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Terebellomorph polychaetes from hydrothermal vents and cold seeps with the description of two new species of Terebellidae (Annelida: Polychaeta) representing the first records of the family from deep-sea vents

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Terebellomorph polychaetes are reported from hydrothermal vents and cold seeps collected in the Pacific and Atlantic Oceans. Two new species of Terebellidae, Neoamphitrite hydrothermalis *sp. nov. and* Streblosoma kaia *sp. nov., are described from hydrothermal vents of the western Pacific. These are the first terebellid species described from hydrothermal vents. New records from hydrothermal vents and cold seeps and new geographical records are presented for nine additional species belonging to Ampharetidae, Alvinellidae, Terebellidae and Trichobranchidae. A synoptic table with diagnostic characters for all species of the genus* Streblosoma *Sars, 1872 is provided. Keys for all terebellomorph species currently known from hydrothermal vents and cold seeps, respectively, are included. Additionally the new combination* Neoamphitrite pachyderma *(Hutchings & Glasby, 1988) comb. nov. is proposed.*

Keywords: hydrothermal vent, cold seep, Terebellomorpha, Alvinellidae, Ampharetidae, Terebellidae, Trichobranchidae, *Neoamphitrite*, *Streblosoma*, deep sea

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INTRODUCTION

Since the discovery of the rich fauna at hydrothermal vents in 1977, about 115 polychaete species from 23 different families have been recorded from this habitat (Aguado & Rouse, 2006; Morineaux *et al.*, 2010). Terebellidae Malmgren, 1866, is one of the most speciose polychaete families with more than 550 valid species (Garraffoni & Lana, 2010). No terebellid species had been identified from deep-sea vents prior to this study. The only available evidence of the family was recorded as Terebellidae indet. (Hashimoto *et al.*, 1995; Schander *et al.*, 2010). The second largest terebellomorph family, the Ampharetidae, is represented with four species that regularly form dense aggregations at vents in the Pacific and Atlantic Oceans, respectively. The Alvinellidae, initially described as aberrant representatives of Ampharetidae, seem to be confined to hydrothermal vents in the Pacific Ocean. Eleven species and one subspecies of these 'Pompeii worms' have been described. Trichobranchids have not been found at vent sites.

Cold seep faunas seem to be less distinct from surrounding non-seep environments than hydrothermal vent faunas. Determining the number of polychaete species from this habitat is therefore less straightforward. Among terebellomorph polychaetes the Ampharetidae show highest species richness. Eleven species have been found; three of them are new records of this study. Three of the four hydrothermal vent species occur at cold seeps as well. Three species of Terebellidae and Trichobranchidae have been found at cold seeps, respectively. Two of the records in each family are new. Alvinellids seem to be absent from cold seeps. The fifth family that is traditionally considered as belonging to Terebellomorpha, the Pectinariidae, has not been recorded from either habitat to date.

MATERIALS AND METHODS

The specimens examined in this study have been collected during cruises of the German research vessels RV 'Meteor' and RV 'Sonne' to hydrothermal vent sites in the Atlantic, the

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Table 1. List of stations (MAR, Mid-Atlantic Ridge; PAR, Pacific–Antarctic Ridge; Me, RV 'Meteor'; So, RV 'Sonne'; TVG, TV-grab; ROV, remotely operated vehicle; HV, hydrothermal vent; CS, cold seep; HV → CS, hydrothermal vent in transition to cold seep).

Cruise	Station	Region	Location	Coordinates	Depth (m)	Date	Habitat
Me 60/3	35 TVG	MAR Logatchev HF 1	Irina II	14°45.19′N 44°58.75′W	3019	25 January 2004	HV
	56 ROV	MAR Logatchev HF 1	Irina II; Anjàs garden	14°45.20′N 44°58.77′W – 14°45.19′N 44°58.74′W	3038–3046	31 January 2004	HV
	66 ROV	MAR Logatchev HF 1	Irina I; Irina II; Calyptogena Field	14°45.07′N 44°58.73′W – 14°45.19′N 44°58.75′W	2950–3050	3 February 2004	HV
Me 64/1	109 TVG	MAR 5°S	Wideawake Mussel Field	4°48.64′S 12°22.36′W	2998	9 April 2005	HV
	125 ROV	MAR 5°S	Wideawake Mussel Field	4°48.62′S 12°22.36′W	2985–3000	12 April 2005	HV
	132 TVG	MAR 5°S	Wideawake Mussel Field	4°48.62′S 12°22.34′W	2996	13 April 2005	HV
	200 ROV	MAR 10°S	Lilliput	9°32.86′S 13°12.56′W	1495	25 April 2005	HV
Me 64/2	232 ROV	MAR Logachev HF 1	Irina II Mussel Site 1	14°45.11′N 44°58.81′W	3037	14 April 2005	HV
	244 ROV	MAR Logachev HF 1	Irina II Mussel Site 2	14°45.18′N 44°58.73′W	3032	18 May 2005	HV
	266 ROV	MAR Logachev HF 1	Irina II Mussel Site 1 & Site B	14°45.18′N 44°58.74′W – 14°45.10′N 44°58.67′W	3003–3034	23 May 2005	HV
	277 ROV	MAR Logachev HF 1	Irina II E-Wall	14°45.18′N 44°58.72′W	3046	25 May 2005	HV
	281 ROV	MAR Logachev HF 1	Quest Site	14°45.21′N 44°58.81′W	3053	25 May 2005	HV
So 99	115 TVG	North Fiji Basin	LHOS	16°59.65′S 173°54.73′E	2003	26 January 1995	HV
So 109/2	121 TVG	Cascadia Margin off Oregon	'Bioherm'	44°40.233′N 125°06.568′W – 44°40.193′N 125°06.605′W	622	24 June 1996	CS
So 110/1a	4 ROV	Cascadia Margin off Oregon	'Bioherm'	44°40.4′N 125°06.5′W – 44°40.2′N 125°06.5′W	632–635	10 July 1996	CS
	8 ROV	Cascadia Margin off Oregon	'Bioherm'	44°40.169′N 125°05.867′W – 44°40.451′N 125°05.947′W	592–615	11 July 1996	CS
	9 TVG	Cascadia Margin off Oregon	'Bioherm'	44°40.167′N 125°05.873′W	596	12 July 1996	CS
	15 ROV	Cascadia Margin off Oregon	'Bioherm'	44°40.15′N 125°05.81′W – 44°40.14′N 125°05.72′W	595	12 July 1996	CS
So 133	10 TVG	Lihir Basin	Edison Seamount	3°18.855′S 152°34.913′E	1474	22 July 1998	HV → CS
	33 TVG	Lihir Basin	Edison Seamount	3°19.041′S 152°34.854′E	1480	25 July 1998	HV → CS
	44 TVG	Lihir Basin	Mussel Cliff	3°19.352′S 152°35.462′E	1577	26 July 1998	CS
So 134	35 TVG	North Fiji Basin	LHOS Area A	16°59.426′S 173°54.819′E	2002	20 August 1998	HV
	66 TVG	North Fiji Basin	LHOS Area A	16°59.447′S 173°54.937′E	1997	25 August 1998	HV
	99 TVG	North Fiji Basin	Near Mussel Hill Area A	16°59.486′S 173°54.910′E	1999	3 September 1998	HV
So 157	30 TVG	PAR	Central Axial High	37°47.443′S 110°54.834′W	2212	28 June 2001	HV

west, north-east and the south-east Pacific Ocean, i.e. Me 60/3, Hydromar I: Mid-Atlantic Ridge (Kuhn *et al.*, 2004); Me 64/1, Marsüd 2: Mid-Atlantic Ridge (Haase *et al.*, 2005); Me 64/2, Hydromar II: Mid-Atlantic Ridge (Lackschewitz *et al.*, 2005); So 99, Hyfiflux I: North Fiji Basin (Halbach *et al.*, 1996); So 109/2, Hydrotrace: Axial Seamount off Oregon (Herzig *et al.*, 1997); So 110, So-Ro: So 110/1a: Cascadia Margin off Oregon (Suess & Bohrmann, 1997); So 133, Edison II: Lihir Basin (Bismarck Archipelago) (Herzig *et al.*, 1998); So 134, Hyfiflux II: North Fiji Basin (Halbach *et al.*, 1998); and So 157, Foundation 3: Pacific-Antarctic Ridge (Stoffers *et al.*, 2001).

Samples were taken using Van Veen grabs with integrated TV camera (TVG), and remotely operated vehicles (ROVs) and sieved on-board. Specimens were fixed in 10% formaldehyde–seawater solution and later transferred to 70% ethanol. Preserved specimens were examined using the stereo microscopes Wild Heerbrugg M5 and Zeiss Stemi 2000-C and the compound microscopes Olympus BH-2 and Zeiss Axiostar. Methylene blue was used in order to enhance contrast and visibility of certain structures.

Drawings of specimens were made using a camera lucida. Drawings were finalized according to the method described by Coleman (2003). Photographs were taken with a Canon Powershot G7. Adobe Photoshop was used for shadings and assembly of plates.

The condition of the specimens is indicated in the text as: cs (complete specimen) and af (anterior fragment).

Types and additional specimens have been deposited in the following institutions: Senckenberg Museum Frankfurt (SMF) (http://sesam.senckenberg.de), Natural History Museum, London (NHMUK) and Muséum National d'Histoire Naturelle, Paris (MNHN).

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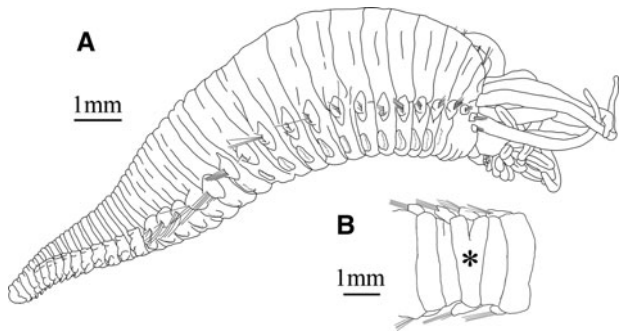

Fig. 1. *Amathys lutzi*. (A) Complete specimen, lateral view; (B) Y-shaped segment (*), dorsal view.

SYSTEMATICS
Family AMPHARETIDAE Malmgren, 1866
Genus *Amathys* Desbruyères & Laubier, 1996
Amathys lutzi Desbruyères & Laubier, 1996
(Figure 1A, B)

Amathys lutzi Desbruyères & Laubier, 1996: 249–254, figures 1–3.—Desbruyères 2006d: 295, figures 1–5; 2010a: DVD, 5 figures.

SPECIMENS EXAMINED
15 specimens (12 cs, 3 af) (Me 60/3, Station 35 TVG) [SMF 17782, 17783, 17785, 17787-17790, 17792]. 2 specimens, complete (Me 60/3, Station 56 ROV) [SMF 17791]. 2 specimens, complete (Me 60/3, Station 66 ROV) [SMF 17784]. 78 specimens (76 cs, 2 af) (Me 64/1, Station 109 TVG) [SMF 17864, 17865]. 14 specimens (13 cs, 1 af) (Me 64/1, Station 125 ROV) [SMF 17859-17861, 17863]. 59 specimens (58 cs, 1 af) (Me 64/1, Station 132 TVG) [SMF 17866]. 1 specimen, complete (Me 64/1, Station 200 ROV) [SMF 17862]. 1 specimen, complete (Me 64/2, Station 232 ROV) [SMF 17830]. 15 specimens (14 cs, 1 af) (Me 64/2, Station 244 ROV) [SMF 17825, 17829]. 2 specimens (1 cs, 1 af) (Me 64/2, Station 266 ROV) [SMF 17827]. 2 specimens, complete (Me 64/2, Station 277 ROV) [SMF 17828]. 26 specimens (25 cs, 1 af), (Me 64/2, Station 281 ROV) [SMF 17826].

DIAGNOSIS
Prostomial glandular ridges and eye-spots absent. Buccal tentacles smooth. 4 pairs of cirriform branchiae in segments III and IV (2 + 2). Segment II without chaetae (paleae). 20 thoracic chaetigers. 17 thoracic uncinigers. No modified segment. Abdomen with glandular pads above neuropodia. Up to 18 abdominal segments. Thoracic and abdominal uncini with four teeth in one vertical row. Juvenile uncini with teeth in up to four rows.

REMARKS
While the regular number of notopodia is 20 (Figure 1A), twelve of the 207 complete specimens examined (6%) had an abnormal number of notopodia on one side. Five specimens had only 19 notopodia, six specimens had 21 notopodia, and one specimen 22 notopodia on one side while the opposite side showed the regular number of 20 notopodia. In most of those specimens it is the last thoracic segment or the first abdominal segment that lost or gained one notopodium, respectively. In contrast, two of the specimens had a Y-shaped segment in the mid-thorax that bears two notopodia on one side and only one on the other side (Figure 1B).

Fig. 2. *Amphisamytha galapagensis*. Complete specimen, dorsolateral view.

DISTRIBUTION
Hydrothermal vent fields along the Mid-Atlantic Ridge. The species was originally described from the Lucky Strike area and has meanwhile been recorded from the Rainbow, Broken Spur, Snake Pit and Logachev hydrothermal fields. It is here newly recorded from the hydrothermal vent fields Wideawake and Lilliput on the Mid-Atlantic Ridge.

Genus *Amphisamytha* Hessle, 1917
Amphisamytha galapagensis Zottoli, 1983
(Figure 2)

Amphisamytha galapagensis Zottoli, 1983: 382–389, figures 1–2.—Desbruyères 2006e: 296, figures 1–7; 2010b: DVD, 7 figures.

Amphisamytha fauchaldi Solís-Weiss & Hernández-Alcántara, 1994: 128–133, figure 1.

SPECIMENS EXAMINED
1 specimen, complete (So 110/1a, Station 8 ROV) [SMF 17812]. 4 specimens, complete (So 157, Station 30 TVG) [SMF 17753-17755].

COMPARATIVE MATERIAL EXAMINED
Amphisamytha fauchaldi Solís-Weiss & Hernández-Alcántara, 1994. Holotype, complete (Alvin Dive 1979) Guaymas Basin (Southern Trough), *Riftia* washings, 2014 m. Collected 18 February 1988 [USNM 168087].

Amphisamytha galapagensis Zottoli, 1983. Holotype, complete (Alvin Dive N 990 #41) Galapagos Rift (Rose Garden), 2450 m. Collected 7 December 1979 [USNM 81288].

DIAGNOSIS
Prostomial glandular ridges and eye-spots absent. Buccal tentacles smooth. 4 pairs of cirriform branchiae in segments III and IV (2 + 2). Segment II without chaetae (paleae). 17 thoracic chaetigers. 14 thoracic uncinigers. No modified segment. Abdomen with glandular pads above neuropodia. Up to 15 abdominal segments. Thoracic and abdominal uncini with four teeth in one vertical row. Juvenile uncini with teeth in up to four rows.

REMARKS
Amphisamytha fauchaldi Solís-Weiss & Hernández-Alcántara, 1994 is considered a junior synonym (see Reuscher *et al.* (2009) for a discussion).

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DISTRIBUTION
Hydrothermal vent fields of the north-east and east Pacific (British Columbia; Guaymas Basin; EPR 21°N; EPR 9°–13°N; Galapagos Rift, type locality). Newly recorded here from hydrothermal vent fields at the Pacific–Antarctic Ridge in the south-east Pacific and from cold seeps sites at the Cascadia Margin off Oregon. This finding represents the first cold seep record since an earlier record from cold seeps at the Florida Escarpment was based on misidentification (McHugh & Tunnicliffe, 1994).

The distribution of *A. galapagensis* is restricted to the eastern Pacific while records from the western Pacific appear to belong to the recently described species *Amphisamytha vanuatuensis* Reuscher, Fiege & Wehe, 2009.

Amphisamytha galapagensis may be a species complex consisting of cryptic species (Chevaldonné *et al.*, 2002).

Genus *Grassleia* Solís-Weiss, 1993
Grassleia hydrothermalis Solís-Weiss, 1993
(Figure 3)

Grassleia hydrothermalis Solís-Weiss, 1993: 662–665, figure 1.

SPECIMENS EXAMINED
1 specimen, complete (So 110/1a, Station 15 ROV) [SMF 17810].

DIAGNOSIS
Prostomial glandular ridges absent. Buccal tentacles smooth. 4 pairs of cirriform branchiae, arranged in one transverse line (presumably in segment IV). Segment II with notochaetae, not shaped as paleae. 15 thoracic chaetigers. 10 thoracic uncinigers. No modified segment. Abdomen without rudimentary notopodia. 7 abdominal segments. Thoracic and abdominal uncini with a multitude of teeth in several rows.

DISTRIBUTION
Hydrothermal vent fields of the north-east Pacific (off Oregon, type locality). Newly recorded here from cold seeps of the same area.

Family ALVINELLIDAE Desbruyères & Laubier, 1980
Genus *Paralvinella* Desbruyères & Laubier, 1982
Paralvinella (Miralvinella) dela Detinova, 1988
(Figure 4A, B)

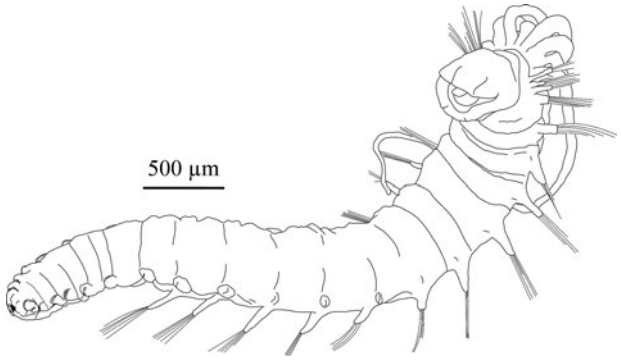

Fig. 3. *Grassleia hydrothermalis*. Complete specimen, ventrolateral view.

Paralvinella dela Detinova, 1988: 861–863, figure 2.—Desbruyères & Laubier 1993: 235.—Desbruyères 2006a: 286, figures 1 & 2; 2010c: DVD, 2 figures.

SPECIMENS EXAMINED
2 specimens (1cs, 1 af) (So 134, Station 99 TVG) [SMF 17855].

DIAGNOSIS
Up to 170 chaetigers. 4 pairs of pinnate branchiae. Segment VII with 4 visible acicular hooks. Uncini from chaetigers 40–63. Notopodia without lobes. Uncini with two teeth.

REMARKS
Long and slender, with numerous (cs with 150) short segments (Figure 4A). Peristomium with ventral longitudinal furrows (Figure 4B).

DISTRIBUTION
Hydrothermal vent fields of the north-east Pacific (Juan de Fuca, type locality). Newly recorded here from hydrothermal vent fields of the west Pacific (North Fiji Basin).

Paralvinella (Miralvinella) hessleri Desbruyères & Laubier, 1989
(Figure 4C, D)

Paralvinella hessleri Desbruyères & Laubier, 1989: 761–767, figures 1–4.—Miura & Ohta 1991: 383–385, figure 1.—Desbruyères 2006b: 287, figures 1–3; 2010d: DVD, 5 figures.

SPECIMENS EXAMINED
11 specimens, complete (So 134, Station 35 TVG) [SMF 17851, 17854]. 10 specimens (8cs, 2af) (So 134, Station 99 TVG) [SMF 17852].

DIAGNOSIS
Up to 73 chaetigers. 4 pairs of pinnate branchiae. Segment VII with 4–5 visible acicular hooks. Uncini from chaetigers 14–21, located in long tori. Notopodia of segment IV through to segments XIII–XVII with dorsal lobes. Uncini with two teeth.

REMARKS
Most conspicuous notopodial lobes located in segment VIII (Figure 4C). We found that segment VII bears eight acicular hooks (Figure 4D). However, only 4–5 hooks penetrate the epidermis. A re-examination of the number of the acicular hooks of each species may be of taxonomic interest.

One specimen bears acicular hooks in segment IX (only on one side).

DISTRIBUTION
Hydrothermal vent fields of the west Pacific (Mariana Back–Arc Basin, type locality; Okinawa Trough; Manus Basin). Newly recorded here from hydrothermal vent fields of the North Fiji Basin.

Paralvinella (Nautalvinella) unidentata Desbruyères & Laubier, 1993
(Figure 4E, F)

Paralvinella unidentata Desbruyères & Laubier, 1993: 226–232, figures 1, 3 & 4.—Desbruyères 2006c: 289–290, figures 1–9; 2010e: DVD, 8 figures.

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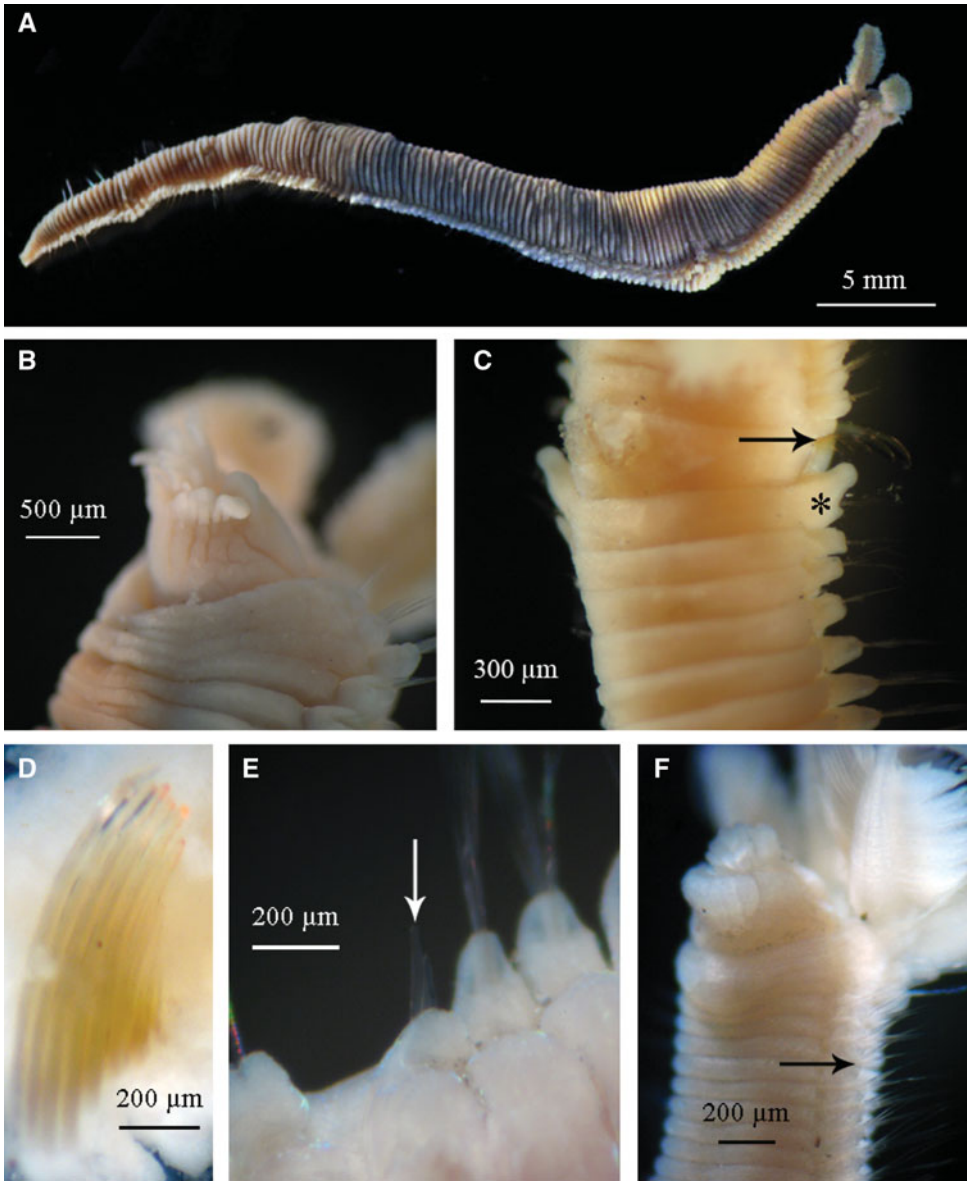

Fig. 4. *Paralvinella dela*: (A) complete specimen, dorsolateral view; (B) lower lip, ventral view. *Paralvinella hessleri*: (C) segments V–XIV, ventral view, showing 5 acicular hooks in segment VII (→) and notopodial lobes in segment VIII (*); (D) dissected chaetae of segment VII, showing 8 acicular hooks. *Paralvinella unidentata*: (E) acicular hooks of segment VII in mature specimen, dorsal view; (F) anterior end, ventrolateral view, showing regular chaetae of segment VII in immature specimen (→).

SPECIMENS EXAMINED

30 specimens (26 cs, 4 af) (So 134, Station 35 TVG) [SMF 17853, 17886]. 9 specimens (8cs, 1 af) (So 134, Station 99 TVG) [SMF 17857, 17858].

DIAGNOSIS

Up to 88 chaetigers. 4 pairs of pinnate branchiae with terminal cirriform filament. Segment VII of larger specimens (>10 mm) with 2–3 relatively small and brittle acicular hooks. Uncini from chaetigers 23–31, located in long tori. Notopodia without dorsal lobes. Uncini with only one tooth.

REMARKS

While the maximum body length is given with 11 mm in the original description, our specimens measured up to 24 mm. Uncini start in chaetigers 23–31, rather than in chaetigers 26–31 as reported by Desbruyères & Laubier (1993). Acicular hooks were only developed in specimens with a body length of 11–24 mm and 80–82 chaetigers (Figure 4E). Specimens with a length of 2–10 mm and 35–80 chaetigers have not yet developed hooks in chaetiger 7. Instead, they bear simple capillary chaetae as in remaining segments (Figure 4F). Thus, *Paralvinella unidentata* seems to develop acicular hooks in a rather late stage of development. Similarly, Desbruyères & Laubier (1986) described the development of acicular hooks in *P. pandorae irlandei* Desbruyères & Laubier, 1986 in specimens of >60 segments, i.e. close to the maximum number of segments (at a body length of ~14 mm). In contrast, *P. hessleri* has developed stout hooks in the 35 chaetiger stages at a body length of 1.5 mm (authors' observations). Desbruyères & Laubier (1993) described *P. unidentata* with acicular hooks, although their specimens measured only 4.8–11 mm.

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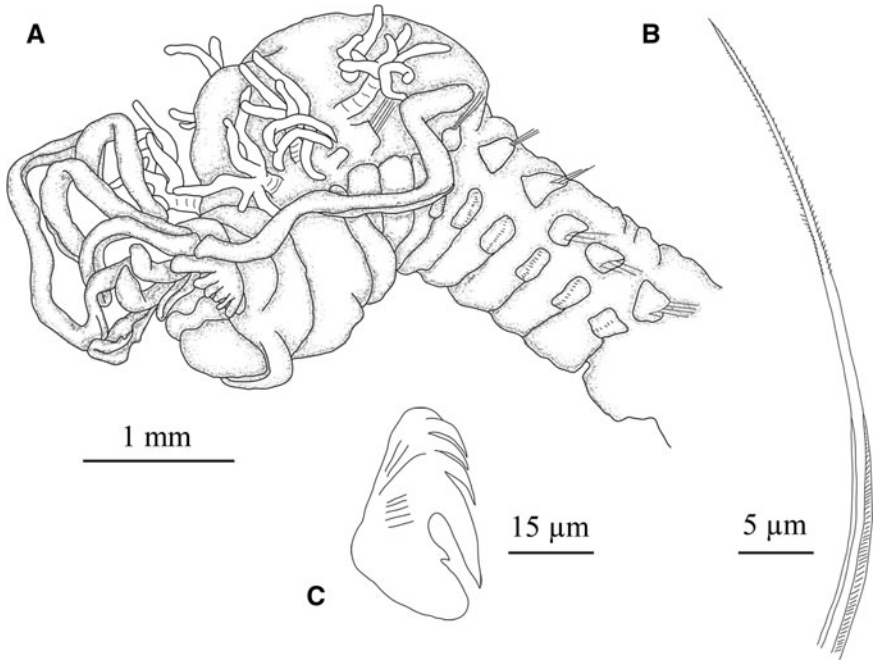

Fig. 5. *Neoamphitrite hydrothermalis* sp. nov. [SMF 17871; holotype]: (A) anterior end, lateral view; (B) capillary chaeta; (C) uncinus from anterior thoracic torus, lateral view.

DISTRIBUTION

Hydrothermal vent fields of the west Pacific (North Fiji Basin, type locality).

Family TEREBELLIDAE Malmgren, 1866
Genus *Neoamphitrite* Hessle, 1917

TYPE SPECIES

Amphitrite affinis Malmgren, 1866.

GENERIC DIAGNOSIS (ACCORDING TO: HOLTHE 1986A, EMENDED)

3 pairs of dichotomous branchiae with pronounced stems in segments II–IV. Lateral lobes usually present. Nephridial papillae in segment III only or extending for a variable number of segments. Thorax with 15–39 pairs of notopodia starting in segment IV, and 14–38 uncinigerous neuropodia starting in segment V. Capillary chaetae distally hirsute. Uncini avicular, arranged in double rows in posterior thorax and, occasionally in anterior abdomen.

REMARKS

The generic diagnosis is emended to include *Neoamphitrite hydrothermalis* sp. nov. and *N. glasbyi* Londoño-Mesa & Carrera-Parra, 2005 whose numbers of notopodia are lower and higher, respectively, than in previously described species of this genus.

The genus *Neoamphitrite* was erected by Hessle (1917) for some species formerly described as belonging to *Amphitrite* O.F. Müller, 1771. In contrast to the latter genus, *Neoamphitrite* has, according to Hessle, dichotomous rather than filiform branchiae, the number of nephridia is higher, and the nephridial tubes are free rather than fused. Fauvel (1927) and Hutchings & Glasby (1988) rejected *Neoamphitrite* since they considered the number and arrangement of nephridia as inappropriate for taxonomic purposes. The latter authors also regarded the different shapes of branchiae as not useful to delineate these two genera. They argued that the reduction of the branchial stem causes the filiform shape but that this reduction varied gradually among species of both genera. Nevertheless, we consider these characters useful and treat *Neoamphitrite* as a valid genus, as do a number of other authors (e.g. Hilbig, 2000a; Londoño-Mesa & Carrera-Parra, 2005).

Neoamphitrite hydrothermalis sp. nov.
(Figure 5A–C)

TYPE MATERIAL

Holotype, anterior fragment (So 133, Station 10 TVG) [SMF 17871]. Paratype, anterior fragment (So 133, Station 10 TVG) [SMF 17870].

ADITIONAL MATERIAL EXAMINED

10 specimens, anterior fragments (So 133, Station 33 TVG) [SMF 17869].

DIAGNOSIS

3 pairs of dichotomous branchiae with pronounced stems in segments II–IV, gradually increasing in size. Lateral lobes present in segments II–IV, gradually decreasing in size. Nephridial papillae in segment III. 15 pairs of notopodia. Notochaetae capillaries with hirsute tips. Uncini avicular, arranged in double rows in last 8 thoracic segments and at least first 3 abdominal segments. Uncini with high number of teeth above main fang.

DESCRIPTION

Body small and delicate. Holotype incomplete, consisting of complete thorax with 15 chaetigers and three abdominal segments. Length about 13 mm. Head region bent at sharp

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angle. Epidermis of some anterior segments detached on dorsal side, giving anterior end a swollen appearance (Figure 5A). Tentacular lobe short and collar-like. Buccal tentacles filiform with a deep ventral groove. Eyespots absent. Upper lip undulating. Lower lip retracted, covering mouth, cushion-like. Peristomium with a fleshy ridge on ventral side, separated anteriorly from lower lip by groove. 3 pairs of branchiae in segments II–IV, gradually increasing in size. Branchiae dichotomous, with distinct annulated main stem and thick secondary branches with blunt ends. Branchiae arranged along longitudinal line; last pair of branchiae attached closely to notopodia, leaving a wide dorsomedian gap. Segment II with prominent lateral lobes protruding forwards. Lateral lobes of segment III slightly smaller, also protruding forwards. Lobes of segment IV small, only dorsally developed. Segments II and III ventrally thickened, cushion-like. One pair of large nephridial papillae, resembling notopodia; nephridial papillae located in segment III, arranged in line with following notopodia. Glandular pads in segments V–XII, gradually decreasing in width forming a glandular groove from segment XIII. 15 pairs of notopodia from segment IV. Neuropodia from segment V continuing to abdomen. Uncini in single rows from segments V–XI, in double rows, 'face-to-face', in thoracic segments XII–XIX and in three remaining abdominal segments. Capillary chaetae bilimbate with hirsute tips (Figure 5B). Uncini of thorax and abdomen of same shape, avicular with large main fang, surmounted by 3 rows of numerous teeth, subrostrum with small process (Figure 5C).

VARIATIONS IN PARATYPES

No clear distinction between glandular pads and glandular groove.

REMARKS

The species differs from all other species of the genus *Neoamphitrite* by the number of notopodia. Whereas *Neoamphitrite hydrothermalis* sp. nov. has 15 pairs of notopodia, the remaining species have between 17 and 39 pairs. Unusual is also the arrangement of uncini in double rows in abdominal segments, a character also found in *N. figulus* (Dalyell, 1853) and *N. pachyderma* (Hutchings & Glasby, 1988) comb. nov. The latter species was originally described as belonging to the genus *Amphitrite*. The new combination was introduced as the branchial shape of this species fits to the genus *Neoamphitrite*, rather than *Amphitrite*.

ETYMOLOGY

The species is named after the hydrothermal vent habitat where it was collected.

DISTRIBUTION

Hydrothermal vent fields of the west Pacific: Lihir Basin (Bismarck Archipelago).

Genus *Pista* Malmgren, 1866

Pista shizugawaensis Nishi & Tanaka, 2006

Pista shizugawaensis Nishi & Tanaka 2006: 141–144, figures 2–4.

SPECIMENS EXAMINED

3 specimens (1 cs, 2af) (So 133, Station 44 TVG) [SMF 17868].

DIAGNOSIS

2 pairs of arborescent branchiae with pronounced stems in segments II–III, each pair consisting of equally or unequally

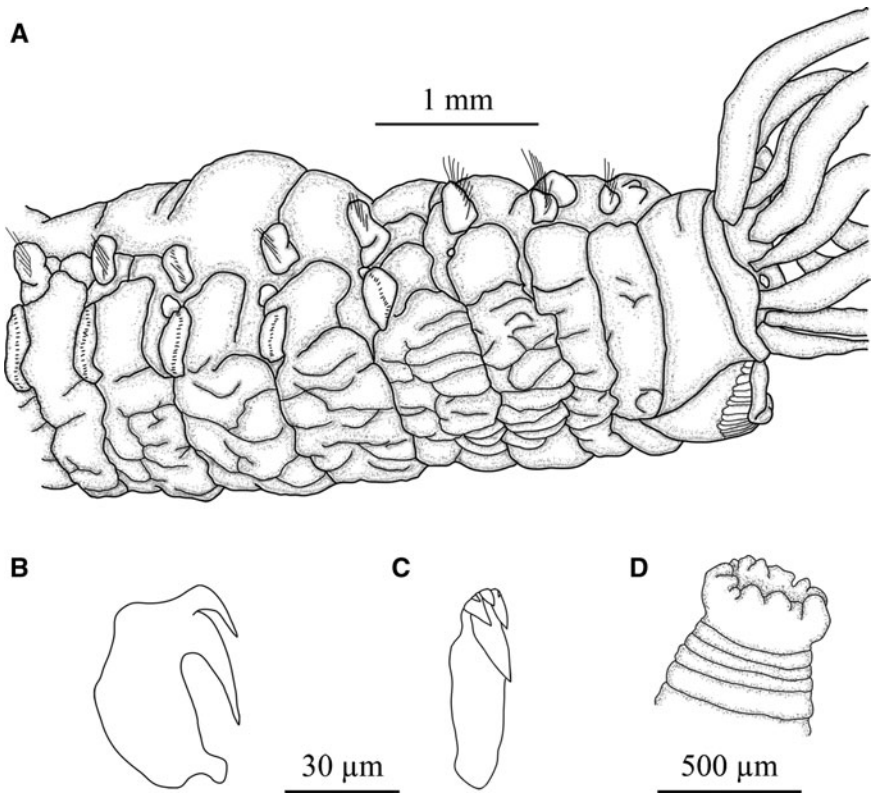

Fig. 6. *Streblosoma kaia* sp. nov. [SMF 17820; holotype]: (A) anterior end, lateral view; (B) uncinus from anterior torus, lateral view; (C) uncinus from anterior torus, frontal view; (D) [SMF 17817; paratype] pygidium, dorsal view.

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Table 2. Synoptic table for all species of the genus *Streblosoma* Sars 1872. (MF, main fang; n.d., no data).

Species	Branchial filaments (segments II; III; IV)	Eyes	Notopodial pairs	Uncini of anterior torus	Uncini of posterior torus	Remarks
S. abranchiata[1,2] Day, 1963	0; 0; 0	−	>19	MF:4–5:8–12	MF:4–5:8–12	Branchiae absent
S. acymatum[1,9,10] Hutchings & Rainer, 1979	18–30; 16–20; 18–25	+	>37	MF:2–4:0–2	MF:2–3:1–3	Branchial filaments originate from swollen glandular areas; those of segment II forming continuous band
S. amboinense[1,10] Caullery, 1944	8–12; 7–8; 9–10	+	n.d.	MF:2:1:9:∞	n.d.	
S. antarctica[1,12] (Monro, 1936)	1–2; 1–2; 1–2	−	28	MF:3:4	MF:5:9	
S. atlanticus[1,8] (Hartman & Fauchald, 1971)	1; 1; 0	n.d.	13	MF:3–4:5–7: 8–10: ∞	n.d.	
S. atos[1,9,10] Hutchings & Murray, 1984	12; 5; 6	+	25	MF:2–4:3–7	MF:2–4:3–7	
S. bairdi[5,6,12] (Malmgren, 1866)	7; 4; 4	+/−	90	MF:2–3:4–6	n.d.	
S. bingarra[1] Nogueira & Hutchings, 2007	∞; ∞; ∞	+	>15	MF:2–4	?	Numerous branchial filaments form continuous bands
S. cespitosa[1,10] Willey, 1905	5; 6; 5	+	>24	MF:2:1:5:∞	n.d.	
S. chilensis[1,2,8] (McIntosh, 1885)	1; 1; 0	−	>20	MF:1:1–3	n.d.	
S. comatus[3] (Grube, 1859)	28–35; 24–28; 19–22	+	~66	MF:1–2:0–6	MF:2:5–8	Uncini from mid-body in C-shaped curves
S. crassibranchia[1,4] Treadwell, 1914	5; 4; 3	+	31	MF:3	MF:3	Uncini from segment VI
S. duplicata[1] Hutchings, 1990	1; 2; 2	−	23	MF:2–3:1	n.d.	Uncini form closed circle in segments XIV–XXIV
S. dyticos[1] Hutchings & Glasby, 1990	4–7; 3–6; 2–4	+	55	MF:2–3:2–6: 3–6	MF:2–3:4–6: 4–6	
S. gracile[1,10] Caullery, 1944	10–12; 8; 10	−	>17	MF:2:3:2	n.d.	
S. hartmanae[1,11] Kritzler, 1971	12–14; 7–8; 5–6	+	38	MF:2–3	MF:2–3	Branchial filaments of segments II–IV form transverse band
S. hesslei[1,2] Day, 1955	n.d.	+	33	MF:2–5:5–9	MF:2–5:5–9	Uncini arranged in loops from segment IX
S. intestinalis[5,6] Sars, 1872	3–5; 2–3; 0–3	−	30	MF:2–3:5	n.d.	
S. japonica[1,10] Hessle, 1917	9; 7; 9	+	>19	MF:2:3	MF:2–3:3–5	
S. kaia sp. nov.[13]	0–4; 0–2; 0	−	82	MF:2:3	MF:2:3	Branchiae reduced to papillae; notopodia in almost all segments
S. latitudinis[1,10] Hutchings & Murray, 1984	24–26; 12–14; 10–12	+	23	MF:2:2–3	MF:2:2–3	
S. longa[1] Mohammad, 1973	10; 12; 18–20	+	~120	MF:3:5–6	MF:3:5–6	
S. longifilis[1] Rioja, 1962	15–17; 12–15; 10–13	+	39	MF:2:0–1	MF:2:0–1	
S. longiremis[1,10] Caullery, 1915	12; 10; 10	−	>30	MF:2:1–3	n.d.	
S. maligirrima[1] Hutchings, 1997	10–12; 13–15; 10–11	+	>85	MF:2:3:2:∞	MF:3–4:5:∞	
S. minutum[1,10] Hutchings & Glasby, 1987	0–1; 1; 1	+/−	>23	MF:2–3:3–5	MF:2–3:2–4	
S. oligobranchiatum[1] Nogueira & Amaral, 2001	1–2; 1; 0–1	+	26	MF:2:5	MF:4:9	Branchiae strongly reduced
*S. pacifica**[1] Hilbig, 2000a	n.d.	+	29–30	MF:2:3:2	MF:2:3:2	Uncini from segment III; branchiae in segments II–VI or VII
S. patriciae[1] dos Santos, Nogueira, Fukuda & Christoffersen, 2010	10–37; 15–26; 14–25	+	35	MF:1–3:1–2	MF:1–3:1–2	Branchial filaments originate from swollen glandular areas
S. persica[2] (Fauvel, 1908)	n.d.	−	38	MF:2–3:1–5	n.d.	
S. polybranchia[1] Verrill, 1900	n.d.	n.d.	44	MF:2:1–3	MF:2:1–3	Branchiae in segments II–VI or VII

Continued

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Table 2. Continued

Species	Branchial filaments (segments II; III; IV)	Eyes	Notopodial pairs	Uncini of anterior torus	Uncini of posterior torus	Remarks
S. porchatensis[1] Nogueira, Garraffoni & Alves, 2004	17; 7; 7	+	58	MF:1–3:6–7	MF:1–3:6–7	Uncini in loops from segments XV–XVI
S. prora[1,7,10] Hutchings & Glasby, 1987	4–11; 2–10; 3–12	+	30	MF:2–3:4–8	MF:3–5:3–5: 5–7	
S. quadridentatum[1,10] Caullery, 1944	∞; ∞; ∞	−	>19	MF:2:3:3	MF:2:2:5	
S. sinica[1] (Wu, Wu & Qian, 1987)	3–4; 2; 2	−	n.d.	MF:2:3–5	MF:4:3	
S. spiralis[1] (Verrill, 1874)	n.d.	−	~120	n.d.	n.d.	
S. toddae[1] Hutchings & Smith, 1997	40; 15; 15	+	140	MF:2–3	MF:2	Notopodia in almost all segments; uncini in loops from mid-body
S. uncinatus[1] (Kudenov, 1975)	12–15; 5–9; 5–9	+?	55	MF:2:0–1	MF:2:0–1	Notopodia in almost all segments; uncini in loops in chaetigers 15–56
S. variouncinatum[1] (Hartmann-Schröder & Rosenfeldt, 1991)	5; 4; 1–3	−	34	(a) MF:2 (b) MF:2:1	MF:2–4:1–7:2–3	Two types of uncini in anterior tori
S. xiangyanghong[1] Wu, Wu & Qian, 1987	5–6; 3; 3	+	34	MF:3–4:3–5	n.d.	

The number of notopodia given indicates the highest number found in the respective species. Numbers given with '>' indicate the lowest number reported, based on the original description or counting on incomplete type specimens. (1) Original description; (2) Day (1967); (3) Glasby & Hutchings (1987); (4) Hartman (1969); (5) Hessle (1917); (6) Holthe (1986a); (7) Hutchings (1997); (8) Hutchings & Glasby (1986); (9) Hutchings & Glasby (1987); (10) Hutchings & Glasby (1990); (11) Londoño-Mesa & Carrera-Parra (2005); (12) Wu *et al.* (1987); (13) authors' observations. According to Santos *et al.* (2010), *Pseudothelepus nyanganus* Augener, 1918 belongs to *Streblosoma*. A re-description of this species from South Africa is in preparation (Nogueira *et al.*, in preparation, cited in Santos *et al.* (2010)). *The description of *S. pacifica* Hilbig, 2000a appears to be based on a misinterpretation of the generic diagnosis of the genus *Streblosoma* and should be re-examined.

Invalid species (according to Holthe 1986b):

S. cochleatum Sars, 1872	Synonym of *Streblosoma bairdi* Malmgren, 1866
S. crassibranchiata Monro, 1933	Error for *Streblosoma crassibranchia* Treadwell, 1914
S. magna Treadwell, 1937	Synonym of *Thelepus crispus* Johnson, 1901
S. verrilli Treadwell, 1911	Synonym of *Thelepus setosus* (Quatrefages, 1866)

sized branchiae. Lateral lobes present in peristomium and segments II–VI; peristomial lobes large, fleshy, conical protrusions, fused dorsally and ventrally; lobes of segment II small, ventrally fused, otherwise mostly covered by lobes of segment III; the latter lobes pronounced semi-circular protrusions; lobes of segment IV distinct protrusions but smaller than lobes of segment III; lobes of segments V and VI small and paddle-like, on ventral side. Nephridial papillae in segments VI and VII. 17 pairs of notopodia with smooth capillary chaetae from segment IV. Uncinigerous neuropodia from segment V. Uncini avicular, with prolonged shaft throughout, however less distinct in posterior thoracic segments.

REMARKS

The specimens from the Lihir Basin differ slightly from the description of *Pista shizugawaensis*: (1) in the shape of the peristomial lateral lobes which are conical rather than semicircular; and (2) in the shape of the uncini of the posterior thoracic segments with chitinized shafts clearly prolonged, albeit less distinct than in uncini of anterior segments. The first point may be due to preservation artefacts, while the latter is probably dependent on the stage of development (Saphronova, 1985). Therefore, these differences do not justify the erection of a new species.

DISTRIBUTION

West Pacific: Japan (type locality: Shizugawa Bay, Honshu). Newly recorded here from cold seeps of the Lihir Basin (Bismarck Archipelago).

Genus *Streblosoma* Sars, 1872

TYPE SPECIES

Grymaea bairdi Malmgren, 1866.

GENERIC DIAGNOSIS (ACCORDING TO: KRITZLER, 1971, EMENDED)

Usually 3 pairs of filiform branchiae, some species with 0, 2, 4 or 5 pairs of branchiae; exceptionally, branchiae may be rudimentary. Branchiae from segment II. No lateral lobes. Nephridial papillae present or absent. Notopodia from segment II. Neuropodia from segment V. Notochaetae smooth capillaries. Uncini avicular, usually with well developed sub-terminal button. Uncini in single rows throughout, occasionally arranged in loop.

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REMARKS

The generic diagnosis of Kritzler (1971) was emended to include *Streblosoma kaia* sp. nov. characterized by the presence of branchial rudiments.

Streblosoma kaia sp. nov.
(Figure 6A–D; Table 2)

TYPE MATERIAL

Holotype, anterior fragment (So 134, Station 66 TVG) [SMF 17820]. Paratypes (1 cs, 1 af) (So 134, Station 35 TVG) [SMF 17817]. Paratypes (1 cs, 2 af) (So 134, Station 35 TVG) [SMF 17832]. Paratypes (1 cs) (So 134, Station 35 TVG) [MNHN-POLY TYPE 1526]. Paratypes (3 af) (So 134, Station 35 TVG) [NHMUK: 2011. 13–15]. Paratypes (1cs, 1 af) (So 134, Station 99 TVG) [SMF 17818].

ADDITIONAL MATERIAL EXAMINED

8 specimens, anterior fragments (So 99, Station 115 TVG) [SMF 17824]. 49 specimens (1cs, 48 af) (So 134, Station 35 TVG) [SMF 17821, 17874]. 21 specimens, anterior fragments (So 134, Station 66 TVG) [SMF 17873]. 51 specimens, anterior fragments (So 134, Station 99 TVG) [SMF 17875].

DIAGNOSIS

Branchiae reduced to small papilliform rudiments in segments II and III, or entirely lacking. Four pairs of nephridial papillae from segments IV–VII. Up to 82 pairs of notopodia with smooth capillary chaetae from segment II continuing almost to posterior end. Neuropodia with uncini from segment V to posterior end. Uncini avicular, with broad and blunt sub-terminal button.

DESCRIPTION

Length of holotype about 80 mm for 57 thoracic chaetigers. Posterior end missing. Tentacular lobe collar-like. Numerous long tentacles with deep median groove. Eye-spots absent. Upper lip folded. Lower lip crenulated (Figure 6A). Two pairs of small papilliform branchial rudiments in segments II and III. First pair with two papillae on each side, second pair with one big papilla on each side, situated immediately dorsally to notopodia, leaving a wide dorsomedian gap. Lateral lobes absent. Glandular pads, in anterior segments hardly discernible because of highly rugose epidermis, continuing to segment XXVII. Central ventral groove from segment XXVIII. Four pairs of nephridial papillae in segments IV–VII, gradually increasing in size. Papillae situated below notopodia or between notopodia and neuropodia, respectively. Notopodia with smooth capillary chaetae from segment II, first pair slightly shifted dorsally. Neuropodia with uncini from segment V, becoming more erect in posterior segments. Uncini avicular, with 2 horizontally arranged teeth above main fang and three uppermost teeth. Basal prow moderately developed. Sub-terminal button well developed, broad and blunt, separated from prow by distinct notch (Figure 6B, C). Uncini with same shape throughout, gradually decreasing in size towards posterior end. Pygidium missing in holotype.

VARIATIONS IN PARATYPES AND ADDITIONAL MATERIAL

Complete specimens without distinct separation of thorax and abdomen. Notopodia and notochaetae present almost to pygidium, notopodia becoming gradually smaller and hardly visible in posterior segments. Up to 82 chaetigers with notochaetae and 18 posterior segments with uncini only. Number of branchial rudiments of all specimens studied varies between 0 and 4 in segment II and 0 and 2 in segment III. Rudiments of some specimens are arranged on a more or less distinct transverse ridge. Pygidium surrounded by a circle of about 9–14 broad, blunt papillae (Figure 6D). Tubes stiff, yellow-brown.

REMARKS

The strong reduction of branchiae is one of the remarkable characters of the new species described here. A similar phenomenon is described for *S. oligobranchiatum* Nogueira & Amaral, 2001 and for two species in the genus *Thelepus* Leuckart, 1849: *T. praecox* Hutchings & Glasby, 1987 with minute papillae and *T. microbranchiatus* Caullery, 1944 with very short, rudimentary filaments. Nephridial papillae are hardly visible in some specimens, especially smaller ones. In some specimens, notopodia in segment II are completely absent or present only on one side. Because there are no visible scars, an intra-specific variation regarding the presence of the first notopodia may be possible. This would, however, question the distinction between the genera *Streblosoma* (segment II with notopodia) and *Thelepus* (segment II without notopodia). We rather consider those specimens as aberrant.

The only species with a complete branchial reduction in the genus *Streblosoma* is *S. abranchiata* Day, 1963. It differs from *S. kaia* sp. nov. in having a lower number of notopodia, a considerable number of abdominal segments without notopodia and a different shape of uncini. The morphologically most similar species to *S. kaia* sp. nov. regarding reduced number and length of branchiae is *S. oligobranchiatum*. It differs from *S. kaia* sp. nov. in the shape of the uncini and the possession of eyes, whereas the small number of segments described for *S. oligobranchiatum* may be correlated to the small body size of the type material. The following species have a reduced number of branchial filaments: *S. antarctica* (Monro, 1936), *S. atlanticus* (Hartman & Fauchald, 1971), *S. chilensis* (McIntosh, 1885), *S. duplicata* Hutchings, 1990, *S. intestinalis* Sars, 1872 and *S. minutum* Hutchings & Glasby, 1987. In contrast to the new species described here, only the number but not the size of branchial filaments is reduced. Table 2 shows the distinguishing characters for all valid species of the genus *Streblosoma*.

ETYMOLOGY

The species name refers to the Melanesian demons *Kaia* that inhabit volcanoes and metamorphose into different animals.

DISTRIBUTION

Hydrothermal vent fields of the west Pacific: North Fiji Basin.

Genus *Thelepus* Leuckart, 1849
Thelepus extensus Hutchings & Glasby, 1987

Thelepus extensus Hutchings & Glasby, 1987: 233–236, figure 9.

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SPECIMEN EXAMINED
1 specimen, complete (So 109/2, Station 121 TVG) [SMF 17872].

DIAGNOSIS
3 pairs of filiform branchiae in segments II–IV with distinct dorsomedian gap. About 80 pairs of notopodia with smooth capillary chaetae from segment III. Neuropodia with uncini from segment V to posterior end. Number of abdominal segments about 110. Uncini avicular, with sub-terminal button.

REMARKS
Thelepus extensus is similar to *Thelepus setosus* Quatrefages, 1866. The latter is described as a cosmopolitan species, which also occurs in north-east Pacific waters. The specimen examined here belongs to *T. extensus* since it has a distinct dorsomedian gap between the branchial filaments and more abdominal than thoracic segments, which are the distinguishing characters, according to Hutchings & Glasby (1987).

DISTRIBUTION
Western Pacific: Australia (type locality: West Island, South Australia). Newly recorded here from cold seeps of the north-east Pacific off Oregon.

Family TRICHOBRANCHIDAE Malmgren, 1866
Genus *Terebellides* Sars, 1835
Terebellides horikoshii Imajima & Williams, 1985

Terebellides horikoshii Imajima & Williams, 1985: 15–16, figure 4d–f.—Hilbig, 2000b: 303–304, figure 10.4.—Hutchings & Peart, 2000: table 3a & b.

SPECIMENS EXAMINED
2 specimens (1cs, 1 af) (So 110/1a, Station 9 TVG) [SMF 17838].

DIAGNOSIS
Branchial lobes fused for half of their length. First pair of notopodia well developed. Lateral lappets of chaetigers 1–3 well developed, those of chaetigers 4 and 5 inconspicuous. Notopodia of segment 2 somewhat elevated. Acicular neurochaetae of chaetiger 6 gently curved, their tip not covered by sheath. Following thoracic chaetigers with about 40 long-handled uncini per neuropodium.

DISTRIBUTION
West Pacific: Japan (type locality: Suruga Bay, Honshu), off Kamchatka. East Pacific: California. Newly recorded here from cold seeps of the north-east Pacific off Oregon.

Terebellides kerguelensis (McIntosh, 1885)

Terebellides stroemii kerguelensis McIntosh, 1885: 480–481, plate 19A, figures 7 & 8, plate 38A, figure 4.—Hutchings & Peart, 2000: tables 3a & 3b.

Terebellides kerguelensis Parapar & Moreira, 2008: 145–148, figures 1–5.

SPECIMEN EXAMINED
1 specimen, complete (So 110/1a, Station 4 ROV) [SMF 17836].

DIAGNOSIS
Branchial lobes fused for half of their length. First pair of notopodia well developed. Lateral lappets weakly developed, only distinguishable in chaetigers 1 and 2. Acicular neurochaetae of chaetiger 6 bent at right angle. Following thoracic chaetigers with about 10 long-handled uncini per neuropodium.

DISTRIBUTION
Antarctic: Kerguelen Islands (type locality: off London River and Christmas Harbour), South Shetland Islands, Bellingshausen Sea. Newly recorded here from cold seeps of the north-east Pacific off Oregon.

KEY TO TEREBELLOMORPH POLYCHAETES FROM HYDROTHERMAL VENTS:

1. No acicular hooks in anterior segments. 2
   – Acicular hooks in one or two anterior segments present . . . . . .Alvinellidae Desbruyères & Laubier, 1980 3
2. Buccal tentacles retractable. Branchiae cirriform . . . . . .Ampharetidae Malmgren, 1866 14
   – Buccal tentacles not retractable. Branchiae dichotomous, filiform, or reduced . . . . Terebellidae Malmgren, 1866 17

Alvinellidae

3. Chaetigers 4 and 5 with acicular hooks . . . . . *Alvinella* Desbruyères & Laubier, 1980 4
   – Chaetiger 7 with acicular hooks . . . . . .*Paralvinella* Desbruyères & Laubier, 1982 5
4. Body divided into two parts. Posterior part tail-like. Notopodia of posterior part with digitiform lobes. Up to 200 chaetigers . . . . . *Alvinella caudata* Desbruyères & Laubier, 1986
   – Body uniform. Posterior part not tail-like. Notopodia of posterior part without digitiform lobes. Less than 100 chaetigers . . . . . .*Alvinella pompejana* Desbruyères & Laubier, 1980
5. First uncinigerous tori in chaetiger 5 or 6 6
   – First uncinigerous tori in more posterior chaetiger . . .7
6. First uncinigerous tori in chaetiger 5. . . . . *Paralvinella pandorae pandorae* Desbruyères & Laubier, 1986
   – First uncinigerous tori in chaetiger 6 . . . . . *Paralvinella pandorae irlandei* Desbruyères & Laubier, 1986
7. First uncinigerous tori in chaetiger 31 or more anterior chaetiger 8
   – First uncinigerous tori in chaetiger 35 or more posterior chaetiger 13
8. Less than 70 chaetigers 9
   – More than 70 chaetigers. 11
9. First uncinigerous tori in chaetigers 25–31 . . . . . *Paralvinella sulfincola* Desbruyères & Laubier, 1993
   – First uncinigerous tori in more anterior chaetiger . . .10
10. First uncinigerous tori in chaetigers 16–21. 4–5 acicular hooks. Notopodial lobes from chaetigers 4 to 13–17. . . . . *Paralvinella hessleri* Desbruyères & Laubier, 1989
    – First uncinigerous tori in chaetigers 12–19. 3–4 acicular hooks. Notopodial lobes from chaetigers . . . . 9 to 30 *Paralvinella fijiensis* Desbruyères & Laubier, 1993

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11. Up to 88 chaetigers. Branchiae with terminal filament. 2–3 acicular hooks. No notopodial lobes. Uncini with 1 tooth . . . . . *Paralvinella unidentata* Desbruyères & Laubier, 1993
– More than 88 chaetigers. Branchiae without terminal filament. 3–5 acicular hooks. Some anterior notopodia with lobes. Uncini with 2 teeth 12
12. First uncinigerous tori in chaetigers 13–17. 3–4 acicular hooks . . . . . *Paralvinella grasslei* Desbruyères & Laubier, 1982
– First uncinigerous tori in chaetigers 20–31. 5 acicular hooks . . . . . *Paralvinella palmiformis* Desbruyères & Laubier, 1986
13. First uncinigerous tori in chaetigers 35–37. 4–6 acicular hooks. Notopodial lobes present in chaetigers 8–32 . . . . . *Paralvinella bactericola* Desbruyères & Laubier, 1991
– First uncinigerous tori in chaetigers 40–63. 4 acicular hooks. Notopodial lobes absent . . . . . *Paralvinella dela* Detinova, 1988

Ampharetidae

14. 10 thoracic uncinigers . . . . . *Grassleia hydrothermalis* Solís-Weiss, 1993
– 14 or 17 thoracic uncinigers 15
15. 17 thoracic uncinigers . . . . . *Amathys lutzi* Desbruyères & Laubier, 1996
– 14 thoracic uncinigers 16
16. Up to 25 abdominal segments. Abdominal glandular ridges with papilliform cirri . . . . . *Amphisamytha vanuatuensis* Reuscher, Fiege & Wehe, 2009
– Up to 15 abdominal segments. Abdominal glandular ridges without papilliform cirri . . . . . *Amphisamytha galapagensis* Zottoli, 1983

Terebellidae

17. 3 pairs of dichotomous branchiae. 15 pairs of notopodia. Uncini in posterior thorax arranged in double rows . . . . . *Neoamphitrite hydrothermalis* sp. nov.
– 0–2 pairs of papilliform branchial rudiments. More than 50 pairs of notopodia. Uncini never arranged in double rows . . . . . *Streblosoma kaia* sp. nov.

KEY TO TEREBELLOMORPH POLYCHAETES FROM COLD SEEPS:

1. Neurochaetae of first unciniger not formed as acicular hooks 2
– First neurochaetae formed as acicular hooks . . . . . Trichobranchidae Malmgren, 1866 3
2. Buccal tentacles retractable. Branchiae cirriform . . . . . Ampharetidae Malmgren, 1866 5
– Buccal tentacles not retractable. Branchiae dichotomous, ... filiform or, reduced Terebellidae Malmgren, 1866 15

Trichobranchidae (genus *Terebellides*)

3. Thoracic uncini arranged in at least two rows . . . . . *Terebellides horikoshii* Imajima & Williams, 1985
– Thoracic uncini arranged in single row 4
4. Lateral lappets in chaetigers 1–3. Acicular hooks gently curved . . . . . *Terebellides stroemii* Sars, 1835
– Lateral lappets in chaetigers 1–5. Acicular hooks bent at right angle . . . . *Terebellides kerguelensis* (McIntosh, 1885)

Ampharetidae

5. 3 pairs of branchiae 6
– 4 pairs of branchiae 8
6. 12 thoracic uncinigers. Notopodia of unciniger 8 elevated . . . . . *Anobothrus laubieri* (Desbruyères, 1978)
– 11 thoracic uncinigers. Notopodia of unciniger 8 not elevated 7
7. No gap between left and right group of branchiae . . . . . *Glyphanostomum holthei* Reuscher, Fiege & Wehe, 2009
– Wide median gap between groups of branchiae . . . . . *Glyphanostomum pallescens* (Théel, 1879)
8. 10 thoracic uncinigers . . . . . *Grassleia hydrothermalis* Solís-Weiss, 1993
– 11, 12 or 14 thoracic uncinigers 9
9. 11 thoracic uncinigers . . . . . *Amagopsis klugei* Pergament & Khlebovich in Klebovich 1964
– 12 or 14 thoracic uncinigers 10
10. 12 thoracic uncinigers 11
– 14 thoracic uncinigers 13
11. Notopodia of unciniger 8 elevated . . . . . *Anobothrus apaleatus* Reuscher, Fiege & Wehe, 2009
– Notopodia of unciniger 8 not elevated 12
12. Notochaetae of segment II present . . . . . *Pavelius ushakovius* Kuznetsov & Levenstein, 1988
– Notochaetae of segment II absent . . . *Amage benhami* Reuscher, Fiege & Wehe, 2009
13. Notochaetae of segment II present . . . . . *Amphicteis gunneri* (Sars, 1835)
– Notochaetae of segment II absent 14
14. Up to 25 abdominal segments. Abdominal glandular ridges with papilliform cirri . . . . . *Amphisamytha vanuatuensis* Reuscher, Fiege & Wehe, 2009
– Up to 15 abdominal segments. Abdominal glandular ridges without papilliform cirri . . . . . *Amphisamytha galapagensis* Zottoli, 1983

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15. Branchiae dichotomous. Uncini of anterior thorax with long shafts. Uncini of posterior thorax arranged in double rows. . . . . *Pista shizugawaensis* Nishi & Tanaka, 2006
– Branchiae filiform. Uncini of anterior thorax without long shafts. Uncini arranged in single rows throughout 16
16. 2 pairs of branchiae . . . . . *Thelepus cincinnatus* (Fabricius, 1780)
– 3 pairs of branchiae . . . . . *Thelepus extensus* Hutchings & Glasby, 1987

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