1978, depth 285 m; 210 spms, OC-321, 17 March 1980, depth 290 m; six spms, OC-336, 24 March 1981, depth 210 m; three spms, OC-630, 31 March 1988, depth 200–270 m; one spm., OC-467, 20 March 1985, depth 33 m; one spm., OC-511, 1 October 1985, depth 129 m; eight spms, D-40, 17 December 1993, depth 40 m; eight spms, OC-292, 1 March 1980, depth 255 m; two spms, OC-432, 8 February 1985, depth 126 m; four spms, OC-444, 21 February 1985, depth 175 m; two spms, OC-485, 10 August 1985, depth 232 m; six spms, OC-472, 27 April 1985, depth 245 m; seven spms, OC-479, 11 May 1985, depth 240 m; eight spms, OC-478, 11 May 1985, depth 252 m; two spms, OC-482, 23 July 1985, depth 254 m; three spms, OC-486, 10 August 1985, depth 270 m; two spms, OC-484, 23 July 1985, depth 278 m; two spms, OC-420, 21

Figure 9. *Peraeospinosus pushkini* (Tzareva, 1982), female. (A) Dorsal view; (B) lateral view; (C) cephalon ventral view; (D) pleopod. Scale bars: 1.0 mm (A, B); 0.1 mm (C, D).

Figure 10. *Peraeospinosus pushkini* (Tzareva, 1982), female. (A) Antennule; (B) antenna; (C) labrum; (D, E) mandibles left and right, respectively; (F) maxillule; (G) maxilla; (H) maxilliped; (I) labium; (J) cheliped. Scale bars: 0.1 mm.

Figure 11. *Peraeospinosus pushkini* (Tzareva, 1982), female. (A–F) Pereopods 1–6, respectively; (G) uropod. Scale bars: 0.1 mm.

January 1985, depth 280 m; 14 spms, OC-548, 8 January 1986, depth 296 m; 17 spms, OC-447, 9 March 1985, depth 317 m; two spms, OC-535, 3 December 1985, depth 333 m; 19 spms, OC-520, 3 November 1985, depth 335 m; 19 spms, OC-549, 3

November 1985, depth 337 m; 34 spms, OC-449, 9 March 1985, depth 349 m; 28 spms, OC-448, 9 March 1985, depth 352 m; 18 spms, OC-536, 3 December 1985, depth 380 m; three spms, OC-416, 17 January 1985, depth 400 m; two spms, OC-533, 15 November 1985, depth 492 m; three spms, OC-532, 18 January 1985, depth 496 m; three spms, OC-341, 23 March 1981, depth 400–600 m; two spms, OC-279, 7 February 1980, depth 170 m; one spm., OC-274, 7 February 1980, depth 187 m; three spms, OC-252, 4 January 1980, depth 240 m; five spms, OC-253, 4 January 1980, depth 242 m; one spm., OC-249, 4 January 1980, depth 262 m.

Diagnosis

Female. Carapace rounded, swollen, little longer than wide. All pereonites wider than long. Pereonite 1 relatively short (one-third length of carapace). Pereonites 4–6 with rounded margins. Pleon little longer than carapace, pleotelson round. Antennule article 3 only two times as long as article 2. Pereopod 2 propodus long (length: width ratio about 4.4). Pereopod 6 propodus distal setae not longer than dactylus. Uropod exopod a little shorter than two-articled endopod.

Description

Female without oostegites, holotype, length 5.3 mm (Figures 9–11).

Body. Body about six times as long as wide.

Cephalothorax. Smooth, rounded, swollen, little longer than wide, rostrum round.

Pereonites. All pereonites rectangular, pereonites 4–6 with slightly rounded margins.

Pleon. All pleonites similar in size; pleotelson round.

Antennule (Figure 10A). Article 1 massive, about 1.5 times as long as articles 2 and 3 combined, with three groups of pinnate setae and one simple seta distally; article 2 shorter than article 3, with one simple seta; article 3 with five simple setae and two pinnate setae distally.

Antenna (Figure 10B). Article 2 a little longer than article 3; article 3 with four simple setae; article 4 twice as long as article 5, with two minute and two pinnate distal setae; article 5 with two simple seta distally; article 6 very short with, six terminal setae.

Mouthparts. Labrum (Figure 10C) hood-shaped, covered by numerous short needle-like setae. Mandible (Figure 10D, E) robust, molar process with undulated margin and setae on “lower margin”, *lacinia mobilis* well-developed, crenulated. Maxillule (Figure 10F) endite as long as palp, with nine apical spiniform setae (two of them fused together); palp with two pinnate setae, one longer than the other. Maxilla (Figure 19G) hemispherical, smooth.

Maxillipeds (Figure 10H). Basis fused in heart-shaped plate, with one seta on distal margin; endite with two setae and two tubercles on distal margin; palp article 1 naked; article 2

wedge-shaped, with three plumose setae on inner margin and one minute seta on outer margin; article 3 trapezoidal, with four serrated setae and one simple seta on inner margin; article 4 more slender than the others, with one simple seta in outer margin and with a group of five serrated terminal setae.

Cheliped (Figure 10f). Basis robust, slightly rounded, 1.8 times as long as wide, fused with the body; merus wedge-shaped, with one seta ventrally; carpus with rounded dorsal margin armed with two setae on ventral margin and row of 10 minute setae on dorsal margin; propodus with seta on inner side; fixed finger (propodus projection) tipped with a strong spine, with two to three teeth and three setae on dorsal margin, two setae on ventral margin; dactylus slightly curved, with minute seta on dorsal margin.

Pereopod 1 (Figure 11A). Basis smooth, with one pinnate seta in proximal part only and nine short rod setae, longer than ischium, merus and carpus together; ischium short, with one seta; merus subequal to propodus, with one spiniform and two simple setae distally; carpus with four setae and one rod seta distally; propodus with three setae, propodus length: width ratio 6; dactylus as long as unguis, with one long seta.

Pereopod 2 (Figure 11B). Basis little shorter than the rest of articles combined, with five rod setae; ischium short with one simple seta; merus and carpus subequal, both with one spiniform seta distally; additionally two simple setae on merus and four simple setae on carpus; propodus as long as merus and carpus combined, with one short simple seta and two spiniform distally; propodus length: width ratio 5; dactylus with one simple seta, tipped by subequal unguis.

Pereopod 3 (Figure 11C). Similar to pereopod 2 but spiniform setae on merus and two distal setae on carpus are modified to strong spines.

Pereopod 4 (Figure 11D). Basis wide, one-fifth as long as wide and clearly shorter than length of rest of articles combined, with one rod seta ventrally; ischium with two setae (one broken off); merus subequal to carpus; merus with combs of setae and two spiniform setae; carpus with two distal hooks and one seta distally; large prickly tubercles surrounded by short, blunt and well-calcified spines; propodus longer than carpus, with one pinnate setae on dorsal margin; propodus with one long seta distally and two spiniform setae ventrally; dactylus tipped by relatively short, bifurcated unguis.

Pereopod 5 (Figure 11E). Similar to pereopod 4 except for two additional pinnate setae on basis.

Pereopod 6 (Figure 11F). Similar to pereopod 5; basis with one simple seta and one pinnate seta; propodus tipped by three relatively short terminal setae (not longer than dactylus).

Pleopods (Figure 9D). All pleopods similar in structure; exopod and endopod with a row of plumose setae on outer margin (length: width ratio of exopod 2.6; of endopod 3.2); the most proximal seta on the exopod and endopod, separated from remainder by a gap; one plumose seta on inner margin of endopod.

Uropod (Figure 11I). Exopod uni-articled a little shorter than endopod; endopod with two articles; endopod article 1 with two pinnate setae distally; endopod article 2 tipped by four

long and one short simple setae and two pinnate setae; exopod with short simple seta in proximal part of outer margin, one strong seta and one minute simple seta distally.

Distribution

Peraeospinosus pushkini so far has been found only at the Antarctic Peninsula at the depth range of 33–600 m (Figure 25).

Remarks

Peraeospinosus pushkini is the only member of the genus which has a two-articled endopod of the uropod.

Peraeospinosus rectus (Kudinova-Pasternak, 1966) n. comb.
(Figures 12–14)

Synonymy. *Typhlotanais rectus* Kudinova-Pasternak 1966, p 525; 1970, p 349, 379; 1975, p 211–212, 217; 1976, p 121; 1977, p 121.

Material examined

Holotype: ♀, MS-944, Vitjaz Sta. 4074, 40°19.7'N, 175°45.3'E, depth 6065 m.

Diagnosis

Female. Carapace rounded, as long as wide, a little swollen. Pereonites 2 and 3 as wide as long. Pereonite 1 relatively long (two-thirds length of carapace). Pleon little longer than carapace, truncated posteriorly. Antennule article 3 twice as long as article 2. Propodus of pereopod 2 length: width ratio about 4.6. One distal seta on propodus of pereopod 6 reaching over the unguis. Pleopod endopod elongated (over four times as long as wide). Pleopod endopod with one dorsal seta. Uropod exopod slightly shorter than endopod.

Supplementary description

Female without oostegites, length 5.8 mm (Figures 12–14).

Body (Figure 12A, B). Body about 5.5 times longer than wide.

Cephalothorax. Rounded, only slightly longer than wide, twice as long as pereonite 6; rostrum rounded.

Pereonites. Pereonites 1, 5, and 6 wider than long, pereonites 2 and 3 as long as wide, pereonite 4 longer than wide. Pereonites 1–3 with characteristic grooves (one on pereonites 1 and 3 and two on pereonite 2).

Pleon. Pleon as long as carapace. All pleonites similar in size; pleotelson rectangular.

Antennule (Figure 13A). Article 1 massive, about three times as long as wide and a little longer than articles 2 and 3 combined, with group of pinnate setae at middle, and one simple seta distally; article 2 with two pinnate setae distally; article 3 with six simple apical setae (four long and two short).

Figure 12. *Peraeospinosus rectus* (Kudinova-Pasternak, 1966), holotype female (MS-944). (A) Dorsal view; (B) lateral view; (C) pleopod. Scale bars: 1.0 mm (A, B); 0.1 mm (C).

Antenna (Figure 13B). Article 2 twice as long as article 3, article 2 with short seta; article 4 twice as long as article 5, with one simple seta and two pinnate setae distally; article 5 with one long simple setae distally; article 6 with five terminal setae.

Figure 13. *Peraeospinosus rectus* (Kudinova-Pasternak, 1966), holotype female (MS-944). (A) Antennule; (B) antenna; (C) left mandible; (D) maxillule; (E) maxilla; (F) labium; (G) maxilliped; (H) epignath. Scale bars: 0.1 mm.

Figure 14. *Peraeospinosus rectus* (Kudinova-Pasternak, 1966), holotype female (MS-944). (A) Cheliped; (B–G) pereopods 1–6, respectively; (H) uropod. Scale bars: 0.1 mm.

Mouthparts. Labrum missing. Mandible (Figure 13C) typical for genus: robust, molar process well-developed with strongly undulated margins and short setae at “lower” margin; *lacinia mobilis* well-developed, crenulated. Maxillule (Figure 13D) typical for genus: with nine apical spiniform setae; two of them fused together; palp lost during dissection. Maxilla semi-oval (Figure 13E). Labium (Figure 13F) typical for genus; both lobes poorly separated and hirsute in distal parts; inner lobe with tubercle distally; each “accessory lobe” with row of short simple setae and comb of setae along outer margin.

Maxilliped (Figure 13G). Basis (typical for genus) fused in heart-shaped plate; endite with two rod setae and two flat setae (tubercles) distally; palp article 1 unarmed, article 2 wedge-shaped, with two weakly serrated and one strongly serrated setae on inner margin and one minute seta on outer margin; article 3 trapezoidal, with four weakly serrated setae on inner margin; article 4 slender, with one simple seta on outer margin and five weakly serrated distal setae. Epignath (Figure 10H) simply tipped (not bifurcated distally).

Cheliped (Figure 14A). Basis robust, slightly rounded, 1.5 times as long as wide; merus wedge-shaped with one rod seta ventrally; carpus with row of six small rod setae dorsally and two short rod setae ventrally; propodus robust, 1.5 times as long as wide; fixed finger (propodus projection) tipped with a thick spine, with three setae dorsally and two setae ventrally; dactylus slightly curved with one rod seta dorsally and two spines ventrally.

Pereopod 1 (Figure 14B). Basis with one pinnate seta in proximal part and four rod setae along article; ischium with one rod seta; merus subequal to propodus, with three rod setae distally; carpus with five rod setae distally; propodus five times as long as wide, with two rod setae dorsally and minute spiniform seta ventrally; dactylus subequal to unguis, with one seta not longer than unguis.

Pereopod 2 (Figure 14C). Basis a little shorter than merus, carpus, and propodus combined, with two rod and one pinnate seta; ischium naked; merus a little longer than carpus, with two setae and one spiniform setae distally; carpus with three spiniform, one simple, and one tubercle distally; propodus a little shorter than merus and carpus combined, with spiniform seta ventrally and two rod setae dorsally; propodus length: width ratio 5.6; unguis twice as long as dactylus.

Pereopod 3 (Figure 14D). Similar to pereopod 2 but carpus with some combs of strongly calcified, blunt setae.

Pereopod 4 (Figure 14E). Basis 2.6 times as long as wide, with pinnate setae and one rod seta along article; ischium with one seta; merus ventral margin with spiniform setae and combs of blunt teeth; carpus with two distal hooks and large, prickly tubercle surrounded by row of blunt, strongly calcified spines; propodus with two spiniform setae ventrally, pinnate seta dorsally and distal seta reaching over unguis; dactylus tipped by bifurcated unguis.

Pereopod 5 (Figure 14F). Similar to pereopod 4 except basis with only two pinnate setae, ischium with two setae, merus with two additional spiniform setae distally.

Pereopod 6 (Figure 14G). Similar to pereopod 5, but propodus with three distal setae (one long and two short).

Pleopods (Figure 12C). All pleopods similar in structure; exopod with row of 16, and endopod with row of 10 plumose setae on outer margin (length: width ratio of exopod 3.1; of endopod 3.4); most proximal seta on exopod, as well as on endopod, is separated from remainder by a gap; one plumose seta on inner margin of endopod.

Uropod (Figure 14H). Exopod with one article. Endopod with suture at place of fusion of two articles; endopod clearly longer than exopod; endopod with two pinnate setae at the middle, tipped by four simple terminal setae and three pinnate setae; exopod with short simple seta in proximal part of outer margin, tipped by strong and minute simple setae.

Distribution

The species has two centres of distribution: Pacific Ocean (Kuryl-Kamchatka Trench, Japan Trench) and West Antarctic (Figure 25). Depth range 4664–7370 m.

Remarks

Peraeospinosus rectus can be distinguished from the other members of the genus by the presence of strong, blunt, and well-calcified spines on the merus and carpus of pereopods 4–6. Similar spines can be observed in *P. exiliremis*, which has also other distinguishing characters such as pleon narrower than pereonite, weakly developed pleopods, and uropod exopod little longer than endopod.

***Peraeospinosus emergensis* n. sp.** (Figures 15, 16)

Material examined

Holotype: non-ovigerous ♀, USNM 306701, Ross Sea, *Eltanin* 51, Sta. 5761, 76°51.5'–76°01.6'S, 179°49.9'–179°53.5'E, depth 388–399 m. One non-ovigerous ♀ paratype, length 9.8 mm, USNM 306700, *Eltanin* 51, Sta. 5762, 76°02.1'–76°02.3'S, 179°57.0'–179°51.1'E, depth 347–358 m; three non-ovigerous ♀♀, USNM 000000, one dissected on slides, USNM 1082152, Ross Sea, *Eltanin* 51, Sta. 5761, 76°51.5'–76°01.6'S, 179°49.9'–179°53.5'E, depth 388–399 m; three non-ovigerous ♀♀, USNM 306700, Ross Sea, *Eltanin* 51, Sta. 5762, 76°02.1'–76°02.3'S, 179°57.0'–179°51.1'E, depth 347–358 m; one non-ovigerous ♀, two manca, USNM 306703, Ross Sea, *Eltanin* 51, Sta. 5761, 76°51.5'–76°01.6'S, 179°49.9'–179°53.5'E, depth 388–399 m; one non-ovigerous ♀, one manca, USNM 306704, *Eltanin* 51, Sta. 5762, 76°02.1'–76°02.3'S, 179°57.0'–179°51.1'E, depth 347–358 m; seven non-ovigerous ♀♀, two manca, USNM 306702, *Eltanin* 51, Sta. 5762, 76°02.1'–76°02.3'S, 179°57.0'–179°51.1'E, depth 347–358 m.

Etymology

Named according to the phenomenon of “polar emergence” that is observed for the genus *Peraeospinosus*.

Figure 15. *Peraeospinosus emergensis* n. sp., female. (A) Female dorsal view; (B) antennule; (C) antenna; (D) left mandible; (E) incisor of right mandible; (F) maxillule; (F') tip of maxillule; (G) maxilliped; (G') details of maxilliped endite; (H) cheliped; (H') details of cheliped propodus and dactylus; (I) uropod. Scale bar: 1.0 mm (A); 0.1 mm (B–I).

Figure 16. *Peraeospinosus emergensis* n. sp., female. (A–F) Pereopods 1–6, respectively; (G) pleopod. Scale bar: 0.1 mm.

Diagnosis

Female. Carapace rounded, swollen, little longer than wide. Pereonites 2–5 rectangular and narrowed in middle. Pereonite 1 relatively long (two-thirds length of carapace). Pereonite 6 with rounded margins. Pleon shorter than carapace, pleotelson rectangular. Antennule article 3 only two times as long as article 2. Pereopod 1 carpus with long calceolus on disto-dorsal corner (Figure 15A). Pereopod 2 propodus long (length: width ratio about 8). Pereopod 6 propodus distal setae not longer than dactylus. Uropod rami subequal.

Description

Female without oostegites, holotype, length 11.3 mm (Figures 15, 16).

Body. Body about 10 times as long as wide.

Cephalothorax. Smooth, rounded, swollen, little longer than wide, rostrum pointed.

Pereonites. Pereonites 2–5 rectangular, with only slightly rounded corners; pereonite 6 with rounded margins in lateral view.

Pleon. All pleonites similar in size; pleotelson rectangular; caudal projection distinctive.

Antennule (Figure 15B). Article 1 massive, about twice as long as articles 2 and 3 combined, with three groups of simple and pinnate setae; article 2 half length of article 3, with one pinnate seta and two rod setae; article 3 with five simple apical setae.

Antenna (Figure 15C). Articles 1–3 subequal; article 4 twice as long as article 5, with three minute distal setae; article 5 with one simple seta distally; article 6 very short with five terminal setae.

Mouthparts. Labrum hood-shaped, covered by numerous short needle-like setae (not drawn). Mandible (Figure 15D, E) robust, molar process well-developed with margins covered by numerous teeth, incisor sharp, *lacinia mobilis* well-developed, crenulated. Maxillule (Figure 15F) endite as long as palp, with nine apical spiniform setae (two of them fused together); palp with two pinnate setae, one longer than the other. Maxilla hemispherical, smooth.

Maxillipeds (Figure 15G). Basis fused in heart-shaped plate, with plumose seta on distal margin; endite with two setae and two tubercles distally; palp article 1 unarmed, second wedge-shaped, with three plumose setae on inner margin and one minute seta on outer margin; article 3 trapezoidal, with three setae on inner margin and one simple seta on outer margin; article 4 more slender than the others, with one simple seta in outer margin and five plumose terminal setae.

Cheliped (Figure 15H). Basis robust, slightly rounded, 1.5 times as long as wide, fused with the body; merus rectangular with one seta ventrally; carpus with rounded dorsal margin armed with two setae on ventral margin and row of 11 minute setae on dorsal margin; propodus with seta on inner side; fixed finger (propodus projection) tipped with a strong spine, with two to three teeth and three setae on dorsal margin, two setae on ventral margin; one seta near insertion of dactylus; dactylus slightly curved, with minute seta on dorsal margin.

Pereopod 1 (Figure 16A). Basis smooth, with two pinnate setae in proximal part only, longer than ischium, merus, and carpus together; ischium short, naked; merus subequal to propodus, with two simple setae and one rod seta distally; carpus with two setae and one

long rod seta distally; propodus with one calceolus and two setae, propodus length: width ratio 6.25; dactylus as long as unguis.

Pereopod 2 (Figure 16B). Basis almost equal to the rest of articles combined, with two minute setae on ventral margin; ischium short, naked; merus and carpus subequal, both with one spiniform seta distally; additionally two simple setae on merus and three simple and one pinnate seta on carpus; propodus as long as merus and carpus combined, with one short simple seta and one spiniform seta distally; propodus length: width ratio 7.7; dactylus with one simple seta, tipped by subequal unguis.

Pereopod 3 (Figure 16C). Similar to pereopod 2.

Pereopod 4 (Figure 16D). Basis wide, twice as long as wide and a little shorter than total length of carpus and propodus combined, with four pinnate and three simple setae; ischium with one seta; merus subequal to carpus; carpus with prickly tubercle surrounded by short, blunt and calcified spines, two distal hooks and one spiniform seta distally; propodus twice as long as carpus, with one middle seta; in distal part of propodus one long seta and two spiniform setae ventrally; dactylus tipped by relatively short bifurcated unguis.

Pereopod 5 (Figure 16E). Similar to pereopod 4 except for two additional spiniform setae on merus.

Pereopod 6 (Figure 16F). Similar to pereopod 5; basis unarmed; ischium with two minute setae; propodus tipped by three relatively short terminal setae.

Pleopods (Figure 16G). All pleopods similar in structure; exopod and endopod with a row of plumose setae on outer margin (length: width ratio of exopod 3.1; of endopod 3.4); the most proximal seta on the exopod and endopod, separated from remainder by a gap; one plumose seta on inner margin of endopod.

Uropod (Figure 16I). Both rami uni-articled, subequal, three times as long as basal article; endopod with two pinnate setae at the middle, tipped by four simple terminal setae and two pinnate setae; exopod with short simple seta in distal in proximal part of outer margin, tipped by one strong seta and one minute simple seta.

Distribution

Ross Sea, Victoria Land, Pennel Bank (Antarctic) at the depth range of 347–399 m (Figure 25).

Remarks

Peraeospinosus emergensis n. sp. is distinguished by the presence of long calceoli on the disto-dorsal corner of pereopod 1 (a character easily seen also in small specimens). It is also characterized by a long merus, carpus (about twice as long as wide), and propodus (eight times as long as wide) of pereopod 2. The other members of the genus *Peraeospinosus* have carpus and merus as long as wide, and propodus 4.5–6 times as long as wide. Pereonites

2–4 long and rectangular, narrowed in the middle is a character shared by *P. emergensis* n. sp., *P. magnificus*, and *P. exiliremis* n. sp., but *P. magnificus* has an oval carapace (longer than pereonite 1) and *P. exiliremis* has a pleotelson much narrower than the pereon, and the uropod exopod a little longer than the endopod. The sixth pereonite is smooth and has rounded margins in dorsal view.

***Peraeospinosus exiliremis* n. sp.**

(Figures 17, 18)

Material examined

Holotype: non-ovigerous ♀ (ZMH 40990), ANDEEP PS 61/114-4; 58°24.96'S, 25°0.84'W; 22 March 2002, multibox corer, depth 2293 m. Paratype: non-ovigerous ♀ dissected on the slides (USNM 1082153), *Eltanin* 12, Sta. 991, 60°57'S, 56°52'W; Blake trawl, depth 3020 fathoms.

Diagnosis

Female without oostegites. Body about 8.5 times as long as wide. Carapace smooth, swollen, as long as wide, truncated anteriorly. Pereonite 1 subequal to carapace length (0.8), rostrum distinctive. Pereonites 1–5 trapezoidal, longer than wide. Pereonite 6 very short (2.5 times as wide as long). Pleon narrower than pereonites, pleon 0.7 times carapace length, twice as long as pereonite 6. Pleotelson rectangular. Antennule article 3 three times as long as article 2. Propodus of pereopod 2 length: width ratio about 4.5. Pereopods 4–6 merus and carpus with few strong and rarely distributed spines. One distal seta of pereopod 6 propodus longer than unguis, other two well-calcified. Pleopods with weakly developed setae (most are short and simple). Uropod exopod slightly longer than endopod.

Etymology

The name reflects the weakly developed pleopods that are used by tanaids for swimming or producing water current in tubes (Latin: *exilis*+*remus*=meagre+oar).

Description

Female without oostegites, body length 6.8 mm (Figure 17A).

Body. Body about 8.5 times as long as wide.

Cephalothorax. Carapace smooth, as long as wide, swollen posteriorly, truncated anteriorly.

Pereonites. Pereonite 1 trapezoidal, about as long as wide, pereonites 2–5 narrowed medially, little longer than wide. Pereonite 6 very short (2.5 times wider than long).

Pleon. Pleon narrower than pereon; twice as long as pereonite 6. All pleonites similar in size. Pleotelson rectangular.

Antennule (Figure 17B). Article 1 a little longer than articles 2 and 3 combined, with three groups of simple and pinnate setae on outer margin; inner margin with row of four rod

Figure 17. *Peraeospinosus exiliremis* n. sp., female. (A) Dorsal view; (B) antennule; (C) antenna; (D) molar of mandible; (E) maxillule; (G) maxilliped; (F) cheliped. Scale bars: 1.0 mm (A); 0.1 mm (B–F).

Figure 18. *Peraeospinosus exiliremis* n. sp., paratype female (USNM 1082153). (A–F) Pereopods 1–6; (G) pleopod; (H) uropod. Scale bars: 0.1 mm.

setae. Article 2 one-third length of article 3, with three rod setae distally. Article 3 with seven simple setae and one pinnate apical setae.

Antenna (Figure 17C). Article 3 with minute seta. Article 4 almost twice as long as article 5, with three rod setae and three pinnate setae distally. Article 5 with one simple seta distally. Article 6 very short, with five terminal setae.

Mouthpart. Labrum not dissected. Mandible typical for genus; molar process (Figure 17D) well-developed, with undulated margins with bunch of well-calcified setae at “lower” margin. Maxillule (Figure 17E) with nine apical spiniform setae (two of them fused together); three of the setae swollen and well-calcified distally. Maxilla and labium lost during dissection.

Maxilliped (Figure 17G). Typical for genus. Basis fused in heart-shaped plate with two pinnate setae; endite with two simple setae and two flat setae (tubercles) distally. Palp article 1 naked. Article 2 wedge-shaped, with two weakly serrated setae and one simple seta on inner margin and one minute seta on outer margin. Article 3 trapezoidal, inner margin with one simple, one serrated seta and two weakly serrated setae swollen distally. Article 4 slender, with one simple seta in outer margin and five sparsely serrated distal setae (one seta distally swollen).

Cheliped (Figure 17F). Basis robust; merus wedge-shaped with long, well-calcified rod seta; carpus with row of five small rod setae dorsally and two well-calcified rod setae ventrally; propodus 1.3 times as long as carpus, with seta on inner side and short seta distally on dorsal margin; fixed finger (propodus projection) tipped with a strong spine, with two to three teeth, three rod setae dorsally, and two setae ventrally; one seta near insertion of dactylus; dactylus slightly curved, with two strong spiniform setae ventrally and one short rod seta proximally on dorsal margin.

Pereopod 1 (Figure 18A). Basis with one pinnate seta in proximal part only and three short rod setae along article; ischium naked; merus subequal to carpus, with three short setae distally; carpus with five simple setae and one rod seta; merus and carpus combined longer than propodus; propodus with one simple and two rod setae distally, propodus length: width ratio 5.75; dactylus half as long as unguis.

Pereopod 2 (Figure 18B). Basis little longer than rest of articles combined, naked; ischium naked; merus and carpus subequal, each with one robust spiniform seta and two setae distally; propodus a little shorter than merus and carpus combined, with minute spine ventrally and two rod setae dorsally; propodus length: width ratio is 4.5; dactylus tipped with slightly longer well-calcified unguis.

Pereopod 3 (Figure 18C). Similar to pereopod 2 but carpus with two spiniform setae distally.

Pereopod 4 (Figure 18D). Basis half as long as wide, with two pinnate setae distally; ischium with two setae; merus a little longer than carpus with two strong spiniform setae on ventral margin and sharp, well-calcified spines; carpus with two distal hooks and one seta dorsally; ventrally, large prickly tubercles surrounded by row of well-calcified and sparsely distributed strong spines; propodus with two spiniform setae ventrally and long distal

seta; dactylus tipped with weakly bifurcated unguis; row of teeth on ventral margin of dactylus.

Pereopod 5 (Figure 18E). Similar to pereopod 4; but basis with pinnate setae and one rod seta proximally.

Pereopod 6 (Figure 18F). Similar to pereopod 5; basis with two pinnate setae; propodus tipped with terminal setae (two very short, coarsely serrated and one finely serrated, reaching over unguis).

Pleopods (Figure 18G). All pleopods similar in structure; exopod with short and simple setae on distal part; endopod with five setae on lower margin two long, feather and three short, simple setae; one plumose seta on inner margin (length: width ratio of both exopod and endopod 3.0); no proximal setae on exopod or endopod.

Uropod (Figure 18H). Both rami uni-articled, exopod a little longer than endopod; endopod with three pinnate setae at the middle, tipped with five simple terminal setae (two short); exopod with short simple seta on outer margin, tipped with one strong seta and one minute setae.

Distribution

Species known from Antarctic Peninsula and Weddell Sea (Figure 25).

Remarks

Peraeospinosus exiliremis can be distinguished from the other species of *Peraeospinosus* by the pleon, which is narrower than the pereon, the weakly developed pleopods, and the uropod exopod being slightly longer than the endopod.

***Peraeospinosus peculiaroides* sp. nov.**

(Figure 19)

Material examined

One ♀, ZMUC CRU-3885, R/V *Galathea* Sta. 280, Seychelles-Ceylon [=Sri Lanka], 1°56'N, 77°05'E, depth 4350 m, 9 April 1951.

Diagnosis

Female. Pereonites 2–5 longer than wide; pereon almost half carapace length. Pleotelson rectangular posteriorly. Antennule article 3 four times as long as article 2. Propodus of pereopod 2 length: width ratio about 4. One of three distal setae on propodus of pereopod 6 reaching over dactylus, two others as long as dactylus. Pereopods 4–6 unguis without teeth below bifurcated tip. Pereopods 4–6 merus and carpus with small and numerous spines ventrally. Pleopod endopod with one dorsal seta; no clear gap between proximal seta and the remaining ones. Uropod exopod slightly shorter than endopod.

Figure 19. *Peraeospinosus peculiaroides* n. sp., holotype female (ZMUC CRU-3885). (A) Female dorsal view; (B) left mandible; (C, D) pereopod 5 and 6, respectively. Scale bars: 1.0 mm (A); 0.1 mm (B–D).

Etymology

The name reflects former classification to the *Peraeospinosus peculiaris*.

Description

Female without oostegites (Figure 19).

Cephalothorax. Missing.

Pereonites. Pereonites 1–4 subequal, longer than wide, pereonite 5 as long as wide; pereonite 6 the shortest, half length of pereonite 5.

Pleon. Pleon and pleotelson combined as long as pereonite 1; all pleonites similar in size; pleotelson rectangular.

Appendages. For description and figures of appendages see Lang (1968, p 161–166).

Distribution

Species known only from the type locality: Seychelles-Ceylon [=Sri Lanka], 1°56'N, 77°05'E, depth 4350 m (Lang, 1968) (Figure 25).

Remarks

The description and figures by Lang (1968, p 162, 164–165, Figures 99–101) are carefully and completely prepared. Some missing details of mandible molar and pereopods 5 and 6 are given in Figure 19.

The type specimen of *Peraeospinosus peculiaroides* is missing the carapace, nevertheless the characters displayed by rest of the body and the dissected appendages distinguish it clearly from *P. peculiaris* s. str. Pereonite 1 of *P. peculiaroides* is almost subequal to pereonite 2 and pereonite 6 is half the length of pereonite 5, while in *P. peculiaris* pereonite 1 is clearly shorter than pereonite 2 and pereonite 6 is two-thirds the length of pereonite 5. The cheliped carpus of *P. peculiaris* is stout (1.6 times as long as wide) and armed with seven rod setae on the dorsal edge; in *P. peculiaroides* (Lang 1968, p 164) it is about twice as long as wide and armed with 16 rod setae dorsally. Bases of all pereopods in *P. peculiaris* have more (about six) rod setae and the merus and carpus of pereopods 4–6 are delicately setose (poorly calcified) on the ventral side. On the contrary, *P. peculiaroides* has fewer setae on the bases of the pereopods (not more than four) and the merus and carpus of pereopods 4–6 are armed ventrally with strong spines. Propodus of pereopod 6 has one long and two short setae distally in both species, but the two short setae are as long as the dactylus in *P. peculiaroides* and only half as long as the dactylus in *P. peculiaris*. The gap between the most proximal and the other setae is clear in both pleopod rami in *P. peculiaris*, while it is not obvious on the exopod and is absent on the endopod in *P. peculiaroides*. Other differences can be observed in the mouthparts of both species; the setae on the molar process of the mandible are long and relatively thin in *P. peculiaris*, while they are short but more calcified in *P. peculiaroides*.

***Peraeospinosus subtigaleatus* n. sp.**

(Figures 20–23)

Material examined

Holotype: non-ovigerous ♀, USNM 306708, *Eltanin* 32, Sta. 1996, 72°05'–72°05'S, 172°08'–172°09'E, depth 348–352 m. Paratypes: two non-ovigerous ♀♀, USNM 306707, *Eltanin* 32, Sta. 1996, 72°05'–72°05'S, 172°08'–172°09'E, depth 348–352 m; adult ♂, USNM 1082154, body length 2.3 mm, *Eltanin* 32, Sta. 1996, 72°05'–72°05'S, 172°08'–172°09'E, depth 348–352 m; 14♀♀; 1♀ dissected on slides USNM 1082155; one adult ♂ dissected on slides, USNM 306708, *Eltanin* 32, Sta. 1996, 72°05'–72°05'S, 172°08'–172°09'E, depth 348–352 m; 3♀♀, two manca, USNM 306709, *Eltanin* 32, Sta. 1996, 72°05'–72°05'S, 172°08'–172°09'E, depth 348–352 m.

Diagnosis

Non-ovigerous female. Carapace narrow, 1.3 times as long as wide, truncated anteriorly. Pereonite 1 short (one-third length of carapace) and subequal to pereonite 6. Pereonites 2–5 wider than long. Pleon subequal to carapace length. Pleotelson truncated posteriorly.

Figure 20. *Peraeospinosus subtigaleatus* n. sp., female. (A) Dorsal view; (B) cephalon ventral view; (C) cheliped. Scale bars: 1.0 mm (A, B); 0.1 mm (C).

Figure 21. *Peraeospinosus subtigaleatus* n. sp., female. (A) Antennule; (B) antenna; (C) labrum; (D–E) mandibles left and right, respectively; (F) maxillule; (G) maxilla; (H) maxilliped; (I) epignath. Scale bars: 0.1 mm.

Figure 22. *Peraeospinosus subtigaleatus* n. sp., female. (A–F) Pereopods 1–6, respectively; (G) pleopod; (H) uropod. Scale bars: 0.1 mm.

Figure 23. *Peraeospinosus subtigaleatus* n. sp., male. (A) Antennule; (B) antenna; (C) cheliped; (D) dorsal view; (E) maxilliped; (F) uropod; (G) details of pleotelson. Scale bars: 0.1 mm.

Antennule article 3 two times as long as article 2. Antennule article 1 with row of six setae on inner margin. Labrum sparsely covered with needle-like setae. Lower margin of mandible molar with few needle-like setae. Propodus of pereopod 2 length: width ratio about 5. Pereopods 4–6 with blunt and robust (well-calcified) combs of setae on merus and carpus. Pleopod endopod with one dorsal seta. Uropod rami equal.

Etymology

Named for the relatively narrow carapace (Latin: *subtilis*+*galeatus*=slender+helmeted).

Description

Female without oostegites, holotype, body length 4.1 mm (Figure 20A, B).

Body. Body about seven times as long as wide.

Cephalothorax. Smooth, long (1.3 times as long as wide), rostrum distinctive, blunt.

Pereonites. Pereonites wider than long; pereonite 1 short (one-third length of carapace) and two-thirds length of pereonite 2. Pereonite 1 subequal to pereonite 6.

Pleon. All pleonites similar in size. Pleon only a little shorter than carapace. Pleotelson truncated posteriorly.

Antennule (Figure 21A). Article 1 massive, less than twice length of articles 2 and 3 combined, with three groups of simple and pinnate setae on outer edge and row of six simple setae on inner margin; article 2 with simple seta distally, half as long as article 3; article 3 tipped with eight simple setae, one pinnate seta, and one aestethasc.

Antenna (Figure 21B). Articles 1 and 3 subequal; article 2 a little longer than article 3, with short distal seta; article 4 twice as long as article 5, with three minute and one pinnate setae distally; article 5 with one simple seta distally; article 6 very short with six apical setae.

Mouthparts. Labrum (Figure 21C) hood-shaped, covered by sparse, short needle-like setae. Mandible (Figure 21D, E) typical for genus; robust, molar process well-developed with undulated margins, needle-like setae on lower margin sparsely distributed; incisor process well-calcified; *lacinia mobilis* strong and crenulated. Maxillule (Figure 21F) endite longer than palp, with nine apical spiniform setae (two of them are fused together); palp with two pinnate setae (not illustrated). Maxilla (Figure 21G) triangular, corners rounded.

Maxilliped (Figure 21H). Basis fused in heart-shaped plate, with two plumose setae on distal margin; endite with numerous short setae on inner margins; distal margin with two flat setae (tubercles), one simple seta, and one rod-like seta; palp article 1 unarmed, article 2 wedge-shaped, with one small seta on outer margin and three setae on inner margin (simple, strongly pinnate and rod seta); article 3 trapezoidal, with four setae on inner margin (two simple, one serrated, and one rod seta); article 4 more slender than article 3, simple seta on outer margin and five serrated or simple terminal setae on inner margin.

Cheliped (Figure 20C). Basis robust, slightly rounded distally; merus wedge-shaped with one rod seta ventrally; carpus with two setae on ventral margin and row of six minute setae on dorsal margin; propodus fixed finger (propodus projection) tipped with a strongly calcified, blunt spine, two to three strongly calcified teeth and three setae on dorsal margin, two setae on ventral margin; dactylus slightly curved, with minute seta on dorsal margin and two strong spiniform setae on ventral margin.

Pereopod 1 (Figure 22A). Basis with six rod setae along article and one pinnate seta proximally; ischium with one seta; merus subequal to carpus, with two setae distally; carpus with two rod setae and two simple setae distally; merus and carpus combined longer than propodus; propodus with one simple and two rod setae distally, propodus length: width ratio 5.5; dactylus half as long as unguis, with one seta.

Pereopod 2 (Figure 22B). Basis a little shorter than the rest of articles combined, with six rod setae along article and one pinnate seta proximally; ischium with one seta; merus subequal to carpus, with one tubercle and one seta distally; carpus with four blunt spiniform setae and one simple seta distally; merus and carpus with numerous well-calcified combs of setae; propodus length: width ratio 4.8; dactylus with one simple seta, unguis longer than dactylus.

Pereopod 3 (Figure 22C). Similar to pereopod 2 but combs of setae on carpus strongly calcified; merus and carpus with two simple setae distally.

Pereopod 4 (Figure 22D). Basis wide, twice as long as wide, with two pinnate setae distally, one pinnate seta proximally and four simple setae along article; ischium with two setae; merus a little longer than carpus, with strong spiniform seta ventrally, carpus with two distal hooks and one seta distally; ventral margin of basis, merus, and carpus covered by strong spines; propodus with pinnate seta in middle, two spiniform setae ventrally and long seta distally; dactylus tipped by a bifurcated unguis.

Pereopod 5 (Figure 22E). Similar to pereopod 4.

Pereopod 6 (Figure 22F). Similar to pereopod 5; basis unarmed; propodus with three terminal setae, shorter than dactylus.

Pleopods (Figure 22G). All pleopods similar in structure; endopod with one plumose seta dorsally and 16 setae ventrally; exopod with 23 short simple setae on outer margin (length: width ratio of exopod 3.0; of endopod 3.0); proximal seta on exopod and endopod separated by gaps from the others.

Uropod (Figure 22H). Both rami uni-articled; exopod subequal to endopod; exopod with one minute seta at the middle, tipped by strong and minute simple setae; endopod with two pinnate setae at the middle; with five terminal setae.

Male. Body length 2.32 mm (Figures 23, 24).

Body (Figure 23D). Body of swimming type.

Figure 24. *Peraeospinosus subtigaleatus* n. sp., male. (A–F) Pereopods 1–6, respectively; (G) pleopod. Scale bar: 0.1 mm.

Figure 25. Distribution of genus *Peraeospinosus* based on Beddard (1886a, 1886b), Kudinova-Pasternak (1966, 1969, 1990), Lang (1968), and Shiino (1978).

Cephalothorax. Relatively long (little shorter than combined length of pereonites 1–5); clearly narrow proximal and wider distally.

Pereonites. Pereonites 1–3 shorter than pereonites 4–6; pereonite 6 rounded posteriorly.

Pleon. Pleon 0.8 times as long as total body length; pleotelson elongated, with well-developed caudal process.

Antennule (Figure 23A). With seven articles; articles 1 and 2 relatively robust, subequal, with groups of simple setae; articles 3–5 narrow, article 6 as long as article 7; article 3 with two long simple setae; articles 4–6 with row of aesthetascs; article 7 with four simple apical setae and one aesthetasc.

Antenna (Figure 23B). With seven articles; articles 2–4 subequal; article 3 with one distal seta, articles 5 and 6 subequal, article 7 one-third length of article 6; last three articles with simple distal setae.

Maxilliped (Figure 23E). Basis fused, forming heart-shaped plate; endite lobe-shaped, with two simple setae and flat setae (tubercles). Palp article 1 unarmed, article 2 with two long setae on inner margin and one on outer margin, article 3 trapezoidal, with four elongate setae on inner margin; article 4 relatively slender, with six distal setae.

Cheliped (Figure 23C). Basis unarmed, somewhat elongated and rounded distally; merus wedge-shaped, with two simple setae on ventral margin; carpus large, trapezoidal, with two setae on ventral margin; fixed finger tipped with large spiniform seta and one simple seta on ventral margin; row of 13 setae near insertion of dactylus; dactylus curved, with two spiniform setae on inner margin and proximal seta on inner side.

Pereopod 1 (Figure 24A). Very long and slender (walking type); basis as long as ischium, merus, carpus and half of propodus combined, with some short setae; short ischium with one seta only; merus and carpus subequal; merus with two, carpus with five distal simple setae; propodus only a little shorter than merus and carpus combined, with three setae in distal part; dactylus elongated, about twice as long as unguis; dactylus and claw combined almost half as long as propodus.

Pereopod 2 (Figure 24B). Similar to pereopod 1; some of setae on merus and carpus are modified to spiniform setae.

Pereopod 3 (Figure 24C). Similar to pereopod 2; all setae on merus and carpus modified to spiniform setae.

Pereopod 4 (Figure 24D). Similar to pereopod 3, but basis, merus, and carpus stouter; two setae on ischium; dactylus and unguis combined as long as three-quarters of propodus length.

Pereopod 5 (Figure 24E). Similar to pereopod 4.

Pereopod 6 (Figure 24F). Similar to pereopod 5 but ischium with only one seta.

Pleopods (Figure 24G). All pleopods of similar structure; endopod with nine elongate plumose setae on outer margin, and single seta on inner margin; exopod with 16 plumose setae on outer margin.

Uropod (Figure 23F). Exopod three-articled: first article short, second as long as third, tipped with two elongated and four short terminal setae; exopod two-articled, first article half length of the second, with one seta on outer margin, distal article tipped with one strong and one short simple seta.

Distribution

The new species is known only from the type locality (Figure 25).

Remarks

Peraeospinosus subtigaleatus n. sp. is distinguishable by its narrow carapace in the female (1.3 times as long as wide) and row of six simple setae on the inner margin of antennule article 1.

Discussion

Sieg (1992) postulated that "tanaidacean fauna in Antarctic is represented by phylogenetically young taxa" and in general "the species composition is more like that of

the deep sea". Basing his interpretation on fossil records (Schram, 1986), global climate and water temperature in the Cretaceous and Eocene, the phylogenetic relationship of recent Tanaidacea, and some characteristics of deep-sea fauna, e.g. lack of eyes, he concluded that the Antarctic fauna had to be extinct during the Cenozoic climatic deterioration. As a result, cold-stenothermal eurybathic taxa could have invaded vacant niches, supporting the hypothesis of *polar emergence* (Hessler and Thistle 1975). Brandt (1999) argued that some phylogenetically old tanaidacean taxa that are poorly represented in the West Antarctic could have survived the ice ages in refugia on the Antarctic shelf (as the isopod families Antarcturidae and Serolidae). Study of the material of tanaidaceans collected in the Southern Ocean on board the *Eltanin*, *Hero*, and *Polarstern* from the 1960s to the 1990s, revealed that abyssal and shelf tanaid faunas in the Antarctic are represented by two different sets of species. The few exceptions such as *Paranarthura fortispina* (Sieg, 1986) and *Typhlotanais greenwichensis* Shiino, 1970, which are found both in shallow and deep waters, are much more likely to be eurybathic taxa than records supporting *polar emergence*. On the contrary, one sample taken by *Eltanin* (Cr 6 Sta 339, see Larsen and Błażewicz-Paszkowycz 2003) in the lower Antarctic shelf (500–570 m) may well illustrate the polar emergence phenomena, as it consisted of typical shallow-water species (*Nototanais antarcticus*, *Paratanais oculatus*, *Synapseudes ideos*) together with typical deep-water taxa such as *Exspina typica* and *N. affinis*. It is regretted that no more samples were taken in the lower sublittoral or upper continental slope to exclude a potential artefact.

A present-day distribution of a genus does not in itself indicate its origin, although the possibility of a deep-water origin cannot be excluded. There is no reason to reject that a phylogenetically young and blind *Peraeospinosus* or *Typhlotanais* (typhlos [gr]=blind) could have colonized Antarctic free niches and then radiated. Without a phylogeny relating to primitive species in the deep sea, it is impossible to say.

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